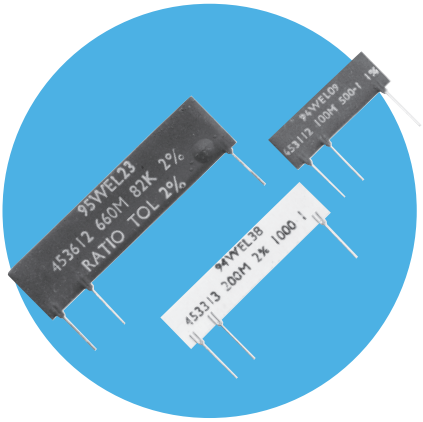
Resistors

High Voltage Planar Dividers

4530 Series

- Dissipation up to 4.5 Watts at 70°C
- Voltage up to 15 kV dc
- TCR tracking down to 100 ppm/°C
- Suitable for high voltage precision dividers, feedback circuits and measurement systems



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

Electrical Data

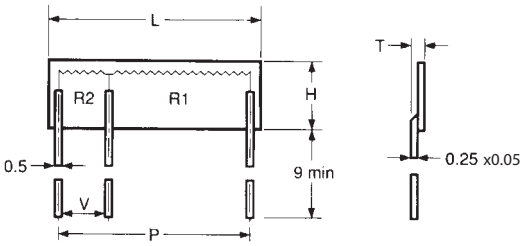
		4531*	4532*	4533*	4534*	4535*	4536*	4537*
Power rating at 70°C	watts	1.0	1.7	2.0	3.0	2.8	3.6	4.5
Resistance range	ohms	20K to 130M	36K to 250M	36K to 250M	62K to 450M	51K to 370M	82K to 660M	180K to 1.4G
Limiting element voltage	volts	6.5K	6.5K	10K	10K	15K	15K	15K
TCR (20°C to 70°C)	ppm/°C	100						
Resistance tolerance	%	1, 2, 5						
Resistance ratio tolerances	%	1, 2, 5						
Standard values		Any value to order						
Ambient temperature range	°C	-55 to 125						

*5th or 6th digit determines protection and lead type (see marking)

Physical Data

Dimensions (mm) of Uncoated Resistors*

Type	L max	H max	T max	V nom	P nom	Substrate nominal
4531	25.7	9	2	5.1	20.3	25 x 8.5
4532	25.7	13	2	5.1	20.3	25 x 12.5
4533	38.7	9	2	5.1	33.0	38 x 8.5
4534	38.7	13	2	5.1	33.0	38 x 12.5
4535	51.2	9	2	7.62	45.7	50 x 8.5
4536	51.2	13	2	7.62	45.7	50 x 12.5
4537	51.2	25.7	2	7.62	45.7	50 x 25



*Conformally coated resistors: Add 1mm to dimensions L and H and 0.5mm to T.
Coating can be extended up to 2mm down leads.
Example: A conformally coated 4531 measures 26.7 x 10 x 2.5 max.

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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TT Electronics

4530 Series

Construction
A high quality alumina substrate is printed with a specially selected high voltage 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 lead-frame or 0.8mm dia, copper wire leads.

Solderability Meets the requirements of IEC 115-1, Clause 4.17.3.2.

Marking
Legend marked with type reference, resistance value, tolerance ratio and manufacturing date code.

5th digit: 1 refers to leadframe
2 refers to copper wire lead

6th digit: 2 refers to conformal coating
3 refers to screen printed protection
4 refers to unprotected components

Solvent Resistance
The marking and protection will withstand all commonly used industrial cleaning solvents.

Performance Data

		Maximum	Typical
Load: 1000 hours at 70°C	ΔR%	5	0.3
Derating from rated power at 70°C		Zero at 125°C	
Shelf life: 12 months at room temperature	ΔR%	0.3	< 0.1
Temperature rapid change	ΔR%	0.1	0.02
Resistance to solder heat	ΔR%	0.05	0.02
Voltage coefficient of resistance ppm/volt	4531, 4532	5	< 3
	4533, 4534	3	< 2
	4535, 4536, 4537	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.

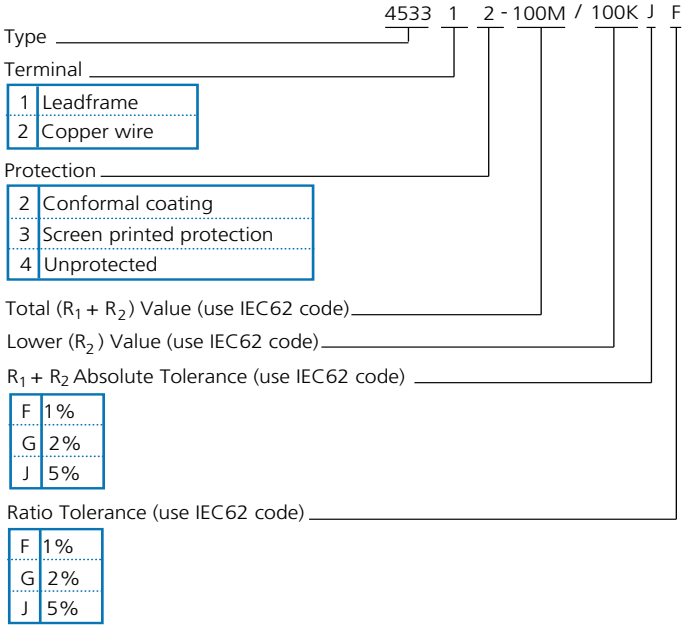
Temperature Category
Lower temperature category is -55°C, upper temperature category is 125°C. Due to the possibility of surface condensation it is recommended that high voltage is not applied to resistors in conditions of high humidity.

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.
Multiple dividers R1, R2, R3 etc.

Packaging
Packed in foam within a box.

Ordering Procedure
Example: 4533 with leadframe terminals and conformal coat at R_1 =99.9 megohms and R_2 = 100 kilohms (total R_1 +R_2 = 100M) at 5% absolute tolerance and 1% ratio tolerance -



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