

## Data Sheet

Customer:

Product: Thick Film Chip Resistor - CR Series

Size: 01005/0201/0402/0603/0805/1206/1210/2010/2512/  
1225/0612

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|---------------------|-----------------|---------------------|------------------------|---------------------------|
| 10-Mar-21           | 10-Mar-21       | 10-Mar-21           | 10-Mar-21              |                           |
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# Thick Film Chip Resistor



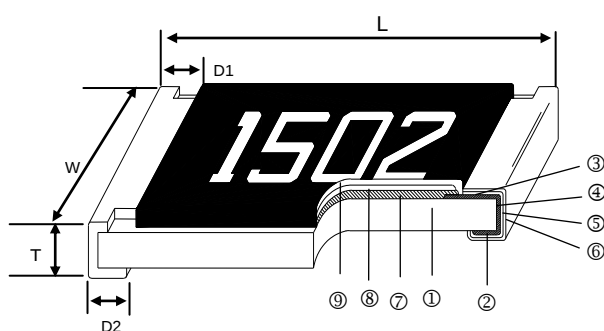
## Scope

- This specification applies to all sizes of rectangular-type fixed chip resistors with Ruthenium-base as material.

## Features

- Small size and light weight
- Highly reliable multilayer electrode construction
- Compatible with all soldering process
- Long side terminations

## Construction



## Applications

- Telecommunication Equipments
- Radio and Tape Recorders, TV Tuners
- Digital Cameras, Watches, Pocket Calculators
- Computers, Instruments
- Medical Equipment

|                     |                      |                      |
|---------------------|----------------------|----------------------|
| ① Alumina Substrate | ④ Edge Electrode     | ⑦ Resistor Layer     |
| ② Bottom Electrode  | ⑤ Barrier Layer      | ⑧ Primary Overcoat   |
| ③ Top Electrode     | ⑥ External Electrode | ⑨ Secondary Overcoat |

## Dimensions

| Type  | Size (Inch) | L (mm)    | W (mm)    | T (mm)    | D1 (mm)   | D2 (mm)   | Weight (g) (1000pcs) |
|-------|-------------|-----------|-----------|-----------|-----------|-----------|----------------------|
| CR-E5 | 01005       | 0.40±0.02 | 0.20±0.02 | 0.13±0.02 | 0.10±0.03 | 0.10±0.03 | 0.037                |
| CR-01 | 0201        | 0.60±0.03 | 0.30±0.03 | 0.23±0.03 | 0.15±0.05 | 0.15±0.05 | 0.150                |
| CR-02 | 0402        | 1.00±0.05 | 0.50±0.05 | 0.35±0.05 | 0.20±0.10 | 0.20±0.10 | 0.620                |
| CR-03 | 0603        | 1.60±0.10 | 0.80±0.10 | 0.45±0.10 | 0.30±0.20 | 0.30±0.20 | 2.042                |
| CR-05 | 0805        | 2.00±0.10 | 1.25±0.10 | 0.50±0.10 | 0.35±0.20 | 0.40±0.20 | 4.368                |
| CR-06 | 1206        | 3.10±0.10 | 1.55±0.10 | 0.55±0.10 | 0.50±0.25 | 0.50±0.20 | 8.947                |
| CR-10 | 1210        | 3.10±0.10 | 2.60±0.15 | 0.55±0.10 | 0.50±0.25 | 0.50±0.20 | 15.959               |
| CR-0A | 2010        | 5.00±0.10 | 2.50±0.15 | 0.55±0.10 | 0.60±0.25 | 0.50±0.20 | 24.241               |
| CR-12 | 2512        | 6.35±0.10 | 3.10±0.15 | 0.55±0.10 | 0.60±0.25 | 0.50±0.20 | 39.448               |
| CR-25 | 1225        | 3.20±0.15 | 6.45±0.15 | 0.90±0.15 | 0.60±0.30 | 0.80±0.25 | 64.88                |
| CR-62 | 0612        | 1.55±0.10 | 3.10±0.15 | 0.55±0.10 | 0.25±0.15 | 0.35±0.15 | 9.31                 |

## Part Numbering

Part Number : CR-03FL7---10R

Part Number : CR-03JL7----0R

| CR-          | 03                                                                                                                                | F                                                                                   | L                                                                               | 7                                                                                                                                                                                                                                    | - - - 1 0 R                                                                                                                   |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| CR-          | 03                                                                                                                                | J                                                                                   | L                                                                               | 7                                                                                                                                                                                                                                    | - - - - 0 R                                                                                                                   |
| Product Type | Dimensions                                                                                                                        | Resistance Tolerance                                                                | Function Code                                                                   | Packaging Code                                                                                                                                                                                                                       | Resistance                                                                                                                    |
| CR-          | E5: 01005<br>01: 0201<br>02: 0402<br>03: 0603<br>05: 0805<br>06: 1206<br>10: 1210<br>0A: 2010<br>12: 2512<br>25: 1225<br>62: 0612 | B: $\pm 0.1\%$<br>C: $\pm 0.25\%$<br>D: $\pm 0.5\%$<br>F: $\pm 1\%$<br>J: $\pm 5\%$ | L: Standard & High Precision<br>E: TC50<br>P: High Power<br>H: Ultra High Power | 0: 7" Reel 15Kpcs<br>2: 7" Reel 2Kpcs<br>4: 7" Reel 4Kpcs<br>5: 7" Reel 20Kpcs<br>6: 7" Reel 10Kpcs<br>7: 7" Reel 5Kpcs<br>9: 10" Reel 8Kpcs<br>A: 10" Reel 10Kpcs<br>B: 10" Reel 20Kpcs<br>C: 13" Reel 40Kpcs<br>D: 13" Reel 20Kpcs | --- 1R2: 1.2 $\Omega$<br>--- 3K3: 3.3K $\Omega$<br>--- 10K: 10K $\Omega$<br>-- 100K: 100K $\Omega$<br>" " to fill up 6 spaces |

