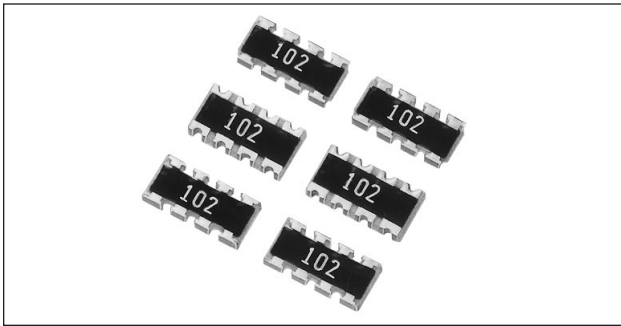


# Chip Resistor Arrays



## CRA, CRB, CRC Series



Chip Resistor Arrays have several resistor elements integrated as a single component.

4 Element Array:

CRA3A4E Series	Convex Scallop Type
CRB3A4E Series	Concave Type
CRC3A4E Series	Convex Corner Type

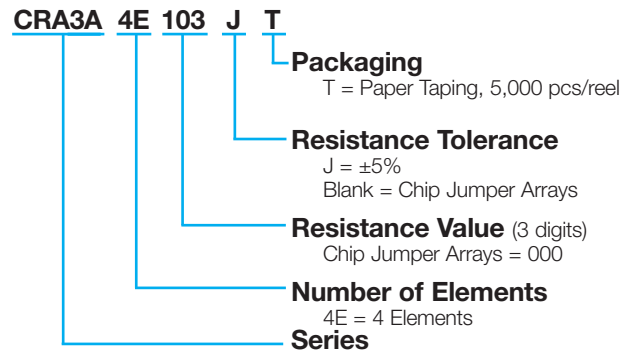
## FEATURES

- Reduction in mounting process & costs
- Save PCB space
- Reduction of inventory control costs

## APPLICATIONS

- Computer
- Hard Disk Drive
- Printer
- CD-ROM

## HOW TO ORDER



## RATING

Chip Resistor Arrays		Chip Jumper Arrays	
Item	Rating	Item	Rating
Rated Power (70°C)*	1/16W Element	Rated Current	1A
Max. Working Voltage	50V		
Max. Overload Voltage	100V		
Resistance Value	J = 10Ω to 2.2MΩ	Conductive Resistance Value	50mΩ max.
Tolerance	J±5%		
Working Temperature	-55 to +125°C		
Number of Elements	4E = 4 Elements		

\*Rated voltage = 50V or  $\sqrt{\text{Rated power} \times \text{Resistance value}}$ , whichever is less

## DIMENSIONS

millimeters (inches)

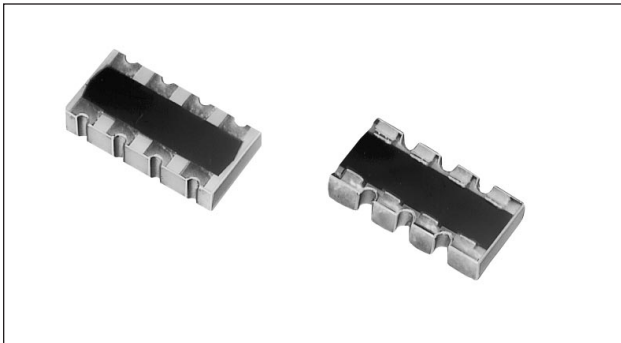
	4 Elements CRA3A4E Series	4 Elements CRB3A4E Series	4 Elements CRC3A4E Series
Style			
W	1.60±0.15 (0.063±0.006)	1.60±0.15 (0.063±0.006)	1.60±0.15 (0.063±0.006)
L	3.20±0.15 (0.126±0.006)	3.20±0.15 (0.126±0.006)	3.20±0.15 (0.126±0.006)
c	0.30±0.20 (0.012±0.008)	0.30±0.20 (0.012±0.008)	0.30±0.20 (0.012±0.008)
d	0.20±0.15 (0.008±0.006)	0.40±0.15 (0.016±0.006)	0.20±0.15 (0.008±0.006)
t	0.50±0.10 (0.020±0.004)	0.60±0.10 (0.024±0.004)	0.50±0.10 (0.020±0.004)
p	0.80 typ (0.031)	0.80 typ (0.031)	0.80 typ (0.031)

Detailed specifications are available on request.

