

## Type CRGS Series

### Key Features

Small size and light weight

Suitable for both wave and reflow soldering techniques

Supplied on tape

Can withstand high surge

5 different package sizes

Terminal finish matte Sn over Ni

Moisture sensitivity level - MSL1



TE Connectivity is pleased to introduce this SMD Anti surge thick film Chip resistor, suitable for auto placement in volume and for most applications. Available in five different packages and supplied on tape and reel for automatic insertion processes. Standard values – E24 Series

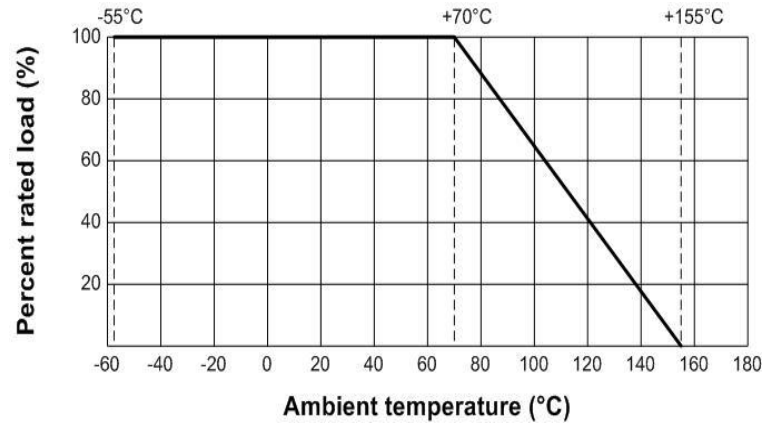
**Note:** SMD (Surface mount devices) resistors and inductors should be kept in their original packaging to protect them from ESD (Electrostatic Discharge). The full reels can be broken into smaller quantities, without exposing them to ESD, as long as the components are still in the plastic or paper tape. These resistors and inductors should not be removed from the plastic or paper tape unless they are in an ESD protected environment.

### Characteristics – Electrical

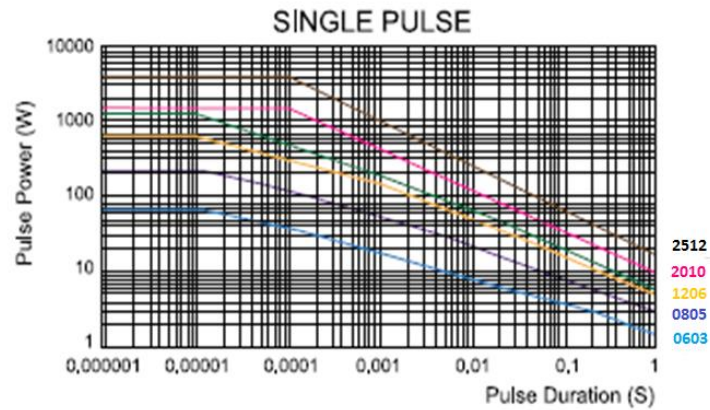
| Type                            | CRGS0603  | CRGS0805  | CRGS1206  | CRGS2010  | CRGS2512  |
|---------------------------------|---|-----------|-----------|---|-----------|
| Power Rating                    | 0.25W   | 0.5W      | 0.6W      | 0.75W   | 1.5W      |
| Resistance Range                | 1R0 – 10M   | 1R0 – 10M | 1R0 – 10M | 1R0 – 10M   | 1R0 – 10M |
| Tolerance                       | ±5%   |           |           |   |           |
| T.C.R.                          | 1Ω-10Ω : ≤±400PPM/°C<br>11Ω-10MΩ : ≤±100PPM/°C  |           |           | 1Ω-10Ω : ≤±200PPM/°C<br>11Ω-10MΩ :<br>≤±100PPM/°C |           |
| Standard Series                 | E24   |           |           |   |           |
| Max. Working Voltage            | 50V   | 150V      | 200V      | 200V  | 250V      |
| Max. Overload Voltage           | 100V  | 300V      | 400V      | 500V  | 500V      |
| Dielectric Withstanding Voltage | 300V  | 500V      | 500V      | 500V  | 500V      |
| Temperature Range               | -55°C ~ +155°C  |           |           |   |           |
| Storage Temperature             | 25°C ± 5°C at a relative humidity of 60%RH ± 10%RH<br>Store in original packaging, out of direct sunlight and not in air with high concentrations of salt or corrosive gases. |           |           |   |           |

