

# APC Precision Chip Resistor



- Precision Thin Film Technology
- Wide Resistance Range 1R - 3M
- Precision tolerance down to  $\pm 0.01\%$
- TCR as low as  $\pm 2\text{ppm}/^\circ\text{C}$
- Tape & Reel packaging



- Standard Electrical Specifications
- Tolerance (Code):  $\pm 0.05\%$  (A),  $\pm 0.1\%$  (B),  $\pm 0.25\%$  (C),  $\pm 0.5\%$  (D),  $\pm 1\%$  (F)
- TCR (Code):  $\pm 25\text{ppm}$  (E),  $\pm 50\text{ppm}$  (F)

| Type    | Power Rating at 70°C | Operating Temp Range | Max Operating Voltage | Max Overload Voltage | Tolerance / Resistance Range |                |               |                 |     | TCR (PPM°C) |
|---------|----------------------|----------------------|-----------------------|----------------------|------------------------------|----------------|---------------|-----------------|-----|-------------|
|         |                      |                      |                       |                      | ±0.05%                       | ±0.1%          | ±0.25%        | ±0.5%           | ±1% |             |
| APC0201 | 1/32W                | -55 to +155°C        | 15V                   | 30V                  | N/A                          |                |               | 49.9Ω to 4.99KΩ |     | ±25         |
|         |                      |                      |                       |                      |                              |                |               | 49.9Ω to 33KΩ   |     | ±50         |
| APC0402 | 1/16W                | -55 to +155°C        | 25V                   | 50V                  | 49.9Ω to 12KΩ                | 10Ω to 255KΩ   | 4.7Ω to 511KΩ |                 |     | ±25         |
|         |                      |                      |                       |                      |                              |                |               | ±50             |     |             |
| APC0603 | 1/16W                | -55 to +155°C        | 50V                   | 100V                 | 4.7Ω to 332KΩ                | 4.7Ω to 1MΩ    | 1Ω to 1MΩ     |                 |     | ±25         |
|         |                      |                      |                       |                      |                              |                |               | ±50             |     |             |
| APC0805 | 1/10W                | -55 to +155°C        | 100V                  | 200V                 | 4.7Ω to 1MΩ                  | 4.7Ω to 2MΩ    | 1Ω to 2MΩ     |                 |     | ±25         |
|         |                      |                      |                       |                      |                              |                |               | ±50             |     |             |
| APC1206 | 1/8W                 | -55 to +155°C        | 150V                  | 300V                 | 4.7Ω to 1MΩ                  | 4.7Ω to 2.49MΩ | 1Ω to 2.49MΩ  |                 |     | ±25         |
| APC1210 | 1/4W                 |                      |                       |                      |                              |                |               |                 |     | ±50         |
| APC2010 | 1/4W                 | -55 to +155°C        | 150V                  | 300V                 | 4.7Ω to 1MΩ                  | 4.7Ω to 3MΩ    | 1Ω to 3MΩ     |                 |     | ±25         |
| APC2512 | 1/2W                 |                      |                       |                      |                              |                |               |                 |     | ±50         |

- Special Electrical Specifications
- Tolerance (Code):  $\pm 0.01\%$  (T),  $\pm 0.05\%$  (A),  $\pm 0.1\%$  (B),  $\pm 0.25\%$  (C),  $\pm 0.5\%$  (D),  $\pm 1\%$  (F)
- TCR (Code):  $\pm 2\text{ppm}$  (X),  $\pm 3\text{ppm}$  (Y),  $\pm 5\text{ppm}$  (Z),  $\pm 10\text{ppm}$  (B),  $\pm 15\text{ppm}$  (A)

