AURIX™ TC23x variants

Datasheet Addendum

About this document

Scope and purpose

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

Prefix naming conventions

- 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 naming conventions

- 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
- S – Single Core without Lockstep and HSM
- SP – Single Core with HSM

Table of contents

About this document 1
Table of contents 1
1 Variants AB Step 2
2 Variants AB Step – Special Types 4
3 Variants AC Step 5
4 Memory maps of variants 7
Revision history 10

1 Variants AB Step

Derivative	Production Status	Package Type	Temp. Range	Chip ID	Freq. (MHz)	Flash (MB) 1)	EEPROM (KB)	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	-40°C - +125 °C	4442 3241 H 4446 3241 H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	Yes
SAK-TC234LH-32F200F AB	on request	PG-TQFP-144	-40°C - +125 °C	4447 3941 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes
SAK-TC234LP-32F200F AB	on request	PG-TQFP-144	-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	-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	-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	-40°C - +150 °C	4442 3141 H 4446 3141 H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	Yes
SAK-TC234L-24F200F AB	on request	PG-TQFP-144	-40°C - +125 °C	0442 3141 H 0446 3141 H 2)	200	1.5	128@125k	192	184	8	24	1 / 2	No	No
SAL-TC233LP-32F200F AB	on request	PG-TQFP-100	-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	-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	-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	-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	-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	-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	-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	-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	-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	-40°C - +150 °C	0442 3041 H 0446 3041 H 2)	200	2	128@125k	192	184	8	24	1 / 2	No	No

Variants AB Step

Derivative	Production Status	Package Type	Temp. Range	Chip ID	Freq. (MHz)	Flash (MB) 1)	EEPROM (KB)	Total SRAM (KB)	Core 0 TC16E 1)		ADC Chan.	FlexRay (#/ch.)	ETH	HSM
									DSPR (KB)	PSPR (KB)				
SAL-TC234LP-16F200F AB	on request	PG-TQFP-144	-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	-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	-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 the 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)	EEPROM (KB)	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	-40°C - +125 °C	4443 3941 H 4447 3941 H 2)	200	2	128@125k	736	184	8	32	512	24	1 / 2	Yes	Yes	Yes
SAK-TC234LX-32F200F AB	STANDARD	PG-TQFP-144	-40°C - +125 °C	4443 3941 H 4447 3941 H 2)	200	2	128@125k	736	184	8	32	512	24	1 / 2	Yes	Yes	No

1) The address range starts at the 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)	EEPROM (KB)	Total SRAM (KB)	Core 0 TC16E 1)		ADC Chan.	FlexRay (#/ch.)	ETH	HSM	CAN FD ISO 11898-1
									DSPR (KB)	PSPR (KB)					
SAK-TC237LP-32F200N AC	STANDARD	PG-LFBGA-292	-40°C - +125 °C	4446 3242 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	Yes
SAK-TC237LP-32F200S AC	on request	PG-LFBGA-292	-40°C - +125 °C	4446 3242 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	No
SAK-TC234LP-32F200F AC	on request	PG-TQFP-144	-40°C - +125 °C	4446 3142 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	No
SAK-TC234LP-32F200N AC	STANDARD	PG-TQFP-144	-40°C - +125 °C	4446 3142 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	Yes
SAK-TC233LC-24F133N AC	on request	PG-TQFP-100	-40°C - +125 °C	5346 3442 H	133	1.5	128@125k	192	184	8	24	1 / 2	No	Yes	Yes
SAK-TC233LP-24F200N AC	on request	PG-TQFP-100	-40°C - +125 °C	4346 3042 H	200	1.5	128@125k	192	184	8	24	1 / 2	No	Yes	Yes
SAK-TC233LP-16F200F AC	on request	PG-TQFP-100	-40°C - +125 °C	4246 3042 H	200	1	128@125k	192	184	8	24	1 / 2	No	Yes	No
SAK-TC233LP-32F200F AC	on request	PG-TQFP-100	-40°C - +125 °C	4446 3042 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	No
SAK-TC233LP-32F200N AC	STANDARD	PG-TQFP-100	-40°C - +125 °C	4446 3042 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	Yes
SAL-TC237LP-32F200N AC	on request	PG-LFBGA-292	-40°C - +150 °C	4446 3242 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	Yes
SAL-TC237LP-32F200S AC	on request	PG-LFBGA-292	-40°C - +150 °C	4446 3242 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	No
SAL-TC233LP-32F200F AC	on request	PG-TQFP-100	-40°C - +150 °C	4446 3042 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	No
SAL-TC233LP-32F200N AC	on request	PG-TQFP-100	-40°C - +150 °C	4446 3042 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	Yes
SAK-TC237L-32F200N AC	on request	PG-LFBGA-292	-40°C - +125 °C	0446 3242 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	Yes
SAK-TC237L-32F200S AC	on request	PG-LFBGA-292	-40°C - +125 °C	0446 3242 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	No
SAK-TC234L-32F200F AC	on request	PG-TQFP-144	-40°C - +125 °C	0446 3142 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	No
SAK-TC234L-32F200N AC	on request	PG-TQFP-144	-40°C - +125 °C	0446 3142 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	Yes
SAK-TC233L-32F200N AC	on request	PG-TQFP-100	-40°C - +125 °C	0446 3042 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	Yes
SAK-TC233L-32F200F AC	on request	PG-TQFP-100	-40°C - +125 °C	0446 3042 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	No
SAK-TC233S-32F200N AC	on request	PG-TQFP-100	-40°C - +125 °C	0446 3042 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	Yes
SAK-TC234LP-24F200F AC	on request	PG-TQFP-144	-40°C - +125 °C	4346 3142 H	200	1.5	128@125k	128	120	8	24	1 / 2	No	Yes	No
SAK-TC234L-24F200F AC	on request	PG-TQFP-144	-40°C - +125 °C	0346 3142 H	200	1.5	128@125k	128	120	8	24	1 / 2	No	No	No

