
Bluetooth Module Datasheet

CZW-3021-01

Model: CZW-3021-01

Hardware Version: V2.0

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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 (I² S), inter-integrated circuit interface (I² C), 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 (I² C/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 I²S 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

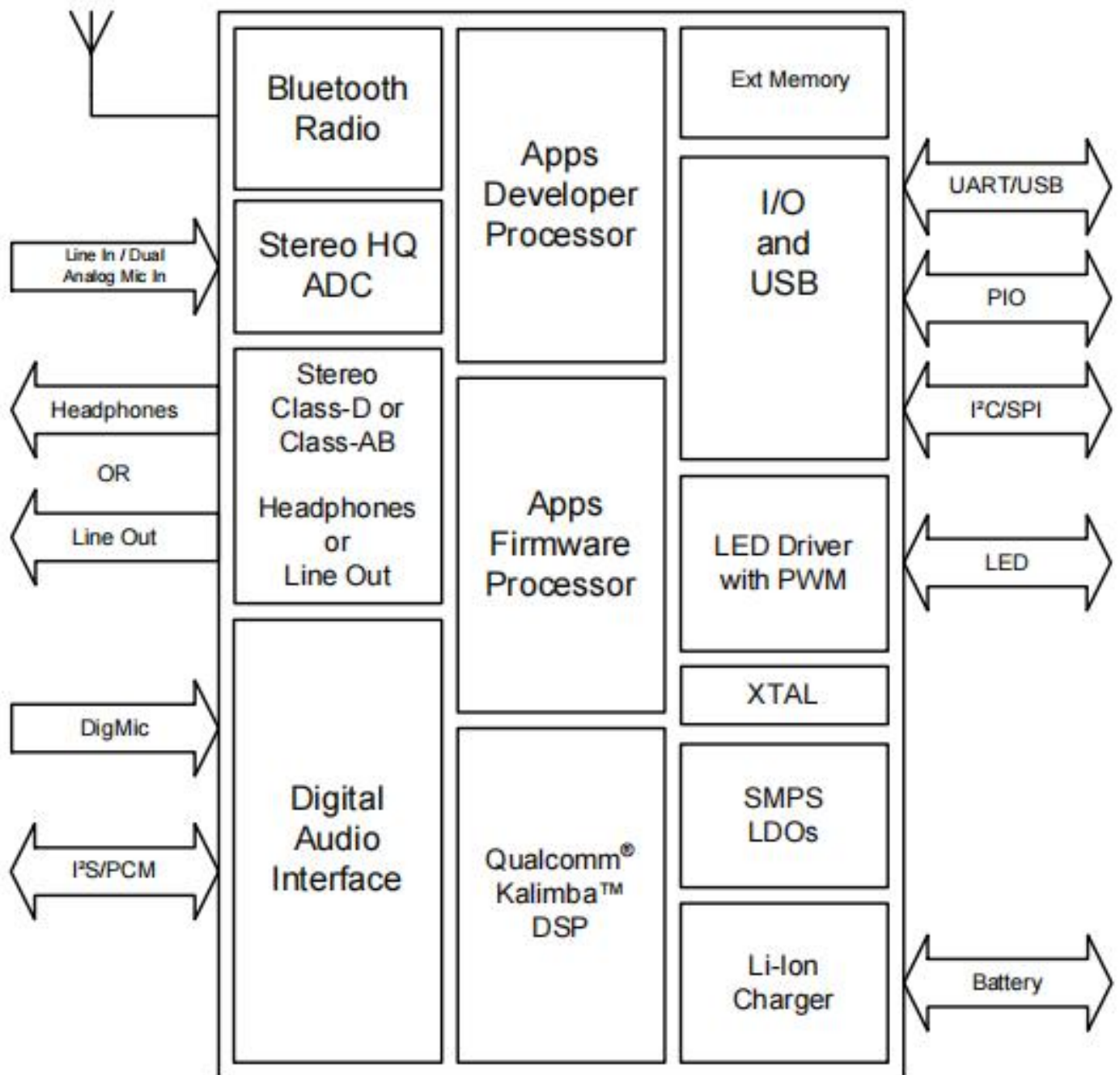
3.9 Peripherals and physical interfaces

- ★ A UART interface
- ★ 2 x Bit Serializers (programmable serial peripheral interface (SPI) and I²C 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

