Bluetooth Module Datasheet

CZW-3040-03

Model:CZW-3040-03

Hardware Version：V2.0

Release Date：2019.01.11

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1 summary

CZW-3040-03 is a Bluetooth module designed by ShenZhen Cheng Zhi Wei Technology Co.,Ltd. using Qualcomm Bluetooth chip qcc3040。

CZW-3040-03 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-3040-03 package is compatible with czw03 series pins, easy replacement and upgrade

2 General specifications

Model Name	CZW-3040-03
Package	60 Pin Module
Dimension	13.8mm x 20.5mm 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.

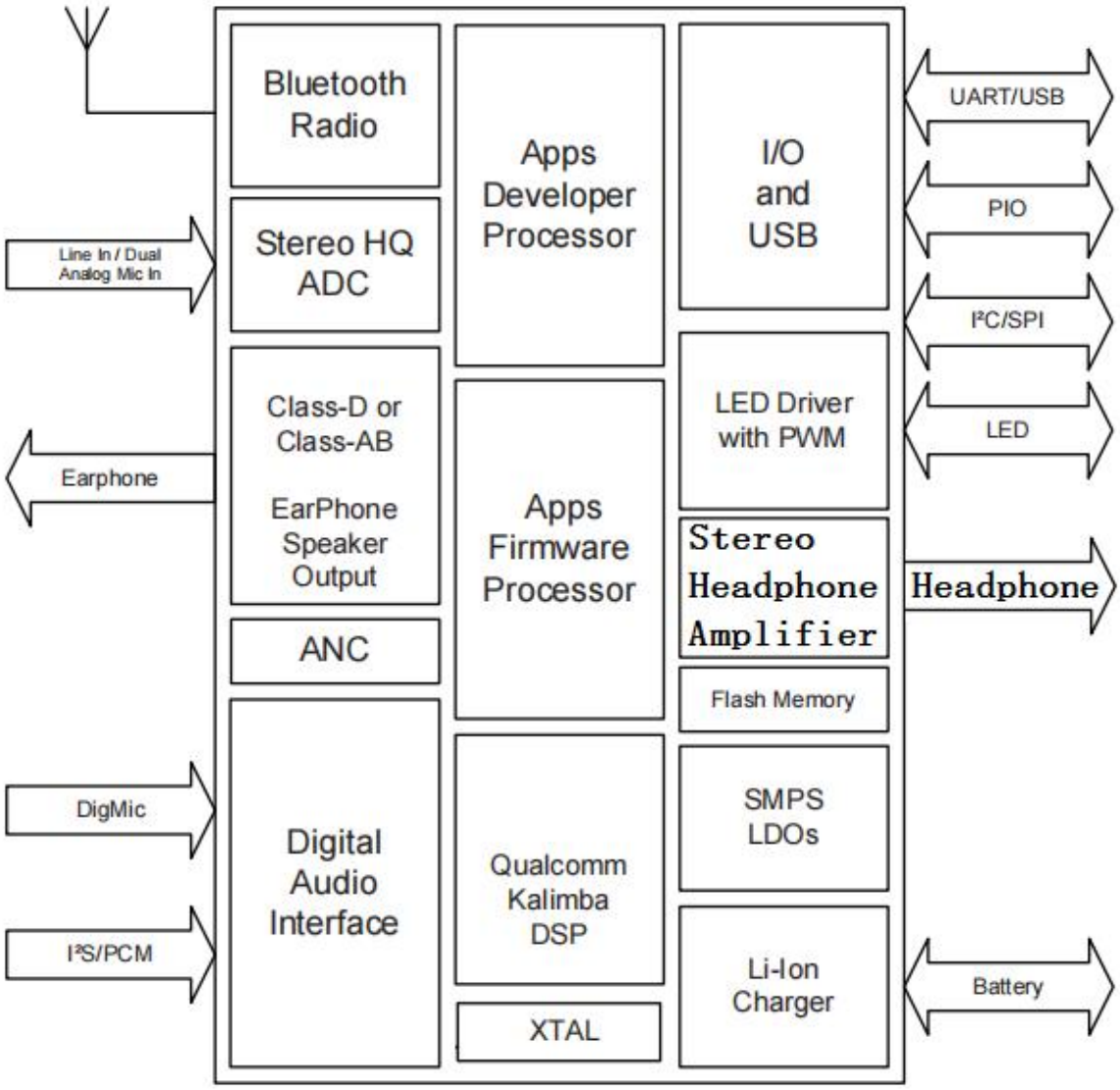
3.9 Peripherals and physical interfaces

★ 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

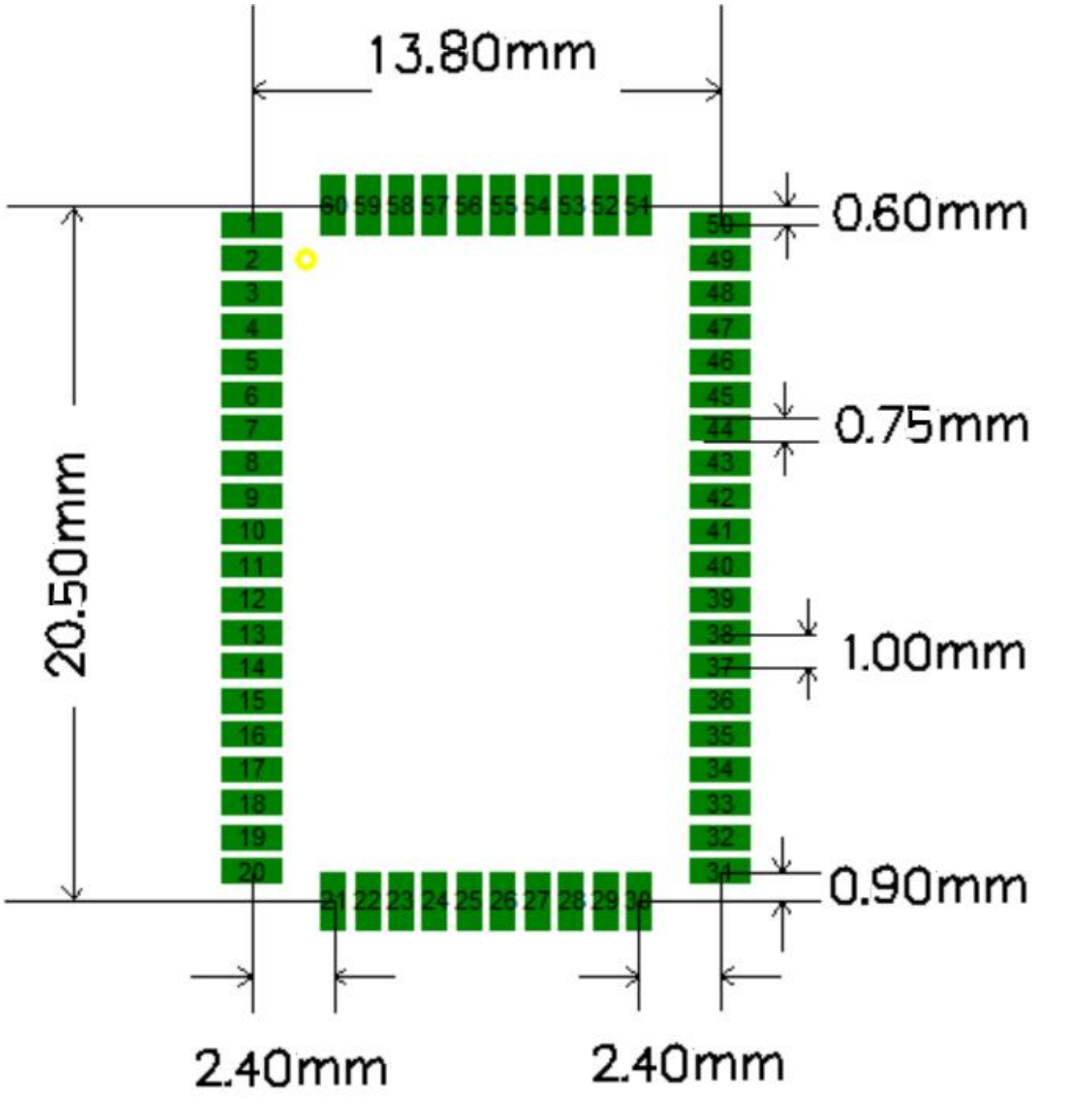
★ TrueWireless™ stereo earbuds

5 Block Diagram

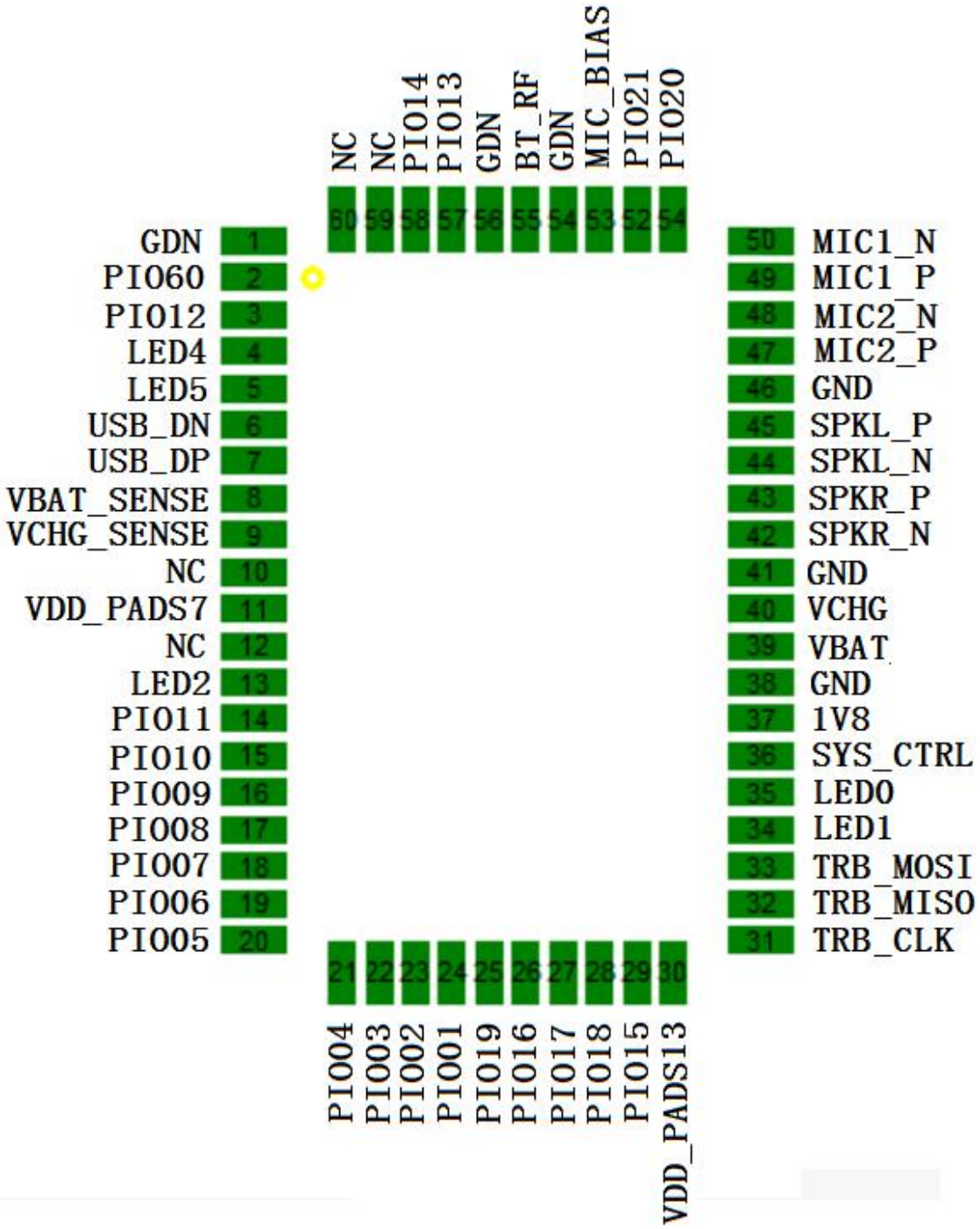


6 Module Package Information

6.1 Pinout Diagram and package dimensions



6.2 Module Pin descriptions



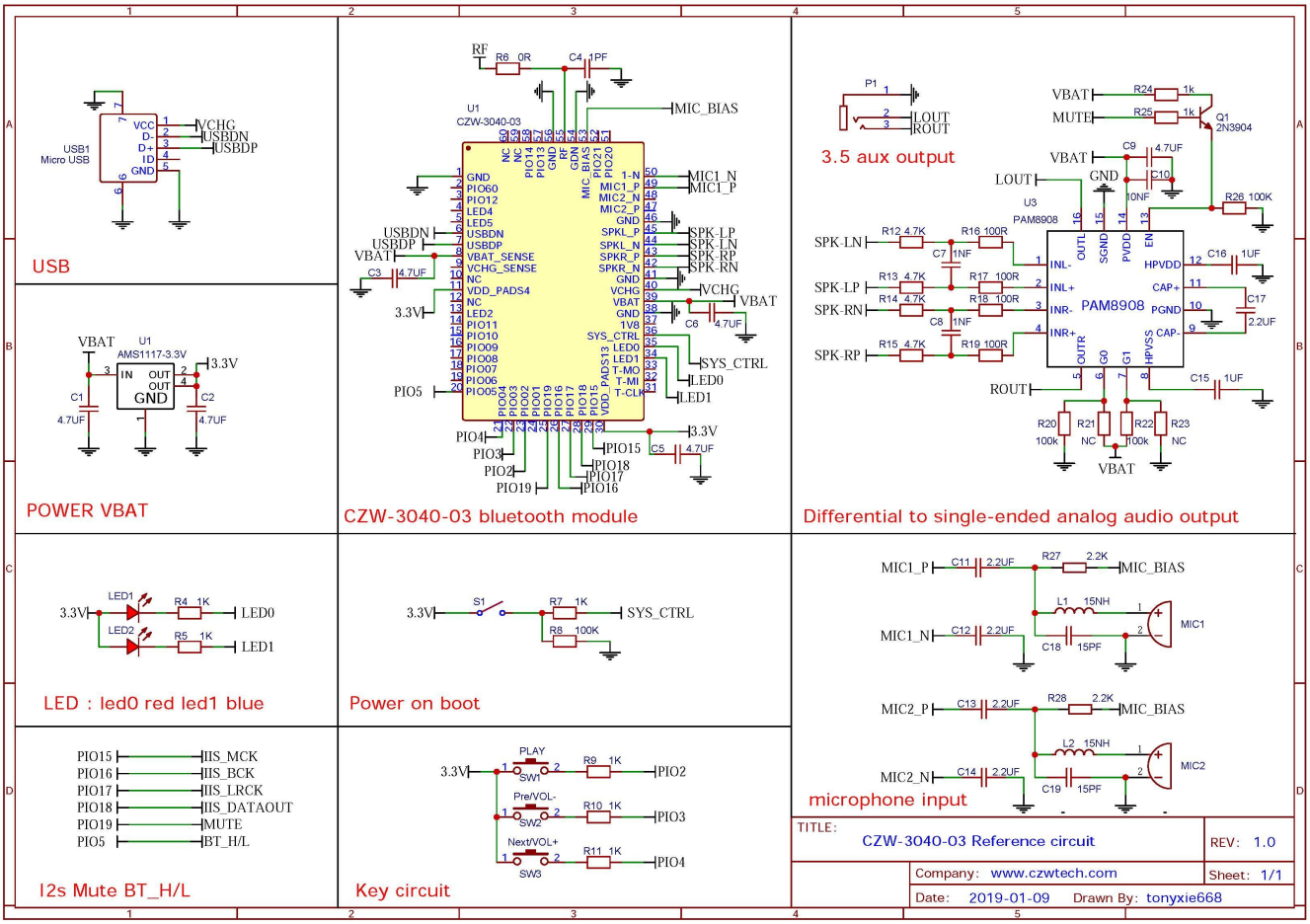
7 Pin Function Description

Pin#	Pin Name	Pin type	Description
1	GND	Ground	Ground
2	PIO[60]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 60.
