

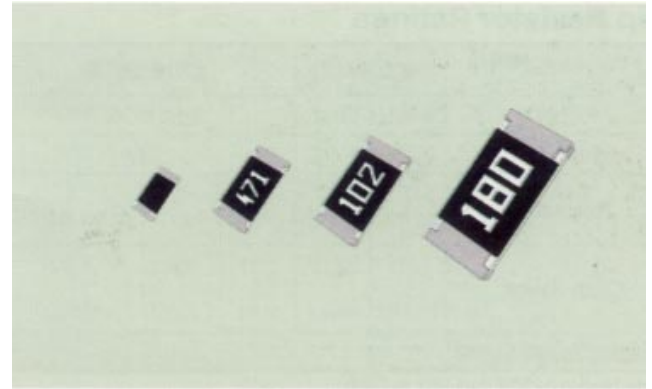
Thick Film Chip Resistors



CR05 / CR10 / CR21 / CR32 Series

Features:

- 1) Wave, IR reflow and vapor phase soldering compatible.
- 2) Wrap-around nickel barrier terminations.
- 3) Suitable size & packaging for surface mount assembly.
- 4) Low noise.



How To Order:

CR 32 – 101 J – T

Packaging

- B = Bulk (1,000 pcs/bag)
- T = 7" Reel/Punched Paper Tape (5,000 pcs/reel) except CR05
- H = 7" Reel/Punched Paper Tape (10,000 pcs/reel, 2mm pitch taping) CR05 and CR10
- D = 10" Reel/Punched Paper Tape (10,000 pcs/reel) CR32, CR21, CR10
- K = 13" Reel/Punched Paper Tape (20,000 pcs/reel) except CR05 (optional)

Resistance Tolerance

- Blank = Jumper
- K = $\pm 10\%$
- J = $\pm 5\%$
- G = $\pm 2\%$
- F = $\pm 1\%$
- D = $\pm 0.5\%$

Resistance Code

- | | |
|----------------------------|---------------------------|
| For G, J, and K Tolerances | For D and F Tolerances |
| 3 digit code (E-24) | 4 digit code (E-96) |
| 2 significant digits plus | 3 significant digits plus |
| number of zeros | number of zeros |
| Examples: | Examples: |
| 2.2 Ω = 2R2 | 10 Ω = 10R0 |
| 10 Ω = 100 | 100 Ω = 1000 |
| 100 Ω = 101 | 1k Ω = 1001 |
| 1k Ω = 102 | |
| 0 Ω = 000 (Jumper) | |

Case Size

- 05 = 0402
- 10 = 0603
- 21 = 0805
- 32 = 1206

Style

- CR = Chip Resistor
- CJ = Zero Ohm Jumper

Dimensions:

| | CR05 (CJ05) | CR10 (CJ10) | CR21 (CJ21) | CR32 (CJ32) |
|----------|-----------------------------------|---|---|---|
| L | 1.00 \pm 0.05 (.039 \pm .002) | 1.60 \pm 0.10 (.063 \pm .004) | 2.00 \pm 0.10 (.079 \pm .004) | 3.10 \pm 0.10 (.122 \pm .004) |
| W | 0.50 \pm 0.05 (.020 \pm .002) | 0.80 $^{+0.15}_{-0.10}$ (.031 $^{+0.006}_{-.004}$) | 1.25 $^{+0.15}_{-0.10}$ (.049 $^{+0.006}_{-.004}$) | 1.55 $^{+0.15}_{-0.10}$ (.061 $^{+0.006}_{-.004}$) |
| T | 0.35 \pm 0.05 (.014 \pm .002) | 0.50 \pm 0.10 (.020 \pm .004) | 0.55 \pm 0.10 (.022 \pm .004) | 0.55 $^{+0.10}_{-0.05}$ (.022 $^{+0.004}_{-.002}$) |
| C | 0.20 \pm 0.15 (.008 \pm .006) | 0.25 \pm 0.20 (.010 \pm .008) | 0.35 \pm 0.20 (.014 \pm .008) | 0.45 \pm 0.20 (.018 \pm .008) |
| D | 0.20 \pm 0.10 (.008 \pm .004) | 0.20 $^{+0.20}_{-0.15}$ (.008 $^{+0.008}_{-.006}$) | 0.40 \pm 0.20 (.016 \pm .008) | 0.45 \pm 0.20 (.018 \pm .008) |

mm (inches)

