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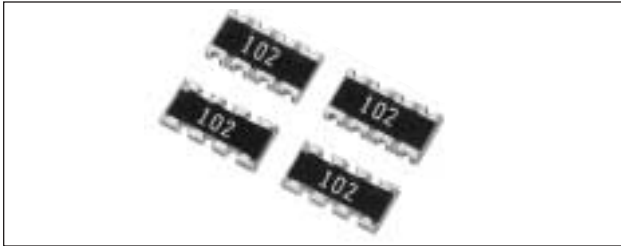
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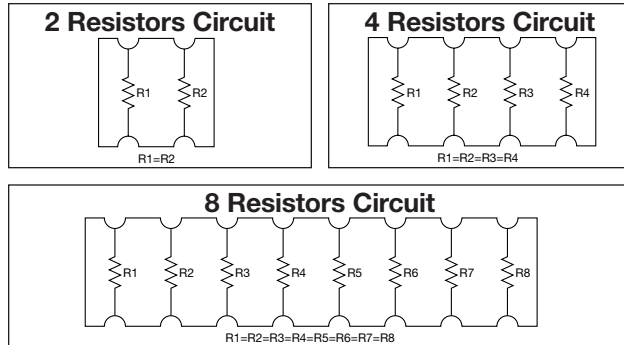
# Chip Resistor Arrays



## CRB Series (Concave Type)



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



### RATING

Chip Resistor Arrays	
Item	Rating
Rated Power (70°C)*	1/16W Element
Max. Working Voltage	50V
Max. Overload Voltage	100V
Resistance Value	10Ω to 2.2MΩ (CRB6A 1MΩ max.)
Tolerance	J±5% (CRB6A G ± 2% only)
Working Temperature	-55 to +125°C

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

### DIMENSIONS

**CRB1A2E**

Top view dimensions:  $W$ ,  $L$ ,  $C$ ,  $d$ ,  $t$ ,  $a$ ,  $b$ ,  $P$ .  
Side view dimensions:  $d$ ,  $W$ ,  $t$ .

Code	W	L	C	d	t	a	b	P
Dim.	1.60±0.15 (0.063±0.006)	1.60±0.20 (0.063±0.008)	0.30±0.20 (0.012±0.008)	0.40±0.15 (0.016±0.006)	0.60±0.10 (0.024±0.006)	0.50±0.15 (0.020±0.006)	0.30±0.10 (0.012±0.004)	0.80±0.10 (0.031±0.004)

No Marking on chips

**CRB2A4E**

Top view dimensions:  $L$ ,  $W$ ,  $T$ ,  $P$ ,  $b$ ,  $c$ ,  $d$ ,  $e$ .  
Side view dimensions:  $d$ ,  $W$ ,  $T$ .

Code	L	W	T	P	b	c	d	e
Dim.	2.00±0.10 (0.079±0.004)	1.00±0.10 (0.039±0.004)	0.40±0.10 (0.016±0.004)	0.50 typ (0.020 typ)	ø0.15 typ (ø0.006 typ)	0.20±0.15 (0.008±0.006)	0.25±0.015 (0.010±0.006)	0.25 typ (0.010 typ)

**CRB3A4E**

Top view dimensions:  $W$ ,  $L$ ,  $C$ ,  $D$ ,  $T$ ,  $P$ .  
Side view dimensions:  $d$ ,  $W$ ,  $T$ .

Code	W	L	C	D	T	P
Dim.	1.60±0.15 (0.063±0.006)	3.20±0.15 (0.126±0.006)	0.30±0.20 (0.012±0.008)	0.40±0.15 (0.016±0.006)	0.60±0.10 (0.024±0.004)	0.80 typ (0.031 typ)

**CRB6A8E**

Top view dimensions:  $L$ ,  $W$ ,  $T$ ,  $P$ ,  $c$ ,  $d$ ,  $e$  (top),  $e$  (bottom).  
Side view dimensions:  $d$ ,  $W$ ,  $T$ .

