

# WW12R\_V

±1%, ±5%

Metal low ohm power chip resistors Size 1206 (1W) Automotive grade AEC Q200 compliant Anti-sulfuration H<sub>2</sub>S 10ppm x 1000hrs compliant

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



## FEATURE

- 1. Metal ultra low and stable TCR performance
- 2. High power rating and compact size
- 3. High reliability and stability
- 4. 100% CCD visual inspection
- 5. RoHS compliant & complete Lead free
- 6. Automotive grade AEC Q200 compliant
- 7. Anti-sulfuration H2S 10ppm x 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 terminations.



Fig 1. Construction of Chip-R

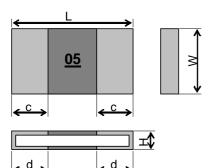
# QUICK REFERENCE DATA

Item	General Specification		
Series No.	WW12R		
Size code	1206 (3216)		
Resistance Tolerance	±5% , ±1%		
Resistance Range	1 ~ 15 mΩ		
TCR (ppm/°C)	1 mohm: ±100 ppm/°C; 2 ~ 15mohm: ±70 ppm/°C		
Max. power at T <sub>amb</sub> =70°C	1W		
Max. Operation Current	31.6A ~ 8.2A		
Operation temperature	- 55 ~ +155C		

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

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

# **MECHANICAL DATA**



## Unit: mm

Туре	Size (inch)	Resistance	L (mm)	W (mm)	H (mm)	c (mm)	d (mm)
WW12R	1206	1mΩ	3.2±0.15	1.6±0.15	0.32±0.15	1.1±	0.25
		2mΩ			0.32±0.15	0.5±	0.25
		3mΩ			0.35±0.1	0.7±0.25	1.3±0.25
		4mΩ			0.35±0.1	0.85	±0.25
		5mΩ			0.35±0.1	1.0±	0.25
		6mΩ			0.35±0.1	1.1±	0.25
		7mΩ			0.35±0.1	0.70:	±0.25
		8mΩ			0.35±0.1	0.60	±0.25
		9mΩ			0.30±0.1	0.75	±0.25
		10mΩ			0.28±0.1	0.50	±0.25
		12mΩ			0.22±0.1	0.65	<b>±0.25</b>
		13mΩ			0.22±0.1	0.65	±0.25

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15mΩ 0.22±0.1 0.50±0.25
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#### MARKING

WW12R each resistor is marked with a 2-digit code with underline on the protective coating to designate the nominal resistance value.

Example:

 $\frac{05}{10} = 0.005\Omega$  $\frac{10}{10} = 0.010\Omega$ 

## FUNCTIONAL DESCRIPTION

#### **Derating curve**

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

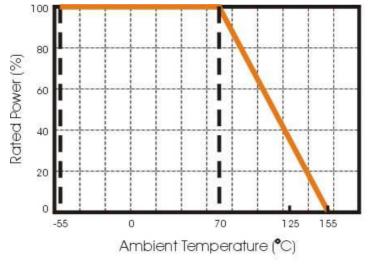


Fig.2 Maximum dissipation in percentage of rated power As a function of the ambient temperature



## **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 245°C during 3 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

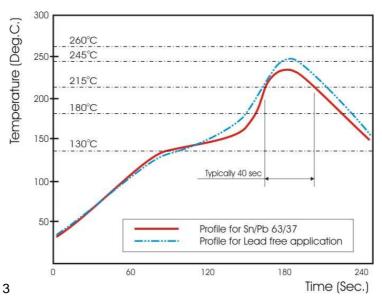


Fig 3. Infrared soldering profile for Chip Resistors WW12R

## CATALOGUE NUMBERS

The resistors have a catalogue number starting with .

