

APPROVAL SHEET

WW12N, WW25N_J 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

Automotive AEC Q200 Compliant

Anti-Sulfuration ASTM B-809 105'C 1000hrs

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

FEATURE

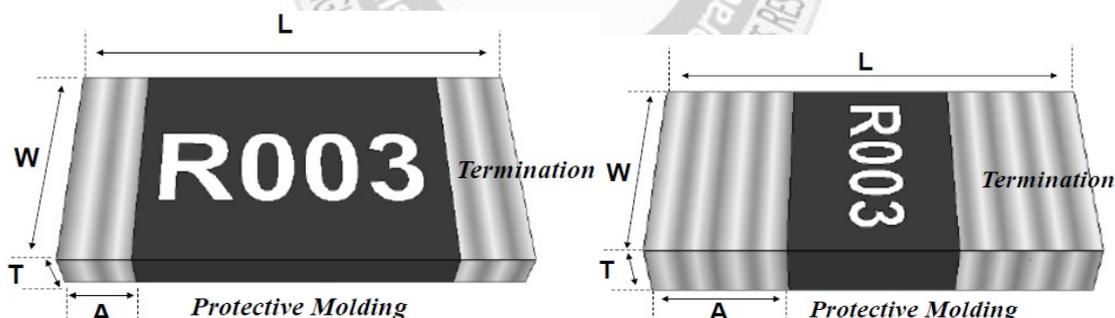
1. Ultra low ohm and high current jumper
2. High power rating and compact size
3. High reliability and stability
4. Reduced size of final equipment
5. RoHS compliant and Total Lead free product

APPLICATION

- 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.



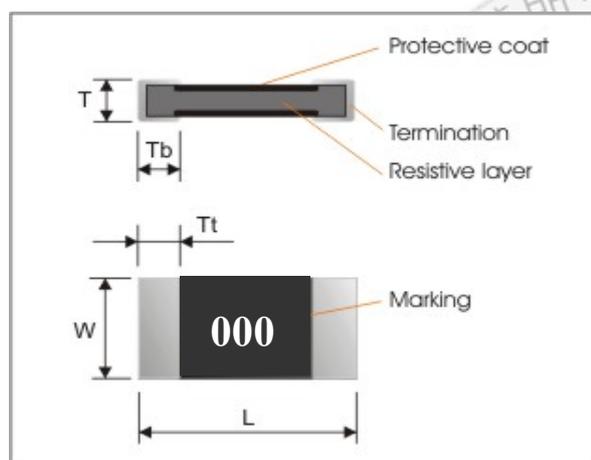
Item	Protective Molding	Resistive Element	Internal Terminal	External Terminal
Material	Resin	Alloy Metal	Copper	Solder

Fig 1. Construction of Chip-R

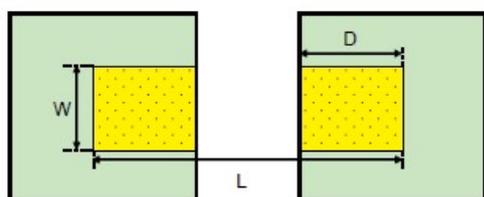
QUICK REFERENCE DATA

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 $T_{amb}=70^{\circ}\text{C}$	2W	1W
Max. working current	120A	80A
Max. overload current	150A	100A
Operation temperature	-55/+170°C	

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
W	1.80	3.70
D	1.30	1.60
L	4.70	7.60

MARKING

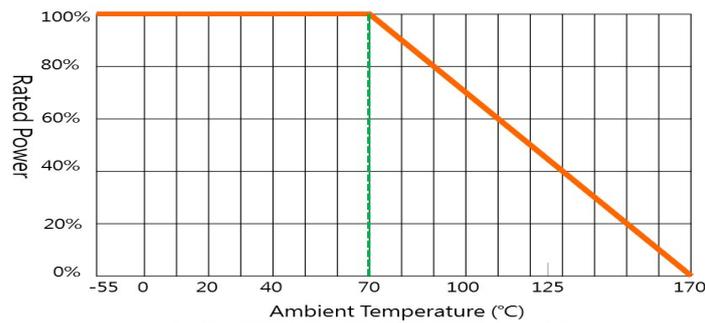
Each resistor is marked with a three-digit code on the protective coating to designate the nominal resistance value.

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.

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.

