

## Features

- Metal foil
- High power density
- High reliability and stability
- RoHS compliant\* and halogen free\*\*
- AEC-Q200 Compliant

## Applications

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

## CFN-A Series Metal Foil, Current Sensing Chip Resistor

### Electrical Characteristics

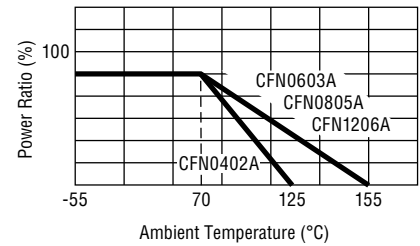
Characteristic	CFN0402A	CFN0603A	CFN0805A	CFN1206A
Power Rating @ 70 °C	0.2 W	0.5 W	0.75 W	1 W
Resistance Value	10 mΩ, 20 mΩ	5 mΩ, 10 mΩ, 20 mΩ	5 mΩ, 10 mΩ, 20 mΩ, 30 mΩ	5 mΩ, 10 mΩ, 20 mΩ, 40 mΩ
Operating Temperature Range	-55 °C ~ +125 °C	-55 °C ~ +155 °C		
Temperature Coefficient of Resistance	±100 ppm/°C	±50 ppm/°C & ±100 ppm/°C		
Tolerance		±1 %, ±5 %		

### Additional Information

Click these links for more information:



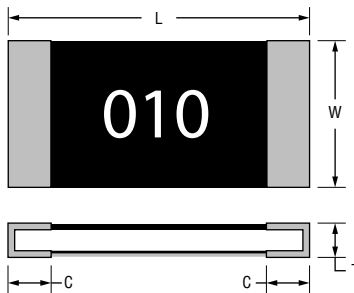
### Derating Curve



### 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	D	t
<b>CFN0402A</b>	$\frac{1.10 \pm 0.10}{(.043 \pm .004)}$	$\frac{0.55 \pm 0.10}{(.021 \pm .004)}$	$\frac{0.25 \pm 0.10}{(.009 \pm .004)}$	$\frac{0.45 \pm 0.10}{(.017 \pm .004)}$
<b>CFN0603A</b>	$\frac{1.60 \pm 0.20}{(.063 \pm .008)}$	$\frac{0.80 \pm 0.20}{(.031 \pm .008)}$	$\frac{0.40 \pm 0.20}{(.016 \pm .008)}$	$\frac{0.60 \pm 0.20}{(.024 \pm .008)}$
<b>CFN0805A</b>	$\frac{2.00 \pm 0.20}{(.079 \pm .008)}$	$\frac{1.25 \pm 0.20}{(.049 \pm .008)}$	$\frac{0.40 \pm 0.20}{(.016 \pm .008)}$	$\frac{0.70 \pm 0.20}{(.028 \pm .008)}$
<b>CFN1206A</b>	$\frac{3.20 \pm 0.20}{(.126 \pm .008)}$	$\frac{1.60 \pm 0.20}{(.063 \pm .008)}$	$\frac{0.50 \pm 0.20}{(.020 \pm .008)}$	$\frac{0.70 \pm 0.20}{(.028 \pm .008)}$

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



### 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.

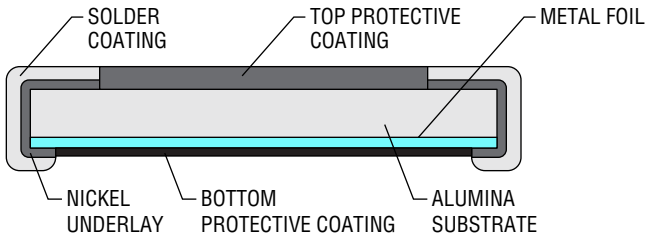
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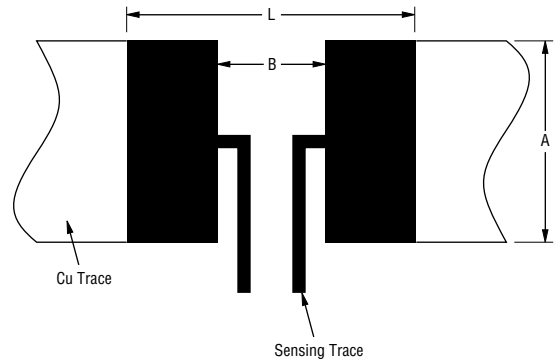
# CFN-A Series Metal Foil, Current Sensing Chip Resistor



