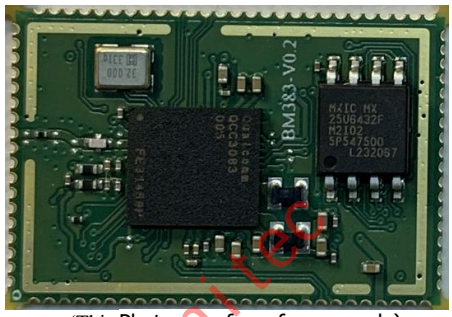
BM383 Wireless Audio Module

Bluetooth Qualified

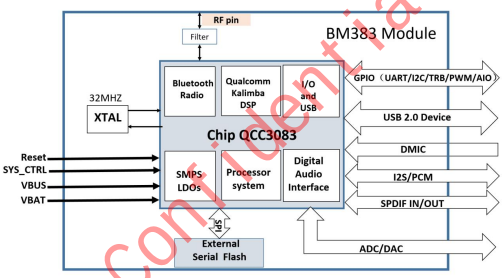
Qualcomm QCC3083

Features:

- Qualified to Bluetooth® v5.4 specification
- Support profile：A2DP1.4,AVRCP1.6,GAVDP 1.3,HFP1.8 ,PBP 1.0,TMAP 1.0
- 240 MHz Qualcomm® Kalimba™ audio DSP
- 32/80MHz Developer Processor for applications
- Firmware Processor for system
- Flexible QSPI flash programmable platform
- Advanced audio algorithms
- High-performance 24bit stereo audio interface
- Digital and analog microphone interfaces
- Flexible LED controller and LED pins with PWM support
- Qualcomm® aptX™ and aptX HD Audio ,aptX Adaptive, enabled using license key
- Advanced audio algorithms
- Qualcomm® Broadcast Audio support
- Qualcomm True Wireless Stereo & Qualcomm True Wireless Stereo Plus
- 1-mic Qualcomm® cVc™ speaker noise reduction and echo cancellation technology
- Serial interfaces: UART, Bit Serializer (I² C/SPI), USB 2.0
- Integrated PMU: Dual SMPS for system/digital circuits, Integrated Li-ion battery charger
- 48 PIOs, 6 LED pads with PWM or AIO
- Both analog-to-digital converter (ADC)s and DACs support sample rates of 8 kHz, 16 kHz, 32 kHz, 44.1 kHz, 48 kHz, 96 kHz. DACs also support 192 kHz and 384 kHz.
- Size: 24.50±0.5mm x 16.70±0.5mm x 2.7±0.05mm
- Weight: 1.0g
-



(This Photos are for reference only)



System Architecture

Product Description:

The BM383 module consumer audio platform for wired and wireless applications integrates an ultra-low-power DSP and application processor with embedded flash memory, a high-performance stereo codec, a power management subsystem, LED and LCD drivers and capacitive touch sensor inputs in a SOC IC. The dual-core architecture with flash memory enables manufacturers to easily differentiate their products with new features without extending development cycles.

Applications:

- Smart remote controllers
- Wired or wireless speakers and headphones
- Wearable audio with sensors
- Low-end docking stations and soundbars
- Gaming headsets

Specifications:

Operating Frequency Band	2.4GHz ~ 2.48GHz unlicensed ISM band
Bluetooth Specification	v5.4
Output Power Class	Class 1
Max. Output Power	15dBm
Date Rate	3Mbps
Channel No.	79
Modulation Type	GFSK π/4 DQPSK 8DPSK
Operating Voltage	3.3V~4.6V
Host Interface	USB 2.0 or UART or I2C
Audio Interface	PCM, I2S, SPDIF
Flash Memory Size	32 or 64Mbit or 128Mbit external SPI flash
Dimension	24.50mm (L) x 16.70 (W) mm x 2.7mm (H)

