



SYNTON-TECH CORPORATION
CARBON FILM FIXED RESISTORS
FCF(FLAME-PROOF COATING TYPE)

File No.:	FCF-02
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1. INTRODUCTION

The FCF series flame-proof Carbon Film Resistors are manufactured by Coating a homogeneous film of pure carbon on high grade ceramic rods, resistance less than 10Ω have an electro less deposited nickel film, and are coated with layers of gray color flame-proof lacquer. These resistors meet overload tests in accordance with UL specification #1412 without producing a fire hazard.

2. FEATURES

- Low cost, prompt delivery
- High power-to-size ratio for significant space savings
- Complete flameproof construction-UL 1412
- Excellent long-term stability
- Wide resistance range : $1\Omega \sim 10M\Omega$
- Coating and marking resist Trichloroethylene, Freon, and other cleaning agents

APPROVED	CHECKED	DESIGNED	REMARK	DOCUMENT NO.
Carol	May	Chen		0201010015



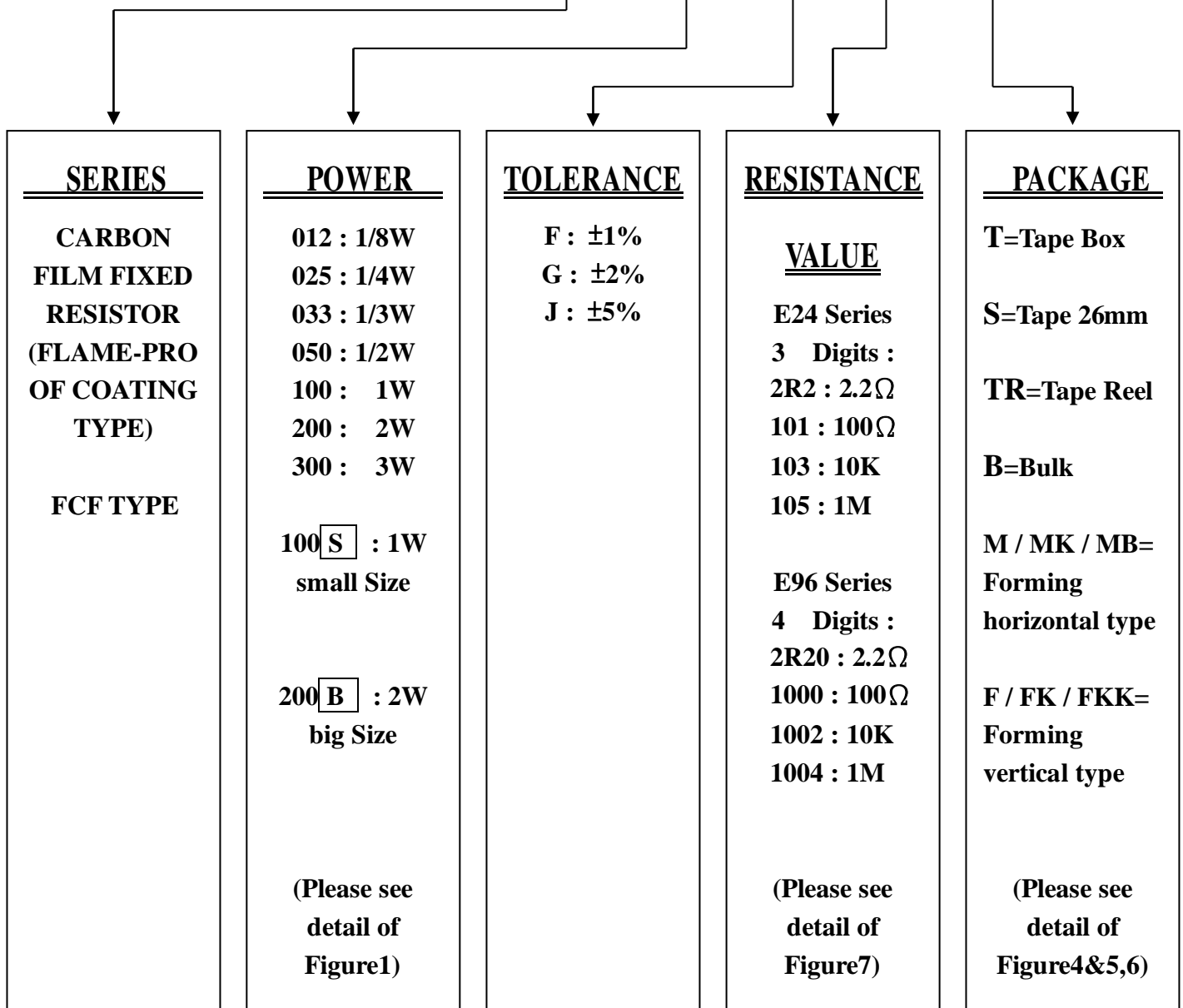
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3. EXPLANATIONS OF ORDERING CODE

