AURIX™ TC33x/TC32x Variants

About this document

Scope and purpose

This document is an addendum to the TC33x/TC32x Product Data Sheet and User's Manual, listing all planned product variants, key parameters such as memory size and optional features.

The User's Manual lists functions implemented on the Silicon, but this document counts functions that are pinning dependent; i.e. functions are counted that are connected to at least one package pin. As pins are overlaid with several functions the pinning needs to be checked (see Product Data Sheet) to determine the number of usable functions in an application.

Naming conventions

Prefix:

- SAK: $T_{ambient}$ Temperature Range from -40 °C up to +125 °C.
- SAL: $T_{ambient}$ Temperature Range from -40 °C up to +150 °C (packaged device).

Feature package:

- P: Standard feature.
- E: Emulation device with all features of the emulated standard type, additionally full MCDS, overlay functionality for calibration, AGBT as trace interface for development (depending on the package).
- C,S,V,Z: Customer Specific.
- A: ADAS ext. Memory.
- T: ADAS + emulation.
- X: Extended Feature device. These products contain the extended memory (EMEM) of the ADAS subsystem. The ADAS peripherals SPU and RIF are not available.
- M: MotionWise software.
- F: Extended Flash.
- G: Additional Connectivity.
- H: ADAS Standard feature.
- N: Standard feature with AMU.

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1 TC33x/TC32x AA step variants

1.1 TC33x and TC32x AA step (part 1)

A table listing the TC33x and TC32x AA step variants.

Table 1 TC33x and TC32x AA step (part 1)

SAK-TC334LP-32F200F	SAK-TC337LP-32F200S	SAL-TC337LP-32F200S	SAL-TC334LP-32F200F	SAK-TC333LP-32F200F	SAL-TC333LP-32F200F	SAK-TC323LP-16F160F
Step						
AA	AA	AA	AA	AA	AA	AA
Production Status						
Standard	Standard	Standard	Standard	Standard	Standard	Standard
Package Type						
PG-QFP-144	PG-LFBGA-292	PG-LFBGA-292	PG-QFP-144	PG-QFP-100	PG-QFP-100	PG-QFP-100
Pinout						
TQFP 0.4 mm	LFBGA 0.8 mm	LFBGA 0.8 mm	TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm
Reference Silicon						
TC33x	TC33x	TC33x	TC33x	TC33x	TC33x	TC33x
Temperature Range (Ambient)						
SAK	SAK	SAL	SAL	SAK	SAL	SAK
Chip ID						
Attention*: *The value of SCU_CHIPID in the UCODE field contains the default value 0 not the µCode version.						
0x84003480	0x84003780	0x84003780	0x84003480	0x84003380	0x84003380	0x82002380
Cores / Checker Cores						
1/1	1/1	1/1	1/1	1/1	1/1	1/1
Max. Freq. (MHz)						
200	200	200	200	200	200	160
Program Flash (MB)						
2	2	2	2	2	2	1
Data Flash0 (single-ended) (KB)						
128	128	128	128	128	128	96
Total SRAM (without EMEM and Cache) (KB)						
208	208	208	208	208	208	104
EMEM Size (KB)						
0	0	0	0	0	0	0
DSPR (KB)						

(table continues...)

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1 TC33x/TC32x AA step variants

Table 1 (continued) TC33x and TC32x AA step (part 1)

SAK-TC334LP-32F200F	SAK-TC337LP-32F200S	SAL-TC337LP-32F200S	SAL-TC334LP-32F200F	SAK-TC333LP-32F200F	SAL-TC333LP-32F200F	SAK-TC323LP-16F160F
192	192	192	192	192	192	96
DLMU (KB)						
8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	0
PSPR (KB)						
8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0
LMU (KB)						
0	0	0	0	0	0	0
DAM (KB)						
0	0	0	0	0	0	0
AMU[1)]						
No	No	No	No	No	No	No
ADC (Primary Groups/Channels)						
2/16	2/16	2/16	2/16	2/15	2/15	2/15
ADC (Secondary Groups/Channels)						
2/26	2/28	2/28	2/26	1/15	1/15	1/15
ADC (Fast Compare Channels)						
0	0	0	0	0	0	0
ADC (EDSADC Channels)						
0	0	0	0	0	0	0
CAN (Modules/Nodes)						
2/8	2/8	2/8	2/8	2/6	2/6	2/6
FlexRay (Modules/Channels)						
1/2	1/2	1/2	1/2	1/2	1/2	0
HSSL Modules						
0	0	0	0	0	0	0
ASCLIN Modules / with ASC & LIN / with 3-wire SPI						
12/12/10	12/12/10	12/12/10	12/12/10	5/5/5	5/5/5	5/5/5
QSPI Modules / with LVDS						
4/0	4/0	4/0	4/0	4/0	4/0	4/0
SENT Channels						

(table continues...)

1 AMU is abbreviated as ASC Modeling Unit. For Additional details about AMU, Contact an Infineon Representative

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1 TC33x/TC32x AA step variants

Table 1 (continued) TC33x and TC32x AA step (part 1)

SAK-TC334LP-32F200F	SAK-TC337LP-32F200S	SAL-TC337LP-32F200S	SAL-TC334LP-32F200F	SAK-TC333LP-32F200F	SAL-TC333LP-32F200F	SAK-TC323LP-16F160F
6	6	6	6	6	6	6
MSC Modules						
0	0	0	0	0	0	0
PSI5 Channels						
0	0	0	0	0	0	0
PSI5-S Module						
No	No	No	No	No	No	No
SDMMC Module						
No	No	No	No	No	No	No
Max. Ethernet Availability: 1GBit/100Mbit/No						
No	No	No	No	No	No	No
MCDS Availability						
No	No	No	No	No	No	No
ADAS Cluster Available						
No	No	No	No	No	No	No
CIF						
No	No	No	No	No	No	No
HSM Available						
Yes	Yes	Yes	Yes	Yes	Yes	Yes

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1.2 TC33x and TC32x AA step (part 2)

A continuation table listing the TC33x and TC32x AA step variants.

