

Metal Foil Low Ohm Power Chip Resistors WW12D, WW08D

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**RoHS
Compliant**



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.

Features

- Metal ultra low and stable TCR performance
- High power rating and compact size
- High reliability and stability
- Reduced size of final equipment
- Lead free

Application

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

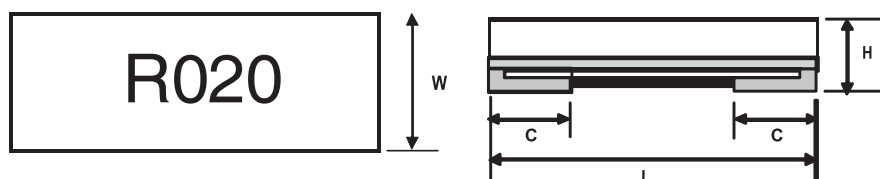
Item	General Specification	
Series No.	WW08D	WW12D
Size code	0805 (2012)	1206 (3216)
Resistance Tolerance	±5%, ±1%	
Resistance Range	20, 25, 30, 40, 50mΩ	20, 25, 30, 40, 50mΩ
TCR (ppm/°C)	±70 ppm/°C	
Max. power at TAMB=70°C	1/2W	1W
Max. Operation Current (DC or RMS)	5A, 4.4A, 4A, 3.5A, 3.1A	7A, 6.3A, 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

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

Mechanical Data



Type	Size (inch)	Resistance	L (mm)	W (mm)	H (mm)	C (mm)
WW12D	1206	20mΩ	3.2 ±0.15	1.6 ±0.15	0.55 ±0.1	1 ±0.25
		25mΩ			0.55 ±0.1	0.8 ±0.25
		30mΩ			0.55 ±0.1	0.5 ±0.25
		40mΩ			0.50±0.10	0.8 ±0.25
		50mΩ			0.50±0.10	0.6 ±0.25

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Type	Size (inch)	Resistance	L (mm)	W (mm)	H (mm)	C (mm)
WW08D	0805	20mΩ	1.95 ±0.15	1.2 ±0.15	0.55 ±0.10	0.5 ±0.20
		25mΩ			0.55 ±0.10	0.35±0.20
		30mΩ			0.50 ±0.10	0.30±0.20
		40mΩ			0.50 ±0.10	0.55±0.20
		50mΩ			0.50 ±0.10	0.45±0.20

Marking

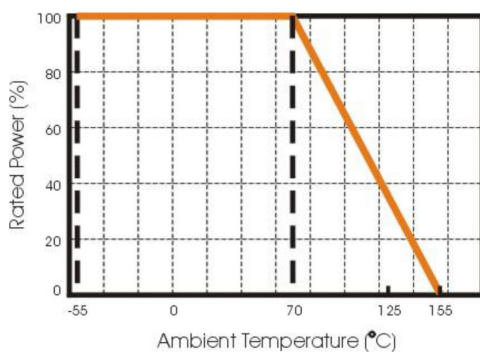
Each resistor is marked with a four-digit code on the protective coating to designate the nominal resistance value.

Example :R020 = 0.02Ω
R040 = 0.04Ω

Functional Description

Derating

The power that the resistor can dissipate depends on the operating temperature



Max. 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.

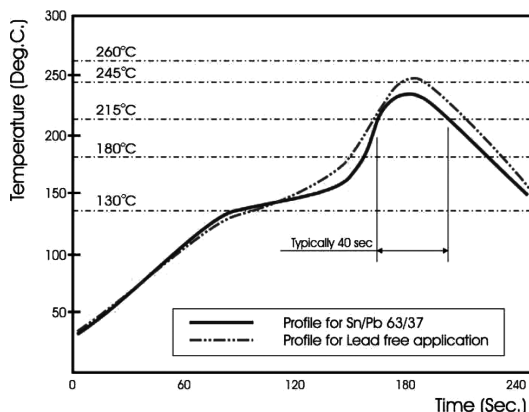
Soldering Condition

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 Figure below.

