



## Features

- Ultra-tight tolerance
- Wide resistance range
- RoHS compliant\*
- Four package sizes available

## Applications

- Current sense
- Precision circuits
- Medical equipment\*\*
- Printers
- Automation equipment
- Navigation equipment

# CRT Series - Thin Film Precision Chip Resistors

## Electrical Characteristics

| Characteristic                              | Model CRT0402                                    | Model CRT0603 | Model CRT0805 | Model CRT1206 |
|---------------------------------------------|--------------------------------------------------|---------------|---------------|---------------|
| Power Rating @ 70 °C                        | 1/16 watt                                        | 1/10 watt     | 1/8 watt      | 1/4 watt      |
| Operating Temperature Range                 | -55 to +155 °C                                   |               |               |               |
| Derated to Zero Load at                     | +155 °C                                          |               |               |               |
| Maximum Working Voltage                     | 25 V                                             | 75 V          | 150 V         | 200 V         |
| Maximum Overload Voltage                    | 50 V                                             | 150 V         | 300 V         | 400 V         |
| Resistance Range (E-96 + E-24 Values)       | (See Standard Values Table)                      |               |               |               |
| Temperature Coefficient of Resistance (TCR) | 2 to 50 PPM/°C (See Value - TCR Table on Page 2) |               |               |               |

## Environmental Characteristics

| Specification                | Test (MIL STD 202)                         | Limit ( $\Delta R$ ) (Tol. $\leq 0.05\%$ ) | Limit ( $\Delta R$ ) (Tol. $> 0.05\%$ ) |
|------------------------------|--------------------------------------------|--------------------------------------------|-----------------------------------------|
| Short Time Overload          | 2.5 x Max. Operating Voltage for 5 seconds | $\pm 0.05\%$                               | $\pm 0.2\%$                             |
| Load Life                    | 1000 Hours at Rated Power                  | $\pm 0.05\%$                               | $\pm 0.2\%$                             |
| Humidity (Steady State)      | Method 103B                                | $\pm 0.05\%$                               | $\pm 0.3\%$                             |
| Thermal Shock                | Method 107                                 | $\pm 0.05\%$                               | $\pm 0.3\%$                             |
| Solderability                | Method 208H                                |                                            |                                         |
| Resistance to Soldering Heat | Method 210E                                | $\pm 0.05\%$                               | $\pm 0.2\%$                             |

## How to Order

### CRT 0603 - C V - 1003 E LF

Model \_\_\_\_\_  
(CRT = Thin Film Precision Chip Resistor)

Size \_\_\_\_\_

- 0402
- 0603
- 0805
- 1206

Resistance Tolerance \_\_\_\_\_

F =  $\pm 1\%$     B =  $\pm 0.1\%$   
D =  $\pm 0.5\%$     A =  $\pm 0.05\%$   
C =  $\pm 0.25\%$     P =  $\pm 0.01\%$

TCR (PPM/°C) \_\_\_\_\_

Z =  $\pm 50$     V =  $\pm 5$   
Y =  $\pm 25$     U =  $\pm 3$   
X =  $\pm 15$     T =  $\pm 2$   
W =  $\pm 10$

Resistance Value \_\_\_\_\_

<100 ohms: "R" represents decimal point  
(example: 24R3 = 24.3 ohms)  
  
≥100 ohms: First three digits are significant, fourth digit  
represents number of zeroes to follow  
(example: 8252 = 82.5K ohms)

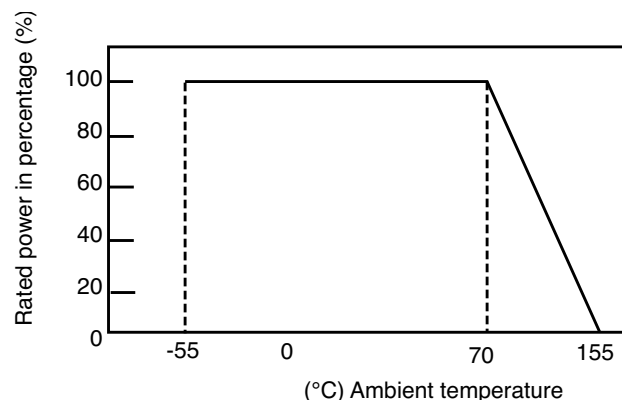
Packaging \_\_\_\_\_

G = Paper tape (10K pcs.) on 7 " plastic reel (CRT0402)  
E = Paper tape (5K pcs.) on 7 " plastic reel (CRT0603, CRT0805,  
CRT1206)

Termination \_\_\_\_\_

LF = Tin-plated (RoHS compliant)

## Derating Curve



\* RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8, 2011.

