



GDS Import Wizard V5.6 Manual

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 - iCap (integrated capacitors)

A smart tool to translate GDSII to 3DLayout EDB quickly:

- Extract nets from GDS and import to EDB
- Extract accurate material property from IRCX
- Extract accurate layer thickness and stackup from IRCX
- Automatic generate control xml for AEDT GDSII Importing
- Automatic create Via Group and SnapViaGroups
- Automatic generate components on top and bottom layer for easier port setup
- Automatic generate TSV Insulation coating
- Synchronous import to AEDT when EDB prepared
- Automatic detect and fix of small gaps between layers to avoid mesh Issue (New in V4.0)
- Support sheet layers to simplify thinner metal layer mesh e.g. 0.001um (New in V4.0)
- support to generate temperature dependent material (New in V5.0)
- Add CSV input template to provide more flexible input for other Technology File (New in V5.0)
- Support New TSV Layer feature in 3D Layout 2022R1 (New in V5.0)
- Support ConvertPolygonToCircle Feature to reduce mesh(New in V5.0)
- More flexible setting options and enhanced command line(No-GUI) support(windows and Linux)

/ ANSYS workflow for 2.5D/3D SI Interpower Simulation

Integrated with ANSYS AEDT

Option1:

- ✓ TSMC IRCX
- ✓ GDS File

Option2:

- ✓ Customized Tech file (CSV)
- ✓ GDS File

GDSImportWizard

- ✓ Net name extract
- ✓ Stackup
- ✓ Layer thickness
- ✓ Material properties
- ✓ Via Groups
- ✓ Snap Primitives
- ✓ More...

HFSS 3D Layout

- ✓ S-parameter Extraction
- ✓ Crosstalk
- ✓ SSN
- ✓ Eye opening
- ✓ PDN
- ✓ Thermal-EM Co-simulation

Step 1

Step 2

Step 3

Get the latest GDSImportWizard Tool

Return

<https://github.com/YongshengGuo/GDSImportWizard/releases/latest>

YongshengGuo / GDSImportWizard

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Latest release

55fcee7 Verified Compare

GDSImportWizard Verxx

YongshengGuo released this 1 hour ago

Auto UnitScale

Assets 2

Source code (zip)

Source code (tar.gz)

Getting From here!

Add GDS Import Wizard to AEDT

The screenshot illustrates the process of adding the GDS Import Wizard to the AEDT menu. The main application window shows the 'Tools' menu with 'External Tools...' highlighted (1). The 'Customize User Tools Menu' dialog is open, showing 'GDSImportWizard' in the 'Menu Contents' list (2). The 'Add' button is highlighted (3). The 'Menu Text' is 'GDSImportWizard' and the 'Command' is 'i2XML_V 3\GDSImportWizard.py' (3). The 'Initial Directory' is highlighted (4). The 'Select Program' dialog shows the file 'GDSImportWizard.py' selected (4). The 'File name' field in the 'Select Program' dialog is 'GDSImportWizard.py' (4). The 'GDSImportWizard' option is highlighted in the 'Tools' menu (5).

① External Tools...

② Add

③ Command: i2XML_V 3\GDSImportWizard.py

④ GDSImportWizard.py

⑤ Open GDSImportWizard from here!

GDS Import Wizard V5.0

GDSII Import Wizard V5.0 (build 20220217)

GDS Import Wizard V5.0

FastMode
Import
Wizard model
1) Files input
2) Stackup XML
3) EDB Post
About

Function List

Work Area

ControlXml

Tech File Browse

GDSII Browse

SimplifyDielectric ☒ UseSheetLayer

MergeMethod ☐ UseDefaultDF

ThinDielectricThreshold

DkDeviationThreshold

EDB Generation

AEDT Installed Dir Browse

EBD File Browse

☒ Auto Generate Component ☒ Add TSV Insulator Ring ☐ UseTemperatureDependMaterial

☒ ConvertPolygonToCircle

Import Close

Running in Fast Mode

Fast Mode

Fast mode provides a way of one click to Import all. Compared with Wizard mode, fast mode provides faster setting, but it cannot edit the intermediate files and fewer options.

GDSII Import Wizard V5.0 (build 20220217)

GDS Import Wizard V5.0

FastMode
Import

Wizard model

1) Files input
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DkDeviationThreshold

EDB Generation

AEDT Installed Dir Browse

EBD File Browse

☒ Auto Generate Component ☒ Add TSV Insulator Ring ☐ UseTemperatureDependMaterial

☒ ConvertPolygonToCircle

Import Close

Select FastMode

Fast Mode

GDSII Import Wizard V5.0 (build 20220217)

GDS Import Wizard V5.0

FastMode

Import

Wizard model

1) Files input

2) Stackup XML

3) EDB Post

About

ControlXml

Tech File D:\Study\Script\repository\HFSS\GDSII\GDS2XML\TECH2XML_test\TSMC_INTERPOSER.ircx Browse

GDSII D:\Study\Script\repository\HFSS\GDSII\GDS2XML\TECH2XML_test\test.gds Browse

SimplifyDielectric Weighted Average UseSheetLayer ☒

MergeMethod MergeThinLayer UseDefaultDF ☐ 0.02

ThinDielectricThreshold 0.1

DkDeviationThreshold 0.05

EDB Generation

AEDT Installed Dir C:\Program Files\AnsysEM\v221\Win64\ Browse

EBD File D:\Study\Script\repository\HFSS\GDSII\GDS2XML\TECH2XML_test\test.aedb Browse

☒ Auto Generate Component ☒ Add TSV Insulator Ring ☐ UseTemperatureDependMaterial

☒ ConvertPolygonToCircle

Import Close

Set IRCX and GDS files

Control XML Option

AEDT Version and Project path

EDB post-processing

Click Import to import GDS to 3DL at once

Running in Wizard Mode

/ Fast Mode

Wizard Mode provides more detailed setting and control.
Wizard Mode and Fast Mode share the same setting and options.

Select WizardMode

Fast Mode – 1) Files input

GDSII Import Wizard V5.0 (build 20220217)

GDS Import Wizard V5.0

FastMode

Import

Wizard model

- 1) Files input
- 2) Stackup XML
- 3) EDB Post

About

Files Input

TechFile (ircx, csv) D:\Study\Script\repository\HFSS\GDSII\GDS2XML\TECH2XML_test\TSMC_ Browse

LayerMap Browse

GDSII D:\Study\Script\repository\HFSS\GDSII\GDS2XML\TECH2XML_test\test.gc Browse

NetLayerMap metal3:133:0 metal4:126:0 ubmb:125:100 metal1:131:0 mb1:131:100 metal2: AutoSet

Test Extracta Nets

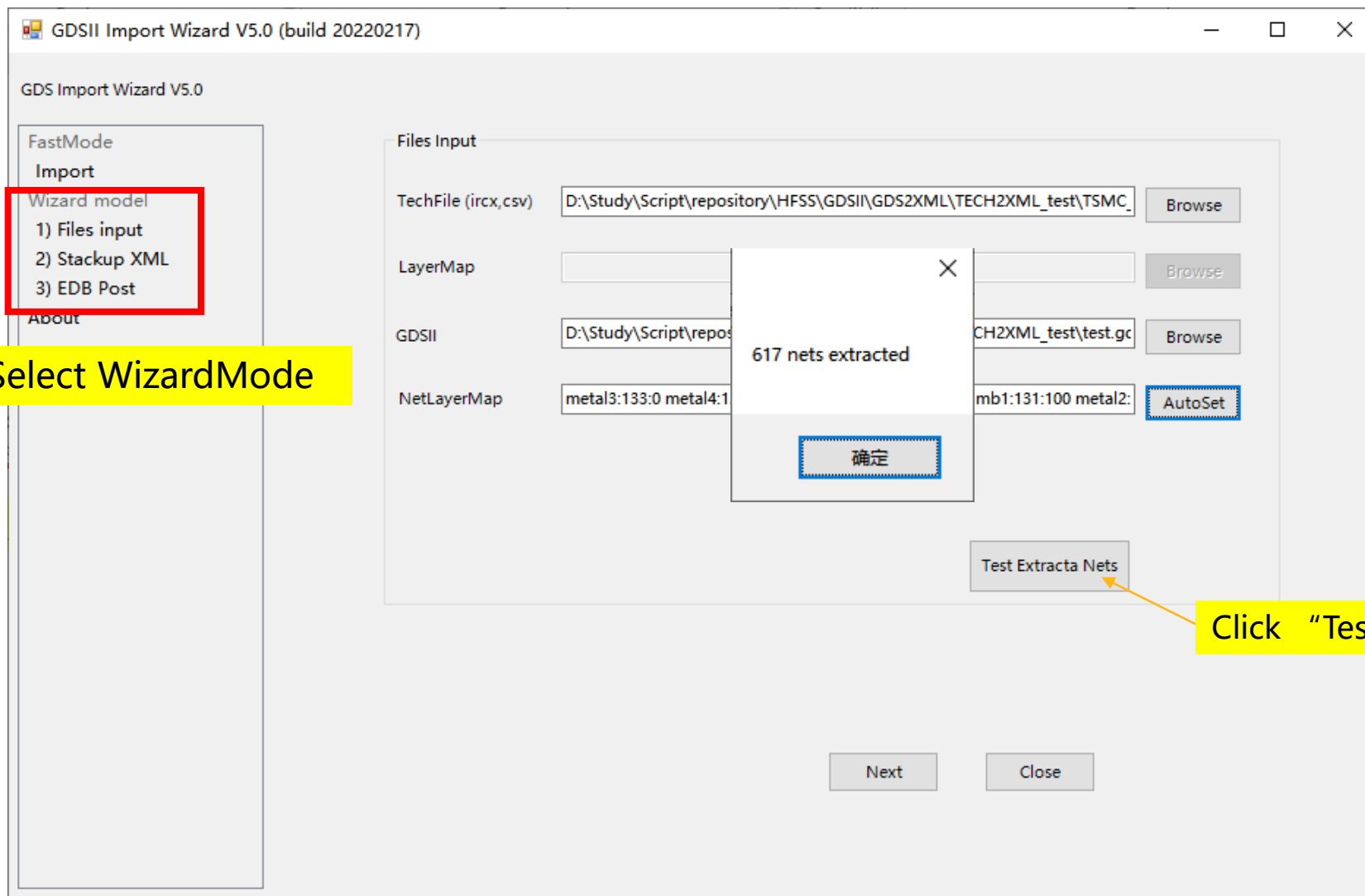
Next Close

Select WizardMode

Set IRCX and GDS files

NetLayerMap: Indicates which layers of GDS are used to extract Nets information. Click "AutoSet" to extract all net layer map in IRCX.

