

## Features

- Tight tolerance
- Wide resistance range
- Four package sizes available
- Sulfur-resistant
- RoHS compliant\*
- AEC-Q200 compliant

## Applications

- Automotive
- Precision circuits
- DDR memory modules
- SD cards
- Automation equipment
- Navigation equipment

# CRT-A Series – Thin Film Precision Chip Resistors

### Electrical Characteristics

Characteristic	Model No.			
	CRT0402A	CRT0603A	CRT0805A	CRT1206A
Power Rating @ 70 °C	1/16 W	1/10 W	1/8 W	1/4 W
Operating Temp. Range	-55 °C to +155 °C			
Derated to Zero Load @	+155 °C			
Max. Working Voltage	50 V	75 V	150 V	200 V
Max. Overload Voltage	100 V	150 V	300 V	400 V
Resistance Range (E-96 + E-24 Values)	<a href="#">(See Standard Values table)</a>			
Temperature Coefficient of Resistance (TCR)	10 to 50 PPM/°C (See Value - TCR Table on Page 2)			

### Additional Information

Click these links for more information:



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### How to Order

**CRT 0603 A CW - 1003 E LF**

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

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

Compliance \_\_\_\_\_  
 A = AEC-Q200 Compliant

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

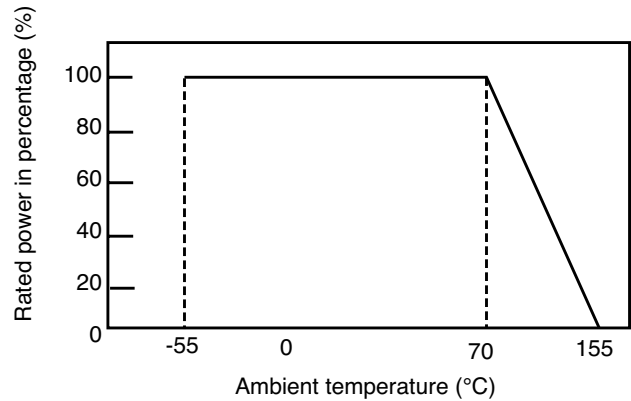
TCR (PPM/°C) \_\_\_\_\_  
 Z = ±50  
 Y = ±25  
 X = ±15  
 W = ±10

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 (CRT0402A)  
 E = Paper tape (5K pcs.) on 7" plastic reel (CRT0603A, CRT0805A,  
 CRT1206A)

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

### Derating Curve



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**Cancer and Reproductive Harm**  
[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

