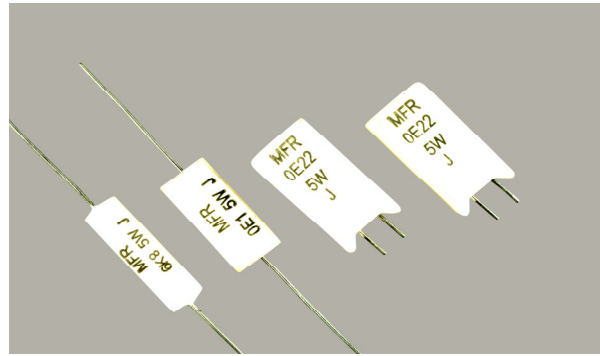


CERAMIC ENCASED WIRE WOUND RESISTORS

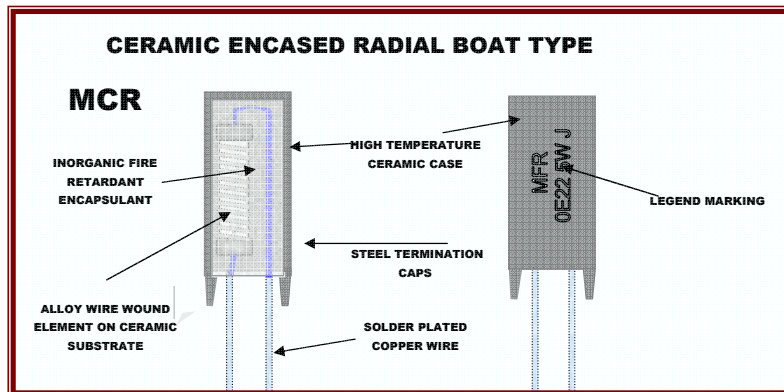
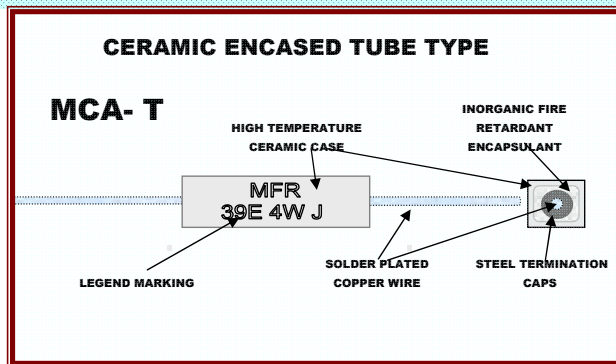
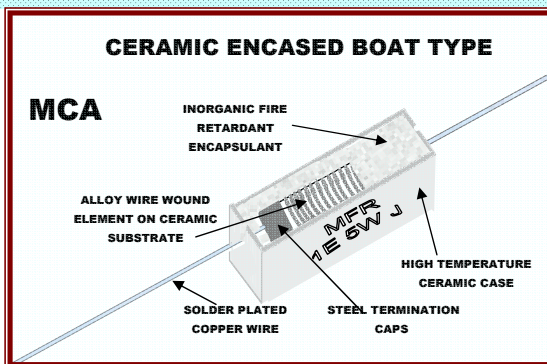
Series : MCA, MCA-T / MCR

Features:

- Fully welded construction.
- Flameproof inorganic construction.
- Enhanced heat dissipation.
- Operating temperature **-55°C to -275°C.**
- MO film element utilized for higher resistance values.
- Any special design on request.
- Lead (Pb)-free solder contacts.
- **RoHS** Compliant directive 2002/95/EC

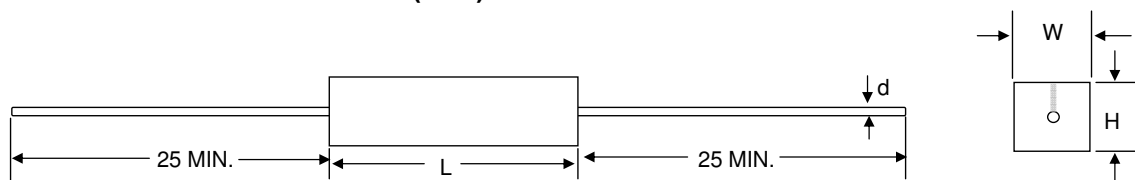


Construction :



