EWM 105-WBS30S Product Specification Sheet

SoC WiFi/BLE/SLE USB2.0 Wireless Combo Module



成都亿佰特电子科技有限公司
Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Table of contents

SoC WiFi/BLE/SLE USB2.0 Wireless Combo Module 1
Disclaimer and Copyright Notice ..... 错误！未定义书签。
Chapter 1 Overview 4
1.1 Introduction 4
1.2 Features and Functions 4
1.3 Application Scenario 2
Chapter 2 Specifications and Parameters 2
2.1 RF performance 2
2.2 Electrical performance 2
2.3 Hardware Parameter 2
Chapter 3 Mechanical Dimensions and Pin Definitions 3
3.1 EWM105-WBS30S Dimensions and Pin Definitions 3
Chapter 4 Basic Applications 4
4.1 Reference Circuit 4
Chapter 5 Hardware Design 5
Chapter 6 Frequently Asked Questions 6
6.1 Transmission distance is not ideal 6
6.2 Modules are easily damaged ..... 67 .
6.3 Too high error rate 6
Chapter 7 Welding Operation Instructions 7
7.1 Reflow soldering temperature 7
7.2 Reflow soldering profile (Figure) 7
Chapter 8 Related Model 8
Chapter 9 Packaging Methods 8
9.1 EWM105-WBS30S Packaging Method 8
Revision History 9
About Us 9

Copyright © 2012–2025 , Chengdu Ebyte Electronic Technology Co., Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Disclaimer and Copyright Notice

The information contained herein, including the URLs for reference, is subject to change without prior notice. This document is provided "as is" without any warranties, including but not limited to warranties of merchantability, fitness for a particular purpose, and non-infringement, as well as any warranties implied by proposals, specifications, or samples mentioned elsewhere. The company shall not be liable for any claims, including liabilities arising from the use of information in this document that may infringe upon any patent rights. No intellectual property license, either express or implied, is granted herein by estoppel or otherwise.

All test data stated in this document are obtained by Ebyte Laboratory, and actual results may vary slightly.

All trade names, trademarks and registered trademarks mentioned herein are the property of their respective owners.

This product is strictly prohibited from being used in military applications and life safety-related scenarios. The user shall bear full responsibility for any unauthorized use.

Chengdu Ebyte Electronic Technology Co., Ltd. reserves the right of final interpretation.

Notice :

The content of this manual may be modified due to product version upgrades or other reasons. Chengdu Ebyte Electronic Technology Co., Ltd. reserves the right to revise the contents of this manual without prior notice. This manual is intended solely for operational guidance. While every effort has been made to ensure the accuracy of the information herein, the company does not warrant that the content is entirely error-free. All statements, information and recommendations contained in this manual shall not constitute any express or implied warranties whatsoever.

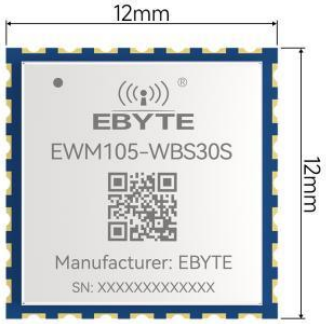
Copyright © 2012–2025 , Chengdu Ebyte Electronic Technology Co., Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Chapter 1 Overview

1.1 Introduction

EWM105-WBS30S module, developed by Chengdu Ebyte Electronics Technology Co., Ltd., is a highly integrated 2.4GHz SoC WiFi6, BLE5.2, and SLE1.0 combo module . It supports a USB 2.0 interface and features small size, abundant resources , high transmission power, fast transmission speed, and strong anti-interference capabilities . The module can be widely used in smart wearables, home automation, home security, personal healthcare, smart appliances, accessories and remote controls, automobiles, lighting, industrial internet, intelligent data acquisition, and intelligent control.



