



## **Resistor Product Discontinuation & Update**

We would like to take this opportunity to thank you for your patronage and the many years of support you have given to our resistive products. As you know we are de-emphasizing the product line and would like to inform you of our decision to re-align our product offering.

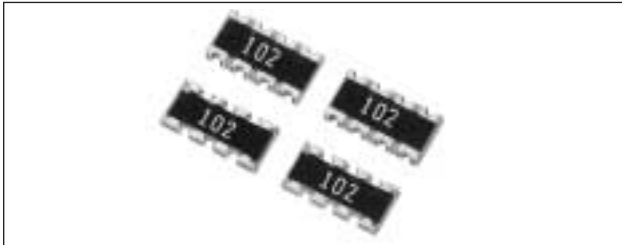
AVX will expand our focus on our 0408 and smaller resistor array products and discontinue to offer our larger case size resistor chip series along with the 1206 resistor arrays. This will be accomplished in several stages over the next twelve months. Please refer to each product series below and the effective dates we will cease to supply the products.

- **Chip Resistor Series (CR63, CR32, CR21, CR10)**  
Final Ship Date: February 1st, 2004
- **Chip Resistor Series (CR05)**  
Final Ship Date: August 1<sup>st</sup>, 2004
- **1206 Resistor Array Series (CRA3A4E, CRB3A4E, CRC3A4E)**  
Final Ship Date: August 1<sup>st</sup>, 2004

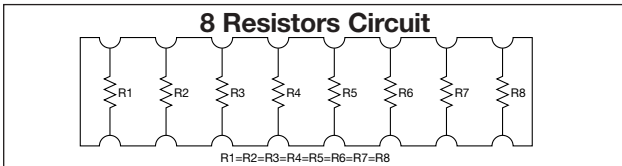
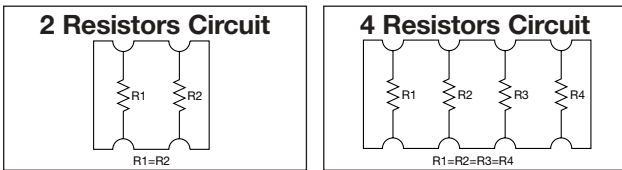
We would like to work closely with you during the discontinuation period and minimize any inconveniences that may arise. Should you have any questions or comments, please contact KDP Marketing.

# Chip Resistor Arrays

## CRB Series (Concave Type)



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



### 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

**CRB 1A 2E 103 J T**  
Series

**Size**  
1A = 0606 size  
2A = 0804 size  
3A = 1206 size  
6A = 2506 size

**Number of Elements**  
2E = 2 Elements  
4E = 4 Elements  
8E = 8 Elements

#### Packaging

- 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

#### Resistance Tolerance

- J =  $\pm 5\%$
- G =  $\pm 2\%$
- Blank = Chip Jumper Arrays

**Resistance Value** (3 digits)  
Chip Jumper Arrays = 000

### 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 $\pm 5\%$ (CRB6A G $\pm 2\%$ only)
Working Temperature	-55 to +125°C

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

Chip Jumper Arrays	
Item	Rating
Rated Current	1A
Conductive Resistance Value	50MΩ max.
Resistance Value	Zero ohms (0 $\pm$ .5 ohms)
Working Temperature	-55 to +125°C

### DIMENSIONS

millimeters (inches)

