AURIX™ TC23x variants

Data Sheet Addendum

TC233 / TC234 / TC237

AURIX™

32-bit microcontroller

Addendum

v1.7, 2015-12-17

Microcontrollers

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About this document

Scope and purpose

This document is an addendum to the TC23x data sheet listing all intended product variants, key parameters such as memory size and optional features.

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

- L – Standard type without HSM
- LP – Standard type with HSM
- LC – Customer specific feature set
- LX – SRAM extension – HSM enabled
- LA – ADAS feature package – HSM enabled

1. Variants AB Step

Derivative	Production Status	Package Type	Temp. Range	Chip ID	Freq. (MHz)	Flash (MB) 1)	DFLASH (KB@cycles)	Total SRAM (KB)	Core 0 TC16E 1)		ADC Chan.	FlexRay (#/ch.)	ETH	HSM
									DSPR (KB)	PSPR (KB)				
SAK-TC237LP-32F200S AB	on request	PG-LFBGA-292-6	-40°C - +125 °C	4442 3241 H 4446 3241 H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	Yes
SAK-TC234LP-32F200F AB	on request	PG-TQFP-144-27	-40°C - +125 °C	4442 3141 H 4446 3141 H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	Yes
SAK-TC233LP-32F200F AB	on request	PG-TQFP-100-23	-40°C - +125 °C	4442 3041 H 4446 3041 H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	Yes
SAL-TC237LP-32F200S AB	on request	PG-LFBGA-292-6	-40°C - +150 °C	4442 3241H 4446 3241H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	Yes
SAL-TC234LP-32F200F AB	on request	PG-TQFP-144-27	-40°C - +150 °C	4442 3141 H 4446 3141 H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	Yes
SAL-TC233LP-32F200F AB	on request	PG-TQFP-100-23	-40°C - +150 °C	4442 3041 H 4446 3041 H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	Yes
SAK-TC237L-32F200S AB	on request	PG-LFBGA-292-6	-40°C - +125 °C	0442 3241 H 0446 3241 H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	No
SAK-TC234L-32F200F AB	on request	PG-TQFP-144-27	-40°C - +125 °C	0442 3141 H 0446 3141 H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	No
SAK-TC233L-32F200F AB	on request	PG-TQFP-100-23	-40°C - +125 °C	0442 3041 H 0446 3041 H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	No
SAK-TC234LP-16F200F AB	on request	PG-TQFP-144-27	-40°C - +125 °C	4242 3141 H 4246 3141 H 2)	200	1	128@125k	96	88	8	24	1 / 2	No	Yes
SAK-TC233L-16F200F AB	on request	PG-TQFP-100-23	-40°C - +125 °C	0242 3041 H 0246 3041 H 2)	200	1	128@125k	96	88	8	24	1 / 2	No	No
SAK-TC233LP-16F200F AB	on request	PG-TQFP-100-23	-40°C - +125 °C	4242 3041 H 4246 3041 H 2)	200	1	128@125k	96	88	8	24	1 / 2	No	Yes
SAL-TC237L-32F200S AB	on request	PG-LFBGA-292-6	-40°C - +150 °C	0442 3241 H 0446 3241 H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	No
SAL-TC234L-32F200F AB	on request	PG-TQFP-144-27	-40°C - +150 °C	0442 3141 H 0446 3141 H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	No

SAL-TC233L-32F200F AB	on request	PG-TQFP-100-23	-40°C - +150 °C	0442 3041 H 0446 3041 H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	No
SAL-TC234LP-16F200F AB	on request	PG-TQFP-144-27	-40°C - +150 °C	4242 3141 H 4246 3141 H 2)	200	1	128@125k	96	88	8	24	1 / 2	No	Yes
SAL-TC233LP-16F200F AB	on request	PG-TQFP-100-23	-40°C - +150 °C	4242 3041 H 4246 3041 H 2)	200	1	128@125k	96	88	8	24	1 / 2	No	Yes
SAK-TC233LC-24F133F AB	on request	PG-TQFP-100-23	-40°C - +125 °C	5342 3441 H 5346 3441 H 2)	133	1,5	128@125k	128	120	8	24	1 / 2	No	Yes

