APPROVAL SHEET

WW25B_J

±5%, ±1%

Metal low ohm current sensing chip resistors
Size 2512 (6432) 3W
Automotive AEC Q200 Compliant
RoHS exemption free and Halogen free
Low Thermal EMF

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

FEATURE

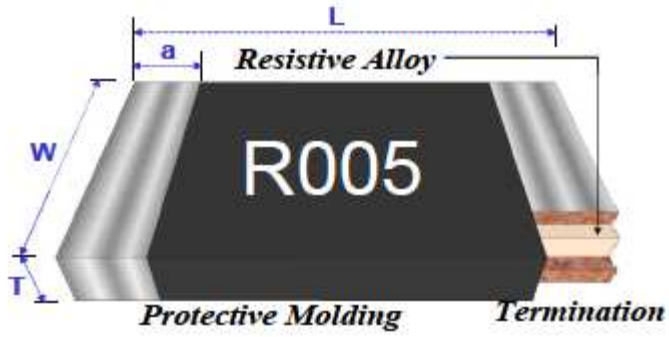
1. Metal low ohm and High power low TCR performance
2. Automotive grade AEC Q-200 compliant
3. 100% CCD inspection
4. RoHS exemption free and Halogen free
5. Inductance less than 1.0nH
6. Low thermal EMF

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 Tin (lead-free) soder alloy.



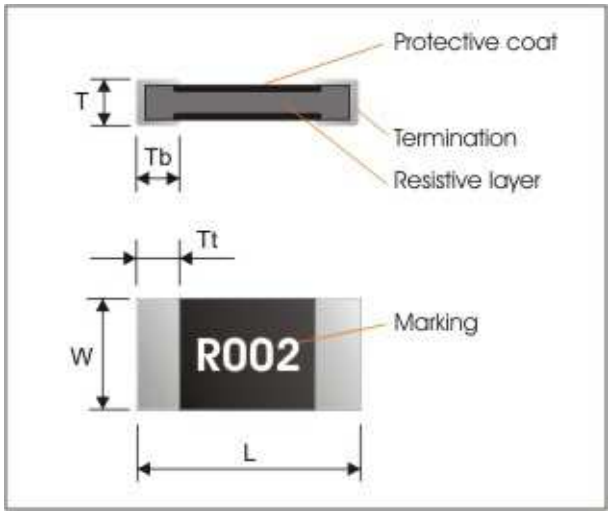
Item	Protective Molding	Resistive Element	Internal Terminal	External Terminal
Material	Resin	Alloy Metal	Copper	Solder

Fig 1. Construction of Chip-R

QUICK REFERENCE DATA

Item	General Specification
Series No.	WW25B
Size code	2512 (6432)
Resistance Tolerance	±5%, ±1%
Resistance Range	5, 6, 7, 8, 9, 10, 20mΩ
TCR (ppm/°C)	5, 6, 7, 8, 9, 10mΩ: ≤ ±70 ppm/°C 20mΩ: ≤ ±50 ppm/°C
Max. dissipation at T_{amb}=70°C	3 W
Operation temperature	- 55 ~ +170'C

MECHANICAL DATA



Symbol	Dimensions (mm)
L	6.20±0.20
W	3.25±0.20
T	0.65±0.20
Tt	0.80±0.20
Tb	0.80±0.20

MARKING

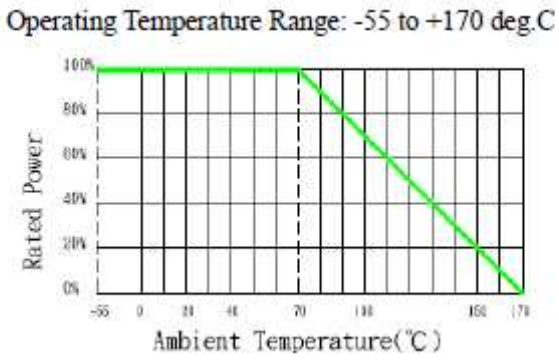
Each resistor is marked with a four-digit code on the protection coat to define resistance value.
Example:

R020 = 0.020Ω, R050 = 0.05Ω

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.

