

## WRM-HP Series

### Features:

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

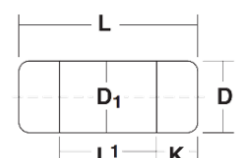


All parts are Pb-free and comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

## Electrical Data

		WRM0204HP	WRM0207HP
Power rating @70°C	W	0.4	1
Resistance range	ohms	R10 – 1M0	
Limiting element voltage	V	200	350
Maximum overload voltage	V	400	700
TCR	ppm/°C	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 <sup>10</sup>	
Voltage proof	V	284	497

## Physical Data

Dimensions in mm and weight in g							
Type	L max	D max	D <sub>1</sub> max	K min	L <sub>1</sub> min	Wt. nom.	
WRM0204HP	3.7	1.55	1.55	0.7	1.5	0.02	
WRM0207HP	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.

### TCR and Tolerance Ranges

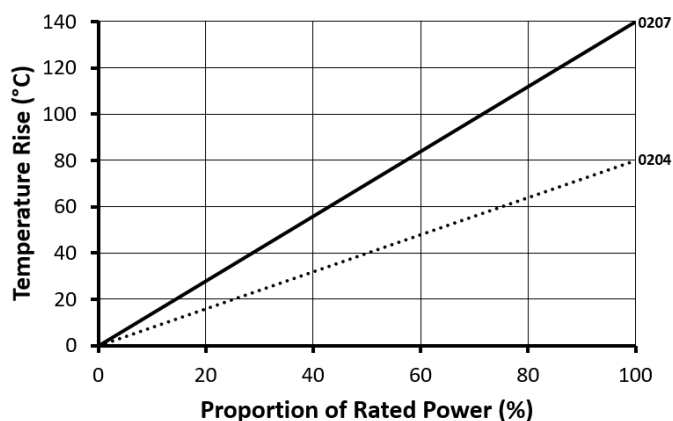
Type	TCR ( $\pm$ ppm/ $^{\circ}$ C)	Tolerance ( $\pm$ %)				
		5	1	0.5	0.25	0.1
WRM0204	100	R10 – 1M0				
	50	R20 – 1M0		1R0 – 1M0	10R – 1M0	
	25			10R – 1M0		
	15			10R – 300K		
WRM0207	100	R10 – 1M0				
	50	R20 – 1M0		1R0 – 1M0	10R – 1M0	
	25			10R – 1M0		
	15			10R – 300K		

### Performance Data

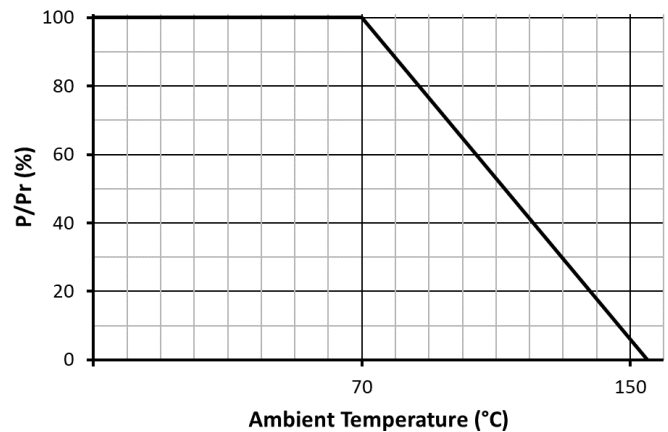
		Maximum
Short term overload: Lesser of $6.25 \times P_r$ or $2 \times \text{LEV}$ for 5s	$\pm \Delta R\%$	0.15
Biased humidity: 1000hrs $85^{\circ}\text{C}/85\% \text{RH}$ 10% of $P_r$	$\pm \Delta R\%$	0.15
Surge test: IEC 60115-1, $10/700\mu\text{s}$ at lesser of $V(P_r, R)$ & $2 \times \text{LEV}$	$\pm \Delta R\%$	0.15
High temperature exposure: 1000 hours at $155^{\circ}\text{C}$	$\pm \Delta R\%$	0.3
Bending test: 2mm deflection for 60s	$\pm \Delta R\%$	0.05
Resistance to solder heat: $260 \pm 5^{\circ}\text{C}$ for 10s	$\pm \Delta R\%$	0.15
Temperature rapid change: 1000 cycles $-55/125^{\circ}\text{C}$	$\pm \Delta R\%$	0.2
Endurance: $P_r$ for 1000 hours at $70^{\circ}\text{C}$	$\pm \Delta R\%$	0.25
Endurance extended: $P_r$ for 8000 hours at $70^{\circ}\text{C}$	$\pm \Delta R\%$	0.5
Endurance extended: $P_r$ for 225,000 hours at $70^{\circ}\text{C}$	$\pm \Delta R\%$	1.5
Mechanical shock: half-sine, 100g peak, 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: $245 \pm 5^{\circ}\text{C}$ for 3s		>95% coverage
Voltage proof: $1.42 \times \text{LEV}$		No breakdown or flashover

