APPROVAL SHEET

WF25A

±1%, ±5%, 3W

Thick Film High Power Chip Resistors

Size 2512 (6432)

RoHS Compliant & Halogen free

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

FEATURE

1. Ultra high power rating and compact size
2. High reliability and stability
3. Reduced size of final equipment
4. RoHS compliant and Halogen free

APPLICATION

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

DESCRIPTION

The resistors are constructed in a high grade ceramic body (aluminum oxide). Internal metal electrodes are added at each end and connected by a resistive paste that is applied to the top surface of the substrate. The composition of the paste is adjusted to give the approximate resistance required and the value is trimmed to nominated value within tolerance which controlled by laser trimming of this resistive layer.

The resistive layer is covered with a protective coat. Finally, the two external end terminations are added. For ease of soldering the outer layer of these end terminations is Tin (lead free) alloy.

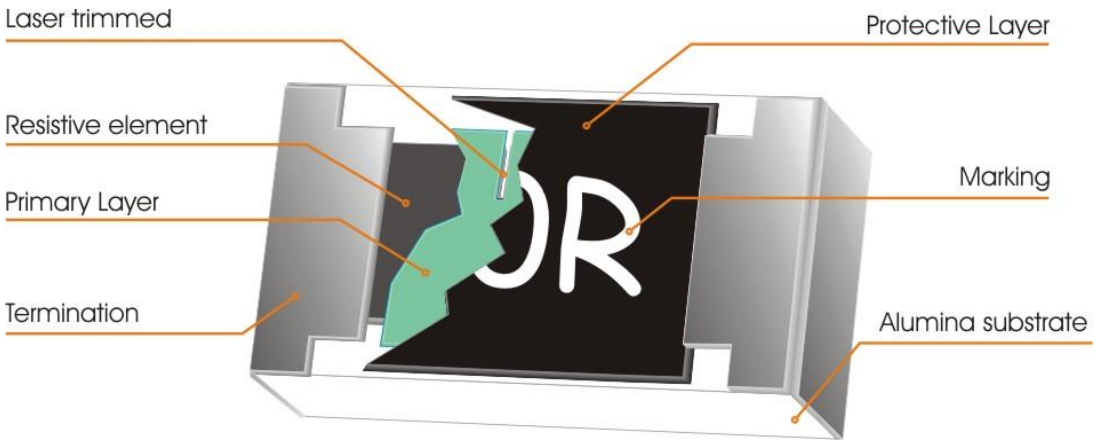


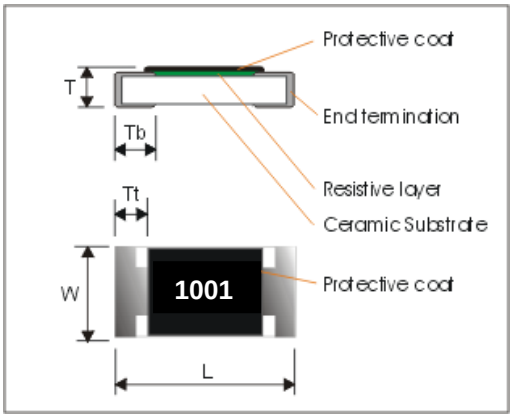
Fig 1. Construction of Chip-R

QUICK REFERENCE DATA

Item	General Specification	
Series No.	WF25A	
Size code	2512 (6432)	
Resistance Tolerance & Range	±5%: 1Ω - 1MΩ (E24), Jumper	
	±1%: 1Ω - 1MΩ (E24+E96)	
TCR (ppm/°C) +25 ~ +155°C	±5%: ≤ ±200 ppm/°C	±1%: ≤ ±100 ppm/°C
Max. dissipation at T_{amb}=70°C	3 W	
Operation temperature	-55 ~ +155'C	

Note: Jumper is defined as max. 20mohm with rated current 12A!

MECHANICAL DATA



Symbol	Dimensions (mm)
L	6.40±0.20
W	3.10±0.20
T	1.10±0.20
Tt	0.45±0.25
Tb	1.80±0.25

MARKING

For ±1%, each resistor is marked with a four-digit code on the protective coating to designate the nominal resistance value.
For ±5%, each resistor is marked with a three-digit code on the protective coating to designate the nominal resistance value.
For Jumper, it is marked with a four-digit code 0000.

