

## High Power MELF Resistors

### WRM-HP Series

- AEC-Q200 qualified
- High power up to 1W
- Tolerance down to  $\pm 0.1\%$
- TCR down to  $\pm 15\text{ppm}/^\circ\text{C}$
- High pulse handling capability



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

### Electrical Data

		WRM0204HP	WRM0207HP
Power rating at 70°C	watts	0.4	1
Resistance range	ohms	R10 – 1M0	
Limiting element voltage	volts	200	350
Maximum overload voltage	volts	400	700
TCR	ppm/°C	15, 25, 50, 100	15, 25, 50, 100
Resistance tolerance	%	0.1, 0.25, 0.5, 1, 5	
Standard values		E24 & E96	
Thermal impedance	°C/W	200	140
Ambient temperature range	°C	-55 to +155	
Insulation resistance	ohms	$>10^{10}$	
Voltage proof	volts	284	497

### Physical Data

Dimensions (mm) and weight (g)						
Type	L max	D max	D1 max	K min	L <sup>1</sup> min	Weight
WRM 0204HP	3.7	1.55	1.55	0.7	1.5	0.02
WRM 0207HP	6.1	2.4	2.4	1.2	2.9	0.08

### Construction

A metal film is deposited onto a high dissipation ceramic former to which tin plated terminating caps are fitted.

The resistor is adjusted to value by a helical cut in the film and the body is protected by a lacquer coating.

### Marking

Resistance values are colour coded with three or four bands, indicating value and multiplier.

### Terminations

**Material** Plated steel cap.

**Solderability** The pure tin finish produces ageing free contacts on which low melting solders can be used. Dipped area shall be covered with a smooth and bright solder coating after 3 seconds immersion at 215°C.

### Solvent Resistance

The body protection and marking are resistant to all normal industrial cleaning solvents suitable for printed circuit boards.

### General Note

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## TCR and Tolerance Range

Type	TCR ( $\pm$ ppm/ $^{\circ}$ C)	Tolerance ( $\pm$ %)				
		5	1	0.5	0.25	0.1
WRM0204HP	$\pm$ 100	OR1 – 1M0		–	–	–
	$\pm$ 50	OR2 – 1M0		1R0 – 1M0		10R – 1M0
	$\pm$ 25	–	10R – 1M0			
	$\pm$ 15	–	10R – 300K			
WRM0207HP	$\pm$ 100	OR1 – 1M0		–	–	–
	$\pm$ 50	OR2 – 1M0		1R0 – 1M0		10R – 1M0
	$\pm$ 25	–	10R – 1M0			
	$\pm$ 15	–	10R – 300K			