EWM105-WBS30S

1.2 Features and Functions

Starlight (SLE)

- Sparklink Low Energy (SLE) technology
- Supports SLE 1.0
- Supports SLE 1MHz/2MHz/4MHz, with a maximum air interface rate of 12Mbps.
- Supports Polar channel coding.
- Supports SLE gateways

BLE

- Bluetooth Low Energy (BLE)
- Supports BLE 4.0/4.1/4.2/5.0/5.1/5.2/5.4
- Supports speeds of 125Kbps, 500Kbps, 1Mbps, and 2Mbps.
- Supports Class 1
- Supports high power up to 20dBm
- Supports BLE Mesh and BLE gateway.

WiFi

- 1 × 1 2.4GHz band;
- The PHY supports IEEE 802.11b/g/n/ax;
- The MAC supports IEEE 802.11d/e/i/k/v/r/w;
- Supports 802.11n 20MHz/40MHz bandwidth and 802.11ax 20MHz bandwidth;
- Supported maximum speeds: 150 Mbit/s @ HT40 MCS7, 114.7 Mbit/s @ HE20 MCS9
- Built-in PA and LNA, integrated TX/RX switch, Balun, etc.
- Supports STA, AP, and P2P configurations; when used as an AP, it supports up to 8 STAs.
- Supports STA+AP coexistence and STA+P2P coexistence.
- Support A-MPDU, A-MSDU
- Supports Block-ACK
- Supports QoS to meet the service quality requirements of different services.
- Supports WPA/WPA2/WPA3 Personal and WPS 2.0.
- Supports RF self-calibration scheme
- Supports STBC and LDP

peripheral interfaces

- 14 GPIO ports, 2 UART ports, and 1 USB 2.0 port.

Copyright © 2012–2025 , Chengdu Ebyte Electronic Technology Co., Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

- External crystal clock frequencies 24MHz and 40MHz

1.3 Application scenarios

- Smart home and industrial sensors, etc.
- Smart Wearables
- Home security
- Smart home appliances
- Accessories and remote controls
- Wireless sensing
- Intelligent control
- Petroleum, chemical, metallurgy, etc.

Chapter 2 Specifications

2.1 RF performance

Radio frequency projects	Minimum value	Typical value	Maximum value	Unit	Test conditions
Operating frequency band	2400	-	2500	MHz	Frequency points below 2401MHz and above 2483.5MHz cannot meet the radiation requirements of the Radio Regulatory Commission, and the selection of channel frequencies must comply with protocol and regulatory requirements.
WiFi RX Sensitivity	-	-99.4	-97.9	dBm	WIFI RX 11B 1Mbps DSSS PER8% 1024 octet PSDU
WiFi RX Adjacent channel rejection ratio	39	43	-	dB	WIFI RX 11B 1Mbps DSSS Mask margin greater than 5dB
WiFi TX Maximum transmit power	twenty two	twenty three	-	dBm	WIFI TX 11B 1Mbps DSSS PER8% 1024 octet PSDU
WiFi Reference communication distance	-	250	-	m	@EWM105-WBS30S, in a clear, open, unobstructed environment, with an onboard PCB antenna gain of 0.5dBi, antenna height of 1.2m, and transmit power of 20dBm.
	-	400	-	m	@EWM105-WBS30S, in a clear, open, unobstructed environment, with an antenna gain of 5.0 dBi, an antenna height of 1.2 m, and a transmit power of 20 dBm.
BLE RX Sensitivity	-	-99	-97.5	dBm	@BLE 1M, PER<30%
BLE TX Maximum transmit power	19.5	20	-	dBm	@Meets EVM and ACP requirements
BLE Reference communication distance	-	360	-	m	@EWM105-WBS30S, in a clear, open, unobstructed environment, with an onboard PCB antenna gain of 0.5dBi, antenna height of 1.2m, and transmit power of 20dBm.
	-	580	-	m	@EWM105-WBS30S, in a clear, open, unobstructed environment, with an antenna gain of 5.0 dBi, an antenna height of 1.2 m, and a transmit power of 20 dBm.
SLE RX Sensitivity	-	-98.8	-97.3	dBm	@SLE 1M GFSK, PER<10%
SLE TX	19.5	20	-	dBm	@SLE 1M GFSK, meets EVM and ACP requirements.

