



STARCHIP
PRODUCT PROVIDER FOR SEMICONDUCTOR MARKET

SCM288G

Product Brief
MAR014 - rev1



Trademark



StarChip® is a registered trademark of StarChip Company.



This product uses SuperFlash® technology. Super Flash® is registered trademark of Silicon Storage Technology, Inc.



This product uses APS3 CPU core. APS3 is a product of CORTUS S.A.

References

- [Ref1] ISO/IEC 7816-3, 3rd Edition, 2006-11-01
- [Ref2] GSM 11.11, Specification of the Subscriber Identity Module - Mobile Equipment
- [Ref3] TEP009 SCF384G Technical Datasheet, rev1x
- [Ref4] TEP011 SCF384G Derivative Sheet, rev1

Derivatives

This document describes SCM288G. This product derivates from SCF320G. Differences are about memory sizes, endurance capabilities, clock frequency and operation parameters.

Thus for complete technical documentation, please refer to documents *[Ref3]* and *[Ref4]*.

For further information contact your StarChip sales contact or send an email to sales@starchip-ic.com

1. Key Features

- | | |
|--------------------------|--|
| General | <ul style="list-style-type: none"> • CORTUS APS3 32 bits core with Harvard RISC Architecture • Advanced Low power modes • Internal Clock oscillator (VFO) at 20MHz • 4kV ESD Protection (Human Body Model) • Class A, B, C supported with Class Indicator |
| Memory | <ul style="list-style-type: none"> • SST SuperFlash® Non volatile Memory • 256K Bytes of Flash Program Memory <ul style="list-style-type: none"> - Sector: 2K bytes - Byte program: 8µs • 32K Bytes of Flash Data Memory <ul style="list-style-type: none"> - Sector: 128 bytes - Byteprogram: 16µs - 96 Bytes OTP Memory • 9.5K Bytes RAM Memory • 2ms Sector Erase • Endurance Global Capacity: at least 1000 Millions cycles Program/Erase (25°) <ul style="list-style-type: none"> - Endurance Enhancement Engine (E³) - See “Memory Parameters” on page 5 • at least 25 years data retention (See “Quality & Reliability” on page 5) • Full Memory Personalization Time: Down to 4,5 seconds • Code Extension capability |
| Security | <ul style="list-style-type: none"> • Compliant with GSM Security requirements • Environmental Protection System <ul style="list-style-type: none"> - Frequency monitors - Power Supply monitors • Dedicated Secure Personalization mode • Software Authentication capability • Unique Serial Number per chip |
| Peripherals | <ul style="list-style-type: none"> • Smart Card ISO7816 Controller <ul style="list-style-type: none"> - 625 Kbits/s at 5MHz - Specific DMA for easy data management - ISO7816 dedicated timer for ETU and cycle counter - Waiting Time & Guard Time automatic management - Compliant with T=0 and T=1 Protocols • Random Number Generator • CRC-16 Engine • 32 bits Counter |
| Development Tools | <ul style="list-style-type: none"> • Emulator: STARBOX. Secure Hardware FPGA • Full packaged Eclipse development suite available: compiler based on GNU's (GCC) |

