Bluetooth Module Datasheet

CZW-3040-01

Model:CZW-3040-01

Hardware Version：V2.0

Release Date：2019.01.11

ShenZhen Cheng Zhi Wei Technology Co.,Ltd
Tel: (0755) 83328582
E-mail: xh@czwtech.com
Web: www.czwtech.com
Shenzhen

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1 summary

CZW-3040-01 is a Bluetooth module designed by ShenZhen Cheng Zhi Wei Technology Co.,Ltd. using Qualcomm Bluetooth chip qcc3040。

CZW-3040-01 is includes an application-dedicated Developer Processor and a system Firmware Processor that runs code from an internal flash memory. Both processors have tightly coupled memory (TCM) and an on-chip cache for performance while executing from flash memory。

CZW-3040-01 package is compatible with czw01 series pins, easy replacement and upgrade

2 General specifications

Model Name	CZW-3040-01
Package	40 Pin Module
Dimension	13mm x 28.5mm x 2.4mm
Chipset	QCC3040
Bluetooth Version	Bluetooth 5.2
Power Class	Class2
Transmission Distance	≥10M
Voltage	2.8~4.2V
Temperature	-10～+70℃
Storage Temperature	-40～+85℃
Frequency Range	2402～2480MHz
Maximum RF Transmit Power	9dBm
π/4 DQPSK Receive Sensitivity	-91dBm
8DPSK Receive Sensitivity	-81dBm

3 Key Features

3.1 Device description

★ Tri-core processor architecture
★ High-performance programmable Bluetooth® mono audioSoC
★ Low power modes to extend battery life

3.2 Features

★ Qualified to Bluetooth v5.1 specification
★ 120 MHz Qualcomm® Kalimba™ audio DSP
★ 32 MHz Developer Processor for applications
★ Firmware Processor for system
★ Flexible QSPI flash programmable platform
★ High-performance 24- bit audio interface
★ Digital and analog microphone interfaces
★ Flexible PIO controller and LED pins with PWM support
★ Serial interfaces: UART, Bit Serializer (I^2C/SPI), USB 2.0
★ Advanced audio algorithms
★ Active Noise Cancellation: Hybrid, Feedforward, and Feedback modes, using Digital or Analog Mics, enabled using license keys available from Qualcomm®
★ Qualcomm® aptX™ and aptX HD Audio
★ 1 or 2 mic Qualcomm® cVc™ headset speech processing
★ Integrated PMU: Dual SMPS for system/digital circuits，Integrated Li-ion battery charger

3.3 Audio subsystem

★ 32- bit Kalimba audio digital signal processor (DSP) core with flexible clocking from 2 MHz to 120 MHz to enable optimization of performance vs. power consumption
★ DSP executes code from ROM
★ 112 KB program random access memory (RAM)
★ 448 KB data RAM
★ 6 Mb ROM

3.4 Application subsystem

★ Dual-core application subsystem 32 MHz operation
★ 32- bit Firmware Processor
★ 32- bit Developer Processor executes:
★ 32 Mb flash memory
★ On-chip caches per core enable optimized performance and power consumption

3.5 Bluetooth subsystem

★ Qualified to Bluetooth v5.1 specification including 2 Mbps Bluetooth Low Energy
★ Single ended antenna connection with on-chip balun and Tx/Rx switch
★ Bluetooth, Bluetooth Low Energy, and mixed topologies supported
★ Class 1 support

3.6 Li-ion battery charger

★ Integrated battery charger supporting up to 200 mA charge current
★ Variable float (or termination) voltage adjustable in 50 mV steps from 3.65 V to 4.4 V
★ Thermal monitoring and management are available in application software
★ Pre-charge to fast charge transition configurable at 2.5 V, 2.9 V, 3.0 V, and 3.1 V

3.7 Power management

★ Integrated power management unit (PMU) to minimize external components
★ runs directly from a Li-ion, USB, or external supply (2.8 V to 6.5 V)
★ Auto-switching between battery and USB (or other) charging source
★ Power islands employed to optimize power consumption for variety of use-cases
★ Dual switch-mode power supply