## Standard Electrical Specifications

| Item<br>Type  | Power Rating<br>at 70°C<br>Jumper<br>Rated Current | Operating<br>Temp. Range | Max.<br>Operating<br>Voltage | Max.<br>Overload<br>Voltage | Resistance Range                                                                                                           |                             | TCR<br>(PPM/°C)                                  |
|---------------|----------------------------------------------------|--------------------------|------------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------------------------------|
|               |                                                    |                          |                              |                             | $\pm 1\%$ (E24、E96)                                                                                                        | $\pm 5\%$ (E24)             |                                                  |
| CR-E5 (01005) | 1/32W                                              | -55 ~ +125°C             | 15V                          | 30V                         | 10 $\Omega$ - 1M $\Omega$                                                                                                  |                             | $\pm 300$                                        |
|               | Jumper: 0.5A                                       |                          |                              |                             | -                                                                                                                          | 0 $\Omega$ (<50m $\Omega$ ) | -                                                |
| CR-01 (0201)  | 1/20W                                              | -55 ~ +125°C             | 25V                          | 50V                         | 1 $\Omega$ - 10M $\Omega$                                                                                                  |                             | $\pm 200$                                        |
|               | Jumper: 1A                                         |                          |                              |                             | -                                                                                                                          | 0 $\Omega$ (<50m $\Omega$ ) | -                                                |
| CR-02 (0402)  | 1/16W                                              | -55 ~ +155°C             | 50V                          | 100V                        | 1 $\Omega$ - 9.76 $\Omega$<br>10 $\Omega$ - 1M $\Omega$<br>1.02M $\Omega$ - 20M $\Omega$<br>20.5M $\Omega$ - 100M $\Omega$ |                             | $\pm 200$<br>$\pm 100$<br>$\pm 200$<br>$\pm 400$ |
|               | Jumper: 1A                                         |                          |                              |                             | -                                                                                                                          | 0 $\Omega$ (<50m $\Omega$ ) | -                                                |
| CR-03 (0603)  | 1/10W                                              | -55 ~ +155°C             | 75V                          | 150V                        | 1 $\Omega$ - 9.76 $\Omega$<br>10 $\Omega$ - 1M $\Omega$<br>1.02M $\Omega$ - 20M $\Omega$<br>20.5M $\Omega$ - 100M $\Omega$ |                             | $\pm 200$<br>$\pm 100$<br>$\pm 200$<br>$\pm 400$ |
|               | Jumper: 1A                                         |                          |                              |                             | -                                                                                                                          | 0 $\Omega$ (<50m $\Omega$ ) | -                                                |
| CR-05 (0805)  | 1/8W                                               | -55 ~ +155°C             | 150V                         | 300V                        | 1 $\Omega$ - 9.76 $\Omega$<br>10 $\Omega$ - 1M $\Omega$<br>1.02M $\Omega$ - 20M $\Omega$<br>20.5M $\Omega$ - 100M $\Omega$ |                             | $\pm 200$<br>$\pm 100$<br>$\pm 200$<br>$\pm 400$ |
|               | Jumper: 2A                                         |                          |                              |                             | -                                                                                                                          | 0 $\Omega$ (<50m $\Omega$ ) | -                                                |
| CR-06 (1206)  | 1/4W                                               | -55 ~ +155°C             | 200V                         | 400V                        | 1 $\Omega$ - 9.76 $\Omega$<br>10 $\Omega$ - 1M $\Omega$<br>1.02M $\Omega$ - 20M $\Omega$<br>20.5M $\Omega$ - 100M $\Omega$ |                             | $\pm 200$<br>$\pm 100$<br>$\pm 200$<br>$\pm 400$ |
|               | Jumper: 2A                                         |                          |                              |                             | -                                                                                                                          | 0 $\Omega$ (<50m $\Omega$ ) | -                                                |
| CR-10 (1210)  | 1/3W                                               | -55 ~ +155°C             | 200V                         | 400V                        | 1 $\Omega$ - 9.76 $\Omega$<br>10 $\Omega$ - 1M $\Omega$<br>1.02M $\Omega$ - 20M $\Omega$<br>20.5M $\Omega$ - 39M $\Omega$  |                             | $\pm 200$<br>$\pm 100$<br>$\pm 200$<br>$\pm 400$ |
|               | Jumper: 2.5A                                       |                          |                              |                             | -                                                                                                                          | 0 $\Omega$ (<50m $\Omega$ ) | -                                                |

