APPROVAL SHEET

WW25Q

±1%, ±5%, 1W

Metal plate low ohm power chip resistors

Size 2512 (6432)

Current Sensing Type

Automotive AEC Q200 compliant

*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 compliant and Lead free product
6. Low inductance below 3nH
7. Automotive AEC Q200 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

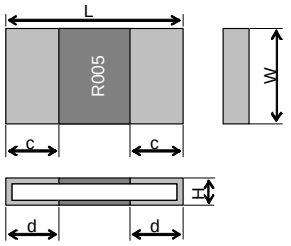
QUICK REFERENCE DATA

Item	General Specification
Series No.	WW25Q
Size code	2512 (6432)
Resistance Tolerance	±5%, ±1%
Resistance Value	0.001Ω ~ 0.015Ω
TCR (ppm/°C)	0.001Ω: ±100ppm; 0.002Ω-0.015Ω: ±70 ppm/°C
Max. dissipation at T_{amb}=70°C	1 W
Max. Operation Current	31.6A ~ 8.16A
Operation temperature	-55 ~ +155'C

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

$$RCWC = \sqrt{Rated\,Power / Resistance\,Value}$$

MECHANICAL DATA



Type	Size (inch)	Resistance	L (mm)	W (mm)	H (mm)	C (mm)	D (mm)
WW25Q	2512	1mΩ	6.3±0.25	3.2±0.25	0.38±0.15	2.20±0.25	
		2mΩ		3.1±0.25		1.10±0.25	
		3mΩ		3.1±0.25	0.45±0.15	2.20±0.25	
		4mΩ			0.35±0.15	2.20±0.25	
		5mΩ			0.34±0.15	1.95±0.25	
		6mΩ			0.34±0.15	1.75±0.25	
		7mΩ			0.35±0.15	1.40±0.25	
		8mΩ			0.35±0.15	1.10±0.25	
		9mΩ			0.35±0.15	0.80±0.25	
		10mΩ			0.23±0.15	1.75±0.25	
		11mΩ				1.55±0.25	
		12mΩ				1.35±0.25	
		13mΩ				1.25±0.25	
		14mΩ				1.05±0.25	
		15mΩ				0.95±0.25	

MARKING

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

R005 = 5 mΩ
R001 = 1 mΩ

FUNCTIONAL DESCRIPTION

Derating curve

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

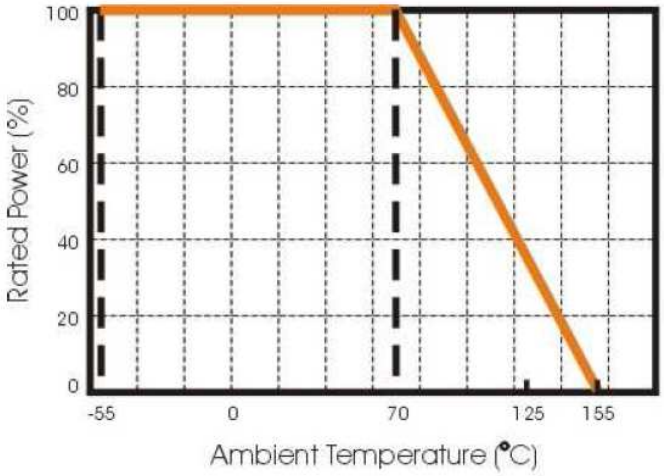


Fig.2 Maximum dissipation in percentage of rated power
As a function of the ambient temperature

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 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 3 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.

