

# Carbon Film Fixed Resistors

## Performance Specification

Temperature Coefficient	$\leq 10\Omega$ : $\pm 350\text{PPM}/^\circ\text{C}$ $11\Omega \sim 99\text{K}\Omega$ : $0 \sim -450\text{PPM}/^\circ\text{C}$ $100\text{K}\Omega \sim 1\text{M}\Omega$ : $0 \sim -700\text{PPM}/^\circ\text{C}$ $1.1\text{M}\Omega \sim 10\text{M}\Omega$ : $0 \sim -1500\text{PPM}/^\circ\text{C}$
Short Time Overload	$\pm(1.0\% + 0.05\Omega)\text{Max}$ , with no evidence of mechanical damage.
Insulation Resistance	Min. 10,000 Mega Ohm
Dielectric Withstanding Voltage	No evidence of flashover, mechanical damage, arcing or insulation breakdown.
Terminal Strength	No evidence of mechanical damage.
Resistance to Soldering Heat	$\pm(1.0\% + 0.05\Omega)\text{Max}$ , with no evidence of mechanical damage.
Solderability	Min. 95% coverage.
Resistance to Solvent	No deterioration of protective coating and markings.
Temperature Cycling	$\pm(1.0\% + 0.05\Omega)\text{Max}$ , with no evidence of mechanical damage.
Load Life in Humidity	Normal type: $<100\text{K}\Omega$ : $\pm(3.0\% + 0.05\Omega)\text{Max}$ $\geq 100\text{K}\Omega$ : $\pm(5.0\% + 0.05\Omega)\text{Max}$ Non-Flame type: $<100\text{K}\Omega$ : $\pm(5.0\% + 0.05\Omega)\text{Max}$ $\geq 100\text{K}\Omega$ : $\pm(10.0\% + 0.05\Omega)\text{Max}$
Load Life	Normal type: $<56\text{K}\Omega$ : $\pm(2.0\% + 0.05\Omega)\text{Max}$ $\geq 56\text{K}\Omega$ : $\pm(3.0\% + 0.05\Omega)\text{Max}$ Non-Flame type: $<100\text{K}\Omega$ : $\pm(5.0\% + 0.05\Omega)\text{Max}$ $\geq 100\text{K}\Omega$ : $\pm(10.0\% + 0.05\Omega)\text{Max}$

## Ordering Procedure: Ex.: CFR 1/4W, +/-5%, 10K $\Omega$ , T/B-5000

C	F	R	0	W	4	J	0	1	0	3	A	5	0	
Type: CFR = Carbon Film			Wattage: Normal size W8 = 1/8W W6 = 1/6W W4 = 1/4W W2 = 1/2W 1W = 1W 2W = 2W  Small size S4 = 1/4W-S S3 = 1/3W-S S2 = 1/2W-S 1S = 1W-S 2S = 2W-S 3S = 3W-S  Extra small size U2 = 1/2W-SS 1U = 1W-SS			Resistance Value: <ul style="list-style-type: none"> <li>E-24 series: 1<sup>st</sup> digit is "0" 2<sup>nd</sup> &amp; 3<sup>rd</sup> digits are the significant figures of the resistance 4<sup>th</sup> indicates the number of zeros: "J" ~ 0.1, "K" ~ 0.01 <b>Ex.:</b> 4.7<math>\Omega</math> ~ 47J, 4.7K<math>\Omega</math> ~ 472</li> <li>E-96 series: 1<sup>st</sup> to 3<sup>rd</sup> digits are the significant figures of the resistance and the 4<sup>th</sup> digit indicates the number of zeros. <b>Ex.:</b> 1.33K<math>\Omega</math> = 1331</li> </ul>			Packing Type: A = Tape/Box T = Tape/Reel B = Bulk/Box P = Tape/Box of PT-26mm			Packing Qty: 1 = 1,000 pcs.    2 = 2,000 pcs. 4 = 4,000 pcs.    5 = 5,000 pcs. A = 500 pcs.        B = 2,500 pcs. 0 = Bulk/Box		
Feature: 0 = Standard F = Non-Flame I = Non-Inductive			Tolerance: F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$ K = $\pm 10\%$			Additional Information: P = Panasert type 1 = Avisert type 2 = Avisert type 2 3 = Avisert type 3 0 = PT-52mm, PT-26mm 8 = PT-58mm 9 = PT-64mm 7 = Lead wire (H) 38mm								



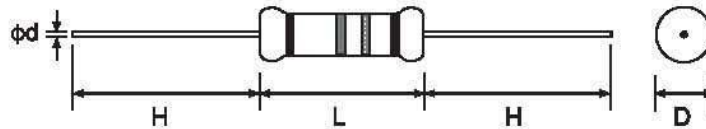
## Carbon Film Fixed Resistors

### Features

- Automatically insertable
- High quality performance
- Non-Flame type available
- Cost effective and commonly used
- Too low or too high values can be supplied on case to case basis



