M65&M66

Compatible Design

GSM/GPRS Module Series

Rev. M65&M66_Compatible_Design_V1.0

Date: 2019-11-08

Status: Released

Our aim is to provide customers with timely and comprehensive service. For any assistance, please contact our company headquarters:

Quectel Wireless Solutions Co., Ltd.
Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233
Tel: +86 21 5108 6236
Email: info@quectel.com

Or our local office. For more information, please visit:
http://www.quectel.com/support/sales.htm

For technical support, or to report documentation errors, please visit:
http://www.quectel.com/support/technical.htm
Or email to: support@quectel.com

GENERAL NOTES

QUECTEL OFFERS THE INFORMATION AS A SERVICE TO ITS CUSTOMERS. THE INFORMATION PROVIDED IS BASED UPON CUSTOMERS' REQUIREMENTS. QUECTEL MAKES EVERY EFFORT TO ENSURE THE QUALITY OF THE INFORMATION IT MAKES AVAILABLE. QUECTEL DOES NOT MAKE ANY WARRANTY AS TO THE INFORMATION CONTAINED HEREIN, AND DOES NOT ACCEPT ANY LIABILITY FOR ANY INJURY, LOSS OR DAMAGE OF ANY KIND INCURRED BY USE OF OR RELIANCE UPON THE INFORMATION. ALL INFORMATION SUPPLIED HEREIN IS SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

COPYRIGHT

About the Document

History

Revision	Date	Author	Description
1.0	2019-11-08	Claude WEI/ Tate WANG	Initial

Contents

Table Index

Figure Index

1 Introduction

Quectel GSM/GPRS modules M65 and M66 are compatible, and this document briefly describes the compatible design between them.

2 General Description

2.1. Product Description

M65 and M66 are quad-band GSM/GPRS modules supporting GSM850/EGSM900/DCS1800/PCS1900. The two modules are compatible, and customers can choose a suitable product for terminal applications according to their needs.

Table 1: Module General Information

Module	Appearance	Packaging	Dimensions	Description
M65		44 LCC pins	17.7mm × 15.8mm × 2.4mm	Quad-band GSM/GPRS module
M66		44 LCC pins	17.7mm × 15.8mm × 2.3mm	Quad-band GSM/GPRS module

2.2. Features Overview

The following table compares the general properties and features of M65 and M66 modules.

Table 2: Features Overview

Features	M65	M66	Remarks
Power Supply	3.45V~4.25V Typ. 4.0V	3.3V~4.6V Typ. 4.0V	
Peak Current	2.0A	1.6A	
Sleep Current	1.2mA @DRX=5 1.1mA @DRX=9	1.3mA @DRX=5 1.2mA @DRX=9	
Frequency Bands	Quad-band: GSM850/EGSM900/ DCS1800/PCS1900	Quad-band: GSM850/EGSM900/ DCS1800/PCS1900	
Temperature Range	Operation temperature range: -35°C ~ +75°C 1) Extended temperature range: -40°C ~ +85°C 2) Storage temperature range: -40°C ~ +90°C	Operation temperature range: -35°C ~ +75°C 1) Extended temperature range: -40°C ~ +85°C 2) Storage temperature range: -40°C ~ +90°C	
UART Interface	**Main UART port:** ● Full function serial port ● Used for AT command transfer and GPRS data transfer ● Adaptive baud rate range: 4800bps~115200bps **Debug UART port:** ● For software debugging ● For firmware upgrade, fixed baud rate: 921600bps **Auxiliary UART port:** ● Used for AT command transfer ● The default baud rate of the module is 115200bps ● Adaptive baud rate is not supported	**Main UART port:** ● Full function serial port ● Used for AT command transfer and GPRS data transfer ● Adaptive baud rate range: 4800bps~115200bps ● For firmware upgrade **Debug UART port:** ● For software debugging only, baud rate must be 460800bps **Auxiliary UART port:** ● Used for AT command transfer ● The default baud rate of the module is 115200bps ● Adaptive baud rate is not supported	**Signal level:** 2.8V

(U)SIM Interface	1.8V/3.0V (U)SIM card	1.8V/3.0V (U)SIM card
Audio Interface	One analog input channel Two analog output channels	One analog input channel Two analog output channels
PCM Interface	Not supported	Supported
ADC	Supported	Supported
BT	Not supported	Support BT 3.0
RTC	Vnorm=3.1V V_I=3.0V~3.5V	Vnorm=2.8V V_I=1.5V~3.3V
Firmware Upgrade	Debug UART or DFOTA	Main UART or DFOTA

NOTES

1. The part marked in red are the differences between M65 and M65 features.
2. [1)] Within operation temperature range, the module is 3GPP compliant.
3. [2)] Within extended temperature range, the module remains the ability to establish and maintain a voice, SMS, data transmission, etc. There is no unrecoverable malfunction. There are also no effects on radio spectrum and no harm to radio network. Only one or more parameters like P_{out} might reduce in their value and exceed the specified tolerances. When the temperature returns to normal operation temperature levels, the module will meet 3GPP specifications again.

2.3. Pin Assignment

The following figure shows the pin assignment of M65 and M66.

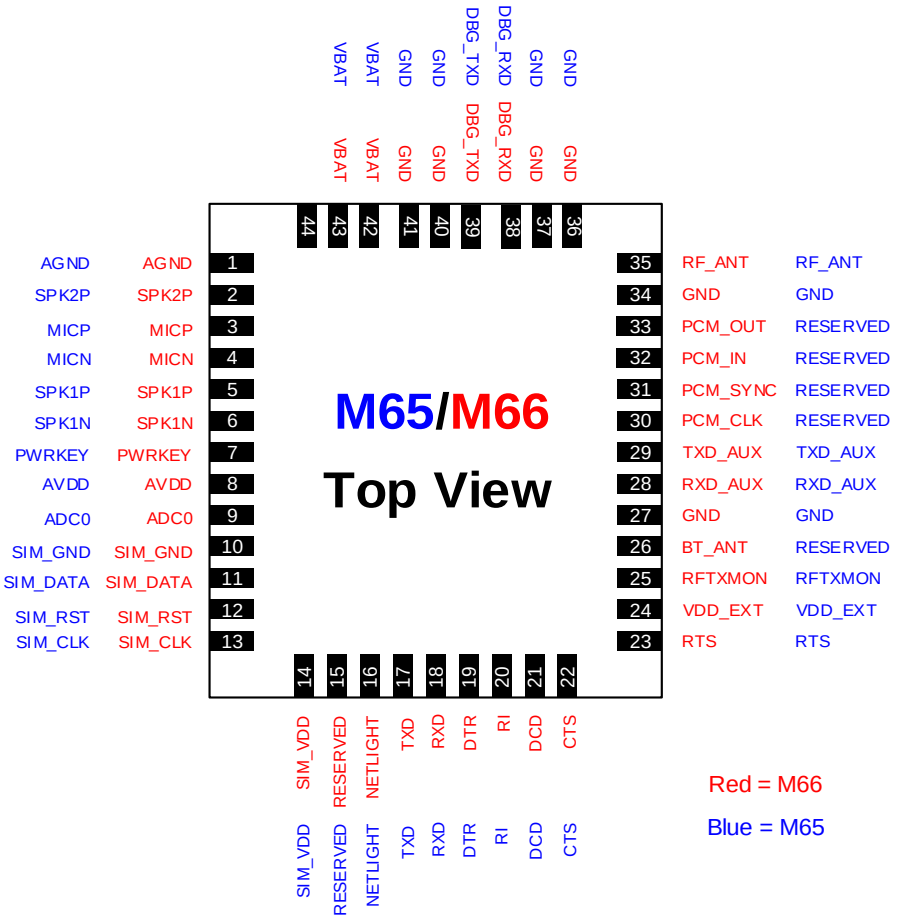

Figure 1: M65&M66 Pin Assignment

NOTES

1. The pin names marked in blue are for M65 module.
2. The pin names marked in red are for M66 module.

3 Pin Description

This chapter describes the pin definition of M65 and M66, as well as the pin comparison between them.

