



## 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<br>(±1 %, E24 & E96 Series) | ±100 ppm/°C       | ±100 ppm/°C | ±100 ppm/°C | ±100 ppm/°C | ±100 ppm/°C |
| 10 Ω to 1 MΩ<br>(±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.

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**WARNING Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://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.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

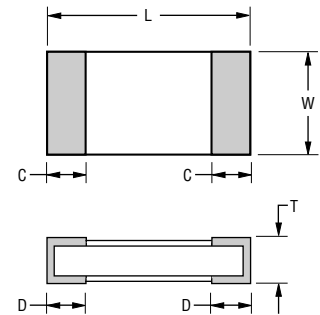
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# CMP-A Series High Power Anti-Surge Chip Resistors

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## Product Dimensions

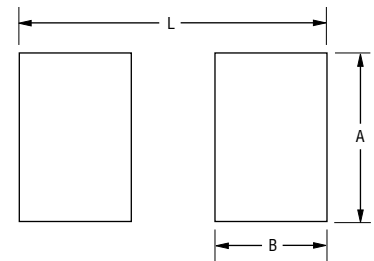
| Model    | L                                       | W                                       | C                                       | D                                       | T                                       |
|----------|---|---|---|---|---|
| CMP0603A | $\frac{1.60 \pm 0.10}{(.063 \pm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



DIMENSIONS:  $\frac{\text{MM}}{(\text{INCHES})}$

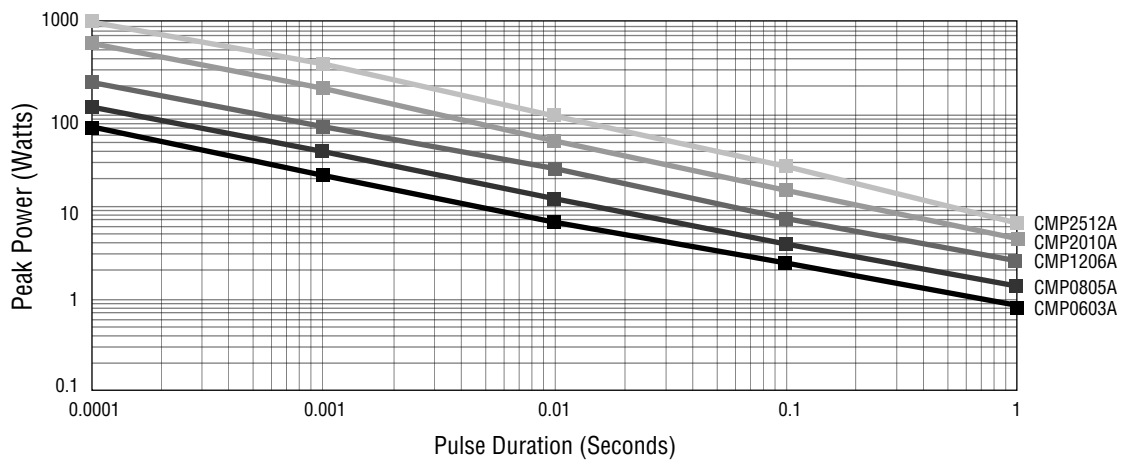
## Recommended Solder Pad Layout

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



DIMENSIONS:  $\frac{\text{MM}}{(\text{INCHES})}$

## Surge Performance



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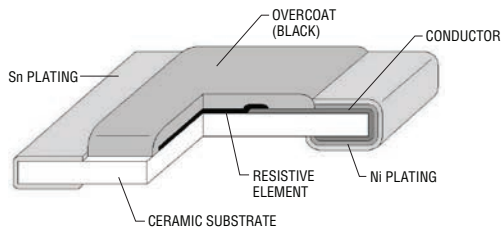
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# CMP-A Series High Power Anti-Surge Chip Resistors