1) The address range starts at lowest address defined in the User's Manual (See the Memory Maps chapter).
2) Featuring microcode 23_H

2. Variants AB Step – Special Types

Derivative	Production Status	Package Type	Temp. Range	Chip ID	Freq. (MHz)	Flash (MB) 1)	DFLASH (KB@cycles)	Total SRAM (KB)	Core 0 TC16E 1)		LMU (KB)	EMEM (KB)	ADC Chan.	FlexRay (#/ch.)	ETH	HSM	FFT
									DSPR (KB)	PSPR (KB)							
SAK-TC234LA-32F200F AB	STANDARD	PG-TQFP-144-27	-40°C - +125 °C	$4443\ 3941_H$ $4447\ 3941_{H}$ 2)	200	2	128@125k	736	184	8	512	32	24	1 / 2	Yes	Yes	Yes
SAK-TC234LX-32F200F AB	STANDARD	PG-TQFP-144-27	-40°C - +125 °C	$4443\ 3941_H$ $4447\ 3941_{H}$ 2)	200	2	128@125k	736	184	8	512	32	24	1 / 2	Yes	Yes	No

1) The address range starts at lowest address defined in the User's Manual (See the Memory Maps chapter).
2) Featuring microcode 23_H

3. Variants AC Step

Derivative	Production Status	Package Type	Temp. Range	Chip ID	Freq. (MHz)	Flash (MB) 1)	DFLASH (KB@cycles)	Total SRAM (KB)	Core 0 TC16E 1)		ADC Chan.	FlexRay (#/ch.)	ETH	HSM	CAN FD	CAN FD
									DSPR (KB)	PSPR (KB)						ISO 11898-1
SAK-TC237LP-32F200N AC	STANDARD	PG-LFBGA-292-6	-40°C - +125 °C	4446 3242 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	Yes	Yes
SAK-TC234LP-32F200N AC	STANDARD	PG-TQFP-144-27	-40°C - +125 °C	4446 3142 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	Yes	Yes
SAK-TC233LP-32F200N AC	STANDARD	PG-TQFP-100-23	-40°C - +125 °C	4446 3042 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	Yes	Yes
SAL-TC237LP-32F200N AC	on request	PG-LFBGA-292-6	-40°C - +150 °C	4446 3242 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	Yes	Yes
SAL-TC234LP-32F200N AC	on request	PG-TQFP-144-27	-40°C - +150 °C	4446 3142 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	Yes	Yes
SAL-TC233LP-32F200N AC	on request	PG-TQFP-100-23	-40°C - +150 °C	4446 3042 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	Yes	Yes
SAK-TC237L-32F200N AC	on request	PG-LFBGA-292-6	-40°C - +125 °C	0446 3242 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	Yes	Yes
SAK-TC234L-32F200N AC	on request	PG-TQFP-144-27	-40°C - +125 °C	0446 3142 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	Yes	Yes
SAK-TC233L-32F200N AC	on request	PG-TQFP-100-23	-40°C - +125 °C	0446 3042 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	Yes	Yes
SAK-TC234LP-16F200N AC	on request	PG-TQFP-144-27	-40°C - +125 °C	4246 3142 H	200	1	128@125k	96	88	8	24	1 / 2	No	Yes	Yes	Yes
SAK-TC233LP-16F200N AC	on request	PG-TQFP-100-23	-40°C - +125 °C	4246 3042 H	200	1	128@125k	96	88	8	24	1 / 2	No	Yes	Yes	Yes
SAL-TC237L-32F200N AC	on request	PG-LFBGA-292-6	-40°C - +150 °C	0446 3242 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	Yes	Yes
SAL-TC234L-32F200N AC	on request	PG-TQFP-144-27	-40°C - +150 °C	0446 3142 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	Yes	Yes
SAL-TC233L-32F200N AC	on request	PG-TQFP-100-23	-40°C - +150 °C	0446 3042 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	Yes	Yes
SAK-TC233LC-24F133N AC	on request	PG-TQFP-100-23	-40°C - +125 °C	5346 3442 H	133	1,5	128@125k	128	120	8	24	1 / 2	No	Yes	Yes	Yes

