E103-W07 User Manual

WIFI MESH



Chengdu Ebyte Electronic Technology Co.,Ltd.

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

Contents

目录

WIFI MESH....1
Disclaimer....2
1 Introduction....3
2 Electrical characteristics....3
2.1 Absolute maximum ratings....3
3 Hardware description....4
3.1 Mechanical size and pin definition....4
3.2 Mechanical size and pin definition....7
4 Detailed function....11
4.1 The term....11
Node:....11
4.2 Tree topology....11
4.4 Mesh networking....12
4.4.1 Automatic networking....12
4.4.2 Manual networking....12
4.5 Networking with and without routers....12
4.6 MESH data flow....13
4.7 MQTT....13
4.7.1 Quality Service Level QoS....13
4.7.2 Quality Service Level QoS....13
5 AT Command....14
5.1 Constraints....14
5.2 Error code....14
5.5.10 +MEDAT report Mesh network data....22
5.6 TCP/IP communication....23
5.6.1 AT+CIFSR query ROOT node IP address....23
5.6.5 AT+CIPSEND send TCP UDP data....26
5.6.7 +IPD receive TCP UDP data....26
5.7 MQTT communication....27
5.7.8 +MQTTSUBRECV MQTT receive data....29
6 Quick guide....30
6.1 Module power up....30
6.2 Module preparation is complete....30
6.3 MESH networking....31
6.3.1 With routing, manual networking....31
6.3.2 Send and receive data....31
6.4 Socket communication....32
6.4.1 TCP Client....33
6.4.2 TCP Server....33
6.4.3 Socket communication....33
6.5 Mqtt communication....34
6.5.1 Configure, connect....34
6.5.2 Subscribe to topics....34
6.5.3 Release the news....34
7 Common problems....35
7.1 Transmission distance is not ideal....35
7.2 Module is easily damaged....35
7.3 Bit error rate is too high....35
8 Welding operation guidance....35
8.1 Reflow temperature....35
8.2 Reflow soldering curve....36
9 Disclaimer....36
Revision history....37
About us....37

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

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

Disclaimer

EBYTE reserves all rights to this document and the information contained herein. Products, names, logos and designs described herein may in whole or in part be subject to intellectual property rights. Reproduction, use, modification or disclosure to third parties of this document or any part thereof without the express permission of EBYTE is strictly prohibited.

The information contained herein is provided "as is" and EBYTE assumes no liability for the use of the information. No warranty, either express or implied, is given, including but not limited, with respect to the accuracy, correctness, reliability and fitness for a particular purpose of the information. This document may be revised by EBYTE at any time. For most recent documents, visit www.ebyte.com.

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

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

1 Introduction

1.1 Brief Introduction



E103-W07 is a WIFI MESH module based on the ESP32-S2 chip solution. E103-W07 is a set of network protocols based on Wi-Fi protocol. ESP-MESH allows a large number of devices (hereinafter referred to as nodes) distributed in a large area (indoor and outdoor) to be connected to each other in the same WLAN (wireless local area network). E103-W07 has the characteristics of self-organizing and self-repairing, which means that the mesh network can be independently constructed and maintained.

1.2 Features

- Support AT commands;
- Support serial communication and flow control. The baud rate supports up to 128000;
- Support WIFI MESH;
- Up to 1000 MESH nodes;
- Support custom MESH roles;
- Support automatic and manual networking;
- Support routing networking and non-routing networking;
- Support configuration of MESH network capacity
- Support 1 TCP Server, maximum 8 connections;
- Support TCP Client, UDP communication, up to 8 Sockets, and can coexist;
- Support TCP Server, TCP Client, UDP coexistence;
- Support MQTT V3.1.1.
- Intelligent street lamp.

2 Electrical characteristics

2.1 Absolute maximum ratings

Symbol	Parameter	Minimum	Max	Remark
VDD33	Power pin voltage	–0.3	3.6	V
TSTORE	Storage temperature	–40	85	℃

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

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

2.2 Recommended working conditions

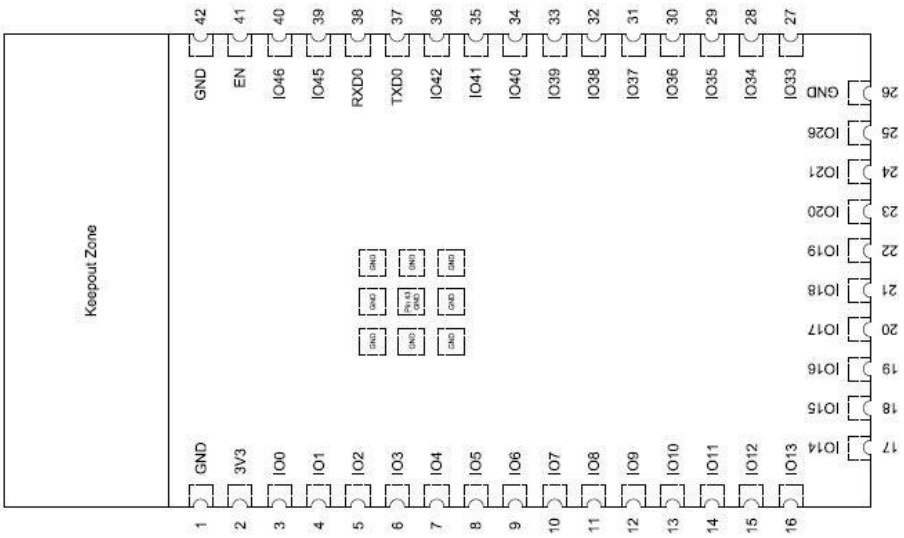
Symbol	Main parameter	Performance			Remark
		Min	Type	Max	
VDD33	Power pin voltage	3.0	3.3	3.6	V
IVDD	Supply current of external power supply	0.5	—	—	A
T	Recommended working tempTransmit Powererature	–40	—	85	°C
Humidity	humidity	—	85	—	%RH
Imax	Peak current	—	—	400	mA
I	Average current	—	—	100	mA
P	Transmit Power	—	20	—	dBm

2.3 RF characteristics

Working channel center frequency range		**2412~2484MHz**
Wi-Fi		Protocol IEEE802.11b/g/n
Antenna type		PCB,IPEX Antenna
Distance	With router @Mercury MW305R	200m
	Between modules	100m

3 Hardware description

3.1 Mechanical size and pin definition



Pin layout (top view)

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

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

Item	Pin No.	type	Features
GND	1	P	Grounded
3V3	2	P	Power supply
IO0	3	I/O/T	RTC_GPIO0,GPIO0
IO1	4	I/O/T	Restore, the pin is internally pulled up. Used to restore factory settings. Pin to ground 10ms, and then to VCC 10ms, reset the parameters.
IO2	5	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO3	6	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO4	7	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO5	8	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO6	9	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO7	10	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO8	11	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO9	12	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO10	13	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO11	14	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO12	15	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO13	16	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO14	17	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO15	18	I/O/T	U0RTS
IO16	19	I/O/T	U0CTS
IO17	20	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO18	21	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO19	22	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO20	23	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"

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

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

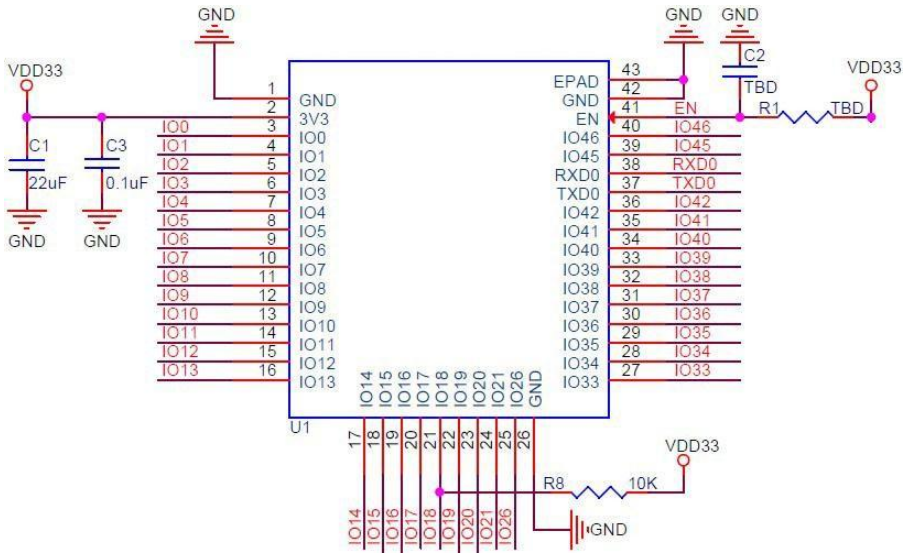
IO21	24	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO26	25	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
GND	26	P	Grounded
IO33	27	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO34	28	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO35	29	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO36	30	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO37	31	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO38	32	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO39	33	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO40	34	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO41	35	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO42	36	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
TXD0	37	I/O/T	U0TXD
RXD0	38	I/O/T	U0RXD
IO45	39	I/O/T	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
IO46	40	I	Unused. For pin definition, please refer to "ESP32-S2-WROOM Technical Specification.pdf"
EN	41	I	High level: chip enable; Low level: the chip is off; Be careful not to let the EN pin float.
GND	42	P	Grounded