DESCRIPTION : FCF 1W 5% 100Ω

SYNTON CODE : FCF 100 J 101 T





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4. ELECTRICAL CHARACTERISTICS

TYPE	FCF-12	FCF-25S	FCF-25	FCF-33S	FCF-50S	FCF-50	FCF-100S	FCF-100	FCF-200S	FCF-200	FCF-200B	FCF-300S	FCF-300
Power Rating at 70°C	1/16W 1/8W 1/6W	1/4W	1/4W	1/3W	1/2W	1/2W	1W	1W	2W	2W	2W	3W	3W
Operating Temp. Range	-55°C ~ +155°C												
Maximum Working Volt.	200V	250V	250V	350V	350V	350V	500V	500V	500V	500V	500V	500V	500V
Maximum Overload Volt.	400V	500V	500V	700V	700V	700V	1000V	1000V	1000V	1000V	1000V	1000V	1000V
Dielectric withstanding Volt.	400V	500V	500V	700V	700V	700V	1000V	1000V	1000V	1000V	1000V	1000V	1000V
Value Range	STANDARD 10Ω~1MΩ												
Temp. Coefficient	10Ω below						±200PPM/°C						
	56KΩ below						±300PPM/°C						
	56KΩ~470KΩ						-500PPM/°C						
	470KΩ~1MΩ						-800PPM/°C						
	1MΩ up						-1000PPM/°C						

Figure 1

5. POWER RATING

(1)Power Derating : The rated power at the temperature in excess of 70°C shall be derated in accordance with figure2

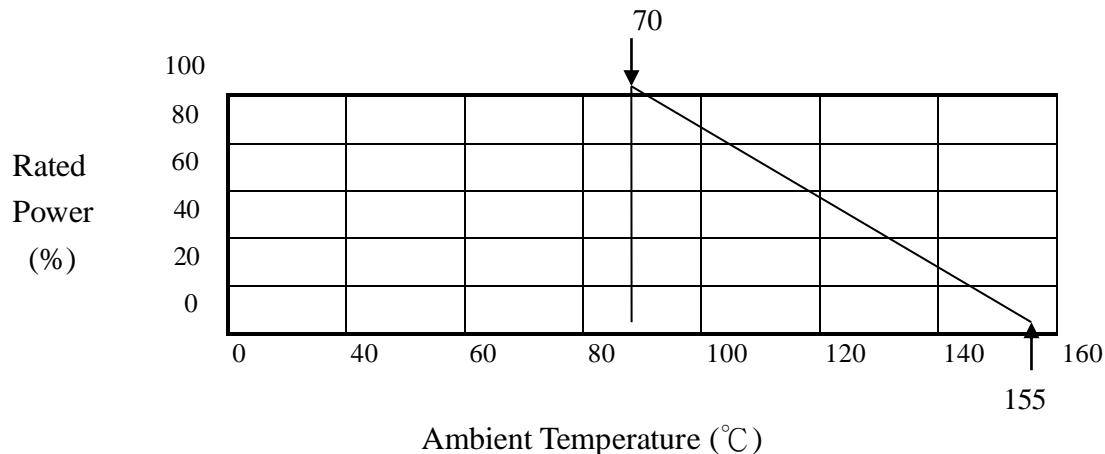


Figure2



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(2)Rated Voltage : The DC or AC(rms) continuous working voltage corresponding to the rated power is determined by the following formula:

$$E = \sqrt{R \times P}$$

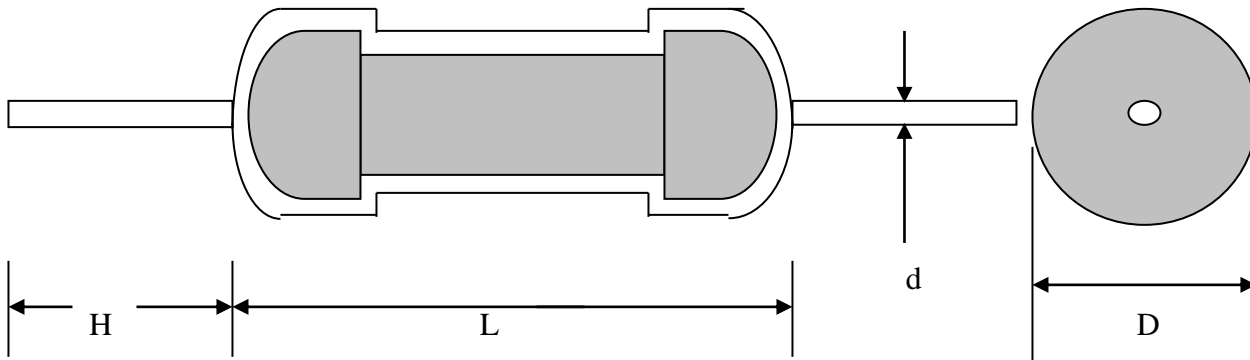
Where E : Continuous rated DC or AC (rms) working voltage (v)
P : Rated power (w)
R : Resistance value (Ω)



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6. DIMENSIONS



Unit: m/m

TYPE	POWER	L	D	H	d
FCF-12	1/16W 1/6W 1/8W	3.5 ± 0.3	1.8 ± 0.3	25 ± 3	0.43 ± 0.05
FCF-25S	1/4W				
FCF-25	1/4W	6.0 ± 0.5	2.3 ± 0.3	25 ± 3	0.54 ± 0.1
FCF-33S	1/3W				
FCF-50S	1/2W				
FCF-50	1/2W	9.0 ± 0.5	3.2 ± 0.5	25 ± 3	0.58 ± 0.1
FCF-100S	1W				
FCF-100	1W	11 ± 1.0	4.5 ± 0.5	35 ± 3	0.75 ± 0.1
FCF-200S	2W				
FCF-200B	2W	17 ± 1.0	6.0 ± 0.5	35 ± 3	0.75 ± 0.1
FCF-200	2W	15 ± 1.0	5.0 ± 0.5	35 ± 3	0.75 ± 0.1
FCF-300S	3W				
FCF-300	3W	17 ± 1.0	6.0 ± 0.5	35 ± 3	0.75 ± 0.1

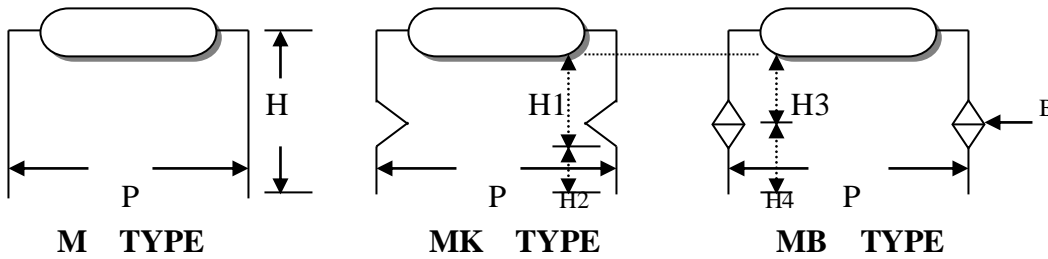
Figure3



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(1) FORMING PACKING
Forming horizontal type