Copyright © 2012–2025 , Chengdu Ebyte Electronic Technology Co., Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Maximum transmit power					
SLE Reference communication distance	-	360	-	m	@EWM105-WBS30S, in a clear, open, unobstructed environment, with an onboard PCB antenna gain of 0.5dBi, antenna height of 1.2m, and transmit power of 20dBm.
	-	580	-	m	@EWM105-WBS30S, in a clear, open, unobstructed environment, with an antenna gain of 5.0 dBi, an antenna height of 1.2 m, and a transmit power of 20 dBm.

2.2 Electrical performance

Electrical projects	Minimum value	Typical value	Maximum value	Unit	Remark
Operating voltage	3.0	3.3	3.6	V	Output power can be guaranteed with a voltage of ≥3.3V; exceeding 3.6V carries a risk of burnout.
Communication level	-	3.3	-	V	Using 5V TTL levels carries a risk of damage; please use level conversion circuits appropriately.
WiFi TX current	-	500	550	mA	@3.3V instantaneous power consumption, maximum transmit power in WiFi mode, and is related to the matched antenna.
BLE TX current	-	450	500	mA	@3.3V Instantaneous power consumption, maximum transmit power in BLE mode, and dependent on the matched antenna.
SLE TX current	-	450	500	mA	@3.3V Instantaneous power consumption, maximum transmit power in SLE mode, and dependent on the matched antenna.
Operating temperature	-40	-	+85	℃	Industrial-grade design
Operating humidity	10	-	90	%rh	-
Storage temperature	-50	-	+150	℃	-

2.3 Hardware parameters

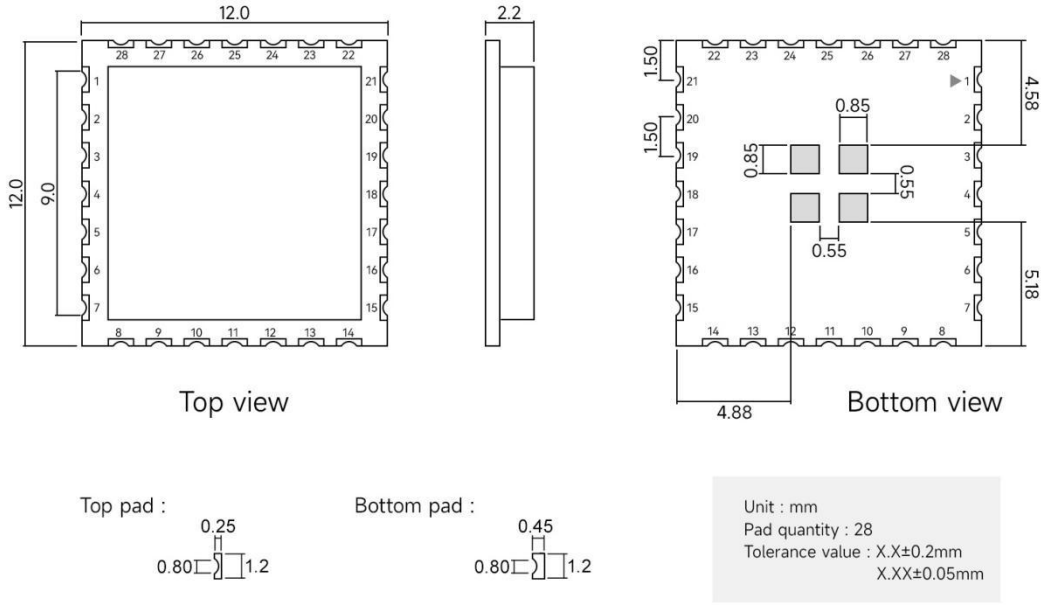
Hardware projects	Parameter value	Unit	Remark
processor	32	Bit	-
Maximum operating frequency	240	MHz	-
Spectrum range	2400~2483.5	MHz	-
Communication interface	UART	-	The communication voltage level is 3.0-3.6V, but 3.3V is recommended to ensure data reliability.
Crystal oscillator frequency	40	MHz	The module is already built in.
Module size	12.0*12.0*2.2(±0.2)	mm	Length * Width * Height
Antenna type	stamp perforation	-	-
Packaging	SMD-28	-	Bottom pad lead-out
Operating temperature	-40~85	℃	-
Storage temperature	-50~150°C, <90%RH	℃	-
weight	0.60	g	±0.1g