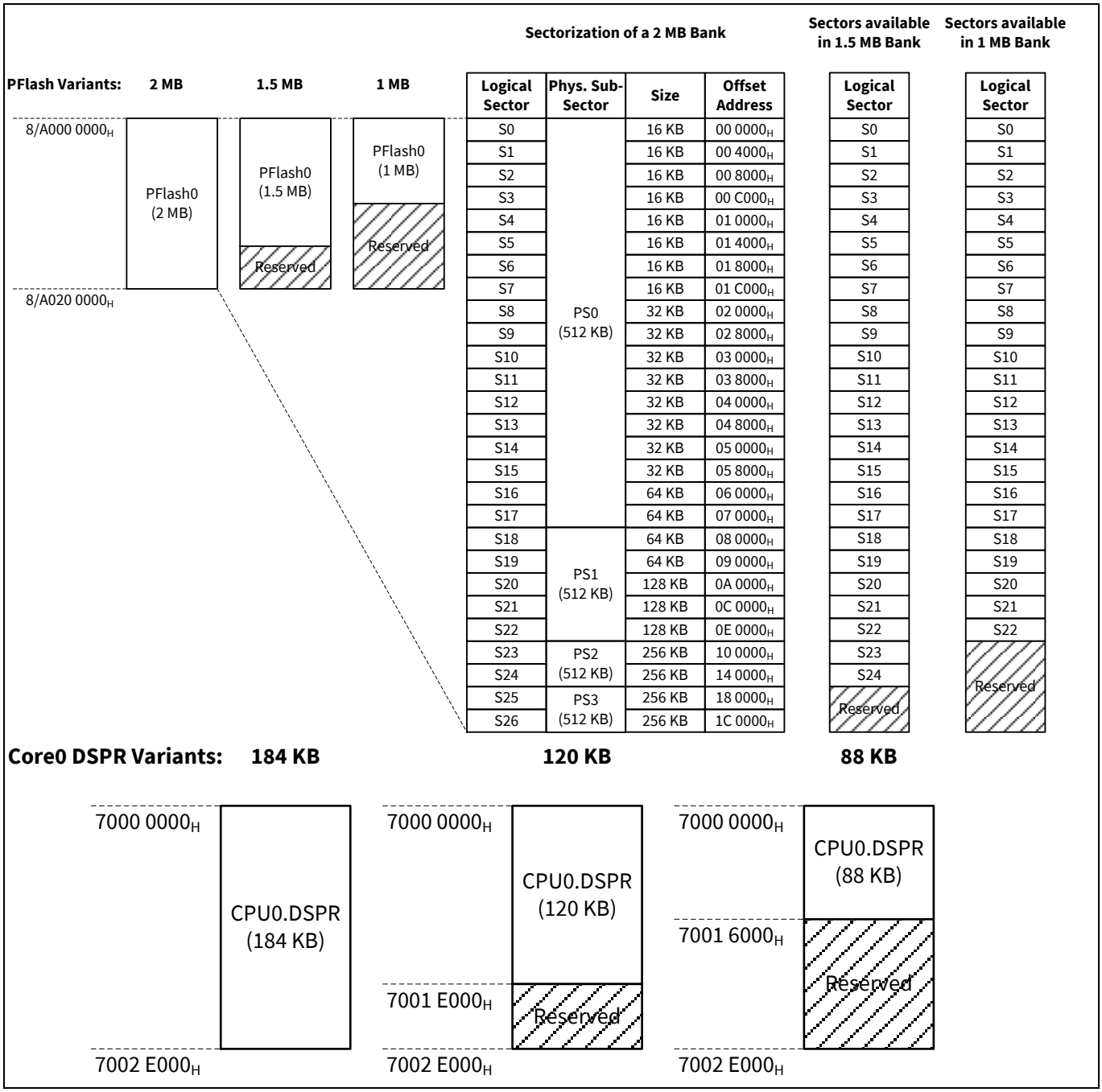
Variants AC Step

Derivative	Production Status	Package Type	Temp. Range	Chip ID	Freq. (MHz)	Flash (MB) 1)	EEPROM (KB)	Total SRAM (KB)	Core 0 TC16E 1)		ADC Chan.	FlexRay (#/ch.)	ETH	HSM	CAN FD ISO 11898-1
									DSPR (KB)	PSPR (KB)					
SAK-TC234L-24F200N AC	on request	PG-TQFP-144	-40°C - +125 °C	0346 3142 H	200	1.5	128@125k	128	120	8	24	1 / 2	No	No	Yes
SAK-TC234LP-16F200F AC	on request	PG-TQFP-144	-40°C - +125 °C	4246 3142 H	200	1	128@125k	96	88	8	24	1 / 2	No	Yes	No
SAK-TC233LP-16F200N AC	on request	PG-TQFP-100	-40°C - +125 °C	4246 3042 H	200	1	128@125k	192	184	8	24	1 / 2	No	Yes	Yes
SAK-TC233LP-24F200N AC	on request	PG-TQFP-100	-40°C - +125 °C	4346 3042 H	200	1.5	128@125k	192	184	8	24	1 / 2	No	Yes	Yes
SAL-TC233L-32F200F AC	on request	PG-TQFP-100	-40°C - +150 °C	0446 3042 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	No
SAL-TC233L-32F200N AC	on request	PG-TQFP-100	-40°C - +150 °C	0446 3042 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	Yes
SAL-TC234LP-32F200N AC	on request	PG-TQFP-144	-40°C - +150 °C	4446 3142 H	200	2	128@125k	96	88	8	24	1 / 2	No	Yes	Yes
SAK-TC234LC-24F133F AC	on request	PG-TQFP-144	-40°C - +125 °C	5346 3542 H	133	1.5	128@125k	128	120	8	24	1 / 2	No	Yes	No
SAK-TC233LC-24F133F AC	on request	PG-TQFP-100	-40°C - +125 °C	5346 3442 H	133	1.5	128@125k	128	120	8	24	1 / 2	No	Yes	No
SAK-TC233SP-32F200N AC	on request	PG-TQFP-100	-40°C - +125 °C	4446 3042 H	200	2	128@125k	192	184	8	24	1 / 2	No	Yes	Yes
SAL-TC237L-32F200S AC	on request	PG-LFBGA-292	-40°C - +150 °C	0446 3242 H	200	2	128@125k	192	184	8	24	1 / 2	No	No	No

