# **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 (RoHS2)

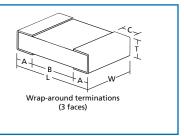
## **Electrical Data**

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			1	R0 to 10M				
Tolerance	%		10R to 1M: 0.5, All values: 1, 5						
LEV	V	75	150	20	00	4	00	50	00
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		E96 preferred - other values to special order							
Pulse Capability		See graphs – full application note available on request							

<sup>\*</sup>Recommended minimum pad & adjacent trace area for each termination for rated power dissipation on FR4 PCB

# Physical Data

Dimensions of PWC resistors are given below in mm and weight in g									
	L	W	T max	Α	В	С	Wt.		
0603	1.5±0.1	0.8±0.1	0.55	0.3±0.15	0.6 min	0.3±0.15	0.002		
0805	2.0±0.3	1.25±0.2	0.6	0.3±0.15	0.9 min	0.3±0.1	0.009		
1206	3.2±0.4	1.6±0.2	0.7	0.4±0.2	1.7 min	0.4±0.15	0.020		
2010	5.1±0.3	2.5±0.2	0.8	0.6±0.3	3.0 min	0.6±0.25	0.036		
2512	6.5±0.3	3.2±0.2	0.8	0.6±0.3	4.4 min	0.6±0.25	0.055		



### 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 100R 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.

#### General Note

### **PWC Series**



# Performance Data

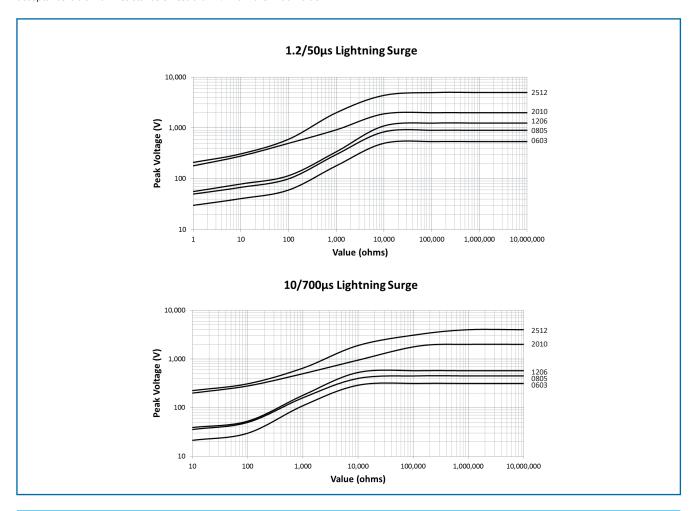
Size		Maximum	Typical
Load at rated power: 1000 hours at 70°C	ΔR%	1	0.25
Shelf life test: 12 months at room temperature	ΔR%	0.1	0.02
Derating from rated power at 70°C		Zero at	155°C
Overload: 6.25 x rated power for 2 seconds	ΔR%	1	0.1
Dry heat: 1000 hours at 155°C	ΔR%	1	0.2
Long term damp heat	ΔR%	1	0.25
Temperature rapid change	ΔR%	0.25	0.05
Resistance to solder heat	ΔR%	0.25	0.05
Resistance to sulphur-bearing gas (AS version only): ASTM-B-8	09	0.25	0.05
Voltage proof	Volts	50	0

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  $1.2/50\mu s$  and  $10/700\mu s$  pulse shapes. 10 pulses are applied. The limit of acceptance is a shift in resistance of less than 1% from the initial value.