Electrical Characteristics

Absolute Maximum Rating	Min	Max
Storage Temperature	-40°C	+85°C
Supply Voltage, (VBAT)	-0.4V	+4.8V
Input Voltage, (SYS_CTRL)	-0.4V	+4.8V
Supply Voltage, (VDD_PADS)	-0.4V	+3.6V
Supply Voltage, (VBUS)	-0.4V	+6.5V
Other terminal voltages	VSS - 0.4	VDD + 0.4

Recommended Operating Conditions	Min	Max
Operating Temperature Range	-20°C	+70°C
Supply Voltage, (VBAT)	3.0V	+4.6V
Supply Voltage, (SYS_CTRL)	0	+4.6V
Supply Voltage, (VDD_PADS)	+1.7V	+3.6V
Supply Voltage, (VDD_MEM)	+1.7V	+1.9V
Supply Voltage, (VBUS)	4.5V	+5.75V

RF Characteristics

Receiver	Units	Min	Typ	Max	Bluetooth Spec
Sensitivity at 0.1% BER	dBm	-	-96	-94	≤-70
Maximum Receiver Signal	dBm	-20	-9	-	≥ -20
C/I Co-Channel	dB	-	6	11	≤11
Adjacent Channel Selectivity C/I -1MHz	dB	-	-6	0	≤0
2nd Adjacent Channel Selectivity C/I -2MHz	dB	-	-38	-20	≤-30
3rd Adjacent Channel Selectivity C/I -3MHz	dB	-	-45	-40	≤-40
Image Rejection C/I	dB	-	-16	-9	≤-9

VBAT = 3.7V; f = 2.4441GHz; T=25°C

Transmitter	Units	Min	Typ	Max	Bluetooth Spec
RF Peak Output Power - Basic Data Rate	dBm	10	12	14	0 to +20
RF Peak Output Power - Enhanced Data Rate	dBm	10	12	14	0 to +20
RF Peak Output Power - Low Energy	dBm	4	7	9	0 to +10
RF Power Control Range	dB	16	24	-	> 16
RF Power Range Control Resolution	dB	-	0.5	-	-
20dB Bandwidth for Modulated Carrier	KHz	-	940	1000	<1000
2nd Adjacent Channel Power (+/- 2MHz)	dBm	-	-38	-20	≤-20
3rd Adjacent Channel Power (+/- 3MHz)	dBm	-	-45	-40	≤-40

VBAT = 3.7V; f = 2.4441GHz; T=25°C
All specifications including pinouts and electrical specifications may be changed without prior notice