# Chip Resistor Arrays



## CRB 2A4E, CRC 2A4E Series



Ultra miniature chip resistor arrays have 4 resistor elements integrated as a single component.

### FEATURES

- Miniature (2.0x1.0mm) Resistor Arrays  
Max. 60% space saving compared with the use of standard chip array (3.2x1.6mm)
- 0.5mm Termination pitch (same as IC lead-pin pitch)  
Easy designing of pattern layout and improve electrical characteristics for circuit

### HOW TO ORDER

**CRB 2A 4E 103 J T**

#### Packaging

T = Paper Taping, 2mm Pitch,  
10,000 pcs/reel

#### Resistance Tolerance

J = ±5%  
Blank = Chip Jumper Arrays

#### Resistance Value (3 digits)

472 = 4.7kΩ    103 = 10kΩ  
000 = 0Ω (Chip Jumper Array)

#### Number of Elements

4E = 4 Elements

#### Size 2A = 0804

#### Series CRB, CRC

4 Element Chip Resistor Array:

CRB2A4E Series (□ Termination)

CRC2A4E Series (⊏ Termination)

### DIMENSIONS

millimeters (inches)

**CRB2A4E**

Code	L	W	T	P	b	c	d	e
<b>Dim.</b>	2.00 <sup>+0.10</sup> <sub>-0.10</sub> (0.079 <sup>+0.004</sup> <sub>-0.004</sub> )	1.00 <sup>+0.10</sup> <sub>-0.10</sub> (0.039 <sup>+0.004</sup> <sub>-0.004</sub> )	0.40 <sup>+0.10</sup> <sub>-0.10</sub> (0.016 <sup>+0.004</sup> <sub>-0.004</sub> )	0.50 typ (0.020 typ)	∅0.15 typ (∅0.006 typ)	0.20 <sup>+0.15</sup> <sub>-0.15</sub> (0.008 <sup>+0.006</sup> <sub>-0.006</sub> )	0.25 <sup>+0.15</sup> <sub>-0.15</sub> (0.010 <sup>+0.006</sup> <sub>-0.006</sub> )	0.25 typ (0.010 typ)

Non-Marking on chips

### DIMENSIONS

millimeters (inches)

**CRC2A4E**

Code	L	W	T	P	c	d	e1	e2
<b>Dim.</b>	2.00 <sup>+0.10</sup> <sub>-0.10</sub> (0.079 <sup>+0.004</sup> <sub>-0.004</sub> )	1.00 <sup>+0.10</sup> <sub>-0.10</sub> (0.039 <sup>+0.004</sup> <sub>-0.004</sub> )	0.40 <sup>+0.10</sup> <sub>-0.10</sub> (0.016 <sup>+0.004</sup> <sub>-0.004</sub> )	0.50 typ (0.020 typ)	0.15 <sup>+0.15</sup> <sub>-0.15</sub> (0.006 <sup>+0.006</sup> <sub>-0.006</sub> )	0.25 <sup>+0.15</sup> <sub>-0.15</sub> (0.010 <sup>+0.006</sup> <sub>-0.006</sub> )	0.30 <sup>+0.10</sup> <sub>-0.10</sub> (0.012 <sup>+0.004</sup> <sub>-0.004</sub> )	0.40 <sup>+0.10</sup> <sub>-0.10</sub> (0.016 <sup>+0.004</sup> <sub>-0.004</sub> )

Non-Marking on chips

### RATING

Chip Resistor Arrays		Chip Jumper Arrays	
Item	Rating	Item	Rating
Rated Power (70°C)	1/32W Element	Rated Current	1A
Max. Working Voltage*	25V		
Max. Overload Voltage	50V		
Resistance Value	10Ω to 1MΩ	Conductive Resistance Value	50mΩ max.
Tolerance	J = ±5%		
Working Temperature		-55 to +125°C	
Number of Elements		4E = 4 Elements	

\*Please contact sales engineer for any other requirements of the nominal resistance value and the tolerance.

