

# 449 Series

## NANO2® > Slo-Blo®



### Description

The lead free NANO2® Slo-Blo® fuse is RoHS compliant, Halogen Free and 100% lead-free. This product is fully compatible with lead-free solder alloys and higher temperature profiles associated with lead-free assembly. The Slo-Blo® fuse design has enhanced inrush withstand characteristics over the NANO2® Fast-Acting Fuse. The unique time delay feature of this fuse design helps solve the problem of nuisance “opening” by accommodating inrush currents that normally cause a fast-acting fuse to open.

### Features & Benefits

- Lead-free, Halogen free and RoHS compliant
- Small size
- Wide range of current ratings available
- Wide operating temperature range
- UL Recognized to UL/CSA/NMX UL 248-1 and UL/CSA/NMX UL 248-14
- Conforms to DENAN's Appendix 3

### Additional Information



Resources



Accessories



Samples

### Agency Approvals

Agency	Agency File Number	Ampere Range
	E10480	0.375A - 5A
	NBK030205-E10480B	1A - 5A
	N/A	0.375A - 5A
	N/A	0.375A - 5A

### Electrical Characteristics for Series

% of Ampere Rating	Opening Time
100%	4 hours, Minimum
200%	1 sec., Min.; 60 sec., Max.
300%	0.2 sec., Min.; 3 sec., Max
800%	0.002 sec., Min.; 0.1 sec., Max.

### Electrical Specifications by Item

Ampere Rating (A)	Amp Code	Max Voltage Rating (V)	Interrupting Rating	Nominal Cold Resistance (Ohms)	Nominal Melting I <sup>2</sup> t (A <sup>2</sup> sec)	Agency Approvals			
						UK CA	CE	c UL US	PS E
0.375	.375	125	50A @125 VAC/VDC PSE: 100A @100 VAC	1.5130	0.088	x	x	x	-
0.500	.500	125		0.7633	0.258	x	x	x	-
0.750	.750	125		0.4080	0.847	x	x	x	-
1.00	001.	125		0.2516	1.76	x	x	x	x
1.50	01.5	125		0.1186	4.70	x	x	x	x
2.00	002.	125		0.0708	6.76	x	x	x	x
2.50	02.5	125		0.0400	13.18	x	x	x	x
3.00	003.	125		0.0352	19.55	x	x	x	x
3.50	03.5	125		0.0261	32.70	x	x	x	x
4.00	004.	125		0.0227	40.80	x	x	x	x
5.00	005.	125	0.0171	59.59	x	x	x	x	

Notes - I<sup>2</sup>t calculated at 8ms. Resistance is measured at 10% of rated current, 25°C

### Applications

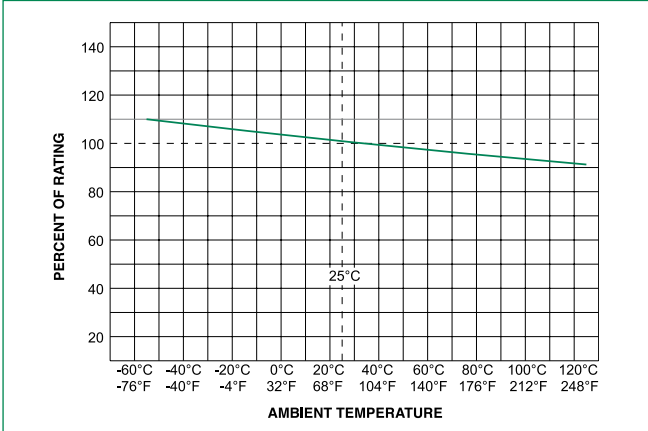
Secondary protection for space constrained applications:

- Notebook PC
- LCD/PDP TV
- LCD monitor
- LCD/PDP panel
- LCD backlight inverter
- Portable DVD player
- Power supply
- Networking
- PC server
- Cooling fan system
- Storage system
- Telecom system
- Wireless basestation
- White goods
- Game console
- Office Automation equipment
- Battery charging circuit protection
- Industrial equipment

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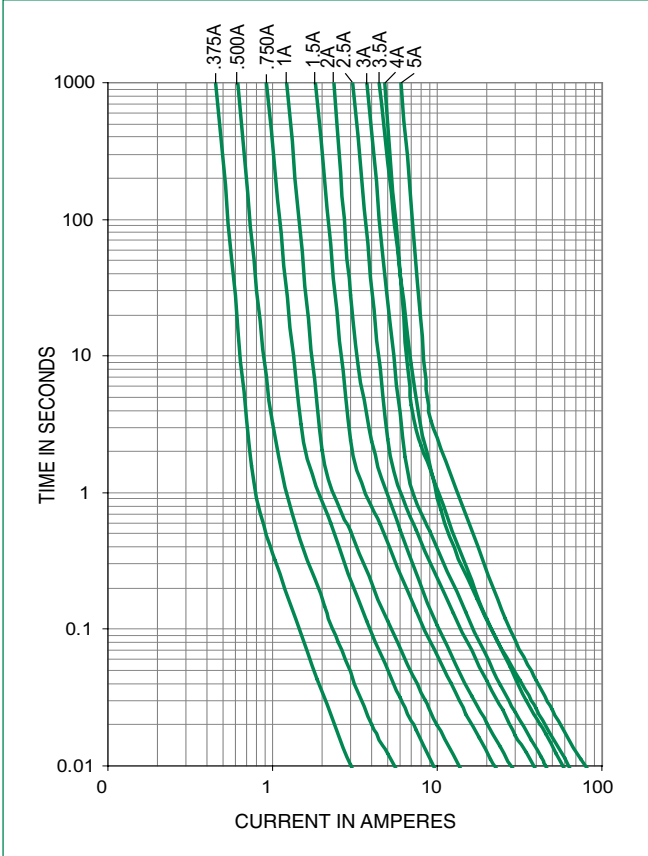
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### Temperature Re-rating Curve



