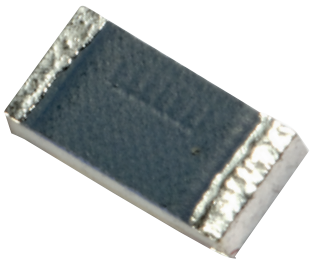
Resistors

Pulse Withstanding Chip Resistors

PWC Series

- Excellent pulse withstand performance
- Improved working voltage
- Improved power rating
- Custom designs available
- Anti-sulphur version available



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

Electrical Data

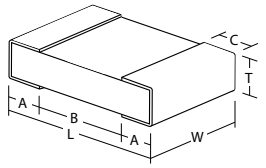
Size		PWC0603	PWC0805	PWC1206		PWC2010		PWC2512	
Power @70°C	W	0.125	0.25	0.33	0.5	0.75	1	1.5	2
Resistance range	ohms	1R0 to 10M							
Tolerance	%	10R to 1M: 0.5, All values: 1, 5							
LEV	V	75	150	200		400		500	
TCR	ppm/°C	<10R:200 ≥10R:100							
Operating temperature	°C	-55 to +155							
Thermal Impedance	°C/W	302	220	160	145	80	70	55	40
Pad / trace area *	mm²	30	40	50	125	60	250	100	500
Values		E24 or E96 preferred - other values to special order							
Pulse Capability		See graphs – full application note available on request							

*Recommended minimum pad & adjacent trace area for each termination for rated power dissipation on FR4 PCB

Physical Data

Dimensions (mm) & weight (mg)

	L	W	T max	A	B min	C	Wt.
0603	1.6±0.1	0.8±0.1	0.55	0.3±0.15	0.6	0.3±0.15	2.2
0805	2.0±0.15	1.25±0.15	0.6	0.3±0.15	0.9	0.3±0.1	4.7
1206	3.2±0.2	1.6±0.2	0.7	0.4±0.2	1.7	0.4±0.15	8.5
2010	5.1±0.3	2.5±0.2	0.8	0.6±0.3	3.0	0.6±0.25	36
2512	6.5±0.3	3.2±0.2	0.8	0.6±0.3	4.4	0.6±0.25	55



Wrap-around terminations
(3 faces)

Construction

Thick film resistor material, overglaze and organic protection are screen printed on a 96% alumina substrate. Wrap-around terminations have an electroplated nickel barrier and solder coating, this ensures excellent 'leach' resistance properties and solderability.

Note that anti-sulphur version parts below 5R are produced in flip-chip format with the resistor element on the underside.

Marking

Components are not marked. Reels are marked with type, value, tolerance, date code and quantity.

Solvent Resistance

The body protection is resistant to all normal industrial cleaning solvents suitable for printed circuits.

Performance Data

Size			Maximum	Typical
Load at rated power: 1000 hours at 70°C		ΔR%	1	0.25
Shelf life test: 12 months at room temperature		ΔR%	0.1	0.02
Derating from rated power at 70°C			Zero at 155°C	
Overload: 6.25 x rated power for 2 seconds		ΔR%	1	0.1
Dry heat: 1000 hours at 155°C		ΔR%	1	0.2
Long term damp heat		ΔR%	1	0.25
Temperature rapid change		ΔR%	0.25	0.05
Resistance to solder heat		ΔR%	0.25	0.05
Anti-sulphur grade (AS)	ASTM-B-809 (1000 hours, 50°C, 91-93% RH)	ΔR%	0.25	0.05
Sulphur-resistant grade (SR)	EIA-977 (750 hours, 105°C)	ΔR%	0.25	0.05
	ASTM-B-809 (1000 hours, 50°C, 91-93% RH)	ΔR%	0.25	0.05
	Modified ASTM-B-809 (1000 hours, 105°C, 85% RH)	ΔR%	1	0.25
Voltage proof		Volts	500	

