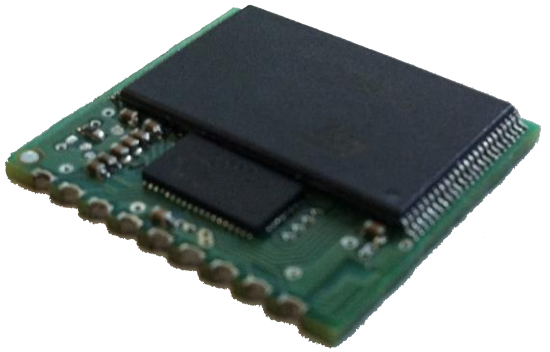
Art of Technology

SOLDERABLE MEMORY MODULE (SMM)

DATA SHEET



ABSTRACT

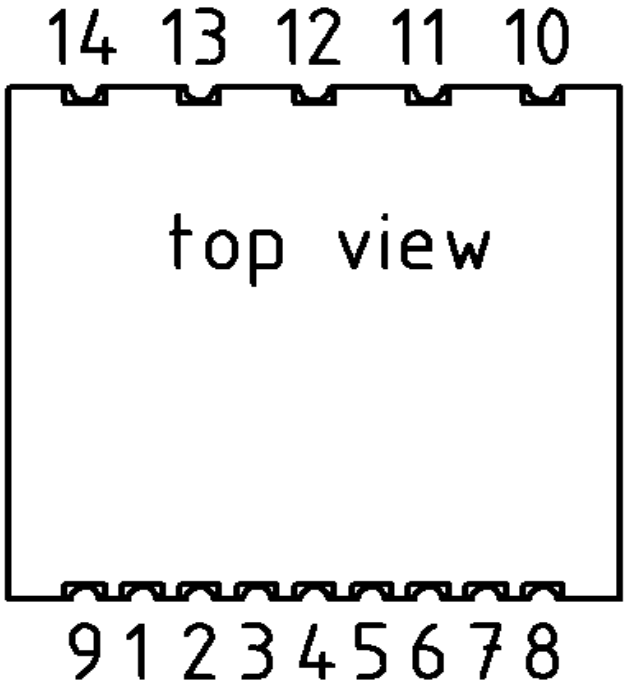
The Solderable Memory Module (SMM) is an alternative to SD/MMC cards for use in industrial and medical embedded systems. The module combines all the advantages of a SD/MMC card without its disadvantages, in particular the need for an additional cardholder and manual card assembly. The SMM is built especially for harsh environments, where a Memory-Card with cardholder is not suitable due to required coatings, vibration or impact and also where production volumes or assembly technologies do not allow the use of a discrete setup on the motherboard.

Built with SLC NAND Flash and a Flash controller from Hyperstone, the module is approximately half the size of a conventional SD/MMC memory card, offers a controlled and transparent BOM. In addition to different memory capacities the SMM can also be supplied with customised software.

KEY FUNCTIONS

- Fast and reliable memory module (can be soldered to any PCB)
- Available in capacities from 1024 and 2048 MBytes
- Simple interface compatible to SD/MMC-Card
- Supports SPI interface
- Replaces standard SD-Card / MMC card in applications (where card does not have to be replaced)
- Uses high performance SLC Flash memory for highest reliability and high number of write cycles

PIN LAYOUT



	SPI MODE			SD/MMC MODE		
PIN	NAME	TYPE	SIGNAL	NAME	TYPE	SIGNAL
1	SPI_CS	Input	Chip select	SD_DAT3	Input / Output	SD Data Line 3
2	SPI_DI	Input	Serial data input	CMD	Input / Output	Command line
3	GND	Power	GND	GND	Power	GND
4	VDD	Power	Power supply	VDD	Power	Power supply
5	SPI_CLK	Input	Clock input	CLK	Input	Clock signal
6	GND	Power	GND	GND	Power	GND
7	SPI_DO	Output	Serial Data Output	SD_DAT0	Input / Output	SD Data line 0
8	Reserved			SD_DAT1	Input / Output	SD Data Line 1
9	Reserved			SD_DAT2	Input / Output	SD Data Line 2
10	NC	None	No internal connection	NC	None	No internal connection
11	NC	None	No internal connection	NC	None	No internal connection
12	NC	None	No internal connection	NC	None	No internal connection
13	NC	None	No internal connection	NC	None	No internal connection
14	NC	None	No internal connection	NC	None	No internal connection

