

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 a case to case basis



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 |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|

Resistor Type:
CFR = Carbon Film Fixed Resistors

Special Feature:
0 = Standard Product
F = Non-Flame
I = Non-Inductive

Wattage:
Normal size: W8=1/8W, W6=1/6W, W4=1/4W, W2=1/2W, 1W=1W, 2W=2W, 3W=3W
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

Tolerance:
F = ±1%, G = ±2%, J = ±5%, K = ±10%

Resistance Value:

- E-24 series: the 1st digit is "0", the 2nd & 3rd digits are for the significant figures of the resistance and the 4th indicate the number of zeros: "J" ~ 0.1, "K" ~ 0.01
Ex.: 4.7Ω ~ 47J, 4.7KΩ ~ 472
- E-96 series: the 1st to 3rd digits are for the significant figures of the resistance and the 4th digit denotes the number of zeros.
Ex.: 1.33KΩ = 1331

Packing Type:
A = Tape / Box
T = Tape / Reel
B = Bulk / Box
P = Tape / Box of PT-26 product

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 = for Bulk / Box packing

** More explanation on part no, please see details on pages 79-80.*

Performance Specifications

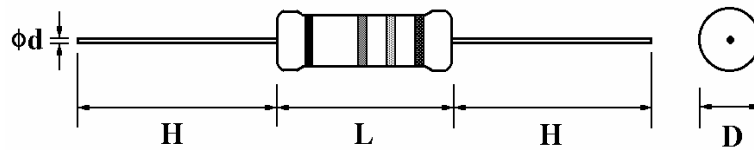
| | |
|--|---|
| Temperature coefficient | ±350PPM/°C for ≤ 10Ω ±450PPM/°C for 11Ω ~ 99KΩ 0 ~ -700PPM/°C for 100KΩ ~ 1MΩ 0 ~ -1500PPM/°C for 1.1MΩ ~ 10MΩ |
| Short time overload | ΔR/R ≤ ±(1.0% + 0.05Ω), with no evidence of mechanical damage. |
| Insulation resistance | Min. 10,000 Mega Ohm |
| Dielectric withstanding voltage | No evidence of flashover, mechanical damage, arcing or insulation breakdown. |
| Terminal strength | No evidence of mechanical damage. |
| Resistance to soldering heat | ΔR/R ≤ ±(1.0% + 0.05Ω), with no evidence of mechanical damage. |
| Solderability | Min. 95% coverage. |
| Resistance to solvent | No deterioration of protective coating and markings. |
| Temperature cycling | ΔR/R ≤ ±(1.0% + 0.05Ω), with no evidence of mechanical damage. |
| Load life in humidity | Normal type: ΔR/R ±3% for <100KΩ, ±5% for ≥ 100KΩ Non-Flame type: ΔR/R ±5% for <100KΩ, ±10% for ≥ 100KΩ |
| Load life | Normal type: ΔR/R ±2% for <56KΩ, ±3% for ≥ 56KΩ Non-Flame type: ΔR/R ±5% for <100KΩ, ±10% for ≥ 100KΩ |

Additional Information:
P = Panasert type
1 = Avisert type
2 = Avisert type 2
3 = Avisert type 3
0 = PT-52mm, NIL for PT-26
8 = PT-58mm
9 = PT-64mm
7 = Lead wire (H) 38mm

**More details, please see pages 77-78.*

CARBON FILM FIXED RESISTORS

Dimension (mm)



Normal Size

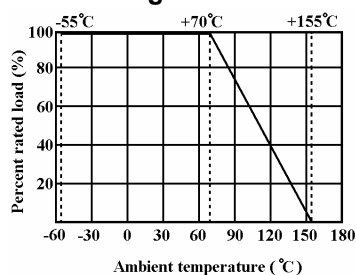
| Part No. | Style | Power Rating at 70°C | Dimension (mm) | | | | Max. Working Voltage | Max. Overload Voltage | Dielectric With-standing Voltage | Resistance Range |
|----------|---------|----------------------|----------------|--------|-------|---------------------|----------------------|-----------------------|----------------------------------|------------------|
| | | | D Max. | L Max. | H ± 3 | d ± 0.05 | | | | |
| CFR0W8 | CFR-125 | 1/8W (0.125W) | 1.85 | 3.5 | 28 | 0.45 | 200 V | 400 V | 400 V | 1Ω~1MΩ |
| CFR0W4 | CFR-25 | 1/4W (0.25W) | 2.5 | 6.8 | 28 | 0.54 ⁽¹⁾ | 250 V | 500 V | 500 V | 1Ω~10MΩ |
| CFR0W2 | CFR-50 | 1/2W (0.5W) | 3.5 | 10.0 | 28 | 0.54 | 350 V | 700 V | 700 V | 1Ω~10MΩ |
| CFR01W | CFR-100 | 1W | 5.5 | 16.0 | 28 | 0.70 | 500 V | 1,000 V | 1,000 V | 1Ω~10MΩ |
| CFR02W | CFR-200 | 2W | 6.5 | 17.5 | 28 | 0.75 | 500 V | 1,000 V | 1,000 V | 1Ω~10MΩ |