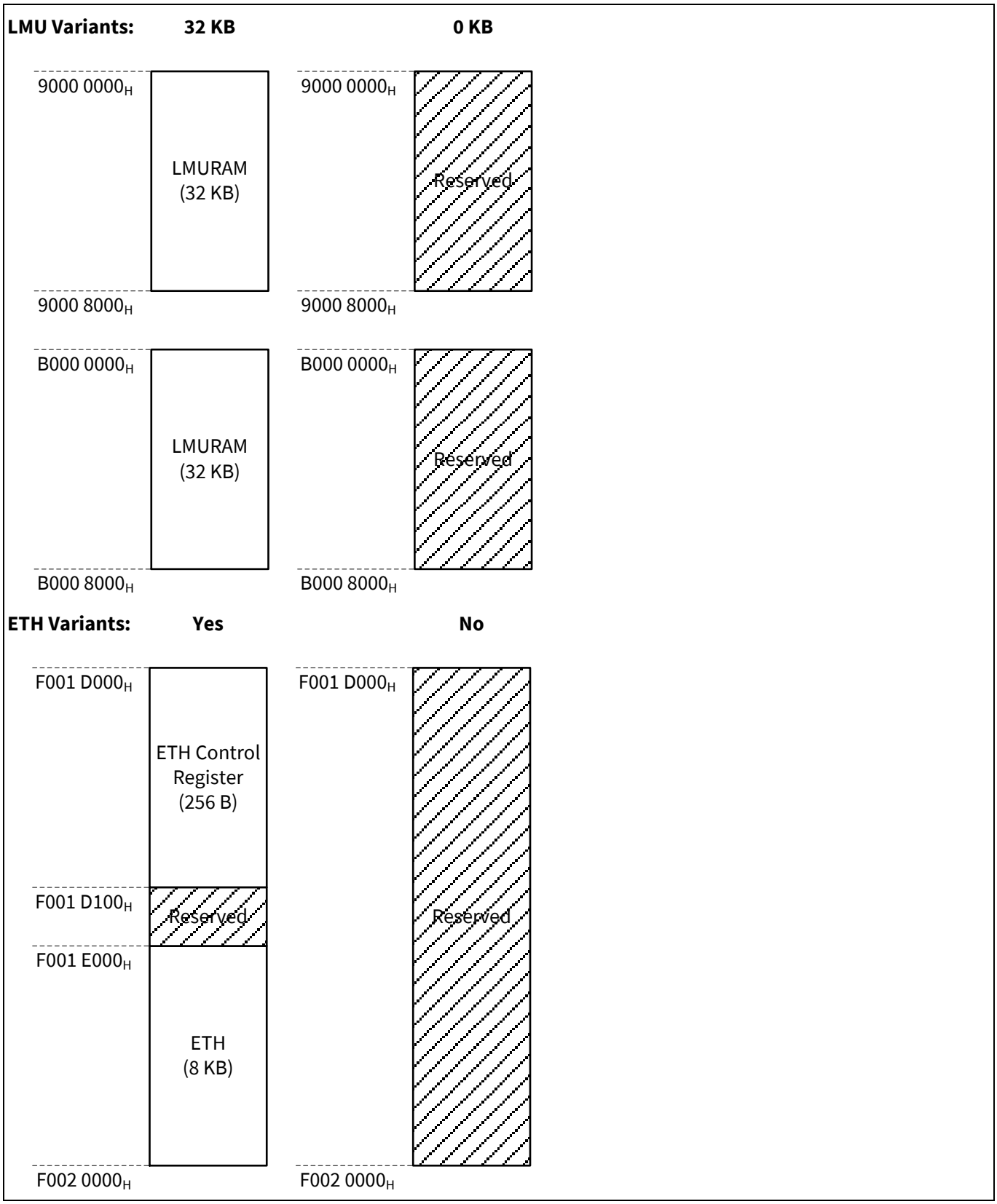
1) The address range starts at the lowest address defined in the User's Manual (See the Memory Maps chapter).

