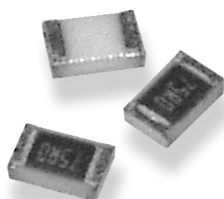


## Type CPF Series

### Type CPF Series



Precision metal terminations are screen printed onto a ceramic base and fired. The resistive element is sputtered and fired and the passivation layer added. The pre-scribed tile is broken into strips, the end plating is fired on and the strips broken into individual components. Final termination is made by electroplating.

### Key Features

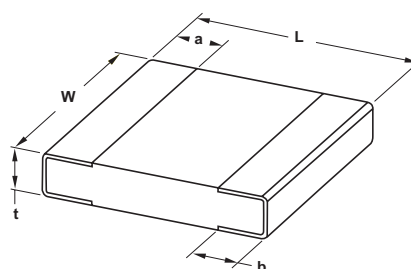
- Thin film precision resistors with TC's of 15ppm, 25ppm and 50ppm and tolerances to 0.1%. Applications in measurement, telemetry and for sensing circuits.
- Case sizes 0402, 0603, 0805, 1206, 2010 and 2512
- CPF chip resistors are suitable for all applications where close accuracy and stability are essential

### Characteristics - Electrical

|                                       | 0402        |       |       | 0603        |       |       |       | 0805        |       |       |       |       |
|---------------------------------------|-------------|-------|-------|-------------|-------|-------|-------|-------------|-------|-------|-------|-------|
| Rated Power @ 70 °C (W)               | 0.063       |       |       | 0.063       |       |       |       | 0.1         |       |       |       |       |
| Resistance Range (Ohms) Min           | 10R         |       |       | 4R7         |       | 2R0   |       | 4R7         |       | 1R0   |       |       |
| Max                                   | 200K        |       |       | 800K        |       | 4R6   |       | 2M0         |       | 4R6   |       |       |
| Tolerance (%)                         | 0.1         | 0.5   | 1     | 0.1         | 0.5   | 1     | 0.5   | 1           | 0.1   | 0.5   | 1     | 0.5   |
| Code letter                           | B           | D     | F     | B           | D     | F     | D     | F           | B     | D     | F     | D     |
| Selection Series                      | E24 + E96   |       |       | E24 + E96   |       |       |       | E24 + E96   |       |       |       |       |
| Temperature Coefficient (ppm/°C)      | 15ppm       | 25ppm | 50ppm | 15ppm       | 25ppm | 50ppm | 50ppm | 15ppm       | 25ppm | 50ppm | 50ppm | 50ppm |
| Code Letter                           | D           | E     | C     | D           | E     | C     | C     | D           | E     | C     | C     | C     |
| Limiting Element Voltage (V)          | 25          |       |       | 60          |       |       |       | 100         |       |       |       |       |
| Maximum Overload Voltage (V)          | 50          |       |       | 120         |       |       |       | 200         |       |       |       |       |
| Operating Temp. Range (°C)            | -55 to +125 |       |       | -55 to +125 |       |       |       | -55 to +125 |       |       |       |       |
| Climatic Category (°C)                | 55/125/55   |       |       | 55/125/55   |       |       |       | 55/125/55   |       |       |       |       |
| Insulation Resistance Dry Min (Mohms) | 10000       |       |       | 10000       |       |       |       | 10000       |       |       |       |       |
| Stability (%)                         | 0.5         |       |       | 0.5         |       |       |       | 0.5         |       |       |       |       |