\*Rated voltage =  $\sqrt{\text{Rated power} \times \text{Resistance value}}$ , whichever is less

# Chip Resistor Arrays



## CR, CJ, CRA, CRB, CRC Series - Test Conditions

### ELECTRICAL CHARACTERISTICS

Item	Standard		Test Conditions							
	Resistor	Jumper	Resistor	Jumper						
<b>DC Resistance</b>	Within Initial Tolerance		Power Condition A (20°C, 65% RH)							
<b>Temperature Characteristics</b>	<table border="1"> <thead> <tr> <th>Resistance (<math>\Omega</math>)</th> <th>TCR (ppm/°C)</th> </tr> </thead> <tbody> <tr> <td>D, F 10 ≤ R ≤ 1M</td> <td>-100 to +100</td> </tr> <tr> <td>J R &lt; 10 10 ≤ R ≤ 1M 1M &lt; R</td> <td>-100 to +600 -200 to +200 -500 to +300</td> </tr> </tbody> </table>		Resistance ( $\Omega$ )	TCR (ppm/°C)	D, F 10 ≤ R ≤ 1M	-100 to +100	J R < 10 10 ≤ R ≤ 1M 1M < R	-100 to +600 -200 to +200 -500 to +300	/	Test Temperature: 25, 125(°C) $\Delta R/R = R_2 - R_1 / R_1 \times 1 / T_2 - T_1 \times 10^6$ $\Delta R/R =$ Temp. Coefficient (ppm/°C) $T_1 = 25(°C)$ $T_2 = 125(°C)$ $R_1 = T_1$ Resistance at ( $\Omega$ ) $R_2 = T_2$ Resistance at ( $\Omega$ )
	Resistance ( $\Omega$ )	TCR (ppm/°C)								
D, F 10 ≤ R ≤ 1M	-100 to +100									
J R < 10 10 ≤ R ≤ 1M 1M < R	-100 to +600 -200 to +200 -500 to +300									
<b>Short-time Overload</b>	$\Delta R/R$ $\pm(2.0\% + 0.10\Omega)$ max. of the initial value	50m $\Omega$ max.	(1) Apply 2.0 x rated voltage for 5 sec. (2.5 x rated voltage for Arrays) (2) Wait 30 minutes (3) Measure resistance CR05 = 50V max. CR10 = 100V max. CR21 = 200V max. CR32 = 400V max. CRA, CRB, CRC = 100V max.							
<b>Intermittent Overload</b>	<b>Visual</b>	No evidence of mechanical damage intermittent overload		(1) 2A for 5 sec. (2) Wait 30 minutes (3) Measure resistance						
	$\Delta R/R$	$\pm(5\% + 0.1\Omega)$ max. of the initial value	50m $\Omega$ max.							
<b>Dielectric Withstanding Voltage</b>	<b>Visual</b>	No evidence of mechanical damage		(1) Perform 10,000 voltage cycles as follows: ON (2.0 x rated voltage, 2.5 x for Arrays) 1 sec. OFF 25 sec. (2) Stabilization time 30 min. without loading (3) Measure resistance CR05 = 50V max. CR10 = 150V max. CR21 = 200V max. CR32 = 400V max. CRA, CRB, CRC = 100V max.						
	$\Delta R/R$	$\pm(5\% + 0.1\Omega)$ max. of the initial value								
<b>Insulation Resistance</b>	No evidence of mechanical damage • CR05, CJ05 = 10 <sup>9</sup> $\Omega$ min. • CR10, CJ10 = 10 <sup>9</sup> $\Omega$ min. • CR21, CJ21 = 10 <sup>10</sup> $\Omega$ min. • CR32, CJ32 = 10 <sup>12</sup> $\Omega$ min. • CRA, CRB, CRC = 10 <sup>9</sup> $\Omega$ min.		Apply 500 VAC for 1 min. (CR10 300 VAC) (CR05, CRA, CRB, CRC 300 VAC/1 sec.)  Apply 500V DC (CR05, CRA, CRB, CRC 100V DC)							