2. Product Brief Description

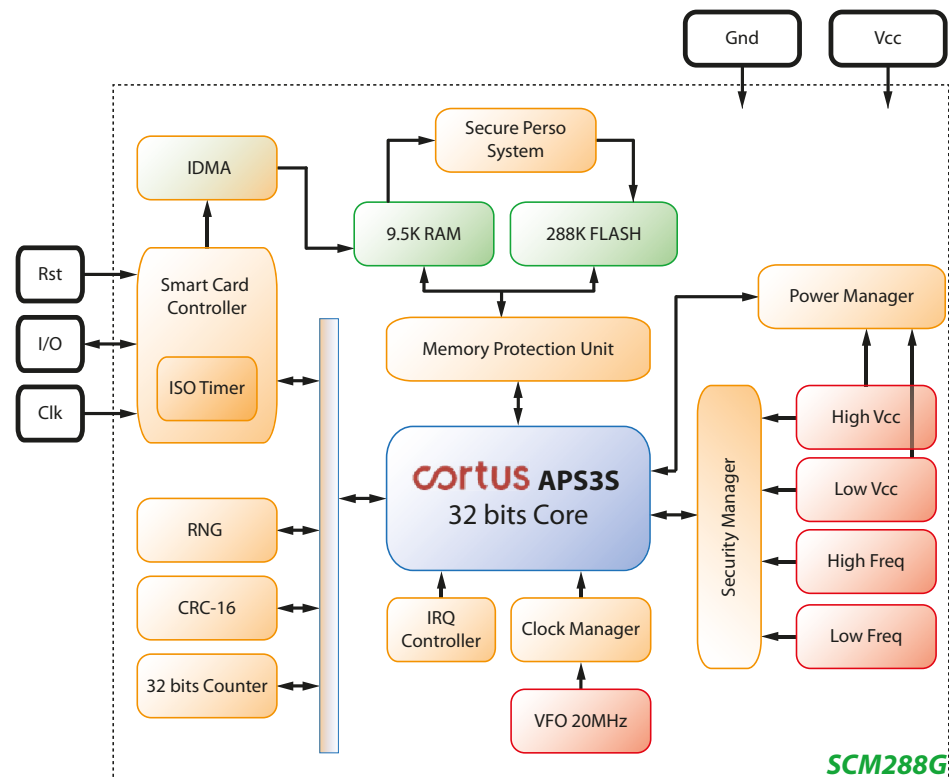
2.1 Introduction

The SCM288G is a powerful, low-power, full flash 32 bits microcontroller, based on APS3 Core, and SuperFlash® technology.

Thanks to APS3, based on 32bits Harvard RISC architecture, SCM288G achieves 20MIPS @20MHz. SuperFlash enhanced by proprietary E³ mechanism grants the user a flexible product with best of the class endurance level.

SCM288G targets GSM SIM Machine-to-Machine market, with security and secure personalization mode to protect customer knowhow, and perform flash personalization in less than 10 seconds. Targeted security is compliant with the usual GSM SIM security level for M2M market and doesn't require any security certification.

Figure 2.1 Block Diagram



2.2 Pin List

Pin Name	Supply	Role
Vcc	--	Power Supply from 1,62V to 5,5V
Rst	Vcc	Reset input (behavior dependant to product setup)
Clk	Vcc	Clock input (used for ISO7816 communication only)
IO	Vcc	Data Input / Output
Gnd	--	Ground

3. Product Information

3.1 Ordering Information

Part Number	Voltage Class	Temperature Range	Package	Packing
SCM288Gxx-B3DAD	Class A, B, C	-40°C to +105°C	DFN8	tape & reel

The “xx” 2 digits correspond to CODEXT limit definition. These 2 digits indicate the number (coded in hexadecimal) of 2K bytes blocks of Flash Data to consider as Code. For instance, SCM288G05 part number corresponds to a SCM288G product with 10K bytes of Flash data considered as Code; which makes: 256K Code, 10K Codext and 22K Data.

SCM288G00 stands for default configuration with no Codext definition (256K Code and 32K Data).

3.2 Quality & Reliability

SCM288G qualification is based on the following standards:

- JESD47, which relates to “Stress-Test-Driven Qualification of Integrated Circuits”
- JESD22a117, which relates to “Electrically Erasable Programmable ROM (EEPROM) or FLASH Program/Erase Endurance and Data Retention Stress Test”
- JESD48, which relates to “Integrated Circuit Latch-Up Test”
- JP001-01, which relates to “Foundry Process Qualification Guidelines”
- ANSI-ESDSTM51, which relates to “Electrostatic Discharge: Human Body Model (HBM) Component Label”
- JESD22-A113, which relates to “MSL Preconditioning”
- JESD22-A103, which relates to “High Temperature Storage”
- JESD22-A110, which relates to “Temperature Humidity Bias”
- JESD22-A104, which relates to “Temperature Cycling”

SCM288G qualification report available on demand.

3.2.1 Memory Parameters

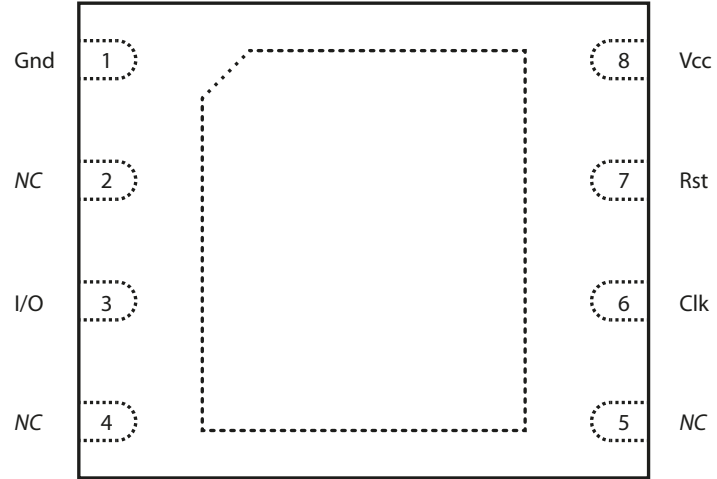
Table 3-1 Flash Memory Characteristics

Parameter	Limits			Unit
	Min	Typ	Max	
Endurance Global Capacity	1 000 000 000			cycles
Data Retention	25			years
Programming Time ^[1]	4		16	µs / byte
Erase Time ^[1]	0.5		2	ms / sector

