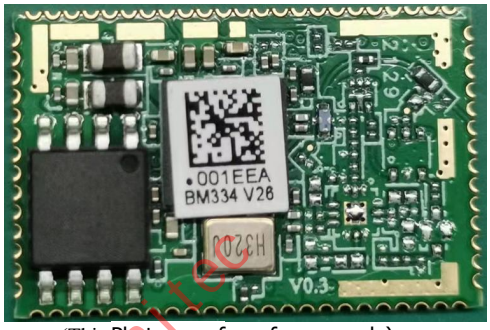
BM334 Multimedia Module

Bluetooth Qualified

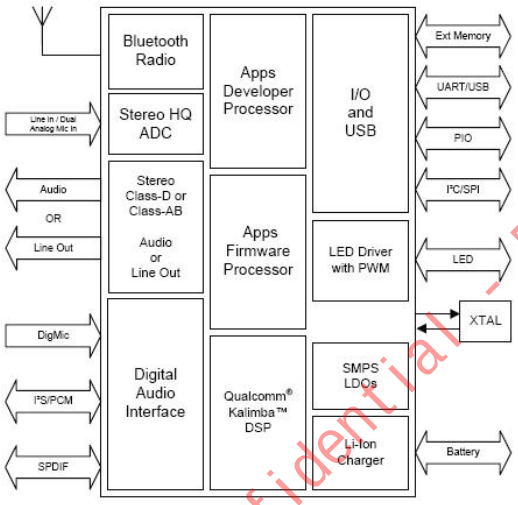
Qualcomm QCC3034

Features:

- Qualified to Bluetooth® v5.1 specification
- Dual 120 MHz Qualcomm®Kalimba™ audio DSPs
- 32MHz 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
- Qualcomm® Broadcast Audio support
- Qualcomm TrueWireless Stereo & Qualcomm TrueWireless Stereo Plus
- Serial interfaces: UART, Bit Serializer (I^2C/SPI), USB 2.0
- Integrated PMU: Dual SMPS for system/digital circuits, Integrated Li-ion battery charger
- 21 PIOs, 5 LED pads with PWM or AIO
- Size: 20.65±0.5mm x 13.5±0.5mm x 1.8±0.5mm
- Weight: 0.8g



(This Photos are for reference only)



System Architecture

Product Description:

The BM334 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	v5.1
Output Power Class	Class 1
Max. Output Power	10dBm
Date Rate	3Mbps
Channel No.	79
Modulation Type	GFSK π/4 DQPSK 8DPSK
Operating Voltage	3.3V
Host Interface	USB 2.0 or UART
Audio Interface	PCM, I2S, SPDIF
Flash Memory Size	32 or 64Mbit SPI flash
Dimension	20.65mm (L) x 13.5 (W) mm x 1.8mm (H)

Electrical Characteristics

Absolute Maximum Rating	Min	Max
Storage Temperature	-40°C	+105°C
Supply Voltage, (VREGENABLE)	-0.4V	+4.4V
Supply Voltage, (VDD)	-0.4V	+3.6V
Supply Voltage, (V_CHG)	-0.30V	+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, (VREGENABLE)	0.7 x VDD	+4.25V
Supply Voltage, (VDD)	+1.7V	+3.6V
Supply Voltage, (V_CHG)	4.5V	+5.75V

Power Consumption	Units	Average
SCO Connection HV3 (30ms interval sniff mode)	mA	
SCO Connection HV1	mA	
ACL Data Transfer 115.2Kbps UART no traffic (Master)	mA	
ACL Data Transfer 115.2Kbps UART no traffic (Slave)	mA	
CODEC		
Microphone inputs and ADC/channel	mA	
DAC and loudspeaker driver, no signal/channel	mA	
Digital audio processing subsystem	mA	

VBAT = 4.2V; f = 2.441GHz; T=20°C

RF Characteristics

Receiver	Units	Min	Typ	Max	Bluetooth Spec
Sensitivity at 0.1% BER	dBm	-95	-	-	≤-70
Maximum Receiver Signal	dBm	-20	-10	-	≥ -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	-30	≤-30
3rd Adjacent Channel Selectivity C/I -3MHz	dB	-	-45	-40	≤-40
Image Rejection C/I	dB	-	-16	-9	≤-9

VBAT = 4.2V; f = 2.4441GHz; T=20°C

Transmitter	Units	Min	Typ	Max	Bluetooth Spec
RF Peak Output Power - Basic Data Rate	dBm	5	7	9	0 to +20
RF Peak Output Power - Enhanced Data Rate	dBm	5	7	9	0 to +20
RF Peak Output Power - Low Energy	dBm	1	3	5	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	-	-36	-20	≤-20
3rd Adjacent Channel Power (+/- 3MHz)	dBm	-	-45	-40	≤-40

