



## **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.

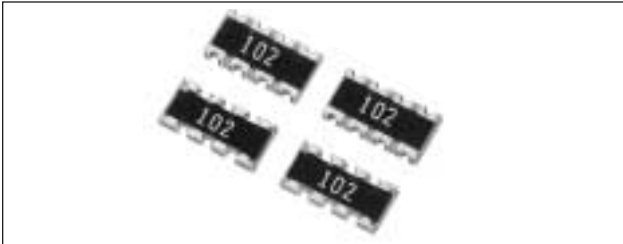
AVX will expand our focus on our 0408 and smaller resistor array products and discontinue to offer our larger case size resistor chip series along with the 1206 resistor arrays. This will be accomplished in several stages over the next twelve months. Please refer to each product series below and the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

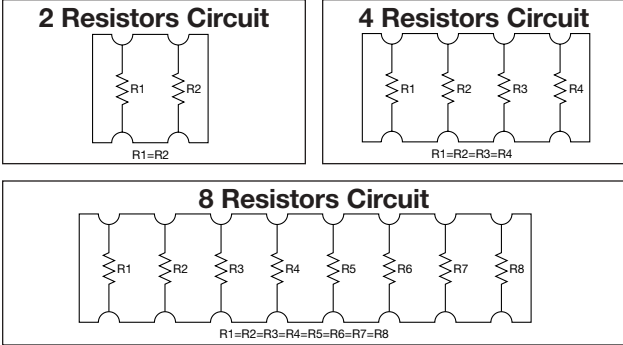
We would like to work closely with you during the discontinuation period and minimize any inconveniences that may arise. Should you have any questions or comments, please contact KDP Marketing.

# Chip Resistor Arrays

## CRB Series (Concave Type)



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



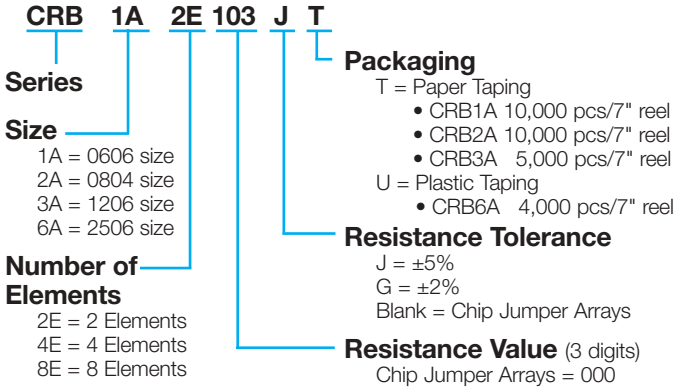
### FEATURES

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

### APPLICATIONS

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

### HOW TO ORDER



### 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

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

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

### DIMENSIONS

millimeters (inches)

Code	W	L	C	d	t	a	b	P
<b>CRB1A2E</b>								
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								
Code	L	W	T	P	b	c	d	e
<b>CRB2A4E</b>								
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)	∅0.15 typ (∅0.006 typ)	0.20±0.15 (0.008±0.006)	0.25±0.015 (0.010±0.006)	0.25 typ (0.010 typ)
Code	W	L	C	D	T	P		
<b>CRB3A4E</b>								
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)		
Code	L	W	T	P	c	d	e (top)	e (bottom)
<b>CRB6A8E</b>								
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)

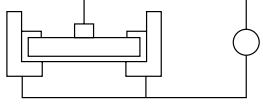
Detailed specifications are available on request.

# 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 10 ≤ R ≤ 1M 1M &lt; R</td> <td>-100 to +600 -250 to +250 -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 10 ≤ R ≤ 1M 1M < R	-100 to +600 -250 to +250 -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 10 ≤ R ≤ 1M 1M < R	-100 to +600 -250 to +250 -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		(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.							
<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		(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.							
<b>Dielectric Withstanding Voltage</b>		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.)							
<b>Insulation Resistance</b>		<ul style="list-style-type: none"> <li>• CR03, CJ03 = 10<sup>8</sup>Ω min.</li> <li>• CR05, CJ05 = 10<sup>8</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 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 $^{+48}$ 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			

# Packaging of Chip Component

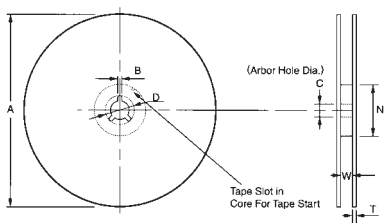


## Automatic Insertion Packaging

### TAPE AND REEL

#### REEL DIMENSIONS

millimeters (inches)