1) The address range starts at lowest address defined in the User's Manual (See the Memory Maps chapter).

4. Memory Maps of Variants

This section shows the influence of above feature variants on the memory map.

Sectorization of a 2 MB Bank

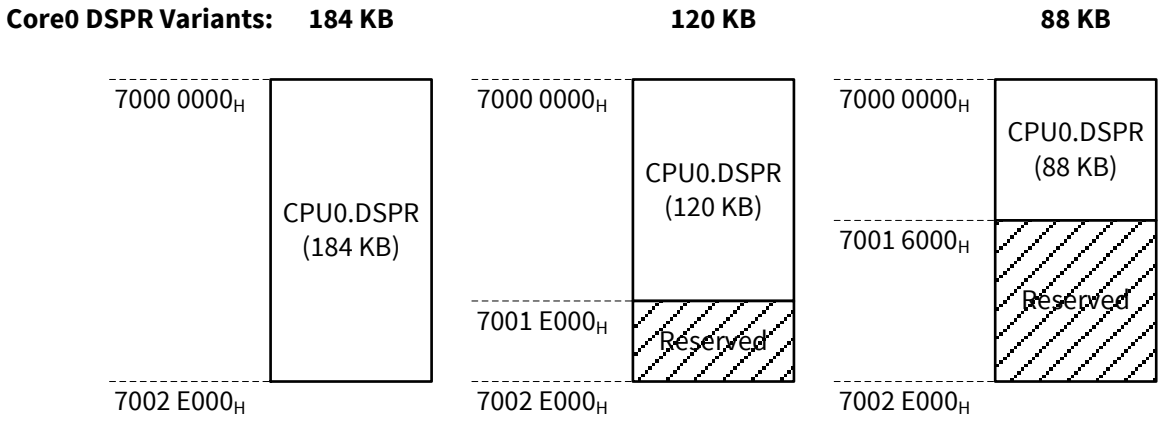
Logical Sector	Phys. Sub-Sector	Size	Offset Address
S0	PS0 (512 KB)	16 KB	00 0000H
S1		16 KB	00 4000H
S2		16 KB	00 8000H
S3		16 KB	00 C000H
S4		16 KB	01 0000H
S5		16 KB	01 4000H
S6		16 KB	01 8000H
S7		16 KB	01 C000H
S8		32 KB	02 0000H
S9		32 KB	02 8000H
S10		32 KB	03 0000H
S11		32 KB	03 8000H
S12		32 KB	04 0000H
S13		32 KB	04 8000H
S14		32 KB	05 0000H
S15		32 KB	05 8000H
S16		64 KB	06 0000H
S17		64 KB	07 0000H
S18	PS1 (512 KB)	64 KB	08 0000H
S19		64 KB	09 0000H
S20		128 KB	0A 0000H
S21		128 KB	0C 0000H
S22		128 KB	0E 0000H
S23	PS2 (512 KB)	256 KB	10 0000H
S24		256 KB	14 0000H
S25	PS3 (512 KB)	256 KB	18 0000H
S26		256 KB	1C 0000H