Table 2 TC33x and TC32x AA step (part 2)

SAK-TC324LP-16F160F	SAK-TC322LP-16F160F	SAK-TC332LP-32F200F	SAL-TC332LP-32F200F	SAK-TC332LP-32F300F	SAK-TC333LP-32F300F	SAK-TC334LP-32F300F
Step						
AA	AA	AA	AA	AA	AA	AA
Production Status						
Standard	Standard	Standard	Standard	Standard	Standard	Standard
Package Type						
PG-QFP-144	PG-QFP-80	PG-QFP-80	PG-QFP-80	PG-QFP-80	PG-QFP-100	PG-QFP-144
Pinout						
TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm
Reference Silicon						
TC33x	TC33x	TC33x	TC33x	TC33x	TC33x	TC33x
Temperature Range (Ambient)						
SAK	SAK	SAK	SAL	SAK	SAK	SAK
Chip ID ***Attention*: *The value of SCU_CHIPID in the UCODE field contains the default value 0 not the µCode version.***						
0x82002480	0x82002280	0x84003280	0x84003280	0x84003280	0x84003380	0x84003480
Cores / Checker Cores						
1/1	1/1	1/1	1/1	1/1	1/1	1/1
Max. Freq. (MHz)						
160	160	200	200	300	300	300
Program Flash (MB)						
1	1	2	2	2	2	2
Data Flash0 (single-ended) (KB)						
96	96	128	128	128	128	128
Total SRAM (without EMEM and Cache) (KB)						
104	104	208	208	208	208	208
EMEM Size (KB)						
0	0	0	0	0	0	0
DSPR (KB)						
96	96	192	192	192	192	192
DLMU (KB)						

(table continues...)

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1 TC33x/TC32x AA step variants

Table 2 (continued) TC33x and TC32x AA step (part 2)

SAK-TC324LP-16F160F	SAK-TC322LP-16F160F	SAK-TC332LP-32F200F	SAL-TC332LP-32F200F	SAK-TC332LP-32F300F	SAK-TC333LP-32F300F	SAK-TC334LP-32F300F
0	0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0
PSPR (KB)						
8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0
LMU (KB)						
0	0	0	0	0	0	0
DAM (KB)						
0	0	0	0	0	0	0
AMU[2)]						
No	No	No	No	No	No	No
ADC (Primary Groups/Channels)						
2/16	2/9	2/9	2/9	2/9	2/15	2/16
ADC (Secondary Groups/Channels)						
2/26	1/8	1/8	1/8	1/8	1/15	2/26
ADC (Fast Compare Channels)						
0	0	0	0	0	0	0
ADC (EDSADC Channels)						
0	0	0	0	0	0	0
CAN (Modules/Nodes)						
2/6	2/6	2/6	2/6	2/6	2/6	2/8
FlexRay (Modules/Channels)						
0	0	1/2	1/2	1/2	1/2	1/2
HSSL Modules						
0	0	0	0	0	0	0
ASCLIN Modules / with ASC & LIN / with 3-wire SPI						
6/6/6	5/5/5	5/5/5	5/5/5	5/5/5	5/5/5	12/12/10
QSPI Modules / with LVDS						
4/0	3/0	3/0	3/0	3/0	4/0	4/0
SENT Channels						
6	6	6	6	6	6	6
MSC Modules						

(table continues...)

2 AMU is abbreviated as ASC Modeling Unit. For Additional details about AMU, Contact an Infineon Representative

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1 TC33x/TC32x AA step variants

Table 2 (continued) TC33x and TC32x AA step (part 2)

SAK-TC324LP-16F160F	SAK-TC322LP-16F160F	SAK-TC332LP-32F200F	SAL-TC332LP-32F200F	SAK-TC332LP-32F300F	SAK-TC333LP-32F300F	SAK-TC334LP-32F300F
0	0	0	0	0	0	0
PSI5 Channels						
0	0	0	0	0	0	0
PSI5-S Module						
No	No	No	No	No	No	No
SDMMC Module						
No	No	No	No	No	No	No
Max. Ethernet Availability: 1GBit/100Mbit/No						
No	No	No	No	No	No	No
MCDS Availability						
No	No	No	No	No	No	No
ADAS Cluster Available						
No	No	No	No	No	No	No
CIF						
No	No	No	No	No	No	No
HSM Available						
Yes	Yes	Yes	Yes	Yes	Yes	Yes

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1.3 TC33x and TC32x AA step (part 3)

A continuation table listing the TC33x and TC32x AA step variants.