Minimal schematic diagram

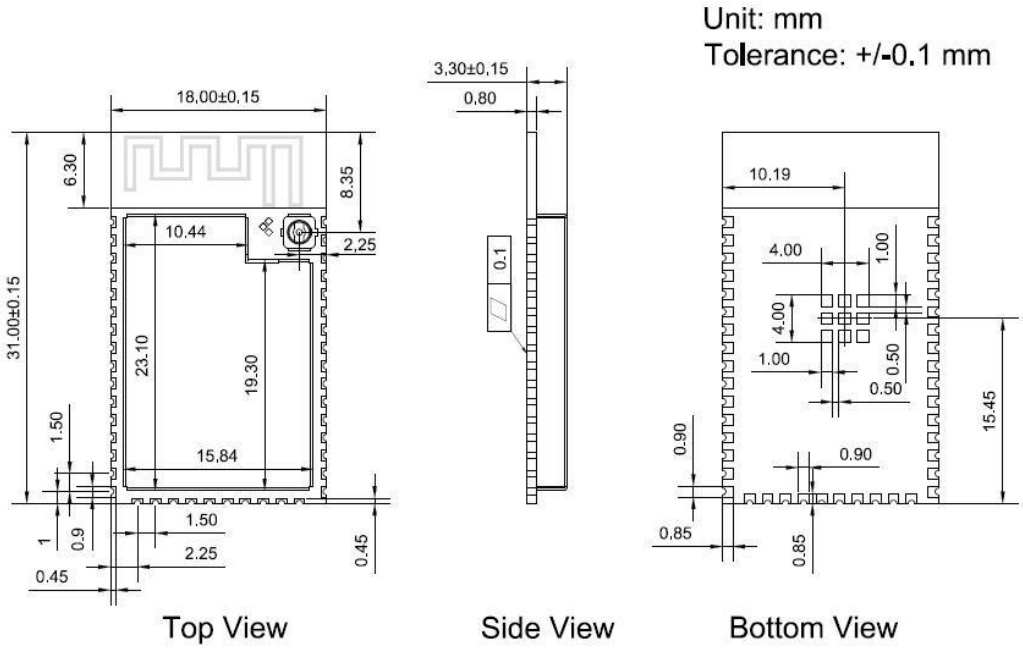
Copyright ©2012–2025，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

3.2 Mechanical size and pin definition

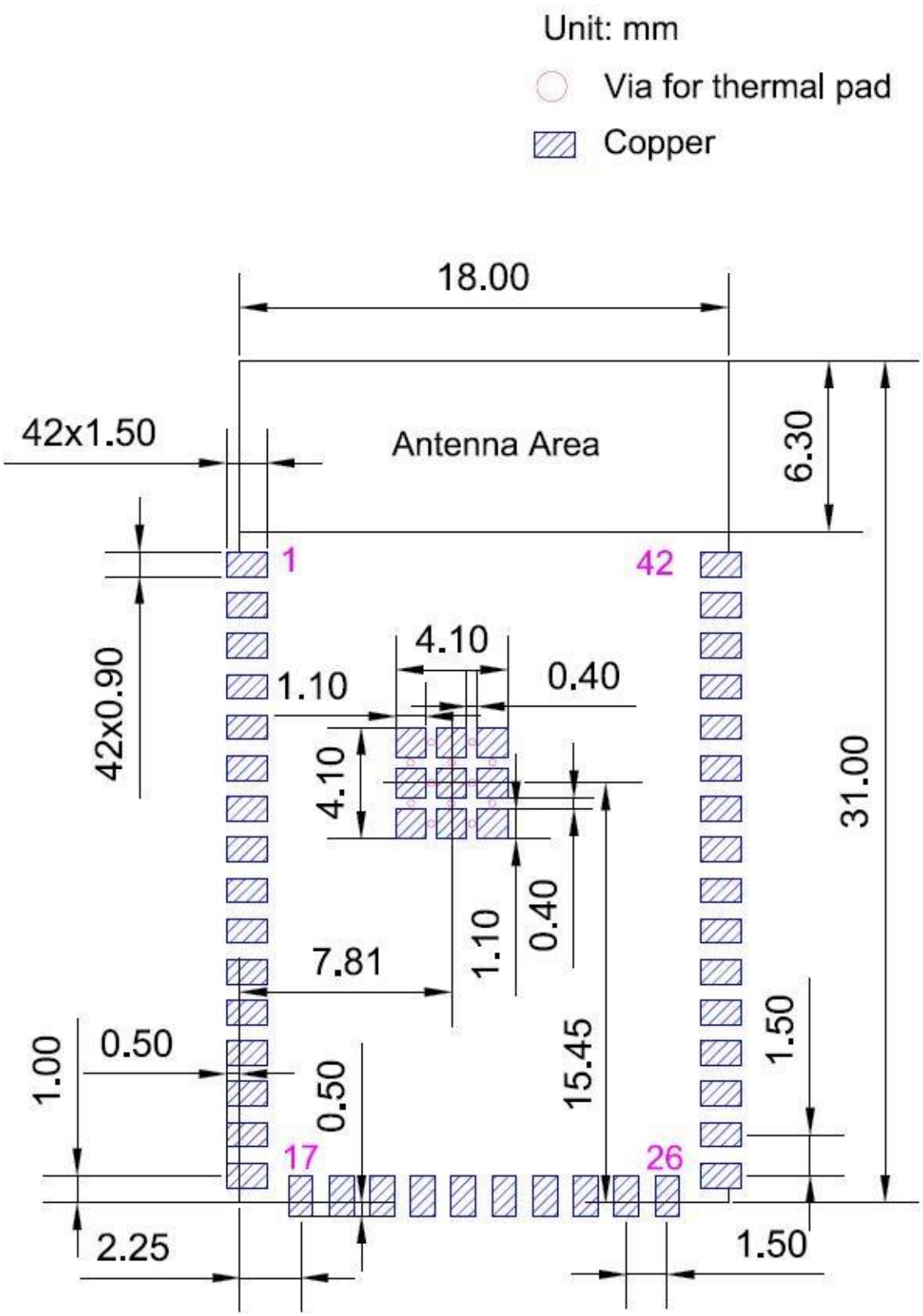


3.3 Module size



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

3.4 PCB package pattern



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

4 Detailed function

4.1 The term

Node:

Any device that is or can be part of the ESP-MESH network.

ROOT Node:

The node at the top of the network. The Mesh network has one and only one root node.

Child Node:

If node X is connected to node Y, and X is farther from the root node than Y (the number of connections crossed is more), then X is called a child node of Y.

Node address:

The MESH network uses MAC address + IP address port. Any node has two MAC addresses: AP and STA.

The MESH network address is the AP MAC address, and the MAC address of the parent node is the AP's MAC address.

