

## High Pulse Withstanding Chip Resistors

### HPWC Series

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



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

## Electrical Data

Size		HPWC0805	HPWC1206		HPWC2010		HPWC2512	
Power @70°C	W	0.25	0.33	0.5	0.75	1	1.5	2
Resistance range	ohms	1R0 to 1M0						
Tolerance	%	All values: 5, 10, 20						
LEV	V	150	200		400		500	
TCR	ppm/°C	<10R:200 ≥ 10R:100						
Operating temperature	°C	-55 to +155						
Thermal Impedance	°C/W	220	160	145	80	70	55	40
Pad / trace area *	mm <sup>2</sup>	40	50	125	60	250	100	500
Values		E24 or E96 preferred - other values to special order						
Pulse Capability		See graphs						

\*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.
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

### 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.

### 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.

## HPWC Series

### Performance Data

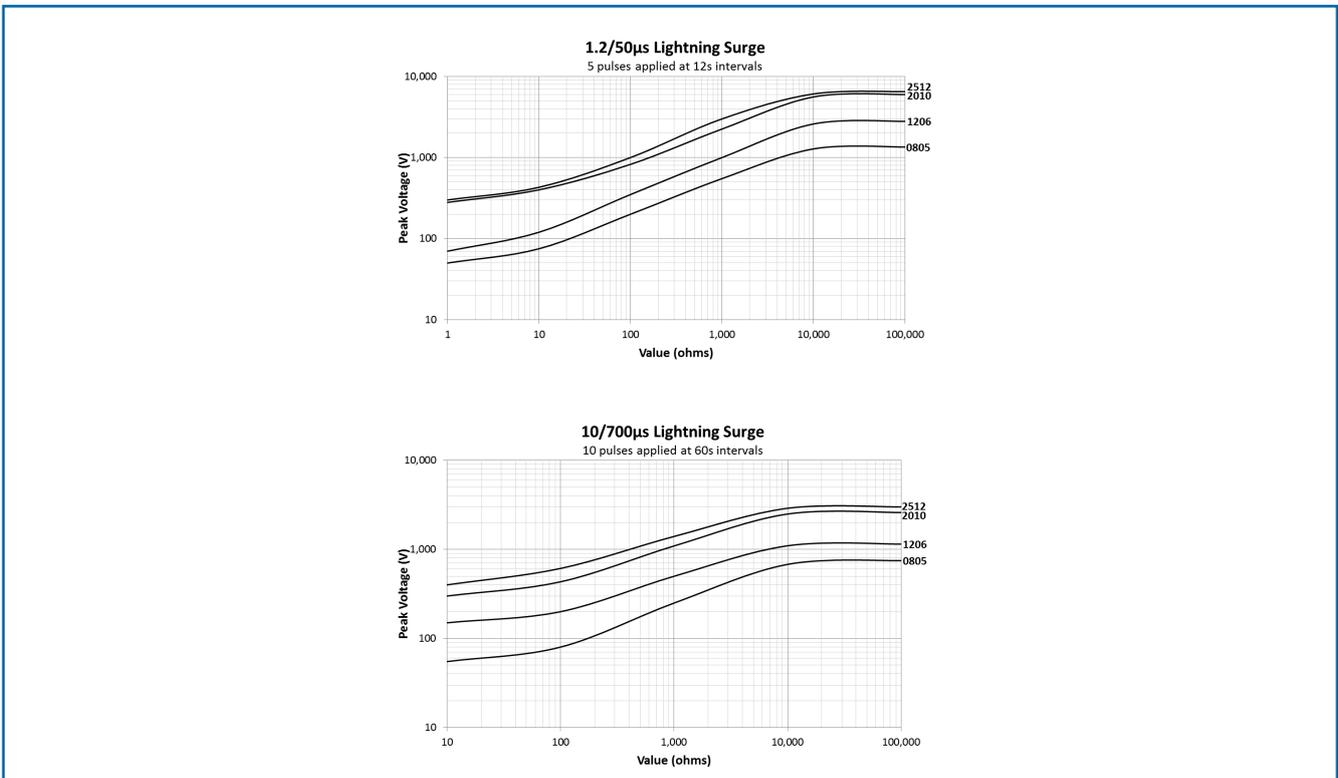
Size		Maximum	Typical
Load at rated power: 1000 hours at 70°C	$\Delta R\%$	1	0.25
Shelf life test: 12 months at room temperature	$\Delta R\%$	0.1	0.02
Derating from rated power at 70°C		Zero at 155°C	
Overload: 6.25 x rated power for 2 seconds	$\Delta R\%$	1	0.1
Dry heat: 1000 hours at 155°C	$\Delta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

