

Features

- Metal foil
- High power density
- Low inductance <5 nH
- Low thermal EMF <3 $\mu\text{V}/^\circ\text{C}$
- High reliability and stability
- RoHS compliant* and halogen free**

Applications

- Current sensing
- Power supplies
- Stepper motor drives
- Input amplifiers

CFN Series Metal Foil, Current Sense Resistor

Electrical Characteristics

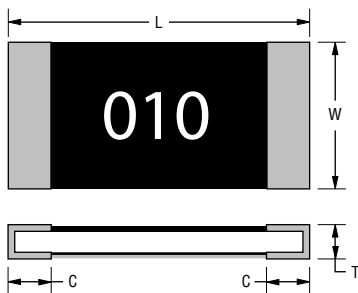
Characteristic	CFN0402	CFN0603	CFN0805	CFN1206
Power Rating @ 70 °C (W)	0.25	0.5	0.75	1
Resistance Value (m Ω)	10, 20	5, 10, 20	5, 10, 20, 30	5, 10, 20, 40
Operating Temperature Range (°C)	-55 ~ +125	-55 ~ +155		
Temperature Coefficient of Resistance (ppm/°C)	± 100	$\pm 50, \pm 100$		
Tolerance (%)	$\pm 1, \pm 5$			

Environmental Characteristics

Storage Conditions

Temperature	+5 °C ~ +35 °C
Humidity	40 % ~ 75 %
Shelf Life.....	2 years from manufacturing date
Solder Recommendations.....	Reflow profile (Solder: Sn96.5 / Ag3 / Cu0.5)
Moisture Sensitivity Level.....	1

Product Dimensions



	L	W	C	T
CFN0402	$\frac{1.10 \pm 0.10}{(.043 \pm .004)}$	$\frac{0.55 \pm 0.10}{(.021 \pm .004)}$	$\frac{0.25 \pm 0.20}{(.010 \pm .004)}$	$\frac{0.45 \pm 0.10}{(.017 \pm .004)}$
CFN0603	$\frac{1.60 \pm 0.20}{(.063 \pm .008)}$	$\frac{0.80 \pm 0.20}{(.031 \pm .008)}$	$\frac{0.40 \pm 0.20}{(.016 \pm .008)}$	$\frac{0.60 \pm 0.20}{(.023 \pm .008)}$
CFN0805	$\frac{2.00 \pm 0.20}{(.079 \pm .008)}$	$\frac{1.25 \pm 0.20}{(.049 \pm .008)}$	$\frac{0.40 \pm 0.20}{(.016 \pm .008)}$	$\frac{0.70 \pm 0.20}{(.028 \pm .008)}$
CFN1206	$\frac{3.20 \pm 0.20}{(.126 \pm .008)}$	$\frac{1.60 \pm 0.20}{(.063 \pm .008)}$	$\frac{0.50 \pm 0.20}{(.020 \pm .008)}$	$\frac{0.70 \pm 0.20}{(.028 \pm .008)}$

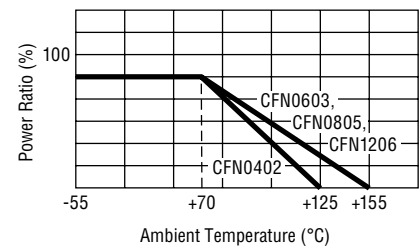
DIMENSIONS: $\frac{\text{MM}}{\text{(INCHES)}}$

Additional Information

Click these links for more information:



Derating Curve



BOURNS®

Asia-Pacific: Tel: +886-2 2562-4117 • Email: asiacus@bourns.com

EMEA: Tel: +36 88 885 877 • Email: eurocus@bourns.com

The Americas: Tel: +1-951 781-5500 • Email: americus@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.

Specifications are subject to change without notice.

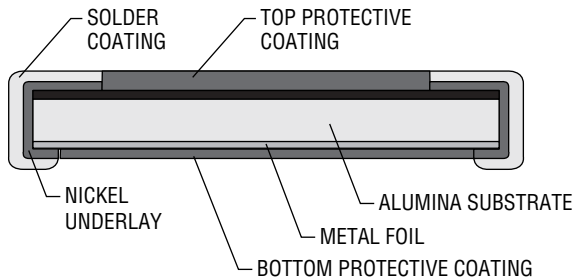
Users should verify actual device performance in their specific applications.

