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# **Bluetooth Module Datasheet**

## **CZW-5126-02**

**Model: CZW-5126-02**

**Hardware Version: V2.0**

**Release Date: 2019.03.16**

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**Shenzhen**

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## 1 summary

CZW-5126-02 is a Bluetooth module designed by ShenZhen Cheng Zhi Wei Technology Co.,Ltd. using Qualcomm Bluetooth chip qcc5126。

CZW-5126-02 is a Bluetooth, audio and programmable application processor.It includes high-performance, analog, and digital audio codecs, Class-AB and Class-D headphone drivers, advanced power management, Li-ion battery charger, light-emitting diode (LED) drivers, and flexible interfaces including inter<sub>1</sub> integrated circuit sound (I<sup>2</sup>S), universal asynchronous receiver transmitter(UART), and programmable input/output (PIO)。

CZW-5126-02 package is compatible with czw02 series pins, easy replacement and upgrade

## 2 General specifications

Model Name	CZW-5126-02
Package	54 Pin Module
Dimension	13mm x 18mm x 2.4mm
Chipset	QCC5126
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	-96dBm
8DPSK Receive Sensitivity	-89dBm

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## 3 Key Features

### 3.1 Audio subsystem

- ★ Dual 32bit Kalimba audio digital signal processor (DSP) cores with flexible clocking from 2 MHz to 120 MHz to allow optimization and trade-off performance vs. Power consumption
- ★ DSPs execute code from ROM and from program RAM, original equipment manufacturer (OEM) and third party developed features can run from program RAM
- ★ 80 KB program RAM
- ★ 256 KB data RAM
- ★ 5 Mb ROM
- ★ 16 Mb Audio buffer RAM

### 3.2 Application subsystem

- ★ Dual core application subsystem 32/80 MHz operation
- ★ 32- bit Firmware Processor:
- ★ 32- bit Developer Processor:
- ★ Both cores execute code from external flash memory using QSPI clocked at 32 MHz or 80 MHz
- ★ On-chip caches per core allow for optimized performance and power consumption 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

### 3.3 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 Power management
- ★ Integrated power management unit (PMU) to minimize external components
- ★ QCC5126 VFBGA 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)

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### 3.4 Audio engine and digital audio interfaces

- ★ 24-bit I<sup>2</sup>S 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 outputs configurable as differential Class-AB headphone outputs or differential high efficiency Class-D 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.

