

# APPROVAL SHEET

## WW12N, WW25N Jumper

### 1W, 2W

Ultra low ohm power chip resistors

Size 1206 (3216), 2512 (6332)

Metal Current Sensing Type

RoHS Exemption free and Total Lead Free



\*Contents in this sheet are subject to change without prior notice.

## FEATURES

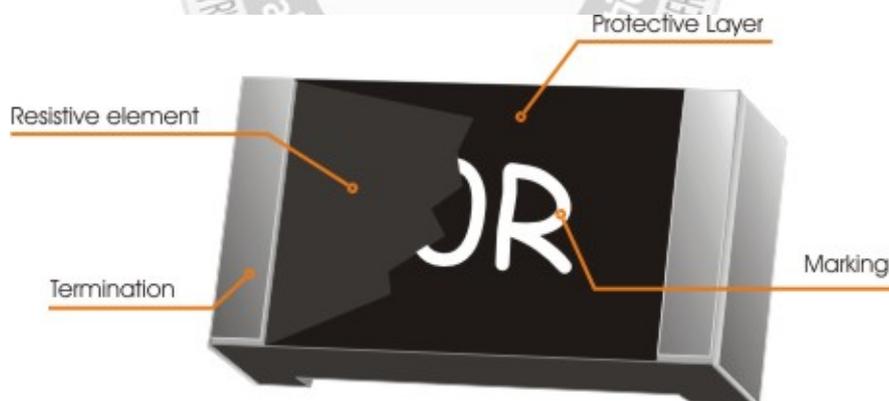
1. Ultra low ohm and high current jumper
2. High power rating and compact size
3. High reliability and stability
4. Reduced size of final equipment
5. RoHS compliant and Total Lead free product

## APPLICATIONS

- Power supply
- PDA
- Digital meter
- Computer
- Automotives
- Battery charger
- DC-DC power converter

## DESCRIPTION

The resistors are constructed in a high grade low resistive metal body. The resistive layer is covered with a protective coat and printed a resistance marking code over it. Finally, the two external end terminations are added. For ease of soldering the outer layer of these end terminations is a lead-free solder.



Item	Protective Molding	Resistive Element	Internal Terminal	External Terminal
Material	Resin	Alloy Metal	Copper	Solder

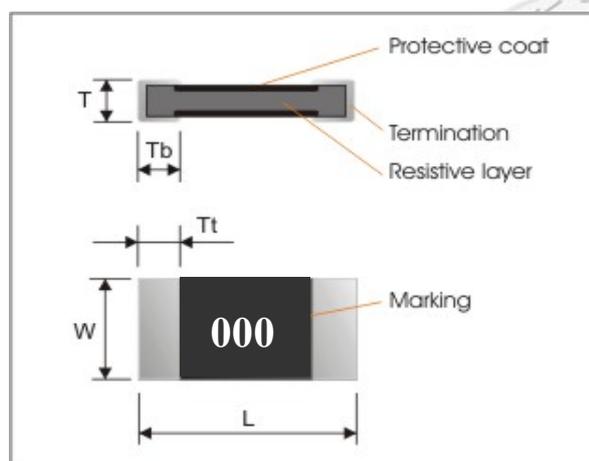
Fig 1. Construction of Chip-R

## QUICK REFERENCE DATA

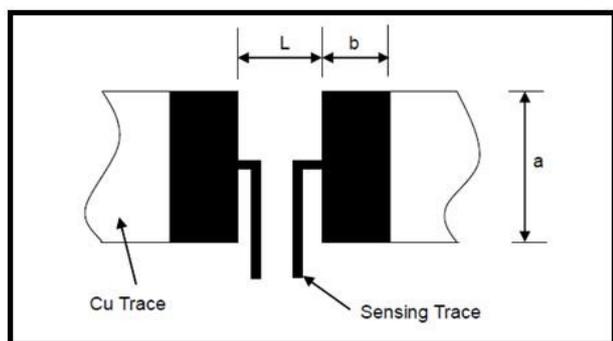
Item	General Specification	
Series No.	WW25N	WW12N
Size code	2512 ( 6332 )	1206 ( 3216 )
Resistance Tolerance	Jumper	
Resistance Value	Max. 0.1mΩ	Max. 0.2mΩ
Max. dissipation at $T_{amb}=70^{\circ}\text{C}$	2 W	1 W
Max. working current	120A	80A
Max. overload current	150A	100A
Operation temperature	-55/+170°C	

Note: Temperature Coefficient Resistance not applicable.

