

RYA8000

2.4GHz High quality audio module
with Integrated Antenna

Datasheet



PRODUCT DESCRIPTION

The RYA8000 has low enough latency and high quality audio signal transmission ability. that users are not bothered by delay when playing their favorite games or audio applications.

FEATURES

- Be able to customize firmware.
- Be able to 10ms Audio latency.
- FSK or GFSK modulation.
- Low sleep current under 15uA.
- High data rate 4M mode.
- High TX power level 17 dBm.
- High RX sensitivity: -85dBm at data rate 4M mode.
- Low Battery Detector indication.
- Audio digital mixer.
- USB 2.0 compatible controller for Interrupt/Isochronous audio class.

APPLICATIONS

- Gaming Handset
- Voice broadcast
- Wireless audio peripheral
- Wireless microphone/speaker system
- 2.4GHz wireless home theater
- Voice broadcast

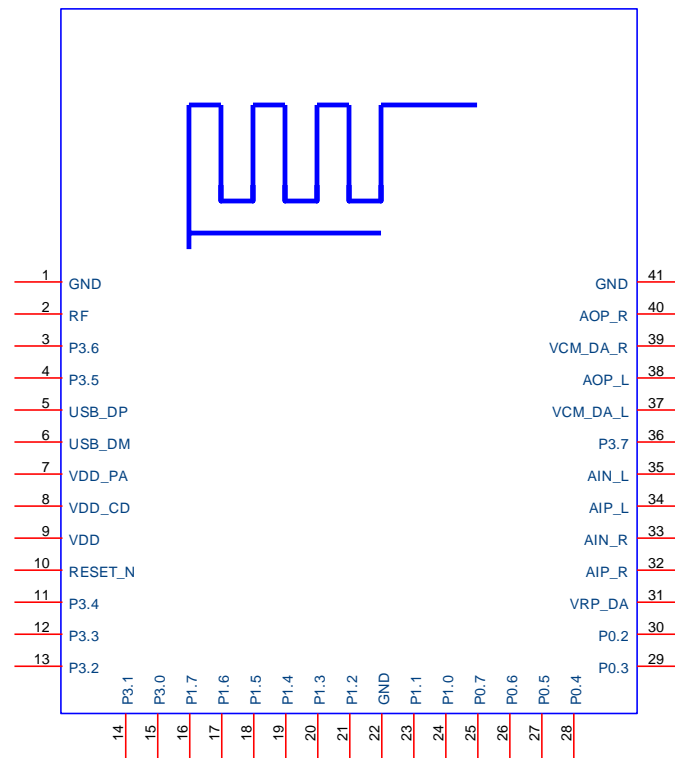
OS SUPPORT

- PC : WinXP, Vista32/64, Win7 32/64, Win8/8.1, Win10.
- MAC : Mac OS®X (Support version after 10.2.8)
- PS4

SPECIFICATION

Item	Min.	Typical	Max.	Unit	Condition
Operation Voltage	2.7	3.3	3.6	V	VDD, VDD_PA, VDD_CD
RF Output Power	10		17	dBm	
RF Input level			10	dBm	
Audio latency	10			mSec	
Active Current			130	mA	TX power @ 17dBm
Sleep Current		15		uA	
Data rate	3.072		4.096	Mbps	
Audio sampling rate	32		48	KSPS	
Wake Up Time		1		ms	
V _{IH}	0.8*VDD		VDD	V	High level input voltage
V _{IL}	0		0.2*VDD	V	Low-level input voltage
V _{OH}	VDD-0.4		VDD	V	High level output voltage
V _{OL}	0		0.4	V	Low level output voltage
RF Frequency Range	2400		2483.5	MHz	
Operating Temperature	0	25	+85	°C	
Antenna					PCB or External Antenna
Weight		0.8		g	