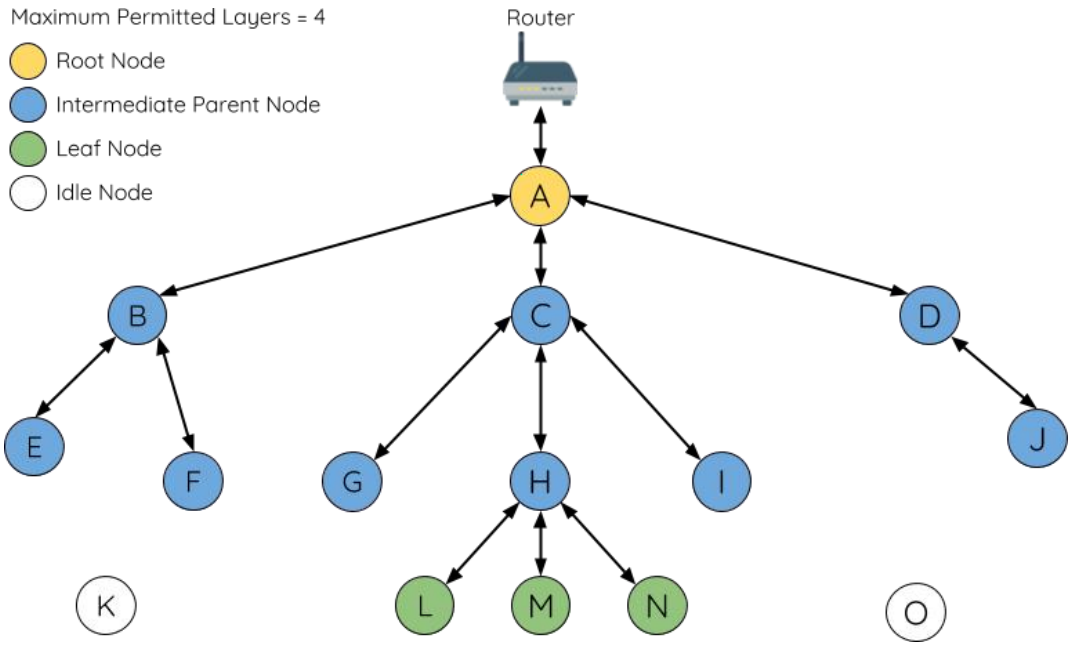
The child node address is the STA MAC address.

The MAC address of the STA is stored in the Mesh routing table;Only the root node has an IP address, and other nodes have no IP addresses.

MESH ID:

MESH ID is the identification of the Mesh network.

4.2 Tree topology



Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

4.3 Node type selection

E104-W07 supports three types of nodes: unconnected nodes, root nodes, ordinary nodes, and leaf nodes.

If the module uses the default node type (node not connected to the network) MESH network is started, the module automatically enumerates to generate the root node. If the specified module is the root node, the module will give up automatic enumeration.

The module automatically enumerates the root node, based on the strongest router signal obtained from all nodes, which is the root node.

In the MESH network, only the root node can access the socket master. Other nodes communicate with the external network and can use the root node to forward data.

Leaf nodes are only generated during automatic networking. Manually specifying the node type does not support specifying as a leaf node.

4.4 Mesh networking

The module supports two networking modes: manual networking and automatic networking.

4.4.1 Automatic networking

Automatic networking, without user intervention, automatically enumerate ROOT nodes after the module is powered on, and automatically select the parent node. The user only needs to communicate after the networking is completed. Automatic networking can avoid too deep network layers and too complicated routing.

In automatic networking, the node type can only be configured as an idle node.

4.4.2 Manual networking

For manual networking, users can specify the modules as ROOT nodes and ordinary nodes.

Note: Before the MESH network is officially built, it must be ensured that all nodes in the network have the same configuration. Each node must be configured with the same MESH ID, router configuration, and softAP configuration.

4.5 Networking with and without routers

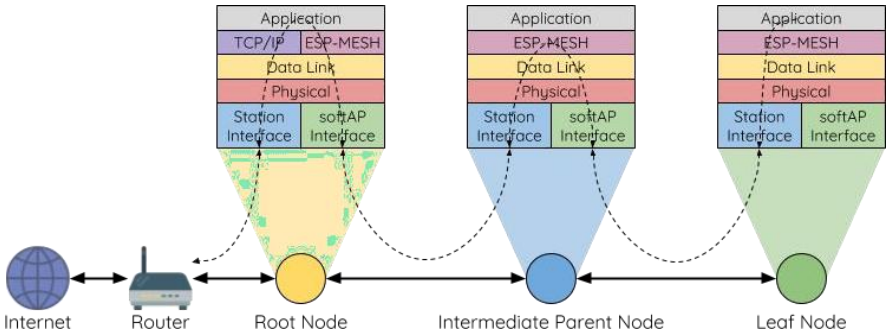
The so-called router network refers to whether the router is connected according to the node.

The module supports these two networking modes. No routing network does not need to specify the router ssid, password. But the channel must be specified. If there is a router network, the channel may not be specified. If the specified channel is different from the routing channel, or the channel is not specified, then the root node needs to scan the full channel, so that it takes longer to connect to the router; if the correct channel is specified, join the router Time will be soon.

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

4.6 MESH data flow



In the MESH grid, only the root node has the TCP/IP protocol stack, which means that only the base node can connect to the Internet for communication. Only the root node supports TCP, UDP, and MQTT.

In use, ordinary nodes can send data to the root node, and the root node forwards the data to the Internet.

4.7 MQTT

For more MQTT knowledge, please refer to the Chinese website: http://mqtt.p2hp.com/ .

4.7.1 Quality Service Level QoS

- QoS 0：Distribute once at most. The performance of the underlying network since the message was distributed. The recipient can only receive the message once, or not even once.
- QoS 1：Distribute at least once. The quality of service in this case ensures that the message reaches the recipient at least once.
- QoS 2： is distributed exactly once. This is the highest quality of service and is used in situations where lost and duplicate messages are unacceptable. This quality of service will increase overhead.

4.7.2 Quality Service Level QoS

The client and server can store the session state so that they can reliably deliver messages across a series of network connections. This is used to control the life cycle of the session state.

If CleanSession is set to 0, the server must resume communication with the client according to the current session state (the client's unique identifier is used as the session identifier). If there is no drawing related to the unique identifier of the client, the server must create a new session. The client and server must store the session after disconnecting [MQTT-3.1.2-4]. When the session with CleanSession as 0 is disconnected, the server must also store all QoS1 and QoS2 messages related to the client's subscription as part of the session state [MQTT-3.1.2-5]. You can also choose to store the QoS0 message.

If CleanSession is set to 1, the client and server must disconnect the previous session and start a new session. The session exists as long as the network connection exists. The state data of a session must not be reused by subsequent sessions [MQTT-3.1.2-6].

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

5 AT Command

5.1 Constraints

1. AT command is character content;
2. The AT command ends with "\r\n" (the AT command will not be described in the following section).
3. AT commands do not distinguish between upper and lower case, but the parameters are case-sensitive.
4. AT command execution error return format: +ERROR:<CODE>\r\n
5. [params] are required parameters, and <params> are optional parameters.
6. All character parameters must use "".

5.2 Error code

CODE	Description	Possible Causes	Solution
0	Instruction does not exist		Confirm whether the instruction is supported
1	Parameter length error		Check parameter length
2	Wrong number of parameters		Check the number of parameters
3	Parameter error		Check parameter content
4	Null pointer		
5	Limited resources		
6	The queue is empty		
7	Incomplete initialization		
8	Parameters not configured		
9	wrong address		
100	The operation is not supported		
101	AT address does not exist		
102	AT command format error		
300	Mesh is not initialized		
301	Mesh startup error	Incorrect parameter settings	
302	Mesh has been successfully connected		
303	Mesh is not connected		
304	Node type configuration error		
305	Mesh is not connected	This command is mainly returned in TCP UDP MQTT	
400	Flash operation error		
401	Factory default parameters are		

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

	damaged		
402	Flash is full		
403	The record was not found		
404			
405	Flash update error		
405	Does not support saving this record		
600	Failed to create socket		
601	Connection failed		
602	Failed to bind local port		
603	Failed to listen to the local port		
604	Tcp server already exists	Only support the creation of a tcp server	
605	Link id has been used		
606	Error while accepting remote connection		
607	Connection does not exist		
608	Reconnect more than 5 times		
700	Mqtt connection error	Parameter problem	
701	The current mqtt has been disconnected		

5.3 Status return

Node connected to parent node		
instruction	+ME:"PARENT CONNECT", ["mac"]	
parameter	Mac:	Parent node MAC address
Description	ROOT nodes without routing will not output this state;	
Disconnect the parent node		
instruction	+ME:"PARENT DISCONNECT", ["mac"]	
parameter	Mac	Parent node MAC address
Description	no	
There are child nodes connected		
instruction	+ME:"CHILD CONNECT", ["mac"]	
parameter	Mac	MAC address of child node
Description	no	
Child node disconnected		
instruction	+ME:"CHILD DISCONNECT", ["mac"]	
parameter	Mac	MAC address of child node
Description	no	
Get IP successfully		