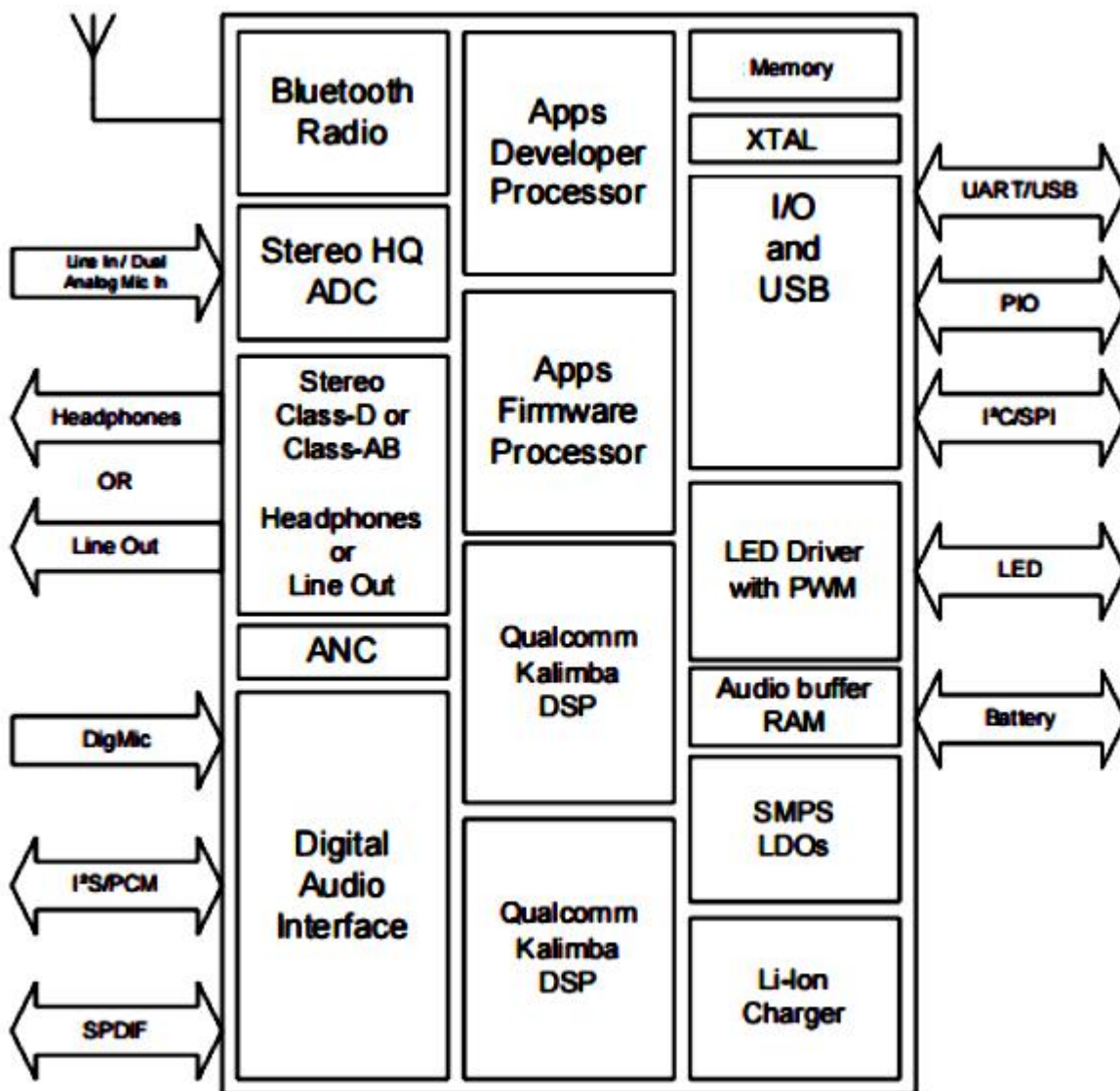
### 3.5 Peripherals and physical interfaces

- ★ A UART interface
- ★ 2 x Bit Serializers (programmable serial peripheral interface (SPI) and I<sup>2</sup>C hardware accelerator)
- ★ 1 x USB interface:
- ★ A secure digital input/output (SDIO) v2.0 compliant Host with 1 port, capable of interfacing to storage device (SD), or multimedia card (MMC) cards
- ★ QSPI NOR flash interface
- ★ Up to 19 PIO and 5 open drain/digital input LED pads with pulse width modulation (PWM)

## 4 Applications

- ★ Wireless speakers
- ★ Wired/wireless stereo headsets/headphones
- ★ Qualcomm True Wireless™ stereo earbuds/speakers