### Thermal Performance

Temperature Rise



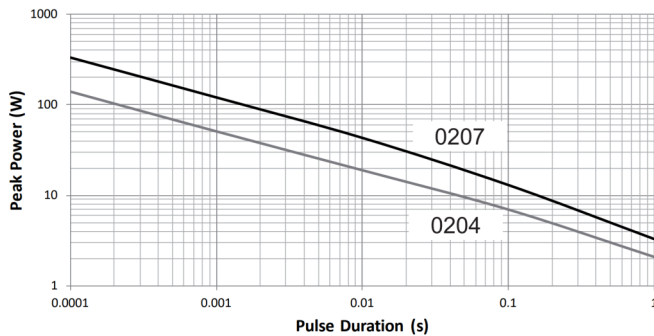
Derating Curve



### Pulse & Surge Performance

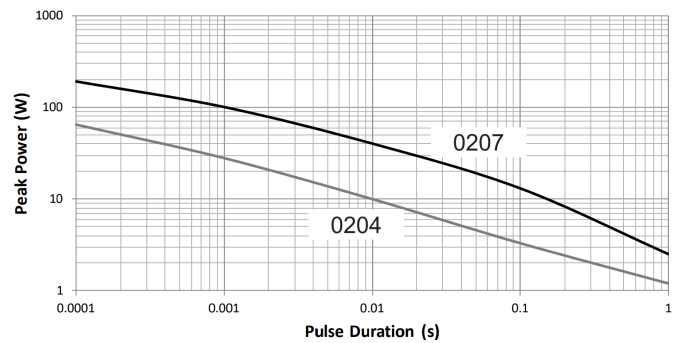
#### Single Pulse

50 rectangular pulses applied at 60s intervals such that mean power is less than 10% of rated power. Maximum permitted change is  $\pm 1\%$ .



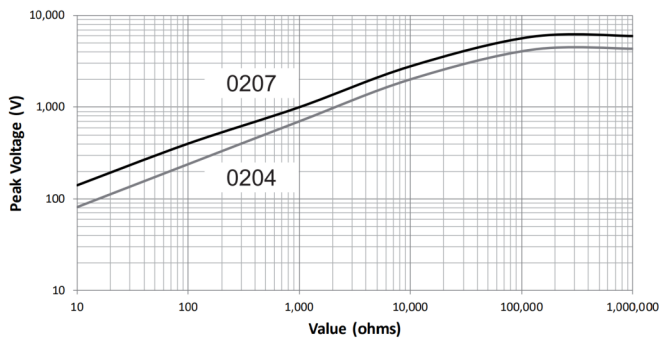
#### Continuous Pulses

Continuous rectangular pulses applied at intervals such that mean power is equal to the rated power. Maximum permitted change is  $\pm 1\%$ .



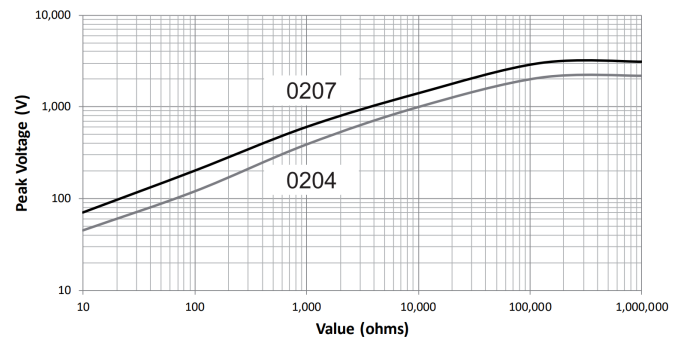
#### 1.2/50 $\mu$ s Lightning Surge

IEC 60115-1 1.2/50 $\mu$ s surge test, 10 surges. Maximum permitted change is  $\pm 0.5\%$ .



#### 10/700 $\mu$ s Lightning Surge

IEC 60115-1 10/700 $\mu$ s surge test, 10 surges. Maximum permitted change is  $\pm 0.5\%$ .

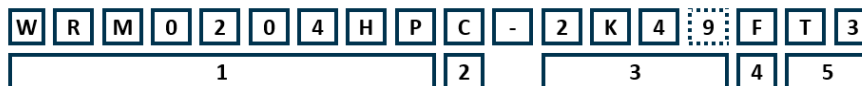


### Packaging

WRM0204HP resistors are supplied in 8mm plastic tape on 7" reels. WRM0207HP resistors are supplied in 12mm plastic tape on 7" reels. Packing complies with the requirements of IEC286-3.

### Ordering Procedure

Example: WRM0204HPC-2K49FT3 (WRM0204HP, 50ppm/ $^{\circ}$ C, 2.49 kilohms  $\pm 1\%$ , Pb-free)



1	2	3	4	5		
Type	TCR	Value	Tolerance	Packing		
WRM0204HP	Y = $\pm 15$ ppm/ $^{\circ}$ C	E24/E96	B = $\pm 0.1\%$	T3	0204	3000 / 7" reel
WRM0207HP	D = $\pm 25$ ppm/ $^{\circ}$ C	3/4 characters R = ohms K = kilohms M = megohms	C = $\pm 0.25\%$	T2	0207	2000 / 7" reel
	C = $\pm 50$ ppm/ $^{\circ}$ C		D = $\pm 0.5\%$			
	Z = $\pm 100$ ppm/ $^{\circ}$ C		F = $\pm 1\%$			
			J = $\pm 5\%$			