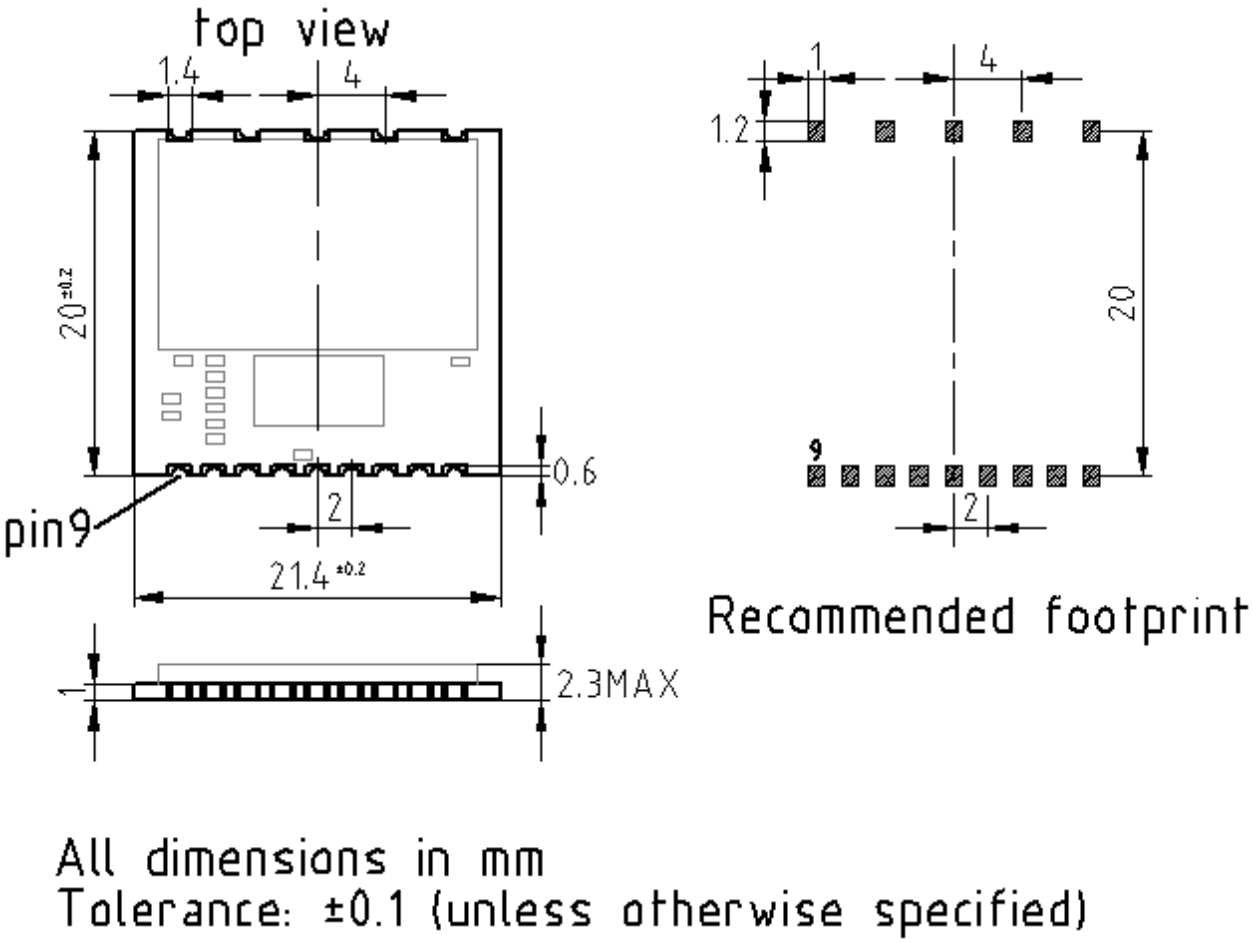
ELECTRICAL SPECIFICATION

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	**SYMBOL**	**MIN**	**MAX**	**UNITS**
Power supply voltage with respect to ground	VCC	-0.3	+3.7	V
I/O Voltage for any input with respect to ground	VIO	-0.3	VCC + 0.3	V
Operating temperature range	Top	-25	+85	°C
Storage temperature range	Tst	-40	+85	°C