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



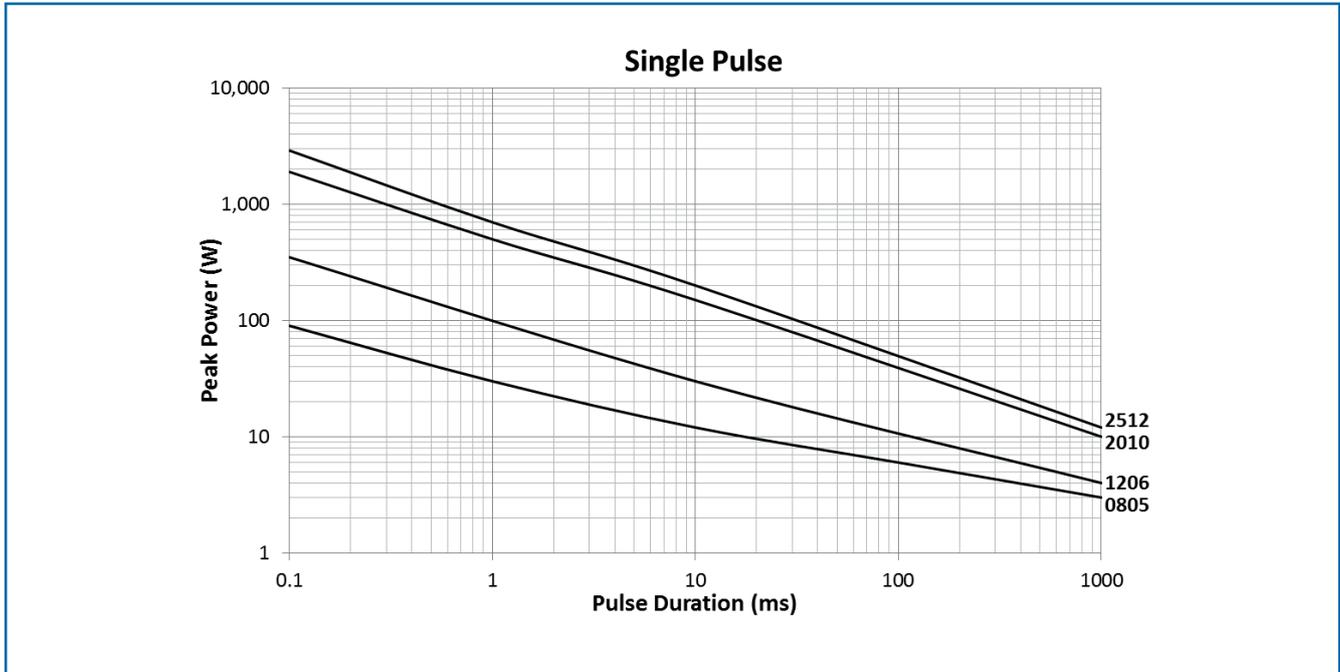
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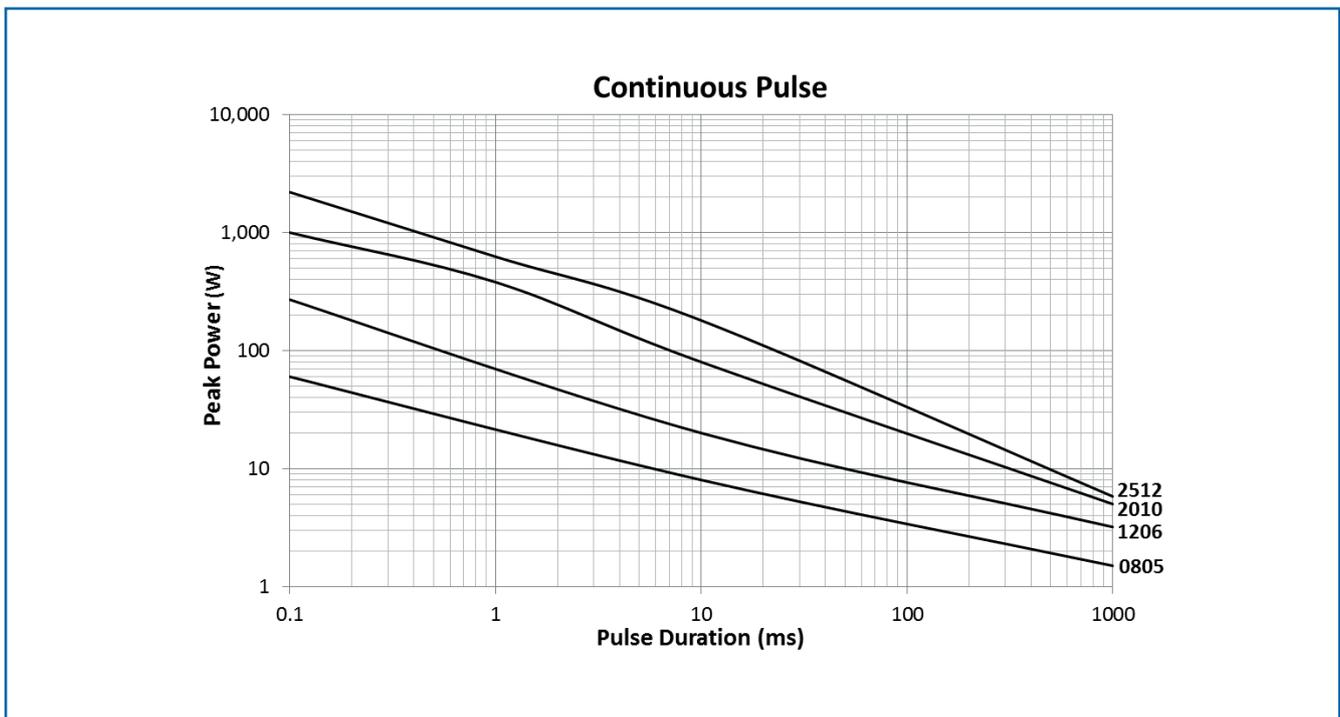
### Single Pulse

