



5% Thick Film Chip Resistors (RoHS Compliant)

CR5-RC Series

FEATURES

- Temperature Range: -55°C ~ +125°C
- High purity alumina substrate
- Wave or flow solderable
- Excellent high frequency characteristics
- Wrap around termination
- Inner electrode protection
- Value range 0Ω ~ 10MΩ



RoHS Compliant



DERATING CURVE



REEL DIMENSIONS (mm)



PART NUMBERING SYSTEM



SERIES, SIZE, WATTAGE, VOLTAGE, AND DIMENSIONS

| Series | Case Size | Watts | Voltage (V) (max.) | | Dimensions (mm) | | | | |
|--------|-----------|-------|--------------------|------|-----------------|------------|------------|------------|-----------|
| | | | W.V. | O.V. | L | W | C | D | t |
| 260 | 0805 | 1/10 | 150 | 300 | 2.0 ± 0.15 | 1.25 ± .15 | 0.4 ± 0.2 | 0.4 ± 0.2 | .55 ± .10 |
| 263 | 1206 | 1/8 | 200 | 400 | 3.1 ± 0.15 | 1.55 ± .15 | 0.45 ± 0.2 | 0.45 ± 0.2 | .55 ± .10 |
| 301 | 0603 | 1/16 | 50 | 100 | 1.60 ± .10 | 0.8 ± .15 | 0.3 ± .20 | 0.30 ± .20 | .45 ± .10 |



STANDARD STOCKED VALUES (Ω)

| | | | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|----|----|-----|-----|-----|------|------|------|------|-----|-----|------|------|------|------|------|------|------|
| 0 | 2.0 | 4.3 | 9.1 | 20 | 43 | 91 | 200 | 430 | 910 | 2K | 4.3K | 9.1K | 20K | 43K | 91K | 200K | 430K | 820K | 1.8M | 3.9M | 8.2M |
| 1.0 | 2.2 | 4.7 | 10 | 22 | 47 | 100 | 220 | 470 | 1K | 2.2K | 4.7K | 10K | 22K | 47K | 100K | 220K | 470K | 910K | 2M | 4.3M | 9.1M |
| 1.1 | 2.4 | 5.1 | 11 | 24 | 51 | 110 | 240 | 510 | 1.1K | 2.4K | 5.1K | 11K | 24K | 51K | 110K | 240K | 510K | 1M | 2.2M | 4.7M | 10M |
| 1.2 | 2.7 | 5.6 | 12 | 27 | 56 | 120 | 270 | 560 | 1.2K | 2.7K | 5.6K | 12K | 27K | 56K | 120K | 270K | 560K | 1.1M | 2.4M | 5.1M | |
| 1.3 | 3.0 | 6.2 | 13 | 30 | 62 | 130 | 300 | 620 | 1.3K | 3K | 6.2K | 13K | 30K | 62K | 130K | 300K | 620K | 1.2M | 2.7M | 5.6M | |
| 1.5 | 3.3 | 6.8 | 15 | 33 | 68 | 150 | 330 | 680 | 1.5K | 3.3K | 6.8K | 15K | 33K | 68K | 150K | 330K | 660K | 1.3M | 3M | 6.2M | |
| 1.6 | 3.6 | 7.5 | 16 | 36 | 75 | 160 | 360 | 750 | 1.6K | 3.6K | 7.5K | 16K | 36K | 75K | 160K | 360K | 680K | 1.5M | 3.3M | 6.8M | |
| 1.8 | 3.9 | 8.2 | 18 | 39 | 82 | 180 | 390 | 820 | 1.8K | 3.9K | 8.2K | 18K | 39K | 82K | 180K | 390K | 750K | 1.6M | 3.6M | 7.5M | |

NOTE: RoHS Compliant by Exemption

CONSTRUCTION

| No. | Part Name |
|-----|---|
| 1 | Protective coating: Epoxy |
| 2 | Al ₂ O ₃ high purity alumina substrate: Al 96fi |
| 3 | Resistive element: metal film |
| 4 | Termination (Inner): Ag/Pd |
| 5 | Termination (Between): Ni plating film |
| 6 | Termination (Outer): Sn plating film |





