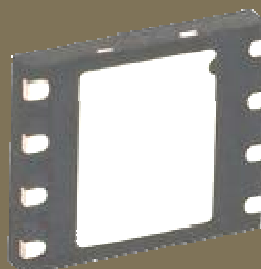




Machine to Machine SIM Cards

Full M2M Quad Specifications



Last update : September 2010

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1. Overview

The ^{Full}M2M Quad SIM is a dedicated SIM platform specifically designed for M2M applications. The ^{Full}M2M Quad SIM is a solution that combines traditional smart card security with a more rugged form factor.



This SIM card has a specific form factor (DFN-8, also called SON-8, and previously called VQFN-8 in some documents) intended to be welded in a M2M device.

2. Product specifications

Product	2G/3G M2M SIM
packaging	DFN8 / SON8 (sometimes called VQFN-8)
Package size	6 mm x 5 mm
Operating temperature	-40°C to + 105°C
Storage temperature	-40°C to + 125°C
OS	2G/3G, LinQUs USIM JAVA, eXtended-Life (XL)
Supply Voltage & Consumption	Supply voltage range: from 1.62V to 5.5V Consumption limits: < 10 mA @ 5 V < 6 mA @ 3.3 V < 4 mA @ 1.98 V
ESD protection	Larger than 4000 V (HBM)



eXtended-Life operating system is a M2M specific operating system especially designed to maximize the lifespan of the memory chip, making it more resistant to stress (erase/write cycles) and allowing to have a very low failure rate (ppm).

3. Embedded Security

Authentication algorithm	Comp128-v1, Comp128-v2, Comp128-v3 Comp128-v4, milenage
Symmetric Algorithm	DES, 3DES (ECB and CBC mode)
Hashing functions	SHA-1, MD5
SW & HW Counter-measures	Against: Single power attacks (SPA) Differential power attacks (DPA) Fault attacks (FA)

4. Electrical Parameters

Parameter	Symbol	Min	Max	Units
Supply Voltage	V _{cc}	-0.3	+5,5	V
Input Voltage	V _{in}	V _{ss} -0.3	V _{cc} +0.3	V
Operating temperature	T _{A-SLM}	-40	+105	°C
Storage temperature	T _{S-SLM}	-40	+125	°C

Note: Stresses exceeding the values listed above may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or at any other conditions whose values exceed those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability, including EEPROM data retention and write/erase endurance. According to EIA/JESD22-A114-B, Section 4 including ISO/IEC 7816-1 and ISO/IEC 10373.

5. Soldering Profile

- Compliant with standard JEDEC J-STD-020C:
- Package classification reflow temperature: 260°C
- Lead free packaging compliant to the European Directive for Restriction of Hazardous Substances (RoHS directive).

6. Standards compliancy

6.1. Telecom

ISO 7816 Parts 1&3	Identification cards-Integrated circuit(s) cards with contacts, Part 1: Physical characteristics. Part 3: Electronic signals and transmission protocols	V2004
Java Card	Java Card Virtual Machine Specification	JC2.2.1
Global Platform	Global Platform Card Specification	GP2.1.1
3GPP TS 23.040	Technical realization of Short Message Service (SMS) Point-To-Point	Release 6
3GPP TS 23.041	Technical realization of Short Message Service (SMS) Cell Broadcast	Release 6
3GPP TS 23.048	Security Mechanisms for the SIM application toolkit; Stage 2	V5.8.0
3GPP TS 31.101	UICC-Terminal Interface; Physical and Logical Characteristics	Release 6
3GPP TS 31.102	Characteristics of the USIM Application	Release 6
3GPP TS 31.110	Numbering system for telecommunication IC card applications	V4.1.0
3GPP TS 31.111	USIM Application Toolkit (USAT)	Release 6
3GPP TS 31.115	Secured packet structure for (U)SIM Toolkit applications	Release 6
3GPP TS 31.116	Remote APDU Structure for (U)SIM Toolkit applications	Release 6
TS 31.130	(U)SIM Application Programming Interface API; (U)SIM API for Java Card(TM) (ETSI 102.241 – UICC API).	Release 6
3GPP TS 43.019	Specification of the SIM Application Programming Interface For Java Card	Release 6
3GPP TS 51.011	Specification of the Subscriber Identity Module – Mobile Equipment (SIM- ME) interface	Release 5
3GPP TS 51.013	Test specification for Subscriber Identity Module (SIM) Application Programming Interface (API) for Java Card™	V5.4.0
3GPP TS 51.014	Specification of the SIM Application Toolkit for the Subscriber Identity Module - Mobile Equipment (SIM ME) interface	V4.2.0
ETSI TS 102.127	Transport protocol for CAT applications Stage 2	V6.9.0
ETSI TS 102.220	Integrated Circuit Cards (ICC) Numbering system	V6.5.0
ETSI TS 102.221	Physical and logical characteristics	V6.10.0
ETSI TS 102.222	Integrated Circuit Cards (ICC); Administrative commands for Telecommunications applications	V6.11.0
ETSI TS 102.223	Smart cards; Card Application Toolkit (CAT)	V6.5.0
ETSI TS 102.225	Secured Packet structure for UICC based applications	V6.4.0
ETSI TS 102.226	Remote APDU Structure for UICC based applications	V6.8.0
ETSI TS 102.230	"Physical, Electrical and Logical tests Specification".	V5.1.0
ETSI TS 102.241	UICC Application Programming Interface for Java Card™	V6.12.0
ETSI TS 102.267	Connection Oriented Service API for Java Card	V7.0.0
ETSI TS 102.268	Test specification for UICC API	V6.0.0
ETSI TS 102.431	Test specification for the Transport Protocol of CAT Applications (CAT_TP) validation	V7.0.0
ETSI TS 102.671	Machine-to-machine UICC; Physical and logical characteristics	V9.0.0

