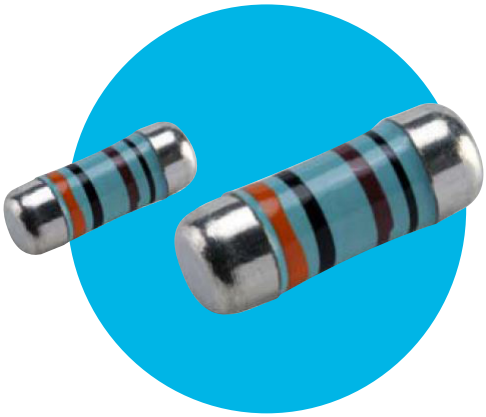
Resistors

High Power MELF Resistors



WRM-HP Series

- AEC-Q200 qualified
- High power up to 1W
- Tolerance down to ±0.1%
- TCR down to ±15ppm/°C
- High pulse handling capability

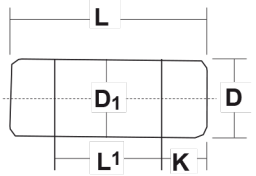
All parts are Pb-free and comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

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^1 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 (±ppm/°C)	Tolerance (±%)				
		5	1	0.5	0.25	0.1
WRM0204HP	±100	0R1 – 1M0		–	–	–
	±50	0R2 – 1M0		1R0 – 1M0		10R – 1M0
	±25	–	10R – 1M0			
	±15	–	10R – 300K			
WRM0207HP	±100	0R1 – 1M0		–	–	–
	±50	0R2 – 1M0		1R0 – 1M0		10R – 1M0
	±25	–	10R – 1M0			
	±15	–	10R – 300K			

Performance Data

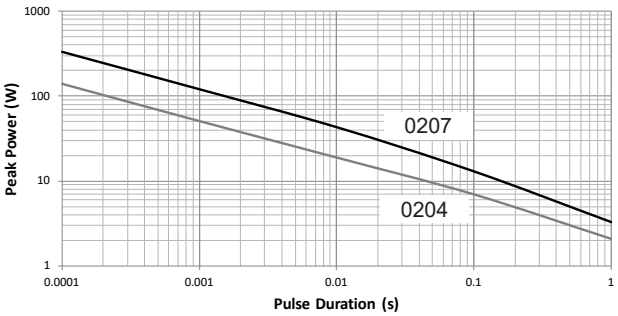
		Maximum
Short time overload: 5s at lesser of 6.25 x rated power or 2 x LEV	±ΔR%	0.15
Biased humidity: 1000hrs 85°C/85%RH 10% of rated power	±ΔR%	0.15
Surge test: IEC 60115-1, 10/700µs at lesser of $V(P_{70}.R)$ & 2 x LEV	±ΔR%	0.15
High temperature exposure: 1000hrs at 155°C	±ΔR%	0.3
Bending test: 2mm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

Pulse & Thermal Performance

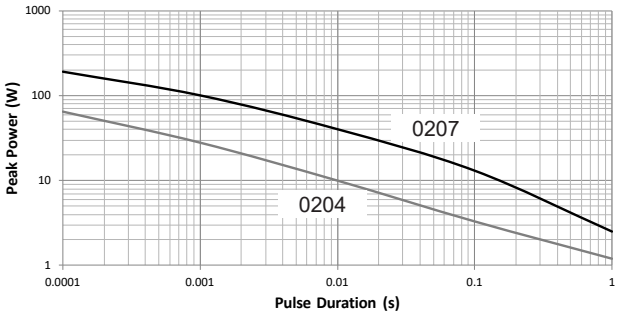
Single Pulse: 50 rectangular pulses applied at 60s intervals such that mean power is <10% of rated power. Maximum permitted change ±1%.

Continuous Pulses: Continuous rectangular pulses applied at intervals such that mean power is equal to the rated power. Maximum permitted change ±1%.

Single Pulse



Continuous Pulses



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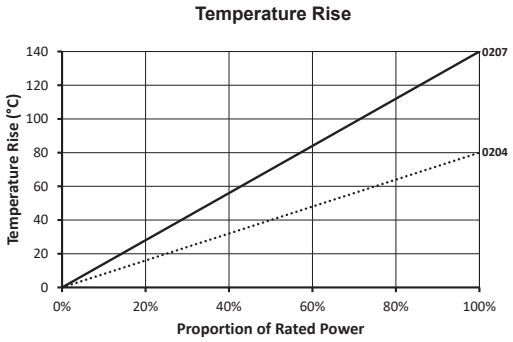
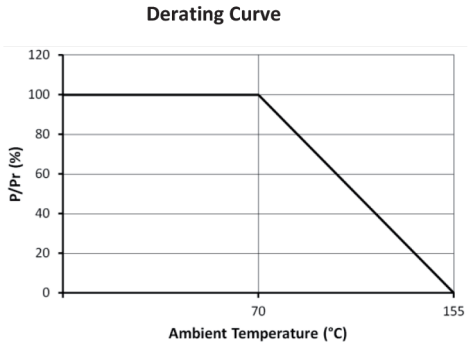
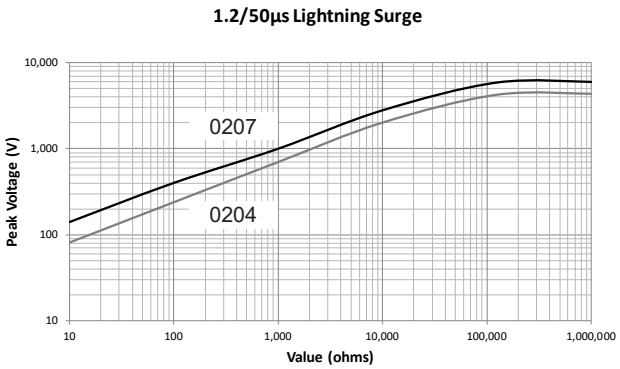
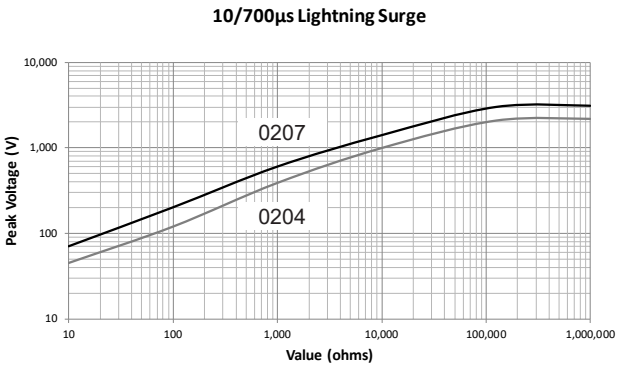




Lightning Surge Performance

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)

W	R	M	0	2	0	4	H	P	C	-	2	K	4	9	F	T	3
1									2		3				4	5	

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		D = ±0.5%			
	Z = ±100ppm/°C		F = ±1%			
			J = ±5%			

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