| Item<br>Type | Power Rating<br>at 70°C<br>Jumper<br>Rated Current | Operating<br>Temp. Range | Max.<br>Operating<br>Voltage | Max.<br>Overload<br>Voltage | Resistance Range                                           |            | TCR<br>(PPM/°C)              |
|--------------|----------------------------------------------------|--------------------------|------------------------------|-----------------------------|------------------------------------------------------------|------------|------------------------------|
|              |                                                    |                          |                              |                             | ±1%(E24、E96)                                               | ±5%(E24)   |                              |
| CR-0A (2010) | 3/4W                                               | -55 ~ +155°C             | 200V                         | 400V                        | 1Ω - 9.76Ω<br>10Ω - 1MΩ<br>1.02MΩ - 20MΩ<br>20.5MΩ - 100MΩ |            | ±200<br>±100<br>±200<br>±400 |
|              | Jumper: 3.5A                                       |                          |                              |                             | -                                                          | 0Ω (<50mΩ) | -                            |
| CR-12 (2512) | 1W                                                 | -55 ~ +155°C             | 250V                         | 500V                        | 1Ω - 9.76Ω<br>10Ω - 1MΩ<br>1.02MΩ - 20MΩ<br>20.5MΩ - 100MΩ |            | ±200<br>±100<br>±200<br>±400 |
|              | Jumper: 4A                                         |                          |                              |                             | -                                                          | 0Ω (<50mΩ) | -                            |
| CR-25 (1225) | 2W                                                 | -55 ~ +155°C             | 200V                         | 400V                        | 10Ω - 20KΩ                                                 |            | ±100                         |
|              | Jumper: 10A                                        |                          |                              |                             | -                                                          | 0Ω (<20mΩ) | -                            |
| CR-62 (0612) | 0.75W                                              | -55 ~ +155°C             | 200V                         | 400V                        | 1Ω-1MΩ                                                     |            | ±100                         |

## High Precision Electrical Specifications

| Item<br>Type | Power Rating<br>at 70°C | Operating<br>Temp. Range | Max.<br>Operating<br>Voltage | Max.<br>Overload<br>Voltage | Resistance Range<br>(E24、E96) |              |              | TCR<br>(PPM/°C) |
|--------------|-------------------------|--------------------------|------------------------------|-----------------------------|-------------------------------|--------------|--------------|-----------------|
|              |                         |                          |                              |                             | ±0.1%                         | ±0.25%       | ±0.5%        |                 |
| CR-02 (0402) | 1/16W                   | -55 ~ +155°C             | 50V                          | 100V                        | -                             |              | 10Ω - 1MΩ    | ±100            |
|              |                         |                          |                              |                             | -                             |              | 1.02M - 10MΩ | ±200            |
| CR-03 (0603) | 1/10W                   |                          | 75V                          | 150V                        | 10Ω - 1MΩ                     |              |              | ±100            |
|              |                         |                          |                              |                             | -                             | 1.02M - 10MΩ |              | ±200            |
| CR-05 (0805) | 1/8W                    |                          | 150V                         | 300V                        | 10Ω - 1MΩ                     |              |              | ±100            |
|              |                         |                          |                              |                             | -                             | 1.02M - 10MΩ |              | ±200            |
| CR-06 (1206) | 1/4W                    |                          | 200V                         | 400V                        | 10Ω - 1MΩ                     |              |              | ±100            |
|              |                         |                          |                              |                             | -                             | 1.02M - 10MΩ |              | ±200            |
| CR-10 (1210) | 1/3W                    |                          | 200V                         | 400V                        | 10Ω - 1MΩ                     |              |              | ±100            |
|              |                         | -                        |                              |                             | 1.02M - 10MΩ                  |              | ±200         |                 |
| CR-0A (2010) | 3/4W                    | 200V                     | 400V                         | 10Ω - 1MΩ                   |                               |              | ±100         |                 |
|              |                         |                          |                              | -                           | 1.02M - 10MΩ                  |              | ±200         |                 |
| CR-12 (2512) | 1W                      | 250V                     | 500V                         | 10Ω - 1MΩ                   |                               |              | ±100         |                 |
|              |                         |                          |                              | -                           | 1.02M - 10MΩ                  |              | ±200         |                 |

## TC50 Electrical Specifications

| Item<br>Type | Power Rating<br>at 70°C | Operating Temp.<br>Range | Max.<br>Operating<br>Voltage | Max.<br>Overload<br>Voltage | Resistance Range (E24 · E96) |            |            |     | TCR<br>(PPM/°C) |
|--------------|-------------------------|--------------------------|------------------------------|-----------------------------|------------------------------|------------|------------|-----|-----------------|
|              |                         |                          |                              |                             | ±0.1%                        | ±0.25%     | ±0.5%      | ±1% |                 |
| CR-02 (0402) | 1/16W                   | -55 ~ +155°C             | 50V                          | 100V                        | -                            |            | 100Ω - 1MΩ |     | ±50             |
| CR-03 (0603) | 1/10W                   |                          | 75V                          | 150V                        | 10Ω -<br>1MΩ                 | 10Ω - 10MΩ |            |     |                 |
| CR-05 (0805) | 1/8W                    |                          | 150V                         | 300V                        |                              |            |            |     |                 |
| CR-06 (1206) | 1/4W                    |                          | 200V                         | 400V                        |                              |            |            |     |                 |
| CR-10 (1210) | 1/3W                    |                          | 200V                         | 400V                        |                              |            |            |     |                 |
| CR-0A (2010) | 3/4W                    |                          | 200V                         | 400V                        |                              |            |            |     |                 |
| CR-12 (2512) | 1W                      |                          | 250V                         | 500V                        |                              |            |            |     |                 |

