SPECIFICATION FOR AP PROVAL
acknowledgement

CUSTOMER
customer name:_____

CUSTOMER' SP/N
Customer part number: _____

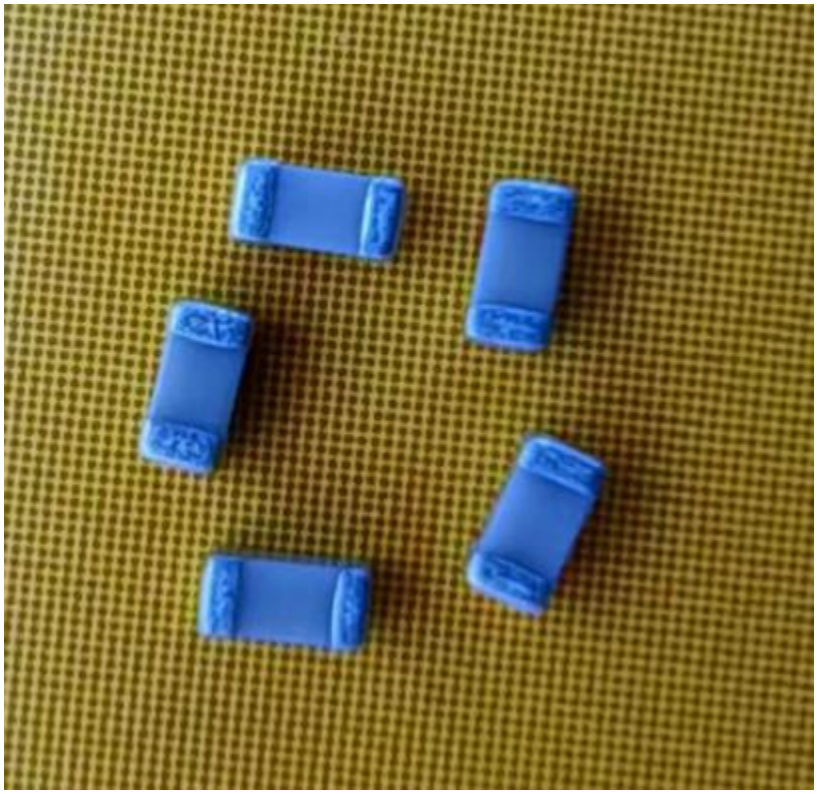
PART NUMBER
P / N:_____

ISSUE DATE
date:_____

CUSTOMER APPROVED Customer acknowledgment

Address: Room 202, Building 10, No.1 Jingdong Road, Fenggang Town, Dongguan City, Guangdong Province

A1608C2G42M100-02 chip antenna



Product features:

- The whole is a surface mount device

It has the characteristics of small volume, low shape and light weight

- band width
- Passed lead-free certification
- Size: 1.6x0.8x0.8mm

※ apply:

- Bluetooth/wireless LAN/homeland radio frequency technology
- ISM band 2.4GHz application

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qualification:

center frequency	2.45 GHz
frequency bandwidth	100 MHz (typ .)
maximum gain	1.92 dBi (typ .) (XZ-V)
Average gain	1.76 dBi (typ .) (XZ-V)
voltage standing-wave ratio	1.5(max)
impedance	50Ω
power capacity	2W(max)
working temperature	-40~+85° C
Storage temperature	-40~+85° C

Component number information:

A 1608 C 2G42 M100- 02

A	antenna	2G42	The center frequency is 2.42G
1608	Size 1.6x0.8	M100	Bandwidth 100M
C	capacitive character	02	product model

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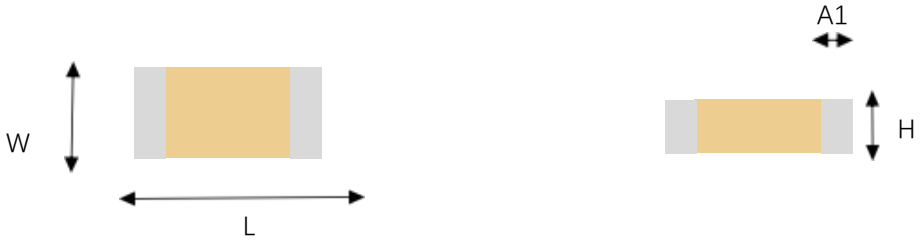
structural description:

Pin No.	1	2
pin assignment	Feed end	stiff end
Note: One of these two pads connects to the RF signal, and the other is used to fix without receiving any signal. The left and right sides of these two pads are completely symmetrical, without distinguishing between positive and negative or left and right.		