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

instruction	+ME:"IP", ["IP"]	
parameter	**IP**	IP address assigned by the router
Description	1. Only ROOT nodes return; 2. It means that the Root node is successfully connected to the router, after which tcp, udp, and mqtt communication can be carried out.	
There is a new TCP client connected to the local service		
instruction	+IP:"CONNECT", [linkid], ["IP"], [port]	
parameter	LinkID	Connection id. Used to mark the socket link
	IP	Remote IP. "192.168.0.2"
	port	Remote port
Description	Create TCP server locally, output when remote tcp clinet connects;	
TCP connection lost		
instruction	+IP:"DISCONNECT", [linkId]	
parameter	LinkID	Connection ID
Description	1. Output when remote TCP client and local client are disconnected	
Mqtt connects to Broker		
instruction	+MQTT:CONNECT	
parameter	no	
Description	no	
Mqtt disconnect		
instruction	+MQTT:DISCONNECT	
parameter	no	
Description	no	

5.4 Basic instructions

5.4.1 AT test

Instruction	**Answer**
AT	+OK
Description: None	

5.4.2 AT+RESET restart

Instruction	**Answer**
AT+RESET	+OK
Description: effective immediately	

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

5.4.3 AT+RESTORE restore factory settings

Instruction	Answer
AT+RESTORE	+OK
Description: After resetting, it will restart automatically; During the process of restoring the factory settings, any form of reset is prohibited, and the power off before the operation is completed is prohibited.	

5.4.4 AT+BAUD serial port baud rate

Instruction		Answer
Inquire	AT+BAUD?	+ BAUD :[para]
Set up	AT+BAUD=[para]	+OK: success +ERR:[NUM]: Error
parameter	Maximum support 12800bps	
Description	Restart to take effect	
Example	AT+BAUD=115200. Set the baud rate to 115200	

5.4.5 AT+UART UART Settings

Instruction			Answer
Inquire	AT+UART?		+UART: [baud],[databits],[parity],[stopbits],[hw]
Set up	AT+UART=[baud],[databits],[parity],[stopbits],[hw]		+OK: success +ERR:[NUM]: Error
parameter		parameter	description
	baud	1200 ~5M (default 115200)	UART baud rate
	databits	0	5 bits
		1	6 bits
		2	7 bits
		3 (default)	8 bits
	parity	0 (default)	No verification
		2	Even parity
		3	Odd parity
	stopbits	1 (default)	Stop bit is 1bit
		2	The stop bit is 1.5bits
		3	Stop bit is 2bits
	HW	0 (default)	not support
		3	Hardware flow control
Description	Restart to take effect		

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

Example	AT+UART=115200,3,0,1,0

5.5 Mesh network

5.5.1 AT+ROUTER router parameters

Instruction			Answer
Inquire	AT+ROUTER?		+ROUTER: ["ssid"],["password"],[routerswitchdisable],["bssid"]
Set up	AT+ROUTER=["ssid"],["password"], <routerswitchdisable>,<"bssid">		+OK success +ERR:[NUM] error
Parameter	ssid		WIFI name. The maximum length of the string is 31 bytes
	password		WIFI password. The string length is 8~63 bytes
	routerswitchdisable	0	Enable switching
		1 (default)	No switching
		-	——
	bssid		Router MAC address. Fixed to 6 bytes
Description	1. Restart to take effect, save when power off; 2. The default value is all empty, or 0 3. If the router SSID is hidden, the BSSID must be specified; 4. In the actual application scenario, there are multiple routers/APs with the same SSID. At this time, the BSSID must be specified, otherwise multiple MESH networks will appear, causing nodes to be unable to communicate with each other. 5. If the BSSID is specified, but routerswitchdisable is not set, when the router with the specified BSSID is still not found after several times, the entire network is allowed to switch to another router with the same SSID. The new router may also be on a different channel.If the passwords of the new switching router and the previous router are different, a mesh network may be established, but the root node will never connect to the new switching router, which is a risk		
Example	Get the current router settings: AT+ROUTER? Module response: +ROUTER:"test","1357924680",0,"00:00:00:00:00:00"		
	Set the router name to: test01, the password to: 12345678, and no designated router MAC address: AT+ROUTER="test01","12345678"		
	Set the router name as: test02, the password as: 12345678, and the designated router MAC as: 01:02:03:04:05:06; AT+ROUTER="test02","12345678",0,"01:02:03:04:05:06"		
	Set the router name: test03, no password, no specified MAC AT+ROUTER="test02"		

5.5.2 AT+MESHID mesh ID setting or query

Instruction	Answer

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

Inquire	AT+MEID?	+MEID:["mesh id"]
Set up	AT+ MEID = ["mesh id"]	+OK success +ERR:[NUM] error
parameter	mesh id	The identity of the Mesh network. It consists of 6 bytes. XX:XX:XX:XX:XX:XX
Description	1. Restart to take effect, save when power off 2. Default value: "00:00:00:00:00:01" 3. MESH ID is the MESH network identification. Modules with different MESH IDs cannot join the same network.	
Example	Get the mesh ID: AT+MEID? Module response: +MEID: "00:00:00:00:00:01"	
	AT+MEID="00:00:00:00:00:22"	

5.5.3 AT+MEAP mesh network ap information

Instruction		**Answer**
Inquiry	AT+MEAP?	+MEAP:[" password"]
Setting	AT+ MEAP = ["password"]	+OK Success +ERR:[NUM] Error
Parameter	password	Password is a character string, its length range: 8~63 bytes
Description	1. Restart to take effect, save when power off 2. Default: 12345678; 3. In the same network, the password must be the same, otherwise you cannot join;	
Example	Get mesh ap information: AT+MEAP? Module response: +MEAP:"12345678"	
	AT+MEAP="11111111"	

5.5.4 AT+MECHANNEL MESH network channel

Instruction			**Answer**
Inquiry	AT+MECHANNEL?		+ MECHANNEL:=[channel],[channel switch]
Setting	AT+MECHANNEL=[channel],[channel switch]		+OK Success +ERR:[NUM] Error
Parameter	channel		MESH network channel. Value range 1 ~ 14. The default is 1
	channel switch	0(default)	Enable channel switching
		1	Prohibit channel switching

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

Description	1. Restart to take effect, save when power off; 2. In a mesh network with a router, the channel depends on the channel of the router AP; in a mesh network without a router, the channel must be set. 3. In a MESH grid with a router, the channel switch should be set to 0 when the channel of the router AP is not clear, otherwise the module cannot join the Mesh network because there is no designated AP in this channel.
Example	Get the mesh channel: AT+MECHANNEL? Module response: + MECHANNEL:1,0
	AT+MECHANNEL=7,1

5.5.5 AT+MECAPACITY MESH network capacity

Instruction			**Answer**
Inquiry	AT+MECAPACITY?		+MECAPACITY: [ApConnectNum],[LayersMax],[CapacityNum]
Setting	AT+MECAPACITY=[ApConnectNum],[LayersMax],[CapacityNum]		+OK Success +ERR:[NUM] Error
Parameter	ApConnectNum	The maximum number of child nodes that can be connected. Value range: <= 10, default: 6	
	LayersMax	Mesh network layer number. Value range: 2~25. Default: 6	
	CapacityNum	The maximum number of nodes in a Mesh network. Value range: <= 1000, default: 300	
Description	1. Restart to take effect, save when power off; 2. The MESH network determines the network capacity based on the values of ApConnectNum and LayersMax. The MESH network is a tree network. If the number of layers is 3 and the number of child nodes is 3, the theoretical network capacity: 3^0+3^1+3^2=13. If the value of CapacityNum is set to <13, then the network capacity of the most network is determined by CapacityNum; if At this time CapacityNum>13, then the network capacity is determined according to the calculation result 13.		
Example	AT+MECAPACITY=2,3,50	Set the result to 2, 3, 50	

5.5.6 AT+METYPE The type of node in the network

Instruction		**Answer**
Inquiry	AT+METYPE?	+METYPE:[type]
Setting	AT+METYPE=[type]	+OK Success +ERR:[NUM] Error
Parameter	type	description
	0(default)	MESH_IDLE(Not joined the network)
	1	MESH_ROOT(Root node)
	2	MESH_NODE(node)

