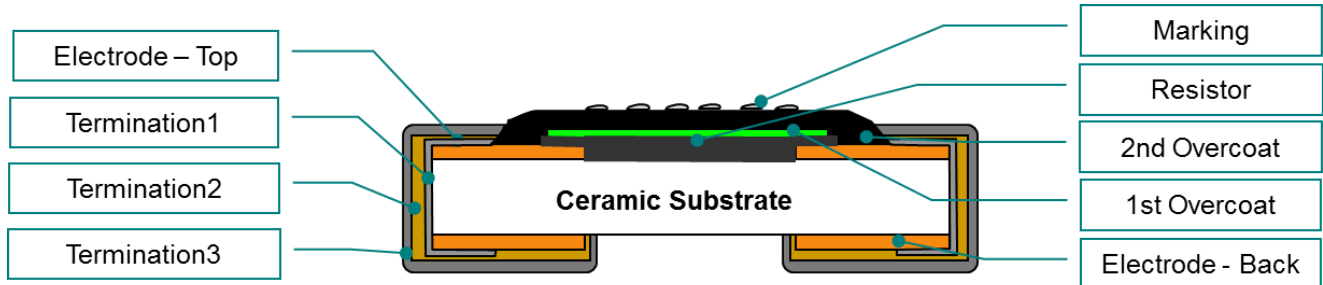


Chip- R Application Guide

Construction



Structure		Material
Layer	Name	
Substrate	Substrate	Aluminum Oxide
Electrode - Top side	C1	Thick film of Ag/Pd
Electrode- Back side (Bottom side)	C3	Thick film of Ag
Resistor	R	Thick film of RuO ₂ /Ag/Pd/Pb
1 st Overcoat - Primary coating	G1	Glass
2 nd Overcoat - Protective coating	G2	Epoxy resin
Marking	MK	Epoxy resin
Termination1- End side	C2	Ni-Cr Alloy
Termination2	Plating Ni	Nickel
Termination3	Plating Sn	Tin

Storage and Handling Conditions

1. Products are recommended to be used up within two years since production as ensured shelf life . Check solderability in case shelf life extension is needed. **Guarantee: 1 year.**
2. To store products with following condition:
 - Temperature :5 to 40°C
 - Humidity :20 to 70% relative humidity
3. Caution:
 - Don't store products in a corrosive environment such as **sea breeze, Cl₂, H₂S, SO₂, NO₂, NH₃, etc.** It may cause oxidization of electrode, which easily be resulted in poor soldering
 - To store products on the shelf and avoid exposure to moisture.
 - Don't expose products to excessive shock, vibration, direct sunlight and so on

Recommendation of Soldering Profiles

In general application, the lead free (Pb-free) termination CRs are used and may be mounted on PCB by IR reflow or wave soldering process with lead-free solder material. The recommended soldering profiles are shown as Fig.1 & 2. The lead-free termination CRs are also suitable on SMT process against lead-containing solder paste. But the soldering temperature should be higher than the melting point of solder paste 30°C at least. If the optimized solder joint is requested, increasing soldering time, temperature and concentration of N₂ within oven are recommended. Advised IR reflow soldering profile is shown as Fig.3.

