

# Metal Glaze Film Resistors



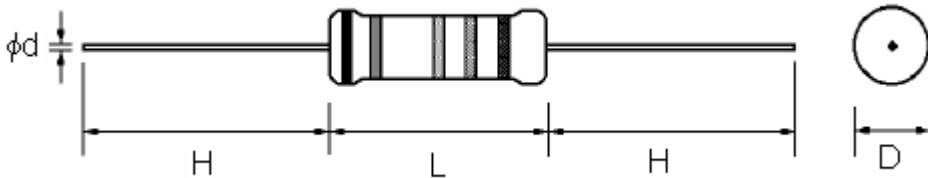
## Features:

- Small in dimension and broad range in high resistance.
- Metal glaze resistor elements provide high stable performance against environmental conditions and overload.
- Excellent in absorption of electric shock (pulse, surge voltage).
- Approved to IEC 60065 safety requirements (VDE).

## Performance Specifications:

Temperature coefficient	: $\leq \pm 200 \text{ PPM}/^\circ\text{C}$ .
Short-time overload	: $\Delta R/R \leq \pm(1.0\% + 0.05\Omega)$ , with no evidence of mechanical damage.
Dielectric withstanding voltage	: No evidence of flashover, mechanical damage, arcing or insulation breakdown.
Pulse overload	: $\Delta R/R \leq \pm(2.0\% + 0.05\Omega)$ , with no evidence of mechanical damage.
Terminal strength	: No evidence of mechanical damage.
Resistance to soldering heat	: $\Delta R/R \leq \pm(1.0\% + 0.05\Omega)$ , with no evidence of mechanical damage.
Minimum solderability	: 95% coverage.
Resistance to solvent	: No deterioration of protective coating and markings.
Temperature cycling	: $\Delta R/R \leq \pm(1.0\% + 0.05\Omega)$ , with no evidence of mechanical damage.
Load life in humidity	: $\Delta R/R \leq \pm(5.0\% + 0.05\Omega)$ , with no evidence of mechanical damage.
Load life	: $\Delta R/R \leq \pm(5.0\% + 0.05\Omega)$ , with no evidence of mechanical damage.
Surge withstanding voltage	: $\Delta R/R \leq \pm(20.0\% + 0.05\Omega)$ , with no evidence of mechanical damage.

## Dimension:



Dimensions : Millimetres

- 5 colour code band for  $\pm 5\%$  tolerance and last band black colour for identification.
- MGRF1W and MGRF2W using non-flame point.

## Specification Table

Type	Style	Power Rating at 70°C (W)	Dimension			
			D Maximum	L Maximum	d $\pm 0.05$	H $\pm 3$
MGRF1W	MGR-100	1	5.2	13.0	0.75	25
MGRF2W	MGR-200	2	6.0	17.0		28

Dimensions : Millimetres



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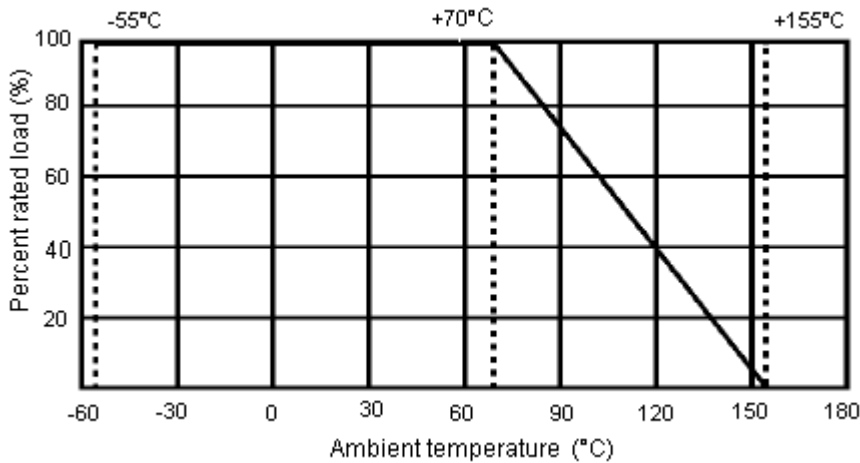
## Power Rating

Style	Maximum Working Voltage (V)	Maximum Overload Voltage (V)	Dielectric Withstanding Voltage (V)	Surge Withstanding Voltage (V)	Resistance Range
MGR-100	3500	4000	1000	100KΩ ~ 33MΩ : 10000	±5%: 1KΩ ~ 33MΩ
MGR-200					

