



## features

- Flameproof coating is available (specify "CFP")
- Reduced body size (specify "CFS/CFPS")
- Suitable for automatic machine insertion
- Marking: Venetian red with color-coded bands on CF  
Green body color with color-coded bands on CFP  
Ivory body color with color-coded bands on CFS1/4
- Products with lead-free terminations meet EU RoHS and China RoHS requirements

## dimensions and construction



| Type              | Dimensions inches (mm) |                |                         |                |                           | I**                         |  |
|-------------------|------------------------|----------------|-------------------------|----------------|---------------------------|-----------------------------|--|
|                   | L                      | C (max.)       | D                       | d (nom.)       | Standard                  | Long                        |  |
| CFS1/4<br>CFPS1/4 | .126±.008<br>(3.2±0.2) | .134<br>(3.4)  | .067±.008<br>(1.7±0.2)  | .018<br>(0.45) | .551 Min.*<br>(14.0 Min.) | .787 Min.***<br>(20.0 Min.) |  |
| CF1/4<br>CFP1/4   | .240±0.2<br>(6.1±0.5)  | .280<br>(7.1)  | .092±.012<br>(2.3±0.3)  | .024<br>(0.6)  |                           |                             |  |
| CFS1/2<br>CFPS1/2 | .248±.02<br>(6.3±0.5)  | .280<br>(7.1)  | .112±.012<br>(2.85±0.3) | .024<br>(0.6)  | .787 Min.<br>(20.0 Min.)  | —                           |  |
| CFB1/2<br>CFPB1/2 | .354±.039<br>(9.0±1.0) | .433<br>(11.0) | .138±.02<br>(3.5±0.5)   | .028<br>(0.7)  |                           |                             |  |

\* Forming code S is applied for bulk type.

\*\* Lead length: changes depending on taping and forming type.

\*\*\* Long type is custom-made

## ordering information

| New Part # | CF        | 1/4                                                                   | C                               | T52                                                                                                                                                                    | R                               | 103                                                                                               | J                             |
|------------|-----------|-----------------------------------------------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------|
| Type       | CF<br>CFP | Power Rating<br>S1/4: 0.25W<br>1/4: 0.25W<br>S1/2: 0.5W<br>B1/2: 0.5W | Termination Material<br>C: SnCu | Taping and Forming<br>Axial: T26, T52, L52<br>Radial: VT, MT, MHT, VTP, VTE<br>U Forming: U, UCL<br>M Forming: M5, M10, M12.5<br>L Forming: L10, L12.5<br>S Forming: S | Packaging<br>A: Ammo<br>R: Reel | Nominal Resistance<br>2 significant figures + 1 multiplier<br>"R" indicates decimal on value <10Ω | Tolerance<br>G: ±2%<br>J: ±5% |

For further information  
on packaging, please refer  
to Appendix C.

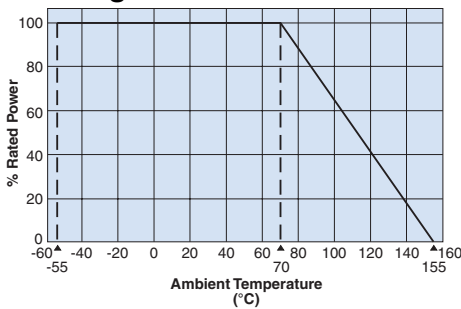
## applications and ratings

| Part Designation | Power Rating @ 70°C | Minimum Dielectric Withstanding Voltage | T.C.R. (ppm/°C) |               |               |               | Resistance Range E-24 (G±2%) | Resistance Range E-24 (J±5%) | Absolute Maximum Working Voltage | Absolute Maximum Overload Voltage |
|------------------|---------------------|-----------------------------------------|-----------------|---------------|---------------|---------------|------------------------------|------------------------------|----------------------------------|-----------------------------------|
|                  |                     |                                         | +350 to -450    | 0 to -700     | 0 to -1000    | 0 to -1300    |                              |                              |                                  |                                   |
| CFS1/4           | 0.25W               | 300V                                    | 2.2Ω - 47kΩ     | 51kΩ - 100kΩ  | 110kΩ - 330kΩ | 360kΩ - 1MΩ   | 10Ω - 330kΩ                  | 2.2Ω - 1MΩ                   | 250V                             | 500V                              |
| CFPS1/4          |                     |                                         | 2.2Ω - 47kΩ     | 51kΩ - 100kΩ  | 110kΩ - 330kΩ | 360kΩ - 1MΩ   | 10Ω - 100kΩ                  | 2.2Ω - 1MΩ                   |                                  |                                   |
| CF1/4            |                     | 500V                                    | 2.2Ω - 100kΩ    | 110kΩ - 330kΩ | 360kΩ - 1MΩ   | 1.1MΩ - 5.1MΩ | 10Ω - 1MΩ                    | 2.2Ω - 5.1MΩ                 | 300V                             | 600V                              |
| CFP1/4           |                     |                                         | 2.2Ω - 100kΩ    | 110kΩ - 330kΩ | 360kΩ - 1MΩ   | —             |                              | 2.2Ω - 1MΩ                   |                                  |                                   |
| CFS1/2           | 0.50W               | 700V                                    | 1.0Ω - 91kΩ     | 100kΩ - 1MΩ   | 1.1MΩ - 2.2MΩ | 2.4MΩ - 5.1MΩ |                              | 1.0Ω - 5.1MΩ                 | 350V                             | 700V                              |
| CFPS1/2          |                     |                                         | 2.2Ω - 91kΩ     |               | —             | —             |                              | 2.2Ω - 1MΩ                   |                                  |                                   |
| CFB1/2           | 0.50W               | 700V                                    | 2.2Ω - 100kΩ    | 110kΩ - 1MΩ   | 1.1MΩ - 2.2MΩ | 2.4MΩ - 5.1MΩ |                              | 2.2Ω - 5.1MΩ                 | 400V                             | 800V                              |