[1]. The time is based on operation completion detection

3.3 Pinout

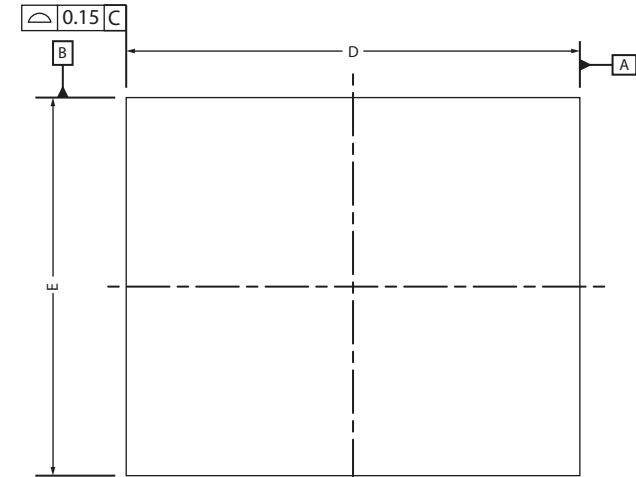
Figure 3.1 DFN8 Pinout



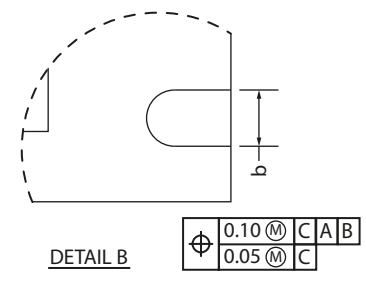
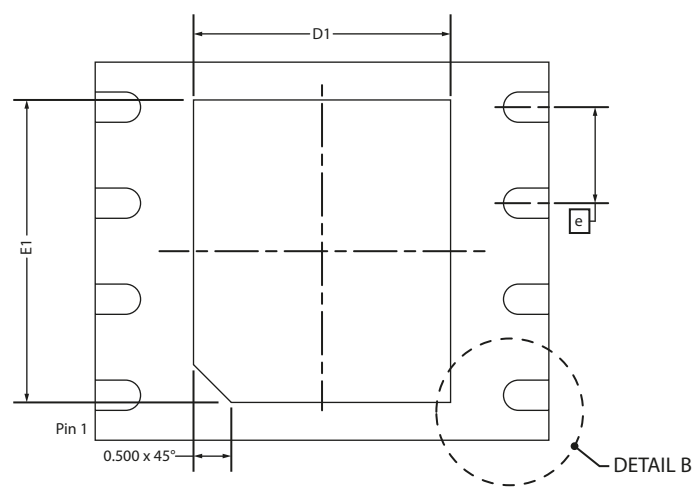
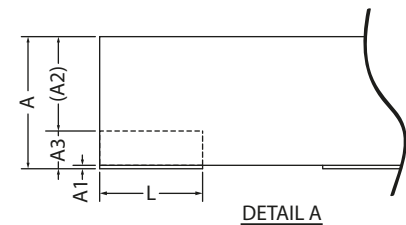
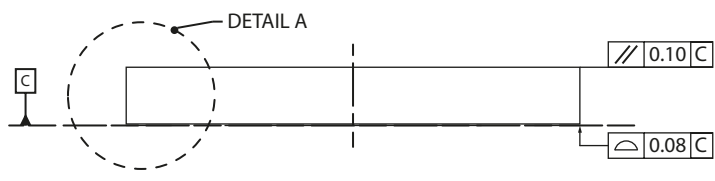
e-pad underneath the package is not connected

3.4 Mechanical Information

Figure 3.2 DFN8



SYMBOL	DIMENSION (MM)			DIMENSION (MIL)		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.70	0.75	0.80	28	30	31
A1	0.00	0.02	0.05	0	1	2
A2	0	0.55	0.80	0	22	31
A3	-	0.20	-	-	8	-
b	0.35	0.40	0.45	14	16	18
D	5.90	6.00	6.10	232	236	240
D1	3.30	3.40	3.50	130	134	138
E	4.90	5.00	5.10	193	197	201
E1	3.90	4.00	4.10	154	157	161
e	1.27 BSC			50 BSC		
L	0.55	0.60	0.65	22	24	26



NOTE :
 1. REFER TO JEDEC STD: MO-229.
 2. DIMENSION "b" APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.15MM AND 0.30MM FROM THE TERMINAL TIP. IF THE TERMINAL HAS OPTIONAL RADIUS ON THE OTHER END OF THE TERMINAL, THE DIMENSION B SHOULD NOT BE MEASURED IN THAT RADIUS AREA.

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