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1 Introduction

Easy Core Tech. introduces the pioneer of the Bluetooth 5.0 modules EM6Q303A which is a high performance, cost effective, low power and compact solution. The Bluetooth module provides a complete 2.4GHz Bluetooth system based on the QCC3003 QFN chipset which is a single chip radio and baseband IC for Bluetooth 2.4GHz systems,. This module is fully qualified single-chip dual mode Bluetooth@v5.0 system.

2 Key Features

Bluetooth Profiles

- Bluetooth v5.0 specification support
- Qualcomm® Bluetooth® Low Energy secure connection
- A2DP v1.3.1
- AVRCP v1.6
- HFP v1.7
- HSP v1.2
- SPP v1.2
- DID v1.3
- HID v1.1
- PXP v1.0.1
- FMP v1.0
- BAS v1.0
- QTIL's proximity pairing and QTIL's proximity connection

Music Enhancements

- SBC and AAC audio codecs
- Qualcomm Shareme, which allows the sharing of audio from QCC3003 to another Bluetooth A2DP sink device
- Configurable Signal Detection to trigger events
- 1 bank of up to 10-stage Speaker Parametric EQ
- 6 banks of up to 5-stage User Parametric EQ for music enhancement
- Qualcomm® meloD™ Expansion audio processing: 3D stereo widening
- Compressor to compress or expand the dynamic range of the audio
- Post Mastering to improve DAC fidelity
- I²S input/output

Additional Functionality

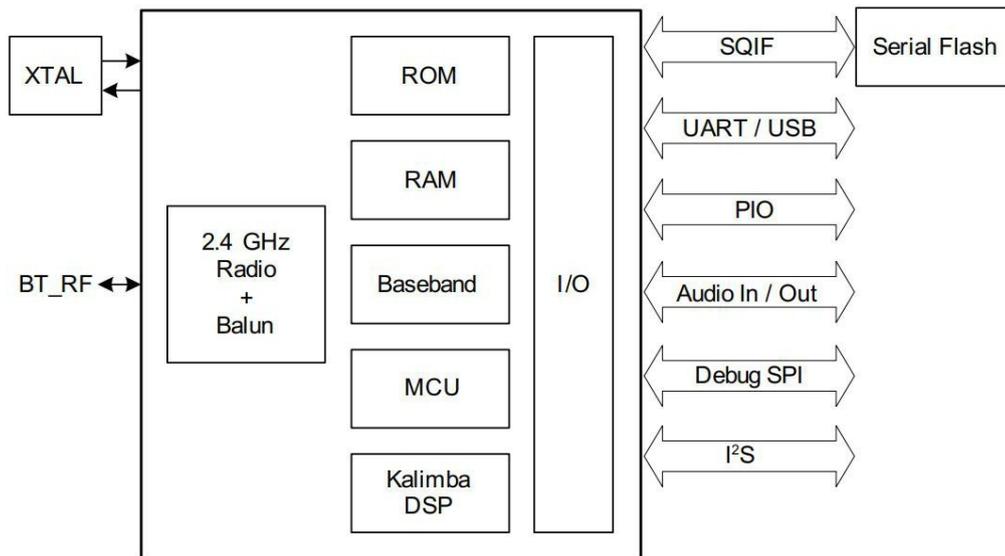
- Support for multi-language programmable audio prompts
- Multipoint support for A2DP connection to 2 A2DP sources for music playback
- Talk-time extension, which automatically reduces processor functions to extend use when a low battery condition is detected
- Slim module with 13mm x 26mm x 2.4mm



3 Applications

- Stereo Headsets
- Wired Stereo headsets and headphones
- Portable Bluetooth Stereo speakers