Code	L	W	T	P	c	d	e (top)	e (bottom)
Dim.	6.40±0.20 (0.252±0.008)	1.60±0.20 (0.063±0.008)	0.60±0.10 (0.024±0.004)	0.80 typ (0.031 typ)	0.30±0.20 (0.012±0.008)	0.40±0.15 (0.016±0.006)	0.50±0.10 (0.020±0.004)	0.40±0.15 (0.016±0.006)

Detailed specifications are available on request.

### 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

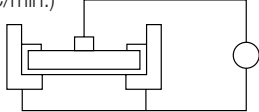
<b>CRB</b>	<b>1A</b>	<b>2E</b>	<b>103</b>	<b>J</b>	<b>T</b>
<b>Series</b>					
<b>Size</b>					
	1A = 0606 size				
	2A = 0804 size				
	3A = 1206 size				
	6A = 2506 size				
<b>Number of Elements</b>					
	2E = 2 Elements				
	4E = 4 Elements				
	8E = 8 Elements				
					<b>Packaging</b>
					T = Paper Taping
					• CRB1A 10,000 pcs/7" reel
					• CRB2A 10,000 pcs/7" reel
					• CRB3A 5,000 pcs/7" reel
					U = Plastic Taping
					• CRB6A 4,000 pcs/7" reel
					<b>Resistance Tolerance</b>
					J = ±5%
					G = ±2%
					Blank = Chip Jumper Arrays
					<b>Resistance Value (3 digits)</b>
					Chip Jumper Arrays = 000

# Chip Resistor Arrays



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

### ELECTRICAL CHARACTERISTICS

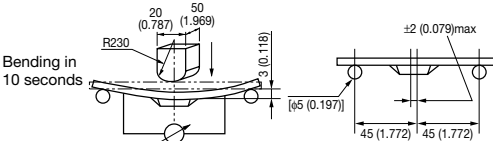
Item		Standard		Test Conditions							
		Resistor	Jumper	Resistor	Jumper						
DC Resistance		Within Initial Tolerance		Power Condition A (20°C, 65% RH)							
Temperature Characteristics		<table><tr><th>Resistance (Ω)</th><th>TCR (ppm/°C)</th></tr><tr><td>*D, F 10≤ R ≤1M</td><td>-100 to +100</td></tr><tr><td>J, CR05 = F R &lt;10 10≤ R ≤1M 1M&lt; R</td><td>-100 to +600 -250 to +250 -500 to +300</td></tr></table>	Resistance (Ω)	TCR (ppm/°C)	*D, F 10≤ R ≤1M	-100 to +100	J, CR05 = F R <10 10≤ R ≤1M 1M< R	-100 to +600 -250 to +250 -500 to +300		<div>Test Temperature: 25, 125(°C) ΔR/R=R<sub>2</sub>−R<sub>1</sub>/R<sub>1</sub>×1/T<sub>2</sub>−T<sub>1</sub>×10<sup>6</sup> ΔR/R = Temp. Coefficient (ppm/°C) T<sub>1</sub> = 25(°C) T<sub>2</sub> = 125(°C) R<sub>1</sub> = T<sub>1</sub> Resistance at (Ω) R<sub>2</sub> = T<sub>2</sub> Resistance at (Ω)</div>	
Resistance (Ω)	TCR (ppm/°C)										
*D, F 10≤ R ≤1M	-100 to +100										
J, CR05 = F R <10 10≤ R ≤1M 1M< R	-100 to +600 -250 to +250 -500 to +300										
Short-time Overload	ΔR/R	±(2.0%+0.10Ω) max. of the initial value	50mΩ 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 CR03 = 30V max. CR05 = 50V max. CR10 = 100V max. CR21 = 200V max. CR32 = 400V max. CRA3A, CRB3A, CRC3A = 100V max.	(1) 2A for 5 sec. (CJ03 = 1A) (2) Wait 30 minutes (3) Measure resistance						
	Visual	No evidence of mechanical damage intermittent overload									
Intermittent Overload	ΔR/R	±(5%+0.1Ω) max. of the initial value	50mΩ max.	(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 CR03 = 30V max. CR05 = 50V max. CR10 = 150V max. CR21 = 200V max. CR32 = 400V max. CRA, CRB, CRC = 100V max.	(1) Perform 10,000 current cycles as follows: ON (2A) 1 sec. OFF 25 sec. (2) Wait 30 minutes (3) Measure resistance CJ03 = 1A max.						
	Visual	No evidence of mechanical damage									
Dielectric Withstanding Voltage		No evidence of mechanical damage		Apply 500 VAC for 1 min. (CR10 300 VAC) (CR05, CRA3A, CRB3A, CRC3A 300 VAC/1 sec. CR03 50 VAC/min.)							
Insulation Resistance		<div>• CR03, CJ03 = 10<sup>8</sup>Ω min. • CR05, CJ05 = 10<sup>8</sup>Ω min. • CR10, CJ10 = 10<sup>9</sup>Ω min. • CR21, CJ21 = 10<sup>10</sup>Ω min. • CR32, CJ32 = 10<sup>12</sup>Ω min. • CRA3A, CRB3A, CRC3A = 10<sup>9</sup>Ω min.</div>		<div>Apply 500V DC (CR05, CRA3A, CRB3A, CRC3A 100V DC CR03 50 VDC)</div> <div></div>							

