JEDEC PUBLICATION

PartModel Electrical Guidelines for Electronic-Device Packages – XML Requirements

JEP30-E100I

(Revision of JEP30-E100H, June 2025)

September 2025

JEDEC SOLID STATE TECHNOLOGY ASSOCIATION

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(From JEDEC Board Ballots JCB-17-48, JCB-23-10, JCB-23-27, JCB-23-33, JCB-24-08, JCB-24-29, JCB-24-50, JCB-24-53, and JCB-25-59 formulated under the cognizance of the JC-11 Committee on PartModel XML Schema Definition.)

1 Scope

The JEP30 document establishes the requirements for exchanging part data between part manufacturers and their customers for electrical and electronic products. The JEP30 documents are part of a series to describe XML data exchange structure and hierarchy. The JEP30 document series will detail data exchange between companies for design at the next level, analysis, and interconnection. The parent JEP30 document specifically focuses on the parental structure, under which several sub-sections are listed, such as electrical, physical, thermal, supply chain, assembly process classification, design kit, generated ECAD models, product substrate and assemblies, and environment including material declaration. This document specifically focuses on the Electrical sub-section of the PartModel.

All releases of the *ElectricalSection* sub-schema must be under the umbrella of the PartModel Schema to ensure that the PartModel schema is referencing the correct version of the Electrical sub-schema. In addition, this will enable the *ElectricalSection* sub-schema. In addition, this will enable the *ElectricalSection* sub-schema to connect to the Manufacturer Part Number and the Manufacturer of the Part.

1.1. Purpose

This standard is intended to benefit part manufacturers and their customers by providing consistency and efficiency to the transfer of part design rule data from part manufacturer to customers. It establishes standard electronic data exchange formats that will facilitate and improve data transfer along the entire global supply chain, at every stage in the product life cycle. A key aspect therefore is the structure of the content that is contained in this format, which the committee believes should be based on the following two principles:

1) Data that is required to be consumed by software tools, and

2) Data that is not required to be consumed by software tools but is provided for informational purposes.

This standard specifically covers data applicable to the electrical definition of the device.

2 Applicable Documents

The following documents form a part of this standard to the extent specified herein. The revision of the document in effect at the time of solicitation shall take precedence.

2.1. JEDEC (www.jedec.org)

JEDEC Publication, JEP30, *PartModel Guideline for Electronic Device packages – XML Requirements.*

JEDEC Publication, JEP30-10, *PartModel Schema.*

JEDEC Publication, JEP30-E101, *PartModel Electrical Schema.*

JEDEC Publication, JEP30-D10, *PartModel Schema Types Dictionary* (Required to support the PartModel Schema and each of its sectional sub-schemas.).

JEDEC Publication, JEP95, *JEDEC Registered and Standard Outlines for Solid State Products*.

JEDEC Publication, JEP104, *Reference Guide to Letter Symbols for Semiconductor Devices*.

JEDEC/ESD Publication, JEP157 - Recommended ESD-CDM Target Levels

JEDEC Standard, JESD30J, *Descriptive Designation System for Electronic-device Packages.*

JEDEC Standard, JESD77, *Terms, Definitions, and Letter Symbols for Discrete Semiconductor and Optoelectronic Devices.*

JEDEC Standard, JESD79-3F, *(DDR3 SDRAM Standard)*

JEDEC Standard, JESD79-4B, *(DDR4 SDRAM)*

JEDEC Standard, JESD79-5A, *(DDR5 SDRAM)*

JEDEC Standard, JESD82-32A, *DDR4 Data Buffer Definition (DDR4DB02)*

JEDEC Standard, JESD84-B42, *MultiMediaCard (MMC) Electrical Standard, High Capacity (MMCA, 4.2)*

JEDEC Standard, JESD84-B51A, *Embedded Multi-Media Card (eMMC) Electrical Standard (5.1A)*

JEDEC Standard, JESD84-A441, *Embedded MultiMediaCard(e•MMC) e•MMC/Card Product Standard, High Capacity, including Reliable Write, Boot, Sleep Modes, Dual Data Rate, Multiple Partitions Supports, Security Enhancement, Background Operation and High Priority Interrupt (MMCA, 4.41)*

JEDEC Standard, JESD88E, *JEDEC Dictionary of Terms for Solid-State Technology.*

2.1 JEDEC (www.jedec.org) (cont'd)

JEDEC Standard, JESD99, *Terms, Definitions, and Letter Symbols for Microelectronic Devices.*

JEDEC Standard, JESD100, *Terms, Definitions, and Letter Symbols for Microcomputers, Microprocessors, and Memory Integrated Circuits*.

JEDEC Standard, JESD209-4D, *Low Power Double Data Rate 4 (LPDDR4)*

JEDEC Standard, JESD209-5B, *Low Power Double Data Rate 5 (LPDDR5)*

JEDEC Standard, JESD212C, *Graphics Double Data Rate (GDDR5) SGRAM Standard*

JEDEC Standard, JESD220E, *Universal Flash Storage (UFS) Version 3.1*

JEDEC Standard, JESD223C, *Universal Flash Storage Host Controller Interface (UFSHCI) Version 2.1*

JEDEC Standard, JESD232A, *Graphics Double Data Rate (GDDR5X) SGRAM Standard*

JEDEC Standard, JESD235D, *High Bandwidth Memory DRAM (HBM1, HBM2)*

JEDEC Standard, JESD238, *High Bandwidth Memory DRAM (HBM3)*

JEDEC Standard, JESD250C, *Graphics Double Data Rate (GDDR6) SGRAM Standard*

JEDEC Standard, JESD270-4, *High Bandwidth Memory (HBM4) DRAM Standard*

JEDEC/ESDA Standard, JS-001-2014, *For Electrostatic Discharge Sensitivity Testing – Human Body Model (HBM) – Component Level.*

JEDEC/ESDA Standard, JS-002-2014, *For Electrostatic Discharge Sensitivity Testing – Charged Device Model (CDM) – Device Level.*

2.2. CHIPS ALLIANCE (https://chipsalliance.org/)

AIB Specification: https://github.com/chipsalliance/AIB-specification

2.3. IEEE (www.ieee.org)

IEEE std 802.3, IEEE *Standard for Ethernet.*

IEEE 802.3ba-2010, *IEEE Standard for Information technology-- Local and metropolitan area networks-- Specific requirements-- Part 3: CSMA/CD Access Method and Physical Layer Specifications Amendment 4: Media Access Control Parameters, Physical Layers, and Management Parameters for 40 Gb/s and 100 Gb/s Operation.*

IEEE 802.3ae-2002, *IEEE Standard for Information technology - Local and metropolitan area networks - Part 3: CSMA/CD Access Method and Physical Layer Specifications - Media Access*

Control (MAC) Parameters, Physical Layer, and Management Parameters for 10 Gb/s Operation.

2.3 IEEE (www.ieee.org) (cont'd)

IEEE 802.3u-1995, *IEEE Standards for Local and Metropolitan Area Networks: Supplement - Media Access Control (MAC) Parameters, Physical Layer, Medium Attachment Units, and Repeater for 100Mb/s Operation, Type 100BASE-T (Clauses 21-30).*

IEEE std 802.3z-1998, Gigabit Task Force (https://www.ieee802.org/3/z/)

IEEE Standard, 2977-2021, *IEEE Standard for Adoption of MIPI Alliance Specification for A-PHY Interface (A-PHY) Version 1.0.*

2.4. IEEE/ANSI/CSA (www.ansi.org)

ANSI Y32.2-1975 (Reaffirmed 1989), *Graphic Symbols for Electrical and Electronics Diagrams.*

2.5. IEC (www.iec.org)

IEC 60617, *Graphical symbols for diagrams.*

2.6. IPC (www.ipc.org)

IPC-T-50, *Terms and Definitions for Interconnecting and Packaging Electronic Circuits.*

2.7. INCITIS (www.incitis.org)

2221-D, *Fibre Channel Physical Interface-6.*

2.8. MIPI (www.mipi.org)

Specification for C-PHY

Specification for D-PHY Version 1.00.00

Specification for M-PHY Version 4.1.

Specification for RF Front-End Control Interface Version 1.10

Specification for Unified Protocol (UniPro) Version 1.8

System Power Management Interface V2.0

2.9. OIF (www.oiforum.com)

IA # OIF-CEI-04.0, *Common Electrical I/O (CEI) - Electrical and Jitter Interoperability agreements for 6G+ bps, 11G+ bps,25G+ bps I/O and 56G+ bps.*

2.10. OPEN Compute Project (https://www.opencompute.org/)

BoW-PHY: https://opencomputeproject.github.io/ODSA-BoW/bow_specification.html

OpenHBI: https://www.opencompute.org/documents/odsa-openhbi-v1-0-spec-rc-final-1-pdf

2.11. HDMI Licensing, LLC (www.hdmi.com)

High-Definition Multimedia Interface Specification Version 1.3a

2.12. PCI-SIG (www.pcisig.com)

PCI Express Card Electromechanical Specification Rev 2. 0

PCI Express® External Cabling Specification Revision 2.0

2.13. HP (www.hp.com)

RGMII - Reduced Gigabit Media Independent Interface (RGMII) Version 2.0 - http://www.hp.com/rnd/pdfs/RGMIIv2_0_final_hp.pdf

2.14. SDA (www.sdcard.org)

2.15. SMI (www.powersig.org/)

System Management Bus (SMBus) Specification Version 3.0

2.16. USB-IF (www.usb.org)

Universal Serial Bus Specification Revision 2.0

Universal Serial Bus 3.2 Specification Revision 1.0

2.17. UCIe (https://www.uciexpress.org/)

2.18. Accellera (https://www.accellera.org/)

2.19. American Mathematical Society

"Short Math Guide for LaTeX", Version 1.09 (2002-03-22), currently available at http://www.ams.org/tex/short-math-guide.html.

2.20. MathML - https://www.w3.org/TR/mathml4/#intro_overview

3 Requirements

The following terms and definitions are applicable to this XML Schema.

3.1. Terms and Definitions

All definitions and terms associated with the Electrical Data are defined in the JESD51 series of documents, as listed in the applicable documents section. The Electrical details of the part are defined in the *ElectricalSection* of the PartModel XML Schema.

All common Terms and Definitions that are used by more than one sectional sub-schema, such as any of the Electrical, Package, Environmental, Assembly Process Classification, are defined in the “PartModel Common Types Library”

All other definitions and terms necessary to define the schema, are defined in this document.

PartModel: A PartModel is a data representation described in an XML file that conforms to the rules and structure of the PartModel XML Schema.

NOTE 1 Companies who use the PartModel XML Files and claim compliance to JEDEC, must ensure that their PartModel XML file conforms to the specific released version of the PartModel XML Schema released by JEDEC.

NOTE 2 Section 4 will define the outline of the structure of the Electrical XML Schema. Specific components of the XML Schema and their hierarchy are specifically controlled by the JC-16 and JC-42 Standards Committee who retain the expertise for these structures.

NOTE 3 The *ElectricalSection* of the schema forms part of the PartModel XML Schema and is not intended to act as a standalone schema. In addition, there is a “PartModel Schema Types Library” XML Schema, which is a common set of xml structures shared across the PartModel XML Schema and all its sub-section schemas.

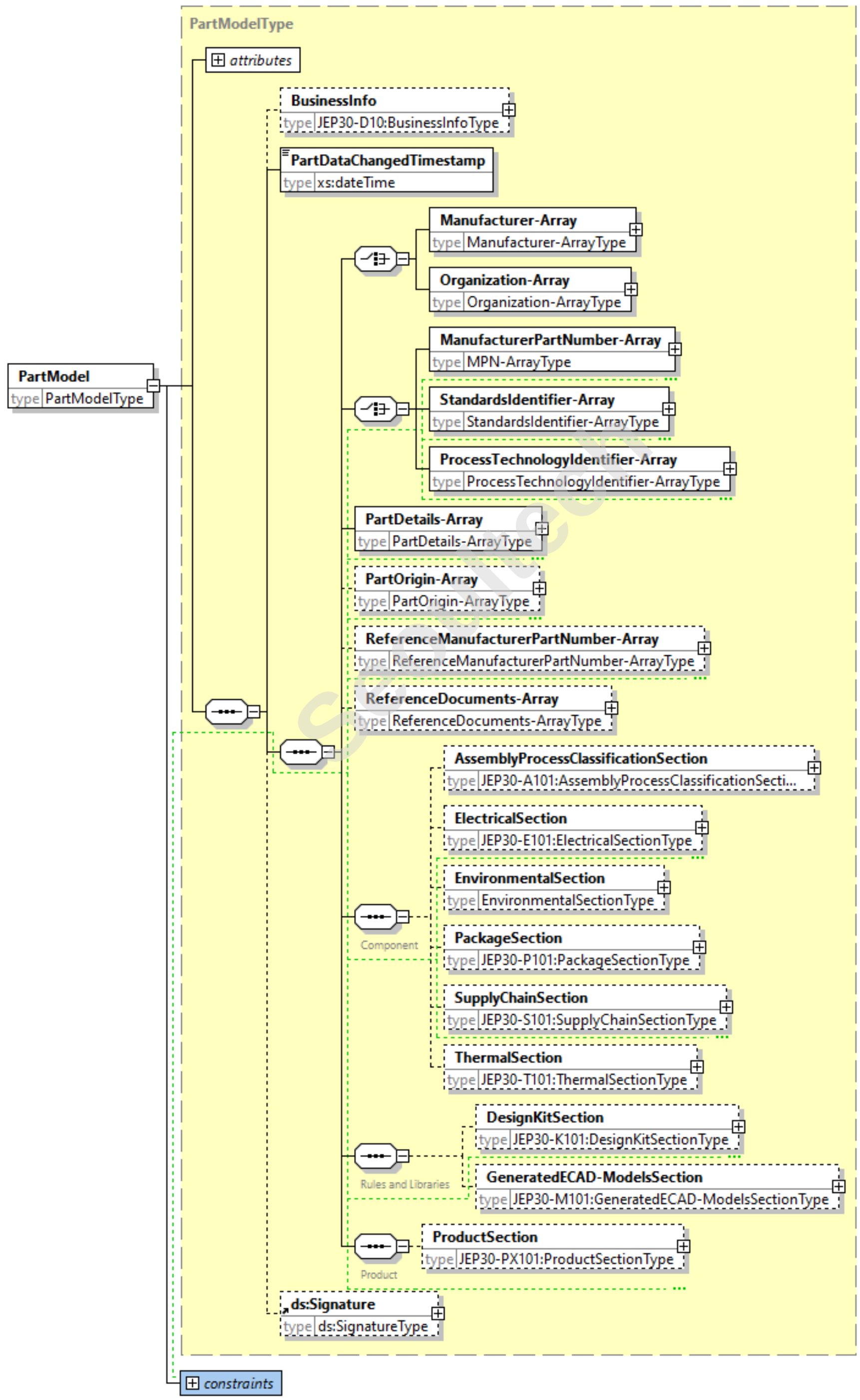
3.2. XML Schema Key Terms and Definitions

Reference the JEP30 publication for details of the "XML Schema Key Terms and Definitions".

4 PartModel Schema Definition

The following section describes the XML Schema structure.

4.1. PartModel -> Electrical Section

<table>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>PartModel Type -> Electrical Section</td></tr>
</table>

4.1 PartModel -> Electrical Section (cont'd)

The *PartModelType* belongs to the "PartModel XML Schema". The *ElectricalSection* belongs to the "PartModel Electrical XML Schema". The primary purpose of the PartModel Schema is to provide the structure for identifying unique parts (Manufacturer and MPN) or unique standards (Organization and Standards Identifier) and the structure to include the sub schemas which define the part details, as outline in the JEP30 - PartModel Guidelines for Electronic-Device Packages – XML Requirements.

This document covers the *ElectricalSection*, which is referenced from its parent's structure, the *PartModel*. The contents under the *ElectricalSection* are

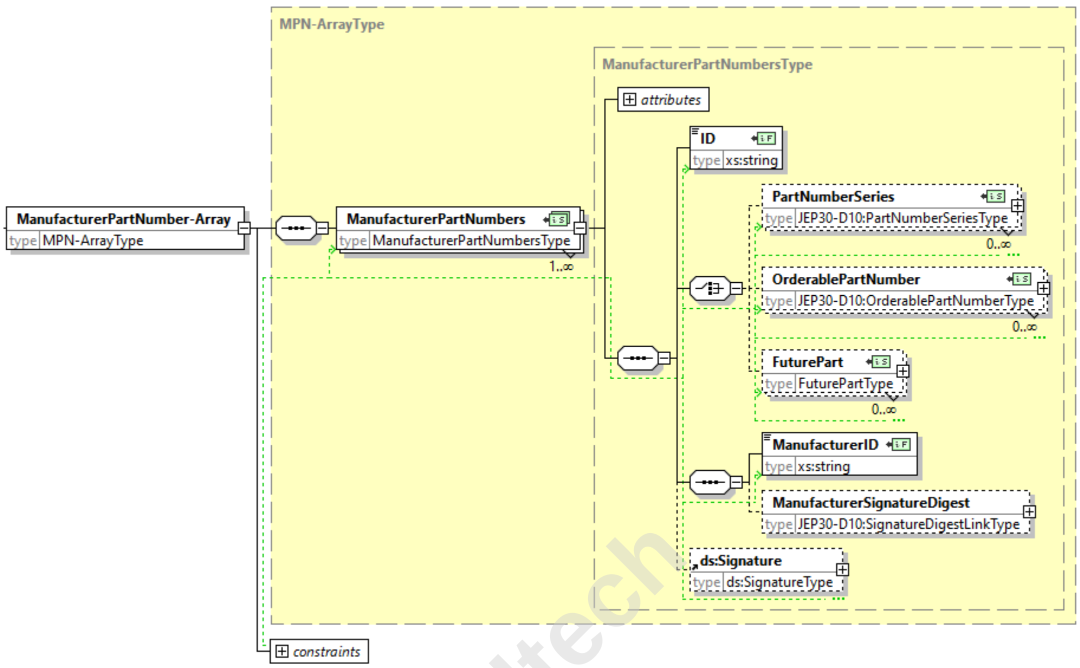
1. Tied to the Manufacturer's name and Manufacturer's part number if the electrical section is applicable to a part or a chiplet, or
2. Tied to a Standards Body and a Standards Model Identifier, if the electrical section represents a standard set of Interfaces or Functions or Electrical standards as defined by a specific Standards Body.

The *ComplianceToPartModelSchemaVersion* indicates the version of the Schema to which the XML file is to be validated against. All new releases to this document or XML Schema are governed by the rules outlined in the JEP30 and must be release in sync with the PartModel.

> *"Each time that a Sub-schema gets updated, then the PartModel version also gets updated in order to release that Sub-schema under the umbrella of the PartModel. This is because the PartModel must now reference the new version of Sub-schema, since all subschemas have their own version number. The parent schema includes them by referring to a precise version, so a version bump in the subschema requires a version bump in the parent only at the time of release of the Parent."*

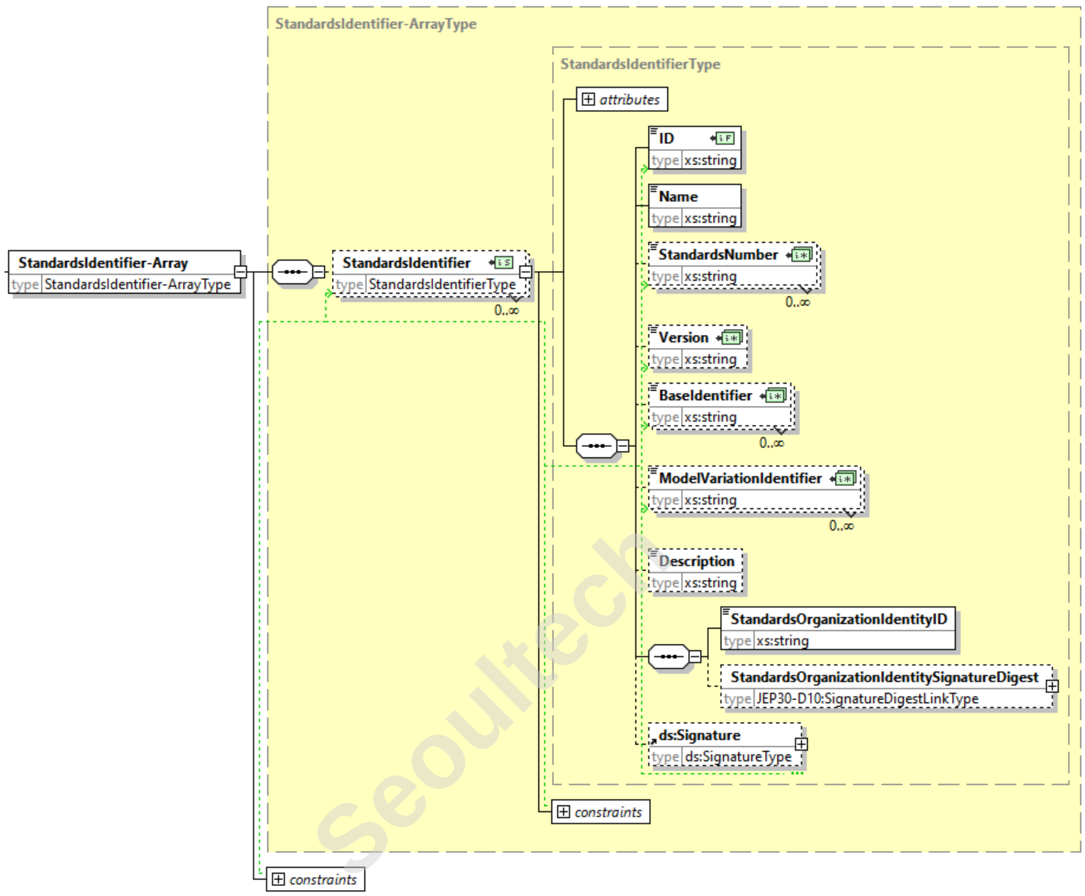
The *PartModelContentRevision* indicates the revision of the data for the Part that is submitted in the XML file. This enables the Component Manufacturer to provide a new XML file for a Part each time they wish to upgrade a new set of data for a part, in any of the sub-sections such as this *ElectricalSection*.

4.2. Manufacturer Part Number-Array

path	**PartModel/ManufacturerPartNumber-Array.**
diagram	
type	**MPN–ArrayType, ManufacturerPartNumbersType, PartNumberType, OrderablePartNumber-ArrayType, FuturePartType, JEP30-D10:SignatureDigestLinkType, ds:SignatureType.**

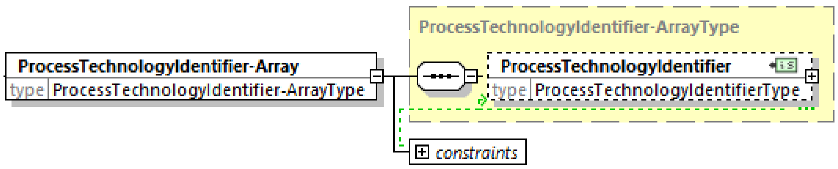
The *ManufacturerPartNumber-Array/ManufacturerPartNumber* provides the definition of the part number or a specific Standard, so that it can be connected to the technical specification details in the *ElectricalSection* via the *PartDetails-Array* section.

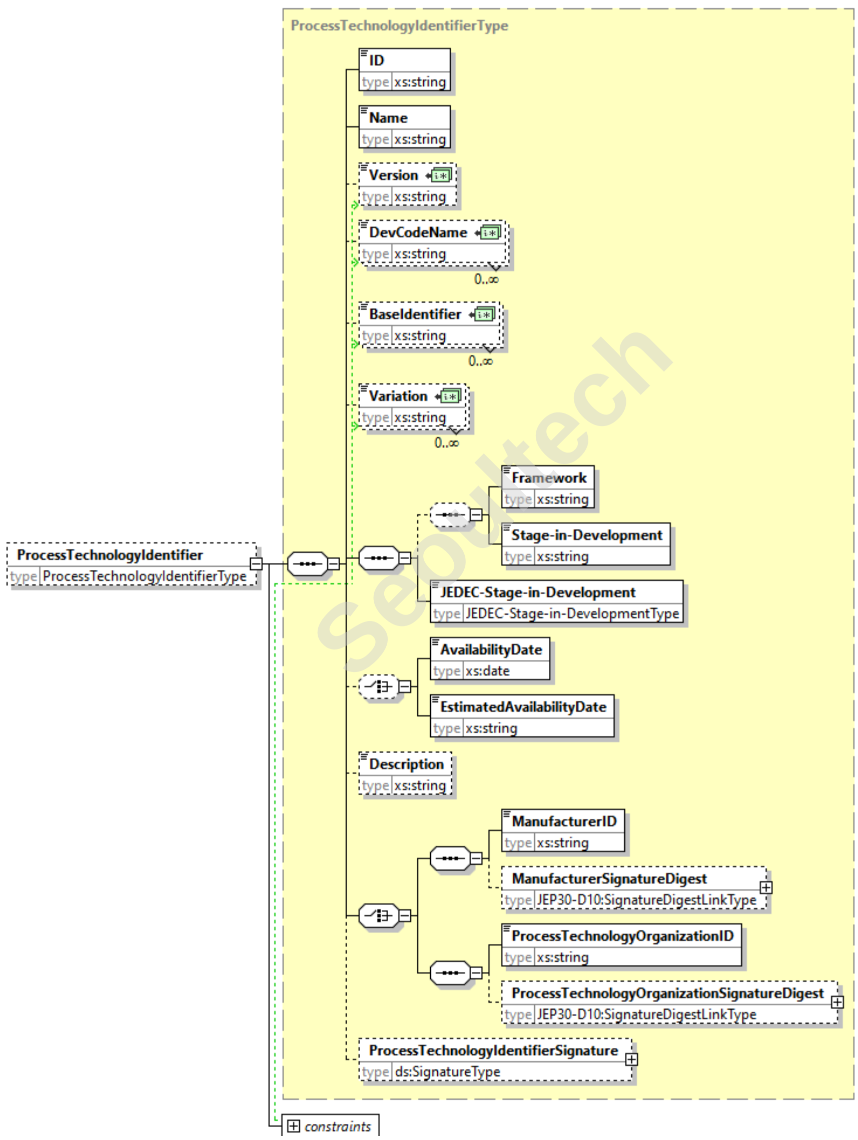
4.3. Standards Identifier - Array

path	**PartModel/StandardsIdentifier-Array.**
diagram	
type	**StandardsIdentifier-ArrayType, StandardsIdentifierType, JEP30-D10:SignatureDigestLinkType, ds:SignatureType.**

The *StandardsIdentifier-Array/StandardsIdentifier* provides the definition of a specific Standard, so that it can be connected to the technical specification details in the *ElectricalSection* via the *PartDetails-Array* section.

4.4. Process Technology Identifier - Array

<table>
<tr><td>path</td><td>PartModel/ProcessTechnologyIdentifier-Array.</td></tr>
<tr><td>diagram 1 of 2</td><td>


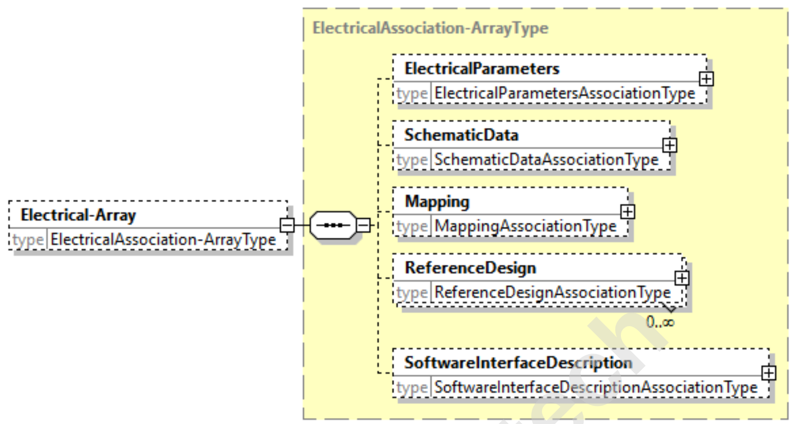
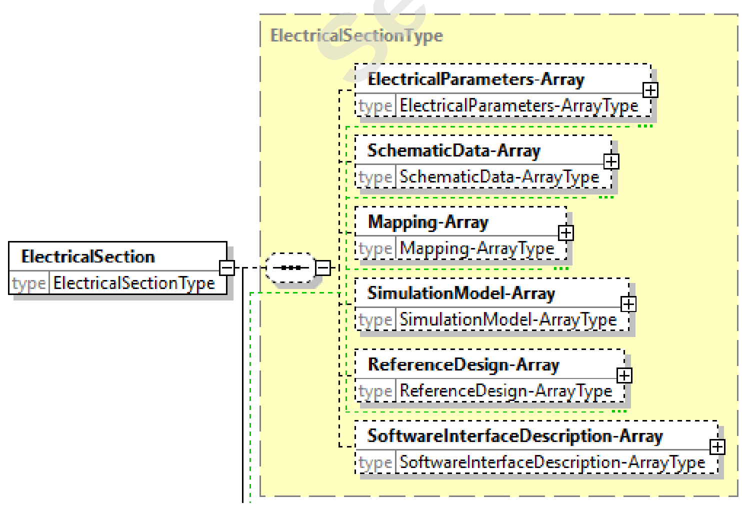
</td></tr>
<tr><td>diagram 2 of 2</td><td>


</td></tr>
<tr><td>type</td><td>ProcessTechnologyIdentifier–ArrayType, ProcessTechnologyIdentifier, JEDEC-Stage-in-DevelopmentType, JEP30-D10:SignatureDigestLinkType, ds:SignatureType.</td></tr>
</table>

The *ProcessTechnologyIdentifier-Array/ProcessTechnologyIdentifier* provides the definition of the process technology identifier, so that it can be connected to the technical specification details in the *ElectricalSection* via the *PartDetails-Array* section.

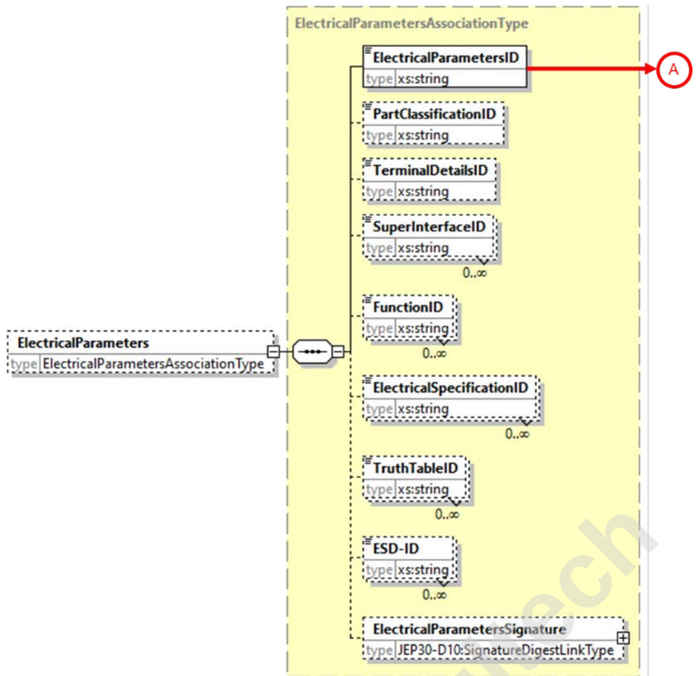
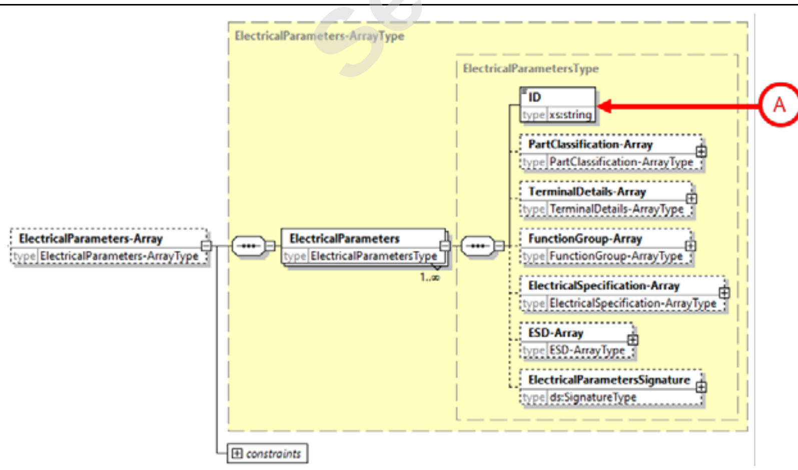
4.5. Linking the Manufacturing Part Number to a specific Electrical Data set

The linking of the Parts to its technical data is done via the *PartDetails-Array* section as outline in the JEP30 - PartModel Guidelines for Electronic-Device Packages – XML Requirements. This consists of two sections called *PartsSelection-Array* and *Association-Array* which defines the relationship between identifying the specific set of parts and how they are associated with the electrical content. Reference the JEP30 parent document for more details on this association.

<table>
<tr><td>path</td><td>PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array.</td></tr>
<tr><td>diagram at the Association level</td><td>
</td></tr>
<tr><td>type</td><td>ElectricalAssociation-ArrayType, ElectricalParametersAssociationType, SchematicDataAssociationType, MappingAssociationType, ReferenceDesignAssociationType, SoftwareInterfaceDescriptionAssociationType</td></tr>
<tr><td>diagram at the Electrical Section level</td><td>
</td></tr>
<tr><td>type</td><td>ElectricalSectionType, ElectricalParameters-ArrayType, SchematicData-ArrayType, Mapping-ArrayType, SimulationModel-ArrayType, ReferenceDesign-ArrayType, SoftwareInterfaceDescription-ArrayType.</td></tr>
</table>

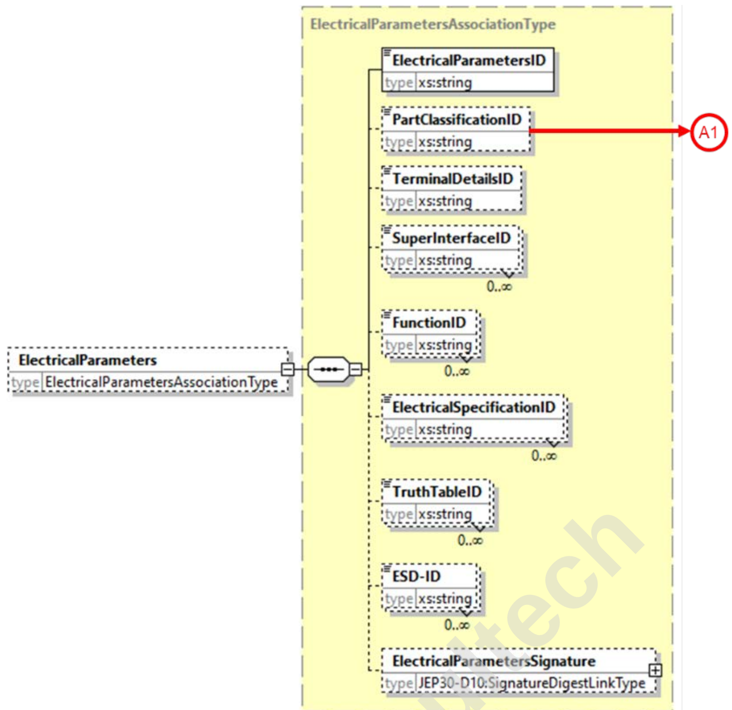
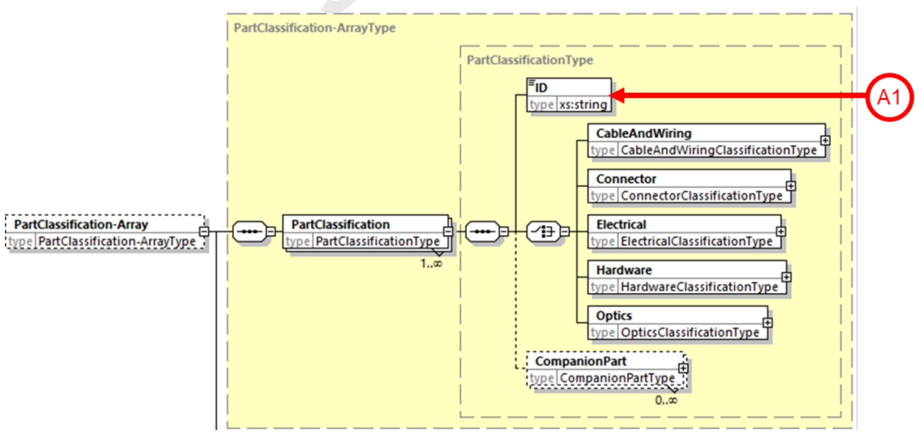
The electrical content is now sub-grouped into six major sections as shown in the diagram. This enables each section to be digitially signed independently of each other. The linkage between the two sections is shown below.

4.5.1. Linking the Manufacturing Part Number to Electrical Parameters

<table>
<tr><td>path</td><td>PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/ElectricalParameters</td></tr>
<tr><td>diagram at the Electrical Parameters Association level</td><td>
</td></tr>
<tr><td>type</td><td>ElectricalParametersAssociationType, JEP30-D10:SignatureDigestLinkType.</td></tr>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters</td></tr>
<tr><td>diagram at the Electrical Parameters-Array level</td><td>
</td></tr>
<tr><td>type</td><td>ElectricalParametersType, ElectricalParametersType, Electrical-ArrayType,
ElectricalSpecification-ArrayType.</td></tr>
</table>

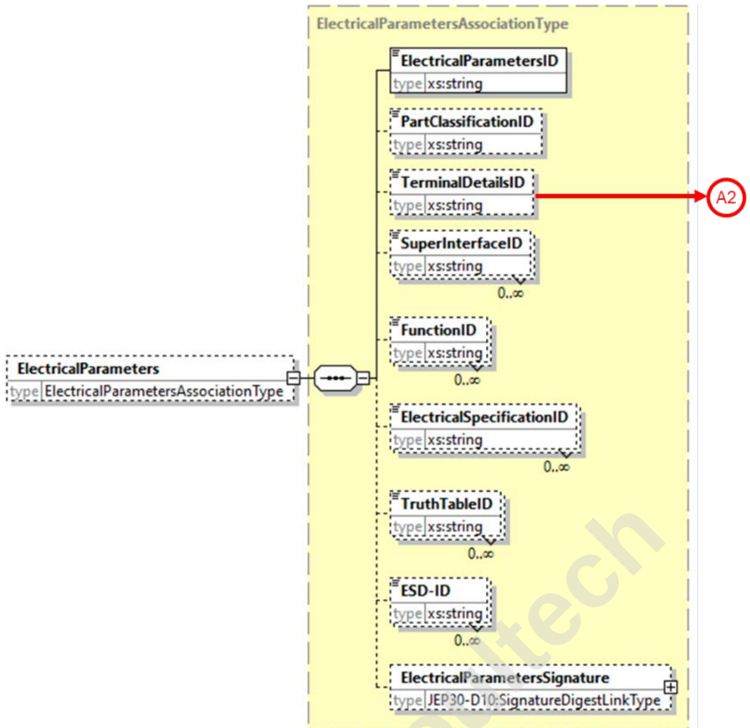
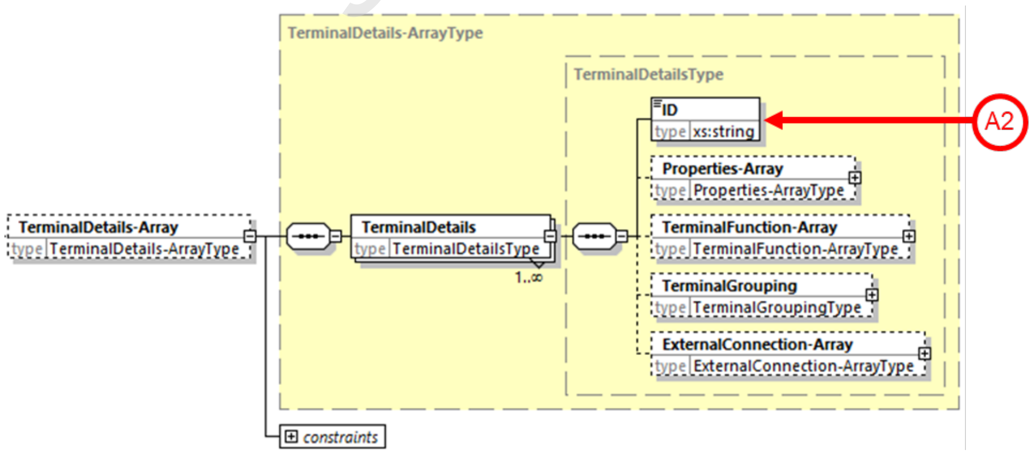
The *ElectricalParameterID* references the *ElectricalParameters/ID* under the *ElectricalSection/ ElectricalParameters-Array*. This is enforced by the key named as *ElectricalParametersKey* that is assigned to the *ElectricalParameters/ID* element, which is referenced by the *ElectricalParameterID* which has a KeyRef that refers to the *JEP30-E101:ElectricalParametersKey*.

4.5.2. Linking the Manufacturing Part Number to Part Classification

path	**PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/ElectricalParameters**
diagram at the Electrical Parameters Association level	
type	**ElectricalParametersAssociationType, JEP30-D10:SignatureDigestLinkType.**
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification**
diagram at the Part Classification-Array level	
type	**PartClassification-ArrayType, PartClassificationType, …**

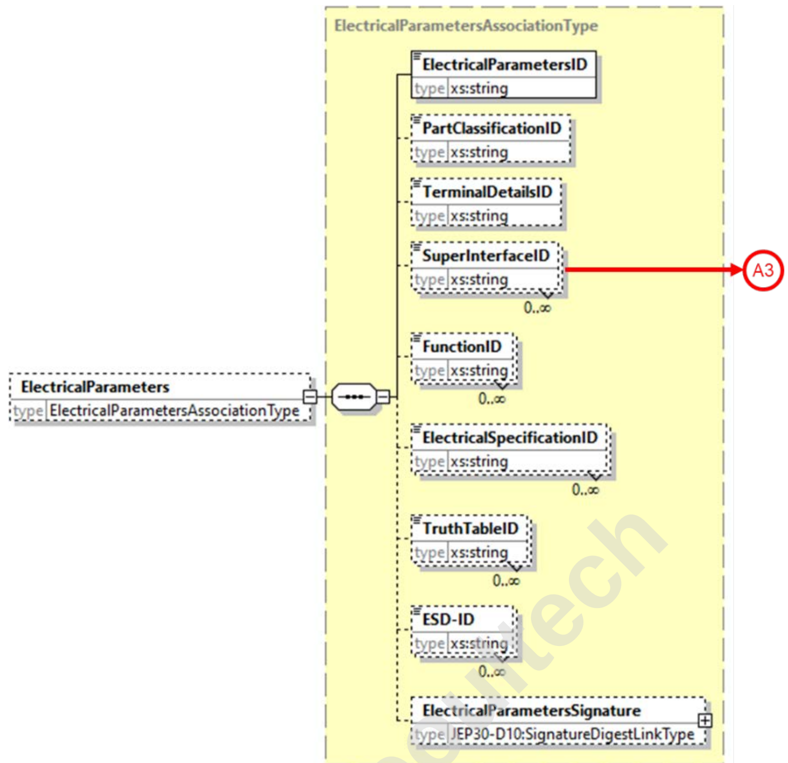
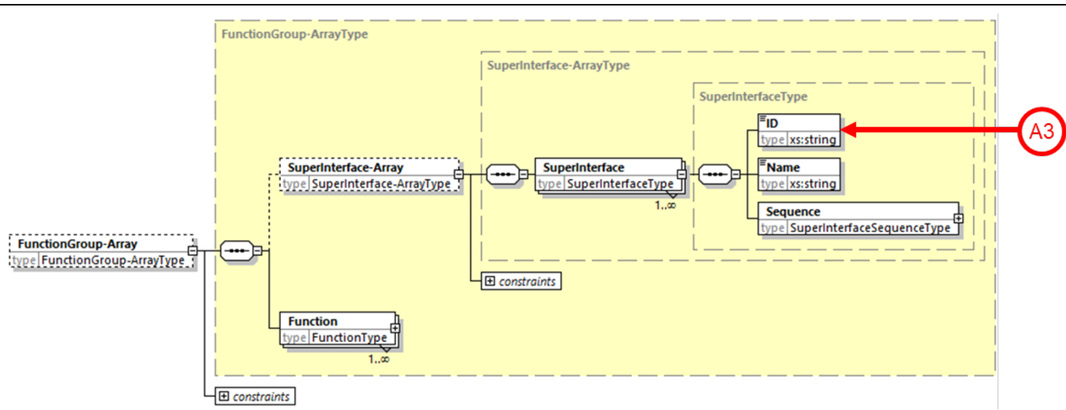
The *PartClassificationID* references the *PartClassification/ID* under the *ElectricalSection/ ElectricalParameters-Array/ElectricalParameters/PartClassification-Array*. This is enforced by the key named as *PartClassificationKey* that is assigned to the *PartClassification/ID* element, which is referenced by the *PartClassificationID* which has a KeyRef that refers to the *JEP30-E101:PartClassificationKey*.

4.5.3. Linking the Manufacturing Part Number to Terminal Details

path	**PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/ElectricalParameters**
diagram at the Electrical Parameters Association level	
type	**ElectricalParametersAssociationType, JEP30-D10:SignatureDigestLinkType.**
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array**
diagram at the Electrical-Array level	
type	**TerminalDetails-ArrayType, TerminalDetailsType, …**

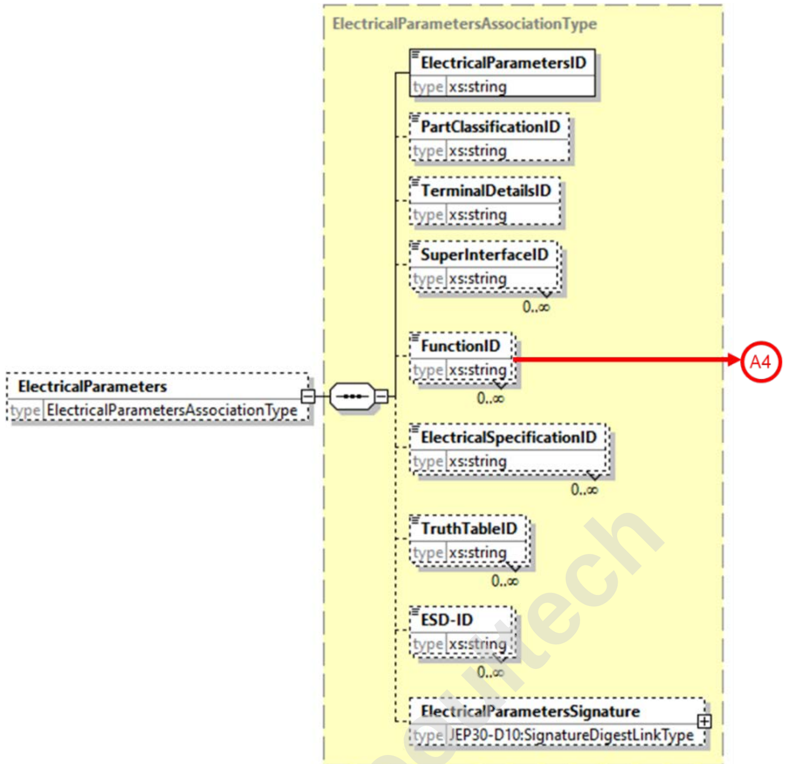
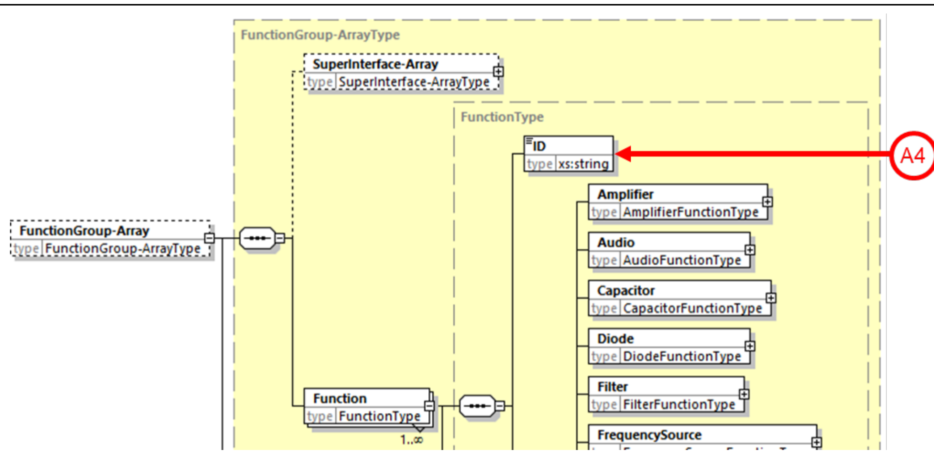
The unbounded element *TerminalDetailsID* references the *TerminalDetails/ID* under the *ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array*. This is enforced by the key named as *TerminalDetailsKey* that is assigned to the *TerminalDetails/ID* element, which is referenced by the *TerminalDetailsID* which has a KeyRef that refers to the *JEP30-E101:TerminalDetailsKey*.

4.5.4. Linking the Manufacturing Part Number to Super Interface

path	**PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/ElectricalParameters**
diagram at the Electrical Parameters Association level	
type	**ElectricalParametersAssociationType, JEP30-D10:SignatureDigestLinkType.**
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array**
diagram at the Electrical-Array level	
type	**Electrical-ArrayType, ElectricalType, …**

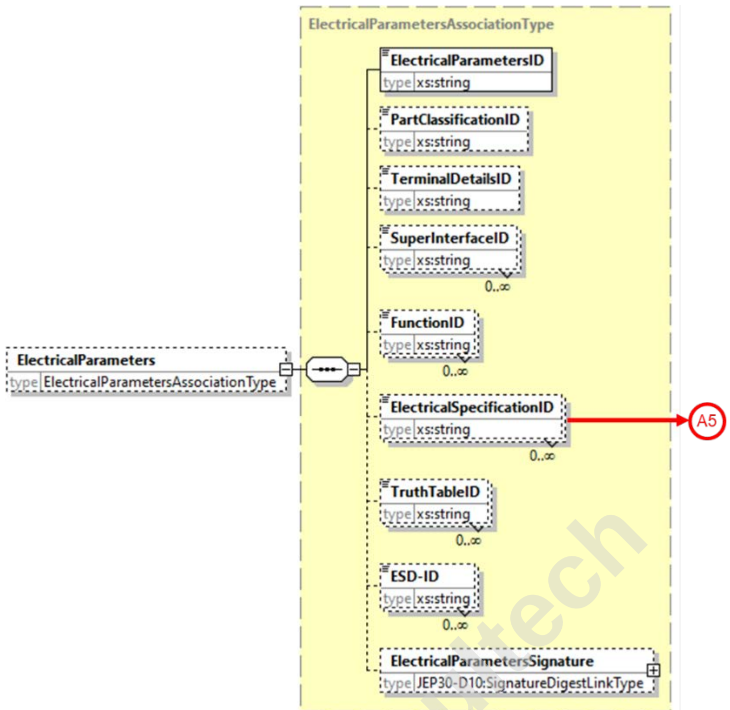
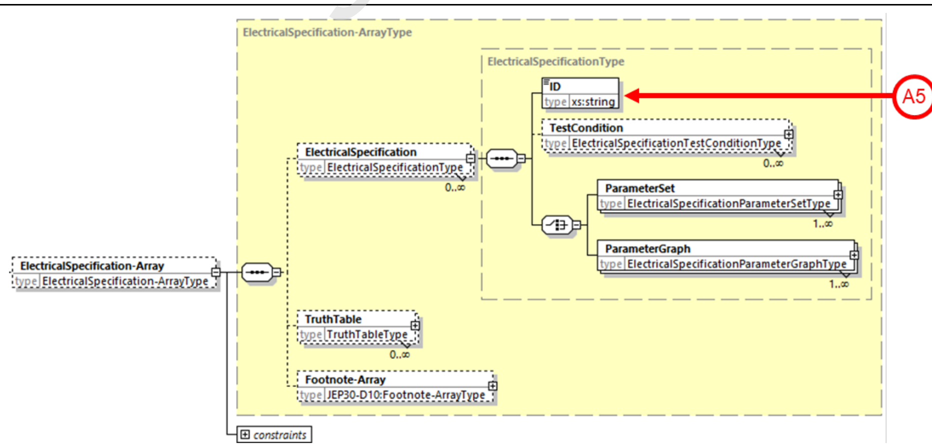
The unbounded element *SuperInterfaceID* references the *SuperInterface/ID* under the *ElectricalSection/ElectricalParameters-Array/ElectricalParameters/Function-Array*. This is enforced by the key named as *SuperInterfaceKey* that is assigned to the *SuperInterface/ID* element, which is referenced by the *SuperInterfaceID* which has a KeyRef that refers to the *JEP30-E101:SuperInterface*.

4.5.5. Linking the Manufacturing Part Number to Functions

path	**PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/ElectricalParameters**
diagram at the Electrical Parameters Association level	
type	**ElectricalParametersAssociationType, JEP30-D10:SignatureDigestLinkType.**
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array**
diagram at the Electrical-Array level	
type	**Electrical-ArrayType, ElectricalType, …**

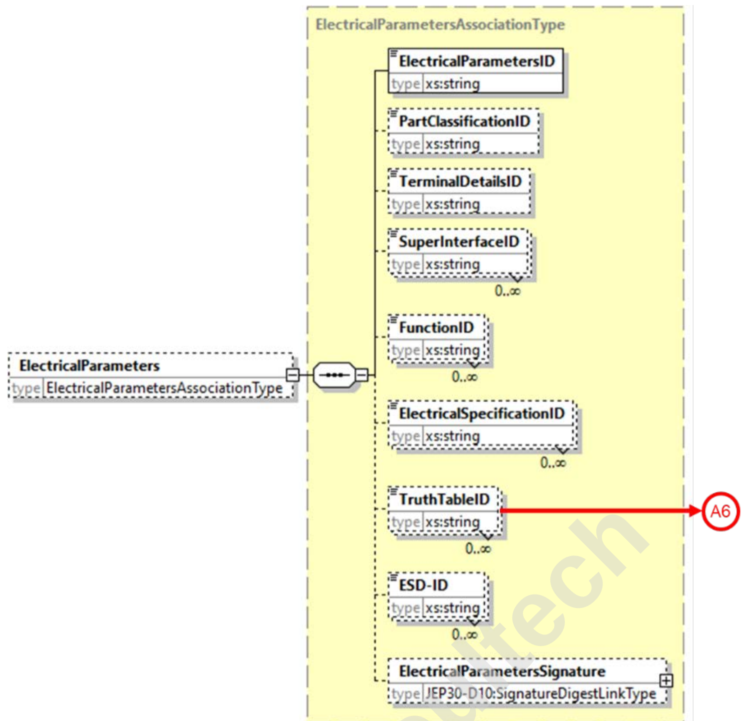
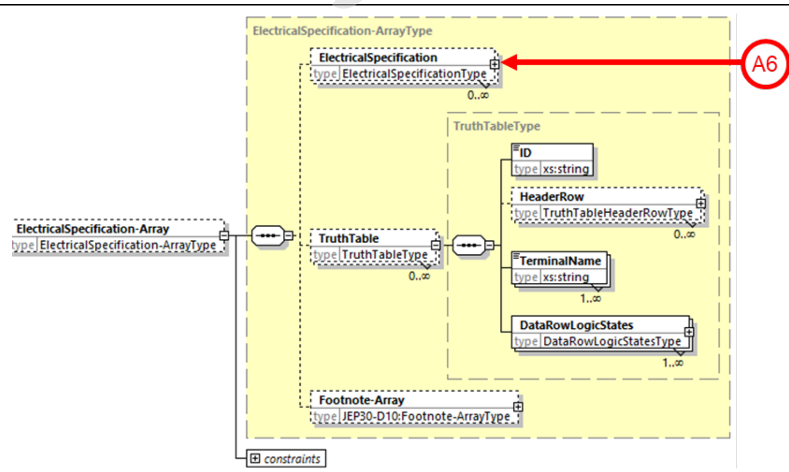
The unbounded element *FunctionID* references the *Function/ID* under the *ElectricalSection/ElectricalParameters-Array/ElectricalParameters/Function-Array*. This is enforced by the key named as *FunctionKey* that is assigned to the *Function/ID* element, which is referenced by the *FunctionID* which has a KeyRef that refers to the *JEP30-E101:FunctionKey*.

4.5.6. Linking the Manufacturing Part Number to Electrical Specification

path	**PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/ElectricalParameters**
diagram at the Electrical Parameters Association level	
type	**ElectricalParametersAssociationType, JEP30-D10:SignatureDigestLinkType.**
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification**
diagram at the Electrical Specification-Array level	
type	**ElectricalSpecification-ArrayType, ElectricalSpecificationType, …**

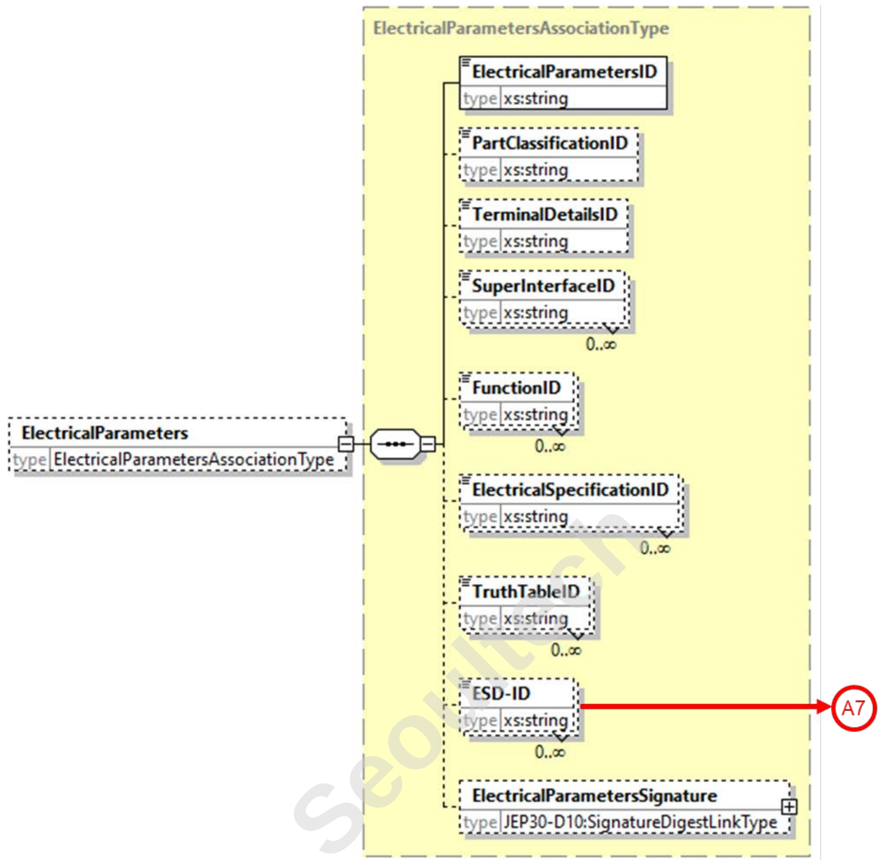
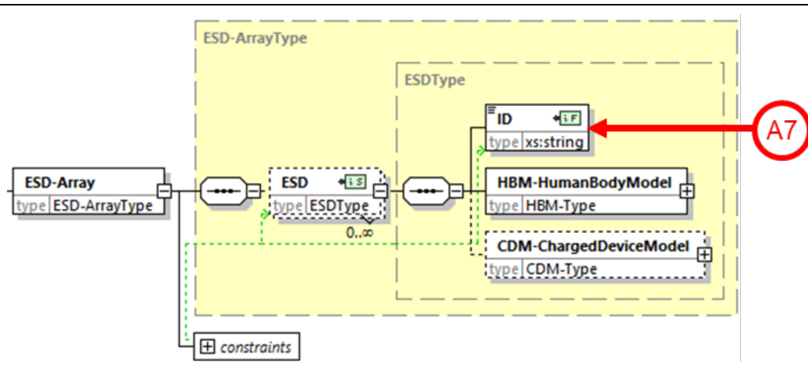
The *ElectricalSpecificationID* references the *ElectricalSpecification/ID* under the *ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricaSpecification-Array*. This is enforced by the key named as *ElectricalSpecificationKey* that is assigned to the *ElectricalSpecification/ID* element, which is referenced by the *ElectricalSpecificationID* which has a KeyRef that refers to the *JEP30-E101:ElectricalSpecificationKey*.

4.5.7. Linking the Manufacturing Part Number to Truth Table

<table>
<tr><td>path</td><td>PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/ElectricalParameters</td></tr>
<tr><td>diagram at the Electrical Parameters Association level</td><td>
</td></tr>
<tr><td>type</td><td>ElectricalParametersAssociationType, JEP30-D10:SignatureDigestLinkType.</td></tr>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/TruthTable</td></tr>
<tr><td>diagram at the Electrical Specification-Array level</td><td>
</td></tr>
<tr><td>type</td><td>TruthTable-ArrayType, TruthTableType, …</td></tr>
</table>

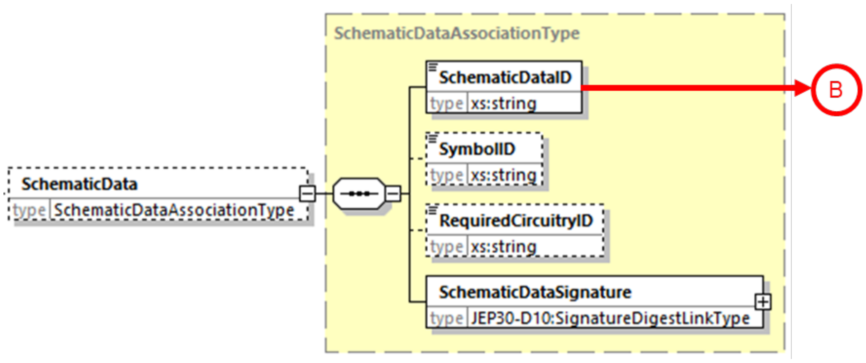
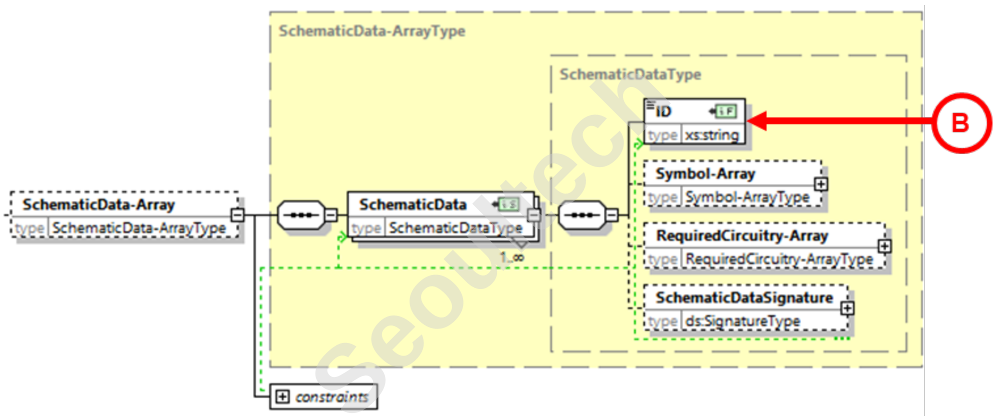
The *TruthTableID* references the *TruthTable/ID* under the *ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TruthTableID-Array*. This is enforced by the key named as *TruthTableKey* that is assigned to the *TruthTable/ID* element, which is referenced by the *TruthTableID* which has a KeyRef that refers to the *JEP30-E101:TruthTableKey*.

4.5.8. Linking the Manufacturing Part Number to ESD

<table>
<tr><td>path</td><td>PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/ElectricalParameters</td></tr>
<tr><td>diagram at the Electrical Parameters Association level</td><td>
</td></tr>
<tr><td>type</td><td>ElectricalParametersAssociationType, JEP30-D10:SignatureDigestLinkType.</td></tr>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ESD-Array</td></tr>
<tr><td>diagram at the Electrical Specification-Array level</td><td>
</td></tr>
<tr><td>type</td><td>ESD-ArrayType, ESDType, …</td></tr>
</table>

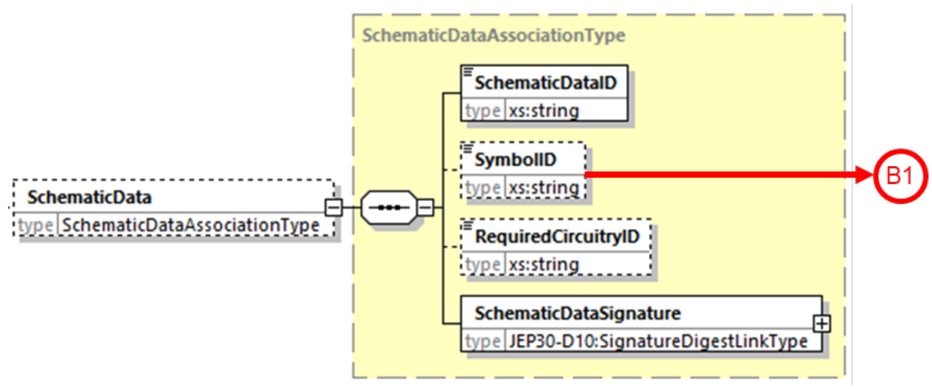
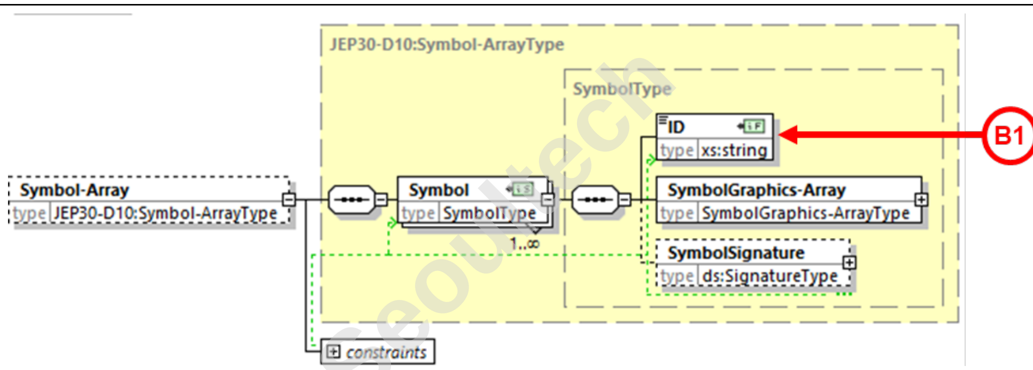
The *ESD-ID* references the *ESD/ID* under the *ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ESD-Array*. This is enforced by the key named as *ESD-Key* that is assigned to the *ESD/ID* element, which is referenced by the *ESD-ID* which has a KeyRef that refers to the *JEP30-E101:ESD-Key*.

4.5.9. Linking the Manufacturing Part Number to Schematic Data

path	**PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/SchematicData**
diagram at the Schematic Data Association level	
type	**SchematicDataAssociationType, JEP30-D10:SignatureDigestLinkType.**
path	**PartModel/ElectricalSection/SchematicData-Array**
diagram at the Schematic Data-Array level	
type	**SchematicData-ArrayType, SchematicDataType, …**

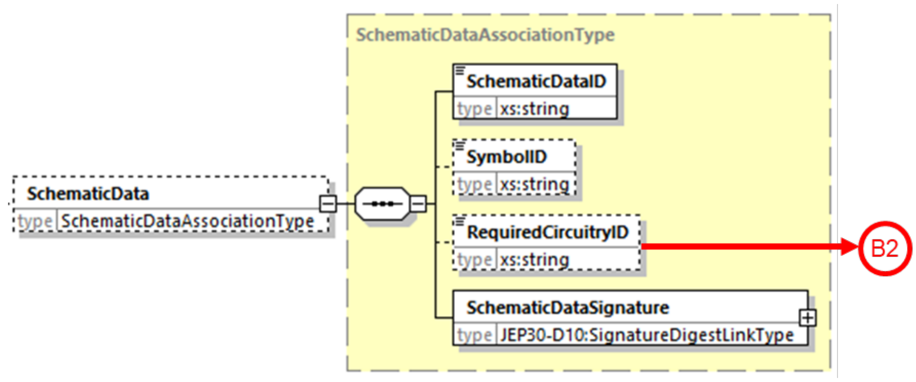
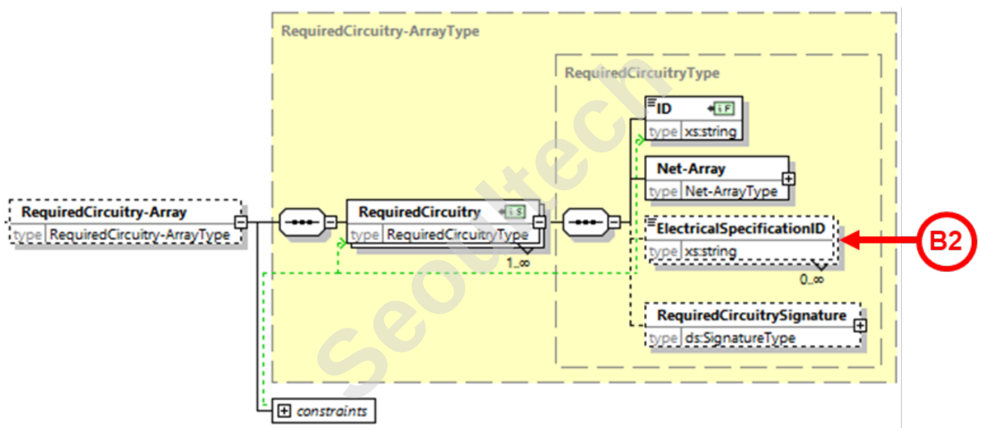
The *SchematicDataID* references the *SchematicData/ID* under the *ElectricalSection/ SchematicData-Array*. This is enforced by the key named as *SchematicDataKey* that is assigned to the *SchematicData/ID* element, which is referenced by the *SchematicDataID* which has a KeyRef that refers to the *JEP30-E101:SchematicDataKey*.

4.5.10. Linking the Manufacturing Part Number to Symbol

path	**PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/SchematicData**
diagram at the Schematic Data Association level	
type	**SchematicDataAssociationType, JEP30-D10:SignatureDigestLinkType.**
path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array**
diagram at the Symbol-Array level	
type	**Symbol-ArrayType, SymbolType, …**

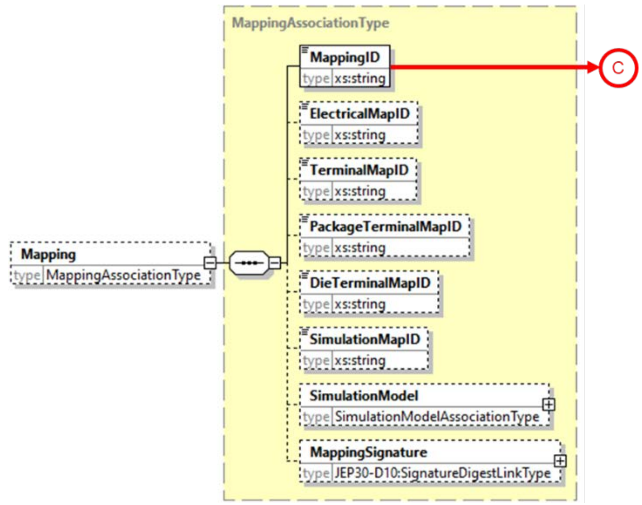
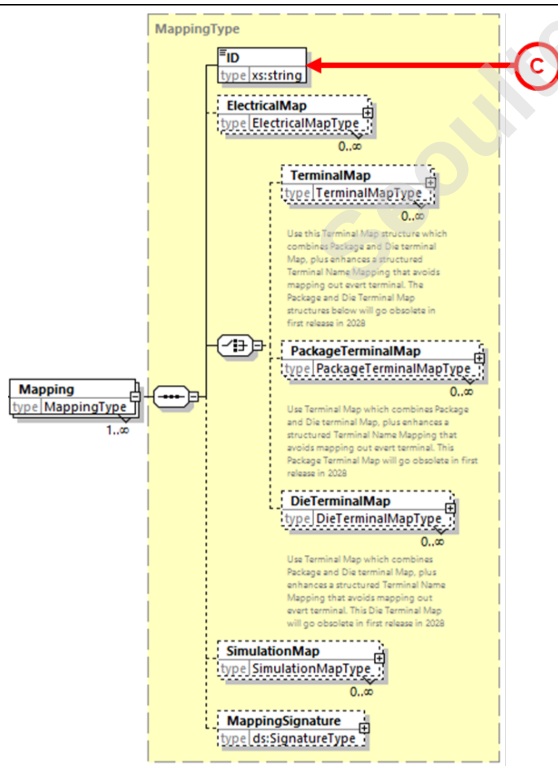
The *SymbolID* references the *Symbol/ID* under the *ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array*. This is enforced by the key named as *SymbolKey* that is assigned to the *Symbol /ID* element, which is referenced by the *SymbolID* which has a KeyRef that refers to the *JEP30-E101:SymbolKey*.

4.5.11. Linking the Manufacturing Part Number to Required Circuitry

path	PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/SchematicData
diagram at the Schematic Data Association level	
type	SchematicDataAssociationType, JEP30-D10:SignatureDigestLinkType.
path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/RequiredCircuitry-Array
diagram at the Required Circuitry-Array level	
type	RequiredCircuitry-ArrayType, RequiredCircuitryType, …

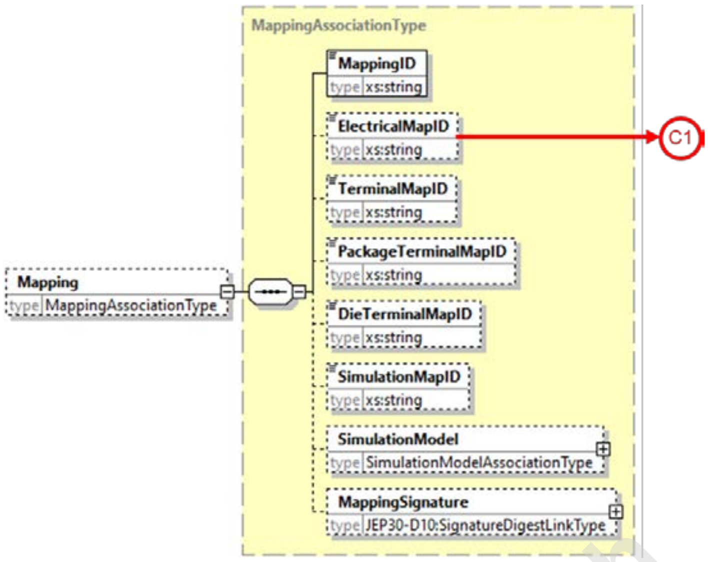
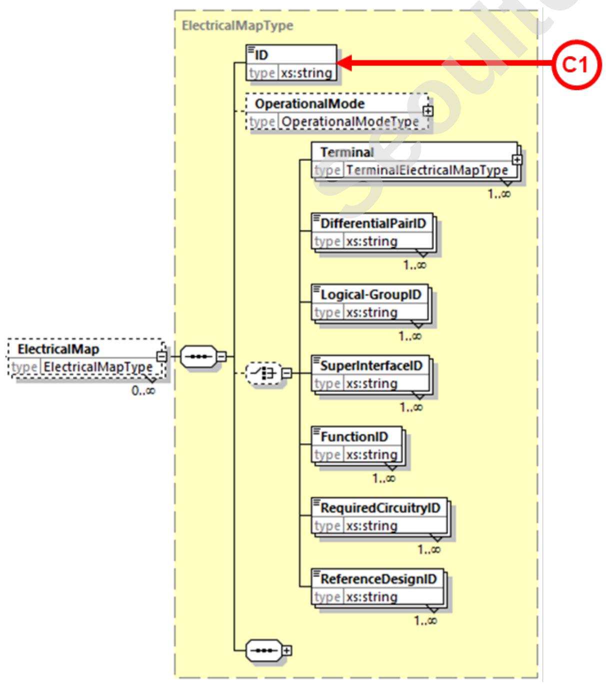
The *RequiredCircuitryID* references the *RequiredCircuitry/ID* under the *ElectricalSection/SchematicData-Array/SchematicData/RequiredCircuitry-Array*. This is enforced by the key named as *RequiredCircuitryKey* that is assigned to the *RequiredCircuitry/ID* element, which is referenced by the *RequiredCircuitryID* which has a KeyRef that refers to the *JEP30-E101: RequiredCircuitryKey*.

4.5.12. Linking the Manufacturing Part Number to Mapping data

path	**PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/Mapping**
diagram at the Mapping Association level	
type	**MappingAssociationType, JEP30-D10:SignatureDigestLinkType, ...**
path	**PartModel/ElectricalSection/Mapping-Array**
diagram at the Mapping-Array level	
type	**Mapping-ArrayType, MappingType, ...**

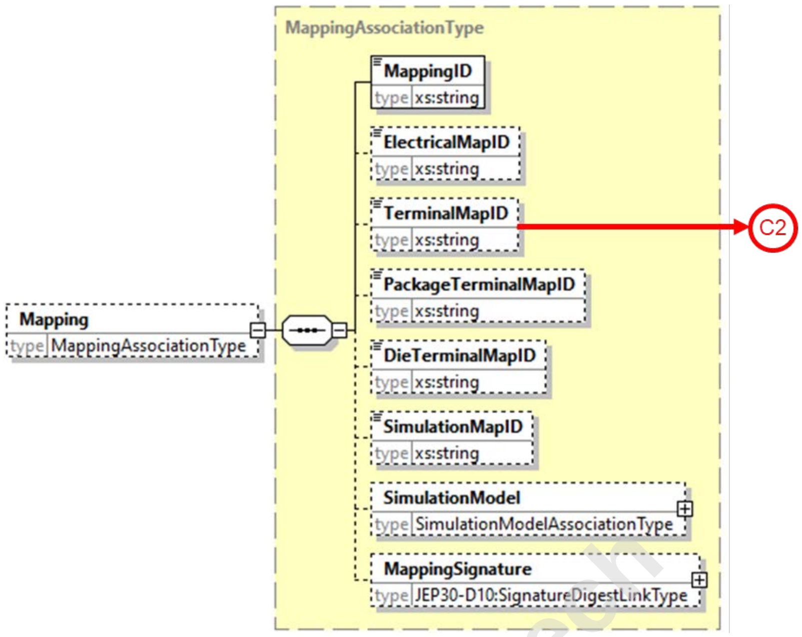
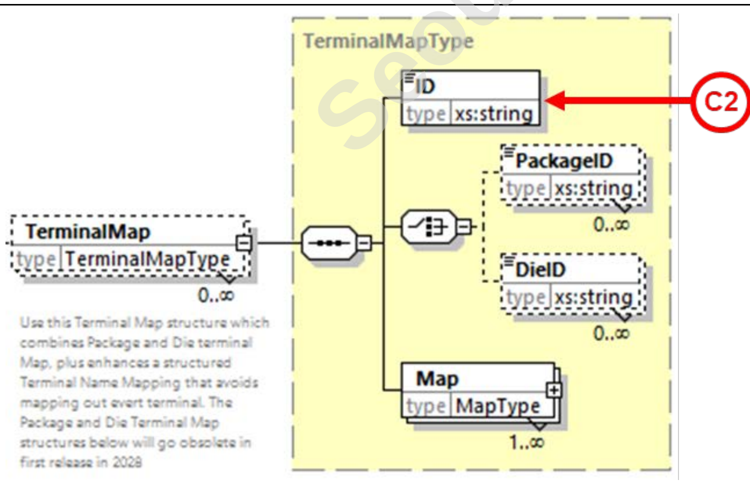
The *MappingID* references the *Mapping/ID* under the *ElectricalSection/Mapping-Array*. This is enforced by the key named as *MappingKey* that is assigned to the *Mapping/ID* element, which is referenced by the *MappingID* which has a KeyRef that refers to the *JEP30-E101:MappingKey*.

4.5.13. Linking the Manufacturing Part Number to Electrical Map data

<table>
<tr><td>path</td><td>PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/Mapping</td></tr>
<tr><td>diagram at the Mapping Association level</td><td>
</td></tr>
<tr><td>type</td><td>MappingAssociationType, JEP30-D10:SignatureDigestLinkType, …</td></tr>
<tr><td>path</td><td>PartModel/ElectricalSection/Mapping-Array/Mapping/ElectricalMap</td></tr>
<tr><td>diagram at Terminal Map level</td><td>
</td></tr>
<tr><td>type</td><td>ElectricalMapType, …</td></tr>
</table>

The *ElectricalMapID* references the *Mapping/ID* under the *ElectricalSection/Mapping-Array/Mapping/ElectricalMap*. This is enforced by the key named as *ElectricalMapKey* that is assigned to the *ElectricalMap/ID* element, which is referenced by the *ElectricalMapID* which has a KeyRef that refers to the *JEP30-E101:ElectricalMapKey*.

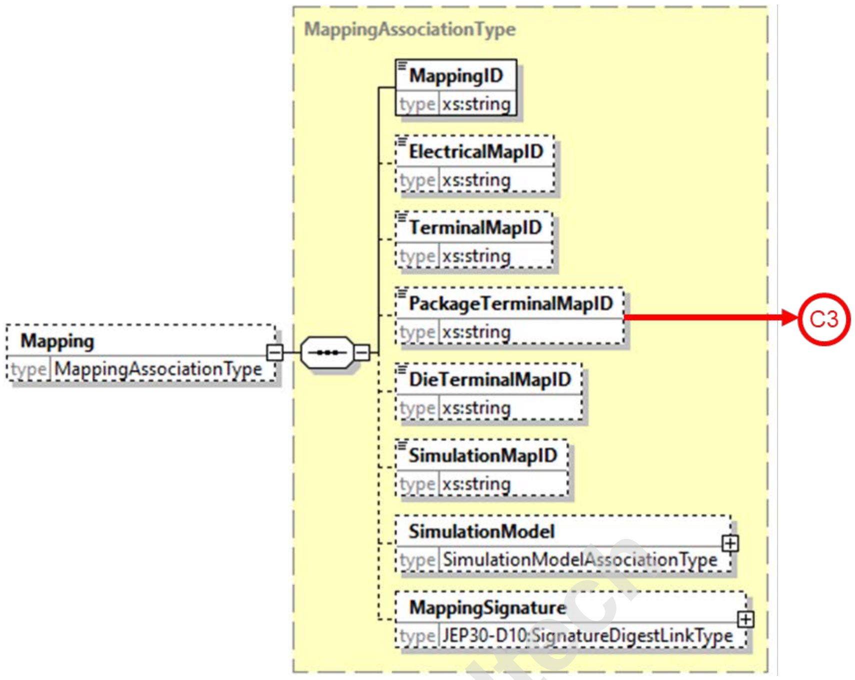
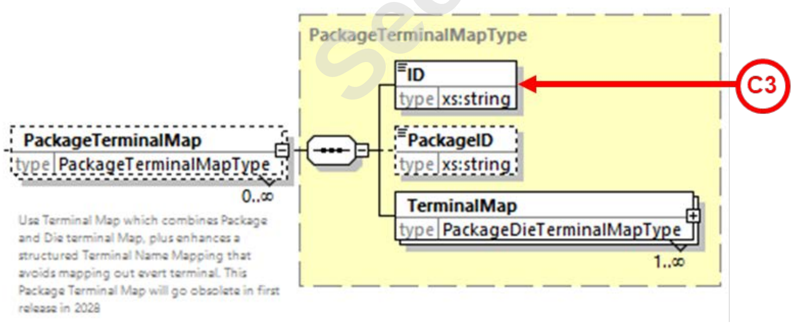
4.5.14. Linking the Manufacturing Part Number to Terminal Map data

path	**PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/Mapping**
diagram at the Mapping Association level	
type	**MappingAssociationType, JEP30-D10:SignatureDigestLinkType, …**
path	**PartModel/ElectricalSection/Mapping-Array/Mapping/TerminalMap**
diagram at Terminal Map level	
type	**PackageTerminalMapType, …**

The *TerminalMapID* references the *TerminalMap/ID* under the *ElectricalSection/Mapping-Array/Mapping/TerminalMap*. This is enforced by the key named as *TerminalMapKey* that is assigned to the *TerminalMap /ID* element, which is referenced by the *TerminalMapID* which has a KeyRef that refers to the *JEP30-E101: TerminalMapKey*.

NOTE: Use this Terminal Map structure which combines Package and Die terminal Map, plus enhances a structured Terminal Name Mapping that avoids mapping out every terminal. The Package and Die Terminal Map structures below will go obsolete in first release in 2028

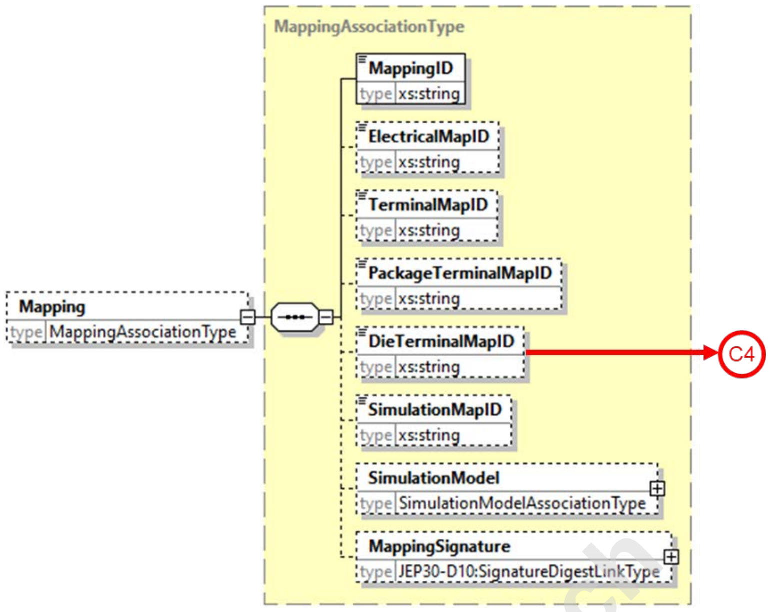
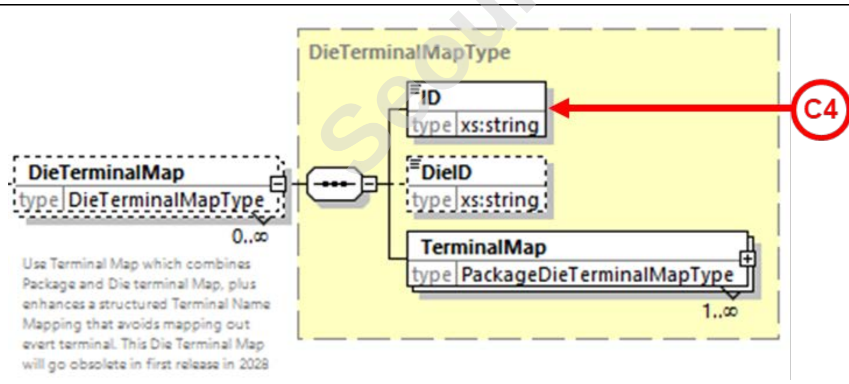
4.5.15. Linking the Manufacturing Part Number to Package Terminal Map data

path	**PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/Mapping**
diagram at the Mapping Association level	
type	**MappingAssociationType, JEP30-D10:SignatureDigestLinkType, …**
path	**PartModel/ElectricalSection/Mapping-Array/Mapping/PackageTerminalMap**
diagram at Terminal Map level	
type	**PackageTerminalMapType, …**

The *PackageTerminalMapID* references the *PackageTerminalMap/ID* under the *ElectricalSection/Mapping-Array/Mapping/PackageTerminalMap*. This is enforced by the key named as *PackageTerminalMapKey* that is assigned to the *PackageTerminalMap /ID* element, which is referenced by the *PackageTerminalMapID* which has a KeyRef that refers to the *JEP30-E101:PackageTerminalMapKey*.

NOTE: Use Terminal Map which combines Package and Die terminal Map, plus enhances a structured Terminal Name Mapping that avoids mapping out every terminal. This Package Terminal Map will go obsolete in first release in 2028

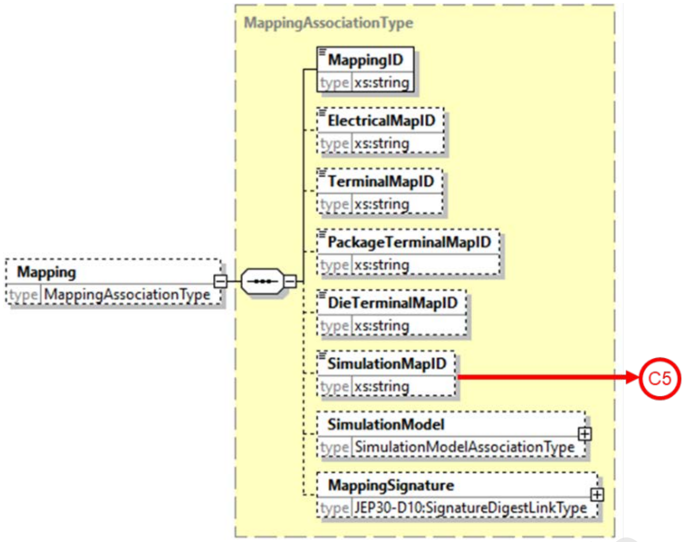
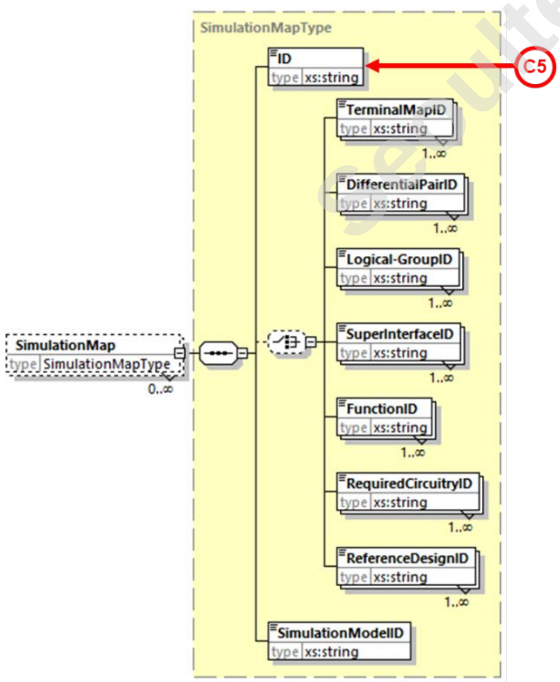
4.5.16. Linking the Manufacturing Part Number to Die Terminal Map data

<table>
<tr><td>path</td><td>PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/Mapping</td></tr>
<tr><td>diagram at the Mapping Association level</td><td>
</td></tr>
<tr><td>type</td><td>MappingAssociationType, JEP30-D10:SignatureDigestLinkType, …</td></tr>
<tr><td>path</td><td>PartModel/ElectricalSection/Mapping-Array/Mapping/DieTerminalMap</td></tr>
<tr><td>diagram at Terminal Map level</td><td>
</td></tr>
<tr><td>type</td><td>TerminalMapType, …</td></tr>
</table>

The *DieTerminalMapID* references the *DieTerminalMap/ID* under the *ElectricalSection/Mapping-Array//Mapping/DieTerminalMap*. This is enforced by the key named as *DieTerminalMapKey* that is assigned to the *DieTerminalMap/ID* element, which is referenced by the *DieTerminalMapID* which has a KeyRef that refers to the *JEP30-E101: DieTerminalMapKey*.

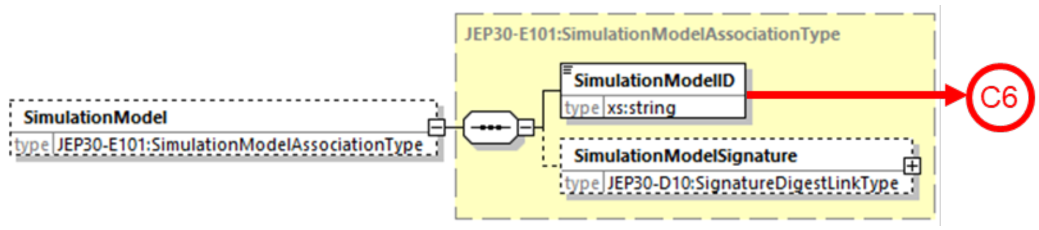
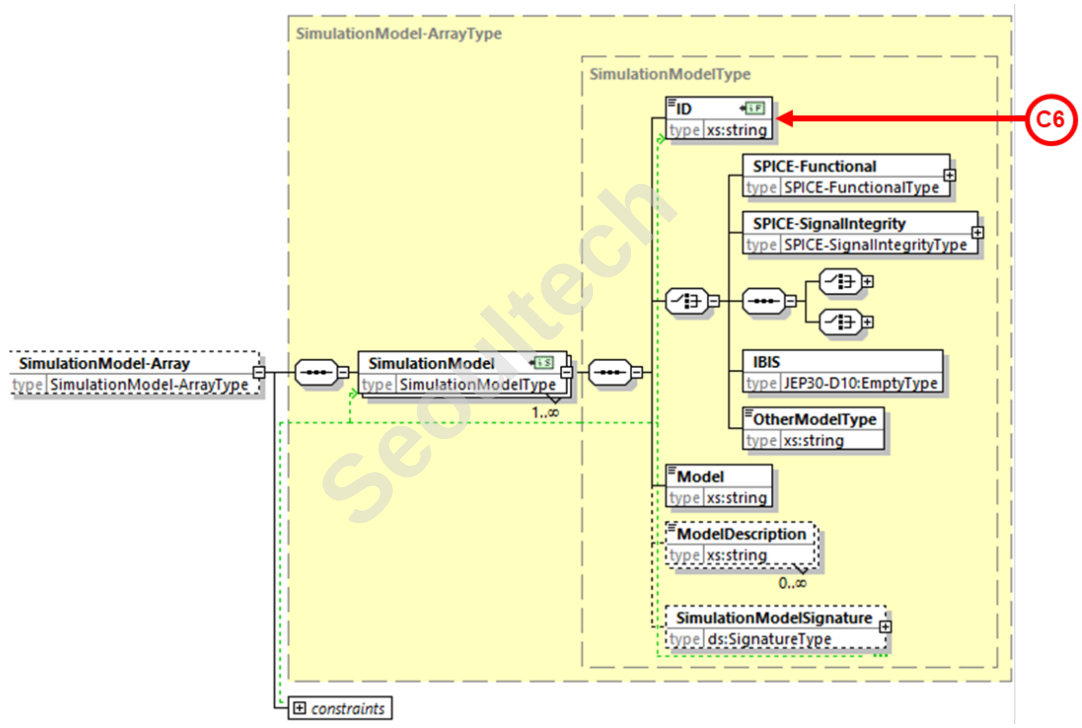
NOTE: Use Terminal Map which combines Package and Die terminal Map, plus enhances a structured Terminal Name Mapping that avoids mapping out every terminal. This Die Terminal Map will go obsolete in first release in 2028.

4.5.17. Linking the Manufacturing Part Number to Simulation Map data

path	**PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/Mapping**
diagram at the Mapping Association level	
type	**MappingAssociationType, JEP30-D10:SignatureDigestLinkType, …**
path	**PartModel/ElectricalSection/Mapping-Array/Mapping/SimulationMap**
diagram at the Simulation Map level	
type	**SimulationMapType.**

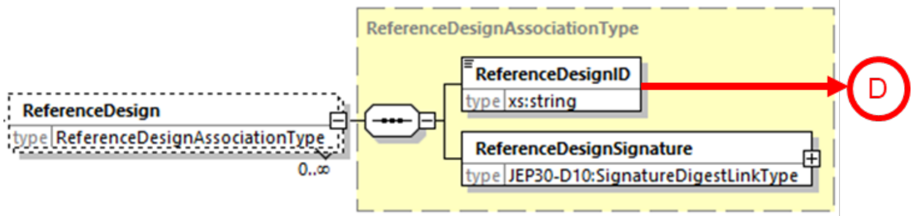
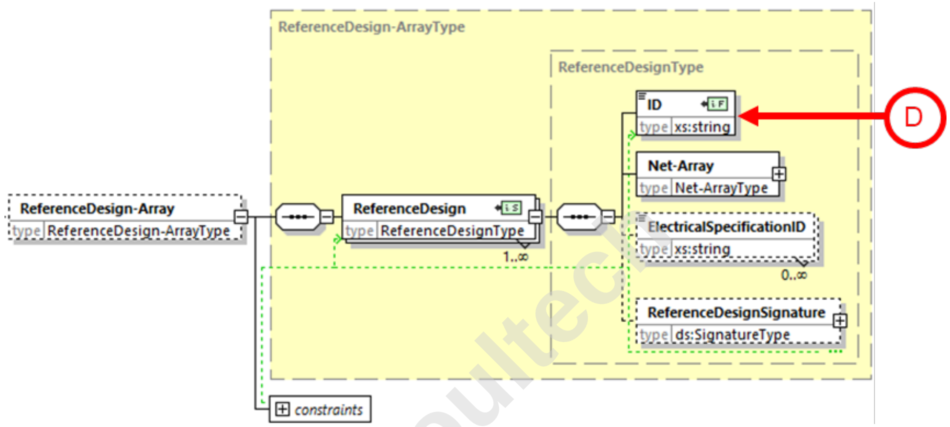
The *SimulationMapID* references the *SimulationMap/ID* under the *ElectricalSection/Mapping-Array/Mapping/SimulationMap*. This is enforced by the key named as *SimulationMapKey* that is assigned to the *SimulationMap/ID* element, which is referenced by the *SimulationMapID* which has a KeyRef that refers to the *JEP30-E101:SimulationMapKey*.

4.5.18. Linking the Manufacturing Part Number to Simulation Models

<table>
<tr><td>path</td><td>PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/Mapping/SimulationModel</td></tr>
<tr><td>diagram at the Simulation Model Association level</td><td>
</td></tr>
<tr><td>type</td><td>JEP30-E101:SimulationModelAssociationType, JEP30-D10:SignatureDigestLinkType.</td></tr>
<tr><td>path</td><td>PartModel/ElectricalSection/SimulationModel-Array</td></tr>
<tr><td>diagram at the Simulation Model-Array level</td><td>
</td></tr>
<tr><td>type</td><td>SimulationModel-ArrayType, SimulationModelType, …</td></tr>
</table>

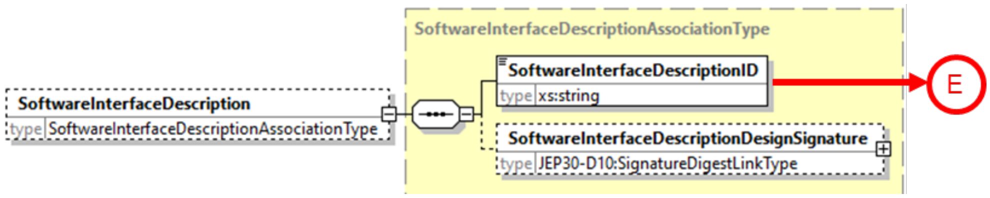
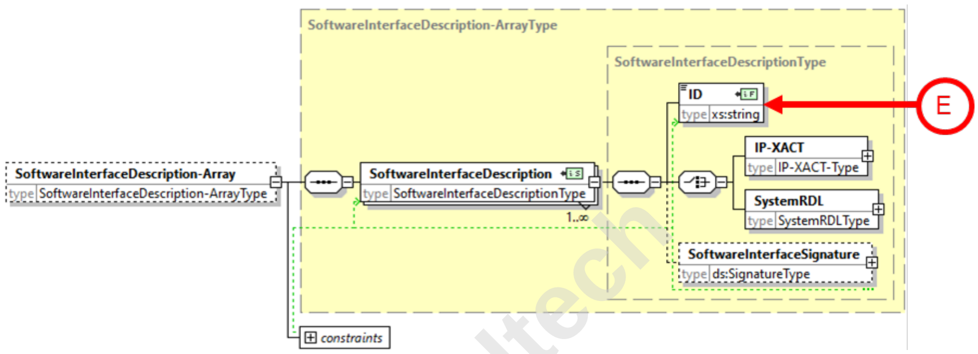
The *SimulationModelID* references the *SimulationModel/ID* under the *ElectricalSection/ SimulationModel-Array/SimulationModel*. This is enforced by the key named *SimulationModelKey* is assigned to the *SimulationModel/ID* element, which is referenced by the *SimulationModelID* which has a KeyRef that refers to the *JEP30-E101: SimulationModelKey*.

4.5.19. Linking the Manufacturing Part Number to Reference Design

path	**PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/ReferenceDesign**
diagram at the Reference Design Association level	
type	**ReferenceDesignAssociationType, JEP30-D10:SignatureDigestLinkType, …**
path	**PartModel/ElectricalSection/ReferenceDesign-Array**
diagram at the Reference Design-Array level	
type	**ReferenceDesign-ArrayType, ReferenceDesignType, …**

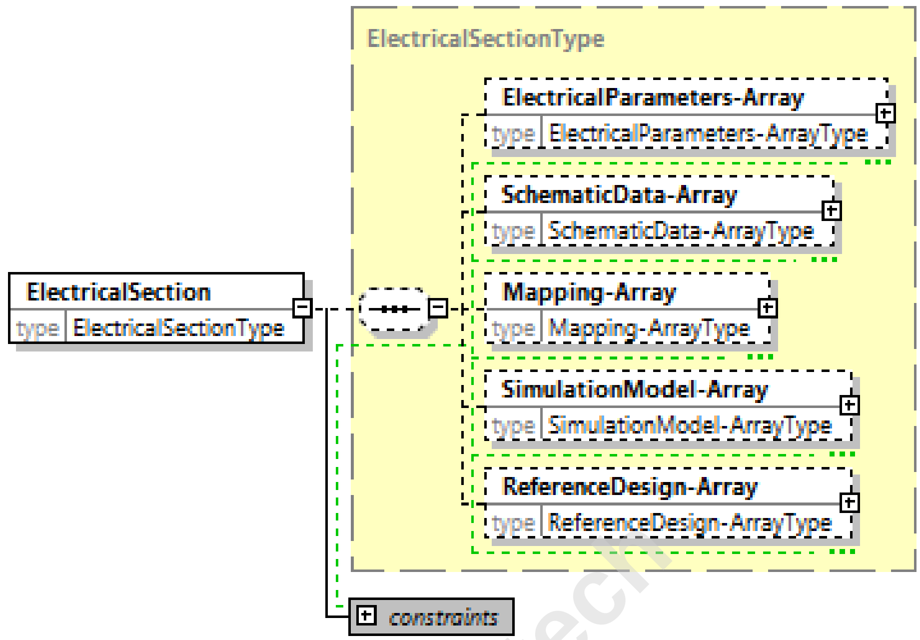
The *ReferenceDesignID* references the *ReferenceDesign/ID* under the *ElectricalSection/SchematicData-Array/ReferenceDesign-Array*. This is enforced by the key named as *ReferenceDesignKey* is assigned to the *ReferenceDesign/ID* element, which is referenced by the *ReferenceDesignID* which has a KeyRef that refers to the *JEP30-E101: ReferenceDesignKey*.

4.5.20. Linking the Manufacturing Part Number to Software Interface Description

<table>
<tr><td>path</td><td>PartModel/PartDetails-Array/PartDetails/Association-Array/Association/Electrical-Array/SoftwareInterfaceDescription</td></tr>
<tr><td>diagram at the Software Interface Description Association level</td><td>
</td></tr>
<tr><td>type</td><td>SoftwareInterfaceDescriptionAssociationType, JEP30-D10:SignatureDigestLinkType, …</td></tr>
<tr><td>path</td><td>PartModel/ElectricalSection/SoftwareInterfaceDescription-Array</td></tr>
<tr><td>diagram at the Software Interface Description -Array level</td><td>
</td></tr>
<tr><td>type</td><td>SoftwareInterfaceDescription-ArrayType, SoftwareInterfaceDescription Type, …</td></tr>
</table>

The *SoftwareInterfaceDescriptionID* references the *SoftwareInterfaceDescription/ID* under the *ElectricalSection/SchematicData-Array/SoftwareInterfaceDescription-Array*. This is enforced by the key named as *SoftwareInterfaceDescriptionKey* is assigned to the *SoftwareInterfaceDescription/ID* element, which is referenced by the *SoftwareInterfaceDescriptionID* which has a KeyRef that refers to the *JEP30-E101: SoftwareInterfaceDescriptionKey*.

4.6. Electrical Section

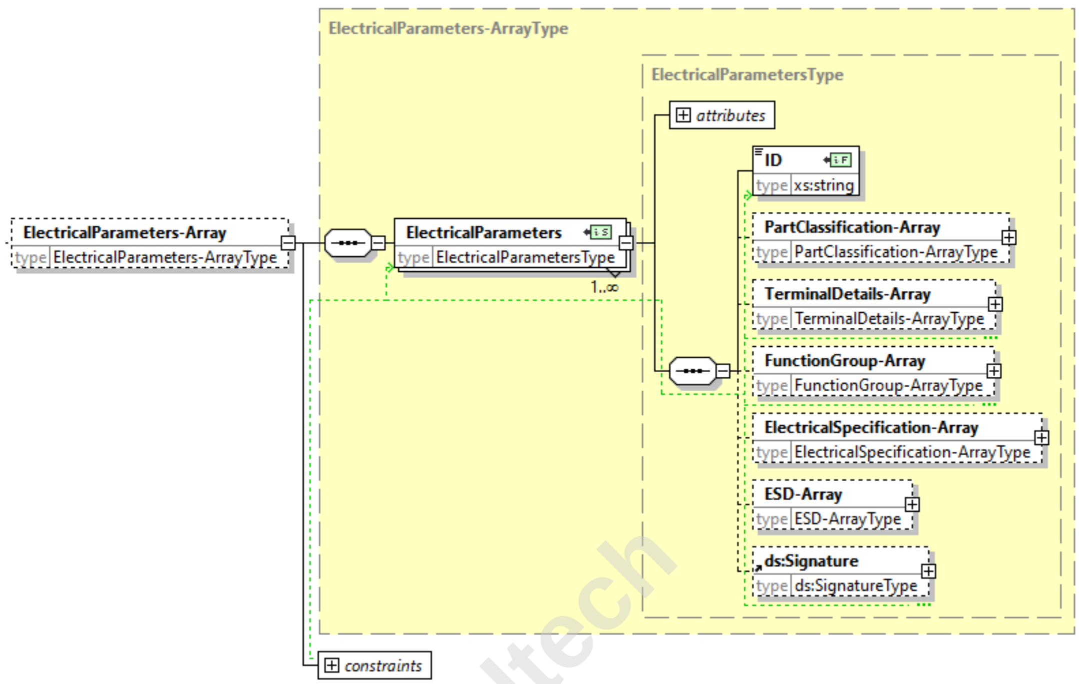
path	PartModel/ElectricalSection
diagram	
type	ElectricalParameters-ArrayType, SchematicData-ArrayType, Mapping-ArrayType, SimulationModel-ArrayType, ReferenceDesign-ArrayType.

The Electrical section is grouped into 5 individual sections to facilitate the digital signing of the content, so that the customer can obtain a high degree of confidence in the integrity of the content. The content is organized such that all the electriocal properties is grouped under the *ElectricalParameters-Array* branch. Content that is required to support circuitry design, namely Symbols and Required Circuitry are grouped under *SchematicData-Array*.

When the electrical representation of the data is mapped to a package or to simulation models, then this data is represented under the *Mapping-Array* branch. Some parts have various kinds of functional and simulation models that describe the operation and / or performance of the part. These models are grouped under the *SimulationModel-Array* branch. Component manufacturers, distributors, data aggregators or any service bureaus sometimes take hero parts and develop partial of full reference designs. These reference design are grouped under the *ReferenceDesign-Array* branch.

These are described in more detail in the following sections.

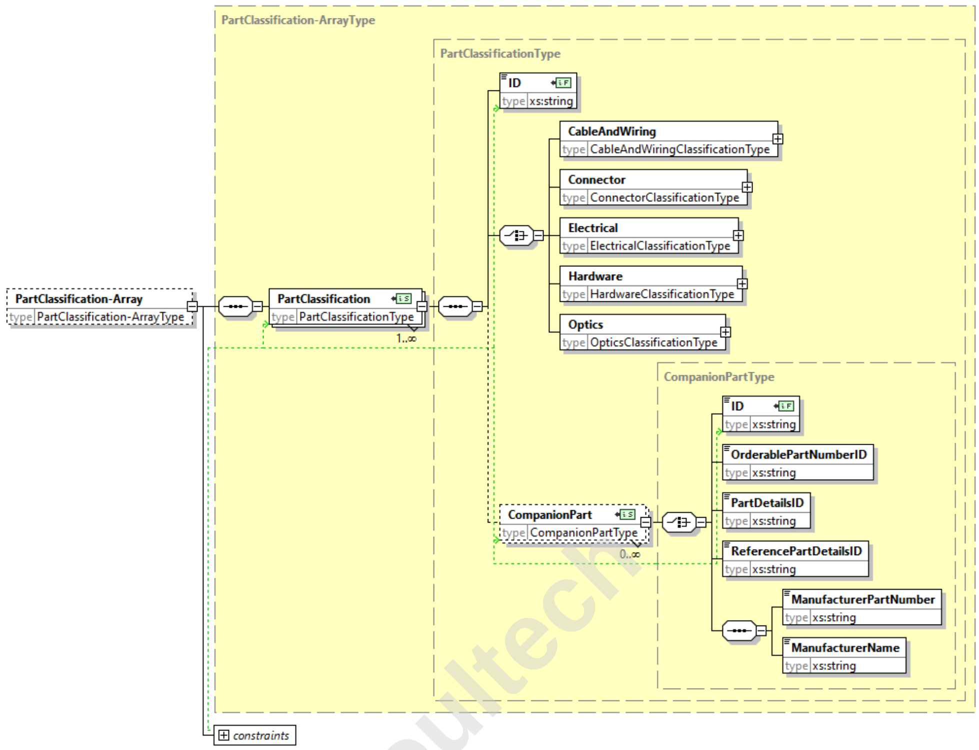
4.7. Electrical Parameters

path	PartModel/ElectricalSection/ElectricalParameters-Array
diagram	
type	ElectricalParameters-ArrayType, ElectricalParametersType, PartClassification-ArrayType, Electrical-ArrayType, ElectricalSpecification-ArrayType, ds:SignatureType

The *ElectricalParameters-Array* section captures electrical content about the Part in basically the following groups of data, namely:-

1. Part Classification
2. Terminal Details,
3. FunctionGroup-Array details which can be assigned to a discrete device or can represent just one component of the device, and
4. Electrical Specifications
5. Electrostatic Discharge (*ESD*) limitations.

4.7.1. Part Classification - Array

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array**
diagram	
type	**PartClassification-ArrayType, PartClassificationType, CableAndWiringClassificationType, ConnectorClassificationType, ElectricalClassificationType, HardwareClassificationType, OpticsClassificationType, CompanionPartType.**

A Part can be classified into one of 5 major types, namely as:-

1. *CableAndWiring,*
2. *Connector,*
3. *Electrical*,
4. *Hardware*, or
5. *Optic*.

Even if a Part is classified as Connector, Hardware or Optics, it may also have electrical data that needs to be captured under some of the other sections.

A *CompanionPart* is a part that accompanies this Part that is being reference in the PartModel. This *CompanionPart* could be for example

- A heatsink that is required for this electrical device

4.7.1 Part Classification - Array (cont'd)

- Attachment Hardware for use with a connector during assembly, such as screws, nuts, clips, etc
- A mating connector
- An electrical component that is fitted into a Socket in order to be attached to the PB Assembly, such as Memory Modules requiring a DIMM socket.
- A metal cage or housing for various connector or for an electrical device that requires shielding.

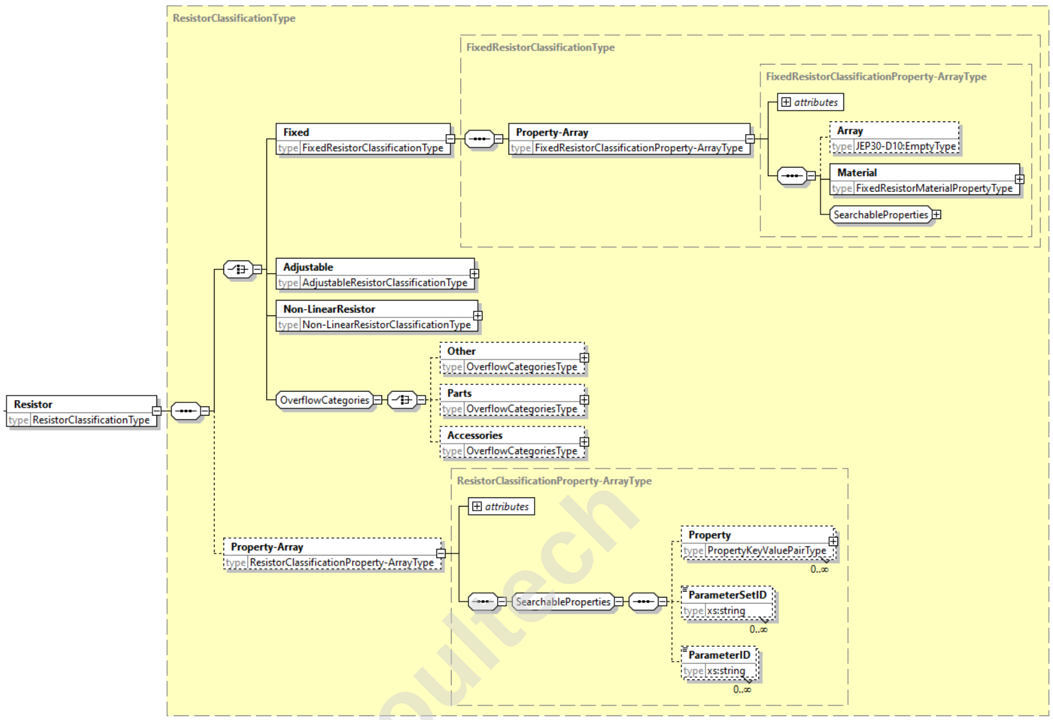
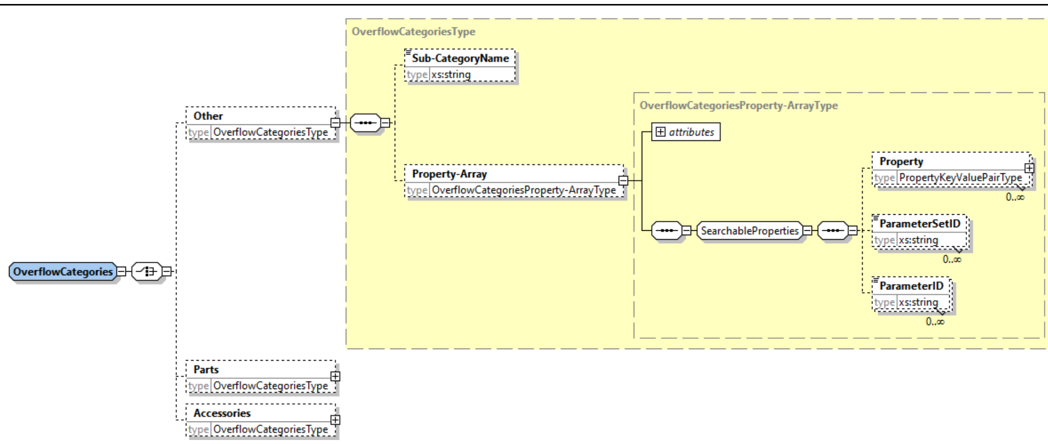
The *CompanionPart* is another entry within the PartModel file and can have its own technical content structure. Alternatively, the *CompanionPart* is another could be stored in a separate PartModel file. The identity of the *CompanionPart* could be via an an Orderable Part Number that is already within this PartModel file or referenced to a Manufacturer's Part Number form a specific Manufacturer. In some cases, a hard identity is not required such as sttachment hardware, in such case a reference to a PartDetails ID or a ReferencePartDetails ID adequate where definition of a simple set of specifications for the part is adequate.

Each of the 5 classifications above have a hierarichal structure that sub-divide the higher-level classification into smaller and smaller grouping of parts. At all levels, a set of properties can be defined tunder a Property-Array that provide additional details for the parts. The purpose of classificing parts into a hierarichal structure is to assist the user to search for the parts that they are looking for. Because of this a deep hierarichal structure is not desired and an optimal 2 or 3 levels is preferred. Below level 3, any sub-classification is suggested to be represented as opposed to a further deepening of the classification structure.

To clearly distinguish the separation of classification levels from properties, an *Attribute* called *ClassificationProperties* is added to the element "*Property-Array*" under which all properties for that part (or group of parts) are added. If the PartModel represents a single part, then typically all the relevant properties are assigned to the lowest level classification. If the Part is assigned to a parent classification and not to the child classifications, then the part properties are assigned to the *Property-Array* at the level in the hierarchy where the classification map is made. This enables the scabalility of defining *PartModel* data for parts whose sub-classifications have not yet been defined. All schema structures containing the element *Property-Array* will contain the structure as shown below by default. If additional properties are added under the *Property-Array*, then that *Property-Array* structure will be expanded.

Each level of the *PartClassification* tree in which there are sub-categories, an *OverflowCategories* group is added. This group contains the original *Other* sub-category but is joined by the the addition of *Parts* and *Accessories*. The *Other* sub-category contains the objects that cannot be classified into other specified sub-categories in the existing structure, but that are classified to their parent-classification category. The *Parts* sub-category contains the objects with spare part characteristics that maintain or re-store the original condition of the objects classified under the parent-classification category. The *Accessories* sub-category contains the objects with complemental characteristics, without which the basic function of the objects classified under the parent-classification category is still guaranteed. Some *OverflowCategories* groups have additional properties identified under some of the sub-category branches under the *Property-Array* because it is deemed such properties are ideal for the parent-classification category.

4.7.1 Part Classification - Array (cont'd)

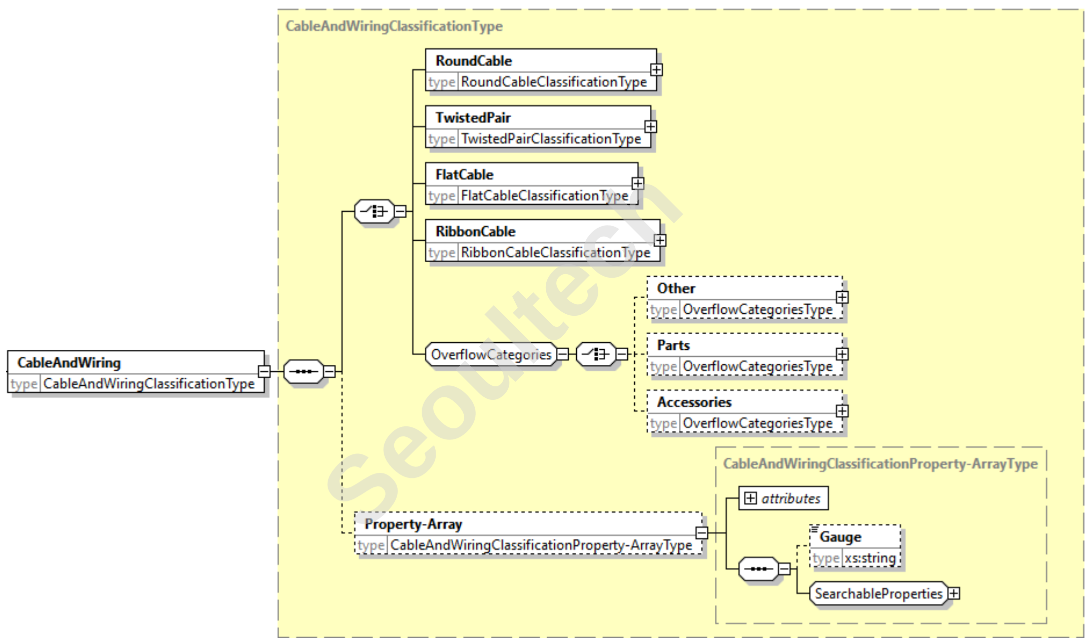
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/….(all classification branches to lowest level classification branch. The Resistor branch is just one of these branches)**
diagram part 1 of 2	
type (sample specifically for Resistor category)	**ResistorClassificationType, FixedResistorClassificationType, FixedResistorClassificationProperty-ArrayType, JEP30-D10:EmptyType, FixedResistorMaterialPropertyType, FixedResistorClassificationPropertyType, AdjustableResistorClassificationType, NonLinearResistorClassificationType, OverflowCategoriesType, ResistorClassificationProperty-ArrayType, PropertyKeyValuePairType.**
diagram part 2 of 2	
type	**OverflowCategoriesType, OverflowCategoriesProperty-ArrayType, PropertyKeyValuePairType.**
group	**OverflowCategories, SearchableProperties.**

4.7.1 Part Classification Array (cont'd)

Classifications under the category *Other*, *Parts* and *Accessories* are candidates for future standardization via this publication. The *Sub-CategoryName* enables the component manufacturer to propose specific sub-classifications via this structure.

The ParameterID and ParameterSetID allows the connection of electrical parameters that are specified under the ElectricalSpecification-Array to be referenced under the PartClassification as suitable parameters for the purpose of enabling the user to search for a part in a component DB.

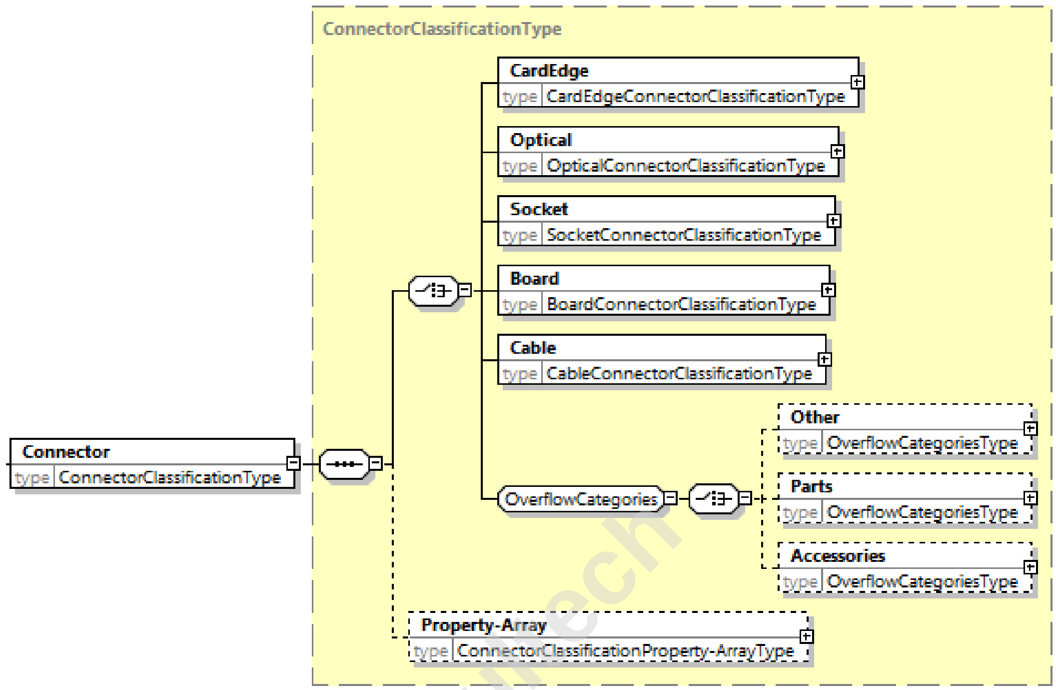
4.7.1.1. Cable and Wiring Classification

path	**ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/CableAndWiring**
diagram	
type	**CableAndWiringClassificationType, RoundCableClassificationType, TwistedPairClassificationType, FlatCableClassificationType, RibbonCableClassificationType, OverflowCategoriesType, CableAndWiringClassificationProperty-ArrayType.**
group	**OverflowCategories, SearchableProperties.**

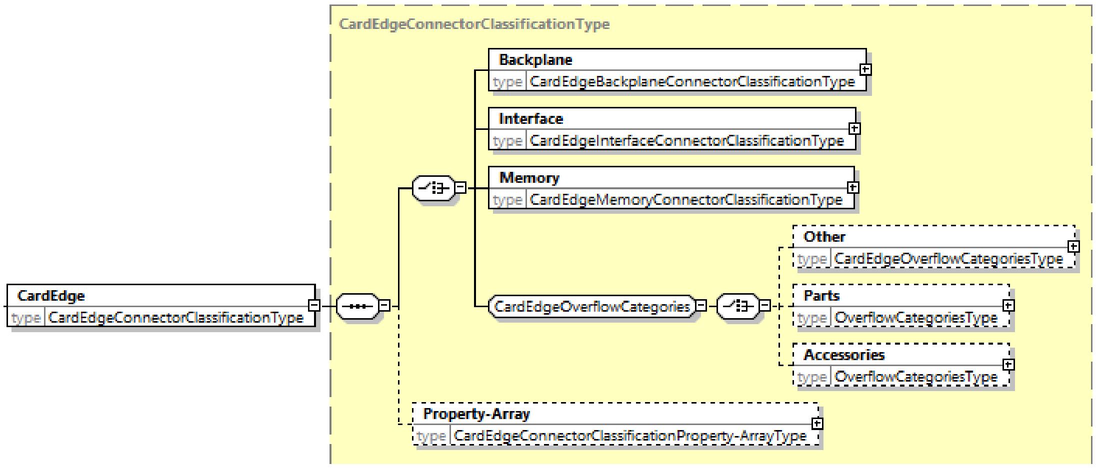
Each of the above sub-classifications of *RoundCable*, *TwistedPair*, *FlatCable*, *RibbonCable* and *Other* have their own dedicated *Property-Array*, which will enable future dedicated properties to be added to any one sub-classification and be unique to that sub-classification.

The *Property-Array* that is located directly under the parent *CableAndWiring*, with the *CableAndWiringClassificationProperty-ArrayType*, has a unique property *Gauge* defined. This therefore applies to all sub-classifications of *RoundCable*, *TwistedPair*, *FlatCable*, *RibbonCable* and each of the sub-categories under the *OverflowCategories* group, namely *Other*, *Parts*, and *Accessories*. Each *Property* has its own key value pairs, namely *Name* and *Value*.

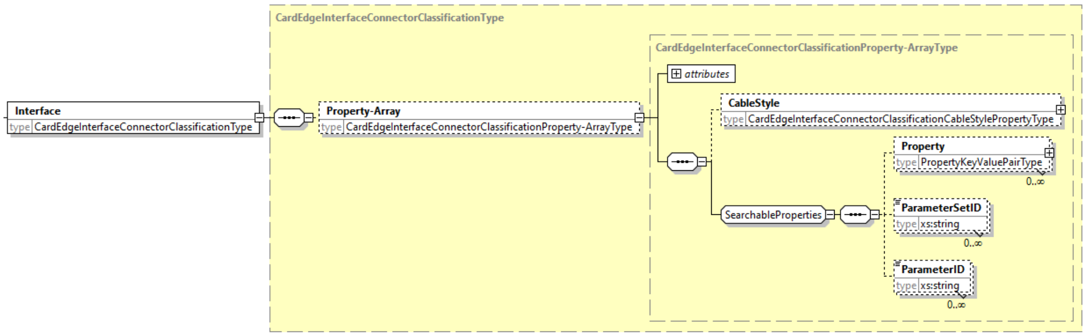
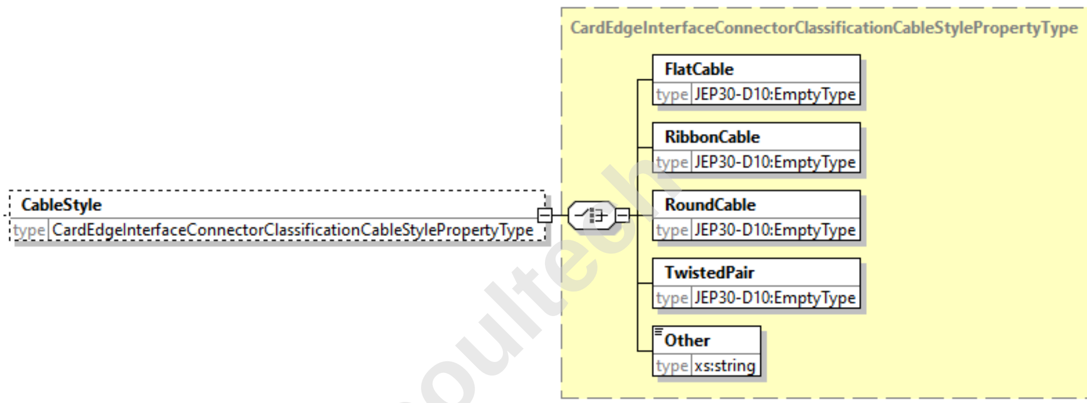
4.7.1.2. Connector Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector
diagram	
type	ConnectorClassificationType, CardEdgeConnectorClassificationType, OpticalConnectorClassificationType, SocketConnectorClassificationType, BoardConnectorClassificationType, CableConnectorClassificationType, OverflowCategoriesType, ConnectorClassificationProperty-ArrayType.
group	OverflowCategories.

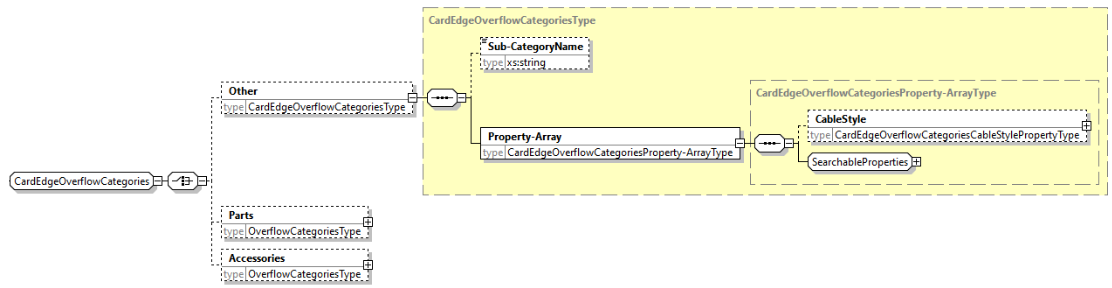
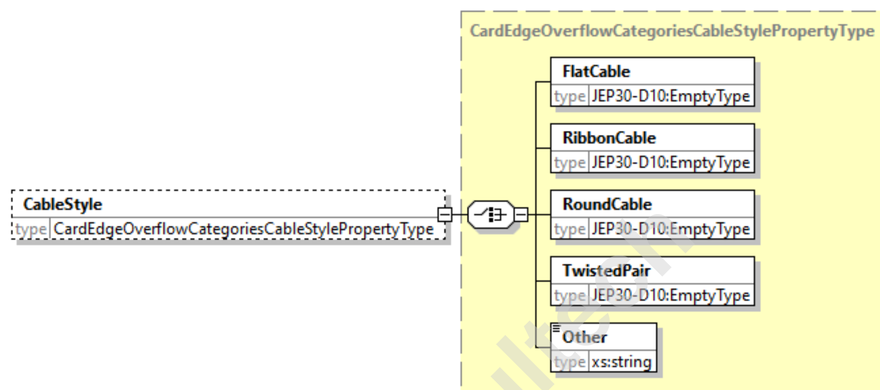
4.7.1.2.1. CardEdge Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/CardEdge
diagram	
type	CardEdgeConnectorClassificationType, CardEdgeBackplaneConnectorClassificationType, CardEdgeInterfaceConnectorClassificationType, CardEdgeMemoryConnectorClassificationType, CardEdgeOverflowCategoriesType, OverflowCategoriesType, CardEdgeConnectorClassificationProperty-ArrayType.
group	CardEdgeOverflowCategories

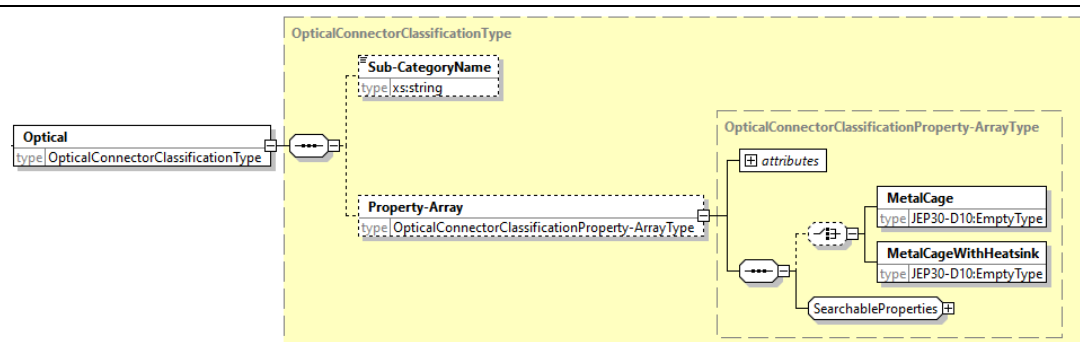
4.7.1.2.1.1. CardEdge Interface Connector Classification

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/CardEdge/Interface</td></tr>
<tr><td>diagram
1 of 2</td><td>
</td></tr>
<tr><td>diagram
2 of 2</td><td>
</td></tr>
<tr><td>type</td><td>CardEdgeInterfaceConnectorClassificationType,
CardEdgeInterfaceConnectorClassificationProperty-ArrayType,
CardEdgeInterfaceConnectorClassificationCableStylePropertyType, JEP30-D10:EmptyType.</td></tr>
<tr><td>group</td><td>SearchableProperties.</td></tr>
</table>

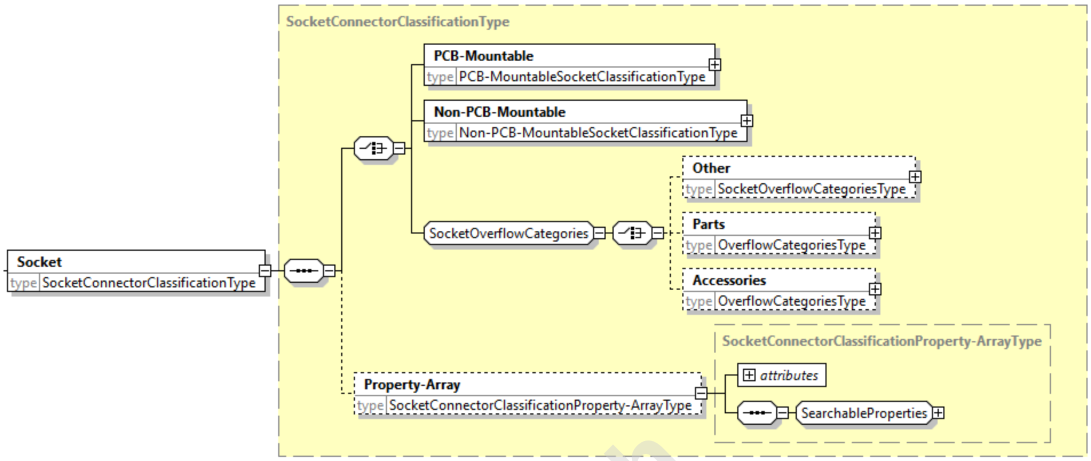
4.7.1.2.1.2. CardEdge Overflow Categories Group

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/CardEdge</td></tr>
<tr><td>diagram
1 of 2</td><td>
</td></tr>
<tr><td>diagram
2 of 2</td><td>
</td></tr>
<tr><td>type</td><td>CardEdgeOverflowCategoriesType, CardEdgeOverflowCategoriesProperty-ArrayType, CardEdgeOverflowCategoriesCableStylePropertyType, OverflowCategoriesType.</td></tr>
<tr><td>group</td><td>CardEdgeOverflowCategories, SearchableProperties.</td></tr>
</table>

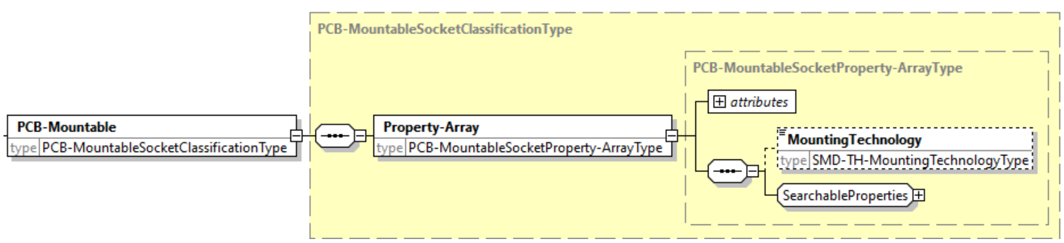
4.7.1.2.2. Optical Classification

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Optical</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>OpticalConnectorClassificationType, OpticalConnectorClassificationProperty-ArrayType, JEP30-D10:EmptyType.</td></tr>
<tr><td>group</td><td>SearchableProperties.</td></tr>
</table>

4.7.1.2.3. Socket Classification

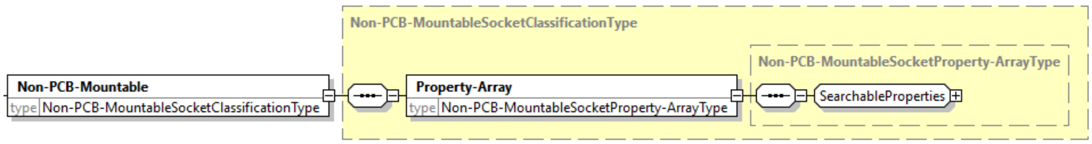
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Socket**
diagram	
type	**SocketConnectorClassificationType, PCB-MountableSocketClassificationType, Non-PCB-MountableSocketClassificationType, SocketOverflowCategoriesType, OverflowCategoriesType, SocketConnectorClassificationProperty-ArrayType.**
group	**SocketOverflowCategories, SearchableProperties.**

4.7.1.2.3.1. PCB-Mountable Socket Classification

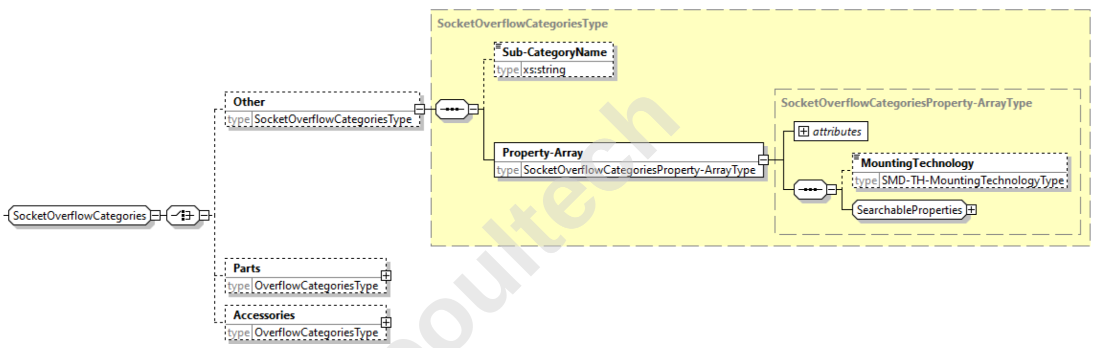
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Socket/PCB-Mountable**
diagram	
type	**PCB-MountableSocketClassificationType, PCB-MountableSocketProperty-ArrayType, SMD-TH-MountingTechnologyType.**
group	**SearchableProperties.**

The *MountingTechnology* element has enumerated values of *SMD* and *Thru-Hole*.

4.7.1.2.3.2. Non-PCB-Mountable Socket Classification

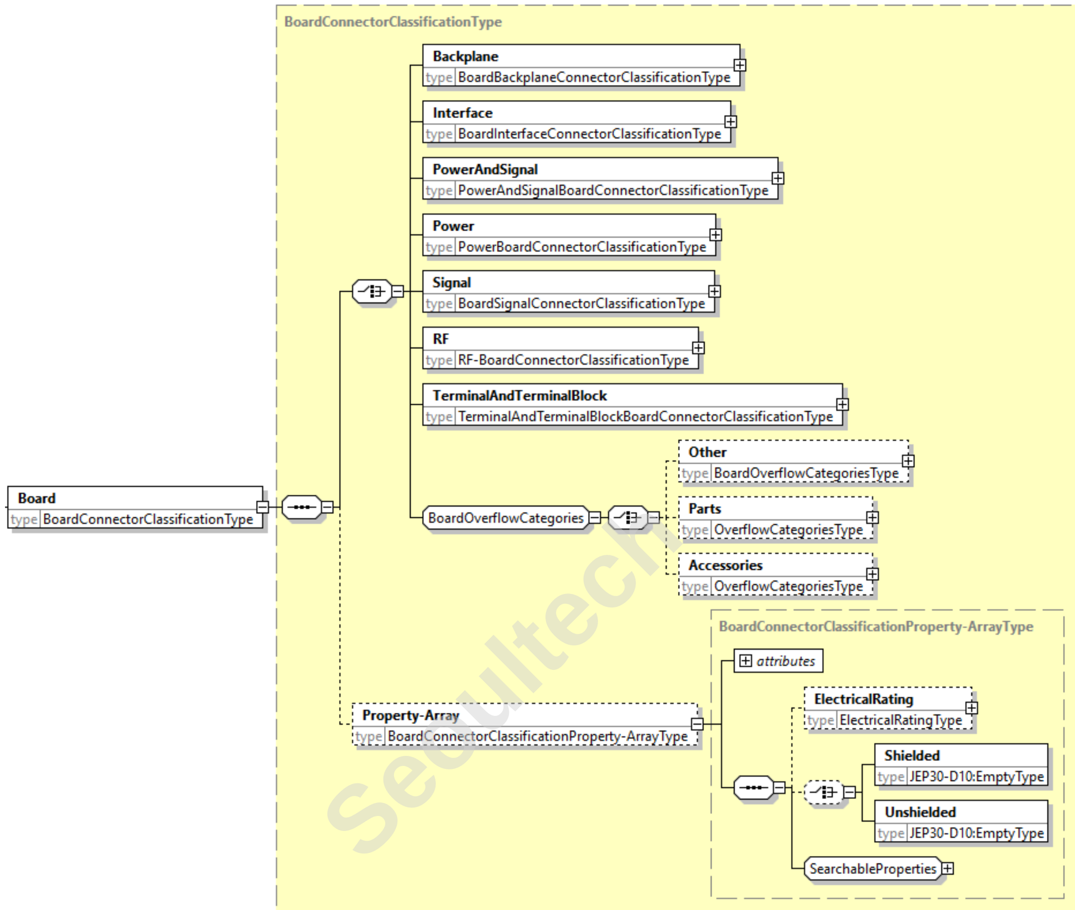
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Socket/Non-PCB-Mountable**
diagram	
type	**Non-PCB-MountableSocketClassificationType, Non-PCB-MountableSocketProperty-ArrayType.**
group	**SearchableProperties.**

4.7.1.2.3.3. Socket Overflow Categories Group

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Socket**
diagram	
type	**SocketOverflowCategoriesType, OverflowCategoriesType, SocketOverflowCategoriesProperty-ArrayType, SMD-TH-MountingTechnologyType.**
group	**SocketOverflowCategories, SearchableProperties.**

MountingTechnology has an enumerated value of *SMD*, or *Thru-Hole*. While this information can be defined in the *PartModel/PackageSection* of the PartModel, many users find value in being able to search for the Backplane connector via this attribute.

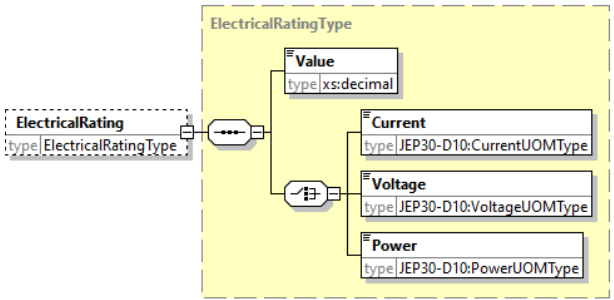
4.7.1.2.4. Board Classification

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Board</td></tr>
<tr><td>diagram</td><td>


</td></tr>
<tr><td>type</td><td>BoardConnectorClassificationType, BoardBackplaneConnectorClassificationType, BoardInterfaceConnectorClassificationType, PowerAndSignalBoardConnectorClassificationType, PowerBoardConnectorClassificationType, BoardSignalConnectorClassificationType, RF-BoardConnectorClassificationType, TerminalAndTerminalBlockBoardConnectorClassificationType, BoardOverflowCategoriesType, BoardConnectorClassificationProperty-ArrayType, ElectricalRatingType, JEP30-D10:EmptyType</td></tr>
<tr><td>group</td><td>BoardOverflowCategories, SearchableProperties.</td></tr>
</table>

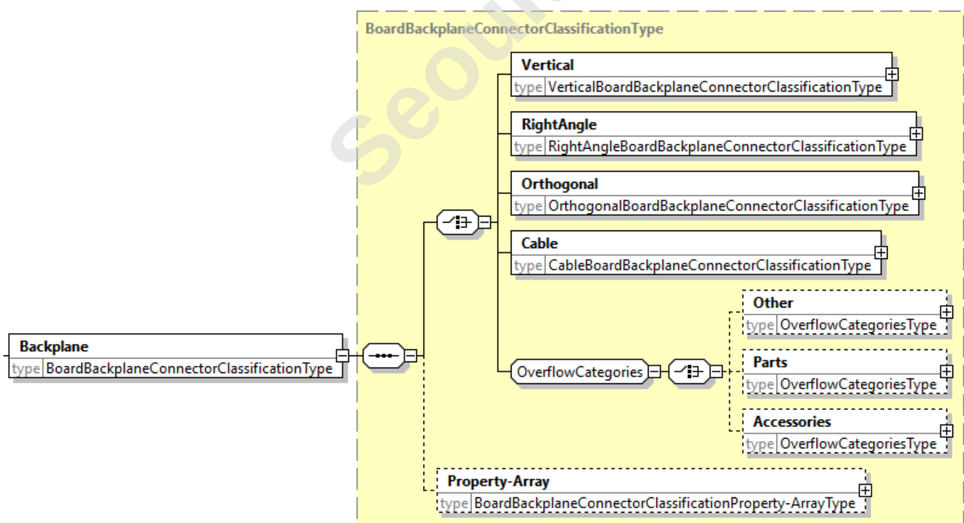
A *Board* connector can be sub-classified into one of the above categories or can have a new category specified under the sub-category *Other*. The *Backplane* category has additional classification as shown below, whereas *Interface*, *PowerAndSignal*, *Power*, *Signal, RF* and *TerminalAndTerminalBlock* do not have additional sub-classifications in this release.

4.7.1.2.4.1. Electrical Rating

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Board/Property-Array/ElectricalRating
diagram	
type	ElectricalRatingType, JEP30-D10:CurrentUOMType, JEP30-D10:VoltageUOMType, JEP30-D10:PowerUOMType.

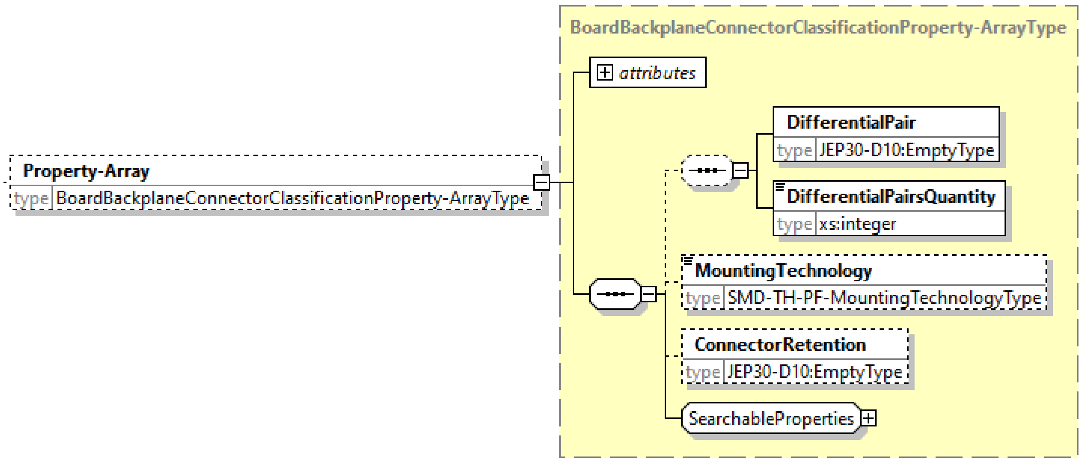
The enumerated values of *Current*, *Voltage*, and *Power* can be seen in Table 3 — UOM Enumerated Lists below.

4.7.1.2.4.2. Backplane Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Board/Backplane
diagram	
type	BoardBackplaneConnectorClassificationType, VerticalBoardBackplaneConnectorClassificationType, RightAngleBoardBackplaneConnectorClassificationType, OrthogonalBoardBackplaneConnectorClassificationType, CableBoardBackplaneConnectorClassificationType, OverflowCategoriesType, BoardBackplaneConnectorClassificationProperty-ArrayType
group	OverflowCategories.

Board/Backplane connectors can be sub-classified into *Vertical*, *RightAngle*, *Orthogonal*, or connect to a *Cable*.

4.7.1.2.4.2.1. Board Backplane Connector Classification Property – Array Type

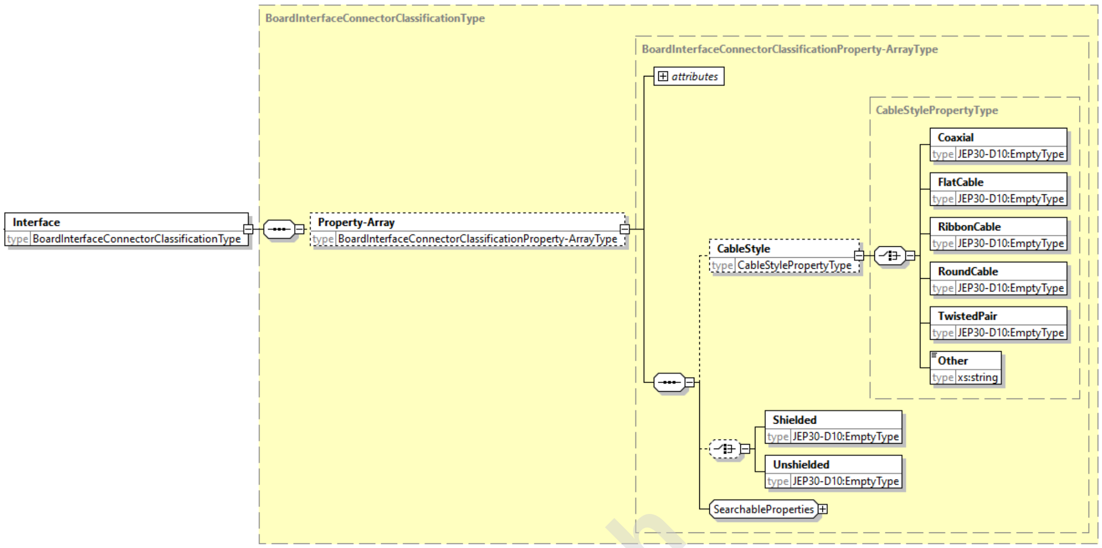
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Board/Backplane/Property-Array
diagram	
type	BoardBackplaneConnectorClassificationProperty-ArrayType, JEP30-D10:EmptyType, SMD-TH-PF-MountingTechnologyType.
group	SearchableProperties.

If the *Backplane* connector contains differential pairs, then *DifferentialPair* is inserted into the PartModel file along with the *DifferentialPairsQuantity* that is supported by that connector column.

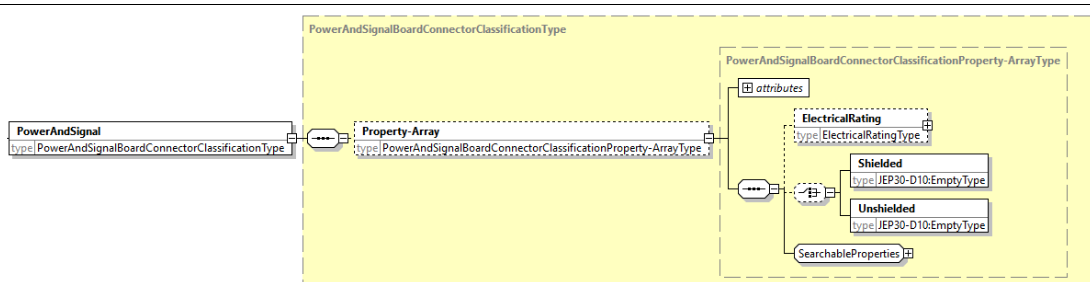
MountingTechnology has an enumerated value of *SMD*, *Thru-Hole* or *Pressfit*. While this information can be defined in the *PartModel/PackageSection* of the PartModel, many users find value in being able to search for the Backplane connector via this attribute.

If the *Backplane* connector has retention capability to its mating connector, then *ConnectorRetention* element is inserted into the PartModel file.

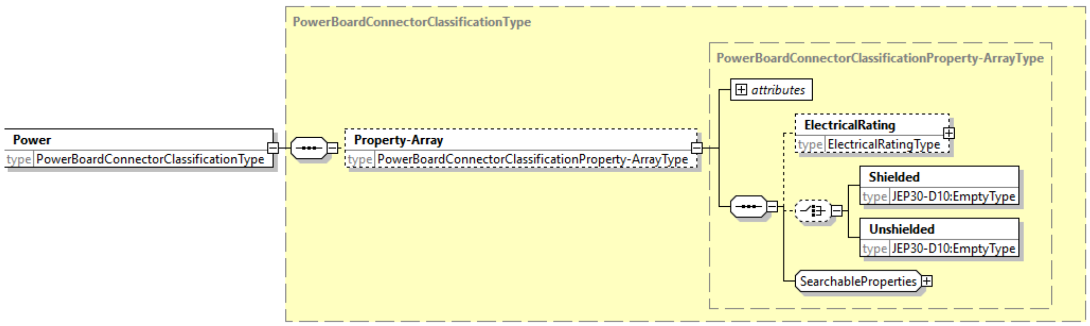
4.7.1.2.4.3. Interface Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Board/Interface
diagram	
type	BoardInterfaceConnectorClassificationType, BoardInterfaceConnectorClassificationProperty-ArrayType, CableStylePropertyType, JEP30-D10:EmptyType.
group	SearchableProperties.

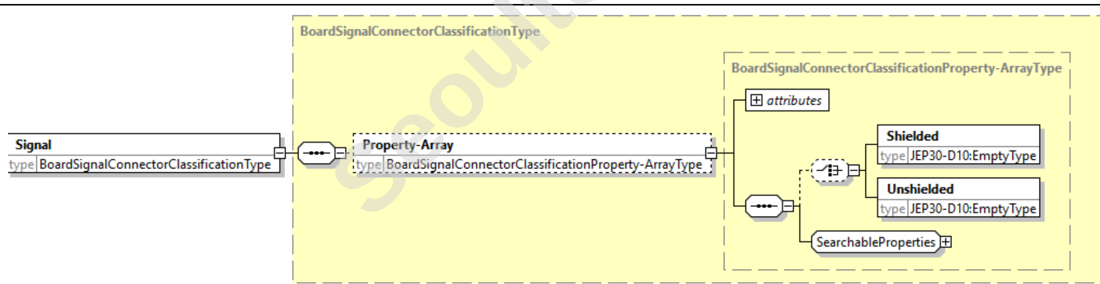
4.7.1.2.4.4. Power And Signal Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Board/PowerAndSignal
diagram	
type	PowerAndSignalBoardConnectorClassificationType, PowerAndSignalBoardConnectorClassificationProperty-ArrayType, ElectricalRatingType, JEP30-D10:EmptyType.
group	SearchableProperties.

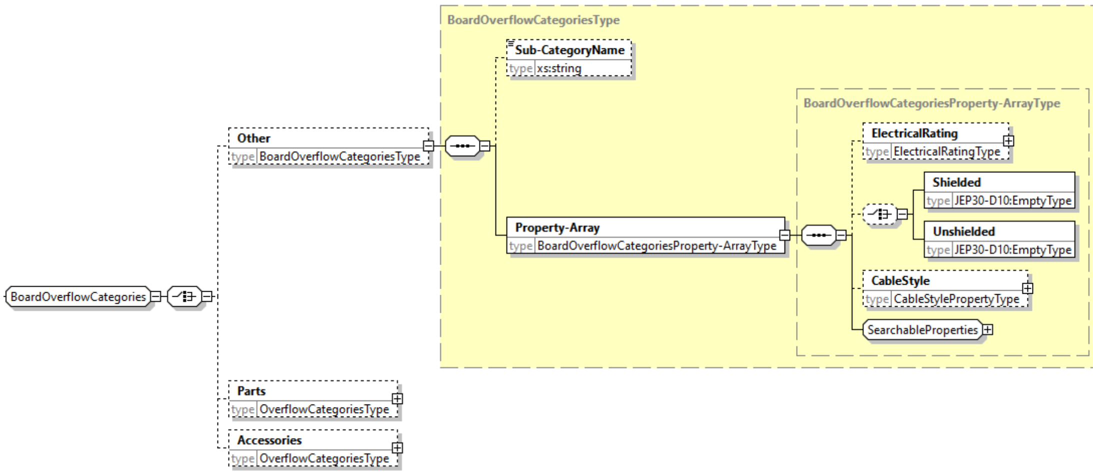
4.7.1.2.4.5. Power And Signal Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Board/Power**
diagram	
type	**PowerBoardConnectorClassificationType, PowerBoardConnectorClassificationProperty-ArrayType, ElectricalRatingType, JEP30-D10:EmptyType.**
group	**SearchableProperties.**

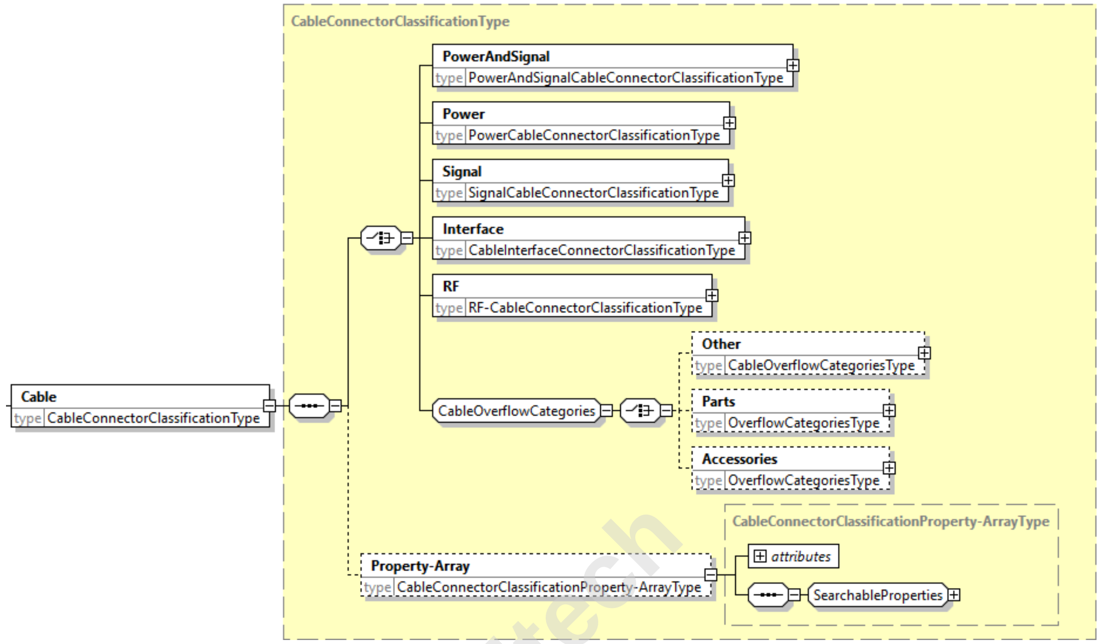
4.7.1.2.4.6. Signal Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Board/Signal**
diagram	
type	**SignalBoardConnectorClassificationType, SignalBoardConnectorClassificationProperty-ArrayType, ElectricalRatingType, JEP30-D10:EmptyType.**
group	**SearchableProperties.**

4.7.1.2.4.7. Board Overflow Categories

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Board/Signal</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>BoardOverflowCategoriesType, BoardOverflowCategoriesProperty-ArrayType, ElectricalRatingType, JEP30-D10:EmptyType, CableStylePropertyType.</td></tr>
<tr><td>group</td><td>BoardOverflowCategories, SearchableProperties.</td></tr>
</table>

4.7.1.2.5. Cable Classification

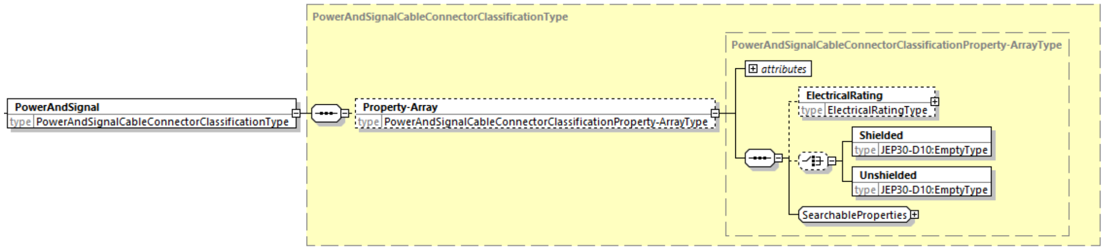
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Cable
diagram	
type	CableConnectorClassificationType, PowerAndSignalCableConnectorClassificationType, PowerCableConnectorClassificationType, SignalCableConnectorClassificationType, CableInterfaceConnectorClassificationType, RF-CableConnectorClassificationType, CableOverflowCategoriesType, OverflowCategoriesType, CableConnectorClassificationProperty-ArrayType.
group	CableOverflowCategories, SearchableProperties.

If the *Backplane* connector contains differential pairs then *DifferentialPair* is inserted into the PartModel file along with the *DifferentialPairsQuantity* that is supported by that connector column.

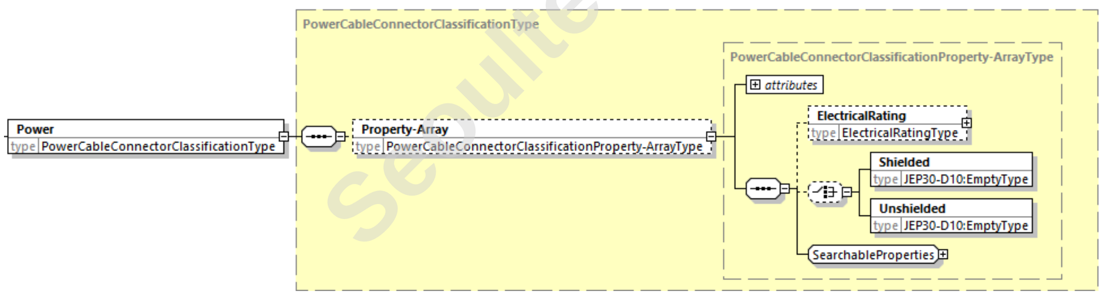
MountingTechnology has an enumerated value of *SMD*, *Thru-Hole* or *Pressfit*. While this information can be defined in the *PartModel/PackageSection* of the PartModel, many users find value in being able to search for the Backplane connector via this attribute.

If the *Backplane* connector has retention capability to its mating connector, then *ConnectorRetention* element is inserted into the PartModel file.

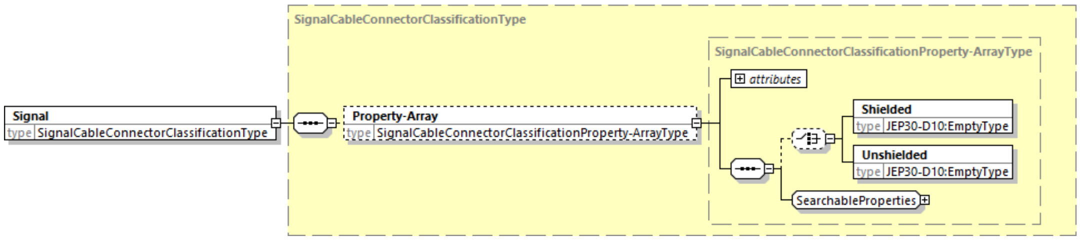
4.7.1.2.5.1. Power And Signal Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Cable/PowerAndSignal
diagram	
type	PowerAndSignalCableConnectorClassificationType, PowerAndSignalCableConnectorClassificationProperty-ArrayType, ElectricalRatingType, JEP30-D10:EmptyType.
group	SearchableProperties.

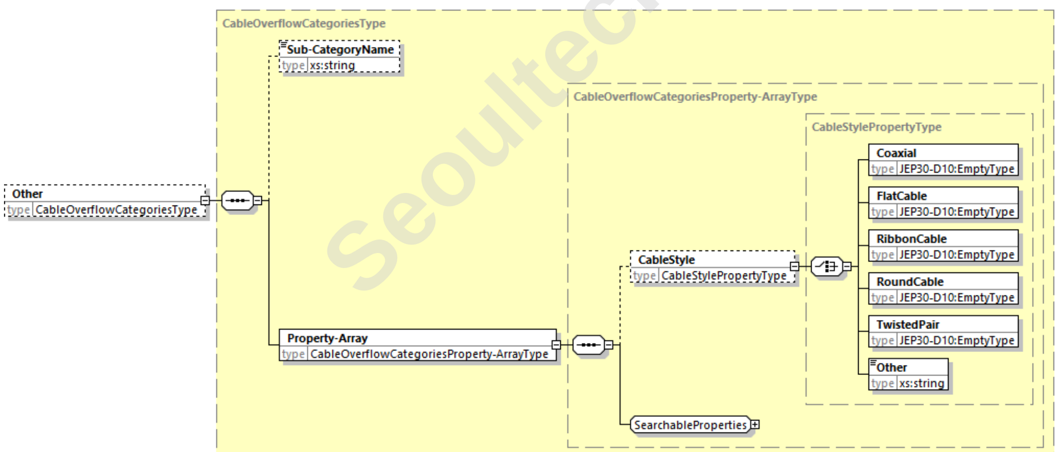
4.7.1.2.5.2. Power Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Cable/Power
diagram	
type	PowerCableConnectorClassificationType, PowerCableConnectorClassificationProperty-ArrayType, ElectricalRatingType, JEP30-D10:EmptyType.
group	SearchableProperties.

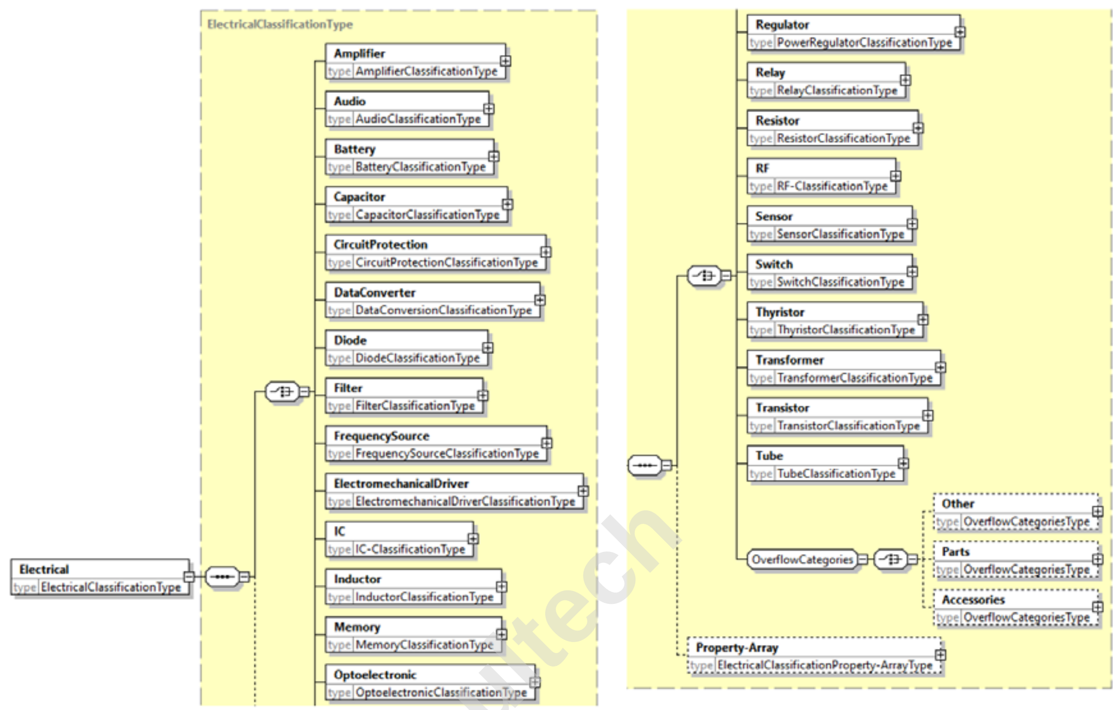
4.7.1.2.5.3. Signal Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Cable/Signal
diagram	
type	SignalCableConnectorClassificationType, SignalCableConnectorClassificationProperty-ArrayType, JEP30-D10:EmptyType.
group	SearchableProperties.

4.7.1.2.5.4. Cable Overflow Categories Type

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Connector/Cable
diagram	
type	CableOverflowCategoriesType, CableOverflowCategoriesProperty-ArrayType, CableStylePropertyType’ JEP30-D10:EmptyType.
group	SearchableProperties.

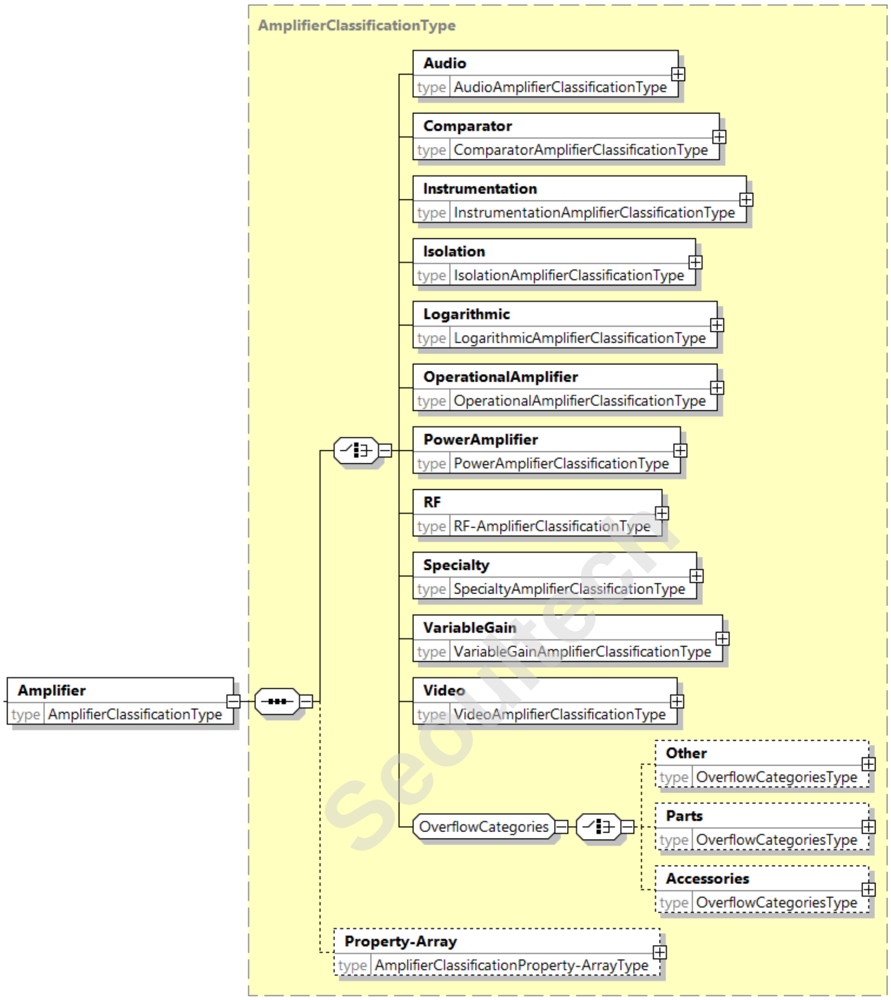
4.7.1.3. Electrical Classification

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>ElectricalClassificationType, AmplifierClassificationType, AudioClassificationType, BatteryClassificationType, CapacitorClassificationType, CircuitProtectionClassificationType, DataConversionClassificationType, DiodeClassificationType, FilterClassificationType, FrequencySourceClassificationType, ElectromechanicalDriverClassificationType, IC-ClassificationType, InductorClassificationType, MemoryClassificationType, OptoelectronicsClassificationType, PowerRegulatorClassificationType, RelayClassificationType, ResistorClassificationType, RF-ClassificationType, SensorClassificationType, SwitchClassificationType, ThyristorClassificationType, TransformerClassificationType, TransistorClassificationType, TubeClassificationType, OverflowCategoriesType, ElectricalClassificationProperty-ArrayType.</td></tr>
<tr><td>group</td><td>OverflowCategories.</td></tr>
</table>

There are several high-level *Electrical* classifications for a Part, with the capability of further sub-level classifications as shown in the following sections. A component manufacturer can also create their own classification by using the category *Other* and entering in their classification definition. However, caution should be taken in using this category, since it will reduce the effectiveness of the software tools to leverage off this data for more efficient processing of the data, since such manually defined classification may not be recognized by the software tools.

Classifications under the category *Other* are candidates for future standardization via this publication.

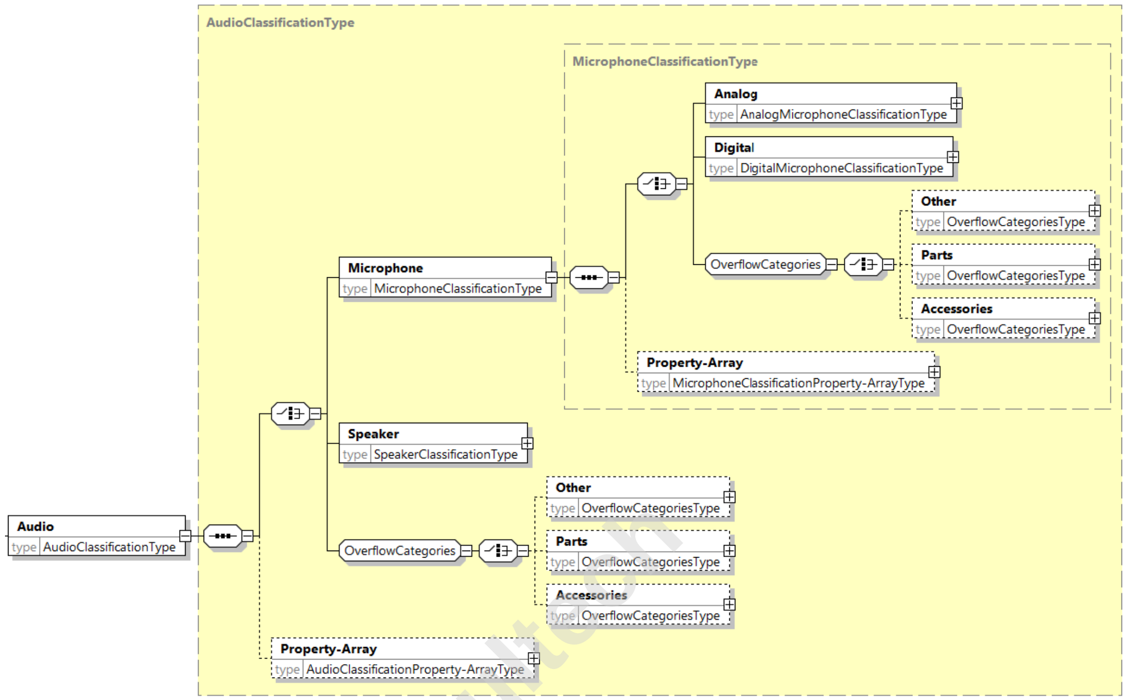
4.7.1.3.1. Amplifier Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Amplifier
diagram	
type	AmplifierClassificationType, AudioAmplifierClassificationType, ComparatorAmplifierClassificationType, InstrumentationAmplifierClassificationType, IsolationAmplifierClassificationType, LogarithmicAmplifierClassificationType, OperationalAmplifierClassificationType, PowerAmplifierClassificationType, RF-AmplifierClassificationType, SpecialtyAmplifierClassificationType, VariableGainAmplifierClassificationType, VideoAmplifierClassificationType, OverflowCategoriesType, AmplifierClassificationProperty-ArrayType
group	OverflowCategories.

An *Amplifier* can be sub-classified into one of the above categories or can have a new category specified under the category *Other*.

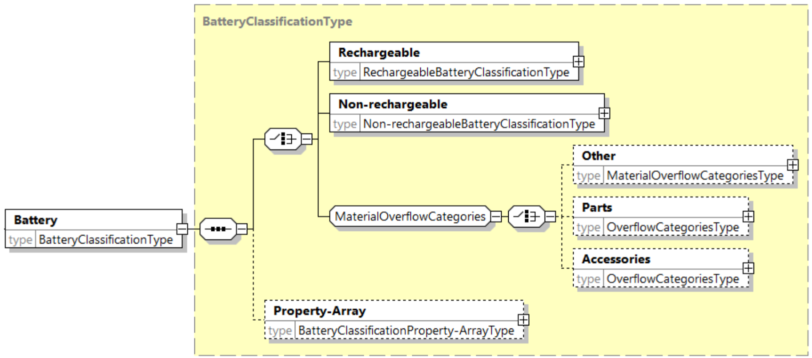
Classifications under the category *Other* are candidates for future standardization via this publication. The *Sub-CategoryName* enables the component manufacturer to propose specific sub-classifications via this structure.

4.7.1.3.2. Audio Classification

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Audio</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>AudioClassificationType, MicrophoneClassificationType, AnalogMicrophoneClassificationType, DigitalMicrophoneClassificationType, MicrophoneClassificationProperty-ArrayType, SpeakerClassificationType, OverflowCategoriesType, AudioClassificationProperty-ArrayType.</td></tr>
<tr><td>group</td><td>OverflowCategories.</td></tr>
</table>

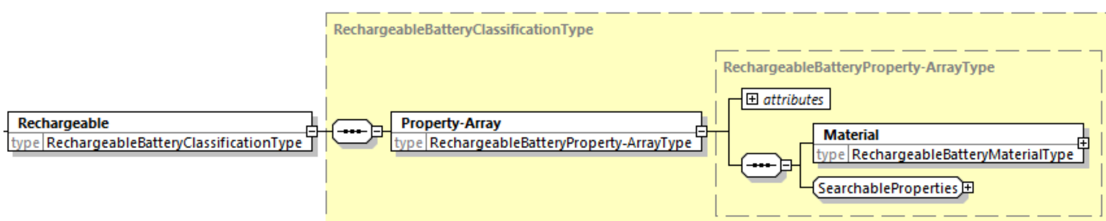
An *Audio* part can be sub-classified into one of the above categories or can have a new category specified under the category *Other*.

4.7.1.3.3. Battery Classification

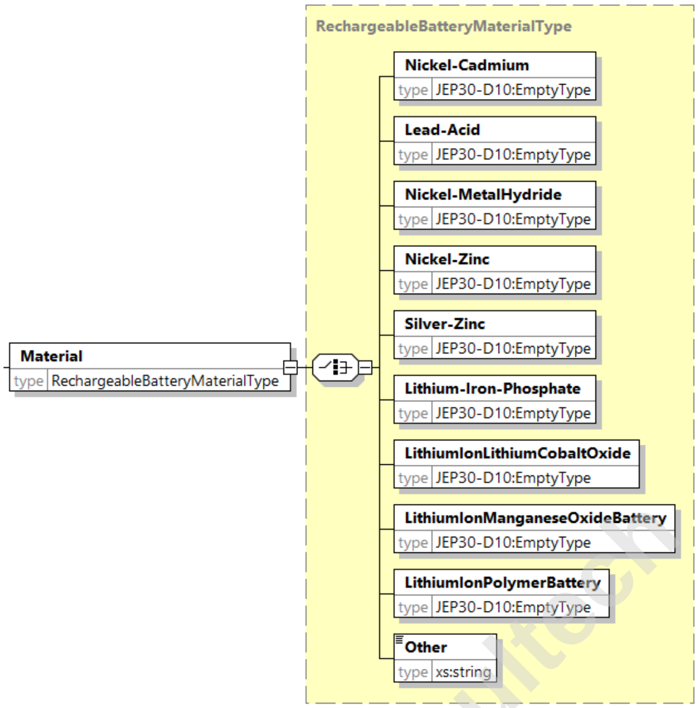
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Battery**
diagram	
type	**BatteryClassificationType, RechargeableBatteryClassificationType, Non-rechargeableBatteryClassificationType, MaterialOverflowCategoriesType, OverflowCategoriesType, BatteryClassificationProperty-ArrayType.**
group	**MaterialOverflowCategories.**

A *Battery* is either *Rechargeable* or *Non-rechargeable*. A *Non-rechargeable* battery, otherwise known as Primary Cell (single-use or "disposable") battery is used once and discarded; the electrode materials are irreversibly changed during discharge. Common examples are the alkaline battery used for flashlights and a multitude of portable electronic devices. A *Rechargeable* battery, otherwise known as Secondary batteries, can be discharged and recharged multiple times using an applied electric current; the original composition of the electrodes can be restored by reverse current.

4.7.1.3.3.1. Rechargeable Battery Classification

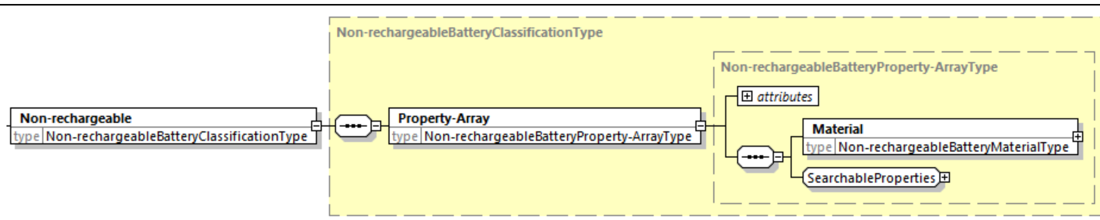
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Battery/Rechargeable**
diagram	
type	**RechargeableBatteryClassificationType, RechargeableBatteryProperty-ArrayType, RechargeableBatteryMaterialType.**
group	**SearchableProperties.**

4.7.1.3.3.1.1. Rechargeable Battery Material Property

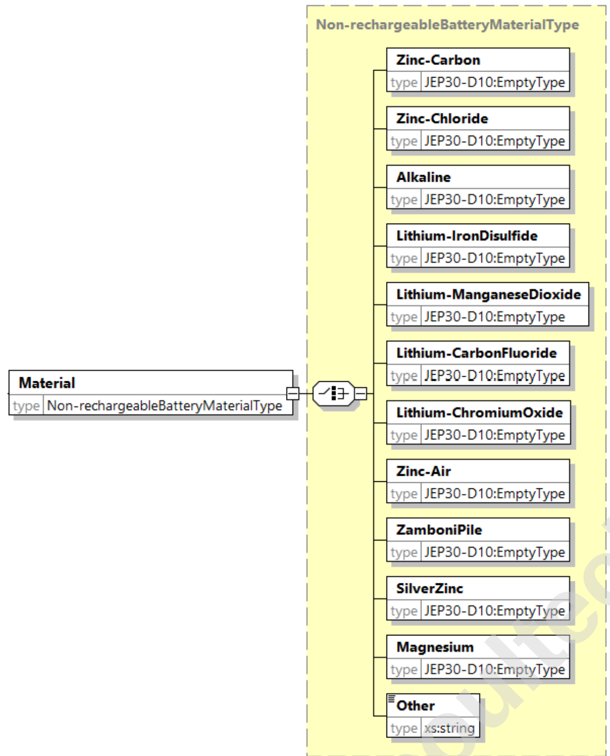
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Battery/Rechargeable/Property-Array/Material**
diagram	
type	**RechargeableBatteryMaterialType, JEP30-D10:EmptyType.**

The rechargeable battery *Material* property can be set to one of the above materials or in the event of new materials, can be specified under *Other*.

4.7.1.3.3.2. Non-rechargeable Battery Classification

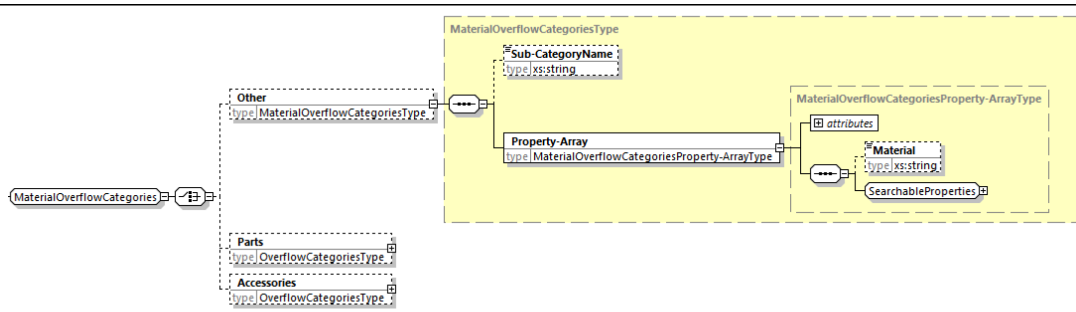
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Battery/Non-rechargeable**
diagram	
type	**Non-rechargeableBatteryClassificationType, Non-rechargeableBatteryProperty-ArrayType, Non-rechargeableBatteryMaterialType.**
group	**SearchableProperties.**

4.7.1.3.3.2.1. Non-rechargeable Battery Material Property

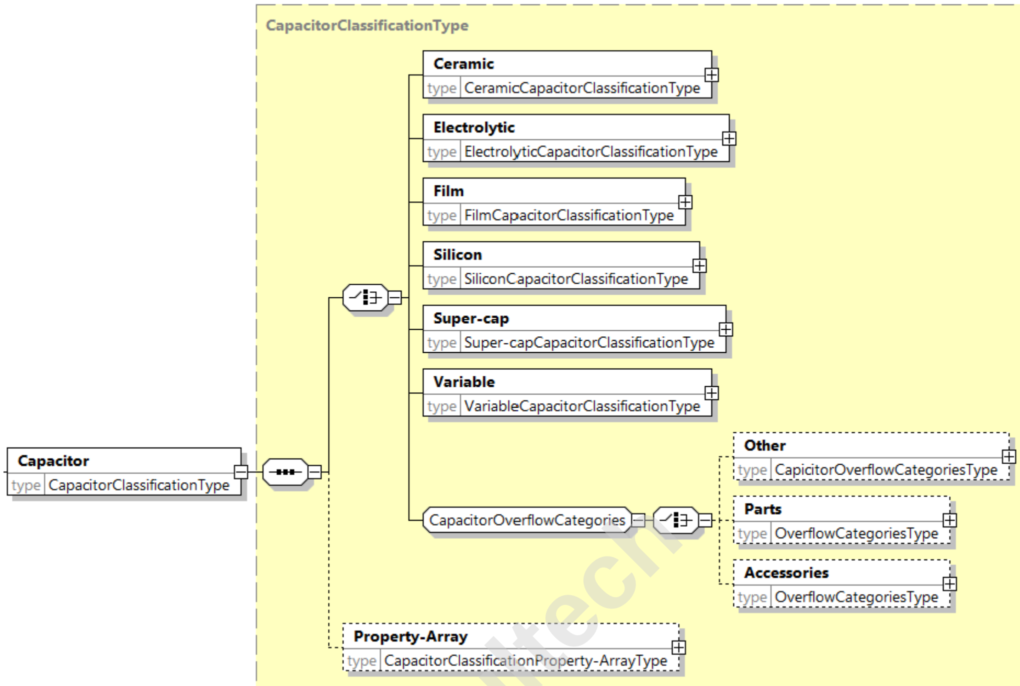
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Battery/Non-rechargeable/Property-Array/Material</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>Non-rechargeableBatteryMaterialType, JEP30-D10:EmptyType.</td></tr>
</table>

A Non-rechargeable battery *Material* property can be set to one of the above materials or in the event of new materials, can be specified under *Other*.

4.7.1.3.3.3. Material Overflow Categories Group

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Battery</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>MaterialOverflowCategoriesType, MaterialOverflowCategoriesProperty-ArrayType.</td></tr>
<tr><td>group</td><td>MaterialOverflowCategories, SearchableProperties.</td></tr>
</table>

4.7.1.3.4. Capacitor Classification

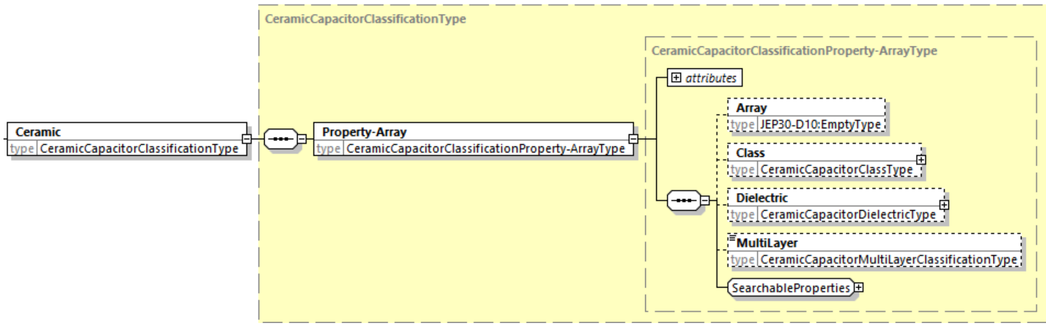
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Capacitor**
diagram	
type	**CapacitorClassificationType, CeramicCapacitorClassificationType, ElectrolyticCapacitorClassificationType, FilmCapacitorClassificationType, SiliconCapacitorClassificationType, Super-capCapacitorClassificationType, VariableCapacitorClassificationType, CapicitorOverflowCategoriesType, OverflowCategoriesType, CapacitorClassificationProperty-ArrayType.**
group	**CapacitorOverflowCategories.**

A *Capacitor* is either *Fixed* or *Variable*. If *Fixed*, then the capacitor can be sub-classified into either

1. *Ceramic*,
2. *Electrolytic*,
3. *Film*, or
4. *Silicon*, or
5. *Super-cap*.

Alternatively, special fixed capacitors can be specified under the category *Other*.

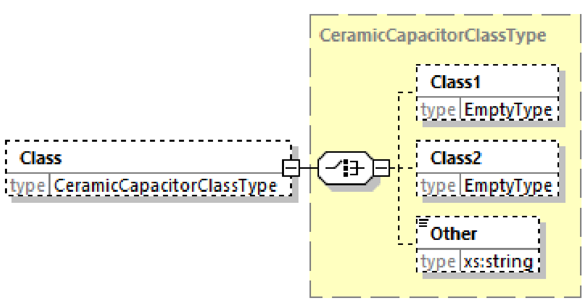
4.7.1.3.4.1. Ceramic Capacitor Classification and Property-Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Capacitor/Fixed/Ceramic</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>CeramicCapacitorClassificationType, CeramicCapacitorClassificationProperty-ArrayType, JEP30-D10:EmptyType, CeramicCapacitorClassType, CeramicCapacitorDielectricType, CeramicCapacitorMultiLayerClassificationType.</td></tr>
<tr><td>group</td><td>SearchableProperties.</td></tr>
</table>

Ceramic capacitors are often consolidated in array form, and this can be additionally classified via the optional element *Array*. The enumerated list of values for *MultiLayer* are *Yes*, *No* and *Unspecified*. If this element is not specified in the PartModel file, it is assumed to be *Unspecified*.

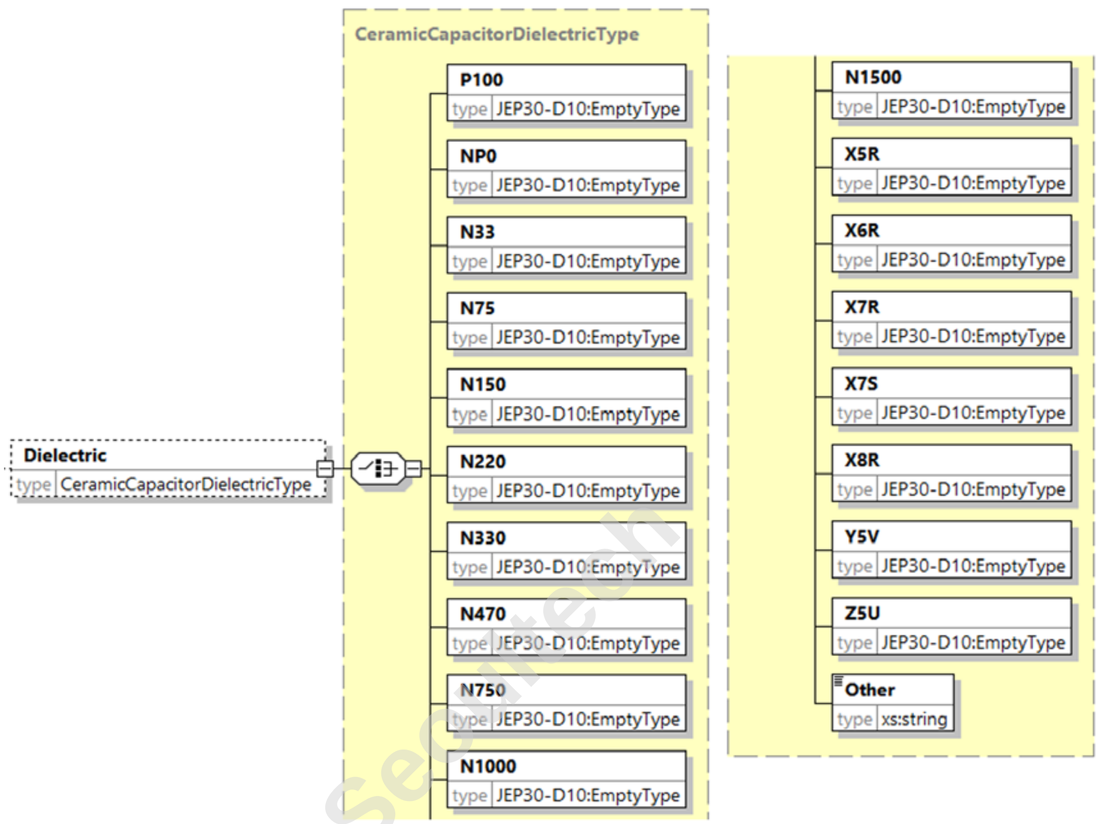
Figure 1 - Ceramic Capacitor Array

4.7.1.3.4.1.1. Ceramic Capacitor Class Property

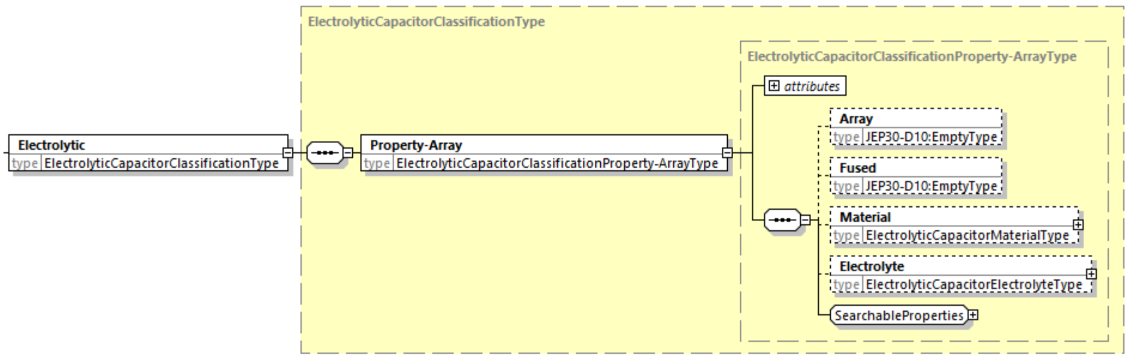
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Capacitor/Fixed/Ceramic/Property-Array/Class</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>CeramicCapacitorClassType, JEP30-D10:EmptyType.</td></tr>
</table>

Most *Ceramic* capacitors can be sub-classified as either *Class1* or *Class2*, however some can be specified under the category *Other*.

4.7.1.3.4.1.2. Ceramic Capacitor Dielectric Property

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Capacitor/Fixed/Ceramic/Property-Array/Dielectric
diagram	
type	CeramicCapacitorDielectricType, JEP30-D10:EmptyType.

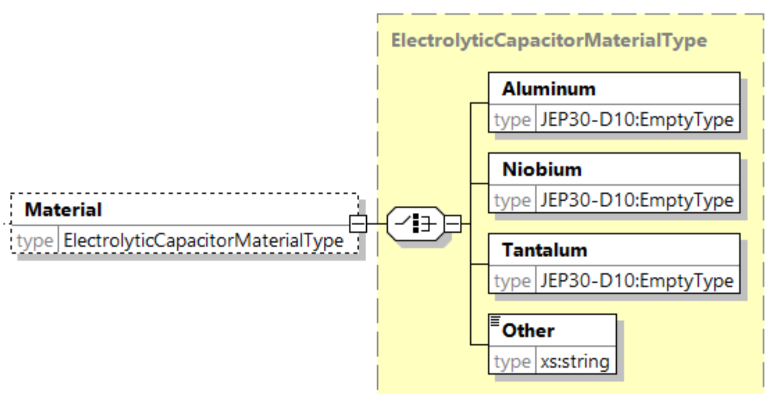
4.7.1.3.4.2. Electrolytic Capacitor Classification and Property-Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Capacitor/Fixed/Electrolytic
diagram	
type	ElectrolyticCapacitorClassificationType, ElectrolyticCapacitorClassificationProperty-ArrayType, JEP30-D10:EmptyType, ElectrolyticCapacitorMaterialType, ElectrolyticCapacitorElectrolyteType, PropertyKeyValuePairType.

Some *Electrolytic* capacitors are “Fused” which can be defined by adding the *Fused* property to the property-array.

Figure 2— Fused Electrolytic Capacitor

4.7.1.3.4.2.1. Electrolytic Capacitor Material Property

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Capacitor/Fixed/Electrolytic/Property-Array/Material
diagram	
type	ElectrolyticCapacitorMaterialType, JEP30-D10:EmptyType.

4.7.1.3.4.2.1 Electrolytic Capacitor Material Property (cont'd)

Standard *Electrolytic* capacitors are polarized components due to their asymmetrical construction. It is the generic term for typically three different capacitor family members, namely:-

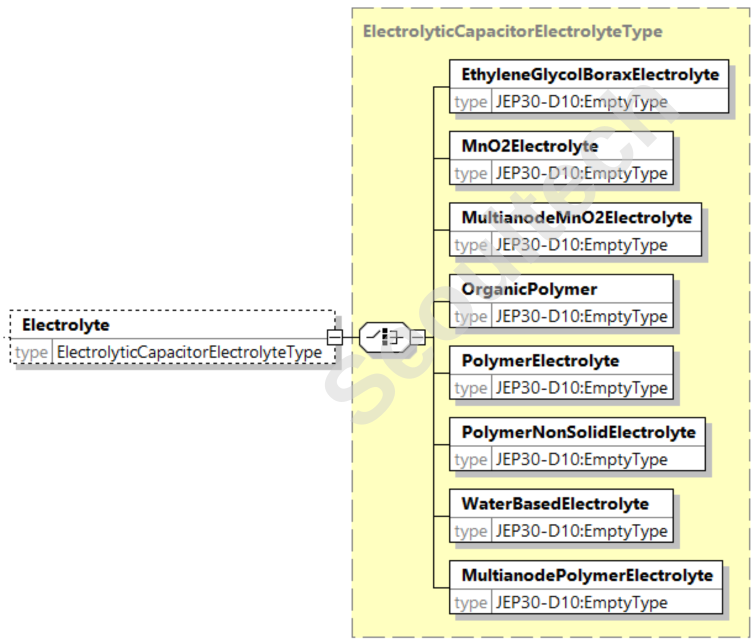
1. *Aluminum* electrolytic capacitors,

2. *Niobium* electrolytic capacitors,

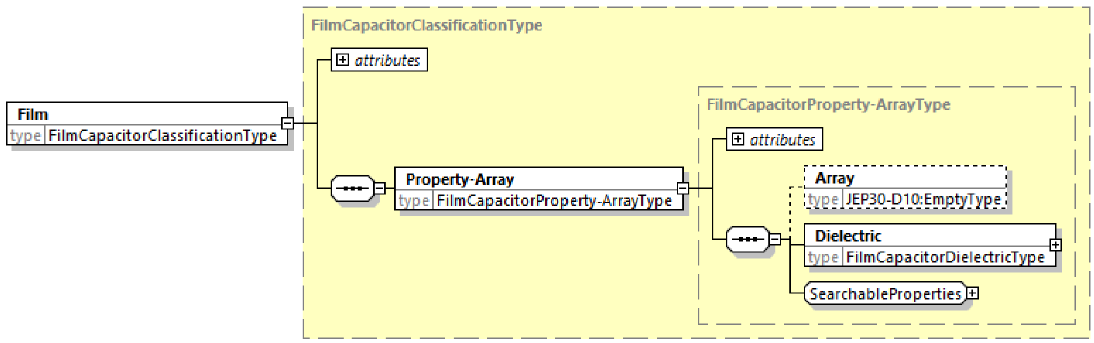
3. *Tantalum* electrolytic capacitors,

However, other types of *Electrolytic* capacitors can be specified under the category *Other*.

