



## Features

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



This series is currently available but not recommended for new designs. The [Model CRT Series](#) is the suggested replacement.

## CRT-ST Series - Thin Film Precision Chip Resistors

### Electrical Characteristics

| Characteristic                                 | Model<br>CRT0402-ST                               | Model<br>CRT0603-ST | Model<br>CRT0805-ST | Model<br>CRT1206-ST |
|------------------------------------------------|---------------------------------------------------|---------------------|---------------------|---------------------|
| 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                        | 50 V                                              | 75 V                | 150 V               | 200 V               |
| Maximum Overload Voltage                       | 100 V                                             | 150 V               | 300 V               | 400 V               |
| Resistance Range<br>(E-96 + E-24 Values)       | (See Value - TCR Table on Page 2)                 |                     |                     |                     |
| Temperature Coefficient<br>of Resistance (TCR) | 25 to 50 PPM/°C (See Value - TCR Table on Page 2) |                     |                     |                     |

NOTE: TCR code assigned as "X", see "How to Order".

### Performance Characteristics

| Test                                           | Test Method                                                                                                     | Test Limits ΔR     |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------|
| Temperature Coefficient<br>of Resistance (TCR) | MIL-STD-202 Method 304                                                                                          | As specified       |
| Short Time Overload                            | JIS-C-5201-1 5.5<br>RCWV*2.5 or max. overload voltage; whichever is lower, for 5 seconds                        | ≤±0.2 %            |
| Insulation Resistance                          | MIL-STD-202 Method 302<br>Apply 100 Vdc for 1 minute                                                            | >10 GΩ             |
| Endurance                                      | MIL-STD-202 Method 108A<br>70 ±2 °C, RCWV for 1,000 hours with 1.5 hours "ON" and 0.5 hours "OFF"               | ≤±0.5 %            |
| Damp Heat with Load                            | MIL-STD-202 Method 103B<br>40 ±2 °C, 90~95 % R.H., RCWV for 1,000 hours with 1.5 hours "ON" and 0.5 hours "OFF" | ≤±0.5 %            |
| Bending Strength                               | JIS-C-5201-1 56.1.4<br>Bending Amplitude 3 mm for 10 seconds                                                    | ≤±0.1 %            |
| Solderability                                  | MIL-STD-202 Method 208H<br>245 ±5 °C for 3 seconds                                                              | 95 % min. coverage |
| Resistance to Solder Heat                      | MIL-STD-202 Method 210E<br>260 ±5 °C for 10 seconds                                                             | ≤±0.1 %            |
| Thermal Shock                                  | MIL-STD-202 Method 107G<br>-55 °C to 150 °C, 100 cycles                                                         | ≤±0.2 %            |
| Low Temperature Operation                      | JIS-C-5201-1 7.1<br>1 hour, -65 °C, followed by 45 minutes of RCWV                                              | ≤±0.5 %            |

RCWV (Rated Continuous Working Voltage) =  $\sqrt{P \cdot R}$  or Max. Operating Voltage, whichever is lower.

### Environmental Characteristics

Moisture Sensitivity Level..... 1

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\*RoHS Directive 2015/863, Mar 31, 2015 and Annex.

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## Applications

- Current sense
- Precision circuits
- Printers
- Automation equipment
- Navigation equipment

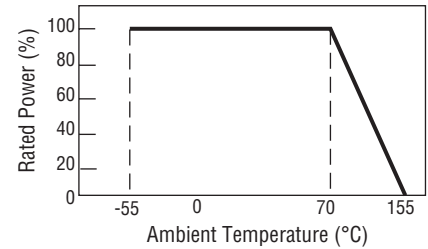
## CRT-ST Series - Thin Film Precision Chip Resistors

