High Power MELF Resistors

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)

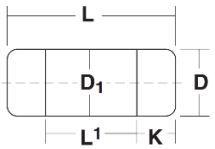
Electrical Data

		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	$>10^{10}$	
Voltage proof	V	284	497

Physical Data

Dimensions in mm and weight in g

Type	L max	D max	D_1 max	K min	L_1 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.

High Power MELF Resistors

WRM-HP Series

TCR and Tolerance Ranges

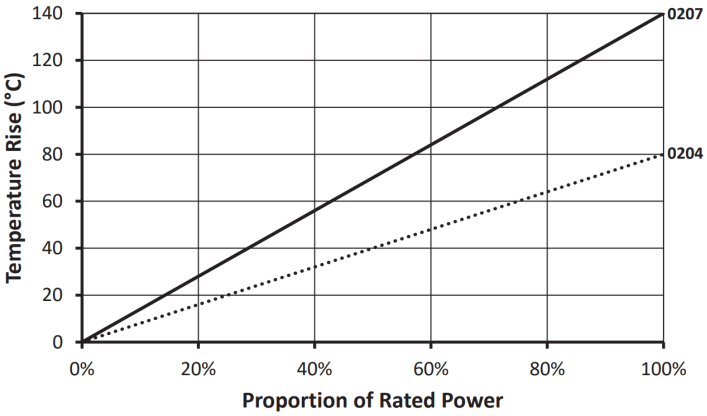
Type	TCR (±ppm/°C)	Tolerance (±%)				
		5	1	0.5	0.25	0.1
WRM0204	100	R10 – 1M0				
	50	R20 – 1M0		1R0 – 1M0		10R – 1M0
	25		10R – 1M0			
	15		10R – 300K			
WRM0207	100	R10 – 1M0				
	50	R20 – 1M0		1R0 – 1M0		10R – 1M0
	25		10R – 1M0			
	15		10R – 300K			

Performance Data

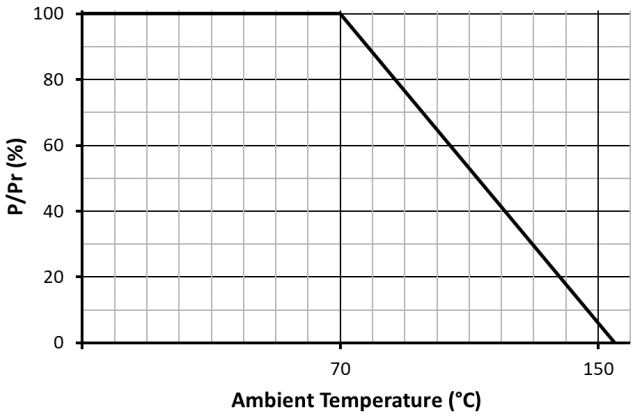
		Maximum
Short term overload: Lesser of 6.25xP_r or 2xLEV for 5s	±ΔR%	0.15
Biased humidity: 1000hrs 85°C/85%RH 10% of P_r	±ΔR%	0.15
Surge test: IEC 60115-1, 10/700µs at lesser of √(P_r.R) & 2 x LEV	±ΔR%	0.15
High temperature exposure: 1000 hours at 155°C	±ΔR%	0.3
Bending test: 2mm deflection for 60s	±ΔR%	0.05
Resistance to solder heat: 260±5°C for 10s	±ΔR%	0.15
Temperature rapid change: 1000 cycles -55/125°C	±ΔR%	0.2
Endurance: P_r for 1000 hours at 70°C	±ΔR%	0.25
Endurance extended: P_r for 8000 hours at 70°C	±ΔR%	0.5
Endurance extended: P_r for 225,000 hours at 70°C	±ΔR%	1.5
Mechanical shock: half-sine, 100g peak, 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

Thermal Performance

Temperature Rise



Derating Curve



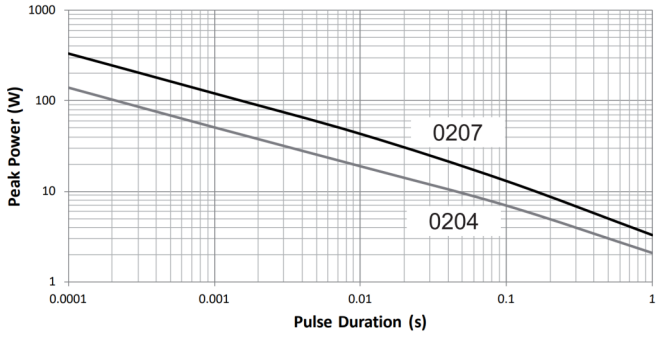
High Power MELF Resistors

WRM-HP Series

Pulse & Surge Performance

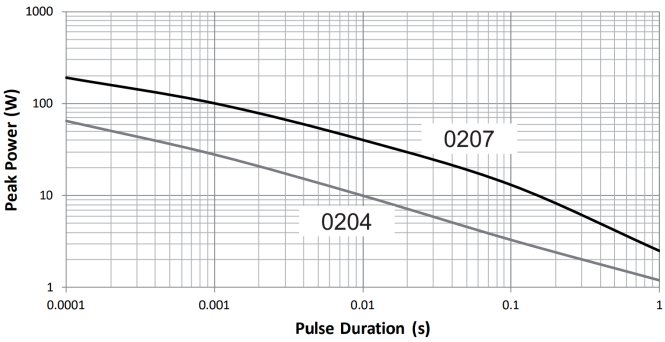
Single Pulse

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



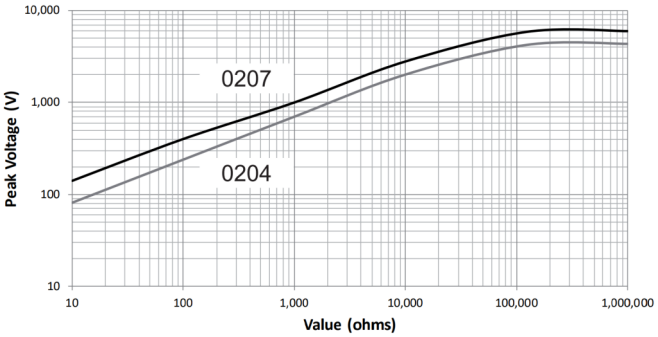
Continuous Pulses

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



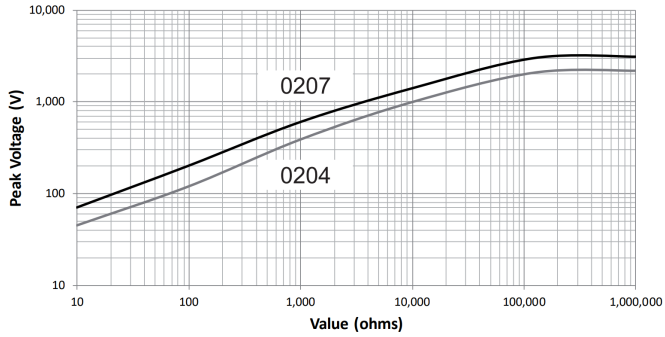
1.2/50µs Lightning Surge

IEC 60115-1 1.2/50µs surge test, 10 surges.
Maximum permitted change is ±0.5%.



10/700µs Lightning Surge

IEC 60115-1 10/700µs surge test, 10 surges.
Maximum permitted change is ±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/°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	2	3	4	5		
Type	**TCR**	**Value**	**Tolerance**	**Packing**		
WRM0204HP	Y = ±15ppm/°C	E24/E96 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%			