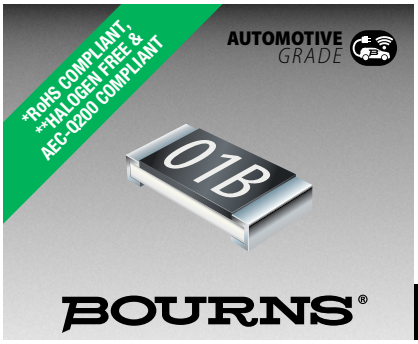



## Features

- Thick film technology
- Power rating up to 1.5 watts @ 70 °C
- High power surge withstanding
- RoHS compliant*
- Halogen free**
- AEC-Q200 compliant

## Applications

- Power supplies
- Digital meters
- Consumer electronics
- LED lighting
- Industry control boards

# CMP-A Series High Power Anti-Surge Chip Resistors

### Electrical Characteristics

| Characteristic | Model | | | | |
|---|---|---|---|---|---|
| | CMP0603A | CMP0805A | CMP1206A | CMP2010A | CMP2512A |
| Power Rating @ 70 °C | 0.25 W | 0.5 W | 0.75 W | 1 W | 1.5 W |
| Operating Temperature Range | -55 °C to +155 °C | | | | |
| Derated to Zero Load at | +155 °C | | | | |
| Maximum Working Voltage | 75 V | 200 V | 250 V | 200 V | 300 V |
| Maximum Overload Voltage | 125 V | 300 V | 500 V | 400 V | 600 V |
| Resistance Tolerance | ±1 %, ±5 % | | | | |
| Temperature Coefficient | | | | | |
| 10 Ω to 1 MΩ (±1 %, E24 & E96 Series) | ±100 ppm/°C | ±100 ppm/°C | ±100 ppm/°C | ±100 ppm/°C | ±100 ppm/°C |
| 10 Ω to 1 MΩ (±5 %, E24 Series | ±200 ppm/°C | ±200 ppm/°C | ±200 ppm/°C | ±200 ppm/°C | ±200 ppm/°C |

*Note: Solder pad and trace size should be evaluated and board surface temperature should not exceed +105 °C when applying full rated power.*

### Additional Information

Click these links for more information:

PRODUCT SELECTOR | TECHNICAL LIBRARY | INVENTORY | SAMPLES | CONTACT

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**Asia:** Tel: +886-2-2562-4117 • Email: asiacus@bourns.com
**EMEA:** Tel: +36 88 885 877 • Email: eurocus@bourns.com
**www.bourns.com**

**WARNING Cancer and Reproductive Harm** - www.P65Warnings.ca.gov

* RoHS Directive 2015/863, Mar 31, 2015 and Annex.
** Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less.

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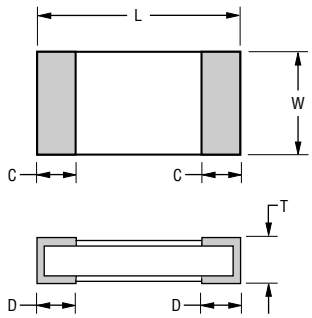
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# CMP-A Series High Power Anti-Surge Chip Resistors

BOURNS®

## Product Dimensions

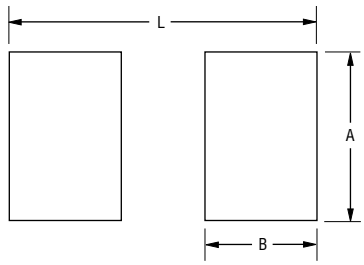
| Model | L | W | C | D | T |
|---|---|---|---|---|---|
| CMP0603A | 1.60 ± 0.10 (.063 ± .004) | 0.80 ± 0.10 (.031 ± .004) | 0.30 ± 0.20 (.012 ± .008) | 0.30 ± 0.20 (.012 ± .008) | 0.45 ± 0.10 (.018 ± .004) |
| CMP0805A | 2.00 ± 0.10 (.079 ± .004) | 1.25 ± 0.10 (.049 ± .004) | 0.40 ± 0.20 (.016 ± .008) | 0.40 ± 0.20 (.016 ± .008) | 0.50 ± 0.10 (.020 ± .004) |
| CMP1206A | 3.10 ± 0.10 (.122 ± .004) | 1.60 ± 0.10 (.063 ± .004) | 0.50 ± 0.25 (.020 ± .010) | 0.50 ± 0.25 (.020 ± .010) | 0.55 ± 0.10 (.022 ± .004) |
| CMP2010A | 5.00 ± 0.20 (.197 ± .008) | 2.50 ± 0.20 (.098 ± .008) | 0.65 ± 0.25 (.026 ± .010) | 0.60 ± 0.25 (.023 ± .010) | 0.60 ± 0.10 (.024 ± .004) |
| CMP2512A | 6.40 ± 0.20 (.252 ± .008) | 3.10 ± 0.20 (.122 ± .008) | 0.60 ± 0.25 (.024 ± .010) | 1.80 ± 0.25 (.071 ± .010) | 0.60 ± 0.15 (.024 ± .006) |




