



Features

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

Applications

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

CRT-AS Series - Sulfur-Resistant Thin Film Precision Chip Resistors

Electrical Characteristics

| Characteristic | Model CRT0402-AS | Model CRT0603-AS | Model CRT0805-AS | Model CRT1206-AS |
|---------------------------------------------|-----------------------------------------------------------------------------------|------------------|------------------|------------------|
| 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) | ±10 PPM/°C, ±15 PPM/°C, ±25 PPM/°C, ±50 PPM/°C, (See Value - TCR Table on Page 2) | | | |

Environmental Characteristics

| Specification | Test Method | Limit (ΔR) (Tol. \leq 0.05 %) | Limit (ΔR) (Tol. $>$ 0.05 %) |
|------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------|
| Short Time Overload | JIS-C-5201-1 4.13 IEC 60115-1 4.13 | ±0.2 % | |
| Load Life | MIL-STD-202 Method 108 | ±0.5 % | |
| Humidity (Steady State) | MIL-STD-202 Method 103 | ±0.5 % | |
| Thermal Shock | JESD22 Method JA-104 | ±0.05 % | ±0.2 % |
| Solderability | JIS-C-5201-1 4.17 IEC 60115-1 4.17 | >95 % coverage | |
| Resistance to Soldering Heat | JIS-C-5201-1 4.18 IEC 60115-1 4.18 | ±0.05 % | ±0.2 % |
| Mechanical Shock | MIL-STD-202 Method 213 | ±0.05 % | ±0.1 % |
| Vibration | MIL-STD-202 Method 204 | ±0.05 % | ±0.1 % |
| ESD | AEC-Q200-002, 2 kV | ±0.1 % | |
| Flammability | UL-94V0 | -- | |
| Sulfur Test | ASTM-B-809-95 3~5 PPM H ₂ S, 50 ± 2 °C, 91~93 % RH, no load for 1000 hrs. | ±0.5 % | |

How to Order

CRT 0603 - C V - 1003 E AS

Model _____
(CRT = Thin Film Precision Chip Resistor)

Size _____
• 0402 • 0603 • 0805 • 1206

Resistance Tolerance _____
F = ±1 % D = ±0.5 % C = ±0.25 % B = ±0.1 % A = ±0.05 %

TCR (PPM/°C) _____
W = ±10 X = ±15 Y = ±25 Z = ±50

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-AS)
E = Paper tape (5K pcs.) on 7" plastic reel (CRT0603-AS, CRT0805-AS, CRT1206-AS)

Special Design and Termination _____
AS = Sulfur-resistant version, Tin-plated (RoHS compliant)

* 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 (or equivalent foreign applications) and their use in such applications is neither recommended nor supported.

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Value - TCR Table

| Model | TCR | | Resistance Tolerance (Code) | | | | | |
|------------|----------|--------|-----------------------------|-----------------|----------------|---------------|-------------|--|
| | (PPM/°C) | (Code) | ±0.05 % (A) | ±0.1 % (B) | ±0.25 % (C) | ±0.5 % (D) | ±1 % (F) | |
| CRT0402-AS | ±10 | (W) | 49.9 to 10K Ω | 49.9 to 10K Ω | | | | |
| | ±15 | (X) | | 49.9 to 69.8K Ω | | | | |
| | ±25 | (Y) | | 10 to 100K Ω | | | | |
| | ±50 | (Z) | | | | | | |
| CRT0603-AS | ±10 | (W) | 49.9 to 10K Ω | 10 to 332K Ω | | | | |
| | ±15 | (X) | | | | | | |
| | ±25 | (Y) | | | | | | |
| | ±50 | (Z) | | | | | | |
| CRT0805-AS | ±10 | (W) | 10 to 100K Ω | 10 to 511K Ω | | | | |
| | ±15 | (X) | | 10 to 1M Ω | | | | |
| | ±25 | (Y) | | | | | | |
| | ±50 | (Z) | | | | | | |
| CRT1206-AS | ±10 | (W) | 10 to 200K Ω | 10 to 1M Ω | | | | |
| | ±15 | (X) | | | | | | |
| | ±25 | (Y) | | | | | | |
| | ±50 | (Z) | | | | | | |

Typical Part Marking

CRT0402-AS
No marking.