E24 ±5% : 3 Digits marking to identify the resistance value



$301 \rightarrow 30 \times 10^{1} = 300\,\Omega$

E24/E96 ±1% : 4 Digits marking to identify the resistance value

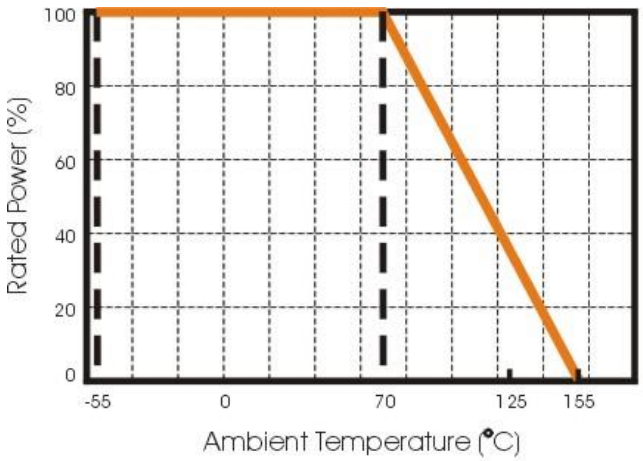


$1542 \rightarrow 154 \times 10^{2} = 15.4\,K\Omega$

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.

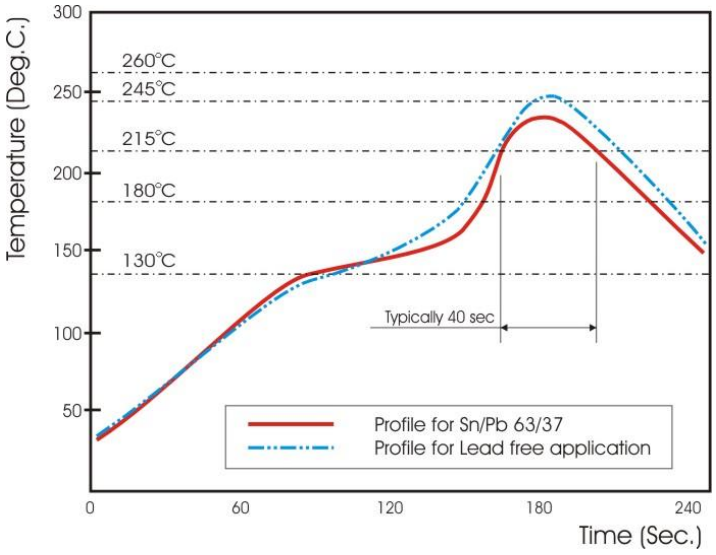


Fig 3. Infrared soldering profile for Chip Resistors WF25A

CATALOGUE NUMBERS

The resistors have a catalogue number starting with .

WF25	A	1001	F	Z	L
Size code WF25 : 2512	**Type code** **A** : 3W	**Resistance code** ±5%, two digits followed by 3 significant digit 100Ω = 101 Jumper = 000 ±1%, three digits followed by 4 significant digit 100Ω = 1000	**Tolerance** J : ±5% F : ±1% P : Jumper	**Packaging code** **Z** : 7" reel taped 3,000pcs!	**Termination code** L = Sn base (lead free)

Reeled tape packaging : 12mm width plastic emboss taping 3,000pcs per 7" reel.

TEST AND REQUIREMENTS(JIS C 5201-1 : 1998)

Essentially all tests are carried out according to the schedule of IEC publication 115-8, category **LCT**/**UCT**/56(rated temperature range : **L**ower **C**ategory **T**emperature, **U**pper **C**ategory **T**emperature; damp heat, long term, 56 days). The testing also meets the requirements specified by EIA, EIAJ and JIS.

The tests are carried out in accordance with IEC publication 68, "Recommended basic climatic and mechanical robustness testing procedure for electronic components" and under standard atmospheric conditions according to IEC 60068-1, subclause 5.3. Unless otherwise specified, the following value supplied :

Temperature: 15°C to 35°C.

Relative humidity: 45% to 75%.

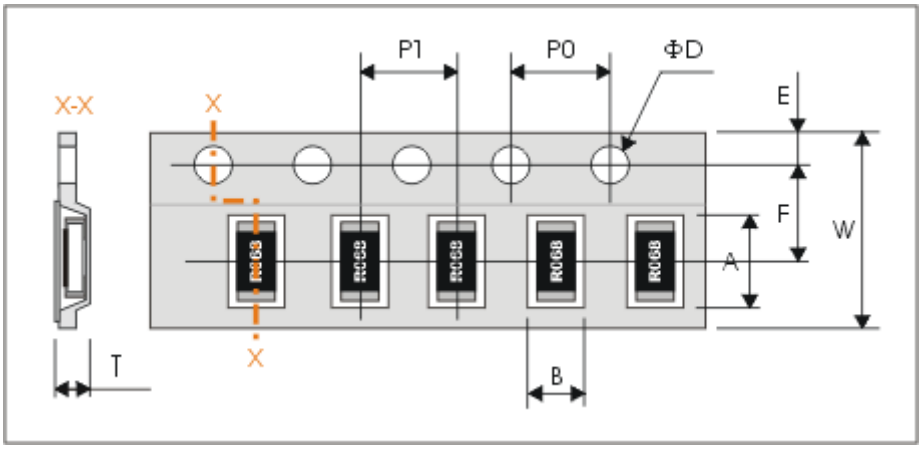
Air pressure: 86kPa to 106 kPa (860 mbar to 1060 mbar).