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

	3	LEAF_NODE(Leaf node)
Description	1. Restart to take effect, save when power off; 2. Currently, only MESH_IDLE, MESH_ROOT and MESH_NODE device types are supported. The router-less solution only supports two types: MESH_ROOT and MESH_NODE. 3. Leaf nodes cannot be set. The leaf node may only return this type when obtaining the mesh state	
Example	AT+METYPE=1	

5.5.7 AT+MESTART start mesh

Instruction		**Answer**
Start	AT+MESTART	+OK Success +ERR:[NUM] Error
Parameter	NONE	
Description	1. Effective immediately; 2. After the module is powered on, it will not automatically join or create the MESH network. You need to use this command to start the MESH network. When using this network, please pay attention to the parameters of the MESH network. Wrong parameters, the module will not start the MESH network. 3. After this command is issued, the module will respond OK only after initializing the MESH.	
Example	AT+MESTART	

5.5.8 AT+MESEND send MESH data

Instruction		**Answer**
Setting	AT+MESEND="[mac]",[len]	+OK Success +ERR:[NUM] Error
Parameter	mac	MAC address of the target node
	len	The length of the data to be sent
Description	1. Effective immediately; 2. This command is only used for node-to-node communication. If the mac address is empty, the data is sent to the root node. 3. The module only returns to the AT command mode after receiving data of the specified length; 4. The maximum length of Len is 1440 bytes;	
Example	1. Send string (hello mesh)： AT+MESEND="00:00:00:00:00:01",11 > Hello mesh. +OK:11 1. Send string to the root node AT+MESEND="",11 > Hello mesh. +OK:11	

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

5.5.9 AT+MESTATUS Current mesh network status

Instruction		Answer
Inquiry	AT+MESTATUS?	+ MESTATUS: [type],[connected],[layer],[node num],[parent addr],[local sta addr], local ap addr],[child num] [child1 addr] [child2 addr]…
Parameter	type	Node type, refer to "3.4.6 AT+METYPE Node Type in the Net" for definition.
	connected	0, not connected; 1 connected
	layer	The current layer. Refer to the definition in "3.4.5 AT+MECAPACITY MESH network capacity"
	Node num	The total number of current network nodes, including ROOT nodes
	parent_addr	Parent node address
	local_sta addr	Local station address
	local_ap addr	Local ap address
	Child num	Number of child nodes
	Child addr	Child node address
Description	In many cases, there is not only one child node of a node. When the instruction returns the address of the child node, all are returned. Through nodes, parent nodes, and child nodes, the actual topology of the network can be directly reflected.	
Example	+MESTATUS=1,1,10,"01:01:01:01:01:0","00:00:00:00:00:01","00:00:00:00:00:02","00:00:00:00:00:03",2 "00:00:00:00:00:04" "00:00:00:00:00:05"	

5.5.10 +MEDAT report Mesh network data

Receive data	+MEDAT:<"src addr">,[len]	
Parameter	Src addr	Data source address
	Len	Data length
Description	1. AT+CIPDINFO=1, the output data contains Src addr; AT+CIPDINFO=0, the output data packet does not contain Src ADDR; 2. After the module receives the MESH data, it actively reports it. 3. After the module receives the data, it outputs the instruction and then outputs the data. 4. If the output data length is greater than 1440 bytes, it will be output in packets.	
Example	1. When AT+CIPDINFO=1, output data packet: +MEDAT:"11:11:11:11:11:11",10 hellw mesh. 2. When AT+CIPDINFO=0, output data +MEDAT: 10	

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

hellw mesh.

3.When AT+CIPDINFO=0, the output data is greater than 1540 bytes:

+MEDAT:"11:11:11:11:11:11",1440

……<payload>……

+MEDAT:"11:11:11:11:11:11",100

……<payload>……

5.5.11 AT+MEAUTO Power-on automatic networking

Instruction			Answer
Inquiry	AT+MEAUTO?		+MEAUTO:[auto] Success +ERR:[NUM] Error
Setting	AT+MEAUTO=[auto]		+OK Success +ERR:[NUM] Error
Parameter	Auto	0（default）	After power-on, automatic start of MESH networking is prohibited
		1	After power-on, enable automatic start of MESH networking
Description	1. Effective immediately, save when power off; 2. If ParameterError, the module will stop networking and will not output any Error information;		
Example	AT+MEAUTO=1		

5.6 TCP/IP communication

5.6.1 AT+CIFSR query ROOT node IP address

Instruction		Answer
Inquiry	AT+CIFSR?	+CIFSR:[IP] Success +ERR:[NUM] Error
Parameter	IP address	Root node IP address The format is "xxx.xxx.xxx.xxx"
Description	1. Effective immediately; 2. This instruction is only valid for Root nodes; 3. This command can return normally only after starting the mesh network, Success is connected to the router;	
Example	AT+CIFSR? +CIFSR:"192.168.0.239"	

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

5.6.2 AT+CIPSTART establish TCP connection, UDP transmission

5.6.2.1 TCP communication

Instruction		Answer	
Inquiry	AT+CIPSTART=[link ID],"[type]",[remote IP],[remote port][, TCP keep alive]	+OK Success +ERR:[NUM] Error	
Parameter	Link ID	Connection ID. Value range is 0~7	
	Type	"TCP"	TCP client
		"UDP"	UDP communication
	remote IP	Server IP address	
	remote port	Server port. Max 65535	
	TCP keep alive	TCP heartbeat. Value range: 0 ~ 2700.	
Description	1. Effective immediately; 2. When TCP keep alive is 0, close the TCP heartbeat. When this value is not set, the default is 5S; 3. LinkID needs to be manually specified. If the current LinkId has been used, an Error will be returned. 4. After the local TCP client disconnects, it will automatically reconnect. After connecting for 5 times, it still fails to connect, and the module returns "disconnect". The time interval between each reconnection is about 500ms. 5 reconnection failures, usually because the server is shut down and the network link (hardware connection) is disconnected. 5. Server or link issues		
Example	AT+CIPSTART=0,"TCP","192.168.0.205",6001,300; AT+CIPSTART=0,"TCP","192.168.0.205",6001;		

The RFC does not mandate how long TCP must maintain a connection. However, generally TCP will keep the link from being disconnected for 3-5 minutes. Sometimes, the router will clean up TCP links that have not passed through for a long time, and the channel will be disconnected at this time. Therefore, for TCP, a very small data packet is usually sent to the server in about 3 minutes. Therefore, closing the heartbeat packet may cause abnormal interruption. Usually the heartbeat of the protocol layer is turned off, and the application layer needs to maintain a heartbeat packet by itself.

5.6.2.2 UDP communication

Instruction		Answer	
Inquiry	AT+CIPSTART=[link ID],["type"],[remote IP],[remote port],[UDP local port],[UDP mode]	+OK Success +ERR:[NUM] Error	
Parameter	Link ID	Connection ID. Value range is 0~7	
	Type	"TCP"	TCP client
		"UDP"	UDP communication
	remote IP	Server IP address	
	remote port	Server port. Max 65535	
	UDP local port	Local listening port.	