VBAT = 4.2V; f = 2.4441GHz; T=20°C
All specifications including pinouts and electrical specifications may be changed without prior notice

Pin Configurations

PIN NO.	NAME	TYPE	FUNCTION	Reset state
1	GPIO17	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 17. Alternative function: ■ PCM_SYNC	Weak pull-down
2	GPIO18	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 18. Alternative function: ■ PCM_DOUT[0]	Weak pull-down
3	GPIO19	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 19. Alternative function: ■ PCM_DIN[0]	Weak pull-down
4	GND	GND	Ground	
5	GPIO6	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 6. Alternative function: ■ TBR_MOSI[0]	Strong pull-up
6	GPIO7	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 7. Alternative function: ■ TBR_MISO[0]	Strong pull-up
7	GPIO8	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 8. Alternative function: ■ TBR_CLK	Weak pull-down
8	NC	NC	NC	NC
9	GND	GND	Ground	
10	GPIO1	Digital: Bidirectional with programmable strength internal pullup/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
11	NC	NC	NC	NC
12	NC	NC	NC	NC
13	VBAT_SENSE	Supply	Battery voltage sense input	
14	GPIO15	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 15. Alternative function: ■ MCLK_OUT	Weak pull-down
15	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]	
16	LED1/AIO1	Analog or digital input/open drain output	General-purpose analog/digital input or open drain LED output. BT Chip AIO[1]/LED[1]	
17	LED2/AIO2	Analog or digital input/open drain output	General-purpose analog/digital input or open drain LED output. BT Chip AIO[2]/LED[2]	
18	GPIO15	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 15. Alternative function: ■ MCLK_OUT	Weak pull-down
19	GPIO1	Digital: Bidirectional with programmable strength internal pullup/pull-down	Automatically defaults to RESET# mode when the device is unpowered, or in off modes. Reconfigurable as a	Strong pull-up

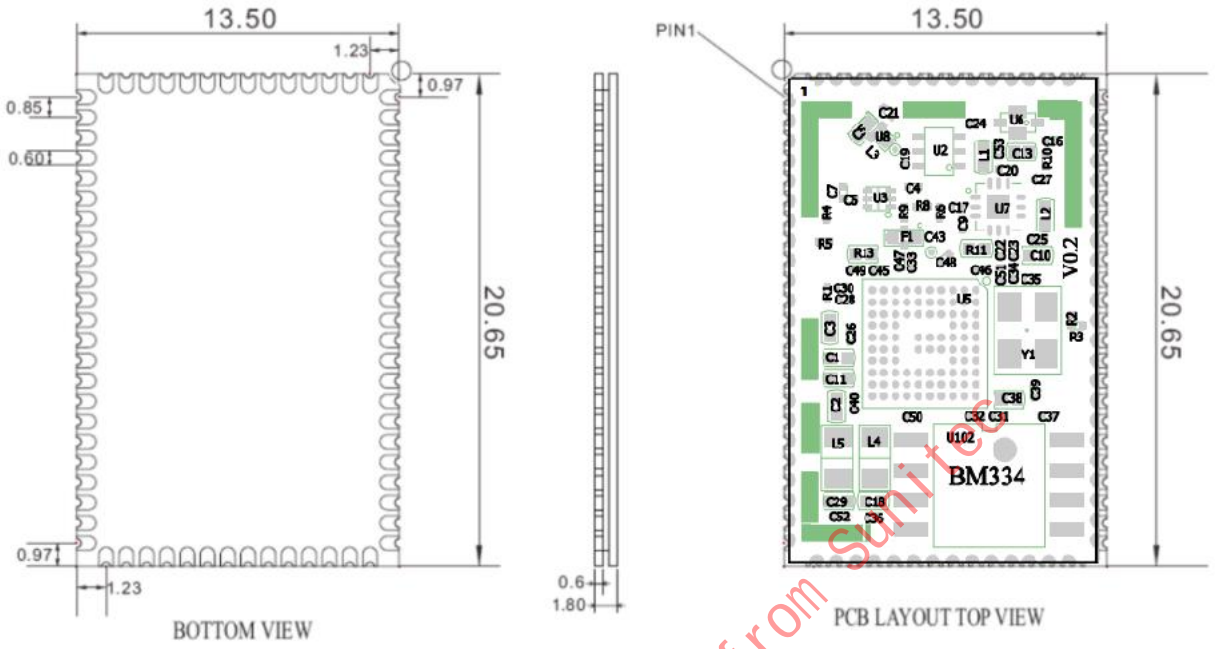
			PIO after boot. Alternative function: ■ Programmable I/O line 1	
20	GPIO2	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 2. Alternative function: ■ TBR_MISO[3]	Weak pull-down
21	GPIO3	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 2. Alternative function: ■ TBR_MISO[2]	Weak pull-down
22	GPIO4	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 4. Alternative function: ■ TBR_MOSI[1]	Weak pull-down
23	GPIO5	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 5. Alternative function: ■ TBR_MISO[1]	Weak pull-down
24	GPIO8	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 8. Alternative function: ■ TBR_CLK	Weak pull-down
25	GPIO7	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 7. Alternative function: ■ TBR_MISO[0]	Strong pull-up
26	GPIO6	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 6. Alternative function: ■ TBR_MOSI[0]	Strong pull-up
27	GPIO54	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 54.	Weak pull-down
28	GPIO52	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 52.	Weak pull-down
29	GPIO53	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 53.	Weak pull-down
30	GPIO20	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 20.	Weak pull-down
31	GPIO21	Digital: Bidirectional with programmable strength internal pullup/ pull-down	Programmable I/O line 21.	Weak pull-down
32	GND	GND	Ground	
33	NC	NC	NC	NC
34	NC	NC	NC	NC
35	NC	NC	NC	NC
36	NC	NC	NC	NC
37	NC	NC	NC	NC
38	NC	NC	NC	NC
39	GPIO61	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 61	Weak pull-down
40	GPIO60	Digital: Bidirectional with programmable strength internal pullup/ pull-down	Programmable I/O line 60	Weak pull-down
41	GND	GND	Ground	
42	USB_D+	Digital	USB Full Speed device D+ I/O.	
43	USB_D-	Digital	USB Full Speed device D- I/O.	

