

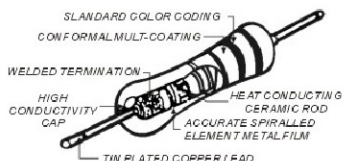
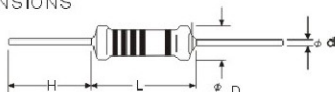
METAL FILM FIXED RESISTORS

INTRODUCTION:

MF series is a group of metal film-fixed resistors applying high Aluminum content base material vacuum sputtered by Ni-Cr alloy and excellent heat-and wet-proof special resin for protective coating. Those resistors are manufactured through integrated automatic production system and then have good stable and uniform property. Furthermore, they show excellent performance regardless open in air.

MF系列是一組鋁材經鍍鎳合金真空噴灑及特殊樹脂表被防火、防潮的金屬膜固定電阻。這些電阻由整體自動化系統製造，所以有穩定及均勻品質。而且，即使暴露在空氣中仍有極佳的品質。

DIMENSIONS



GENERAL SPECIFICATIONS

MIL STYLE	STYLE	POWER RATING(W)	DIMENSION (mm)				MAX WORKING VOLTAGE	MAX OVERLOAD
			L	D	H(MIN)	d		
RN-50	MF-12	0.125W	3.7 ± 0.4	1.8 ± 0.2	27	0.46 ± 0.02	200	400
RN-50	MF-16	0.125W	3.7 ± 0.4	1.8 ± 0.2	27	0.46 ± 0.02	200	400
RN-55	MF-25	0.25W	6.8 ± 0.5	2.5 ± 0.2	27	0.58 ± 0.02	250	500
RN-60	MF-50	0.5W	9.0 ± 1.0	3.5 ± 0.5	25	0.68 ± 0.02	350	700
RN-65	MF-100	1W	12 ± 1.0	4.5 ± 0.5	33	0.80 ± 0.03	500	1000
RN-70	MF-200	2W	16 ± 1.0	5.5 ± 0.5	33	0.80 ± 0.03	500	1000
RN-75	MF-300	3W	17 ± 1.0	6.0 ± 0.5	30	0.80 ± 0.03	600	1000