## High Power & Ultra High Power Rating Electrical Specifications

| Type \ Item  | Power Rating<br>at 70°C   | Operating<br>Temp. Range | Max.<br>Operating<br>Voltage | Max.<br>Overload<br>Voltage | Resistance Range   |                              |                                       | TCR<br>(PPM/°C)   |
|--------------|---------------------------|--------------------------|------------------------------|-----------------------------|--------------------|------------------------------|---------------------------------------|-------------------|
|              |                           |                          |                              |                             | ±0.5%<br>(E24、E96) | ±1%<br>(E24、E96)             | ±5%<br>(E24)                          |                   |
| CR-02 (0402) | 1/8W<br>Jumper: 1.5A      | -55 ~ +155°C             | 50V                          | 100V                        | 10Ω - 1MΩ          | 1Ω - 9.76Ω<br>10Ω - 1MΩ<br>- | 1Ω - 9.76Ω<br>10Ω - 1MΩ<br>0Ω (<20mΩ) | ±200<br>±100<br>- |
| CR-03 (0603) | 1/4W<br>Jumper: 2A        |                          | 75V                          | 150V                        |                    |                              |                                       |                   |
| CR-05 (0805) | 1/3W<br>Jumper: 2.5A      |                          | 150V                         | 300V                        |                    |                              |                                       |                   |
| CR-06 (1206) | 1/3 *1/2W<br>Jumper: 3.5A |                          | 200V                         | 400V                        |                    |                              |                                       |                   |
| CR-10 (1210) | 1/2 *3/4W<br>Jumper: 5A   |                          | 200V                         | 400V                        |                    |                              |                                       |                   |
| CR-0A (2010) | 1W<br>Jumper: 6A          |                          | 200V                         | 400V                        |                    |                              |                                       |                   |
| CR-12 (2512) | 2W<br>Jumper: 7A          |                          | 250V                         | 500V                        |                    |                              |                                       |                   |

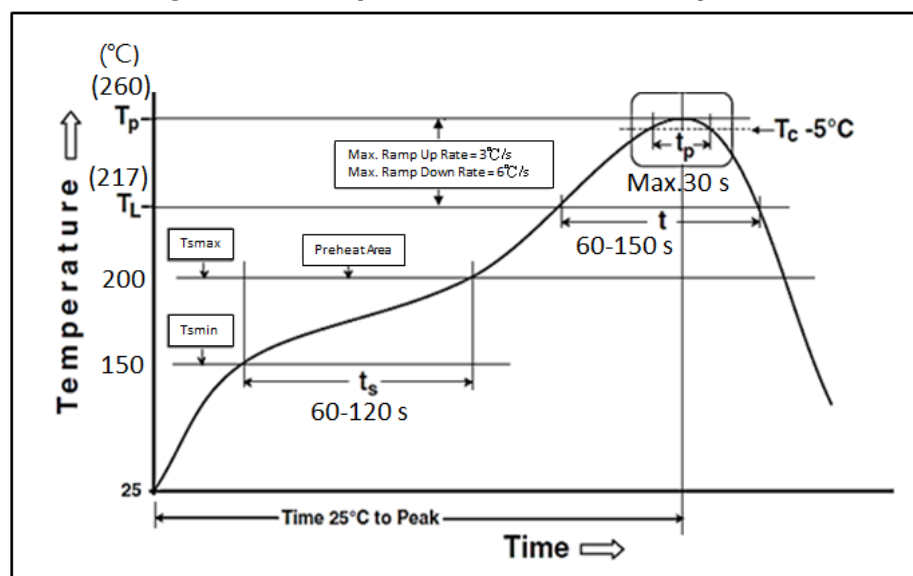
\*: Ultra High Power

Operating Voltage= $\sqrt{P \cdot R}$  or Max. Operating Voltage listed above, whichever is lower.

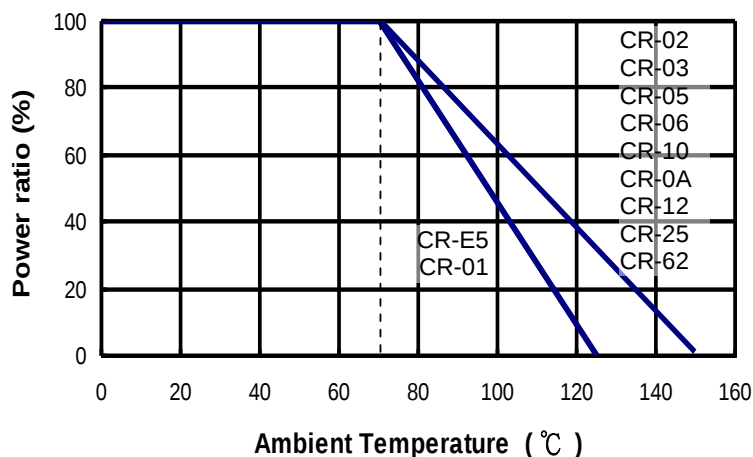
Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$  or Max. Overload Voltage listed above, whichever is lower.

■ Viking is capable of manufacturing the optional spec based on customer's requirement.