## MECHANICAL DATA



Unit: mm	WW12N	WW25N
L	3.10±0.20	6.20±0.20
W	1.65±0.20	3.25±0.20
T	0.60±0.20	0.60±0.20
Tt	0.60±0.20	0.80±0.20
Tb	0.60±0.20	0.80±0.20



Unit: mm	WW12N	WW25N
a	1.80±0.20	3.60±0.20
b	1.30±0.20	1.60±0.20
L	2.10±0.20	4.40±0.20

## CATALOGUE NUMBERS

The resistors have a catalogue number starting with .

WW12	N	000_	P	T	L
<b>Size code</b> WW12 : 1206 WW25 : 2512	<b>Type code</b> N : WW12N: 1W WW25N: 2W Sensing type	<b>Resistance code</b> Jumper = 000_ ("_" means a blank)	<b>Tolerance</b> P: Jumper	<b>Packaging code</b> T : 7" reeled in tape, 4,000pcs	<b>Termination code</b> L = Sn base (lead free)

## MARKING

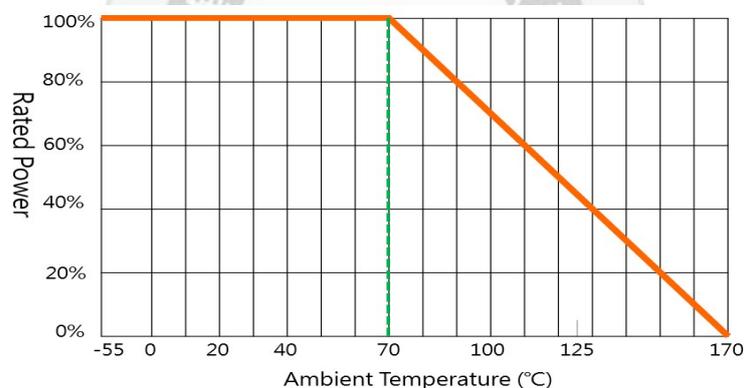
Each resistor is marked with a three-digit code on the protective coating to designate the nominal resistance value.

**000 = Jumper**

## FUNCTIONAL DESCRIPTION

### Derating curve

The power that the resistor can dissipate depends on the operating temperature; see Fig.2



## MOUNTING

Due to their rectangular shapes and small tolerances, Surface Mountable Resistors are suitable for handling by automatic placement systems.

Chip placement can be on ceramic substrates and printed-circuit boards (PCBs).

Electrical connection to the circuit is by individual soldering condition.

The end terminations guarantee a reliable contact.

