Specification Sheet for Approved

Customer Name:	
Customer Part No.:	
Ceaiya Part No:	CWCI0603C 系列
Spec No:	C-0603C

【For Customer Approval Only】

If you Approval, Please Stamp

【RoHS Compliant Parts】

Approved By	Checked By	Prepared By
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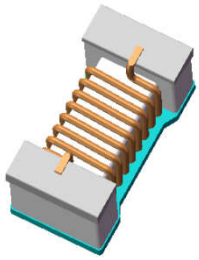
【Version of Changed Record】

Rev.	Effective Date	Changed Contents	Change Reasons	Approved By
A0	2023-06-27	New release	/	Li qing hui

1. Scope

This specification applies to the CWCI0603C Series of wire wound SMD chip inductor.



2. Product Description and Identification (Part Number)

1) Description:

CWCI0603C series of Wire wound SMD chip inductor.

2) Product Identification (Part Number)

CWCI	0603	C	-	10N	S	T
①	②	③		④	⑤	⑥

①	Type
CWCI	Wire Wound Chip Inductor

② External Dimensions(L×W) 【inch】	
0603	1.60mm×0.8mm

③	Material type
C	Ceramic

④	Nominal Inductance
Example	Example
4N7	4.7nH
10N	10nH
R10	100nH

⑤	Inductance Tolerance
H	±3%
J	±5%
K	±10%

⑥ Packing	
T	Tape & Reel

3. Electrical Characteristics

Please refer to Item 5.

1） Operating temperature range (individual chip without packing): -25℃ ~ +100℃ （Including Self-heating）.

2） Storage temperature range (packaging conditions): -25℃ ~ +100℃ and RH 70% (Max.).

4. Shape and Dimensions (Unit:mm)

Dimensions and recommended PCB pattern for reflow soldering, please see Fig4-1 and Table4-1

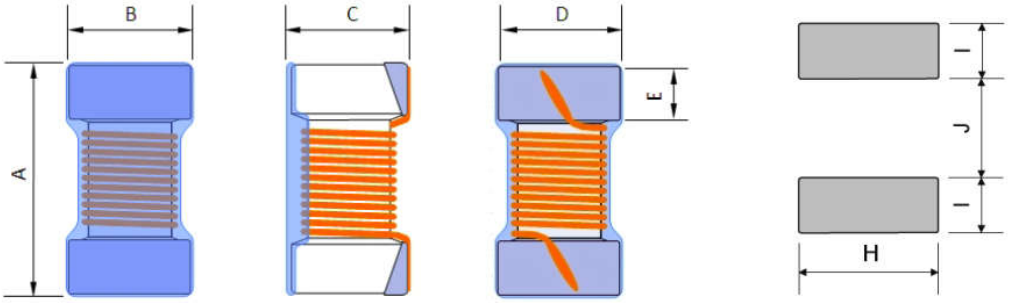


Fig4-1.

Table 4-1.

Series	A	B	C	D	E	H	I	J
CWCI0603C	1.80 Max.	1.20 Max.	1.0 Max.	0.90 typ.	0.30 Ref	1.15 Ref	0.64 Ref	0.64 Ref