Unit : m/m

TYPE	POWER	FORMING Type	P ± 1	H ±2.5	H1 ± 1	H2 ± 1	H3 ± 1	H4 ± 1
FCF-12 FCF-25S	1/16,1/6,1/8W 1/4W	M	5~	5~	—	—	—	—
FCF-25 FCF-33S FCF-50S	1/4W 1/3W 1/2W	M	10~	5~	—	—	—	—
		MK		—	8~	3~	—	—
FCF-50 FCF-100S	1/2W 1W	M	12.5~	10~	—	—	—	—
		MK.MB		—	8~	3~	8~	5~
FCF-100 FCF-200S	1W 2W	M	15~	10~	—	—	—	—
		MK.MB		—	8~	3~	8~	5~
FCF-200 FCF-300S	2W 3W	M	20~	10~	—	—	—	—
		MK MB		—	8~	3~	8~	5~
FCF-200B FCF-300	3W	M	25~	10~	—	—	—	—
		MK MB		—	6~	3~	8~	5~

Remark : 1. B = 1.15 ~

2. ALTERNATE MARKING METHOD ALSO AVAILABLE ON REQUEST.

Figure4

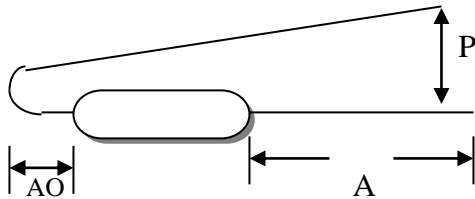


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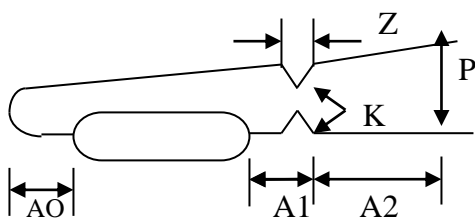
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(2) FORMING PACKING

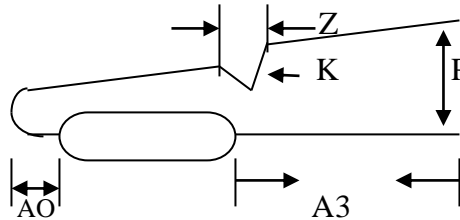
Forming vertical type



F TYPE



FKK TYPE



FK TYPE

Unit : m/m

TYPE	POWER	FORMING Type	P ± 1	A ± 1	A1 ± 1	A2 ± 1	A3 ± 1	A0 Max
FCF-12 FCF-25S	1/16,1/6,1/8W 1/4W	F		25±3				4.0
FCF-25 FCF-33S FCF-50S	1/4W 1/3W 1/2W	F FK FKK	5~10	—	—	—	25±3	4.0
FCF-50 FCF-100S	1/2W 1W	F FK FK FKK	5~10	5~	—	—	25±3	4.0
FCF-100 FCF-200S	1W 2W	F FK FKK	5~10	5~	—	—	—	4.0
FCF-200 FCF-300S	2W 3W	F FK FKK	5~10	5~	—	—	—	4.0
FCF-200B FCF-300	3W	F FK FKK	5~10	5~	—	—	—	4.0