3.8 Audio engine and digital audio interfaces

★ 1 x unidirectional 24- bit inter-integrated circuit sound (I^2S) interface
★ Mono analog output configurable as differential Class-AB earphone speaker output or differential high efficiency Class-D output
★ Dual analog inputs configurable as single ended line inputs or, unbalanced or balanced analog microphone inputs
★ 1 microphone bias (single bias shared by the two channels)
★ Digital microphone inputs with capability to interface up to 8 digital microphones
★ Both analog-to-digital converter (ADC)s and the digital-toanalog converter (DAC) support sample rates of 8 kHz, 16 kHz, 32 kHz, 44.1 kHz, 48 kHz, 96 kHz. The DAC also supports 192 kHz and 384 kHz.

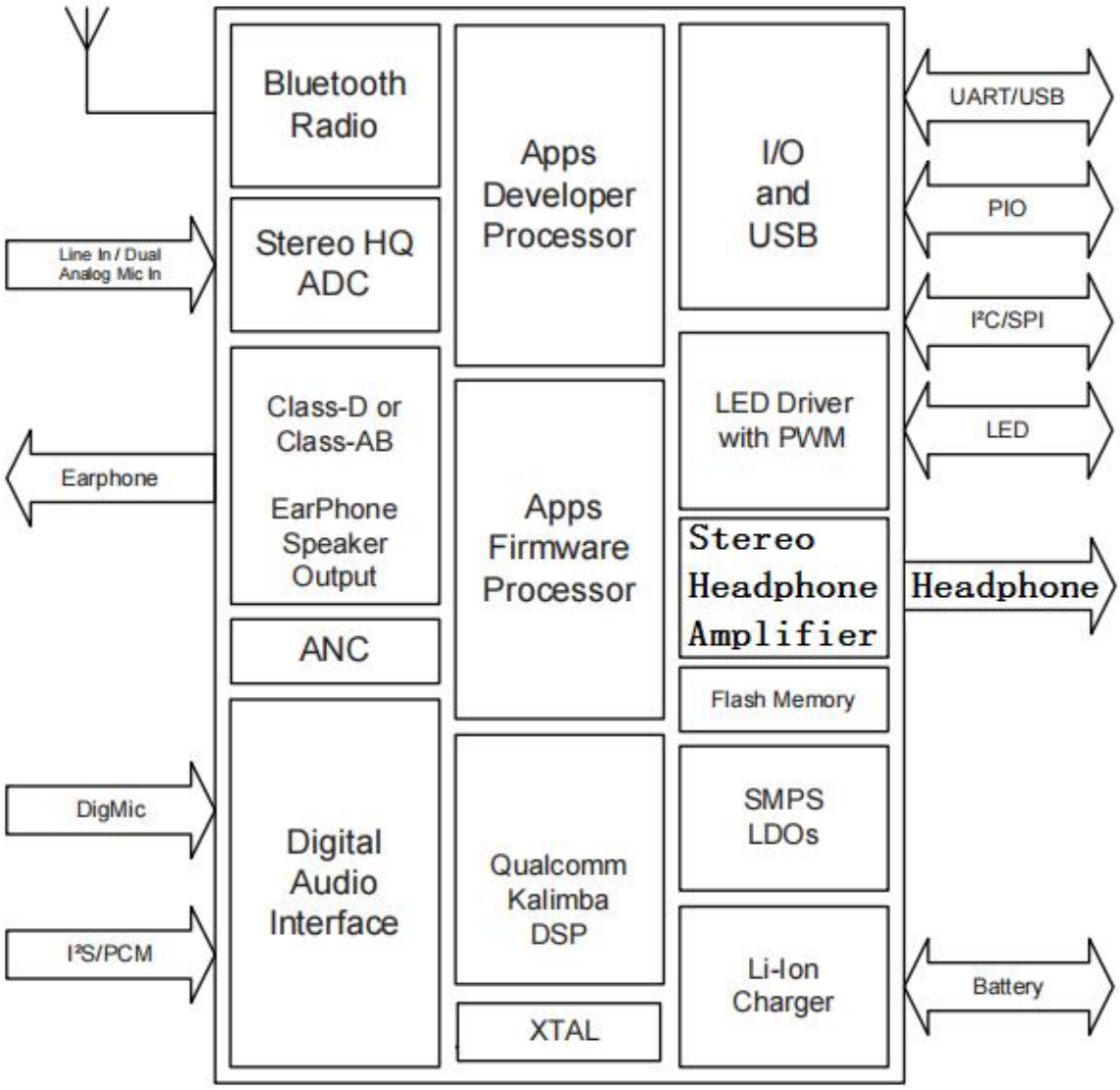
3.9 Peripherals and physical interfaces

★ A universal asynchronous receiver transmitter (UART) interface
★ 2 x Bit Serializers (programmable serial peripheral interface (SPI) and inter-integrated circuit interface (I^2C) hardware accelerator)
★ 1 x USB interface
★ Internal NOR flash interface
★ Up to 22 programmable input/output (PIO) and 5 open drain/digital input light-emitting diode (LED) pads with pulse width modulation (PWM)