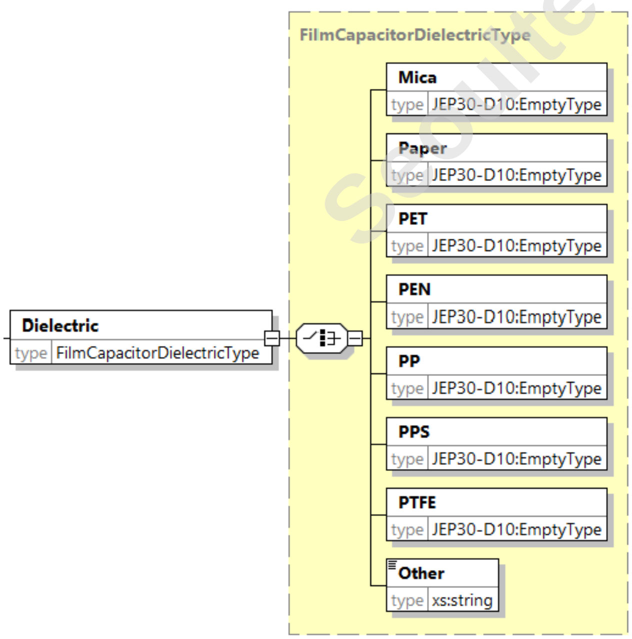
4.7.1.3.4.2.2. Electrolytic Capacitor Electrolyte Property

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Capacitor/Fixed/Electrolytic/Property-Array/Electrolyte</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>ElectrolyticCapacitorElectrolyteType, JEP30-D10:EmptyType.</td></tr>
</table>

4.7.1.3.4.3. Film Capacitor Classification and Property-Array

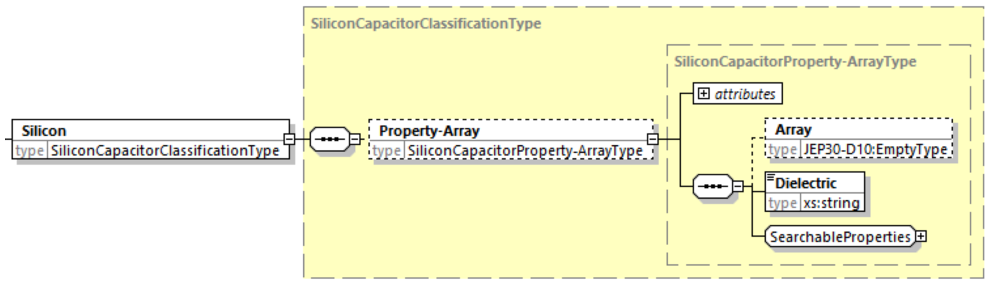
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Capacitor/Fixed/Film
diagram	
type	FilmCapacitorClassificationType, FilmCapacitorProperty-ArrayType, FilmCapacitorDielectricType.
group	SearchableProperties.

4.7.1.3.4.3.1. Film Capacitor Dielectric Property

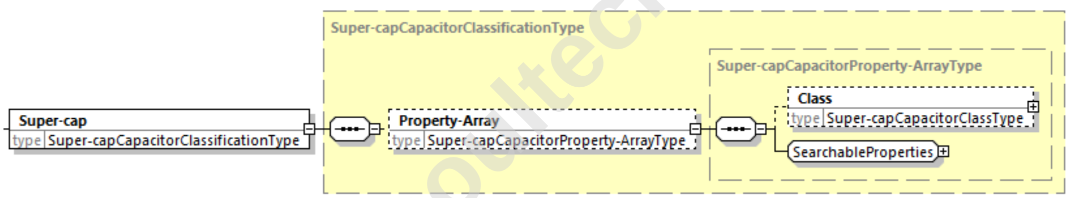
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Capacitor/Fixed/Film/ Property-Array/Dielectric
diagram	
type	FilmCapacitorDielectricType, JEP30-D10:EmptyType.

Film capacitors are electrical capacitors with an insulating plastic film as the dielectric. They come in several types as listed above. Alternative Dielectric can be listed under the *Other* property.

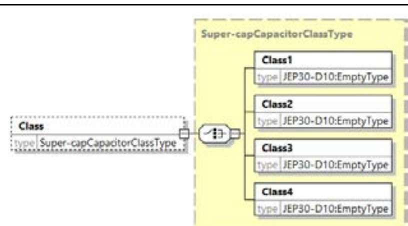
4.7.1.3.4.4. Silicon Capacitor Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Capacitor/Fixed/Silicon
diagram	
type	SiliconCapacitorClassificationType, SiliconCapacitorProperty-ArrayType.
group	SearchableProperties.

4.7.1.3.4.5. Super-cap Capacitor Classification

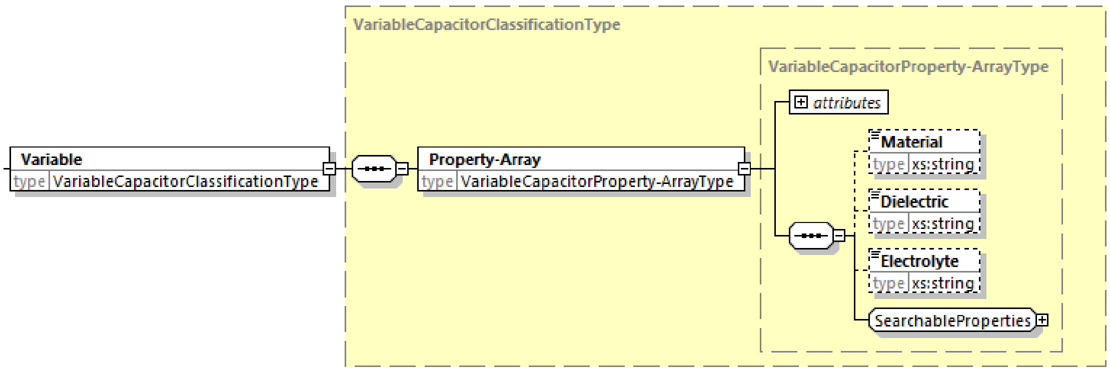
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Capacitor/Fixed/Super-cap
diagram	
type	Super-capCapacitorClassificationType, Super-capCapacitorProperty-ArrayType, Super-capCapacitorClassType.
group	SearchableProperties.

4.7.1.3.4.5.1. Super-cap Capacitor Class Property

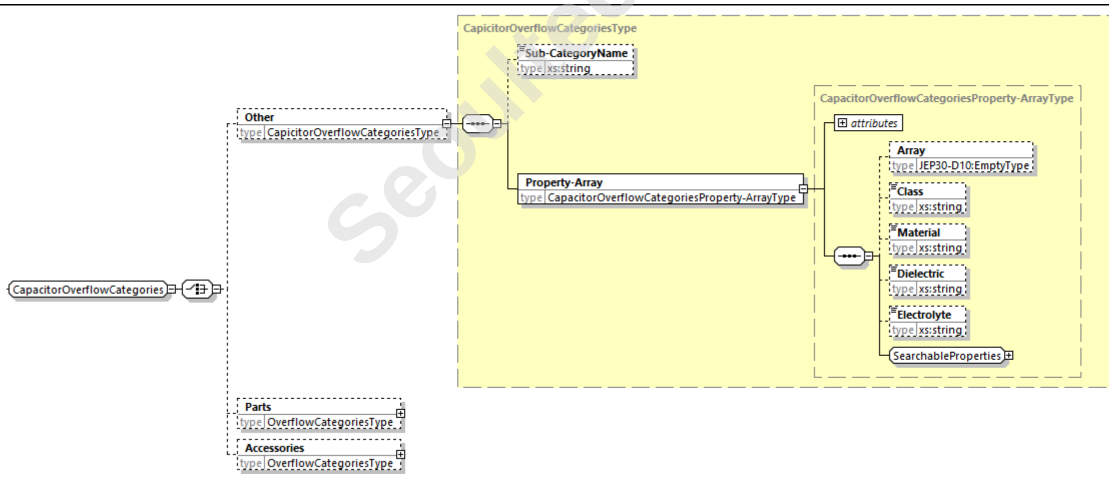
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Capacitor/Fixed/Super-cap/Property-Array/Class
diagram	
type	Super-capCapacitorClassificationType.

A *Super-cap* is a high-capacity capacitor with capacitance values much higher than other capacitors (but lower voltage limits) that bridge the gap between electrolytic capacitors and rechargeable batteries. They typically store 10 to 100 times more energy per unit volume or mass than electrolytic capacitors, can accept and deliver charge much faster than batteries, and tolerate many more charge and discharge cycles than rechargeable batteries. There are 4 classes of *Super-cap* as shown above.

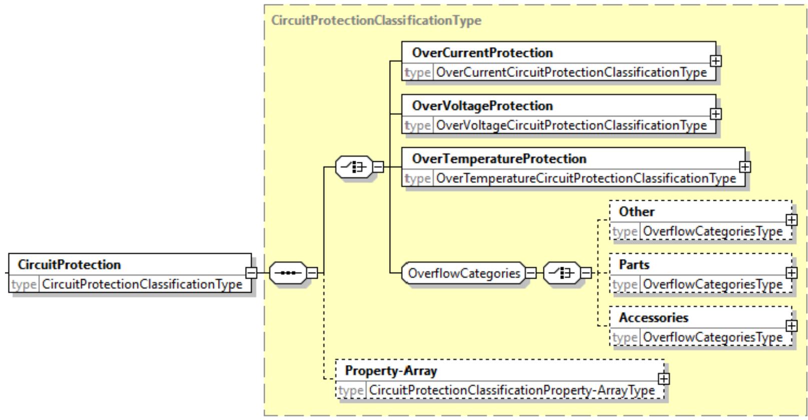
4.7.1.3.4.6. Variable Capacitor Classification and Property-Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Capacitor/Variable
diagram	
type	VariableCapacitorClassificationType, VariableCapacitorProperty-ArrayType, PropertyKeyValuePairType.

4.7.1.3.4.7. Capacitor Overflow Categories Group

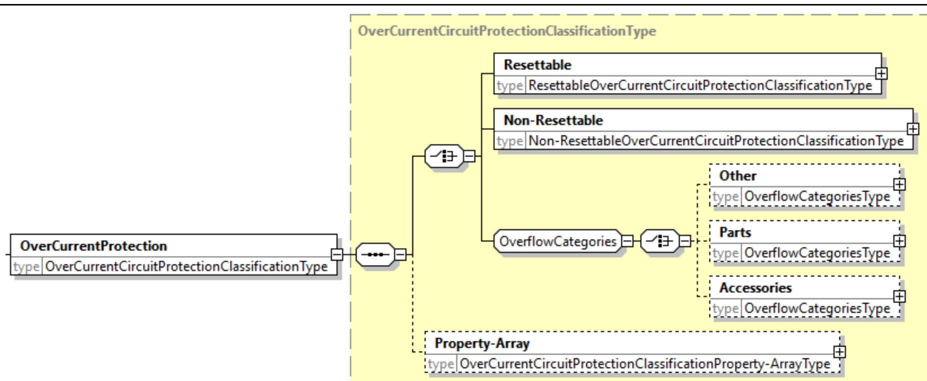
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Capacitor
diagram	
type	CapicitorOverflowCategoriesType, CapacitorOverflowCategoriesProperty-ArrayType, JEP30-D10:EmptyType, OverflowCategoriesType, PropertyKeyValuePairType.
group	CapacitorOverflowCategories.

4.7.1.3.5. Circuit Protection Classification

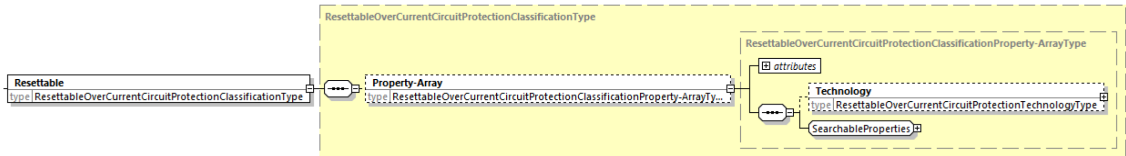
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Circuit-Protection**
diagram	
type	**CircuitProtectionClassificationType, OverCurrentCircuitProtectionClassificationType, OverVoltageCircuitProtectionClassificationType, OverTemperatureCircuitProtectionClassificationType, OverflowCategoriesType, CircuitProtectionClassificationProperty-ArrayType**
group	**OverflowCategories.**

CircuitProtection devices are used to protect the circuit's wires and components from circuit overload. An overloaded circuit occurs when there's too much current flowing through the circuit, i.e. *OverCurrentProtection*. It can damage components and wiring that are sensitive to high current. Other *Circuit-Protection* devices can also be classified under the category *OverVoltageProtection*, *OverTemperatureProtection*, or *Other*.

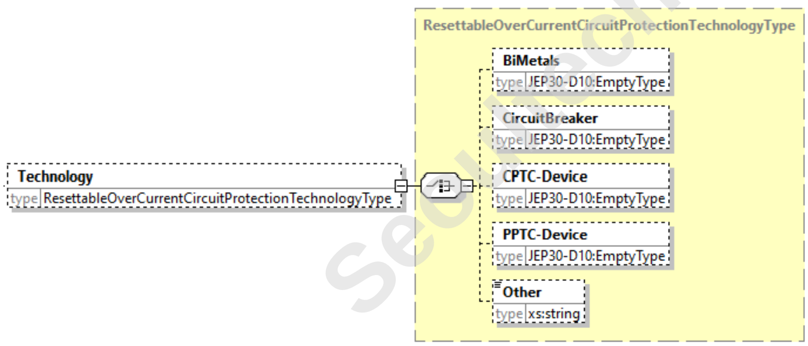
4.7.1.3.5.1. Over Current Circuit Protection Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/CircuitProtection/OverCurrentProtection**
diagram	
type	**OverCurrentCircuitProtectionClassificationType, ResettableOverCurrentCircuitProtectionClassificationType, Non-ResettableOverCurrentCircuitProtectionClassificationType, OverflowCategoriesType, OverCurrentCircuitProtectionClassificationProperty-ArrayType**
group	**OverflowCategories.**

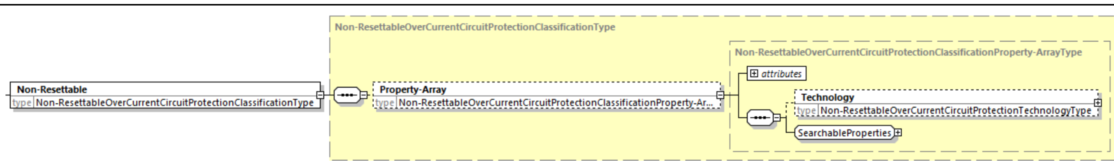
4.7.1.3.5.1.1. Resettable Over Current Circuit Protection Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/CircuitProtection/OverCurrentProtection/Resettable
diagram	
type	ResettableOverCurrentCircuitProtectionClassificationType, ResettableOverCurrentCircuitProtectionClassificationProperty-ArrayType, ResettableOverCurrentCircuitProtectionTechnologyType.
group	SearchableProperties.

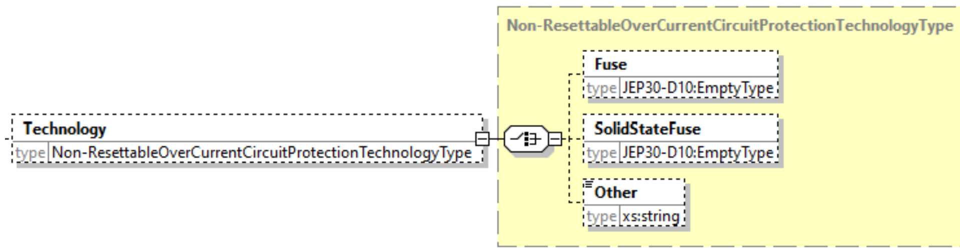
4.7.1.3.5.1.2. Resettable Over Current Circuit Protection Technology Property

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/CircuitProtection/OverCurrentProtection/Resettable/Property-Array/Technology
diagram	
type	ResettableOverCurrentCircuitProtectionTechnologyType, JEP30-D10:EmptyType

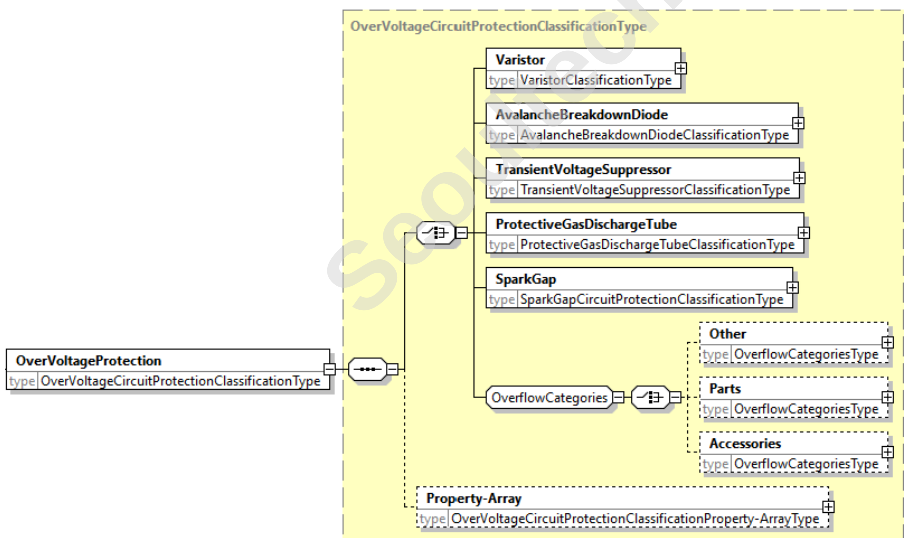
4.7.1.3.5.1.3. Non-Resettable Over Current Circuit Protection Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/CircuitProtection/OverCurrentProtection/Non-Resettable
diagram	
type	Non-ResettableOverCurrentCircuitProtectionClassificationType, Non- ResettableOverCurrentCircuitProtectionClassificationProperty-ArrayType, Non-ResettableOverCurrentCircuitProtectionTechnologyType.
group	SearchableProperties.

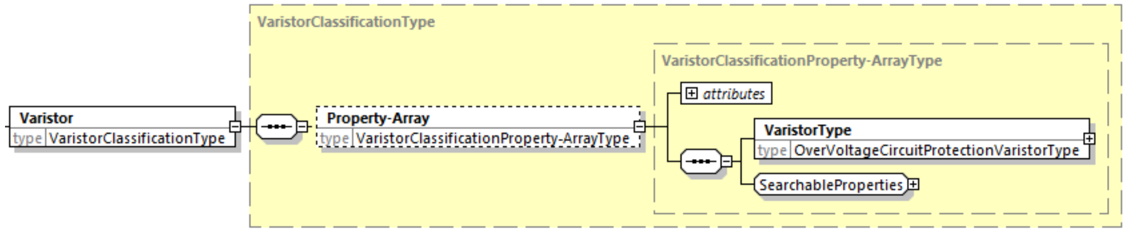
4.7.1.3.5.1.4. Non-Resettable Over Current Circuit Protection Technology Property

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/CircuitProtection/OverCurrentProtection/Non-Resettable/Property-Array/Technology**
diagram	
type	**Non-ResettableOverCurrentCircuitProtectionTechnologyType, JEP30-D10:EmptyType.**

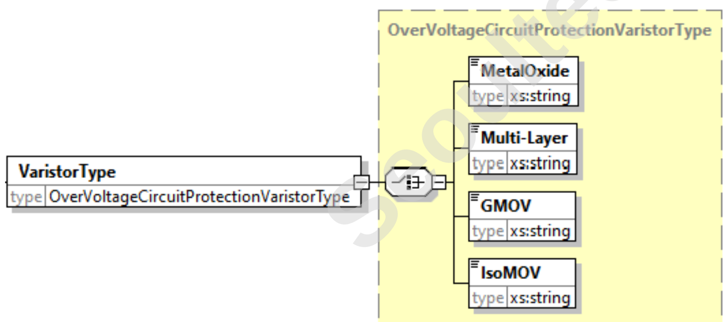
4.7.1.3.5.2. Over Voltage Circuit Protection Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/CircuitProtection/OverVoltageProtection**
diagram	
type	**OverVoltageCircuitProtectionClassificationType, VaristorClassificationType, AvalancheBreakdownDiodeClassificationType, TransientVoltageSuppressorClassificationType, ProtectiveGasDischargeTubeClassificationType, SparkGapCircuitProtectionClassificationType, OverflowCategoriesType, OverVoltageCircuitProtectionClassificationProperty-ArrayType**
group	**OverflowCategories.**

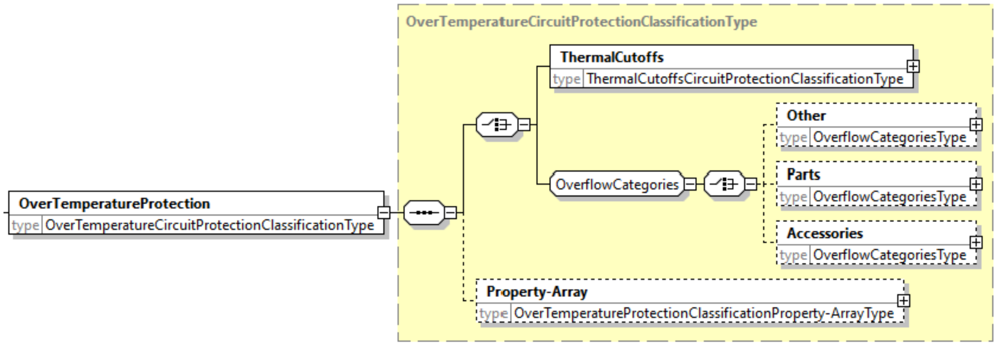
4.7.1.3.5.2.1. Over Voltage Circuit Protection Varistor Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/CircuitProtection/OverVoltageProtection/Varistor
diagram	
type	VaristorClassificationType, VaristorClassificationProperty-ArrayType, OverVoltageCircuitProtectionVaristorType.
group	SearchableProperties.

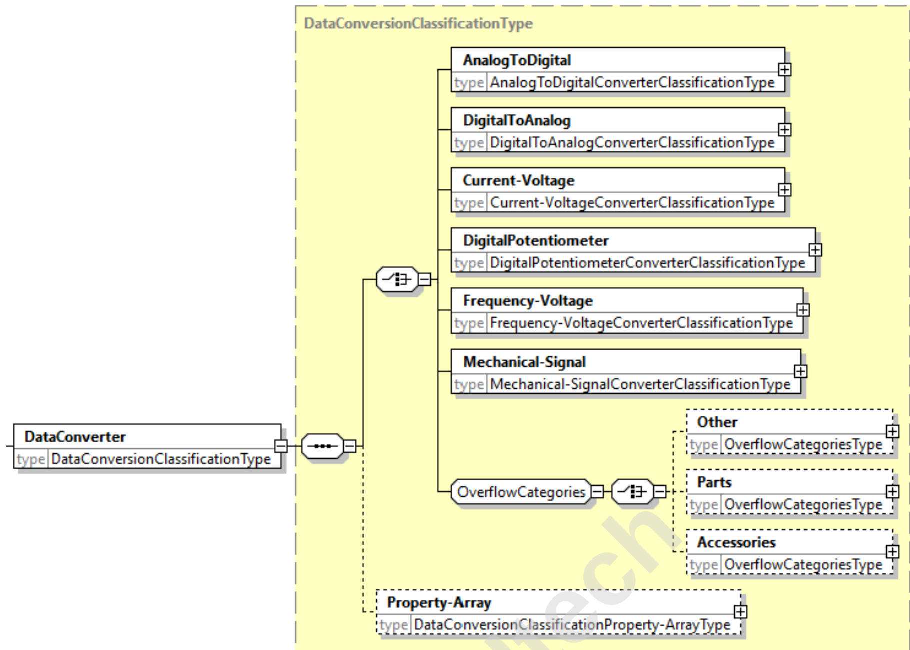
4.7.1.3.5.2.2. Over Voltage Circuit Protection Varistor Type Property

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/CircuitProtection/OverVoltageProtection/Varistor/Property-Array/VaristorType
diagram	
type	OverVoltageCircuitProtectionVaristorType, JEP30-D10:EmptyType.

4.7.1.3.5.3. Over Temperature Circuit Protection Classification

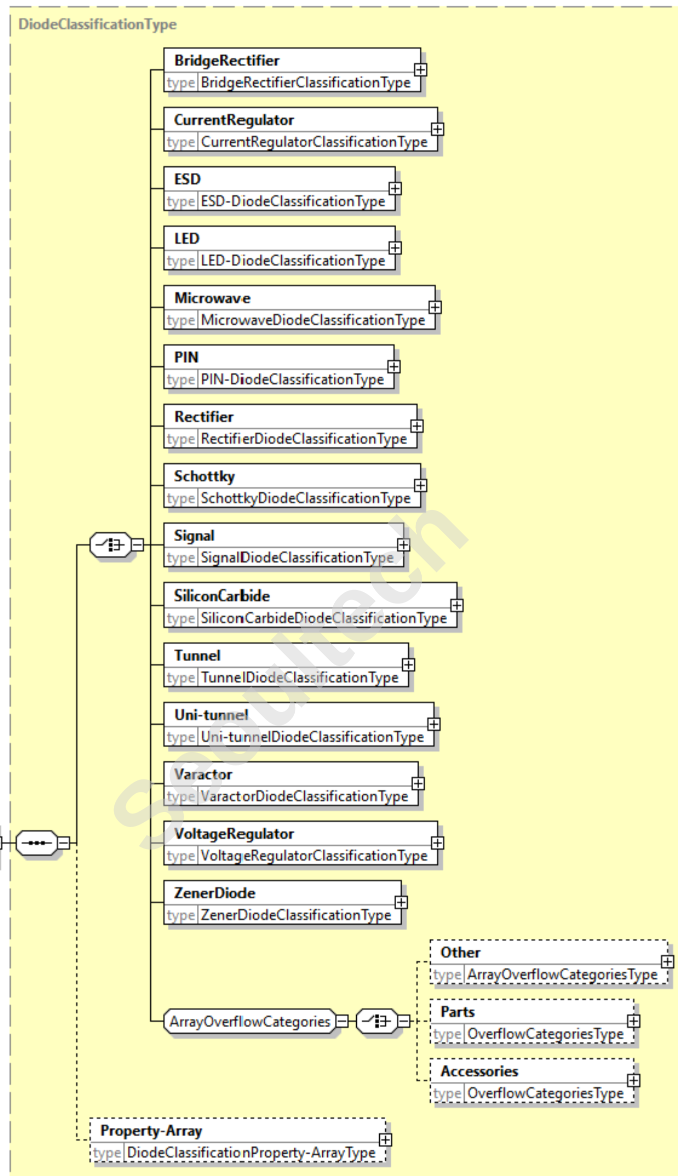
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/CircuitProtection/ OverTemperatureProtection
diagram	
type	OverTemperatureCircuitProtectionClassificationType, ThermalCutoffsCircuitProtectionClassificationType, OverflowCategoriesType, OverTemperatureProtectionClassificationProperty-ArrayType.
group	OverflowCategories.

4.7.1.3.6. Data Converter Classification

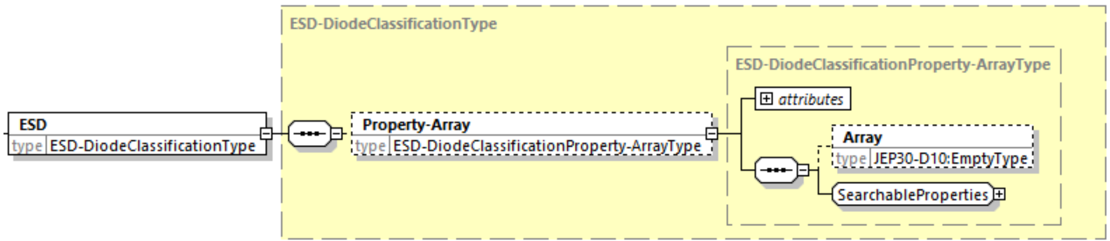
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/DataConverter**
diagram	
type	**Data-ConversionClassificationType, AnalogToDigitalConverterClassificationType, DigitalToAnalogConverterClassificationType, Current-VoltageConverterClassificationType, DigitalPotentiometerConverterClassificationType, Frequency-VoltageConverterClassificationType, Mechanical-SignalConverterClassificationType, OverflowCategories Type, DataConversionClassificationProperty-ArrayType.**
group	**OverflowCategories.**

A *Data-Converter* is a device that converts one signal type into another signal type, as identified above, but the less common types can be classified under the category *Other*.

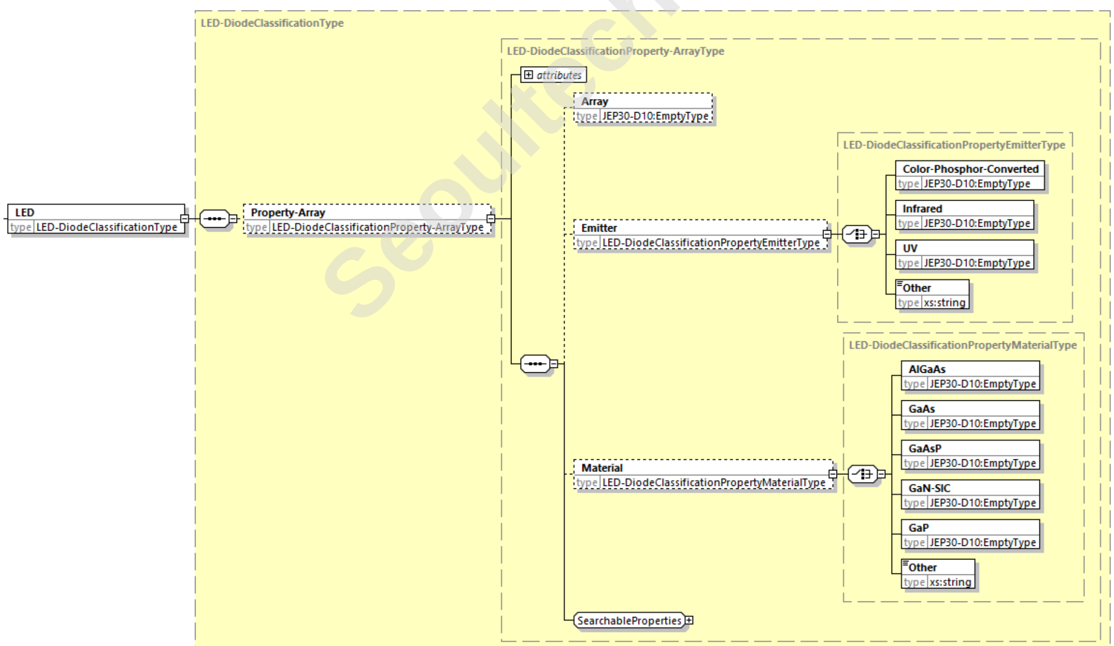
4.7.1.3.7. Diode Classification

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Diode</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>DiodeClassificationType, BridgeRectifierClassificationType, CurrentRegulatorClassificationType, ESD-DiodeClassificationType, LED-DiodeClassificationType, MicrowaveDiodeClassificationType, PIN-DiodeClassificationType, RectifierDiodeClassificationType, SchottkyDiodeClassificationType, SignalDiodeClassificationType, SiliconCarbideDiodeClassificationType, TunnelDiodeClassificationType, Uni-tunnelDiodeClassificationType, VaractorDiodeClassificationType, VoltageRegulatorClassificationType, ZenerDiodeClassificationType, ArrayOverflowCategoriesType, OverflowCategoriesType, DiodeClassificationProperty-ArrayType.</td></tr>
<tr><td>group</td><td>OverflowCategories.</td></tr>
</table>

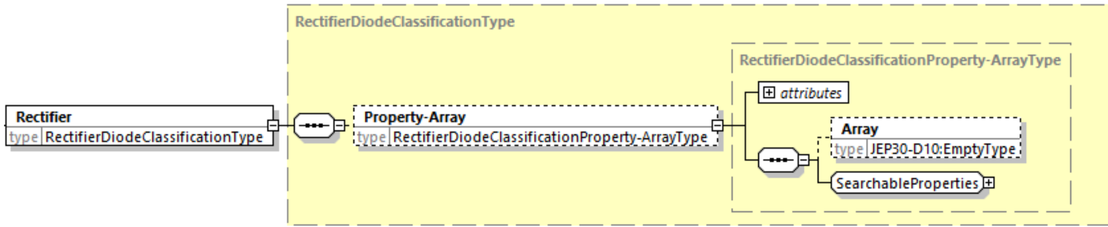
4.7.1.3.7.1. ESD Diode Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Diode/ESD**
diagram	
type	**ESD-DiodeClassificationType, ESD-DiodeClassificationProperty-ArrayType, JEP30-D10:EmptyType.**
group	**SearchableProperties.**

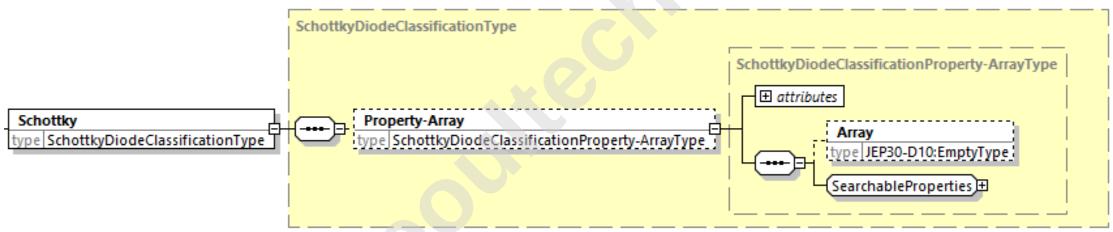
4.7.1.3.7.2. LED Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Diode/LED**
diagram	
type	**LED-DiodeClassificationType, LED-DiodeClassificationProperty-ArrayType, JEP30-D10:EmptyType, LED-DiodeClassificationPropertyEmitterType, LED-DiodeClassificationPropertyMaterialType.**
group	**SearchableProperties.**

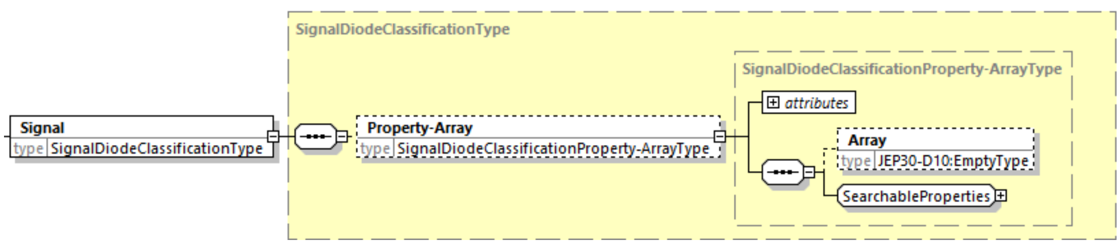
4.7.1.3.7.3. Rectifier Diode Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Diode/Rectifier
diagram	
type	RectifierDiodeClassificationType, RectifierDiodeClassificationProperty-ArrayType, JEP30-D10:EmptyType.
group	SearchableProperties.

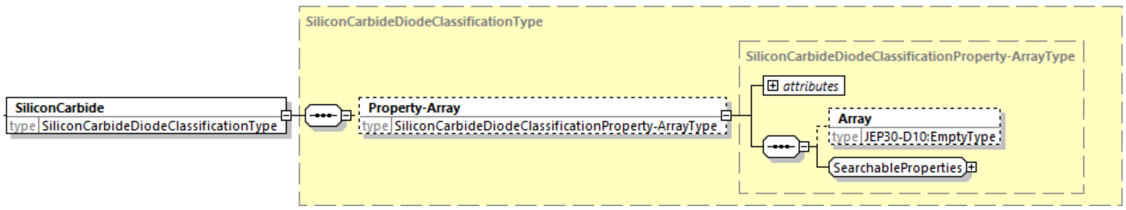
4.7.1.3.7.4. Schottky Diode Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Diode/Schottky
diagram	
type	SchottkyDiodeClassificationType, SchottkyDiodeClassificationProperty-ArrayType, JEP30-D10:EmptyType.
group	SearchableProperties.

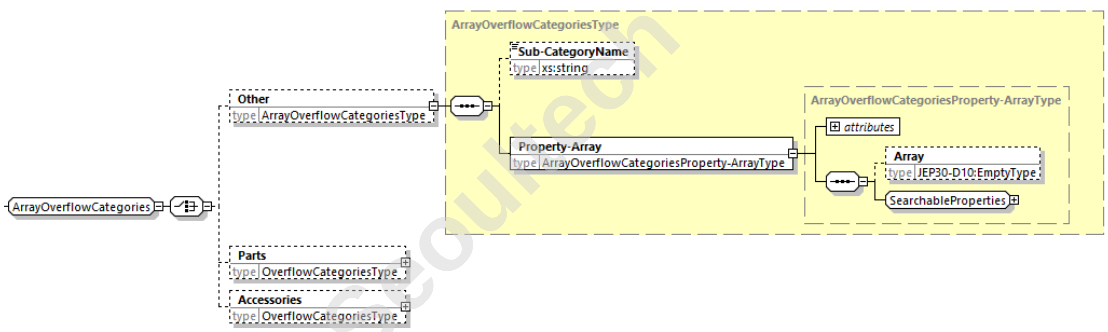
4.7.1.3.7.5. Signal Diode Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Diode/Signal
diagram	
type	SignalDiodeClassificationType, SignalDiodeClassificationProperty-ArrayType, JEP30-D10:EmptyType.
group	SearchableProperties.

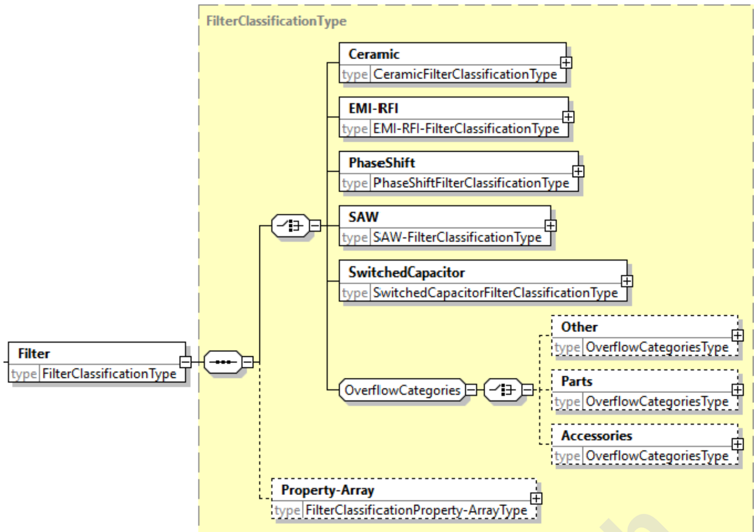
4.7.1.3.7.6. Silicon Carbide Diode Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Diode/SiliconCarbide**
diagram	
type	**ArrayOverflowCategoriesType, ArrayOverflowCategoriesProperty-ArrayType, JEP30-D10:EmptyType.**
group	**SearchableProperties.**

4.7.1.3.7.7. Array Overflow Categories Group

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Diode**
diagram	
type	**ArrayOverflowCategoriesType, ArrayOverflowCategoriesProperty-ArrayType , JEP30-D10:EmptyType,** **OverflowCategoriesType.**
group	**SearchableProperties.**

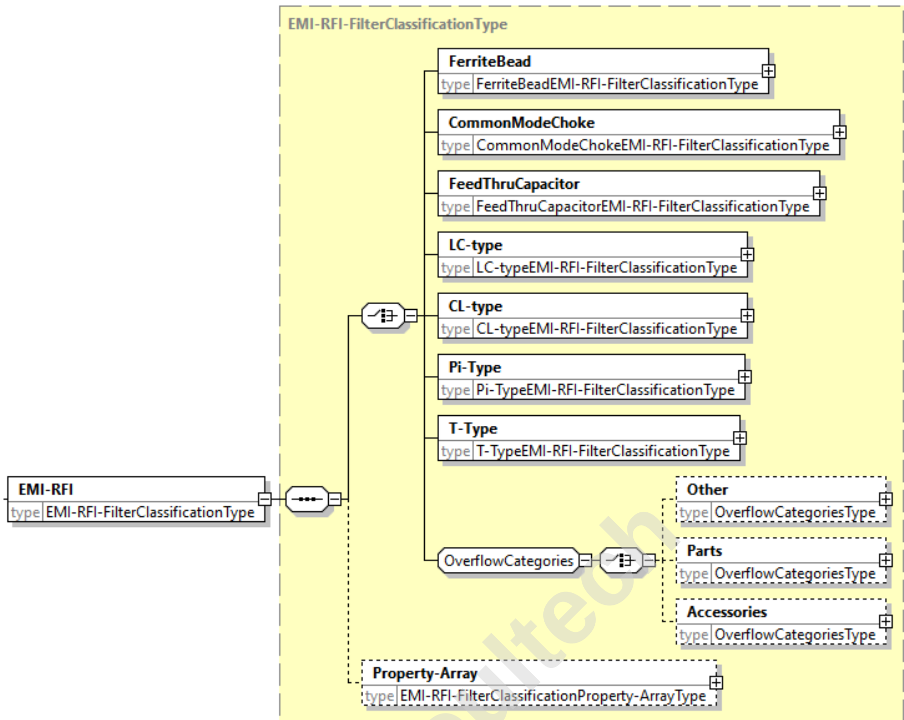
4.7.1.3.8. Filter Classification

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Filter</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>FilterClassificationType, CeramicFilterClassificationType, EMI-RFI-FilterClassificationType, PhaseShiftFilterClassificationType, SAW-FilterClassificationType, SwitchedCapacitorFilterClassificationType, OverflowCategoriesType, FilterClassificationProperty-ArrayType.</td></tr>
<tr><td>group</td><td>OverflowCategories.</td></tr>
</table>

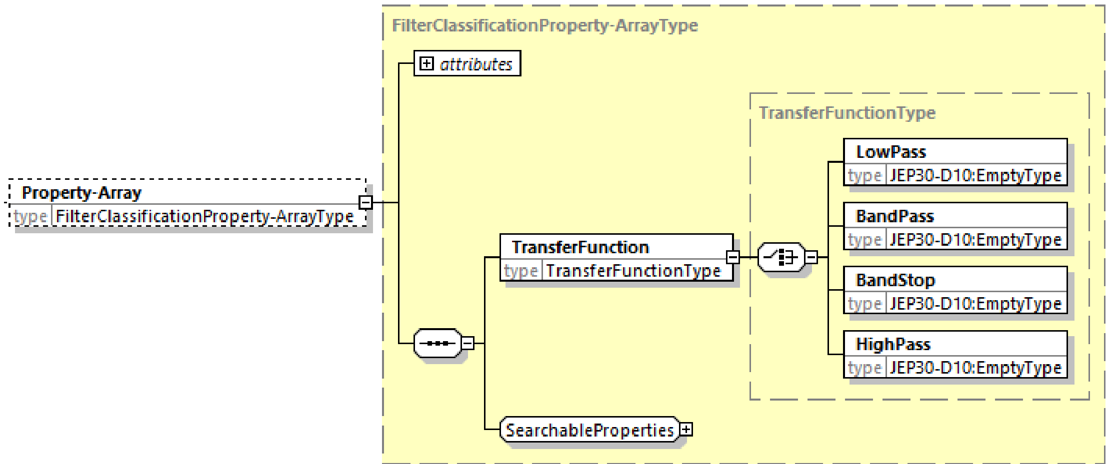
In signal processing, a *Filter* is a device or process that removes some unwanted components or features from a signal. Filtering is a class of signal processing. The defining feature of filters being the complete or partial suppression of some aspect of the signal. Most often, this means removing some frequencies or frequency bands. However, filters do not exclusively act in the frequency domain; especially in the field of image processing where other filtering targets exist.

There are many different bases of classifying filters, as shown above and additional types can be classified under the category *Other*.

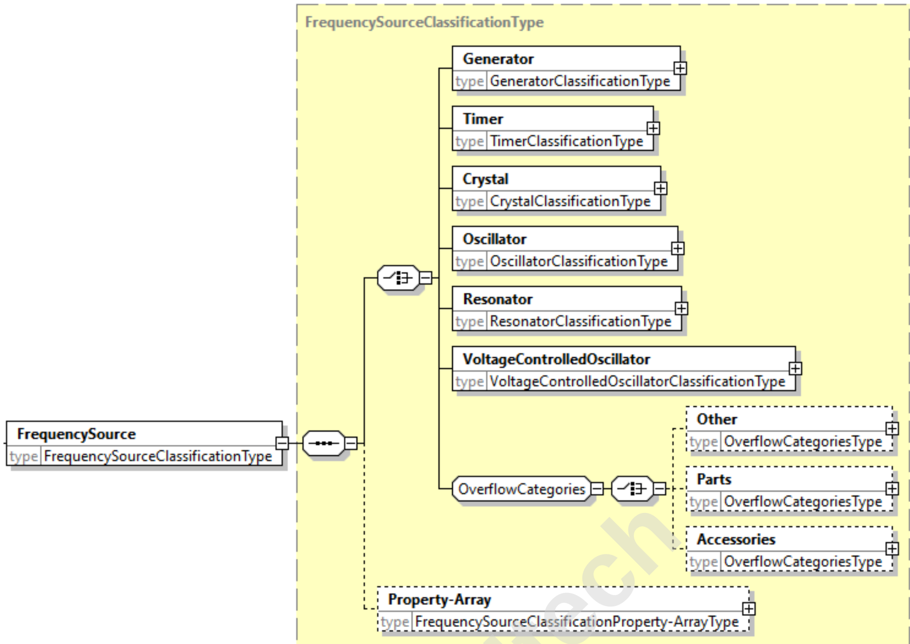
4.7.1.3.8.1. EMI-RFI Filter Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Filter/EMI-RFI
diagram	
type	EMI-RFI-FilterClassificationType, FerriteBeadEMI-RFI-FilterClassificationType, CommonModeChokeEMI-RFI-FilterClassificationType, FeedThruCapacitorEMI-RFI-FilterClassificationType, LC-typeEMI-RFI-FilterClassificationType, CL-typeEMI-RFI-FilterClassificationType, Pi-TypeEMI-RFI-FilterClassificationType, T-TypeEMI-RFI-FilterClassificationType, OverflowCategoriesType, EMI-RFI-FilterClassificationProperty-ArrayType.
group	OverflowCategories.

4.7.1.3.8.2. Filter Classification Property - Array

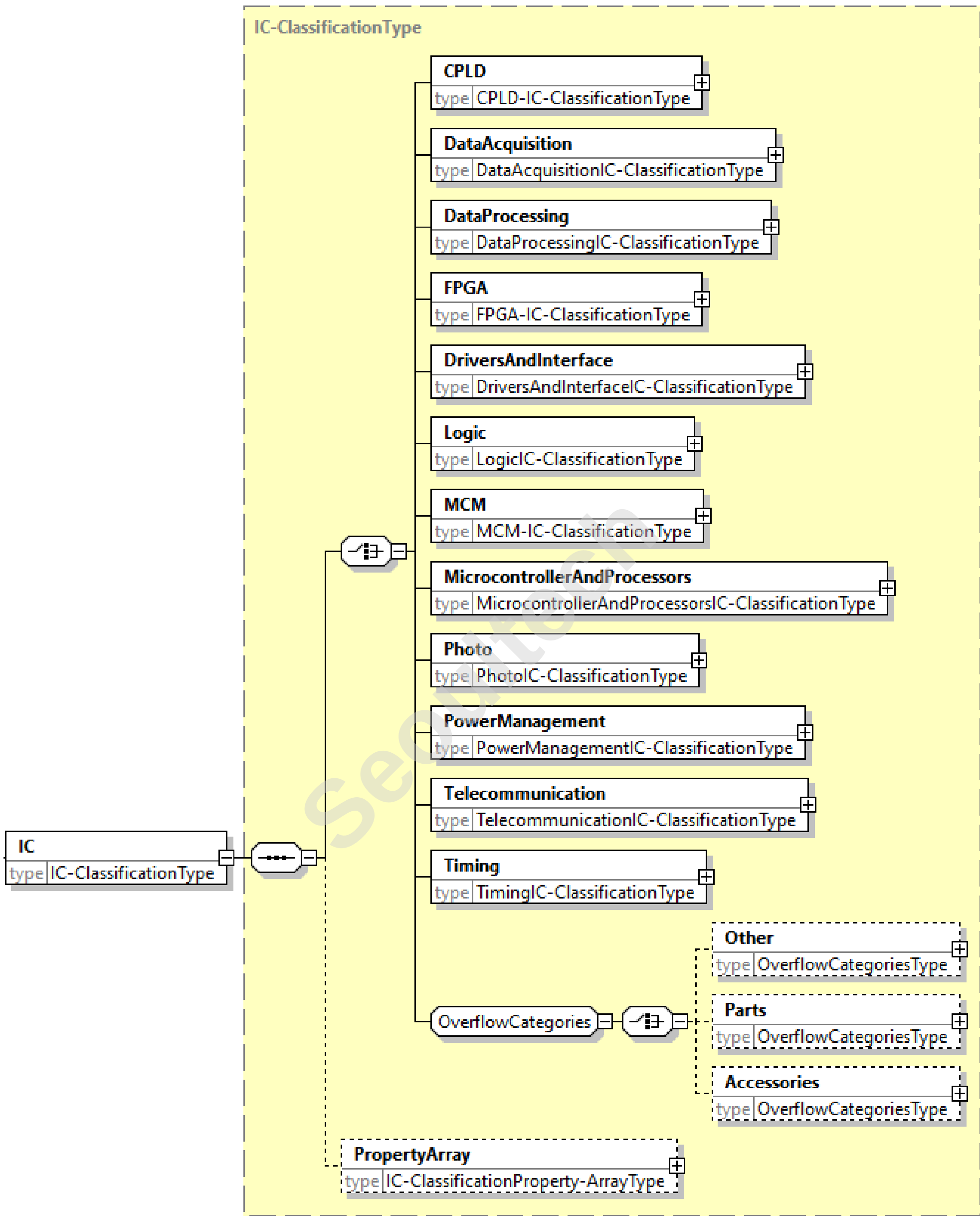
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Filter/Other
diagram	
type	FilterClassificationProperty-ArrayType, TransferFunctionType, JEP30-D10:EmptyType.
group	SearchableProperties.

4.7.1.3.9. Frequency Source Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/FrequencySource**
diagram	
type	**FrequencySourceClassificationType, GeneratorClassificationType, TimerClassificationType, CrystalClassificationType, OscillatorClassificationType, ResonatorClassificationType, VoltageControlledOscillatorClassificationType, OverflowCategoriesType, FilterClassificationProperty-ArrayType**
group	**OverflowCategories.**

A *FrequencySource* is an electronic device that generates repeating or non-repeating electronic signals in either the analog or the digital domain. There are many kinds of *FrequencySource* types with different purposes and applications, as identified above, and additional types can be classified under the category *Other*.

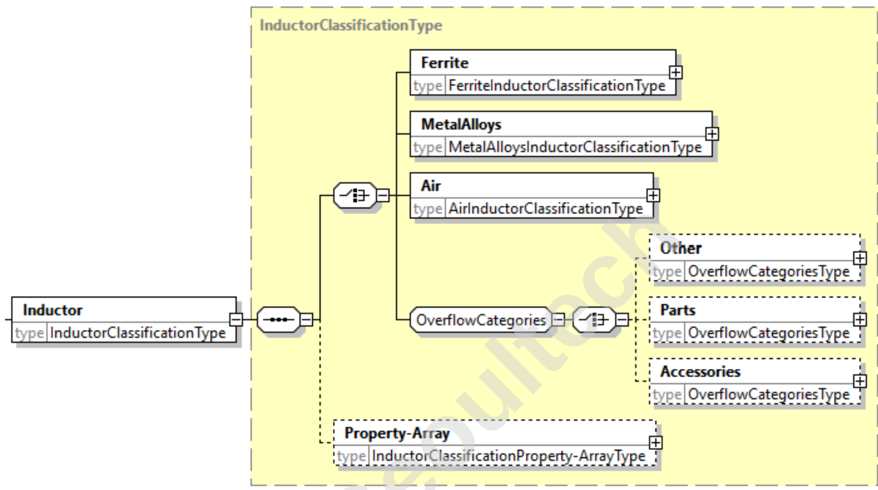
4.7.1.3.10. IC Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/IC**
diagram	
type	**IC-ClassificationType, CPLD-IC-ClassificationType, DataAcquisitionIC-ClassificationType, DigitalSignalProcessingIC-ClassificationType, FPGA-IC-ClassificationType, DriversAndInterfaceIC-ClassificationType, LogicIC-ClassificationType, MCM-IC-ClassificationType, MicrocontrollerAndProcessorsIC-ClassificationType, PhotoIC-ClassificationType, PowerManagementIC-ClassificationType, TelecommunicationIC-ClassificationType, TimingIC-ClassificationType, OverflowCategoriesType, IC-ClassificationProperty-ArrayType.**
group	**OverflowCategories.**

4.7.1.3.10 IC Classification (cont'd)

An integrated circuit or monolithic integrated circuit (also referred to as an *IC*, a chip, or a microchip) is a set of electronic circuits on one small plate of semiconductor material, normally silicon. This can be made much smaller than a discrete circuit made from independent electronic components. The above categories are high level categories, and other categories can be captured under the category *Other*.

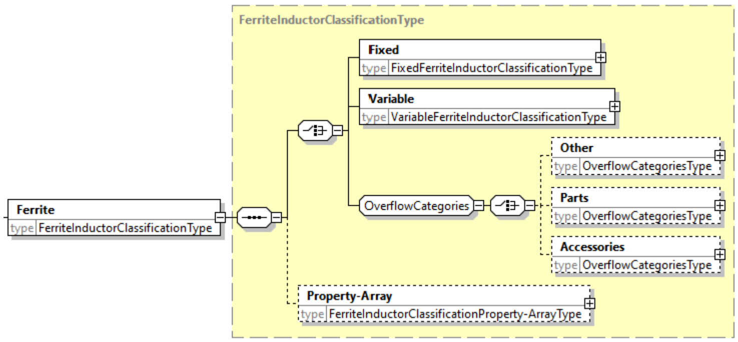
4.7.1.3.11. Inductor Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Inductor**
diagram	
type	**InductorClassificationType, FerriteInductorClassificationType, MetalAlloysInductorClassificationType, AirInductorClassificationType, OverflowCategoriesType, InductorClassificationProperty-ArrayType**
group	**OverflowCategories.**

An *Inductor*, also called a coil or reactor, is a passive electrical component that stores electrical energy in a magnetic field when electric current is flowing through it. An inductor typically consists of an electric conductor, such as a wire, that is wound into a coil around a core.

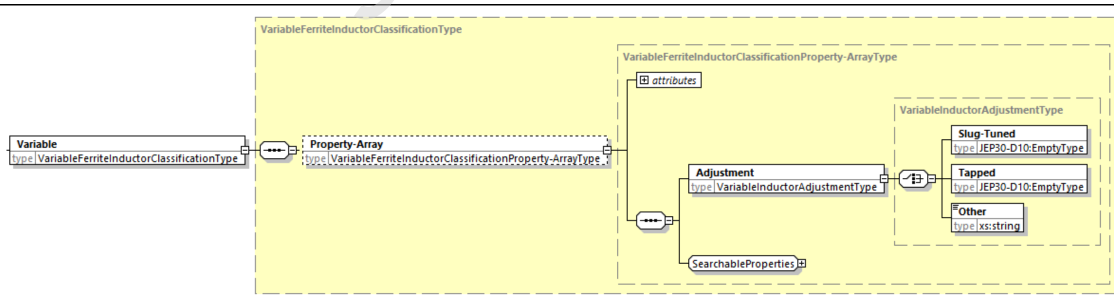
When the current flowing through an inductor changes, the time-varying magnetic field induces a voltage in the conductor, described by Faraday's law of induction. According to Lenz's law, the direction of induced electromotive force (e.m.f.) opposes the change in current that created it. As a result, inductors oppose any changes in current through them.

4.7.1.3.11.1. Ferrite Inductor Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Inductor/Ferrite**
diagram	
type	**FerriteInductorClassificationType, FixedFerriteInductorClassificationType, VariableFerriteInductorClassificationType, OverflowCategoriesType, FerriteInductorClassificationProperty-ArrayType**
group	**OverflowCategories.**

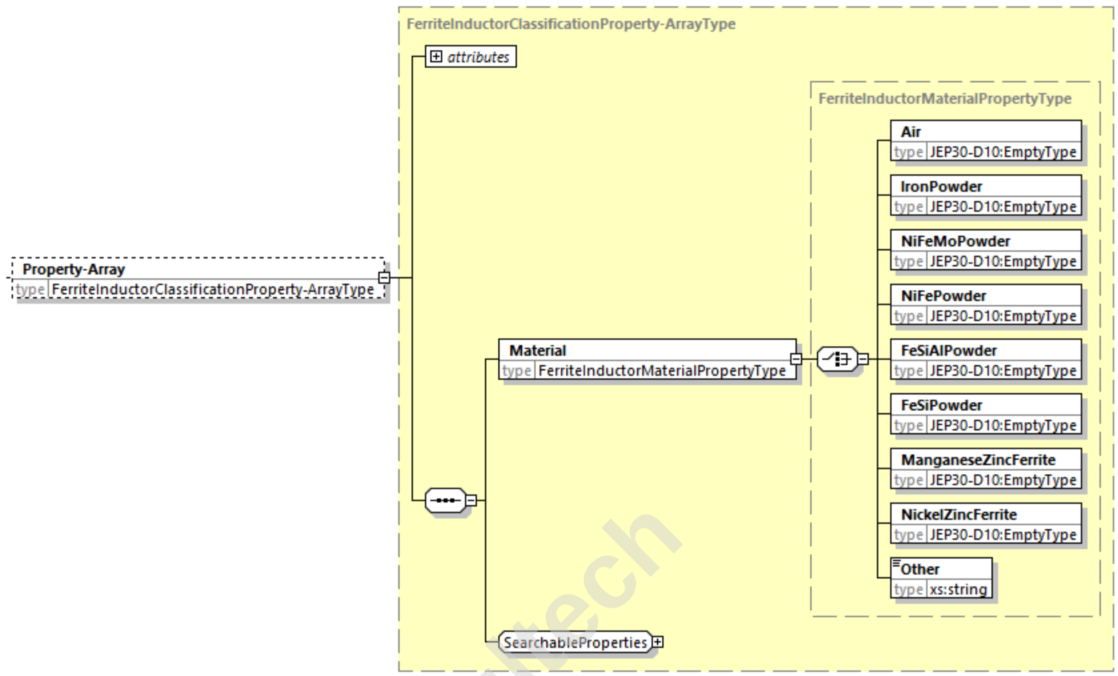
A *Variable* Inductor is a passive inductor wherein the inductor device includes a movable element which may be adjusted to different positions or adjusted to vary its physical dimensions to change the effective inductance from one value to another.

4.7.1.3.11.1.1. Variable Ferrite Inductor Property-Array

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Inductor/Ferrite/Variable/Property-Array**
diagram	
type	**VariableFerriteInductorClassificationType, VariableFerriteInductorClassificationProperty-ArrayType, VariableInductorAdjustmentType, JEP30-D10:EmptyType.**
group	**SearchableProperties.**

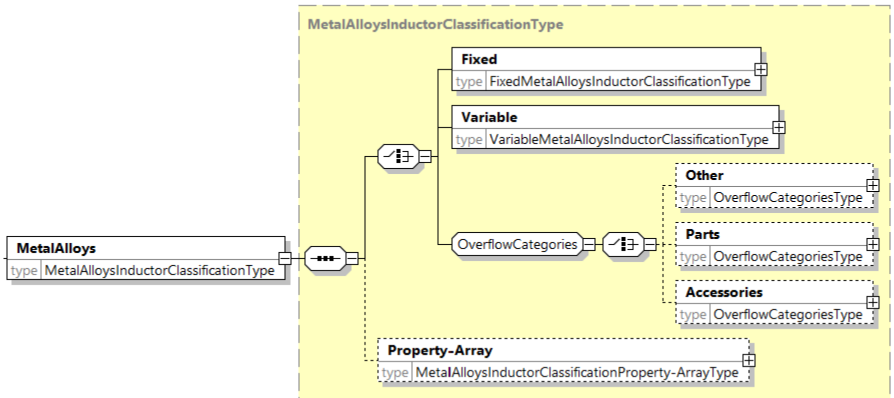
Examples are *Adjustment* types on a *Variable* inductor are *Slug-tuned* or *Tapped*, but other categories can be captured under the category *Other*.

4.7.1.3.11.1.2. Ferrite Inductor Property-Array

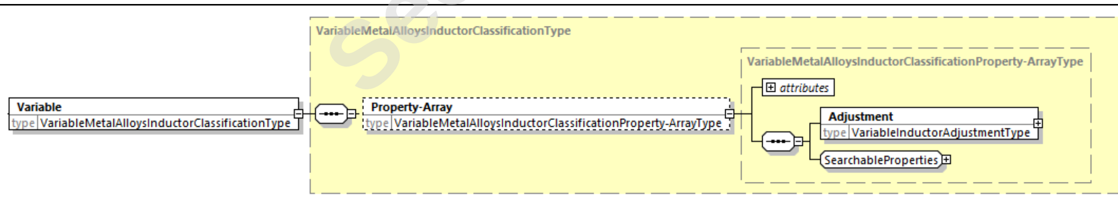
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Inductor/Ferrite/Property-Array**
diagram	
type	**FerriteInductorClassificationProperty-ArrayType, FerriteInductorMaterialPropertyType, JEP30-D10:EmptyType.**
group	**SearchableProperties.**

Ferrite Inductors have typically one of the core materials as outlined in the *Material* property above, however other material can be captured under the property *Other* as a string.

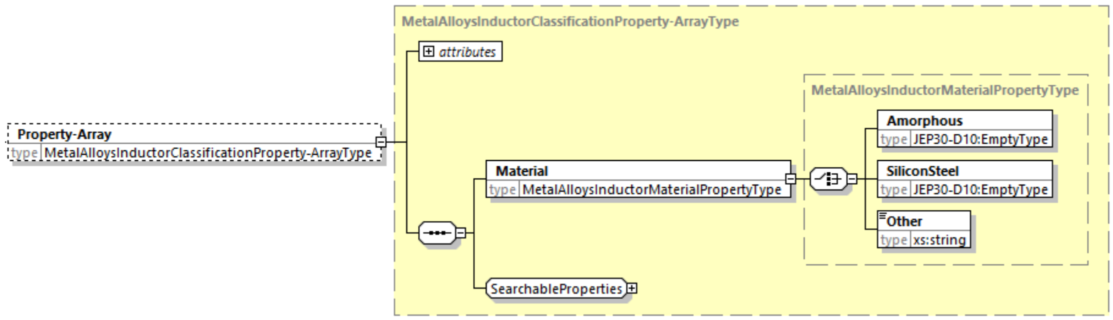
4.7.1.3.11.2. MetalAlloys Inductor Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Inductor/MetalAlloys
diagram	
type	MetalAlloysInductorClassificationType, FixedMetalAlloysInductorClassificationType, VariableMetalAlloysInductorClassificationType, OverflowCategoriesType, MetalAlloysInductorClassificationProperty-ArrayType.
group	OverflowCategories.

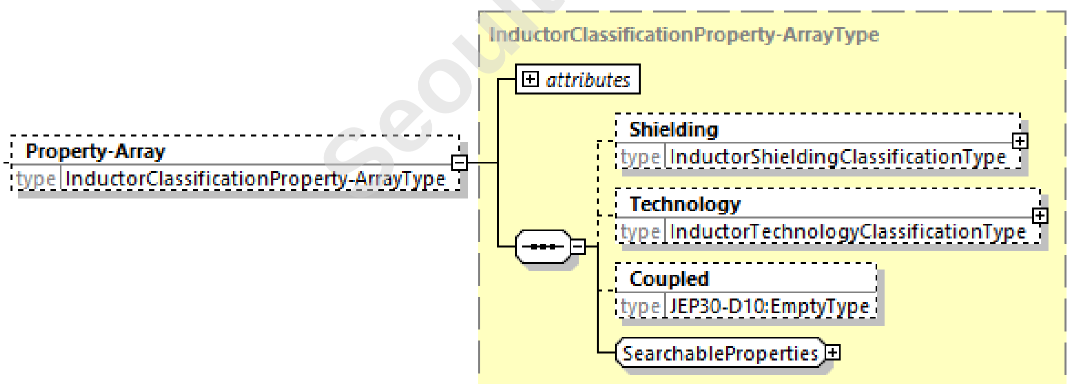
4.7.1.3.11.2.1. Variable

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Inductor/MetalAlloys/Variable
diagram	
type	VariableMetalAlloysInductorClassificationType, VariableMetalAlloysInductorClassificationProperty-ArrayType, VariableInductorAdjustmentType.
group	SearchableProperties.

4.7.1.3.11.2.2. Property - Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Inductor/MetalAlloys/Property-Array
diagram	
type	MetalAlloysInductorClassificationProperty-ArrayType, MetalAlloysInductorMaterialPropertyType, JEP30-D10:EmptyType.
group	SearchableProperties.

4.7.1.3.11.3. Inductor Property - Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Inductor/Property-Array
diagram	
type	InductorClassificationProperty-ArrayType, InductorShieldingClassificationType, InductorTechnologyClassificationType, JEP30-D10:EmptyType.
group	SearchableProperties.

An *Inductor* can come with various levels of *Shielding* and can be either *Fixed* or *Variable* in value.

Mutual inductance occurs when the change in current in one inductor induces a voltage in another nearby inductor. It is the mechanism by which transformers work.

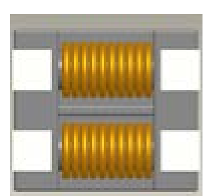
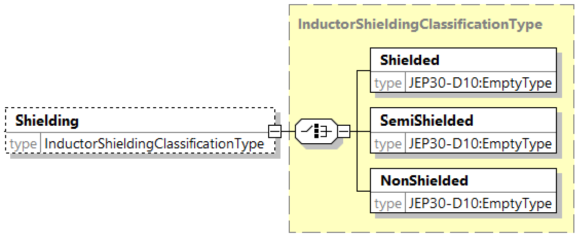
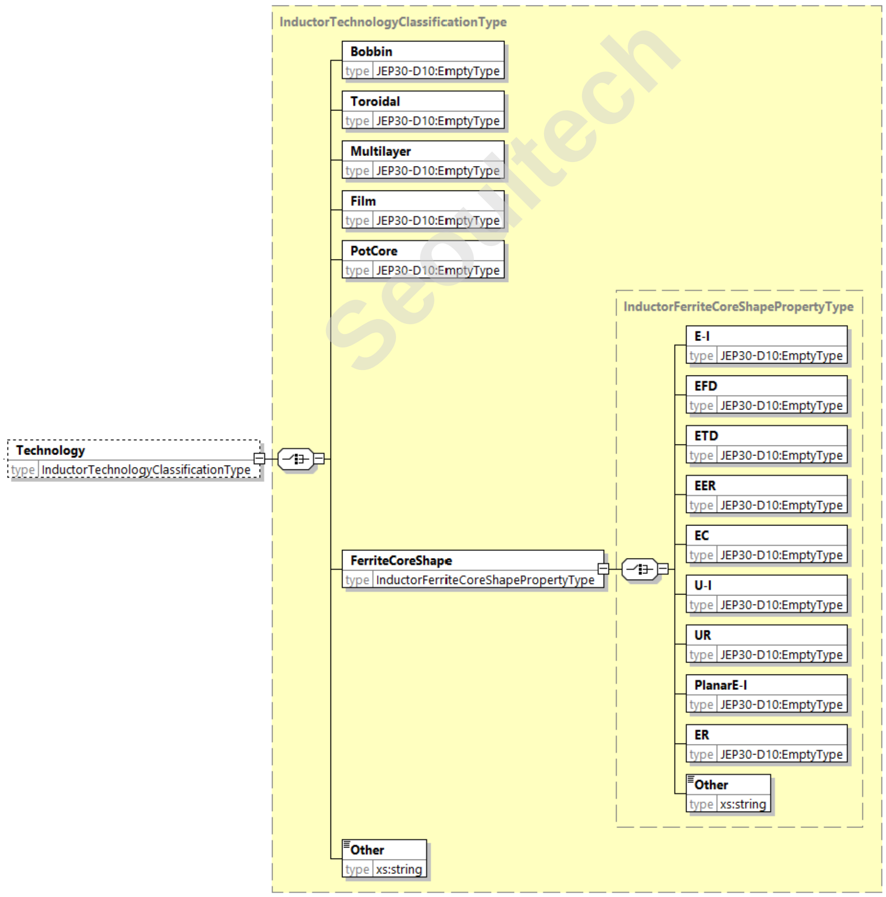


Figure 3 — Coupled Inductor

4.7.1.3.11.3.1. Inductor Shielding Property

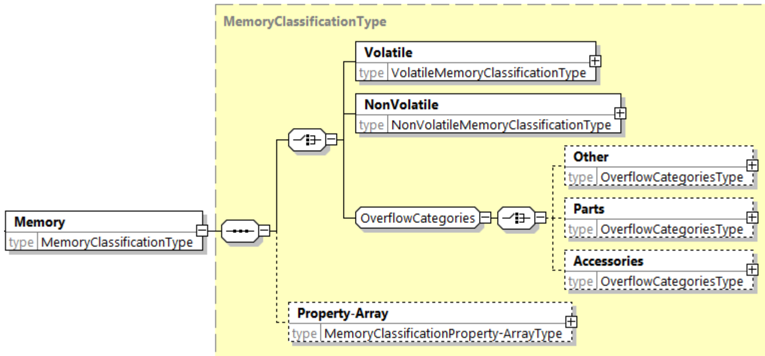
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Inductor/Property-Array/Shielding
diagram	
type	InductorShieldingClassificationType, JEP30-D10:EmptyType.

4.7.1.3.11.3.2. Inductor Technology Property

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Inductor/Property-Array/Technology
diagram	
type	InductorTechnologyClassificationType, JEP30-D10:EmptyType, InductorFerriteCoreShapePropertyType.

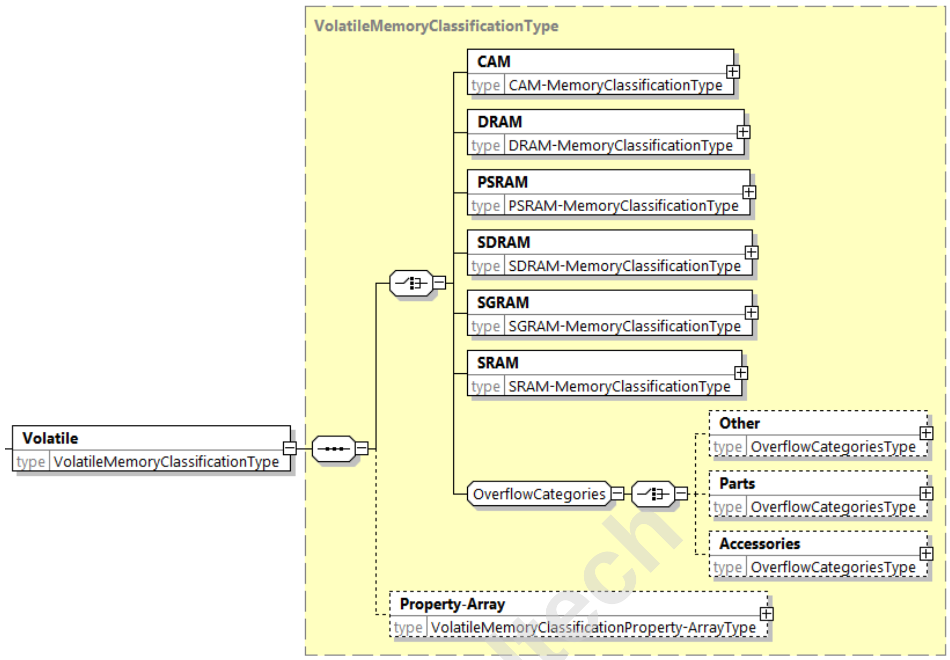
All Inductors whether fixed or variable can have different *Technology* construction as outlined above, but other technologies can be captured under the *Other* property elements.

4.7.1.3.12. Memory Classification

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Memory</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>MemoryClassificationType, VolatileMemoryClassificationType, NonVolatileMemoryClassificationType, OverflowCategoriesType.</td></tr>
<tr><td>group</td><td>OverflowCategories.</td></tr>
</table>

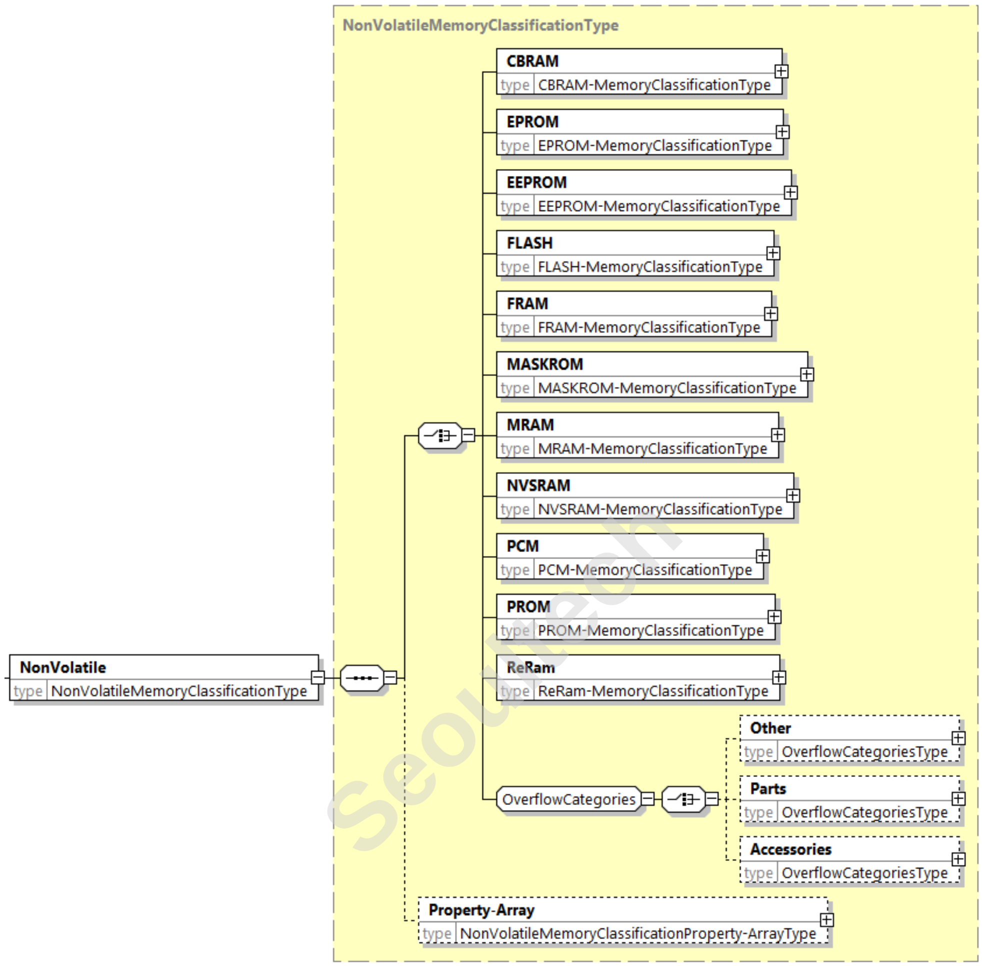
A *Memory* device is any device that is used to store data or information. *Volatile* memory is computer storage that only maintains its data while the device is powered. *Non-volatile* memory (NVM) is a type of computer memory that has the capability to hold saved data even if the power is turned off. Unlike *Volatile* memory, *Non-volatile* memory does not require its memory data to be periodically refreshed. It is commonly used for secondary storage or long-term consistent storage.

4.7.1.3.12.1. Volatile Memory Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Memory/Volatile**
diagram	
type	**VolatileMemoryClassificationType, CAM-MemoryClassificationType, DRAM-MemoryClassificationType, PSRAM-MemoryClassificationType, SDRAM-MemoryClassificationType, SGRAM-MemoryClassificationType, SRAM-MemoryClassificationType, OverflowCategoriesType , VolatileMemoryClassificationProperty-ArrayType.**
group	**OverflowCategories.**

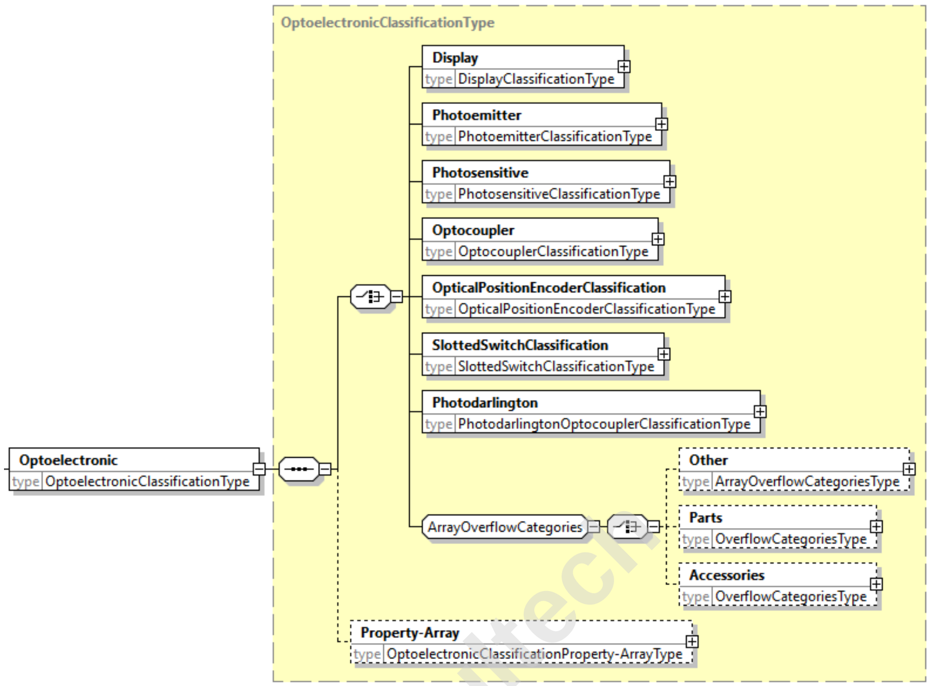
There are several sub-classifications for both *Volatile* memory devices, as shown above, however new sub-classifications can be captured under the category *Other*.

4.7.1.3.12.2. NonVolatile Memory Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Memory/NonVolatile
diagram	
type	NonVolatileMemoryClassificationType, CBRAM-MemoryClassificationType, EPROM-MemoryClassificationType, EEPROM-MemoryClassificationType, FLASH-MemoryClassificationType, FRAM-MemoryClassificationType, MASKROM-MemoryClassificationType, MRAM-MemoryClassificationType, NVSRAM-MemoryClassificationType, PCM-MemoryClassificationType, PROM-MemoryClassificationType, ReRam-MemoryClassificationType, OverflowCategoriesType, NonVolatileMemoryClassificationProperty-ArrayType
group	OverflowCategories.

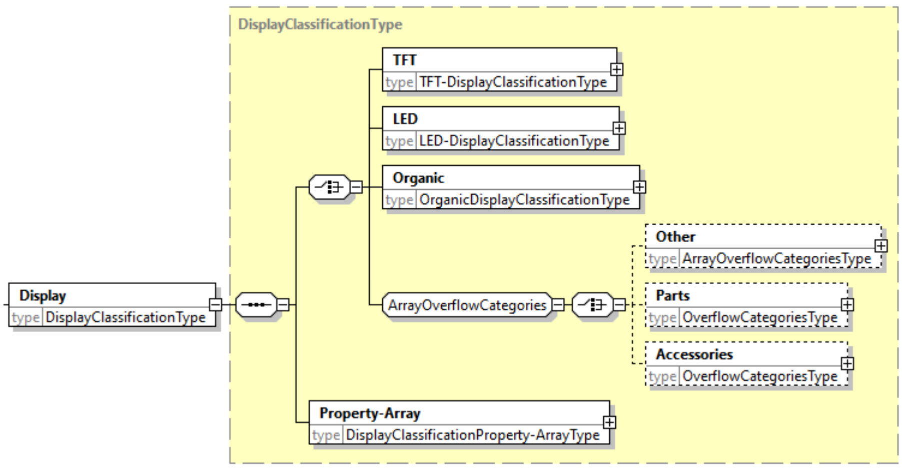
There are several sub-classifications for both *Non-volatile* memory devices, as shown above, however new sub-classifications can be captured under the category *Other*.

4.7.1.3.13. Optoelectronics Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Optoelectronic
diagram	
type	OptoelectronicsClassificationType, DisplayClassification, PhotoemitterClassificationType, PhotosensitiveClassificationType, OptocouplerClassificationType, OpticalPositionEncoderClassificationType, SlottedSwitchClassificationType, PhotodarlingtonOptocouplerClassificationType, ArrayOverflowCategoriesType, OverflowCategoriesType.
group	ArrayOverflowCategories.

Optoelectronic devices are devices that responds to, emits, or modifies electromagnetic radiation in the visible, infrared, and/or ultraviolet spectral regions. These devices utilize electromagnetic radiation in the visible, infrared, and/or ultraviolet spectral regions for its internal operation.

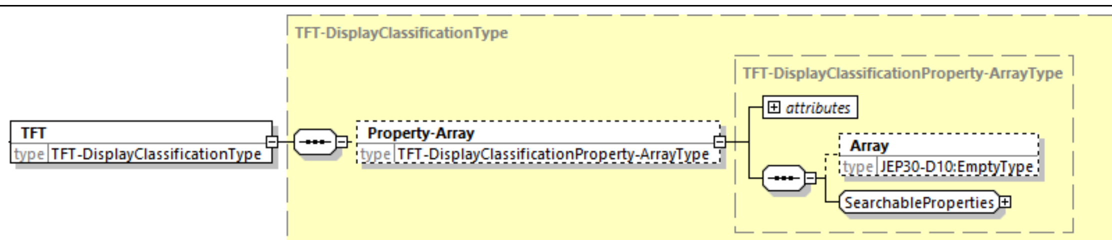
4.7.1.3.13.1. Display Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Optoelectronic/Display
diagram	
type	DisplayClassificationType, TFT-DisplayClassificationType, LED-DisplayClassificationType, OrganicDisplayClassificationType, ArrayOverflowCategoriesType, OverflowCategoriesType, DisplayClassificationProperty-ArrayType.
group	ArrayOverflowCategories.

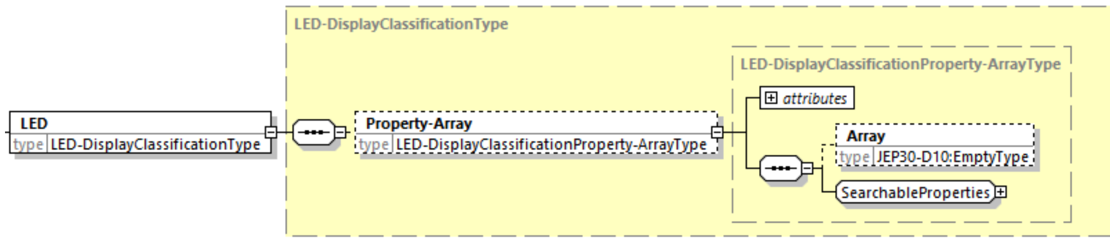
A *Display* device is an output device for presentation of information in visual or tactile form (the latter used for example in tactile electronic displays for blind people). Additional sub-classification can be defined under the category *Other*.

The *TFT*, *LED* and the *Organic* displays can be provided in *Array* form as shown below.

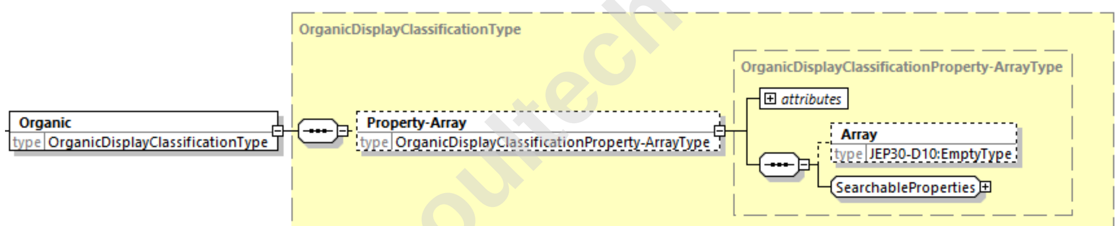
4.7.1.3.13.1.1. TFT Display Classification Type

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Optoelectronic/Display/TFT
diagram	
type	TFT-DisplayClassificationType, TFT-DisplayClassificationProperty-ArrayType, JEP30-D10:EmptyType.
group	SearchableProperties.

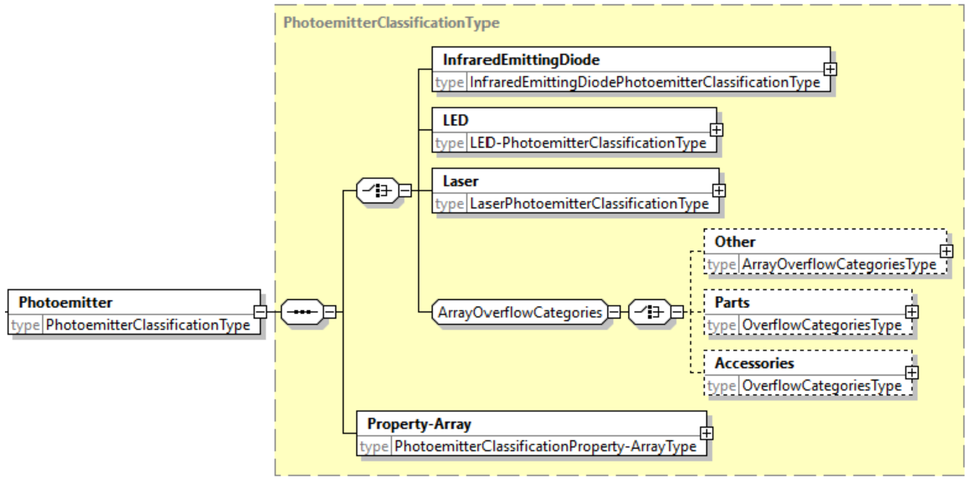
4.7.1.3.13.1.2. LED Display Classification Type

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Optoelectronic/Display/LED
diagram	
type	LED-DisplayClassificationType, LED-DisplayClassificationProperty-ArrayType, JEP30-D10:EmptyType.
group	SearchableProperties.

4.7.1.3.13.1.3. Organic Display Classification

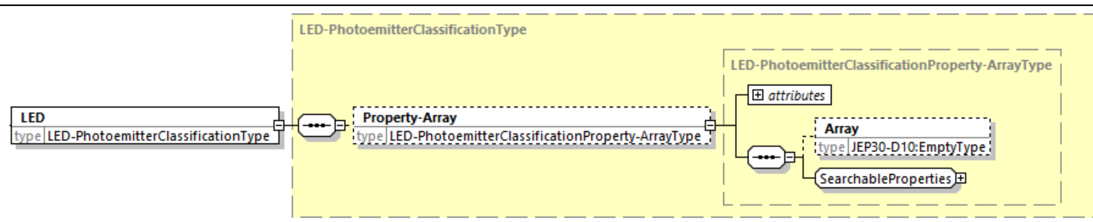
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Optoelectronic/Display/Organic
diagram	
type	OrganicDisplayClassificationType, OrganicDisplayClassificationProperty-ArrayType, JEP30-D10:EmptyType.
group	SearchableProperties.

4.7.1.3.13.2. Photoemitter Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Optoelectronic/Photoemitter
diagram	
type	PhotoemitterClassificationType, InfraredEmittingDiodePhotoemitterClassificationType, LED-PhotoemitterClassificationType, LaserPhotoemitterClassificationType, ArrayOverflowCategoriesType, OverflowCategoriesType, PhotoemitterClassificationProperty-ArrayType.
group	ArrayOverflowCategories.

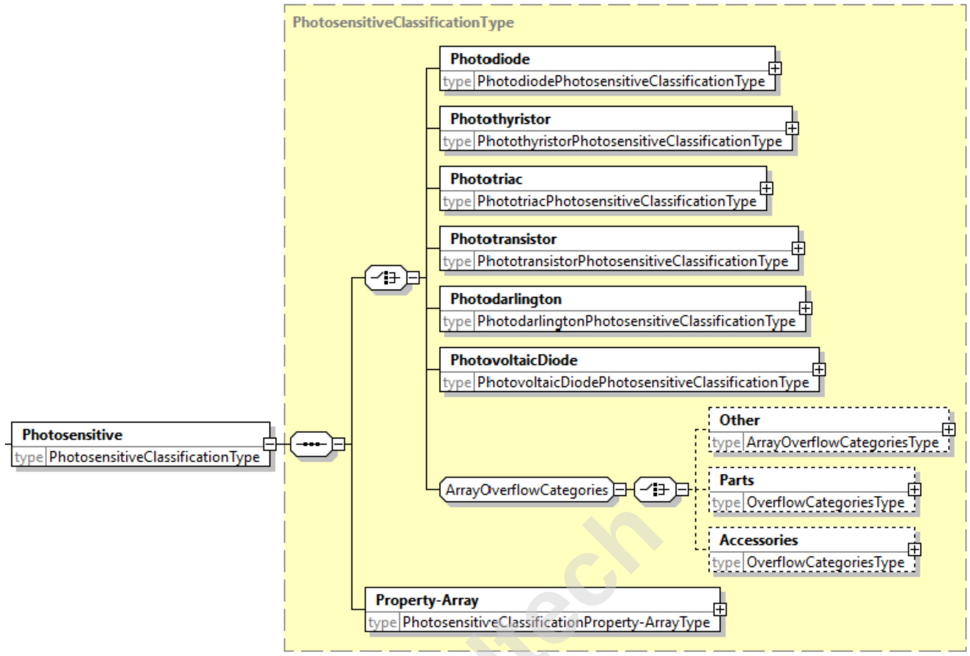
Photoemitter devices are device that emits electromagnetic radiation in the visible, infrared, and/or ultraviolet spectral regions. Some of the more common classifications are defined above, but additional classification can be defined under the category *Other*.

4.7.1.3.13.2.1. Photoemitter LED Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Optoelectronic/Photoemitter/LED
diagram	
type	LED-PhotoemitterClassificationType, LED-PhotoemitterClassificationProperty-ArrayType, JEP30-D10:EmptyType.
group	SearchableProperties.

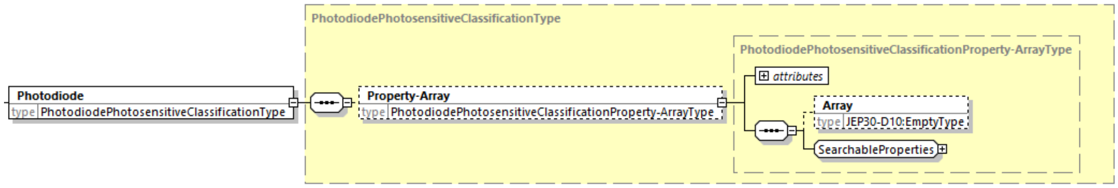
NOTE The *LED* category can be supplied in an *Array* form.

4.7.1.3.13.3. Photosensitive Classification

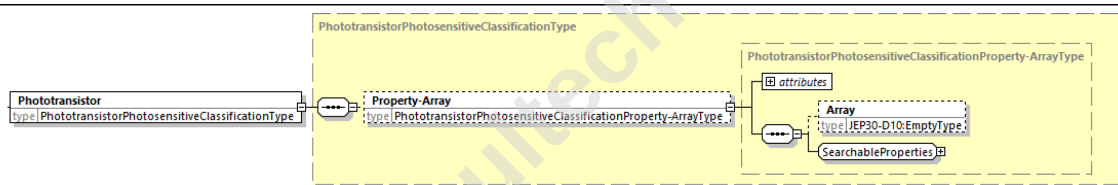
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Optoelectronic/Photosensitive</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>PhotosensitiveClassificationType, PhotodiodePhotosensitiveClassificationType, PhotothyristorPhotosensitiveClassificationType, PhototriacPhotosensitiveClassificationType, PhototransistorPhotosensitiveClassificationType, PhotodarlingtonPhotosensitiveClassificationType, PhotovoltaicDiodePhotosensitiveClassificationType, ArrayOverflowCategoriesType, OverflowCategoriesType, PhotosensitiveClassificationProperty-ArrayType.</td></tr>
<tr><td>group</td><td>ArrayOverflowCategories.</td></tr>
</table>

A *Photosensitive* device is a device that is responsive to electromagnetic radiation in the visible, infrared, and/or ultraviolet spectral regions. Some of the more common classifications are defined above, but additional classification can be defined under the category *Other*. Note that some classifications such as the *Photodiode* and the *Phototransistor* can come in *Array* form.

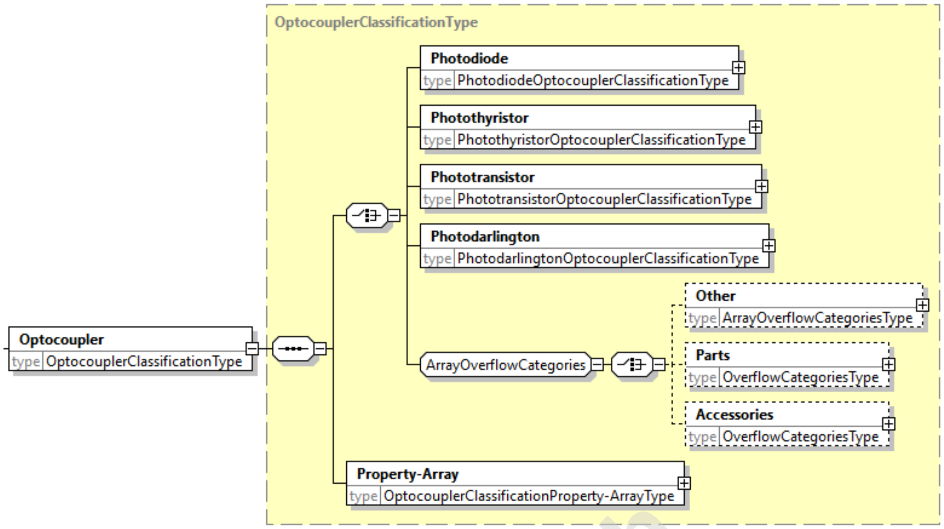
4.7.1.3.13.3.1. Photodiode Photosensitive Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Optoelectronic/Photosensitive/Photodiode
diagram	
type	PhotodiodePhotosensitiveClassificationType, PhotodiodePhotosensitiveClassificationProperty-ArrayType, JEP30-D10:EmptyType.
group	SearchableProperties.

4.7.1.3.13.3.2. Phototransistor Photosensitive Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Optoelectronic/Photosensitive/Phototransistor
diagram	
type	PhototransistorPhotosensitiveClassificationType, PhototransistorPhotosensitiveClassificationProperty-ArrayType, JEP30-D10:EmptyType.
group	SearchableProperties.

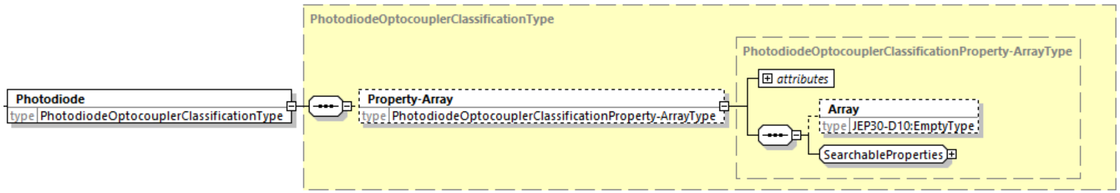
4.7.1.3.13.4. Optocoupler Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Optoelectronic/Optocoupler**
diagram	
type	**OptocouplerClassificationType, PhotodiodeOptocouplerClassificationType, PhotothyristorOptocouplerClassificationType, PhototransistorOptocouplerClassificationType, PhotodarlingtonOptocouplerClassificationType, ArrayOverflowCategoriesType, OverflowCategoriesType, OptocouplerClassificationProperty-ArrayType.**
group	**ArrayOverflowCategories.**

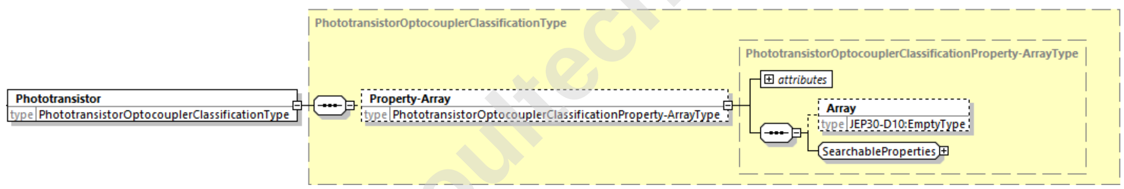
An *Optocoupler* device designed for the transformation of electrical signals by utilizing optical radiant energy to provide coupling with electrical isolation between the input and the output. (Ref. IEC 747-5.). Some of the more common classifications are defined above, but additional classification can be defined under the category *Other*.

Some classifications such as the *Photodiode* and the *Phototransistor* can come in *Array* form as shown bellow.

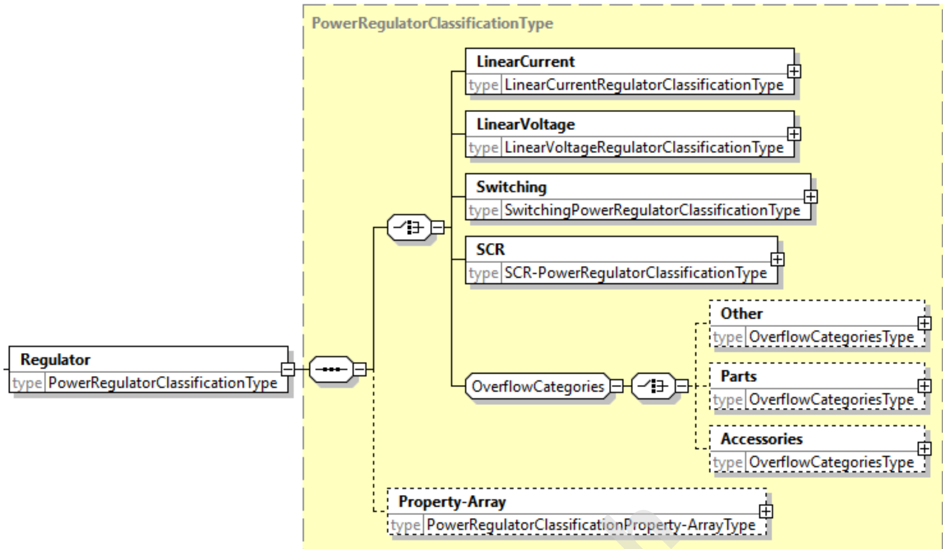
4.7.1.3.13.4.1. Photodiode Optocoupler Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Optoelectronic/Optocoupler/Photodiode**
diagram	
type	**PhotodiodeOptocouplerClassificationType, PhotodiodeOptocouplerClassificationProperty-ArrayType, JEP30-D10:EmptyType.**
group	**SearchableProperties.**

4.7.1.3.13.4.2. Phototransistor Optocoupler Classification

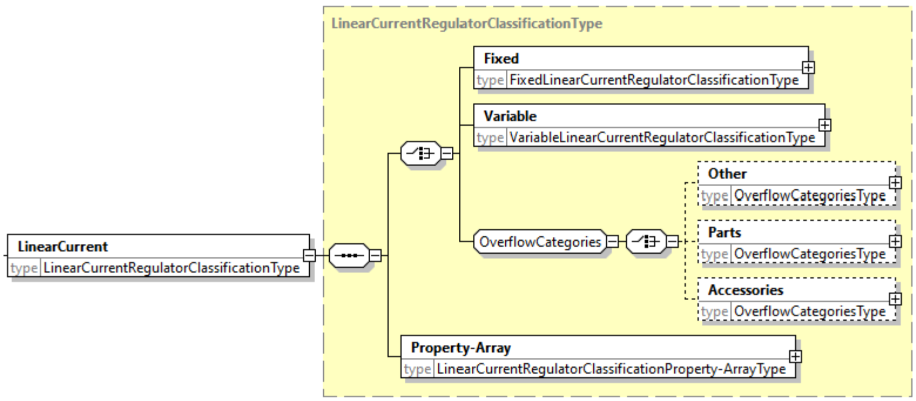
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Optoelectronic/Optocoupler/ Phototransistor, JEP30-D10:EmptyType, PropertyKeyValuePairType**
diagram	
type	**PhototransistorOptocouplerClassificationType, PhototransistorOptocouplerClassificationProperty-ArrayType, JEP30-D10:EmptyType.**
group	**SearchableProperties.**

4.7.1.3.14. Regulator Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Regulator**
diagram	
type	**PowerRegulatorClassificationType, LinearCurrentRegulatorClassificationType, LinearVoltageRegulatorClassificationType, SwitchingPowerRegulatorClassificationType, SCR-PowerRegulatorClassificationType, OverflowCategoriesType, PowerRegulatorClassificationProperty-ArrayType**
group	**OverflowCategories.**

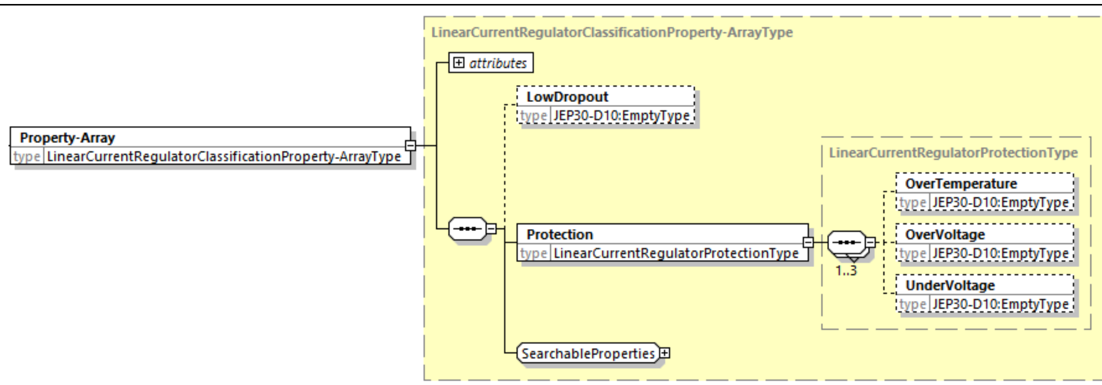
A power *Regulator* is a device that is designed to have minimal changes in the regulated power over a broad input range. There are various kinds of regulators available as listed above, and other variations can be defined under the category *Other*. Typically, these *Regulator* have one or more various *Protections*.

4.7.1.3.14.1. Linear Current Regulator Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Regulator/LinearCurrent
diagram	
type	LinearCurrentRegulatorClassificationType, FixedLinearCurrentRegulatorClassificationType, VariableLinearCurrentRegulatorClassificationType, OverflowCategoriesType, LinearCurrentRegulatorClassificationProperty-ArrayType
group	OverflowCategories.

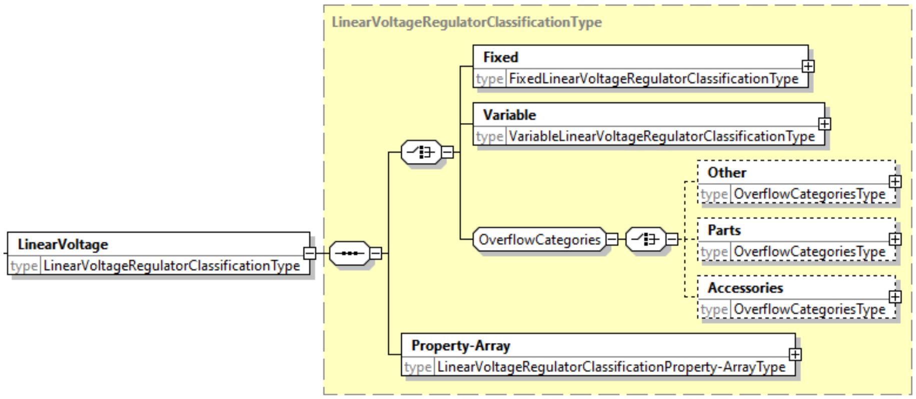
A *LinearCurrent* regulator device is a system used to maintain a steady current. The resistance of the regulator varies in accordance with the load resulting in a constant output current.

4.7.1.3.14.2. Linear Current Regulator Property-Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Regulator/LinearCurrent/Property-Array
diagram	
type	LinearCurrentRegulatorClassificationProperty-ArrayType, JEP30-D10:EmptyType, LinearCurrentRegulatorProtectionType.
group	SearchableProperties.

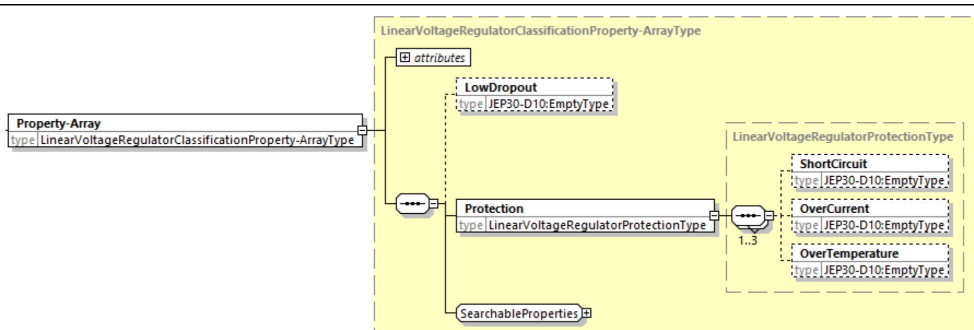
Linear Current regulators come with a *LowDropout* option, and have *Protection* against *OverTemperature*, *OverVoltage*, and or *UnderVoltage*.

4.7.1.3.14.3. Linear Voltage Regulator Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Regulator/LinearVoltage**
diagram	
type	**LinearVoltageRegulatorClassificationType, FixedLinearVoltageRegulatorClassificationType, VariableLinearVoltageRegulatorClassificationType, OverflowCategoriesType, LinearVoltageRegulatorClassificationProperty-ArrayType**
group	**OverflowCategories.**

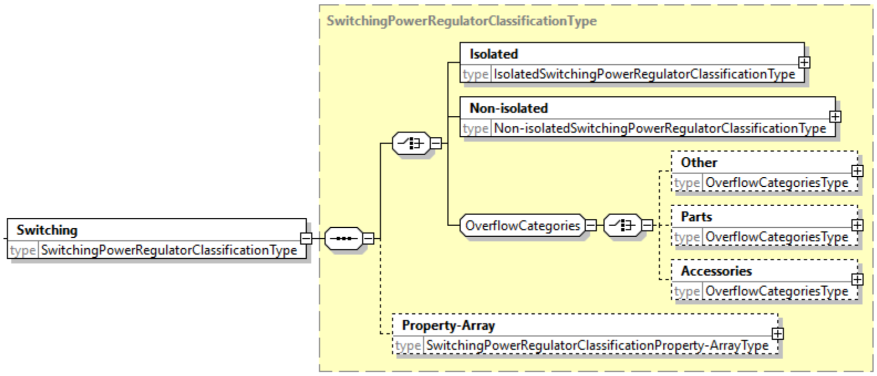
A *Linear* regulator device is a system used to maintain a steady voltage. The resistance of the regulator varies in accordance with the load resulting in a constant output voltage. The regulating device is made to act like a variable resistor, continuously adjusting a voltage divider network to maintain a constant output voltage and continually dissipating the difference between the input and regulated voltages as waste heat. Linear regulators come with a *LowDropout* option.

4.7.1.3.14.4. Linear Voltage Regulator Property-Array

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Regulator/LinearVoltage/Property-Array**
diagram	
type	**LinearVoltageRegulatorClassificationProperty-ArrayType, JEP30-D10:EmptyType, LinearVoltageRegulatorProtectionType.**
group	**SearchableProperties.**

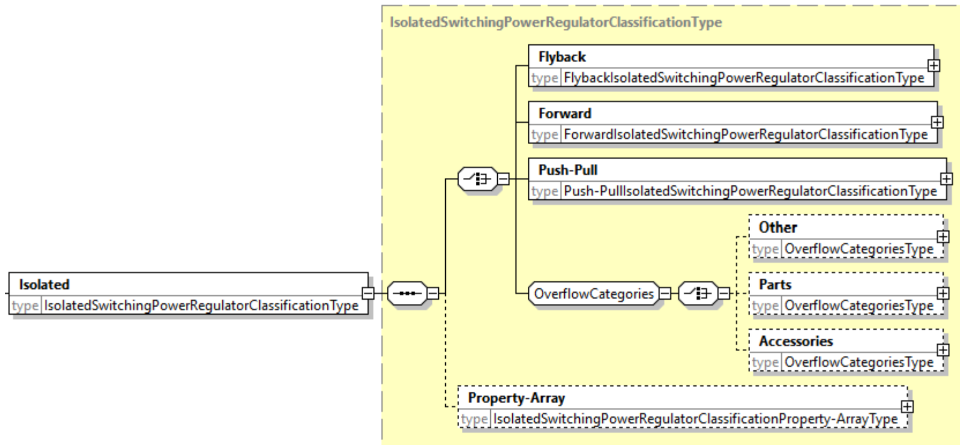
Linear Voltage regulators come with a *LowDropout* option, and have *Protection* against *ShortCircuit*, *OverCurrent*, and/or *OverTemperature*.

4.7.1.3.14.5. Switching Regulator Classification

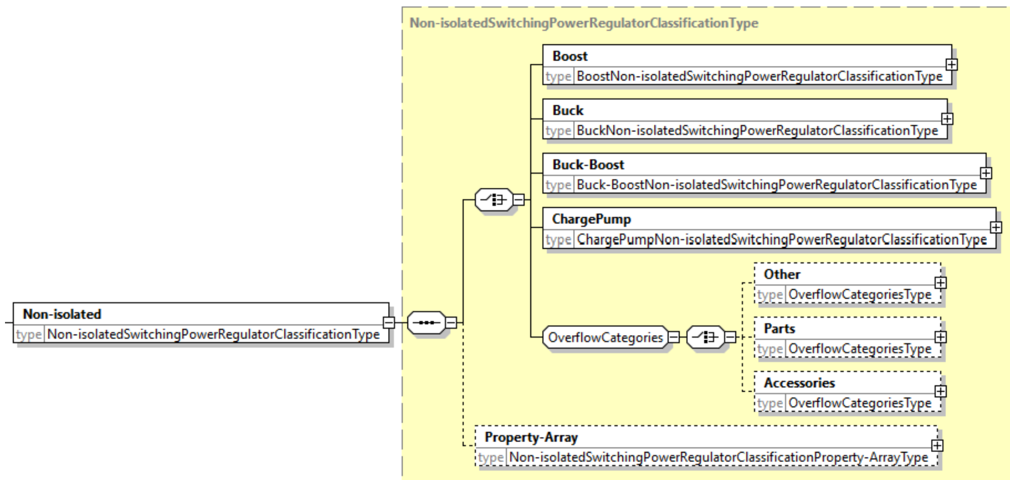
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Regulator/Switching**
diagram	
type	**SwitchingPowerRegulatorClassificationType, IsolatedSwitchingPowerRegulatorClassificationType, Non-isolatedSwitchingPowerRegulatorClassificationType, OverflowCategoriesType, SwitchingPowerRegulatorClassificationProperty-ArrayType**
group	**OverflowCategories.**

In contrast to a *Linear* regulator, a *Switching* regulator uses an active device that switches on and off to maintain an average value of output. The duty cycle of the switch sets how much charge is transferred to the load.

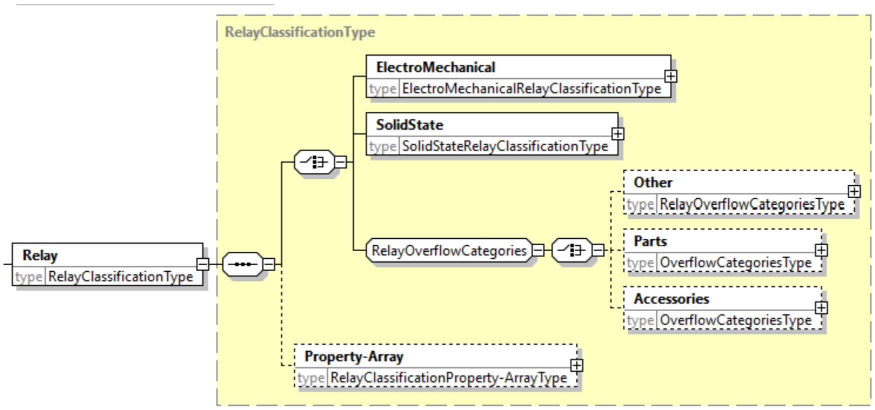
4.7.1.3.14.5.1. Isolated Switching Regulator Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Regulator/Switching/Isolated
diagram	
type	IsolatedSwitchingPowerRegulatorClassificationType, FlybackIsolatedSwitchingPowerRegulatorClassificationType, ForwardIsolatedSwitchingPowerRegulatorClassificationType, Push-PullIsolatedSwitchingPowerRegulatorClassificationType, OverflowCategoriesType, IsolatedSwitchingPowerRegulatorClassificationProperty-ArrayType
group	OverflowCategories.

4.7.1.3.14.5.2. Non-isolated Switching Regulator Classification

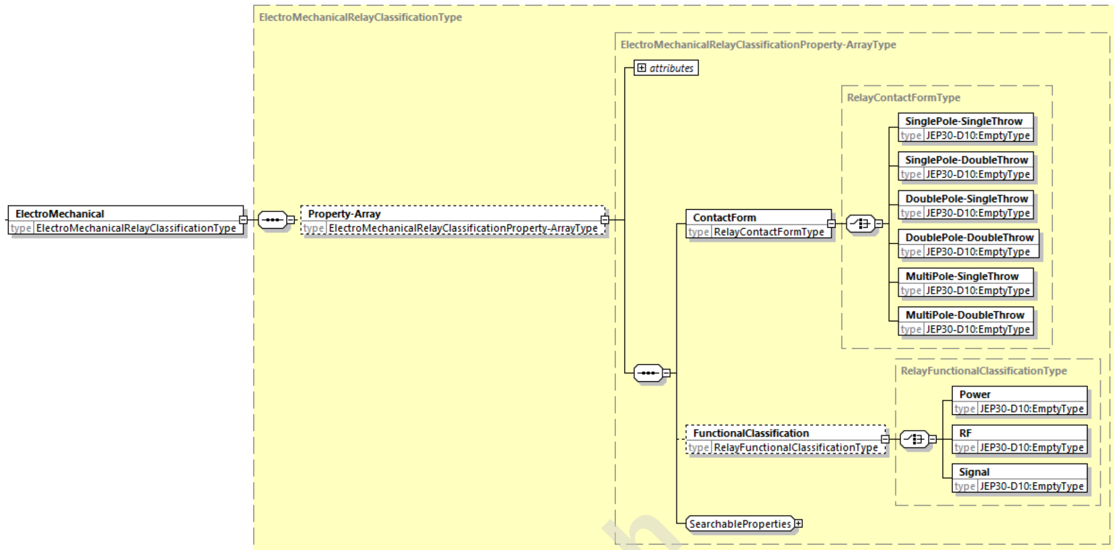
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Regulator/Switching/Non-isolated</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>Non-isolatedSwitchingPowerRegulatorClassificationType,
BoostNon-isolatedSwitchingPowerRegulatorClassificationType,
BuckNon-isolatedSwitchingPowerRegulatorClassificationType,
Buck-BoostNon-isolatedSwitchingPowerRegulatorClassificationType,
ChargePumpNon-isolatedSwitchingPowerRegulatorClassificationType, OverflowCategoriesType,
Non-isolatedSwitchingPowerRegulatorClassificationProperty-ArrayType</td></tr>
<tr><td>group</td><td>OverflowCategories.</td></tr>
</table>

4.7.1.3.15. Relay Classification

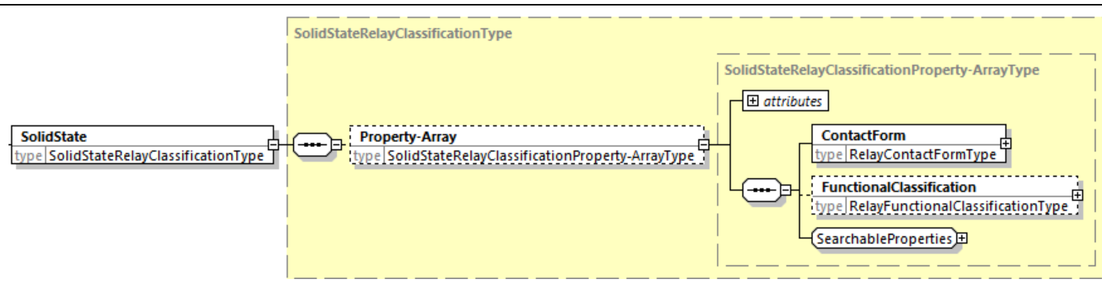
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Relay</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>RelayClassificationType, ElectroMechanicalRelayClassificationType, SolidStateRelayClassificationType, RelayOverflowCategoriesType, OverflowCategoriesType, RelayClassificationProperty-ArrayType.</td></tr>
<tr><td>group</td><td>RelayOverflowCategories.</td></tr>
</table>

A *Relay* is an electrically operated switch. Many relays use an electromagnet (*Coil*) to mechanically operate a switch, but other operating principles are also used, such as *SolidState*. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal.

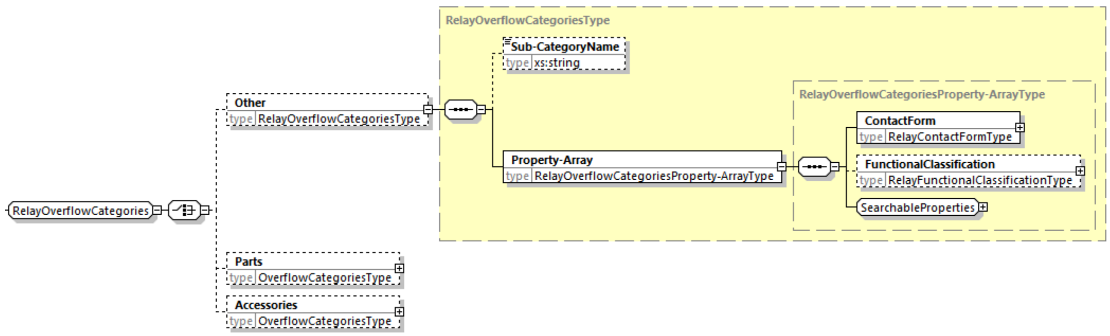
4.7.1.3.15.1. ElectroMechanical Relay Classification and Property-Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Relay/ElectroMechanical
diagram	
type	ElectroMechanicalRelayClassificationType, ElectroMechanicalRelayClassificationProperty-ArrayType, RelayContactFormType, RelayFunctionalClassificationType, JEP30-D10:EmptyType.
group	SearchableProperties.

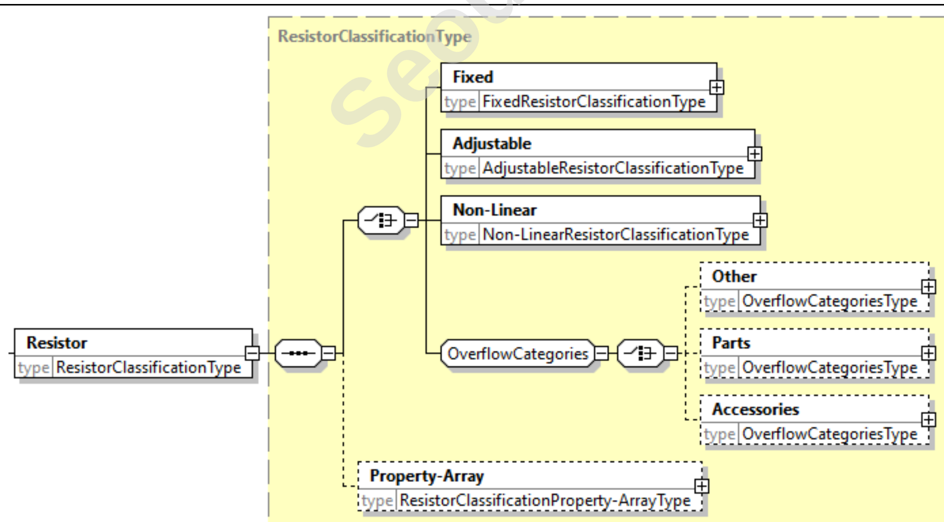
4.7.1.3.15.2. SolidState Relay Classification and Property-Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Relay/SolidState
diagram	
type	SolidStateRelayClassificationType, SolidStateRelayClassificationProperty-ArrayType, RelayContactFormType, RelayFunctionalClassificationType.
group	SearchableProperties.

4.7.1.3.15.3. Relay Overflow Categories Group

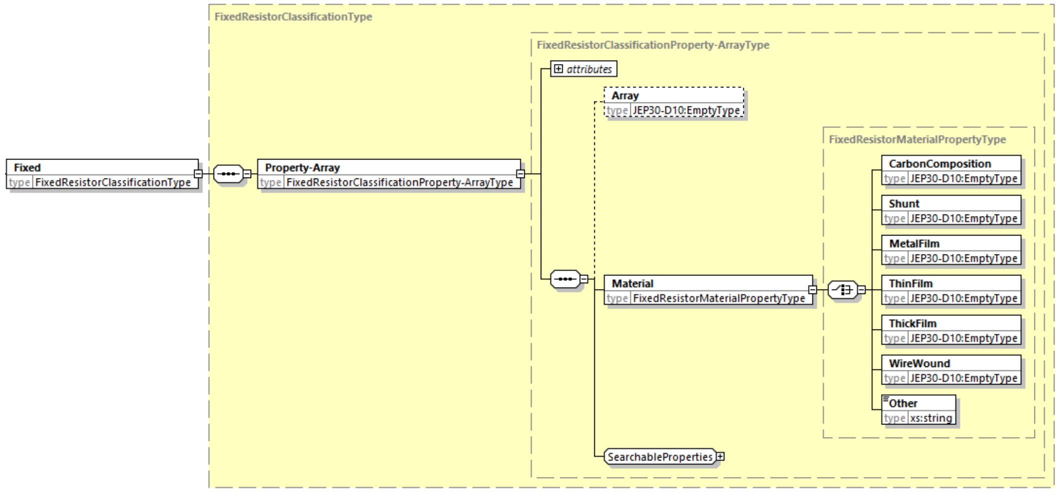
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Relay/Other</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>RelayOverflowCategoriesType, RelayOverflowCategoriesProperty-ArrayType, RelayContactFormType, RelayFunctionalClassificationType, PropertyKeyValuePairType, OverflowCategoriesType.</td></tr>
<tr><td>group</td><td>RelayOverflowCategories, SearchableProperties.</td></tr>
</table>

4.7.1.3.16. Resistor Classification

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Resistor</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>ResistorClassificationType, FixedResistorClassificationType, AdjustableResistorClassificationType, NonLinearResistorClassificationType, OverflowCategoriesType, ResistorClassificationProperty-ArrayType.</td></tr>
<tr><td>group</td><td>OverflowCategories.</td></tr>
</table>

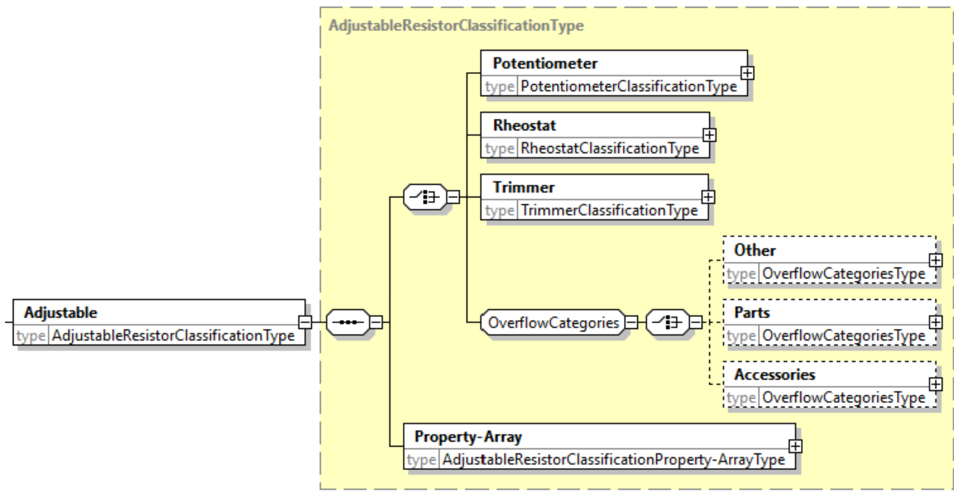
A *Resistor* is a passive electrical component that implements electrical resistance as a circuit element. They are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.

4.7.1.3.16.1. Fixed Resistor Classification and Property-Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Resistor/Fixed
diagram	
type	FixedResistorClassificationType, FixedResistorClassificationProperty-ArrayType, JEP30-D10:EmptyType, FixedResistorMaterialPropertyType.
group	SearchableProperties.

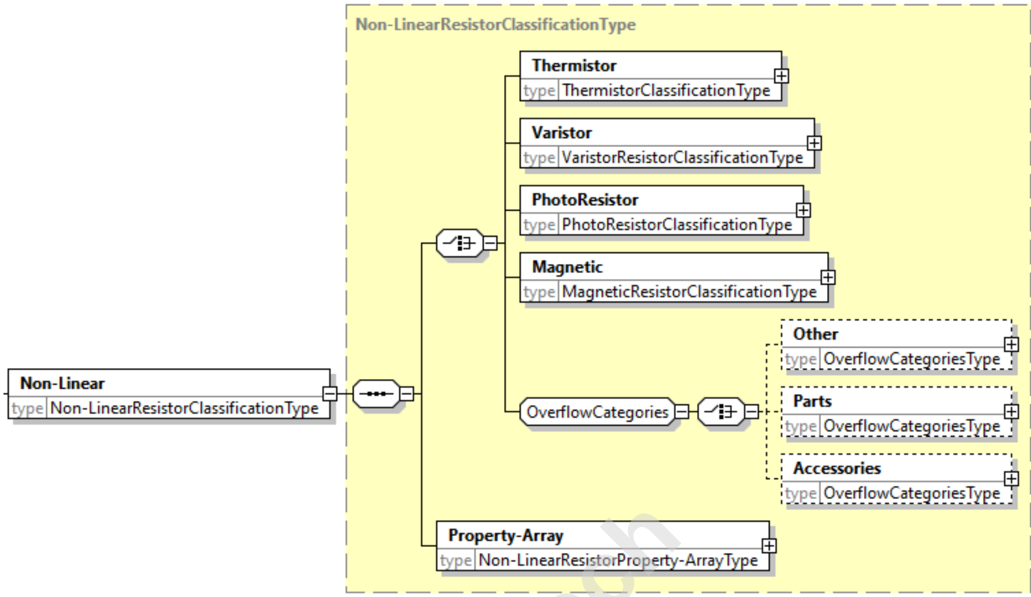
Fixed resistors have resistances that only change slightly with temperature, time or operating voltage.

4.7.1.3.16.2. Adjustable Resistor Classification

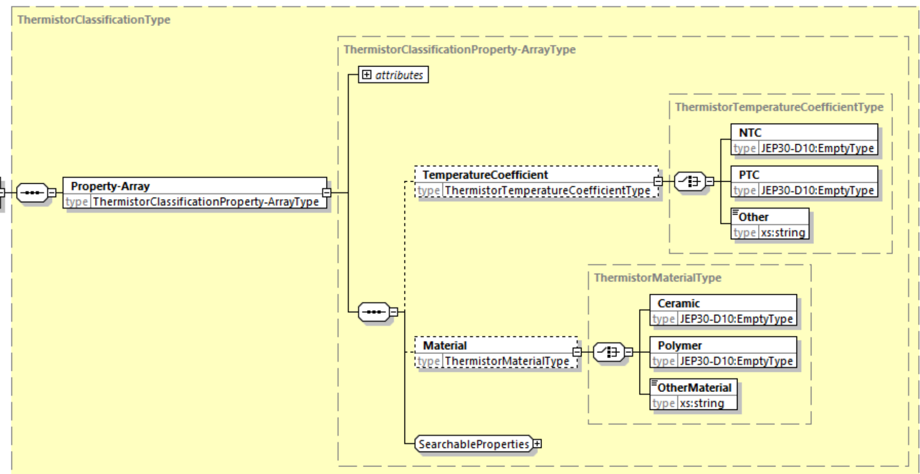
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Resistor/Adjustable
diagram	
type	AdjustableResistorClassificationType, PotentiometerClassificationType, RheostatClassificationType, TrimmerClassificationType, OverflowCategoriesType, AdjustableResistorClassificationProperty-ArrayType.
group	OverflowCategories.

Adjustable resistors can be used to adjust circuit elements, or as sensing devices for heat, light, humidity, force, or chemical activity.

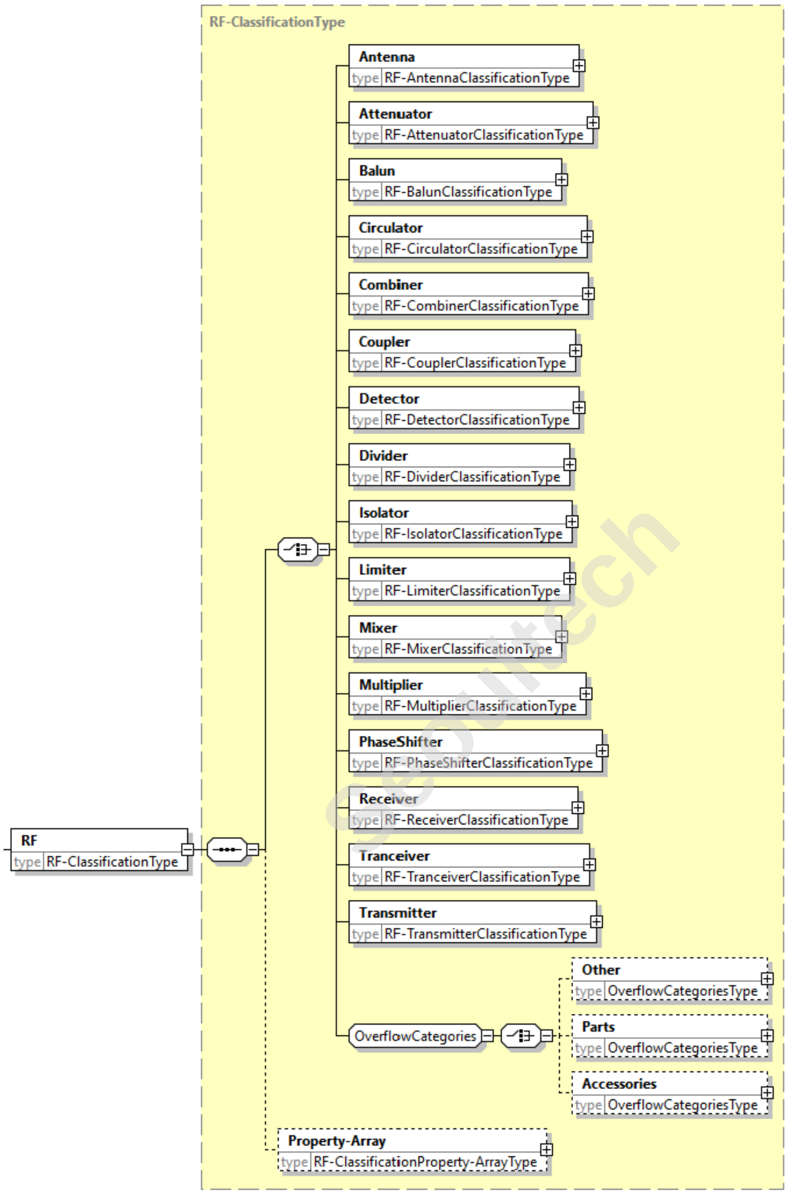
4.7.1.3.16.3. Non-Linear Resistor Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Resistor/Non-Linear
diagram	
type	LinearResistorClassificationType, ThermistorClassificationType, VaristorResistorClassificationType, PhotoResistorClassificationType, MagneticResistorClassificationType, OverflowCategoriesType, Non-LinearResistorProperty-ArrayType.
group	OverflowCategories.

4.7.1.3.16.4. Thermistor Classification and Property-Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Resistor/Non-Linear/Thermistor</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>ThermistorClassificationType, ThermistorClassificationProperty-ArrayType,
ThermistorTemperatureCoefficientType, ThermistorMaterialType, JEP30-D10:EmptyType.</td></tr>
<tr><td>group</td><td>SearchableProperties.</td></tr>
</table>

4.7.1.3.17. RF Classification

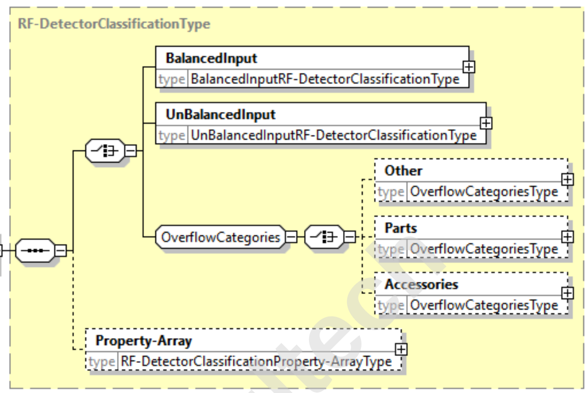
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/RF</td></tr>
<tr><td>diagram</td><td>


</td></tr>
<tr><td>type</td><td>RF-ClassificationType, RF-AntennaClassificationType, RF-AttenuatorClassificationType, RF-BalunClassificationType, RF-CirculatorClassificationType, RF-CombinerClassificationType, RF-CouplerClassificationType, RF-DetectorClassificationType, RF-DividerClassificationType, RF-IsolatorClassificationType, RF-LimiterClassificationType, RF-MixerClassificationType, RF-MultiplierClassificationType, RF-PhaseShifterClassificationType, RF-ReceiverClassificationType, RF-TranceiverClassificationType, RF-TransmitterClassificationType, OverflowCategoriesType, RF-ClassificationProperty-ArrayType</td></tr>
<tr><td>group</td><td>OverflowCategories.</td></tr>
</table>

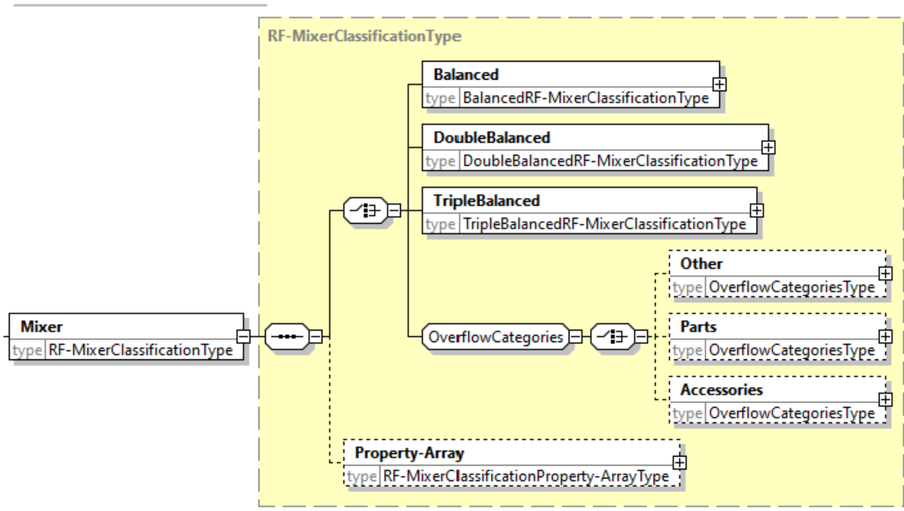
4.7.1.3.17 RF Classification (cont'd)

RF is any frequency within the electromagnetic spectrum associated with radio wave propagation. When an RF current is supplied to an antenna, an electromagnetic field is created that then can propagate through space. This section covers devices that operate with RF type signals. The section has a broad set of sub-classifications, with the provision to define other categories, if needed under the category *Other*.

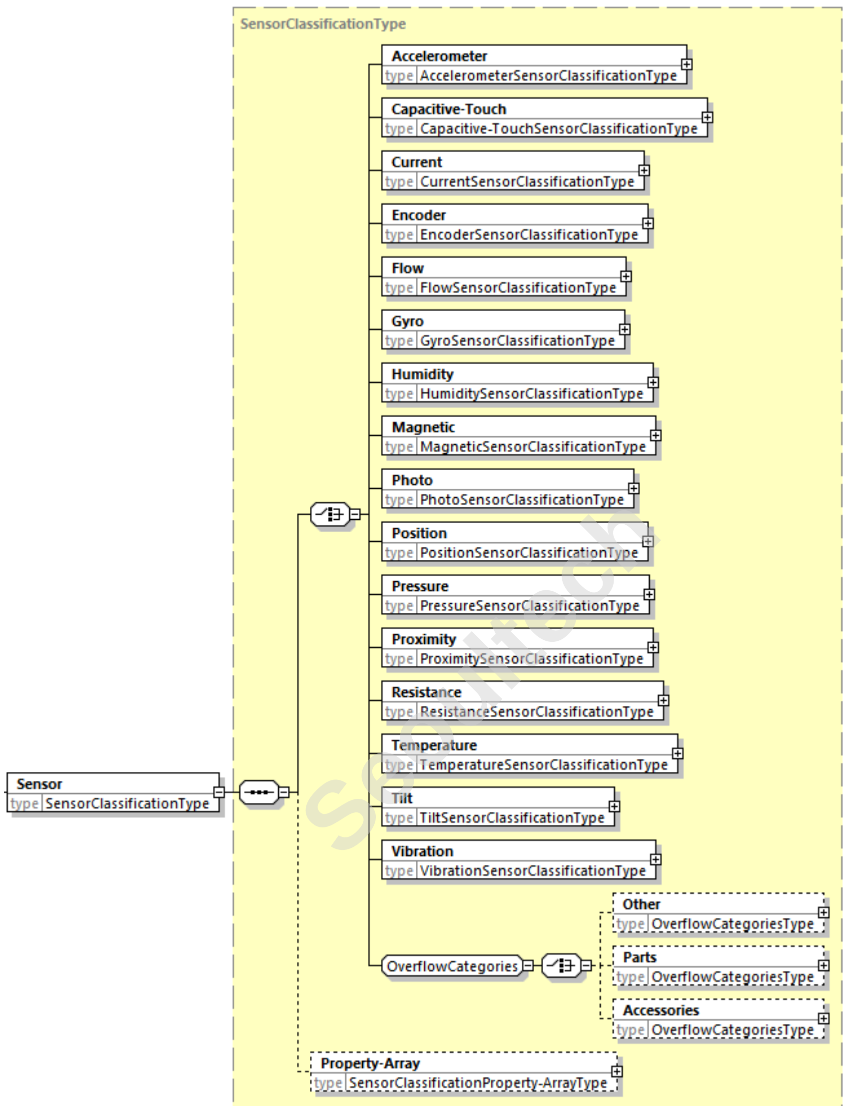
4.7.1.3.17.1. RF Detector Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/RF/Detector**
diagram	
type	**RF-DetectorClassificationType, BalancedInputRF-DetectorClassificationType, UnBalancedInputRF-DetectorClassificationType, OverflowCategoriesType, RF-DetectorClassificationProperty-ArrayType**
group	**OverflowCategories.**

4.7.1.3.17.2. RF Mixer Classification

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/RF/Mixer</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>RF-MixerClassificationType, BalancedRF-MixerClassificationType, DoubleBalancedRF-MixerClassificationType, TripleBalancedRF-MixerClassificationType, OverflowCategoriesType, RF-MixerClassificationProperty-ArrayType</td></tr>
<tr><td>group</td><td>OverflowCategories.</td></tr>
</table>

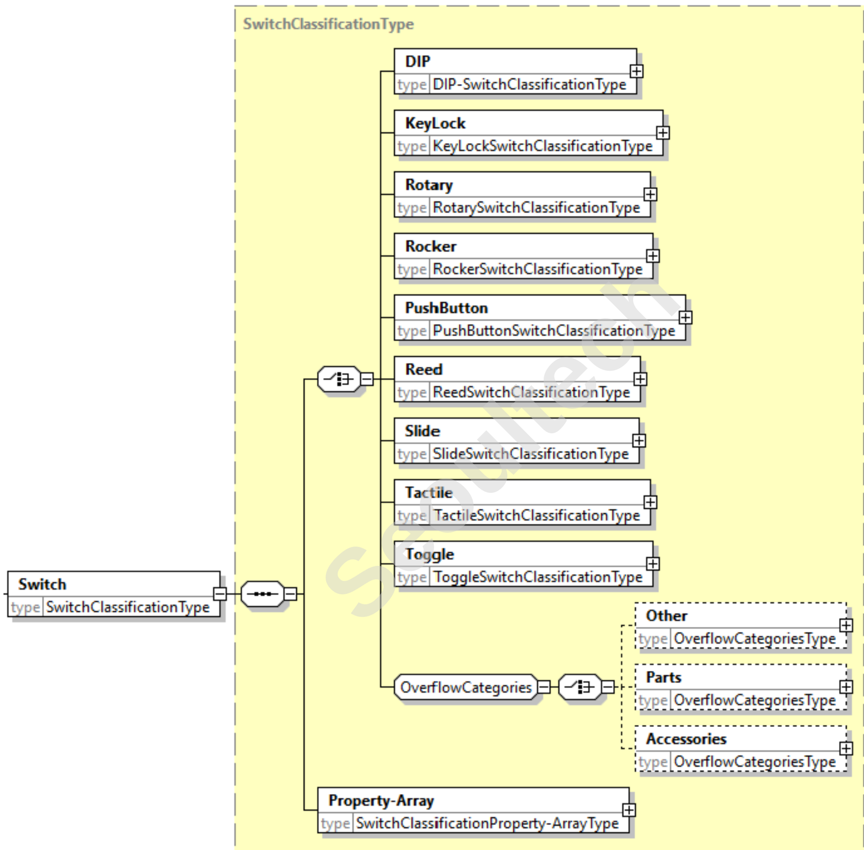
4.7.1.3.18. Sensor Classification

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Sensor</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>SensorClassificationType, AccelerometerSensorClassificationType, Capacitive-TouchSensorClassificationType, CurrentSensorClassificationType, EncoderSensorClassificationType, FlowSensorClassificationType, GyroSensorClassificationType, HumiditySensorClassificationType, MagneticSensorClassificationType, PhotoSensorClassificationType, PositionSensorClassificationType, PressureSensorClassificationType, ProximitySensorClassificationType, ResistanceSensorClassificationType, TemperatureSensorClassificationType, TiltSensorClassificationType, VibrationSensorClassificationType, OverflowCategoriesType, SensorClassificationProperty-ArrayType</td></tr>
<tr><td>group</td><td>OverflowCategories.</td></tr>
</table>

4.7.1.3.18 Sensor Classification (cont'd)

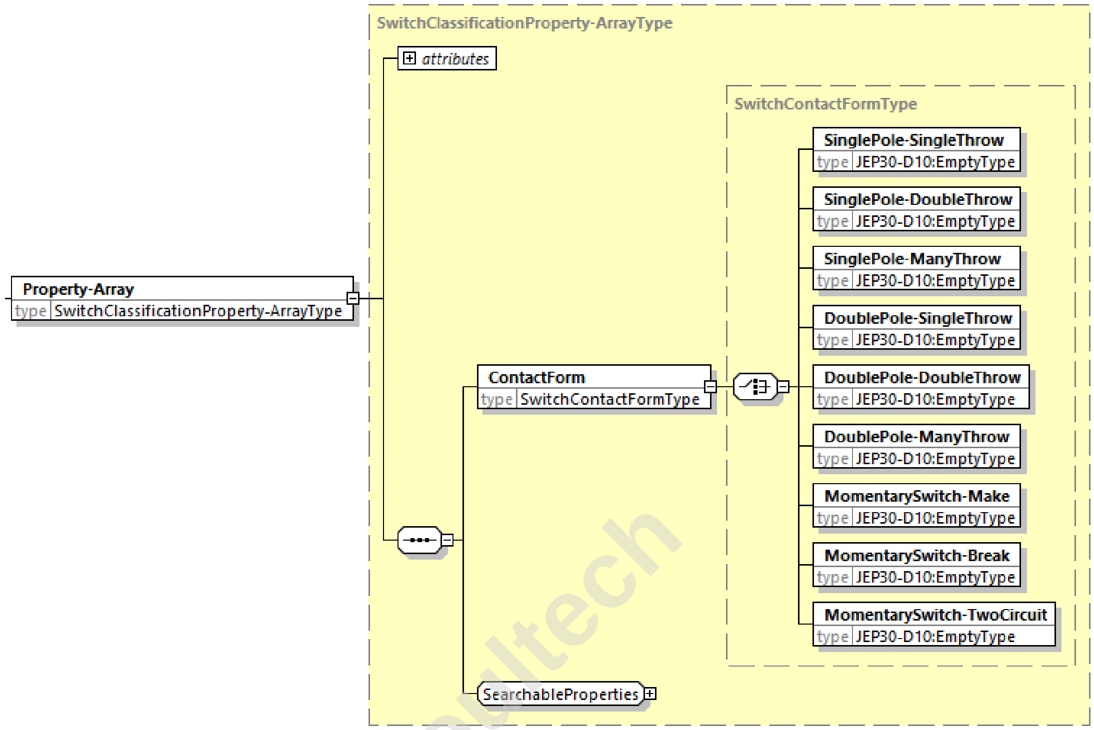
A *Sensor* is an electronic component, module, or subsystem whose purpose is to detect events or changes in its environment and send the information to other electronic devices. There is a broad classification of sensors as shown above, however new sub-classifications can be captured under the category *Other*.

4.7.1.3.19. Switch Classification

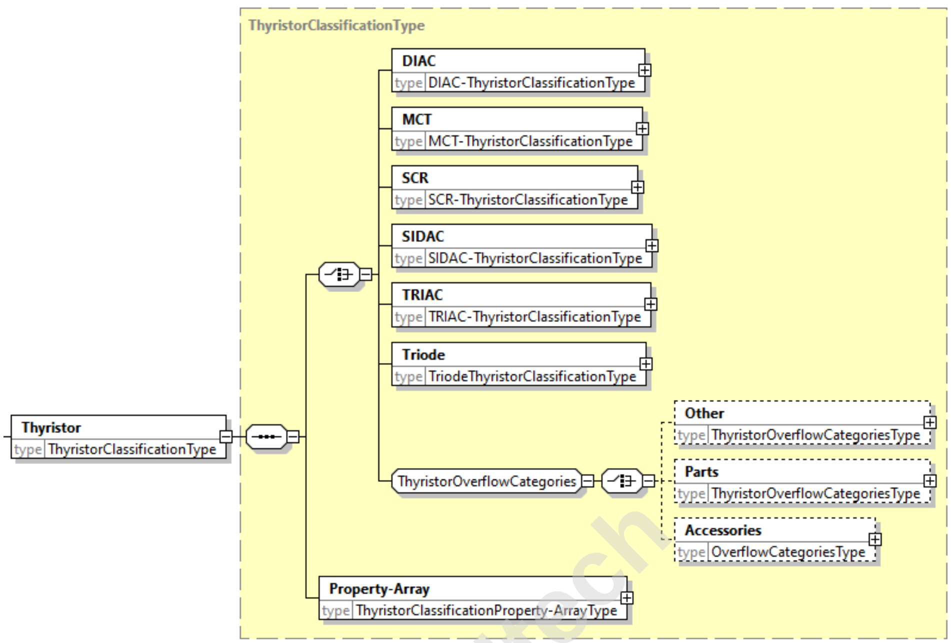
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Switch**
diagram	
type	**SwitchClassificationType, DIP-SwitchClassificationType, KeyLockSwitchClassificationType, RotarySwitchClassificationType, RockerSwitchClassificationType, PushButtonSwitchClassificationType, ReedSwitchClassificationType, SlideSwitchClassificationType, TactileSwitchClassificationType, ToggleSwitchClassificationType, OverflowCategoriesType, SwitchClassificationProperty-ArrayType.**
group	**OverflowCategories.**

A *Switch* is an electrical component that can "make" or "break" an electrical circuit, interrupting the current or diverting it from one conductor to another. The mechanism of a switch removes or restores the conducting path in a circuit when it is operated.

4.7.1.3.19.1. Switch Property-Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Switch/Property-Array
diagram	
type	SwitchClassificationProperty-ArrayType, SwitchContactFormType, JEP30-D10:EmptyType, PropertyKeyValuePairType

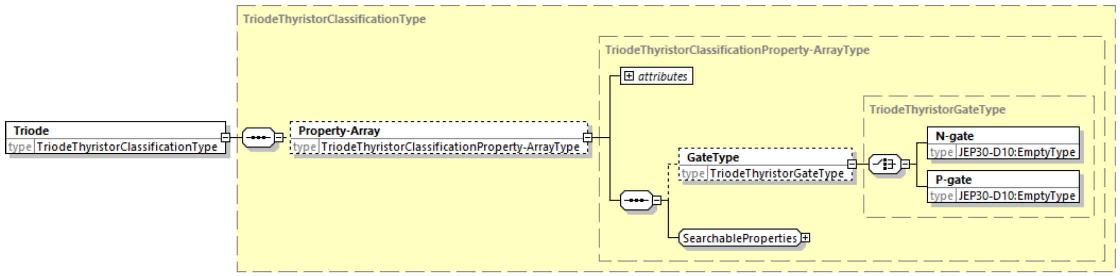
4.7.1.3.20. Thyristor Classification

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Thyristor</td></tr>
<tr><td>diagram</td><td>


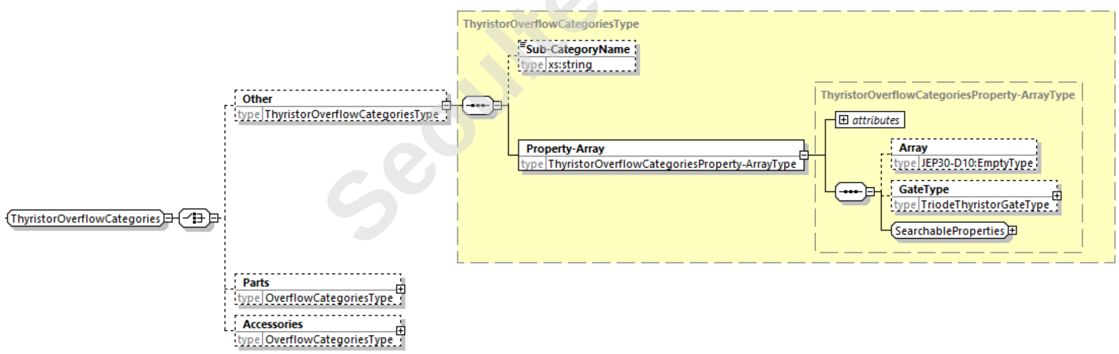
</td></tr>
<tr><td>type</td><td>ThyristorClassificationType, DIAC-ThyristorClassificationType, MCT-ThyristorClassificationType, SCR-ThyristorClassificationType, SIDAC-ThyristorClassificationType, TRIAC-ThyristorClassificationType, TriodeThyristorClassificationType, ThyristorOverflowCategoriesType, OverflowCategoriesType, ThyristorClassificationProperty-ArrayType</td></tr>
<tr><td>group</td><td>ThyristorOverflowCategories.</td></tr>
</table>

A *Thyristor,* also known as a semiconductor-controlled rectifier (SCR) or silicon-controlled rectifier (SCR), is a solid-state semiconductor device with four layers of alternating N and P-type materials. It acts exclusively as a bistable switch, conducting when the gate receives a current trigger, and continuing to conduct while the voltage across the device is not reversed (forward biased). A three-terminal thyristor is designed to control the larger current of its two terminals by combining that current with the smaller current of its other terminals, known as its control terminal. In contrast, a two-terminal thyristor is designed to switch on if the potential difference between its terminals is sufficiently large (breakdown voltage).

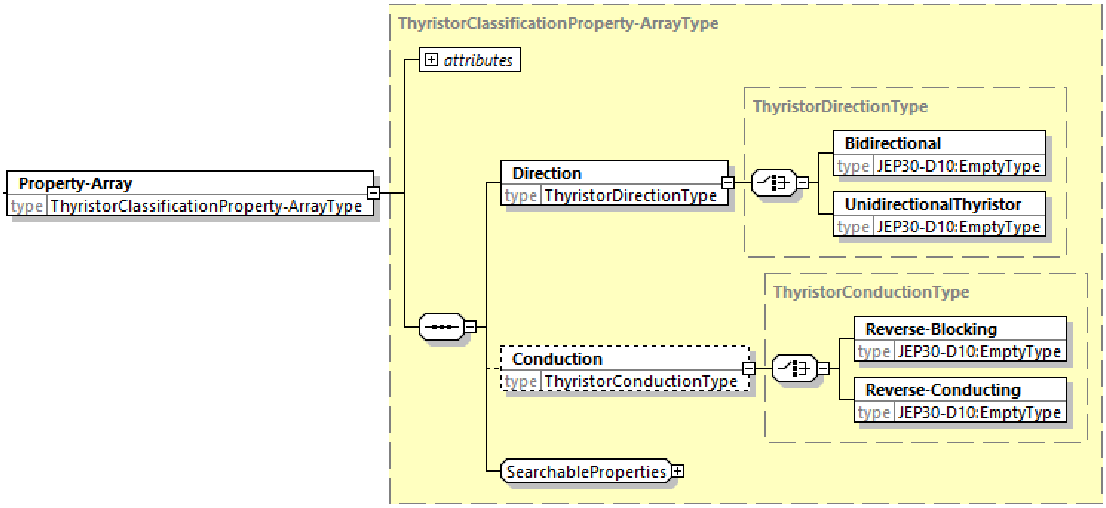
4.7.1.3.20.1. Triode Thyristor Classification

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Thyristor/Triode</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>TriodeThyristorClassificationType, TriodeThyristorClassificationProperty-ArrayType,
TriodeThyristorGateType, JEP30-D10:EmptyType.</td></tr>
<tr><td>group</td><td>SearchableProperties.</td></tr>
</table>

4.7.1.3.20.2. Thyristor Overflow Categories Group

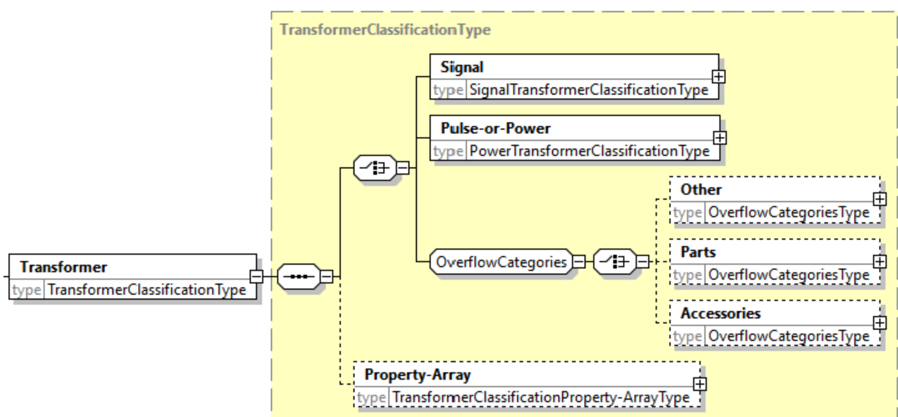
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Thyristor</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>ThyristorOverflowCategoriesType, ThyristorOverflowCategoriesProperty-ArrayType, JEP30-D10:EmptyType,
TriodeThyristorGateType, OverflowCategoriesType,</td></tr>
<tr><td>group</td><td>ThyristorOverflowCategories, SearchableProperties.</td></tr>
</table>

4.7.1.3.20.3. Thyristor Property-Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Thyristor/Property-Array
diagram	
type	ThyristorClassificationProperty-ArrayType, ThyristorDirectionType, ThyristorConductionType, JEP30-D10:EmptyType.
group	SearchableProperties.

The *Bidirectional* thyristor is where two separate thyristors are integrated into the same device.

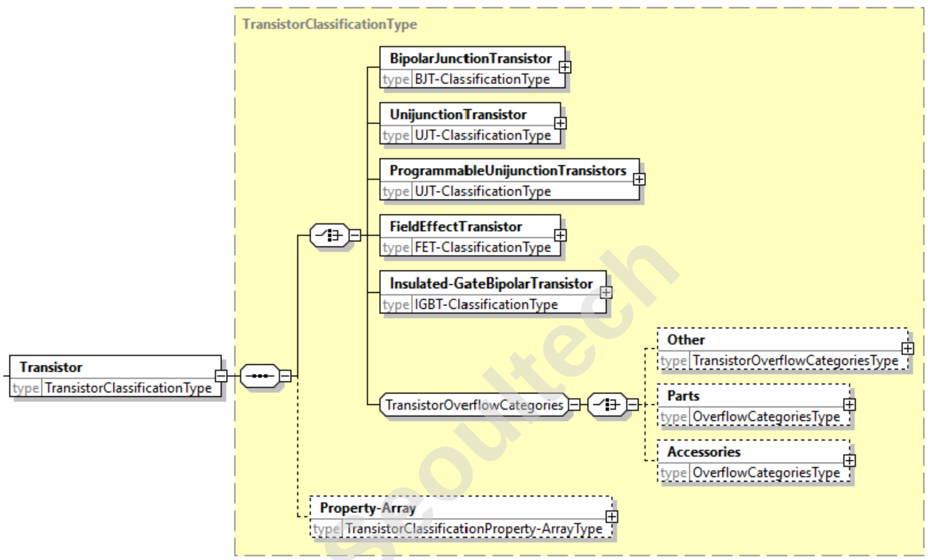
4.7.1.3.21. Transformer Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Transformer
diagram	
type	TransformerClassificationType, SignalTransformerClassificationType, PowerTransformerClassificationType, OverflowCategoriesType, TransformerClassificationProperty-ArrayType.
group	OverflowCategories.

4.7.1.3.21. Transformer Classification (cont'd)

A transformer is an electrical device that transfers electrical energy between two or more circuits through electromagnetic induction. A varying current in one coil of the transformer produces a varying magnetic field, which induces a voltage in a second coil. Power is transferred between the two coils through the magnetic field, without a connection between the two circuits. Typically, there are two types of transformers – Signal and Power, but other types can be defined.

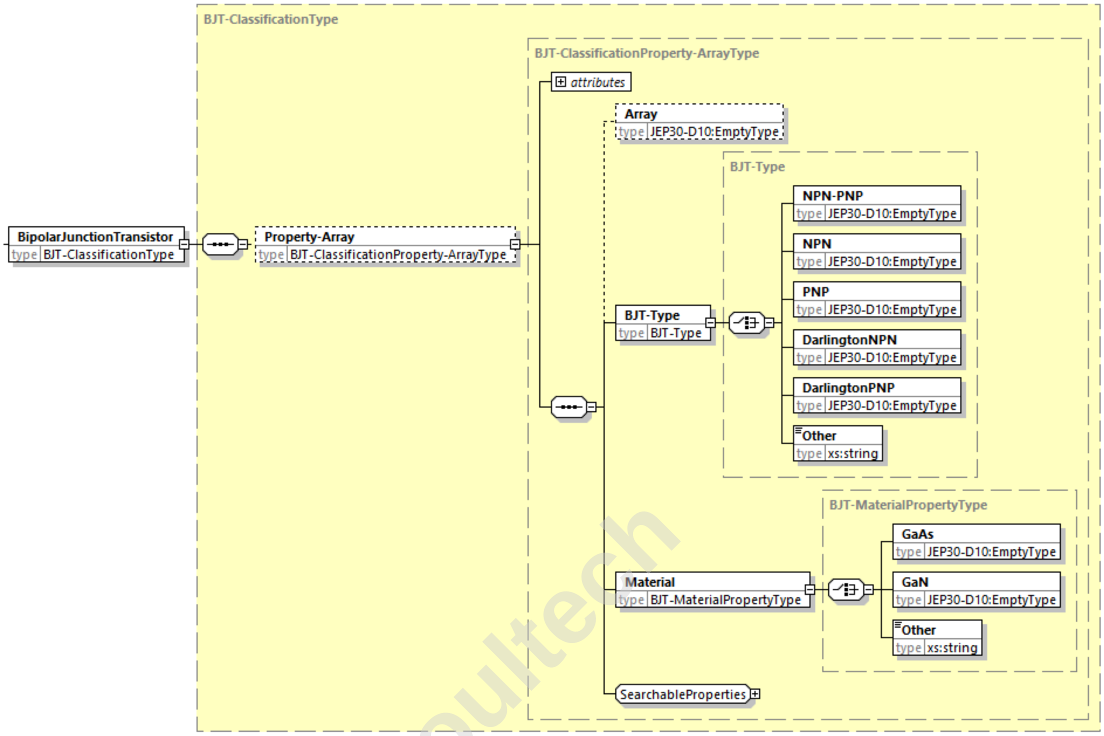
4.7.1.3.22. Transistor Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Transistor**
diagram	
type	**TransistorClassificationType, BJT-ClassificationType, UJT-ClassificationType, FET-ClassificationType, IGBT-ClassificationType, TransistorOverflowCategoriesType, OverflowCategoriesType, TransistorClassificationProperty-ArrayType.**
group	**TransistorOverflowCategories.**

A *Transistor* is an electronic device that controls the flow of an electric current, most often used as an amplifier or switch. Transistors usually consist of three layers of semiconductor material, in which the flow of electric current across the outer layer is regulated by the voltage or current applied at the middle layer.

There are several classifications of transistors as shown above, however new classifications can be captured under the category *Other*.

4.7.1.3.22.1. Bipolar Junction Transistor Classification and Property-Array

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Transistor/BipolarJunctionTransistor**
diagram	
type	**BJT-ClassificationType, BJT-ClassificationProperty-ArrayType, JEP30-D10:EmptyType, BJT-Type, BJT-MaterialPropertyType.**
group	**SearchableProperties.**

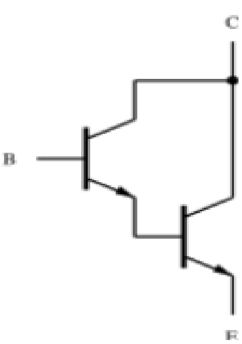


Figure 4— NPN Darlington

A *BipolarJunctionTransistor* (bipolar transistor or BJT) is a type of transistor that uses both electron and hole charge carriers. BJT's are manufactured in two types, NPN and PNP, and are available as individual components, combined or fabricated in integrated circuits, often in large numbers. The basic function of a BJT is to amplify current. This allows BJTs to be used as amplifiers or switches, giving them wide applicability in electronic.

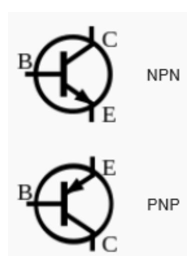


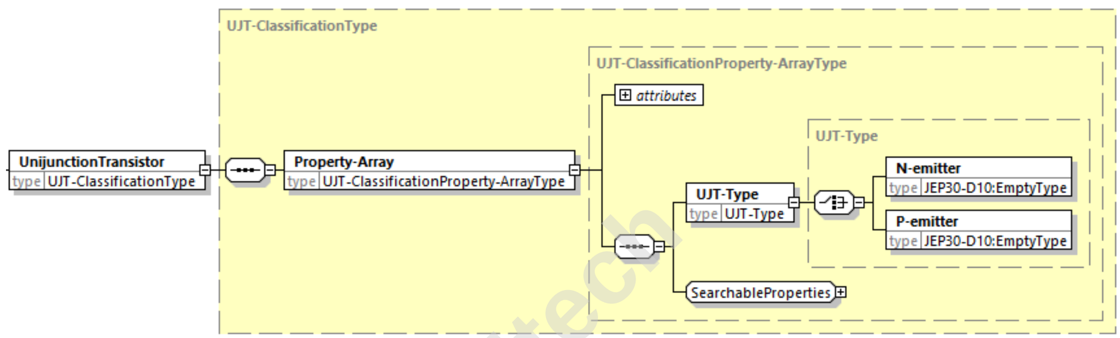
Figure 5 — BJT

4.7.1.3.22.1 Bipolar Junction Transistor Classification and Property–Array (cont'd)

The Darlington transistor is a compound structure of a particular design made by two bipolar transistors connected in such a way that the current amplified by the first transistor is amplified further by the second one. This configuration gives a much higher current gain than each transistor taken separately.

Other classifications can be captured under the category *Other*.

4.7.1.3.22.2. Unijunction Transistor Classification and Property-Array

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Transistor/UnijunctionTransistor**
diagram	
type	**UJT-ClassificationType, UJT-ClassificationProperty-ArrayType, UJT-Type, JEP30-D10:EmptyType.**
group	**SearchableProperties.**

A *UnijunctionTransistor* (UJT) is a three-terminal electronic semiconductor device with only one junction that acts exclusively as an electrically controlled switch.

A P-type UJT is where the base is formed by a lightly doped n-type bar of silicon. Two ohmic contacts B1 and B2 are attached at its ends. The emitter is of p-type and is heavily doped; this single PN junction gives the device its name. A complementary N-Type UJT uses a p-type base and an n-type emitter and operates the same as the n-type base device but with all voltage polarities reversed.

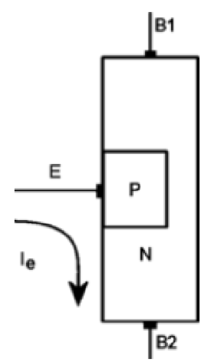
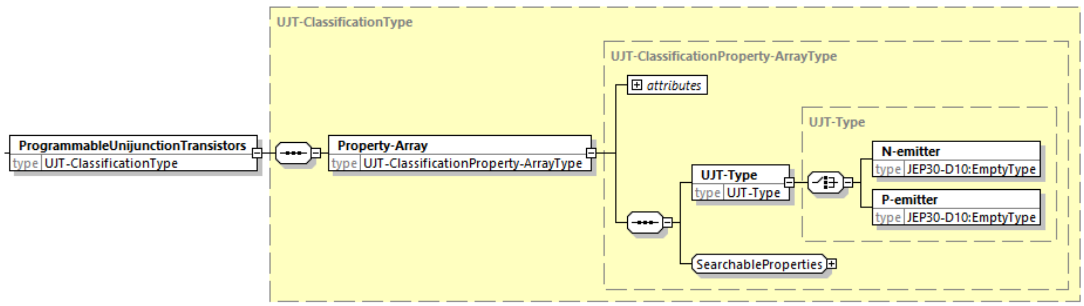


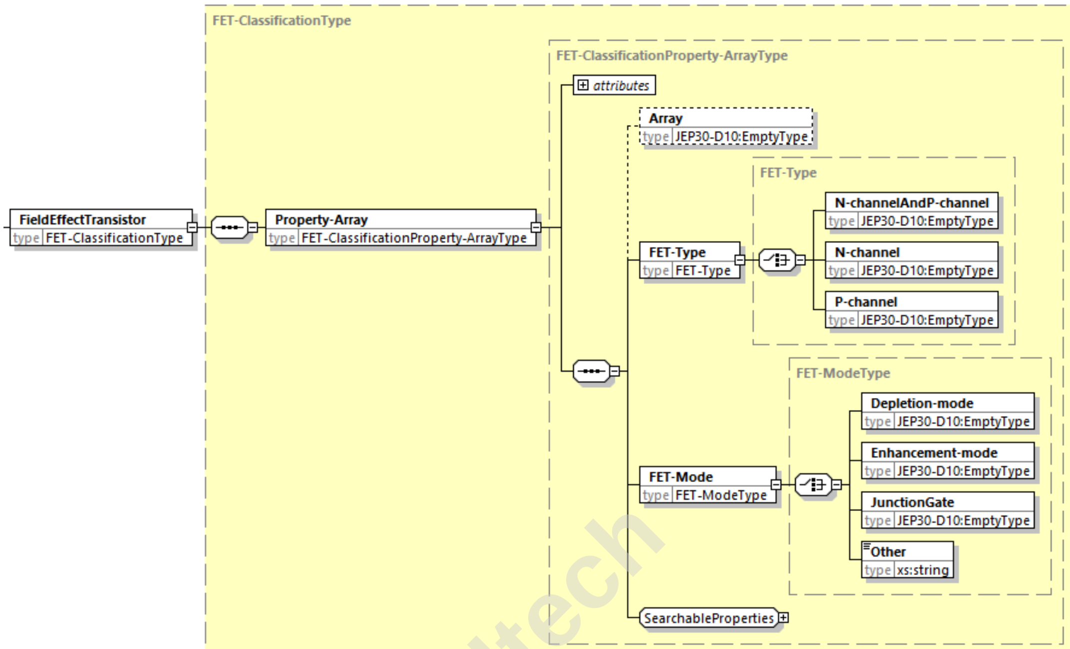
Figure 6 — p-type UJT

4.7.1.3.22.3. Programmable Unijunction Transistor Classification and Property-Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Transistor/UnijunctionTransistor</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>UJT-ClassificationType, UJT-ClassificationProperty-ArrayType, UJT-Type, JEP30-D10:EmptyType.</td></tr>
<tr><td>group</td><td>SearchableProperties.</td></tr>
</table>

The *ProgrammableUnijunctionTransistor*, or PUT, is a multi-junction device that, with two external resistors, displays similar characteristics to the UJT.

4.7.1.3.22.4. Field Effect Transistor Classification and Property-Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Transistor/FieldEffectTransistor
diagram	
type	FET-ClassificationType, FET-ClassificationProperty-ArrayType, JEP30-D10:EmptyType, FET-Type, FET-ModeType.
group	SearchableProperties.

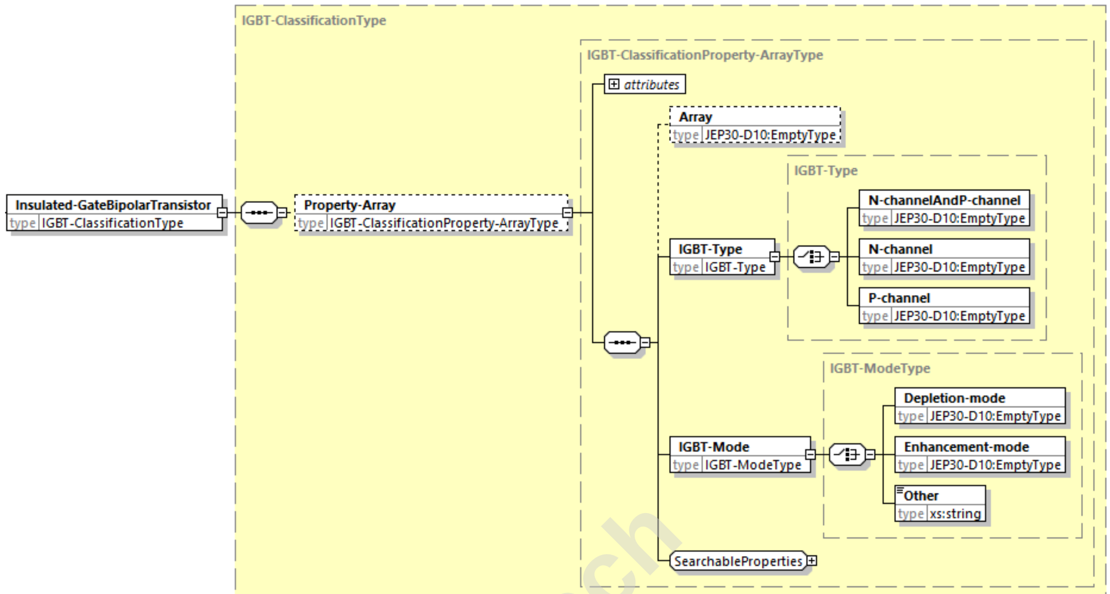
The *FieldEffectTransistor* (FET) is a transistor that uses an electric field to control the electrical behaviour of the device. FET's are also known as unipolar transistors since they involve single-carrier-type operation. Many different implementations of field effect transistors exist, as shown above, and other classifications can be captured under the category *Other*.

FET's generally display very high input impedance at low frequencies. The conductivity between the drain and source terminals is controlled by an electric field in the device, which is generated by the voltage difference between the body and the gate of the device.

Enhancement-mode devices are OFF at zero gate–source voltage, and can be turned on by pulling the gate voltage either higher than the source voltage, for NMOS, or lower than the source voltage, for PMOS. In most circuits, this means pulling an enhancement-mode MOSFET's gate voltage towards its drain voltage turns it ON.

A *Depletion-mode* device is normally ON at zero gate–source voltage.

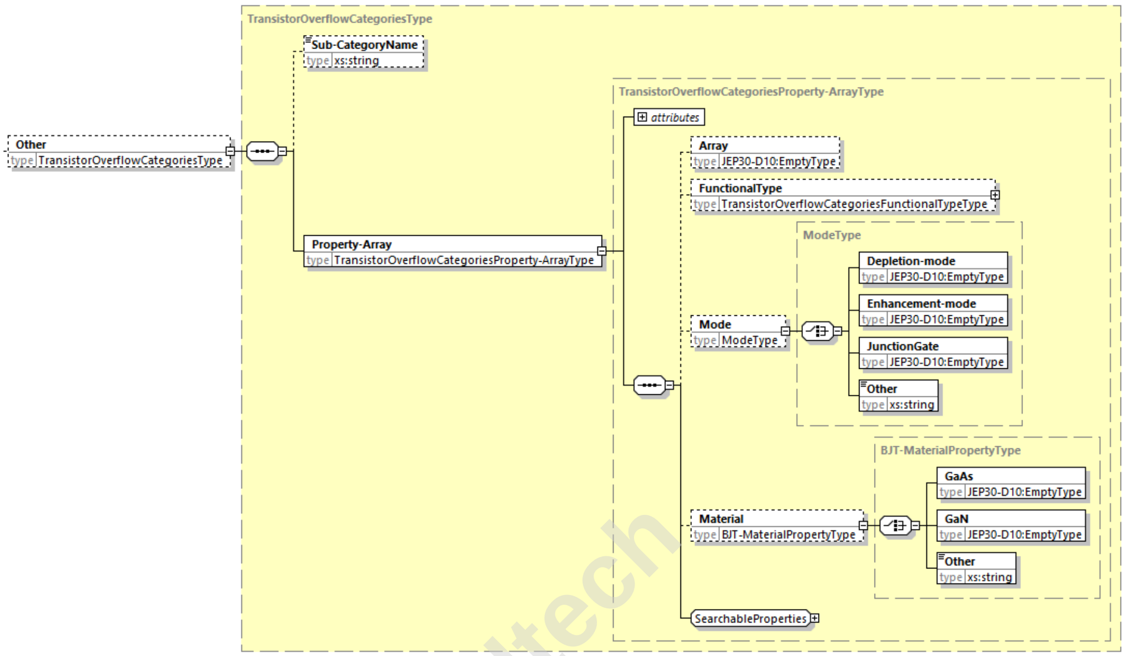
4.7.1.3.22.5. Insulated Gate Bipolar Transistor Classification and Property-Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Transistor/Insulated-GateBipolarTransistor
diagram	
type	IGBT-ClassificationType, IGBT-ClassificationProperty-ArrayType, JEP30-D10:EmptyType, IGBT-Type, IGBT-ModeType.
group	SearchableProperties.

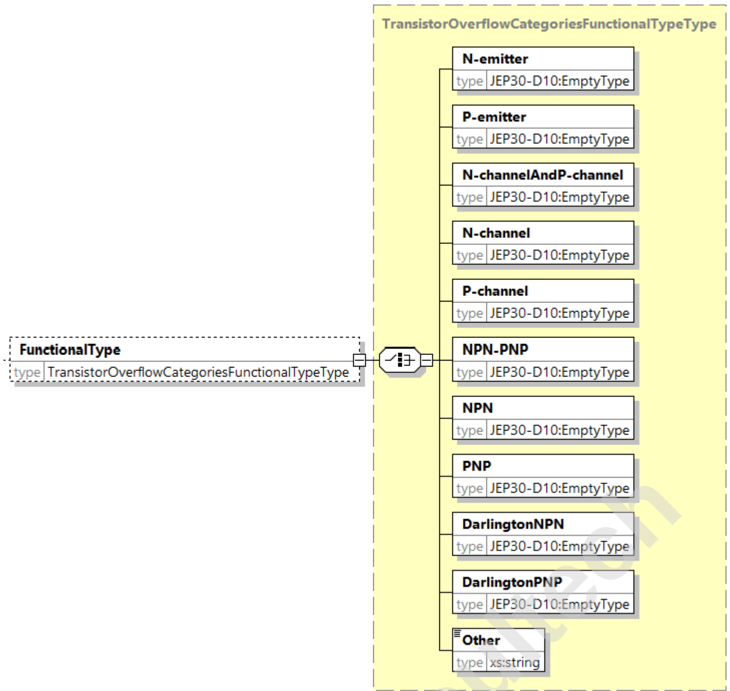
An *Insulated-GateBipolarTransistor* (IGBT) is a three-terminal power semiconductor device primarily used as an electronic switch which combine high efficiency and fast switching. The IGBT is a semiconductor device with four alternating layers (P-N-P-N) that are controlled by a metal-oxide-semiconductor (MOS) gate structure without regenerative action.

These devices can also be provided in array form. Other IGBT classifications can be captured under the category *Other*.

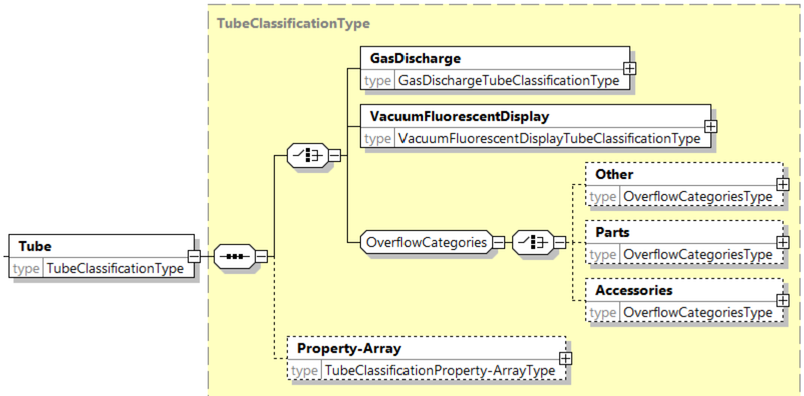
4.7.1.3.22.6. Transistor Overflow Categories Type

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Transistor/Other**
diagram	
type	**TransistorOverflowCategoriesType, TransistorOverflowCategoriesProperty-ArrayType, JEP30-D10:EmptyType, TransistorOverflowCategoriesFunctionalTypeType, ModeType, BJT-MaterialPropertyType.**
group	**TransistorOverflowCategories, SearchableProperties.**

4.7.1.3.22.6.1. Functional Type

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Transistor/Other/TransistorOverflowCategoriesProperty-Array/FunctionalType
diagram	
type	TransistorOverflowCategoriesFunctionalTypeType, JEP30-D10:EmptyType.

4.7.1.3.23. Tube Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Electrical/Tube
diagram	
type	TubeClassificationType, GasDischargeTubeClassificationType, VacuumFluorescentDisplayTubeClassificationType, OverflowCategoriesType, TubeClassificationProperty-ArrayType
group	OverflowCategories.

A gas or vapor filled tube that is used to conduct electricity when voltage is applied is called a *GasDischarge* Tube. Gas discharge tubes dissipate voltage transients through a contained plasma gas. They have high insulation resistance plus low capacitance and leakage to ensure minimal effect on normal operation of equipment.

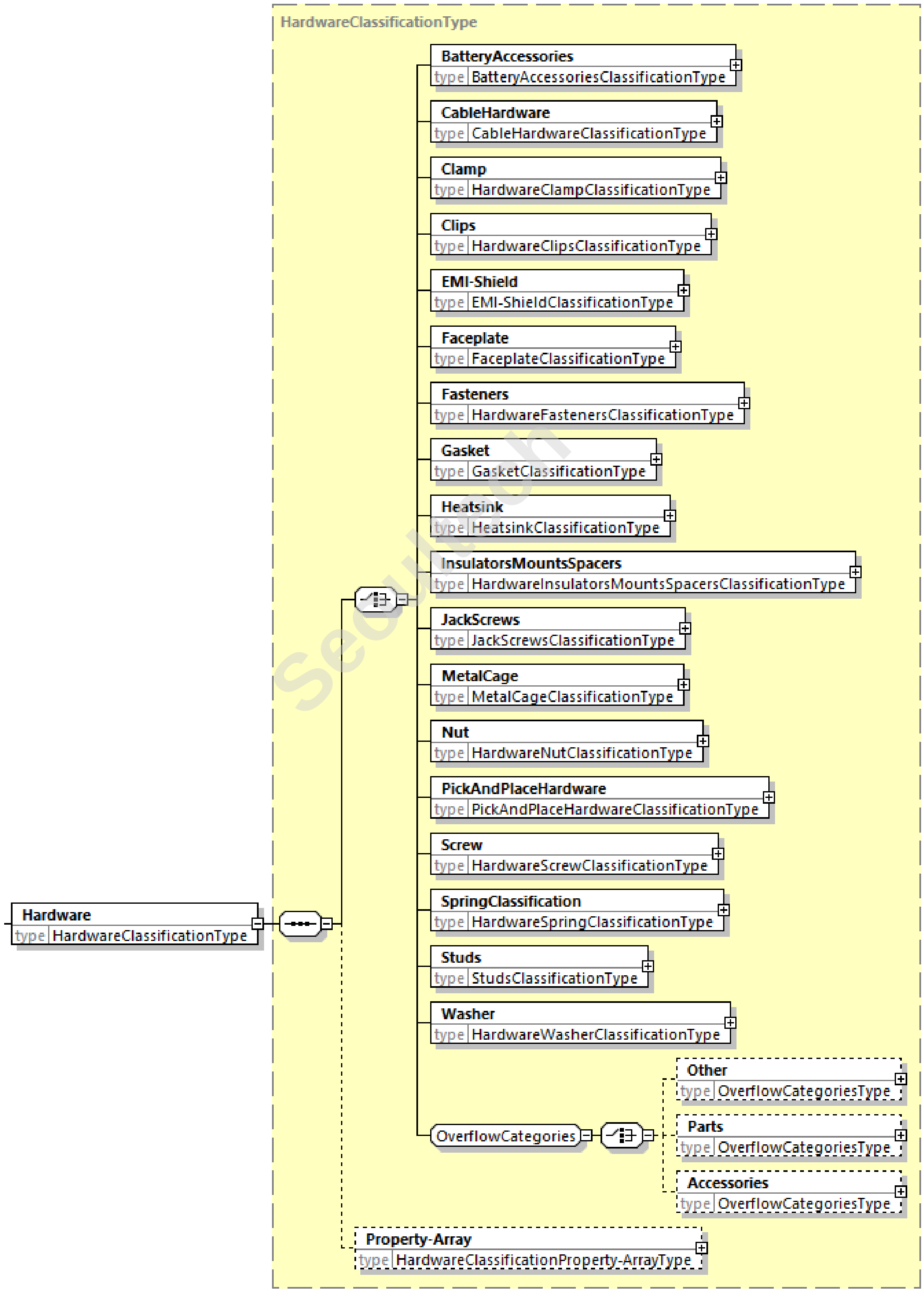
Figure 7 — Gas Discharge Tube

A *VacuumFluorescentDisplay* (VFD) is a display device, sometimes named as ice tube indicator, operates on the principle of cathodoluminescence, roughly similar to a cathode ray tube, but operating at much lower voltages. Each tube in a VFD has a phosphor coated anode that is bombarded by electrons emitted from the cathode filament. In fact, each tube in VFD is a triode vacuum tube because it also has a mesh control grid.

Figure 8 — Vacuum Fluorescent Display

Unlike liquid crystal displays, a VFD emits a very bright light with high contrast and can support display elements of various colors. Other Tube classifications can be captured under the category *Other*.

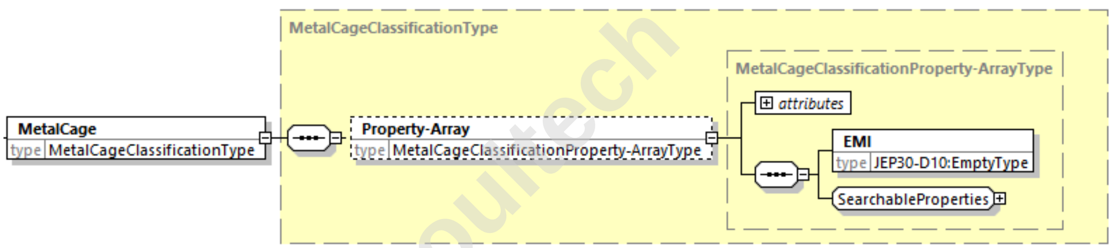
4.7.1.4. Hardware Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Hardware
diagram	

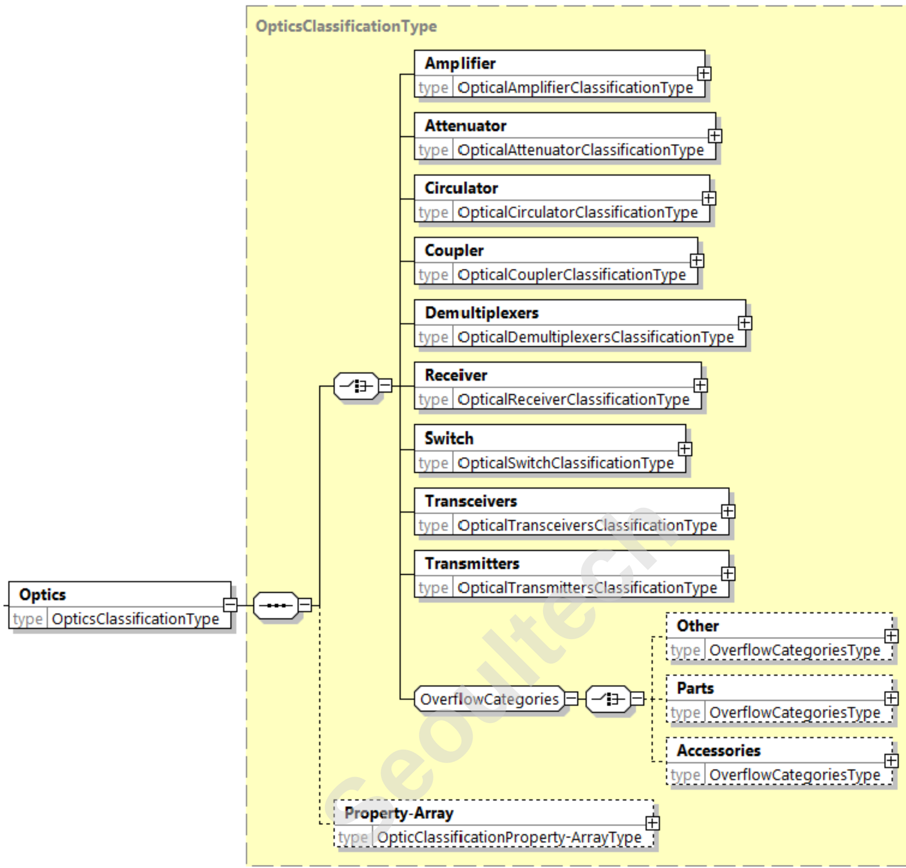
4.7.1.4. Hardware Classification (cont'd)

type	**HardwareClassificationType, BatteryAccessoriesClassificationType, CableHardwareClassificationType, HardwareClampClassificationType, HardwareClipsClassificationType, EMI-ShieldClassificationType, FaceplateClassificationType, HardwareFastenersClassificationType, GasketClassificationType, HeatsinkClassificationType, HardwareInsulatorsMountsSpacersClassificationType, JackScrewsClassificationType, MetalCageClassificationType, HardwareNutClassificationType, PickAndPlaceHardwareClassificationType, HardwareScrewClassificationType, HardwareSpringClassificationType, StudsClassificationType, HardwareWasherClassificationType, OverflowCategoriesType, HardwareClassificationProperty-ArrayType.**
group	**OverflowCategories.**

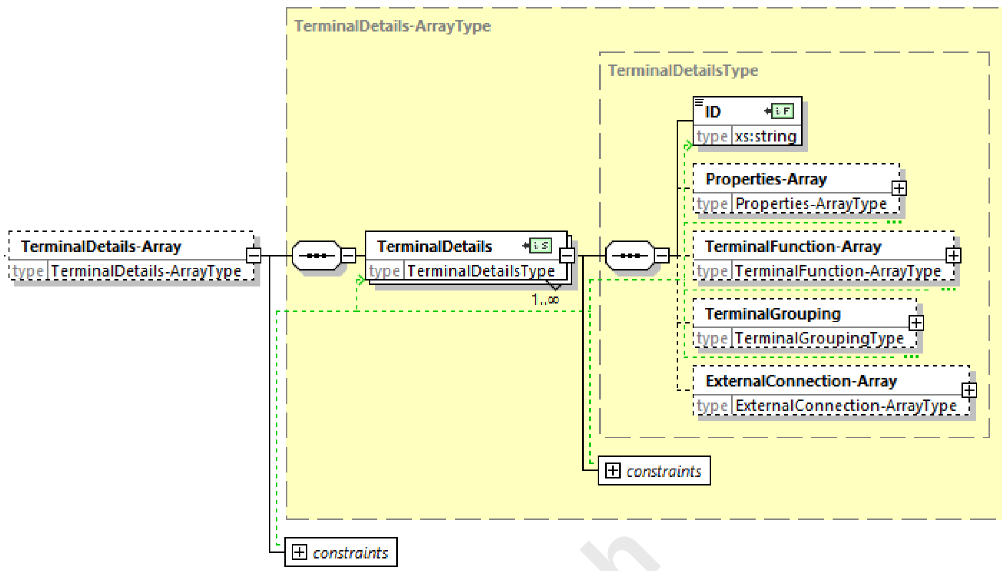
4.7.1.4.1. MetalCage Classification

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Hardware/MetalCage**
diagram	
type	**MetalCageClassificationType, MetalCageClassificationProperty-ArrayType, JEP30-D10:EmptyType.**
group	**SearchableProperties**

4.7.1.5. Optics Classification

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/PartClassification-Array/PartClassification/Optics
diagram	
type	OpticsClassificationType, OpticalAmplifierClassificationType, OpticalAttenuatorClassificationType, OpticalCirculatorClassificationType, OpticalCouplerClassificationType, OpticalDemultiplexersClassificationType, OpticalReceiverClassificationType, OpticalSwitchClassificationType, OpticalTransceiversClassificationType, OpticalTransmittersClassificationType, OverflowCategoriesType, OpticClassificationProperty-ArrayType.
group	OverflowCategories.

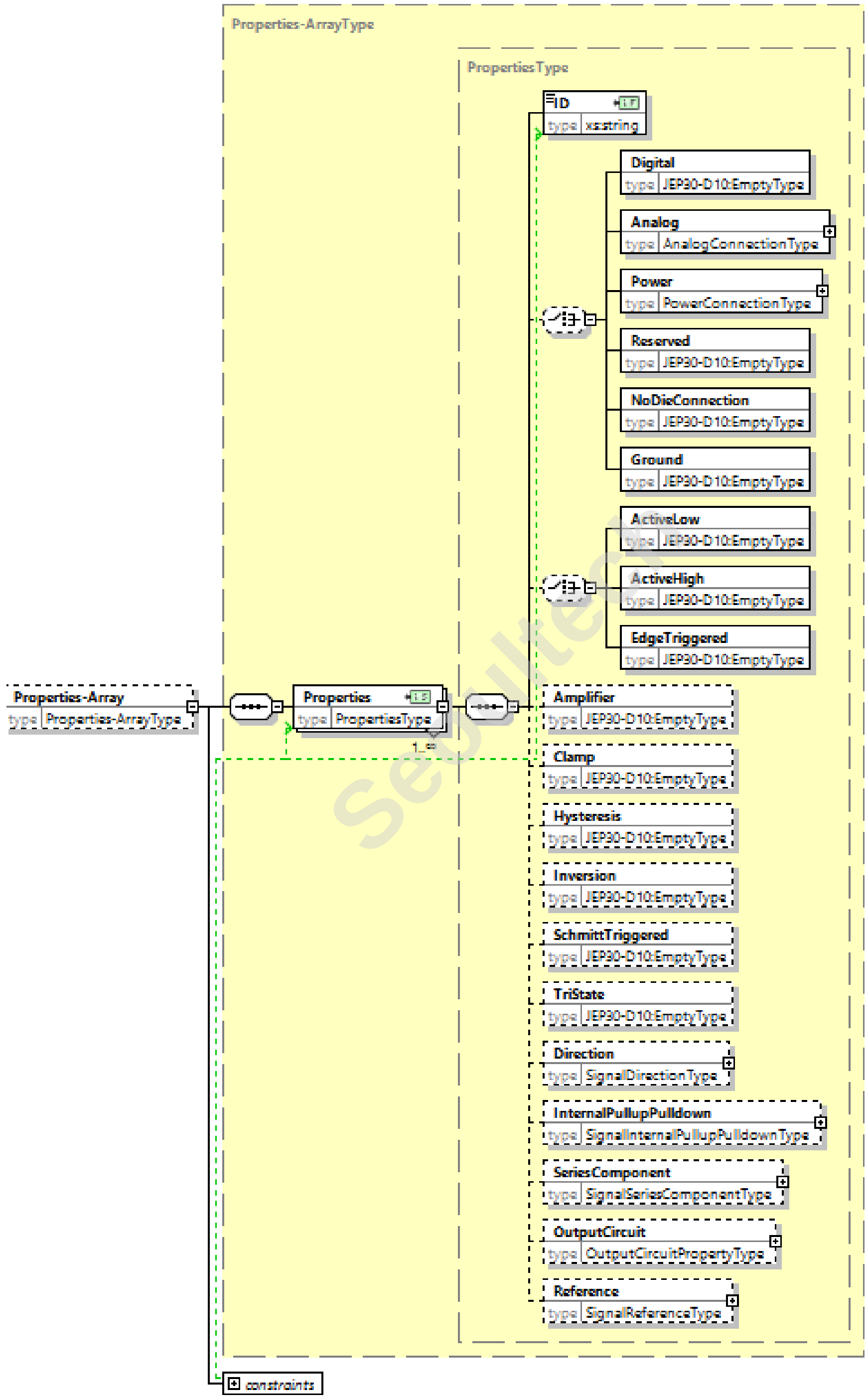
4.7.2. Terminal Details - Array

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array**
diagram	
type	**TerminalDetails-ArrayType, TerminalDetailsType, Properties–ArrayType, TerminalFunction–ArrayType, TerminalGroupingType, ExternalConnection–ArrayType.**

The *TerminalDetails-Array* section basically captures all the electrical detail associate with the Terminal, or group of terminals.

Some of these details may reference other arrays that are shared with both the Part and the Terminal since their structure is the same. These will be linked via ID's and will be described in more detail following sections, whenever applicable.

4.7.2.1. Properties - Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array
diagram	
type	Properties–ArrayType, PropertiesType, JEP30-D10:EmptyType, AnalogConnectionType, PowerConnectionType, SignalDirectionType, SignalInternalPullUp-DownType, SignalSeriesComponentType, OutputCircuitPropertyType, SignalReferenceType

4.7.2.1 Properties – Array (cont'd)

The *Properties-Array* section captures a set of electrical *Properties* which are then assigned to their respective *TerminalName* or *InternalNode* via an *ID* as shown in the following section. The *Properties-Array* contains the following properties:-

Signal Type is defined as one of the following types.

1. *Digital*,
   a. Reference JESD99 for "Signal, digital" definition.
2. *Analog*,
   a. Reference JESD99 for "Signal, analog" definition.
3. *Power*,
4. *Reserved* – This terminal should not be used. It is usually required by the part manufacturer for their internal processing requirements, such as part verification or part configuration.
5. *NoDieConnection* is where a terminal has no internal connection, as shown in Figure 9.

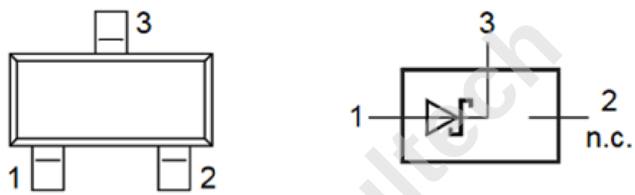


Figure 9 — Sample Device with no internal die connection

6. *Ground*.,

When a signal is referred to be *ActiveLow* in a digital circuit, it signifies that the signal will execute its function when the logic level of the signal is between 0 to 0.7 V. It is necessary to "pull" the terminal LOW if it is an active-low terminal by connecting it to ground.

ActiveHigh refers to voltage levels between 3.3V to 5V. Usually in digital circuits, the active high terminal is pulled to VCC.

EdgeTriggered is a type of triggering that allows a circuit to become active at the positive edge or the negative edge of the clock signal.

Amplifier boosts the input or output signal depending on the direction of the signal.

Clamp is a circuit that prevents the terminal signal from exceeding the clamp voltage (usually the supply voltage of the Part), by typically 0.4 to 0.7 V (which is the forward voltage drop of the diode), or from dropping below the lower clamp voltage (usually the negative supply or Ground), by again typically 0.4 to 0.7 V.

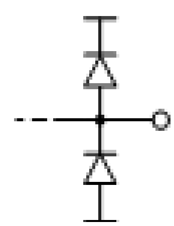


Figure 10 — Clamp Circuit

4.7.2.1 Properties – Array (cont'd)

Hysteresis is the dependence of the state of a system on its history. Plots of a single component of the moment often form a loop or hysteresis curve, where there are different values of one variable depending on the direction of change of another variable. It prevents unwanted frequent switching in Schmitt triggered devices. Hysteresis can be a dynamic lag between an input and an output that disappears if the input is varied more slowly; this is known as rate-dependent hysteresis. In control systems, hysteresis can be used to filter signals so that the output reacts less rapidly than it otherwise would, by taking recent history into account.

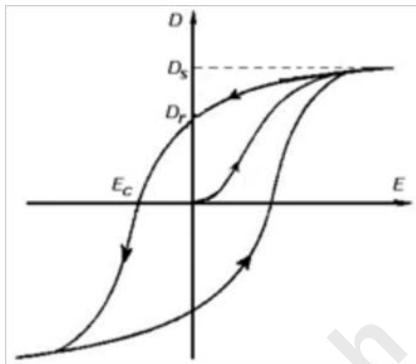


Figure 11 — Hysteresis Loop Curve

Often, some amount of hysteresis is intentionally added to an electronic circuit to prevent unwanted rapid switching. This and similar techniques are used to compensate for contact bounce in switches, or noise in an electrical signal. *SchmittTriggered* is a simple electronic circuit that exhibits this property. Schmitt trigger is a comparator circuit with hysteresis implemented by applying positive feedback to the non-inverting input of a comparator or differential amplifier. It is an active circuit which converts an analog input signal to a digital output signal. The circuit is named a "trigger" because the output retains its value until the input changes sufficiently to trigger a change. Figure 12 shows a typical response of a Schmitt Trigger with a much sharper transition that in a normal hysteresis circuit. The horizontal and vertical axes are input voltage and output voltage, respectively. T and −T are the switching thresholds, and M and −M are the output voltage levels.

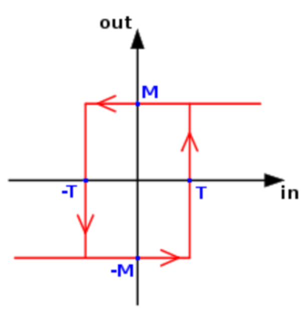


Figure 12 — Schmitt Trigger

4.7.2.1 Properties – Array (cont'd)

Inversion is where the signal is electrically inverted from positive peak to negative peak but does not translate the signal to any other form, as shown in the attached wave form. A phase inversion is neither a time shift nor a phase shift, but simply a swap of plus and minus. In digital logic, an inverter implements logical negation, similar to an Inverter or a NOT gate. So a Logic "0" input is considered true and a logic "1" input is considered false.

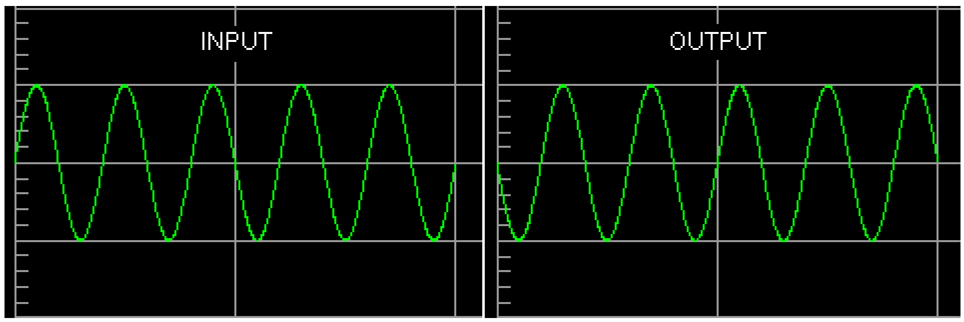
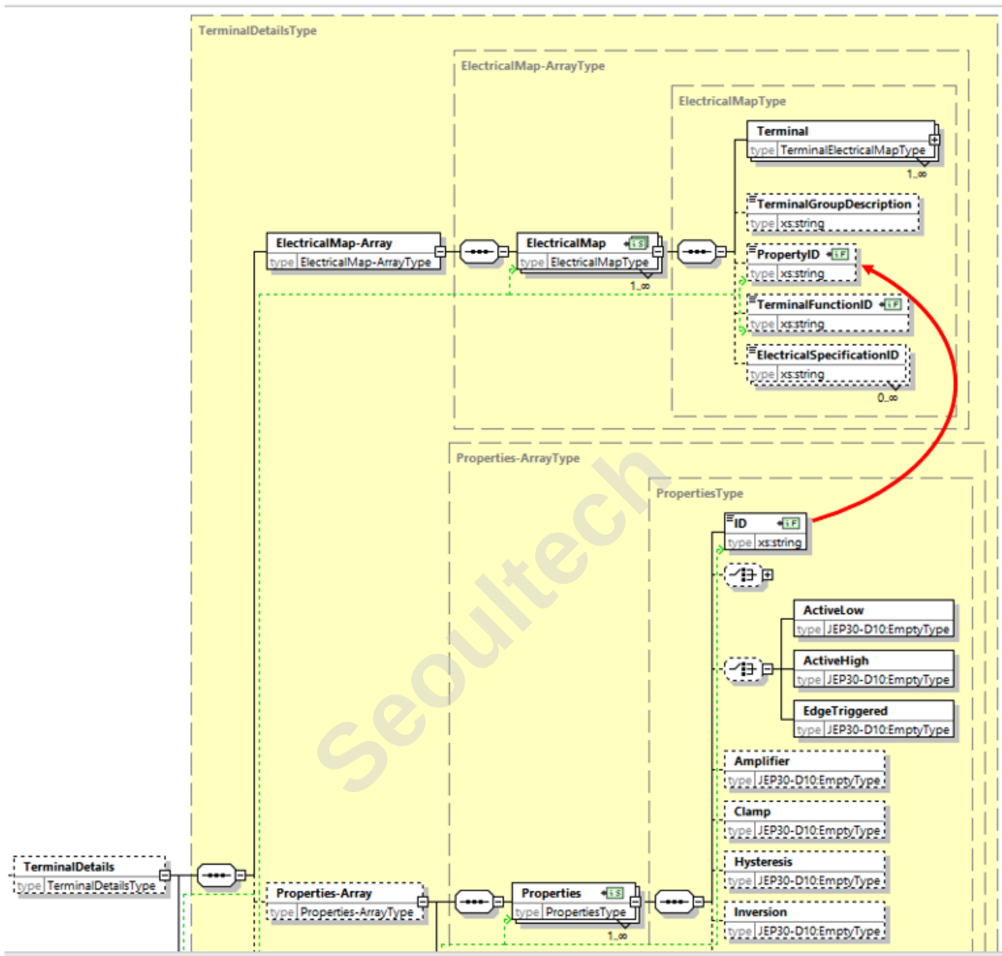


Figure 13 — Signal Inversion

An electronic output stage consisting of a logic gate, commonly an inverter or buffer, that exhibits three possible logic states, namely logic 1, logic 0, and an inactive (high-impedance or open-circuit) state, effectively removing the output from the circuit. This allows multiple circuits to share the same output line or lines (such as a bus which cannot listen to more than one device at a time). A *TriState* buffer can be thought of as a switch. If B is on, the switch is closed. If B is off, the switch is open.