Fast Mode – 1) Files input



Fast Mode – 2) Stackup XML

GDSII Import Wizard V5.0 (build 20220217)

GDS Import Wizard V5.0

FastMode

Import

Wizard model

1) Files input

2) Stackup XML

3) EDB Post

About

Control XML

Stackup XML

SimplifyDielectric

MergeMethod

ThinDielectricThreshold

DkDeviationThreshold

☐ UseDefaultDF

☒ CreateViaGroups

☒ UseSheetLayer

☒ Add TSV Insulator Ring

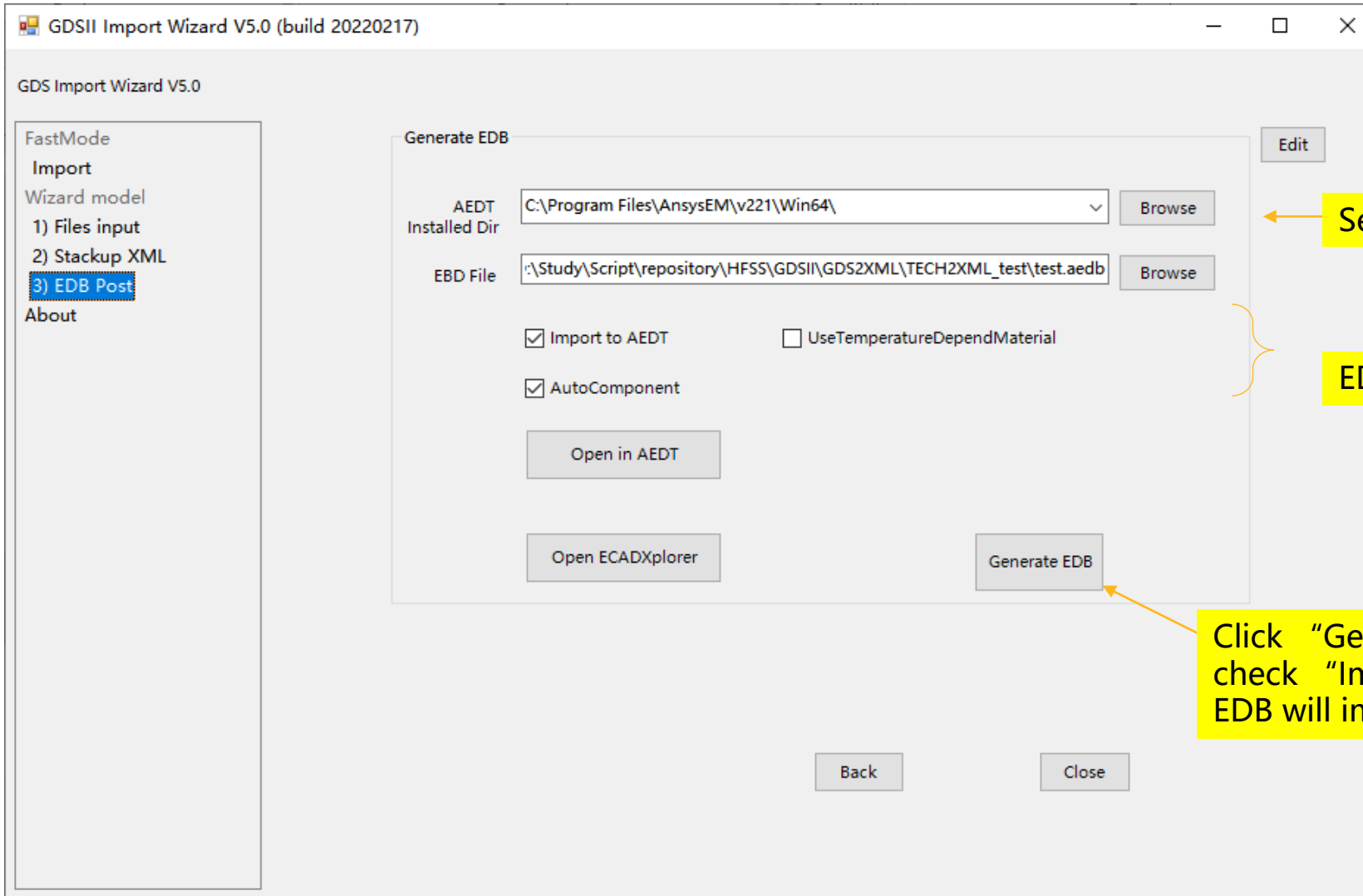
☒ ConvertPolygonToCircle

Set Stackup XML Save path

Control XML Option

Click "Generate Control XML" to generate Control XML

Fast Mode – 3) EDB Post



Set AEDT Path (Version)

EDB post Option

Click "Generate EDB" to generate EDB, if check "Import to AEDT", the generated EDB will import to 3DL.

Running in windows command line

Running in batch mode - Windows

Eg1. Configure from system environment:

- set AedtInstallDir=C:\Program Files\AnsysEM\AnsysEM21.1\Win64
- set GdsFile=D:\HFSS\GDSII\GDS2XML\TECH2XML_test\test.gds
- set TechFile=D:\HFSS\GDSII\GDS2XML\TECH2XML_test\TSMC_INTERPOSER.ircx
- set path=% AedtInstallDir %\common\IronPython;%path%
- ipy64 GDSImportWizard.py -batch

Eg2. Configure from command arguments:

- set AedtInstallDir=C:\Program Files\AnsysEM\AnsysEM21.1\Win64
- set path=% AedtInstallDir %\common\IronPython;%path%
- ipy64 GDSImportWizard.py -GdsFile "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\test.gds" - TechFile "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\TSMC_INTERPOSER.ircx"

Note: system environment and command arguments could be mixed.

Running in batch mode - Windows

- A short command is supported:
 - ipy64 GDSImportWizard.py gdspath
 - ipy64 GDSImportWizard.py gdspath edbpath
- Eg3. short command
 - ipy64 GDSImportWizard.py "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\test.gds" -TechFile "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\TSMC_INTERPOSER.ircx"

Running in Linux terminal command

Running in batch mode - Linux

Eg1. Configure from system environment:

- export AedtInstallDir='/home/ansys/app/AnsysEM20.1/Linux64'
- export GdsFile=/home/ansys/yguo/test/test.gds
- export TechFile=/home/ansys/yguo/test/TSMC_INTERPOSER.ircx
- export ipy64="\$AedtInstallDir /common/mono/Linux64/bin/mono \$AedtInstallDir /common/IronPython/ipy64.exe"
- \$ipy64 GDSImportWizard.py

Eg2. Configure from command arguments:

- export AedtInstallDir='/home/ansys/app/AnsysEM20.1/Linux64'
- export ipy64="\$AedtInstallDir /common/mono/Linux64/bin/mono \$AedtInstallDir /common/IronPython/ipy64.exe"
- \$ipy64 GDSImportWizard.py -GdsFile "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\test.gds" - TechFile "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\TSMC_INTERPOSER.ircx"

Note: system environment and command arguments could be mixed.

Running in batch mode - Linux

- A short command is supported:
 - `ipy64 GDSImportWizard.py gdspath`
 - `ipy64 GDSImportWizard.py gdspath edbpath`
- Eg3. short command
 - `export AedtInstallDir='/home/ansys/app/AnsysEM20.1/Linux64'`
 - `export ipy64="$aedtInstallPath/common/mono/Linux64/bin/mono $aedtInstallPath/common/IronPython/ipy64.exe"`
 - `$ipy64 GDSImportWizard.py "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\test.gds" – TechFile "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\TSMC_INTERPOSER.ircx"`

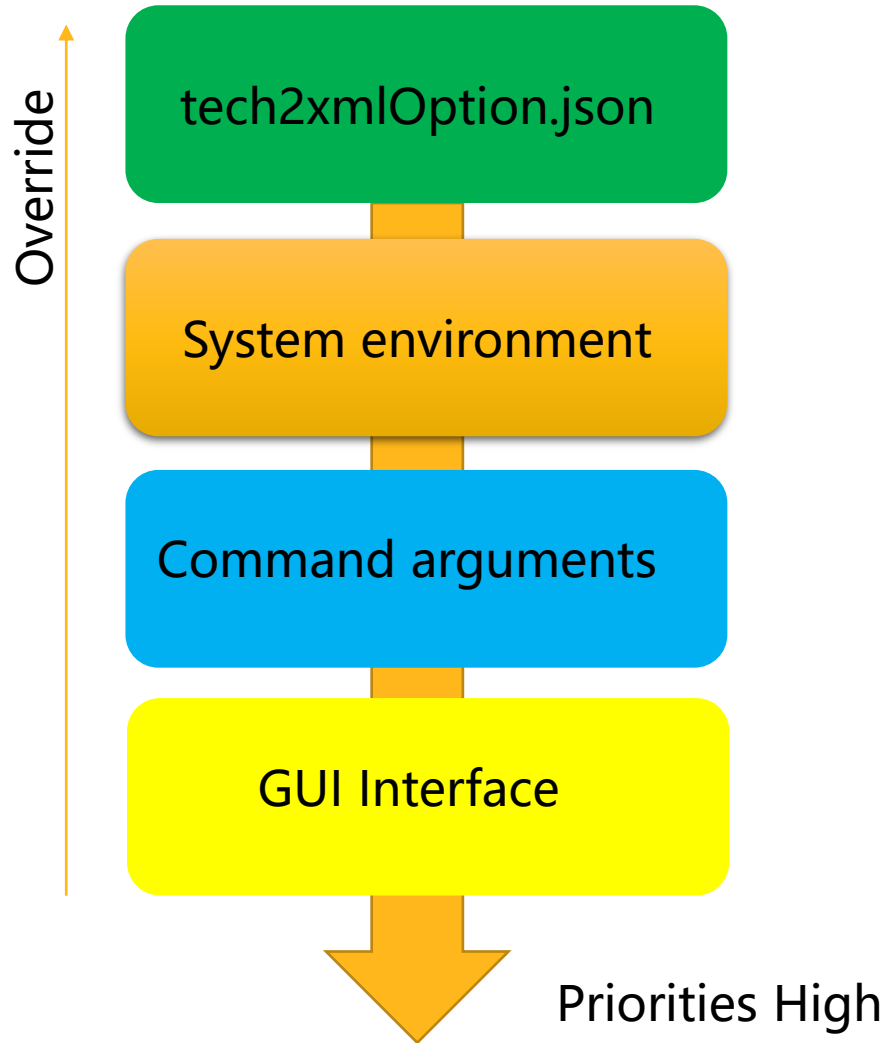
Options Setting

/ Options Parameters in GDS Import Wizard

- There are Four ways to set the options for GDS Import Wizard
 - 1) By configure file: tech2xmlOption.json (in same directory with toolkit)
 - 2) By system environment variables
 - 3) Set the parameters in command arguments.
 - 4) Set in GUI.

These three methods will achieve the same effect, but with different priorities.

