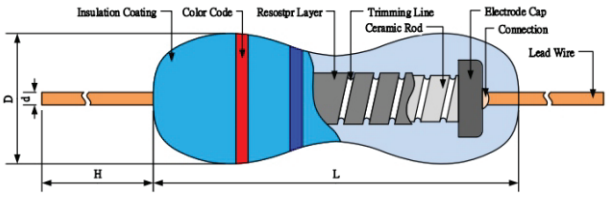
Film Resistors
MR Series: Standard Metal Film



INTRODUCTION

Metal Film Resistors are designed to provide MIL performance and reliability at a significantly lower cost. High grade materials make the much smaller space saver size available. Automated production assures uniform quality and low cost.

FEATURES

- Operating Temperature: -55°C to +155°C
- 50ppm, 100ppm, 200ppm
- Precision Tolerance of 0.1%, 0.5%, 1% & 5%
- Standard UL94-V0 rated epoxy coating.

POWER RATING & DIMENSIONS (mm)

CODE	Rated Wattage	Max. Working Voltage	Max. Overload Voltage	Dimensions				Resistance Range (Ω)	Standard Taping
				L ± 0.5	D ± 0.5	H	d ± 0.05		
MR12	0.125	150V	300V	3.3	1.8	26	0.4	0.1 ~ 10M (Tol: 1%)	T52
MR25M	0.25	200V	400V				0.45		
MR25		250V	500V	6.3	2.3		0.52		
MR50M	0.5	300V							
MR50		350V		9	3.2				
MR100M	1		600V	6.3	2.4		0.55		
MR100S		400V		9	3.2		0.65		
MR100		500V	700V	11.5	4.5				T73
MR200M	2			9	3.5	35	0.62		T52
MR200S				11.5	4.5		0.65		T73
MR200			1000V	15.5	5		0.72		
MR300M	3								

1. Resistance Range for standard resistance, below or over this resistance range on request.
2. Resistance Range is based on ±1% tolerance. Other tolerance is avilable on request.
3. Standard Resistance is in accordance with the EIA Standard E96.
4. Use Series Code MRF for flame proof coating rather than standard UL94-V0 rated coating.

PART NUMBER EXAMPLE

MR 50M A 47K5 F

- MR — Series
- 50M — Size Code
- A — Packaging
- 47K5 — Resistance
- F — Tolerance
- (blank) — Temperature Coefficient (Can omit for Temperature Coefficient of 100ppm)
- (blank) — Tape if not standard for T52, T63, & T73

TOLERANCE

±%	0.1	0.5	1	5
Code	B	D	F	J

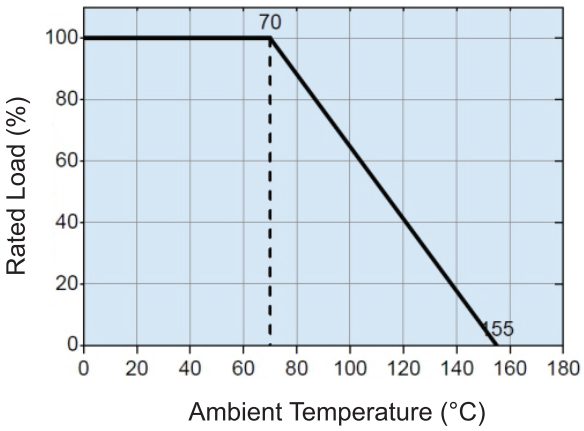
RESISTANCE

Ohms	0.5	1.5	1.5K	15K	1.5Meg	150Meg
Code	0R5	1R5	1K5	15K	1M5	150M

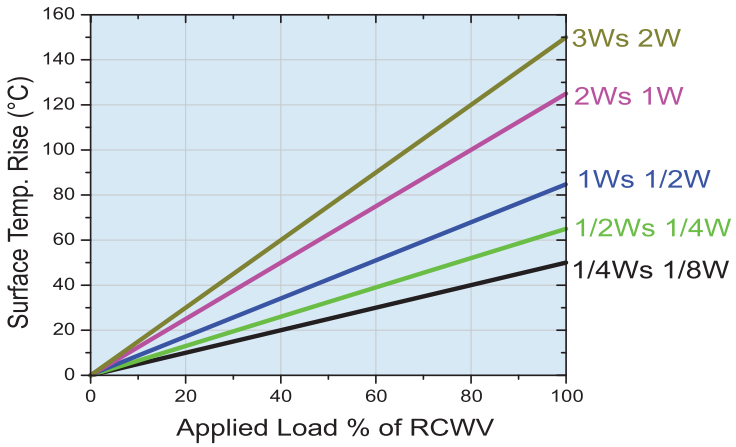
■ ELECTRICAL CHARACTERISTICS (T_a=25℃ Unless otherwise specified)

