Pulse Withstanding Fusible Flameproof Metal Film Resistors

EMC Series



Features:

- UL1412 recognised fusible resistor *
- Failsafe 240V mains fusing
- Good pulse handling capability
- Small size for power rating
- UL94-V0 flameproof protection
- Surface mount ZI-form option

* UL file number E234469

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

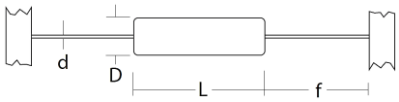
Electrical Data

		EMC2
Power rating @70°C	W	2
Resistance range	ohms	4R7 to 68R
UL recognised resistance range	ohms	22R to 68R
TCR 25 to 75°C	ppm/°C	100
Isolation voltage	V	500
Resistance tolerance	%	10, 20
Standard values		E12
Thermal impedance	°C/W	82
Ambient temperature range	°C	-55 to 155

Physical Data

Dimensions in mm and weight in g

Type	L max	D max	f min	d nom	PCB mounting centres	Min. bend radius	Wt. nom
EMC2	10	4	27	0.8	15	1.2	0.55



Construction

The metal film is deposited onto a high purity ceramic rod. End caps are force fitted and termination wires are welded to the end caps. Finally, cement protection is applied to the resistor body prior to marking with indelible ink. The cement protection is applied in a manner that leaves the terminations completely clear. This permits a well-defined body length (clean lead to clean lead dimension L).

Marking

EMC resistors are colour coded with five bands. Four of the bands indicate value and tolerance in accordance with IEC 60062. Parts with 20% tolerance have no fourth band. A fifth yellow band denotes constant voltage fusibility.

Terminations

Terminations are hot tin dipped copper wire. They meet the strength requirements of IEC 60115-1 clause 9.5 and the solderability requirements of IEC 60115-1 clause 11.1.

Solvent Resistance

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

Flammability

The resistor coating is UL94-V0 rated and will not burn or emit incandescent particles under any condition of applied temperature or power overload.

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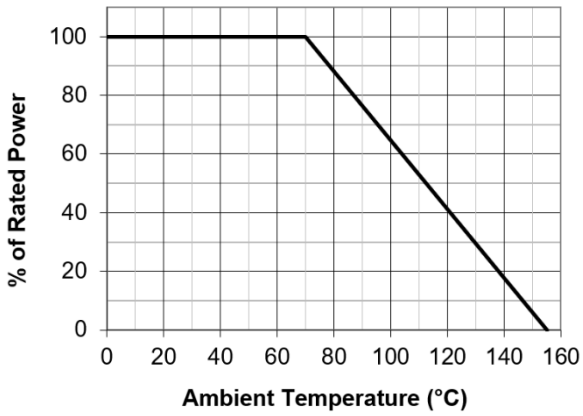
EMC Series

Performance Data

		Maximum
Load at rated power 1000 hours at 70°C	±ΔR%	5
Shelf-life test 12 months at room temperature	±ΔR%	2
Climatic	±ΔR%	3
Climatic category		55/155/56
Temperature rapid change	±ΔR%	0.5
Resistance to solder heat	±ΔR%	0.5

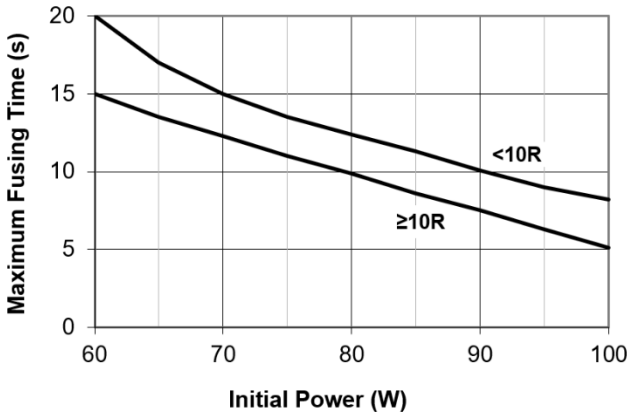
Thermal & Fusing Performance

Temperature Derating



Fusing Characteristic

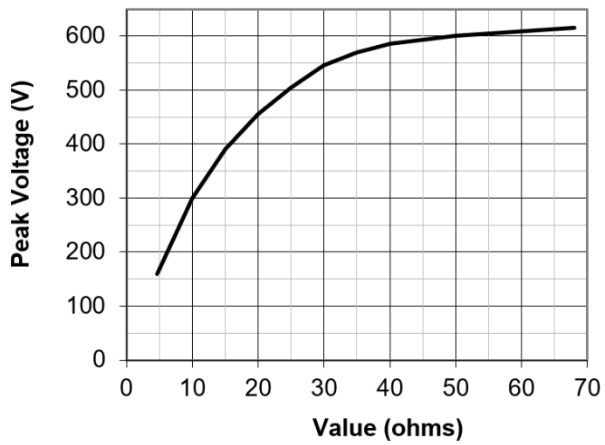
(constant voltage)



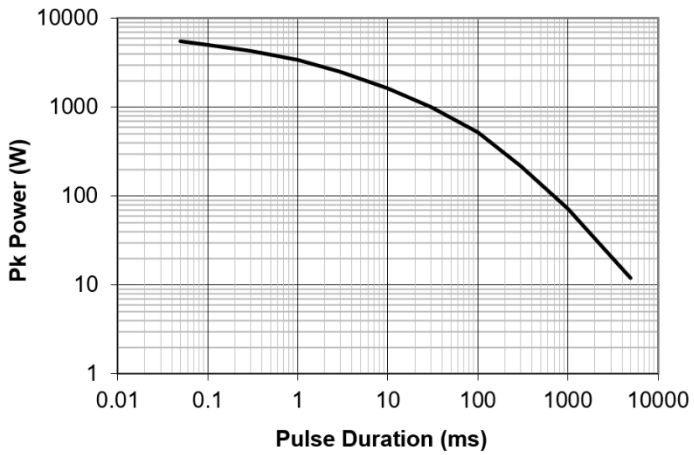
EMC2 resistors fuse open circuit at overload powers exceeding 60W within the time indicated on the Fusing Characteristic. Their fusing performance at lower overload powers is not specified. EMC2 resistors fuse safely in the event of a 115Vrms / 240Vrms overload (line / mains short circuit condition) without burning or emitting incandescent particles. After fusing, the resistance is at least 100 times greater than the original nominal value.

