



Product Family: [Current Sensing Power Resistor](#)
Part Number Series: [CPA0612-FA Series \(Wrapped - Black Marked\)](#)



	<p>Construction:</p> <ul style="list-style-type: none"> • High purity alumina substrate • Nickel alloy thin-film resistive element • Epoxy-resin overcoat • Pre-tinned (Sn100, matte) terminations over Ni barrier is standard (RoHS compliant and Pb Free) 	<p>Features:</p> <ul style="list-style-type: none"> • TCR = ± 50 ppm/$^{\circ}$C • Power up to 1 watt • RoHS compliant (Pb Free) and Halogen Free • High volume production suitable for commercial and special applications
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Description:

These thin film, low resistance, high power chip resistors exhibit excellent performance in resistance, noise performance, surface heat distribution and have a lower surface temperature. They are useful in many current sensing applications. These component feature wraparound electrodes and a black colored top surface with white/gray orientation bar.

Product Dimensions:

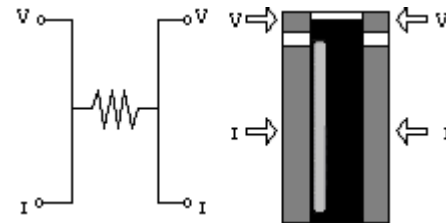
	<table border="1"> <thead> <tr> <th>Dimension</th> <th>Specification</th> </tr> </thead> <tbody> <tr> <td>L</td> <td>0.063 \pm 0.008</td> </tr> <tr> <td>W</td> <td>0.126 \pm 0.008</td> </tr> <tr> <td>t</td> <td>0.020 \pm 0.006</td> </tr> <tr> <td>S1</td> <td>0.094 \pm 0.006</td> </tr> <tr> <td>S2</td> <td>0.020 \pm 0.006</td> </tr> <tr> <td>S3</td> <td>0.012 \pm 0.006</td> </tr> </tbody> </table>	Dimension	Specification	L	0.063 \pm 0.008	W	0.126 \pm 0.008	t	0.020 \pm 0.006	S1	0.094 \pm 0.006	S2	0.020 \pm 0.006	S3	0.012 \pm 0.006	<table border="1"> <thead> <tr> <th>Dimension</th> <th>Specification</th> </tr> </thead> <tbody> <tr> <td>B1</td> <td>0.102 \pm 0.008</td> </tr> <tr> <td>B2</td> <td>0.012 \pm 0.004</td> </tr> <tr> <td>B3</td> <td>0.012 \pm 0.006</td> </tr> <tr> <td>B4</td> <td>0.024 \pm 0.008</td> </tr> <tr> <td>B5</td> <td>0.016 \pm 0.004</td> </tr> <tr> <td>B6</td> <td>0.008 \pm 0.006</td> </tr> </tbody> </table>	Dimension	Specification	B1	0.102 \pm 0.008	B2	0.012 \pm 0.004	B3	0.012 \pm 0.006	B4	0.024 \pm 0.008	B5	0.016 \pm 0.004	B6	0.008 \pm 0.006
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Note: All dimensions in inches

Product Construction & Marking: (refer to callouts in diagram above)

- 1 = Substrate (96% Alumina)
 - 2 = Resistor Film (Ni Alloy)
 - 3 = Terminals (100% Matte Sn)
 - 4 = Protection Coating (Epoxy Resin)
 - 5 = Marking (Epoxy Resin)
- Marking will consist of an orientation marker only

Schematic:



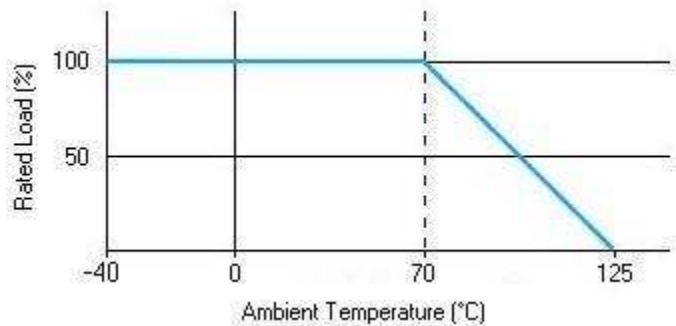
Part Numbering: CPA0612QR005FA* (*Note: T&R package quantity (-T50) will be appended by us to the end of the part number)