Sectors available in 1.5 MB Bank

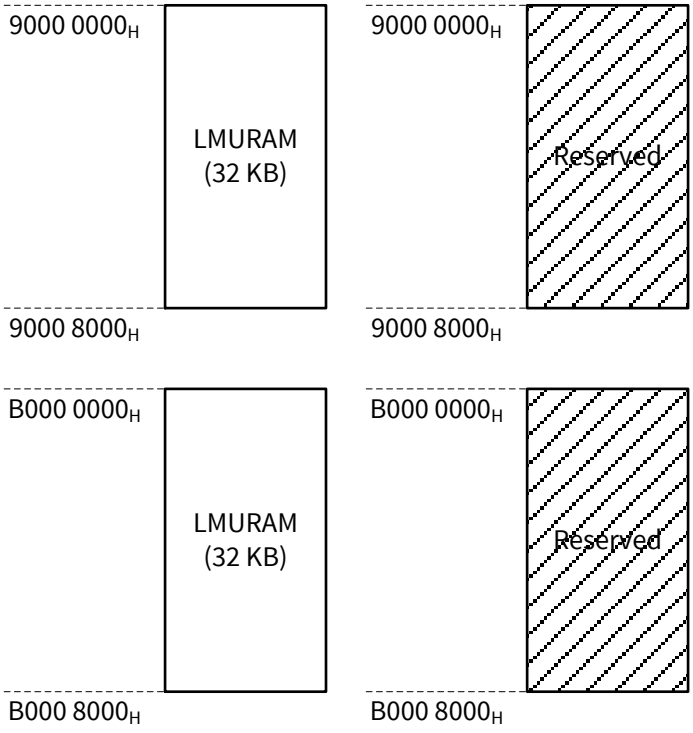
Logical Sector
S0
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
S17
S18
S19
S20
S21
S22
S23
S24
Reserved

Sectors available in 1 MB Bank

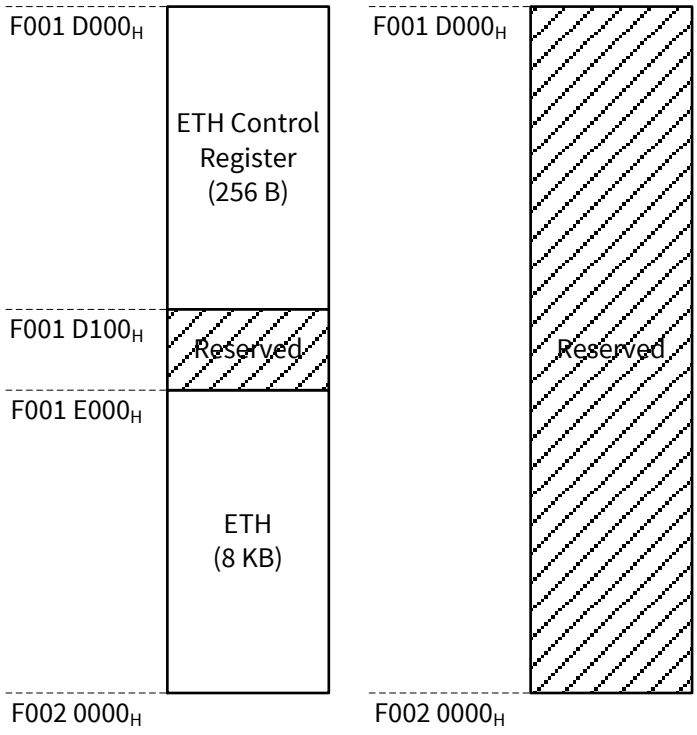
Logical Sector
S0
S1
S2
S3
S4
S5
S6
S7
S8
S9
S10
S11
S12
S13
S14
S15
S16
S17
S18
S19
S20
S21
S22
Reserved