Pulse Performance

IEC 61000-4-5 1.2/50µs Surge



Single Rectangular Pulse

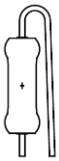
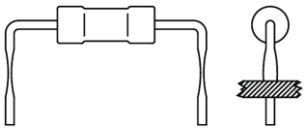
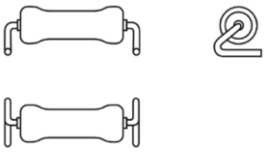


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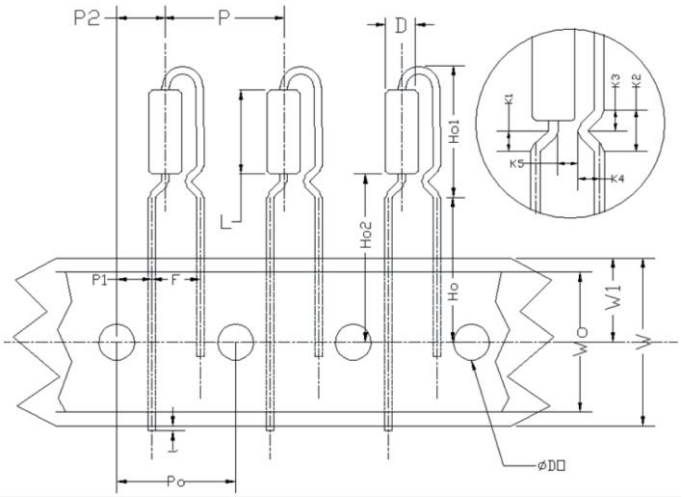
Application Notes

1. If the resistors are to dissipate full rated power, it is recommended that the terminations should not be soldered closer than 4mm from the body.
2. Due to operating temperature limits imposed by some PCB materials, derating may be necessary. An estimate of the temperature rise to be expected can be calculated using the thermal impedance figure given under Electrical Data.
3. For the purposes of UL approval, the following points should be observed:
   - 3.1 To protect against fire under all conditions of overload, a positive clearance of at least 13mm should be provided between the body of the resistor and any combustible materials.
   - 3.2 A positive clearance of 13mm should be provided between the resistor body or terminations and uninsulated parts of opposite polarity or uninsulated dead metal parts.
4. EMC2 resistors can also be supplied loose packed with hairpin, goalpost or lancet pre-formed leads. For details see: https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Application-Note/TN008-Resistors-Leadform-Capability.pdf.
5. EMC2 resistors are also available in an SMD format with ZI formed leads and packed in blister tape. For details see: https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Datasheet/ZI-form.pdf.

Hairpin	Goalpost	Lancet	ZI-form
			

6. A radial taped version is also available as shown below:

Radial Taped Dimensions in mm		
Dimension	**Notation**	**EMC2R**
Component body length	L	10 max
Component body diameter	D	4 max
Terminal lead diameter	d	0.8 nom
Component pitch	P	12.7 ±0.5
Hole pitch	P_0	12.7 ±0.2
Component to hole offset	P_1	3.85 ±0.3
	P_2	5.85 ±0.5
Lead pitch	F	5 +0.75, -0.34
Width of backing strip	W	18 ±0.3
Position of hole	W_1	9 ±0.25
Diameter of hole	Do	4 ±0.3
Height to lead form	Ho	16 ±0.3
Height from lead form	Ho_1	21.7 max
Height to resistor	Ho_2	18 max
Width of adhesive tape	W_0	15 ±0.5
Length of protrusion	I	<2.5
Form dimensions	K_1	2 ±0.3
	K_2	3 ±0.5
	K_3	1.5 ±0.25
	K_4	1 ±0.2

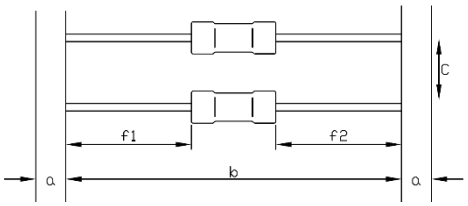


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Packaging

The standard packaging for EMC2 is taped. The critical dimensions are shown below. The component wires will not protrude beyond the outside edge of the tapes. Taped product is then packed into boxes; see Ordering Procedure for details. Alternative packaging is available by request. Pre-formed hairpin, goalpost and lancet resistors are supplied loose packed in plastic bags or boxes. ZI form SMD parts are packed in blister tape.



Dims in mm	EMC2
a	6
b	68
c	5
$f_1 - f_2$	≤ 1.4

Ordering Procedure

Example 1: EMC2-33RMI (EMC2, 33 ohms ±20%, Pb-free)
Example 2: EMC2R-33RMT15 (EMC2R radially formed & taped, 33 ohms ±20%, Pb-free)

E	M	C	2		-	3	3	R	M	I		
1				2		3			4	5		

1 Type	2 Leadforming	3 Value	4 Tolerance	5 Packing			
EMC2	Blank = axial	E12 = 3 characters R = ohms	K = ±10%	I	EMC2	Ammo	2000/box
	R = radial taped		M = ±20%	T15	EMC2R	Reel	1500/reel

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