

Thick Film Chip Resistors



CR63 Series

Features:

- 1) Rated power 1.0W.
- 2) Nominal resistor values from 1Ω to 1MΩ.
- 3) EIA chip size 2512.

How To Order:

CR 63 – 562 J – UE

Packaging

B = Bulk (100 pcs/bag)
UE = 7" Reel/Embossed Plastic Tape (4,000 pcs/reel)

Resistance Tolerance

K = ±10%
J = ±5%

Resistance Code

For J and K Tolerances
3 digit code (E-24)
2 significant digits plus
number of zeros
Examples:
2.2Ω = 2R2
10Ω = 100
100Ω = 101
1kΩ = 102

Case Size

63 = 2512

Style

CR = Chip Resistor

Dimensions:

	CR63	
L	6.30±0.20	(.248±.008)
W	3.20±0.20	(.126±.008)
T	0.60±0.20	(.024±.008)
C	0.45±0.20	(.018±.008)
D	0.45±0.20	(.018±.008)

mm (inches)

Chip Resistor Ratings

Spec	Style	CR63 (2512)
Power		1.0W
Voltage		200V max.
Tolerance	J (±5%) K (±10%)	
Value Range		1.0Ω 1 MΩ
Working Temperature		-55°C ~ +125°C

Marking

Marking available as follows:

Series: CR63

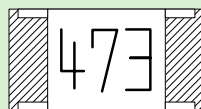
3 digit indication

Example: 473 = $47 \times 10^3 = 47000 \Omega = 47 \text{ k}\Omega$

100 : 10 Ω

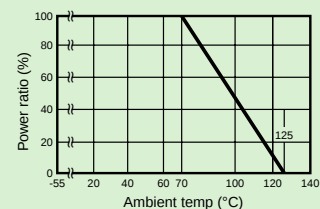
102 : 1 kΩ

105 : 1 MΩ



Derating Curve

Under high temperature, power must not exceed derating curve.



Specifications and Test Methods for Chip Resistors and Arrays

Mechanical Characteristics

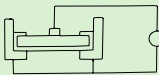
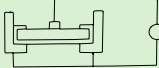
Item		Specification		Test Method
			Jumpers	
Terminal Strength	$\Delta R/R$	$\leq \pm (1\% + 0.05\Omega)$ of initial value	$R \leq 50m\Omega$	Apply the load as shown: Measure resistance during load application. PC board: glass-epoxy (T=1.6M) CR/CJ32: 3mm CR/CJ21: 3mm CR/CJ10: 3mm CR/CJ05: 3mm 
	Visual	No evidence of mechanical damage after loading		
	Breaking strength	Lead Pull > 0.5kg		 Except for CRA, CR05
Resistance to Soldering Heat	$\Delta R/R$	$\leq \pm (1 + 0.05\Omega)$ of the initial value		Immerse into molten solder at $260\pm 5^{\circ}\text{C}$ for 10 ± 1 sec. Stabilize at room temperature for 60 min. Measure resistance.
	Visual	Visual: no evidence of leaching		
Solderability		Coverage $\geq 95\%$ Each termination end		Immerse for 2 ± 0.5 sec. in Sn62 solder at $235 \pm 5^{\circ}\text{C}$
Anti-vibration Test	$\Delta R/R$	$\leq \pm (1\% + 0.1\Omega)$ of the initial value	$R \leq 50m\Omega$	2 hrs. each in x, y and z axis. (total 6 hrs.) 10 to 55Hz sweep in 1 min at 1.5mm amplitude.
	Visual	No evidence of mechanical damage		
Solvent Resistance	$\Delta R/R$	$\leq \pm (0.5\% + 0.05\Omega)$ of the initial value	$R \leq 50m\Omega$	Immerse in static state trichloroethylene at 20° to 25°C for 30 ± 5 sec. Dry in air @ 25°C for 30 minutes. Measure resistance.
	Visual	No evidence of mechanical damage		