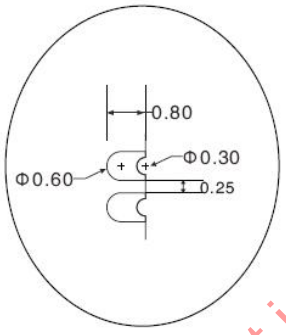
44	GND	GND	Ground	
45	VDD_PADS	Power(in)	1.7V to 3.6V positive supply input for input/output ports: ■RST# ■UART ■PCM ■I2C ■TRB ■ PIO ■ GPIO	
46	VDD_MEM	Power(in)	1.8V positive supply input for input/output ports: ■ Serial quad I/O flash port	
47	1V8_OUT	Power(out)	1.8V switch-mode power regulator output	
48	VBAT	Power	Battery positive terminal	
49	VCHG_SENSE	Supply	Supply to SMPS power switch from charger input.	
50	CHG_EXT	Analog	External charger transistor current control. Connect to base of external charger transistor as per application schematic.	
51	v5.1	Supply	Supply to SMPS power switch from charger input. Charger input to Bypass regulator.	
52	SYS_CTRL	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 useable as a digital input in normal operation. No pull. Additional function: ■ PIO[0] input only	
53	GPIO20	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 20.	Weak pull-down
54	GPIO21	Digital: Bidirectional with programmable strength internal pullup/ pull-down	Programmable I/O line 21.	Weak pull-down
55	GND	GND	Ground	
56	MIC_RN	Analogue	Microphone differential 2 input, negative. Alternative function: ■ Differential audio line input right, negative	
57	MIC_RP	Analogue	Microphone differential 2 input, positive. Alternative function: ■ Differential audio line input right, positive	
58	MIC_BIAS	Analogue out	Microphone bias output	
59	MIC_LN	Analogue	Microphone differential 1 input, negative. Alternative function: ■ Differential audio line input left, negative	
60	MIC_LP	Analogue	Microphone differential 1 input, positive. Alternative function: ■ Differential audio line input left, positive	
61	MIC_BIAS	Analogue out	Microphone bias output	
62	GND	GND	Ground	
63	SPK_LN	Analogue	Audio/speaker differential left output, negative. Alternative function: ■ Differential left line output, negative	
64	SPK_LP	Analogue	Audio/speaker differential left output, positive. Alternative function: ■ Differential left line output, positive	
65	SPK_RN	Analogue	Audio/speaker differential right output, negative. Alternative function:	