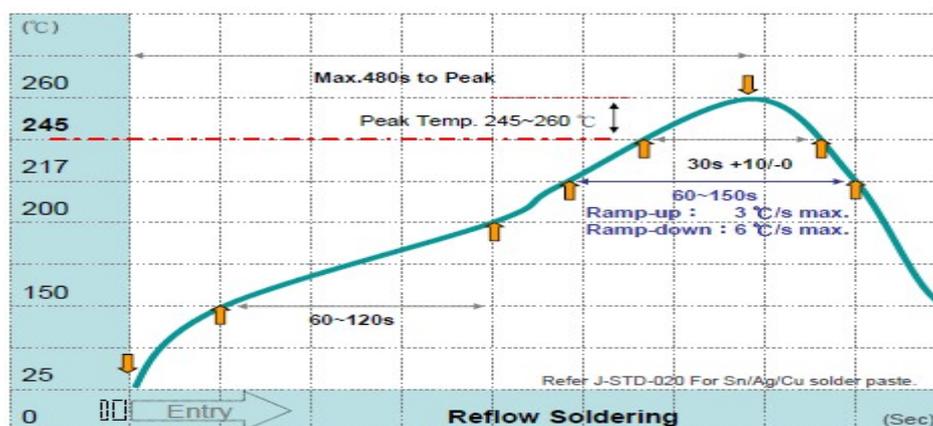
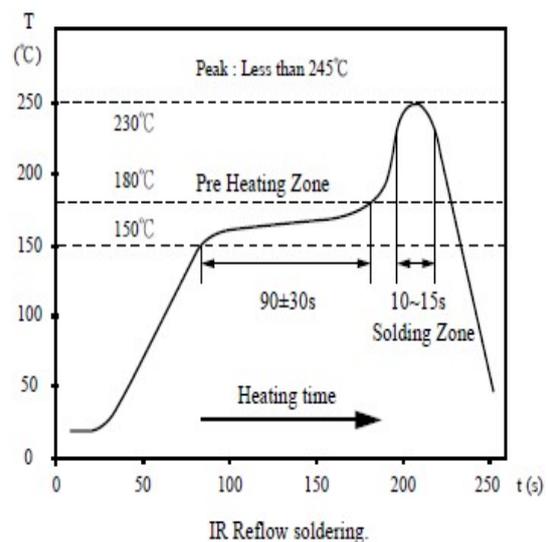
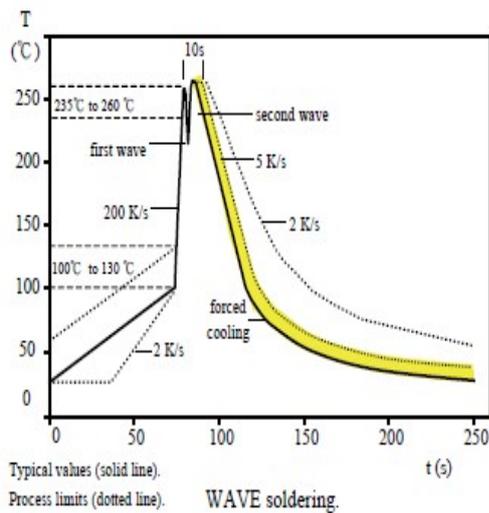
### Storage and Handling Conditions:

1. Products are recommended to be used up within two years since operation date as ensured shelf life. Check solderability in case shelf life extension is needed.
2. To store products with following condition:
  - Temperature :5 to 40°C
  - Humidity :20 to 70% relative humidity
3. Caution:
  - a. Don't store products in a corrosive environment such as sulfide, chloride gas, or acid.
    - It may cause oxidation of electrode, which easily be resulted in poor soldering.
  - b. To store products on the shelf and avoid exposure to moisture.
  - c. Don't expose products to excessive shock, vibration, direct sunlight and so on.

### SOLDERING CONDITION

The robust construction of chip resistors allows them to be completely immersed in a solder bath of 260°C for 10 seconds. Therefore, it is possible to mount Surface Mount Resistors on one side of a PCB and other discrete components on the reverse (mixed PCBs).

Surface Mount Resistors are tested for solderability at 235°C during 2 seconds. The test condition for no leaching is 260°C for 30 seconds. Typical examples of soldering processes that provide reliable joints without any damage are given in Fig 3.



## TEST AND REQUIREMENTS (JIS C 5201-1 : 1998)

Essentially all tests are carried out according to the schedule of IEC publication 115-8, category **LCT/UCT/56**(rated temperature range : Lower Category Temperature, Upper Category Temperature; damp heat, long term, 56 days). The testing also meets the requirements specified by EIA, EIAJ and JIS.

The tests are carried out in accordance with IEC publication 68, "Recommended basic climatic and mechanical robustness testing procedure for electronic components" and under standard atmospheric conditions according to IEC 60068-1, subclause 5.3. Unless otherwise specified, the following value supplied :

Temperature: 15°C to 35°C.

Relative humidity: 45% to 75%.

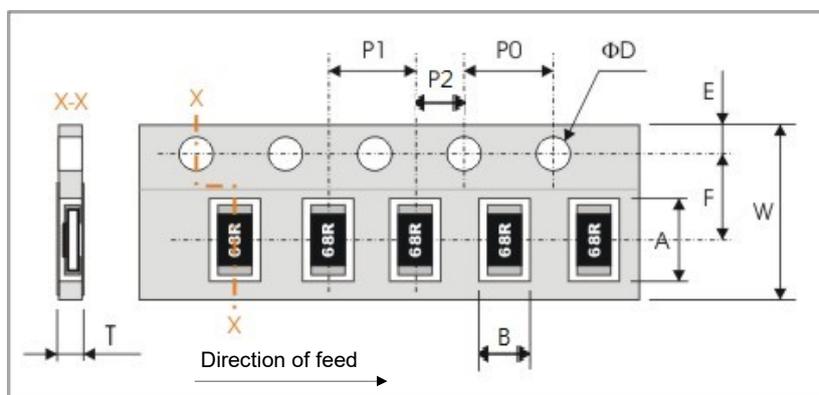
Air pressure: 86kPa to 106 kPa (860 mbar to 1060 mbar).