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



### Continuous Pulse

The continuous pulse 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. The limit of acceptance is a shift in resistance of less than 1% from the initial value.

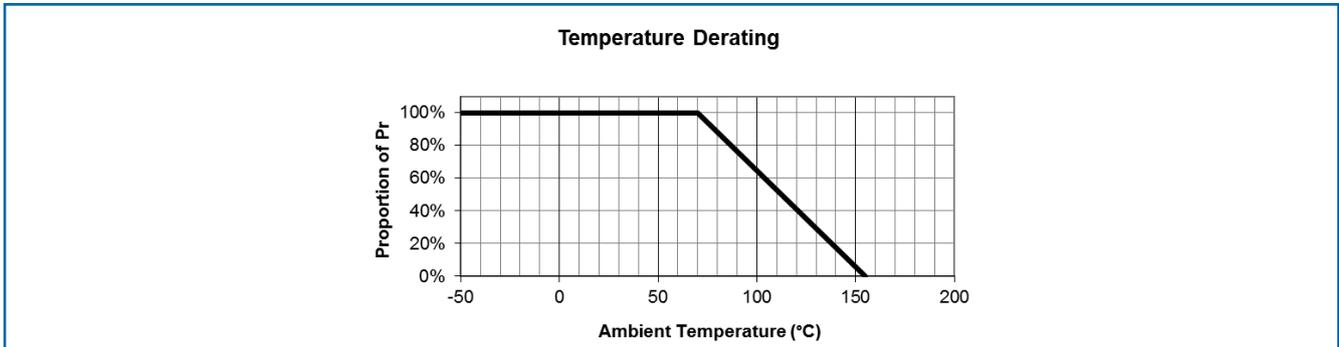


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## HPWC Series

### Thermal Performance Data



### Packaging

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

HPWC 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.

### Ordering Procedure

**Example: HPWC2512-2K0JT18** (2512, 2 kilohms ±5%, Pb-free)



1 Type	2 Size	3 Sulphur Grade <sup>1</sup>	4 Value	5 Tolerance	6 Termination & Packing		
HPWC	0805	Omit for standard	E24 = 3/4 characters	J = ±5%	Standard Pb-free finish		
	1206	AS = Anti-sulphur	E96 = 3/4 characters	K = ±10%	T3	3000/reel standard	
	2010	SR = Sulphur Resistant	R = ohms	M = ±20%			
	2512		K = kilohms				
					T18	2512	1800/reel standard
					T1	All sizes	1000/reel available
					SnPb finish		
					PB	All sizes	Standard quantities as for Pb-free

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

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