DC SPECIIFCATION (RECOMMENDED OPERATING CONDITIONS +25°C)				
PARAMETER	**SYMBOL**	**MIN**	**MAX**	**UNITS**
Power supply voltage with respect to ground	VCC	2.7	3.6	V
Operating current	ICC	25	65	mA
I/O Voltage for any input with respect to ground	VIO	-0.3	VCC + 0.3	V
Operating temperature range	Top	-25	+85	°C
Storage temperature range	Tst	-40	+85	°C
Input LOW Voltage	VIL	-0.3	25% of VCC	V
Input HIGH Voltage	VIH	62.5% of VCC	VCC + 0.3	V
Output LOW Voltage (@ 100 µA Load)	VOL		12.5% of VCC	V
Output HIGH Voltage (@ 100 µA Load)	VOH	75% of VCC		V
Input leakage current	ILI		± 10	µA
Output leakage current	ILO		± 10	µA
Input/Output capacitance	CI/O		15	pF
Power supply voltage with respect to ground	VCC	2.7	3.6	V

AC SPECIFICATIONS				
PARAMETER	**SYMBOL**	**MIN**	**MAX**	**UNITS**
Clock in data transfer mode	fdata		25	MHz
Clock in identification mode	fid		400	kHz
Clock low time		10		ns
Clock high time		10		ns
Clock rise time			10	ns
Clock fall time			10	ns
CMD, DATA input setup time	Tisu	5		ns
CMD, DATA input hold time	Tih	5		ns
CMD, DAT output delay time	Todly		14	ns

MECHANICAL SPECIFICATION



MECHANICAL DIMENSIONS				
PARAMETER	**SYMBOL**	**NOM**	**TOL**	**UNITS**
Length	L	21.4	±0.2	mm
Width	W	20	±0.2	mm
Height	H	2.1	+0.2	mm

SOLDERING
Single Re-Flow Process only
Solder profile for lead free solder process:
▪ Preheat: 150°C to 200°C (60 to 120 sec)
▪ Maximum solder temperature: 240°C (max 10 sec)
▪ Limit time above 220°C (30 to 60 sec)
▪ Ramp down: < 2°C / sec

CAPACITY

Approximately 2-4 % of the theoretical memory space is not usable for the file system due to “bad block” handling and internal organization overhead. This is a common limitation for standard SD- and MMC-Cards. For a 1024 MByte device, the usable capacity is approximately 998 MBytes.

For optimal performance while writing / updating data, only a portion of the capacity should be used. Unused capacity is used for internal organization and will improve system behaviour.

ORDERING INFROMATION

ORDER CODE	SMM_CCCC.IPVTD.HH.SS
CCCC	Capacity
I	Interface (M) MMC-Card (S) SD-CARD
P	Package Type (L) LCC 20x22mm^2
T	Temperature Range (E) -25°C ... +85°C
D	Delivery in (T) Tubes (standard) or (R) as Tape & Reel (optional)
HH	Hardware Revision
SS	Software Revision

E.G.

SMM_1024.SLET.01.01 : 1024 MBytes SD-Mode, LCC package 20 x 22 mm^2

SMM_2048.SLET.01.01 : 2048 MBytes SD-Mode, LCC package 20 x 22 mm^2

TRACEABILITY

To provide full tracking capability changes in device Revision codes are updated in case of:

- revision changes in controller hardware
- revision changes in memory hardware
- revision changes in controller software
- revision changes in PCB

DOCUMENT INFORMATION

Title	Solderable Memory Module
Document Type	Data Sheet
Document Number	11-01.39-005.SPC.00.32.SMM-Data-Sheet
Document Status	Preliminary

DOCUMENT STATUS

Objective specification	This data provided herein represents target values. Revised and supplementary data will be published later
Advance Information	This data provided herein is based on early testing. Revised and supplementary data will be published later
Preliminary	The data provided herein is based product verification. Revised and supplementary data may be published later.
Released	The data given is the product specification.

CONTACT INFORMATION

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THIS DOCUMENT APPLIES TO THE FOLLOWING PRODUCTS

NAME	MEMORY SIZE	HW VERSION	SW VERSION	PCN REFERENCE
SMM	1024 Mbytes	01	01	SMM_1024.xLET.0101
SMM	2048 MBytes	01	01	SMM_2048.xLET.0101