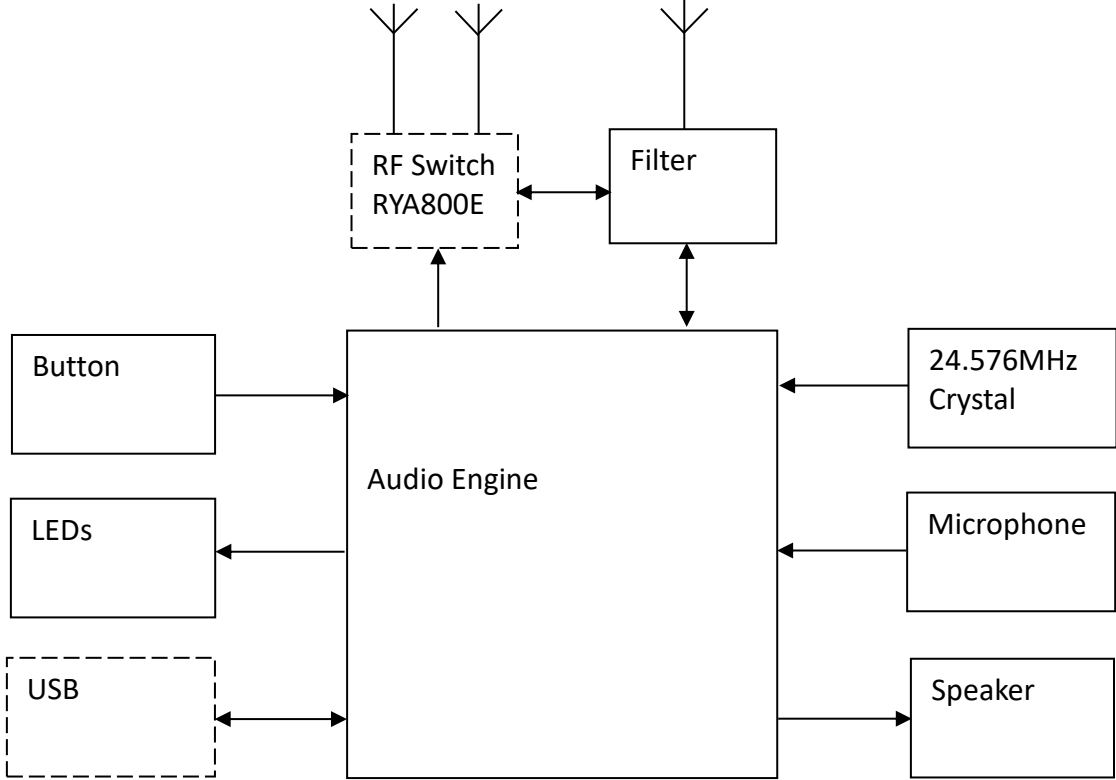
PIN DESCRIPTION



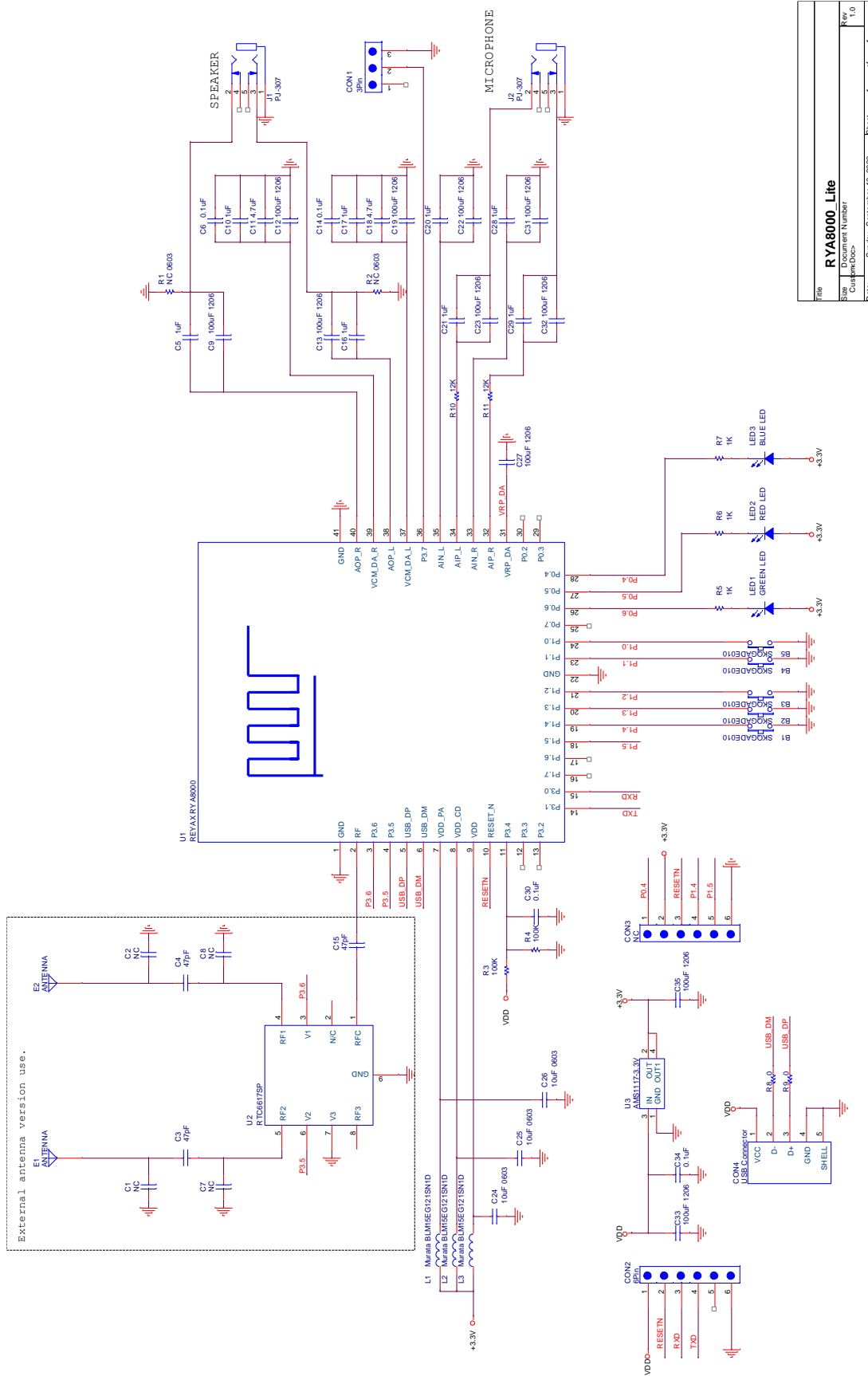
Pin	Name	I/O	Condition
1	GND	-	Ground
2	RF	I/O	RYA800E External Antenna Version Used.
3	P3.6	I/O	Reserved, Leave Unconnected.
4	P3.5	I/O	Reserved, Leave Unconnected.
5	USB_DP	I/O	USB Data Plus
6	USD_DM	I/O	USB Data Minus
7	VDD_PA	I	PA power supply input.
8	VDD_CD	I	Audio CODEC power supply input.
9	VDD	I	Power supply input.
10	RESET_N	I	RESET, Keep Low over 50mSec.
11	P3.4	I/O	Reserved, Leave Unconnected.
12	P3.3	I/O	Reserved, Leave Unconnected.
13	P3.2	I/O	Reserved, Leave Unconnected.
14	P3.1	I/O	Reserved, Leave Unconnected.
15	P3.0	I/O	Reserved, Leave Unconnected.
16	P1.7	I/O	Reserved, Leave Unconnected.
17	P1.6	I/O	Reserved, Leave Unconnected.