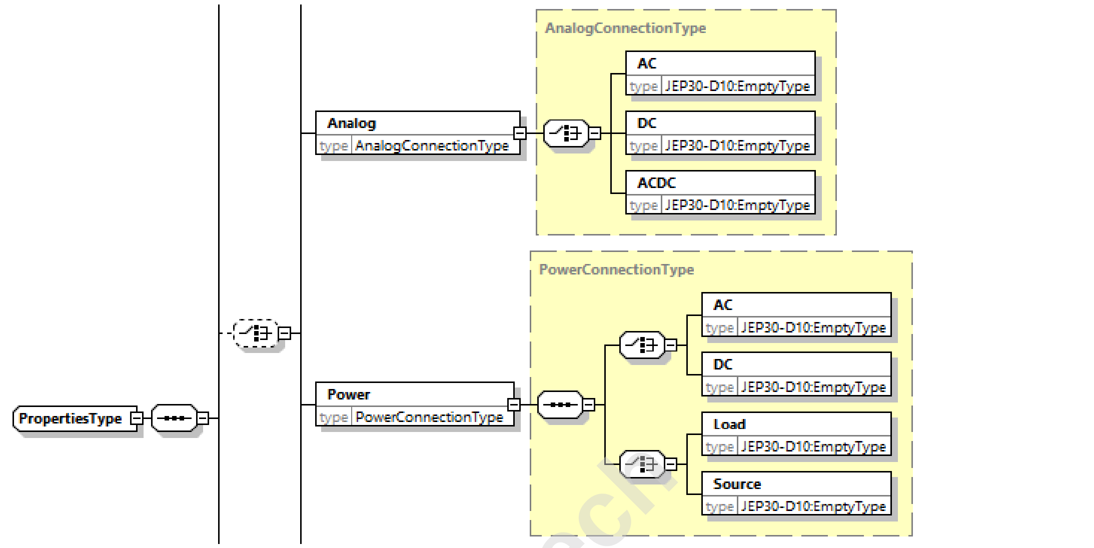
Figure 14 — Tri-State

4.7.2.1.1. Linking the Terminal Map and the Internal Node to the Property ID

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/ElectricalMap-Array/ElectricalMap/PropertyID ->** **PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/ID**
diagram	
type	**TerminalDetailsType, ElectricalMap-ArrayType, ElectricalMapType, Properties-ArrayType, PropertiesType.**

The *PropertyID* under *ElectricalMap* connect to the *Properties/ID* under the *Properties-Array*, thereby connecting the set of electrical *Properties* identified under a specific ID back to the *Terminal*.

4.7.2.1.2. Analog and Power Connection Type

path	**1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/Analog.** **2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/PowerConnectionType**
diagram	
type	**AnalogConnectionType, PowerConnectionType.**

The Analog signal can be one of

1. *AC*,
2. *DC*, or
3. *ACDC* represents an AC signal superimposed on a DC signal as shown in Figure 17.

The power connection can be either AC or DC and in addition be either a

1. *Load*, or
    a. The total power consumed by the device.
2. *Source*.

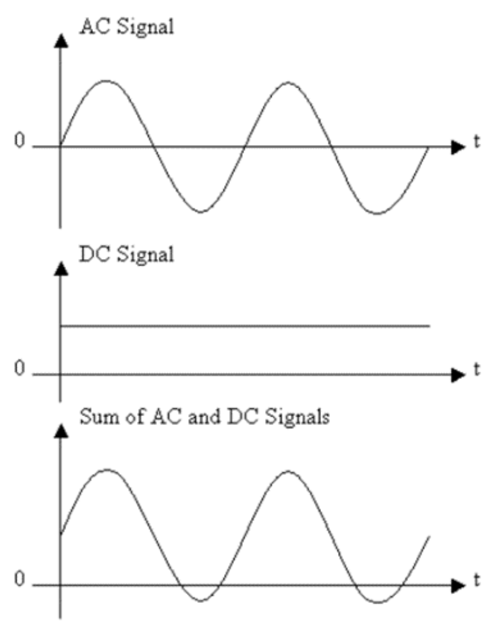
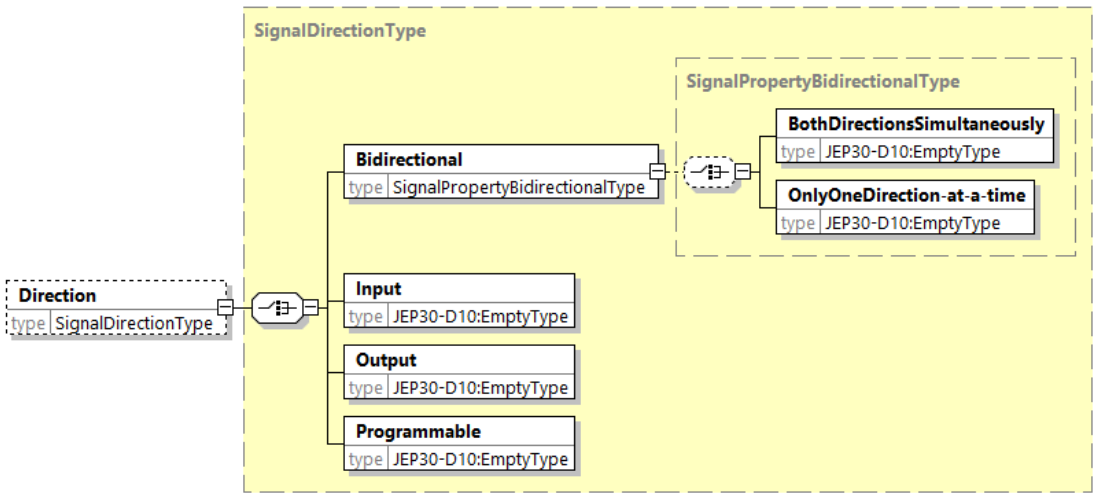


Figure 15 — Analog Connection Types

4.7.2.1.3. Signal Direction

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/Direction</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>SignalDirectionType, SignalPropertyBidirectionalType, JEP30-D10:EmptyType.</td></tr>
</table>

A *Bidirectional* communication system is a point-to-point system composed of two connected devices that can communicate with one another in both directions. There are two types of bidirectional communication:-

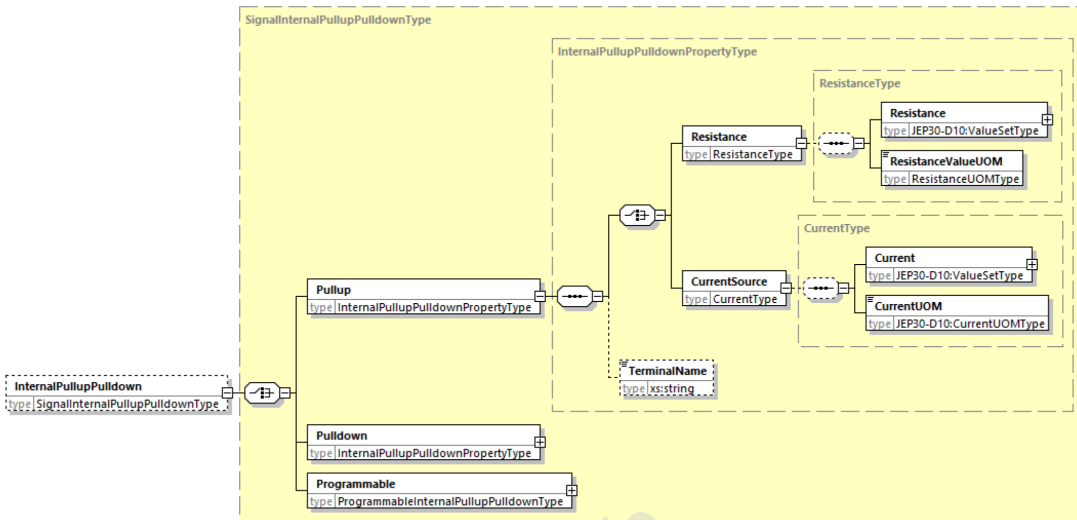
1. *BothDirectionsSimultaneously*, and
2. *OnlyOneDirection-at-a-time*.

If the signal being transmitted is a RF signal, then both devices can communicate with each other simultaneously.

If the signal being transmitted is a digital signal, even though each party can communicate with the other, they can't communicate simultaneously. The communication is one direction at a time.

Programmable direction is where the terminal can be configured to be either an output source of the signal or an input recipient of the signal. It is also possible for the terminal to be programmed to be a bidirectional signal.

4.7.2.1.4. Internal Pullup / Pulldown

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/InternalPullupPulldown
diagram	
type	SignalInternalPullUp–DownType, InternalPullUp–PullDownPropertyType, ResistanceType, ResistanceUOMType, CurrentType, JEP30-D10:CurrentUOMType, ProgrammableInternalPullUp-DownType.

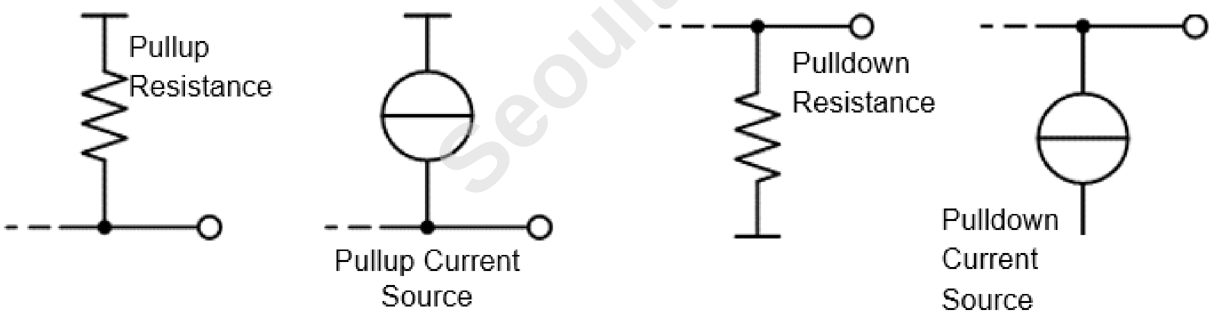
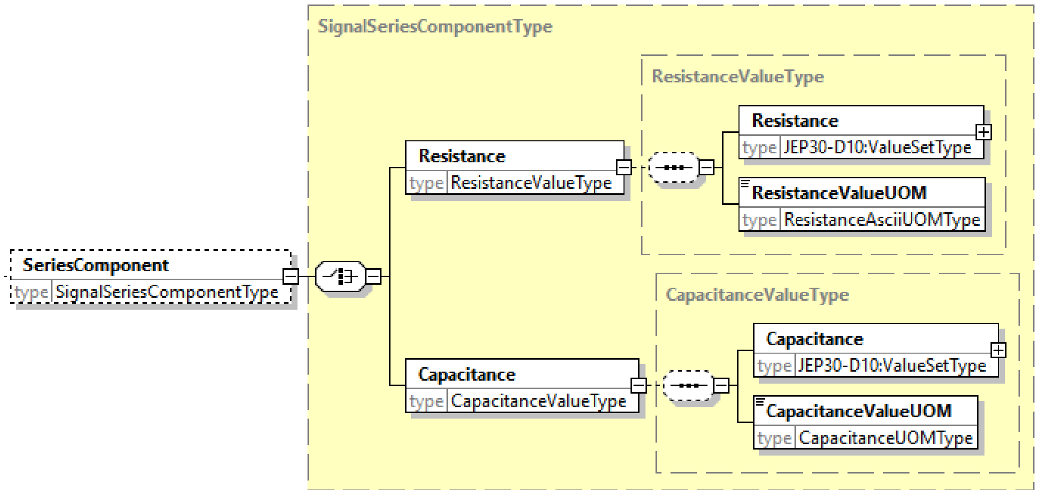


Figure 16 — Internal Pullup / Pulldown Circuits

In electronic logic circuits, a *Pullup* resistor is a resistor connected between a signal conductor and a positive power supply voltage to ensure that the signal will be a valid logic level if external devices are disconnected or high-impedance is introduced. They may also be used at the interface between two different types of logic devices, possibly operating at different logic levels and power supply voltages.

A *Pulldown* resistor works in the same way but is connected to ground. It holds the logic signal at a low logic level when no other active device is connected. An active *CurrentSource* instead of a *Resistance* element, may also be used as wide voltage range *Pullup* links within power supplies and other wide voltage range circuits. If ordinary resistors were used then the current would vary considerably over the voltage range.

4.7.2.1.5. Series Component

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/SeriesComponent</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>SignalSeriesComponentType, ResistanceValueType, JEP30-D10:ValueSetType, ResistanceUOMType, CapacitanceValueType, CapacitanceUOMType.</td></tr>
</table>

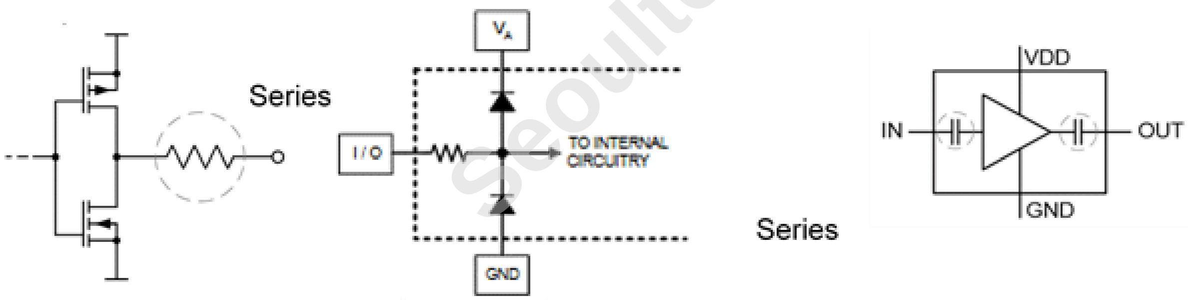
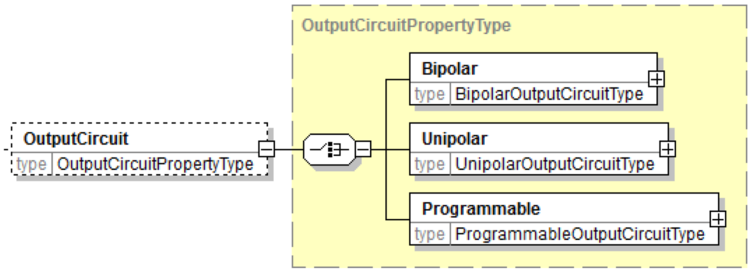


Figure 17 — Series Component Types

A series *Resistance* as a *SeriesComponent* on the output provides opposition to current flow to protects the load network being connected to it. Series termination is effective in reducing the driver's edge rate, and it consumes low power. Series termination provides good signal quality by damping overshoot and undershoot, and effectively reducing line noise and EMI. Its drawbacks are that it slows the signal's rise and fall time, and that it should not be used with distributed loads. When connected to an input, the series resistance protects the device itself for internal damage in the event of a too high input current or voltage.

The *Capacitance* as a *SeriesComponent* is to remove the DC component of the signal, thereby only allowing the AC component to pass through it.

4.7.2.1.6. Output Circuit

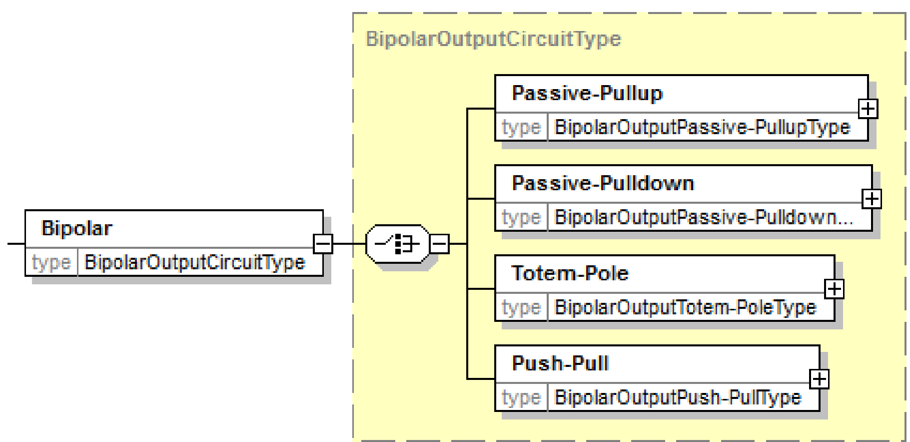
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/OutputCircuit**
diagram	
type	**OutputCircuitPropertyType, BipolarOutputCircuitType, UnipolarOutputCircuitType, ProgrammableOutputCircuitType.**

OutputCircuit described in this section can be categorized as either *Bipolar* or *Unipolar*. The *Programmable* output circuit is a combination of some of the outputs available in the *Bipolar* and *Unipolar* branches. Ref. JESD99 “Types of outputs”.

A *Bipolar* output is an output having internal connections through two active devices to two supply voltages so that, according to the relative states of the active devices, the output can source or sink current through the load. Ref. JESD99 “bipolar output”.

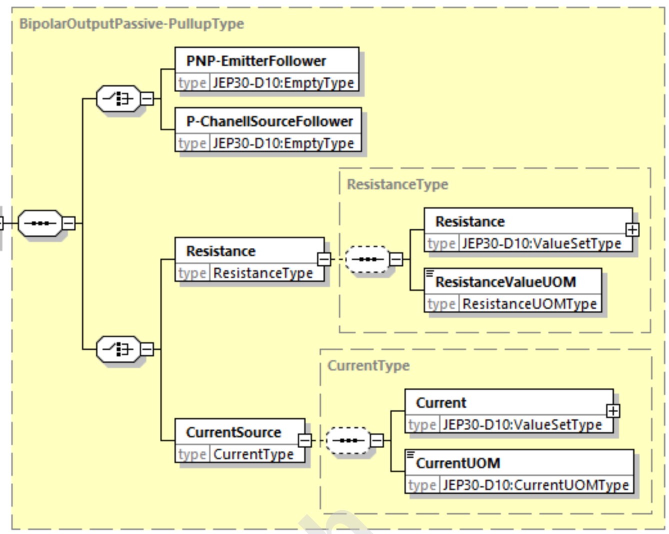
A *Unipolar* output is an output that, depending on its design, can either source or sink current, but not both. Ref. JESD99 “unipolar output”.

4.7.2.1.6.1. Bipolar

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/OutputCircuit/Bipolar**
diagram	
type	**BipolarOutputCircuitType, BipolarOutputPassive-PullupType, BipolarOutputPassive-PulldownType, BipolarOutputTotem-PoleType, BipolarOutputPush-PullType,**

There are four basic types of *Bipolar* outputs which are described in the following sections.

4.7.2.1.6.1.1. Passive – Pullup

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/OutputCircuit/Bipolar/Passive-Pullup**
diagram	
type	**BipolarOutputPassive-PullupType, JEP30-D10:EmptyType, ResistanceType, CurrentType, JEP30-D10:CurrentUOMType**

A *Passive-Pullup* output, as shown in Figure 18 below is an output similar to an open-circuit output except that, in addition to having an internal connection through an active device to a supply voltage, it also has an internal connection through a passive device, usually a resistor, to a second supply voltage that is more positive (less negative) than the first supply voltage. Ref JESD99 “passive-pullup output”.

An emitter follower is an output circuit whose output load is connected in the emitter circuit of a transistor and whose input is applied between the base and the remote end of the emitter load, which may be at ground potential. Ref JESD99 “emitter follower output”. The *PNP-EmitterFollower* is a *Passive-Pullup* output.

A source follower is an output circuit whose output load is connected in the source circuit of a field-effect transistor and whose input is applied between the gate and the remote end of the source load, which may be at ground potential. Ref JESD99 “source follower output”. The *P-ChanellSourceFollower* is a *Passive-Pullup* output.

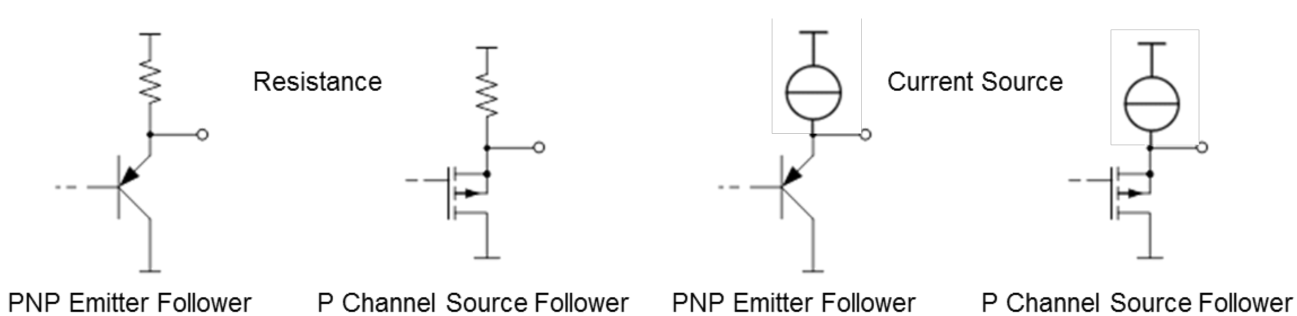
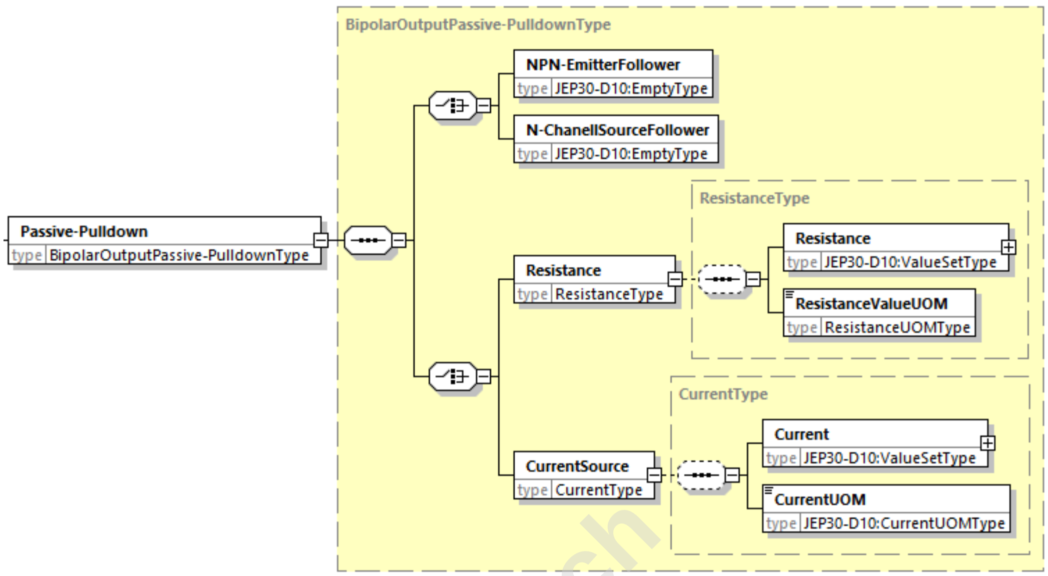


Figure 18 — Passive Pull-up Output Circuit

4.7.2.1.6.1.2. Passive - Pulldown

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/OutputCircuit/Bipolar/Passive-Pulldown
diagram	
type	BipolarOutputPassive-PulldownType, JEP30-D10:EmptyType, ResistanceType, ResistanceUOMType, CurrentType, JEP30-D10:CurrentUOMType.

A *Passive-Pulldown* output, as shown in Figure 19 below is an output similar to an open-circuit except that, in addition to having an internal connection through an active device to a supply voltage, it also has an internal connection through a passive device, usually a resistor, to a second supply voltage that is more negative (less positive) than the first supply voltage. Ref. JESD99 “passive-pulldown output”. The *NPN-EmitterFollower* and the *N-ChanellSourceFollower* are *Passive-Pulldown* outputs.

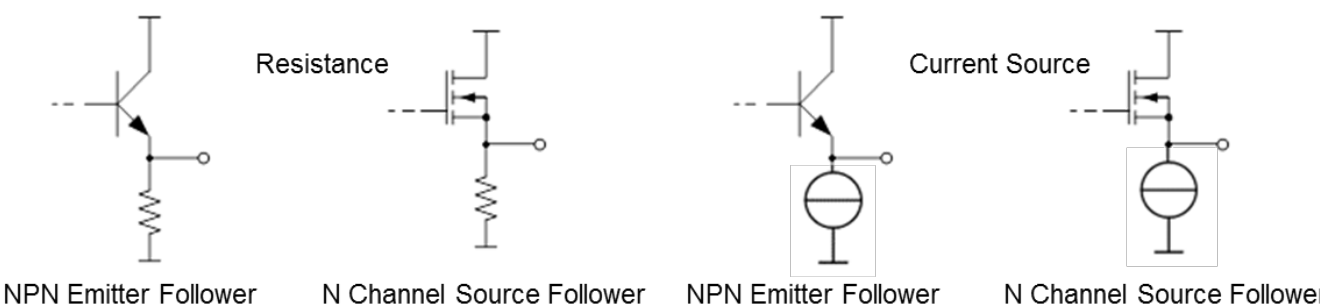
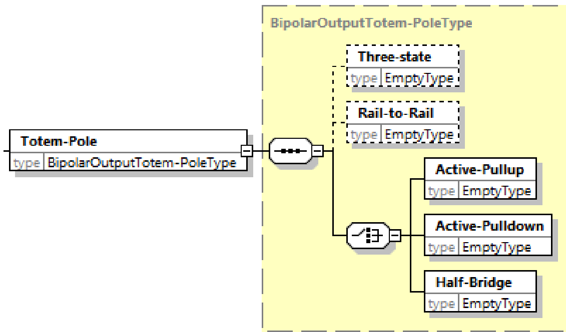


Figure 19 — Passive Pull-down Output Circuit

4.7.2.1.6.1.3. Totem - Pole

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/OutputCircuit/Bipolar/Totem-Pole
diagram	
type	BipolarOutputTotem–PoleType, JEP30-D10:EmptyType.

A *Totem-Pole* output is a bipolar output whose active devices are so controlled that as the resistance of one increases, the resistance of the other decreases so that, according to the relative states of the two active devices, the output voltage can swing between levels approaching the two supply voltages. Ref. JESD99 “totem-pole output”.

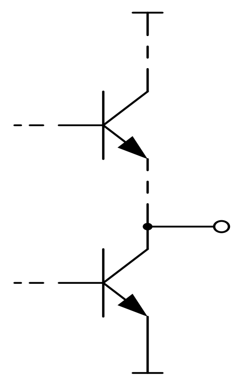


Figure 20 — Totem Pole

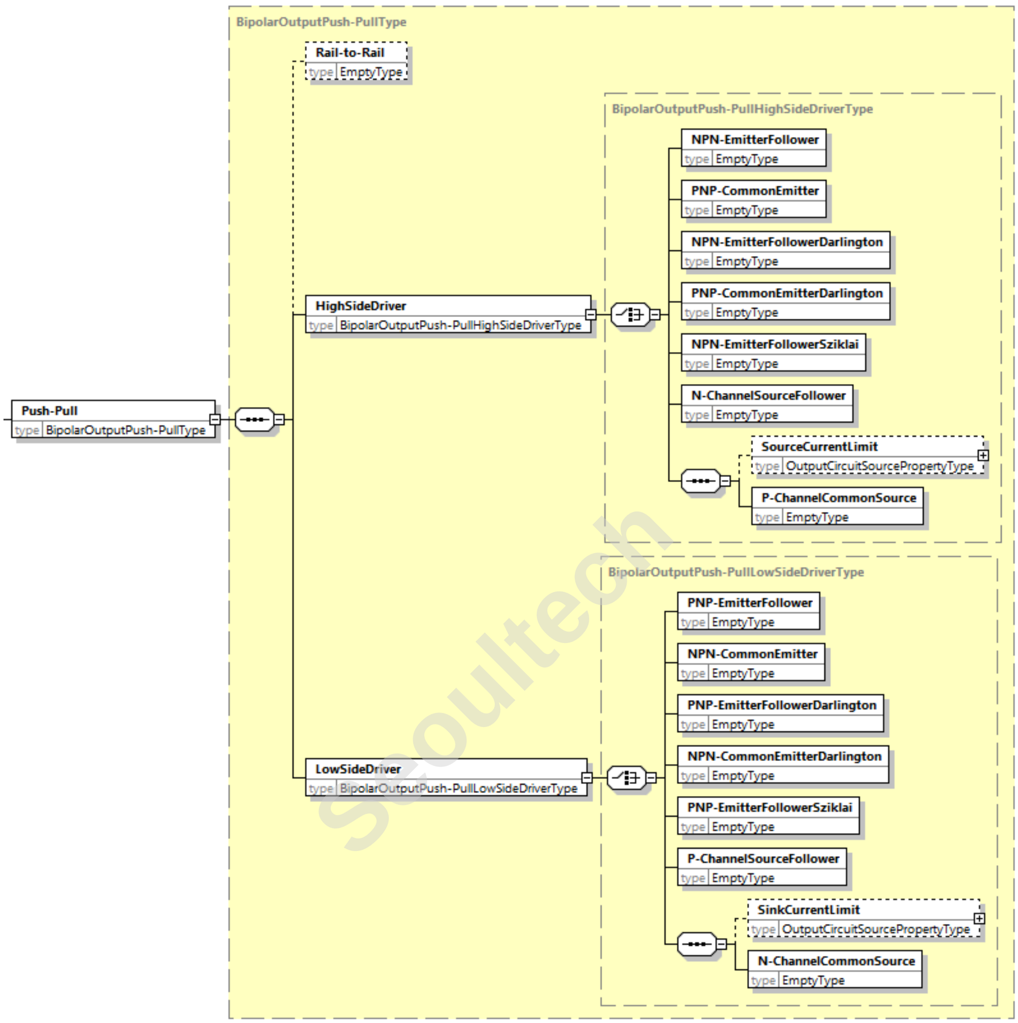
A *Three-state* output is a bipolar output both of whose active devices can be caused to be in the off state at the same time, thus presenting a high-impedance state at the output similar to the off state of an open circuit output. Ref. JESD99 “three-state output”.

A *Rail-to-Rail* driver is a bipolar (three-state or totem-pole) output that can swing between voltage levels that are essentially equal to the supply voltages. Ref. JESD99 “rail-to-rail driver”.

An *Active-Pullup* output is a bipolar (three-state or totem-pole) output whose sink-current capability significantly exceeds its source-current capability. An *Active-Pulldown* output is a bipolar (three-state or totem-pole) output whose source-current capability significantly exceeds its sink-current capability. *Active-Pullup* and *Active-Pulldown* are features that allow to limit power consumption by the output stage. Example: If the output is driven low, then active pullup increase its resistance to limit the current. Ref. JESD99 “active-pullup output” and “active-pulldown output” respectively.

A *Half-Bridge* (output) is a bipolar (three-state or totem-pole) power-driver output. Ref. JESD99 “half-bridge (output)”.

4.7.2.1.6.1.4. Push - Pull

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/OutputCircuit/Bipolar/Push-Pull</td></tr>
<tr><td>diagram</td><td>

</td></tr>
<tr><td>type</td><td>BipolarOutputPush-PullType, JEP30-D10:EmptyType, BipolarOutputPush-PullHighSideDriverType, BipolarOutputPush-PullLowSideDriverType, OutputCircuitSourcePropertyType.</td></tr>
</table>

A *Push-Pull* output is two open-circuit outputs operating in complementary fashion so that as the resistance of one increases, the resistance of the other decreases. Ref JESD99 “push-pull output”.

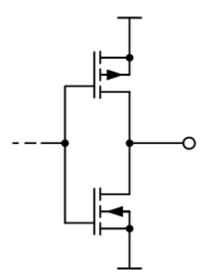


Figure 21 — Rail-to-Rail Push-Pull

4.7.2.1.6.1.4 Push – Pull (cont'd)

The following diagrams represent the variations of the High-side Driver.

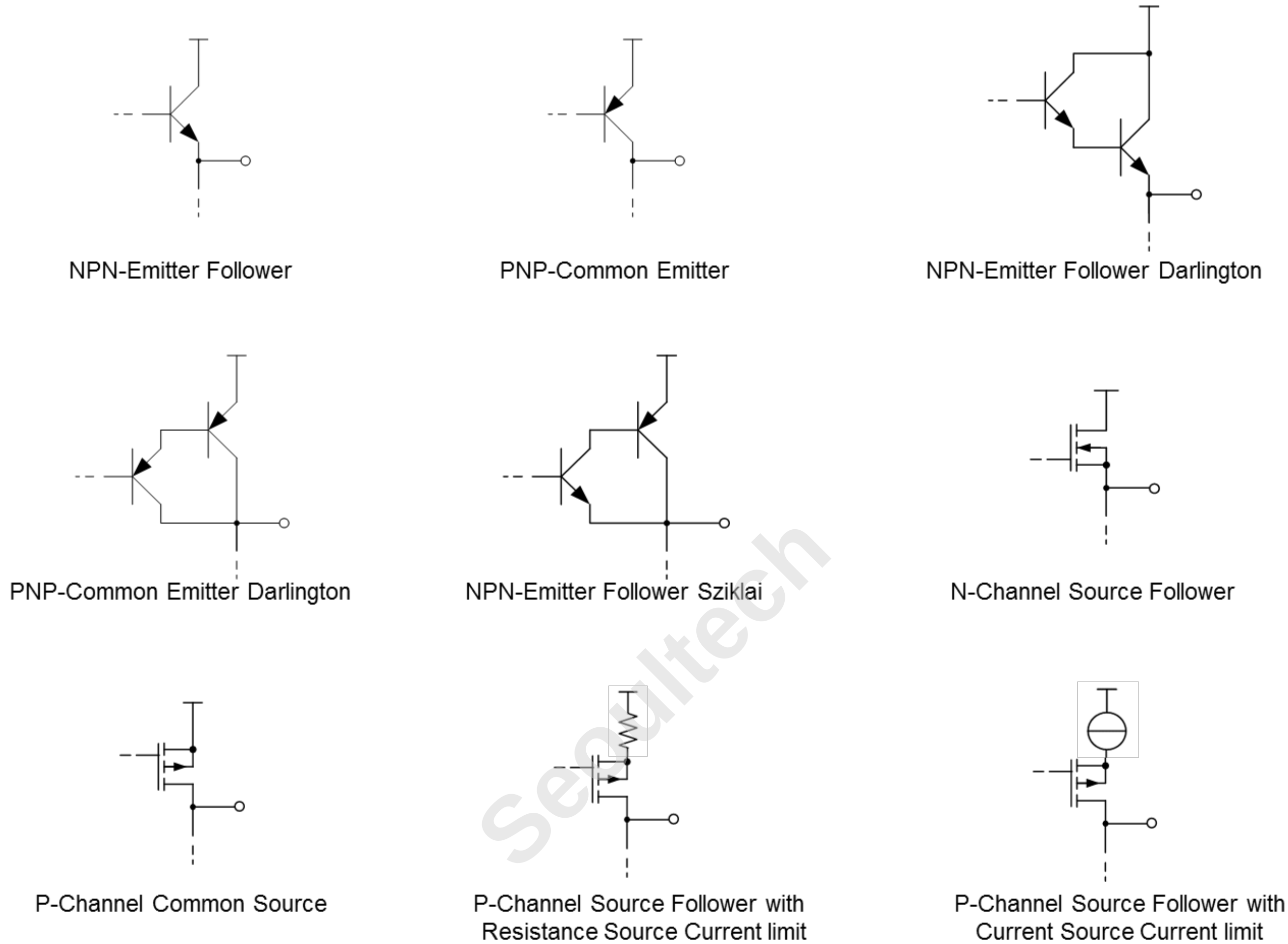


Figure 22 — High Side Driver (Source Driver)

A *HighSideDriver* is a source driver whose primary connection within the integrated circuit is through an active device to a positive supply voltage

4.7.2.1.6.1.4 Push – Pull (cont'd)

The following diagrams represent the variations of the Low-side Driver.

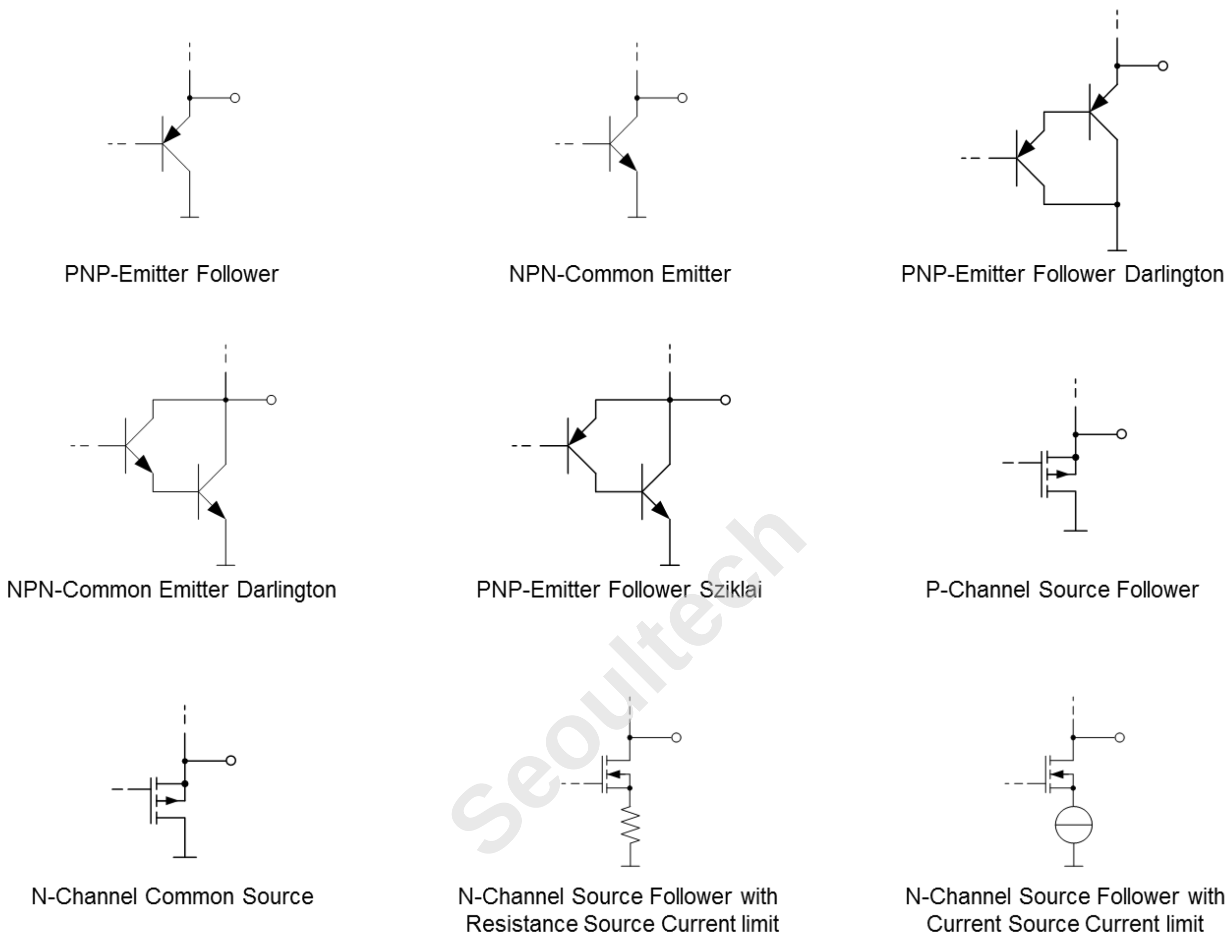
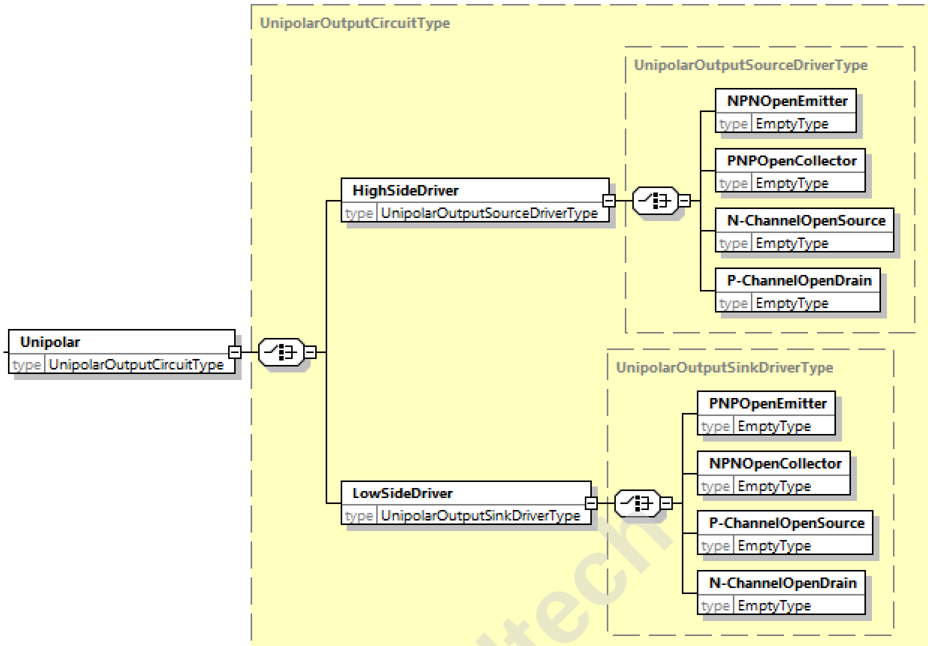


Figure 23 — Low Side Driver (Sink Driver)

A *LowSideDriver* is a sink driver whose primary connection within the integrated circuit is through an active device to the circuit common

4.7.2.1.6.2. Unipolar

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/OutputCircuit/Unipolar</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>UnipolarOutputCircuitType, UnipolarOutputSinkDriverType, UnipolarOutputSourceDriverType, JEP30-D10:EmptyType.</td></tr>
</table>

A *LowSideDriver* is a sink driver whose primary connection within the integrated circuit is through an active device to the circuit common. Ref JESD99 “low-side driver”.

A *HighSideDriver* is a source driver whose primary connection within the integrated circuit is through an active device to a positive supply voltage. Ref JESD99 “high-side driver t”.

An open-circuit output (of an integrated circuit) is a unipolar output whose only connection within the integrated circuit is through an active device, usually a transistor, to one of the supply voltages. When the active device is in its ON state, the output voltage approaches the voltage of the supply to which it is connected (through the active device). When the device is in its OFF state, the output impedance to any other internal node of the integrated circuit is high and the output voltage is determined by the external circuit to which the output is connected. Outputs of this generic class are usually classified according to the name of the element of the active device to which they are connected within the integrated circuit, e.g.,

3. Open-emitter output,
   a. An open-circuit output whose internal connection is to the emitter of a bipolar transistor. Ref. JESD99 “open-emitter output”.

      NOTE For graphic symbols, see “source driver” (for npn) or “sink driver” (for pnp).
4. Open-collector output,
   a. An open-circuit output whose internal connection is to the collector of a bipolar transistor. Ref. JESD99 “open-collector output”.

4.7.2.1.6.2 Unipolar (cont'd)

5. Open-source output,

   a. An open-circuit output whose internal connection is to the source of a field-effect transistor. Ref. JESD99 "open-source output".

      NOTE For graphic symbols, see "source driver" (for p-channel outputs) or "sink driver" (for n-channel outputs).

6. Open-drain output,

   a. An open-circuit output whose internal connection is to the drain of a field-effect transistor. Ref JESD99 "open-drain output".

      NOTE For graphic symbols, see "sink driver" (for n-channel outputs) or "source driver" (for p-channel outputs).

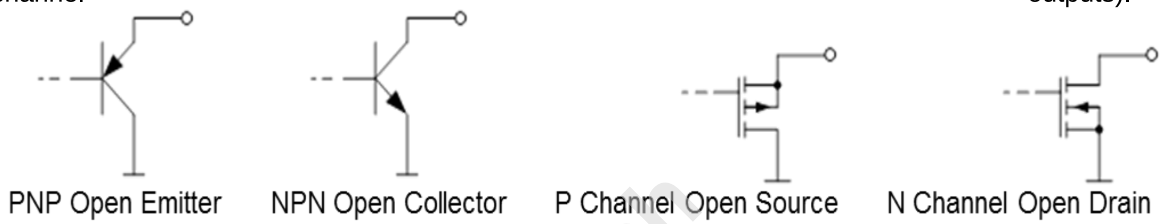
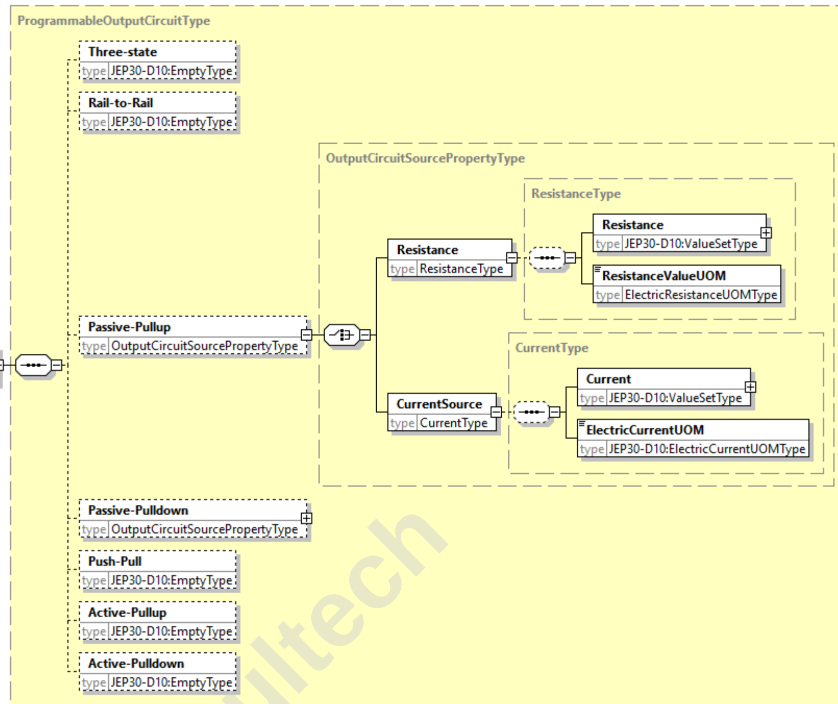


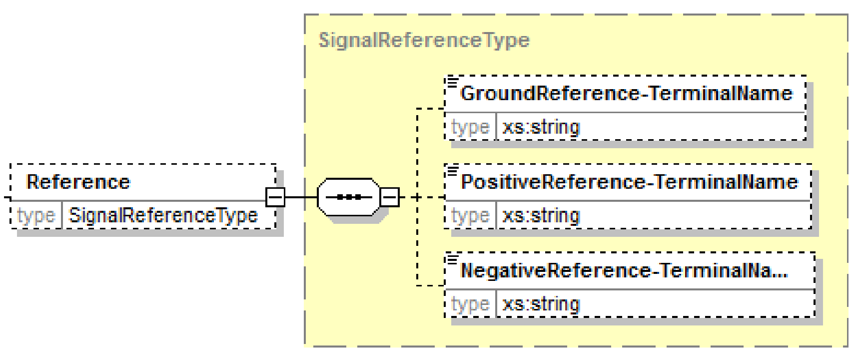
Figure 24 — Open-circuit Low Side Driver Type

Figure 25 — Open-circuit High Side Driver Type

4.7.2.1.6.3. Programmable

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/OutputCircuit/Programmable
diagram	
type	ProgrammableOutputCircuitType, OutputCircuitSourcePropertyType, ResistanceType, JEP30-D10:ValueSetType, ElectricResistanceUOMType, CurrentType, JEP30-D10:ElectricCurrentUOMType.

4.7.2.1.7. Reference

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/Reference
diagram	
type	SignalReferenceType.

4.7.2.1.7 Reference (cont'd)

In electrical engineering, ground or earth is the reference point in an electrical circuit from which voltages are measured, a common return path for electric current, or a direct physical connection to the Earth. In a multilayer board, the ground plane and the power plane can be used as a reference for the signal line.

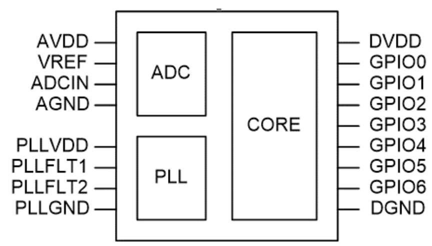


Figure 26 — Signal Reference

```
<Mapping-Array>
    <Mapping>
        <ID>Mapping ID 1</ID>
        < PackageTerminalMap>
            <ID>Package Terminal Map ID 1</ID>
            <PackageID>Package ID 1</ PackageID > <!—PBGA-B17…-->
            <TerminalMap>
                <ID>Terminal Map ID 1</ID>
                <TerminalName>ADCIN</TerminalName>
                <TerminalNumber>3</TerminalNumber>
            </TerminalMap>
            <TerminalMap>
                <ID>Terminal Map ID 2</ID>
                <TerminalName>VREF</TerminalName>
                <TerminalNumber>2</TerminalNumber>
            </TerminalMap>
            <TerminalMap>
                <ID>Terminal Map ID 3</ID>
                <TerminalName>PLLFLT1</TerminalName>
                <TerminalNumber>6</TerminalNumber>
            </TerminalMap>
            <TerminalMap>
                <ID>Terminal Map ID 4</ID>
                <TerminalName>PLLFLT2</TerminalName>
                <TerminalNumber>7</TerminalNumber>
            </TerminalMap>
            <TerminalMap>
                <ID>Terminal Map ID 5</ID>
                <TerminalName>GPIO0</TerminalName>
                <TerminalNumber>16</TerminalNumber>
            </TerminalMap>
            <TerminalMap>
                <ID>Terminal Map ID 6</ID>
                <TerminalName>GPIO1</TerminalName>
                <TerminalNumber>15</TerminalNumber>
            </TerminalMap>
            <TerminalMap>
                <ID>Terminal Map ID 7</ID>
                <TerminalName>GPIO2</TerminalName>
                <TerminalNumber>14</TerminalNumber>
            </TerminalMap>
            <TerminalMap>
                <ID>Terminal Map ID 8</ID>
                <TerminalName>GPIO3</TerminalName>
                <TerminalNumber>13</TerminalNumber>
            </TerminalMap>
```

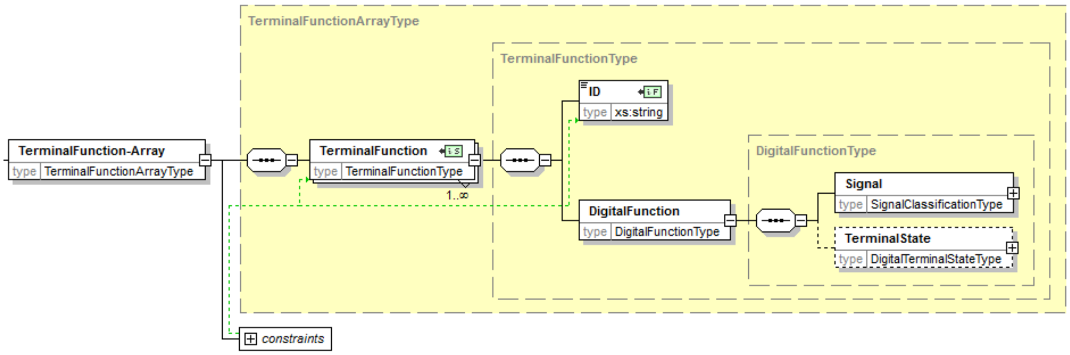
4.7.2.1.7 Reference (cont'd)

```
                <TerminalMap>
                        <ID>Terminal Map ID 9</ID>
                        <TerminalName>GPIO4</TerminalName>
                        <TerminalNumber>12</TerminalNumber>
                </TerminalMap>
                <TerminalMap>
                        <ID>Terminal Map ID 10</ID>
                        <TerminalName>GPIO5</TerminalName>
                        <TerminalNumber>11</TerminalNumber>
                </TerminalMap>
                <TerminalMap>
                        <ID>Terminal Map ID 11</ID>
                        <TerminalName>GPIO6</TerminalName>
                        <TerminalNumber>10</TerminalNumber>
                </TerminalMap>
                        :
                        :
                        :
        </PackageTerminalMap>
    </Mapping>
</ Mapping-Array>
    :
    :
    :
<ElectricalMap-Array>
    <ElectricalMap>
        < Terminal>
                <TerminalMapID>Terminal Map ID 1</TerminalMapID>
        </ Terminal>
        <PropertyID>Property ID 1</PropertyID>
    </ElectricalMap>
    <ElectricalMap>
        < Terminal>
                <TerminalMapID>Terminal Map ID 2</TerminalMapID>
        </ Terminal>
        <PropertyID>Property ID 2</PropertyID>
    </ElectricalMap>
    <ElectricalMap>
        < Terminal>
                <TerminalMapID>Terminal Map ID 3</TerminalMapID>
        </ Terminal>
        < Terminal>
                <TerminalMapID>Terminal Map ID 4</TerminalMapID>
        </ Terminal>
        <PropertyID>Property ID 3</PropertyID>
    </ElectricalMap>
    <ElectricalMap>
        < Terminal>
                <TerminalMapID>Terminal Map ID 5</TerminalMapID>
        </ Terminal>
        < Terminal>
                <TerminalMapID>Terminal Map ID 6</TerminalMapID>
        </ Terminal>
        < Terminal>
                <TerminalMapID>Terminal Map ID 7</TerminalMapID>
        </ Terminal>
```

4.7.2.1.7 Reference (cont’d)

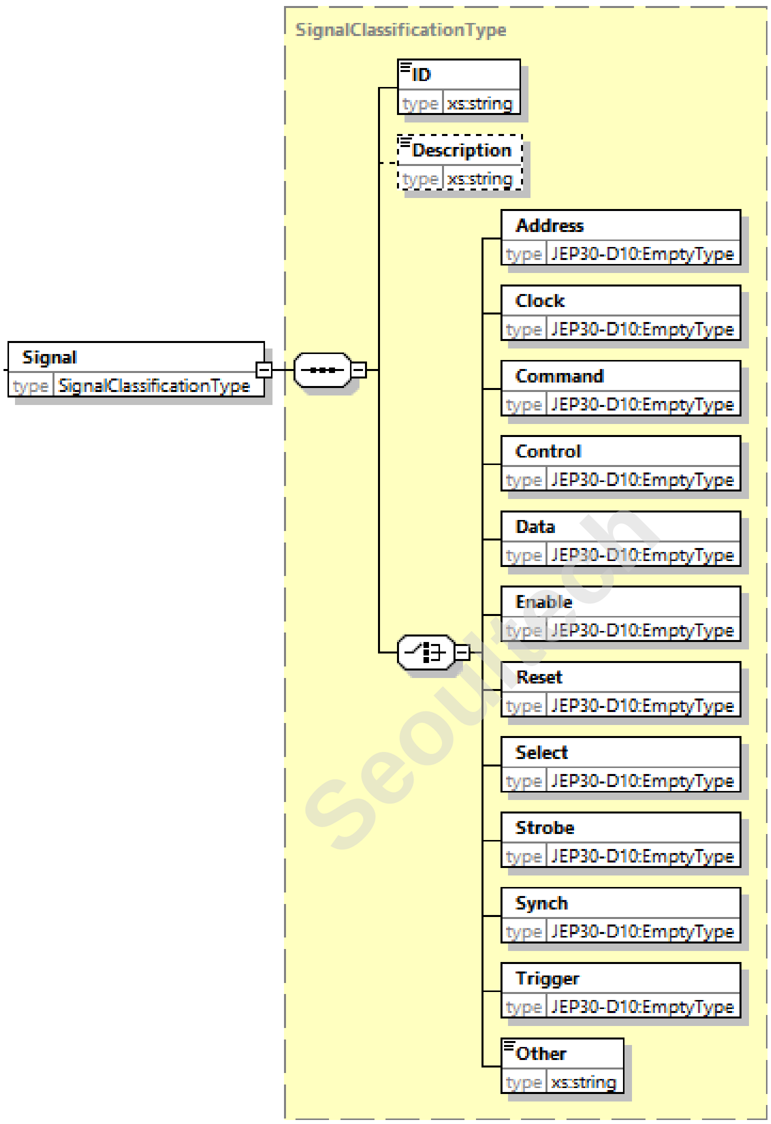
```
        < Terminal>
            <TerminalMapID>Terminal Map ID 8</TerminalMapID>
        </ Terminal>
        < Terminal>
            <TerminalMapID>Terminal Map ID 9</TerminalMapID>
        </ Terminal>
        < Terminal>
            <TerminalMapID>Terminal Map ID 10</TerminalMapID>
        </ Terminal>
        < Terminal>
            <TerminalMapID>Terminal Map ID 11</TerminalMapID>
        </ Terminal>
        <PropertyID>Property ID 4</PropertyID>
    </ElectricalMap>
</ElectricalMap-Array>
:
:
:
<Properties-Array>
        <Properties>
            <ID>Property ID 1</ID> <!– ADCIN references AGND and AVDD -->
            <Reference>
                <GroundReference-TerminalName>AGND</GroundReference-TerminalName>
                <PositiveReference-TerminalName>AVDD</PositiveReference-TerminalName>
            </Reference>
        </Properties>
        <Properties>
            <ID>Property ID 2</ID> <!– VREF references AGND -->
            <Reference>
                <GroundReference-TerminalName>AGND</GroundReference-TerminalName>
            </Reference>
        </Properties>
        <Properties>
            <ID>Property ID 3</ID> <!– PLLFLT1 and PLLFLT2 references PLLGND and
PLLVDD -->
            <Reference>
                <GroundReference-TerminalName>PLLGND</GroundReference-TerminalName>
                <PositiveReference-TerminalName>PLLVDD</PositiveReference-TerminalName>
            </Reference>
        </Properties>
        <Properties>
            <ID>Property ID 4</ID>
            <Reference>
                <GroundReference-TerminalName>DGND</GroundReference-TerminalName>
                <PositiveReference-TerminalName>DVDD</PositiveReference-TerminalName>
            </Reference>
        </Properties>
    </Properties-Array>
```

4.7.2.2. Terminal Function – Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalFunction-Array
diagram	
type	TerminalFunction-ArrayType, TerminalFunctionType, DigitalFunctionType, SignalClassificationType, DigitalTerminalStateType.

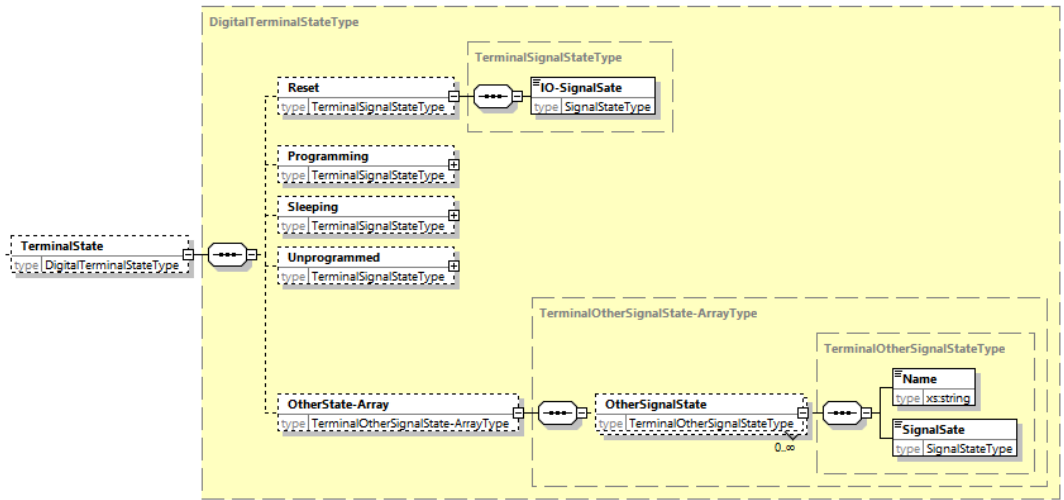
This section captures additional information about digital terminals, basically the classification of the digital signal and the logic state of the terminal necessary to perform various functions for certain types of devices.

4.7.2.2.1. Digital Function – Signal

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalFunction-Array/TerminalFunction/DigitalFunction/Signal**
diagram	
type	**SignalClassificationType, DigitalTerminalStateType, JEP30-D10:EmptyType.**

The various classifications of a digital *Signal* are as outlined above; however other classifications can be specified in the category *Other*. The above *Signal* classifications can assist software tools to be more efficient in terms of schematic symbol generation, net connectivity, and schematic DRC (Design Rule Checking).

4.7.2.2.2. Digital Function – Terminal State

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalFunction-Array/TerminalFunction/DigitalFunction/TerminalState**
diagram	
type	**DigitalTerminalStateType, TerminalSignalStateType, SignalStateType, TerminalOtherSignalState-ArrayType, TerminalOtherSignalStateType.**

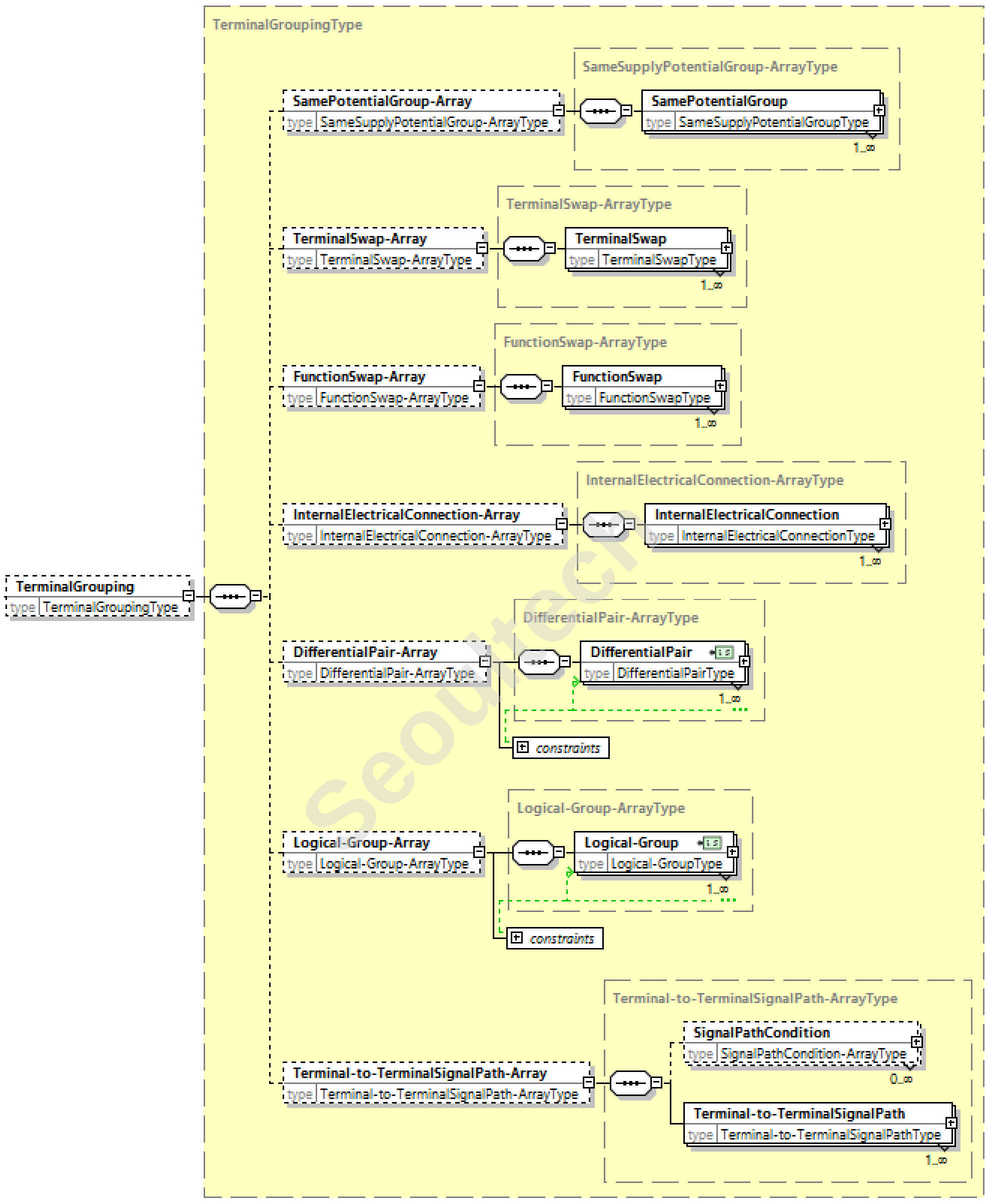
The four most common types of terminal signal states for complex and/or programmable devices are

1. *Reset*,
2. *Programming*,
3. *Sleeping*, and
4. *Unprogrammed*.

Other Terminal states can be captured under the category *OtherState-Array*. The enumerated values of the state are as follows:-

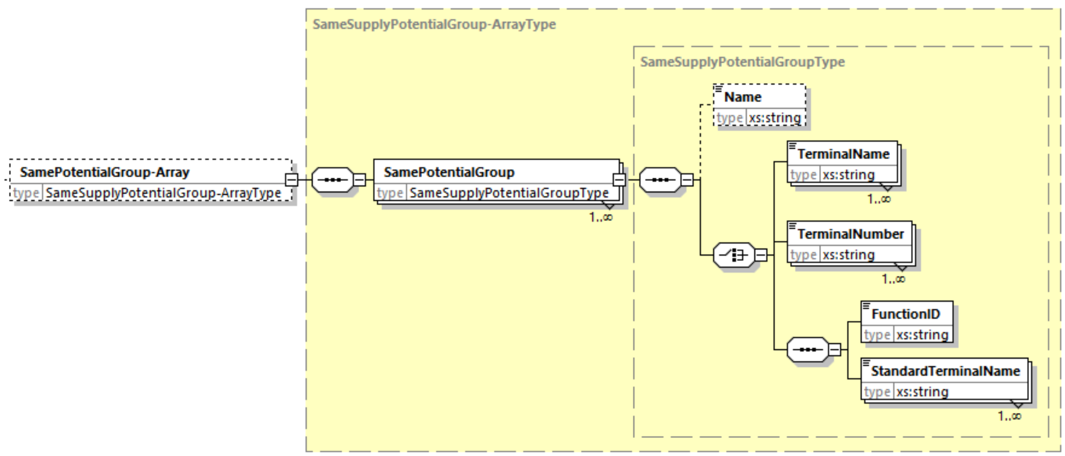
1. *0*,
2. *0Pulldown*,
3. *1*,
4. *1Pullup*,
5. *HighImpedanceState*,
6. *LowState*,
7. *HighState*,
8. *Input*,
9. *Output*,

4.7.2.3. Terminal Grouping – Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping
diagram	
type	TerminalGroupingType, SameSupplyPotentialGroup-ArrayType, SameSupplyPotentialGroupType, TerminalSwap–ArrayType, TerminalSwapType, FunctionSwap-ArrayType, FunctionSwapType, InternalElectricalConnection-ArrayType, InternalElectricalConnectionType, DifferentialPair-ArrayType, DifferentialPairType, LogicalGroup–ArrayType, LogicalGroupType, Terminal-to-TerminalSignalPath-ArrayType, SignalPathCondition-ArrayType, Terminal-to-TerminalSignalPathType,

This section captures data about various terminal groups based on their similarities.

4.7.2.3.1. Same Potential Group - Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/SamePotentialGroup-Array
diagram	
type	SameSupplyPotentialGroup-ArrayType, SameSupplyPotentialGroupType

This device shown in Figure 27 has 3 terminal names that have the same potential.

```
<SamePotentialGroup->
    <TerminalName>DGND</TerminalName>
    <TerminalName>AGND</TerminalName>
    <TerminalName>PLLGND</TerminalName>
</SamePotentialGroup->
```

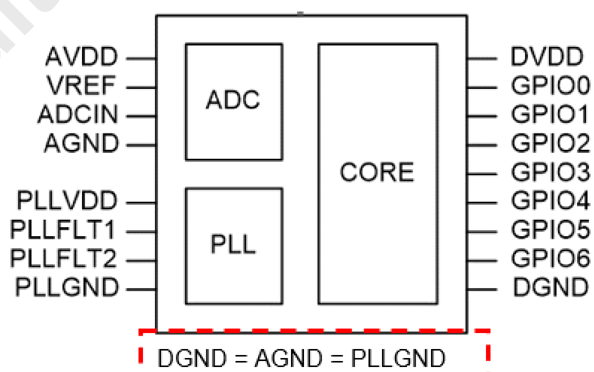
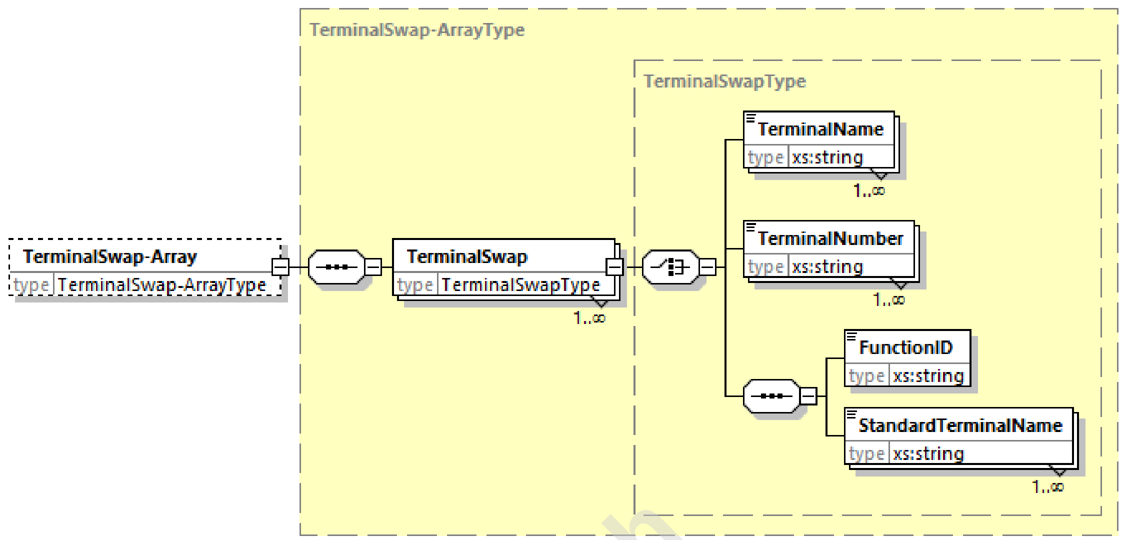


Figure 27 – Same potential

4.7.2.3.2. Terminal Swap - Array

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/TerminalSwap-Array**
diagram	
type	**TerminalSwap–ArrayType, TerminalSwapType.**

If terminals names can be swapped, as in Figure 28, where,

1. Terminals 2 and 3 can be swapped,
2. Terminals 5 and 6 can be swapped,
3. Terminal 8 and 9 can be swapped, and
4. Terminal 11 and 12 can be swapped.

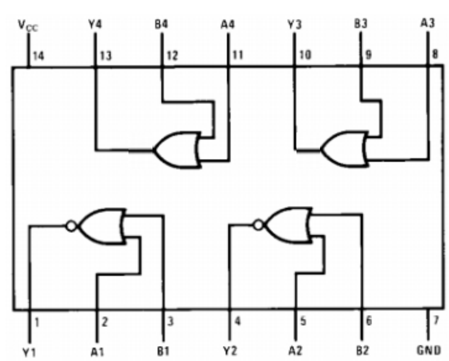


Figure 28 — Sample Mixed Gate Device

This data can be captured under the *TerminalSwap–Array* section, as follows:

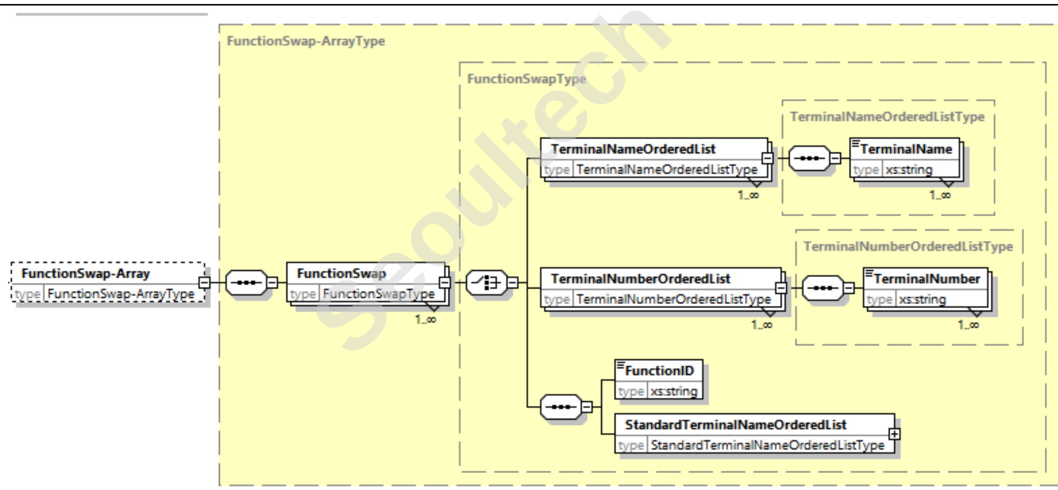
```
<TerminalSwap-Array>
        <TerminalSwap>
                <TerminalNumber>2</TerminalNumber>
                <TerminalNumber>3</TerminalNumber>
        </TerminalSwap>
        <TerminalSwap>
                <TerminalNumber>5</TerminalNumber>
                <TerminalNumber>6</TerminalNumber>
        </TerminalSwap>
```

4.7.2.3.2 Terminal Swap – Array (cont'd)

```xml
        <TerminalSwap>
                <TerminalNumber>8</TerminalNumber>
                <TerminalNumber>9</TerminalNumber>
        </TerminalSwap>
        <TerminalSwap>
                <TerminalNumber>11</TerminalNumber>
                <TerminalNumber>12</TerminalNumber>
        </TerminalSwap>
</TerminalSwap-Array>
```

See next section to capture the details of how to swap one gate function with the next gate function.

4.7.2.3.3. Function Swap - Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/FunctionSwap-Array</td></tr>
<tr><td>diagram</td><td>


</td></tr>
<tr><td>type</td><td>FunctionSwap–ArrayType, FunctionSwapType.</td></tr>
</table>

Figure 28 — Sample Mixed Gate Device gave an example of four gates that could be interchangeable, as follows:

Gate 1 can be swapped with Gate 2, but not with either Gate 3 or Gate 4, because Gates 1 and 2 are OR gates while Gates 3 and 4 are NOR gates.

1. Gate 1 has Terminals 1, 2, 3,
2. Gate 2 has Terminals 4, 5, 6.
3. Gate 3 has Terminals 8, 9, 10,
4. Gate 4 has Terminals 11, 12, 13.

This is an ordered terminal list, meaning that the sequence of the numbers in the list are in the same order for each gate that is swappable with each other.

4.7.2.3.3 Function Swap – Array (cont'd)

```
<FunctionSwap-Array>
	<FunctionSwap>
		<TerminalNumberOrderedList>1, 2, 3</TerminalNumberOrderedList>
		<TerminalNumberOrderedList>4, 5, 6</TerminalNumberOrderedList>
	</FunctionSwap>
	<FunctionSwap>
		<TerminalNumberOrderedList>8, 9, 10</TerminalNumberOrderedList>
		<TerminalNumberOrderedList>11, 12, 13</TerminalNumberOrderedList>
	</FunctionSwap>
</FunctionSwap-Array>
```

Alternatively, terminal name could have been used as follows

```
<FunctionSwap-Array>
	<FunctionSwap>
		<TerminalNameOrderedList>Y1, A1, B1</TerminalNameOrderedList>
		<TerminalNameOrderedList > Y2, A2, B2</TerminalNameOrderedList>
	</FunctionSwap>
	<FunctionSwap>
		<TerminalNameOrderedList> Y3, A3, B3</TerminalNameOrderedList>
		<TerminalNameOrderedList > Y4, A4, B4</TerminalNameOrderedList>
	</FunctionSwap>
</FunctionSwap-Array>
```


If all the four gates were swappable as in Figure 29, then the XML structure would look like this. Note how the terminal number sequence in the ordered list, represents the same terminal name (function) of each gate. This means that if I swap gate 1 with gate 3, that terminal 1 would swap with terminal 10, terminal 2 would swap with terminal 9, and terminal 3 would swap with terminal 8, all in one operation.

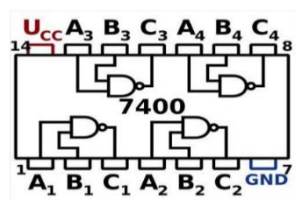
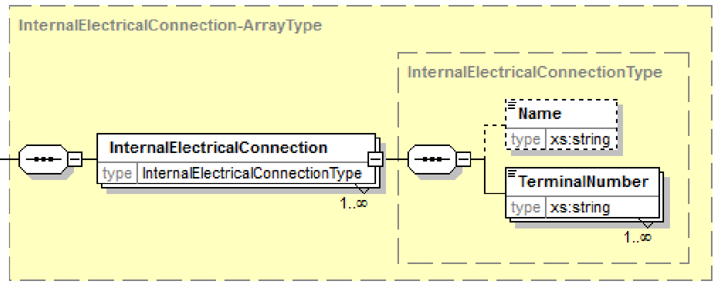


Figure 29 – Sample NAND Gate Device

```
<FunctionSwap-Array>
	<FunctionSwap>
		<TerminalNumberOrderedList>1, 2,
3</TerminalNumberOrderedList>
		<TerminalNumberOrderedList>4, 5, 6</TerminalNumberOrderedList>
		<TerminalNumberOrderedList>10, 9, 8</TerminalNumberOrderedList>
		<TerminalNumberOrderedList>13, 12, 11</TerminalNumberOrderedList>
	</FunctionSwap>
</FunctionSwap-Array>
```

4.7.2.3.4. Internal Electrical Connection - Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/InternalElectricalConnection-Array</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>InternalElectricalConnection–ArrayType, InternalElectricalConnectionType.</td></tr>
</table>

This section captures all the Terminals that are electrically connected together inside the device, under the *InternalElectricalConnection* branch.

```
<InternalElectricalConnection-Array>
        <InternalElectricalConnection>
                <TerminalNumber>1</TerminalNumber>
                <TerminalNumber>2</TerminalNumber>
                <TerminalNumber>3</TerminalNumber>
                <TerminalNumber>4</TerminalNumber>
        </InternalElectricalConnection>
        <InternalElectricalConnection>
                <TerminalNumber>5</TerminalNumber>
                <TerminalNumber>6</TerminalNumber>
                <TerminalNumber>7</TerminalNumber>
        </InternalElectricalConnection>
</InternalElectricalConnection-Array>
```

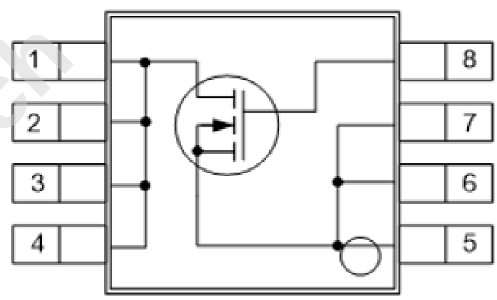
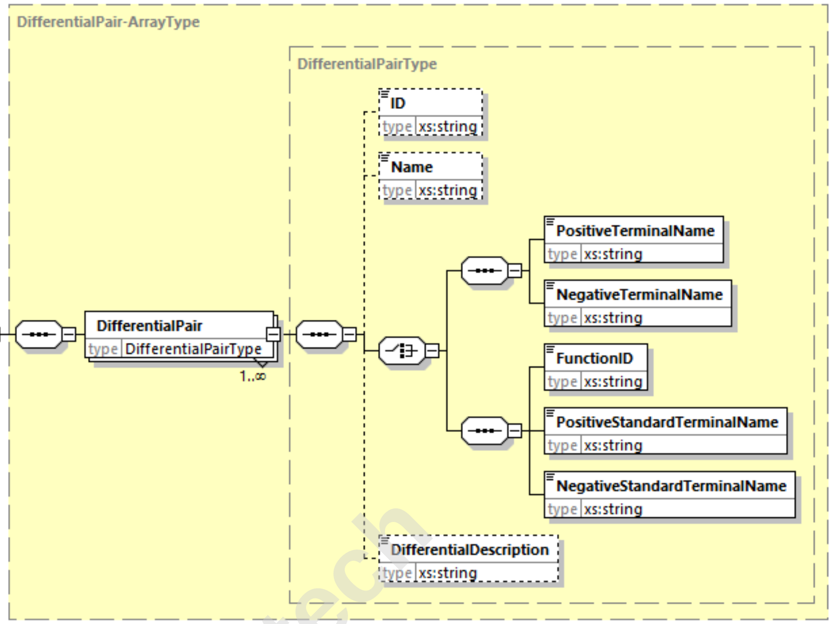


Figure 30 — Internal Electrical Connection

4.7.2.3.5. Differential Pair - Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/DifferentialPair-Array</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>DifferentialPair-ArrayType, DifferentialPairType.</td></tr>
</table>

This section captures the terminal data that makes up the *DifferentialPair*. Differential signaling is a method for electrically transmitting information using two complementary signals. The technique sends the same electrical signal as a differential pair of signals, each in its own conductor. The receiving circuit responds to the electrical difference between the two signals, rather than the difference between a single wire and ground.

The opposite technique is called single-ended signaling. Provided that the source and receiver impedances in the differential signaling circuit are equal, external electromagnetic interference tends to affect both conductors identically. Since the receiving circuit only detects the difference between the wires, the technique resists electromagnetic noise compared to one conductor with an un-paired reference (ground).

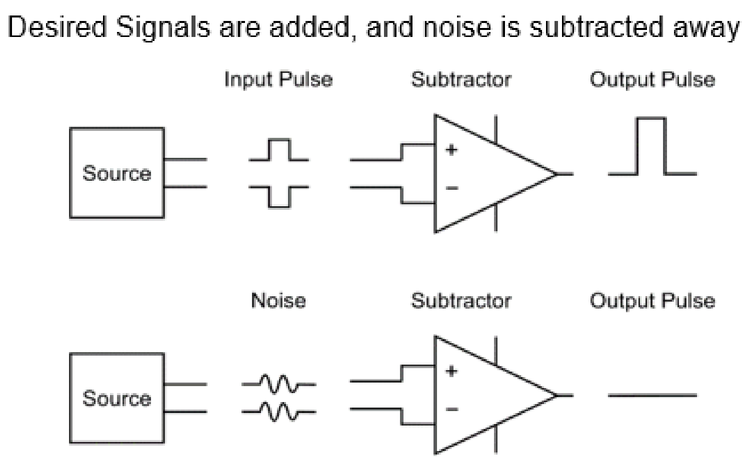


Figure 31 — System with Differential Receiver

4.7.2.3.5 Differential Pair - Array (cont'd)

The technique minimizes electronic crosstalk and electromagnetic interference, both noise emission and noise acceptance, and can achieve a constant or known characteristic impedance, allowing impedance matching techniques important in a high-speed signal transmission line or high-quality balanced line and balanced circuit audio signal path.

The technique works for both analog and digital signaling.

A *DifferentialPair* may also have a unique set of electrical specifications that can be referenced via the *ElectricalSpecificationID*.

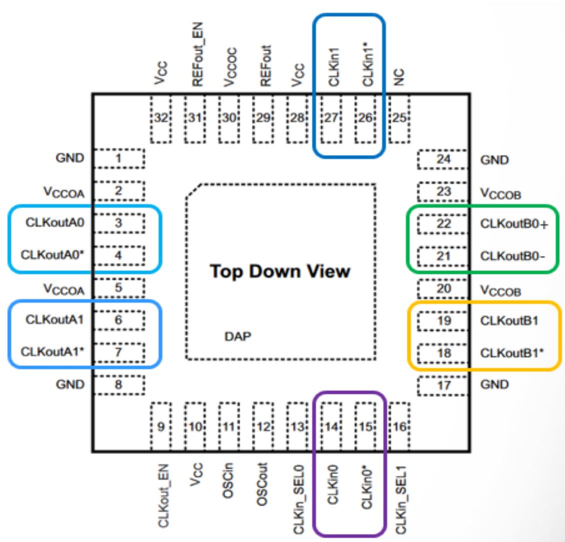


Figure 32 — Differential Pair Device

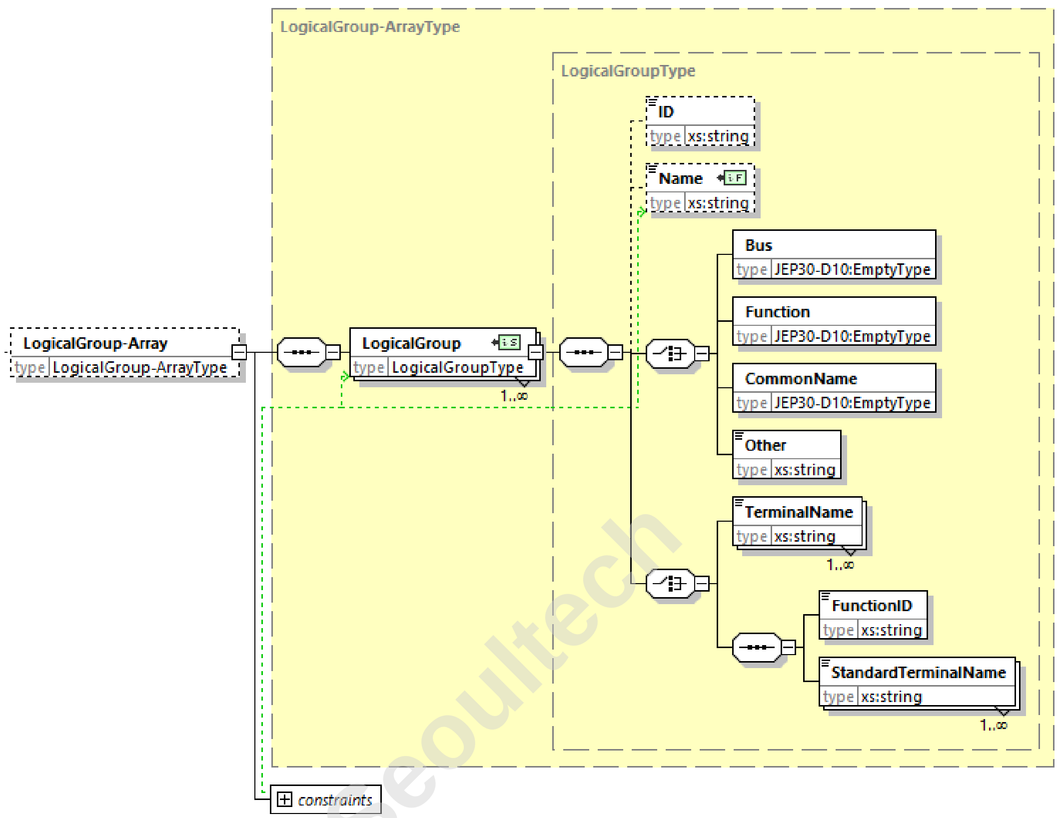
```
<DifferentialPair-Array>
        <DifferentialPair>
                <Name>CLK_outA0</Name>
                <PositiveTerminalName>CLK_outA0</PositiveTerminalName>
        <NegativeTerminalName>CLK_outA0*</NegativeTerminalName>
        </DifferentialPair>
        <DifferentialPair>
                <Name>CLK_outA1</Name>
                <PositiveTerminalName>CLK_outA1</PositiveTerminalName>
                <NegativeTerminalName>CLK_outA1*</NegativeTerminalName>
        </DifferentialPair>
        <DifferentialPair>
                <Name>CLK_in0</Name>
                <PositiveTerminalName>CLK_in0</PositiveTerminalName>
                <NegativeTerminalName>CLK_in0*</NegativeTerminalName>
        </DifferentialPair>
        <DifferentialPair>
                <Name>CLK_outB1</Name>
                <PositiveTerminalName>CLK_outB1</PositiveTerminalName>
                <NegativeTerminalName>CLK_outB1*</NegativeTerminalName>
        </DifferentialPair>
        <DifferentialPair>
                <Name>CLK_outB0</Name>
                <PositiveTerminalName>CLK_outB0+</PositiveTerminalName>
                <NegativeTerminalName>CLK_outB0-</NegativeTerminalName>
        </DifferentialPair>
        <DifferentialPair>
                <Name>CLK_in1</Name>
                <PositiveTerminalName>CLK_in1</PositiveTerminalName>
                <NegativeTerminalName>CLK_in1*</NegativeTerminalName>
        </DifferentialPair>
</DifferentialPair-Array>
```

4.7.2.3.5 Differential Pair - Array (cont'd)

If a Differential Pair will be also captured in a *Terminal-to-TerminalSignalPath*, as seen in section 4.5.2.3.7 below, then the *Name* element should be captured, so that it can be referenced in that section. Typically, the name assigned to a Differential Pair, is the same as the common characters of the positive and negative terminal names. The XML example below represents the differential pairs shown in Figure 35 — Differential Multiplexer, and can be used to demonstrate how the differential pair names can be leveraged in the section.

```
<DifferentialPair-Array>
    <DifferentialPair>
        <Name>IN0</Name>
        <PositiveTerminalName>INP0</PositiveTerminalName>
        <NegativeTerminalName>INN0</NegativeTerminalName>
    </DifferentialPair>
    <DifferentialPair>
        <Name>IN1</Name>
        <PositiveTerminalName>INP1</PositiveTerminalName>
        <NegativeTerminalName>INN1</NegativeTerminalName>
    </DifferentialPair>
    <DifferentialPair>
        <Name>OUT0</Name>
        <PositiveTerminalName>OUTP0</PositiveTerminalName>
        <NegativeTerminalName>OUTN0</NegativeTerminalName>
    </DifferentialPair>
    <DifferentialPair>
        <Name>OUT1</Name>
        <PositiveTerminalName>OUTP1</PositiveTerminalName>
        <NegativeTerminalName>OUTN1</NegativeTerminalName>
    </DifferentialPair>
    <DifferentialPair>
        <Name>OUT2</Name>
        <PositiveTerminalName>OUTP2</PositiveTerminalName>
        <NegativeTerminalName>OUTN2</NegativeTerminalName>
    </DifferentialPair>
    <DifferentialPair>
        <Name>OUT3</Name>
        <PositiveTerminalName>OUTP3</PositiveTerminalName>
        <NegativeTerminalName>OUTN3</NegativeTerminalName>
    </DifferentialPair>
</DifferentialPair-Array>
```

4.7.2.3.6. Logical Group - Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/LogicalGroup-Array
diagram	
type	LogicalGroup–ArrayType, LogicalGroupType, JEP30-D10:EmptyType.

A *LogicalGroup* of Terminals can provide significant efficiencies within software tools, such as schematic capture tools and PB Layout tools. The grouping of all the terminals involved in a *Bus* can significantly reduce the visualization complexity of bus connections in a schematic. Instead of showing 64 separate routes (where 1 route represents 1 bit of a 64-bit bus), the entire set of 64 routes can be routed throughout the schematic as a “Bus identifiable trace” which is then tapped for the appropriate bit routes at the various route designations.

Rules can be applied to logical groupings, thereby applying to all terminals identified by that *LogicalGroup*.

Figure 33 a function block diagram of a 12-bit wide bus switch. The A port can be routed to the B or C port for all bits simultaneously. The switches can be bi-directional depending on the setting of SEL 1 and SEL 2. The EN terminal can be toggled high to put all channels into high-Z mode.

4.7.2.3.6 Logical Group - Array (cont'd)

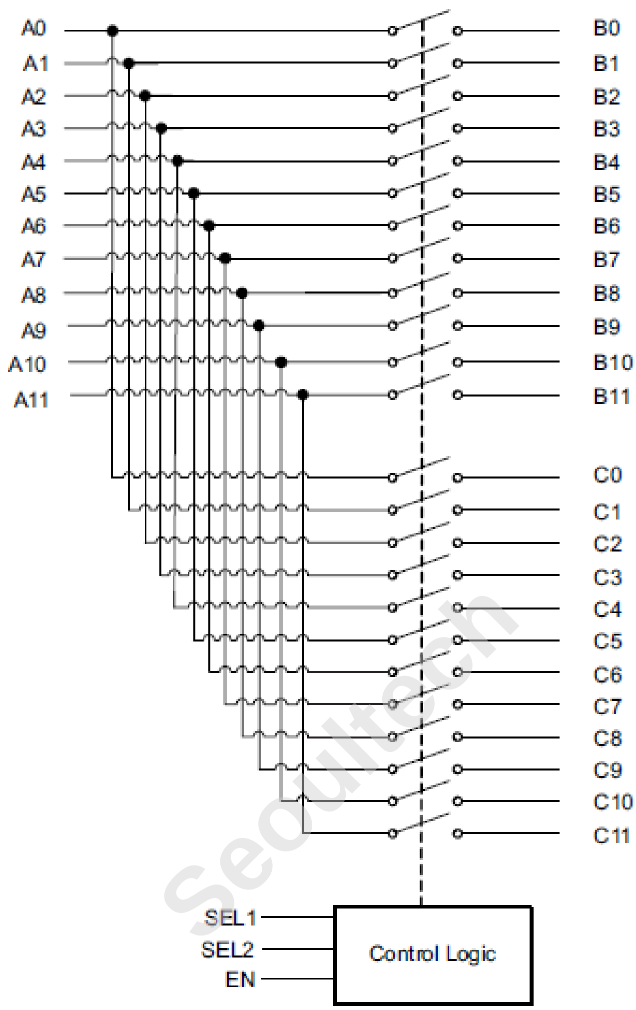


Figure 33 — Function Block Diagram of a 12-bit Bus Switching Device

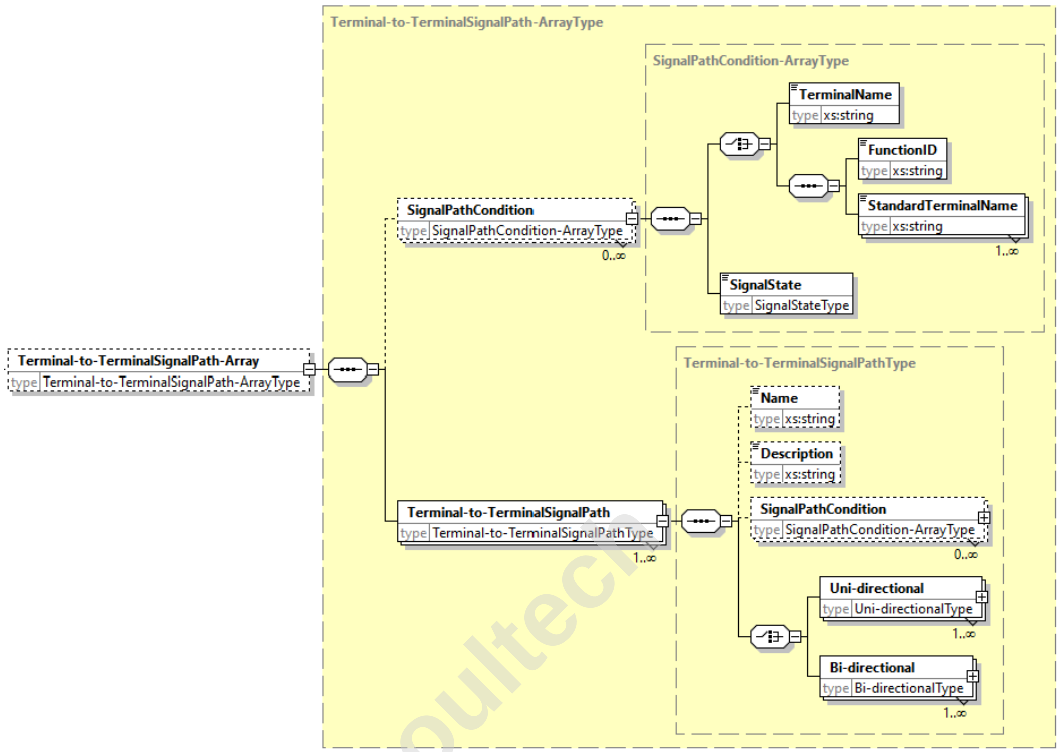
Table 2 in 4.5.2.3.7 Terminal-to-Terminal Signal Path – Array shows the logic for the operation of this function block shown in Figure 33.

4.7.2.3.6 Logical Group - Array (cont'd)

The following XML example shows the XML representation of the Logical Groups of the above function block diagram.

```
<LogicalGroup-Array>
	<LogicalGroup>
	<Name>A</Name>
		<Bus/>
		<TerminalName>A0</TerminalName>
		<TerminalName>A1</TerminalName>
		<TerminalName>A2</TerminalName>
		<TerminalName>A3</TerminalName>
		<TerminalName>A4</TerminalName>
		<TerminalName>A5</TerminalName>
		<TerminalName>A6</TerminalName>
		<TerminalName>A7</TerminalName>
		<TerminalName>A8</TerminalName>
		<TerminalName>A9</TerminalName>
		<TerminalName>A10</TerminalName>
		<TerminalName>A11</TerminalName>
	</LogicalGroup>
	<LogicalGroup>
	<Name>B</Name>
		<Bus/>
		<TerminalName>B0</TerminalName>
		<TerminalName>B1</TerminalName>
		<TerminalName>B2</TerminalName>
		<TerminalName>B3</TerminalName>
		<TerminalName>B4</TerminalName>
		<TerminalName>B5</TerminalName>
		<TerminalName>B6</TerminalName>
		<TerminalName>B7</TerminalName>
		<TerminalName>B8</TerminalName>
		<TerminalName>B9</TerminalName>
		<TerminalName>B10</TerminalName>
		<TerminalName>B11</TerminalName>
	</LogicalGroup>
	<LogicalGroup>
	<Name>C</Name>
		<Bus/>
		<TerminalName>C0</TerminalName>
		<TerminalName>C1</TerminalName>
		<TerminalName>C2</TerminalName>
		<TerminalName>C3</TerminalName>
		<TerminalName>C4</TerminalName>
		<TerminalName>C5</TerminalName>
		<TerminalName>C6</TerminalName>
		<TerminalName>C7</TerminalName>
		<TerminalName>C8</TerminalName>
		<TerminalName>C9</TerminalName>
		<TerminalName>C10</TerminalName>
		<TerminalName>C11</TerminalName>
	</LogicalGroup>
</LogicalGroup-Array>
```

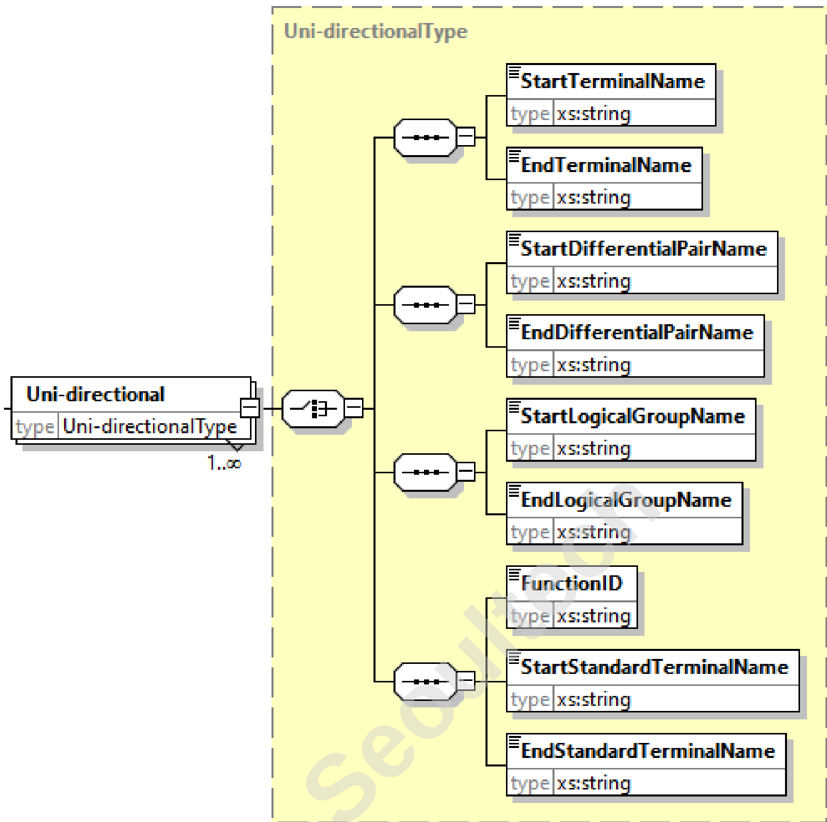
4.7.2.3.7. Terminal-to-Terminal Signal Path – Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/Terminal-to-TerminalSignalPath-Array</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>Terminal-to-TerminalSignalPath–ArrayType, SignalPathCondition–ArrayType, SignalStateType, Terminal-to-TerminalSignalPathType, Uni-directionalType, Bi-directionalType.</td></tr>
</table>

In a two terminal device, the signal path is easily defined, as the signal enters one terminal and exits the other. However, in more complex circuits, this is not so easily defined.

Terminal-to-Terminal Signal Paths can be *Uni-directional* or *Bi-directional*. The following shows several examples of *Terminal-to-TerminalSignalPath-Array* with their XML representation.

4.7.2.3.7.1. Uni-directional Terminal-to-Terminal Signal Path

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/Terminal-to-TerminalSignalPath-Array/Terminal-to-TerminalSignalPath/Uni-directional</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>Terminal-to-TerminalSignalPath–ArrayType, SignalPathCondition–ArrayType, SignalStateType, Terminal-to-TerminalSignalPathType, Uni-directionalType, Bi-directionalType.</td></tr>
</table>

The example shown here is a uni-directional terminal to terminal signal path for a clock buffer.

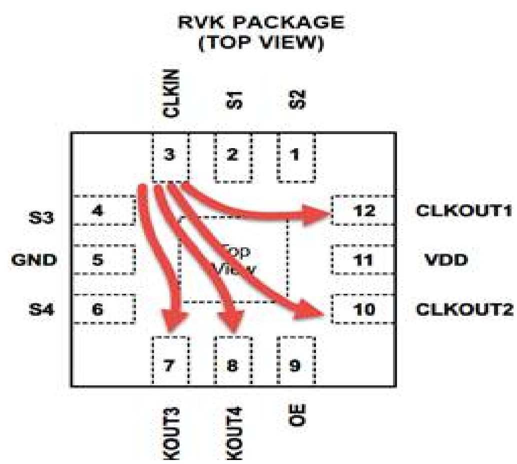


Figure 34 — Clock Buffer

4.7.2.3.7.1 Uni-directional Terminal-to-Terminal Signal Path (cont'd)

```xml
<Terminal-to-TerminalSignalPath-Array>
    <SignalPathCondition>
        <TerminalName>OE</TerminalName>
        <SignalSate>LowState</SignalSate>
    </SignalPathCondition>
    <Terminal-to-TerminalSignalPath>
        <SignalPathCondition>
            <TerminalName>S1</TerminalName>
            <SignalSate>HighState</SignalSate>
        </SignalPathCondition>
        <Uni-directional>
            <StartTerminalName>CLKIN</StartTerminalName>
            <EndTerminalName>CLKOUT1</EndTerminalName>
        </Uni-directional>
    </Terminal-to-TerminalSignalPath>
    <Terminal-to-TerminalSignalPath>
        <SignalPathCondition>
            <TerminalName>S2</TerminalName>
            <SignalSate>HighState</SignalSate>
        </SignalPathCondition>
        <Uni-directional>
            <StartTerminalName>CLKIN</StartTerminalName>
            <EndTerminalName>CLKOUT2</EndTerminalName>
        </Uni-directional>
    </Terminal-to-TerminalSignalPath>
    <Terminal-to-TerminalSignalPath>
        <SignalPathCondition>
            <TerminalName>S3</TerminalName>
            <SignalSate>HighState</SignalSate>
        </SignalPathCondition>
        <Uni-directional>
            <StartTerminalName>CLKIN</StartTerminalName>
            <EndTerminalName>CLKOUT3</EndTerminalName>
        </Uni-directional>
    </Terminal-to-TerminalSignalPath>
    <Terminal-to-TerminalSignalPath>
        <SignalPathCondition>
            <TerminalName>S4</TerminalName>
            <SignalSate>HighState</SignalSate>
        </SignalPathCondition>
        <Uni-directional>
            <StartTerminalName>CLKIN</StartTerminalName>
          <EndTerminalName>CLKOUT4</EndTerminalName>
        </Uni-directional>
    </Terminal-to-TerminalSignalPath>
</Terminal-to-TerminalSignalPath-Array>
```

4.7.2.3.7.1 Uni-directional Terminal-to-Terminal Signal Path (cont'd)

In this differential multiplexer example, the Differential Pair *Terminal-to-TerminalSignalPath* map could be captured by using the *DifferentialPair/Name*. This would make the data representation more condense.

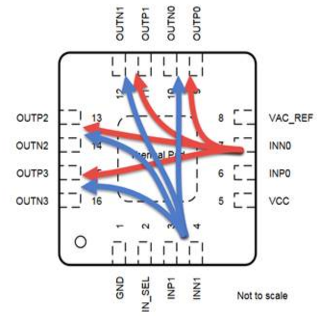


Figure 35 — Differential Multiplexer

```
<Terminal-to-TerminalSignalPath-Array>
        <Terminal-to-TerminalSignalPath>
                <SignalPathCondition>
                        <TerminalName>IN_SEL</TerminalName>
                        <SignalSate>LowState</SignalSate>
                </SignalPathCondition>
                <Uni-directional>

        <StartDifferentialPairName>IN0</StartDifferentialPairName>
                        <EndDifferentialPairName>OUT0</EndDifferentialPairName>
                </Uni-directional>
                <Uni-directional>
                        <StartDifferentialPairName>IN0</StartDifferentialPairName>
                        <EndDifferentialPairName>OUT1</EndDifferentialPairName>
                </Uni-directional>
                <Uni-directional>
                        <StartDifferentialPairName>IN0</StartDifferentialPairName>
                        <EndDifferentialPairName>OUT2</EndDifferentialPairName>
                </Uni-directional>
                <Uni-directional>
                        <StartDifferentialPairName>IN0</StartDifferentialPairName>
                        <EndDifferentialPairName>OUT3</EndDifferentialPairName>
                </Uni-directional>
        </Terminal-to-TerminalSignalPath>
        <Terminal-to-TerminalSignalPath>
                <SignalPathCondition>
                        <TerminalName>IN_SEL</TerminalName>
                        <SignalSate>HighState</SignalSate>
                </SignalPathCondition>
                <Uni-directional>
                        <StartDifferentialPairName>IN1</StartDifferentialPairName>
                        <EndDifferentialPairName>OUT0</EndDifferentialPairName>
                </Uni-directional>
                <Uni-directional>
                        <StartDifferentialPairName>IN1</StartDifferentialPairName>
                        <EndDifferentialPairName>OUT1</EndDifferentialPairName>
                </Uni-directional>
                <Uni-directional>
                        <StartDifferentialPairName>IN1</StartDifferentialPairName>
                        <EndDifferentialPairName>OUT2</EndDifferentialPairName>
                </Uni-directional>
                <Uni-directional>
                        <StartDifferentialPairName>IN1</StartDifferentialPairName>
                        <EndDifferentialPairName>OUT3</EndDifferentialPairName>
                </Uni-directional>
        </Terminal-to-TerminalSignalPath>
</Terminal-to-TerminalSignalPath-Array>
```

4.7.2.3.7.2. BI-directional Terminal-to-Terminal Signal Path

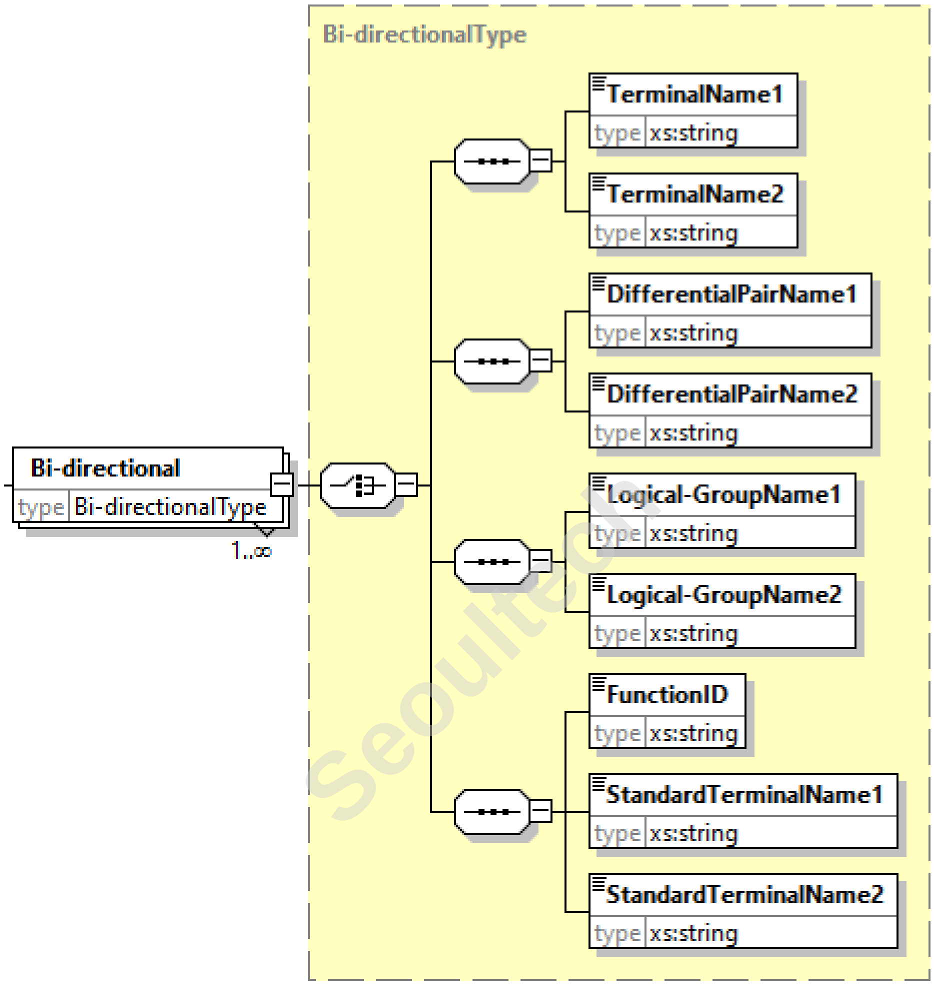
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/Terminal-to-TerminalSignalPath-Array/Terminal-to-TerminalSignalPath/Bi-directional
diagram	
type	Terminal-to-TerminalSignalPath–ArrayType, SignalPathCondition–ArrayType, SignalStateType, Terminal-to-TerminalSignalPathType, Uni-directionalType, Bi-directionalType.

Table 2 shows the logic for the operation of the function block shown in Figure 33 — Function Block Diagram of a 12-bit Bus Switching Device. This is used to provide an example of the Signal Path that changes upon a set of conditions for a bidirectional connection.

4.7.2.3.7.2 Bi-directional Terminal-to-Terminal Signal Path (cont'd)

Table 1 — Switch Function Table

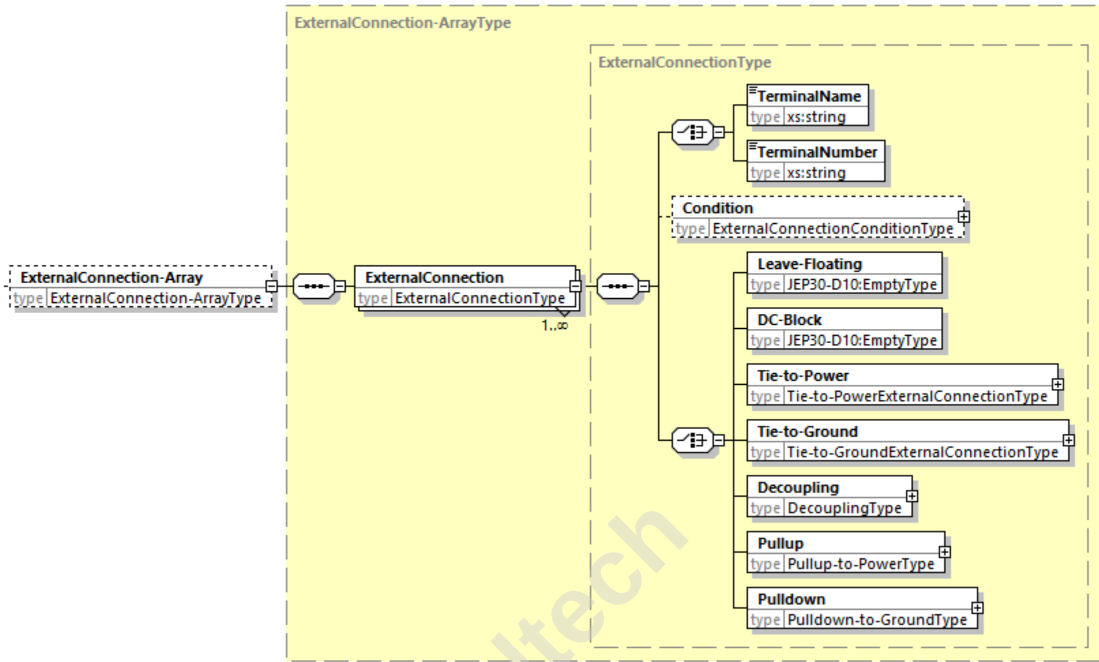
SEL 1	SEL 2	EN	Bx	Ax	Cx
X	X	H	Z	Z	Z
L	L	L	↔		Z
L	H	L	→		Z
H	L	L	Z	↔	
H	H	L	Z	←	

```
<Terminal-to-TerminalSignalPath-Array>
    <SignalPathCondition>
        <TerminalName>EN</TerminalName>
        <SignalSate>LowState</SignalSate>
    </SignalPathCondition>
    <Terminal-to-TerminalSignalPath>
        <SignalPathCondition>
            <TerminalName>SEL 1</TerminalName>
            <SignalSate>LowState</SignalSate>
        </SignalPathCondition>
        <SignalPathCondition>
            <TerminalName>SEL2</TerminalName>
            <SignalSate>LowState</SignalSate>
        </SignalPathCondition>
        <Bi-directional>
            <Logical-GroupName1>A</Logical-GroupName1>
            <Logical-GroupName2>B</Logical-GroupName2>
        </Bi-directional>
    </Terminal-to-TerminalSignalPath>
    <Terminal-to-TerminalSignalPath>
        <SignalPathCondition>
            <TerminalName>SEL 1</TerminalName>
            <SignalSate>LowState</SignalSate>
        </SignalPathCondition>
        <SignalPathCondition>
            <TerminalName>SEL2</TerminalName>
            <SignalSate>HighState</SignalSate>
        </SignalPathCondition>
        <Uni-directional>
            <StartLogical-GroupName>B</StartLogical-GroupName>
            <EndLogical-GroupName>A</EndLogical-GroupName>
        </Uni-directional>
    </Terminal-to-TerminalSignalPath>
    <Terminal-to-TerminalSignalPath>
        <SignalPathCondition>
            <TerminalName>SEL 1</TerminalName>
            <SignalSate>HighState</SignalSate>
        </SignalPathCondition>
```

4.7.2.3.7.2 Bi-directional Terminal-to-Terminal Signal Path (cont'd)

```
        <SignalPathCondition>
            <TerminalName>SEL2</TerminalName>
            <SignalSate>LowState</SignalSate>
        </SignalPathCondition>
        <Bi-directional>
            <Logical-GroupName1>A</Logical-GroupName1>
            <Logical-GroupName2>C</Logical-GroupName2>
        </Bi-directional>
    </Terminal-to-TerminalSignalPath>
    <Terminal-to-TerminalSignalPath>
        <SignalPathCondition>
            <TerminalName>SEL 1</TerminalName>
            <SignalSate>HighState</SignalSate>
        </SignalPathCondition>
        <SignalPathCondition>
            <TerminalName>SEL2</TerminalName>
            <SignalSate>HighState</SignalSate>
        </SignalPathCondition>
        <Uni-directional>
            <StartLogical-GroupName>C</StartLogical-GroupName>
            <EndLogical-GroupName>A</EndLogical-GroupName>
        </Uni-directional>
    </Terminal-to-TerminalSignalPath>
</Terminal-to-TerminalSignalPath-Array>
```

4.7.2.4. External Connection - Array

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/ExternalConnection-Array**
diagram	
type	**ExternalConnection–ArrayType, ExternalConnectionType, ExternalConnectionConditionType, Tie-to-PowerExternalConnectionType, Tie-to-GroundExternalConnectionType, DecouplingType, Pullup-to-PowerType, Pulldown-to-GroundType, JEP30-D10:EmptyType.**

There are several different types of *ExternalConnection* that may be mandatory for the operation of the device. Some terminals are *Leave-Floating*, because for example they are *Reserved* or they have *NoDieConnection*. For details on these terminal properties see section 4.5.2.1 Properties - Array above. Other reasons may also exist for terminals to be left floating.

DC-Block prevents the flow of direct current (DC) through radio frequency (RF) circuits. They serve as high-pass filters that prevent DC voltages, which have a frequency of zero Hertz (Hz), from interfering with sensitive RF components such as receivers. In other words, DC blocks are capacitors in series with a transmission line. They prevent the flow of DC energy while allowing RF signals to pass with little (if any) attenuation.

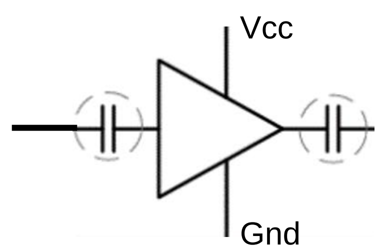
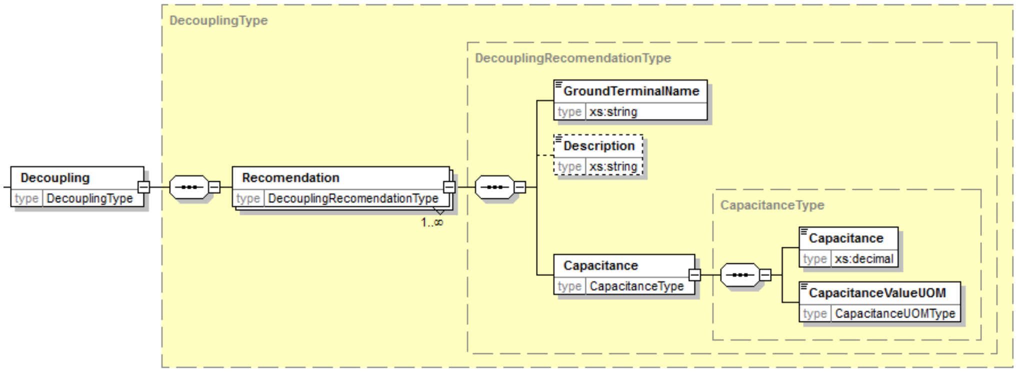


Figure 36 — Circuit with DC-Blocking

Tie-to-Power or *Tie-to-Ground* may be external requirements for terminals that will be unused in a circuit. In this case the condition of *Unused* is set. Other types of External Connection such as *Decoupling*, *Pullup* and *Pulldown* are described in the next sections.

4.7.2.4.1. Decoupling

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/ExternalConnection-Array/ExternalConnection/Decoupling**
diagram	
type	**DecouplingType, DecouplingRecommendationType, CapacitanceType, CapacitanceUOMType.**

Active devices of an electronic system (transistors, ICs, vacuum tubes, for example) are connected to their power supplies through conductors with finite resistance and inductance. If the current drawn by an active device changes, voltage drops from power supply to device will also change due to these impedances. If several active devices share a common path to the power supply, changes in the current drawn by one element may produce voltage changes large enough to affect the operation of others - voltage spikes or ground bounce, for example - so the change of state of one device is coupled to others through the common impedance to the power supply. A *Decoupling* capacitor provides a bypass path for transient currents, instead of flowing through the common impedance.

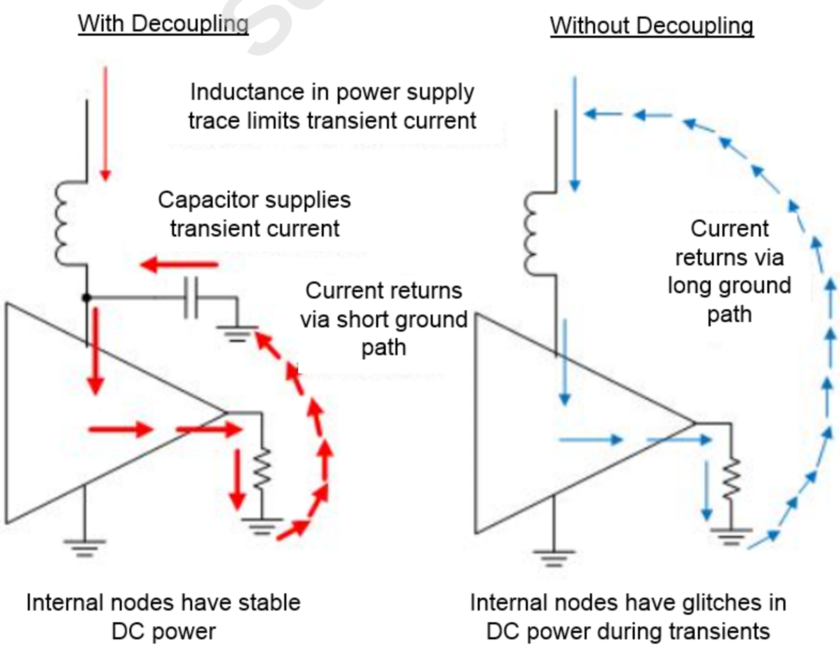
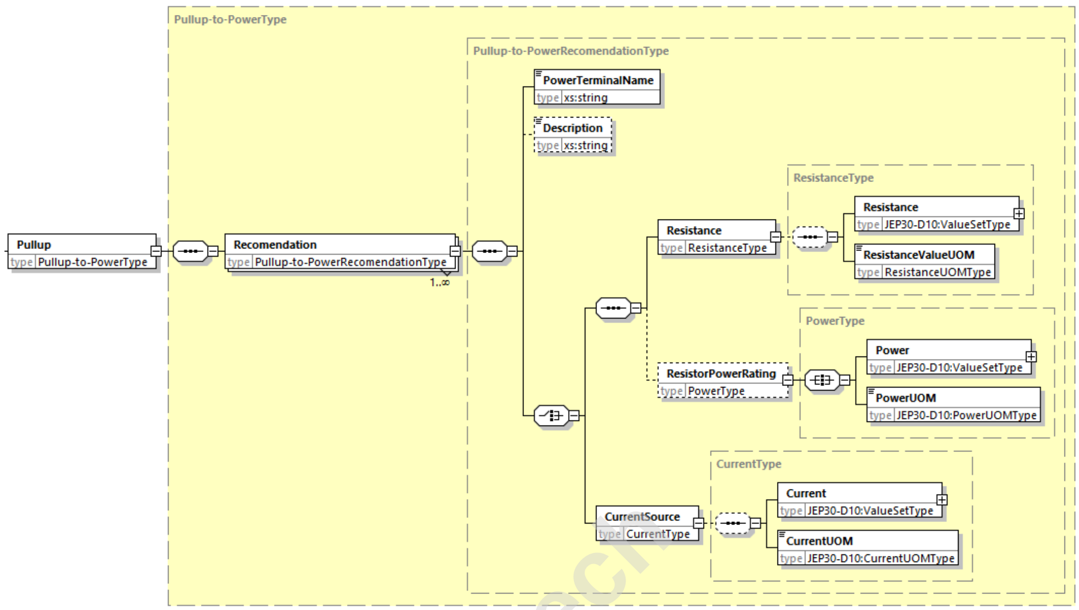


Figure 37 — Decoupling Circuit

4.7.2.4.2. Pullup to Power

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/ExternalConnection-Array/ExternalConnection/Pullup</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>Pull-up-to-PowerType, Pull-up-to-PowerRecommendationType, ResistanceType, ResistanceUOMType, PowerType, JEP30-D10:PowerUOMType, CurrentType, JEP30-D10:CurrentUOMType.</td></tr>
</table>

In electronic logic circuits, a *Pullup* resistor is a resistor connected between a signal conductor and a positive power supply voltage (*PowerTerminalName*) to ensure that the signal will be a valid logic level if external devices are disconnected or high-impedance is introduced. They may also be used at the interface between two different types of logic devices, possibly operating at different logic levels and power supply voltages.

A *Pullup* resistor pulls the voltage of the signal it is connected to towards its voltage source level. When the other components associated with the signal are inactive, the voltage supplied by the *Pullup* prevails and brings the signal up to a logical high level. When another component on the line goes active, it overrides the *Pullup* resistor. The *Pullup* resistor ensures that the net is at a defined logic level even if no active devices are connected to it. A *Pullup* can also be achieved through a *CurrentSource*.

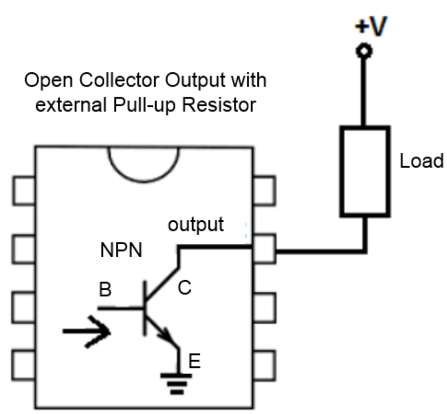
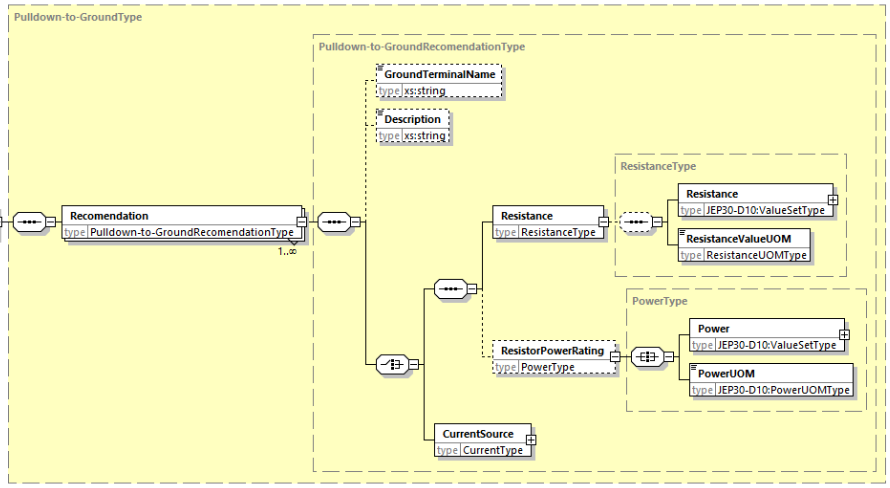


Figure 38 — Pull-up Resistor to Power

4.7.2.4.3. Pulldown to Ground

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/ExternalConnection-Array/ExternalConnection/Pulldown
diagram	
type	Pull-down-to-GroundType, Pull-up-to-GroundRecommendationType, ResistanceType, ResistanceUOMType, PowerType, JEP30-D10:PowerUOMType, CurrentType.

Similar to a *Pullup* resistor, a *Pulldown* resistor or *CurrentSource* is connected between a signal conductor and ground to ensure that the signal will be a valid logic level if external devices are disconnected or high-impedance is introduced.

Whereas Figure 38 shows a resistor as the pull-up component, Figure 39 shows a current source in place of a resistor.

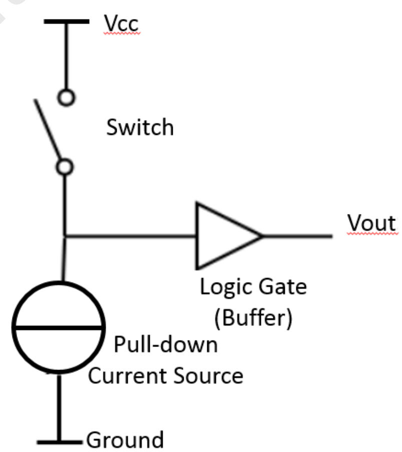
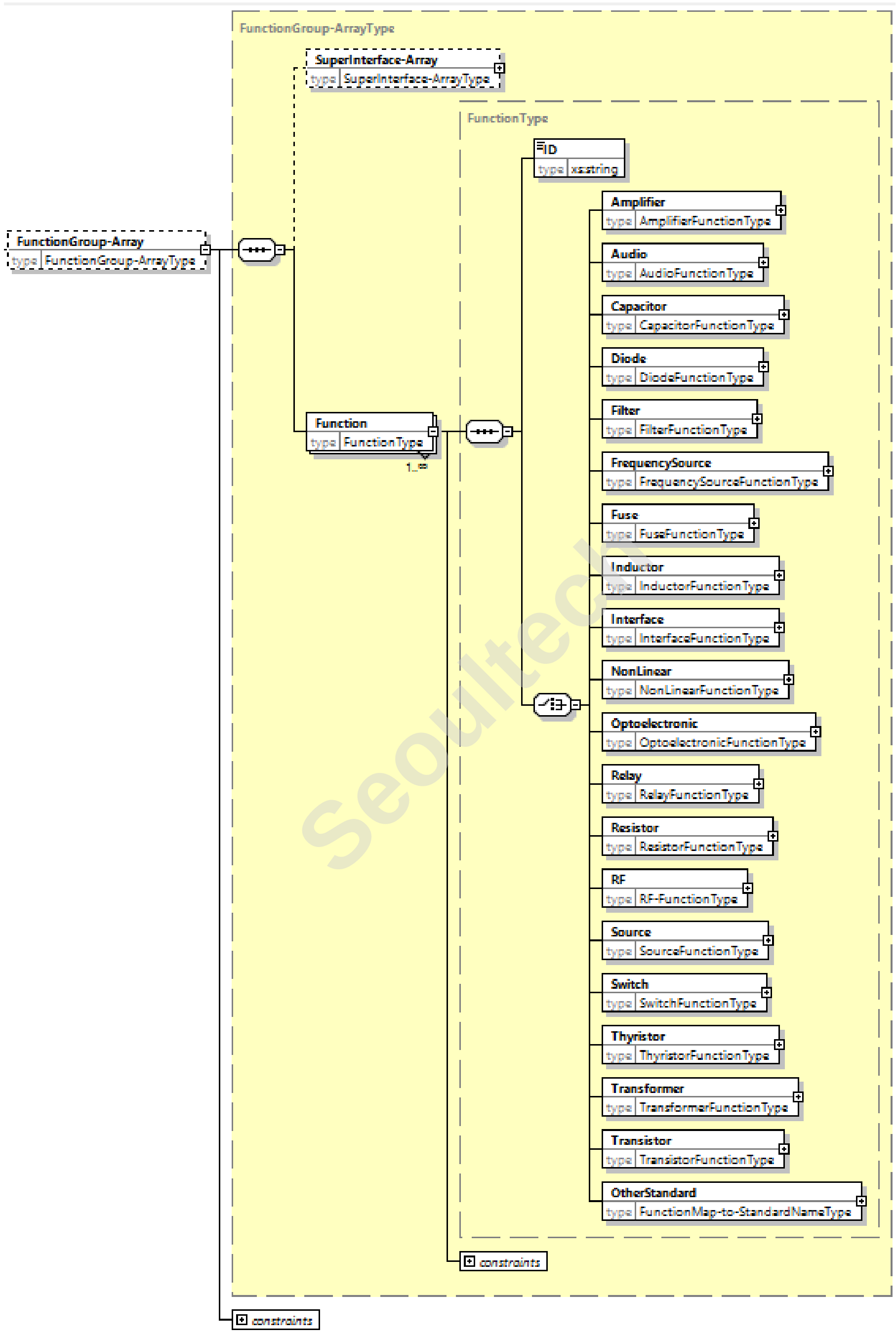


Figure 39 — Pull-down Current Source to Ground

4.7.3. Function Group - Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array</td></tr>
<tr><td>diagram</td><td>


</td></tr>
<tr><td>type</td><td>FunctionGroup-ArrayType, SuperInterface-ArrayType, FunctionType, AudioFunctionType, AmplifierFunctionType, CapacitorFunctionType, DiodeFunctionType, FilterFunctionType, FrequencySourceFunctionType, FuseFunctionType, InductorFunctionType, InterfaceFunctionType, NonLinearFunctionType, OptoelectronicFunctionType, RelayFunctionType, ResistorFunctionType, SourceFunctionType, SwitchFunctionType, ThyristorFunctionType, TransformerFunctionType, TransistorFunctionType, FunctionMap-to-StandardNameType.</td></tr>
</table>

4.7.3 Function Group – Array (cont'd)

The *FunctionGroup-Array* section captures some of the basic internal functions of the device. Simple discrete parts might consist of a single function, while other may have an array of such functions. Other more complex parts can multiple different functions, while at the furthest extreme, some parts can have many millions of internal functions. This section is not intended to capture all the functions that a device may contain, however it is intended to capture sufficient information that would improve the efficiency of the software tools that would consume this data.

The *Function* is an unbounded element, providing the capability to define a single or multiple functions for a single device.

The principal objective for every function type listed under the Function Group is to capture the *StandardTerminalNameAssignment* mapping to the terminals on the device. Section 4.7.2 Package Terminal Map below captures the *TerminalName* as defined by the device manufacturer and maps that to the *TerminalNumber*. This section captures that mapping defined by the device manufacturer, over to the *StandardTerminalNameAssignment* as defined by JEDEC and other standard bodies.

Figure 40 shows a device that contains 3 different functions connected via an internal node A. The functions are:

1. Function R1
   a. Resistor, Fixed, R = 10k,
   b. Terminal1 = Internal Node A,
   c. Terminal2 = External Terminal 1
2. Function R2
   a. Resistor, Fixed, R = 10k,
   b. Terminal1 = Internal Node A,
   c. Terminal2 = External Terminal 2
3. Function Q1
   a. Transistor, Bipolar Junction, NPN,
   b. Base = Internal Node A,
   c. Collector = External Terminal 3,
   d. Emitter = External Terminal 2,
4. Device Specification
   a. I_{CMax} = 100mA, f_T = 250MHz, etc…

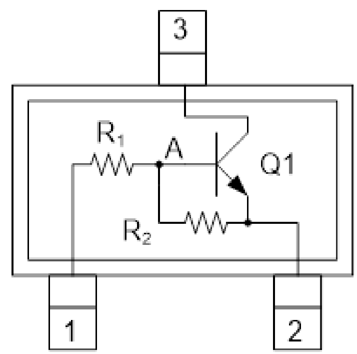


Figure 40 — Sample Transistor Circuit

The above data is shown in the XML structure below for the device connectivity to its various functions. Note how the electrical specification for resistors R1 and R2 are referenced with the function, whereas the electrical specification for the device is outside of the *FunctionGroup-Array* since this specific specification is for the entire device and not a specific function within the device.

While 4.5.1.3 Electrical Classification captures the data associated with the primary classification, a part may have many different functions, to its device *PartClassification/Electrical* classification above. These *Function* classifications are required to capture the *TerminalName* mapping to the standard terminal names for each function within the device. For example, Figure 40 shows functions for a device that may be classified under the *PartClassification/Electrical* classification as an NPN Bipolar Junction Transistor.

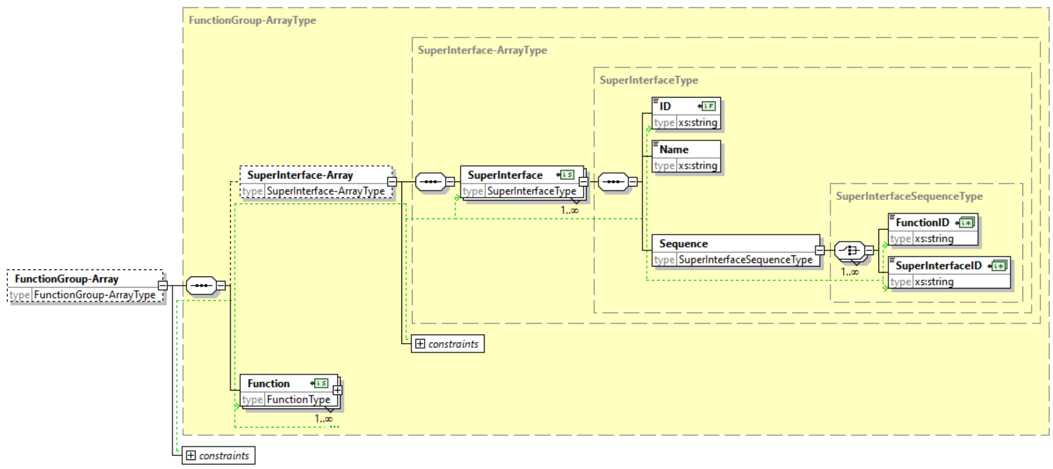
4.7.3 Function Group – Array (cont'd)


```xml
<Electrical-Array>
    <Electrical>
        <ID>NPN Device ID 1</ID>
        <TerminalDetails>
            <TerminalMap-Array>
                <TerminalMap>
                    <Map>
                        <TerminalName>B</TerminalName>
                        <TerminalNumber>1</TerminalNumber>
                    </Map>
                    <Map>
                        <TerminalName>E</TerminalName>
                        <TerminalNumber>2</TerminalNumber>
                    </Map>
                    <Map>
                        <TerminalName>C</TerminalName>
                        <TerminalNumber>3</TerminalNumber>
                    </Map>
                </TerminalMap>
            </TerminalMap-Array>
            <InternalNode-Array>
                <InternalNode>
                    <Name>A</Name>
                </InternalNode>
            </InternalNode-Array>
        </TerminalDetails>
        <FunctionalGroup-Array>
            <Function>
                <Resistor>
                    <Fixed>
                        <StandardTerminalNameAssignment>
                            <Terminal1>
                                <TerminalNumber>1</TerminalNumber>
                            </Terminal1>
                            <Terminal2>
                                <InternalNodeName>A</InternalNodeName>
                            </Terminal2>
                        </StandardTerminalNameAssignment>
                    </Fixed>
                </Resistor>
                <ElectricalSpecificationID>Res ID 1</ElectricalSpecificationID>
            </Function>
            <Function>
                <Resistor>
                    <Fixed>
                        <StandardTerminalNameAssignment>
                        <Terminal1>
                                <TerminalNumber>2</TerminalNumber>
                            </Terminal1>
                            <Terminal2>
                                <InternalNodeName>A</InternalNodeName>
                            </Terminal2>
                        </StandardTerminalNameAssignment>
```

4.7.3 Function Group – Array (cont'd)

```
                        </Fixed>
                    </Resistor>
                    <ElectricalSpecificationID>Res ID 1</ElectricalSpecificationID>
                </Function>
                <Function>
                    <Transistor>
                        <BipolarJunction>
                            <NPN>
                                <StandardTerminalNameAssignment>
                                    <Base>
                                        <InternalNodeName>A</InternalNodeName>
                                    </Base>
                                    <Collector>
                                        <TerminalNumber>3</TerminalNumber>
                                    </Collector>
                                    <Emitter>
                                        <TerminalNumber>3</TerminalNumber>
                                    </Emitter>
                                </StandardTerminalNameAssignment>
                            </NPN>
                        </BipolarJunction>
                    </Transistor>
                </Function>
            </FunctionalGroup-Array>
        </Electrical>
    </Electrical-Array>
    <ElectricalSpecification-Array>
        <ElectricalSpecification>
            <ID>Res ID 1</ID>
            <ParameterSet>
                <Parameter>
                    <LaTeX-Symbol>R</LaTeX-Symbol>
                    <SymbolDescription>Resistance Value</SymbolDescription>
                    <Values>
                        <Nominal>10</Nominal>
                    </Values>
                    <Units>
                        <ElectricResistance>kΩ</ElectricResistance>
                    </Unitss>
                </Parameter>
            </ParameterSet>
        </ElectricalSpecification>
    </ElectricalSpecification-Array>
```

4.7.3.1. Super Interface - Array

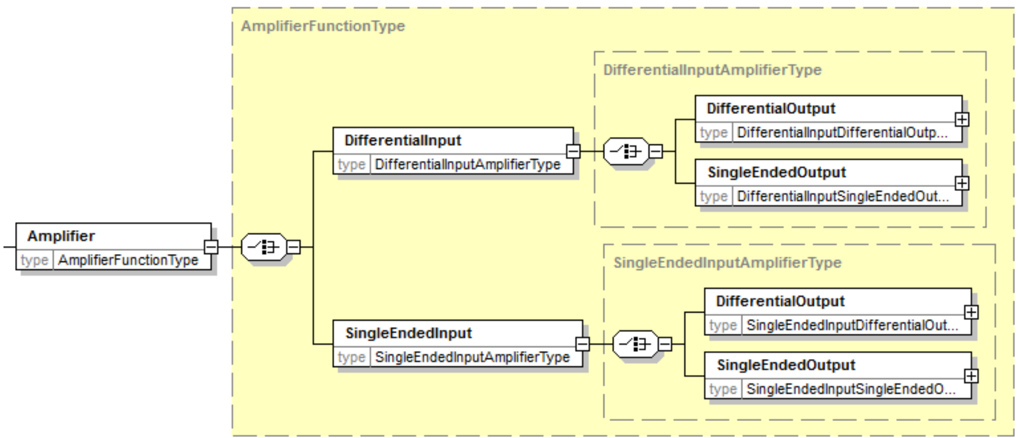
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/SuperInterface-Array**
diagram	
type	**SuperInterface-ArrayType, SuperInterfaceType, SuperInterfaceSequenceType**

A *SuperInterface-Array* is a collection of *Functions* (typically Interfaces) and merge them into one larger group of *Functions/Interfaces*, so that software tools can reference their collection as one group.

A typical example of how this may be used would be in a multi-channel device, in which each channel was made up a set of Interfaces and functions. Let's assume the following example. A device has 2 or more Banks, where each Bank contains 3 channels A to C. Each channel consists of a DDR6 interface, and a PCIe Interface. Channels A through C are swappable, whereas the Banks are not swapable, but do share the same functions and specifications. In this scenario, it makes sense to create a SuperInterface instance for the Channel. The Bank SuperInterface is then made up of 3 Channel Super Interfaces.

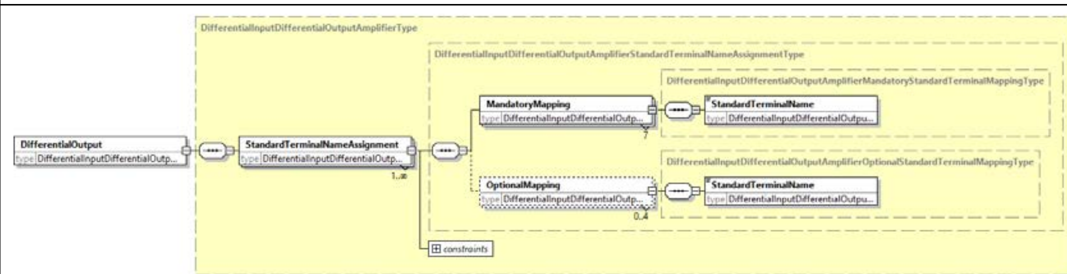
```
<SuperInterface-Array>
    <SuperInterface>
        <ID>Super Interface ID 1</ID>
        <Name>Channel</Name>
        <Sequence>
            <FunctionID>DDR6 ID</FunctionID>
            <FunctionID>PCIe ID</FunctionID>
        </Sequence>
    </SuperInterface>
    <SuperInterface>
        <ID>Super Interface ID 2</ID>
        <Name>Bank</Name>
        <Sequence>
            <SuperInterfaceID>Super Interface ID 1</SuperInterfaceID>
            <SuperInterfaceID>Super Interface ID 1</SuperInterfaceID>
            <SuperInterfaceID>Super Interface ID 1</SuperInterfaceID>
        </Sequence>
    </SuperInterface>
</SuperInterface-Array>
```

4.7.3.2. Amplifier

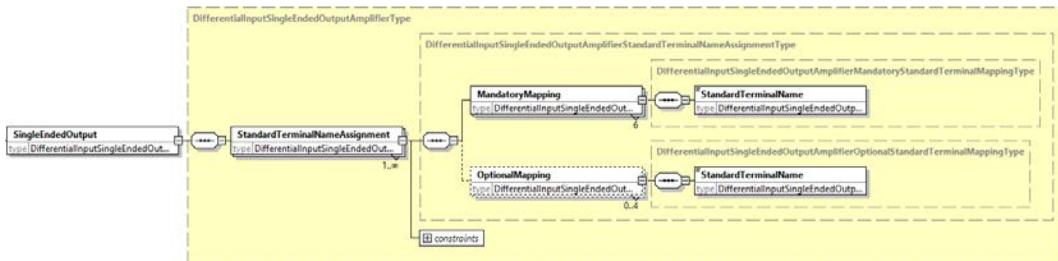
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Amplifier</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>AmplifierFunctionType, DifferentialInputAmplifierType, DifferentialInputDifferentialOutputAmplifierType, DifferentialInputSingleEndedOutputAmplifierType, SingleEndedInputAmplifierType, SingleEndedInputDifferentialOutputAmplifierType, SingleEndedInputSingleEndedOutputAmplifierType.</td></tr>
</table>

An *Amplifier* can have two different types of inputs (*DifferentialInput* and *SingleEndedInput*) and two different types of outputs (*DifferentialOutput* and *SingleEndedOutput*) giving rise to 4 different combinations of inputs and outputs *StandardTerminalNameAssignment*, as shown below.

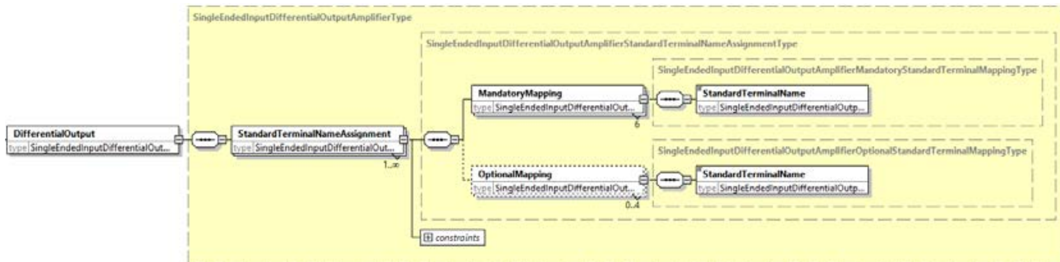
4.7.3.2.1. Differential Input Differential Output

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Amplifier/DifferentialInput/DifferentialOutput</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DifferentialInputDifferentialOutputAmplifierType, DifferentialInputDifferentialOutputAmplifierStandardTerminalNameAssignmentType, DifferentialInputDifferentialOutputAmplifierMandatoryStandardTerminalMappingType, DifferentialInputDifferentialOutputAmplifierMandatoryStandardTerminalNameType, DifferentialInputDifferentialOutputAmplifierOptionalStandardTerminalMappingType, DifferentialInputDifferentialOutputAmplifierOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="6">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Positive Input</td><td>2. Negative Input</td><td>3. Positive Output</td><td>4. Negative Output</td></tr>
<tr><td>5. Negative Rail</td><td>6. Positive Rail</td><td>7. Common</td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Gain Resistor Terminal 1</td><td>2. Gain Resistor Terminal 2</td><td>3. Offset Node 1</td><td>4. Offset Node 2</td></tr>
</table>

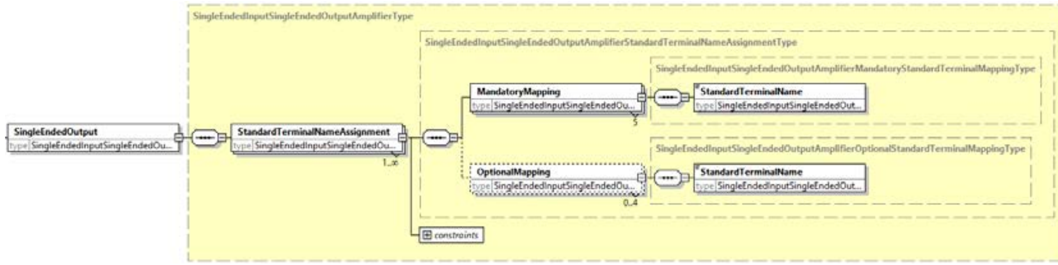
4.7.3.2.2. Differential Input Single Ended Output

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Amplifier/DifferentialInput/SingleEndedOutput</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DifferentialInputSingleEndedOutputAmplifierType,
DifferentialInputSingleEndedOutputAmplifierStandardTerminalNameAssignmentType,
DifferentialInputSingleEndedOutputAmplifierMandatoryStandardTerminalMappingType,
DifferentialInputSingleEndedOutputAmplifierOptionalStandardTerminalMappingType,
DifferentialInputSingleEndedOutputAmplifierMandatoryStandardTerminalNameType,
DifferentialInputSingleEndedOutputAmplifierOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="6">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Positive Input</td><td>2. Negative Input</td><td>3. Output</td><td>4. Negative Rail</td></tr>
<tr><td>5. Positive Rail</td><td>6. Common</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Gain Resistor Terminal 1</td><td>2. Gain Resistor Terminal 2</td><td>3. Offset Node 1</td><td>4. Offset Node 2</td></tr>
</table>

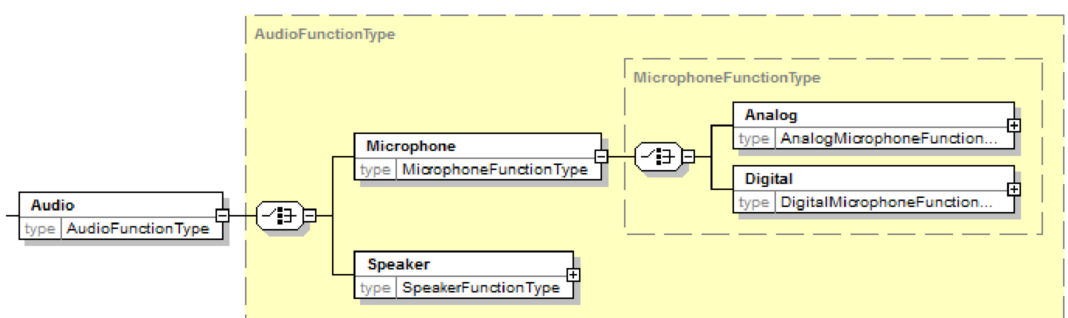
4.7.3.2.3. Single Ended Input Differential Output

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Amplifier/SingleEndedInput/DifferentialOutput</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">SingleEndedInputDifferentialOutputAmplifierType,
SingleEndedInputDifferentialOutputAmplifierStandardTerminalNameAssignmentType,
SingleEndedInputDifferentialOutputAmplifierMandatoryStandardTerminalMappingType,
SingleEndedInputDifferentialOutputAmplifierMandatoryStandardTerminalNameType,
SingleEndedInputDifferentialOutputAmplifierOptionalStandardTerminalMappingType,
SingleEndedInputDifferentialOutputAmplifierOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="6">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Input</td><td>2. Positive Output</td><td>3. Negative Output</td><td>4. Negative Rail</td></tr>
<tr><td>5. Positive Rail</td><td>6. Common</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Gain Resistor Terminal 1</td><td>2. Gain Resistor Terminal 2</td><td>3. Offset Node 1</td><td>4. Offset Node 2</td></tr>
</table>

4.7.3.2.4. Single Ended Input Single Ended Output

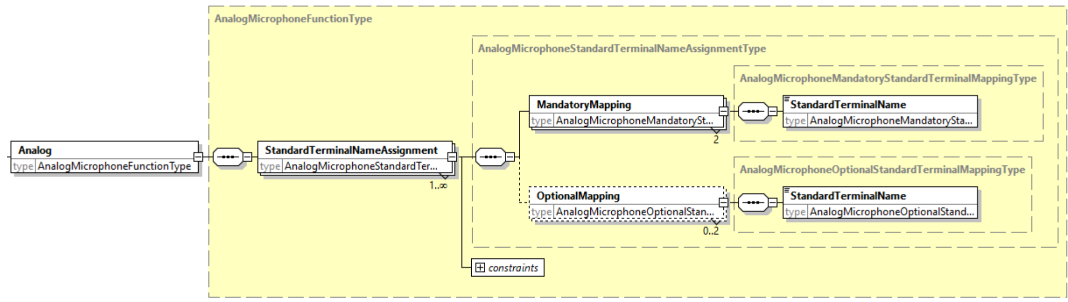
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Amplifier/SingleEndedInput/SingleEndedOutput			
diagram				
type	SingleEndedInputDifferentialOutputAmplifierType, SingleEndedInputSingleEndedOutputAmplifierStandardTerminalNameAssignmentType, SingleEndedInputSingleEndedOutputAmplifierMandatoryStandardTerminalMappingType, SingleEndedInputSingleEndedOutputAmplifierMandatoryStandardTerminalNameType, SingleEndedInputSingleEndedOutputAmplifierOptionalStandardTerminalMappingType, SingleEndedInputSingleEndedOutputAmplifierOptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. Input	2. Output	3. Negative Rail	4. Positive Rail
	5. Common			
	OptionalMapping/StandardTerminalName			
	1. Gain Resistor Terminal 1	2. Gain Resistor Terminal 2	3. Offset Node 1	4. Offset Node 2

4.7.3.3. Audio

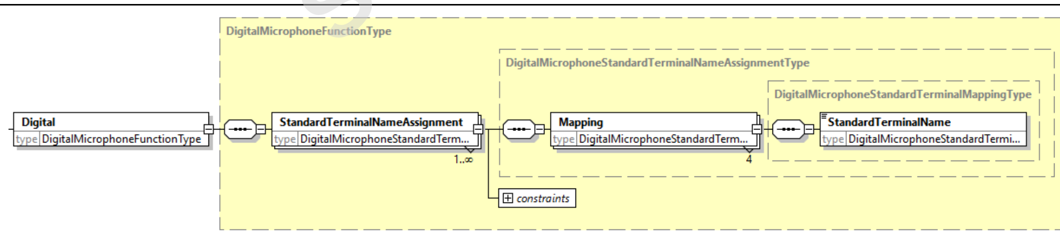
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Audio
diagram	
type	AudioFunctionType, MicrophoneFunctionType, AnalogMicrophoneFunctionType, DigitalMicrophoneFunctionType, SpeakerFunctionType.

An *Audio* can be one of two types: *Speaker* or *Microphone*, which itself can be of type *Analog* or *Digital*. Each of these types is described in further detail below.

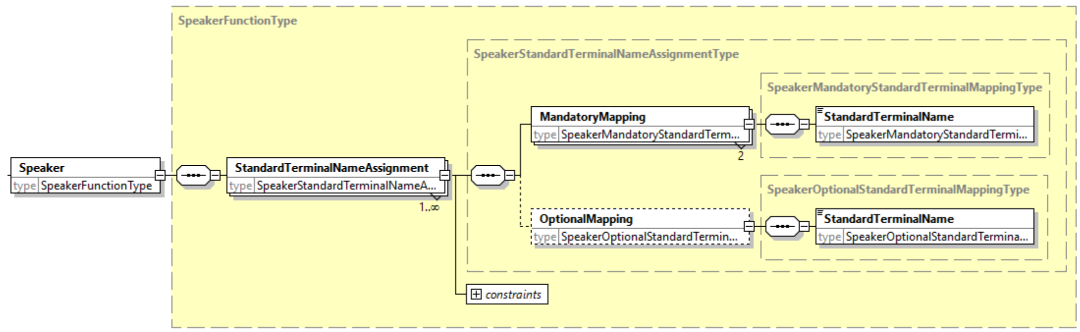
4.7.3.3.1. Analog Microphone

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Audio/Microphone			
diagram				
type	AnalogMicrophoneFunctionType, AnalogMicrophoneStandardTerminalNameAssignmentType, AnalogMicrophoneMandatoryStandardTerminalMappingType, AnalogMicrophoneMandatoryStandardTerminalNameType, AnalogMicrophoneOptionalStandardTerminalMappingType, AnalogMicrophoneOptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. Output	2. Ground		
	OptionalMapping/StandardTerminalName			
	3. Case	4. Power		

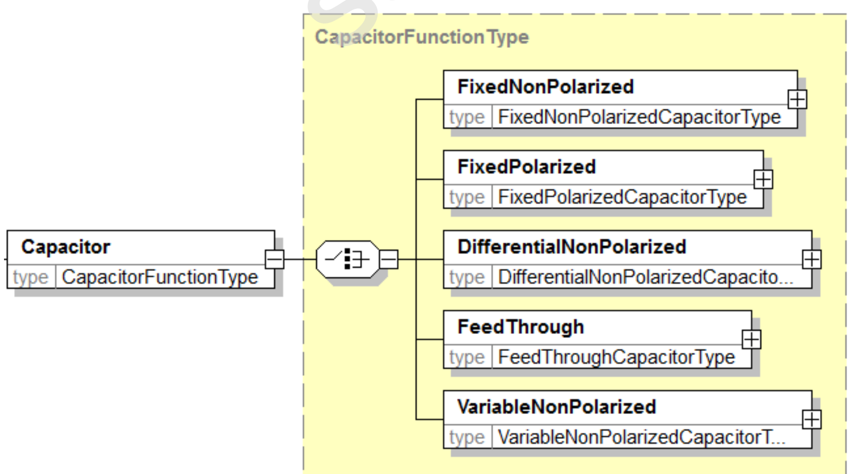
4.7.3.3.2. Digital Microphone

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Audio/Microphone			
diagram				
type	DigitalMicrophoneFunctionType, DigitalMicrophoneStandardTerminalNameAssignmentType, DigitalMicrophoneStandardTerminalMappingType, DigitalMicrophoneStandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. Clock	2. Data	3. Ground	4. Power

4.7.3.3.3. Speaker

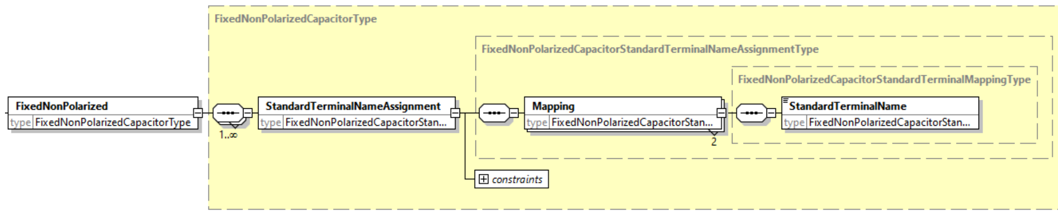
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Audio/Speaker**
diagram	
type	**SpeakerFunctionType, SpeakerStandardTerminalNameAssignmentType, SpeakerMandatoryStandardTerminalMappingType, SpeakerOptionalStandardTerminalMappingType, SpeakerOptionalStandardTerminalNameType, SpeakerMandatoryStandardTerminalNameType**
list of enumerate values	**MandatoryMapping/StandardTerminalName** **1. Positive** **2. Negative** **OptionalMapping/StandardTerminalName** **1. Case**

4.7.3.4. Capacitor

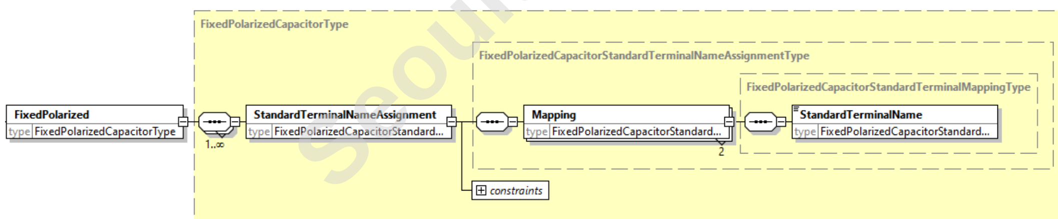
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Capacitor**
diagram	
type	**CapacitorFunctionType, FixedNonPolarizedCapacitorType, FixedPolarizedCapacitorType, DifferentialNonPolarizedCapacitorType, FeedThroughCapacitorType, VariableNonPolarizedCapacitorType.**

A capacitor can be one of the following five types: *FixedNonPolarized*, *FixedPolarized*, *DifferentialNonPolarized*, *FeedThrough*, and *VariableNonPolarized*, each specified in more detail below.

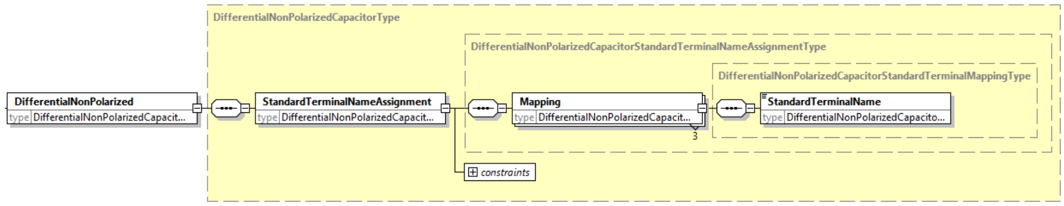
4.7.3.4.1. Fixed Non Polarized

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Capacitor/FixedNonPolarized</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">FixedNonPolarizedCapacitorType, FixedNonPolarizedCapacitorStandardTerminalNameAssignmentType,
FixedNonPolarizedCapacitorStandardTerminalMappingType,
FixedNonPolarizedCapacitorStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Terminal 1</td><td>2. Terminal 2</td><td></td><td></td></tr>
</table>

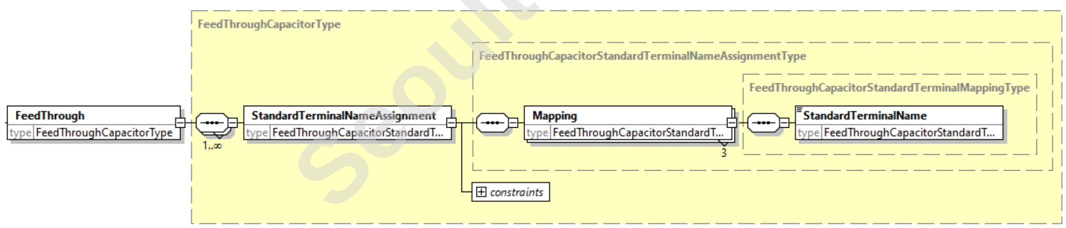
4.7.3.4.2. Fixed Polarized

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Capacitor/FixedPolarized</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">FixedPolarizedCapacitorType, FixedPolarizedCapacitorStandardTerminalNameAssignmentType,
FixedPolarizedCapacitorStandardTerminalMappingType,
FixedPolarizedCapacitorStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Positive</td><td>2. Negative</td><td></td><td></td></tr>
</table>

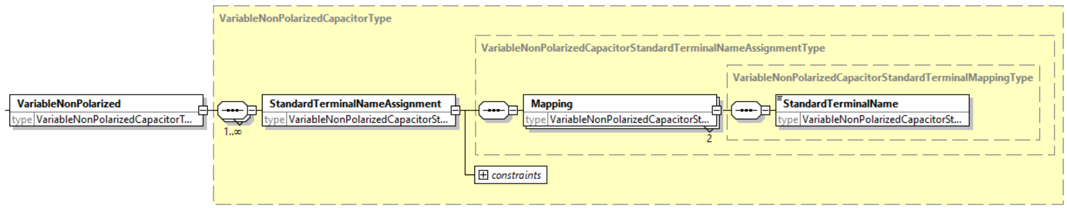
4.7.3.4.3. Differential Non Polarized

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Capacitor/DifferentialNonPolarized</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DifferentialNonPolarizedCapacitorType,
DifferentialNonPolarizedCapacitorStandardTerminalNameAssignmentType,
DifferentialNonPolarizedCapacitorStandardTerminalMappingType,
DifferentialNonPolarizedCapacitorStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Terminal 1</td><td>2. Terminal 2</td><td>3. Common</td><td></td></tr>
</table>

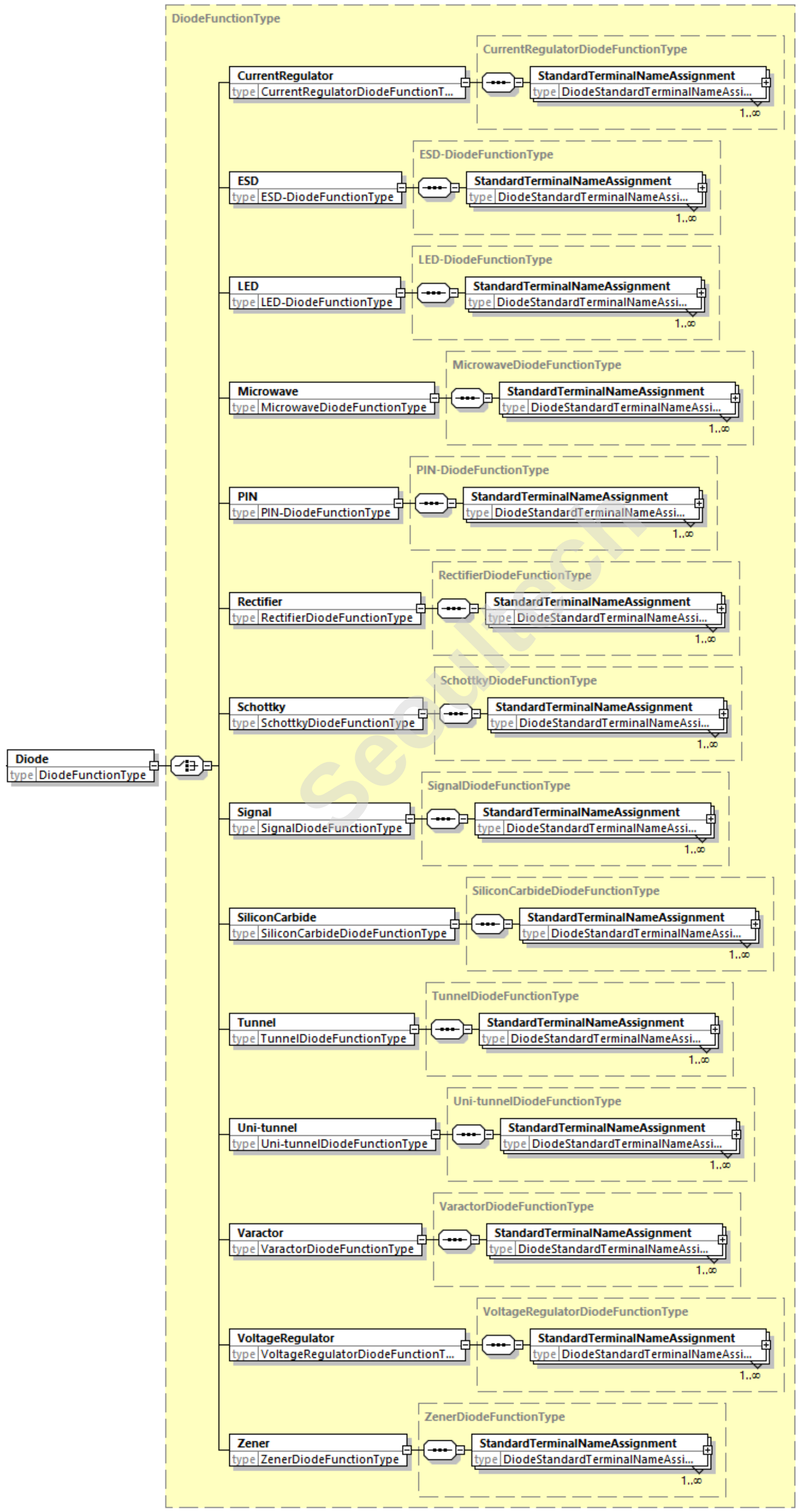
4.7.3.4.4. Feed Through

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Capacitor/FeedThrough</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">FeedThroughCapacitorType, FeedThroughCapacitorStandardTerminalNameAssignmentType,
FeedThroughCapacitorStandardTerminalMappingType,
FeedThroughCapacitorStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Terminal 1</td><td>2. Terminal 2</td><td>3. Common</td><td></td></tr>
</table>

4.7.3.4.5. Variable Non Polarized

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Capacitor/VariableNonPolarized</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">VariableNonPolarizedCapacitorType,
VariableNonPolarizedCapacitorStandardTerminalNameAssignmentType,
VariableNonPolarizedCapacitorStandardTerminalMappingType,
VariableNonPolarizedCapacitorStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Terminal 1</td><td>2. Terminal 2</td><td></td><td></td></tr>
</table>

4.7.3.5. Diode

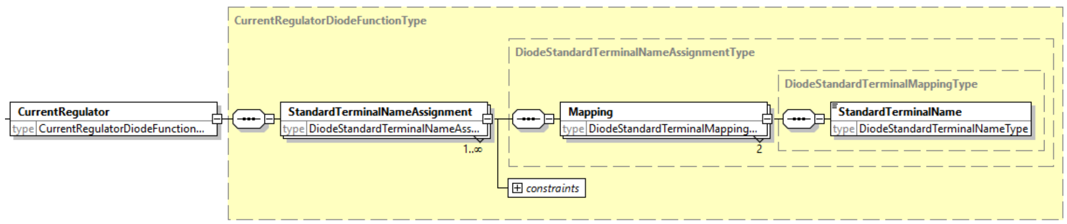
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode</td></tr>
<tr><td>diagram</td><td>
</td></tr>
</table>

4.7.3.10 Diode (cont'd)

type	**DiodeFunctionType, CurrentRegulatorDiodeFunctionType, ESD-DiodeFunctionType, LED-DiodeFunctionType, MicrowaveDiodeFunctionType, PIN-DiodeFunctionType, RectifierDiodeFunctionType, SchottkyDiodeFunctionType, SignalDiodeFunctionType, SiliconCarbideDiodeFunctionType, TunnelDiodeFunctionType, Uni-tunnelDiodeFunctionType, VaractorDiodeFunctionType, VoltageRegulatorDiodeFunctionType, ZenerDiodeFunctionType, DiodeStandardTerminalNameAssignmentType.**

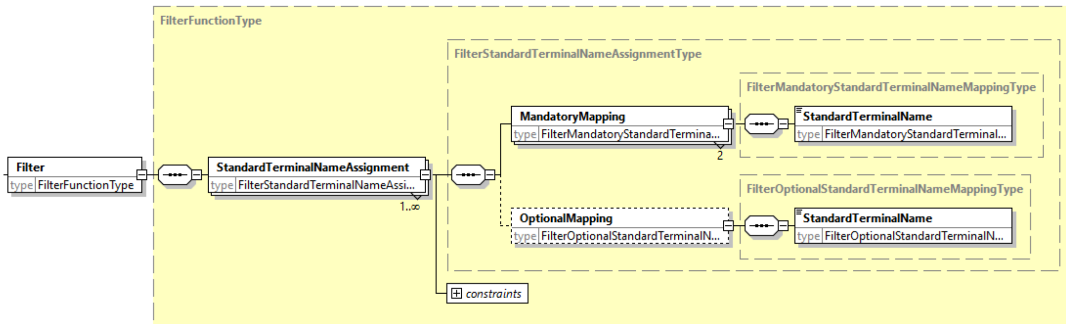
A diode can be one of the following types: *CurrentRegulator*, *ESD*, *LED*, *Microwave*, *PIN*, *Rectifier*, *Schottky*, *Signal*, *SiliconCarbide*, *Tunnel*, *Uni-tunnel*, *Varactor*, *VoltageRegulator*, and *Zener*, each ending with the same type.

4.7.3.5.1. Diode Standard Terminal Name Assignment Type

<table>
<tr><td>path</td><td colspan="4">
1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode/CurrentRegulator/StandardTerminalNameAssignment
2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode/ESD/StandardTerminalNameAssignment/Mapping/StandardTerminalName
3. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode/LED/StandardTerminalNameAssignment/Mapping/StandardTerminalName
4. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode/Microwave/StandardTerminalNameAssignment
5. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode/PIN /StandardTerminalNameAssignment
6. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode/Rectifier/StandardTerminalNameAssignment
7. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode/Schottky/StandardTerminalNameAssignment
8. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode/Signal/StandardTerminalNameAssignment
9. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode/SiliconCarbide/StandardTerminalNameAssignment
10. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode/Tunnel/StandardTerminalNameAssignment
11. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode/Uni-tunnel/StandardTerminalNameAssignment
12. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode/Varactor/StandardTerminalNameAssignment
13. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode/VoltageRegulator/StandardTerminalNameAssignment
14. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Diode/Zener/StandardTerminalNameAssignment
</td></tr>
<tr><td>diagram</td><td colspan="4">


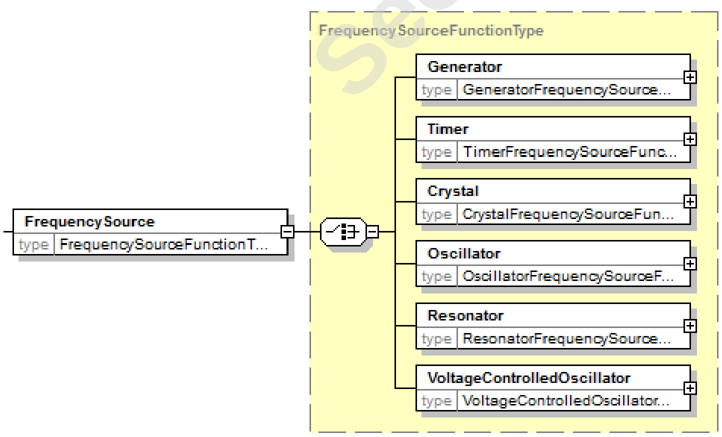
</td></tr>
<tr><td>type</td><td colspan="4">DiodeStandardTerminalNameAssignmentType, DiodeStandardTerminalMappingType, DiodeStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Anode</td><td>2. Cathode</td><td></td><td></td></tr>
</table>

4.7.3.6. Filter

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Filter</td></tr>
<tr><td>diagram</td><td colspan="4">


</td></tr>
<tr><td>type</td><td colspan="4">FilterFunctionType, FilterStandardTerminalNameAssignmentType, FilterStandardTerminalMappingType, FilterStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Terminal 1</td><td>2. Terminal 2</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Ground</td><td></td><td></td><td></td></tr>
</table>

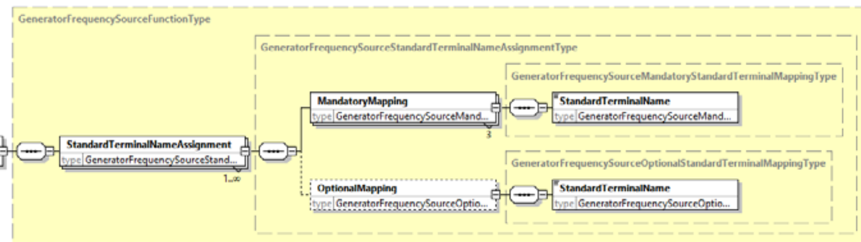
4.7.3.7. Frequency Source

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/FrequencySource</td></tr>
<tr><td>diagram</td><td>


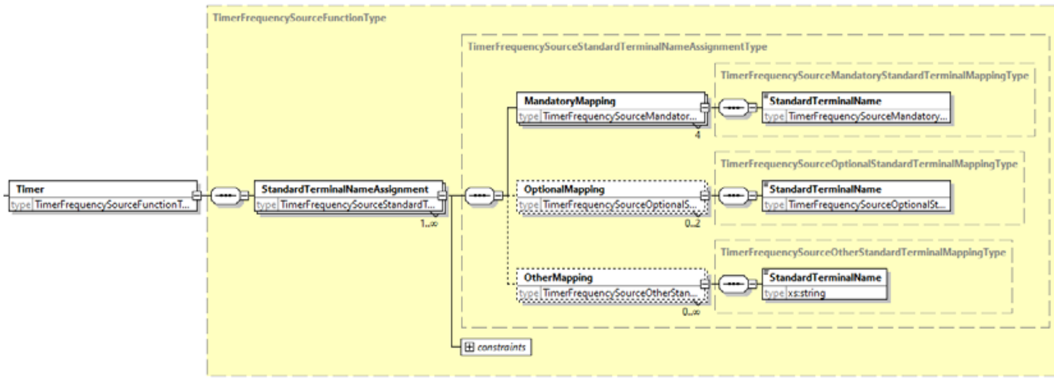
</td></tr>
<tr><td>type</td><td>FrequencySourceFunctionType, GeneratorFrequencySourceFunctionType, TimerFrequencySourceFunctionType, CrystalFrequencySourceFunctionType, OscillatorFrequencySourceFunctionType, ResonatorFrequencySourceFunctionType, VoltageControlledOscillatorFrequencySourceFunctionType.</td></tr>
</table>

A frequency source can be one of the following six types: *Generator*, *Timer*, *Crystal*, *Oscillator, Resonator*, and *VoltageControlledOscillator*, each specified in more detail below.

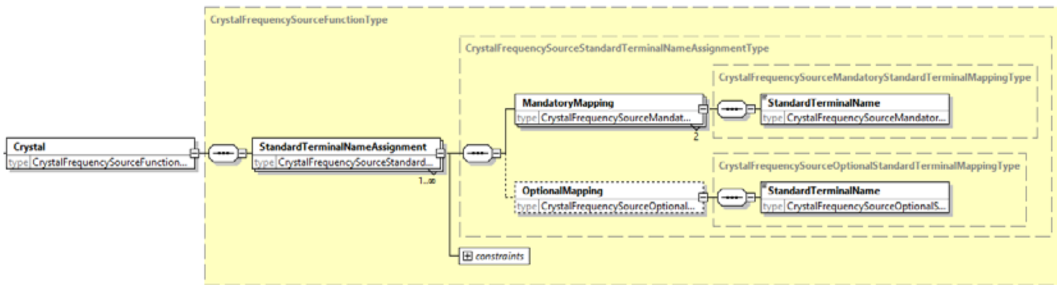
4.7.3.7.1. Generator

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/FrequencySource/Generator</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">GeneratorFrequencySourceFunctionType,
GeneratorFrequencySourceStandardTerminalNameAssignmentType,
GeneratorFrequencySourceMandatoryStandardTerminalMappingType,
GeneratorFrequencySourceMandatoryStandardTerminalNameType,
GeneratorFrequencySourceOptionalStandardTerminalMappingType,
GeneratorFrequencySourceOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Output</td><td>2. Ground</td><td>3. Power</td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Enable</td><td></td><td></td><td></td></tr>
</table>

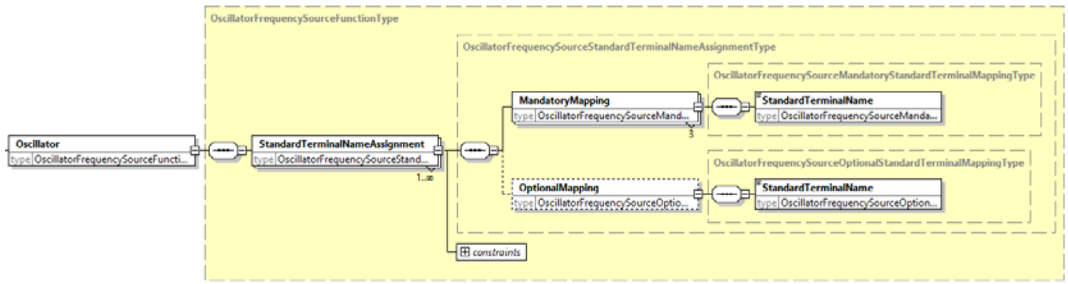
4.7.3.7.2. Timer

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/FrequencySource/Timer</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">TimerFrequencySourceFunctionType, TimerFrequencySourceStandardTerminalNameAssignmentType,
TimerFrequencySourceMandatoryStandardTerminalMappingType,
TimerFrequencySourceMandatoryStandardTerminalNameType,
TimerFrequencySourceOptionalStandardTerminalMappingType,
TimerFrequencySourceOptionalStandardTerminalNameType,
TimerFrequencySourceOtherStandardTerminalMappingType,
TimerFrequencySourceOtherStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Output</td><td>2. Trigger</td><td>3. Power</td><td>4. Ground</td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Enable</td><td>2. Reset</td><td></td><td></td></tr>
</table>

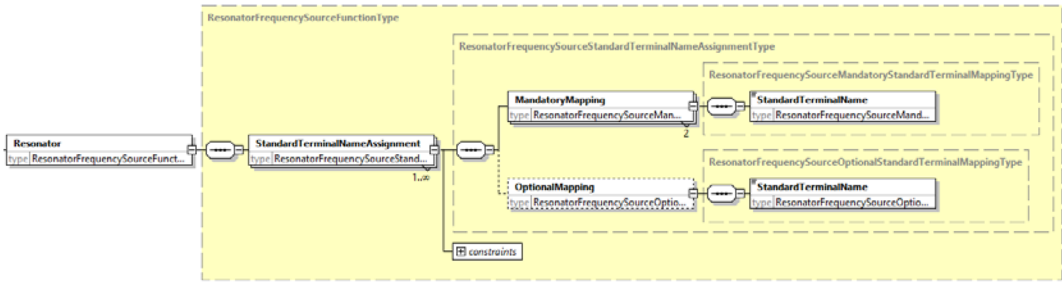
4.7.3.7.3. Crystal

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/FrequencySource/Crystal</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">CrystalFrequencySourceFunctionType,
CrystalFrequencySourceStandardTerminalNameAssignmentType,
CrystalFrequencySourceMandatoryStandardTerminalMappingType,
CrystalFrequencySourceMandatoryStandardTerminalNameType,
CrystalFrequencySourceOptionalStandardTerminalMappingType,
CrystalFrequencySourceOptionaStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Terminal 1</td><td>2. Terminal 2</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Case</td><td></td><td></td><td></td></tr>
</table>

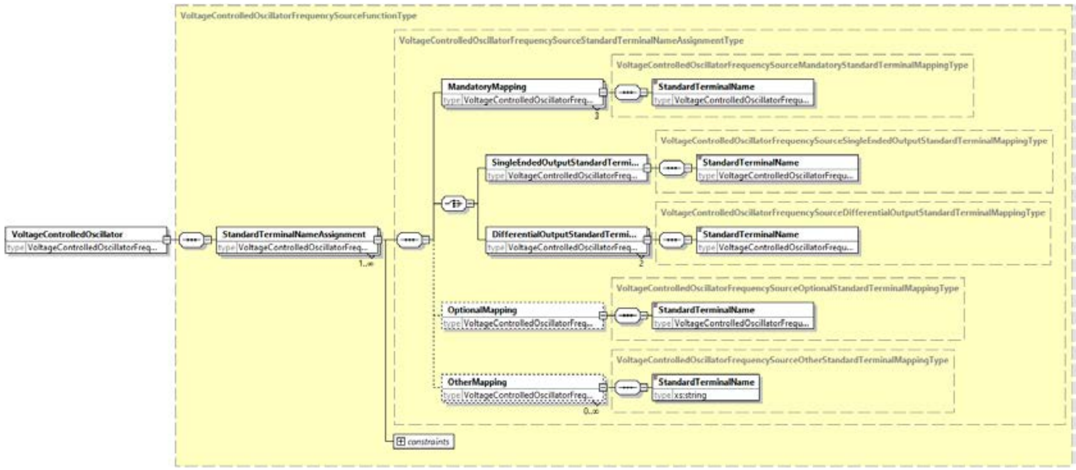
4.7.3.7.4. Oscillator

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/FrequencySource/Oscillator</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">OscillatorFrequencySourceFunctionType,
OscillatorFrequencySourceStandardTerminalNameAssignmentType,
OscillatorFrequencySourceMandatoryStandardTerminalMappingType,
OscillatorFrequencySourceMandatoryStandardTerminalNameType,
OscillatorFrequencySourceOptionalStandardTerminalMappingType,
OscillatorFrequencySourceOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Output</td><td>2. Ground</td><td>3. Power</td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Enable</td><td></td><td></td><td></td></tr>
</table>

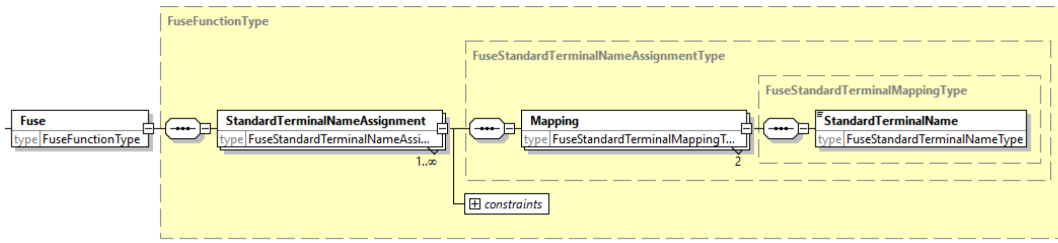
4.7.3.7.5. Resonator

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/FrequencySource/Resonator</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">ResonatorFrequencySourceFunctionType,
ResonatorFrequencySourceStandardTerminalNameAssignmentType,
ResonatorFrequencySourceMandatoryStandardTerminalMappingType,
ResonatorFrequencySourceMandatoryStandardTerminalNameType,
ResonatorFrequencySourceOptionalStandardTerminalMappingType,
ResonatorFrequencySourceOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Terminal 1</td><td>2. Terminal 2</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Case</td><td></td><td></td><td></td></tr>
</table>

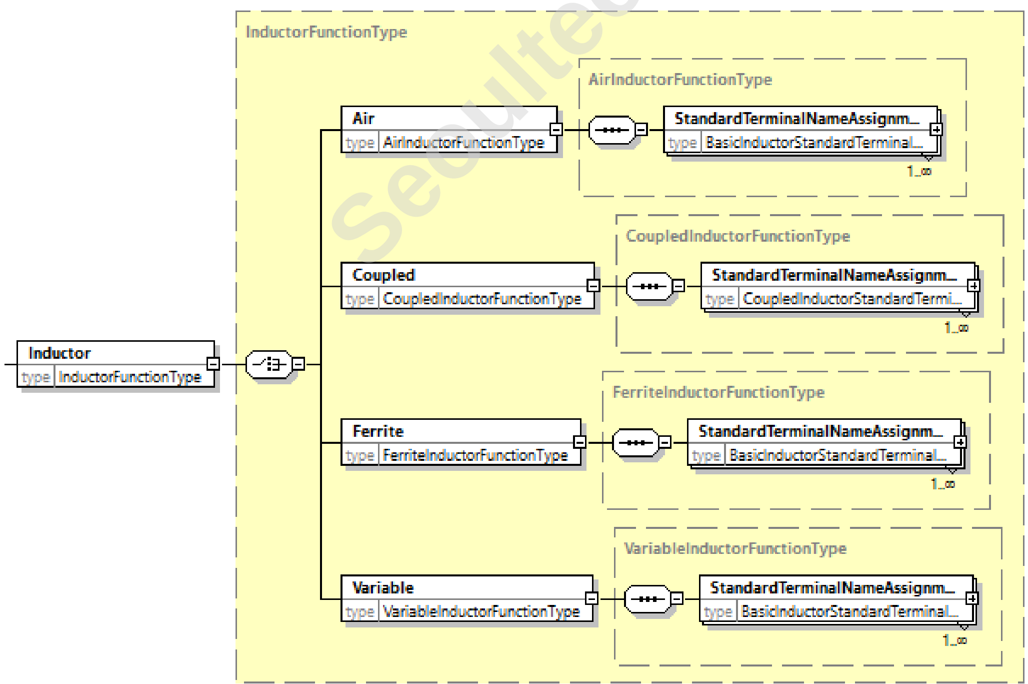
4.7.3.7.6. Voltage Controlled Oscillator

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/FrequencySource/VoltageControlledOscillator
diagram	
type	VoltageControlledOscillatorFrequencySourceFunctionType, VoltageControlledOscillatorFrequencySourceStandardTerminalNameAssignmentType, VoltageControlledOscillatorFrequencySourceMandatoryStandardTerminalMappingType, VoltageControlledOscillatorFrequencySourceMandatoryStandardTerminalNameType, VoltageControlledOscillatorFrequencySourceSingleEndOutputStandardTerminalMappingType, VoltageControlledOscillatorFrequencySourceSingleEndOutputStandardTerminalNameType, VoltageControlledOscillatorFrequencySourceDifferentialOutputStandardTerminalMappingType, VoltageControlledOscillatorFrequencySourceDifferentialOutputStandardTerminalNameType, VoltageControlledOscillatorFrequencySourceOptionalStandardTerminalMappingType, VoltageControlledOscillatorFrequencySourceOptionalStandardTerminalNameType, VoltageControlledOscillatorFrequencySourceOtherStandardTerminalMappingType, VoltageControlledOscillatorFrequencySourceOtherStandardTerminalNameType.
list of enumerate values	MandatoryMapping/StandardTerminalName 1. Output; 2. Ground; 3. Power SingleEndedOutputStandardTerminalMapping/ StandardTerminalName 1. Output DifferentialOutputStandardTerminalMapping/ StandardTerminalName 1. Positive Output; 2. Negative Output OptionalMapping/StandardTerminalName 1. Enable

4.7.3.8. Fuse

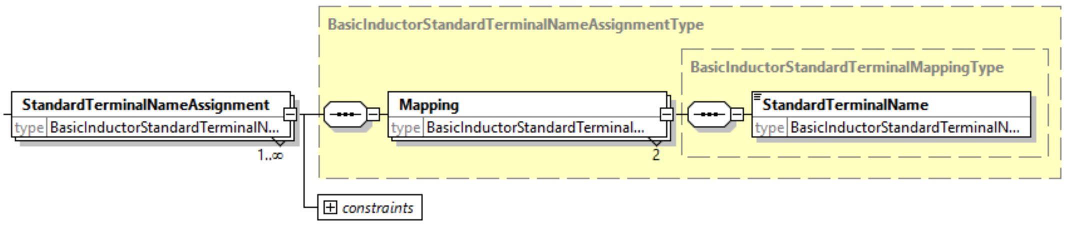
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Fuse
diagram	
type	FuseType, FuseStandardTerminalNameAssignmentType, FuseStandardTerminalMappingType, FuseStandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName 1. Terminal 1 | 2. Terminal 2

4.7.3.9. Inductor

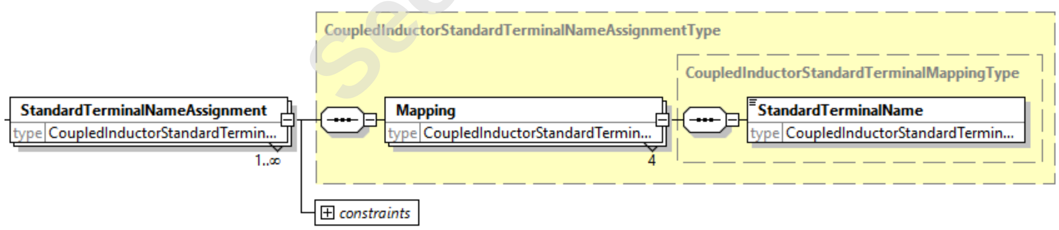
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Inductor
diagram	
type	InductorFunctionType, AirInductorFunctionType, BasicInductorStandardTerminalNameAssignmentType, CoupledInductorFunctionType, CoupledInductorStandardTerminalNameAssignmentType, FerriteInductorFunctionType, VariableInductorFunctionType.

An inductor can be one of the following four types: *Air*, *Coupled*, *Ferrite*, and *Variable*. Each of these types is explained below in further detail.

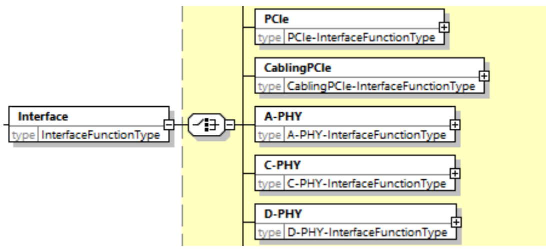
4.7.3.9.1. Basic Inductor Standard Terminal Name Assignment

path	1. **PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Inductor/Air** 2. **PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Inductor/Ferrite** 3. **PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Inductor/Variable**			
diagram				
type	**BasicInductorStandardTerminalNameAssignmentType, BasicInductorStandardTerminalMappingType, BasicInductorStandardTerminalNameType.**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. Terminal 1	**2. Terminal 2**		

4.7.3.9.2. Coupled Inductor Standard Terminal Name Assignment

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Inductor/Coupled**			
diagram				
type	**InductorFunctionType, AirInductorFunctionType, BasicInductorStandardTerminalNameAssignmentType, CoupledInductorFunctionType, CoupledInductorStandardTerminalNameAssignmentType, FerriteInductorFunctionType, VariableInductorFunctionType.**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. Primary Coil Terminal 1	**2. Primary Coil Terminal 2**	**3. Secondary Coil Terminal 1**	**4. Secondary Coil Terminal 2**

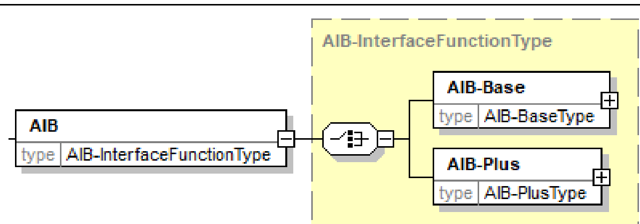
4.7.3.10. Interface

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface	
Sample diagram (See list of defined Interfaces below)		
Standard interface versus type	InterfaceFunctionType,	
	1. AIB	AIB-InterfaceFunctionType
	2. Battery	BatteryInterfaceFunctionType
	3. Camera	CameraInterfaceFunctionType
	4. ComputerExpressLink	ComputerExpressLink-InterfaceFunctionType
	5. DisplayBus	DisplayBusInterfaceFunctionType
	6. DDR3	DDR3-InterfaceFunctionType
	7. DDR4	DDR4-InterfaceFunctionType
	8. DDR5	DDR5-InterfaceFunctionType
	9. DDR6	DDR6-InterfaceFunctionType
	10. DigRF3G	DigRF3G-InterfaceFunctionType
	11. DigRFv4	DigRFv4-InterfaceFunctionType
	12. EE1002-SPD-EEPROM	EE1002-SPD-EEPROM-InterfaceFunctionType
	13. EmbeddedDisplayPort	EmbeddedDisplayPort-InterfaceFunctionType
	14. Ethernet	EthernetInterfaceFunctionType
	15. eTrak	eTrakInterfaceFunctionType
	16. FC-PI-6	FC-PI-6-InterfaceFunctionType
	17. HBM	HBM-InterfaceFunctionType
	18. HDMI	HDMI-InterfaceFunctionType
	19. HSI	HSI-InterfaceFunctionType
	20. HTI	HTI-InterfaceFunctionType
	21. HTIv1	HTIv1-InterfaceFunctionType
	22. I2C	I2C-InterfaceFunctionType
	23. I3C	I3C-InterfaceFunctionType
	24. LLI-Serial	LLI-Serial-InterfaceFunctionType
	25. LVSTL06	LVSTL06-InterfaceFunctionType
	26. MultiMediaCard	MultiMediaCard-InterfaceFunctionType
	27. MII	MII-InterfaceFunctionType
	28. OIF-CEI-04.0	OIF-CEI-04.0-InterfaceFunctionType
	29. PCIe	PCIe-InterfaceFunctionType

4.7.3.10 Interface Function (cont'd)

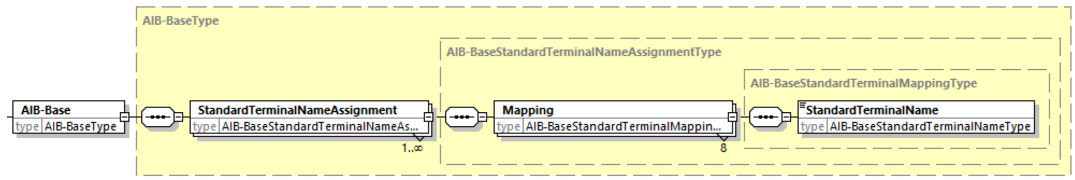
Standard interface versus type	30. CablingPCIe	CablingPCIe-InterfaceFunctionType
	31. A-PHY	A-PHY-InterfaceFunctionType
	32. BoW-PHY	BoW-PHY-InterfaceFunctionType
	33. C-PHY	C-PHY-InterfaceFunctionType
	34. D-PHY	D-PHY-InterfaceFunctionType
	35. M-PHY	M-PHY-InterfaceFunctionType
	36. OpenHBI	OpenHBI-InterfaceFunctionType
	37. PTI	PTI-InterfaceFunctionType
	38. RadioFrontEnd	RadioFrontEnd-interfaceFunctionType
	39. RFFE	RFFE-InterfaceFunctionType
	40. SD	SD-InterfaceFunctionType
	41. SD-UHS-II	SD-UHS-II -InterfaceFunctionType
	42. SerialInterface	SerialInterfaceFunctionType
	43. SLIMbus	SLIMbus-InterfaceFunctionType
	44. SMB	SMB-InterfaceFunctionType
	45. SoundWire	SoundWire-InterfaceFunctionType
	46. SPMI	SPMI-InterfaceFunctionType
	47. UART	UART-InterfaceFunctionType
	48. UniPro	UniPro-InterfaceFunctionType
	49. UCIe	UCIe-InterfaceFunctionType
	50. UniversalFlashStorage	UniversalFlashStorage-InterfaceFunctionType
	51. USB	USB-InterfaceFunctionType
	52. XFM	XFM-InterfaceFunctionType
	53. OtherInterfaceStandard	FunctionMap-to-StandardNameType

4.7.3.10.1. AIB

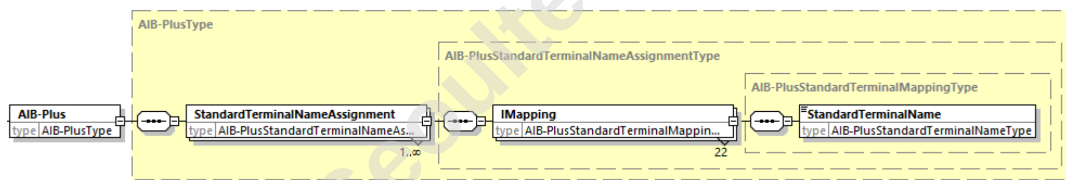
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/AIB
diagram	
type	AIB-InterfaceFunctionType, AIB-BaseType, AIB-PlusType.

For more information about the AIB Interface, refer to the CHIPS ALLIANCE standard Advanced Interface Bus (AIB) Specification.

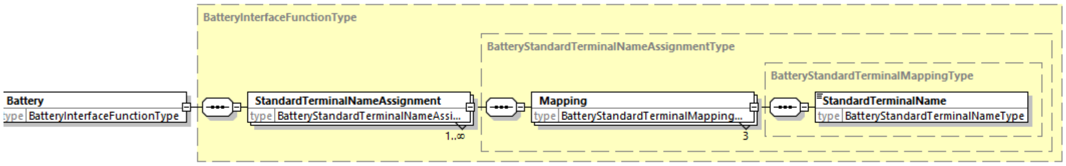
4.7.3.10.1.1. AIB-Base

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/AIB/AIB-Base			
diagram				
type	AIB-BaseType, BaseStandardTerminalNameAssignmentType, AIB-BaseStandardTerminalMappingType, AIB-BaseStandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. TX	2. RX	3. ns_fwd_clk	4. ns_fwd_clkb
	5. fs_fwd_clk	6. fs_fwd_clkb	7. ns_mac_rdy	8. fs_mac_rdy

4.7.3.10.1.2. AIB-Plus

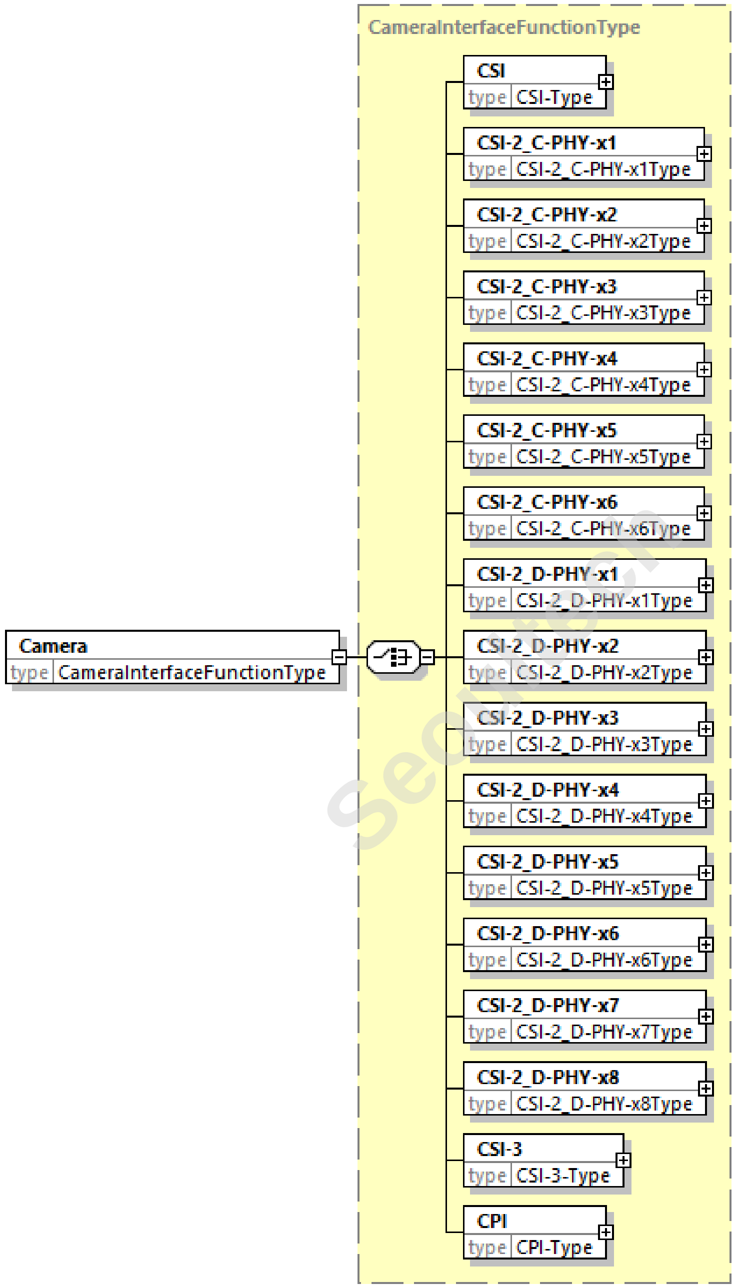
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/AIB/AIB-Base			
diagram				
type	AIB-BaseType, BaseStandardTerminalNameAssignmentType, AIB-BaseStandardTerminalMappingType, AIB-BaseStandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. TX	2. RX	3. ns_fwd_clk	4. ns_fwd_clkb
	5. fs_fwd_clk	6. fs_fwd_clkb	7. ns_rcv_clk	8. ns_rcv_clkb
	9. fs_rcv_clk	10. fs_rcv_clkb	11. ns_sr_clk	12. ns_sr_clkb
	13. fs_sr_clk	14. fs_sr_clkb	15. ns_sr_data	16. fs_sr_data
	17. ns_sr load	18. fs_sr_load	19. ns_mac_rdy	20. fs_mac_rdy
	21. ns_adapter_rstn	22. fs_adapter_rstn		

4.7.3.10.2. Battery Interface Function

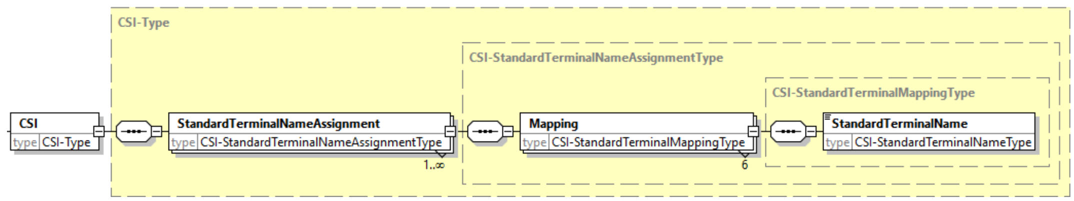
<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/Battery</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">BatteryInterfaceFunctionType, BatteryStandardTerminalNameAssignmentType,
BatteryStandardTerminalMappingType, BatteryStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. VBAT</td><td>2. BCL</td><td>3. GND</td><td></td></tr>
</table>

For more information about the Battery Interface, refer to the MIPI Alliance standard Specification for Battery Interface Version 1.1.1.

