

# DATA SHEET

## MELF CARBON FILM RESISTORS

General Purpose

MCF Series

$\pm 2\%$ ,  $\pm 5\%$

1/6W to 1W

RoHS compliant & Halogen Free





## APPLICATIONS

- All general purpose applications
- Power applications
- Energy meter

## FEATURES

- MELF, SMD package
- Excellent pulse withstanding capability
- Wide resistance range
- RoHS compliant & halogen-free

## ORDERING INFORMATION

Part number of the MELF carbon film resistor is identified by the series, power rating, tolerance, packing, temperature coefficient and resistance value.

## PART NUMBER

<u>MCF</u>	<u>25S</u>	<u>J</u>	<u>R</u>	<u>-</u>	<u>100R</u>
(1)	(2)	(3)	(4)	(5)	(6)

### (1) SERIES

MCF Series

### (2) POWER RATING

-12 = 1/6W

25S = 1/4W

204 = 0.4W

-25 = 1/4W

50S = 1/2W

207 = 0.6W

-50 = 1/2W

1WS = 1W

### (3) TOLERANCE

G =  $\pm 2\%$

J =  $\pm 5\%$

- = Based on spec.

### (4) PACKAGING

R = Reel Pack

### (5) TEMPERATURE COEFFICIENT OF RESISTANCE

- = Based on spec.

### (6) RESISTANCE VALUE

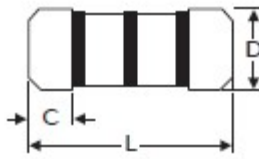
E24 Series value

Example:

1R = 1 $\Omega$ , 10K = 10,000 $\Omega$ , 1M = 1,000,000 $\Omega$

**DIMENSIONS**

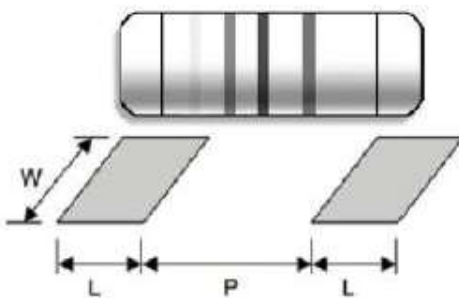
Unit: mm



Normal	Miniature	L	D	C Min.
MCF-12	MCF25S / MCF204	3.50 ± 0.2	1.40 ± 0.15	0.5
MCF-25	MCF50S / MCF207	5.90 ± 0.2	2.20 ± 0.1	0.5
MCF-50	MCF1WS	8.50 ± 0.2	3.20 ± 0.2	0.5

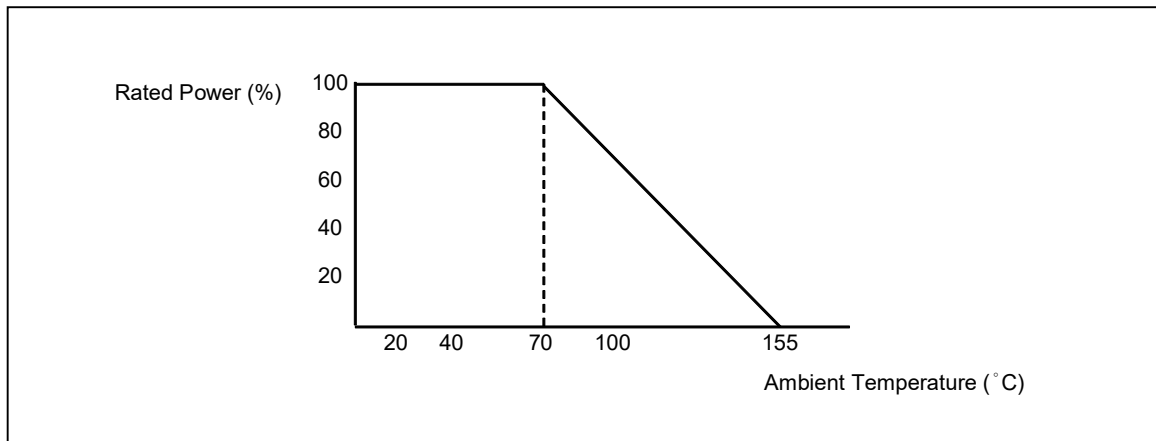
**SUGGESTED PAD LAYOUT**

Unit: mm



Normal	Miniature	Soldering Mode	L Min.	P	W Min.
MCF-12	MCF25S MCF204	Reflow	1.3	1.6 ± 0.1	1.6
		Wave	1.5	1.5 ± 0.1	1.8
MCF-25	MCF50S MCF207	Reflow	2.0	3.0 ± 0.1	3.0
		Wave	2.5	3.0 ± 0.1	3.0
MCF-50	MCF1WS	Reflow	2.3	5.5 ± 0.2	4.0
		Wave	2.8	5.5 ± 0.2	4.0