## Power derating curve

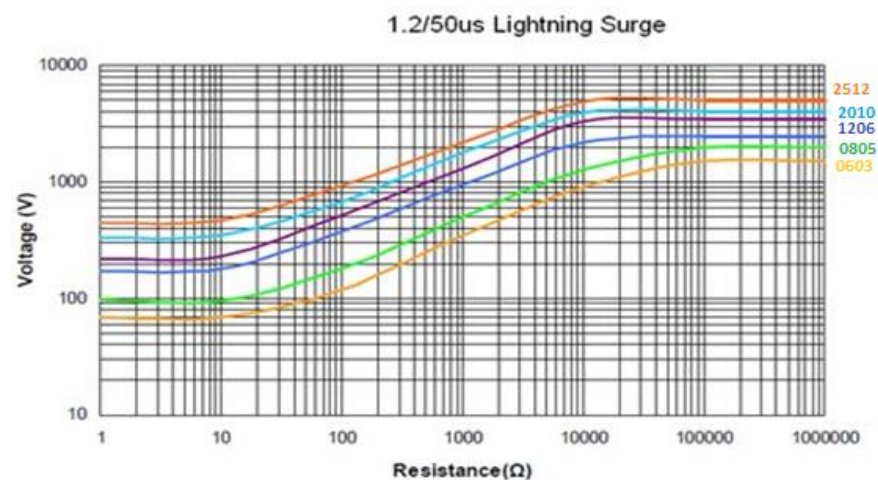
Power rating based on continuous load operation in ambient temperature of 70°C. For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with this curve.



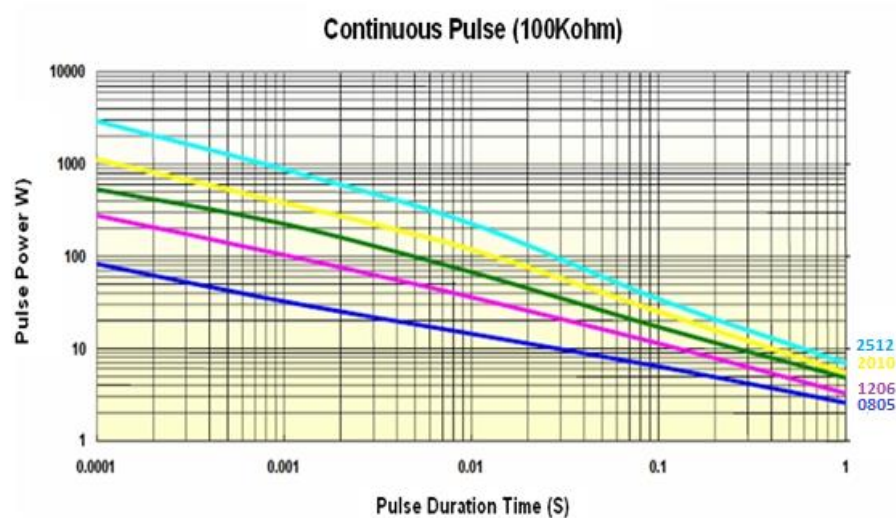
## One Pulse Limiting Electrical Power



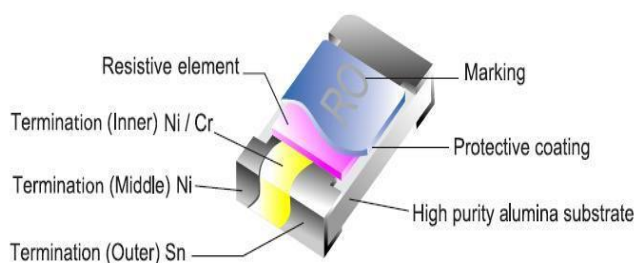
## Lightning Surge



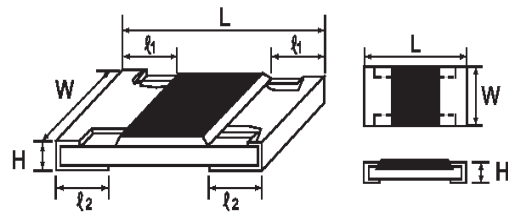
## Continuous Pulse



## Construction



Dimensions:



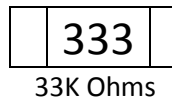
| Type     | Dimension (mm) |                     |            |             |             |
|----------|----------------|---------------------|------------|-------------|-------------|
|          | L              | W                   | H          | l1          | l2          |
| CRGS0603 | 1.60 ±0.10     | 0.80 +0.15<br>-0.10 | 0.45 ±0.10 | 0.30 ±0.20  | 0.30 ±0.20  |
| CRGS0805 | 2.00 ±0.15     | 1.25 +0.15<br>-0.10 | 0.55 ±0.10 | 0.40 ±0.20  | 0.40 ±0.20  |
| CRGS1206 | 3.10 ±0.15     | 1.55 +0.15<br>-0.10 | 0.55 ±0.10 | 0.45 ±0.20  | 0.45 ±0.20  |
| CRGS2010 | 5.00 ± 0.10    | 2.50 ± 0.15         | 0.55 ±0.10 | 0.60 ± 0.25 | 0.50 ± 0.20 |
| CRGS2512 | 6.35 ± 0.10    | 3.20 ± 0.15         | 0.55 ±0.10 | 0.60 ± 0.25 | 1.80 ± 0.25 |

Marking:

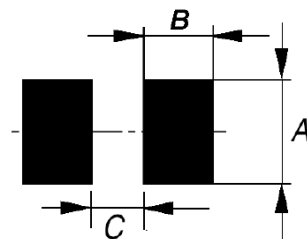
For E24 values 0603 ~ 2512 sizes 3 digit marking.

The first two digits are significant figures of resistance and the third digit denoted number of zeros

Example:



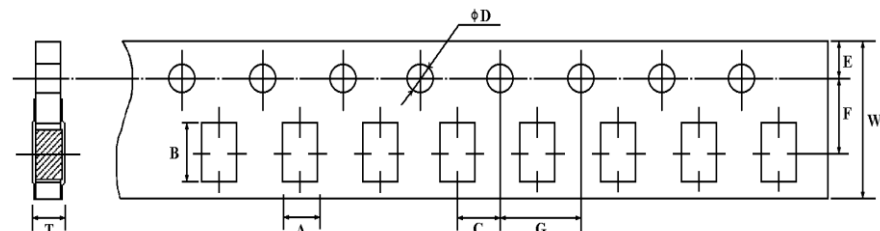
Recommended PCB layout plan



| Type     | A   | B    | C   |
|----------|-----|------|-----|
| CRGS0603 | 1.0 | 1.0  | 0.6 |
| CRGS0805 | 1.3 | 1.2  | 1.0 |
| CRGS1206 | 1.8 | 1.2  | 2.2 |
| CRGS2010 | 3.0 | 1.5  | 3.8 |
| CRGS2512 | 3.7 | 2.45 | 2.7 |

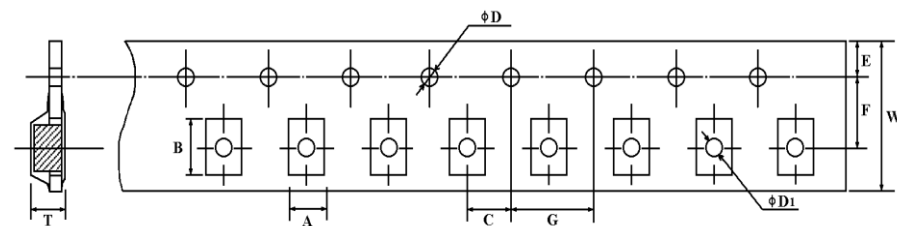
## Packing specification:

### A Paper tape:



| Type     | A<br>± 0.2 | B<br>± 0.2 | C<br>± 0.05 | ØD<br>+0.1<br>-0 | E<br>± 0.1 | F<br>± 0.05 | G<br>± 0.1 | W<br>± 0.2 | T<br>± 0.1 |
|----------|------------|------------|-------------|------------------|------------|-------------|------------|------------|------------|
| CRGS0603 | 1.10       | 1.90       | 2.0         | 1.5              | 1.75       | 3.5         | 4.0        | 8.0        | 0.67       |
| CRGS0805 | 1.65       | 2.40       | 2.0         | 1.5              | 1.75       | 3.5         | 4.0        | 8.0        | 0.81       |
| CRGS1206 | 2.00       | 3.60       | 2.0         | 1.5              | 1.75       | 3.5         | 4.0        | 8.0        | 0.81       |

