E104-BT54S User Manual

BLUENRG355MC 2.4GHz 8dBm BLE Module



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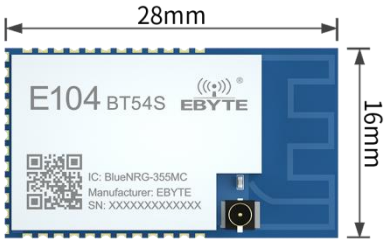
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1. Overview

1.1 Introduction

The E104-BT54S module is a wireless SOC module designed based on the BLUENRG355MC chip solution..It has a variety of transmission methods working in the 2.4GHz frequency band, TTL level output, and 3.3V IO port voltage.



The BLUENRG355MC chip is based on a high-performance ARM Cortex-M0+ 32-bit core processor with a working frequency of 1MHz-64 MHz. The chip is embedded with high-speed memory (up to 64kbytes of SRAM), as well as a wide range of enhanced I/Os and peripherals. For more information on the chip, please refer to the official documentation.

This module is a pure hardware SoC module without a program at the factory. The Bluetooth-based function of broadcasting, scanning, connection, transparent transmission etc. can only be used after users' secondary development on it..

1.2 Features

- Support BLE 5.1;
- A new Bluetooth module developed based on BLUENRG355MC;
- Maximum transmit power 8dBm;
- Support deep sleep, the power consumption of the whole machine in this mode is about 1.3uA;
- Support the global license-free ISM 2.4GHz frequency band;
- Flash: 256 kB; RAM: 64 kB;
- 3.3V ~ 3.6V power supply, 3.3V power supply can guarantee the best performance;
- Industrial grade standard design, can work under -40 ~ 85 °C for a long time;
- IPEX interface/PCB antenna are available. .

2. Specification and parameter

2.1 Limit parameter

Main parameter	Performance		Remark
	Min.	Max.	
Power supply（V）	0	3.6	Voltage over 3.6V will cause permanent damage to module
Operating temperature（℃）	-40	85	Industrial grade

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2.2 Operating parameter

Main parameter		Performance			Remark
		Min.	Typ.	Max.	
Operating voltage（V）		1.8	3.3	3.6	≥3.3 V can ensures output power
Communication level（V）		-	3.3	-	For 5V TTL, it may be at risk of burning down
Operating temperature（℃）		-40	-	85	Industrial design
Operating frequency（MHz）		2400	-	2480	Support ISM band
Power consumption	TX current（mA）	-	18	-	Instant power consumption @8dBm
	RX current（mA）	-	11	-	3.3V power supply
	Sleep current （μA）	-	1.3	-	Stop 2 mode, RTC enabled, please refer to the chip user manual for details
Max Tx power（dBm）		7.5	8.0	8.2	-
Receiving sensitivity（dBm）		-118	-	-148	-
Distance for reference (with PCB antenna)		150M			with PCB antenna
Distance for reference (IPEX interface)		300M			TX2400-JK-11 rubber antenna/antenna gain 2.5dBi
Package		SMD			-
IC		BLUENRG355MC QFN48			-
Size		28*16mm*2.7mm			-
Antenna		PCB/IPEX			Impedance is about 50 ohms