Environmental Characteristics

Item		Specification		Test Method
			Jumpers	
Low Temperature Storage	ΔR/R	≤ ± (2% + 0.1Ω) of the initial value	R ≤ 50mΩ	Dwell in -65°C chamber without loading for 1000 +48/-0 hrs Stabilize at room temperature for 60 min. Measure resistance value.
	Visual	No evidence of mechanical damage		
High Temperature Exposure	ΔR/R	≤±(3% + 0.1Ω) of the initial value	R ≤ 50mΩ	Dwell in 125°C chamber for 1,000 +48/-0 hrs. without loading. Stabilize at room temperature for 60 minutes. Measure resistance value
	Visual	No evidence of mechanical damage		
Temperature Cycle	ΔR/R	≤±(1%+0.05Ω) of the initial value	R ≤ 50mΩ	① Perform 5 cycles as follows: -55±3°C for 30 min. →room temp. for 10~15 min. ⇄125±3° for 30 min. ② Stabilize at room temperature for 1 hr, then measure value.
	Visual	No evidence of mechanical damage		
Moisture Resistance	ΔR/R	≤±(3% + 0.1Ω) of the initial value	R ≤ 50mΩ	Dwell in test chamber at +65°C, and 90-95% RH for 1000 +48/-0 hours Stabilize at room temperature for 60 min. Measure resistance value.
	Visual	No evidence of mechanical damage		
Salt Spray	ΔR/R	≤±(3%+0.1Ω) of the initial value	R ≤ 50mΩ	Dwell in temp. 35±2°C Salt density 5% for 24 ±2 hrs.
	Visual	No evidence of mechanical damage		
Voltage Cycle in High Temperature	ΔR/R	≤±(3% + 0.1Ω) of the initial value	R ≤ 50mΩ	① Perform 1,000 +48/-0 hrs. in chamber (70±3°C) ON: 90 min. at rated voltage; OFF: 30 min. ② Stabilize at room temperature for 1 hr., then measure value.
	Visual	No evidence of mechanical damage		
Voltage Cycle in High Humidity	ΔR/R	≤±(3% + 0.1Ω) of the initial value	R ≤ 50mΩ	① Perform 1,000 +48/-0 hrs. in chamber (40 ±2°C, 90~95%RH) ON: 90 min. at rated voltage; OFF: 30 min. ② Stabilize at room temperature for 1 hr., then measure value.
	Visual	No evidence of mechanical damage		

Specifications and Test Methods for Chip Resistors and Arrays

Electrical Characteristics

Item		Specification		Test Method	
			Jumpers		
DC Resistance		Within initial tolerance	R≤50mΩ	Test Voltage	(20°C, 65% RH)
				Range of resistance (Ω)	Maximum voltage to be applied
				R<10	0.1 (V)
				10≤R<100	0.3 (V)
				100≤R<1K	1.0
				1K≤R<10K	3
				10K≤R<100K	10
				100K≤R<1M	35
				1M≤R	50
Resistance Temperature Characteristic		CR Series See Page 2 CRA Series See Page 6		Test temperature: - 55°C ~ 125°C	
				$\Delta R/R = \frac{R_2 - R_1}{R_1} \times \frac{1}{T_2 - T_1} \times 10^6$ ΔR/R: Temp. coefficient (ppm/°C) T ₁ : 25 °C T ₂ : 125 °C R ₁ : Resistance at T1 (Ω) R ₂ : Resistance at T2 (Ω)	
Short-time Overload	ΔR/R	≤± (2.0% + 0.1Ω) of the initial value	R ≤50mΩ	① Apply 2.5 x rated voltage (rated current: Jumper Chip) for 5 sec. ② Wait 30 minutes ③ Measure resistance CR32: 400V Max CR21: 200V Max CR10: 100V Max CR05: 50V Max CRA: 50V Max	
	Visual	No evidence of mechanical damage			
Intermittent Overload	ΔR/R	≤± (5% + 0.1Ω) of the of the initial value	R ≤50mΩ	① Perform 10000 voltage cycles as follows ON (2.5 x rated voltage or current) 1 sec. OFF 25 sec. ② Stabilization time 30 min. without loading ③ Measure resistance CR32: 400V Max CR21: 200V Max CR10: 100V Max CR05: 50V Max CRA: 50V Max	
	Visual	No evidence of mechanical damage			
Dielectric Withstanding Voltage		No evidence of mechanical damage		For CR32 & CR21 apply 500VAC for 1 min. For CRA and CR05 apply 300VAC for 1 sec. For CR10 apply 300VAC for 1 min.	
Insulation Resistance		•CR05: 10 ⁸ Ω Min •CR10: 10 ⁹ Ω Min •CR21: 10 ¹⁰ Ω Min •CR32: 10 ¹² Ω Min •CRA: 10 ⁹ Ω Min	•CJ05: 10 ⁸ Ω Min •CJ10: 10 ⁹ Ω Min •CJ21: 10 ¹⁰ Ω Min •CJ32: 10 ¹² Ω Min •CJA: 10 ⁹ Ω Min	For CR32, CR21, CR10 CJ32, CJ21, CJ10 apply 500VDC For CRA, CR05 CJA, CJ05 apply 100VDC	
Noise Level		Resistance	Noise	Refer to JIS C5202 5.9 Measurement method of noise level Except CR05, CRA	
		R<100Ω	-10dB (0.32μV/V)		
		100Ω≤R<1KΩ	0dB (1.0μV/V)		
		1KΩ≤R<10KΩ	10dB (3.2μV/V)		
		10KΩ≤R<100KΩ	15dB (5.6μV/V)		
		100KΩ≤R<1MΩ	20dB (10μV/V)		
		1MΩ≤R	30dB (32μV/V)		