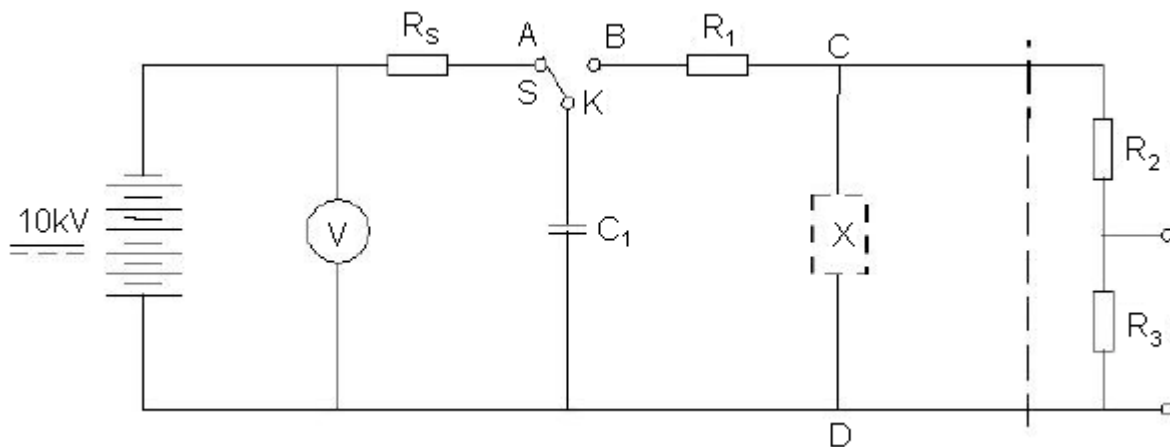
Surge withstanding voltage: IEC 60065.

1. Discharge test : 3kV ~ <10kV, 0.01μF capacitor discharge pulse, 10 times (1pulse : 2.5 second "ON", 2.5 second "OFF").
2. Discharge test : ≥10kV, 0.001μF (1nF) capacitor discharge pulse, 50 times (1pulse : 2.5 second "ON", 2.5 second "OFF").

## Derating Curve



## Surge Test - Test Circuit



Note :  $C_1 = 0.01\mu\text{F} < 10000\text{V}$   $C_1 = 1\text{nF} (0.001\mu\text{F}) \geq 10000\text{V}$   $R_1 = 1\text{k}\Omega$   $R_2 = 100\text{M}\Omega$   $R_3 = 0.1\text{M}\Omega$   $R_s = 15\text{M}\Omega$ .



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## Resistance Preferred Value Range

E6	E12	E24	E96	E6	E12	E24	E96	E6	E12	E24	E96
10	10	10	10.0				21.5				46.4
			10.2	22	22	22	22.1	47	47	47	47.5
			10.5				22.6				48.7
			10.7				23.2				49.9
		11	11.0				23.7			51	51.1
			11.3			24	24.3				52.3
			11.5				24.9				53.6
			11.8				25.5				54.9
	12	12	12.1				26.1		56	56	56.2
			12.4				27.7				57.6
			12.7		27	27	27.4				59.0
		13	13.0				28.0				60.4
			13.3				28.7			62	61.9
			13.7				29.4				63.4
			14.0			30	30.1				64.9
			14.3				30.9				66.5
			14.7				31.6	68	68	68	68.1
15	15	15	15.0				32.4				69.8
			15.4	33	33	33	33.2				71.5
			15.8				34.0				73.2
		16	16.2				34.8			75	75.0
			16.5				35.7				76.8
			16.9			36	36.5				78.7
			17.4				37.4				80.6
			17.8				38.3		82	82	82.5
	18	18	18.2		39	39	39.2				84.5
			18.7				40.2				86.6
			19.1				41.2				88.7
			19.6				42.2			91	90.9
		20	20.0			43	43.2				93.1
			20.5				44.2				95.3
			21.0				45.3				97.6