CRT0603-AS
3-Digit Marking
E-96



Examples:

- 52C = 34K Ω,
- 11C = 12.7K Ω

| Code | E96 | Code | E96 | Code | E96 | Code | E96 | | | | |
|------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|
| 01 | 100 | 25 | 178 | 49 | 316 | 73 | 562 | | | | |
| 02 | 102 | 26 | 182 | 50 | 324 | 74 | 576 | | | | |
| 03 | 105 | 27 | 187 | 51 | 332 | 75 | 590 | | | | |
| 04 | 107 | 28 | 191 | 52 | 340 | 76 | 604 | | | | |
| 05 | 110 | 29 | 196 | 53 | 348 | 77 | 619 | | | | |
| 06 | 113 | 30 | 200 | 54 | 357 | 78 | 634 | | | | |
| 07 | 115 | 31 | 205 | 55 | 365 | 79 | 649 | | | | |
| 08 | 118 | 32 | 210 | 56 | 374 | 80 | 665 | | | | |
| 09 | 121 | 33 | 215 | 57 | 383 | 81 | 681 | | | | |
| 10 | 124 | 34 | 221 | 58 | 392 | 82 | 698 | | | | |
| 11 | 127 | 35 | 226 | 59 | 402 | 83 | 715 | | | | |
| 12 | 130 | 36 | 232 | 60 | 412 | 84 | 732 | | | | |
| 13 | 133 | 37 | 237 | 61 | 422 | 85 | 750 | | | | |
| 14 | 137 | 38 | 243 | 62 | 432 | 86 | 768 | | | | |
| 15 | 140 | 39 | 249 | 63 | 442 | 87 | 787 | | | | |
| 16 | 143 | 40 | 255 | 64 | 453 | 88 | 806 | | | | |
| 17 | 147 | 41 | 261 | 65 | 464 | 89 | 825 | | | | |
| 18 | 150 | 42 | 267 | 66 | 475 | 90 | 845 | | | | |
| 19 | 154 | 43 | 274 | 67 | 487 | 91 | 866 | | | | |
| 20 | 158 | 44 | 280 | 68 | 499 | 92 | 887 | | | | |
| 21 | 162 | 45 | 287 | 69 | 511 | 93 | 909 | | | | |
| 22 | 165 | 46 | 294 | 70 | 523 | 94 | 931 | | | | |
| 23 | 169 | 47 | 301 | 71 | 536 | 95 | 953 | | | | |
| 24 | 174 | 48 | 309 | 72 | 549 | 96 | 976 | | | | |
| Code | A | B | C | D | E | F | G | H | X | Y | Z |
| Multiplier | 10 ⁰ | 10 ¹ | 10 ² | 10 ³ | 10 ⁴ | 10 ⁵ | 10 ⁶ | 10 ⁷ | 10 ⁻¹ | 10 ⁻² | 10 ⁻³ |

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Typical Part Marking (Continued)

CRT0603-AS
3-Digit Marking
E-24



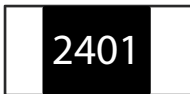
First two digits are significant;
third digit represents number of
zeroes to follow.

Examples:

- 102 = 1K Ω ,
- 181 = 180 Ω

| Code | | | |
|------|----|----|----|
| 10 | 18 | 33 | 56 |
| 11 | 20 | 36 | 62 |
| 12 | 22 | 39 | 68 |
| 13 | 24 | 43 | 75 |
| 15 | 27 | 47 | 82 |
| 16 | 30 | 51 | 91 |

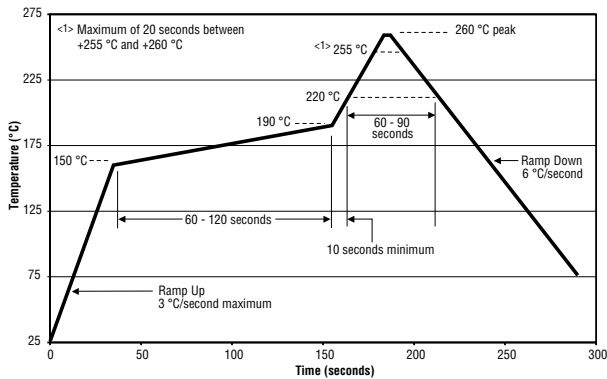
CRT0805-AS
CRT1206-AS
4-Digit Marking



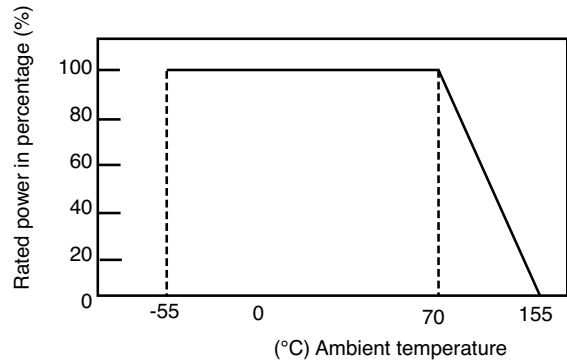
First three digits are significant;
fourth digit represents number of
zeroes to follow.

| Examples | |
|----------------|---------|
| Resistance | Marking |
| 200 Ω | 2000 |
| 2.4K Ω | 2401 |
| 5.36K Ω | 5361 |