WW12	R	R005	J	Т	L	V
Size code	Type code	Resistance code	Tolerance	Packaging code	Termination code	Visual code
WW12 :1206	R : 1W, 1206	R is first digit followed by 3 significant digits. 0.010Ω = R010 0.005Ω = R005		T : 7" reeled in tape	L = Sn base (lead free)	<ul> <li>V = AEC Q200 compliant with 100% CCD inspection + Anti-sulfur H2S 10ppm x 1000hrs compliant</li> </ul>

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



## **TEST & REQUIREMENTS**

		Table-4(1)	
No.	Test items	Condition of test	Performance requirements
1	High temperature exposure	MIL-STD-202 Method 108	$\Delta R/R$ : Within ±3%
	AEC Q200 - No.3	Ambient temperature:155±2°C,	No visible damage
		Condition: Without load,	
		Duration: 1000 +48 h	
		Interval measurements: 250 h and 500 h	
2	Temperature cycling	JESD22 Method JA-104	$\Delta R/R$ : Within ±1%
	AEC Q200 - No.4	Temperature: -55±3°C / 125±2°C,	No visible damage
		Dwell time: 30min maximum at each temp.	
		Transition time: 1 min. max.	
		Number of cycles: 1000 cycles.	
		Interval measurements: 250 cy and 500 cy	
3	Bias humidity	MIL-STD-202 Method 103	$\Delta R/R$ : Within ±3%
	AEC Q200 – No.7	Condition: 85°C & 85% R.H.	No visible damage
		Test power: 10% of rated power shall be applied	
		for continuously.	
		Duration: 1,000 <sup>+48</sup> h	
		Interval measurements: 250 h and 500 h	
4	Operational life	MIL-STD-202 Method 108	$\Delta R/R$ : Within ±3%
	AEC Q200 – No.8	Ambient temperature: 125±2°C	No visible damage
		The applied voltage shall be the voltage to be	
		calculated at 35% of rated dissipation or the	
		limiting element voltage whichever is the smaller.	
		Condition: The voltage shall be applied for	
		continuously.	
		Duration: 1000 <sup>+48</sup> h	
		Interval measurements: 250 h and 500 h	
5	Dimensions	JESD22 Method JB-100	As in Table–3
	AEC Q200 - No.10		
6	Resistance to Solvents	MIL-STD-202 Method 215	$\Delta R/R$ : Within ±1%
	AEC Q200 – No.12	Solvent: 2-propanol at 25°C	No visible damage
		Immersion time: 3 min	
		Brush: 10 times brushing	
		Immersion and brush cycle: 3cycle	
7	Mechanical Shock	MIL-STD-202 Method 213	$\Delta R/R$ : Within ±1%
	AEC Q200 – No.13	Waveform: half sine,	No visible damage
		Peak value100G,	
		Normal duration 6ms Condition: XX'YY'ZZ', 10times each	
8	Vibration	MIL-STD-202 Method 204	ΔR/R: Within ±1%
0	AEC Q200 – No.14	Peak acceleration and Sweep time: 5 g's for 20 min ,	
	AEC 0/200 - NO. 14	Frequency 10Hz to 2000Hz,	No visible damage
		Condition: 12 cycles each of 3 orientations	
		COndition. 12 Cycles Each OFS Offendations	