Remark : 1. Z = 3 ± 1. K = 2 ± 0.5,

2. ALTERNATE MARKING METHOD ALSO AVAILABLE ON REQUEST.

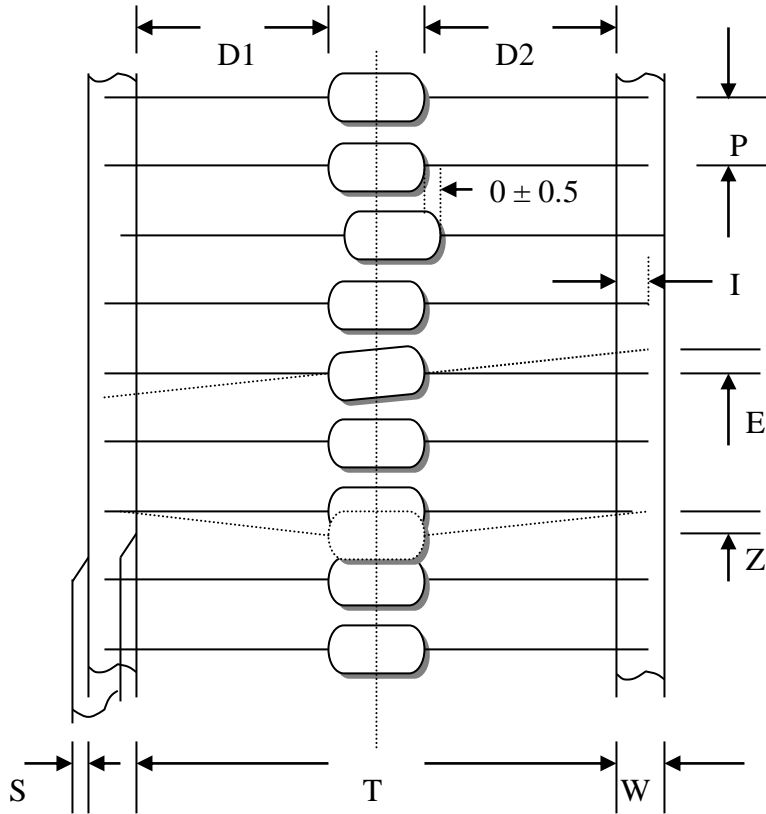
Figure5



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(3) TAPE PACKING (T-TYPE)



Unit:m/m

TYPE		SIZE	T	P ± 0.5	W ± 0.5	D1—D2 Max.	E Max.	Z Max.	S Max.	I Min.
FCF-12	1/8W	T-26	26 \pm 1.0	5	6	0.8	1	1.2	1	3
FCF-25S	1/4W	T-52	52 \pm 2.0	5	6	0.8	1	1.2	1	3
FCF-25	1/4W	T-26	26 \pm 1.0	5	6	1.0	1	1.2	1	3
FCF-33S	1/3W	T-52	52 \pm 2.0	5	6	1.0	1	1.2	1	3
FCF-50S	1/2W									
FCF-50	1/2W	T-52	52 \pm 2.0	5	6	1.2	1	1.2	1	3
FCF-100S	1W	T-52	52 \pm 2.0	5	6	1.2	1	1.2	1	3
FCF-100 FCF-200S	1W 2W	T-52	52 \pm 2.0	5	6	1.2	1	1.2	1	3
		T-63	63 \pm 2.0	5	6	1.4	1	1.2	1	3
		T-74	74 \pm 2.0	5	6	1.4	1	1.2	1	3
FCF-200 FCF-300S	2W 3W	T-52	52 \pm 2.0	10	6	1.2	1	1.2	1	3
		T-63	63 \pm 2.0	10	6	1.4	1	1.2	1	3
		T-74	74 \pm 2.0	10	6	1.4	1	1.2	1	3
FCF-200B FCF-300	2W 3W	T-63	63 \pm 2.0	10	6	1.4	1	1.2	1	3
		T-74	74 \pm 2.0	10	6	1.4	1	1.2	1	3

Figure6



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7. CHARACTERISTICS

(1) Short Time Overload

Test Method : 2.5 times RCWV for 5 seconds

Acceptance Standard : $\pm(1\%+0.05\ \Omega)$

(2) Insulation Resistance

Test Method : in V-Block

Acceptance Standard : $>1,000M\ \Omega$

(3) Solderability

Test Method : 260°C for 5 ± 0.5 seconds

Acceptance Standard : 95% min. coverage

(4) Resistance to Solvent

Test Method : Trichroethane for 1 min. with ultrasonic

Acceptance Standard : no deterioration of coatings and marking

(5) Terminal Strength

Test Method : Direct load for 10 sec. in the direction of the terminal leads

Acceptance Standard : $\geq 2.5\text{kg}$ (24.5N)