Dimension description:



unit (mm)	L	W	H	A1
outline dimension	1.6 ± 0.05	0.8 ± 0.05	0.42 ± 0.05	0.15 ± 0.05

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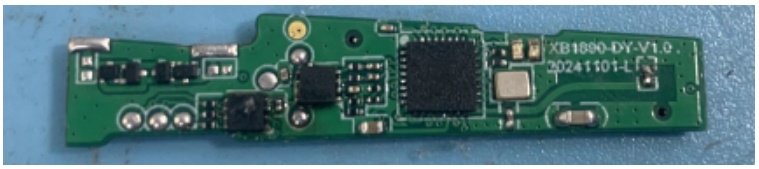
Schematic diagram of antenna placement, clearance treatment and matching network



graph 1

Match device values	graph 1	
	Parallel device Shunt 1	3pF
	Series device Series 1	0.3pF
	graph 2	
	Series device Series 1	0.3pF
	Series device Series 2	0.3pF

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Any type of antenna requires impedance matching to ensure that the antenna performance meets the requirements of impedance specifications, and A1608C2G42M100-02 patch antennas also require additional matching networks to ensure that the antenna performance meets the standards.

Three matching devices are used to form π type matching network for impedance matching of A1608C2G42M100-02 patch antenna.

The specific device values of these matching devices need to be obtained after antenna impedance matching and debugging. The device values shown in the figure above are the values we test on the circuit board and can be used as reference values. If you do not require high antenna performance, you can also directly use the above reference values.

The line width should be designed to match the 50 ohm characteristic impedance according to the PCB material and thickness.

It is recommended that the antenna be placed at the edge or corner of the circuit board, not in the middle of the circuit board, and not surrounded by conductors.

Near the antenna area on the circuit board, there needs to be a gap. As shown in the figure above, the blank area (white area) on the circuit board is the gap area for the antenna. The so-called clearance area refers to the region where no mounting or wiring should occur, except for the antenna pad and antenna signal traces. The gap treatment in this area should cover all layers of the PCB, not just the surface layer.

The net area of the antenna should be as large as possible, and the antenna should be placed as close to the edge of the circuit board as possible, so that the antenna body is far away from the circuit board. The larger the net area, the better the antenna efficiency and gain performance.

In the structure of the whole machine, it is recommended that there should be no conductor above or below the head area in the direction of the PCB, otherwise it will affect the antenna performance.

Non-clean areas need to be paved, and the layers are connected through holes to increase the ground as much as possible.

The device used for antenna matching debugging is the network analyzer. If you are an antenna professional, you can use it with your own

The network analyzer performs antenna matching debugging. If you do not have relevant technology, please contact us, we can provide professional antenna impedance debugging service for your products. Antenna matching debugging requires providing the whole product (no need to open).

Please note that the antenna impedance matching debugging mentioned here is not related to the RF line impedance control. The RF line impedance control is only for the RF line wiring in the paved area, and the antenna impedance matched here is the antenna. Please do not confuse the two.

