Bluetooth Module Datasheet

CZW-3021-01

Model:CZW-3021-01

Hardware Version：V2.0

Release Date：2018.05.11

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

List of Contents

1 summary

CZW-3021-01 is a Bluetooth module designed by ShenZhen Cheng Zhi Wei Technology Co.,Ltd. using Qualcomm Bluetooth chip qcc3021。

CZW-3021-01 is a Bluetooth, audio and programmable application processor. It includes high-performance, analog, and digital audio codecs, Class-AB speaker driver, advanced power management, Li-ion battery charger, light-emitting diode (LED) drivers, and flexible interfaces including inter┐integrated circuit sound (I^2S), inter-integrated circuit interface (I^2C), universal asynchronous receiver transmitter (UART), and programmable input/output (PIO)。

CZW-3021-01 package is compatible with czw01 series pins, easy replacement and upgrade

2 General specifications

Model Name	CZW-3021-01
Package	40 Pin Module
Dimension	13mm x 28.5mm x 2.4mm
Chipset	QCC3021
Bluetooth Version	Bluetooth 5.1
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	-85dBm

3 Key Features

3.1 Device description

★ High-performance programmable Bluetooth® stereo audio SoC
★ Fully qualified single-chip dual-mode Bluetooth v5.0 system
★ Tri-core processor architecture with low power for extended battery life

3.2 Features

★ Qualified to Bluetooth® v5.0 specification
★ 120 MHz Qualcomm® Kalimba™ audio DSP
★ 32 MHz Developer Processor for applications
★ Firmware Processor for system
★ Flexible QSPI flash programmable platform
★ Advanced audio algorithms
★ High-performance 24‑ bit stereo audio interface
★ Digital and analog microphone interfaces
★ Flexible PIO controller and LED pins with PWM support
★ 1-mic Qualcomm® cVc™ speaker noise reduction and echo cancellation technology
★ SBC and AAC audio codecs support
★ Serial interfaces: UART, Bit Serializer (I^2C/SPI), USB 2.0
★ 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 allow
optimization and trade-off performance vs. power consumption
★ DSP runs from ROM
★ 80 KB program random access memory (RAM)
★ 256 KB data RAM
★ 5 Mb ROM

3.4 Application subsystem

★ Dual core application subsystem 32 MHz operation
★ 32‑ bit Firmware Processor:
★ 32‑ bit Developer Processor:
★ Both cores execute code from external flash memory using QSPI clocked at 32 MHz
★ On-chip caches per core allow for optimized performance and power consumption Bluetooth subsystem

3.5 Bluetooth subsystem

★ Qualified to Bluetooth v5.0 specification including 2 Mbps Bluetooth low energy (Production parts)
★ 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 internal mode (up to 200 mA) and external mode (up to 1.8 A)
★ Variable float (or termination) voltage adjustable in 50 mV steps from 3.65 V to 4.4 V
★ Thermal monitoring and management are implementable 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
★ QCC3021 QFN 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 (SMPS)

3.8 Audio engine and digital audio interfaces

★ 24-bit I^2S interface with 1 input and 3 output channels
★ Programmable audio master clock (MCLK)
★ Sony/Philips digital interface (SPDIF): 2, configurable as input or output
★ Stereo analog Class-AB headphone outputs
★ 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 6 digital microphones
★ Both analog-to-digital converter (ADC)s and digital-to-analog converter (DAC)s support sample rates of 8, 16, 32, 44.1, 48, 96 kHz. DACs also support 192 kHz