Copyright © 2012–2025 , Chengdu Ebyte Electronic Technology Co., Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Chapter 3 Mechanical dimensions and pin definitions

3.1 EWM105-WBS30S Dimensions and Pin Definitions



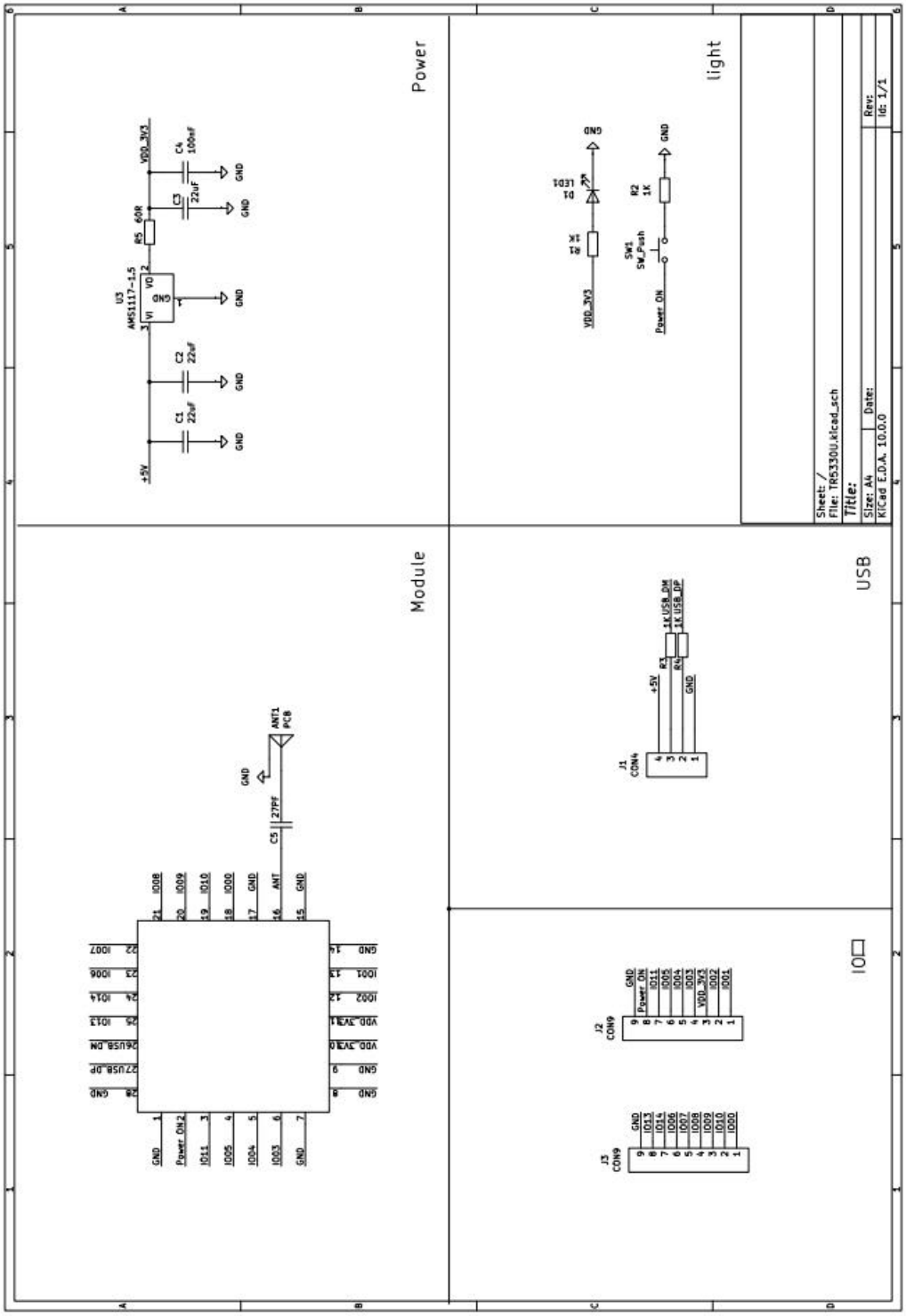
Pin number	name	Function	Remark
1	GND	-	Module GND
2	POWER_ON	-	The module reset pin has an internal pull-up resistor and is active low.
3	GPIO11	I/0	General purpose I/O ports
4	GPIO5	I/0	General purpose I/O ports
5	GPIO4	I/0	General purpose I/O ports
6	GPIO3	I/0	General purpose I/O ports
7	GND	-	Module GND
8	GND	-	Module GND
9	GND	-	Module GND
10	VDD	-	Module power supply, 3.0-3.6V
11	VDD	-	Module power supply, 3.0-3.6V
12	GPIO2	I/0	General purpose I/O ports
13	GPIO1	I/0	General purpose I/O ports
14	GND	-	Module GND
15	GND	-	Module GND
16	ANT	Output	The RF signal output pin needs to be matched with a 50Ω impedance.
17	GND	-	Module GND
18	GPIO0	I/0	General purpose I/O ports
19	GPIO10	I/0	General purpose I/O ports
20	GPIO9	I/0	General purpose I/O ports
21	GPIO8	I/0	General purpose I/O ports
22	GPIO7	I/0	General purpose I/O ports
23	GPIO6	I/0	General purpose I/O ports
24	GPIO14	I/0	General purpose I/O ports
25	GPIO13	I/0	General purpose I/O ports
26	USB_DM	-	Negative data signal, D-
27	USB_DP	-	Positive data signal, D+
28	GND	-	Module GND