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CFN Series Metal Foil, Current Sensing Chip Resistor

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Construction

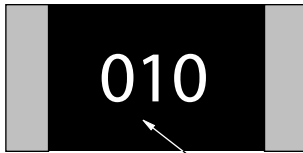


Typical Part Marking

CFN0402 & CFN0603:

No marking.

CFN0805 & CFN1206:



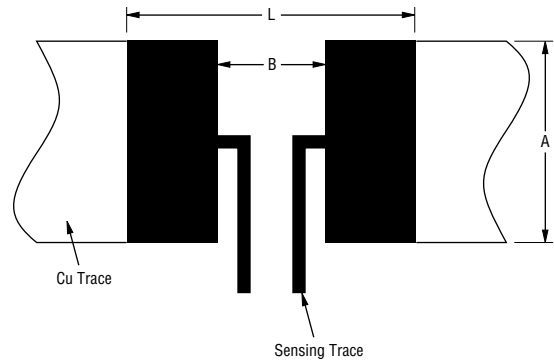
RESISTANCE CODE:
 005 = 5 mΩ
 6.5 = 6.5 mΩ
 010 = 10 mΩ
 020 = 20 mΩ

Popular Resistance Values*

Code	Resistance Value (milliohms)	Model
R005	5	CFN0603
R010	10	CFN0402, 0603, 0805, 1206
R020	20	CFN0402, 0603, 0805, 1206
R030	30	CFN0805
R040	40	CFN1206

*Please consult factory for other resistance values.

Recommended Solder Pad Dimensions



Model	Resistance	A	L	B
CFN0402	$10 \leq R < 20$	$\frac{0.70}{(.027)}$	$\frac{1.20}{(.047)}$	$\frac{0.45}{(.018)}$
CFN0603	$10 \leq R < 20$	$\frac{1.00}{(.039)}$	$\frac{2.80}{(.110)}$	$\frac{0.60}{(.024)}$
CFN0805	$10 \leq R < 30$	$\frac{1.40}{(.055)}$	$\frac{3.20}{(.126)}$	$\frac{1.20}{(.047)}$
CFN1206	$20 \leq R < 30$	$\frac{1.80}{(.071)}$	$\frac{4.70}{(.185)}$	$\frac{1.60}{(.063)}$
	$R = 40$			$\frac{2.20}{(.087)}$

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CFN Series Metal Foil, Current Sensing Chip Resistor

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Solder Reflow Recommendations



Solder Profile	Lead Free Assembly
Average ramp-up rate ($T_{S\text{max}}$ to T_P)	3 °C / second max.
Preheat: - Temperature Min. ($T_{S\text{min}}$) - Temperature Max. ($T_{S\text{max}}$) - Time ($T_{S\text{min}}$ to $T_{S\text{max}}$) (t_s)	150 °C 200 °C 60~150 seconds
Time maintained above: - Temperature (T_L) - Time (T_L)	217 °C 60~120 seconds
Peak Temperature (T_P)	260 °C
Time within +0/-5 °C of actual Peak Temperature (T_P) ²	10 seconds
Ramp-down rate	6 °C / second max.
Time 25 °C to Peak Temperature	8 minutes max.

How to Order

CFN 0805 - F X - R005 E LF

Model _____
CFN = Metal Foil Current Sense Resistor

Size _____
0402 = 0402 Size
0603 = 0603 Size
0805 = 0805 Size
1206 = 1206 Size

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

TCR _____
X = ±100 PPM/°C
Z = ±50 PPM/°C

Resistance Code – (See Popular Resistance Table) _____
"R" (decimal point) followed by three significant digits (example: R005 = 0.005 ohms)

Packaging _____
E = Tape and Reel
4,000 pcs. / 7-inch reel, paper tape (CFN0805, CFN1206)
5,000 pcs. / 7-inch reel, paper tape (CFN0603)
10,000 pcs. / 7-inch reel, paper tape (CFN0402)