## Construction



## Recommended Solder Pad Dimensions



## Marking



CFN0805A  
CFN1206A  
005 = 5 mΩ  
010 = 10 mΩ  
020 = 20 mΩ  
6.5 = 6.5 mΩ

CFN0402A  
CFN0603A  
No Marking

Model		A	L	B
CFN0402A	$10 \leq R \leq 20$	$\frac{0.70}{(.027)}$	$\frac{1.20}{(.047)}$	$\frac{0.45}{(.018)}$
CFN0603A	$10 \leq R \leq 20$	$\frac{1.00}{(.039)}$	$\frac{2.80}{(.110)}$	$\frac{0.60}{(.024)}$
CFN0805A	$10 \leq R \leq 30$	$\frac{1.40}{(.055)}$	$\frac{3.20}{(.126)}$	$\frac{1.20}{(.047)}$
CFN1206A	$20 \leq R \leq 30$	$\frac{1.80}{(.071)}$	$\frac{4.70}{(.185)}$	$\frac{1.60}{(.063)}$
	$R = 40$			$\frac{2.20}{(.087)}$

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

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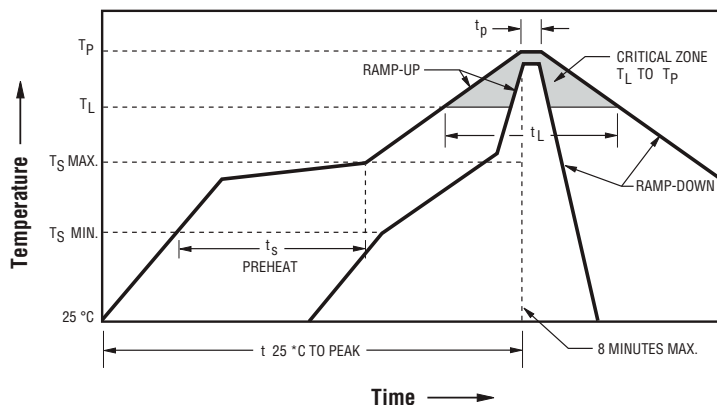
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# CFN-A Series Metal Foil, Current Sensing Chip Resistor



## Solder Reflow Recommendations



Solder Profile	Lead Free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3 °C / second max.
Preheat: - Temperature Min. (T <sub>smin</sub> ) - Temperature Max. (T <sub>smax</sub> ) - Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )	150 °C 200 °C 60~150 seconds
Time maintained above: - Temperature (T <sub>L</sub> ) - Time (T <sub>L</sub> )	217 °C 60~120 seconds
Peak Temperature (T <sub>p</sub> )	260 °C
Time within +0/-5 °C of actual Peak Temperature (T <sub>p</sub> ) <sup>2</sup>	10 seconds
Ramp-down rate	6 °C / second max.
Time 25 °C to Peak Temperature	8 minutes max.