Pin Configurations

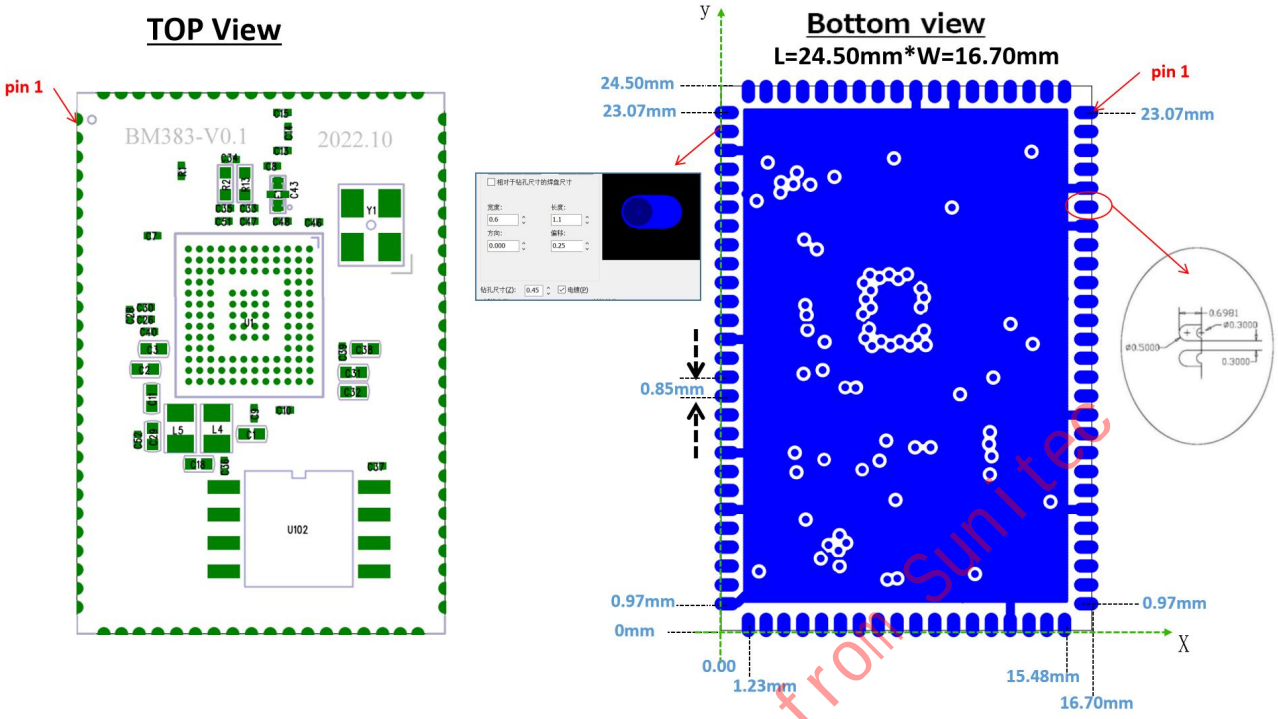
PIN NO.	NAME	TYPE	FUNCTION	Reset state
1	VREG_EN	Digital input	Typically connected to an ON/OFF push button. Boots device in response to a button press when power is still present from battery and/or charger but software has placed the device in the OFF or DORMANT state. Additionally use able as a digital input in normal operation. No pull. Additional function: ■ PIO[0] input only	
2	GPIO31	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 31.	Weak pull-down
3	GND	GND	Ground	GND
4	GPIO16	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 16. Alternative function: ■ PCM_CLK	Weak pull-down
5	GPIO21	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 21. Alternative function: ■ PCM_OUT[2]	Weak pull-down
6	GPIO20	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 20. Alternative function: ■ PCM_OUT[1]	Strong pull-up
7	GPIO18	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 18. Alternative function: ■ PCM_DOUT[0]	Strong pull-up
8	GPIO17	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 17. Alternative function: ■ PCM_SYNC	Weak pull-down
9	GPIO15	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 15. Alternative function: ■ MCLK_OUT	Strong pull-up
10	GPIO19	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 19. Alternative function: ■ PCM_DIN[0]	Weak pull-down
11	GPIO22	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 22. Alternative function: ■ PCM_DIN[1]	Weak pull-down
12	GPIO23	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 23. Alternative function: ■ PCM_DIN[2]	Weak pull-down
13	GND	GND	Ground	GND
14	GPIO26	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 26.	Strong pull-up
15	GPIO30	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 30.	Strong pull-up
16	GPIO29	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 29.	Strong pull-down
17	GPIO32	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 32.	Strong pull-up
18	GPIO33	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 33.	Strong pull-up
19	GND	GND	Ground	GND
20	USB_DN	Digital	USB Full Speed device DN	
21	USB_DP	Digital	USB Full Speed device DP	
22	GND	GND	Ground	GND
23	CHG_EXT	Analog	External charger transistor current control. Connect to base of external charger transistor as per application schematic.	
24	V5.0	Supply	Supply to SMPS power switch from charger input. Charger input to Bypass regulator.	