Code	W	L	C	d	t	a	b	P
Dim.	1.60 $\pm$ 0.15 (0.063 $\pm$ 0.006)	1.60 $\pm$ 0.20 (0.063 $\pm$ 0.008)	0.30 $\pm$ 0.20 (0.012 $\pm$ 0.008)	0.40 $\pm$ 0.15 (0.016 $\pm$ 0.006)	0.60 $\pm$ 0.10 (0.024 $\pm$ 0.006)	0.50 $\pm$ 0.15 (0.020 $\pm$ 0.006)	0.30 $\pm$ 0.10 (0.012 $\pm$ 0.004)	0.80 $\pm$ 0.10 (0.031 $\pm$ 0.004)
No Marking on chips								
Code	L	W	T	P	b	c	d	e
Dim.	2.00 $\pm$ 0.10 (0.079 $\pm$ 0.004)	1.00 $\pm$ 0.10 (0.039 $\pm$ 0.004)	0.40 $\pm$ 0.10 (0.016 $\pm$ 0.004)	0.50 typ (0.020 typ)	$\varnothing$ 0.15 typ ( $\varnothing$ 0.006 typ)	0.20 $\pm$ 0.15 (0.008 $\pm$ 0.006)	0.25 $\pm$ 0.015 (0.010 $\pm$ 0.006)	0.25 typ (0.010 typ)
Code	W	L	C	D	T	P		
Dim.	1.60 $\pm$ 0.15 (0.063 $\pm$ 0.006)	3.20 $\pm$ 0.15 (0.126 $\pm$ 0.006)	0.30 $\pm$ 0.20 (0.012 $\pm$ 0.008)	0.40 $\pm$ 0.15 (0.016 $\pm$ 0.006)	0.60 $\pm$ 0.10 (0.024 $\pm$ 0.004)	0.80 typ (0.031 typ)		
Code	L	W	T	P	c	d	e (top)	e (bottom)
Dim.	6.40 $\pm$ 0.20 (0.252 $\pm$ 0.008)	1.60 $\pm$ 0.20 (0.063 $\pm$ 0.008)	0.60 $\pm$ 0.10 (0.024 $\pm$ 0.004)	0.80 typ (0.031 typ)	0.30 $\pm$ 0.20 (0.012 $\pm$ 0.008)	0.40 $\pm$ 0.15 (0.016 $\pm$ 0.006)	0.50 $\pm$ 0.10 (0.020 $\pm$ 0.004)	0.40 $\pm$ 0.15 (0.016 $\pm$ 0.006)

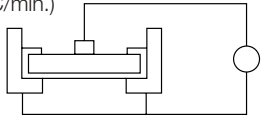
Detailed specifications are available on request.

# 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		50mΩ max.											
<b>Temperature Characteristics</b>		<table border="1"> <thead> <tr> <th>Resistance (Ω)</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, CR05 = F R &lt; 10</td> <td>-100 to +600</td> </tr> <tr> <td>10 ≤ R ≤ 1M</td> <td>-250 to +250</td> </tr> <tr> <td>1M &lt; R</td> <td>-500 to +300</td> </tr> </tbody> </table>		Resistance (Ω)	TCR (ppm/°C)	*D, F 10 ≤ R ≤ 1M	-100 to +100	J, CR05 = F R < 10	-100 to +600	10 ≤ R ≤ 1M	-250 to +250	1M < R	-500 to +300	Power Condition A (20°C, 65% RH)  Test Temperature: 25, 125(°C) $\Delta R/R = R_2 - R_1 / R_1 \times 1 / T_2 - T_1 \times 10^6$ $\Delta R/R = \text{Temp. Coefficient (ppm/°C)}$ $T_1 = 25(°C)$ $T_2 = 125(°C)$ $R_1 = T_1 \text{ Resistance at } (\Omega)$ $R_2 = T_2 \text{ Resistance at } (\Omega)$	
Resistance (Ω)	TCR (ppm/°C)														
*D, F 10 ≤ R ≤ 1M	-100 to +100														
J, CR05 = F R < 10	-100 to +600														
10 ≤ R ≤ 1M	-250 to +250														
1M < R	-500 to +300														
<b>Short-time Overload</b>	<b>ΔR/R</b>	±(2.0%+0.10Ω) max. of the initial value		50mΩ max.											
	<b>Visual</b>	No evidence of mechanical damage intermittent overload													
<b>Intermittent Overload</b>	<b>ΔR/R</b>	±(5%+0.1Ω) max. of the initial value		50mΩ max.											
	<b>Visual</b>	No evidence of mechanical damage													
<b>Dielectric Withstanding Voltage</b>		No evidence of mechanical damage													
<b>Insulation Resistance</b>		<ul style="list-style-type: none"> <li>• CR03, CJ03 = 10<sup>9</sup>Ω min.</li> <li>• CR05, CJ05 = 10<sup>9</sup>Ω min.</li> <li>• CR10, CJ10 = 10<sup>9</sup>Ω min.</li> <li>• CR21, CJ21 = 10<sup>10</sup>Ω min.</li> <li>• CR32, CJ32 = 10<sup>12</sup>Ω min.</li> <li>• CRA3A, CRB3A, CRC3A = 10<sup>9</sup>Ω min.</li> </ul>		Apply 500 VAC for 1 min. (CR10 300 VAC) (CR05, CRA3A, CRB3A, CRC3A 300 VAC/1 sec. CR03 50 VAC/min.)    Apply 500V DC (CR05, CRA3A, CRB3A, CRC3A 100V DC CR03 50 VDC)											