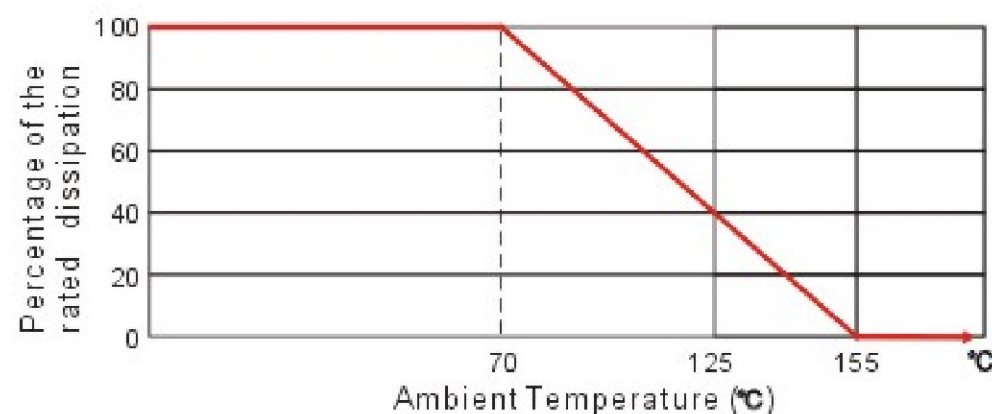
RESISTANCE RANGE

MIL STYLE	STYLE	TOLERANCE	TC ±25PPM/°C	TC ±100PPM/°C TC ±50PPM/°C
RN-50	MF-12 MF-16	±1%	10Ω~1MΩ	1Ω~10MΩ
		±0.5%	100Ω~1MΩ	51.1Ω~470KΩ
RN-55	MF-25	±1%	10Ω~10MΩ	0.1Ω~10MΩ
		±0.5%	0.1Ω~10MΩ	0.1Ω~10MΩ
RN-60	MF-50	±1%	10Ω~470KΩ	0.1Ω~10MΩ
		±0.5%	10Ω~470KΩ	0.1Ω~10MΩ
RN-65	MF-100	±1%	10Ω~470KΩ	0.1Ω~10MΩ
		±0.5%	10Ω~470KΩ	0.1Ω~10MΩ
RN-70	MF-200	±1%	10Ω~470KΩ	0.1Ω~10MΩ
		±0.5%	10Ω~470KΩ	0.1Ω~10MΩ
RN-75	MF-300	±1%	10Ω~470KΩ	0.1Ω~10MΩ
		±0.5%	10Ω~470KΩ	0.1Ω~10MΩ

METAL FILM FIXED RESISTORS

Characteristic	Specification	Test Method
		(All resistance measurements should be performed after stabilisation or conditioning periods) .
DC RESISTANCE	Within specified tolerance.	MIL-STD-202 Method 303
TEMPERATURE COEFFICIENT	As buyer requested $\pm 25\text{PPM}/^{\circ}\text{C}$, $\pm 100\text{PPM}/^{\circ}\text{C}$, $\pm 50\text{PPM}/^{\circ}\text{C}$	MIL-STD-202 Method 304
DIELECTRIC STRENGTH	No flashover or damage	MIL-STD-202 Method 301 1/8W300V1 minute 1/4W500V1 minute 1/2W700V1 minute 1.2W750V1 minute
INSULATION RESISTANCE	at least 1,000M Ω	MIL-STD-202 Method 302 1000V1 minute
CURRENT NOISE TEST	below 10K Ω below 0.05 $\mu\text{V/V}$ 10K Ω ~below 0.1 $\mu\text{V/V}$ below 1M Ω below 0.2 $\mu\text{V/V}$	MIL-STD-202 Method 308
VIBRATION	ΔR within $\pm (0.25\% + 0.05\Omega)$	MIL-STD-202 Method 201 10~HZ X.Y.Z. 3directions 2 hours each
TORMINAL STRENGTH	Lead is not break or loose	MIL-STD-202 Method 211
RESISTANCETO SOLDERING HEAT	ΔR within $\pm (0.25\% + 0.05\Omega)$	MIL-STD-202 Method 210 350 $^{\circ}\text{C}$, 3 ± 0.05 sec
SOLDERABILITY	At least 95% coverage	MIL-STD-202 Method 208 230 $^{\circ}\text{C}$, 5 sec
THERMAL SHOCK	ΔR within $\pm (0.5\% + 0.05\Omega)$	MIL-STD-202 Method 107 -55 $^{\circ}\text{C}$, +155 $^{\circ}\text{C}$ 5cycles
SHORT TIME OVERLOAD	ΔR within $\pm (0.5\% + 0.05\Omega)$	MIL-R-10509 Para,4,6,6, 2.5times rated working voltage, 5 seconds
HUMI DITY	ΔR within $\pm (1\% + 0.05\Omega)$ NO mechanical damage	MIL-STD-202 Method 103 40 $^{\circ}\text{C}$, RH95% 500
LOWTEMPERATURE OPERATION	ΔR within $\pm (0.5\% + 0.05\Omega)$	MIL-R-10509 Para 4,6,5 rated working voltage, at-65 $^{\circ}\text{C}$ 45minutes.
LOAD LIFE	ΔR within $\pm (1\% + 0.05\Omega)$	MIL-STD-202 method 108 Rated working voltage 1.5 hours on,0.5 hours off for total 1000 hours
RESISTANCETO SOVENT	Color bands legible No mechanical damage	MIL-STD-202 method 215

DERATING CURVE



GENERAL SPECIFICATION OF RESISTORS

**E24 E96
E192**

COLOR	1ST BAND	2ND BAND	3RD BAND	MULTIPLIER	TOLERANCE
BLACK	0	0	0	10^0	
BROWN	1	1	1	10^1	F (±1%)
RED	2	2	2	10^2	G (±2%)
ORANGE	3	3	3	10^3	
YELLOW	4	4	4	10^4	
GREEN	5	5	5	10^5	D (±0.5%)
BLUE	6	6	6	10^6	C (±0.25%)
VIOLET	7	7	7	10^7	B (±0.1%)
GRAY	8	8	8		
WHITE	9	9	9	10^{-9}	
GOLD				10^{-1}	J (±5%)
SILVER				10^{-2}	K (±10%)
PLAIN					M (±20%)