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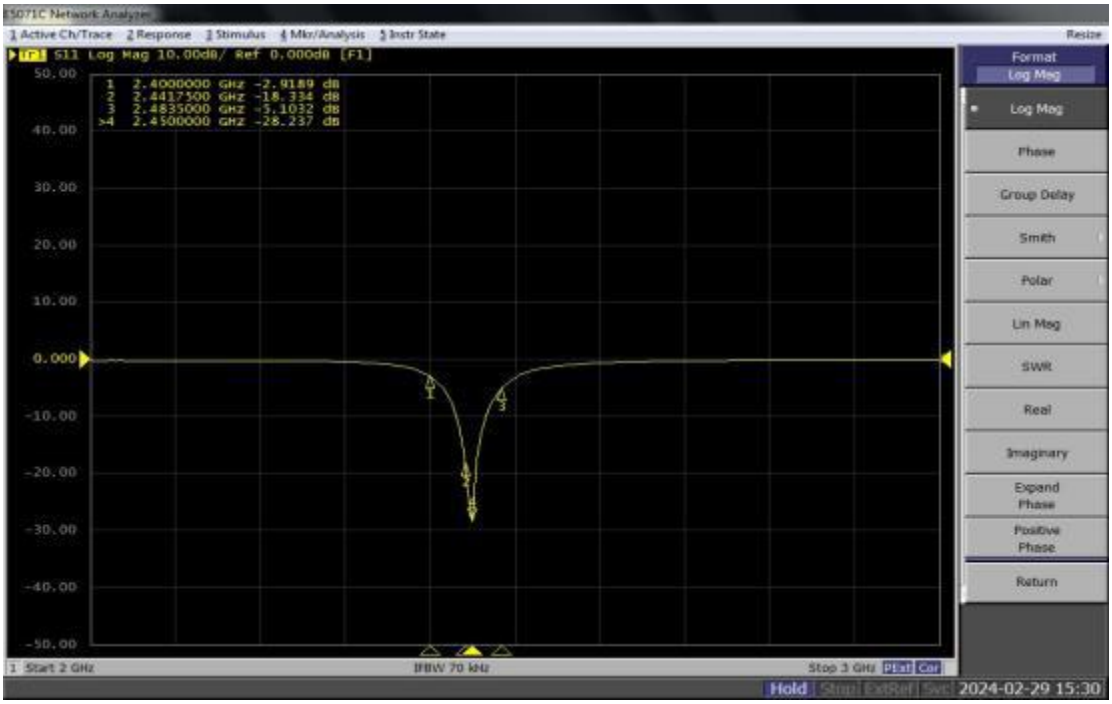
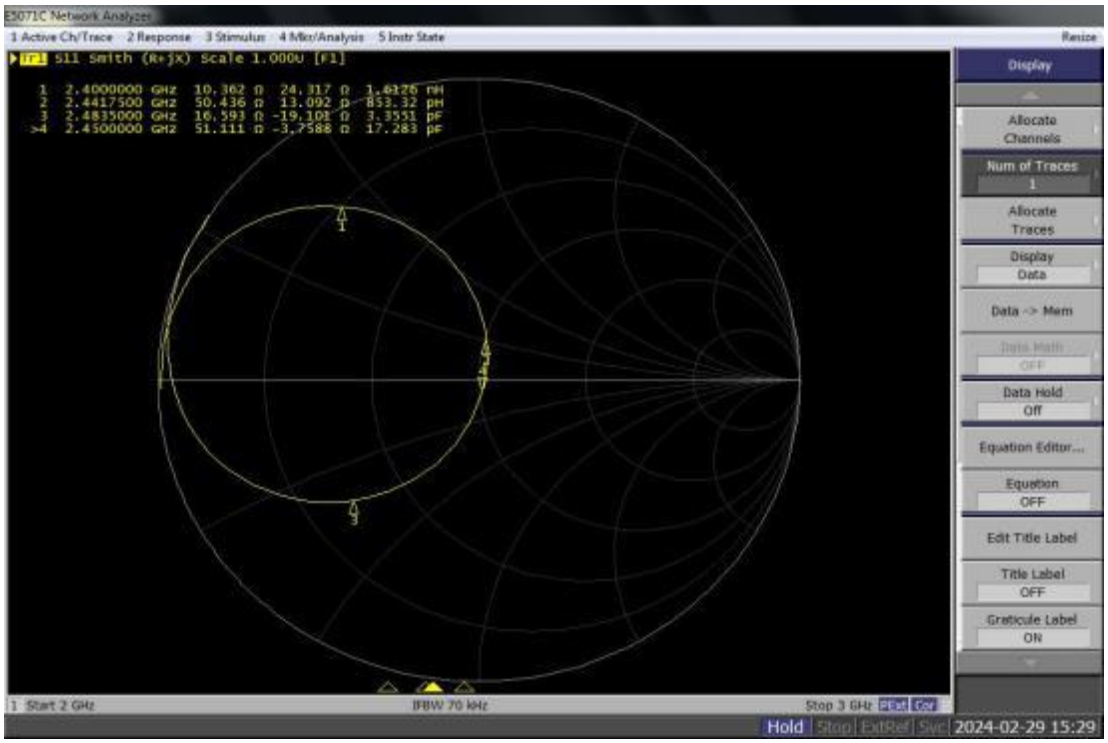
2. The performance parameters after antenna matching and debugging are shown in the following figure:

S11 Log Mag ：



S11 Smith R+jx ：



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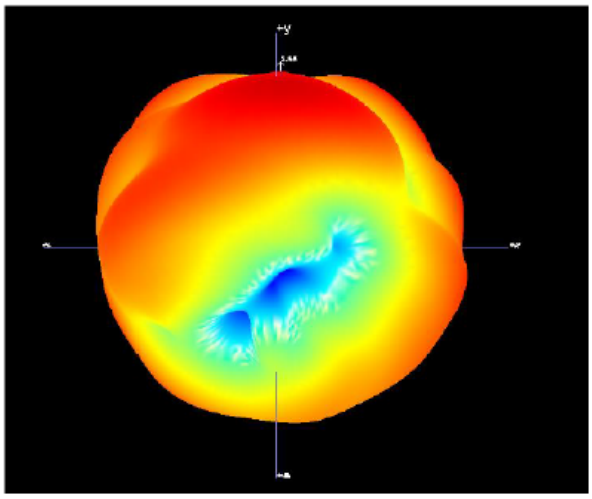
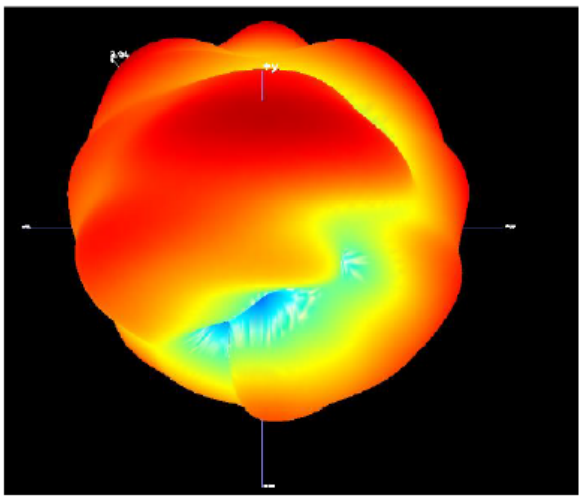
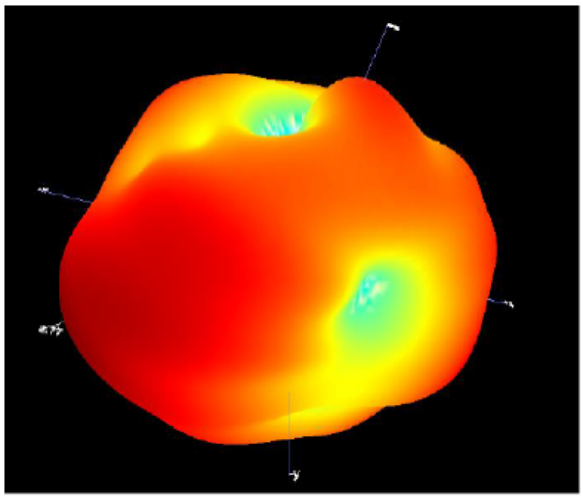


