

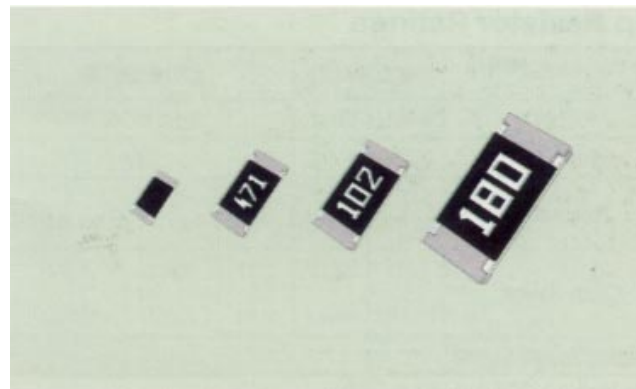
Thick Film Chip Resistors



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

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 $\pm$ 0.15 (.031 $\pm$.006) -0.10 -0.04	1.25 $\pm$ 0.15 (.049 $\pm$.006) -0.10 -0.04	1.55 $\pm$ 0.15 (.061 $\pm$.006) -0.10 -0.04
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 $\pm$ 0.10 (.022 $\pm$.004) -0.05 -0.02
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 $\pm$ 0.20 (.008 $\pm$.006) -0.15 -0.06	0.40 $\pm$ 0.20 (.016 $\pm$.008)	0.45 $\pm$ 0.20 (.018 $\pm$.008)

mm (inches)

Thick Film Chip Resistors



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

	CR05					CR10						
Tolerance	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
	CR21											
Tolerance	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 ↓ 1MΩ	1MΩ ↓ 10MΩ	0.47Ω ↓ 1.0Ω	1.0Ω ↓ 10Ω	10Ω ↓ 1MΩ	1MΩ ↓ 10MΩ
TCR (ppm/°C)	±200*	±200*	±200*	±200	-500 ↓ +300	-100 ↓ +600	±200	-500 ↓ +300	-100 ↓ +1000	-100 ↓ +600	±200	-500 ↓ +300
	CR32											
Tolerance	D (±0.5%)	F (±1%)		G (±2%)		J (±5%)			K (±10%)			
Resistance Range	10Ω ↓ 1MΩ	100Ω ↓ 1MΩ	10Ω ↓ 100Ω	1MΩ ↓ 2.2MΩ	10Ω ↓ 1MΩ	10Ω ↓ 1MΩ	1MΩ ↓ 10MΩ	1.0Ω ↓ 10Ω	0.36Ω ↓ 1.0Ω	1.0Ω ↓ 10Ω	10Ω ↓ 1MΩ	1MΩ ↓ 10MΩ
TCR (ppm/°C)	±200*	±200*	±200*	-500 ↓ +300	±200	±200	-500 ↓ +300	-100 ↓ +600	-100 ↓ +1000	-100 ↓ +600	±200	-500 ↓ +300

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

Standard Decade Values

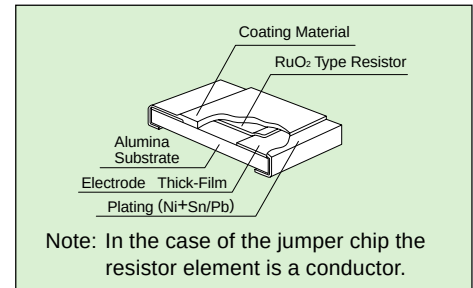
For ±10%, ±5%, ±2%, 1% and ±0.5% Tolerances (E-24)

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

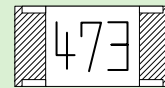
Example: 473=47 X 10³= 47000 Ω = 47 kΩ

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.

