

Type CPF Series

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.
- Wide range of case sizes from 0201 to 2512
- CPF chip resistors are suitable for all applications where close accuracy and stability are essential
- Terminal finish - electroplated 100% matte Sn



Applications

- Communications
- Industrial Controls
- Instrumentation
- Medical

The CPF series is a high stability precision chip resistor range offering various power dissipations relating to a wide range of chip sizes. The CPF series offers TCR's down to 15ppm/°C and resistance tolerances to 0.1%. Standard values are within the IEC 63 E96 and E24 value grids. The CPF has accurate and uniform physical dimensions to facilitate placement.

Characteristics - Electrical

| | 0201 | | | | 0402 | | | | 0402 | | | | |
|--------------------------------|---------------|------|------|------|---------------|-----|------|------|---------------|------|------|-----|------|
| Rated Power @ 70°C: | 0.03125W | | | | 0.063W | | | | 0.063W | | | | |
| Resistance Range (Ohms) | Min: | 49R9 | 49R9 | 49R9 | 49R9 | 10R | 10R | 49R9 | 10R | 1R0 | 49R9 | 10R | 1R0 |
| | Max: | 5K0 | 33K | 5K0 | 33K | 70K | 255K | 205K | 70K | 255K | 205K | 70K | 255K |
| Tolerance (%): | 0.5 | | 1 | | 0.1 | | 0.5 | | 1 | | 1 | | |
| Code letter: | D | | F | | B | | D | | F | | F | | |
| Selection Series: | E24 & E96 | | | | E24 & E96 | | | | E24 & E96 | | | | |
| Temp. Coefficient (ppm/°C): | 25 | 50 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 |
| Code Letter: | E | C | E | C | D | E | C | D | E | C | D | E | C |
| Limiting Element Voltage: | 15V | | | | 25V | | | | 25V | | | | |
| Max. Overload Voltage: | 30V | | | | 50V | | | | 50V | | | | |
| Operating Temp. Range: | -55 to +155°C | | | | -55 to +155°C | | | | -55 to +155°C | | | | |
| Climatic Category (°C): | 55/125/55 | | | | 55/125/55 | | | | 55/125/55 | | | | |
| Insulation Resistance Dry Min: | 1000MΩ | | | | 1000MΩ | | | | 1000MΩ | | | | |
| Stability: | 0.5% | | | | 0.5% | | | | 0.5% | | | | |

| | 0603 | | | | 0805 | | | | 0805 | | | | |
|--------------------------------|---------------|------|-----|------|---------------|------|-----|------|---------------|------|-----|------|-----|
| Rated Power @ 70°C: | 0.063W | | | | 0.1W | | | | 0.1W | | | | |
| Resistance Range (Ohms) | Min: | 4R7 | 4R7 | 4R7 | 2R0 | 4R7 | 2R0 | 4R3 | 4R7 | 4R3 | 1R0 | 4R3 | 1R0 |
| | Max: | 332K | 1M0 | 332K | 1M0 | 332K | 1M0 | 511K | 2M0 | 511K | 2M0 | 511K | 2M0 |
| Tolerance (%): | 0.1 | | 0.5 | | 1 | | 0.1 | | 0.5 | | 1 | | |
| Code letter: | B | | D | | F | | B | | D | | F | | |
| Selection Series: | E24 & E96 | | | | E24 & E96 | | | | E24 & E96 | | | | |
| Temp. Coefficient (ppm/°C): | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | |
| Code Letter: | D | E | C | D | E | C | D | E | C | D | E | C | |
| Limiting Element Voltage: | 50V | | | | 100V | | | | 100V | | | | |
| Max. Overload Voltage: | 100V | | | | 200V | | | | 200V | | | | |
| Operating Temp. Range: | -55 to +155°C | | | | -55 to +155°C | | | | -55 to +155°C | | | | |
| Climatic Category (°C): | 55/125/55 | | | | 55/125/55 | | | | 55/125/55 | | | | |
| Insulation Resistance Dry Min: | 1000MΩ | | | | 1000MΩ | | | | 1000MΩ | | | | |
| Stability: | 0.5% | | | | 0.5% | | | | 0.5% | | | | |