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

Specification	Reference Standard	Condition of Test	Test Limits
Flowers of Sulfur Corrosion (FoS)	ASTM-B-809-95 (modified)	Sulfur 1000 hrs., 105 °C, unpowered	±(1 % + 0.05 Ω)
Temperature Coefficient of Resistance	IEC 60115-1-4.8 JIS C5201-1-4.8	+25 to +125 °C	Refer 5.0
Short Time Overload	IEC 60115-1-4.13 JIS C5201-1-4.13	2.5 X rated voltage for 5 sec.	±(0.05 % + 0.05 Ω)
High Temperature Exposure (Storage)	AEC-Q200-REV D - Test 3 MIL-STD-202 Method 108	1000 hrs. @ T = 125 °C, unpowered 1000 hrs. @ T = 155 °C, unpowered	±(0.1 % + 0.05 Ω) ±(0.2 % + 0.05 Ω)
Temperature Cycling	JESD22 Method JA-104	-55 °C (30 min.) / +125 °C (30 min.) 1000 cycles, 1 min. max. transition time	±(0.1 % + 0.05 Ω)
Moisture Resistance	AEC-Q200-REV D - Test 6 MIL-STD-202 Method 106	T = 24 hrs. / cycle, 10 cycles, unpowered	±(0.1 % + 0.05 Ω)
Biased Humidity	MIL-STD-202 Method 103	1000 hrs. @ 85 °C / 85 % R.H. 10 % rated power	±(0.1 % + 0.05 Ω)
High Temperature Operational Life	MIL-STD-202 Method 108	1000 hrs. @ T = 70 °C, rated power	±(0.1 % + 0.05 Ω) ±(0.3 % + 0.05 Ω)
Resistance to Solvent	AEC-Q200-REV D - Test 12 MIL-STD-202 Method 215	a: Isopropyl alcohol : mineral spirits = 1:3 b: Terpene defluxer (Bioact EC-7R) c: Deionized water : propylene glycol monomethyl ether : monoethanolamine = 42:1:1	Marking and protective layer can't be detached
Mechanical Shock	AEC-Q200-REV D - Test 13 MIL-STD-202 Method 213	Wave form: tolerance for half sine shock pulse. Peak value is 100 g. Normal duration (D) is 6 (ms).	±(0.1 % + 0.05 Ω)
Vibration	AEC-Q200-REV D - Test 14 MIL-STD-202 Method 204	5 g for 20 min., 12 cycles each of 3 orientations. Note: Test from 10-2000 Hz.	±(0.1 % + 0.05 Ω)
Resistance to Solder Heat	AEC-Q200-REV D - Test 15 MIL-STD-202 Method 210	250 ±5 °C solder, 30 ±5 sec. dwell	±(0.05 % + 0.05 Ω)
Thermal Shock	AEC-Q200-REV D - Test 16 MIL-STD-202 Method 107	-55 °C (15 min.) / +155 °C (15 min.) 1000 cycles, max. transfer time of 20 sec., air-air	±(0.1 % + 0.05 Ω)
ESD	AEC-Q200-REV D - Test 17	Human body model 0402/0603: 200 V 0805/1206: 1 kV	±(0.5 % + 0.05 Ω)
Solderability	IEC 60115-1-4.17 JIS C5201-1-4.17	Aging 4 hours at 155 °C dry heat Lead-free solder bath at: 1. Method B1: 245 ±5 °C solder, 5 ± 0.5 sec. dwell 2. Method D: 260 ±5 °C solder, 30 ± 0.5 sec. dwell	At least 95 % of surface area of electrode shall be covered with new solder.
Flammability	AEC-Q200-REV D - Test 20 UL-94	V-0 or V-1 are acceptable. Electrical test not required.	V-0 or V-1
Board Flex (Bending)	AEC-Q200-005	3 mm deflection for 60 sec.	±(0.1 % + 0.05 Ω)
Terminal Strength (SMD)	AEC-Q200-REV D - Test 22	04: 1.0 kg for 60 sec. 06/10/12: 1.8 kg for 60 sec.	No broken terminals

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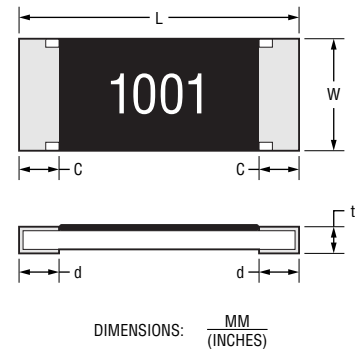
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Value - TCR Table

Model	TCR		Resistance Range			
	(PPM/°C)	(Code)	±0.1 % (B)	±0.25 % (C)	±0.5 % (D)	±1 % (F)
CRT0402A	±10	(W)	10 Ω to 100K Ω			
	±15	(X)				
	±25	(Y)				
	±50	(Z)				
CRT0603A	±10	(W)	10 Ω to 511K Ω			
	±15	(X)				
	±25	(Y)				
	±50	(Z)				
CRT0805A	±10	(W)	10 Ω to 800K Ω			
	±15	(X)				
	±25	(Y)				
	±50	(Z)				
CRT1206A	±10	(W)	10 Ω to 1M Ω			
	±15	(X)				
	±25	(Y)				
	±50	(Z)				

