APPROVAL SHEET

WW20N_J

±1%, ±5%

Metal low ohm current sensing chip resistors

Size 2010 (5025) 1W

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. Metal low ohm and stable TCR performance

2. Automotive grade AEC Q-200 compliant

3. 100% CCD inspection

4. RoHS exemption free and Halogen free products

5. ASTM B-809 105'C 1000hrs compliant

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 soder.

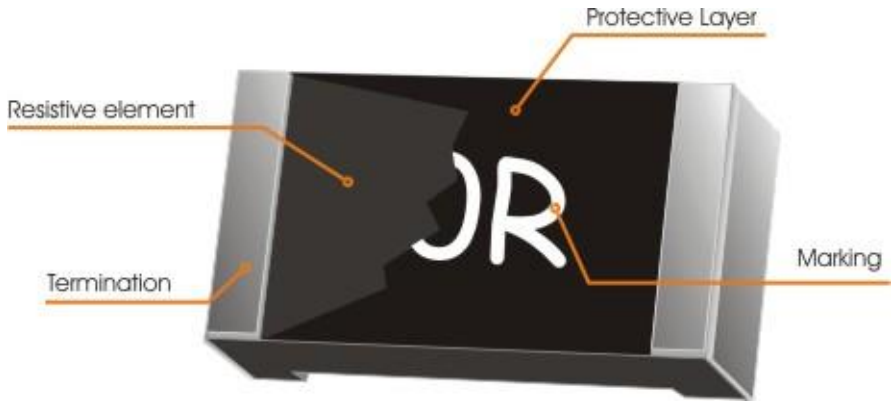
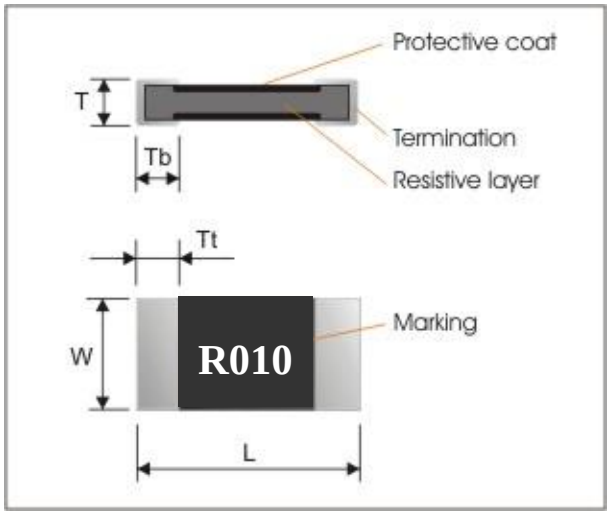


Fig 1. Construction of Chip-R

QUICK REFERENCE DATA

Item	General Specification
Series No.	WW20N
Size code	2010 (5025)
Resistance Tolerance	±5%; ±1%
Resistance Value	0.005Ω, 0.010Ω, 0.015Ω, 0.020Ω, 0.025Ω
TCR (ppm/°C)	≤ 70 ppm/°C
Max. dissipation at T_{amb}=70°C	1W
Operation temperature	-55 ~ +170'C

MECHANICAL DATA



Symbol	Dimensions (mm)
L	5.00±0.20
W	2.50±0.20
T	0.60±0.15
Tt	0.65±0.25
Tb	0.65±0.25

MARKING

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

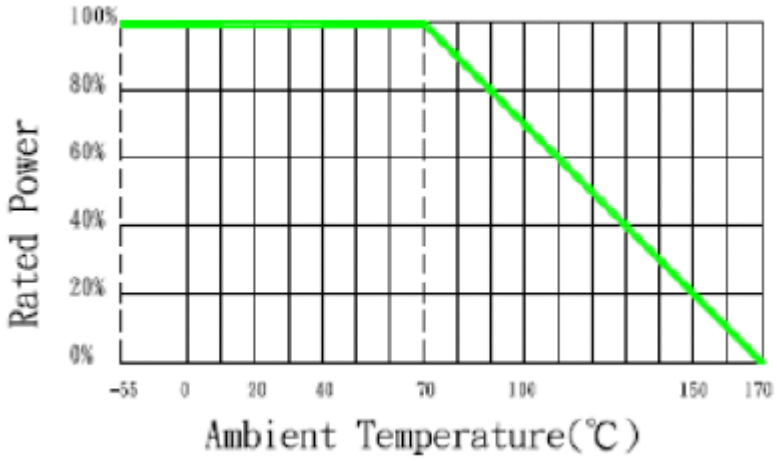


R020 = 20mΩ

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.