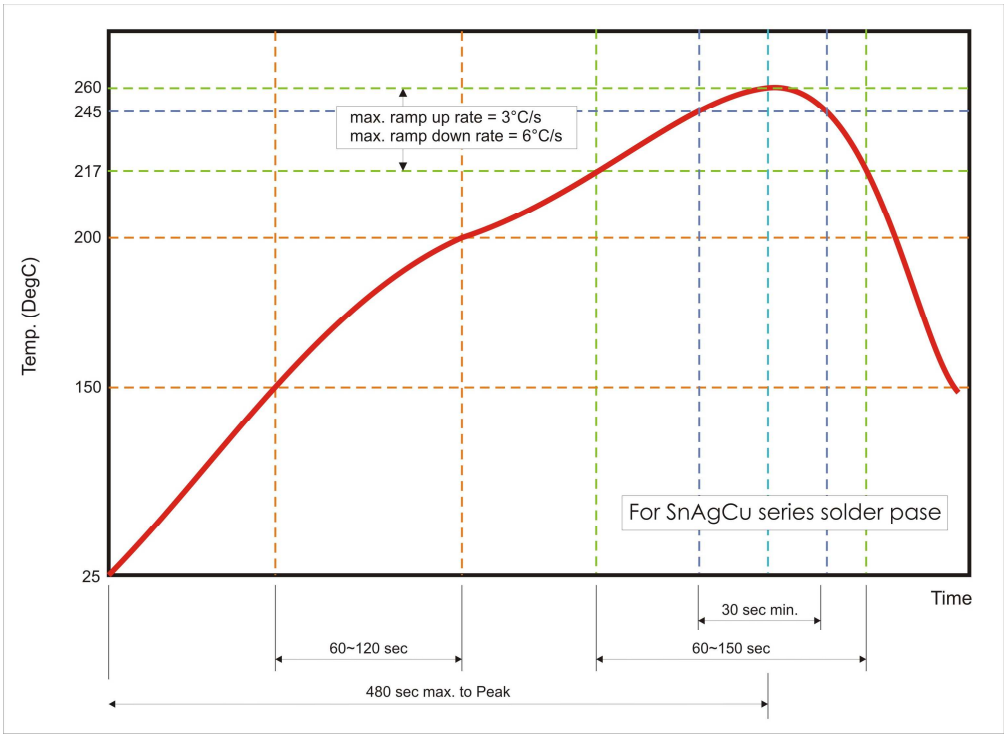


Fig 3. Infrared soldering profile for Chip Resistors WW25A

CATALOGUE NUMBERS

The resistors have a catalogue number starting with

WW25	B	R005	F	T	L	J
Size code WW25 : 2512	**Type code** **B** : 3W Metal sensing type Low EMF	**Resistance code** 0.005Ω = R005	**Tolerance** J : ±5% F : ±1%	**Packaging code** T : 7" reeled in tape	**Termination code** L = Sn base (lead free)	**Special code** **J** = Automotive grade AEC Q-200 compliant

Reeled tape packaging : 12mm width plastic emboss taping 4,000pcs per reel.

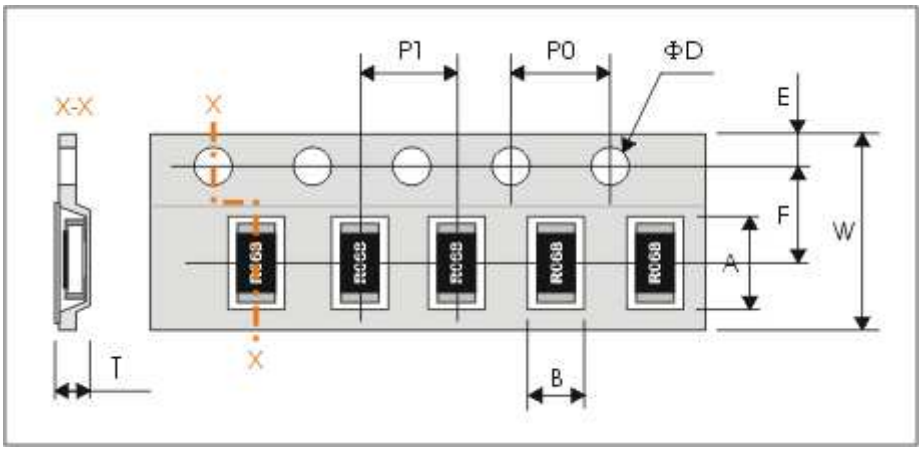
TEST AND REQUIREMENTS (AEC Q-200)