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

	UDP mode	0	Fixed remote address
		1	When UDP receives the network data, modify the remote IP and PORT to the address of the current data packet
Description	1. Effective immediately; 2. LinkID needs to be manually specified. If the current LinkId has been used, an Error will be returned. 3. UDP local port is not set or set to 0, the local port is a random port; 4. UDP mode is not set, default is 0;		
Example	AT+CIPSTART=0,"UDP","192.168.0.205",60001,60001,1 AT+CIPSTART=0,"UDP","192.168.0.205",60001,60001 AT+CIPSTART=0,"UDP","192.168.0.205",60001		

5.6.3 AT+CIPCLOSE Close TCP and UDP communication

Instruction		**Answer**
Disconnect specified connection	AT+CIPCLOSE=[link ID]	+OK Success +ERR:[NUM] Error
Disconnect all	AT+CIPCLOSE	
Parameter	Link ID	Connection ID. Value range is 0~7
Description	1. Effective immediately; 2. This command can only disconnect the client. To disconnect the TCP server, the command AT+CIPSERVER must be used. 3. After the disconnect command is issued, the module immediately responds with OK. After the connection is completely disconnected, the module returns +IP: "DISCONNECT"	
Example	AT+CIPCLOSE=0	

5.6.4 AT+CIPSERVER Create and close TCP service

Instruction		**Answer**	
Inquiry	AT+CIPSERVER=[enable],[LocalPort]	+OK Success +ERR:[NUM] Error	
Parameter	enable	0	Close service
		1	Create service
	LocalPort	TCP service listening port	
Description	1. Effective immediately; 2. Disconnecting the service will disconnect all remote TCP Clients. After disconnecting from the remote TCP client, the module returns +IP: "DISCONNECT" 3. Disconnecting the TCP service requires only one parameter to be entered. For example: AT+CIPSERVER=0		
Example	AT+CIPSERVER=1,60001		

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

	AT+CIPSERVER=0 //Disconnecting the TCP service will disconnect all TCP service processes

5.6.5 AT+CIPSEND send TCP UDP data

Instruction		Answer
Inquiry	AT+CIPSEND=[LinkID],[Length]	+OK Success +ERR:[NUM] Error
Parameter	LinkID	Connection ID. 0~7
	Length	The length of the data to be sent
Description	1. Effective immediately; 2. After the instruction is sent, the module returns '>', providing data that can be input 3. The module only returns to the AT command mode after receiving data of the specified length; 4. The maximum length of Len is 11520 bytes;	
Example	AT+CIPSEND=1，10 +OK > Enter "Hello Mesh." from the serial port	

5.6.6 AT+CIPDINFO TCP output data configuration

Instruction			Answer
Inquiry	AT+CIPDINFO=[enable]		+OK Success +ERR:[NUM] Error
Parameter	enable	0	Prohibit the output of data is to carry the address of the other party
		1（default）	Enable output data to carry the address of the other party
Description	1. Effective immediately, save when power off; 2. This command affects all output data formats		
Example	AT+CIPDINFO=1		

5.6.7 +IPD receive TCP UDP data

+IPD：[LinkID],[Length],["RemoteIp"],[RemotePort],[Data]		
Parameter	LinkID	Connection ID
	Length	The length of the Data field.
	RemoteIp	Remote IP
	RemotePort	Remote Port
Description	1. After receiving TCP UDP data, actively report;	

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

	2. When the data is received, the command is output first, followed by the actual data. 3. If the output data length is greater than 1440 bytes, it will be output in packets.
Example	1. When AT+CIPDINFO=1: +IPD: 1,10,"192.168.0.244",60001 Hello Mesh. 2. When AT+CIPDINFO=0 +IPD: 1,10 Hello Mesh. 3. When AT+CIPDINFO=1, the output data length is 1540 bytes: +IPD: 1,1440,"192.168.0.244",60001 ……<payload>…… +IPD: 1,100,"192.168.0.244",60001 ……<payload>……

5.7 MQTT communication

5.7.1 AT+MQTTUSERCFG MQTT user configuration information

Setting	AT+MQTTUSERCFG=[Scheme],["client_id"],["username"],["password"]	+OK Success +ERR:[NUM] Error
Inquiry	AT+MQTTUSERCFG?	+MQTTUSERCFG: ["client_id"],["username"],["password"]
Parameter	Scheme	Fixed at 1. MQTT TCP
	client_id	Mqtt client ID. Maximum length: 255 characters
	username	username. Maximum length: 63 bytes
	password	password. Maximum length 63 bytes
Description	1. Effective immediately; 2. The client id of different modules must be unique. The same client ID will cause conflicts between modules.	
Example	AT+MQTTUSERCFG=1,"W07","W07","123456789"	

5.7.2 AT+MQTTCONNCFG MQTT connection configuration information

Setting	AT+MQTCONNCFG= [keepalive],[disable_clean_session],["lwt_topic"],["lwt_msg"],[lwt_qos],[lwt_retain]	+OK Success +ERR:[NUM] Error
Inquiry	AT+ MQTCONNCFG?	+MQTCONNCFG= [keepalive],[disable_clean_session],["lwt_topic"],["lwt_msg"],[lwt_qos],[lwt_retain]
Parameter	keepalive	MQTT Heartbeat
	disable_clean_session	Prohibit clearing the session.
	lwt_topic	The subject of the will. Maximum length 64 bytes

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

	lwt_msg	Will message. Maximum length 64 bytes
	lwt_qos	The quality of the will message. 0, 1, 2
	lwt_retain	If Will Retain is set to 0, then the server must publish Will Message without saving; If Will Retain is set to 1, then the server must publish Will Message and save it
Description	Effective immediately;	
Example	AT+MQTTCONNCFG=30,0,"ABCD","kljk",2,1	

5.7.3 AT+MQTTCONN connect to MQTT Brokers

Setting	AT+MQTCONN= ["host"],[port],[reconnect]		+OK Success +ERR:[NUM] Error
Inquiry	AT+MQTCONN?		+MQTCONNCFG= [stats],["host"],[port],[reconnect]
Parameter	stats		0 means MQTT is not connected to Success, 1 means to connect to Success
	host		Broker address. Maximum length 128 bytes
	port		Broker port
	reconnect	0	Enable reconnection
		1	Disable reconnection
Description	1. Effective immediately; 2. Use the mqttclean command to disconnect, the client will not reconnect. reconnect = 0, Mqtt will automatically reconnect after disconnecting due to network reasons for 1s.		
Example	AT+MQTTCONN="mqtt:// mqtt://mqtt.eclipse.org ",1883,0\r\n		

5.7.4 AT+MQTTPUB publish MQTT message

Setting	AT+MQTTPUB= ["topic"],["length"],[qos],[retain]	+OK Success +ERR:[NUM] Error
Parameter	topic	The topic of the publication. String length 63 bytes
	length	Data length
	qos	Message quality. 0, 1, 2
	retain	Value range: 0, 1
Description	1. Effective immediately; 2. Retain=1, in a PUBLISH packet sent from the client to the server, the server must store the application message and QoS so that it can be sent to subscribers who subscribe to this topic later. When a new subscription occurs, the last retained message, if any, matches the subscription topic, must be sent to the subscriber; Retain=0, the server must not store this message, and must not delete or replace any existing ones Reserved message 3. The module only returns to the AT command mode after receiving data of the specified length; 4. The maximum length of Len is 11520 bytes;	

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

Example	AT+MQTTPUB="/com/www",10,0,0\ > Hello word. +Ok：10

5.7.5 AT+MQTTSUB Subscribe to topic

Setting	AT+MQTTSUB= ["topic"], [qos]	+OK Success +ERR:[NUM] Error
Parameter	topic	The topic of the publication. String length 63 bytes
	qos	Message quality. 0, 1, 2
Description	Effective immediately;	
Example	AT+MQTTSUB="/com/wws",2	

5.7.6 AT+MQTTUNSUB Unsubscribe topic

Setting	AT+MQTTUNSUB= ["topic"]	+OK Success +ERR:[NUM] Error
Parameter	topic	The topic of the publication. String length 63 bytes
Description	Effective immediately;	
Example	AT+MQTTSUB="/com/wws"	

5.7.7 AT+MQTTCLEAN close MQTT connection

Execution	AT+MQTTCLEAN	+OK Success +ERR:[NUM] Error
Parameter	NONE	
Description	1. Effective immediately; 2. Actively disconnect the Mqtt connection. Actively disconnect, mqtt will not reconnect.	
Example	AT+MQTTCLEAN	

5.7.8 +MQTTSUBRECV MQTT receive data

+MQTTSUBRECV: ["topic"],[data_length]		
Parameter	topic	Subject of receiving data
	data_length	Data length
Description	1. After the module receives the MQTT data, it actively reports;	

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

	2. After the module receives the data, it chooses to output the command, and then follows the actual data; 3. If the data length is greater than 1440 bytes, it will be output in packets
Example	1. The data length is less than 1440 bytes: +MQTTSUBRECV: "/com/wws",10 Hello Mesh. 2. The data length is 1540 bytes +MQTTSUBRECV: "/com/wws",1440 ……<payload>…… +MQTTSUBRECV: "/com/wws",100 ……<payload>……

6 Quick guide

6.1 Module power up

The following information is automatically output when the module is powered on. The parameters of this part of the information serial port: 115200, 8, 0, 1. :

```
ESP-ROM:esp32s2-rc4-20191025
Build:Oct 25 2019
rst:0x1 (POWERON),boot:0x8 (SPI_FAST_FLASH_BOOT)
SPIWP:0xee
mode:DIO, clock div:1
load:0x3ffe6100,len:0x8
load:0x3ffe6108,len:0x530
load:0x4004c000,len:0x80c
load:0x40050000,len:0x260c
entry 0x4004c178
```

Power-on information, fixed serial port parameters, the serial port parameters of this information are not affected by user configuration.