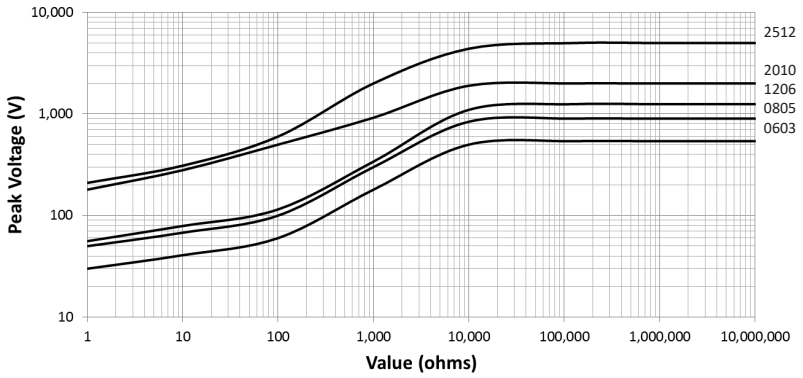
Note: A 0.01 Ohm addition to be added to the performance of all resistors <10 Ohms.

Pulse Performance Data

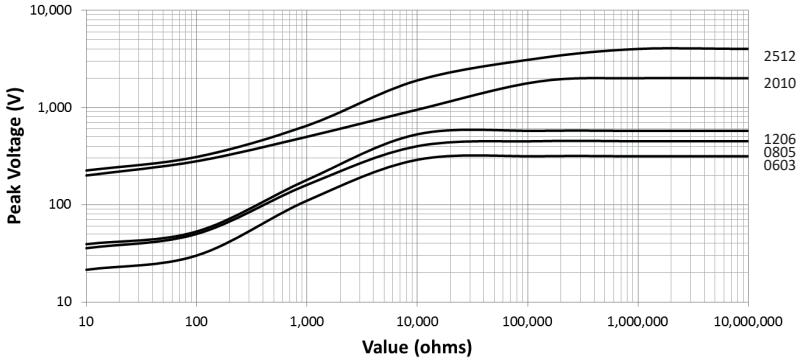
Lightning Surge

Lightning surge resistors are tested in accordance with IEC 60 115-1 using both 1.2/50µs and 10/700µs pulse shapes. 10 pulses are applied. The limit of acceptance is a shift in resistance of less than 1% from the initial value.