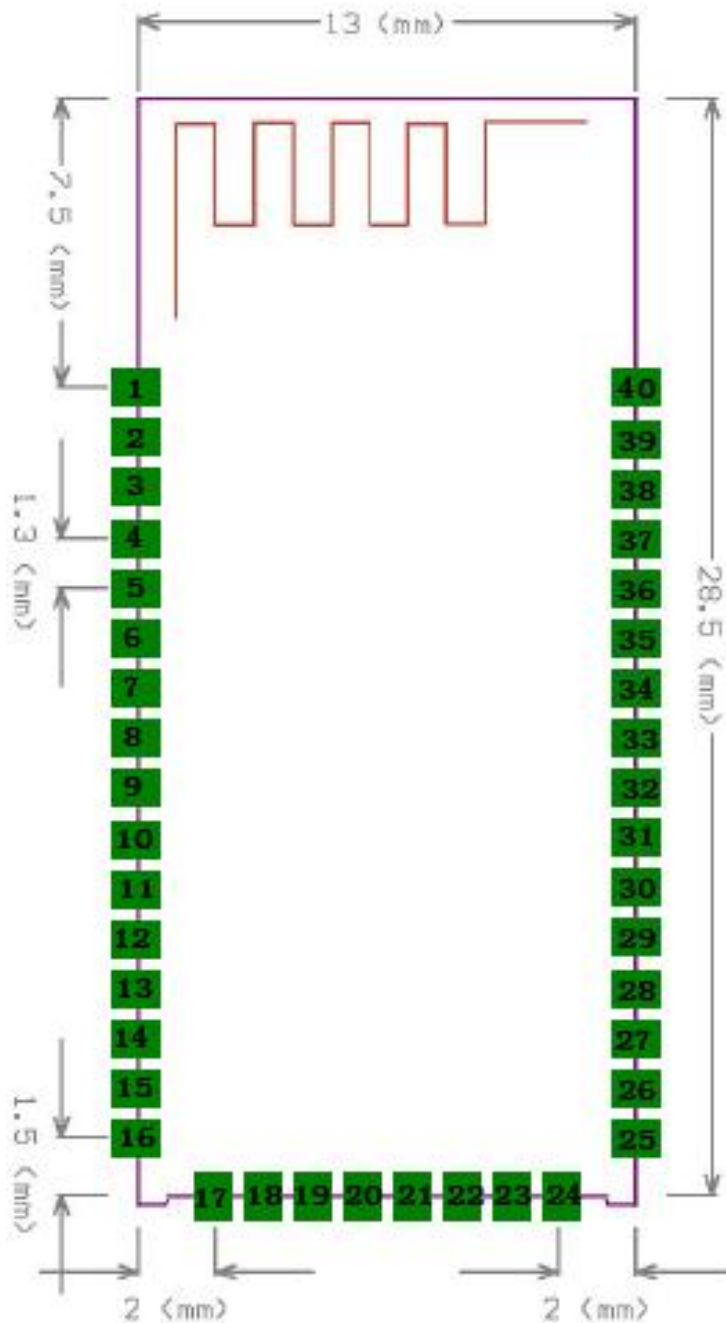
★ Wireless speakers

5 Block Diagram

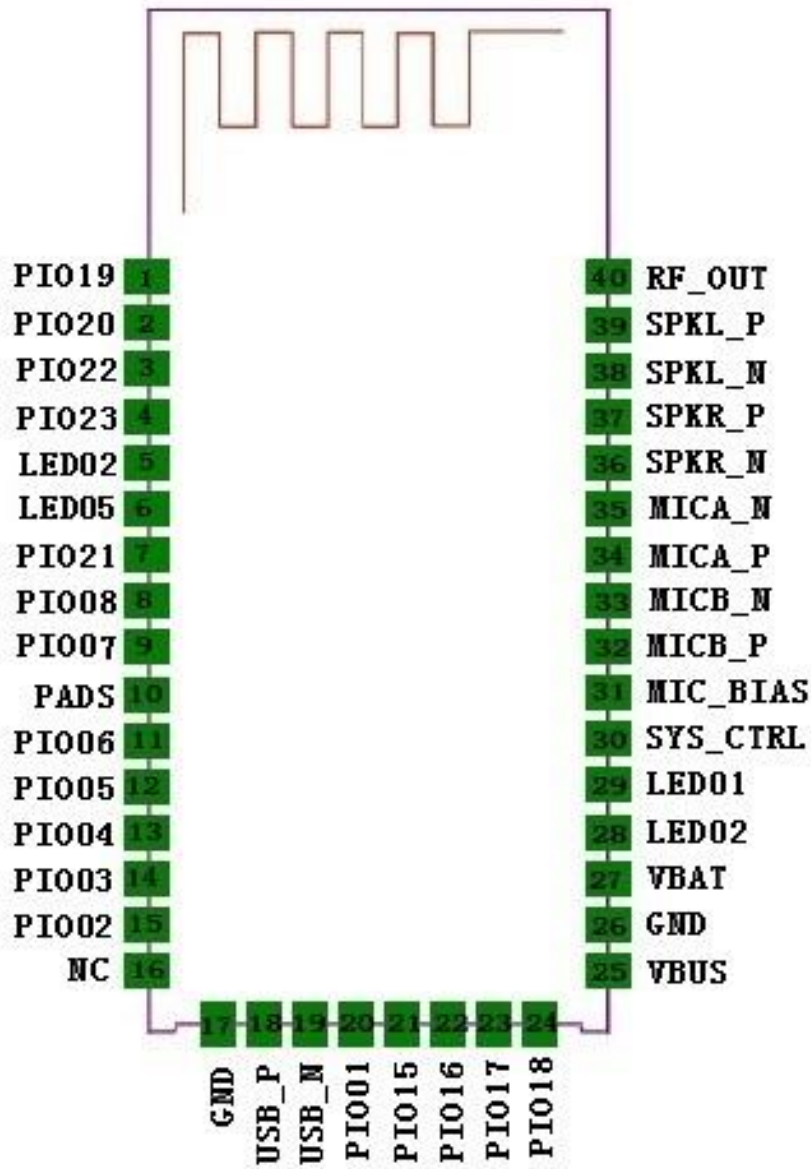


6 Module Package Information

6.1 Pinout Diagram and package dimensions



6.2 Module Pin descriptions

