

Vodafone GUSIM M2M Standard Plastic

Technical Datasheet

Physical / Electrical Datasheet

Version 1.7

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Version: 1.7
Date: 04.05.2020
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Comments: Data sheet is subject to change without prior notice

Notes

For the graphical personalisation and for the packaging of the M2M Plastic SIM please see also the documents:

- M2M Plastic + M2M Robust Plastic - Packaging Information Sheet
- M2M Plastic + M2M Robust Plastic - Graphical Personalisation Information Sheet

1 Introduction

Vodafone's **GUSIM M2M Standard Plastic** is a standard commercial consumer SIM product. It does not have any specific environmental extensions over and above a "normal" commercial Plug-in SIM offered for the consumer market.

This silicon is designed for standard environmental conditions and not designed to perform continuously at high temperatures. Data retention and endurance is specified for a normal temperature environment.

As for all Vodafone SIM products, the GUSIM M2M Standard Plastic SIM is qualified by the silicon supplier, by the SIM supplier and by the Vodafone SIM Technology Centre.

The Vodafone GUSIM M2M Standard Plastic SIM comes in either a Plug-in UICC (Mini SIM) or Mini-UICC (Micro SIM) or 4FF (Nano SIM) form factor according to ETSI TS 102.221.



Key Features

- Combined 2G SIM and 3G USIM
- Plug-in UICC or Mini-UICC or Nano form factor according to ETSI TS 102.221 Rel-11.
- 48 KBytes of available operator memory
- Endurance: Minimum of 100.000 erase/write cycles at +25°C + at least 16 high update files (with size 128 bytes each) with 500.000 erase/write cycles at +25°C
- Typical data retention of 10 years at +25°C
- Operating temperature range from -25°C to +85°C
- Operating voltage range from 1.62V - 3.3V (Support of Voltage Classes B and C)
- Frequency range of external clock from 1 MHz - 5 MHz

Supported Telecom Standards

- ETSI TS 102 221 Rel-6
- ETSI TS 102 221 Rel-11 (for 4FF form factor)
- 3GPP TS 31.102 Rel-6
- ETSI TS 102 222 Rel-6
- 3GPP TS 31.111 Rel-6
- 3GPP TS 51.011 Rel-4
- 3GPP TS 51.014 Rel-4
- ETSI TS 102 225 Rel-6
- ETSI TS 102 226 Rel-6
- 3GPP 31.115 Rel-6
- 3GPP 31.116 Rel-6
- 3GPP TS 23 048 Rel-5

Operating Conditions

Parameter	Min	Max	Unit
Supply Voltage / VDD	Class B: 2.7 Class C: 1.62	Class B: 3.3 Class C: 1.98	V
Operating Temperature	-25	+85	°C

Table 1: Operating Conditions

2 Electrical Contacts

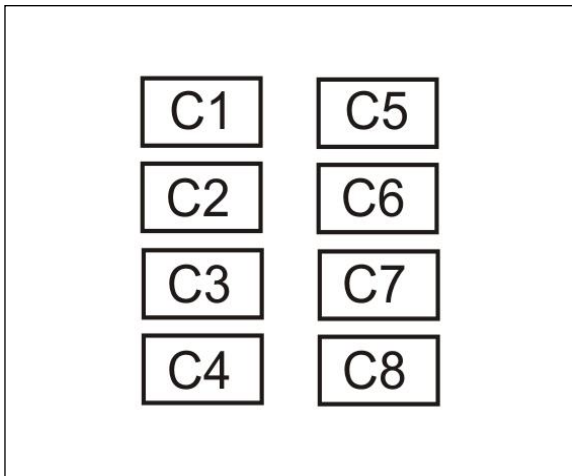


Figure 1: Contact layout

NOTES:

1. The pin layout is as specified in ETSI TS 102 221
2. The ETSI contact numbering shown in table 2 is according to ETSI TS 102 221
3. The contacts C4 and C8 are optional

Contact Number (ETSI)	Name	Signal Direction	Function Description
C1	VDD	-	Power input
C2	RST	Input	System reset input
C3	CLK	Input	External clock input
C4	NC	-	No Connection
C5	GND	-	Ground
C6	NC	-	No Connection
C7	I/O	Input / Output	Serial data input and output
C8	NC	-	No Connection

Table 2: Contact assignment from Figure 1

3 Electrical Characteristics

The electrical characteristics are in accordance with ETSI TS 102 221 Rel-6 by respecting the recommended operating conditions.

