



## Features

- RoHS compliant\*
- Power rating at 70 °C: CR2010 - 1/2 W, CR2512 - 1 W
- Tight tolerances of bottom electrode width
- Three layer termination process with nickel barrier prevents leaching and provides excellent solderability
- Suitable for most types of soldering processes
- Standard packaging on tape and reel
- AEC-Q200 approval upon request

## CR2010/CR2512 - Chip Resistors

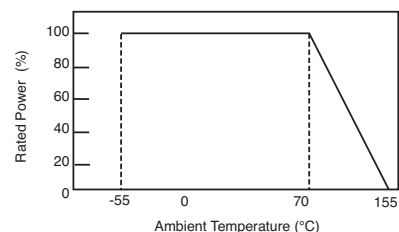
### Electrical Characteristics

| Characteristic                                  | Model CR2010                                                                                                                                                                                                                      | Model CR2512 |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Power Rating @ 70 °C                            | 1/2 W                                                                                                                                                                                                                             | 1 W          |
| Operating Temperature Range                     | -55 °C to +155 °C                                                                                                                                                                                                                 |              |
| Derated to 0 Load at                            | +155 °C                                                                                                                                                                                                                           |              |
| Maximum Working Voltage                         | 200 V                                                                                                                                                                                                                             |              |
| Maximum Overload Voltage                        | 400 V                                                                                                                                                                                                                             |              |
| Resistance Range: 1 % E-96 + E-24               | $10 \text{ ohms} \leq R \leq 1 \text{ M ohms}$<br>$\pm 100 \text{ PPM}/^{\circ}\text{C}$<br>$1 \text{ M ohms} < R \leq 10 \text{ M ohms}$<br>$\pm 200 \text{ PPM}/^{\circ}\text{C}$                                               |              |
| Resistance Range: 5 % E-24                      | $10 \text{ ohms} \leq R \leq 10 \text{ M ohms}$<br>$\pm 200 \text{ PPM}/^{\circ}\text{C}$<br>$1 \text{ ohm} \leq R < 10 \text{ ohms}$<br>$10 \text{ M ohms} < R \leq 20 \text{ M ohms}$<br>$\pm 400 \text{ PPM}/^{\circ}\text{C}$ |              |
| Zero Ohm Jumper <0.05 ohm Rated/Maximum Current | 2 A/5 A                                                                                                                                                                                                                           | 2 A/5 A      |

### Chip Dimensions

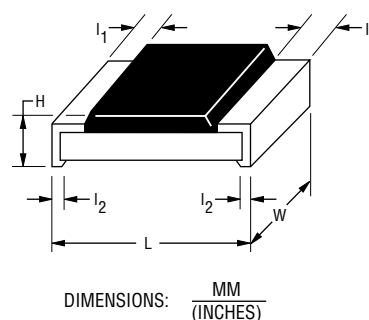
| Dimension | Model CR2010                              | Model CR2512                              |
|-----------|-------------------------------------------|-------------------------------------------|
| L         | $\frac{5.00 \pm 0.20}{(0.197 \pm 0.008)}$ | $\frac{6.30 \pm 0.20}{(0.248 \pm 0.008)}$ |
| W         | $\frac{2.50 \pm 0.20}{(0.098 \pm 0.008)}$ | $\frac{3.10 \pm 0.20}{(0.122 \pm 0.008)}$ |
| H         | $\frac{0.60 \pm 0.10}{(0.024 \pm 0.004)}$ | $\frac{0.60 \pm 0.15}{(0.024 \pm 0.006)}$ |
| l1        | $\frac{0.60 \pm 0.25}{(0.024 \pm 0.010)}$ | $\frac{0.60 \pm 0.25}{(0.024 \pm 0.010)}$ |
| l2        | $\frac{0.60 \pm 0.25}{(0.024 \pm 0.010)}$ | $\frac{0.60 \pm 0.25}{(0.024 \pm 0.010)}$ |

### Derating Curve



For Standard Values Used in Capacitors, Inductors, and Resistors, [click here](#).