5. Electrical Characteristics

Part No.	Inductance	Tolerance	Typ. Quality Factor	L/Q Test Freq.	Max.DC Resistance	Max.Rated Current	Min. Self-resonant Frequency
	nH	-	-	MHz	Ω	mA	MHz
	L	-	Q	Freq.	DCR	Ir	S.R.F
CWCI0603C-2N2□T	2.2	H,J,K	15	250	0.080	700	>6000
CWCI0603C-3N3□T	3.3	H,J,K	30	250	0.059	700	>6000
CWCI0603C-3N6□T	3.6	H,J,K	25	250	0.090	700	>6000
CWCI0603C-3N9□T	3.9	H,J,K	25	250	0.090	700	>6000
CWCI0603C-4N7□T	4.7	H,J,K	30	250	0.120	700	>6000
CWCI0603C-5N6□T	5.6	H,J,K	30	250	0.120	700	5800
CWCI0603C-6N8□T	6.8	H,J,K	30	250	0.120	700	5800
CWCI0603C-7N5□T	7.5	H,J,K	27	250	0.130	700	5800
CWCI0603C-8N2□T	8.2	H,J,K	30	250	0.130	700	5800
CWCI0603C-10N□T	10	H,J,K	35	250	0.150	600	4600
CWCI0603C-12N□T	12	H,J,K	40	250	0.150	600	4000
CWCI0603C-15N□T	15	H,J,K	40	250	0.160	600	4000
CWCI0603C-16N□T	16	H,J,K	40	250	0.160	600	3000
CWCI0603C-18N□T	18	H,J,K	42	250	0.200	600	3000
CWCI0603C-20N□T	20	H,J,K	45	250	0.200	600	3000
CWCI0603C-22N□T	22	H,J,K	40	250	0.210	600	3000
CWCI0603C-23N□T	23	H,J,K	45	250	0.220	600	2650
CWCI0603C-24N□T	24	H,J,K	50	250	0.220	490	2650
CWCI0603C-27N□T	27	H,J,K	40	250	0.220	490	2650
CWCI0603C-33N□T	33	H,J,K	40	250	0.280	470	2250
CWCI0603C-36N□T	36	H,J,K	40	250	0.280	460	2250
CWCI0603C-39N□T	39	H,J,K	50	250	0.290	460	2080
CWCI0603C-43N□T	43	H,J,K	50	250	0.320	400	2000
CWCI0603C-47N□T	47	H,J,K	36	200	0.320	400	2000
CWCI0603C-51N□T	51	H,J,K	35	200	0.320	390	1900
CWCI0603C-56N□T	56	H,J,K	38	200	0.350	360	1900
CWCI0603C-62N□T	62	H,J,K	36	200	0.380	350	1800
CWCI0603C-68N□T	68	H,J,K	36	200	0.380	350	1700
CWCI0603C-72N□T	72	H,J,K	35	150	0.600	320	1700
CWCI0603C-75N□T	75	H,J,K	38	150	0.600	300	1700
CWCI0603C-82N□T	82	H,J,K	34	150	0.620	300	1700
CWCI0603C-R10□T	100	H,J,K	35	150	0.780	260	1400
CWCI0603C-R12□T	120	G,H,J,K	32	150	1.000	240	1200
CWCI0603C-R13□T	130	H,J,K	32	150	1.000	220	1000
CWCI0603C-R15□T	150	H,J,K	32	150	1.120	200	990
CWCI0603C-R16□T	160	H,J,K	30	100	1.200	220	990
CWCI0603C-R18□T	180	H,J,K	30	100	1.380	180	980
CWCI0603C-R20□T	200	H,J,K	30	100	1.490	150	950
CWCI0603C-R22□T	220	H,J,K	30	100	2.200	150	900
CWCI0603C-R27□T	270	H,J,K	30	100	2.600	150	900
CWCI0603C-R30□T	300	H,J,K	30	100	3.200	110	900
CWCI0603C-R33□T	330	H,J,K	30	100	4.200	100	800
CWCI0603C-R39□T	390	H,J,K	30	100	4.200	100	800
CWCI0603C-R47□T	470	H,J,K	30	100	5.700	90	700

6. Test and Measurement Procedures

6.1 Test Conditions

Unless otherwise specified, the standard atmosptheric conditions for measurement/test as:

a. Ambient Temperature: 20±15℃

b. Relative Humidity: 65%±20%

c. Air Pressure: 86 KPa to 106KPa

If any doubt on the results, measurements/tests should be made within the following limits:

a. Ambient Temperature: 20±2℃

b. Relative Humidity:65%±5%

c. Air Pressure: 86KPa to 106KPa

6.2 Visual Examination

a. Inspection Equipment: 30X magnifier

6.3 Electrical Test

6.3.1 DC Resistance (DCR)

a. Refer to Item 5.

b. Test equipment: HIOKI3540 or equivalent.

6.3.2 Inductance (L)

a. Refer to Item 5.

b. Test equipment: Agilent 4287A+ Agilent 16197A or equivalent.

c. Test signal: -13dBm or 10mA

d. Test frequency refers to Item 3.

6.3.3 Q Factor (Q)

a. Refer to Item 5

b. Test equipment: Agilent4287A + Agilent16197A or equivalent.

c. Test signal: -13dBm or 10mA

d. Test frequency refers to Item 5.

