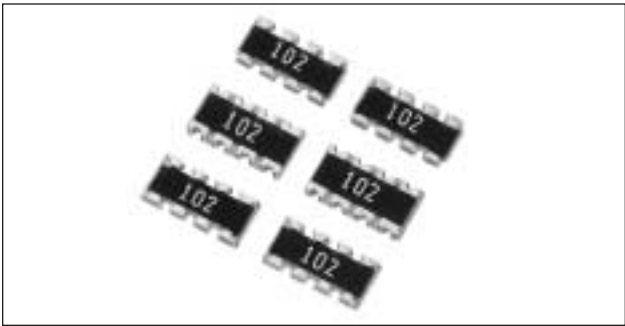


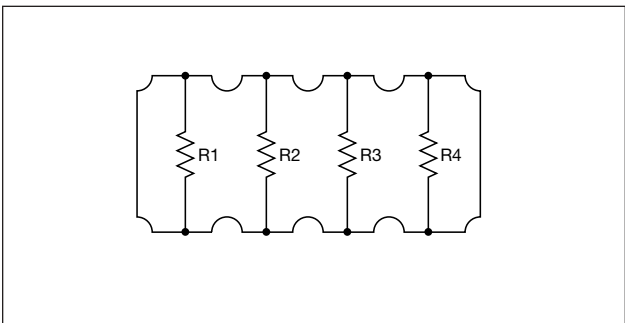
# Chip Resistor Arrays

## CRA Series (Convex Scallop Corner Type)



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

### CIRCUIT DIAGRAM



### RATING

| Chip Resistor Arrays  |                  |
|-----------------------|------------------|
| Item                  | Rating           |
| Rated Power (70°C)*   | 1/16W Element    |
| Max. Working Voltage  | 50V              |
| Max. Overload Voltage | 100V             |
| Resistance Value      | J = 10Ω to 2.2MΩ |
| 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

### 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>CRA3A</b> | <b>4E</b> | <b>103</b> | <b>J</b> | <b>T</b> |                                    |
|              |           |            |          |          | <b>Packaging</b>                   |
|              |           |            |          |          | T = Paper Taping, 5,000 pcs/reel   |
|              |           |            |          |          | <b>Resistance Tolerance</b>        |
|              |           |            |          |          | J = ±5%                            |
|              |           |            |          |          | Blank = Chip Jumper Arrays         |
|              |           |            |          |          | <b>Resistance Value</b> (3 digits) |
|              |           |            |          |          | Chip Jumper Arrays = 000           |
|              |           |            |          |          | <b>Number of Elements</b>          |
|              |           |            |          |          | 4E = 4 Elements                    |
|              |           |            |          |          | <b>Series</b>                      |

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

### DIMENSIONS

mm (inches)

| 4 Elements<br>CRA3A4E Series |                         |
|------------------------------|-------------------------|
| Style                        |                         |
| W                            | 1.60±0.15 (0.063±0.006) |
| L                            | 3.20±0.15 (0.126±0.006) |
| c                            | 0.30±0.20 (0.012±0.008) |
| d                            | 0.20±0.15 (0.008±0.006) |
| t                            | 0.50±0.10 (0.020±0.004) |
| p                            | 0.80 typ (0.031)        |

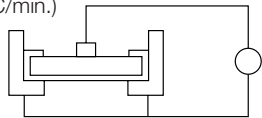
Detailed specifications are available on request.