### Dimensional Drawing



### Performance Characteristics

| Test                            | Procedure                                                                                | Method            | Test Limits $\Delta R$           |                                |
|---------------------------------|------------------------------------------------------------------------------------------|-------------------|----------------------------------|--------------------------------|
|                                 |                                                                                          |                   | 1 %                              | 5 %                            |
| Thermal Shock                   | -55 °C for 30 minutes, +155 °C for 30 minutes, 5 cycles                                  | IEC60115-1-4.19   | $\leq \pm(0.5 \% + 0.05 \Omega)$ | $\leq \pm(1 \% + 0.05 \Omega)$ |
| Short Time Overload             | 2.5 X rated voltage for 5 seconds                                                        | IEC60115-1-4.13   | $\leq \pm(1 \% + 0.05 \Omega)$   |                                |
| Resistance to Solder Heat       | 270 $\pm$ 5 °C for 10 $\pm$ 1 seconds                                                    | IEC60115-1-4.18   | $\leq \pm(0.5 \% + 0.05 \Omega)$ | $\leq \pm(1 \% + 0.05 \Omega)$ |
| Resistance to Dry Heat          | 125 $\pm$ 5 °C for 96 $\pm$ 4 hours                                                      | IEC60115-1-4.23.2 | $\leq \pm(1 \% + 0.05 \Omega)$   | $\leq \pm(2 \% + 0.1 \Omega)$  |
| Load Life                       | Rated voltage for 1000 hours, 70 °C, 1.5 hours "ON", 0.5 hours "OFF"                     | IEC60115-1-4.25.1 | $\leq \pm(1 \% + 0.05 \Omega)$   | $\leq \pm(3 \% + 0.1 \Omega)$  |
| Load Life with Humidity         | Rated voltage for 1000 hours, 40 $\pm$ 2 °C, 90~95 % RH, 1.5 hours "ON", 0.5 hours "OFF" | IEC60115-1-4.24   | $\leq \pm(1 \% + 0.05 \Omega)$   | $\leq \pm(3 \% + 0.1 \Omega)$  |
| Solderability                   | 245 $\pm$ 5 °C, 2 $\pm$ 0.5 seconds                                                      | IEC60115-1-4.17   | $\geq 95 \%$ of area covered     |                                |
| Bending                         | 3 mm                                                                                     | IEC60115-1-4.33   | $\leq \pm(0.5 \% + 0.05 \Omega)$ | $\leq \pm(1 \% + 0.05 \Omega)$ |
| Dielectric Withstanding Voltage | --                                                                                       | IEC60115-1-4.7    | >500 V                           |                                |
| Insulation Resistance           | 100 V                                                                                    | IEC60115-1-4.6    | $\geq 1 \text{ G}\Omega$         |                                |

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

Specifications are subject to change without notice.

The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time. Users should verify actual device performance in their specific applications.

# CR2010/CR2512 - Chip Resistors

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## How to Order

**CR 2010 - F X - 8252 E LF**

Model \_\_\_\_\_  
(CR = Chip Resistor)

Size \_\_\_\_\_  
• 2010  
• 2512

Resistance Tolerance \_\_\_\_\_  
F =  $\pm 1\%$  ..... Use with "X" TCR code only for values from 10 ohms through 1 megohm;  
Use with "W" TCR code only for values from 1 megohm through 10 megohms  
J =  $\pm 5\%$  ..... Use with "W" TCR code for values from 10 ohms through 10 megohms;  
Use with "Z" TCR code for values above 10 megohms through 20 megohms;  
Use with "/" TCR code for zero ohm (jumper) and values from 1 ohm through 9.1 ohms.

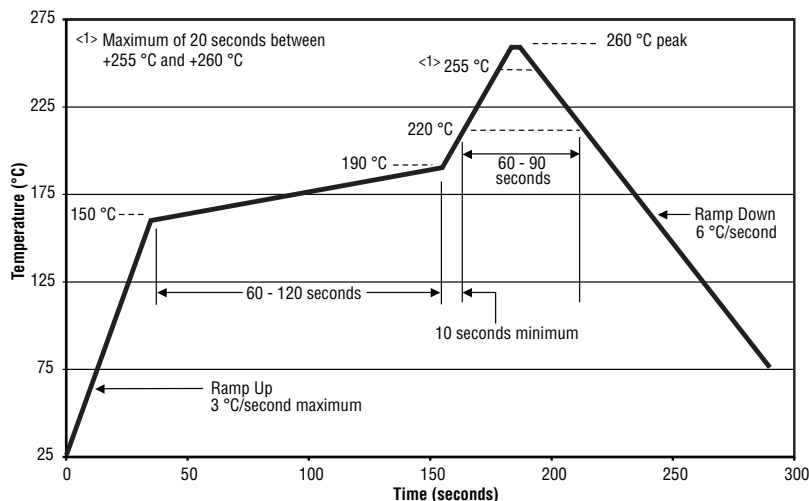
TCR (ppm/ $^{\circ}$ C) \_\_\_\_\_  
X =  $\pm 100$   
W =  $\pm 200$   
Z =  $\pm 400$   
/ = Used with "J" Resistance Tolerance code for zero ohm (jumper) and values from 1 ohm through 9.1 ohms.