# 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.	<p>Apply the load as shown: Measure resistance during load application</p>  <p>PC Board = Glass epoxy t = 1.60 (0.063)</p>	
	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.	<p>Immerse into molten solder at <math>260\pm 5^\circ\text{C}</math> for <math>10\pm 1</math> sec. Stabilize component at room temperature for 1 hr. Measure resistance.</p>	
	Visual	No evidence of leaching			
Solderability		Coverage $\geq 95\%$ each termination end		<p>Immerse in Rogin Flux for <math>2\pm 0.5</math> sec. and in SN62 solder at <math>235\pm 5^\circ\text{C}</math> for <math>2\pm 0.5</math> sec.</p>	
Anti-Vibration Test	$\Delta R/R$	$\pm(1\%+0.1\Omega)$ max. of the initial value	50m $\Omega$ max.	<p>2 hrs. each in X, Y and Z axis. (TTL 6 hrs.) 10 to 55 Hz sweep in 1 min. at 1.5mm amplitude.</p>	
	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.	<p>Immerse in static state butyl acetate at <math>20^\circ\text{C}</math> to <math>25^\circ\text{C}</math> for <math>30\pm 5</math> sec. Stabilize component at room temperature for 30 min. then measure value.</p>	
	Visual	No evidence of mechanical damage			

### ENVIRONMENTAL CHARACTERISTICS

Item		Standard		Test Conditions	
		Resistor	Jumper	Resistor	Jumper
Temperature Cycle	ΔR/R	±(1%+0.05Ω) max. of the initial value	50mΩ max.	(1) Run 5 cycles as follows: -55±3°C for 30 min. 125±3°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	ΔR/R	±(2%+0.1Ω) max. of the initial value	50mΩ max.	(1) Dwell in -55°C chamber without loading for 1000 <sup>+48</sup> <sub>-0</sub> hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			
High Temperature Storage	ΔR/R	±(3%+0.1Ω) max. of the initial value	50mΩ max.	(1) Dwell in 125°C chamber without loading for 1000 <sup>+48</sup> <sub>-0</sub> hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			
Moisture Resistance	ΔR/R	±(3%+0.1Ω) max. of the initial value	50mΩ max.	(1) Dwell in temp.: 65°C RH90 to 95% RH chamber without loading for 1000 <sup>+48</sup> <sub>-0</sub> hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			
Life Test	ΔR/R	±(3%+0.1Ω) max. of the initial value	50mΩ max.	(1) Temp.: 70±3°C Voltage: (rated voltage) on 90 min. off 30 min. Duration: 1000 <sup>+48</sup> <sub>-0</sub> hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			
Loading Life in Moisture	ΔR/R	±(3%+0.1Ω) max. of the initial value	50mΩ max.	(1) Temp.: 40±2°C RH: 90-95% Voltage Cycle: on 90 min. (rated voltage) off 30 min. Duration: 1000 <sup>+48</sup> <sub>-0</sub> hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			

# Packaging of Chip Component



## Automatic Insertion Packaging

### TAPE AND REEL

### REEL DIMENSIONS

millimeters (inches)

	Tape Size	A Max.	B Min.	C	D Min.	N Min.	W	T Max.
	8mm	178 (7) 260 (10)	1.50 (0.059)	13.0±0.50 (0.512±0.020)	20.2 (0.795)	50 (1.969)	10.0±1.50 (0.394±0.059)	2.50 (0.098)

Metric dimensions will govern.  
English measurements rounded and for reference only.

