



# 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

|        |   |   |   |       |   |   |   |                         |   |
|--------|---|---|---|-------|---|---|---|-------------------------|---|
| 2      | 6 | 0 | - | 1     | 0 | K | - | R                       | C |
| Series |   |   |   | Value |   |   |   | Suffix (RoHS Compliant) |   |

## 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 <sub>2</sub> O <sub>3</sub> 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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# CR5-RC Series

## ■ CHARACTERISTICS

| Characteristics                 | Limits                                                                                                                                          | Test Methods ( JIS C 5201-1 )                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |             |      |   |                             |         |   |            |            |   |                              |         |   |            |            |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|------|---|-----------------------------|---------|---|------------|------------|---|------------------------------|---------|---|------------|------------|
| Temperature coefficient         | $1\Omega \sim 10\Omega \leq \pm 400 \text{ PPM} / ^\circ\text{C}$<br>$11\Omega \sim 10\text{M}\Omega \leq \pm 200 \text{ PPM} / ^\circ\text{C}$ | 5.2 Natural resistance change per temp. degree centigrade.<br>$\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM/}^\circ\text{C)}$<br>R1: Resistance value at room temperature (t <sub>1</sub> )<br>R2: Resistance value at room temp.plus 100°C (t <sub>2</sub> )                                                                                                                                                                                                                   |      |             |      |   |                             |         |   |            |            |   |                              |         |   |            |            |
| Short time overload             | Resistance change rate is $\pm (2.0 \% + 0.1\Omega) \text{ Max.}$                                                                               | 5.5 Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds.                                                                                                                                                                                                                                                                                                                                                                                       |      |             |      |   |                             |         |   |            |            |   |                              |         |   |            |            |
| Insulation resistance           | 1,000M $\Omega$ 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                | $\pm (1.0\% + 0.05\Omega) \text{ Max.}$                                                                                                         | 6.1.4 Twist of Test Board:<br>Y/X=5/90mm for 10 seconds                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |             |      |   |                             |         |   |            |            |   |                              |         |   |            |            |
| Temperature cycling             | $\pm (1.0\% + 0.05\Omega) \text{ Max.}$                                                                                                         | 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 <math>\pm 3^\circ\text{C}</math></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 <math>\pm 2^\circ\text{C}</math></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 $\pm 3^\circ\text{C}$ | 30 mins | 2 | Room temp. | 10~15 mins | 3 | +155°C $\pm 2^\circ\text{C}$ | 30 mins | 4 | Room temp. | 10~15 mins |
| Step                            | Temperature                                                                                                                                     | Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |             |      |   |                             |         |   |            |            |   |                              |         |   |            |            |
| 1                               | -55°C $\pm 3^\circ\text{C}$                                                                                                                     | 30 mins                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |             |      |   |                             |         |   |            |            |   |                              |         |   |            |            |
| 2                               | Room temp.                                                                                                                                      | 10~15 mins                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |             |      |   |                             |         |   |            |            |   |                              |         |   |            |            |
| 3                               | +155°C $\pm 2^\circ\text{C}$                                                                                                                    | 30 mins                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |             |      |   |                             |         |   |            |            |   |                              |         |   |            |            |
| 4                               | Room temp.                                                                                                                                      | 10~15 mins                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |             |      |   |                             |         |   |            |            |   |                              |         |   |            |            |
| Load life in humidity           | Resistance change rate is $\pm (3.0\% + 0.1\Omega) \text{ Max.}$                                                                                | 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 $\pm 2^\circ\text{C}$ and 90 to 95 % relative humidity                                                                                                                                                                                                                                                                                                            |      |             |      |   |                             |         |   |            |            |   |                              |         |   |            |            |
| Load life                       | Resistance change rate is $\pm (3.0\% + 0.1\Omega) \text{ Max.}$                                                                                | 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 $\pm 2^\circ\text{C}$ ambient                                                                                                                                                                                                                                                                                                                           |      |             |      |   |                             |         |   |            |            |   |                              |         |   |            |            |
| Soldering Heat                  | Electrical characteristics shall be satisfied. Without distinct deformation in appearance.                                                      | <u>Solder bath method</u><br>Pre-Heat: 100 to 105°C, 30 $\pm 5$ sec.<br>Temperature: 265 $\pm 3^\circ\text{C}$ , 5 +1/-0 sec<br><br><u>Reflow soldering method</u><br>Peak: 250 +5/-0°C<br>230°C or higher, 30 $\pm 10$ Sec.<br><br><u>Solder iron method</u><br>Bit temperature: 350° $\pm 10^\circ\text{C}$<br>Application time of soldering iron: 3 +1/-0 seconds                                                                                                                        |      |             |      |   |                             |         |   |            |            |   |                              |         |   |            |            |
| Solderability                   | 95% Coverage min.                                                                                                                               | 6.5 Test temperature of solder: 245° $\pm 3^\circ\text{C}$<br>Dipping them solder: 2~3 seconds                                                                                                                                                                                                                                                                                                                                                                                              |      |             |      |   |                             |         |   |            |            |   |                              |         |   |            |            |

## Данный компонент на территории Российской Федерации

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Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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