			■ Differential right line output, negative	
66	SPK_RP	Analogue	Audio/speaker differential right output, positive. Alternative function: ■ Differential right line output, positive	
67	GND	GND	Ground	
68	GND	GND	Ground	
69	RF-IN	RF	Bluetooth 50Ω transmitter output /receiver input	
70	GND	GND	Ground	
71	AIO4/LED4	Analog or digital input/ open drain output	General-purpose analog/digital input or open drain LED output. BT Chip AIO[4]/LED[4]	
72	AIO5/LED5	Analog or digital input/open drain output	General-purpose analog/digital input or open drain LED output. BT Chip AIO[5]/LED[5]	
73	GND	GND	Ground	
74	PIO16	Digital: Bidirectional with programmable strength internal pullup/pull-down	Programmable I/O line 16. Alternative function: ■ PCM_CLK	Weak pull-down

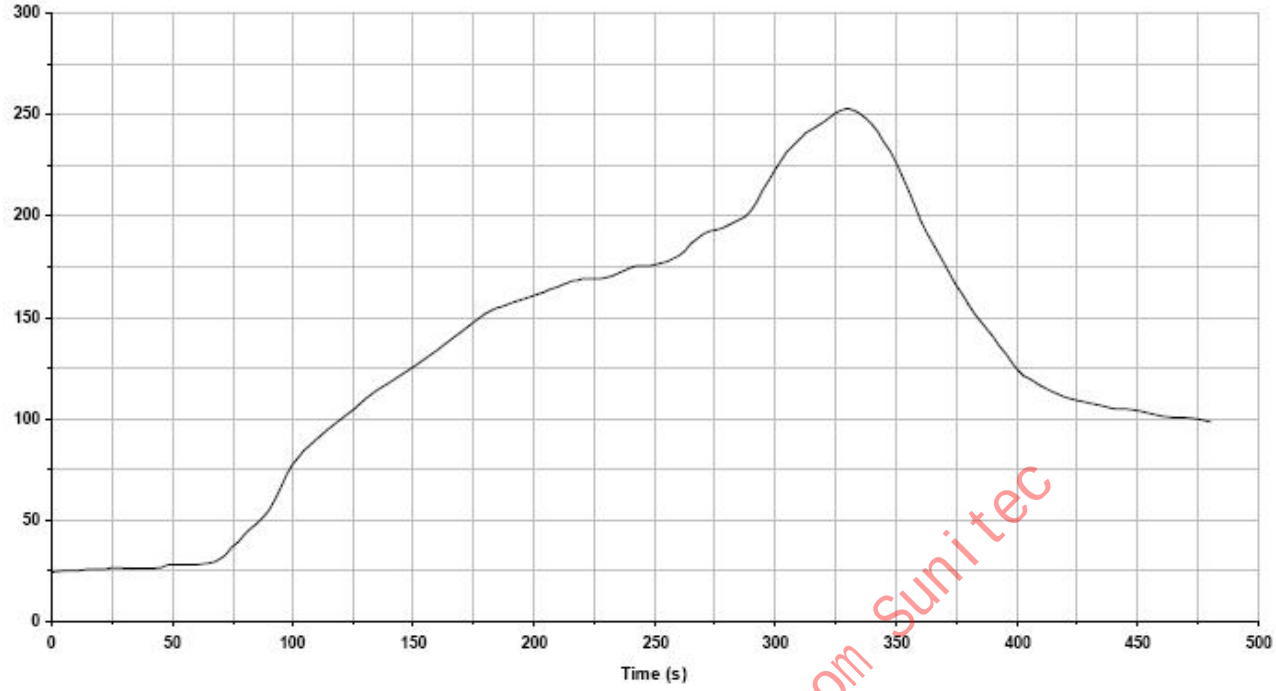
Recommended Layout patterns:

Physical Dimension Unit in mm





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
0CA6 94 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)

Length:6* Width:5 (mm)

The tab code pastes style:

(This Photos are for reference only)