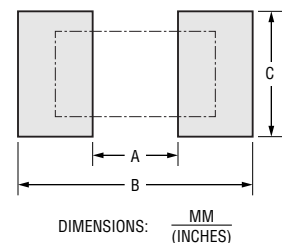
Chip Dimensions

Dimension	CRT0402A	CRT0603A	CRT0805A	CRT1206A
L	$\frac{1.00 \pm 0.10}{(.040 \pm .004)}$	$\frac{1.60 \pm 0.10}{(.063 \pm .004)}$	$\frac{2.00 \pm 0.10}{(.079 \pm .004)}$	$\frac{3.20 \pm 0.15}{(.126 \pm .006)}$
W	$\frac{0.50 \pm 0.05}{(.020 \pm .002)}$	$\frac{0.80 \pm 0.10}{(.031 \pm .004)}$	$\frac{1.25 \pm 0.10}{(.049 \pm .004)}$	$\frac{1.55 \pm 0.15}{(.061 \pm .006)}$
t	$\frac{0.35 \pm 0.10}{(.014 \pm .004)}$	$\frac{0.45 \pm 0.10}{(.018 \pm .004)}$	$\frac{0.50 \pm 0.15}{(.020 \pm .006)}$	$\frac{0.55 \pm 0.15}{(.022 \pm .006)}$
c	$\frac{0.20 \pm 0.10}{(.008 \pm .004)}$	$\frac{0.30 \pm 0.20}{(.012 \pm .008)}$	$\frac{0.40 \pm 0.20}{(.016 \pm .008)}$	$\frac{0.50 \pm 0.30}{(.020 \pm .012)}$
d	$\frac{0.25 \pm 0.10}{(.010 \pm .004)}$	$\frac{0.30 +0.20/-0.10}{(.012 +.008/-0.004)}$	$\frac{0.40 \pm 0.20}{(.016 \pm .008)}$	$\frac{0.40 \pm 0.20}{(.016 \pm .008)}$



Recommended Land Pattern

Dimension	CRT0402A	CRT0603A	CRT0805A	CRT1206A
A	$\frac{0.50 \sim 0.60}{(.020 \sim .024)}$	$\frac{0.70 \sim 0.90}{(.028 \sim .035)}$	$\frac{1.00 \sim 1.40}{(.039 \sim .055)}$	$\frac{2.00 \sim 2.40}{(.079 \sim .094)}$
B	$\frac{1.40 \sim 1.60}{(.055 \sim .063)}$	$\frac{2.00 \sim 2.20}{(.079 \sim .087)}$	$\frac{3.20 \sim 3.80}{(.126 \sim .150)}$	$\frac{4.40 \sim 5.00}{(.173 \sim .197)}$
C	$\frac{0.50 \sim 0.60}{(.020 \sim .024)}$	$\frac{0.90 \sim 1.00}{(.035 \sim .039)}$	$\frac{1.30 \sim 1.40}{(.051 \sim .055)}$	$\frac{1.60 \sim 1.80}{(.063 \sim .071)}$