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Infrared soldering profile for Chip Resistors WWxxR

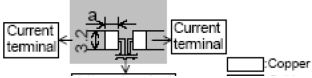
Catalogue Numbers

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. 0.02Ω = R020 0.04Ω = R040	Tolerance J : ±5% F : ±1%	Packaging code T : 7" Reeled taping	Termination code L = Sn base (lead free)

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

Test & Requirements

Test items	Condition of test (JIS C 5201-1)	Performance requirements
Visual examination	Sub-clause 4.4.1. Checked by visual examination.	As in 4.4.1 The marking shall be legible, as checked by visual examination.
Dimension Resistance	Sub-clause 4.4.2 Resistance value shall be measured by mounting the substrate of the following condition.  a: 2.9mm (2mΩ, 3mΩ, 4mΩ), 1.8mm (5mΩ) Thickness of copper clad: 0.035mm 4-Terminal method Measurement current: 1(A) Note: The measuring apparatus corresponding to DC Low-ohm Mater (1A) of AX-1152D for ADEX CORPORATION	As in 4.5.2 The resistance value shall correspond with the rated resistance taken into account the specified tolerance.

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Test items	Condition of test (JIS C 5201-1)	Performance requirements
Voltage proof	Sub-clause 4.7 Method: 4.6.1.4 Test voltage: Alternating voltage with a peak value of 1.42 times the insulation voltage Duration: 60s \pm 5s Insulation resistance Test voltage: Insulation voltage Duration: 1 min	No breakdown or flash over $R \geq 1G\Omega$
Solderability	Sub-clause 4.17 Without aging Flux: The resistors shall be immersed in a non-activated soldering flux for 2 s. Bath temperature: 235°C \pm 5°C Immersion time: 2s \pm 0.5s	As in 4.17.4.5 The terminations shall be covered with a smooth and bright solder coating
Mounting Overload (in the mounted state) Solvent resistance of the marking	Sub-clause 4.31 Substrate material: Epoxide woven glass Test substrate: Figure-3 Sub-clause 4.13 The applied voltage shall be 2.5 times the rated voltage or the current corresponding to. Duration: 2 s Visual examination Resistance Sub-clause 4.30 Solvent: 2-propanol Rubbing material cotton wool Without recovery Solvent temperature: 23°C \pm 5°C Method 1 Rubbing material: cotton wool without recovery	No visible damage $\Delta R \leq \pm 1\%$ Legible markings
Mounting Bound strength of the end face plating Final measurements	Sub-clause 4.31 Substrate material: Epoxide woven glass Test substrate: Figure-4 Sub-clause 4.33 Bent value: 1mm Resistance Sub-clause 4.33.6 Visual examination	$\Delta R \leq \pm 1\%$ No visible damage
Resistance to soldering heat Component resistance solvent	Sub-clause 4.18 Solder temperature: 260°C \pm 5 °C Immersion time: 10 s \pm 0.5 s Visual examination Resistance Sub-clause 4.29 Method 2 Solvent: 2-propanol Solvent temperature: 23°C \pm 5°C Recovery: 48 h Visual examination Resistance	As in 4.18.3.4 No sign of damage such as cracks. $\Delta R \leq \pm 1\%$ No visible damage $\Delta R \leq \pm 1\%$

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Test items	Condition of test (JIS C 5201-1)	Performance requirements
Mounting Adhesion Rapid change temperature	Sub-clause 4.31 Substrate material: Epoxide woven glass Test substrate: Figure-3 Sub-clause 4.32 Force: 5N Duration: 10s ±1s Visual examination Sub-clause 4.19 Lower category temperature:-55°C Upper category temperature:+155°C Duration of exposure at each temperature: 30min. Number of cycles: 5 cycles. Visual examination Resistance	No visible damage No visible damage $\Delta R \leq \pm 1\%$
Climatic sequence -Dry heat -Damp heat, cycle (12+12 hour cycle) First cycle -Cold -Damp heat, cycle (12+12hour cycle) Remaining cycle -D.C. load	Sub-clause 4.23 Sub-clause 4.23.2. Test temperature: +155 °C Duration: 16 h Sub-clause 4.23.3 Test method: 2 Test temperature: 55 °C [Severity(2)] Sub-clause 4.23.4 Test temperature -55 °C Duration: 2h Sub-clause 4.23.6 Test method: 2 Test temperature: 55 °C [Severity (2)] Number of cycles: 5 cycles Sub-clause 4.23.7 The applied current shall be the rated current. Duration: 1 min. Visual examination Resistance	No visible damage $\Delta R \leq \pm 5\%$
Mounting Endurance at 70°C	Sub-clause 4.31 Substrate material: Epoxide woven glass Test substrate: "Soldering conditions" Sub-clause 4.25.1 Ambient temperature: 70 °C+2 °C Duration: 1000 h The current shall be applied in cycles of 1.5 h on and 0.5 h. The applied current shall be the rated current Examina- tion at 48 h, 500 h and 1000 h: Visual examination Resistance	No visible damage $\Delta R \leq \pm 5\%$