\*\*Bourns® products have not been specifically designed and tested for FDA Class III applications and their use in such applications is neither recommended nor supported. Specifications are subject to change without notice.

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# CRT Series - Thin Film Precision Chip Resistors

**BOURNS®**

Value - TCR Table

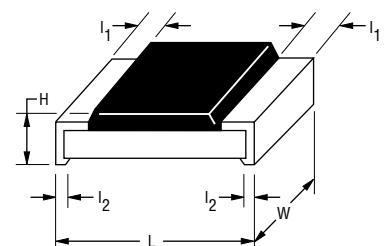
| Model   | TCR      |        | Resistance Tolerance (Code) |                |                 |                |               |             |
|---------|----------|--------|-----------------------------|----------------|-----------------|----------------|---------------|-------------|
|         | (PPM/°C) | (Code) | ±0.01 %<br>(P)              | ±0.05 %<br>(A) | ±0.1 %<br>(B)   | ±0.25 %<br>(C) | ±0.5 %<br>(D) | ±1 %<br>(F) |
| CRT0402 | ±2       | (T)    | 49.9 to 4.99K Ω             |                |                 | N/A            |               |             |
|         | ±3       | (U)    |                             |                |                 |                |               |             |
|         | ±5       | (V)    | 49.9 to 4.99K Ω             |                |                 |                |               |             |
|         | ±10      | (W)    | 49.9 to 12K Ω               |                | 49.9 to 60K Ω   |                |               |             |
|         | ±15      | (X)    |                             |                | 49.9 to 69.8K Ω |                |               |             |
|         | ±25      | (Y)    |                             |                | 10 to 255K Ω    |                | 4.7 to 511K Ω |             |
|         | ±50      | (Z)    |                             |                |                 |                |               |             |
| CRT0603 | ±2       | (T)    | 24.9 to 15K Ω               |                |                 | N/A            |               |             |
|         | ±3       | (U)    |                             |                |                 |                |               |             |
|         | ±5       | (V)    | 24.9 to 15K Ω               |                |                 |                |               |             |
|         | ±10      | (W)    | 24.9 to 100K Ω              | 4.7 to 332K Ω  |                 |                |               |             |
|         | ±15      | (X)    |                             | 4.7 to 332K Ω  |                 | 4.7 to 1M Ω    |               |             |
|         | ±25      | (Y)    |                             |                |                 |                |               |             |
|         | ±50      | (Z)    |                             |                |                 |                |               |             |
| CRT0805 | ±2       | (T)    | 24.9 to 30K Ω               |                |                 | N/A            |               |             |
|         | ±3       | (U)    |                             |                |                 |                |               |             |
|         | ±5       | (V)    | 24.9 to 30K Ω               |                |                 |                |               |             |
|         | ±10      | (W)    | 24.9 to 200K Ω              | 4.7 to 511K Ω  | 4.7 to 511K Ω   |                |               |             |
|         | ±15      | (X)    |                             |                | 4.7 to 1M Ω     |                | 4.7 to 1M Ω   |             |
|         | ±25      | (Y)    |                             |                |                 |                | 1 to 1M Ω***  |             |
|         | ±50      | (Z)    |                             |                |                 |                |               |             |
| CRT1206 | ±2       | (T)    | 24.9 to 49.9K Ω             |                |                 | N/A            |               |             |
|         | ±3       | (U)    |                             |                |                 |                |               |             |
|         | ±5       | (V)    | 24.9 to 49.9K Ω             |                |                 |                |               |             |
|         | ±10      | (W)    | 24.9 to 499K Ω              | 4.7 to 1M Ω*** |                 |                |               |             |
|         | ±15      | (X)    |                             |                |                 |                |               |             |
|         | ±25      | (Y)    |                             |                |                 |                |               |             |
|         | ±50      | (Z)    |                             |                |                 |                |               |             |