**DERATING CURVE**



**TABLE I TEMPERATURE COEFFICIENT**

TYPE	MAX. VALUE OF TEMP. COEFFICIENT PPM/ °C			
	under 1KΩ	1K1Ω – 47KΩ	51KΩ – 470KΩ	510KΩ – 1MΩ
MCF-12, MCF25S, MCF204	0 ~ -350	0 ~ -600	0 ~ -1000	0 ~ -1500
MCF-25, MCF50S, MCF207, MCF-50, MCF1WS	0 ~ -350	0 ~ -600	0 ~ -1000	

**ELECTRICAL CHARACTERISTICS**

CHARACTERISTICS	MCF-12	MCF25S	MCF204	MCF-25	MCF50S	MCF207	MCF-50	MCF1WS
Power Rating at 70 °C	1/6W	1/4W	0.4W	1/4W	1/2W	0.6W	1/2W	1W
Maximum Working Voltage	200V	250V	250V	300V	300V	300V	350V	350V
Maximum Overload Voltage	400V	500V	500V	600V	600V	600V	700V	700V
Voltage Proof on Insulation	200V	200V	200V	500V	500V	500V	700V	700V
Resistance Range	10Ω ~ 1MΩ & 0Ω for E24 series value							
Operating Temp. Range	- 55°C to +155°C							
Temperature Coefficient	see Table I							

Note: For resistance value out of above range is by request.

**TEST AND REQUIRMENTS**

TEST	TEST METHOD	PROCEDURE	APPRAISE
Short Time Overload	IEC 60115-1 4.13	2.5 times RCWV for 5 sec.(Not more than maximum overload voltage)	±1.0%+0.05Ω
Voltage Proof on Insulation	IEC 60115-1 4.7	In V-Block for 60 sec. test voltage as above table	No Breakdown
Temperature Coefficient	IEC 60115-1 4.8	Between -55°C to +155°C	By Type
Insulation Resistance	IEC 60115-1 4.6	In V-Block for 60 sec.	>10,000MΩ
Solderability	IEC 60115-1 4.17	245±5°C for 3±0.5 Sec.	95% Min. coverage
Solvent Resistance of Marking	IEC 60115-1 4.30	IPA for 5±0.5 Min. with ultrasonic	No deterioration of coatings and markings
Periodic-pulse Overload	IEC 60115-1 4.39	4 times RCWV 10,000 cycles (1 Sec. on, 25 Sec.off)	±1.0%+0.05Ω
Damp Heat Steady State	IEC 60115-1 4.24	40±2°C,90-95% RH for 56 days, loaded with 0.1 times RCWV	±5.0%+0.05Ω
Endurance at 70°C	IEC 60115-1 4.25	70±2°C at RCWV(or Umax., whichever less) for 1,000 Hr.(1.5 Hr.on,0.5 Hr. off)	±3.0%+0.05Ω
Temperature Cycling	IEC 60115-1 4.19	➔ -55°C ➔ Room Temp. ➔ +155°C Room Temp.(5 cycles)	±0.75%+0.05Ω
Resistance to Soldering Heat	IEC 60115-1 4.18	260±3°C for 10±1 Sec., immersed to a point 3±0.5mm from the body	±1.0%+0.05Ω

Note:

**RCWV (Rated Continuous Working Voltage):**

The DC or AC (rms) continuous working voltage corresponding to the rated power is determined by the following formula:

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

or max. working voltage whichever is less

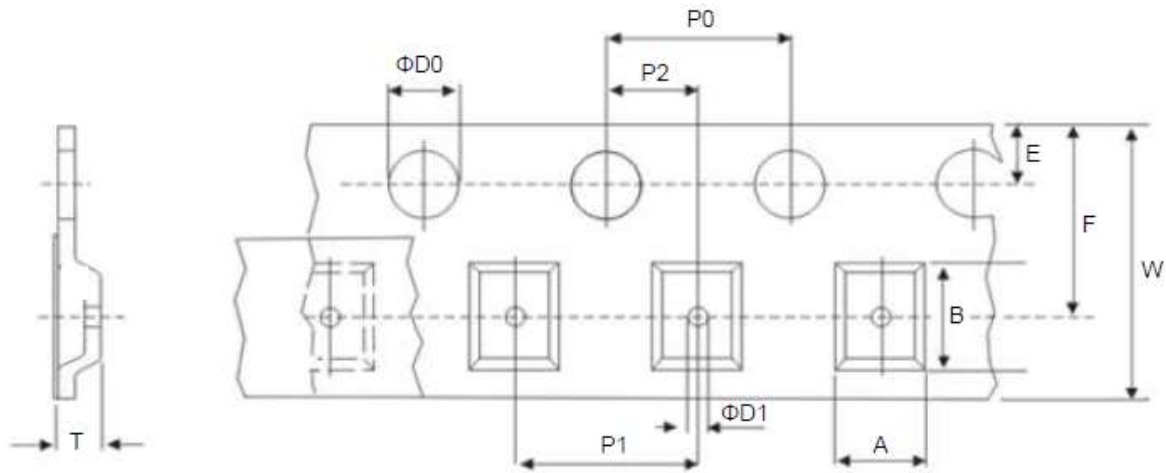
Where

V=Continuous rated DC or AC (rms) working voltage (V)

P=Rated power (W)

R=Resistance value ( $\Omega$ )

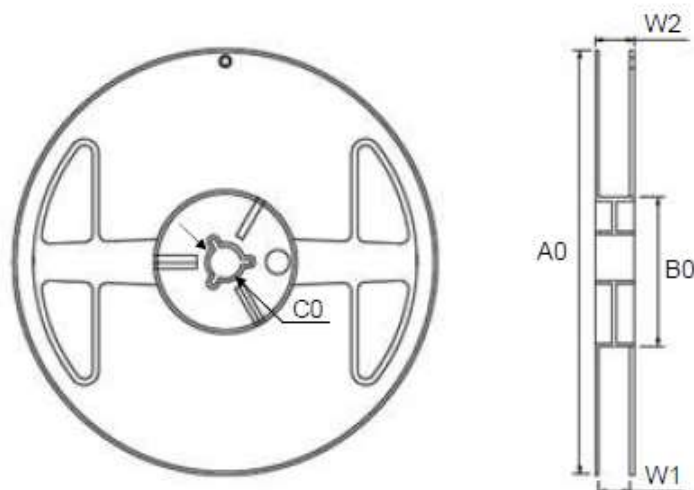
**PACKING METHODS**



DIMENSIONS

Unit: mm

TYPE	A	B	W	E	F	P0	P1	P2	ΦD0	ΦD1	T
MCF-12 MCF25S MCF204	1.6±0.1	3.7±0.1	8.0±0.2	1.75±0.1	5.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.5±0.1	0.9 Min.	1.45±0.1
MCF-25 MCF50S MCF207	2.4±0.1	6.3±0.1	12.0±0.2	1.75±0.1	7.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.5±0.1	1.4 Min.	2.50±0.1
MCF-50 MCF1WS	3.3±0.1	9.0±0.1	16.0±0.3	1.75±0.1	9.5±0.1	4.0±0.1	8.0±0.1	2.0±0.05	1.5±0.1	1.4 Min.	3.30±0.1

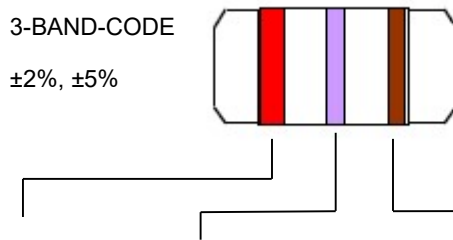


DIMENSIONS

Unit: mm/piece

TYPE	A0	B0	C0	W1	W2	Packaging	Quantity
MCF-12 MCF25S MCF204	178.5±1.5	60.0±1.0	13.0±0.2	9.0±0.5	12.5±0.5	7"	3,000
MCF-25 MCF50S MCF207	178.5±1.5	60.0±1.0	13.0±0.5	13.0±0.5	15.5±0.5	7"	2,000
MCF-50 MCF1WS	330.0±1.5	100.0±1.0	13.0±0.5	17.0±0.5	19.0±0.5	13"	2,500

**MARKING**



COLOR	1st BAND	2nd BAND	MULTIPLIER
BLACK	0	0	1Ω
BROWN	1	1	10Ω
RED	2	2	100Ω
ORANGE	3	3	1KΩ
YELLOW	4	4	10KΩ
GREEN	5	5	100K
BLUE	6	6	1MΩ
VIOLET	7	7	10MΩ
GREY	8	8	0.001Ω
WHITE	9	9	0.0001Ω
GOLD			0.1Ω
SILVER			0.01Ω

## **REVISION HISTORY**

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 2	Sep. 05, 2024	-	-Updated packing methods
Version 1	Aug. 31, 2023	-	- Revised LEGAL DISCLAIMER
Version 0	Aug. 2, 2021	-	- First issue of this specification

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