18	P1.5	I/O	Reserved, Leave Unconnected.
19	P1.4	I/O	Reserved, Leave Unconnected.
20	P1.3	I/O	Reserved, Leave Unconnected.
21	P1.2	I/O	Reserved, Leave Unconnected.
22	GND	-	Ground
23	P1.1	I/O	Reserved, Leave Unconnected.
24	P1.0	I/O	Reserved, Leave Unconnected.
25	P0.7	I/O	Reserved, Leave Unconnected.
26	P0.6	I/O	Reserved, Leave Unconnected.
27	P0.5	I/O	Reserved, Leave Unconnected.
28	P0.4	I/O	Reserved, Leave Unconnected.
29	P0.3	I/O	Reserved, Leave Unconnected.
30	P0.2	I/O	Reserved, Leave Unconnected.
31	VRP_DA	I/O	Reserved, Leave Unconnected.
32	AIP_R	I	Audio/Voice ADC R-channel positive input
33	AIN_R	O	Audio/Voice ADC R-channel negative reference
34	AIP_L	I/O	Audio/Voice ADC L-channel positive input
35	AIN_L	I/O	Audio/Voice ADC L-channel negative reference
36	P3.7	I/O	Reserved, Leave Unconnected.
37	VCM_DA_L	O	Audio DAC L-channel common mode output.
38	AOP_L	O	Audio DAC L-channel output.
39	VCM_DA_R	O	Audio DAC R-channel common mode output.
40	AOP_R	O	Audio DAC R-channel output.
41	GND	-	Ground