6.3.4 Self-Resonant Frequency (SRF)

a. Refer to Item 5

b. Test equipment: Agilent4991B + Agilent16197A and HP 8753E or equivalent.

c. Test signal: -20dBm or 50mV

6.3.5 Saturation Current (IDC)

a. Refer to Item 5

b. Test equipment: Electric Power, Electric current meter, Agilent4991A + Agilent16197A or equivalent.

c. Measurement method:

1. Set test current to be 0 mA.
2. Measure initial chip inductance.
3. Gradually increase voltage and measure chip inductance for corresponding current.

d. Definition of Saturation Current (IDC): IDC is direct electric current as chip inductance drop just 10% from its value without current.

6.3.6 Rated Current (Irms)

e. Refer to Item 5.

f. Test equipment (see Fig.6.3.4-1): Electric Power, Electric current meter, Thermometer.

g. Measurement method (see Fig.6.3.4-1):

1. Set test current to be 0 mA.
2. Measure initial temperature of chip surface.
3. Gradually increase voltage and measure chip temperature for corresponding current.

h. Definition of Rated Current (Irms): Irms is direct electric current as chip surface temperature rose just 15˚C against chip initial surface temperature (Ta) (see Fig.6.3.4-2)

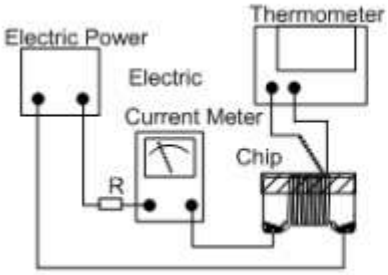


Fig. 6.3.4-1

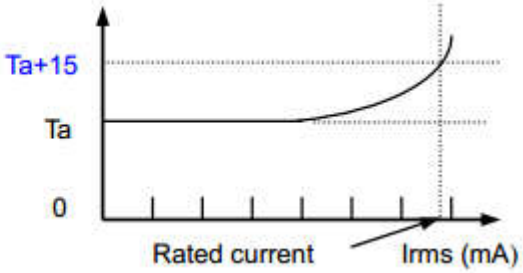
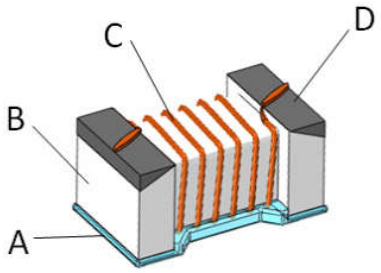


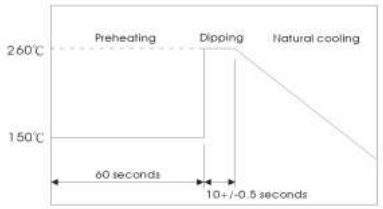
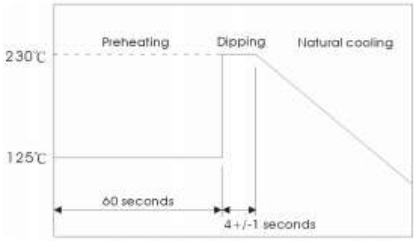
Fig. 6.3.4-2

7. Structure: See the following.



No.	Components	Material
A	Coating	Ultraviolet epoxy resin
B	Core	Ceramic
C	Wire	Polyurethane system enameled copper wire
D	Electrodes	Ag/Ag-Pd with Ni and Sn plating