Table 3 TC33x and TC32x AA step (part 3)

SAK-TC337LP-32F300S	SAK-TC323LP-24F200F	SAK-TC324LP-24F200F	SAK-TC323L-24F200F	SAK-TC324L-24F200F	SAK-TC336LP-32F200S	SAL-TC336LP-32F200S
Step						
AA	AA	AA	AA	AA	AA	AA
Production Status						
Standard	Customer Specific	Customer Specific	Customer Specific	Customer Specific	Standard	Standard
Package Type						
PG-LFBGA-292	PG-QFP-100	PG-QFP-144	PG-QFP-100	PG-QFP-144	PG-LFBGA-180	PG-LFBGA-180
Pinout						
LFBGA 0.8 mm	TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm	LFBGA 0.8 mm	LFBGA 0.8 mm
Reference Silicon						
TC33x	TC33x	TC33x	TC33x	TC33x	TC33x	TC33x
Temperature Range (Ambient)						
SAK	SAK	SAK	SAK	SAK	SAK	SAL
Chip ID ***Attention:*** ***The value of SCU_CHIPID in the UCODE field contains the default value 0 not the µCode version.***						
0x84003780	0xA3002380	0xA3002480	0x3002380	0x3002480	0x84003680	0x84003680
Cores / Checker Cores						
1/1	1/1	1/1	1/1	1/1	1/1	1/1
Max. Freq. (MHz)						
300	200	200	200	200	200	200
Program Flash (MB)						
2	1.5	1.5	1.5	1.5	2	2
Data Flash0 (single-ended) (KB)						
128	96	96	96	96	128	128
Total SRAM (without EMEM and Cache) (KB)						
208	104	104	104	104	208	208
EMEM Size (KB)						
0	0	0	0	0	0	0
DSPR (KB)						
192	96	96	96	96	192	192

(table continues...)

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1 TC33x/TC32x AA step variants

Table 3 (continued) TC33x and TC32x AA step (part 3)

SAK-TC337LP-32F300S	SAK-TC323LP-24F200F	SAK-TC324LP-24F200F	SAK-TC323L-24F200F	SAK-TC324L-24F200F	SAK-TC336LP-32F200S	SAL-TC336LP-32F200S
DLMU (KB)						
8 in CPU0	0	0	0	0	8 in CPU0	8 in CPU0
PSPR (KB)						
8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0
LMU (KB)						
0	0	0	0	0	0	0
DAM (KB)						
0	0	0	0	0	0	0
AMU[3)]						
No	No	No	No	No	No	No
ADC (Primary Groups/Channels)						
2/16	2/15	2/16	2/15	2/16	2/16	2/16
ADC (Secondary Groups/Channels)						
2/28	1/15	2/26	1/15	2/26	2/26	2/26
ADC (Fast Compare Channels)						
0	0	0	0	0	0	0
ADC (EDSADC Channels)						
0	0	0	0	0	0	0
CAN (Modules/Nodes)						
2/8	2/6	2/6	2/6	2/6	2/8	2/8
FlexRay (Modules/Channels)						
1/2	0	0	0	0	1/2	1/2
HSSL Modules						
0	0	0	0	0	0	0
ASCLIN Modules / with ASC & LIN / with 3-wire SPI						
12/12/10	5/5/5	6/6/6	5/5/5	6/6/6	12/12/10	12/12/10
QSPI Modules / with LVDS						
4/0	4/0	4/0	4/0	4/0	4/0	4/0
SENT Channels						
6	6	6	6	6	6	6

(table continues...)

3 AMU is abbreviated as ASC Modeling Unit. For Additional details about AMU, Contact an Infineon Representative

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1 TC33x/TC32x AA step variants

Table 3 (continued) TC33x and TC32x AA step (part 3)

SAK-TC337LP-32F300S	SAK-TC323LP-24F200F	SAK-TC324LP-24F200F	SAK-TC323L-24F200F	SAK-TC324L-24F200F	SAK-TC336LP-32F200S	SAL-TC336LP-32F200S
MSC Modules						
0	0	0	0	0	0	0
PSI5 Channels						
0	0	0	0	0	0	0
PSI5-S Module						
No	No	No	No	No	No	No
SDMMC Module						
No	No	No	No	No	No	No
Max. Ethernet Availability: 1GBit/100Mbit/No						
No	No	No	No	No	No	No
MCDS Availability						
No	No	No	No	No	No	No
ADAS Cluster Available						
No	No	No	No	No	No	No
CIF						
No	No	No	No	No	No	No
HSM Available						
Yes	Yes	Yes	No	No	Yes	Yes

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1.4 TC33x and TC32x AA step (part 4)

A continuation table listing the TC33x and TC32x AA step variants.

Table 4 TC33x and TC32x AA step (part 4)

SAK-TC336LP-32F300S	SAL-TC323LP-16F160F	SAL-TC324LP-16F160F	SAL-TC322LP-16F160F	SAL-TC327LP-16F160S	SAK-TC333L-32F200F	SAK-TC334L-32F200F
Step						
AA	AA	AA	AA	AA	AA	AA
Production Status						
Standard	Standard	Standard	Standard	Standard	Customer Specific	Customer Specific
Package Type						
PG-LFBGA-180	PG-QFP-100	PG-QFP-144	PG-QFP-80	PG-LFBGA-292	PG-QFP-100	PG-QFP-144
Pinout						
LFBGA 0.8 mm	TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm	LFBGA 0.8 mm	TQFP 0.4 mm	TQFP 0.4 mm
Reference Silicon						
TC33x	TC33x	TC33x	TC33x	TC33x	TC33x	TC33x
Temperature Range (Ambient)						
SAK	SAL	SAL	SAL	SAL	SAK	SAK
Chip ID ***Attention:*** ***The value of SCU_CHIPID in the UCODE field contains the default value 0 not the µCode version.***						
0xA4003680	0x82002380	0x82002480	0x82002280	0x82002780	0x4003380	0x4003480
Cores / Checker Cores						
1/1	1/1	1/1	1/1	1/1	1/1	1/1
Max. Freq. (MHz)						
300	160	160	160	160	200	200
Program Flash (MB)						
2	1	1	1	1	2	2
Data Flash0 (single-ended) (KB)						
128	96	96	96	96	128	128
Total SRAM (without EMEM and Cache) (KB)						
208	104	104	104	104	208	208
EMEM Size (KB)						
0	0	0	0	0	0	0
DSPR (KB)						
192	96	96	96	96	192	192

(table continues...)