3.0 V – Class B – Operating Conditions

Supply Voltage (VDD) – Terminal 8

Symbol	Minimum	Maximum	Unit
V _{DD}	2.7	3.3	V

Reset (RST) – Terminal 7

Symbol	Conditions	Minimum	Maximum	Unit
V _{OH}	I _{OHmax} = +20 μA	V _{DD} X0.8	V _{DD}	V
V _{OL}	I _{OLmax} = -200 μA	0	0.2xV _{DD}	V
t _R t _F	C _{out} = C _{in} = 30pF		400	μs

Clock (CLK) – Terminal 6

Symbol	Conditions	Minimum	Maximum	Unit
V _{OH}	I _{OHmax} = +20 μA	V _{DD} X0.7	V _{DD}	V
V _{OL}	I _{OLmax} = -20 μA	0	0.2xV _{DD}	V
t _R t _F	C _{out} = C _{in} = 30pF		50	ns

Clock rate: 1 – 5 MHz with a duty cycle of 40% to 60% of a period

Input / Output (I/O) – Terminal 3

Symbol	Conditions	Minimum	Maximum	Unit
V _{IH}	I _{IHmax} = ±20μA	V _{DD} X0.7	V _{DD} +0.3	V
V _{IL}	I _{ILmax} = +1mA	-0.3	V _{DD} X0.2	V
V _{OH}	I _{OHmax} = +20 μA	V _{DD} X0.7	V _{DD}	V
V _{OL}	I _{OLmax} = -1mA	0	0.4	V
t _R t _F	C _{out} = C _{in} = 30pF		1	μs

Power Consumption

Symbol	Conditions	Maximum	Unit
I _{DD}	During ATR @ 4 MHz	6	mA
I _{DD}	Normal operation during UICC session, max. external clock frequency	50	mA
I _{DD}	Idle state, max. external clock frequency present	200	μA
I _{DD}	Idle state, external clock halted	100	μA

1.8 V – Class C – Operating Conditions

Supply Voltage (VDD) – Terminal 8

Symbol	Minimum	Maximum	Unit
V _{DD}	1.62	1.98	V

Reset (RST) – Terminal 7

Symbol	Conditions	Minimum	Maximum	Unit
V _{OH}	I _{OHmax} = +20 μA	V _{DD} X0.8	V _{DD}	V
V _{OL}	I _{OLmax} = -200 μA	0	0.2xV _{DD}	V
t _R t _F	C _{out} = C _{in} = 30pF		400	μs

Clock (CLK) – Terminal 6

Symbol	Conditions	Minimum	Maximum	Unit
V _{OH}	I _{OHmax} = +20 μA	V _{DD} X0.7	V _{DD}	V
V _{OL}	I _{OLmax} = -20 μA	0	0.2xV _{DD}	V
t _R t _F	C _{out} = C _{in} = 30pF		50	ns

Clock rate: 1 – 5 MHz with a duty cycle of 40% to 60% of a period

Input / Output (I/O) – Terminal 3

Symbol	Conditions	Minimum	Maximum	Unit
V _{IH}	I _{IHmax} = +20μA	V _{DD} X0.7	V _{DD} +0.3	V
V _{IL}	I _{ILmax} = +1mA	-0.3	V _{DD} X0.2	V
V _{OH}	I _{OHmax} = +20 μA	V _{DD} X0.7	V _{DD}	V
V _{OL}	I _{OLmax} = -1mA	0	0.3	V
t _R t _F	C _{out} = C _{in} = 30pF		1	μs

Power Consumption

Symbol	Conditions	Maximum	Unit
I _{DD}	During ATR @ 4 MHz	4	mA
I _{DD}	Normal operation during UICC session, max. external clock frequency	30	mA
I _{DD}	Idle state, max. external clock frequency present	200	μA
I _{DD}	Idle state, external clock halted	100	μA