Options Priorities



If the same parameter given in multiple places, the higher priority parameter will take precedence.

As one example, if one parameter is given in System environment and tech2xmlOption.json at the same time, System environment value will have high priorities and take precedence.

GUI Interface have the highest priority, Command arguments System environment and tech2xmlOption.json setting will be used as initial values of GUI input elements.

Options

Options	Default Value	Description
Stackup XML Parameters		
InputType	0	0: Ircx, others: not define
UseShortMergeLayerName	True	changing is not recommended
SimplifyDielectricMethod	1,	0: NoSimplify, No Merge on Dielectric, exact layers in IRCX 1 : MergeThinLayer, Merge layer thinner than a specific value 2:BlockMerge, use average DK on all layers except substrate
MergeDielectricMethod	0	0: Weighted Average , 1: Weighted Average , 2: Kraszewski equation, 3: Landau equation, 4: Lichtenecker equation
ThinDielectricThreshold	0.1	0.1: Merge layer when layer thickness<0.1um, default unit um
DkDeviationThreshold	0.05 or 5%	0.05: Merge layers when dk difference less than 10%
FixedSmallLayerGap	0.005	0.005: Fix small air gap between layers less than 0.005um, default unit um
UseDefaultDF	True	True: If not hav df value in technology, a default df value will be used false: If not hav df value in technology, will set df =0
DefaultDF	0.02	set for default df value
NotUseDfonSubstrate	True	True: default df value will never used on Substrate layer(Silicon material), it is recommended to set as True.
UseSheetLayer	True	True: set the layers as 0um when it small then "SheetLayerThreshold", which will avoid to generate large number of tiny meshes
SheetLayerThreshold	0.0015	0.0015: if "UseSheetLayer" is True, layers which < 0.0015um will set to zero thickness(treat as 2D sheet object)
CreatViaGroups	True	True: ViaGroups will be implemented on via layers
CreatViaGroupsOption	Default	Default: "Method:proximity,Tolerance:5um,CheckContainment:true", Option: "Method:range,Persistent:false,Tolerance:1um"
NotUseViaGroupsOnLayers	".*tsv.*,pmb"	Regular expressions are used, don't create ViaGroups if layer name match anyone of list.
IgnoreLayersReg	"air,ctm.*,cbm.*"dtce.*"	layers will not import into 3D Layout. Regular expressions are used, and ignoreLayerNames are separate with comma or space
TextLayermap	None	Text layers indicate for net extraction, None will use all text layer in technology files. User could set it according to the rule: "ubmb:125:100, "ubump:125:0"
ConvertPolygonToCircle	True	True: will convert all polygons on a layer to circles, only support from AEDT 2022R1
ConvertPolygonToCircleRatio	0.9	polygons with Circle Ratio 0.9 will convert to circles, valid when ConvertPolygonToCircle as True

/ Options

Path Parameters		
TechFile	None	input: techFile path (Absolute), must set
LayerMapFile	None	input: layerMapFile path (Absolute), not used
GdsFile	None	input: gdsFile path (Absolute), must set
AedtInstallDir	None	input: AEDT installation path (Absolute), must set to do edb post
ControlXmlPath	None	output: controlXmlPath (Absolute), optional
edbPath	None	output: edbPath (Absolute), optional
Gds post Parameters		
OpenInAedt	True	true: will open EDB when the conversion is completed
AutoComps	True	true: will automatic generation device, easy port creation
CompLayerList	1,-1	index for which layers will generate components, 1 indicate top layer, -1 indicate bottom layer, and so on.
ComponentPinsTolerance	10	Pins spacing less than 10 times pad diameter with each other will be considered as a component
AutoTSVCoat	True	true: will automatic generation tsv insulator
DissolveViaGroup	False	true: dissolve all groups or component before doing edb post processing
UseTemperatureDependMaterial	True	true: will generate temperature dependence material if TC1/TC2 given in material definition

Customized Technology File- CSVTech_overlapping_template

CSV Tech overlapping template

- The CSV format template provide an easy way to define Customized Technology File.
- You could find a demo file in the folder of the toolkit as CSVTech_overlapping_template.csv
- overlapping template is suited for any stackup, the dielectrics and metals are defined separately.
- The follow pages will give the details the overlapping template.

CSVTech_overlapping_template.csv

NO	LayerName	Type	LayerMap	TextLayerMap	Thickness	Height	LowerLayer	UpperLayer	DK	DF	Cond	TC1	TC2	Tref	
1	UF1	D			35	107.64			3.7						
19	IMD1a	D			0.05	100.75			8.1						
20	ILD	D			0.75	100			4						
21	substrate	D			100	0			11.9		10				
22	PASSB1	D			0.8	-0.8			6.7						
23	PASSB2b	D			2	-2.8			6.7						
24	PASSB2a	D			0.4	-3.2			6.7						
25	underFill_C	D			0.001	-3.201			6.7						
26	ubump	C	170;0 74;0	125;0	0.001	142.639					5.80E+07	0.00E+00	0.00E+00	25.00	
27	metal4	C	74;0		1.45	105.19					5.80E+07	3.89E-03	-1.50E-07	25.00	
28	metal3	C	33;40		0.85	103.565					5.80E+07	3.63E-03	-1.39E-06	25.00	
29	metal2	C	32;40		0.85	102.12					5.80E+07	3.63E-03	-1.39E-06	25.00	
30	ctm	C			0.08	101.793					5.80E+07	0.00E+00	0.00E+00	25.00	
31	cbm	C			0.2	101.575					5.80E+07	0.00E+00	0.00E+00	25.00	
32	metal1	C	31;40		0.85	100.675					5.80E+07	3.63E-03	-1.39E-06	25.00	
33	mb1	C	31;100		0.001	-0.801					5.80E+07	0.00E+00	0.00E+00	25.00	
34	ubmb	C	170;100	125;100	0.001	-3.201					5.80E+07	0.00E+00	0.00E+00	25.00	
36	via4	V	86;0				metal4	ubump			5.80E+07				
37	via3	V	85;0				metal3	metal4			5.80E+07				
38	via2	V	52;40				metal2	metal3			5.80E+07	3.63E-03	-1.39E-06		
39	ctm_via	V					ctm	metal2			5.80E+07	0.00E+00	0.00E+00		
40	cbm_via	V					cbm	metal2			5.80E+07	0.00E+00	0.00E+00		
41	via1	V	51;40				metal1	metal2			5.80E+07				
42	tsv	V	251;0 86;0				mb1	metal1			5.80E+07				
43	pmb	V	5;100				ubmb	mb1			5.80E+07				
44	tsv	I			0.15				4						

CSVTech_overlapping_template.csv is in the folder of the toolkit.

/ Column Definition - CSV Tech overlapping template

1. **LayerName** is the names will be used in 3D Layout stackup, should be present.
2. **Type**, C : Conductor/Metal layer, V : Via layer, D : Dielectric layer, I : Insulating layer
 - Via Group and SnapViaGroups will be implemented on all Via layers.
 - Insulating layer is designed to define TSV insulation thickness, it must have a LayerName that have defined in Via Layers, or will be ignore
3. **LayerMap** indicates the layer mapping in GDS file.
 - Conductor/Metal and Via layer must have LayerMap value or will be ignore.
 - Multiple layermap Mapping could set to one layer separated with space, e.g. 86;0 85;0
4. **TextLayerMap** indicates which layer used to extract net list in GDS,
 - the layermap in GDS should have net information.
5. **Thickness** is set for Dielectrics/ Metals/Vias layer thickness, the default unit is um.
6. **Height** indicates position of the layer in stackup
 - All Height define in the lower of the layer, dielectrics Layers or Metal/Vias layers will be reordered by Height value, respectively.
 - If dielectrics Height not give, the height will be obtained by accumulating the thickness of dielectrics layer (invert order)
 - If Metal and Vias Height not give, the height will be obtained by accumulating the thickness of Metal and Vias layer (invert order)
 - The last dielectric layer is the origin, all height (D/C/V) value refer to this value, negative value is accepted.