Type CPF Series

| | 1206 | | | | | | 1210 | | | | | | | | |
|--------------------------------|---------------|-----|-----|-----|-----|-----|---------------|-----|-----|-----|-----|-----|-----|----|----|
| Rated Power @ 70°C: | 0.125W | | | | | | 0.2W | | | | | | | | |
| Resistance Range (Ohms) | Min: | 4R7 | 4R7 | 4R7 | 1R0 | 4R7 | 1R0 | 4R7 | 4R7 | 4R7 | 1R0 | 4R7 | 1R0 | | |
| | Max: | 1M0 | 2M5 | 1M0 | 2M5 | 1M0 | 2M5 | 1M0 | 2M5 | 1M0 | 2M5 | 1M0 | 2M5 | | |
| Tolerance (%): | 0.1 | | 0.5 | | 1 | | 0.1 | | 0.5 | | 1 | | | | |
| Code Letter: | B | | D | | F | | B | | D | | F | | | | |
| Selection Series: | E24 & E96 | | | | | | E24 & E96 | | | | | | | | |
| Temp. Coefficient (ppm/°C): | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 |
| Code Letter: | D | E | C | D | E | C | D | E | C | D | E | C | D | E | C |
| Limiting Element Voltage: | 150V | | | | | | 150V | | | | | | | | |
| Max. Overload Voltage: | 300V | | | | | | 300V | | | | | | | | |
| Operating Temp. Range: | -55 to +155°C | | | | | | -55 to +155°C | | | | | | | | |
| Climatic Category (°C): | 55/125/55 | | | | | | 55/125/55 | | | | | | | | |
| Insulation Resistance Dry Min: | 1000MΩ | | | | | | 1000MΩ | | | | | | | | |
| Stability: | 0.5% | | | | | | 0.5% | | | | | | | | |

| | 2010 | | | | | | 2512 | | | | | | | | |
|--------------------------------|---------------|-----|-----|-----|-----|-----|---------------|-----|-----|-----|-----|-----|-----|----|----|
| Rated Power @ 70°C: | 0.25W | | | | | | 0.5W | | | | | | | | |
| Resistance Range (Ohms) | Min: | 4R7 | 4R7 | 4R7 | 1R0 | 4R7 | 1R0 | 4R7 | 4R7 | 4R7 | 1R0 | 4R7 | 1R0 | | |
| | Max: | 1M0 | 3M0 | 1M0 | 3M0 | 1M0 | 3M0 | 1M0 | 3M0 | 1M0 | 3M0 | 1M0 | 3M0 | | |
| Tolerance (%): | 0.1 | | 0.5 | | 1 | | 0.1 | | 0.5 | | 1 | | | | |
| Code letter: | B | | D | | F | | B | | D | | F | | | | |
| Selection Series: | E24 & E96 | | | | | | E24 & E96 | | | | | | | | |
| Temp. Coefficient (ppm/°C): | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 |
| Code Letter: | D | E | C | D | E | C | D | E | C | D | E | C | D | E | C |
| Limiting Element Voltage: | 150V | | | | | | 150V | | | | | | | | |
| Max. Overload Voltage: | 300V | | | | | | 300V | | | | | | | | |
| Operating Temp. Range: | -55 to +155°C | | | | | | -55 to +155°C | | | | | | | | |
| Climatic Category (°C): | 55/125/55 | | | | | | 55/125/55 | | | | | | | | |
| Insulation Resistance Dry Min: | 1000MΩ | | | | | | 1000MΩ | | | | | | | | |
| Stability: | 0.5% | | | | | | 0.5% | | | | | | | | |

Characteristics - Environmental

| Item | Requirement | | Test Method |
|--|---|-----------------------|---|
| | Tol. ≤ 0.05% | Tol. > 0.05% | |
| Temperature Coefficient of Resistance (TCR): | AS per TCRs specified in value range table on page 1 | | +25/-55/+25/+125/+25°C |
| Short Time Overload: | $\Delta R \pm 0.05\%$ | $\Delta R \pm 0.2\%$ | RCWV* 2.5 or max. overload voltage for 5 seconds |
| Insulation Resistance: | $\Delta R \pm 0.2\%$ for high power rating >1000MΩ | | Apply 100VDC for 1 minute |
| Endurance: | $\Delta R \pm 0.05\%$ | $\Delta R \pm 0.2\%$ | 70 ±2°C, max. working voltage for 1000hrs with 1.5hrs "ON" and 0.5 hrs "OFF" |
| Damp Heat with Load: | $\Delta R \pm 0.05\%$ | $\Delta R \pm 0.3\%$ | 40 ±2°C, 90 - 95% R.H. max. working voltage hrs with 1.5hrs "ON" and 0.5hrs "OFF" |
| Bending Strength: | $\Delta R \pm 0.05\%$ | $\Delta R \pm 0.2\%$ | Bending amplitude 3mm for 10 seconds |
| Solderability: | 95% min. coverage | | 245 ±5°C for 3 seconds |
| Resistance to Soldering Heat: | $\Delta R \pm 0.05\%$ | $\Delta R \pm 0.2\%$ | 260 ±5°C for 10 seconds |
| Dielectric Withstand Voltage: | By Type | | Max. overload voltage for 1 minute |
| Thermal Shock: | $\Delta R \pm 0.05\%$ | $\Delta R \pm 0.25\%$ | -55°C to +150°C, 100 cycles |
| Low Temperature Operation: | $\Delta R \pm 0.05\%$ | $\Delta R \pm 0.2\%$ | 1 hour, -65°C, followed by 45 minutes of RCWV |
| | $\Delta R \pm 0.5\%$ for high power rating | | |