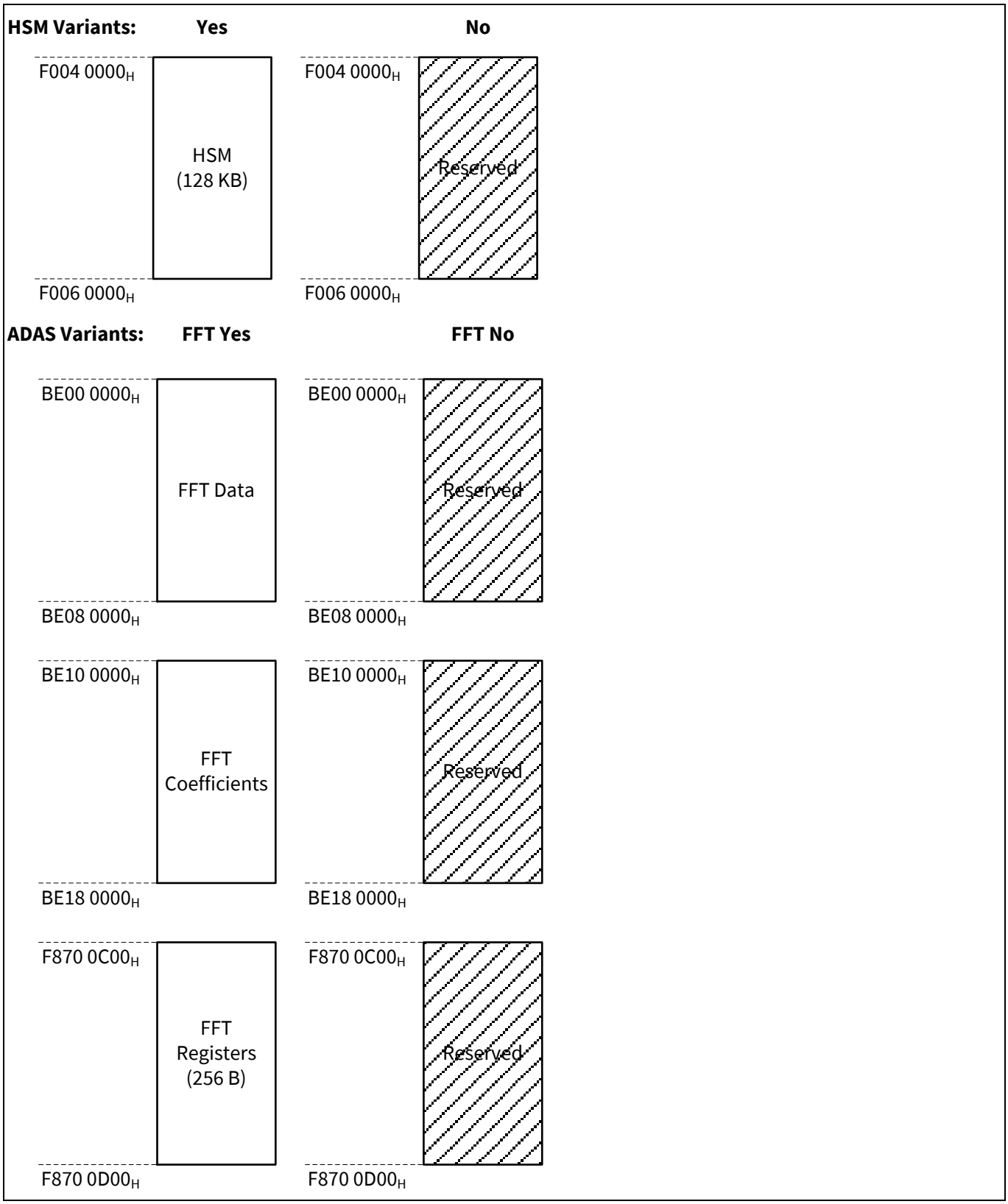
4 Memory maps of variants

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



Memory maps of variants





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

Document version	Date of release	Description of changes
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
v1.8		AC Step Markings Added
v1.9		Correction in Freq. (MHz) of SAK-TC234LC-24F133F AC and SAK-TC233LC-24F133F AC Correction in Total SRAM (KB) of SAK-TC233LP-16F200N AC andSAK-TC233LP16F200F AC SAK-TC233SP-32F200N AC added
v2.0		SAL-TC237L-32F200S AC added
v2.1		Correction in HSM of SAL-TC237L-32F200S AC, SAL-TC233L-32F200N AC added
v2.2		SAK-TC233LP-24F200N added, old CAN FD column removed
v2.3		Package information updated
v2.4		SAK-TC233LC-24F133N AC, SAK-TC233LP-24F200N AC, SAL-TC234LP-32F200N AC, SAK-TC234LH-32F200F AB, SAK-TC237L-32F200N AC added Chip ID for SAK-TC234L-24F200F AB, SAK-TC234LC-24F133F AC and SAK-TC233LC24F133F AC corrected
v2.4.1		Flash size in Variants AB stepFlash corrected from 1,5 to 1.5 Max. temperature for SAK-TC234L-24F200F AB corrected Chip ID for SAK-TC234L-24F200F AB, SAK-TC234LC-24F133F AC, SAK-TC233LC-24F133F AC, SAK-TC233LC-24F133N AC and SAL-TC234LP-32F200N AC corrected Front and back matter updated

Trademarks
All referenced product or service names and trademarks are the property of their respective owners.

Edition 2022-07-01

Published by

Infineon Technologies AG

81726 München, Germany

© 2022 Infineon Technologies AG. All Rights Reserved.

Do you have a question about this document?

Email: erratum@infineon.com

Document reference

IMPORTANT NOTICE

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenheitsgarantie") .

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology delivery terms and conditions and prices please contact your nearest Infineon Technologies office (**www.infineon.com**).

WARNINGS

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.