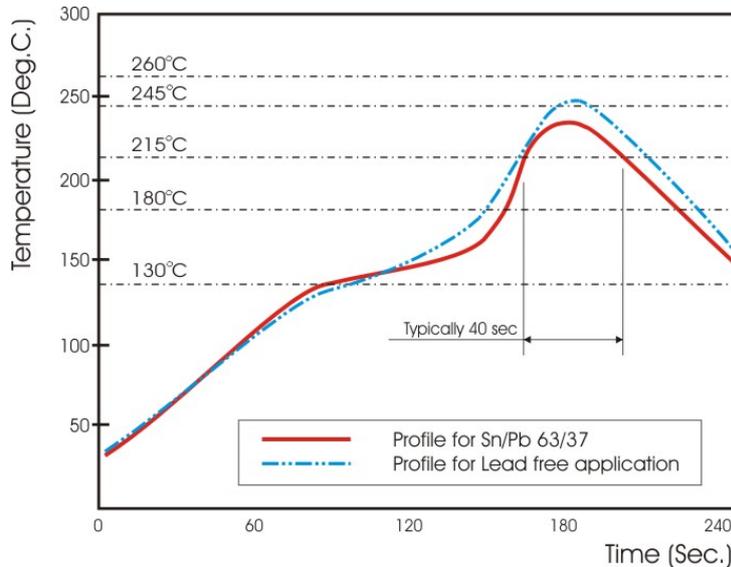


Fig 3. Infrared soldering profile for Chip Resistors

CATALOGUE NUMBERS

The resistors have a catalogue number starting with .

WW12	N	000_	P	T	L	J
Size code WW12 : 1206 WW25 : 2512	Type code N : 1206: 1W 2512: 2W Sensing type	Resistance code Jumper = 000_ ("_" means a blank)	Tolerance P: Jumper	Packaging code T : 7" reeled in tape, 4,000pcs	Termination code L = Sn base (lead free)	Special code J = Automotive grade AEC Q-200 compliant ASTM B-809 compliant

TEST AND REQUIREMENTS

Test Item	Specification	Test Method (AEC-Q200. IEC 60115)
DC Resistance	max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N	AEC-Q200 TABLE 7.1 IEC 60115-1 / JIS C 5201-1 , Clause 4.5 Measure the resistance Value.
High Temperature Exposure (Storage)	No visible damage max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N	AEC-Q200 TABLE 7.3 1000 hrs. @ T=170°C. Unpowered. Measurement at 24 ±2 hours after test conclusion.
Temperature Cycling	No visible damage max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N	AEC-Q200 TABLE 7.4 1000 Cycles (-55°C to +125°C). Measurement at 24±2 hours after test conclusion.
Moisture Resistance	max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N	AEC-Q200 TABLE 7.6 Test 65°C/80~100%RH/10Cycles. Measurement at 24±2 hours after test conclusion. (t=24hrs/cycle).
Biased Humidity	max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N	AEC-Q200 TABLE 7.7 1000 hours 85°C/85%RH. 10% of operating power. Measurement at 24 ±2 hours after test conclusion.
Operational Life	max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N	AEC-Q200 TABLE 7.8 Test 1000hr @ T=125°C at specified rated power. Measurement at 24±2 hours after test conclusion.
External Visual	No visual damage and refer marking code.	AEC-Q200 TABLE 7.9 Inspect device construction, marking and workmanship.
Physical Dimension	Within the spec.	AEC-Q200 TABLE 7.10 Verify physical dimensions to the applicable device detail specification.
Mechanical Shock	max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N	AEC-Q200 TABLE 7.13 Test Peak value: 100g's, Wave: Half-sine, Duration: 6ms, Velocity:12.3ft/sec.
Vibration	max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N	AEC-Q200 TABLE 7.14 5 g's for 20 min., 12 cycles each of 3 orientations. Test from 10-2000 Hz.
Resistance to Solder Heat	max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N	AEC-Q200 TABLE 7.15 Solder dipping @ 260°C±5°C for 10sec.±1sec.

