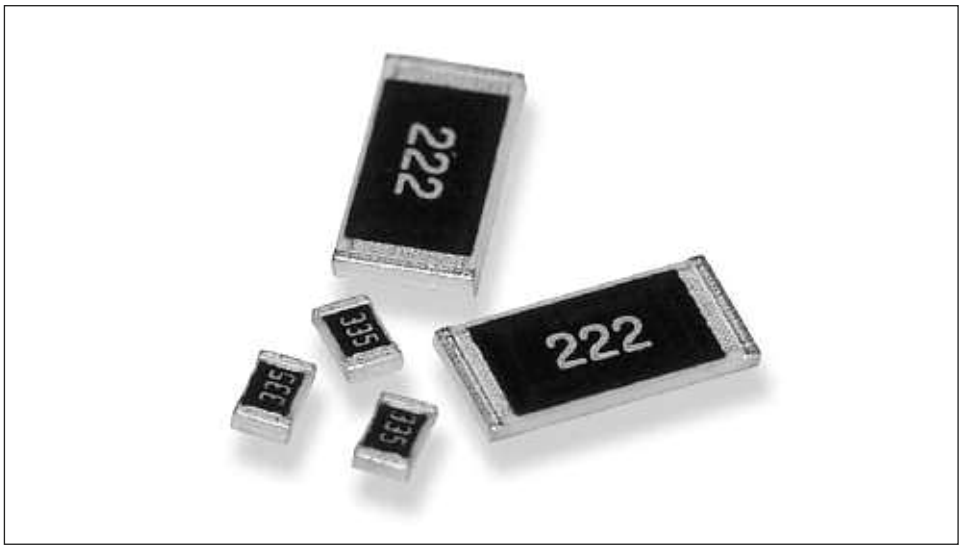
# Type CRG Series

## Key Features

- Thick film resistors with a high power to size ratio,ideally suited to industrial and general purpose use.
  A range from 1 ohm to 10M and tolerances of 1% and 5%. Also including zero ohm links.
- Suitable for most applications, including high frequency operation, owing to the short lead structure and low capacitance.
- Seven Package Sizes
- Terminal finish: Matte Sn
- MSL Level 2




Precious metal terminations are screen printed onto a ceramic base and fired. The resistive element is screen printed and fired and the passivation layer added. Each resistor is trimmed to tolerance by laser. The pre-scribed tile is broken into strips, the end plating is fired on and the strips broken into individual components. Final termination is made by electroplating.

## Characteristics – Electrical

| | | 0201 | | | 0402 | | | 0603 | | | | 0805 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rated Power @ 70 °C (W) | | 0.05 | | | 0.063 | | | 0.1 | | | | 0.125 | | | |
| Resistance Range | Min | 10 | 1 | 11 | 10 | 1 | 11 | 1 | 101 | 1 | 11 | 1 | 101 | 1 | 11 |
| (Ohms) | Max | 1M0 | 10 | 1M0 | 2M0 | 10 | 3M3 | 100 | 1M0 | 10 | 10M | 100 | 1M0 | 10 | 10M |
| Tolerance (%) | | 1 | 5 | 5 | 1 | 5 | 5 | 1 | 1 | 5 | 5 | 1 | 1 | 5 | 5 |
| Code letter | | F | J | J | F | J | J | F | F | J | J | F | F | J | J |
| Selection Series | | E24 E96 | E24 | E24 | E24 E96 | E24 | E24 | E24 | E24 E96 | E24 | E24 | E24 | E24 E96 | E24 | E24 |
| Temp. Coefficient (ppm/°C) | | ±200 | ±400 | ±200 | ±100 | ±400 | ±200 | ±200 | ±100 | ±200 | ±200 | ±200 | ±100 | ±400 | ±200 |

| | | 1206 | | | | 2010 | | | | 2512 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rated Power @ 70 °C (W) | | 0.25 | | | | 0.5 | | | | 1 | | | |
| Resistance Range | Min | 1 | 101 | 1 | 11 | 1 | 101 | 1 | 11 | 1 | 101 | 1 | 11 |
| Ohms | Max | 100 | 1M0 | 10 | 10M | 100 | 1M0 | 10 | 10M | 100 | 1M0 | 10 | 10M |
| Tolerance (%) | | 1 | 1 | 5 | 5 | 1 | 1 | 5 | 5 | 1 | 1 | 5 | 5 |
| Code letter | | F | F | J | J | F | F | J | J | F | F | J | J |
| Selection Series | | E24 | E24 E96 | E24 | E24 | E24 | E24 E96 | E24 | E24 | E24 | E24 E96 | E24 | E24 |
| Temp. Coefficient (ppm/°C) | | ±200 | ±100 | ±400 | ±200 | ±200 | ±100 | ±400 | ±200 | ±200 | ±100 | ±400 | ±200 |

| | 0201 | 0402 | 0603 | 0805 | 1206 | 2010 | 2512 |
|---|---|---|---|---|---|---|---|
| Working Voltage (V) | 25 | 50 | 50 | 150 | 200 | 200 | 200 |
| Max. Overload Voltage (V) | 50 | 100 | 100 | 300 | 400 | 400 | 400 |
| Operating Temp. Range (°C) | -55 to +125 | | | | | | |
| Climatic Category (°C) | 55/125/56 | | | | | | |
| Insulation Resistance Dry Min (Mohms) | 1000 | | | | | | |
| Stability (%) | 3 | | | | | | |
| Zerohm (A) Current Max | 0.5 | 1 | 1 | 2 | 2 | 2 | 2 |
| Resistance Max | <50 mOhm | | | <50 mOhm | | | |



Dimensions are in millimeters and inches unless otherwise specified. Values in brackets are standard equivalents.