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

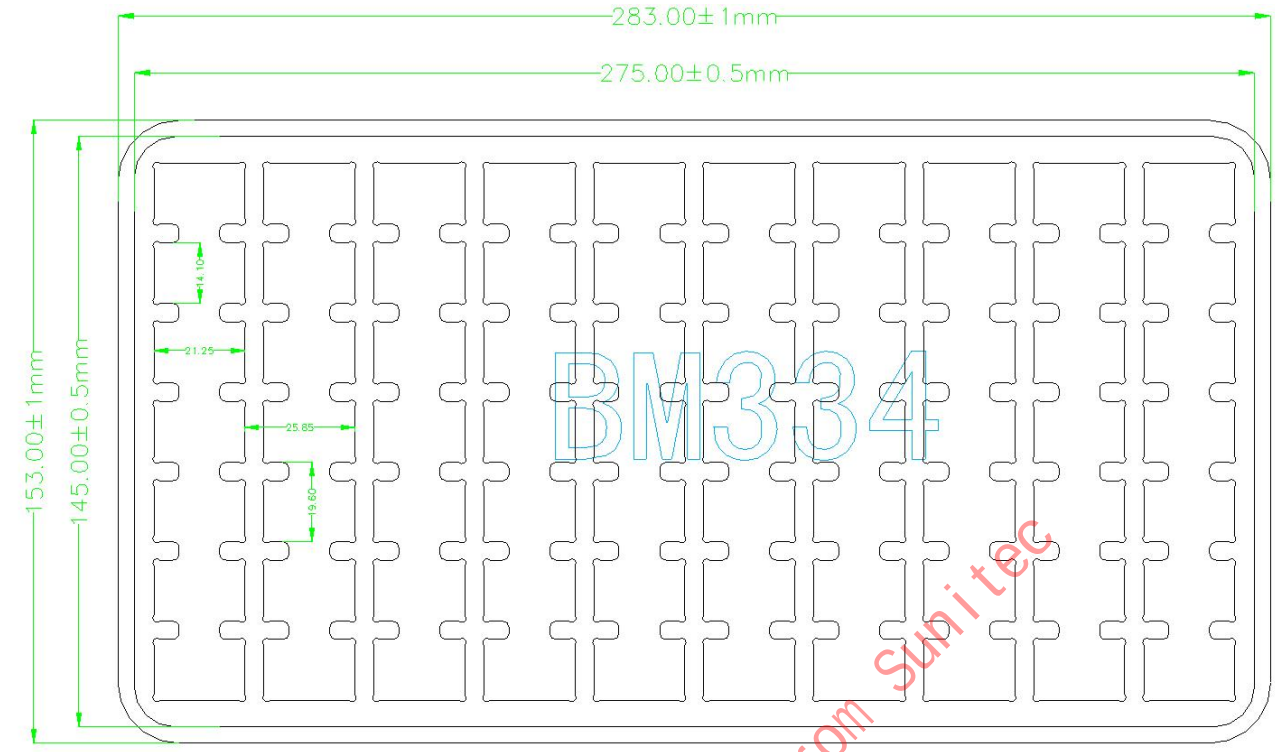
Delivering carton box

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）



QDL Certificate

QDID: D052107

Bluetooth

Project Details

Project Name	Bluetooth Module (BM331F3A)
Product Type	End Product
TCRL Version:	TCRL 2019-2
Referenced Qualified Design(s)	
Previously Qualified Design Used in this Qualification(s)	86101 130674 131175
Listing Date	2020-09-16
Declaration ID	D052107

Ordering Information

No	Items	Ordering Code	Description
1	QCC3034 Module	BM3341V8F128	128Mbit internal SPI flash operating voltage is 1.8V, without license
2	QCC3034 Module	BM3341V8F64	64Mbit internal SPI flashoperating voltage is 1.8V, without license
	QCC3034 Module	BM3341V8F32	32Mbit internal SPI flash operating voltage is 1.8V, without license
	QCC3034 Module	BM3341V8F16	16Mbit internal SPI flash operating voltage is 1.8V, without license
	QCC3034 Module	BM3341V8F04	4Mbit internal SPI flash operating voltage is 1.8V, without license

Document References

References	Version
Specifications of the Bluetooth System	Bluetooth Specification Version 5.0
QCC3034 VFBGA Data Sheet	80-cg232-1_aa_qcc3034_vfbga_data_sheet.pdf

Document History

Revision	Date	History
Draft V0.1	2018-07-09	Draft
V0.2	2019-03-14	Modify pinout description
V0.3	2020-05-21	Updated Layout patterns
V0.4	2020-07-23	Change pin13 to VBAT SENSE
V0.5	2021-04-28	Updated pin1 of Layout patterns
V0.6	2021-05-19	updated The tab code pastes style
V0.7	2021-09-25	updated Packing Information
V0.8	2021-09-27	updated Packing Information
V0.9	2021-10-25	updated Packing Information
V1.0	2021-10-27	Add information ESD tray dimension（Single grid）：21.25x14.1mm（Max）
V1.1	2021-12-02	updated Product Picture
V1.2	2022-06-15	Updated ESD、Reliability、Life
V1.3	2022-12-22	Updated Bluetooth version to BT v5.1
V1.4	2023-11-13	ADD EDR and BLE RF power output spec
V1.5	2024-1-10	Updated EDR and BLE RF power output spec to follow firmware V1.0.4

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Specifications are subject to change without prior notice