CR05 / CR10 / CR21 / CR32 Series Performance Characteristics

Chip Resistor Ratings

| Spec \ Style | CR05 (0402) | | CR10 (0603) | | | | CR21 (0805) | | | | | CR32 (1206) | | | | |
|---------------------|--------------------|--------------------|------------------|--------------------|--------------------|-------------|------------------|------------------|--------------------|--------------------|---------------------|------------------|------------------|--------------------|--------------------|---------------------|
| Power | 0.063 (1/16) W | | 0.063 (1/16) W | | | | 0.100 (1/10) W | | | | | 0.125 (1/8) W* | | | | |
| Voltage | 50V | | 50V | | | | 100V | | | | | 200V | | | | |
| Tolerance | J (±5%) | K (±10%) | F (±1%) | G (±2%) | J (±5%) | K (±10%) | D (±0.5%) | F (±1%) | G (±2%) | J (±5%) | K (±10%) | D (±0.5%) | F (±1%) | G (±2%) | J (±5%) | K (±10%) |
| Value Range | 10Ω ↓ 2.2 MΩ | 2.2Ω ↓ 10 MΩ | 10Ω ↓ 1 MΩ | 10Ω ↓ 2.2 MΩ | 1.0Ω ↓ 10 MΩ | | 10Ω ↓ 1 MΩ | 10Ω ↓ 1 MΩ | 10Ω ↓ 2.2 MΩ | 1.0Ω ↓ 10 MΩ | 0.47Ω ↓ 10 MΩ | 10Ω ↓ 1 MΩ | 10Ω ↓ 1 MΩ | 10Ω ↓ 2.2 MΩ | 1.0Ω ↓ 10 MΩ | 0.36Ω ↓ 10 MΩ |
| Working Temperature | -55°C ~ +125°C | | | | | | | | | | | | | | | |

*May be rated to 0.250W from 10Ω to 2.2MΩ.

Chip Zero Ohm Jumper Ratings

| Spec \ Style | CJ05 (0402) | CJ10 (0603) | CJ21 (0805) | CJ32 (1206) |
|---------------------|----------------|-------------|-------------|-------------|
| Rated Current | 1A (70°C) | | | 2A (70°C) |
| Resistivity | 50 mΩ Maximum | | | |
| Working Temperature | -55°C ~ +125°C | | | |

Temperature Coefficient of Resistance

| Tolerance | CR05 | | | | | CR10 | | | | | | |
|------------------|-----------------|-------------------|-------------------|-----------------|-------------------|------------------|------------------|-----------------|-------------------|-------------------|-----------------|-------------------|
| | J (±5%) | | K (±10%) | | | F (±1%) | | G (±2%) | | J (±5%) | | K (±10%) |
| Resistance Range | 10Ω ↓ 1MΩ | 1MΩ ↓ 2.2MΩ | 2.2Ω ↓ 10Ω | 10Ω ↓ 1MΩ | 1MΩ ↓ 10MΩ | 10Ω ↓ 100Ω | 100Ω ↓ 1MΩ | 10Ω ↓ 1MΩ | 1MΩ ↓ 2.2MΩ | 1.0Ω ↓ 10Ω | 10Ω ↓ 1MΩ | 1MΩ ↓ 10MΩ |
| TCR (ppm/°C) | ±250 | -500 ↓ +300 | -100 ↓ +600 | ±250 | -500 ↓ +300 | ±200 | ±200 | ±200 | -500 ↓ +300 | -100 ↓ +600 | ±200 | -500 ↓ +300 |