Copyright © 2012–2025 , Chengdu Ebyte Electronic Technology Co., Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Chapter 4 Basic Applications

4.1 Reference circuit



Copyright © 2012–2025 , Chengdu Ebyte Electronic Technology Co., Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Chapter 5 Hardware Design

- It is recommended to use a DC regulated power supply to power this module, with the power supply ripple coefficient as small as possible, and the module must be reliably grounded;
- Please ensure the correct connection of the positive and negative power terminals. Reversing the connection may cause permanent damage to the module.
- Please check the power supply and ensure it is within the recommended voltage range. Exceeding the maximum value will cause permanent damage to the module.
- Please check the power supply stability; the voltage should not fluctuate significantly or frequently.
- When designing power supply circuits for modules, it is often recommended to retain a margin of more than 30% to ensure long-term stable operation of the entire unit.
- The module should be kept as far away as possible from power supplies, transformers, high-frequency traces, and other parts with high electromagnetic interference.
- High-frequency digital traces, high-frequency analog traces, and power traces must avoid the area under the module. If it is absolutely necessary to run the traces under the module, assuming the module is soldered on the Top Layer, lay ground copper on the Top Layer of the module contact area (all copper and well grounded), and run the traces close to the digital part of the module on the Bottom Layer .
- Assuming the module is soldered or placed in the Top Layer, it is also wrong to arbitrarily route traces in the Bottom Layer or other layers, as this will affect the module's stray emissions and receiver sensitivity to varying degrees .
- If there are devices around the module that cause significant electromagnetic interference, it will greatly affect the module's performance. Depending on the intensity of the interference, it is recommended to keep them away from the module. If possible, appropriate isolation and shielding can be implemented.
- If there are traces around the module that cause significant electromagnetic interference (high-frequency digital, high-frequency analog, power supply traces), it will greatly affect the module's performance. Depending on the intensity of the interference, it is recommended to keep them away from the module. If possible, appropriate isolation and shielding can be implemented.
- Try to stay away from TTL protocols that also use a physical layer of 2.4GHz, such as USB 3.0;
- The antenna mounting structure has a significant impact on module performance; therefore, it is essential to ensure that the antenna is exposed, ideally vertically upwards. When the module is installed inside the housing, a high-quality antenna extension cable can be used to extend the antenna to the outside of the housing.
- Antennas should never be installed inside a metal casing, as this will greatly reduce the transmission distance.