## How to Order

CFN 0805 A 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

Feature \_\_\_\_\_  
 A = AEC-Q200 Compliant

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 (CFN0805A, CFN1206A)  
 5,000 pcs. / 7-inch reel, paper tape (CFN0603A)  
 10,000 pcs. / 7-inch reel, paper tape (CFN0402A)

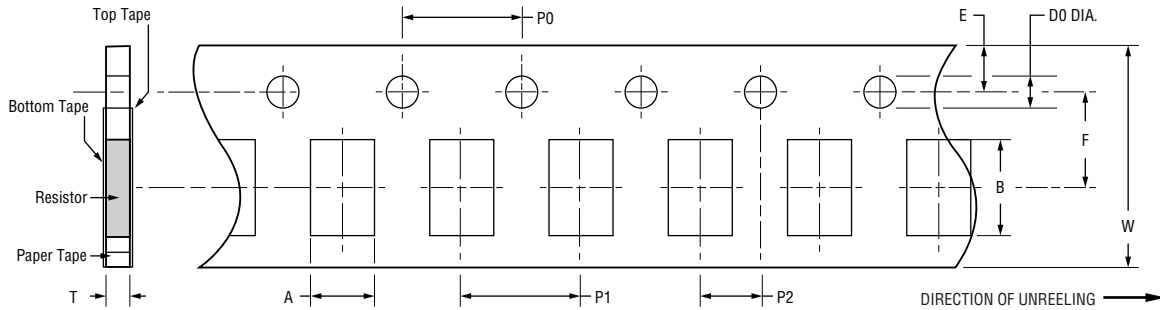
Termination \_\_\_\_\_  
 LF = Tin-plated (RoHS Compliant)

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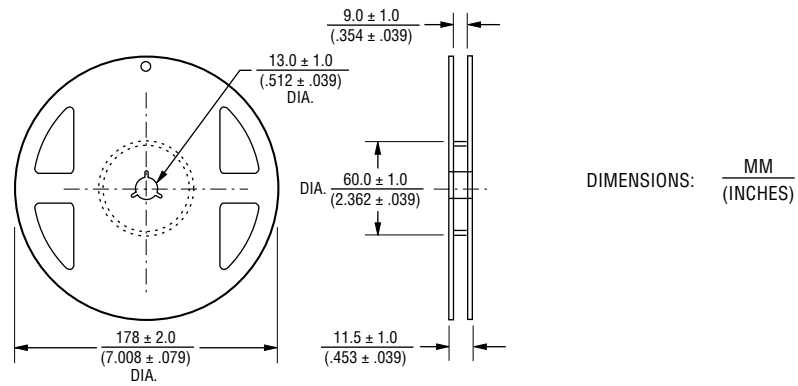
# CFN-A Series Metal Foil, Current Sensing Chip Resistor

**BOURNS®**

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



	A	B	W	F	E	P1	P2	P0	D0	T
CFN0402A	$\frac{0.75}{(.030)}$	$\frac{1.30}{(.051)}$	$\frac{8.00}{(.315)}$	$\frac{3.50}{(.138)}$	$\frac{1.75}{(.069)}$	$\frac{2.00}{(.079)}$	$\frac{2.00}{(.079)}$	$\frac{4.00}{(.157)}$	$\frac{1.50}{(.059)}$	$\frac{0.65}{(.026)}$
CFN0603A	$\frac{1.10}{(.043)}$	$\frac{1.90}{(.075)}$				$\frac{0.85}{(.033)}$				
CFN0805A	$\frac{1.60}{(.063)}$	$\frac{2.40}{(.094)}$				$\frac{1.05}{(.041)}$				
CFN1206A	$\frac{2.00}{(.079)}$	$\frac{3.60}{(.142)}$				$\frac{1.05}{(.041)}$				