4.7.3.10.3. Camera Interface Function

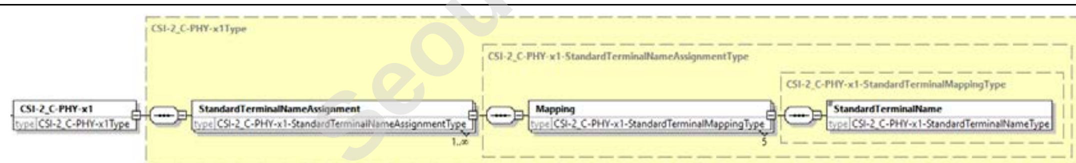
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/Camera
diagram	
type	CameraInterfaceFunctionType, CSI-Type, CSI-2_C-PHY-x1Type, CSI-2_C-PHY-x2Type, CSI-2_C-PHY-x3Type, CSI-2_C-PHY-x4Type, CSI-2_C-PHY-x5Type, CSI-2_C-PHY-x6Type, CSI-2_D-PHY-x1Type, CSI-2_D-PHY-x2Type, CSI-2_D-PHY-x3Type, CSI-2_D-PHY-x4Type, CSI-2_D-PHY-x5Type, CSI-2_D-PHY-x6Type, CSI-2_D-PHY-x7Type, CSI-2_D-PHY-x8Type, CSI-3-Type, CPI-Type.

4.7.3.10.3.1. CSI

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI			
diagram				
type	CSI-Type, CSI-StandardTerminalNameAssignmentType, CSI-StandardTerminalMappingType, CSI-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. Data+	2. Data-	3. Clk+	4. Clk-
	5. SCL	6. SDA		

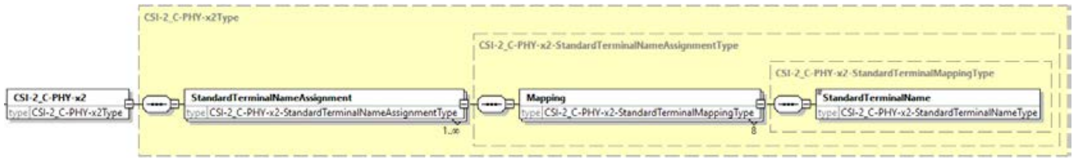
For more information about the CSI Interface, refer to the MIPI Alliance standard Specification for Camera Serial Interface Version 1.0.

4.7.3.10.3.2. CSI-2 C-PHY-x1

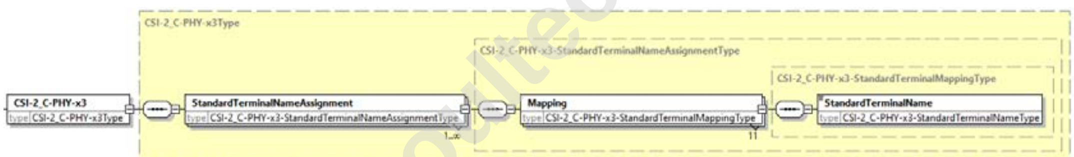
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-2_C-PHY-x1			
diagram				
type	CSI-2_C-PHY-x1Type, CSI-2_C-PHY-x1-StandardTerminalNameAssignmentType, CSI-2_C-PHY-x1-StandardTerminalMappingType, CSI-2_C-PHY-x1-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. Data1_A	2. Data1_B	3. Data1_C	4. SCL
	5. SDA			

For more information about the CSI-2 Interface, refer to the MIPI Alliance standard Specification for Camera Serial Interface 2 (CSI-2) Version 4.0.

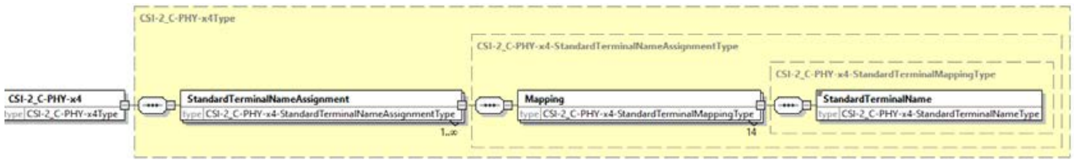
4.7.3.10.3.3. CSI-2 C-PHY-x2

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-2_C-PHY-x2</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">CSI-2_C-PHY-x2Type, CSI-2_C-PHY-x2-StandardTerminalNameAssignmentType,
CSI-2_C-PHY-x2-StandardTerminalMappingType, CSI-2_C-PHY-x2-StandardTerminalNameType.</td></tr>
<tr><td rowspan="3">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Data1_A</td><td>2. Data1_B</td><td>3. Data1_C</td><td>4. SCL</td></tr>
<tr><td>5. SDA</td><td>6. Data2_A</td><td>7. Data2_B</td><td>8. Data2_C</td></tr>
</table>

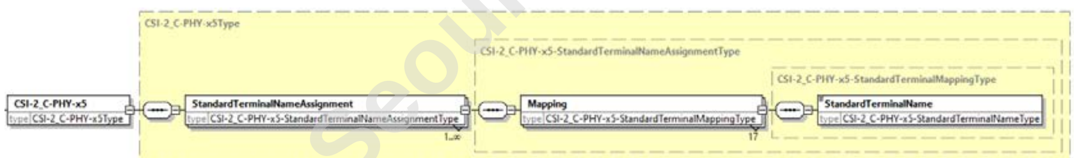
4.7.3.10.3.4. CSI-2 C-PHY-x3

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-2_C-PHY-x3</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">CSI-2_C-PHY-x3Type, CSI-2_C-PHY-x3-StandardTerminalNameAssignmentType,
CSI-2_C-PHY-x3-StandardTerminalMappingType, CSI-2_C-PHY-x3-StandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Data1_A</td><td>2. Data1_B</td><td>3. Data1_C</td><td>4. SCL</td></tr>
<tr><td>5. SDA</td><td>6. Data2_A</td><td>7. Data2_B</td><td>8. Data2_C</td></tr>
<tr><td>9. Data3_A</td><td>10. Data3_B</td><td>11. Data3_C</td><td></td></tr>
</table>

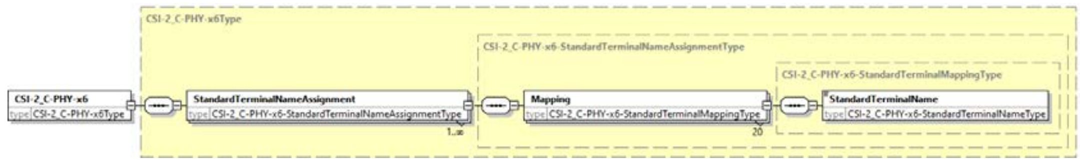
4.7.3.10.3.5. CSI-2 C-PHY-x4

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-2_C-PHY-x4			
diagram				
type	CSI-2_C-PHY-x4Type, CSI-2_C-PHY-x4-StandardTerminalNameAssignmentType, CSI-2_C-PHY-x4-StandardTerminalMappingType, CSI-2_C-PHY-x4-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. Data1_A	2. Data1_B	3. Data1_C	4. SCL
	5. SDA	6. Data2_A	7. Data2_B	8. Data2_C
	9. Data3_A	10. Data3_B	11. Data3_C	12. Data4_A
	13. Data4_B	14. Data4_C		

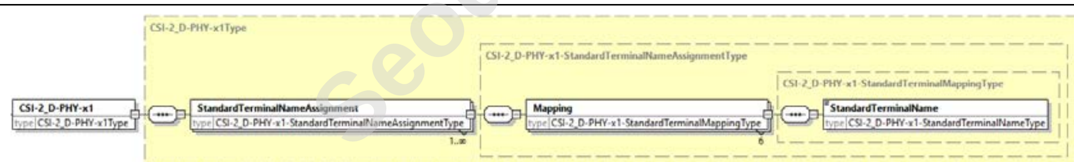
4.7.3.10.3.6. CSI-2 C-PHY-x5

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-2_C-PHY-x5			
diagram				
type	CSI-2_C-PHY-x5Type, CSI-2_C-PHY-x5-StandardTerminalNameAssignmentType, CSI-2_C-PHY-x5-StandardTerminalMappingType, CSI-2_C-PHY-x5-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. Data1_A	2. Data1_B	3. Data1_C	4. SCL
	5. SDA	6. Data2_A	7. Data2_B	8. Data2_C
	9. Data3_A	10. Data3_B	11. Data3_C	12. Data4_A
	13. Data4_B	14. Data4_C	15. Data5_A	16. Data5_B
	17. Data5_C			

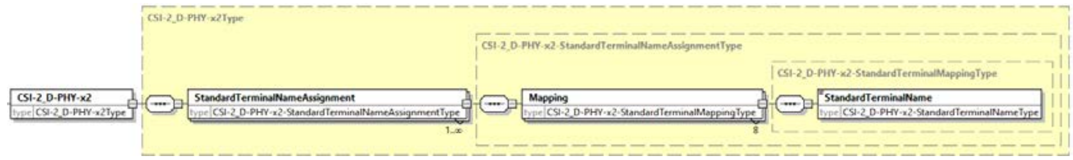
4.7.3.10.3.7. CSI-2 C-PHY-x6

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-2_C-PHY-x6</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">CSI-2_C-PHY-x6Type, CSI-2_C-PHY-x6-StandardTerminalNameAssignmentType,
CSI-2_C-PHY-x6-StandardTerminalMappingType, CSI-2_C-PHY-x6-StandardTerminalNameType.</td></tr>
<tr><td rowspan="6">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Data1_A</td><td>2. Data1_B</td><td>3. Data1_C</td><td>4. SCL</td></tr>
<tr><td>5. SDA</td><td>6. Data2_A</td><td>7. Data2_B</td><td>8. Data2_C</td></tr>
<tr><td>9. Data3_A</td><td>10. Data3_B</td><td>11. Data3_C</td><td>12. Data4_A</td></tr>
<tr><td>13. Data4_B</td><td>14. Data4_C</td><td>15. Data5_A</td><td>16. Data5_B</td></tr>
<tr><td>17. Data5_C</td><td>18. Data6_A</td><td>19. Data6_B</td><td>20. Data6_C</td></tr>
</table>

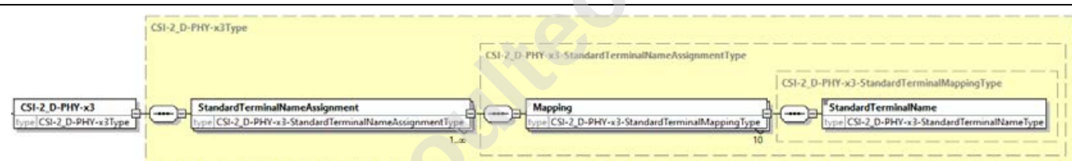
4.7.3.10.3.8. CSI-2 D-PHY-x1

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-2_D-PHY-x1</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">CSI-2_D-PHY-x1Type, CSI-2_D-PHY-x1-StandardTerminalNameAssignmentType,
CSI-2_D-PHY-x1-StandardTerminalMappingType, CSI-2_D-PHY-x1-StandardTerminalNameType.</td></tr>
<tr><td rowspan="3">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Data1+</td><td>2. Data1-</td><td>3. Clock+</td><td>4. Clock-</td></tr>
<tr><td>5. SCL</td><td>6. SDA</td><td></td><td></td></tr>
</table>

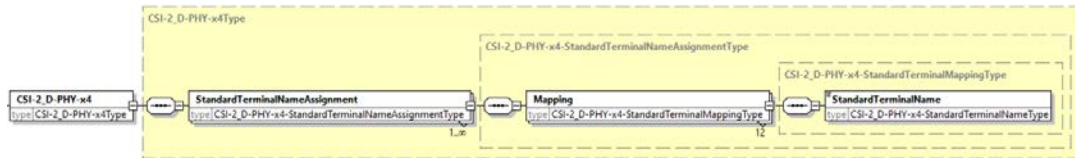
4.7.3.10.3.9. CSI-2 D-PHY-x2

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-2_D-PHY-x2			
diagram				
type	CSI-2_D-PHY-x2Type, CSI-2_D-PHY-x2-StandardTerminalNameAssignmentType, CSI-2_D-PHY-x2-StandardTerminalMappingType, CSI-2_D-PHY-x2-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. Data1+	2. Data1-	3. Clock+	4. Clock-
	5. SCL	6. SDA	7. Data2+	8. Data2-

4.7.3.10.3.10. CSI-2 D-PHY-x3

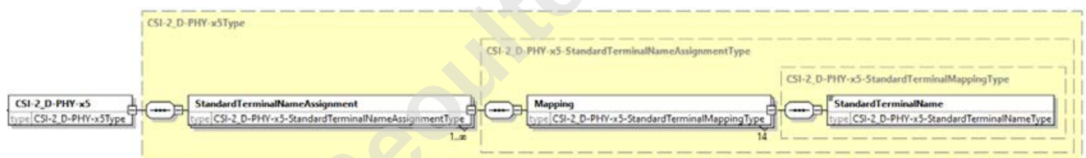
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-2_D-PHY-x3			
diagram				
type	CSI-2_D-PHY-x3Type, CSI-2_D-PHY-x3-StandardTerminalNameAssignmentType, CSI-2_D-PHY-x3-StandardTerminalMappingType, CSI-2_D-PHY-x3-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. Data1+	2. Data1-	3. Clock+	4. Clock-
	5. SCL	6. SDA	7. Data2+	8. Data2-
	9. Data3+	10. Data3-		

4.7.3.10.3.11. CSI-2 D-PHY-x4

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-2_D-PHY-x4
diagram	
type	CSI-2_D-PHY-x4Type, CSI-2_D-PHY-x4-StandardTerminalNameAssignmentType, CSI-2_D-PHY-x4-StandardTerminalMappingType, CSI-2_D-PHY-x4-StandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName

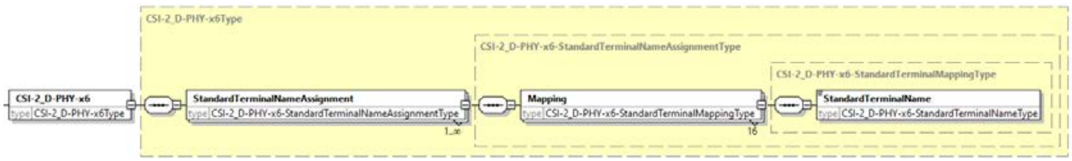
1. Data1+	2. Data1-	3. Clock+	4. Clock-
5. SCL	6. SDA	7. Data2+	8. Data2-
9. Data3+	10. Data3-	11. Data4+	12. Data4-

4.7.3.10.3.12. CSI-2 D-PHY-x5

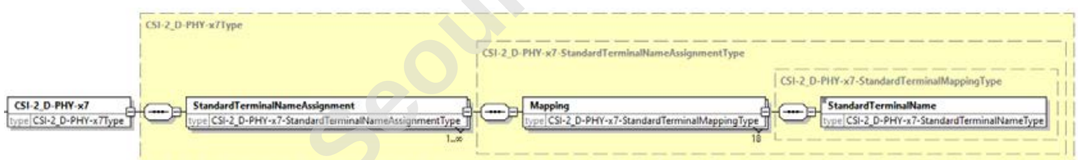
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-2_D-PHY-x5
diagram	
type	CSI-2_D-PHY-x5Type, CSI-2_D-PHY-x5-StandardTerminalNameAssignmentType, CSI-2_D-PHY-x5-StandardTerminalMappingType, CSI-2_D-PHY-x5-StandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName

1. Data1+	2. Data1-	3. Clock+	4. Clock-
5. SCL	6. SDA	7. Data2+	8. Data2-
9. Data3+	10. Data3-	11. Data4+	12. Data4-
13. Data5+	14. Data5-		

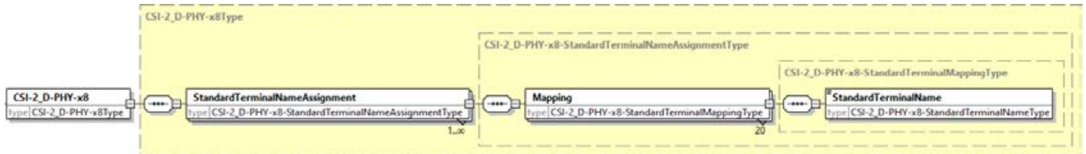
4.7.3.10.3.13. CSI-2 D-PHY-x6

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-2_D-PHY-x6			
diagram				
type	CSI-2_D-PHY-x6Type, CSI-2_D-PHY-x6-StandardTerminalNameAssignmentType, CSI-2_D-PHY-x6-StandardTerminalMappingType, CSI-2_D-PHY-x6-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. Data1+	2. Data1-	3. Clock+	4. Clock-
	5. SCL	6. SDA	7. Data2+	8. Data2-
	9. Data3+	10. Data3-	11. Data4+	12. Data4-
	13. Data5+	14. Data5-	15. Data6+	16. Data6-

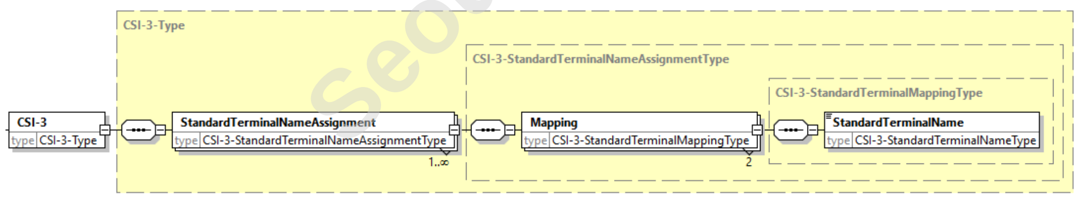
4.7.3.10.3.14. CSI-2 D-PHY-x7

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-2_D-PHY-x7			
diagram				
type	CSI-2_D-PHY-x7Type, CSI-2_D-PHY-x7-StandardTerminalNameAssignmentType, CSI-2_D-PHY-x7-StandardTerminalMappingType, CSI-2_D-PHY-x7-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. Data1+	2. Data1-	3. Clock+	4. Clock-
	5. SCL	6. SDA	7. Data2+	8. Data2-
	9. Data3+	10. Data3-	11. Data4+	12. Data4-
	13. Data5+	14. Data5-	15. Data6+	16. Data6-
	17. Data7+	18. Data7-		

4.7.3.10.3.15. CSI-2 D-PHY-x8

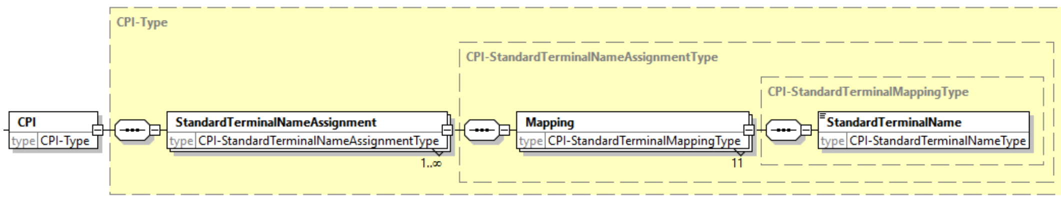
<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-2_D-PHY-x8</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">CSI-2_D-PHY-x8Type, CSI-2_D-PHY-x8-StandardTerminalNameAssignmentType,
CSI-2_D-PHY-x8-StandardTerminalMappingType, CSI-2_D-PHY-x8-StandardTerminalNameType.</td></tr>
<tr><td rowspan="6">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Data1+</td><td>2. Data1-</td><td>3. Clock+</td><td>4. Clock-</td></tr>
<tr><td>5. SCL</td><td>6. SDA</td><td>7. Data2+</td><td>8. Data2-</td></tr>
<tr><td>9. Data3+</td><td>10. Data3-</td><td>11. Data4+</td><td>12. Data4-</td></tr>
<tr><td>13. Data5+</td><td>14. Data5-</td><td>15. Data6+</td><td>16. Data6-</td></tr>
<tr><td>17. Data7+</td><td>18. Data7-</td><td>19. Data8+</td><td>20. Data8-</td></tr>
</table>

4.7.3.10.3.16. CSI-3

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CSI-3</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">CSI-3-Type, CSI-3-StandardTerminalNameAssignmentType,
CSI-3-StandardTerminalMappingType, CSI-3-StandardTerminalNameType</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. M-TX</td><td>2. M-RX</td><td></td><td></td></tr>
</table>

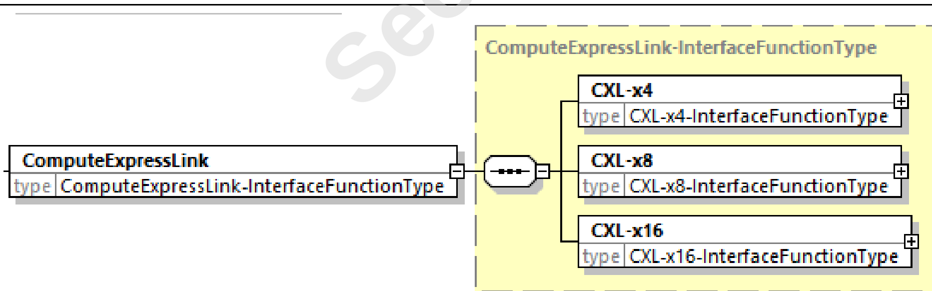
For more information about the CSI-3 Interface, refer to the MIPI Alliance standard Specification for Camera Serial Interface 3 (CSI-3) Version 1.1.

4.7.3.10.3.1. CPI

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/Camera/CPI			
diagram				
type	CPI-Type, CPI-StandardTerminalNameAssignmentType, CPI-StandardTerminalMappingType, CPI-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. I2C_SCL	2. I2C_SDA	3. CPI_CLK	4. CPI_DAT[0]
	5. CPI_DAT[1]	6. CPI_DAT[2]	7. CPI_DAT[3]	8. CPI_DAT[4]
	9. CPI_DAT[5]	10. CPI_DAT[6]	11. CPI_DAT[7]	

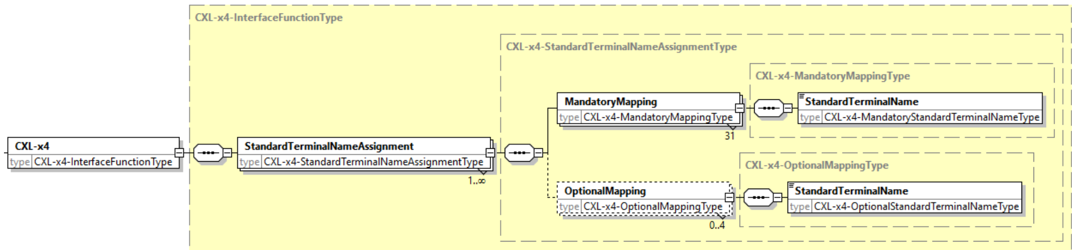
For more information about the CPI Interface, refer to the MIPI Alliance standard Specification for Camera Parallel Interface (CPI) Version 1.0

4.7.3.10.4. Compute Express Link Function

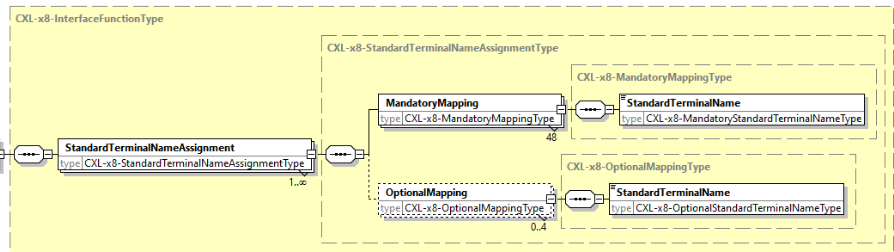
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/ComputeExpressLink
diagram	
type	ComputeExpressLink-InterfaceFunctionType, CXL-x4-InterfaceFunctionType, CXL-x8-InterfaceFunctionType, CXL-x4-InterfaceFunctionType.

For more information about the Compute Express Link Interface, refer to the JEDEC standard JESD317.

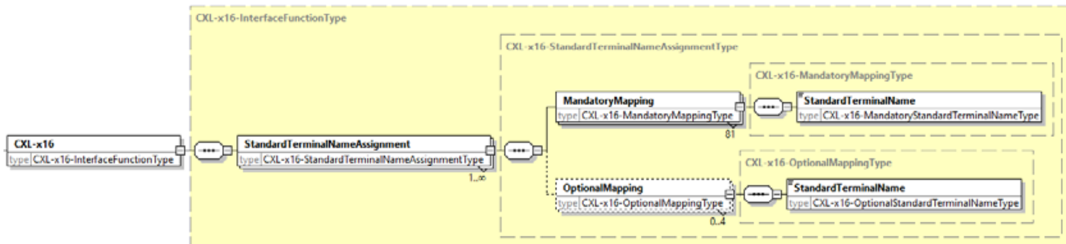
4.7.3.10.4.1. CXL-x4

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/ComputeExpressLink/CXL-x4</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">CXL-x4-InterfaceFunctionType, CXL-x4-StandardTerminalNameAssignmentType,
CXL-x4-MandatoryMappingType, CXL-x4-MandatoryStandardTerminalNameType,
CXL-x4-OptionalMappingType, CXL-x4-OptionalStandardTerminalNameType</td></tr>
<tr><td rowspan="11">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. PETp0</td><td>2. PETn0</td><td>3. PETp1</td><td>4. PETn1</td></tr>
<tr><td>5. PETp2</td><td>6. PETn2</td><td>7. PETp3</td><td>8. PETn3</td></tr>
<tr><td>9. PERp0</td><td>10. PERn0</td><td>11. PERp1</td><td>12. PERn1</td></tr>
<tr><td>13. PERp2</td><td>14. PERn2</td><td>15. PERp3</td><td>16. PERn3</td></tr>
<tr><td>17. REFCLKp0</td><td>18. REFCLKn0</td><td>19. PERST0#</td><td>20. PRSNT0#</td></tr>
<tr><td>21. SMBCLK</td><td>22. SMBDATA</td><td>23. SMBRST#</td><td>24. DUALPORTEN#</td></tr>
<tr><td>25. LED</td><td>26. PWRDIS</td><td>27. MFG</td><td>28. RFU</td></tr>
<tr><td>29. 12V</td><td>30. 3.3Vaux</td><td>31. GND</td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. REFCLKp1</td><td>2. REFCLKn1</td><td>3. PERST1#</td><td>4. CLKREQ#</td></tr>
</table>

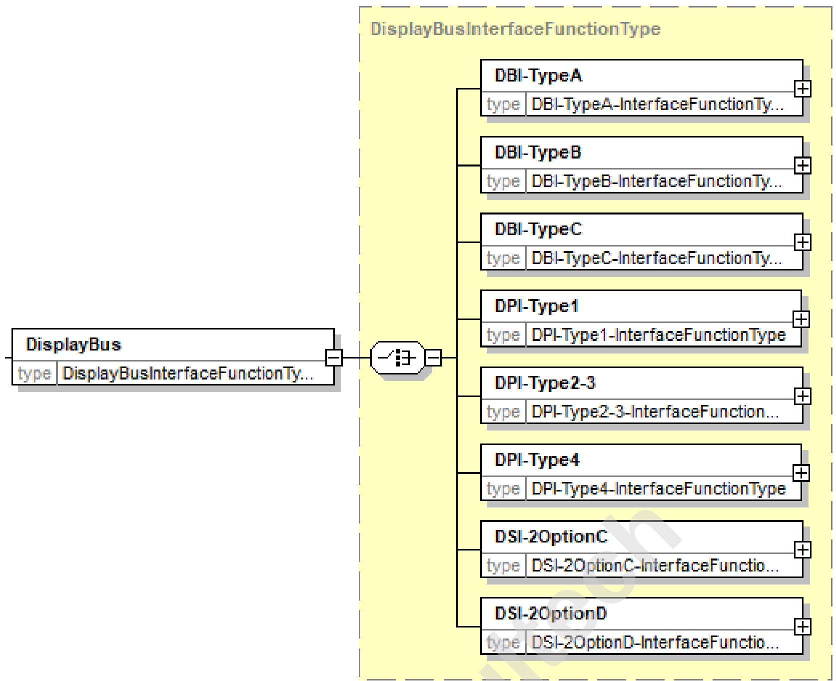
4.7.3.10.4.2. CXL-x8

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/ComputeExpressLink/CXL-x8			
diagram				
type	CXL-x8-InterfaceFunctionType, CXL-x8-StandardTerminalNameAssignmentType, CXL-x8-MandatoryMappingType, CXL-x8-MandatoryStandardTerminalNameType, CXL-x8-OptionalMappingType, CXL-x8-OptionalStandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. PETp0	2. PETn0	3. PETp1	4. PETn1
	5. PETp2	6. PETn2	7. PETp3	8. PETn3
	9. PETp4	10. PETn4	11. PETp5	12. PETn5
	13. PETp6	14. PETn6	15. PETp7	16. PETn7
	17. PERp0	18. PERn0	19. PERp1	20. PERn1
	21. PERp2	22. PERn2	23. PERp3	24. PERn3
	25. PERp4	26. PERn4	27. PERp5	28. PERn5
	29. PERp6	30. PERn6	31. PERp7	32. PERn7
	33. REFCLKp0	34. REFCLKn0	35. PERST0#	36. PRSNT0#
	37. PRSNT1#	38. SMBCLK	39. SMBDATA	40. SMBRST#
	41. DUALPORTEN#	42. LED	43. PWRDIS	44. MFG
	45. RFU	46. 12V	47. 3.3Vaux	48. GND
	OptionalMapping/StandardTerminalName			
	1. REFCLKp1	2. REFCLKn1	3. PERST1#	4. CLKREQ#

4.7.3.10.4.3. CXL-x16

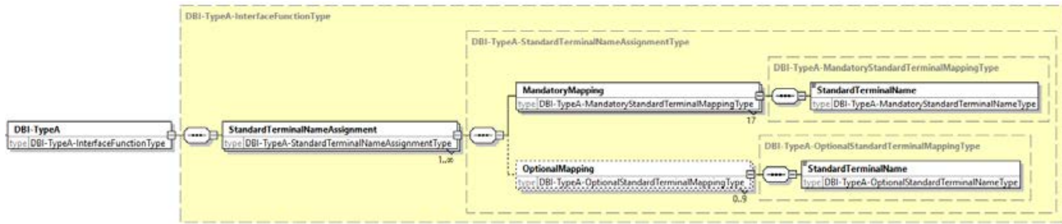
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/ComputeExpressLink/CXL-x16			
diagram				
type	CXL-x16-InterfaceFunctionType, CXL-x16-StandardTerminalNameAssignmentType, CXL-x16-MandatoryMappingType, CXL-x16-MandatoryStandardTerminalNameType, CXL-x16-OptionalMappingType, CXL-x16-OptionalStandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. PETp0	2. PETn0	3. PETp1	4. PETn1
	5. PETp2	6. PETn2	7. PETp3	8. PETn3
	9. PETp4	10. PETn4	11. PETp5	12. PETn5
	13. PETp6	14. PETn6	15. PETp7	16. PETn7
	17. PETp8	18. PETn8	19. PETp9	20. PETn9
	21. PETp10	22. PETn10	23. PETp11	24. PETn11
	25. PETp12	26. PETn12	27. PETp13	28. PETn13
	29. PETp14	30. PETn14	31. PETp15	32. PETn15
	33. PERp0	34. PERn0	35. PERp1	36. PERn1
	37. PERp2	38. PERn2	39. PERp3	40. PERn3
	41. PERp4	42. PERn4	43. PERp5	44. PERn5
	45. PERp6	46. PERn6	47. PERp7	48. PERn7
	49. PERp8	50. PERn8	51. PERp9	52. PERn9
	53. PERp10	54. PERn10	55. PERp11	56. PERn11
	57. PERp12	58. PERn12	59. PERp13	60. PERn13
	61. PERp14	62. PERn14	63. PERp15	64. PERn15
	65. REFCLKp0	66. REFCLKn0	67. PERST0#	68. PRSNT0#
	69. PRSNT1#	70. PRSNT2#	71. SMBCLK	72. SMBDATA
	73. SMBRST#	74. DUALPORTEN#	75. LED	76. PWRDIS
	77. MFG	78. RFU	79. 12V	80. 3.3Vaux
	81. GND			
	OptionalMapping/StandardTerminalName			
	1. REFCLKp1	2. REFCLKn1	3. PERST1#	4. CLKREQ#

4.7.3.10.5. Display Bus Function

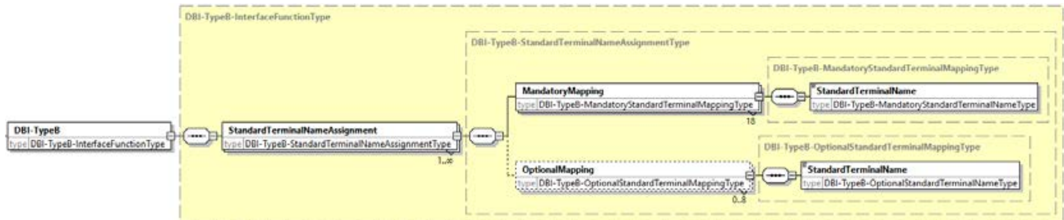
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/DisplayBus
diagram	
type	DisplayBusInterfaceFunctionType, DBI-TypeA-InterfaceFunctionType, DBI-TypeB-InterfaceFunctionType, DBI-TypeC-InterfaceFunctionType, DPI-Type1-InterfaceFunctionType, DPI-Type2-3-InterfaceFunctionType, DPI-Type4-InterfaceFunctionType, DSI-2OptionC-InterfaceFunctionType, DSI-2OptionD-InterfaceFunctionType.

For more information about the Display Bus Interface, refer to the MIPI Alliance standard Specification for Display Bus Interface Version 2.0

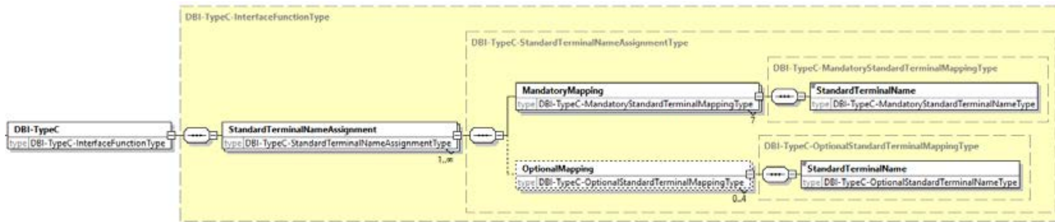
4.7.3.10.5.1. DBI-TypeA

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/DisplayBus/DBI-TypeA			
diagram				
type	DBI-TypeA-InterfaceFunctionType, DBI-TypeA-StandardTerminalNameAssignmentType, DBI-TypeA-MandatoryStandardTerminalMappingType, DBI-TypeA-MandatoryStandardTerminalNameType, DBI-TypeA-OptionalStandardTerminalMappingType, DBI-TypeA-OptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. VDD	2. AGND	3. VDDI	4. DGND
	5. CSX	6. RESX	7. D/CD	8. R/WX
	9. E	10. D[0]	11. D[1]	12. D[2]
	13. D[3]	14. D[4]	15. D[5]	16. D[6]
	17. D[7]			
	OptionalMapping/StandardTerminalName			
	1. D[8]	2. D[9]	3. D[10]	4. D[11]
	5. D[12]	6. D[13]	7. D[14]	8. D[15]
	9. TE			

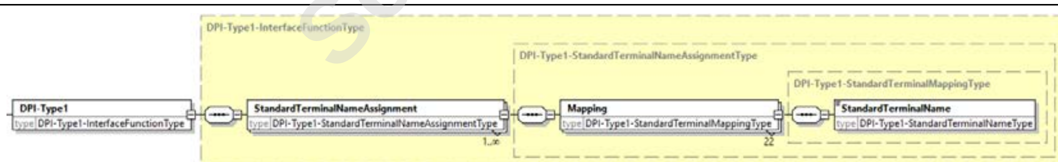
4.7.3.10.5.2. DBI-TypeB

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/DisplayBus/DBI-TypeB</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DBI-TypeB-InterfaceFunctionType, DBI-TypeB-StandardTerminalNameAssignmentType,
DBI-TypeB-MandatoryStandardTerminalMappingType,
DBI-TypeB-MandatoryStandardTerminalNameType, DBI-TypeB-OptionalStandardTerminalMappingType,
DBI-TypeB-OptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="9">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. VDD</td><td>2. AGND</td><td>3. VDDI</td><td>4. DGND</td></tr>
<tr><td>5. CSX</td><td>6. RESX</td><td>7. TE</td><td>8. D/CX</td></tr>
<tr><td>9. WRX</td><td>10. RDX</td><td>11. D[0]</td><td>12. D[1]</td></tr>
<tr><td>13. D[2]</td><td>14. D[3]</td><td>15. D[4]</td><td>16. D[5]</td></tr>
<tr><td>17. D[6]</td><td>18. D[7]</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. D[8]</td><td>2. D[9]</td><td>3. D[10]</td><td>4. D[11]</td></tr>
<tr><td>5. D[12]</td><td>6. D[13]</td><td>7. D[14]</td><td>8. D[15]</td></tr>
</table>

4.7.3.10.5.3. DBI-TypeC

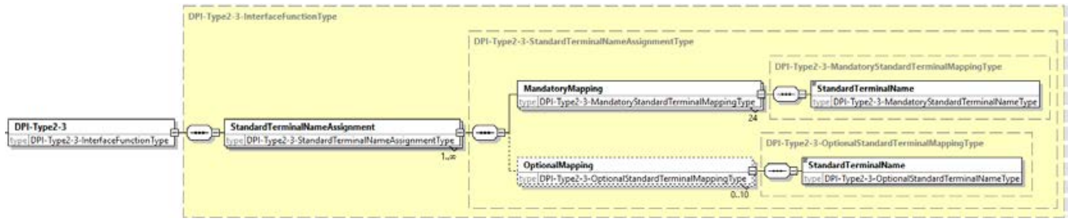
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/DisplayBus/DBI-TypeC			
diagram				
type	DBI-TypeB-InterfaceFunctionType, DBI-TypeC-StandardTerminalNameAssignmentType, DBI-TypeC-MandatoryStandardTerminalMappingType, DBI-TypeC-MandatoryStandardTerminalNameType, DBI-TypeC-OptionalStandardTerminalMappingType, DBI-TypeC-OptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. VDD	2. AGND	3. VDDI	4. DGND
	5. CSX	6. RESX	7. SCL	
	OptionalMapping/StandardTerminalName			
	1. D/CX	2. DOUT	3. DIN	4. SDA

4.7.3.10.5.4. DPI-Type1

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/DisplayBus/DPI-Type1			
diagram				
type	DPI-Type1-InterfaceFunctionType, DPI-Type1-StandardTerminalNameAssignmentType, DPI-Type1-StandardTerminalMappingType, DPI-Type1-StandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. DPI_PCLK	2. DPI_VS	3. DPI_HS	4. DPI_ACDE
	5. DPI_PixDat[0]	6. DPI_PixDat[1]	7. DPI_PixDat[2]	8. DPI_PixDat[3]
	9. DPI_PixDat[4]	10. DPI_PixDat[5]	11. DPI_PixDat[6]	12. DPI_PixDat[7]
	13. DPI_PixDat[8]	14. DPI_PixDat[9]	15. DPI_PixDat[10]	16. DPI_PixDat[11]
	17. DPI_PixDat[12]	18. DPI_PixDat[13]	19. DPI_PixDat[14]	20. DPI_PixDat[15]
	21. DPI_PixDat[16]	22. DPI_PixDat[17]		

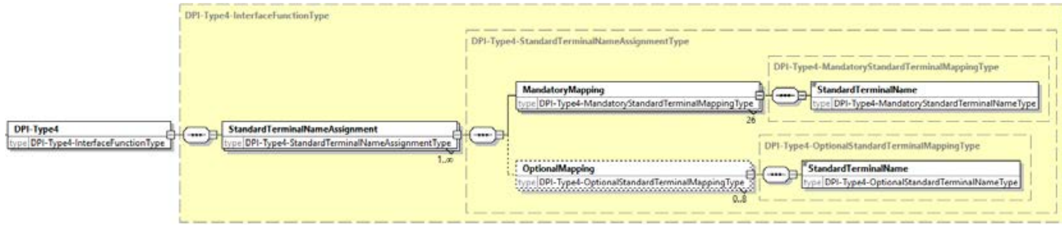
For more information about the Display Pixel Interface, refer to the MIPI Alliance standard Specification for Display Pixel Interface Version 1.0

4.7.3.10.5.5. DPI-Type2-3

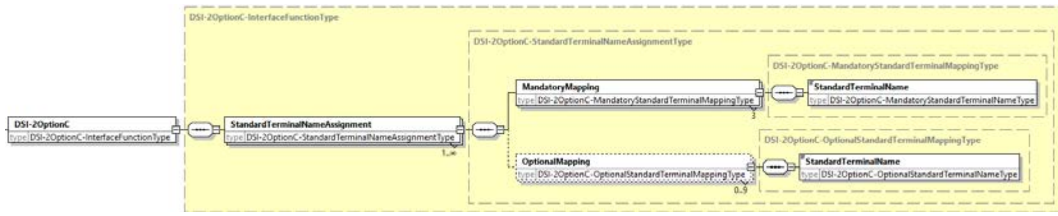
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/DisplayBus/DPI-Type2-3**			
diagram				
type	**DPI-Type2-3-InterfaceFunctionType, DPI-Type2-3-StandardTerminalNameAssignmentType,** **DPI-Type2-3-MandatoryStandardTerminalMappingType,** **DPI-Type2-3-MandatoryStandardTerminalNameType,** **DPI-Type2-3-OptionalStandardTerminalMappingType, DPI-Type2-3-OptionalStandardTerminalNameType.**			
list of enumerate values	**MandatoryMapping/StandardTerminalName**			
	1. VDD	**2. AGND**	**3. VDDI**	**4. DGND**
	5. VSYNC	**6. HSYNC**	**7. DE**	**8. PCLK**
	9. D[0]	**10. D[1]**	**11. D[2]**	**12. D[3]**
	13. D[4]	**14. D[5]**	**15. D[6]**	**16. D[7]**
	17. D[8]	**18. D[9]**	**19. D[10]**	**20. D[11]**
	21. D[12]	**22. D[13]**	**23. D[14]**	**24. D[15]**
	OptionalMapping/StandardTerminalName			
	1. D[16]	**2. D[17]**	**3. D[18]**	**4. D[19]**
	5. D[20]	**6. D[21]**	**7. D[22]**	**8. D[23]**
	9. SD	**10. CM**		

For more information about the Display Pixel Interface Type 2, Type 3, Type 4, refer to the MIPI Alliance standard Specification for Display Pixel Interface (DPI-2) Version 2.0

4.7.3.10.5.6. DPI-Type4

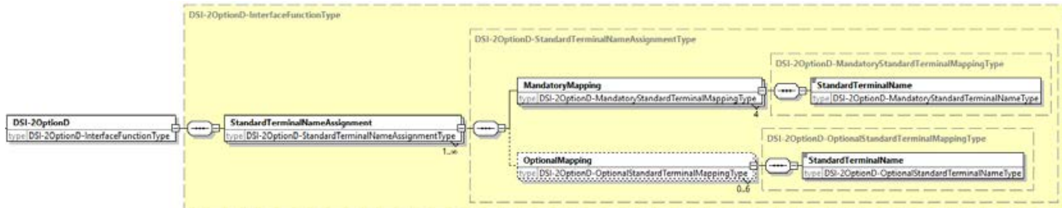
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/DisplayBus/DPI-Type4**			
diagram				
type	**DPI-Type4-InterfaceFunctionType, DPI-Type4-StandardTerminalNameAssignmentType, DPI-Type4-MandatoryStandardTerminalMappingType, DPI-Type4-MandatoryStandardTerminalNameType, DPI-Type4-OptionalStandardTerminalMappingType, DPI-Type4-OptionalStandardTerminalNameType.**			
list of enumerate values	**MandatoryMapping/StandardTerminalName**			
	1. VDD	**2. AGND**	**3. VDDI**	**4. DGND**
	5. VSYNC	**6. HSYNC**	**7. DE**	**8. PCLK**
	9. SD	**10. CM**	**11. D[0]**	**12. D[1]**
	13. D[2]	**14. D[3]**	**15. D[4]**	**16. D[5]**
	17. D[6]	**18. D[7]**	**19. D[8]**	**20. D[9]**
	21. D[10]	**22. D[11]**	**23. D[12]**	**24. D[13]**
	25. D[14]	**26. D[15]**		
	OptionalMapping/StandardTerminalName			
	1. D[16]	**2. D[17]**	**3. D[18]**	**4. D[19]**
	5. D[20]	**6. D[21]**	**7. D[22]**	**8. D[23]**

4.7.3.10.5.7. DSI-2-OptionC

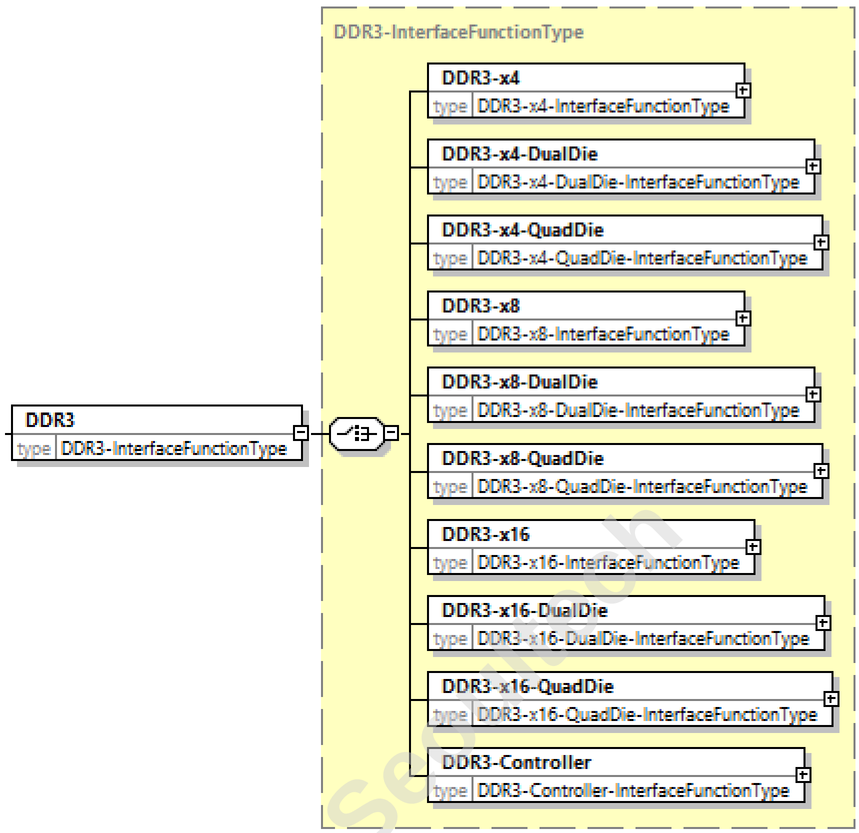
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/DisplayBus/DSI-2OptionC			
diagram				
type	DSI-2OptionC-InterfaceFunctionType, DSI-2OptionC-StandardTerminalNameAssignmentType, DSI-2OptionC-MandatoryStandardTerminalMappingType, DSI-2OptionC-MandatoryStandardTerminalNameType, DSI-2OptionC-OptionalStandardTerminalMappingType, DSI-2OptionC-OptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. Data0_A	2. Data0_B	3. Data0_C	
	OptionalMapping/StandardTerminalName			
	1. Data1_A	2. Data1_B	3. Data1_C	4. Data2_A
	5. Data2_B	6. Data2_C	7. Data3_A	8. Data3_B
	9. Data3_C			

For more information about the Display Serial Interface 2 (DSI-2) refer to the MIPI Alliance standard Specification for Display Serial Interface 2 (DsI-2) Version 2.0

4.7.3.10.5.8. DSI-2-OptionD

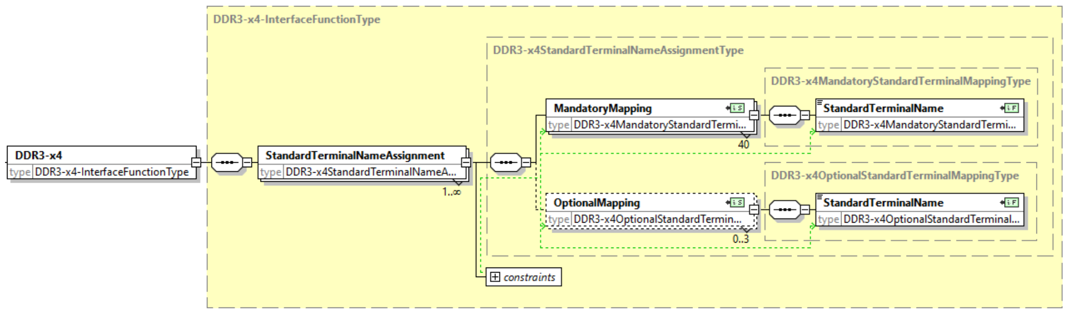
<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/DisplayBus/DSI-2OptionD</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DSI-2OptionD-InterfaceFunctionType, DSI-2OptionD-StandardTerminalNameAssignmentType, DSI-2OptionD-MandatoryStandardTerminalMappingType, DSI-2OptionD-MandatoryStandardTerminalNameType, DSI-2OptionD-OptionalStandardTerminalMappingType, DSI-2OptionD-OptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="5">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Data0+</td><td>2. Data0-</td><td>3. Clock+</td><td>4. Clock-</td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Data1+</td><td>2. Data1-</td><td>3. Data2+</td><td>4. Data2-</td></tr>
<tr><td>5. Data3+</td><td>6. Data3-</td><td></td><td></td></tr>
</table>

4.7.3.10.6. DDR3 Interface Function

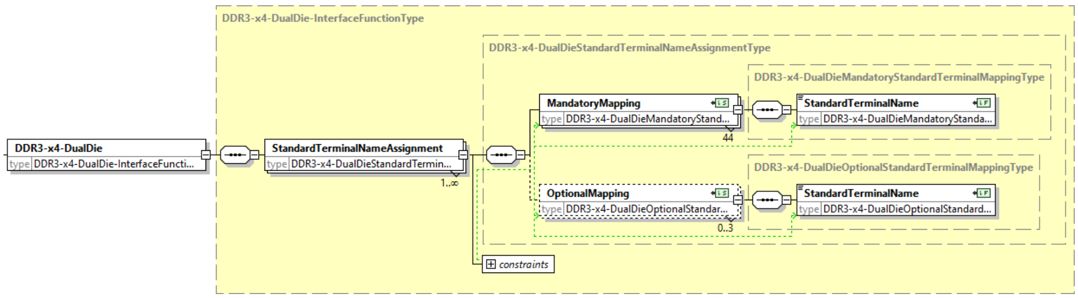
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR3**
diagram	
type	**DDR3-InterfaceFunctionType, DDR3-x4-InterfaceFunctionType, DDR3-x4-DualDie-InterfaceFunctionType, DDR3-x4-QuadDie-InterfaceFunctionType, DDR3-x8-InterfaceFunctionType, DDR3-x8-DualDie-InterfaceFunctionType, DDR3-x8-QuadDie-InterfaceFunctionType, DDR3-x16-InterfaceFunctionType, DDR3-x16-DualDie-InterfaceFunctionType, DDR3-x16-QuadDie-InterfaceFunctionType, DDR3-Controller-InterfaceFunctionType.**

For more information about the DDR3 Interface, refer to the JEDEC standard JESD79-3F.

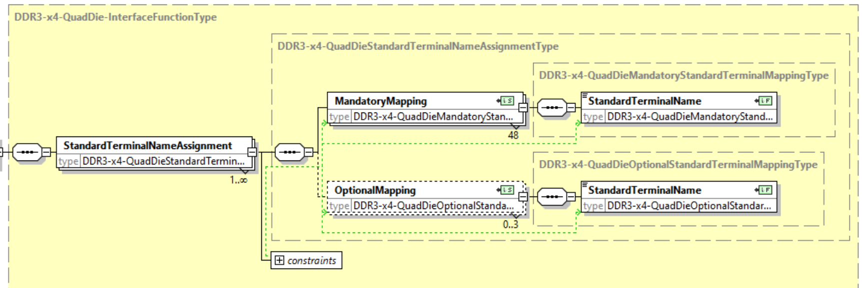
4.7.3.10.6.1. DDR3-x4

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR3/DDR3-x4			
diagram				
type	DDR3-x4–InterfaceFunctionType, DDR3-x4StandardTerminalNameAssignmentType, DDR3-x4MandatoryStandardTerminalMappingType, DDR3-x4MandatoryStandardTerminalNameType, DDR3-x4OptionalStandardTerminalMappingType, DDR3-x4OptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. A0	2. A1	3. A2	4. A3
	5. A4	6. A5	7. A6	8. A7
	9. A8	10. A9	11. A10/AP	12. A11
	13. A12/BC#	14. BA0	15. BA1	16. BA2
	17. CAS#	18. CK	19. CK#	20. CKE
	21. CS#	22. DM	23. DQ[0]	24. DQ[1]
	25. DQ[2]	26. DQ[3]	27. DQS	28. DQS#
	29. ODT	30. RAS#	31. RESET#	32. VDD
	33. VDDQ	34. VPP	35. VREFCA	36. VREFDQ
	37. VSS	38. VSSQ	39. WE#	40. ZQ
	OptionalMapping/StandardTerminalName			
	1. A13	2. A14	3. A15	

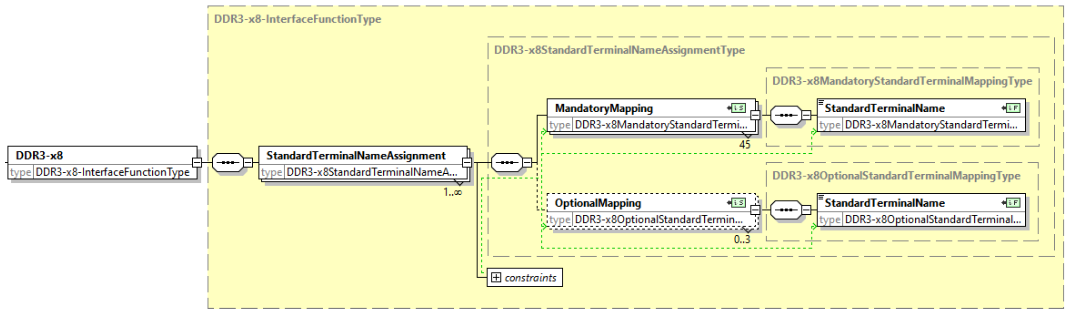
4.7.3.10.6.2. DDR3-x4 – Dual Die

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR3/DDR3-x4-DualDie</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DDR3-x4–DualDie-InterfaceFunctionType, DDR3-x4-DualDieStandardTerminalNameAssignmentType,
DDR3-x4-DualDieMandatoryStandardTerminalMappingType,
DDR3-x4-DualDieMandatoryStandardTerminalNameType,
DDR3-x4-DualDieOptionalStandardTerminalMappingType,
DDR3-x4-DualDieOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="14">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. VDDQ</td><td>2. VSSQ</td><td>3. VPP</td><td>4. VDD</td></tr>
<tr><td>5. VSS</td><td>6. DQS</td><td>7. DQS#</td><td>8. DM</td></tr>
<tr><td>9. CK</td><td>10. CK#</td><td>11. CKE0</td><td>12. CKE1</td></tr>
<tr><td>13. ZQ0</td><td>14. ZQ1</td><td>15. RESET#</td><td>16. ODT0</td></tr>
<tr><td>17. ODT1</td><td>18. CS0#</td><td>19. CS1#</td><td>20. WE#</td></tr>
<tr><td>21. RAS#</td><td>22. CAS#</td><td>23. BA0</td><td>24. BA1</td></tr>
<tr><td>25. BA2</td><td>26. VREFCA</td><td>27. VREFDQ</td><td>28. A0</td></tr>
<tr><td>29. A1</td><td>30. A2</td><td>31. A3</td><td>32. A4</td></tr>
<tr><td>33. A5</td><td>34. A6</td><td>35. A7</td><td>36. A8</td></tr>
<tr><td>37. A9</td><td>38. A10/AP</td><td>39. A11</td><td>40. A12/BC#</td></tr>
<tr><td>41. DQ[0]</td><td>42. DQ[1]</td><td>43. DQ[2]</td><td>44. DQ[3]</td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. A13</td><td>2. A13</td><td>3. A13</td><td></td></tr>
</table>

4.7.3.10.6.3. DDR3-x4 – Quad Die

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR3/DDR3-x4-QuadDie</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DDR3-x4–QuadDie-InterfaceFunctionType, DDR3-x4-QuadDieStandardTerminalNameAssignmentType,
DDR3-x4-QuadDieMandatoryStandardTerminalMappingType,
DDR3-x4-QuadDieMandatoryStandardTerminalNameType,
DDR3-x4-QuadDieOptionalStandardTerminalMappingType,
DDR3-x4-QuadDieOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="16">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. VDDQ</td><td>2. VSSQ</td><td>3. VPP</td><td>4. VDD</td></tr>
<tr><td>5. VSS</td><td>6. DQS</td><td>7. DQS#</td><td>8. DM</td></tr>
<tr><td>9. CK</td><td>10. CK#</td><td>11. CKE0</td><td>12. CKE1</td></tr>
<tr><td>13. ZQ0</td><td>14. ZQ1</td><td>15. ZQ2</td><td>16. ZQ3</td></tr>
<tr><td>17. RESET#</td><td>18. ODT0</td><td>19. ODT1</td><td>20. CS0#</td></tr>
<tr><td>21. CS1#</td><td>22. CS2#</td><td>23. CS3#</td><td>24. WE#</td></tr>
<tr><td>25. RAS#</td><td>26. CAS#</td><td>27. BA0</td><td>28. BA1</td></tr>
<tr><td>29. BA2</td><td>30. VREFCA</td><td>31. VREFDQ</td><td>32. A0</td></tr>
<tr><td>33. A1</td><td>34. A2</td><td>35. A3</td><td>36. A4</td></tr>
<tr><td>37. A5</td><td>38. A6</td><td>39. A7</td><td>40. A8</td></tr>
<tr><td>41. A9</td><td>42. A10/AP</td><td>43. A11</td><td>44. A12/BC#</td></tr>
<tr><td>45. DQ[0]</td><td>46. DQ[1]</td><td>47. DQ[2]</td><td>48. DQ[3]</td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. A13</td><td>2. A13</td><td>3. A13</td><td></td></tr>
</table>

4.7.3.10.6.4. DDR3-x8

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR3/DDR3-x8
diagram	
type	DDR3-x8–InterfaceFunctionType, DDR3-x8StandardTerminalNameAssignmentType, DDR3-x8MandatoryStandardTerminalMappingType, DDR3-x8MandatoryStandardTerminalNameType, DDR3-x8OptionalStandardTerminalMappingType, DDR3-x8OptionalStandardTerminalNameType.

list of enumerate values

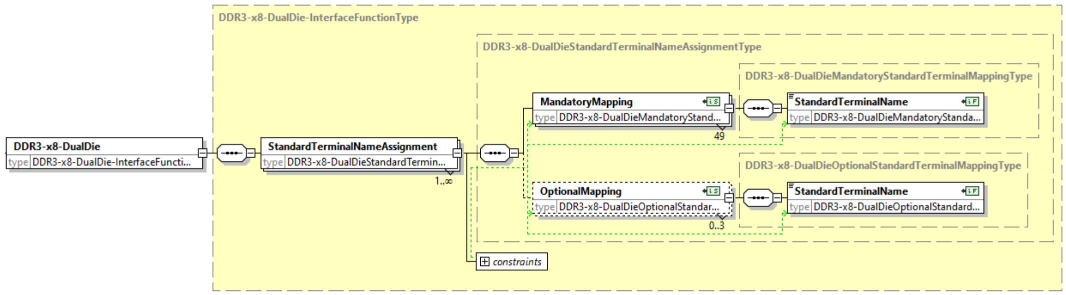
MandatoryMapping/StandardTerminalName

1. VDDQ	2. VSSQ	3. VPP	4. VDD
5. VSS	6. DQS	7. DQS#	8. VREFCA
9. VREFDQ	10. DM/TDQS	11. NU/TDQS#	12. CK
13. CK#	14. CKE	15. ZQ	16. RESET#
17. ODT	18. CS#	19. WE#	20. RAS#
21. CAS#	22. BA0	23. BA1	24. BA2
25. A0	26. A1	27. A2	28. A3
29. A4	30. A5	31. A6	32. A7
33. A8	34. A9	35. A10/AP	36. A11
37. A12/BC#	38. DQ[0]	39. DQ[1]	40. DQ[2]
41. DQ[3]	42. DQ[4]	43. DQ[5]	44. DQ[6]
45. DQ[7]			

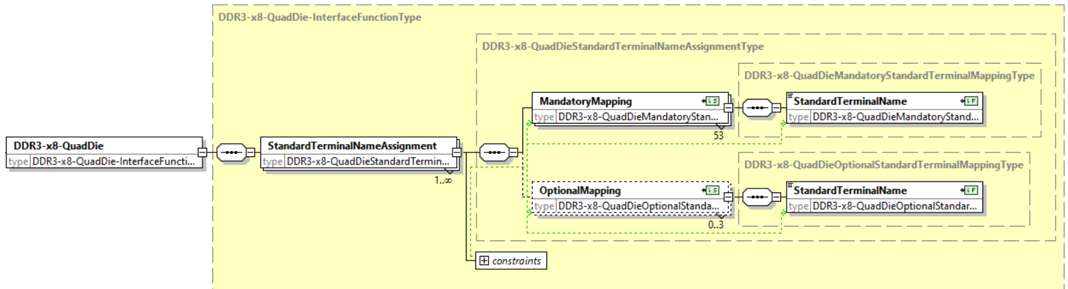
OptionalMapping/StandardTerminalName

1. A13	2. A13	3. A13	

4.7.3.10.6.5. DDR3-x8 – Dual Die

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR3/DDR3-x8-DualDie			
diagram				
type	DDR3-x8–DualDie-InterfaceFunctionType, DDR3-x8-DualDieStandardTerminalNameAssignmentType, DDR3-x8-DualDieMandatoryStandardTerminalMappingType, DDR3-x8-DualDieMandatoryStandardTerminalNameType, DDR3-x8-DualDieOptionalStandardTerminalMappingType, DDR3-x8-DualDieOptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. VDDQ	2. VSSQ	3. VPP	4. VDD
	5. VSS	6. DQS	7. DQS#	8. VREFCA
	9. VREFDQ	10. DM/TDQS	11. NU/TDQS#	12. CK
	13. CK#	14. CKE0	15. CKE1	16. ZQ0
	17. ZQ1	18. RESET#	19. ODT0	20. ODT1
	21. CS0#	22. CS1#	23. WE#	24. RAS#
	25. CAS#	26. BA0	27. BA1	28. BA2
	29. A0	30. A1	31. A2	32. A3
	33. A4	34. A5	35. A6	36. A7
	37. A8	38. A9	39. A10/AP	40. A11
	41. A12/BC#	42. DQ[0]	43. DQ[1]	44. DQ[2]
	45. DQ[3]	46. DQ[4]	47. DQ[5]	48. DQ[6]
	49. DQ[7]			
	OptionalMapping/StandardTerminalName			
	1. A13	2. A13	3. A13	

4.7.3.10.6.6. DDR3-x8 – Quad Die

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR3/DDR3-x8-QuadDie
diagram	
type	DDR3-x8–QuadDie-InterfaceFunctionType, DDR3-x8-QuadDieStandardTerminalNameAssignmentType, DDR3-x8-QuadDieMandatoryStandardTerminalMappingType, DDR3-x8-QuadDieMandatoryStandardTerminalNameType, DDR3-x8-QuadDieOptionalStandardTerminalMappingType, DDR3-x8-QuadDieOptionalStandardTerminalNameType.

list of enumerate values

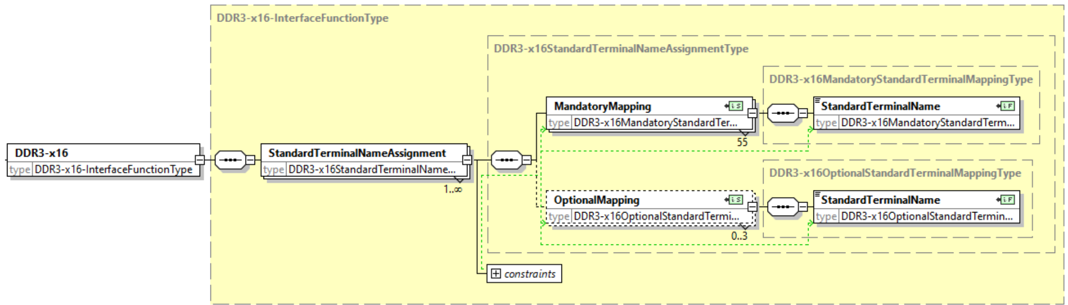
MandatoryMapping/StandardTerminalName

1. VDDQ	2. VSSQ	3. VPP	4. VDD
5. VSS	6. DQS	7. DQS#	8. VREFCA
9. VREFDQ	10. DM/TDQS	11. NU/TDQS#	12. CK
13. CK#	14. CKE0	15. CKE1	16. ZQ0
17. ZQ1	18. ZQ2	19. ZQ3	20. RESET#
21. ODT0	22. ODT1	23. CS0#	24. CS1#
25. CS2#	26. CS3#	27. WE#	28. RAS#
29. CAS#	30. BA0	31. BA1	32. BA2
33. A0	34. A1	35. A2	36. A3
37. A4	38. A5	39. A6	40. A7
41. A8	42. A9	43. A10/AP	44. A11
45. A12/BC#	46. DQ[0]	47. DQ[1]	48. DQ[2]
49. DQ[3]	50. DQ[4]	51. DQ[5]	52. DQ[6]
53. DQ[7]			

OptionalMapping/StandardTerminalName

1. A13	2. A13	3. A13	

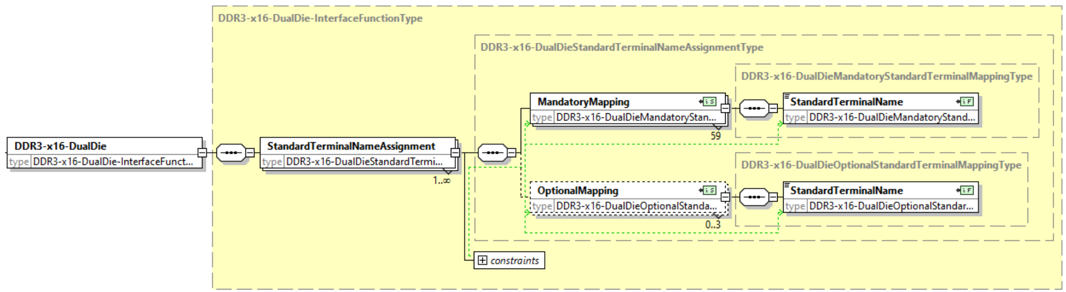
4.7.3.10.6.7. DDR3-x16

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR3/DDR3-x16			
diagram				
type	DDR3-x16–InterfaceFunctionType, DDR3-x16StandardTerminalNameAssignmentType, DDR3-x16MandatoryStandardTerminalMappingType, DDR3-x16MandatoryStandardTerminalNameType, DDR3-x16OptionalStandardTerminalMappingType, DDR3-x16OptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. VDDQ	2. VSSQ	3. VPP	4. VDD
	5. VSS	6. DQSU	7. DQSU#	8. DQSL
	9. DQSL#	10. VREFCA	11. VREFDQ	12. DML
	13. DMU	14. CK	15. CK#	16. CKE
	17. ZQ	18. RESET#	19. ODT	20. CS#
	21. WE#	22. RAS#	23. CAS#	24. BA0
	25. BA1	26. BA2	27. A0	28. A1
	29. A2	30. A3	31. A4	32. A5
	33. A6	34. A7	35. A8	36. A9
	37. A10/AP	38. A11	39. A12/BC#	40. DQU[0]
	41. DQU[1]	42. DQU[2]	43. DQU[3]	44. DQU[4]
	45. DQU[5]	46. DQU[6]	47. DQU[7]	48. DQL[0]
	49. DQL[1]	50. DQL[2]	51. DQL[3]	52. DQL[4]
	53. DQL[5]	54. DQL[6]	55. DQL[7]	
	OptionalMapping/StandardTerminalName			
	1. A13	2. A13	3. A13	

4.7.3.10.6.8. DDR3-x16 – Dual Die

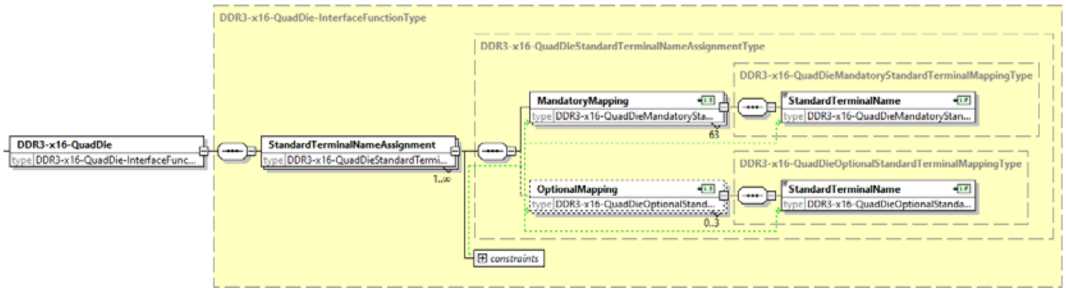
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR3/DDR3-x16-DualDie

diagram

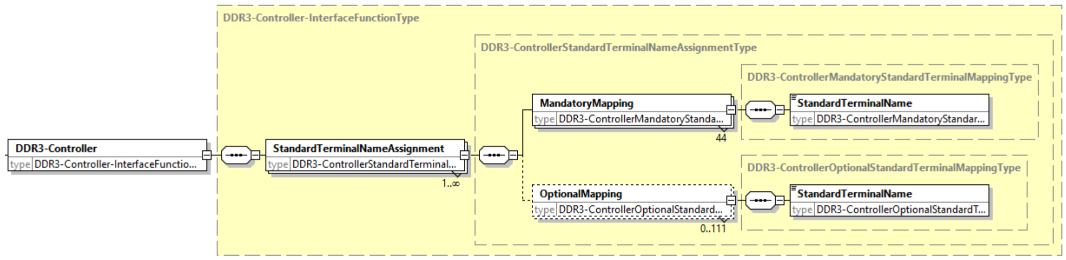


type	DDR3-x16–DualDie-InterfaceFunctionType, DDR3-x16-DualDieStandardTerminalNameAssignmentType, DDR3-x16-DualDieMandatoryStandardTerminalMappingType, DDR3-x16-DualDieMandatoryStandardTerminalNameType, DDR3-x16-DualDieOptionalStandardTerminalMappingType, DDR3-x16-DualDieOptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. VDDQ	2. VSSQ	3. VPP	4. VDD
	5. VSS	6. DQSU	7. DQSU#	8. DQSL
	9. DQSL#	10. VREFCA	11. VREFDQ	12. DML
	13. DMU	14. CK	15. CK#	16. CKE0
	17. CKE1	18. ZQ0	19. ZQ1	20. RESET#
	21. ODT0	22. ODT1	23. CS0#	24. CS1#
	25. WE#	26. RAS#	27. CAS#	28. BA0
	29. BA1	30. BA2	31. A0	32. A1
	33. A2	34. A3	35. A4	36. A5
	37. A6	38. A7	39. A8	40. A9
	41. A10/AP	42. A11	43. A12/BC#	44. DQU[0]
	45. DQU[1]	46. DQU[2]	47. DQU[3]	48. DQU[4]
	49. DQU[5]	50. DQU[6]	51. DQU[7]	52. DQL[0]
	53. DQL[1]	54. DQL[2]	55. DQL[3]	56. DQL[4]
	57. DQL[5]	58. DQL[6]	59. DQL[7]	
	OptionalMapping/StandardTerminalName			
	1. A13	2. A13	3. A13	

4.7.3.10.6.9. DDR3-x16 – Quad Die

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR3/DDR3-x16-QuadDie			
diagram				
type	DDR3-x16–QuadDie-InterfaceFunctionType, DDR3-x16-QuadDieStandardTerminalNameAssignmentType, DDR3-x16-QuadDieMandatoryStandardTerminalMappingType, DDR3-x16-QuadDieMandatoryStandardTerminalNameType, DDR3-x16-QuadDieOptionalStandardTerminalMappingType, DDR3-x16-QuadDieOptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. VDDQ	2. VSSQ	3. VPP	4. VDD
	5. VSS	6. DQSU	7. DQSU#	8. DQSL
	9. DQSL#	10. VREFCA	11. VREFDQ	12. DML
	13. DMU	14. CK	15. CK#	16. CKE0
	17. CKE1	18. ZQ0	19. ZQ1	20. ZQ2
	21. ZQ3	22. RESET#	23. ODT0	24. ODT1
	25. CS0#	26. CS1#	27. CS2#	28. CS3#
	29. WE#	30. RAS#	31. CAS#	32. BA0
	33. BA1	34. BA2	35. A0	36. A1
	37. A2	38. A3	39. A4	40. A5
	41. A6	42. A7	43. A8	44. A9
	45. A10/AP	46. A11	47. A12/BC#	48. DQU[0]
	49. DQU[1]	50. DQU[2]	51. DQU[3]	52. DQU[4]
	53. DQU[5]	54. DQU[6]	55. DQU[7]	56. DQL[0]
	57. DQL[1]	58. DQL[2]	59. DQL[3]	60. DQL[4]
	61. DQL[5]	62. DQL[6]	63. DQL[7]	
list of enumerate values	OptionalMapping/StandardTerminalName			
	1. A13	2. A14	3. A15	

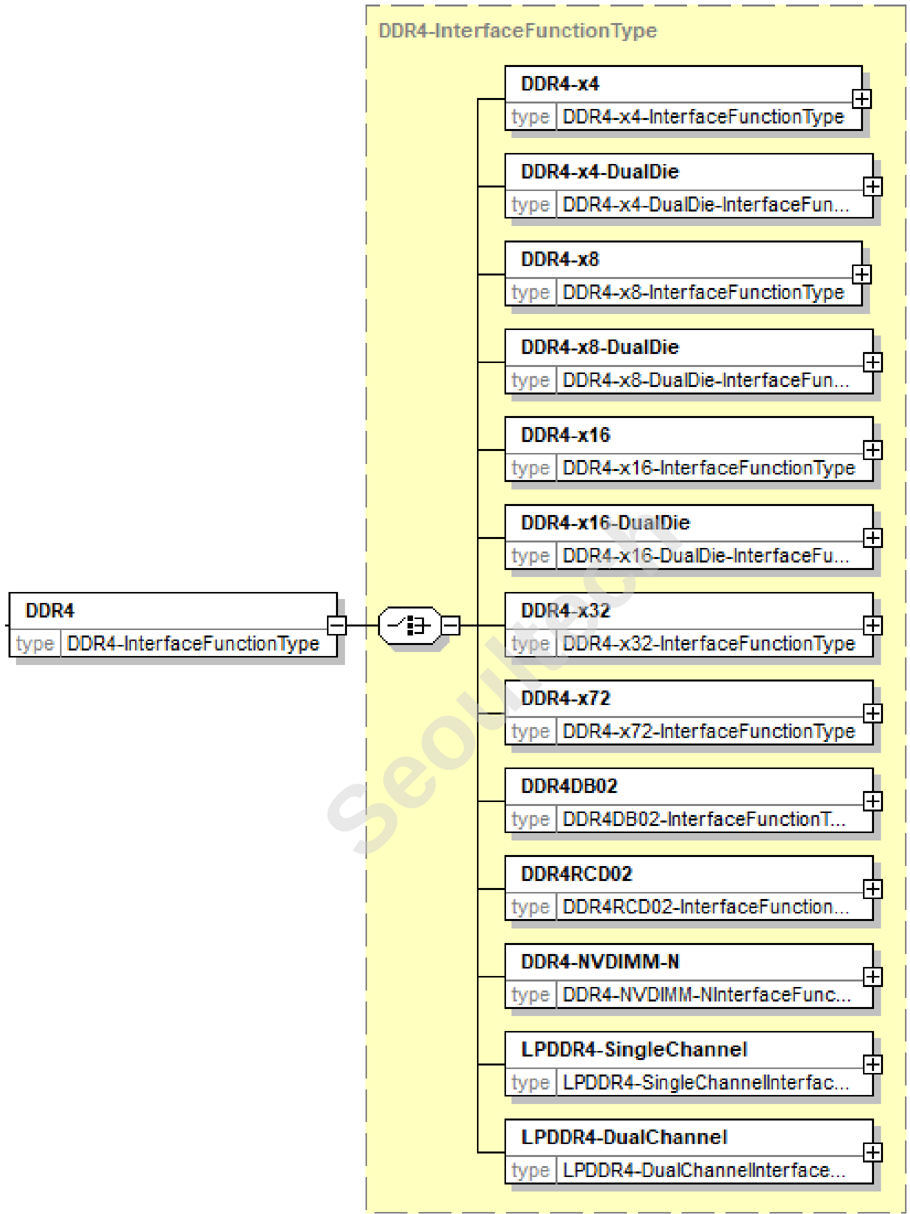
4.7.3.10.6.10. DDR3 Controller

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR3-Controller</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DDR3-Controller-InterfaceFunctionType, DDR3-ControllerStandardTerminalNameAssignmentType,
DDR3-ControllerMandatoryStandardTerminalMappingType,
DDR3-ControllerMandatoryStandardTerminalNameType,
DDR3-ControllerOptionalStandardTerminalMappingType,
DDR3-ControllerOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="19">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. A0</td><td>2. A1</td><td>3. A2</td><td>4. A3</td></tr>
<tr><td>5. A4</td><td>6. A5</td><td>7. A6</td><td>8. A7</td></tr>
<tr><td>9. A8</td><td>10. A9</td><td>11. A10/AP</td><td>12. A11</td></tr>
<tr><td>13. A12/BC#</td><td>14. BA0</td><td>15. BA1</td><td>16. BA2</td></tr>
<tr><td>17. CAS#</td><td>18. CK0</td><td>19. CK0#</td><td>20. CKE0</td></tr>
<tr><td>21. CS0#</td><td>22. DM0</td><td>23. DQ[0]</td><td>24. DQ[1]</td></tr>
<tr><td>25. DQ[2]</td><td>26. DQ[3]</td><td>27. DQ[4]</td><td>28. DQ[5]</td></tr>
<tr><td>29. DQ[6]</td><td>30. DQ[7]</td><td>31. DQ[8]</td><td>32. DQ[9]</td></tr>
<tr><td>33. DQ[10]</td><td>34. DQ[11]</td><td>35. DQ[12]</td><td>36. DQ[13]</td></tr>
<tr><td>37. DQ[14]</td><td>38. DQ[15]</td><td>39. DQS0</td><td>40. DQS0#</td></tr>
<tr><td>41. ODT0</td><td>42. RAS#</td><td>43. RESET#</td><td>44. WE#</td></tr>
<tr><td>45. A13</td><td>46. A14</td><td>47. A15</td><td>48. CB0</td></tr>
<tr><td>49. CB1</td><td>50. CB2</td><td>51. CB3</td><td>52. CB4</td></tr>
<tr><td>53. CB5</td><td>54. CB6</td><td>55. CB7</td><td>56. CK1</td></tr>
<tr><td>57. CK1#</td><td>58. CKE1</td><td>59. CS1#</td><td>60. CS2#</td></tr>
<tr><td>61. CS3#</td><td>62. DM1</td><td>63. DM2</td><td>64. DM3</td></tr>
<tr><td>65. DM4</td><td>66. DM5</td><td>67. DM6</td><td>68. DM7</td></tr>
<tr><td>69. DM8</td><td>70. DQ[16]</td><td>71. DQ[17]</td><td>72. DQ[18]</td></tr>
</table>

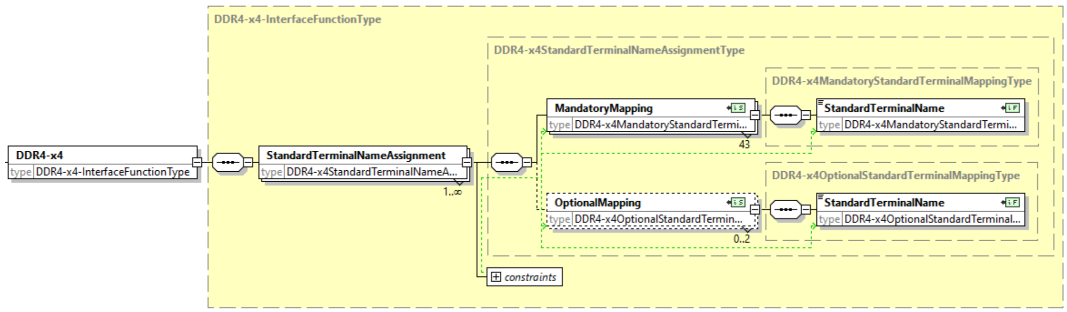
4.7.3.10.6.10 DDR3 Controller (cont'd)

list of enumerate values (cont.)	OptionalMapping/StandardTerminalName			
	73. DQ[19]	74. DQ[20]	75. DQ[21]	76. DQ[22]
	77. DQ[23]	78. DQ[24]	79. DQ[25]	80. DQ[26]
	81. DQ[27]	82. DQ[28]	83. DQ[29]	84. DQ[30]
	85. DQ[31]	86. DQ[32]	87. DQ[33]	88. DQ[34]
	89. DQ[35]	90. DQ[36]	91. DQ[37]	92. DQ[38]
	93. DQ[39]	94. DQ[40]	95. DQ[41]	96. DQ[42]
	97. DQ[43]	98. DQ[44]	99. DQ[45]	100. DQ[46]
	101. DQ[47]	102. DQ[48]	103. DQ[49]	104. DQ[50]
	105. DQ[51]	106. DQ[52]	107. DQ[53]	108. DQ[54]
	109. DQ[55]	110. DQ[56]	111. DQ[57]	112. DQ[58]
	113. DQ[59]	114. DQ[60]	115. DQ[61]	116. DQ[62]
	117. DQ[63]	118. DQS1	119. DQS1#	120. DQS2
	121. DQS2#	122. DQS3	123. DQS3#	124. DQS4
	125. DQS4#	126. DQS5	127. DQS5#	128. DQS6
	129. DQS6#	130. DQS7	131. DQS7#	132. DQS8
	133. DQS8#	134. DQS9	135. DQS9#	136. DQS10
	137. DQS10#	138. DQS11	139. DQS11#	140. DQS12
	141. DQS12#	142. DQS13	143. DQS13#	144. DQS14
	145. DQS14#	146. DQS15	147. DQS15#	148. DQS16
	149. DQS16#	150. DQS17	151. DQS17#	152. ODT1
	153. VREF	154. VREFCA	155. VREFDQ	

4.7.3.10.7. DDR4 Interface Function

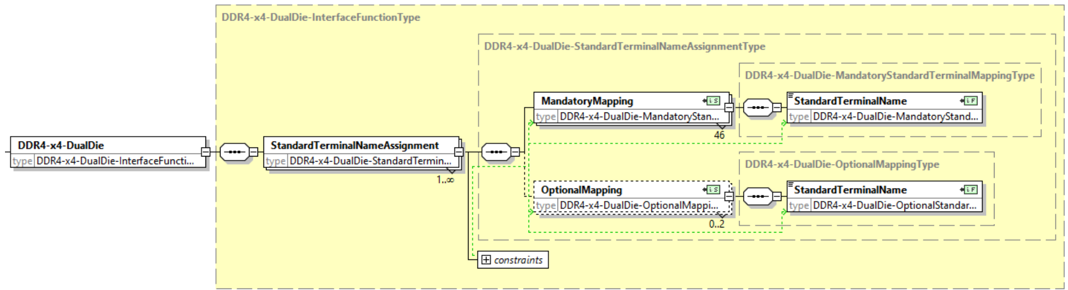
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4**
diagram	
type	**DDR4-InterfaceFunctionType, DDR4-x4-InterfaceFunctionType, DDR4-x4-DualDie-InterfaceFunctionType, DDR4-x8-InterfaceFunctionType, DDR4-x8-DualDie-InterfaceFunctionType, DDR4-x16-InterfaceFunctionType, DDR4-x16-DualDie-InterfaceFunctionType, DDR4-x32-InterfaceFunctionType, DDR4-x72-InterfaceFunctionType, DDR4DB02-InterfaceFunctionType, DDR4RCD02-InterfaceFunctionType, DDR4-NVDIMM-NInterfaceFunctionType, DDR4-x72-InterfaceFunctionType, LPDDR4-DualChannelInterfaceFunctionType,**

4.7.3.10.7.1. DDR4-x4

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/DDR4-x4			
diagram				
type	DDR4-x4–InterfaceFunctionType, DDR3-x4StandardTerminalNameAssignmentType, DDR4-x4MandatoryStandardTerminalMappingType, DDR4-x4MandatoryStandardTerminalNameType, DDR4-x4OptionalStandardTerminalMappingType, DDR4-x4OptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. VDDQ	2. VSSQ	3. VPP	4. VDD
	5. VSS	6. DQS_c	7. DQS_t	8. ODT
	9. CS_n	10. CK_t	11. CK_c	12. ZQ
	13. ALERT_n	14. ACT_n	15. CKE	16. PAR
	17. RESET_n	18. VREFCA	19. BA0	20. BA1
	21. BG0	22. BG1	23. A0	24. A1
	25. A2	26. A3	27. A4	28. A5
	29. A6	30. A7	31. A8	32. A9
	33. A10/AP	34. A11	35. A12/BC_n	36. A13
	37. WE_n/A14	38. CAS_n/A15	39. RAS_n/A16	40. DQ[0]
	41. DQ[1]	42. DQ[2]	43. DQ[3]	
	OptionalMapping/StandardTerminalName			
	1. TEN	2. A17		

For more information about the DDR4-x4 Interface, refer to the JEDEC standard JESD79-4B.

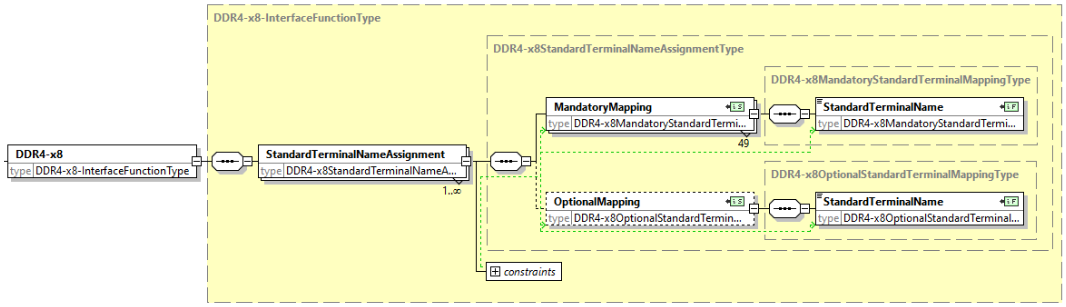
4.7.3.10.7.2. DDR4-x4 – Dual Die

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/DDR4-x4-DualDie
diagram	
type	DDR4-x4–DualDie-InterfaceFunctionType, DDR4-x4-DualDieStandardTerminalNameAssignmentType, DDR4-x4-DualDieMandatoryStandardTerminalMappingType, DDR4-x4-DualDieMandatoryStandardTerminalNameType, DDR4-x4-DualDieOptionalStandardTerminalMappingType, DDR4-x4-DualDieOptionalStandardTerminalNameType.

list of enumerate values				
	MandatoryMapping/StandardTerminalName			
	1. VDDQ	2. VSSQ	3. VPP	4. VDD
	5. VSS	6. DQS_c	7. DQS_t	8. ODT
	9. CS_n	10. CK_t	11. CK_c	12. ZQ
	13. ALERT_n	14. ACT_n	15. CKE	16. PAR
	17. RESET_n	18. VREFCA	19. BA0	20. BA1
	21. BG0	22. BG1	23. CKE1	24. CS1_n
	25. ODT1	26. A0	27. A1	28. A2
	29. A3	30. A4	31. A5	32. A6
	33. A7	34. A8	35. A9	36. A10/AP
	37. A11	38. A12/BC_n	39. A13	40. WE_n/A14
	41. CAS_n/A15	42. RAS_n/A16	43. DQ[0]	44. DQ[1]
	45. DQ[2]	46. DQ[3]		
	OptionalMapping/StandardTerminalName			
	1. TEN	2. A17		

For more information about the DDR4-x4 Dual Die Interface, refer to the JEDEC standard JESD79-4B.

4.7.3.10.7.3. DDR4-x8

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/DDR4-x8
diagram	

type	DDR4-x8–InterfaceFunctionType, DDR4-x8StandardTerminalNameAssignmentType, DDR4-x8MandatoryStandardTerminalMappingType, DDR4-x8MandatoryStandardTerminalNameType, DDR4-x8OptionalStandardTerminalMappingType, DDR4-x8OptionalStandardTerminalNameType.
list of enumerate values	MandatoryMapping/StandardTerminalName

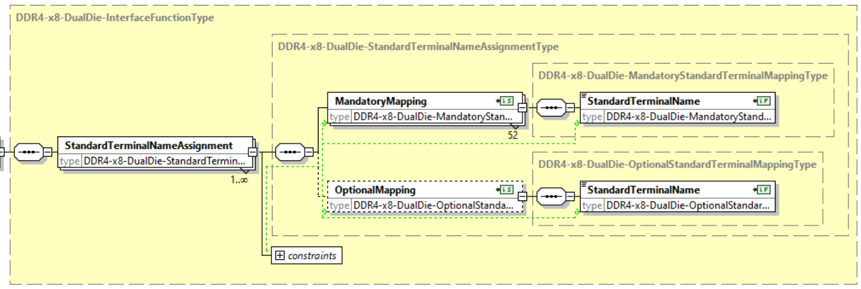
1. VDDQ	2. VSSQ	3. VPP	4. VDD
5. VSS	6. DM_n/DBI_n/TDQS_t	7. TDQS_c	8. DQS_c
9. DQS_t	10. ODT	11. CS_n	12. CK_t
13. CK_c	14. ZQ	15. ALERT_n	16. ACT_n
17. CKE	18. PAR	19. RESET_n	20. VREFCA
21. BA0	22. BA1	23. BG0	24. BG1
25. A0	26. A1	27. A2	28. A3
29. A4	30. A5	31. A6	32. A7
33. A8	34. A9	35. A10/AP	36. A11
37. A12/BC_n	38. A13	39. WE_n/A14	40. CAS_n/A15
41. RAS_n/A16	42. DQ[0]	43. DQ[1]	44. DQ[2]
45. DQ[3]	46. DQ[4]	47. DQ[5]	48. DQ[6]
49. DQ[7]			

OptionalMapping/StandardTerminalName

1. TEN			

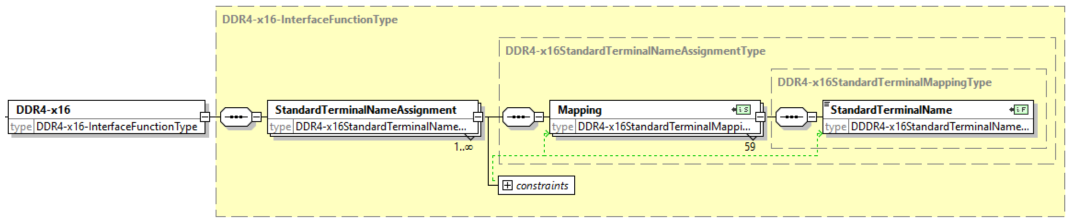
For more information about the DDR4-x8 Interface, refer to the JEDEC standard JESD79-4B.

4.7.3.10.7.4. DDR4-x8 Dual Die

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/DDR4-x8-DualDie</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DDR4-x8–DualDie-InterfaceFunctionType, DDR4-x8-DualDieStandardTerminalNameAssignmentType, DDR4-x8-DualDieMandatoryStandardTerminalMappingType, DDR4-x8-DualDieMandatoryStandardTerminalNameType, DDR4-x8-DualDieOptionalStandardTerminalMappingType, DDR4-x8-DualDieOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="16">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. VDDQ</td><td>2. VSSQ</td><td>3. VPP</td><td>4. VDD</td></tr>
<tr><td>5. VSS</td><td>6. DM_n/DBI_n/TDQS_t</td><td>7. TDQS_c</td><td>8. DQS_c</td></tr>
<tr><td>9. DQS_t</td><td>10. ODT</td><td>11. CS_n</td><td>12. CK_t</td></tr>
<tr><td>13. CK_c</td><td>14. ZQ</td><td>15. ALERT_n</td><td>16. ACT_n</td></tr>
<tr><td>17. CKE</td><td>18. PAR</td><td>19. RESET_n</td><td>20. VREFCA</td></tr>
<tr><td>21. BA0</td><td>22. BA1</td><td>23. BG0</td><td>24. BG1</td></tr>
<tr><td>25. CKE1</td><td>26. CS1_n</td><td>27. ODT1</td><td>28. A0</td></tr>
<tr><td>29. A1</td><td>30. A2</td><td>31. A3</td><td>32. A4</td></tr>
<tr><td>33. A5</td><td>34. A6</td><td>35. A7</td><td>36. A8</td></tr>
<tr><td>37. A9</td><td>38. A10/AP</td><td>39. A11</td><td>40. A12/BC_n</td></tr>
<tr><td>41. A13</td><td>42. WE_n/A14</td><td>43. CAS_n/A15</td><td>44. RAS_n/A16</td></tr>
<tr><td>45. DQ[0]</td><td>46. DQ[1]</td><td>47. DQ[2]</td><td>48. DQ[3]</td></tr>
<tr><td>49. DQ[4]</td><td>50. DQ[5]</td><td>51. DQ[6]</td><td>52. DQ[7]</td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. TEN</td><td></td><td></td><td></td></tr>
</table>

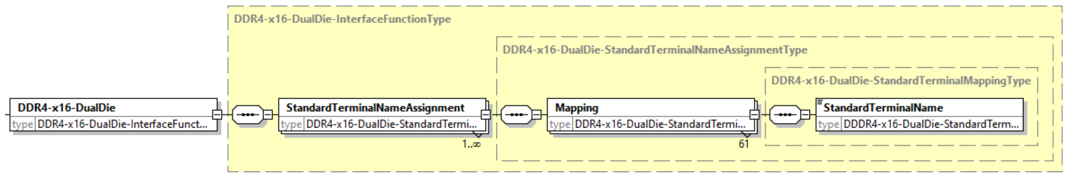
For more information about the DDR4-x8 Dual Die Interface, refer to the JEDEC standard JESD79-4B.

4.7.3.10.7.5. DDR4-x16

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/DDR4-x16			
diagram				
type	DDR4-x16–InterfaceFunctionType, DDR4-x16StandardTerminalNameAssignmentType, DDR4-x16StandardTerminalMappingType, DDR4-x16StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. VDDQ	2. VSSQ	3. VPP	4. VDD
	5. VSS	6. DQSU_c	7. DQSU_t	8. DQU[0]
	9. DQU[1]	10. DQU[2]	11. DQU[3]	12. DQU[4]
	13. DQU[5]	14. DQU[6]	15. DQU[7]	16. DQL[0]
	17. DQL[1]	18. DQL[2]	19. DQL[3]	20. DQL[4]
	21. DQL[5]	22. DQL[6]	23. DQL[7]	24. DMU_n/DBIU_n
	25. DML_n/DBIL_n	26. DQSL_c	27. DQSL_t	28. CKE
	29. ODT	30. CK_t	31. CK_c	32. A0
	33. A1	34. A2	35. A3	36. A4
	37. A5	38. A6	39. A7	40. A8
	41. A9	42. A10/AP	43. A11	44. A12/BC_n
	45. A13	46. WE_n/A14	47. CAS_n/A15	48. RAS_n/A16
	49. ACT_n	50. CS_n	51. VREFCA	52. BG0
	53. BA0	54. BA1	55. TEN	56. RESET_n
	57. ALERT_n	58. PAR	59. ZQ	

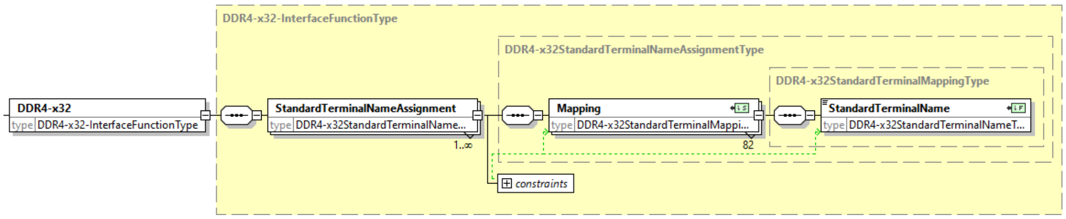
For more information about the DDR4-x16 Interface, refer to the JEDEC standard JESD79-4B.

4.7.3.10.7.6. DDR4-x16 – Dual Die

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/DDR4-x16-DualDie			
diagram				
type	DDR4-x16–DualDie-InterfaceFunctionType, DDR4-x16-DualDieStandardTerminalNameAssignmentType, DDR4-x16-DualDieStandardTerminalMappingType, DDR4-x16-DualDieStandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. VDDQ	2. VSSQ	3. VPP	4. VDD
	5. VSS	6. DQSU_c	7. DQSU_t	8. DQU[0]
	9. DQU[1]	10. DQU[2]	11. DQU[3]	12. DQU[4]
	13. DQU[5]	14. DQU[6]	15. DQU[7]	16. DQL[0]
	17. DQL[1]	18. DQL[2]	19. DQL[3]	20. DQL[4]
	21. DQL[5]	22. DQL[6]	23. DQL[7]	24. DMU_n/DBIU_n
	25. DML_n/DBIL_n	26. DQSL_c	27. DQSL_t	28. CKE
	29. ODT	30. CK_t	31. CK_c	32. A0
	33. A1	34. A2	35. A3	36. A4
	37. A5	38. A6	39. A7	40. A8
	41. A9	42. A10/AP	43. A11	44. A12/BC_n
	45. A13	46. WE_n/A14	47. CAS_n/A15	48. RAS_n/A16
	49. ACT_n	50. CS_n	51. VREFCA	52. BG0
	53. BG1	54. BA0	55. BA1	56. TEN
	57. RESET_n	58. ALERT_n	59. PAR	60. UZQ
	61. LZQ			

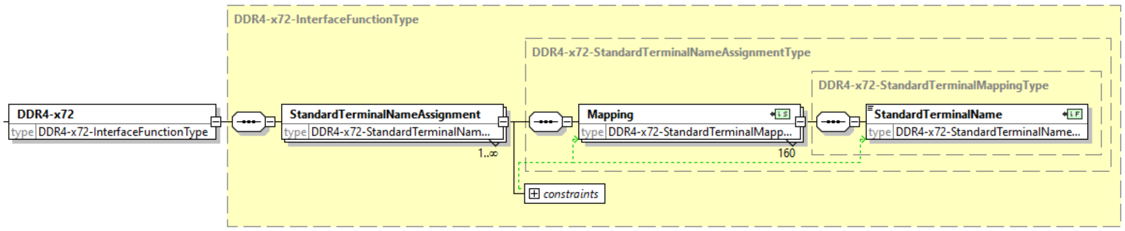
For more information about the DDR4-x16 Dual Die Interface, refer to the JEDEC standard JESD79-4B.

4.7.3.10.7.7. DDR4-x32

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/DDR4-x32</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DDR4-x32–InterfaceFunctionType, DDR4-x32StandardTerminalNameAssignmentType,
DDR4-x32StandardTerminalMappingType, DDR4-x32StandardTerminalNameType.</td></tr>
<tr><td rowspan="22">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. VDDQ</td><td>2. VSSQ</td><td>3. VPP</td><td>4. VDD</td></tr>
<tr><td>5. VSS</td><td>6. DQS0_t</td><td>7. DQS0_c</td><td>8. DQS1_c</td></tr>
<tr><td>9. DQS1_t</td><td>10. ODT</td><td>11. ODT1</td><td>12. CS_n</td></tr>
<tr><td>13. CS1_n</td><td>14. CKE</td><td>15. CKE1</td><td>16. CK_t</td></tr>
<tr><td>17. CK_c</td><td>18. TEN</td><td>19. VREFCA</td><td>20. BA0</td></tr>
<tr><td>21. BA1</td><td>22. ACT_n</td><td>23. BG0</td><td>24. RESET_n</td></tr>
<tr><td>25. RFU</td><td>26. ALERT_n</td><td>27. PAR</td><td>28. ZQ</td></tr>
<tr><td>29. ZQ1</td><td>30. A0</td><td>31. A1</td><td>32. A2</td></tr>
<tr><td>33. A3</td><td>34. A4</td><td>35. A5</td><td>36. A6</td></tr>
<tr><td>37. A7</td><td>38. A8</td><td>39. A9</td><td>40. A10/AP</td></tr>
<tr><td>41. A11</td><td>42. A12/BC_n</td><td>43. A13</td><td>44. WE_n/A14</td></tr>
<tr><td>45. CAS_n/A15</td><td>46. RAS_n/A16</td><td>47. DM0_n/DBI0_n</td><td>48. DM1_n/DBI1_n</td></tr>
<tr><td>49. DM2_n/DBI2_n</td><td>50. DM3_n/DBI3_n</td><td>51. DQ[0]</td><td>52. DQ[1]</td></tr>
<tr><td>53. DQ[2]</td><td>54. DQ[3]</td><td>55. DQ[4]</td><td>56. DQ[5]</td></tr>
<tr><td>57. DQ[6]</td><td>58. DQ[7]</td><td>59. DQ[8]</td><td>60. DQ[9]</td></tr>
<tr><td>61. DQ[10]</td><td>62. DQ[11]</td><td>63. DQ[12]</td><td>64. DQ[13]</td></tr>
<tr><td>65. DQ[14]</td><td>66. DQ[15]</td><td>67. DQ[16]</td><td>68. DQ[17]</td></tr>
<tr><td>69. DQ[18]</td><td>70. DQ[19]</td><td>71. DQ[20]</td><td>72. DQ[21]</td></tr>
<tr><td>73. DQ[22]</td><td>74. DQ[23]</td><td>75. DQ[24]</td><td>76. DQ[25]</td></tr>
<tr><td>77. DQ[26]</td><td>78. DQ[27]</td><td>79. DQ[28]</td><td>80. DQ[29]</td></tr>
<tr><td>81. DQ[30]</td><td>82. DQ[31]</td><td></td><td></td></tr>
</table>

For more information about the DDR4-x32 Interface, refer to the JEDEC standard JESD79-4B.

4.7.3.10.7.8. DDR4-x72

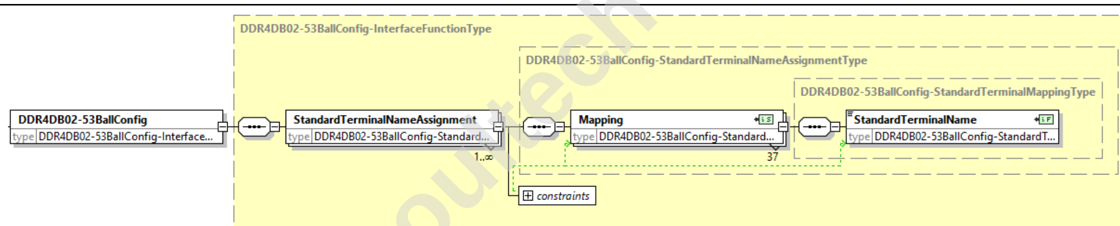
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/DDR4-x72
diagram	
type	DDR4-x72-InterfaceFunctionType, DDR4-x72-StandardTerminalNameAssignmentType, DDR4-x72-StandardTerminalMappingType, DDR4-x72-StandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName

1. A0	2. A1	3. A10/AP	4. A11
5. A12/BC_n	6. A13	7. A17	8. A2
9. A3	10. A4	11. A5	12. A6
13. A7	14. A8	15. A9	16. ACT_n
17. ALERT_n	18. BA0	19. BA1	20. BG0
21. BG1	22. CAS_n/A15	23. CB0	24. CB1
25. CB2	26. CB3	27. CB4	28. CB5
29. CB6	30. CB7	31. CK0_c	32. CK0_t
33. CK1_c	34. CK1_t	35. CKE0	36. CKE1/NC
37. CS0_n	38. CS1_n/NC	39. CS2_n/C0	40. CS3_n/C1, NC
41. DQ[0]	42. DQ[1]	43. DQ[2]	44. DQ[3]
45. DQ[4]	46. DQ[5]	47. DQ[6]	48. DQ[7]
49. DQ[8]	50. DQ[9]	51. DQ[10]	52. DQ[11]
53. DQ[12]	54. DQ[13]	55. DQ[14]	56. DQ[15]
57. DQ[16]	58. DQ[17]	59. DQ[18]	60. DQ[19]
61. DQ[20]	62. DQ[21]	63. DQ[22]	64. DQ[23]
65. DQ[24]	66. DQ[25]	67. DQ[26]	68. DQ[27]
69. DQ[28]	70. DQ[29]	71. DQ[30]	72. DQ[31]
73. DQ[32]	74. DQ[33]	75. DQ[34]	76. DQ[35]
77. DQ[36]	78. DQ[37]	79. DQ[38]	80. DQ[39]
81. DQ[40]	82. DQ[41]	83. DQ[42]	84. DQ[43]
85. DQ[44]	86. DQ[45]	87. DQ[46]	88. DQ[47]
89. DQ[48]	90. DQ[49]	91. DQ[50]	92. DQ[51]
93. DQ[52]	94. DQ[53]	95. DQ[54]	96. DQ[55]
97. DQ[56]	98. DQ[57]	99. DQ[58]	100. DQ[59]
101. DQ[60]	102. DQ[61]	103. DQ[62]	104. DQ[63]
105. DQS0_c	106. DQS0_t	107. DQS09_c/TDQS9_c	108. DQS1_c
109. DQS1_t	110. DQS10_c/TDQS10_c	111. DQS10_t/TDQS10_t	112. DQS11_c/TDQS11_c
113. DQS11_t/TDQS11_t	114. DQS12_c/TDQS12_c	115. DQS12_t/TDQS12_t	116. DQS13_c/TDQS13_c
117. DQS13_t/TDQ13_t	118. DQS14_c/TDQS14_c	119. DQS14_t/TDQS14_t	120. DQS15_c/TDQS15_c
121. DQS15_t/TDQS15_t	122. DQS16_c/TDQS16_c	123. DQS16_t/TDQS16_t	124. DQS17_c/TDQS17_c

4.7.3.10.7.8 DDR4-x72 (cont'd)

list of enumerate values	**Mapping/StandardTerminalName**			
	125. DQS17_t/TDQS17_t	**126. DQS2_c**	**127. DQS2_t**	**128. DQS3_c**
	129. DQS3_t	**130. DQS4_c**	**131. DQS4_t**	**132. DQS5_c**
	133. DQS5_t	**134. DQS6_c**	**135. DQS6_t**	**136. DQS7_c**
	137. DQS7_t	**138. DQS8_c**	**139. DQS8_t**	**140. DQS9_t/TDQS9_t**
	141. EVENT_n	**142. NC**	**143. NC/C2**	**144. ODT0**
	145. ODT1/NC	**146. PARITY**	**147. RAS_n/A16**	**148. RESET_n**
	149. SA0	**150. SA1**	**151. SA2**	**152. SCL**
	153. SDA	**154. VDD**	**155. VDDSPD**	**156. VPP**
	157. VREFCA	**158. VSS**	**159. VTT**	**160. WE_n/A14**
	161. DQS1_t	**162. DQS10_c/TDQS10_c**	**163. DQS10_t/TDQS10_t**	**164. DQS11_c/TDQS11_c**

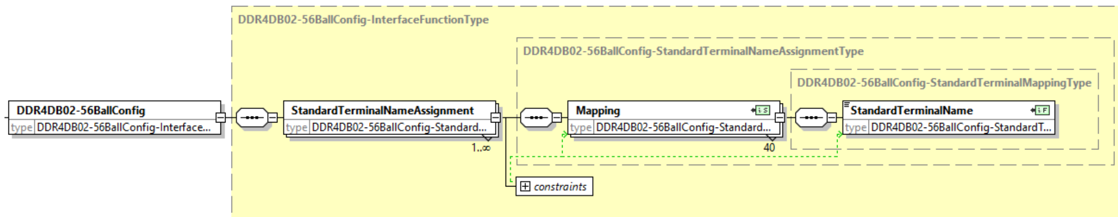
4.7.3.10.7.9. DDR4DB02 - 53 Ball Configuration

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/DDR4DB02**
diagram	
type	**DDR4DB02-53BallConfig-InterfaceFunctionType,** **DDR4DB02-53BallConfig-StandardTerminalNameAssignmentType,** **DDR4DB02-53BallConfig-StandardTerminalMappingType,** **DDR4DB02-53BallConfig-StandardTerminalNameType.**

list of enumerate values	**Mapping/StandardTerminalName**			
	1. ALERT_n	**2. BCK_c**	**3. BCK_t**	**4. BCKE**
	5. BCOM0	**6. BCOM1**	**7. BCOM2**	**8. BCOM3**
	9. BODT	**10. BVrefCA**	**11. DQ0**	**12. DQ1**
	13. DQ2	**14. DQ3**	**15. DQ4**	**16. DQ5**
	17. DQ6	**18. DQ7**	**19. DQS0_c**	**20. DQS0_t**
	21. DQS1_c	**22. DQS1_t**	**23. MDQ0**	**24. MDQ1**
	25. MDQ2	**26. MDQ3**	**27. MDQ4**	**28. MDQ5**
	29. MDQ6	**30. MDQ7**	**31. MDQS0_c**	**32. MDQS0_t**
	33. MDQS1_c	**34. MDQS1_t**	**35. VDD**	**36. VSS**
	37. ZQCAL			

For more information about the DDR4DB02 Interface, refer to the JEDEC standard JESD82-32A.

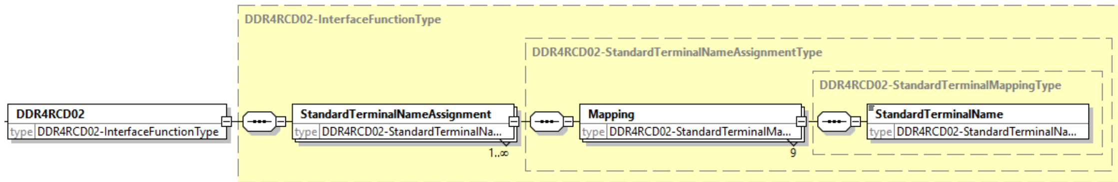
4.7.3.10.7.10. DDR4DB02 - 56 Ball Configuration

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/DDR4DB02
diagram	
type	DDR4DB02-56BallConfig-InterfaceFunctionType, DDR4DB02-56BallConfig-StandardTerminalNameAssignmentType, DDR4DB02-56BallConfig-StandardTerminalMappingType, DDR4DB02-56BallConfig-StandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName

1. ALERT_n	2. BCK_c	3. BCK_t	4. BCKE
5. BCOM0	6. BCOM1	7. BCOM2	8. BCOM3
9. BODT	10. BVrefCA	11. DQ0	12. DQ1
13. DQ2	14. DQ3	15. DQ4	16. DQ5
17. DQ6	18. DQ7	19. DQS0_c	20. DQS0_t
21. DQS1_c	22. DQS1_t	23. LDQ0	24. LDQ1
25. LDQS	26. MDQ0	27. MDQ1	28. MDQ2
29. MDQ3	30. MDQ4	31. MDQ5	32. MDQ6
33. MDQ7	34. MDQS0_c	35. MDQS0_t	36. MDQS1_c
37. MDQS1_t	38. VDD	39. VSS	40. ZQCAL

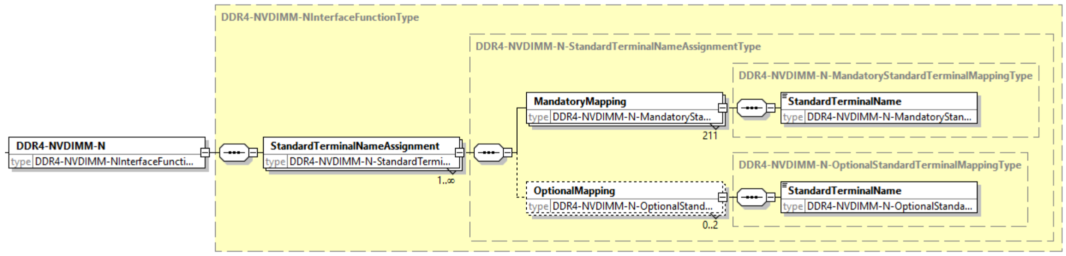
For more information about the DDR4DB02 Interface, refer to the JEDEC standard JESD82-32A.

4.7.3.10.7.11. DDR4RCD02

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/DDR4RCD02</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DDR4RCD02-InterfaceFunctionType, DDR4RCD02-StandardTerminalNameAssignmentType,
DDR4RCD02-StandardTerminalMappingType, DDR4RCD02-StandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. BCOM0</td><td>2. BCOM1</td><td>3. BCOM2</td><td>4. BCOM3</td></tr>
<tr><td>5. BCKE</td><td>6. BODT</td><td>7. BCK_t</td><td>8. BCK_c</td></tr>
<tr><td>9. BVrefCA</td><td></td><td></td><td></td></tr>
</table>

For more information about the DDR4CD02 Interface, refer to the JEDEC standard JESD82-31A.

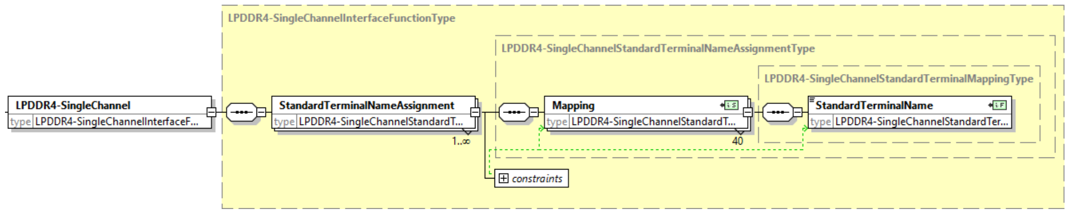
4.7.3.10.7.12. DDR4-NVDIMM-N

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/DDR4-NVDIMM-N			
diagram				
type	DDR4-NVDIMM-NInterfaceFunctionType, DDR4-NVDIMM-N-StandardTerminalNameAssignmentType, DDR4-NVDIMM-N-MandatoryStandardTerminalMappingType, DDR4-NVDIMM-N-MandatoryStandardTerminalNameType, DDR4-NVDIMM-N-OptionalStandardTerminalMappingType, DDR4-NVDIMM-N-OptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. A0	2. A1	3. A2	4. A3
	5. A4	6. A5	7. A6	8. A7
	9. A8	10. A9	11. A10	12. A11
	13. A12	14. A13	15. A14	16. A15
	17. A16	18. BA0	19. BA1	20. BG0
	21. BG1	22. RAS_n	23. CAS_n	24. WE_n
	25. CS0_n	26. CS01_n	27. CS2_n	28. CS3_n
	29. CKE0	30. CKE1	31. ODT0	32. ODT1
	33. ACT_n	34. DQ[0]	35. DQ[1]	36. DQ[2]
	37. DQ[3]	38. DQ[4]	39. DQ[5]	40. DQ[6]
	41. DQ[7]	42. DQ[8]	43. DQ[9]	44. DQ[10]
	45. DQ[11]	46. DQ[12]	47. DQ[13]	48. DQ[14]
	49. DQ[15]	50. DQ[16]	51. DQ[17]	52. DQ[18]
	53. DQ[19]	54. DQ[20]	55. DQ[21]	56. DQ[22]
	57. DQ[23]	58. DQ[24]	59. DQ[25]	60. DQ[26]
	61. DQ[27]	62. DQ[28]	63. DQ[29]	64. DQ[30]
	65. DQ[31]	66. DQ[32]	67. DQ[33]	68. DQ[34]
	69. DQ[35]	70. DQ[36]	71. DQ[37]	72. DQ[38]
	73. DQ[39]	74. DQ[40]	75. DQ[41]	76. DQ[42]

4.7.3.10.7.12 DDR4-NVDIMM-N (cont'd)

list of enumerate values (cont.)	MandatoryMapping/StandardTerminalName			
	77. DQ[43]	78. DQ[44]	79. DQ[45]	80. DQ[46]
	81. DQ[47]	82. DQ[48]	83. DQ[49]	84. DQ[50]
	85. DQ[51]	86. DQ[52]	87. DQ[53]	88. DQ[54]
	89. DQ[55]	90. DQ[56]	91. DQ[57]	92. DQ[58]
	93. DQ[59]	94. DQ[60]	95. DQ[61]	96. DQ[62]
	97. DQ[63]	98. CB0	99. CB1	100. CB2
	101. CB3	102. CB4	103. CB5	104. CB6
	105. CB7	106. TQDS9_t	107. TQDS10_t	108. TQDS11_t
	109. TQDS12_t	110. TQDS13_t	111. TQDS14_t	112. TQDS15_t
	113. TQDS16_t	114. TQDS17_t	115. TQDS9_c	116. TQDS10_c
	117. TQDS11_c	118. TQDS12_c	119. TQDS13_c	120. TQDS14_c
	121. TQDS15_c	122. TQDS16_c	123. TQDS17_c	124. DQS0_t
	125. DQS1_t	126. DQS2_t	127. DQS3_t	128. DQS4_t
	129. DQS5_t	130. DQS6_t	131. DQS7_t	132. DQS8_t
	133. DQS9_t	134. DQS10_t	135. DQS11_t	136. DQS12_t
	137. DQS13_t	138. DQS14_t	139. DQS15_t	140. DQS16_t
	141. DQS17_t	142. DQS0_c	143. DQS1_c	144. DQS2_c
	145. DQS3_c	146. DQS4_c	147. DQS5_c	148. DQS6_c
	149. DQS7_c	150. DQS8_c	151. DQS9_c	152. DQS10_c
	153. DQS11_c	154. DQS12_c	155. DQS13_c	156. DQS14_c
	157. DQS15_c	158. DQS16_c	159. DQS17_c	160. DBI0_n
	161. DBI1_n	162. DBI2_n	163. DBI3_n	164. DBI4_n
	165. DBI5_n	166. DBI6_n	167. DBI7_n	168. DBI8_n
	169. DBI9_n	170. DBI10_n	171. DBI11_n	172. DBI12_n
	173. DBI13_n	174. DBI14_n	175. DBI15_n	176. DBI16_n
	177. DBI17_n	178. DBI18_n	179. CK0_t	180. CK1_t
	181. CK0_c	182. CK1_c	183. SCL	184. SDA
	185. SA0	186. SA1	187. SA2	188. PAR
	189. VDD	190. C0	191. C1	192. C2
	193. 12V	194. VREFCA	195. VSS	196. VSDDSPD
	197. ALERT_n	198. VPP	199. SAVE_n	200. DM0_n
	201. DM1_n	202. DM2_n	203. DM3_n	204. DM4_n
	205. DM5_n	206. DM6_n	207. DM7_n	208. DM8_n
	209. RESET_n	210. EVENT_n	211. VTT	
list of enumerate values	OptionalMapping/StandardTerminalName			
	1. RFU	2. A17		

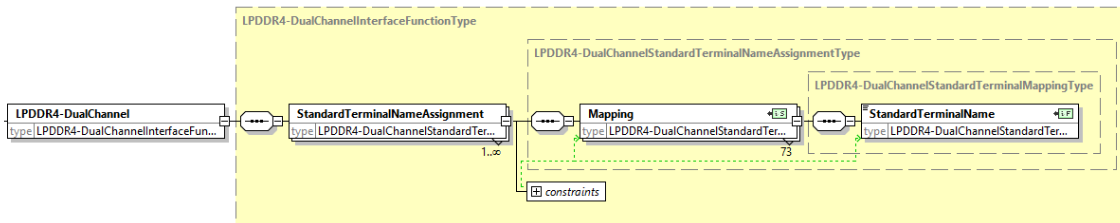
4.7.3.10.7.13. LPDDR4 – Single Channel

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/LPDDR4-SingleChannel
diagram	
type	LPDDR4-SingleChannel-InterfaceFunctionType, LPDDR4-SingleChannelStandardTerminalNameAssignmentType, LPDDR4-SingleChannelStandardTerminalMappingType, LPDDR4-SingleChannelStandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName

1. CK_t	2. CK_c	3. CKE	4. CS
5. CA0	6. CA1	7. CA2	8. CA3
9. CA4	10. CA5	11. ODT(ca)	12. DQ[0]
13. DQ[1]	14. DQ[2]	15. DQ[3]	16. DQ[4]
17. DQ[5]	18. DQ[6]	19. DQ[7]	20. DQ[8]
21. DQ[9]	22. DQ[10]	23. DQ[11]	24. DQ[12]
25. DQ[13]	26. DQ[14]	27. DQ[15]	28. DQS0_t
29. DQS1_t	30. DQS0_c	31. DQS1_c	32. DMI0
33. DMI1	34. ZQ	35. VDDQ	36. VDD1
37. VDD2	38. VSS	39. VSSQ	40. RESET_n

For more information about the LPDDR4 – Single Channel Interface, refer to the JEDEC standard JESD209-4D.

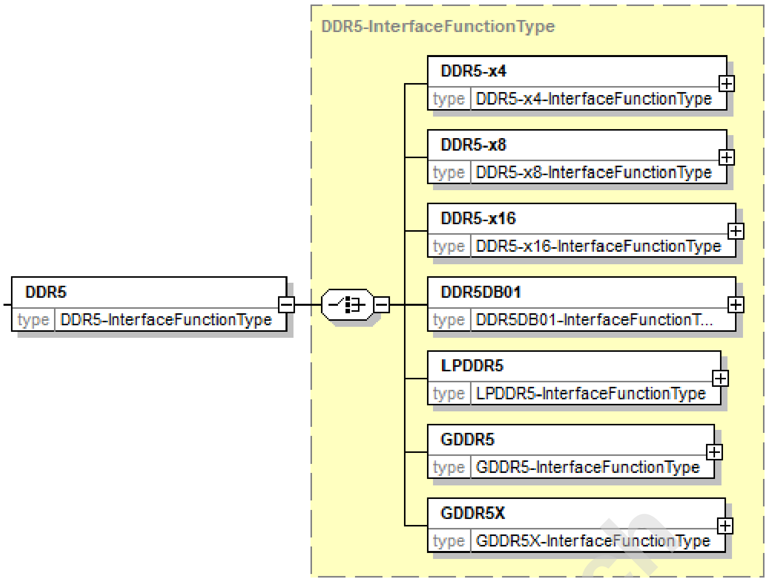
4.7.3.10.7.14. LPDDR4 – Dual Channel

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/LPDDR4-DualChannel
diagram	
type	LPDDR4-DualChannelInterfaceFunctionType, LPDDR4-DualChannelStandardTerminalNameAssignmentType, LPDDR4-DualChannelStandardTerminalMappingType, LPDDR4-DualChannelStandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName

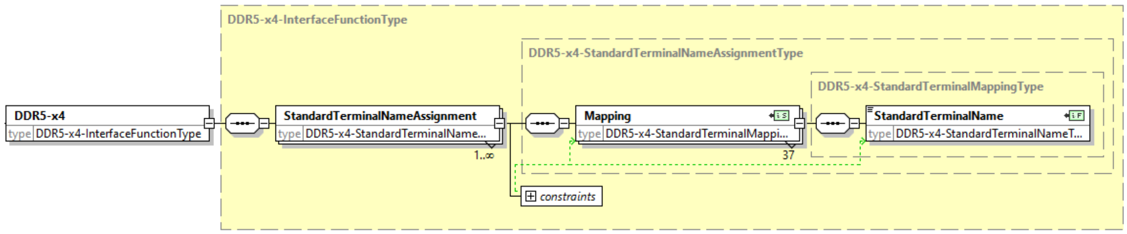
1. CK_t_A	2. CK_c_A	3. CK_t_B	4. CK_c_B
5. CKE_A	6. CKE_B	7. CS_A	8. CS_B
9. CA0_A	10. CA1_A	11. CA2_A	12. CA3_A
13. CA4_A	14. CA5_A	15. CA0_B	16. CA1_B
17. CA2_B	18. CA3_B	19. CA4_B	20. CA5_B
21. ODT(ca)_A	22. ODT(ca)_B	23. DQ[0]_A	24. DQ[1]_A
25. DQ[2]_A	26. DQ[3]_A	27. DQ[4]_A	28. DQ[5]_A
29. DQ[6]_A	30. DQ[7]_A	31. DQ[8]_A	32. DQ[9]_A
33. DQ[10]_A	34. DQ[11]_A	35. DQ[12]_A	36. DQ[13]_A
37. DQ[14]_A	38. DQ[15]_A	39. DQ[0]_B	40. DQ[1]_B
41. DQ[2]_B	42. DQ[3]_B	43. DQ[4]_B	44. DQ[5]_B
45. DQ[6]_B	46. DQ[7]_B	47. DQ[8]_B	48. DQ[9]_B
49. DQ[10]_B	50. DQ[11]_B	51. DQ[12]_B	52. DQ[13]_B
53. DQ[14]_B	54. DQ[15]_B	55. DQS0_t_A	56. DQS1_t_A
57. DQS0_c_A	58. DQS1_c_A	59. DQS0_t_B	60. DQS1_t_B
61. DQS0_c_B	62. DQS1_c_B	63. DMI0_A	64. DMI1_A
65. DMI0_B	66. DMI1_B	67. ZQ	68. VDDQ
69. VDD1	70. VDD2	71. VSS	72. VSSQ
73. RESET_n			

For more information about the LPDDR4 – Dual Channel Interface, refer to the JEDEC standard JESD209-4D.

4.7.3.10.8. DDR5 Interface Function

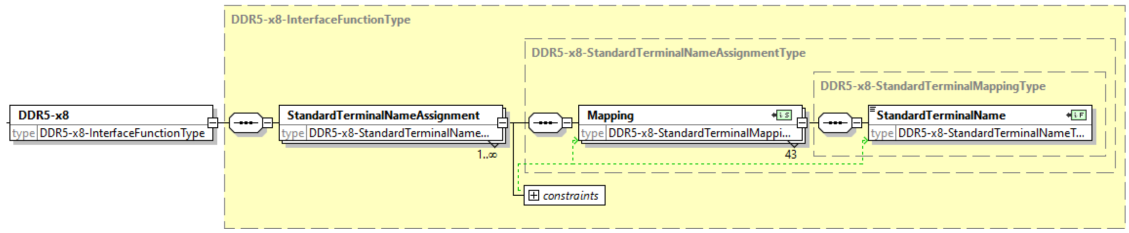
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR5
diagram	
type	DDR5-InterfaceFunctionType, DDR5-x4-InterfaceFunctionType, DDR5-x8-InterfaceFunctionType, DDR5-x16-InterfaceFunctionType, DDR5DB01-InterfaceFunctionType, LPDDR5-InterfaceFunctionType, GDDR5-InterfaceFunctionType GDDR5X-InterfaceFunctionType.

4.7.3.10.8.1. DDR5-x4

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR5-x4</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DDR5-x4-InterfaceFunctionType, DDR5-x4-StandardTerminalNameAssignmentType,
DDR5-x4-StandardTerminalMappingType, DDR5-x4-StandardTerminalNameType.</td></tr>
<tr><td rowspan="11">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. ALERT_n</td><td>2. CA_ODT</td><td>3. CA0</td><td>4. CA1</td></tr>
<tr><td>5. CA2</td><td>6. CA3</td><td>7. CA4</td><td>8. CA5</td></tr>
<tr><td>9. CA6</td><td>10. CA7</td><td>11. CA8</td><td>12. CA9</td></tr>
<tr><td>13. CA10</td><td>14. CA11</td><td>15. CA12</td><td>16. CA13</td></tr>
<tr><td>17. CAI</td><td>18. CK_c</td><td>19. CK_t</td><td>20. CS_n</td></tr>
<tr><td>21. DM_n</td><td>22. DQ[0]</td><td>23. DQ[1]</td><td>24. DQ[2]</td></tr>
<tr><td>25. DQ[3]</td><td>26. DQS_c</td><td>27. DQS_t</td><td>28. LBDQ</td></tr>
<tr><td>29. LBDQS</td><td>30. MIR</td><td>31. RESET_n</td><td>32. TEN</td></tr>
<tr><td>33. VDD</td><td>34. VDDQ</td><td>35. VPP</td><td>36. VSS</td></tr>
<tr><td>37. ZQ</td><td></td><td></td><td></td></tr>
</table>

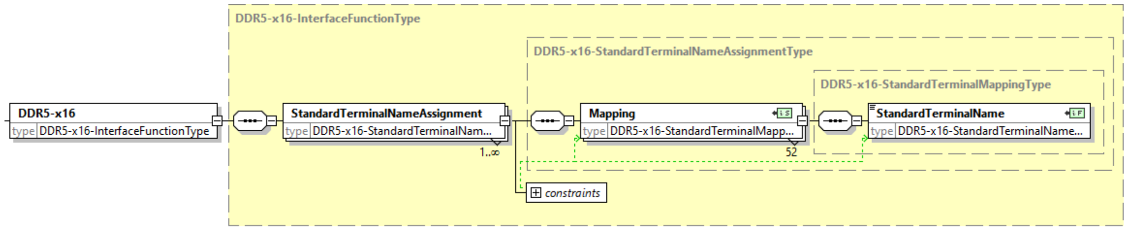
For more information about the DDR5-x4 Interface, refer to the JEDEC standard JESD79-5A.

4.7.3.10.8.2. DDR5-x8

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR5-x8</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DDR5-x8-InterfaceFunctionType, DDR5-x8-StandardTerminalNameAssignmentType,
DDR5-x8-StandardTerminalMappingType, DDR5-x8-StandardTerminalNameType.</td></tr>
<tr><td rowspan="12">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. ALERT_n</td><td>2. CA_ODT</td><td>3. CA0</td><td>4. CA1</td></tr>
<tr><td>5. CA2</td><td>6. CA3</td><td>7. CA4</td><td>8. CA5</td></tr>
<tr><td>9. CA6</td><td>10. CA7</td><td>11. CA8</td><td>12. CA9</td></tr>
<tr><td>13. CA10</td><td>14. CA11</td><td>15. CA12</td><td>16. CA13</td></tr>
<tr><td>17. CAI</td><td>18. CK_c</td><td>19. CK_t</td><td>20. CS_n</td></tr>
<tr><td>21. DM_n</td><td>22. DQ[0]</td><td>23. DQ[1]</td><td>24. DQ[2]</td></tr>
<tr><td>25. DQ[3]</td><td>26. DQ[4]</td><td>27. DQ[5]</td><td>28. DQ[6]</td></tr>
<tr><td>29. DQ[7]</td><td>30. DQS_c</td><td>31. DQS_t</td><td>32. LBDQ</td></tr>
<tr><td>33. LBDQS</td><td>34. MIR</td><td>35. RESET_n</td><td>36. TDQS_c</td></tr>
<tr><td>37. TDQS_t</td><td>38. TEN</td><td>39. VDD</td><td>40. VDDQ</td></tr>
<tr><td>41. VPP</td><td>42. VSS</td><td>43. ZQ</td><td></td></tr>
</table>

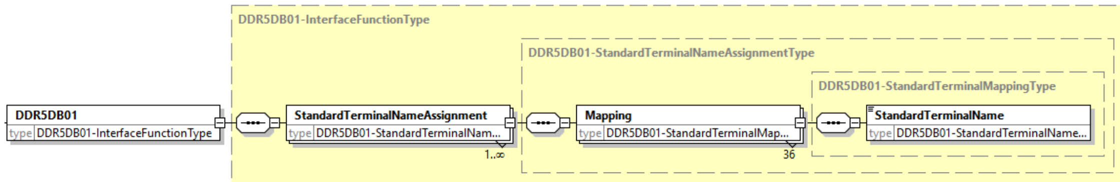
For more information about the DDR5-x8 Interface, refer to the JEDEC standard JESD79-5A.

4.7.3.10.8.3. DDR5-x16

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR5-x16</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DDR5-x16-InterfaceFunctionType, DDR5-x16-StandardTerminalNameAssignmentType,
DDR5-x16-StandardTerminalMappingType, DDR5-x16-StandardTerminalNameType.</td></tr>
<tr><td rowspan="14">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. ALERT_n</td><td>2. CA_ODT</td><td>3. CA0</td><td>4. CA1</td></tr>
<tr><td>5. CA2</td><td>6. CA3</td><td>7. CA4</td><td>8. CA5</td></tr>
<tr><td>9. CA6</td><td>10. CA7</td><td>11. CA8</td><td>12. CA9</td></tr>
<tr><td>13. CA10</td><td>14. CA11</td><td>15. CA12</td><td>16. CA13</td></tr>
<tr><td>17. CAI</td><td>18. CK_c</td><td>19. CK_t</td><td>20. CS_n</td></tr>
<tr><td>21. DML_n</td><td>22. DMU_n</td><td>23. DQL[0]</td><td>24. DQL[1]</td></tr>
<tr><td>25. DQL[2]</td><td>26. DQL[3]</td><td>27. DQL[4]</td><td>28. DQL[5]</td></tr>
<tr><td>29. DQL[6]</td><td>30. DQL[7]</td><td>31. DQSL_c</td><td>32. DQSL_t</td></tr>
<tr><td>33. DQSU_c</td><td>34. DQSU_t</td><td>35. DQU[0]</td><td>36. DQU[1]</td></tr>
<tr><td>37. DQU[2]</td><td>38. DQU[3]</td><td>39. DQU[4]</td><td>40. DQU[5]</td></tr>
<tr><td>41. DQU[6]</td><td>42. DQU[7]</td><td>43. LBDQ</td><td>44. LBDQS</td></tr>
<tr><td>45. MIR</td><td>46. RESET_n</td><td>47. TEN</td><td>48. VDD</td></tr>
<tr><td>49. VDDQ</td><td>50. VPP</td><td>51. VSS</td><td>52. ZQ</td></tr>
</table>

For more information about the DDR5-x16 Interface, refer to the JEDEC standard JESD79-5A.

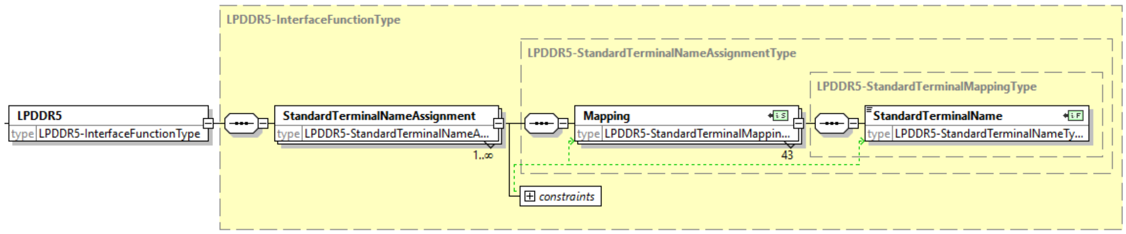
4.7.3.10.8.4. DDR5DB01

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR5DB01
diagram	
type	DDR5DB01-InterfaceFunctionType, DDR5DB01-StandardTerminalNameAssignmentType, DDR5DB01-StandardTerminalMappingType, DDR5DB01-StandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName

1. BCS_n	2. BRST_n	3. BCOM0	4. BCOM1
5. BCOM2	6. BCK_t	7. BCK_c	8. DQ[0]
9. DQ[1]	10. DQ[2]	11. DQ[3]	12. DQ[4]
13. DQ[5]	14. DQ[6]	15. DQ[7]	16. DQS0_t
17. DQS0_c	18. DQS1_t	19. DQS1_c	20. MDQ0
21. MDQ1	22. MDQ2	23. MDQ3	24. MDQ4
25. MDQ5	26. MDQ6	27. MDQ7	28. MDQS0_t
29. MDQS0_c	30. MDQS1_t	31. MDQS1_c	32. LBTXDQ
33. LBTXDQS	34. VDD	35. VSS	36. ZQCAL

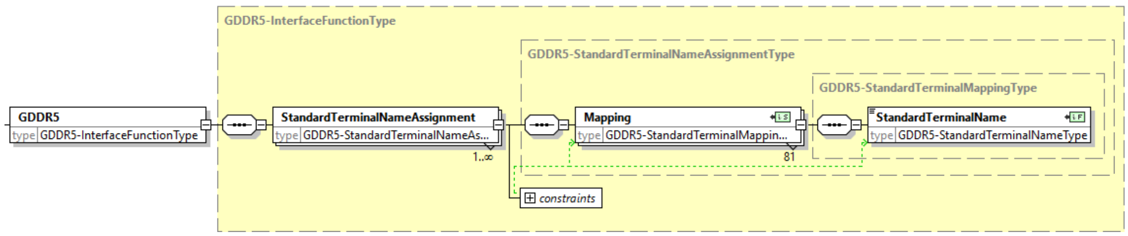
For more information about the DDR5DB01 Interface, refer to the JEDEC standard JESD82-521.

4.7.3.10.8.5. LPDDR5

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/LPDDR5</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">LDDR5-InterfaceFunctionType, LDDR5-StandardTerminalNameAssignmentType,
LDDR5-StandardTerminalMappingType, LDDR5-StandardTerminalNameType.</td></tr>
<tr><td rowspan="12">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. CK_t</td><td>2. CK_c</td><td>3. CS</td><td>4. CA0</td></tr>
<tr><td>5. CA1</td><td>6. CA2</td><td>7. CA3</td><td>8. CA4</td></tr>
<tr><td>9. CA5</td><td>10. CA6</td><td>11. DQ[0]</td><td>12. DQ[1]</td></tr>
<tr><td>13. DQ[2]</td><td>14. DQ[3]</td><td>15. DQ[4]</td><td>16. DQ[5]</td></tr>
<tr><td>17. DQ[6]</td><td>18. DQ[7]</td><td>19. DQ[8]</td><td>20. DQ[9]</td></tr>
<tr><td>21. DQ[10]</td><td>22. DQ[11]</td><td>23. DQ[12]</td><td>24. DQ[13]</td></tr>
<tr><td>25. DQ[14]</td><td>26. DQ[15]</td><td>27. WCK0_t</td><td>28. WCK0_c</td></tr>
<tr><td>29. WCK1_t</td><td>30. WCK1_c</td><td>31. RDQS0_t</td><td>32. RDQS0_c</td></tr>
<tr><td>33. RDQS1_t</td><td>34. RDQS1_c</td><td>35. DMI0</td><td>36. DMI1</td></tr>
<tr><td>37. ZQ</td><td>38. VDDQ</td><td>39. VDD1</td><td>40. VDD2H</td></tr>
<tr><td>41. VDD2L</td><td>42. VSS</td><td>43. RESET_n</td><td></td></tr>
</table>

For more information about the LPDDR5 Interface, refer to the JEDEC standard JESD209-5B.

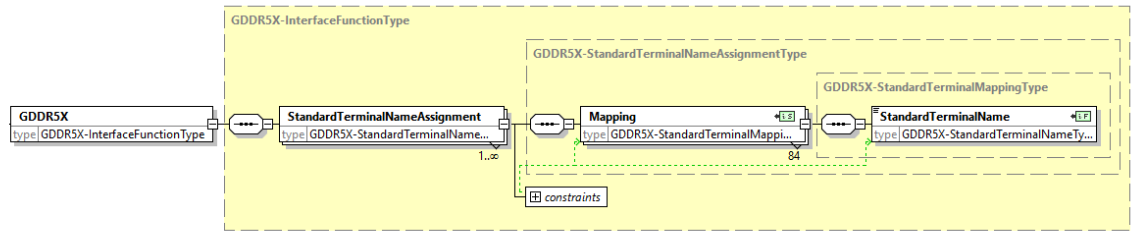
4.7.3.10.8.6. GDDR5

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/GDDR5
diagram	
type	GDDR5-InterfaceFunctionType, GDDR5-StandardTerminalNameAssignmentType, GDDR5-StandardTerminalMappingType, GDDR5-StandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName

1. A0	2. A1	3. A2	4. A3
5. A4	6. A5	7. A6	8. A7
9. A8	10. A9	11. A10	12. A11
13. A12	14. A13	15. ABI_n	16. BA0
17. BA1	18. BA2	19. BA3	20. CAS_n
21. CK_c	22. CK_t	23. CKE_n	24. CS_n
25. DBI0_n	26. DBI1_n	27. DBI2_n	28. DBI3_n
29. DQ[0]	30. DQ[1]	31. DQ[2]	32. DQ[3]
33. DQ[4]	34. DQ[5]	35. DQ[6]	36. DQ[7]
37. DQ[8]	38. DQ[9]	39. DQ[10]	40. DQ[11]
41. DQ[12]	42. DQ[13]	43. DQ[14]	44. DQ[15]
45. DQ[16]	46. DQ[17]	47. DQ[18]	48. DQ[19]
49. DQ[20]	50. DQ[21]	51. DQ[22]	52. DQ[23]
53. DQ[24]	54. DQ[25]	55. DQ[26]	56. DQ[27]
57. DQ[28]	58. DQ[29]	59. DQ[30]	60. DQ[31]
61. EDC0	62. EDC1	63. EDC2	64. EDC3
65. MF	66. RAS_n	67. RESET_n	68. SEN
69. VDD	70. VDDQ	71. VPP	72. VREFC
73. VREFD	74. VSS	75. VSSQ	76. WCK01_c
77. WCK01_t	78. WCK23_c	79. WCK23_t	80. WE_n
81. ZQ			

For more information about the GDDR5 Interface, refer to the JEDEC standard JESD212C.

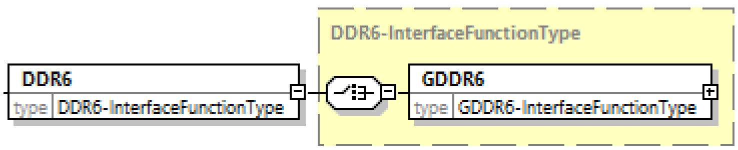
4.7.3.10.8.7. GDDR5X

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/GDDR5X
diagram	
type	GDDR5X-InterfaceFunctionType, GDDR5X-StandardTerminalNameAssignmentType, GDDR5X-StandardTerminalMappingType, GDDR5X-StandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName

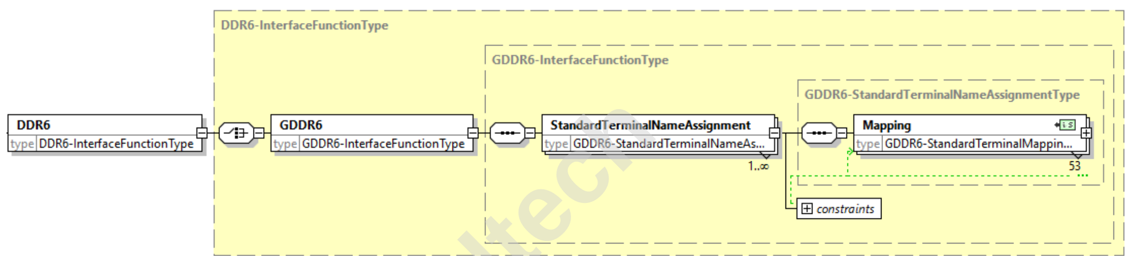
1. A0	2. A1	3. A2	4. A3
5. A4	6. A5	7. A6	8. A7
9. A8	10. A9	11. A10	12. A11
13. A12	14. A13	15. A14	16. A15
17. ABI_n	18. BA0	19. BA1	20. BA2
21. BA3	22. CAS_n	23. CK_c	24. CK_t
25. CKE_n	26. DBI0_n	27. DBI1_n	28. DBI2_n
29. DBI3_n	30. DQ[0]	31. DQ[1]	32. DQ[2]
33. DQ[3]	34. DQ[4]	35. DQ[5]	36. DQ[6]
37. DQ[7]	38. DQ[8]	39. DQ[9]	40. DQ[10]
41. DQ[11]	42. DQ[12]	43. DQ[13]	44. DQ[14]
45. DQ[15]	46. DQ[16]	47. DQ[17]	48. DQ[18]
49. DQ[19]	50. DQ[20]	51. DQ[21]	52. DQ[22]
53. DQ[23]	54. DQ[24]	55. DQ[25]	56. DQ[26]
57. DQ[27]	58. DQ[28]	59. DQ[29]	60. DQ[30]
61. DQ[31]	62. EDC0	63. EDC1	64. EDC2
65. EDC3	66. MF	67. RAS_n	68. RESET_n
69. TCK	70. TDI	71. TDO	72. TMS
73. VDD	74. VDDQ	75. VPP	76. VREFC
77. VSS	78. VSSQ	79. WCK01_c	80. WCK01_t
81. WCK23_c	82. WCK23_t	83. WE_n	84. ZQ

For more information about the GDDR5X Interface, refer to the JEDEC standard JESD232A.

4.7.3.10.9. DDR6 Interface Function

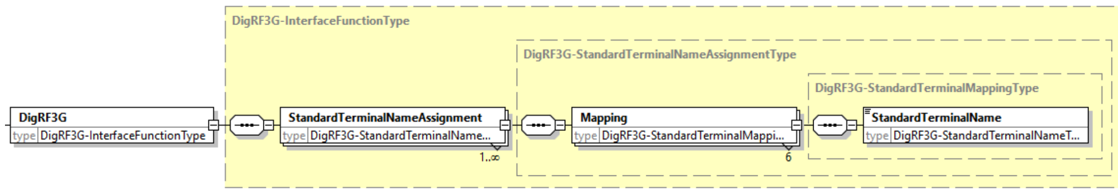
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR5</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>DDR6-InterfaceFunctionType, GDDR6-InterfaceFunctionType</td></tr>
</table>

4.7.3.10.9.1. GDDR6

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DDR4/LPDDR4-DualChannel</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">GDDR6-InterfaceFunctionType, GDDR6-StandardTerminalNameAssignmentType, GDDR6-StandardTerminalMappingType, GDDR6-StandardTerminalNameType.</td></tr>
<tr><td rowspan="14">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. CA0</td><td>2. CA1</td><td>3. CA2</td><td>4. CA3</td></tr>
<tr><td>5. CA4</td><td>6. CA5</td><td>7. CA6</td><td>8. CA7</td></tr>
<tr><td>9. CA8</td><td>10. CA9</td><td>11. CA10</td><td>12. CABI_n</td></tr>
<tr><td>13. CK_c</td><td>14. CK_t</td><td>15. CKE_n</td><td>16. DBI0_n</td></tr>
<tr><td>17. DBI1_n</td><td>18. DQ[0]</td><td>19. DQ[1]</td><td>20. DQ[2]</td></tr>
<tr><td>21. DQ[3]</td><td>22. DQ[4]</td><td>23. DQ[5]</td><td>24. DQ[6]</td></tr>
<tr><td>25. DQ[7]</td><td>26. DQ[8]</td><td>27. DQ[9]</td><td>28. DQ[10]</td></tr>
<tr><td>29. DQ[11]</td><td>30. DQ[12]</td><td>31. DQ[13]</td><td>32. DQ[14]</td></tr>
<tr><td>33. DQ[15]</td><td>34. EDC0</td><td>35. EDC1</td><td>36. RESET_n</td></tr>
<tr><td>37. TCK</td><td>38. TDI</td><td>39. TDO</td><td>40. TMS</td></tr>
<tr><td>41. VDD</td><td>42. VDDQ</td><td>43. VPP</td><td>44. VREFC</td></tr>
<tr><td>45. VSS</td><td>46. WCK0_c</td><td>47. WCK0_t</td><td>48. WCK1_c</td></tr>
<tr><td>49. WCK1_t</td><td>50. ZQ</td><td></td><td></td></tr>
</table>

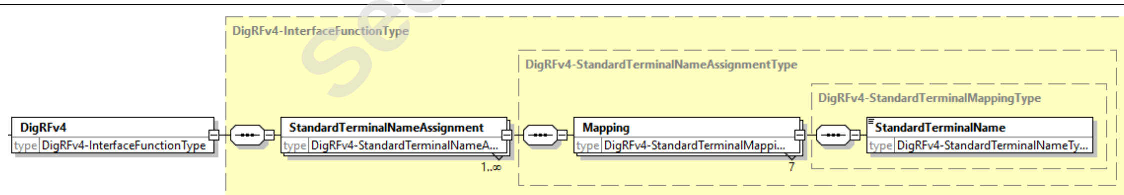
For more information about the GDDR6 Interface, refer to the JEDEC standard JESD250C.

4.7.3.10.10. DigRF3G Interface Function

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DigRF3G			
diagram				
type	DigRF3G-InterfaceFunctionType, DigRF3G-StandardTerminalNameAssignmentType, DigRF3G-StandardTerminalMappingType, DigRF3G-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. SysClk	2. SysClkEn	3. TxDataP	4. TxDataN
	5. RxDataP	6. RxDataN		

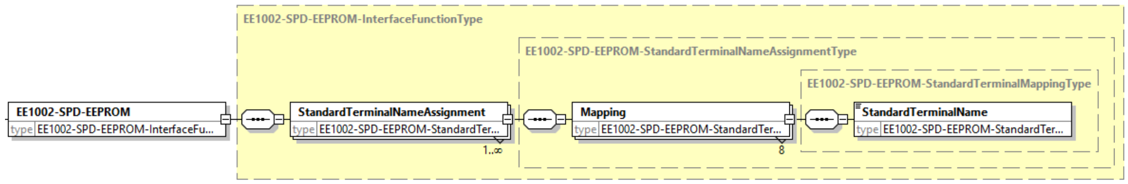
For more information about the DigRF3G Interface, refer to the MIPI Alliance standard Specification for Dual Mode 2.5G/3G Baseband/RFIC Interface Version 3.09.06.

4.7.3.10.11. DigRFv4 Interface Function

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/DigRFv4			
diagram				
type	DigRFv4-InterfaceFunctionType, DigRFv4-StandardTerminalNameAssignmentType, DigRFv4-StandardTerminalMappingType, DigRFv4-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. TxDataP	2. TxDataN	3. RxDataP	4. RxDataN
	5. DigRFEN	6. RefClkEn	7. RefClk	

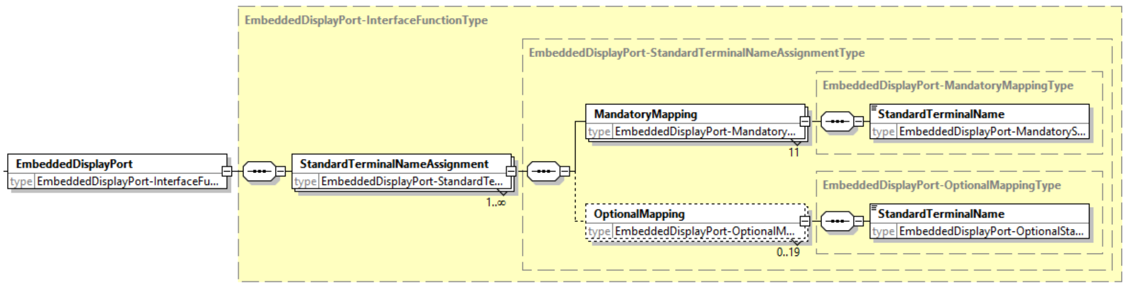
For more information about the DigRFv4 Interface, refer to the MIPI Alliance standard Specification for DigiRFv4 Version 1.2.

4.7.3.10.12. EE1002-SPD-EEPROM

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/EE1002-SPD-EEPROM</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">EE1002-SPD-EEPROM-InterfaceFunctionType, EE1002-SPD-EEPROM-StandardTerminalNameAssignmentType, EE1002-SPD-EEPROM-StandardTerminalMappingType, EE1002-SPD-EEPROM-StandardTerminalNameType.</td></tr>
<tr><td rowspan="3">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. SA0</td><td>2. SA1</td><td>3. SA2</td><td>4. VSSSPD</td></tr>
<tr><td>5. SDA</td><td>6. SCL</td><td>7. WC#</td><td>8. VDDSPD</td></tr>
</table>

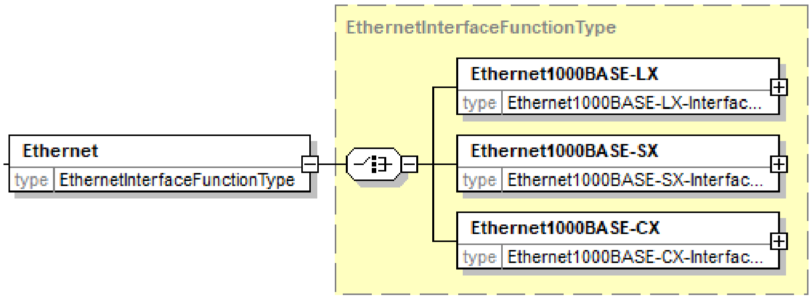
For more information about the EE1002-SPD-EEPROM Interface, refer to the JEDEC standard No. 21-C.

4.7.3.10.13. Embedded Display Port Interface

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/eTrak			
diagram				
type	EmbeddedDisplayPort-InterfaceFunctionType, EmbeddedDisplayPort-StandardTerminalNameAssignmentType, EmbeddedDisplayPort-MandatoryMappingType, EmbeddedDisplayPort-OptionalMappingType, EmbeddedDisplayPort-MandatoryStandardTerminalNameType, EmbeddedDisplayPort-OptionalStandardTerminalNameType .			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. ML_Lane_0_P	2. ML_Lane_0_N	3. ML_Lane_1_P	4. ML_Lane_1_N
	5. AUX_CH_P	6. AUX_CH_N	7. HPD	8. LCDVCC
	9. H_GND	10. LCD_GND	11. NC-RESERVED	
	OptionalMapping/StandardTerminalName			
	1. ML_Lane_2_P	2. ML_Lane_2_N	3. ML_Lane_3_P	4. ML_Lane_3_N
	5. VDC1	6. VDC2	7. VDC3	8. VDC4
	9. VDC5	10. VDC6	11. VDC	12. BL_GND
	13. BL_ENABLE	14. NC	15. ON/OFF	16. BL_PWM_DIM
	17. PWM	18. BL_PWR	19. LCD_Self_Test	

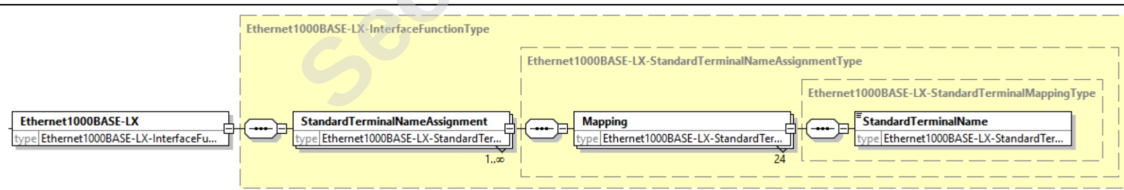
For more information about the Embedded Display Port (eDP) Interface, refer to the VESA Embedded DisplayPort (eDP) Standard.

4.7.3.10.14. Ethernet

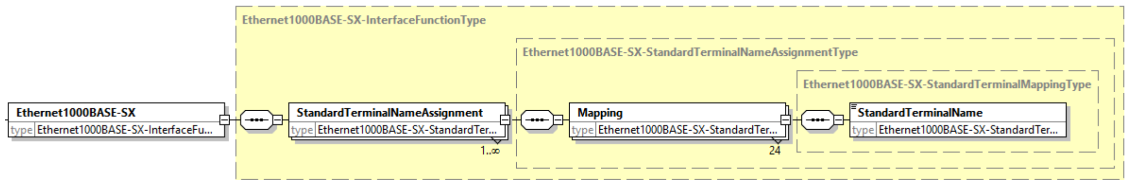
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/Ethernet**
diagram	
type	**EthernetInterfaceFunctionType, Ethernet1000BASE-LX-InterfaceFunctionType, Ethernet1000BASE-SX-InterfaceFunctionType, Ethernet1000BASE-CX-InterfaceFunctionType.**

For more information about the Ethernet Interface, refer to the IEEE Standard 802.3.

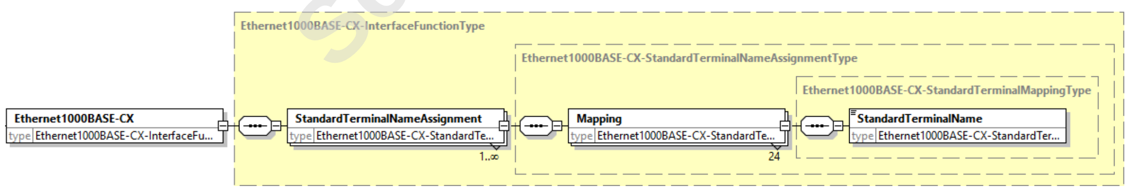
4.7.3.10.14.1. Ethernet1000BASE-LX

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/ Ethernet1000BASE-LX**			
diagram				
type	**Ethernet1000BASE-LX-InterfaceFunctionType, Ethernet1000BASE-LX-StandardTerminalNameAssignmentType, Ethernet1000BASE-LX-StandardTerminalMappingType, Ethernet1000BASE-LX-StandardTerminalNameType.**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. TXD[0]	**2. TXD[1]**	**3. TXD[2]**	**4. TXD[3]**
	5. TXD[4]	**6. TXD[5]**	**7. TXD[6]**	**8. TXD[7]**
	9. TX_EN	**10. TX_ER**	**11. GTX_CLK**	**12. RXD[0]**
	13. RXD[1]	**14. RXD[2]**	**15. RXD[3]**	**16. RXD[4]**
	17. RXD[5]	**18. RXD[6]**	**19. RXD[7]**	**20. RX_DV**
	21. RX_ER	**22. RX_CLK**	**23. COL**	**24. CRS**

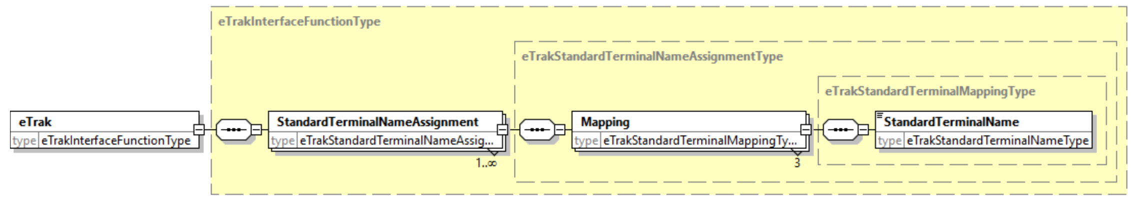
4.7.3.10.14.2. Ethernet1000BASE-SX

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/ Ethernet1000BASE-SX			
diagram				
type	Ethernet1000BASE-SX-InterfaceFunctionType, Ethernet1000BASE-SX-StandardTerminalNameAssignmentType, Ethernet1000BASE-SX-StandardTerminalMappingType, Ethernet1000BASE-SX-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. TXD[0]	2. TXD[1]	3. TXD[2]	4. TXD[3]
	5. TXD[4]	6. TXD[5]	7. TXD[6]	8. TXD[7]
	9. TX_EN	10. TX_ER	11. GTX_CLK	12. RXD[0]
	13. RXD[1]	14. RXD[2]	15. RXD[3]	16. RXD[4]
	17. RXD[5]	18. RXD[6]	19. RXD[7]	20. RX_DV
	21. RX_ER	22. RX_CLK	23. COL	24. CRS

4.7.3.10.14.3. Ethernet1000BASE-CX

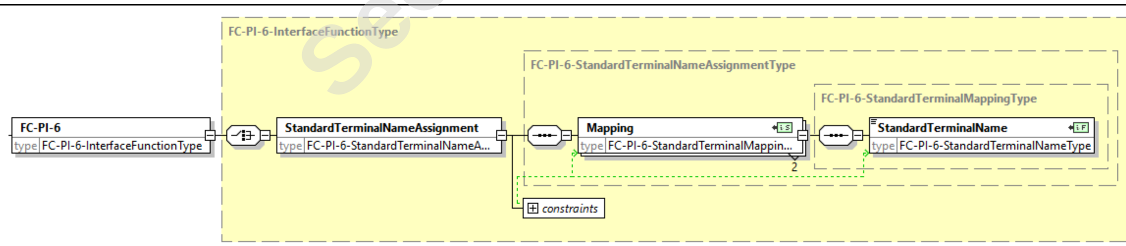
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/ Ethernet1000BASE-CX			
diagram				
type	Ethernet1000BASE-CX-InterfaceFunctionType, Ethernet1000BASE-CX-StandardTerminalNameAssignmentType, Ethernet1000BASE-CX-StandardTerminalMappingType, Ethernet1000BASE-CX-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. TXD[0]	2. TXD[1]	3. TXD[2]	4. TXD[3]
	5. TXD[4]	6. TXD[5]	7. TXD[6]	8. TXD[7]
	9. TX_EN	10. TX_ER	11. GTX_CLK	12. RXD[0]
	13. RXD[1]	14. RXD[2]	15. RXD[3]	16. RXD[4]
	17. RXD[5]	18. RXD[6]	19. RXD[7]	20. RX_DV
	21. RX_ER	22. RX_CLK	23. COL	24. CRS

4.7.3.10.15. eTrak Interface

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/eTrak**			
diagram				
type	**eTrakInterfaceFunctionType, eTrakStandardTerminalNameAssignmentType, eTrakStandardTerminalMappingType, eTrakStandardTerminalNameType.**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. I	**2. Q**	**3. VREF**	

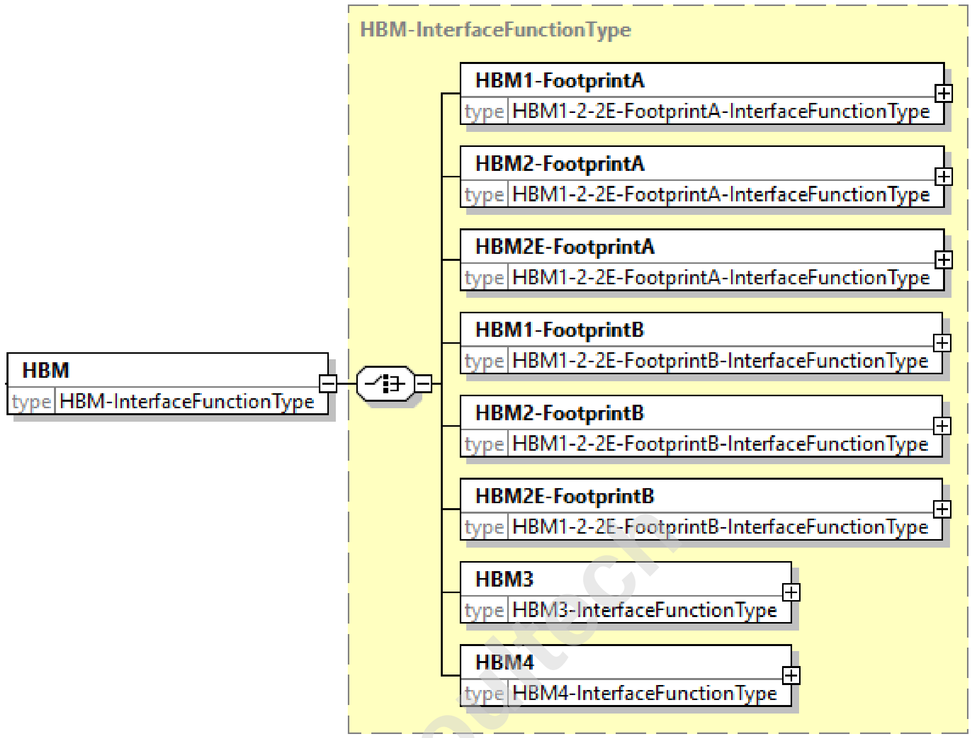
For more information about the eTrak Interface, refer to the MIPI Alliance standard Specification for Analog Interface for Envelope Tracking (eTrak) Version 1.1.

4.7.3.10.16. FC-PI-6 Interface Function

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/FC-PI-6**			
diagram				
type	**FC-PI-6-InterfaceFunctionType, FC-PI-6-StandardTerminalNameAssignmentType, FC-PI-6-StandardTerminalMappingType, FC-PI-6-StandardTerminalNameType.**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. Tx	**2. Rx**		

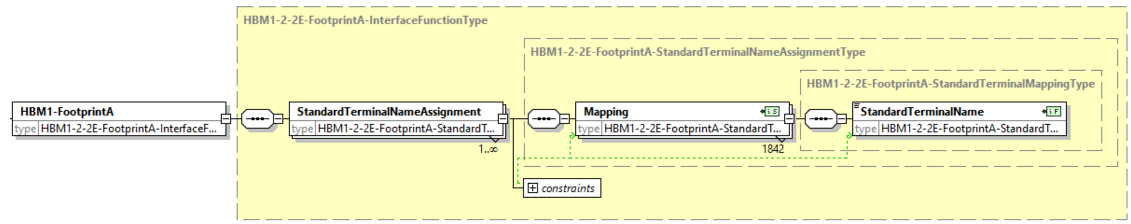
For more information about the FC-PI-6 Interface, refer to the INCITS standard 2221-D.

4.7.3.10.17. HBM Interface Function

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HBM
diagram	
type	HBM-InterfaceFunctionType, HBM1-2-2E- FootprintA-InterfaceFunctionType, HBM1-2-2E- FootprintB-InterfaceFunctionType, HBM3-InterfaceFunctionType, HBM4-InterfaceFunctionType.

4.7.3.10.17.1. HBM1, HBM2 and HBM2E Footprint A Interface Functions

path	1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HBM-HBM1-FootprintA 2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HBM-HBM2-FootprintA 3. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HBM-HBM2E-FootprintA
diagram	



type	HBM1-2-2E-FootprintA-InterfaceFunctionType, HBM1-2-2E-FootprintA-StandardTerminalNameAssignmentType, HBM1-2-2E-FootprintA-StandardTerminalMappingType, HBM1-2-2E-FootprintA-StandardTerminalNameType
list of enumerate values	Mapping/StandardTerminalName

1. AERRa	2. AERRb	3. AERRc	4. AERRd
5. AERRe	6. AERRf	7. AERRg	8. AERRh
9. ARFUa[0]	10. ARFUa[1]	11. ARFUa[2]	12. ARFUa[3]
13. ARFUb[0]	14. ARFUb[1]	15. ARFUb[2]	16. ARFUb[3]
17. ARFUc[0]	18. ARFUc[1]	19. ARFUc[2]	20. ARFUc[3]
21. ARFUd[0]	22. ARFUd[1]	23. ARFUd[2]	24. ARFUd[3]
25. ARFUe[0]	26. ARFUe[1]	27. ARFUe[2]	28. ARFUe[3]
29. ARFUf[0]	30. ARFUf[1]	31. ARFUf[2]	32. ARFUf[3]
33. ARFUg[0]	34. ARFUg[1]	35. ARFUg[2]	36. ARFUg[3]
37. ARFUh[0]	38. ARFUh[1]	39. ARFUh[2]	40. ARFUh[3]
41. CAPTUREWR	42. CATTRIP	43. Ca[0]	44. Ca[1]
45. Ca[2]	46. Ca[3]	47. Ca[4]	48. Ca[5]
49. Ca[6]	50. Ca[7]	51. Cb[0]	52. Cb[1]
53. Cb[2]	54. Cb[3]	55. Cb[4]	56. Cb[5]
57. Cb[6]	58. Cb[7]	59. Cc[0]	60. Cc[1]
61. Cc[2]	62. Cc[3]	63. Cc[4]	64. Cc[5]
65. Cc[6]	66. Cc[7]	67. Cd[0]	68. Cd[1]
69. Cd[2]	70. Cd[3]	71. Cd[4]	72. Cd[5]
73. Cd[6]	74. Cd[7]	75. Ce[0]	76. Ce[1]
77. Ce[2]	78. Ce[3]	79. Ce[4]	80. Ce[5]
81. Ce[6]	82. Ce[7]	83. Cf[0]	84. Cf[1]
85. Cf[2]	86. Cf[3]	87. Cf[4]	88. Cf[5]
89. Cf[6]	90. Cf[7]	91. Cg[0]	92. Cg[1]
93. Cg[2]	94. Cg[3]	95. Cg[4]	96. Cg[5]
97. Cg[6]	98. Cg[7]	99. Ch[0]	100. Ch[1]
101. Ch[2]	102. Ch[3]	103. Ch[4]	104. Ch[5]
105. Ch[6]	106. Ch[7]	107. CKa_c	108. CKa_t

4.7.3.10.17.1 HBM1, HBM2 and HBM2E Footprint A Interface Function (cont'd)

list of enumerate values (cont.)	109. CKb_c	110. CKb_t	111. CKc_c	112. CKc_t
	113. CKd_c	114. CKd_t	115. CKe_c	116. CKe_t
	117. CKEa	118. CKEb	119. CKEc	120. CKEd
	121. CKEe	122. CKEf	123. CKEg	124. CKEh
	125. CKf_c	126. CKf_t	127. CKg_c	128. CKg_t
	129. CKh_c	130. CKh_t	131. DA[0]	132. DA[1]
	133. DA[2]	134. DA[3]	135. DA[4]	136. DA[5]
	137. DA[6]	138. DA[7]	139. DA[8]	140. DA[9]
	141. DA[10]	142. DA[11]	143. DA[12]	144. DA[13]
	145. DA[14]	146. DA[15]	147. DA[16]	148. DA[17]
	149. DA[18]	150. DA[19]	151. DA[20]	152. DA[21]
	153. DA[22]	154. DA[23]	155. DA[24]	156. DA[25]
	157. DA[26]	158. DA[27]	159. DA[28]	160. DA[29]
	161. DA[30]	162. DA[31]	163. DA[32]	164. DA[33]
	165. DA[34]	166. DA[35]	167. DA[36]	168. DA[37]
	169. DA[38]	170. DA[39]	171. DA[40]	172. DA[41]
	173. DA[42]	174. DA[43]	175. DA[44]	176. DA[45]
	177. DA[46]	178. DA[47]	179. DA[48]	180. DA[49]
	181. DA[50]	182. DA[51]	183. DA[52]	184. DA[53]
	185. DA[54]	186. DA[55]	187. DA[56]	188. DA[57]
	189. DA[58]	190. DA[59]	191. DBIa[0]	192. DBIa[1]
	193. DBIa[2]	194. DBIa[3]	195. DBIa[4]	196. DBIa[5]
	197. DBIa[6]	198. DBIa[7]	199. DBIa[8]	200. DBIa[9]
	201. DBIa[10]	202. DBIa[11]	203. DBIa[12]	204. DBIa[13]
	205. DBIa[14]	206. DBIa[15]	207. DBIb[0]	208. DBIb[1]
	209. DBIb[2]	210. DBIb[3]	211. DBIb[4]	212. DBIb[5]
	213. DBIb[6]	214. DBIb[7]	215. DBIb[8]	216. DBIb[9]
	217. DBIb[10]	218. DBIb[11]	219. DBIb[12]	220. DBIb[13]
	221. DBIb[14]	222. DBIb[15]	223. DBIc[0]	224. DBIc[1]
	225. DBIc[2]	226. DBIc[3]	227. DBIc[4]	228. DBIc[5]
	229. DBIc[6]	230. DBIc[7]	231. DBIc[8]	232. DBIc[9]
	233. DBIc[10]	234. DBIc[11]	235. DBIc[12]	236. DBIc[13]
	237. DBIc[14]	238. DBIc[15]	239. DBId[0]	240. DBId[1]
	241. DBId[2]	242. DBId[3]	243. DBId[4]	244. DBId[5]
	245. DBId[6]	246. DBId[7]	247. DBId[8]	248. DBId[9]
	249. DBId[10]	250. DBId[11]	251. DBId[12]	252. DBId[13]
	253. DBId[14]	254. DBId[15]	255. DBIe[0]	256. DBIe[1]
	257. DBIe[2]	258. DBIe[3]	259. DBIe[4]	260. DBIe[5]
	261. DBIe[6]	262. DBIe[7]	263. DBIe[8]	264. DBIe[9]
	265. DBIe[10]	266. DBIe[11]	267. DBIe[12]	268. DBIe[13]
	269. DBIe[14]	270. DBIe[15]	271. DBIf[0]	272. DBIf[1]
	273. DBIf[2]	274. DBIf[3]	275. DBIf[4]	276. DBIf[5]
	277. DBIf[6]	278. DBIf[7]	279. DBIf[8]	280. DBIf[9]
	281. DBIf[10]	282. DBIf[11]	283. DBIf[12]	284. DBIf[13]
	285. DBIf[14]	286. DBIf[15]	287. DBIg[0]	288. DBIg[1]
	289. DBIg[2]	290. DBIg[3]	291. DBIg[4]	292. DBIg[5]
	293. DBIg[6]	294. DBIg[7]	295. DBIg[8]	296. DBIg[9]
	297. DBIg[10]	298. DBIg[11]	299. DBIg[12]	300. DBIg[13]

4.7.3.10.17.1 HBM1, HBM2 and HBM2E Footprint A Interface Function (cont'd)

list of enumerate values (cont.)	301. DBIg[14]	302. DBIg[15]	303. DBIh[0]	304. DBIh[1]
	305. DBIh[2]	306. DBIh[3]	307. DBIh[4]	308. DBIh[5]
	309. DBIh[6]	310. DBIh[7]	311. DBIh[8]	312. DBIh[9]
	313. DBIh[10]	314. DBIh[11]	315. DBIh[12]	316. DBIh[13]
	317. DBIh[14]	318. DBIh[15]	319. DERRa[0]	320. DERRa[1]
	321. DERRa[2]	322. DERRa[3]	323. DERRb[0]	324. DERRb[1]
	325. DERRb[2]	326. DERRb[3]	327. DERRc[0]	328. DERRc[1]
	329. DERRc[2]	330. DERRc[3]	331. DERRd[0]	332. DERRd[1]
	333. DERRd[2]	334. DERRd[3]	335. DERRe[0]	336. DERRe[1]
	337. DERRe[2]	338. DERRe[3]	339. DERRf[0]	340. DERRf[1]
	341. DERRf[2]	342. DERRf[3]	343. DERRg[0]	344. DERRg[1]
	345. DERRg[2]	346. DERRg[3]	347. DERRh[0]	348. DERRh[1]
	349. DERRh[2]	350. DERRh[3]	351. DMa[0]	352. DMa[1]
	353. DMa[2]	354. DMa[3]	355. DMa[4]	356. DMa[5]
	357. DMa[6]	358. DMa[7]	359. DMa[8]	360. DMa[9]
	361. DMa[10]	362. DMa[11]	363. DMa[12]	364. DMa[13]
	365. DMa[14]	366. DMa[15]	367. DMb[0]	368. DMb[1]
	369. DMb[2]	370. DMb[3]	371. DMb[4]	372. DMb[5]
	373. DMb[6]	374. DMb[7]	375. DMb[8]	376. DMb[9]
	377. DMb[10]	378. DMb[11]	379. DMb[12]	380. DMb[13]
	381. DMb[14]	382. DMb[15]	383. DMc[0]	384. DMc[1]
	385. DMc[2]	386. DMc[3]	387. DMc[4]	388. DMc[5]
	389. DMc[6]	390. DMc[7]	391. DMc[8]	392. DMc[9]
	393. DMc[10]	394. DMc[11]	395. DMc[12]	396. DMc[13]
	397. DMc[14]	398. DMc[15]	399. DMd[0]	400. DMd[1]
	401. DMd[2]	402. DMd[3]	403. DMd[4]	404. DMd[5]
	405. DMd[6]	406. DMd[7]	407. DMd[8]	408. DMd[9]
	409. DMd[10]	410. DMd[11]	411. DMd[12]	412. DMd[13]
	413. DMd[14]	414. DMd[15]	415. DMe[0]	416. DMe[1]
	417. DMe[2]	418. DMe[3]	419. DMe[4]	420. DMe[5]
	421. DMe[6]	422. DMe[7]	423. DMe[8]	424. DMe[9]
	425. DMe[10]	426. DMe[11]	427. DMe[12]	428. DMe[13]
	429. DMe[14]	430. DMe[15]	431. DMf[0]	432. DMf[1]
	433. DMf[2]	434. DMf[3]	435. DMf[4]	436. DMf[5]
	437. DMf[6]	438. DMf[7]	439. DMf[8]	440. DMf[9]
	441. DMf[10]	442. DMf[11]	443. DMf[12]	444. DMf[13]
	445. DMf[14]	446. DMf[15]	447. DMg[0]	448. DMg[1]
	449. DMg[2]	450. DMg[3]	451. DMg[4]	452. DMg[5]
	453. DMg[6]	454. DMg[7]	455. DMg[8]	456. DMg[9]
	457. DMg[10]	458. DMg[11]	459. DMg[12]	460. DMg[13]
	461. DMg[14]	462. DMg[15]	463. DMh[0]	464. DMh[1]
	465. DMh[2]	466. DMh[3]	467. DMh[4]	468. DMh[5]
	469. DMh[6]	470. DMh[7]	471. DMh[8]	472. DMh[9]
	473. DMh[10]	474. DMh[11]	475. DMh[12]	476. DMh[13]
	477. DMh[14]	478. DMh[15]	479. DQa[0]	480. DQa[1]
	481. DQa[2]	482. DQa[3]	483. DQa[4]	484. DQa[5]
	485. DQa[6]	486. DQa[7]	487. DQa[8]	488. DQa[9]
	489. DQa[10]	490. DQa[11]	491. DQa[12]	492. DQa[13]

4.7.3.10.17.1 HBM1, HBM2 and HBM2E Footprint A Interface Function (cont'd)

list of enumerate values (cont.)	493. DQa[14]	494. DQa[15]	495. DQa[16]	496. DQa[17]
	497. DQa[18]	498. DQa[19]	499. DQa[20]	500. DQa[21]
	501. DQa[22]	502. DQa[23]	503. DQa[24]	504. DQa[25]
	505. DQa[26]	506. DQa[27]	507. DQa[28]	508. DQa[29]
	509. DQa[30]	510. DQa[31]	511. DQa[32]	512. DQa[33]
	513. DQa[34]	514. DQa[35]	515. DQa[36]	516. DQa[37]
	517. DQa[38]	518. DQa[39]	519. DQa[40]	520. DQa[41]
	521. DQa[42]	522. DQa[43]	523. DQa[44]	524. DQa[45]
	525. DQa[46]	526. DQa[47]	527. DQa[48]	528. DQa[49]
	529. DQa[50]	530. DQa[51]	531. DQa[52]	532. DQa[53]
	533. DQa[54]	534. DQa[55]	535. DQa[56]	536. DQa[57]
	537. DQa[58]	538. DQa[59]	539. DQa[60]	540. DQa[61]
	541. DQa[62]	542. DQa[63]	543. DQa[64]	544. DQa[65]
	545. DQa[66]	546. DQa[67]	547. DQa[68]	548. DQa[69]
	549. DQa[70]	550. DQa[71]	551. DQa[72]	552. DQa[73]
	553. DQa[74]	554. DQa[75]	555. DQa[76]	556. DQa[77]
	557. DQa[78]	558. DQa[79]	559. DQa[80]	560. DQa[81]
	561. DQa[82]	562. DQa[83]	563. DQa[84]	564. DQa[85]
	565. DQa[86]	566. DQa[87]	567. DQa[88]	568. DQa[89]
	569. DQa[90]	570. DQa[91]	571. DQa[92]	572. DQa[93]
	573. DQa[94]	574. DQa[95]	575. DQa[96]	576. DQa[97]
	577. DQa[98]	578. DQa[99]	579. DQa[100]	580. DQa[101]
	581. DQa[102]	582. DQa[103]	583. DQa[104]	584. DQa[105]
	585. DQa[106]	586. DQa[107]	587. DQa[108]	588. DQa[109]
	589. DQa[110]	590. DQa[111]	591. DQa[112]	592. DQa[113]
	593. DQa[114]	594. DQa[115]	595. DQa[116]	596. DQa[117]
	597. DQa[118]	598. DQa[119]	599. DQa[120]	600. DQa[121]
	601. DQa[122]	602. DQa[123]	603. DQa[124]	604. DQa[125]
	605. DQa[126]	606. DQa[127]	607. DQb[0]	608. DQb[1]
	609. DQb[2]	610. DQb[3]	611. DQb[4]	612. DQb[5]
	613. DQb[6]	614. DQb[7]	615. DQb[8]	616. DQb[9]
	617. DQb[10]	618. DQb[11]	619. DQb[12]	620. DQb[13]
	621. DQb[14]	622. DQb[15]	623. DQb[16]	624. DQb[17]
	625. DQb[18]	626. DQb[19]	627. DQb[20]	628. DQb[21]
	629. DQb[22]	630. DQb[23]	631. DQb[24]	632. DQb[25]
	633. DQb[26]	634. DQb[27]	635. DQb[28]	636. DQb[29]
	637. DQb[30]	638. DQb[31]	639. DQb[32]	640. DQb[33]
	641. DQb[34]	642. DQb[35]	643. DQb[36]	644. DQb[37]
	645. DQb[38]	646. DQb[39]	647. DQb[40]	648. DQb[41]
	649. DQb[42]	650. DQb[43]	651. DQb[44]	652. DQb[45]
	653. DQb[46]	654. DQb[47]	655. DQb[48]	656. DQb[49]
	657. DQb[50]	658. DQb[51]	659. DQb[52]	660. DQb[53]
	661. DQb[54]	662. DQb[55]	663. DQb[56]	664. DQb[57]
	665. DQb[58]	666. DQb[59]	667. DQb[60]	668. DQb[61]
	669. DQb[62]	670. DQb[63]	671. DQb[64]	672. DQb[65]
	673. DQb[66]	674. DQb[67]	675. DQb[68]	676. DQb[69]
	677. DQb[70]	678. DQb[71]	679. DQb[72]	680. DQb[73]
	681. DQb[74]	682. DQb[75]	683. DQb[76]	684. DQb[77]

4.7.3.10.17.1 HBM1, HBM2 and HBM2E Footprint A Interface Function (cont'd)

list of enumerate values (cont.)	685. DQb[78]	686. DQb[79]	687. DQb[80]	688. DQb[81]
	689. DQb[82]	690. DQb[83]	691. DQb[84]	692. DQb[85]
	693. DQb[86]	694. DQb[87]	695. DQb[88]	696. DQb[89]
	697. DQb[90]	698. DQb[91]	699. DQb[92]	700. DQb[93]
	701. DQb[94]	702. DQb[95]	703. DQb[96]	704. DQb[97]
	705. DQb[98]	706. DQb[99]	707. DQb[100]	708. DQb[101]
	709. DQb[102]	710. DQb[103]	711. DQb[104]	712. DQb[105]
	713. DQb[106]	714. DQb[107]	715. DQb[108]	716. DQb[109]
	717. DQb[110]	718. DQb[111]	719. DQb[112]	720. DQb[113]
	721. DQb[114]	722. DQb[115]	723. DQb[116]	724. DQb[117]
	725. DQb[118]	726. DQb[119]	727. DQb[120]	728. DQb[121]
	729. DQb[122]	730. DQb[123]	731. DQb[124]	732. DQb[125]
	733. DQb[126]	734. DQb[127]	735. DQc[0]	736. DQc[1]
	737. DQc[2]	738. DQc[3]	739. DQc[4]	740. DQc[5]
	741. DQc[6]	742. DQc[7]	743. DQc[8]	744. DQc[9]
	745. DQc[10]	746. DQc[11]	747. DQc[12]	748. DQc[13]
	749. DQc[14]	750. DQc[15]	751. DQc[16]	752. DQc[17]
	753. DQc[18]	754. DQc[19]	755. DQc[20]	756. DQc[21]
	757. DQc[22]	758. DQc[23]	759. DQc[24]	760. DQc[25]
	761. DQc[26]	762. DQc[27]	763. DQc[28]	764. DQc[29]
	765. DQc[30]	766. DQc[31]	767. DQc[32]	768. DQc[33]
	769. DQc[34]	770. DQc[35]	771. DQc[36]	772. DQc[37]
	773. DQc[38]	774. DQc[39]	775. DQc[40]	776. DQc[41]
	777. DQc[42]	778. DQc[43]	779. DQc[44]	780. DQc[45]
	781. DQc[46]	782. DQc[47]	783. DQc[48]	784. DQc[49]
	785. DQc[50]	786. DQc[51]	787. DQc[52]	788. DQc[53]
	789. DQc[54]	790. DQc[55]	791. DQc[56]	792. DQc[57]
	793. DQc[58]	794. DQc[59]	795. DQc[60]	796. DQc[61]
	797. DQc[62]	798. DQc[63]	799. DQc[64]	800. DQc[65]
	801. DQc[66]	802. DQc[67]	803. DQc[68]	804. DQc[69]
	805. DQc[70]	806. DQc[71]	807. DQc[72]	808. DQc[73]
	809. DQc[74]	810. DQc[75]	811. DQc[76]	812. DQc[77]
	813. DQc[78]	814. DQc[79]	815. DQc[80]	816. DQc[81]
	817. DQc[82]	818. DQc[83]	819. DQc[84]	820. DQc[85]
	821. DQc[86]	822. DQc[87]	823. DQc[88]	824. DQc[89]
	825. DQc[90]	826. DQc[91]	827. DQc[92]	828. DQc[93]
	829. DQc[94]	830. DQc[95]	831. DQc[96]	832. DQc[97]
	833. DQc[98]	834. DQc[99]	835. DQc[100]	836. DQc[101]
	837. DQc[102]	838. DQc[103]	839. DQc[104]	840. DQc[105]
	841. DQc[106]	842. DQc[107]	843. DQc[108]	844. DQc[109]
	845. DQc[110]	846. DQc[111]	847. DQc[112]	848. DQc[113]
	849. DQc[114]	850. DQc[115]	851. DQc[116]	852. DQc[117]
	853. DQc[118]	854. DQc[119]	855. DQc[120]	856. DQc[121]
	857. DQc[122]	858. DQc[123]	859. DQc[124]	860. DQc[125]
	861. DQc[126]	862. DQc[127]	863. DQd[0]	864. DQd[1]
	865. DQd[2]	866. DQd[3]	867. DQd[4]	868. DQd[5]
	869. DQd[6]	870. DQd[7]	871. DQd[8]	872. DQd[9]
	873. DQd[10]	874. DQd[11]	875. DQd[12]	876. DQd[13]

4.7.3.10.17.1 HBM1, HBM2 and HBM2E Footprint A Interface Function (cont'd)

list of enumerate values (cont.)	877. DQd[14]	878. DQd[15]	879. DQd[16]	880. DQd[17]
	881. DQd[18]	882. DQd[19]	883. DQd[20]	884. DQd[21]
	885. DQd[22]	886. DQd[23]	887. DQd[24]	888. DQd[25]
	889. DQd[26]	890. DQd[27]	891. DQd[28]	892. DQd[29]
	893. DQd[30]	894. DQd[31]	895. DQd[32]	896. DQd[33]
	897. DQd[34]	898. DQd[35]	899. DQd[36]	900. DQd[37]
	901. DQd[38]	902. DQd[39]	903. DQd[40]	904. DQd[41]
	905. DQd[42]	906. DQd[43]	907. DQd[44]	908. DQd[45]
	909. DQd[46]	910. DQd[47]	911. DQd[48]	912. DQd[49]
	913. DQd[50]	914. DQd[51]	915. DQd[52]	916. DQd[53]
	917. DQd[54]	918. DQd[55]	919. DQd[56]	920. DQd[57]
	921. DQd[58]	922. DQd[59]	923. DQd[60]	924. DQd[61]
	925. DQd[62]	926. DQd[63]	927. DQd[64]	928. DQd[65]
	929. DQd[66]	930. DQd[67]	931. DQd[68]	932. DQd[69]
	933. DQd[70]	934. DQd[71]	935. DQd[72]	936. DQd[73]
	937. DQd[74]	938. DQd[75]	939. DQd[76]	940. DQd[77]
	941. DQd[78]	942. DQd[79]	943. DQd[80]	944. DQd[81]
	945. DQd[82]	946. DQd[83]	947. DQd[84]	948. DQd[85]
	949. DQd[86]	950. DQd[87]	951. DQd[88]	952. DQd[89]
	953. DQd[90]	954. DQd[91]	955. DQd[92]	956. DQd[93]
	957. DQd[94]	958. DQd[95]	959. DQd[96]	960. DQd[97]
	961. DQd[98]	962. DQd[99]	963. DQd[100]	964. DQd[101]
	965. DQd[102]	966. DQd[103]	967. DQd[104]	968. DQd[105]
	969. DQd[106]	970. DQd[107]	971. DQd[108]	972. DQd[109]
	973. DQd[110]	974. DQd[111]	975. DQd[112]	976. DQd[113]
	977. DQd[114]	978. DQd[115]	979. DQd[116]	980. DQd[117]
	981. DQd[118]	982. DQd[119]	983. DQd[120]	984. DQd[121]
	985. DQd[122]	986. DQd[123]	987. DQd[124]	988. DQd[125]
	989. DQd[126]	990. DQd[127]	991. DQe[0]	992. DQe[1]
	993. DQe[2]	994. DQe[3]	995. DQe[4]	996. DQe[5]
	997. DQe[6]	998. DQe[7]	999. DQe[8]	1000. DQe[9]
	1001. DQe[10]	1002. DQe[11]	1003. DQe[12]	1004. DQe[13]
	1005. DQe[14]	1006. DQe[15]	1007. DQe[16]	1008. DQe[17]
	1009. DQe[18]	1010. DQe[19]	1011. DQe[20]	1012. DQe[21]
	1013. DQe[22]	1014. DQe[23]	1015. DQe[24]	1016. DQe[25]
	1017. DQe[26]	1018. DQe[27]	1019. DQe[28]	1020. DQe[29]
	1021. DQe[30]	1022. DQe[31]	1023. DQe[32]	1024. DQe[33]
	1025. DQe[34]	1026. DQe[35]	1027. DQe[36]	1028. DQe[37]
	1029. DQe[38]	1030. DQe[39]	1031. DQe[40]	1032. DQe[41]
	1033. DQe[42]	1034. DQe[43]	1035. DQe[44]	1036. DQe[45]
	1037. DQe[46]	1038. DQe[47]	1039. DQe[48]	1040. DQe[49]
	1041. DQe[50]	1042. DQe[51]	1043. DQe[52]	1044. DQe[53]
	1045. DQe[54]	1046. DQe[55]	1047. DQe[56]	1048. DQe[57]
	1049. DQe[58]	1050. DQe[59]	1051. DQe[60]	1052. DQe[61]
	1053. DQe[62]	1054. DQe[63]	1055. DQe[64]	1056. DQe[65]
	1057. DQe[66]	1058. DQe[67]	1059. DQe[68]	1060. DQe[69]
	1061. DQe[70]	1062. DQe[71]	1063. DQe[72]	1064. DQe[73]
	1065. DQe[74]	1066. DQe[75]	1067. DQe[76]	1068. DQe[77]

4.7.3.10.17.1 HBM1, HBM2 and HBM2E Footprint A Interface Function (cont'd)

list of enumerate values (cont.)	1069. DQe[78]	1070. DQe[79]	1071. DQe[80]	1072. DQe[81]
	1073. DQe[82]	1074. DQe[83]	1075. DQe[84]	1076. DQe[85]
	1077. DQe[86]	1078. DQe[87]	1079. DQe[88]	1080. DQe[89]
	1081. DQe[90]	1082. DQe[91]	1083. DQe[92]	1084. DQe[93]
	1085. DQe[94]	1086. DQe[95]	1087. DQe[96]	1088. DQe[97]
	1089. DQe[98]	1090. DQe[99]	1091. DQe[100]	1092. DQe[101]
	1093. DQe[102]	1094. DQe[103]	1095. DQe[104]	1096. DQe[105]
	1097. DQe[106]	1098. DQe[107]	1099. DQe[108]	1100. DQe[109]
	1101. DQe[110]	1102. DQe[111]	1103. DQe[112]	1104. DQe[113]
	1105. DQe[114]	1106. DQe[115]	1107. DQe[116]	1108. DQe[117]
	1109. DQe[118]	1110. DQe[119]	1111. DQe[120]	1112. DQe[121]
	1113. DQe[122]	1114. DQe[123]	1115. DQe[124]	1116. DQe[125]
	1117. DQe[126]	1118. DQe[127]	1119. DQf[0]	1120. DQf[1]
	1121. DQf[2]	1122. DQf[3]	1123. DQf[4]	1124. DQf[5]
	1125. DQf[6]	1126. DQf[7]	1127. DQf[8]	1128. DQf[9]
	1129. DQf[10]	1130. DQf[11]	1131. DQf[12]	1132. DQf[13]
	1133. DQf[14]	1134. DQf[15]	1135. DQf[16]	1136. DQf[17]
	1137. DQf[18]	1138. DQf[19]	1139. DQf[20]	1140. DQf[21]
	1141. DQf[22]	1142. DQf[23]	1143. DQf[24]	1144. DQf[25]
	1145. DQf[26]	1146. DQf[27]	1147. DQf[28]	1148. DQf[29]
	1149. DQf[30]	1150. DQf[31]	1151. DQf[32]	1152. DQf[33]
	1153. DQf[34]	1154. DQf[35]	1155. DQf[36]	1156. DQf[37]
	1157. DQf[38]	1158. DQf[39]	1159. DQf[40]	1160. DQf[41]
	1161. DQf[42]	1162. DQf[43]	1163. DQf[44]	1164. DQf[45]
	1165. DQf[46]	1166. DQf[47]	1167. DQf[48]	1168. DQf[49]
	1169. DQf[50]	1170. DQf[51]	1171. DQf[52]	1172. DQf[53]
	1173. DQf[54]	1174. DQf[55]	1175. DQf[56]	1176. DQf[57]
	1177. DQf[58]	1178. DQf[59]	1179. DQf[60]	1180. DQf[61]
	1181. DQf[62]	1182. DQf[63]	1183. DQf[64]	1184. DQf[65]
	1185. DQf[66]	1186. DQf[67]	1187. DQf[68]	1188. DQf[69]
	1189. DQf[70]	1190. DQf[71]	1191. DQf[72]	1192. DQf[73]
	1193. DQf[74]	1194. DQf[75]	1195. DQf[76]	1196. DQf[77]
	1197. DQf[78]	1198. DQf[79]	1199. DQf[80]	1200. DQf[81]
	1201. DQf[82]	1202. DQf[83]	1203. DQf[84]	1204. DQf[85]
	1205. DQf[86]	1206. DQf[87]	1207. DQf[88]	1208. DQf[89]
	1209. DQf[90]	1210. DQf[91]	1211. DQf[92]	1212. DQf[93]
	1213. DQf[94]	1214. DQf[95]	1215. DQf[96]	1216. DQf[97]
	1217. DQf[98]	1218. DQf[99]	1219. DQf[100]	1220. DQf[101]
	1221. DQf[102]	1222. DQf[103]	1223. DQf[104]	1224. DQf[105]
	1225. DQf[106]	1226. DQf[107]	1227. DQf[108]	1228. DQf[109]
	1229. DQf[110]	1230. DQf[111]	1231. DQf[112]	1232. DQf[113]
	1233. DQf[114]	1234. DQf[115]	1235. DQf[116]	1236. DQf[117]
	1237. DQf[118]	1238. DQf[119]	1239. DQf[120]	1240. DQf[121]
	1241. DQf[122]	1242. DQf[123]	1243. DQf[124]	1244. DQf[125]
	1245. DQf[126]	1246. DQf[127]	1247. DQg[0]	1248. DQg[1]
	1249. DQg[2]	1250. DQg[3]	1251. DQg[4]	1252. DQg[5]
	1253. DQg[6]	1254. DQg[7]	1255. DQg[8]	1256. DQg[9]
	1257. DQg[10]	1258. DQg[11]	1259. DQg[12]	1260. DQg[13]

4.7.3.10.17.1 HBM1, HBM2 and HBM2E Footprint A Interface Function (cont'd)

list of enumerate values (cont.)	1261. DQg[14]	1262. DQg[15]	1263. DQg[16]	1264. DQg[17]
	1265. DQg[18]	1266. DQg[19]	1267. DQg[20]	1268. DQg[21]
	1269. DQg[22]	1270. DQg[23]	1271. DQg[24]	1272. DQg[25]
	1273. DQg[26]	1274. DQg[27]	1275. DQg[28]	1276. DQg[29]
	1277. DQg[30]	1278. DQg[31]	1279. DQg[32]	1280. DQg[33]
	1281. DQg[34]	1282. DQg[35]	1283. DQg[36]	1284. DQg[37]
	1285. DQg[38]	1286. DQg[39]	1287. DQg[40]	1288. DQg[41]
	1289. DQg[42]	1290. DQg[43]	1291. DQg[44]	1292. DQg[45]
	1293. DQg[46]	1294. DQg[47]	1295. DQg[48]	1296. DQg[49]
	1297. DQg[50]	1298. DQg[51]	1299. DQg[52]	1300. DQg[53]
	1301. DQg[54]	1302. DQg[55]	1303. DQg[56]	1304. DQg[57]
	1305. DQg[58]	1306. DQg[59]	1307. DQg[60]	1308. DQg[61]
	1309. DQg[62]	1310. DQg[63]	1311. DQg[64]	1312. DQg[65]
	1313. DQg[66]	1314. DQg[67]	1315. DQg[68]	1316. DQg[69]
	1317. DQg[70]	1318. DQg[71]	1319. DQg[72]	1320. DQg[73]
	1321. DQg[74]	1322. DQg[75]	1323. DQg[76]	1324. DQg[77]
	1325. DQg[78]	1326. DQg[79]	1327. DQg[80]	1328. DQg[81]
	1329. DQg[82]	1330. DQg[83]	1331. DQg[84]	1332. DQg[85]
	1333. DQg[86]	1334. DQg[87]	1335. DQg[88]	1336. DQg[89]
	1337. DQg[90]	1338. DQg[91]	1339. DQg[92]	1340. DQg[93]
	1341. DQg[94]	1342. DQg[95]	1343. DQg[96]	1344. DQg[97]
	1345. DQg[98]	1346. DQg[99]	1347. DQg[100]	1348. DQg[101]
	1349. DQg[102]	1350. DQg[103]	1351. DQg[104]	1352. DQg[105]
	1353. DQg[106]	1354. DQg[107]	1355. DQg[108]	1356. DQg[109]
	1357. DQg[110]	1358. DQg[111]	1359. DQg[112]	1360. DQg[113]
	1361. DQg[114]	1362. DQg[115]	1363. DQg[116]	1364. DQg[117]
	1365. DQg[118]	1366. DQg[119]	1367. DQg[120]	1368. DQg[121]
	1369. DQg[122]	1370. DQg[123]	1371. DQg[124]	1372. DQg[125]
	1373. DQg[126]	1374. DQg[127]	1375. DQh[0]	1376. DQh[1]
	1377. DQh[2]	1378. DQh[3]	1379. DQh[4]	1380. DQh[5]
	1381. DQh[6]	1382. DQh[7]	1383. DQh[8]	1384. DQh[9]
	1385. DQh[10]	1386. DQh[11]	1387. DQh[12]	1388. DQh[13]
	1389. DQh[14]	1390. DQh[15]	1391. DQh[16]	1392. DQh[17]
	1393. DQh[18]	1394. DQh[19]	1395. DQh[20]	1396. DQh[21]
	1397. DQh[22]	1398. DQh[23]	1399. DQh[24]	1400. DQh[25]
	1401. DQh[26]	1402. DQh[27]	1403. DQh[28]	1404. DQh[29]
	1405. DQh[30]	1406. DQh[31]	1407. DQh[32]	1408. DQh[33]
	1409. DQh[34]	1410. DQh[35]	1411. DQh[36]	1412. DQh[37]
	1413. DQh[38]	1414. DQh[39]	1415. DQh[40]	1416. DQh[41]
	1417. DQh[42]	1418. DQh[43]	1419. DQh[44]	1420. DQh[45]
	1421. DQh[46]	1422. DQh[47]	1423. DQh[48]	1424. DQh[49]
	1425. DQh[50]	1426. DQh[51]	1427. DQh[52]	1428. DQh[53]
	1429. DQh[54]	1430. DQh[55]	1431. DQh[56]	1432. DQh[57]
	1433. DQh[58]	1434. DQh[59]	1435. DQh[60]	1436. DQh[61]
	1437. DQh[62]	1438. DQh[63]	1439. DQh[64]	1440. DQh[65]
	1441. DQh[66]	1442. DQh[67]	1443. DQh[68]	1444. DQh[69]
	1445. DQh[70]	1446. DQh[71]	1447. DQh[72]	1448. DQh[73]
	1449. DQh[74]	1450. DQh[75]	1451. DQh[76]	1452. DQh[77]