(6) Pulse Overload

Test Method : 3 times RCWV 1000 ± 100 cycles (1 sec. on , 25 sec. off)

Acceptance Standard : $\pm (1\%+0.05\ \Omega)$

(7) Load Life in Humidity

Test Method : $40\pm 2^{\circ}\text{C}$ 90~95% RH at RCWV for 1000 hours. (1.5 hrs. on , 0.5 hrs. off)

Acceptance Standard : $\pm (3\%+0.05\ \Omega)$



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(8) Load Life

Test Method : 70°C at RCWV for 1000 hours.

(1.5 hrs. on , 0.5 hrs. off)

Acceptance Standard : $\pm (3\% + 0.05 \Omega)$

(9) Temperature Cycling

Test Method : -55°C → room temp. → 155°C → room temp. for 5 cycles

Acceptance Standard : $\pm (1\% + 0.05 \Omega)$

(10) Resistance to Soldering Heat

Test Method : 350°C \pm 10°C for 3 \pm 0.5 seconds

Acceptance Standard : $\pm (1\% + 0.05 \Omega)$

(11) Soldering Recommendation

Test Method : The Standard Length of epoxy on the terminal of our product is less than 1.5mm. Also, the Standard Welding Point must be over than 1.6mm from Resistor body.

● **Rated continuous Working Voltage (RCWV)**

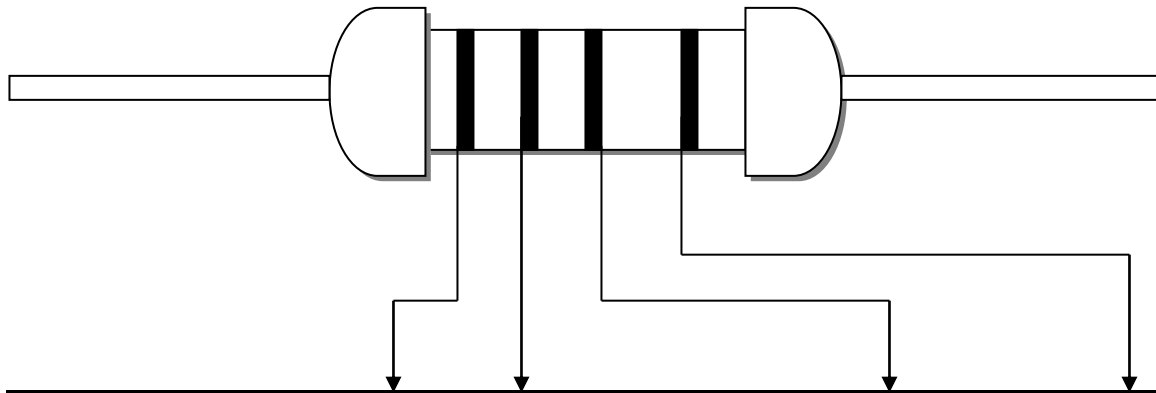
$$= \sqrt{\text{power rating} \times \text{resistance value}}$$



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8. COLOR CODING



Color	1st, 2nd (Significant Figure)		3rd (Multiplier)	4th (Tolerance)
Black	0	0	10^0	—
Brown	1	1	10^1	F (±1%)
Red	2	2	10^2	G (±2%)
Orange	3	3	10^3	—
Yellow	4	4	10^4	—
Green	5	5	10^5	—
Blue	6	6	10^6	—
Violet	7	7	10^7	—
Gray	8	8	10^8	—
White	9	9	10^9	—
Gold	—	—	10^{-1}	J (±5%)
Silver	—	—	10^{-2}	—
Plain	—	—	10^{-32}	—

Figure7