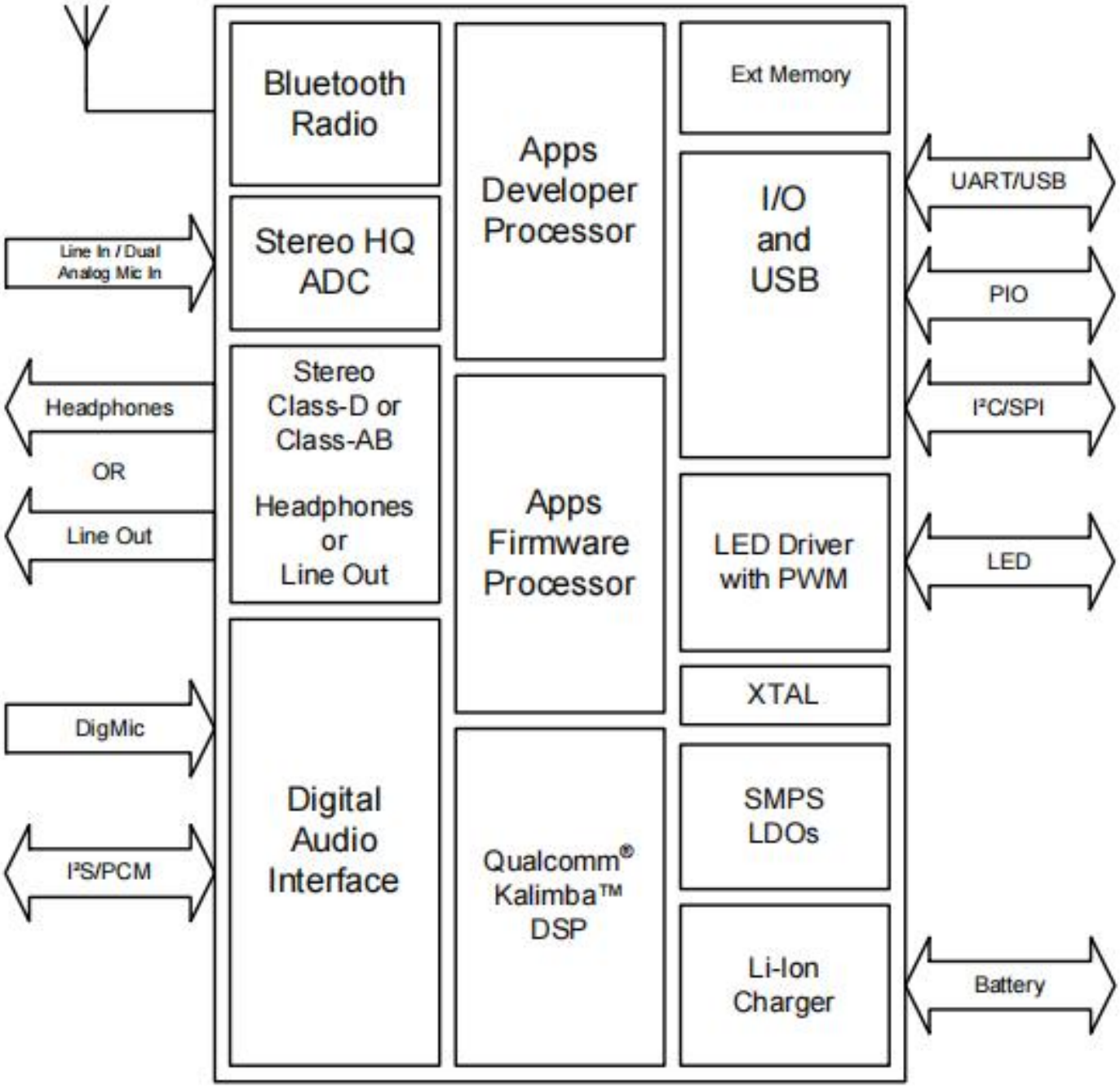
3.9 Peripherals and physical interfaces

★ A UART interface
★ 2 x Bit Serializers (programmable serial peripheral interface (SPI) and I^2C hardware accelerator)
★ 1 x USB interface
★ QSPI NOR flash interface
★ Up to 17 PIO and 4 open drain/digital input LED pads with pulse width modulation (PWM)