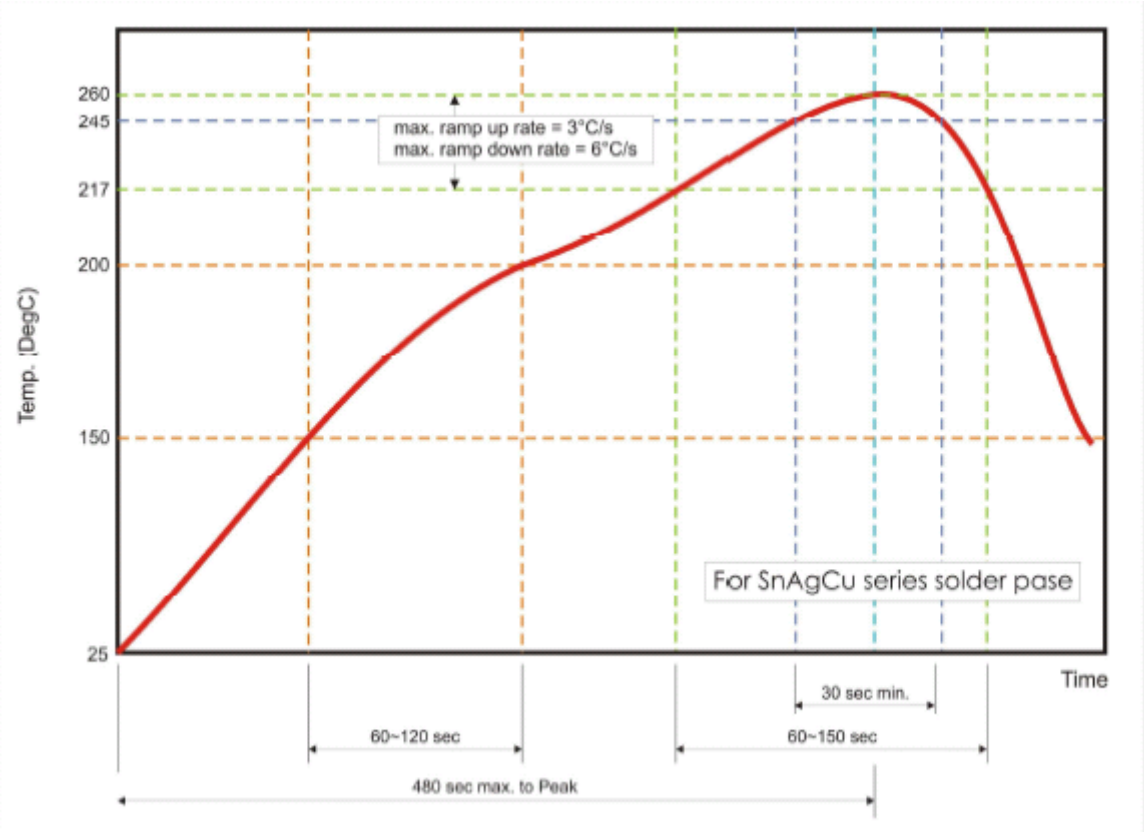


Fig 3. Infrared soldering profile for Chip Resistors WW20

CATALOGUE NUMBERS

The resistors have a catalogue number starting with:

WW20	N	R010	F	T	L	J
Size code WW20 : 2010	**Type code** **N : 1W** Sensing type	**Resistance code** R is first digit followed by 3 significant digits. 0.010Ω = R010	**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 Q200 compliant ASTM B-809 Compliant

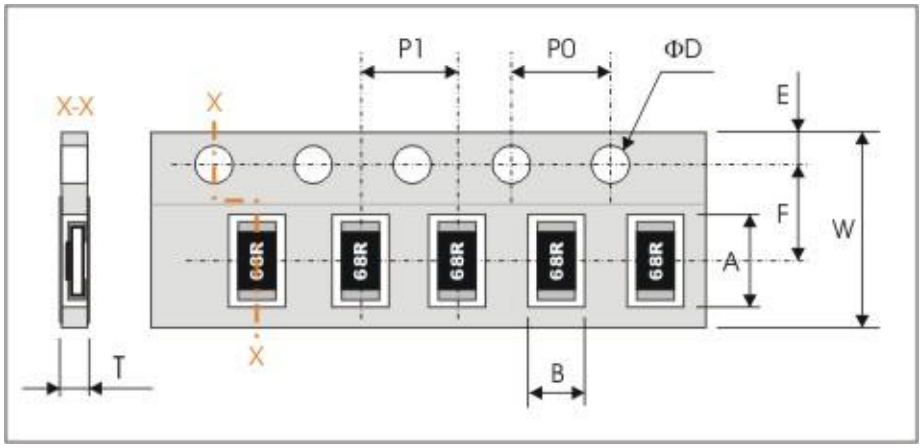
Reel tape packing: 12mm width plastic emboss tape with 4,000pcs per 7" reel. .