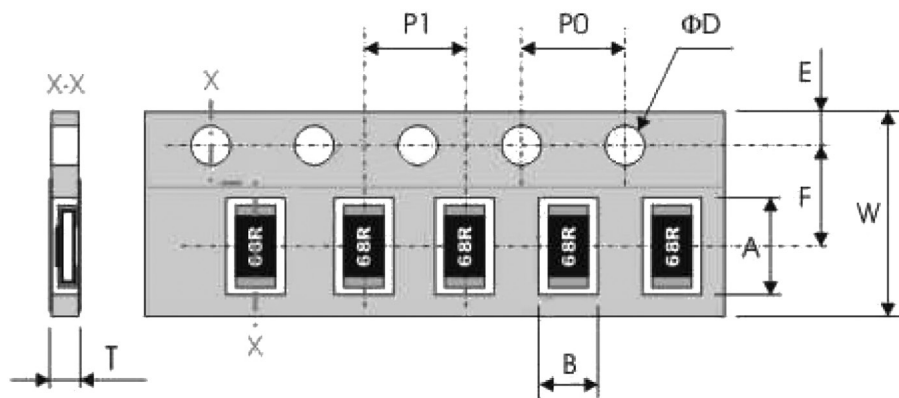
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Test items	Condition of test (JIS C 5201-1)	Performance requirements
Mounting Variation of resistance with temperature	Sub-clause 4.31 Substrate material: Epoxide woven glass Test substrate: "Soldering conditions" Sub-clause 4.8 +20 °C/+155 °C	-
Mounting Damp heat, steady state	Sub-clause 4.31 Substrate material: Epoxide woven glass Sub-clause 4.24 Ambient temperature: 40°C ±2°C Relative humidity: 933% Without current applied. Visual examination Resistance	No visible damage Legible marking $\Delta R \leq \pm 5\%$
Dimensions (detail) Mounting Endurance at upper category temperature	Sub-clause 4.4.3 Sub-clause 4.31 Substrate material: Epoxide woven glass Test substrate. Sub-clause 4.25.3 Ambient temperature: 155°C ±2°C Duration: 1000 h Examination at 48 h, 500 h and 1000 h: Visual examination Resistance	No visible damage $\Delta R \leq \pm 5\%$

Packaging

Paper Tape specifications



Series No.	A	B	W	F	E
WW12D	3.6 ±0.2	2 ±0.15	8 ±0.2	3.5 ±0.05	1.75 ±0.1
WW08D	2.5 ±0.2	1.65 ±0.15			

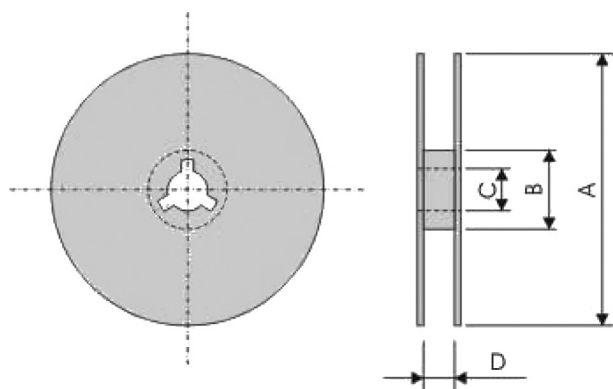
Series No.	P1	P0	ØD	T
WW12D	4 ±0.1	4 ±0.1	1.5 ^{+0.1} _{-0.0}	1 Max.
WW08D				

Dimensions : Millimetres

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Reel Dimensions



A (mm)	B (mm)	C (mm)	D (mm)
Ø180 ±1.5	Ø60 ±1	13 ±0.2	9 +1

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