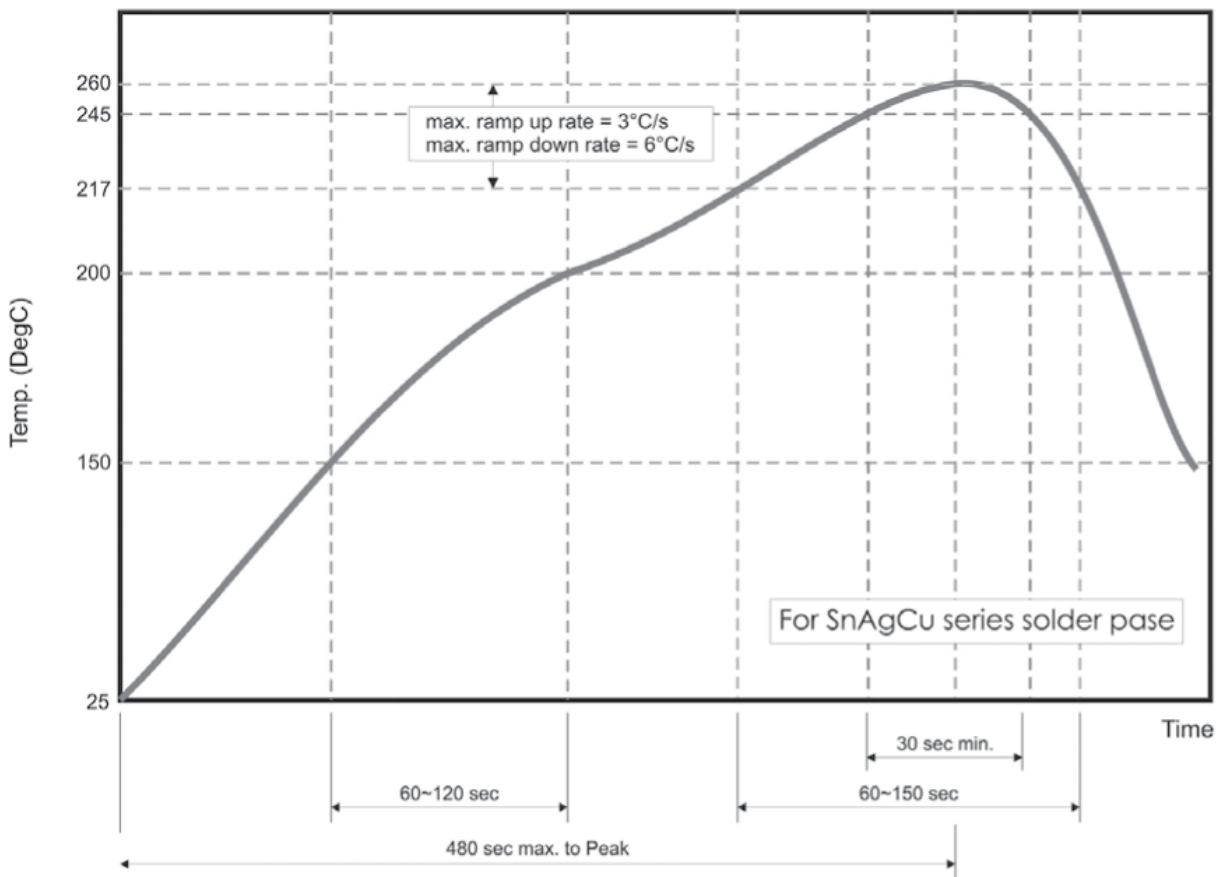


Fig. 1 Recommended IR reflow soldering profile for SMT process with SnAgCu series solder paste