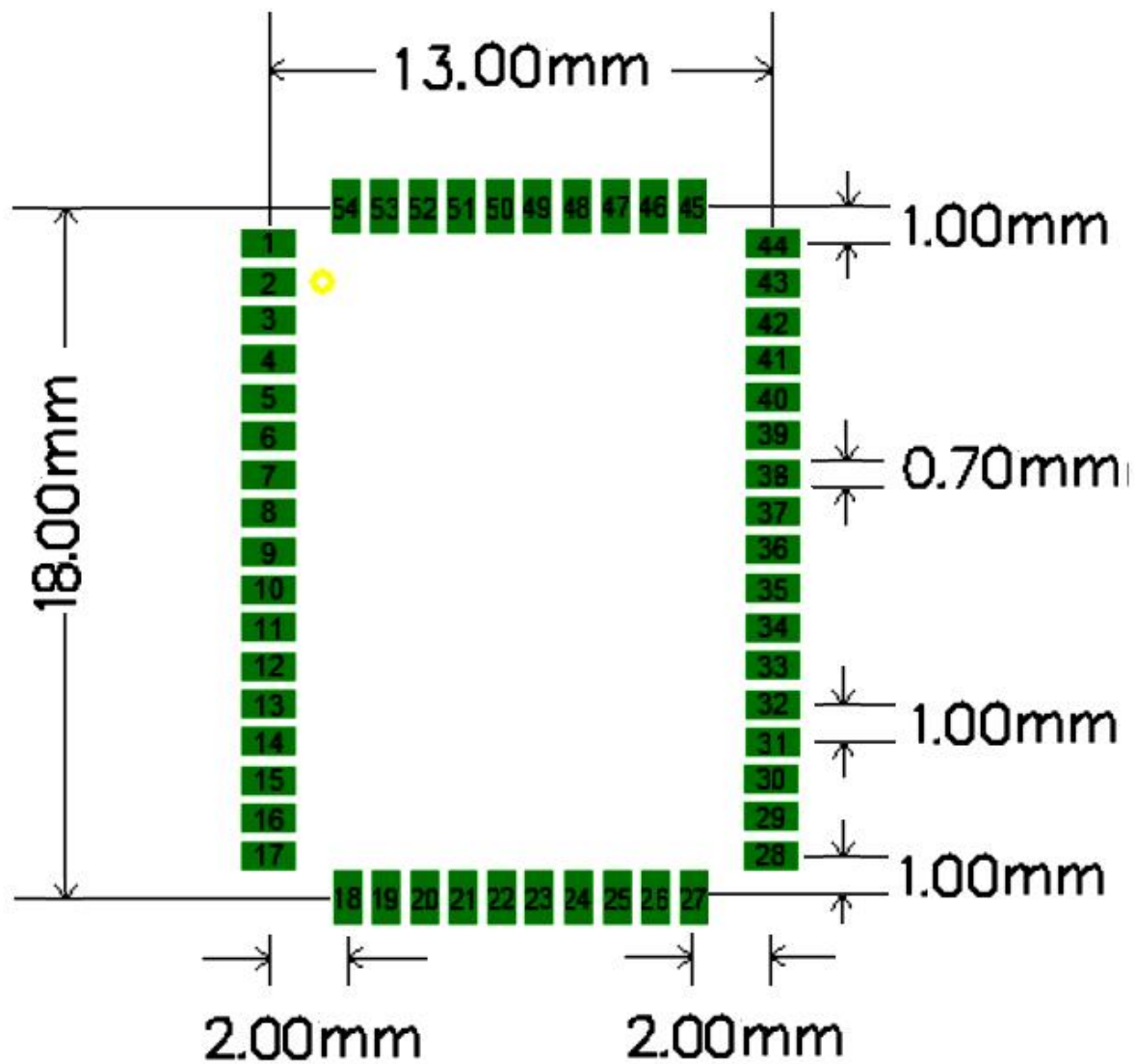
## 5 Block Diagram



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## 6 Module Package Information

### 6.1 Pinout Diagram and package dimensions



## 6.2 Module Pin descriptions

Pin	Function	Pin	Function
1	NC	44	GND
2	PI019	43	MIC1_P
3	PI018	42	MIC1_N
4	PI017	41	MIC2_P
5	PI016	40	MIC2_N
6	PI015	39	MIC_BIAS
7	VBAT_SENSE	38	GND
8	USB_DN	37	SPKL_P
9	USB_DP	36	SPKL_N
10	VCHG	35	SPKR_P
11	VCHG_SENSE	34	SPKR_N
12	CHG_EXT	33	NC
13	SYS_CTRL	32	PI001
14	VBAT	31	PI002
15	GND	30	PI007
16	LED0	29	PI008
17	LED1	28	PI005
18	LED2		
19	LED4		
20	LED5		
21	GND		
22	1V8		
23	VDD_PADS1		
24	VDD_PADS37		
25	PI004		
26	PI003		
27	PI006		
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## 7 Pin Function Description

