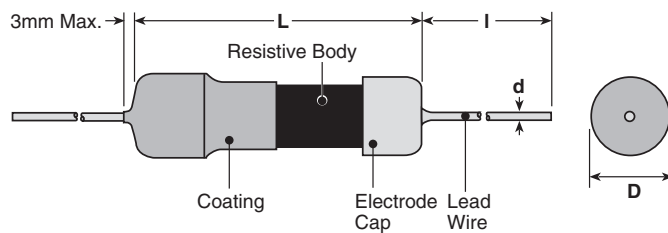


### features

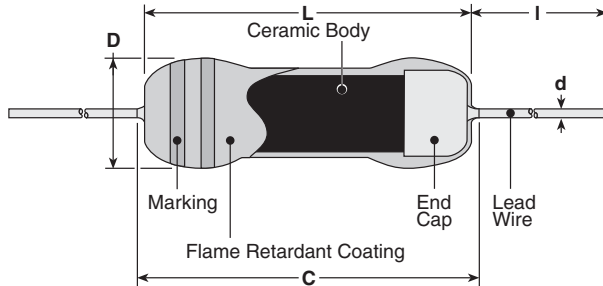
- PCF series: Coated with UL94V0 flameproof material
- Suitable for automatic machine insertion
- Able to replace carbon composition resistors in most applications
- Marking: HFC size: Reddish brown body color with alpha-numeric marking, PCF size: Light green body color with color-coded bands
- Products with lead-free terminations meet EU RoHS requirements

### dimensions and construction

#### HPC



#### PCF



| Type   | Dimensions inches (mm)   |                |                        |               |                         |
|--------|--------------------------|----------------|------------------------|---------------|-------------------------|
|        | L                        | C (max.)       | D                      | d (nom.)      | I                       |
| HPC1/2 | .433±.039<br>(11.0±2.0)  | —              | .138±.039<br>(3.5±0.1) | .031<br>(0.8) | 1.50±.118<br>(38.0±3.0) |
| HPC1   | 0.630±.039<br>(16.0±2.0) | —              | .177±.039<br>(4.5±1.0) |               |                         |
| HPC2   | .827±.039<br>(21.0±2.0)  | —              | .197±.039<br>(5.0±1.0) |               |                         |
| HPC3   | 1.02±.039<br>(26.0±2.0)  | —              | .236±.039<br>(6.0±1.0) |               |                         |
| HPC4   | 1.50±.039<br>(38.0±2.0)  | —              | .276±.039<br>(7.0±1.0) |               |                         |
| HPC5   | 1.73±.039<br>(44.0±2.0)  | —              | .295±.039<br>(7.5±1.0) | .039<br>(1.0) | 1.18±.118<br>(30.0±3.0) |
| PCF1/2 | .354±.039<br>(9.0±1.0)   | .437<br>(11.1) | .138±.02<br>(3.5±0.5)  | .028<br>(0.7) |                         |
| PCF1   | 0.65±.039<br>(16.5±1.0)  | .748<br>(19.0) | .217±.039<br>(5.5±1.0) | .031<br>(0.8) |                         |
| PCF2   | .748±.039<br>(19.0±1.0)  | .886<br>(22.5) | .276±.039<br>(7.0±1.0) |               |                         |

### ordering information

| Part # | PCF        | 1/2  | C                    | T631                  | R         | 102  | K                  |
|--------|------------|--|----------------------|-----------------------|-----------|--|--------------------|
| Type   | HPC<br>PCF | Power Rating   | Termination Material | Taping                | Packaging | Nominal Resistance   | Tolerance          |
|        |            | 1/2: 0.5W<br>1: 1W<br>2: 2W<br>3: 3W<br>4: 4W<br>5: 5W | C: SnCu              | 1/2: T631<br>1,2: T52 | R: Reel   | 2 significant figures + 1 multiplier<br>3 significant figures + 1 multiplier | K: ±10%<br>M: ±20% |