4 Block Diagram



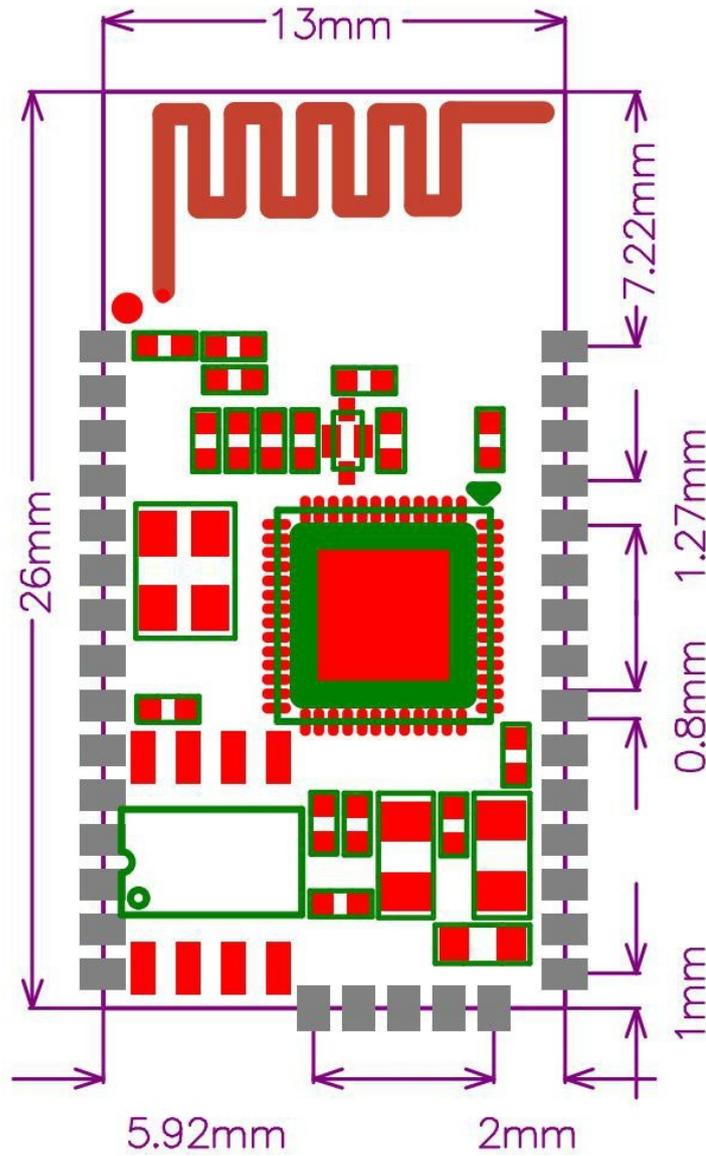
5 General specifications

Model Name	EM6Q303A
Product Description	Bluetooth 5.0 Class2 Module
Bluetooth Standard	Bluetooth 5.0
Chipset	QCC3003 QFN
Dimension	13mm x 26mm x 2.4mm
Operating Conditions	
Voltage	2.8~4.2V
Temperature	-10~+70°C
Storage Temperature	-40~+85°C
Electrical Specifications	
Frequency Range	2402~2480MHz
Maximum RF Transmit Power	9dBm
$\pi/4$ DQPSK Receive Sensitivity	-91dBm
8DPSK Receive Sensitivity	-81dBm