25	VBAT_SENSE	Supply	Battery voltage sense input **NOTE:** If using internal charger or no charger, connect VCHG_SENSE direct to SMPS_VCHG.	Charger input sense pin after external mode sense-resistor. High impedance.
26	VBAT	Power (in)	Battery positive terminal	
27	GND	GND	Ground	GND
28	LED0/AIO0	Analog or digital input/open drain output	General-purpose analog/digital input or open drain LED output. BT Chip AIO[0]/LED[0]	Open drain
29	LED0/AIO5	Analog or digital input/open drain output	General-purpose analog/digital input or open drain LED output. BT Chip AIO[5]/LED[5]	Open drain
30	LED0/AIO4	Analog or digital input/open drain output	General-purpose analog/digital input or open drain LED output. BT Chip AIO[0]/LED[4]	Open drain
31	LED0/AIO1	Analog or digital input/open drain output	General-purpose analog/digital input or open drain LED output. BT Chip AIO[0]/LED[1]	Open drain
32	LED0/AIO3	Analog or digital input/open drain output	General-purpose analog/digital input or open drain LED output. BT Chip AIO[0]/LED[3]	Open drain
33	LED0/AIO2	Analog or digital input/open drain output	General-purpose analog/digital input or open drain LED output. BT Chip AIO[0]/LED[2]	Open drain
34	GPIO4	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 4. Alternative function: ■ TBR_MOSI[1]	Weak pull-down
35	GPIO3	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 3. Alternative function: ■ TBR_MISO[2]	Strong pull-up
36	GPIO2	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 2. Alternative function: ■ TBR_MISO[3]	Weak pull-down
37	GPIO6	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 6. Alternative function: ■ TBR_MOSI[0]	Strong pull-up
38	GPIO1	Digital: Bidirectional with programmable strength internal pull up/pull-down	Automatically defaults to RESET# mode when the device is unpowered, or in off modes.Reconfigurable as a PIO after boot. Alternative function: ■ Programmable I/O line 1	Strong pull-up
39	GPIO5	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 5. Alternative function: ■ TBR_MISO[1]	Weak pull-down
40	GPIO8	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 8. Alternative function: ■ TBR_CLK	Weak pull-down
41	GPIO7	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 7. Alternative function: ■ TBR_MISO[0]	Strong pull-up
42	GND	GND	Ground	GND
43	GPIO48	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 48.	Weak pull-down
44	GPIO24	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 24.	Weak pull-down
45	GPIO25	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 25.	Weak pull-down
46	GPIO53	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 53.	Weak pull-down

