



## Features

- RoHS compliant\*
- Values from 0.02 to 9.10 ohms
- Tolerance of 1 % or 5 %
- Five package sizes available
- Tape and reel packaging

## CRL Series - Low Value Chip Resistors

### Electrical Characteristics

| Characteristic                                                                      | Model CRL0603                             | Model CRL0805                    | Model CRL1206                    | Model CRL2010                    | Model CRL2512                    |
|-------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Power Rating @ 70 °C                                                                | 0.100 watt                                | 0.125 watt                       | 0.250 watt                       | 0.50 watt                        | 1.00 watt                        |
| Operating Temperature Range                                                         | -55 to +125 °C                            |                                  |                                  |                                  |                                  |
| Derated to Zero Load at                                                             | +125 °C                                   |                                  |                                  |                                  |                                  |
| Maximum Working Voltage                                                             | (PR) <sup>1/2</sup>                       | (PR) <sup>1/2</sup>              | (PR) <sup>1/2</sup>              | (PR) <sup>1/2</sup>              | (PR) <sup>1/2</sup>              |
| Resistance Range<br>E24 Values:<br>See Value Table:                                 | 0.10 to 9.10 Ω<br>N/A                     | 0.10 to 9.10 Ω<br>0.05 to 0.09 Ω | 0.10 to 9.10 Ω<br>0.02 to 0.09 Ω | 0.10 to 9.10 Ω<br>0.02 to 0.09 Ω | 0.10 to 9.10 Ω<br>0.02 to 0.09 Ω |
| Temperature Coefficient<br>0.05 Ω to 9.10 Ω<br>0.03 Ω to 0.04 Ω<br>0.01 Ω to 0.02 Ω | ±200 PPM/°C<br>±400 PPM/°C<br>±600 PPM/°C |                                  |                                  |                                  |                                  |

### Value Table

| Value (Ω) | CRL0603<br>1 % | CRL0603<br>5 % | CRL0805<br>1 % | CRL0805<br>5 % | CRL1206<br>1 % | CRL1206<br>5 % | CRL2010<br>1 % | CRL2010<br>5 % | CRL2512<br>1 % | CRL2512<br>5 % |
|-----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 0.02      | Not Available  | Not Available  | Not Available  | Not Available  | A              | A              | P              | P              | P              | P              |
| 0.03      | Not Available  | Not Available  | Not Available  | Not Available  | A              | A              | P              | P              | P              | P              |
| 0.04      | Not Available  | Not Available  | Not Available  | Not Available  | A              | A              | P              | P              | P              | P              |
| 0.05      | Not Available  | Not Available  | A              | A              | A              | A              | P              | P              | P              | P              |
| 0.06      | Not Available  | Not Available  | A              | A              | A              | A              | A              | A              | A              | A              |
| 0.07      | Not Available  | Not Available  | A              | A              | A              | A              | A              | A              | A              | A              |
| 0.08      | Not Available  | Not Available  | A              | A              | A              | A              | A              | A              | A              | A              |
| 0.09      | Not Available  | Not Available  | A              | A              | A              | A              | A              | A              | A              | A              |

P = Popular Value

A = Available Value (may have greater minimum order quantity)

### Environmental Characteristics

| Description                  | Method                                                                                 | Limit                                                                                                                |
|------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Short Time Overload          | 2.5 x (PR) <sup>1/2</sup> for 5 seconds.<br>(IEC 115-1 4.13)                           | 1 % Tolerance: $\Delta R \leq \pm(1 \% + 0.001 \Omega)$<br>5 % Tolerance: $\Delta R \leq \pm(2 \% + 0.001 \Omega)$   |
| Load Life                    | (PR) <sup>1/2</sup> for 1000 hours; 1.5 hours on; 0.5 hours off.<br>(IEC 115-1 4.25.1) | 1 % Tolerance: $\Delta R \leq \pm(1 \% + 0.001 \Omega)$<br>5 % Tolerance: $\Delta R \leq \pm(2 \% + 0.001 \Omega)$   |
| Resistance to Soldering Heat | 260 °C for 10 seconds.<br>(IEC 115-1 4.18)                                             | 1 % Tolerance: $\Delta R \leq \pm(0.5 \% + 0.001 \Omega)$<br>5 % Tolerance: $\Delta R \leq \pm(1 \% + 0.001 \Omega)$ |
| Thermal Shock                | 5 cycles from -55 °C to +125 °C, 30 minutes at temperature.<br>(IEC 115-1 4.19)        | 1 % Tolerance: $\Delta R \leq \pm(0.5 \% + 0.001 \Omega)$<br>5 % Tolerance: $\Delta R \leq \pm(1 \% + 0.001 \Omega)$ |

\*RoHS Directive 2002/95/EC Jan 27, 2003 including Annex.

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Customers should verify actual device performance in their specific applications.

