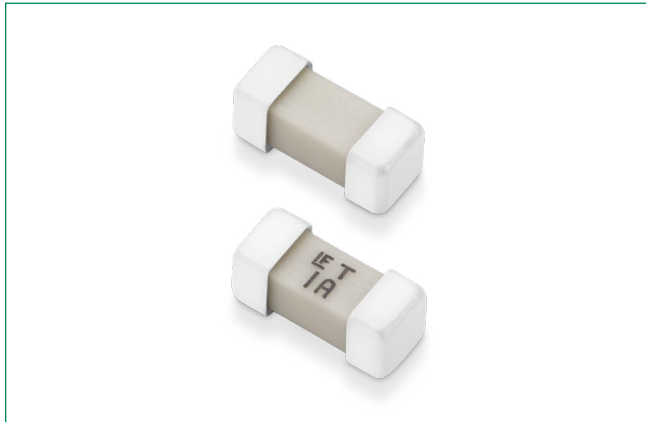


# 452/454 Series

## NANO<sup>2</sup>® > Slo-Blo<sup>®</sup> Fuse



### Web Resources



Download ECAD models, order samples, and find technical resources at [www.littelfuse.com/452](http://www.littelfuse.com/452)



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### Agency Approvals

Agency	Agency File Number	Ampere Range
	E10480	0.375A - 12A
	29862	0.375A - 12A
	NBK030205-E10480B	1A - 5A
	J50515033	0.375A - 5A, 6.3A, 10A
	N/A	0.375A - 5A, 6.3A, 10A
	N/A	0.375A - 5A, 6.3A, 10A

### Description

The NANO<sup>2</sup> Slo-Blo<sup>®</sup> fuse has enhanced inrush withstand characteristics over the NANO<sup>2</sup> 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

- Small size
- Wide range of current rating available (0.375A to 12A)
- Wide operating temperature range
- RoHS compliant and Halogen Free
- UL Recognized to UL/CSA/NMX UL 248-1 and UL/CSA/NMX UL 248-14
- Conforms to DENAN's Appendix 3
- Conforms to EN 60127-1 and EN 60127-7
- CE Mark indicates suitability for the European Market
- UKCA Mark indicates suitability for the UK Market

### Applications

- Notebook PC
- LCD/PDPTV
- 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

### 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.

# 452/454 Series

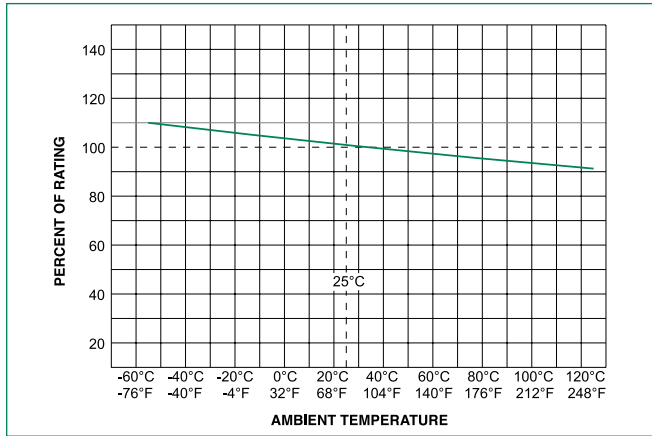
## NANO<sup>2</sup>® > Slo-Blo<sup>®</sup> Fuse

### 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					
						UL US	SP	PE	△	CE	UK CA
0.375	.375	125	50A @ 125 VAC/VDC 300A @ 32 VDC PSE: 100A @ 100 VAC	1.2000	0.101	x	x	-	x	x	x
0.500	.500	125		0.7000	0.240	x	x	-	x	x	x
0.750	.750	125		0.3600	0.904	x	x	-	x	x	x
001.	001.	125		0.2250	1.98	x	x	x	x	x	x
1.50	01.5	125		0.0930	3.65	x	x	x	x	x	x
2.00	002.	125		0.0625	8.20	x	x	x	x	x	x
2.50	02.5	125		0.0450	15.0	x	x	x	x	x	x
3.00	003.	125		0.0340	20.16	x	x	x	x	x	x
3.50	03.5	125		0.0224	26.53	x	x	x	x	x	x
4.00	004.	125		0.0186	34.40	x	x	x	x	x	x
5.00	005.	125		0.0136	53.72	x	x	x	x	x	x
6.30	06.3	75	50A @ 72 VAC 50A @ 60 VDC 100A @ 75 VDC	0.0123	64.0	x	x	-	x	x	x
7.00	007.	75		0.0105	123.83	x	x	-	-	x	x
8.00	008.	75		0.0088	137.34	x	x	-	-	x	x
10.0	010.	75		0.0080	195.0	x	x	-	x	x	x
12.0	012.	75		0.0061	260.46	x	x	-	-	x	x