8. Reliability Test

Items	Performance	Test Condition
8.1 Solder Heat Resiestance 耐焊锡热	Appearance: No significant abnormality. Inductance change: Within ±20% 外观： 无明显异常 电感值：变化值在初始值 20%以内	Preheat: 150℃, 60sec. Solder: H63A Solder temperature: 260±5℃ Flux for lead free: rosin Dip time: 10±0.5sec. 预热：150℃，60 sec 锡炉温度：260±5℃ 助焊剂：rosin. 时间：10±0.5sec 
8.2 Solderability Test 端面焊锡性	More than 90% of the teminal electrode should be covered with solder. 端电极之锡覆盖面达 90%以上	Preheat: 125±25℃, 60sec. Solder: H63A Solder temperature:230±5℃ Flux for lead free: rosin Dip time: 4±1sec 预热：125℃，60 sec 锡炉温度：230±5℃ 助焊剂：rosin. 时间：4±1sec 
8.3 High Temperature Resistance Test 高温放置测试	Appearance: no damage. Inductance: within±20% of initial value. No disconnection or short circuit. 外观不能破损 电感值：变化值在初始值 20%以内 电性无短路或断线。	Temperature: 85±2℃. Applied current: rated current. Duration: 500 hrs
8.4 Humidity Resistance Test 高湿放置测试	Appearance: no damage. Inductance: within±20% of initial value. No disconnection or short circuit. 外观不能破损 电感值：变化值在初始值 20%以内 电性无短路或断线。	Temperature: 40±2℃. Applied current: rated current. Duration: 500 hrs Humidity: 90~95%
8.5 Thermal shock 热冲击试验	Appearance: no damage. Inductance: within±20% of initial value. No disconnection or short circuit. 外观不能破损 电感值：变化值在初始值 20%以内 电性无短路或断线。	Condition for 1 cycle Step1: -25±2℃ , 30±3 min. Step2: Room temperature within 15 min. Step3: +85±5℃, 30±3 min. Step4: Room temperature within 15 min. Number of cycles: 50PCS Phase / Temperature(℃) / Time(min) 1 / -25±2℃ / 30±3 2 / Room Temp. / 15 3 / +85±2℃ / 30±3 4 / Room Temp. / 15
8.6 Humidity Resistance 高湿测试	Appearance: no damage. Inductance: within±20% of initial value. No disconnection or short circuit. 外观不能破损 电感值：变化值在初始值 20%以内 电性无短路或断线。	Humidity: 90~95%RH. Temperature: 40±5℃. Applied current: rated current. Duration: 500±12hrs. Measured at room temperature after placing for 2 to 3hrs. 湿度：90~95%RH. 温度：40±5℃. 须加电流：额定电流。 放置时间：500±12hrs.

9. Packaging and Storage

9.1 Packaging

There is one type of packaging for the chip chip inductors. Please specify the packing code when ordering.

Tape Carrier Packaging:

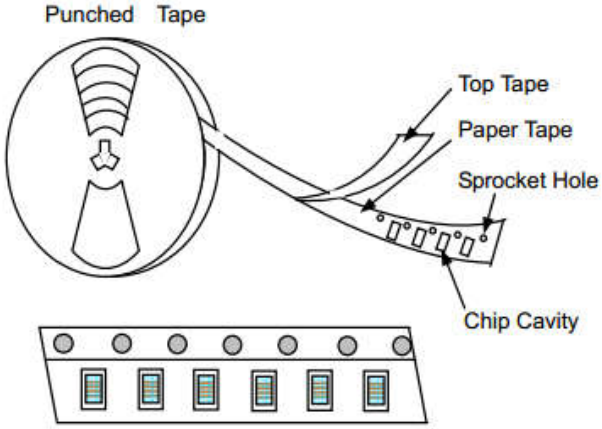
Packaging code: T

i. Tape carrier packaging are specified in attached figure

ii. Tape carrier packaging quantity please see the following table:

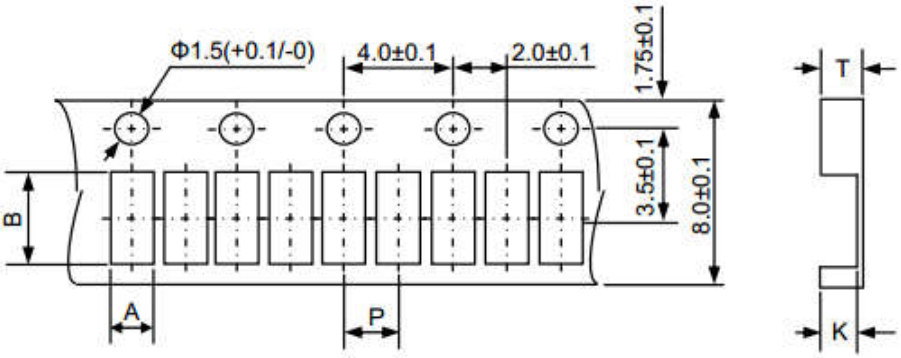
Type	0603
Tape	Punched Tape
Quantity	4K

(1) Taping Drawings (Unit: mm)