Product Designator	Ceramic Type	English Size (Metric Size)	Temp. Coefficient of Resistance (TCR)	Resistance Value *	Tolerance	Serial Code
CP	A = Alumina	0612 (1632)	Q = ± 50 ppm/ $^{\circ}$ C	Ex. R005 = 0.005 Ω	F = $\pm 1\%$	A = Black top surface / Wraparound electrodes

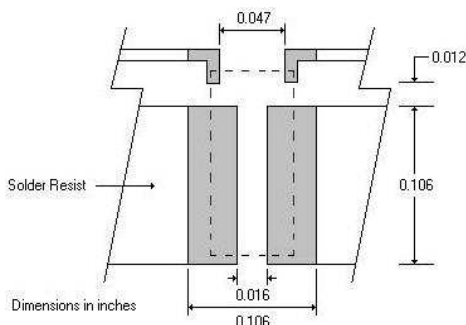
*Note: For resistance values with single milliohm increments, use "R" to specify the decimal point (i.e. R005=0.005 Ω). For resistance values with 1/2 milliohm increments, use "M" to specify the decimal point. For products under 10 milliohm, the "M" will be in the second position (i.e. 7M50 = 7.50m Ω), and for products above 10 milliohms, the "M" will be in the third position (i.e. 10M5 = 10.5m Ω).

Electrical Specifications:

Type	CPA0612-FA
English Size	0612
Metric Size	1632
Power	Up to 1 watt
Rated Voltage	$\sqrt{\text{Power} \times \text{Resistance}}$
Resistance Tolerance	$\pm 1\%$
Standard Resistance Values	0.005 Ω , 0.007 Ω , 0.0075 Ω , 0.010 Ω , 0.020 Ω
TCR ppm/ $^{\circ}\text{C}$ (code)	± 50 ppm/ $^{\circ}\text{C}$ (Q)
Operating Temperature	-40 $^{\circ}\text{C}$ ~ +125 $^{\circ}\text{C}$
Maximum Over Current	45A, 10msec, 10 times Interval of 60 seconds minimum
Packaging	5,000 pcs/reel

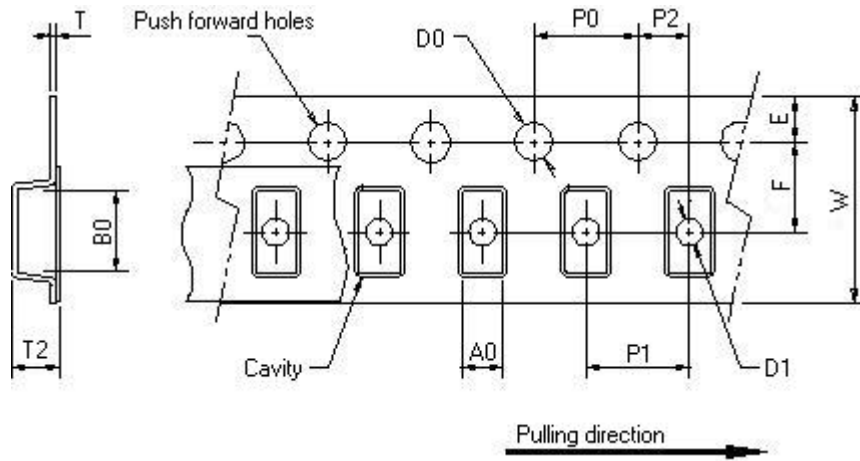
CPA0612 Derating Curve:**Reliability Specifications:**