Dimensions :

1.0 CERAMIC ENCASED BOAT TYPE (MCA)

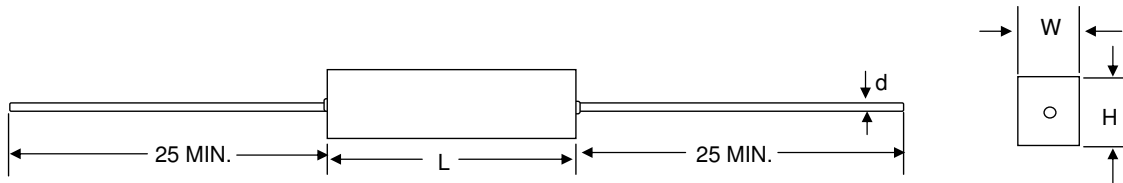


Physical Data:**CERAMIC ENCASED BOAT TYPE (MCA) :**

TYPE	WATT. @ 70°C	TOL	DIMENSIONS (mm)				RESISTANCE RANGE		MAX. WORKING VOLTAGE
			L	W	H	d ± 0.05	WIRE WOUND	MO	
MCA2	2W	±5%	18 ±1.5	7.0 ±1.0	7.0 ±1.0	0.65	0.1Ω ~ 50Ω	51Ω ~ 20KΩ	150 V
MCA3	3W	±5%	22 ±1.5	8.0 ±1.0	8.0 ±1.0	0.75	0.1Ω ~ 50Ω	51Ω ~ 33KΩ	350 V
MCA5	5W	±5%	22 ±1.5	9.5 ±1.0	9.0 ±1.0	0.75	0.1Ω ~ 100Ω	101Ω ~ 50KΩ	350 V
MCA7	7W	±5%	35 ±1.5	9.5 ±1.0	9.0 ±1.0	0.75	0.1Ω ~ 500Ω	501Ω ~ 50KΩ	500 V
MCA10	10W	±5%	48 ±1.5	9.5 ±1.0	9.0 ±1.0	0.75	0.1Ω ~ 500Ω	501Ω ~ 50KΩ	750 V
MCA15	15W	±5%	48 ±1.5	12.5 ±1.0	12.0 ±1.0	0.75	0.5Ω ~ 1KΩ	1KΩ ~ 150KΩ	1000 V
MCA20	20W	±5%	60 ±1.5	14 ±1.0	13.5 ±1.0	0.75	0.5Ω ~ 1KΩ	1KΩ ~ 150KΩ	1000 V

Note : 1.0 Working voltage is $\sqrt{P \times R}$ where P is power & R is resistance in Ohms

2.0 Resistance range & tolerance other than specified is available on request.

Dimensions :**2.0 CERAMIC ENCASED TUBE TYPE (MCA-T)****Physical Data:****CERAMIC ENCASED BOAT TYPE (MCA) :**

TYPE	WATT. @ 70°C	TOL.	DIMENSIONS (mm)				RESISTANCE RANGES	LEAD LENGTH
			L	W	H	d ± 0.10		
MCA-T1	1W	±5%	15 ±1.5	6.0 ±1.0	6.0 ±1.0	0.80	0.01Ω ~ 1.5KΩ	25 min.
MCA-T2	2W	±5%	15 ±1.5	6.5 ±1.0	6.5 ±1.0	0.80	0.01Ω ~ 2KΩ	25 min.
MCA-T3	3W	±5%	15 ±1.5	7.0 ±1.0	7.0 ±1.0	0.80	0.01Ω ~ 2KΩ	25 min.
MCA-T4	4W	±5%	20 ±1.5	6.5 ±1.0	6.5 ±1.0	0.80	0.01Ω ~ 4.7KΩ	25 min.
MCA-T5	5W	±5%	25 ±1.5	6.5 ±1.0	6.5 ±1.0	0.80	0.01Ω ~ 6.8KΩ	25 min.
MCA-T5A	6W	±5%	20 ±1.5	9.0 ±1.0	9.0 ±1.0	0.80	0.01Ω ~ 6.8KΩ	25 min.
MCA-T6		±5%	25 ±1.5	9.0 ±1.0	9.0 ±1.0	0.80	0.01Ω ~ 8.2KΩ	25 min.