2400Mhz

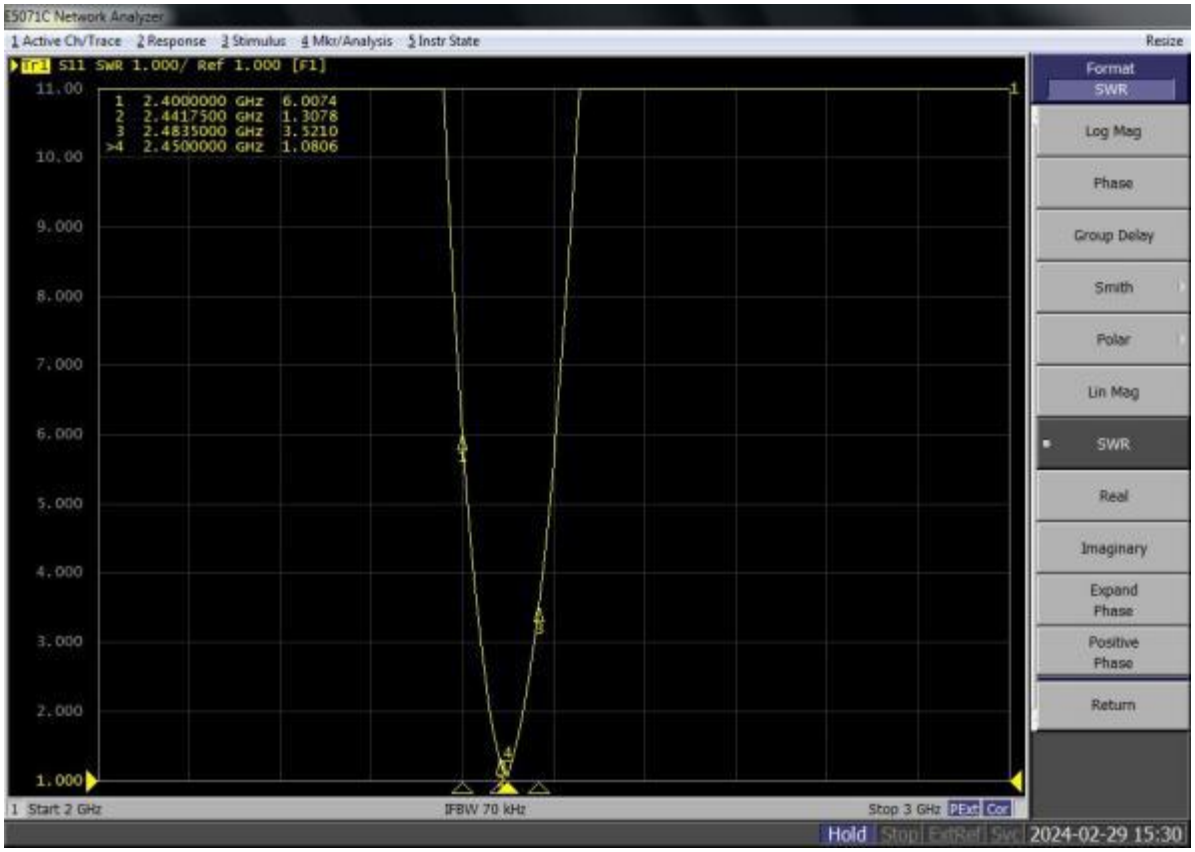


2450Mhz



2483Mhz

S11SWR：


E5071C Network Analyzer
1 Active Ch/Trace 2 Response 3 Stimulus 4 Mkr/Analysis 5 Instr State
Resize
Tr1 S11 SWR 1.000/ Ref 1.000 [F1]
1 2.4000000 GHz 6.0074
2 2.4417500 GHz 1.3078
3 2.4835000 GHz 3.5210
>4 2.4500000 GHz 1.0806
11.00
10.00
9.000
8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
1 Start 2 GHz
IFBW 70 kHz
Stop 3 GHz
PExt Cor
Hold Stop ExtRef Svc 2024-02-29 15:30
Format
SWR
Log Mag
Phase
Group Delay
Smith
Polar
Lin Mag
SWR
Real
Imaginary
Expand Phase
Positive Phase
Return