Note : some of the standards listed above include specification of physical characteristics related to the plug-in form factor, be aware that DFN-8 being a different form factor, it is not supposed to be fully compliant with plug-in form factor related specifications (ex : dimensions, position and dimension of contacts...).

6.2. Other

JeDEC J-STD020	Moisture/Reflow Sensitivity Classification for Non-hermetic Solid State Surface Mount Devices
JeDEC JESD22-A101	Temperature Humidity Bias Life Test (85°C, 85%RH, 1000h)
JeDEC JESD22-A103	High temperature storage (+150°C)
JeDEC JESD22-A104	Temperature cycling (-40..+105°C)
JeDEC JESD22-A113	Preconditioning of Non-hermetic Surface Mount Devices
JeDEC JESD22-A114	Electrostatic Discharge (ESD) – Human Body Model
JeDEC JESD22-A117	NVM Endurance
JeDEC JESD22-B103	Vibration, variable frequency (20G / 20Hz to 2000 Hz)
JeDEC JESD22-B104	Mechanical shock (500G)
JeDEC JESD22-C101	Electrostatic Discharge (ESD) – Charged Device Model

7. Packaging and personalization

7.1. Graphical personalization

Gemalto proposes to personalize characters thanks to laser technology on the top of the Full M2M Quad SIM.