BLOCK DIAGRAM

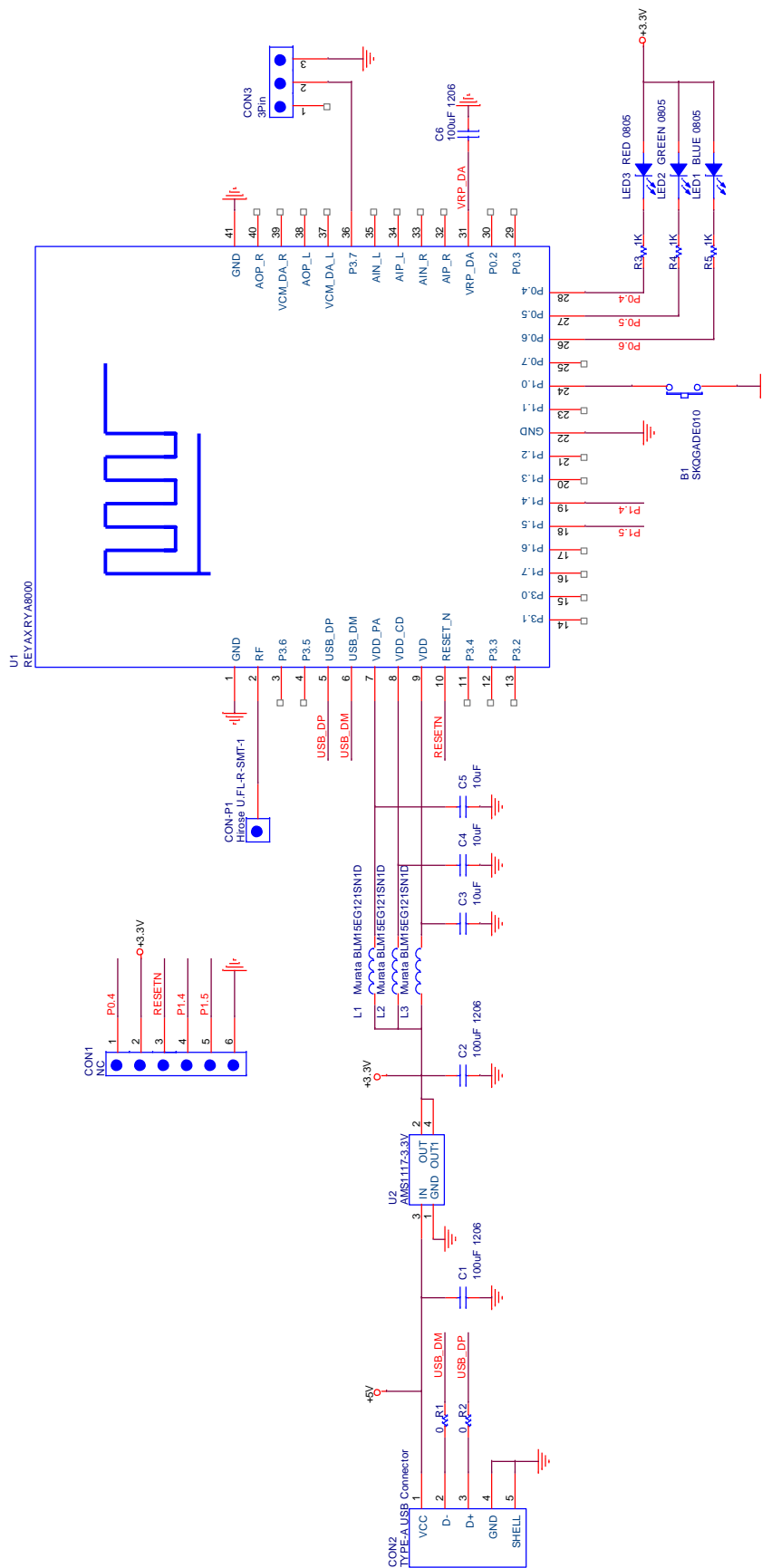


APPLICATION SCHEMATIC RYA8000_Lite



File	RYA8000_Lite
Size	Document Number
Customer	Customer Doc
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APPLICATION SCHEMATIC RYA8000_USB



Title		RYA8000_USB	
Size	Document Number	Rev	1.0
Date:	Sunday, September 13, 2020	Sheet	1 of 1

STANDARD FIRMWARE FUNCTION

RYA8000_USB

There is a connecting button, long press 5 seconds to connecting mode.

The state will be indicated by LED.

Offline mode: the red light flashes once per second.

Connecting mode: the red light flashes 2 times per second when entering the connecting mode.

[1] Successful connecting: the green light flashes. If offline for 10 minutes, it will automatically shut down and turn off the light.

[2] Fail connecting: If the connecting is not successful after two minutes, the red light turns to flash once every 1 second.

RYA8000_Lite

Support two channels of stereo audio reception (2 channels of 44.1KHz audio sampling, 16bit, DAC).
1 channel microphone transmission (audio sampling 44.1KHz, 16bit, ADC).

The button supports virtual 7.1 on/off, power switch and ID pairing (power switch: long press for 2 seconds to turn on/off the headset; automatically reconnecting when power on or pressing for 5 seconds to connecting mode while it's offline mode), button interface [P1.0]

With LED indication, the red light flashes twice when offline after power on, the LED output port [P0.5]. The green flashes slowly every 3 seconds when connected (bright 200mS), the LED output port [P0.6]. After 5 minutes of unconnected or unsuccessful pairing, it will automatically shut down and turn off the light. The shutdown quiescent current (the serial port of the whole machine) is less than 1uA. If you need to continue to use, press the power button to turn on.

The remaining 15% of the power, turn off the connection green light, the red light flashes once every 5 seconds (200mS on), LED output port [P0.5]

REFLOW SOLDERING

Consider the "IPC-7530 Guidelines for temperature profiling for mass soldering (reflow and wave) processes, published 2001.

Preheat phase

Initial heating of component leads and balls. Residual humidity will be dried out. Please note that this preheat phase will not replace prior baking procedures.

- Temperature rise rate: max. 3 °C/s If the temperature rise is too rapid in the preheat phase it may cause excessive slumping.
- Time: 60 - 120 s If the preheat is insufficient, rather large solder balls tend to be generated. Conversely, if performed excessively, fine balls and large balls will be generated in clusters.
- End Temperature: 150 - 200 °C If the temperature is too low, non-melting tends to be caused in areas containing large heat capacity.