Operating temperature: -55°C ~ +155°C

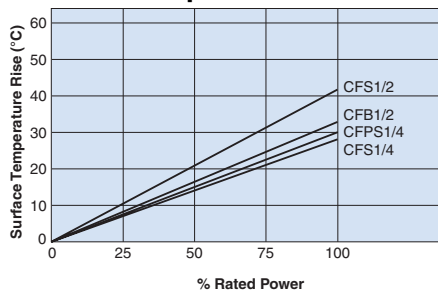
## environmental applications

### Derating Curve

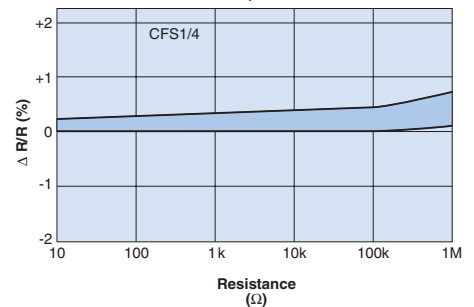


For resistors operated at an ambient temperature of 70°C or above, a power rating shall be derated in accordance with the above derating curve.

### Surface Temperature Rise



### Load Life @ 70°C, 1000 Hr



## Performance Characteristics

| Parameter                               | Requirement Δ R ±(% + 0.05Ω)                                   |         | Test Method                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------|----------------------------------------------------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                         | Limit                                                          | Typical |                                                                                                                                                                                                                                                                                                                                                                             |
| Resistance                              | Within specified tolerance                                     | —       | Measuring points are at 10mm ±1mm from the end cap.                                                                                                                                                                                                                                                                                                                         |
| T.C.R.                                  | Within specified T.C.R.                                        | —       | Room temperature +100°C                                                                                                                                                                                                                                                                                                                                                     |
| Overload (Short time)                   | ±1%                                                            | ±0.5%   | Rated voltage x 2.5 or max. overload voltage for 5 seconds, whichever is lower                                                                                                                                                                                                                                                                                              |
| Resistance to Solder Heat               | ±1%                                                            | ±0.5%   | 260°C ±5°C, 10 seconds ± 1 second                                                                                                                                                                                                                                                                                                                                           |
| Terminal Strength                       | No lead-coming off and loose terminals                         | —       | Twist 360°C, 5 times                                                                                                                                                                                                                                                                                                                                                        |
| Rapid Change of Temperature             | ±1%                                                            | ±0.5%   | -55°C (30 minutes), +125°C (30 minutes), 5 cycles                                                                                                                                                                                                                                                                                                                           |
| Moisture Resistance                     | ±5%                                                            | ±2.5%   | 40°C ± 2°C, 90 - 95% RH, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle                                                                                                                                                                                                                                                                                                            |
| Endurance at 70°C                       | ±3%                                                            | ±1.5%   | 70°C ± 2°C, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle                                                                                                                                                                                                                                                                                                                         |
| Resistance to Solvent (CFS & CFPS only) | No abnormality in appearance. Marking shall be easily legible. | —       | Ultrasonic washing with Isopropyl alcohol for 2 minutes. Power: 0.3W/cm², f: 28kHz, temp: 35°C±5°C                                                                                                                                                                                                                                                                          |
| Flame Retardant (CFS & CFPS only)       | No evidence of flaming or self-flaming                         | —       | Flame test: The test flame shall be applied and removed for each 15 seconds respectively to repeat the cycle 5 times.<br>Overload flame retardant: Power (AC) corresponding to 2, 4, 8, 16 and 32 times the power rating shall be applied for each 1 minute until disconnection occurs. However the applied voltage shall not exceed 4 times the maximum operating voltage. |