# Chip Resistor Arrays



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

### ELECTRICAL CHARACTERISTICS

| Item                                       |                                              | Standard                                                                                                                                                                                                                                                          |                | Test Conditions                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                   |              |                                            |                                              |  |                                                                                                                                                                                                                                                                                                                                                |  |
|--------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------------|----------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|                                            |                                              | Resistor                                                                                                                                                                                                                                                          | Jumper         | Resistor                                                                                                                                                                                                                                                                                                                             | Jumper                                                                                                                                            |              |                                            |                                              |  |                                                                                                                                                                                                                                                                                                                                                |  |
| DC Resistance                              |                                              | Within Initial Tolerance                                                                                                                                                                                                                                          |                | Power Condition A<br>(20°C, 65% RH)                                                                                                                                                                                                                                                                                                  |                                                                                                                                                   |              |                                            |                                              |  |                                                                                                                                                                                                                                                                                                                                                |  |
| Temperature Characteristics                |                                              | <table><tr><th>Resistance (Ω)</th><th>TCR (ppm/°C)</th></tr><tr><td>*D, F<br/>10≤ R ≤1M</td><td>-100 to +100</td></tr><tr><td>J, CR05 = F<br/>R &lt;10<br/>10≤ R ≤1M<br/>1M&lt; R</td><td>-100 to +600<br/>-250 to +250<br/>-500 to +300</td></tr></table>        | Resistance (Ω) | TCR (ppm/°C)                                                                                                                                                                                                                                                                                                                         | *D, F<br>10≤ R ≤1M                                                                                                                                | -100 to +100 | J, CR05 = F<br>R <10<br>10≤ R ≤1M<br>1M< R | -100 to +600<br>-250 to +250<br>-500 to +300 |  | <div>Test Temperature: 25, 125(°C)<br/>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><br/>ΔR/R = Temp. Coefficient (ppm/°C)<br/>T<sub>1</sub> = 25(°C)<br/>T<sub>2</sub> = 125(°C)<br/>R<sub>1</sub> = T<sub>1</sub> Resistance at (Ω)<br/>R<sub>2</sub> = T<sub>2</sub> Resistance at (Ω)</div> |  |
| Resistance (Ω)                             | TCR (ppm/°C)                                 |                                                                                                                                                                                                                                                                   |                |                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                   |              |                                            |                                              |  |                                                                                                                                                                                                                                                                                                                                                |  |
| *D, F<br>10≤ R ≤1M                         | -100 to +100                                 |                                                                                                                                                                                                                                                                   |                |                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                   |              |                                            |                                              |  |                                                                                                                                                                                                                                                                                                                                                |  |
| J, CR05 = F<br>R <10<br>10≤ R ≤1M<br>1M< R | -100 to +600<br>-250 to +250<br>-500 to +300 |                                                                                                                                                                                                                                                                   |                |                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                   |              |                                            |                                              |  |                                                                                                                                                                                                                                                                                                                                                |  |
| Short-time Overload                        | ΔR/R                                         | ±(2.0%+0.10Ω) max.<br>of the initial value                                                                                                                                                                                                                        | 50mΩ max.      | (1) Apply 2.0 x rated voltage for 5 sec. (2.5 x rated voltage for Arrays)<br>(2) Wait 30 minutes<br>(3) Measure resistance<br>CR03 = 30V max.<br>CR05 = 50V max.<br>CR10 = 100V max.<br>CR21 = 200V max.<br>CR32 = 400V max.<br>CRA3A, CRB3A, CRC3A = 100V max.                                                                      | (1) 2A for 5 sec. (CJ03 = 1A)<br>(2) Wait 30 minutes<br>(3) Measure resistance                                                                    |              |                                            |                                              |  |                                                                                                                                                                                                                                                                                                                                                |  |
|                                            | Visual                                       | No evidence of mechanical damage intermittent overload                                                                                                                                                                                                            |                |                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                   |              |                                            |                                              |  |                                                                                                                                                                                                                                                                                                                                                |  |
| Intermittent Overload                      | ΔR/R                                         | ±(5%+0.1Ω) max.<br>of the initial value                                                                                                                                                                                                                           | 50mΩ max.      | (1) Perform 10,000 voltage cycles as follows:<br>ON (2.0 x rated voltage, 2.5 x for Arrays) 1 sec. 25 sec.<br>OFF 25 sec.<br>(2) Stabilization time 30 min. without loading<br>(3) Measure resistance<br>CR03 = 30V max.<br>CR05 = 50V max.<br>CR10 = 150V max.<br>CR21 = 200V max.<br>CR32 = 400V max.<br>CRA, CRB, CRC = 100V max. | (1) Perform 10,000 current cycles as follows:<br>ON (2A) 1 sec.<br>OFF 25 sec.<br>(2) Wait 30 minutes<br>(3) Measure resistance<br>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)<br>(CR05, CRA3A, CRB3A, CRC3A 300 VAC/1 sec.<br>CR03 50 VAC/min.)                                                                                                                                                                                                                            |                                                                                                                                                   |              |                                            |                                              |  |                                                                                                                                                                                                                                                                                                                                                |  |
| Insulation Resistance                      |                                              | <div>• CR03, CJ03 = 10<sup>8</sup>Ω min.<br/>• CR05, CJ05 = 10<sup>8</sup>Ω min.<br/>• CR10, CJ10 = 10<sup>9</sup>Ω min.<br/>• CR21, CJ21 = 10<sup>10</sup>Ω min.<br/>• CR32, CJ32 = 10<sup>12</sup>Ω min.<br/>• CRA3A, CRB3A, CRC3A = 10<sup>9</sup>Ω min.</div> |                | <div>Apply 500V DC<br/>(CR05, CRA3A, CRB3A, CRC3A 100V DC<br/>CR03 50 VDC)</div> <div></div>                                                                                                                                                    |                                                                                                                                                   |              |                                            |                                              |  |                                                                                                                                                                                                                                                                                                                                                |  |



## MECHANICAL CHARACTERISTICS

Technical drawing of a mechanical part showing bending and straightening processes. The drawing includes dimensions in millimeters and inches.