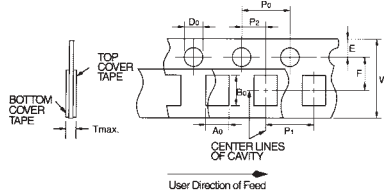


Tape Size	A Max.	B Min.	C	D Min.	N Min.	W	T Max.
8mm	178 (7)	1.50 (0.059)	13.0±0.50 (0.512±0.020)	20.2 (0.795)	50 (1.969)	10.0±1.50 (0.394±0.059)	2.50 (0.098)
	260 (10)						

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

millimeters (inches)

#### PUNCHED TAPE CONFIGURATION 8MM TAPE ONLY

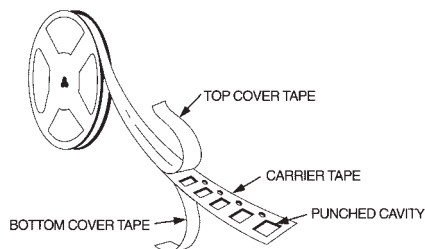


Tape Size	D <sub>0</sub>	E	P <sub>0</sub>	P <sub>2</sub>	W	F
8mm	1.50 <sup>+0.10</sup> / <sub>-0.004</sub> (0.059 <sup>+0.004</sup> / <sub>-0.000</sub> )	1.75±0.10 (0.069±0.004)	4.0±0.10 (0.157±0.004)	2.00±0.05 (0.079±0.002)	8.00±0.20 (0.135±0.008)	3.50±0.05 (0.138±0.002)