6 Module Package Information

6.1 Pinout Diagram and package dimensions

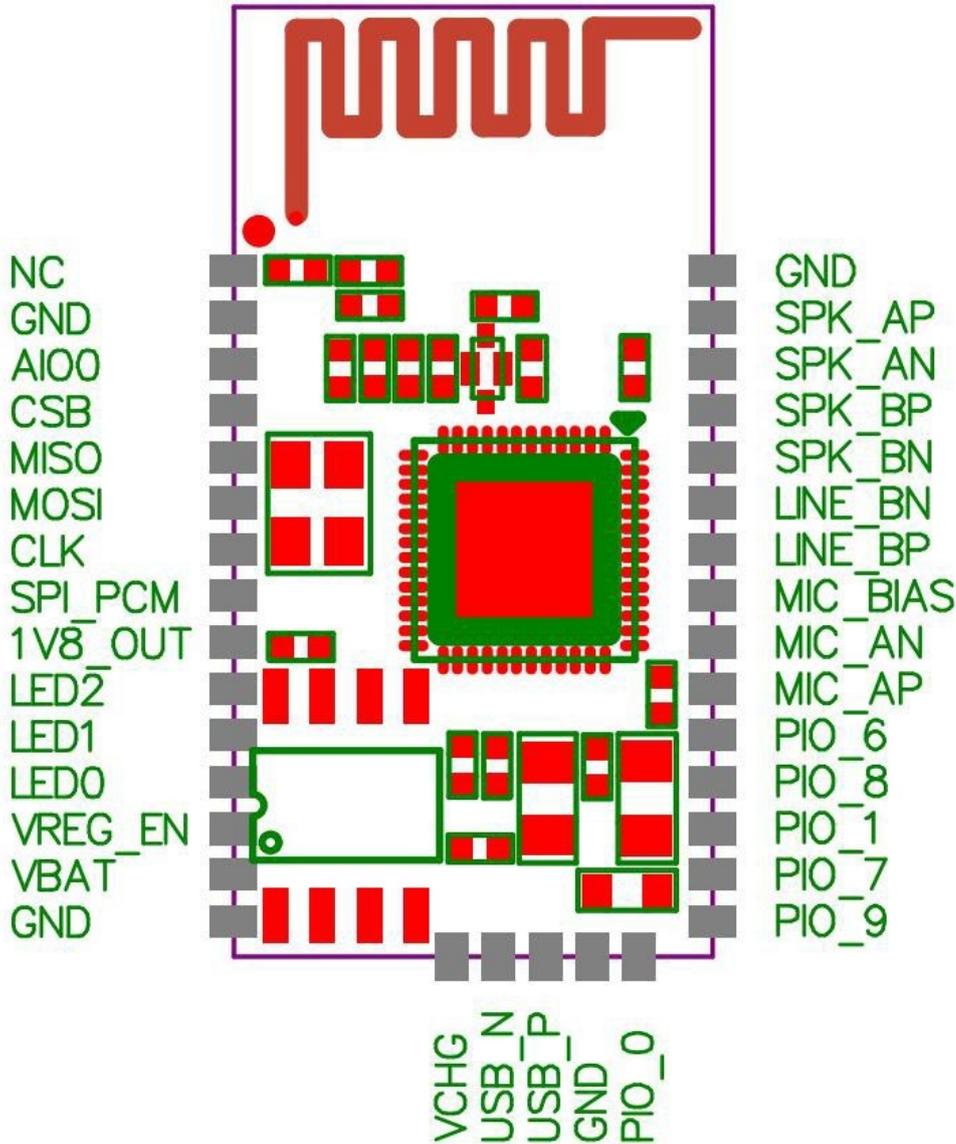


Unit: MM

Recommended PCB layout footprint



6.2 Module Pin descriptions



Pin#	Pin Name	Pin Type	Description
1	NC	NC	NC
2	GND	Ground	Ground
3	AIO_0	Bidirectional	Analog programmable input line 0.
4	SPI_CSB	Bidirectional with weak pull-down	Chip select for SPI,active low Alternative function: ■ PIO_4: Programmable input/output line 4. ■ I2S1_WS: I2S1 word select
5	SPI_MISO	Bidirectional with weak pull-down	SPI data output Alternative function: ■ PIO_3: Programmable input/output line 3. ■ I2S1_SD_OUT: I2S1 synchronous data output
6	SPI_MOSI	Bidirectional with weak pull-down	SPI data input Alternative function: ■ PIO_2: Programmable input/output line 2. ■ I2S1_SD_IN:I2S1 synchronous data input



7	SPI_CLK	Bidirectional with weak pull-down	SPI clock Alternative function: ■ PIO_5: Programmable input/output line 5. ■ I2S1_CLK: I2S1 synchronous data clock
8	SPI_PCM	Input with weak pull-down	SPI/PCM# select input ■ 0=PCM/PIO interface ■ 1=SPI
9	1V8	Power output	Auxiliary regulator output (1.8V out)
10	LED_2	Bidirectional	Open-drain output
11	LED_1	Bidirectional	Open-drain output
12	LED_0	Bidirectional	Open-drain output
13	VREG_EN	CMOS Input	Regulator enable and multifunction button. A high input (tolerant to VBAT voltages) enables the on-chip regulators, which can then be latched on internally and the button used as a multifunction input
14	VBAT	Power Input	Positive supply for BT Module,or battery positive terminal
15	GND	Ground	Ground
16	VCHG	Charge input	Charge input Typically connected charger
17	USB_N	Bi-directional	USB data minus
18	USB_P	Bi-directional	USB data plus with selectable internal 1.5kΩ pull-up resistor
19	GND	Ground	Ground
20	PIO_0	Bidirectional with strong pull-up	Programmable input/output line 0. Alternative function: ■ UART_RX: UART data input
21	PIO_9	Bidirectional with strong pull-down	Programmable input/output line 9. Alternative function: ■ UART_CTS: UART clear to send, active low
22	PIO_7	Bidirectional with strong pull-down	Programmable input/output line 7.
23	PIO_1	Bidirectional with strong pull-up	Programmable input/output line 1. Alternative function: ■ UART_TX: UART data output
24	PIO_8	Bidirectional with strong pull-up	Programmable input/output line 8. Alternative function: ■ UART_RTS: UART request to send, active low
25	PIO_6	Bidirectional with strong pull-down	Programmable input/output line 6.
26	LINE/MIC_AP	Analogue in	Microphone input positive, channel A
27	LINE/MIC_AN	Analogue in	Microphone input negative, channel A
28	MIC_BIAS	Analogue	Microphone bias
29	LINE_BP	Analogue in	Line-in positive, channel B
30	LINE_BN	Analogue in	Line-in negative, channel B
31	SPK_BN	Analogue OUT	Speaker output negative, right
32	SPK_BP	Analogue OUT	Speaker output positive, right
33	SPK_AN	Analogue OUT	Speaker output negative, left
34	SPK_AP	Analogue OUT	Speaker output positive, left
35	GND	Ground	Ground