## Soldering Condition (IPC/JEDEC J-STD-020)



## Derating Curve

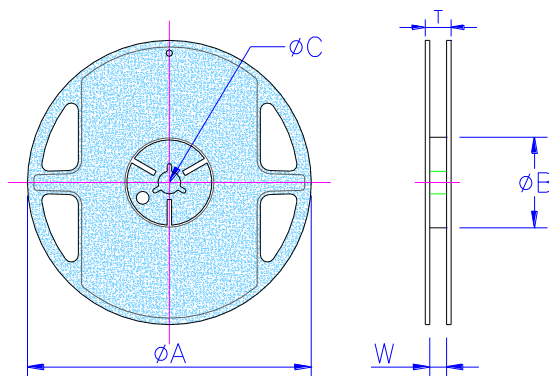


## Environmental Characteristics

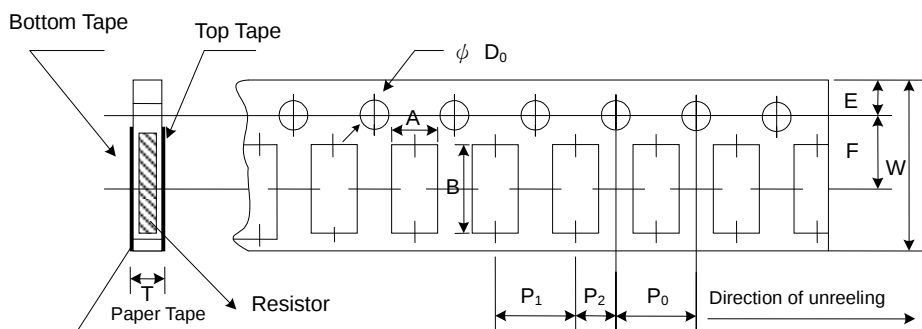
| Item                                           | Requirement                                               |               |        | Test Method                                                                                                                                                |
|------------------------------------------------|-----------------------------------------------------------|---------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                | ±1% and Below                                             | ±5%           | Jumper |                                                                                                                                                            |
| Temperature Coefficient of Resistance (T.C.R.) | As Spec.                                                  |               |        | <b>JIS-C-5201-1 4.8</b><br><b>IEC-60115-1 4.8</b><br>At 25°C/-55°C and 25°C/+125°C, 25°C is the reference temperature                                      |
| Short Time Overload                            | ±(1.0%+0.05Ω)                                             | ±(2.0%+0.05Ω) | <50mΩ  | <b>JIS-C-5201-1 4.13</b><br><b>IEC-60115-1 4.13</b><br>RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds, 2 seconds for high power series |
| Insulation Resistance                          | ≥10G                                                      |               |        | <b>JIS-C-5201-1 4.6</b><br><b>IEC-60115-1 4.6</b><br>Max. Overload Voltage for 1 minute                                                                    |
| Endurance                                      | ±(1.0%+0.10Ω)                                             | ±(2.0%+0.10Ω) | <100mΩ | <b>JIS-C-5201-1 4.25</b><br><b>IEC-60115-1 4.25.1</b><br>70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"                                      |
| Damp Heat with Load                            | ±(1.0%+0.10Ω)                                             | ±(2.0%+0.10Ω) | <100mΩ | <b>JIS-C-5201-1 4.24</b><br><b>IEC-60115-1 4.24</b><br>40±2°C, 90~95% R.H., RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"                           |
| Dry Heat                                       | ±(1.0%+0.05Ω)                                             | ±(1.5%+0.10Ω) | <50mΩ  | <b>JIS-C-5201-1 4.23</b><br><b>IEC-60115-1 4.23.2</b><br>at +125/+155°C for 1000 hrs                                                                       |
| Bending Strength                               | ±(1.0%+0.05Ω)                                             | ±(1.0%+0.05Ω) | <50mΩ  | <b>JIS-C-5201-1 4.33</b><br><b>IEC-60115-1 4.33</b><br>Bending once for 60 seconds<br>2010, 2512 sizes: 2mm    Other sizes: 3mm                            |
| Solderability                                  | 95% min. coverage                                         |               |        | <b>JIS-C-5201-1 4.17</b><br><b>IEC-60115-1 4.17</b><br>245±5°C for 3 seconds                                                                               |
| Resistance to Soldering Heat                   | ±(0.5%+0.05Ω)                                             | ±(1.0%+0.05Ω) | <50mΩ  | <b>JIS-C-5201-1 4.18</b><br><b>IEC-60115-1 4.18</b><br>260±5°C for 10 seconds                                                                              |
| Voltage Proof                                  | No breakdown or flashover                                 |               |        | <b>JIS-C-5201-1 4.7</b><br><b>IEC-60115-1 4.7</b><br>1.42 times Max. Operating Voltage for 1 minute                                                        |
| Leaching                                       | Individual leaching area ≤5%<br>Total leaching area ≤ 10% |               |        | <b>JIS-C-5201-1 4.18</b><br><b>IEC-60068-2-58 8.2.1</b><br>260±5°C for 30 seconds                                                                          |
| Rapid Change of Temperature                    | ±(0.5%+0.05Ω)                                             | ±(1.0%+0.05Ω) | <50mΩ  | <b>JIS-C-5201-1 4.19</b><br><b>IEC-60115-1 4.19</b><br>-55°C to +125/+155°C, 5 cycles                                                                      |

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$  or Max. Operating Voltage whichever is lower.

Storage Temperature: 15~28°C; Humidity < 80%RH

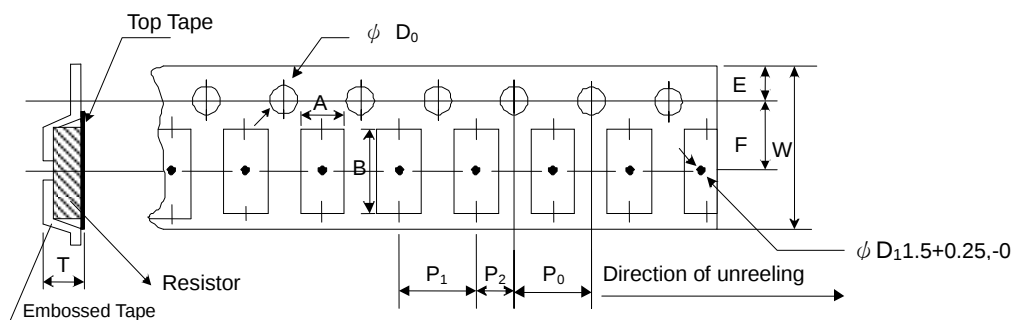
**Thick Film Chip Resistor**
**■ Packaging**
**Reel Specifications & Packaging Quantity**