4 Applications

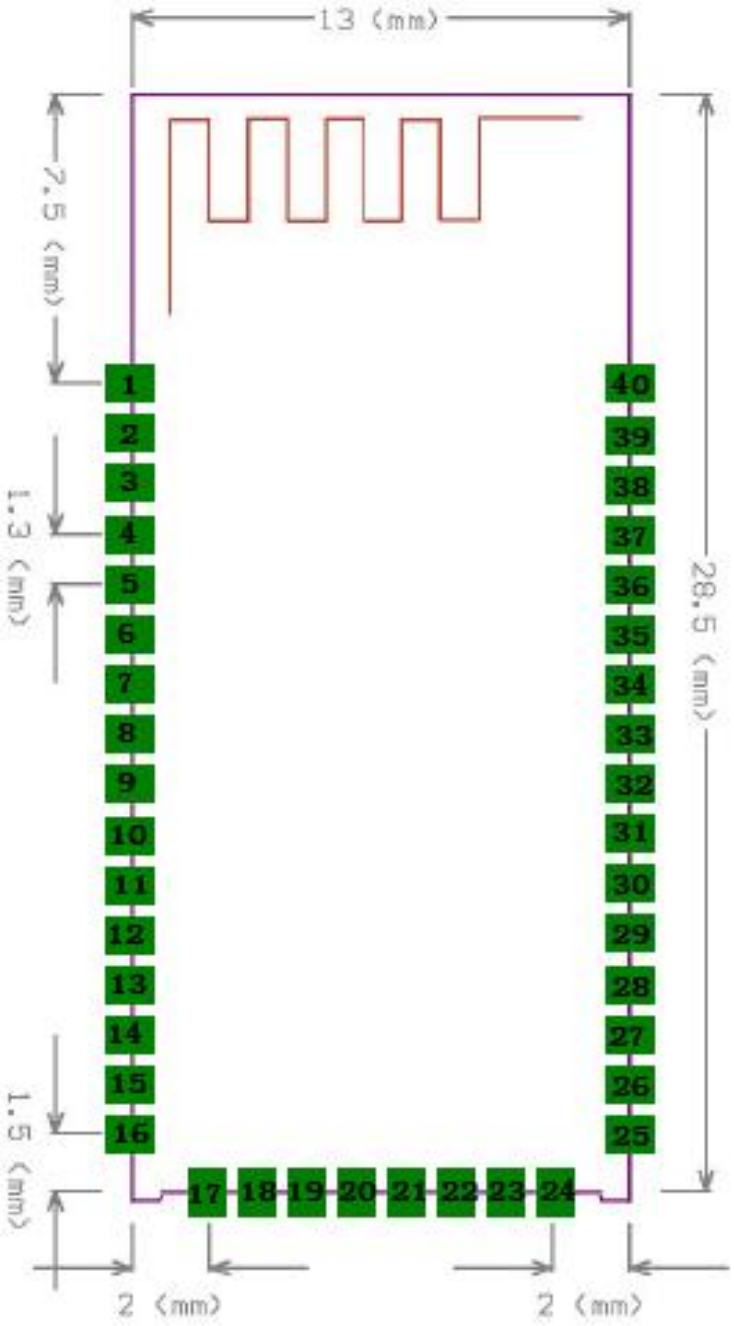
★ Wireless speakers

5 Block Diagram

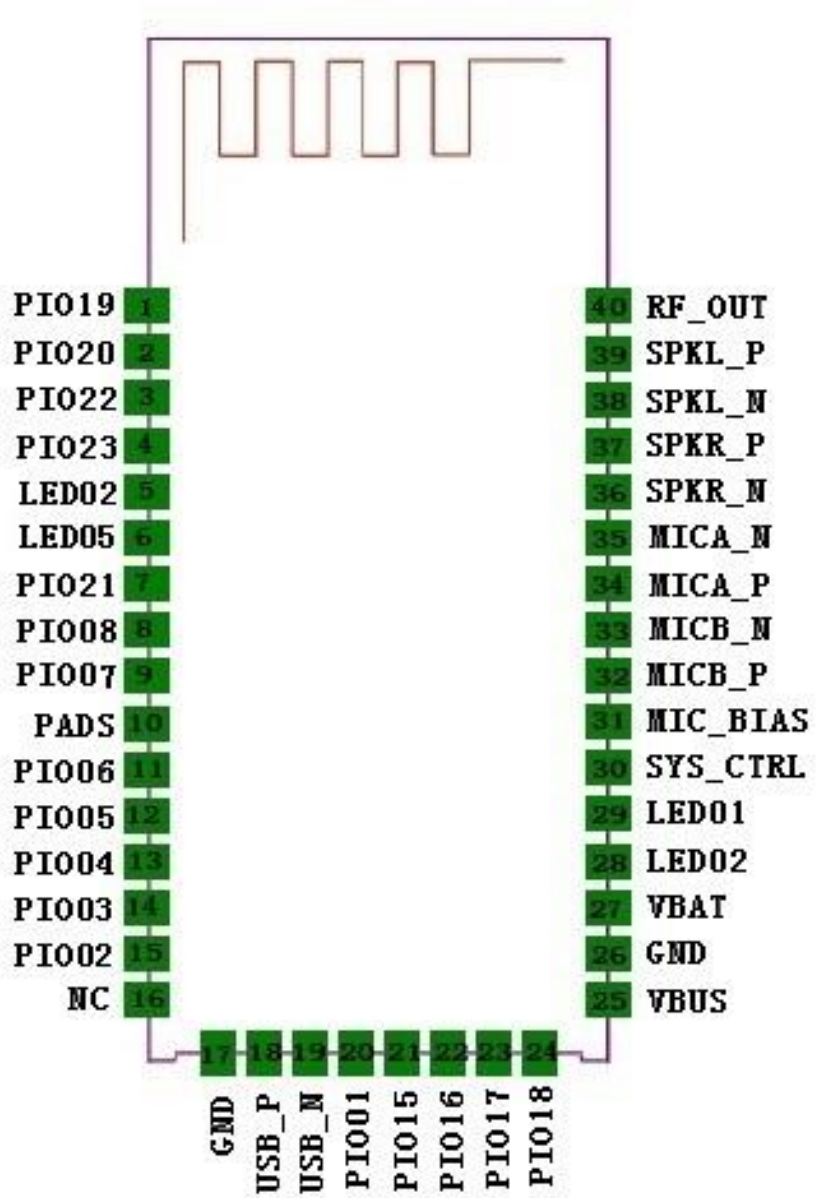


6 Module Package Information

6.1 Pinout Diagram and package dimensions



6.2 Module Pin descriptions

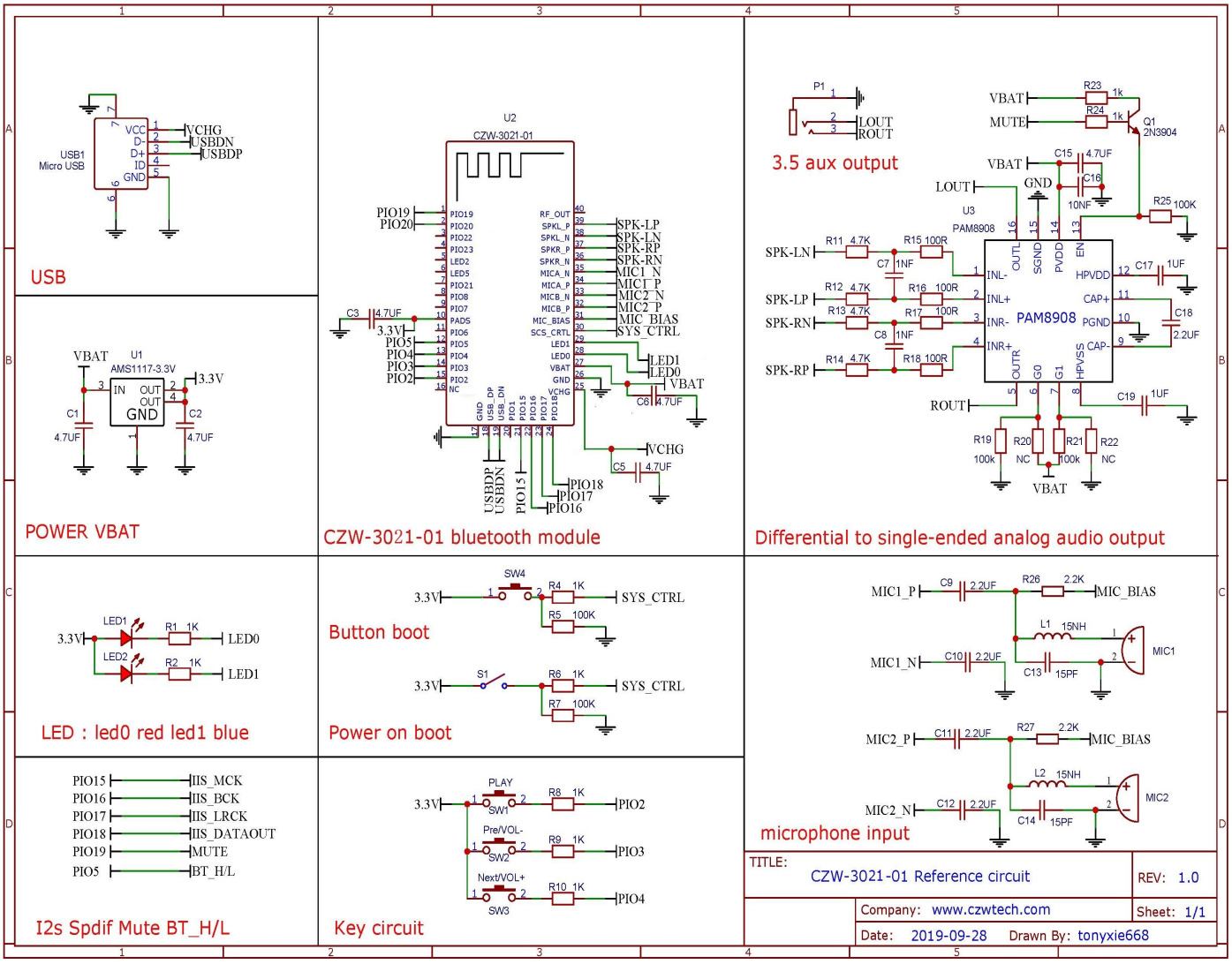


7 Pin Function Description

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[22]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 22.
4	PIO[23]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 23.
5	LED[2]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.
6	LED[5]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.
7	PIO[21]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 21. Alternative function: PCM_DOUT[2]
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	NC	NC	NC
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
22	PIO[16]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 16. Alternative function: PCM_CLK

Pin#	Pin Name	Pin type	Description
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	MIC2_P	VDD_AUDIO_1V8	Microphone differential 2 input, positive. Alternative function: Differential audio line input right, positive
33	MIC2_N	VDD_AUDIO_1V8	Microphone differential 2 input, negative. Alternative function: Differential audio line input right, negative
34	MIC1_P	VDD_AUDIO_1V8	Microphone differential 1 input, positive. Alternative function: Differential audio line input left, positive
35	MIC1_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