Table 3: I/O Parameters Definition

Symbol	Description
AI	Analog Input
AO	Analog Output
DI	Digital Input
DO	Digital Output
IO	Bidirectional
PI	Power Input
PO	Power Output

Table 4: Pin Comparison

Pin No.	M65			M66		
	Pin Name	IO	Description	Pin Name	IO	Description
1	AGND		Analog ground. Separate ground connection for external audio circuits	AGND		Analog ground. Separate ground connection for external audio circuits
2	SPK2P	AO	Channel 2 voice output	SPK2P	AO	Channel 2 voice output
3	MICP	AI	Positive voice input	MICP	AI	Positive voice input
4	MICN	AI	Negative voice input signal	MICN	AI	Negative voice input signal
5	SPK1P	AO	Channel 1 Positive voice output	SPK1P	AO	Channel 1 Positive voice output
6	SPK1N	AO	Channel 1	SPK1N	AO	Channel 1

			Negative voice output			Negative voice output
7	PWRKEY	DI	Pull down PWRKEY to turn on/off the module	PWRKEY	DI	Pull down PWRKEY to turn on/off the module
8	AVDD	PO	Reference voltage of ADC circuit	AVDD	PO	Reference voltage of ADC circuit
9	ADC0	AI	General-purpose analog to digital converter interface	ADC0	AI	General-purpose analog to digital converter interface
10	SIM_GND		Specified ground for (U)SIM card	SIM_GND		Specified ground for (U)SIM card
11	SIM_DATA	IO	(U)SIM card data signal	SIM_DATA	IO	(U)SIM card data signal
12	SIM_RST	DO	(U)SIM card reset signal	SIM_RST	DO	(U)SIM card reset signal
13	SIM_CLK	DO	(U)SIM card clock signal	SIM_CLK	DO	(U)SIM card clock signal
14	SIM_VDD	PO	Power supply for (U)SIM card	SIM_VDD	PO	Power supply for (U)SIM card
15	RESERVED	/	/	RESERVED	/	/
16	NETLIGHT	DO	Network status indication	NETLIGHT	DO	Network status indication
17	TXD	DO	Transmit data	TXD	DO	Transmit data
18	RXD	DI	Receive data	RXD	DI	Receive data
19	DTR	DI	Data terminal ready/ (U)SIM card detection	DTR	DI	Data terminal ready
20	RI	DO	Ring indication	RI	DO	Ring indication
21	DCD	DO	Data carrier detection	DCD	DO	Data carrier detection
22	CTS	DO	Clear to send	CTS	DO	Clear to send
23	RTS	DI	Request to send	RTS	DI	Request to send
24	VDD_EXT	PO	2.8V output power supply for an external circuit	VDD_EXT	PO	2.8V output power supply for an external circuit
25	RFTXMON	DO	Transmission signal indication	RFTXMON	DO	Transmission signal indication
26	RESERVED	/	/	BT_ANT	IO	BT antenna pad
28	RXD_AUX	DI	Receive data	RXD_AUX	DI	Receive data
29	TXD_AUX	DO	Transmit data	TXD_AUX	DO	Transmit data
30	RESERVED	/	/	PCM_CLK	DO	PCM clock

31	RESERVED	/	/	PCM_SYNC	DO	PCM frame synchronization
32	RESERVED	/	/	PCM_IN	DI	PCM data input
33	RESERVED	/	/	PCM_OUT	DO	PCM data output
35	RF_ANT	IO	RF antenna pad	RF_ANT	IO	RF antenna pad
38	DBG_RXD	DI	Receive data	DBG_RXD	DI	Receive data
39	DBG_TXD	DO	Transmit data	DBG_TXD	DO	Transmit data
42	VBAT	PI	Main power supply of the module: VBAT=3.45V~4.25V	VBAT	PI	Main power supply of the module: VBAT=3.3V~4.6V
43	VBAT	PI	Main power supply of the module: VBAT=3.45V~4.25V	VBAT	PI	Main power supply of the module: VBAT=3.3V~4.6V
44	VRTC	IO	Power supply for RTC when module is not powered by VBAT.	VRTC	IO	Power supply for RTC when module is not powered by VBAT.
27, 34, 36, 37, 40, 41	GND	/	Ground	GND	/	Ground

NOTES

1. The pin names marked in red are compatible pins with different functions.
2. The pin names marked in black are compatible pins with the same function.
3. Keep all reserved and unused pins unconnected.
4. All GND pins should be connected to ground.

4 Hardware Reference Design

The following chapters describe the compatible design between M65 and M66 on main hardware functions.

4.1. Power Supply

4.1.1. Module Operating Voltage

The following table shows the operating voltage range of M65 and M66 modules:

Table 5: Operating Voltage Range

Module	Pin Name	Description	Min.	Typ.	Max.	Unit
M65	VBAT	The actual input voltage must be within the range value.	3.45	4.0	4.25	V
M66	VBAT		3.3	4.0	4.6	V

When considering the compatible design between the two modules, please ensure that the module input voltage is 3.45V~4.25V. Even when a voltage drop occurs in the module's input power supply VBAT, make sure that the VBAT voltage is greater than the module's minimum operating voltage value.

The maximum current consumption of the module could reach 2.0A during a burst transmission, which will cause a large voltage drop on VBAT. In order to ensure the stability of the module's operation, it is recommended that the maximum voltage drop during the burst transmission should not exceed 400mV.

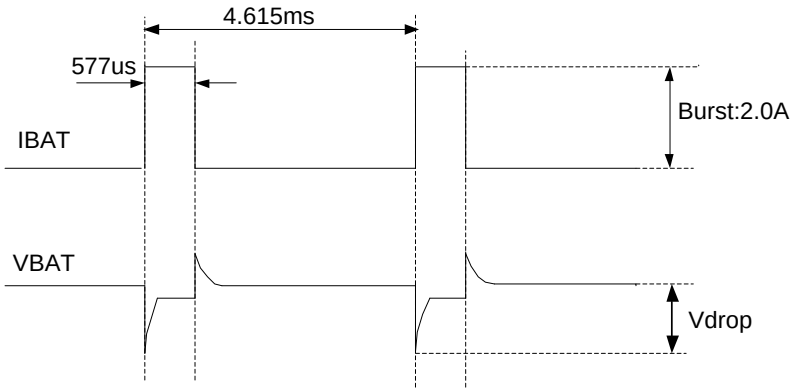

Figure 2: Voltage Ripple during Transmitting

4.1.2. Decrease Supply Voltage Drop

To ensure that the VBAT voltage does not fall below 3.45V, it is recommended to connect a 100μF tantalum capacitor with low ESR (ESR=0.7Ω) and ceramic capacitors of 100nF, 33pF and 10pF (0603 package) in parallel close to the VBAT pin. The reference circuit of VBAT is shown below.

The VBAT trace should be short and wide enough to reduce the equivalent impedance so as to ensure that there is not too much voltage drop during maximum transmit power. The width of VBAT trace should be no less than 2mm; and in principle, the longer the trace is, the wider it will be.