# 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 $^{+48}_0$ 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 $^{+48}_0$ 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 $^{+48}_0$ 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 $^{+48}_0$ 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 $^{+48}_0$ hrs. (2) Stabilize component at room temperature for 1 hr. then measure value.	
	Visual	No evidence of mechanical damage			

# Packaging of Chip Component

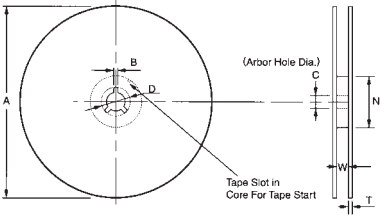
## Automatic Insertion Packaging



### TAPE AND REEL

### REEL DIMENSIONS

millimeters (inches)

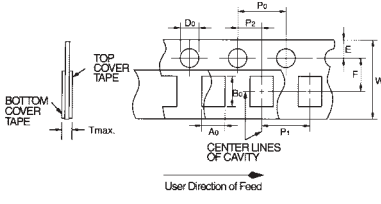


Tape Size	A Max.	B Min.	C	D Min.	N Min.	W	T Max.
8mm	178 (7)	1.50 (0.059)	13.0±0.50 (0.512±0.020)	20.2 (0.795)	50 (1.969)	10.0±1.50 (0.394±0.059)	2.50 (0.098)
	260 (10)						

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

millimeters (inches)

### PUNCHED TAPE CONFIGURATION 8MM TAPE ONLY

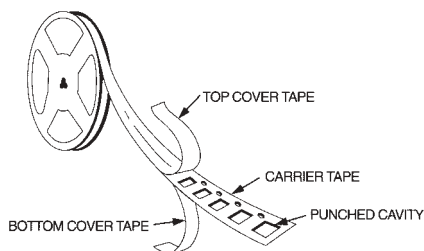


Tape Size	D <sub>0</sub>	E	P <sub>0</sub>	P <sub>2</sub>	W	F
8mm	1.50 <sup>+0.10</sup> <sub>-0.00</sub> (0.059 <sup>+0.004</sup> <sub>-0.000</sub> )	1.75±0.10 (0.069±0.004)	4.0±0.10 (0.157±0.004)	2.00±0.05 (0.079±0.002)	8.00±0.20 (0.135±0.008)	3.50±0.05 (0.138±0.002)

