

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 _{H2)}	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 _{H2)}	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 _{H2)}	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 3241 _H 4446 3241 _{H2)}	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 _{H2)}	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 _{H2)}	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 _{H2)}	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 _{H2)}	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 _{H2)}	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 _{H2)}	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 _{H2)}	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 _{H2)}	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 _{H2)}	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 _{H2)}	200	2	128@125k	192	184	8	24	1 / 2	No	No

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SAL-TC233L-32F200F AB	on request	PG-TQFP-100-23	-40°C - +150 °C	0442 3041 _H 0446 3041 _{H2})	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 _{H2})	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 _{H2})	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 _{H2})	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 _{H2)}	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 _{H2)}	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 ISO 11898-1
									DSPR (KB)	PSPR (KB)						
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

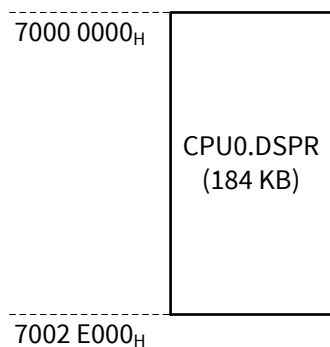
1) The address range starts at lowest address defined in the User's Manual (See the Memory Maps chapter).

4. Memory Maps of Variants

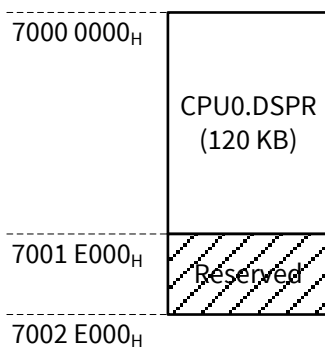
This section shows the influence of above feature variants on the memory map.

Sectorization of a 2 MB Bank								Sectors available in 1.5 MB Bank		Sectors available in 1 MB Bank	
PFlash Variants:	2 MB	1.5 MB	1 MB	Logical Sector	Phys. Sub-Sector	Size	Offset Address	Logical Sector	Logical Sector		
8/A000 0000 _H 8/A020 0000 _H	PFlash0 (2 MB)	PFlash0 (1.5 MB) Reserved	PFlash0 (1 MB) Reserved	S0	PS0 (512 KB)	16 KB	00 0000 _H	S0	S0		
				S1		16 KB	00 4000 _H	S1	S1		
				S2		16 KB	00 8000 _H	S2	S2		
				S3		16 KB	00 C000 _H	S3	S3		
				S4		16 KB	01 0000 _H	S4	S4		
				S5		16 KB	01 4000 _H	S5	S5		
				S6		16 KB	01 8000 _H	S6	S6		
				S7		16 KB	01 C000 _H	S7	S7		
				S8		32 KB	02 0000 _H	S8	S8		
				S9		32 KB	02 8000 _H	S9	S9		
				S10		32 KB	03 0000 _H	S10	S10		
				S11		32 KB	03 8000 _H	S11	S11		
				S12		32 KB	04 0000 _H	S12	S12		
				S13		32 KB	04 8000 _H	S13	S13		
				S14		32 KB	05 0000 _H	S14	S14		
				S15		32 KB	05 8000 _H	S15	S15		
				S16		64 KB	06 0000 _H	S16	S16		
				S17		64 KB	07 0000 _H	S17	S17		
				S18	PS1 (512 KB)	64 KB	08 0000 _H	S18	S18		
				S19		64 KB	09 0000 _H	S19	S19		
				S20		128 KB	0A 0000 _H	S20	S20		
				S21		128 KB	0C 0000 _H	S21	S21		
				S22		128 KB	0E 0000 _H	S22	S22		
				S23	PS2 (512 KB)	256 KB	10 0000 _H	S23	Reserved		
				S24	256 KB	14 0000 _H	S24				
				S25	PS3 (512 KB)	256 KB	18 0000 _H	Reserved		Reserved	
				S26	256 KB	1C 0000 _H					