4 Applications

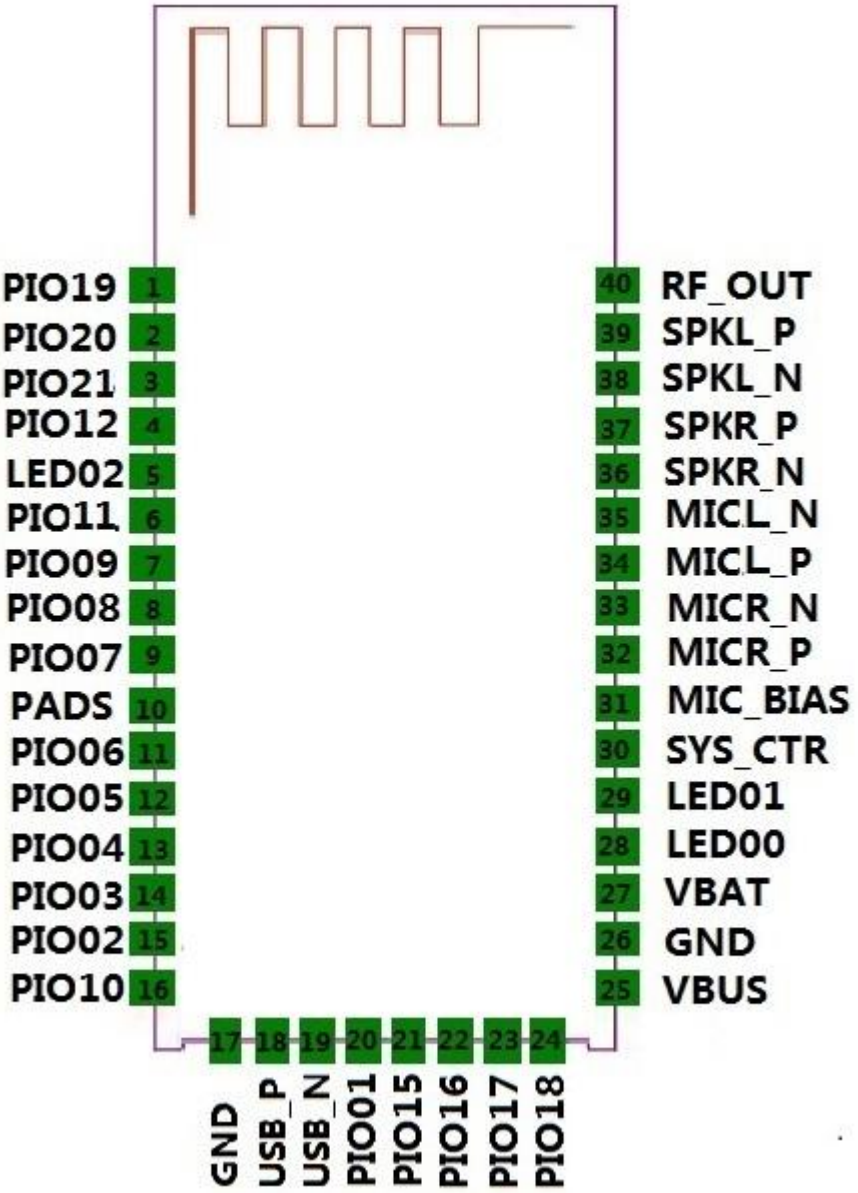
★ TrueWireless™ stereo earbuds

5 Block Diagram

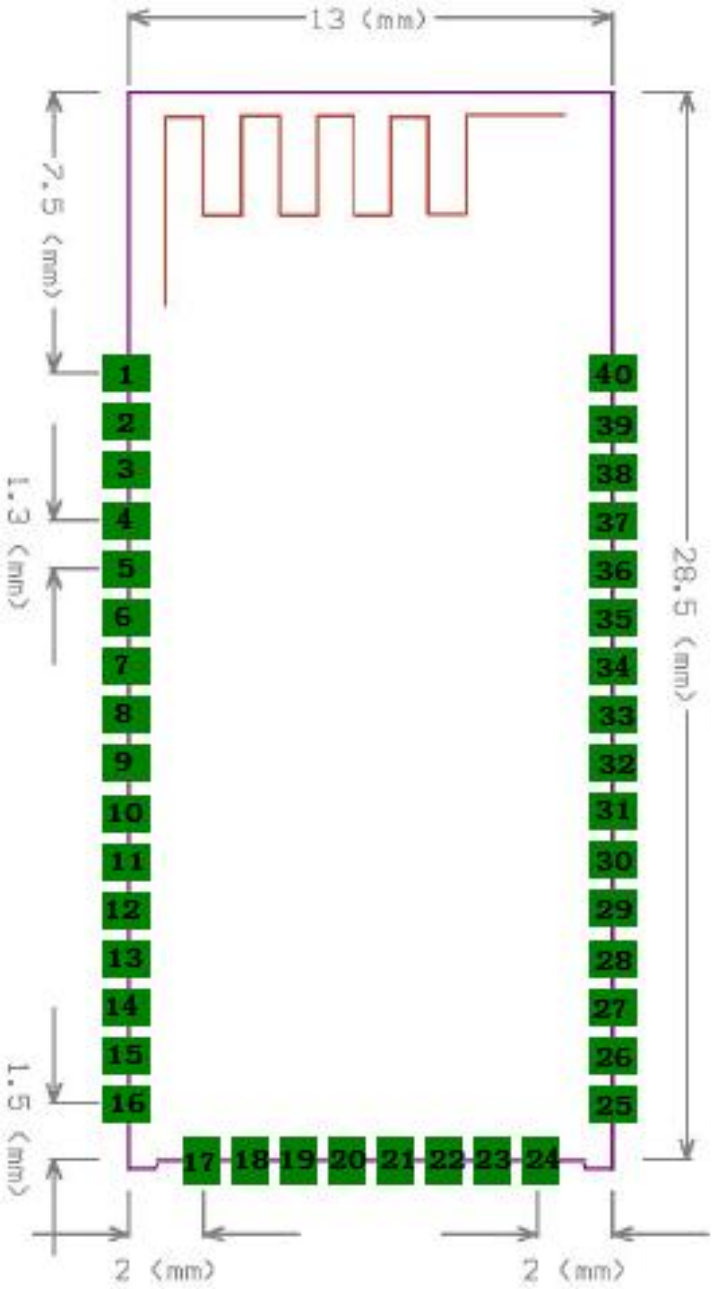


6 Module Package Information

6.1 Pinout Diagram and package dimensions



6.2 Module Pin descriptions

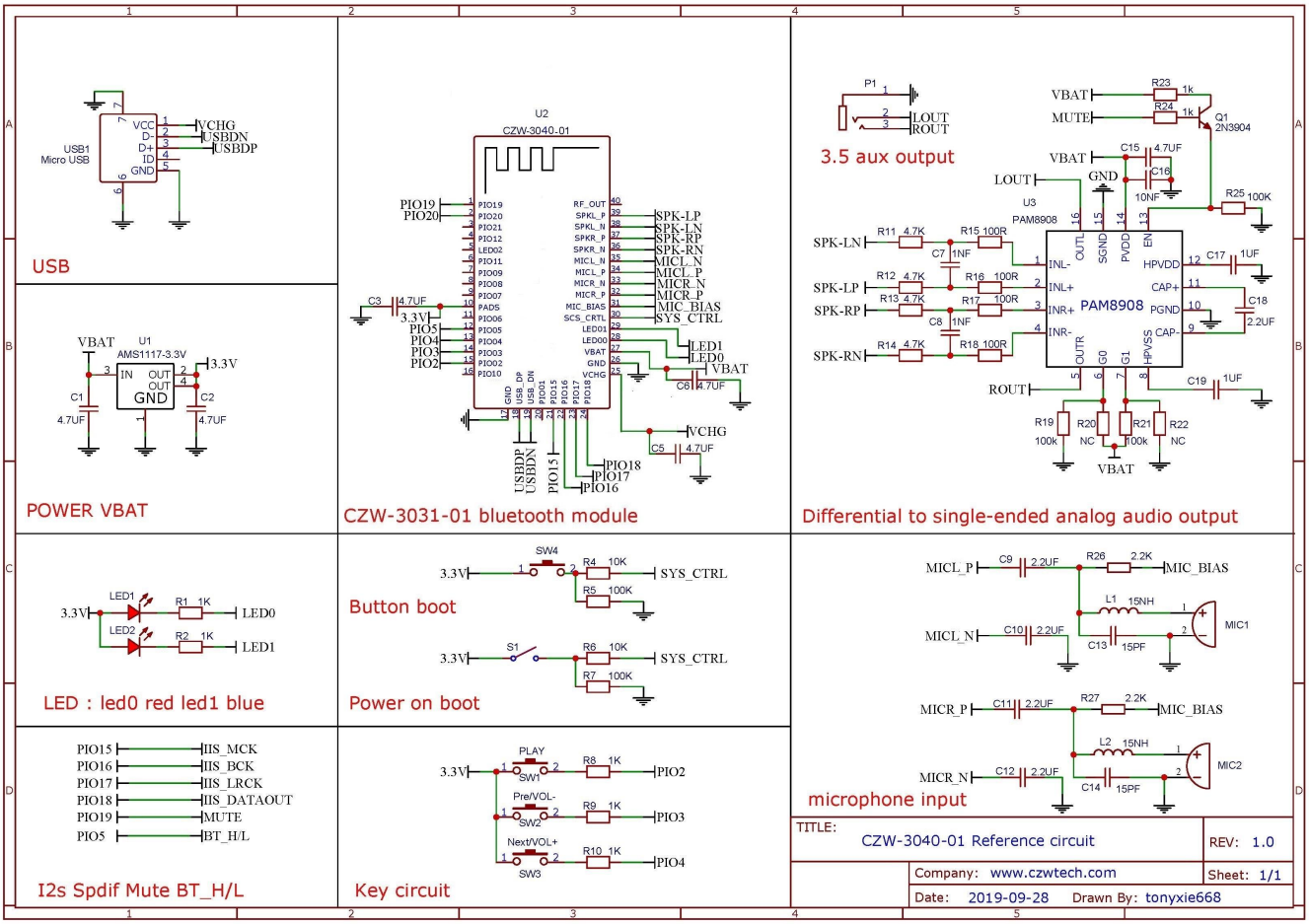


7 Pin Function Description

Pin#	Pin Name	Pin type	Description
1	PIO[19]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 19. Alternative function: PCM_DIN[0]
2	PIO[20]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 20. Alternative function: PCM_DOUT[1]
3	PIO[21]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 21. Alternative function: PCM_DOUT[2]
4	PIO[12]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 12
5	LED[2]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.
6	PIO[11]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 11
7	PIO[9]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 9
8	PIO[8]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 8. Alternative function: TBR_CLK
