GDM7243ST LTE Module Datasheet

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1 GDM7243ST Module General Introduction

1.1 Overview of This Chapter

This Chapter provides an overview of the GDM7243ST LTE module，
Including：

GDM7243ST ID Design
GDM7243ST Function Description
Abbreviations

1.2 GDM7243ST ID Design

GDM7243ST module has a simple, small appearance, refer to figure 1-1.

Figure 1-1GDM7243ST Module ID Design

1.3 GDM7243ST Function Description

GDM7243ST module feqtures are as follows：

- Comply to 3GPP Release9 CAT4 standard；
- Support Band3、Band7、Band20、Band31 band；
- Support channel bandwidth 1.4M/3M/5M/10M/15M/20M；
- Provide common PCIE interface，interface signals include：
  - Power
  - 1 route USIM card signal(supports 3.0v or 1.8vUSIM card)；
  - 1 route high-speed USB2.0 interface
  - Indicator signals,etc.
- Provide the main antennas, diversity antenna interface；
- Support standard AT instruction set；

Table 1-1 GDM7243ST Module product features

Product Features	Description
Frequency Band	Band3 (UL : 1710-1785 MHz, DL : 1805-1880MHz) Band7 (UL:2500-2570 MHz, DL: 2620-2690MHz) Band20(UL : 832-862 MHz, DL : 791-821 MHz) Band31(UL : 452.5-457.5 MHz, DL : 462.5-467.5 MHz)
Maximum Transmit Power	23dBm
Working Temperature	Normal working temperature：-20℃～ +65℃
	Limited working temperature：-30℃～ +70℃
	Storage temperature： -50℃～ +85℃
Power Voltage	3.15V～4.2V (3.3V recommended)
Power Consumption(current)	550mA (Ratio 1:2)
AT Command	Supports the standard AT command set
PCIE Connector	Power supply
	1 route USIM card signal(supports 3.0v or 1.8v USIM card)；
	1 route USB2.0 interface
	Indicator signals
External Interface	Main antenna, diversity antenna interface
	Universal PCIE interface
RoHS	Support

1.4 Abbreviations

Abbreviation	Full Name	
EMC	Electromagnetic Compatibility	
ESD	Electrostatic Discharge	
IEC	International Electrotechnical Commission	
IMEI	International Mobile Equipment Identity	
I/O	Input/Output	
ISO	International Standards Organization	
ITU	International Telecommunications Union	
kbps	kbits per second	
LED	Light Emitting Diode	
NTC	Negative Temperature Coefficient	
PCS	Personal Cellular System	
PCI	Peripheral Component Interconnect	
PDU	Packet Data Unit	
PPP	Point-to-point protocol	
PS	Packet Switched	
QPSK	Quadrate Phase Shift Keying	
TCP/IP	Transmission Control Protocol/ Internet Protocol	
UART	Universal asynchronous receiver-transmitter	
UIM	User Identified Module	
USB	Universal Serial Bus	

Table 1-2：Abbreviations Summary

2 Interface Description

2.1 Overview of This Chapter

This chapter mainly introduces the external interface of GDM7243ST module，including：

- Common PCIE interface
- Antenna interface

2.2 Common PCIE interface

2.2.1 Interface signal

GDM7243ST module interface is common 52pin-PCIE interface.

Table 2-1 describes the functions of the 52pin-PCIE interfaces in the GDM7243ST module

Table 2-1 PCIE interface fuction

Pin	Description	I/O	Remark
1	GPIO 41	I	
2	VCC3V3	P	
3	UART_TXD	O	UART control transmission
4	GND	P	ground
5	UART_RXD	I	UART control reception
6	GPIO 42	I	
7	FACT_RST#	I	Factory reset
8	VSIM	P	USIM card power output
9	GND	P	ground
10	UIM_DATA	IO	USIM data signal
11	RGMII_TXD3	O	
12	UIM_CLK	O	USIM clock signal
13	RGMII_TXD1	O	
14	UIM_RESET	O	USIM card reset signal
15	GND	P	ground
16	GPIO 39	I	
17	RGMII_TXD0	O	
18	GND	P	ground