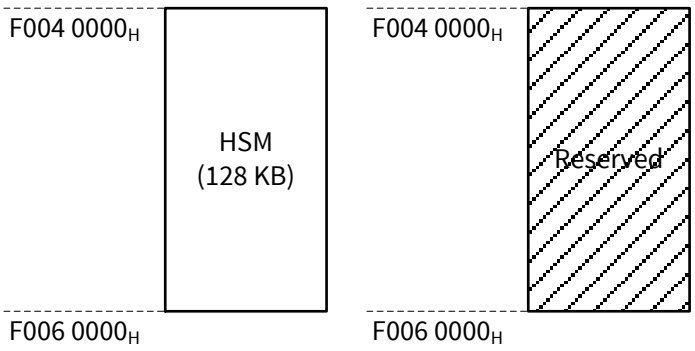
LMU Variants: **32 KB** **0 KB**



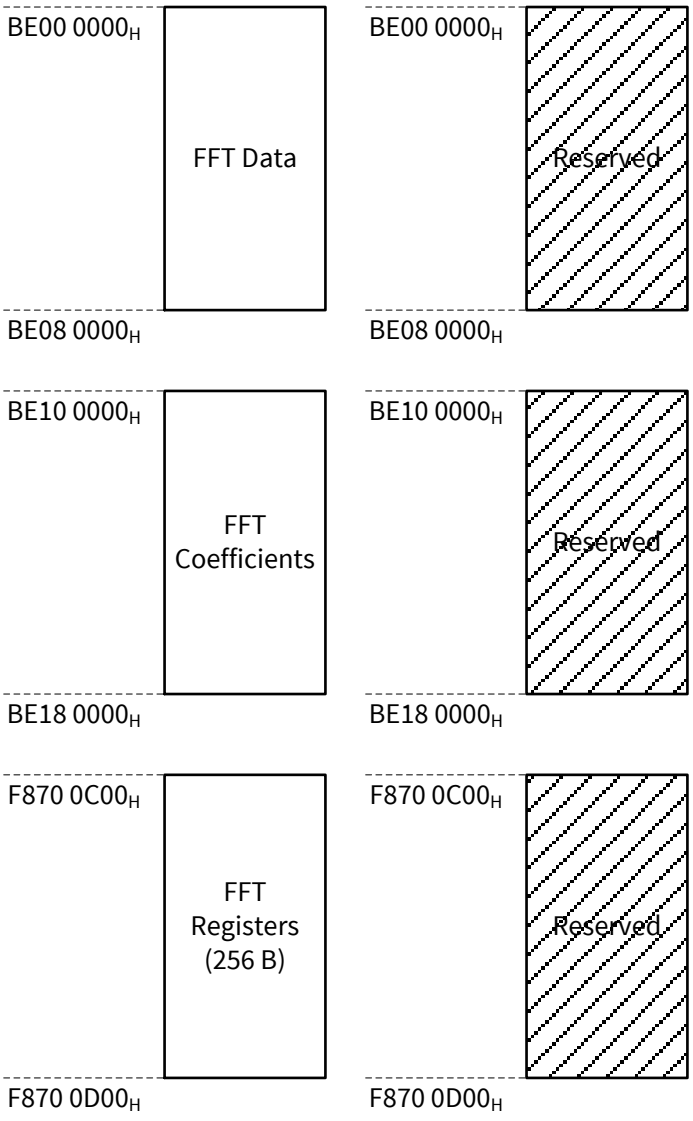
ETH Variants: **Yes** **No**



HSM Variants: **Yes** **No**



ADAS Variants: **FFT Yes** **FFT No**



ADAS Variants:

ADAS = “Yes” variants:

Additionally the VADC kernels ADC02 and ADC03 are available, offering the Converter Groups G02 and G03. Due to that the group related registers with x = 2 and x = 3 are implemented.

Revision History

Major changes since the last revision

Page or Reference	Description of change
v1.0	First release
v1.1	Chip ID added
v1.2	Implementation of review comments
v1.3	Correction in marking of SAK-TC237LA-32F200S AB and SAK-TC237LX-32F200S AB
v1.4	Change in documentation of FFT feature
v1.5	CAN FD DIS 2015 Memory Maps µCode 23_H (Flash firmware version) added
v1.6	Implementation of review comments
v1.7	CAN FD Chip ID added LMU / EMEM info added

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