**Bending in 10 seconds:** The part is bent around a radius of  $R230$  (0.787 inches). The dimensions shown are 20 (0.787) and 50 (1.969) for the top section, and 3 (0.118) for the bottom section. The bending is performed in 10 seconds.

**Dimensions:**

- Top section: 20 (0.787) and 50 (1.969)
- Bottom section: 3 (0.118)
- Radius:  $R230$  (0.787)
- Width: 45 (1.772) (two sections)
- Height:  $\pm 2$  (0.079) max
- Internal feature:  $\varnothing 5$  (0.197)

**millimeters (inches)**

| 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°C for 30 min. 125 $\pm$ 3°C for 30 min. Room temp. for 10-15 min.<br>(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°C chamber without loading for 1000 $^{+48}_{-0}$ hrs.<br>(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°C chamber without loading for 1000 $^{+48}_{-0}$ hrs.<br>(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°C RH90 to 95% RH chamber without loading for 1000 $^{+48}_{-0}$ hrs.<br>(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°C Voltage: (rated voltage) on 90 min. off 30 min. Duration: 1000 $^{+48}_{-0}$ hrs.<br>(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°C RH: 90-95% Voltage Cycle: on 90 min. (rated voltage) off 30 min. Duration: 1000 $^{+48}_{-0}$ hrs.<br>(2) Stabilize component at room temperature for 1 hr. then measure value. |        |
|                          | Visual       | No evidence of mechanical damage                |                   |                                                                                                                                                                                                         |        |

# Packaging of Chip Component

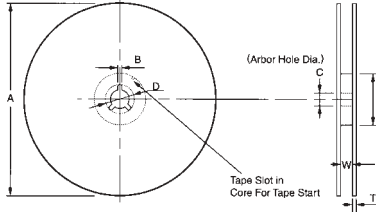


## Automatic Insertion Packaging

### TAPE AND REEL

### REEL DIMENSIONS

millimeters (inches)

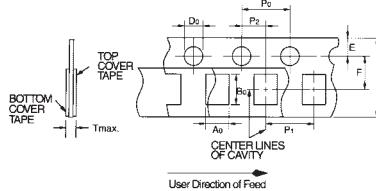


| Tape Size | A Max.      | B Min.          | C                          | D Min.          | N Min.        | W                          | T Max.          |
|-----------|-------------|-----------------|----------------------------|-----------------|---------------|----------------------------|-----------------|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

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

millimeters (inches)

### PUNCHED TAPE CONFIGURATION 8MM TAPE ONLY

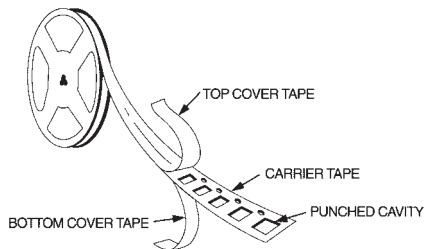


| Tape Size | D <sub>0</sub>                                                                             | E                          | P <sub>0</sub>            | P <sub>2</sub>             | W                          | F                          |
|-----------|--------------------------------------------------------------------------------------------|-------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

### VARIABLE DIMENSIONS

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

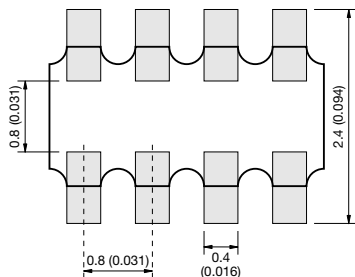
### PUNCHED CARRIER



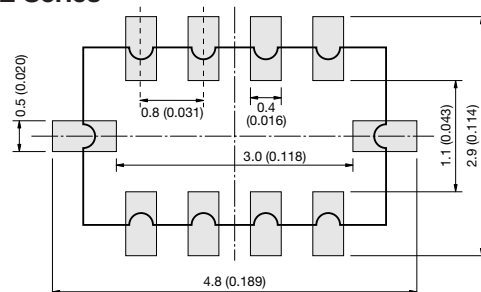
## RECOMMENDED LAND PATTERNS IS REFERRED THE FOLLOWING FOR EXAMPLE

millimeters (inches)