Copyright © 2012–2025 , Chengdu Ebyte Electronic Technology Co., Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Chapter 6 Frequently Asked Questions

6.1Transmission distance is not ideal

- When there are obstacles in line-of-sight communication, the communication distance will be reduced accordingly ;
- Temperature, humidity, and co-channel interference can all lead to increased packet loss rates in communications .
- The ground absorbs and reflects radio waves, and the test results are poor when the ground is close to the ground .
- Seawater has a strong ability to absorb radio waves, so testing results are poor at the seaside .
- If there are metal objects near the antenna, or if it is placed inside a metal casing, the signal attenuation will be very severe .
- Power register settings are incorrect; air speed is set too high (the higher the air speed, the shorter the distance) .
- At room temperature, the power supply voltage is lower than the recommended value; the lower the voltage, the lower the power output .
- The antenna may be poorly matched with the module or have quality issues.

6.2 Module is easily damaged

- Please check the power supply and ensure it is within the recommended voltage range. Exceeding the maximum value will cause permanent damage to the module .
- Please check the power supply stability; the voltage should not fluctuate significantly or frequently .
- Please ensure anti-static operation during installation and use, as high-frequency devices are sensitive to electrostatic discharge .
- Please ensure that the humidity is not too high during installation and use, as some components are humidity-sensitive .
- Unless there are special requirements, it is not recommended to use it at excessively high or low temperatures.

6.3 Too high error rate

- If there is interference from a co-channel signal nearby, move away from the source of interference or change the frequency or channel to avoid the interference.
- An inadequate power supply can also cause garbled characters, so it is essential to ensure the reliability of the power supply.
- Poor quality or excessive length of extension lines or feeders can also lead to a high bit error rate.

Copyright © 2012–2025 , Chengdu Ebyte Electronic Technology Co., Ltd.

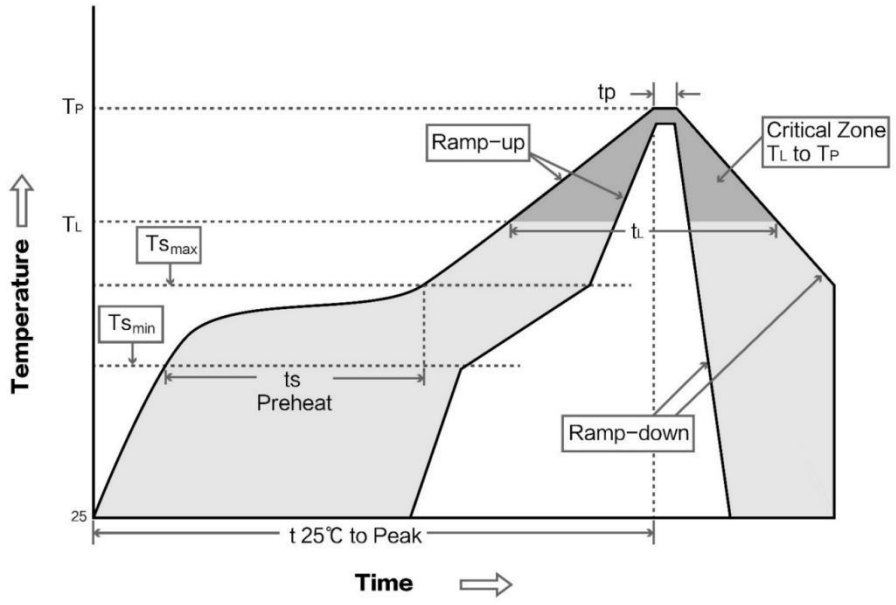
Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Chapter 7 Welding Operation Instructions