Pin	Description	I/O	Remark
19	RGMII_TXEN	O	
20	GPIO 38	I	
21	GND	P	ground
22	PERST#	I	Module reset signal
23	RGMII_TXD2	O	
24	VCC3V3	P	
25	RGMII_GTXCLK	O	
26	GND	P	ground
27	GND	P	ground
28	RGMII_MDC	O	
29	GND	P	ground
30	RGMII RXD0	I	
31	RGMII_RXCLK	I	
32	RGMII_RXD2	I	
33	RGMII_RXD1	I	
34	GND	P	ground
35	GND	P	ground
36	USB_DM	I/O	USB negative signal
37	GND	P	ground
38	USB_DP	I/O	USB positive signal
39	VCC3V3	P	
40	GND	P	ground
41	VCC3V3	P	
42	LED	O	Indicator signal(note 2)
43	GND	P	ground
44	LED	O	Indicator signal(note 2)
45	MII_RXDV	I	
46	LED	O	Indicator signal(note 2)
47	RGMII_RXD3	I	
48	RGMII_MDIO	I/O	-
49	PHY_RESET#	O	
50	GND	P	ground
51	LED	O	Indicator signal(note 2)
52	VCC3V3	P	

Note 1：In table 2-1，P means power pin；I means digital signal input pin；O means digital signal output pin ；I/O:means digital signal input/output;

Note 2: GPIO reserved can be customized，such as LED indicator ；

Note 3：For tetails about the description, functions and usage methods of each pin listed in Table2-1,please refer to the related chapters.

2.3 RF Antenna Interface

2.3.1 Overview

GDM7243ST module has a main and diversity antenna interfaces and connect external antenna through two antenna pads. The size of RF connector is shown in Figure 2-1.