Item	Requirement	Test Method
Resistance Value	1Ω-10MΩ	**IEC-60115-1 4.5** Measure at a distance of 10mm from the cap end
Short Time Overload	±(0.25%+0.05Ω)	**IEC-60115-1 4.13** 2.5 times RCWV for 5 seconds
Insulation Resistance	＞1000MΩ	**IEC-60115-1 4.6** The measure was executed by V-Block methods
Endurance	±(1.5%+0.05Ω)	**IEC-60115-1 4.25** 70±2°C, at RCWV (or Vmax., whichever less) for 1000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF”
Damp Heat, Steady State	±(1.5%+0.05Ω)	**IEC-60115-1 4.24** 40±2°C, 90~95% R.H., for 56 days , loaded with 0.1 times RCWV (or Vmax. whichever less)
Solderability	95% min. Coverage	**IEC-60115-1 4.17** 245±5°C for 3±0.5 seconds
Voltage Proof	By series type	**IEC-60115-1 4.7** In V-Block for 60 seconds
Temperature Coefficient	50, 100, 200ppm	**IEC-60115-1 4.8** Resistance value at room temperature and room Temperature(+100°C)
Periodic-Pulse Overload Test	±(0.75%+0.05Ω)	**IEC-60115-1 4.39** 4 times RCWV(or Vmax., whichever less) for 10000 cycles with 1sec “ON” and 25 sec “OFF”
Solvent Resistance of Marking	No obvious deterioration of coatings and markings	**IEC-60115-1 4.30** IPA for 5±0.5 min. with ultrasonic
Robustness of Terminations	Tensile: ≧ 2.5kg(24.5N)	**IEC-60115-1 4.16** Direct Load for 10 sec. In the direction off the terminal leads
Resistance to Soldering Heat	1/8 Watt: ±(0.75%+0.05Ω) 1/4 & 1/2 Watts ±(0.5%+0.05Ω) 1 & 2 Watts: ±(0.25%+0.05Ω)	**IEC-60115-1 4.18** The solder iron heated to 260°C±5°C and applied to the termination for a duration of 10±1 seconds
Temperature Cycling	±(0.75%+0.05Ω)	**IEC-60115-1 4.19** -55°C/125°C with 5 cycles. the duration at each temperature 30 min
RCWV(Rated continuous working voltage)= √(P*R) or Max. Operating voltage whichever is lower		
Storage Temperature: 25±10°C; Humidity < 80%RH		

DERATING CURVE



HOT-SPOT TEMPERATURE

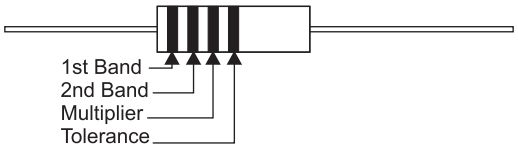


Rated continuous Working Voltage (RCWV) = $\sqrt{POWER.RATING.* RESISTANCE.VALUE}$

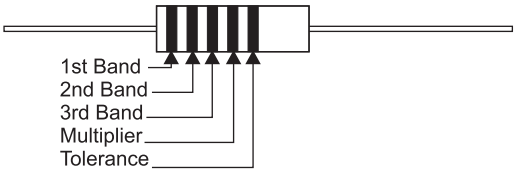
■ COLOR CODE CHART

Color	1st Band	2nd Band	3rd Band (B ~ F Tol)	Multiplier	Tolerance	Tolerance Code
Black	0	0	0	10^{0}		
Brown	1	1	1	10^{1}	±1%	F
Red	2	2	2	10^{2}	±2%	G
Orange	3	3	3	10^{3}		
Yellow	4	4	4	10^{4}		
Green	5	5	5	10^{5}	±0.5%	D
Blue	6	6	6	10^{6}	±0.25%	C
Violet	7	7	7	10^{7}	±0.10%	B
Gray	8	8	8	10^{8}	±0.05%	A
White	9	9	9	10^{9}		
Gold				10^{-1}	±5%	J
Silver				10^{-2}	±10%	K