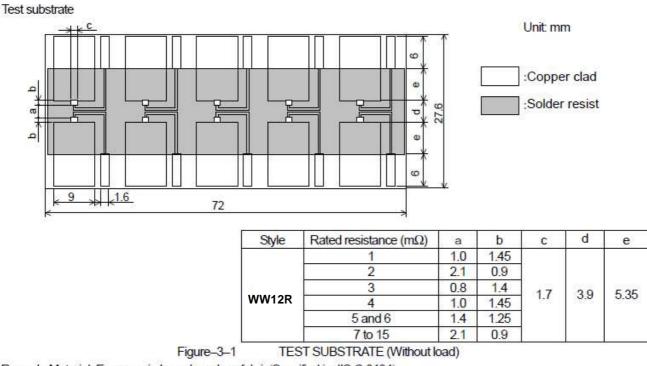
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		Table-4(2)	
No	Test items	Condition of test	Performance requirements
9	Resistance to soldering	MIL-STD-202 Method 210	$\Delta R/R$ : Within ±1%
	heat	Solder bath temp: 260±5°C	No visible damage
	AEC Q200 - No.15	Immersed time: 10±1s	
10	ESD test	AEC-Q200-002	$\Delta R/R$ : Within ±1%
	AEC Q200 – No.17	Human body model, 2 Kohm, 150 pF,	No visible damage
		Test voltage: 8KV	
11	Solderability	J-STD-002	The surface of terminal immersed
	AEC Q200 – No.18	a) Bake the sample for 155 °C dwell time 4h /	shall be min. of 95% covered with a
		solder dipping 235°C/ 5s.	new coating of solder.
		Solder: Sn96.5-Ag3-Cu0.5	
		b) Category 3, Solder dipping 215°C/5s. Solder: Sn63Pb37	
		c) Category 3, Solder dipping 260°C/ 7s.	
12	Electrical Characterization	1. D.C. Resistance	1. The resistance value shall
12	AEC Q200 - No.19	Resistance value shall be measured by	correspond with the rated
	1.20 Q200 110.10	mounting the substrate of the following	resistance taking into account the
		condition.	specified tolerance.
			2. As in Table–1
		terminal	
		Copper clad	
		Voltage terminal Solder resist	
		Unitmm	
		Style Resistance a b c	
		value(ms2)	
		1 1.0 1.45	
		2 2.1 0.9	
		RLP32 3 0.8 1.4 1.7	
		4 1.0 1.45	
		5 and 6 1.4 1.25	
		7 to 15 2.1 0.9	
		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.	
		ADEA CONFORMION.	
		2. Temperature Coefficient of Resistance	
		_55 °C / +20 °C	
		+20 °C / +155°C	
13	Bending strength	AEC-Q200-005	$\Delta R/R$ : Within ±1%
	AEC Q200 - No.21	Bending value2mm	No visible damage
		Holding time: 60sec.	
14	Adhesion	AEC-Q200-006	$\Delta R/R$ : Within ±1%
	AEC Q200 – No.22	Pressurizing force: 17.7N, Test time: 60±1s.	No remarkable damage or removal
			of the terminations
15	Hydrogen sulphide test	H2S concentration: 10ppm	$\Delta R/R$ : Within ±1%
		Test temp.: 57°C	
		Relative humidity: 95%	
		Test period: 1000h	

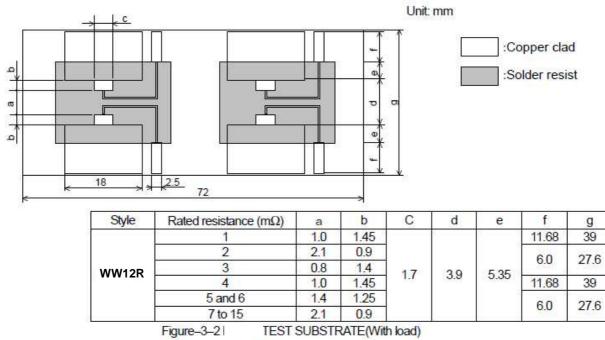
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Remark: Material: Epoxy resin based as glass fabric(Specified in JIS C 6484).
         Thickness: 1.6mm
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Thickness of copper clad: 0.035mm



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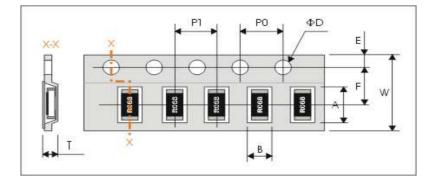
Thickness of copper clad: 0.07mm Thickness: 1.6mm

Remark: In the case of connection by connector, the connecting terminals are gold plated.

However, the plating is not necessary when the connection is made by soldering.

## PACKAGING

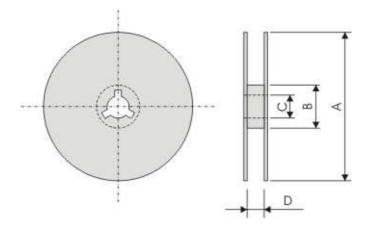
Plastic Tape specifications (unit :mm)



Symbol	Α	В	W	F	Е
WW12R	3.60±0.20	2.00±0.15	8.00±0.20	3.50±0.05	1.75±0.10

Symbol	P1	P0	ΦD	Т
WW12R	4.00±0.10	4.00±0.10	$\Phi 1.50^{+0.1}_{-0.0}$	1.0 max.

#### **Reel dimensions**



S	ymbol	А	В	С	D
(un	it : mm)	Φ180.0 -1.5	$\Phi$ 60.0±1.0	13.0±0.2	9.0 +1.0

## Taping quantity

- Chip resistors 5,000 pcs per reel.