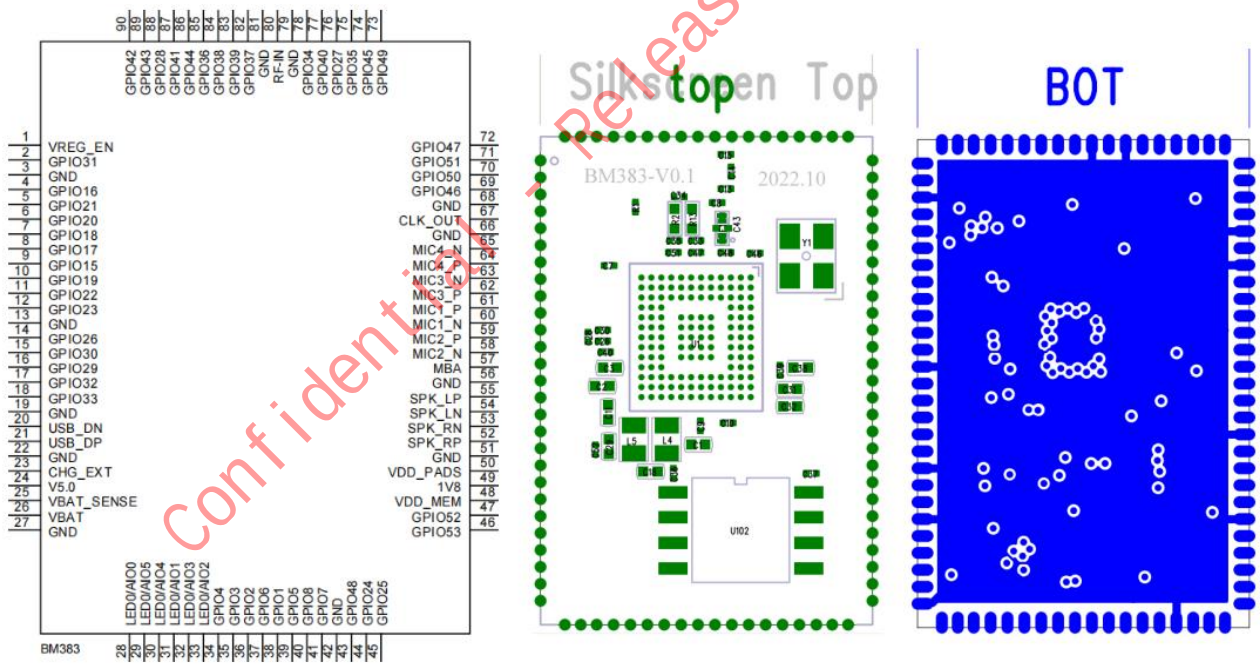
47	GPIO52	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 52.	Weak pull-down
48	VDD_MEM	Power(in)	1.8V positive supply input for input/output ports: ■ Serial quad I/O flash port	
49	1V8	Power(out)	1.8V switch-mode power regulator output	
50	VDD_PADS	Power(in)	1.7V to 3.6V positive supply input for input/output ports: ■RST# ■UART ■PCM ■I2C ■TRB ■ PIO ■ GPIO	
51	GND	GND	Ground	GND
52	SPK_RP	Analogue	Audio/speaker differential right output, positive. Alternative function: ■ Differential right line output, negative	
53	SPK_RN	Analogue	Audio/speaker differential right output, negative. Alternative function: ■ Differential right line output,negative	
54	SPK_LN	Analogue	Audio/speaker differential left output, negative. Alternative function: ■ Differential left line output, negative	
55	SPK_LP	Analogue	Audio/speaker differential left output, positive. Alternative function: ■ Differential left line output, positive	
56	GND	GND	Ground	GND
57	MBA	Power out	Microphone bias output	
58	MIC2_N	Analogue	Microphone differential 2 input, negative. Alternative function: ■ Differential audio line input negative	
59	MIC2_P	Analogue	Microphone differential 2 input, positive. Alternative function: ■ Differential audio line input positive	
60	MIC1_N	Analogue	Microphone differential 1 input, negative. Alternative function: ■ Differential audio line input negative	
61	MIC1_P	Analogue	Microphone differential 1 input, positive. Alternative function: ■ Differential audio line input positive	
62	MIC3_P	Analogue	Microphone differential 3 input, positive. Alternative function: ■ Differential audio line input positive	
63	MIC3_N	Analogue	Microphone differential 3 input, negative. Alternative function: ■ Differential audio line input negative	
64	MIC4_P	Analogue	Microphone differential 4 input, positive. Alternative function: ■ Differential audio line input positive	
65	MIC4_N	Analogue	Microphone differential 4 input, negative. Alternative function: ■ Differential audio line input negative	
66	GND	GND	Ground	GND

67	CLK_OUT	Analogue	Buffered clock output	
68	GND	GND	Ground	GND
69	GPIO46	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 46.	Weak pull-down
70	GPIO50	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 50.	Weak pull-down
71	GPIO51	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 51.	Weak pull-down
72	GPIO47	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 47.	Weak pull-down
73	GPIO49	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 49.	Weak pull-down
74	GPIO45	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 45.	Strong pull-up
75	GPIO35	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 35. Alternative function: ■QSPI2_CLK	Strong pull-down
76	GPIO27	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 27.	Strong pull-up
77	GPIO40	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 40.	Weak pull-down
78	GPIO34	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line34. Alternative function: ■ QSPI2_IO[0]	Weak pull-down
79	GND	GND	Ground	GND
80	RF-IN	RF	Bluetooth 50Ωtransmitter output /receiver input	
81	GND	GND	Ground	GND
82	GPIO37	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 37. Alternative function: ■ QSPI2_IO[1]	Weak pull-down
83	GPIO39	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 39. Alternative function: ■ QSPI2_IO[3]	Strong pull-up
84	GPIO38	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 38. Alternative function: ■ QSPI2_CS0#	Strong pull-up
85	GPIO36	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 36. Alternative function: ■ QSPI2_IO[2]	Strong pull-up
86	GPIO44	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 44.	Strong pull-up
87	GPIO41	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 41.	Strong pull-down
88	GPIO28	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 28.	Weak pull-down
89	GPIO43	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 43.	Weak pull-down
90	GPIO42	Digital: Bidirectional with programmable strength internal pull up/pull-down	Programmable I/O line 42.	Weak pull-down