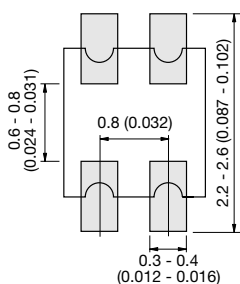
**CRA3A4E Series**



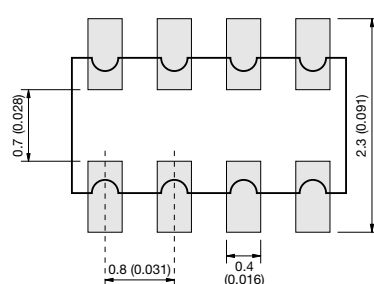
**RNA4A8E Series**



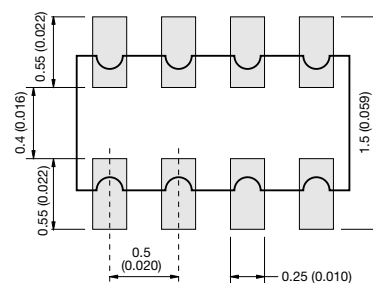
**CRB1A2E Series**



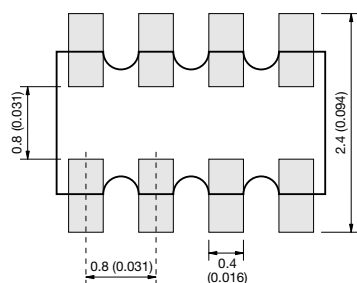
**CRB3A4E Series**



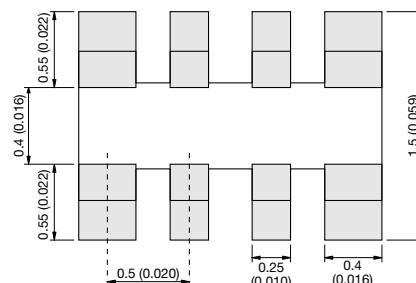
**CRB2A4E Series**



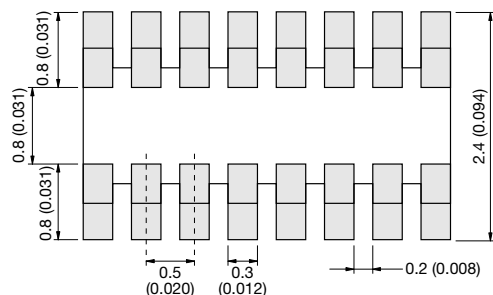
**CRC3A4E Series**



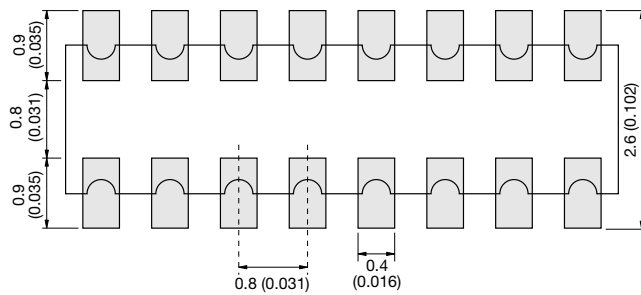
**CRC2A4E Series**



**CRC4A8E Series**



**CRB6A8E Series**



## SAMPLE KIT PART NUMBERS

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

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

## AVX:

|                                     |                                     |                                     |                                     |                                     |                                     |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| <a href="#"><u>CRA3A4E221JT</u></a> | <a href="#"><u>CRA3A4E332JT</u></a> | <a href="#"><u>CRA3A4E120JT</u></a> | <a href="#"><u>CRA3A4E104JT</u></a> | <a href="#"><u>CRA3A4E822JT</u></a> | <a href="#"><u>CRA3A4E474JT</u></a> |
| <a href="#"><u>CRA3A4E220JT</u></a> | <a href="#"><u>CRA3A4E510JT</u></a> | <a href="#"><u>CRA3A4E620JT</u></a> | <a href="#"><u>CRA3A4E390JT</u></a> | <a href="#"><u>CRA3A4E560JT</u></a> | <a href="#"><u>CRA3A4E473JT</u></a> |
| <a href="#"><u>CRA3A4E121JT</u></a> | <a href="#"><u>CRA3A4E105JT</u></a> | <a href="#"><u>CRA3A4E122JT</u></a> | <a href="#"><u>CRA3A4E150JT</u></a> | <a href="#"><u>CRA3A4E331JT</u></a> | <a href="#"><u>CRA3A4E333JT</u></a> |
| <a href="#"><u>CRA3A4E301JT</u></a> | <a href="#"><u>CRA3A4E562JT</u></a> | <a href="#"><u>CRA3A4E270JT</u></a> | <a href="#"><u>CRA3A4E151JT</u></a> | <a href="#"><u>CRA3A4E680JT</u></a> | <a href="#"><u>CRA3A4E204JT</u></a> |
| <a href="#"><u>CRA3A4E202JT</u></a> | <a href="#"><u>CRA3A4E273JT</u></a> | <a href="#"><u>CRA3A4E131JT</u></a> |                                     |                                     |                                     |