| Type    | Power Rating at 70°C | Operating Temp Range | Max Operating Voltage | Max Overload Voltage | Resistance Range |               |                 |        |          |          | TCR (PPM°C) |
|---------|----------------------|----------------------|-----------------------|----------------------|------------------|---------------|-----------------|--------|----------|----------|-------------|
|         |                      |                      |                       |                      | ±0.01%           | ±0.05%        | ±0.1%           | ±0.25% | ±0.5%    | ±1%      |             |
| APC0402 | 1/16W                | -55 to +155°C        | 25V                   | 50V                  | 49.9Ω to 4.99KΩ  |               |                 | N/A    |          |          | ±2, ±3      |
|         |                      |                      |                       |                      | 49.9Ω to 4.99KΩ  |               |                 |        |          |          | ±5          |
|         |                      |                      |                       |                      | 49.9Ω to 12KΩ    |               | 49.9Ω to 60KΩ   |        |          | ±10      |             |
|         |                      |                      |                       |                      |                  |               | 49.9Ω to 69.8KΩ |        |          | ±15      |             |
| APC0603 | 1/16W                | -55 to +155°C        | 50V                   | 100V                 | 24.9Ω to 15KΩ    |               |                 | N/A    |          |          | ±2, ±3      |
|         |                      |                      |                       |                      | 24.9Ω to 15KΩ    |               |                 |        |          |          | ±5          |
|         |                      |                      |                       |                      | 24.9Ω to 100KΩ   | 4.7Ω to 332KΩ | 4.7Ω to 511KΩ   |        |          | ±10, ±15 |             |
| APC0805 | 1/10W                | -55 to +155°C        | 100V                  | 200V                 | 24.9Ω to 30KΩ    |               |                 | N/A    |          |          | ±2, ±3      |
|         |                      |                      |                       |                      | 24.9Ω to 30KΩ    |               |                 |        |          |          | ±5          |
|         |                      |                      |                       |                      | 24.9Ω to 200KΩ   | 4.7Ω to 1MΩ   |                 |        |          | ±10, ±15 |             |
| APC1206 | 1/8W                 | -55 to +155°C        | 150V                  | 300V                 | 24.9Ω to 49.9KΩ  |               |                 | N/A    |          |          | ±2, ±3      |
|         |                      |                      |                       |                      | 24.9Ω to 49.9KΩ  |               |                 |        |          |          | ±5          |
|         |                      |                      |                       |                      | 24.9Ω to 499KΩ   | 4.7Ω to 1MΩ   |                 |        | ±10, ±15 |          |             |
| APC1210 | 1/4W                 | -55 to +155°C        | 150V                  | 300V                 | 24.9Ω to 49.9KΩ  |               |                 | N/A    |          |          | ±2, ±3      |
|         |                      |                      |                       |                      | 24.9Ω to 49.9KΩ  |               |                 |        |          |          | ±5          |
|         |                      |                      |                       |                      | 24.9Ω to 499KΩ   | 4.7Ω to 1MΩ   |                 |        | ±10, ±15 |          |             |
| APC2010 | 1/4W                 | -55 to +155°C        | 150V                  | 300V                 | 24.9Ω to 100KΩ   |               |                 | N/A    |          |          | ±2, ±3      |
|         |                      |                      |                       |                      | 24.9Ω to 100KΩ   |               |                 |        |          |          | ±5          |
|         |                      |                      |                       |                      | 24.9Ω to 499KΩ   | 4.7Ω to 1MΩ   |                 |        | ±10, ±15 |          |             |
| APC2512 | 1/2W                 | -55 to +155°C        | 150V                  | 300V                 | 24.9Ω to 100KΩ   |               |                 | N/A    |          |          | ±2, ±3      |
|         |                      |                      |                       |                      | 24.9Ω to 100KΩ   |               |                 |        |          |          | ±5          |
|         |                      |                      |                       |                      | 24.9Ω to 499KΩ   | 4.7Ω to 1MΩ   |                 |        | ±10, ±15 |          |             |

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It is the responsibility of the customer to ensure that the component selected from our range is suitable for the intended application. If in doubt please ask ARCOL.

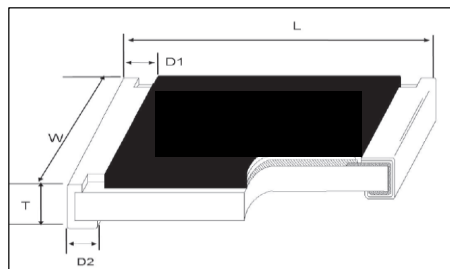
## Characteristics

| Item                  | Tol. ≤ 0.05%          | Tol. > 0.05%           | Method                                                             |
|-----------------------|-----------------------|------------------------|--------------------------------------------------------------------|
| Short Time Overload   | $\Delta R \pm 0.05\%$ | $\Delta R \pm 0.02\%$  | RCWV*2.5 or Max. Overload Voltage - whichever is lower for 5 secs. |
| Insulation Resistance | > 1000 MΩ             |                        | Apply 100V dc for 1 minute                                         |
| Endurance             | $\Delta R \pm 0.05\%$ | $\Delta R \pm 0.02\%$  | 70 ±2°C RCWV for 1000 hours with 1.5 hrs ON and 0.5 hrs OFF        |
| Thermal Shock         | $\Delta R \pm 0.05\%$ | $\Delta R \pm 0.025\%$ | -55 to +155°C, 100 Cycles                                          |
| Low Temp Operation    | $\Delta R \pm 0.05\%$ | $\Delta R \pm 0.2\%$   | 1 hour, -65°C followed by 45 mins of RCWV                          |

\*RCWV (Rated Continuous Working Voltage) =  $\sqrt{P \cdot R}$  or Max. Operating Voltage - whichever is lower