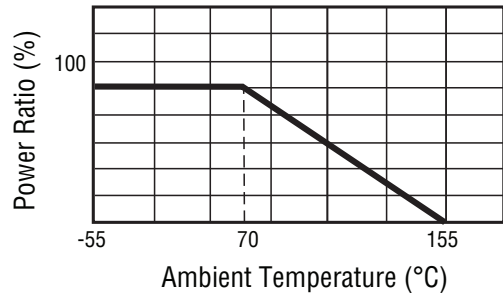
## Construction



## Environmental Characteristics

Moisture Sensitivity Level..... 1

## Derating Curve



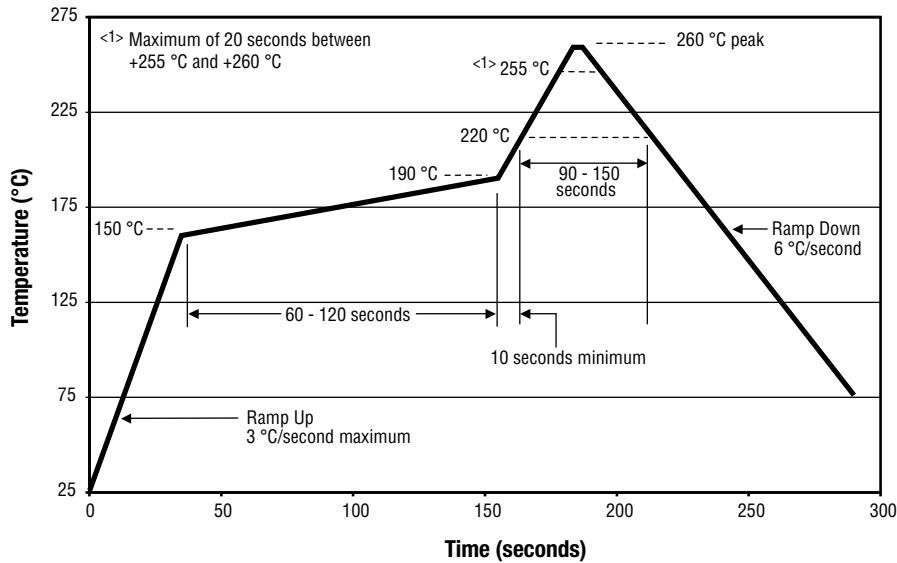
## Rated Voltage

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)

## Soldering Profile



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



## How to Order

CMP 0603 A F X 1002 E LF

|  |       |     |       |      |       |   |       |   |       |   |       |      |       |   |       |    |
|--|-------|-----|-------|------|-------|---|-------|---|-------|---|-------|------|-------|---|-------|----|
| Model                                      | _____ | CMP | _____ | 0603 | _____ | A | _____ | F | _____ | X | _____ | 1002 | _____ | E | _____ | LF |
| Size                                       | _____ |     |       |      |       |   |       |   |       |   |       |      |       |   |       |    |
| Feature                                    | _____ |     |       |      |       |   |       |   |       |   |       |      |       |   |       |    |
| Resistance Tolerance                       | _____ |     |       |      |       |   |       |   |       |   |       |      |       |   |       |    |
| TCR (See Electrical Characteristics chart) | _____ |     |       |      |       |   |       |   |       |   |       |      |       |   |       |    |
| Resistance Value                           | _____ |     |       |      |       |   |       |   |       |   |       |      |       |   |       |    |
| 1 % Tolerance:                             | _____ |     |       |      |       |   |       |   |       |   |       |      |       |   |       |    |
| 5 % Tolerance:                             | _____ |     |       |      |       |   |       |   |       |   |       |      |       |   |       |    |
| Packaging                                  | _____ |     |       |      |       |   |       |   |       |   |       |      |       |   |       |    |
| Termination                                | _____ |     |       |      |       |   |       |   |       |   |       |      |       |   |       |    |

CMP = High Power Anti-Surge Resistor

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

A = AEC-Q200 Compliant

F = ±1 %  
J = ±5 %

W = ±200 PPM/°C  
X = ±100 PPM/°C

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)

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

LF = Tin-plated (RoHS Compliant)

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

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## Performance Characteristics

| Test Item                           | Method              | Procedure  | Test Limits $\Delta R$  |
|-------------------------------------|---------------------|--|---|
| Electrical Characteristics          | AEC-Q200 Table 7.1  | Measure the resistance value   | DC Resistance:<br>F: $\pm 1\%$ ; J : $\pm 5\%$<br>TCR: Within the specified                                     |
| High Temperature Exposure (Storage) | AEC-Q200 Table 7.3  | 1000 hours @ T = 125 °C unpowered;<br>Measurement at 24 $\pm 2$ hours after test conclusion                            | J: $\Delta R \leq \pm(3\% + 0.1 \Omega)$<br>F: $\Delta R \leq \pm(1\% + 0.05 \Omega)$                           |
| Temperature Cycling                 | AEC-Q200 Table 7.4  | 1000 cycles (-55 °C to +125 °C);<br>Measurement at 24 $\pm 2$ hours after test conclusion                              | J: $\Delta R \leq \pm(1\% + 0.1 \Omega)$<br>F: $\Delta R \leq \pm(0.5\% + 0.05 \Omega)$<br>No mechanical damage |
| Moisture Resistance                 | AEC-Q200 Table 7.6  | Test 65 °C / 80-100 % RH / 10 cycles;<br>Measurement at 24 $\pm 2$ hours after test conclusion<br>(t = 24 hours/cycle) | J: $\Delta R \leq \pm(1\% + 0.1 \Omega)$<br>F: $\Delta R \leq \pm(0.5\% + 0.05 \Omega)$                         |
| Biased Humidity                     | AEC-Q200 Table 7.7  | 1000 hours 85 °C / 85 % RH, 10 % of operating power;<br>Measurement at 24 $\pm 2$ hours after test conclusion          | J: $\Delta R \leq \pm(3\% + 0.1 \Omega)$<br>F: $\Delta R \leq \pm(1\% + 0.05 \Omega)$                           |
| Operational Life                    | AEC-Q200 Table 7.8  | Test 1000 hours @ TA = 125 °C at specified rated power;<br>Measurement at 24 $\pm 2$ hours after test conclusion       | J: $\Delta R \leq \pm(3\% + 0.1 \Omega)$<br>F: $\Delta R \leq \pm(1\% + 0.05 \Omega)$                           |
| 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: $\Delta R \leq \pm(1\% + 0.1 \Omega)$<br>F: $\Delta R \leq \pm(0.5\% + 0.05 \Omega)$<br>No mechanical damage |
| Resistance to Solder Heat           | AEC-Q200 Table 7.15 | Solder dipping @ 270 °C $\pm 5$ °C for 10 sec. $\pm 1$ sec.  | J: $\Delta R \leq \pm(1\% + 0.1 \Omega)$<br>F: $\Delta R \leq \pm(0.5\% + 0.05 \Omega)$<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: $\Delta R \leq \pm(1\% + 0.1 \Omega)$<br>F: $\Delta R \leq \pm(0.5\% + 0.05 \Omega)$<br>No mechanical damage |
| ESD                                 | AEC-Q200-002        | Test contact min. 1 KV   | $\Delta R \leq \pm(1\% + 0.1 \Omega)$   |
| 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: $\Delta R \leq \pm(1\% + 0.1 \Omega)$<br>F: $\Delta R \leq \pm(0.5\% + 0.05 \Omega)$<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 $\pm 2$ °C, 1000 hours  | $\Delta R \leq \pm(1\% + 0.1 \Omega)$   |