/ Column Definition - CSV Tech overlapping template

7. **LowerLayer, UpperLayer** defined the start and end layer of via layer

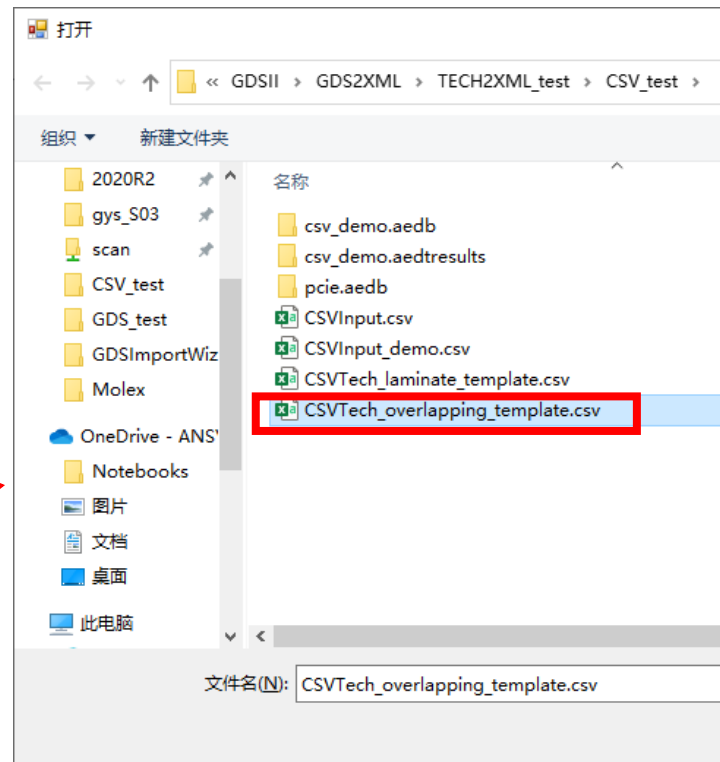
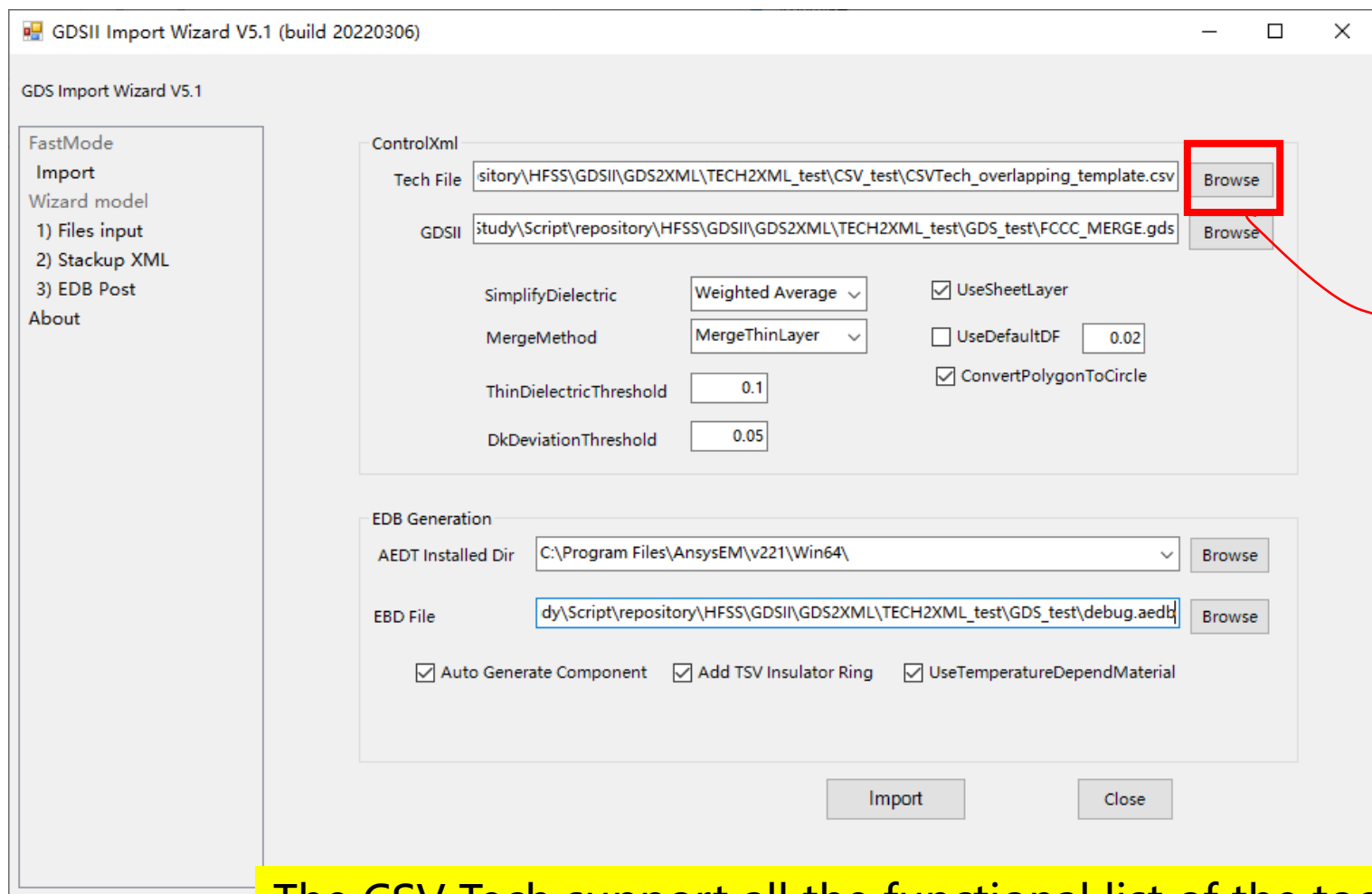
- If LowerLayer, UpperLayer not give, the adjacent layers will set to LowerLayer, UpperLayer
- LowerLayer, UpperLayer determines the thickness of the via layer, which have higher priority the via Thickness property

8. **DK, DF, Cond** is used to set Material properties of the layers

9. **TC1, TC2, Tref** is the temperature coefficient of conductivity, use for corner analysis

- temperature-dependent material (conductivity) will be used if check UseTemperatureDependMaterial option in GUI
- The formular is $\text{Cond} / (1 + (\text{TC1} * (\$Temp - \text{Tref})) + (\text{TC2} * (\$Temp - \text{Tref}) ** 2))$
- Tref is the base temperature, which defines the current conductivity

Use CSV Tech as input



The CSV Tech support all the functional list of the toolkit.

Customized Technology File- CSVTech_laminate_template

CSV Tech laminate template

- The CSV format template provide an easy way to define Customized Technology File.
- You could find a demo file in the folder of the toolkit as CSVTech_laminate_template.csv
- **Laminate template** provides a simplified then input the overlapping template, the dielectrics and metals are defined in laminate mode, more like PCB/Package application.
- Laminated CSV assume all the dielectrics is filled in Metal/Via layers and align with these layers.
- The follow pages will give the details the overlapping template.

/ CSVTech_laminate_template.csv

NO	LayerName	Type	LayerMap	TextLayerMap	Thickness	Height	DK	DF	Cond	TC1	TC2	Tref	
1	TOP_UBM	C	214;0	214;0	44.5		4	0.02	5.80E+07				
2	PI1	V	11;0		3		4	0.02	5.80E+07				
3	RDL1	C	1;0		4		4	0.02	5.80E+07				
4	PI2	V	12;0		3		4	0.02	5.80E+07				
5	RDL2	C	2;0		4		4	0.02	5.80E+07				
6	PI3	V	13;0		3		4	0.02	5.80E+07				
7	RDL3	C	3;0		4		4	0.02	5.80E+07				
8	tsv	V	14;0		3		4	0.02	5.80E+07				
9	RDL4	C	4;0		4		4	0.02	5.80E+07				
10	PI5	V	15;0		3		4	0.02	5.80E+07				
11	BOT_UBM	C	215;0		58		4	0.02	5.80E+07				
12	tsv	I			0.15		4						

Laminated CSV assume all the dielectrics is filled in Metal/Via layers and align with these layers.
CSVTech_laminate_template.csv is in the folder of the toolkit.

/ Column Definition - CSV Tech laminate template

1. **LayerName** is the names will be used in 3D Layout stackup, should be present.
2. **Type**, C : Conductor/Metal layer, V : Via layer, ~~D : Dielectric layer~~, I : Insulating layer
 - **Dielectric layer (type D) should be never present in this laminate template.**
 - The start and end layer is considered as the adjacent layers
 - Via Group and SnapViaGroups will be implemented on all Via layers.
 - Insulating layer is designed to define TSV insulation thickness, it must have a LayerName that have defined in Via Layers, or will be ignore
3. **LayerMap** indicates the layer mapping in GDS file.
 - Conductor/Metal and Via layer must have LayerMap value or will be ignore.
 - Multiple layermap Mapping could set to one layer separated with space, e.g. 86;0 85;0
4. **TextLayerMap** indicates which layer used to extract net list in GDS,
 - the layermap in GDS should have net information.
5. **Thickness** must set for Metals/Vias layer thickness, the default unit is um.
6. **Height** indicates position of the layer in stackup
 - All the height will be obtained by accumulating the thickness of Metal and Vias layer (invert order)
 - Manually set the height value is not suggested.

/ Column Definition - CSV Tech laminate template

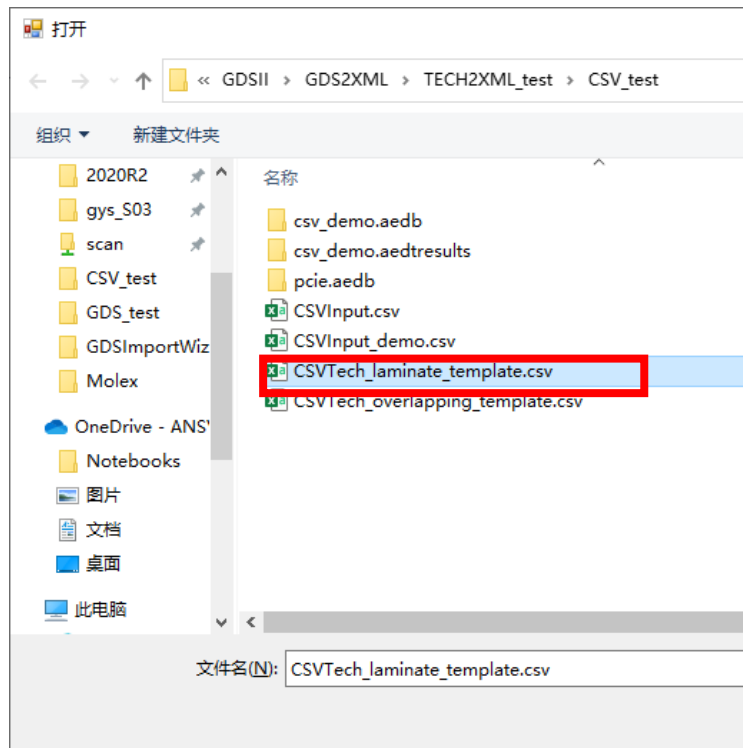
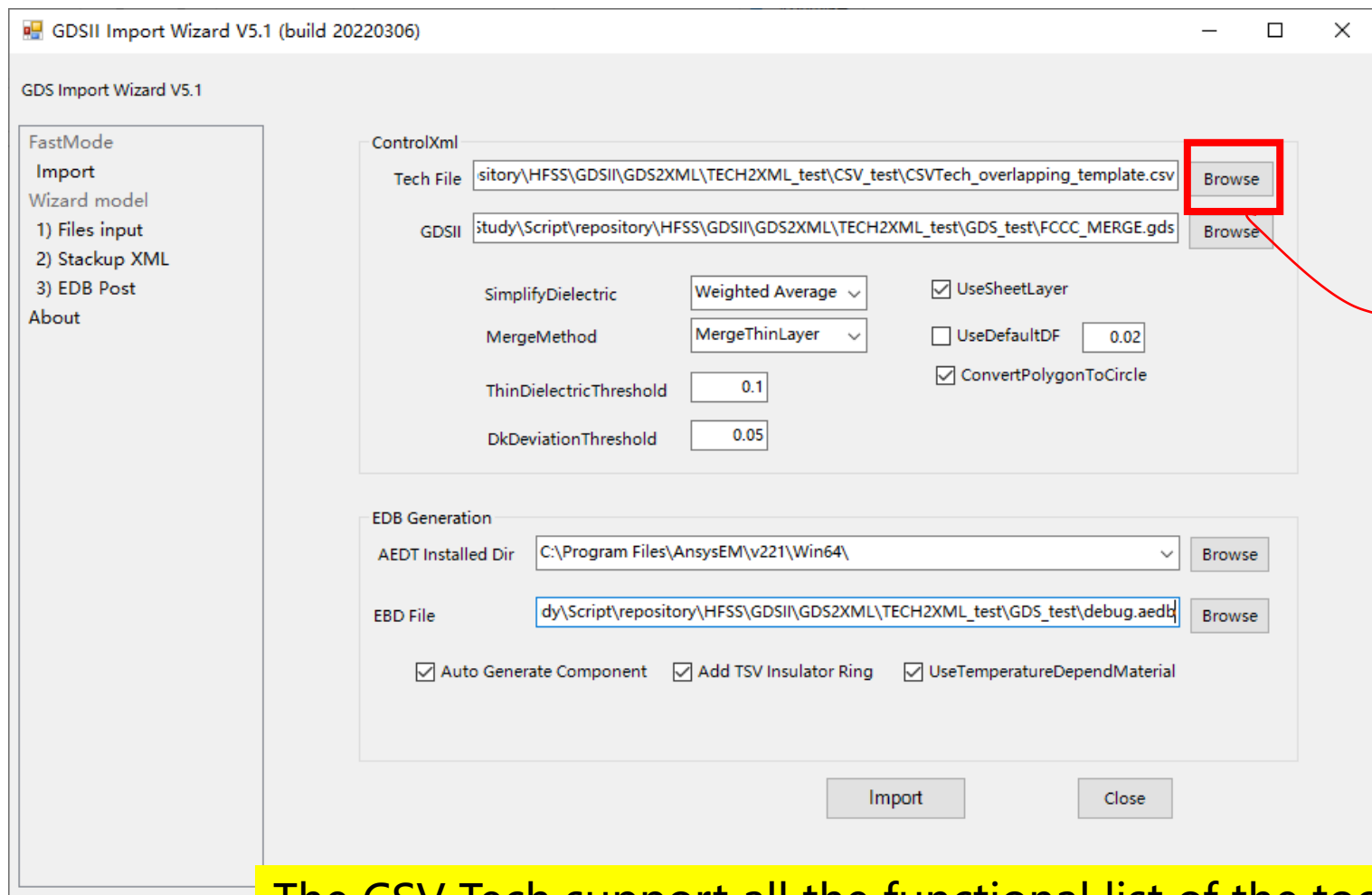
7. **DK, DF, Cond** is used to set Material properties of the layers