Heating/ Reflow phase

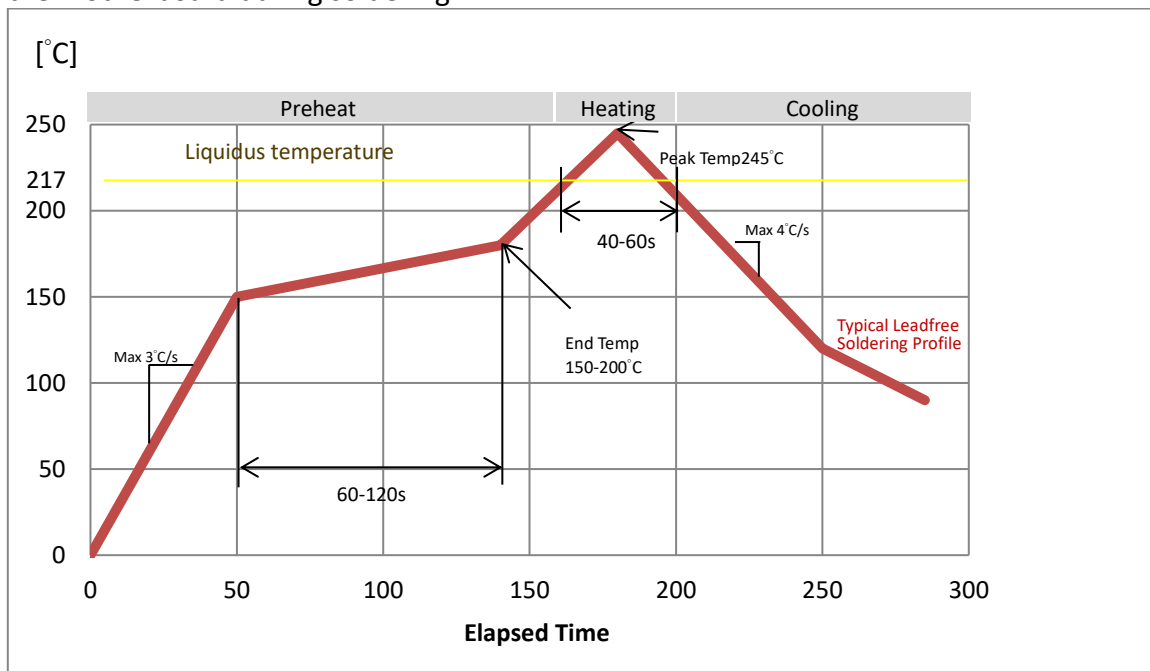
The temperature rises above the liquidus temperature of 217°C. Avoid a sudden rise in temperature as the slump of the paste could become worse.

- Limit time above 217 °C liquidus temperature: 40 - 60 s
- Peak reflow temperature: 245 °C

Cooling phase

A controlled cooling avoids negative metallurgical effects (solder becomes more brittle) of the solder and possible mechanical tensions in the products. Controlled cooling helps to achieve bright solder fillets with a good shape and low contact angle.