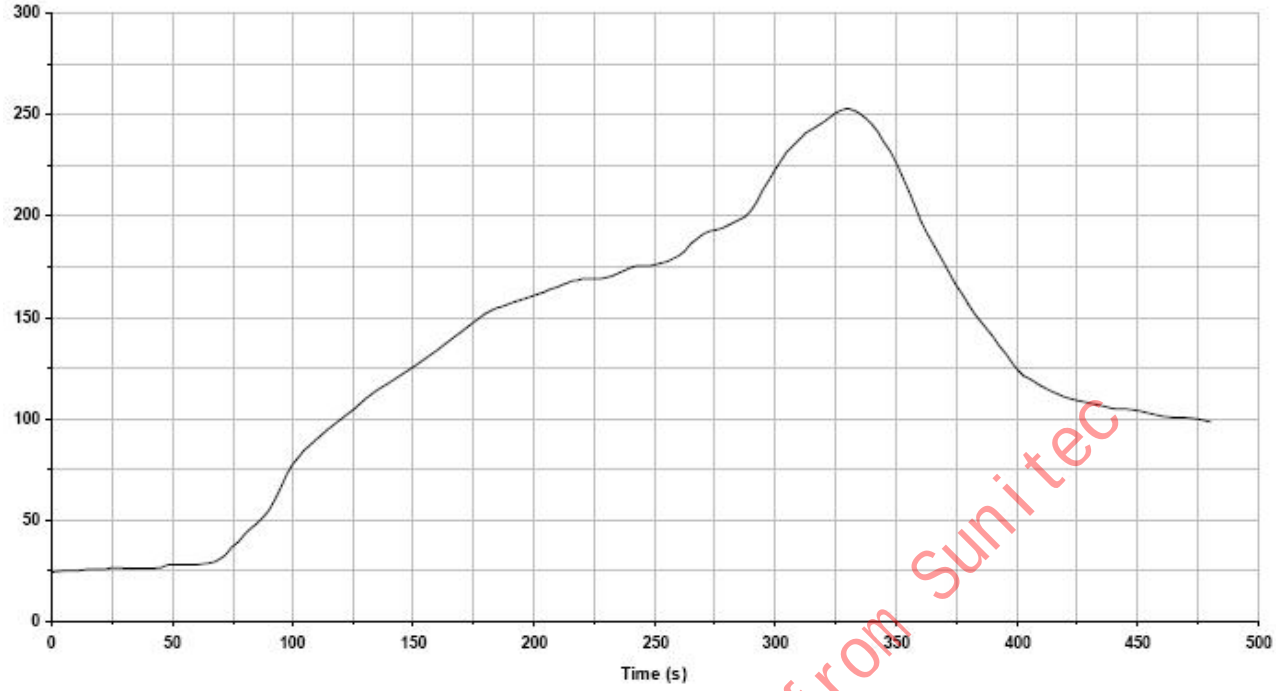
Recommended Layout patterns:



module pin assignment and pin description



Recommended Reflow Temperature Profile:



Key features of the profile:

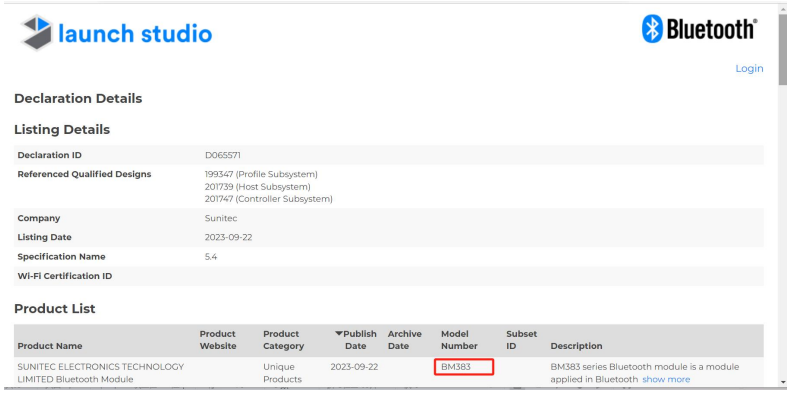
-Initial Ramp=1-2.5℃/sec to 175℃ equilibrium
-Equilibrium time=60 to 80 seconds
-Ramp to Maximum temperature (250℃)=3℃/sec Max
-Time above liquidus temperature(217℃): 45 -90 seconds
-Device absolute maximum reflow temperature: 250℃

MAC Address:

Each Module has his MAC Address
Example ： XXXX XX XXXXXX

Concerning the dimension and printing content of the tab：
1 line the last six letters of the LAP on the module
2 line the software version
3 line the customer material part number
Qr code area, with 12 letters (MAC Address)

QDL Certificate : QDID 223703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Bluetooth

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Declaration Details

Listing Details

Declaration ID	D065571
Referenced Qualified Designs	199347 (Profile Subsystem) 201739 (Host Subsystem) 201747 (Controller Subsystem)
Company	Sunitec
Listing Date	2023-09-22
Specification Name	5.4
Wi-Fi Certification ID	

Product List

Product Name	Product Website	Product Category	Publish Date	Archive Date	Model Number	Subset ID	Description
SUNITEC ELECTRONICS TECHNOLOGY LIMITED Bluetooth Module		Unique Products	2023-09-22		BM383		BM383 series Bluetooth module is a module applied in Bluetooth show more

Electrostatic discharge（ESD）：HBM ≥1000V，CDM≥500V

Un-opened reels Shelf life:

The module can be stored for 25±3°C 30-60%RH for 6 months. After unpacking, the finished patch should be used within 24 hours to avoid welding pad oxidation. Unused materials are returned to sealed packaging in time.

Reliability Test:

Test items	Test method
High Temperature Reliability Test	Temperature 60° C, time 4H, recovery 1H, test
Low Temperature Reliability Test	Temperature -20° C, time 4H, recovery 1H, test
Vibration ReliabilityTest	Vibration frequency 50Hz, vibration time 30min, vibration amplitude 0.5mm, for appearance inspection and functional testing
Drop Reliability Test	The product is less than 10g, the drop height is 100cm, and it has been dropped 6 times for appearance inspection and functional testing.

