

# MELF Resistors

## WRM Series

- High reliability
- Predictable pulse handling capability
- Tolerances down to 0.1%
- TCR down to 5 ppm/°C



## Electrical Data

		WRM 0102	WRM 0204	WRM 0207
Power rating at 70°C	watts	0.125	0.25	0.4
Resistance range	ohms	4R7 - 110K	R22 – 5M1	R22 – 10M
Limiting element voltage	volts	150	200	250
TCR	ppm/°C	50	5,10,15, 25, 50, 100	15, 25, 50, 100
Resistance tolerance	%	1	0.1, 0.25, 0.5, 1.0, 2, 5	
Standard values		E24 & E96		
Thermal impedance	k/W	250	200	140
Ambient temperature range	°C	-55 to +125		
Insulation resistance	ohms	>10 <sup>10</sup>		

## Physical Data

Dimensions (mm) and weight (g)						
Type	L max	D max	D <sup>1</sup> max	K min	Weight	
WRM 0102	2.2	1.35	1.3	0.3	0.01	
WRM 0204	3.7	1.55	1.55	0.5	0.02	
WRM 0207	6.1	2.4	2.4	0.5	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 four bands, three indicating value and one indicating the multiplier. (Note this describes standard marking, but certain values may still be supplied with the addition of a tolerance band following the 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 Reference	TCR	Tolerance					
		5%	2%	1.0%	0.5%	0.25%	0.1%
WRM0102	±50ppm	–	–	4R7 - 110K	–	–	–
	±100ppm	R22 – R91	–	–	–	–	–
WRM0204	±50ppm	–	–	1R – 5M1	10R – 1M6	22R – 332K	43R – 332K
	±25ppm	–	–	4R7 - 500K	10R – 500K	22R – 402K	43R – 332K
	±15ppm	–	–	–	10R – 221K	22R – 221K	43R – 221K
	±10ppm	–	–	–	–	22R – 221K	43R – 221K
	±5ppm	–	–	–	–	100R – 100K	100R – 100K
	±100ppm	R22 – R91	–	–	–	–	–
WRM0207	±50ppm	–	–	1R-10M	10R – 1M6	–	–
	±25ppm	–	–	10R - 1M	10R – 680K	51R1 - 330K	100R - 100K
	±15ppm	–	–	–	51R1 - 10K	51R1 - 10K	100R - 10K
	±100ppm	R22 – R91	–	–	–	–	–

\* TC 10ppm & 5ppm is specified over the temperature range -10°C to +85°C.

## Performance Data

Test	Results $\Delta R/R \pm$		
	0204 & 0207: 75R - 100K	0204 & 0207: 10R - <75R & >100K - 332K	0102: 4R7 - 110K, 0204 & 0207: R22 - <10R & >332K - 10M
Short time overload*	$\leq 0.05\% + 0.01 \Omega$	$\leq 0.1\% + 0.01 \Omega$	$\leq 0.25\% + 0.05 \Omega$
Bending test*	$\leq 0.05\% + 0.01 \Omega$	$\leq 0.1\% + 0.01 \Omega$	$\leq 0.25\% + 0.05 \Omega$
Resistance to soldering heat	$\leq 0.05\% + 0.01 \Omega$	$\leq 0.1\% + 0.01 \Omega$	$\leq 0.25\% + 0.05 \Omega$
Temperature rapid change	$\leq 0.05\% + 0.01 \Omega$	$\leq 0.1\% + 0.01 \Omega$	$\leq 0.25\% + 0.05 \Omega$
Endurance*			
Load life	1000h	$\leq 0.25\% + 0.05 \Omega$	$\leq 0.25\% + 0.05 \Omega$
	8000 h	$\leq 0.5\% + 0.05 \Omega$	$\leq 0.5\% + 0.05 \Omega$
Climatic sequence*	$\leq 0.25\% + 0.05 \Omega$	$\leq 0.5\% + 0.05 \Omega$	$\leq 1.0\% + 0.05 \Omega$
Damp heat steady state*	$\leq 0.25\% + 0.05 \Omega$	$\leq 0.5\% + 0.05 \Omega$	$\leq 1.0\% + 0.05 \Omega$
Current noise	$< 0.05 \mu V/V$	$< 0.25 \mu V/V$	$< 3 \mu V/V$
Solderability	Dipped area shall be covered with a smooth and bright solder coating of at least 96%		
Voltage coefficient	$< 0.5 \cdot 10^6/V$		
Voltage proof	No flashover or breakdown		