\*\*\*Select part numbers listed below are not available:

CRT0805-DZ-1504ELF, CRT1206-CY-1R00ELF, CRT1206-DZ-1R74ELF, CRT1206-DZ-2004ELF

## Chip Dimensions

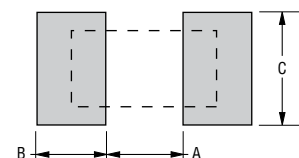
| Dimension      | Model<br>CRT0402                          | Model<br>CRT0603                          | Model<br>CRT0805                          | Model<br>CRT1206                          |
|----------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| L              | $\frac{1.00 \pm 0.10}{(0.040 \pm 0.004)}$ | $\frac{1.55 \pm 0.10}{(0.061 \pm 0.004)}$ | $\frac{2.00 \pm 0.15}{(0.079 \pm 0.006)}$ | $\frac{3.05 \pm 0.15}{(0.120 \pm 0.006)}$ |
| W              | $\frac{0.50 \pm 0.05}{(0.020 \pm 0.002)}$ | $\frac{0.80 \pm 0.10}{(0.031 \pm 0.004)}$ | $\frac{1.25 \pm 0.15}{(0.049 \pm 0.006)}$ | $\frac{1.55 \pm 0.15}{(0.061 \pm 0.006)}$ |
| H              | $\frac{0.30 \pm 0.05}{(0.012 \pm 0.002)}$ | $\frac{0.45 \pm 0.15}{(0.018 \pm 0.006)}$ | $\frac{0.55 \pm 0.10}{(0.022 \pm 0.004)}$ | $\frac{0.55 \pm 0.10}{(0.022 \pm 0.004)}$ |
| l <sub>1</sub> | $\frac{0.20 \pm 0.10}{(0.008 \pm 0.004)}$ | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ | $\frac{0.42 \pm 0.20}{(0.017 \pm 0.008)}$ |
| l <sub>2</sub> | $\frac{0.20 \pm 0.10}{(0.008 \pm 0.004)}$ | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ | $\frac{0.40 \pm 0.25}{(0.016 \pm 0.010)}$ | $\frac{0.35 \pm 0.25}{(0.014 \pm 0.010)}$ |



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

## Recommended Land Pattern

| Dimension | Model<br>CRT0402                          | Model<br>CRT0603                          | Model<br>CRT0805                          | Model<br>CRT1206                          |
|-----------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| A         | $\frac{0.50}{(0.020)}$                    | $\frac{0.80}{(0.031)}$                    | $\frac{1.00}{(0.039)}$                    | $\frac{2.00}{(0.079)}$                    |
| B         | $\frac{0.50}{(0.020)}$                    | $\frac{1.00}{(0.039)}$                    | $\frac{1.00}{(0.039)}$                    | $\frac{1.15}{(0.045)}$                    |
| C         | $\frac{0.60 \pm 0.20}{(0.024 \pm 0.008)}$ | $\frac{0.90 \pm 0.20}{(0.035 \pm 0.008)}$ | $\frac{1.35 \pm 0.20}{(0.053 \pm 0.008)}$ | $\frac{1.70 \pm 0.20}{(0.067 \pm 0.008)}$ |