4.7.3.10.17.1 HBM1, HBM2 and HBM2E Footprint A Interface Function (cont'd)

list of enumerate values (cont.)	1453. DQh[78]	1454. DQh[79]	1455. DQh[80]	1456. DQh[81]
	1457. DQh[82]	1458. DQh[83]	1459. DQh[84]	1460. DQh[85]
	1461. DQh[86]	1462. DQh[87]	1463. DQh[88]	1464. DQh[89]
	1465. DQh[90]	1466. DQh[91]	1467. DQh[92]	1468. DQh[93]
	1469. DQh[94]	1470. DQh[95]	1471. DQh[96]	1472. DQh[97]
	1473. DQh[98]	1474. DQh[99]	1475. DQh[100]	1476. DQh[101]
	1477. DQh[102]	1478. DQh[103]	1479. DQh[104]	1480. DQh[105]
	1481. DQh[106]	1482. DQh[107]	1483. DQh[108]	1484. DQh[109]
	1485. DQh[110]	1486. DQh[111]	1487. DQh[112]	1488. DQh[113]
	1489. DQh[114]	1490. DQh[115]	1491. DQh[116]	1492. DQh[117]
	1493. DQh[118]	1494. DQh[119]	1495. DQh[120]	1496. DQh[121]
	1497. DQh[122]	1498. DQh[123]	1499. DQh[124]	1500. DQh[125]
	1501. DQh[126]	1502. DQh[127]	1503. MRFU[0]	1504. MRFU[1]
	1505. MRFU[2]	1506. MRFU[3]	1507. MRFU[4]	1508. MRFU[5]
	1509. MRFU[6]	1510. MRFU[7]	1511. MRFU[8]	1512. MRFU[9]
	1513. MRFU[10]	1514. MRFU[11]	1515. MRFU[12]	1516. MRFU[13]
	1517. MRFU[14]	1518. MRFU[15]	1519. MRFU[16]	1520. MRFU[17]
	1521. MRFU[18]	1522. MRFU[19]	1523. MRFU[20]	1524. MRFU[21]
	1525. MRFU[22]	1526. MRFU[23]	1527. PARa[0]	1528. PARa[1]
	1529. PARa[2]	1530. PARa[3]	1531. PARb[0]	1532. PARb[1]
	1533. PARb[2]	1534. PARb[3]	1535. PARc[0]	1536. PARc[1]
	1537. PARc[2]	1538. PARc[3]	1539. PARd[0]	1540. PARd[1]
	1541. PARd[2]	1542. PARd[3]	1543. PARe[0]	1544. PARe[1]
	1545. PARe[2]	1546. PARe[3]	1547. PARf[0]	1548. PARf[1]
	1549. PARf[2]	1550. PARf[3]	1551. PARg[0]	1552. PARg[1]
	1553. PARg[2]	1554. PARg[3]	1555. PARh[0]	1556. PARh[1]
	1557. PARh[2]	1558. PARh[3]	1559. Ra[0]	1560. Ra[1]
	1561. Ra[2]	1562. Ra[3]	1563. Ra[4]	1564. Ra[5]
	1565. Rb[0]	1566. Rb[1]	1567. Rb[2]	1568. Rb[3]
	1569. Rb[4]	1570. Rb[5]	1571. Rc[0]	1572. Rc[1]
	1573. Rc[2]	1574. Rc[3]	1575. Rc[4]	1576. Rc[5]
	1577. RC[a]	1578. RC[b]	1579. RC[c]	1580. RC[d]
	1581. RC[e]	1582. RC[f]	1583. RC[g]	1584. RC[h]
	1585. Rd[0]	1586. Rd[1]	1587. Rd[2]	1588. Rd[3]
	1589. Rd[4]	1590. Rd[5]	1591. RDa[0]	1592. RDa[1]
	1593. RDa[2]	1594. RDa[3]	1595. RDa[4]	1596. RDa[5]
	1597. RDa[6]	1598. RDa[7]	1599. RDb[0]	1600. RDb[1]
	1601. RDb[2]	1602. RDb[3]	1603. RDb[4]	1604. RDb[5]
	1605. RDb[6]	1606. RDb[7]	1607. RDc[0]	1608. RDc[1]
	1609. RDc[2]	1610. RDc[3]	1611. RDc[4]	1612. RDc[5]
	1613. RDc[6]	1614. RDc[7]	1615. RDd[0]	1616. RDd[1]
	1617. RDd[2]	1618. RDd[3]	1619. RDd[4]	1620. RDd[5]
	1621. RDd[6]	1622. RDd[7]	1623. RDe[0]	1624. RDe[1]
	1625. RDe[2]	1626. RDe[3]	1627. RDe[4]	1628. RDe[5]
	1629. RDe[6]	1630. RDe[7]	1631. RDf[0]	1632. RDf[1]
	1633. RDf[2]	1634. RDf[3]	1635. RDf[4]	1636. RDf[5]
	1637. RDf[6]	1638. RDf[7]	1639. RDg[0]	1640. RDg[1]
	1641. RDg[2]	1642. RDg[3]	1643. RDg[4]	1644. RDg[5]

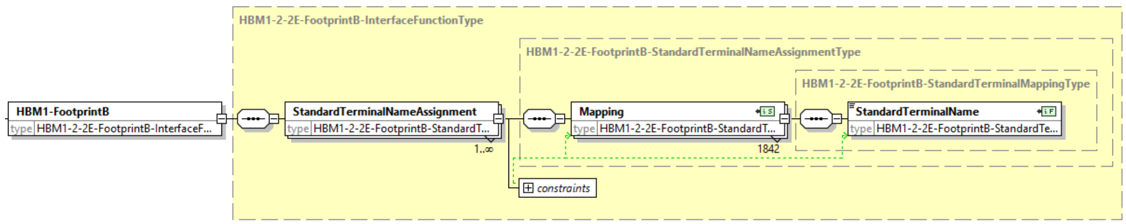
4.7.3.10.17.1 HBM1, HBM2 and HBM2E Footprint A Interface Function (cont'd)

list of enumerate values (cont.)	1645. DQh[78]	1646. DQh[79]	1647. DQh[80]	1648. DQh[81]
	1649. DQh[82]	1650. DQh[83]	1651. DQh[84]	1652. DQh[85]
	1653. DQh[86]	1654. DQh[87]	1655. DQh[88]	1656. DQh[89]
	1657. DQh[90]	1658. DQh[91]	1659. DQh[92]	1660. DQh[93]
	1661. DQh[94]	1662. DQh[95]	1663. DQh[96]	1664. DQh[97]
	1665. DQh[98]	1666. DQh[99]	1667. DQh[100]	1668. DQh[101]
	1669. DQh[102]	1670. DQh[103]	1671. DQh[104]	1672. DQh[105]
	1673. DQh[106]	1674. DQh[107]	1675. DQh[108]	1676. DQh[109]
	1677. DQh[110]	1678. DQh[111]	1679. DQh[112]	1680. DQh[113]
	1681. DQh[114]	1682. DQh[115]	1683. DQh[116]	1684. DQh[117]
	1685. DQh[118]	1686. DQh[119]	1687. DQh[120]	1688. DQh[121]
	1689. DQh[122]	1690. DQh[123]	1691. DQh[124]	1692. DQh[125]
	1693. DQh[126]	1694. DQh[127]	1695. MRFU[0]	1696. MRFU[1]
	1697. MRFU[2]	1698. MRFU[3]	1699. MRFU[4]	1700. MRFU[5]
	1701. MRFU[6]	1702. MRFU[7]	1703. MRFU[8]	1704. MRFU[9]
	1705. MRFU[10]	1706. MRFU[11]	1707. MRFU[12]	1708. MRFU[13]
	1709. MRFU[14]	1710. MRFU[15]	1711. MRFU[16]	1712. MRFU[17]
	1713. MRFU[18]	1714. MRFU[19]	1715. MRFU[20]	1716. MRFU[21]
	1717. MRFU[22]	1718. MRFU[23]	1719. PARa[0]	1720. PARa[1]
	1721. PARa[2]	1722. PARa[3]	1723. PARb[0]	1724. PARb[1]
	1725. PARb[2]	1726. PARb[3]	1727. PARc[0]	1728. PARc[1]
	1729. PARc[2]	1730. PARc[3]	1731. PARd[0]	1732. PARd[1]
	1733. PARd[2]	1734. PARd[3]	1735. PARe[0]	1736. PARe[1]
	1737. PARe[2]	1738. PARe[3]	1739. PARf[0]	1740. PARf[1]
	1741. PARf[2]	1742. PARf[3]	1743. PARg[0]	1744. PARg[1]
	1745. PARg[2]	1746. PARg[3]	1747. PARh[0]	1748. PARh[1]
	1749. PARh[2]	1750. PARh[3]	1751. Ra[0]	1752. Ra[1]
	1753. Ra[2]	1754. Ra[3]	1755. Ra[4]	1756. Ra[5]
	1757. Rb[0]	1758. Rb[1]	1759. Rb[2]	1760. Rb[3]
	1761. Rb[4]	1762. Rb[5]	1763. Rc[0]	1764. Rc[1]
	1765. Rc[2]	1766. Rc[3]	1767. Rc[4]	1768. Rc[5]
	1769. RC[a]	1770. RC[b]	1771. RC[c]	1772. RC[d]
	1773. RC[e]	1774. RC[f]	1775. RC[g]	1776. RC[h]
	1777. Rd[0]	1778. Rd[1]	1779. Rd[2]	1780. Rd[3]
	1781. Rd[4]	1782. Rd[5]	1783. RDa[0]	1784. RDa[1]
	1785. RDa[2]	1786. RDa[3]	1787. RDa[4]	1788. RDa[5]
	1789. RDa[6]	1790. RDa[7]	1791. RDb[0]	1792. RDb[1]
	1793. RDb[2]	1794. RDb[3]	1795. RDb[4]	1796. RDb[5]
	1797. RDb[6]	1798. RDb[7]	1799. RDc[0]	1800. RDc[1]
	1801. RDc[2]	1802. RDc[3]	1803. RDc[4]	1804. RDc[5]
	1805. RDc[6]	1806. RDc[7]	1807. RDd[0]	1808. RDd[1]
	1809. RDd[2]	1810. RDd[3]	1811. RDd[4]	1812. RDd[5]
	1813. RDd[6]	1814. RDd[7]	1815. RDe[0]	1816. RDe[1]
	1817. RDe[2]	1818. RDe[3]	1819. RDe[4]	1820. RDe[5]
	1821. RDe[6]	1822. RDe[7]	1823. RDf[0]	1824. RDf[1]
	1825. RDf[2]	1826. RDf[3]	1827. RDf[4]	1828. RDf[5]
	1829. RDf[6]	1830. RDf[7]	1831. RDg[0]	1832. RDg[1]
	1833. RDg[2]	1834. RDg[3]	1835. RDg[4]	1836. RDg[5]

4.7.3.10.17.1 HBM1, HBM2 and HBM2E Footprint A Interface Function (cont'd)

list of enumerate values (cont.)	1837. WSOc	1838. WSOd	1839. WSOe	1840. WSOf
	1841. WSOg	1842. WSOh		

4.7.3.10.17.2. HBM1, HBM2 and HBM2E Footprint B Interface Functions

path	1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HBM-HBM1-FootprintB 2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HBM-HBM2-FootprintB 3. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HBM-HBM2E-FootprintB
diagram	
type	HBM1-2-2E-FootprintB-InterfaceFunctionType, HBM1-2-2E-FootprintB-StandardTerminalNameAssignmentType, HBM1-2-2E-FootprintB-StandardTerminalMappingType, HBM1-2-2E-FootprintB-StandardTerminalNameType

list of enumerate values — Mapping/StandardTerminalName

1. AERRa	2. AERRb	3. AERRc	4. AERRd
5. AERRe	6. AERRf	7. AERRg	8. AERRh
9. ARFUa[1]	10. ARFUa[3]	11. ARFUb[1]	12. ARFUb[3]
13. ARFUc[1]	14. ARFUc[3]	15. ARFUd[1]	16. ARFUd[3]
17. ARFUe[1]	18. ARFUe[3]	19. ARFUf[1]	20. ARFUf[3]
21. ARFUg[1]	22. ARFUg[3]	23. ARFUh[1]	24. ARFUh[3]
25. CAPTUREWR	26. CATTRIP	27. Ca[0]	28. Ca[1]
29. Ca[2]	30. Ca[3]	31. Ca[4]	32. Ca[5]
33. Ca[6]	34. Ca[7]	35. Ca[8]	36. Cb[0]
37. Cb[1]	38. Cb[2]	39. Cb[3]	40. Cb[4]
41. Cb[5]	42. Cb[6]	43. Cb[7]	44. Cb[8]
45. Cc[0]	46. Cc[1]	47. Cc[2]	48. Cc[3]
49. Cc[4]	50. Cc[5]	51. Cc[6]	52. Cc[7]
53. Cc[8]	54. Cd[0]	55. Cd[1]	56. Cd[2]
57. Cd[3]	58. Cd[4]	59. Cd[5]	60. Cd[6]
61. Cd[7]	62. Cd[8]	63. Ce[0]	64. Ce[1]
65. Ce[2]	66. Ce[3]	67. Ce[4]	68. Ce[5]
69. Ce[6]	70. Ce[7]	71. Ce[8]	72. Cf[0]
73. Cf[1]	74. Cf[2]	75. Cf[3]	76. Cf[4]
77. Cf[5]	78. Cf[6]	79. Cf[7]	80. Cf[8]
81. Cg[0]	82. Cg[1]	83. Cg[2]	84. Cg[3]
85. Cg[4]	86. Cg[5]	87. Cg[6]	88. Cg[7]
89. Cg[8]	90. Ch[0]	91. Ch[1]	92. Ch[2]
93. Ch[3]	94. Ch[4]	95. Ch[5]	96. Ch[6]
97. Ch[7]	98. Ch[8]	99. CKa_c	100. CKa_t
101. CKb_c	102. CKb_t	103. CKc_c	104. CKc_t
105. CKd_c	106. CKd_t	107. CKe_c	108. CKe_t

4.7.3.10.17.2 HBM1, HBM2 and HBM2E Footprint B Interface Function (cont'd)

list of enumerate values (cont.)	109. CKEa	110. CKEb	111. CKEc	112. CKEd
	113. CKEe	114. CKEf	115. CKEg	116. CKEh
	117. CKf_c	118. CKf_t	119. CKg_c	120. CKg_t
	121. CKh_c	122. CKh_t	123. DA[0]	124. DA[1]
	125. DA[2]	126. DA[3]	127. DA[4]	128. DA[5]
	129. DA[6]	130. DA[7]	131. DA[8]	132. DA[9]
	133. DA[10]	134. DA[11]	135. DA[12]	136. DA[13]
	137. DA[14]	138. DA[15]	139. DA[16]	140. DA[17]
	141. DA[18]	142. DA[19]	143. DA[20]	144. DA[21]
	145. DA[22]	146. DA[23]	147. DA[24]	148. DA[25]
	149. DA[26]	150. DA[27]	151. DA[28]	152. DA[29]
	153. DA[30]	154. DA[31]	155. DA[32]	156. DA[33]
	157. DA[34]	158. DA[35]	159. DA[36]	160. DA[37]
	161. DA[38]	162. DA[39]	163. DA[40]	164. DA[41]
	165. DA[42]	166. DA[43]	167. DA[44]	168. DA[45]
	169. DA[46]	170. DA[47]	171. DA[48]	172. DA[49]
	173. DA[50]	174. DA[51]	175. DA[52]	176. DA[53]
	177. DA[54]	178. DA[55]	179. DA[56]	180. DA[57]
	181. DA[58]	182. DA[59]	183. DBIa[0]	184. DBIa[1]
	185. DBIa[2]	186. DBIa[3]	187. DBIa[4]	188. DBIa[5]
	189. DBIa[6]	190. DBIa[7]	191. DBIa[8]	192. DBIa[9]
	193. DBIa[10]	194. DBIa[11]	195. DBIa[12]	196. DBIa[13]
	197. DBIa[14]	198. DBIa[15]	199. DBIb[0]	200. DBIb[1]
	201. DBIb[2]	202. DBIb[3]	203. DBIb[4]	204. DBIb[5]
	205. DBIb[6]	206. DBIb[7]	207. DBIb[8]	208. DBIb[9]
	209. DBIb[10]	210. DBIb[11]	211. DBIb[12]	212. DBIb[13]
	213. DBIb[14]	214. DBIb[15]	215. DBIc[0]	216. DBIc[1]
	217. DBIc[2]	218. DBIc[3]	219. DBIc[4]	220. DBIc[5]
	221. DBIc[6]	222. DBIc[7]	223. DBIc[8]	224. DBIc[9]
	225. DBIc[10]	226. DBIc[11]	227. DBIc[12]	228. DBIc[13]
	229. DBIc[14]	230. DBIc[15]	231. DBId[0]	232. DBId[1]
	233. DBId[2]	234. DBId[3]	235. DBId[4]	236. DBId[5]
	237. DBId[6]	238. DBId[7]	239. DBId[8]	240. DBId[9]
	241. DBId[10]	242. DBId[11]	243. DBId[12]	244. DBId[13]
	245. DBId[14]	246. DBId[15]	247. DBIe[0]	248. DBIe[1]
	249. DBIe[2]	250. DBIe[3]	251. DBIe[4]	252. DBIe[5]
	253. DBIe[6]	254. DBIe[7]	255. DBIe[8]	256. DBIe[9]
	257. DBIe[10]	258. DBIe[11]	259. DBIe[12]	260. DBIe[13]
	261. DBIe[14]	262. DBIe[15]	263. DBIf[0]	264. DBIf[1]
	265. DBIf[2]	266. DBIf[3]	267. DBIf[4]	268. DBIf[5]
	269. DBIf[6]	270. DBIf[7]	271. DBIf[8]	272. DBIf[9]
	273. DBIf[10]	274. DBIf[11]	275. DBIf[12]	276. DBIf[13]
	277. DBIf[14]	278. DBIf[15]	279. DBIg[0]	280. DBIg[1]
	281. DBIg[2]	282. DBIg[3]	283. DBIg[4]	284. DBIg[5]
	285. DBIg[6]	286. DBIg[7]	287. DBIg[8]	288. DBIg[9]
	289. DBIg[10]	290. DBIg[11]	291. DBIg[12]	292. DBIg[13]
	293. DBIg[14]	294. DBIg[15]	295. DBIh[0]	296. DBIh[1]
	297. DBIh[2]	298. DBIh[3]	299. DBIh[4]	300. DBIh[5]

4.7.3.10.17.2 HBM1, HBM2 and HBM2E Footprint B Interface Function (cont'd)

list of enumerate values (cont.)	301. DBIh[6]	302. DBIh[7]	303. DBIh[8]	304. DBIh[9]
	305. DBIh[10]	306. DBIh[11]	307. DBIh[12]	308. DBIh[13]
	309. DBIh[14]	310. DBIh[15]	311. DERRa[0]	312. DERRa[1]
	313. DERRa[2]	314. DERRa[3]	315. DERRb[0]	316. DERRb[1]
	317. DERRb[2]	318. DERRb[3]	319. DERRc[0]	320. DERRc[1]
	321. DERRc[2]	322. DERRc[3]	323. DERRd[0]	324. DERRd[1]
	325. DERRd[2]	326. DERRd[3]	327. DERRe[0]	328. DERRe[1]
	329. DERRe[2]	330. DERRe[3]	331. DERRf[0]	332. DERRf[1]
	333. DERRf[2]	334. DERRf[3]	335. DERRg[0]	336. DERRg[1]
	337. DERRg[2]	338. DERRg[3]	339. DERRh[0]	340. DERRh[1]
	341. DERRh[2]	342. DERRh[3]	343. DMa[0]	344. DMa[1]
	345. DMa[2]	346. DMa[3]	347. DMa[4]	348. DMa[5]
	349. DMa[6]	350. DMa[7]	351. DMa[8]	352. DMa[9]
	353. DMa[10]	354. DMa[11]	355. DMa[12]	356. DMa[13]
	357. DMa[14]	358. DMa[15]	359. DMb[0]	360. DMb[1]
	361. DMb[2]	362. DMb[3]	363. DMb[4]	364. DMb[5]
	365. DMb[6]	366. DMb[7]	367. DMb[8]	368. DMb[9]
	369. DMb[10]	370. DMb[11]	371. DMb[12]	372. DMb[13]
	373. DMb[14]	374. DMb[15]	375. DMc[0]	376. DMc[1]
	377. DMc[2]	378. DMc[3]	379. DMc[4]	380. DMc[5]
	381. DMc[6]	382. DMc[7]	383. DMc[8]	384. DMc[9]
	385. DMc[10]	386. DMc[11]	387. DMc[12]	388. DMc[13]
	389. DMc[14]	390. DMc[15]	391. DMd[0]	392. DMd[1]
	393. DMd[2]	394. DMd[3]	395. DMd[4]	396. DMd[5]
	397. DMd[6]	398. DMd[7]	399. DMd[8]	400. DMd[9]
	401. DMd[10]	402. DMd[11]	403. DMd[12]	404. DMd[13]
	405. DMd[14]	406. DMd[15]	407. DMe[0]	408. DMe[1]
	409. DMe[2]	410. DMe[3]	411. DMe[4]	412. DMe[5]
	413. DMe[6]	414. DMe[7]	415. DMe[8]	416. DMe[9]
	417. DMe[10]	418. DMe[11]	419. DMe[12]	420. DMe[13]
	421. DMe[14]	422. DMe[15]	423. DMf[0]	424. DMf[1]
	425. DMf[2]	426. DMf[3]	427. DMf[4]	428. DMf[5]
	429. DMf[6]	430. DMf[7]	431. DMf[8]	432. DMf[9]
	433. DMf[10]	434. DMf[11]	435. DMf[12]	436. DMf[13]
	437. DMf[14]	438. DMf[15]	439. DMg[0]	440. DMg[1]
	441. DMg[2]	442. DMg[3]	443. DMg[4]	444. DMg[5]
	445. DMg[6]	446. DMg[7]	447. DMg[8]	448. DMg[9]
	449. DMg[10]	450. DMg[11]	451. DMg[12]	452. DMg[13]
	453. DMg[14]	454. DMg[15]	455. DMh[0]	456. DMh[1]
	457. DMh[2]	458. DMh[3]	459. DMh[4]	460. DMh[5]
	461. DMh[6]	462. DMh[7]	463. DMh[8]	464. DMh[9]
	465. DMh[10]	466. DMh[11]	467. DMh[12]	468. DMh[13]
	469. DMh[14]	470. DMh[15]	471. DQa[0]	472. DQa[1]
	473. DQa[2]	474. DQa[3]	475. DQa[4]	476. DQa[5]
	477. DQa[6]	478. DQa[7]	479. DQa[8]	480. DQa[9]
	481. DQa[10]	482. DQa[11]	483. DQa[12]	484. DQa[13]
	485. DQa[14]	486. DQa[15]	487. DQa[16]	488. DQa[17]
	489. DQa[18]	490. DQa[19]	491. DQa[20]	492. DQa[21]

4.7.3.10.17.2 HBM1, HBM2 and HBM2E Footprint B Interface Function (cont'd)

list of enumerate values (cont.)	493. DQa[22]	494. DQa[23]	495. DQa[24]	496. DQa[25]
	497. DQa[26]	498. DQa[27]	499. DQa[28]	500. DQa[29]
	501. DQa[30]	502. DQa[31]	503. DQa[32]	504. DQa[33]
	505. DQa[34]	506. DQa[35]	507. DQa[36]	508. DQa[37]
	509. DQa[38]	510. DQa[39]	511. DQa[40]	512. DQa[41]
	513. DQa[42]	514. DQa[43]	515. DQa[44]	516. DQa[45]
	517. DQa[46]	518. DQa[47]	519. DQa[48]	520. DQa[49]
	521. DQa[50]	522. DQa[51]	523. DQa[52]	524. DQa[53]
	525. DQa[54]	526. DQa[55]	527. DQa[56]	528. DQa[57]
	529. DQa[58]	530. DQa[59]	531. DQa[60]	532. DQa[61]
	533. DQa[62]	534. DQa[63]	535. DQa[64]	536. DQa[65]
	537. DQa[66]	538. DQa[67]	539. DQa[68]	540. DQa[69]
	541. DQa[70]	542. DQa[71]	543. DQa[72]	544. DQa[73]
	545. DQa[74]	546. DQa[75]	547. DQa[76]	548. DQa[77]
	549. DQa[78]	550. DQa[79]	551. DQa[80]	552. DQa[81]
	553. DQa[82]	554. DQa[83]	555. DQa[84]	556. DQa[85]
	557. DQa[86]	558. DQa[87]	559. DQa[88]	560. DQa[89]
	561. DQa[90]	562. DQa[91]	563. DQa[92]	564. DQa[93]
	565. DQa[94]	566. DQa[95]	567. DQa[96]	568. DQa[97]
	569. DQa[98]	570. DQa[99]	571. DQa[100]	572. DQa[101]
	573. DQa[102]	574. DQa[103]	575. DQa[104]	576. DQa[105]
	577. DQa[106]	578. DQa[107]	579. DQa[108]	580. DQa[109]
	581. DQa[110]	582. DQa[111]	583. DQa[112]	584. DQa[113]
	585. DQa[114]	586. DQa[115]	587. DQa[116]	588. DQa[117]
	589. DQa[118]	590. DQa[119]	591. DQa[120]	592. DQa[121]
	593. DQa[122]	594. DQa[123]	595. DQa[124]	596. DQa[125]
	597. DQa[126]	598. DQa[127]	599. DQb[0]	600. DQb[1]
	601. DQb[2]	602. DQb[3]	603. DQb[4]	604. DQb[5]
	605. DQb[6]	606. DQb[7]	607. DQb[8]	608. DQb[9]
	609. DQb[10]	610. DQb[11]	611. DQb[12]	612. DQb[13]
	613. DQb[14]	614. DQb[15]	615. DQb[16]	616. DQb[17]
	617. DQb[18]	618. DQb[19]	619. DQb[20]	620. DQb[21]
	621. DQb[22]	622. DQb[23]	623. DQb[24]	624. DQb[25]
	625. DQb[26]	626. DQb[27]	627. DQb[28]	628. DQb[29]
	629. DQb[30]	630. DQb[31]	631. DQb[32]	632. DQb[33]
	633. DQb[34]	634. DQb[35]	635. DQb[36]	636. DQb[37]
	637. DQb[38]	638. DQb[39]	639. DQb[40]	640. DQb[41]
	641. DQb[42]	642. DQb[43]	643. DQb[44]	644. DQb[45]
	645. DQb[46]	646. DQb[47]	647. DQb[48]	648. DQb[49]
	649. DQb[50]	650. DQb[51]	651. DQb[52]	652. DQb[53]
	653. DQb[54]	654. DQb[55]	655. DQb[56]	656. DQb[57]
	657. DQb[58]	658. DQb[59]	659. DQb[60]	660. DQb[61]
	661. DQb[62]	662. DQb[63]	663. DQb[64]	664. DQb[65]
	665. DQb[66]	666. DQb[67]	667. DQb[68]	668. DQb[69]
	669. DQb[70]	670. DQb[71]	671. DQb[72]	672. DQb[73]
	673. DQb[74]	674. DQb[75]	675. DQb[76]	676. DQb[77]
	677. DQb[78]	678. DQb[79]	679. DQb[80]	680. DQb[81]
	681. DQb[82]	682. DQb[83]	683. DQb[84]	684. DQb[85]

4.7.3.10.17.2 HBM1, HBM2 and HBM2E Footprint B Interface Function (cont'd)

list of enumerate values (cont.)	685. DQb[86]	686. DQb[87]	687. DQb[88]	688. DQb[89]
	689. DQb[90]	690. DQb[91]	691. DQb[92]	692. DQb[93]
	693. DQb[94]	694. DQb[95]	695. DQb[96]	696. DQb[97]
	697. DQb[98]	698. DQb[99]	699. DQb[100]	700. DQb[101]
	701. DQb[102]	702. DQb[103]	703. DQb[104]	704. DQb[105]
	705. DQb[106]	706. DQb[107]	707. DQb[108]	708. DQb[109]
	709. DQb[110]	710. DQb[111]	711. DQb[112]	712. DQb[113]
	713. DQb[114]	714. DQb[115]	715. DQb[116]	716. DQb[117]
	717. DQb[118]	718. DQb[119]	719. DQb[120]	720. DQb[121]
	721. DQb[122]	722. DQb[123]	723. DQb[124]	724. DQb[125]
	725. DQb[126]	726. DQb[127]	727. DQc[0]	728. DQc[1]
	729. DQc[2]	730. DQc[3]	731. DQc[4]	732. DQc[5]
	733. DQc[6]	734. DQc[7]	735. DQc[8]	736. DQc[9]
	737. DQc[10]	738. DQc[11]	739. DQc[12]	740. DQc[13]
	741. DQc[14]	742. DQc[15]	743. DQc[16]	744. DQc[17]
	745. DQc[18]	746. DQc[19]	747. DQc[20]	748. DQc[21]
	749. DQc[22]	750. DQc[23]	751. DQc[24]	752. DQc[25]
	753. DQc[26]	754. DQc[27]	755. DQc[28]	756. DQc[29]
	757. DQc[30]	758. DQc[31]	759. DQc[32]	760. DQc[33]
	761. DQc[34]	762. DQc[35]	763. DQc[36]	764. DQc[37]
	765. DQc[38]	766. DQc[39]	767. DQc[40]	768. DQc[41]
	769. DQc[42]	770. DQc[43]	771. DQc[44]	772. DQc[45]
	773. DQc[46]	774. DQc[47]	775. DQc[48]	776. DQc[49]
	777. DQc[50]	778. DQc[51]	779. DQc[52]	780. DQc[53]
	781. DQc[54]	782. DQc[55]	783. DQc[56]	784. DQc[57]
	785. DQc[58]	786. DQc[59]	787. DQc[60]	788. DQc[61]
	789. DQc[62]	790. DQc[63]	791. DQc[64]	792. DQc[65]
	793. DQc[66]	794. DQc[67]	795. DQc[68]	796. DQc[69]
	797. DQc[70]	798. DQc[71]	799. DQc[72]	800. DQc[73]
	801. DQc[74]	802. DQc[75]	803. DQc[76]	804. DQc[77]
	805. DQc[78]	806. DQc[79]	807. DQc[80]	808. DQc[81]
	809. DQc[82]	810. DQc[83]	811. DQc[84]	812. DQc[85]
	813. DQc[86]	814. DQc[87]	815. DQc[88]	816. DQc[89]
	817. DQc[90]	818. DQc[91]	819. DQc[92]	820. DQc[93]
	821. DQc[94]	822. DQc[95]	823. DQc[96]	824. DQc[97]
	825. DQc[98]	826. DQc[99]	827. DQc[100]	828. DQc[101]
	829. DQc[102]	830. DQc[103]	831. DQc[104]	832. DQc[105]
	833. DQc[106]	834. DQc[107]	835. DQc[108]	836. DQc[109]
	837. DQc[110]	838. DQc[111]	839. DQc[112]	840. DQc[113]
	841. DQc[114]	842. DQc[115]	843. DQc[116]	844. DQc[117]
	845. DQc[118]	846. DQc[119]	847. DQc[120]	848. DQc[121]
	849. DQc[122]	850. DQc[123]	851. DQc[124]	852. DQc[125]
	853. DQc[126]	854. DQc[127]	855. DQd[0]	856. DQd[1]
	857. DQd[2]	858. DQd[3]	859. DQd[4]	860. DQd[5]
	861. DQd[6]	862. DQd[7]	863. DQd[8]	864. DQd[9]
	865. DQd[10]	866. DQd[11]	867. DQd[12]	868. DQd[13]
	869. DQd[14]	870. DQd[15]	871. DQd[16]	872. DQd[17]
	873. DQd[18]	874. DQd[19]	875. DQd[20]	876. DQd[21]

4.7.3.10.17.2 HBM1, HBM2 and HBM2E Footprint B Interface Function (cont'd)

list of enumerate values (cont.)	877. DQd[22]	878. DQd[23]	879. DQd[24]	880. DQd[25]
	881. DQd[26]	882. DQd[27]	883. DQd[28]	884. DQd[29]
	885. DQd[30]	886. DQd[31]	887. DQd[32]	888. DQd[33]
	889. DQd[34]	890. DQd[35]	891. DQd[36]	892. DQd[37]
	893. DQd[38]	894. DQd[39]	895. DQd[40]	896. DQd[41]
	897. DQd[42]	898. DQd[43]	899. DQd[44]	900. DQd[45]
	901. DQd[46]	902. DQd[47]	903. DQd[48]	904. DQd[49]
	905. DQd[50]	906. DQd[51]	907. DQd[52]	908. DQd[53]
	909. DQd[54]	910. DQd[55]	911. DQd[56]	912. DQd[57]
	913. DQd[58]	914. DQd[59]	915. DQd[60]	916. DQd[61]
	917. DQd[62]	918. DQd[63]	919. DQd[64]	920. DQd[65]
	921. DQd[66]	922. DQd[67]	923. DQd[68]	924. DQd[69]
	925. DQd[70]	926. DQd[71]	927. DQd[72]	928. DQd[73]
	929. DQd[74]	930. DQd[75]	931. DQd[76]	932. DQd[77]
	933. DQd[78]	934. DQd[79]	935. DQd[80]	936. DQd[81]
	937. DQd[82]	938. DQd[83]	939. DQd[84]	940. DQd[85]
	941. DQd[86]	942. DQd[87]	943. DQd[88]	944. DQd[89]
	945. DQd[90]	946. DQd[91]	947. DQd[92]	948. DQd[93]
	949. DQd[94]	950. DQd[95]	951. DQd[96]	952. DQd[97]
	953. DQd[98]	954. DQd[99]	955. DQd[100]	956. DQd[101]
	957. DQd[102]	958. DQd[103]	959. DQd[104]	960. DQd[105]
	961. DQd[106]	962. DQd[107]	963. DQd[108]	964. DQd[109]
	965. DQd[110]	966. DQd[111]	967. DQd[112]	968. DQd[113]
	969. DQd[114]	970. DQd[115]	971. DQd[116]	972. DQd[117]
	973. DQd[118]	974. DQd[119]	975. DQd[120]	976. DQd[121]
	977. DQd[122]	978. DQd[123]	979. DQd[124]	980. DQd[125]
	981. DQd[126]	982. DQd[127]	983. DQe[0]	984. DQe[1]
	985. DQe[2]	986. DQe[3]	987. DQe[4]	988. DQe[5]
	989. DQe[6]	990. DQe[7]	991. DQe[8]	992. DQe[9]
	993. DQe[10]	994. DQe[11]	995. DQe[12]	996. DQe[13]
	997. DQe[14]	998. DQe[15]	999. DQe[16]	1000. DQe[17]
	1001. DQe[18]	1002. DQe[19]	1003. DQe[20]	1004. DQe[21]
	1005. DQe[22]	1006. DQe[23]	1007. DQe[24]	1008. DQe[25]
	1009. DQe[26]	1010. DQe[27]	1011. DQe[28]	1012. DQe[29]
	1013. DQe[30]	1014. DQe[31]	1015. DQe[32]	1016. DQe[33]
	1017. DQe[34]	1018. DQe[35]	1019. DQe[36]	1020. DQe[37]
	1021. DQe[38]	1022. DQe[39]	1023. DQe[40]	1024. DQe[41]
	1025. DQe[42]	1026. DQe[43]	1027. DQe[44]	1028. DQe[45]
	1029. DQe[46]	1030. DQe[47]	1031. DQe[48]	1032. DQe[49]
	1033. DQe[50]	1034. DQe[51]	1035. DQe[52]	1036. DQe[53]
	1037. DQe[54]	1038. DQe[55]	1039. DQe[56]	1040. DQe[57]
	1041. DQe[58]	1042. DQe[59]	1043. DQe[60]	1044. DQe[61]
	1045. DQe[62]	1046. DQe[63]	1047. DQe[64]	1048. DQe[65]
	1049. DQe[66]	1050. DQe[67]	1051. DQe[68]	1052. DQe[69]
	1053. DQe[70]	1054. DQe[71]	1055. DQe[72]	1056. DQe[73]
	1057. DQe[74]	1058. DQe[75]	1059. DQe[76]	1060. DQe[77]
	1061. DQe[78]	1062. DQe[79]	1063. DQe[80]	1064. DQe[81]
	1065. DQe[82]	1066. DQe[83]	1067. DQe[84]	1068. DQe[85]

4.7.3.10.17.2 HBM1, HBM2 and HBM2E Footprint B Interface Function (cont'd)

list of enumerate values (cont.)	1069. DQe[86]	1070. DQe[87]	1071. DQe[88]	1072. DQe[89]
	1073. DQe[90]	1074. DQe[91]	1075. DQe[92]	1076. DQe[93]
	1077. DQe[94]	1078. DQe[95]	1079. DQe[96]	1080. DQe[97]
	1081. DQe[98]	1082. DQe[99]	1083. DQe[100]	1084. DQe[101]
	1085. DQe[102]	1086. DQe[103]	1087. DQe[104]	1088. DQe[105]
	1089. DQe[106]	1090. DQe[107]	1091. DQe[108]	1092. DQe[109]
	1093. DQe[110]	1094. DQe[111]	1095. DQe[112]	1096. DQe[113]
	1097. DQe[114]	1098. DQe[115]	1099. DQe[116]	1100. DQe[117]
	1101. DQe[118]	1102. DQe[119]	1103. DQe[120]	1104. DQe[121]
	1105. DQe[122]	1106. DQe[123]	1107. DQe[124]	1108. DQe[125]
	1109. DQe[126]	1110. DQe[127]	1111. DQf[0]	1112. DQf[1]
	1113. DQf[2]	1114. DQf[3]	1115. DQf[4]	1116. DQf[5]
	1117. DQf[6]	1118. DQf[7]	1119. DQf[8]	1120. DQf[9]
	1121. DQf[10]	1122. DQf[11]	1123. DQf[12]	1124. DQf[13]
	1125. DQf[14]	1126. DQf[15]	1127. DQf[16]	1128. DQf[17]
	1129. DQf[18]	1130. DQf[19]	1131. DQf[20]	1132. DQf[21]
	1133. DQf[22]	1134. DQf[23]	1135. DQf[24]	1136. DQf[25]
	1137. DQf[26]	1138. DQf[27]	1139. DQf[28]	1140. DQf[29]
	1141. DQf[30]	1142. DQf[31]	1143. DQf[32]	1144. DQf[33]
	1145. DQf[34]	1146. DQf[35]	1147. DQf[36]	1148. DQf[37]
	1149. DQf[38]	1150. DQf[39]	1151. DQf[40]	1152. DQf[41]
	1153. DQf[42]	1154. DQf[43]	1155. DQf[44]	1156. DQf[45]
	1157. DQf[46]	1158. DQf[47]	1159. DQf[48]	1160. DQf[49]
	1161. DQf[50]	1162. DQf[51]	1163. DQf[52]	1164. DQf[53]
	1165. DQf[54]	1166. DQf[55]	1167. DQf[56]	1168. DQf[57]
	1169. DQf[58]	1170. DQf[59]	1171. DQf[60]	1172. DQf[61]
	1173. DQf[62]	1174. DQf[63]	1175. DQf[64]	1176. DQf[65]
	1177. DQf[66]	1178. DQf[67]	1179. DQf[68]	1180. DQf[69]
	1181. DQf[70]	1182. DQf[71]	1183. DQf[72]	1184. DQf[73]
	1185. DQf[74]	1186. DQf[75]	1187. DQf[76]	1188. DQf[77]
	1189. DQf[78]	1190. DQf[79]	1191. DQf[80]	1192. DQf[81]
	1193. DQf[82]	1194. DQf[83]	1195. DQf[84]	1196. DQf[85]
	1197. DQf[86]	1198. DQf[87]	1199. DQf[88]	1200. DQf[89]
	1201. DQf[90]	1202. DQf[91]	1203. DQf[92]	1204. DQf[93]
	1205. DQf[94]	1206. DQf[95]	1207. DQf[96]	1208. DQf[97]
	1209. DQf[98]	1210. DQf[99]	1211. DQf[100]	1212. DQf[101]
	1213. DQf[102]	1214. DQf[103]	1215. DQf[104]	1216. DQf[105]
	1217. DQf[106]	1218. DQf[107]	1219. DQf[108]	1220. DQf[109]
	1221. DQf[110]	1222. DQf[111]	1223. DQf[112]	1224. DQf[113]
	1225. DQf[114]	1226. DQf[115]	1227. DQf[116]	1228. DQf[117]
	1229. DQf[118]	1230. DQf[119]	1231. DQf[120]	1232. DQf[121]
	1233. DQf[122]	1234. DQf[123]	1235. DQf[124]	1236. DQf[125]
	1237. DQf[126]	1238. DQf[127]	1239. DQg[0]	1240. DQg[1]
	1241. DQg[2]	1242. DQg[3]	1243. DQg[4]	1244. DQg[5]
	1245. DQg[6]	1246. DQg[7]	1247. DQg[8]	1248. DQg[9]
	1249. DQg[10]	1250. DQg[11]	1251. DQg[12]	1252. DQg[13]
	1253. DQg[14]	1254. DQg[15]	1255. DQg[16]	1256. DQg[17]
	1257. DQg[18]	1258. DQg[19]	1259. DQg[20]	1260. DQg[21]

4.7.3.10.17.2 HBM1, HBM2 and HBM2E Footprint B Interface Function (cont'd)

list of enumerate values (cont.)	1261. DQg[22]	1262. DQg[23]	1263. DQg[24]	1264. DQg[25]
	1265. DQg[26]	1266. DQg[27]	1267. DQg[28]	1268. DQg[29]
	1269. DQg[30]	1270. DQg[31]	1271. DQg[32]	1272. DQg[33]
	1273. DQg[34]	1274. DQg[35]	1275. DQg[36]	1276. DQg[37]
	1277. DQg[38]	1278. DQg[39]	1279. DQg[40]	1280. DQg[41]
	1281. DQg[42]	1282. DQg[43]	1283. DQg[44]	1284. DQg[45]
	1285. DQg[46]	1286. DQg[47]	1287. DQg[48]	1288. DQg[49]
	1289. DQg[50]	1290. DQg[51]	1291. DQg[52]	1292. DQg[53]
	1293. DQg[54]	1294. DQg[55]	1295. DQg[56]	1296. DQg[57]
	1297. DQg[58]	1298. DQg[59]	1299. DQg[60]	1300. DQg[61]
	1301. DQg[62]	1302. DQg[63]	1303. DQg[64]	1304. DQg[65]
	1305. DQg[66]	1306. DQg[67]	1307. DQg[68]	1308. DQg[69]
	1309. DQg[70]	1310. DQg[71]	1311. DQg[72]	1312. DQg[73]
	1313. DQg[74]	1314. DQg[75]	1315. DQg[76]	1316. DQg[77]
	1317. DQg[78]	1318. DQg[79]	1319. DQg[80]	1320. DQg[81]
	1321. DQg[82]	1322. DQg[83]	1323. DQg[84]	1324. DQg[85]
	1325. DQg[86]	1326. DQg[87]	1327. DQg[88]	1328. DQg[89]
	1329. DQg[90]	1330. DQg[91]	1331. DQg[92]	1332. DQg[93]
	1333. DQg[94]	1334. DQg[95]	1335. DQg[96]	1336. DQg[97]
	1337. DQg[98]	1338. DQg[99]	1339. DQg[100]	1340. DQg[101]
	1341. DQg[102]	1342. DQg[103]	1343. DQg[104]	1344. DQg[105]
	1345. DQg[106]	1346. DQg[107]	1347. DQg[108]	1348. DQg[109]
	1349. DQg[110]	1350. DQg[111]	1351. DQg[112]	1352. DQg[113]
	1353. DQg[114]	1354. DQg[115]	1355. DQg[116]	1356. DQg[117]
	1357. DQg[118]	1358. DQg[119]	1359. DQg[120]	1360. DQg[121]
	1361. DQg[122]	1362. DQg[123]	1363. DQg[124]	1364. DQg[125]
	1365. DQg[126]	1366. DQg[127]	1367. DQh[0]	1368. DQh[1]
	1369. DQh[2]	1370. DQh[3]	1371. DQh[4]	1372. DQh[5]
	1373. DQh[6]	1374. DQh[7]	1375. DQh[8]	1376. DQh[9]
	1377. DQh[10]	1378. DQh[11]	1379. DQh[12]	1380. DQh[13]
	1381. DQh[14]	1382. DQh[15]	1383. DQh[16]	1384. DQh[17]
	1385. DQh[18]	1386. DQh[19]	1387. DQh[20]	1388. DQh[21]
	1389. DQh[22]	1390. DQh[23]	1391. DQh[24]	1392. DQh[25]
	1393. DQh[26]	1394. DQh[27]	1395. DQh[28]	1396. DQh[29]
	1397. DQh[30]	1398. DQh[31]	1399. DQh[32]	1400. DQh[33]
	1401. DQh[34]	1402. DQh[35]	1403. DQh[36]	1404. DQh[37]
	1405. DQh[38]	1406. DQh[39]	1407. DQh[40]	1408. DQh[41]
	1409. DQh[42]	1410. DQh[43]	1411. DQh[44]	1412. DQh[45]
	1413. DQh[46]	1414. DQh[47]	1415. DQh[48]	1416. DQh[49]
	1417. DQh[50]	1418. DQh[51]	1419. DQh[52]	1420. DQh[53]
	1421. DQh[54]	1422. DQh[55]	1423. DQh[56]	1424. DQh[57]
	1425. DQh[58]	1426. DQh[59]	1427. DQh[60]	1428. DQh[61]
	1429. DQh[62]	1430. DQh[63]	1431. DQh[64]	1432. DQh[65]
	1433. DQh[66]	1434. DQh[67]	1435. DQh[68]	1436. DQh[69]
	1437. DQh[70]	1438. DQh[71]	1439. DQh[72]	1440. DQh[73]
	1441. DQh[74]	1442. DQh[75]	1443. DQh[76]	1444. DQh[77]
	1445. DQh[78]	1446. DQh[79]	1447. DQh[80]	1448. DQh[81]
	1449. DQh[82]	1450. DQh[83]	1451. DQh[84]	1452. DQh[85]

4.7.3.10.17.2 HBM1, HBM2 and HBM2E Footprint B Interface Function (cont'd)

list of enumerate values (cont.)	1453. DQh[86]	1454. DQh[87]	1455. DQh[88]	1456. DQh[89]
	1457. DQh[90]	1458. DQh[91]	1459. DQh[92]	1460. DQh[93]
	1461. DQh[94]	1462. DQh[95]	1463. DQh[96]	1464. DQh[97]
	1465. DQh[98]	1466. DQh[99]	1467. DQh[100]	1468. DQh[101]
	1469. DQh[102]	1470. DQh[103]	1471. DQh[104]	1472. DQh[105]
	1473. DQh[106]	1474. DQh[107]	1475. DQh[108]	1476. DQh[109]
	1477. DQh[110]	1478. DQh[111]	1479. DQh[112]	1480. DQh[113]
	1481. DQh[114]	1482. DQh[115]	1483. DQh[116]	1484. DQh[117]
	1485. DQh[118]	1486. DQh[119]	1487. DQh[120]	1488. DQh[121]
	1489. DQh[122]	1490. DQh[123]	1491. DQh[124]	1492. DQh[125]
	1493. DQh[126]	1494. DQh[127]	1495. MRFU[0]	1496. MRFU[1]
	1497. MRFU[2]	1498. MRFU[3]	1499. MRFU[4]	1500. MRFU[5]
	1501. MRFU[6]	1502. MRFU[7]	1503. MRFU[8]	1504. MRFU[9]
	1505. MRFU[10]	1506. MRFU[11]	1507. MRFU[12]	1508. MRFU[13]
	1509. MRFU[14]	1510. MRFU[15]	1511. MRFU[16]	1512. MRFU[17]
	1513. MRFU[18]	1514. MRFU[19]	1515. MRFU[20]	1516. MRFU[21]
	1517. MRFU[22]	1518. MRFU[23]	1519. PARa[0]	1520. PARa[1]
	1521. PARa[2]	1522. PARa[3]	1523. PARb[0]	1524. PARb[1]
	1525. PARb[2]	1526. PARb[3]	1527. PARc[0]	1528. PARc[1]
	1529. PARc[2]	1530. PARc[3]	1531. PARd[0]	1532. PARd[1]
	1533. PARd[2]	1534. PARd[3]	1535. PARe[0]	1536. PARe[1]
	1537. PARe[2]	1538. PARe[3]	1539. PARf[0]	1540. PARf[1]
	1541. PARf[2]	1542. PARf[3]	1543. PARg[0]	1544. PARg[1]
	1545. PARg[2]	1546. PARg[3]	1547. PARh[0]	1548. PARh[1]
	1549. PARh[2]	1550. PARh[3]	1551. Ra[0]	1552. Ra[1]
	1553. Ra[2]	1554. Ra[3]	1555. Ra[4]	1556. Ra[5]
	1557. Ra[6]	1558. Rb[0]	1559. Rb[1]	1560. Rb[2]
	1561. Rb[3]	1562. Rb[4]	1563. Rb[5]	1564. Rb[6]
	1565. Rc[0]	1566. Rc[1]	1567. Rc[2]	1568. Rc[3]
	1569. Rc[4]	1570. Rc[5]	1571. Rc[6]	1572. RC[a]
	1573. RC[b]	1574. RC[c]	1575. RC[d]	1576. RC[e]
	1577. RC[f]	1578. RC[g]	1579. RC[h]	1580. Rd[0]
	1581. Rd[1]	1582. Rd[2]	1583. Rd[3]	1584. Rd[4]
	1585. Rd[5]	1586. Rd[6]	1587. RDa[0]	1588. RDa[1]
	1589. RDa[2]	1590. RDa[3]	1591. RDa[4]	1592. RDa[5]
	1593. RDa[6]	1594. RDa[7]	1595. RDb[0]	1596. RDb[1]
	1597. RDb[2]	1598. RDb[3]	1599. RDb[4]	1600. RDb[5]
	1601. RDb[6]	1602. RDb[7]	1603. RDc[0]	1604. RDc[1]
	1605. RDc[2]	1606. RDc[3]	1607. RDc[4]	1608. RDc[5]
	1609. RDc[6]	1610. RDc[7]	1611. RDd[0]	1612. RDd[1]
	1613. RDd[2]	1614. RDd[3]	1615. RDd[4]	1616. RDd[5]
	1617. RDd[6]	1618. RDd[7]	1619. RDe[0]	1620. RDe[1]
	1621. RDe[2]	1622. RDe[3]	1623. RDe[4]	1624. RDe[5]
	1625. RDe[6]	1626. RDe[7]	1627. RDf[0]	1628. RDf[1]
	1629. RDf[2]	1630. RDf[3]	1631. RDf[4]	1632. RDf[5]
	1633. RDf[6]	1634. RDf[7]	1635. RDg[0]	1636. RDg[1]
	1637. RDg[2]	1638. RDg[3]	1639. RDg[4]	1640. RDg[5]
	1641. RDg[6]	1642. RDg[7]	1643. RDh[0]	1644. RDh[1]

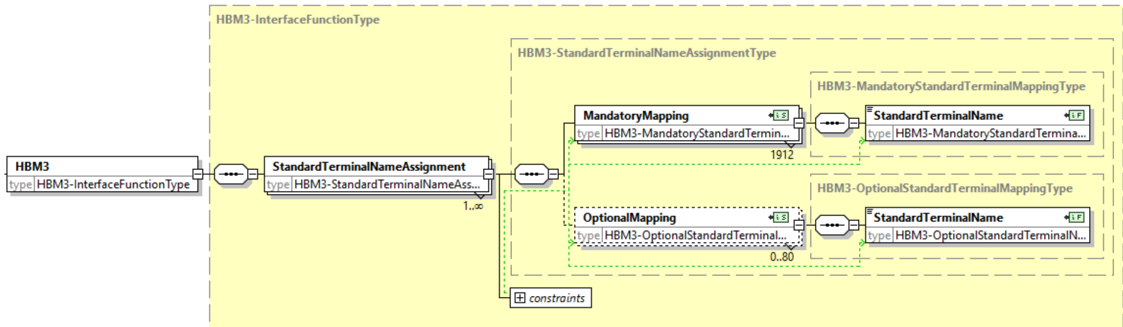
4.7.3.10.17.2 HBM1, HBM2 and HBM2E Footprint B Interface Function (cont'd)

list of enumerate values (cont.)	1645. RDh[2]	1646. RDh[3]	1647. RDh[4]	1648. RDh[5]
	1649. RDh[6]	1650. RDh[7]	1651. RDQSa0_c	1652. RDQSa0_t
	1653. RDQSa1_c	1654. RDQSa1_t	1655. RDQSa2_c	1656. RDQSa2_t
	1657. RDQSa3_c	1658. RDQSa3_t	1659. RDQSb0_c	1660. RDQSb0_t
	1661. RDQSb1_c	1662. RDQSb1_t	1663. RDQSb2_c	1664. RDQSb2_t
	1665. RDQSb3_c	1666. RDQSb3_t	1667. RDQSc0_c	1668. RDQSc0_t
	1669. RDQSc1_c	1670. RDQSc1_t	1671. RDQSc2_c	1672. RDQSc2_t
	1673. RDQSc3_c	1674. RDQSc3_t	1675. RDQSd0_c	1676. RDQSd0_t
	1677. RDQSd1_c	1678. RDQSd1_t	1679. RDQSd2_c	1680. RDQSd2_t
	1681. RDQSd3_c	1682. RDQSd3_t	1683. RDQSe0_c	1684. RDQSe0_t
	1685. RDQSe1_c	1686. RDQSe1_t	1687. RDQSe2_c	1688. RDQSe2_t
	1689. RDQSe3_c	1690. RDQSe3_t	1691. RDQSf0_c	1692. RDQSf0_t
	1693. RDQSf1_c	1694. RDQSf1_t	1695. RDQSf2_c	1696. RDQSf2_t
	1697. RDQSf3_c	1698. RDQSf3_t	1699. RDQSg0_c	1700. RDQSg0_t
	1701. RDQSg1_c	1702. RDQSg1_t	1703. RDQSg2_c	1704. RDQSg2_t
	1705. RDQSg3_c	1706. RDQSg3_t	1707. RDQSh0_c	1708. RDQSh0_t
	1709. RDQSh1_c	1710. RDQSh1_t	1711. RDQSh2_c	1712. RDQSh2_t
	1713. RDQSh3_c	1714. RDQSh3_t	1715. Re[0]	1716. Re[1]
	1717. Re[2]	1718. Re[3]	1719. Re[4]	1720. Re[5]
	1721. Re[6]	1722. RESET_n	1723. Rf[0]	1724. Rf[1]
	1725. Rf[2]	1726. Rf[3]	1727. Rf[4]	1728. Rf[5]
	1729. Rf[6]	1730. Rg[0]	1731. Rg[1]	1732. Rg[2]
	1733. Rg[3]	1734. Rg[4]	1735. Rg[5]	1736. Rg[6]
	1737. Rh[0]	1738. Rh[1]	1739. Rh[2]	1740. Rh[3]
	1741. Rh[4]	1742. Rh[5]	1743. Rh[6]	1744. RRa
	1745. RRb	1746. RRc	1747. RRd	1748. RRe
	1749. RRf	1750. RRg	1751. RRh	1752. RSVD[0]
	1753. RSVD[1]	1754. RSVD[2]	1755. RSVD[3]	1756. RSVD[4]
	1757. RSVD[5]	1758. SELECTWIR	1759. SHIFTWR	1760. TEMP[0]
	1761. TEMP[1]	1762. TEMP[2]	1763. UPDATEWR	1764. VDDC
	1765. VDDQ	1766. VPP	1767. VSS	1768. WDQSa0_c
	1769. WDQSa0_t	1770. WDQSa1_c	1771. WDQSa1_t	1772. WDQSa2_c
	1773. WDQSa2_t	1774. WDQSa3_c	1775. WDQSa3_t	1776. WDQSb0_c
	1777. WDQSb0_t	1778. WDQSb1_c	1779. WDQSb1_t	1780. WDQSb2_c
	1781. WDQSb2_t	1782. WDQSb3_c	1783. WDQSb3_t	1784. WDQSc0_c
	1785. WDQSc0_t	1786. WDQSc1_c	1787. WDQSc1_t	1788. WDQSc2_c
	1789. WDQSc2_t	1790. WDQSc3_c	1791. WDQSc3_t	1792. WDQSd0_c
	1793. WDQSd0_t	1794. WDQSd1_c	1795. WDQSd1_t	1796. WDQSd2_c
	1797. WDQSd2_t	1798. WDQSd3_c	1799. WDQSd3_t	1800. WDQSe0_c
	1801. WDQSe0_t	1802. WDQSe1_c	1803. WDQSe1_t	1804. WDQSe2_c
	1805. WDQSe2_t	1806. WDQSe3_c	1807. WDQSe3_t	1808. WDQSf0_c
	1809. WDQSf0_t	1810. WDQSf1_c	1811. WDQSf1_t	1812. WDQSf2_c
	1813. WDQSf2_t	1814. WDQSf3_c	1815. WDQSf3_t	1816. WDQSg0_c
	1817. WDQSg0_t	1818. WDQSg1_c	1819. WDQSg1_t	1820. WDQSg2_c
	1821. WDQSg2_t	1822. WDQSg3_c	1823. WDQSg3_t	1824. WDQSh0_c
	1825. WDQSh0_t	1826. WDQSh1_c	1827. WDQSh1_t	1828. WDQSh2_c
	1829. WDQSh2_t	1830. WDQSh3_c	1831. WDQSh3_t	1832. WRCK
	1833. WRST_n	1834. WSI	1835. WSOa	1836. WSOb

4.7.3.10.17.2 HBM1, HBM2 and HBM2E Footprint B Interface Function (cont'd)

list of enumerate values (cont.)	1837. WSOc	1838. WSOd	1839. WSOe	1840. WSOf
	1841. WSOg	1842. WSOh		

4.7.3.10.17.3. HBM3 Interface Functions

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HBM/HBM3
diagram	
type	HBM3-InterfaceFunctionType, HBM3-StandardTerminalNameAssignmentType, HBM3-MandatoryStandardTerminalMappingType, HBM3-MandatoryStandardTerminalNameType, HBM3-OptionalStandardTerminalMappingType, HBM3-OptionalStandardTerminalNameType.
list of enumerate values	MandatoryMapping/StandardTerminalName

1. CKa_t	2. CKb_t	3. CKc_t	4. CKd_t
5. CKe_t	6. CKf_t	7. CKg_t	8. CKh_t
9. CKi_t	10. CKj_t	11. CKk_t	12. CKl_t
13. CKm_t	14. CKn_t	15. CKo_t	16. CKp_t
17. CKa_c	18. CKb_c	19. CKc_c	20. CKd_c
21. CKe_c	22. CKf_c	23. CKg_c	24. CKh_c
25. CKi_c	26. CKj_c	27. CKk_c	28. CKl_c
29. CKm_c	30. CKn_c	31. CKo_c	32. CKp_c
33. Ca0	34. Ca1	35. Ca2	36. Ca3
37. Ca4	38. Ca5	39. Ca6	40. Ca7
41. Cb0	42. Cb1	43. Cb2	44. Cb3
45. Cb4	46. Cb5	47. Cb6	48. Cb7
49. Cc0	50. Cc1	51. Cc2	52. Cc3
53. Cc4	54. Cc5	55. Cc6	56. Cc7
57. Cd0	58. Cd1	59. Cd2	60. Cd3
61. Cd4	62. Cd5	63. Cd6	64. Cd7
65. Ce0	66. Ce1	67. Ce2	68. Ce3
69. Ce4	70. Ce5	71. Ce6	72. Ce7
73. Cf0	74. Cf1	75. Cf2	76. Cf3
77. Cf4	78. Cf5	79. Cf6	80. Cf7
81. Cg0	82. Cg1	83. Cg2	84. Cg3
85. Cg4	86. Cg5	87. Cg6	88. Cg7
89. Ch0	90. Ch1	91. Ch2	92. Ch3
93. Ch4	94. Ch5	95. Ch6	96. Ch7
97. Ci0	98. Ci1	99. Ci2	100. Ci3
101. Ci4	102. Ci5	103. Ci6	104. Ci7
105. Cj0	106. Cj1	107. Cj2	108. Cj3
109. Cj4	110. Cj5	111. Cj6	112. Cj7

4.7.3.10.17.3 HBM3 Interface Function (cont'd)

list of enumerate values (cont.)	113. Ck0	114. Ck1	115. Ck2	116. Ck3
	117. Ck4	118. Ck5	119. Ck6	120. Ck7
	121. Cl0	122. Cl1	123. Cl2	124. Cl3
	125. Cl4	126. Cl5	127. Cl6	128. Cl7
	129. Cm0	130. Cm1	131. Cm2	132. Cm3
	133. Cm4	134. Cm5	135. Cm6	136. Cm7
	137. Cn0	138. Cn1	139. Cn2	140. Cn3
	141. Cn4	142. Cn5	143. Cn6	144. Cn7
	145. Co0	146. Co1	147. Co2	148. Co3
	149. Co4	150. Co5	151. Co6	152. Co7
	153. Cp0	154. Cp1	155. Cp2	156. Cp3
	157. Cp4	158. Cp5	159. Cp6	160. Cp7
	161. Ra0	162. Ra1	163. Ra2	164. Ra3
	165. Ra4	166. Ra5	167. Ra6	168. Ra7
	169. Ra8	170. Ra9	171. Rb0	172. Rb1
	173. Rb2	174. Rb3	175. Rb4	176. Rb5
	177. Rb6	178. Rb7	179. Rb8	180. Rb9
	181. Rc0	182. Rc1	183. Rc2	184. Rc3
	185. Rc4	186. Rc5	187. Rc6	188. Rc7
	189. Rc8	190. Rc9	191. Rd0	192. Rd1
	193. Rd2	194. Rd3	195. Rd4	196. Rd5
	197. Rd6	198. Rd7	199. Rd8	200. Rd9
	201. Re0	202. Re1	203. Re2	204. Re3
	205. Re4	206. Re5	207. Re6	208. Re7
	209. Re8	210. Re9	211. Rf0	212. Rf1
	213. Rf2	214. Rf3	215. Rf4	216. Rf5
	217. Rf6	218. Rf7	219. Rf8	220. Rf9
	221. Rg0	222. Rg1	223. Rg2	224. Rg3
	225. Rg4	226. Rg5	227. Rg6	228. Rg7
	229. Rg8	230. Rg9	231. Rh0	232. Rh1
	233. Rh2	234. Rh3	235. Rh4	236. Rh5
	237. Rh6	238. Rh7	239. Rh8	240. Rh9
	241. Ri0	242. Ri1	243. Ri2	244. Ri3
	245. Ri4	246. Ri5	247. Ri6	248. Ri7
	249. Ri8	250. Ri9	251. Rj0	252. Rj1
	253. Rj2	254. Rj3	255. Rj4	256. Rj5
	257. Rj6	258. Rj7	259. Rj8	260. Rj9
	261. Rk0	262. Rk1	263. Rk2	264. Rk3
	265. Rk4	266. Rk5	267. Rk6	268. Rk7
	269. Rk8	270. Rk9	271. Rl0	272. Rl1
	273. Rl2	274. Rl3	275. Rl4	276. Rl5
	277. Rl6	278. Rl7	279. Rl8	280. Rl9
	281. Rm0	282. Rm1	283. Rm2	284. Rm3
	285. Rm4	286. Rm5	287. Rm6	288. Rm7
	289. Rm8	290. Rm9	291. Rn0	292. Rn1
	293. Rn2	294. Rn3	295. Rn4	296. Rn5
	297. Rn6	298. Rn7	299. Rn8	300. Rn9

4.7.3.10.17.3 HBM3 Interface Function (cont'd)

list of enumerate values (cont.)	301. Ro0	302. Ro1	303. Ro2	304. Ro3
	305. Ro4	306. Ro5	307. Ro6	308. Ro7
	309. Ro8	310. Ro9	311. Rp0	312. Rp1
	313. Rp2	314. Rp3	315. Rp4	316. Rp5
	317. Rp6	318. Rp7	319. Rp8	320. Rp9
	321. ARFUa	322. ARFUb	323. ARFUc	324. ARFUd
	325. ARFUe	326. ARFUf	327. ARFUg	328. ARFUh
	329. ARFUi	330. ARFUj	331. ARFUk	332. ARFUl
	333. ARFUm	334. ARFUn	335. ARFUo	336. ARFUp
	337. APARa	338. APARb	339. APARc	340. APARd
	341. APARe	342. APARf	343. APARg	344. APARh
	345. APARi	346. APARj	347. APARk	348. APARl
	349. APARm	350. APARn	351. APARo	352. APARp
	353. DQa[0]	354. DQa[1]	355. DQa[2]	356. DQa[3]
	357. DQa[4]	358. DQa[5]	359. DQa[6]	360. DQa[7]
	361. DQa[8]	362. DQa[9]	363. DQa[10]	364. DQa[11]
	365. DQa[12]	366. DQa[13]	367. DQa[14]	368. DQa[15]
	369. DQa[16]	370. DQa[17]	371. DQa[18]	372. DQa[19]
	373. DQa[20]	374. DQa[21]	375. DQa[22]	376. DQa[23]
	377. DQa[24]	378. DQa[25]	379. DQa[26]	380. DQa[27]
	381. DQa[28]	382. DQa[29]	383. DQa[30]	384. DQa[31]
	385. DQa[32]	386. DQa[33]	387. DQa[34]	388. DQa[35]
	389. DQa[36]	390. DQa[37]	391. DQa[38]	392. DQa[39]
	393. DQa[40]	394. DQa[41]	395. DQa[42]	396. DQa[43]
	397. DQa[44]	398. DQa[45]	399. DQa[46]	400. DQa[47]
	401. DQa[48]	402. DQa[49]	403. DQa[50]	404. DQa[51]
	405. DQa[52]	406. DQa[53]	407. DQa[54]	408. DQa[55]
	409. DQa[56]	410. DQa[57]	411. DQa[58]	412. DQa[59]
	413. DQa[60]	414. DQa[61]	415. DQa[62]	416. DQa[63]
	417. DQb[0]	418. DQb[1]	419. DQb[2]	420. DQb[3]
	421. DQb[4]	422. DQb[5]	423. DQb[6]	424. DQb[7]
	425. DQb[8]	426. DQb[9]	427. DQb[10]	428. DQb[11]
	429. DQb[12]	430. DQb[13]	431. DQb[14]	432. DQb[15]
	433. DQb[16]	434. DQb[17]	435. DQb[18]	436. DQb[19]
	437. DQb[20]	438. DQb[21]	439. DQb[22]	440. DQb[23]
	441. DQb[24]	442. DQb[25]	443. DQb[26]	444. DQb[27]
	445. DQb[28]	446. DQb[29]	447. DQb[30]	448. DQb[31]
	449. DQb[32]	450. DQb[33]	451. DQb[34]	452. DQb[35]
	453. DQb[36]	454. DQb[37]	455. DQb[38]	456. DQb[39]
	457. DQb[40]	458. DQb[41]	459. DQb[42]	460. DQb[43]
	461. DQb[44]	462. DQb[45]	463. DQb[46]	464. DQb[47]
	465. DQb[48]	466. DQb[49]	467. DQb[50]	468. DQb[51]
	469. DQb[52]	470. DQb[53]	471. DQb[54]	472. DQb[55]
	473. DQb[56]	474. DQb[57]	475. DQb[58]	476. DQb[59]
	477. DQb[60]	478. DQb[61]	479. DQb[62]	480. DQb[63]
	481. DQc[0]	482. DQc[1]	483. DQc[2]	484. DQc[3]
	485. DQc[4]	486. DQc[5]	487. DQc[6]	488. DQc[7]

4.7.3.10.17.3 HBM3 Interface Function (cont'd)

list of enumerate values (cont.)	489. DQc[8]	490. DQc[9]	491. DQc[10]	492. DQc[11]
	493. DQc[12]	494. DQc[13]	495. DQc[14]	496. DQc[15]
	497. DQc[16]	498. DQc[17]	499. DQc[18]	500. DQc[19]
	501. DQc[20]	502. DQc[21]	503. DQc[22]	504. DQc[23]
	505. DQc[24]	506. DQc[25]	507. DQc[26]	508. DQc[27]
	509. DQc[28]	510. DQc[29]	511. DQc[30]	512. DQc[31]
	513. DQc[32]	514. DQc[33]	515. DQc[34]	516. DQc[35]
	517. DQc[36]	518. DQc[37]	519. DQc[38]	520. DQc[39]
	521. DQc[40]	522. DQc[41]	523. DQc[42]	524. DQc[43]
	525. DQc[44]	526. DQc[45]	527. DQc[46]	528. DQc[47]
	529. DQc[48]	530. DQc[49]	531. DQc[50]	532. DQc[51]
	533. DQc[52]	534. DQc[53]	535. DQc[54]	536. DQc[55]
	537. DQc[56]	538. DQc[57]	539. DQc[58]	540. DQc[59]
	541. DQc[60]	542. DQc[61]	543. DQc[62]	544. DQc[63]
	545. DQd[0]	546. DQd[1]	547. DQd[2]	548. DQd[3]
	549. DQd[4]	550. DQd[5]	551. DQd[6]	552. DQd[7]
	553. DQd[8]	554. DQd[9]	555. DQd[10]	556. DQd[11]
	557. DQd[12]	558. DQd[13]	559. DQd[14]	560. DQd[15]
	561. DQd[16]	562. DQd[17]	563. DQd[18]	564. DQd[19]
	565. DQd[20]	566. DQd[21]	567. DQd[22]	568. DQd[23]
	569. DQd[24]	570. DQd[25]	571. DQd[26]	572. DQd[27]
	573. DQd[28]	574. DQd[29]	575. DQd[30]	576. DQd[31]
	577. DQd[32]	578. DQd[33]	579. DQd[34]	580. DQd[35]
	581. DQd[36]	582. DQd[37]	583. DQd[38]	584. DQd[39]
	585. DQd[40]	586. DQd[41]	587. DQd[42]	588. DQd[43]
	589. DQd[44]	590. DQd[45]	591. DQd[46]	592. DQd[47]
	593. DQd[48]	594. DQd[49]	595. DQd[50]	596. DQd[51]
	597. DQd[52]	598. DQd[53]	599. DQd[54]	600. DQd[55]
	601. DQd[56]	602. DQd[57]	603. DQd[58]	604. DQd[59]
	605. DQd[60]	606. DQd[61]	607. DQd[62]	608. DQd[63]
	609. DQe[0]	610. DQe[1]	611. DQe[2]	612. DQe[3]

4.7.3.10.17.3 HBM3 Interface Function (cont'd)

list of enumerate values (cont.)	613. DQe[4]	614. DQe[5]	615. DQe[6]	616. DQe[7]
	617. DQe[8]	618. DQe[9]	619. DQe[10]	620. DQe[11]
	621. DQe[12]	622. DQe[13]	623. DQe[14]	624. DQe[15]
	625. DQe[16]	626. DQe[17]	627. DQe[18]	628. DQe[19]
	629. DQe[20]	630. DQe[21]	631. DQe[22]	632. DQe[23]
	633. DQe[24]	634. DQe[25]	635. DQe[26]	636. DQe[27]
	637. DQe[28]	638. DQe[29]	639. DQe[30]	640. DQe[31]
	641. DQe[32]	642. DQe[33]	643. DQe[34]	644. DQe[35]
	645. DQe[36]	646. DQe[37]	647. DQe[38]	648. DQe[39]
	649. DQe[40]	650. DQe[41]	651. DQe[42]	652. DQe[43]
	653. DQe[44]	654. DQe[45]	655. DQe[46]	656. DQe[47]
	657. DQe[48]	658. DQe[49]	659. DQe[50]	660. DQe[51]
	661. DQe[52]	662. DQe[53]	663. DQe[54]	664. DQe[55]
	665. DQe[56]	666. DQe[57]	667. DQe[58]	668. DQe[59]
	669. DQe[60]	670. DQe[61]	671. DQe[62]	672. DQe[63]
	673. DQf[0]	674. DQf[1]	675. DQf[2]	676. DQf[3]
	677. DQf[4]	678. DQf[5]	679. DQf[6]	680. DQf[7]
	681. DQf[8]	682. DQf[9]	683. DQf[10]	684. DQf[11]
	685. DQf[12]	686. DQf[13]	687. DQf[14]	688. DQf[15]
	689. DQf[16]	690. DQf[17]	691. DQf[18]	692. DQf[19]
	693. DQf[20]	694. DQf[21]	695. DQf[22]	696. DQf[23]
	697. DQf[24]	698. DQf[25]	699. DQf[26]	700. DQf[27]
	701. DQf[28]	702. DQf[29]	703. DQf[30]	704. DQf[31]
	705. DQf[32]	706. DQf[33]	707. DQf[34]	708. DQf[35]
	709. DQf[36]	710. DQf[37]	711. DQf[38]	712. DQf[39]
	713. DQf[40]	714. DQf[41]	715. DQf[42]	716. DQf[43]
	717. DQf[44]	718. DQf[45]	719. DQf[46]	720. DQf[47]
	721. DQf[48]	722. DQf[49]	723. DQf[50]	724. DQf[51]
	725. DQf[52]	726. DQf[53]	727. DQf[54]	728. DQf[55]
	729. DQf[56]	730. DQf[57]	731. DQf[58]	732. DQf[59]
	733. DQf[60]	734. DQf[61]	735. DQf[62]	736. DQf[63]
	737. DQg[0]	738. DQg[1]	739. DQg[2]	740. DQg[3]
	741. DQg[4]	742. DQg[5]	743. DQg[6]	744. DQg[7]
	745. DQg[8]	746. DQg[9]	747. DQg[10]	748. DQg[11]
	749. DQg[12]	750. DQg[13]	751. DQg[14]	752. DQg[15]
	753. DQg[16]	754. DQg[17]	755. DQg[18]	756. DQg[19]
	757. DQg[20]	758. DQg[21]	759. DQg[22]	760. DQg[23]
	761. DQg[24]	762. DQg[25]	763. DQg[26]	764. DQg[27]
	765. DQg[28]	766. DQg[29]	767. DQg[30]	768. DQg[31]
	769. DQg[32]	770. DQg[33]	771. DQg[34]	772. DQg[35]
	773. DQg[36]	774. DQg[37]	775. DQg[38]	776. DQg[39]
	777. DQg[40]	778. DQg[41]	779. DQg[42]	780. DQg[43]
	781. DQg[44]	782. DQg[45]	783. DQg[46]	784. DQg[47]

4.7.3.10.17.3 HBM3 Interface Function (cont'd)

list of enumerate values (cont.)	785. DQg[48]	786. DQg[49]	787. DQg[50]	788. DQg[51]
	789. DQg[52]	790. DQg[53]	791. DQg[54]	792. DQg[55]
	793. DQg[56]	794. DQg[57]	795. DQg[58]	796. DQg[59]
	797. DQg[60]	798. DQg[61]	799. DQg[62]	800. DQg[63]
	801. DQh[0]	802. DQh[1]	803. DQh[2]	804. DQh[3]
	805. DQh[4]	806. DQh[5]	807. DQh[6]	808. DQh[7]
	809. DQh[8]	810. DQh[9]	811. DQh[10]	812. DQh[11]
	813. DQh[12]	814. DQh[13]	815. DQh[14]	816. DQh[15]
	817. DQh[16]	818. DQh[17]	819. DQh[18]	820. DQh[19]
	821. DQh[20]	822. DQh[21]	823. DQh[22]	824. DQh[23]
	825. DQh[24]	826. DQh[25]	827. DQh[26]	828. DQh[27]
	829. DQh[28]	830. DQh[29]	831. DQh[30]	832. DQh[31]
	833. DQh[32]	834. DQh[33]	835. DQh[34]	836. DQh[35]
	837. DQh[36]	838. DQh[37]	839. DQh[38]	840. DQh[39]
	841. DQh[40]	842. DQh[41]	843. DQh[42]	844. DQh[43]
	845. DQh[44]	846. DQh[45]	847. DQh[46]	848. DQh[47]
	849. DQh[48]	850. DQh[49]	851. DQh[50]	852. DQh[51]
	853. DQh[52]	854. DQh[53]	855. DQh[54]	856. DQh[55]
	857. DQh[56]	858. DQh[57]	859. DQh[58]	860. DQh[59]
	861. DQh[60]	862. DQh[61]	863. DQh[62]	864. DQh[63]
	865. DQi[0]	866. DQi[1]	867. DQi[2]	868. DQi[3]
	869. DQi[4]	870. DQi[5]	871. DQi[6]	872. DQi[7]
	873. DQi[8]	874. DQi[9]	875. DQi[10]	876. DQi[11]
	877. DQi[12]	878. DQi[13]	879. DQi[14]	880. DQi[15]
	881. DQi[16]	882. DQi[17]	883. DQi[18]	884. DQi[19]
	885. DQi[20]	886. DQi[21]	887. DQi[22]	888. DQi[23]
	889. DQi[24]	890. DQi[25]	891. DQi[26]	892. DQi[27]
	893. DQi[28]	894. DQi[29]	895. DQi[30]	896. DQi[31]
	897. DQi[32]	898. DQi[33]	899. DQi[34]	900. DQi[35]
	901. DQi[36]	902. DQi[37]	903. DQi[38]	904. DQi[39]
	905. DQi[40]	906. DQi[41]	907. DQi[42]	908. DQi[43]
	909. DQi[44]	910. DQi[45]	911. DQi[46]	912. DQi[47]
	913. DQi[48]	914. DQi[49]	915. DQi[50]	916. DQi[51]
	917. DQi[52]	918. DQi[53]	919. DQi[54]	920. DQi[55]
	921. DQi[56]	922. DQi[57]	923. DQi[58]	924. DQi[59]
	925. DQi[60]	926. DQi[61]	927. DQi[62]	928. DQi[63]
	929. DQj[0]	930. DQj[1]	931. DQj[2]	932. DQj[3]
	933. DQj[4]	934. DQj[5]	935. DQj[6]	936. DQj[7]
	937. DQj[8]	938. DQj[9]	939. DQj[10]	940. DQj[11]
	941. DQj[12]	942. DQj[13]	943. DQj[14]	944. DQj[15]
	945. DQj[16]	946. DQj[17]	947. DQj[18]	948. DQj[19]
	949. DQj[20]	950. DQj[21]	951. DQj[22]	952. DQj[23]
	953. DQj[24]	954. DQj[25]	955. DQj[26]	956. DQj[27]

4.7.3.10.17.3 HBM3 Interface Function (cont'd)

list of enumerate values (cont.)	957. DQj[28]	958. DQj[29]	959. DQj[30]	960. DQj[31]
	961. DQj[32]	962. DQj[33]	963. DQj[34]	964. DQj[35]
	965. DQj[36]	966. DQj[37]	967. DQj[38]	968. DQj[39]
	969. DQj[40]	970. DQj[41]	971. DQj[42]	972. DQj[43]
	973. DQj[44]	974. DQj[45]	975. DQj[46]	976. DQj[47]
	977. DQj[48]	978. DQj[49]	979. DQj[50]	980. DQj[51]
	981. DQj[52]	982. DQj[53]	983. DQj[54]	984. DQj[55]
	985. DQj[56]	986. DQj[57]	987. DQj[58]	988. DQj[59]
	989. DQj[60]	990. DQj[61]	991. DQj[62]	992. DQj[63]
	993. DQk[0]	994. DQk[1]	995. DQk[2]	996. DQk[3]
	997. DQk[4]	998. DQk[5]	999. DQk[6]	1000. DQk[7]
	1001. DQk[8]	1002. DQk[9]	1003. DQk[10]	1004. DQk[11]
	1005. DQk[12]	1006. DQk[13]	1007. DQk[14]	1008. DQk[15]
	1009. DQk[16]	1010. DQk[17]	1011. DQk[18]	1012. DQk[19]
	1013. DQk[20]	1014. DQk[21]	1015. DQk[22]	1016. DQk[23]
	1017. DQk[24]	1018. DQk[25]	1019. DQk[26]	1020. DQk[27]
	1021. DQk[28]	1022. DQk[29]	1023. DQk[30]	1024. DQk[31]
	1025. DQk[32]	1026. DQk[33]	1027. DQk[34]	1028. DQk[35]
	1029. DQk[36]	1030. DQk[37]	1031. DQk[38]	1032. DQk[39]
	1033. DQk[40]	1034. DQk[41]	1035. DQk[42]	1036. DQk[43]
	1037. DQk[44]	1038. DQk[45]	1039. DQk[46]	1040. DQk[47]
	1041. DQk[48]	1042. DQk[49]	1043. DQk[50]	1044. DQk[51]
	1045. DQk[52]	1046. DQk[53]	1047. DQk[54]	1048. DQk[55]
	1049. DQk[56]	1050. DQk[57]	1051. DQk[58]	1052. DQk[59]
	1053. DQk[60]	1054. DQk[61]	1055. DQk[62]	1056. DQk[63]
	1057. DQl[0]	1058. DQl[1]	1059. DQl[2]	1060. DQl[3]
	1061. DQl[4]	1062. DQl[5]	1063. DQl[6]	1064. DQl[7]
	1065. DQl[8]	1066. DQl[9]	1067. DQl[10]	1068. DQl[11]
	1069. DQl[12]	1070. DQl[13]	1071. DQl[14]	1072. DQl[15]
	1073. DQl[16]	1074. DQl[17]	1075. DQl[18]	1076. DQl[19]
	1077. DQl[20]	1078. DQl[21]	1079. DQl[22]	1080. DQl[23]
	1081. DQl[24]	1082. DQl[25]	1083. DQl[26]	1084. DQl[27]
	1085. DQl[28]	1086. DQl[29]	1087. DQl[30]	1088. DQl[31]
	1089. DQl[32]	1090. DQl[33]	1091. DQl[34]	1092. DQl[35]
	1093. DQl[36]	1094. DQl[37]	1095. DQl[38]	1096. DQl[39]
	1097. DQl[40]	1098. DQl[41]	1099. DQl[42]	1100. DQl[43]
	1101. DQl[44]	1102. DQl[45]	1103. DQl[46]	1104. DQl[47]
	1105. DQl[48]	1106. DQl[49]	1107. DQl[50]	1108. DQl[51]
	1109. DQl[52]	1110. DQl[53]	1111. DQl[54]	1112. DQl[55]
	1113. DQl[56]	1114. DQl[57]	1115. DQl[58]	1116. DQl[59]
	1117. DQl[60]	1118. DQl[61]	1119. DQl[62]	1120. DQl[63]
	1121. DQm[0]	1122. DQm[1]	1123. DQm[2]	1124. DQm[3]
	1125. DQm[4]	1126. DQm[5]	1127. DQm[6]	1128. DQm[7]

4.7.3.10.17.3 HBM3 Interface Function (cont'd)

list of enumerate values (cont.)	1129. DQm[8]	1130. DQm[9]	1131. DQm[10]	1132. DQm[11]
	1133. DQm[12]	1134. DQm[13]	1135. DQm[14]	1136. DQm[15]
	1137. DQm[16]	1138. DQm[17]	1139. DQm[18]	1140. DQm[19]
	1141. DQm[20]	1142. DQm[21]	1143. DQm[22]	1144. DQm[23]
	1145. DQm[24]	1146. DQm[25]	1147. DQm[26]	1148. DQm[27]
	1149. DQm[28]	1150. DQm[29]	1151. DQm[30]	1152. DQm[31]
	1153. DQm[32]	1154. DQm[33]	1155. DQm[34]	1156. DQm[35]
	1157. DQm[36]	1158. DQm[37]	1159. DQm[38]	1160. DQm[39]
	1161. DQm[40]	1162. DQm[41]	1163. DQm[42]	1164. DQm[43]
	1165. DQm[44]	1166. DQm[45]	1167. DQm[46]	1168. DQm[47]
	1169. DQm[48]	1170. DQm[49]	1171. DQm[50]	1172. DQm[51]
	1173. DQm[52]	1174. DQm[53]	1175. DQm[54]	1176. DQm[55]
	1177. DQm[56]	1178. DQm[57]	1179. DQm[58]	1180. DQm[59]
	1181. DQm[60]	1182. DQm[61]	1183. DQm[62]	1184. DQm[63]
	1185. DQn[0]	1186. DQn[1]	1187. DQn[2]	1188. DQn[3]
	1189. DQn[4]	1190. DQn[5]	1191. DQn[6]	1192. DQn[7]
	1193. DQn[8]	1194. DQn[9]	1195. DQn[10]	1196. DQn[11]
	1197. DQn[12]	1198. DQn[13]	1199. DQn[14]	1200. DQn[15]
	1201. DQn[16]	1202. DQn[17]	1203. DQn[18]	1204. DQn[19]
	1205. DQn[20]	1206. DQn[21]	1207. DQn[22]	1208. DQn[23]
	1209. DQn[24]	1210. DQn[25]	1211. DQn[26]	1212. DQn[27]
	1213. DQn[28]	1214. DQn[29]	1215. DQn[30]	1216. DQn[31]
	1217. DQn[32]	1218. DQn[33]	1219. DQn[34]	1220. DQn[35]
	1221. DQn[36]	1222. DQn[37]	1223. DQn[38]	1224. DQn[39]
	1225. DQn[40]	1226. DQn[41]	1227. DQn[42]	1228. DQn[43]
	1229. DQn[44]	1230. DQn[45]	1231. DQn[46]	1232. DQn[47]
	1233. DQn[48]	1234. DQn[49]	1235. DQn[50]	1236. DQn[51]
	1237. DQn[52]	1238. DQn[53]	1239. DQn[54]	1240. DQn[55]
	1241. DQn[56]	1242. DQn[57]	1243. DQn[58]	1244. DQn[59]
	1245. DQn[60]	1246. DQn[61]	1247. DQn[62]	1248. DQn[63]
	1249. DQo[0]	1250. DQo[1]	1251. DQo[2]	1252. DQo[3]
	1253. DQo[4]	1254. DQo[5]	1255. DQo[6]	1256. DQo[7]
	1257. DQo[8]	1258. DQo[9]	1259. DQo[10]	1260. DQo[11]
	1261. DQo[12]	1262. DQo[13]	1263. DQo[14]	1264. DQo[15]
	1265. DQo[16]	1266. DQo[17]	1267. DQo[18]	1268. DQo[19]
	1269. DQo[20]	1270. DQo[21]	1271. DQo[22]	1272. DQo[23]
	1273. DQo[24]	1274. DQo[25]	1275. DQo[26]	1276. DQo[27]
	1277. DQo[28]	1278. DQo[29]	1279. DQo[30]	1280. DQo[31]
	1281. DQo[32]	1282. DQo[33]	1283. DQo[34]	1284. DQo[35]
	1285. DQo[36]	1286. DQo[37]	1287. DQo[38]	1288. DQo[39]
	1289. DQo[40]	1290. DQo[41]	1291. DQo[42]	1292. DQo[43]
	1293. DQo[44]	1294. DQo[45]	1295. DQo[46]	1296. DQo[47]
	1297. DQo[48]	1298. DQo[49]	1299. DQo[50]	1300. DQo[51]

4.7.3.10.17.3 HBM3 Interface Function (cont'd)

list of enumerate values (cont.)	1301. DQo[52]	1302. DQo[53]	1303. DQo[54]	1304. DQo[55]
	1305. DQo[56]	1306. DQo[57]	1307. DQo[58]	1308. DQo[59]
	1309. DQo[60]	1310. DQo[61]	1311. DQo[62]	1312. DQo[63]
	1313. DQp[0]	1314. DQp[1]	1315. DQp[2]	1316. DQp[3]
	1317. DQp[4]	1318. DQp[5]	1319. DQp[6]	1320. DQp[7]
	1321. DQp[8]	1322. DQp[9]	1323. DQp[10]	1324. DQp[11]
	1325. DQp[12]	1326. DQp[13]	1327. DQp[14]	1328. DQp[15]
	1329. DQp[16]	1330. DQp[17]	1331. DQp[18]	1332. DQp[19]
	1333. DQp[20]	1334. DQp[21]	1335. DQp[22]	1336. DQp[23]
	1337. DQp[24]	1338. DQp[25]	1339. DQp[26]	1340. DQp[27]
	1341. DQp[28]	1342. DQp[29]	1343. DQp[30]	1344. DQp[31]
	1345. DQp[32]	1346. DQp[33]	1347. DQp[34]	1348. DQp[35]
	1349. DQp[36]	1350. DQp[37]	1351. DQp[38]	1352. DQp[39]
	1353. DQp[40]	1354. DQp[41]	1355. DQp[42]	1356. DQp[43]
	1357. DQp[44]	1358. DQp[45]	1359. DQp[46]	1360. DQp[47]
	1361. DQp[48]	1362. DQp[49]	1363. DQp[50]	1364. DQp[51]
	1365. DQp[52]	1366. DQp[53]	1367. DQp[54]	1368. DQp[55]
	1369. DQp[56]	1370. DQp[57]	1371. DQp[58]	1372. DQp[59]
	1373. DQp[60]	1374. DQp[61]	1375. DQp[62]	1376. DQp[63]
	1377. DBIa0	1378. DBIa1	1379. DBIa2	1380. DBIa3
	1381. DBIa4	1382. DBIa5	1383. DBIa6	1384. DBIa7
	1385. DBIb0	1386. DBIb1	1387. DBIb2	1388. DBIb3
	1389. DBIb4	1390. DBIb5	1391. DBIb6	1392. DBIb7
	1393. DBIc0	1394. DBIc1	1395. DBIc2	1396. DBIc3
	1397. DBIc4	1398. DBIc5	1399. DBIc6	1400. DBIc7
	1401. DBId0	1402. DBId1	1403. DBId2	1404. DBId3
	1405. DBId4	1406. DBId5	1407. DBId6	1408. DBId7
	1409. DBIe0	1410. DBIe1	1411. DBIe2	1412. DBIe3
	1413. DBIe4	1414. DBIe5	1415. DBIe6	1416. DBIe7
	1417. DBIf0	1418. DBIf1	1419. DBIf2	1420. DBIf3
	1421. DBIf4	1422. DBIf5	1423. DBIf6	1424. DBIf7
	1425. DBIg0	1426. DBIg1	1427. DBIg2	1428. DBIg3
	1429. DBIg4	1430. DBIg5	1431. DBIg6	1432. DBIg7
	1433. DBIh0	1434. DBIh1	1435. DBIh2	1436. DBIh3
	1437. DBIh4	1438. DBIh5	1439. DBIh6	1440. DBIh7
	1441. DBIi0	1442. DBIi1	1443. DBIi2	1444. DBIi3
	1445. DBIi4	1446. DBIi5	1447. DBIi6	1448. DBIi7
	1449. DBIj0	1450. DBIj1	1451. DBIj2	1452. DBIj3
	1453. DBIj4	1454. DBIj5	1455. DBIj6	1456. DBIj7
	1457. DBIk0	1458. DBIk1	1459. DBIk2	1460. DBIk3
	1461. DBIk4	1462. DBIk5	1463. DBIk6	1464. DBIk7
	1465. DBIl0	1466. DBIl1	1467. DBIl2	1468. DBIl3
	1469. DBIl4	1470. DBIl5	1471. DBIl6	1472. DBIl7

4.7.3.10.17.3 HBM3 Interface Function (cont'd)

list of enumerate values (cont.)	1473. DBIm0	1474. DBIm1	1475. DBIm2	1476. DBIm3
	1477. DBIm4	1478. DBIm5	1479. DBIm6	1480. DBIm7
	1481. DBIn0	1482. DBIn1	1483. DBIn2	1484. DBIn3
	1485. DBIn4	1486. DBIn5	1487. DBIn6	1488. DBIn7
	1489. DBIo0	1490. DBIo1	1491. DBIo2	1492. DBIo3
	1493. DBIo4	1494. DBIo5	1495. DBIo6	1496. DBIo7
	1497. DBIp0	1498. DBIp1	1499. DBIp2	1500. DBIp3
	1501. DBIp4	1502. DBIp5	1503. DBIp6	1504. DBIp7
	1505. ECCa0	1506. ECCa1	1507. ECCa2	1508. ECCa3
	1509. ECCb0	1510. ECCb1	1511. ECCb2	1512. ECCb3
	1513. ECCc0	1514. ECCc1	1515. ECCc2	1516. ECCc3
	1517. ECCd0	1518. ECCd1	1519. ECCd2	1520. ECCd3
	1521. ECCe0	1522. ECCe1	1523. ECCe2	1524. ECCe3
	1525. ECCf0	1526. ECCf1	1527. ECCf2	1528. ECCf3
	1529. ECCg0	1530. ECCg1	1531. ECCg2	1532. ECCg3
	1533. ECCh0	1534. ECCh1	1535. ECCh2	1536. ECCh3
	1537. ECCi0	1538. ECCi1	1539. ECCi2	1540. ECCi3
	1541. ECCj0	1542. ECCj1	1543. ECCj2	1544. ECCj3
	1545. ECCk0	1546. ECCk1	1547. ECCk2	1548. ECCk3
	1549. ECCl0	1550. ECCl1	1551. ECCl2	1552. ECCl3
	1553. ECCm0	1554. ECCm1	1555. ECCm2	1556. ECCm3
	1557. ECCn0	1558. ECCn1	1559. ECCn2	1560. ECCn3
	1561. ECCo0	1562. ECCo1	1563. ECCo2	1564. ECCo3
	1565. ECCp0	1566. ECCp1	1567. ECCp2	1568. ECCp3
	1569. SEVa0	1570. SEVa1	1571. SEVa2	1572. SEVa3
	1573. SEVb0	1574. SEVb1	1575. SEVb2	1576. SEVb3
	1577. SEVc0	1578. SEVc1	1579. SEVc2	1580. SEVc3
	1581. SEVd0	1582. SEVd1	1583. SEVd2	1584. SEVd3
	1585. SEVe0	1586. SEVe1	1587. SEVe2	1588. SEVe3
	1589. SEVf0	1590. SEVf1	1591. SEVf2	1592. SEVf3
	1593. SEVg0	1594. SEVg1	1595. SEVg2	1596. SEVg3
	1597. SEVh0	1598. SEVh1	1599. SEVh2	1600. SEVh3
	1601. SEVi0	1602. SEVi1	1603. SEVi2	1604. SEVi3
	1605. SEVj0	1606. SEVj1	1607. SEVj2	1608. SEVj3
	1609. SEVk0	1610. SEVk1	1611. SEVk2	1612. SEVk3
	1613. SEVl0	1614. SEVl1	1615. SEVl2	1616. SEVl3
	1617. SEVm0	1618. SEVm1	1619. SEVm2	1620. SEVm3
	1621. SEVn0	1622. SEVn1	1623. SEVn2	1624. SEVn3
	1625. SEVo0	1626. SEVo1	1627. SEVo2	1628. SEVo3
	1629. SEVp0	1630. SEVp1	1631. SEVp2	1632. SEVp3
	1633. DPARa0	1634. DPARb0	1635. DPARc0	1636. DPARd0
	1637. DPARe0	1638. DPARf0	1639. DPARg0	1640. DPARh0
	1641. DPARi0	1642. DPARj0	1643. DPARk0	1644. DPARl0

4.7.3.10.17.3 HBM3 Interface Function (cont'd)

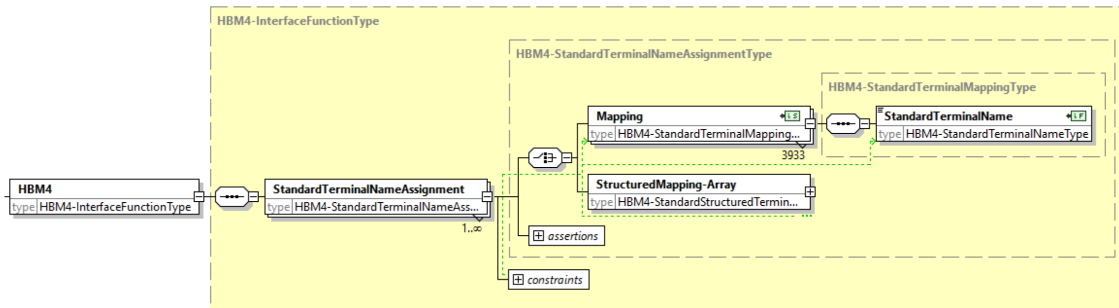
list of enumerate values (cont.)	1645. DPARm0	1646. DPARn0	1647. DPARo0	1648. DPARp0
	1649. DPARa1	1650. DPARb1	1651. DPARc1	1652. DPARd1
	1653. DPARe1	1654. DPARf1	1655. DPARg1	1656. DPARh1
	1657. DPARi1	1658. DPARj1	1659. DPARk1	1660. DPARl1
	1661. DPARm1	1662. DPARn1	1663. DPARo1	1664. DPARp1
	1665. DERRa0	1666. DERRb0	1667. DERRc0	1668. DERRd0
	1669. DERRe0	1670. DERRf0	1671. DERRg0	1672. DERRh0
	1673. DERRi0	1674. DERRj0	1675. DERRk0	1676. DERRl0
	1677. DERRm0	1678. DERRn0	1679. DERRo0	1680. DERRp0
	1681. DERRa1	1682. DERRb1	1683. DERRc1	1684. DERRd1
	1685. DERRe1	1686. DERRf1	1687. DERRg1	1688. DERRh1
	1689. DERRi1	1690. DERRj1	1691. DERRk1	1692. DERRl1
	1693. DERRm1	1694. DERRn1	1695. DERRo1	1696. DERRp1
	1697. AERRa	1698. AERRb	1699. AERRc	1700. AERRd
	1701. AERRe	1702. AERRf	1703. AERRg	1704. AERRh
	1705. AERRi	1706. AERRj	1707. AERRk	1708. AERRl
	1709. AERRm	1710. AERRn	1711. AERRo	1712. AERRp
	1713. WDQSa0_t	1714. WDQSb0_t	1715. WDQSc0_t	1716. WDQSd0_t
	1717. WDQSe0_t	1718. WDQSf0_t	1719. WDQSg0_t	1720. WDQSh0_t
	1721. WDQSi0_t	1722. WDQSj0_t	1723. WDQSk0_t	1724. WDQSl0_t
	1725. WDQSm0_t	1726. WDQSn0_t	1727. WDQSo0_t	1728. WDQSp0_t
	1729. WDQSa1_t	1730. WDQSb1_t	1731. WDQSc1_t	1732. WDQSd1_t
	1733. WDQSe1_t	1734. WDQSf1_t	1735. WDQSg1_t	1736. WDQSh1_t
	1737. WDQSi1_t	1738. WDQSj1_t	1739. WDQSk1_t	1740. WDQSl1_t
	1741. WDQSm1_t	1742. WDQSn1_t	1743. WDQSo1_t	1744. WDQSp1_t
	1745. WDQSa0_c	1746. WDQSb0_c	1747. WDQSc0_c	1748. WDQSd0_c
	1749. WDQSe0_c	1750. WDQSf0_c	1751. WDQSg0_c	1752. WDQSh0_c
	1753. WDQSi0_c	1754. WDQSj0_c	1755. WDQSk0_c	1756. WDQSl0_c
	1757. WDQSm0_c	1758. WDQSn0_c	1759. WDQSo0_c	1760. WDQSp0_c
	1761. WDQSa1_c	1762. WDQSb1_c	1763. WDQSc1_c	1764. WDQSd1_c
	1765. WDQSe1_c	1766. WDQSf1_c	1767. WDQSg1_c	1768. WDQSh1_c
	1769. WDQSi1_c	1770. WDQSj1_c	1771. WDQSk1_c	1772. WDQSl1_c
	1773. WDQSm1_c	1774. WDQSn1_c	1775. WDQSo1_c	1776. WDQSp1_c
	1777. RDQSa0_t	1778. RDQSb0_t	1779. RDQSc0_t	1780. RDQSd0_t
	1781. RDQSe0_t	1782. RDQSf0_t	1783. RDQSg0_t	1784. RDQSh0_t
	1785. RDQSi0_t	1786. RDQSj0_t	1787. RDQSk0_t	1788. RDQSl0_t
	1789. RDQSm0_t	1790. RDQSn0_t	1791. RDQSo0_t	1792. RDQSp0_t
	1793. RDQSa1_t	1794. RDQSb1_t	1795. RDQSc1_t	1796. RDQSd1_t
	1797. RDQSe1_t	1798. RDQSf1_t	1799. RDQSg1_t	1800. RDQSh1_t
	1801. RDQSi1_t	1802. RDQSj1_t	1803. RDQSk1_t	1804. RDQSl1_t
	1805. RDQSm1_t	1806. RDQSn1_t	1807. RDQSo1_t	1808. RDQSp1_t
	1809. RDQSa0_c	1810. RDQSb0_c	1811. RDQSc0_c	1812. RDQSd0_c
	1813. RDQSe0_c	1814. RDQSf0_c	1815. RDQSg0_c	1816. RDQSh0_c

4.7.3.10.17.3 HBM3 Interface Function (cont’d)

list of enumerate values (cont.)	1817. RDQSi0_c	1818. RDQSj0_c	1819. RDQSk0_c	1820. RDQSl0_c
	1821. RDQSm0_c	1822. RDQSn0_c	1823. RDQSo0_c	1824. RDQSp0_c
	1825. RDQSa1_c	1826. RDQSb1_c	1827. RDQSc1_c	1828. RDQSd1_c
	1829. RDQSe1_c	1830. RDQSf1_c	1831. RDQSg1_c	1832. RDQSh1_c
	1833. RDQSi1_c	1834. RDQSj1_c	1835. RDQSk1_c	1836. RDQSl1_c
	1837. RDQSm1_c	1838. RDQSn1_c	1839. RDQSo1_c	1840. RDQSp1_c
	1841. DA0	1842. DA1	1843. DA2	1844. DA3
	1845. DA4	1846. DA5	1847. DA6	1848. DA7
	1849. DA8	1850. DA9	1851. DA10	1852. DA11
	1853. DA12	1854. DA13	1855. DA14	1856. DA15
	1857. DA16	1858. DA17	1859. DA18	1860. DA19
	1861. DA20	1862. DA21	1863. DA22	1864. DA23
	1865. DA24	1866. DA25	1867. DA26	1868. DA27
	1869. DA28	1870. DA29	1871. DA30	1872. DA31
	1873. DA32	1874. DA33	1875. DA34	1876. DA35
	1877. DA36	1878. DA37	1879. DA38	1880. DA39
	1881. RESET_n	1882. WRCK	1883. WRST_n	1884. SelectWIR
	1885. ShiftWR	1886. CaptureWR	1887. UpdateWR	1888. WSI
	1889. WSOa	1890. WSOb	1891. WSOc	1892. WSOd
	1893. WSOe	1894. WSOf	1895. WSOg	1896. WSOh
	1897. WSOi	1898. WSOj	1899. WSOk	1900. WSOl
	1901. WSOm	1902. WSOn	1903. WSOo	1904. WSOp
	1905. TEMP0	1906. TEMP1	1907. CATTRIP	1908. VSS
	1909. VDDC	1910. VDDQ	1911. VPP	1912. VDDQL
	OptionalMapping/StandardTerminalName			
	1. RDa0	2. RDb0	3. RDc0	4. RDd0
	5. RDe0	6. RDf0	7. RDg0	8. RDh0
	9. RDi0	10. RDj0	11. RDk0	12. RDl0
	13. RDm0	14. RDn0	15. RDo0	16. RDp0
	17. RDa1	18. RDb1	19. RDc1	20. RDd1
	21. RDe1	22. RDf1	23. RDg1	24. RDh1
	25. RDi1	26. RDj1	27. RDk1	28. RDl1
	29. RDm1	30. RDn1	31. RDo1	32. RDp1
	33. RDa2	34. RDb2	35. RDc2	36. RDd2
	37. RDe2	38. RDf2	39. RDg2	40. RDh2
	41. RDi2	42. RDj2	43. RDk2	44. RDl2
	45. RDm2	46. RDn2	47. RDo2	48. RDp2
	49. RDa3	50. RDb3	51. RDc3	52. RDd3
	53. RDe3	54. RDf3	55. RDg3	56. RDh3
	57. RDi3	58. RDj3	59. RDk3	60. RDl3
	61. RDm3	62. RDn3	63. RDo3	64. RDp3
	65. RAa	66. RAb	67. RAc	68. Rad
	69. RAe	70. RAf	71. RAg	72. RAh
	73. RAi	74. RAj	75. RAk	76. RAl
	77. RAm	78. RAn	79. RAo	80. RAp

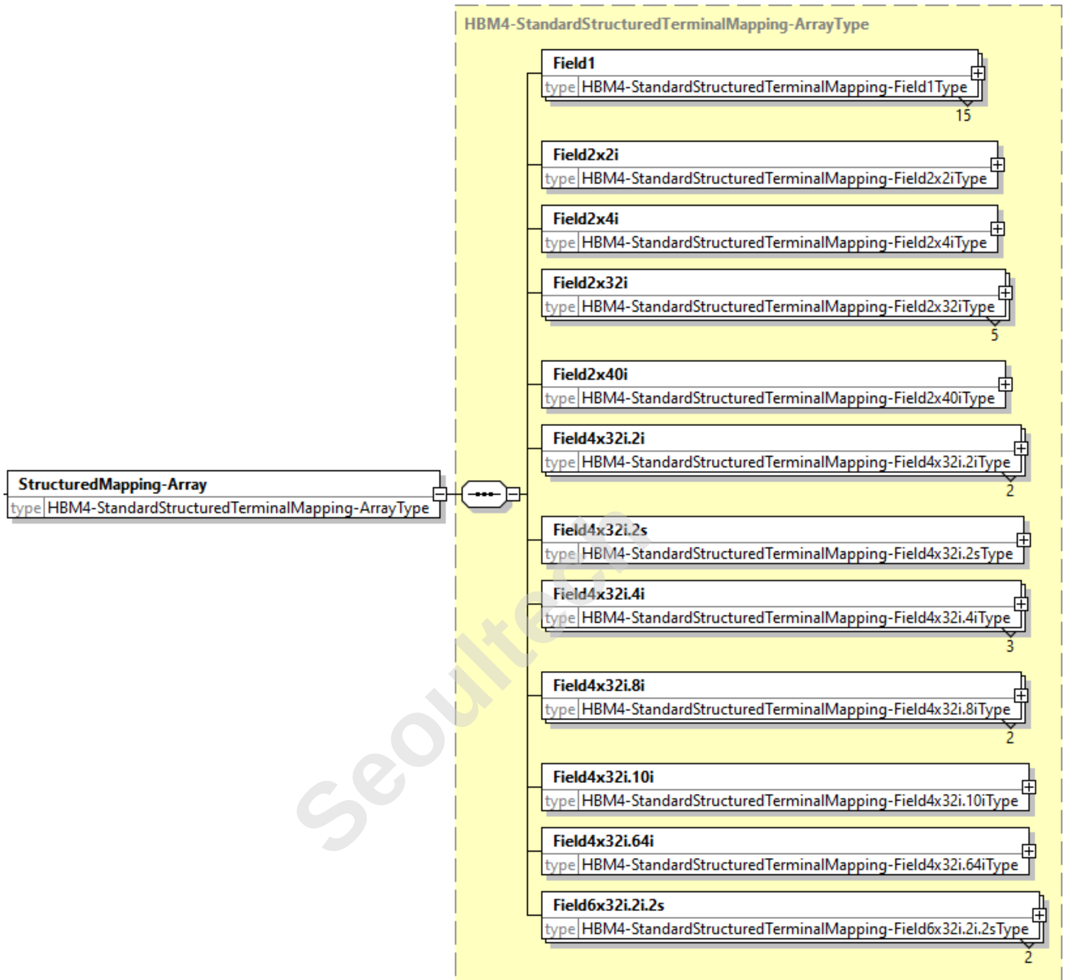
For more information about the HBM3 Interface, refer to the JEDEC standard JESD238.

4.7.3.10.17.4. HBM4 Interface Functions

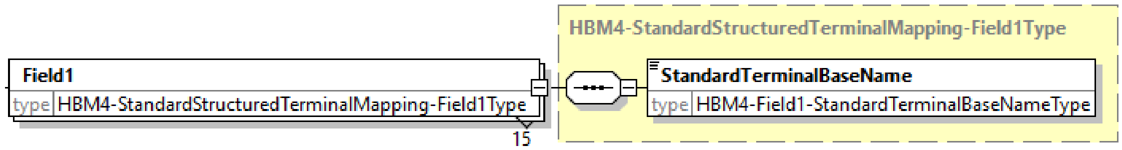
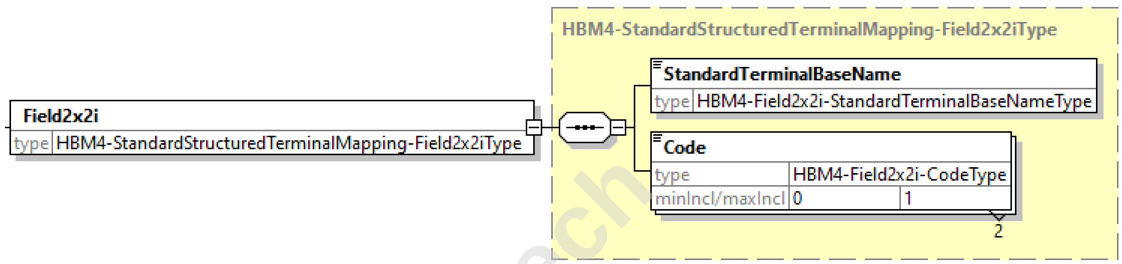
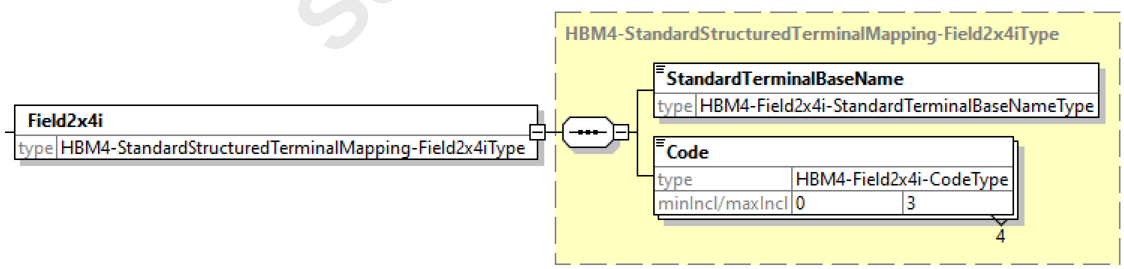
<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HBM/HBM4</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">HBM4-InterfaceFunctionType, HBM4-StandardTerminalNameAssignmentType,
HBM4-StandardTerminalMappingType, HBM4-StandardTerminalNameType,
HBM4-StandardStructuredTerminalMapping-ArrayType</td></tr>
<tr><td rowspan="11">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. CAPTUREWR</td><td>2. CATTRIP</td><td>3. NC</td><td>4. RESET_n</td></tr>
<tr><td>5. SELECTWIR</td><td>6. SHIFTWR</td><td>7. UPDATEWR</td><td>8. VDDC</td></tr>
<tr><td>9. VDDQ</td><td>10. VDDQL</td><td>11. VPP</td><td>12. VSS</td></tr>
<tr><td>13. WRCK</td><td>14. WRST_n</td><td>15. WSI</td><td>16. RM[0..1]</td></tr>
<tr><td>17. MRFU[0..3]</td><td>18. ARFU[0..31]</td><td>19. APAR[0..31]</td><td>20. AERR[0..31]</td></tr>
<tr><td>21. WSO[0..31]</td><td>22. RA[0..31]</td><td>23. DA[0..39]_</td><td>24. DPAR[0..31]_[0..1]</td></tr>
<tr><td>25. DERR[0..31]_[0..1]</td><td>26. CK[0..31]_t</td><td>27. CK[0..31]_c</td><td>28. EEC[0..31]_[0..4]</td></tr>
<tr><td>29. SEV[0..31]_[0..4]</td><td>30. RD[0..31]_[0..4]</td><td>31. C[0..31]_[0..8]</td><td>32. DBI[0..31]_[0..8]</td></tr>
<tr><td>33. R[0..31]_[0..9]</td><td>34. DQ[0..31]_[0..64]</td><td>35. WDQS[0..31]_[0..1]_t</td><td>36. WDQS[0..31]_[0..1]_c</td></tr>
<tr><td>37. RDQS[0..31]_[0..1]_t</td><td>38. RDQS[0..31]_[0..1]_c</td><td></td><td></td></tr>
</table>

For more information about the HBM4 Interface, refer to the JEDEC standard JESD270-4. For the expanded list of Standard Terminal Names, refer to the JEDEC JESD271-4 Bump Matrix Spreadsheet.

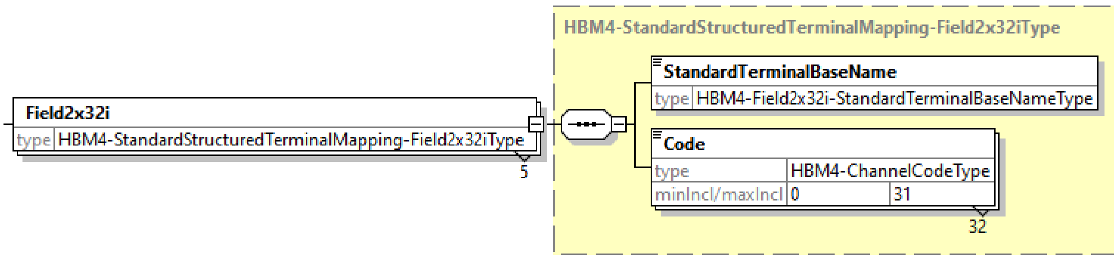
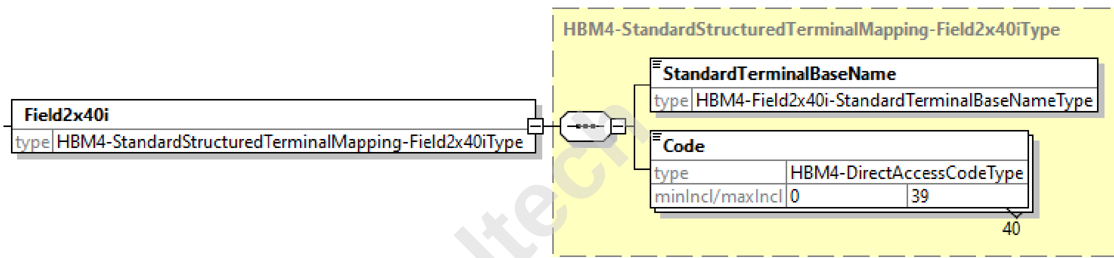
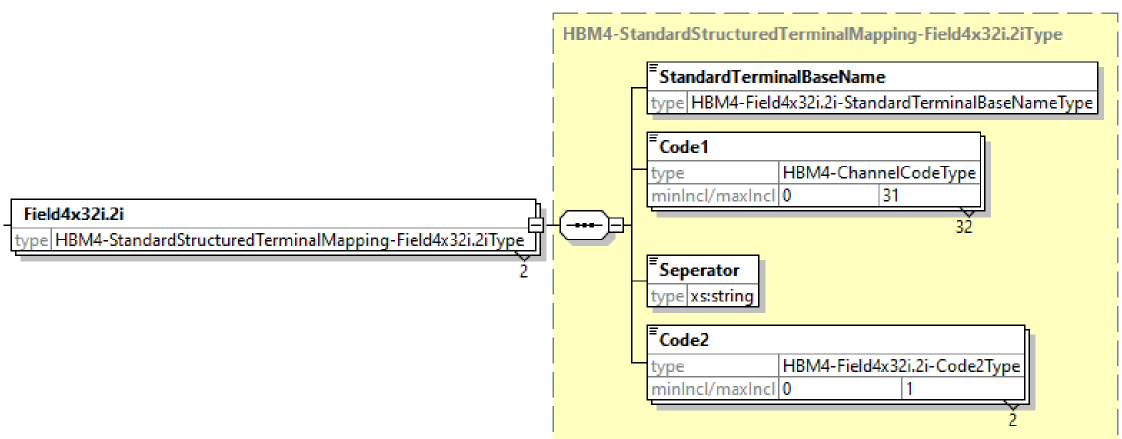
4.7.3.10.17.4.1. HBM4 - Structured Mapping - Array

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HBM/HBM4/StandardTerminalNameAssignment/StructuredMapping-Array**
diagram 1 of 13	
type	**HBM4-StandardStructuredTerminalMapping-ArrayType, HBM4-Field1-StandardTerminalBaseNameType,** **HBM4-StandardStructuredTerminalMapping-Field1Type,** **HBM4-StandardStructuredTerminalMapping-Field2x2iType,** **HBM4-StandardStructuredTerminalMapping-Field2x4iType,** **HBM4-StandardStructuredTerminalMapping-Field2x32iType,** **HBM4-StandardStructuredTerminalMapping-Field2x40iType,** **HBM4-StandardStructuredTerminalMapping-Field4x32i.2iType,** **HBM4-StandardStructuredTerminalMapping-Field4x32i.2sType,** **HBM4-StandardStructuredTerminalMapping-Field4x32i.4iType,** **HBM4-StandardStructuredTerminalMapping-Field4x32i.8iType,** **HBM4-StandardStructuredTerminalMapping-Field4x32i.10iType,** **HBM4-StandardStructuredTerminalMapping-Field4x32i.64iType,** **HBM4-StandardStructuredTerminalMapping-Field6x32i.2i.2sType**

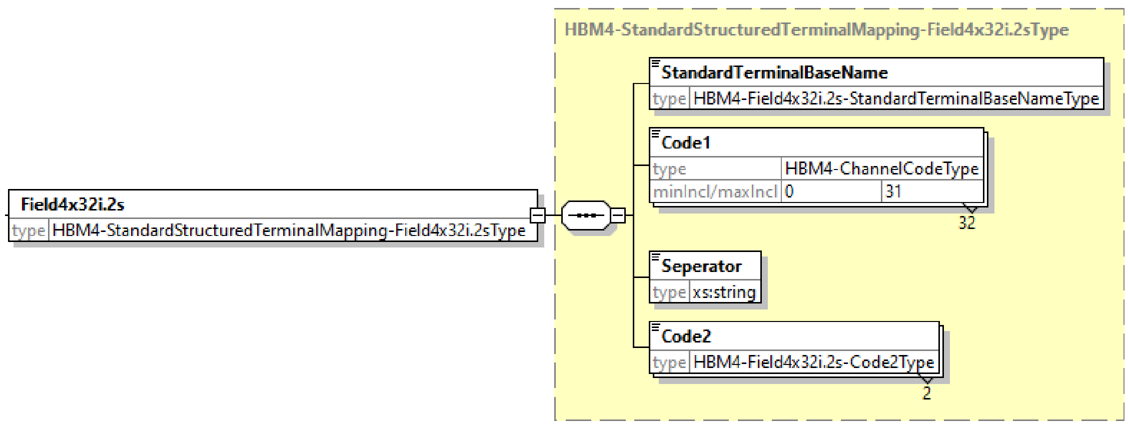
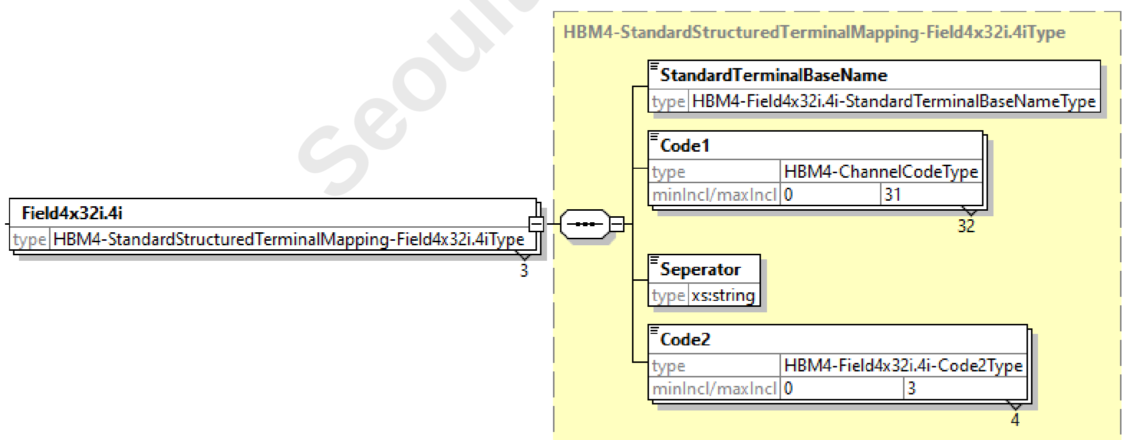
4.7.3.10.17.4.1 HBM4 - Structured Mapping - Array (cont'd)

diagram 2 of 13				
type	**HBM4-StandardStructuredTerminalMapping-ArrayType, HBM4-Field1-StandardTerminalBaseNameType.**			
list of enumerate values	**Standard Terminal Base Name -> HBM4-Field1-StandardTerminalBaseNameType**			
	1. CAPTUREWR	**2. CATTRIP**	**3. NC**	**4. RESET_n**
	5. SELECTWIR	**6. SHIFTWR**	**7. UPDATEWR**	**8. VDDC**
	9. VDDQ	**10. VDDQL**	**11. VPP**	**12. VSS**
	13. WRCK	**14. WRST_n**	**15. WSI**	
diagram 3 of 13				
type	**HBM4-StandardStructuredTerminalMapping-Field2x2iType, HBM4-Field2x2i-StandardTerminalBaseNameType, HBM4-Field2x2i-CodeType**			
list of enumerate values	**Standard Terminal Base Name -> HBM4-Field2x2i-StandardTerminalBaseNameType**			
	1. RM			
diagram 4 of 13				
type	**HBM4-StandardStructuredTerminalMapping-Field2x4iType, HBM4-Field2x4i-StandardTerminalBaseNameType, HBM4-Field2x4i-CodeType.**			
list of enumerate values	**Standard Terminal Base Name -> HBM4-Field2x4i-StandardTerminalBaseNameType**			
	1. MRFU			

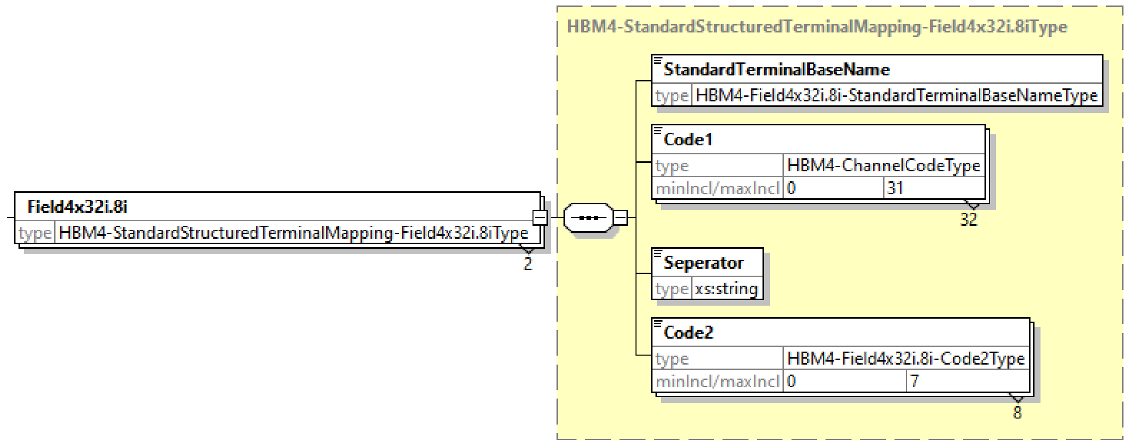
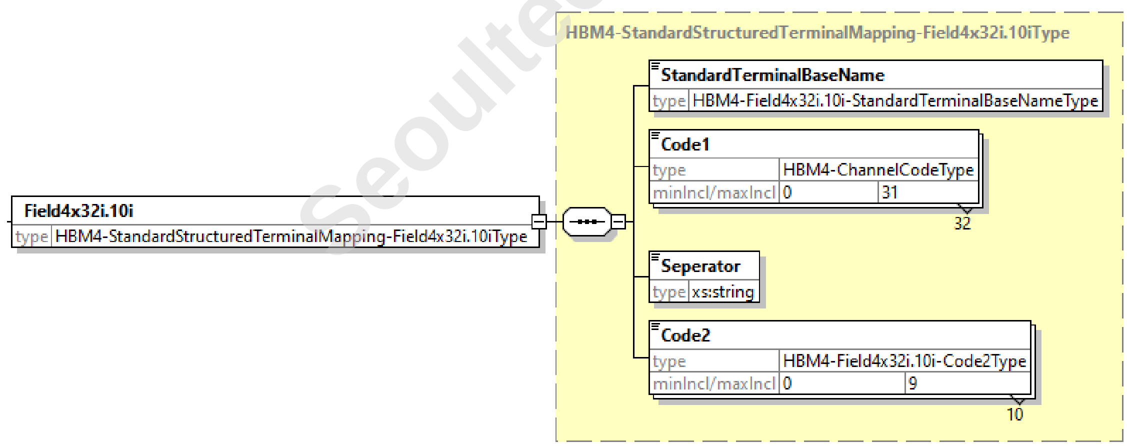
4.7.3.10.17.4.1 HBM4 - Structured Mapping - Array (cont’d)

<table>
<tr><td>diagram 5 of 13</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">HBM4-StandardStructuredTerminalMapping-Field2x32iType,
HBM4-Field2x32i-StandardTerminalBaseNameType, HBM4-ChannelCodeType.</td></tr>
<tr><td rowspan="3">list of enumerate values</td><td colspan="4">Standard Terminal Base Name -> HBM4-Field2x32i-StandardTerminalBaseNameType</td></tr>
<tr><td>1. ARFU</td><td>2. APAR</td><td>3. AERR</td><td>4. WSO</td></tr>
<tr><td>5. RA</td><td></td><td></td><td></td></tr>
<tr><td>diagram 6 of 13</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">HBM4-StandardStructuredTerminalMapping-Field2x40iType,
HBM4-Field2x40i-StandardTerminalBaseNameType, HBM4-DirectAccessCodeType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Standard Terminal Base Name -> HBM4-Field2x40i-StandardTerminalBaseNameType</td></tr>
<tr><td>1. DA</td><td></td><td></td><td></td></tr>
<tr><td>diagram 7 of 13</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">HBM4-StandardStructuredTerminalMapping-Field4x32i.2iType,
HBM4-Field4x32i.2i-StandardTerminalBaseNameType, HBM4-ChannelCodeType,
HBM4-Field4x32i.2i-Code2Type</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Standard Terminal Base Name -> HBM4-Field2x32i-StandardTerminalBaseNameType</td></tr>
<tr><td>1. DPAR</td><td>2. DERR</td><td></td><td></td></tr>
</table>

4.7.3.10.17.4.1 HBM4 - Structured Mapping - Array (cont'd)

diagram 8 of 13				
type	**HBM4-StandardStructuredTerminalMapping-Field4x32i.2sType, HBM4-Field4x32i.2s-StandardTerminalBaseNameType, HBM4-ChannelCodeType, HBM4-Field4x32i.2s-Code2Type**			
list of enumerate values	**Standard Terminal Base Name -> HBM4-Field4x32i.2s-StandardTerminalBaseNameType**			
	1. CK			
	Code 2			
	1. t	**2. c**		
diagram 9 of 13				
type	**HBM4-StandardStructuredTerminalMapping-Field4x32i.4iType, HBM4-Field4x32i.4i-StandardTerminalBaseNameType, HBM4-ChannelCodeType, HBM4-Field4x32i.4i-Code2Type**			
list of enumerate values	**Standard Terminal Base Name -> HBM4-Field4x32i.4i-StandardTerminalBaseNameType**			
	1. ECC	**2. SEV**	**3. RD**	

4.7.3.10.17.4.1 HBM4 - Structured Mapping - Array (cont'd)

<table>
<tr><td>diagram 10 of 13</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">HBM4-StandardStructuredTerminalMapping-Field4x32i.8iType,
HBM4-Field4x32i.8i-StandardTerminalBaseNameType, HBM4-ChannelCodeType,
HBM4-Field4x32i.8i-Code2Type</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Standard Terminal Base Name -> HBM4-Field4x32i.8i-StandardTerminalBaseNameType</td></tr>
<tr><td>1. C</td><td>2. DBI</td><td></td><td></td></tr>
<tr><td>diagram 11 of 13</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">HBM4-StandardStructuredTerminalMapping-Field4x32i.10iType,
HBM4-Field4x32i.10i-StandardTerminalBaseNameType, HBM4-ChannelCodeType,
HBM4-Field4x32i.10i-Code2Type.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Standard Terminal Base Name ->HBM4-Field4x32i.10i-StandardTerminalBaseNameType</td></tr>
<tr><td>1. R</td><td></td><td></td><td></td></tr>
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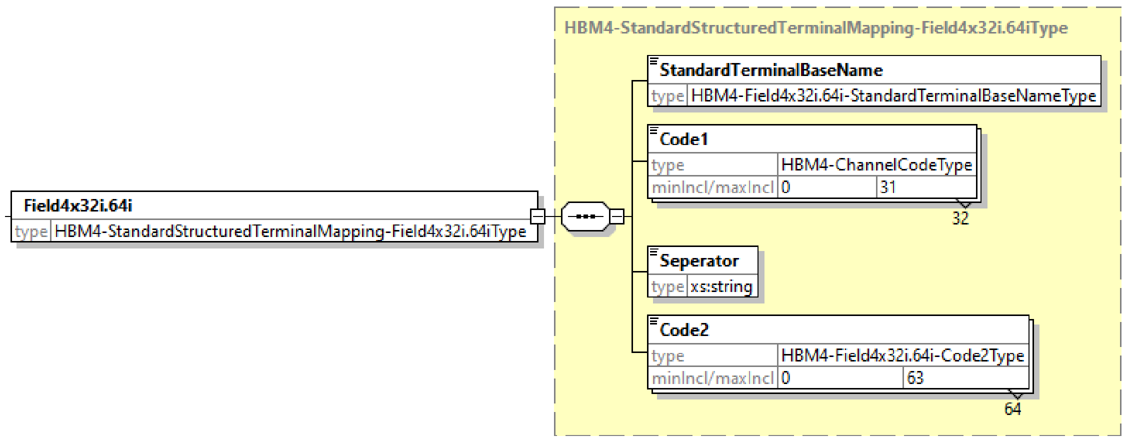
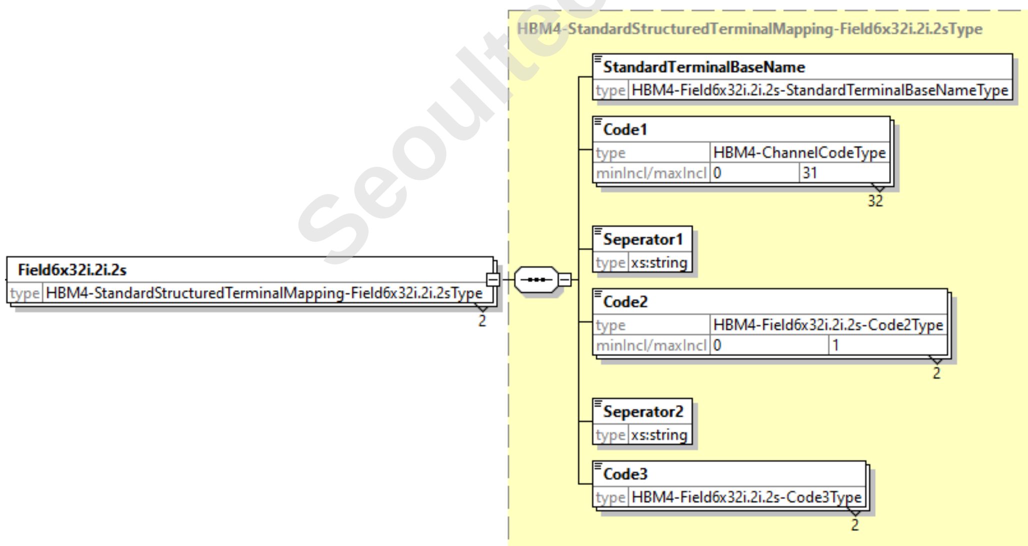
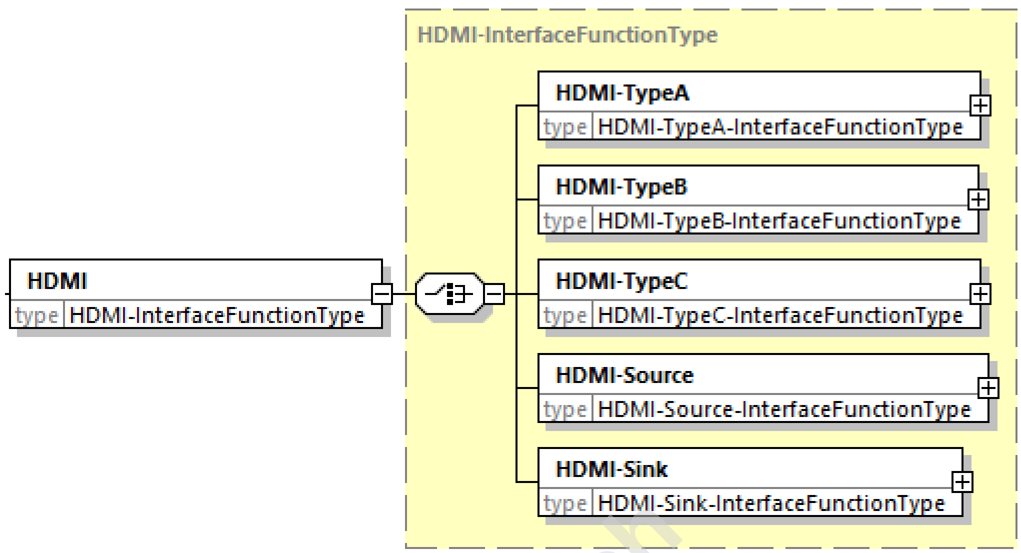
4.7.3.10.17.4.1 HBM4 - Structured Mapping - Array (cont'd)

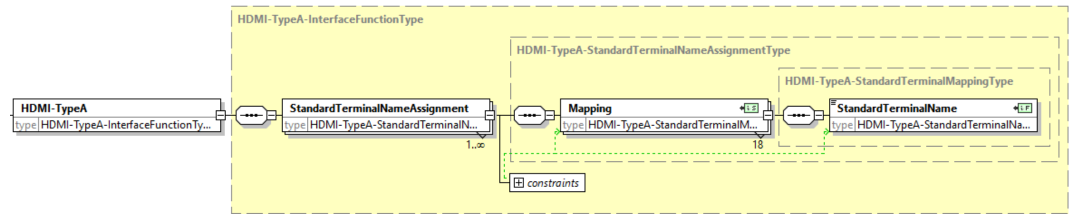
<table>
<tr><td>diagram 12 of 13</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">HBM4-StandardStructuredTerminalMapping-Field4x32i.64iType, HBM4-Field4x32i.64i-StandardTerminalBaseNameType, HBM4-ChannelCodeType, HBM4-Field4x32i.64i-Code2Type</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Standard Terminal Base Name -> HBM4-Field4x32i.64i-StandardTerminalBaseNameType</td></tr>
<tr><td>1. DQ</td><td></td><td></td><td></td></tr>
<tr><td>diagram 13 of 13</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">HBM4-StandardStructuredTerminalMapping-Field6x32i.2i.2sType, HBM4-Field6x32i.2i.2s-StandardTerminalBaseNameType, HBM4-ChannelCodeType, HBM4-Field6x32i.2i.2s-Code2Type, HBM4-Field6x32i.2i.2s-Code3Type</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">Standard Terminal Base Name -> HBM4-Field6x32i.2i.2s-StandardTerminalBaseNameType</td></tr>
<tr><td>1. WDQS</td><td>2. RDQS</td><td></td><td></td></tr>
<tr><td>Code 3</td><td></td><td></td><td></td></tr>
<tr><td>1. t</td><td>2. c</td><td></td><td></td></tr>
</table>

4.7.3.10.18. HDMI Interface Function

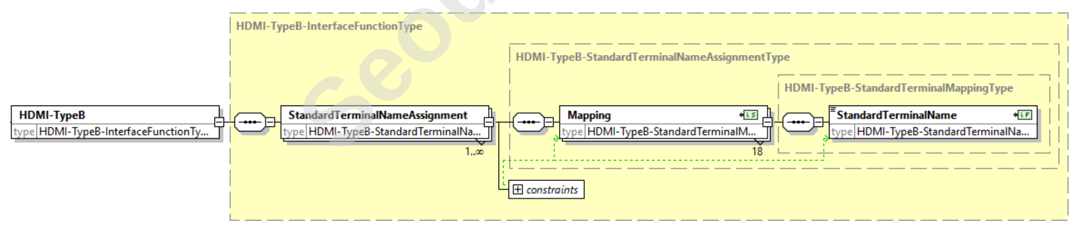
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HDMI**
diagram	
type	**HDMI-InterfaceFunctionType, HDMI-TypeA-InterfaceFunctionType, HDMI-TypeB-InterfaceFunctionType, HDMI-TypeC-InterfaceFunctionType, HDMI-Source-InterfaceFunctionType, HDMI-Sink-InterfaceFunctionType**

For more information about the HDMI Interface, refer to the “High-Definition Multimedia Interface Specification Version 1.3a” on the HDMI website.

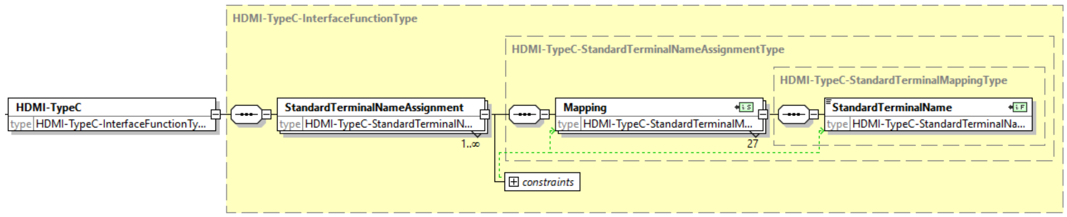
4.7.3.10.18.1. HDMI-TypeA

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HDMI/HDMI-TypeA			
diagram				
type	HDMI-TypeA–InterfaceFunctionType, HDMI-TypeA-StandardTerminalNameAssignmentType, HDMI-TypeA-StandardTerminalMappingType, HDMI-TypeA-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. TMDS Data2+	2. TMDS Data2 Shield	3. TMDS Data2-	4. TMDS Data1+
	5. TMDS Data1 Shield	6. TMDS Data1-	7. TMDS Data0+	8. TMDS Data0 Shield
	9. TMDS Data0-	10. TMDS Clock+	11. TMDS Clock Shield	12. TMDS Clock-
	13. CEC	14. SCL	15. SDA	16. DDC/CEC Ground
	17. +5V Power	18. Hot Plug Detect		

4.7.3.10.18.2. HDMI-TypeB

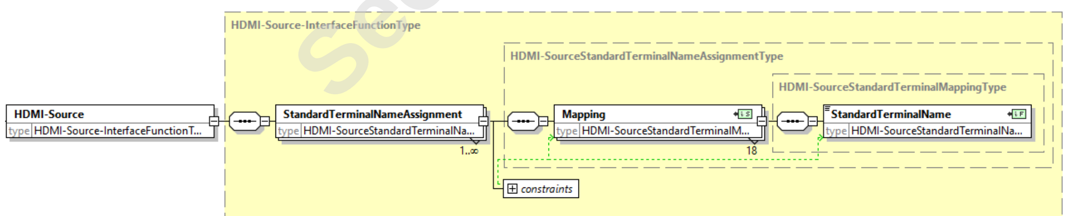
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HDMI/HDMI-TypeB			
diagram				
type	HDMI-TypeB–InterfaceFunctionType, HDMI-TypeB-StandardTerminalNameAssignmentType, HDMI-TypeB-StandardTerminalMappingType, HDMI-TypeB-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. TMDS Data2+	2. TMDS Data2 Shield	3. TMDS Data2-	4. TMDS Data1+
	5. TMDS Data1 Shield	6. TMDS Data1-	7. TMDS Data0+	8. TMDS Data0 Shield
	9. TMDS Data0-	10. TMDS Clock+	11. TMDS Clock Shield	12. TMDS Clock-
	13. CEC	14. SCL	15. SDA	16. DDC/CEC Ground
	17. +5V Power	18. Hot Plug Detect		

4.7.3.10.18.3. HDMI-TypeC

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HDMI/HDMI-TypeC
diagram	
type	HDMI-TypeC–InterfaceFunctionType, HDMI-TypeC-StandardTerminalNameAssignmentType, HDMI-TypeC-StandardTerminalMappingType, HDMI-TypeC-StandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName

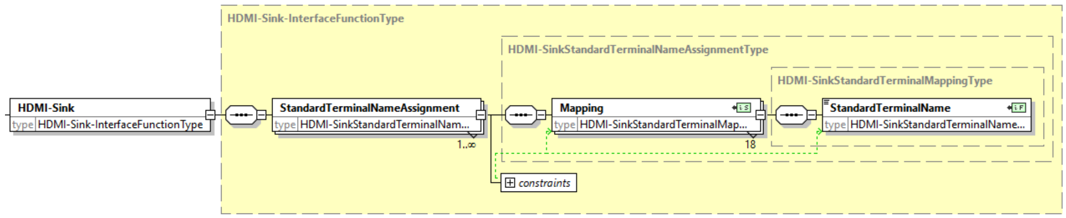
1. TMDS Data2+	2. TMDS Data2 Shield	3. TMDS Data2-	4. TMDS Data1+
5. TMDS Data1 Shield	6. TMDS Data1-	7. TMDS Data0+	8. TMDS Data0 Shield
9. TMDS Data0-	10. TMDS Clock+	11. TMDS Clock Shield	12. TMDS Clock-
13. TMDS Data5+	14. TMDS Data5 Shield	15. TMDS Data5-	16. TMDS Data4+
17. TMDS Data4 Shield	18. TMDS Data4-	19. TMDS Data3+	20. TMDS Data3 Shield
21. TMDS Data3-	22. CEC	23. SCL	24. SDA
25. DDC/CEC Ground	26. +5V Power	27. Hot Plug Detect	

4.7.3.10.18.4. HDMI-Source

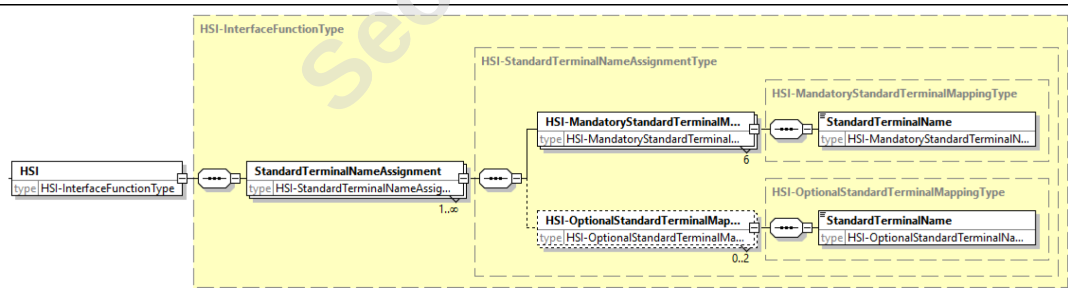
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HDMI/HDMI-Source
diagram	
type	HDMI-Source-InterfaceFunctionType, HDMI-SourceStandardTerminalNameAssignmentType, HDMI-SourceStandardTerminalMappingType, HDMI-SourceStandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName

1. TMDS Data2+	2. TMDS Data2-	3. TMDS Data1+	4. TMDS Data1-
5. TMDS Data0+	6. TMDS Data0-	7. TMDS Clock+	8. TMDS Clock-
9. TMDS Data5+	10. TMDS Data5-	11. TMDS Data4+	12. TMDS Data4-
13. TMDS Data3+	14. TMDS Data3-	15. CEC	16. SCL
17. SDA	18. Hot Plug Detect		

4.7.3.10.18.5. HDMI-Sink

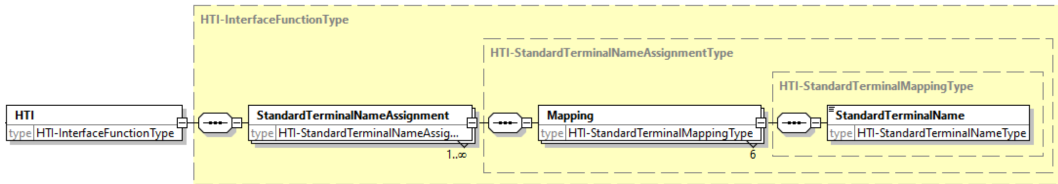
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HDMI/HDMI-Sink			
diagram				
type	HDMI-Sink-InterfaceFunctionType, HDMI-SinkStandardTerminalNameAssignmentType, HDMI-SinkStandardTerminalMappingType, HDMI-SinkStandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. TMDS Data2+	2. TMDS Data2-	3. TMDS Data1+	4. TMDS Data1-
	5. TMDS Data0+	6. TMDS Data0-	7. TMDS Clock+	8. TMDS Clock-
	9. TMDS Data5+	10. TMDS Data5-	11. TMDS Data4+	12. TMDS Data4-
	13. TMDS Data3+	14. TMDS Data3-	15. CEC	16. SCL
	17. SDA	18. Hot Plug Detect		

4.7.3.10.19. HSI Interface

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HSI			
diagram				
type	HSI-InterfaceFunctionType, HSI-StandardTerminalNameAssignmentType, HSI-MandatoryStandardTerminalMappingType, HSI-MandatoryStandardTerminalNameType, HSI-OptionalStandardTerminalMappingType, HSI-OptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. CADATA	2. CAFLAG	3. ACREADY	4. ACDATA
	5. ACFLAG	6. CAREADY		
	OptionalMapping/StandardTerminalName			
	1. CAWAKE	2. ACWAKE		

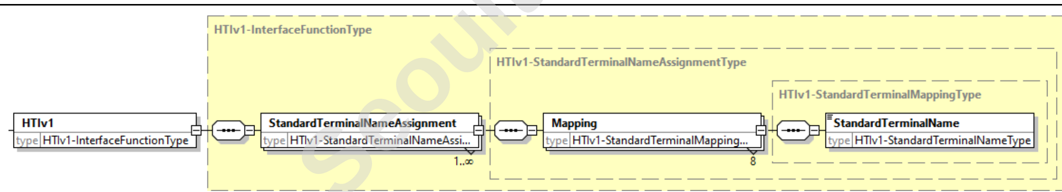
For more information about the HSI Interface, refer to the MIPI Alliance standard Specification for High-Speed Synchronous Serial Interface Version 1.01.

4.7.3.10.20. HTI Interface Function

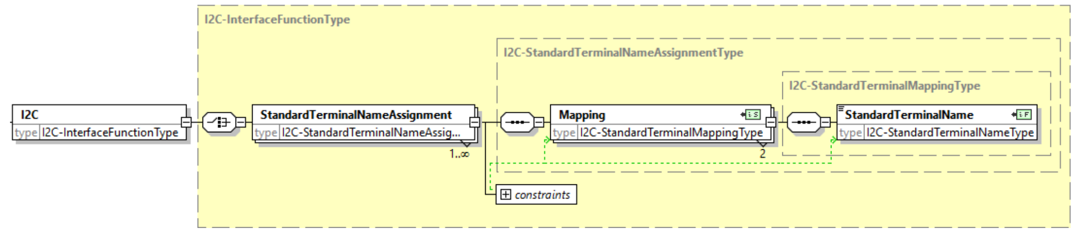
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HTI
diagram	
type	HTI-InterfaceFunctionType, HTI-StandardTerminalNameAssignmentType, HTI-StandardTerminalMappingType, HTI-StandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName 1. Lane1 2. Lane2 3. Lane3 4. Lane4 5. Lane5 6. Lane6

For more information about the HTI Interface, refer to the MIPI Alliance standard Specification for High-Speed Trace Interface (HTI) Version 1.1.

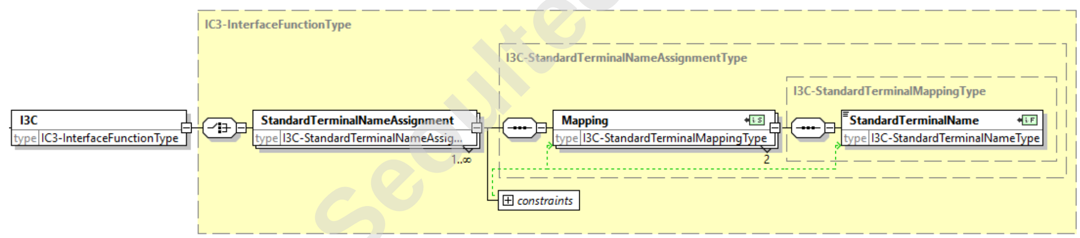
4.7.3.10.21. HTIv1 Interface Function

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HTIv1
diagram	
type	HTIv1-InterfaceFunctionType, HTIv1-StandardTerminalNameAssignmentType, HTIv1-StandardTerminalMappingType, HTIv1-StandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName 1. Lane1 2. Lane2 3. Lane3 4. Lane4 5. Lane5 6. Lane6 7. Lane7 8. Lane8

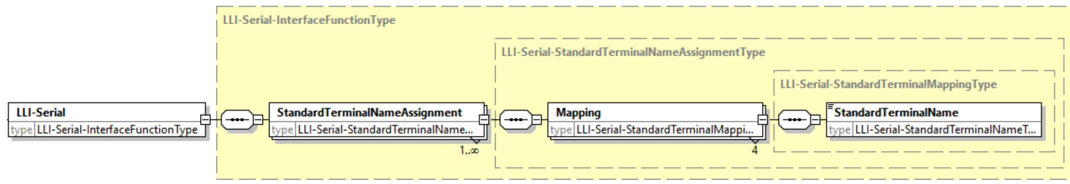
4.7.3.10.22. I2C Interface Function

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/I2C			
diagram				
type	I2C-InterfaceFunctionType, I2C-StandardTerminalNameAssignmentType, I2C-StandardTerminalMappingType, I2C-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. SCL	2. SDA		

4.7.3.10.23. I3C Interface Function

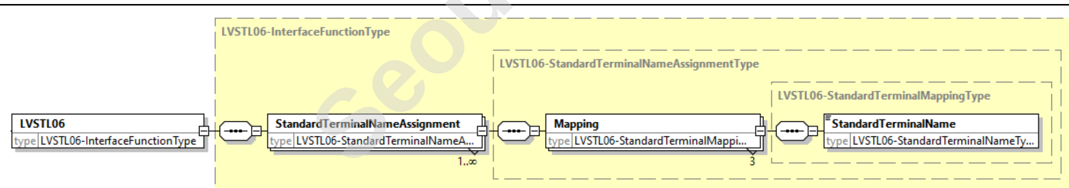
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/I3C			
diagram				
type	I3CType, I3C-StandardTerminalNameAssignmentType, I3C-StandardTerminalMappingType, I3C-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. SDA	2. SCL		

4.7.3.10.24. LLI-Serial Interface Function

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/LLI-Serial</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">LLI-Serial-InterfaceFunctionType, LLI-Serial-StandardTerminalNameAssignmentType, LLI-Serial-StandardTerminalMappingType, LLI-Serial-StandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. TXDP</td><td>2. TXDN</td><td>3. RXDP</td><td>4. RXDN</td></tr>
</table>

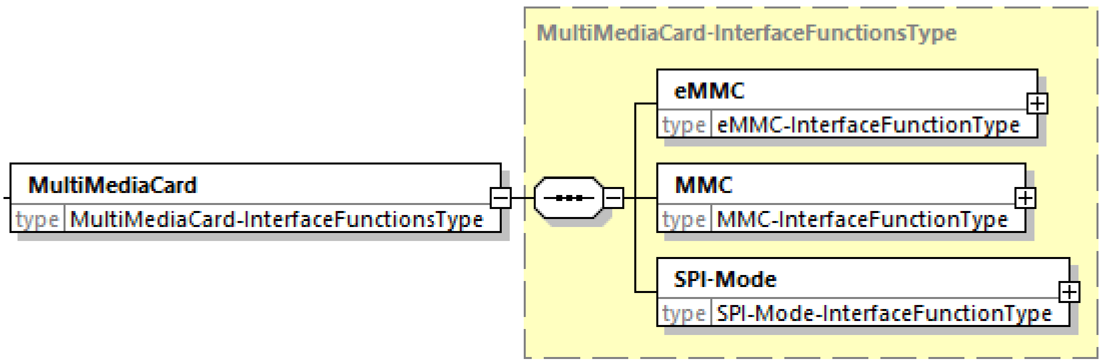
For more information about the LLI-Serial Interface, refer to the MIPI Alliance standard Specification for Low Latency Interface (LLI) Version 2.1.

4.7.3.10.25. LVSTL06 Interface Function

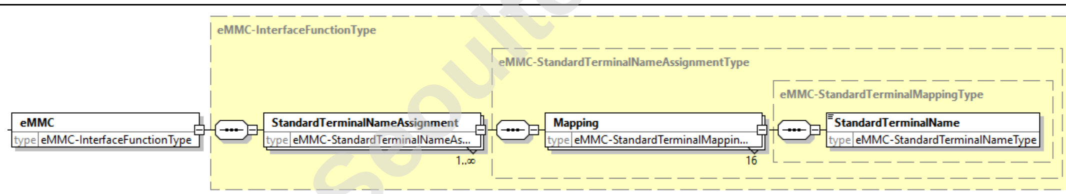
<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/LVSTL06</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">LVSTL06-InterfaceFunctionType, LVSTL06-StandardTerminalNameAssignmentType, LVSTL06-StandardTerminalMappingType, LLVSTL06-StandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. VDDQ</td><td>2. VSSQ</td><td>3. DQ</td><td></td></tr>
</table>

For more information about the LVSTL06 Interface, refer to the JEDEC Standard JESD8-29.

4.7.3.10.26. MMC Interface Function

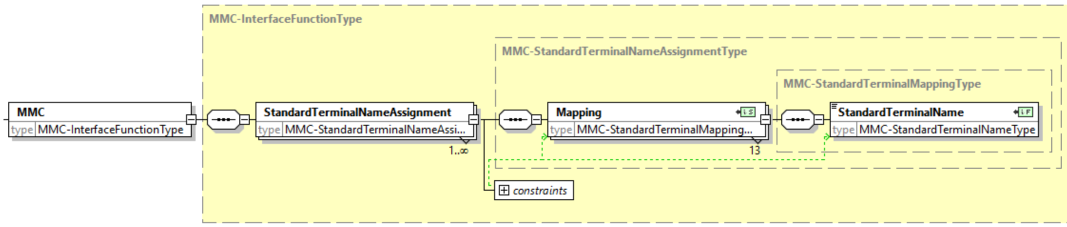
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/MultiMediaCard</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>MultiMediaCard-InterfaceFunctionsType, eMMC-InterfaceFunctionType, MMC-InterfaceFunctionType, SPI-Mode-InterfaceFunctionType.</td></tr>
</table>

4.7.3.10.26.1. eMMC Interface Function

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/MultiMediaCard/MMC</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">eMMC-InterfaceFunctionType, eMMC-StandardTerminalNameAssignmentType,
eMMC-StandardTerminalMappingType, eMMC-StandardTerminalNameType</td></tr>
<tr><td rowspan="5">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. CLK</td><td>2. DS</td><td>3. DAT[0]</td><td>4. DAT[1]</td></tr>
<tr><td>5. DAT[2]</td><td>6. DAT[3]</td><td>7. DAT[4]</td><td>8. DAT[5]</td></tr>
<tr><td>9. DAT[6]</td><td>10. DAT[7]</td><td>11. CMD</td><td>12. RST_n</td></tr>
<tr><td>13. VCC</td><td>14. VCCQ</td><td>15. VSS</td><td>16. VSSQ</td></tr>
</table>

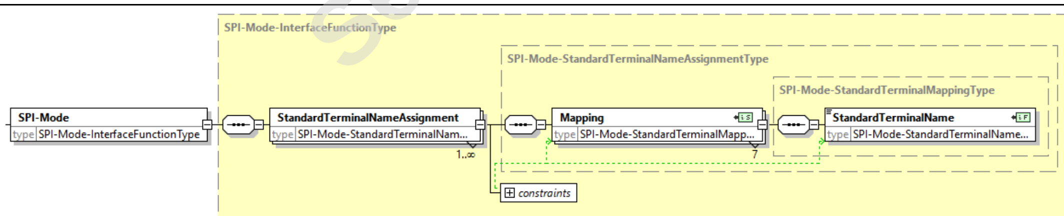
For more information about the eMMC Interface, refer to the JEDEC standard JESD84-B51A.

4.7.3.10.26.2. MMC Interface Function

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/MultiMediaCardMMC</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">MMC-InterfaceFunctionType, MMC-StandardTerminalNameAssignmentType,
MMC-StandardTerminalMappingType, MMC-StandardTerminalNameType</td></tr>
<tr><td rowspan="5">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. CLK</td><td>2. DAT[0]</td><td>3. DAT[1]</td><td>4. DAT[2]</td></tr>
<tr><td>5. DAT[3]</td><td>6. DAT[4]</td><td>7. DAT[5]</td><td>8. DAT[6]</td></tr>
<tr><td>9. DAT[7]</td><td>10. CMD</td><td>11. VSS1</td><td>12. VSS2</td></tr>
<tr><td>13. VDD</td><td></td><td></td><td></td></tr>
</table>

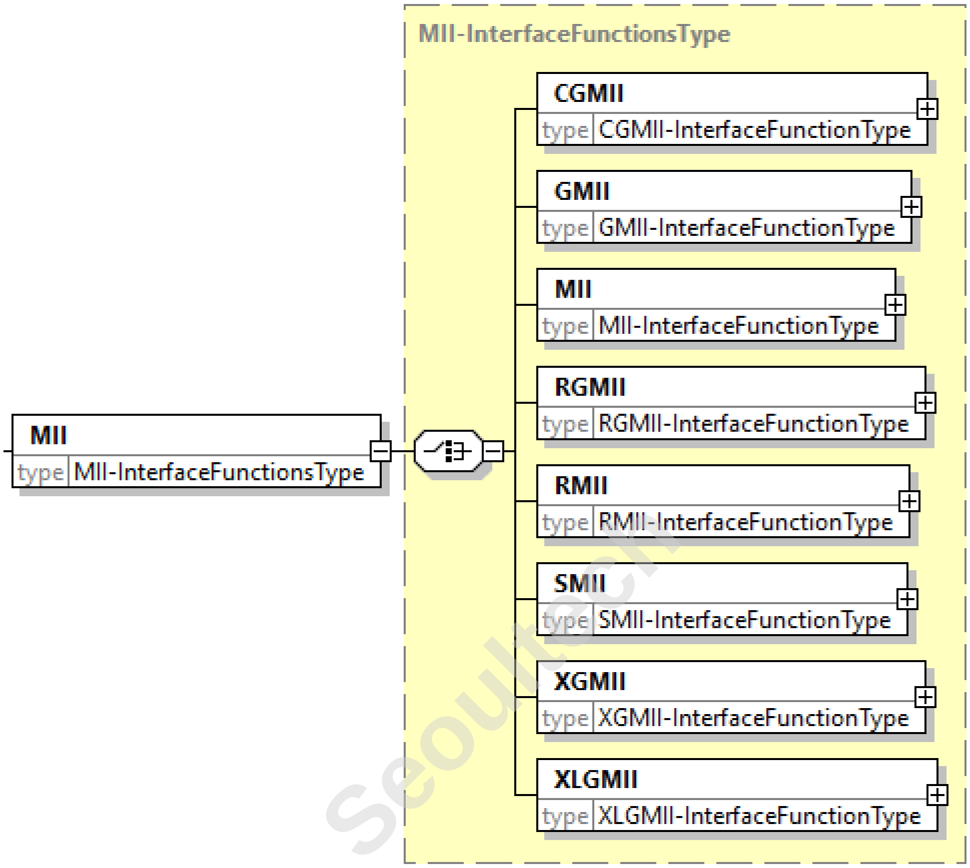
For more information about the MMC Interface, refer to the JEDEC standard JESD84-B42.

4.7.3.10.26.3. SPI-Mode Interface Function

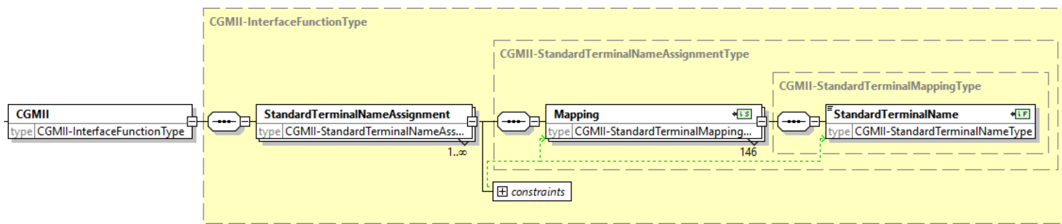
<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/MultiMediaCard/SPI-Mode</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">SPI-Mode-InterfaceFunctionType, SPI-Mode-StandardTerminalNameAssignmentType,
SPI-Mode-StandardTerminalMappingType, SPI-Mode-StandardTerminalNameType</td></tr>
<tr><td rowspan="3">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. CS</td><td>2. DI</td><td>3. VSS</td><td>4. VDD</td></tr>
<tr><td>5. SCLK</td><td>6. VSS2</td><td>7. DO</td><td></td></tr>
</table>

For more information about the SPI Mode Interface, refer to the JEDEC standard JESD84-B42.

4.7.3.10.27. MII Interface Function

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/HDMI
diagram	
type	MII-InterfaceFunctionsType, CGMII-InterfaceFunctionType, GMII-InterfaceFunctionType, MII-InterfaceFunctionType, RGMII-InterfaceFunctionType, RMII-InterfaceFunctionType, SMII-InterfaceFunctionType, XGMII-InterfaceFunctionType, XLGMII-InterfaceFunctionType.

4.7.3.10.27.1. CGMII

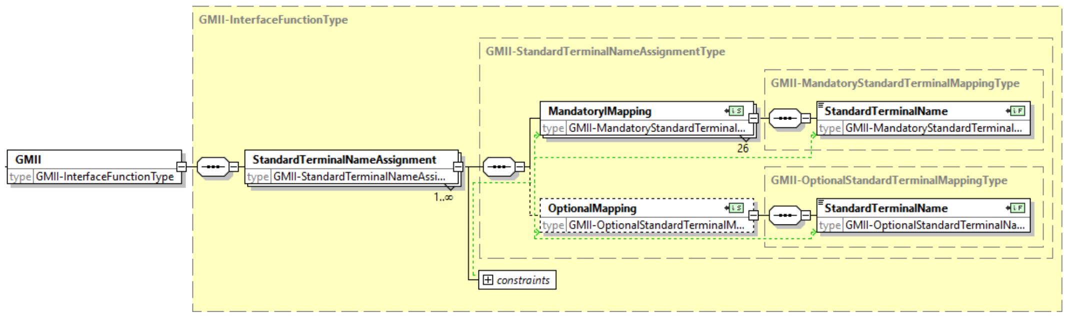
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/MII/CGMII			
diagram				
type	CGMIIType, CGMII-StandardTerminalNameAssignmentType, CGMII-StandardTerminalMappingType, CGMII-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. TX_CLK	2. TXC0	3. TXC1	4. TXC2
	5. TXC3	6. TXC4	7. TXC5	8. TXC6
	9. TXC7	10. TXD[0]	11. TXD[1]	12. TXD[2]
	13. TXD[3]	14. TXD[4]	15. TXD[5]	16. TXD[6]
	17. TXD[7]	18. TXD[8]	19. TXD[9]	20. TXD[10]
	21. TXD[11]	22. TXD[12]	23. TXD[13]	24. TXD[14]
	25. TXD[15]	26. TXD[16]	27. TXD[17]	28. TXD[18]
	29. TXD[19]	30. TXD[20]	31. TXD[21]	32. TXD[22]
	33. TXD[23]	34. TXD[24]	35. TXD[25]	36. TXD[26]
	37. TXD[27]	38. TXD[28]	39. TXD[29]	40. TXD[30]
	41. TXD[31]	42. TXD[32]	43. TXD[33]	44. TXD[34]
	45. TXD[35]	46. TXD[36]	47. TXD[37]	48. TXD[38]
	49. TXD[39]	50. TXD[40]	51. TXD[41]	52. TXD[42]
	53. TXD[43]	54. TXD[44]	55. TXD[45]	56. TXD[46]
	57. TXD[47]	58. TXD[48]	59. TXD[49]	60. TXD[50]
	61. TXD[51]	62. TXD[52]	63. TXD[53]	64. TXD[54]
	65. TXD[55]	66. TXD[56]	67. TXD[57]	68. TXD[58]
	69. TXD[59]	70. TXD[60]	71. TXD[61]	72. TXD[62]
	73. TXD[63]	74. RX_CLK	75. RXC0	76. RXC1
	77. RXC2	78. RXC3	79. RXC4	80. RXC5
	81. RXC6	82. RXC7	83. RXD[0]	84. RXD[1]
	85. RXD[2]	86. RXD[3]	87. RXD[4]	88. RXD[5]
	89. RXD[6]	90. RXD[7]	91. RXD[8]	92. RXD[9]
	93. RXD[10]	94. RXD[11]	95. RXD[12]	96. RXD[13]
	97. RXD[14]	98. RXD[15]	99. RXD[16]	100. RXD[17]
	101. RXD[18]	102. RXD[19]	103. RXD[20]	104. RXD[21]

4.7.3.10.27.1 CGMII – Mandatory Mapping (cont'd)

list of enumerate values (cont.)	105. RXD[22]	106. RXD[23]	107. RXD[24]	108. RXD[25]
	109. RXD[26]	110. RXD[27]	111. RXD[28]	112. RXD[29]
	113. RXD[30]	114. RXD[31]	115. RXD[32]	116. RXD[33]
	117. RXD[34]	118. RXD[35]	119. RXD[36]	120. RXD[37]
	121. RXD[38]	122. RXD[39]	123. RXD[40]	124. RXD[41]
	125. RXD[42]	126. RXD[43]	127. RXD[44]	128. RXD[45]
	129. RXD[46]	130. RXD[47]	131. RXD[48]	132. RXD[49]
	133. RXD[50]	134. RXD[51]	135. RXD[52]	136. RXD[53]
	137. RXD[54]	138. RXD[55]	139. RXD[56]	140. RXD[57]
	141. RXD[58]	142. RXD[59]	143. RXD[60]	144. RXD[61]
	145. RXD[62]	146. RXD[63]		

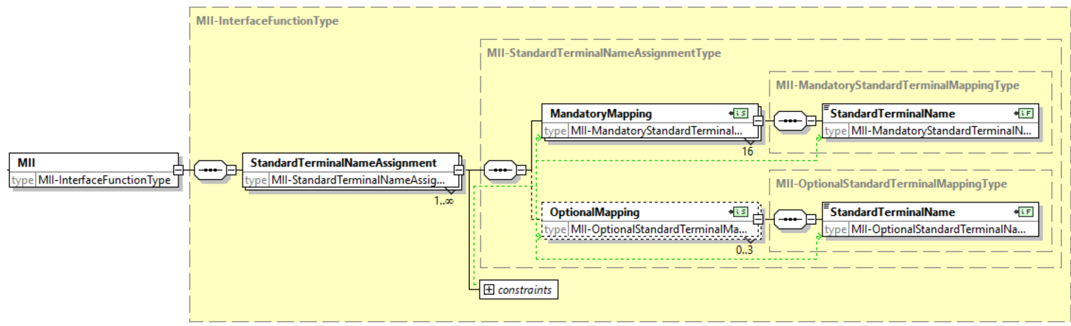
For more information about the CGMII Interface, refer to the IEEE standard IEEE 802.3ba-2010.

4.7.3.10.27.2. GMII

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/MII/GMII</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">GMIIType, GMII-StandardTerminalNameAssignmentType,
GMII-MandatoryStandardTerminalMappingType, GMII-MandatoryStandardTerminalNameType,
GMII-OptionalStandardTerminalMappingType, GMII-OptionalStandardTerminalNameType</td></tr>
<tr><td rowspan="10">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. GTX_CLK</td><td>2. TXD[0]</td><td>3. TXD[1]</td><td>4. TXD[2]</td></tr>
<tr><td>5. TXD[3]</td><td>6. TXD[4]</td><td>7. TXD[5]</td><td>8. TXD[6]</td></tr>
<tr><td>9. TXD[7]</td><td>10. TX_EN</td><td>11. TX_ER</td><td>12. RX_CLK</td></tr>
<tr><td>13. RXD[0]</td><td>14. RXD[1]</td><td>15. RXD[2]</td><td>16. RXD[3]</td></tr>
<tr><td>17. RXD[4]</td><td>18. RXD[5]</td><td>19. RXD[6]</td><td>20. RXD[7]</td></tr>
<tr><td>21. RX_DV</td><td>22. RX_ER</td><td>23. COL</td><td>24. CRS</td></tr>
<tr><td>25. MDC</td><td>26. MDIO</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. TX_CLK</td><td></td><td></td><td></td></tr>
</table>

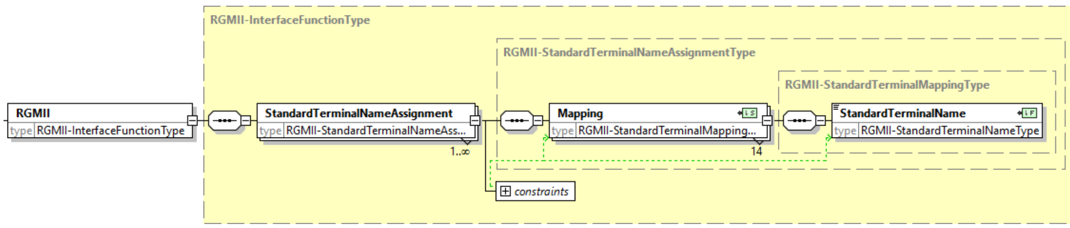
For more information about the GMII Interface, refer to the IEEE standard IEEE 802.3z-1998.

4.7.3.10.27.3. MII

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/MII/MII			
diagram				
type	MIIType, RMII-StandardTerminalNameAssignmentType, MII-MandatoryStandardTerminalMappingType, MII-MandatoryStandardTerminalNameType, MII-OptionalStandardTerminalMappingType, MII-OptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. TXD[0]	2. TXD[1]	3. TXD[2]	4. TXD[3]
	5. TX_EN	6. TX_ERR	7. TX_CLK	8. RXD[0]
	9. RXD[1]	10. RXD[2]	11. RXD[3]	12. RX_DV
	13. RX_ERR	14. RX_CLK	15. COLL	16. CRS
	OptionalMapping/StandardTerminalName			
	1. SPEED	2. DUPLEX	3. LINK	

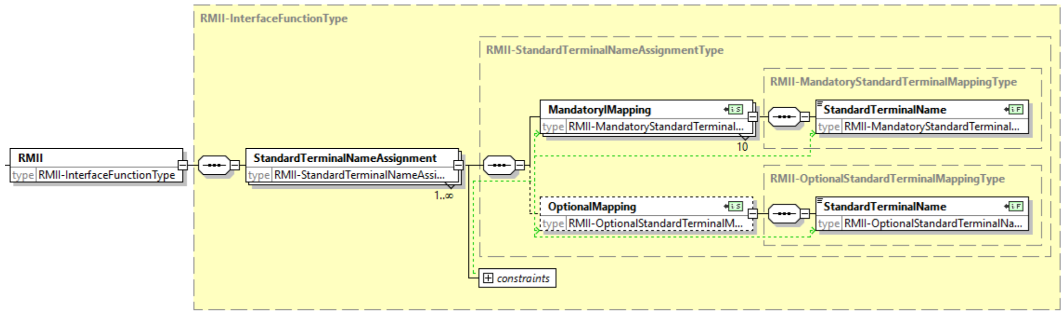
For more information about the MII Interface, refer to the IEEE standard IEEE 802.3u-1995.

4.7.3.10.27.4. RGMII

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/MII/RGMII</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">RGMIIType, RGMII-StandardTerminalNameAssignmentType,
RGMII-StandardTerminalMappingType, RGMII-StandardTerminalNameType</td></tr>
<tr><td rowspan="5">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. TXC</td><td>2. TD[0]</td><td>3. TD[1]</td><td>4. TD[2]</td></tr>
<tr><td>5. TD[3]</td><td>6. TX_CTL</td><td>7. RXC</td><td>8. RD[0]</td></tr>
<tr><td>9. RD[1]</td><td>10. RD[2]</td><td>11. RD[3]</td><td>12. RX_CTL</td></tr>
<tr><td>13. MDIO</td><td>14. MDC</td><td></td><td></td></tr>
</table>

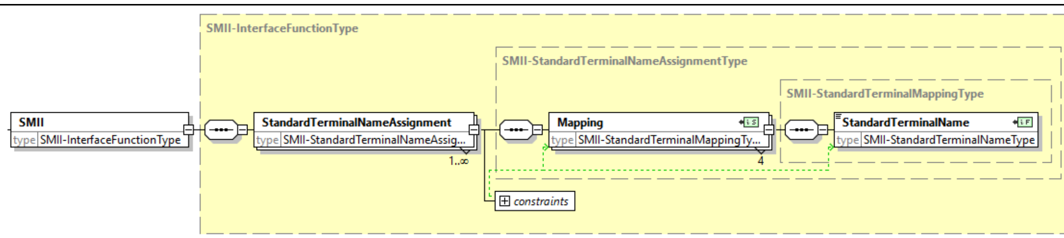
For more information about the RGMII Interface, refer to the document released by HP at http://www.hp.com/rnd/pdfs/RGMIIv2_0_final_hp.pdf.

4.7.3.10.27.5. RMII

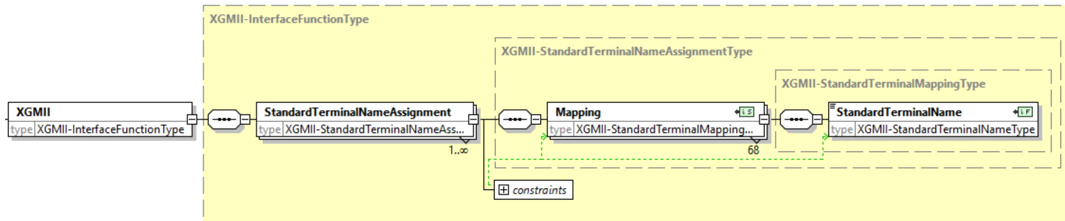
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/MII/RMII**			
diagram				
type	**RMIIType, RMII-StandardTerminalNameAssignmentType, RMII-MandatoryStandardTerminalMappingType, RMII-MandatoryStandardTerminalNameType, RMII-OptionalStandardTerminalMappingType, RMII-OptionalStandardTerminalNameType.**			
list of enumerate values	**MandatoryMapping/StandardTerminalName**			
	1. REF_CLK	**2. TXD[0]**	**3. TXD[1]**	**4. TX_EN**
	5. RXD[0]	**6. RXD[1]**	**7. CRS_DV**	**8. MDIO**
	9. MDC			
	OptionalMapping/StandardTerminalName			
	1. RX_ER			

For more information about the RMII Interface, refer to https://en.wikipedia.org/wiki/Media-independent_interface#RMII.

4.7.3.10.27.6. SMII

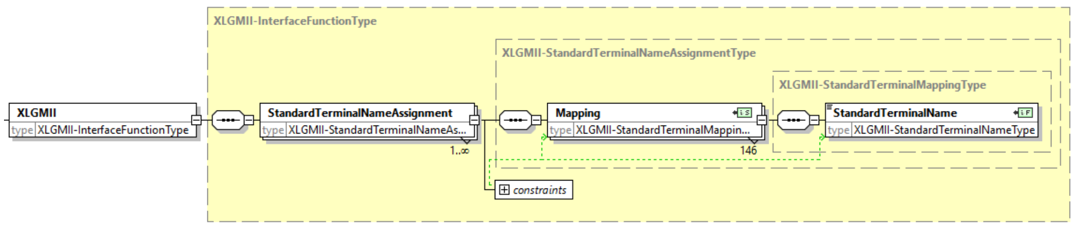
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/MII/SMII**			
diagram				
type	**SMIIType, SMII-StandardTerminalNameAssignmentType, SMII-StandardTerminalMappingType, SMII-StandardTerminalNameType**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. RX	**2. TX**	**3. SYNC**	**4. CLOCK**

4.7.3.10.27.7. XGMII

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/MII/XGMII			
diagram				
type	XGMIIType, XGMII-StandardTerminalNameAssignmentType, XGMII-StandardTerminalMappingType, XGMII-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. TX_CLK	2. TXC	3. TXD[0]	4. TXD[1]
	5. TXD[2]	6. TXD[3]	7. TXD[4]	8. TXD[5]
	9. TXD[6]	10. TXD[7]	11. TXD[8]	12. TXD[9]
	13. TXD[10]	14. TXD[11]	15. TXD[12]	16. TXD[13]
	17. TXD[14]	18. TXD[15]	19. TXD[16]	20. TXD[17]
	21. TXD[18]	22. TXD[19]	23. TXD[20]	24. TXD[21]
	25. TXD[22]	26. TXD[23]	27. TXD[24]	28. TXD[25]
	29. TXD[26]	30. TXD[27]	31. TXD[28]	32. TXD[29]
	33. TXD[30]	34. TXD[31]	35. RX_CLK	36. RXC
	37. RXD[0]	38. RXD[1]	39. RXD[2]	40. RXD[3]
	41. RXD[4]	42. RXD[5]	43. RXD[6]	44. RXD[7]
	45. RXD[8]	46. RXD[9]	47. RXD[10]	48. RXD[11]
	49. RXD[12]	50. RXD[13]	51. RXD[14]	52. RXD[15]
	53. RXD[16]	54. RXD[17]	55. RXD[18]	56. RXD[19]
	57. RXD[20]	58. RXD[21]	59. RXD[22]	60. RXD[23]
	61. RXD[24]	62. RXD[25]	63. RXD[26]	64. RXD[27]
	65. RXD[28]	66. RXD[29]	67. RXD[30]	68. RXD[31]

For more information about the XGMII Interface, refer to the IEEE standard IEEE 802.3ae-2002.

4.7.3.10.27.8. XLGMII

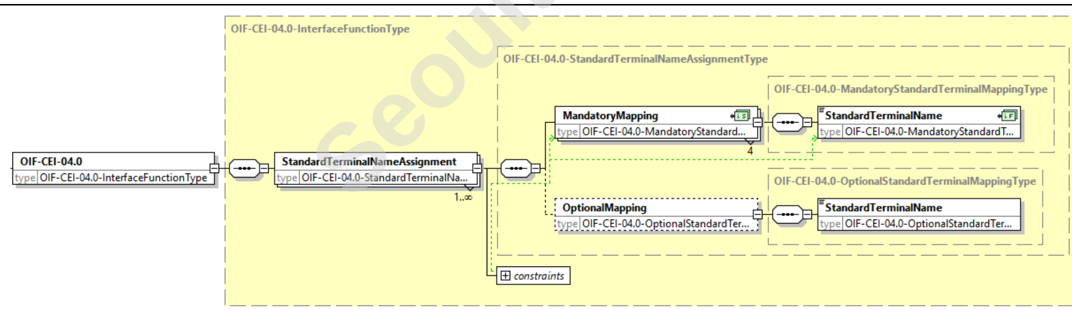
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/MII/XLGMII**			
diagram				
type	**XLGMIIType, XLGMII-StandardTerminalNameAssignmentType, XLGMII-StandardTerminalMappingType, XLGMII-StandardTerminalNameType**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. TX_CLK	**2. TXC0**	**3. TXC1**	**4. TXC2**
	5. TXC3	**6. TXC4**	**7. TXC5**	**8. TXC6**
	9. TXC7	**10. TXD[0]**	**11. TXD[1]**	**12. TXD[2]**
	13. TXD[3]	**14. TXD[4]**	**15. TXD[5]**	**16. TXD[6]**
	17. TXD[7]	**18. TXD[8]**	**19. TXD[9]**	**20. TXD[10]**
	21. TXD[11]	**22. TXD[12]**	**23. TXD[13]**	**24. TXD[14]**
	25. TXD[15]	**26. TXD[16]**	**27. TXD[17]**	**28. TXD[18]**
	29. TXD[19]	**30. TXD[20]**	**31. TXD[21]**	**32. TXD[22]**
	33. TXD[23]	**34. TXD[24]**	**35. TXD[25]**	**36. TXD[26]**
	37. TXD[27]	**38. TXD[28]**	**39. TXD[29]**	**40. TXD[30]**
	41. TXD[31]	**42. TXD[32]**	**43. TXD[33]**	**44. TXD[34]**
	45. TXD[35]	**46. TXD[36]**	**47. TXD[37]**	**48. TXD[38]**
	49. TXD[39]	**50. TXD[40]**	**51. TXD[41]**	**52. TXD[42]**
	53. TXD[43]	**54. TXD[44]**	**55. TXD[45]**	**56. TXD[46]**
	57. TXD[47]	**58. TXD[48]**	**59. TXD[49]**	**60. TXD[50]**
	61. TXD[51]	**62. TXD[52]**	**63. TXD[53]**	**64. TXD[54]**
	65. TXD[55]	**66. TXD[56]**	**67. TXD[57]**	**68. TXD[58]**
	69. TXD[59]	**70. TXD[60]**	**71. TXD[61]**	**72. TXD[62]**
	73. TXD[63]	**74. RX_CLK**	**75. RXC0**	**76. RXC1**
	77. RXC2	**78. RXC3**	**79. RXC4**	**80. RXC5**
	81. RXC6	**82. RXC7**	**83. RXD[0]**	**84. RXD[1]**
	85. RXD[2]	**86. RXD[3]**	**87. RXD[4]**	**88. RXD[5]**
	89. RXD[6]	**90. RXD[7]**	**91. RXD[8]**	**92. RXD[9]**
	93. RXD[10]	**94. RXD[11]**	**95. RXD[12]**	**96. RXD[13]**
	97. RXD[14]	**98. RXD[15]**	**99. RXD[16]**	**100. RXD[17]**
	101. RXD[18]	**102. RXD[19]**	**103. RXD[20]**	**104. RXD[21]**

4.7.3.10.27.8 XLGMII – Mandatory Mapping (cont'd)

	105. RXD[22]	106. RXD[23]	107. RXD[24]	108. RXD[25]
	109. RXD[26]	110. RXD[27]	111. RXD[28]	112. RXD[29]
	113. RXD[30]	114. RXD[31]	115. RXD[32]	116. RXD[33]
	117. RXD[34]	118. RXD[35]	119. RXD[36]	120. RXD[37]
	121. RXD[38]	122. RXD[39]	123. RXD[40]	124. RXD[41]
	125. RXD[42]	126. RXD[43]	127. RXD[44]	128. RXD[45]
	129. RXD[46]	130. RXD[47]	131. RXD[48]	132. RXD[49]
	133. RXD[50]	134. RXD[51]	135. RXD[52]	136. RXD[53]
	137. RXD[54]	138. RXD[55]	139. RXD[56]	140. RXD[57]
	141. RXD[58]	142. RXD[59]	143. RXD[60]	144. RXD[61]
	145. RXD[62]	146. RXD[63]		

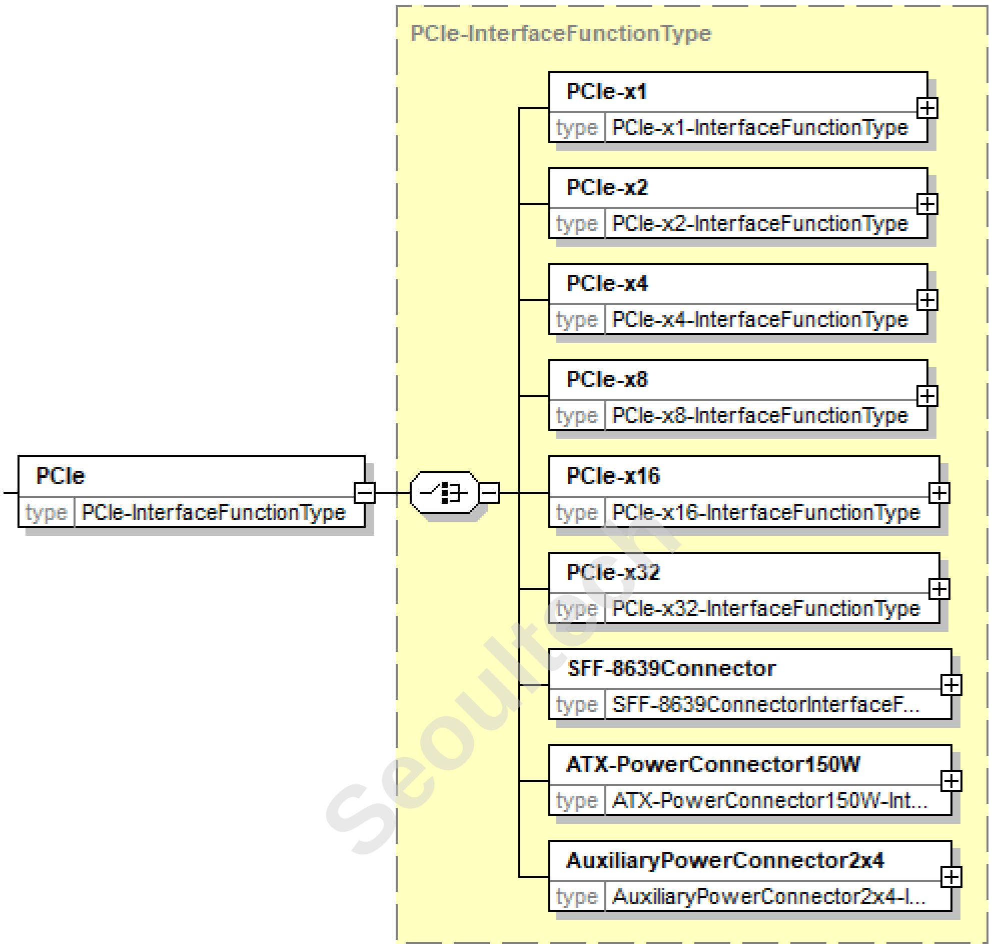
For more information about the XLGMII Interface, refer to the IEEE standard IEEE std 802.3.

4.7.3.10.28. OIF-CEI-04.0 Interface Function

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/OIF-CEI-04.0**			
diagram				
type	**OIF-CEI-04.0-InterfaceFunctionType, OIF-CEI-04.0-StandardTerminalNameAssignmentType, OIF-CEI-04.0-StandardTerminalMappingType, OIF-CEI-04.0-StandardTerminalNameType.**			
list of enumerate values	**MandatoryMapping/StandardTerminalName**			
	1. TxData0P	2. TxData0N	3. RxData0P	4. RxData0N
	OptionalMapping/StandardTerminalName			
	5. RefClk			

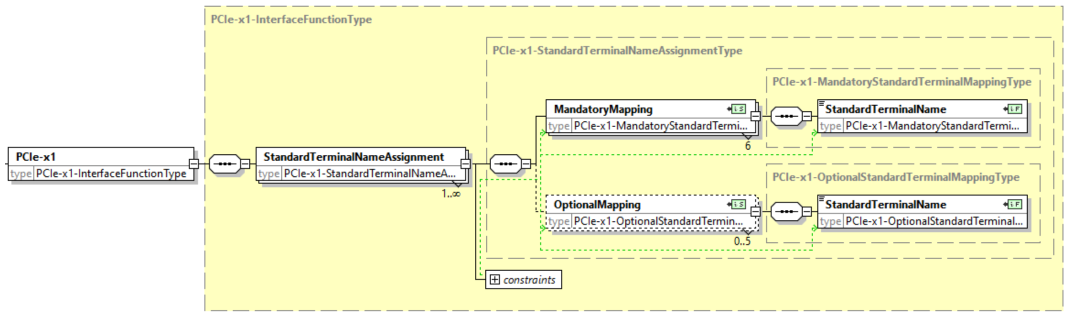
For more information about the XGMII Interface, refer to the OIF standard OIF-CEI-04.0.

4.7.3.10.29. PCIe Interface Function

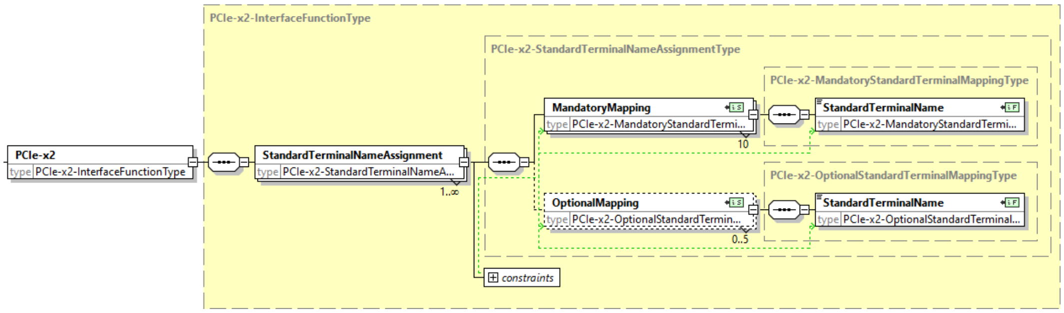
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/PCIe</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>PCIe-InterfaceFunctionType, PCIe-x1-InterfaceFunctionType, PCIe-x2-InterfaceFunctionType, PCIe-x4-InterfaceFunctionType, PCIe-x8-InterfaceFunctionType, PCIe-x16-InterfaceFunctionType, PCIe-x32-InterfaceFunctionType, SFF-8639ConnectorInterfaceFunctionType, ATX-PowerConnector150W-InterfaceFunctionType, AuxiliaryPowerConnector2x4-InterfaceFunctionType.</td></tr>
</table>

For more information about the PCIe Interfaces, refer to the PCI-SIG standard PCI Express Card Electromechanical Specification Rev 2. 0.

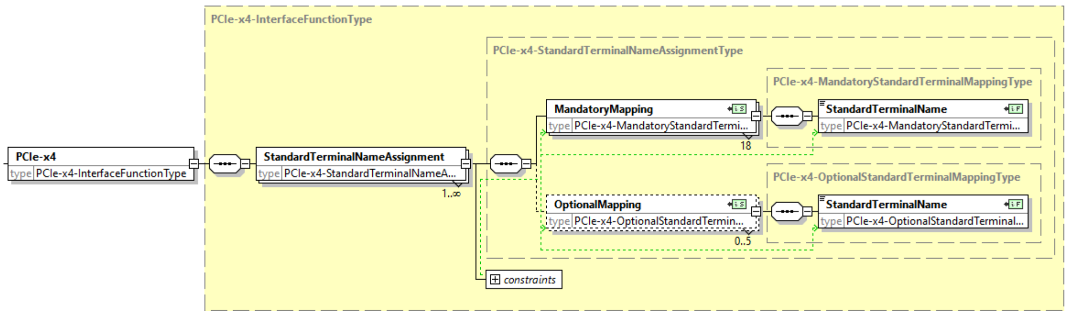
4.7.3.10.29.1. PCIe-x1

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/PCIe/PCIe-x1</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">PCIe-x1–InterfaceFunctionType, PCIe-x1-StandardTerminalNameAssignmentType,
PCIe-x1-MandatoryStandardTerminalMappingType, PCIe-x1-MandatoryStandardTerminalNameType,
PCIe-x1-OptionalStandardTerminalMappingType, PCIe-x1-OptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="6">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. REFCLK+</td><td>2. REFCLK-</td><td>3. PETp0</td><td>4. PETn0</td></tr>
<tr><td>5. PERp0</td><td>6. PERn0</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. WAKE#</td><td>2. CLKREQ#</td><td>3. PERST#</td><td>4. PRSNT1#</td></tr>
<tr><td>5. PRSNT2#</td><td></td><td></td><td></td></tr>
</table>

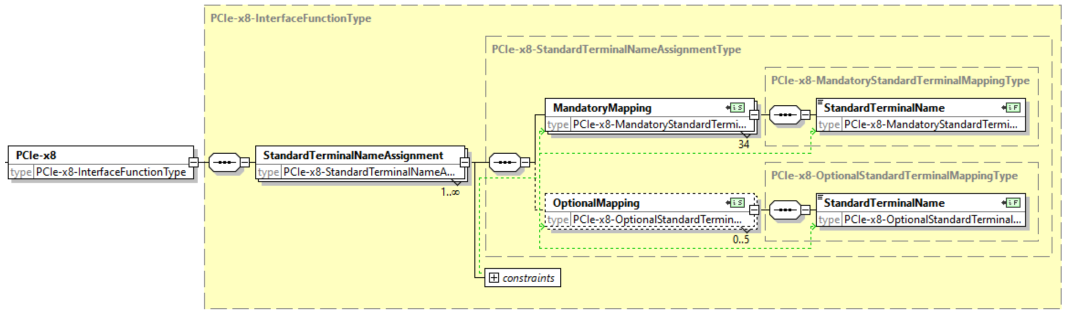
4.7.3.10.29.2. PCIe-x2

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/PCIe/PCIe-x2</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">PCIe-x2–InterfaceFunctionType, PCIe-x2-StandardTerminalNameAssignmentType,
PCIe-x2-MandatoryStandardTerminalMappingType, PCIe-x2-MandatoryStandardTerminalNameType,
PCIe-x2-OptionalStandardTerminalMappingType, PCIe-x2-OptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="7">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. REFCLK+</td><td>2. REFCLK-</td><td>3. PETp0</td><td>4. PETp1</td></tr>
<tr><td>5. PETn0</td><td>6. PETn1</td><td>7. PERp0</td><td>8. PERp1</td></tr>
<tr><td>9. PERn0</td><td>10. PERn1</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. WAKE#</td><td>2. CLKREQ#</td><td>3. PERST#</td><td>4. PRSNT1#</td></tr>
<tr><td>5. PRSNT2#</td><td></td><td></td><td></td></tr>
</table>

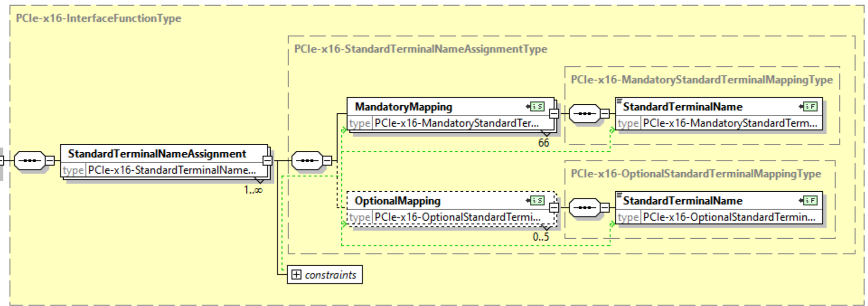
4.7.3.10.29.3. PCIe-x4

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/PCIe/PCIe-x4</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">PCIe-x4–InterfaceFunctionType, PCIe-x4-StandardTerminalNameAssignmentType,
PCIe-x4-MandatoryStandardTerminalMappingType, PCIe-x4-MandatoryStandardTerminalNameType,
PCIe-x4-OptionalStandardTerminalMappingType, PCIe-x4-OptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="9">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. REFCLK+</td><td>2. REFCLK-</td><td>3. PETp0</td><td>4. PETp1</td></tr>
<tr><td>5. PETp2</td><td>6. PETp3</td><td>7. PETn0</td><td>8. PETn1</td></tr>
<tr><td>9. PETn2</td><td>10. PETn3</td><td>11. PERp0</td><td>12. PERp1</td></tr>
<tr><td>13. PERp2</td><td>14. PERp3</td><td>15. PERn0</td><td>16. PERn1</td></tr>
<tr><td>17. PERn2</td><td>18. PERn3</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. WAKE#</td><td>2. CLKREQ#</td><td>3. PERST#</td><td>4. PRSNT1#</td></tr>
<tr><td>5. PRSNT2#</td><td></td><td></td><td></td></tr>
</table>

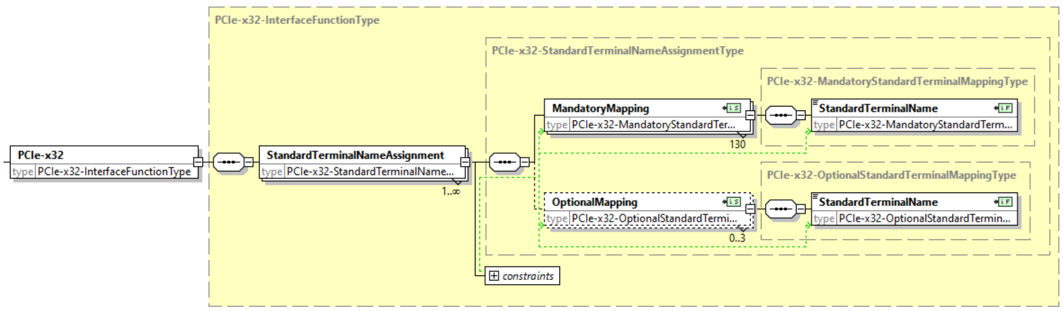
4.7.3.10.29.4. PCIe-x8

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/PCIe/PCIe-x8</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">PCIe-x8–InterfaceFunctionType, PCIe-x8-StandardTerminalNameAssignmentType,
PCIe-x8-MandatoryStandardTerminalMappingType, PCIe-x8-MandatoryStandardTerminalNameType,
PCIe-x8-OptionalStandardTerminalMappingType, PCIe-x8-OptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="13">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. REFCLK+</td><td>2. REFCLK-</td><td>3. PETp0</td><td>4. PETp1</td></tr>
<tr><td>5. PETp2</td><td>6. PETp3</td><td>7. PETp4</td><td>8. PETp5</td></tr>
<tr><td>9. PETp6</td><td>10. PETp7</td><td>11. PETn0</td><td>12. PETn1</td></tr>
<tr><td>13. PETn2</td><td>14. PETn3</td><td>15. PETn4</td><td>16. PETn5</td></tr>
<tr><td>17. PETn6</td><td>18. PETn7</td><td>19. PERp0</td><td>20. PERp1</td></tr>
<tr><td>21. PERp2</td><td>22. PERp3</td><td>23. PERp4</td><td>24. PERp5</td></tr>
<tr><td>25. PERp6</td><td>26. PERp7</td><td>27. PERn0</td><td>28. PERn1</td></tr>
<tr><td>29. PERn2</td><td>30. PERn3</td><td>31. PERn4</td><td>32. PERn5</td></tr>
<tr><td>33. PERn6</td><td>34. PERn7</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. WAKE#</td><td>2. CLKREQ#</td><td>3. PERST#</td><td>4. PRSNT1#</td></tr>
<tr><td>5. PRSNT2#</td><td></td><td></td><td></td></tr>
</table>

4.7.3.10.29.5. PCIe-x16

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/PCIe/PCIe-x16			
diagram				
type	PCIe-x16–InterfaceFunctionType, PCIe-x16-StandardTerminalNameAssignmentType, PCIe-x16-MandatoryStandardTerminalMappingType, PCIe-x16-MandatoryStandardTerminalNameType, PCIe-x16-OptionalStandardTerminalMappingType, PCIe-x16-OptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. REFCLK+	2. REFCLK-	3. PETp0	4. PETp1
	5. PETp2	6. PETp3	7. PETp4	8. PETp5
	9. PETp6	10. PETp7	11. PETp8	12. PETp9
	13. PETp10	14. PETp11	15. PETp12	16. PETp13
	17. PETp14	18. PETp15	19. PETn0	20. PETn1
	21. PETn2	22. PETn3	23. PETn4	24. PETn5
	25. PETn6	26. PETn7	27. PETn8	28. PETn9
	29. PETn10	30. PETn11	31. PETn12	32. PETn13
	33. PETn14	34. PETn15	35. PERp0	36. PERp1
	37. PERp2	38. PERp3	39. PERp4	40. PERp5
	41. PERp6	42. PERp7	43. PERp8	44. PERp9
	45. PERp10	46. PERp11	47. PERp12	48. PERp13
	49. PERp14	50. PERp15	51. PERn0	52. PERn1
	53. PERn2	54. PERn3	55. PERn4	56. PERn5
	57. PERn6	58. PERn7	59. PERn8	60. PERn9
	61. PERn10	62. PERn11	63. PERn12	64. PERn13
	65. PERn14	66. PERn15		
	OptionalMapping/StandardTerminalName			
	1. WAKE#	2. CLKREQ#	3. PERST#	4. PRSNT1#
	5. PRSNT2#			

4.7.3.10.29.6. PCIe-x32

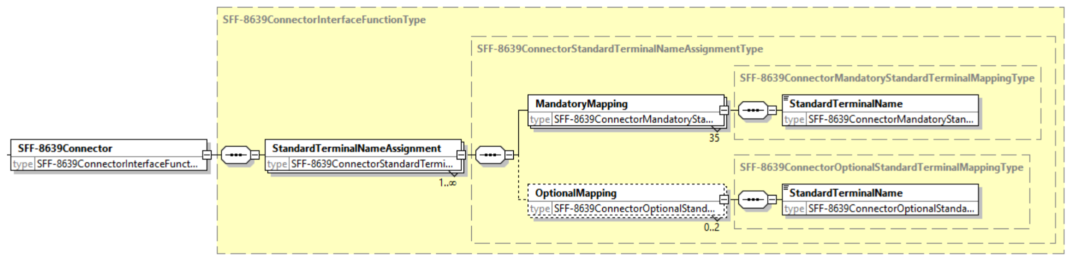
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/PCI3/PCIe-x32
diagram	
type	PCIe-x32–InterfaceFunctionType, PCIe-x32-StandardTerminalNameAssignmentType, PCIe-x32-MandatoryStandardTerminalMappingType, PCIe-x32-MandatoryStandardTerminalNameType, PCIe-x32-OptionalStandardTerminalMappingType, PCIe-x32-OptionalStandardTerminalNameType.
list of enumerate values	MandatoryMapping/StandardTerminalName

1. REFCLK+	2. REFCLK-	3. PETp1	4. PETp1
5. PETp2	6. PETp3	7. PETp4	8. PETp5
9. PETp6	10. PETp7	11. PETp8	12. PETp9
13. PETp10	14. PETp11	15. PETp12	16. PETp13
17. PETp14	18. PETp15	19. PETp16	20. PETp17
21. PETp18	22. PETp19	23. PETp20	24. PETp21
25. PETp22	26. PETp23	27. PETp24	28. PETp25
29. PETp26	30. PETp27	31. PETp28	32. PETp29
33. PETp30	34. PETp31	35. PETn0	36. PETn1
37. PETn2	38. PETn3	39. PETn4	40. PETn5
41. PETn6	42. PETn7	43. PETn8	44. PETn9
45. PETn10	46. PETn11	47. PETn12	48. PETn13
49. PETn14	50. PETn15	51. PETn16	52. PETn17
53. PETn18	54. PETn19	55. PETn20	56. PETn21
57. PETn22	58. PETn23	59. PETn24	60. PETn25
61. PETn26	62. PETn27	63. PETn28	64. PETn29
65. PETn30	66. PETn31	67. PERp0	68. PERp1
69. PERp2	70. PERp3	71. PERp4	72. PERp5
73. PERp6	74. PERp7	75. PERp8	76. PERp9
77. PERp10	78. PERp11	79. PERp12	80. PERp13
81. PERp14	82. PERp15	83. PERp16	84. PERp17
85. PERp18	86. PERp19	87. PERp20	88. PERp21
89. PERp22	90. PERp23	91. PERp24	92. PERp25

4.7.3.10.29.6 PCIe-x32 – Mandatory Mapping (cont'd)

	93. PERp26	94. PERp27	95. PERp28	96. PERp29
	97. PERp30	98. PERp31	99. PERn0	100. PERn1
	101. PERn2	102. PERn3	103. PERn4	104. PERn5
	105. PERn6	106. PERn7	107. PERn8	108. PERn9
	109. PERn10	110. PERn11	111. PERn12	112. PERn13
	113. PERn14	114. PERn15	115. PERn16	116. PERn17
	117. PERn18	118. PERn19	119. PERn20	120. PERn21
	121. PERn22	122. PERn23	123. PERn24	124. PERn25
	125. PERn26	126. PERn27	127. PERn28	128. PERn29
	129. PERn30	130. PERn31		
	OptionalMapping/StandardTerminalName			
	1. WAKE#	2. CLKREQ#	3. PERST#	4. PRSNT1#
	5. PRSNT2#			

4.7.3.10.29.7. SFF-8639 Connector

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/PCIe/SFF-8639Connector
diagram	
type	SFF-8639ConnectorInterfaceFunctionType, SFF-8639ConnectorStandardTerminalNameAssignmentType, SFF-8639ConnectorMandatoryStandardTerminalMappingType, SFF-8639ConnectorMandatoryStandardTerminalNameType, SFF-8639ConnectorOptionalStandardTerminalMappingType, SFF-8639ConnectorOptionalStandardTerminalNameType.
list of enumerate values	MandatoryMapping/StandardTerminalName

MandatoryMapping/StandardTerminalName

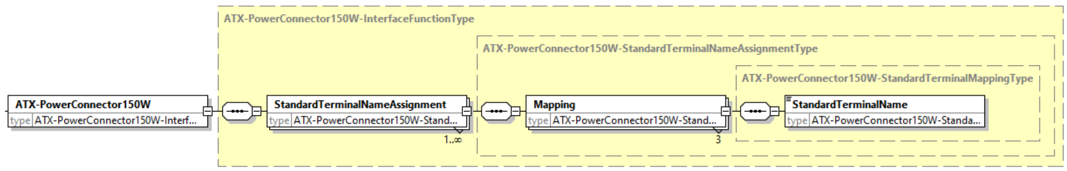
1. WAKE#	2. PWRDIS	3. IfDet#	4. Ground
5. PRSNT#	6. ACTIVITY#	7. +12 V Precharge	8. +12 V
9. HPT0	10. PETp1	11. PETn1	12. PERn1
13. PERP1	14. PETp2	15. PETn2	16. PERn2
17. PERp2	18. REFCLKB+	19. REFCLKB-	20. +3.3 Vaux
21. PERST#	22. REFCLK+	23. REFCLK-	24. PETp0
25. PETn0	26. PERn0	27. PERp0	28. HPT1
29. PETp3	30. PETn3	31. PERn3	32. PERp3
33. SMBCLK	34. SMBDAT	35. DUALPORTEN#	

OptionalMapping/StandardTerminalName

1. CLKREQ#	2. PERSTB#		

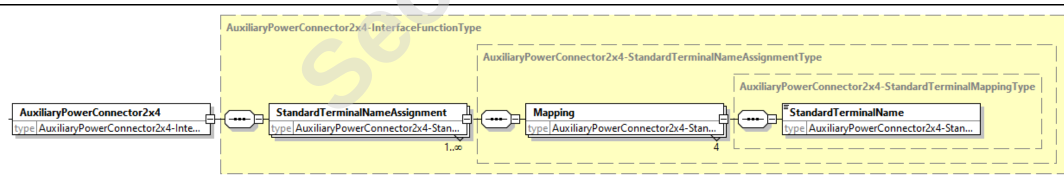
For more information about the SFF-8639 Connector Interface, refer to the PCI Express standard PCI Express SFF-8639 Module Revision 4, Version 1.0

4.7.3.10.29.8. ATX - Power Connector 150W

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/PCIe/ATX-PowerConnector150W</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">ATX-PowerConnector150W-InterfaceFunctionType, ATX-PowerConnector150W-StandardTerminalNameAssignmentType, ATX-PowerConnector150W-StandardTerminalMappingType, ATX-PowerConnector150W-StandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. +12V</td><td>2. Ground</td><td>3. Sense</td><td></td></tr>
</table>

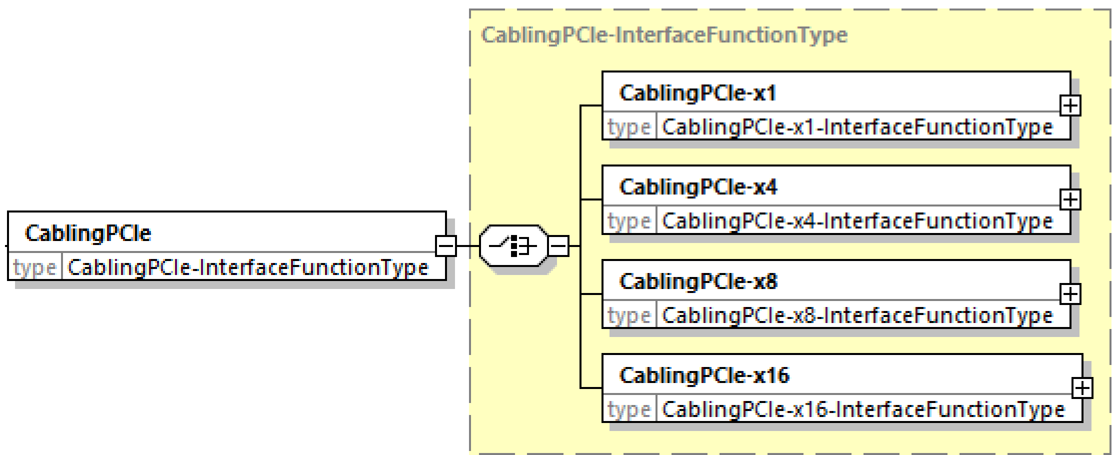
For more information about the ATX-Power Connector 150W Interface, refer to the PCI Express standard Specification PCI Express x16 Graphics 150W-ATX Revision 1.0

4.7.3.10.29.9. AuxiliaryPowerConnector2x4

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/PCIe/AuxiliaryPowerConnector2x4.</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">AuxiliaryPowerConnector2x4-InterfaceFunctionType, AuxiliaryPowerConnector2x4-StandardTerminalNameAssignmentType, AuxiliaryPowerConnector2x4-StandardTerminalMappingType, AuxiliaryPowerConnector2x4-StandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. +12V</td><td>2. Sense0</td><td>3. Sense1</td><td>4. Ground</td></tr>
</table>

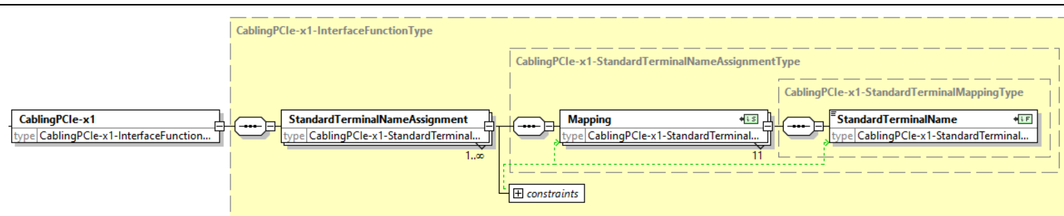
For more information about the Auxiliary Power Connector 2x4 Interface, refer to the PCI Express standard Specification PCI Express 225 W/ 300 W High Power Card Electromechanical Specification Revision 1.0.