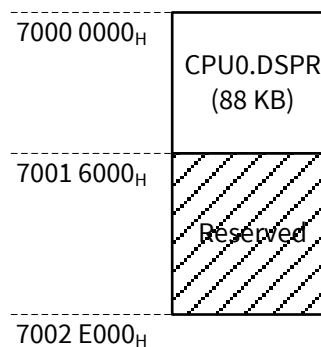
Core0 DSPR Variants: 184 KB

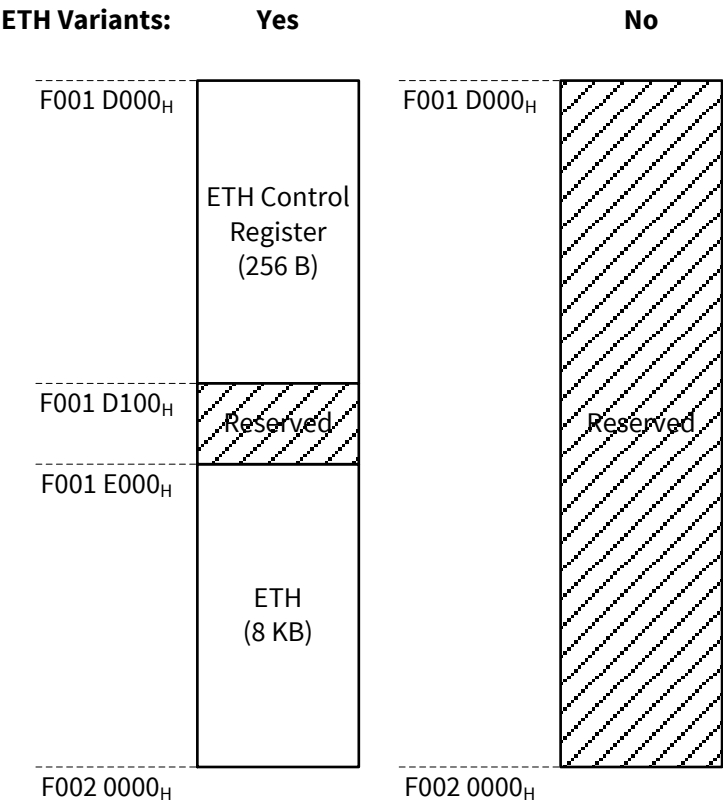
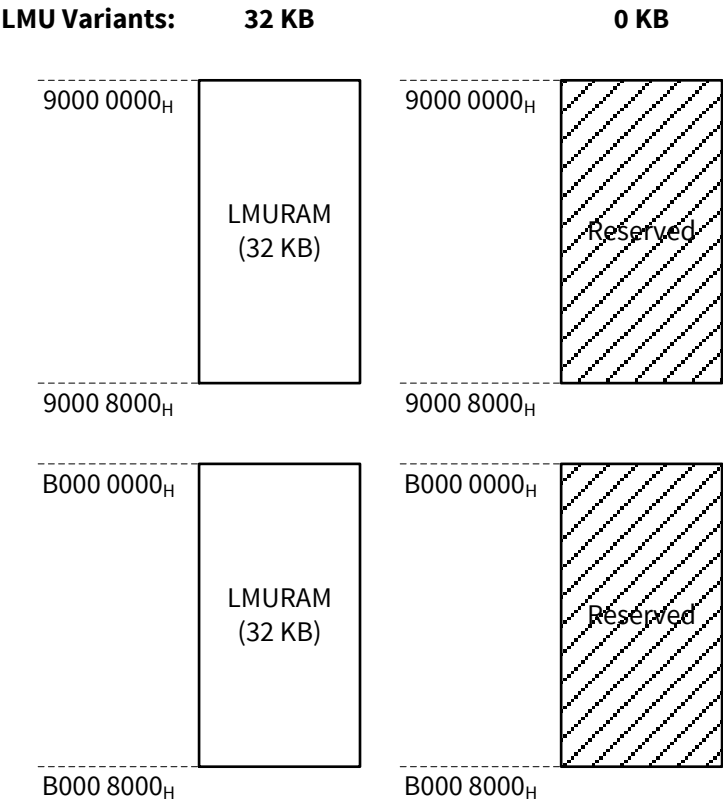