| Type                             | Packaging Quantity | Tape Width | Reel Diameter | ΦA (mm) | ΦB (mm)   | ΦC (mm)             | W (mm)   | T (mm)   |
|----------------------------------|--------------------|------------|---------------|---------|-----------|---------------------|----------|----------|
| CR-E5                            | Paper              | 10K        | 8mm           | 7 inch  | 178.5±1.5 | 60 <sup>+1/-0</sup> | 13.0±0.2 | 12.5±0.5 |
|                                  |                    | 20K        | 8mm           | 7 inch  | 178.5±1.5 | 60 <sup>+1/-0</sup> | 13.0±0.2 | 12.5±0.5 |
| CR-01                            | Paper              | 15K        | 8mm           | 7 inch  | 178.5±1.5 | 60 <sup>+1/-0</sup> | 13.0±0.2 | 12.5±0.5 |
| CR-01<br>CR-02                   | Paper              | 10K        | 8mm           | 7 inch  | 178.5±1.5 | 60 <sup>+1/-0</sup> | 13.0±0.2 | 12.5±0.5 |
|                                  |                    | 20K        | 8mm           | 10 inch | 254±1.0   | 100±0.5             | 13.0±0.2 | 13.5±0.5 |
|                                  |                    | 40K        | 8mm           | 13 inch | 330±1.0   | 100±0.5             | 13.0±0.2 | 13.5±0.5 |
| CR-03<br>CR-05<br>CR-06<br>CR-10 | Paper              | 5K         | 8mm           | 7 inch  | 178.5±1.5 | 60 <sup>+1/-0</sup> | 13.0±0.2 | 12.5±0.5 |
|                                  |                    | 10K        | 8mm           | 10 inch | 254±1.0   | 100±0.5             | 13.0±0.2 | 13.5±0.5 |
|                                  |                    | 20K        | 8mm           | 13 inch | 330±1.0   | 100±0.5             | 13.0±0.2 | 13.5±0.5 |
| CR-0A<br>CR-12                   | Embossed           | 4K         | 12mm          | 7 inch  | 178.5±1.5 | 60 <sup>+1/-0</sup> | 13.0±0.5 | 15.5±0.5 |
|                                  |                    | 8K         | 12mm          | 10 inch | 250±1.0   | 62±0.5              | 13.0±0.5 | 16.5±0.5 |
| CR-25                            | Embossed           | 2K         | 12mm          | 7 inch  | 178.5±1.5 | 60 <sup>+1/-0</sup> | 13.0±0.5 | 15.5±0.5 |
| CR-62                            | Paper              | 5K         | 8mm           | 7 inch  | 178.5±1.5 | 60 <sup>+1/-0</sup> | 13.0±0.2 | 12.5±0.5 |

**Paper Tape Specifications**


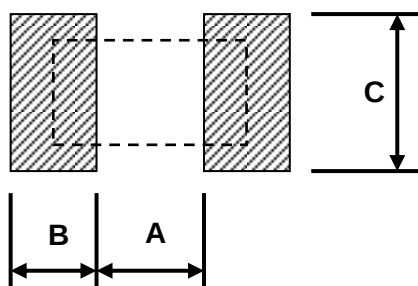
| Type  | A (mm)    | B (mm)    | W (mm)   | E (mm)    | F (mm)    | P <sub>0</sub> (mm) | P <sub>1</sub> (mm) | P <sub>2</sub> (mm) | ΦD <sub>0</sub> (mm) | T (mm)    |
|-------|-----------|-----------|----------|-----------|-----------|---------------------|---------------------|---------------------|----------------------|-----------|
| CR-E5 | 0.24±0.05 | 0.45±0.05 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10           | 2.00±0.05           | 2.00±0.05           | 1.50+0.1,-0          | 0.40±0.10 |
| CR-01 | 0.38±0.05 | 0.68±0.05 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10           | 2.00±0.05           | 2.00±0.05           | 1.50+0.1,-0          | 0.42±0.20 |
| CR-02 | 0.65±0.10 | 1.15±0.10 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10           | 2.00±0.05           | 2.00±0.05           | 1.50+0.1,-0          | 0.45±0.10 |
| CR-03 | 1.10±0.10 | 1.90±0.10 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10           | 4.00±0.05           | 2.00±0.05           | 1.50+0.1,-0          | 0.70±0.10 |
| CR-05 | 1.60±0.10 | 2.40±0.20 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10           | 4.00±0.05           | 2.00±0.05           | 1.50+0.1,-0          | 0.85±0.10 |
| CR-06 | 1.90±0.10 | 3.50±0.20 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10           | 4.00±0.05           | 2.00±0.05           | 1.50+0.1,-0          | 0.85±0.10 |
| CR-10 | 2.90±0.10 | 3.50±0.20 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10           | 4.00±0.05           | 2.00±0.05           | 1.50+0.1,-0          | 0.85±0.10 |
| CR-62 | 1.90±0.10 | 3.50±0.20 | 8.0±0.20 | 1.75±0.10 | 3.50±0.05 | 4.00±0.10           | 4.00±0.05           | 2.00±0.05           | 1.50+0.1,-0          | 0.85±0.10 |