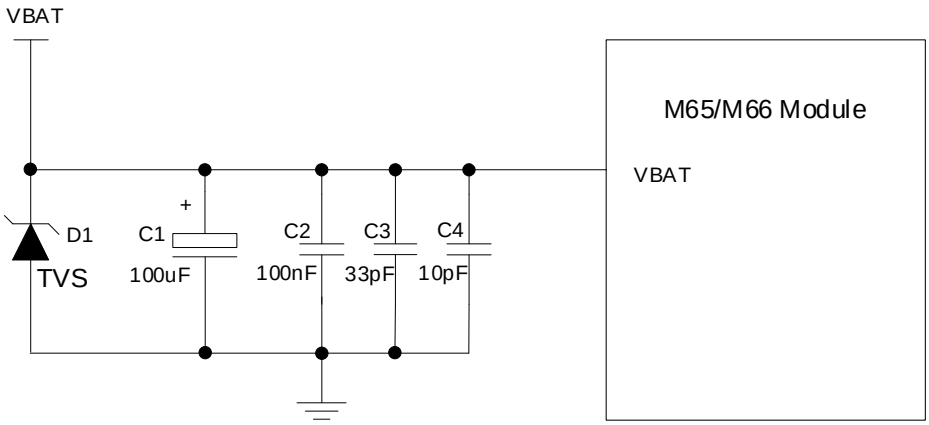

Figure 3: Reference Circuit of VBAT

4.1.3. Reference Design for Power Supply

Power design for the module is very critical, as the performance of the module largely depends on the power source. The power supply should be provided with sufficient current up to 2.0A at least. If the voltage difference between the input and the output voltage is not too big, it is suggested to use an LDO to supply power for the module; if there is a big voltage difference between the input and the output voltage, a switcher power converter is preferred to be used.

The following figure shows a reference design for +5V input power supply. The designed output voltage for the power supply is 4.0V and the maximum load current is 3.0A. A TVS is recommended to be added close to the VBAT pin.

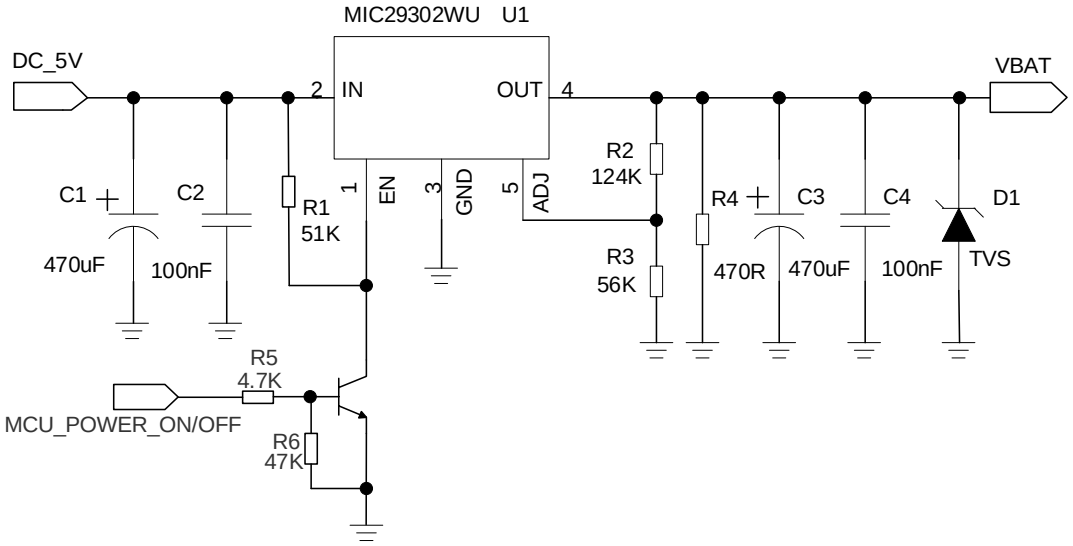

Figure 4: Reference Circuit of Power Supply

4.2. Power-on Circuit

M65 and M66 modules are normally powered on by the PWRKEY pin. Set PWRKEY to low, and the module will be successfully booted after about 1.6s. It is recommended to use an open collector driver circuit to control the pin. The following figure shows the reference circuit.

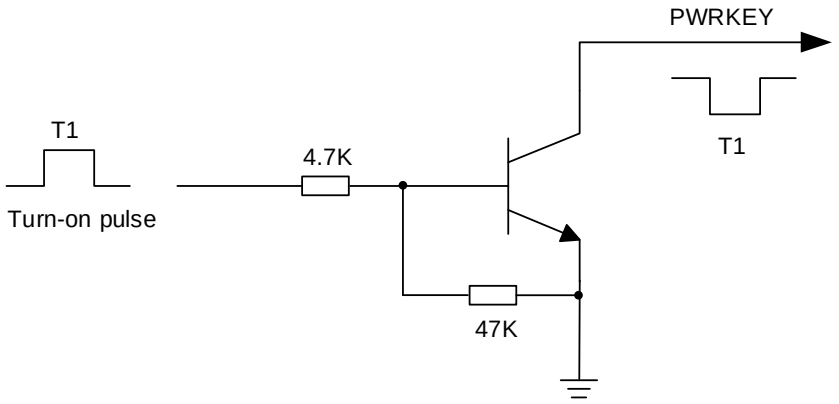

Figure 5: Driver Circuit of the PWRKEY (M65/M66)

The timing of turning on M65 and M66 are illustrated in the figure below.

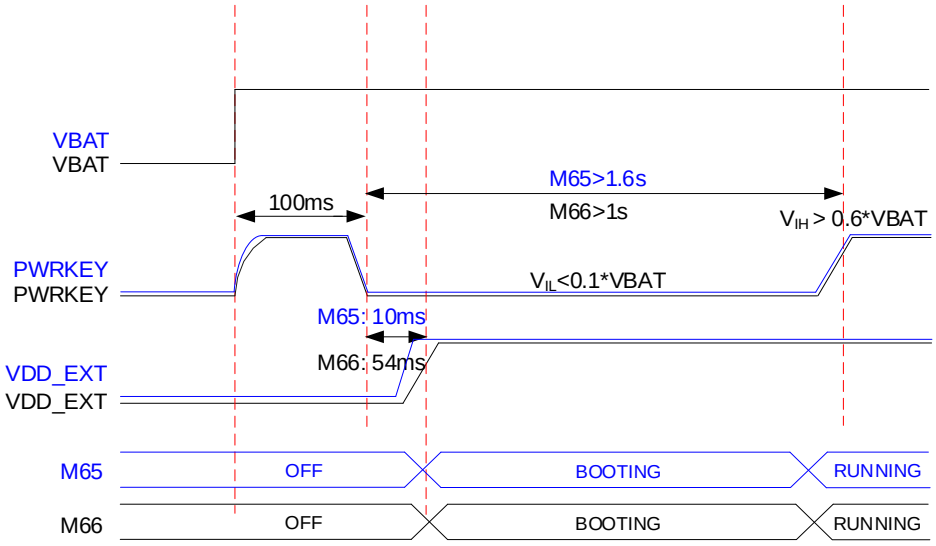

Figure 6: Timing of Turning on the Module (M65/M66)

NOTES

1. When powering on M65/M66 by PWRKEY, PWRKEY pin shall be pulled down after VBAT has been stable for a period of time (greater than 100ms) to ensure VBAT voltage stability.
2. The parts marked in blue in the above figure are for M65 module.
3. The parts marked in black in the above figure are for M66 module.

4.3. Power-off Circuit

M65 and M66 can be powered off by **AT+QPOWD=1** to shut down or pull down the PWRKEY pin for about 1.2s.