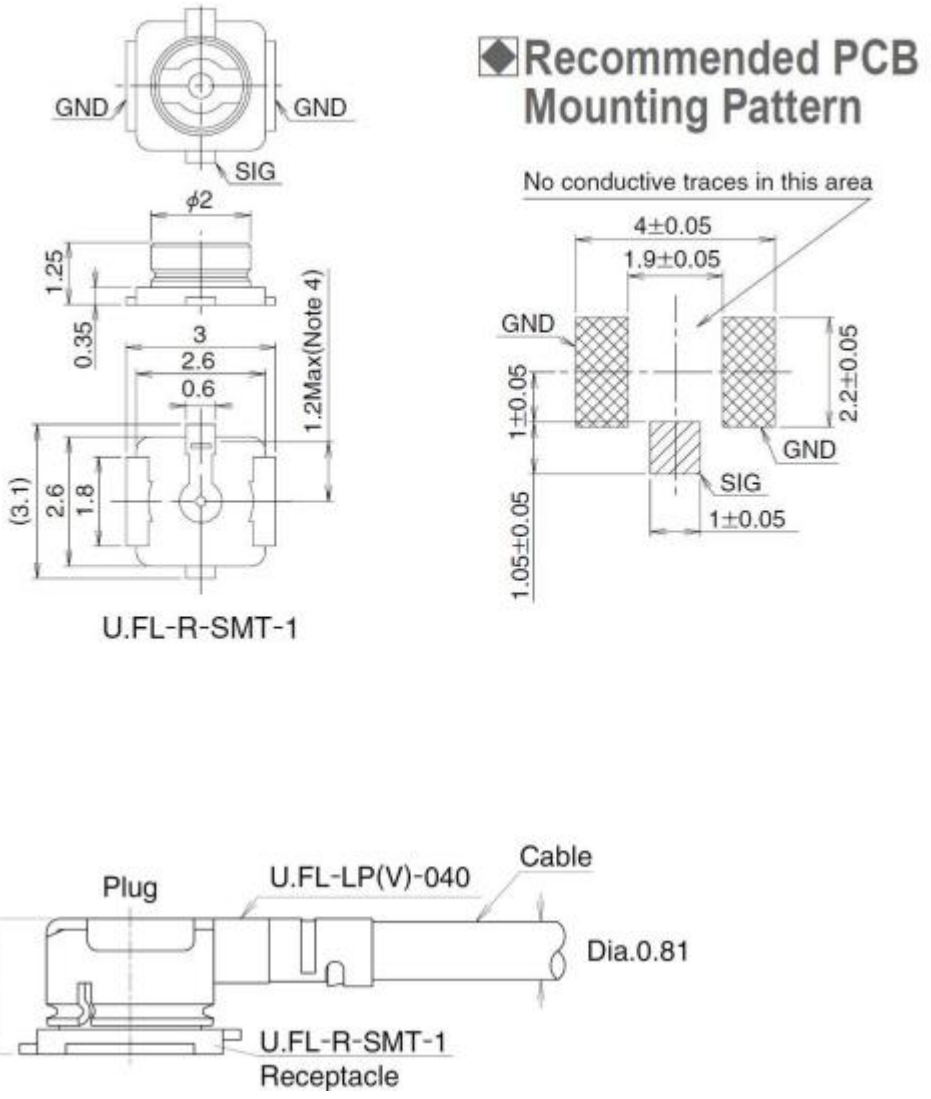

Figure 2-1 RF Connector size

2.3.2 Antenna Interface RF Performance

The RF performance of the module antenna port is shown in table 2-2：

Table 2-2 RF performance of the antenna interface

	Working Frequency	Transmit Power (dBm)	Receive Sensitivity of The Antenna Interface
FDD-LTE	Band 3	23±2	< –93dBm/20MHz
FDD-LTE	Band 7	23±2	< –98dBm/20MHz
FDD-LTE	Band 20	23±2	< –98dBm/20MHz
FDD-LTE	Band31	23±2	< –100dBm/5MHz

3 Interface Electrical Performance

3.1 Overview of This Chapter

This Chapter mianly introduces the electrical performance of GDM7243ST module interface，Including：

Absolute Maximum Ratings

Working, storage temperature

Module IO port level requirements

Power performance

Reliability features

ESD

3.2 Absolute Maximum Ratings

Table 3-1 lists the limitations of the GDM7243ST module，long-term use in excess of these conditions may result in permanent damage to the GDM7243ST module.

Table 3-1GDM7243ST Module Limit Conditions

Parameter	Description	Minimum	Maximum	Unit
VCC_3V3	Module input Volteage	-0.3	6	V
V IN	IO Port Input Voltage	-0.3	3.6	V

3.3 Working, Storage Temperature

Table 3-2 shows the working and storage temperature ranges of the GDM7243ST module.

Table 3-2GDM7243ST Module Temperature Range

Parameter	Description	Minimum	Maximum	Unit
To	Normal working temperature	-20	65	℃
Ta	Limit working temperature	-30	70	℃
Ts	Module storage temperature	-40	85	℃

3.4 Module IO Port Level Requirement

Table 3-3 describes the recommended conditions for using the GDM7243ST module.

Table 3-3 Recommended application conditions for the GDM7243ST module

Parameter	Description	Minimum	Maximum	Unit
VIH	High level input voltage	2	3.6	V
VIL	Low level input voltage	-0.3	0.8	V
VOH	Output high voltage	2.4	3.0	V
VOL	Output low voltage	0	0.4	V

3.5 Power Characteristics

3.5.1 Input Power

Table 3-4 shows the input power requirements of the GDM7243ST module.

Table 3-4 GDM7243ST module Input Power Requirements

Parameter	Minimum	Typical	maximum	Unit
VBAT	3.15	3.3	4.2	V

3.5.2 Working Current

Table 3-5 lists the working current requirements of the GDM7243ST module.

Table 3-5 GDM7243ST Module Operating Current Requirements(Note 2)

Parameter Descriptions	Min	Type	Max	Unit
Power Voltage	3.15	3.3	4.2	V
PS-PA(Note 1)		65		mA
23dBm 1:2		750		mA

Note 1: PS-PA transition occurs if L1 is in IDLE(Standby or NAS parking) for few(configurable) milliseconds.

Note 2：Unless otherwise specified, the data in the table is obtained under the follwoing test conditions: VBAT =3.8VDC, T=25℃

3.5.3 Boot Process

GDM7243ST module loaded to the external motherboard, through the PCI-E interface to provide 3.2-4.2V power supply(3.8V recommended) to boot.