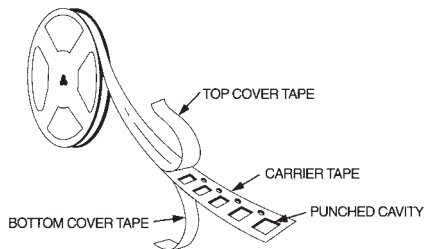
millimeters (inches)

PUNCHED TAPE CONFIGURATION 8MM TAPE ONLY						
Tape Size	D <sub>0</sub>	E	P <sub>0</sub>	P <sub>2</sub>	W	F
8mm	1.50 <sup>+0.10</sup> / <sub>-0.00</sub> (0.059 <sup>+0.004</sup> / <sub>-0.000</sub> )	1.75±0.10 (0.069±0.004)	4.0±0.10 (0.157±0.004)	2.00±0.05 (0.079±0.002)	8.00±0.20 (0.135±0.008)	3.50±0.05 (0.138±0.002)

VARIABLE DIMENSIONS				
Style	P <sub>1</sub>	A <sub>0</sub>	B <sub>0</sub>	T max.
CR/CJ03 CR/CJ05	2.00±0.10 (0.079±0.004)	0.65±0.10 (0.026±0.004)	1.15±0.10 (0.045±0.004)	0.60 (0.024)
CR/CJ/FR10	4.00±0.10 (0.157±0.004) or 2.00±0.10 (0.079±0.004)	1.10±0.20 (0.043±0.008)	1.90±0.20 (0.075±0.008)	1.10 (0.043)
CR/CJ/FR21	4.00±0.10 (0.157±0.004)	1.65±0.20 (0.065±0.008)	2.40±0.20 (0.094±0.008)	
CR/CJ/FR32		2.00±0.20 (0.079±0.008)	3.60±0.20 (0.142±0.008)	
CRB1A		1.90±0.20 (0.075±0.008)	1.90±0.20 (0.075±0.008)	
CRA3A CRB3A CRC3A		2.00±0.20 (0.079±0.008)	3.60±0.20 (0.142±0.008)	
CRB2A	2.00±0.10 (0.079±0.004)	1.25±0.20 (0.049±0.008)	2.50±0.20 (0.098±0.008)	

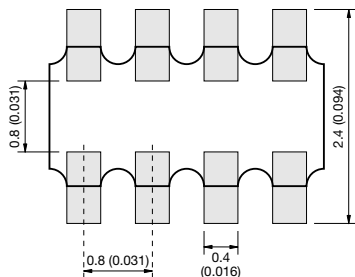
### PUNCHED CARRIER



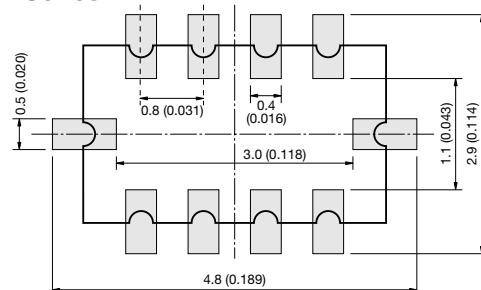
## RECOMMENDED LAND PATTERNS IS REFERRED THE FOLLOWING FOR EXAMPLE

millimeters (inches)