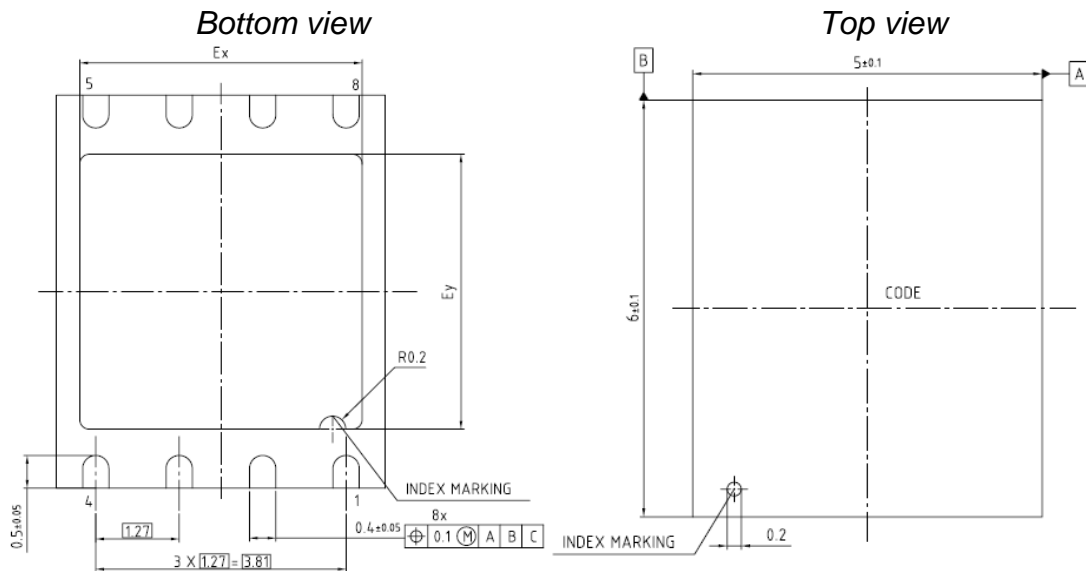


First line is reserved for silicon provider traceability

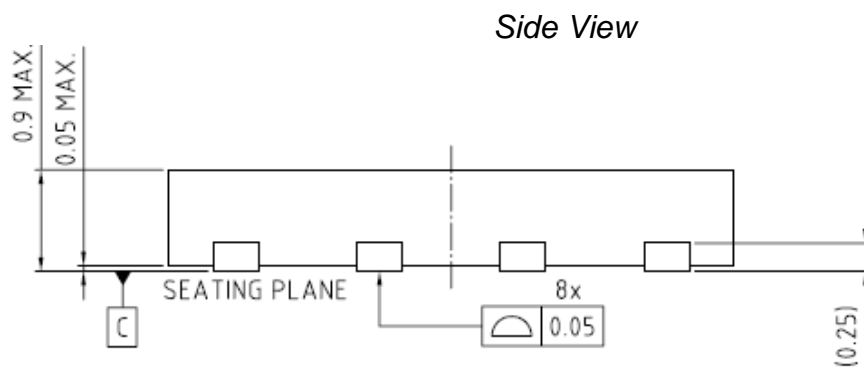
2 lines of 10 characters maximum for customer personalization
We strongly recommend to print a visual identifier (ICCID for example).

1 line for MNO identifier (TRIGRAM).

7.2. Dimensions and PIN outline



EXPOSED DIEPAD DIMENSIONS		
LEADFRAME	Ex	Ey
C66065-A5605-C003	4.20±0.1	3.40±0.1



PIN Configuration

Full M2m Quad product is available with 2 PIN configurations, the 2nd one (with I/O on PIN3) being the one compliant with MFF2 ETSI specifications (M2M UICC - TS102.671).

Config #1

Pin #01 = VSS
Pin #02 = I/O
 Pin #06 = CLK
 Pin #07 = RST
 Pin #08 = VDD

Config #2 (ETSI MFF2)

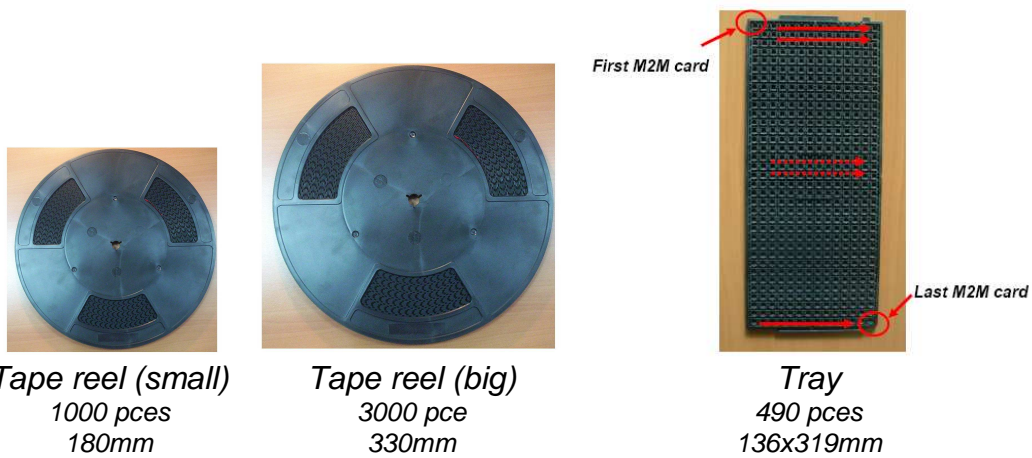
Pin #01 = VSS
Pin #03 = I/O
 Pin #06 = CLK
 Pin #07 = RST
 Pin #08 = VDD

Note for integrators : In order to be independent from the two existing PIN configurations, it is recommended to connect PIN2 and PIN3 on the printed circuit board.

7.3. Handling & Packing

- Package outline according to JEDEC MO-220
- Moisture sensitivity characterization: MSL level 3 with 260°C peak temperature (with limited duration for floor life)
- Vibration Variable Frequency (VVF) according to JESD22-B103
- Temperature Humidity Bias (THB) according to JESD22-A101 Humidity

Gemalto proposes to deliver volumes using tape reel packing method. However, Gemalto is able to deliver small quantities (less than 500 units) using tray packing method.



Reels or trays are packaged in anti static bags with desiccant bags and humidity indicators.