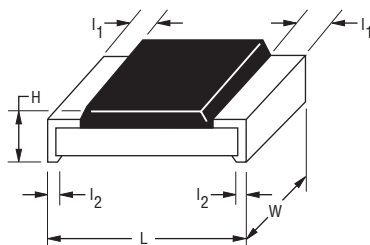
# CRL Series - Low Value Chip Resistors

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## Chip Dimensions

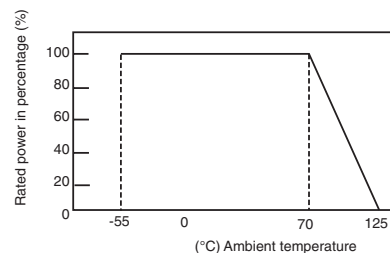
| Dimension | Model CRL0603                             | Model CRL0805                             | Model CRL1206                             | Model CRL2010                             | Model CRL2512                             |
|-----------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| L         | $\frac{1.60 \pm 0.10}{(0.063 \pm 0.004)}$ | $\frac{2.00 \pm 0.15}{(0.079 \pm 0.006)}$ | $\frac{3.20 \pm 0.15}{(0.126 \pm 0.006)}$ | $\frac{5.00 \pm 0.20}{(0.197 \pm 0.008)}$ | $\frac{6.30 \pm 0.20}{(0.248 \pm 0.008)}$ |
| W         | $\frac{0.80 \pm 0.10}{(0.031 \pm 0.004)}$ | $\frac{1.25 \pm 0.10}{(0.049 \pm 0.004)}$ | $\frac{1.60 \pm 0.15}{(0.063 \pm 0.006)}$ | $\frac{2.50 \pm 0.20}{(0.098 \pm 0.008)}$ | $\frac{3.10 \pm 0.20}{(0.122 \pm 0.008)}$ |
| H         | $\frac{0.45 \pm 0.10}{(0.018 \pm 0.004)}$ | $\frac{0.50 \pm 0.10}{(0.020 \pm 0.004)}$ | $\frac{0.60 \pm 0.10}{(0.024 \pm 0.004)}$ | $\frac{0.60 \pm 0.10}{(0.024 \pm 0.004)}$ | $\frac{0.60 \pm 0.10}{(0.024 \pm 0.004)}$ |
| $l_1$     | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ | $\frac{0.40 \pm 0.20}{(0.016 \pm 0.008)}$ | $\frac{0.50 \pm 0.25}{(0.020 \pm 0.010)}$ | $\frac{0.60 \pm 0.25}{(0.024 \pm 0.010)}$ | $\frac{0.60 \pm 0.25}{(0.024 \pm 0.010)}$ |
| $l_2$     | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ | $\frac{0.40 \pm 0.20}{(0.016 \pm 0.008)}$ | $\frac{0.50 \pm 0.25}{(0.020 \pm 0.010)}$ | $\frac{0.60 \pm 0.25}{(0.024 \pm 0.010)}$ | $\frac{0.60 \pm 0.20}{(0.024 \pm 0.008)}$ |

## Dimensional Drawing



DIMENSIONS:  $\frac{\text{MM}}{(\text{INCHES})}$

## Derating Curve



## How to Order

**CRL 0603 - F W - R090 E LF**

Model \_\_\_\_\_  
(CRL = Chip Resistor Low Value)

Size \_\_\_\_\_  

- 0603
- 0805
- 1206
- 2010
- 2512

Resistance Tolerance \_\_\_\_\_  
 F =  $\pm 1\%$   
 J =  $\pm 5\%$

TCR (PPM/°C) \_\_\_\_\_  
 W =  $\pm 200$  (0.05 to 9.10  $\Omega$ )  
 V =  $\pm 400$  (0.03 to 0.04  $\Omega$ )  
 U =  $\pm 600$  (0.01  $\Omega$  to 0.02  $\Omega$ )

Resistance Value (1 % or 5 %) \_\_\_\_\_  

- R stands for decimal point. Three significant digits: (R090 = 0.09  $\Omega$ ; 9R10 = 9.10  $\Omega$ )

Packaging \_\_\_\_\_  

- CRL0603, CRL0805, CRL1206: E = Paper Tape, Plastic Reel, 5,000 pcs.
- CRL2010, CRL2512: E = Embossed Plastic Tape, Plastic Reel, 4,000 pcs.

Termination \_\_\_\_\_  
 LF = Tin-plated (RoHS compliant)