Embossed Plastic Tape Specifications



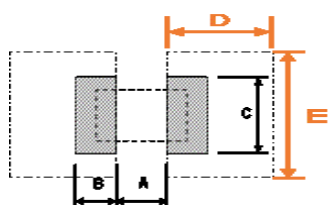
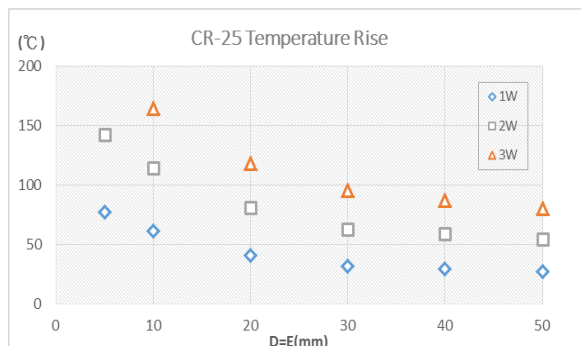
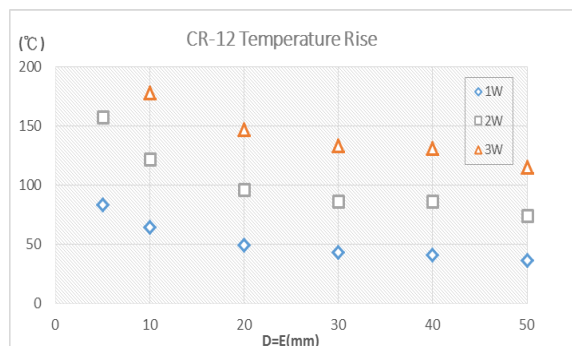
| Type  | A (mm)    | B (mm)    | W (mm)    | E (mm)    | F (mm)   | P <sub>0</sub> (mm) | P <sub>1</sub> (mm) | P <sub>2</sub> (mm) | ΦD <sub>0</sub> (mm) | T (mm)            |
|-------|-----------|-----------|-----------|-----------|----------|---------------------|---------------------|---------------------|----------------------|-------------------|
| CR-0A | 2.8±0.10  | 5.40±0.20 | 12.0±0.30 | 1.75±0.10 | 5.5±0.05 | 4.00±0.10           | 4.00±0.10           | 2.00±0.05           | 1.50+0.1, -0         | 1.2 <sup>+0</sup> |
| CR-12 | 3.5±0.10  | 6.70±0.10 | 12.0±0.30 | 1.75±0.10 | 5.5±0.05 | 4.00±0.10           | 4.00±0.10           | 2.00±0.05           | 1.50+0.1, -0         | 1.2 <sup>+0</sup> |
| CR-25 | 3.38±0.10 | 6.68±0.10 | 12.0±0.30 | 1.75±0.10 | 5.5±0.10 | 4.00±0.10           | 4.00±0.10           | 2.00±0.05           | 1.55+0.05            | 1.45±0.20         |

Recommend Land Pattern



| Type  | A (mm) | B (mm) | C (mm) |
|-------|--------|--------|--------|
| CR-E5 | 0.14   | 0.18   | 0.25   |
| CR-01 | 0.30   | 0.25   | 0.30   |
| CR-02 | 0.50   | 0.45   | 0.60   |
| CR-03 | 0.90   | 0.60   | 0.90   |
| CR-05 | 1.20   | 0.70   | 1.30   |
| CR-06 | 2.00   | 0.90   | 1.60   |
| CR-10 | 2.00   | 0.90   | 2.80   |
| CR-0A | 3.80   | 0.90   | 2.80   |
| CR-12 | 4.90   | 1.60   | 3.50   |
| CR-25 | 1.20   | 2.00   | 7.00   |
| CR-62 | 0.70   | 1.20   | 3.20   |

Temperature Rise



\* FR4 copper board, 35 $\mu\text{m}$  of copper pad thickness

## ■ Marking

No Marking for 01005, 0201 and 0402

Jumper for all: Letter "0"

1% for 0805/1206/1210/2010/2512/1225/0612: 4 digits marking

Example:

| Resistance | 5.6Ω | 97.6Ω | 100Ω | 2.2KΩ | 10KΩ | 49.9KΩ | 100KΩ |
|------------|------|-------|------|-------|------|--------|-------|
| Marking    | 5R60 | 97R6  | 1000 | 2201  | 1002 | 4992   | 1003  |

5% for 0603/0805/1206/1210/2010/2512/1225/0612: 3 digits marking in E24

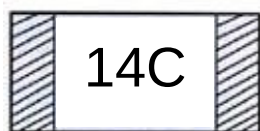
Example: 101=100Ω 102=1KΩ (1<sup>st</sup> and 2<sup>nd</sup> are E24 code and 3<sup>rd</sup> code is multiplier)

| E24 code | 10 | 11 | 12 | 13 | 15 | 16 | 18 | 20 | 22 | 24 | 27 | 30 | 33 | 36 | 39 | 43 | 47 | 51 | 56 | 62 | 68 | 75 | 82 | 91 |
|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|

1% for 0603(E24): 3 digits marking in E24, When the E24 and E96 are the same resistance, this marking in E96