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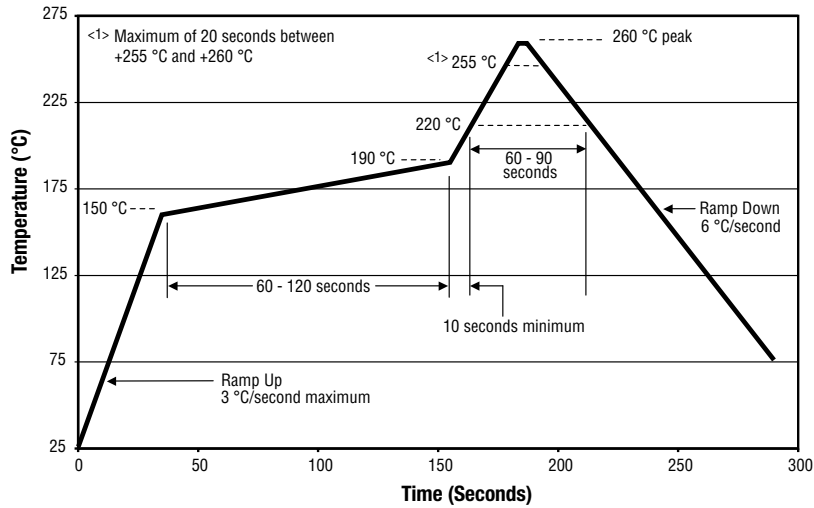
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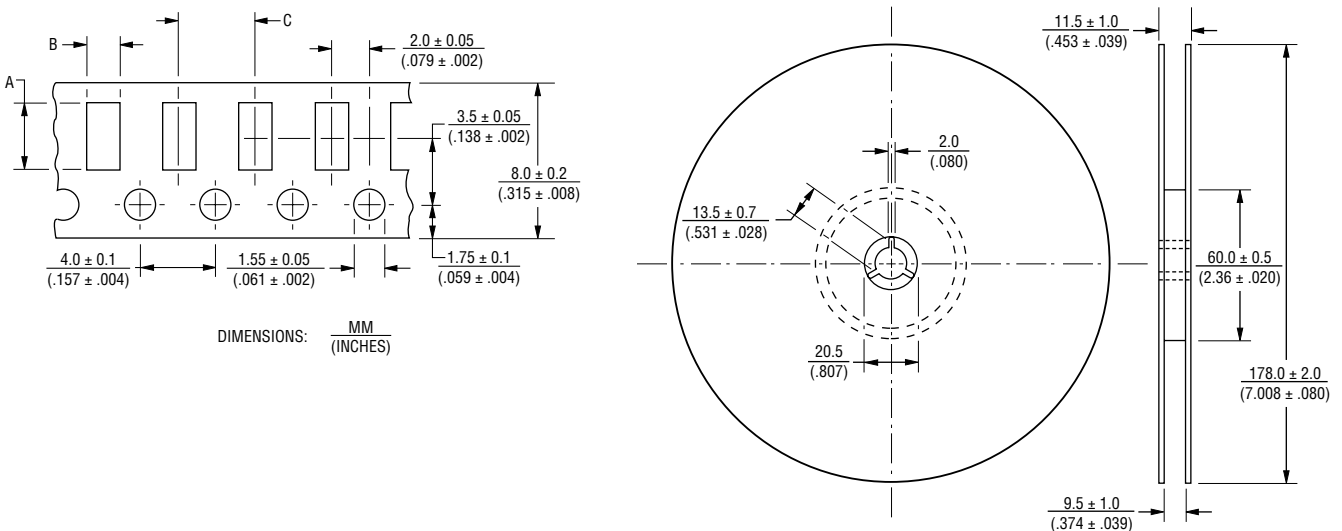


## Soldering Profile



## Packaging Dimensions – Tape

Dimension	CRT0402A	CRT0603A	CRT0805A	CRT1206A
A	$\frac{1.20 \pm 0.05}{(.047 \pm .002)}$	$\frac{1.90 \pm 0.10}{(.075 \pm .004)}$	$\frac{2.40 \pm 0.20}{(.094 \pm .008)}$	$\frac{3.60 \pm 0.20}{(.142 \pm .008)}$
B	$\frac{0.70 \pm 0.05}{(.028 \pm .002)}$	$\frac{1.10 \pm 0.10}{(.043 \pm .004)}$	$\frac{1.60 \pm 0.15}{(.063 \pm .006)}$	$\frac{2.00 \pm 0.15}{(.079 \pm .006)}$
C	$\frac{2.00 \pm 0.10}{(.079 \pm .004)}$	$\frac{4.00 \pm 0.10}{(.157 \pm .004)}$	$\frac{4.00 \pm 0.10}{(.157 \pm .004)}$	$\frac{4.00 \pm 0.10}{(.157 \pm .004)}$



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