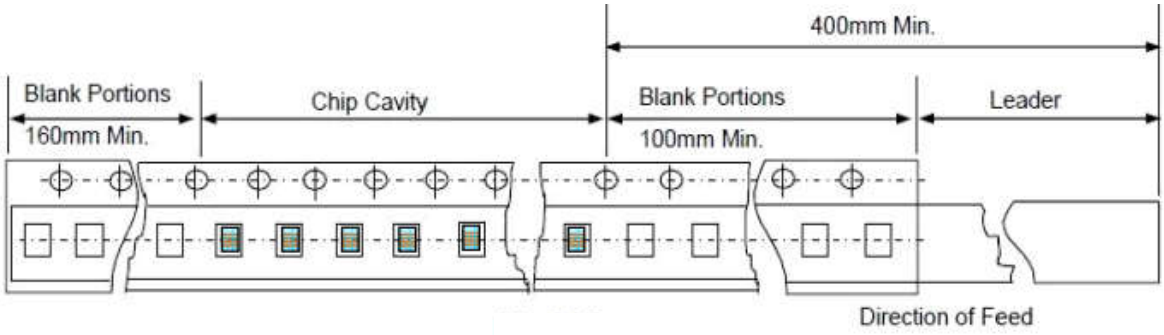
Remark: The sprocket holes are to the right as the tape is pulled toward the user.

(2) Taping Dimensions (Unit: mm)

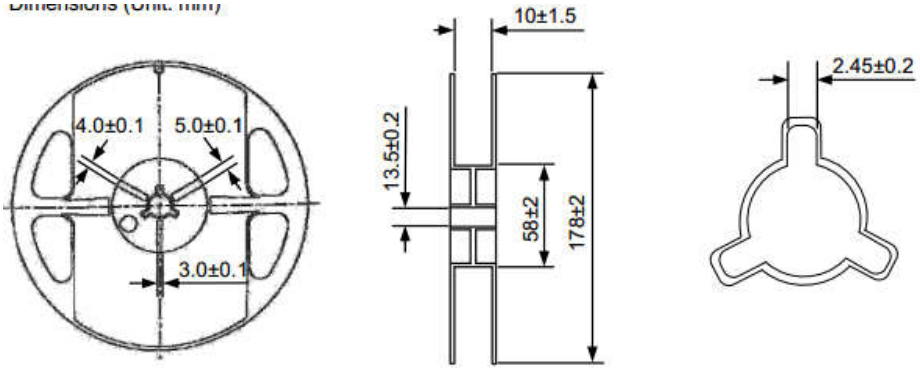


Type	A	B	P	K	T
0603	1.30±0.10	1.90±0.10	4.0±0.05	1.08±0.10	1.12±0.10

(3) Leader and blank portion



(4) Reel Dimensions (Unit: mm)



(5) Peeling off force: 10gf to 70gf in the direction show below.

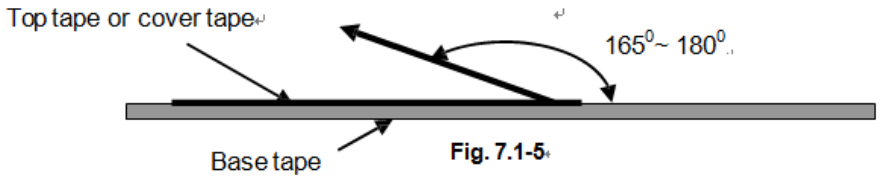


Fig. 7.1-5

10. Storage

a. The solderability of the external electrode may be deteriorated if packages are stored where they are exposed to high humidity. Package must be stored at 40℃ or less and 70% RH or less.

b. The solderability of the external electrode may be deteriorated if packages are stored where they are exposed to dust of harmful gas (e.g. HCl, sulfurous gas of H_2S)

c. Packaging material may be deformed if package are stored where they are exposed to heat of direct sunlight.

d. Minimum packages, such as polyvinyl heat-seal packages shall not be opened until they are used. If opened, use the reels as soon as possible.

e. Solderability shall be guaranteed for 12 months from the date of delivery on condition that they are stored at the environment specified in specification. .For those parts, which passed more than 12months shall be **checked solder-ability before use.**