- DK, DF is used for the filled material
- Cond is used for the metal/via material

8. **TC1, TC2, Tref** is the temperature coefficient of conductivity, use for corner analysis

- temperature-dependent material (conductivity) will be used if check UseTemperatureDependMaterial option in GUI
- The formular is $\text{Cond} / (1 + (\text{TC1} * (\text{\$Temp} - \text{Tref})) + (\text{TC2} * (\text{\$Temp} - \text{Tref}) ** 2))$
- Tref is the base temperature, which defines the current conductivity

Use CSV Tech as input







The CSV Tech support all the functional list of the toolkit.

Additional remarks

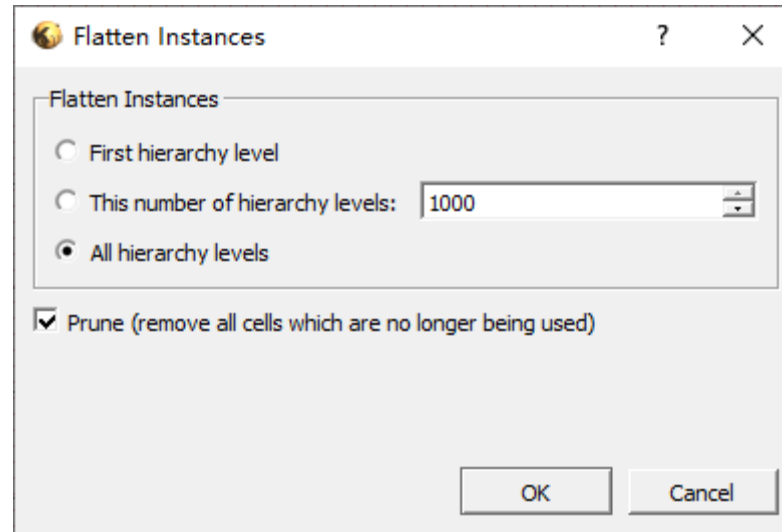
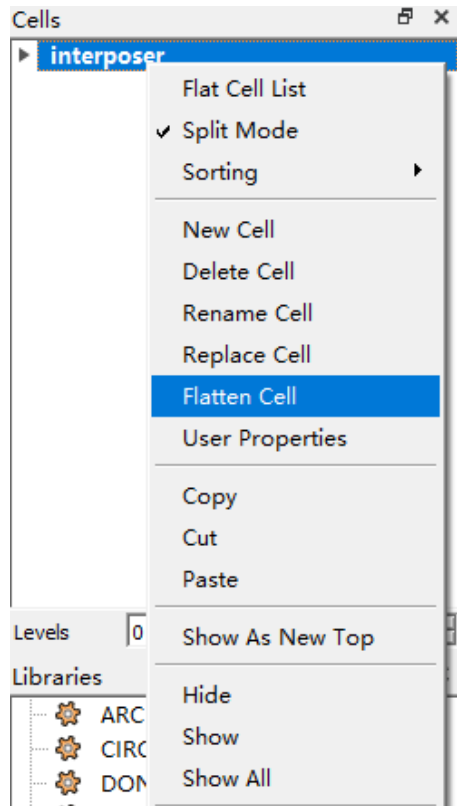
/ Restore default settings

- If you have modified the configuration in tech2xmlOption.json and then want to restore to the default options. Just delete the file and run the toolkit again, tech2xmlOption.json will be made with default options.
- Don't forget that environment variables have higher priority. You need to check the settings in environment variables to make sure it is in purposeful.

名称	修改日期	类型	大小
 GDS Import Wizard V5.0 Manual-202...	2/21/2022 12:19 PM	Foxit Reader PD...	848 KB
 GDSImportWizard.py	2/18/2022 9:14 AM	Python File	2 KB
 gdslib.dll	3/6/2022 4:20 PM	应用程序扩展	1,334 KB
 <u>tech2xmlOption.json</u>	3/6/2022 4:24 PM	JSON File	2 KB

/ About nets loss or error

- A known issue, hierarchy cells may bring wrong net coordinates and cause net lost or wrong (short or not right) . Flatten Cells and then import will solve this issue.
- Below is a demo, how to use KLayout to flatten the cells.



About Stackup simplification

Return

Stack simplification can effectively reduce the complexity of the model and improve efficiency

GDSII Import Wizard V5.0 (build 20220217)

GDS Import Wizard V5.0

FastMode

Import

Wizard model

1) Files input

2) Stackup XML

3) EDB Post

About

Control XML

Stackup XML: D:\Study\Script\repository\HFSS\GDSII\GDS2XML\TECH2XML_test\test.xml [Browse]

SimplifyDielectric: MergeThinLayer

MergeMethod: Weighted Average

ThinDielectricThreshold: 0.1

DkDeviationThreshold: 0.05

☐ UseDefaultDF: 0.02

☒ CreateViaGroups

☒ UseSheetLayer

☒ Add TSV Insulator Ring

☒ ConvertPolygonToCircle

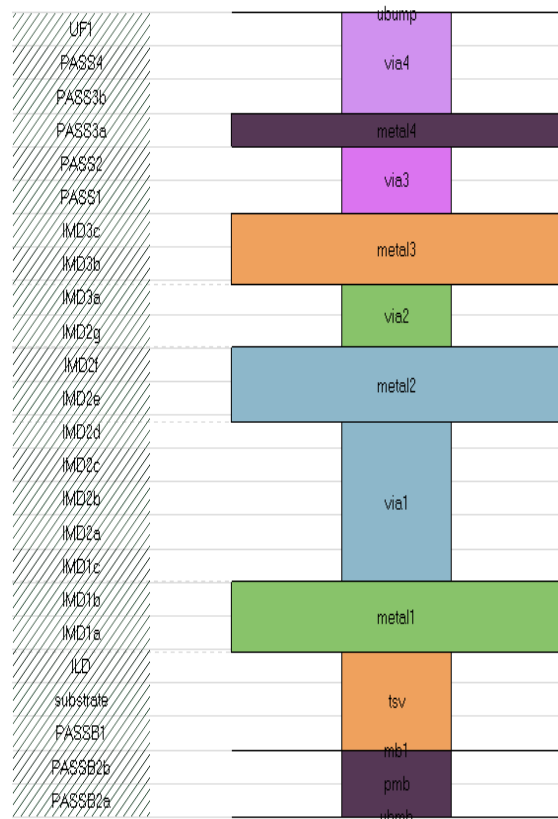
[Edit Control XML] [Generate Control Xml]

The two options only available on MergeThinLayer method, they control how the thin layers be merged.

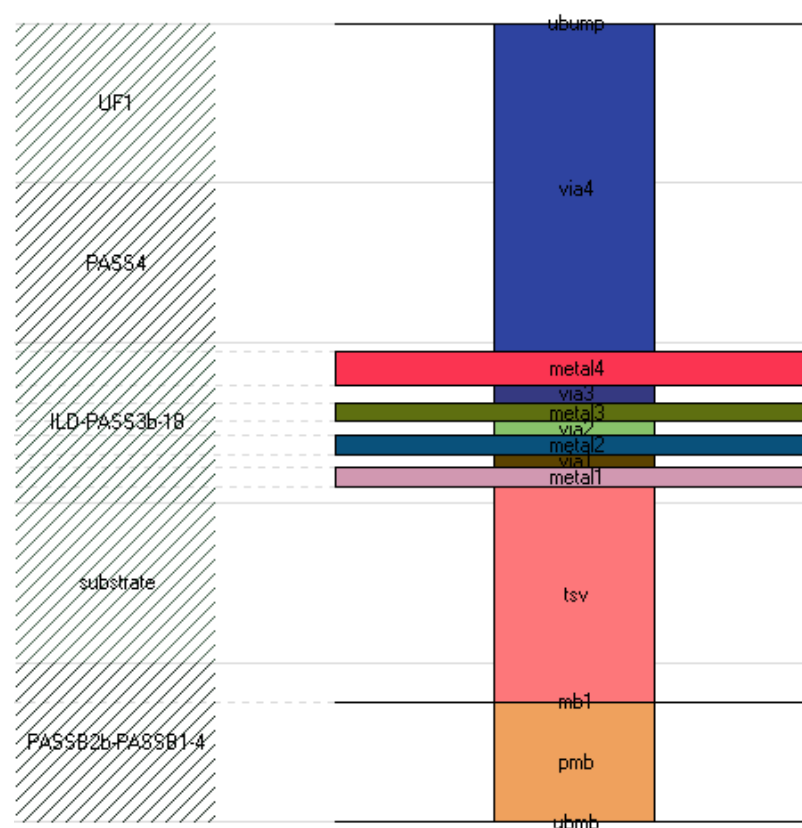
e.g.	ThinDielectricThreshold	DkDeviationThreshold	Note
1	0.1	0.1	Merge when layer thickness < 0.1um, or 2 layers dk difference less than 10%
2	0.05	-1	Only merge when layer thickness < 0.05um
3	-1	0.05	Only merge when 2 layers dk difference less than 5%