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

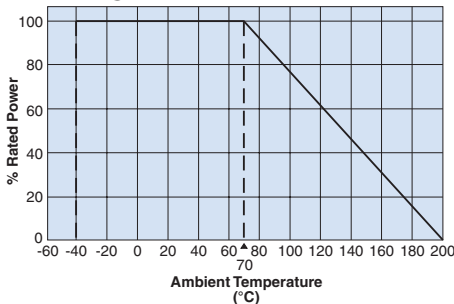
## applications and ratings

| Part Designation | Power Rating @ 70°C | Minimum Dielectric Withstanding Voltage | Resistance Range E-12 ( $\pm 10\%$ ) E-6 ( $\pm 20\%$ ) | Resistance Tolerance           | T.C.R. (ppm/°C)                    | Absolute Maximum Working Voltage | Absolute Maximum Overload Voltage | Absolute Maximum Pulse Voltage* | Operating Temperature Range |
|------------------|---------------------|---|---|--------------------------------|------------------------------------|----------------------------------|-----------------------------------|---------------------------------|-----------------------------|
| HPC1/2           | 0.5W                | 200V                                    | 10 $\Omega$ - 390K $\Omega$ (+10%)                      | K: $\pm 10\%$<br>M: $\pm 20\%$ | -900 $\pm$ 300:<br>R<100 $\Omega$  | 200V                             | 400V                              | 8kV                             | -40°C to +200°C             |
| HPC1             | 1.0W                | 300V                                    |   |                                |                                    | 300V                             | 600V                              | 15kV                            |                             |
| HPC2             | 2.0W                | 400V                                    | 400V  |                                |                                    | 800V                             | 25kV                              |                                 |                             |
| HPC3             | 3.0W                | 450V                                    | 450V  |                                |                                    | 900V                             | 25kV                              |                                 |                             |
| HPC4             | 4.0W                | 500V                                    | 500V  |                                |                                    | 1000V                            | 25kV                              |                                 |                             |
| HPC5             | 5.0W                | 550V                                    | 550V  |                                | 1100V                              | 25kV                             |                                   |                                 |                             |
| PCF1/2           | 0.5W                | 500V                                    | 4.7 $\Omega$ - 100K $\Omega$                            |                                | -900 $\pm$ 300:<br>R<100 $\Omega$  | 200V                             | 400V                              | 10kV                            |                             |
| PCF1             | 1.0W                |   | 3.3 $\Omega$ - 390K $\Omega$                            |                                | -1300 $\pm$ 300:<br>R<100 $\Omega$ | 300V                             | 600V                              | 14kV                            |                             |
| PCF2             | 2.0W                |   | 700V  |                                | 400V                               | 800V                             | 20kV                              |                                 |                             |

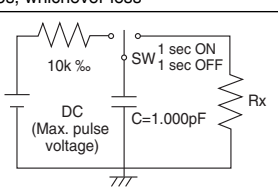
\* Resistance to pulse: change shall be  $\pm 5\%$  of the pre-test values. 1 sec. ON, 1 second OFF, 20,000 cycles. The voltage is applied with maximum pulse voltage.

## environmental applications

### Derating Curve



### Performance Characteristics

| Parameter   | Requirement  |         | Test Method  |                     |
|---|--|---------|--|---------------------|
|   | Limit  | Typical |  |                     |
| Resistance  | Within regulated to tolerance  | —       | Resistance   |                     |
|   |  |         | 3.3 $\Omega$ -8.2 $\Omega$   | Measurement voltage |
|   |  |         | 10 $\Omega$ -82 $\Omega$   | 0.3V                |
|   |  |         | 100 $\Omega$ -390k $\Omega$  | 1.0V                |
| T.C.R.  | HPC: -900 $\pm$ 300 $\times 10^{-6}$ /K:<br>R<100 $\Omega$<br>-1200 $\pm$ 300 $\times 10^{-6}$ /K:R $\geq$ 100 $\Omega$<br>PCF: -900 $\pm$ 300:R<100 $\Omega$<br>-1300 $\pm$ 300:R $\geq$ 100 $\Omega$ | —       | +25°C/-40°C and +25°C/+125°C   |                     |
| Voltage Coefficient (Apply for over 1k $\Omega$ ) | 0-0.2%/V (HPC1/2, PCF)<br>0-0.1%/V (HPC1)<br>0-0.05%/V (HPC2,3,4,5)  | —       | Rated voltage and rated voltage x 10%  |                     |
| Overload  | 2  | 0.4     | Rated voltage x 2.5 or maximum overload voltage for 5s, whichever less   |                     |
| Resistance to pulse                               | 5  | —       | The resistor mounted to the test circuit as below.<br>1 sec. ON and 1 sec. OFF. 20,000 cycles.<br>The voltage is applied with maximum pulse voltage. <div style="text-align: right;">  </div> |                     |
| Resistance to soldering heat                      | 2  | 0.8     | 350°C $\pm$ 10°C, 3.5s $\pm$ 0.5s  |                     |
| Rapid change of temperature                       | 2  | 0.4     | -40°C(30min.)/+85°C(30min.), 5 cycles  |                     |
| Moisture resistance                               | 5  | 0.6     | 40°C $\pm$ 2°C, 90%-95%RH, 1000h, 1.5h ON/0, 5h OFF cycles   |                     |
| Load life   | 5  | 0.4     | HPC: 40°C $\pm$ 2°C, 1000h, 1.5h ON/0, 5h OFF cycles<br>PCF: 70°C $\pm$ 3°C, 1000h, 1.5h ON/0, 5h OFF cycles   |                     |