7.1 Reflow soldering temperature

Profile Feature	Curve characteristics	Sn-Pb Assembly	Pb-Free Assembly
Solder Paste	Solder paste	Sn63/Pb37	Sn96.5/Ag3/Cu0.5
Preheat Temperature min (Tsmin)	Minimum preheating temperature	100℃	150℃
Preheat temperature max (Tsmax)	Maximum preheating temperature	150℃	200℃
Preheat Time (Tsmin to Tsmax)(ts)	preheating time	60-120 sec	60-120 sec
Average ramp-up rate(Tsmax to Tp)	Average rate of ascent	3℃/second max	3℃/second max
Liquidous Temperature (TL)	Liquid phase temperature	183℃	217℃
Time(tL)Maintained Above(TL)	Time above the liquidus line	60-90 sec	30-90 sec
Peak temperature (Tp)	Peak temperature	220-235℃	230-250℃
Aveage ramp-down rate（Tp to Tsmax）	Average rate of descent	6℃/second max	6℃/second max
Time 25℃ to peak temperature	Time from 25℃ to peak temperature	6 minutes max	8 minutes max

7.2 Reflow Soldering Profile



Copyright © 2012–2025 , Chengdu Ebyte Electronic Technology Co., Ltd.

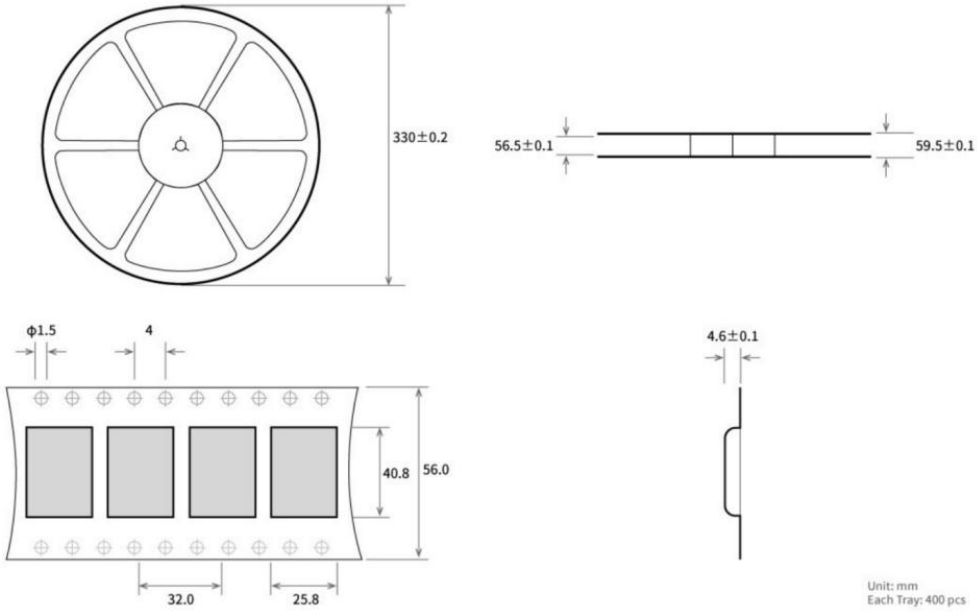
Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Chapter 8 Related Models

Product Model	Chip solutions	Operating frequency Hz	Transmit power dBm	Communication interface	Support Protocol	Product Dimensions mm	Antenna type	Features
E105-BS21	-	2.4G	6	UART	SLE1.0	25.5 * 18.0	PCB	Star Flash Serial port pass-through
E105-BS21X	-	2.4G	6	UART	SLE1.0	19.2 * 18.0	PIPX	Star Flash Serial port pass-through

Chapter 9 Packaging Methods

9.1 Packaging method for EWM105-WBS30S



Copyright © 2012–2025 , Chengdu Ebyte Electronic Technology Co., Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Revision History

Version	Revision Date	Revision Notes	Maintained by
1.0	2026-03-20	Initial version	Lan
1.1	2026-07-07	Modify hardware parameters	Lan

About Us

Technical support: service@cdebyte.com
Documents and RF Setting download link: www.cdebyte.com
Thank you for using Ebyte products! Please contact us with any questions or suggestions: info@cdebyte.com
---
Web: www.cdebyte.com
Address: B5 Mould Park, 199# Xiqu Ave, High-tech District, Sichuan, China

成都亿佰特电子科技有限公司
Chengdu Ebyte Electronic Technology Co.,Ltd.

Copyright © 2012–2025 , Chengdu Ebyte Electronic Technology Co., Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000