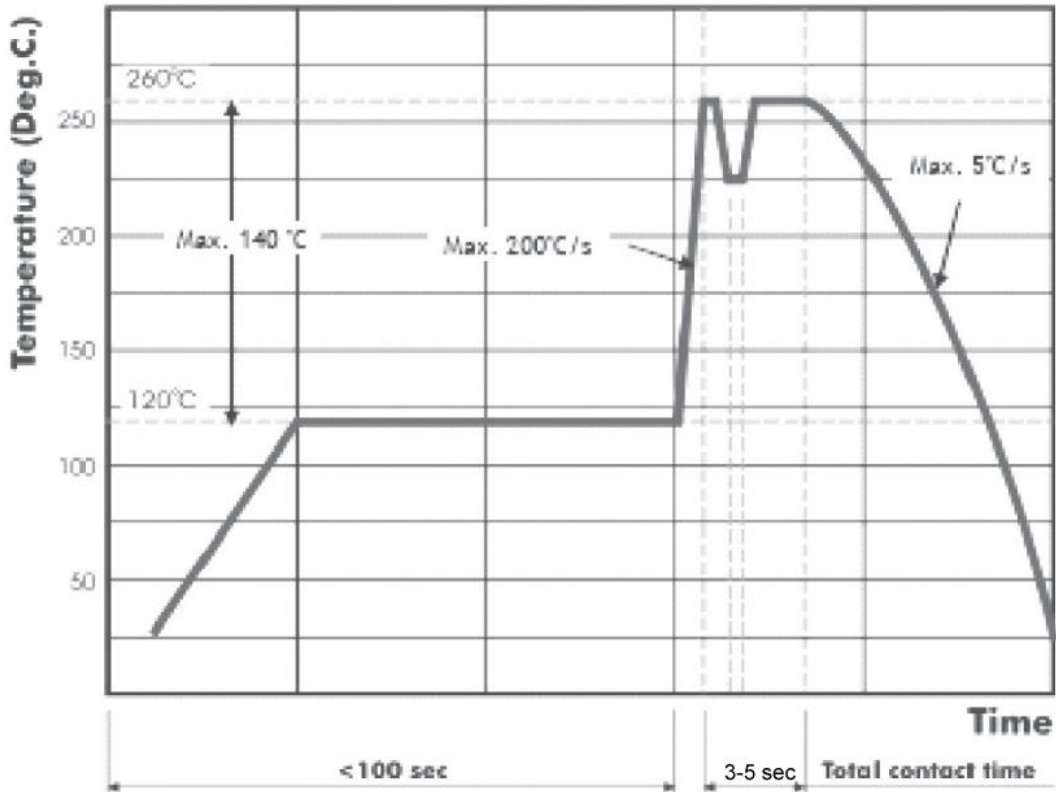


Fig. 2 Recommended wave soldering profile for SMT process with SnAgCu series solder

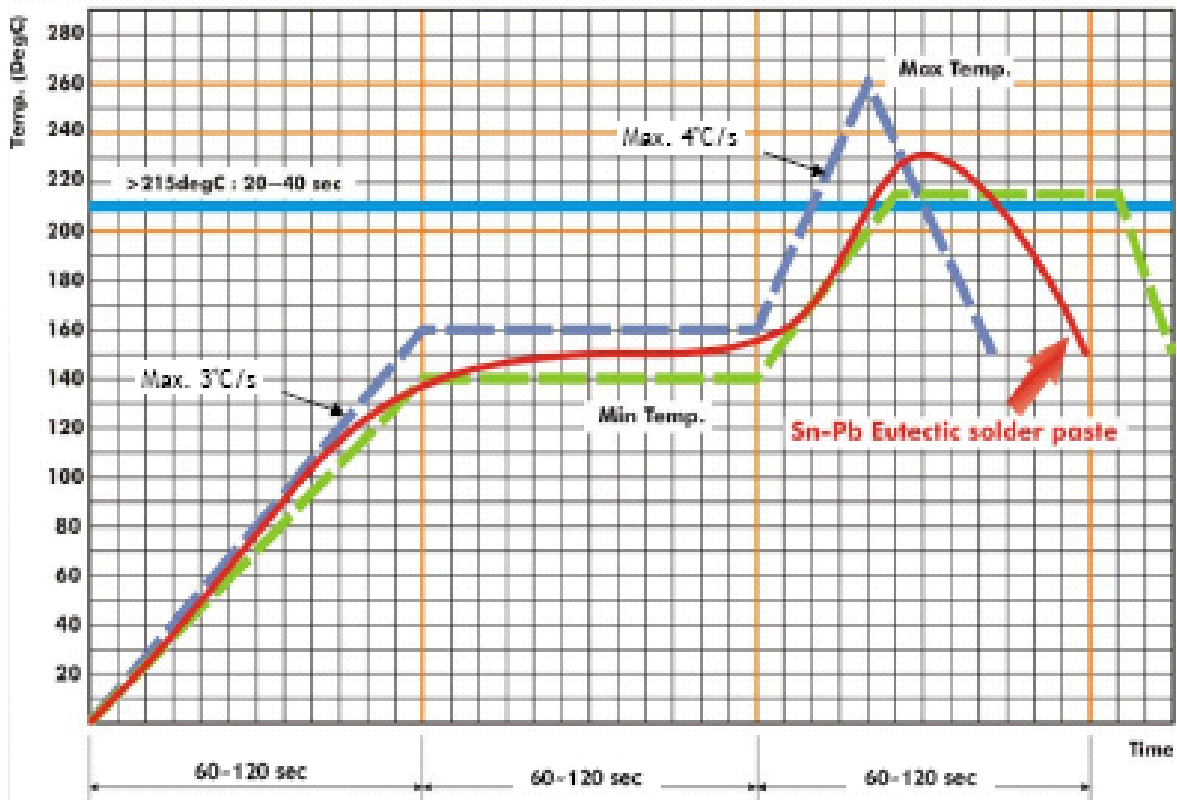


Fig. 3 Recommended reflow soldering profile for SMT process with eutectic SnPb solder paste.

