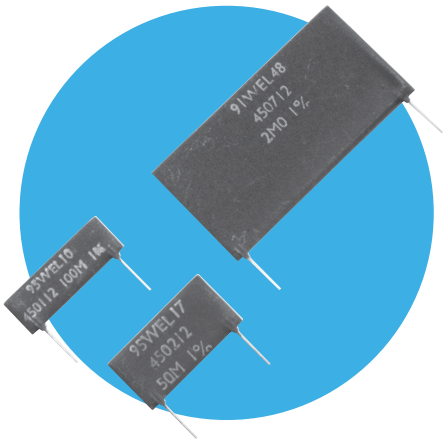
Resistors

High Voltage Planar Resistors



4500 Series

- Voltages up to 20kV dc.
- Powers up to 4.5 Watts
- TCR to 50ppm/°C
- Customs design service available
- Planar construction gives low inductance and capacitance

All parts are Pb-free and comply with EU Directive 2011/65/EU (RoHS2)

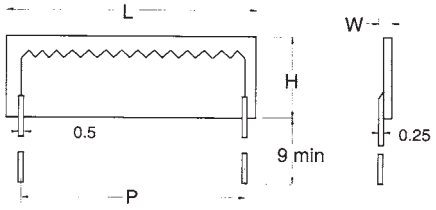
Electrical Data

		4501	4502	4503	4504	4505	4506	4507
Power rating at 70°C	watts	1	1.7	2	3	2.8	3.6	4.5
Resistance range	ohms	20k to 500M	36k to 750M	36k to 750M	62k to 1G	51k to 1G	82k to 1G	180k to 1.5G
Limiting element voltage	volts	10k	10k	15k	15k	20k	20k	20k
TCR (20°C to 70°C)	ppm/°C	100, 150 (see table below for 50ppm)						
Resistance tolerance	%	1, 2, 5						
Values		Any value to order						
Ambient temperature range	°C	-55 to 125						
Value ranges for TCR of 100 ppm/°C		≤150M	≤270M	≤270M	≤470M	≤390M	≤680M	≤1.5G
Value ranges for TCR of 150 ppm/°C		>150M	>270M	>270M	>470M	>390M	>680M	
Value ranges available for								
TCR of 50ppm/°C		<100M	<150M	<200M	<250M	<250M	<300M	<600M

Physical Data

Dimensions (mm) of Uncoated Resistors*

Type	L max	H max	W max	P (nominal) 450000	P (nominal) 450000A
4501	25.7	9	2	20.3	22.9
4502	25.7	13	2	20.3	22.9
4503	38.7	9	2	33.0	35.6
4504	38.7	13	2	33.0	35.6
4505	51.2	9	2	45.7	48.3
4506	51.2	13	2	45.7	48.3
4507	51.2	25.7	2	45.7	48.3



*Conformally coated resistors: Add 1mm to dimensions L and H and 0.5mm to W.

General Note
TT Electronics reserves the right to make changes in product specification without notice or liability.
All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

BI Technologies IRC Welwyn

www.ttelectronicsresistors.com

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Construction
A high quality alumina substrate is printed with a specially selected high voltage thick film resistor ink based on a ruthenium oxide/glass system. A choice of protective systems is available.

Choice of Protection
As standard components are supplied conformally coated with an epoxy resin. By special request components can be supplied unprotected or with a screen printed epoxy 'handling' protection.

Terminations
Material Solder coated phosphor bronze leadframe. Resistors can be supplied without leads, in which case palladium silver pads enable electrical connection to be made.

Strength The terminations meet the requirements of IEC 68.2.21.

Solderability The terminations meet the requirements of IEC 115-1, Clause 4.17.3.2

Marking
Type and protection system references, resistance value tolerance and manufacturing date code are legend marked. The resistance value conforms to IEC 62.

Solvent Resistance
The body protection and marking are resistant to all normal industrial cleaning solvents suitable for printed circuits.

Performance Data

		Actual	
		Maximum	**Typical**
Load at rated power: 1000 hours at 70°C	ΔR%	5	0.3
Shelf life: 12 months at room temperature	ΔR%	0.3	<0.1
Derating		Zero at 125°C	
Temperature rapid change	ΔR%	0.1	0.02
Resistance to solder heat	ΔR%	0.05	0.02
Voltage coefficient of	4501 and 4502	5	<3
Resistance ppm/volt	4503 and 4504	3	<2
	4505, 4506 and 4507	1.5	<1

Application Notes
The terminations should not be bent closer than 1.5mm from the body, and the recommended minimum bend radius is 1mm.

Due to the high voltage which can appear between the resistor body and any adjacent metal part, resistors should be mounted at an adequate distance from other conducting parts.

Due to the possibility of surface condensation it is recommended that high voltages are not applied to resistors in conditions of high humidity.

Design Flexibility
The experience of Welwyn engineers has been used to design this generation of high voltage planar resistors to be suitable for a majority of applications. However, should an application require particular consideration, Welwyn designers are available to provide advice and where applicable, to recommend a non-standard product. Special sizes, designs etc, can be prototyped at short notice.

Non Standard Optional Features
The options listed below are some of the special features which may be provided, subject to agreement.
Special substrate size.
Leadless version with palladium silver solder pads.
Special termination length, diameter and pitch.
Special designs for pulse applications.
Resistance value outside stated range.
Tolerance better than ± 1%
Temperature coefficient of ± 50ppm/°C.

Enquiries Welcomed

Packaging
Packed in foam within a box.

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Ordering Procedure

Example: 4503 on 35.6mm pitch with leadframe terminals and conformal coat at 15 megohms and 1% tolerance -

4 5 0 3 1 2 A – 1 5 M F I

Type

Terminal

1	Leadframe
2	Copper wire

Protection

2	Conformal coating
3	Screen printed protection
4	Unprotected

Pitch

	Standard
A	Alternative

Value (use IEC62 code)

Tolerance (use IEC62 code)

F	1%
G	2%
J	5%

Packing

I	Box	Standard

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