Note : 1.0 Working voltage is $\sqrt{P \times R}$ where P is power & R is resistance in Ohms

2.0 Resistance range & tolerance other then specified is available on request.

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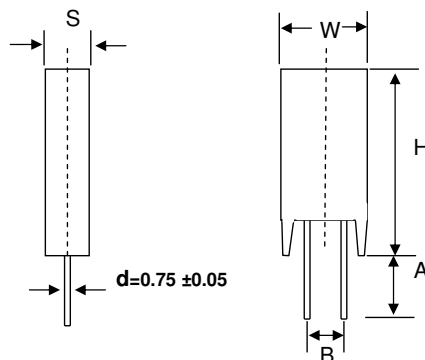
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Revision no. : 120128

Dimensions :

3.0 CERAMIC ENCASED RADIAL BOAT TYPE (MCR)



Physical Data:

CERAMIC ENCASED BOAT TYPE (MCA) :

TYPE	WATT. @ 70°C	TOL. PPM/°C	DIMENSIONS (mm)					RESISTANCE RANGES	
			H	W	S	A	B	WIRE WOUND	MO
MCR2	2W	±5%	20 ±1.5	11 ±1.0	7.5 ±1.0	4.0 ±1.0	5.0 ±1.5	0.1Ω ~ 50Ω	51Ω ~ 20KΩ
MCR3	3W	±5%	25 ±1.5	12 ±1.0	9.0 ±1.0	4.0 ±1.0	5.0 ±1.5	0.1Ω ~ 50Ω	51Ω ~ 33KΩ
MCR5	5W	±5%	25 ±1.5	13 ±1.0	9.0 ±1.0	4.0 ±1.0	5.0 ±1.5	0.1Ω ~ 100Ω	101Ω ~ 50KΩ
MCR7	7W	±5%	39 ±1.5	13 ±1.0	9.0 ±1.0	4.0 ±1.0	5.0 ±1.5	0.1Ω ~ 500Ω	501Ω ~ 50KΩ
MCR10	10W	±5%	51 ±1.5	13 ±1.0	9.0 ±1.0	4.0 ±1.0	5.0 ±1.5	0.1Ω ~ 500Ω	501Ω ~ 50KΩ
MCR10S		±5%	35 ±1.5	16 ±1.0	12 ±1.0	4.0 ±1.0	5.0 ±1.5	0.5Ω ~ 1KΩ	1KΩ ~ 150KΩ

Note : 1.0 Working voltage is $\sqrt{P \times R}$ where P is power & R is resistance in Ohms

2.0 Resistance range & tolerance other then specified is available on request.

Marking:

The MCA, MCA-T & MCR series / type, the nominal resistance & tolerance are marked on the resistor body

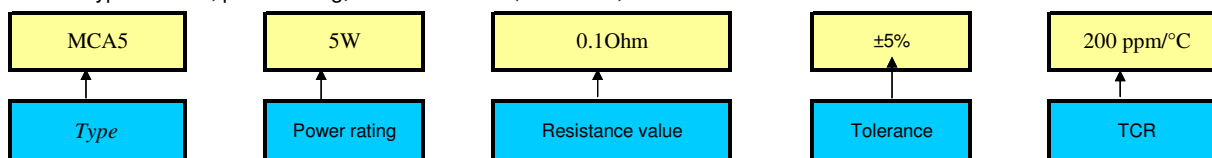
using LEGEND marking

e.g MFR

100E 5W F

Part Numbering Information:

Part Number : Type number, power rating, resistance value, tolerance, tcr.