### 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)	

### PUNCHED CARRIER



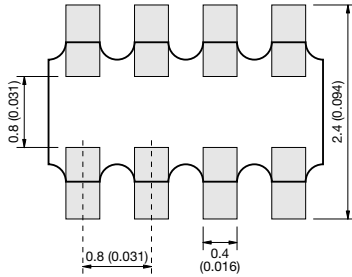
# Recommended Land Patterns



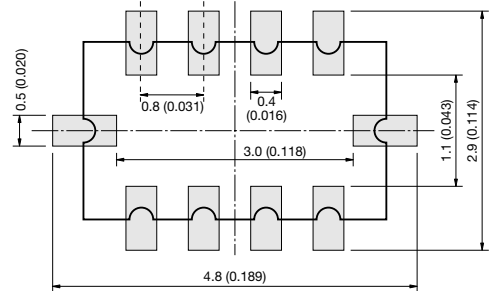
RECOMMENDED LAND PATTERNS IS REFERRED THE FOLLOWING FOR EXAMPLE

millimeters (inches)

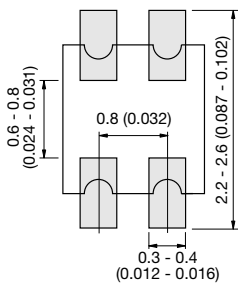
**CRA3A4E Series**



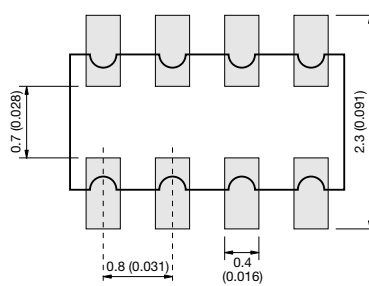
**RNA4A8E Series**



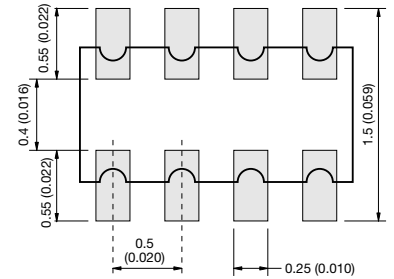
**CRB1A2E Series**



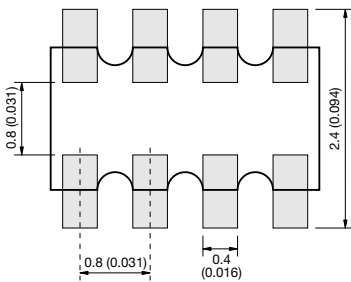
**CRB3A4E Series**



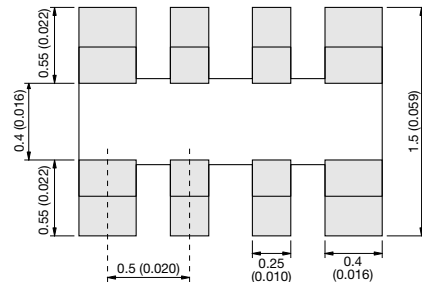
**CRB2A4E Series**



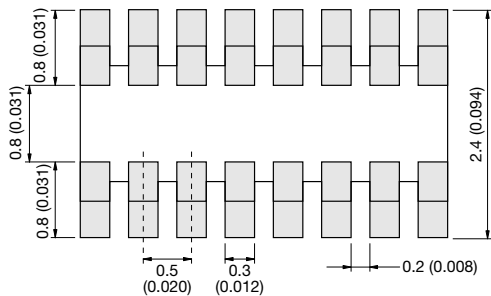
**CRC3A4E Series**



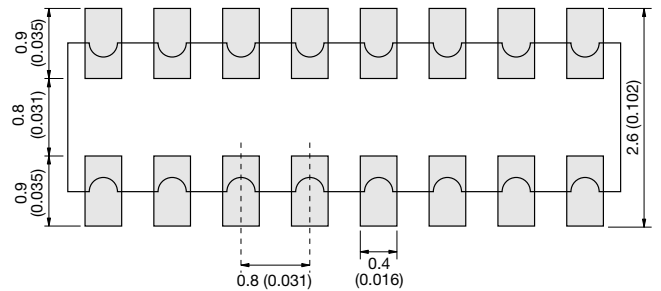
**CRC2A4E Series**



**CRC4A8E Series**



**CRB6A8E Series**



# Chip Resistor and Array Kits



## SAMPLE KIT PART NUMBERS

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