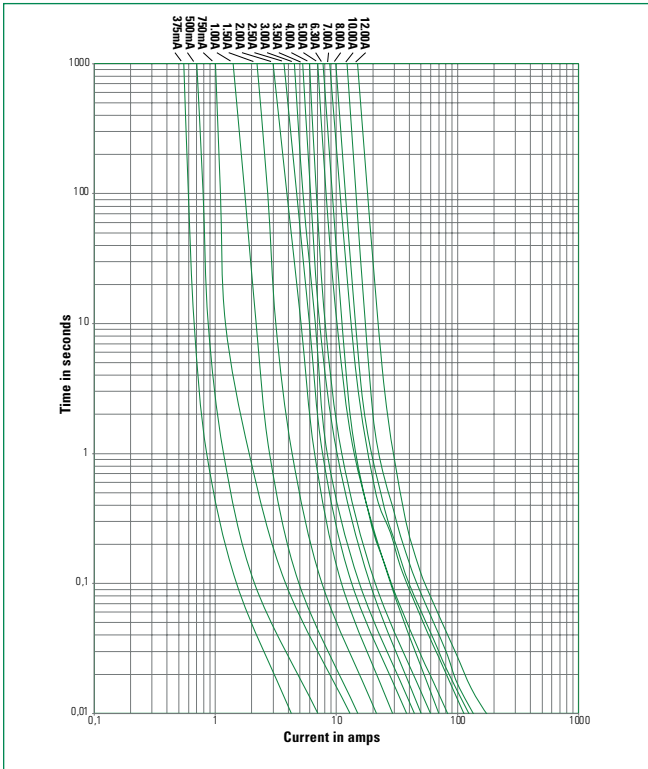
Notes: - I<sup>2</sup>t calculated at 8ms.  
- Resistance is measured at 10% of rated current, 25°C

### 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



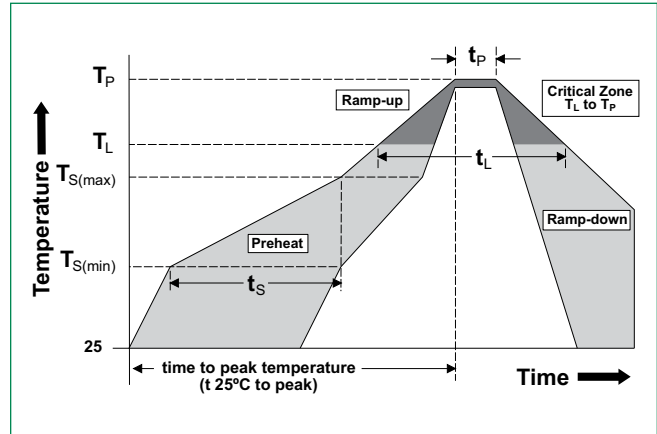
# 452/454 Series

## NANO<sup>2</sup>® > Slo-Blo<sup>®</sup> Fuse

### 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>		5°C/second max.
<b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>		5°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

**Wave Soldering Parameters** 260°C Peak Temperature, 3 seconds max.



### Product Characteristics

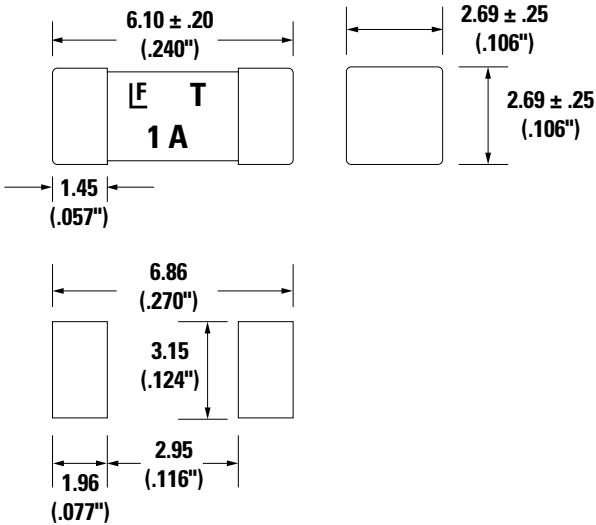
<b>Materials</b>	<b>Body:</b> Ceramic <b>Terminations:</b> Gold-plated Caps / Sn-dipped Silver Plated Caps (452 Series) Silver-plated Caps (454 Series)
<b>Product Marking</b>	Brand, Ampere Rating
<b>Operating Temperature</b>	-55°C to 125°C
<b>Moisture Sensitivity Level</b>	Level 1, J-STD-020
<b>Solderability</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 / +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)

# 452/454 Series

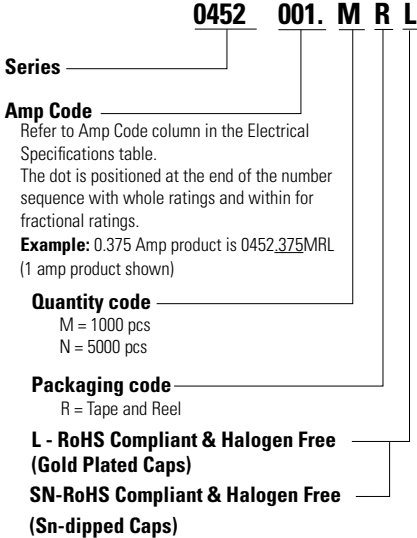
## NANO<sup>2</sup>® > Slo-Blo<sup>®</sup> Fuse

### Dimensions



**Recommended pad layout**

### Part Numbering System



**Notes:**  
452 series may be ordered as "RoHS and HF (Gold Plated Caps)" ("L" suffix).  
454 series is available only as "RoHS and HF" version and does not require "L" suffix.  
Please do not include "L" suffix within 454 series ordering instructions.

### Packaging

Packaging Option	Packaging Specification	Quantity	Quantity & Packaging Code
12mm Tape and Reel	EIA-481 IEC 60286-3	5000	NR
12mm Tape and Reel	EIA-481 IEC 60286-3	1000	MR

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