The timing of turning on M65 and M66 are illustrated in the figure below.

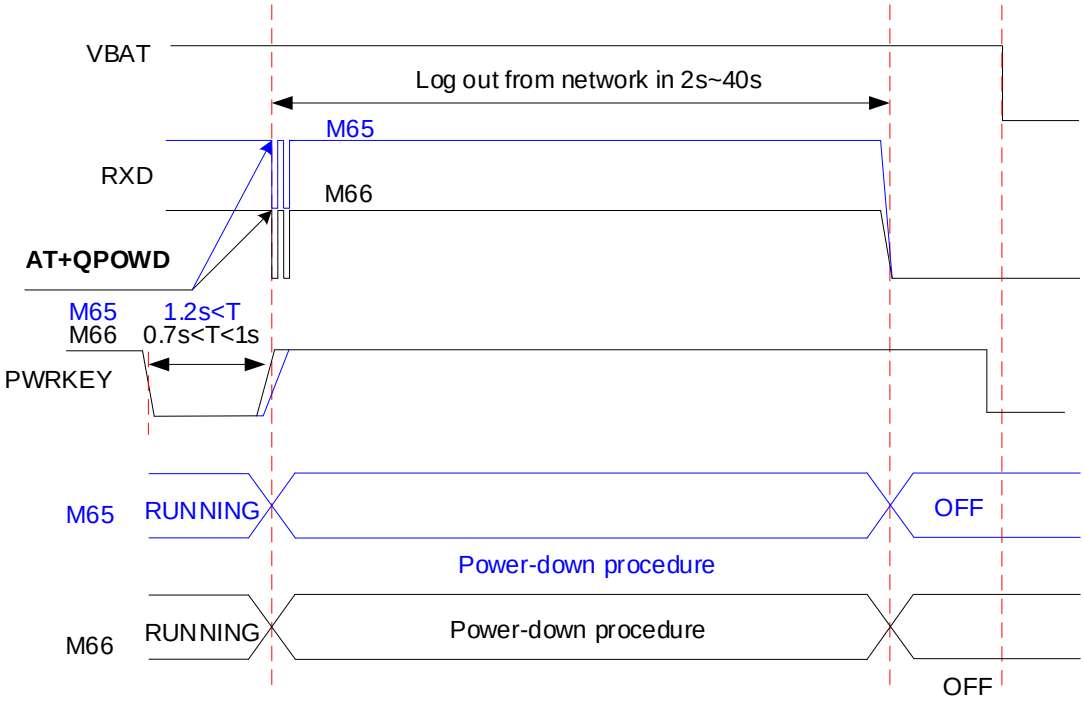

Figure 7: Timing of Turning off the Module (M65/M66)

NOTES

1. The parts marked in blue in the above figure are for M65.
2. The parts marked in black in the above figure are for M66.
3. The time for the module to log out from network depends on local network quality.

4.4. Restart the module

After M65 and M66 are shut down normally, pull down the PWRKEY for a while can restart the module. It is recommended to wait at least 500ms after shutting down the module for the internal LDO discharge of the module. The timing of restarting the module shown below.

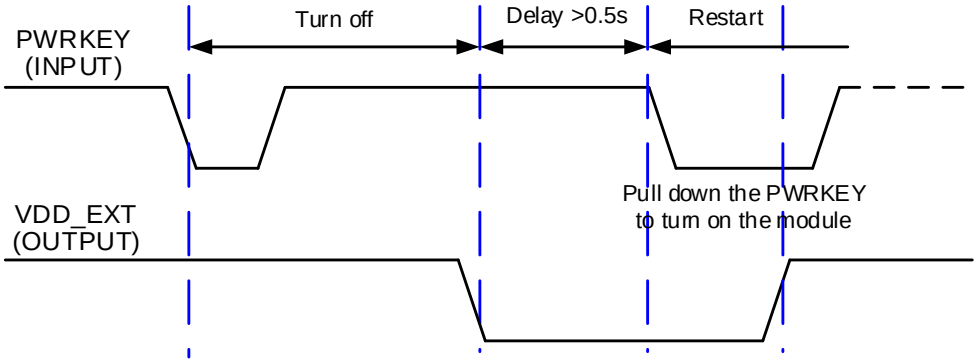

Figure 8: Timing of Restarting the Module

4.5. Network Status Indication

The NETLIGHT pin can be used to drive a network status indicator LED. The reference design is shown below.

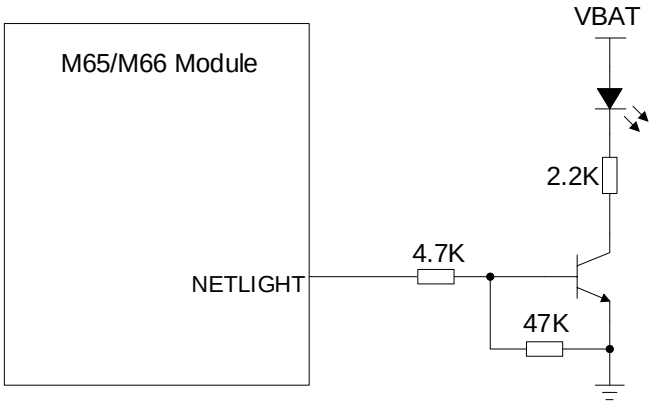

Figure 9: Reference Circuit of NETLIGHT

4.6. (U)SIM Interface

(U)SIM interfaces of M65 and M66 are compatible and support both 1.8V/3.0V (U)SIM cards.

The following figure shows a reference design for (U)SIM interface with a 6-pin (U)SIM card connector.

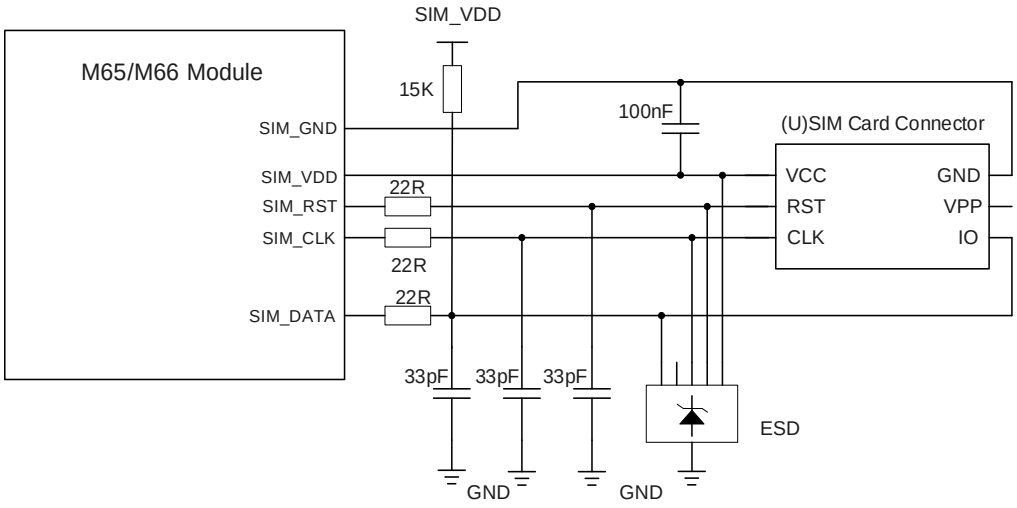

Figure 10: Reference Circuit of (U)SIM Interface with a 6-pin (U)SIM Card Connector

4.7. UART Interfaces

M65's firmware can be upgraded via debug UART interface, and M66's firmware can be upgraded via the main UART interface. The voltage domain of both the UART interfaces is 2.8V.