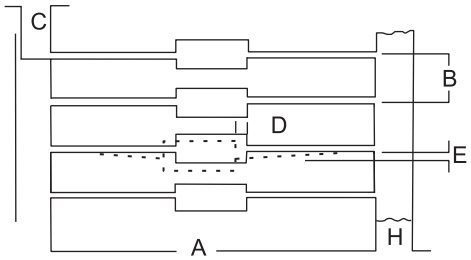
For ±5% Tolerance



For ±1% Tolerance

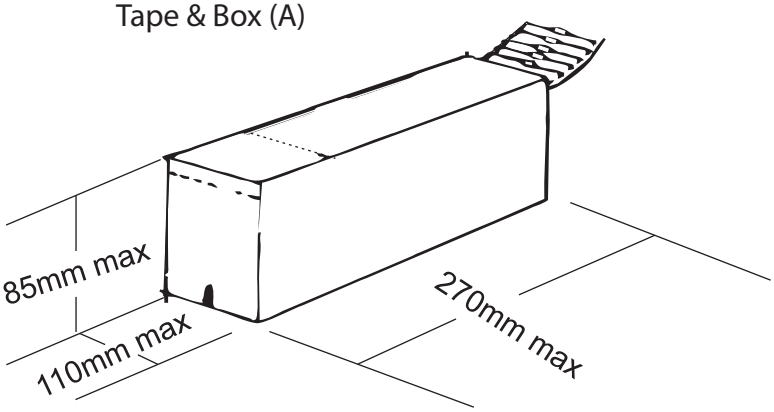


■ TAPE, REEL & AMMO SPECIFICATIONS

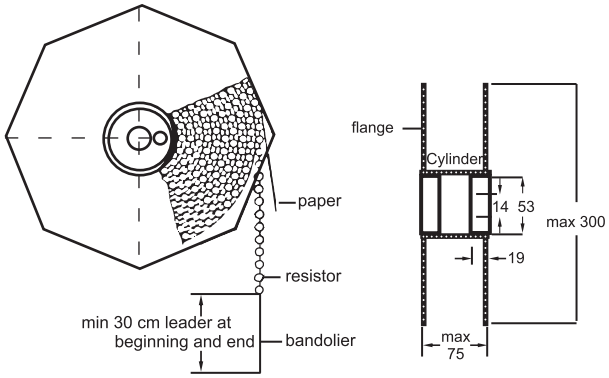


Body Diameter	Size Code	A	B	C	D	E	H
< 5mm	T-52	52 ± 1	5 ± 0.5	4.0 min.	0.8 max.	1.2 max.	6 ± 1
> 5mm	T-52	52 ± 1	10 ± 0.5	4.0 min.	0.8 max.	1.2 max.	6 ± 1
	T-73	73 ± 1					

Tape & Box (A)



Tape & Reel (R)



■ PACKAGING

Packaging Code	R	A	B	C
Description	Tape & Reel	Tape & Box	Loose (Bulk)	Cut & Form
Special Taping Suffix	T52, T73			

Tape & Box (Ammo Pack) packaging is preferred packaging.

■ RESISTANCE DECADE TABLE

Resistance Tolerance	Resistance Values																						
M (20%)	1.0				1.5				2.2				3.3				4.7				6.8		
K (10%)	1.0		1.2		1.5		1.8		2.2		2.7		3.3		3.9		4.7		5.6		6.8		8.2	
G (2%), J (5%)	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.7	3.0	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1
F (1%)	1.00	1.10	1.21	1.33	1.47	1.62	1.78	1.96	2.15	2.37	2.61	2.87	3.16	3.48	3.83	4.22	4.64	5.11	5.62	6.19	6.81	7.50	8.25	9.09
	1.02	1.13	1.24	1.37	1.50	1.65	1.82	2.00	2.21	2.43	2.67	2.94	3.24	3.57	3.92	4.32	4.75	5.23	5.76	6.34	6.98	7.68	8.45	9.31
	1.05	1.15	1.27	1.40	1.54	1.69	1.87	2.05	2.26	2.49	2.74	3.01	3.32	3.65	4.02	4.42	4.87	5.36	5.90	6.49	7.15	7.87	8.66	9.53
	1.07	1.18	1.30	1.43	1.58	1.74	1.91	2.10	2.32	2.55	2.80	3.09	3.40	3.74	4.12	4.53	4.99	5.49	6.04	6.65	7.32	8.06	8.87	9.76
D (0.5%)	1.00	1.10	1.21	1.33	1.47	1.62	1.78	1.96	2.15	2.37	2.61	2.87	3.16	3.48	3.83	4.22	4.64	5.11	5.62	6.19	6.81	7.50	8.25	9.09
C (0.25%)	1.01	1.11	1.23	1.35	1.49	1.64	1.80	1.98	2.18	2.40	2.64	2.91	3.20	3.52	3.88	4.27	4.70	5.17	5.69	6.26	6.90	7.59	8.35	9.20
B (0.1%)	1.02	1.13	1.24	1.37	1.50	1.65	1.82	2.00	2.21	2.43	2.67	2.94	3.24	3.57	3.92	4.32	4.75	5.23	5.76	6.34	6.98	7.68	8.45	9.31
A (0.05%)	1.04	1.14	1.26	1.38	1.52	1.67	1.84	2.03	2.23	2.46	2.71	2.98	3.28	3.61	3.97	4.37	4.81	5.30	5.83	6.42	7.06	7.77	8.56	9.42
	1.05	1.15	1.27	1.40	1.54	1.69	1.87	2.05	2.26	2.49	2.74	3.01	3.32	3.65	4.02	4.42	4.87	5.36	5.90	6.49	7.15	7.87	8.66	9.53
	1.06	1.17	1.29	1.42	1.56	1.72	1.89	2.08	2.29	2.52	2.77	3.05	3.36	3.70	4.07	4.48	4.93	5.42	5.97	6.57	7.23	7.96	8.76	9.65
	1.07	1.18	1.30	1.43	1.58	1.74	1.91	2.10	2.32	2.55	2.80	3.09	3.40	3.74	4.12	4.53	4.99	5.49	6.04	6.65	7.32	8.06	8.87	9.76
	1.09	1.20	1.32	1.45	1.60	1.76	1.93	2.13	2.34	2.58	2.84	3.12	3.44	3.79	4.17	4.59	5.05	5.56	6.12	6.73	7.41	8.16	8.98	9.88