4.7.3.10.30. Cabling PCIe Interface Function

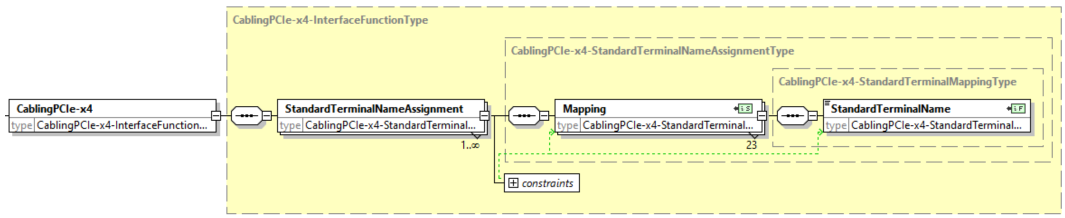
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/CablingPCIe
diagram	
type	CablingPCIe-InterfaceFunctionType, CablingPCIe-x1-InterfaceFunctionType, CablingPCIe-x2-InterfaceFunctionType, CablingPCIe-x4-InterfaceFunctionType, CablingPCIe-x8-InterfaceFunctionType, CablingPCIe-x16-InterfaceFunctionType, CablingPCIe-x32-InterfaceFunctionType.

For more information about the PCIe Interfaces, refer to the PCI-SIG standard PCI Express Card Electromechanical Specification Revision 2.0.

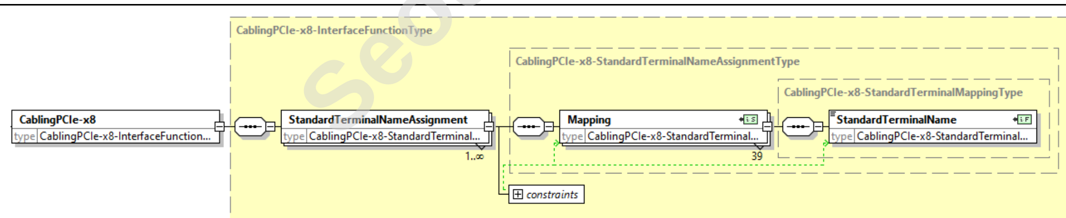
4.7.3.10.30.1. CablingPCIe-x1

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/CablingPCIe/CablingPCIe-x1			
diagram				
type	CablingPCIe-x1-InterfaceFunctionType, CablingPCIe-x1-StandardTerminalNameAssignmentType, CablingPCIe-x1-StandardTerminalMappingType, CablingPCIe-x1-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. SB_RTN	2. CREFCLKp	3. CREFCLKn	4. CPWRON
	5. CWAKE#	6. CPRSNT#	7. CPERST#	8. PETp0
	9. PETn0	10. PERp0	11. PERn0	

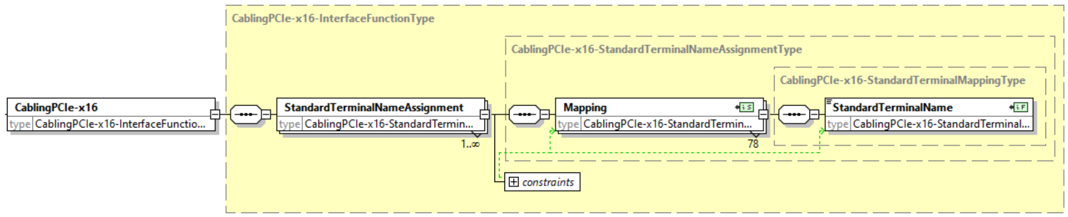
4.7.3.10.30.2. CablingPCIe-x4

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/CablingPCIe/CablingPCIe-x4			
diagram				
type	CablingPCIe-x4-InterfaceFunctionType, CablingPCIe-x4-StandardTerminalNameAssignmentType, CablingPCIe-x4-StandardTerminalMappingType, CablingPCIe-x4-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. SB_RTN	2. CREFCLKp	3. CREFCLKn	4. CPWRON
	5. CWAKE#	6. CPRSNT#	7. CPERST#	8. PETp0
	9. PETp1	10. PETp2	11. PETp3	12. PETn0
	13. PETn1	14. PETn2	15. PETn3	16. PERp0
	17. PERp1	18. PERp2	19. PERp3	20. PERn0
	21. PERn1	22. PERn2	23. PERn3	

4.7.3.10.30.3. CablingPCIe-x8

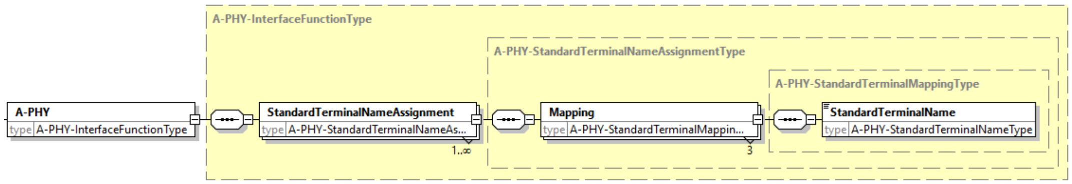
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/CablingPCIe/CablingPCIe-x8			
diagram				
type	CablingPCIe-x8-InterfaceFunctionType, CablingPCIe-x8-StandardTerminalNameAssignmentType, CablingPCIe-x8-StandardTerminalMappingType, CablingPCIe-x8-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. SB_RTN	2. CREFCLKp	3. CREFCLKn	4. CPWRON
	5. CWAKE#	6. CPRSNT#	7. CPERST#	8. PETp0
	9. PETp1	10. PETp2	11. PETp3	12. PETp4
	13. PETp5	14. PETp6	15. PETp7	16. PETn0
	17. PETn1	18. PETn2	19. PETn3	20. PETn4
	21. PETn5	22. PETn6	23. PETn7	24. PERp0
	25. PERp1	26. PERp2	27. PERp3	28. PERp4
	29. PERp5	30. PERp6	31. PERp7	32. PERn0
	33. PERn1	34. PERn2	35. PERn3	36. PERn4
	37. PERn5	38. PERn6	39. PERn7	

4.7.3.10.30.4. CablingPCIe-x16

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/CablingPCIe/CablingPCIe-x16
diagram	
type	CablingPCIe-x16-InterfaceFunctionType, CablingPCIe-x16-StandardTerminalNameAssignmentType, CablingPCIe-x16-StandardTerminalMappingType, CablingPCIe-x16-StandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName

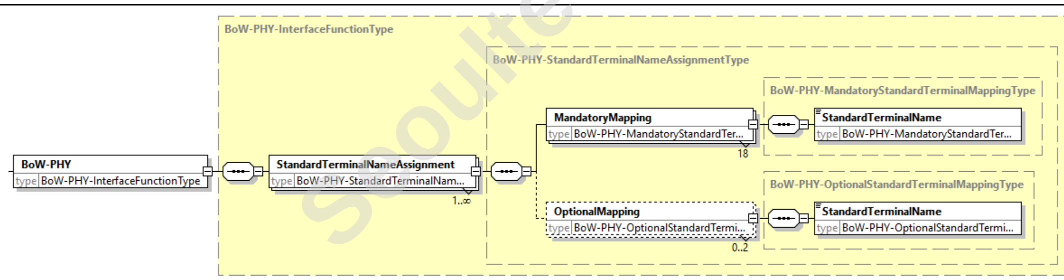
1. SB_RTN1	2. CREFCLKp1	3. CREFCLKn1	4. CPWRON1
5. CWAKE#1	6. CPRSNT#1	7. CPERST#1	8. SB_RTN2
9. CREFCLKp2	10. CREFCLKn2	11. CPWRON2	12. CWAKE#2
13. CPRSNT#2	14. CPERST#2	15. PETp0	16. PETp1
17. PETp2	18. PETp3	19. PETp4	20. PETp5
21. PETp6	22. PETp7	23. PETp8	24. PETp9
25. PETp10	26. PETp11	27. PETp12	28. PETp13
29. PETp14	30. PETp15	31. PETn0	32. PETn1
33. PETn2	34. PETn3	35. PETn4	36. PETn5
37. PETn6	38. PETn7	39. PETn8	40. PETn9
41. PETn10	42. PETn11	43. PETn12	44. PETn13
45. PETn14	46. PETn15	47. PERp0	48. PERp1
49. PERp2	50. PERp3	51. PERp4	52. PERp5
53. PERp6	54. PERp7	55. PERp8	56. PERp9
57. PERp10	58. PERp11	59. PERp12	60. PERp13
61. PERp14	62. PERp15	63. PERn0	64. PERn1
65. PERn2	66. PERn3	67. PERn4	68. PERn5
69. PERn6	70. PERn7	71. PERn8	72. PERn9
73. PERn10	74. PERn11	75. PERn12	76. PERn13
77. PERn14	78. PERn15		

4.7.3.10.31. A-PHY

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/A-PHY			
diagram				
type	A-PHY-InterfaceFunctionType, A-PHY-StandardTerminalNameAssignmentType, A-PHY-StandardTerminalMappingType, A-PHY-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. DP	2. DN	3. GND	

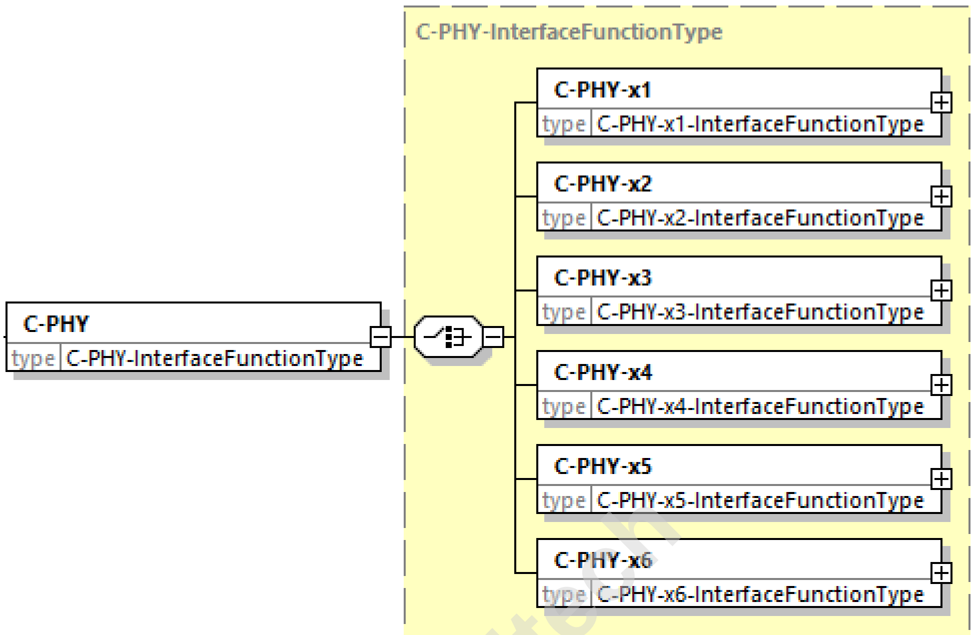
For more information about the A-PHY Interface, refer to the IEEE standard IEEE 2977-2021.

4.7.3.10.32. BoW-PHY

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/BoW-PHY			
diagram				
type	BoW-PHY–InterfaceFunctionType, BoW-PHY-StandardTerminalNameAssignmentType, BoW-PHY-MandatoryStandardTerminalMappingType, BoW-PHY-MandatoryStandardTerminalNameType, BoW-PHY-OptionalStandardTerminalMappingType, BoW-PHY-OptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. CLK+	2. CLK-	3. D[0]	4. D[1]
	5. D[2]	6. D[3]	7. D[4]	8. D[5]
	9. D[6]	10. D[7]	11. D[8]	12. D[9]
	13. D[10]	14. D[11]	15. D[12]	16. D[13]
	17. D[14]	18. D[15]		
	OptionalMapping/StandardTerminalName			
	1. FEC	2. AUX		

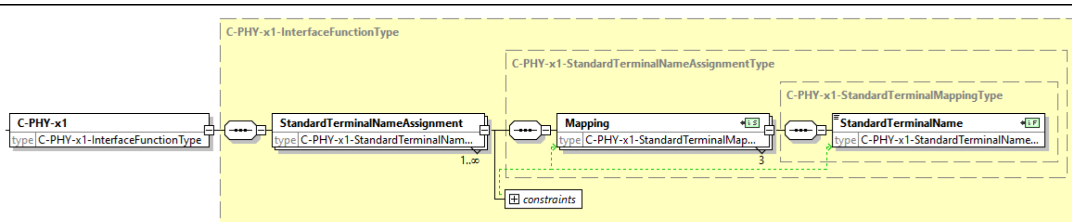
For more information about the BoW-PHY Interface, refer to the OPEN Compute Project standard Bunch of Wires (BoW) PHY Specification.

4.7.3.10.33. C-PHY Interface Function

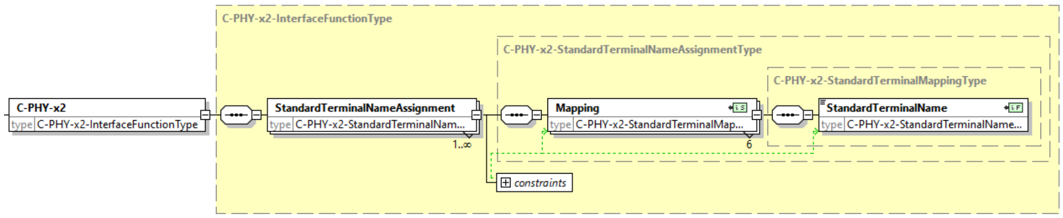
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/C-PHY
diagram	
type	C-PHY-InterfaceFunctionType, C-PHY-x1-InterfaceFunctionType, C-PHY-x2-InterfaceFunctionType, C-PHY-x3-InterfaceFunctionType, C-PHY-x4-InterfaceFunctionType, C-PHY-x5-InterfaceFunctionType, C-PHY-x6-InterfaceFunctionType

For more information about the C-PHY Interfaces, refer to the MIPI Alliance standard Specification for C-PHY.

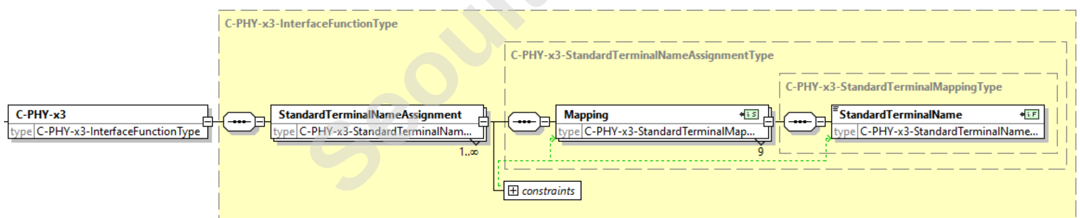
4.7.3.10.33.1. C-PHY-x1

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/C-PHY/C-PHY-x1			
diagram				
type	C-PHY-x1-InterfaceFunctionType, C-PHY-x1-StandardTerminalNameAssignmentType, C-PHY-x1-StandardTerminalMappingType, C-PHY-x1-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. A	2. B	3. C	

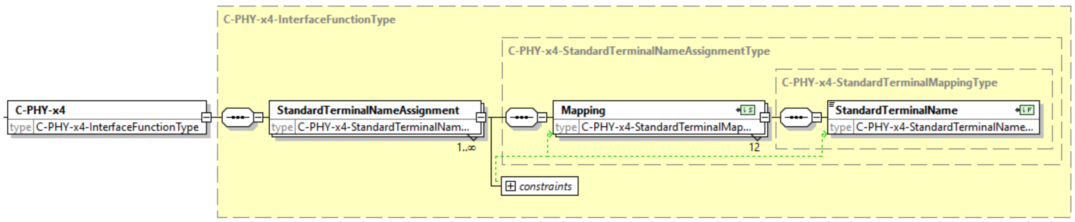
4.7.3.10.33.2. C-PHY-x2

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/C-PHY/C-PHY-x2</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">C-PHY-x2-InterfaceFunctionType, C-PHY-x2-StandardTerminalNameAssignmentType, C-PHY-x2-StandardTerminalMappingType, C-PHY-x2-StandardTerminalNameType</td></tr>
<tr><td rowspan="3">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. A1</td><td>2. B1</td><td>3. C1</td><td>4. A2</td></tr>
<tr><td>5. B2</td><td>6. C2</td><td></td><td></td></tr>
</table>

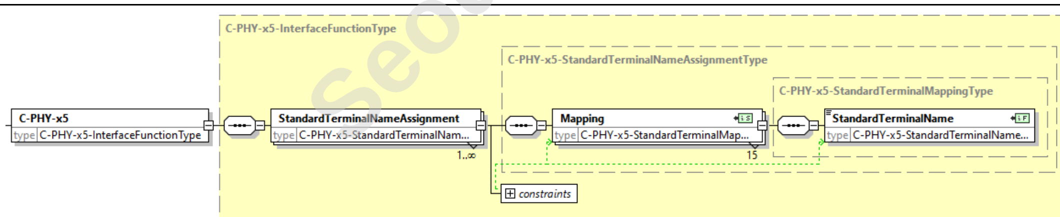
4.7.3.10.33.3. C-PHY-x3

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/C-PHY/C-PHY-x3</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">C-PHY-x3-InterfaceFunctionType, C-PHY-x3-StandardTerminalNameAssignmentType, C-PHY-x3-StandardTerminalMappingType, C-PHY-x3-StandardTerminalNameType</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. A1</td><td>2. B1</td><td>3. C1</td><td>4. A2</td></tr>
<tr><td>5. B2</td><td>6. C2</td><td>7. A3</td><td>8. B3</td></tr>
<tr><td>9. C3</td><td></td><td></td><td></td></tr>
</table>

4.7.3.10.33.4. C-PHY-x4

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/C-PHY/C-PHY-x4**			
diagram				
type	**C-PHY-x4-InterfaceFunctionType, C-PHY-x4-StandardTerminalNameAssignmentType, C-PHY-x4-StandardTerminalMappingType, C-PHY-x4-StandardTerminalNameType**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. A1	**2. B1**	**3. C1**	**4. A2**
	5. B2	**6. C2**	**7. A3**	**8. B3**
	9. C3	**10. A4**	**11. B4**	**12. C4**

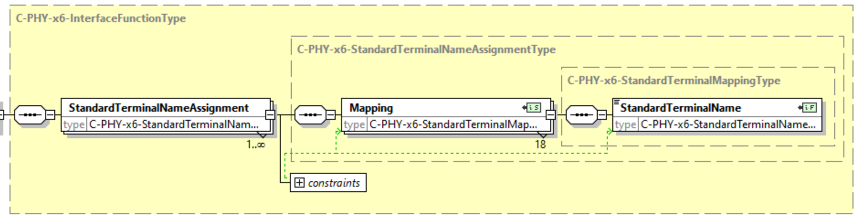
4.7.3.10.33.5. C-PHY-x5

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/C-PHY/C-PHY-x5**			
diagram				
type	**C-PHY-x5-InterfaceFunctionType, C-PHY-x5-StandardTerminalNameAssignmentType, C-PHY-x5-StandardTerminalMappingType, C-PHY-x5-StandardTerminalNameType**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. A1	**2. B1**	**3. C1**	**4. A2**
	5. B2	**6. C2**	**7. A3**	**8. B3**
	9. C3	**10. A4**	**11. B4**	**12. C4**
	13. A5	**14. B5**	**15. C5**	

4.7.3.10.33.6. C-PHY-x6

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/C-PHY/C-PHY-x6

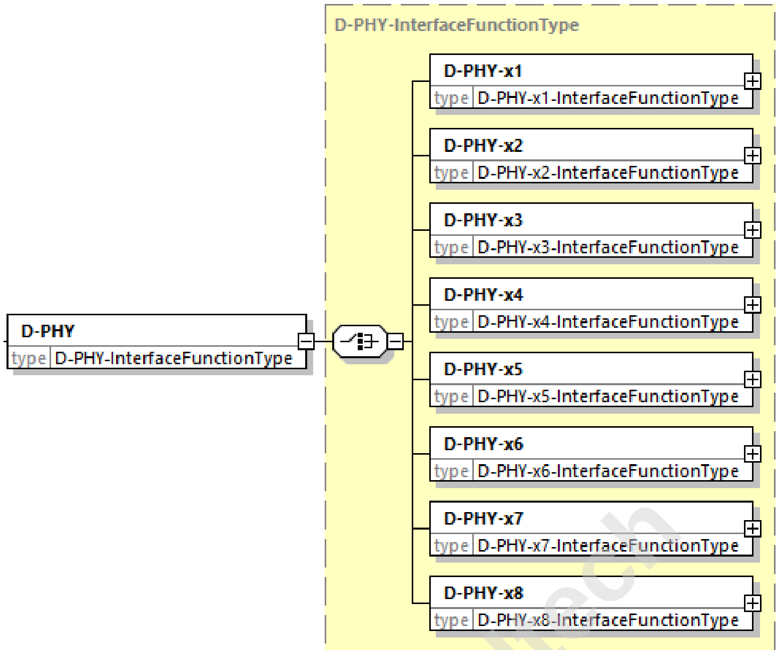
diagram



type	C-PHY-x6-InterfaceFunctionType, C-PHY-x6-StandardTerminalNameAssignmentType, C-PHY-x6-StandardTerminalMappingType, C-PHY-x6-StandardTerminalNameType
list of enumerate values	Mapping/StandardTerminalName

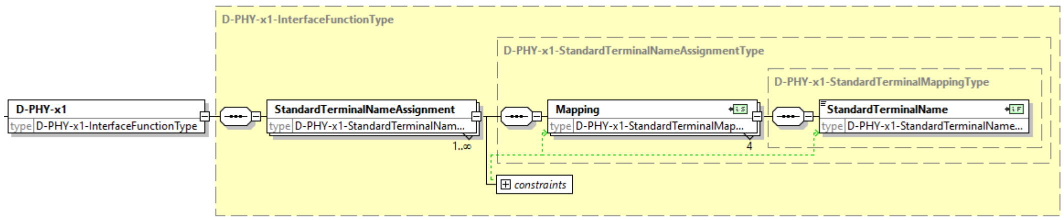
1. A1	2. B1	3. C1	4. A2
5. B2	6. C2	7. A3	8. B3
9. C3	10. A4	11. B4	12. C4
13. A5	14. B5	15. C5	16. A6
17. B6	18. C6		

4.7.3.10.34. D-PHY Interface Function

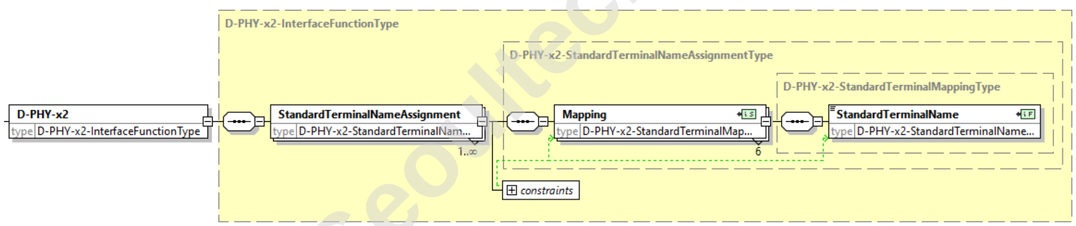
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/D-PHY
diagram	
type	D-PHY-InterfaceFunctionType, D-PHY-x1-InterfaceFunctionType, D-PHY-x2-InterfaceFunctionType, D-PHY-x3-InterfaceFunctionType, D-PHY-x4-InterfaceFunctionType, D-PHY-x5-InterfaceFunctionType, D-PHY-x6-InterfaceFunctionType, D-PHY-x7-InterfaceFunctionType, D-PHY-x8-InterfaceFunctionType

For more information about the D-PHY Interfaces, refer to the MIPI Alliance standard Specification for D-PHY Version 1.00.00.

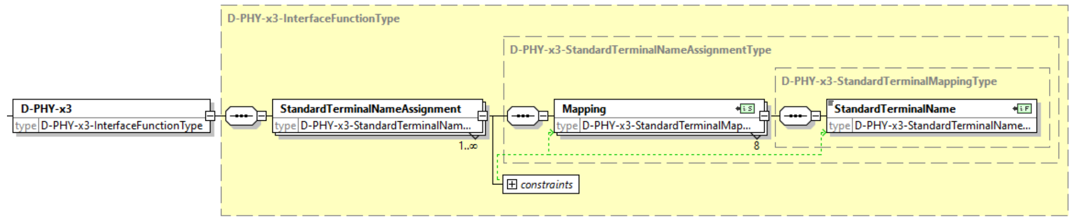
4.7.3.10.34.1. D-PHY-x1

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/D-PHY/D-PHY-x1			
diagram				
type	D-PHY-x1-InterfaceFunctionType, D-PHY-x1-StandardTerminalNameAssignmentType, D-PHY-x1-StandardTerminalMappingType, D-PHY-x1-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. CLOCK+	2. CLOCK-	3. DATA0+	4. DATA0-

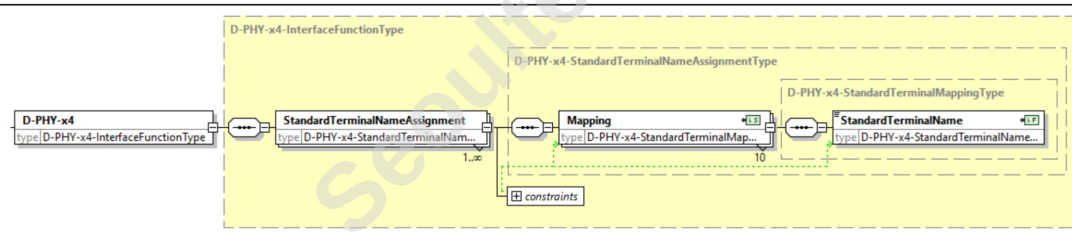
4.7.3.10.34.2. D-PHY-x2

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/D-PHY/D-PHY-x2			
diagram				
type	D-PHY-x2-InterfaceFunctionType, D-PHY-x2-StandardTerminalNameAssignmentType, D-PHY-x2-StandardTerminalMappingType, D-PHY-x2-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. CLOCK+	2. CLOCK-	3. DATA0+	4. DATA0-
	5. DATA1+	6. DATA1-		

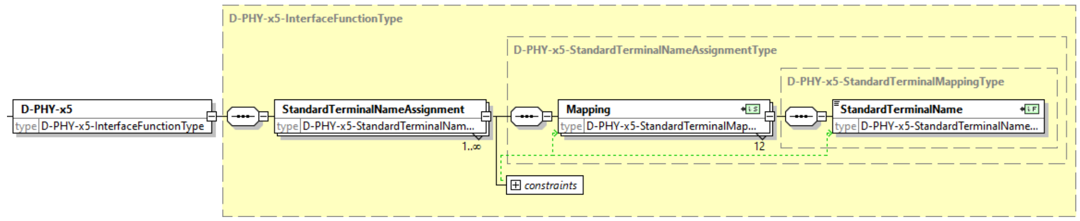
4.7.3.10.34.3. D-PHY-x3

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/D-PHY/D-PHY-x3			
diagram				
type	D-PHY-x3-InterfaceFunctionType, D-PHY-x3-StandardTerminalNameAssignmentType, D-PHY-x3-StandardTerminalMappingType, D-PHY-x3-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. CLOCK+	2. CLOCK-	3. DATA0+	4. DATA0-
	5. DATA1+	6. DATA1-	7. DATA2+	8. DATA2-

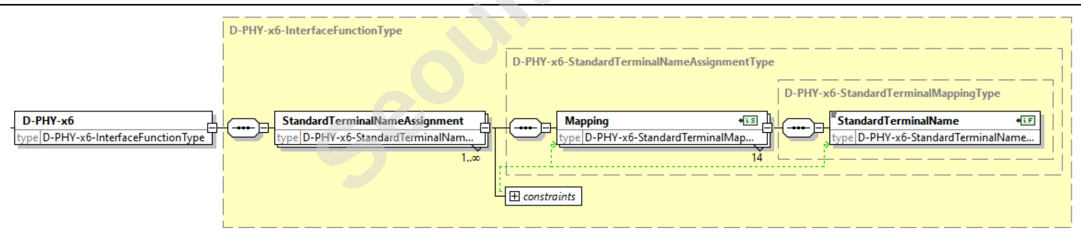
4.7.3.10.34.4. D-PHY-x4

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/D-PHY/D-PHY-x4			
diagram				
type	D-PHY-x4-InterfaceFunctionType, D-PHY-x4-StandardTerminalNameAssignmentType, D-PHY-x4-StandardTerminalMappingType, D-PHY-x4-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. CLOCK+	2. CLOCK-	3. DATA0+	4. DATA0-
	5. DATA1+	6. DATA1-	7. DATA2+	8. DATA2-
	9. DATA3+	10. DATA3-		

4.7.3.10.34.5. D-PHY-x5

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/D-PHY/D-PHY-x5			
diagram				
type	D-PHY-x5-InterfaceFunctionType, D-PHY-x5-StandardTerminalNameAssignmentType, D-PHY-x5-StandardTerminalMappingType, D-PHY-x5-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. CLOCK+	2. CLOCK-	3. DATA0+	4. DATA0-
	5. DATA1+	6. DATA1-	7. DATA2+	8. DATA2-
	9. DATA3+	10. DATA3-	11. DATA4+	12. DATA4-

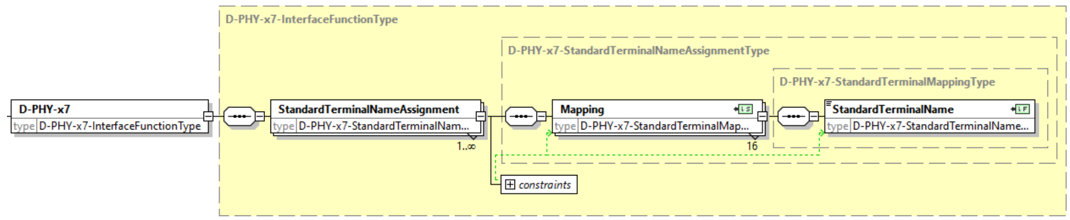
4.7.3.10.34.6. D-PHY-x6

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/D-PHY/D-PHY-x6			
diagram				
type	D-PHY-x6-InterfaceFunctionType, D-PHY-x6-StandardTerminalNameAssignmentType, D-PHY-x6-StandardTerminalMappingType, D-PHY-x6-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. CLOCK+	2. CLOCK-	3. DATA0+	4. DATA0-
	5. DATA1+	6. DATA1-	7. DATA2+	8. DATA2-
	9. DATA3+	10. DATA3-	11. DATA4+	12. DATA4-
	13. DATA5+	14. DATA5-		

4.7.3.10.34.7. D-PHY-x7

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/D-PHY/D-PHY-x7

diagram

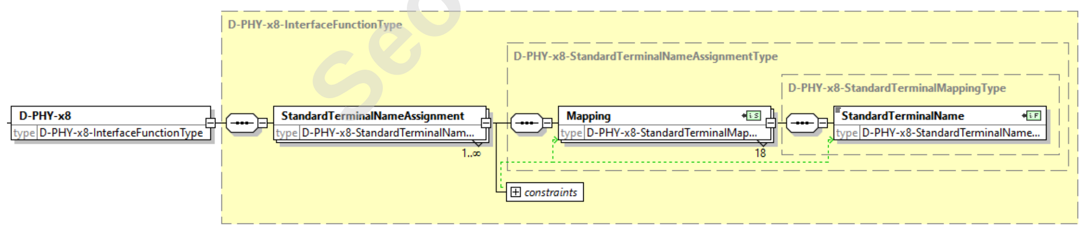


type	D-PHY-x7-InterfaceFunctionType, D-PHY-x7-StandardTerminalNameAssignmentType, D-PHY-x7-StandardTerminalMappingType, D-PHY-x7-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. CLOCK+	2. CLOCK-	3. DATA0+	4. DATA0-
	5. DATA1+	6. DATA1-	7. DATA2+	8. DATA2-
	9. DATA3+	10. DATA3-	11. DATA4+	12. DATA4-
	13. DATA5+	14. DATA5-	15. DATA6+	16. DATA6-

4.7.3.10.34.8. D-PHY-x8

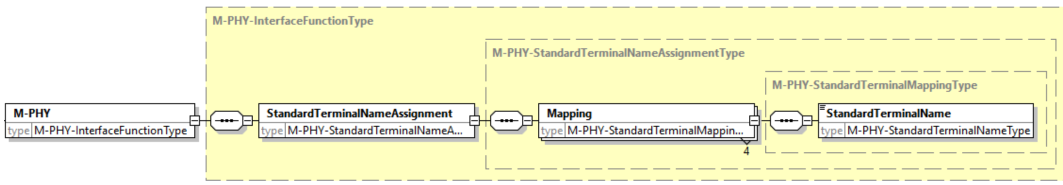
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/D-PHY/D-PHY-x8

diagram



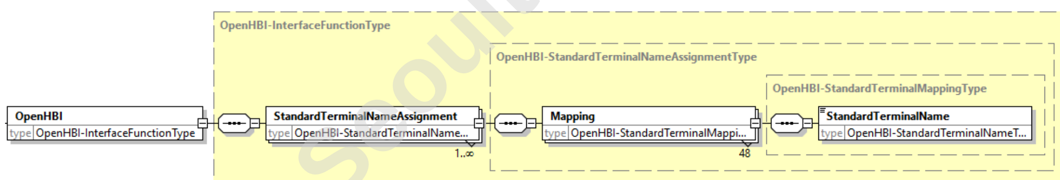
type	D-PHY-x8-InterfaceFunctionType, D-PHY-x8-StandardTerminalNameAssignmentType, D-PHY-x8-StandardTerminalMappingType, D-PHY-x8-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. CLOCK+	2. CLOCK-	3. DATA0+	4. DATA0-
	5. DATA1+	6. DATA1-	7. DATA2+	8. DATA2-
	9. DATA3+	10. DATA3-	11. DATA4+	12. DATA4-
	13. DATA5+	14. DATA5-	15. DATA6+	16. DATA6-
	17. DATA7+	18. DATA7-		

4.7.3.10.35. M-PHY

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/M-PHY			
diagram				
type	M-PHY-InterfaceFunctionType, M-PHY-StandardTerminalNameAssignmentType, M-PHY-StandardTerminalMappingType, M-PHY-StandardTerminalNameType			
list of enumerate values	Mapping/StandardTerminalName			
	1. TXDP	2. TXDN	3. RXDP	4. RXDN

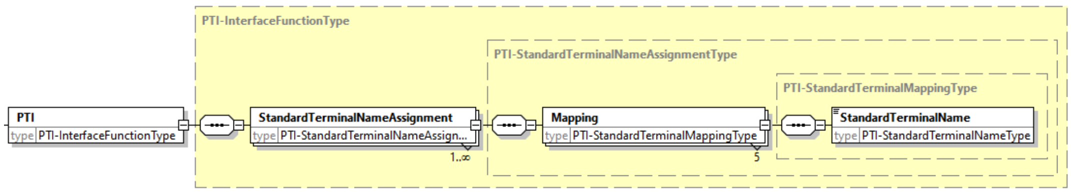
For more information about the M-PHY Interfaces, refer to the MIPI Alliance standard Specification for M-PHY Version 4.1.

4.7.3.10.36. OpenHBI

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/OpenHBI			
diagram				
type	OpenHBI-InterfaceFunctionType, OpenHBI -StandardTerminalNameAssignmentType, OpenHBI -StandardTerminalMappingType, OpenHBI -StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. D[0]	2. D[1]	3. D[2]	4. D[3]
	5. D[4]	6. D[5]	7. D[6]	8. D[7]
	9. D[8]	10. D[9]	11. D[10]	12. D[11]
	13. D[12]	14. D[13]	15. D[14]	16. D[15]
	17. D[16]	18. D[17]	19. D[18]	20. D[19]
	21. D[20]	22. D[21]	23. D[22]	24. D[23]
	25. D[24]	26. D[25]	27. D[26]	28. D[27]
	29. D[28]	30. D[29]	31. D[30]	32. D[31]
	33. D[32]	34. D[33]	35. D[34]	36. D[35]
	37. D[36]	38. D[37]	39. D[38]	40. D[39]
	41. D[40]	42. D[41]	43. WDQS_t	44. WDQS_c
	45. RDQS_t	46. WDQS_c	47. RD0	48. RD1

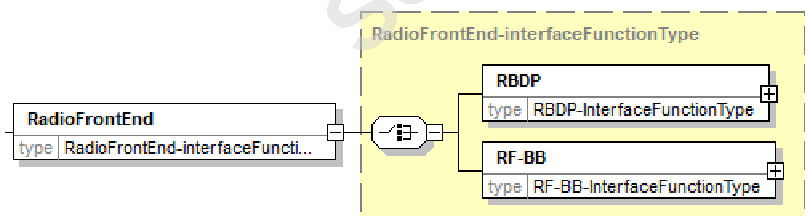
For more information about the OpenHBI Interface, refer to the OPEN Compute Project standard OpenHBI Specification Version 1.0

4.7.3.10.37. PTI Interface Function

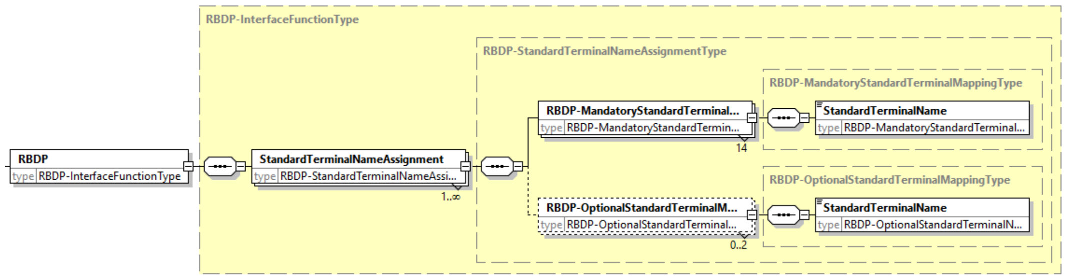
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/PTI			
diagram				
type	PTI-InterfaceFunctionType, PTI -StandardTerminalNameAssignmentType, PTI-StandardTerminalMappingType, PTI-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. TRC_CLK	2. DATA[0]	3. DATA[1]	4. DATA[2]
	5. DATA[3]			

For more information about the PTI Interface, refer to the MIPI Alliance standard Specification for Parallel Trace Interface (PTI) Version 2.0.1.

4.7.3.10.38. Radio Front End Interface Function

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/RadioFrontEnd
diagram	
type	RadioFrontEnd-interfaceFunctionType, RBDP-InterfaceFunctionType, RF-BB-InterfaceFunctionType.

4.7.3.10.38.1. RBDP

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/RadioFrontEnd/RBDP
diagram	
type	RBDP-InterfaceFunctionType, RBDP-StandardTerminalNameAssignmentType, RBDP-MandatoryStandardTerminalMappingType, RBDP-MandatoryStandardTerminalNameType, RBDP-OptionalStandardTerminalMappingType, RBDP-OptionalStandardTerminalNameType.

list of enumerate values

MandatoryMapping/StandardTerminalName

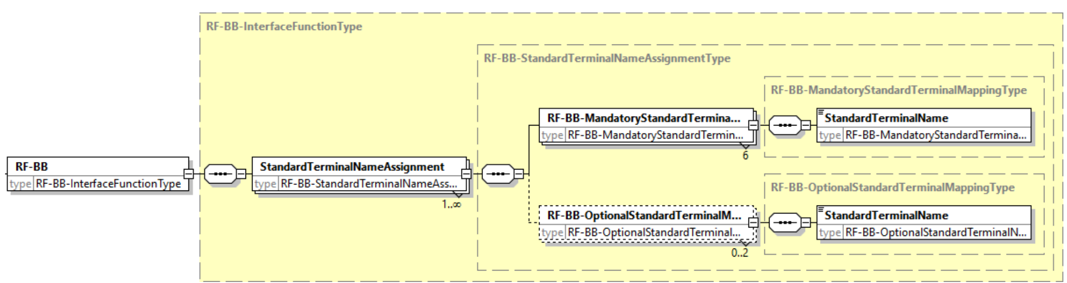
1. MCLK	2. FCLK	3. TXNRX	4. ENABLE
5. DIQ[0]	6. DIQ[1]	7. DIQ[2]	8. DIQ[3]
9. DIQ[4]	10. DIQ[5]	11. DIQ[6]	12. DIQ[7]
13. D1Q[8]	14. D1Q[9]		

OptionalMapping/StandardTerminalName

1. D1Q[10]	2. D1Q[11]		

For more information about the RBDP Interface, refer to JEDEC Standard JESD207.

4.7.3.10.38.2. RF-BB

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/RadioFrontEnd/RF-BB
diagram	
type	RB-BB-InterfaceFunctionType, RF-BB-StandardTerminalNameAssignmentType, RF-BB-MandatoryStandardTerminalMappingType, RF-BB-MandatoryStandardTerminalNameType, RF-BB-OptionalStandardTerminalMappingType, RF-BB-OptionalStandardTerminalNameType.

list of enumerate values

MandatoryMapping/StandardTerminalName

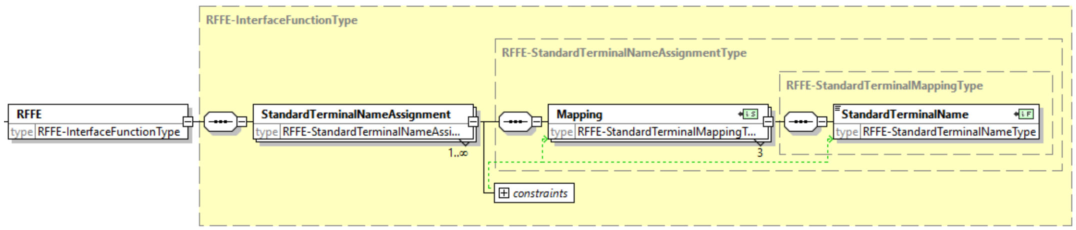
1. CLK	2. CLKN	3. TX	4. TXN
5. RX	6. RXN		

OptionalMapping/StandardTerminalName

1. Tx_Clock	2. Tx_ClockN		

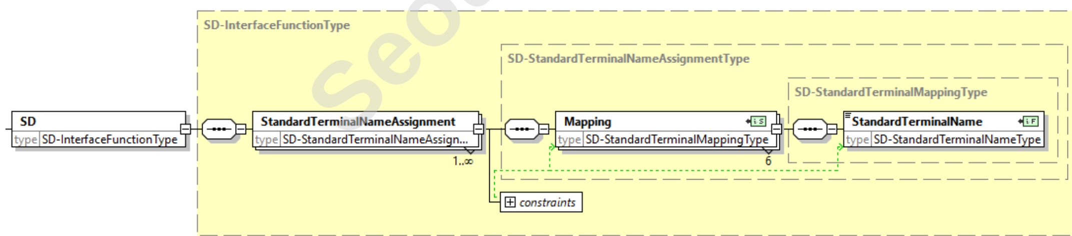
For more information about the RBDP Interface, refer to JEDEC Standard JESD96A.

4.7.3.10.39. RFFE

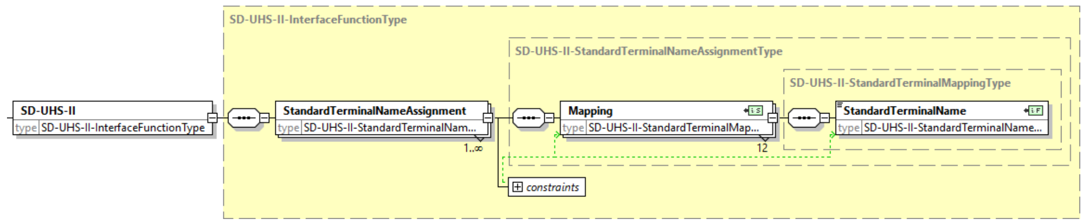
<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/RFFE</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">RFFE-InterfaceFunctionType, RFFE-StandardTerminalNameAssignmentType,
RFFE-StandardTerminalMappingType, RFFE-StandardTerminalNameType</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. SCLK</td><td>2. SDATA</td><td>3. VIO</td><td></td></tr>
</table>

For more information about the M-PHY Interfaces, refer to the MIPI Alliance standard Specification for RF Front-End Control Interface Version 1.10.

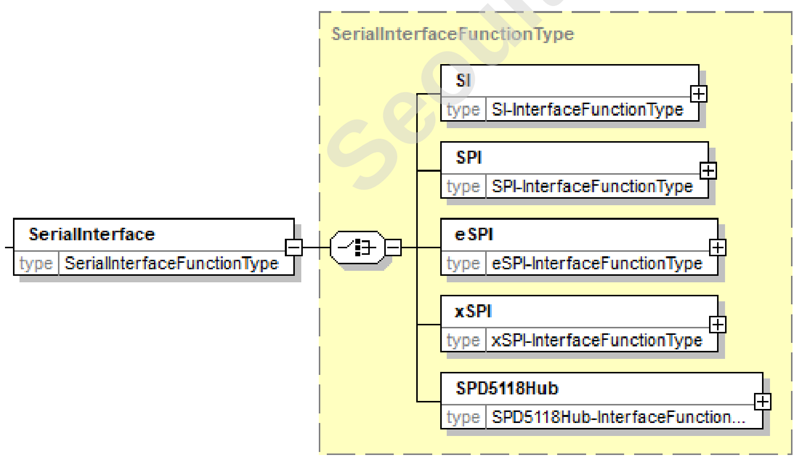
4.7.3.10.40. SD

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/SD</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">SD-InterfaceFunctionType, SD-StandardTerminalNameAssignmentType,
SD-StandardTerminalMappingType, SD-StandardTerminalNameType</td></tr>
<tr><td rowspan="3">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. CLK</td><td>2. DAT[0]</td><td>3. DAT[1]</td><td>4. DAT[2]</td></tr>
<tr><td>5. DAT[3]</td><td>6. CMD</td><td></td><td></td></tr>
</table>

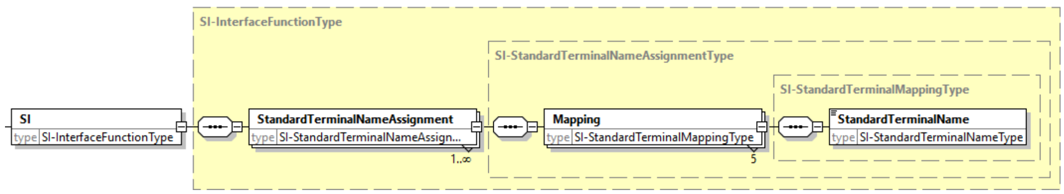
4.7.3.10.41. SD-UHS-II

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/SD-UHS-II</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">SD-UHS-II-InterfaceFunctionType, SD-UHS-II-StandardTerminalNameAssignmentType,
SD-UHS-II-StandardTerminalMappingType, SD-UHS-II-StandardTerminalNameType</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. CLK</td><td>2. DAT[0]</td><td>3. DAT[1]</td><td>4. DAT[2]</td></tr>
<tr><td>5. DAT[3]</td><td>6. CMD</td><td>7. RCLK+</td><td>8. RCLK-</td></tr>
<tr><td>9. D0+</td><td>10. D0-</td><td>11. D1+</td><td>12. D1-</td></tr>
</table>

4.7.3.10.42. Serial Interface Function

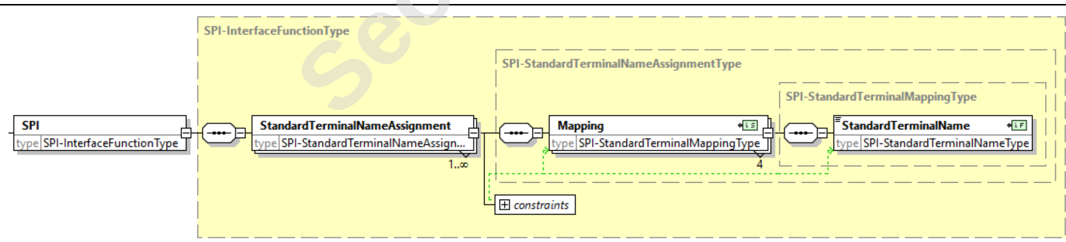
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/SerialInterface</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>SerialInterfaceFunctionType, SI-InterfaceFunctionType, SPI-InterfaceFunctionType, eSPI-InterfaceFunctionType, xSPI-InterfaceFunctionType, SPD5118Hub-InterfaceFunctionType.</td></tr>
</table>

4.7.3.10.42.1. SI

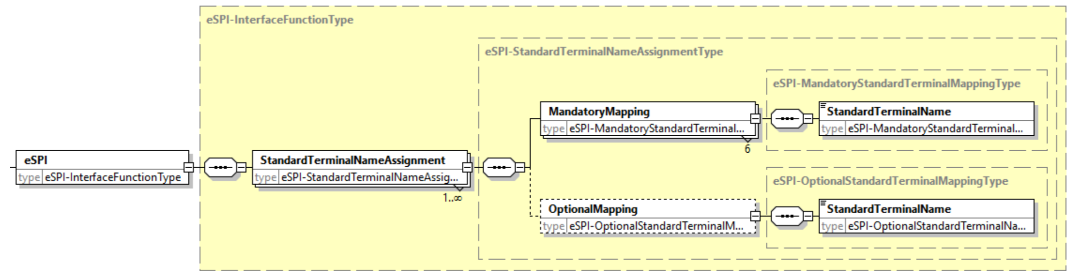
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/SerialInterface/SI**			
diagram				
type	**SI-InterfaceFunctionType, SI-StandardTerminalNameAssignmentType, SI-StandardTerminalMappingType, SI-StandardTerminalNameType.**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. TX	**2. RX**	**3. SYSREF**	**4. Device Clock**
	5. SYNC~			

For more information about the RBDP Interface, refer to JEDEC Standard JESD204C.1.

4.7.3.10.42.2. SPI

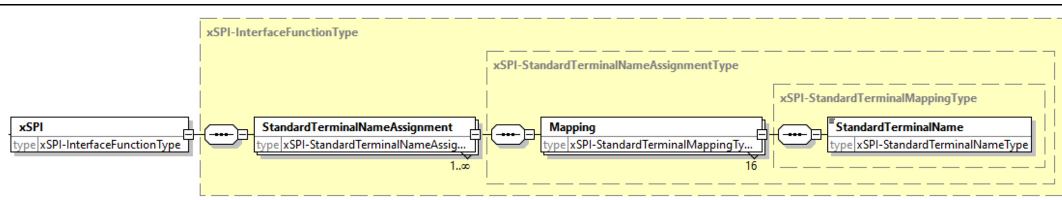
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/SerialInterface/SPI**			
diagram				
type	**SPI-InterfaceFunctionType, SPI-StandardTerminalNameAssignmentType, SPI-StandardTerminalMappingType, SPI-StandardTerminalNameType.**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. SCK	**2. MOSI**	**3. MISO**	**4. ~SS**

4.7.3.10.42.3. eSPI

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/SerialInterface/eSPI			
diagram				
type	eSPI-InterfaceFunctionType, eSPI-StandardTerminalNameAssignmentType, eSPI-MandatoryStandardTerminalMappingType, eSPI-MandatoryStandardTerminalNameType, eSPI-OptionalStandardTerminalMappingType, eSPI-OptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. eSPI Reset#	2. Chip Select#	3. Serial Clock	4. Alert#
	5. I/O[0]			
	OptionalMapping/StandardTerminalName			
	1. I/O[1]	2. I/O[2]	3. I/O[3]	

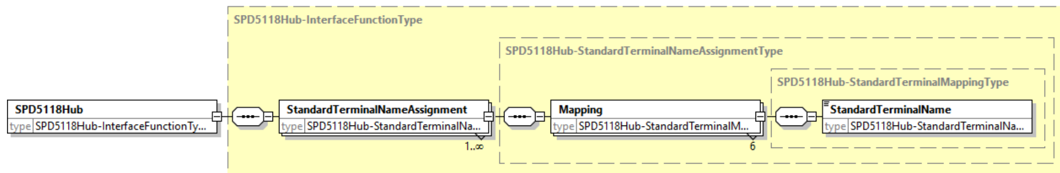
For more information about the eSPI Interface, refer to INTEL Specification 327432-004 Enhanced Serial Peripheral Interface (eSPI) Revision 1.0.

4.7.3.10.42.4. xSPI

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/SerialInterface/xSPI			
diagram				
type	xSPI-InterfaceFunctionType, xSPI-StandardTerminalNameAssignmentType, xSPI-StandardTerminalMappingType, xSPI-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. CS0#	2. CS1#	3. CK	4. IO[0]
	5. IO[1]	6. IO[2]	7. IO[3]	8. IO[4]
	9. IO[5]	10. IO[6]	11. IO[7]	12. DS
	13. VDD	14. VDDQ	15. VSS	16. VSSQ

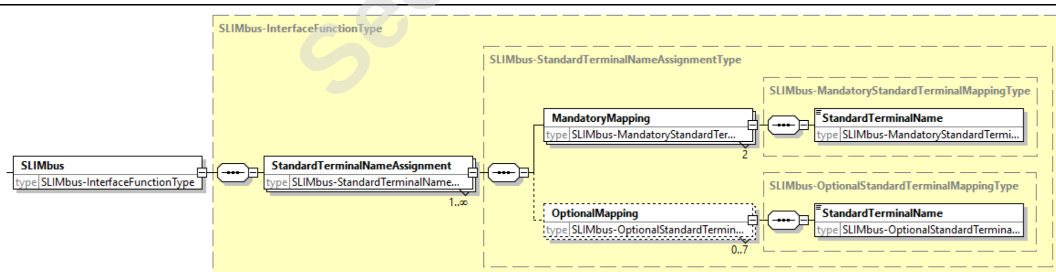
For more information about the RBDP Interface, refer to JEDEC Standard JESD251C.

4.7.3.10.42.5. SPD5118 Hub

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/SerialInterface/SPD5118Hub			
diagram				
type	SPD5118Hub-InterfaceFunctionType, SPD5118Hub-StandardTerminalNameAssignmentType, SPD5118Hub-StandardTerminalMappingType, SPD5118Hub-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. 1.8VVDDSPD	2. VDDIO	3. HSCL	4. HSDA
	5. LSCL	6. LSDA		

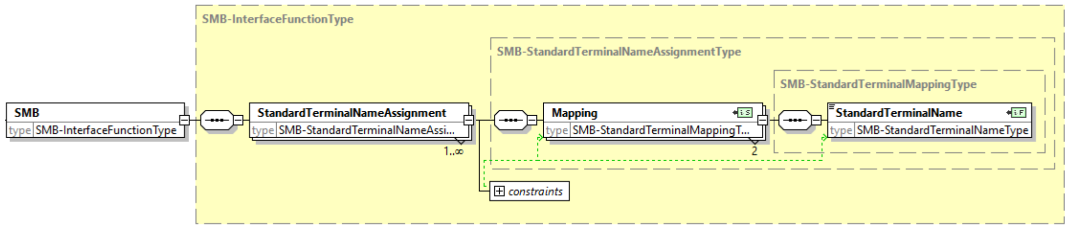
For more information about the RBDP Interface, refer to JEDEC Standard JESD300-5B.

4.7.3.10.43. SLIMbus

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/SLIMbus			
diagram				
type	SLIMbus-InterfaceFunctionType, SLIMbus-StandardTerminalNameAssignmentType, SLIMbus-MandatoryStandardTerminalMappingType, SLIMbus-MandatoryStandardTerminalNameType, SLIMbus-OptionalStandardTerminalMappingType, SLIMbus-OptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. CLK	2. DP0		
	OptionalMapping/StandardTerminalName			
	1. DP[1]	2. DP[2]	3. DP[3]	4. DP[4]
	5. DP[5]	6. DP[6]	7. DP[7]	

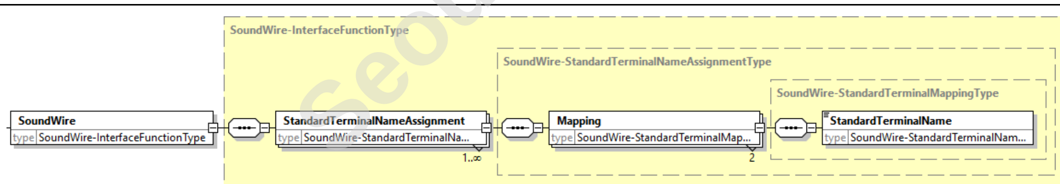
For more information about the SLIMbus Interface, refer to the MIPI Alliance standard Specification for Serial Low-Power Inter-Chip Media Bus (SLIMbus) Version 2.0.

4.7.3.10.44. SMB

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/SMB**
diagram	
type	**SMB-InterfaceFunctionType, SMB-StandardTerminalNameAssignmentType,** **SMB-StandardTerminalMappingType, SMB-StandardTerminalNameType.**
list of enumerate values	**Mapping/StandardTerminalName** **1. SMBCLK** **2. SMBDAT**

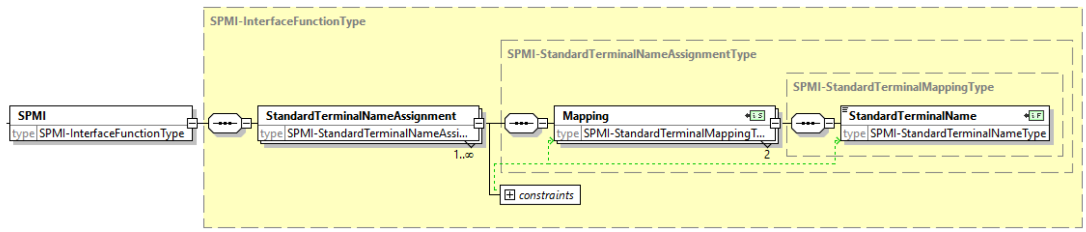
For more information about the SMB Interfaces, refer to the System Management Interface Forum SMI for System Management Bus (SMBus) Specification Version 3.0.

4.7.3.10.45. SoundWire Interface Function

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/SoundWire**
diagram	
type	**SoundWire-InterfaceFunctionType, SoundWire -StandardTerminalNameAssignmentType, SoundWire -StandardTerminalMappingType, SoundWire -StandardTerminalNameType.**
list of enumerate values	**Mapping/StandardTerminalName** **1. Clock** **2. Data**

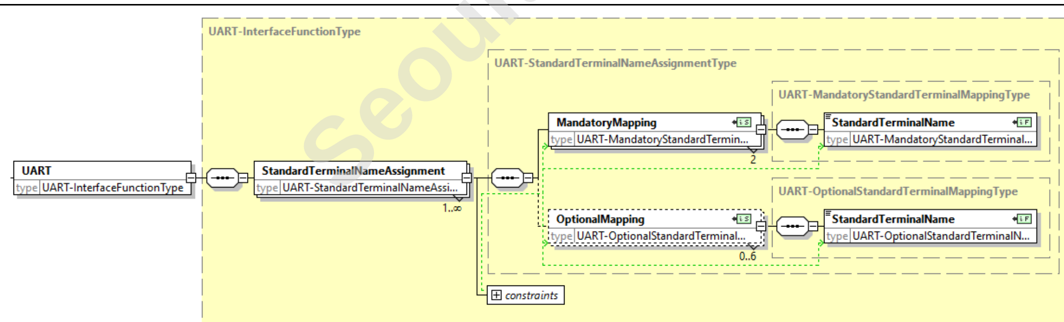
For more information about the SoundWire Interface, refer to the MIPI Alliance standard Specification for SoundWire Version 1.1.

4.7.3.10.46. SPMI

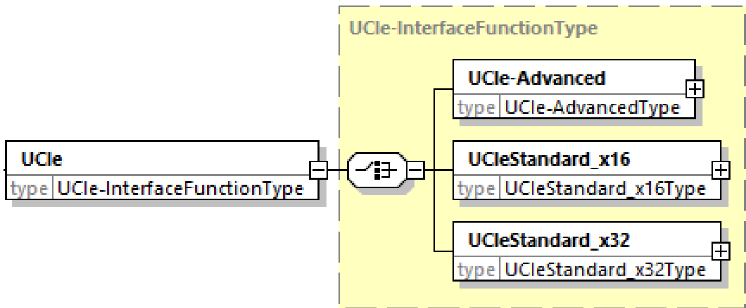
<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/SPMI</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">SPMI-InterfaceFunctionType, SPMI-StandardTerminalNameAssignmentType,
SPMI-StandardTerminalMappingType, SPMI-StandardTerminalNameType</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. SCLK</td><td>2. SDATA</td><td></td><td></td></tr>
</table>

For more information about the SPMI Interfaces, refer to the MIPI Alliance standard System Power Management Interface V2.0.

4.7.3.10.47. UART

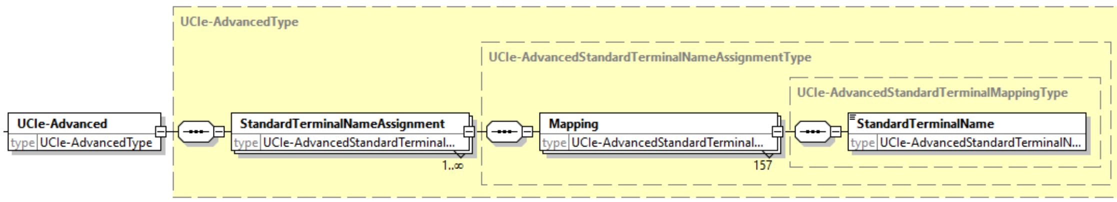
<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/UART</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">UART-InterfaceFunctionType, UART-StandardTerminalNameAssignmentType, UART-MandatoryStandardTerminalMappingType, UART-MandatoryStandardTerminalNameType, UART-OptionalStandardTerminalMappingType, UART-OptionalStandardTerminalNameType</td></tr>
<tr><td rowspan="5">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. RX</td><td>2. TX</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. CTS</td><td>2. RTS</td><td>3. DSR</td><td>4. RI</td></tr>
<tr><td>5. DCD</td><td>6. DTR</td><td></td><td></td></tr>
</table>

4.7.3.10.48. UCIe

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/UCIe-InterfaceFunction</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>UCIe-InterfaceFunctionType, UCIe-AdvancedType, UCIeStandard_x16Type, UCIeStandard_x32Type.</td></tr>
</table>

For more information about the UCIe Interfaces, refer to the UCIe Specification Universal Chiplet Interconnect Express (UCIe) Specification Revision 1.0

4.7.3.10.48.1. UCIe - Advanced

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/UCIe-InterfaceFunction/UCIe-Advanced
diagram	
type	UCIe-AdvancedType, UCIe-AdvancedStandardTerminalNameAssignmentType, UCIe-AdvancedStandardTerminalMappingType, UCIe-AdvancedStandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName

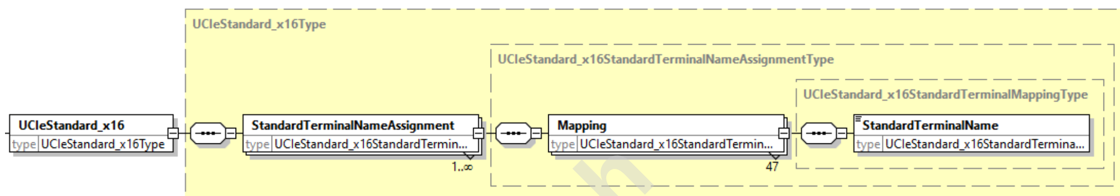
Mapping/StandardTerminalName

1. TXDATA[0]	2. TXDATA[1]	3. TXDATA[2]	4. TXDATA[3]
5. TXDATA[4]	6. TXDATA[5]	7. TXDATA[6]	8. TXDATA[7]
9. TXDATA[8]	10. TXDATA[9]	11. TXDATA[10]	12. TXDATA[11]
13. TXDATA[12]	14. TXDATA[13]	15. TXDATA[14]	16. TXDATA[15]
17. TXDATA[16]	18. TXDATA[17]	19. TXDATA[18]	20. TXDATA[19]
21. TXDATA[20]	22. TXDATA[21]	23. TXDATA[22]	24. TXDATA[23]
25. TXDATA[24]	26. TXDATA[25]	27. TXDATA[26]	28. TXDATA[27]
29. TXDATA[28]	30. TXDATA[29]	31. TXDATA[30]	32. TXDATA[31]
33. TXDATA[32]	34. TXDATA[33]	35. TXDATA[34]	36. TXDATA[35]
37. TXDATA[36]	38. TXDATA[37]	39. TXDATA[38]	40. TXDATA[39]
41. TXDATA[40]	42. TXDATA[41]	43. TXDATA[42]	44. TXDATA[43]
45. TXDATA[44]	46. TXDATA[45]	47. TXDATA[46]	48. TXDATA[47]
49. TXDATA[48]	50. TXDATA[49]	51. TXDATA[50]	52. TXDATA[51]
53. TXDATA[52]	54. TXDATA[53]	55. TXDATA[54]	56. TXDATA[55]
57. TXDATA[56]	58. TXDATA[57]	59. TXDATA[58]	60. TXDATA[59]
61. TXDATA[60]	62. TXDATA[61]	63. TXDATA[62]	64. TXDATA[63]
65. TXVLD	66. TXTRK	67. TXCKP	68. TXCKN
69. TXCKRD	70. TXRD0	71. TXRD1	72. TXRD2
73. RXRD3	74. RXDATA[0]	75. RXDATA[1]	76. RXDATA[2]
77. RXDATA[3]	78. RXDATA[4]	79. RXDATA[5]	80. RXDATA[6]
81. RXDATA[7]	82. RXDATA[8]	83. RXDATA[9]	84. RXDATA[10]
85. RXDATA[11]	86. RXDATA[12]	87. RXDATA[13]	88. RXDATA[14]
89. RXDATA[15]	90. RXDATA[16]	91. RXDATA[17]	92. RXDATA[18]
93. RXDATA[19]	94. RXDATA[20]	95. RXDATA[21]	96. RXDATA[22]
97. RXDATA[23]	98. RXDATA[24]	99. RXDATA[25]	100. RXDATA[26]
101. RXDATA[27]	102. RXDATA[28]	103. RXDATA[29]	104. RXDATA[30]
105. RXDATA[31]	106. RXDATA[32]	107. RXDATA[33]	108. RXDATA[34]
109. RXDATA[35]	110. RXDATA[36]	111. RXDATA[37]	112. RXDATA[38]
113. RXDATA[39]	114. RXDATA[40]	115. RXDATA[41]	116. RXDATA[42]
117. RXDATA[43]	118. RXDATA[44]	119. RXDATA[45]	120. RXDATA[46]
121. RXDATA[47]	122. RXDATA[48]	123. RXDATA[49]	124. RXDATA[50]
125. RXDATA[51]	126. RXDATA[52]	127. RXDATA[53]	128. RXDATA[54]
129. RXDATA[55]	130. RXDATA[56]	131. RXDATA[57]	132. RXDATA[58]
133. RXDATA[59]	134. RXDATA[60]	135. RXDATA[61]	136. RXDATA[62]
137. RXDATA[63]	138. RXVLD	139. RXTRK	140. RXCKP

4.7.3.10.48.1 UCIe - Advanced (cont'd)

list of enumerate values (cont.)	141. RXCKN	142. RXRD0	143. RXRD1	144. RXRD2
	145. RXRD3	146. RXCKRD	147. TXDATASB	148. RXDATASB
	149. TXCKSB	150. RXCKSB	151. TXDATASBRD	152. RXDATASBRD
	153. TXCKSBRD	154. RXCKSBRD	155. VSS	156. VCCIO
	157. VCCAON			

4.7.3.10.48.2. UCIeStandard_x16

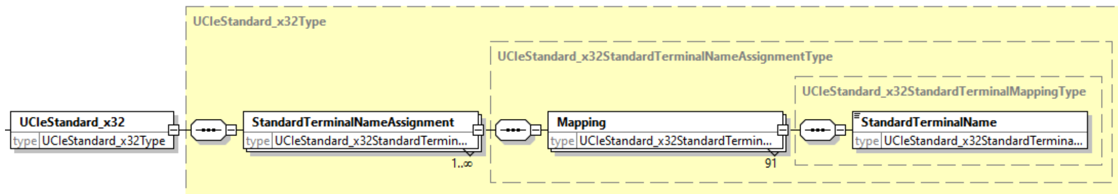
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/UCIe-InterfaceFunction/UCIeStandard_x16
diagram	
type	UCIeStandard_x16Type, UCIeStandard_x16StandardTerminalNameAssignmentType, UCIeStandard_x16StandardTerminalMappingType, UCIeStandard_x16StandardTerminalNameType.

list of enumerate values	Mapping/StandardTerminalName			
	1. TXDATA[0]	2. TXDATA[1]	3. TXDATA[2]	4. TXDATA[3]
	5. TXDATA[4]	6. TXDATA[5]	7. TXDATA[6]	8. TXDATA[7]
	9. TXDATA[8]	10. TXDATA[9]	11. TXDATA[10]	12. TXDATA[11]
	13. TXDATA[12]	14. TXDATA[13]	15. TXDATA[14]	16. TXDATA[15]
	17. TXVLD	18. TXTRK	19. TXCP	20. TXCKN
	21. RXDATA[0]	22. RXDATA[1]	23. RXDATA[2]	24. RXDATA[3]
	25. RXDATA[4]	26. RXDATA[5]	27. RXDATA[6]	28. RXDATA[7]
	29. RXDATA[8]	30. RXDATA[9]	31. RXDATA[10]	32. RXDATA[11]
	33. RXDATA[12]	34. RXDATA[13]	35. RXDATA[14]	36. RXDATA[15]
	37. RXVLD	38. RXTRK	39. RXCKP	40. RXCKN
	41. TXDATASB	42. RXDATASB	43. TXCKSB	44. RXCKSB
	45. VSS	46. VCCIO	47. VCCAON	

4.7.3.10.48.3. UCIeStandard_x32

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/UCIe-InterfaceFunction/ UCIeStandard_x32

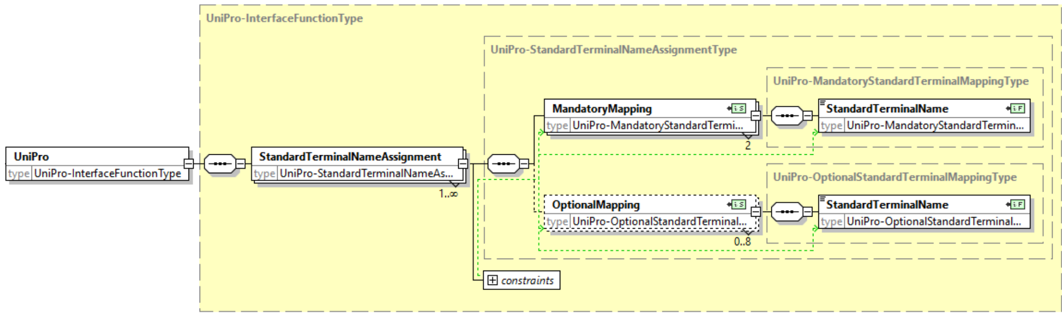
diagram



type	UCIeStandard_x32Type, UCIeStandard_x32StandardTerminalNameAssignmentType, UCIeStandard_x32StandardTerminalMappingType, UCIeStandard_x32StandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName

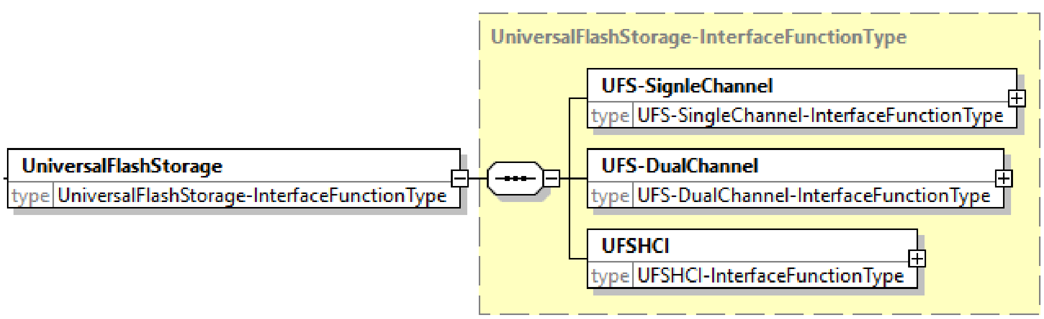
1. M1RXCKN	2. M1RXCKP	3. M1RXCKSB	4. M1RXDATA[0]
5. M1RXDATA[1]	6. M1RXDATA[2]	7. M1RXDATA[3]	8. M1RXDATA[4]
9. M1RXDATA[5]	10. M1RXDATA[6]	11. M1RXDATA[7]	12. M1RXDATA[8]
13. M1RXDATA[9]	14. M1RXDATA[10]	15. M1RXDATA[11]	16. M1RXDATA[12]
17. M1RXDATA[13]	18. M1RXDATA[14]	19. M1RXDATA[15]	20. M1RXDATASB
21. M1RXTRK	22. M1RXVLD	23. M1TXCKN	24. M1TXCKP
25. M1TXCKSB	26. M1TXDATA[0]	27. M1TXDATA[1]	28. M1TXDATA[2]
29. M1TXDATA[3]	30. M1TXDATA[4]	31. M1TXDATA[5]	32. M1TXDATA[6]
33. M1TXDATA[7]	34. M1TXDATA[8]	35. M1TXDATA[9]	36. M1TXDATA[10]
37. M1TXDATA[11]	38. M1TXDATA[12]	39. M1TXDATA[13]	40. M1TXDATA[14]
41. M1TXDATA[15]	42. M1TXDATASB	43. M1TXTRK	44. M1TXVLD
45. M2RXCKN	46. M2RXCKP	47. M2RXCKSB	48. M2RXDATA[0]
49. M2RXDATA[1]	50. M2RXDATA[2]	51. M2RXDATA[3]	52. M2RXDATA[4]
53. M2RXDATA[5]	54. M2RXDATA[6]	55. M2RXDATA[7]	56. M2RXDATA[8]
57. M2RXDATA[9]	58. M2RXDATA[10]	59. M2RXDATA[11]	60. M2RXDATA[12]
61. M2RXDATA[13]	62. M2RXDATA[14]	63. M2RXDATA[15]	64. M2RXDATASB
65. M2RXTRK	66. M2RXVLD	67. M2TXCKN	68. M2TXCKP
69. M2TXCKSB	70. M2TXDATA[0]	71. M2TXDATA[1]	72. M2TXDATA[2]
73. M2TXDATA[3]	74. M2TXDATA[4]	75. M2TXDATA[5]	76. M2TXDATA[6]
77. M2TXDATA[7]	78. M2TXDATA[8]	79. M2TXDATA[9]	80. M2TXDATA[10]
81. M2TXDATA[11]	82. M2TXDATA[12]	83. M2TXDATA[13]	84. M2TXDATA[14]
85. M2TXDATA[15]	86. M2TXDATASB	87. M2TXTRK	88. M2TXVLD
89. VCCAON	90. VCCIO	91. VSS	

4.7.3.10.49. UniPro

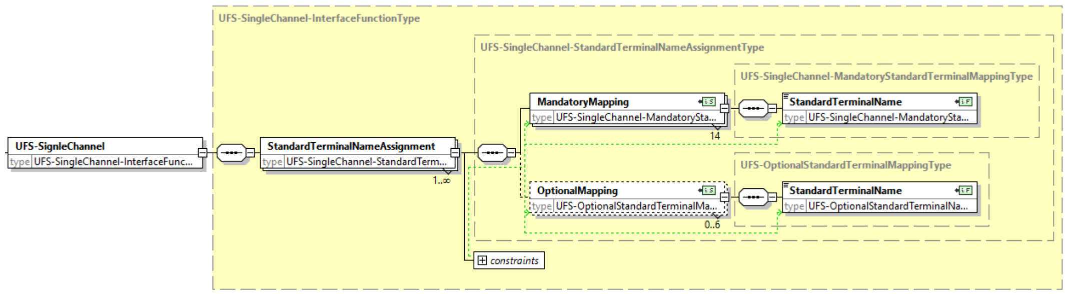
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/ UniPro			
diagram				
type	UniPro–InterfaceFunctionType, UniPro-StandardTerminalNameAssignmentType, UniPro-MandatoryStandardTerminalMappingType, UniPro-MandatoryStandardTerminalNameType, UniPro-OptionalStandardTerminalMappingType, UniPro-OptionalStandardTerminalNameType			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. T_SAP	2. DME_SAP		
	OptionalMapping/StandardTerminalName			
	1. N_SAP	2. DL_SAP	3. PA_SAP	4. PHY_SAP
	5. T_LM_SAP	6. N_LM_SAP	7. DL_LM_SAP	8. PA_LM_SAP

For more information about the SPMI Interfaces, refer to the MIPI Alliance standard Specification for Unified Protocol (UniPro) Version 1.8.

4.7.3.10.50. Universal Flash Storage Interface Function

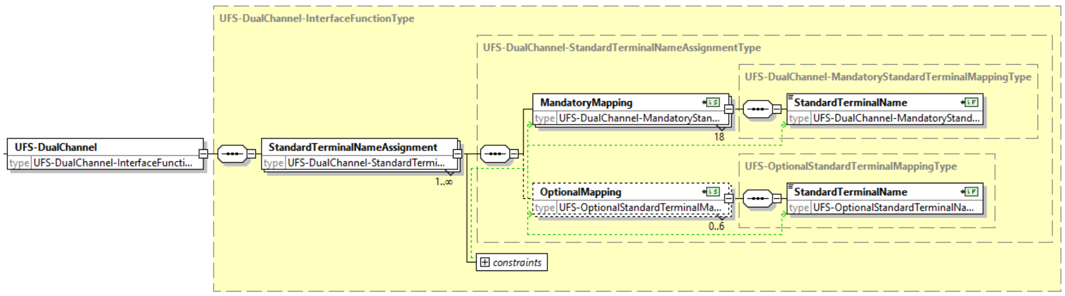
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/UniversalFlashStorage
diagram	
type	UniversalFlashStorage-InterfaceFunctionType, UFS-SingleChannel-InterfaceFunctionType, UFS-DualChannel-InterfaceFunctionType, UFSHCI-InterfaceFunctionType.

4.7.3.10.50.1. UFS – Single Channel

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/UniversalFlashStorage/UFS-SignleChannel</td></tr>
<tr><td>diagram
part 1 of 2</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">UFS-SingleChannel-InterfaceFunctionType,
UFS-SingleChannel-StandardTerminalNameAssignmentType,
UFS-SingleChannel-MandatoryStandardTerminalMappingType,
UFS-SingleChannel-MandatoryStandardTerminalNameType,
UFS-OptionalStandardTerminalMappingType, UFS-OptionalStandardTerminalNameType</td></tr>
<tr><td rowspan="9">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. DIN_c</td><td>2. DIN_t</td><td>3. DOUT_c</td><td>4. DOUT_t</td></tr>
<tr><td>5. LSS</td><td>6. REF_CLK</td><td>7. RST_n</td><td>8. VCC</td></tr>
<tr><td>9. VCCQ</td><td>10. VCCQ2</td><td>11. VDDi</td><td>12. VDDiQ</td></tr>
<tr><td>13. VDDiQ2</td><td>14. VSS</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. C+</td><td>2. C-</td><td>3. CPOUT1</td><td>4. CPOUT2</td></tr>
<tr><td>5. RZQ1</td><td>6. RZQ2</td><td></td><td></td></tr>
</table>

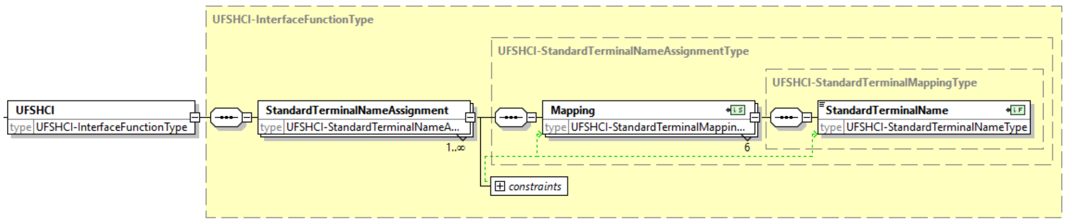
For more information about the UFS Interface, refer to the JEDEC standard JESD220E.

4.7.3.10.50.2. UFS – Dual Channel

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/UniversalFlashStorage/UFS-DualChannel			
diagram part 1 of 2				
type	UFS-DualChannel-InterfaceFunctionType, UFS- DualChannel -StandardTerminalNameAssignmentType, UFS- DualChannel -MandatoryStandardTerminalMappingType, UFS- DualChannel -MandatoryStandardTerminalNameType, UFS-OptionalStandardTerminalMappingType, UFS-OptionalStandardTerminalNameType			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. DIN0_c	2. DIN0_t	3. DIN1_c	4. DIN1_t
	5. DOUT0_c	6. DOUT0_t	7. DOUT1_c	8. DOUT1_t
	9. LSS	10. REF_CLK	11. RST_n	12. VCC
	13. VCCQ	14. VCCQ2	15. VDDi	16. VDDiQ
	17. VDDiQ2	18. VSS		
	OptionalMapping/StandardTerminalName			
	1. C+	2. C-	3. CPOUT1	4. CPOUT2
	5. RZQ1	6. RZQ2		

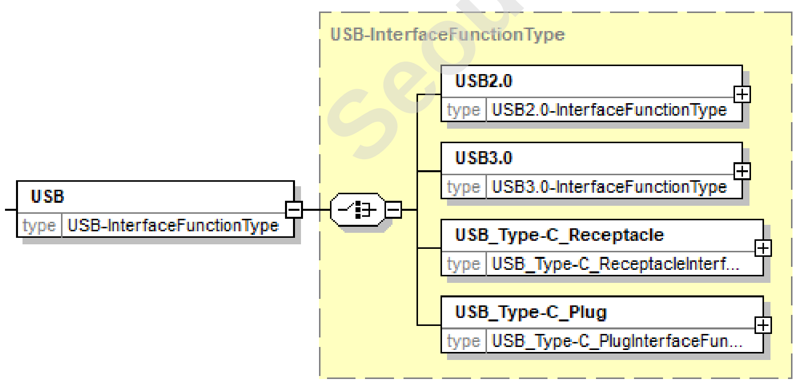
For more information about the UFS Interface, refer to the JEDEC standard JESD220E.

4.7.3.10.50.3. UFSHCI

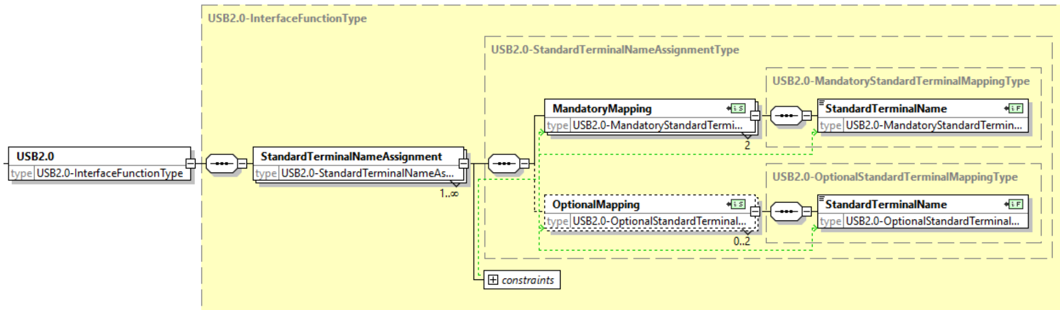
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/UFSHCI**
diagram	
type	**UFSHCI–InterfaceFunctionType, UFSHCI-StandardTerminalNameAssignmentType,** **UFSHCI-MandatoryStandardTerminalMappingType, UFSHCI-MandatoryStandardTerminalNameType,**
list of enumerate values	**MandatoryMapping/StandardTerminalName** **1. Tx+**	**2. Tx-**	**3. Ref_Clock**	**4. Reset** **5. RX+**	**6. RX-**

For more information about the UFSHCI Interface, refer to the JEDEC standard JESD223C.

4.7.3.10.51. USB Interface Function

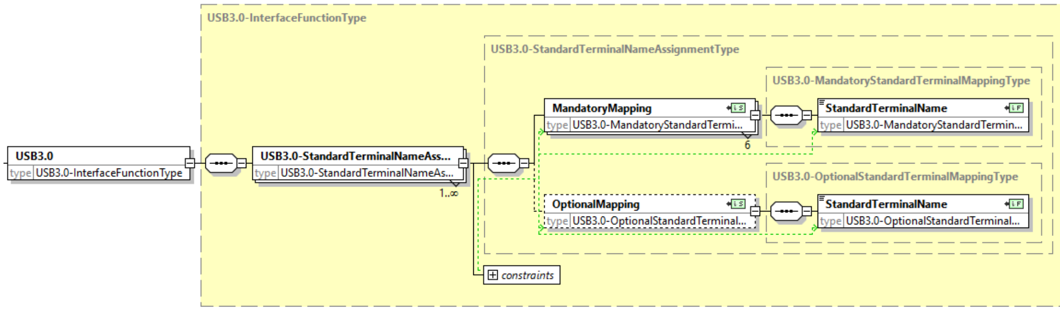
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/USB**
diagram	
type	**USB-InterfaceFunctionType, USB2.0-InterfaceFunctionType, USB3.0-InterfaceFunctionType,** **USB_Type-C_ReceptacleInterfaceFunctionType, USB_Type-C_PlugInterfaceFunctionType.**

4.7.3.10.51.1. USB2.0

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/USB2.0</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">USB2.0–InterfaceFunctionType, USB2.0-StandardTerminalNameAssignmentType, USB2.0-MandatoryStandardTerminalMappingType, USB2.0-MandatoryStandardTerminalNameType, USB2.0-OptionalStandardTerminalMappingType, USB2.0-OptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. D-</td><td>2. D+</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. VBUS</td><td>2. ID</td><td></td><td></td></tr>
</table>

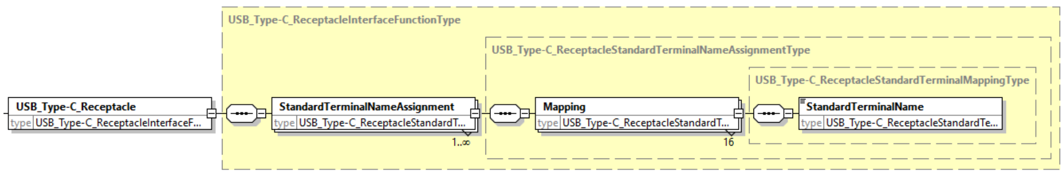
For more information about the USB2.0 Interface, refer to the USB-IF standard Universal Serial Bus Specification Revision 2.0.

4.7.3.10.51.2. USB3.0

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/FunctionGroup/Interface/USB3.0</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">USB3.0–InterfaceFunctionType, USB3.0-StandardTerminalNameAssignmentType,
USB3.0-MandatoryStandardTerminalMappingType, USB3.0-MandatoryStandardTerminalNameType,
USB3.0-OptionalStandardTerminalMappingType, USB3.0-OptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="5">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. SSTX+</td><td>2. SSTX−</td><td>3. SSRX+</td><td>4. SSRX−</td></tr>
<tr><td>5. D+</td><td>6. D−</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. VBUS</td><td></td><td></td><td></td></tr>
</table>

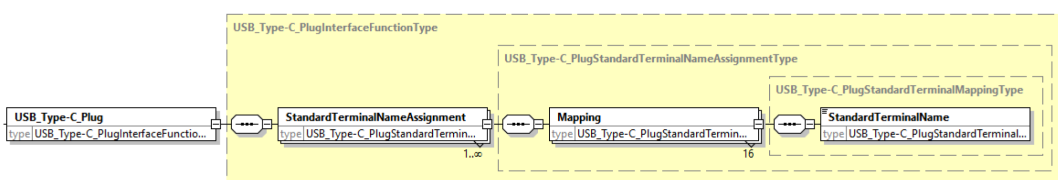
For more information about the USB3.0 Interface, refer to the USB-IF standard Universal Serial Bus 3.2 Specification Revision 1.0.

4.7.3.10.51.3. USB_Type-C_Receptacle

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/USB/USB_Type-C_Receptacle			
diagram				
type	USB_Type-C_Receptacle-InterfaceFunctionType, USB_Type-C_Receptacle-StandardTerminalNameAssignmentType, USB_Type-C_Receptacle-StandardTerminalMappingType, USB_Type-C_Receptacle-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. CC1	2. CC2	3. D+	4. D-
	5. GND	6. RX1+	7. RX1-	8. RX2+
	9. RX2-	10. SBU1	11. SBU2	12. TX1+
	13. TX1-	14. TX2+	15. TX2-	16. VBUS

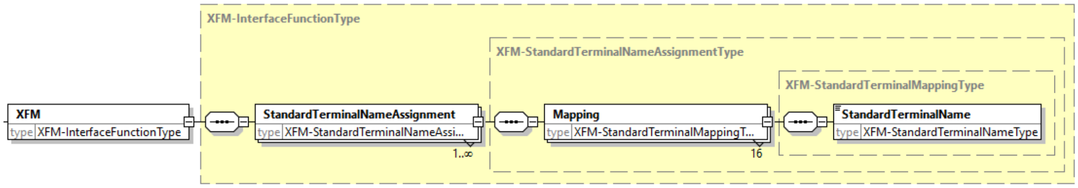
For more information about the USB Type-C Receptacle Interface, refer to the USB Type-C Specification 2.0.

4.7.3.10.51.4. USB_Type-C_Plug

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/USB/USB_Type-C_Plug			
diagram				
type	USB_Type-C_Plug-InterfaceFunctionType, USB_Type-C_ Plug-StandardTerminalNameAssignmentType, USB_Type-C_ Plug-StandardTerminalMappingType, USB_Type-C_ Plug-StandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. CC	2. D+	3. D-	4. GND
	5. RX1+	6. RX1-	7. RX2+	8. RX2-
	9. SBU1	10. SBU2	11. TX1+	12. TX1-
	13. TX2+	14. TX2-	15. VBUS	16. VCONN

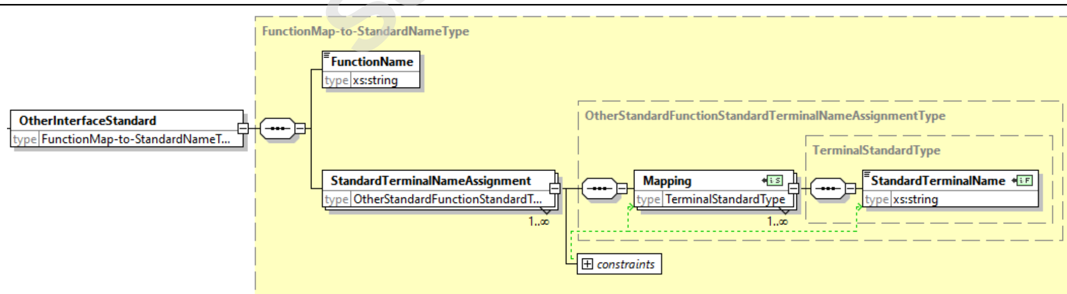
For more information about the USB Type-C Plug Interface, refer to the USB Type-C Specification 2.0.

4.7.3.10.51.5. XFM

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/XFM**			
diagram				
type	**XFM-InterfaceFunctionType, XFM -StandardTerminalNameAssignmentType, XFM -StandardTerminalMappingType, XFM -StandardTerminalNameType**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. GND	**2. PERp0**	**3. PERn0**	**4. PERp1**
	5. PERn1	**6. PETp0**	**7. PETn0**	**8. PETp1**
	9. PETn1	**10. Reserved**	**11.REFCLKp**	**12.REFCLKn**
	13. PERST#	**14. PWR_1**	**15.PWR_2**	**16.CLKREQ#**

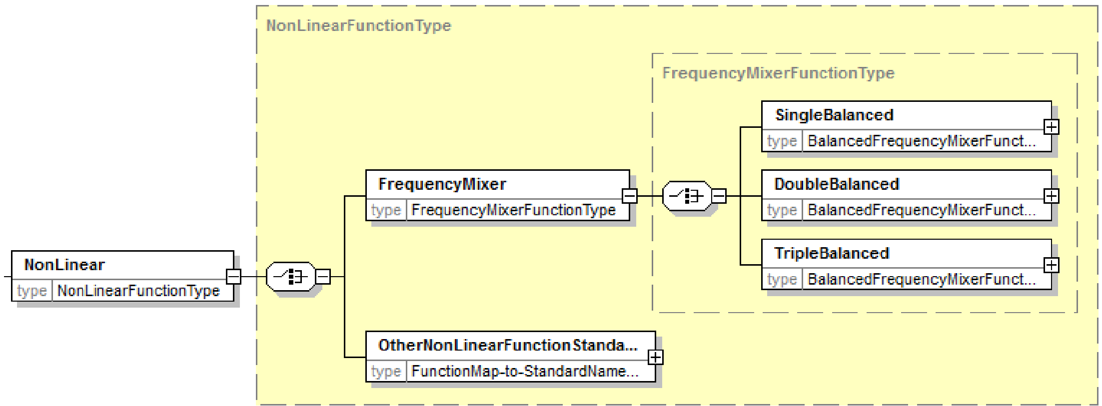
For more information about the XFM Interface, refer to the JEDEC Standard JESD233.

4.7.3.10.52. Other Interface Standard

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Interface/OtherInterfaceStandard**
diagram	
type	**FunctionMap-to-StandardNameType, OtherStandardFunctionStandardTerminalNameAssignmentType, TerminalStandardType.**

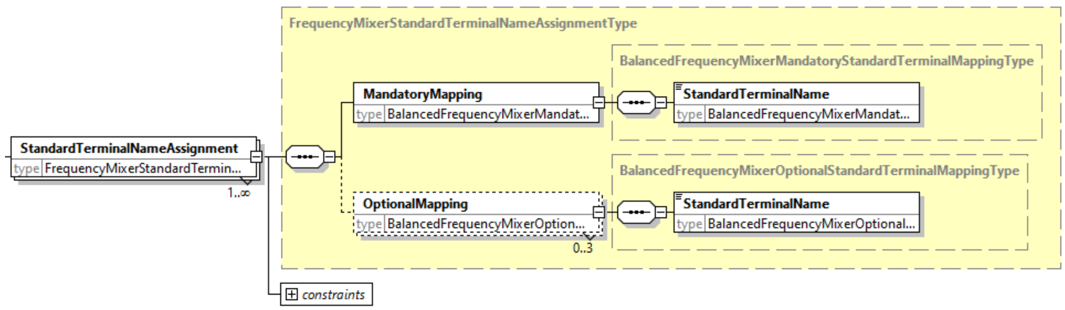
Specific interfaces that are not currently supported by the Schema can be captured under the “Other Interface Standard” section. Here the interface name can be captured along with an unbounded list of the Standard terminal Names mapped over to any one of the following *TerminalNumber*, *TerminalName* or the *InternalNodeName*.

4.7.3.11. Non Linear – Frequency Mixer

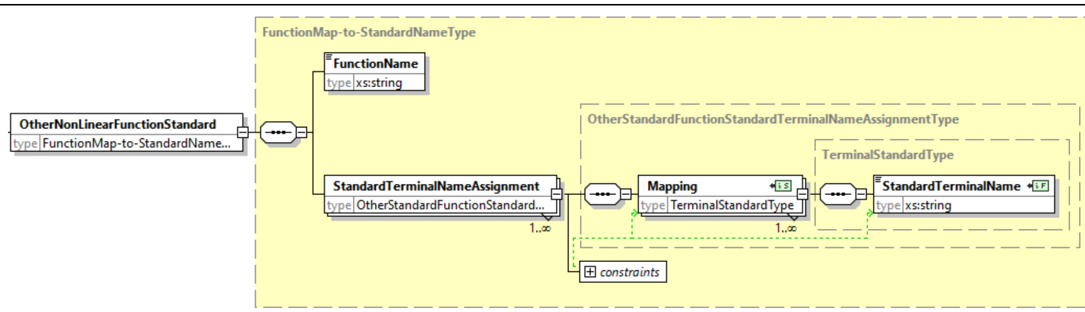
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/NonLinear
diagram	
type	NonLinearFunctionType, FrequencyMixerFunctionType, BalancedFrequencyMixerFunctionType, FunctionMap-to-StandardNameType.

A *NonLinear* can be one of two types: *OtherNonLinearFunctionStandard* and *Frequency*, which itself can be *Balanced* or *Double*. Each of these types is elaborated on below.

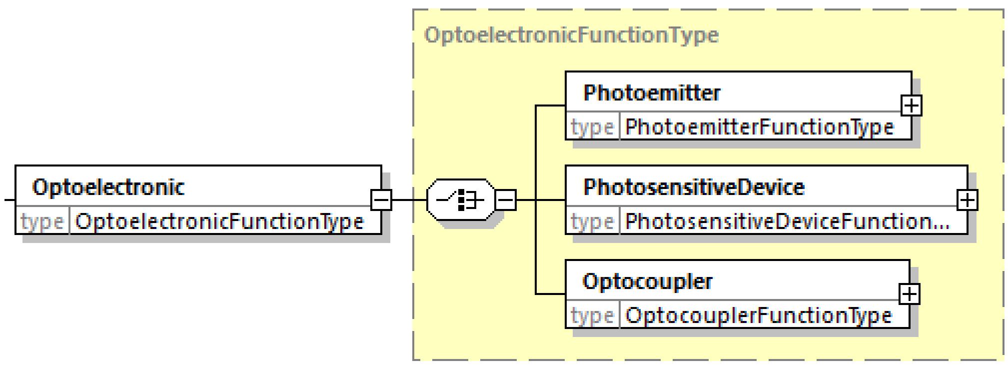
4.7.3.11.1. Balanced

path	1. **PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/NonLinear/FrequencyMixer/SingleBalanced** 2. **PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/NonLinear/FrequencyMixer/DoubleBalanced** 3. **PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/NonLinear/FrequencyMixer/TripleBalanced**
diagram	
type	**BalancedFrequencyMixerFunctionType, FrequencyMixerStandardTerminalNameAssignmentType,** **BalanacedFrequencyMixerMandatoryStandardTerminalMappingType,** **BalanacedFrequencyMixerMandatoryStandardTerminalNameType,** **BalanacedFrequencyMixerOptionalStandardTerminalMappingType,** **BalanacedFrequencyMixerOptionalStandardTerminalNameType.**
list of enumerate values	**MandatoryMapping/StandardTerminalName** **1. Output** **OptionalMapping/StandardTerminalName** **1. Enable** | **2. Positive Rail** | **3. Negative Rail**

4.7.3.11.2. Other Non Linear Function Standard

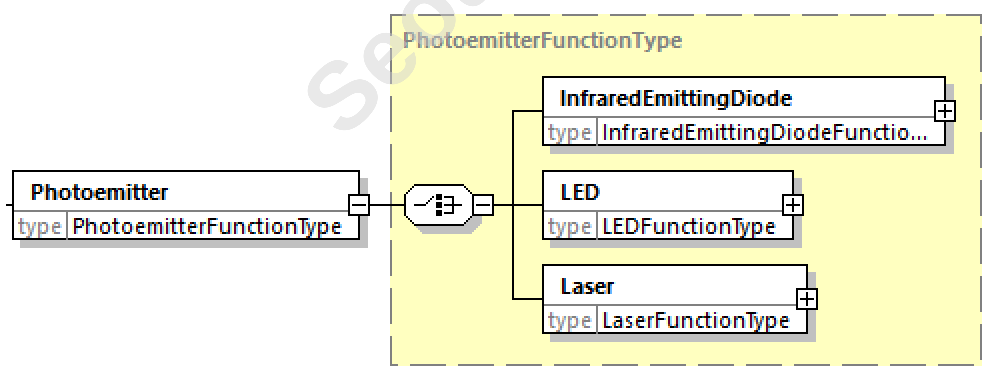
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/NonLinear/OtherNonLinearFunctionStandard**
diagram	
type	**FunctionMap-to-StandardNameType, OtherStandardFunctionStandardTerminalNameAssignmentType,** **TerminalStandardType.**

4.7.3.12. Optoelectronics

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic
diagram	
type	OptoelectronicFunctionType, PhotoemitterFunctionType, PhotosensitiveDeviceFunctionType, OptocouplerFunctionType.

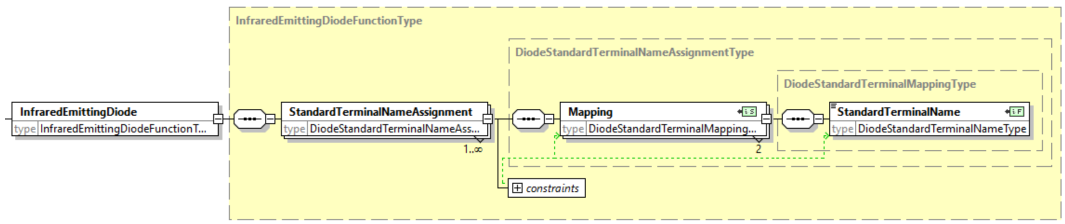
An *Optoelectronic* can be one of the following three types: *Photoemitter*, *PhotosensitiveDevice*, and *Optocoupler*. Each of these types is specified in further detail below.

4.7.3.12.1. Photoemitter

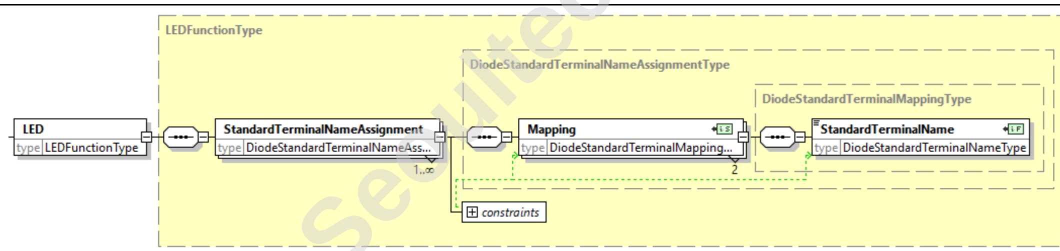
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/Photoemitter
diagram	
type	PhotoemitterFunctionType, InfraredEmittingDiodeFunctionType, LEDFunctionType, LaserFunctionType.

A *Photoemitter* can be one of the following three types: *InfraredEmittingDiode*, *LED*, and *Laser*. Each of these types is specified in further detail below.

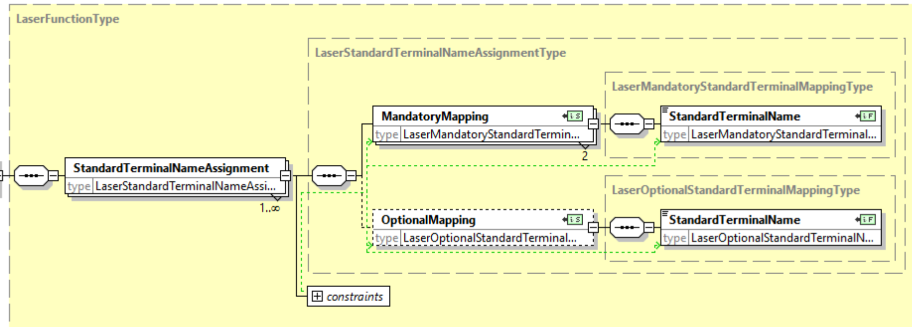
4.7.3.12.1.1. Infrared Emitting Diode

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/Photoemitter/InfraredEmittingDiode**			
diagram				
type	**InfraredEmittingDiodeFunctionType, InfraredEmittingDiodeStandardTerminalNameAssignmentType, DiodeStandardTerminalMappingType, DiodeStandardTerminalNameType.**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. Anode	**2. Cathode**		

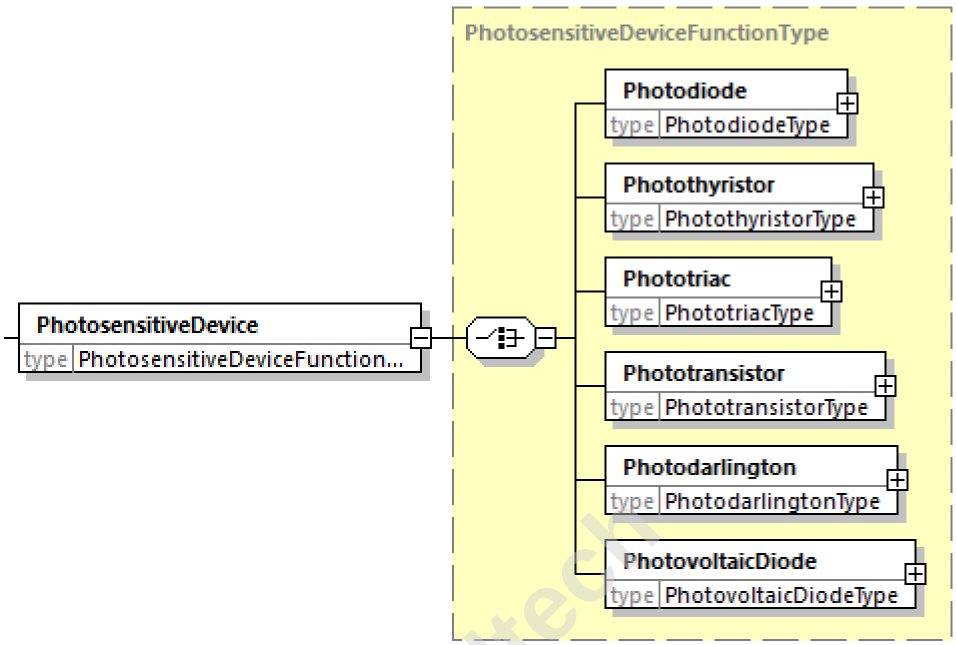
4.7.3.12.1.2. LED

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/Photoemitter/LED**			
diagram				
type	**LEDFunctionType, LEDStandardTerminalNameAssignmentType, DiodeStandardTerminalMappingType, DiodeStandardTerminalNameType.**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. Anode	**2. Cathode**		

4.7.3.12.1.3. Laser

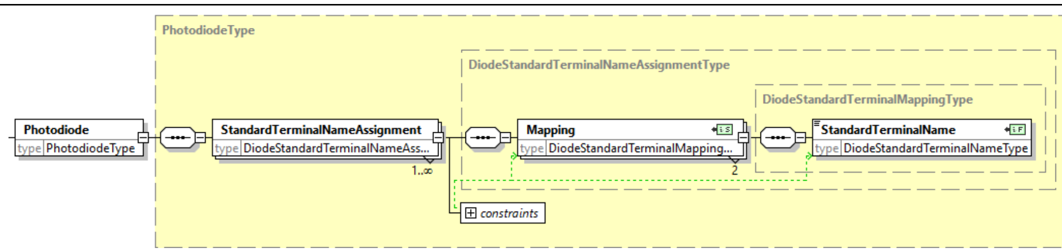
<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/Photoemitter/Laser</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">LaserFunctionType, LaserStandardTerminalNameAssignmentType,
LaserMandatoryStandardTerminalMappingType, LaserMandatoryStandardTerminalNameType,
LaserOptionalStandardTerminalMappingType, LaserOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Anode</td><td>2. Cathode</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Ground</td><td></td><td></td><td></td></tr>
</table>

4.7.3.12.2. Photosensitive Device

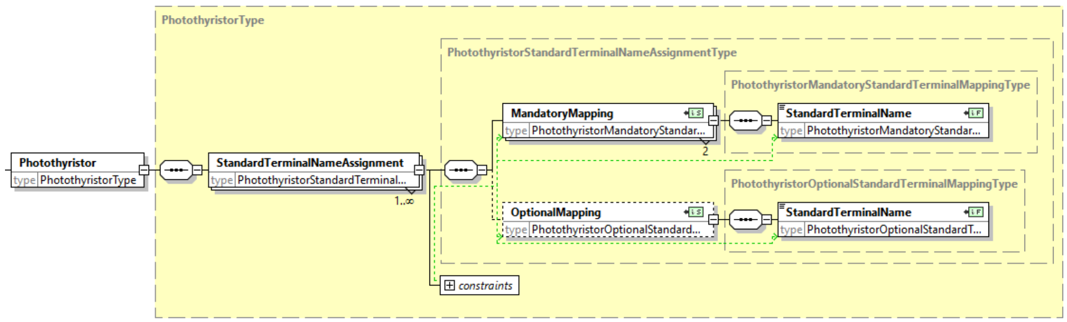
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/PhotosensitiveDevice</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>PhotosensitiveDeviceFunctionType, PhotodiodeType, PhotothyristorType, PhototriacType, PhototransistorType, PhotodarlingtonType, PhotovoltaicDiodeType.</td></tr>
</table>

A *PhotosensitiveDevice* can be one of the following six types: *Photidode*, *Photothyristor*, *Phototriac*, *Phototransistor*, *Photodarlington*, and *PhotovoltaicDiode*. Each of these types is explained in further detail below.

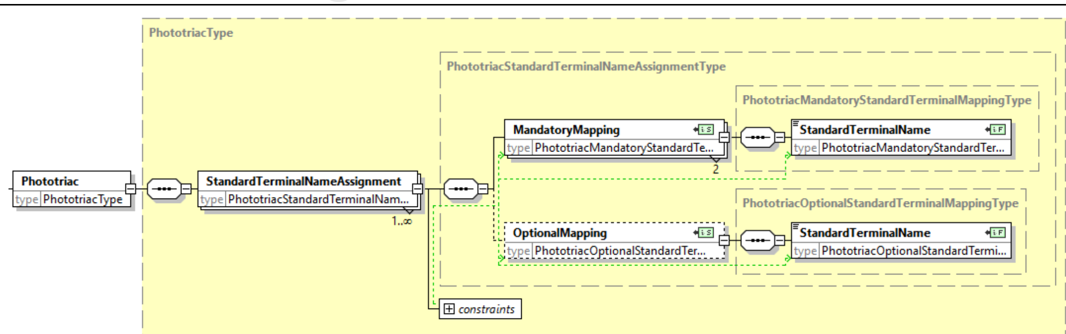
4.7.3.12.2.1. Photodiode

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/PhotosensitiveDevice/Photodiode</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">PhotodiodeType, PhotodiodeStandardTerminalNameAssignmentType, PhotodiodeStandardTerminalMappingType, PhotodiodeStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Anode</td><td>2. Cathode</td><td></td><td></td></tr>
</table>

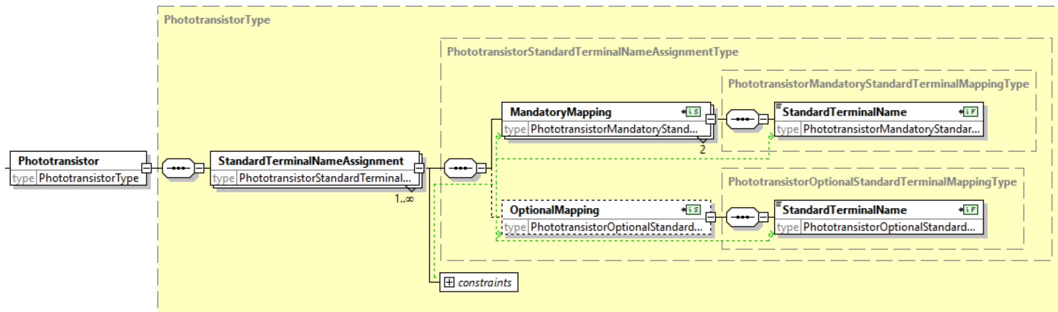
4.7.3.12.2.2. Photothyristor

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/PhotosensitiveDevice/Photothyristor
diagram	
type	PhotothyristorType, PhotothyristorStandardTerminalNameAssignmentType, PhotothyristorMandatoryStandardTerminalMappingType, PhotothyristorMandatoryStandardTerminalNameType, PhotothyristorOptionalStandardTerminalMappingType, PhotothyristorOptionalStandardTerminalNameType.
list of enumerate values	MandatoryMapping/StandardTerminalName 1. Anode · 2. Cathode OptionalMapping/StandardTerminalName 1. Gate

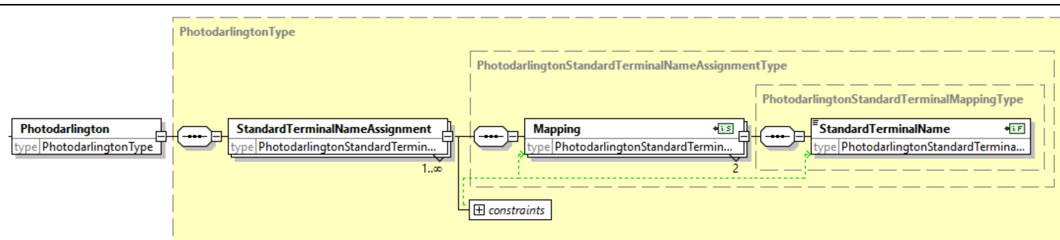
4.7.3.12.2.3. Phototriac

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/PhotosensitiveDevice/Phototriac
diagram	
type	PhototriacType, PhototriacStandardTerminalNameAssignmentType, PhototriacMandatoryStandardTerminalMappingType, PhototriacMandatoryStandardTerminalNameType, PhototriacOptionalStandardTerminalMappingType, PhototriacOptionalStandardTerminalNameType.
list of enumerate values	MandatoryMapping/StandardTerminalName 1. Main Terminal 1 · 2. Main Terminal 2 OptionalMapping/StandardTerminalName 1. Gate

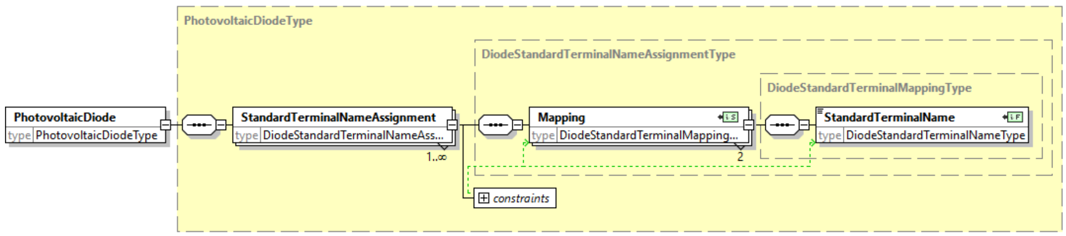
4.7.3.12.2.4. Phototransistor

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/PhotosensitiveDevice/Phototransistor			
diagram				
type	PhototransistorType, PhototransistorStandardTerminalNameAssignmentType, PhototransistorMandatoryStandardTerminalMappingType, PhototransistorMandatoryStandardTerminalNameType, PhototransistorOptionalStandardTerminalMappingType, PhototransistorOptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. Collector	2. Emitter		
	OptionalMapping/StandardTerminalName			
	1. Base			

4.7.3.12.2.5. Photodarlington

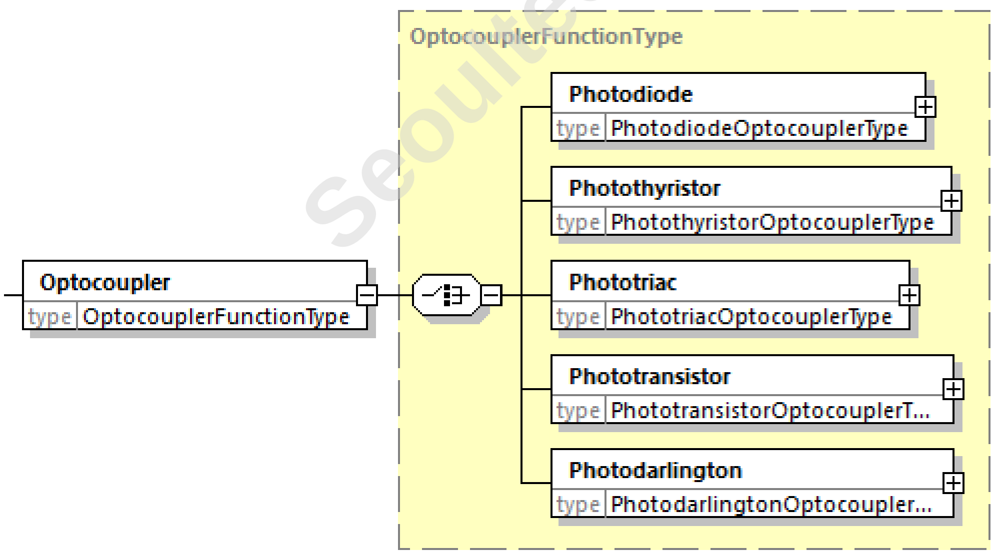
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/PhotosensitiveDevice/Photodarlington			
diagram				
type	PhotodarlingtonType, PhotodarlingtonStandardTerminalNameAssignmentType, PhotodarlingtonStandardTerminalMappingType, PhotodarlingtonStandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. Collector	2. Emitter		

4.7.3.12.2.6. Photovoltaic Diode

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/PhotosensitiveDevice/PhotovoltaicDiode
diagram	
type	PhotovoltaicDiodeType, PhotovoltaicDiodeStandardTerminalNameAssignmentType, PhotovoltaicDiodeStandardTerminalMappingType, PhotovoltaicDiodeStandardTerminalNameType.

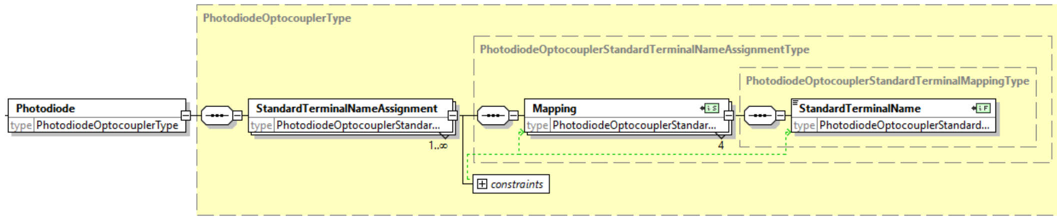
list of enumerate values	Mapping/StandardTerminalName			
	1. Anode	2. Cathode		

4.7.3.12.3. Optocoupler

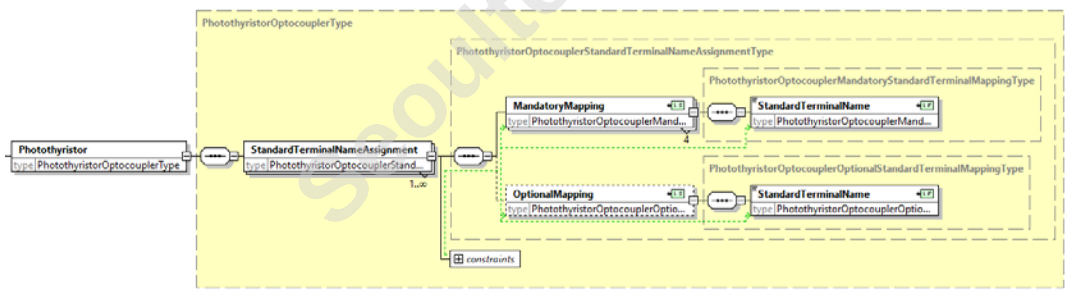
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/Optocoupler
diagram	
type	OptocouplerFunctionType, PhotodiodeOptocouplerType, PhotothyristorOptocouplerType, PhototriacOptocouplerType, PhototransistorOptocouplerType, PhotodarlingtonOptocouplerType.

An *Optocoupler* can be one of the following five types: *Photodiode*, *Photothyristor, Phototriac*, *Phototransistor*, and *Photodarlington*. Each of these types is further specified below.

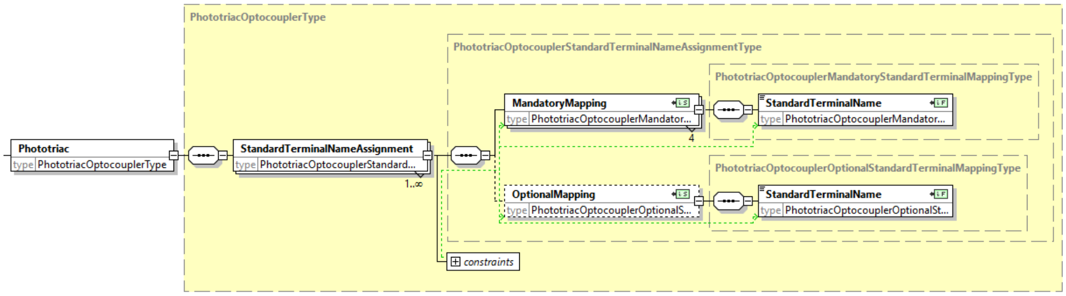
4.7.3.12.3.1. Photodiode

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/Optocoupler/Photodiode**			
diagram				
type	**PhotodiodeOptocouplerType, PhotodiodeOptocouplerStandardTerminalNameAssignmentType, PhotodiodeOptocouplerStandardTerminalMappingType, PhotodiodeOptocouplerStandardTerminalNameType.**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. LED-Anode	**2. LED-Cathode**	**3. Detector-Anode**	**4. Detector-Cathode**

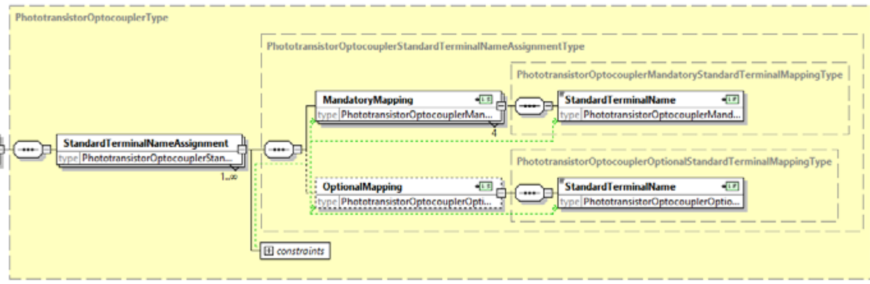
4.7.3.12.3.2. Photothyristor

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/Optocoupler/Photothyristor**			
diagram				
type	**PhotothyristorOptocouplerType, PhotothyristorOptocouplerStandardTerminalNameAssignmentType, PhotothyristorOptocouplerMandatoryStandardTerminalMappingType, PhotothyristorOptocouplerMandatoryStandardTerminalNameType, PhotothyristorOptocouplerOptionalStandardTerminalMappingType, PhotothyristorOptocouplerOptionalStandardTerminalNameType.**			
list of enumerate values	**MandatoryMapping/StandardTerminalName**			
	1. LED-Anode	**2. LED-Cathode**	**3. Detector-Anode**	**4. Detector-Cathode**
	OptionalMapping/StandardTerminalName			
	1. Detector-Gate			

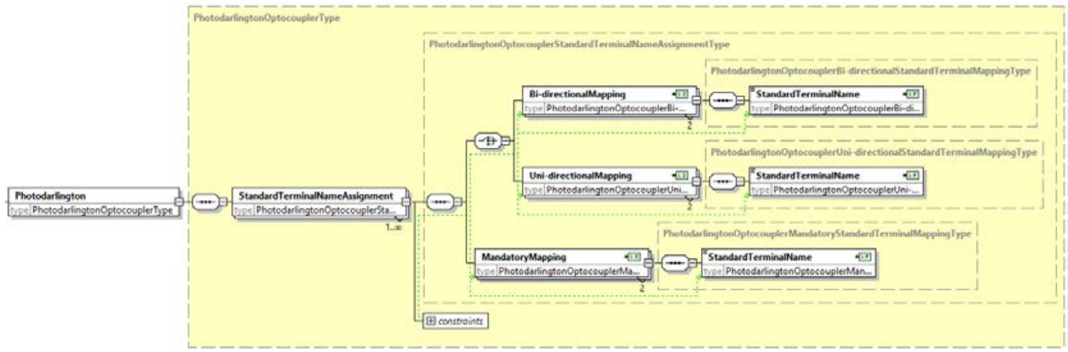
4.7.3.12.3.3. Phototriac

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/Optocoupler/Phototriac</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">PhototriacOptocouplerType, PhototriacOptocouplerStandardTerminalNameAssignmentType,
PhototriacOptocouplerMandatoryStandardTerminalMappingType,
PhototriacOptocouplerMandatoryStandardTerminalNameType,
PhototriacOptocouplerOptionalStandardTerminalMappingType,
PhototriacOptocouplerOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. LED-Anode</td><td>2. LED-Cathode</td><td>3. Detector – Main Terminal 1</td><td>4. Detector – Main Terminal 2</td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Detector-Gate</td><td></td><td></td><td></td></tr>
</table>

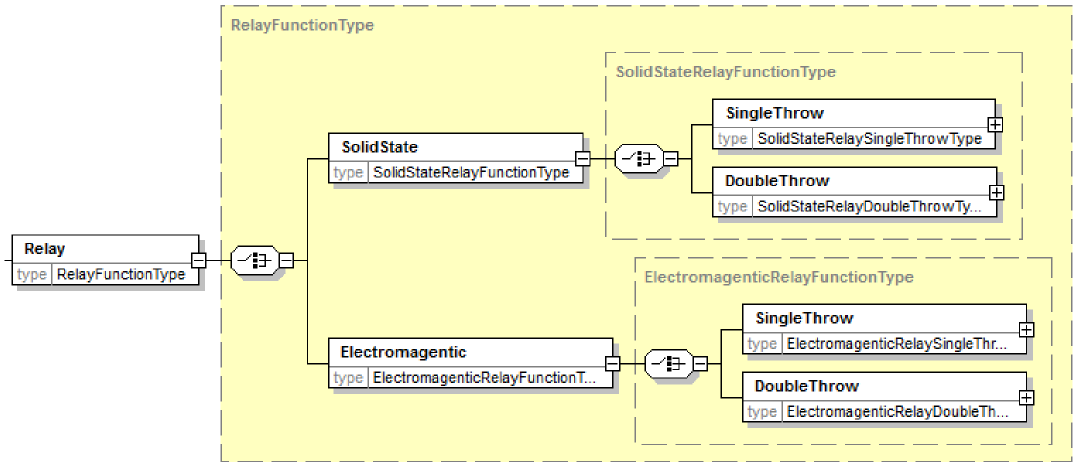
4.7.3.12.3.4. Phototransistor

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/Optocoupler/Phototransistor</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">PhototransistorOptocouplerType, PhototransistorOptocouplerStandardTerminalNameAssignmentType,
PhototransistorOptocouplerMandatoryStandardTerminalMappingType,
PhototransistorOptocouplerMandatoryStandardTerminalNameType,
PhototransistorOptocouplerOptionalStandardTerminalMappingType,
PhototransistorOptocouplerOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. LED-Anode</td><td>2. LED-Cathode</td><td>3. Detector-Anode,</td><td>4. Detector-Cathode</td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Detector-Base</td><td></td><td></td><td></td></tr>
</table>

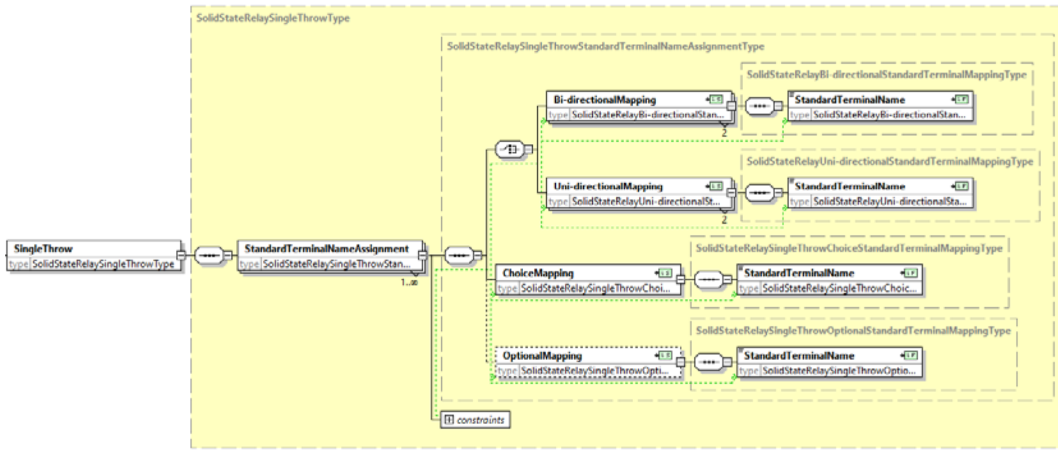
4.7.3.12.3.5. Photodarlington

<table>
<tr><td>path</td><td colspan="4">2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Optoelectronic/Optocoupler/Photodarlington</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">PhotodarlingtonOptocouplerType, PhotodarlingtonOptocouplerStandardTerminalNameAssignmentType,
PhotodarlingtonOptocouplerBi-directionalStandardTerminalMappingType,
PhotodarlingtonOptocouplerBi-directionalStandardTerminalNameType,
PhotodarlingtonOptocouplerUni-directionalStandardTerminalMappingType,
PhotodarlingtonOptocouplerUni-directionalStandardTerminalNameType,
PhotodarlingtonOptocouplerMandatoryStandardTerminalMappingType,
PhotodarlingtonOptocouplerMandatoryStandardTerminalNameType.</td></tr>
<tr><td rowspan="6">list of enumerate values</td><td colspan="4">Bi-directionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Cathode-Anode</td><td>2. Anode-Cathode</td><td></td><td></td></tr>
<tr><td colspan="4">Uni-directionalMapping /StandardTerminalName</td></tr>
<tr><td>1. Anode</td><td>2. Cathode</td><td></td><td></td></tr>
<tr><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Detector-Collector</td><td>2. Detector-Emitter</td><td></td><td></td></tr>
</table>

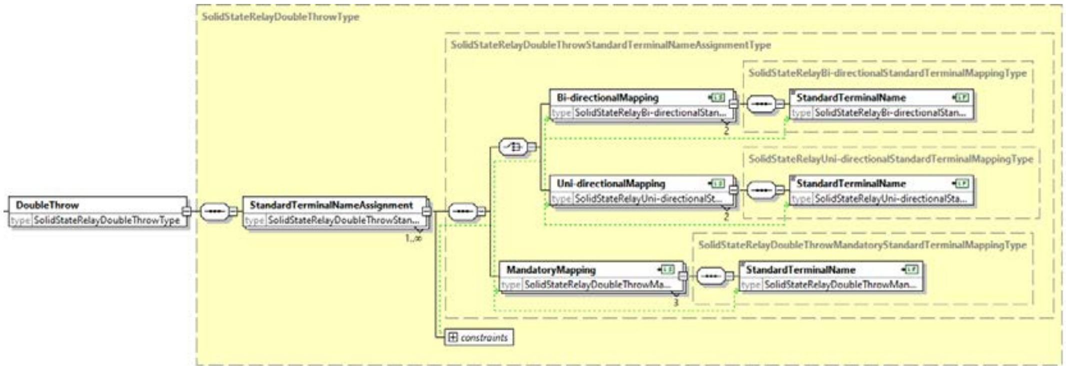
4.7.3.13. Relay

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Relay
diagram	
type	RelayFunctionType, SolidStateRelayFunctionType, SolidStateRelaySingleThrowType, SolidStateRelayDoubleThrowType, ElectromagneticRelayFunctionType, ElectromagneticRelaySingleThrowType, ElectromagneticRelayDoubleThrowType.

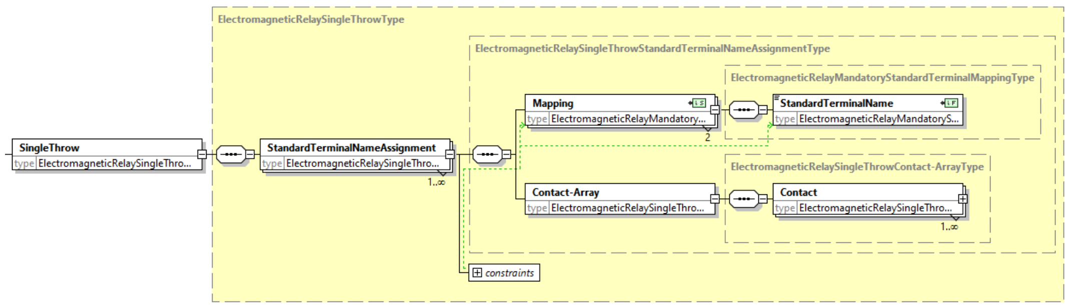
4.7.3.13.1. Solid State Relay – Single Throw

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Relay/SolidState/SingleThrow</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">SolidStateRelayFunctionType, SolidStateRelaySingleThrowType,
SolidStateRelaySingleThrowStandardTerminalNameAssignmentType,
SolidStateRelayBi-direcitonalStandardTerminalMappingType,
SolidStateRelayBi-direcitonalStandardTerminalNameType,
SolidStateRelayUni-direcitonalStandardTerminalMappingType,
SolidStateRelayUni-direcitonalStandardTerminalNameType,
SolidStateRelaySingleThrowChoiceStandardTerminalMappingType,
SolidStateRelaySingleThrowChoiceStandardTerminalNameType,
SolidStateRelaySingleThrowOptionalStandardTerminalMappingType,
SolidStateRelaySingleThrowOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="8">list of enumerate values</td><td colspan="4">Bi-directionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Cathode-Anode</td><td>2. Anode-Cathode</td><td></td><td></td></tr>
<tr><td colspan="4">Uni-directionalMapping /StandardTerminalName</td></tr>
<tr><td>1. Anode</td><td>2. Cathode</td><td></td><td></td></tr>
<tr><td colspan="4">ChoiceMapping/StandardTerminalName</td></tr>
<tr><td>1. Normally Closed</td><td>2. Normally Open</td><td></td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Pole</td><td></td><td></td><td></td></tr>
</table>

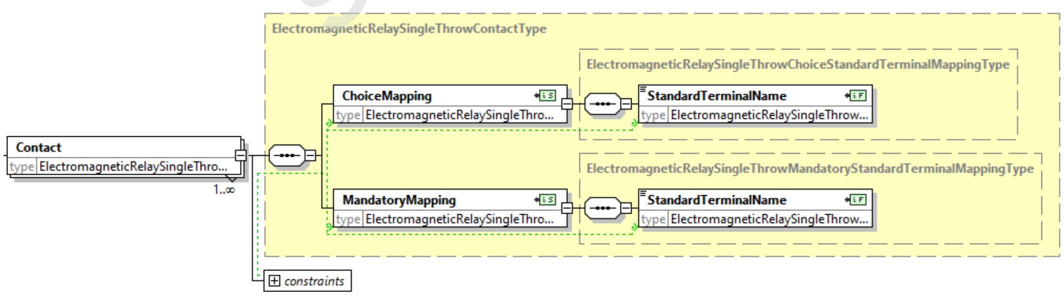
4.7.3.13.2. Solid State Relay – Double Throw

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Relay/SolidState/DoubleThrow</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">SolidStateRelayFunctionType,
SolidStateRelayDoubleThrowStandardTerminalNameAssignmentType,
SolidStateRelayBi-directionalStandardTerminalMappingType,
SolidStateRelayBi-directionalStandardTerminalNameType,
SolidStateRelayUni-directionalStandardTerminalMappingType,
SolidStateRelayUni-directionalStandardTerminalNameType,
SolidStateRelayDoubleThrowMandatoryStandardTerminalMappingType,
SolidStateRelayDoubleThrowMandatoryStandardTerminalNameType.</td></tr>
<tr><td rowspan="6">list of enumerate values</td><td colspan="4">Bi-directionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Cathode-Anode</td><td>2. Anode-Cathode</td><td></td><td></td></tr>
<tr><td colspan="4">Uni-directionalMapping /StandardTerminalName</td></tr>
<tr><td>1. Anode</td><td>2. Cathode</td><td></td><td></td></tr>
<tr><td colspan="4">ChoiceMapping/StandardTerminalName</td></tr>
<tr><td>1. Normally Closed</td><td>2. Normally Open</td><td>3. Pole</td><td></td></tr>
</table>

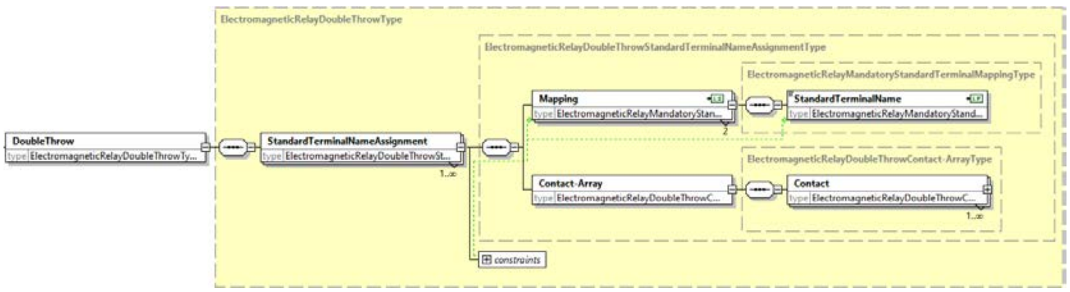
4.7.3.13.3. Electromagnetic Relay – Single Throw

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Relay/Electromagnetic/SingleThrow</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">ElectromagneticRelayFunctionType, ElectromagneticRelaySingleThrowType,
ElectromagneticRelaySingleThrowStandardTerminalNameAssignmentType,
ElectromagneticRelayMandatoryStandardTerminalMappingType,
ElectromagneticRelayMandatoryStandardTerminalNameType,
ElectromagneticRelaySingleThrowContact–ArrayType, ElectromagneticRelaySingleThrowContactType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Input 1</td><td>2. Input 2</td><td></td><td></td></tr>
</table>

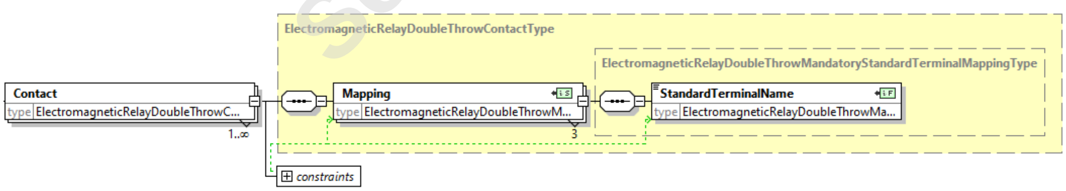
4.7.3.13.3.1. Electromagnetic Relay – Single Throw – Contact Array

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Relay/Electromagnetic/SingleThrow/StandardTerminalNameAssignment/Contact-Array/Contact</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">ElectromagneticRelaySingleThrowContactType,
ElectromagneticRelaySingleThrowChoiceStandardTerminalMappingType,
ElectromagneticRelaySingleThrowChoiceStandardTerminalNameType,
ElectromagneticRelaySingleThrowMandatoryStandardTerminalMappingType,
ElectromagneticRelaySingleThrowMandatoryStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">ChoiceMapping/StandardTerminalName</td></tr>
<tr><td>1. Normally Closed</td><td>2. Normally Open</td><td></td><td></td></tr>
<tr><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Pole</td><td></td><td></td><td></td></tr>
</table>

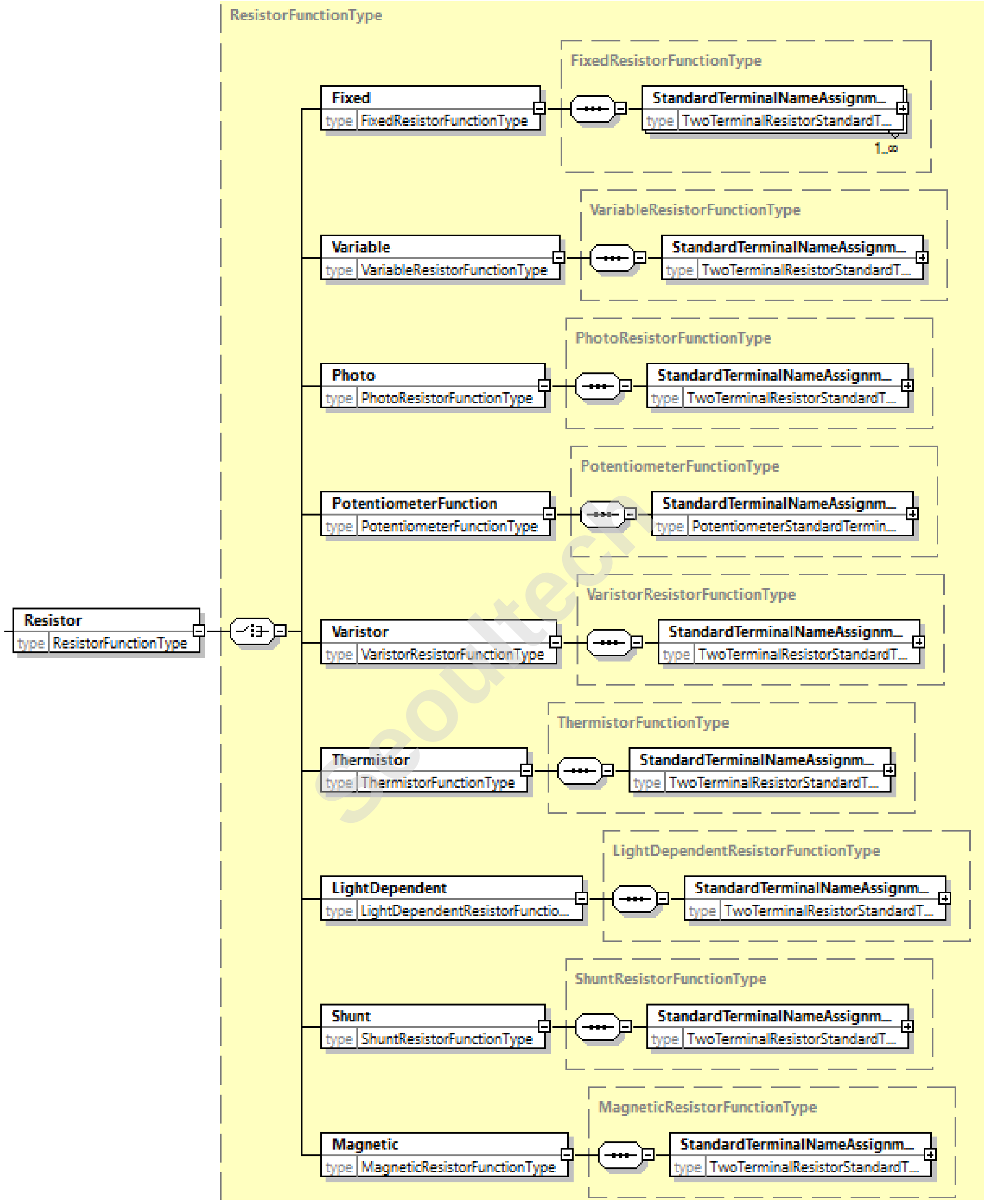
4.7.3.13.4. Electromagnetic Relay – Double Throw

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Relay/Electromagnetic/DoubleThrow
diagram	
type	ElectromagneticRelayFunctionType, ElectromagneticRelaySingleThrowType, ElectromagneticRelaySingleThrowStandardTerminalNameAssignmentType, ElectromagneticRelayMandatoryStandardTerminalMappingType, ElectromagneticRelayMandatoryStandardTerminalNameType, ElectromagneticRelaySingleThrowContact–ArrayType, ElectromagneticRelayDoubleThrowContactType.
list of enumerate values	MandatoryMapping/StandardTerminalName 1. Input 1	2. Input 2

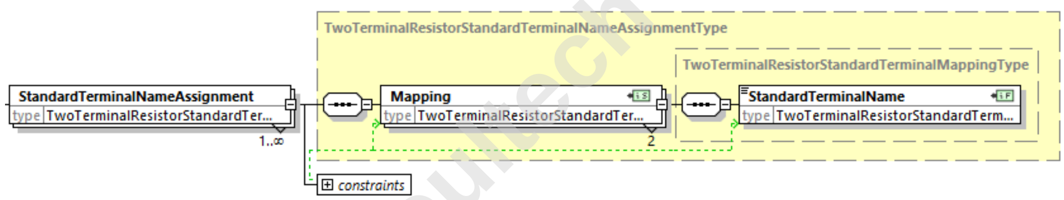
4.7.3.13.5. Electromagnetic Relay – Double Throw – Contact Array

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Relay/Electromagnetic/DoubleThrow/StandardTerminalNameAssignment/Contact-Array/Contact
diagram	
type	ElectromagneticRelayDoubleThrowContactType, ElectromagneticRelayDoubleThrowMandatoryStandardTerminalMappingType, ElectromagneticRelayDoubleThrowMandatoryStandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName 1. Normally Closed	2. Normally Open	3. Pole

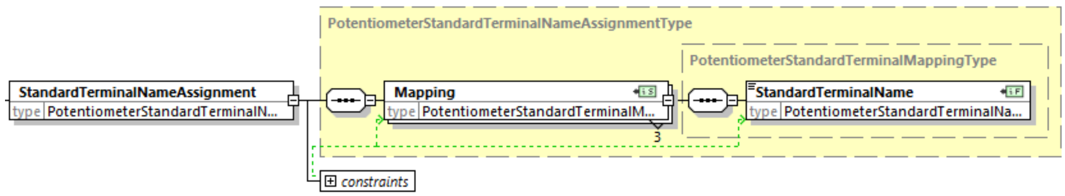
4.7.3.14. Resistor

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Resistor</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>ResistorFunctionType, FixedResistorFunctionType, VariableResistorFunctionType, PhotoResistorFunctionType, PotentiometerFunctionType, VaristorResistorFunctionType, ThermistorFunctionType, LightDependentResistorFunctionType, ShuntResistorFunctionType, MagneticResistorFunctionType, TwoTerminalResistorStandardTerminalNameAssignmentType, PotentiometerStandardTerminalNameAssignmentType.</td></tr>
</table>

4.7.3.14.1. Two Terminal Resistor Standard Terminal Name Assignment Type

path	1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Resistor/Fixed/StandardTerminalNameAssignment 2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Resistor/Variable/StandardTerminalNameAssignment 3. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Resistor/Photo/StandardTerminalNameAssignment 4. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Resistor/PotentiometerFunction/StandardTerminalNameAssignment 5. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Resistor/Varistor/StandardTerminalNameAssignment 6. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Resistor/Thermistor/StandardTerminalNameAssignment 7. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Resistor/LightDependent/StandardTerminalNameAssignment 8. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Resistor/Shunt/StandardTerminalNameAssignment 9. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Resistor/Magnetic/StandardTerminalNameAssignment
diagram	
type	TwoTerminalResistorStandardTerminalNameAssignmentType, TwoTerminalResistorStandardTerminalMappingType, TwoTerminalResistorStandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName 1. Terminal 1 | 2. Terminal 2

4.7.3.14.2. Potentiometer Function

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Resistor/PotentiometerFunction</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">PotentiometerFunctionType, PotentiometerStandardTerminalNameAssignmentType, PotentiometerStandardTerminalMappingType, PotentiometerStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">PotentiometerStandardTerminalName</td></tr>
<tr><td>1. Terminal 1</td><td>2. Terminal 2</td><td>3. Wiper</td><td></td></tr>
</table>

Internal complex array functions as shown in Figure 41 can be described in the XML file as follows:

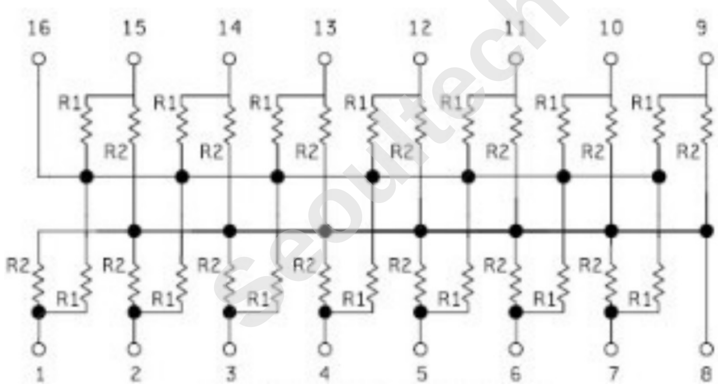
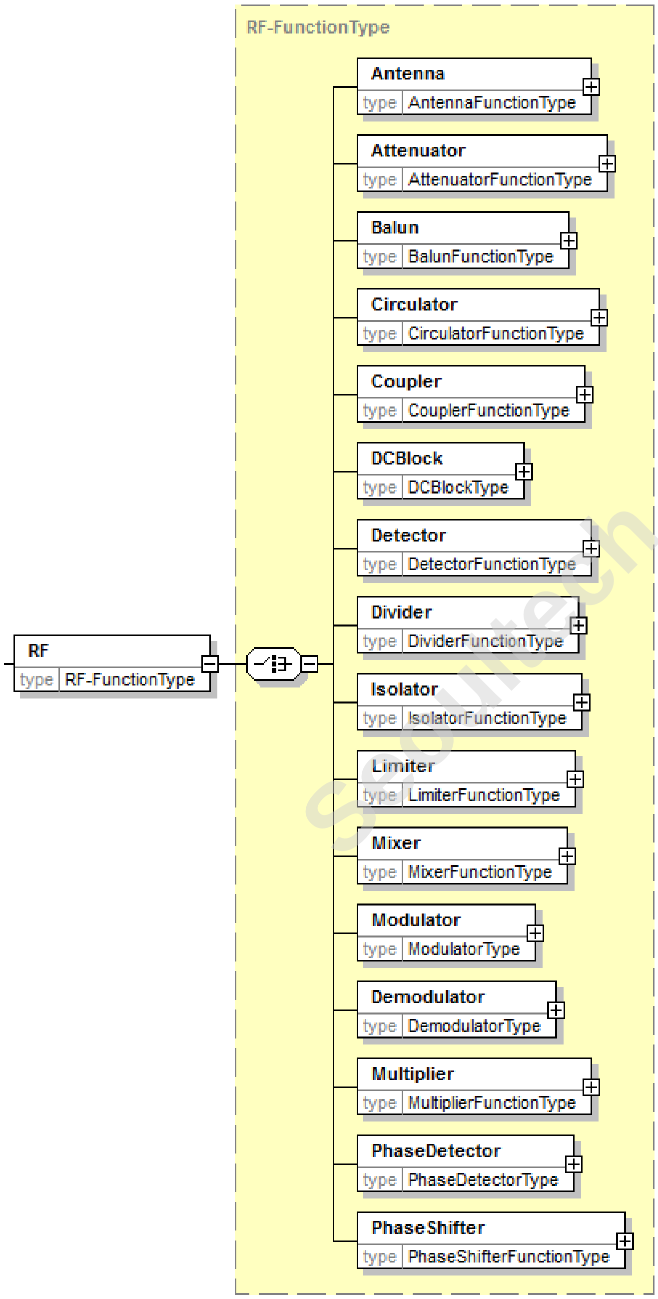


Figure 41 — Pull-up Pull-down Resistor Array

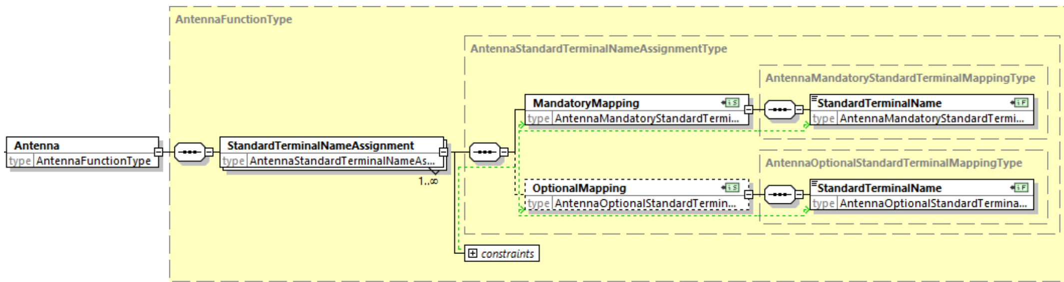
4.7.3.14.2 Potentiometer Function (cont'd)

```
<FunctionGroup-Array>
    <Function>
        <Resistor>
            <StandardTerminalNameAssignment>
                <Terminal1>
                    <TerminalNumber>1</TerminalNumber>
                </Terminal1>
                <Terminal2>
                    <TerminalNumber>16</TerminalNumber>
                </Terminal2>
            </StandardTerminalNameAssignment>
                :
                :
            <StandardTerminalNameAssignment>
                <Terminal1>
                    <TerminalNumber>15</TerminalNumber>
                </Terminal1>
                <Terminal2>
                    <TerminalNumber>16</TerminalNumber>
                </Terminal2>
            </StandardTerminalNameAssignment>
        </Resistor>
        <ElectricalSpecificationID>Res R1</ElectricalSpecificationID>
    </Function>
    <Function>
        <Resistor>
            <StandardTerminalNameAssignment>
                <Terminal1>
                    <TerminalNumber>1</TerminalNumber>
                </Terminal1>
                <Terminal2>
                    <TerminalNumber>8</TerminalNumber>
                </Terminal2>
            </StandardTerminalNameAssignment>
                :
                :
            <StandardTerminalNameAssignment>
                <Terminal1>
                    <TerminalNumber>15</TerminalNumber>
                </Terminal1>
                <Terminal2>
                    <TerminalNumber>8</TerminalNumber>
                </Terminal2>
            </StandardTerminalNameAssignment>
        </Resistor>
        <ElectricalSpecificationID>Res R2</ElectricalSpecificationID>
    </Function>
</FunctionGroup-Array>
```

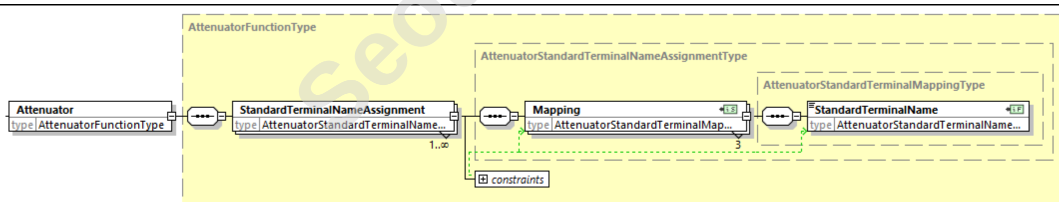
4.7.3.15. RF

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF
diagram	
type	FunctionType, AntennaFunctionType, AttenuatorFunctionType, BalunFunctionType, CirculatorFunctionType, CouplerFunctionType, DCBlockType, DetectorFunctionType, DividerFunctionType, IsolatorFunctionType, LimiterFunctionType, MixerFunctionType, ModulatorType, DemodulatorType, MultiplierFunctionType, PhaseDetectorType, PhaseShifterFunctionType.

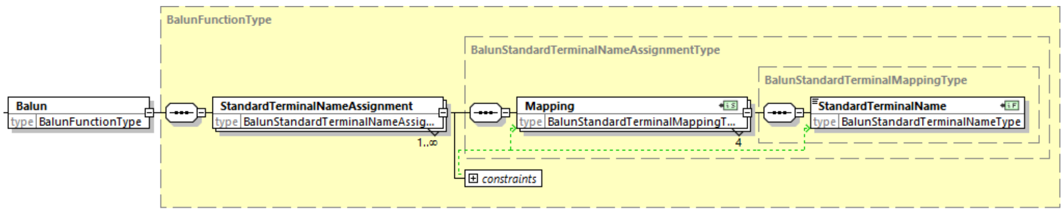
4.7.3.15.1. Antenna

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Antenna**
diagram	
type	**AntennaFunctionType, AntennaStandardTerminalNameAssignmentType, AntennaMandatoryStandardTerminalMappingType, AntennaMandatoryStandardTerminalNameType, AntennaOptionalStandardTerminalMappingType, AntennaOptionalStandardTerminalNameType.**
list of enumerate values	**MandatoryMapping/StandardTerminalName** **1. Port 1** **OptionalMapping/StandardTerminalName** **1. Port2**

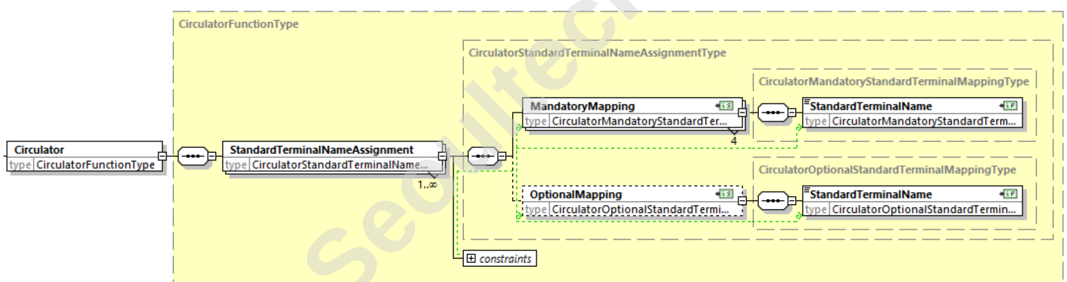
4.7.3.15.2. Attenuator

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Attenuator**
diagram	
type	**AttenuatorFunctionType, AttenuatorStandardTerminalNameAssignmentType, AttenuatorStandardTerminalMappingType, AttenuatorStandardTerminalNameType.**
list of enumerate values	**Mapping/StandardTerminalName** **1. Port 1** **2. Port 2** **3. Ground**

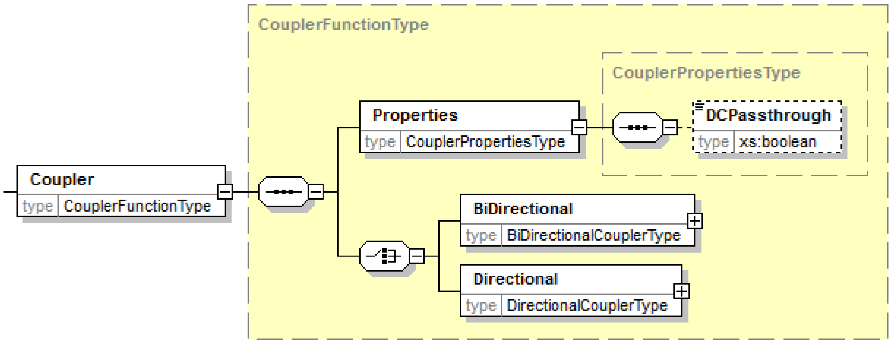
4.7.3.15.3. Balun

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Balun</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">BalunFunctionType, BalunStandardTerminalNameAssignmentType, BalunStandardTerminalMappingType, BalunStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Balanced 1</td><td>2. Balanced 2</td><td>3. Unbalanced</td><td>4. Ground</td></tr>
</table>

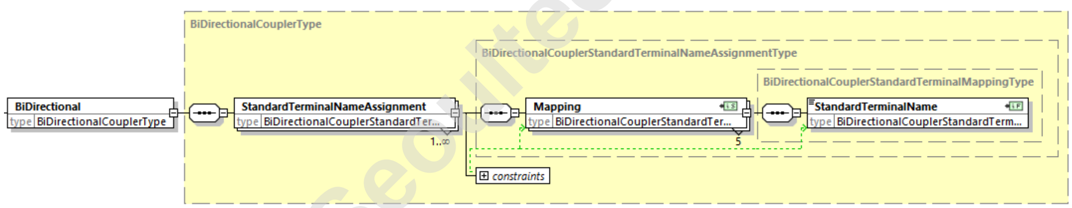
4.7.3.15.4. Circulator

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Circulator</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">CirculatorFunctionType, CirculatorStandardTerminalNameAssignmentType, CirculatorMandatoryStandardTerminalMappingType, CirculatorMandatoryStandardTerminalNameType, CirculatorOptionalStandardTerminalMappingType, CirculatorOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Port 1</td><td>2. Port 2</td><td>3. Port 3</td><td>4. Ground</td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. Port 4</td><td></td><td></td><td></td></tr>
</table>

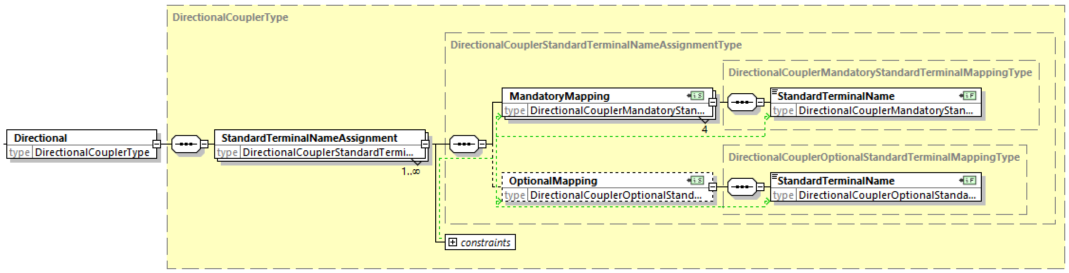
4.7.3.15.5. Coupler

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Coupler**
diagram	
type	**CouplerFunctionType, CouplerPropertiesType, BidirectionalCouplerType, DirectionalCouplerType.**

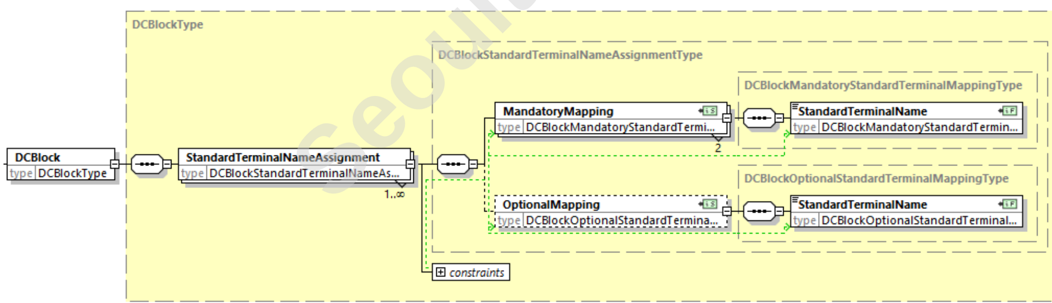
4.7.3.15.5.1. BiDirectional

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Coupler/BiDirectional**			
diagram				
type	**BidirectionalCouplerType, BidirectionalCouplerStandardTerminalNameAssignmentType, BiDirectionalCouplerStandardTerminalMappingType, BiDirectionalCouplerStandardTerminalNameType.**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. Input	**2. Output**	**3. Coupled Forward**	**4. Coupled Reverse**
	5. Ground			

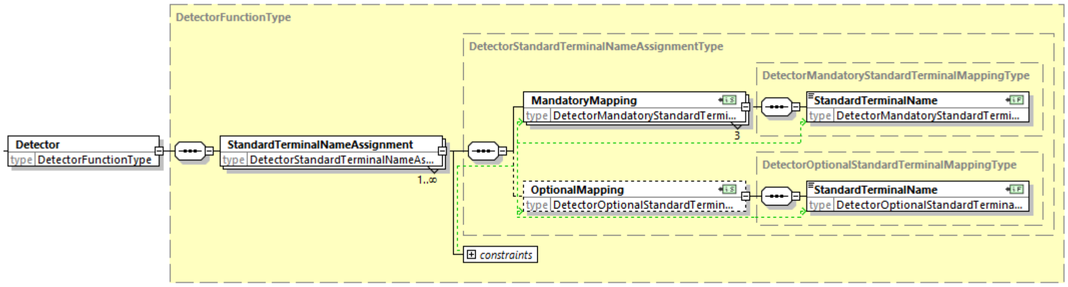
4.7.3.15.5.2. Directional

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Coupler/Directional			
diagram				
type	DirectionalCouplerType, DirectionalCouplerStandardTerminalNameAssignmentType, ConnectionType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. Input	2. Output	3. Coupled Forward	4. Ground
	OptionalMapping/StandardTerminalName			
	1. Termination			

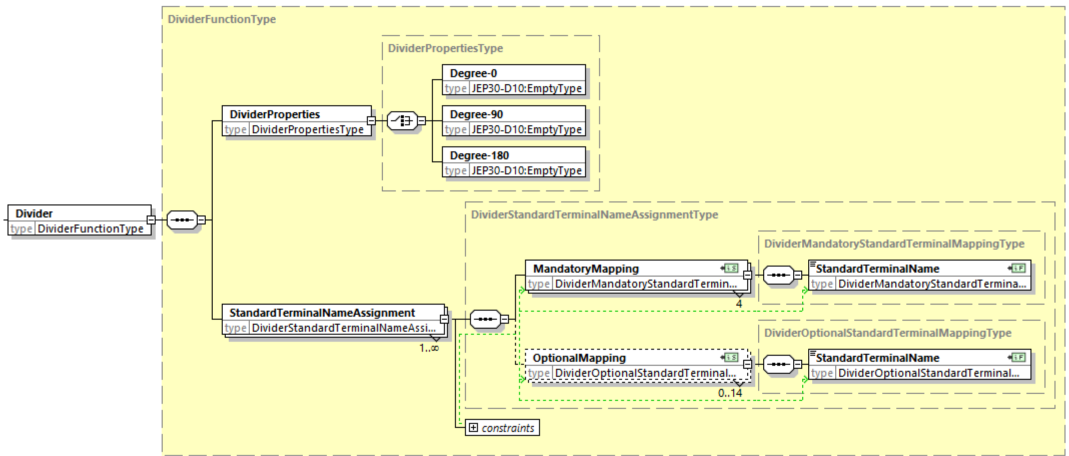
4.7.3.15.6. DC Block

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/DCBlock			
diagram				
type	DCBlockType, DCBlockStandardTerminalNameAssignmentType, DCBlockMandatoryStandardTerminalMappingType, DCBlockMandatoryStandardTerminalNameType, DCBlockOptionalStandardTerminalMappingType, DCBlockOptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. Port 1	2. Port 2		
	OptionalMapping/StandardTerminalName			
	1. Ground			

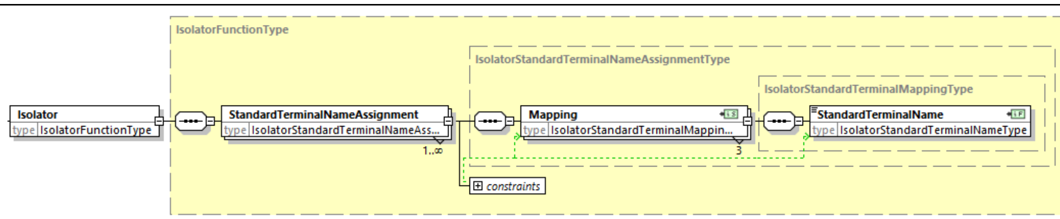
4.7.3.15.7. Detector

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Detector</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DetectorFunctionType, DetectorStandardTerminalNameAssignmentType, DetectorMandatoryStandardTerminalMappingType, DetectorMandatoryStandardTerminalNameType, DetectorOptionalStandardTerminalMappingType, DetectorOptionalStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Input 1</td><td>2. Output</td><td>3. Ground</td><td></td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>4. Input 2</td><td></td><td></td><td></td></tr>
</table>

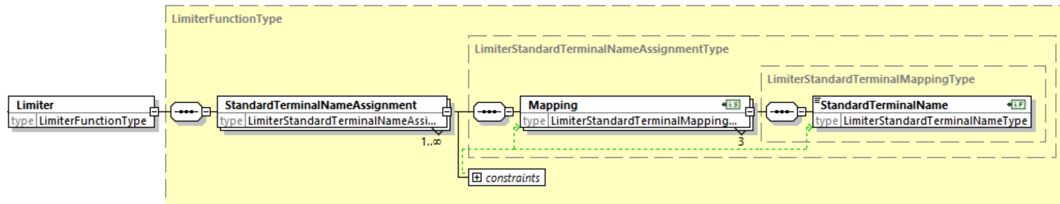
4.7.3.15.8. Divider

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Divider			
diagram				
type	DividerFunctionType, DividerPropertiesType, DividerStandardTerminalNameAssignmentType, DividerMandatoryStandardTerminalMappingType, DividerMandatoryStandardTerminalNameType, DividerOptionalStandardTerminalMappingType, DividerOptionalStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. SUM	2. Port 1	3. Port 2	4. Ground
	OptionalMapping/StandardTerminalName			
	1. Port 3	2. Port 4	3. Port 5	4. Port 6
	5. Port 7	6. Port 8	7. Port 9	8. Port 10
	9. Port 11	10. Port 12	11. Port 13	12. Port 14
	13. Port 15	14. Port 16		

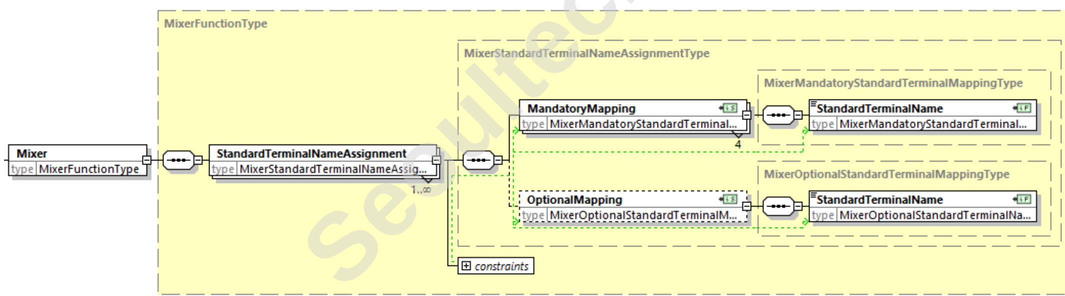
4.7.3.15.9. Isolator

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Isolator			
diagram				
type	IsolatorFunctionType, IsolatorStandardTerminalNameAssignmentType, IsolatorStandardTerminalMappingType, IsolatorStandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. Input	2. Output	3. Ground	

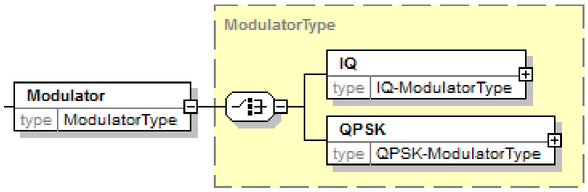
4.7.3.15.10. Limiter

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Limiter</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">LimiterFunctionType, LimiterStandardTerminalNameAssignmentType,
LimiterStandardTerminalMappingType, LimiterStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Input</td><td>2. Output</td><td>3. Ground</td><td></td></tr>
</table>

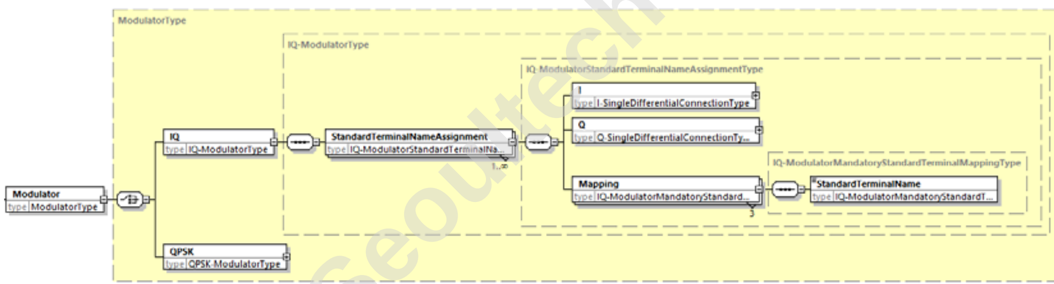
4.7.3.15.11. Mixer

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Mixer</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">MixerFunctionType, MixerStandardTerminalNameAssignmentType,
MixerMandatoryStandardTerminalMappingType, MixerMandatoryStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. RF</td><td>2. LO</td><td>3. IF</td><td>4. Ground</td></tr>
<tr><td colspan="4">OptionalMapping/StandardTerminalName</td></tr>
<tr><td>1. PowerLO</td><td></td><td></td><td></td></tr>
</table>

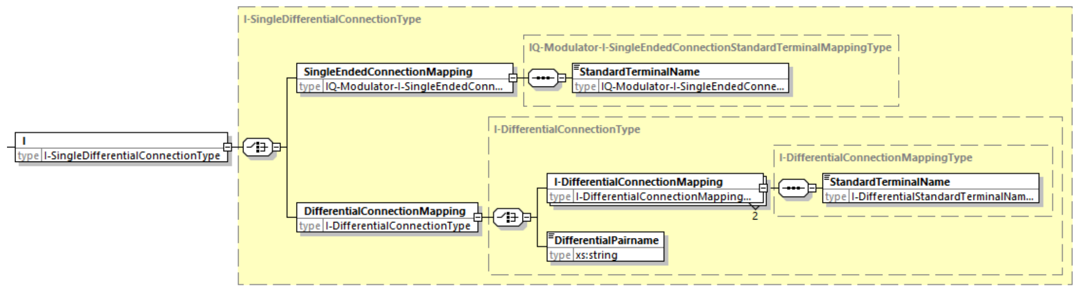
4.7.3.15.12. Modulator

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Modulator
diagram	
type	ModulatorType, IQ-ModulatorType, IQ–ModulatorStandardTerminalNameAssignmentType, QPSK–ModulatorType, QPSK–ModulatorStandardTerminalNameAssignmentType, ConnectionType.

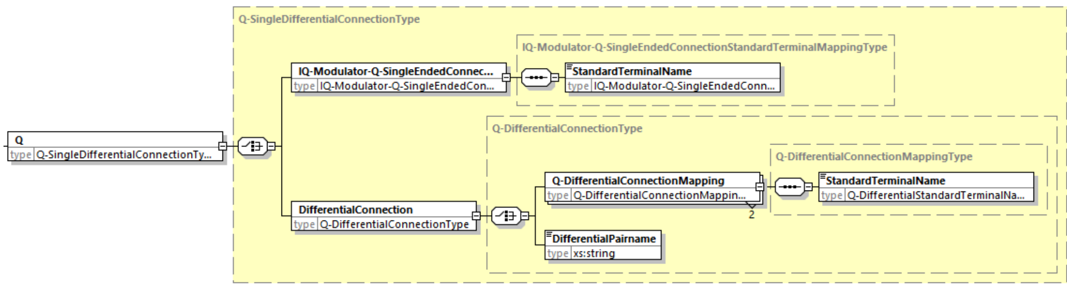
4.7.3.15.12.1. IQ - Modulator Standard Terminal Name Assignment

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Modulator/IQ			
diagram				
type	IQ–ModulatorStandardTerminalNameAssignmentType, I-SingleDifferentialConnectionType, Q-SingleDifferentialConnectionType, IQ-ModulatorMandatoryStandardTerminalMappingType, IQ-ModulatorMandatoryStandardTerminalNameType.			
list of enumerate values	IQ-ModulatorMandatoryStandardTerminalMapping/StandardTerminalName			
	1. RF	2. LO	3. Ground	

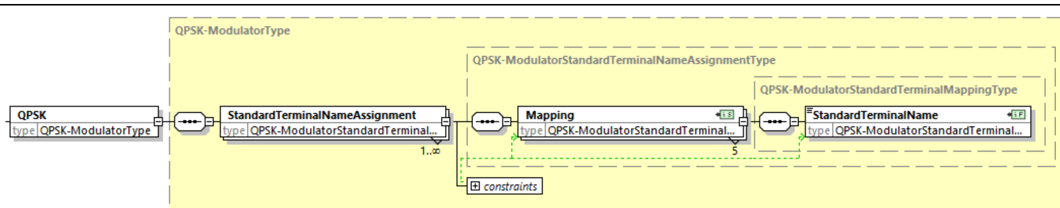
4.7.3.15.12.1.1. I-SingleDifferentialConnectionType

<table>
<tr><td>path</td><td colspan="4">1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Modulator/IQ/StandardTerminalNameAssignment/I
2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Demodulator/IQ/StandardTerminalNameAssignment/I</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">I-SingleDifferentialConnectionType,
IQ-Modulator-I-SingleEndedConnectionStandardTerminalMappingType,
IQ-Modulator-I-SingleEndedConnectionStandardTerminalNameType, I-DifferentialConnectionType,
I-DifferentialConnectionMappingType, I-DifferentialStandardTerminalNameType</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">SingleEndedConnectionMapping/StandardTerminalName</td></tr>
<tr><td>1. I</td><td></td><td></td><td></td></tr>
<tr><td colspan="4">DifferentialConnectionMapping/I-DifferentialConnectionMapping/StandardTerminalName</td></tr>
<tr><td>1. I+</td><td>2. I-</td><td></td><td></td></tr>
</table>

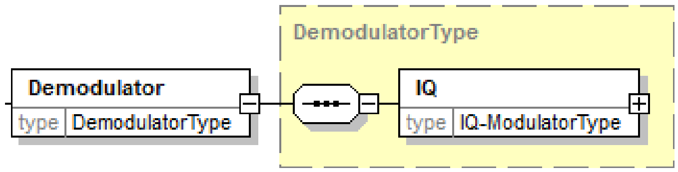
4.7.3.15.12.1.2. Q-SingleDifferentialConnectionType

path	1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Modulator/IQ/StandardTerminalNameAssignment/Q 2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Demodulator/IQ/StandardTerminalNameAssignment/Q			
diagram				
type	SingleDifferentialConnectionType, IQ-Modulator-Q-SingleEndedConnectionStandardTerminalMappingType, IQ-Modulator-Q-SingleEndedConnectionStandardTerminalNameType, Q-DifferentialConnectionType, Q-DifferentialConnectionMappingType, Q-DifferentialStandardTerminalNameType			
list of enumerate values	SingleEndedConnectionMapping/StandardTerminalName			
	1. Q			
	DifferentialConnectionMapping/I-DifferentialConnectionMapping/StandardTerminalName			
	1. Q+	2. Q-		

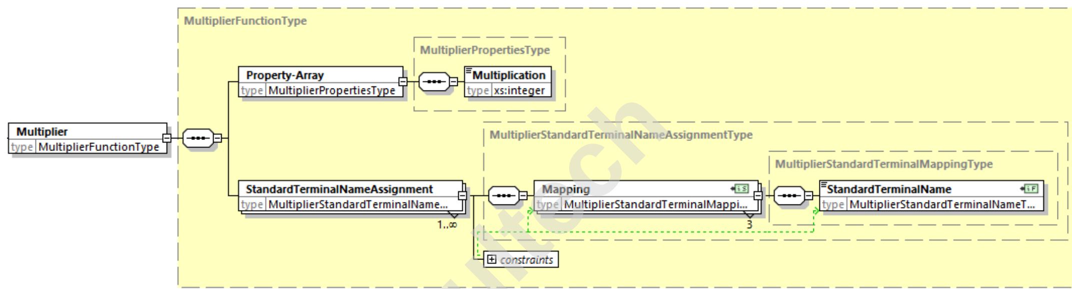
4.7.3.15.12.2. QPSK - Modulator Standard Terminal Name Assignment

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Modulator/QPSK			
diagram				
type	QPSK-ModulatorType, QPSK-ModulatorStandardTerminalNameAssignmentType, QPSK-ModulatorStandardTerminalMappingType, QPSK-ModulatorStandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. RF Input	2. RF Output	3. Ctrl 1	4. Ctrl 2
	5. Ground			

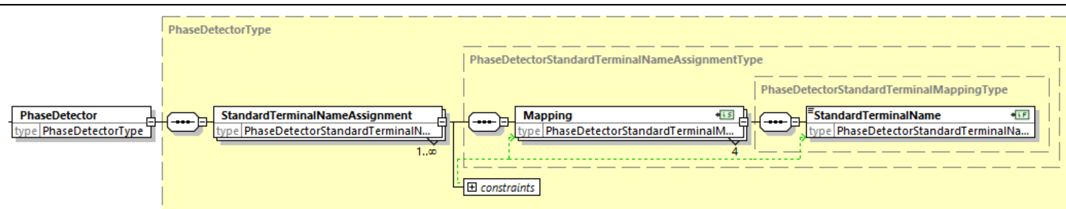
4.7.3.15.13. Demodulator

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Demodulator
diagram	
type	DemodulatorType, IQ–ModulatorType

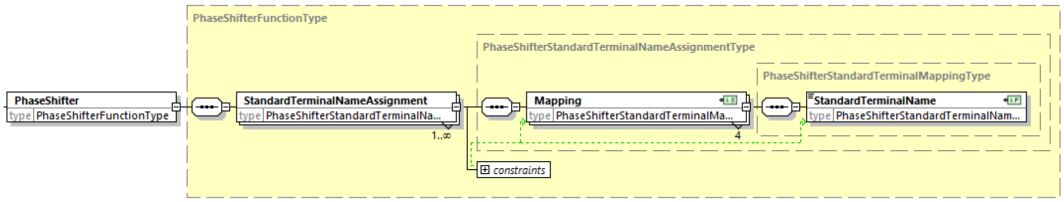
4.7.3.15.14. Multiplier

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/Multiplier
diagram	
type	MultiplierFunctionType, MultiplierPropertiesType, MultiplierStandardTerminalNameAssignmentType, MultiplierStandardTerminalMappingType, MultiplierStandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName 1. Input 2. Output 3. Ground

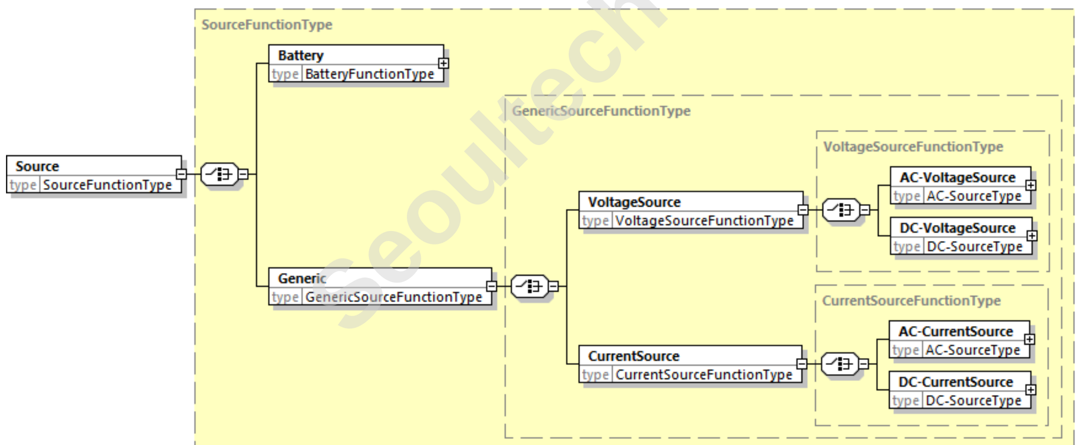
4.7.3.15.15. Phase Detector

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/PhaseDetector
diagram	
type	PhaseDetectorType, PhaseDetectorStandardTerminalNameAssignmentType, PhaseDetectorStandardTerminalMappingType, PhaseDetectorStandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName 1. Input 2. Reference 3. Output 4. Ground

4.7.3.15.16. Phase Shifter

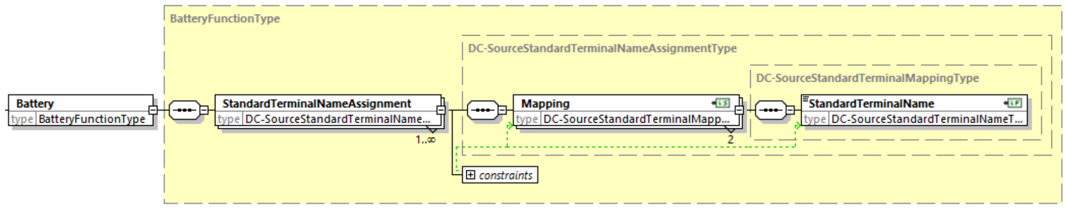
<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/RF/PhaseShifter</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">PhaseShifterFunctionType, PhaseShifterStandardTerminalNameAssignmentType, ConnectionType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Input</td><td>2. Output</td><td>3. Control</td><td>4. Ground</td></tr>
</table>

4.7.3.16. Source

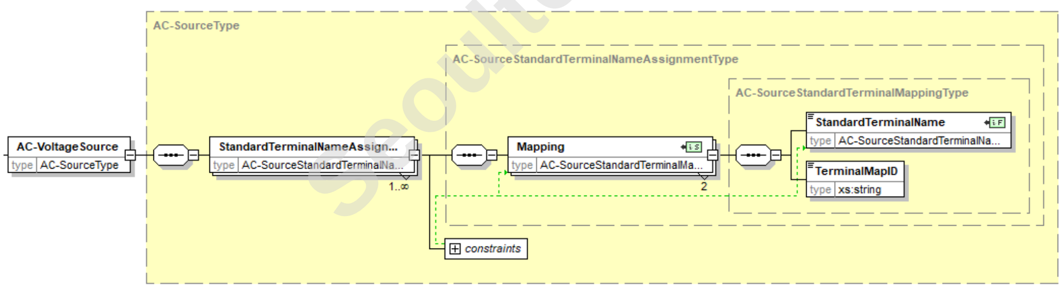
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Source</td></tr>
<tr><td>diagram</td><td>

</td></tr>
<tr><td>type</td><td>SourceFunctionType, BatteryFunctionType, GenericSourceFunctionType, VoltageSourceFunctionType, CurrentSourceFunctionType, AC-SourceType, DC-SourceType.</td></tr>
</table>

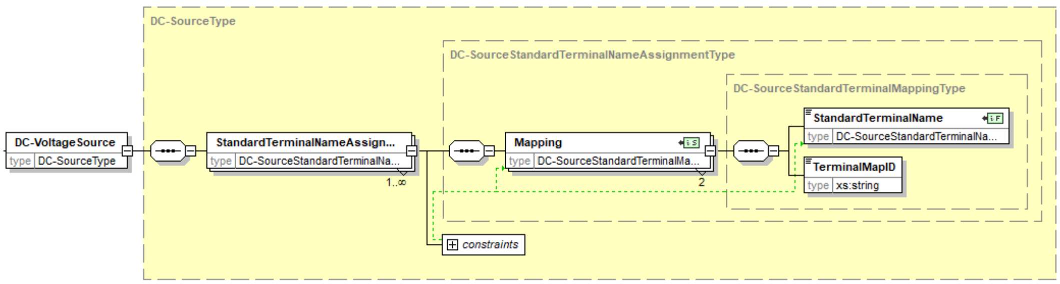
4.7.3.16.1. Battery Source

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Source/Battery</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">BatteryFunctionType, DC-SourceStandardTerminalNameAssignmentType,
DC-SourceStandardTerminalMappingType, DC-SourceStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Positive</td><td>2. Negative</td><td></td><td></td></tr>
</table>

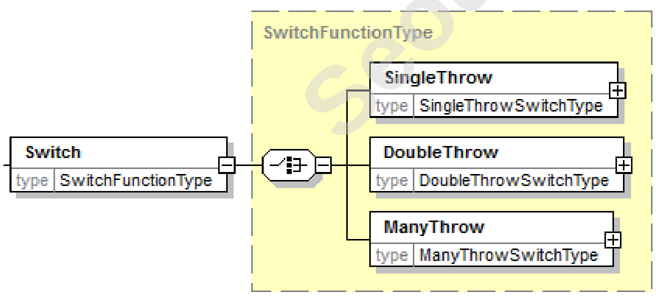
4.7.3.16.2. AC - Source Type

<table>
<tr><td>path</td><td colspan="4">1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Source/Generic/VoltageSource/AC-VoltageSource
2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Source/Generic/CurrentSource/AC-VoltageSource</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">AC-SourceType, AC-SourceStandardTerminalNameAssignmentType,
AC-SourceStandardTerminalMappingType, AC-SourceStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Terminal 1</td><td>2. Terminal 2</td><td></td><td></td></tr>
</table>

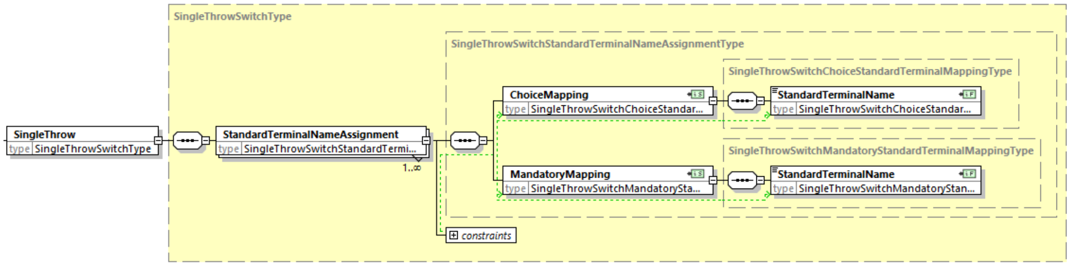
4.7.3.16.3. DC - Source Type

<table>
<tr><td>path</td><td colspan="4">1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Source/Generic/VoltageSource/DC-VoltageSource
2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Source/Generic/CurrentSource/DC-VoltageSource</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DC-SourceType, DC-SourceStandardTerminalNameAssignmentType,
DC-SourceStandardTerminalMappingType, DC-SourceStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Positive</td><td>2. Negative</td><td></td><td></td></tr>
</table>

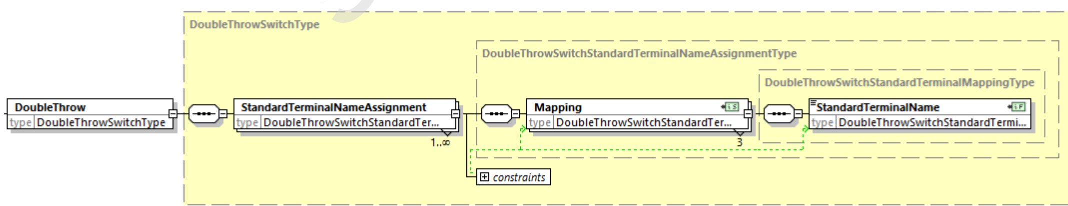
4.7.3.17. Switch

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Switch</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>SwitchFunctionType, SingleThrowSwitchType, DoubleThrowSwitchType, ManyThrowSwitchType.</td></tr>
</table>

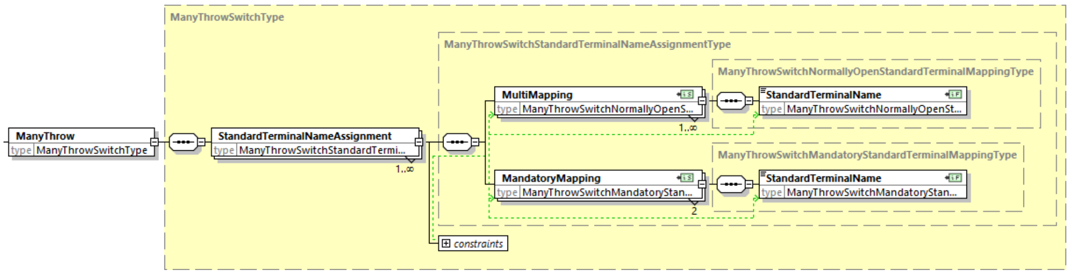
4.7.3.17.1. Single Throw

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Switch/SingleThrow</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">SingleThrowSwitchType, SingleThrowSwitchStandardTerminalNameAssignmentType,
SingleThrowSwitchChoiceStandardTerminalMappingType,
SingleThrowSwitchChoiceStandardTerminalNameType
SingleThrowSwitchMandatoryStandardTerminalMappingType
SingleThrowSwitchMandatoryStandardTerminalNameType.</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="4">ChoiceMapping/StandardTerminalName</td></tr>
<tr><td>1. Normally Closed</td><td>2. Normally Open</td><td></td><td></td></tr>
<tr><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Pole</td><td></td><td></td><td></td></tr>
</table>

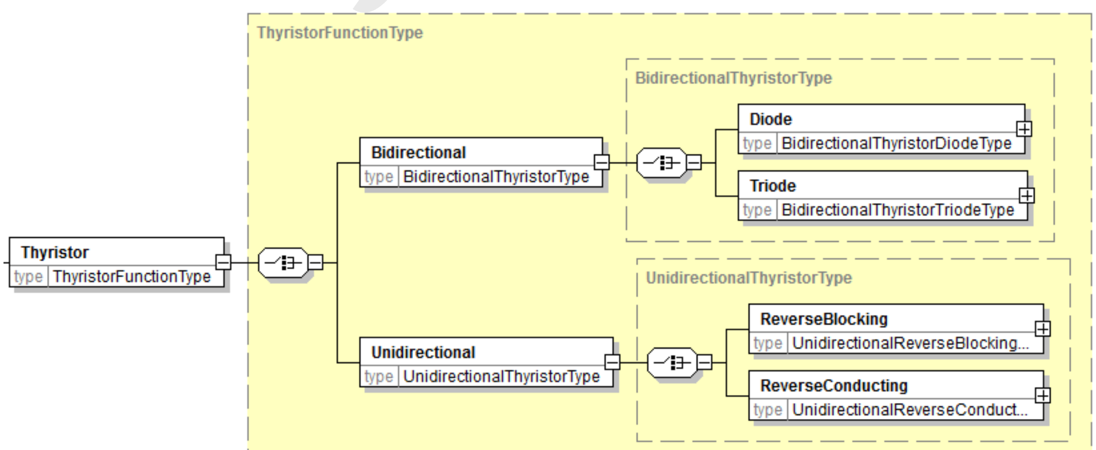
4.7.3.17.2. Double Throw

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Switch/DoubleThrow</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">DoubleThrowSwitchType, DoubleThrowSwitchStandardTerminalNameAssignmentType,
DoubleThrowSwitchStandardTerminalMappingType, DoubleThrowSwitchStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Normally Closed</td><td>2. Normally Open</td><td>3. Pole</td><td></td></tr>
</table>

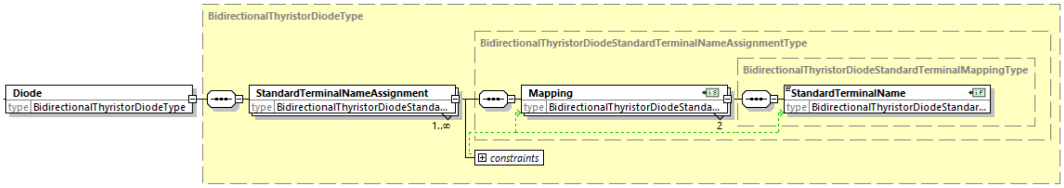
4.7.3.17.3. Many Throw

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Switch/SingleThrow
diagram	
type	ManyThrowSwitchType, ManyThrowSwitchStandardTerminalNameAssignmentType, ManyThrowSwitchNormallyOpenStandardTerminalMappingType, ManyThrowSwitchNormallyOpenStandardTerminalNameType, ManyThrowSwitchMandatoryStandardTerminalMappingType, ManyThrowSwitchMandatoryStandardTerminalNameType.
list of enumerate values	MultiMapping/StandardTerminalName 1. Normally Open MandatoryMapping/StandardTerminalName 1. Normally Closed 2. Pole

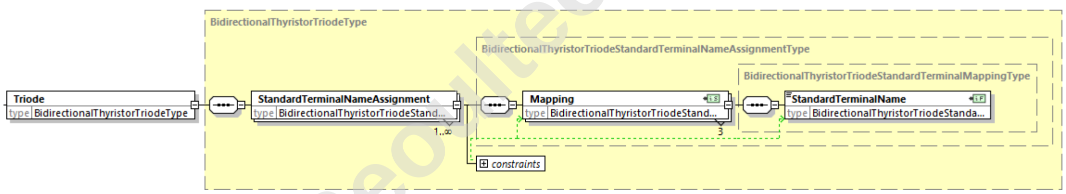
4.7.3.18. Thyristor

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Thyristor
diagram	
type	ThyristorFunctionType, BidirectionalThyristorType, BidirectionalThyristorDiodeStandardTerminalNameAssignmentType, BidirectionalThyristorTriodeType, UnidirectionalThyristorType, UnidirectionalReverseBlockingThyristorType, UnidirectionalReverseConductingThyristorType.