TEMPERATURE COEFFICIENT

UNIT/PPM/°C

SYMBOL	T	E	C	K	J	L	D
T.C.R	±10	±25	±50	±100	±150	±200	+200 -500

RESISTANCE TOLERANCE

UNIT/%

SYMBOL	A	B	C	D	F	G	J	K	M
RESISTANCE TOLERANCE	±0.05	±0.1	±0.25	±0.5	±1	±2	±5	±10	±20

HOW TO APPLY RESISTORS CORRECTLY

- ▲THE CHARACTERISTICS OF RESISTOR HAVE RELATIONS TO TEMPERATURE MOISTURE AND VOLTAGE.
- ▲THE RATING OF RESISTOR IS SPECIFIED ON THE BASIS OF TEMPERATURE.
- ▲THE POWER RATING OF RESISTOR IS ALL SPECIFIED WITH A DIRECT-CURRENT (D.C.) CONTINUOUS WORKING VOLTAGE OR SINE-WAVE ROOT-MEAN-SQUARE (R.M.S.) CONTINUOUS WORKING VOLTAGE AT COMMERCIAL-LINE FREQUENCY.
- ▲THE TESTS REGARDING CHARACTERISTICS OF RESISTOR, IS PRINCIPALLY SPECIFIED ON THE BASIS OF MOISTURE.
- ▲MAXIMUM RATED VOLTAGE AND MAXIMUM OVERLOAD VOLTAGE ARE LIMITED FOR EACH STYLE OF RESISTOR. (1) GENERALLY, RATED VOLTAGE = $\sqrt{P \cdot R}$ WHERE, E=VOLT, P=WATT, R=OHM. (2) GENERALLY, OVERLOAD VOLTAGE $E_T = \sqrt{P \cdot R} \times 2.5$, APPLICATION TIME=5 SECS.
NOTE /MAX. RATED AND MAX. OVERLOAD VOLTAGE ARE SPECIFIED IN EACH SPECIFICATION, SO IF THE VOLTAGE VALUE COMPUTED, IS OVER THAN SPECIFIED VOLTAGE VALUE, THE SPECIFIED VALUE SHOULD BE APPLIED TO RESISTOR..
- ▲IN THE COMPLICATED OR HIGH DENSITY CIRCUIT, IT IS RECOMMENDED THAT THE WATTAGE OR OHMIC VALUES OF RESISTOR SHOULD HAVE A LARGE REDUNDANCY FROM A VIEW POINT OF RELIABILITY.
- ▲IT IS NECESSARY THAT THE HANDLING OR WIRING OF RESISTOR TO THE CIRCUIT, IS CAREFULLY AND PLEASE DO NOT INFLICT ANY STRESS TO RESISTOR WITH OVER HEATING APPLICATION.
- ▲TO RISE THE RELIABILITY OF RESISTOR, IT IS BETTER TO PRERER RESISTOR WITH UNIFORM QUALITY THAN TAKING RESISTOR MET WITH SEVERE SPECIFICATION.
- ▲TO RISE THE STABILITY OF RESISTOR, IT IS VERY IMPORTANT TO TAKE RESISTOR MET WITH CIRCUIT CONDITIONS AND IS ALSO ECONOMICAL NO TO HAVE UNREASONABLE DESIG FROM APOINT OF PRICING OF RESISTOR.
- ▲GENERALLY, FAILURE OF RESISTOR TAKES A CONCENTRATED TREND IN THE IMPULSE CIRCUIT WITH COMPLICATED PULSE WAVE FORM OF LC CIRCUIT GENERATED HIGH VOLTAGE WITH TRANSIENT PHENOMENA, THEREFORE, IT IS VERY IMPORTANT FOR DESIGNERS TO CONSIDER. THESE CONDITIONS IN THE CIRCUIT DESIGN, IF THE RESISTOR IS APPLIED IN THESE CIRCUIT.