**Note:**  
1. Rerating depicted in this curve is in addition to the standard derating of 25% for continuous operation.

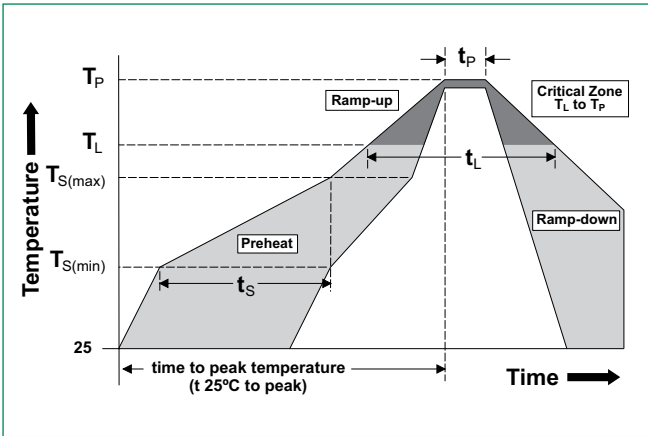
### Average Time Current Curves



### Soldering Parameters

<b>Reflow Condition</b>		Pb – Free assembly
<b>Pre Heat</b>	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (Min to Max) ( $t_s$ )	60 – 180 secs
<b>Average ramp up rate (Liquidus Temp (<math>T_L</math>) to peak)</b>		3°C/second max.
<b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>		3°C/second max.
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Temperature ( $t_L$ )	60 – 150 seconds
<b>Peak Temperature (<math>T_p</math>)</b>		260 <sup>+0/-5</sup> °C
<b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>		20 – 40 seconds
<b>Ramp-down Rate</b>		5°C/second max.
<b>Time 25°C to peak Temperature (<math>T_p</math>)</b>		8 minutes max.
<b>Do not exceed</b>		260°C

<b>Wave Soldering Parameters</b>	260°C Peak Temperature, 3 seconds max.
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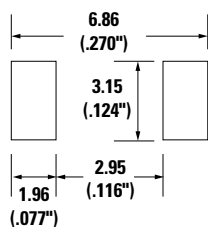
### Product Characteristics

<b>Materials</b>	<b>Body:</b> Ceramic <b>Terminations:</b> Gold-plated Caps
<b>Product Marking</b>	Brand, Amperage Rating
<b>Operating Temperature</b>	-55°C to 125°C
<b>Moisture Sensitivity Level</b>	Level 1, J-STD-020
<b>Solderability</b>	MIL-STD-202, Method 208
<b>Insulation Resistance (after Opening)</b>	MIL-STD-202, Method 302, Test Condition A (10,000 ohms minimum)

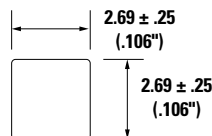
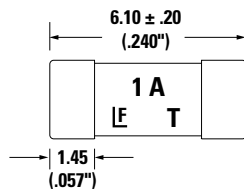
<b>Thermal Shock</b>	MIL-STD-202, Method 107, Test Condition B, 5 cycles, -65°C to 125°C, 15 minutes @ each extreme
<b>Mechanical Shock</b>	MIL-STD-202, Method 213, Test I: Deenergized. 100G's pk amplitude, sawtooth wave 6ms duration, 3 cycles XYZ+xyz = 18 shocks
<b>Vibration</b>	MIL-STD-202, Method 201: 0.03" amplitude, 10-55 Hz in 1 min. 2hrs each XYZ=6hrs
<b>Moisture Resistance</b>	MIL-STD-202, Method 106, 10 cycles
<b>Salt Spray</b>	MIL-STD-202, Method 101, Test Condition B (48hrs)
<b>Resistance to Soldering Heat</b>	MIL-STD-202, Method 210, Test condition B (10 sec at 260°C)

### Dimensions

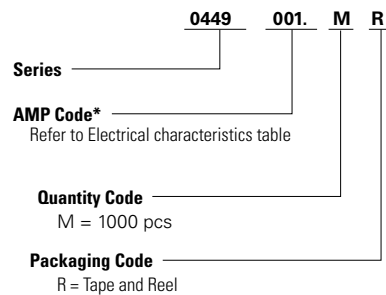
mm (inches)



Recommended pad layout



### Part Numbering System



**\*Example:**  
0.375 Amp product is 0449\_375MR (1 amp product shown above).

### Packaging

Packaging Option	Packaging Specification	Quantity	Quantity & Packaging Code
12mm Tape and Reel	EIA RS-481-2 IEC 60286-3	1000	MR

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