Table 6: UART Interfaces Comparison

Module	Firmware upgrade	Baud Rate for Firmware Upgrade	Remark
M65	Via debug UART	921600bps	Test points need to be reserved for compatible design
M66	Via main UART	115200bps	

The reference design of 3.3V level matching is shown below. If the host is a 3.0V system, please use the 10kΩ resistor instead of the 5.6kΩ one.

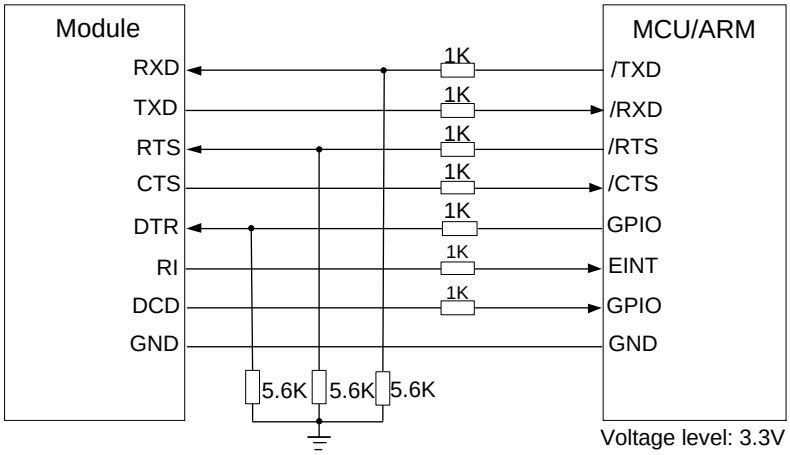

Figure 11: Reference Circuit of Main UART Interface Level Conversion

NOTES

It is strongly recommended that when the host system level is 3V or 3.3V, add a voltage divider circuit to the serial port connection between the module and the host to match the level. For the level matching between higher voltage systems, level conversion chips need to be added between the module and the host.

4.8. ADC Interface

M65 and M66 provide a 10-bit ADC input channel to read the voltage value.

- The ADC0 voltage collection range of M65 is 0~1.8V.
- The ADC0 voltage collection range of M66 is 0~2.8V.

Table 7: Pin Definition Comparison of ADC Interface

Module	Pin Name	Pin No.	Description
M65	ADC0	9	Analog to digital converter interface
M66	ADC0	9	Analog to digital converter interface

4.9. RF Antenna Interface

The pin RF_ANT of M65 and M66 are compatible. Additionally, M66 offers a BT antenna interface BT_ANT (pin 26).

The RF antenna interfaces of these modules have an impedance of 50Ω. In order to achieve better RF performance, a π-type matching circuit is recommended to be reserved, and the π-type matching components (R1&C1&C2) should be placed as close to the antenna as possible. By default, the resistance of R1 is 0Ω and capacitors C1&C2 are not mounted. A reference circuit is shown below.

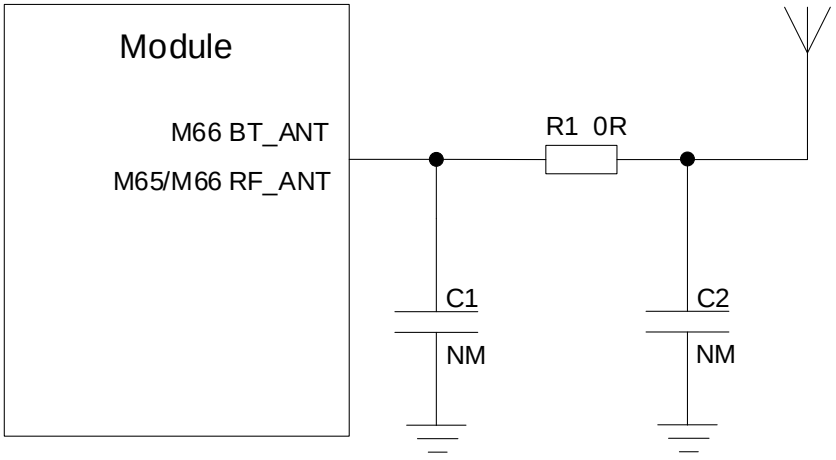

Figure 12: Reference Circuit of RF Antenna Interfaces

4.10. RF Receiving Sensitivity

Table 8: Conducted RF Receiving Sensitivity

Frequency	Receiving Sensitivity	
	M65	M66
GSM850	< -108dBm	< -109dBm
EGSM900	< -108dBm	< -109dBm
DCS1800	< -107dBm	< -109dBm
PCS1900	< -107dBm	< -109dBm

5 Electrical, Reliability and Radio Characteristics

5.1. Absolute Maximum Ratings

Table 9: Absolute Maximum Ratings

Parameter	Min.		Max.		Unit
	M65	M66	M65	M66	
VBAT	-0.3	-0.3	4.5	4.73	V
Peak Current of Power Supply	0	0	2.0	2.0	A
RMS Current of Power Supply (during one TDMA- frame)	0	0	0.7	0.7	A
Voltage at Digital Pins	-0.3	-0.3	3.08	3.08	V
Voltage at Analog Pins	-0.3	-0.3	3.08	3.08	V
Voltage at Digital/Analog Pins in Power Down Mode	N/A	-0.25	N/A	0.25	V

5.2. Power Supply Ratings

Table 10: Power Supply Ratings

Parameter	Description	Conditions	M65			M66			
			Min.	Typ.	Max.	Min.	Typ.	Max.	Unit
VBAT	Supply voltage	The actual input voltages must be kept between the minimum and maximum values.	3.45	4.0	4.25	3.3	4.0	4.6	V
	Voltage drop during burst transmission	Maximum power control level on GSM850 and EGSM900.			400			400	mV
I_{VBAT}	Average supply current	Power down mode		39			150		μA
		Sleep mode @DRX=5		1.2			1.3		mA
		Minimum functionality mode							
		AT+CFUN=0							
		Idle mode		9.5			13		mA
		Sleep mode		0.8			0.98		mA
		AT+CFUN=4							
		Idle mode		9.5			13		mA
		Sleep mode		0.8			1.0		mA
		Talk mode							
		GSM850/EGSM900 @PCL=5		241/229			223/219		mA
		DCS1800/PCS1900 @PCL=0		178/156			153/151		mA

		Data mode, GPRS (3 Rx, 2 Tx) GSM850/EGSM900 @PCL=5 DCS1800/PCS1900 @PCL=0	 366/343 251/222			 363/393 268/257	 mA mA
		Data mode, GPRS (2 Rx, 3 Tx) GSM850/EGSM900 @PCL=5 DCS1800/PCS1900 @PCL=0	 423/397 283/254			 506/546 366/349	 mA mA
		Data mode, GPRS (4 Rx, 1 Tx) GSM850/EGSM900 @PCL=5 DCS1800/PCS1900 @PCL=0	 234/221 165/149			 217/234 172/170	 mA mA
		Data mode, GPRS (1 Rx, 4 Tx) GSM850/EGSM900 @PCL=5 DCS1800/PCS1900 @PCL=0	 457/437 315/283			 458/485 462/435	 mA mA
	Peak supply current (during transmission slot)	Maximum power control level on GSM850 and EGSM900.	1.8	2		1.6	2	A