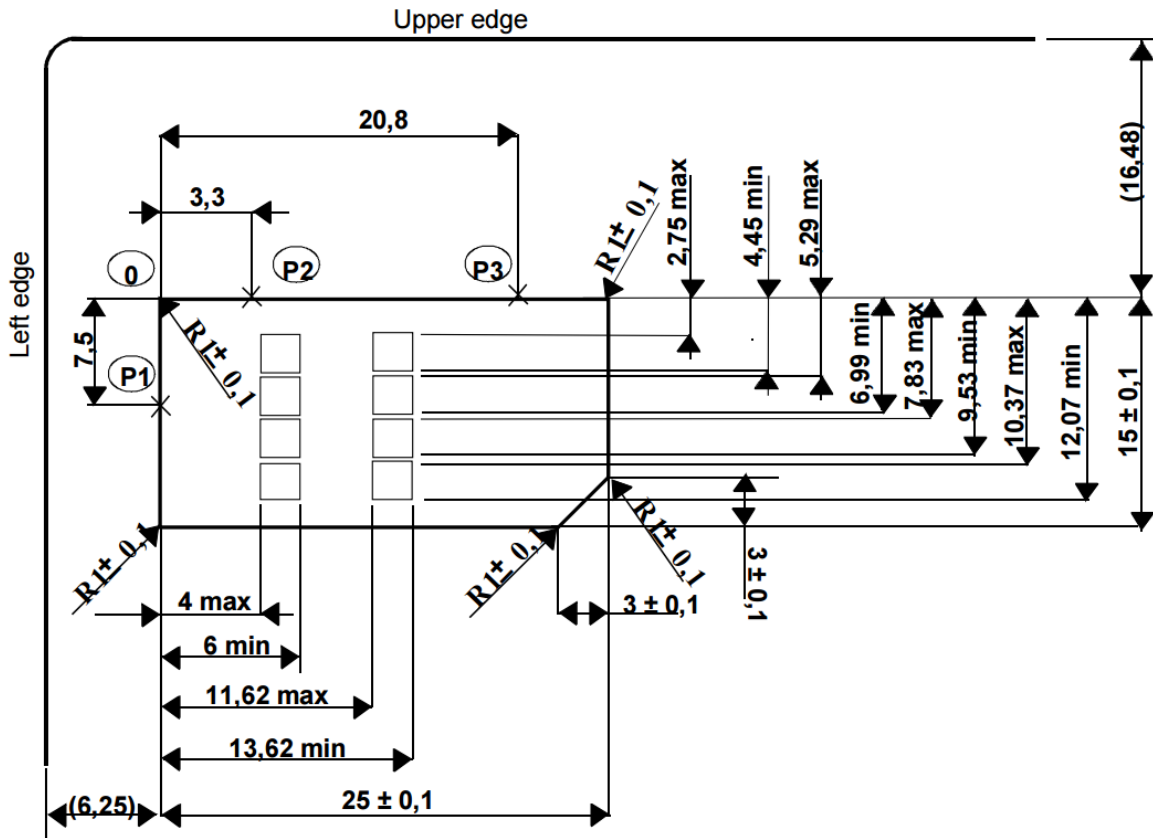
4 Form Factors/sizes

The Vodafone GUSIM M2M Standard Plastic SIM comes in either a Plug-in UICC (Mini SIM) or Mini-UICC (Micro SIM) or 4FF (Nano SIM) form factor according to ETSI TS 102.221.

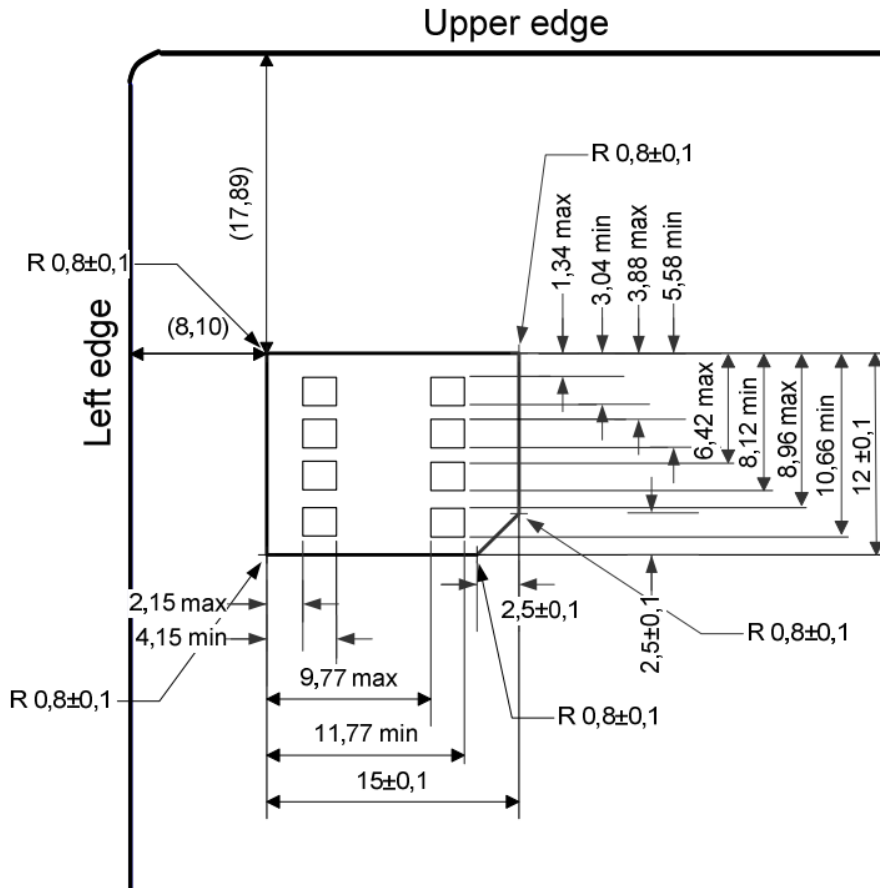
The following table provides the various form factors.

