

## 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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|---------------------|-----------------|---------------------|------------------------|---------------------------|
| 15-Jul-16           | 15-Jul-16       | 15-Jul-16           | 15-Jul-16              |                           |
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**Thick Film Chip Resistor**  
**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 and Military 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        | 3.10±0.15 | 6.30±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: ±0.1%<br>C: ±0.25%<br>D: ±0.5%<br>F: ±1%<br>J: ±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: 1.2Ω<br>--- 3K3: 3.3KΩ<br>--- 10K: 10KΩ<br>-- 100K: 100KΩ<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)              |
|---------------|--|--------------------------|------------------------------|-----------------------------|--|----------|------------------------------|
|               |  |                          |                              |                             | ±1%(E24、E96)   | ±5%(E24) |                              |
| CR-E5 (01005) | 1/32W  | -55 ~ +125°C             | 15V                          | 30V                         | 10Ω - 1MΩ  |          | ±300                         |
|               | Jumper: 0.5A                                       |                          |                              |                             | 0Ω (<50mΩ)   |          | -                            |
| CR-01 (0201)  | 1/20W  | -55 ~ +125°C             | 25V                          | 50V                         | 1Ω - 10MΩ  |          | ±200                         |
|               | Jumper: 1A   |                          |                              |                             | 0Ω (<50mΩ)   |          | -                            |
| CR-02 (0402)  | 1/16W  | -55 ~ +155°C             | 50V                          | 100V                        | 1Ω - 9.76Ω<br>10Ω - 1MΩ<br>1.02MΩ - 20MΩ<br>20.5MΩ - 100MΩ |          | ±200<br>±100<br>±200<br>±400 |
|               | Jumper: 1A   |                          |                              |                             | 0Ω (<50mΩ)   |          | -                            |
| CR-03 (0603)  | 1/10W  | -55 ~ +155°C             | 75V                          | 150V                        | 1Ω - 9.76Ω<br>10Ω - 1MΩ<br>1.02MΩ - 20MΩ<br>20.5MΩ - 100MΩ |          | ±200<br>±100<br>±200<br>±400 |
|               | Jumper: 1A   |                          |                              |                             | 0Ω (<50mΩ)   |          | -                            |
| CR-05 (0805)  | 1/8W   | -55 ~ +155°C             | 150V                         | 300V                        | 1Ω - 9.76Ω<br>10Ω - 1MΩ<br>1.02MΩ - 20MΩ<br>20.5MΩ - 100MΩ |          | ±200<br>±100<br>±200<br>±400 |
|               | Jumper: 2A   |                          |                              |                             | 0Ω (<50mΩ)   |          | -                            |
| CR-06 (1206)  | 1/4W   | -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: 2A   |                          |                              |                             | 0Ω (<50mΩ)   |          | -                            |
| CR-10 (1210)  | 1/3W   | -55 ~ +155°C             | 200V                         | 400V                        | 1Ω - 9.76Ω<br>10Ω - 1MΩ<br>1.02MΩ - 20MΩ<br>20.5MΩ - 39MΩ  |          | ±200<br>±100<br>±200<br>±400 |
|               | Jumper: 2.5A                                       |                          |                              |                             | 0Ω (<50mΩ)   |          | -                            |

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



IR Reflow Soldering

Wave Soldering (Flow Soldering)

- (1) Time of IR reflow soldering at maximum temperature point 260°C : 10s
- (2) Time of wave soldering at maximum temperature point 260°C : 10s
- (3) Time of soldering iron at maximum temperature point 410°C : 5s

**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>-55°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 5 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)=√(P\*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 | 9.0±0.5  | 12.5±0.5 |
|                                  |                    | 20K        | 8mm           | 7 inch  | 178.5±1.5 | 60 <sup>+1/-0</sup> | 13.0±0.2 | 9.0±0.5  | 12.5±0.5 |
| CR-01                            | Paper              | 15K        | 8mm           | 7 inch  | 178.5±1.5 | 60 <sup>+1/-0</sup> | 13.0±0.2 | 9.0±0.5  | 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 | 9.0±0.5  | 12.5±0.5 |
|                                  |                    | 20K        | 8mm           | 10 inch | 254±1.0   | 100±0.5             | 13.0±0.2 | 9.5±0.5  | 13.5±0.5 |
|                                  |                    | 40K        | 8mm           | 13 inch | 330±1.0   | 100±0.5             | 13.0±0.2 | 9.5±0.5  | 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 | 9.0±0.5  | 12.5±0.5 |
|                                  |                    | 10K        | 8mm           | 10 inch | 254±1.0   | 100±0.5             | 13.0±0.2 | 9.5±0.5  | 13.5±0.5 |
|                                  |                    | 20K        | 8mm           | 13 inch | 330±1.0   | 100±0.5             | 13.0±0.2 | 9.5±0.5  | 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 | 13.0±0.5 | 15.5±0.5 |
|                                  |                    | 8K         | 12mm          | 10 inch | 250±1.0   | 62±0.5              | 13.0±0.5 | 12.5±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 | 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 | 9.0±0.5  | 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 |

**Thick Film Chip Resistor**

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  | 5.5±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-12 | 3.5±0.10  | 6.7±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 | 3.80   | 1.60   | 3.50   |
| CR-25 | 1.20   | 2.00   | 7.00   |
| CR-62 | 0.70   | 1.20   | 3.20   |



**Thick Film Chip Resistor**

**■ 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 | 100Ω | 2.2KΩ | 10KΩ | 49.9KΩ | 100KΩ |
| Marking    | 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> |  |  |

**REVISION HISTORY**

| <b>REVISION</b> | <b>DATE</b>  | <b>CHANGE NOTIFICATION</b> | <b>DESCRIPTION</b>   |
|-----------------|--------------|----------------------------|--|
| Version C       | Jun 03, 2014 | -                          | - Environmental Characteristics updated<br>- Size CR-25 specifications added                       |
| Version C1      | Apr 30, 2015 | -                          | - High Power & Ultra High Power Rating<br>Electrical Increase Jumper Specifications                |
| Version C2      | Jun 09, 2015 | -                          | - Increase 0603(E24) 1% marking description  |
| Version C3      | Jul 15, 2016 | -                          | - Remove Material Description<br>- Size CR-62 specifications added<br>- Modify Storage Temperature |

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