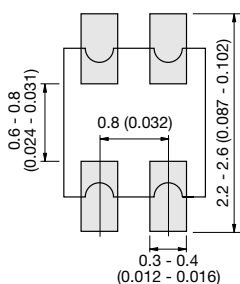
**CRA3A4E Series**



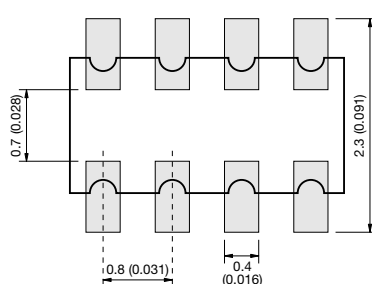
**RNA4A8E Series**



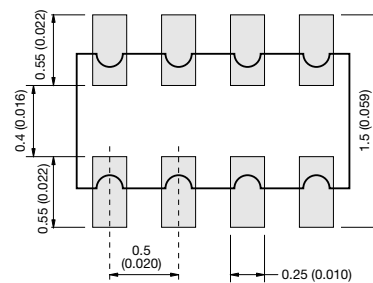
**CRB1A2E Series**



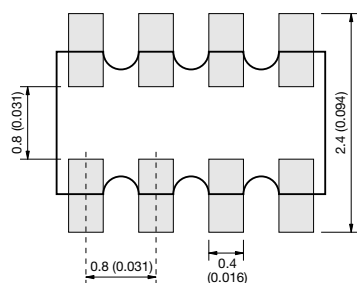
**CRB3A4E Series**



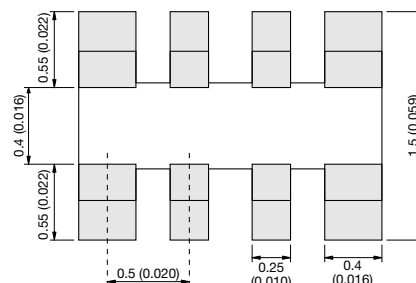
**CRB2A4E Series**



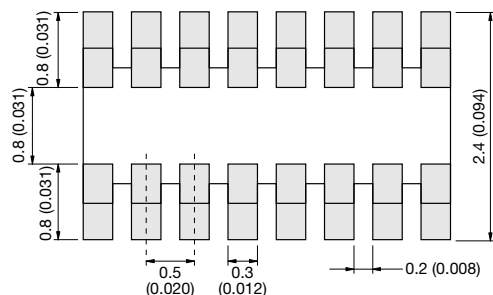
**CRC3A4E Series**



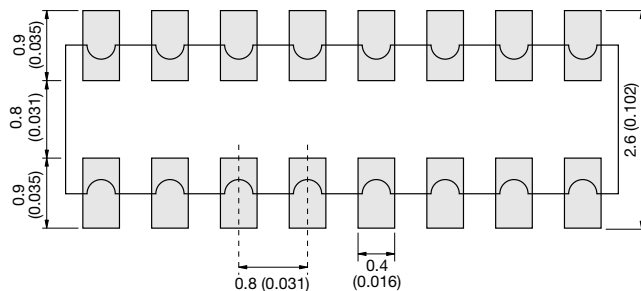
**CRC2A4E Series**



**CRC4A8E Series**



**CRB6A8E Series**



## SAMPLE KIT PART NUMBERS

Part Number	Description
<b>CRJ-E6-Kit</b>	Combination 0603, 0805, 1206, 5% parts 21 values per case size 100 pcs. per value (approx.)
<b>CR05-E12-Kit</b>	0402, 5% parts 63 values 100 pcs. per value
<b>CR10J-E12-Kit</b>	0603, 5% parts 63 values 100 pcs. per value (approx.)
<b>CR21J-E12-Kit</b>	0805, 5% parts 63 values 100 pcs. per value (approx.)
<b>CR32J-E12-Kit</b>	1206, 5% parts 63 values 100 pcs. per value (approx.)
<b>CR05F-E24-Kit</b>	0402, 1% parts 63 values 100 pcs. per value
<b>CR10F-E24-Kit</b>	0603, 1% parts 63 values 100 pcs. per value
<b>CR-ARRAY-E6-Kit</b>	Arrays, Various styles, CRA, CRB, CRC, RNA, 5% 13 values per style (approx.) 20 pcs. per value