11. Warning and Attentions

11.1 Precautions on Use

a. Always wear static control bands to protect against ESD.

b. Any devices used (soldering iron, measuring instruments) should be properly grounded.

c. Use non-magnetic tweezers when handing the chips.

d. Pre-heating when soldering, and refer to the recommended condition specified in specification.

e. Don't apply current in excess of the rated current value. It may cause damage to components due to over-current.

f. Keep clear of anything that may generate magnetic fields such as speakers, coils.

g. When soldering, the electrical characteristics may be varied due to hot energy and mechanical stress.

h. When coating products with resin, the relatively high resin curing stress may change the electrical characteristics. For exterior coating, select resin carefully so that electrical and mechanical performance of the product is not affected. Before using, please evaluate reliability with the product mounted in your application set.

i. When mount chips with adhesive in preliminary assembly, do appropriate check before the soldering stage, i.e., the size of land pattern, type of adhesive, amount applied, hardening of the adhesive on proper usage and amounts of adhesive to use.

j. Mounting density: Add special attention to radiating heat of products when mounting other components nearby. The excessive heat by other products may cause deterioration at joint of this product with substrate.

k. Since some products are constructed like an open magnetic circuit, narrow spacing between components may cause magnetic coupling.

l. Please do not give the product any excessive mechanical shocks in transportation.

m. Please do not touch wires by sharp terminals such as tweezers to avoid causing any damage to wires.

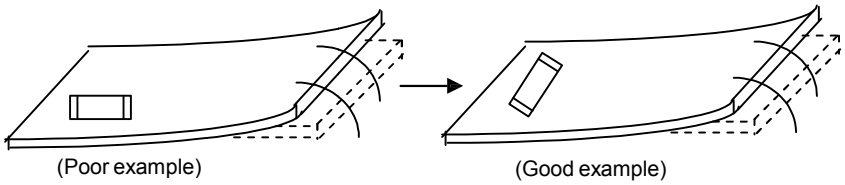
n. Please do not add any shock and power to the soldered product to avoid causing any damage to chip body.

o. Please do not touch the electrodes by naked hand as the solderability of the external electrodes may deteriorate by grease or oil on the skin.

11.2 **PCB Bending Design**

The following shall be considered when designing and laying out PCB's.

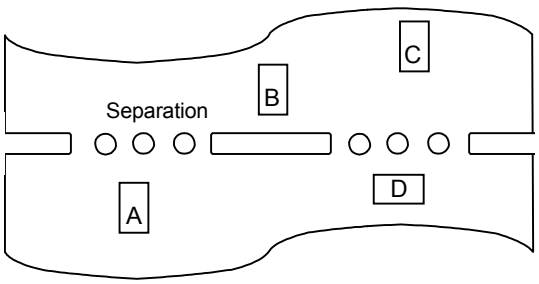
a. PCB shall be designed so that products are not subjected to the mechanical stress from board warp or deflection.



(Poor example) (Good example)

Products shall be located in the sideways direction to the mechanical stress.

b. Products location on PCB separation.



Product shall be located carefully because they may be subjected to the mechanical stress in order of A>C=B>D.

c. When splitting the PCB board, or insert (remove) connector, or fasten thread after mounting components, care is required so as not to give any stress of deflection or twisting to the board. Because mechanical force may cause deterioration of the bonding strength of electrode and solder, even crack of product body. Board separation should not be done manually, but by using appropriate devices.

11.3 Recommended PCB Design for SMT Land-Patterns

When chips are mounted on a PCB, the amount of solder used (size of fillet) and the size of PCB Land-Patterns can directly affect chip performance (such as Q). And they can also cause other soldering question (such as offset and side lap). Therefore, the following items must be carefully considered in the design of solder land patterns.

a. Please use the PCB pad and solder paste we recommend, and contact us in advance if they need to be changed.

b. Please use flux contained with resin since the highly acidic (Chlorine content more than 0.2 wt%) or water-soluble one could damage the insulation film of wires, then causing short circuit of parts.

c. The amount of solder applied can affect the ability of chips to withstand mechanical stresses which may lead to breaking or cracking. Therefore, when designing land-patterns it is necessary to consider the appropriate size and configuration of the solder pads which in turn determines the amount of solder necessary to form the fillets.

d. When more than one part is jointly soldered onto the same land or pad, the pad must be designed that each component's soldering point is separated by solder-resist.