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1 TC33x/TC32x AA step variants

Table 4 (continued) TC33x and TC32x AA step (part 4)

SAK-TC336LP-32F300S	SAL-TC323LP-16F160F	SAL-TC324LP-16F160F	SAL-TC322LP-16F160F	SAL-TC327LP-16F160S	SAK-TC333L-32F200F	SAK-TC334L-32F200F
DLMU (KB)						
8 in CPU0	0	0	0	0	8 in CPU0	8 in CPU0
PSPR (KB)						
8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0
LMU (KB)						
0	0	0	0	0	0	0
DAM (KB)						
0	0	0	0	0	0	0
AMU[4)]						
No	No	No	No	No	No	No
ADC (Primary Groups/Channels)						
2/16	2/15	2/16	2/9	2/16	2/15	2/16
ADC (Secondary Groups/Channels)						
2/26	1/15	2/26	1/8	2/28	1/15	2/26
ADC (Fast Compare Channels)						
0	0	0	0	0	0	0
ADC (EDSADC Channels)						
0	0	0	0	0	0	0
CAN (Modules/Nodes)						
2/8	2/6	2/6	2/6	2/6	2/6	2/2x4
FlexRay (Modules/Channels)						
1/2	0	0	0	0	1/2	1/1x2
HSSL Modules						
0	0	0	0	0	0	0
ASCLIN Modules / with ASC & LIN / with 3-wire SPI						
12/12/10	5/5/5	6/6/6	5/5/5	6/6/6	5/5/5	12/12/10
QSPI Modules / with LVDS						
4/0	4/0	4/0	3/0	4/0	4/0	4/0
SENT Channels						
6	6	6	6	6	6	6

(table continues...)

4 AMU is abbreviated as ASC Modeling Unit. For Additional details about AMU, Contact an Infineon Representative

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1 TC33x/TC32x AA step variants

Table 4 (continued) TC33x and TC32x AA step (part 4)

SAK-TC336LP-32F300S	SAL-TC323LP-16F160F	SAL-TC324LP-16F160F	SAL-TC322LP-16F160F	SAL-TC327LP-16F160S	SAK-TC333L-32F200F	SAK-TC334L-32F200F
MSC Modules						
0	0	0	0	0	0	0
PSI5 Channels						
0	0	0	0	0	0	0
PSI5-S Module						
No	No	No	No	No	No	No
SDMMC Module						
No	No	No	No	No	No	No
Max. Ethernet Availability: 1GBit/100Mbit/No						
No	No	No	No	No	No	No
MCDS Availability						
No	No	No	No	No	No	No
ADAS Cluster Available						
No	No	No	No	No	No	No
CIF						
No	No	No	No	No	No	No
HSM Available						
Yes	Yes	Yes	Yes	Yes	No	No

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1.5 TC33x and TC32x AA step (part 5)

A continuation table listing the TC33x and TC32x AA step variants.

Table 5 TC33x and TC32x AA step (part 5)

SAL-TC333L-32F200F	SAL-TC334L-32F200F	SAL-TC337LP-32F300S	SAL-TC336LP-32F300S	SAL-TC334LP-32F300F	SAL-TC333LP-32F300F	SAL-TC332LP-32F300F
Step						
AA	AA	AA	AA	AA	AA	AA
Production Status						
Customer Specific	Customer Specific	Standard	Standard	Standard	Standard	Standard
Package Type						
PG-QFP-100	PG-QFP-144	PG-LFBGA-292	PG-LFBGA-180	PG-QFP-144	PG-QFP-100	PG-QFP-80
Pinout						
TQFP 0.4 mm	TQFP 0.4 mm	LFBGA 0.8 mm	LFBGA 0.8 mm	TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm
Reference Silicon						
TC33x	TC33x	TC33x	TC33x	TC33x	TC33x	TC33x
Temperature Range (Ambient)						
SAL	SAL	SAL	SAL	SAL	SAL	SAL
Chip ID ***Attention:*** ***The value of SCU_CHIPID in the UCODE field contains the default value 0 not the µCode version.***						
0x4003380	0x4003480	0x84003780	0xA4003680	0x84003480	0x84003380	0x84003280
Cores / Checker Cores						
1/1	1/1	1/1	1/1	1/1	1/1	1/1
Max. Freq. (MHz)						
200	200	300	300	300	300	300
Program Flash (MB)						
2	2	2	2	2	2	2
Data Flash0 (single-ended) (KB)						
128	128	128	128	128	128	128
Total SRAM (without EMEM and Cache) (KB)						
208	208	208	208	208	208	208
EMEM Size (KB)						
0	0	0	0	0	0	0
DSPR (KB)						
192	192	192	192	192	192	192

(table continues...)