About Stack simplification

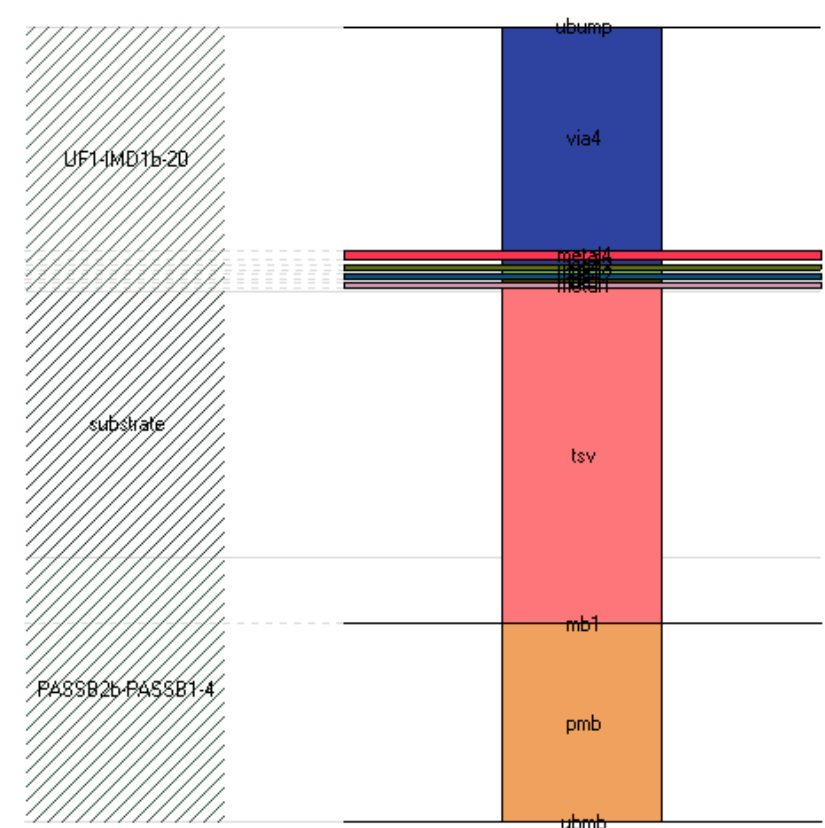
- Merge Method Compare



NoSimplify



MergeThinLayer



BlockMerge

Use Sheet Layer

Return

Sheet layer will reduce the number of meshes

GDSII Import Wizard V5.0 (build 20220217)

GDS Import Wizard V5.0

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Wizard model
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About

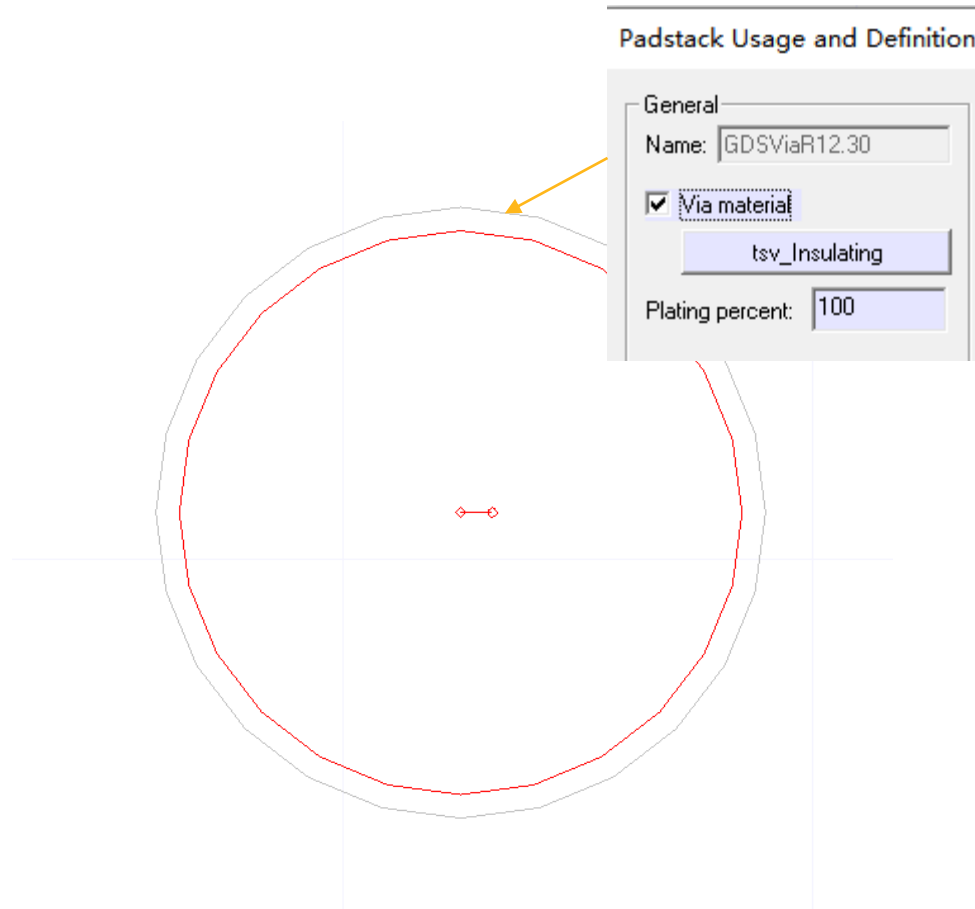
Control XML

Stackup XML

SimplifyDielectric ☒ CreateViaGroups
MergeMethod ☒ UseSheetLayer
☒ Add TSV Insulator Ring
☒ ConvertPolygonToCircle
ThinDielectricThreshold
DkDeviationThreshold
☐ UseDefaultDF

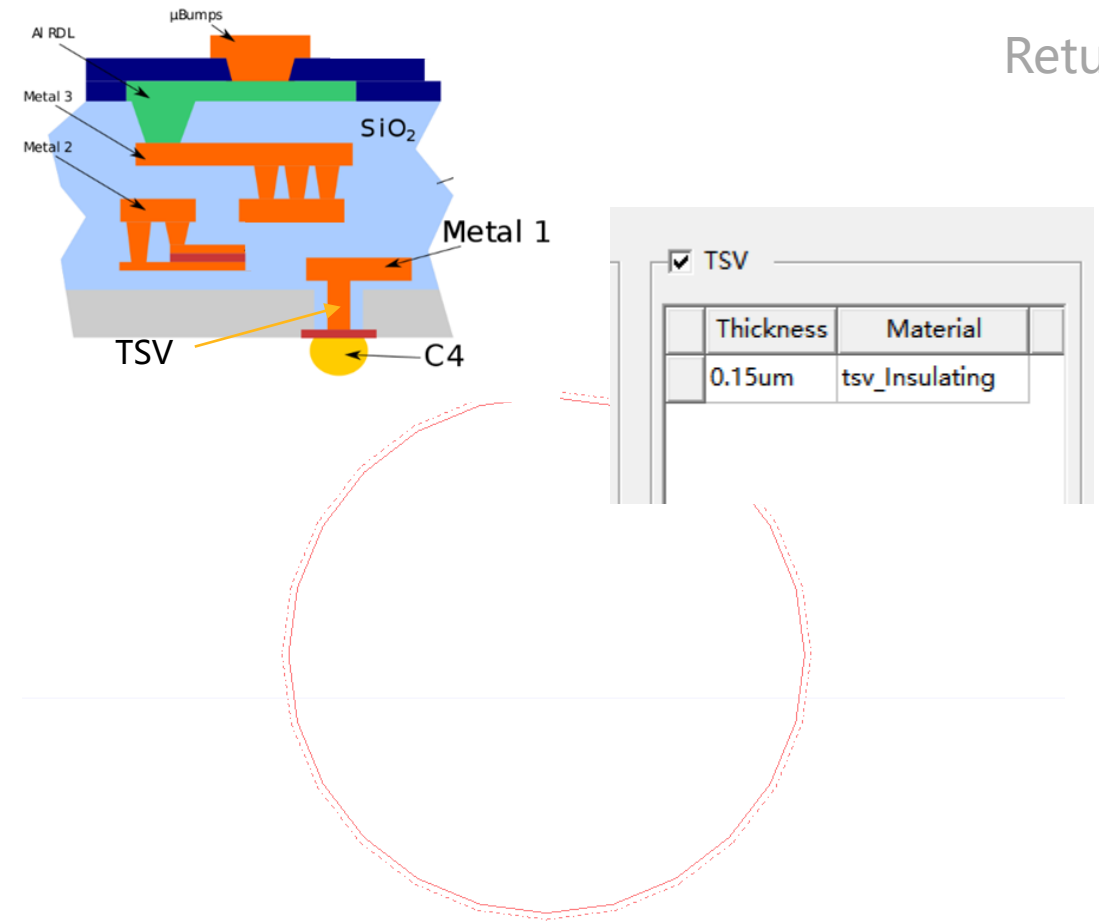
	material	signal	material_cond	thickness
	ILD_PASS3b_18	dielectric	ILD_PASS3b_18	7.04um
	substrate	dielectric	substrate	100um
	tsv	via	tsv_cond	101.476um
	mb1	signal	mb1_cond	0um
	PASSB2b_PASSB1_4	dielectric	PASSB2b_PASSB1_4	3.201um
	pmb	via	pmb_cond	2.4um
	ubmb	signal	ubmb_cond	0um

Layer with thin thickness tool will convert to sheet (0um).
thin thickness is controlled by option SheetLayerThreshold