Recommended land dimensions please refer to product specification.

12. Recommended Soldering Technologies

This product is only for reflow soldering and iron soldering.

12.1 Re-flowing Profile

△ Preheat condition: 150~200℃/60~120sec.

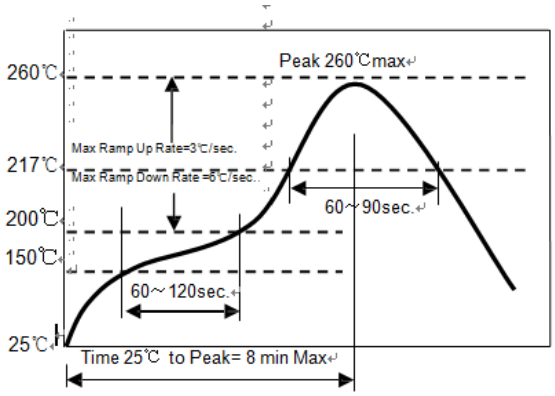
△ Allowed time above 217C: 60~90sec.

△ Max temp: 260℃

△ Max time at max temp: 10sec.

△ Solder paste: Sn/3.0Ag/0.5Cu

△ Allowed Reflow time: 2 times max.



[Note: The reflow profile in the above table is only for qualification and is not meant to specify board assembly profiles. Actual board assembly profiles must be based on the customer's specific board design, solder paste and process, and should not exceed the parameters as the Reflow profile shows.]

12.2 Maintenance of heat gun (for your reference)

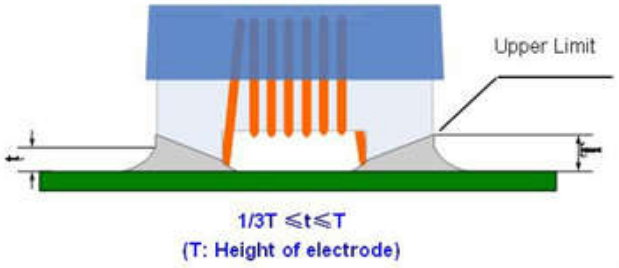
△ Power output: 30W

△ Temperature: 350℃Max

△ **Heat time: More than 5 seconds heating may cause short circuit of parts.**

13. Solder Volume

Solder shall be used not to exceed as shown below.

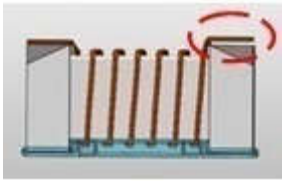
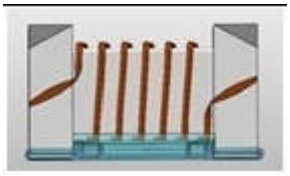
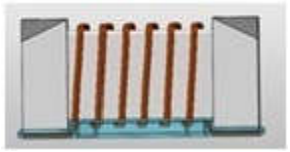
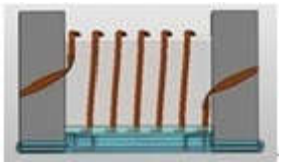
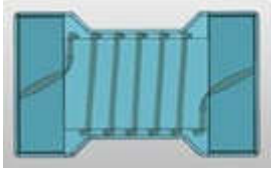


a. Accordingly increasing the solder volume, the mechanical stress to chip is also increased.Exceeding solder volume may cause the failure of mechanical or electrical performance.

b. Before soldering, please ensure that the solder should not adhere to the wire part of chip.

c. Please pay particular attention to whether there is flux remaining on surface of the wire part of chip after subjected to reflow soldering since this may causing short circuit of parts.

Appendix: Appearance standard

File No:		Applied to Wire Wound Ceramic Inductor Series	
Effective date:			
No.	Defect Item Item	Graphic Schematic Drawing	Rejection identification Criteria
1	Wire off/Welding Spot Off		The solder joint welding Spot of wire break away from electrodes, or over the electrodes.
2	Solder misplace	 	Solder joints are not at electrode side but at the coating side or flank.
3	Coating misplace		Coating at flank
			Coating at electrodes side