Example: 01A= 100Ω 05C=11KΩ 123=12KΩ 273=27KΩ

1% for 0603: 3 digits marking in E96



3 digits marking for Example: 14C=13K7Ω 13C=13K3Ω

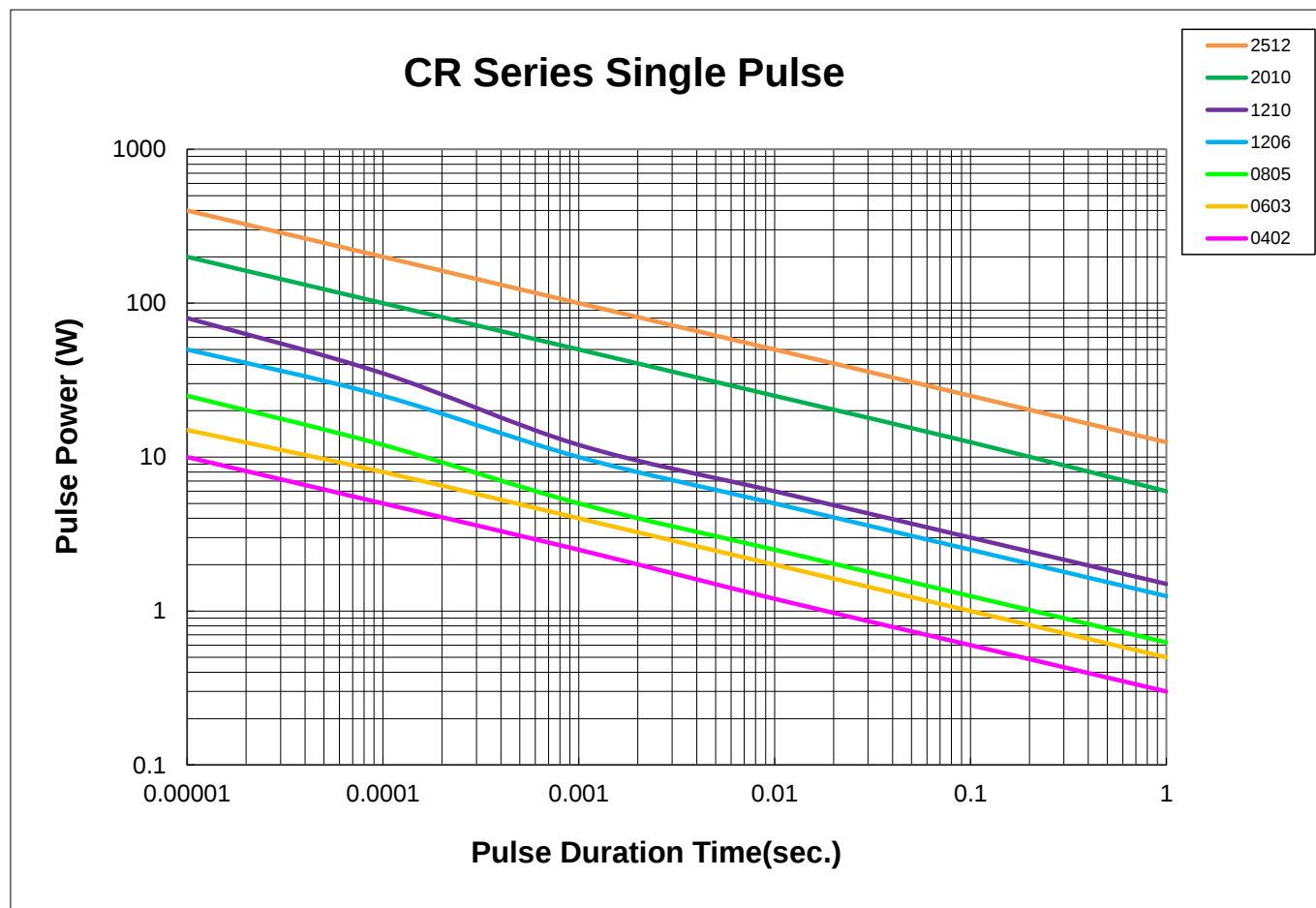
68B=4K99Ω 68X=49.9Ω

## Marking Table

| 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               | X                | Y                |     |  |
| Multiplier | 10 <sup>0</sup> | 10 <sup>1</sup> | 10 <sup>2</sup> | 10 <sup>3</sup> | 10 <sup>4</sup> | 10 <sup>5</sup> | 10 <sup>6</sup> | 10 <sup>-1</sup> | 10 <sup>-2</sup> |     |  |

## Pulse withstanding capacity

The limit of acceptance was a shift in resistance of less than 1% from the initial value. The power applied was subject to the restrictions of the maximum permissible impulse voltage.



**Note:** The limit of the applicable voltage is the max. overload voltage. Please consult us about the resistance characteristic when pulse is applied continuously. This data is a reference value, please be sure to test the products on the actual circuit before you use them.

**REVISION HISTORY**

| REVISION   | DATE         | CHANGE NOTIFICATION | DESCRIPTION                                                                                                                                                                                                                                                                                                                                     |
|------------|--------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Version C  | Jun 03, 2014 | -                   | <ul style="list-style-type: none"><li>- Environmental Characteristics updated</li><li>- Size CR-25 specifications added</li></ul>                                                                                                                                                                                                               |
| Version C1 | Apr 30, 2015 | -                   | <ul style="list-style-type: none"><li>- High Power &amp; Ultra High Power Rating Electrical Increase Jumper Specifications</li></ul>                                                                                                                                                                                                            |
| Version C2 | Jun 09, 2015 | -                   | <ul style="list-style-type: none"><li>- Increase 0603(E24) 1% marking description</li></ul>                                                                                                                                                                                                                                                     |
| Version C3 | Jul 15, 2016 | -                   | <ul style="list-style-type: none"><li>- Remove Material Description</li><li>- Size CR-62 specifications added</li><li>- Modify Storage Temperature</li></ul>                                                                                                                                                                                    |
| Version C4 | Jan 12, 2018 | -                   | <ul style="list-style-type: none"><li>- Modify Electrical Specifications (0R)</li><li>- Modify 1225 Dimension L, W</li><li>- Modify 2512 Land Pattern</li></ul>                                                                                                                                                                                 |
| Version C5 | May 20, 2019 | -                   | <ul style="list-style-type: none"><li>- Modify TCR Test description</li></ul>                                                                                                                                                                                                                                                                   |
| Version C6 | Mar 10, 2021 | -                   | <ul style="list-style-type: none"><li>- Modify Bending Test description</li><li>- Increase High power 0.5% Electrical Spec.</li><li>- Modify 2010 Embossed Plastic Tape B Specification</li><li>- Modify Soldering Condition (IPC/JEDEC J-STD-020)</li><li>- Increase Temperature Rise</li><li>- Increase Pulse withstanding capacity</li></ul> |

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