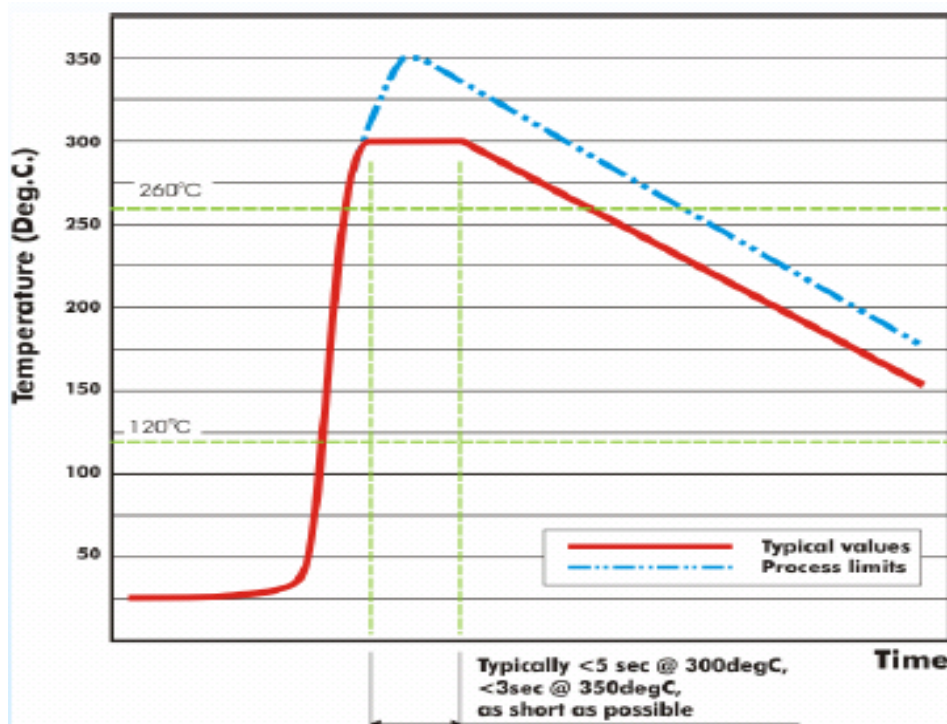


Fig. 4 Recommended soldering profile by manual with SnAgCu series solder material

Precaution of Soldering

1. It is recommended to use a mildly activated rosin flux (less than 0.1% wt chlorine)
2. Excessive flux must be avoided
3. When water-soluble flux is used, enough washing is necessary
- 4. Two times limitations for reflow soldering is highly recommended**
5. Solder repair by soldering iron
 - Max. 350°C for below 3 seconds is highly recommended
 - Do not directly contact termination to avoid thermal shock by using air gun with min. 5mm gap between repairing chip.
 - Keep air blow volume as small as possible
 - Keep Air gun outlet diameter within 2mm
 - Keep air gun blow 45 degree angle with PCB.
6. Prevent any external force on the products until solder is cooled

Mounting

1. Imperfect adjustment of mounting machine may cause the cracks, the chipping and the alignment error. Check and inspect the mounting machine in advance.
2. Set the backup pins in proper layout otherwise the components mounted on the backside of the board are damaged. Do not set these pins at the position of the nozzle.
3. Adjust the bottom dead point of dispenser away from the board when you apply adhesive.
4. Confirm that the products are corresponding to flow soldering when you perform it.
5. Pay attention to the amount of solder because improper amount of solder place large stress on

Chip Resistors

the products and cause cracks or malfunctions

Washing

1. Confirm the ionic residues in solder do not remain after washing for moisture resistance and corrosion. Resistance may cause deterioration when these substances are attached to the products.
2. Confirm the reliability in advance when using no washing solder, water or soluble agent.
3. Wash thoroughly after soldering to remove ionic substances like sweat and salinity.
4. The ultrasonic washing may destruct the products due to resonance by vibration. High hydraulic pressure may also damage the products.
5. Dry the products sufficiently after washing.

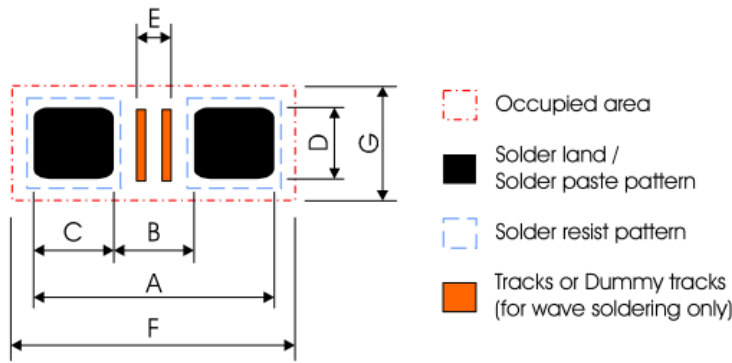
Transportation

The performance of a Chip-R maybe affected by the conditions during transportation.