Before 2021R2

TSV insulation is realized using 2 overlapping vias



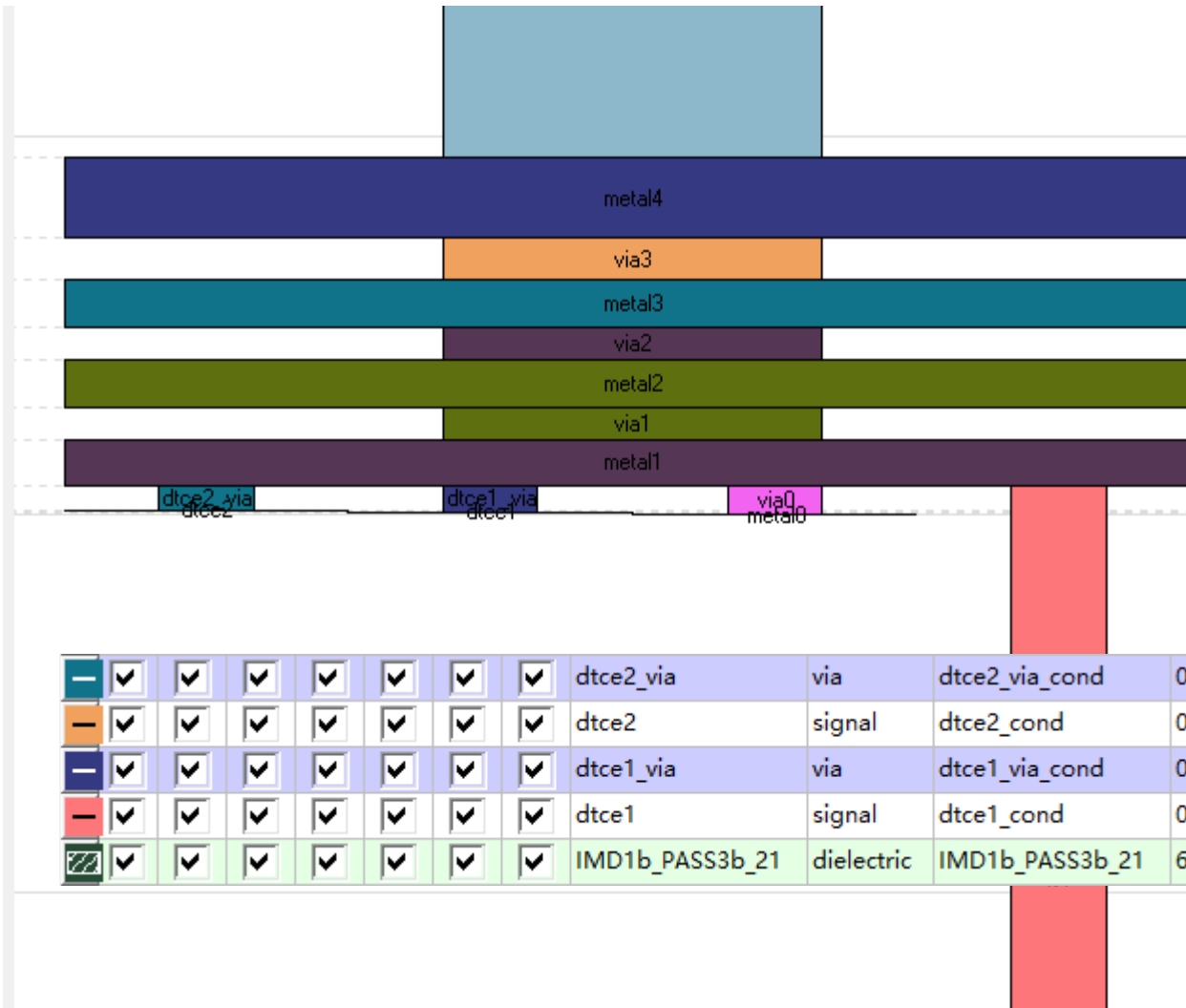
New in 2022R1

TSV insulation is realized using layer TSV new property

GDS Import Wizard V5.0 will automatically choose the best way according to which AEDT version you run it.

/ ICap (integrated capacitors)

Return



ICAP layers are ignored by default because it is thin and not have effect most of the time.

ICAP layers could be imported by setting IgnoreLayersReg to "air"

Temperature dependent material

137

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* CONDUCTOR 10 15 (NAME:V, TYPE:V, HEIGHT:V, THICKNESS:V, WIDTH:V, SPACE:V, B_BIAS:V, T_BIAS:V, BIAS:V, RESIST:V, ABOVE_IMD:V, ABOVE_IMD_DIFF:V, TC1:V, TC2:V, INDIE_TABLE:P)

FIELD TYPE HEIGHT THICKNESS WIDTH SPACE B_BIAS T_BIAS BIAS RESIST ABOVE_IMD ABOVE_IMD_DIFF TC1 TC2 INDIE_TABLE

NAME

ubump C 142.639000 0.001000 22.00000 18.00000 0.0000 0.0000 0.0000 0.00010 UF1 -0.0010 0.00000e+00 0.00000e+00 N/A

metal14 C 105.190000 1.450000 3.00000 2.00000 0.3890 -0.0340 0.1775 0.02100 PASS2 0.0000 3.89000e-03 -1.50000e-07 INDIE_TABLE[metal14]

metal13 C 103.565000 0.850000 0.40000 0.40000 0.0000 0.1000 0.0500 0.02200 IMD3a -0.0750 3.63100e-03 -1.39200e-06 INDIE_TABLE[metal13]

metal12 C 103.565000 0.850000 0.40000 0.40000 0.0000 0.1000 0.0500 0.02200 IMD2d -0.0750 3.63100e-03 -1.39200e-06 INDIE_TABLE[metal12]

ctm 0.0000 0.00000e+00 0.00000e+00 INDIE_TABLE[ctm]

cbm 0.0000 0.00000e+00 0.00000e+00 INDIE_TABLE[cbm]

metal1 0.0000 0.00000e+00 0.00000e+00 INDIE_TABLE[metal1]

ILD -0.0750 3.63100e-03 -1.39200e-06

PASSB2b -0.0010 0.00000e+00 0.00000e+00 N/A

N/A 0.0000 0.00000e+00 0.00000e+00 N/A

PASSB1 N/A N/A N/A N/A

GDSII Import Wizard V5.0 (build 20220217)

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1) Files input

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About

ControlXml

Tech File

Browse

GDSII

Browse

SimplifyDielectric

Weighted Average

UseSheetLayer

MergeMethod

MergeThinLayer

UseDefaultDF

0.02

ThinDielectricThreshold

0.1

DkDeviationThreshold

0.05

EDB Generation

AEDT Installed Dir

C:\Program Files\AnsysEM\v221\Win64\

EBD File

Browse

Auto Generate Component

Add TSV Insulator Ring

UseTemperatureDependMaterial

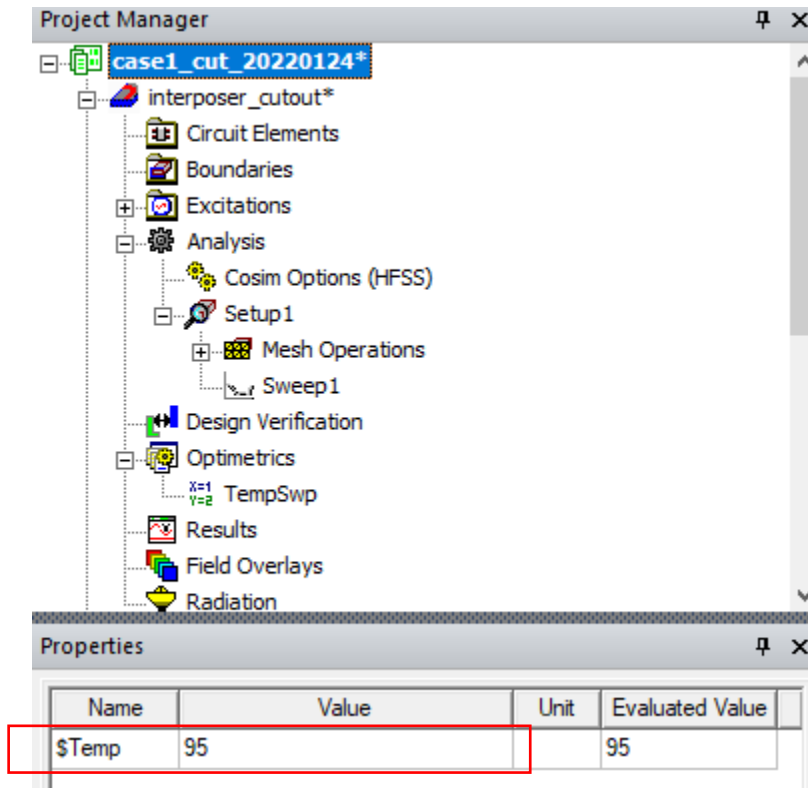
ConvertPolygonToCircle

Import

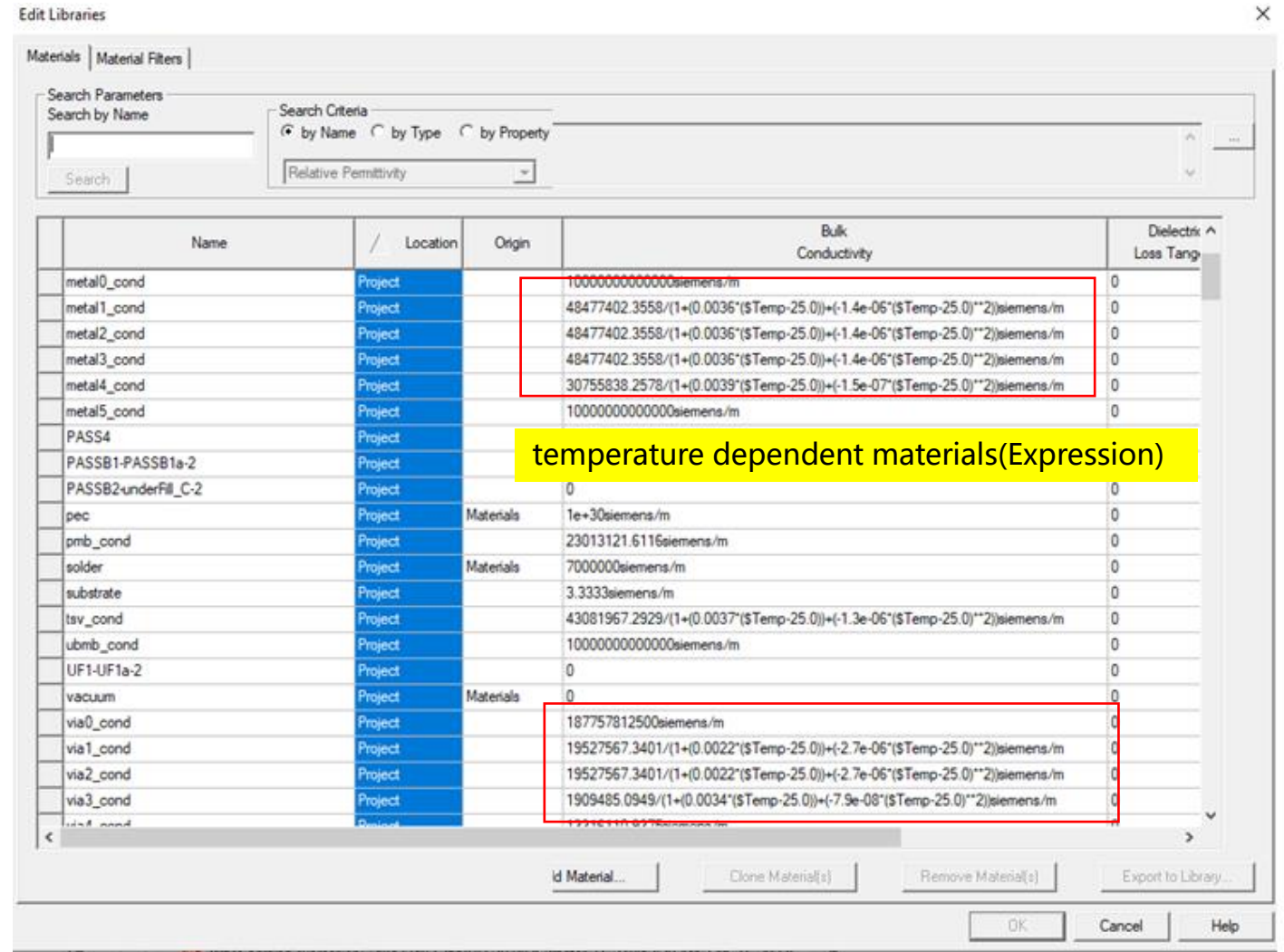
Close

Temperature will affect the conductivity of metal and increase the resistance. If Tc1 and TC2 are given and **UseTemperatureDependMaterial** is checked, temperature dependent materials will be generated