5.3. Current Consumption

Table 11: Current Consumption

Condition	Current Consumption	
	M65	M66
Voice Call		
GSM850	@power level #5 <300mA, Typical 241mA @power level #12, Typical 103mA @power level #19, Typical 73mA	@power level #5 <300mA, Typical 223mA @power level #12, Typical 83mA @power level #19, Typical 62mA
EGSM900	@power level #5 <300mA, Typical 229mA @power level #12, Typical 102mA @power level #19, Typical 74mA	@power level #5 <300mA, Typical 219mA @power level #12, Typical 83mA @power level #19, Typical 63mA
DCS1800	@power level #0 <250mA, Typical 177mA @power level #7, Typical 87mA @power level #15, Typical 68mA	@power level #0 <250mA, Typical 153mA @power level #7, Typical 73mA @power level #15, Typical 60mA
PCS1900	@power level #0 <250mA, Typical 156mA @power level #7, Typical 85mA @power level #15, Typical 67mA	@power level #0 <250mA, Typical 151mA @power level #7, Typical 76mA @power level #15, Typical 61mA
GPRS Data		
DATA Mode, GPRS (3 Rx, 2 Tx) Class 12		
GSM850	@power level #5 <550mA, Typical 366mA	@power level #5 <550mA, Typical 363mA @power level #12, Typical 131mA @power level #19, Typical 91mA
EGSM900	@power level #5 <550mA, Typical 343mA	@power level #5 <550mA, Typical 393mA @power level #12, Typical 132mA @power level #19, Typical 92mA
DCS1800	@power level #0 <450mA, Typical 251mA	@power level #0 <450mA, Typical 268mA @power level #7, Typical 112mA @power level #15, Typical 88mA
PCS1900	@power level #0 <450mA, Typical 222mA	@power level #0 <450mA, Typical 257mA @power level #7, Typical 119mA @power level #15, Typical 89mA
DATA Mode, GPRS (2 Rx, 3 Tx) Class 12		
GSM850	@power level #5 <640mA, Typical 423mA	@power level #5 <640mA, Typical 506mA @power level #12, Typical 159mA @power level #19, Typical 99mA

EGSM900	@power level #5 <600mA, Typical 397mA	@power level #5 <600mA, Typical 546mA @power level #12, Typical 160mA @power level #19, Typical 101mA
DCS1800	@power level #0 <490mA, Typical 283mA	@power level #0 <490mA, Typical 366mA @power level #7, Typical 131mA @power level #15, Typical 93mA
PCS1900	@power level #0 <490mA, Typical 254mA	@power level #0 <480mA, Typical 348mA @power level #7, Typical 138mA @power level #15, Typical 94mA
DATA Mode, GPRS (4 Rx, 1 Tx) Class 12		
GSM850	@power level #5 <350mA, Typical 234mA	@power level #5 <350mA, Typical 216mA @power level #12, Typical 103mA @power level #19, Typical 83mA
EGSM900	@power level #5 <350mA, Typical 221mA	@power level #5 <350mA, Typical 233mA @power level #12, Typical 104mA @power level #19, Typical 84mA
DCS1800	@power level #0 <300mA, Typical 165mA	@power level #0 <300mA, Typical 171mA @power level #7, Typical 96mA @power level #15, Typical 82mA
PCS1900	@power level #0 <300mA, Typical 149mA	@power level #0 <300mA, Typical 169mA @power level #7, Typical 98mA @power level #15, Typical 83mA
DATA Mode, GPRS (1 Rx, 4 Tx) Class 12		
GSM850	@power level #5 <660mA, Typical 453mA	@power level #5 <660mA, Typical 457mA @power level #12, Typical 182mA @power level #19, Typical 106mA
EGSM900	@power level #5 <660mA, Typical 437mA	@power level #5 <660mA, Typical 484mA @power level #12, Typical 187mA @power level #19, Typical 109mA
DCS1800	@power level #0 <530mA, Typical 315mA	@power level #0 <530mA, Typical 461mA @power level #7, Typical 149mA @power level #15, Typical 97mA
PCS1900	@power level #0 <530mA, Typical 283mA	@power level #0 <530mA, Typical 439mA @power level #7, Typical 159mA @power level #15, Typical 99mA

NOTE

The GPRS Class of M65 and M66 can be configured from Class 1 to Class 12, and Class 12 is the default setting. The lower the GPRS level is set, the lower requirement for the power supply current of the module.

6 Recommended Footprint and Stencil Design

This chapter mainly introduces the recommended footprint and stencil design for M65 and M66 modules. All dimensions are measured in millimeter (mm), and the dimensional tolerances are ±0.05mm unless otherwise specified.

6.1. Bottom Views

The following figure shows the bottom views of M65 and M66.

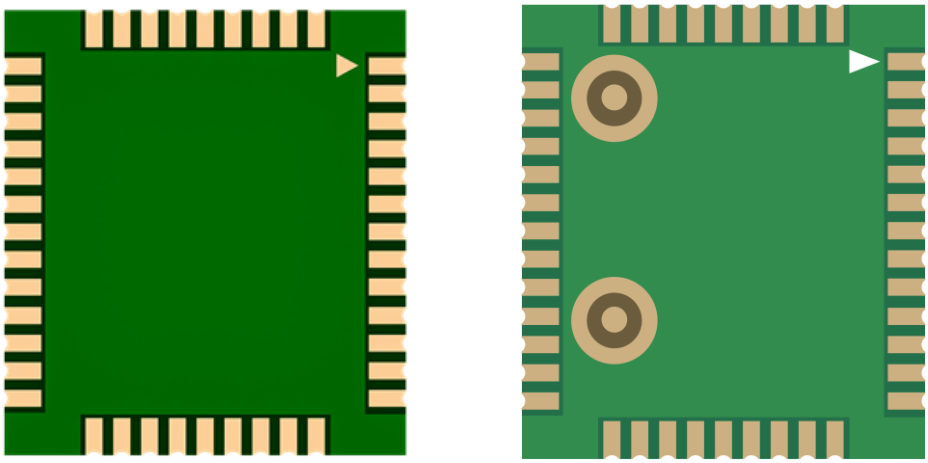

Figure 13: Bottom Views of M65 and M66

6.2. Recommended Compatible Footprint

The following figure shows the recommended compatible footprint of M65 and M66.