3	PIO[12]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 12.
4	LED[4]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.
5	LED[5]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.
6	USB_DN	Digital	USB Full Speed device D- I/O. IEC-61000-4-2 (device level) ESD Protection
7	USB_DP	Digital	USB Full Speed device D+ I/O. IEC-61000-4-2 (device level) ESD Protection
8	VBAT_SENSE	Analog	Battery voltage sense input.
9	VCHG_SENSE	Analog	Charger input sense pin. High impedance. Connect VCHG_SENSE direct to SMPS_VCHG
10	NC	NC	NC
11	VDD_PADS_7	Supply	1.8 V/3.3 V PIO supply.
12	NC	NC	NC
13	LED[2]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.
14	PIO[11]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 11
15	PIO[10]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 10
16	PIO[9]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 9
17	PIO[8]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 8. Alternative function: TBR_CLK
18	PIO[7]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 7. Alternative function: TBR_MISO[0]
19	PIO[6]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 6. Alternative function: TBR_MOSI[0]
20	PIO[5]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 5. Alternative function: TBR_MISO[1]
21	PIO[4]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 4. Alternative function: TBR_MOSI[1]

Pin#	Pin Name	Pin type	Description
22	PIO[3]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 3. Alternative function: TBR_MISO[2]
23	PIO[2]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 2. Alternative function: TBR_MISO[3]
24	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
25	PIO[19]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 19. Alternative function: PCM_DIN[0]
26	PIO[16]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 16. Alternative function: PCM_CLK
27	PIO[17]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 17. Alternative function: PCM_SYNC
28	PIO[18]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 18. Alternative function: PCM_DOUT[0]
29	PIO[15]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 15. Alternative function: MCLK_OUT
30	VDD_PADS_1、3	Supply	1.8 V/3.3 V PIO supply.
31	TBR_CLK	Digital: Bidirectional with programmable strength internal pull- up/pull-down	TBR_CLK Alternative function: Programmable I/O line 8.