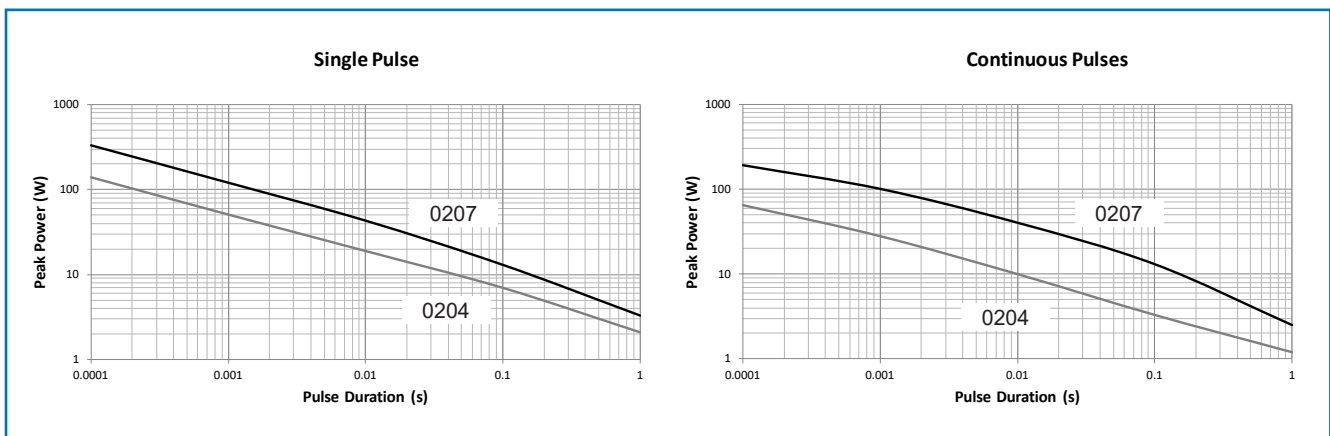
## Performance Data

		Maximum
Short time overload: 5s at lesser of 6.25 x rated power or 2 x LEV	$\pm$ $\Delta$ R%	0.15
Biased humidity: 1000hrs 85 $^{\circ}$ C/85%RH 10% of rated power	$\pm$ $\Delta$ R%	0.15
Surge test: IEC 60115-1, 10/700 $\mu$ s at lesser of $\sqrt{V(P_{70-R})}$ & 2 x LEV	$\pm$ $\Delta$ R%	0.15
High temperature exposure: 1000hrs at 155 $^{\circ}$ C	$\pm$ $\Delta$ R%	0.3
Bending test: 2mm deflection for 60s	$\pm$ $\Delta$ R%	0.05
Resistance to soldering heat: 260 $\pm$ 5 $^{\circ}$ C for 10s	$\pm$ $\Delta$ R%	0.15
Temperature rapid change: 1000cycles-55/125 $^{\circ}$ C	$\pm$ $\Delta$ R%	0.2
Endurance: 1000hrs rated power at 70 $^{\circ}$ C (For endurance at 8000hrs multiply stability by 2, for endurance at 225,000hrs multiply stability by 6)	$\pm$ $\Delta$ R%	0.25
Mechanical shock: half-sine waveform, peak 100g, duration 6ms	$\pm$ $\Delta$ R%	0.1
Vibration: 5g for 20min, 12 cycles each of 3 orientations, 10-2000Hz	$\pm$ $\Delta$ R%	0.15
ESD: 2kV human body model	$\pm$ $\Delta$ R%	0.5
Solderability: 245 $\pm$ 5 $^{\circ}$ C for 3s		>95% coverage
Voltage proof: 1.42 x LEV		No breakdown or flashover

## Pulse & Thermal Performance

Single Pulse: 50 rectangular pulses applied at 60s intervals such that mean power is <10% of rated power. Maximum permitted change  $\pm$ 1%. The peak power for high values is also subject to the restrictions of the pulse voltage graph.

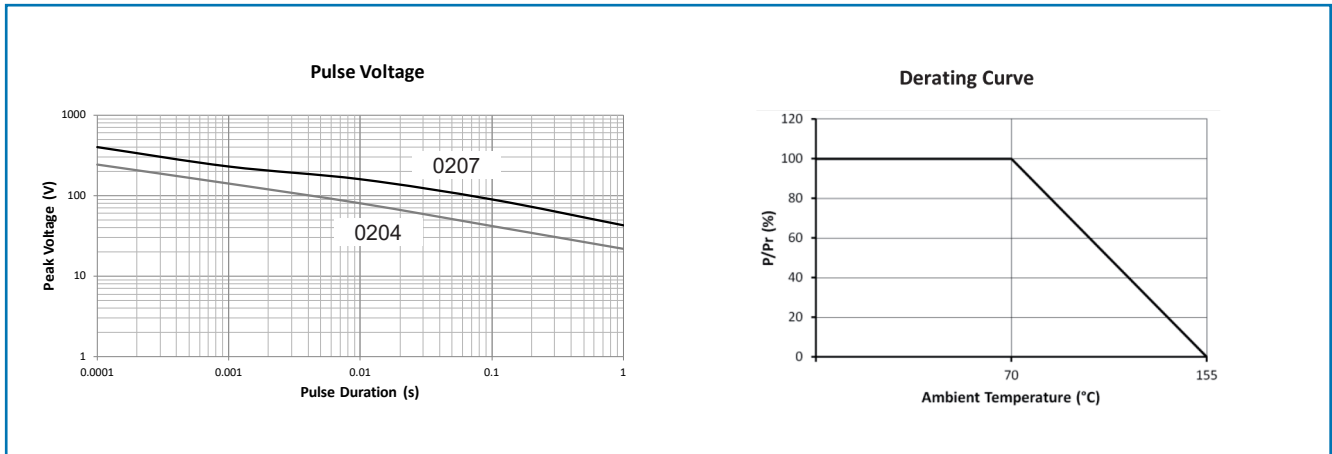
Continuous Pulses: Continuous rectangular pulses applied at intervals such that mean power is equal to the rated power. Maximum permitted change  $\pm$ 1%. The peak power for high values is also subject to the restrictions of the pulse voltage graph.