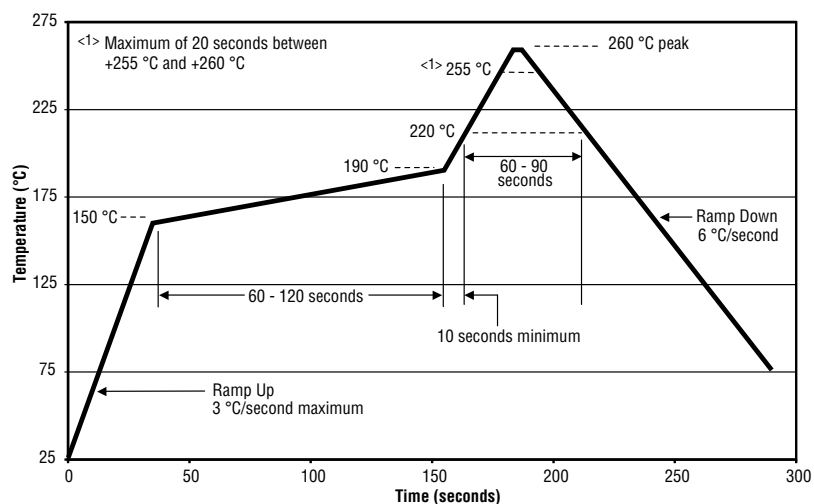


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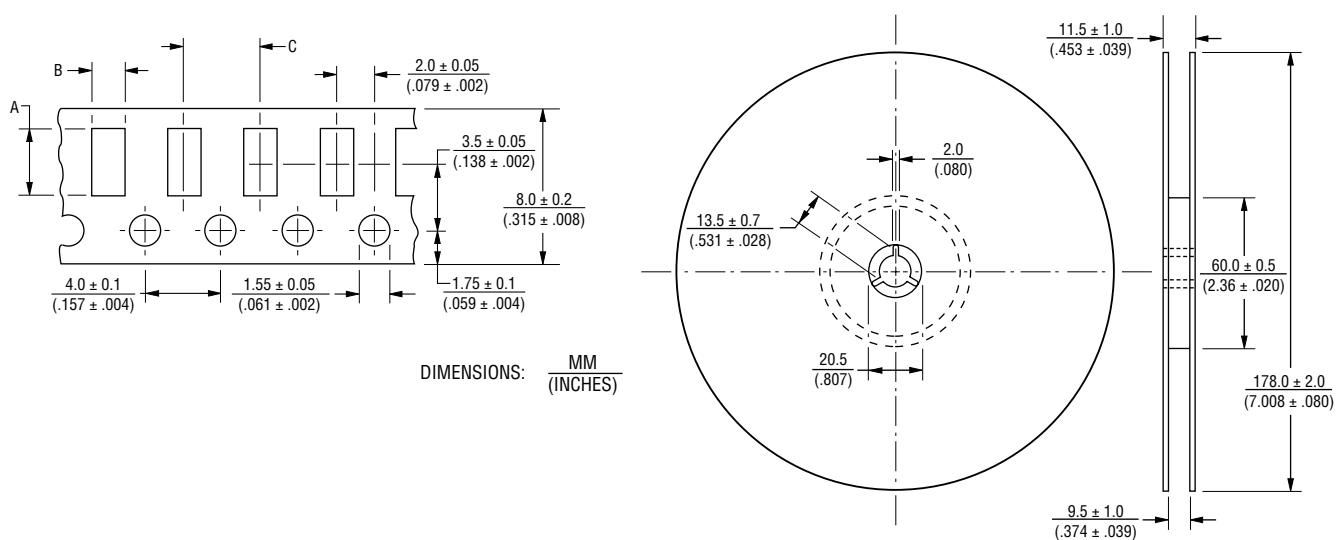
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## Soldering Profile



## Packaging Dimensions - Tape

| Dimension | Model CRT0402                             | Model CRT0603                             | Model CRT0805                             | Model CRT1206                             |
|-----------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| A         | $\frac{1.16 \pm 0.05}{(0.046 \pm 0.002)}$ | $\frac{1.90 \pm 0.05}{(0.075 \pm 0.002)}$ | $\frac{2.37 \pm 0.05}{(0.094 \pm 0.002)}$ | $\frac{3.55 \pm 0.05}{(0.140 \pm 0.002)}$ |
| B         | $\frac{0.70 \pm 0.05}{(0.028 \pm 0.002)}$ | $\frac{1.10 \pm 0.05}{(0.043 \pm 0.002)}$ | $\frac{1.60 \pm 0.05}{(0.063 \pm 0.002)}$ | $\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$ |
| C         | $\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$ | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$ | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$ | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$ |



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