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Value - TCR Table

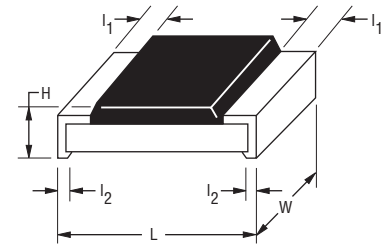
| Model      | TCR      |        | Resistance Tolerance (Code) |                |               |             |
|------------|----------|--------|-----------------------------|----------------|---------------|-------------|
|            | (PPM/°C) | (Code) | ±0.1 %<br>(B)               | ±0.25 %<br>(C) | ±0.5 %<br>(D) | ±1 %<br>(F) |
| CRT0402-ST | ±25      | (Y)    | 4.7 Ω to 255K Ω             |                |               |             |
|            | ±50      | (Z)    |                             |                |               |             |
| CRT0603-ST | ±25      | (Y)    | 1 Ω to 1M Ω                 |                |               |             |
|            | ±50      | (Z)    |                             |                |               |             |
| CRT0805-ST | ±25      | (Y)    | 1 Ω to 2M Ω                 |                |               |             |
|            | ±50      | (Z)    |                             |                |               |             |
| CRT1206-ST | ±25      | (Y)    | 1 Ω to 2.49M Ω              |                |               |             |
|            | ±50      | (Z)    |                             |                |               |             |

Derating Curve



Chip Dimensions

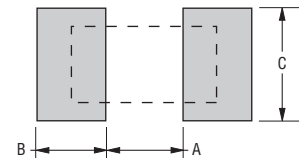
| Dim.           | Model<br>CRT0402-ST                       | Model<br>CRT0603-ST                       | Model<br>CRT0805-ST                       | Model<br>CRT1206-ST                       |
|----------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| L              | $\frac{1.00 \pm 0.05}{(0.040 \pm 0.002)}$ | $\frac{1.60 \pm 0.10}{(0.063 \pm 0.004)}$ | $\frac{2.00 \pm 0.15}{(0.079 \pm 0.006)}$ | $\frac{3.10 \pm 0.15}{(0.122 \pm 0.006)}$ |
| 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              | $\frac{0.30 \pm 0.10}{(0.012 \pm 0.004)}$ | $\frac{0.45 \pm 0.10}{(0.018 \pm 0.004)}$ | $\frac{0.50 \pm 0.10}{(0.020 \pm 0.004)}$ | $\frac{0.55 \pm 0.10}{(0.022 \pm 0.004)}$ |
| 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> | $\frac{0.20 \pm 0.10}{(0.008 \pm 0.004)}$ | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ | $\frac{0.40 \pm 0.20}{(0.016 \pm 0.008)}$ | $\frac{0.35 \pm 0.25}{(0.014 \pm 0.010)}$ |



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

Recommended Land Pattern

| Dimension | Model<br>CRT0402-ST                       | Model<br>CRT0603-ST                       | Model<br>CRT0805-ST                       | Model<br>CRT1206-ST                       |
|-----------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| 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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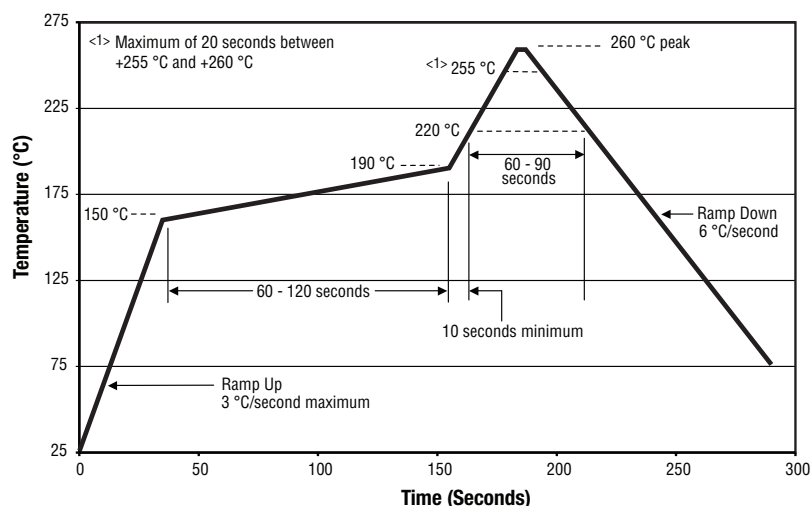
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# CRT-ST Series - Thin Film Precision Chip Resistors

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## Soldering Profile



## How to Order

**CRT 0603 - C Y - 1003 E ST**

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

Size \_\_\_\_\_  
• 0402 • 0603 • 0805 • 1206

Resistance Tolerance \_\_\_\_\_  
F =  $\pm 1\%$  D =  $\pm 0.5\%$  C =  $\pm 0.25\%$  B =  $\pm 0.1\%$