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1 TC33x/TC32x AA step variants

Table 5 (continued) TC33x and TC32x AA step (part 5)

SAL-TC333L-32F200F	SAL-TC334L-32F200F	SAL-TC337LP-32F300S	SAL-TC336LP-32F300S	SAL-TC334LP-32F300F	SAL-TC333LP-32F300F	SAL-TC332LP-32F300F
DLMU (KB)						
8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0
PSPR (KB)						
8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0
LMU (KB)						
0	0	0	0	0	0	0
DAM (KB)						
0	0	0	0	0	0	0
AMU[5]						
No	No	No	No	No	No	No
ADC (Primary Groups/Channels)						
2/15	2/16	2/16	2/16	2/16	2/15	2/9
ADC (Secondary Groups/Channels)						
1/15	2/26	2/28	2/26	2/26	1/15	1/8
ADC (Fast Compare Channels)						
0	0	0	0	0	0	0
ADC (EDSADC Channels)						
0	0	0	0	0	0	0
CAN (Modules/Nodes)						
2/6	2/2x4	2/8	2/8	2/8	2/6	2/6
FlexRay (Modules/Channels)						
1/2	1/1x2	1/2	1/2	1/2	1/2	1/2
HSSL Modules						
0	0	0	0	0	0	0
ASCLIN Modules / with ASC & LIN / with 3-wire SPI						
5/5/5	12/12/10	12/12/10	12/12/10	12/12/10	5/5/5	5/5/5
QSPI Modules / with LVDS						
4/0	4/0	4/0	4/0	4/0	4/0	3/0
SENT Channels						
6	6	6	6	6	6	6

(table continues...)

5 AMU is abbreviated as ASC Modeling Unit. For Additional details about AMU, Contact an Infineon Representative

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1 TC33x/TC32x AA step variants

Table 5 (continued) TC33x and TC32x AA step (part 5)

SAL-TC333L-32F200F	SAL-TC334L-32F200F	SAL-TC337LP-32F300S	SAL-TC336LP-32F300S	SAL-TC334LP-32F300F	SAL-TC333LP-32F300F	SAL-TC332LP-32F300F
MSC Modules						
0	0	0	0	0	0	0
PSI5 Channels						
0	0	0	0	0	0	0
PSI5-S Module						
No	No	No	No	No	No	No
SDMMC Module						
No	No	No	No	No	No	No
Max. Ethernet Availability: 1GBit/100Mbit/No						
No	No	No	No	No	No	No
MCDS Availability						
No	No	No	No	No	No	No
ADAS Cluster Available						
No	No	No	No	No	No	No
CIF						
No	No	No	No	No	No	No
HSM Available						
No	No	Yes	Yes	Yes	Yes	Yes

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1.6 TC33x and TC32x AA step (part 6)

A continuation table listing the TC33x and TC32x AA step variants.

Table 6 TC33x and TC32x AA step (part 6)

SAK-TC327LP-16F160S	SAL-TC323LP-24F200F	SAL-TC324LP-24F200F	SAL-TC323L-24F200F	SAL-TC324L-24F200F	SAK-TC322LS-24F160F	SAK-TC323LS-24F160F
Step						
AA	AA	AA	AA	AA	AA	AA
Production Status						
Standard	Customer Specific	Customer Specific	Customer Specific	Customer Specific	Customer Specific	Customer Specific
Package Type						
PG-LFBGA-292	PG-QFP-100	PG-QFP-144	PG-QFP-100	PG-QFP-144	PG-QFP-80	PG-QFP-100
Pinout						
LFBGA 0.8 mm	TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm	TQFP 0.4 mm
Reference Silicon						
TC33x	TC33x	TC33x	TC33x	TC33x	TC33x	TC33x
Temperature Range (Ambient)						
SAK	SAL	SAL	SAL	SAL	SAK	SAK
Chip ID ***Attention:*** ***The value of SCU_CHIPID in the UCODE field contains the default value 0 not the µCode version.***						
0x82002780	0xA3002380	0xA3002480	0x3002380	0x3002480	0xA3002280	0xA3002380
Cores / Checker Cores						
1/1	1/1	1/1	1/1	1/1	1/1	1/1
Max. Freq. (MHz)						
160	200	200	200	200	160	160
Program Flash (MB)						
1	1.5	1.5	1.5	1.5	1.5	1.5
Data Flash0 (single-ended) (KB)						
96	96	96	96	96	96	96
Total SRAM (without EMEM and Cache) (KB)						
104	104	104	104	104	152	104
EMEM Size (KB)						
0	0	0	0	0	0	0
DSPR (KB)						
96	96	96	96	96	144	96

(table continues...)

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1 TC33x/TC32x AA step variants

Table 6 (continued) TC33x and TC32x AA step (part 6)

SAK-TC327LP-16F160S	SAL-TC323LP-24F200F	SAL-TC324LP-24F200F	SAL-TC323L-24F200F	SAL-TC324L-24F200F	SAK-TC322LS-24F160F	SAK-TC323LS-24F160F
DLMU (KB)						
0	0	0	0	0	0	0
PSPR (KB)						
8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0	8 in CPU0
LMU (KB)						
0	0	0	0	0	0	0
DAM (KB)						
0	0	0	0	0	0	0
AMU[6)]						
No	No	No	No	No	No	No
ADC (Primary Groups/Channels)						
2/16	2/15	2/16	2/15	2/16	2/9	2/15
ADC (Secondary Groups/Channels)						
2/28	1/15	2/26	1/15	2/26	1/8	1/15
ADC (Fast Compare Channels)						
0	0	0	0	0	0	0
ADC (EDSADC Channels)						
0	0	0	0	0	0	0
CAN (Modules/Nodes)						
2/6	2/6	2/6	2/6	2/6	2/6	2/6
FlexRay (Modules/Channels)						
0	0	0	0	0	0	0
HSSL Modules						
0	0	0	0	0	0	0
ASCLIN Modules / with ASC & LIN / with 3-wire SPI						
6/6/6	5/5/5	6/6/6	5/5/5	6/6/6	5/5/5	5/5/5
QSPI Modules / with LVDS						
4/0	4/0	4/0	4/0	4/0	3/0	4/0
SENT Channels						
6	6	6	6	6	6	6

(table continues...)