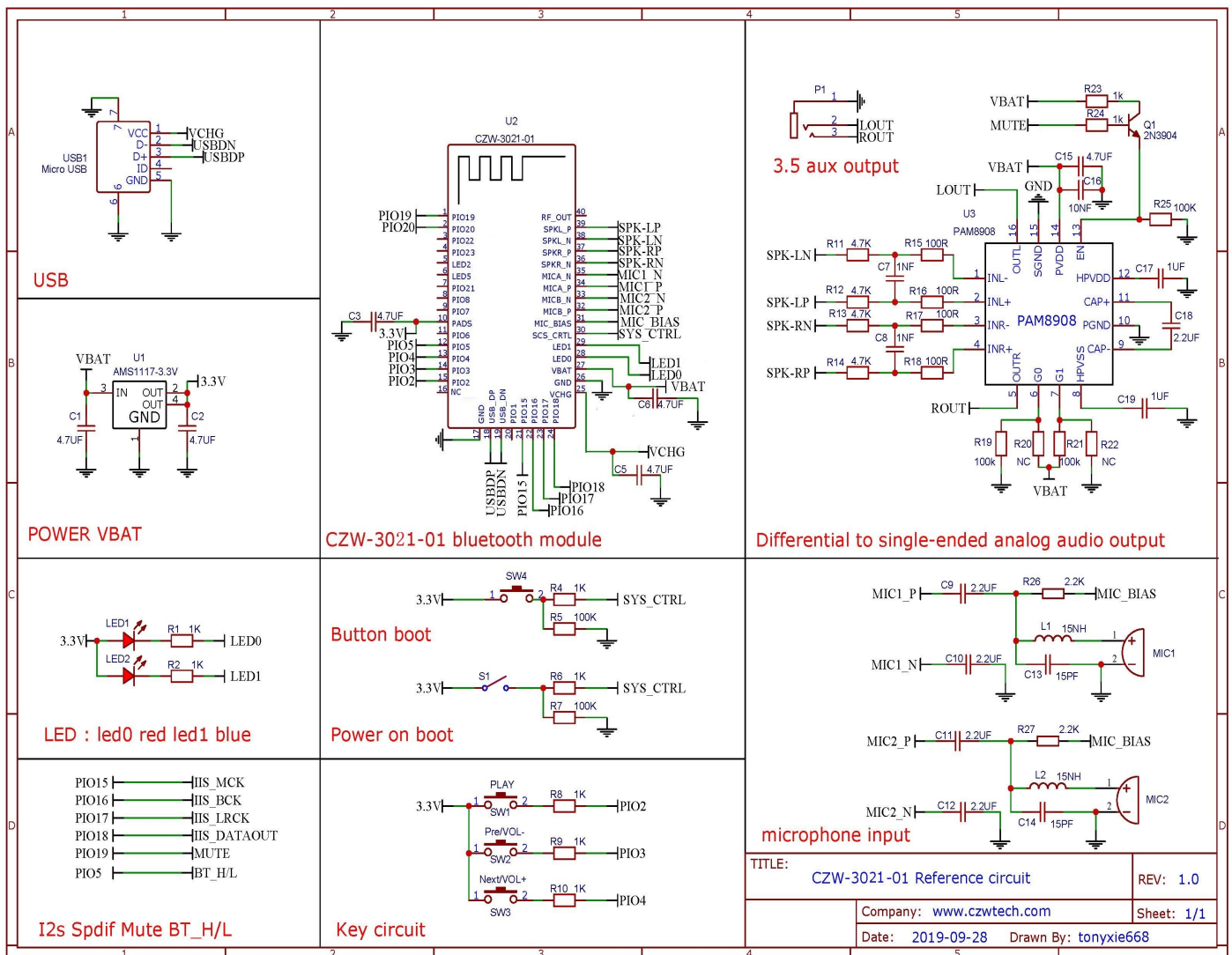


7 Pin Function Description

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, negative. Alternative function: Differential audio line input left, negative
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