**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

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## Reliability Tests

Test Items	Reference Standard	Condition of Test	Test Limits
Temperature Coefficient of Resistance	IEC 60115-1 4.8	+25 ~ 125 °C	Reference item 4
Short Time Overload	IEC 60115-1 4.13	5X rated power for 5 s	< ±1 %
High Temperature Exposure (Storage)	AEC-Q200-REV D-Test 3 MIL-STD-202 Method 108	1000 hrs @ T = 125 °C. Unpowered. Measurement at 24 ±2 hours after test conclusion.	< ±1 %
Temperature Cycling	AEC-Q200-REV D-Test 4 JESD22 Method JA-104	1000 cycles (-55 °C to +125 °C). Measurement at 24 ±4 hours after test conclusion. 30 min. max. dwell time at each temperature extreme. 1 min. max. transition time.	< ±1 %
Moisture Resistance	AEC-Q200-REV D-Test 6 MIL-STD-202 Method 106	T = 24 hours/cycle, 10 cycles. Notes: Steps 7a & 7b not required. Unpowered.	< ±1 %
Biased Humidity	AEC-Q200-REV D-Test 7 MIL-STD-202 Method 103	1000 hours 85 °C / 85 % RH. Note: Specified conditions: 10 % of operating power (not exceeding max. working voltage). Measurement at 24 ±2 hours after test conclusion.	< ±1 %
Operational Life	AEC-Q200-REV D-Test 8 MIL-STD-202 Method 108	1000 hours T <sub>A</sub> = 125 °C at 35 % rated power. Measurement at 24 ±4 hours after test conclusion.	< ±2 %
External Visual	AEC-Q200-REV D-Test 9 MIL-STD-883 Method 2009	Electrical test not required. Inspect device construction, marking and workmanship.	
Physical Dimensions	AEC-Q200-REV D-Test 10 JESD22 Method JB-100	Verify physical dimensions to the applicable device detail specification. Note: User(s) and Suppliers spec. Electrical test not required.	
Resistance to Solvents	AEC-Q200-REV D-Test 12 MIL-STD-202 Method 215	a: Isopropyl Alcohol : Mineral Spirits = 1 : 3 b: Terpene Defluxer (Bioact EC-7R) c: Deionized Water : Propylene Glycol Monomethyl Ether : monoethanolamine 42 : 1 : 1	Marking and protective layer cannot be detached
Mechanical Shock	AEC-Q200-REV D-Test 13 MIL-STD-202 Method 213	Wave Form: Tolerance for half sine shock pulse. Peak value is 100 g's. Normal duration (D) is 6 ms	< ±1.0 %
Vibration	AEC-Q200-REV D-Test 14 MIL-STD-202 Method 204	5 g's for 20 min., 12 cycles each of 3 orientations. Note: Test from 10-2000 Hz.	< ±1.0 %
Resistance to Soldering Heat	AEC-Q200-REV D-Test 15 MIL-STD-202 Method 210	Condition B: Immerse the specimens in an eutectic solder at 260 ±5 °C for 10 ±1 s.	< ±0.5 %
Thermal Shock	AEC-Q200-REV D-Test 16 MIL-STD-202 Method 107	-55 °C / +155 °C. Note: Number of cycles required: 300, Maximum transfer time: 20 s, Dwell time: 15 minutes, Air - Air	< ±1.0 %
ESD	AEC-Q200-REV D-Test 17 AEC-Q200-002 or ISO/DIS 10605	Verify the voltage setting at 500 V	< ±1.0 %
Solderability	AEC-Q200-REV D-Test 18 J-STD-202	Method B, aging 4 hours @ 155 °C dry heat. Lead-free solder bath @ 235 ±3 °C Dipping time: 3 ±0.5 seconds.	> 95 % area covered with tin
Flammability	AEC-Q200-REV D-Test 20 UL 94	V-0 or V-1 are acceptable. Electrical test not required.	V-0 or V-1
Board Flex (Bending)	AEC-Q200-REV D-Test 21 AEC-Q200-005	The duration of the applied forces shall be 60 +5 seconds 3 mm deflection (RLS06 ~ RLS 12) 2 mm deflection (RLS 25)	< ±1.0 %
Terminal Strength (SMD)	AEC-Q200-REV D-Test 22 AEC-Q200-006	Force of 1.8 kg for 60 seconds Remarks: 0201-NA	< ±1.0 %

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