6 AMU is abbreviated as ASC Modeling Unit. For Additional details about AMU, Contact an Infineon Representative

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1 TC33x/TC32x AA step variants

Table 6 (continued) TC33x and TC32x AA step (part 6)

SAK-TC327LP-16F160S	SAL-TC323LP-24F200F	SAL-TC324LP-24F200F	SAL-TC323L-24F200F	SAL-TC324L-24F200F	SAK-TC322LS-24F160F	SAK-TC323LS-24F160F
MSC Modules						
0	0	0	0	0	0	0
PSI5 Channels						
0	0	0	0	0	0	0
PSI5-S Module						
No	No	No	No	No	No	No
SDMMC Module						
No	No	No	No	No	No	No
Max. Ethernet Availability: 1GBit/100Mbit/No						
No	No	No	No	No	No	No
MCDS Availability						
No	No	No	No	No	No	No
ADAS Cluster Available						
No	No	No	No	No	No	No
CIF						
No	No	No	No	No	No	No
HSM Available						
Yes	Yes	Yes	No	No	Yes	Yes

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1.7 TC33x and TC32x AA step (part 7)

A continuation table listing the TC33x and TC32x AA step variants.

Table 7 TC33x and TC32x AA step (part 7)

	SAK-TC332LS-32F200F
Step	
	AA
Production Status	
	Customer Specific
Package Type	
	PG-QFP-80
Pinout	
	TQFP 0.4 mm
Reference Silicon	
	TC33x
Temperature Range (Ambient)	
	SAK
Chip ID ***Attention**: The value of SCU_CHIPID in the UCODE field contains the default value 0 not the µCode version.*	
	0x84003280
Cores / Checker Cores	
	1/1
Max. Freq. (MHz)	
	200
Program Flash (MB)	
	2
Data Flash0 (single-ended) (KB)	
	128
Total SRAM (without EMEM and Cache) (KB)	
	208
EMEM Size (KB)	
	0
DSPR (KB)	
	192
DLMU (KB)	
	8 in CPU0

(table continues...)

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1 TC33x/TC32x AA step variants

Table 7 (continued) TC33x and TC32x AA step (part 7)

	SAK-TC332LS-32F200F
PSPR (KB)	
	8 in CPU0
LMU (KB)	
	0
DAM (KB)	
	0
AMU[7)]	
	No
ADC (Primary Groups/Channels)	
	2/9
ADC (Secondary Groups/Channels)	
	1/8
ADC (Fast Compare Channels)	
	0
ADC (EDSADC Channels)	
	0
CAN (Modules/Nodes)	
	2/6
FlexRay (Modules/Channels)	
	1/2
HSSL Modules	
	0
ASCLIN Modules / with ASC & LIN / with 3-wire SPI	
	5/5/5
QSPI Modules / with LVDS	
	3/0
SENT Channels	
	6
MSC Modules	
	0
PSI5 Channels	
	0

(table continues...)

7 AMU is abbreviated as ASC Modeling Unit. For Additional details about AMU, Contact an Infineon Representative

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1 TC33x/TC32x AA step variants

Table 7 (continued) TC33x and TC32x AA step (part 7)

	SAK-TC332LS-32F200F
PSI5-S Module	
	No
SDMMC Module	
	No
Max. Ethernet Availability: 1GBit/100Mbit/No	
	No
MCDS Availability	
	No
ADAS Cluster Available	
	No
CIF	
	No
HSM Available	
	Yes

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2 Memory maps of TC33x/TC32x variants

This section describes the influence of the available feature variants on the memory map.

Program flash

Variants:

- 2 MB: umbrella for TC33x (1 x 2 MB), see User's Manual.
- 1.5 MB (see Figure below).
- 1 MB (see Figure below).