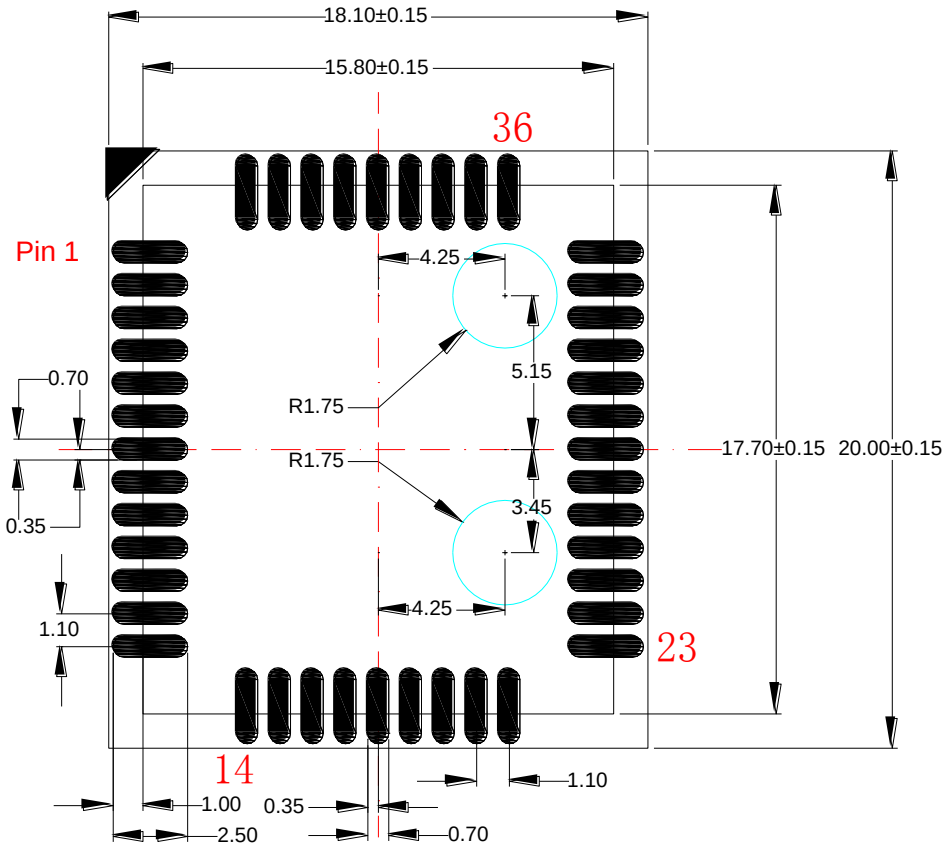

Figure 14: Recommended Footprint of M65 and M66

NOTES

1. The modules should be kept about 3mm away from other components in the host PCB.
2. The circular test points with a radius of 1.75mm in the above recommended footprint should not be designed in schematic and PCB decal, and these test points should be served as a keepout area.

6.3. Recommended Stencil Design

The thickness of stencil for M65 and M66 is recommended to be 0.15mm~0.18mm. For more details, please refer to ***document [3]***.

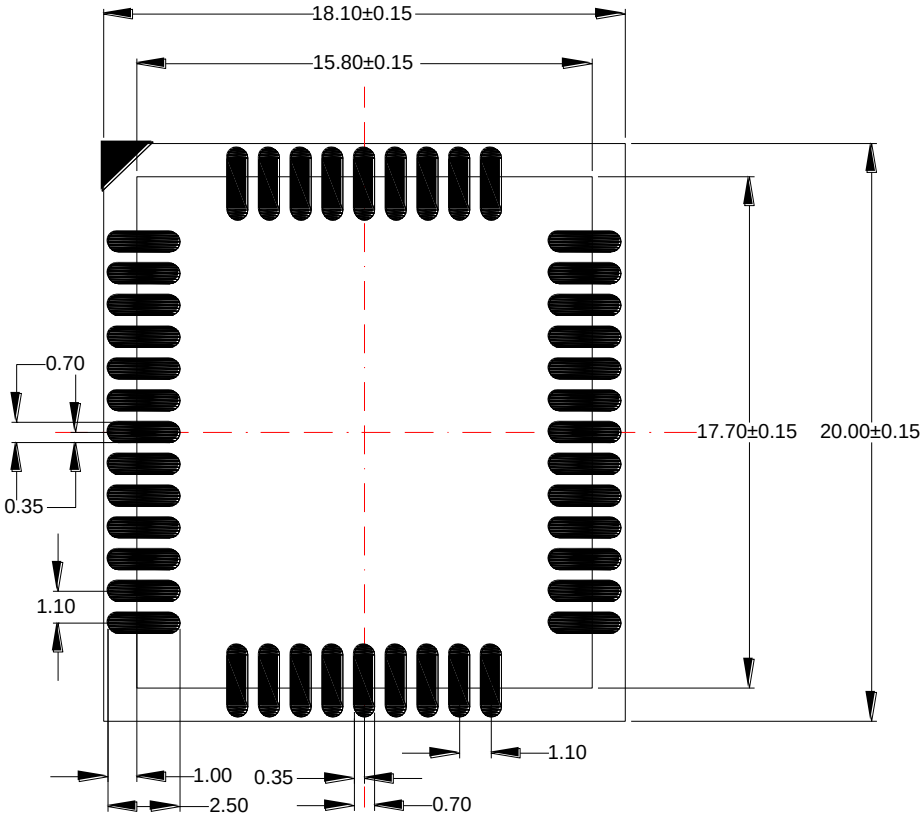

Figure 15: Recommended Stencil Design for M65 and M66 (Unit: mm)

6.4. Installation Sketch Map

The following figure shows the sketch map of installation for M65 and M66.

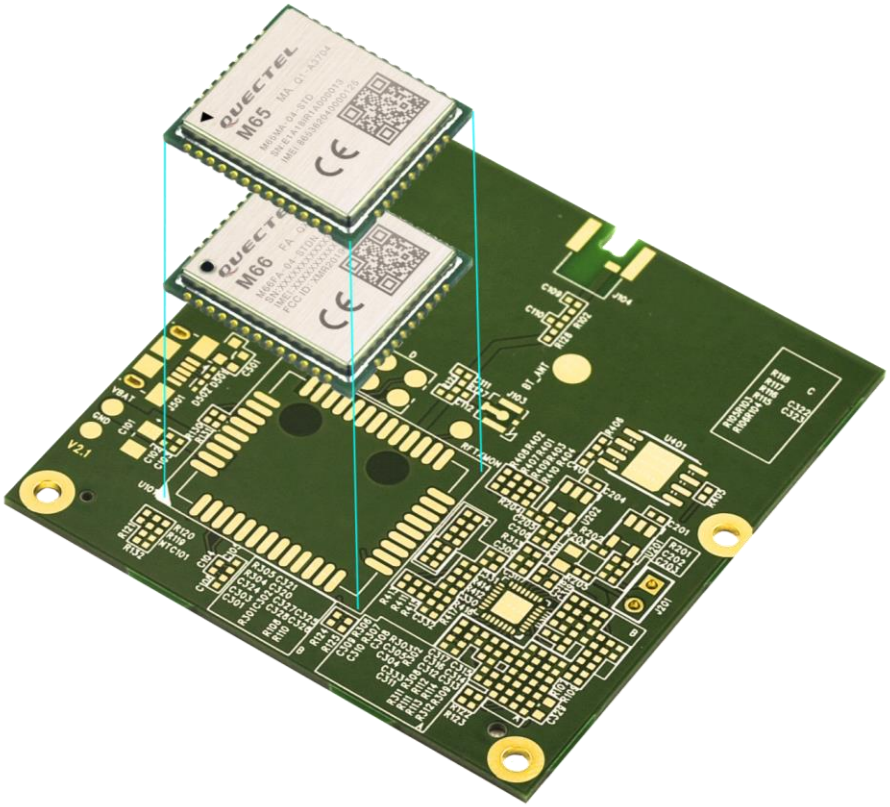

Figure 16: Installation Sketch Map for M65 and M66

7 Manufacturing and Packaging

7.1. Manufacturing and Soldering

Push the squeegee to apply the solder paste on the surface of stencil, thus making the paste fill the stencil openings and then penetrate to the PCB. The force on the squeegee should be adjusted properly so as to produce a clean stencil surface on a single pass.

It is suggested that the peak reflow temperature is 238ºC~245ºC, and the absolute maximum reflow temperature is 245ºC. To avoid damage to the module caused by repeated heating, it is strongly recommended that the module should be mounted after reflow soldering for the other side of PCB has been completed. The recommended reflow soldering thermal profile (lead-free reflow soldering) and related parameters are shown below.

