

APPROVAL SHEET

WW12D, WW08D

±1%, ±5%

Metal Foil low ohm power chip resistors

Size 1206 (1W), 0805 (1/2W)

Sensing Type

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

FEATURE

1. Ultra low and stable TCR performance
2. High power rating and compact size
3. High reliability and stability
4. Reduced size of final equipment
5. RoHS exemption free & Lead free

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 foil which adhere on top of ceramic substrate 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 terminations.



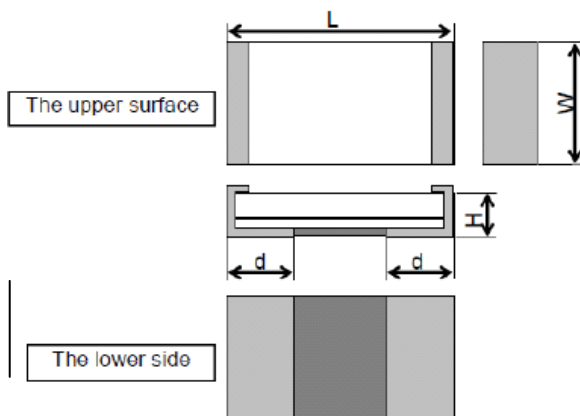
Fig 1. Construction of Chip-R

QUICK REFERENCE DATA

Item	General Specification	
Series No.	WW08D	WW12D
Size code	0805 (2012)	1206 (3216)
Resistance Tolerance	±5% , ±1%	
Resistance Range	20, 25, 30, 35, 40, 45, 50 mΩ	
TCR (ppm/°C)	±70 ppm/°C	
Max. power at T _{amb} =70°C	1/2W	1W
Max. Operation Current (DC or RMS)	5A, 4.4A, 4A, 3.5A, 3.1A	7A, 6.3A, 5.7A, 5A, 4.4A
Climatic category (IEC 60068)	55/155/56	

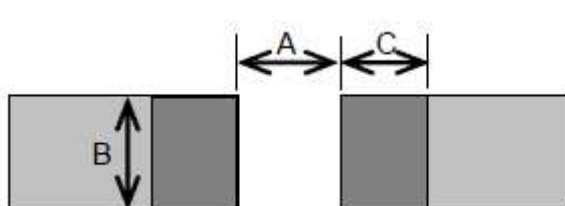
Note : Max. Operation Current : So called RCWC (Rated Continuous Working Current) is determined by

$$RCWC = \sqrt{\text{Rated Power} / \text{Resistance Value}} \text{ listed above.}$$

MECHANICAL DATA

Unit: mm

Type	Size (inch)	L (mm)	W (mm)	H (mm)	d (mm)
WW12D	1206	3.3±0.20	1.7±0.20	0.65±0.20	0.68±0.30
WW08D	0805	2.10±0.20	1.35±0.20	0.65±0.20	0.50±0.20

RECOMMENDED SOLDER LAND PATTERN

Unit : mm

Style	A	B	C	*t
WW08D	0.8	1.44	1.4	0.105
WW12D	1.2	1.84	1.8	0.105

* t Thickness of pad metal

MARKING

Each resistor is marked with a four-digit code on WW12D & three-digit code on WW08D protective coating to designate the nominal resistance value.

Example:

$$R020 = 0.02\Omega \text{ (WW12D)}$$

$$020 = 0.02\Omega \text{ (WW08D)}$$

FUNCTIONAL DESCRIPTION

Derating curve

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

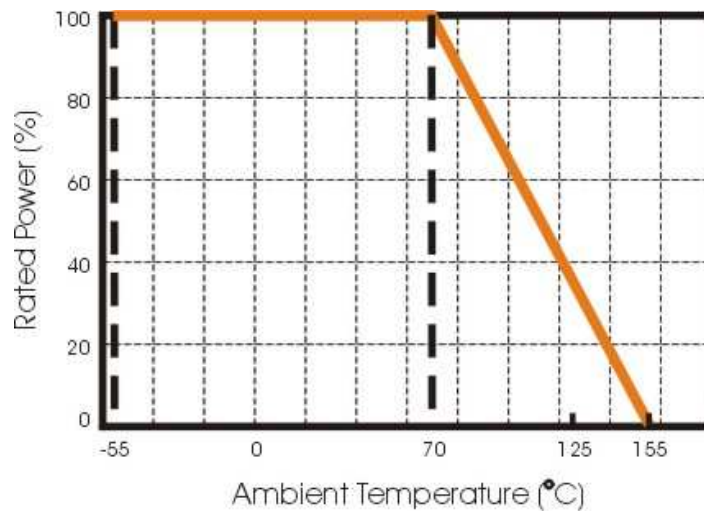


Fig.2 Maximum dissipation in percentage of rated power
As a function of the ambient temperature

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 CONDITIONS

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 within lead-free solder bath. 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

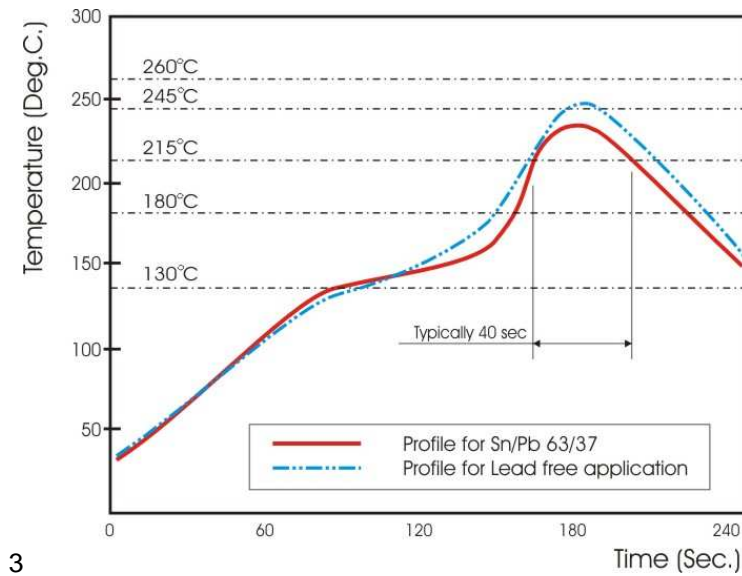


Fig 3. Infrared soldering profile for Chip Resistors WW12/08D

CATALOGUE NUMBERS

The resistors have a catalogue number starting with .

WW12	D	R020	F	T	L
Size code WW12 : 1206 WW08 : 0805	Type code D : Metal foil	Resistance code R is first digit followed by 3 significant digits. 0.020Ω = R020 0.040Ω = R040	Tolerance J : ±5% F : ±1%	Packaging code T : 7" reeled in tape	Termination code L = Sn base (lead free)

Reeled tape packaging : 8mm width paper taping 5,000pcs per reel.

TEST & REQUIREMENTS

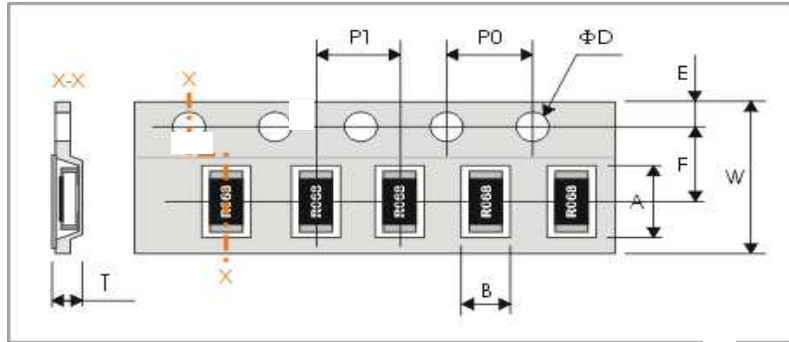
Table- 4(1)