Reference Standards: MIL-STD-202, JIS-C 5201-1

Storage Temperature: 25±3°C; Humidity < 80%RH

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 ⁰ | 10 ¹ | 10 ² | 10 ³ | 10 ⁴ | 10 ⁵ | 10 ⁶ | 10 ⁷ | 10 ⁻¹ | 10 ⁻² | 10 ⁻³ |

Type CPF Series

Power Derating Curve



For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with this curve.

Dimensions



- | | | |
|--------------------------|----------------------------|--------------------------|
| 1. Alumina Substrate | 4. Edge Electrode (NiCr) | 7. Resistor Layer (NiCr) |
| 2. Bottom Electrode (Ag) | 5. Barrier Layer (Ni) | 8. Overcoat (Epoxy) |
| 3. Top Electrode (Ag-Pd) | 6. External Electrode (Sn) | 9. Marking |

| Part Number | L | W | H | a | b | Weight (g) 1000 pieces |
|-------------|------------|------------|------------|------------|------------|---------------------------|
| CPF0201 | 0.58 ±0.05 | 0.29 ±0.05 | 0.23 ±0.05 | 0.12 ±0.05 | 0.15 ±0.05 | 0.14 |
| CPF0402 | 1.00 ±0.05 | 0.50 ±0.05 | 0.30 ±0.05 | 0.20 ±0.10 | 0.20 ±0.10 | 0.54 |
| CPF0603 | 1.55 ±0.10 | 0.80 ±0.10 | 0.45 ±0.10 | 0.30 ±0.20 | 0.30 ±0.20 | 1.83 |
| CPF0805 | 2.00 ±0.15 | 1.25 ±0.15 | 0.55 ±0.10 | 0.30 ±0.20 | 0.40 ±0.25 | 4.71 |
| CPF1206 | 3.05 ±0.15 | 1.55 ±0.15 | 0.55 ±0.10 | 0.42 ±0.20 | 0.35 ±0.25 | 9.02 |
| CPF1210 | 3.10 ±0.15 | 2.40 ±0.15 | 0.55 ±0.10 | 0.40 ±0.20 | 0.55 ±0.25 | 10.00 |
| CPF2010 | 4.90 ±0.15 | 2.40 ±0.15 | 0.55 ±0.10 | 0.60 ±0.30 | 0.50 ±0.25 | 23.61 |
| CPF2512 | 6.30 ±0.15 | 3.10 ±0.15 | 0.55 ±0.10 | 0.60 ±0.30 | 0.50 ±0.25 | 38.08 |

Recommend Land Pattern



| Type | A | B | C |
|---------|------|------|-----------|
| CPF0201 | 0.25 | 0.3 | 0.40 ±0.2 |
| CPF0402 | 0.5 | 0.5 | 0.60 ±0.2 |
| CPF0603 | 0.8 | 1.0 | 0.90 ±0.2 |
| CPF0805 | 1.0 | 1.0 | 1.35 ±0.2 |
| CPF1206 | 2.0 | 1.15 | 1.70 ±0.2 |
| CPF1210 | 2.0 | 1.15 | 2.50 ±0.2 |
| CPF2010 | 3.6 | 1.4 | 2.50 ±0.2 |
| CPF2512 | 4.9 | 1.6 | 3.10 ±0.2 |

Type CPF Series

Packaging Quantity & Reel Specifications



| Type | øA | øB | øC | W | T | Paper Tape (EA) | Embossed Plastic Tape (EA) |
|---------|------------|-----------|-----------|-----------|-----------|-----------------|----------------------------|
| CPF0201 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±1.0 | 11.5 ±1.0 | 1000 / 5000 | - |
| CPF0402 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±1.0 | 11.5 ±1.0 | 1000 / 5000 | - |
| CPF0603 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±1.0 | 11.5 ±1.0 | 1000 / 5000 | - |
| CPF0805 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±1.0 | 11.5 ±1.0 | 1000 / 5000 | - |
| CPF1206 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±1.0 | 11.5 ±1.0 | 1000 / 5000 | - |
| CPF1210 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±1.0 | 11.5 ±1.0 | 1000 / 5000 | - |
| CPF2010 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 13.5 ±1.0 | 15.5 ±1.0 | - | 4000 |
| CPF2512 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 13.5 ±1.0 | 15.5 ±1.0 | - | 4000 |