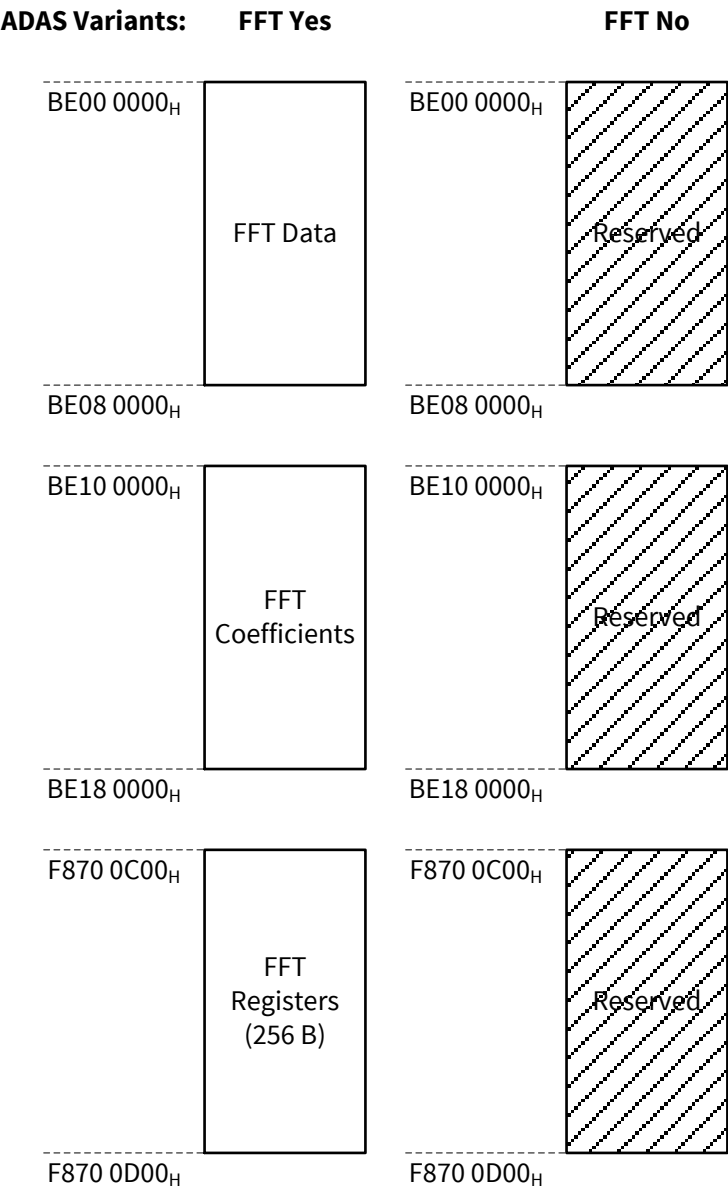
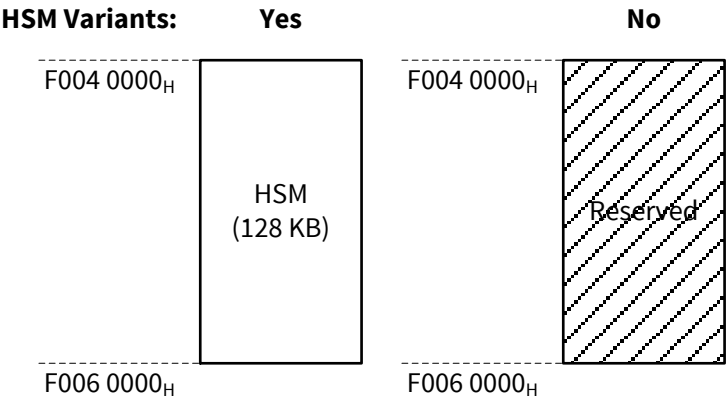
120 KB



88 KB







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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