All soldering tests are performed with mildly activated flux.

TEST	PROCEDURE	REQUIREMENT
Resistance <b>Clause 4.8</b>	DC resistance measurement	max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N
Short time overload (S.T.O.L) <b>Clause 4.13</b>	Permanent resistance change after a 5 second application of max. overload current ( 100A for WW12N; 150A for WW25N )	no visible damage max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N
Solderability <b>Clause 4.17</b>	Un-mounted chips completely immersed for 3±0.5 second in a SAC solder bath at 235°C±2°C	good tinning (>95% covered) no visible damage
Resistance to soldering heat(R.S.H) <b>Clause 4.18</b>	Un-mounted chips completely immersed for 10±1second in a SAC solder bath at 260°C ±5°C	no visible damage max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N
Load life in Humidity <b>Clause 4.24</b>	1000 hours under max. working current in humidity chamber controller at 40°C±2°C and 90~95% relative humidity, 1.5hours on and 0.5 hours off ( 80A for WW12N; 120A for WW25N )	no visible damage max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N
Load life (endurance) <b>Clause 4.25</b>	70±2°C, 1000 hours, loaded with max. working current, 1.5 hours on and 0.5 hours off ( 80A for WW12N; 120A for WW25N )	no visible damage max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N
Temperature cycling <b>Clause 4.19</b>	30 minutes at -55°C±3°C, 2~3 minutes at 25°C, 30 minutes at +155°C±3°C, 2~3 minutes at 25°C, total 5 continuous cycles	no visible damage max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N
Insulation resistance <b>Clause 4.6</b>	Test voltage: 100±15V between termination and overcoat	> 1000MΩ
Bending strength	Resistance change after 2mm bended on the 90mm PCB.	no visible damage max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N

## PACKAGING

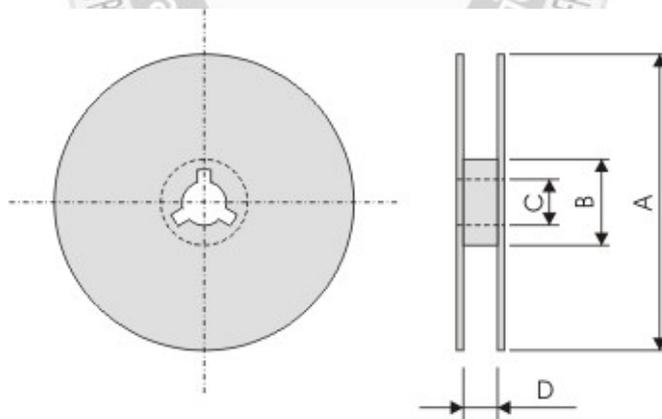
Tape specifications (unit :mm)



Series No.	A	B	W	F	E
WW12N	3.60±0.20	2.00±0.20	8.00±0.30	3.50±0.05	1.75±0.10
WW25N	6.75±0.20	3.50±0.20	12.00±0.30	5.50±0.05	1.75±0.10

Series No.	P1	P0	P2	ΦD	T
WW12N	4.00±0.10	4.00±0.10	2.00±0.10	Φ1.50 <sup>+0.1</sup> <sub>-0.0</sub>	Max. 1.2
WW25N	4.00±0.10	4.00±0.10	2.00±0.10	Φ1.50 <sup>+0.1</sup> <sub>-0.0</sub>	Max. 1.2

## Reel dimensions



(unit : mm)	A	B	C	D
WW12N	Φ178.0±2.0	Φ60.0±1.0	13.0±0.2	9.0±0.5
WW25N	Φ178.0±2.0	Φ60.0±1.0	13.0±0.2	12.4+2.0/-0

Taping qty: 4000pcs per reel