# CRL Series - Low Value Chip Resistors

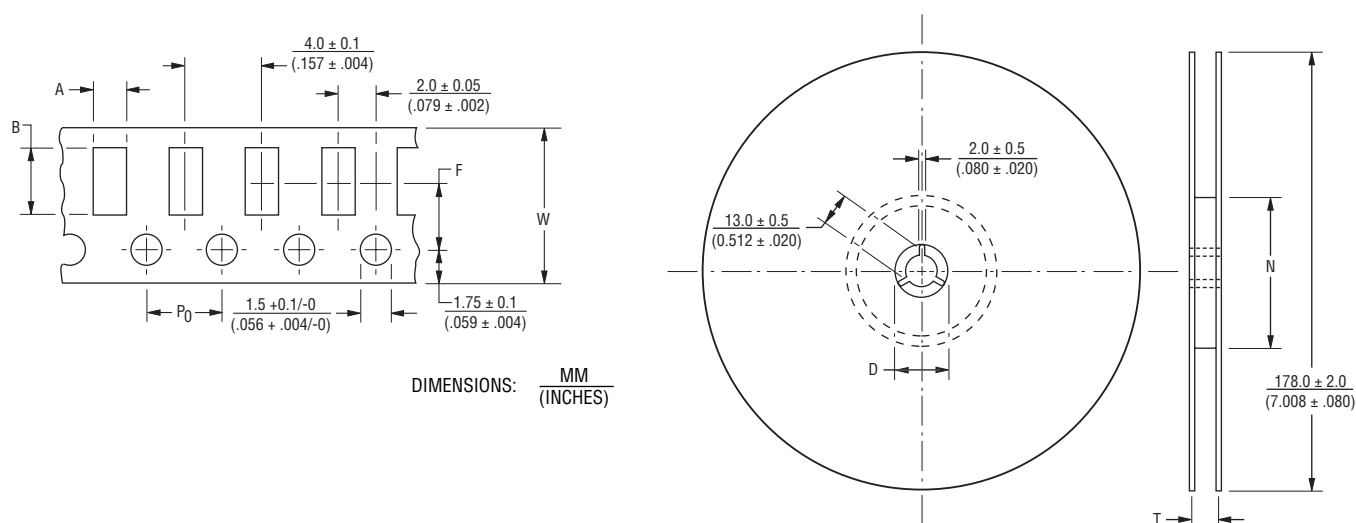
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## Packaging Dimensions - Tape

| Dimension      | Model CRL0603                             | Model CRL0805                                          | Model CRL1206                                          | Model CRL2010                             | Model CRL2512                              |
|----------------|-------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|-------------------------------------------|--------------------------------------------|
| A              | $\frac{1.10 \pm 0.10}{(0.043 \pm 0.004)}$ | $\frac{1.65 + 0.20 / - 0.10}{(0.065 + 0.008 / -.004)}$ | $\frac{1.95 + 0.10 / - 0.05}{(0.077 + 0.004 / -.002)}$ | $\frac{2.80 \pm 0.20}{(0.110 \pm 0.008)}$ | $\frac{3.50 \pm 0.20}{(0.138 \pm 0.008)}$  |
| B              | $\frac{1.90 \pm 0.10}{(0.075 \pm 0.004)}$ | $\frac{2.40 + 0.20 / - 0.10}{(0.094 + 0.008 / -.004)}$ | $\frac{3.50 \pm 0.10}{(0.138 \pm 0.004)}$              | $\frac{5.50 \pm 0.20}{(0.217 \pm 0.008)}$ | $\frac{6.70 \pm 0.20}{(0.264 \pm 0.008)}$  |
| W              | $\frac{8.00 \pm 0.20}{(0.315 \pm 0.008)}$ | $\frac{8.00 \pm 0.20}{(0.315 \pm 0.008)}$              | $\frac{8.00 \pm 0.20}{(0.315 \pm 0.008)}$              | $\frac{12.0 \pm 0.30}{(0.472 \pm 0.012)}$ | $\frac{12.00 \pm 0.30}{(0.472 \pm 0.012)}$ |
| F              | $\frac{3.50 \pm 0.05}{(0.138 \pm 0.002)}$ | $\frac{3.50 \pm 0.05}{(0.138 \pm 0.002)}$              | $\frac{3.50 \pm 0.05}{(0.138 \pm 0.002)}$              | $\frac{5.50 \pm 0.05}{(0.217 \pm 0.002)}$ | $\frac{5.50 \pm 0.05}{(0.217 \pm 0.002)}$  |
| P <sub>0</sub> | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$ | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$              | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$              | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$ | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$  |

## Packaging Dimensions - Reel

| Dimension | Model CRL0603                              | Model CRL0805                              | Model CRL1206                              | Model CRL2010                              | Model CRL2512                              |
|-----------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|
| N         | $\frac{80.00 \pm 1.00}{(3.150 \pm 0.040)}$ | $\frac{80.00 \pm 1.00}{(3.150 \pm 0.040)}$ | $\frac{80.00 \pm 1.00}{(3.150 \pm 0.040)}$ | $\frac{80.00 \pm 0.20}{(3.150 \pm 0.008)}$ | $\frac{80.00 \pm 0.20}{(3.150 \pm 0.008)}$ |
| D         | $\frac{20.50}{(0.807)}$                    | $\frac{20.50}{(0.807)}$                    | $\frac{20.50}{(0.807)}$                    | $\frac{20.00}{(0.787)}$ MIN.               | $\frac{20.00}{(0.787)}$ MIN.               |
| T         | $\frac{10.00 \pm 1.50}{(0.394 \pm 0.059)}$ | $\frac{10.00 \pm 1.50}{(0.394 \pm 0.059)}$ | $\frac{10.00 \pm 1.50}{(0.394 \pm 0.059)}$ | $\frac{16.70}{(0.657)}$ MAX.               | $\frac{16.70}{(0.657)}$ MAX.               |



REV. 02/11

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