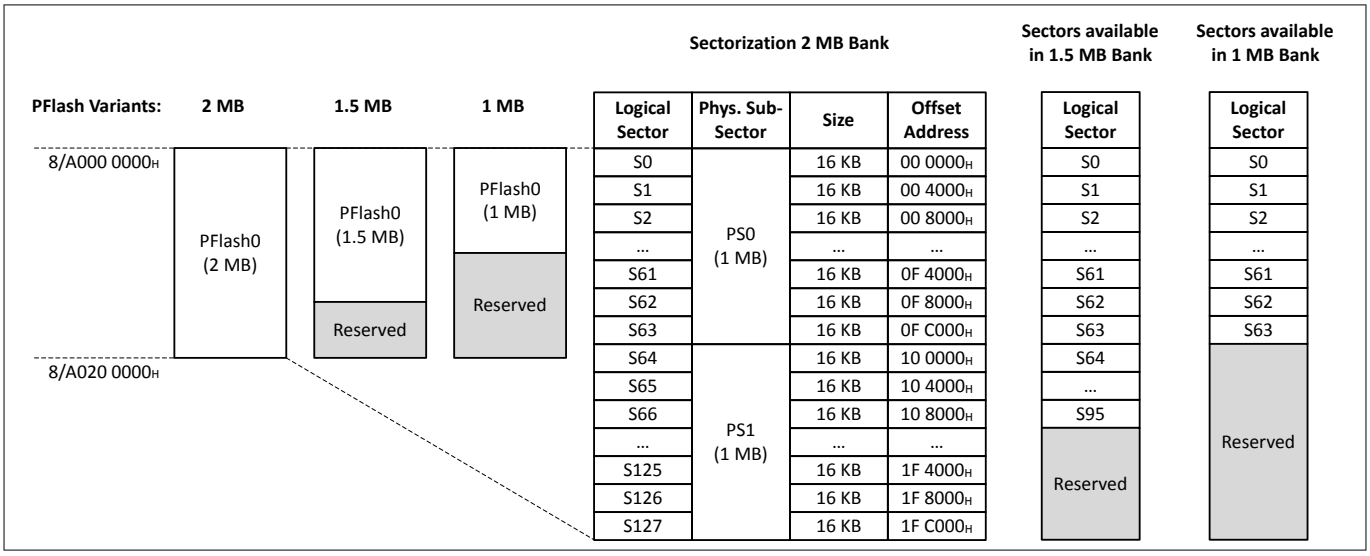

Figure 1 PFlash variants

Data flash

Variants:

- 128 KB: umbrella for TC33x, see User's Manual.
- 96 KB (see figure below).

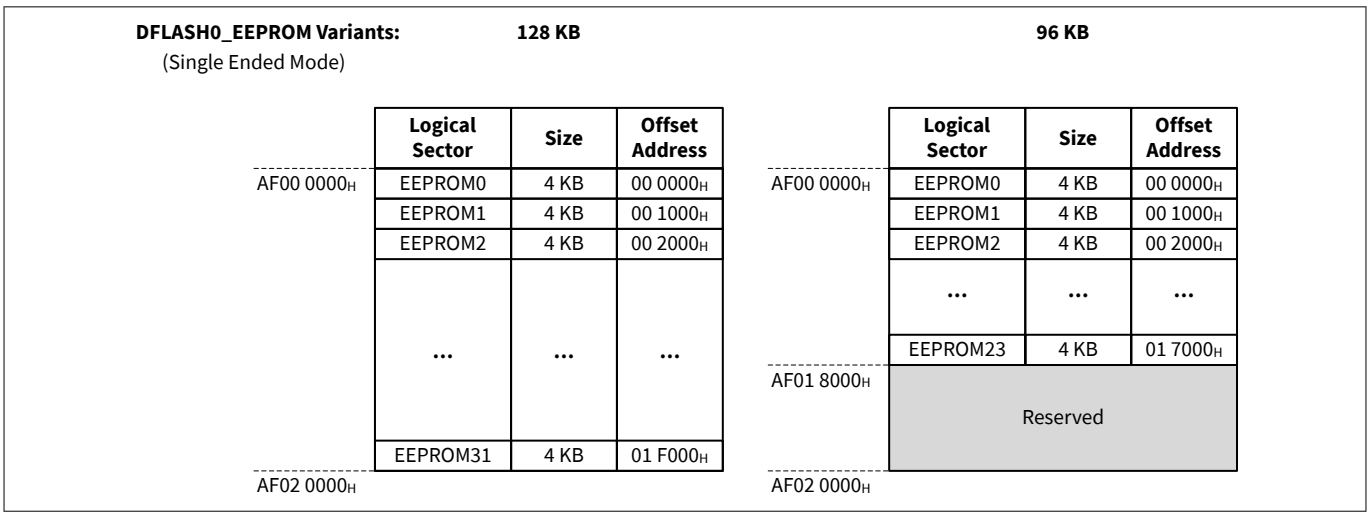

Figure 2 DFlash variants

CPU RAMs

DSPR variants:

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2 Memory maps of TC33x/TC32x variants

- DSPR: 192 KB in CPU0: umbrella for TC33x, see User's Manual.
- DSPR: 144 KB in CPU0: reduced RAM variant of TC33x/TC32x (see Figure below for available DSPR address ranges).
- DSPR: 96 KB in CPU0: reduced RAM variant of TC33x/TC32x (see Figure below for available DSPR address ranges).

DLMU variants:

- DLMU: 8 KB in CPU0: umbrella for TC33x, see User's Manual.
- DLMU: 0 KB: reduced RAM variant of TC33x (see figure below for available DLMU address ranges).