Test	Test Method	Specification
Short Time Overload	Applied voltage: 1.5X rated voltage. Test duration: 5 seconds	$\pm 1.0\%$
Load Life	Test Temperature: 70 $^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Applied voltage: rated voltage Test period: 1000 hours with power cycling as follows: 90 min. power ON/30 min. power OFF,	$\pm 1.0\%$
Moisture Load Life	Test Condition: 40 $^{\circ}\text{C}/90\%$ RH Applied voltage: rated voltage Test period: 1000 hours with power cycling as follows: 90 min. power ON/30 min. power OFF	$\pm 2.0\%$
Temperature Cycle (Thermal Shock) MIL-STD-202 - Method 107B	Repeat 100 cycles as follows: -65 $^{\circ}\text{C}$ (30 min.) / Room temp (3 min) / +125 $^{\circ}\text{C}$ (30 min.) / Room temp (3 min)	$\pm 1.0\%$
Resistance To Solder Heat	Parts are immersed into a molten solder bath with a temperature of 260 $\pm 5^{\circ}\text{C}$ for a period of 30 ± 1 seconds. Repeat for a total of 2 cycles.	Part must meet initial specifications following testing.
High Temperature Exposure	Test Temperature: 125 $^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Test period: 1000 hours No electrical load	$\pm 1.0\%$
HAST (Highly Accelerated Stress Test - Autoclave)	Test Temperature: 121 $^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Test Pressure: 30 PSIA Test period: 48 hours No electrical load	$\pm 2.0\%$
Terminal Strength AEC-Q200-006	Test Force: 17.7N Duration: 60 ± 1 seconds	$\pm 0.5\%$
Vibration MIL-STD-202 - Method 204D	Frequency: 10 - 2,000Hz Acceleration: 5G Test Duration: 20 mins / 12 Cycles	$\pm 1.0\%$
Mechanical Shock MIL-STD-202 - Method 213	Force: 100G peak Test Duration: 6 milliseconds	$\pm 1.0\%$
Solderability	Dipped into molten solder for 3 ± 1 seconds at 245 $\pm 5^{\circ}\text{C}$	New solder coverage of 90% minimum

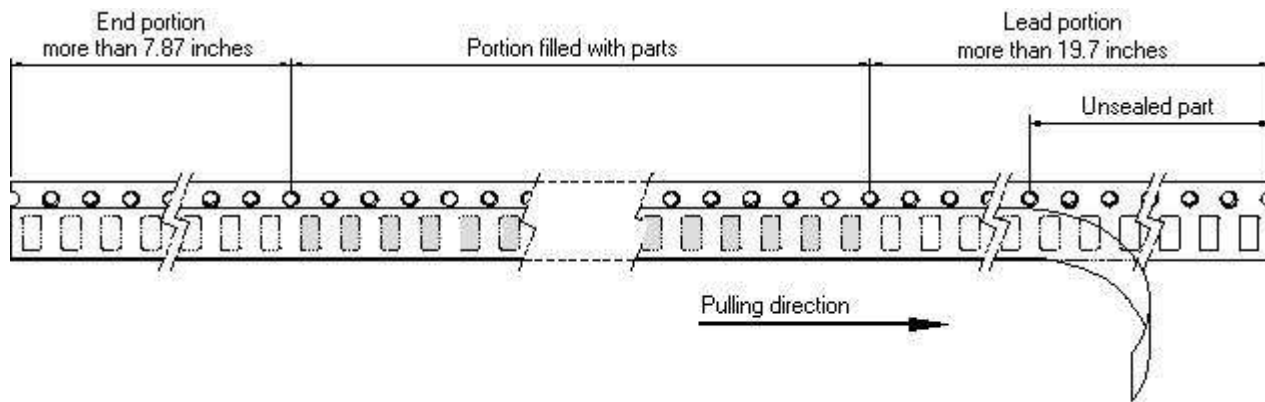
Recommended Land Pattern for Current Sensing:**Notes:**

- 1) Board material: Glass epoxy (FR4), 24 mil board thickness, 4 mil copper thickness
- 2) Board surface temperature shall not exceed 100 $^{\circ}\text{C}$ when applying rated wattage

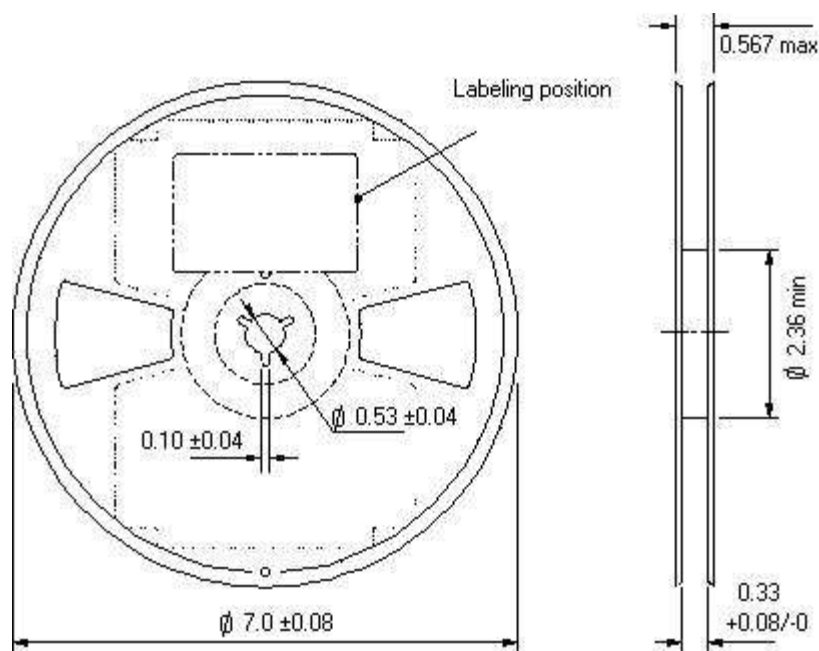
Taping Diagrams:



Symbol	Dimensions (inch)
A0	0.075 ±0.004
B0	0.138 ±0.004
W	0.315 ±0.008
F	0.138 ±0.002
E	0.069 ±0.004
P0	0.157 ±0.004
P1	0.157 ±0.004
P2	0.079 ±0.002
D0	0.061 ±0.002
D1	0.041 ±0.002
T	0.008 ±0.002
T2	0.039 ±0.008

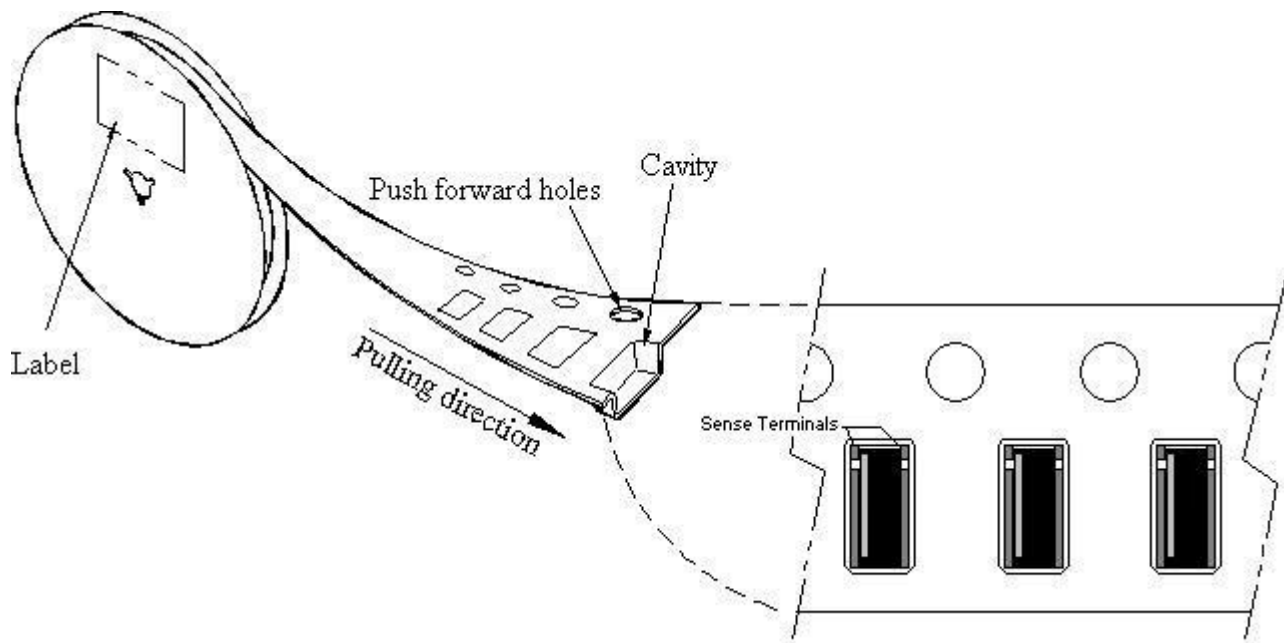


Reel - Labeling Position:



(Unit = inches) Material = Plastic

Taping Direction:



Recommended Soldering Profile:

SOLDERING PROFILE

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate ($T_{s_{max}}$ to T_p)	3 °C/second max.
Preheat	
- Temperature Min ($T_{s_{min}}$)	150 °C
- Temperature Max ($T_{s_{max}}$)	200 °C
- Time ($t_{s_{min}}$ to $t_{s_{max}}$)	60-180 seconds
Time maintained above:	
- Temperature (T_L)	217 °C
- Time (t_L)	60-150 seconds
Peak Temperature (T_p)	260 ±0 °C
Time within 5 °C of actual Peak Temperature (t_p)	20-40 seconds
Ramp-Down Rate	6 °C/second max.
Time 25 °C to Peak Temperature	8 minutes max.