Resistance Value \_\_\_\_\_  
For 1 % Tolerance:  
<100 ohms..... "R" represents decimal point (example: 24R3 = 24.3 ohms)  
 $\geq 100$  ohms..... First three digits are significant, fourth digit represents number of zeros to follow (example: 8252 = 82.5k W)  
For 5 % Tolerance:  
<10 ohms ..... "R" represents decimal point (example: 4R7 = 4.7 ohms)  
 $\geq 10$  ohms..... First two digits are significant, third digit represents number of zeros to follow (example: 474 = 470k ohms; 000 = Jumper)

Packaging \_\_\_\_\_  
E = Embossed Plastic Tape (4,000 pcs.) on 7 " Plastic Reel

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

## Soldering Profile for RoHS Compliant Chip Resistors and Arrays



## Marking Explanation

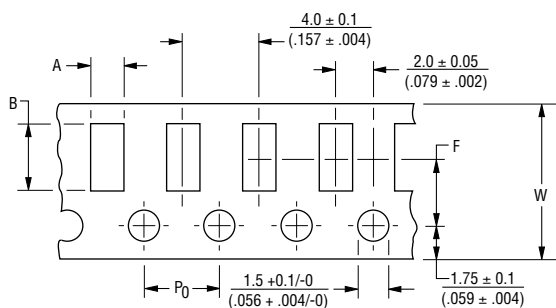
Resistors with 5 % tolerance may have a 3-digit or 4-digit resistance code. Complete information about resistance value and tolerance is found on the label of the reel of chip resistors.

- 5 %: 3 digits, first two digits are significant, third digit is number of zeros to follow. Letter R is decimal point for values from 1 to 9.9 ohms.
- 5 %: 4 digits, first three digits are significant, fourth digit is number of zeros to follow. Letter R is decimal point for values from 1 to 99.9 ohms.
- 1 %: 4 digits, first three digits are significant, fourth digit is number of zeros to follow. Letter R is decimal for values from 1 to 99.9 ohms.

# CR2010/CR2512 - Chip Resistors

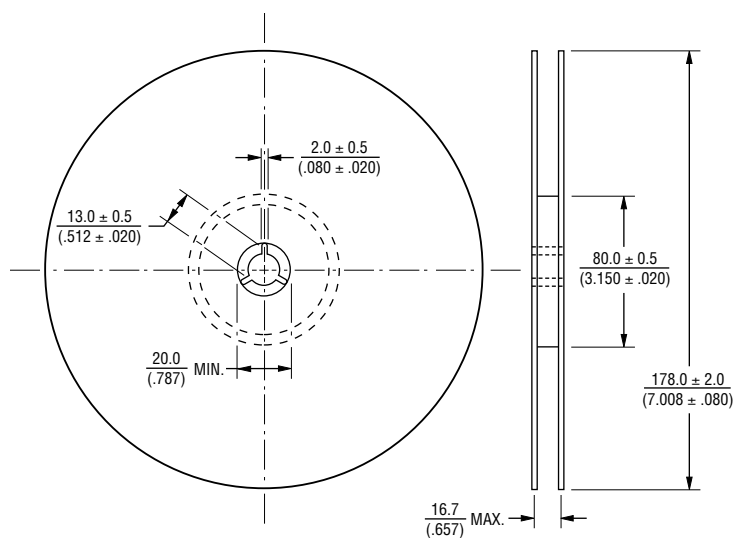
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## Packaging Dimensions



| Dimension | Model CR2010                             | Model CR2512                             |
|-----------|------------------------------------------|------------------------------------------|
| A         | $\frac{2.8 \pm 0.2}{(0.110 \pm 0.008)}$  | $\frac{3.5 \pm 0.2}{(0.138 \pm 0.008)}$  |
| B         | $\frac{5.5 \pm 0.2}{(0.217 \pm 0.008)}$  | $\frac{6.7 \pm 0.2}{(0.264 \pm 0.008)}$  |
| W         | $\frac{12.0 \pm 0.3}{(0.472 \pm 0.012)}$ | $\frac{12.0 \pm 0.3}{(0.472 \pm 0.012)}$ |
| F         | $\frac{5.5 \pm 0.05}{(0.217 \pm 0.002)}$ | $\frac{5.5 \pm 0.05}{(0.217 \pm 0.002)}$ |
| P0        | $\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$  | $\frac{4.0 \pm 0.1}{(0.157 \pm 0.004)}$  |

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



REV. 07/15

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