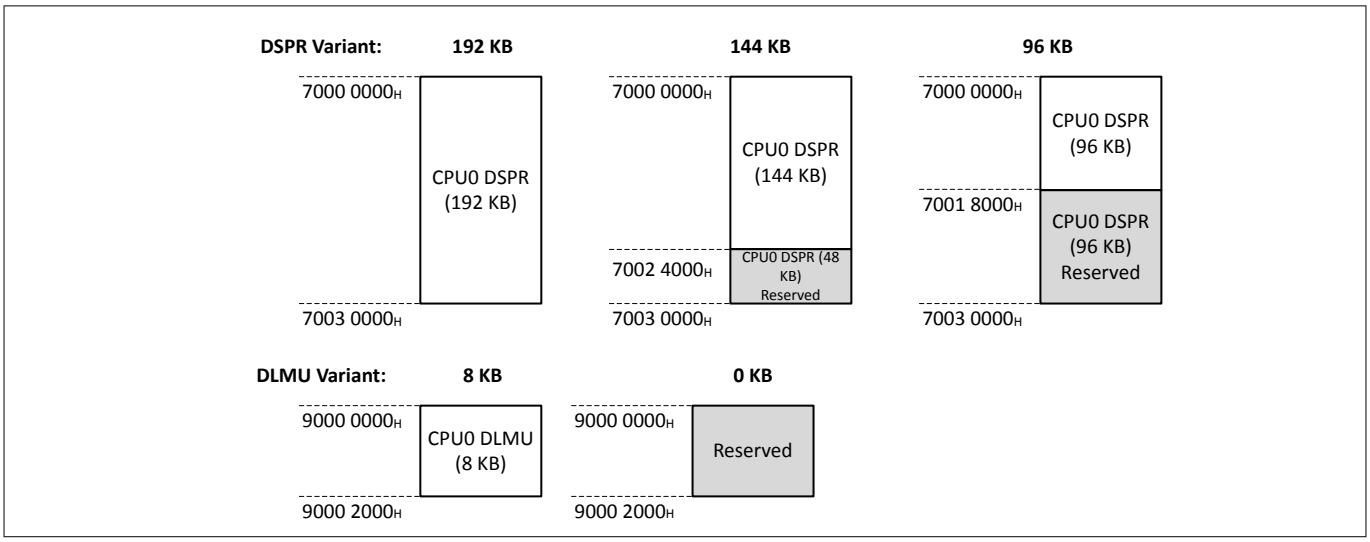

Figure 3 DSPR and DLMU variants

HSM

Variants:

- Yes: umbrella, see User's Manual.
- No: HSM and DF1 are not available.

ADC Availability

- Limitation on availability of ADC channels are caused by pin limitations. See Data Sheet for the pinning table of the package.

CAN and ASCLIN Availability

- In case of a lesser number of channels or nodes are specified for a particular package variant, then the Nodes or Channels in sequence are to be used to honor the lesser number.

  Example: Number of CAN Nodes specified as 2/8 and 2/6 for different package variants than in the case of 2/6, the first 6 CAN Nodes namely CAN0 – Node[0:3] and CAN1 – Node[0:1] are to be used.

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Revision history

Document version	Date of release	Description of changes
V1.0	2019-03-01	• First release.
V1.1	2019-06-12	• Chapter 1: Added the Variants SAK-TC327LP-16F160S, SAL-TC327LP-16F160S • Chapter 1: TC33x AA step variants table format changed to fit all the contents. • Chapter 1: Added new row in the variant tables called "AMU" with the footnote for additional details. • Chapter: About this document: Feature package definitions are updated to consistent with the product naming nomenclature definition.
V1.2	2019-08-13	• Chapter 1: Added the Variants SAK-TC323LP-24F200F,SAK-TC324LP-24F200F,SAK-TC323L-24F200F,SAK-TC324L-24F200F • Chapter 1.3: ChipID values changed for the variants SAK-TC336LP-32F200S,SAL-TC336LP-32F200S,SAK-TC336LP-32F300S due to the change in VART fields.
V1.3	2020-03-13	• Chapter 1: Added the Variants SAK-TC333L-32F200F, SAK-TC334L-32F200F, SAL-TC333L-32F200F, SAL-TC334L-32F200F, SAL-TC337LP-32F300S, SAL-TC336LP-32F300S, SAL-TC334LP-32F300F, SAL-TC333LP-32F300F, SAL-TC332LP-32F300F,SAL-TC323LP-24F200F, SAL-TC324LP-24F200F, SAL-TC323L-24F200F, SAL-TC324L-24F200F, SAK-TC322LS-24F160F, SAK-TC323LS-24F160F. • Page 1: About the document:Feature Package 'X' definition is updated to remove CIF. • Chapter 1:Added new row in the variant tables called "CIF" indicating the Camera Interface availability. • Chapter 1: In the PSPR (KB) row, added 'per CPU' to make it more transparent. • Chapter 1: SAL-TC327LP-16F160S, SAK-TC327LP-16F160S - ADC (Secondary Groups/ Channels) changed to 2/28. • Chapter 2: Updated the Figure 3 with the 144KB DSPR variant.
V1.4	2020-11-19	• Chapter 1: SAK-TC333LP-32F200F,SAL-TC333LP-32F200F,SAK-TC323LP-16F160F,SAK-TC322LP-16F160F,SAK-TC332LP-32F200F,SAL-TC332LP-32F200F,SAK-TC332LP-32F300F,SAK-TC333LP-32F300F,SAK-TC323LP-24F200F,SAK-TC323L-24F200F,SAL-TC323LP-16F160F,SAL-TC322LP-16F160F,SAK-TC333L-32F200F,SAL-TC333L-32F200F,SAL-TC333LP-32F300F,SAL-TC332LP-32F300F,SAL-TC323LP-24F200F,SAL-TC323L-24F200F,SAK-TC322LS-24F160FSAK-TC323LS-24F160F - ADC (Primary and Secondary Groups/ Channels) For TC333x/TC323x changed the Primary Groups/Channels to: 2 / 15, Secondary Groups/ Channels to: 1 / 15 and for TC332x/TC322x changed the Primary Groups/ Channels to: 2 / 9, Secondary Groups/Channels to: 1 / 8 respectively. • Chapter 2: Added a note regarding the CAN and ASCLIN availability in the variants.
V1.5	2021-06-25	• Chapter 1: Added new TC33x AA variant: SAK-TC332LS-32F200F. • Chapter 1: SAK-TC322LS-24F160F:QSPI modules corrected from 4 to 3.

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