DIMENSIONS: MM / (INCHES)

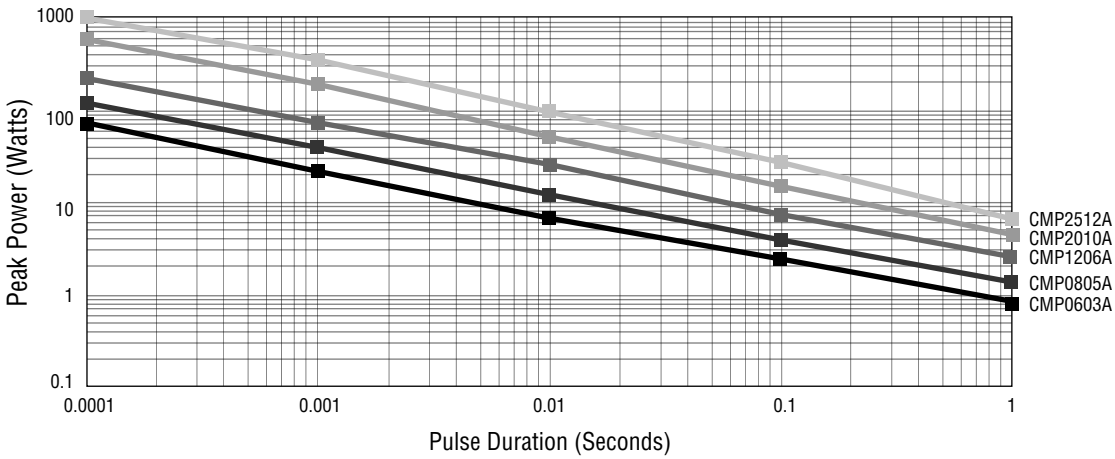
## Recommended Solder Pad Layout

| Model | A | B | L |
|---|---|---|---|
| CMP0603A | 0.90 (.035) | 1.00 (.039) | 3.00 (.118) |
| CMP0805A | 1.30 (.051) | 1.15 (.045) | 3.50 (.138) |
| CMP1206A | 1.80 (.071) | 1.30 (.051) | 4.70 (.185) |
| CMP2010A | 3.00 (.118) | 1.50 (.059) | 6.80 (.268) |
| CMP2512A | 3.70 (.146) | 2.45 (.096) | 7.60 (.299) |




DIMENSIONS: MM / (INCHES)

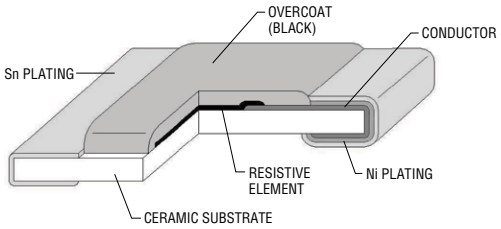
## Surge Performance




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## Construction




## Rated Voltage

The rated voltage is calculated by the following formula:

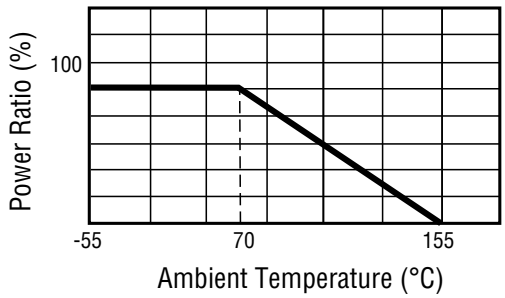
$V = \sqrt{P \times R}$

**V**: Rated Voltage (V)
**P**: Rated Power (W)
**R**: Resistance Value (Ω)

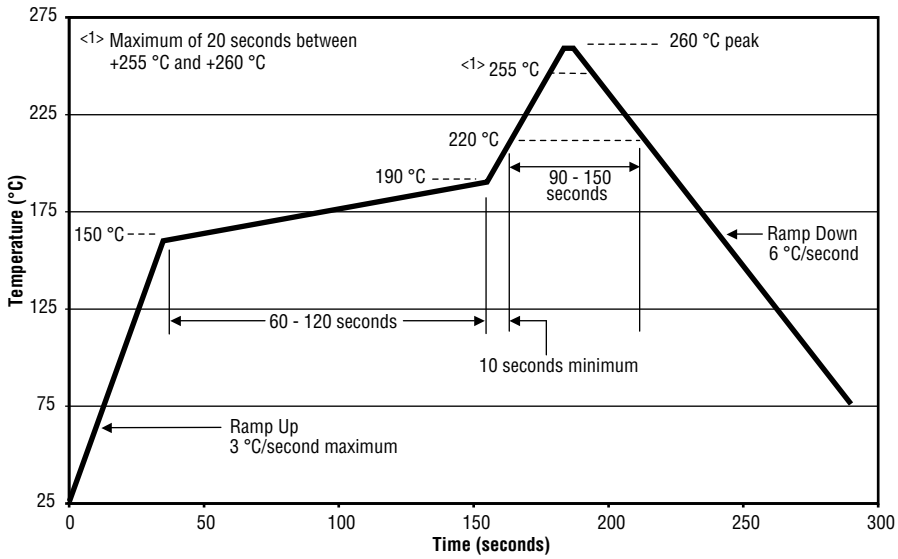
## Environmental Characteristics

Moisture Sensitivity Level.....1

## Derating Curve




## Soldering Profile




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## How to Order

**CMP 0603 A F X - 1002 E LF**

Model
- CMP = High Power Anti-Surge Resistor

Size
- 0603 = 0603 Size
- 0805 = 0805 Size
- 1206 = 1206 Size
- 2010 = 2010 Size
- 2512 = 2512 Size

Feature
- A = AEC-Q200 Compliant

Resistance Tolerance
- F = ±1 %
- J = ±5 %

TCR (See Electrical Characteristics chart)
- W = ±200 PPM/°C
- X = ±100 PPM/°C

Resistance Value

1 % Tolerance:
- <100 Ω.....“R” represents decimal point *(example: 24R3 = 24.3 Ω)*
- ≥100 Ω.....First three digits are significant, fourth digit represents number of zeros to follow *(example: 8252 = 82.5K Ω)*

5 % Tolerance:
- ≥10 Ω.....First two digits are significant, third digit represents number of zeros to follow *(example: 474 = 470K Ω)*

Packaging
- E = 5,000 pieces on 180 mm (7 inch) plastic reel, paper tape - CMP0603, CMP0805, CMP1206
  4,000 pieces on 180 mm (7 inch) reel, plastic tape - CMP2010, CMP2512

Termination
- LF = Tin-plated (RoHS Compliant)

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## Performance Characteristics