6.2 Module preparation is complete

After the module is ready, the following information will be output:

```
ready\r\n
```

After the condition information (including information), the module uses the serial port parameters configured by the user to communicate. The default serial port parameters of the module are: 115200, 8, 0, 1

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

6.3 MESH networking

6.3.1 With routing, manual networking

STEP 1. Configure router information (no default information):

```
at+router="ble","1357924680",0\r\n
+OK\r\n
```

Note: If there is no routing network, you do not need to configure the above commands.

STEP 2. Configure MESH ID (default id "00:00:00:00:00:01"):

```
AT+MEID="AB:77:77:77:77:cd"\r\n
+OK\r\n
```

STEP 3. Configure MESH AP password (default: 12345678):

```
at+meap="MAP_32144556"\r\n
+OK\r\n
```

STEP 4. Configure the channel (default channel: 1; switchable)

```
AT+mechannel=1,0\r\n
+OK\r\n
```

Note:

The above parameters Root node and ordinary nodes must be consistent, otherwise the network cannot be successfully established.

STEP 5. Configure node type (default: 0 (no specified type)):

```
AT+METYPE=1\r\n                    //The slave should send AT+METYPE=2\r\n
+OK\r\n
```

STEP 6. Start networking

```
AT+MESTART\r\n                     //The slave also needs to send this command
+OK\r\n
```

Mesh starts networking, Root is responsible for creating the network and waiting for child nodes to join; ordinary nodes find available Mesh networks and join the mesh network group. The networking process is as follows:

ROOT NODE	NORMAL NODE
+ME:"PARENT CONNECT","b8:f8:83:3b:72:e0"	
+ME:"IP","192.168.0.172"	
+ME:"CHILD CONNECT","7c:df:a1:05:8c:76"	+ME:"PARENT CONNECT","7c:df:a1:00:e8:39"

Since then, data can be sent and received between nodes.

6.3.2 Send and receive data

STEP 1. ROOT node sends data to child nodes (hello mesh.):

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

```
AT+MESEND="7c:df:a1:05:8c:76",11\r\n                    //Here 11 represents the number of bytes sent
+OK\r\n
>
```

STEP 2. After the module returns ">", the data can be sent

```
Hello mesh.
+OK:11\r\n
```

STEP 3. After receiving the data, the child node actively reports:

```
+MEDAT:11,"7c:df:a1:00:e8:38",hello mesh.
```

STEP 4. The number of child nodes sent to the root node (root node) (hello mesh.)

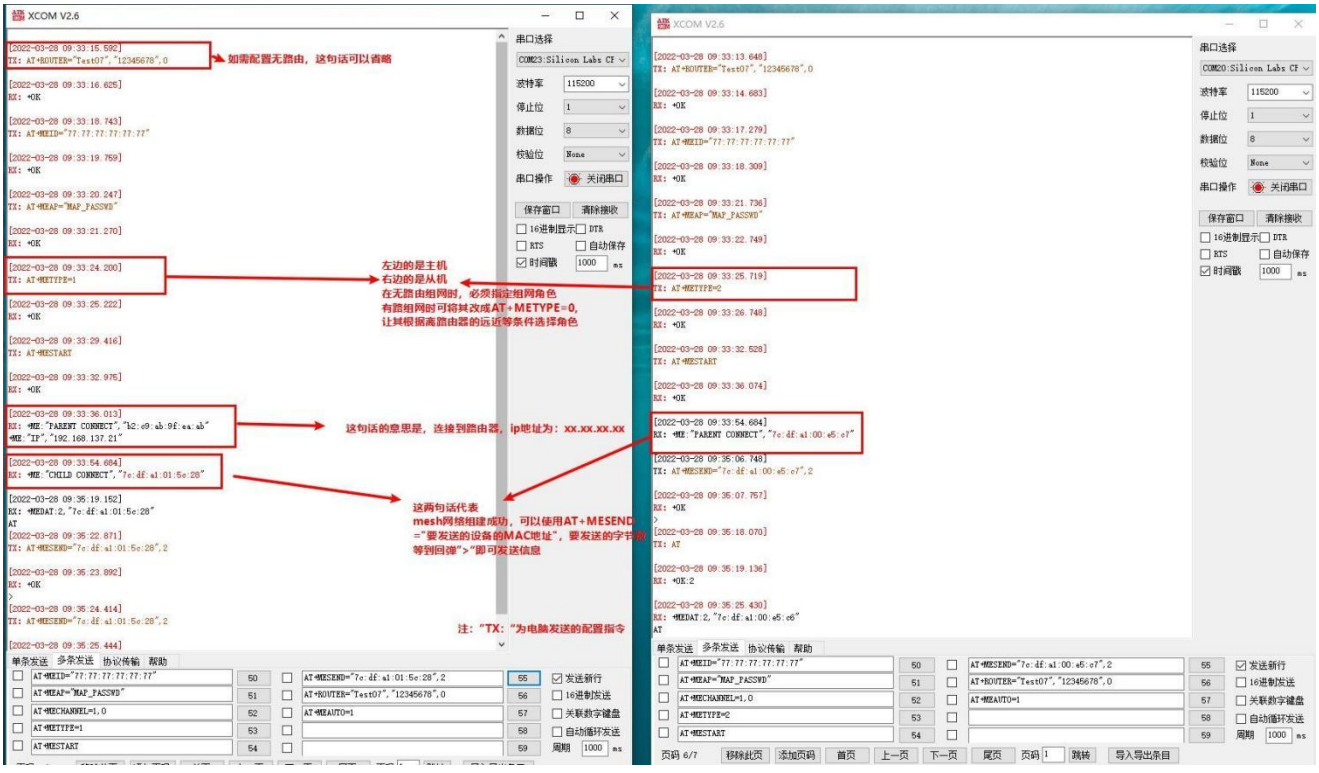
```
AT+MESEND="7c:df:a1:00:e8:38",11\r\n
>
```

STEP 5. After the module returns ">", the data can be sent

```
Hello mesh.
+OK:11\r\n
```

STEP 6. The root node actively reports after receiving the data

```
+MEDAT:11,"7c:df:a1:05:8c:76",hello mesh.
```



6.4 Socket communication

Only Root nodes can communicate with sockets. If it is a non-router network, the Root node also does not use socket communication. Socket is only used for communication between the root node and the external network. If the child node needs to communicate with the external network, it needs to be forwarded by the Root node.

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

6.4.1 TCP Client

STEP 1. Create a TCP Server on the PC, monitor port 6001, and PC local IP: 192.168.0.205;

STEP 2. ROOT node creates TCP Client:

```
AT+CIPSTART=0,"TCP","192.168.0.205",6001\r\n
+OK\r\n
```

After the creation is completed, the communication can be completed.

6.4.2 TCP Server

STEP 1. Create TCP Server. Listening port: 60000

```
AT+CIPSERVER=1,60000\r\n
+OK\r\n
```

STEP 2. After the ROOT node service is created, the PC creates a client and connects to the Root node. After the ROOT node TCP Server has a new Client connection, the ROOT node actively reports:

```
+IP:"CONNECT",1,"192.168.0.205",59924
```

The ROOT node outputs this information to indicate that the remote client has successfully connected to the Server. From then on, it can communicate.