| Tolerance | CR21 | | | CR32 | | | | |
|------------------|-----------------|------------------|------------------|-----------------|-------------------|-------------------|------------------|-------------------|
| | D (±0.5%) | F (±1%) | G (±2%) | J (±5%) | | K (±10%) | | |
| Resistance Range | 10Ω ↓ 1MΩ | 10Ω ↓ 100Ω | 100Ω ↓ 1MΩ | 10Ω ↓ 1MΩ | 1MΩ ↓ 2.2MΩ | 1.0Ω ↓ 10Ω | 10Ω ↓ 10MΩ | 1MΩ ↓ 10MΩ |
| TCR (ppm/°C) | ±200* | ±200* | ±200* | ±200 | -500 ↓ +300 | -100 ↓ +600 | ±200 | -500 ↓ +300 |

*Optional for 1% and 0.5% tolerance ±100ppm/°C

Standard Decade Values

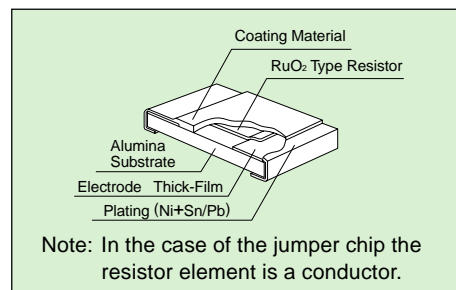
For ±10%, ±5%, ±2%, 1% and ±0.5% Tolerances (E-24)

| | | | | |
|-----|-----|-----|-----|-----|
| 1.0 | 1.1 | 1.2 | 1.3 | 1.5 |
| 1.6 | 1.8 | 2.0 | 2.2 | 2.4 |
| 2.7 | 3.0 | 3.3 | 3.6 | 3.9 |
| 4.3 | 4.7 | 5.1 | 5.6 | 6.2 |
| 6.8 | 7.5 | 8.2 | 9.1 | |

For ±1% and ±0.5% Tolerance (E-96)

| | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|
| 10.0 | 10.2 | 10.5 | 10.7 | 11.0 | 11.3 | 11.5 | 11.8 | 12.1 | 12.4 |
| 12.7 | 13.0 | 13.3 | 13.7 | 14.0 | 14.3 | 14.7 | 15.0 | 15.4 | 15.8 |
| 16.2 | 16.5 | 16.9 | 17.4 | 17.8 | 18.2 | 18.7 | 19.1 | 19.6 | 20.0 |
| 20.5 | 21.0 | 21.5 | 22.1 | 22.6 | 23.2 | 23.7 | 24.3 | 24.9 | 25.5 |
| 26.1 | 26.7 | 27.4 | 28.0 | 28.7 | 29.4 | 30.1 | 30.9 | 31.6 | 32.4 |
| 33.2 | 34.0 | 34.8 | 35.7 | 36.5 | 37.4 | 38.3 | 39.2 | 40.2 | 41.2 |
| 42.2 | 43.2 | 44.2 | 45.3 | 46.4 | 47.5 | 48.7 | 49.9 | 51.1 | 52.3 |
| 53.6 | 54.9 | 56.2 | 57.6 | 59.0 | 60.4 | 61.9 | 63.4 | 64.9 | 66.5 |
| 68.1 | 69.8 | 71.5 | 73.2 | 75.0 | 76.8 | 78.7 | 80.6 | 82.5 | 84.5 |
| 86.6 | 88.7 | 90.9 | 93.1 | 95.3 | 97.6 | | | | |

Construction



Marking

Marking available as follows:

Series: CR32, CJ32, CR21, CJ21, CR10, CJ10
3 digit indication

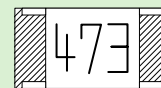
Example: 473=47 X 10³= 47000 Ω = 47 kΩ

0 : 0 Ω (Jumper)

100 : 10 Ω

102 : 1 kΩ

105 : 1 MΩ



Series: CR05 and CJ05 - No marking

Note: On CR32 4 digit marking is available for ±1% and ±0.5% tolerances.

Derating Curve

Under high temperature, power must not exceed derating curve.

