

PRECISION METAL FILM RESISTORS

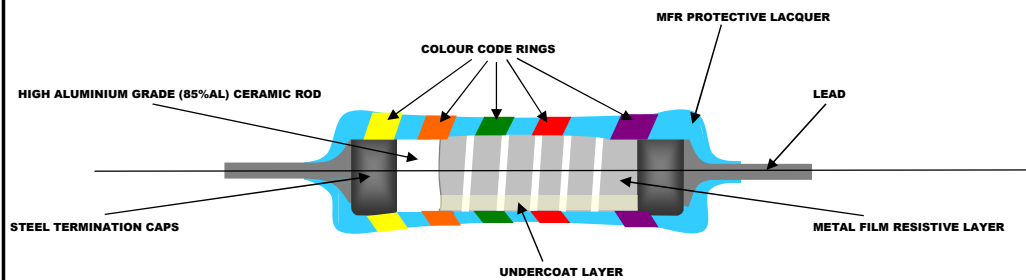
Series : MFP & MFSP

Features:

- Meet performance requirements of JSS Std. & MIL Std.
- Flameproof Coating available on request.
- Miniature Size available for Space savings.
- Close Tolerance available **±0.01% ~ ±0.5%**.
- TCR Available **5, 10, 15, 25, 50ppm/° C**.
- Available ranges from **10 Ohm ~ 1 M Ohms**.
- **RoHS** Compliant directive 2002/95/EC
- Lead (Pb)-free solder contacts.
- Low cost & miniature size



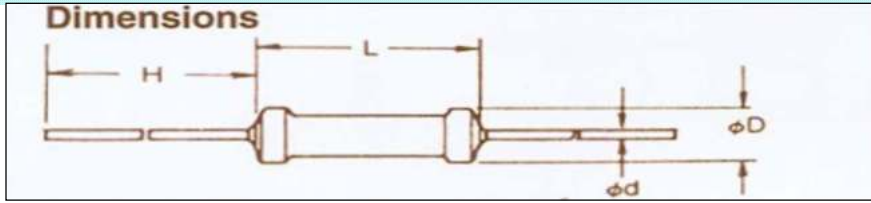
Construction :



Technical specification:

DESCRIPTION	GENERAL SERIES				MINIATURE SERIES			
	MF25P	MF50P	MF100P	MF200P	MFS60P	MFS100P	MFS200P	MFS300P
Resistance range	10Ω ~ 1MΩ							
Resistance tolerance	±0.01% ~ ±0.5%							
Temperature coefficient	5 ppm/°C ~ 50 ppm/°C							
Maximum dissipation @ 70°C	0.25W	0.5W	1W	2W	0.6W	1W	2W	3W
Maximum dissipation @ 125°C	0.125W	0.25W	0.5W	1W	0.25W	0.5W	1W	1.5W
Maximum permissible voltage	250V	350V	500V	500V	300	350	500	500
Operating Temperature	-55° ~ 155°C							
Filure Rate	0.1% / 1000 hrs							
COMPLYING STD	JSS 50401							
Climatic category	55/155/56							
Stability, R max.								
Load	△ R±(0.5% +0.01Ω)							
Climatic test	△ R±(0.5% +0.01Ω)							
Soldering	△ R±(0.1% +0.01Ω)							
Short time overload	△ R±(0.2% +0.01Ω)							

Dimensions :



Physical Data:

1.0 GENERAL SERIES SPECIFICATION :

TYPE	WATT. @ 70°C	TOL.	TCR PPM/°C	DIMENSIONS (mm)				RESISTANCE RANGE	MAX. WORKING VOLTAGE	MAX. OVERLOAD VOLTAGE
				L	D	d ± 0.05	H			
MF25P	0.25W	±0.01% ~ 0.5%	5 ~ 50	6.5± 0.5	2.3 ±0.2	0.6	25 min	10 Ω ~ 1MΩ	250V	500 V
MF50P	0,5W	±0.01% ~ 0.5%	5 ~ 50	9.5± 1	3.5 ±0.5	0.6	25 min	10 Ω ~ 1MΩ	350V	700 V
MF100P	1W	±0.01% ~ 0.5%	10 ~ 50	12± 1	4.5 ±0.5	0.8	24 min	10 Ω ~ 1MΩ	500V	1000 V
MF200P	2W	±0.01% ~ 0.5%	10 ~ 50	16± 1	5.5 ±0.5	0.8	25 min	10 Ω ~ 1MΩ	500V	1000 V

Note :1.0 Lower & higher resistance value other than specified above are available on request.

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

2.0 MINITURE SERIES SPECIFICATION:

TYPE	WATT. @ 70°C	TOL.	TCR PPM/°C	DIMENSIONS (mm)				RESISTANCE RANGE	MAX. WORKING VOLTAGE	MAX. OVERLOAD VOLTAGE
				L	D	d ± 0.05	H			
MFS60P	0.6W	±0.01% ~ 0.5%	10 ~ 50	6.5± 0.5	2.3 ±0.2	0.6	25 min	10 Ω ~ 1MΩ	300V	600 V
MFS100P	1W	±0.01% ~ 0.5%	10 ~ 50	9.5± 1	3.5 ±0.5	0.6	25 min	10 Ω ~ 1MΩ	350V	700 V
MFS200P	2W	±0.01% ~ 0.5%	10 ~ 50	12± 1	4.5 ±0.5	0.8	24 min	10 Ω ~ 1MΩ	500V	1000 V
MFS300P	3W	±0.01% ~ 0.5%	10 ~ 50	16± 1	5.5 ±0.5	0.8	25 min	10 Ω ~ 1MΩ	500V	1000 V

Note :1.0 Lower & higher resistance value other than specified above are available on request.

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

Marking:

The MFP & MFSP series / type, the nominal resistance & tolerance are marked on the resistor body using four or five coloured bands in accordance with IEC publication 60062 "color codes for fixed resistors"

Material Specifications:

Element : Vacuum-deposited nickel-chrome alloy

Core : Fire cleaned high purity ceramic

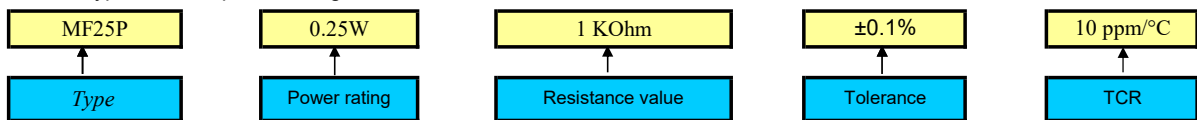
End caps : Steel caps

Coating : Specially formulated epoxy compound

Standard Terminals : Solderable - tinplated copper

Part Numbering Information:

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

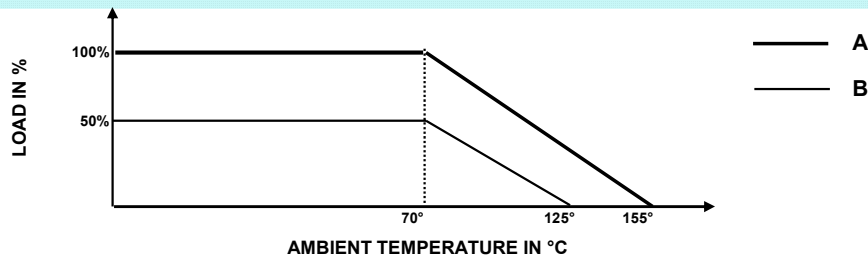


Examples: PART NO. : MF25P, 0.25W, 1 KOhm, ±0.1%, 10ppm/°C

Packing Information:

TYPE	Pcs Per Poly Bag/ Blue box	Pcs Per Brown Box		Pcs Per Real
MF25P / MFS60P	1,000	1,000	5,000	5000
MF50P / MFS100P	500	500	2,500	2500
MF100P / MFS200P	---	---	1,500	2500
MF200P / MFS300P	---	---	1,000	2500

Derating Curve :



Performance Data (Procedure & Requirements):

TEST	PROCEDURE	REQUIREMENTS	A		B	
			MAX.	TYPICAL	MAX.	TYPICAL
Robustness Of Termination						
1. Tensile Test	Load 10 N for 10 sec.	No visual damage				
2. Bend Test	Load 5 N 90°, 180°, 90°	No visual damage				
3. Torsion Test	3 X 360° in opposite directions	No visual damage Δ R/R max.: $\pm(0.20\% + 0.01 \Omega)$	0.06%	0.02%	0.03%	0.01%
Solderability Test	16 hrs steam or 16 hrs. at 155°C. 2 sec. ± 0.5 sec. in solder at 235° $\pm 5^\circ$ C Using flux	>95% coverage covered (good tinning) & no damage	>95% coverage	>95% coverage	>95% coverage	>95% coverage
Resistance To Soldering Heat	at 260°C $\pm 5^\circ$ C for 10 sec., 6mm from the body	Δ R/R max.: $\pm(0.10\% + 0.01 \Omega)$	0.06%	0.03%	0.03%	0.01%
Temperature Cycling	30 minutes at -55°C & 30 minutes at 150°C Total 5 number of cycles.	No visual damage Δ R/R max.: $\pm(0.20\% + 0.01 \Omega)$	0.15%	0.05%	0.05%	0.03%
High Temperature Exposure	16 hrs at 150°C	Δ R/R max.: $\pm(0.20\% + 0.01 \Omega)$	0.30%	0.10%	0.05%	0.03%
Low Temperature Storage	2 hrs at -65°C	Δ R/R max.: $\pm(0.20\% + 0.01 \Omega)$	0.15%	0.05%	0.05%	0.03%
Short Time Overload	2.5 X Rated voltage for 5 sec. @ 25°C	Δ R/R max.: $\pm(0.20\% + 0.01 \Omega)$	0.10%	0.02%	0.05%	0.02%
Endurance @ 70°C	2000 hrs. load with Pn (power nominal) 1.5 hr. ON & 0.5 hr. OFF	No visual damage Δ R/R max.: $\pm(0.5\% + 0.01 \Omega)$	0.30%	0.10%	0.10%	0.05%
Endurance @ Upper Category Temperature	1000 hrs. at 150°C with no load	No visual damage Δ R/R max.: $\pm(0.5\% + 0.01 \Omega)$	0.20%	0.05%	0.05%	0.02%
Shock (Medium Impact)	1Km/S ²	Δ R/R max.: $\pm(0.20\% + 0.01 \Omega)$	0.06%	0.02%	0.05%	0.01%
Vibration (High Frequency)	10 to 2000 Hz: m/S ²	Δ R/R max.: $\pm(0.20\% + 0.01 \Omega)$	0.06%	0.02%	0.05%	0.01%
Temperature Rise Test	Horizontally mounted, loaded with Pn	Hot spot temperature less than maximum body temperature				
Damp Heat Steady State	56 days, 40°C; 90 to 95% Rh; dissipation ≤ 0.01 Pn	No visual damage Δ R/R max.: $\pm(0.5\% + 0.05 \Omega)$	0.30%	0.10%	0.05%	0.03%
Temperature Coefficient	At 25/-55/25 °C & 25/150/25 °C	Within specified limits	--	--	--	--
Insulation Resistance	V- Block method for 1 minute duration At 500 V dc	> 10 ⁴ M Ω	--	--	--	--
Voltage proof test	V- Block method for 1 minute duration. At twice the limiting voltage or max. working voltage	No flash over or break down should observed	--	--	--	--