Dimensions are shown for reference purposes only. Specifications subject to change.

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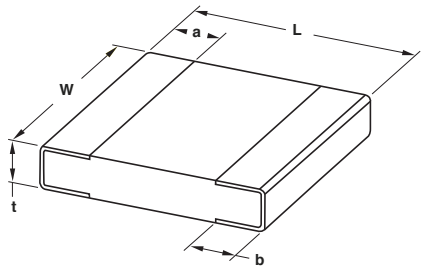
## Dimensions




| Style | L | W | t | a | b |
|---|---|---|---|---|---|
| **0201** | 0.6 ±0.03 | 0.3 ±0.03 | 0.23 ±0.03 | 0.10 ±0.05 | 0.15 ±0.05 |
| **0402** | 1.0 ±0.1 | 0.5 ±0.05 | 0.35 ±0.05 | 0.2 ±0.1 | 0.25 ±0.1 |
| **0603** | 1.6 ±0.1 | 0.8 ±0.15 | 0.45 ±0.1 | 0.3 ±0.2 | 0.3 ±0.1 |
| **0805** | 2.0 ±0.15 | 1.25 ±0.15 | 0.55 ±0.1 | 0.4 ±0.2 | 0.4 ±0.2 |
| **1206** | 3.1 ±0.15 | 1.55 ±0.15 | 0.55 ±0.1 | 0.45 ±0.2 | 0.45 ±0.2 |
| **2010** | 5.0 ±0.1 | 2.5 ±0.15 | 0.55 ±0.1 | 0.6 ±0.25 | 0.5 ±0.2 |
| **2512** | 6.35 ±0.1 | 3.2 ±0.15 | 0.55 ±0.1 | 0.6 ±0.25 | 0.5 ±0.2 |

## Marking Codes - Case Sizes 0805 to 2512

### IEC 4 Digit Marking

| **Resistance** | 100Ω | 2.2KΩ | 10KΩ | 49.9KΩ | 100KΩ |
|---|---|---|---|---|---|
| **Marking Code** | 1000 | 2201 | 1002 | 4992 | 1003 |

## Case Sizes 0603

### E24 3 Digit Marking - Example: 101=100Ω 102=1KΩ

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

### E96 3 Digit Marking - Examples: 14C=13K7Ω, 13C=13K3Ω, 68B=4K99Ω, 68X=49.9Ω

### 0603 E96 Marking Code 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 | H | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Multiplier | $10^0$ | $10^1$ | $10^2$ | $10^3$ | $10^4$ | $10^5$ | $10^6$ | $10^7$ | $10^{-1}$ | $10^{-2}$ | $10^{-3}$ |



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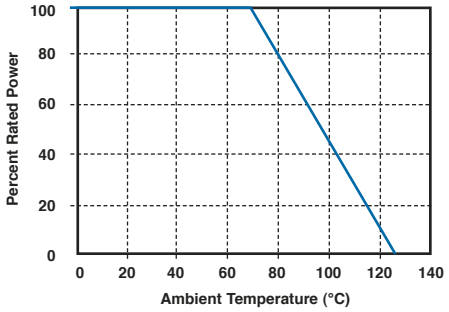
## Derating Curve




## Mounting

The resistors are suitable for processing on automatic insertion equipment.

## Marking

**CRG0805, CRG1206, CRG2010, CRG2512**
E24 series resistors are marked with a three digit code.
E96 series resistors are marked with a four digit code.
Zerohm components are marked '0'.

**CRG0603**
E24 5% series are marked with a three digit code.
E24 1% series are marked with a three digit code.
E96 series are marked with the international alphanumeric three character code (available on request).
EXCEPT 10, 11, 13, 15, 20 & 75 decades which are marked as the E24 series.

**CRG0201 & CRG0402 series unmarked.**

## Performance Characteristics

The evaluation of the performance characteristics is carried out with reference to IECQ specifications QC 400 000 and QC 400 100.

| TEST REF | Long Term Tests ±(3% + 0.1 ohm) |
|---|---|
| **4.23** | Climatic sequence |
| **4.24** | Damp heat, steady state |
| **4.25.1** | Endurance at 70 °C |
| **4.25.3** | Endurance at 125 °C |
| **TEST REF** | **Short Term Tests ±(1% + 0.05 ohm)** |
| **4.13** | Overload |
| **4.32** | Adhesion |
| **4.33** | Bond strength of end face plating |
| **4.19** | Rapid change of temperature |
| **4.18** | Resistance to soldering heat |

## Storage

Unopened reels should be stored within a temperature range of +5 °C to +25 °C, separated from any dust, chemicals and solvent based materials. Non-adherence to this procedure could effect the solderability of this product.

## How to Order

| CRG | 0603 | J | 1K0 |
|---|---|---|---|
| **Common Part** | **Size** | **Tolerance** | **Resistance Value** |
| CRG - Thick Film Chip Resistor | 0201<br>0402<br>0603<br>0805<br>1206<br>2512 | F - ±1%<br>J - ±5% | 1 ohm<br>(1 ohm) 1R0<br>1K ohm<br>(1000 ohms) 1K<br>100K ohm<br>(100000 ohms) 100K<br>1M ohm<br>(1000000 ohms) 1M |

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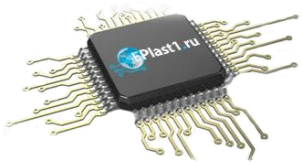
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.




**Как с нами связаться**

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