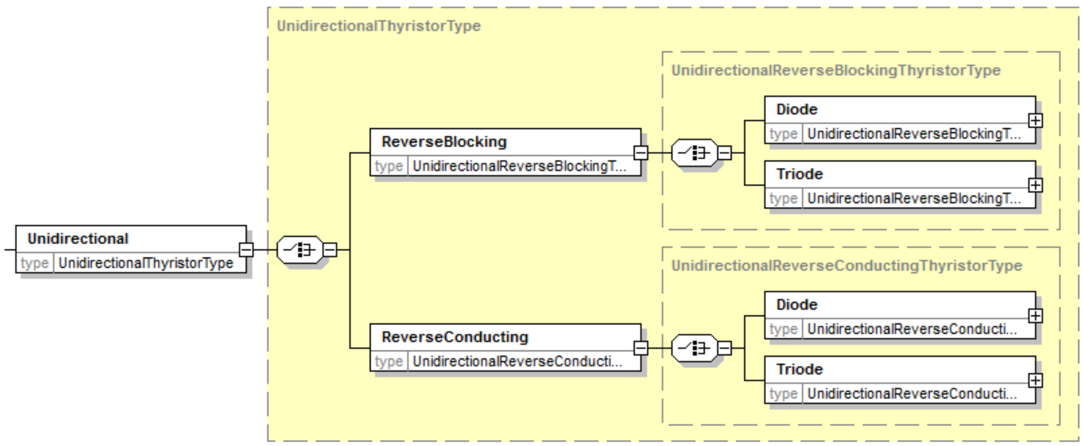
4.7.3.18.1. Bidirectional Thyristor Diode

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Thyristor/Bidirectional/Diode</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">BidirectionalThyristorDiodeType, BidirectionalThyristorDiodeStandardTerminalNameAssignmentType, BidirectionalThyristorDiodeStandardTerminalMappingType, BidirectionalThyristorDiodeStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Terminal 1</td><td>2. Terminal 2</td><td></td><td></td></tr>
</table>

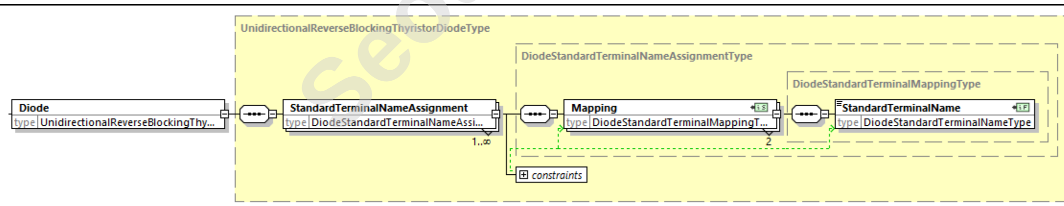
4.7.3.18.2. Bidirectional Thyristor Triode

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Thyristor/Bidirectional/Triode</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">BidirectionalThyristorDiodeType, BidirectionalThyristorDiodeStandardTerminalNameAssignmentType, BidirectionalThyristorTriodeStandardTerminalMappingType, BidirectionalThyristorTriodeStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Terminal 1</td><td>2. Terminal 2</td><td>3. Gate</td><td></td></tr>
</table>

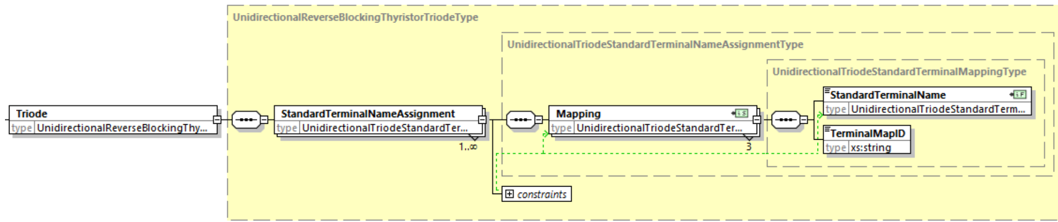
4.7.3.18.3. Unidirectional

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Thyristor/Unidirectional**
diagram	
type	**UnidirectionalThyristorType, UnidirectionalReverseBlockingThyristorType, UnidirectionalReverseConductingThyristorType.**

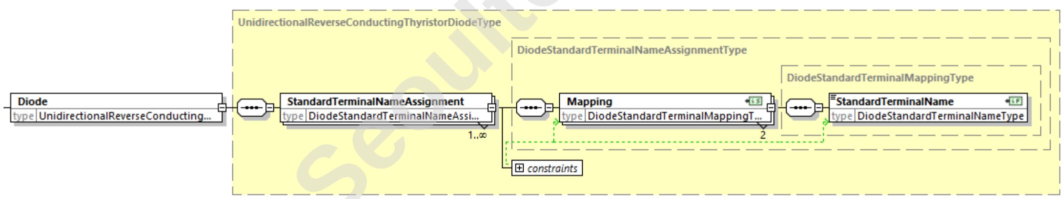
4.7.3.18.3.1. Reverse Blocking - Diode

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Thyristor/Unidirectional/ReverseBlocking/Diode**			
diagram				
type	**UnidirectionalReverseBlockingThyristorDiodeType, DiodeStandardTerminalNameAssignmentType, DiodeStandardTerminalMappingType, DiodeStandardTerminalNameType.**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. Anode	**2. Cathode**		

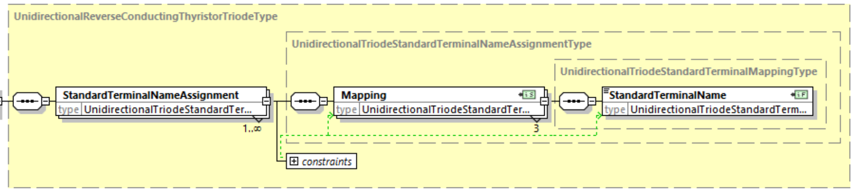
4.7.3.18.3.2. Reverse Blocking - Triode

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Thyristor/Unidirectional/ReverseBlocking/Triode
diagram	
type	UnidirectionalReverseBlockingThyristorTriodeType, UnidirectionalTriodeStandardTerminalNameAssignmentType, UnidirectionalTriodeStandardTerminalMappingType, UnidirectionalTriodeStandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName 1. Anode 2. Cathode 3. Gate

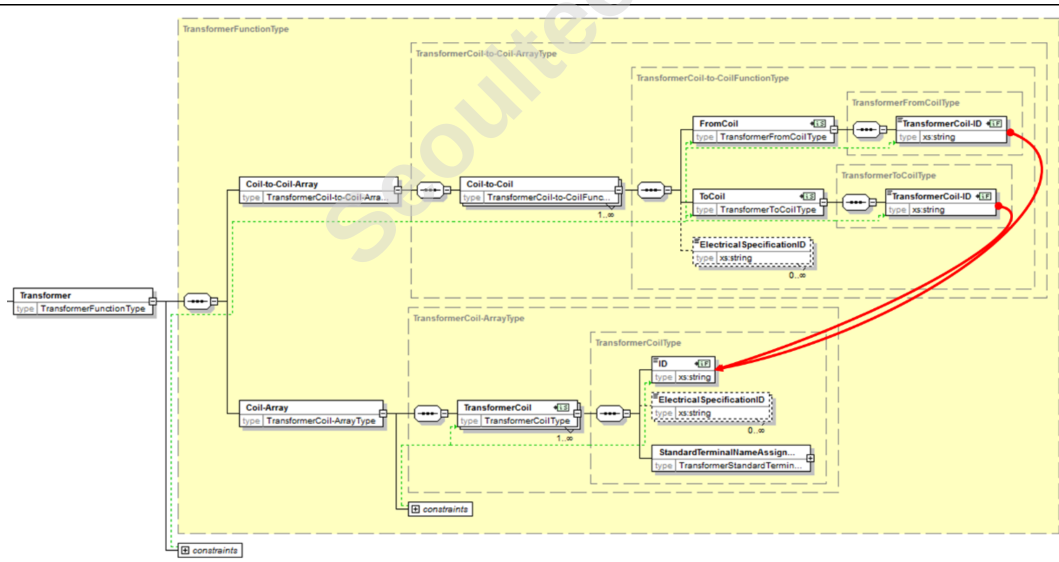
4.7.3.18.3.3. Reverse Conducting - Diode

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Thyristor/Unidirectional/ReverseConducting/Diode
diagram	
type	UnidirectionalReverseConductingThyristorDiodeType, DiodeStandardTerminalNameAssignmentType, DiodeStandardTerminalMappingType, DiodeStandardTerminalNameType.
list of enumerate values	Mapping/StandardTerminalName 1. Anode 2. Cathode

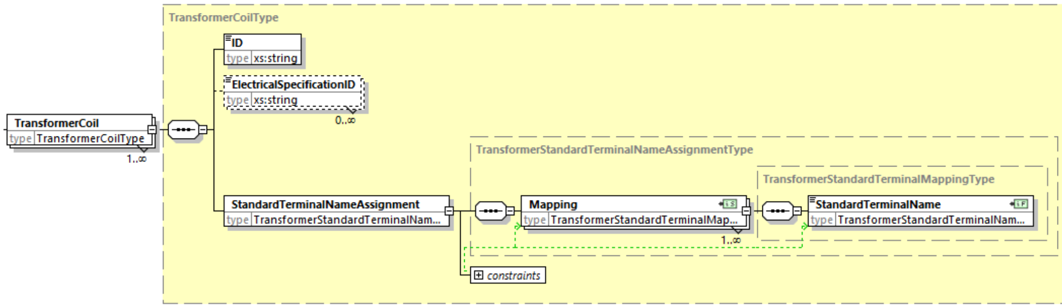
4.7.3.18.3.4. Reverse Conducting - Triode

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Thyristor/Unidirectional/ReverseConducting/Triode</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">UnidirectionalReverseConductingThyristorTriodeType, UnidirectionalTriodeStandardTerminalNameAssignmentType, UnidirectionalTriodeStandardTerminalMappingType, UnidirectionalTriodeStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Anode</td><td>2. Cathode</td><td>3. Gate</td><td></td></tr>
</table>

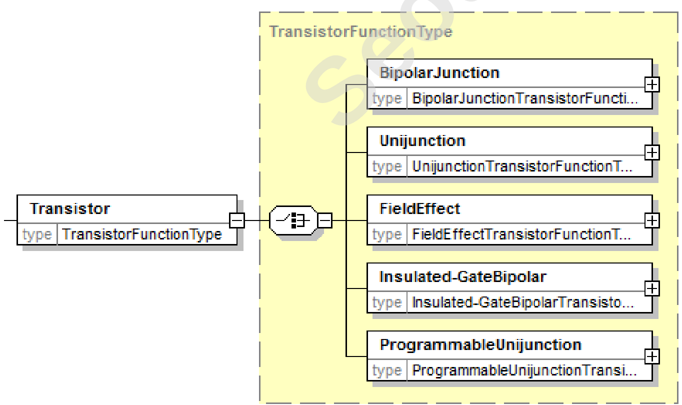
4.7.3.19. Transformer

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transformer</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>TransformerFunctionType, TransformerCoil-to-Coil-ArrayType, TransformerCoil-to-CoilFunctionType, TransformerFromCoilType, TransformerToCoilType, TransformerCoil-ArrayType, TransformerCoilType, TransformerStandardTerminalNameAssignmentType, TransformerStandardTerminalNameAssignmentType.</td></tr>
</table>

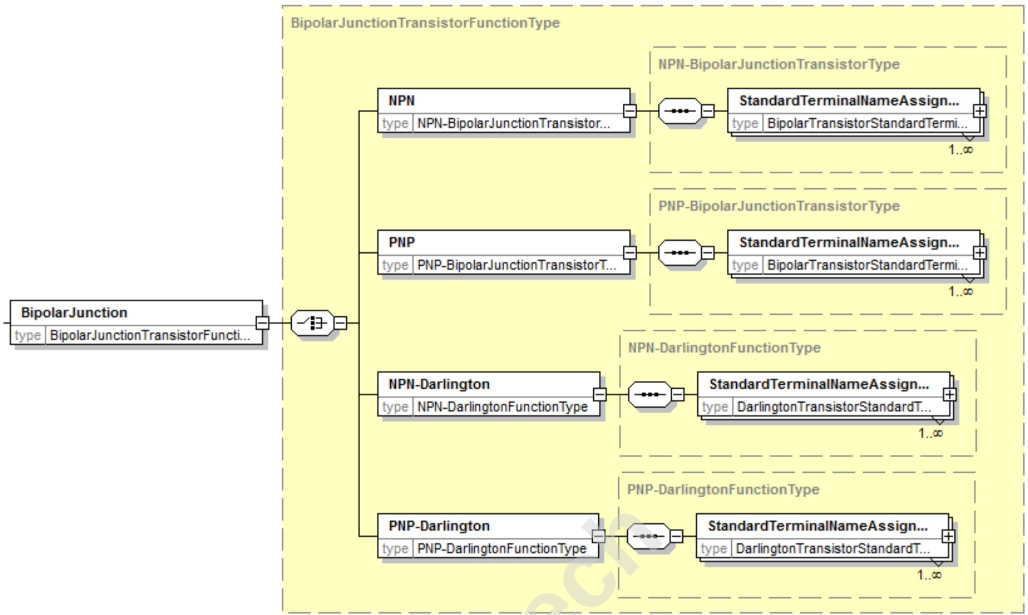
4.7.3.19.1. Transformer Coil Mapping

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transformer			
diagram				
type	TransformerCoilType, TransformerStandardTerminalNameAssignmentType, TransformerStandardTerminalMappingType, TransformerStandardTerminalNameType.			
list of enumerate values	Mapping/StandardTerminalName			
	1. Start Wiring	2. End Wiring		

4.7.3.20. Transistor

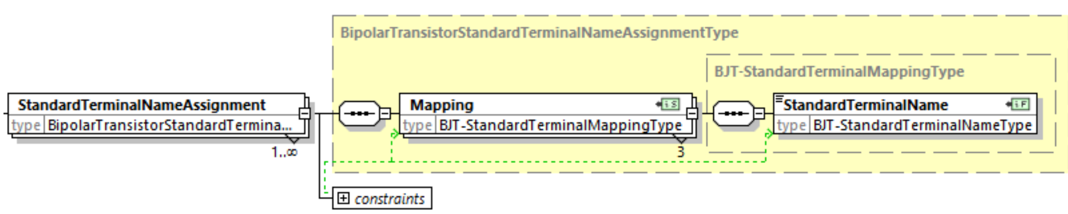
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor
diagram	
type	TransistorFunctionType, BipolarJunctionTransistorFunctionType, UnijunctionTransistorFunctionType, FieldEffectTransistorFunctionType, GateBipolarTransistorFunctionType, ProgrammableUnijunctionTransistorFunctionType.

4.7.3.20.1. Bipolar Junction Transistor

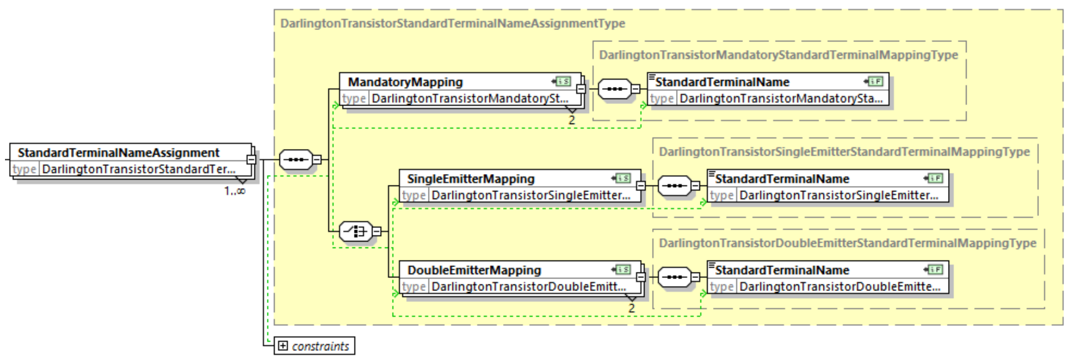
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/BipolarJunction**
diagram	
type	**BipolarJunctionTransistorFunctionType, NPN–BipolarJunctionTransistorType, PNP-BipolarJunctionTransistorType, BipolarTransistorStandardTerminalNameAssignmentType, NPN-DarlingtonFunctionType, PNP–DarlingtonFunctionType, DarlingtonTransistorStandardTerminalNameAssignmentType.**

A *BipolarJunction* can have one of the following four types: *NPN*, *PNP*, *NPN-Darlington*, and *PNP-Darlington*. These four types have two different terminal name assignment as shown below.

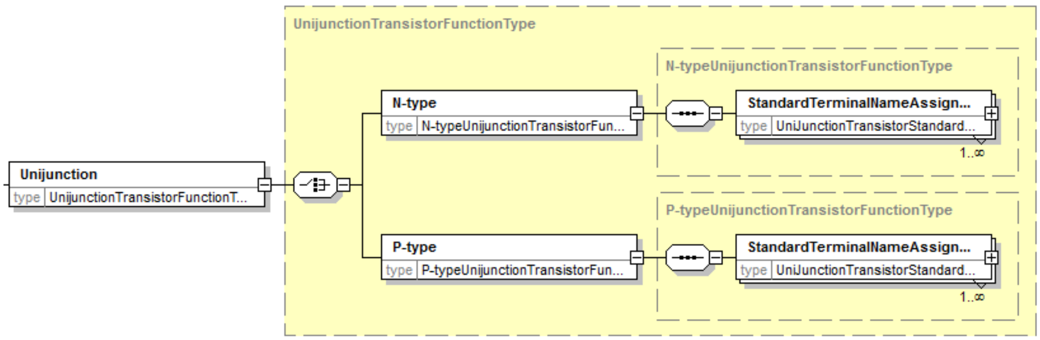
4.7.3.20.1.1. Bipolar Transistor Standard Terminal Name Assignment

path	**1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/BipolarJunction/NPN/StandardTerminalNameAssignment** **2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/BipolarJunction/PNP/StandardTerminalNameAssignment**			
diagram				
type	**BipolarTransistorStandardTerminalNameAssignmentType, BJT-StandardTerminalMappingType, BJT-StandardTerminalNameType.**			
list of enumerate values	**Mapping/StandardTerminalName**			
	1. Base	**2. Collector**	**3. Emitter**	

4.7.3.20.1.2. Darlington Transistor Standard Terminal Name Assignment

path	1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/BipolarJunction/NPN-Darlington 2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/BipolarJunction/PNP-Darlington			
diagram				
type	DarlingtonTransistorStandardTerminalNameAssignmentType, DarlingtonTransistorMandatoryStandardTerminalMappingType, DarlingtonTransistorMandatoryStandardTerminalNameType, DarlingtonTransistorSingleEmitterStandardTerminalMappingType, DarlingtonTransistorSingleEmitterStandardTerminalNameType, DarlingtonTransistorDoubleEmitterStandardTerminalMappingType, DarlingtonTransistorDoubleEmitterStandardTerminalNameType.			
list of enumerate values	MandatoryMapping/StandardTerminalName			
	1. Base	2. Collector		
	SingleEmitterMapping/StandardTerminalName			
	1. Emitter			
	DoubleEmitterMapping/StandardTerminalName			
	1. Emitter 1	2. Emitter 2		

4.7.3.20.2. Unijunction Transistor

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/Unijunction</td></tr>
<tr><td>diagram</td><td>


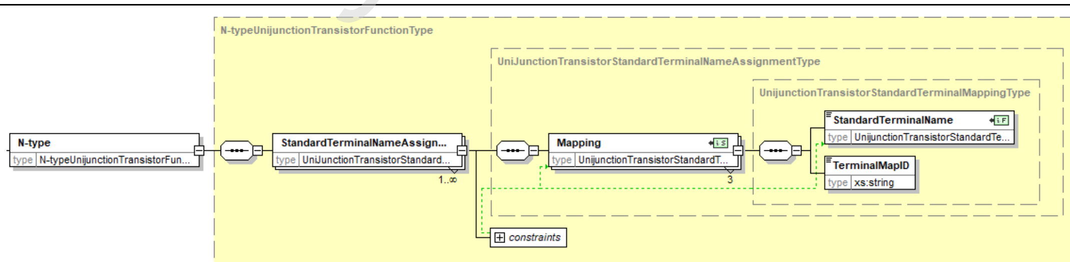
</td></tr>
<tr><td>type</td><td>UnijunctionTransistorFunctionType, N-typeUnijunctionTransistorFunctionType,

P-typeUnijunctionTransistorFunctionType, UniJunctionTransistorStandardTerminalNameAssignmentType.</td></tr>
</table>

A *Unijunction* can have one of the following two types: *N-type* and *P-type*. These types share the same standard terminal name assignment structure.

4.7.3.20.2.1. N-type Unijunction Transistor

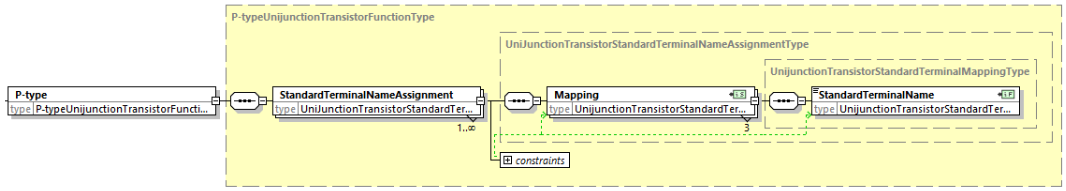
<table>
<tr><td>path</td><td colspan="4">1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/Unijunction/N-type

2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/Unijunction/P-type</td></tr>
<tr><td>diagram</td><td colspan="4">


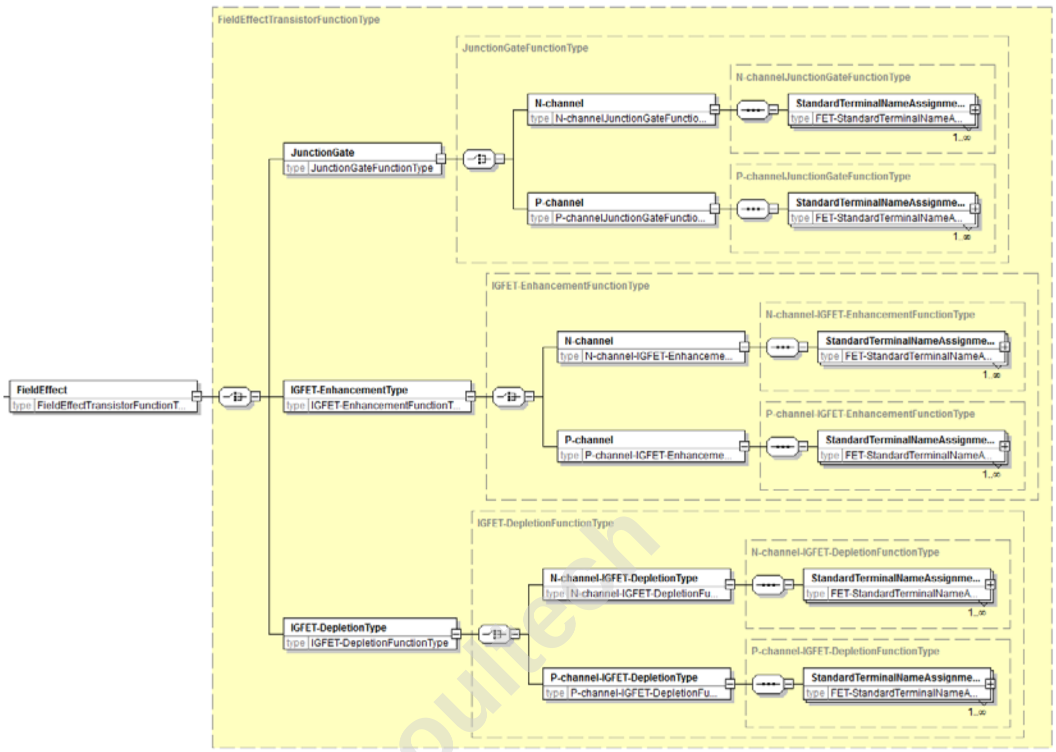
</td></tr>
<tr><td>type</td><td colspan="4">UnijunctionTransistorStandardTerminalNameAssignmentType,

UnijunctionTransistorStandardTerminalMappingType, UnijunctionTransistorStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Base 1</td><td>2. Base 2</td><td>3. Emitter</td><td></td></tr>
</table>

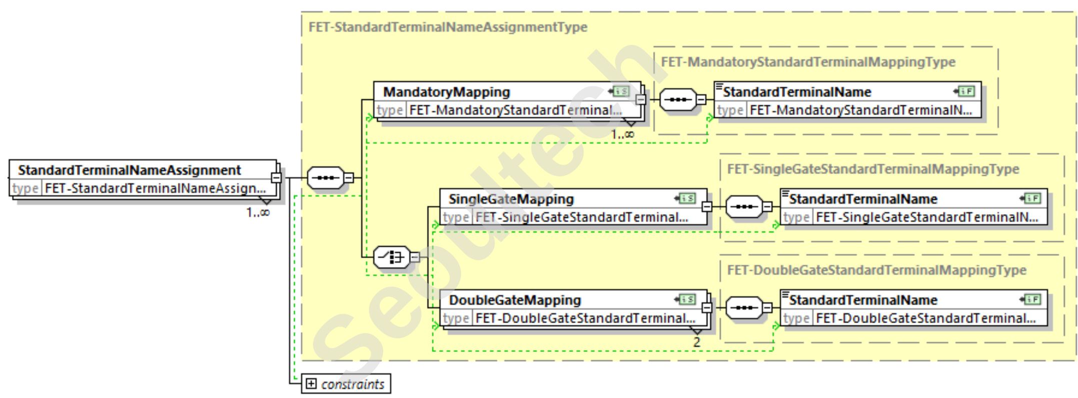
4.7.3.20.2.2. P-type Unijunction Transistor

<table>
<tr><td>path</td><td colspan="4">PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/Unijunction/P-type</td></tr>
<tr><td>diagram</td><td colspan="4">
</td></tr>
<tr><td>type</td><td colspan="4">P-typeUnijunctionTransistorFunctionType,
UnijunctionTransistorStandardTerminalNameAssignmentType,
UnijunctionTransistorStandardTerminalMappingType,
UnijunctionTransistorStandardTerminalNameType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="4">Mapping/StandardTerminalName</td></tr>
<tr><td>1. Base 1</td><td>2. Base 2</td><td>3. Emitter</td><td></td></tr>
</table>

4.7.3.20.3. Field Effect Transistor (FET)

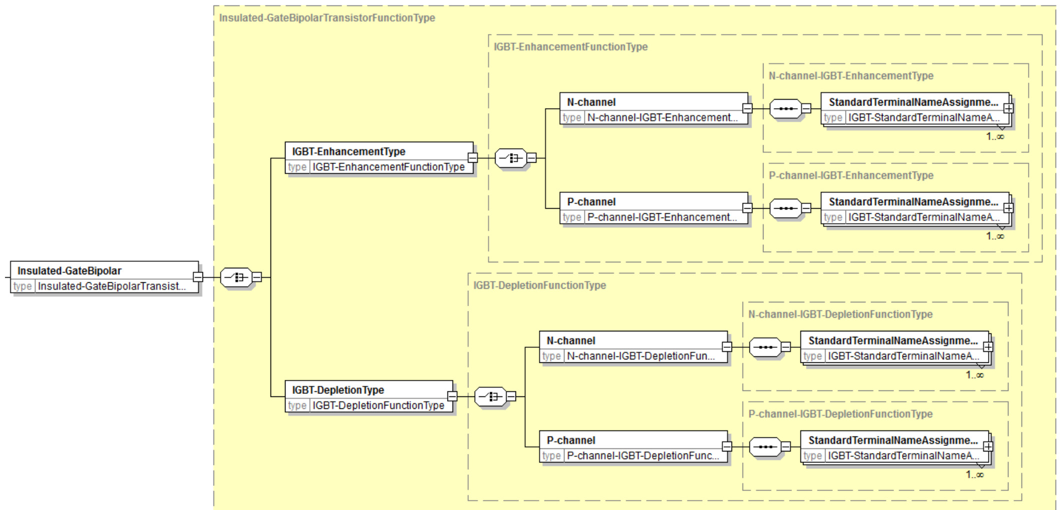
path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/FieldEffect
diagram	
type	FieldEffectTransistorFunctionType, JunctionGateFunctionType, N-channelJunctionGateFunctionType, P-channelJunctionGateFunctionType, IGFET–EnhancementFunctionType, N-channel-IGFET–EnhancementFunctionType, P-channel-IGFET-EnhancementFunctionType, IGFET-DepletionFunctionType, N-channel-IGFET–DepletionFunctionType, P-channel-IGFET–DepletionFunctionType, FET–StandardTerminalNameAssignmentType.

4.7.3.20.3.1. FET – Standard Terminal Name Assignment

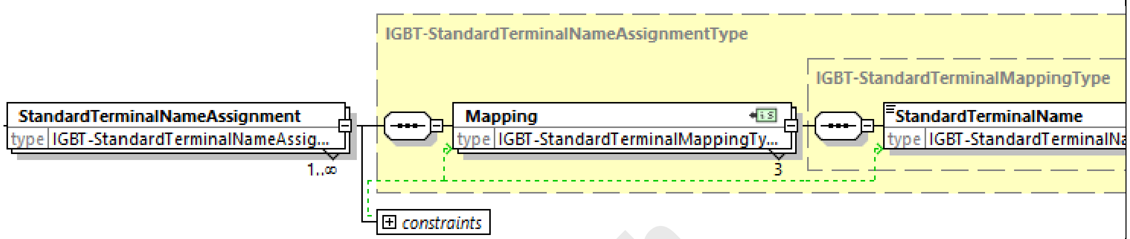
<table>
<tr><td>path</td><td colspan="4">
1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/FieldEffect/JunctionGate/N-channel/StandardTerminalNameAssignment
2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/FieldEffect/JunctionGate/P-channel/StandardTerminalNameAssignment
3. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/FieldEffect/IGFET-EnhancementType/N-channel/StandardTerminalNameAssignment
4. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/FieldEffect/IGFET-EnhancementType/P-channel/StandardTerminalNameAssignment
5. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/FieldEffect/IGFET-DepletionType/N-channelIGFET-DepletionType/StandardTerminalNameAssignment
6. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/FieldEffect/IGFET-DepletionType/P-channelIGFET-DepletionType/StandardTerminalNameAssignment
</td></tr>
<tr><td>diagram</td><td colspan="4">


</td></tr>
<tr><td>type</td><td colspan="4">FET–StandardTerminalNameAssignmentType, FET–MandatoryStandardTerminalMappingType, FET–MandatoryStandardTerminalNameType, FET–SingleGateStandardTerminalMappingType, FET–SingleGateStandardTerminalNameType, FET–DoubleGateStandardTerminalMappingType, FET–DoubleGateStandardTerminalNameType.</td></tr>
<tr><td rowspan="6">list of enumerate values</td><td colspan="4">MandatoryMapping/StandardTerminalName</td></tr>
<tr><td>1. Drain</td><td>2. Source</td><td></td><td></td></tr>
<tr><td colspan="4">SingleEmitterMapping/StandardTerminalName</td></tr>
<tr><td>3. Gate</td><td></td><td></td><td></td></tr>
<tr><td colspan="4">DoubleEmitterMapping/StandardTerminalName</td></tr>
<tr><td>1. Gate 1</td><td>2. Gate 2</td><td></td><td></td></tr>
</table>

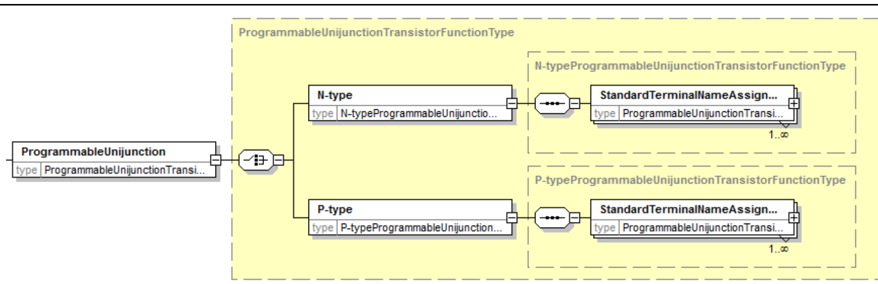
4.7.3.20.4. Insulated Gate Bipolar Transistor (IGBT)

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/Insulated-GateBipolar
diagram	
type	Insulated–GateBipolarTransistorFunctionType, IGBT–EnhancementFunctionType, N-channel-IGBT-EnhancementType, P-channel-IGBT-EnhancementType, IGBT-DepletionFunctionType, N-channel-IGBT-DepletionFunctionType, P-channel-IGBT-DepletionFunctionType, IGBT-StandardTerminalNameAssignmentType.

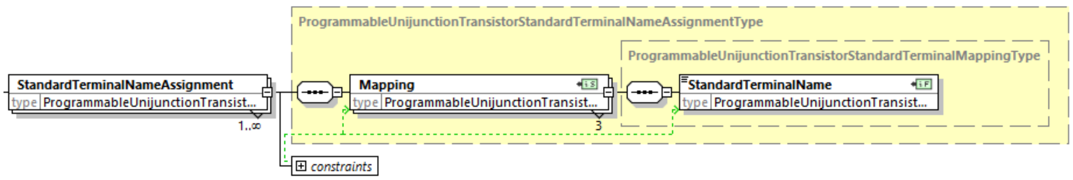
4.7.3.20.4.1. IGBT – Standard Terminal Name Assignment Type

path	1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/Insulated-GateBipolar/IGBT-EnhancementType/N-channel/IGBT-StandardTerminalNameAssignment 2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/Insulated-GateBipolar/IGBT-EnhancementType/P-channel/IGBT-StandardTerminalNameAssignment 3. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/Insulated-GateBipolar/IGBT-DepletionType/N-channel/IGBT-StandardTerminalNameAssignment 4. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/Insulated-GateBipolar/IGBT-DepletionType/P-channel/IGBT-StandardTerminalNameAssignment			
diagram				
type	IGBT-StandardTerminalNameAssignmentType, IGBT-StandardTerminalMappingType, IGBT-StandardTerminalNameType.			
	Mapping/StandardTerminalName			
	1. Gate	2. Collector	3. Emitter	

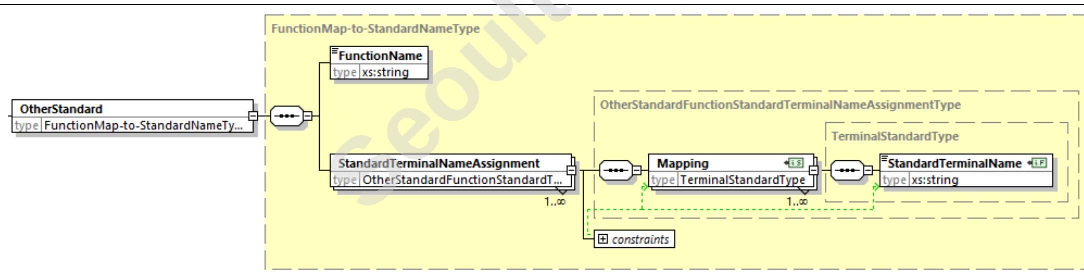
4.7.3.20.5. Programmable Unijunction Transistor

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/ProgrammableUnijunction
diagram	
type	ProgrammableUnijunctionTransistorFunctionType, N-typeProgrammableUnijunctionTransistorFunctionType, P-typeProgrammableUnijunctionTransistorFunctionType, ProgrammableUnijunctionTransistorStandardTerminalNameAssignmentType, ProgrammableUnijunctionTransistorStandardTerminalNameMappingType.

4.7.3.20.5.1. Terminal Mapping

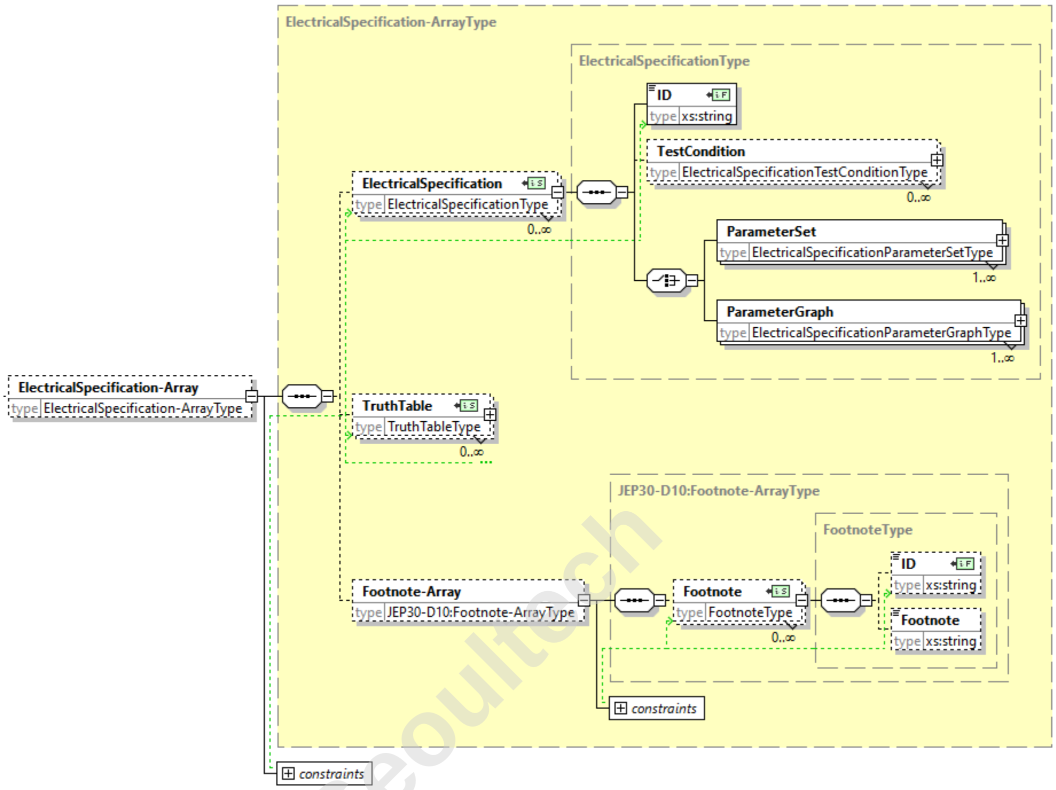
path	1. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/ProgrammableUnijunction/N-type/ProgrammableUnijunctionTransistorStandardTerminalNameAssignment 2. PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/Transistor/ProgrammableUnijunction/P-type/ProgrammableUnijunctionTransistorStandardTerminalNameAssignment			
diagram				
type	ProgrammableUnijunctionTransistorStandardTerminalMappingType, ProgrammableUnijunctionTransistorStandardTerminalNameType.			
	Mapping/StandardTerminalName			
	1. Gate	2. Anode	3. Cathode	

4.7.3.21. Other Standard Electrical Functions

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/OtherStandard
diagram	
type	FunctionMap–to–StandardNameType, OtherStandardFunctionStandardTerminalNameAssignmentType, TerminalStandardType.

This section can be used to capture the standard terminal name assignments for functions not classified here. If other functions are desired to be captured by this XML standard, please contact the JEDEC committee JC-16.

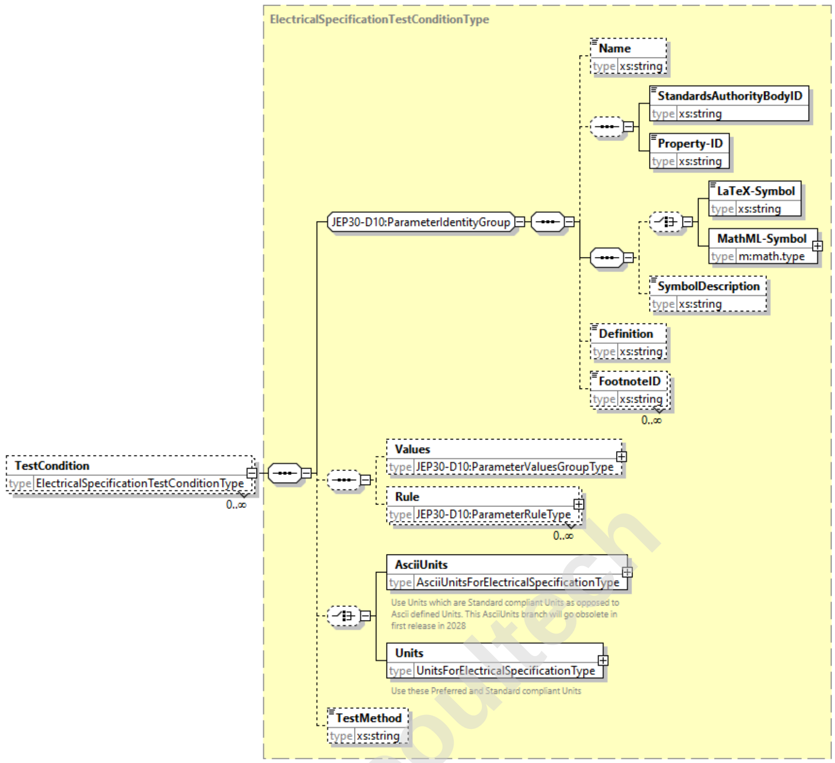
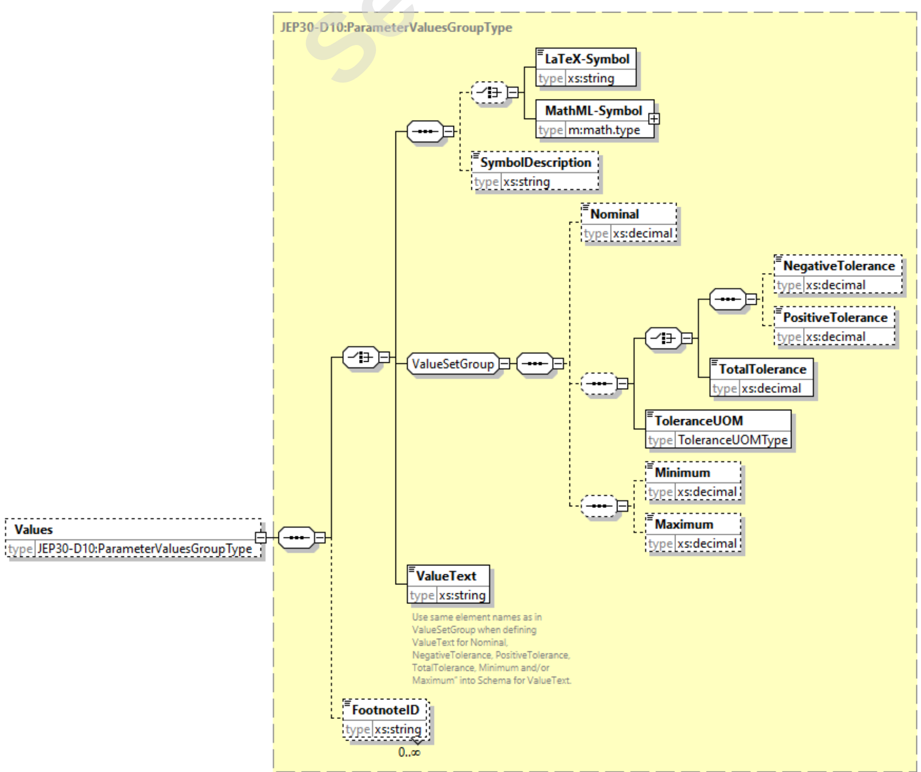
4.7.4. Electrical Specification

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>ElectricalSpecification-ArrayType, ElectricalSpecificationType, ElectricalSpecificationTestConditionType, ElectricalSpecificationParameterSetType, ElectricalSpecificationParameterGraphType, TruthTableType, JEP30-D10:Footnote-ArrayType, FootnoteType.</td></tr>
</table>

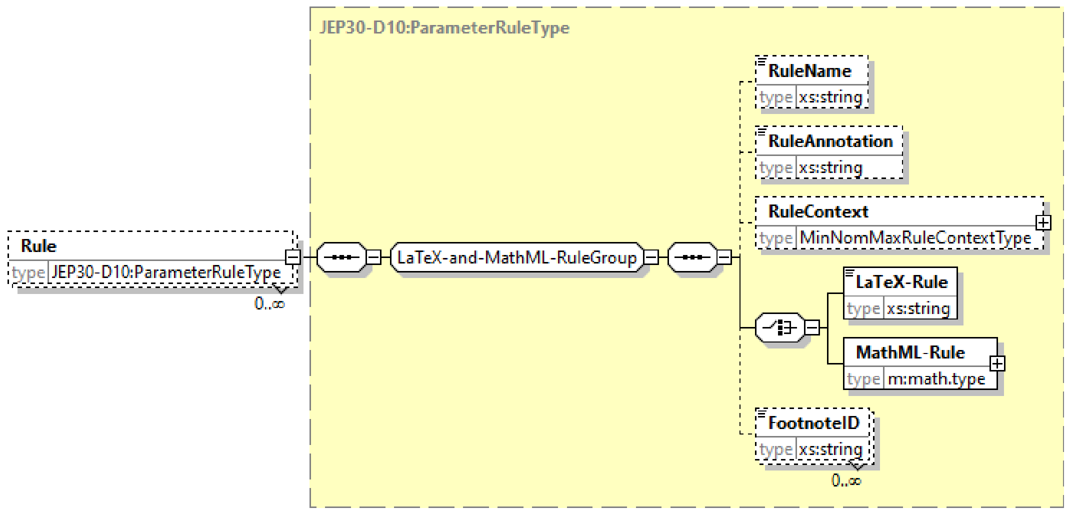
The *ElectricalSpecification-Array* is split into 2 sections, namely the *ElectricalSpecification* which typically captures the analog specifications, and the *TruthTable* which captures the logical definition of the device operation.

Several *TestConditions* can be defined for any given *ParameterSet*, or *ParameterGraph*. *TestConditions* set at this level must be the same for all the content contained in the *ParameterSet*, or the *ParameterGraph*. An example here is the ambient temperature of a device (T_A = 25 °C) in which a set of parameters are defined.

4.7.4.1. Test Condition

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/TestCondition</td></tr>
<tr><td>diagram 1 of 3</td><td>
</td></tr>
<tr><td>diagram 2 of 3</td><td>
</td></tr>
</table>

4.5.4.1. Test Condition (cont'd)

diagram 3 of 3	
type	**ElectricalSpecificationTestConditionType, m:math.type, JEP30-D10:ParameterValuesGroupType, JEP30-D10:ParameterRuleType, MinNomMaxRuleContextType, AsciiUnitsForElectricalSpecificationType, UnitsForElectricalSpecificationType.**
group	**JEP30-D10:ParameterIdentityGroup, ValueSetGroup, LaTeX-and-MathML-RuleGroup**

An example formula (dI/dt ≤ 70 A/µs) is shown below in its XML representation.

<TestCondition>

<LaTeX-Symbol>dI/dt</LaTeX-Symbol>

<SymbolDescription>rate of rise of the current</SymbolDescription>

<LaTeX-Rule>\leq 70 A/µs</LaTeX-Rule>

</TestCondition>

NOTE The *LaTeX-Symbol* is specified because the rule applies to a specific symbol.

Another formula example in which more than one Symbol is defined ($V_{DD} \leq V_{DS}$) is shown below in its XML representation. In this case the Symbols are encoded directly into the rule syntax.

<TestCondition>

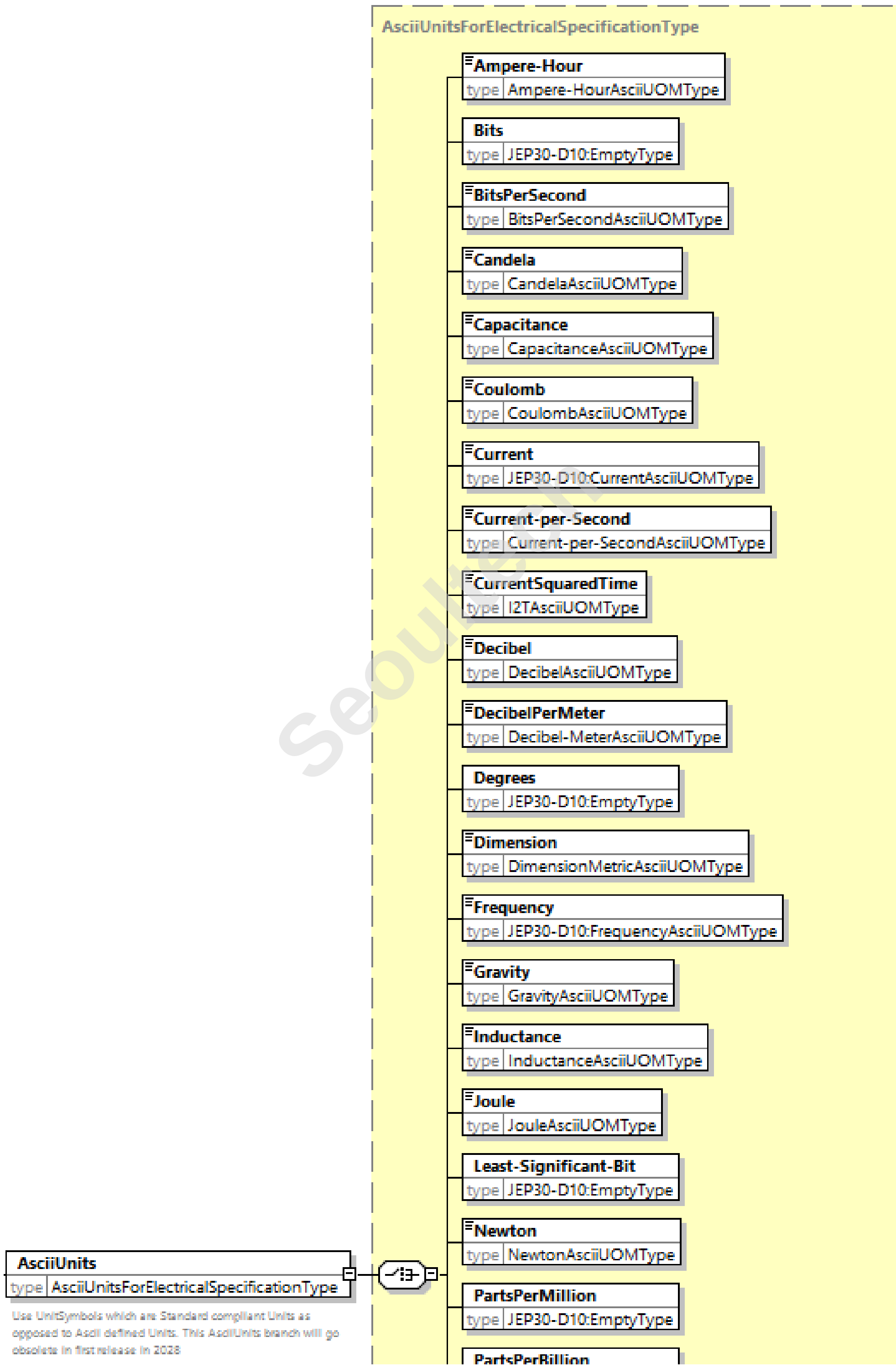
<LaTeX-Rule>V_{DD} \leq V_{DS}</LaTeX-Rule>

</TestCondition>

Alternatively, the rule may be expressed via MathML under the MathML-Rule element. This uses an existing MathML XML schema as defined by W3C.

The annotation under the *ValueText* is “Use same element names as in *ValueSetGroup* when defining *ValueText* for *Nominal*, *NegativeTolerance*, *PositiveTolerance*, *TotalTolerance*, *Minimum* and/or *Maximum* into Schema for *ValueText*.”

4.7.4.1.1. Ascii Units

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/TestCondition/AsciiUnits
diagram part 1 of 2	

4.7.4.1.1. Ascii Units (cont'd)

diagram
part 2 of 2

4.7.4.1.1. Ascii Units (cont'd)

type	**AsciiUnitsForElectricalSpecificationType, Ampere-HourAsciiUOMType, JEP30-D10:EmptyType, BitsPerSecondAsciiUOMType, CandelaAsciiUOMType, CapacitanceAsciiUOMType, CoulombAsciiUOMType, JEP30-D10:CurrentAsciiUOMType, Current-per-SecondAsciiUOMType, I2TAsciiUOMType, DecibelAsciiUOMType, Decibel-MeterAsciiUOMType, DimensionMetricAsciiUOMType, JEP30-D10:FrequencyAsciiUOMType, GravityAsciiUOMType, InductanceAsciiUOMType, JouleAsciiUOMType, NewtonAsciiUOMType, JEP30-D10:PowerAsciiUOMType, PressureAsciiUOMType, Pressure-per-KelvinAsciiUOMType, Pressure-per-SecondAsciiUOMType, ResistanceAsciiUOMType, SiemensAsciiUOMType, TelsaAsciiUOMType, JEP30-D10:TemperatureAsciiUOMType, JEP30-D10:ThermalResistanceAsciiUOMType, JEP30-D10:Time-in-uSec-to-Sec-AsciiUOMType, TorqueAsciiUOMType, JEP30-D10:VoltageAsciiUOMType, JEP30-D10:ComplexAsciiUOMType.**
NOTE:	Use Units which are Standard compliant Units as opposed to Ascii defined Units. This AsciiUnits branch will go obsolete in first release in 2028.

4.7.4.1.1. Ascii Units (cont'd)

The enumerated list of values for each of the UOM's specified above are identified in Table 3.

Table 2 — UOM Enumerated Lists

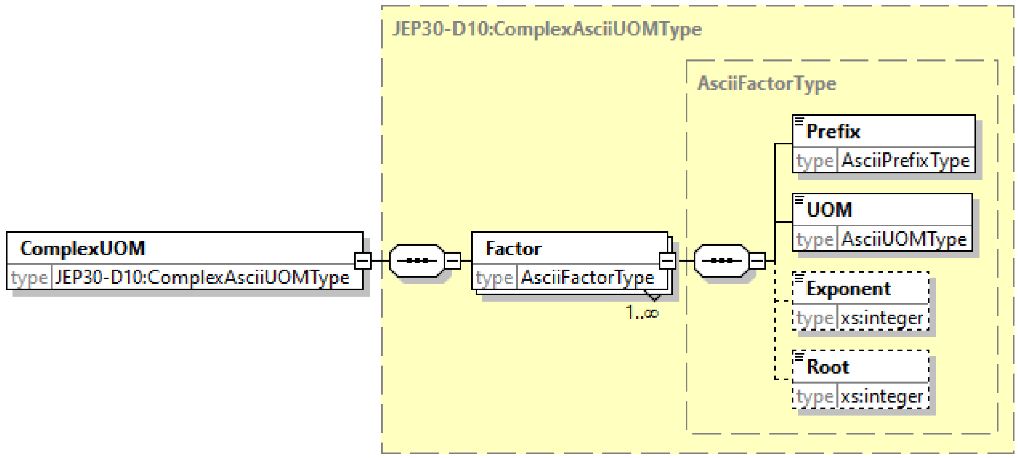
Unit	Enumerated Values									
Ampere-Hour	uAh	mAh	Ah	kAh						
BitsPerSecond	bps	kbps	Mbps	Gbps						
Candela	cd									
Capacitance	aF	fF	pF	nF	uF	mF	F			
Coulomb	nC	uC	mC	C	kC					
Current	nA	uA	mA	A						
Current-per-Second	mA/s	A/us	A/ms	A/s						
Current Squared Time	A^2s									
Decibel	dB	dB(A)								
DecibelPerMeter	dB/m									
Dimension	nm	um	mm	m						
Frequency	Hz	kHz	MHz	GHz						
Gravity	gn									
Inductance	uH	mH	H							
Joule	uJ	mJ	J	kJ						
Newton	uN	mN	N	kN						
Power	mW	W	kW	dBm						
Pressure	mPa	Pa	kPa	MPa	atm	mbar	bar	lb/in^2		
Pressure-per-Kelvin	Pa/K									

4.7.4.1.1. Ascii Units (cont'd)

Table 2 - UOM Enumerated Lists (cont'd)

Unit	Enumerated Values									
Pressure-per-Second	Pa/s									
Resistance	mOhm	Ohm	KOhm	MOhm	GOhm					
Siemens	uS	mS	S	kS	MS					
Tesla	nT	uT	mT	T	kT					
Temperature	DegC	DegF	K							
ThermalResistance	K/W	DegC/W								
Time	ps	ns	us	ms	s	min	h	d	wk	y
Torque	Nm									
Voltage	uV	mV	V	kV	dBV	dBV(A)				
Voltage-per-Second	mV/us	mV/min	V/us	V/ms	V/s					
ComplexUOM										
Prefix	Femto	Pico	Nano	Micro	Milli	Unity	Kilo	Mega	Giga	Tera
	Ampere	Bits	Candela	Celsius	Decibel	Fahrenheit		Farad	Foot	Gram
	Henry	Hertz	Hour	Inch	Kelvin	Least-Significant-Bit		Lumen	Meter	Mil
	Min	Newton	Ohm	Ounce	Pascal	Percent	PartsPerMillion		PartsPerBillion	
	Pound	Second	Tesla	Volt	Watt					

4.7.4.1.1.1. Complex UOM

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/TestCondition/AsciiUnits/ComplexUOM**
diagram	
type	**ComplexAsciiUOMType, AsciiFactorType, AsciiPrefixType, AsciiUOMType.**

Other UOM can be defined under the *ComplexUOM* branch. An example formula (dI/dt = 100 A/µs) is shown below in its XML representation.

```
<TestCondition>
	<LaTeX-Symbol>dI/dt</LaTeX-Symbol>
	<SymbolDescription>rate of rise of the current</SymbolDescription>
	<Value>100</Value>
	<AsciiUnits>
		<ComplexUOM>
			<Factor>
				<Prefix>Unity</Prefix>
				<UOM>Ampere</UOM>
			</Factor>
			<Factor>
				<Prefix>Micro</Prefix>
				<UOM>Second</UOM>
				<Exponent>-1</Exponent>
			</Factor>
		</ComplexUOM>
	</AsciiUnits>
</TestCondition>
```

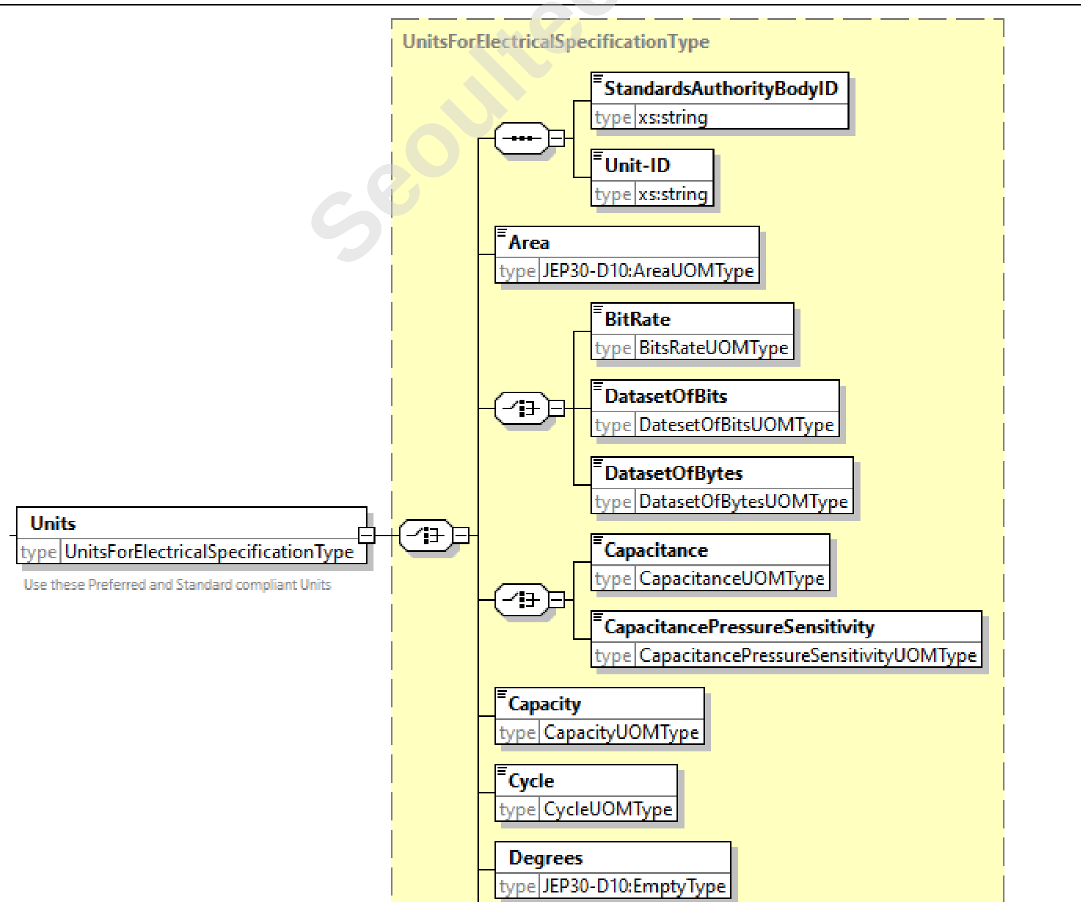
4.7.4.1.1. Complex UOM (cont'd)

An alternative Unit such as Decibel/Meter can be created such as.

```
<AsciiUnits>
    <ComplexUOM>
        <Factor>
            <UOM>Decibel</UOM>
        </Factor>
        <Factor>
            <UOM>Meter</UOM>
            <Exponent>-1</Exponent>
        </Factor>
    </ComplexUOM>
</AsciiUnits>
```

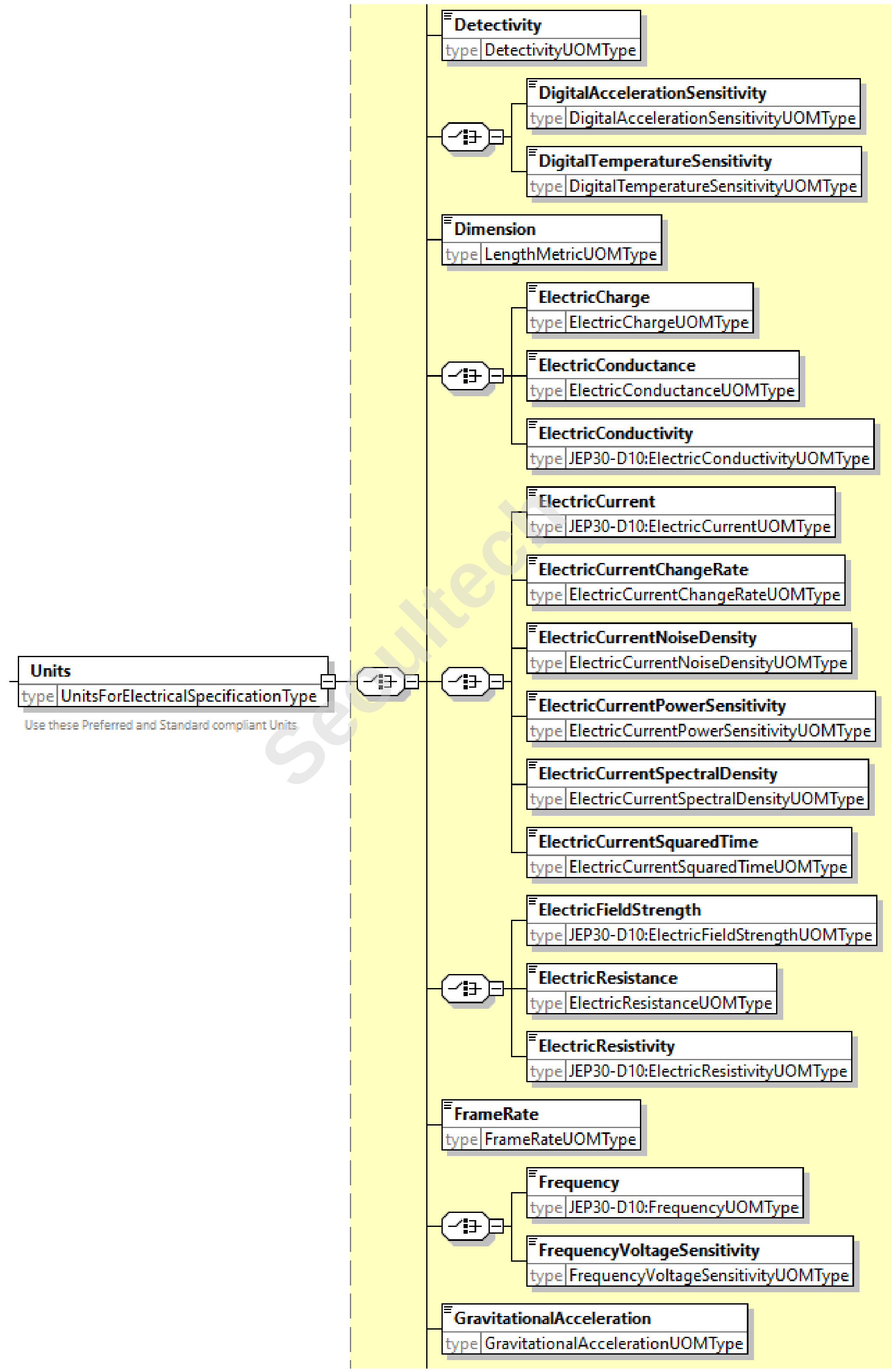
The absence of *Prefix* deafults to *Unity*.

4.7.4.1.2. Units

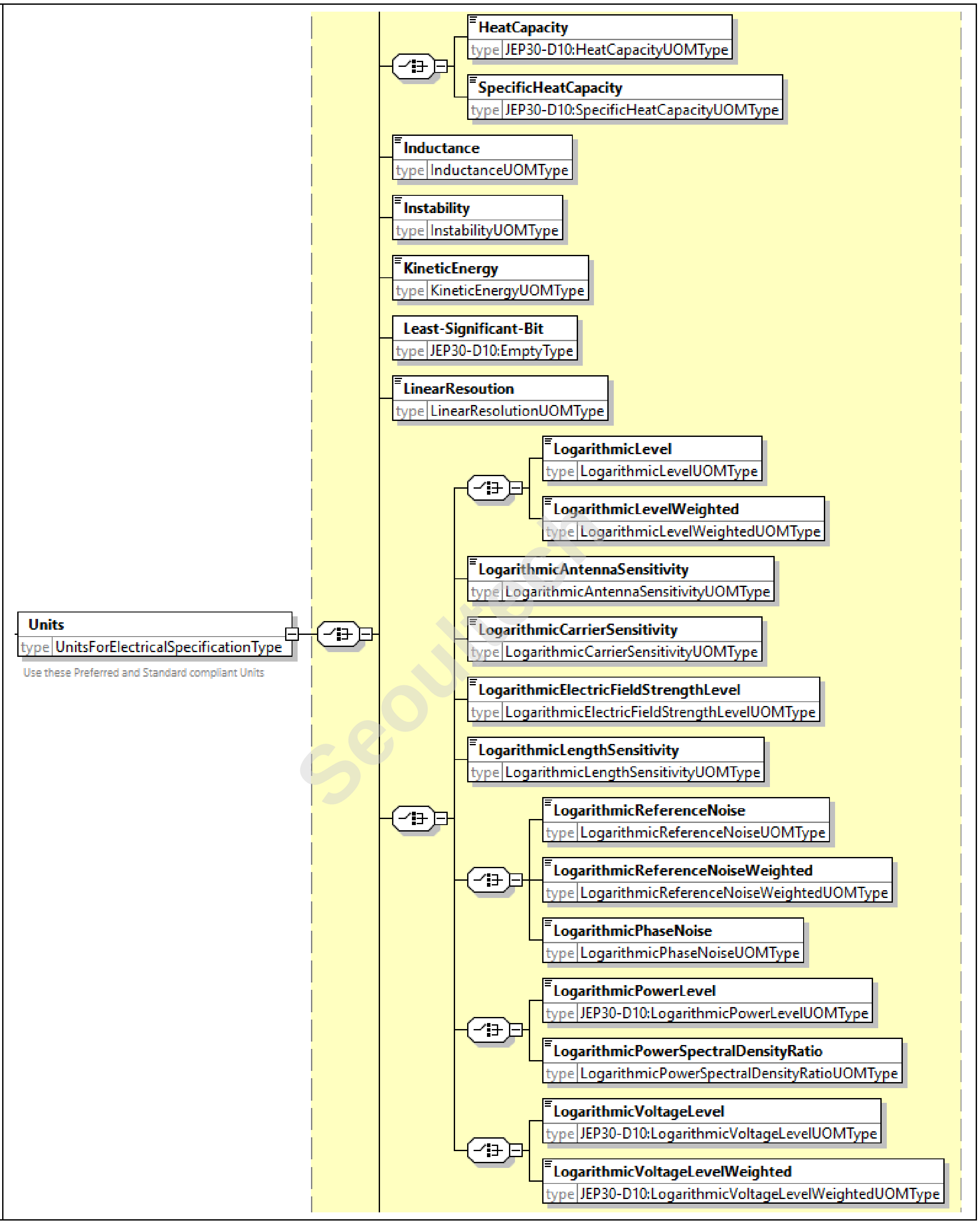
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/TestCondition/Units**
diagram part 1 of 6	

4.7.4.1.2. Units (cont'd)

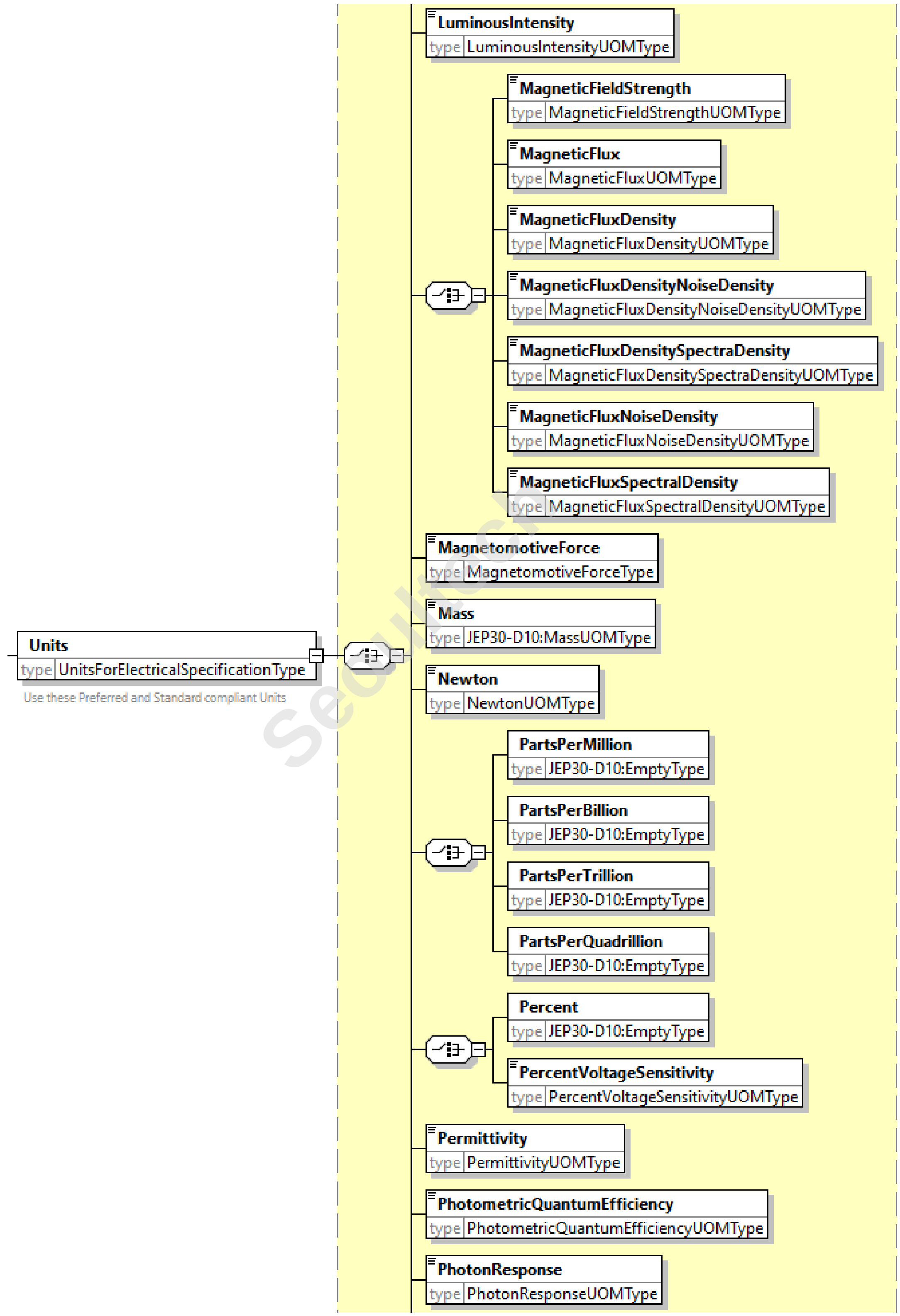
diagram part 2 of 6



4.7.4.1.2. Units (cont'd)

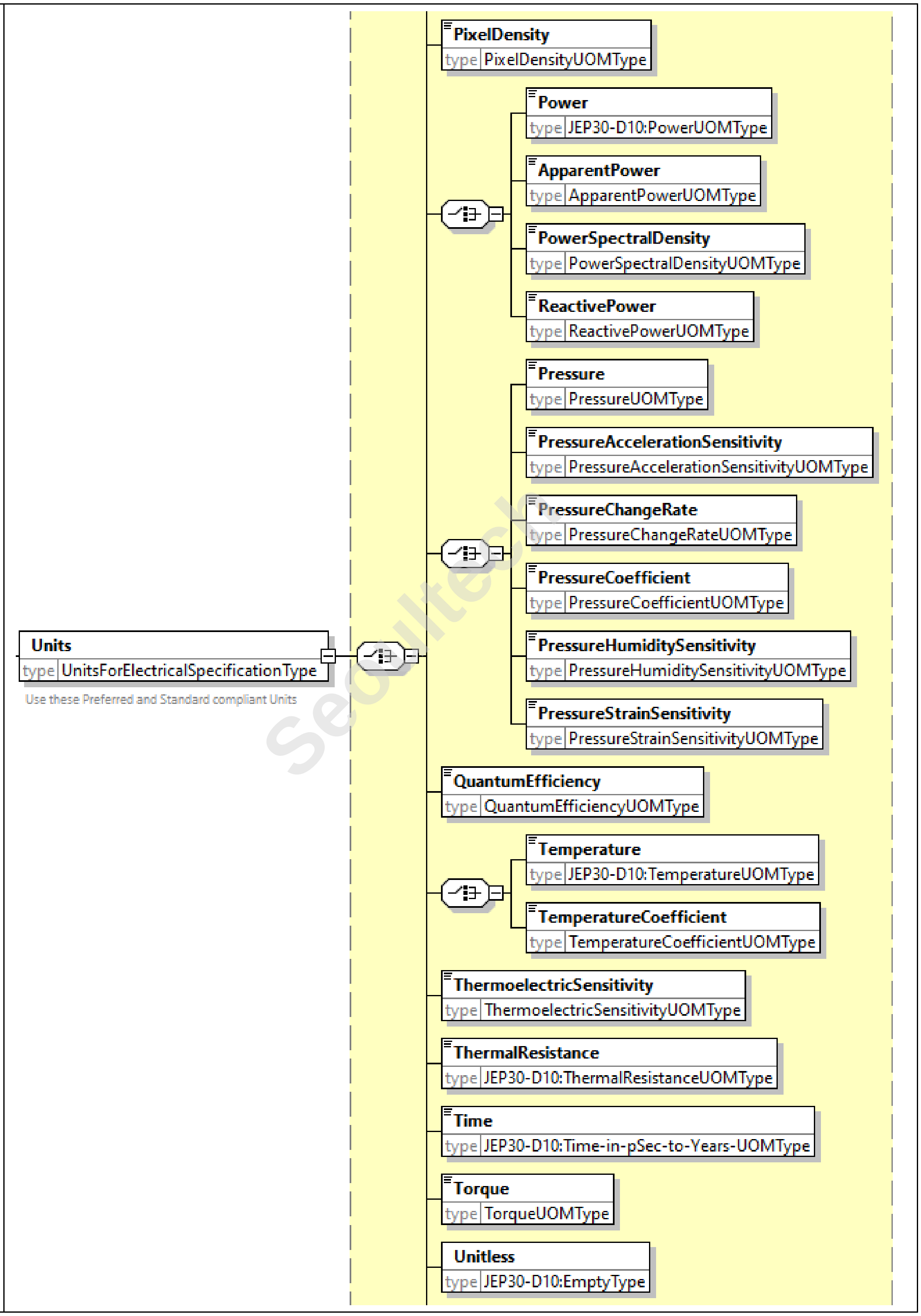
diagram part 3 of 6	

4.7.4.1.2. Units (cont'd)

diagram part 4 of 6	

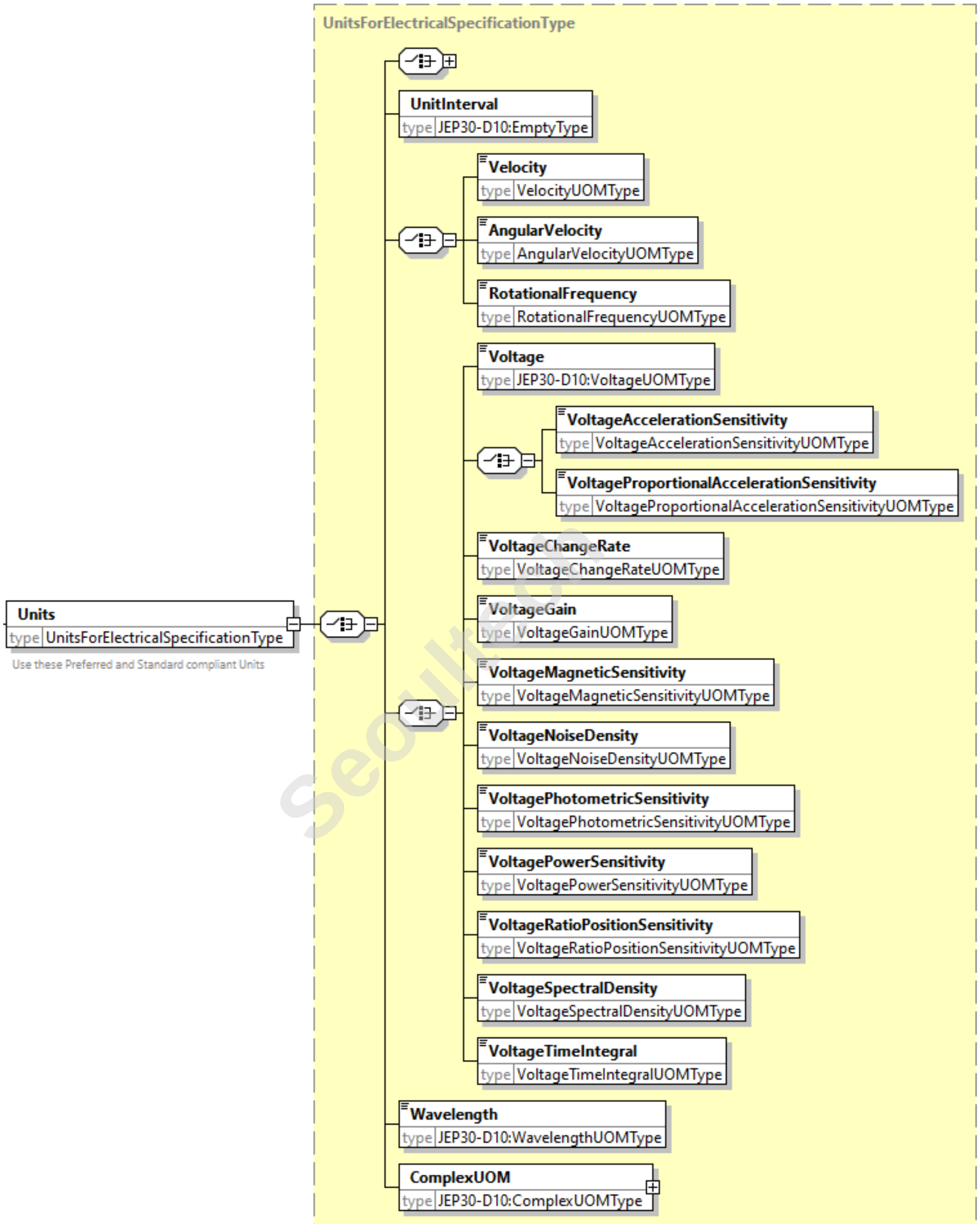
4.7.4.1.2. Units (cont'd)

diagram
part 5 of 6



4.7.4.1.2. Units (cont'd)

diagram part 6 of 6



4.7.4.1.2. Units (cont'd)

type	UnitsForElectricalSpecificationType, JEP30-D10:AreaUOMType, BitsRateUOMType, DatesetOfBitsUOMType, DatesetOfBytesUOMType, CapacitanceUOMType, CapacitancePressureSensitivityUOMType, CapacityUOMType, CycleUOMType, JEP30-D10:EmptyType, DetectivityUOMType, DigitalAccelerationSensitivityUOMType, DigitalTemperatureSensitivityUOMType, LengthMetricUOMType, ElectricChargeUOMType, ElectricConductanceUOMType, JEP30-D10:ElectricConductivityUOMType, JEP30-D10:ElectricCurrentUOMType, ElectricCurrentChangeRateUOMType, ElectricCurrentNoiseDensityUOMType, ElectricCurrentPowerSensitivityUOMType, ElectricCurrentSpectralDensityUOMType, ElectricCurrentSquaredTimeUOMType, ElectricFieldStrengthUOMType, ElectricResistanceUOMType, JEP30-D10:ElectricResistivityUOMType, FrameRateUOMType, JEP30-D10:FrequencyUOMType, FrequencyVoltSensitivityUOMType, GravitationalAccelerationUOMType, JEP30-D10:HeatCapacityUOMType, JEP30-D10:SpecificHeatCapacityUOMType, InductanceUOMType, InstabilityUOMType, KineticEnergyUOMType, LinearResolutionUOMType, LogarithmicLevelUOMType, LogarithmicLevelWeightedUOMType, LogarithmicAntennaSensitivityUOMType, LogarithmicCarrierSensitivityUOMType, LogarithmicElectricFieldStrengthLevelUOMType, LogarithmicLengthSensitivityUOMType, LogarithmicReferenceNoiseUOMType, LogarithmicReferenceNoiseWeightedUOMType, LogarithmicPhaseNoiseUOMType, JEP30-D10:LogarithmicPowerLevelUOMType, LogarithmicPowerSpectralDensityRatioUOMType, JEP30-D10:LogarithmicVoltageLevelUOMType, JEP30-D10:LogarithmicVoltageLevelWeightedUOMType, LuminousIntensityUOMType, MagnetomotiveForceType, MagneticFieldNoiseDensityUOMType, MagneticFieldSpectralDensityUOMType, MagneticFieldStrengthUOMType, MagneticFluxUOMType, MagneticFieldDensityUOMType, MagneticFluxNoiseDensityUOMType, MagneticFieldSpectralDensityUOMType, JEP30-D10:MassUOMType, NewtonUOMType, PercentVoltSensitivityUOMType, PermittivityUOMType, PhotometricQuantumEfficiencyUOMType, PhotonResponseUOMType, PixelDensityUOMType, JEP30-D10:PowerUOMType, ApparentPowerUOMType, PowerSpectralDensityUOMType, ReactivePowerUOMType, PressureUOMType, PressureAccelerationSensitivityUOMType, PressureChangeRateUOMType, PressureCoefficientUOMType, PressureHumiditySensitivityUOMType, PressureStrainSensitivityUOMType, QuantumEfficiencyUOMType, JEP30-D10:TemperatureUOMType, TemperatureCoefficientUOMType, JEP30-D10:ThermalResistanceUOMType, JEP30-D10:Time-in-pSec-to-Years-UOMType, TorqueUOMType, VelocityUOMType, AngularVelocityUOMType, RotationalFrequencyUOMType, JEP30-D10:VoltageUOMType, VoltageAccelerationSensitivityUOMType, VoltageProportionalAccelerationSensitivityUOMType, VoltageChangeRateUOMType, VoltageGainUOMType, VoltageMagneticSensitivityUOMType, VoltageNoiseDensityUOMType, VoltagePhotometricSensitivityUOMType, VoltagePowerSensitivityUOMType, VoltageRatioPositionSensitivityUOMType, VoltageSpectralDensityUOMType, VoltageTemperatureSensitivityUOMType, VoltageTimeIntegralUOMType, WavelengthUOMType, JEP30-D10:ComplexUOMType.
NOTE:	Use these Preferred and Standard compliant Units

4.7.4.1.2. Units (cont'd)

The enumerated list of values for each of the UOM's specified above are identified in Table 3.

Table 3 — UOM Enumerated Lists

Unit	Enumerated Values									
Area	nm^2	µm^2	mm^2	cm^2	m^2					
BitRate	bit/s	kbit/s	Mbit/s	Gbit/s	Tbit/s					
DatasetOfBits	bit	kbit	Mbit	Gbit	Tbit					
DatasetOfBytes	byte	kbyte	Mbyte	Gbyte	Tbyte					
Capacitance	aF	fF	pF	nF	µF	mF	F			
Capacitance Pressure Sensitivity	aF/Pa	aF/kPa	aF/MPa	fF/Pa	fFk/Pa	fF/MPa	pF/Pa	pF/kPa	pF/MPa	nF/Pa
	nF/kPa	nF/MPa	aF/bar	aF/mbar	fF/bar	fF/mbar	pF/bar	pF/mbar	nF/bar	nF/mbar
	aF/psi	fF/psi	pF/psi	nF/psi	aF/Torr	fF/Torr	pF/Torr	nF/Torr		
Capacity	µA·h	mA·h	A·h	kA·h						
Cycles	cycles	kcycles	Mcycles	Gcycles	Tcycles					
Detectivity	mm·√Hz/W		cm·√Hz/W		m·√Hz/W					
Digital Acceleration Sensitivity	LSB/gn									
Digital Temperature Sensitivity	LSB/mK	LSB/K	LSB/°C							
Dimension	nm	µm	mm	m						
Electric Charge	pC	nC	µC	mC	C	kC				
Electric Conductance	pS	nS	µS	mS	S	kS	MS			
Electric Conductivity	S/m									
Electric Current	pA	nA	µA	mA	A	kA				

4.7.4.1.2. Units (cont'd)

Table 3 - UOM Enumerated Lists (cont'd)

Unit	Enumerated Values									
Electric Current Change Rate	µA/s	mA/µs	mA/ms	mA/s	A/µs	A/ms	A/s			
Electric Current Noise Density	pA/√Hz	nA/√Hz	µA/√Hz	mA/√Hz	A/√Hz					
Electric Current Power Sensitivity	mA/mW	A/mW	µA/W	mA/W	A/W					
Electric Current Spectral Density	pA^2/Hz	nA^2/Hz	µA^2/Hz	mA^2/Hz	A^2/Hz					
Electric Current Squared Time	A^2·ms	mA^2·s	A^2·s	kA^2·s						
Electric Field Strength	µV/m	mV/m	V/m	kV/m	MV/m	V/cm	kV/cm	MV/cm		
Electric Resistance	nΩ	µΩ	mΩ	Ω	KΩ	MΩ	GΩ			
Electric Resistivity	Ω·m									
Force	pN	nN	µN	mN	N	kN				
Frame Rate	Hz									
Frequency	mHz	Hz	kHz	MHz	GHz	THz				
Frequency Voltage Sensitivity	Hz/mV	Hz/V	kHz/mV	kHz/V	MHz/mV	MHz/V	GHz/mV	GHz/V	THz/mV	THz/V
Gravitational Acceleration	mgn	gn	kgn							
Heat Capacity	mJ/K	J/K	mJ/°C	J/°C						
Specific Heat Capacity	J/(g·K)	J/(kg·K)	J/(g·°C)	J/(kg·°C)	calIT/(g·K)		kcalIT/(g·K)		calIT/(g·°C)	
	kcalIT/(g·°C)		calth/(g·K)		kcalth/(g·K)		calth/(g·°C)		kcalth/(g·°C)	
Inductance	pH	nH	µH	mH	H	kH				

4.7.4.1.2. Units (cont'd)

Table 3 - UOM Enumerated Lists (cont'd)

Unit	Enumerated Values									
Instability	ppm/s	ppm/min	ppm/h	ppm/d	ppm/y	ppb/s	ppb/min	ppb/h	ppb/d	ppb/y
	ppt/s	ppt/min	ppt/h	ppt/d	ppt/y	ppq/s	ppq/min	ppq/h	ppq/d	ppq/y
Kinetic Energy	fJ	pJ	nJ	µJ	mJ	J	kJ			
Linear Resolution	ppi	pp·cm	dpi							
Logarithmic Level	dB									
Logarithmic Level Weighted	dB(A)	dB(C)	dB(Z)							
Logarithmic Antenna Sensitivity	dBi	dBd								
Logarithmic Carrier Sensitivity	dBc									
Logarithmic Electric Field Strength Level	dBµV/m	dBmV/m	dBV/m							
Logarithmic Length Sensitivity	dB/µm	dB/mm	dB/cm	dB/m						
Logarithmic Reference Noise	dBrn									
Logarithmic Reference Noise Weighted	dBrn(C)	dBrn(O)								
Logarithmic Phase Noise	dBc/Hz	dBc/kHz	dBc/MHz							
Logarithmic Power Level	dBµW	dBm	dBW							
Logarithmic Power Spectral Density Ratio	dBm/Hz	dBm/kHz		dBm/MHz		dBW/Hz	dBW/kHz		dBW/MHz	

4.7.4.1.2. Units (cont'd)

Table 3 - UOM Enumerated Lists (cont'd)

Unit	Enumerated Values									
Logarithmic Voltage Level	dBµV	dBmV	dBV							
Logarithmic Voltage Level Weighted	dBµV(A)	dBmV(A)		dBV(A)						
Luminous Intensity	µcd	mcd	cd							
Magnetic Flux Density Noise Density	pT/√Hz	nT/√Hz	µT/√Hz	mT/√Hz	T/√Hz					
Magnetic Flux Density Spectral Density	pT²/Hz	nT²/Hz	µT²/Hz	mT²/Hz	T²/Hz					
Magnetic Field Strength	pA/m	nA/m	µA/m	mA/m	A/m					
Magnetic Flux	pWb	nWb	µWb	mWb	Wb	kWb				
Magnetic Flux Density	pT	nT	µT	mT	T	kT				
Magnetic Flux Noise Density	pWb/√Hz		nWb/√Hz		µWb/√Hz		mWb/√Hz		Wb/√Hz	
Magnetic Flux Spectral Density	pWb²/Hz	nWb²/Hz	µWb²/Hz	mWb²/Hz		Wb²/Hz				
MagnetomotiveForce	A·t									
Mass	µg	mg	g	kg	oz	lb				
Percent Voltage Sensitivity	%/µV	%/mV	%/V	%/kV						
Permittivity	pF/m	nF/m	µF/m	mF/m	F/m					
Photometric Quantum Efficiency	e⁻/(lx·s)									

4.7.4.1.2. Units (cont'd)

Table 3 - UOM Enumerated Lists (cont'd)

Unit	Enumerated Values									
Photon Response	γ/(lx·s)									
Pixel Density	pixel/mm^2		kpixel/mm^2		Mpixel/mm^2		Gpixel/mm^2		pixel/cm^2	
	kpixel/cm^2		Mpixel/cm^2		Gpixel/cm^2					
Power	pW	nW	µW	mW	W	kW	MW			
Apparent Power	nV·A	µV·A	mV·A	V·A	kV·A	MV·A				
Power Spectral Density	pW/Hz	nW/Hz	µW/Hz	mW/Hz	W/Hz					
Reactive Power	pVAR	nVAR	µVAR	mVAR	VAR	kVAR	MVAR			
Pressure	µPa	mPa	Pa	kPa	MPa	mbar	bar	atm	psi	µTorr
	mTorr	Torr								
Pressure Acceleration Sensitivity	mPa/gn	Pa/gn	hPa/gn	kPa/gn	mbar/gn	bar/gn	psi/gn	Torr/gn		
Pressure Change Rate	mPa/s	Pa/s	kPa/s							
Pressure Coefficient	mPa/K	Pa/K	kPa/K							
Pressure Humidity Sensitivity	mPa/%RH		Pa/%RH		hPa/%RH		kPa/%RH		mbar/%RH	
	bar/%RH		psi/%RH		Torr/%RH					
Pressure Strain Sensitivity	Pa/µε									
Quantum Efficiency	(lx·s)$^{-1}$									
Temperature	°C	°F	K							
Temperature Coefficient	ppb/K	ppm/K	%/K	ppb/°C	ppm/°C	%/°C				
Thermal Resistance	K/mW	K/W	K/kW	°C/mW	°C/W	°C/kW				

4.7.4.1.2. Units (cont'd)

Table 3 - UOM Enumerated Lists (cont'd)

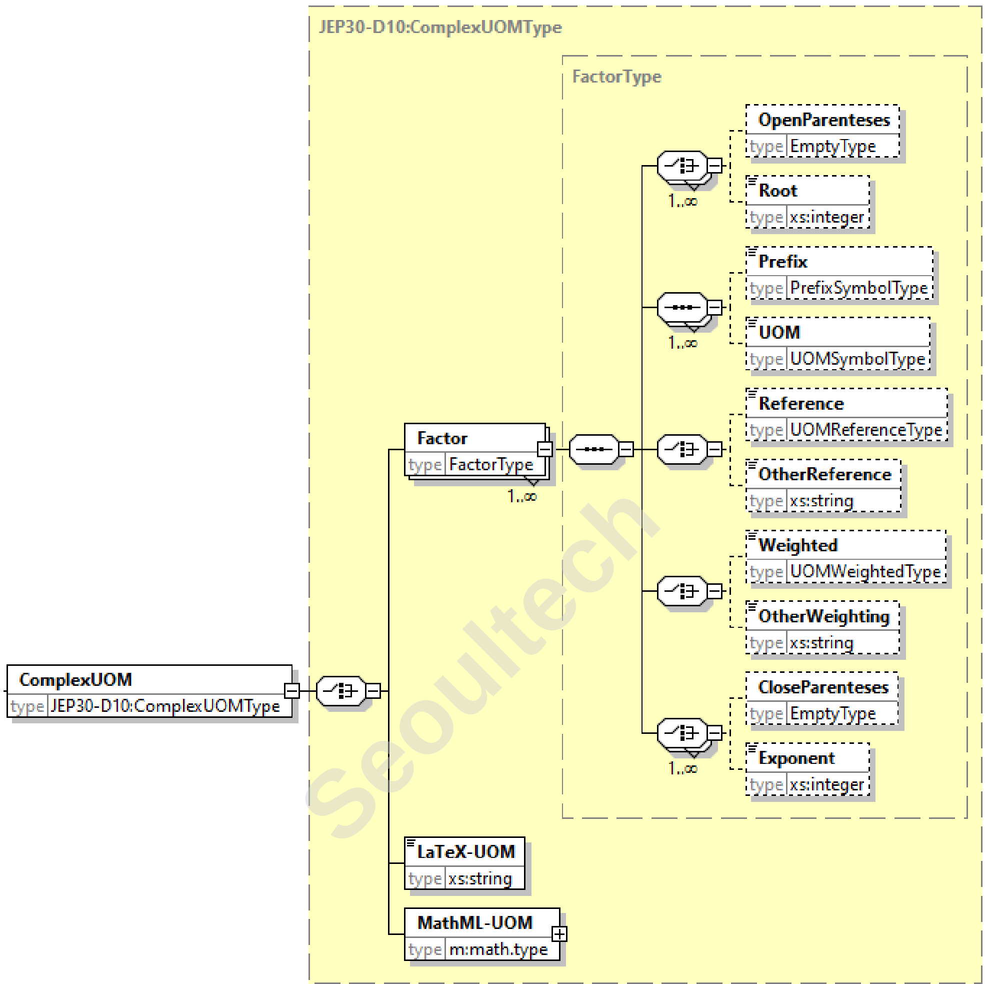
Unit	Enumerated Values									
Thermoelectric Sensitivity	μV/°C	V/°C	MV/°C	μV/K	V/K	MV/K				
Time	ps	ns	μs	ms	s	min	h	d	wk	mo
	y									
Torque	μN·m	mN·m	mN·m							
Velocity	m/s	ft/s	km/h	mph						
Angular Velocity	°/ms	°/s	°/min	rad/ms	rad/s					
Rotational Frequency	rev/s	rev/min								
Voltage	μV	mV	V	kV						
Voltage Acceleration Sensitivity	nV/gn	μV/gn	mV/gn	V/gn						
Voltage Proportional Acceleration Sensitivity	mV/(%·gn)		V/(%·gn)							
Voltage Change Rate	μV/min	mV/min	V/min	μV/s	mV/s	V/s	μV/ms	mV/ms	V/ms	μV/μs
	mV/μs	V/μs	μV/ns	mV/ns	V/ns					
Voltage Gain	μV/V	μV/mV	μV/μV	mV/V	mV/mV	mV/μV	V/V	V/mV	V/μV	
Voltage Magnetic Sensitivity	pV/T	pV/mT	pV/μT	pV/nT	nV/T	nV/mT	nV/μT	nV/nT	μV/T	μV/mT
	μV/μT	uV/nT	mV/T	mV/mT	mV/μT	mV/nT	V/T	V/mT	V/μT	V/nT
Voltage Noise Density	pV/√Hz	nV/√Hz	μV/√Hz	mV/√Hz	V/√Hz					
Voltage Photometric Sensitivity	μV/(lx·s)		mV/(lx·s)		V/(lx·s)					
Voltage Power Sensitivity	μV/μW	mV/μW	mV/mW	V/mW	V/W					

4.7.4.1.2. Units (cont’d)

Table 3 - UOM Enumerated Lists (cont’d)

Unit	Enumerated Values									
Voltage Ratio Position Sensitivity	(mV/V)/mm		(V/V)/mm		(mV/V)/cm		(V/V)/cm	(mV/V)/in		(V/V)/in
Voltage Spectral Density	pV²/Hz	nV²/Hz	µV²/Hz	mV²/Hz	V²/Hz					
Voltage Time Integral	µV·ps	µV·ns	µV·-µs	µV·ms	µV·s	mV·ps	mV·ns	mV·µs	mV·ms	mV·s
	V·ps	V·ns	V·µs	V·ms	V·s	kV·ps	kV·ns	kV·µs	kV·ms	kV·s
Wavelength	pm	nm	µm	mm	m					
Complex UOM										
- Prefix	a	f	p	n	µ	c	m	k	M	G
	T									
- UOM	%	°C	°F	A	bar	bit	byte	C	cd	cycles
	dB	dpi	e⁻	F	fc	ft	g	gn	H	h
	Hz	in	J	K	lm	LSB	lx	m	min	N
	Pa	ppm	ppb	ppt	ppq	ppcm	ppi	px	rad	rev
	S	s	T	t	Torr	V	VAR	W	Wb	γ
	ε	Ω								
- Reference	c	d	i	rn						
- Weighted	(A)	(C)	(O)	(Z)						

4.7.4.1.2.1. Complex UOM

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/TestCondition/Units/ComplexUOM**
diagram	
type	**ComplexUOMType, FactorType, EmptyType, PrefixSymbolType, UOMSymbolType, UOMReferenceType, UOMWeightedType, m:math.type**

Other UOM can be defined under the *ComplexUOM* branch. A simple example of a complexUOM such as (mV/V)/cm is shown below in its XML representation.

```
<ComplexUOM>
        <Factor>
                <UOM>dB</UOM>
        </Factor>
        <Factor>
                <UOM>m</UOM>
                <Exponent>-1</Exponent>
        </Factor>
</ComplexUOM>
```

4.7.4.1.2.1. Complex UOM (cont'd)

A more complex unit as in Voltage Ratio Position Sensitivity (mV/V)/cm can be expressed as

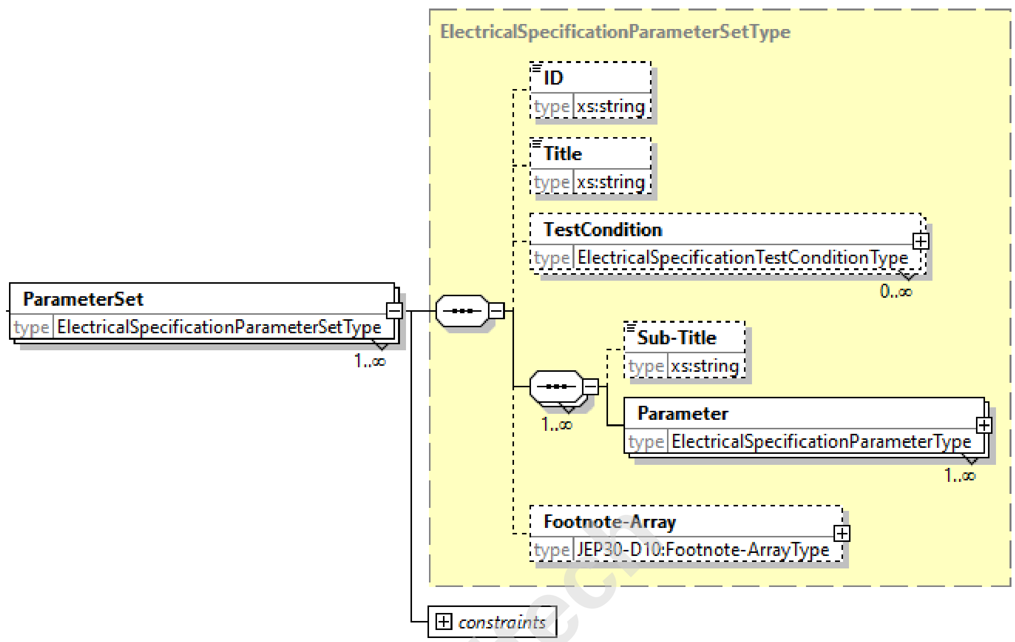
```xml
<ComplexUOM>
        <Factor>
                <OpenParenteses/>
                <Prefix>m</Prefix>
                <UOM>V</UOM>
        </Factor>
        <Factor>
                <UOM>V</UOM>
                <Exponent>-1</Exponent>
                <CloseParenteses/>
        </Factor>
        <Factor>
                <Prefix>c</Prefix>
                <UOM>m</UOM>
                <Exponent>-1</Exponent>
        </Factor>
</ComplexUOM>
```

Another complex UOM such as Voltage Photometric Sensitivity µV/(lx·s) can be expressed as

```xml
<ComplexUOM>
        <Factor>
                <Prefix>µ</Prefix>
                <UOM>V</UOM>
        </Factor>
        <Factor>
                <OpenParenteses/>
                <UOM>lx</UOM>
        </Factor>
        <Factor>
                <UOM>s</UOM>
                <CloseParenteses/>
                <Exponent>-1</Exponent>
        </Factor>
</ComplexUOM>
```

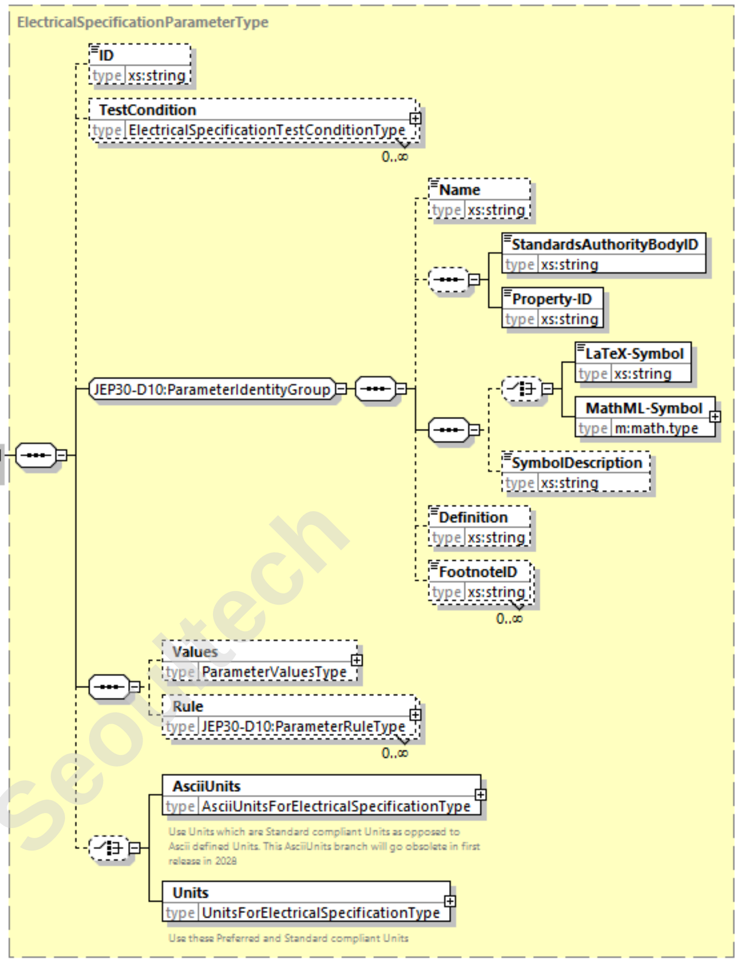
The absence of *Prefix* deafults to unity.

4.7.4.2. Parameter Set

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/ParameterSet
diagram	
type	ElectricalSpecificationParameterSetType, ElectricalSpecificationTestConditionType, ElectricalSpecificationParameterType, JEP30-D10:Footnote-ArrayType.

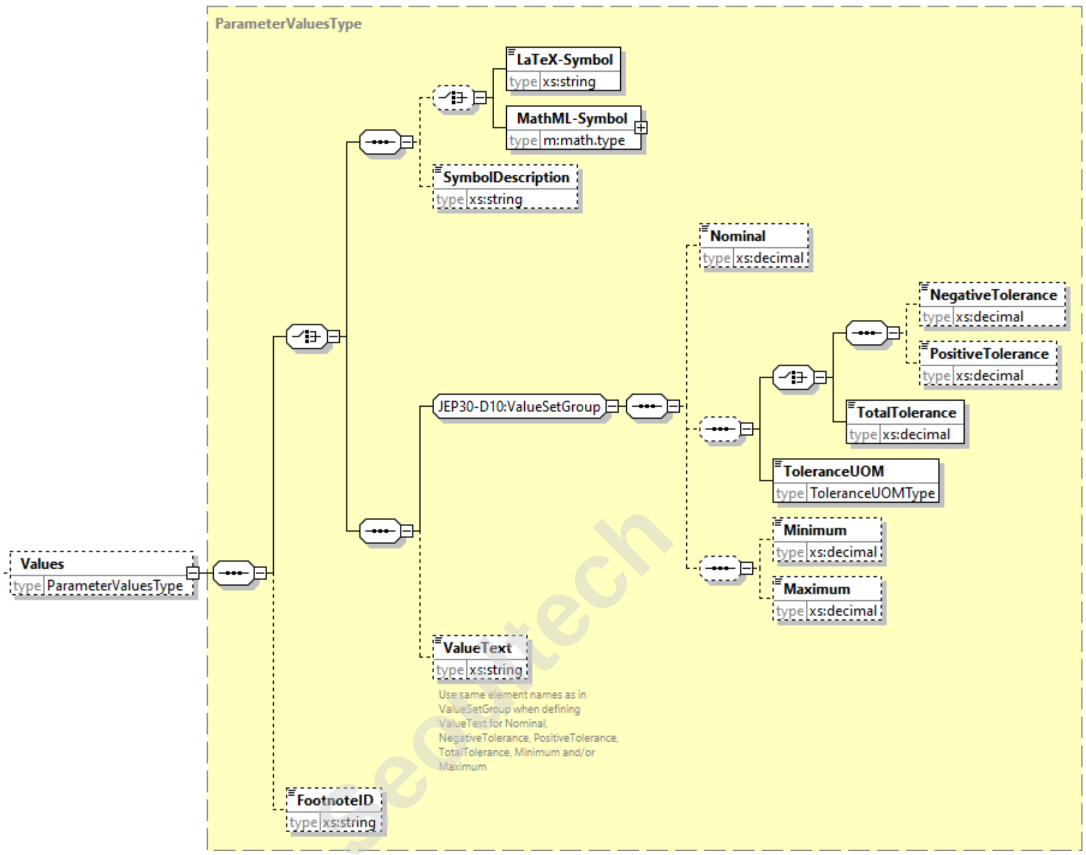
The *TestCondition* defined under a *ParameterSet* is specific to the condition under which the Parameter is true. For example, when the *TestCondition* is set to I_F = 1.5 A, then the Parameter V_F has a typical (nominal) value of 0.41 V. When the *TestCondition* is set to I_F = 3.0 A, then the Parameter V_F has a nominal value of 0.46 V and a maximum value of 0.54 V. Both of these *TestConditions* occur at an ambient temperature (T_A = 25 °C), therefore the ambient temperature test condition is set at the *ElectricalSpecification/TestCondition* branch.

4.7.4.2.1. Parameter

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/ParameterSet/Parameter**
diagram	
type	**ElectricalSpecificationParameterType, ElectricalSpecificationTestConditionType, ParameterValuesType, ParameterRuleType, AsciiUnitsForElectricalSpecificationType, UnitsForElectricalSpecificationType.**
group	**JEP30-D10:ParameterIdentityGroup**

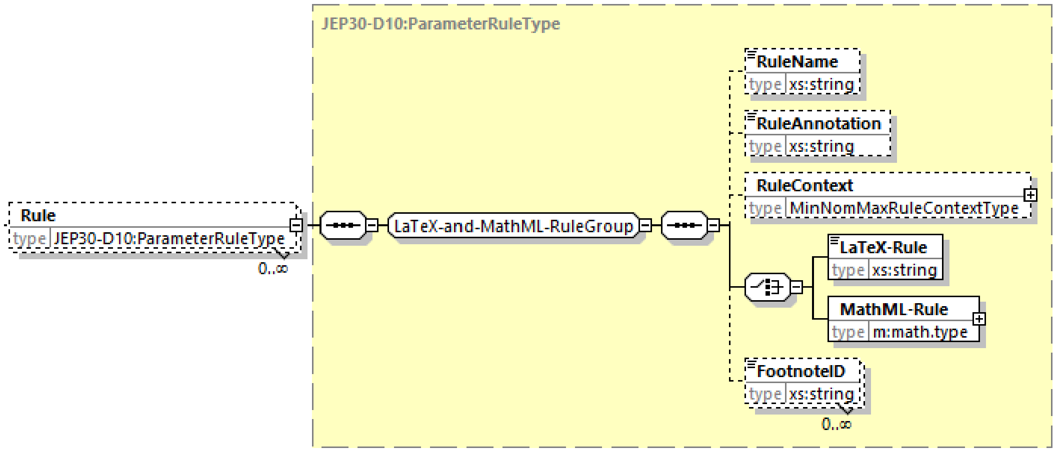
NOTE: The element Units has the following annotation “Use IEC compliant Units as opposed to Ascii defined Units. This Units branch will go obsolete in first release in 2028”.

4.7.4.2.1.1. Values

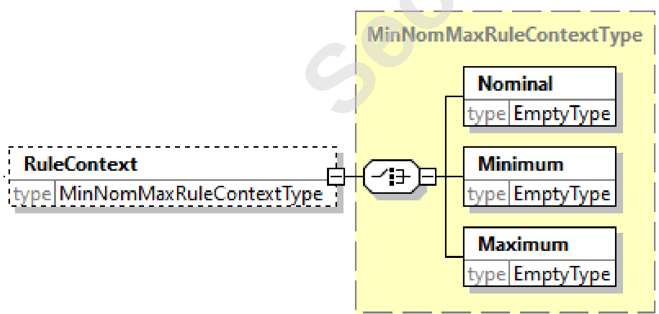
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/ParameterSet/Parameter/Values</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>ParameterValuesType, m.math.type, ToleranceUOMType, UnitsForElectricalSpecificationType.</td></tr>
<tr><td>group</td><td>JEP30-D10:ValueSetGroup,</td></tr>
</table>

NOTE 1: The element Units has the following annotation “Use same element names as in ValueSetGroup when defining ValueText for Nominal, NegativeTolerance, PositiveTolerance, TotalTolerance, Minimum and/or Maximum”.

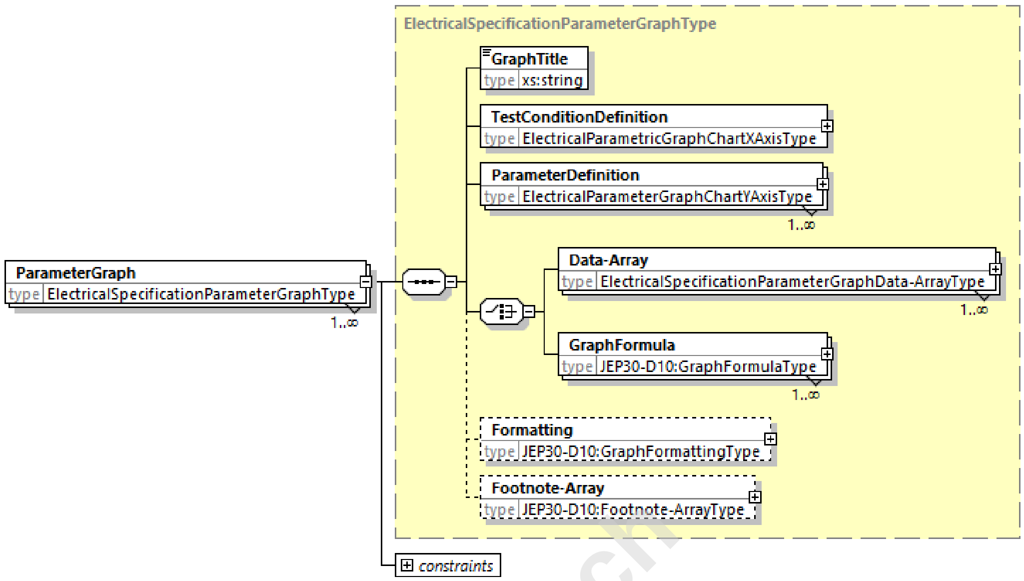
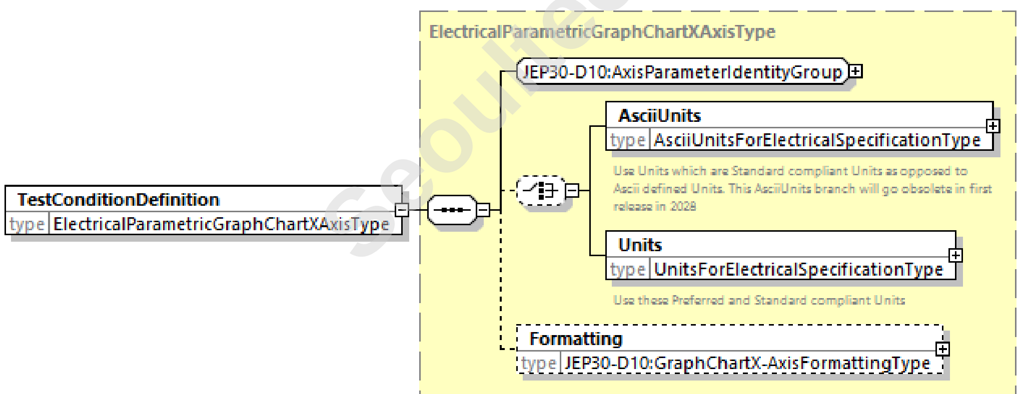
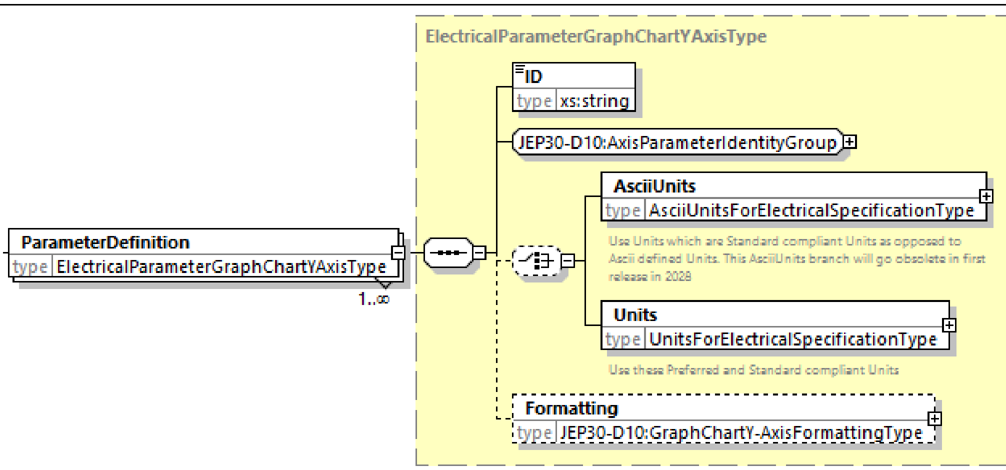
4.7.4.2.1.2. Rule

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/ParameterSet/Parameter/RuleContext
diagram	
type	ParameterRuleType, MinNomMaxRuleContextType, m:math.type
group	JEP30-D10:LaTeX-and-MathML-RuleGroup

4.7.4.2.1.2.1. Rule Context

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/ParameterSet/Parameter/Rule/RuleContext
diagram	
type	MinNomMaxRuleContextType, EmptyType.

4.7.4.3. Parameter Graph

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/ParameterGraph</td></tr>
<tr><td>diagram
1 of 3</td><td>
</td></tr>
<tr><td>diagram
2 of 3</td><td>
</td></tr>
<tr><td>diagram
3 of 3</td><td>
</td></tr>
</table>

4.7.4.3. Parameter Graph (cont'd)

type	**ElectricalSpecificationParameterGraphType, ElectricalParameterGraphChartXAxisType, AsciiUnitsForElectricalSpecificationType, UnitsForElectricalSpecificationType, JEP30-D10:GraphChartX-AxisFormattingType, ElectricalParameterGraphChartYAxisType, JEP30-D10:GraphChartY-AxisFormattingType, ElectricalSpecificationParameterGraphData-ArrayType, JEP30-D10:GraphFormulaType, JEP30-D10:GraphFormattingType, JEP30-D10:Footnote-ArrayType.**
group	**JEP30-D10:AxisParameterIdentityGroup**

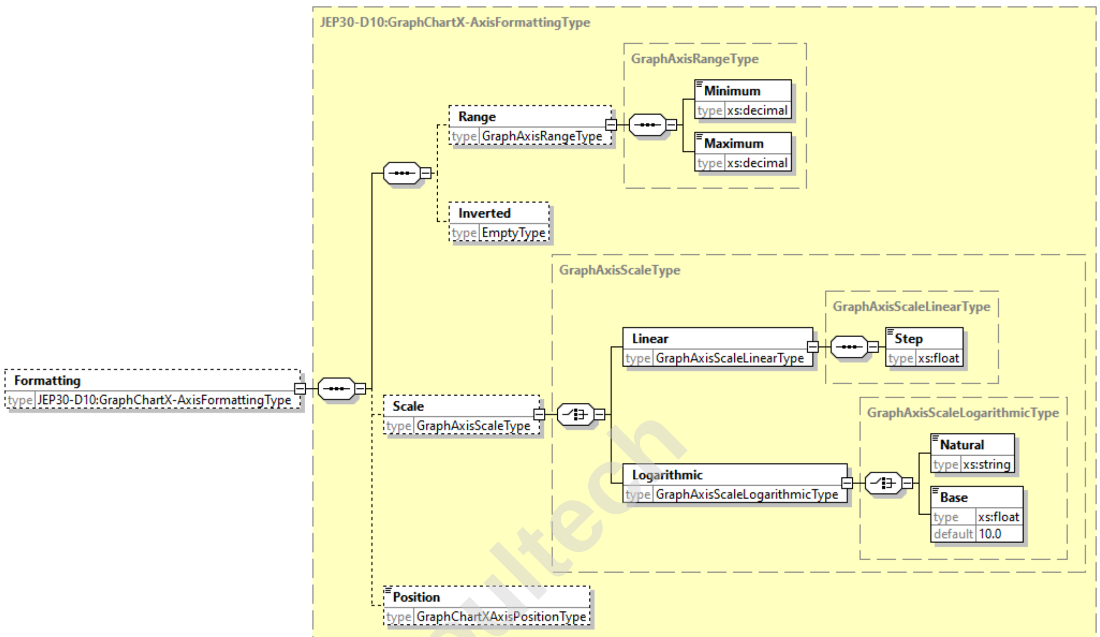
A *ParameterGraph* has 2 axis that are defined by the *TestConditionType* (The X-axis definition), and the *ParameterType* (The Y-axis definition). Each axis is labelled by the *AxisTitle*. When possible, the *LaTeX-Symbol* or the *MathML-Symbol* which represents the *AxisTitle* should be added to the PartModel file and should represent a standards-based symbol as defined in the appropriate Terms and Definitions standards. If appropriate, a more detailed *Description* can be used to describe the definition of the *AxisTitle*. Each axis will also have a pre-defined set of *Units* but can be optionally excluded for those axis' which are unitless.

Note that the *ParameterDefinition* is unbounded whereas the *TestConditionDefinition* is bounded to a single instance. This is to cater for those graphs in which there are 2 or more y-axis, each with their own definition.

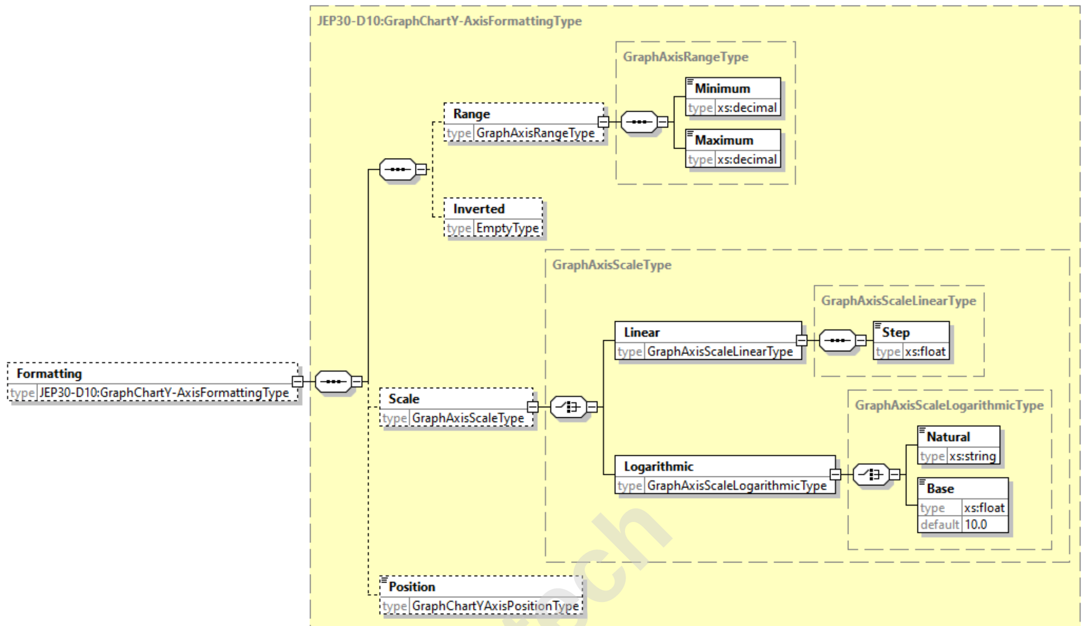
The graph can either be captured under the *Data-Array* or represented via a *GraphFormula (A string representing the equation of the ParameterDefinition relationship to the Test TestConditionDefinition).*

4.7.4.3.1. Formatting

The Formatting is an optional set of data that enables the user to re-create the graph for visualization purposes. Formatting applies to the following

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/ParameterGraph/TestConditionDefinition/Formatting.**
diagram	
type	**GraphChartXAxisFormattingType, GraphAxisRangeType, JEP30-D10:EmptyType, GraphAxisScaleType, GraphAxisScaleLinearType, GraphAxisScaleLogarithmicType, GraphChartXAxisPositionType.**

4.7.4.3.1. Formatting (cont'd)

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/ParameterGraph/ParameterDefinition/Formatting.</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>GraphChartYAxisFormattingType, GraphAxisRangeType, JEP30-D10:EmptyType, GraphAxisScaleType, GraphAxisScaleLinearType, GraphAxisScaleLogarithmicType, GraphChartYAxisPositionType.</td></tr>
</table>

The axis range which is usually defined from minimum to maximum can be inverted to show a graph going from maximum to minimum. The scale can be defined in either a linear step amount, a natural logarithm, or a logarithm of the specified base. The *Base* log is set to a default of *Base 10* but can be defined to any base number.

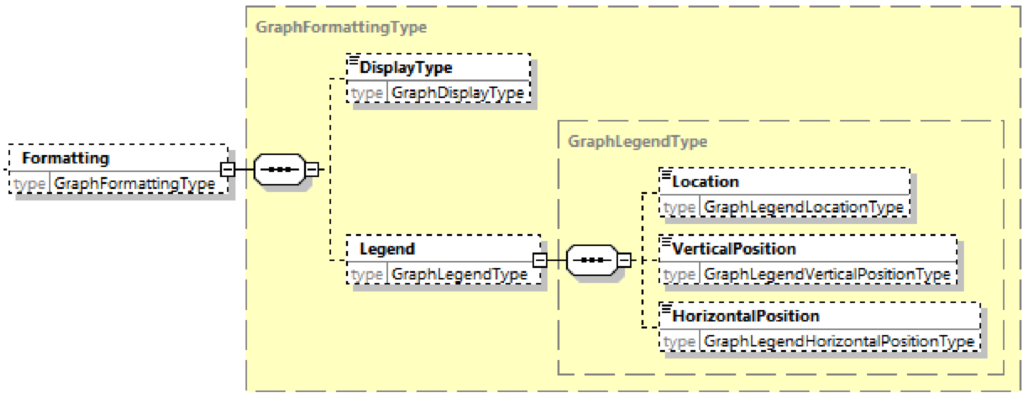
The *Position* enumerated list for the *GraphChartXAxisPositionType* is

- Top
- Bottom

And for the *GraphChartYAxisPositionType*, the enumerated values are

- Left
- Right

4.5.4.3.1. Formatting (cont'd)

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/ParameterGraph/Formatting
diagram	
type	GraphFormattingType, GraphDisplayType, GraphLegendType, GraphLegendLocationType, GraphLegendVerticalPositionType, GraphLegendHorizontalPositionType.

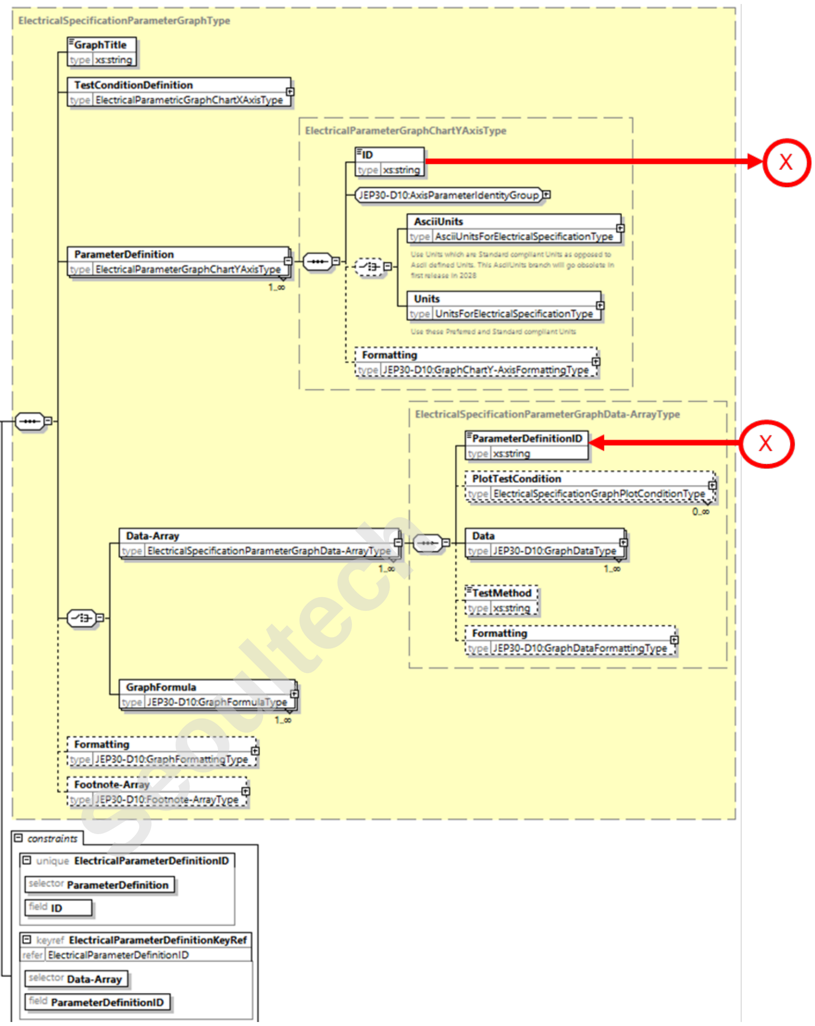
The body of the graph can be formatted under the *GraphFormattingType*. The *DisplayType* enumerated list is

- Line
- Bar

The graph Legend can also be positioned around the graph in any of the following locations:

- Location
  - Inside Graph,
  - Outside Graph,
- Vertical Position
  - Top,
  - Center,
  - Bottom,
- Horizontal Position
  - Left,
  - Center,
  - Right.

4.7.4.3.1.1. Linking the Data-Array to the Appropriate Parameter Definition

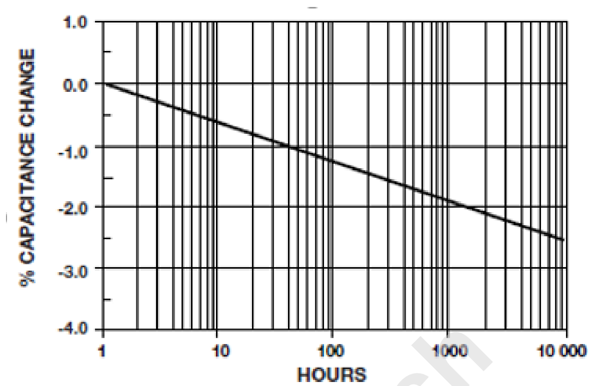
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/ParameterGraph**
diagram	
type	**ElectricalSpecificationParameterGraphType, ElectricalParametricGraphChartXAxisType, ElectricalParameterGraphChartYAxisType, AsciiUnitsForElectricalSpecificationType, UnitsForElectricalSpecificationType, JEP30-D10:GraphChartYAxisFormattingType, ElectricalSpecificationParameterGraphData-ArrayType, ElectricalSpecificationGraphPlotConditionType, JEP30-D10:GraphDataType, JEP30-D10:GraphDataFormattingType, JEP30-D10:GraphFormulaType, JEP30-D10:GraphFormattingType,**
group	**JEP30-D10:AxisParameterIdentityGroup**

When populating the *Data-Array* for a given graph, the set of data is referenced to the specific *ParameterDefinition* via the *ParameterDefinitionID. The process is replicated for each ParameterDefinition* if there are 2 or more vertical *ParameterDefinition* axis defined. Each set of data captured under the *Data-Array* is now tied to the appropriate *ParameterDefinition* axis.

4.7.4.3.1.1. Linking the Data-Array to the Appropriate Parameter Definition (cont'd)

The data plot on the graph, is a set of points associated with the intersection of these two axis and can be either captured under the *Data-Array*, or represented via a *GraphFormula*.

A rule may also be defined as a function on one electrical parameter against a second electrical parameter. The aging rate of the materials in a device is generally defined on a simple logarithmic curve. In this example, the Aging Rate, shown in Figure 42 can be captured with a *GraphFormula* under the *ParameterGraph* as shown below.



Source: Vishay Vitramon

Figure 42 – Aging Rate

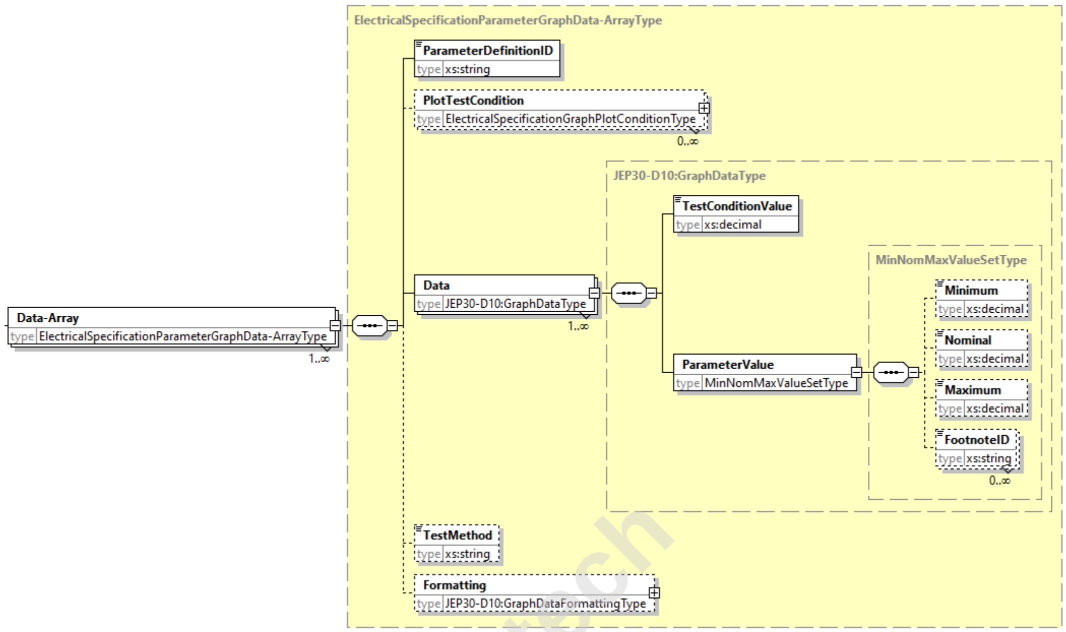
This is a straight line; however, the scale of the HOURS axis is logarithmic. HOURS is represented by the symbol “h” and the Capacitance change is represented by the symbol “\Delta C”. The formula of the graph plot is \Delta C = LOG(h ^ -0.625). The xml fragment shown below represents the data plotted in Figure 44 — Aging Rate

```
<ParameterGraph>
	<GraphTitle>Aging Rate</GraphTitle>
	<TestConditionDefinition>
		<AxisTitle>HOURS</AxisTitle >
		<LaTeX-Symbol>h</LaTeX-Symbol>
		<SymbolDescription>Hours</SymbolDescription>
		<Units>
			<Time>h</Time>
		</Units>
		<Formatting>
			<Range>
				<Minimum>1</Minimum >
				<Maximum>10000</Maximum >
			</Range >
			<Scale>
				<Logarithmic>
					<Base>10</Base>
				</ Logarithmic >
			</Scale>
			<Position>Bottom</ Position >
```

4.7.4.3.1.1. Linking the Data-Array to the Appropriate Parameter Definition (cont'd)

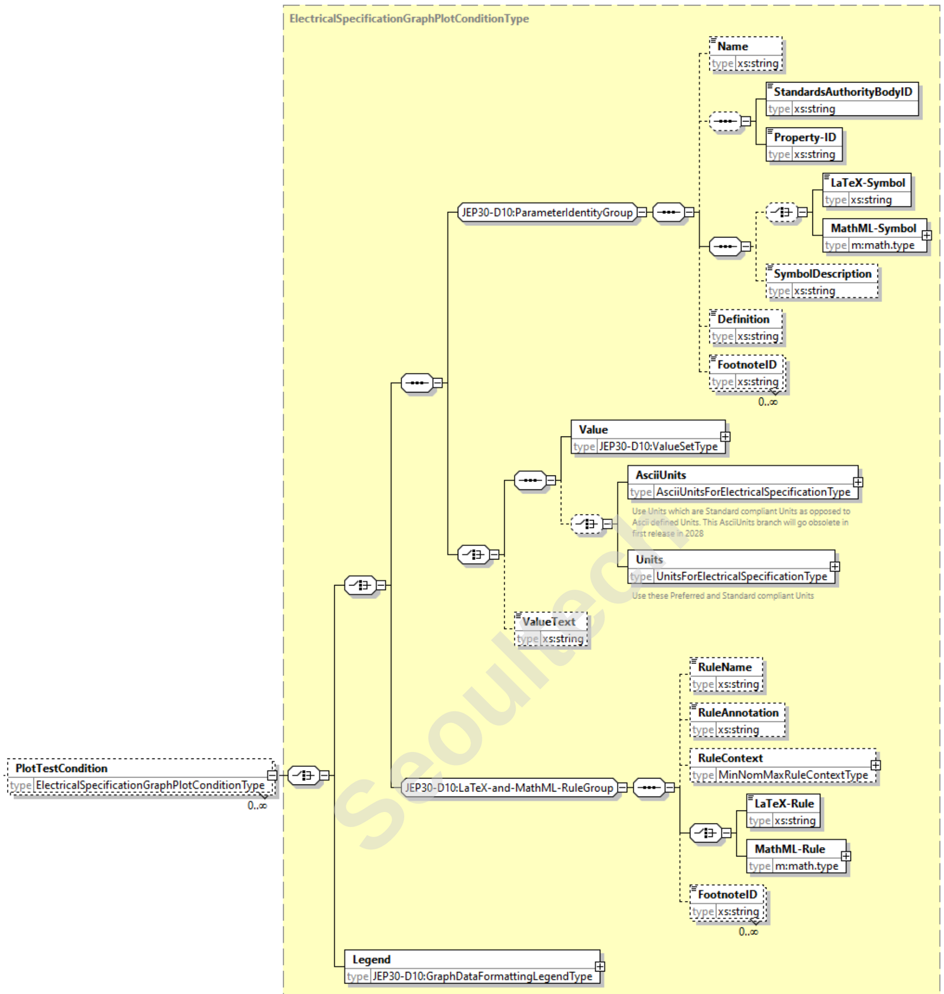

```
        </Formatting >
    </TestConditionDefinition>
    <ParameterDefinition>
        <ID>Plot1</ID >
        <AxisTitle>% CAPACITANCE CHANGE</AxisTitle >
        <LaTeX-Symbol>\Delta C</LaTeX-Symbol>
        <Description>Capacitance Change</Description>
        <Units>
            <Percent/>
        </Units>
        <Formatting>
            <Range>
                <Minimum>-4</Minimum >
                <Maximum>1</Maximum >
            </Range >
            <Scale>
                <Linear>
                    <Step>1</Step>
                </Linear>
            </Scale>
            <Position>Left</ Position >
        </Formatting >
    </ParameterDefinition>
    <GraphFormula>
        <LaTex-Rule>log10(h ^ -0.625)</LaTeX-Rule>
    </GraphFormula>
</ParameterGraph>
```

4.7.4.3.2. Data-Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/ParameterGraph/Data-Array</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>ElectricalSpecificationParameterGraphData-ArrayType, ElectricalSpecificationGraphPlotConditionType,
JEP30-D10:GraphDataType, MinNomMaxValueSetType, JEP30-D10:GraphDataFormattingType.</td></tr>
</table>

Each *Data* set consisting of the *TestConditionValue*, and the *ParameterValue* represents one point of the data plot on the graph. Various examples of Parameter Graphs are shown below, and representation of those parameter graph examples accompany each graph.

4.7.4.3.2. Data-Array (cont’d)

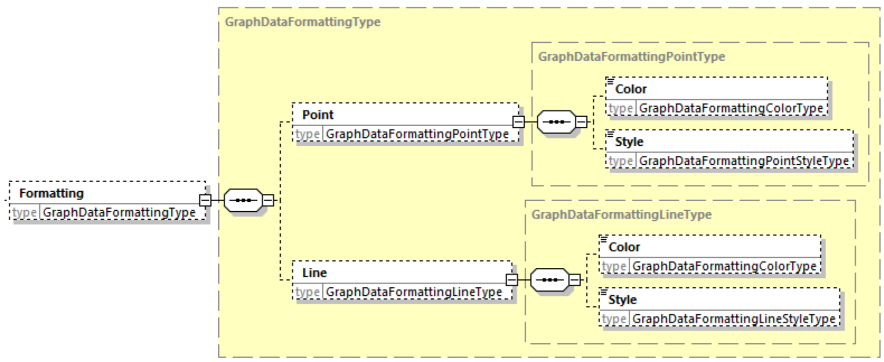
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/ParameterGraph/Data-Array/PlotTestCondition.</td></tr>
<tr><td>diagram</td><td>


</td></tr>
<tr><td>type</td><td>ElectricalSpecificationGraphPlotConditionType, m.math.type, JEP30-D10:ValueSetType,
AsciiUnitsForElectricalSpecificationType, UnitsForElectricalSpecificationType,
MinNomMaxRuleContextType, JEP30-D10:GraphDataFormattingLegendType.</td></tr>
<tr><td>group</td><td>JEP30-D10:ParameterIdentityGroup, JEP30-D10:LaTeX-and-MathML-RuleGroup</td></tr>
</table>

Depending upon the type of test condition, its value may be a string or label that describes the *PlotTestCondition*, in which case the value is populated under the *Legend* branch.

If, however, the *PlotTestCondition* can be represented by a *Symbol* or a *Rule*, then this should be written to the top branch under the *PlotTestCondition* as opposed to the *Legend* branch as a string. The *Symbol* should represent a standards-based symbol as defined in the appropriate Terms and Definitions standards. If appropriate, a more detailed *SymbolDescription* can be defined to describe the definition of the *PlotTestCondition*. The *Symbol* can have a pre-defined set of *Units* but can be optionally excluded for those *PlotTestCondition* which are unitless.

4.7.4.3.2. Data-Array (cont'd)

path	**PartModel/ThermalSection/ThermalFamily-Array/ThermalFamily/ThermalData/ThermalMetrics-Array/ThermalMetricGraph/Data-Array/Formatting.**
diagram	
type	**GraphDataFormattingType, GraphDataFormattingPointType. GraphDataFormattingLineType, GraphDataFormattingColorType, GraphDataFormattingPointStyleType, GraphDataFormattingLineStyleType.**

The data points can also be formatted. Individual data points can have the following styles

- Point Styles are
  - Circle,
  - Square,
  - Triangle,
  - None.
- Line Style are
  - Solid,
  - Dash,
  - Dot,
  - Dash-dot,
  - Dash-dash-dot,
  - None.
- Colors are
  - Red,
  - Green,
  - Blue,
  - Orange,
  - Brown,
  - Pink,
  - Purple,
  - Yellow,
  - Black.

The xml fragment shown below represents the data plotted in Figure 44 — Capacitance Value versus Temperature.

4.7.4.3.2. Data-Array (cont'd)

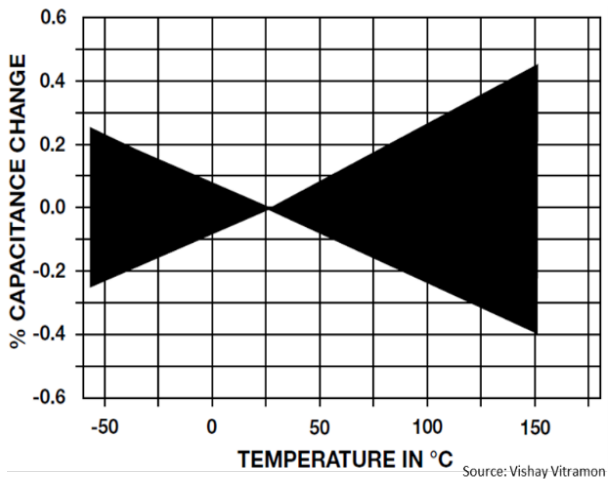


Figure 43 — Capacitance Value versus Temperature

```
<ParameterGraph>
    <GraphTitle>Capacitance Value versus Temperature</GraphTitle>
    <TestConditionDefinition>
        <AxisTitle>Temperature</AxisTitle>
        <LaTeX-Symbol>T</LaTeX-Symbol>
        <Description>Temperature in DegC</Description>
        <Units>
            <Temperature>DegC</Temperature>
        </Units>
        <Formatting>
            <Range>
                <Minimum>-50</Minimum>
                <Maximum>175</Maximum>
            </Range >
            <Scale>
                <Linear>
                    <Step>25</Step>
                </Linear>
            </Scale>
            <Position>Bottom</ Position >
        </Formatting>
    </TestConditionDefinition>
    <ParameterDefinition>
        <ID>Plot1</ID >
        <AxisTitle>% CAPACITANCE CHANGE</AxisTitle>
        <LaTeX-Symbol>ΔC</LaTeX-Symbol>
        <Description>Capacitance change</Description>
        <Units>
            <Percent/>
        </Units>
```

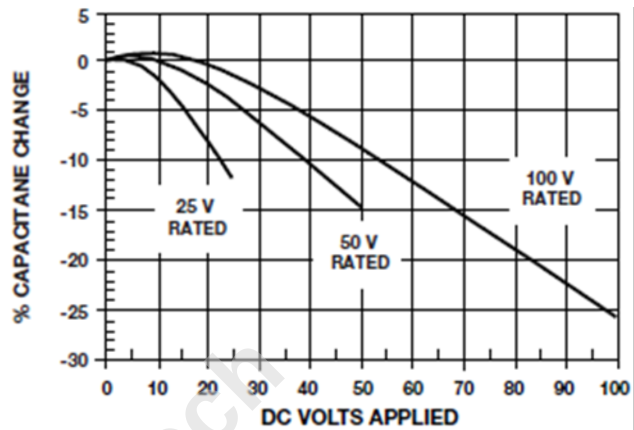
4.7.4.3.2. Data-Array (cont'd)

```
        <Formatting>
            <Range>
                <Minimum>-0.6</Minimum>
                <Maximum>0.6</Maximum>
            </Range >
            <Scale>
                <Linear>
                    <Step>0.1</Step>
                </Linear>
            </Scale>
            <Position>Left</ Position >
        </Formatting >
    </ParameterType>
    <Data-Array>
        <ParameterDefinitionID> Plot1</ParameterDefinitionID>
        <Data>
            <TestConditionValue>-55</TestConditionValue>
            <ParameterValue>
                <Minimum>-0.25</Minimum>
                <Maximum>0.25</Maximum>
            </ParameterValue>
        </Data>
        <Data>
            <TestConditionValue>25</TestConditionValue>
            <ParameterValue>
                <Minimum>0.0</Minimum>
                <Maximum>0.0</Maximum>
            </ParameterValue>
        </Data>
        <Data>
            <TestConditionValue>150</TestConditionValue>
            <ParameterValue>
                <Minimum>-0.4</Minimum>
                <Maximum>0.45</Maximum>
            </ParameterValue>
        </Data>
        <Formatting>
            <Point>
                <Color>Black</Color>
                < Style>None</Style>
            </Point>
            <Line>
                <Color>Black</Color>
                < Style>Solid</Style>
            </ Line>
        </Formatting>
    </Data-Array>
```

4.7.4.3.2. Data-Array (cont'd)

```xml
        <Formatting>
                <DisplayType>Line</DisplayType>
                <Legend>
                        <Location>Outside Graph</Location>
                        <VerticalPosition>Center</VerticalPosition>
                        <HorizontalPosition>Right</HorizontalPosition>
                </ Legend>
        </Formatting>
</ParameterGraph>
```

The *TestCondition* under the *Data*, represents different plots on the same graph, as shown in Figure 45 and captured below in the XML file.



Source: Vishay Vitramon

Figure 44 — Voltage Coefficient of Capacitance

```xml
<ParameterGraph>
        <GraphTitle>Voltage Coefficient of Capacitance</GraphTitle>
        <TestConditionDefinition>
                <AxisTitle>DC Volts Applied</AxisTitle>
                <LaTeX-Symbol>V_{DC}</LaTeX-Symbol>
                < Description>DC Volts Applied</Description>
                <Units>
                        <Voltage>V</Voltage>
                </Units>
                <Formatting>
                        <Range>
                                <Minimum>0</Minimum>
                                <Maximum>100</Maximum>
                        </Range >
                        <Scale>
                                <Linear>
                                        <Step>10</Step>
                                </Linear>
                        </Scale>
                        <Position>Bottom</ Position >
                </Formatting>
        </TestConditionType>
        <ParameterType>
                <ID>Plot1</ID >
                <AxisTitle>% CAPACITANCE CHANGE</AxisTitle>
```

4.7.4.3.2. Data-Array (cont'd)


```
        <LaTeX-Symbol>\Delta C</LaTeX-Symbol>
        <Description>Capacitance change</Description>
        <Units>
            <Percent/>
        </Units>
        <Formatting>
            <Range>
                <Minimum>-30</Minimum>
                <Maximum>5</Maximum>
            </Range >
            <Scale>
                <Linear>
                    <Step>5</Step>
                </Linear>
            </Scale>
            <Position>Left</ Position >
        </Formatting >
    </ParameterType>
    <Data-Array>
        <PlotTestCondition>
            <LaTeX-Symbol>VDC</LaTeX-Symbol>
            <SymbolDescription>Rated Voltage DC</SymbolDescription>
            <Value>25</Value>
            <Units>
                <Voltage>V</Voltage>
            </Units>
        </PlotTestCondition>
        <Data>
            <TestConditionValue>0</TestConditionValue>
            <ParameterValue>
                <Nominal>0</Nominal>
            </ParameterValue>
        </Data>
        <Data>
            <TestConditionValue>5</TestConditionValue>
            <ParameterValue>
                <Nominal>0</Nominal>
            </ParameterValue>
        </Data>
        <Data>
            <TestConditionValue>10</TestConditionValue>
            <ParameterValue>
                <Nominal>-2</Nominal>
            </ParameterValue>
        </Data>
        <Data>
            <TestConditionValue>15</TestConditionValue>
            <ParameterValue>
                <Nominal>-5</Nominal>
            </ParameterValue>
        </Data>
```

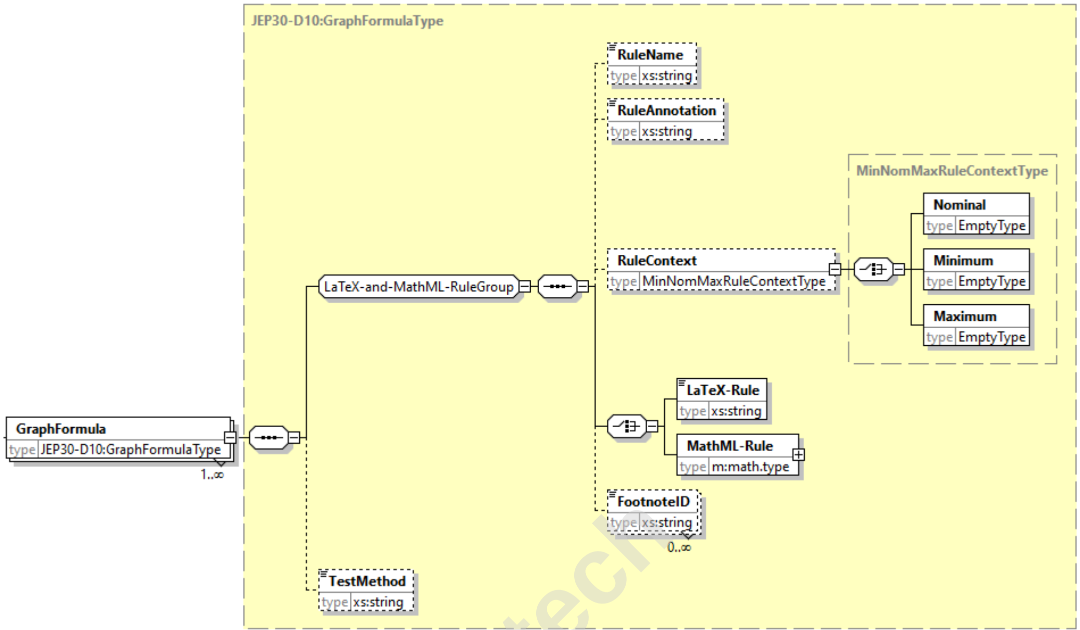
4.7.4.3.2. Data-Array (cont'd)

```
        <Data>
            <TestConditionValue>25</TestConditionValue>
            <ParameterValue>
                <Nominal>-12</Nominal>
            </ParameterValue>
        </Data>
    </Data-Array>
    <Data-Array>
        <PlotTestCondition>
            <LaTeX-Symbol>VDC</LaTeX-Symbol>
            <SymbolDescription>Rated Voltage DC</SymbolDescription>
            <Value>50</Value>
            <Units>
                <Voltage>V</Voltage>
            </Units>
        </PlotTestCondition>
        <Data>
            <TestConditionValue>0</TestConditionValue>
            <ParameterValue>
                <Nominal>0</Nominal>
            </ParameterValue>
        </Data>
        <Data>
            <TestConditionValue>4</TestConditionValue>
            <ParameterValue>
                <Nominal>1</Nominal>
            </ParameterValue>
        </Data>
        <Data>
            <TestConditionValue>10</TestConditionValue>
            <ParameterValue>
                <Nominal>0</Nominal>
            </ParameterValue>
        </Data>
        <Data>
            <TestConditionValue>20</TestConditionValue>
            <ParameterValue>
                <Nominal>-2</Nominal>
            </ParameterValue>
        </Data>
        <Data>
            <TestConditionValue>50</TestConditionValue>
            <ParameterValue>
                <Nominal>-15</Nominal>
            </ParameterValue>
        </Data>
    </Data-Array>
    <Data-Array>
        <PlotTestCondition>
            <LaTeX-Symbol>VDC</LaTeX-Symbol>
            <SymbolDescription>Rated Voltage DC</SymbolDescription>
            <Value>100</Value>
```

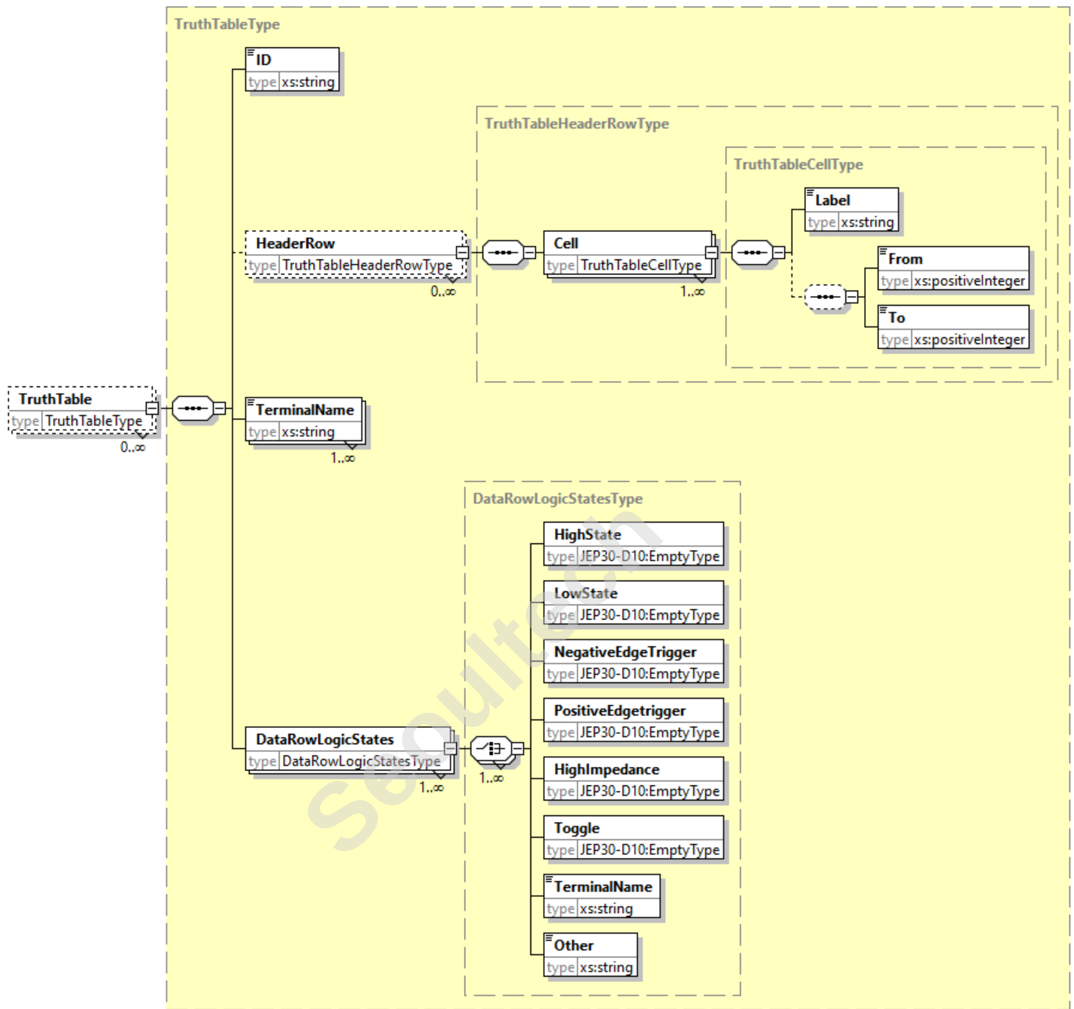
4.7.4.3.2. Data-Array (cont'd)


```xml
                <Units>
                        <Voltage>V</Voltage>
                </Units>
        </PlotTestCondition>
        <Data>
                <TestConditionValue>0</TestConditionValue>
                <ParameterValue>
                        <Nominal>0</Nominal>
                </ParameterValue>
        </Data>
        <Data>
                <TestConditionValue>4</TestConditionValue>
                <ParameterValue>
                        <Nominal>1</Nominal>
                </ParameterValue>
        </Data>
        <Data>
                <TestConditionValue>10</TestConditionValue>
                <ParameterValue>
                        <Nominal>1</Nominal>
                </ParameterValue>
        </Data>
        <Data>
                <TestConditionValue>20</TestConditionValue>
                <ParameterValue>
                        <Nominal>-1</Nominal>
                </ParameterValue>
        </Data>
        <Data>
                <TestConditionValue>50</TestConditionValue>
                <ParameterValue>
                        <Nominal>-9</Nominal>
                </ParameterValue>
        </Data>
        <Data>
                <TestConditionValue>100</TestConditionValue>
                <ParameterValue>
                        <Nominal>-26</Nominal>
                </ParameterValue>
        </Data>
    </Data-Array>
</ParameterGraph>
```

4.7.4.3.3. Graph Formula

path	PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/ElectricalSpecification/ParameterGraph
diagram	
type	JEP30-D10:GraphFormulaType, MinNomMaxRuleContextType, m:math.type
group	LaTeX-and-MathML-RuleGroup

4.7.5. Truth Table

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ElectricalSpecification-Array/TruthTable**
diagram	
type	**TruthTableType, TruthTableHeaderRowType, TruthTableCellType, DataRowLogicStatesType**

A *TruthTable* is a breakdown of a logic function by listing all possible values the function can attain. Such a table typically contains several rows and columns, with the top row representing the logical variables and combinations, in increasing complexity leading up to the final function.

The *HeaderRow* branch captures the multi row header structure of a table for ease of human readability. It is not required for the capture of the actual logic steps that represents the function of the device and is therefore an optional branch.

The columns of the table are made up of the *TerminalNames* and the table rows are captured under the *DataRowLogicStates* branch. The value under the data row represent the values for each column in sequence to match the sequence of the *TerminalNames*. If there are 3 terminal names, then there should be 3 values within each data row container.

4.7.5 Truth Table (cont'd)

Table 4 — NOR logic States

Input		Output
A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

Table 4 can be represented in the xml file as follows:

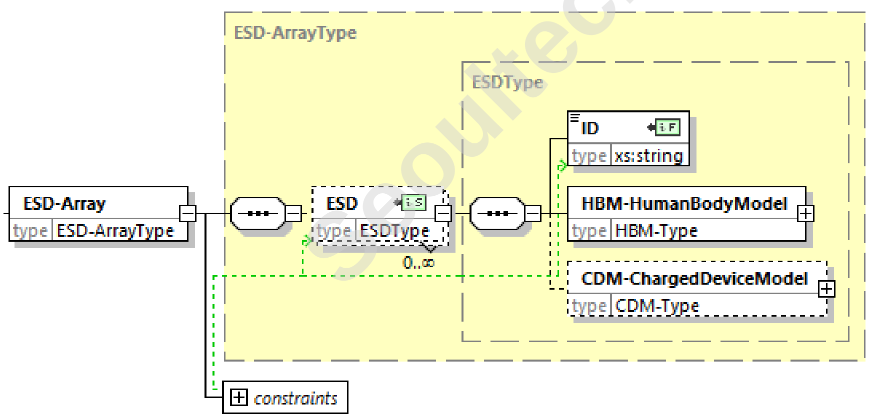
```
<TruthTable>
        <ID>Logic Function ID 1</ID>
        <HeaderRow>
                <Cell>
                        <Label>Input</Label>
                        <From>1</From>
                        <To>2</To>
                </Cell>
                <Cell>
                        <Label>Output</Label>
                </Cell>
        </HeaderRow>
        <TerminalName>A</TerminalName>
        <TerminalName>B</TerminalName>
        <TerminalName>Y</TerminalName>
        <DataRowLogicStates>
                <LowState/>
                <LowState/>
                <HighState/>
        </DataRowLogicStates>
        <DataRowLogicStates>
                <LowState/>
                <HighState/>
                <LowState/>
        </DataRowLogicStates>
        <DataRowLogicStates>
                <HighState/>
                <LowState/>
                <LowState/>
        </DataRowLogicStates>
        <DataRowLogicStates>
                <HighState/>
                <HighState/>
                <HighState/>
        </DataRowLogicStates>
</TruthTable>
```

4.7.5 Truth Table (cont'd)

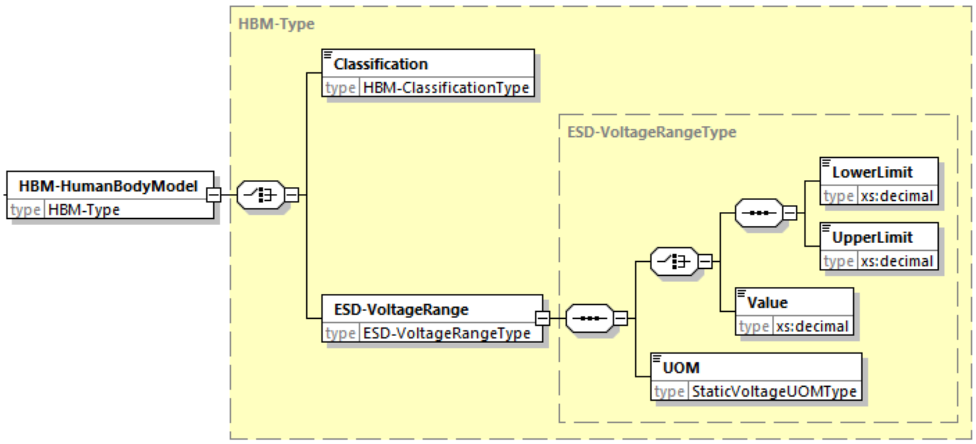
The enumerated values for the Truth Table Value element are:

1. "1"
2. "0"
3. "Negative Edge trigger"
4. "Positive Edge trigger"
5. "↓"
6. "↑"
7. "Z"
8. "High Impedance"
9. "Toggle"
10. "N/A"

4.7.6. ESD

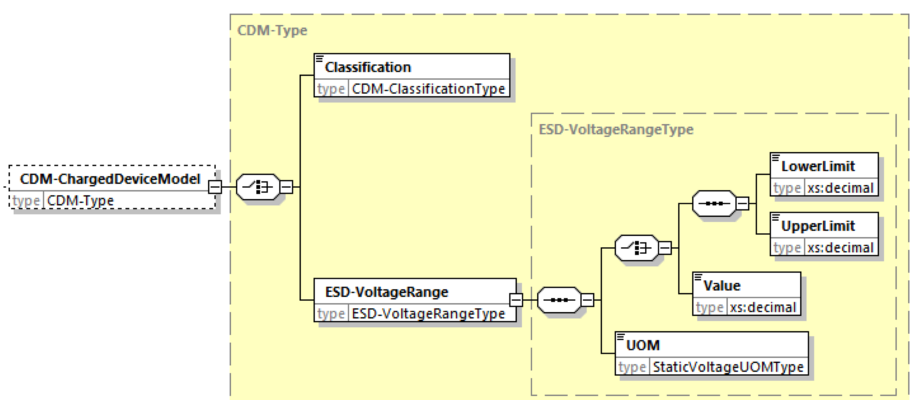
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ESD-Array</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>ESD-ArrayType, ESDType, HBM–Type, CDM–Type.</td></tr>
</table>

4.7.6.1. HBM – Human Body Model

path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ESD-Array/ESD/HBM-HumanBodyModel**
diagram	
type	**HBM–Type, HBM–ClassificationType, ESD–VoltageRangeType, StaticVoltageUOMType.**

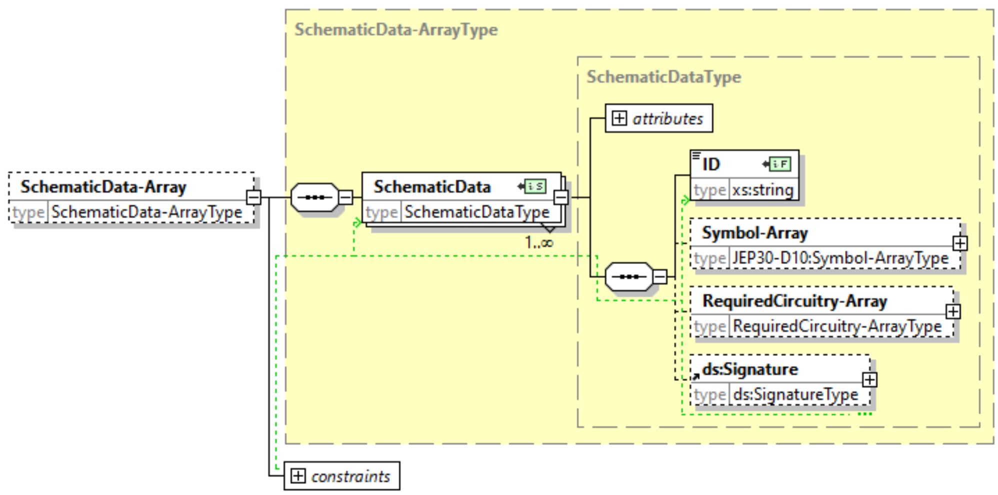
ESD sensitive components are classified according to their *HBM-HumanBodyModel* withstand voltage, regardless of polarity, as defined in ANSI/ESDA/JEDEC JS-001-2017, Human Body Model (HBM) – Component Level. The enumerated values of the *HBM-Classification* are defined in the "Component Classification" section of this publication. The *UOM* enumerated values are V and kV.

4.7.6.2. CDM – Charged Device Model

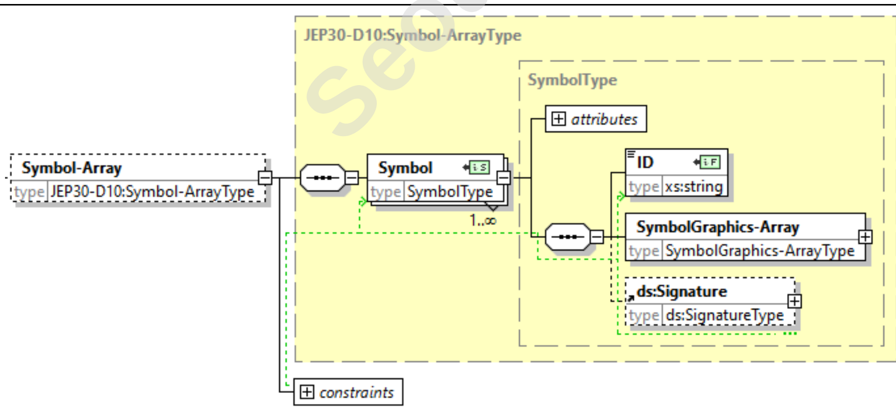
path	**PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/ESD-Array/ESD/CDM-ChargedDeviceModel**
diagram	
type	**CDM–Type, CDM–ClassificationType, ESD–VoltageRangeType, StaticVoltageUOMType.**

ESD sensitive components are also classified according to their *CDM-ChargedDeviceModel* withstand voltage in accordance with ANSI/ESDA/JEDEC JS-002-2018, Charged Device Model (CDM) - Device Level. The enumerated values of the *CDM-Classification* are defined in the "CDM Classification Criteria" section of this publication.

4.8. Schematic Data - Array

path	PartModel/ElectricalSection/SchematicData-Array
diagram	
type	SchematicData-Array, SchematicDataType, Symbol-ArrayType, RequiredCircuitry-ArrayType, ds:SignatureType

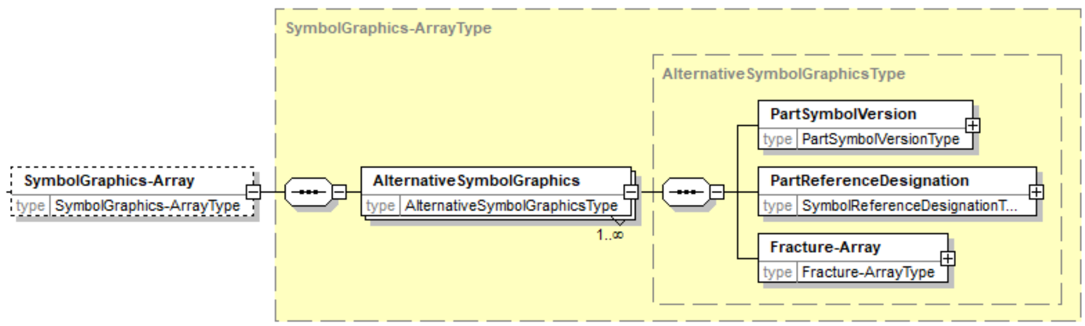
4.8.1. Symbol - Array

path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array
diagram	
type	Symbol–ArrayType, SymbolType, SymbolGraphics-ArrayType, ds:SignatureType

Symbol data used in Schematic design is not normally provided by the component manufacturer. However, its provision can enhance the efficiency of utilizing that Part within a design process. There are various drafting standards to which a symbol can be generated to, such as ANSI, IEEE or IEC Drafting Standard.

Throughout this section as defined by the path *PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array*, all dimensions and xy coordinates refers to grid spacing as opposed to any dimensional units of measure. This is because, customers defing their schematic grid spacing to be a multiple of a metric unit versus a multiple of an imperial unit (i.e., 2.5mm versus 100 mil). The grid spacing is defined in the software tool that absorbs this *Symbol–Array* section of the PartModel xml file.

4.8.1.1. Symbol Graphics – Array

path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array**
diagram	
type	**SymbolGraphics–ArrayType, AlternativeSymbolGraphicsType, PartSymbolVersionType, SymbolReferenceDesignationType, Fracture-ArrayType.**

The *SymbolGraphics-Array* captures the necessary data required by a software tool to generate a graphical symbol for an electronic part. The AlternativeSymbolGraphics is unbounded because there are several different graphical representations that can be used to represent the same part as shown in the diagram here.

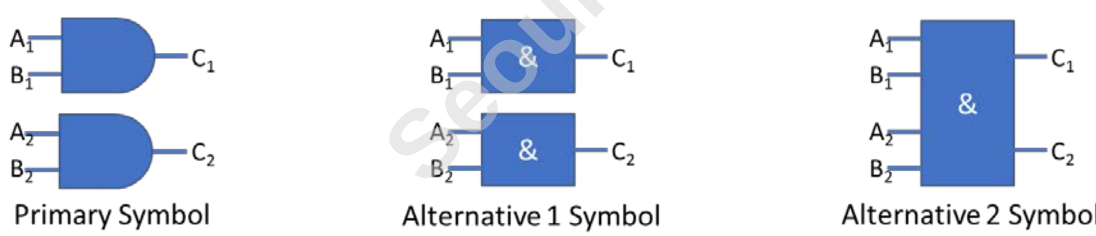
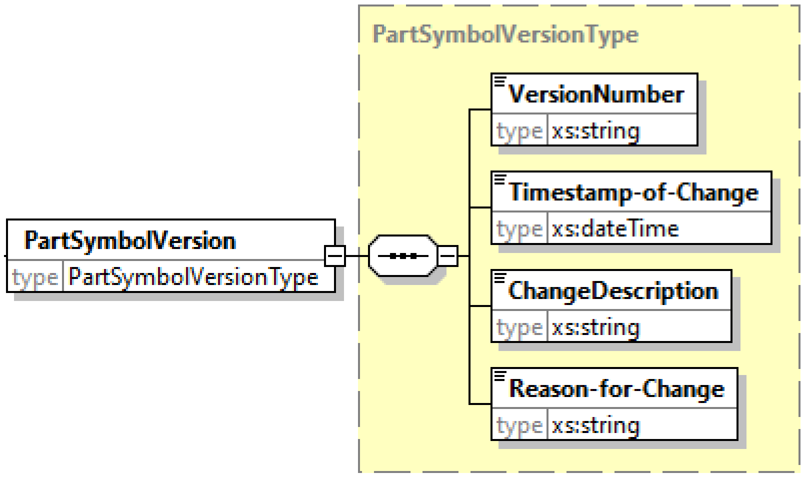


Figure 45 – Alternative Symbols

The data is grouped into the following sections:

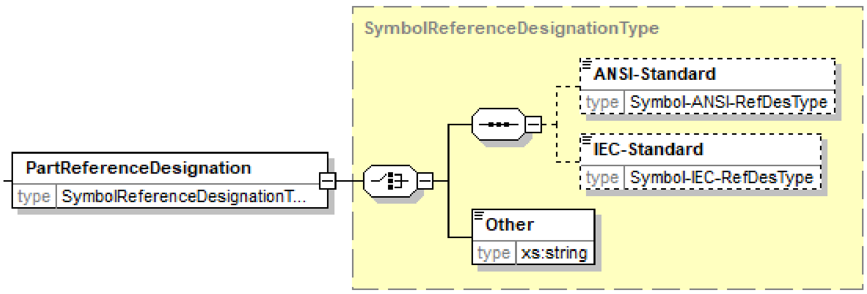
- *PartSymbolVersion*
- *PartReferenceDesignation, and*
- *Fracture-Array*

4.8.1.1.1. Part Symbol Version

path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/PartSymbolVersion
diagram	
type	PartSymbolVersionType.

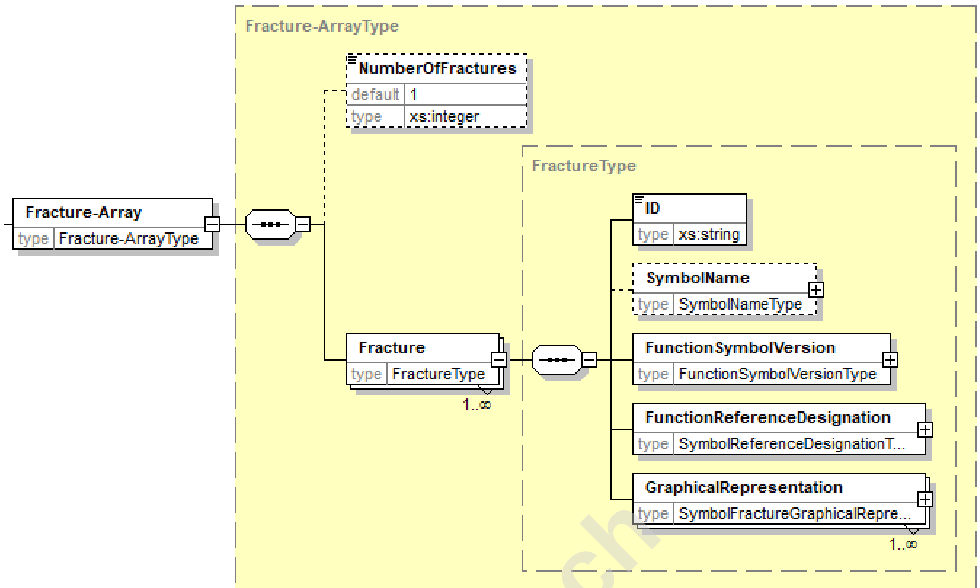
PartSymbolVersion captures the version number of the symbol, timestamp of the latest changes, change description, and reason for change.

4.8.1.1.2. Part Reference Designation

path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/PartReferenceDesignation		
diagram			
type	SymbolReferenceDesignationType, Symbol-ANSI-RefDesType, Symbol-IEC-RefDesType.		
list of enumerate values	ANSI-Standard		
	1. A	2. AR	3. AT
	4. BT	5. C	6. CB
	7. CR	8. D	9. DC
	10. DS	11. E	12. F
	13. FL	14. G	15. H
	16. J	17. K	18. L
	19. LS	20. MK	21. MT
	22. P	23. PS	24. Q
	25. R	26. RE	27. RT
	28. RV	29. S	30. T
	31. TC	32. TR	33. U
	34. V	35. VR	36. Y
list of enumerate values	IEC-Standard		
	1. B	2. G	3. C
	4. Q	5. F	6. V
	7. R	8. Z	9. L
	10. A	11. U	12. K
	13. S	14. T	

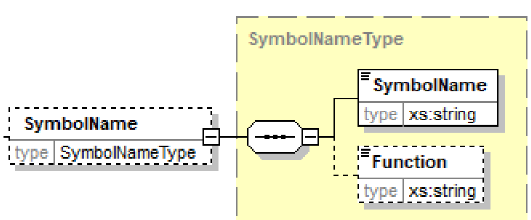
PartReferenceDesignation captures the reference designator based on the ANSI standard or the IEC standard. If the reference designator is not defined by either of those standards, *Other* reference designator may be defined. If the symbol is made up of multiple fractures, and each *FractureReferenceDesignation* is the same, then that value can roll up to be the same for the *PartReferenceDesignation*.

4.8.1.1.3. Fracture – Array

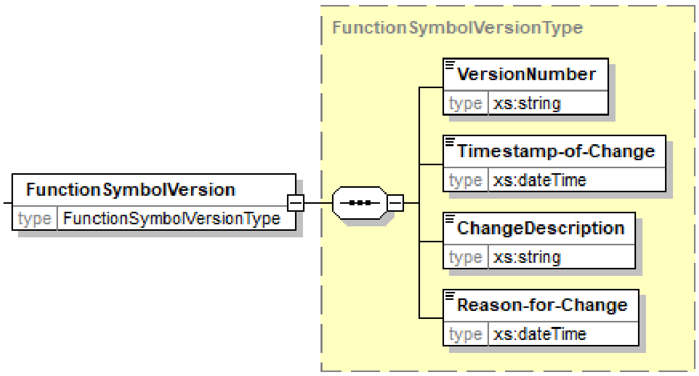
path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array
diagram	
type	Fracture-ArrayType, FractureType, SymbolNameType, FunctionSymbolVersionType, SymbolReferenceDesignationType, SymbolFractureGraphicalRepresentationType.

Fracture-Array contains fractures of symbols. When there are many terminals on a Part, it might be more practical to split the symbol into several Fractures. Terminal are then typically assigned to a *Fracture*, based on some logical organization of the terminals. The fracture name is a string that can be appended onto the symbol name or can remain as a standalone name. The list of terminals on all the fractures is the complete list of terminals for the part.

4.8.1.1.3.1. Symbol Name

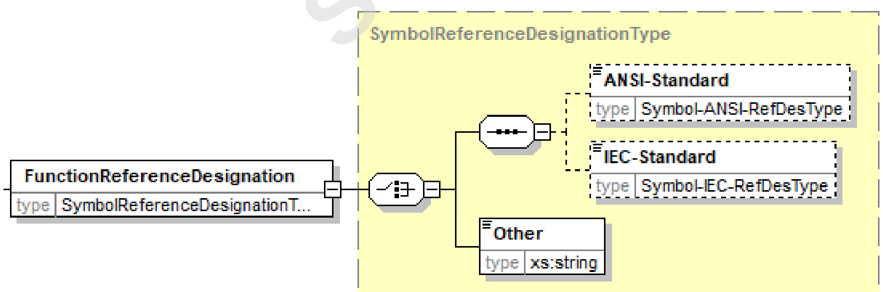
path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/SymbolName
diagram	
type	SymbolNameType.

4.8.1.1.3.1.1. Function Symbol Version

path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/FunctionSymbolVersion
diagram	
type	FunctionSymbolVersionType.

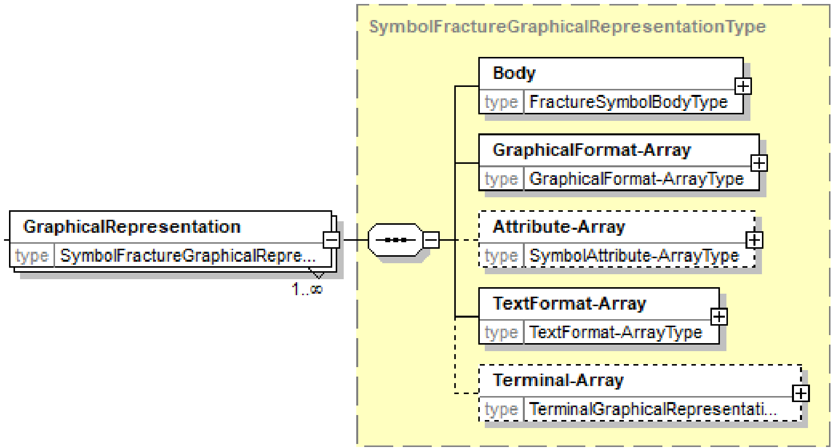
Each Fracture can have its own symbol. This structure provides the ability to track the version of the symbol, the date of change, the description and the reason for the change, in their respective elements.

4.8.1.1.3.2. Function Reference Designation

path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/FunctionReferenceDesignation
diagram	
type	SymbolReferenceDesignationType.

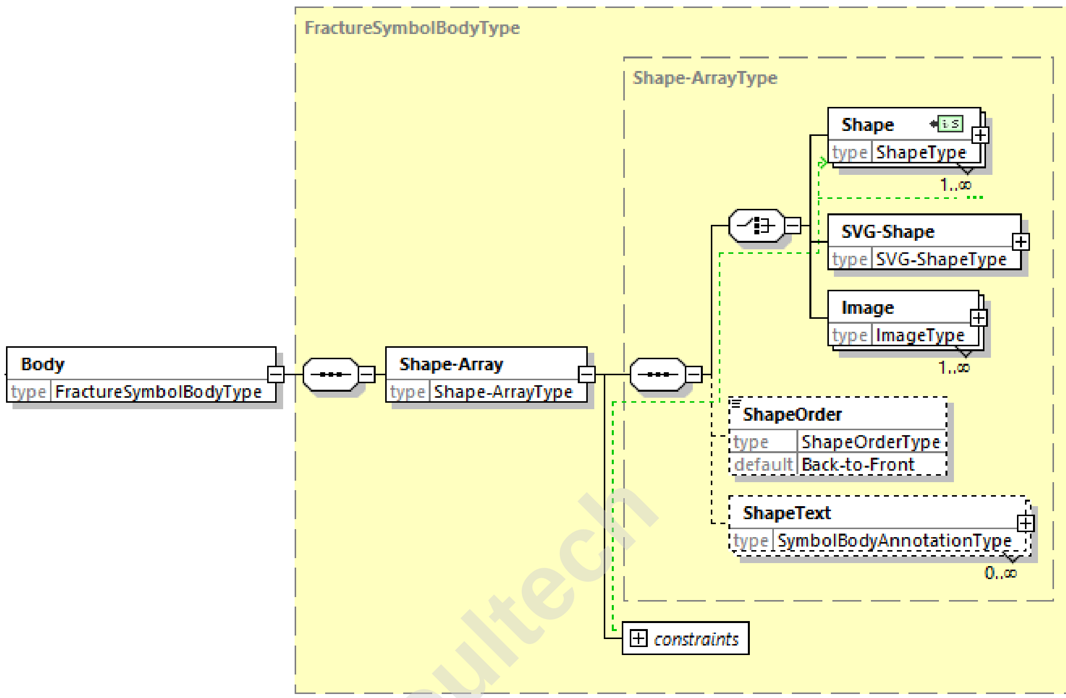
The *FunctionReferenceDesignation* follows the same concept as the *PartReferenceDesignation*. When compiling the schematic to be forward annotated with the layout, the *PartReferenceDesignation* will over-write the *FunctionReferenceDesignation*.

4.8.1.1.3.3. Graphical Representation

path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation
diagram	
type	SymbolFractureGraphicalRepresentationType, FractureSymbolBodyType, GraphicalFormat-ArrayType, SymbolAttribute-ArrayType, TextFormat-ArrayType, TerminalGraphicalRepresentation-ArrayType.

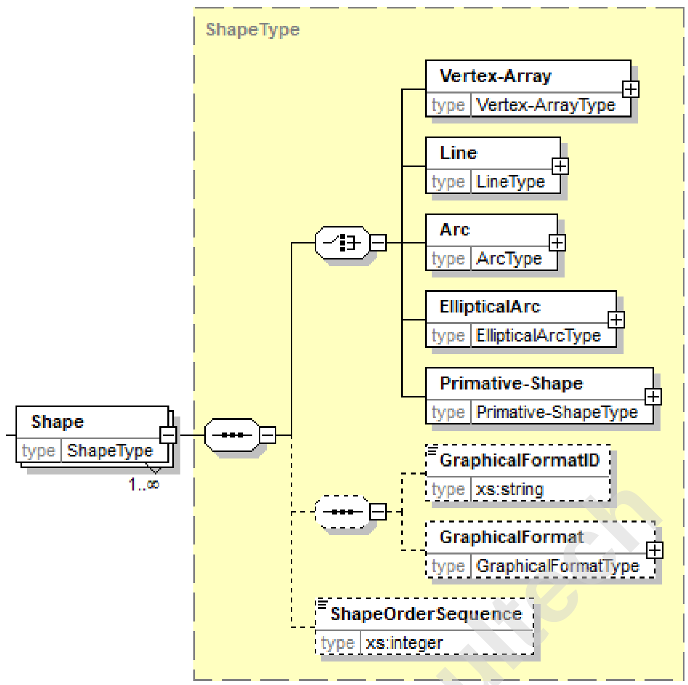
The *GraphicalRepresentation* is principally made up of 3 sections, namely the *Body* structure, the *Attribute-Array* structure that is applied to the Part, and the *Terminal-Array*, with two supporting structures called *GraphicalFormat-Array* and *TextFormat-Array*.

4.8.1.1.3.3.1. Body

path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Body**
diagram	
type	**FractureSymbolBodyType, Shape-ArrayType, ShapeType, SVG-ShapeType, ImageType, SymbolBodyAnnotationType.**
list of enumerate values	**ShapeOrder** **1. Back-to-Front** | **2. Front-to-Back**

The Body shape can be constructed from a series of *Shapes*, a single *SVG-Shape*, or a series of *Images*. The *ShapeOrder* is set for all the shapes as "*Back-to-Front*" as default but can be changed to "*Front-to-Back*". The order of the sequence is captured within the relevant shape array. The *ShapeText* captures the structure for any text that is assigned to the shape.

4.8.1.1.3.3.1.1. Shape

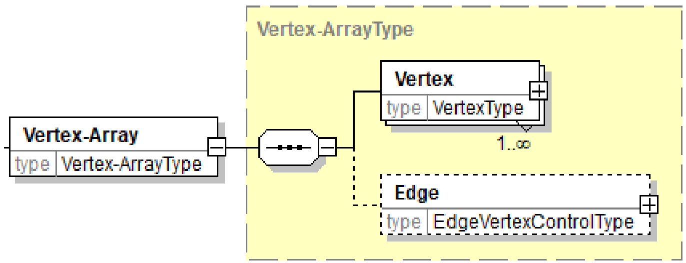
path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Body/Shape-Array/Shape**
diagram	
type	**ShapeType, Vertex-ArrayType, LineType, ArcType, EllipticalArcType, Primative-ShapeType, GraphicalFormatType.**

The Shape can be created from a choice of Vertices, Lines, Arcs, Elliptical Arcs, or primitive shapes.

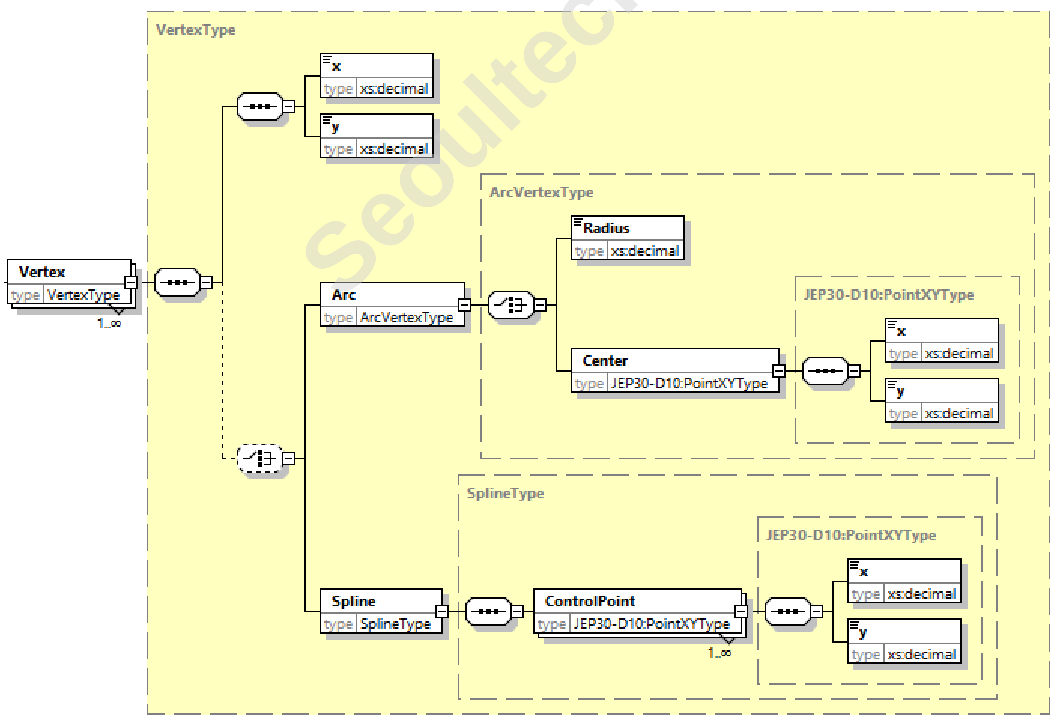
GraphicalFormatID serves as a reference ID for the *GraphicalFormat*, that is defined under the *GraphicalFormat-Array/GraphicalFormats* where a set of graphical formats can be defined that can be standardized across multiple *Shape* entries. The addition of the *GraphicalFormat* under *Shape* enables unique modification of a references Graphical Format for applying to this specific *Shape* instance.

The *ShapeOrderSequence* can be used to define the order of shapes for a complex symbol that may consist of various shapes. It works in tandem with the *ShapeOrder* that is defined under *Body/Shape-Array*.

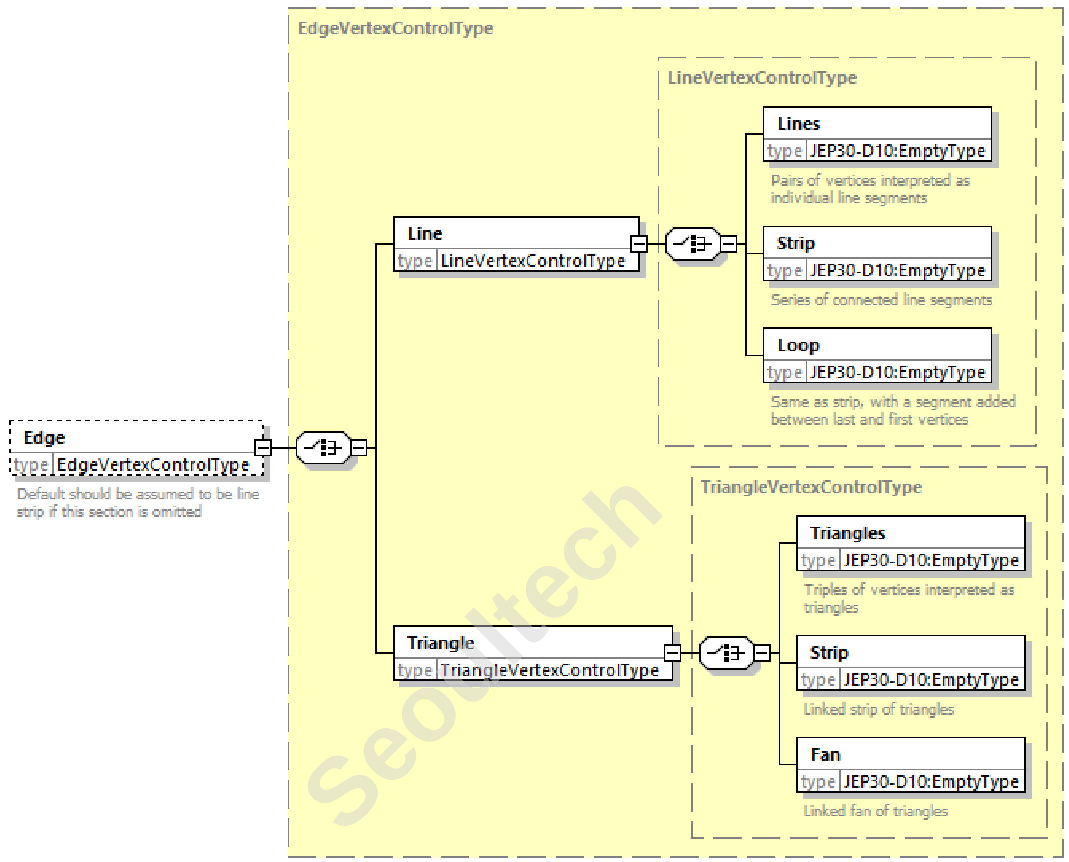
4.8.1.1.3.3.1.1.1. Vertex – Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Body/Shape-Array/Shape/Vertex-Array</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>Vertex-ArrayType, VertexType, EdgeVertexControlType.</td></tr>
</table>

4.8.1.1.3.3.1.1.2. Vertex

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Body/Shape-Array/Shape/Vertex-Array/Vertex</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>VertexType, ArcVertexType, SplineType, JEP30-D10:PointXYType.</td></tr>
</table>

4.8.1.1.3.3.1.1.3. Edge

path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Body/Shape-Array/Shape/Vertex-Array/Edge**
diagram	
type	**EdgeVertexControlType, LineVertexControlType, TriangleVertexControlType, JEP30-D10:EmptyType.**

The default is assumed to be *Line/Strip* if the *Edge* element is omitted. The *Edge* structure governs how each of the vertices in the unbounded *Vertex* element is to be processed.

Line/Lines represent pairs of vertices interpreted as individual line segments. Vertices 1 and 2 make one line segment whereas vertices 3 and 4 makes the 2nd line segment. Veritces 2 and 3 are not connected with a line segment.

Line/Strip represent a series of connected line segments. Vertices 1 and 2 make one line segment whereas vertices 2 and 3 makes the 2nd line segment, and vertices 3 and 4 makes the 3rd line segment.

Lines/Loop is the same as strip, with a segment added between last and first vertices. From the previous example, vertices 4 and 1 makes the final line segment, creation a closed loop.

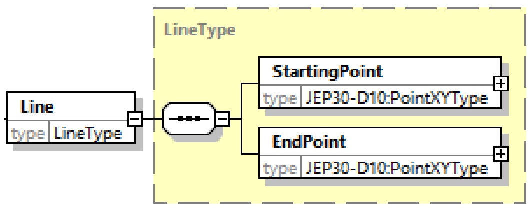
Triangle/Traingles represent each triple set of vertices to be interpreted as an individual triangle. Vertices 1, 2, and 3 make one traingle whereas vertices 4, 5, and 6 makes the 2nd triangle.

4.8.1.1.3.3.1.1.3. Edge (cont'd)

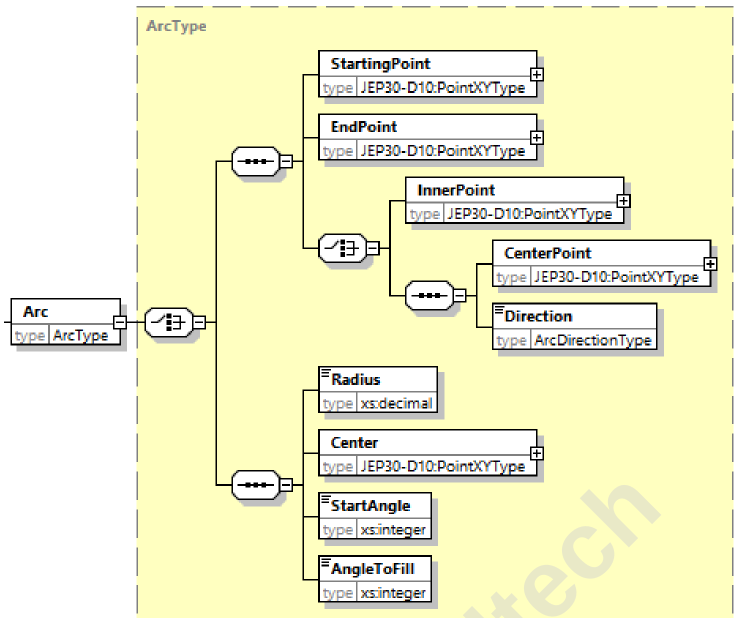
Triangle/Strip represent a linking strip of triangles, where vertices 1, 2, and 3 make up the first triangle and vertices 2, 3 and 4 make up the next triangle.

