



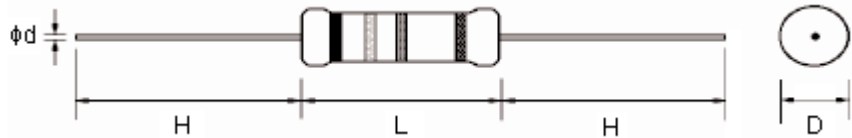
PART NO.

MCRE0000 Series

REVISIONS

ECN #	REV	DESCRIPTION	DRAWN	DATE	CHECKD	DATE	APPRVD	DATE
-	A	RELEASED	Kiran	07/05/09	Suresh	07/05/09	Farnell	21/05/09

Dimension:



Dimensions : Millimetres

Type	Power Rating (W)	Maximum D	Maximum L	d ±0.05	H ±3
MC	1/8	1.85	3.5	0.45	28

Dimensions : Millimetres

Specifications:

- Resistance range : 1Ω to 1MΩ.
- Finished size : 1.85mm x 3.5mm.
- Lead wire diameter : 0.45 ±0.05mm.
- Pitch of tape (PT) : 52mm.

Ratings

Type	MC
Rated power	0.125W at 70°C
Maximum working voltage	200V
Maximum overload voltage	400V
Dielectric withstanding voltage	
Rated ambient temperature	70°C
Operating temperature range	-55 °C to +155°C
Resistance tolerance	±5%
Resistance range	1.1MΩ to 1MΩ

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Kiran	07/05/09
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Suresh	07/05/09
APPROVED BY:	DATE:
Farnell	21/05/09

DRAWING TITLE:

1700197-1700277

SIZE A	DWG NO. M10002174	ELECTRONIC FILE 1700197-1700277_DWG	REV A
SCALE: NTS		U.O.M.: mm	SHEET: 1 OF 10



PART NO.

MCRE0000 Series

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Power Rating:

Resistors shall have a power rating based on continuous full load operation at an ambient temperature of 70°C. For temperature in excess of 70°C, the load shall be derated.

Voltage Rating:

Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial-line frequency and waveform corresponding to the power rating, as determined from the following formula :

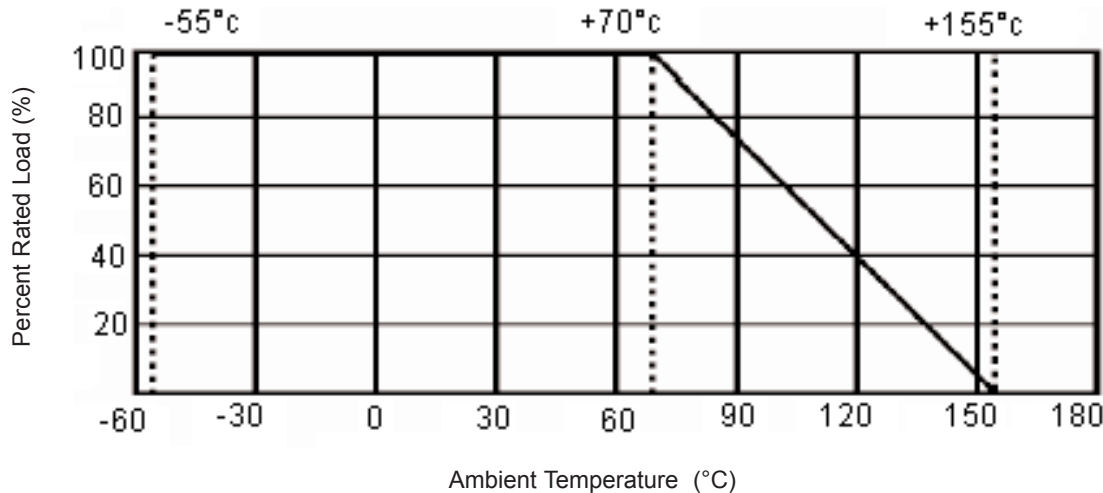
$$RCWV = \sqrt{P \times R}$$

Were: RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volt)

P = Power rating (watt)

R = Nominal resistance (ohm)

In no case shall the rated DC or RMS AC continuous working voltage be greater than the applicable maximum value.



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Farnell	21/05/09

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1700197-1700277

SIZE A	DWG NO. M10002174	ELECTRONIC FILE 1700197-1700277_DWG	REV A
SCALE: NTS		U.O.M.: mm	SHEET: 2 OF 10



PART NO.