TEST	PROCEDURE / TEST METHOD	REQUIREMENT
		Resistor
Electrical Characteristics **JISC5201-1: 1998** Clause 4.8	- DC resistance values measurement - Temperature Coefficient of Resistance (T.C.R) Natural resistance change per change in degree centigrade. $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6$ (ppm/°C) t_1 : 20℃+5℃-1℃ R_1 : Resistance at reference temperature R_2 : Resistance at test temperature	Within the specified tolerance Refer to "QUICK REFERENCE DATA"
Resistance to soldering heat (R.S.H) **MIL-STD-202 method 210**	Un-mounted chips completely immersed for 10±1second in a SAC solder bath at 270℃±5°C	J: ΔR/R max. ±(1.0%+0.5mΩ) F: ΔR/R max. ±(0.5%+0.5mΩ) no visible damage
Solderability **AEC Q-200**	a) Bake the sample for 155℃ dwell time 4hrs/ solder dipping 235℃/ 5sec. b) Steam the sample dwell time 8 hour/ solder dipping 215℃/ 5sec. c) Steam the sample dwell time 8 hour/ solder dipping 260℃/ 7sec.	95% coverage min., good tinning and no visible damage
Temperature cycling **AEC Q-200 7.4**	1000 cycles, -55℃ ~ +125℃, dwell time 30min maximum.	J: ΔR/R max. ±(1.0%+1mΩ) F: ΔR/R max. ±(0.5%+1mΩ) No visible damage
Moisture Resistance **MIL-STD-202 method 106**	65±2°C, 80~100% RH, 10 cycles, 24 hours/ cycle	J: ΔR/R max. ±(1.0%+0.5mΩ) F: ΔR/R max. ±(0.5%+0.5mΩ) No visible damage
Bias Humidity **MIL-STD-202 method 103**	1000+48/-0 hours; 85°C, 85% RH, 10% of operation power	J: ΔR/R max. ±(3.0%+0.5mΩ) F: ΔR/R max. ±(1.0%+0.5mΩ) No visible damage
Operational Life **MIL-STD-202 method 108**	1000+48/-0 hours; specified rated power at 125±2°C	J: ΔR/R max. ±(3.0%+0.5mΩ) F: ΔR/R max. ±(1.0%+0.5mΩ) No visible damage
High Temperature Exposure **MIL-STD-202 Method 108**	1000+48/-0 hours; without load in a temperature chamber controlled 125±3°C	J: ΔR/R max. ±(3.0%+0.5mΩ) F: ΔR/R max. ±(1.0%+0.5mΩ) No visible damage
Board Flex **AEC-Q200-005**	Resistors mounted on a 90mm glass epoxy resin PCB(FR4),bending once 2mm for 60sec.	J: ΔR/R max. ±(1.0%+1mΩ) F: ΔR/R max. ±(0.5%+1mΩ) No visible damage
Terminal strength **AEC-Q200-006**	Pressurizing force: 1Kg, Test time: 60±1sec.	No remarkable damage or removal of the terminations
Thermal shock **MIL-STD-202 method 107**	Test –55 to 155℃/ dwell time 15min/ Max transfer time 20sec 300cycles	J: ΔR/R max. ±(1.0%+0.5mΩ) F: ΔR/R max. ±(0.5%+0.5mΩ) No visible damage

ESD **AEC-Q200-002**	Test contact 1KV.	ΔR/R max. ±(1%+0.5mΩ) No visible damage
Mechanical Shock **MIL-STD-202** **method 213**	Test ½ Sine Pulse, Peak value: 100g, normal duration: 6ms, Velocity change:12.3ft/sec. Three shocks in each direction, total 18 shocks.	Within product specification tolerance and no visible damage.
Vibration **MIL-STD-202** **method 204**	Test 5g's for 20 min., 12 cycles each of 3 orientations.	No visible damage.
Resistance to Solvents : **MIL-STD-202** **Method 215**	Solvent is Isopropyl alcohol, immersion 3mins at 25℃ and brush 10 strokes with a toothbrush with a handle made of a non-reactive material (wet bristle), immersion and brush 3 times and then air blow dry.	No superficial defect on marking, encapsulation, coating, appearance. Electrical characteristics within products specification and tolerance. Inspect at 3X max. for marking, inspect at 10X for part damage.
External Visual **MIL-STD-883** **method 2009**	Electrical test not required. Inspect device construction, marking and workmanship	No visual damage and refer WTC marking code.
Physical Dimension **JESD22** **method JB-100**	Verify physical dimensions(L, W, T, Tb, Tt)	Within the specified tolerance for WTC.

PACKAGING

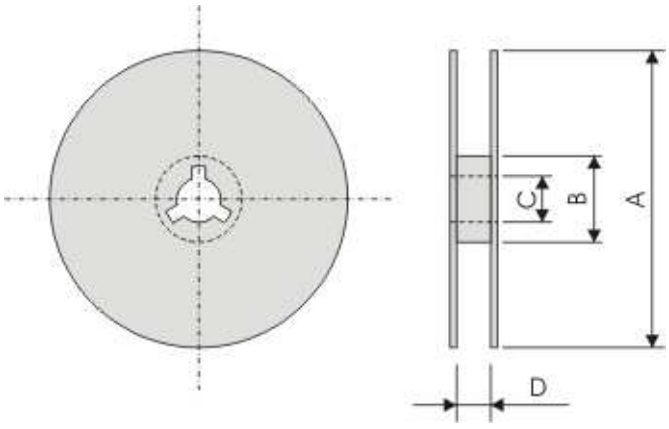
Plastic Tape specifications (unit :mm)



Symbol	A	B	W	F	E
Dimensions	6.75±0.20	3.50±0.20	12.00±0.30	5.50±0.1	1.75±0.10

Symbol	P1	P0	ΦD	T
Dimensions	4.00±0.10	4.00±0.10	$\Phi 1.50^{+0.1}_{-0.0}$	Max. 1.2

Reel dimensions



Symbol	A	B	C	D
(unit : mm)	Φ178.0±2.0	Φ60.0±1.0	13.0±0.2	14.0±0.2

Taping quantity

- Chip resistors 4,000 pcs per reel.