±2% ±5%	±1%	±0.5% ±0.1%
E24	E96	E192
100	100	100
	101	101
	102	102
	104	104
	105	105
	106	106
	107	107
	108	108
	109	109
110	110	110
	111	111
	113	113
	114	114
	115	115
	117	117
120	118	118
	120	120
	121	121
	123	123
	124	124
	126	126
	127	127
	129	129
130	130	130
	132	132
	133	133
	135	135
	137	137
	138	138
	140	140
	142	142
	143	143
	145	145
	147	147
	149	149
150	150	150
	152	152
	154	154
	156	156
	158	158
160	158	158
	162	162
	164	164
	165	165
	169	169
	172	172
	174	174
	176	176
	178	178
180	182	182
	184	184
	187	187
	189	189
	191	191
	193	193
	196	196
	198	198
200	200	200
	203	203
	205	205
	207	207
	210	210
	215	215
	218	218
220	221	221
	223	223
	226	226
	229	229
	232	232
	233	233
	237	237
240	240	240
	243	243
	246	246
249	249	249
	252	252
	255	255
	258	258
	261	261
	264	264
	267	267
270		271
	274	274
	277	277
	280	280
	284	284
	287	287
	291	291
	294	294
	298	298
300	301	301
	305	305
	309	309
	312	312
	316	316
	320	320
	324	324
	328	328

±2% ±5%	±1%	±0.5% ±0.1%
E24	E96	E192
330		332
	332	332
	336	336
	340	340
	344	344
	348	348
	352	352
	357	357
360	357	357
	361	361
	365	365
	370	370
	374	374
	379	379
	383	383
	388	388
390	392	392
	397	397
	402	402
	407	407
	412	412
	417	417
	422	422
	427	427
430	432	432
	437	437
	442	442
	448	448
	453	453
	459	459
	464	464
470	470	470
	475	475
	481	481
	487	487
	493	493
	499	499
	505	505
510	511	511
	517	517
	523	523
	530	530
	536	536
	543	543
	549	549
	556	556
560	562	562
	569	569
	576	576
	583	583
	590	590
	597	597
	604	604
	612	612
	619	619
620	626	626
	634	634
	642	642
	649	649
	657	657
	665	665
	673	673
680	681	681
	690	690
	698	698
	706	706
	715	715
	723	723
	732	732
	741	741
750	750	750
	759	759
	768	768
	777	777
	787	787
	796	796
	806	806
	816	816
820	825	825
	835	835
	845	845
	856	856
	866	866
	876	876
	887	887
	898	898
	909	909
910	920	920
	931	931
	942	942
	953	953
	965	965
	976	976
	988	988

EXAMPLE:

DESCRIPTION

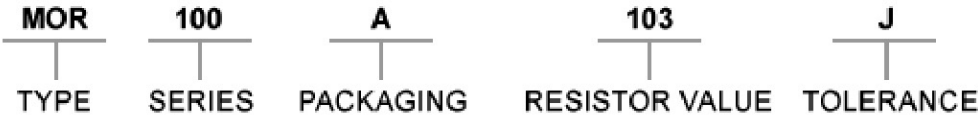
MOR

1W

10K

5%

SERIAL NUMBER



TYPE
METAL OXIDE FILM RESISTORS (MOR)
METAL FILM FIXED RESISTORS (MF)
CARBON FILM FIXED RESISTORS (CR)

SERIES	
12	1/8W
25	1/4W
50	1/2W
100	1W
200	2W
300	3W
500	5W
100S	1W (SMALL SIZE)

PACKAGING	
A	Tape Box
R	Tape Reel
B	Bulk
C	Forming
hor120Ntal Type	

TOLERANCE	
F	±1%
G	±2%
J	±5%
B	±0.1%

RESISTOR VALUE	
E24 Series 5% 3Digits	
2R2	2.2Ω
101	100Ω
103	10k
105	1M

RESISTOR VALUE	
E96 Series 1% 4Digits	
2R20	2.2Ω
1000	100Ω
1002	10K
1004	1M