Automatic Insertion Packaging

Tape & Reel Quantities (Punched Paper Tape)

Style	CR05	CR10, CR21, CR32
Punched Carrier	8mm	8mm
Pieces/7" Reel	10,000	5,000
Pieces/10" or 13" Reel	NA	10,000

Reel Dimensions (Metric dimensions will govern)



Tape Size	A Max.	B Min.	C	D Min.	N Min.	W	T Max.
8mm	178 (7)	1.5 (.059)	13.0±0.50 (.512±.020)	20.2 (.795)	50 (1.969)	10.0±1.5 (.394±.060)	2.5 (.098)
	260 (10)						
	330 (13)						

Metric dimensions will govern.

English measurements rounded and for reference only.

mm (inch)

Punched Tape Configuration

8mm Tape Only (Metric dimensions will govern, inches are in parentheses)

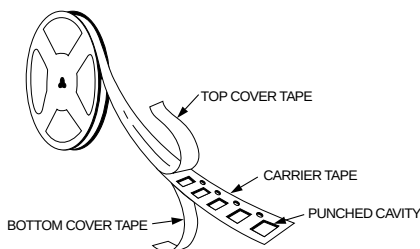
Constant Dimensions

Tape Size	D ₀	E	P ₀	P ₂	W	F
8mm	1.5 ^{+0.1} _{-0.0} (.059 ^{+0.004} _{-.000})	1.75±0.10 (.069±.004)	4.0±0.10 (.157±.004)	2.0±0.05 (.079±.002)	8.0±0.2 (.315±.008)	3.5±0.05 (.138±.002)

Variable Dimensions

Style	P ₁	A ₀	B ₀	T _{MAX.}
CR/CJ05	2.0±0.1 (.079±.004)	0.65±0.10 (.026±.004)	1.15±0.10 (.045±.004)	0.6 (.024)
CR/CJ/FR10	4.0±0.1 (.157±.004) or 2.0±0.1 (.079±.004)	1.1±0.20 (.043±.008)	1.9±0.20 (.075±.008)	1.1 (.043)
CR/CJ/FR21	4.0±0.10 (.157±.004)	1.65±0.20 (.065±.008)	2.4±0.20 (.094±.008)	
CR/CJ/FR32		2.0±0.20 (.079±.008)	3.6±0.20 (.142±.008)	
CRA3A CRB3A CRC3A				
CRA1A CRB1A CRC1A		1.9±0.20 (.079±.008)	1.9±0.20 (.079±.008)	
CRB2A	2.0±0.1 (.079±.004)	1.25±0.2 (.049±.008)	2.5±0.2 (.098±.008)	

Punched Carrier



Bulk Packaging

- 1) Package: 100 × 60mm Plastic bag
- 2) Unit: 1,000 pcs/bag
- 3) Label includes the following:
 - Part Number
 - Quantity
 - Lot Number