Temperature dependent material



Sweep the \$Temp variable will get the corner results at different temperatures



Multiple layermaps support in IRCX

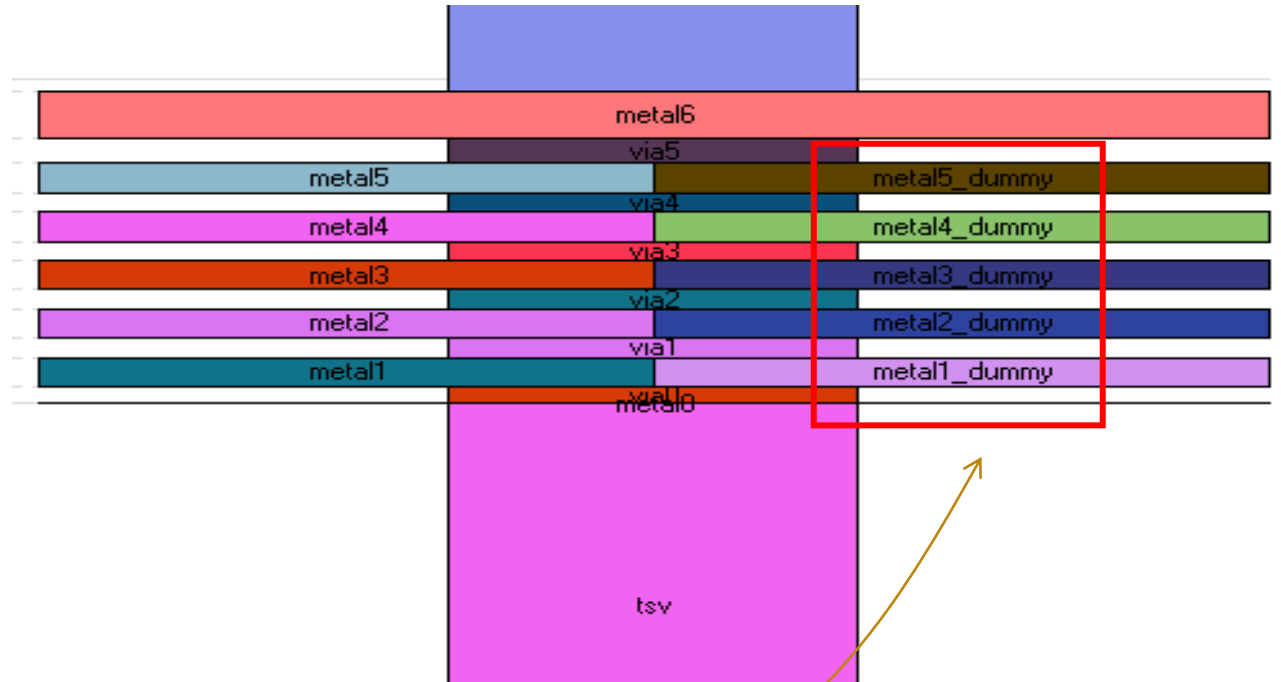
```
1441 [LAYER_MAPPING]
1442 #substate is reversed-tone NWELL
1443 #via4 is (ubump AND metal4)
1444 #ubump_top_pin is ubump_pin
1445 #ubmb_top_pin is ubmb_pin
1446 #RC      GDS LVS      DFII
1447 ubump      170;0      ubump      UBM;drawing
1448 metal4      74;0      metal4      AP;drawing
1449 DUM4      74;1      DUM4      AP;dummy
1450 metal3      33;40      metal3      M3;drawing
1451 DUM3      33;41      DUM3      M3;dummy
1452 metal2      32;40:32;41      metal2      M2;drawing
1453 DUM2      32;41      DUM2      M2;dummy
1454 metall      31;40      metall      M1;drawing
1455 DUM1      31;41      DUM1      M1;dummy
1456 mb1      31;100      MB1      M1;BSL
1457 ubmb      170;100      UBMB      UBM;BSL
1458 via4      86;0      via4      CB2;drawing
1459 via3      85;0      via3      RV;drawing
1460 via2      52;40      via2      VIA2;drawing
1461 vial      51;40      vial      VIA1;drawing
1462 tsv      251;0      tsv      TSV;drawing
1463 tsv_3t      251;3      tsv_3t      TSV;dummy1
1464 pmb      5;100      PMB      PM;dummy
1465 ubump_pin      125;0      ubm_top_pin      UBM;pin
1466 metal4_pin      126;0      metal4_pin      AP;pin
1467 metal3_pin      133;0      metal3_pin      M3;pin
1468 metal2_pin      132;0      metal2_pin      M2;pin
1469 metall_pin      131;0      metall_pin      M1;pin
1470 mb1_pin      131;100      MB1_pin      M1;BSP
1471 ubmb_pin      125;100      UBMB_pin      UBM;test0
1472 ctm      77;0      ctm      CTM;drawing
1473 cbm      88;0      cbm      CBM;drawing
1474 ctm_via      51;40      ctm_via      VIA1;drawing
1475 cbm_via      51;40      cbm_via      VIA1;drawing
1476
```

Multiple layermaps are supported from V5.4, it only need add the new layermap to the corresponding metal layer and separated with ":" .

Just append the dummy layermap to metal layer if you want consider the dummy metal.

Dummy Layer support in IRCX

```
34 "AedtInstallDir": null,  
35 "MergeDielectricMethod": 0,  
36 "SheetLayerThreshold": 0.0015,  
37 "ConvertPolygonToCircleRatio": 0.900000000000000002,  
38 "DefaultDF": 0.02,  
39 "Precision": 6,  
40 "ControlXmlPath": null,  
41 "Materials": [],  
42 "InputType": 0,  
43 "TextLayermap": {},  
44 "DummyLayerReg": [  
45   "metal\\d+"  
46 ],  
47 "ThinDielectricInresnoid": 0.100000000000000001,  
48 "UnionPrimitivesOnLayer": [  
49   "ubmb",  
50   "ubump"  
51 ],  
52 "RemoveDuplicatePins": false,  
53 "UseTemperatureDependMaterial": false,  
54 "ImportDummyNet": true,  
55 "OpenInAedt": true,  
56 "GdsFile": null,  
57 "InsulatorThickness": 1,  
58 "SimplifyDielectricMethod": 1,  
59 "IgnoreLayersReg": [  
60   "air",  
61   "ctm.*",  
62   "cbm.*",  
63   "dtce.*"  
64 ],  
65 "ImportDummyLayer": true  
66 ]
```



Additional layers will be generated when "ImportDummyLayer" is set

CreViaGroups Method

```
1 {
2   "ConvertPolygonToCircle": true,
3   "Default": null,
4   "CreatViaGroupsOption": "Method:proximity,Tolerance:5um,CheckContainment:true",
5   "NotUseViaGroupsOnLayers": [
6     ".*tsv.*",
7     "pmb"
8   ],
9 }
```

"Method:proximity,Tolerance:5um,CheckContainment:true"

```
142 <Layer Name="52" Material="via2_cond" GDSDataType="40" TargetLayer="via2" StartLayer="meta
143 <CreateViaGroups Method="proximity" Tolerance="5um" CheckContainment="true" />
144 <SnapViaGroups Method="areaFactor" Tolerance="3" RemoveUnconnected="true" />
145 </Layer>
146 <Layer Name="51" Material="via1_cond" GDSDataType="40" TargetLayer="via1" StartLayer="meta
147 <CreateViaGroups Method="proximity" Tolerance="5um" CheckContainment="true" />
148 <SnapViaGroups Method="areaFactor" Tolerance="3" RemoveUnconnected="true" />
149 </Layer>
150 <Layer Name="251" Material="tsv_cond" GDSDataType="0" TargetLayer="tsv" StartLayer="metall
151 <TSVProperties Thickness="0.15" Material="tsv_Insulating" />
152 </Layer>
153 <Layer Name="5" Material="pmb_cond" GDSDataType="100" TargetLayer="pmb" StartLayer="mb1" S
154 </Layer>
155 </Vias>
```

```
1 {
2   "ConvertPolygonToCircle": true,
3   "Default": null,
4   "CreatViaGroupsOption": "Method:range,Persistent:false,Tolerance:1um",
5   "NotUseViaGroupsOnLayers": [
6     ".*tsv.*",
7     "pmb"
8   ],
9   "OpenInAedt": true,
```

"Method:range,Persistent:false,Tolerance:1um"

```
142 <Layer Name="52" Material="via2_cond" GDSDataType="40" TargetLayer="via2" S
143 <CreateViaGroups Method="range" Persistent="false" Tolerance="1um" />
144 <SnapViaGroups Method="areaFactor" Tolerance="3" RemoveUnconnected="true" />
145 </Layer>
146 <Layer Name="51" Material="via1_cond" GDSDataType="40" TargetLayer="via1" S
147 <CreateViaGroups Method="range" Persistent="false" Tolerance="1um" />
148 <SnapViaGroups Method="areaFactor" Tolerance="3" RemoveUnconnected="true" />
149 </Layer>
150 <Layer Name="251" Material="tsv_cond" GDSDataType="0" TargetLayer="tsv" Sta
151 <TSVProperties Thickness="0.15" Material="tsv_Insulating" />
```

Note: Environment variables and command-line arguments could be set for this option.

/ Options in CSV Tech (from V5.6)

	A	B	C	D	E	F	G	H	I
1	NO	LayerName	Type	LayerMap	TextLayerI	Thickness	Height	LowerLayer	UpperLayer
2	13	fill_in	D			0.001			
3	14	M4	C	31;0		0.001	0.002		
4	15	CTM2	C	67;3		0.0003	0.0006		
5	17	M3	C	28;0		0.0005	0		
6	21	via34	V	29;0				None	M4
7									
8		UseSheetLayer	O	FALSE					
9		FixedSmallLayerGap	O	0					
10		CreatViaGroups	O	FALSE					
11		AutoComps	O	FALSE					
12	#Note:								

Options in CSV Tech with Type as O or (Option).

Options in CSV Tech have highest priority then GUI and any other ways, it should be used with caution, which may cause mismatch between GUI and finally effective.

 **Ansys**