Paper Tape Specification



| Type | A | B | W | E | F | P ₀ | P ₁ | P ₂ | øD ₀ | T |
|---------|------------|------------|------------|------------|-----------|----------------|----------------|----------------|-----------------|------------|
| CPF0201 | 0.40 ±0.05 | 0.70 ±0.05 | 8.00 ±0.10 | 1.75 ±0.05 | 3.5 ±0.05 | 4.00 ±0.10 | 2.00 ±0.05 | 2.00 ±0.05 | 1.55 ±0.03 | 0.42 ±0.02 |
| CPF0402 | 0.70 ±0.05 | 1.16 ±0.05 | 8.00 ±0.10 | 1.75 ±0.05 | 3.5 ±0.05 | 4.00 ±0.10 | 2.00 ±0.05 | 2.00 ±0.05 | 1.55 ±0.05 | 0.40 ±0.03 |
| CPF0603 | 1.10 ±0.05 | 1.90 ±0.05 | 8.00 ±0.10 | 1.75 ±0.05 | 3.5 ±0.05 | 4.00 ±0.10 | 4.00 ±0.10 | 2.00 ±0.05 | 1.55 ±0.05 | 0.60 ±0.03 |
| CPF0805 | 1.60 ±0.05 | 2.37 ±0.05 | 8.00 ±0.10 | 1.75 ±0.05 | 3.5 ±0.05 | 4.00 ±0.10 | 4.00 ±0.10 | 2.00 ±0.05 | 1.55 ±0.05 | 0.75 ±0.05 |
| CPF1206 | 2.00 ±0.05 | 3.55 ±0.05 | 8.00 ±0.10 | 1.75 ±0.05 | 3.5 ±0.05 | 4.00 ±0.10 | 4.00 ±0.10 | 2.00 ±0.05 | 1.55 ±0.05 | 0.75 ±0.05 |
| CPF1210 | 2.75 ±0.05 | 3.40 ±0.05 | 8.00 ±0.10 | 1.75 ±0.05 | 3.5 ±0.05 | 4.00 ±0.05 | 4.00 ±0.10 | 2.00 ±0.05 | 1.60 ±0.10 | 0.75 ±0.05 |

Type CPF Series

Embossed Plastic Tape Specifications



| Type | A | B | W | E | F | P ₀ | P ₁ | P ₂ | øD ₀ | T |
|---------|------------|------------|------------|------------|-----------|----------------|----------------|----------------|-----------------|------------|
| CPF2010 | 2.85 ±0.10 | 5.45 ±0.10 | 12.0 ±0.10 | 1.75 ±0.10 | 5.5 ±0.05 | 4.00 ±0.05 | 4.00 ±0.10 | 2.00 ±0.05 | 1.50 +0.10 | 1.00 ±0.20 |
| CPF2512 | 3.40 ±0.10 | 6.65 ±0.10 | 12.0 ±0.10 | 1.75 ±0.10 | 5.5 ±0.05 | 4.00 ±0.05 | 4.00 ±0.10 | 2.00 ±0.05 | 1.50 +0.10 | 1.00 ±0.20 |

How to Order

| CPF | 0603 | B | 100R | E | 1 |
|------------------------------------|--|-------------------------------------|---|-------------------------------------|--------------------------------|
| Common Part | Package Size | Tolerance | Value | TCR | Packaging |
| CPF - Chip precision film resistor | 0201 1206 0402 1210 0603 2010 0805 2512 | B - ± 0.1% D - ±0.5% F - ± 1% | 100R (100 Ohms) 1K0 (1000 Ohms) 100K (100,000 Ohms) | D - 15ppm E - 25ppm C - 50ppm | 1 - 1K REEL Blank - 5K REEL |

TE Connectivity, TE connectivity (logo) and TE (logo) are trademarks.
Other logos, product and Company names mentioned herein may be trademarks of their respective owners.

While TE has made every reasonable effort to ensure the accuracy of the information in this datasheet, TE does not guarantee that it is error-free, nor does TE make any other representation, warranty or guarantee that the information is accurate, correct, reliable or current. TE reserves the right to make any adjustments to the information contained herein at any time without notice. TE expressly disclaims all implied warranties regarding the information contained herein, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. The dimensions in this datasheet are for reference purposes only and are subject to change without notice. Specifications are subject to change without notice. Consult TE for the latest dimensions and design specifications.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.