Examples: PART NO. : MCA5, 5W, 0.1Ohm, $\pm 5\%$, 200ppm/ $^{\circ}\text{C}$

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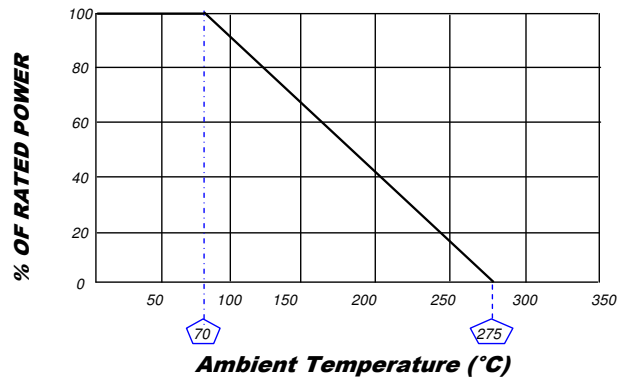
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Performance Data (Procedure & Requirements):

TEST	PROCEDURE	REQUIREMENTS
Terminal strength	5 lbs. minimum	No visual damage $\Delta R/R$ max.: $\pm(0.50\% + 0.05 \Omega)$
Solderability Test	16 hrs steam or 16 hrs. at 155 $^{\circ}\text{C}$ 2 sec. ± 0.5 sec. in solder at 260 $^{\circ}\pm 5^{\circ}\text{C}$ Using flux	>95% coverage covered (good tinning) & no damage
Resistance To Soldering Heat	at 350 $^{\circ}\text{C}$ for 3 sec., 2.5mm from the body	$\Delta R/R$ max.: $\pm(1.0\% + 0.05 \Omega)$
Temperature Cycling	30 minutes at -55 $^{\circ}\text{C}$ & 30 minutes at 150 $^{\circ}\text{C}$ Total 5 number of cycles.	No visual damage $\Delta R/R$ max.: $\pm(1.0\% + 0.05 \Omega)$
Dry Heat Test	16 hrs at 150 $^{\circ}\text{C}$	$\Delta R/R$ max.: $\pm(5.0\% + 0.05 \Omega)$
Cold Test	2 hrs at -55 $^{\circ}\text{C}$	$\Delta R/R$ max.: $\pm(1.0\% + 0.05 \Omega)$
Short Time Overload	5 X Power nominal for 5 sec. @ 25 $^{\circ}\text{C}$	$\Delta R/R$ max.: $\pm(1.0 + 0.05 \Omega)$
Endurance @ 70 $^{\circ}\text{C}$	1000 hrs. load with Pn (power nominal) 1.5 hr. ON & 0.5 hr. OFF	No visual damage $\Delta R/R$ max.: $\pm(5.0\% + 0.05 \Omega)$
Endurance @ Upper Category Temperature	1000 hrs. at 150 $^{\circ}\text{C}$ with no load	No visual damage $\Delta R/R$ max.: $\pm(5.0\% + 0.05 \Omega)$
Temperature Rise Test	Horizontally mounted, loaded with Pn	Hot spot temperature less than maximum body temperature
Damp Heat Steady State	56 days, 40 $^{\circ}\text{C}$; 90 to 95% Rh; dissipation $\leq 0.01\text{Pn}$	No visual damage $\Delta R/R$ max.: $\pm(5.0\% + 0.05 \Omega)$
Temperature Coefficient	At 25/-55/25 $^{\circ}\text{C}$ & 25/150/25 $^{\circ}\text{C}$	Within specified limits
Insulation Resistance	V- Block method for 1 minute duration At 500 V dc	> $10^4 \text{ M}\Omega$
Voltage Proof Test	V- Block method for 1 minute duration At 500 V	No flash over or break down should observed

Derating Curve:



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