Pin#	Pin Name	Pin type	Description
1	NC	NC	NC
2	PIO[19]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 19. Alternative function: PCM_DIN[0]
3	PIO[18]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 18. Alternative function: PCM_DOUT[0]
4	PIO[17]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 17. Alternative function: PCM_SYNC
5	PIO[16]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 16. Alternative function: PCM_CLK
6	PIO[15]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 15. Alternative function: MCLK_OUT
7	VBAT_SENSE	Analog	Battery voltage sense input.
8	USB_DN	Digital	USB Full Speed device D- I/O. IEC-61000-4-2 (device level) ESD Protection
9	USB_DP	Digital	USB Full Speed device D+ I/O. IEC-61000-4-2 (device level) ESD Protection
10	VCHG	Supply	Charger input to Bypass regulator.
11	VCHG_SENSE	Analog	Charger input sense pin after external mode sense-resistor. High impedance. NOTE If using internal charger or no charger, connect VCHG_SENSE direct to VCHG.
12	CHG_EXT	Analog	External charger transistor current control. Connect to base of external charger transistor as per application schematic.
13	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
14	VBAT	Supply	Battery voltage input.
15	GND	Ground	Ground
16	LED[0]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.
17	LED[1]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.

Pin#	Pin Name	Pin type	Description
18	LED[2]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.
19	LED[4]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.
20	LED[5]	Analog or digital input/ open drain output.	General-purpose analog/digital input or open drain LED output.
21	GND	Ground	Ground
22	1V8	Supply	1.8V voltage output
23	VDD_PADS_1	Supply	1.8 V/3.3 V PIO supply.
24	VDD_PADS_3、7	Supply	1.8 V/3.3 V PIO supply.
25	PIO[4]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 4. Alternative function: TBR_MOSI[1]
26	PIO[3]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 3. Alternative function: TBR_MISO[2]
27	PIO[6]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 6. Alternative function: TBR_MOSI[0]
28	PIO[5]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 5. Alternative function: TBR_MISO[1]
29	PIO[8]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 8. Alternative function: TBR_CLK
30	PIO[7]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 7. Alternative function: TBR_MISO[0]
31	PIO[2]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 2. Alternative function: TBR_MISO[3]
32	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
33	NC	NC	NC
34	SPKR_N	VDD_AUDIO_HP_SPKR	Headphone/speaker differential right output, negative. Alternative function: Differential right line output, negative
35	SPKR_P	VDD_AUDIO_HP_SPKR	Headphone/speaker differential right output, positive. Alternative function: Differential right line output, positive
36	SPKL_N	VDD_AUDIO_HP_SPKL	Headphone/speaker differential left output, negative. Alternative function: Differential left line output, negative

Pin#	Pin Name	Pin type	Description
37	SPKL_P	VDD_AUDIO_HP_SPKL	Headphone/speaker differential left output, positive. Alternative function: Differential left line output, positive
38	GND	Ground	Ground
39	MIC_BIAS	VDD_AUDIO_1V8	Mic bias output.
40	MIC2_N	VDD_AUDIO_1V8	Microphone differential 2 input, negative. Alternative function: Differential audio line input right, negative
41	MIC2_P	VDD_AUDIO_1V8	Microphone differential 2 input, positive. Alternative function: Differential audio line input right, positive
42	MIC1_N	VDD_AUDIO_1V8	Microphone differential 1 input, negative. Alternative function: Differential audio line input left, negative
43	MIC1_P	VDD_AUDIO_1V8	Microphone differential 1 input, positive. Alternative function: Differential audio line input left, positive
44	GND	Ground	Ground
45	GND	Ground	Ground
46	BT_RF	VDD_BT_RADIO	Bluetooth transmit/receive.
47	GND	Ground	Ground
48	PIO[54]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 54. Alternative function: SDIO_D[0]
49	PIO[53]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 53. Alternative function: SDIO_CMD
50	PIO[52]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 52. Alternative function: SDIO_CLK
51	VDD_RAM	Supply	1.8 V PIO supply for Audio buffer RAM.
52	PIO[61]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 61.
53	PIO[21]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 21. Alternative function: PCM_DOUT[2]
54	PIO[20]	Digital: Bidirectional with programmable strength internal pull- up/pull-down	Programmable I/O line 20. Alternative function: PCM_DOUT[1]

**USB**

**VDD\_RAM**

**POWER\_VBAT**

**LED : led0 red led1 blue**

**Button boot**

**Power on boot**

**I2S Spdif Mute BT\_H/L**

**Key circuit**

**CZW-5126-02 bluetooth module**

**Differential to single-ended analog audio output**

**3.5 aux output**

**microphone input**

TITLE: Sheet_1 CZW-5126-02 Reference circuit		REV: 1.0
Company: www.czwtech.com		Sheet: 1/1
Date: 2019-03-18		Drawn By: tonyxie668