Above values in accordance with IEC Publication 63 (1963) and BS2488



# Metal Glaze Film Resistors



## Part Number

Resistance Value	Part Number
1M2	MGRF1WJ0125A10
1M5	MGRF1WJ0155A10
1M8	MGRF1WJ0185A10
2M2	MGRF1WJ0225A10
2M7	MGRF1WJ0275A10
3M3	MGRF1WJ0335A10
3M9	MGRF1WJ0395A10
4M7	MGRF1WJ0475A10
5M6	MGRF1WJ0565A10
6M8	MGRF1WJ0685A10
8M2	MGRF1WJ0825A10
10M	MGRF1WJ0106A10
15M	MGRF1WJ0156A10
22M	MGRF1WJ0226A10
33M	MGRF1WJ0336A10
1M2	MGRF2WJ0125AA9
1M5	MGRF2WJ0155AA9
1M8	MGRF2WJ0185AA9
2M2	MGRF2WJ0225AA9
2M7	MGRF2WJ0275AA9
3M3	MGRF2WJ0335AA9
3M9	MGRF2WJ0395AA9
4M7	MGRF2WJ0475AA9
5M6	MGRF2WJ0565AA9
6M8	MGRF2WJ0685AA9
8M2	MGRF2WJ0825AA9
10M	MGRF2WJ0106AA9
15M	MGRF2WJ0156AA9
22M	MGRF2WJ0226AA9
33M	MGRF2WJ0336AA9



# Metal Glaze Film Resistors



## Multiplier Code (for 5% Marking)

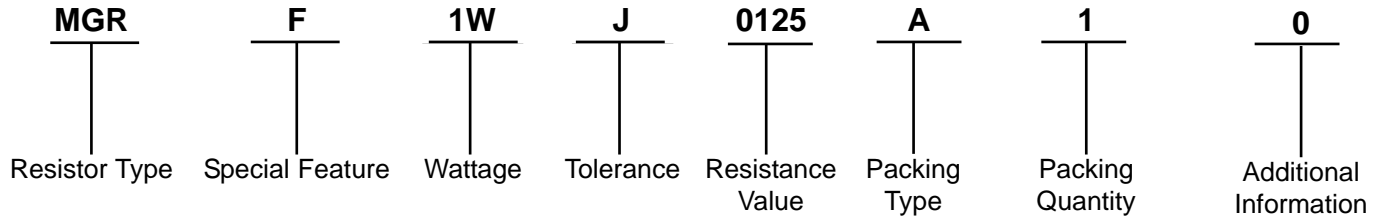
Code	A	B	C	D	E	F	G	H	X	Y	Z
Multiplier	$10^0$	$10^1$	$10^2$	$10^3$	$10^4$	$10^5$	$10^6$	$10^7$	$10^{-1}$	$10^{-2}$	$10^{-3}$

## Standard E-96 Series Resistance Value Code (for 5% Marking)

Value	Code	Value	Code	Value	Code	Value	Code	Value	Code
100	01	162	21	261	41	422	61	681	81
102	02	165	22	267	42	432	62	698	82
105	03	169	23	274	43	442	63	715	83
107	04	174	24	280	44	453	64	732	84
110	05	178	25	287	45	464	65	750	85
113	06	182	26	294	46	475	66	768	86
115	07	187	27	301	47	487	67	787	87
118	08	191	28	309	48	499	68	806	88
121	09	196	29	316	49	511	69	825	89
124	10	200	30	324	50	523	70	845	90
127	11	205	31	332	51	536	71	866	91
130	12	210	32	340	52	549	72	887	92
133	13	215	33	348	53	562	73	909	93
137	14	221	34	357	54	576	74	931	94
140	15	226	35	365	55	590	75	953	95
143	16	232	36	374	56	604	76	976	96
147	17	237	37	383	57	619	77	-	-
150	18	243	38	392	58	634	78	-	-
154	19	249	39	402	59	649	79	-	-
158	20	255	40	412	60	665	80	-	-



## Part Number Explanation



- Resistor Type** : MGR = Metal glaze film fixed resistors.
- Special Feature** : F = UL non-flame for 1W and 2W.
- Wattage** : 1W = 1W (UL non-flame paint) and 2W = 2W (UL non-flame paint).
- Tolerance** : J =  $\pm 5\%$ .
- Resistance Value** : E-24 series: the 1<sup>st</sup> digit is "0", the 2<sup>nd</sup> and 3<sup>rd</sup> digits are for the significant figures of the resistance and the 4<sup>th</sup> indicate the number of zeros. "J" ~ 0.1, "K" ~ 0.01. Ex. 4.7 ~ 47J and 4.7K $\Omega$  ~ 472.  
E-96 series: The 1<sup>st</sup> to 3<sup>rd</sup> digits are significant figures of resistance and the 4<sup>th</sup> one denotes number of zeros. Ex. 1.33 K $\Omega$  = 1331.
- Packing Type** : A = Tape/Box.
- Packing Quantity** : 1 = 1000 pieces and 0 = for Bulk/Box packing.
- Additional Information** : 0 = PT-52mm and 9 = PT-64mm.

# Metal Glaze Film Resistors



## Notes:

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