1.2/50µs Lightning Surge



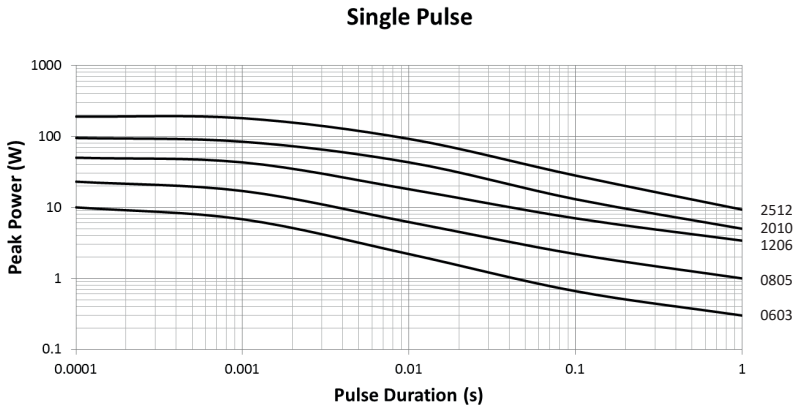
10/700µs Lightning Surge



PWC Series

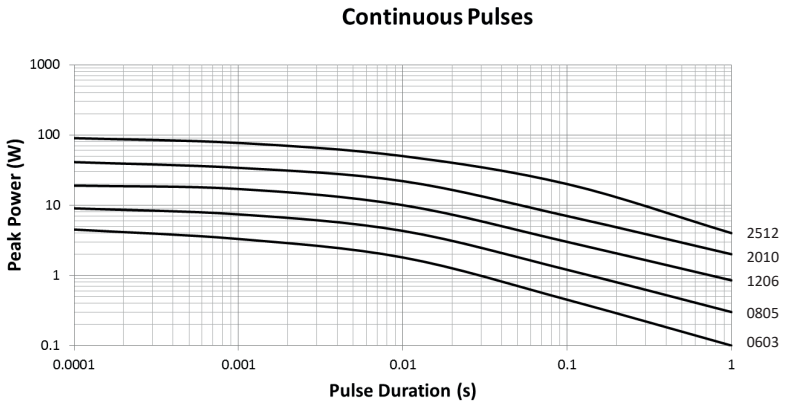
Single Impulse

The single impulse graph is the result of 50 impulses of rectangular shape applied at one minute intervals. The limit of acceptance was a shift in resistance of less than 1% from the initial value.



Continuous Load Due to Repetitive Pulses

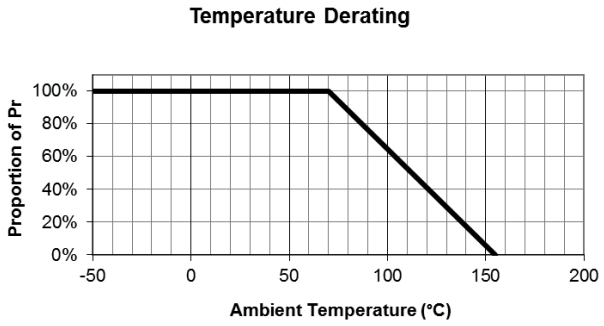
The continuous load graph was obtained by applying repetitive rectangular pulses where the pulse period was adjusted so that the average power dissipated in the resistor was equal to its rated power at 70°C. Again the limit of acceptance was a shift in resistance of less than 1% from the initial value



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.

Thermal Performance Data



Packaging

0603, 0805 and 1206 resistors are supplied on 8mm carrier tape and 2010 and 2512 resistors are supplied on 12mm carrier tape, all on 7 inch reels as per IEC 286-3.

Application Note

PWC resistors themselves can operate at a maximum temperature of 155°C. For soldered resistors, the joint temperature should not exceed 110°C. This condition is met when the stated power levels at 70°C and recommended pad and trace areas are used. Pad and trace area is defined as the total area of the solder pad plus all copper trace within two squares of the edge of the solder pad. Allowance should be made if smaller areas of copper are used.

A full Application Note on the PWC Series is available.

Ordering Procedure

This product has two valid part numbers:

European (Welwyn) Part Number: PWC2512-2K0JI (2512, 2 kilohms ±5%, Pb-free)

P	W	C	2	5	1	2			-	2	K	0	J	I	
1			2				3			4			5	6	

1 Type	2 Size	3 Sulphur Grade[1]	4 Value	5 Tolerance	6 Termination & Packing	
PWC	0603	Omit for standard	E24 = 3/4 characters	D = ±0.5%	I = Pb-free, Standard,	
	0805	AS = Anti-sulphur	E96 = 3/4 characters	F = ±1%	PB = SnPb, Standard	
	1206	SR = Sulphur Resistant	R = ohms	J = ±5%	0603	5000/reel
	2010		K = kilohms		0805, 1206, 2010	3000/reel
	2512		M = megohms		2512	1800/reel
					T1 = Pb-free, 1K reel	
					All sizes	1000/reel

Note 1: For new designs requiring resistance to sulphur-bearing gas, SR grade is preferred.

USA (IRC) Part Number: PWC-PWC2512LF-2K00-J (2512, 2 kilohms ±5%, Pb-free)

P	W	C	-	P	W	C	2	5	1	2	L	F	-	2	K	0	0	-	J
1				2			3				4			5					6

1 Family	2 Model	3 Size	4 Termination	5 Value	6 Tolerance	Packing	
PWC	PWC	1206	Omit for SnPb	E24 = 4 characters	D = ±0.5%	Plastic tape	
		2010	LF = Pb-free	E96 = 4 characters	F = ±1%	1206, 2010	3000/reel
		2512		R = ohms	J = ±5%		
				K = kilohms		2512	1800/reel
				M = megohms			

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