No.	Test items	Condition of test (JIS C 5201-1)	Performance requirements
1	Resistance	Sub-clause 4.5 Resistance shall be measured with 25°C in the 4-wire resistance test.	The resistance of the test device shall be within the limits specified.
2	Temperature characteristic of resistance	4.8 Getting the sampling device resistance values measured in 25°C and 125°C and put them in to the following equation to calculate the TCR. $TCR = (R_b - R_a) / R_a \times 1 / (T_b - T_a) \times 10^6$ ta : 25°C, tb: 125°C Ra : Resistance at ta temperature Rb : Resistance at tb temperature	See Table-1.
3	Short time overload	4.13 2.5 × Rated power for 5 sec.	ΔR/R: Within ±(1%+0.5mΩ)
4	High temperature exposure	4.25 Test condition: 155±2°C Test period: 1,000h	ΔR/R: Within ±(1%+0.5mΩ)
5	Low temperature storage	4.25 Test condition: -55±2°C Test period: 1,000h	ΔR/R: Within ±(1%+0.5mΩ)
6	Moisture load life	4.25 Test condition: 60±2°C, 95%RH Test period: 1,000h loaded with RCWV or Vmax 90 min ON and 30 min OFF.	ΔR/R: Within ±(2%+0.5mΩ)
7	Thermal Shock	4.19 -55°C 30min. → Room temp 3 min. → +150°C 30min. → Room temp 3 min. 100 cycles	ΔR/R: Within ±(1%+0.5mΩ)
8	Load life at 70 °C	4.25 Test condition: 70±2°C Test period: 1,000h loaded with RCWV or Vmax 90 min ON and 30 min OFF.	ΔR/R: Within ±(2%+0.5mΩ)
9	Solderability	4.17 Dip into solder at 245°C±5°C for 3±0.5 s	The covered area > 95%
10	Resistance to soldering heat	4.18 Through reflow-265°C±5°C for 10±1 s	ΔR/R: Within ±(1%+0.5mΩ)
11	Mechanical Shock	4.21 Acceleration: 100g Amplitude: 11 ms 5 times shock	ΔR/R: Within ±(1%+0.5mΩ)

No	Test items	Condition of test (JIS C 5201-1)	Performance requirements
12	Bending strength	4.33 Span between fulcrums: 90mm Bend width: 2mm, Test board: Glass-Epoxy Board, Thickness: 1.6mm	ΔR/R: Within ±(1%+0.5mΩ)
13	Insulation resistance	4.6 between protective layer and resistive shall be measured by high ohm meter	The resistance of the test device shall over 100MΩ

PACKAGING

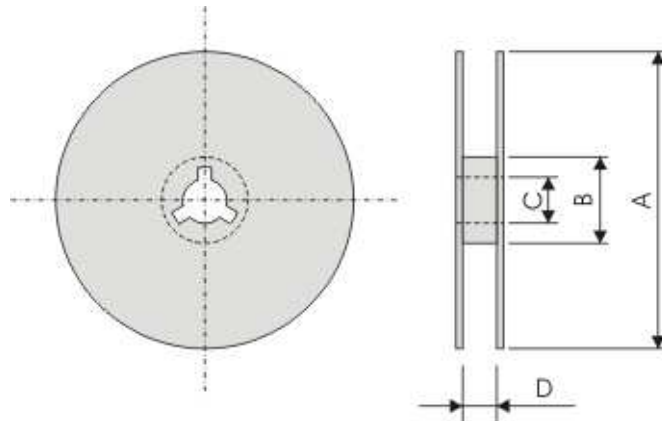
Plastic Tape specifications (unit :mm)



Symbol	A	B	W	F	E
WW12D	3.65±0.20	2.05±0.20	8.00±0.20	3.50±0.05	1.75±0.10
WW08D	2.50±0.20	1.65±0.15	8.00±0.20	3.50±0.05	1.75±0.10

Symbol	P1	P0	ΦD	T
WW12D	4.00±0.10	4.00±0.10	Φ1.50 ^{+0.1} _{-0.0}	1.0 max.
WW08D	4.00±0.10	4.00±0.10	Φ1.50 ^{+0.1} _{-0.0}	1.0 max.

Reel dimensions



Symbol	A	B	C	D
(unit : mm)	Φ180.0 -1.5	Φ60.0±1.0	13.0±0.2	9.0 +1.0

Taping quantity

- Chip resistors 5,000 pcs per reel.