6.4.3 Socket communication

STEP 1. Send data (hello mesh.) to link 0 (the TCP cline created above)

```
AT+CIPSEND=0,10\r\n
>
```

STEP 2. Wait for the module to return ">", then send data (hello mesh.)

```
hello mesh.
+OK:11\r\n
```

STEP 3. The PC receives the data:

```
hello mesh.
```

STEP 4. The PC sends data to the module (hello mesh.)

```
hello mesh.
```

STEP 5. After the module receives the data, it actively reports:

```
+IPD:0,11,"192.168.0.205",6001
hello mesh.
```

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

6.5 Mqtt communication

6.5.1 Configure, connect

STEP 1. Configure MQTT user parameters:

```
AT+MQTTUSERCFG=1,"W07","W07","123456789"\r\n
+OK\r\n
```

STEP 2. Configure MQTT connection parameters:

```
AT+MQTTCONNCFG=30,0,"lwt","wo7",1,1\r\n
+OK\r\n
```

STEP 3. Connect to MQTT Broker

```
AT+MQTTCONN="mqtt.eclipseprojects.io",1883,0\r\n
+OK\r\n
```

STEP 4. Wait for the successful connection of Mqtt. After the successful connection of Mqtt, take the initiative to input:

```
+MQTT:CONNECT
```

Since then, ROOT has been connected to the mqtt broker. The module will be used to subscribe to topics and publish messages.

6.5.2 Subscribe to topics

Subscribe to the topic: /com/wws, the message quality is 2;

```
AT+MQTTSUB="/com/wws",2\r\n
+OK\r\n
```

After successfully subscribing to a topic, you can receive messages from the topic.

```
+MQTTSUBRECV:"/com/wws",10
hello mqtt
```

6.5.3 Release the news

Publish a message to the topic "/com/www"" (hello mqtt)

```
AT+MQTTPUB="/com/www",10,0,0\r\n
+OK\r\n
```

After waiting for the module to return ">", send "hello mqtt":

```
Hello mqtt
+OK：10\r\n
```

Data received at the remote end

```
Hello mqtt
```

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

7 Common problems

7.1 Transmission distance is not ideal

- When there is a straight line communication obstacle, the communication distance will be attenuated accordingly;
- Temperature, humidity, and co-frequency interference will increase the communication packet loss rate;
- The ground absorbs and reflects radio waves, and the test results near the ground are poor;
- Sea water has a strong ability to absorb radio waves, so the seaside test results are poor;
- If there are metal objects near the antenna or placed in a metal shell, the signal attenuation will be very serious;
- The power register is set incorrectly, and the air speed is set too high (the higher the air speed, the closer the distance);
- The low voltage of the power supply at room temperature is lower than the recommended value, the lower the voltage, the lower the power output;

7.2 Module is easily damaged

- Please check the power supply to ensure that it is within the recommended power supply voltage. If it exceeds the maximum value, it will cause permanent damage to the module;
- Please check the stability of the power supply, and the voltage should not fluctuate greatly and frequently;
- Please ensure anti-static operation during installation and use, and high-frequency components are electrostatically sensitive;
- Please ensure that the humidity should not be too high during installation and use, and some components are humidity sensitive devices;
- If there is no special requirement, it is not recommended to use it at too high or too low temperature.

7.3 Bit error rate is too high

- There is co-frequency signal interference nearby, stay away from the interference source or modify the frequency and channel to avoid interference;
- The clock waveform on the UART is not standard, check whether there is interference on the UART line;
- Unsatisfactory power supply may also cause garbled codes. Be sure to ensure the reliability of the power supply;

8 Welding operation guidance

8.1 Reflow temperature

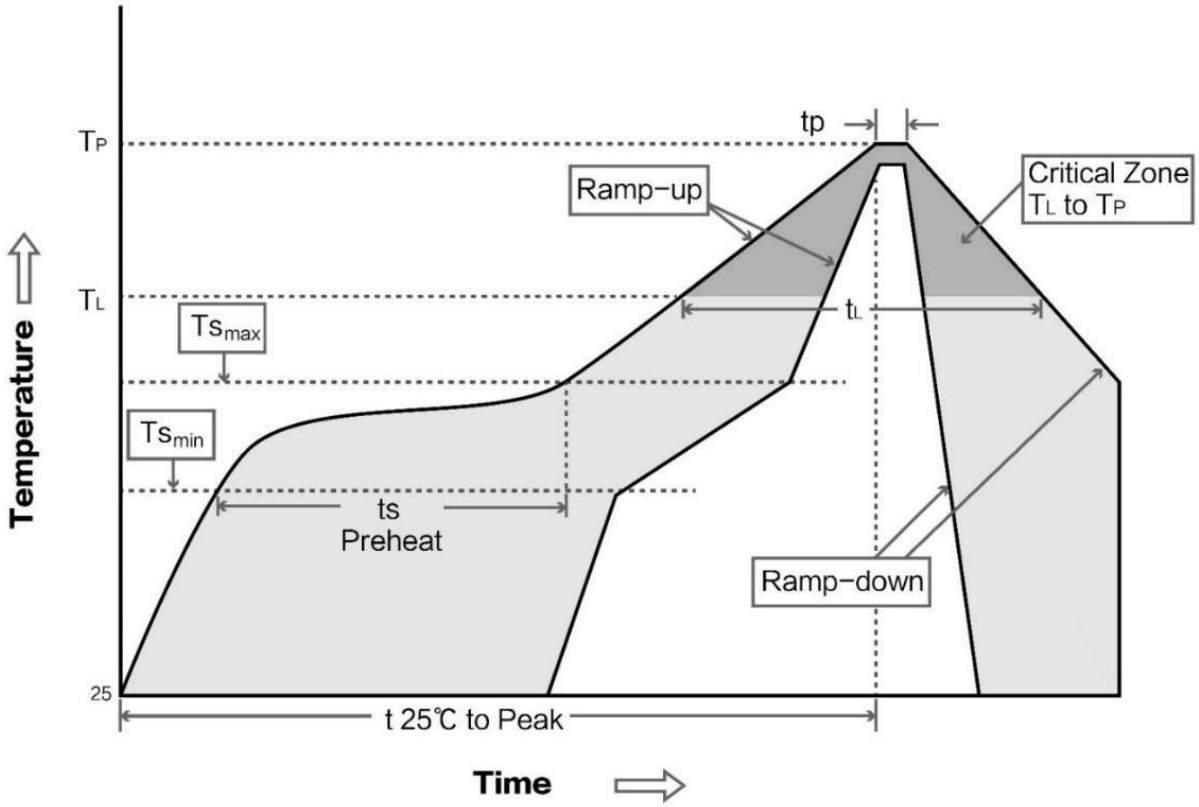
Profile Feature	Curve characteristics	Sn-Pb Assembly	Pb-Free Assembly
Solder Paste	Solder paste	Sn63/Pb37	Sn96.5/Ag3/Cu0.5

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

Preheat Temperature min （Tsmin）	Minimum preheating temperature	100℃	150℃
Preheat temperature max (Tsmax)	Maximum preheating temperature	150℃	200℃
Preheat Time (Tsmin to Tsmax)(ts)	Preheat time	60-120 sec	60-120 sec
Average ramp-up rate(Tsmax to Tp)	Average ascent rate	3℃/second max	3℃/second max
Liquidous Temperature (TL)	Liquidus temperature	183℃	217℃
Time（tL）Maintained Above（TL）	Time above liquidus	60-90 sec	30-90 sec
Peak temperature（Tp）	Peak temperature	220-235℃	230-250℃
Aveage ramp-down rate（Tp to Tsmax）	Average descent rate	6℃/second max	6℃/second max
Time 25℃ to peak temperature	Time from 25℃ to peak temperature	6 minutes max	8 minutes max

8.2 Reflow soldering curve



9 Disclaimer

- This manual shall try its best to make a comprehensive and detailed introduction based on the existing information. The company reserves the right to modify the contents of the manual without further notice
- This manual is only used as a guide, all the information in the manual does not constitute any express or implied guarantee.

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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

Revision history

Version	Date	Description	Issued by
V1.0	2021/3/18	First edition, first public release.	- -
V1.1	2022/03/28	Added text descriptions and textures for MESH networking. Optimized the details in the document to make the whole document look more elegant. With the modification of the code part, the display format of AT+MESTAUS has been changed.	
V1.2	2023-6-30	Bug repair	Hao
V1.3	2025-4-14	Add pin description	Hao

About us

Technical support: support@cdebyte.com

Documents and RF Setting download link: https://www.cdebyte.com/

Thank you for using Ebyte products! Please contact us with any questions or suggestions: info@cdebyte.com

---

Web: https://www.cdebyte.com/

Address: B5 Mould Park, 199# Xiqu Ave, High-tech District, Sichuan, China

Chengdu Ebyte Electronic Technology Co.,Ltd.

Copyright ©2012–2021，Chengdu Ebyte Electronic Technology Co.,Ltd.

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