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CHARACTERISTICS

| Characteristics | Limits | Test Methods (JIS C 5201-1) | | | | | | | | | | | | | | | |
|---------------------------------|--|--|-------------|-------------|------|---|------------|---------|---|------------|------------|---|-------------|---------|---|------------|------------|
| Temperature coefficient | 1Ω ~ 10Ω ≤ ±400 PPM / °C 11Ω ~ 10MΩ ≤ ±200 PPM / °C | 5.2 Natural resistance change per temp. degree centigrade. R ₂ -R ₁ ———— x10 ⁶ (PPM/°C) R ₁ (t ₂ -t ₁) R ₁ : Resistance value at room temperature (t ₁) R ₂ : Resistance value at room temp.plus 100°C (t ₂) | | | | | | | | | | | | | | | |
| Short time overload | Resistance change rate is ± (2.0 % + 0.1Ω) Max. | 5.5 Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds. | | | | | | | | | | | | | | | |
| Insulation resistance | 1,000M Ω or more | 5.6 Apply 500V DC between protective coating and termination for 1 minute | | | | | | | | | | | | | | | |
| Dielectric withstanding voltage | No evidence of flashover mechanical damage, arcing or insulation break down. | 5.7 Apply 500V AC between protective coating and termination for 1 minute | | | | | | | | | | | | | | | |
| Terminal bending | ±(1.0% +0.05Ω) Max. | 6.1.4 Twist of Test Board: Y/X=5/90mm for 10 seconds | | | | | | | | | | | | | | | |
| Temperature cycling | ± (1.0% + 0.05Ω) Max. | 7.4 Resistance change after continuous 5 cycles for duty shown below: | | | | | | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55°C ±3°C</td> <td>30 mins</td> </tr> <tr> <td>2</td> <td>Room temp.</td> <td>10~15 mins</td> </tr> <tr> <td>3</td> <td>+155°C ±2°C</td> <td>30 mins</td> </tr> <tr> <td>4</td> <td>Room temp.</td> <td>10~15 mins</td> </tr> </tbody> </table> | Step | Temperature | Time | 1 | -55°C ±3°C | 30 mins | 2 | Room temp. | 10~15 mins | 3 | +155°C ±2°C | 30 mins | 4 | Room temp. | 10~15 mins |
| | | Step | Temperature | Time | | | | | | | | | | | | | |
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| 3 | +155°C ±2°C | 30 mins | | | | | | | | | | | | | | | |
| 4 | Room temp. | 10~15 mins | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| Load life in humidity | Resistance change rate is ± (3.0% + 0.1Ω) Max. | 7.9 Resistance change after 1,000 hours (1.5 hours "on", 0.5 hour "off") at RCWV in a humidity chamber controlled at 40°C ± 2°C and 90 to 95 % relative humidity | | | | | | | | | | | | | | | |
| Load life | Resistance change rate is ± (3.0% + 0.1Ω) Max. | 7.10 Permanent resistance change after 1,000 hours operating at RCWV, with duty cycle of (1.5 hours "on", 0.5 hour "off") at 70°C ± 2°C ambient | | | | | | | | | | | | | | | |
| Soldering Heat | Electrical characteristics shall be satisfied. Without distinct deformation in appearance. | <u>Solder bath method</u> Pre-Heat: 100 to 105°C, 30 ±5 sec. Temperature: 265 ± 3°C, 5 +1/-0 sec <u>Reflow soldering method</u> Peak: 250 +5/-0°C 230°C or higher, 30 ±10Sec. <u>Solder iron method</u> Bit temperature: 350° ±10°C Application time of soldering iron: 3 +1/-0 seconds | | | | | | | | | | | | | | | |
| Solderability | 95% Coverage min. | 6.5 Test temperature of solder: 245° ±3°C Dipping them solder: 2~3 seconds | | | | | | | | | | | | | | | |