# Pulse Withstanding Chip Resistors

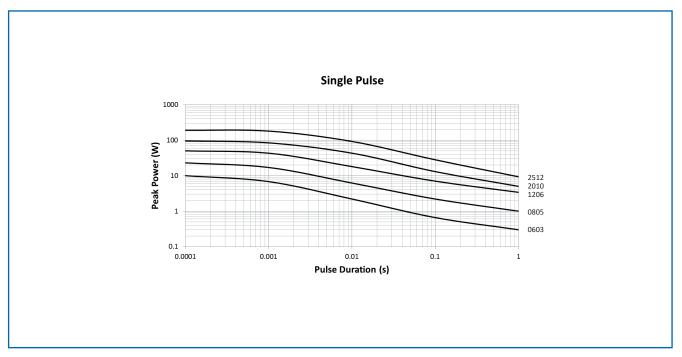


# TT Electronics

### **PWC Series**

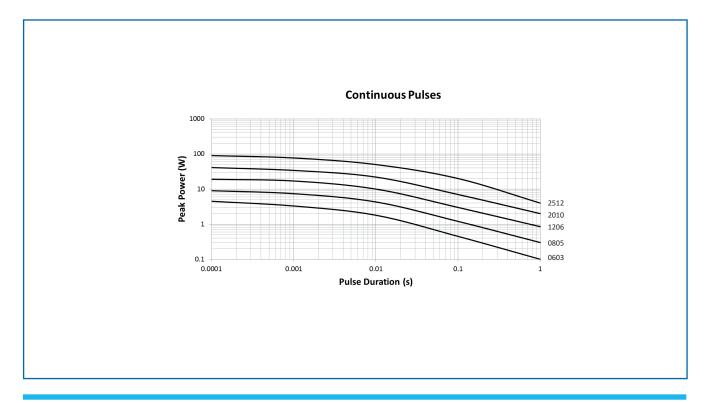
#### Single Impulse

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

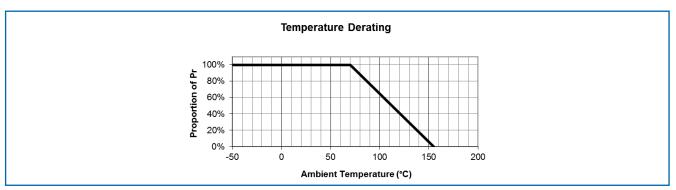
The continuous load graph was obtained by applying repetitive rectangular pulses where the pulse period was adjusted so that the average power dissipated in the resistor was equal to its rated power at 70°C. Again the limit of acceptance was a shift in resistance of less than 1% from the initial value



### **PWC Series**



### 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)



1	2	3	4	5	6		
Туре	Size	Anti-Sulphur	Value	Tolerance	Termination & Packi		
PWC	0603	Omit for standard	E24 = 3/4 characters	$D = \pm 0.5\%$	I = Star	ndard,	
	0805	AS = Anti-sulphur	E96 = 3/4 characters	F = ±1%	0603	5000/reel	
	1206		R = ohms	J = ±5%	0805, 1206,	3000/reel	
	2010		K = kilohms		2010	3000/1661	
	2512		M = megohms		2512	1800/reel	
•				-	T	1	
					All sizes	1000/reel	

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



1	2	3	4	5	6		
Family	Model	Size	Termination	Value	Tolerance	Packing	
PWC	PWC	1206	Omit for SnPb	E24 = 4 characters	$D = \pm 0.5\%$	Plastic tape	
		2010	LF = Pb-free	E96 = 4 characters	F = ±1%	1206, 2010	3000/reel
		2512		R = ohms	J = ±5%	1200, 2010	
	'		•	K = kilohms		2512	1800/reel
				M = megohms			

# **Mouser Electronics**

**Authorized Distributor** 

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

### TT Electronics:

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PWC1206-348K-FT PWC1206LF-1R00-JT PWC1206LF-3R01-FT PWC1206LF-7K15-FT PWC2010LF-1000-JT
PWC2512-36R0-JT PWC2512LF-100K-JT PWC2512LF-100R-FT PWC2512LF-10K0-FT PWC2512LF-10R0-FT
PWC2512LF-120R-FT PWC2512LF-14R7-FT PWC2512LF-1R00-FT PWC2512LF-200K-FT PWC2512LF-22R1-FT
PWC2512LF-2R00-FT PWC2512LF-2R21-FT PWC2512LF-33R2-FT PWC2512LF-36R0-JT PWC2512LF-4K70-JT
PWC2512LF-5R11-FT PWC2512LF-6K80-JT PWC2512-20R0-F PWC2512LF-1K00-JT PWC2512LF-1K20-JT
PWC2512LF-2K70-JT PWC0805LF-33R0-JT PWC2010LF-30R1-FT PWC2512LF-1R00-JT PWC2512LF-10M-FT
PWC2512LF-10M0-FT PWC0805LF-15R0-FT PWC1206LF-1R00-FT PWC1206LF-49R9-FT PWC1206LF-5R60-JT
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