

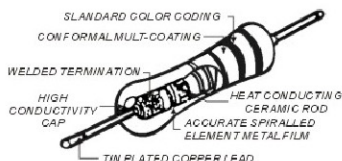
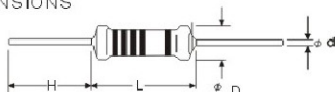
METAL FILM FIXED RESISTORS

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

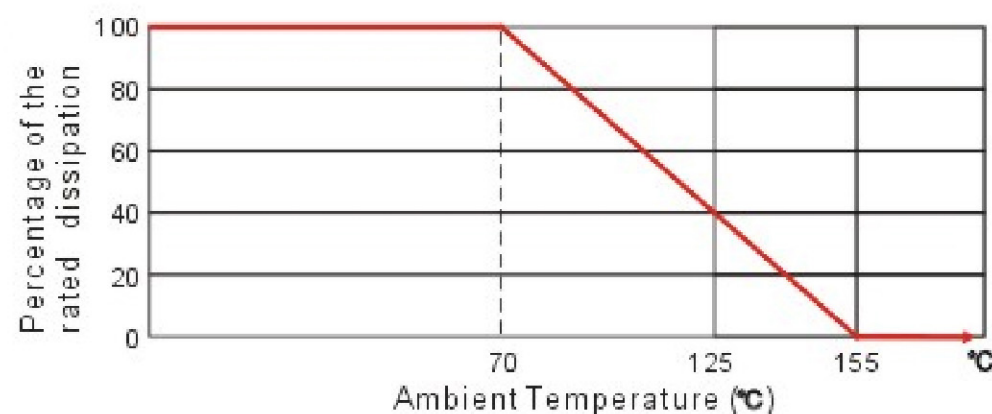
RESISTANCE RANGE

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
		±0.25%	51.1Ω~470KΩ	
		±0.1%	51.1Ω~470KΩ	
RN-55	MF-25	±1%	0.1Ω~10MΩ	0.1Ω~10MΩ
		±0.5%	0.1Ω~10MΩ	0.1Ω~10MΩ
		±0.25%	10Ω~470KΩ	
		±0.1%	10Ω~470KΩ	
RN-60	MF-50	±1%	0.1Ω~10MΩ	0.1Ω~10MΩ
		±0.5%	0.1Ω~10MΩ	0.1Ω~10MΩ
		±0.25%	10Ω~470KΩ	
		±0.1%	10Ω~470KΩ	
RN-65	MF-100	±1%	0.1Ω~10MΩ	0.1Ω~10MΩ
		±0.5%	0.1Ω~10MΩ	0.1Ω~10MΩ
		±0.25%	10Ω~470KΩ	
		±0.1%	10Ω~470KΩ	
RN-70	MF-200	±1%	0.1Ω~10MΩ	0.1Ω~10MΩ
		±0.5%	0.1Ω~10MΩ	0.1Ω~10MΩ
		±0.25%	10Ω~470KΩ	
		±0.1%	10Ω~470KΩ	
RN-75	MF-300	±1%	0.1Ω~10MΩ	0.1Ω~10MΩ
		±0.5%	0.1Ω~10MΩ	0.1Ω~10MΩ
		±0.25%	10Ω~470KΩ	
		±0.1%	10Ω~470KΩ	

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 DESIGE 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%	±2% ±5%	±1%	±0.5% ±0.1%
E24	E96	E192	E24	E96	E192
100	100	100	330		
	101	101		332	332
	102	102		336	336
	104	104		340	340
	105	105		344	344
	106	106		348	348
	107	107		352	352
	108	108		357	357
	109	109			
110	110	110	360	365	361
	111	111		366	366
	113	113		370	370
	114	114		374	374
	115	115		379	379
	117	117		383	383
	118	118		388	388
120	120	120	390	392	392
	121	121		397	397
	123	123		402	402
	124	124		407	407
	126	126		412	412
	127	127		417	417
	129	129		422	422
130	130	130		427	427
	133	133	430	432	432
	135	135		437	437
	137	137		442	442
	138	138		448	448
	140	140		453	453
	143	143		459	459
	145	145		464	464
	147	147	470	470	470
	149	149		475	475
150	150	150		481	481
	152	152		487	487
	154	154		493	493
	156	156		499	499
	158	158	510	511	511
160	160	160		517	517
	162	162		523	523
	164	164		530	530
	165	165		536	536
	169	169		543	543
	172	172		549	549
	174	174		556	556
	176	176	560	562	562
	178	178		569	569
180	180	180		576	576
	182	182		583	583
	184	184		590	590
	187	187		597	597
	189	189		604	604
	191	191		612	612
	193	193		619	619
196	196	196	620	626	626
	198	198		634	634
200	200	200		642	642
	203	203		649	649
	205	205		657	657
	207	207		665	665
	210	210	680	681	681
	215	215		690	690
220	221	221		698	698
	223	223		706	706
	226	226		715	715
	229	229		723	723
	232	232		732	732
	233	233		741	741
240	240	240	750	750	750
	243	243		759	759
249	249	249		768	768
	255	255		777	777
	261	261		787	787
	264	264		796	796
	267	267		806	806
270			820	825	825
	271	271		835	835
	274	274		845	845
	277	277		856	856
	280	280		866	866
	284	284		876	876
	287	287		887	887
	291	291		898	898
	294	294	910	909	909
	298	298			
300	301	301		931	920
	305	305		942	931
	309	309		953	942
	312	312		965	953
	316	316		976	965
	320	320			
	324	324			
	328	328			

EXAMPLE:

DESCRIPTION

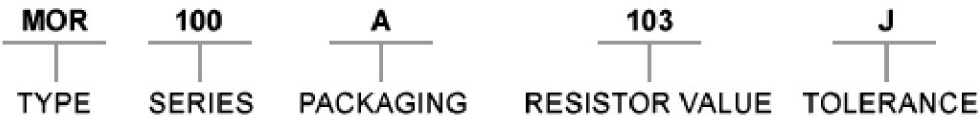
MOR

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