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3. Size and pin definition

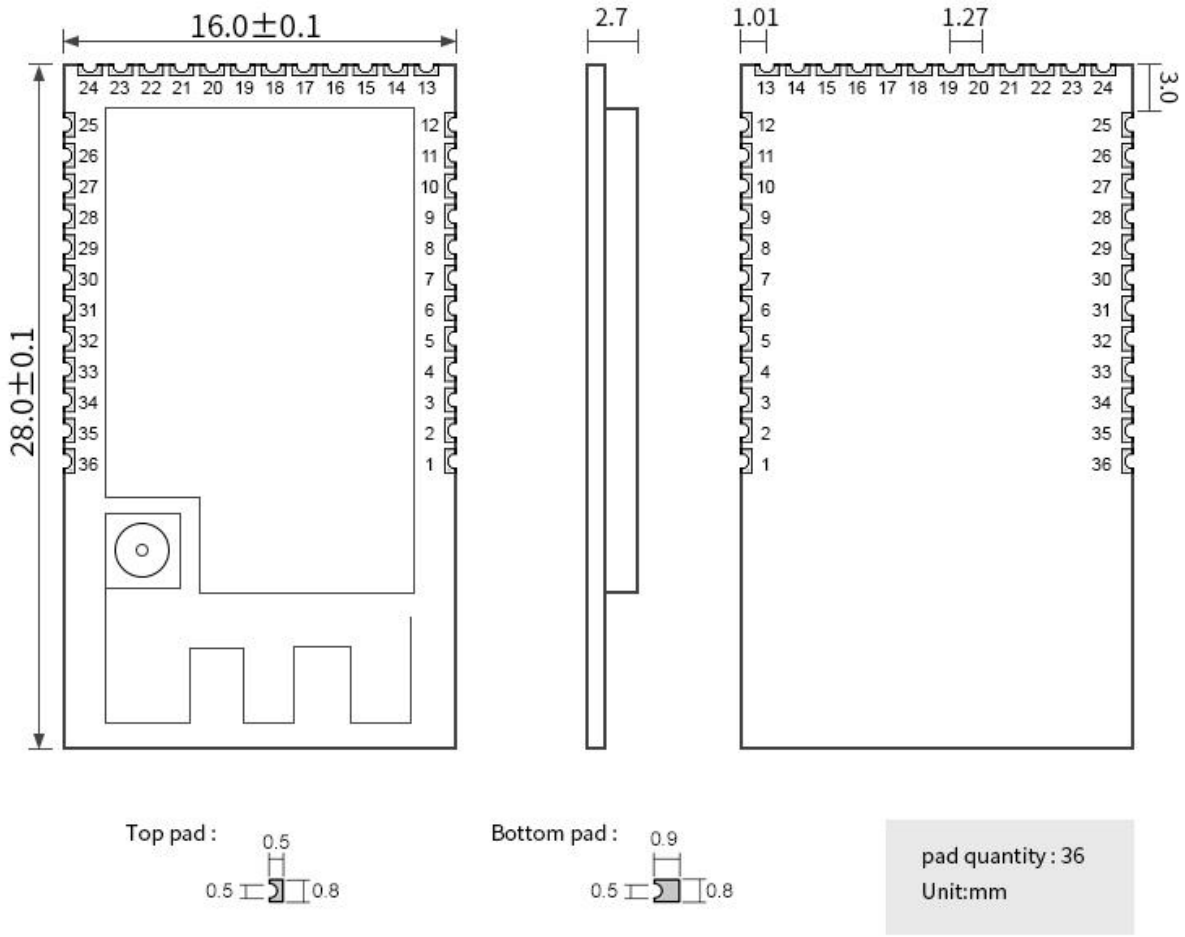


Figure 3-1 Mechanical size and pin definition

Table 3-1 Pin definition table

Pin No.	Pin Name	Pin direction	Description
1	GND	S	Ground wire, connected to the power reference ground;
2	PA0	I/O	MCU GPIO, please refer to the chip user manual for details;
3	PA1	I/O	MCU GPIO, please refer to the chip user manual for details;
4	PA2/SWDIO	I/O	MCU GPIO, please refer to the chip user manual for details;
5	PA3/SWCLK	I/O	MCU GPIO, please refer to the chip user manual for details;
6	PA4/LPUART TX	I/O	MCU GPIO, please refer to the chip user manual for details;
7	PA5/LPUART RX	I/O	MCU GPIO, please refer to the chip user manual for details;
8	PA6	I/O	MCU GPIO, please refer to the chip user manual for details;
9	PA7	I/O	MCU GPIO, please refer to the chip user manual for details;
10	PB15	I/O	MCU GPIO, please refer to the chip user manual for details;

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11	PB14	I/O	MCU GPIO, please refer to the chip user manual for details;
12	VDD	S	Power supply pin, 1.7-3.6V, read the chip user manual for details
13	GND	S	Ground wire, connected to the power reference ground;
14	RST	I/O	Module reset pin, built-in power-on reset circuit;
15	VDDA	S	1.2 V analog ADC core, read the chip user manual for details ；
16	PB11	I/O	MCU GPIO, please refer to the chip user manual for details;
17	PB10	I/O	MCU GPIO, please refer to the chip user manual for details;
18	PB9	I/O	MCU GPIO, please refer to the chip user manual for details;
19	PB8	I/O	MCU GPIO, please refer to the chip user manual for details;
20	PB7	I/O	MCU GPIO, please refer to the chip user manual for details;
21	PB6	I/O	MCU GPIO, please refer to the chip user manual for details;
22	PB5	I/O	MCU GPIO, please refer to the chip user manual for details;
23	PB4	I/O	MCU GPIO, please refer to the chip user manual for details;
24	GND	S	MCU GPIO, please refer to the chip user manual for details;
25	PB3	I/O	MCU GPIO, please refer to the chip user manual for details;
26	PB2	I/O	MCU GPIO, please refer to the chip user manual for details;
27	PB1	I/O	MCU GPIO, please refer to the chip user manual for details;
28	PB0	I/O	MCU GPIO, please refer to the chip user manual for details;
29	PA15	I/O	MCU GPIO, please refer to the chip user manual for details;
30	PA14	I/O	MCU GPIO, please refer to the chip user manual for details;
31	PA13	I/O	MCU GPIO, please refer to the chip user manual for details;
32	PA12	I/O	MCU GPIO, please refer to the chip user manual for details;
33	PA11	I/O	MCU GPIO, please refer to the chip user manual for details;
34	PA10	I/O	MCU GPIO, please refer to the chip user manual for details;
35	PA9/TXD	I/O	MCU GPIO, please refer to the chip user manual for details;
36	PA8/RXD	I/O	MCU GPIO, please refer to the chip user manual for details;