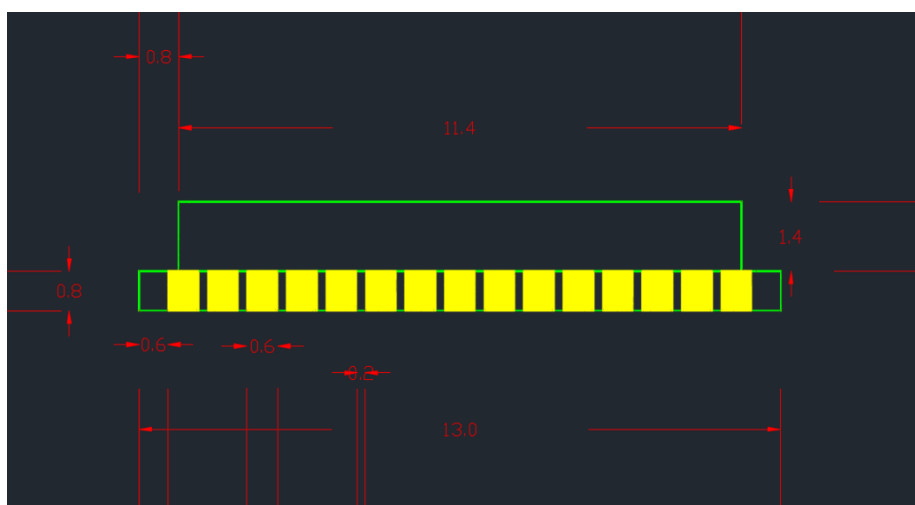
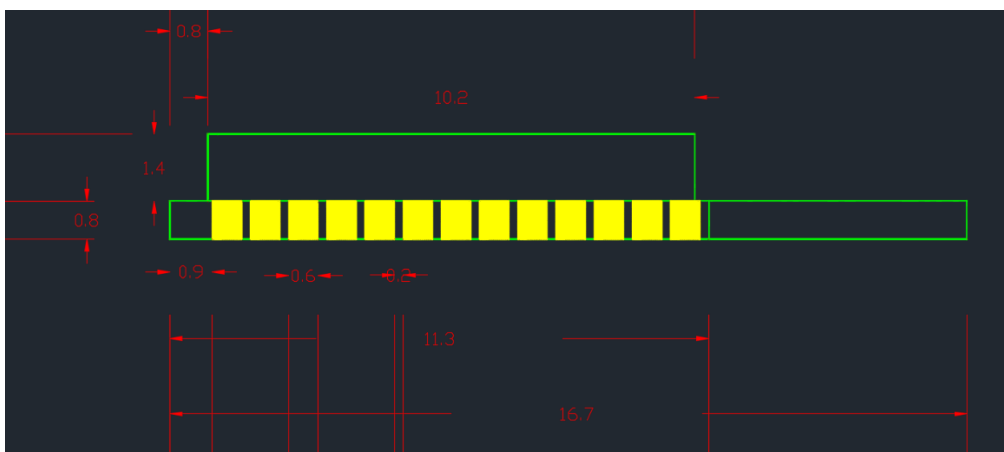
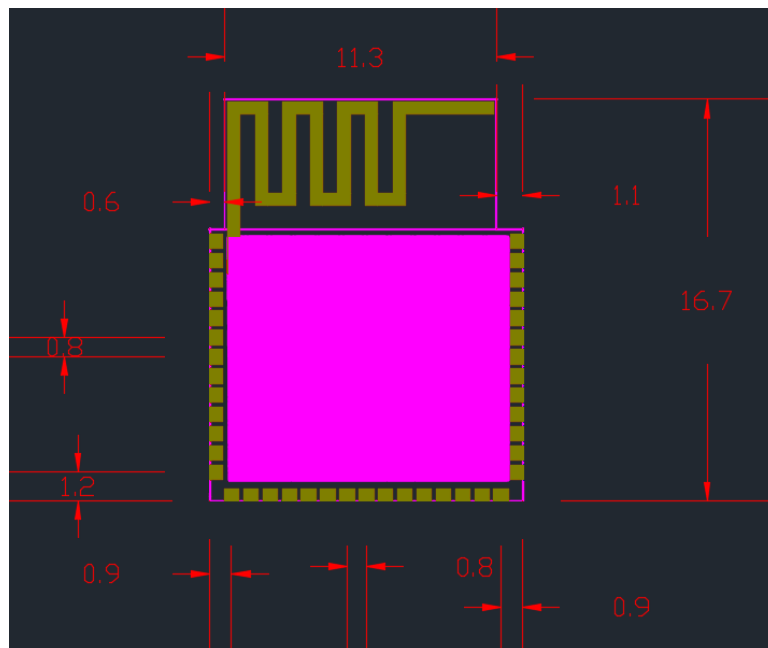
- Temperature fall rate: max 4 °C/s To avoid falling off, the module should be placed on the topside of the motherboard during soldering.