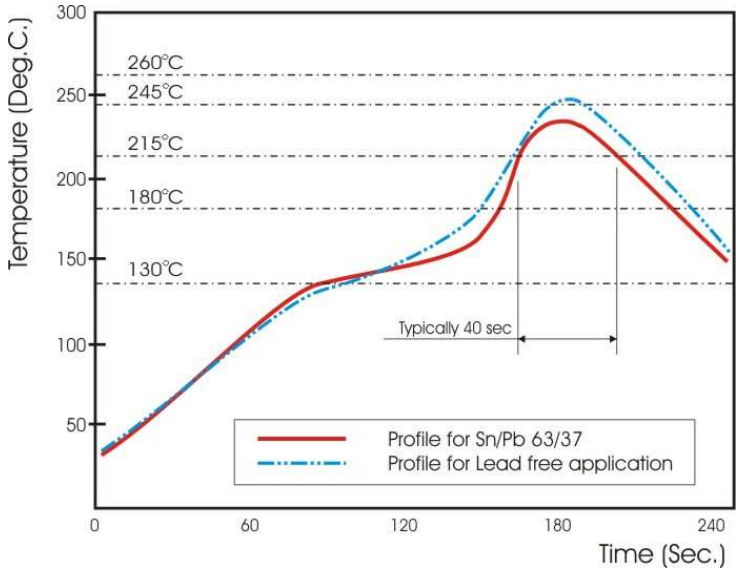


Fig 3. Infrared soldering profile for Chip Resistors WW25

CATALOGUE NUMBERS

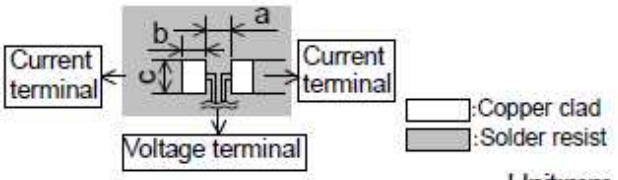
The resistors have a catalogue number starting with .

WW25	Q	R001	F	T	L	J
Size code WW25 : 2512	**Type code** **Q** : 1W Sensing type	**Resistance code** R is first digit followed by 3 significant digits. 0.001Ω = R001 0.005Ω = R005 0.010Ω = R010 0.0005Ω = R0L5	**Tolerance** J : ±5% F : ±1%	**Packaging code** T : 7" Reel taping	**Termination code** L = Sn base (lead free)	**Special code** **J** = AEC Q200 compliant

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

TEST AND REQUIREMENTS

TEST	PROCEDURE	REQUIREMENT
High temperature exposure MIL-STD-202-108	Ambient temperature 155±2°C, no load, 1000 hrs	no visible damage ΔR/R max. ±3%
Temperature cycling JESD22 JA-104	1. 30 minutes at -55°C±3°C, 2. 2~3 minutes at room temperature, 3. 30 minutes at +125°±3°C, 4. 2~3 minutes at room temperature, Total 1000 continuous cycles	no visible damage ΔR/R max. ±1%
Bias Humidity MIL-STD-202-103	Condition: 85°C & 85% R.H. Test power: 10% of rated power shall be applied continuously. Duration 1000hrs	no visible damage ΔR/R max. ±3%
Operational Life MIL-STD-202-108	Ambient temperature: 125±2ºC 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 continuously. Duration: 1000 hrs	no visible damage ΔR/R max. ±3%
Dimension	JESD22 Method JB-100	Meet dimension spec as defined in p.3
Resistance to Solvents MIL-STD-202-215	Solvent: 2−propanol at 25℃ Immersion time: 3 min Brush: 10 times brushing Immersion and brush cycle: 3cycle	ΔR/R: max ±1% No visible damage
Mechanical Shock MIL-STD-202-213	Waveform: half sine, Peak value100G, Normal duration 6ms Condition: XX'YY'ZZ', 10times each	ΔR/R: max. ±1% No visible damage
Vibration MIL-STD-202-204	Peak acceleration and Sweep time: 5 g's for 20 min , Frequency 10Hz to 2000Hz, Condition: 12 cycles each of 3 orientations	ΔR/R: max ±1% No visible damage
Resistance to soldering heat MIL-STD-202-210	Un-mounted chips 10±0.5 seconds, 260±5°C	ΔR/R: max ±1% No visible damage
ESD test AEC Q200-002	Human body model, 2 Kohm, 150 pF, Test voltage: 8KV	ΔR/R: max ±1% No visible damage
Solderability J-STD-002	a)4hrs / 155℃*dry then solder dipping 235℃/5sec b)Steam 8 hrs then 215℃ / 5sec solder dipping c)Steam 8 hrs then 260℃ / 7sec solder dipping	good tinning (>95% covered) no visible damage
Bending strength AEC Q200-005	Bending 2mm for 60 seconds.	ΔR/R: max ±1% No visible damage
Adhesion AEC Q200-006	Pressurizing force: 17.7N, Test time: 60±1s.	ΔR/R: max ±1% No visible damage