The Chip-R should be protected against excessive temperature, humidity and mechanical force during transportation.

1. Climatic conditions
 - Low air temperature -55 °C
 - Change of air/air temperature -25°C/ +25°C
 - Low air pressure 30kPa
 - Change of air pressure 6kPa/min.
2. Mechanic condition
 - Transportation should bedone in such waythat the boxes are not deformed and forces are not directly passed on to the inner package.

Footprint Design



Footprint Design for chip resistor

Size	Reflow Soldering							Processing Remarks	Placement Accuracy
	A	B	C	D	E	F	G		
01005	0.58	0.18	0.20	0.20	0.10	0.90	0.40	IR or hot plate soldering	±0.03
0201	0.90	0.30	0.30	0.30	0.20	1.10	0.50		±0.05
0402	1.50	0.50	0.50	0.60	0.10	1.90	1.00		±0.15
0603	2.10	0.90	0.60	0.90	0.50	2.35	1.45		±0.25
0805	2.60	1.20	0.70	1.30	0.75	2.85	1.90		±0.25
1206	3.80	2.00	0.90	1.60	1.60	4.05	2.25		±0.25
1210	3.80	2.00	0.90	2.80	1.60	4.05	3.15		±0.25
1218	3.80	2.00	0.90	4.80	1.40	4.20	5.50		±0.25
2010	5.60	3.80	0.90	2.80	3.40	5.85	3.15		±0.25
2512	7.00	3.80	1.60	3.50	3.40	7.25	3.85		±0.25

Size	Wave Soldering							Processing Number & Dimensions of dummy tracks	Placement Accuracy
	A	B	C	D	E	F	G		
0603	2.70	0.90	0.90	0.80	0.15	3.40	1.90	1x (0.15 x 0.80)	±0.25
0805	3.40	1.30	1.05	1.30	0.20	4.30	2.70	1x (0.20 x 1.30)	±0.25
1206	4.80	2.30	1.25	1.70	1.25	5.90	3.20	3x (0.25 x 1.70)	±0.25
1210	4.80	2.30	1.25	2.50	1.25	5.90	3.60	3x (0.25 x 1.70)	±0.25
1218	4.80	2.30	1.25	4.80	1.30	5.90	5.60	3x (0.25 x 4.80)	±0.25
2010	6.30	3.50	1.40	2.50	3.00	7.00	3.60	3x (0.75 x 2.50)	±0.25
2512	8.50	4.50	2.00	3.20	3.00	9.00	4.30	3x (1.00 x 3.20)	±0.25

Footprint Design for Array Resistor

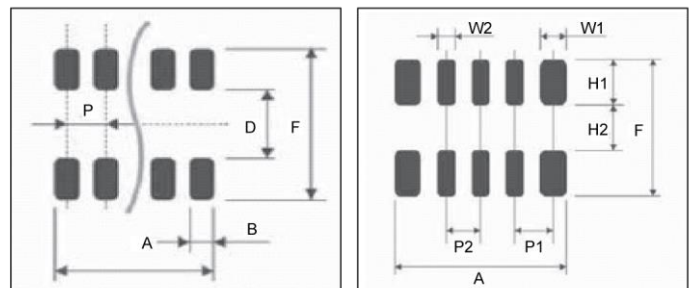
Unit: mm

Symbol	0603x4 array	0603x2 array	0402x4 array	0402x2 array	0402x8 array	WA02A	WA02B
A	3.0+0.10/-0.05	1.5+0.10/-0.05	1.80±0.05	1.20±0.05	3.85±0.05	1.40±0.05	0.80±0.05
B	0.45±0.05	0.45±0.05	0.30±0.05	0.40 +0/-0.05	0.28 +0/-0.05	0.20 +0/-0.05	0.30 +0/-0.05
D	0.80±0.10	0.80±0.10	0.50±0.10	0.50±0.05	1.00 +0.1/-0.20	0.30±0.05	0.30±0.05
P	0.8	1.0	0.5	0.65	0.5	0.4	0.5
F	1.90±0.20	1.80±0.20	1.3 +0.20/-0.10	1.3 +0.20/-0.10	1.90±0.20	0.9±0.10	0.9±0.10

Footprint Design for 10P8R Network Resistor

Unit: mm

Symbol	WT04X
W1	0.50±0.05
W2	0.35±0.05
H2	0.80±0.10
P1	0.70±0.05
P2	0.65±0.05
A	3.20±0.10
F	2.80 + 0.40 / -0.20



Array

Network