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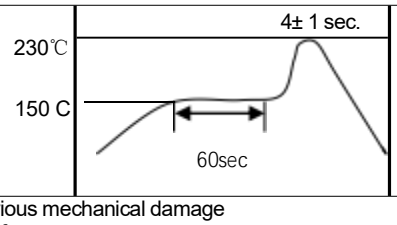
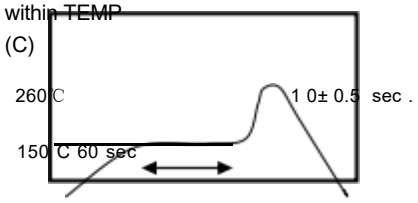
3. Reliability and test conditions

<table>
<tr><th>project</th><th>requirement</th><th>TEST CONDITION</th></tr>
<tr><td>weldability test</td><td>1. The wetting should exceed 90% coverage
2. No visible mechanical damage temperature
 
</td><td>Heating temperature: 150 c / 60 seconds. Welding temperature: 230±5 c
Duration: 4±1 second.
Welding: Sn-Ag3.0-Cu0.5
Lead-free solder: rosin</td></tr>
<tr><td>Welding material heat resistance</td><td>1. No obvious mechanical damage
2. Center frequency change: ±6%
 
</td><td>Heating temperature: 150 c / 60 seconds. Welding temperature: 260±5 c
Duration: 10±0.5 seconds.
Welding: Sn-Ag3.0-Cu0.5
Lead-free solder: rosin</td></tr>
<tr><td>Component adhesion (Push test)</td><td>1. No obvious mechanical damage</td><td>The device should be reflow soldered (230±5C for 10 seconds) to the tin-coated copper substrate and a force gauge should be applied on the side of the component. The equipment must have -st-f0.5 kg, and the connection to the component should not be terminated 。</td></tr>
<tr><td>Component adhesion (draw trial)</td><td>1. No obvious mechanical damage</td><td>Insert the 10cm wire into the remaining open eye bend and wind the ends of the wire evenly upward together.
The terminal should not be obviously damaged.</td></tr>
<tr><td>thermal shock</td><td>1. No obvious mechanical damage
2. Center frequency change: ±6% or less
<table>
<tr><th>stage</th><th>temperature (C)</th><th>time (min)</th></tr>
<tr><td>1</td><td>+1 10± 5 C</td><td>30±3</td></tr>
<tr><td>2</td><td>room temperature</td><td>Within 3 seconds</td></tr>
<tr><td>3</td><td>-40± 2 C</td><td>30±3</td></tr>
<tr><td>4</td><td>room temperature</td><td>Within 3 seconds</td></tr>
</table></td><td>+ 110 c => 30±3 minutes
-40 c => 30±3
minute test cycle:
10 cycles
The chip is stable for 2 to 3 hours under normal conditions before measurement.</td></tr>
<tr><td>resistance to elevated temperatures</td><td>1. No obvious mechanical damage
2. Center frequency change: ±6% or less
3. No disconnection or short circuit</td><td>Temperature: +110±5C Duration: 1000±12h The chip should be stable in normal state for 2~3 hours before measurement.</td></tr>
<tr><td>Low temperature resistance</td><td>1. No obvious mechanical damage
2. Center frequency change: ±6% or less
3. No disconnection or short circuit</td><td>temperature:-40±5c
Duration: 1000±12 hours
The chip is stable for 2~3 hours before measurement under normal conditions.</td></tr>
</table>