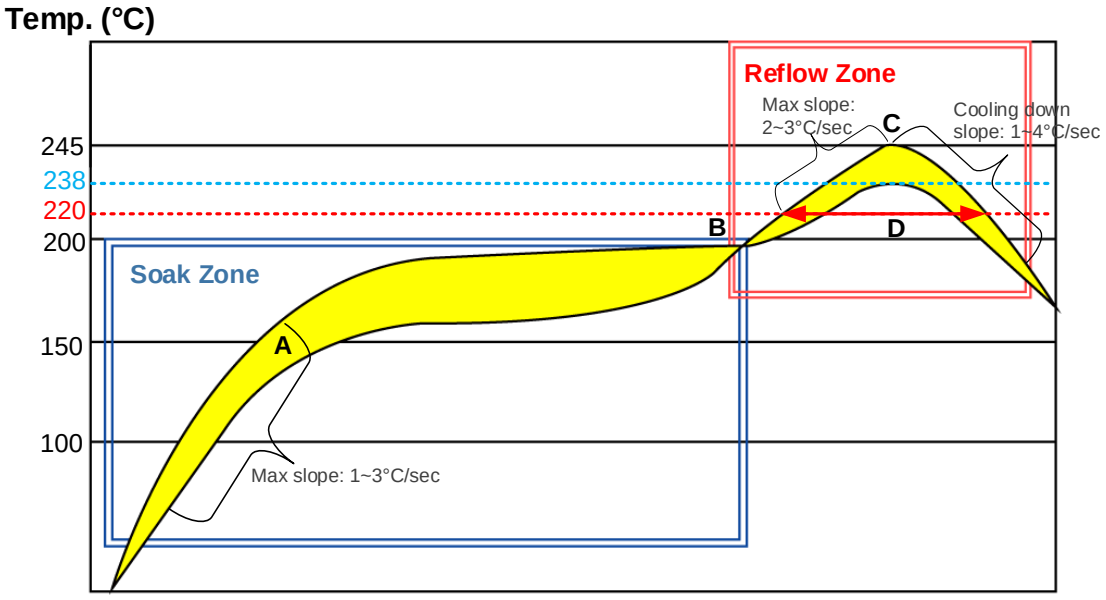

Figure 17: Reflow Soldering Thermal Profile

Table 12: Recommended Thermal Profile Parameters

Factor	Recommendation
Soak Zone	
Max slope	1°C/sec~3°C/sec
Soak time (between A and B: 150°C and 200°C)	60sec~120sec
Reflow Zone	
Max slope	2°C/sec~3°C/sec
Reflow time (D: over 220°C)	40sec~60sec
Max temperature	238°C~245°C
Cooling downslope	1°C/sec~4°C/sec
Reflow Cycle	
Max reflow cycle	1

7.2. Packaging

The modules are stored inside a vacuum-sealed bag which is ESD protected. It should not be opened until the devices are ready to be soldered onto the application.

The reel is 330mm in diameter and each reel contains 250 modules.

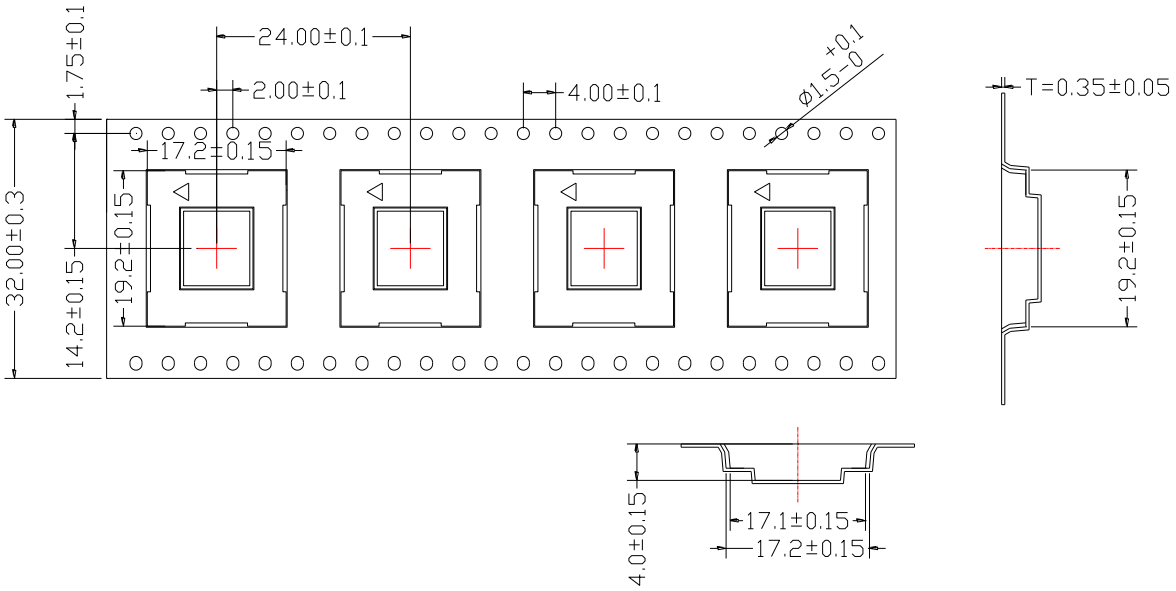

Figure 18: Tape Dimensions

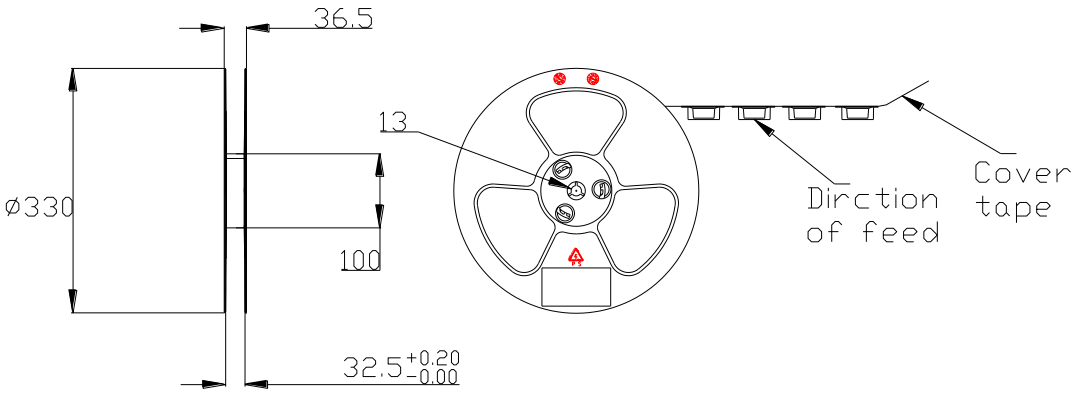

Figure 19: Reel Dimensions

8 Appendix A References

Table 13: Related Documents

SN	Document Name	Remark
[1]	Quectel_M65_Hardware_Design	M65 Hardware Design
[2]	Quectel_M66_Hardware_Design	M66 Hardware Design
[3]	Module_Secondary_SMT_User_Guide	Module Secondary SMT User Guide

Table 14: Terms and Abbreviations

Abbreviation	Description
ADC	Analog-to-Digital Converter
BT	Bluetooth
CTS	Clear to send
DCD	Data Carrier Detect
DCS	Digital Communication System
DRX	Discontinuous Reception
DTR	Data Terminal Ready
EGSM	Extended Global System for Mobile
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
LCC	Leadless Chip Carriers
MIC	Microphone
PCB	Printed Circuit Board

PCM	Pulse Code Modulation
PCS	Personal Communication System
RF	Radio Frequency
RI	Ring Indicator
RTC	Real-Time Clock
RTS	Require To Send
RXD	Receive Direction
SPK	Speaker
TXD	Transmitting Direction
UART	Universal Asynchronous Receiver & Transmitter
(U)SIM	(Universal) Subscriber Identity Module
Vnorm	Normal Output Voltage Value