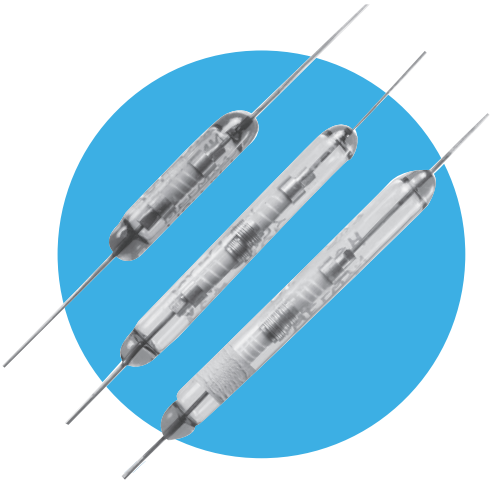
Resistors

Ultra-High Value Precision Resistors



3810 Series

- Resistance range up to 100 T ohms (10^{14} ohms)
- Designed for low current (picoampere level) measurements
- Low voltage coefficient
- Hermetically sealed
- Leakage current minimised by hermetic sealing and guard ring

All parts are Pb-free and comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

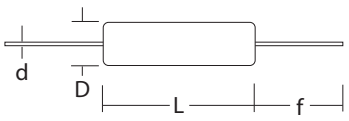
Electrical Data

		3810	3811	3812
Resistance range	ohms	100M to 1T	100M to 1T	1T to 100T
Limiting element voltage	volts	500	1000	1000
TCR (20°C to 70°C)	ppm/°C	-500 to -3500		
Resistance tolerance	%	10, 20	1, 2, 5, 10	1T to 10T; 2, 5, 10 >10T; 5, 10
Values		E24 preferred		
Ambient temperature range	°C	-40 to 100		

Physical Data

Dimensions (mm) & Weight (g)

Type	L max	D max	f min	d nom	PCB mounting Centres	Min. Bend Radius	Wt. nom
3810	25.0	6	30	0.6	29.2	0.6	1.5
3811	42.9	6	30	0.6	47.1	0.6	2.2
3812	48.0	6	30	0.6	52.2	0.6	2.5



Construction

The Cermetox® resistive film is fired onto high quality ceramic substrate; brass end caps are forced fitted to the substrate which is then adjusted to value with a helical cut in the film; the leads are mechanically locked into the end caps and the assembly sealed into the glass envelope. All close tolerance units utilise two resistors connected in series within the glass envelope. The guard band is described, with application notes, at
http://www.ttelectronics.com/themes/ttelectronics/datasheets/resistors/literature/3810_AN.pdf

Terminations

Material Solder-coated Dumet wire.

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

The serial number, resistance value and tolerance code are legend marked. The resistance value marking conforms to IEC 62.

Solvent Resistance

The glass envelope is coated with silicone and should not be subjected to solvents or their vapours. (See Application Notes.)

Performance Data

			Maximum	Typical
Load at rated voltage: 1000 hours at 20°C		ΔR%	2	1
Shelf life: 12 months at room temperature		ΔR%	1	0.5
Resistance to solder heat		ΔR%	0.2	<0.1
Capacitance	3810	pF	0.4	
	3811	pF	0.2	

Voltage coefficient of resistance			ppm/volt	
	100MΩ	1TΩ	100TΩ	Measured at voltages of 100 and 500 volts
3810	-20	-160		
3811	-10	-80		
3812	-10	-80	-150	

Application Notes

Each resistor is packed with a card stating nominal resistance value at 100 V applied, selection tolerance, date and serial number.

Although the glass envelope is an excellent insulant and would be adequate in a dry atmosphere, the condensation which occurs in a normal atmosphere will provide a shunt resistance which will modify the very high resistance value. To minimise this effect all units are coated with silicone, and it is essential that this coating is not damaged; any handling should be by the terminations. For the same reason solvents must not be used.

The resistors should not be used in a damp atmosphere. If moisture develops on the body the resistor should be dried for 30 minutes at 70°C and allowed to cool for a further 30 minutes in a dry atmosphere.

To avoid damage to the seal between terminations and glass, the leads must be fully supported inside the point of bending during any preforming.

Guard Band

For details of how to use the guard band, fitted to resistors of 100 G ohms and over, see
http://www.ttelectronics.com/themes/ttelectronics/datasheets/resistors/literature/3810_AN.pdf

Non-standard versions

Units without glass envelopes but with lacquer protection are available, but will have a limited electrical performance.

Measured values at a voltage other than 100V may be recorded.

For non-standard items contact TT Electronics.

Packaging

Each resistor is individually packed in a polythene envelope together with a card carrying measurement details and serial number (See Application Notes).

Ordering Procedure

Example: 3812 at 10 teraohms and 2% tolerance -

3 8 1 2 – 1 0 T G I

Type

Value (use IEC62 code)

Tolerance (use IEC62 code)

F	1%	J	5%
G	2%	K	10%

Packing

I	Individual/Bulk	Standard

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