|                                       | 1206        |       |       |       | 2010        |       |       |       | 2512        |       |       |       |
|---------------------------------------|-------------|-------|-------|-------|-------------|-------|-------|-------|-------------|-------|-------|-------|
| Rated Power @ 70 °C (W)               | 0.125       |       |       |       | 0.25        |       |       |       | 0.5         |       |       |       |
| Resistance Range (Ohms) Min           | 4R7         |       | 1R0   |       | 4R7         |       | 1R0   |       | 4R7         |       | 1R0   |       |
| Max                                   | 2M0         |       | 4R6   |       | 2M0         |       | 4R6   |       | 2M0         |       | 4R6   |       |
| Tolerance (%)                         | 0.1         | 0.5   | 1     | 0.5   | 0.1         | 0.5   | 1     | 0.5   | 0.1         | 0.5   | 1     | 0.5   |
| Code letter                           | B           | C     | F     | C     | B           | C     | F     | C     | B           | C     | F     | C     |
| Selection Series                      | E24 + E96   |       |       |       | E24 + E96   |       |       |       | E24 + E96   |       |       |       |
| Temperature Coefficient (ppm/°C)      | 15ppm       | 25ppm | 50ppm | 50ppm | 15ppm       | 25ppm | 50ppm | 50ppm | 15ppm       | 25ppm | 50ppm | 50ppm |
| Code Letter                           | D           | E     | C     | C     | D           | E     | C     | C     | D           | E     | C     | C     |
| Limiting Element Voltage (V)          | 150         |       |       |       | 150         |       |       |       | 150         |       |       |       |
| Maximum Overload Voltage (V)          | 300         |       |       |       | 300         |       |       |       | 300         |       |       |       |
| Operating Temp. Range (°C)            | -55 to +125 |       |       |       | -55 to +125 |       |       |       | -55 to +125 |       |       |       |
| Climatic Category (°C)                | 55/125/55   |       |       |       | 55/125/55   |       |       |       | 55/125/55   |       |       |       |
| Insulation Resistance Dry Min (Mohms) | 10000       |       |       |       | 10000       |       |       |       | 10000       |       |       |       |
| Stability (%)                         | 0.5         |       |       |       | 0.5         |       |       |       | 0.5         |       |       |       |

### Dimensions



| Style | L         | W          | t          | a          | b         |
|-------|-----------|------------|------------|------------|-----------|
| 0603  | 1.6 ± 0.1 | 0.8 ± 0.1  | 0.45 ± 0.1 | 0.25 ± 0.1 | 0.2 ± 0.1 |
| 0805  | 2.0 ± 0.2 | 1.25 ± 0.2 | 0.5 ± 0.1  | 0.4 ± 0.2  | 0.3 ± 0.2 |
| 1206  | 3.1 ± 0.2 | 1.55 ± 0.2 | 0.55 ± 0.1 | 0.45 ± 0.2 | 0.3 ± 0.2 |

## Type CPF Series

### Marking Codes - Case Sizes 0805 to 2512

#### IEC 4 Digit Marking

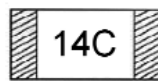
|              |      |       |      |        |       |
|--------------|------|-------|------|--------|-------|
| Resistance   | 100Ω | 2.2KΩ | 10KΩ | 49.9KΩ | 100KΩ |
| Marking Code | 1000 | 2201  | 1002 | 4992   | 1003  |

### Case Sizes 0603

#### E24 3 Digit Marking - Example: 101=100Ω 102=1KΩ

|     |    |    |    |    |    |    |    |    |    |    |    |    |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| E24 | 10 | 11 | 12 | 13 | 15 | 16 | 18 | 20 | 22 | 24 | 27 | 30 |
|     | 33 | 36 | 39 | 43 | 47 | 51 | 56 | 62 | 68 | 75 | 82 | 91 |