Standard: 2%, 5% 10%—E 24 series  
1%—E 96 series

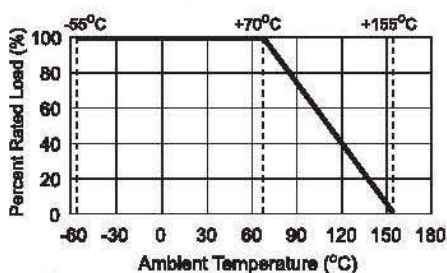


Part No.	Style	Power Rating at 70°C	Dimension (mm)					Resistance Range	Max Working Voltage	Max Overload Voltage	Dielectric Withstanding Voltage	Std Packing Qty
			D Max	L Max	H±3	d±0.05	PT					
<b>Normal size</b>												
CFR0W8	CFR 12	1/8W (0.125W)	1.85	3.5	28	0.45	52	1Ω ~ 1MΩ	200	400	400	5,000
CFR0W4	CFR 25	1/4W (0.25W)	2.5	6.8	28	0.54 <sup>(1)</sup>	52	1Ω ~ 10MΩ	250	500	500	5,000
CFR0W2	CFR 50	1/2W (0.50W)	3.5	10.0	28	0.54	52	1Ω ~ 10MΩ	350	700	700	1,000
CFR01W	CFR 100	1W	5.5	16.0	28	0.70	64	1Ω ~ 10MΩ	500	1,000	1,000	1,000
CFR02W	CFR 200	2W	6.5	17.5	28	0.75	64	1Ω ~ 10MΩ	500	1,000	1,000	500
<b>Small size</b>												
CFR0S4	CFR 25-S	1/4W (0.25W)	1.85	3.5	28	0.45	52	1Ω ~ 1MΩ	200	400	400	5,000
CFRFU2	CFR 50-SS	1/2W (0.50W)	2.5	6.8	28	0.54 <sup>(1)</sup>	52	1Ω ~ 10MΩ	250	500	250	5,000
CFR0S2	CFR 50-S	1/2W (0.50W)	3.0	9.0	28	0.54	52	1Ω ~ 10MΩ	350	700	700	2,000
CFRF1U	CFR 100-SS	1W	3.5	10.0	28	0.54	52	1Ω ~ 10MΩ	350	700	350	1,000
CFR01S	CFR 100-S	1W	5.0	12.0	25	0.70	52	1Ω ~ 10MΩ	500	1,000	1,000	1,000
CFR02U	CFR 200-SS	2W	5.0	12.0	25	0.70	52	1Ω ~ 10MΩ	500	1,000	1,000	1,000
CFR02S	CFR 200-S	2W	5.5	16.0	28	0.70	64	1Ω ~ 10MΩ	500	1,000	1,000	1,000
CFR03U	CFR 300-SS	3W	5.5	16.0	28	0.70	64	1Ω ~ 10MΩ	500	1,000	1,000	1,000
CFR03S	CFR 300-S	3W	6.5	17.5	28	0.75	64	1Ω ~ 10MΩ	500	1,000	1,000	500

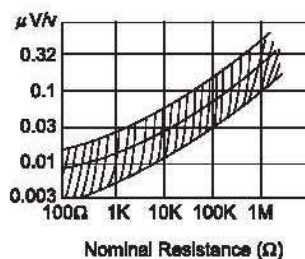
### Note:

- Standard beige base color
- Standard grayish-green base color (Non-flammable coating) for SS
- <sup>(1)</sup> Lead diameter of CFR0W4 & CFRFU2 can be provided in 0.50mm, 0.54mm & 0.60mm
- Ohmic values outside the standard range available on a case to case basis

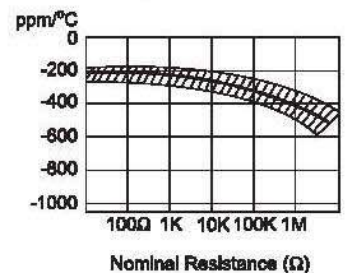
### Derating Curve



### Current Noise

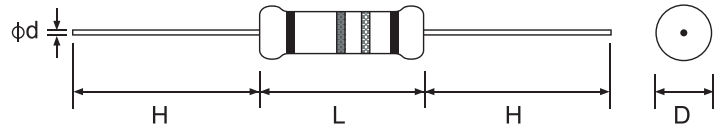


### Temp. Coefficient



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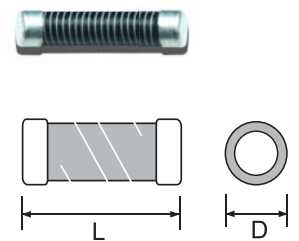
- (1) Copper Plated Steel Lead Wire Type
  - Copper Plated Wire (CP)
  - Tin Plated Copper Steel Lead Wire (CT)