Small Size

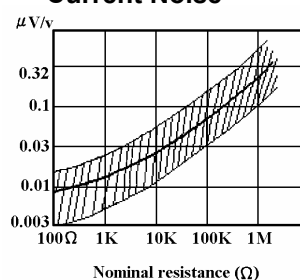
| Part No. | Style | Power Rating at 70°C | Dimension (mm) | | | | Max. Working Voltage | Max. Overload Voltage | Dielectric With-standing Voltage | Resistance Range |
|----------|-----------|----------------------|----------------|--------|-------|---------------------|----------------------|-----------------------|----------------------------------|------------------|
| | | | D Max. | L Max. | H ± 3 | d ± 0.05 | | | | |
| CFR0S4 | CFR-25-S | 1/4W (0.25W) | 1.85 | 3.5 | 28 | 0.45 | 200 V | 400 V | 400 V | 1Ω~1MΩ |
| CFRFU2 | CFR-50-SS | 1/2W (0.5W) | 2.5 | 6.8 | 28 | 0.54 ⁽¹⁾ | 250 V | 500 V | 250 V | 1Ω~10MΩ |
| CFR0S2 | CFR-50-S | 1/2W (0.5W) | 3.0 | 9.0 | 28 | 0.54 | 350 V | 700 V | 700 V | 1Ω~10MΩ |
| CFR01S | CFR-100-S | 1W | 5.0 | 12.0 | 28 | 0.70 | 500 V | 1,000 V | 1,000 V | 1Ω~10MΩ |
| CFR02S | CFR-200-S | 2W | 5.5 | 16.5 | 28 | 0.70 | 500 V | 1,000 V | 1,000 V | 1Ω~10MΩ |
| CFR03S | CFR-300-S | 3W | 6.5 | 17.5 | 28 | 0.75 | 500 V | 1,000 V | 1,000 V | 1Ω~10MΩ |

- Note:**
- Standard E-24 series values in ±5% tolerance
 - Standard beige base color; Light brown base color for CFR01S, CFR02S & CFR03S
 - Standard grayish-green base color (Non-flammable coating) for CFRFU2
 - ⁽¹⁾ Lead diameter of CFR0W4 & CFRFU2 can be provided in 0.50mm, 0.54mm & 0.60mm
 - For any special inquiry which includes too low or high ohmic values are available on a case to case basis

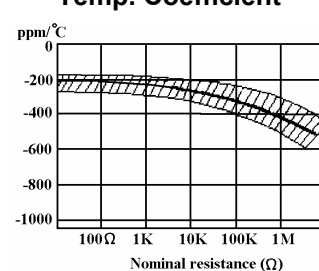
Derating Curve



Current Noise



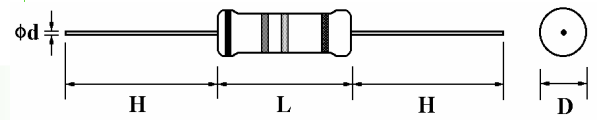
Temp. Coefficient



CARBON FILM FIXED RESISTORS

(1) Copper Plated Steel Lead Wire Type

Copper Plated Wire (CP)/Tin Plated Copper Wire (CT)



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

(2) Cutting (CO) Type



| Part No. | Dimension (mm) | Power Rating at 70°C | Dimension (mm) | | Resistance Range |
|-------------|----------------|----------------------|------------------------|------------------------|------------------|
| | | | D | L | |
| CO...W8 | CO-12 | 0.125W | +0.10 1.6 - 0.00 | 3.2 ±0.1 | 1Ω ~ 10MΩ |
| CO...W4 | CO-25 | 0.25W | +0.09 2.1 - 0.00 | +0.10 5.6 - 0.20 | 1Ω ~ 10MΩ |
| CO...W4...A | CO-25-A | 0.25W | +0.09 2.1 - 0.00 | +0.10 5.9 - 0.15 | 1Ω ~ 10MΩ |
| CO...W4...B | CO-25-B | 0.25W | +0.09 2.1 - 0.01 | +0.10 6.4 - 0.15 | 1Ω ~ 10MΩ |

* Cutting type resistors are produced without lead-wire and without coating * Cap plated: 1. Tin-plated (Royal std), 2. Nickel-plated (Special request)

Ordering Procedure: (Ex.: CP0 1/4W, +/-5%, 10Ω, T/B-5000)

| | | | | | | | | | | | | | |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| C | P | 0 | 0 | W | 4 | J | 0 | 1 | 0 | 0 | A | 5 | 0 |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|

Resistor Type:
 CP0 = Copper Plated Steel Lead Wire, H=28mm
 CPL = Copper Plated Steel Lead Wire, H=38mm
 CT0 = Tin Plated Copper Steel Lead Wire, H=28mm
 CTL = Tin Plated Copper Steel Lead Wire, H=38mm
 COT = Cutting Type (Tin-Plated Cap)
 CON = Cutting Type (Nickel-Plated Cap)

Wattage:
 Normal size:
 W8 = 1/8W
 W4 = 1/4W
 W3 = 1/3W
 Small size:
 S2 = 1/2W-S
 S3 = 1/3W-S

Resistance Value:
 E-24 series: the 1st digit is "0", the 2nd & 3rd digits are for the significant figures of the resistance and the 4th indicate the number of zeros.
 "J" ~ 0.1, "K" ~ 0.01
 Ex. 4.7Ω ~ 47J, 4.7KΩ ~ 472

Tolerance:
 G = ±2%
 J = ±5%
 K = ±10%

Packing Type:
 A = Tape / Box
 T = Tape / Reel
 B = Bulk / Box

Special Feature:
 0 = Standard Product
 F = Non-Flame
 I = Non-Inductive

Packing Qty:
 1 = 1,000 pcs, 2 = 2,000 pcs, 5 = 5,000 pcs,
 A = 500 pcs, B = 2,500 pcs, 0 = for Bulk / Box packing

Additional Information:
 0 = For CP/CT type,
 A = Cutting type (CO-25-A)
 B = Cutting type (CO-25-B)

* More explanation on part no, please see details on pages 79-80.