TEST AND REQUIREMENTS (AEC Q200)

TEST	PROCEDURE	REQUIREMENT
High temperature exposure **MIL-STD-202 Method 108**	Test 1000 hrs./ @T=125℃/ Un-powered. Measurement at 24±2 hours after test conclusion.	∆ R/R max. ±(1%+0.5mΩ) no visible damage
Temperature Cycling **JESD22 Method JA-104**	Test 1000 cycles (-55℃ to +125℃). Measurement at 24±2 hours after test conclusion	∆ R/R max. ±(0.5%+0.5mΩ) no visible damage
Moisture Resistance **MIL-STD-202 Method 106**	Test 65℃/ 80~100%RH/ 10Cycles (t=24hrs/cycle). Measurement at 24±2 hours after test conclusion.	∆ R/R max. ±(0.5%+0.5mΩ) no visible damage
Biased Humidity **MIL-STD-202 Method 103**	Test 1000 hours/ @85℃/85% RH./ 10% of operation power. Measurement at 24±2 hours after test conclusion.	∆ R/R max. ±(1%+0.5mΩ) no visible damage
Operational Life **MIL-STD-202 Method 108**	Test 1000 hrs./ TA=125℃ / 35% of operating power. Measurement at 24±2 hours after test conclusion	∆ R/R max. ±(1%+0.5mΩ) no visible 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 Dimensions **JESD22 Method JB-100**	The chip dimension (L, W, T, D) prescribed in the detail specification shall be checked	Within the specified tolerance
Mechanical Shock **MIL-STD-202 Method 213**	Test Peak value:100g's / Wave:Hail-sine / Duration:6ms / Velocity:12.3ft/sec.	Within product specification tolerance and no visible damage
Vibration **MIL-STD-202 Method 204**	Test 5g's for 20min., 12 cycles each of 3 orientations.	∆R/R max. ±(0.5%+0.5mΩ) no visible damage
Resistance to Soldering Heat **MIL-STD-202 Method 210**	Solder dipping @ 270℃±5℃ for 10±1sec.	∆ R/R max. ±(0.5%+0.5mΩ) no visible damage
Thermal Shock **MIL-STD-202 Method 107**	Test -55 to 155℃/ dwell time 15min/ Max transfer time 20sec/ 300cycles.	∆ R/R max. ±(0.5%+0.5mΩ) no visible damage
ESD **AEC-Q200-002**	Test contact 1KV(min)	∆ R/R max. ±(1%+0.5mΩ) no visible damage
Solderability **J-STD-002**	a) Bake 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.	good tinning (>95% covered) no visible damage
Temperature Coefficient of Resistance(T.C.R) **Clause 4.8**	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°C+5°C-1°C R_1 : Resistance at reference temperature R_2 : Resistance at test temperature	Refer to "QUICK REFERENCE DATA"
Board flex **AEC-Q200-005**	Bending 2mm (Min).	∆ R/R max. ±(0.5%+0.5mΩ) no visible damage
Termination strength **AEC-Q200-006**	Force: 1.8kg for 60sec.	No cracking or no part being sheared off from its pad.

PACKAGING

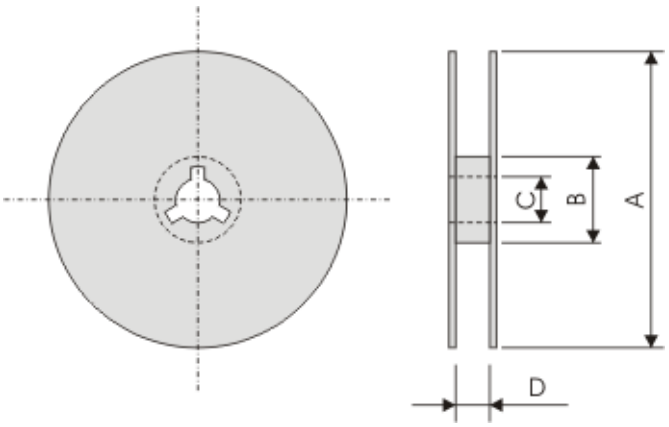
Paper Tape specifications (unit :mm)



Series No.	A	B	W	F	E
WW20N	5.50±0.20	2.80±0.20	12.00±0.30	5.50±0.05	1.75±0.10

Series No.	P1	P0	ΦD	T
WW20N	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 Qty: 4,000pcs per reel