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

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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** =  $30 \times 10^1 = 300 \text{ ohms}$

±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** =  $154 \times 10^2 = 15.4K \text{ ohms}$

±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** =  $22 \times 10^2 = 2.2K \text{ ohms}$

±1 % (E96):

**CMP0603A**



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

Example: **01B** =  $100 \times 10^1 = 1K \text{ ohms}$

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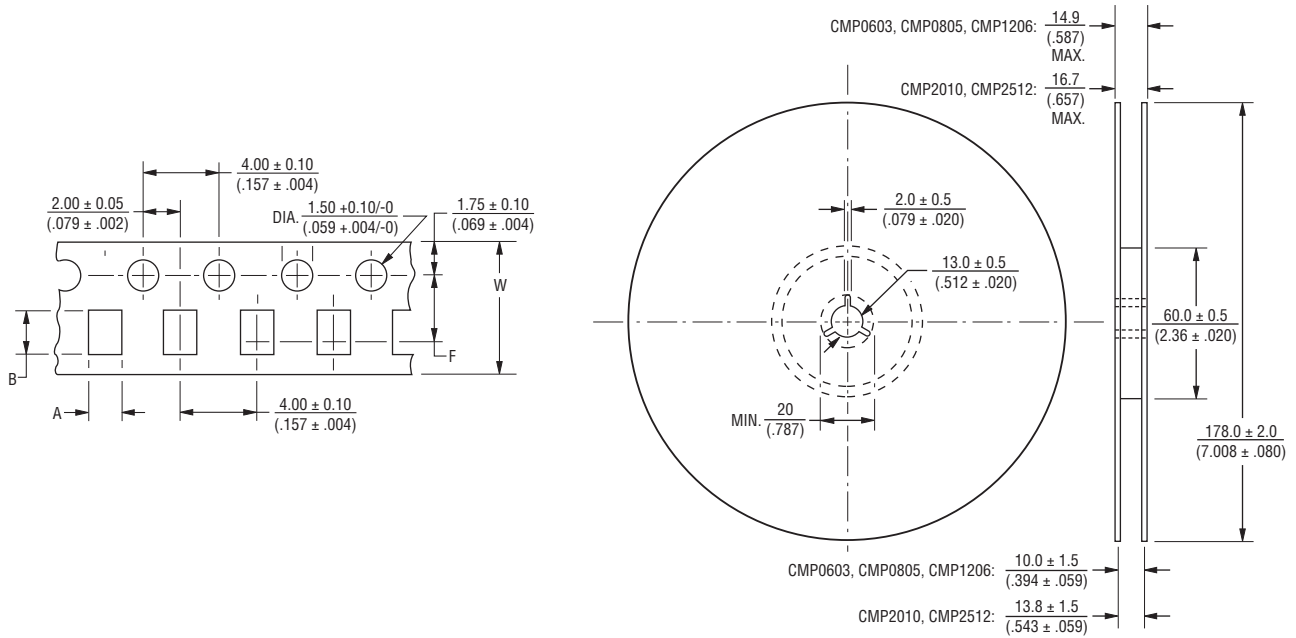
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## Packaging Dimensions (Conforms to EIA RS-481A)



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

DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

REV. 05/26/20

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