#### 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

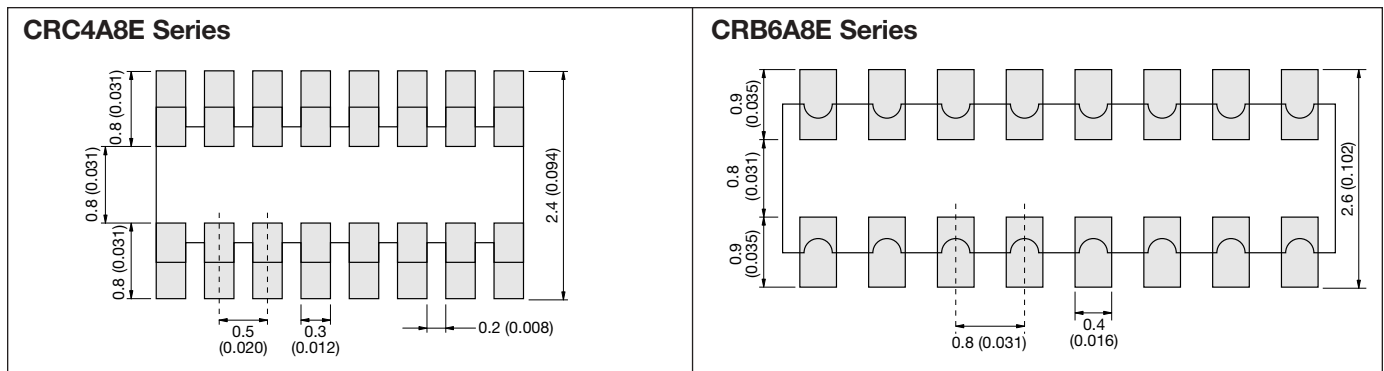
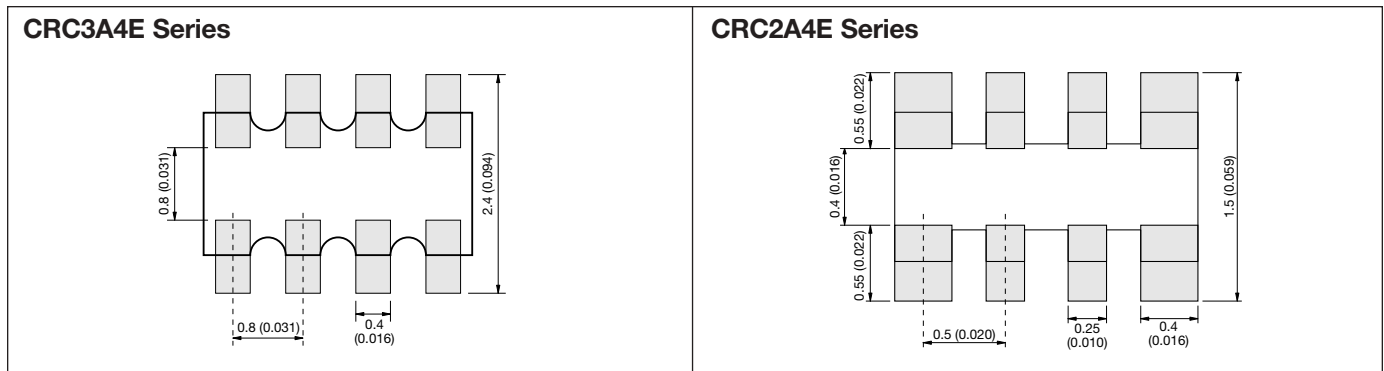
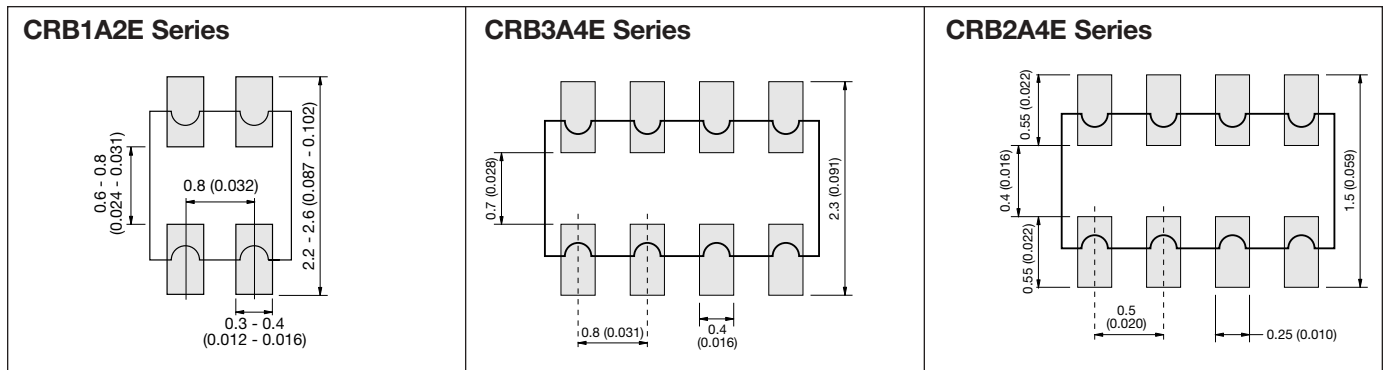
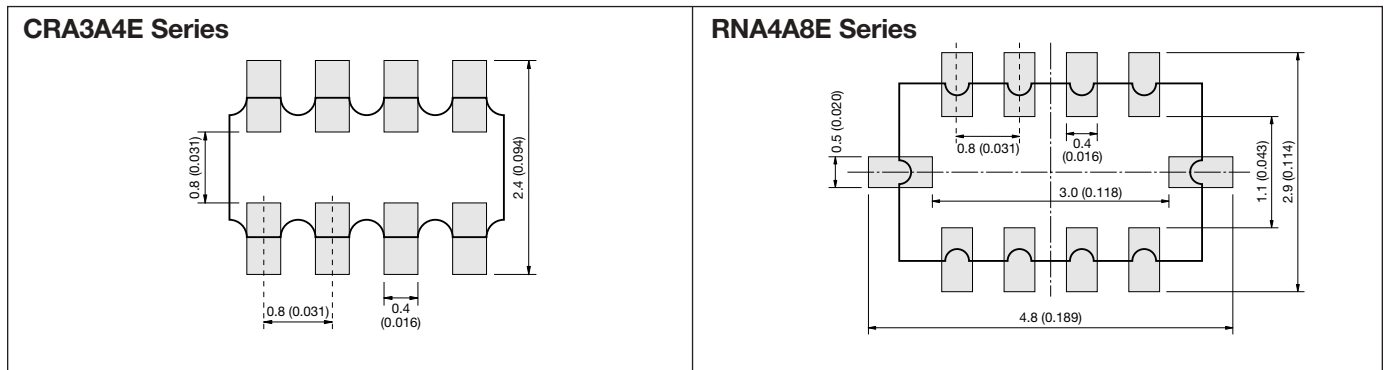


# Recommended Land Patterns



RECOMMENDED LAND PATTERNS IS REFERRED THE FOLLOWING FOR EXAMPLE

millimeters (inches)



## 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