# Chip Resistor Arrays



## CR, CJ, CRA, CRB, CRC Series - Test Conditions

### MECHANICAL CHARACTERISTICS

Item		Standard		Test Conditions	
		Resistor	Jumper	Resistor	Jumper
Terminal Strength	$\Delta R/R$	$\pm(1\%+0.05\Omega)$ max. of the initial value	50m $\Omega$ max.	Apply the load as shown: Measure resistance during load application	
	Visual	No evidence of mechanical damage after loading			
Soldering Heat Resistance	$\Delta R/R$	$\pm(1\%+0.05\Omega)$ max. of the initial value	50m $\Omega$ max.	Immerse into molten solder at 260 $\pm$ 5 $^{\circ}$ C for 10 $\pm$ 1 sec. Stabilize component at room temperature for 1 hr. Measure resistance.	
	Visual	No evidence of leaching			
Solderability		Coverage $\geq$ 95% each termination end		Immerse in Rogin Flux for 2 $\pm$ 0.5 sec. and in SN62 solder at 235 $\pm$ 5 $^{\circ}$ C for 2 $\pm$ 0.5 sec.	
Anti-Vibration Test	$\Delta R/R$	$\pm(1\%+0.1\Omega)$ max. of the initial value	50m $\Omega$ max.	2 hrs. each in X, Y and Z axis. (TTL 6 hrs.) 10 to 55 Hz sweep in 1 min. at 1.5mm amplitude.	
	Visual	No evidence of mechanical damage			
Solvent Resistance	$\Delta R/R$	$\pm(0.5\%+0.05\Omega)$ max. of the initial value	50m $\Omega$ max.	Immerse in static state butyl acetate at 20 $^{\circ}$ C to 25 $^{\circ}$ C for 30 $\pm$ 5 sec. Stabilize component at room temperature for 30 min. then measure value.	
	Visual	No evidence of mechanical damage			

### ENVIRONMENTAL CHARACTERISTICS

Item		Standard		Test Conditions	
		Resistor	Jumper	Resistor	Jumper
Temperature Cycle	$\Delta R/R$	$\pm(1\%+0.05\Omega)$ max. of the initial value	50m $\Omega$ max.	(1) Run 5 cycles as follows: -55 $\pm$ 3 $^{\circ}$ C for 30 min. 125 $\pm$ 3 $^{\circ}$ C for 30 min. Room temp. for 10-15 min. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			
Low Temperature Storage	$\Delta R/R$	$\pm(2\%+0.1\Omega)$ max. of the initial value	50m $\Omega$ max.	(1) Dwell in -55 $^{\circ}$ C chamber without loading for 1000 $^{+48}$ hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			
High Temperature Storage	$\Delta R/R$	$\pm(3\%+0.1\Omega)$ max. of the initial value	50m $\Omega$ max.	(1) Dwell in 125 $^{\circ}$ C chamber without loading for 1000 $^{+48}$ hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			
Moisture Resistance	$\Delta R/R$	$\pm(3\%+0.1\Omega)$ max. of the initial value	50m $\Omega$ max.	(1) Dwell in temp.: 65 $^{\circ}$ C RH90 to 95% RH chamber without loading for 1000 $^{+48}$ hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			
Life Test	$\Delta R/R$	$\pm(3\%+0.1\Omega)$ max. of the initial value	50m $\Omega$ max.	(1) Temp.: 70 $\pm$ 3 $^{\circ}$ C Voltage: (rated voltage) on 90 min. off 30 min. Duration: 1000 $^{+48}$ hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			
Loading Life in Moisture	$\Delta R/R$	$\pm(3\%+0.1\Omega)$ max. of the initial value	50m $\Omega$ max.	(1) Temp.: 40 $\pm$ 2 $^{\circ}$ C RH: 90-95% Voltage Cycle: on 90 min. (rated voltage) off 30 min. Duration: 1000 $^{+48}$ hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			