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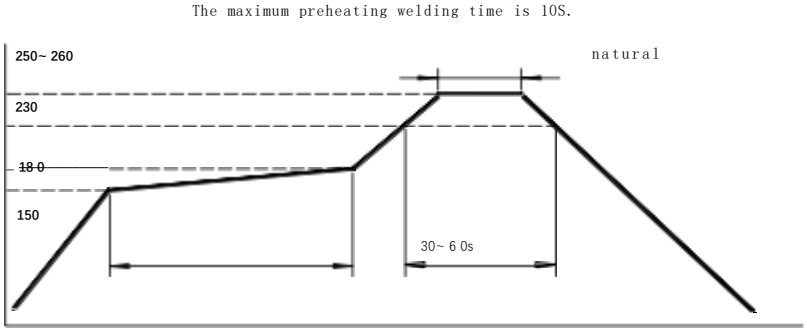
Moisture testing	1. No obvious mechanical damage 2. Center frequency change: ±6% 3. No disconnection or short circuit	temperature:40±2c Humidity: 90% ~95% RH Duration: 1000±12h Before measurement, the chip should be stable in normal state for 2~3 hours.

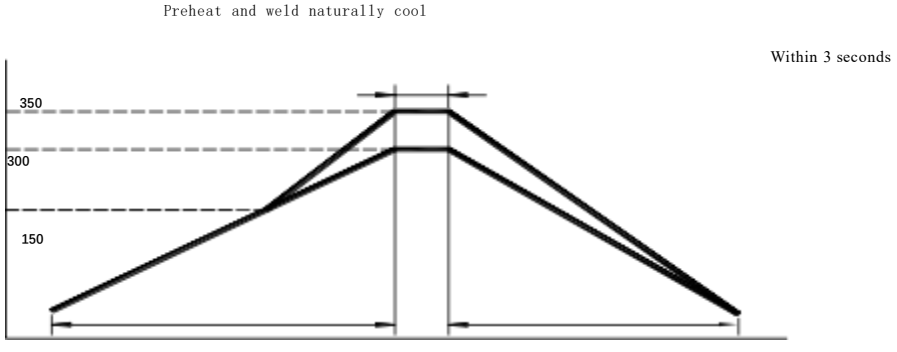
4. Welding process

Mildly activated rosin flux is the preferred choice. Due to the different thermal expansion coefficients between solder, chips, and substrates, using too little solder can lead to stress failure. Terminals are suitable for all wave and reflow soldering systems. If manual soldering is unavoidable, the preferred technique is to use a hot air soldering tool.

reflow soldering



iron soldering



The recommended temperature curve of reflow soldering is shown in Figure 1.

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Due to inherent process control limitations, the use of soldering irons to connect products is not encouraged. If a soldering iron must be used, the following precautions are recommended.

· Preheat the circuit and product to 150℃
· Do not use ceramic with iron tip 20 watt soldering iron, soldering iron head diameter 1.0 mm
· Top temperature (maximum) 280℃
· Needle tip diameter (maximum 1.0mm) limits the welding time to 3 seconds.

5. User reminder of A1608C2G42M100-02 ceramic chip antenna

1. The chip antenna is made of ceramic material, which is harder and more fragile than the printed circuit board material. Bending of the circuit board where the chip antenna is located can cause cracking of the solder joint or the antenna itself.

2. The antenna should be placed in the corner of the PCB with sufficient gap from other circuits. No components, planes, mounting screws or traces shall be placed in the antenna no zone of each layer. The actual prohibited area depends on the antenna used.

3. As an internal antenna, ceramic antenna should avoid the influence of circuit board metal and shell as far as possible, so direct use often will have performance problems, so it cannot be directly used, but must be adjusted according to your own product.

4. Ultrasonic welding near the chip antenna position should be operated with caution. Strong ultrasonic vibration may cause the chip antenna solder to crack.

5. The above data is measured on the reference PCB (ground) shown in this specification. When the antenna position or size of the PCB changes, the antenna performance and the value of the matching element may differ from the data shown here.

6. The information provided in this reference is considered correct as of the date of publication. Guangdong Dongyou Technology Co., Ltd. reserves the right to modify the reference specifications without prior notice due to technical

improvements and other reasons. Before using this product, please consult the companys engineering team for the latest information. At the customers request, we can simulate or measure the equipment of interest in our testing facilities to provide advice and assistance for the installation of the antenna on the customers equipment.

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