Packing Information:·

Standard Packing Information

PCBA packing bag dimension: 350.0mm x 195.0mm

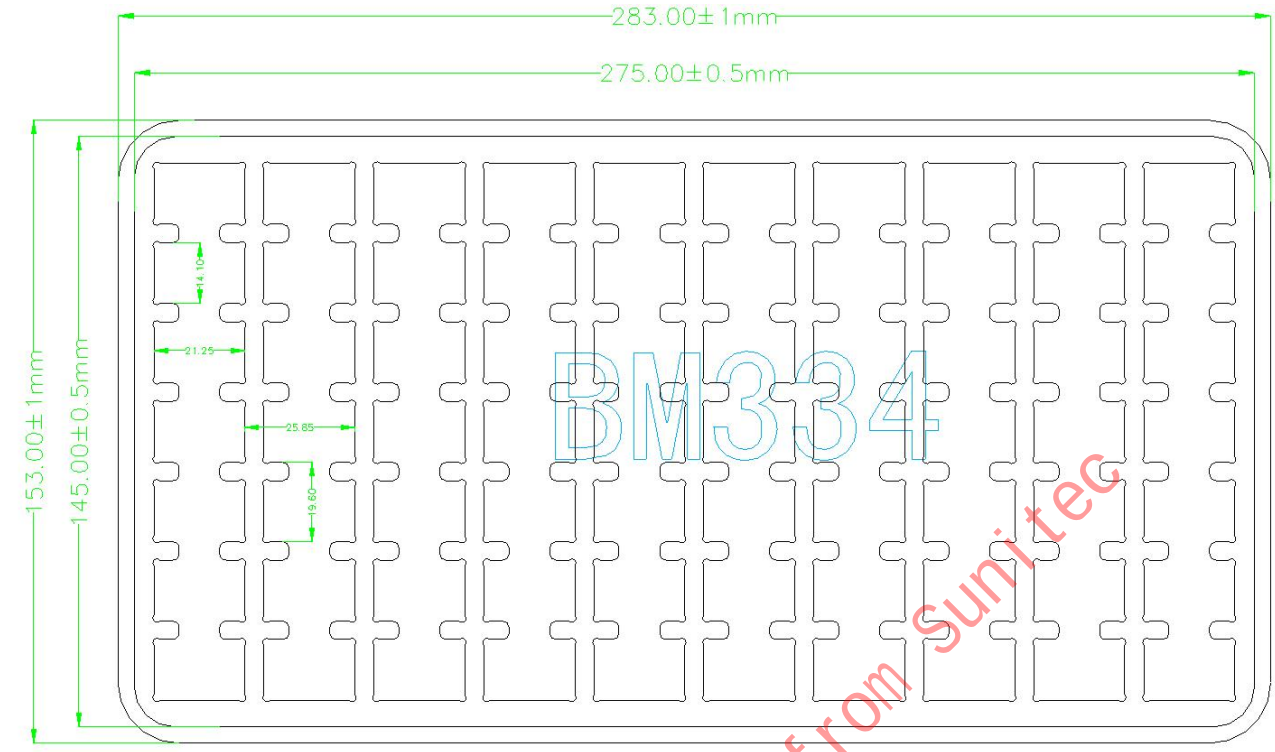
Delivering carton box

Delivery Carton Box dimension: 415.0mm x 350.0mm x 175.0mm (L xW x H)

ESD tray dimension: 283mm x 153.0mm x 5.0mm (L xW x H)

ESD tray dimension（Single grid）：21.25mm x 14.1mm（Max）

Packaging Quantity	1 pc per cavity
	70pcs per tray
	10 trays per packing bag
	10 bag per carton
Total Quantity	7000 pcs（Full box）



Ordering Information

No	Items	Ordering Code	Description
1	QCC3083 Module	BM383F128	128Mbit internal SPI flash operating voltage is 1.8V, without license
2	QCC3083 Module	BM383	64Mbit internal SPI flashoperating voltage is 1.8V, without license
3	QCC3083 Module	BM383F32	32Mbit internal SPI flash operating voltage is 1.8V, without license

Document References

References	Version
Specifications of the Bluetooth System	Bluetooth Specification Version 5.4
QCC3083 VFBGA Data Sheet	QCC3083 VFBGA DATA SHEET_80-41748-1.pdf

Document History

Revision	Date	History
V1.0	2022-10-17	First release
V1.1	2022-12-1	Updated module pin description
V1.2	2023-3-17	Updated QDL Certificate
V1.3	2023-11-13	● Updated to BT5.4 ● Updated profile information ● Updated BDR,EDR,BLE RF output power; ● Updated module photo;
V1.4	2023-12-03	● Updated module pin assignment and pin description ● Updated BLE RF Power range; ● Updated ordering information

Contact Information

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Fax: 86-755-28016097
E-mail: sales@sunitec-cn.com or project@sunitec-cn.com
Http://www.sunitec-cn.com

Specifications are subject to change without prior notice