Termination _____
LF = Tin-plated (RoHS Compliant)

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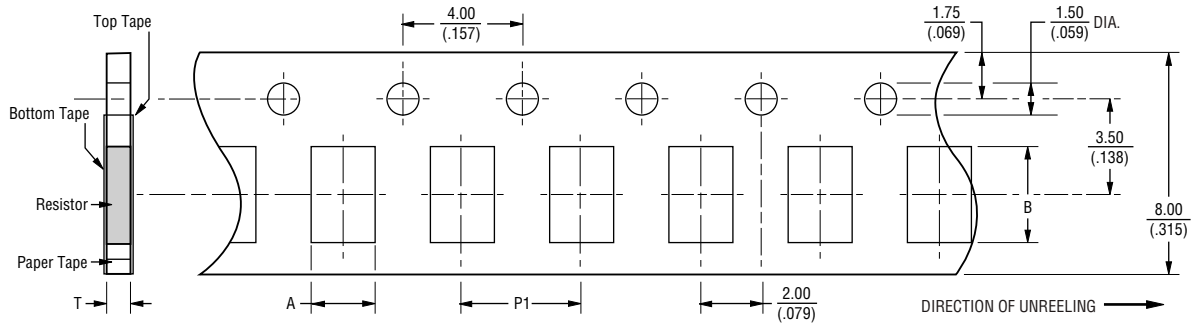
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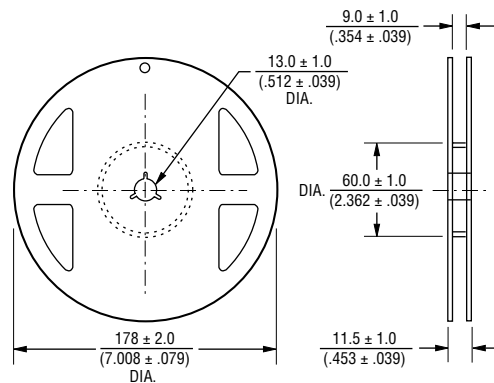
CFN Series Metal Foil, Current Sensing Chip Resistor

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Packaging Dimensions (Conforms to EIA RS-481A)



Model	A	B	P1	T
CFN0402	$\frac{0.75}{(.030)}$	$\frac{1.30}{(.051)}$	$\frac{2.00}{(.079)}$	$\frac{0.65}{(.026)}$
CFN0603	$\frac{1.10}{(.043)}$	$\frac{1.90}{(.075)}$	$\frac{4.00}{(.157)}$	$\frac{0.85}{(.034)}$
CFN0805	$\frac{1.60}{(.063)}$	$\frac{2.40}{(.094)}$		$\frac{1.05}{(.041)}$
CFN1206	$\frac{2.00}{(.079)}$	$\frac{3.60}{(.142)}$		



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Reliability Tests

Test Items	Condition of Test	ΔR Maximum
Load Life	1000 hours at rated power, 70 °C, 1.5 hours "ON", 0.5 hour "OFF"	< ± 1 %
Short Time Overload	5 X rated power for 5 sec.	< ± 1 %
Moisture no Load	85 °C, 85 %RH, 1000 hrs.	< ± 1 %
Temperature Cycle	-55 °C & +155 °C, 100 cycles, 15 min. per extreme condition (CFN0402: -55 °C & +125 °C, 100 cycles)	< ± 1 %
Resistance to Soldering Heat	260 ± 5 °C for 10 ± 1 sec.	< ± 0.5 %
Solderability	245 ± 5 °C, 2 ± 0.5 sec.	At least 95 % of surface area of electrode shall be covered with new solder
High Temperature Exposure	+155 °C, 1000 hrs. (CFN0402: +125 °C, 1000 hrs.)	< ± 1 %
Low Temperature Storage	-55 °C, 1000 hrs.	< ± 1 %
Substrate Bending	Bending width 2 mm	< ± 0.5 %
Insulation Resistance	100 V DC for 1 minute	>100 M Ω

REV. 06/21

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