### General Note

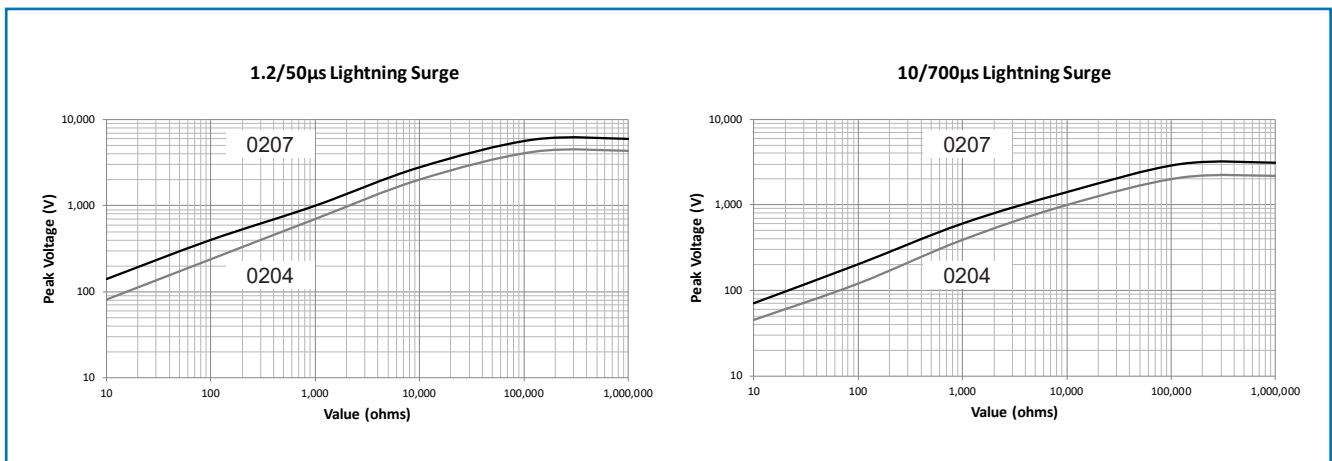
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WRM-HP Series



Lightning Surge Performance

Resistors are tested in accordance with IEC 60115-1 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 0.5% from the initial value.



Ordering Procedure

Example: WRM0204HPC-2K49FT3 (WRM0204HP, 50ppm/°C, 2.49 kilohms ±1%, Pb-free)



1 Type	2 TCR	3 Value	4 Tolerance	5 Packing
WRM0204HP	Y = ±15ppm/°C	3/4 characters R = ohms K = kilohms M = megohms	B = ±0.1%	T3 0204 3000 / 7" reel
WRM0207HP	D = ±25ppm/°C		C = ±0.25%	T2 0207 2000 / 7" reel
	C = ±50ppm/°C		F = ±1%	
	Z = ±100ppm/°C		J = ±5%	

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