| Test Item | Method | Procedure | Test Limits ΔR |
|---|---|---|---|
| Electrical Characteristics | AEC-Q200 Table 7.1 | Measure the resistance value | DC Resistance:<br>F: ±1 % : J : ±5 %<br>TCR: Within the specified |
| High Temperature Exposure (Storage) | AEC-Q200 Table 7.3 | 1000 hours @ T = 125 °C unpowered;<br>Measurement at 24 ±2 hours after test conclusion | J: Δ R ≤ ±(3 % + 0.1 Ω)<br>F: Δ R ≤ ±(1 % + 0.05 Ω) |
| Temperature Cycling | AEC-Q200 Table 7.4 | 1000 cycles (-55 °C to +125 °C);<br>Measurement at 24 ±2 hours after test conclusion | J: Δ R ≤ ±(1 % + 0.1 Ω)<br>F: Δ R ≤ ±(0.5 % + 0.05 Ω)<br>No mechanical damage |
| Moisture Resistance | AEC-Q200 Table 7.6 | Test 65 °C / 80-100 % RH / 10 cycles;<br>Measurement at 24 ±2 hours after test conclusion<br>(t = 24 hours/cycle) | J: Δ R ≤ ±(1 % + 0.1 Ω)<br>F: Δ R ≤ ±(0.5 % + 0.05 Ω) |
| Biased Humidity | AEC-Q200 Table 7.7 | 1000 hours 85 °C / 85 % RH, 10 % of operating power;<br>Measurement at 24 ±2 hours after test conclusion | J: Δ R ≤ ±(3 % + 0.1 Ω)<br>F: Δ R ≤ ±(1 % + 0.05 Ω) |
| Operational Life | AEC-Q200 Table 7.8 | Test 1000 hours @ TA = 125 °C at specified rated power;<br>Measurement at 24 ±2 hours after test conclusion | J: Δ R ≤ ±(3 % + 0.1 Ω)<br>F: Δ R ≤ ±(1 % + 0.05 Ω) |
| Mechanical Shock | AEC-Q200 Table 7.13 | Test peak value: 100 g's, wave: hail-sine;<br>Duration: 6 ms, Velocity: 12.3 ft/sec. | Within product specification tolerance and no visible damage |
| Vibration | AEC-Q200 Table 7.14 | 5 g's for 20 min., 12 cycles each of 3 orientations;<br>Test from 10-2000 Hz | J: Δ R ≤ ±(1 % + 0.1 Ω)<br>F: Δ R ≤ ±(0.5 % + 0.05 Ω)<br>No mechanical damage |
| Resistance to Solder Heat | AEC-Q200 Table 7.15 | Solder dipping @ 270 °C ±5 °C for 10 sec. ±1 sec. | J: Δ R ≤ ±(1 % + 0.1 Ω)<br>F: Δ R ≤ ±(0.5 % + 0.05 Ω)<br>No mechanical damage |
| Thermal Shock | AEC-Q200 Table 7.16 | -55 to 155 °C / dwell time 15 min /<br>max transfer time 20 sec / 300 cycles | J: Δ R ≤ ±(1 % + 0.1 Ω)<br>F: Δ R ≤ ±(0.5 % + 0.05 Ω)<br>No mechanical damage |
| ESD | AEC-Q200-002 | Test contact min. 1 KV | Δ R ≤ ±(1 % + 0.1 Ω) |
| Solderability | AEC-Q200 Table 7.18 | a) Baking 155 °C 4H, dipping 235 °C 5 sec<br>b) Steam 8H, dipping 215 °C 5 sec<br>c) Steam 8H, dipping 260 °C 7 sec | Over 95 % of termination must be covered with solder |
| Flammability | AEC-Q200 Table 7.20 | UL-94 V-0 or V-1 are acceptable | Refer UL-94 |
| Board Flex | AEC-Q200 Table 7.21 | Bending 2 mm (2512, 1206),<br>3 mm (0805, 0603) | J: Δ R ≤ ±(1 % + 0.1 Ω)<br>F: Δ R ≤ ±(0.5 % + 0.05 Ω)<br>No mechanical damage |
| Terminal Strength | AEC-Q200 Table 7.22 | Force 1.8 Kg for 60 sec | No mechanical damage |
| Sulfur-Resistant | ASTM B-809 | +50 °C ±2 °C, 1000 hours | Δ R ≤ ±(1 % + 0.1 Ω) |

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## Typical Part Marking

**±5 % (E24):** **CMP0603A, CMP0805A, CMP1206A, CMP2010A, CMP2512A**




Resistance value is expressed by 3 digits. The first two digits represent the significant figures of the nominal resistance value in ohms; the third digit represents the exponent for a base of 10.

*Example: **301** = 30 x $10^1$ = 300 ohms*

**±1 % (E24/E96):** **CMP0805A, CMP1206A, CMP2010A, CMP2512A**




Resistance value is expressed by 4 digits. The first three digits represent the significant figures of the nominal resistance value in ohms; the third digit represents the exponent for a base of 10.

*Example: **1542** = 154 x $10^2$ = 15.4K ohms*

**±1 % (E24):** **CMP0603A**




Resistance value is expressed by 3 digits. The first two digits represent the significant figures of the nominal resistance value in ohms; the third digit represents the exponent for a base of 10.

*Example: **222** = 22 x $10^2$ = 2.2K ohms*

**±1 % (E96):** **CMP0603A**




Resistance value is expressed by 2 digits followed by an alpha character multiplier. (Refer to marking table below.)

*Example: **01B** = 100 x $10^1$ = 1K ohms*

This table shows the first two digits for the three-digit E96 part marking scheme. The third character is a letter multiplier:

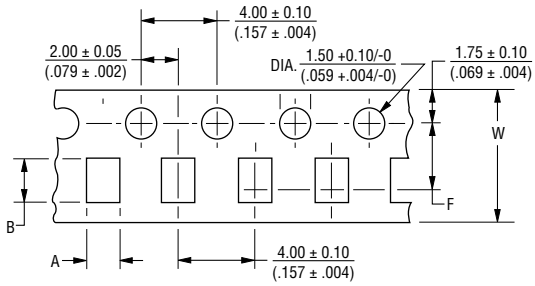
A=$10^0$
B=$10^1$
C=$10^2$
D=$10^3$
E=$10^4$
F=$10^5$
G=$10^6$
H=$10^7$
X=$10^{-1}$
Y=$10^{-2}$
Z=$10^{-3}$