MCRE0000 Series

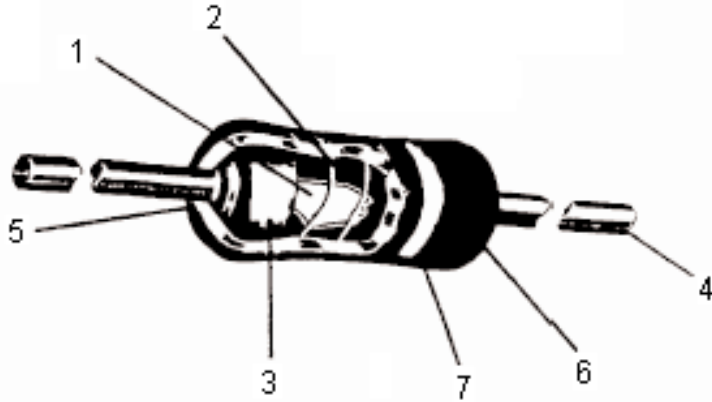
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Nominal Resistance:

Effective figures of nominal resistance shall be in accordance with E-24 series, and resistance tolerance

Construction:



Item Number	Name	Material
1	Basic body	Rod type ceramics
2	Resistance film	Carbon film
3	End cap	Steel (tin plated iron surface)
4	Lead wire	Annealed copper wire coated with tin
5	Joint	By welding
6	Coating	Insulated epoxy resin (colour: beige)
7	Colour code	Epoxy resin

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Farnell	21/05/09

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1700197-1700277

SIZE A	DWG NO. M10002174	ELECTRONIC FILE 1700197-1700277_DWG	REV A
SCALE: NTS		U.O.M.: mm	SHEET: 3 OF 10



PART NO.

MCRE0000 Series

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Characteristics

Characteristics	Limits	Test Methods (JIS C 5201-1)	
DC resistance	Must be within the specified tolerance	The limit of error of measuring apparatus shall not exceed allowable range or 5% of resistance tolerance (Sub-clause 4.5)	
Insulation resistance	Insulation resistance 10,000MΩ minimum	Resistors shall be clamped in the trough of a 90° metallic V-block or foil method use a metal foil shall be wrapped closely around the body of the resistor. After that shall be tested at DC potential respectively specified in the above list for 60 +10/-0 seconds. (Sub-clause 4.6)	
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down	Resistors shall be clamped in the trough of a 90° metallic V-block or foil method use a metal foil shall be wrapped closely around the body of the resistor. After that shall be tested at DC potential respectively specified in the above list for 60 +10/-0 seconds. (Sub-clause 4.7)	
Temperature coefficient	Resistance Range	Natural resistance change per temperature degree centigrade $R2-R1/R1(t2-t1) \times 10^6$ (PPM/°C) R1: Resistance value at room temperature (t1) R2: Resistance value at room temperature plus 100°C (t2) (Sub-clause 4.8)	
	≤10Ω		0 to ±350
	11Ω to 99K		0 to -450
	100K to 1M		0 to -700
	1.1M to 10M	0 to -1500	
Short time overload	Resistance change rate is ±(1% + 0.05Ω) maximum with no evidence of mechanical damage	Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds (Sub-clause 4.13)	
Terminal strength	No evidence of mechanical damage	Direct load: Resistance to a 2.5kg direct load for 10 seconds in the direction of the longitudinal axis of the terminal leads. Twist test: Terminal leads shall be bent through 90° at a point of about 6mm from the body of the resistor and shall be rotated through 360° about the original axis of the bent terminal in alternating direction for a total of 3 rotations. (Sub-clause 4.16)	

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1700197-1700277			
SIZE	DWG NO.	ELECTRONIC FILE	REV
A	M10002174	1700197-1700277_DWG	A
SCALE: NTS		U.O.M.: mm	SHEET: 4 OF 10



PART NO.

MCRE0000 Series

REVISIONS

ECN #	REV	DESCRIPTION	DRAWN	DATE	CHECKD	DATE	APPRVD	DATE
-	A	RELEASED	Kiran	07/05/09	Suresh	07/05/09	Farnell	21/05/09