#### E96 3 Digit Marking - Examples: 14C=13K7Ω, 13C=13K3Ω, 68B=4K99Ω, 68X=49.9Ω

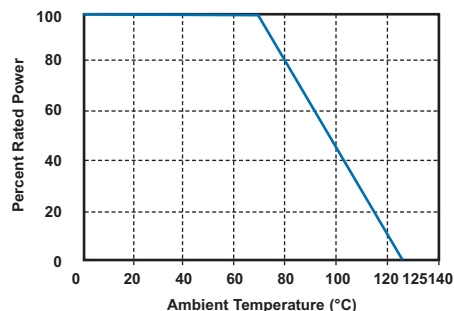


#### 0603 E96 Marking Code Table

| Code       | E96             |                 | Code            | E96             |                 | Code            | E96             |                 | Code             | E96              |                  |
|------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|
| 01         | 100             |                 | 25              | 178             |                 | 49              | 316             |                 | 73               | 562              |                  |
| 02         | 102             |                 | 26              | 182             |                 | 50              | 324             |                 | 74               | 576              |                  |
| 03         | 105             |                 | 27              | 187             |                 | 51              | 332             |                 | 75               | 590              |                  |
| 04         | 107             |                 | 28              | 191             |                 | 52              | 340             |                 | 76               | 604              |                  |
| 05         | 110             |                 | 29              | 196             |                 | 53              | 348             |                 | 77               | 619              |                  |
| 06         | 113             |                 | 30              | 200             |                 | 54              | 357             |                 | 78               | 634              |                  |
| 07         | 115             |                 | 31              | 205             |                 | 55              | 365             |                 | 79               | 649              |                  |
| 08         | 118             |                 | 32              | 210             |                 | 56              | 374             |                 | 80               | 665              |                  |
| 09         | 121             |                 | 33              | 215             |                 | 57              | 383             |                 | 81               | 681              |                  |
| 10         | 124             |                 | 34              | 221             |                 | 58              | 392             |                 | 82               | 698              |                  |
| 11         | 127             |                 | 35              | 226             |                 | 59              | 402             |                 | 83               | 715              |                  |
| 12         | 130             |                 | 36              | 232             |                 | 60              | 412             |                 | 84               | 732              |                  |
| 13         | 133             |                 | 37              | 237             |                 | 61              | 422             |                 | 85               | 750              |                  |
| 14         | 137             |                 | 38              | 243             |                 | 62              | 432             |                 | 86               | 768              |                  |
| 15         | 140             |                 | 39              | 249             |                 | 63              | 442             |                 | 87               | 787              |                  |
| 16         | 143             |                 | 40              | 255             |                 | 64              | 453             |                 | 88               | 806              |                  |
| 17         | 147             |                 | 41              | 261             |                 | 65              | 464             |                 | 89               | 825              |                  |
| 18         | 150             |                 | 42              | 267             |                 | 66              | 475             |                 | 90               | 845              |                  |
| 19         | 154             |                 | 43              | 274             |                 | 67              | 487             |                 | 91               | 866              |                  |
| 20         | 158             |                 | 44              | 280             |                 | 68              | 499             |                 | 92               | 887              |                  |
| 21         | 162             |                 | 45              | 287             |                 | 69              | 511             |                 | 93               | 909              |                  |
| 22         | 165             |                 | 46              | 294             |                 | 70              | 523             |                 | 94               | 931              |                  |
| 23         | 169             |                 | 47              | 301             |                 | 71              | 536             |                 | 95               | 953              |                  |
| 24         | 174             |                 | 48              | 309             |                 | 72              | 549             |                 | 96               | 976              |                  |
| Code       | A               | B               | C               | D               | E               | F               | G               | H               | X                | Y                | Z                |
| Multiplier | 10 <sup>0</sup> | 10 <sup>1</sup> | 10 <sup>2</sup> | 10 <sup>3</sup> | 10 <sup>4</sup> | 10 <sup>5</sup> | 10 <sup>6</sup> | 10 <sup>7</sup> | 10 <sup>-1</sup> | 10 <sup>-2</sup> | 10 <sup>-3</sup> |

## Type CPF Series

### Derating Curve



### Marking

E24 series resistors are marked with a three digit code.  
E96 series resistors are marked with a four digit code.  
0603 E96 series are unmarked.

### Mounting

The resistors are suitable for processing on automatic insertion equipment.

### Performance Characteristics

The evaluation of the performance characteristics is carried out with reference to IECQ specifications QC 400 000 and QC 400 100.

| TEST REF | Long Term Tests $\pm(0.5\% + 0.05 \text{ ohm})$  |
|----------|--------------------------------------------------|
| 4.23     | Climatic sequence                                |
| 4.24     | Damp heat, steady state                          |
| 4.25.1   | Endurance at 70 °C                               |
| 4.25.3   | Endurance at 125 °C                              |
| TEST REF | Short Term Tests $\pm(0.5\% + 0.05 \text{ ohm})$ |
| 4.13     | Overload                                         |
| 4.32     | Adhesion                                         |
| 4.33     | Bond strength of end face plating                |
| 4.19     | Rapid change of temperature                      |
| 4.18     | Resistance to soldering heat                     |

### Storage

Unopened reels should be stored within a temperature range of +5 °C to +25 °C, separated from any dust, chemicals and solvent based materials. Non-adherence to this procedure could affect the solderability of this product.

### How to Order

| CPF                                | 0603                 | B                    | 100R                                                                                         | E                                   |
|------------------------------------|----------------------|----------------------|----------------------------------------------------------------------------------------------|-------------------------------------|
| Common Part                        | Package Size         | Tolerance            | Value                                                                                        | TCR                                 |
| CPF - Chip Precision Film Resistor | 0603<br>0805<br>1206 | B - 0.1%<br>D - 0.5% | 100 ohms<br>(100 ohms) 100R<br>1 K ohm<br>(1000 ohms) 1K0<br>100 K ohm<br>(100000 ohms) 100K | D - 15ppm<br>E - 25ppm<br>C - 50ppm |