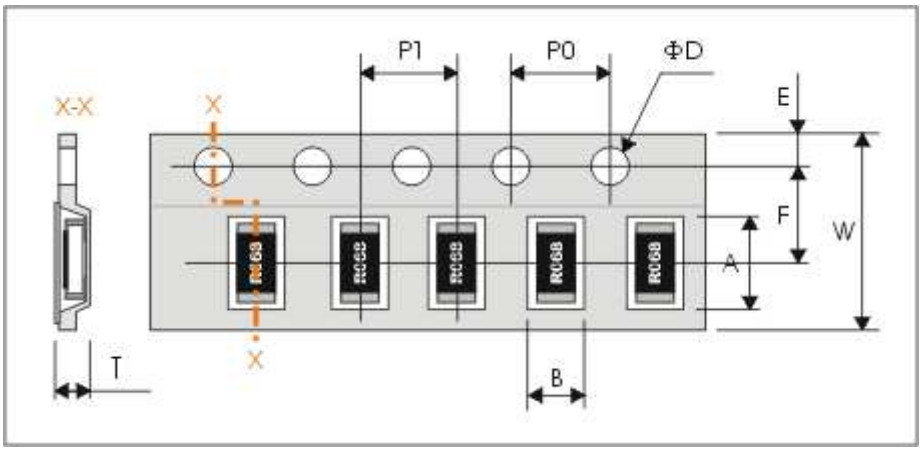
<table>
<tr>
<td>Electrical Characterization</td>
<td>1. D.C. Resistance
Resistance value shall be measured by mounting the substrate of the following condition.


Unit:mm
<table>
<tr><th>Style</th><th>Resistance value(mΩ)</th><th>a</th><th>b</th><th>c</th></tr>
<tr><td rowspan="5">WW25Q</td><td>1</td><td>1.5</td><td>3.0</td><td>4.0</td></tr>
<tr><td>2</td><td>4.0</td><td>1.8</td><td rowspan="4">3.5</td></tr>
<tr><td>3, 4</td><td>1.8</td><td>2.9</td></tr>
<tr><td>5</td><td>2.4</td><td>2.6</td></tr>
<tr><td>6 to 15</td><td>4.0</td><td>1.8</td></tr>
</table>
Thickness of copper clad: 0.035mm
4-Terminal method, Measurement current: 1(A)
Note: The measuring apparatus corresponding to DC Low ohm Meter (1A) of AX–1152D for ADEX CORPORATION.

2. Temperature Coefficient of Resistance
–55 ℃ / +20 ℃ / +20 ℃ / +155℃</td>
<td>As specified in specification</td>
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PACKAGING

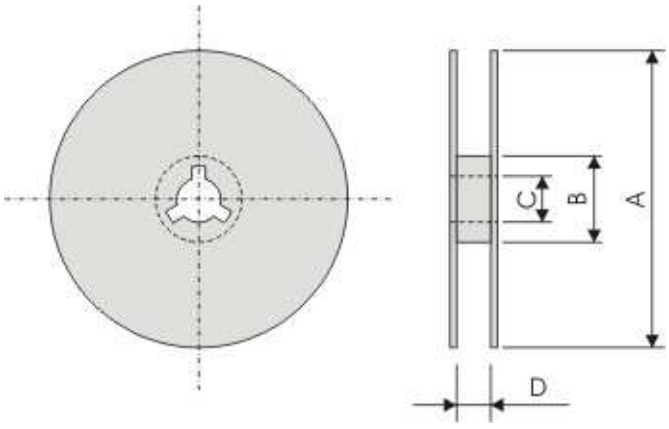
Plastic Tape specifications (unit :mm)



Symbol	A	B	W	F	E
Dimensions	6.90±0.20	3.60±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	$\Phi 1.50^{+0.1}_{-0.0}$	1.10±0.15

Reel dimensions



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

Taping Quantity

- Chip resistors 4,000 pcs per reel.