Note: For more chip information, please refer to the official information of "BLUENRG355MC".

4. Welding operation guidance

4.1 Reflow Soldering Temperature

Table 4-1 Reflow soldering temperature table

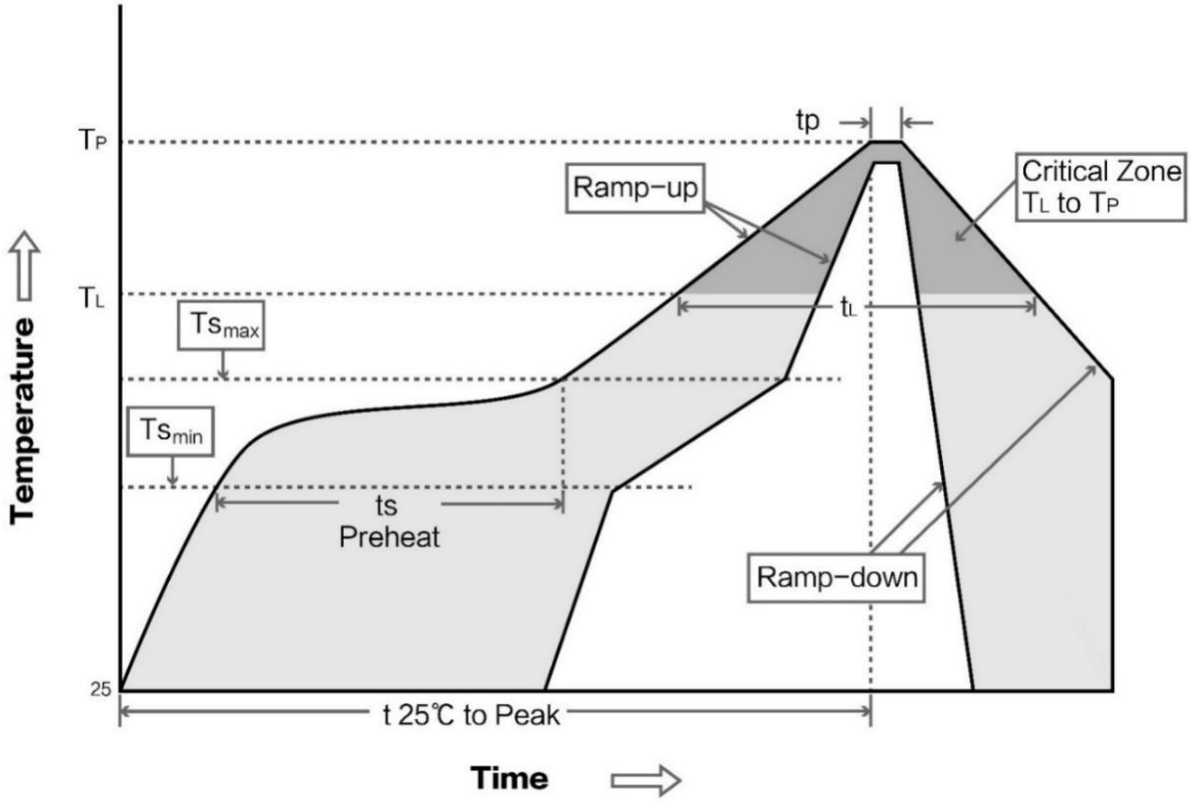
Profile Feature	Curve feature	Sn-Pb Assembly	Pb-Free Assembly
Solder Paste	Solder paste	Sn63/Pb37	Sn96.5/Ag3/Cu0.5
Preheat Temperature min （Tsmin）	Minimum preheating temperature	100℃	150℃
Preheat temperature max (Tsmax)	Maximum preheating temperature	150℃	200℃
Preheat Time (Tsmin to Tsmax)(ts)	Preheating time	60-120 sec	60-120 sec