7 Electrical Characteristics

7.1 Absolute Maximum Ratings

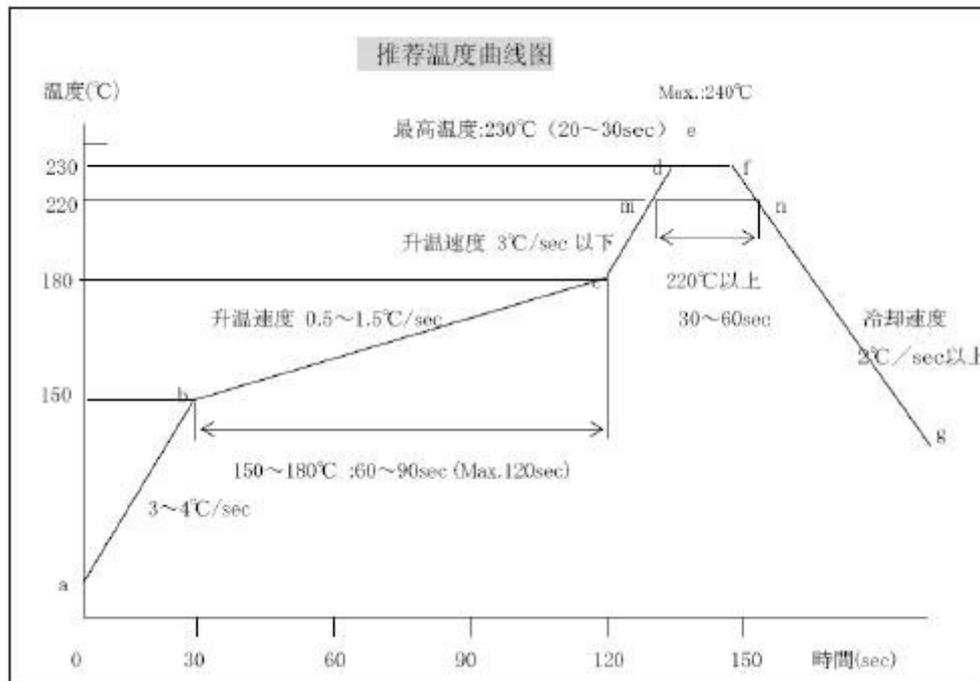
Rating	Minimum	Maximum
Storage temperature	-40°C	+85°C

7.2 Recommended Operating Conditions

Operating Condition	Minimum	Maximum
Operating temperature range	-10°C	+70°C
Supply voltage: VBAT	+2.8V	+4.2V



8 Recommended reflow temperature profile





CAUTION
This bag contains
MOISTURE-SENSITIVE DEVICES

LEVEL

3

If Blank, see adjacent
bar code label

1. Calculated shelf life in sealed bag:12 months at < 40 °C and < 90% relative humidity (RH)
2. Peak package body temperature: 260 °C
If Blank, see adjacent bar code label
3. After bag is opened, devices that will be subjected to reflow solder or other high temperature process must
 - a) Mounted within: 168 hours of factory
If Blank, see adjacent bar code label

conditions ≤ 30 °C / 60 %
b) stored at < 10%RH
4. Devices require bake, before mounting, if :
 - a) Humidity Indicator Card is > 10 %when read at 23 ± 5 °C
 - b) 3a or 3b not met.
5. If baking is required, devices may be baked for 48 hours at 125 ± 5 °C
Note: If device containers cannot be subjected to high temperature or shorter bake times are desired,
reference IPC /JEDEC J-STQ-033 for bake procedure

Bag Seal Date: _____
If Blank, see adjacent bar code label

Note Level and body temperature defined by IPC /JEDEC J-STQ-020

The module Must go through 125°C baking for at least 9 hours before SMT AND IR reflow process!



Record of Changes

Data	Revision	Description
2018-06-30	V1.0	Original publication of this document.
2018-07-05	V1.1	Fix PIN definition.
2020-06-29	V1.2	Update product model.

IMPORTANT NOTICE

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