9	PIO[7]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 7. Alternative function: TBR_MISO[0]
10	PADS	Supply	1.8 V/3.3 V PIO supply.
11	PIO[6]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 6. Alternative function: TBR_MOSI[0]
12	PIO[5]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 5. Alternative function: TBR_MISO[1]
13	PIO[4]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 4. Alternative function: TBR_MOSI[1]
14	PIO[3]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 3. Alternative function: TBR_MISO[2]
15	PIO[2]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 2. Alternative function: TBR_MISO[3]
16	PIO[10]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 10
17	GND	Ground	Ground
18	USB_DP	Digital	USB Full Speed device D+ I/O. IEC-61000-4-2 (device level) ESD Protection
19	USB_DN	Digital	USB Full Speed device D- I/O. IEC-61000-4-2 (device level) ESD Protection
20	PIO[1]	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
21	PIO[15]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 15. Alternative function: MCLK_OUT

Pin#	Pin Name	Pin type	Description
22	PIO[16]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 16. Alternative function: PCM_CLK
23	PIO[17]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 17. Alternative function: PCM_SYNC
24	PIO[18]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 18. Alternative function: PCM_DOUT[0]
25	VBUS	Supply	Charger input to Bypass regulator.
26	GND	Ground	Ground
27	VBAT	Supply	Battery voltage input.
28	LED[0]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.
29	LED[1]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.
30	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
31	MIC_BIAS	VDD_AUDIO_1V8	Mic bias output.
32	MICR_P	VDD_AUDIO_1V8	Microphone differential 2 input, positive. Alternative function: Differential audio line input right, positive
33	MICR_N	VDD_AUDIO_1V8	Microphone differential 2 input, negative. Alternative function: Differential audio line input right, negative
34	MICL_P	VDD_AUDIO_1V8	Microphone differential 1 input, positive. Alternative function: Differential audio line input left, positive
35	MICL_N	VDD_AUDIO_1V8	Microphone differential 1 input, positive. Alternative function: Differential audio line input left, positive
36	SPKR_N	VDD_AUDIO_HP_ SPKR	Headphone/speaker differential right output, negative. Alternative function: Differential right line output, negative
37	SPKR_P	VDD_AUDIO_HP_ SPKR	Headphone/speaker differential right output, positive. Alternative function: Differential right line output, positive
38	SPKL_N	VDD_AUDIO_HP_ SPKL	Headphone/speaker differential left output, negative. Alternative function: Differential left line output, negative
39	SPKL_P	VDD_AUDIO_HP_ SPKL	Headphone/speaker differential left output, positive. Alternative function: Differential left line output, positive
40	RF_OUT	VDD_BT_RADIO	Bluetooth transmit/receive.

8 Reference application circuit



Notice: for reference only, please design the circuit according to the actual application