	Front	Back
2FF		
3FF		
4FF		

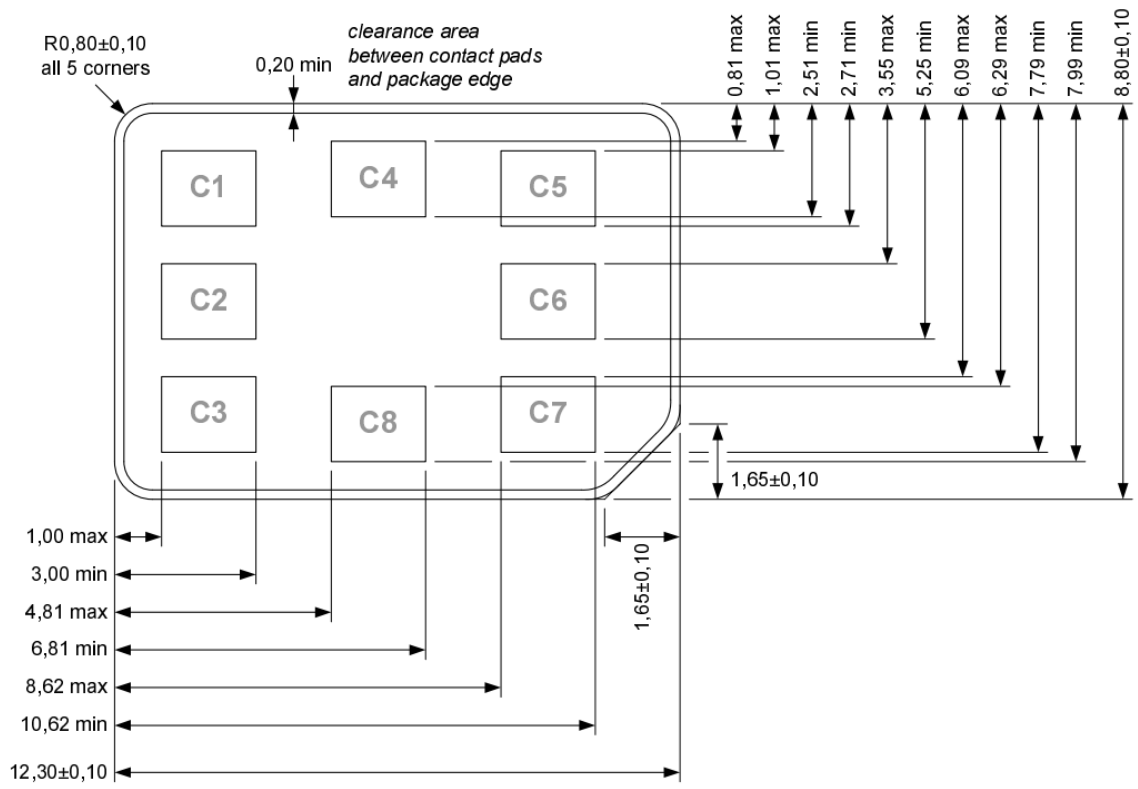
The following figures show the measurements of the plug-in as per the ETSI specifications:



Size and dimensions of 2FF



Size and dimensions of 3FF



Size and dimensions of 4FF

5 Application Notes

High operating temperatures and a high number of erase/write cycles to the memory could lead to a degradation of the memory cells. That can eventually lead to device failure. Therefore, we recommend not to expose the SIM device permanently to high temperatures and to keep the erase/write cycles as low as possible.

6 Storage Guidelines

The Vodafone GUSIM M2M cards are designed to high standards. However, to ensure that the SIMs perform best, the following storage guidelines need to be followed.

- Cards should not be submitted to thermal shock.
- Cards should not be in contact with silicone rubber material.
- Cards should be kept in original supplier packaging
- Storage time shall be less than 6 months consecutively
- Storage temperature shall be within 15°C and 30°C with humidity within 40% and 60%
- Cards should not be submitted to rapid modification of temperature and humidity (maximum 5°C/minute) and/or humidity, to avoid condensation on the card surface.

7 Glossary

3GPP	: 3 rd Generation Partnership Project
C	: Capacitance (Input / Output)
CLK	: Clock
ETSI	: European Telecommunication Standards Institute
GND	: Ground
I/O	: Input / Output
IccID	: Integrated circuit card identity (number)
I _{DD}	: Operating current
I _{IL}	: Output current I/O line state 'low'
I _{IH}	: Output current I/O line state 'high'
I _{oL}	: Input current state 'low'
I _{oH}	: Input current state 'high'
NC	: Not Connected
RST	: Reset
t _f	: Pulse fall-time
t _r	: Pulse rise-time
V _{DD}	: Supply voltage (In ETSI specification V _{cc} is used)
V _{IL}	: Output voltage state 'low'
V _{IH}	: Output voltage state 'high'
V _{oL}	: Input voltage state 'low'
V _{oH}	: Input voltage state 'high'