## Dimensions (mm)

| Type    | L          | W          | T          | D1         | D2         |
|---------|------------|------------|------------|------------|------------|
| APC0201 | 0.58 ±0.05 | 0.29 ±0.05 | 0.23 ±0.05 | 0.12 ±0.05 | 0.15 ±0.05 |
| APC0402 | 1.00 ±0.05 | 0.50 ±0.05 | 0.30 ±0.05 | 0.20 ±0.05 | 0.20 ±0.05 |
| APC0603 | 1.55 ±0.10 | 0.80 ±0.10 | 0.45 ±0.10 | 0.30 ±0.20 | 0.30 ±0.20 |
| APC0805 | 2.00 ±0.15 | 1.25 ±0.15 | 0.55 ±0.10 | 0.30 ±0.20 | 0.40 ±0.20 |
| APC1206 | 3.05 ±0.15 | 1.55 ±0.15 | 0.55 ±0.10 | 0.42 ±0.20 | 0.35 ±0.25 |
| APC1210 | 3.10 ±0.15 | 2.40 ±0.15 | 0.55 ±0.10 | 0.40 ±0.20 | 0.55 ±0.25 |
| APC2010 | 4.90 ±0.15 | 2.40 ±0.15 | 0.55 ±0.10 | 0.60 ±0.30 | 0.50 ±0.25 |
| APC2512 | 6.30 ±0.15 | 3.10 ±0.15 | 0.55 ±0.10 | 0.60 ±0.30 | 0.50 ±0.25 |

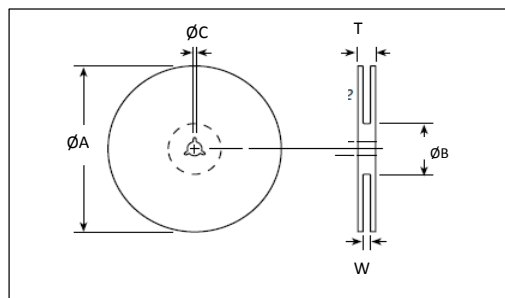


## Reel Dimensions (mm)

| Size   | ØA       | ØB      | ØC        | W         | T         | Qty Per Reel |
|--------|----------|---------|-----------|-----------|-----------|--------------|
| 0201*  | 178 ±1.0 | 60 ±1.0 | 13.5 ±0.7 | 9.5 ±1.0  | 11.5 ±1.0 | 10,000       |
| 0402*  | 178 ±1.0 | 60 ±1.0 | 13.5 ±0.7 | 9.5 ±1.0  | 11.5 ±1.0 | 10,000       |
| 0603*  | 178 ±1.0 | 60 ±1.0 | 13.5 ±0.7 | 9.5 ±1.0  | 11.5 ±1.0 | 5,000        |
| 0805*  | 178 ±1.0 | 60 ±1.0 | 13.5 ±0.7 | 9.5 ±1.0  | 11.5 ±1.0 | 5,000        |
| 1206*  | 178 ±1.0 | 60 ±1.0 | 13.5 ±0.7 | 9.5 ±1.0  | 11.5 ±1.0 | 5,000        |
| 1210*  | 178 ±1.0 | 60 ±1.0 | 13.5 ±0.7 | 9.5 ±1.0  | 11.5 ±1.0 | 5,000        |
| 2010** | 178 ±1.0 | 60 ±1.0 | 13.5 ±0.7 | 13.5 ±1.0 | 15.5 ±1.0 | 4,000        |
| 2512** | 178 ±1.0 | 60 ±1.0 | 13.5 ±0.7 | 13.5 ±1.0 | 15.5 ±1.0 | 4,000        |

\* Paper Tape

\*\* Plastic Embossed Tape



## Ordering Procedure

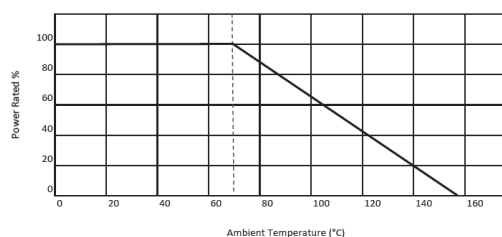
Standard Resistor: Series, Size, Tol Code, Resistance Value, TCR Code

Eg: APC0603A100RB  
 100Ω  
 ±0.05%  
 1/16 watt  
 (0603 size)

Tol: ±0.01% (T), ±0.05% (A), ±0.1% (B), ±0.25% (C), ±0.5% (D), ±1% (F)

TCR: ±2ppm (X), ±3ppm (Y), ±5ppm (Z), ±10ppm (B), ±15ppm (A), ±25ppm (E), ±50ppm (F)

## Derating Curve



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