9 Electrical Characteristics

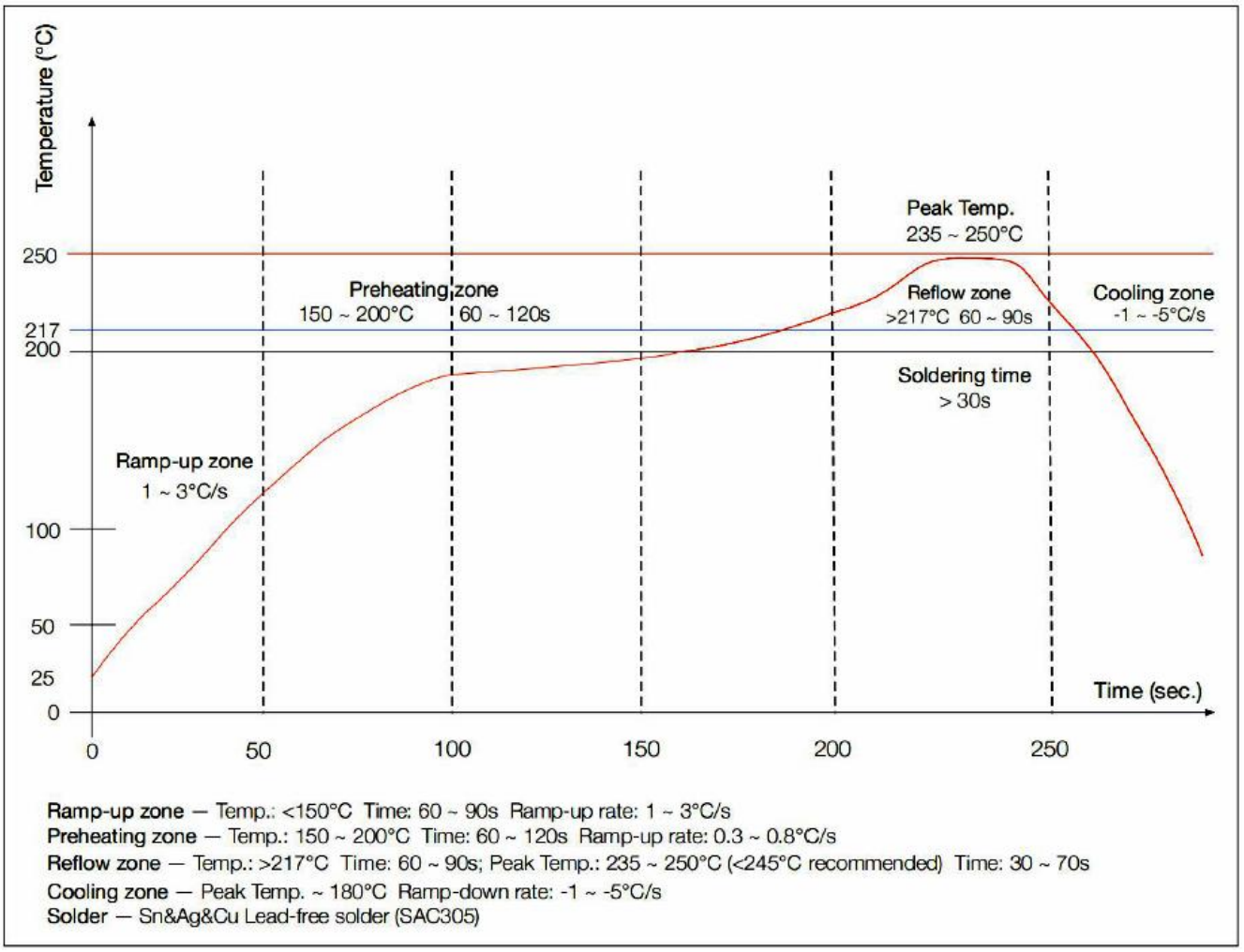
9.1 Absolute Maximum Ratings

Rating	Minimum	Maximum
Storage temperature	-40℃	+85℃

9.2 Recommended Operating Conditions

Operating Condition	Minimum	Maximum
Operating temperature range	-40℃	+85℃
Supply voltage: VBAT	+2.8V	+4.3V

10 Recommended reflow temperature profile



Ramp-up zone — Temp.: <150°C Time: 60 ~ 90s Ramp-up rate: 1 ~ 3°C/s
Preheating zone — Temp.: 150 ~ 200°C Time: 60 ~ 120s Ramp-up rate: 0.3 ~ 0.8°C/s
Reflow zone — Temp.: >217°C Time: 60 ~ 90s; Peak Temp.: 235 ~ 250°C (<245°C recommended) Time: 30 ~ 70s
Cooling zone — Peak Temp. ~ 180°C Ramp-down rate: -1 ~ -5°C/s
Solder — Sn&Ag&Cu Lead-free solder (SAC305)

The module Must go through 100℃ baking for at least 12 hours before SMT AND IR reflow process!

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