Recommended soldering profile

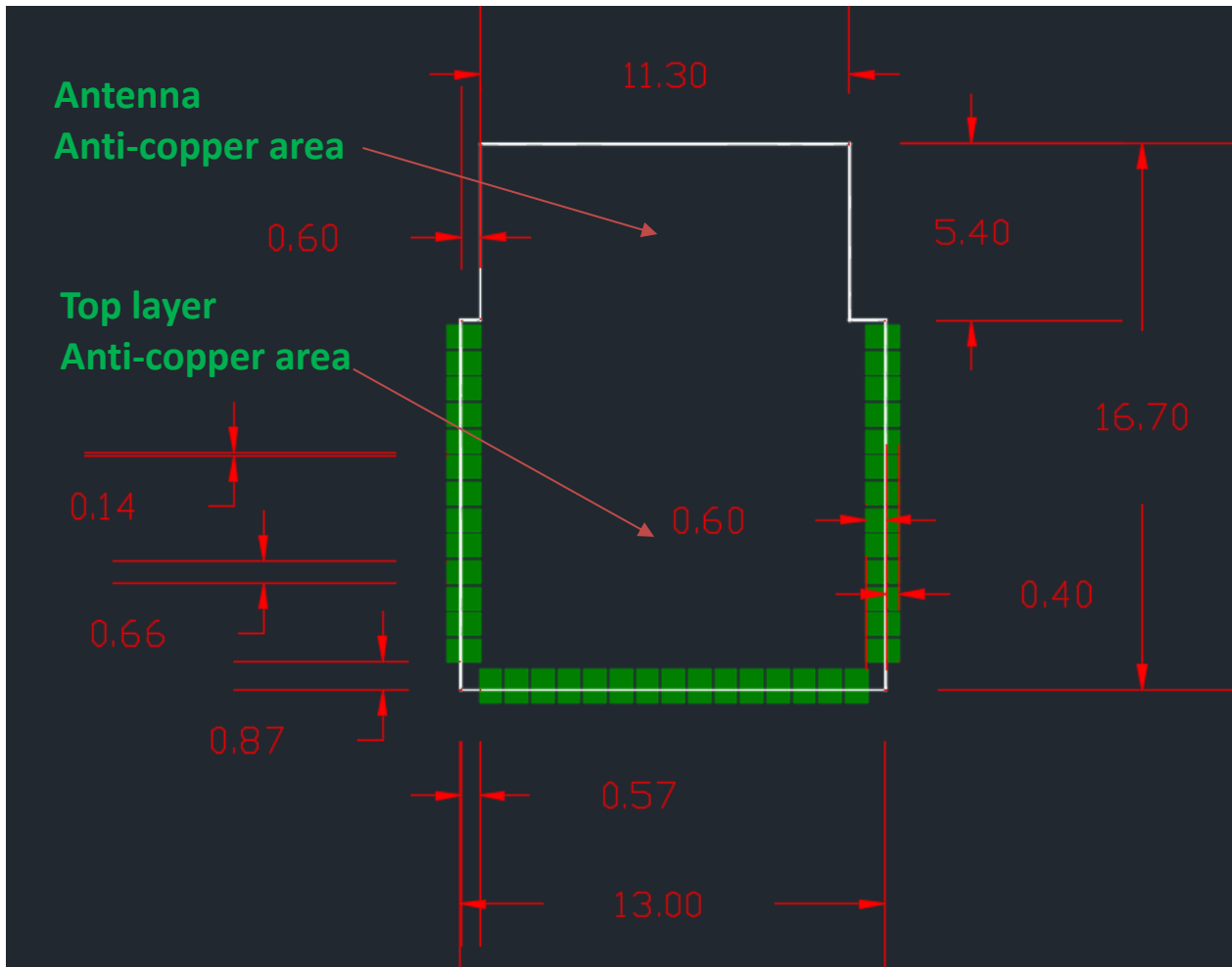
*Note: Does not support upside-down/bottom side reflow.

DIMENSIONS



Unit : mm

LAYOUT FOOTPRINT RECOMMENDATIONS



Unit : mm

ORDER INFORMATION

Ordering No.	Antenna	Firmware
RYA8000	Internal	Standard
RYA800E	External	Standard
RYA8000_xxx	Internal	xxx
RYA800E_yyy	External	yyy

* If you need the customize firmware, please contact us.