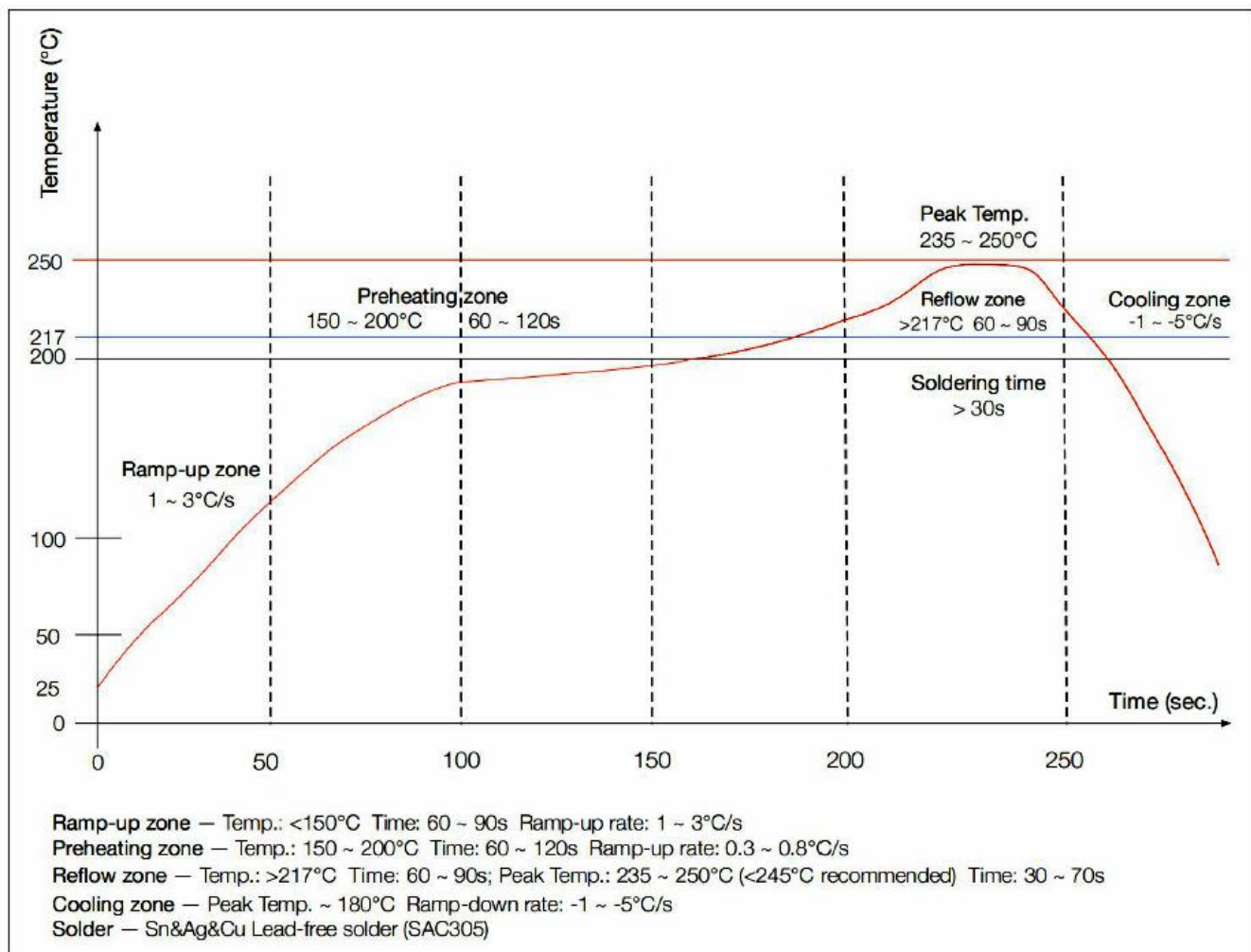
9.1 Absolute Maximum Ratings

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

9.2 Recommended Operating Conditions

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

10 Recommended reflow temperature profile



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

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