3.6 Reliability Characteristics

GDM7243ST module part of the mechanical reliability test conditions and results are shown in Table 3-6 below：

Table 3-6 Reliability Characteristics

Test Item	Test Conditions	Test Standard
Radom Vibration	Frequency range：5-20Hz PSD:1.0m^2/s^3 Frequency range：20-200Hz，-3dB/oct 3 axes, 1 hour per axial	IEC 68-2-6
Impact Test	Half-sine wave impact Acceleration: 20g Impact time: 11ms 6 axial directions，one impact per axial direction(±x, y and z)	TIA/EIA 603 3.3.5 GB/T15844.2 4.1
Temperature Shock	Low temperature:-40℃±2℃ High temperature: +85℃±2℃ Temperature change time: less than 30 seconds Test duration: 1 hour The number of cycles: 100	IEC 68-2-14 Na ETS 300019-2-7
Alternating Hot and Humid	High temperature: 55℃±2℃ Low temperature: +25℃±2℃ Humidity: 95% Cycle test: 4 Test duration: 12h+12h	IEC 68-2-30 Db
Low Temperature Operating	Temperature: -30±2℃ Test duration: 48h	IEC 68-2-1Ab
High Temperature Operating	Temperature: +70±2℃ Test duration: 48h	IEC 68-2-2Bb
Low Temperature Storage	Temperature: -40±2℃ Test duration: 24h	IEC 68-2-1Ab
High Temperature Storage	Temperature: +85±2℃ Test duration: 24h	IEC 68-2-2Bb

3.7 ESD Features

3.7.1 Overview

When the GDM7243ST module is used , the ESD protection should be considered. The ESD

performance of the module has been tested according to the EN61000-4-2 standard. The Table 3-7 lists the test results.

Table 3-7 ESD prformance

SIM card interface	Air discharge: ±8k	V
	Contact discharge:±4k	V

Notes:

The other ports of module are not accessible to the user of the final product(since they are installed within the device) and therefore, are only protected according to the : “Human Body Model” requirements.

The following sections describe the recommended circuit of the USIM card interface.

3.7.2 ESD Protection of USIM Card Interface

Figure 3-1 shows the recommended ESD-protection circuit of the USIM card interface on the module. The transient voltage suppressor (TVS) diode should be placed as close to the USIM card connector as possible.

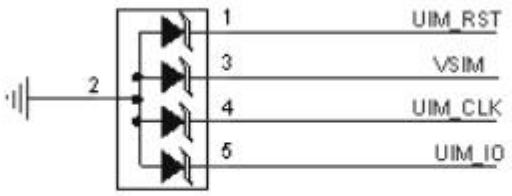

Figure 3-1Recommended ESD protection circuit of the USIM card interface

4 Interface Application

4.1 Overview of This Chapter

This chapter describes the GDM7243ST module interface applications, Including：

- USIM card interface
- Power interface
- USB bus
- RESET interface
- Control signal interface
- UART signal interface

4.2 USIM Card Interface

Instead of reserving the USIM deck on the GDM7243ST module， the USIM card related signals are led to the outside through the Mini PCIE connector. The USIM deck can be placed on the interface board by the user. 3.0V/1.8V external USIM card can be connected, the interface level is 3.0V or 1.8V. Table 4-1 shows the signals of the USIM card.

Table 4-1USIM Card Interface Pin Description

SN	PIN	Signal	Description
1	8	VSIM	USIM card power
2	14	UIM_REST	USIM card reset signal
3	12	UIM_CLK	USIM card clock signal
4	10	UIM_DATA	USIM card data cable