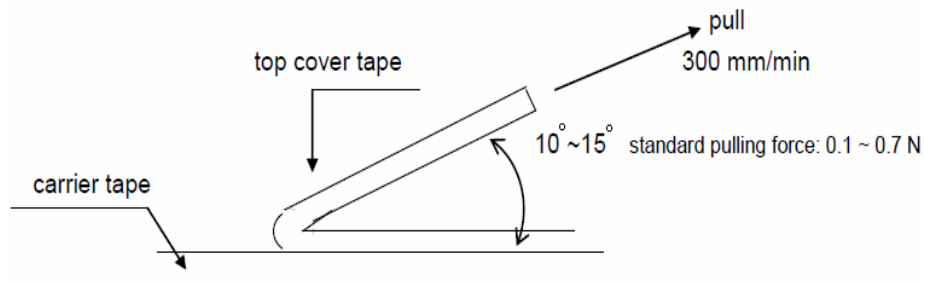
### B. Embossed Tape:



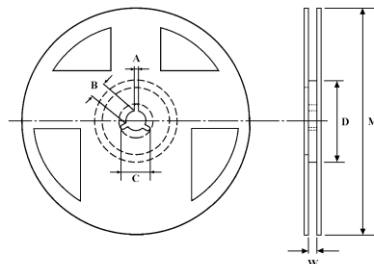
| Type     | A<br>±0.2 | B<br>±0.2 | C<br>±0.05 | ØD<br>+0.1<br>-0 | E<br>±0.1 | F<br>±0.05 | G<br>±0.1 | W<br>±0.2 | ØD<br>+0.1<br>-0 | T<br>± 0.1 |
|----------|-----------|-----------|------------|------------------|-----------|------------|-----------|-----------|------------------|------------|
| CRGS2010 | 2.90      | 5.60      | 2.0        | 1.5              | 1.75      | 5.5        | 4.0       | 12.0      | 1.5              | 1.0        |
| CRGS2512 | 3.50      | 6.70      | 2.0        | 1.5              | 1.75      | 5.5        | 4.0       | 12.0      | 1.5              | 1.0        |

## Peeling strength of top cover tape

Test Condition: 0.1 to 0.7N at a peel off speed of 300mm / min.



## Reel dimension (mm)

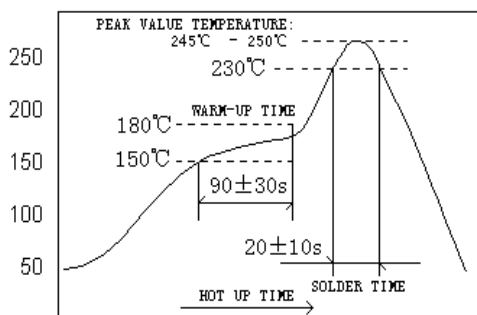


| Type     | Packaging | Quantity Per Reel | A ± 0.5 | B ± 0.5 | C ± 0.5 | D ± 1 | M ± 2 | W ± 1 |
|----------|-----------|-------------------|---------|---------|---------|-------|-------|-------|
| CRGS0603 | Paper     | 5,000 pcs.        | 2       | 13      | 21      | 60    | 178   | 10    |
| CRGS0805 | Paper     | 5,000 pcs.        | 2       | 13      | 21      | 60    | 178   | 10    |
| CRGS1206 | Paper     | 5,000 pcs.        | 2       | 13      | 21      | 60    | 178   | 10    |
| CRGS2010 | Embossed  | 4,000 pcs.        | 2       | 13      | 21      | 60    | 178   | 13.8  |
| CRGS2512 | Embossed  | 4,000 pcs.        | 2       | 13      | 21      | 60    | 178   | 13.8  |

## Solder Profile

Wave solder: 245°C ±3°C dipping time in solder : 2-3 seconds.

## Reflow Solder



## How To Order

| CRGS                                       | 0603 | J         | 10K                     |
|--|------|-----------|-------------------------|
| Common Part                                | Size | Tolerance | Resistance Value        |
| CRGS – Anti-Surge Thick Film Chip Resistor | 0603 | J - ±5%   | 1 ohm (1Ω) 1R0          |
|  | 0805 |           | 1K ohm (1000Ω) 1K0      |
|  | 1206 |           | 100K ohm (100000Ω) 100K |
|  | 2010 |           |                         |
|  | 2512 |           | 1M ohm (1000000Ω) 1M0   |