All soldering tests are performed with midly activated flux.

TEST	PROCEDURE	REQUIREMENT
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 : 25°C R_1 : Resistance at reference temperature 25°C R_2 : Resistance at test temperature 155°C	Refer to "QUICK REFERENCE DATA"
Short time overload (S.T.O.L) **Clause 4.13**	Permanent resistance change after a 5second application of a 5 times rated power.	J: ΔR/R max. ±(2%+0.5mΩ) F: ΔR/R max. ±(1%+0.5mΩ)
Solderability **Clause 4.17**	Un-mounted chips completely immersed for 3±0.5 second in a SAC solder bath at 245℃±2℃	good tinning (>95% covered) no visible damage
Resistance to soldering heat(R.S.H) **Clause 4.18**	Un-mounted chips completely immersed for 10±1 second in a SAC solder bath at 260℃±5°C	no visible damage J: ΔR/R max. ±(1%+0.5mΩ) F: ΔR/R max. ±(0.5%+0.5mΩ)
Temperature cycling **Clause 4.19**	30 minutes at -55°C±3°C, 2~3 minutes at 20°C+5°C-1°C, 30 minutes at +155°C±3°C, 2~3 minutes at 20°C+5°C-1°C, total 5 continuous cycles	no visible damage J: ΔR/R max. ±(1%+0.5mΩ) F: ΔR/R max. ±(0.5%+0.5mΩ)
Load life (endurance) **Clause 4.25**	1000 +48/-0 hours, loaded with RCWV or Vmax in chamber controller 70±2°C, 1.5 hours on and 0.5 hours off	J: ΔR/R max. ±(3%+0.5mΩ) F: ΔR/R max. ±(1%+0.5mΩ)
Load life in Humidity **Clause 4.24**	1000 +48/-0 hours, loaded with RCWV or Vmax in humidity chamber controller at 40°C±2°C and 90~95% relative humidity, 1.5hours on and 0.5 hours off	J: ΔR/R max. ±(3%+0.5mΩ) F: ΔR/R max. ±(1%+0.5mΩ)
Bending strength **Clause 4.33**	Resistors mounted on a 90mm glass epoxy resin PCB(FR4); bending : 2mm once for 10 seconds	no visible damage J: ΔR/R max. ±(1%+0.5mΩ) F: ΔR/R max. ±(0.5%+0.5mΩ)
Insulation Resistance **Clause 4.6**	Test voltage 100+/-15V between termination and overcoat	Min 1000Mohm

PACKAGING

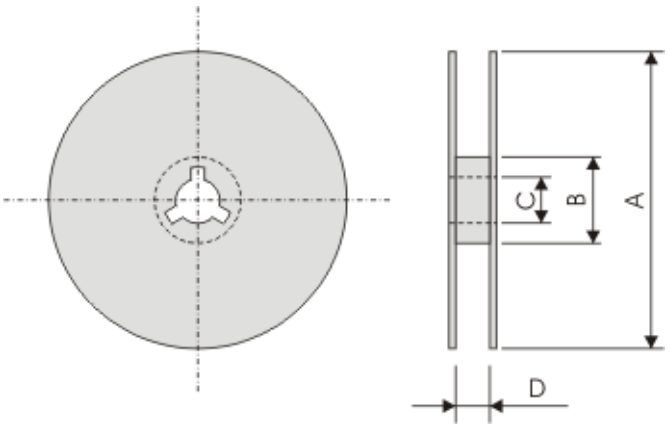
Plastic Tape specifications (unit: mm)



TYPE	A	B	W	F	E
WF25A	6.70±0.20	3.50±0.20	12.00±0.30	5.50±0.1	1.75±0.10

TYPE	P1	P0	ΦD	T
WF25A	4.00±0.10	4.00±0.10	$\Phi 1.50^{+0.1}_{-0.0}$	Max. 1.5

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 quantity

- Chip resistors 3,000 pcs per reel.