Characteristics

Characteristics	Limits	Test Methods (JIS C 5201-1)															
Solderability	95% coverage minimum	The area covered with a new, smooth clean, shiny and continuous surface free from concentrated pinholes. Test temperature of solder : 245°C ±3°C Dwell time in solder : 2 to 3 seconds (Sub-clause 4.17)															
Soldering temperature reference	Electrical characteristics shall be satisfied. Without distinct deformation in appearance. (95% coverage minimum)	The leads immersed into solder bath to 3.2 to 4.8mm from the body. Permanent resistance change shall be checked. Wave soldering condition: (2 cycles maximum) Pre-heat : 100 to 120°C, 30 ±5 seconds. Suggestion solder temperature : 235 to 255°C, 10 seconds maximum Park temperature : 260°C Hand soldering condition: Hand Soldering bit temperature : 380 ±10°C Dwell time in solder : 3 +1/-0 seconds															
Resistance to soldering heat	Resistance change rate is ±(1% + 0.05Ω) maximum with no evidence of mechanical damage	Permanent resistance change when leads immersed to 3.2 to 4.8 mm from the body in 350°C ±10°C solder for 3 ±0.5 seconds (Sub-clause 4.18)															
Temperature cycling	Resistance change rate is ±(1% + 0.05Ω) maximum with no evidence of mechanical damage	Resistance change after continuous 5 cycles for duty shown below: <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55°C ±3°C</td> <td>30 minutes</td> </tr> <tr> <td>2</td> <td>Room temperature</td> <td>10 to 15 minutes</td> </tr> <tr> <td>3</td> <td>155°C ±2°C</td> <td>30 minutes</td> </tr> <tr> <td>4</td> <td>Room temperature</td> <td>10 to 15 minutes</td> </tr> </tbody> </table> (Sub-clause 4.19)	Step	Temperature	Time	1	-55°C ±3°C	30 minutes	2	Room temperature	10 to 15 minutes	3	155°C ±2°C	30 minutes	4	Room temperature	10 to 15 minutes
Step	Temperature	Time															
1	-55°C ±3°C	30 minutes															
2	Room temperature	10 to 15 minutes															
3	155°C ±2°C	30 minutes															
4	Room temperature	10 to 15 minutes															

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1700197-1700277			
SIZE	DWG NO.	ELECTRONIC FILE	REV
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SCALE: NTS		U.O.M.: mm	SHEET: 5 OF 10



PART NO.

MCRE0000 Series

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-	A	RELEASED	Kiran	07/05/09	Suresh	07/05/09	Farnell	21/05/09

Characteristics

Characteristics	Limits	Test Methods (JIS C 5201-1)							
Vibration	Resistance change rate is $\pm(1\% + 0.05\Omega)$ maximum	55Hz, 3 planes 2 hours each Total amplitude = 1.5mm (Sub-clause 4.22)							
Load life in humidity	<table border="1"> <thead> <tr> <th>Resistance Value</th> <th>$\Delta R/R$</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Normal Type</td> <td><100KΩ</td> <td>$\pm 3\%$</td> </tr> <tr> <td></td> <td>$\pm 5\%$</td> </tr> </tbody> </table>	Resistance Value	$\Delta R/R$	Normal Type	<100K Ω	$\pm 3\%$		$\pm 5\%$	Resistance change after 1000 hours operating at RCWV with duty cycle of (1.5 hours "on", 0.5 hour "off") in a humidity test chamber controlled at 40°C $\pm 2^\circ\text{C}$ and 90 to 95% relative humidity (Sub-clause 4.24.2.1)
Resistance Value	$\Delta R/R$								
Normal Type	<100K Ω	$\pm 3\%$							
		$\pm 5\%$							
Load life	<table border="1"> <thead> <tr> <th>Resistance Value</th> <th>$\Delta R/R$</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Normal Type</td> <td><56KΩ</td> <td>$\pm 2\%$</td> </tr> <tr> <td>$\geq 56\text{K}\Omega$</td> <td>$\pm 3\%$</td> </tr> </tbody> </table>	Resistance Value	$\Delta R/R$	Normal Type	<56K Ω	$\pm 2\%$	$\geq 56\text{K}\Omega$	$\pm 3\%$	Permanent resistance change after 1000 hours operating at RCWV with duty cycle of (1.5 hours "on", 0.5 hour "off") at 70°C $\pm 2^\circ\text{C}$ ambient (Sub-clause 4.25.1)
Resistance Value	$\Delta R/R$								
Normal Type	<56K Ω	$\pm 2\%$							
	$\geq 56\text{K}\Omega$	$\pm 3\%$							
Resistance to solvent	No deterioration of protective coatings and markings	Specimens shall be immersed in a bath of trichloroethane completely for 3 minutes with ultrasonic (Sub-clause 4.30)							

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SIZE	DWG NO.	ELECTRONIC FILE	REV
A	M10002174	1700197-1700277_DWG	A
SCALE: NTS	U.O.M.: mm	SHEET: 6 OF 10	



PART NO.

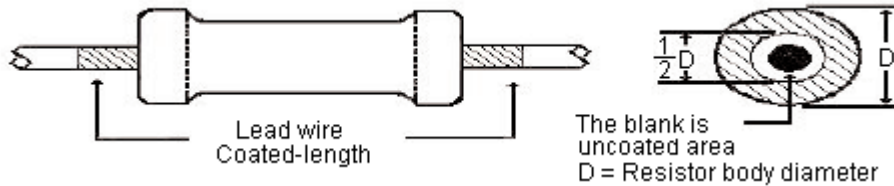
MCRE0000 Series

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Painting Method:

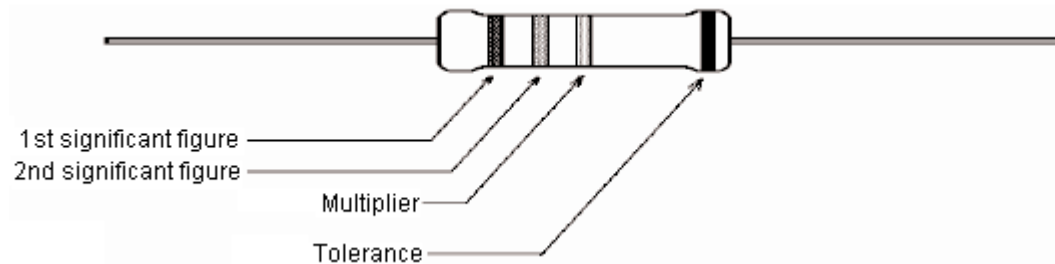
Welding point, terminal and lead wire, is permissible to be exposed without the outer coated cover. The extent should be within 1/2 of the angle.



Marking:

Resistor:

Resistor shall be marked with colour coding, colours shall be in accordance with JIS C 0802.



Specification Table

Description	Wattage (mW)	Resistance Value	Part Number
Carbon Film Resistor	125	1R	MCRE000001
		1R2	MCRE000002
		1R5	MCRE000003
		1R8	MCRE000004
		2R2	MCRE000005

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SIZE A	DWG NO. M10002174	ELECTRONIC FILE 1700197-1700277_DWG	REV A
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PART NO.

MCRE0000 Series

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Specification Table

Description	Wattage (mW)	Resistance Value	Part Number
Carbon Film Resistor	125	2R7	MCRE000006
		3R3	MCRE000007
		3R9	MCRE000008
		4R7	MCRE000009
		5R6	MCRE000010
		6R8	MCRE000011
		8R2	MCRE000012
		10R	MCRE000013
		12R	MCRE000014
		15R	MCRE000015
		18R	MCRE000016
		22R	MCRE000017
		27R	MCRE000018
		33R	MCRE000019
		39R	MCRE000020
		47R	MCRE000021
56R	MCRE000022		
68R	MCRE000023		
82R	MCRE000024		
100R	MCRE000025		
120R	MCRE000026		

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Specification Table

Description	Wattage (mW)	Resistance Value	Part Number
Carbon Film Resistor	125	150R	MCRE000027
		180R	MCRE000028
		220R	MCRE000029
		270R	MCRE000030
		330R	MCRE000031
		390R	MCRE000032
		470R	MCRE000033
		560R	MCRE000034
		680R	MCRE000035
		820R	MCRE000036
		1K	MCRE000037
		1K2	MCRE000038
		1K5	MCRE000039
		1K8	MCRE000040
		2K2	MCRE000041
		2K7	MCRE000042
		3K3	MCRE000043
		3K9	MCRE000044
4K7	MCRE000045		
5K6	MCRE000046		
6K8	MCRE000047		

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MCRE0000 Series

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Specification Table

Description	Wattage (mW)	Resistance Value	Part Number
Carbon Film Resistor	125	8K2	MCRE000048
		10K	MCRE000049
		12K	MCRE000050
		15K	MCRE000051
		18K	MCRE000052
		22K	MCRE000053
		27K	MCRE000054
		33K	MCRE000055
		39K	MCRE000056
		47K	MCRE000057
		56K	MCRE000058
		68K	MCRE000059
		82K	MCRE000060
		100K	MCRE000061
		120K	MCRE000062
		150K	MCRE000063
		180K	MCRE000064
220K	MCRE000065		
270K	MCRE000066		
330K	MCRE000067		
390K	MCRE000068		

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DRAWN BY:	DATE:
Kiran	07/05/09
CHECKED BY:	DATE:
Suresh	07/05/09
APPROVED BY:	DATE:
Farnell	21/05/09

DRAWING TITLE:			
1700197-1700277			
SIZE	DWG NO.	ELECTRONIC FILE	REV
A	M10002174	1700197-1700277_DWG	A
SCALE: NTS		U.O.M.: mm	SHEET: 10 OF 10



PART NO.

MCRE0000 Series

REVISIONS

ECN #	REV	DESCRIPTION	DRAWN	DATE	CHECKD	DATE	APPRVD	DATE
-	A	RELEASED	Kiran	07/05/09	Suresh	07/05/09	Farnell	21/05/09

Specification Table

Description	Wattage (mW)	Resistance Value	Part Number
Carbon Film Resistor	125	470K	MCRE000069
		560K	MCRE000070
		680K	MCRE000071
		820K	MCRE000072
		1M	MCRE000073

<http://www.farnell.com>

<http://www.newark.com>

<http://www.cpc.co.uk>

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A	M10002174	1700197-1700277_DWG	A
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