Triangle/Fan represent a linking strip of triangles the same as the strip where the last triangle is defined by vertices n-1, n and 1. This in effect creates a fan of traingles

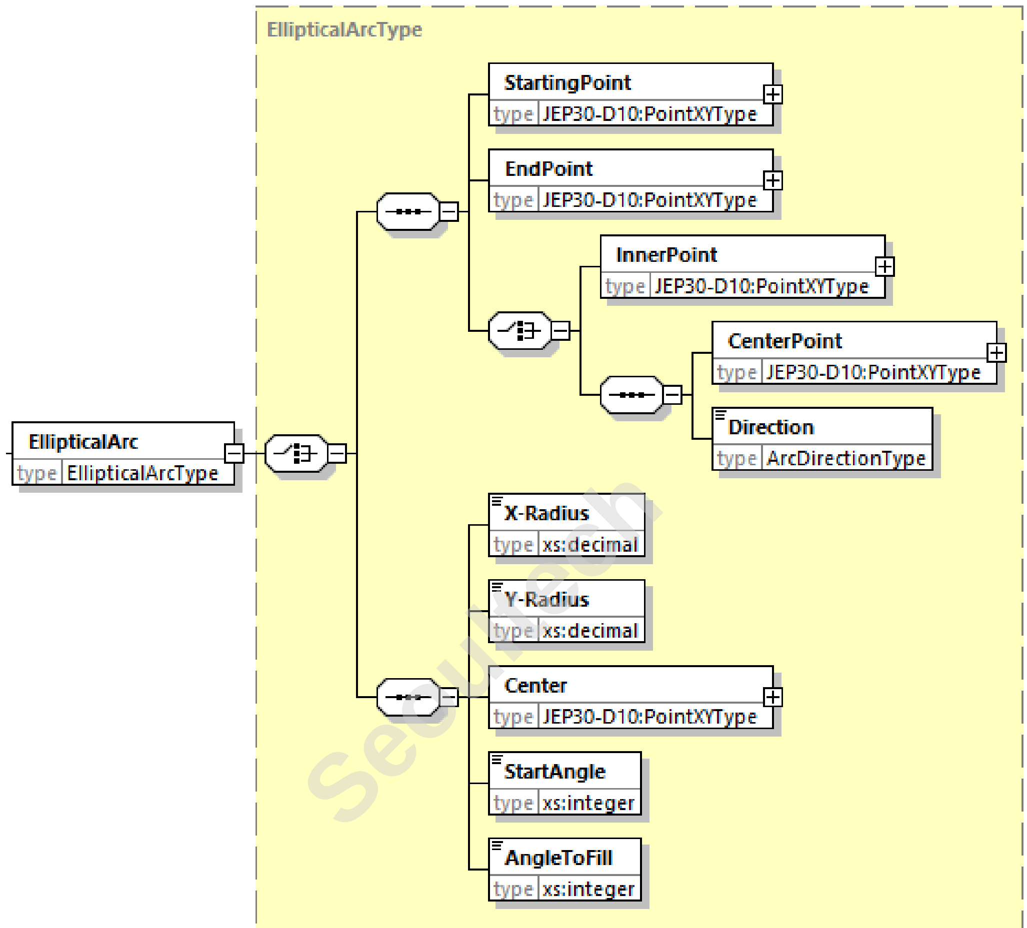
4.8.1.1.3.3.1.1.4. Line

path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Body/Shape-Array/Shape/Line**
diagram	
type	**LineType, JEP30-D10:PointXYType.**

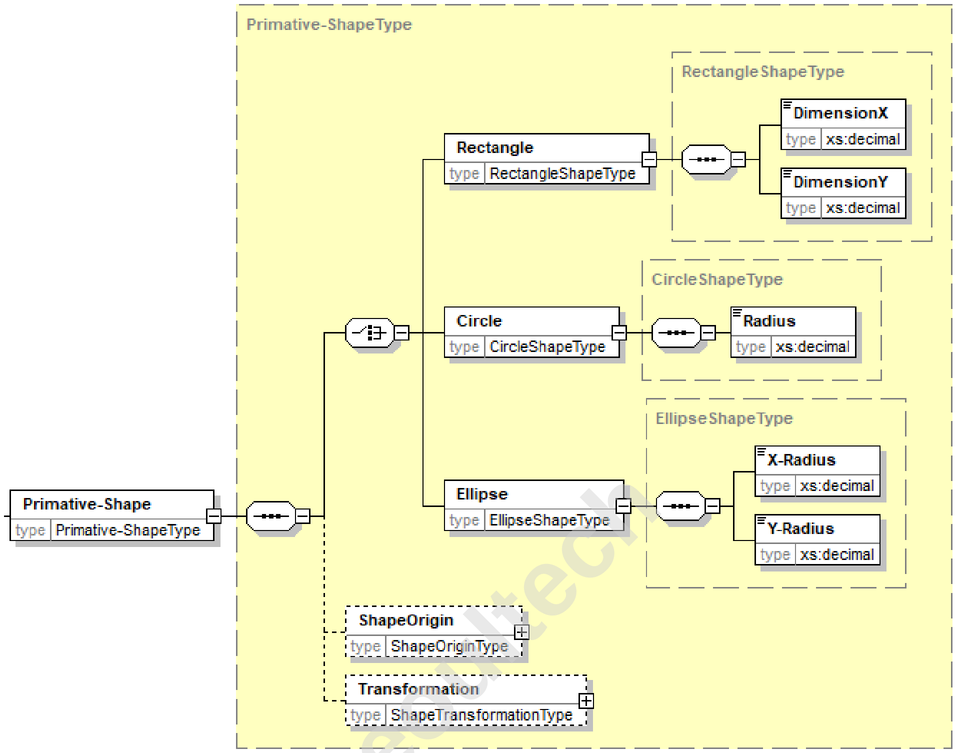
4.8.1.1.3.3.1.1.5. Arc

path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Body/Shape-Array/Shape/Arc
diagram	
type	ArcType, ArcDirectionType, JEP30-D10:PointXYType.
list of enumerate values	Direction 1. Clockwise; 2. Anti-clockwise

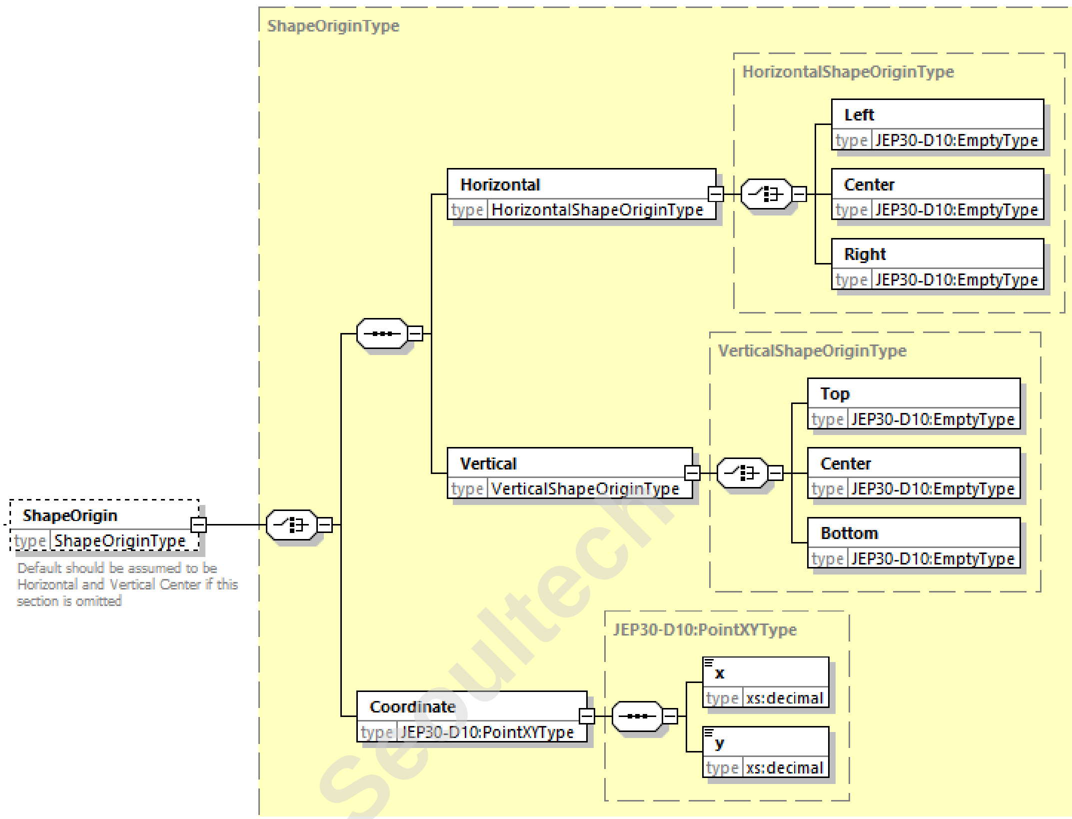
4.8.1.1.3.3.1.1.6. Elliptical Arc

path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Body/Shape-Array/Shape/EllipticalArc**
diagram	
type	**EllipticalArcType, ArcDirectionType, JEP30-D10:PointXYType.**

4.8.1.1.3.3.1.1.7. Primative-Shape

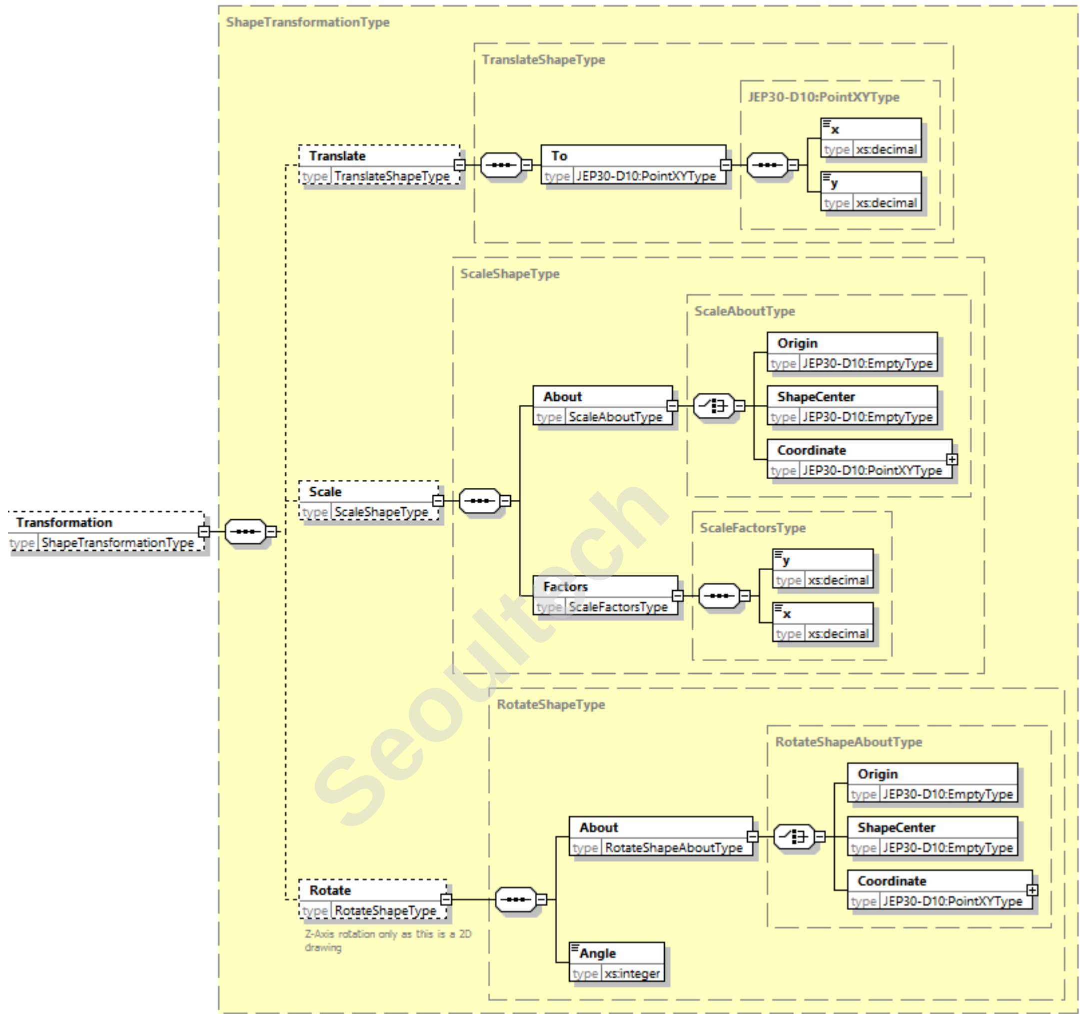
path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Body/Shape-Array/Shape/Primative-Shape**
diagram	
type	**Primative-ShapeType, RectangleShapeType, CircleShapeType, EllipseShapeType, ShapeOriginType, ShapeTransformationType.**

4.8.1.1.3.3.1.1.8. Shape Origin

path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Body/Shape-Array/Shape/Primative-Shape/ShapeOrigin**
diagram	
type	**ShapeOriginType, HorizontalShapeOriginType, VerticalShapeOriginType, JEP30-D10:PointXYType, JEP30-D10:EmptyType.**

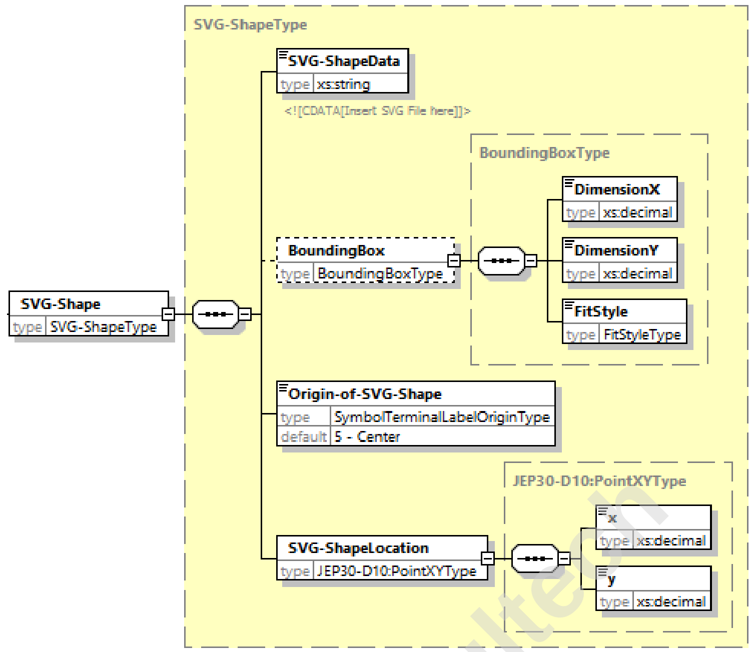
If the *ShapeOrigin* is omitted, the default should be assumed to be *Horizontal/Center* and *Vertical/Center*.

4.8.1.1.3.3.1.1.9. Transformation

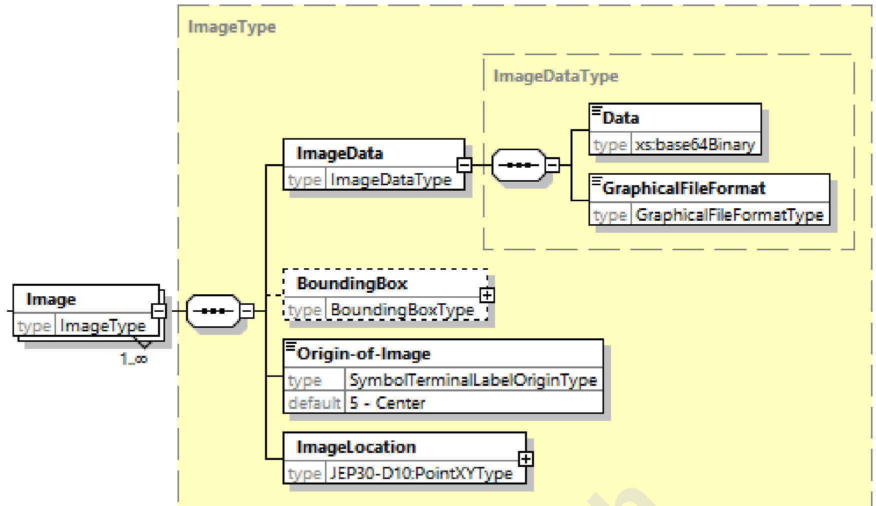
path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Body/Shape-Array/Shape/Primative-Shape/Transformation**
diagram	
type	**ShapeTransformationType, TranslateShapeType, JEP30-D10:PointXYType, ScaleShapeType, ScaleAboutType, ScaleFactorsType, RotateShapeType, RotateShapeAboutType, JEP30-D10:EmptyType.**

Transformation enables additional modification to be performed to a primitative shape. The *Translate* moves the shape from the location currently defined by the *ShapeOrigin* to the new x,y coordinates. The *Scale* enables the re-sizing of the shape and provides options for the scaling to be performed around the *Origin*, *ShapeCenter* or any set of *Coordinates*. The Rotate enables the rotation to be performed around a similar set of points such as the *Origin*, *ShapeCenter* or any set of *Coordinates*. The Angle is specified in degrees whereas a positive number is considered as anti-cloctkwise and a negative number is considered clockwise (eg., if 3 o'clock is 0 degrees, then 12 o'clock is 90 degrees and 6 o'clock is 270 degrees or -90 degrees).

4.8.1.1.3.3.1.2. SVG-Shape

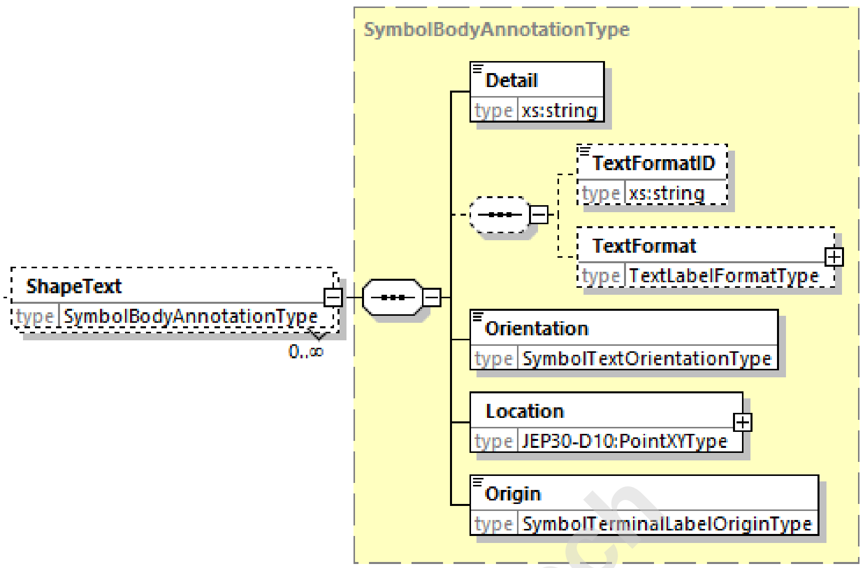
<table>
<tr><td>path</td><td colspan="3">PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Body/Shape-Array/SVG-Shape</td></tr>
<tr><td>diagram</td><td colspan="3">
</td></tr>
<tr><td>type</td><td colspan="3">SVG-ShapeType, BoundingBoxType, FitStyleType, SymbolTerminalLabelOriginType,
JEP30-D10:PointXYType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="3">FitStyleType</td></tr>
<tr><td>1. Scale to Fit</td><td>2. Stretch to Fit</td><td>3. Crop</td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="3">SymbolTerminalLabelOriginType</td></tr>
<tr><td>1. Northwest</td><td>2. Leftcenter</td><td>3. Southwest</td></tr>
<tr><td>4. Uppercenter</td><td>5. Center</td><td>6. Backcenter</td></tr>
<tr><td>7. Northeast</td><td>8. Rightcenter</td><td>9. Southeast</td></tr>
</table>

4.8.1.1.3.3.1.3. Image

<table>
<tr><td>path</td><td colspan="3">PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Body/Shape-Array/Image</td></tr>
<tr><td>diagram</td><td colspan="3">
</td></tr>
<tr><td>type</td><td colspan="3">ImageType, ImageDataType , GraphicalFileFormatType , BoundingBoxType, FitStyleType, SymbolTerminalLabelOriginType, JEP30-D10:PointXYType.</td></tr>
<tr><td rowspan="3">list of enumerate values</td><td colspan="3">GraphicalFileFormatType</td></tr>
<tr><td>1. .jpg</td><td>2. .png</td><td>3. .gif</td></tr>
<tr><td>4. .bmp</td><td></td><td></td></tr>
</table>

When inserting an *Image* into the xml file, the information should be processed as a string and not as xml. Therefore, insert the image file name within the string <![CDATA[Insert Image (.png, .jpg, .gif, .bmp) File here]]>

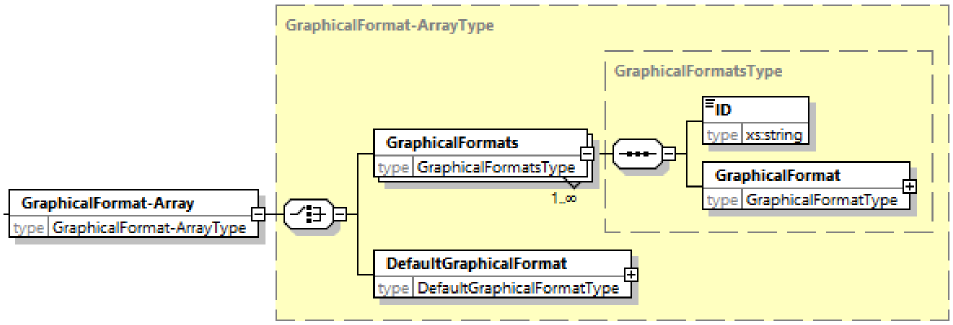
4.8.1.1.3.3.1.4. Shape Text

path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Body/Shape-Array/ShapeText		
diagram			
type	SymbolBodyAnnotationType, TextLabelFormatType, SymbolTextOrientationType, JEP30-D10:PointXYType, SymbolTerminalLabelOriginType.		
list of enumerate values	SymbolTextOrientationType		
	0 - Normal orientation	1 - 90 Degree rotation	2- 180 Degree rotation
	3 - 270 Degree rotation		
list of enumerate values	SymbolTerminalLabelOriginType		
	1. Northwest	2. Leftcenter	3. Southwest
	4. Uppercenter	5. Center	6. Backcenter
	7. Northeast	8. Rightcenter	9. Southeast

TextFormatID serves as a reference ID for the *TextFormat*, that is defined under the *GraphicalRepresentation/TextFormat-Array/TextFormats* where a set of text formats can be defined that can be standardized in the *Body/Shape-Array* entry. The addition of the *TextFormat* under *ShapeText* enables unique modification of a references Text Format for applying to this specific *ShapeText* instance. When the *TextFormatID* is specified, then all the elements under *GraphicalRepresentation/TextFormat-Array/TextFormats/TextFormat* will be applied to the *ShapeText*, unless elements under the *ShapeText/TextFormat* are populated, in which case the latter *ShapeText/TextFormat* elements will override those elements as referenced by the *TextFormatID*.

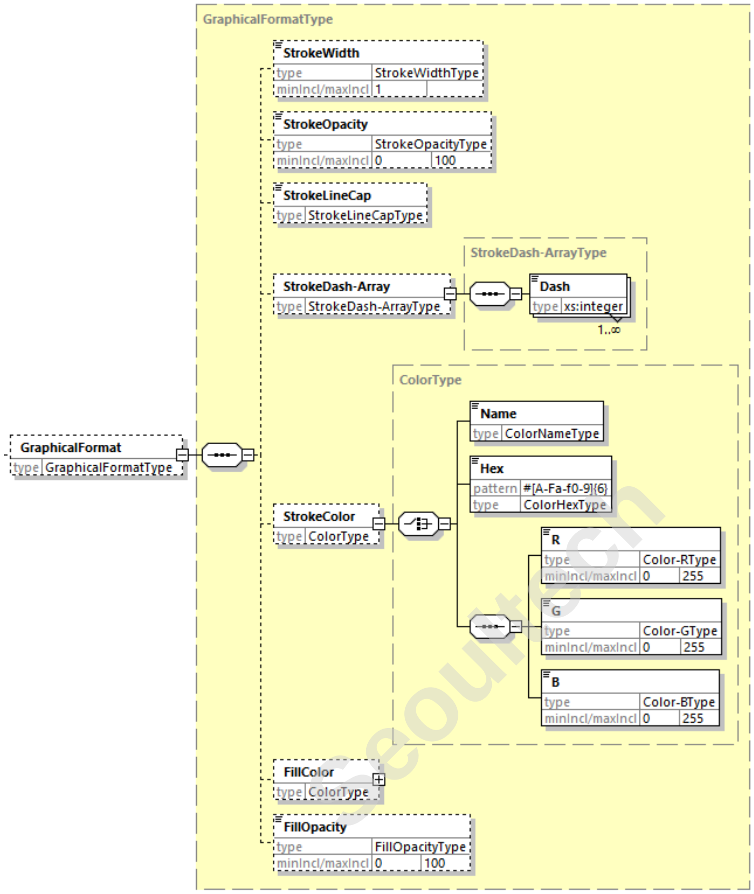
FontStyle for *TextFormat* is restricted to any combination of *Bold*, *Italics* and *Underline*

4.8.1.1.3.3.2. Graphical Format – Array

path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/GraphicalFormat-Array**
diagram	
type	**GraphicalFormat-ArrayType, GraphicalFormatsType, GraphicalFormatType, DefaultGraphicalFormatType.**

GraphicalFormat-Array contains a structure that enables the supplier to provide a series of additional graphical formats including a default graphical format, that can be referenced by the shapes under the *Body/Shape-Array*.

4.8.1.1.3.3.2.1. Graphical Format

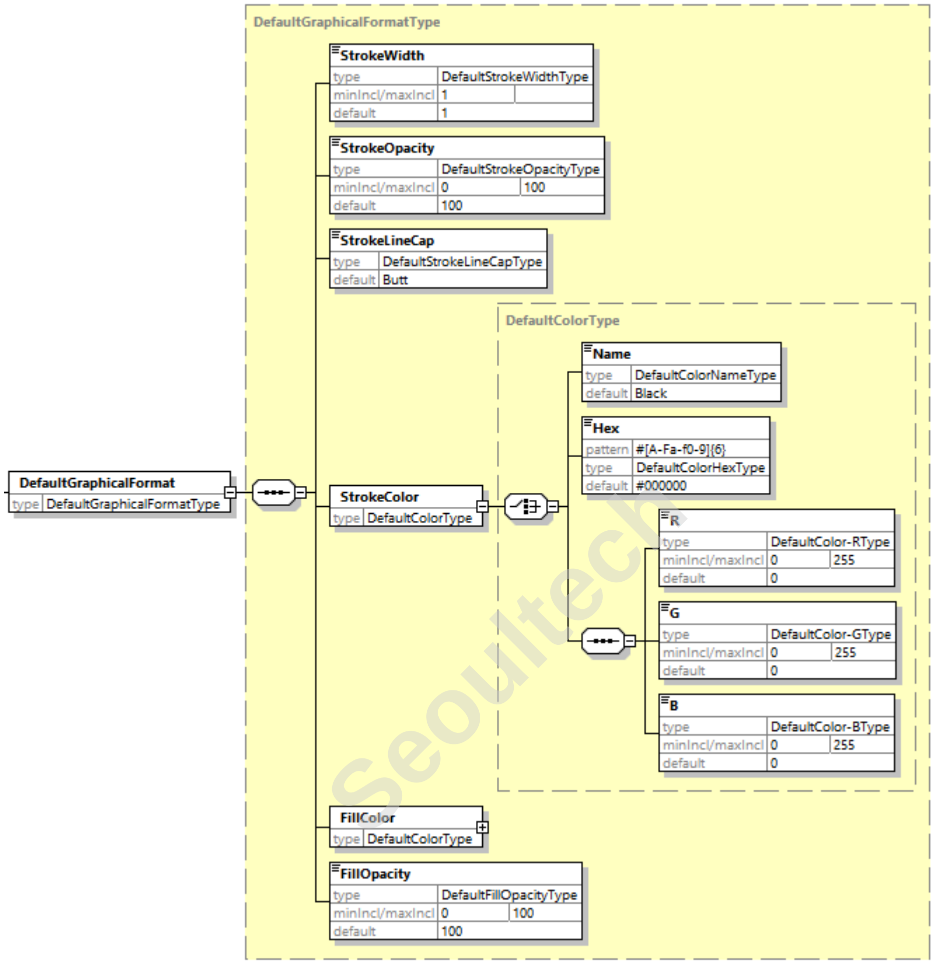
path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/GraphicalFormat-Array/GraphicalFormats/GraphicalFormat**
diagram	
type	**GraphicalFormatType, StrokeWidthType, StrokeOpacityType, StrokeLineCapType, StrokeDash-ArrayType, ColorType, ColorNameType, ColorHexType, Color-RType, Color-GType, Color-BType, FillOpacityType.**
list of enumerate values	**StrokeLineCapType** **1. Butt** **2. Round** **3. Square**

ColorNameType as defined in the *StrokeColor/Name* element list the names of the Scalable Vector Graphics (SVG) Colors as defined by the Scalable Vector Graphics (SVG) Specification.

ColorHexType as defined in the *StrokeColor/Hex* element uses a regular expression pattern to recognize the six-digit hexadecimal representation of the Scalable Vector Graphics (SVG) Colors.

Color-RType, *Color-GType*, *Color-BType* allows the construction of all the colors from the combination of the red, green, and blue colors in the RGB Color Space. The red, green, and blue use 8 bits each, which have integer values from 0 to 255.

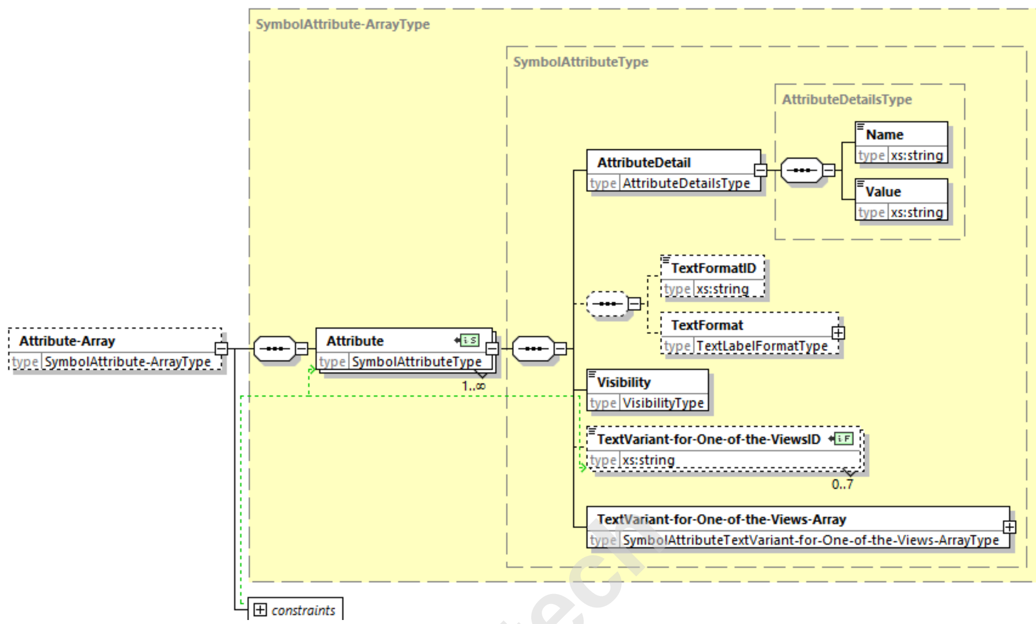
4.8.1.1.3.3.2.2. Default Graphical Format

path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/GraphicalFormat-Array/DefaultGraphicalFormat**
diagram	
type	**DefaultGraphicalFormatType, DefaultStrokeWidthType, DefaultStrokeOpacityType, DefaultStrokeLineCapType, DefaultColorType, DefaultColorNameType, DefaultColorHexType, DefaultColor-RType, DefaultColor-GType, DefaultColor-BType, DefaultFillOpacityType.**

If no independent *GraphicalFormat* are defined, then the *DefaultGraphicalFormat* will define the default values as follows,

a. *StrokeWidth* is defaulted to the value 1
b. *StrokeLineCap* is defaulted to value “Butt”
c. *StrokeColor/Name* is defaulted to value “Black”
d. *StrokeColor/Hex* is defaulted to value “#000000”
e. *StrokeColor/R*, *G* and *B* are defaulted to the value 0
f. *StrokeOpacity* and *FillOpacity* are defaulted to 100

4.8.1.1.3.3.3. Attribute – Array

path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Attribute-Array
diagram	
type	SymbolAttribute-ArrayType, SymbolAttributeType, AttributeDetailsType, TextLabelFormatType, VisibilityType, SymbolAttributeTextVariant-for-One-of-the-Views-ArrayType.
list of enumerate values	**Visibility** 1. Invisible 2. Visible

Attributes are text that can be assigned to the symbol. When symbols are rotated, then the attributes will also need to be rotated and its rotation is not the same as the rotation of the symbol. The attribute may also have to be re-located on the symbol.

The structure under the element *TextVariant-for-One-of-the-Views-Array* as described in the next section provides that ability to re-position the attribute text and to independently rotate the text to the rotation of the symbol.

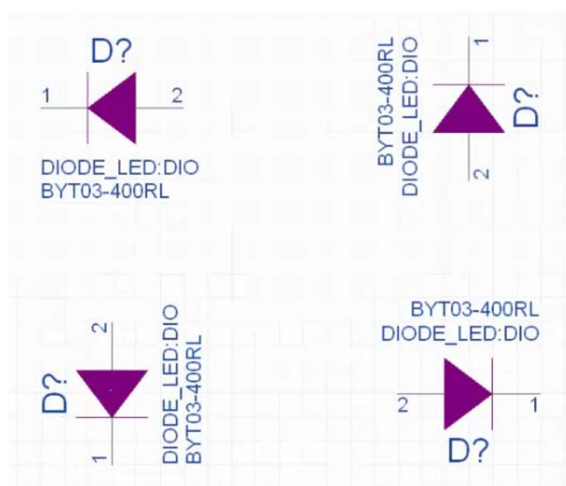
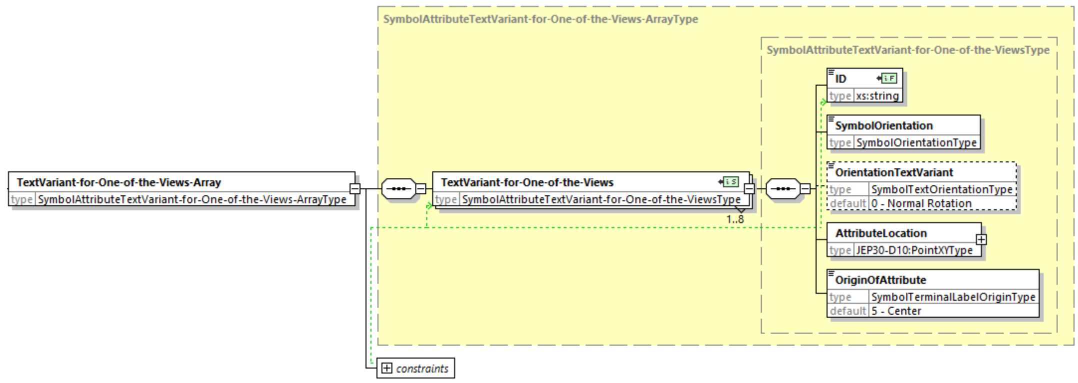
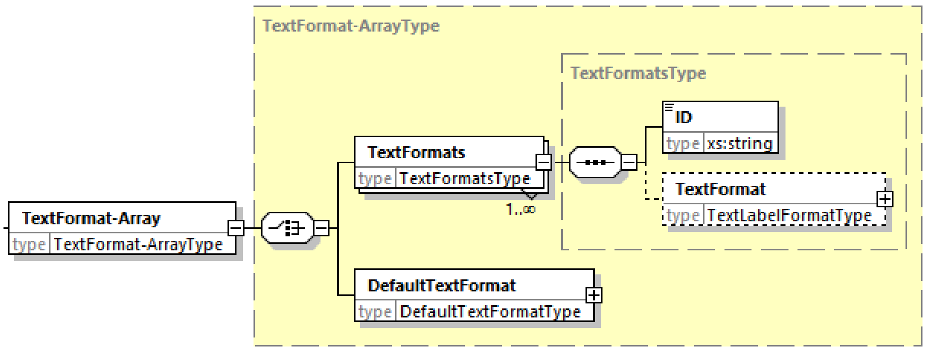


Figure 46 – Text Views for Alternative Symbol Rotation

4.8.1.1.3.3.3.1. Text Variant for One of the Views – Array

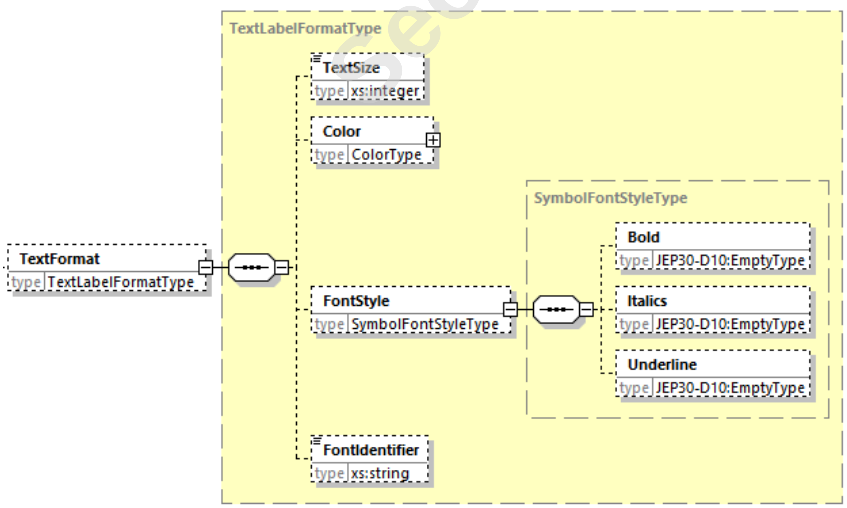
path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Attribute-Array/Attribute/TextVariant-for-One-of-the-Views-Array**		
diagram			
type	**SymbolAttributeTextVariant-for-One-of-the-Views-ArrayType,** **SymbolAttributeTextVariant-for-One-of-the-ViewsType, SymbolOrientationType,** **SymbolAttributeLocationType, JEP30-D10:PointXYType , SymbolTerminalLabelOriginType.**		
list of enumerate values	**SymbolOrientationType**		
	0 - Normal orientation	**1 - 90 Degree rotation**	**2- 180 Degree rotation**
	3 - 270 Degree rotation	**4 - Mirror about x axis**	**5 - Mirror about x axis and 90 Degree rotation**
	6 - Mirror about x axis and 180 Degree rotation	**7 - Mirror about x axis and 270 Degree rotation**	
list of enumerate values	**SymbolTextOrientationType**		
	0 - Normal orientation	**1 - 90 Degree rotation**	**2- 180 Degree rotation**
	3 - 270 Degree rotation		
list of enumerate values	**SymbolTerminalLabelOriginType**		
	1. Northwest	**2. Leftcenter**	**3. Southwest**
	4. Uppercenter	**5. Center**	**6. Backcenter**
	7. Northeast	**8. Rightcenter**	**9. Southeast**

4.8.1.1.3.3.4. Text Format – Array

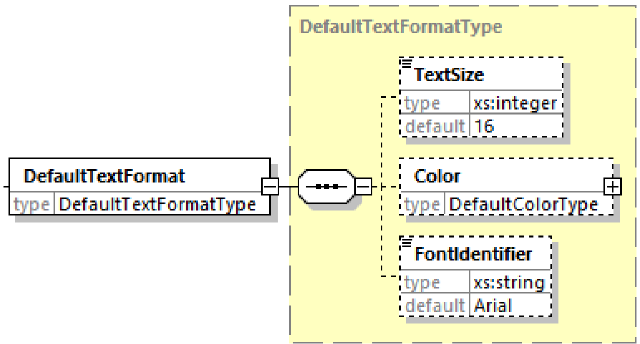
path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/TextFormat-Array
diagram	
type	TextFormat-ArrayType, TextFormatsType, TextLabelFormatType, DefaultTextFormatType.

TextlFormat-Array contains a structure that enables the supplier to provide a series of additional text formats including a default text format, that can be referenced by the *ShapeText* under the *Body/Shape-Array*, or the *Attribute* under the *Attribute-Array*.

4.8.1.1.3.3.4.1. Text Format

path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/TextFormat-Array/TextFormats/TextFormat
diagram	
type	TextFormatsType, ColorType, SymbolFontStyleType, JEP30-D10:EmptyType.

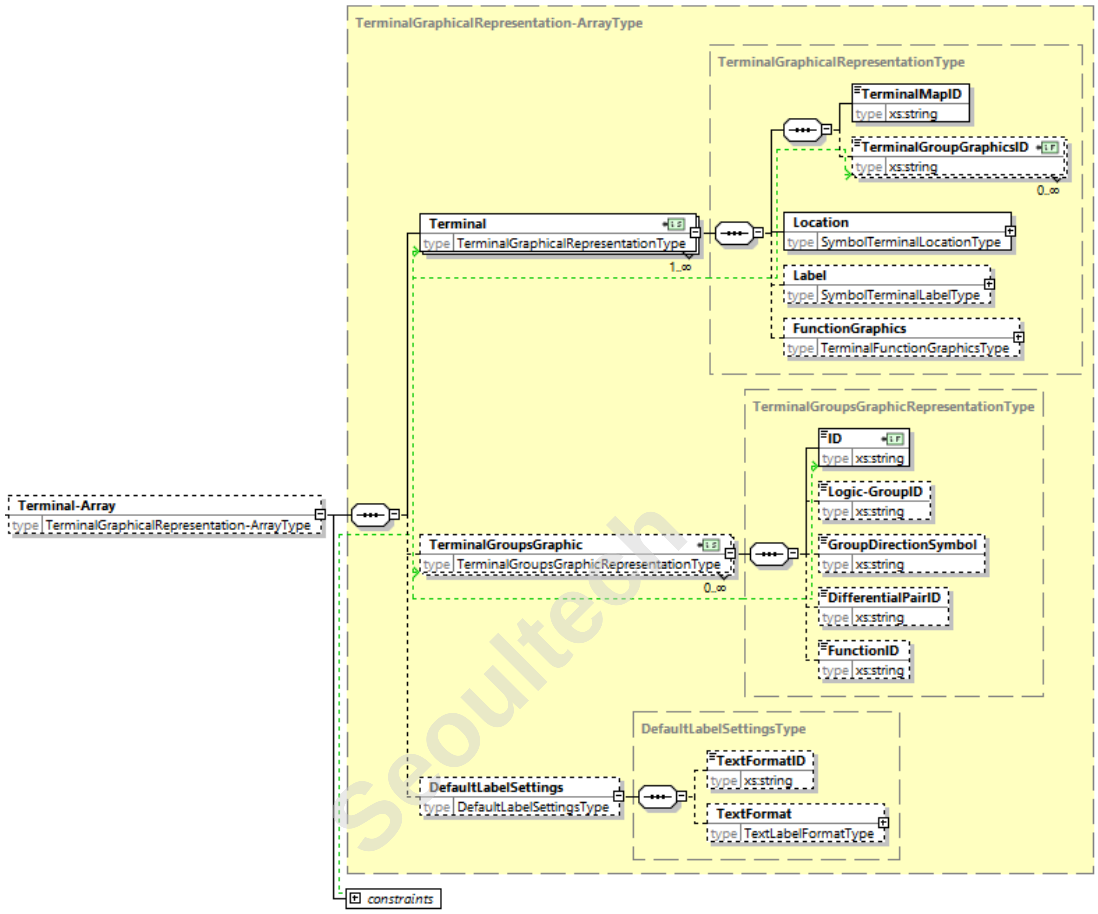
4.8.1.1.3.3.4.2. Default Text Format

path	PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/TextFormat-Array/DefaultTextFormat
diagram	
type	DefaultTextFormatType, DefaultColorType.

The *DefaultTextFormat* does not have *FontStyle* since the default font style is normal (i.e., Not Bold, nor Italics nor Underline). The default values as follows,

a. TextSize is defaulted to value “16”
b. Color has the same default as previously defined for shapes.
c. FontIdentifier is defaulted to value “Arial”

4.8.1.1.3.3.5. Terminal – Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Terminal-Array</td></tr>
<tr><td>diagram</td><td>


</td></tr>
<tr><td>type</td><td>TerminalGraphicalRepresentation-ArrayType, TerminalGraphicalRepresentationType, TerminalGroupsGraphicRepresentationType, SymbolTerminalLocationType, SymbolTerminalLabelType, TerminalFunctionGraphicsType, DefaultLabelSettingsType, TextLabelFormatType.</td></tr>
</table>

The *TerminalMapID* has a KeyRef called *SymbolTerminalMapKeyRef* which references a Key called *TerminalMapKey*. This *TerminalMapKey* is assigned to *ElectricalSection/Mapping-Array/Mapping/PackageTerminalMap/TerminalMap/ID*. It therefore links in here the *TerminalName* and *TerminalNumber* for each terminal on the device. For standard based symbols for which no package has yet beed defined, then it will just bring in the *TerminalName*. This is therefore suitable for Standards based Interfaces and Functions that are defined by Standards Bodies, while the assignment of the Standards based functionality into the package body can be left to the component manufacturer.

The *TerminalGroupGraphicsID* has a KeyRef called *TerminalGroupsGraphicKeyRef* which references a Key called *TerminalGroupsGraphicKey*. This *TerminalGroupsGraphicKey* is assigned to *Terminal-Array/TerminalGroupsGraphic/ID*, as shown above in the diagram. It therefore links in here the *TerminalName* and *TerminalNumber* for each terminal on the device.

4.8.1.1.3.3.5. Terminal - Array (cont'd)

The *Logic-GroupID* has a KeyRef called *SymbolLogicalGroupKeyRef* which references a Key called *LogicalGroupKey*. This *LogicalGroupKey* is assigned to *PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/LogicalGroup-Array/LogicalGroup/ID*. It therefore links in here the *TerminalName* to the respective logical group that it is assigned too.

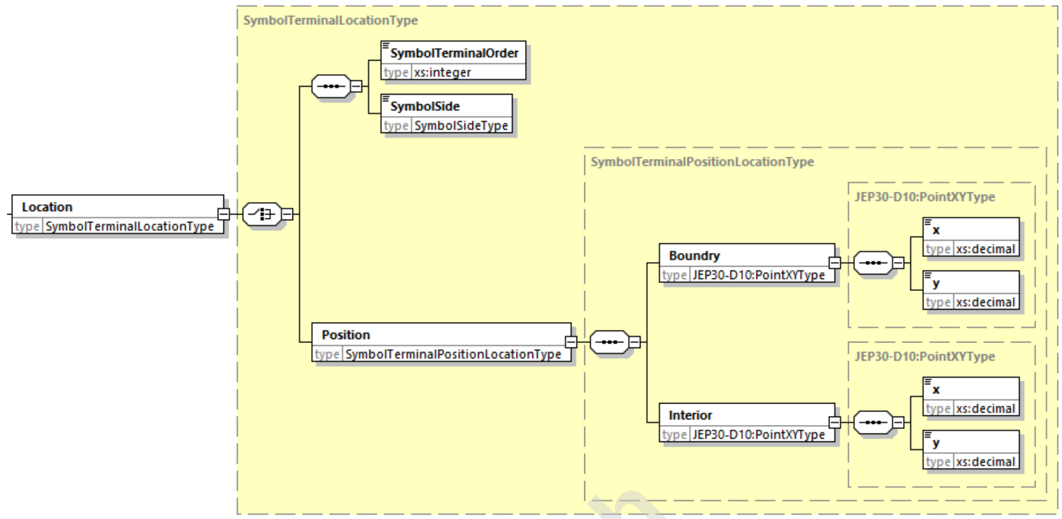
All terminals that belog to a group as defined by the *Logic-GroupID* should be co-located on the symbol graphics, so that hierarical symbol representation can be applied to the group as opposed to duplicating that same symbol representation for each terminal. Once the logical grouping of the terminals is applied to the symbol, then the following group symbols can be applied.

The *GroupDirectionSymbol* has a KeyRef called *SymbolTerminalGroupDirectionKeyRef* which references a Key called *LogicalGroupElectricalPropertyKey*. This *LogicalGroupElectricalPropertyKey* is assigned to *PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/LogicalGroup-Array/LogicalGroup/PropertyID*. It therefore links the logical group of terminals as defined by the *Logic-GroupID* to the *Direction* in the *PropertiesType* via its *PropertyID.*

The *DifferentialPairID* has a KeyRef called *SymbolDifferentialPairKeyRef* which references a Key called *DifferentialPairKey*. This *DifferentialPairKey* is assigned to *PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/DifferentialPair-Array/DifferentialPair/ID*. It therefore links pair of *TerminalName* and the *DifferentialPair* symbol for each respective pair of terminal on the device.

The *FunctionID* has a KeyRef called *SymbolTerminalGroupFunctionSymbolKeyRef* which references a Key called *LogicalGroupTerminalFunctionKey*. This Key is assigned to *PartModel/ElectricalSection /ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/LogicalGroup-Array/LogicalGroup /TerminalFunctionID*. It therefore links the logical group of terminals as defined by the *Logic-GroupID* to the Signal in the *SignalClassificationType* via the *TerminalFunctionID*.

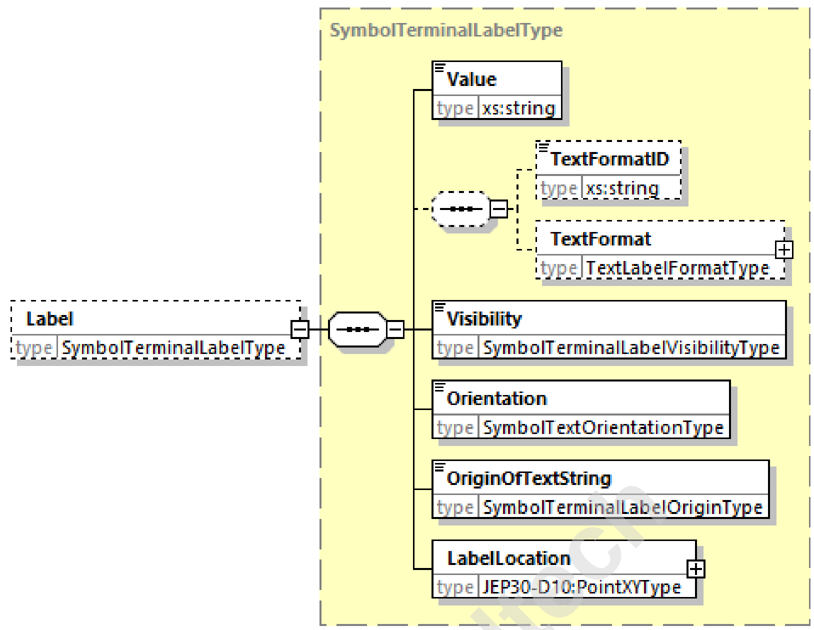
4.8.1.1.3.3.5.1. Location

path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Terminal-Array/Terminal/Location**
diagram	
type	**SymbolTerminalLocationType, SymbolSideType, SymbolTerminalPositionLocationType, JEP30-D10:PointXYType.**
list of enumerate values	**SymbolSideType** **1. Left** | **2. Right** | **3. Top** **4. Bottom**

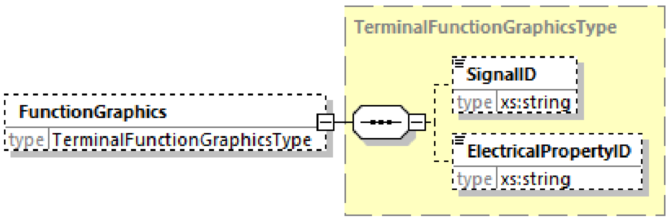
The *SymbolTerminalOrder* is the sequence of the placement of the terminal on the Symbol from the top to the bottom when the terminal is placed on either the left or right side of the symbol. The *SymbolTerminalOrder* is from left to right when the terminal is placed on either the top or bottom side of the symbol.

Alternatively, for non-standard shaped symbol bodies, the terminals can be located via the *Position* branch in which the user can specify *Boundary* (i.e., outer point of the terminal line) and the *Interior* (i.e., inner point of the terminal line that is adjacent to the Symbol body)

4.8.1.1.3.3.5.2. Label

<table>
<tr><td>path</td><td colspan="3">PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Terminal-Array/Terminal/Label</td></tr>
<tr><td>diagram</td><td colspan="3">
</td></tr>
<tr><td>type</td><td colspan="3">SymbolTerminalLabelType, TextLabelFormatType, SymbolTerminalLabelVisibilityType,
SymbolTextOrientationType, SymbolTerminalLabelOriginType, JEP30-D10:PointXYType.</td></tr>
<tr><td rowspan="2">list of enumerate values</td><td colspan="3">Visibility</td></tr>
<tr><td>Invisible</td><td>Visible</td><td></td></tr>
<tr><td rowspan="3">list of enumerate values</td><td colspan="3">Orientation</td></tr>
<tr><td>0 - Normal orientation</td><td>1 - 90 Degree rotation</td><td>2- 180 Degree rotation</td></tr>
<tr><td>3 - 270 Degree rotation</td><td></td><td></td></tr>
<tr><td rowspan="4">list of enumerate values</td><td colspan="3">OriginOfTextString</td></tr>
<tr><td>1. Northwest</td><td>2. Leftcenter</td><td>3. Southwest</td></tr>
<tr><td>4. Uppercenter</td><td>5. Center</td><td>6. Backcenter</td></tr>
<tr><td>7. Northeast</td><td>8. Rightcenter</td><td>9. Southeast</td></tr>
</table>

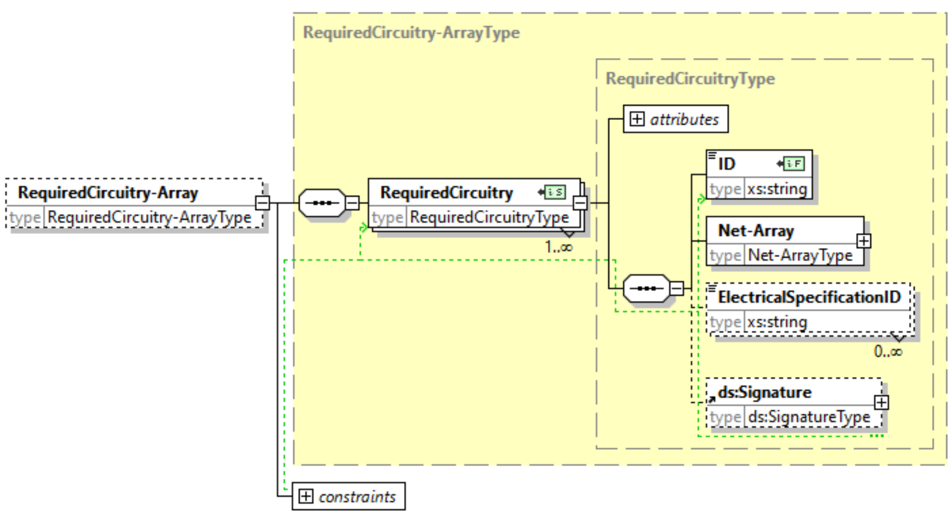
4.8.1.1.3.3.5.3. Function Graphics

path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/Symbol-Array/Symbol/SymbolGraphics-Array/AlternativeSymbolGraphics/Fracture-Array/Fracture/GraphicalRepresentation/Terminal-Array/Terminal/FunctionGraphics**
diagram	
type	**TerminalFunctionGraphicsType.**

The *SignalID* has a KeyRef called *SignalKeyRef* which references a Key called *SignalKey*. This *SignalKey* is assigned to *PartModel/ElectricalSection/ElectricalParameters-Array /ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalFunction-Array/TerminalFunction/DigitalFunction/Signal/ID*. It therefore links in here the *Signal* value for this specific *TerminalName*.

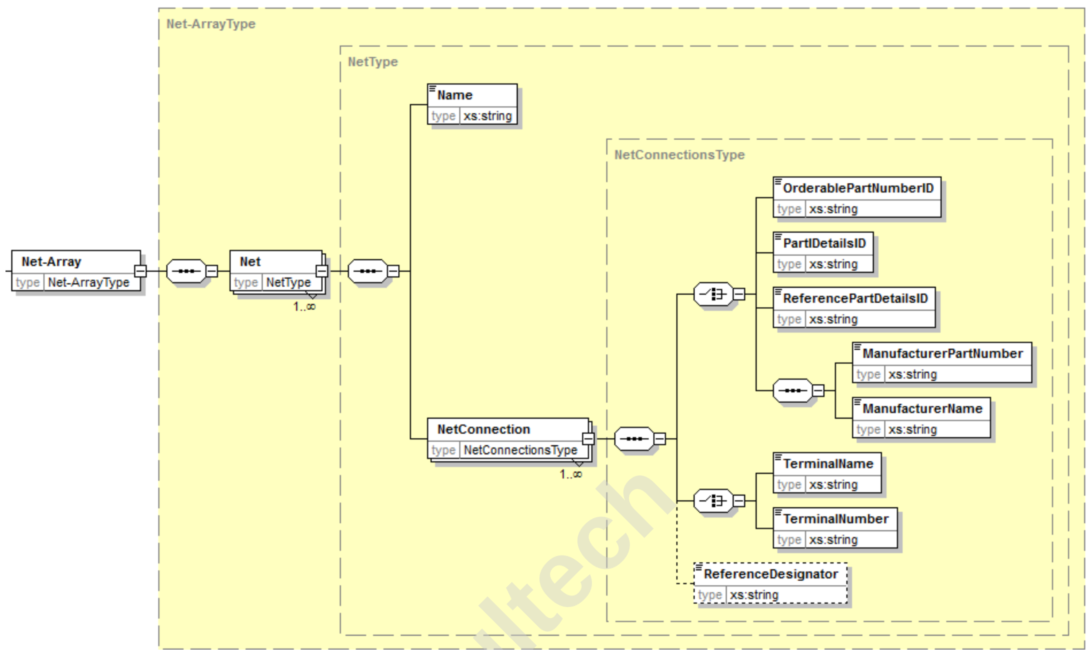
The *ElectricalPropertyID* has a KeyRef called *ElectricalPropertyKeyRef* which references a Key called *ElectricalPropertyKey*. This *ElectricalPropertyKey* is assigned to *PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/Properties-Array/Properties/ID*. It therefore links in here the *Properties* value for this specific *TerminalName*.

4.8.2. Required Circuitry - Array

path	**PartModel/ElectricalSection/SchematicData-Array/SchematicData/RequiredCircuitry-Array**
diagram	
type	**RequiredCircuitry-ArrayType, RequiredCircuitryType, Net-ArrayType, ds:SignatureType.**

This section captures the necessary circuitry surrounding the device for the device to operate correctly. This *RequiredCircuitry* can be more complex that that defined via 4.7.1.6.

4.8.2.1. Net - Array

path	1. PartModel/ElectricalSection/SchematicData-Array/SchematicData/RequiredCircuitry-Array/RequiredCircuitry/Net-Array 2. PartModel/ElectricalSection/ReferenceDesign-Array/ReferenceDesign/Net-Array
diagram	
type	Net–ArrayType, NetType, NetConnectionType.

4.8.2.1. Net - Array (cont'd)

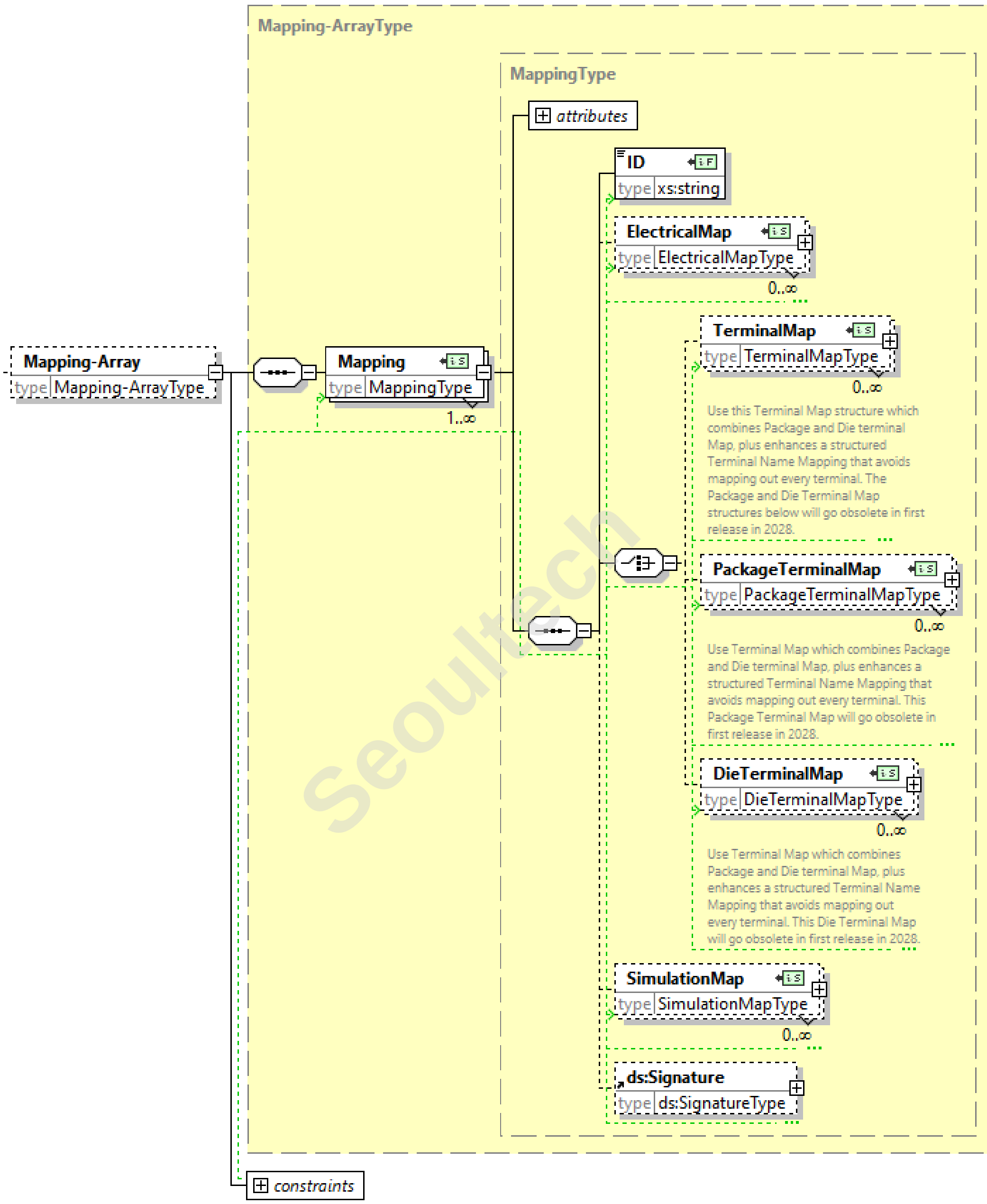
This section captures the list of *NetConnections* (otherwise known as the Netlist) between devices that makes up the required circuitry for the primary device being defined in the XML file. Since many parts can be defined within this xml structure, each part is identified via an ID or *ManufacturerPartNumber* and *ManufacturerName* combination. The details of use are defined as follows.

1. *OrderablePartNumberID*, or
   a. Specify the exact Part from a specific Manufacturer. This part may be described via several Part Details ID's that are connected together under an orderable part number ID. This is a fully identifiable part.
2. *PartDetailsID*, or
   a. Specify a limited set of specifications via a partial part number from a specified manufacturer. This is a partially anonymous part.
   b. The limited set of specifications are critical to be met to satisfy the requirements of the circuit for the successful operation of the primary device.
3. *ReferencePartDetailsID*, or
   a. Specify a limited set of specifications without having to specify any variation of the part number (partial or full), and without having to specify any manufacturer. This is a fully anonymous part, as the only detail may be 10K Resistor or any resistor between the value of 10K and 100K.
   b. The limited set of specifications are critical to be met to satisfy the requirements of the circuit for the successful operation of the primary device.
4. Alternatively, for parts that are not defined within this xml, the provision of a *ManufacturerPartNumber* and *ManufacturerName*,
   a. This branch is for Parts that are not specified in this XML File

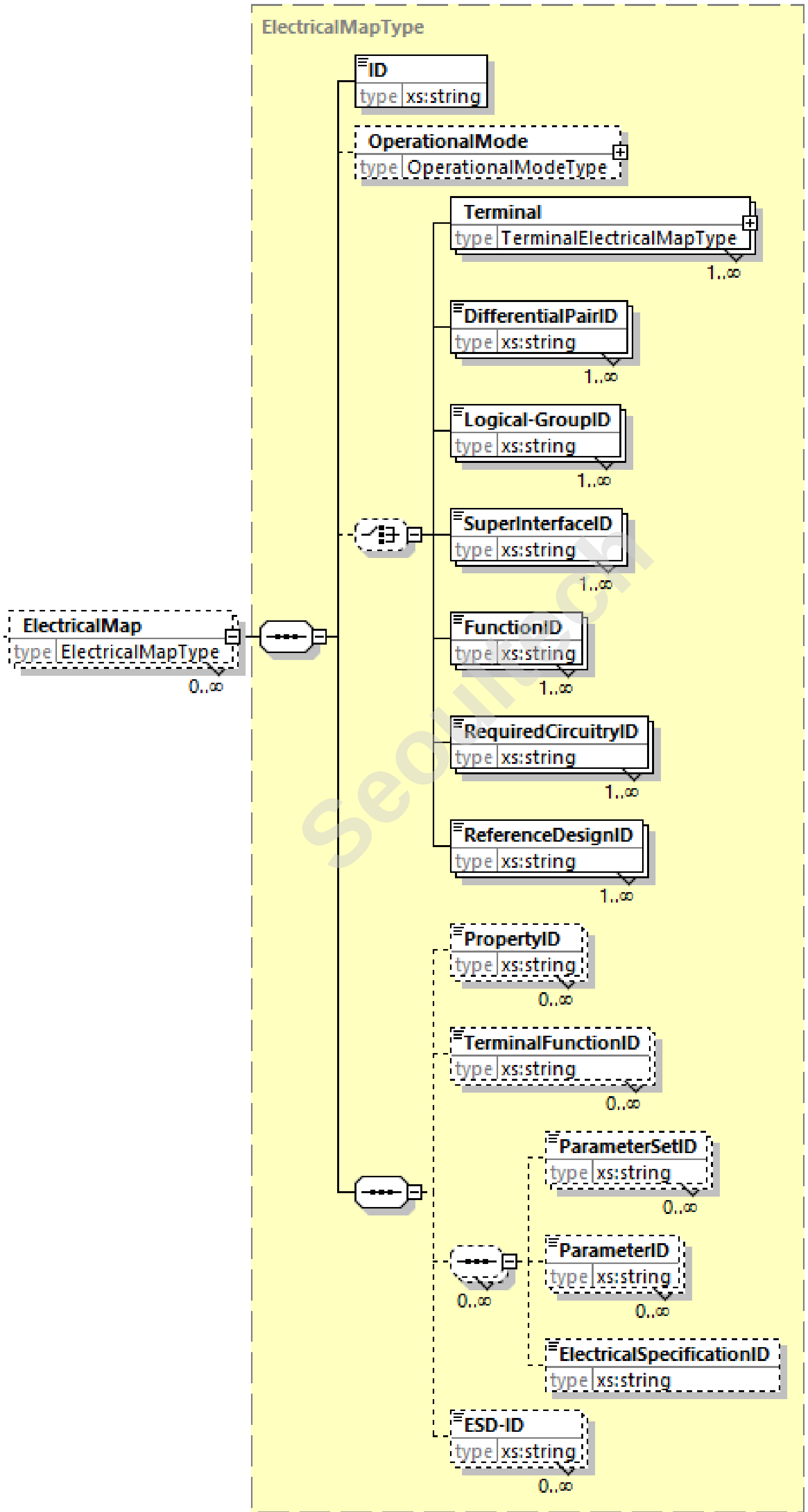
The net is connected to either the *TerminalName* or to the *TerminalNumber* of the part identified under the above 4 choices.

The *ReferenceDesignator* is an optional element that is required in the event that the circuit being captured here contains two or more of the exact same devices, or device functions in the same circuit.

4.9. Mapping - Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/Mapping-Array</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>Mapping-Array, MappingType, PackageTerminalMapType, DieTerminalMapType, SimulationMapType, ds:SignatureType.</td></tr>
<tr><td>NOTE</td><td>Use Terminal Map structure which combines Package and Die terminal Map, plus enhances a structured Terminal Name Mapping that avoids mapping out every terminal. The Package and Die Terminal Map structures below will go obsolete in first release in 2028.</td></tr>
</table>

4.9.1. Electrical Map – Array

path	PartModel/ElectricalSection/Mapping-Array/Mapping/ElectricalMap
diagram	
type	ElectricalMapType, OperationalModeType, TerminalElectricalMapType.

4.9.1 Electrical Map – Array (cont'd)

The *ElectricalMap* is an array that contains a mapping of between

- a set of terminals as defined by the *TerminalMapID*, or
- a pre-defined group of terminals as defined the *DifferentialPairID* or *Logical-GroupID*, or
- a Function as defined by the *FunctionID*, or
- a required circuitry for the operation of the device as defined by the *RequiredCircuitryID*, or
- a reference design as defined by the *ReferenceDesignID*.

over to their properties, terminal functions and/or their electrical specifications as defined by their connections via *PropertyID*, *TerminalFunctionID*, and/or *ElectricalSpecificationID*.

Figure 47 — Sample NAND Gate Device shows a sample device that contains four NAND gates. Each gate is similar in terms of properties, function and electrical specification; therefore, we can associate several terminal mappings to these reference ID's.

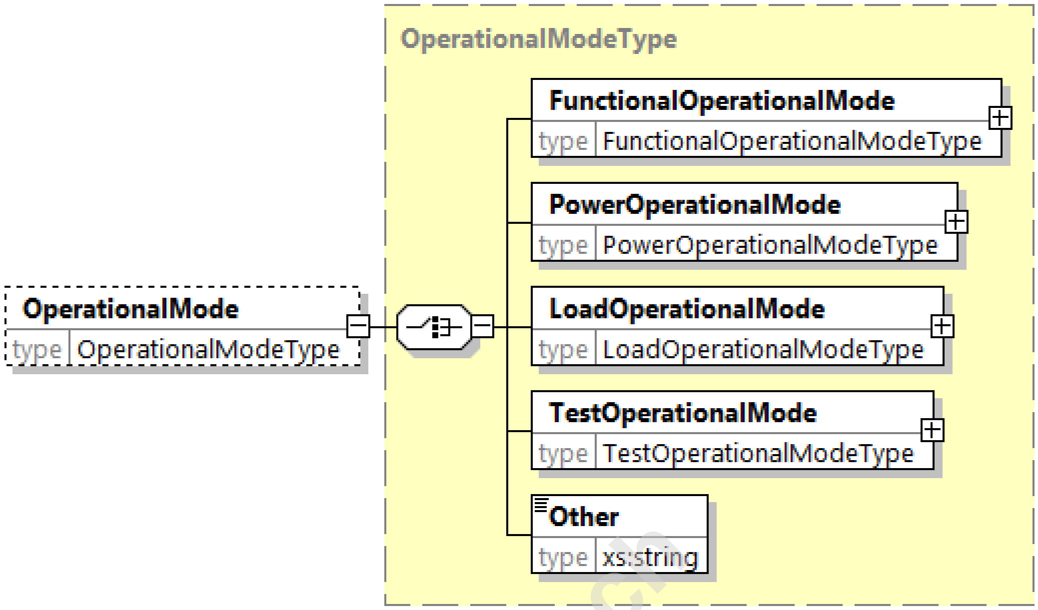
A *TerminalMap-Array* sample is shown below where we just label the signals as A, B and C. This is suitable for parts with duplicate functions.


```xml
<Mapping-Array>
   <Mapping>
      <ElectricalMap>
            < Terminal>
                  <TerminalMapID>Terminal Map ID 1</TerminalMapID>
            </Terminal>
            < Terminal>
                  <TerminalMapID>Terminal Map ID 2</TerminalMapID>
            </Terminal>
            < Terminal>
                  <TerminalMapID>Terminal Map ID 4</TerminalMapID>
            </Terminal>
            < Terminal>
                  <TerminalMapID>Terminal Map ID 5</TerminalMapID>
            </Terminal>
            < Terminal>
                  <TerminalMapID>Terminal Map ID 9</TerminalMapID>
            </Terminal>
            < Terminal>
                  <TerminalMapID>Terminal Map ID 10</TerminalMapID>
            </ Terminal>
            < Terminal>
                  <TerminalMapID>Terminal Map ID 12</TerminalMapID>
            </ Terminal>
            < Terminal>
                  <TerminalMapID>Terminal Map ID 13</TerminalMapID>
            </ Terminal>
            <TerminalGroupDescription>Input Logic Signal</TerminalGroupDescription>
            <PropertyID>Terminal Property ID 1</PropertyID>
            <TerminalFunctionID>Terminal Function ID 1</TerminalFunctionID>
            <ElectricalSpecificationID>Terminal Electrical Specification ID 1</ElectricalSpecificationID>
```

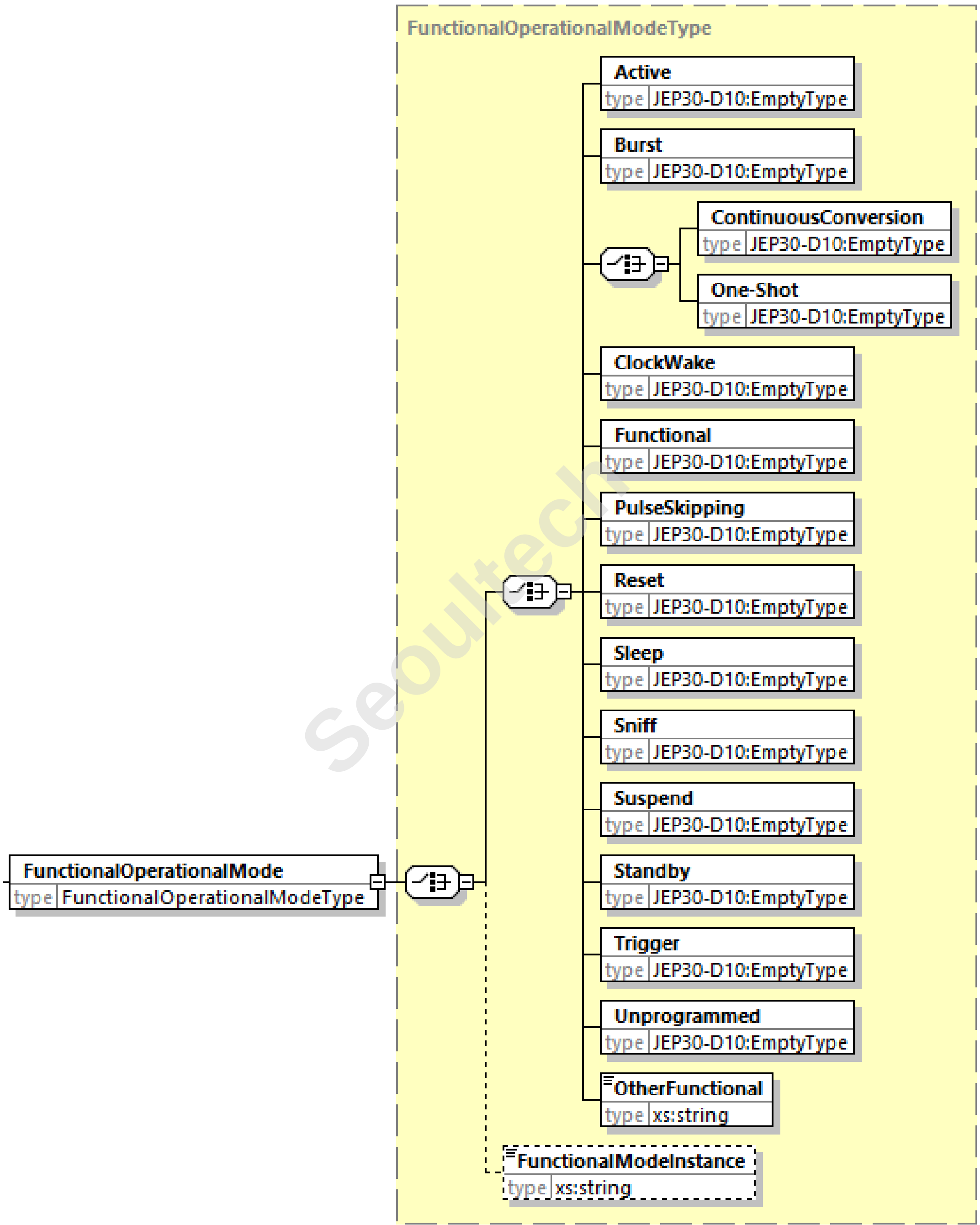
4.9.1 Electrical Map – Array (cont’d)

```
        </ElectricalMap>
        <ElectricalMap>
                < Terminal>
                        <TerminalMapID>Terminal Map ID 3</TerminalMapID>
                </ Terminal>
                < Terminal>
                        <TerminalMapID>Terminal Map ID 6</TerminalMapID>
                </ Terminal>
                < Terminal>
                        <TerminalMapID>Terminal Map ID 8</TerminalMapID>
                </ Terminal>
                < Terminal>
                        <TerminalMapID>Terminal Map ID 11</TerminalMapID>
                </ Terminal>
                <TerminalGroupDescription>Output Logic Signal</TerminalGroupDescription>
                <PropertyID>Terminal Property ID 2</PropertyID>
                <TerminalFunctionID>Terminal Function ID 2</TerminalFunctionID>
                <ElectricalSpecificationID>Terminal Electrical Specification ID 2</ElectricalSpecificationID>
        </ElectricalMap>
        <ElectricalMap>
                < Terminal>
                        <TerminalMapID>Terminal Map ID 7</TerminalMapID>
                        <TerminalDescription>Ground Terminal</TerminalDescription>
                </Terminal>
                <PropertyID>Terminal Property ID 3</PropertyID>
                <TerminalFunctionID>Terminal Function ID 3</TerminalFunctionID>
                <ElectricalSpecificationID>Terminal Electrical Specification ID 3</ElectricalSpecificationID>
        </ElectricalMap>
        <ElectricalMap>
                < Terminal>
                        <TerminalMapID>Terminal Map ID 14</TerminalMapID>
                        <TerminalDescription> Power Terminal</TerminalDescription>
                </Terminal>
                <PropertyID>Terminal Property ID 4</PropertyID>
                <TerminalFunctionID>Terminal Function ID 4</TerminalFunctionID>
                <ElectricalSpecificationID>Terminal Electrical Specification ID 4</ElectricalSpecificationID>
        </ElectricalMap>
    </Mapping>
</Mapping-Array>
```

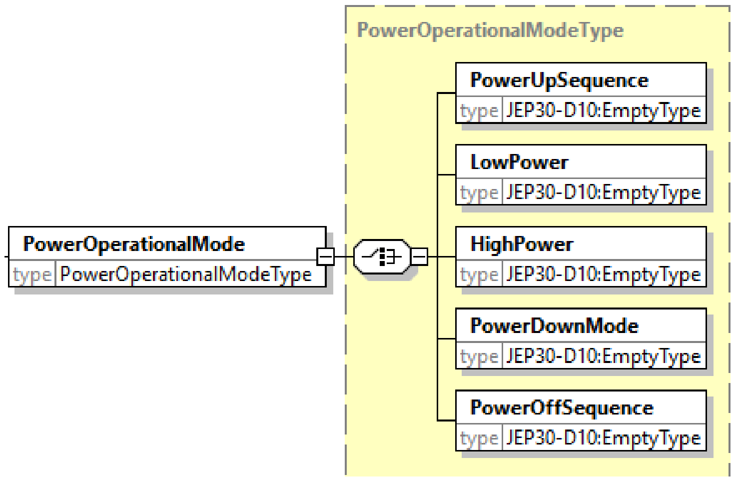
4.9.1.1. Operational Mode

path	PartModel/ElectricalSection/Mapping-Array/Mapping/ElectricalMap/OperationalMode
diagram	
type	OperationalModeType

4.9.1.1.1. Functional Operational Mode

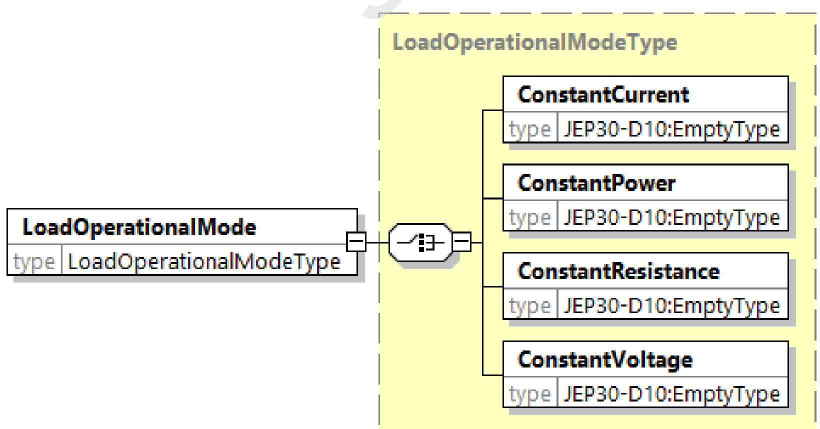
path	PartModel/ElectricalSection/Mapping-Array/Mapping/ElectricalMap/OperationalMode/FunctionalOperationalMode
diagram	
type	FunctionalOperationalModeType

4.9.1.1.2. Power Operational Mode

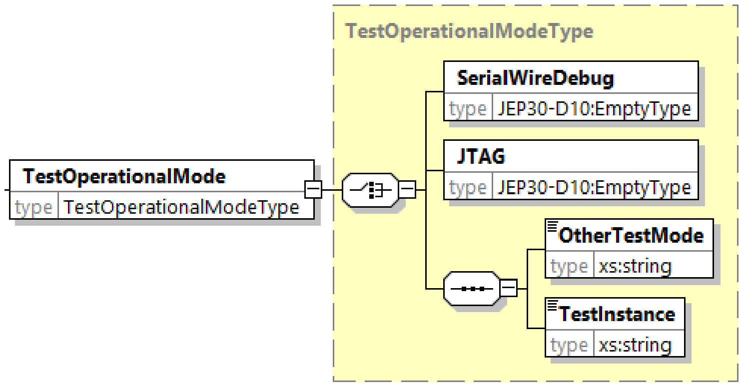
<table>
<tr><td>path</td><td>PartModel/ElectricalSection/Mapping-Array/Mapping/ElectricalMap/OperationalMode/PowerOperationalMode</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>PowerOperationalModeType</td></tr>
</table>

PowerDownMode differs from *PowerOffSequence*, insofar that *PowerDownMode* brings the device to a Sleep or Hibernation mode, whereas *PowerOffSequence*, completely shuts the device down.

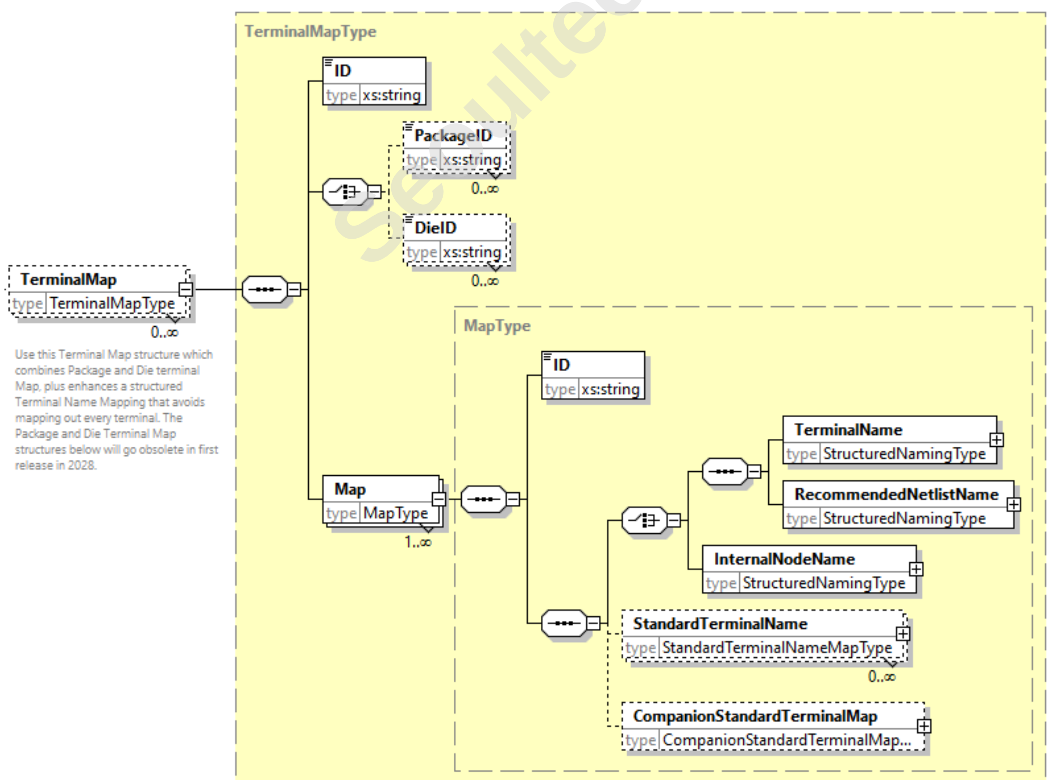
4.9.1.1.3. Load Operational Mode

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/Mapping-Array/Mapping/ElectricalMap/OperationalMode/LoadOperationalMode</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>LoadOperationalModeType</td></tr>
</table>

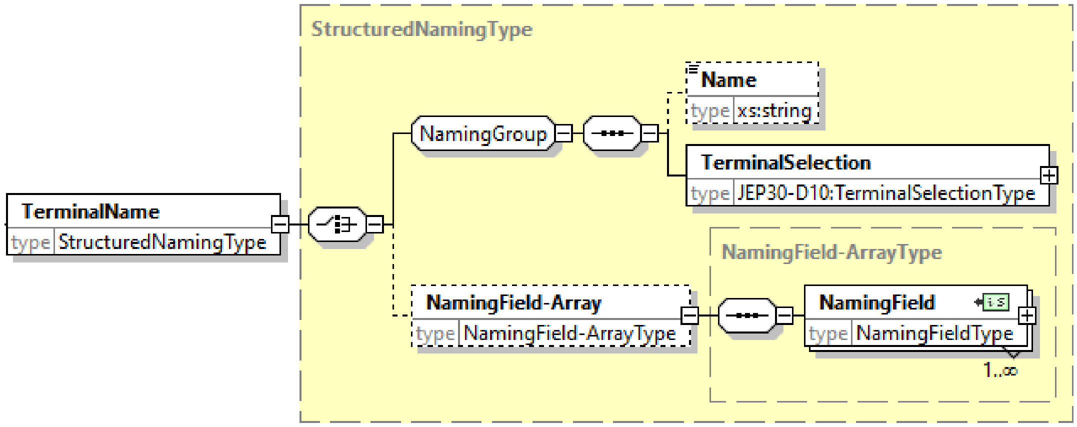
4.9.1.1.4. Test Operational Mode

path	PartModel/ElectricalSection/Mapping-Array/Mapping/ElectricalMap/OperationalMode/TestOperationalMode
diagram	
type	TestOperationalModeType

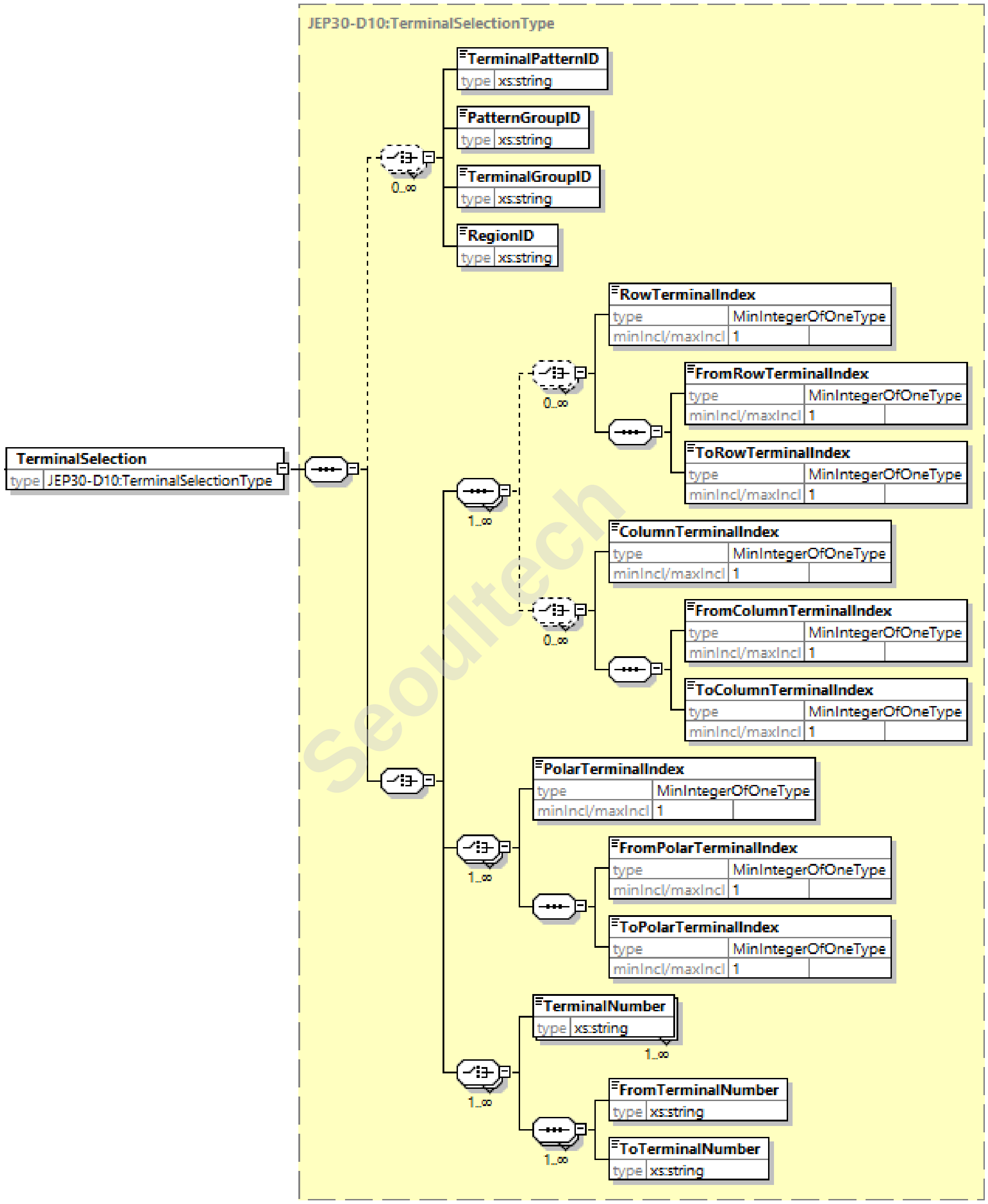
4.9.2. Terminal Map

path	PartModel/ElectricalSection/Mapping-Array/TerminalMap
diagram	
type	TerminalMapType, MapType, StructuredNamingType, StandardTerminalNameMapType, CompanionStandardTerminalMapType

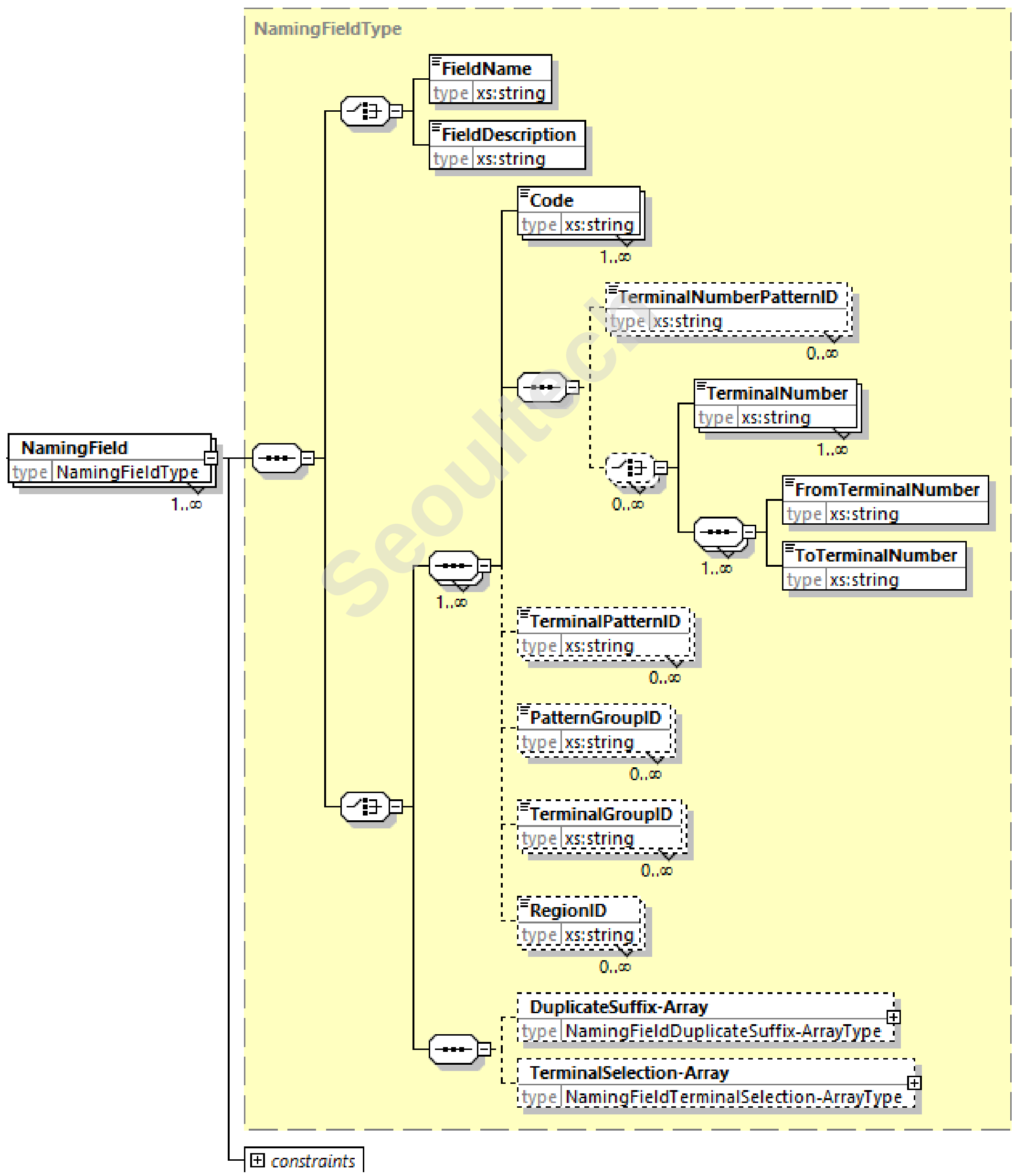
4.9.2.1. Terminal Name

path	PartModel/ElectricalSection/Mapping-Array/Mapping/TerminalMap/Map/TerminalName
diagram	
type	StructuredNamingType, JEP30-D10:TerminalSelectionType, NamingField-ArrayType, NamingFieldType.
Group	NamingGroup

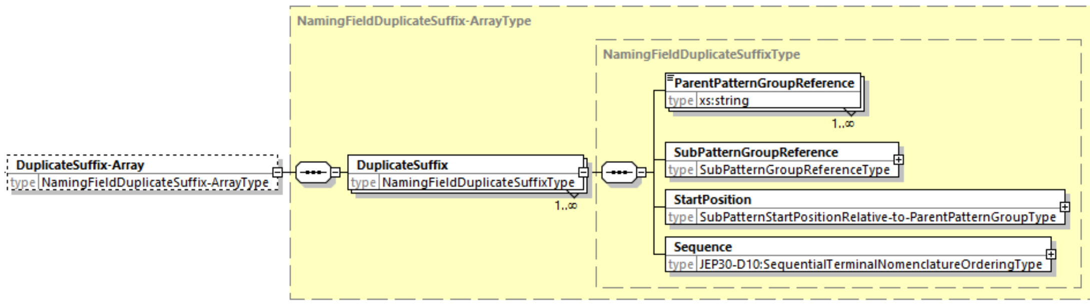
4.9.2.1.1.1.1. Terminal Selection

path	PartModel/ElectricalSection/Mapping-Array/Mapping/TerminalMap/Map/TerminalName/TerminalSelection
diagram	
type	JEP30-D10:TerminalSelectionType, MinIntegerOfOneType.

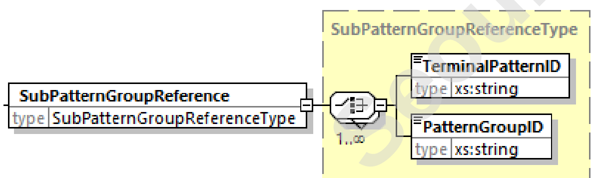
4.9.2.1.2. Naming Field

path	PartModel/ElectricalSection/Mapping-Array/Mapping/TerminalMap/Map/TerminalName/NamingField-Array/NamingField PartModel/ElectricalSection/Mapping-Array/Mapping/TerminalMap/Map/RecommendedNetlistName/NamingField-Array/NamingField PartModel/ElectricalSection/Mapping-Array/Mapping/TerminalMap/Map/InternalNodeName/NamingField-Array/NamingField PartModel/ElectricalSection/Mapping-Array/Mapping/TerminalMap/Map/CompanionStandardTerminalMap/NamingField-Array/NamingField
diagram	
type	NamingFieldType, NamingFieldDuplicateSuffix-ArrayType, NamingFieldTerminalSelection-ArrayType

4.9.2.1.2.1. Duplicate Suffix - Array

path	**PartModel/ElectricalSection/Mapping-Array/Mapping/TerminalMap/Map/TerminalName/NamingField-Array/NamingField/DuplicateSuffix-Array**
diagram	
type	**NamingFieldDuplicateSuffix-ArrayType, NamingFieldDuplicateSuffixType, SubPatternGroupReferenceType, SubPatternStartPositionRelative-to-ParentPatternGroupType, JEP30-D10:SequentialTerminalNomenclatureOrderingType**

4.9.2.1.2.1.1. Sub Pattern Group Reference

path	**PartModel/ElectricalSection/Mapping-Array/Mapping/TerminalMap/Map/TerminalName/NamingField-Array/NamingField/DuplicateSuffix-Array/DuplicateSuffix/SubPatternGroupReference**
diagram	
type	**SubPatternGroupReferenceType,**

4.9.2.1.2.1.2. Start Position

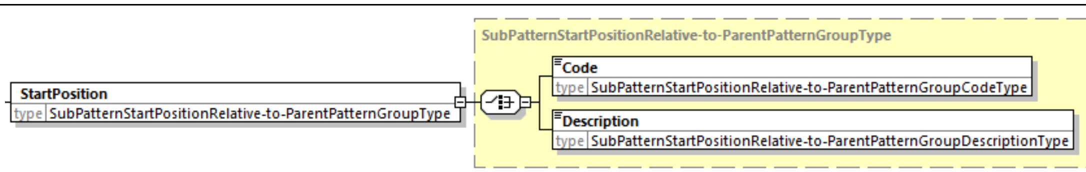
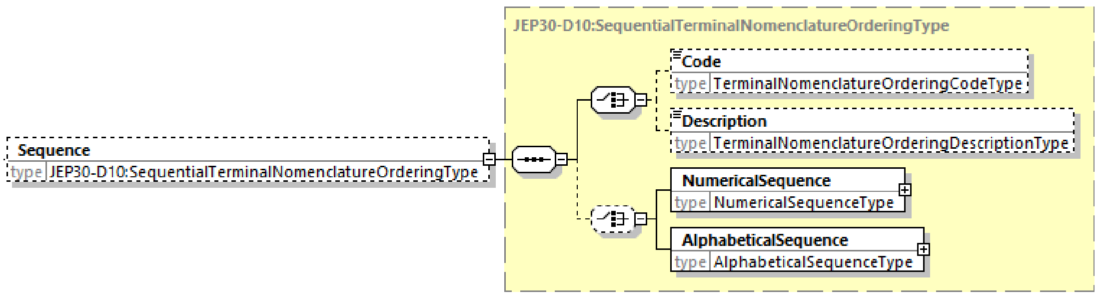
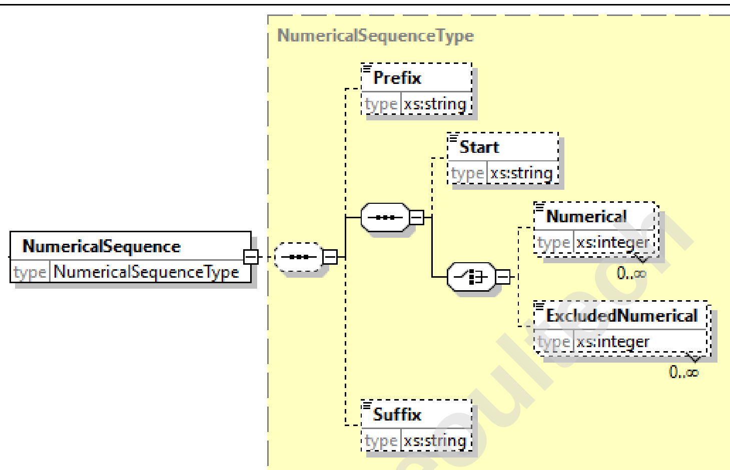
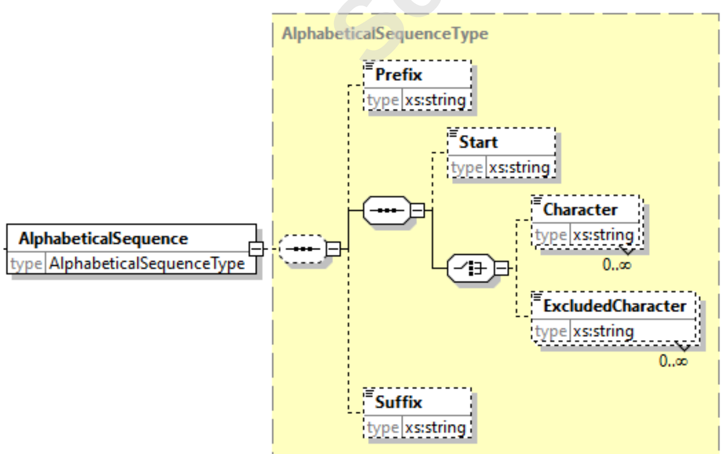
path	**PartModel/ElectricalSection/Mapping-Array/Mapping/TerminalMap/Map/TerminalName/NamingField-Array/NamingField/DuplicateSuffix-Array/DuplicateSuffix/StartPosition**
diagram	
type	**SubPatternStartPositionRelative-to-ParentPatternGroupType, SubPatternStartPositionRelative-to-ParentPatternGroupCodeType, SubPatternStartPositionRelative-to-ParentPatternGroupDescriptionType.**

TABLE 5 – SUB PATTERN START POSITION RELATIVE-TO-PARENT PATTERN GROUP

Code	Description
SW	Southwest
SE	Southeast
NE	Northeast
NW	Northwest
L	Left
B	Back
R	Right
F	Front
BL	Back-Left
BR	Back-Right
FL	Front-Left
FR	Front-Right
LB	Left-Bottom
LT	Left-Top
RB	Right-Bottom
RT	Right-Top

4.9.2.1.2.1.3. Sequence

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/Mapping-Array/Mapping/TerminalMap/Map/TerminalName/NamingField-Array/NamingField/DuplicateSuffix-Array/DuplicateSuffix/Sequence</td></tr>
<tr><td>diagram 1 of 3</td><td>
</td></tr>
<tr><td>diagram 2 of 3</td><td>
</td></tr>
<tr><td>diagram 3 of 3</td><td>
</td></tr>
<tr><td>type</td><td>SequentialTerminalNomenclatureOrderingType, TerminalNomenclatureOrderingCodeType, TerminalNomenclatureOrderingDescriptionType, NumericalSequenceType, AlphabeticalSequenceType.</td></tr>
</table>

4.9.2.1.1.3 Sequence (cont'd)

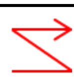
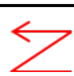
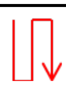
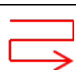
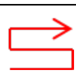
TABLE 6 – NAMING NOMENCLATURE ORDERING CODE & DESCRIPTION

Code	Description
CW	Clockwise
CCW	Counter-Clockwise
L2R	Left-to-Right
B2F	Back-to-Front
R2L	Right-to-Left
F2B	Front-to-Back
S-H	Snake Horizontal
S-V	Snake Vertical
ZZ-H	Zig-Zag Horizontal
ZZ-V	Zig-Zag Vertical

Typically, the default sequence is a running number starting with the digit 1 and incrementing by 1. If this is the case, then the *NumericalSequence* or the *AlphabeticalSequence* do not have to be populated. However, in some cases, the Numerical or alphabetical sequence can override the default, have its own *Start* value in which case the sequence of applied numbers or applied characters is applied in the same order as the sequence defined in the xml.

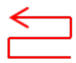
4.9.2.1.1.3 Sequence (cont'd)

TABLE 7 - NAMING FIELD PATTERNS

Pattern	Naming Field Pattern	Sequential Code	Start Position	Towards Point 2	Towards Point 3	Towards Point 4	Towards Point 5	Last Point
1		CW	User Defined	Start + 1 CW	Start + 2 CW	Start + 3 CW	Start + 4 CW	Start - 1 CW
2		CCW	User Defined	Start + 1 CCW	Start + 2 CCW	Start + 3 CCW	Start + 4 CCW	Start - 1 CCW
3		ZZ-V	BL	TL	BL+1	TL+1	BL+2	TR
4		ZZ-V	BR	TR	BR-1	TR-1	BR-2	TL
5		ZZ-V	TR	BR	TR-1	BR-1	TR-2	BL
6		ZZ-V	TL	BL	TL+1	BL+1	TL+2	BR
7		ZZ-H	TL	TR	T-1L	T-1R	T-2L	BR
8		ZZ-H	BL	BR	B+1L	B+1R	B+2L	TR
9		ZZ-H	BR	BL	B+1R	B+1L	B+2R	TL
10		ZZ-H	TR	TL	T-1R	T-1L	T-2R	BL
11		S-V	TL	BL	BL+1	TL+1	TL+2	IF(Col # = odd, BR, TR)
12		S-V	BL	TL	TL+1	BL+1	BL+2	IF(Col # = odd, TR, BR)
13		S-V	TR	BR	BR-1	TR-1	TR-2	IF(Col # = odd, BL, TL)
14		S-V	BR	TR	TR-1	BR-1	BR-2	IF(Col # = odd, TL, BL)
15		S-H	TL	TR	T-1R	T-1L	T-2L	IF(Col # = odd, BR, BL)
16		S-H	BL	BR	B+1R	B+1L	B+2L	IF(Col # = odd, TR, TL)
17		S-H	TR	TL	R-1L	T-1R	T-2R	IF(Col # = odd, BL, BR)

4.9.2.1.1.3 Sequence (cont'd)

TABLE 7 - NAMING FIELD PATTERNS (cont'd)

Pattern	Naming Field Pattern	Sequential Code	Start Position	Towards Point 2	Towards Point 3	Towards Point 4	Towards Point 5	Last Point
18		S-H	BR	BL	B+1L	B+1R	B+2R	IF(Col # = odd, TL, TR)
19	→	L2R	L	L+1	L+2	L+3	L+4	R
20	←	R2L	R	R-1	R-2	R-3	R-4	L
21	↑	B2F	B	B+1	B+2	B+3	B+4	T
22	↓	F2B	T	T-1	T-2	T-3	T-4	B

By combining the start position of the naming field nomenclature via the *SubPatternStartPositionRelative-to-ParentPatternGroupType* with the *Sequence* pattern, we can achieve the naming field patterns outlined in Table 7 - Naming Field Patterns for naming field nomenclature.

For positions of BL, TL, BR, TR, the following is also valid for naming fields for *SubPatternGroupReference* positioned in non-matrix patterns within the *ParentPatternGroupReference*, namely.

1. The position of BL (Bottom Left) corresponds to
   (a) For *SubPatternGroupReference* with a position of Left-to-Right within the *ParentPatternGroupReference*, then Left-bottom (LB),
   (b) For *SubPatternGroupReference* with a position of Back-to-Front within the *ParentPatternGroupReference*, then Back-left (BL),
   (c) For *SubPatternGroupReference* with a position of Diagonal within the *ParentPatternGroupReference*, then Southwest (SW),
2. The position of TL (Top Left) corresponds to
   (a) For *SubPatternGroupReference* with a position of Left-to-Right within the *ParentPatternGroupReference*, then Left-top (LT),
   (b) For *SubPatternGroupReference* with a position of Back-to-Front within the *ParentPatternGroupReference*, then Front-left (FL),
   (c) For *SubPatternGroupReference* with a position of Diagonal within the *ParentPatternGroupReference*, then Northwest (NW),

4.9.2.1.1.1.3 Sequence (cont'd)

3. The position of BR (Bottom Right) corresponds to

    (a) For *SubPatternGroupReference* with a position of Left-to-Right within the *ParentPatternGroupReference*, then Right-bottom (RB),

    (b) For *SubPatternGroupReference* with a position of Back-to-Front within the *ParentPatternGroupReference*, then Back-right (BR),

    (c) For *SubPatternGroupReference* with a position of Diagonal within the *ParentPatternGroupReference*, then Southeast (SE),

4. The position of TR (Top Right) corresponds to

    (a) For *SubPatternGroupReference* with a position of Left-to-Right within the *ParentPatternGroupReference*, then Right-top (RT),

    (b) For *SubPatternGroupReference* with a position of Back-to-Front within the *ParentPatternGroupReference*, then Front-right (FR),

    (c) For *SubPatternGroupReference* with a position of Diagonal within the *ParentPatternGroupReference*, then Northeast (NE).

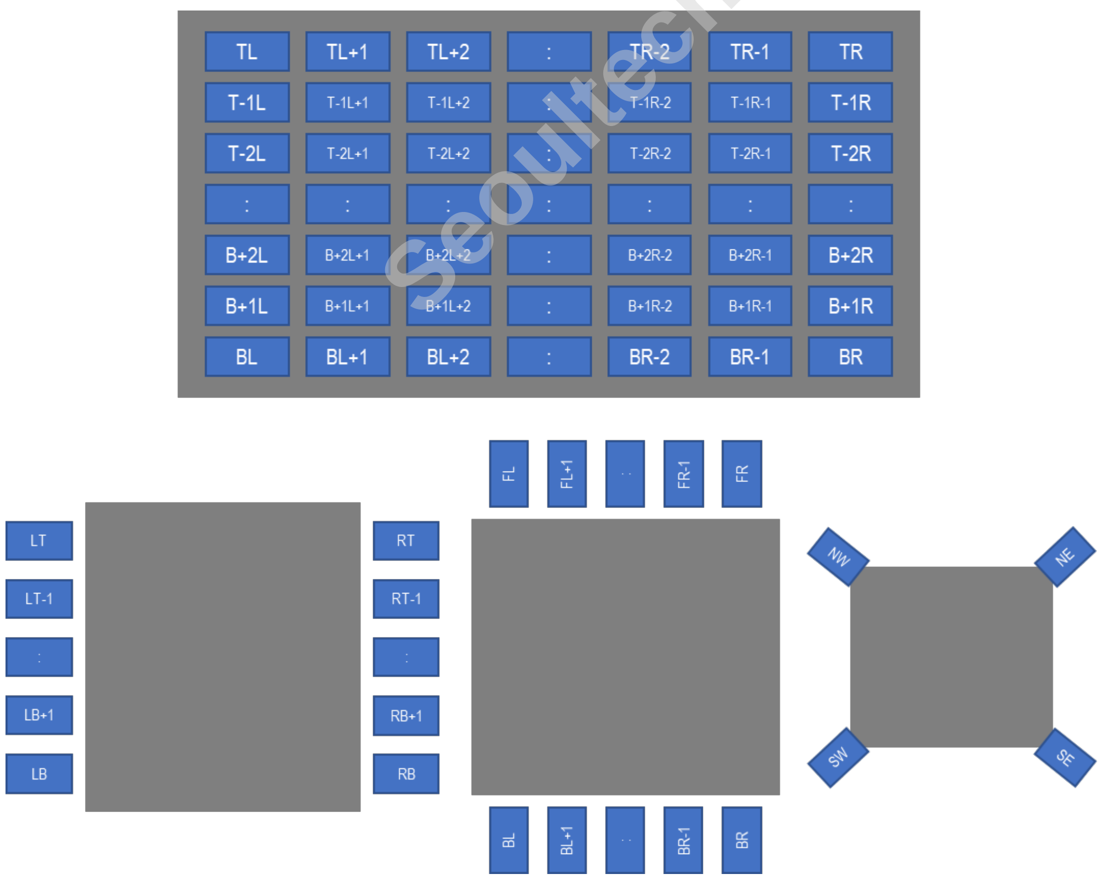
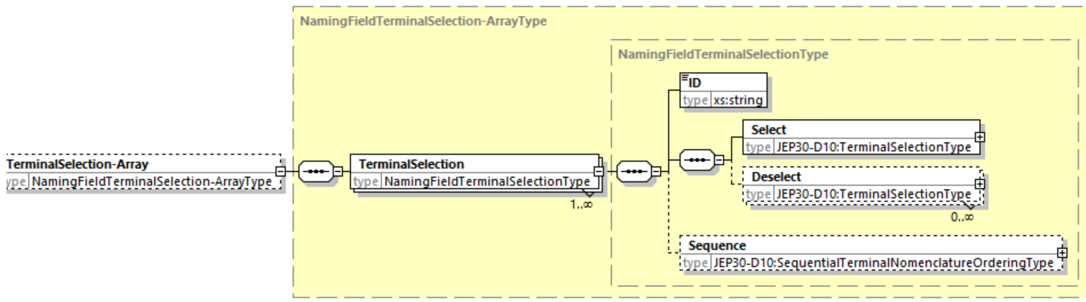
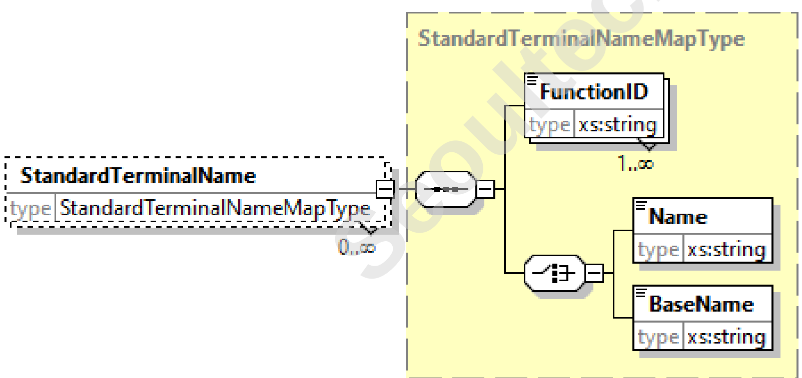


FIGURE 47 – TERMINAL NAMING FIELD PATTERN SAMPLES

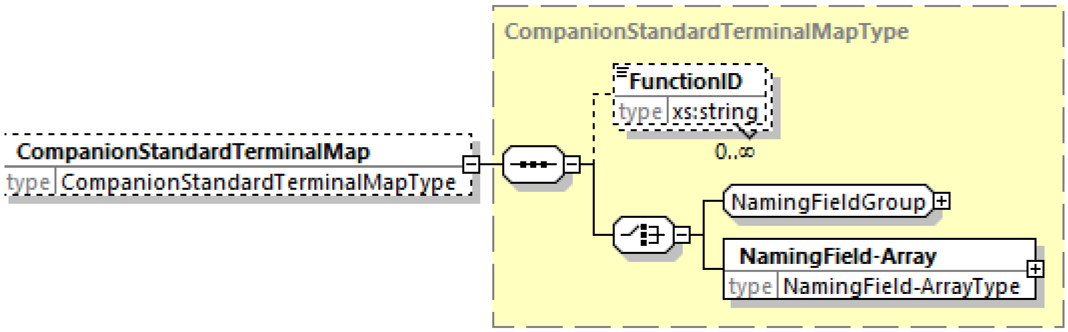
4.9.2.1.2.2. Terminal Selection - Array

path	PartModel/ElectricalSection/Mapping-Array/Mapping/TerminalMap/Map/TerminalName/NamingField-Array/NamingField/TerminalSelection-Array
diagram	
type	NamingFieldTerminalSelection-ArrayType, NamingFieldTerminalSelectionType, JEP30-D10:TerminalSelectionType, JEP30-D10:SequentialTerminalNomenclatureOrderingType

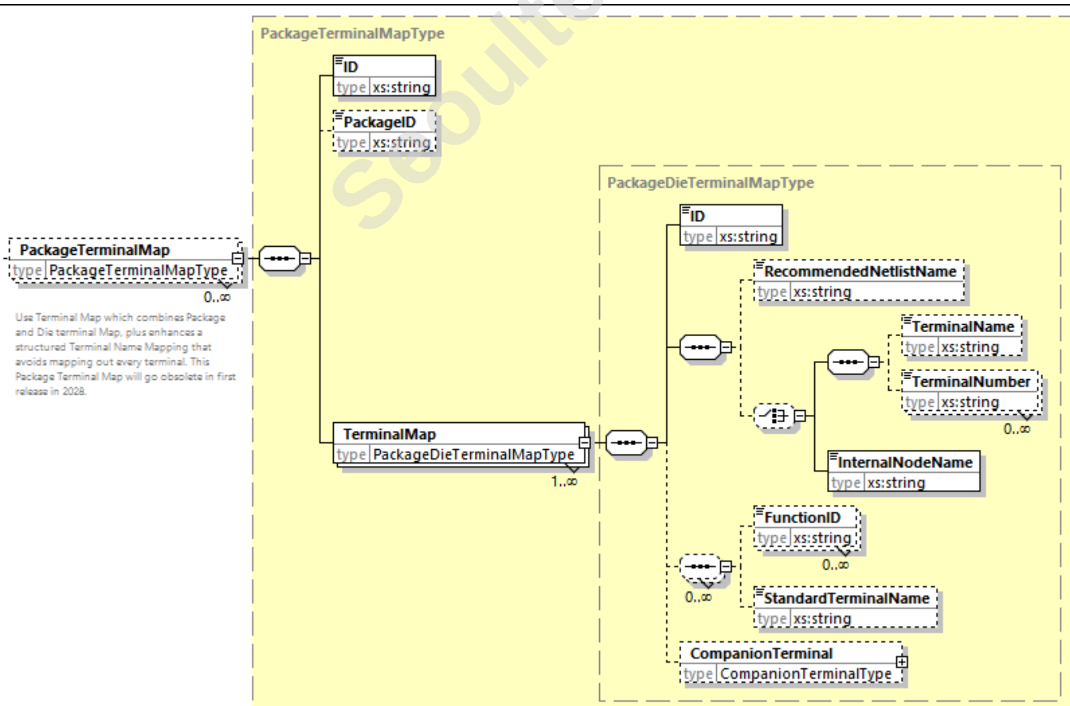
4.9.2.2. Standard Terminal Name

path	PartModel/ElectricalSection/Mapping-Array/Mapping/TerminalMap/Map/StandardTerminalName
diagram	
type	StandardTerminalNameMapType.

4.9.2.3. Companion Standard Terminal Map

path	PartModel/ElectricalSection/Mapping-Array/Mapping/TerminalMap/Map/TerminalName
diagram	
type	CompanionStandardTerminalMapType, NamingField-ArrayType.
Group	NamingFieldGroup

4.9.3. Package Terminal Map

path	PartModel/ElectricalSection/Mapping-Array/PackageTerminalMap
diagram	
type	PackageTerminalMapType, PackageDieTerminalMapType.
NOTE	Use Terminal Map which combines Package and Die terminal Map, plus enhances a structured Terminal Name Mapping that avoids mapping out every terminal. This Package Terminal Map will go obsolete in first release in 2028.

4.9.3 Package Terminal Map (cont'd)

The *TerminalMap* is an array that contains a mapping of *TerminalNames* to *TerminalNumbers*, or *InternalNodeName*. When Terminal Numbers is populated, it is assumed that the Package section of the PartModel is also populated so that the consumer knows which package that these terminal numbers belong to as defined by the *PackageID*.

Figure 47 shows a sample device that contains four NAND gates. The *TerminalNumber* is an unbounded element that then captures the Terminal Numbers that is specific to a *TerminalName*.

A *TerminalMap-Array* sample is shown below.

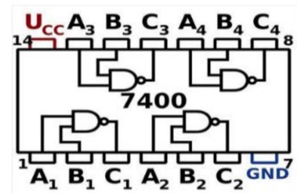


Figure 48 — Sample NAND Gate Device

```
<Mapping-Array>
        <Mapping>
                <ID>Mapping ID 1</ID>
                < PackageTerminalMap>
                        <ID>Package Terminal Map ID 1</ID>
                        <PackageID>Package ID 1</ PackageID > <!--SOIC-->
                        <TerminalMap>
                                <ID>Terminal Map ID 1</ID>
                                <TerminalName>A1</TerminalName>
                                <TerminalNumber>1</TerminalNumber>
                        </TerminalMap>
                        <TerminalMap>
                                <ID>Terminal Map ID 2</ID>
                                <TerminalName>B1</TerminalName>
                                <TerminalNumber>1</TerminalNumber>
                        </TerminalMap>
                        <TerminalMap>
                                <ID>Terminal Map ID 3</ID>
                                <TerminalName>C1</TerminalName>
                                <TerminalNumber>1</TerminalNumber>
                        </TerminalMap>
                        <TerminalMap>
                                <ID>Terminal Map ID 4</ID>
                                <TerminalName>A2</TerminalName>
                                <TerminalNumber>1</TerminalNumber>
                        </TerminalMap>
                        <TerminalMap>
                                <ID>Terminal Map ID 5</ID>
                                <TerminalName>B2</TerminalName>
                                <TerminalNumber>1</TerminalNumber>
                        </TerminalMap>
                        <TerminalMap>
                                <ID>Terminal Map ID 6</ID>
                                <TerminalName>C2</TerminalName>
                                <TerminalNumber>1</TerminalNumber>
                        </TerminalMap>
```

4.9.3 Package Terminal Map (cont'd)


```
                <TerminalMap>
                        <ID>Terminal Map ID 7</ID>
                        <TerminalName>GND</TerminalName>
                        <TerminalNumber>1</TerminalNumber>
                </TerminalMap>
                <TerminalMap>
                        <ID>Terminal Map ID 8</ID>
                        <TerminalName>C4</TerminalName>
                        <TerminalNumber>1</TerminalNumber>
                </TerminalMap>
                <TerminalMap>
                        <ID>Terminal Map ID 9</ID>
                        <TerminalName>B4</TerminalName>
                        <TerminalNumber>1</TerminalNumber>
                </TerminalMap>
                <TerminalMap>
                        <ID>Terminal Map ID 10</ID>
                        <TerminalName>A4</TerminalName>
                        <TerminalNumber>1</TerminalNumber>
                </TerminalMap>
                <TerminalMap>
                        <ID>Terminal Map ID 11</ID>
                        <TerminalName>C3</TerminalName>
                        <TerminalNumber>1</TerminalNumber>
                </TerminalMap>
                <TerminalMap>
                        <ID>Terminal Map ID 12</ID>
                        <TerminalName>B3</TerminalName>
                        <TerminalNumber>1</TerminalNumber>
                </TerminalMap>
                <TerminalMap>
                        <ID>Terminal Map ID 13</ID>
                        <TerminalName>A3</TerminalName>
                        <TerminalNumber>1</TerminalNumber>
                </TerminalMap>
                <TerminalMap>
                        <ID>Terminal Map ID 14</ID>
                        <TerminalName>VCC</TerminalName>
                        <TerminalNumber>1</TerminalNumber>
                </TerminalMap>
        </PackageTerminalMap>
    </Mapping>
</ Mapping-Array>
```


The identification of an *InternalNode* (A shown in Figure 48 — Sample Transistor Circuit) becomes particularly important when trying to describe the internal circuit of a device that has Nodes that are not connected to any external terminal of the part.

These nodes can be optionally connected to a Terminal Name and Terminal Number.

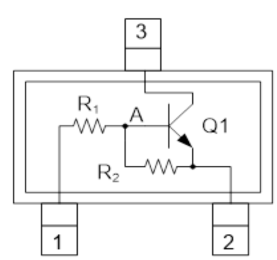
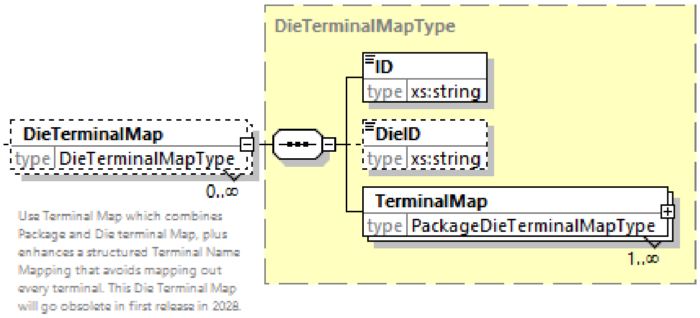
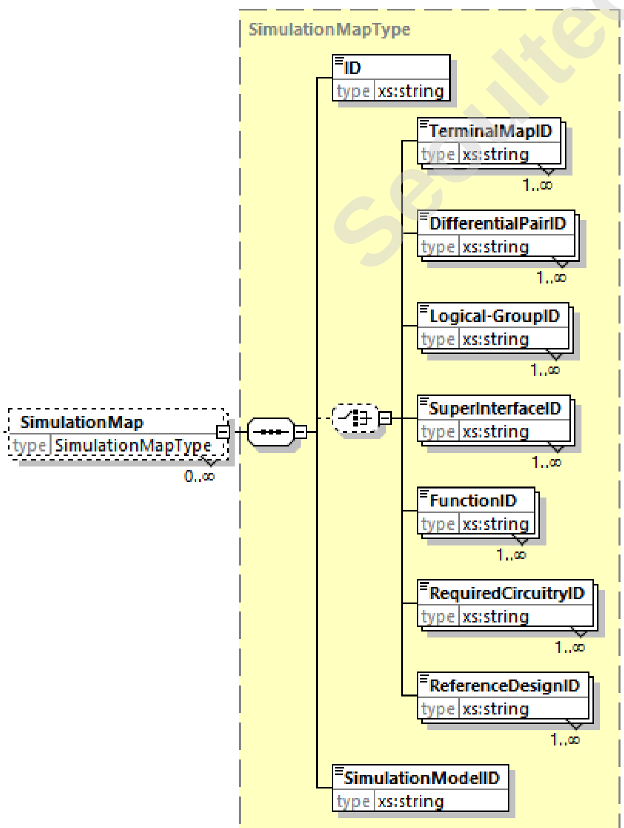


Figure 49 — Sample Transistor

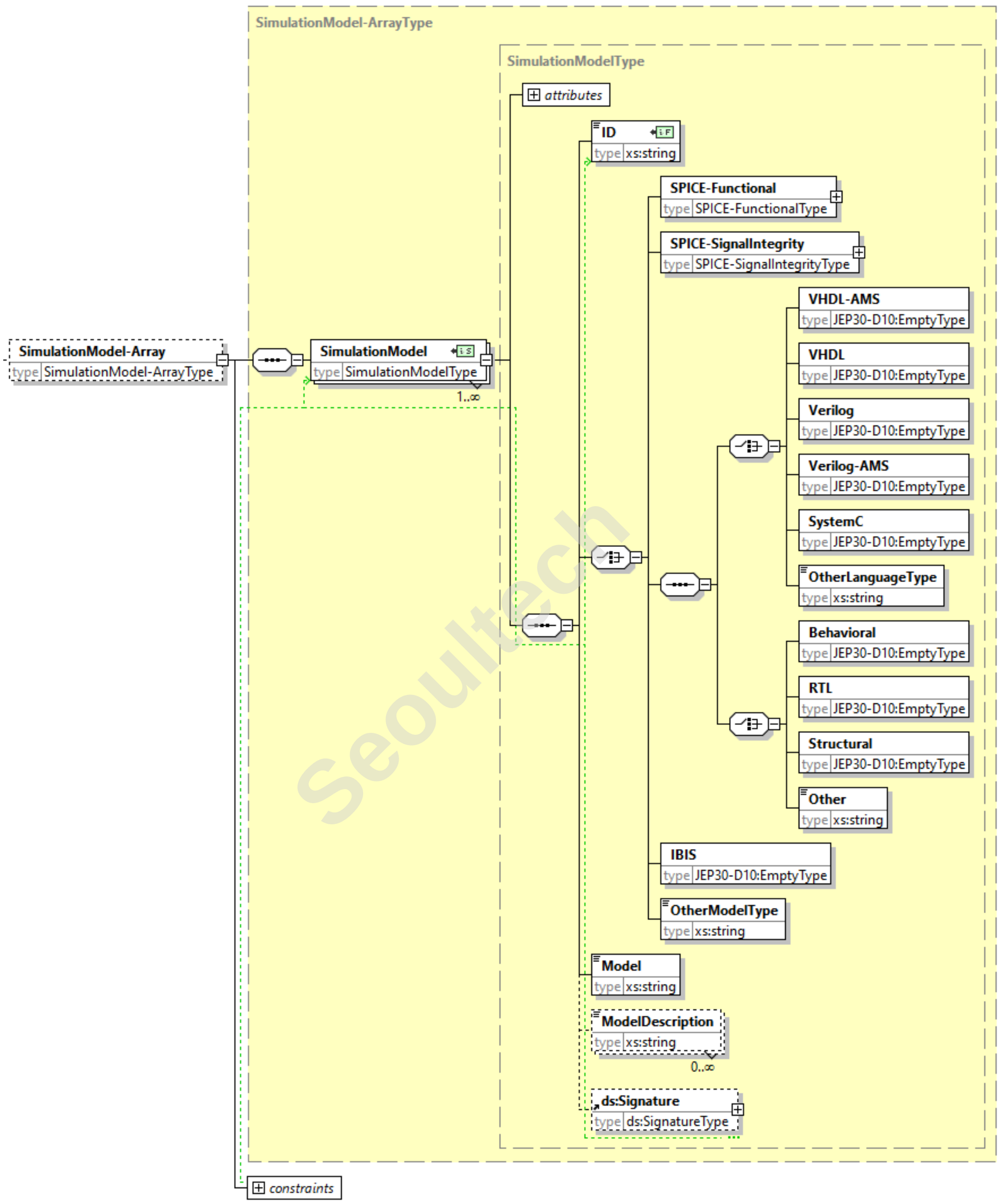
4.9.4. Die Terminal Map

path	PartModel/ElectricalSection/Mapping-Array/DieTerminalMap
diagram	
type	DieTerminalMapType, PackageDieTerminalMapType.
NOTE	Use Terminal Map which combines Package and Die terminal Map, plus enhances a structured Terminal Name Mapping that avoids mapping out every terminal. This Die Terminal Map will go obsolete in first release in 2028.

4.9.5. Simulation Map

path	PartModel/ElectricalSection/Mapping-Array/SimulationMap
diagram	
type	SimulationMapType.

4.10. Simulation Model - Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/SimulationModel-Array</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>SimulationModel–ArrayType, SimulationModelType, SPICE-FunctionalType, SPICE-SignalIntegrityType, ds:SignatureType.</td></tr>
</table>

Electronic circuit simulation uses mathematical models to replicate the behavior of an actual electronic device or circuit. Simulation software allows for modeling of circuit operation prior to building the product. There are various types of simulation software which require various *SimulationModel* libraries to perform the function of analyzing the device within the intended product design.

4.10 Simulation Model - Array (cont'd)

SPICE (Simulation Program with Integrated Circuit Emphasis) is a general-purpose, open source analog electronic circuit simulator. It is a program used in integrated circuit and board-level design to check the integrity of circuit designs and to predict circuit behavior. The Spice models can be either SPICE-Functional or SPICE-SignalIntegrity.

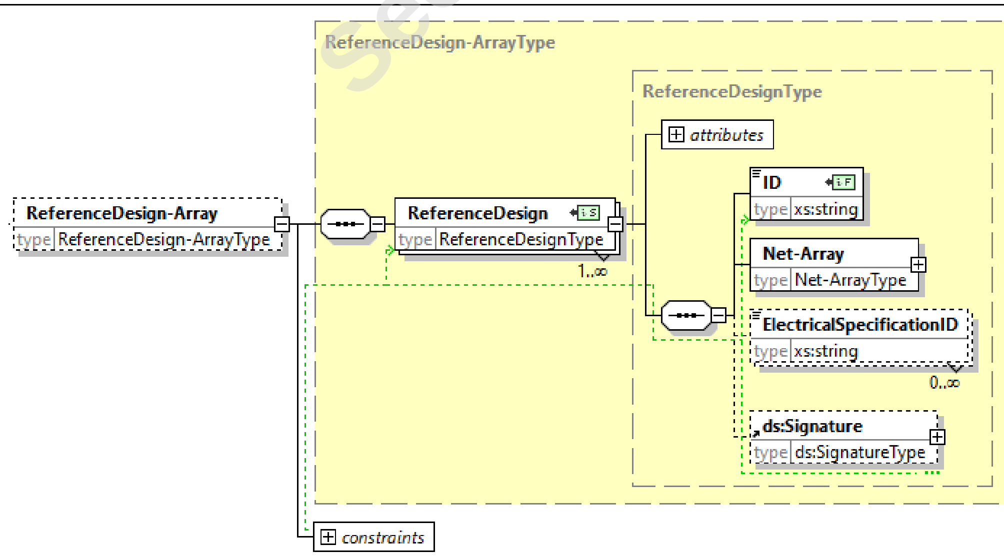
VHDL (VHSIC Hardware Description Language) is a hardware description language used in electronic design automation to describe digital and mixed-signal systems such as field-programmable gate arrays and integrated circuits.

Verilog, standardized as IEEE 1364, is a hardware description language (HDL) used to model electronic systems. It is most commonly used in the design and verification of digital circuits at the register-transfer level of abstraction. It is also used in the verification of analog circuits and mixed-signal circuits, as well as in the design of genetic circuits

Input/output Buffer Information Specification or *IBIS* is a specification of a method for integrated circuit vendors to provide information about the input/output buffers of their product to their prospective customers without revealing the intellectual property of their implementation and without requiring proprietary encryption keys.

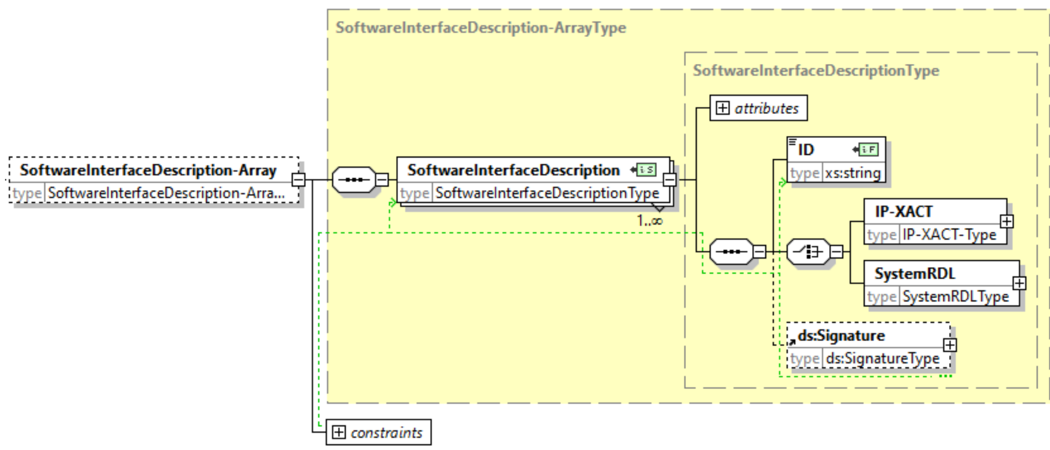
Model captures the URL link for the appropriate simulation model, or in the event that the simulation model is provided with the XML File, then the Model file name.

4.11. Reference Design - Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/ReferenceDesign-Array</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>ReferenceDesign–ArrayType, ReferenceDesignType, Net–ArrayType, ds:SignatureType.</td></tr>
</table>

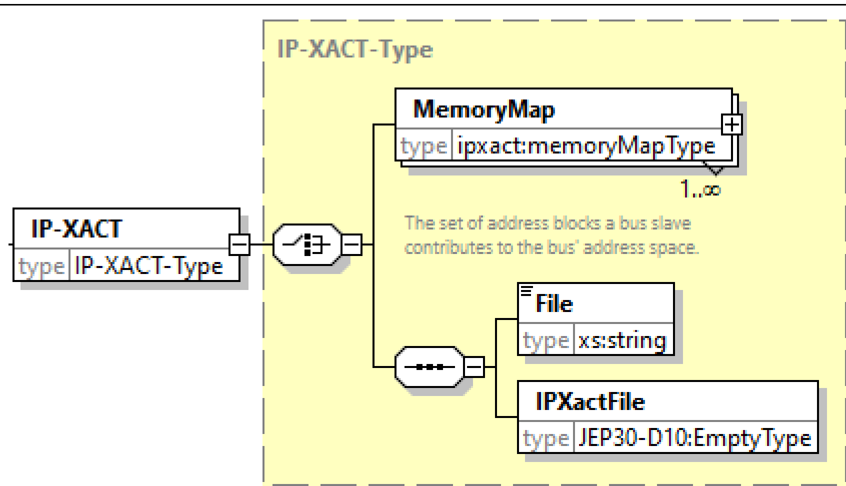
This section has the same structure as section 4.6.2 Required Circuitry - Array above, however it is to capture *ReferenceDesigns* as opposed to *RequiredCircuitry*. Component Manufacturers can provide reference designs via this section, to enable and support their users with various Product designs, in which their parts will be used.

4.12. Software Interface Description - Array

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/SoftwareInterfaceDescription-Array</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>SoftwareInterfaceDescription-ArrayType, SoftwareInterfaceDescriptionType, IP-XACT-Type, SystemRDLType, ds:SignatureType.</td></tr>
</table>

Component Manufacturers are now able to include their *SoftwareInterfaceDescription* in the form of either *IP-XACT* or a *SystemRDL* along with other part related technical content in one submission to their customers.

4.12.1. IP-XACT

<table>
<tr><td>path</td><td>PartModel/ElectricalSection/SoftwareInterfaceDescription-Array/SoftwareInterfaceDescription/IPXact</td></tr>
<tr><td>diagram</td><td>
</td></tr>
<tr><td>type</td><td>IP-XACT-Type, ipxact:memoryMapType, JEP30-D10:EmptyType</td></tr>
</table>

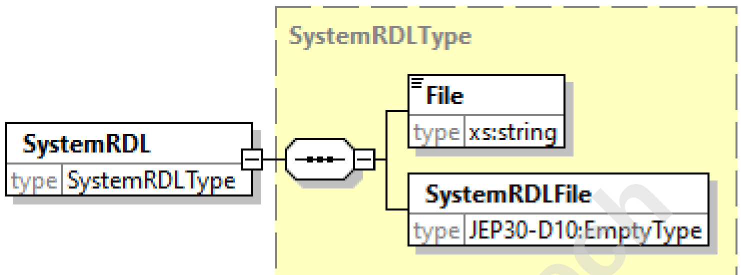
IP-XACT is an XML format that defines and describes individual, re-usable electronic circuit designs to facilitate their use in creating integrated circuits. *IP-XACT* describes the meta-data of IP designs and flows and the interconnection of IP interfaces in a standard specification. A sub-section of the *IP-XACT* specification, memoryMap, describes the registers, memories and address maps used in the circuit designs.

4.12.1 IP-XACT (cont'd)

The component manufacturer has the option to provide the data as an XML structured data (as per memoryMap.xsd) or as a file reference.

For more information on IP-XACT, refer to https://www.accellera.org/downloads/standards/ip-xact.

4.12.2. System RDL

path	**PartModel/ElectricalSection/SoftwareInterfaceDescription-Array/SoftwareInterfaceDescription/SystemRDL**
diagram	
type	**SystemRDLType, JEP30-D10:EmptyType**

SystemRDL is a language for the design and delivery of intellectual property (IP) products used in complex digital systems. SystemRDL semantics supports the description of a system of registers and memory. SystemRDL can also be used to automatically generate and synchronize the register specification in hardware design, software development, verification, and documentation of the complex digital system.

For more information on SystemRDL, refer to https://www.accellera.org/activities/working-groups/systemrdl.

5 Quick TeX reference

The notation used for representing electrical symbols is based on the TeX language. TeX is a system for typesetting high quality technical documents. It provides a text-based language that describes complex mathematical formulas. TeX commands commonly start with a backslash and are grouped with curly braces. These commands include all kinds of technical symbols, and modifiers such as subscripts and superscripts. TeX is a widely use formatting system in both academia and industry, and it is in the public domain. Reference the “Short Math Guide by the American Mathematical Society.

5.1. Syntax

Table 8 — LaTeX Syntax Sample

Syntax	Description
_{abc}	Subscript $_{abc}$
^{abc}	Superscript ^{abc}
\overline{abc}	Overline abc
\bar{a}	ā
\hat{a}	â
\tilde{a}	ã
\vec{a}	a with arrow on top
\sqrt{a}	Square root of a

5.2. Symbols

Table 9 — LaTeX Symbols and Descriptions Sample

Symbol	Description
\alpha, \beta, \gamma, … , \omega	α, β, γ, …, ω (lowercase greek letters)
\Gamma, \Delta, \Theta, …, \Omega	Γ, Δ, Θ, , Ω (non-latin-looking uppercase greek letters)
_, \^, \#, \%, \&, \backslash	_, ^, #, %, &, \ (symbols with special meaning)
\infty	∞
\circ	∘
\pm	±
\leq, \geq, \neq	≤, ≥, ≠
\backslash	\
\sym	~
\approx	≈
\leftarrow, \rightarrow	←, →
NOTE < and > are special symbols in XML, so they have to be escaped in the document as < and >. XML tools may or may not take care of this.	

6 Rule Syntax

The rule syntax within the PartModel is used to create string definitions in the XML element *Rule*. The *Rule* element occurs in the *ElectricalSpecification* section where there is a *TestCondition/Rule* and also under the *ParameterSet*. However the is accessed via its ID from several places such as:-

1. *PartModel/ManufacturerPartNumber-Array/PartDetails/ElectricalSpecificationID*,
2. *PartModel/ReferenceManufacturerPartNumber-Array/PartDetails/ElectricalSpecificationID*,
3. *PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalMap-Array/TerminalMap/ElectricalSpecificationID*,
4. *PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/InternalNode-Array/InternalNode/ElectricalSpecificationID*,
5. *PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/DifferentialPair-Array/DifferentialPair/ElectricalSpecificationID*,
6. *PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/TerminalDetails-Array/TerminalDetails/TerminalGrouping/Logical-Group-Array/Logical-Group/ElectricalSpecificationID*,
7. *PartModel/ElectricalSection/ElectricalParameters-Array/ElectricalParameters/FunctionGroup-Array/Function/ElectricalSpecificationID*,
8. *PartModel/ElectricalSection/SchematicData-Array/SchematicData/RequiredCircuitry-Array/RequiredCircuitry/ElectricalSpecificationID*,
9. *PartModel/ElectricalSection/ReferenceDesign-Array/ReferenceDesign/ElectricalSpecificationID*.

In some cases such as defining the electrical relationship between terminals the rule is defining a single electrical parameter of one or more terminals as a function of other terminals.

6.1. Rule applied to a Logical-Group

The *Rule* elements within the PartModel schema allow the electrical parameter of a terminal or group of terminals to be described as a function of another terminal or group of terminals. As an example a part defines as a limit parameter that a group of terminals has a maximum total current, I_{OHmax} and I_{OLmax}, for all combined outputs, which should not exceed ±48 mA. If the output terminals included *TerminalNumbers* 13 through *TerminalNumbers* 18, then a formula can be written which describes the sum of the current for each of the *TerminalNumbers* 13 – 18 must be greater than -48 mA and less than 48 mA. A PartModel XML that defines this electrical characteristic would use the symbol I_{OHmax} as the symbol name. The rule will be:

I(13)+I(14)+I(15)+I(16)+I(17)+I(18)<48mA

I(13) references the steady-state current of terminal 13. The '+' sign represents the summing the operands on each side of the symbol. The less than sign expresses that what is to the left of the less than sign must be less than what is to the right. The "48mA" is a constant and its unit is mA. To complete the example a second rule would be written for the negative side and applied to the symbol I_{OLmax}. This rule is:

-48mA<I(13)+I(14)+I(15)+I(16)+I(17)+I(18)

These 2 rules would be represented in the xml file under the ParameterSet as follows:


```xml
<ParameterSet>
	<Parameter>
		<LaTeX-Symbol>I_{OHmax}</LaTeX-Symbol>
		<SymbolDescription>Capacitance change</SymbolDescription>
		<Rule>
			<LaTeX-Rule>I(13)+I(14)+I(15)+I(16)+I(17)+I(18)&lt;48mA</LaTeX-Rule>
		</Rule>
	</Parameter>
	<Parameter>
		<LaTeX-Symbol>I_{OLmax}</LaTeX-Symbol>
		<Rule>
			<LaTeX-Rule>-48mA&lt;I(13)+I(14)+I(15)+I(16)+I(17)+I(18)</LaTeX-Rule>
		</Rule>
	</Parameter>
</ParameterSet>
```

A rule such as this would be place in the *ElectricalSpecification* section but referenced from the *TerminalDetails/TerminalGrouping/Logical-Group-Array/Logical-Group/ElectricalSpecificationID* as shown in 4.7.1.5.6 Logical-Group - Array.

6.2. Rule applied to a Terminal Map

It is also possible to define an electrical parameter for a single terminal as a function of another terminal's electrical parameter. As an example a terminal's Low-level input voltage, V_{IL}, is defined as the value of Ground plus 0.6V. *TerminalNumber* 4 of the part is connected to Ground. A PartModel XML that defines the electrical characteristic would use the symbol V_{IL} and Volts would be the unit of the electrical specification. The rule for the parameter value will be:

=V(4)+0.6V

These 2 rules would be represented in the xml file under the ParameterSet as follows:-

```
<ParameterSet>
        <Parameter>
                <LaTeX-Symbol>V_{IL}</LaTeX-Symbol>
                <Rule>
                        <LaTeX-Rule>V(4)+0.6V</LaTeX-Rule>
                </Rule>
        </Parameter>
</ParameterSet>
```

V(4) represents the voltage of terminal 4. "0.6V" is a constant whose unit is Volts. If the name of the terminal 4 is V_{SS} the same rule can be defined as.

=V(V_{SS})+0.6V

These 2 rules would be represented in the xml file under the ParameterSet as follows:-

```
<ParameterSet>
        <Parameter>
                <LaTeX-Symbol>V_{IL}</LaTeX-Symbol>
                <Rule>
                        <LaTeX-Rule>=V(V_{SS})+0.6V</LaTeX-Rule>
                </Rule>
        </Parameter>
</ParameterSet>
```


A rule such as this would be place in the *ElectricalSpecification* section but referenced from the *TerminalDetails/TerminalMap-Array/TerminalMap/ElectricalSpecificationID* as shown in 4.7.1.1 Terminal Map - Array.

6.3. Rule Functions

Rules can be defined in multiple ways through the use of arithmetic operators, comparison operators, constant values, references to electrical characteristics of other terminals, and functions.

6.3.1. Arithmetic Operations

Table 10 — Arithmetic Operations

Operator	Description
+	Addition of right and left operand
-	Subtraction of right operand from left operand.
/	Division of left operand by right operand.
*	Multiplication of left and right operand
^	Raise the left hand operand to the power of the value of the right hand operand.

Arithmetic operations follow the basic order of precedence. * and / take precedence over + and -.

6.3.2. Modifying Precedence

Parenthesis allow you to define the proper precedence of your operations. Take the following as an example:

2 + 3 * 4

The calculation would be interpreted as follows:

2 + 3 * 4

2 + 12

14

Adding parenthesis will change the calculation and the result as follows.

(2 + 3) * 4

(5) * 4

20

Use parentheses where necessary to ensure you explicitly and correctly define rules.

6.3.3. Function to Reference Other Terminals

Functions enable rules to reference electrical parameters of other terminals. The function has a specific form. The name of the function is any valid symbol as defined by JEDEC. The parameter, inside the parentheses, is any valid *TerminalName* or *TerminalNumber* which must be defined in the *TerminalMap* section of the XML file.

6.3.3 Function to Reference Other Terminals (cont'd)

Table 11 — Rule Functions

Function	Description
I(T)	Steady-state current of terminal T (Positive value returned for flowing out, Negative value returned for current flowing in)
V(T)	Steady-state voltage of terminal T
P(T)	Power of terminal T

6.3.3.1. Functions

Additional mathematical operations that can be performed in the rule.

Table 12 — Mathematical Functions

Operation	Description
ABS(x)	Absolute value of expression x.
SQRT(X)	Square Root of expression x.
AVG(X, Y, …)	Average of expression X and expression Y. Must have at least 2 parameters. Allows any number of parameters.
MAX(X, Y, …)	Returns the maximum value out of X and Y. Must have at least 2 parameters. Allows any number of parameters.
MIN(X, Y, …)	Returns the minimum value out of X and Y. Must have at least 2 parameters. Allows any number of parameters.
EXP(X)	Returns e to the power of X.
LOG(X)	Returns the base 10 logarithm of X.
LOG(X, [Y])	Returns the base Y logarithm of X
LN(X)	Returns the natural log of X.
POWER(X, Y)	

6.3.4. Constants

Any value that begins with a number is considered a constant value. The constant may be defined as an integer or a decimal. A '.' is used as the separator for the decimal portion of the constant. If the constant has a unit, then that unit must follow the value. Examples include:

1. 10 mA
2. 10.5 V
3. 0.6 W

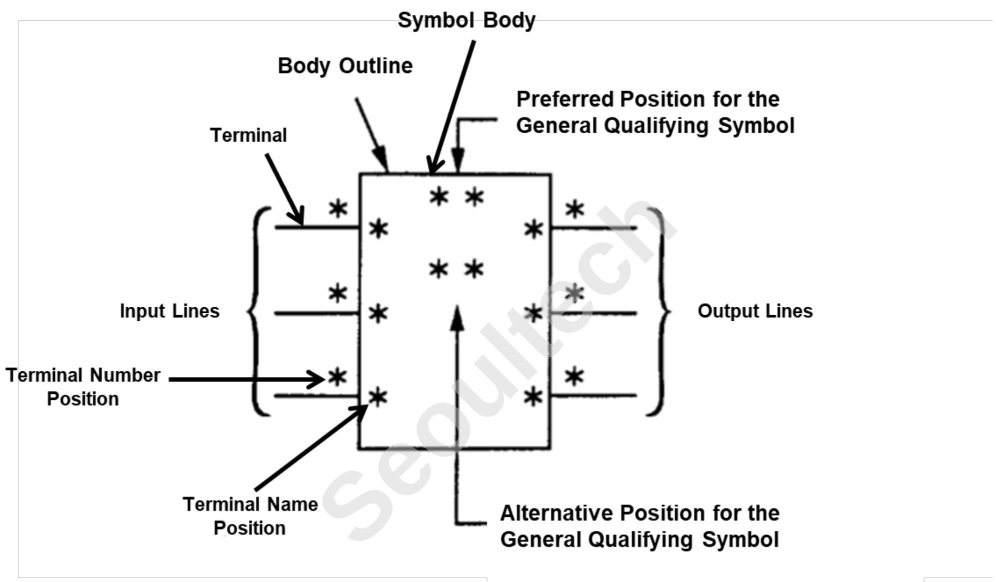
The valid unit abbreviations can be found in Table 3 — UOM Enumerated Lists.

Annex A (informative) Graphic Symbol Definition

The following recommendations are based on the IEEE Standard/ American National Standard/ Canadian Standard "*Graphic Symbols for Electrical and Electronics Diagrams*" IEEE Std 315-1975 (Reaffirmed 1993), ANSI Y32.2-1975 (Reaffirmed 1989), CSA Z99-1975.

While Drafting Standards define many "terminal naming requirements", it is recommended that Terminal names used in the Symbol are the same as that specified by the component manufacturer.

A.1. General Recommended Graphic Sizing



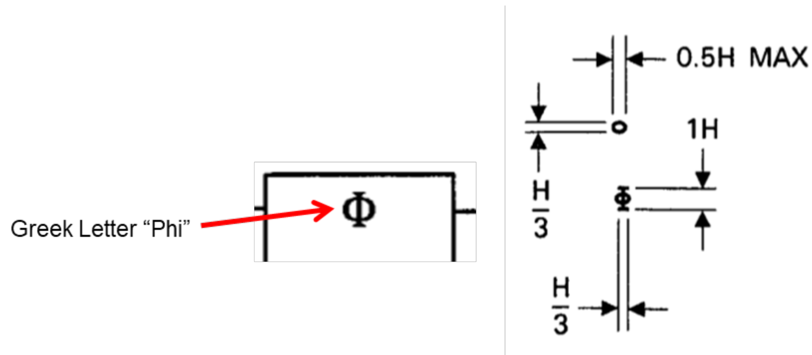
Typical symbol properties include Symbol Name and Reference Designator. Terminal Names are placed inside the symbol body. As the text grows within the body outline, the body outline should grow to prevent terminal names on the left from overlapping the terminal names on the right.

Body outline size and placements of terminals should be placed on a grid. Grid sizes should be defined in terms of grid spacing, so that customers who want to see their graphics on a metric grid versus an imperial grid can simply define the grid size to either a metric value or an imperial value.

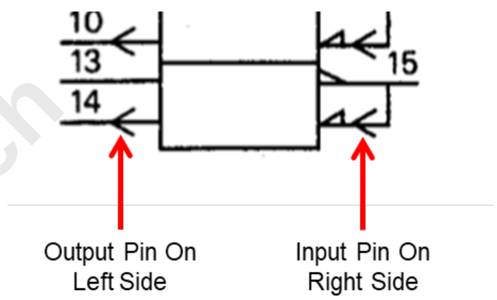
The normal conventions are that Input terminals are on the left with output terminals are on the right. Positive power terminals are on the top, while ground and negative power terminals are on the bottom of the body outline. However, violating these conventions does not violate the drafting standards.

A.1 General Recommended Graphic Sizing (cont'd)

The "General Qualifying Symbol" is the Greek Letter "Phi"



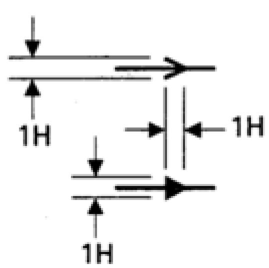
A.1.1. Input and Output Terminals Graphics.

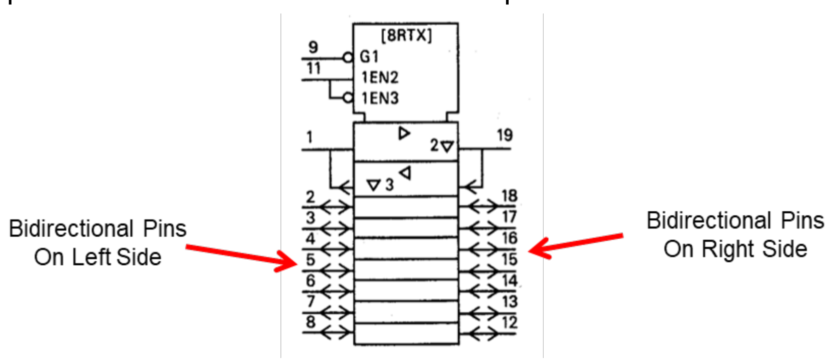


When an Input terminal is on the Left side it does not require a terminal direction graphical indicator. When the Input terminal is placed on any other side of the symbol the terminal Direction should be marked by a graphical indicator.

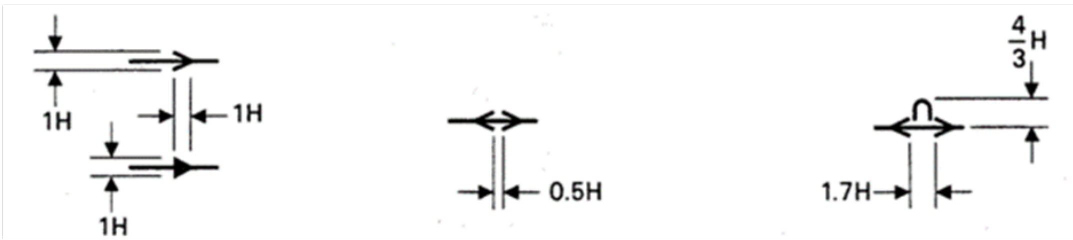
When an Output terminal is on the Right it does not require a terminal direction graphical indicator. When the Output terminal is placed on any other side of the symbol the terminal Direction should be marked by a graphical indicator.

Bi-directional terminals should always have a graphical indicator. The IEEE spec recognizes two separate forms of a bidirectional signal and has specified different graphical conventions: (IEEE 315 Pg. 32). The ASNI IEEE spec allows either "closed arrows" or "open arrows" to be used for indicating signal direction.





A.1.2. Bidirectional Signal – Only One Direction at a time



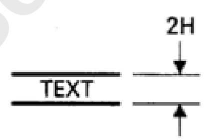
Note that when a bi-directional signal is an analog signal, the analog symbol indicator is placed between the arrows. The dimensions of the arrows follow the same dimensions as single directional arrows.

A.1.3. Bidirectional Signal – Both directions Simultaneously

The arrow points are directed towards each other when the bidirectional signal is in both directions simultaneously. .

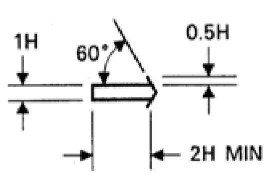
A.1.4. Text Height

A.1.5. Line to Line with Text

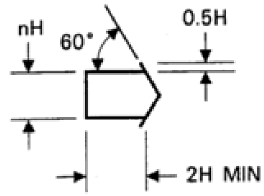


A.1.6. Line to Line without Text

A.1.7. Graphic Sizing for Bus without Text



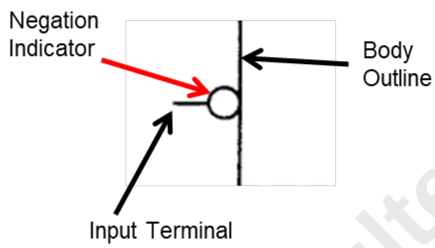
A.1.8. Graphic Sizing for Bus with Text

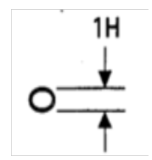


A.2. Recommended Graphic Symbol Representation of Signals, Properties, Functions

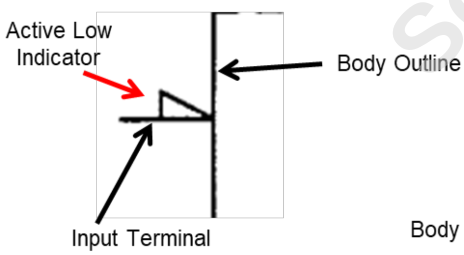
The following graphics are recommended on the symbol graphics to visibilly show the function of the symbol or part.

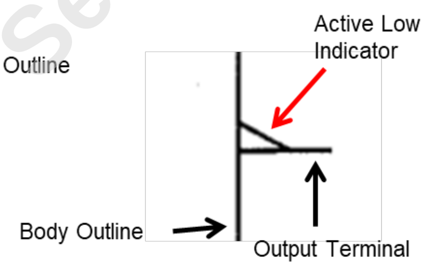
A.2.1. Negation

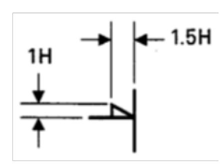




A.2.2. Active Low & Active High

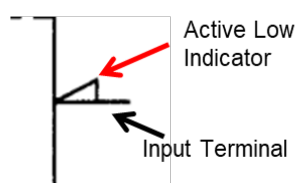






“Active Low” terminals has a graphical indicator, that can represent

1. “A low signal activated this input”
2. “A low signal implies this output has been activated.

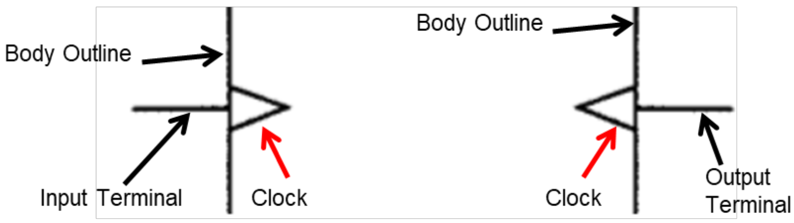


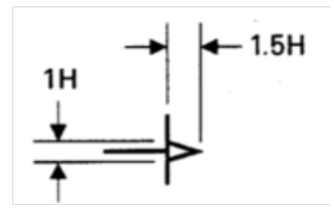
Level indicators are oriented along the direction of the signal flow. If the input terminal is on the right side of the symbol, the active low indicator should be drawn as shown in the image to the right.

Since Active High is the assumed behavior, graphical indicators for “active high” are omitted from the symbol.

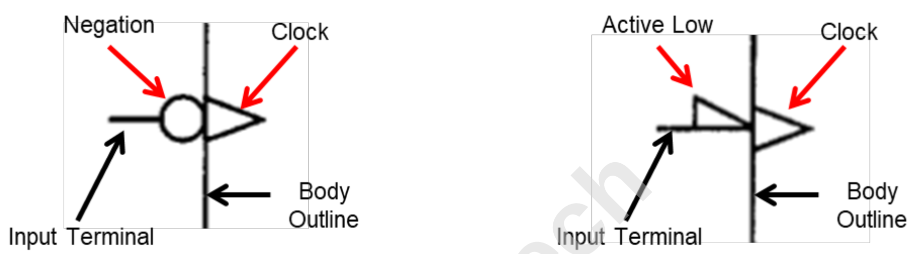
A.2.3. Clock

The Clock signal should be represented on the input terminal and the output terminal as shown below

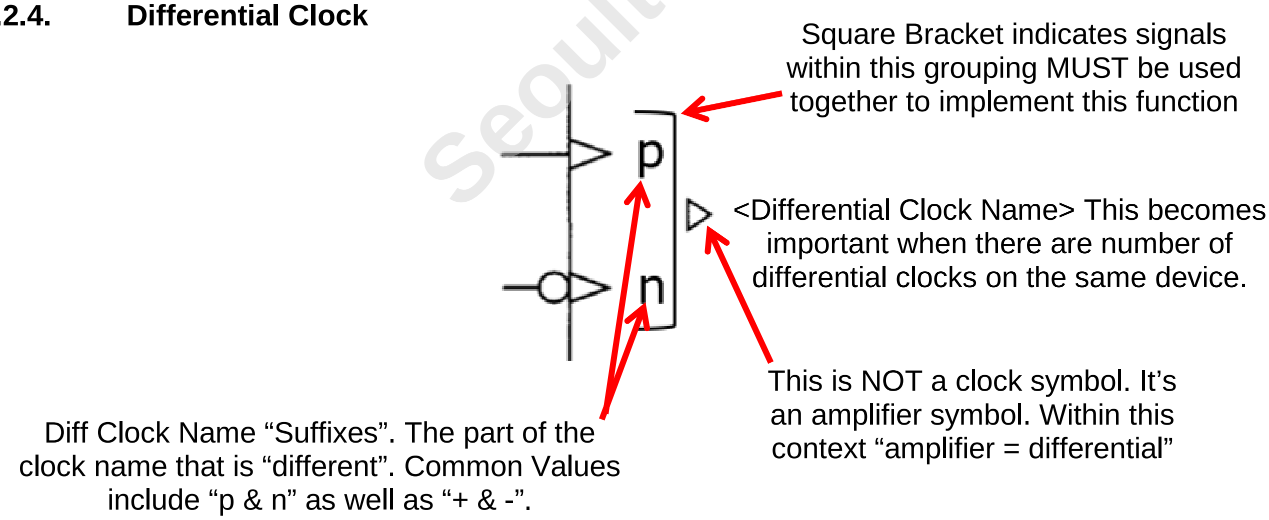




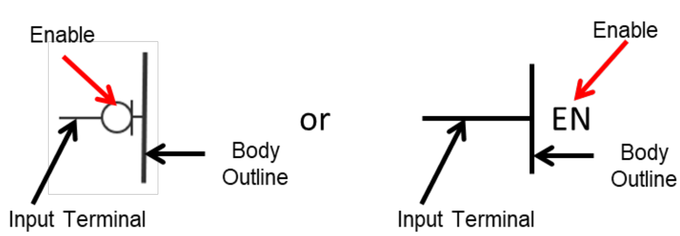
When combining Clocks with polarity indicators, the symbols look like the image below.



A.2.4. Differential Clock

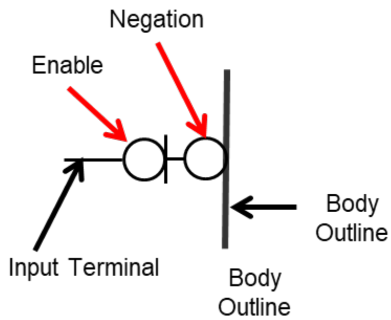


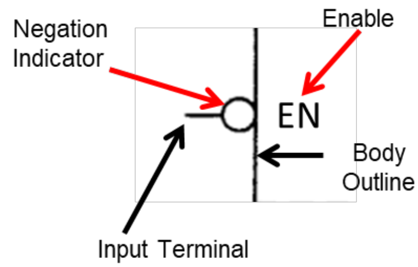
A.2.5. Enable



A.2.5 Enable (cont'd)

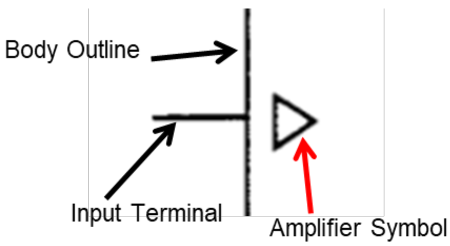
When combining Enable with a Negation indicators, the symbols look like the image below.

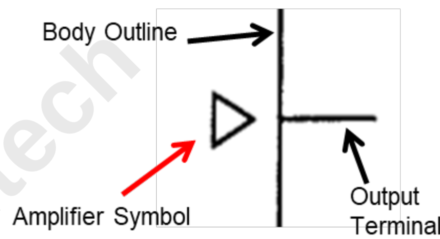




A.2.6. Amplifier

The amplifier should be represented on the input and the output terminal as shown below



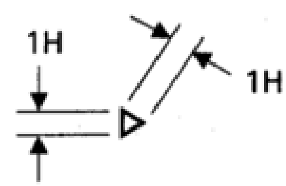


The Amplifier symbol applies only to inputs and outputs. It does not apply to Bi-directional signals. It may be used in combination with other terminal function symbols.

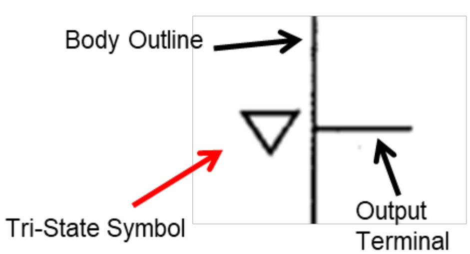
Output Combination Restrictions: If this symbol is used with Open Circuit Output, Open Circuit Output H-Type, Open Circuit Output L-Type, Passive-pulldown, Passive-pullup or Tri-State symbols, those symbols are placed between the amplification symbol and the edge of the Body outline.

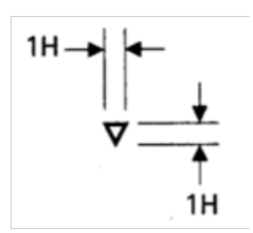
Input Combination Notes: For use with the hysteresis symbol, the line-grouping symbol, or dependency notation

The recommended graphic sizing for the Amplifier symbol is shown here.



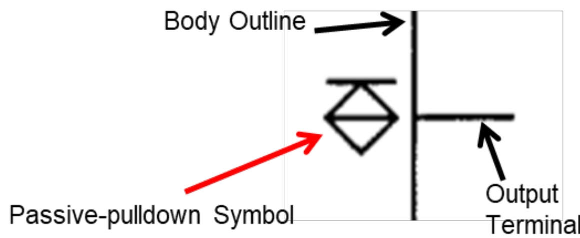
A.2.7. Tri-State Output





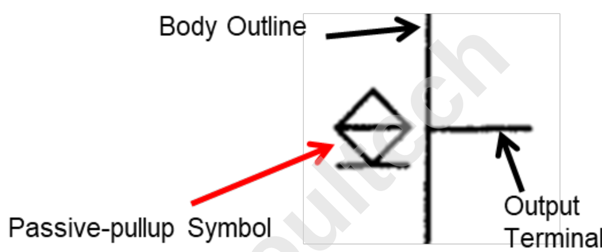
A.2.8. Passive Pulldown

Supports simple wired logic without the need for an external component (Resistor). The passive pulldown should be represented on the output terminal as shown below.



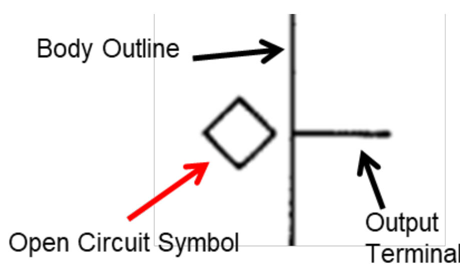
A.2.9. Passive Pullup

Supports simple wired logic without the need for an external component (Resistor). The passive pullup should be represented on the output terminal as shown below.



A.2.10. Open Circuit Output

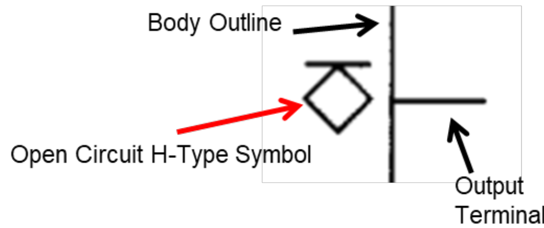
Examples of open circuit output include open-emitter, open-collector, open-source, or open-drain output. Open Circuit Output should be represented on the output terminal as shown below.



A.2.11. Open Circuit Output (H-Type)

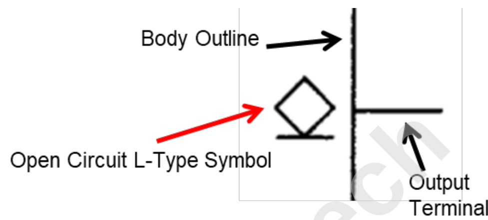
Examples of open circuit output High type include PNP Open-collector, NPN open-emitter, P-Channel open-drain, or N-Channel open Source. Open Circuit Output H-Type should be represented on the output terminal as shown below.

A.2.11 Open Circuit Output (H-Type) (cont'd)

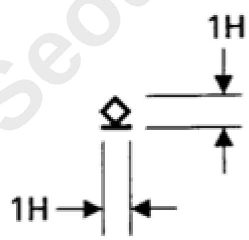


A.2.12. Open Circuit Output (L-Type)

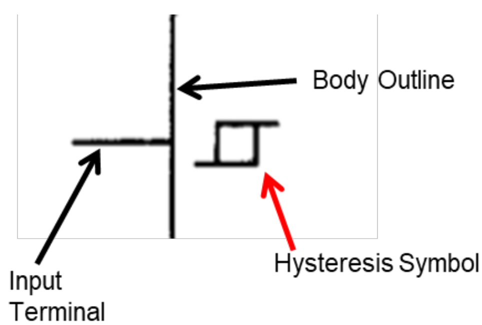
Examples of open circuit output Low type include NPN Open-collector, PNP open-emitter, N-Channel Open-drain, or P-channel open-source. Open Circuit Output L-Type should be represented on the output terminal as shown below.

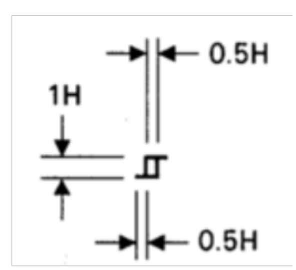


The recommended graphic sizing for an Open Circuit (L Type) symbol is shown below.



A.2.13. Schmitt Trigger

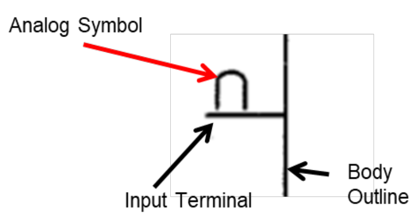


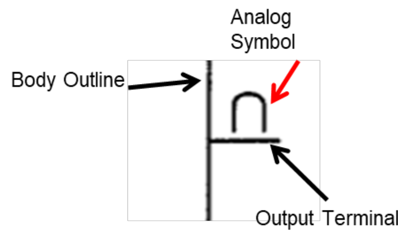


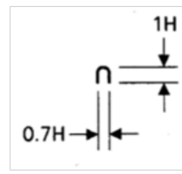
The Hysteresis symbol may be used in combinations with other terminal function symbols. When used with a dynamic input symbol (clock symbol), the hysteresis symbol shall be shown following the dynamic input symbol even though its effect occurs first. For use with the special amplification symbol, the line-grouping symbol, or dependency notation

A.2.14. Analog Terminal

The Analog terminal symbol should be used on the input and output terminals only when it is necessary to distinguish analog signals on parts that contain both analog and digital signals.

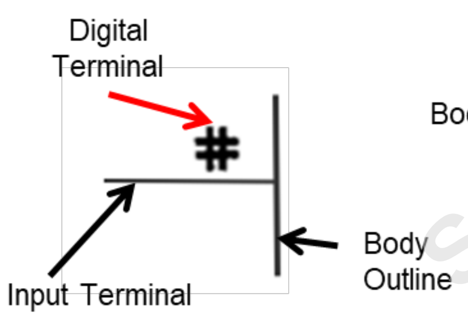


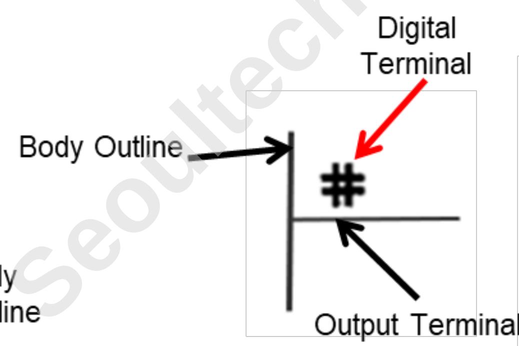


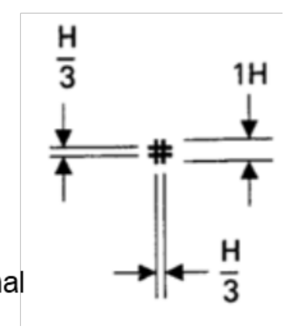


A.2.15. Digital Terminal

Signals are assumed to be digital so in most situations, the use of the digital terminal symbol is not used. When the display of the symbol would be simplified or clarified the digital terminal symbol may be used. The Digital terminal symbol should be represented on the input, output, or Bi-directional signals as shown below.

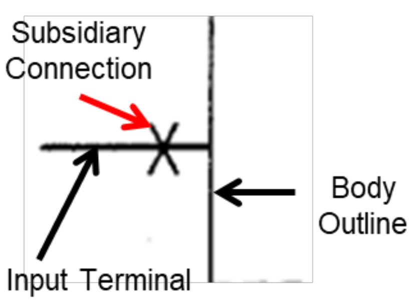


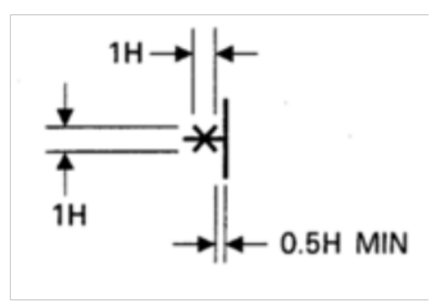




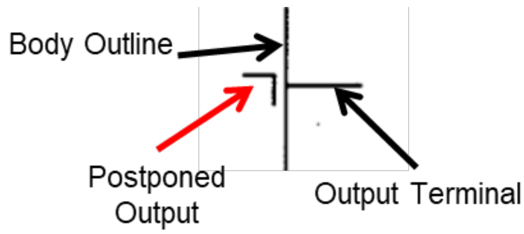
A.2.18. Subsidiary Connection

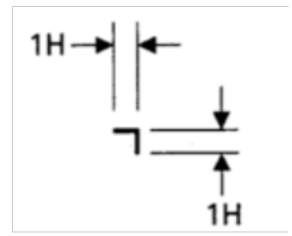
Subsidiary connection symbol may be used to designate an input supplying power to the device or a connection, the knowledge of whose level is not important to understand the function of the element and the circuit (such as a connection to an external supplementary resistor or capacitor).





A.2.19. Postponed Output

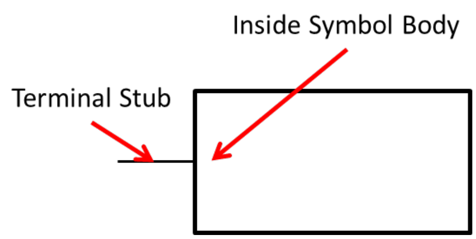




A.3. Recommended Rules

This section defines the recommended rules for symbol ordering, terminal grouping and their graphical sizing. There are Two Types of terminal symbols

a. Symbols on the pin stub
b. Symbols within the symbol body

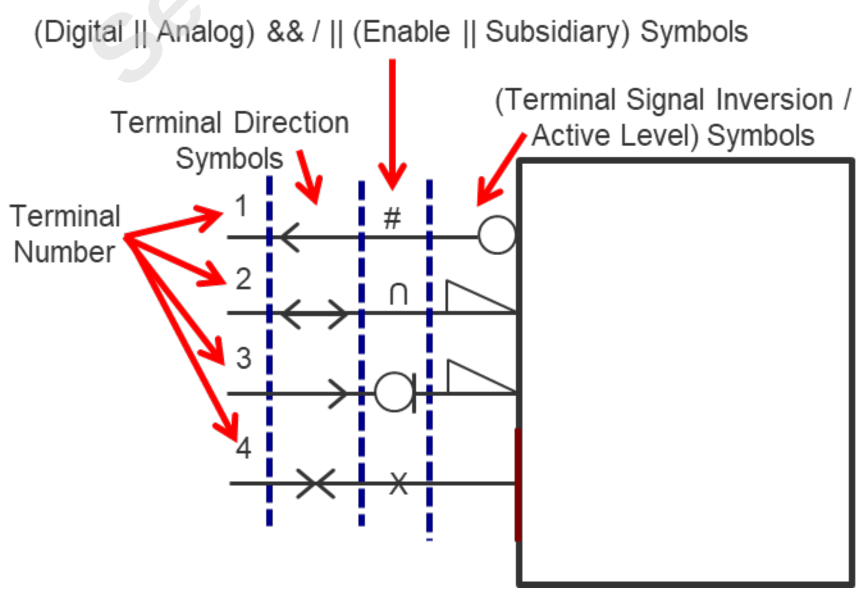


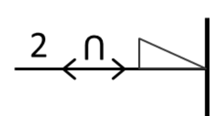
Both Types of terminal symbols may be present in combinations. The Terminal Stub: Composed of four “sections”

a. Terminal Number
b. Terminal Signal Direction
c. Analog or Digital and/or Enable or Subsidiary marker
d. Inversion or Level activation market

It is good practice that all Terminals on any one side of the symbol must have the same length. The minimum stub length is determined by the terminal requiring the most terminal symbol “decorations”.

The minimum stub length may be reduced by stacking symbols as in the case shown above of an analog symbol on a bidirectional symbol.





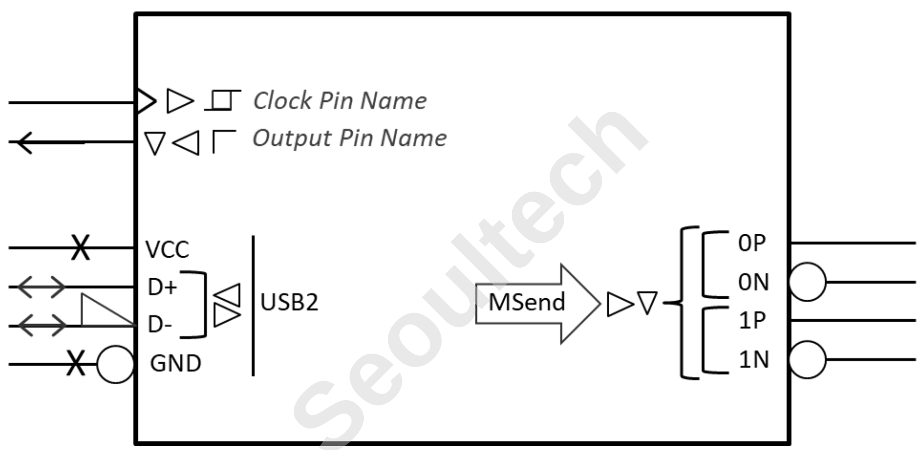
A simple symbol pattern consisting of terminal functional graphics internal to the symbol body plus located on the terminal stub is shown below.

A.3 Recommended Rules (cont’d)

Inside the Symbol Body

a. Terminal Specific Functional Symbol may be comprised of up to 3 symbols
b. Terminal Name (or Terminal Name Suffix / Bit)
c. Grouping Symbol
d. Group Functional Symbol may be composed of up to 2 symbols
e. Group Name (Terminal Base Name), may be wrapped with “Group Direction Symbol”
f. Groups symbols may be “nested” or stacked.

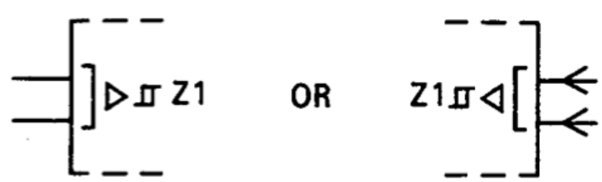
Where Possible move the function symbols to the highest common level {furthest from Terminal}. This will minimize symbol duplication.



A.3.1. Symbol Ordering Rule

If more than one symbol is required for one terminal the symbol order is defined by the Drafting Standard

a. Terminal Grouping
b. Amplification
c. Hysteresis



A.3.2. Terminal Grouping

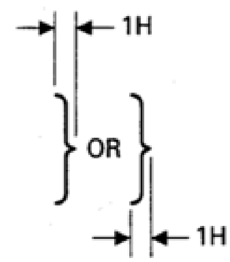
Three Forms of Terminal Grouping are defined by the ANSI IEEE spec:

a. Bit Grouping
b. Function Grouping, and
c. Common Name Grouping.

A.3.2.1 Bit Grouping

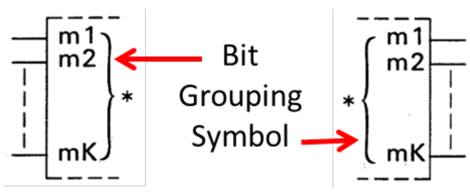
Bit-Grouping is denoted using Curly Braces "}" & "{"

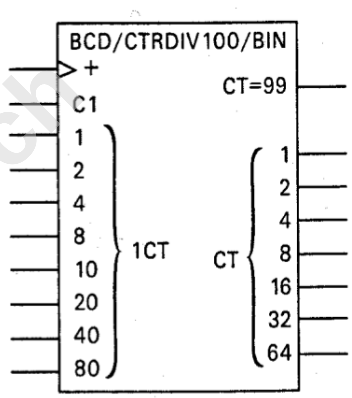
a. Inputs & Outputs {No Bidirectional Terminals}
b. Does NOT support mixing inputs & outputs in the same group
c. "Outputs grouped by this symbol represent a value that is the sum of the individual weights of the outputs standing at their internal 1-states. The individual outputs shall be shown in ascending or descending order by weight"



The recommended graphic sizing for Bit Grouping is shown below. The precise shape of the curly braces is unimportant.

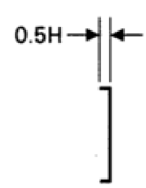
A few examples of Bit Grouping are shown below:





A.3.2.2 Function Grouping

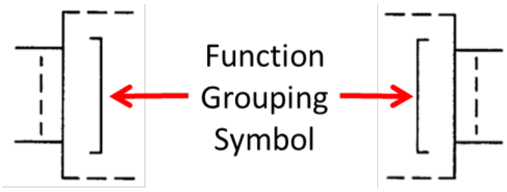
Function Grouping is denoted by using Square Bracket "]" & "["

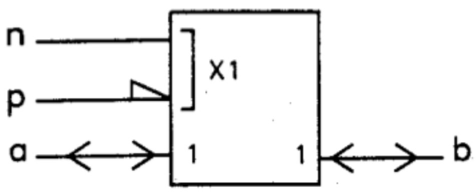


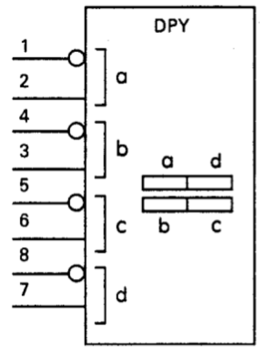
a. Inputs & Outputs {No Bidirectional Terminals}
b. Does NOT support mixing inputs & outputs in the same group
c. "This symbol indicates that two or more terminals are needed to implement a single logic input."

A few examples of Function Grouping are shown below:

A.3.2.2 Function Grouping (cont'd)





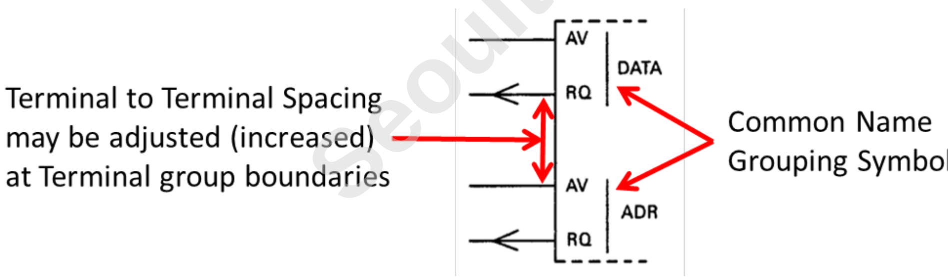


A.3.2.3 Common Name Grouping

a. Inputs, Outputs & Bidirectional Terminals.

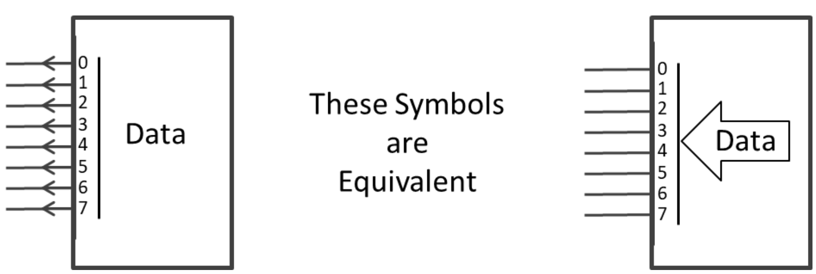
b. Supports Mixing inputs, outputs & Bidirectional terminals in the same group.

A few examples of Common Name Grouping are shown below:

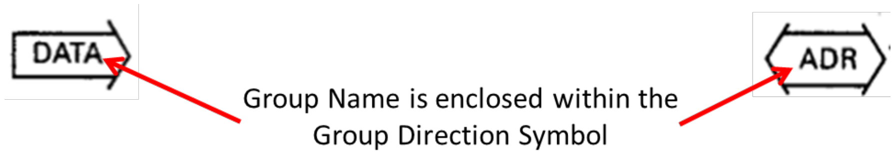


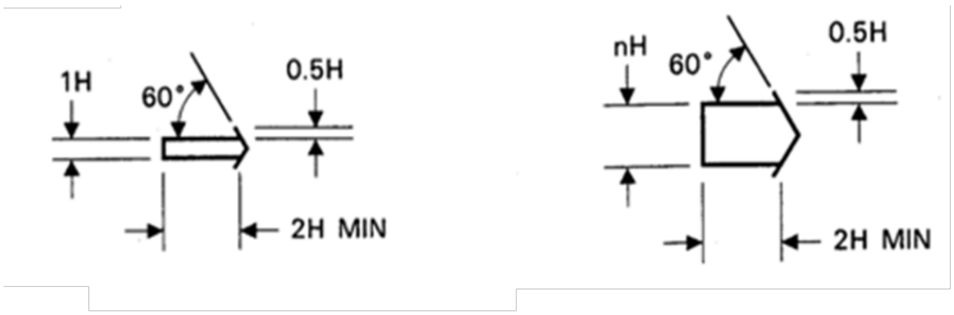
A.3.3. Group Direction Symbols

Group Direction Graphics may be used with label names to indicate signal direction. If group direction graphics are used direction symbols on individual terminals are not required.



A.3.3 Group Direction Symbols (cont'd)





Bus directional arrow without the Group Name

Bus with Group Name within the directional Arrow

Annex B (informative) Differences between JEP30-E100 and its predecessors

This table briefly describes most of the changes made to entries that appear in this standard, JEP30-E100, compared to its predecessor; Punctuation changes may or may not be included.

Initial Issue: N/A	Date: APRIL 2018	JC11 Item Number: 11.2-938

Change Record History

Issue: A	Date: March 2023	Item Number: 839S
Description of changes		
Section 2 Applicable Documents: Added in references to additional standards that are applicable to this Standard		
Section 4.3 Linking the Manufacturing Part Number to a specific Electrical Data set: Revised this section.		
Section 4.4.x Electrical Section: Restructured this section to facilitate adding Digital Signitatures.		
Section 4.5.1 Part Classification Array: Added in new sub-classifications for *CableAndWiring*. Added in section for *CompanionPart*. Classification types are added or updated to add a *Property-Array* structure for every classification and sub-classification branch. Classification hierarchy is limited to 3 levels under each section, with additional levels transferred to properties.		
Section 4.5.1.1.x Cable and Wiring Classification Type: Added in a classification structure with Properties for *CableAndWiring*		
Section 4.5.1.2.x Connector Classification Type: Added in a classification structure with Properties for *Connector.*		
Section 4.5.1.3.1.x Amplifier Classification: Added in 2 new sub-classifications "*Audio*" and "*Video*".		
Section 4.5.1.3.3.x Battery Classification: Moved Material sub-classification into *Material* property.		
Section 4.5.1.3.4.x Capacitior Classification: Added *Silicon* as a new Sub-classification to Fixed Capacitor. Added *Class*, *Dielectric*, *Electrolyte* and *Material* properties throughout the Capacitior Classification structure.		
Section 4.5.1.3.5 Circuit Protection Classification: Revised this section using *OverCurrent*, *OverVoltage* and *OverTemperature* Protection classifications.		
Section 4.5.1.3.7 Diode Classification: Added *LED*, *PIN*, *SiliconCarbide*, and *ESD* as new sub-classifications		
Section 4.5.1.3.8 Filter Classification: Added *Ceramic* and *SAW* as new sub-classifications and moved Transfer Function to a Property		

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Section 4.5.1.3.10 IC Classification: Added *DataAcquisition*, *DigitalSignalProcessing*, *Interface*, *Power Management* and *Timing* as new sub-classifications
Section 4.5.1.3.11.x Inductor Classification: Revised this section.
Section 4.5.1.3.12.2 NonVolatile Memory Classification: Added *EPROM*, *MASKROM* and *PROM* as new sub-classifications.
Section 4.5.1.3.13.x Optoelectronics Classification: Revised this section.
Section 4.5.1.3.14.x Regulator Classification: Revised this section.
Section 4.5.1.3.15.x Relay Classification: Changed *Coil* to *ElectroMechanical*. Moved Contact Form classifications to property. Added Functional classification property.
Section 4.5.1.3.16.x Resistor Classification: Reduced number of classification levels and moved Material and Temperature coefficient to Properties.
Section 4.5.1.3.19 Switch Classification: Moved Contact Form to Property. Transferred extended Package Outline from JEP30-P101 to sub-classifications in this section.
Section 4.5.1.3.20.x Thyristor Classification: Added "*DIAC*", "*SCR*", "*SIDAC*" and "*TRIAC*" as new sub-classifications. Moved Direction and Conductance classifications to Properties
Section 4.5.1.3.21.x Transformer Classification: Changed sub-classification *Power* to *Pulse-or-Power*
Section 4.5.1.3.22.x Transistor Classification: Reduced number of classification levels and moved Material and Transistor types to Properties.
Section 4.5.1.4.x Hardware Classification Type: Added in a classification structure with Properties for *Hardware.*
Section 4.5.1.5.x Optics Classification Type: Added in a classification structure with Properties for *Optics.*
Section 4.7.2.3.2 Terminal Swap Array: Added in *TerminalName* into *TerminalSwap* group
Section 4.7.2.3.3 Function Swap Array: Added in *TerminalNameOrderedList* into *FunctionSwap* group
Section 4.7.3.9.x Interface Function: Grouped liked Interfaces into a hierarchy – *DDR3, DDR4, DDR5, DDR6, HBM, HDMI, MultiMediaCard, MII, PCIe, CablingPCIe, C-PHY, D-PHY, Universal Flash Storage* and USB. Added in several new Interfaces into this section - DDR4-X72, LPDDR4 - Single Channel, LPDDR4 - Dual Channel, DDR4DB02, DDR5-x4, DDR5-x8, DDR5-x16, LPDDR5, GDDR5, GDDR5X, GDDR6, FC-PI-6, HBM1, HBM2, HBM2E, HBM3, eMMC, MMC Mode, SPI Mode, OIF-CEI-04.0, A-PHY, M-PHY, UniPro, UFS, and UFSHCI
Section 4.5.4.1.1 Units. Added additional Units-of-Measure to Units and updated Table 3 with their enumerated values
Section 4.5.4.3.x Parameter Graph: Enhanced the Graph section to enabling formatting of the graph data.

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Section 4.5.6 ESD: Changed reference to the "ANSI/ESDA/JEDEC JS-001-2014" to "JS-001-2017" and updated the enumerated list for the HBM-Classification Type to align with JS-001-2017. Changed reference to the "ANSI/ESDA/JEDEC JS-002-2014" to "JS-002-2018".
Revised Table of Contents

Issue: B	Date: August 2023	Item Number: 400.07
Description of changes		
Section 4.5.1.3.14.4. Linear Voltage Regulator Property-Array: Changed Max occurrence under Protection from 4 to 3.		
Section 4.5.3.1 Super Interface – Array: Added new section for Super Interfaces.		
Section 4.5.3.10.3: Added new Interface for the Compute Express Link		
Section 4.5.3.10.13: Added new Interface for the Embedded Display Port Interface		
Section 4.6.1 Symbol – Array: Added optional digital signature capability to Symbols		
Section 4.6.1.1.3.3.5 Terminal – Array: Make element "Terminal/TerminalGroupGraphicsID" unbounded.		
Section 4.6.2 Required Circuitry – Array: Removed Simulation Model and added Required Circuitry Signature.		
Section 4.7.1 Electrical Map – Array: Added Operational Mode		
Section 4.7.2. Package Terminal Map: Added in Recommended Netlist Name and Companion Terminal to Terminal Map Type.		

Issue: C	Date: November 2023	Item Number: 400.08
Description of changes		
Section 2.18, Added new reference to Accellera.org		
Section 4.3, Update diagrams to include Software Interface Description Association		
Section 4.3.18, Added new section to show the linking of the Manufacturing Part Number to the Software Interface Description		
Section 4.10: Added new section for Software Interface Description Array		

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Issue: D	Date: February 2024	Item Number: 400.09
Description of changes		
Section 4.7, Update diagrams to include Die Terminal Map		
Section 4.7.3, Add new section for Die Terminal Map		

Issue: E	Date: August 2024	Item Number: 400.10
Description of changes		
Section 2 Applicable Documents: Added new reference for MathML		
Section 4.1, and section 4.2: Update sections to align with modifications performed at the JEP30 parent structure.		
Section 4.5.1 Part Classification – Array: Update entire section to include OverflowCategories group to enhance the existing Other element with Parts and Accessories.		
Section 4.5.1.2.5.1 CardEdge-to-Cable Interface Connector Classification and section 4.5.1.2.5.2 CardEdge-to-Cable Interface Connector Classification: Added missing enumerated list for CableStyle.		
Section 4.5.1.3.4 Capacitor Classification: Remove the Fixed Level and moved all sub-categories up one level.		
Section 4.5.1.3.4.1 Ceramic Capacitor Classification and Property-Array: Added MultiLayer element.		
Section 4.5.1.3.4.2 Electroyltic, 4.5.1.3.4.3 Film, 4.5.1.3.4.4 Silicon Capacitor Classifications: Added Array element.		
Section 4.5.1.3.6 Data Converter Classification: Changed "Current-to-Voltage" to "Current-Voltage", and "Frequency-to-Voltage" to "Frequency-Voltage". Added "Digital Potentiometer" and "Mechanical-Signal"		
Section 4.5.2.3.7 Terminal-to-Terminal Signal Path – Array: Updated image to fix spelling error.		
Section 4.5.3.1 Super-Interface – Array: Updated image		
Section 4.5.4.1 Test Condition: Added Footnote and updated Value and Rule structure		
Section 4.5.4.1.1 Units: Added several new UOMs and updated Table 3 with enumerated lists		
Section 4.5.4.1.1.1 ComplexUOM: Added comments to further explain ComplexUOM		
Section 4.5.4.2.1 Parameter: Added Footnote and updated Value and Rule structure		
Section 4.5.4.2.1.1 Values: Changed type from Values Set Type to ParametersValuesType.		

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Section 4.5.4.2.1.2: Added new section for Context
Section 4.5.4.3 Parameter Graph: Added Footnote and updated Graph Formula structure
Section 4.5.4.3.1.1. Linking the Data-Array to the Appropriate Parameter Definition: Updated image
Section 4.6.1.1.1 Part Symbol Version: Correct type for “Reason-for-Change”.
Section 4.7.2 Package Terminal Map: Updated image with correction for Recommended netlist Name

Issue: F	Date: December 2024	Item Number: 400.11
Description of changes		
Section 4.5.1 Part Classification: Update image for Overflow Categories Group to reflect that Property-Array is optional		
Section 4.5.1.2 Connector Classification: Merge Board-to-Board and Cable-to-Board to Board. Rename Cable-to-Cable to Cable. Merge CardEdge-to-Board and CardEdge-to-Cable to CardEdge. Then re-order based on priority of assignment.		
Section 4.5.1.2.1 CardEdge Classification: Consolidate level 3 sub classifications that was in CardEdge-to-Board and CardEdge-to-Cable prior classifications into this new CardEdge classification.		
Section 4.5.1.2.3 Socket Classification: Replace specific socket types with two generic types of PCB-Mountable and Non-PCB-Mountable classifications.		
Section 4.5.1.2.4 Board Classification: Consolidate level 3 sub classifications that was in Board-to-Board and Cable-to-Board to Board into this new Board classification.		
Section 4.5.1.2.5 Cable Classification: Rename Cable-to-Cable to Cable throughout this section.		

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Issue: G	Date: February 2025	Item Number: 400.12
Description of changes		
Section 4.5.1.3 Electrical Classification: Changed Drivers to ElectromechanicalDrivers		
Section 4.5.1.3.10 IC Classification: Revised the IC sub-classifications.		
Section 4.5.1.3.18 Sensor Classification: Added Position and Proximity Sensor classifications.		
Section 4.5.2.1.3 Signal Direction: Update image to make Bidirectional choice optional.		
Section 4.5.4.1 Test Condition: Update structure to add Groups enforcing consistency across other schemas. Changed Value to Nonimal. Also added Footnote ID's and Test Method.		
Section 4.5.4.1.1 Units: Added several units and updated Complex UOM … UOM type		
Section 4.5.4.2.1 Parameter: Update structure to add Groups enforcing consistency across other schemas. Also added Footnote ID's.		
Section 4.5.4.2.1.1 Values: Update structure to add Groups enforcing consistency across other schemas. Also added Footnote ID's.		
Section 4.5.4.2.1.2 Rule Context: Changed "Context" to "Rule Context"		
Section 4.5.4.3.1.1 Linking the Data-Array to the Appropriate Parameter Definition: Updated image due to insertion of groups.		
Section 4.5.4.3.2. Data-Array: Changed "TestCondition" to "PlotTestCondition" to distinguish the different types of Test conditions, and make unbounded. Updated image and added Footnote ID to Paramater Value and PlotTestCondition.		
Section 4.5.4.3.3 Graph Formula: Moved structure to a group and place under an element called GraphFormula.		
Section 4.5.5 Truth Table: Correct list of types in document.		

Issue: H	Date: May 2025	Item Number: 400.13
Description of changes		
Section 4.5.4.1.1 Units: Added additional units of measure to diagram and table		
Section 4.5.4.3.1 Formatting: Updates the X and Y axis Range from xs:int to xs:decimal.		

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Issue: I	Date: September 2025	Item Number: 400.14
Description of changes		
Section 2.1 Applicable Documents/JEDEC: Added new document for HBM4		
Section 4.1 PartModel - SupplyChain Section: Updated images to match changes in the JEP30 parent schema		
Section 4.2 Manufacturer Part Number-Array: Updated images to match changes in the JEP30 parent schema		
Section 4.3 Standards Identifier Array: Added new section to connect Standards Identifiers to the Electrical content.		
Section 4.4 Process Technology Identifier Array: Added new section to connect Process Technology Identifiers to the Electrical content.		
All Sub-sections of 4.5 Linking the Manufacturing Part Number to to a specific Electrical Data set: Added SuperInterfaceID to association diagram. Added TerminalDetails-Array and Functiongroup-Array at the Electrical Parameters Array level.		
Section 4.7.1 Part Classification Array: Added throughout all classifications ParameterID and ParameterSetID and made Property key value pair type optional under a Searchable Properties Group.		
Section 4.7.2.1.6.3 Programmable: Updated Programmable Output Circuit with image pointing to new units.		
Section 4.7.3.10.17 HBM Interface Function: Added HBM4. Added reference to" Standard Terminal Base Name" throughout schema in multiple sections alongside each instance of "Standard Terminal Name".		
Sections 4.7.4.x Electrical Specifications sub-sections: Add StandardsAuthorityBodyID with PropertyID to the ParameterIdentityGroup. Also changed Symbol to LaTeX-Symbol and added MathML-Symbol. Moved Units out from under Values and made it available to both Values and Rules. Change choice of Values or Rules to a Sequence and made Values optional, to enable a combination of Rules and Values to be defined for Min, Max and Nominal. Also added annotation for ValueText. Moved FootnoteID up one level. Moved ParameterRuleType to dictionary. Added choice for Ascii Units and Units. Added note of discontinuance in future release for Ascii Units. Added new sub section for Units including table of enumerated values, that comply with IEC definition.		
Section 4.7.3.14.2 Potentiometer Function: Correct image due to typo and added unique constraint.		
Multiple Sections: Update all examples in which Symbol was changed to LaTeX-Symbol and where Units was changed to AsciiUnits with a choice of Units.		
Section 4.7.4.2 Parameter Set: Added Title and Sub-Title to help correlate the data in the PartModel xml file to the tables in the datasheet. Also added Footnote Array.		

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Section 4.7.4.2.1.1 Values: Removed the branches for Standard and Limits because of duplication with the flatten structure of ValueSetgroup. Added annotation for ValueText.
Section 4.7.4.3 Parameter Graph: Added Footnote Array.
Section 4.7.4.3.1 Formatting: Updates the X and Y axis Range from xs:int to xs:decimal.
Section 4.7.4.3.1.1 Linking the Data-Array to the Appropriate Parameter Definition: Updated image to reflect the choice of Units.
Section 4.7.4.3.2 Data-Array: Update PlotTestCondition with the new Parameter identity Group and Units structure.
Section 4.7.6.1 HBM – Human Body Model: Documented the enumerated values of UOM.
Section 4.9 Mapping Array: Added new structure for Terminal Map to replace the Package Terminal Map and the Die Terminal Map which will be removed in 2028.
Section 4.9.1 Electrical Map Array: Update the Electrical Map to add additional reference a ParameterSetID, ParameterID, and ESD-ID.
Section 4.9.2 Terminal Map: Added new structure for Terminal Map. This new structure also enhances a structured Terminal Name Mapping that avoids mapping out every terminal name. The new "Terminal Map" structure will replace the existing "Package Terminal Map" and the "Die Terminal Map" which will be removed in future release.
Sections 4.9.5 Simulation Map: Added SuperInterfaceID to the Simulaion Map.

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Standard Improvement Form **JEDEC Standard No._ JEP30-E100I_**

The purpose of this form is to provide the Technical Committees of JEDEC with input from the industry regarding usage of the subject standard. Individuals or companies are invited to submit comments to JEDEC. All comments will be collected and dispersed to the appropriate committee(s).

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