32	TBR_MISO	Digital: Bidirectional with programmable strength internal pull- up/pull-down	TBR_MISO[0] Alternative function: Programmable I/O line7.
33	TBR_MOS	Digital: Bidirectional with programmable strength internal pull- up/pull-down	TBR_MOSI[0] Alternative function: Programmable I/O line6.
34	LED[1]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.
35	LED[0]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.
36	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
37	1V8	Supply	1.8V voltage output
38	GND	Ground	Ground
39	VBAT	Supply	Battery voltage input.
40	VCHG	Supply	Charger input to Bypass regulator.
41	GND	Ground	Ground

Pin#	Pin Name	Pin type	Description
42	SPKR_N	VDD_AUDIO_HP_ SPKR	Headphone/speaker differential right output, negative. Alternative function: Differential right line output, negative
43	SPKR_P	VDD_AUDIO_HP_ SPKR	Headphone/speaker differential right output, positive. Alternative function: Differential right line output, positive
44	SPKL_N	VDD_AUDIO_HP_ SPKL	Headphone/speaker differential left output, negative. Alternative function: Differential left line output, negative
45	SPKL_P	VDD_AUDIO_HP_ SPKL	Headphone/speaker differential left output, positive. Alternative function: Differential left line output, positive
46	GND	Ground	Ground
47	MIC2_P	VDD_AUDIO_1V8	Microphone differential 2 input, positive. Alternative function: Differential audio line input right, positive
48	MIC2_N	VDD_AUDIO_1V8	Microphone differential 2 input, negative. Alternative function: Differential audio line input right, negative
49	MIC1_P	VDD_AUDIO_1V8	Microphone differential 1 input, positive. Alternative function: Differential audio line input left, positive
50	MIC1_N	VDD_AUDIO_1V8	Microphone differential 1 input, negative. Alternative function: Differential audio line input left, negative
51	PIO[20]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 20. Alternative function: PCM_DOUT[1]
52	PIO[21]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 21. Alternative function: PCM_DOUT[2]
53	MIC_BIAS	VDD_AUDIO_1V8	Mic bias output.
54	GND	Ground	Ground
55	BT_RF	VDD_BT_RADIO	Bluetooth transmit/receive.
56	GND	Ground	Ground
57	PIO[13]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 13
58	PIO[14]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 14
59	NC	NC	NC
60	NC	NC	NC