USIM card external interface circuit can be as follwos：

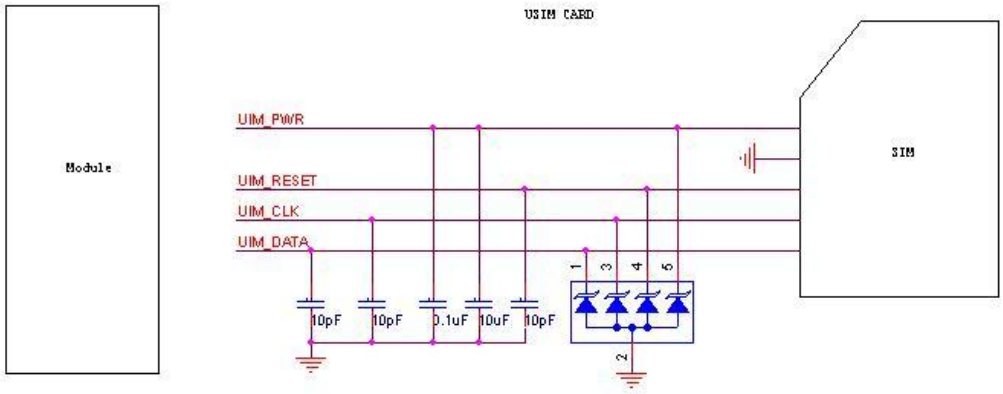

Figure 4-1 USIM Card Interface Circuit Diagram

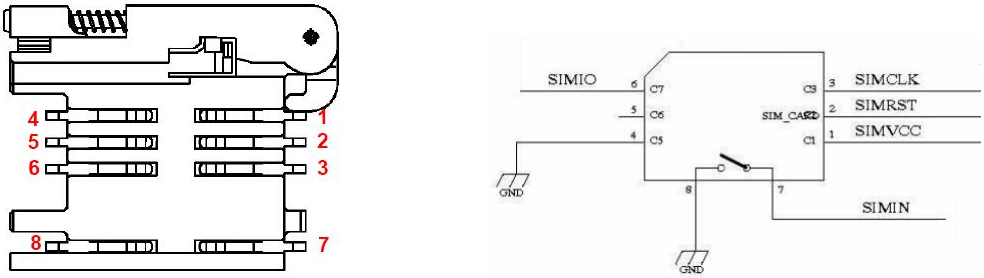

Figure 4-2 USIM Deck Pin Sequence Diagram and USIM Card Connection Diagram

Note：

- The interface rate of USIM card is about 3.25MHz. Therefore, the USIM deck should be located close to the module interface to prevent the signal line from being severely distorted due to the long trace(not more than 100mm). The traces of the USIM-CLK and USIM-IO signals need to be covered by the ground wire.
- Add a 0.1uF or 0.22uF capacitor to the USIM-VCC. Add the 33pF capacitor to the GND network on the remaining USIM-CLK, USIM-IO, and USIM-RESET filters out the antenna signal interference. In addition, these 4 signals are protected against static through the TVS tube.

4.3 Power Interface

External power supply with a specification of 3.15V-4.2V(3.3V typical) is used to power the GDM7243ST module. When the network signal is weak, the antenna transmits at its maximum power, and the module's maximum transient current will be 1A. It is recommended to use more than 1A LDO or switching power supply.

In addition taking into account possible high-voltage launch voltage drop, the power port in the module plus a larger capacitor.

Note：The switching power supply due to the EMC interference of its products, the circuit aligment do not close to the antenna part.

4.4 USB Bus Interface

GDM7243ST module provides a USB 2.0 interface,the USB interface and drive with the mapping port on the PC.

The USB drive used by the GDM7243ST has a VID of 0x2000 and a PID of 0x258d.Two ports can be mapped on the PC,which are:

1、4G ACM port, carrying AT command, mainly used for initiating data service；

2、4G ECM port, ECM standard network card, mainly carrying business data.

4.5 Status Indication Signals

There are four GPIO pins of GDM7243ST module. The mode LED functions as the network mode indicator and the status LED function as the signal strength indicator. The LEDs are controlled by a sink current source. The high voltage is the voltage of VCC3V3(with the typical value of 3.3V). According to LED feature, you can adjust the LED brightness by adjusting the impedance of resistor R.

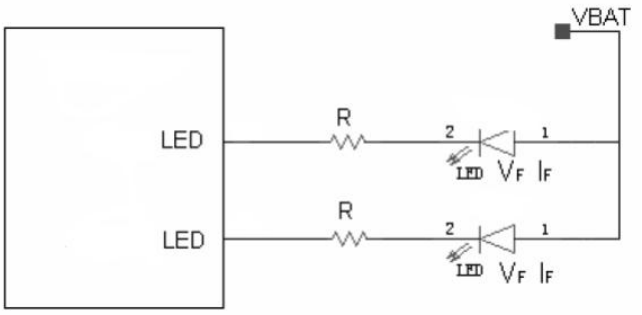

Figure 4-3Recommended circuits of the LED pins

4.6 RESET Interface

A PERST_N pin provided by module can RESET module through an external RESET circuit. Pull low RESET button(RESIN_N pin) to 100ms, the module will be reset.