Soldering Profile



Derating Curve

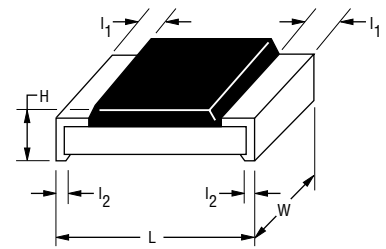


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Chip Dimensions

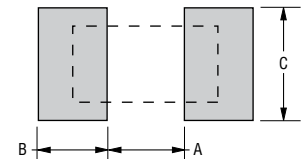
| Dimension | Model CRT0402-AS | Model CRT0603-AS | Model CRT0805-AS | Model CRT1206-AS |
|----------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| L | $\frac{1.00 \pm 0.10}{(0.040 \pm 0.004)}$ | $\frac{1.55 \pm 0.10}{(0.061 \pm 0.004)}$ | $\frac{2.00 \pm 0.15}{(0.079 \pm 0.006)}$ | $\frac{3.05 \pm 0.15}{(0.120 \pm 0.006)}$ |
| 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 ₁ | $\frac{0.20 \pm 0.10}{(0.008 \pm 0.004)}$ | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ | $\frac{0.42 \pm 0.20}{(0.017 \pm 0.008)}$ |
| l ₂ | $\frac{0.20 \pm 0.10}{(0.008 \pm 0.004)}$ | $\frac{0.30 \pm 0.20}{(0.012 \pm 0.008)}$ | $\frac{0.40 \pm 0.25}{(0.016 \pm 0.010)}$ | $\frac{0.35 \pm 0.25}{(0.014 \pm 0.010)}$ |



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

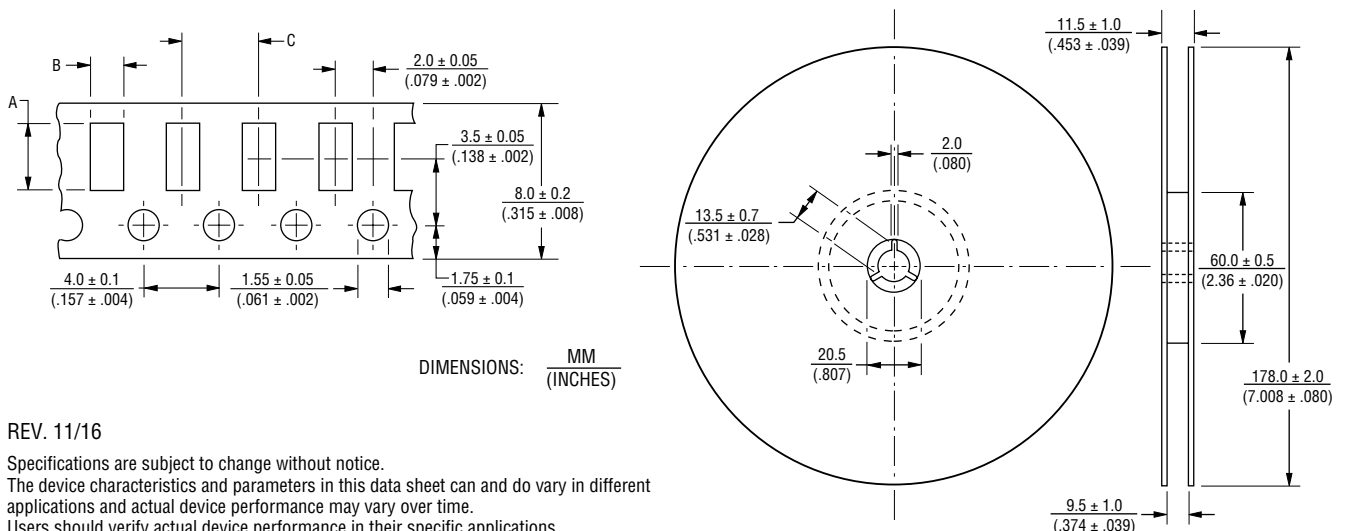
Recommended Land Pattern

| Dimension | Model CRT0402-AS | Model CRT0603-AS | Model CRT0805-AS | Model CRT1206-AS |
|-----------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| 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 | $\frac{0.60 \pm 0.20}{(0.024 \pm 0.008)}$ | $\frac{0.90 \pm 0.20}{(0.035 \pm 0.008)}$ | $\frac{1.35 \pm 0.20}{(0.053 \pm 0.008)}$ | $\frac{1.70 \pm 0.20}{(0.067 \pm 0.008)}$ |



Packaging Dimensions - Tape

| Dimension | Model CRT0402-AS | Model CRT0603-AS | Model CRT0805-AS | Model CRT1206-AS |
|-----------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| 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 | $\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$ | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$ | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$ | $\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$ |



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

REV. 11/16

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