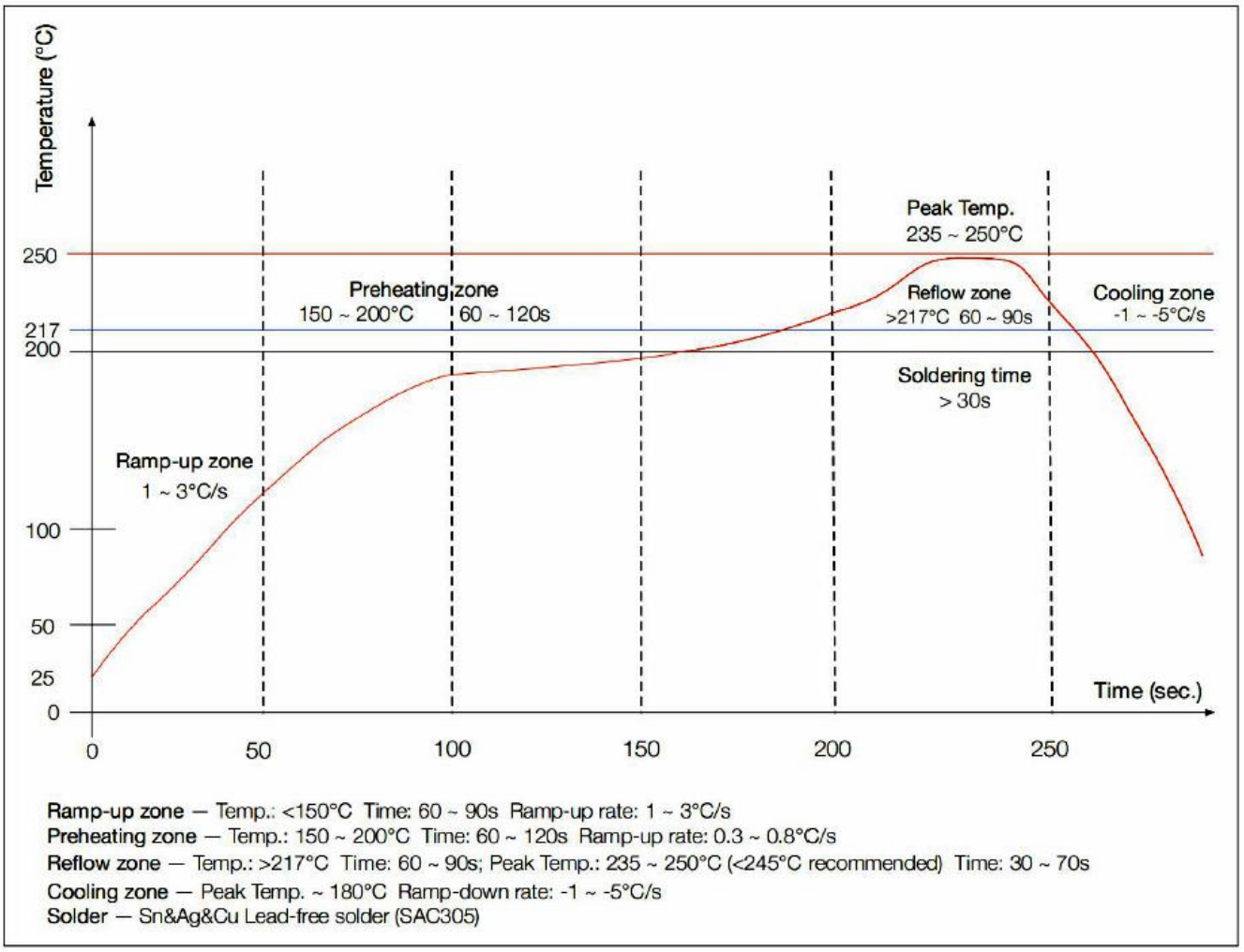
9.1 Absolute Maximum Ratings

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!

IMPORTANT NOTICE

ShenZhen Cheng Zhi Wei Technology Co.,Ltd (CZW) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current. All products are sold subject to the CZW terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

CZW warrants performance of its products to specifications applicable at the time of sale in accordance with CZW's standard warranty. Testing and other quality control techniques are utilized to the extent CZW deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

In order to minimize risks associated with customer applications, adequate design and operating safeguards must be used by the customer to minimize inherent or procedural hazards. CZW products are not authorized for use as critical components in life support devices or systems without the express written approval of an officer of the company. Life support devices or systems are devices or systems that are intended for surgical implant into the body, or support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided, can be reasonably expected to result in a significant injury to the user. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

CZW assumes no liability for applications assistance or customer product design. CZW does not warrant or represent that any license, either express or implied, is granted under any patent right, mask work right, or other intellectual property right of CZW covering or relating or any combination, machine, or process in which such products or services might be or are used.