

# Carbon Film Fixed Resistors

## Performance Specification

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

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

| C  | F | R | 0 | W   | 4 | J | 0   | 1 | 0 | 3 | A | 5 | 0 |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type:<br>CFR = Carbon Film                                     |   |   |   | Wattage:<br>Normal size<br>W8 = 1/8W<br>W6 = 1/6W<br>W4 = 1/4W<br>W2 = 1/2W<br>1W = 1W<br>2W = 2W |   |   | Resistance Value:<br>• E-24 series:<br>1 <sup>st</sup> digit is "0"<br>2 <sup>nd</sup> & 3 <sup>rd</sup> digits are the significant figures of the resistance<br>4 <sup>th</sup> indicates the number of zeros:<br>"J" ~ 0.1, "K" ~ 0.01<br><b>Ex.: 4.7Ω ~ 47J, 4.7KΩ ~ 472</b> |   |   |   |   |   |   |
| Feature:<br>0 = Standard<br>F = Non-Flame<br>I = Non-Inductive |   |   |   | Small size<br>S4 = 1/4W-S<br>S3 = 1/3W-S<br>S2 = 1/2W-S<br>1S = 1W-S<br>2S = 2W-S<br>3S = 3W-S    |   |   | • E-96 series:<br>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.<br><b>Ex.: 1.33KΩ = 1331</b>   |   |   |   |   |   |   |
|  |   |   |   | Extra small size<br>U2 = 1/2W-SS<br>1U = 1W-SS  |   |   | Packing Type:<br>A = Tape/Box<br>T = Tape/Reel<br>B = Bulk/Box<br>P = Tape/Box of PT-26mm   |   |   |   |   |   |   |
|  |   |   |   | Tolerance:<br>F = $\pm 1\%$<br>G = $\pm 2\%$<br>J = $\pm 5\%$<br>K = $\pm 10\%$                   |   |   | Packing Qty:<br>1 = 1,000 pcs. 2 = 2,000 pcs.<br>4 = 4,000 pcs. 5 = 5,000 pcs.<br>A = 500 pcs. B = 2,500 pcs.<br>0 = Bulk/Box   |   |   |   |   |   |   |
|  |   |   |   |   |   |   | Additional Information:<br>P = Panasert type<br>1 = Avisert type<br>2 = Avisert type 2<br>3 = Avisert type 3<br>0 = PT-52mm, PT-26mm<br>8 = PT-58mm<br>9 = PT-64mm<br>7 = Lead wire (H) 38mm  |   |   |   |   |   |   |



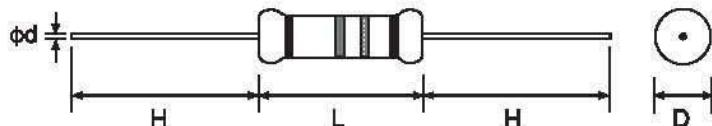
## Carbon Film Fixed Resistors

### 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

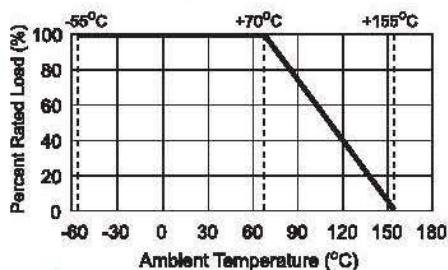


| Part No.           | Style      | Power Rating at 70°C | Dimension (mm) |       |     |                     |    | Resistance Range | Max Working Voltage | Max Overload Voltage | Dielectric Withstanding Voltage | Std Packing Qty |
|--------------------|------------|----------------------|----------------|-------|-----|---------------------|----|------------------|---------------------|----------------------|---------------------------------|-----------------|
|                    |            |                      | 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            | 18.0  | 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             |

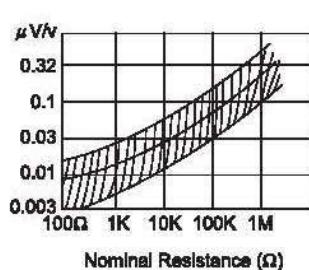
### Note:

- Standard beige base color
- Standard grayish-green base color (Non-flammable coating) for SS
- <sup>(1)</sup> Lead diameter of CFR0W4 & CFFRU2 can be provided in 0.50mm, 0.54mm & 0.60mm
- Ohmic values outside the standard range available on a case to case basis

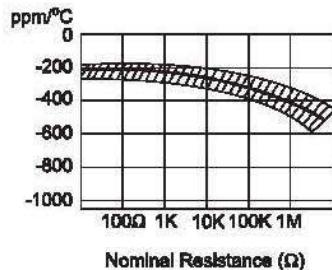
### Derating Curve



### Current Noise



### Temp. Coefficient

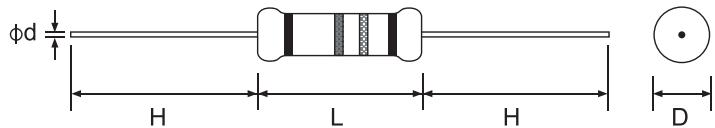


## Carbon Film Fixed Resistors

#### (1) Copper Plated Steel Lead Wire Type

## Copper Plated Wire (CP)

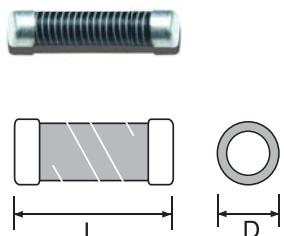
## Tin Plated Copper Steel Lead Wire (CT)



| 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<br>- 0.00  | 3.2±0.1       | 1Ω ~ 10MΩ        |
| CO...W4   | CO 25   | 1/4W (0.25W)         | 2.1<br>- 0.00  | 5.6<br>- 0.20 | 1Ω ~ 10MΩ        |
| CO...W4-A | CO 25-A | 1/4W (0.25W)         | 2.1<br>- 0.00  | 5.9<br>- 0.15 | 1Ω ~ 10MΩ        |
| CO...W4-B | CO 25-B | 1/4W (0.25W)         | 2.1<br>- 0.00  | 6.4<br>- 0.15 | 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