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Average ramp-up rate(Tsmax to Tp)	Average rising rate	3℃/second max	3℃/second max
Liquidous Temperature (TL)	Liquid phase temperature	183℃	217℃
Time（tL）Maintained Above（TL）	Time above liquidus	60-90 sec	30-90 sec
Peak temperature（Tp）	Peak temperature	220-235℃	230-250℃
Aveage ramp-down rate（Tp to Tsmax）	Average descent rate	6℃/second max	6℃/second max
Time 25℃ to peak temperature	Time of 25 ° C to peak temperature	6 minutes max	8 minutes max

4.2 Reflow Soldering Curve



5. Antenna Type

5.1 Antenna recommendation

The antenna plays an important role in the communication process. The inferior antenna often has a great impact on the communication system. Therefore, we recommend some antennas that support our wireless modules and have excellent performance and reasonable price.

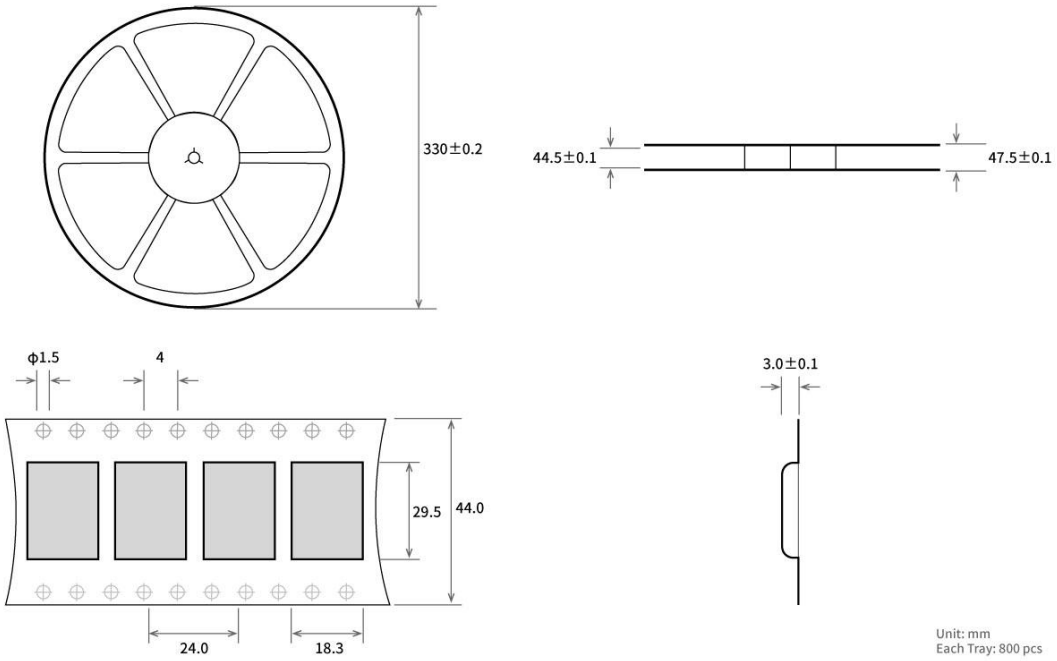
Product	Type	Frequency Hz	Gain dBi	Size mm	Wire cm	Interface	Feature
TX2400-NP-5010	Flexible antenna	2.4G	2.0	10*50	-	IPEX	Built-in flexible FPC soft

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TX2400-JZ-3	Rubber antenna	2.4G	2.0	30	-	SMA-J	Short straight, omnidirectional
TX2400-JZ-5	Rubber antenna	2.4G	2.0	50	-	SMA-J	Short straight, omnidirectional
TX2400-JW-5	Rubber antenna	2.4G	2.0	50	-	SMA-J	Fixed bend, omnidirectional
TX2400-JK-11	Rubber antenna	2.4G	2.5	110	-	SMA-J	Bendable, omnidirectional
TX2400-JK-20	Rubber antenna	2.4G	3.0	200	-	SMA-J	Bendable, omnidirectional
TX2400-XPL-150	Sucker antenna	2.4G	3.5	150	150	SMA-J	Small sucker antenna, cost effective

6. Batch packaging



Revision history

Version	Date	Description	Issued by
1.0	2021-8-18	Initial version	

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