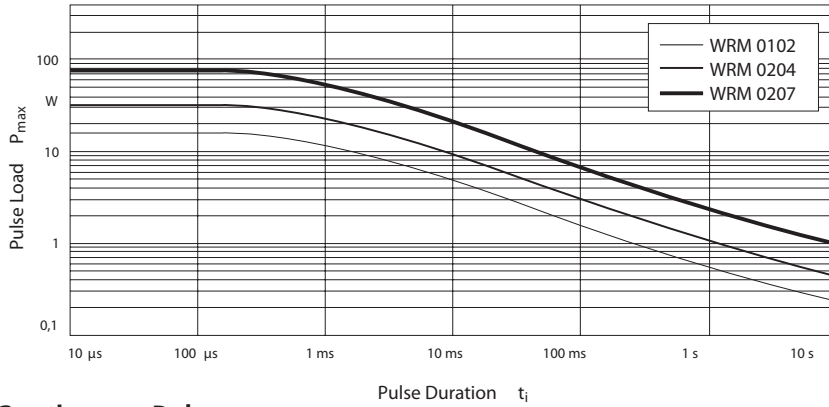
\* Resistors to be mounted on a PC-board according to IEC 115-1, clause 4.27.1

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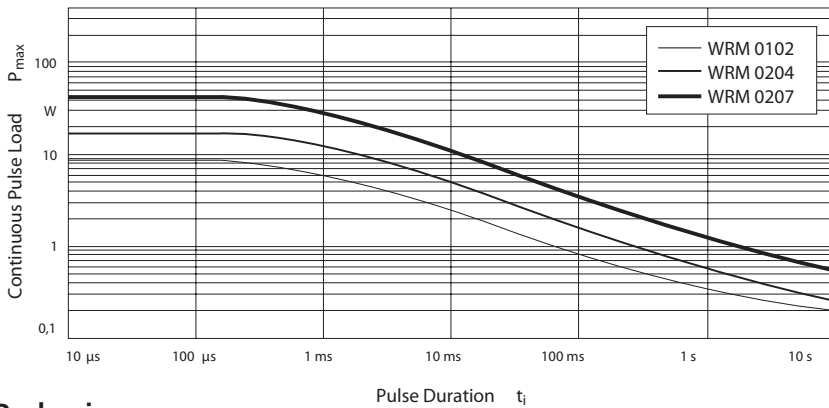
### Single Pulse

Maximum Pulse Load



### Continuous Pulses

Maximum Pulse Load



### Packaging

The WRM 0102 and 0204 resistors are supplied reeled on 8mm blister tape.

WRM 0207 resistors are supplied on 12mm blister tape.

Packaging complies with the requirements of IEC 286-3.

## Ordering Procedure

Example: WRM0204 at 1 kilohm, 1% tolerance and 50ppm/°C TCR on a reel of 3000 pieces -

Type ..... **WRM** **0204** **C** - **1K0** **F** **I**

Size ..... **0204**

TCR ..... **C**

Z	100ppm/°C	Y	15ppm/°C
C	50ppm/°C	T	10ppm/°C
D	25ppm/°C	V	5ppm/°C

Value (use IEC62 code) ..... **1K0**

Tolerance (use IEC62 code) ..... **F**

B	0.1%	D	0.5%	G	2%
C	0.25%	F	1%	J	5%

Packing ..... **I**

I	Tape	0102	3000 / reel (7")	Standard
		0204	3000 / reel (7")*	
		0207	1500 / reel (7")	

\* High precision parts may be supplied on 1000 piece reels – please enquire

Note: F or zero-ohm versions order **WRM0204C-R00FI** or **WRM0207C-R00FI**

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