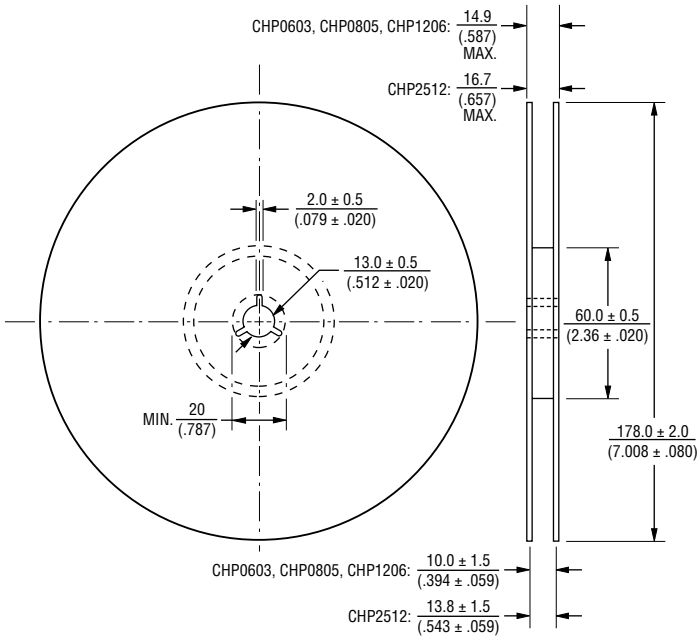
| Code | R Value | Code | R Value | Code | R Value | Code | R Value | Code | R Value |
|---|---|---|---|---|---|---|---|---|---|
| 01 | 100 | 21 | 162 | 41 | 261 | 61 | 422 | 81 | 681 |
| 02 | 102 | 22 | 165 | 42 | 267 | 62 | 432 | 82 | 698 |
| 03 | 105 | 23 | 169 | 43 | 274 | 63 | 442 | 83 | 715 |
| 04 | 107 | 24 | 174 | 44 | 280 | 64 | 453 | 84 | 732 |
| 05 | 110 | 25 | 178 | 45 | 287 | 65 | 464 | 85 | 750 |
| 06 | 113 | 26 | 182 | 46 | 294 | 66 | 475 | 86 | 768 |
| 07 | 115 | 27 | 187 | 47 | 301 | 67 | 487 | 87 | 787 |
| 08 | 118 | 28 | 191 | 48 | 309 | 68 | 499 | 88 | 806 |
| 09 | 121 | 29 | 196 | 49 | 316 | 69 | 511 | 89 | 825 |
| 10 | 124 | 30 | 200 | 50 | 324 | 70 | 523 | 90 | 845 |
| 11 | 127 | 31 | 205 | 51 | 332 | 71 | 536 | 91 | 866 |
| 12 | 130 | 32 | 210 | 52 | 340 | 72 | 549 | 92 | 887 |
| 13 | 133 | 33 | 215 | 53 | 348 | 73 | 562 | 93 | 909 |
| 14 | 137 | 34 | 221 | 54 | 357 | 74 | 576 | 94 | 931 |
| 15 | 140 | 35 | 226 | 55 | 365 | 75 | 590 | 95 | 953 |
| 16 | 143 | 36 | 232 | 56 | 374 | 76 | 604 | 96 | 976 |
| 17 | 147 | 37 | 237 | 57 | 383 | 77 | 619 | | |
| 18 | 150 | 38 | 243 | 58 | 392 | 78 | 634 | | |
| 19 | 154 | 39 | 249 | 59 | 402 | 79 | 649 | | |
| 20 | 158 | 40 | 255 | 60 | 412 | 80 | 665 | | |

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## Packaging Dimensions (Conforms to EIA RS-481A)




| Model | Tape Type | Pieces per Reel | A | B | W | F |
|---|---|---|---|---|---|---|
| CMP0603A | Paper | 5,000 | 1.10 ± 0.20 (.043 ± .008) | 1.90 ± 0.20 (.075 ± .008) | 8.00 ± 0.30 (.315 ± .012) | 3.50 ± 0.05 (.138 ± .020) |
| CMP0805A | | | 1.65 ± 0.20 (.065 ± .008) | 2.40 ± 0.20 (.094 ± .008) | | |
| CMP1206A | | | 2.00 ± 0.20 (.079 ± .008) | 3.60 ± 0.20 (.142 ± .008) | | |
| CMP2010A | Plastic | 4,000 | 2.80 ± 0.20 (.110 ± .008) | 5.50 ± 0.20 (.216 ± .008) | 12.00 ± 0.30 (.472 ± .012) | 5.50 ± 0.05 (.217 ± .020) |
| CMP2512A | | | 3.50 ± 0.20 (.138 ± .008) | 6.70 ± 0.20 (.264 ± .008) | | |

DIMENSIONS: MM (INCHES)

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