Test Item	Specification	Test Method (AEC-Q200. IEC 60115)
Thermal Shock	max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N	AEC-Q200 TABLE 7.16 -55 to 155°C/ dwell time 15min/ Max transfer time 20sec/ 300cycles.
ESD	No mechanical damage. max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N	AEC-Q200-002 Test contact min. 1KV.
Solder Ability	Over 95% of termination must be covered with solder.	AEC-Q200 TABLE 7.18 a)Baking 155°C 4H, dipping 235°C 5s b)Steam 8H, dipping 215°C 5s c)Steam 8H, dipping 260°C 7s
Flammability	Refer UL-94.	AEC-Q200 TABLE 7.20 UL-94 V-0 or V-1 are acceptable
Board Flex	No mechanical damage. max. 0.2mΩ for WW12N max. 0.1mΩ for WW25N	AEC-Q200 TABLE 7.21 Bending 2mm 2512.1206
Terminal Strength	No mechanical damage	AEC-Q200 TABLE 7.22 Force 1.8 Kg for 60 seconds.
Anti-Sulfur	$\Delta R_{\leq} \pm 1\%$	ASTM-B-809-95(Modified) Sulfur 1000 hours, 105±2°C

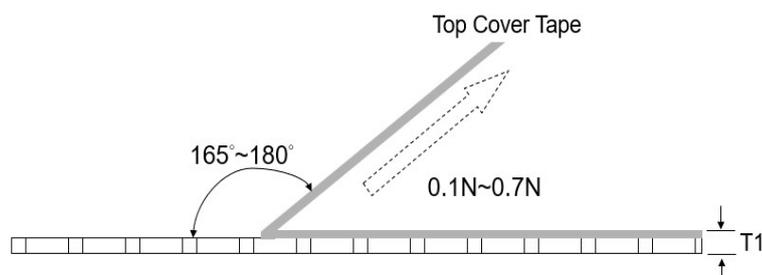
Remarks. AEC-Q200 type compliable standard type reliability items.

PACKAGING

Peel Strength of Top Cover Tape

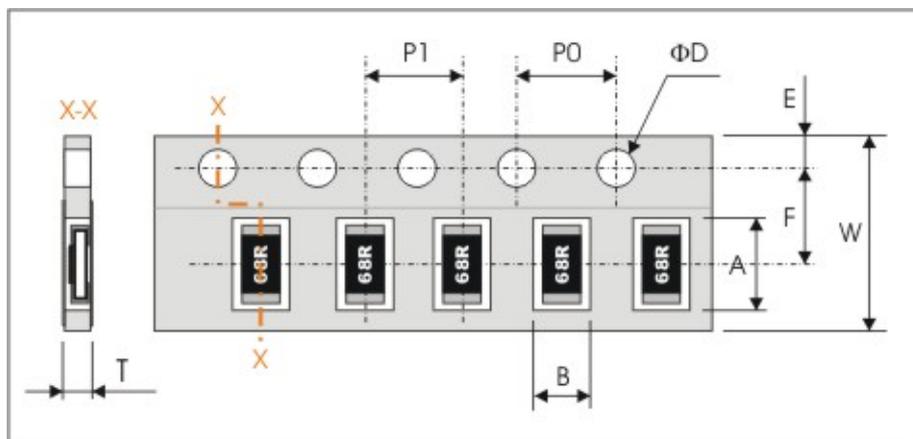
The peel speed shall be about 300 mm/min

The peel force of top cover tape shall between 0.1 to 0.7



PACKAGING

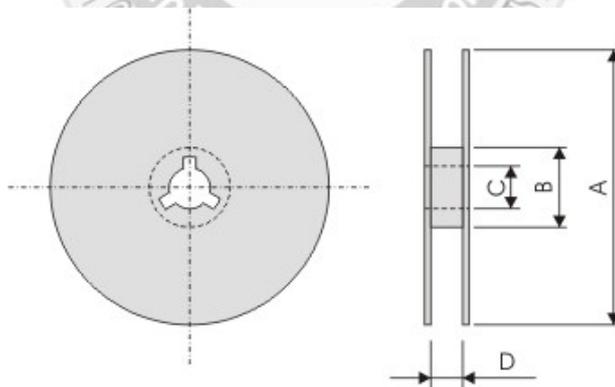
Tape specifications (unit :mm)



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	ΦD	T
WW12N	4.00±0.10	4.00±0.10	Φ1.50 ^{+0.1} _{-0.0}	Max. 1.2
WW25N	4.00±0.10	4.00±0.10	Φ1.50 ^{+0.1} _{-0.0}	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