TCR (PPM/°C) \_\_\_\_\_  
Z =  $\pm 50$  Y =  $\pm 25$

Resistance Value \_\_\_\_\_  
<100 ohms: "R" represents decimal point  
(example: 24R3 = 24.3 ohms)  
 $\geq 100$  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-ST)  
E = Paper tape (5K pcs.) on 7 " plastic reel (CRT0603-ST, CRT0805-ST, CRT1206-ST)

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

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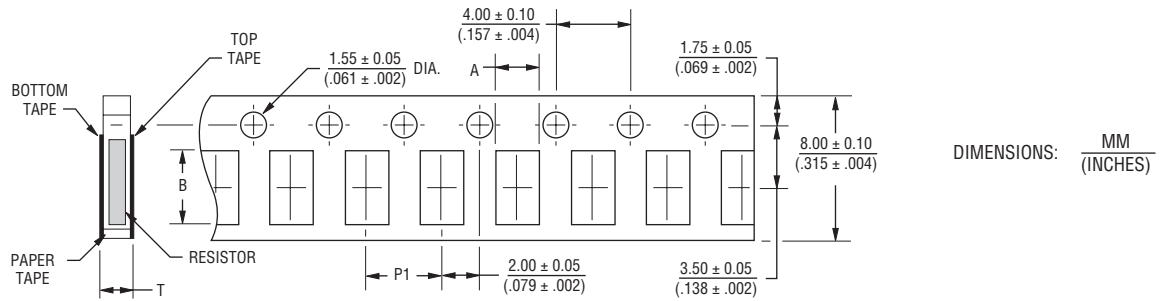
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# CRT-ST Series - Thin Film Precision Chip Resistors

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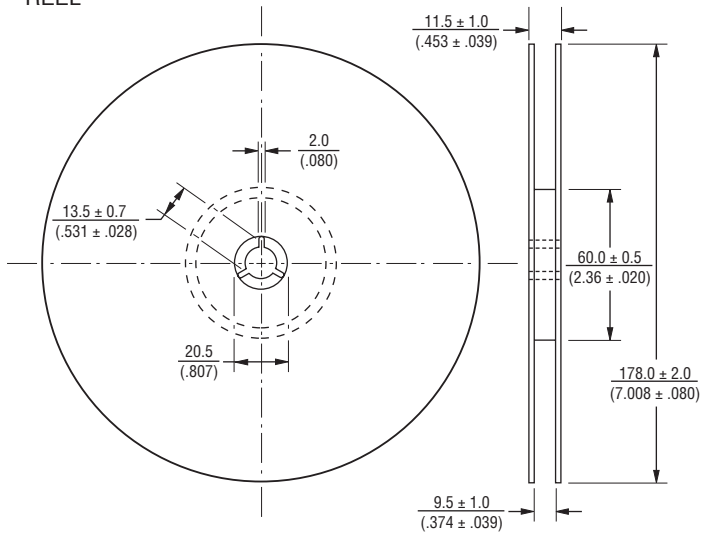
## Packaging Dimensions

### TAPE



| Dimension | Model<br>CRT0402-ST                       | Model<br>CRT0603-ST                       | Model<br>CRT0805-ST                       | Model<br>CRT1206-ST                       |
|-----------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| A         | $\frac{0.70 \pm 0.05}{(0.028 \pm 0.002)}$ | $\frac{1.10 \pm 0.05}{(0.043 \pm 0.002)}$ | $\frac{1.60 \pm 0.05}{(0.063 \pm 0.002)}$ | $\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$ |
| B         | $\frac{1.16 \pm 0.05}{(0.046 \pm 0.002)}$ | $\frac{1.90 \pm 0.05}{(0.075 \pm 0.002)}$ | $\frac{2.37 \pm 0.05}{(0.093 \pm 0.002)}$ | $\frac{3.55 \pm 0.05}{(0.140 \pm 0.002)}$ |
| P1        | $\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$ | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$ | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$ | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$ |
| T         | $\frac{0.40 \pm 0.03}{(0.016 \pm 0.001)}$ | $\frac{0.60 \pm 0.03}{(0.024 \pm 0.001)}$ | $\frac{0.75 \pm 0.05}{(0.030 \pm 0.002)}$ | $\frac{0.75 \pm 0.05}{(0.030 \pm 0.002)}$ |

### REEL



Model CRT0402-ST Series: 10,000 pcs./reel

Model CRT0603-ST, CRT0805-ST, CRT1206-ST Series: 5,000 pcs./reel

REV. 08/21

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