Part No.	Style	Power Rating at 70°C	Dimension (mm)					Max Working Voltage	Max Overload Voltage	Dielectric Withstanding Voltage	Resistance Range	Std Packing Qty
			D Max	L Max	d±0.02	H±3	PT					
CPxxW8 / CTxxW8	CP/ CT 12	1/8W (0.125W)	1.85	3.5	0.50	28	52	200V	400V	400V	1Ω ~ 1MΩ	5,000
CPxxW4 / CTxxW4	CP/ CT 25	1/4W (0.25W)	2.5	6.8	0.50	28/38	52	250V	500V	500V	1Ω ~ 10MΩ	5,000
CPxxS3 / CTxxS3	CP/ CT 33-S	1/3W (0.33W)	2.5	6.8	0.50	28/38	52	300V	600V	500V	1Ω ~ 10MΩ	5,000
CPxxW3 / CTxxW3	CP/ CT 33	1/3W (0.33W)	3.0	9.0	0.50	28	52	300V	600V	700V	1Ω ~ 10MΩ	2,000
CPxxS2 / CTxxS2	CP/ CT 50-S	1/2W (0.5W)	3.0	9.0	0.50	28	52	350V	700V	700V	1Ω ~ 10MΩ	2,000

### (2) Cutting (CO) Type

Part No.	Style	Power Rating at 70°C	Dimension (mm)		Resistance Range
			D	L	
CO...W8	CO 12	1/8W (0.125W)	1.6 <sup>+0.10</sup> <sub>-0.00</sub>	3.2±0.1	1Ω ~ 10MΩ
CO...W4	CO 25	1/4W (0.25W)	2.1 <sup>+0.09</sup> <sub>-0.00</sub>	5.6 <sup>+0.10</sup> <sub>-0.20</sub>	1Ω ~ 10MΩ
CO...W4-A	CO 25-A	1/4W (0.25W)	2.1 <sup>+0.09</sup> <sub>-0.00</sub>	5.9 <sup>+0.10</sup> <sub>-0.15</sub>	1Ω ~ 10MΩ
CO...W4-B	CO 25-B	1/4W (0.25W)	2.1 <sup>+0.09</sup> <sub>-0.00</sub>	6.4 <sup>+0.10</sup> <sub>-0.15</sub>	1Ω ~ 10MΩ



Cutting type resistors are produced without lead-wire and without coating  
 \*Cap plated : 1.Tin plated (ROYALOHM std.)

### Ordering Procedure: Ex.: CPO 1/4W, +/-5%, 10Ω, T/B-5000

<p><b>C P O 0 W 4 J 0 1 0 0 A 5 0</b></p>	<p><b>Type:</b>  <b>CPO</b> =                  Copper plated lead wire (H=28mm)  <b>CPL</b> =                  Coppler plated lead wire (H=38mm)  <b>CTO</b> =                  Tin plated copper steel lead wire (H=38mm)  <b>CTL</b> =                  Tin plated copper steel lead wire (H=38mm)  <b>COT</b>=                  Cutting Type (Tin-Plated Cap)</p>	<p><b>Wattage:</b>                  Normal                  W8 = 1/8W                  W4 = 1/4W                  W3 = 1/3W                   Small                  S2 = 1/2W-S                  S3 = 1/3W-S</p>	<p><b>Tolerance:</b>                  G = ±2%                  J = ±5%                  K = ±10%</p>	<p><b>Resistance Value:</b>                  • E-24 series:                  1<sup>st</sup> digit is "0"                  2<sup>nd</sup> &amp; 3<sup>rd</sup> digits are the significant figures of the resistance                  4<sup>th</sup> digit indicates the number of zeros: "J" ~ 0.1, "K" ~ 0.01  <b>Ex.:</b> 4.7Ω ~ 47J, 4.7KΩ ~ 47Z</p>	<p><b>Packing Type:</b>                  A = Tape/Box                  T = Tape/Reel                  B = Bulk/Box</p>	<p><b>Packing Qty:</b>                  1 = 1,000 pcs. 2 = 2,000 pcs. 4 = 4,000 pcs.                  5 = 5,000 pcs. A = 500 pcs. B = 2,500 pcs.                  0 = Bulk/Box</p>	<p><b>Additional Information:</b>                  0 = CP/CT Type                  A = Cutting type (CO-25-A)                  B = Cutting type (CO-25-B)</p>
	<p><b>Feature:</b>                  0 = Standard                  F = Non-Flame                  I = Non-Inductive</p>						