8 Reference application circuit



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

9 Electrical Characteristics

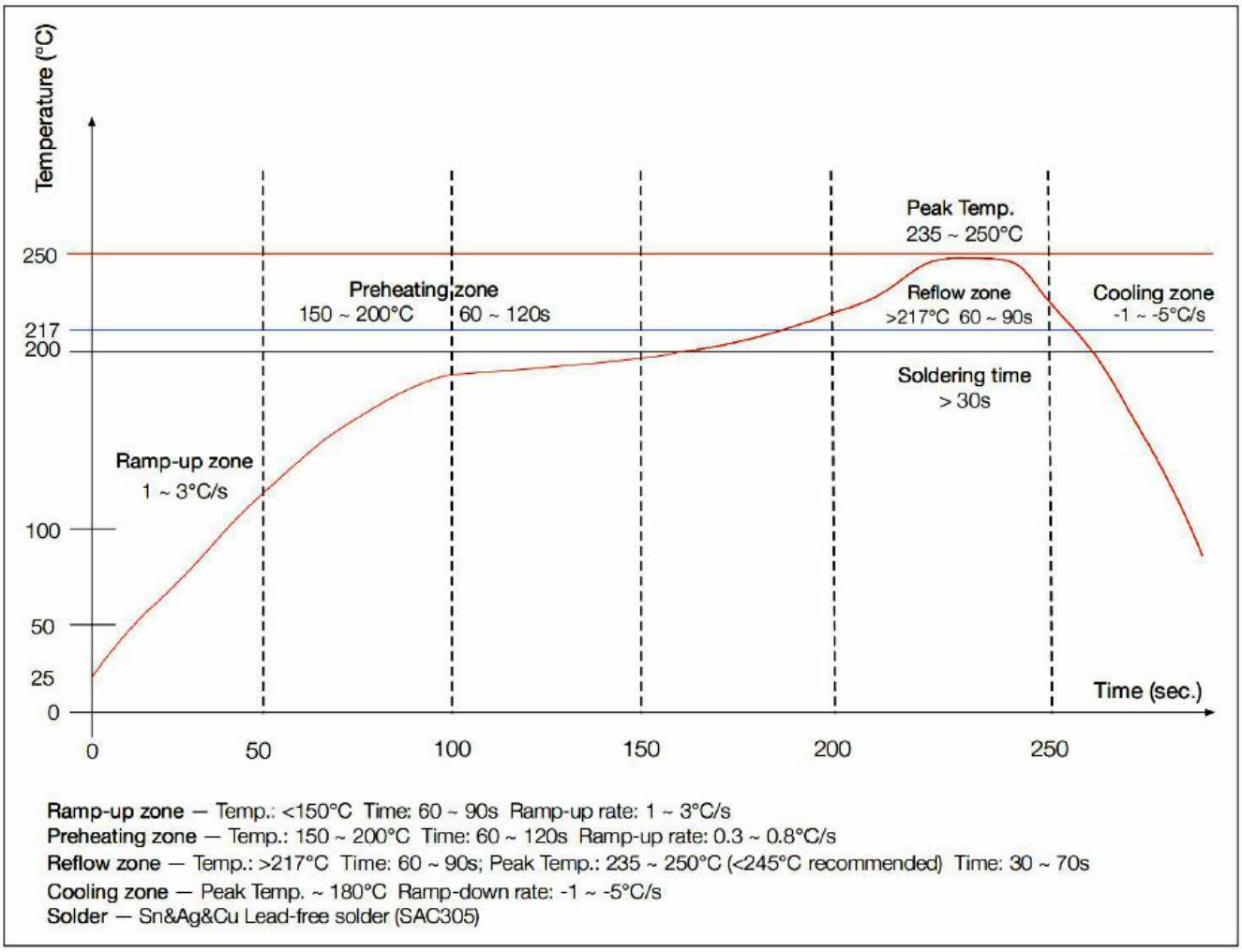
9.1 Absolute Maximum Ratings

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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