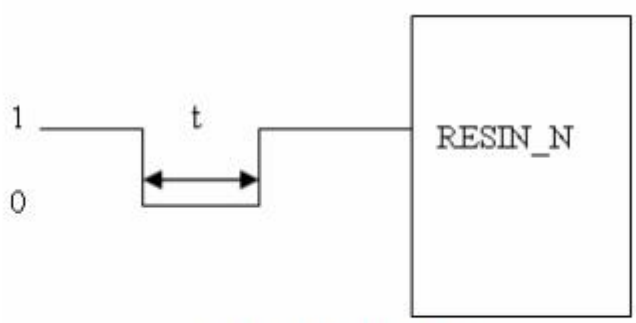

Figure 4-3：RESET interface

Note: 50 ms < t < 200ms. In addition, because the pin is rather sensitive to interference, it is important to pay attention to the module interface board line otherwise it may bring such as interference caused by module reset.

5 Structure

5.1 Overview

This Chapter describes te GDM7243ST module mechanical structure Size, Including:

- GDM7243st module dimensions
- GDM7243ST interface dimension

5.2 GDM7243ST Module Dimensions

Size:32.8±0.20x52.35±0.20x4.8±0.10mm

Weight:12±0.5g

Dimensions shown in below Figure 5-1

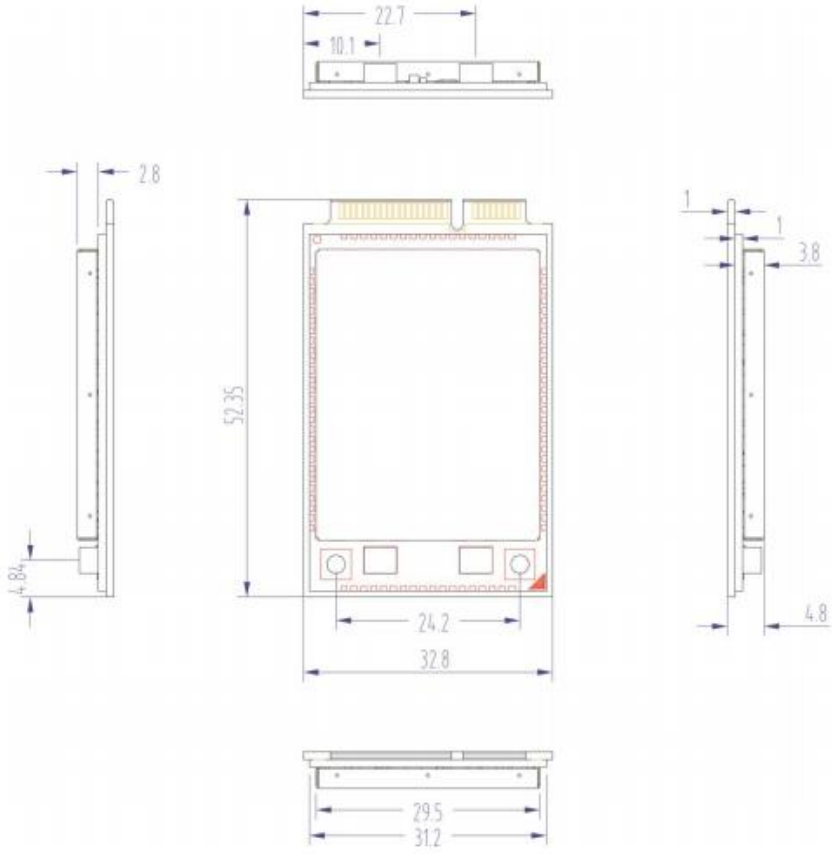

Figure5-1GDM7243ST Wireless module outline drawing (Unit：mm)