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## 9 Electrical Characteristics

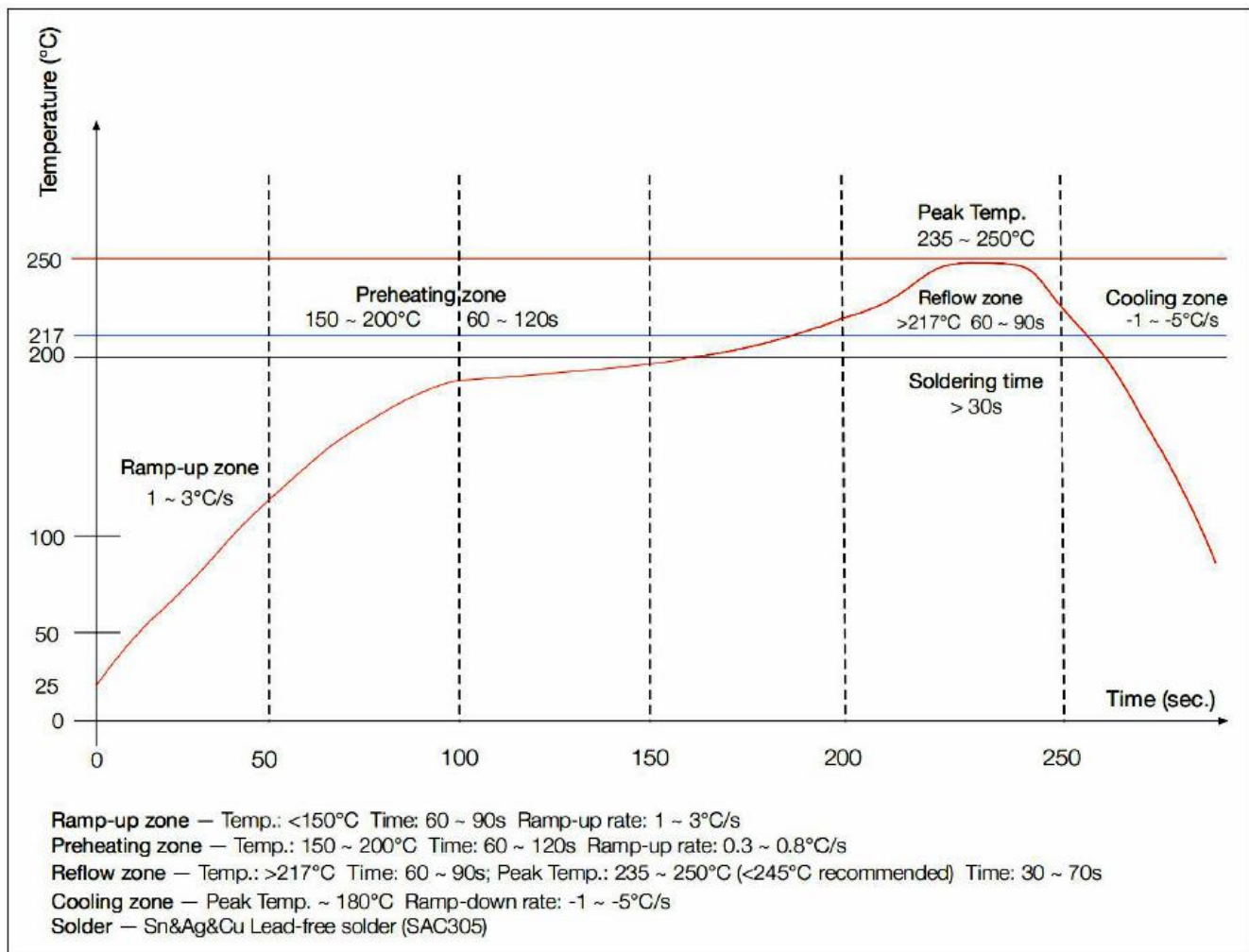
### 9.1 Absolute Maximum Ratings

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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