

# Surface Mount Fuses

## Subminiature Surface Mount

### RoHS NANO<sup>2</sup> Slo-Blo<sup>®</sup> Fuse 452/454 Series



The NANO<sup>2</sup> Slo-Blo 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.

- 452 Series **RoHS Compliant** version now available, use ordering suffix ‘L’ (see example on data sheet).

#### ELECTRICAL CHARACTERISTICS:

% of Ampere Rating	Opening Time
100%	4 hours, <b>Minimum</b>
200%	1 second, <b>Min.</b> ; 60 seconds, <b>Max.</b>
300%	0.2 seconds, <b>Min.</b> ; 3 seconds, <b>Max.</b>
800%	0.02 seconds, <b>Min.</b> ; 0.1 seconds, <b>Max.</b>

**AGENCY APPROVALS:** Recognized under the Components Program of Underwriters Laboratories and Certified by CSA.

**AGENCY FILE NUMBERS:** UL E10480, CSA LR 29862.

#### INTERRUPTING RATINGS:

50 amperes at 125 VAC/VDC; 300 amperes at 32 VDC

#### ENVIRONMENTAL SPECIFICATIONS:

**Operating Temperature:** -55°C to 125°C.

**Shock:** MIL-STD-202, Method 213, Test Condition I (100 G's peak for 6 milliseconds).

**Vibration:** MIL-STD-202, Method 201 (10–55 Hz, .06 in. total excursion).

**Salt Spray:** MIL-STD-202, Method 101, Test Condition B (48 hrs.).

**Insulation Resistance (After Opening):** MIL-STD-202, Method 302, Test Condition A, (10,000 ohms minimum).

**Resistance to Soldering Heat:** MIL-STD-202, Method 210, (3 sec. at 260°C).

**Thermal Shock:** MIL-STD-202, Method 107, Test Condition B (-65 to 125°C).

**Moisture Resistance:** MIL-STD-202, Method 106, High Humidity (90-98 RH), Heat (65°C).

#### PHYSICAL SPECIFICATIONS:

**Materials:** Body: Ceramic

Terminations: Tin-Lead Alloy

RoHS Compliant Terminations: Gold over Nickel Plated Caps(452)  
Silver Plated Caps(454)

#### Soldering Parameters:

Wave Solder — 260°C, 3 seconds maximum

Reflow Solder — 260°C, 30 seconds maximum

**Solderability:** MIL-STD-202, Method 208.

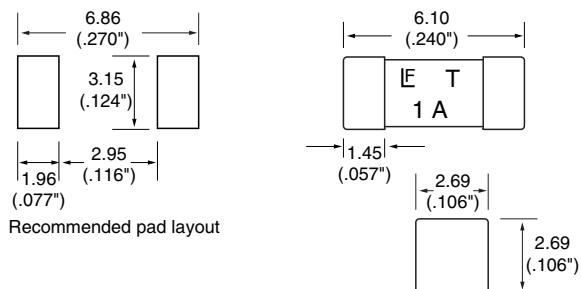
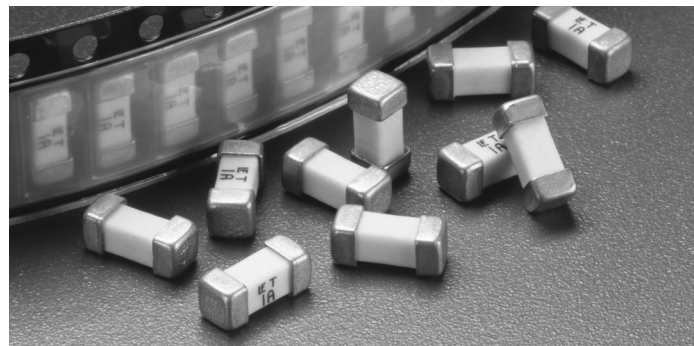
**PACKAGING SPECIFICATIONS:** 12mm Tape and Reel per EIA-RS481-1 (IEC 286, part3); 1,000 pieces per reel, add packaging suffix, MR; 5,000 per reel, add packaging suffix NR.

**Options:** For RoHS Compliant 452 series add the letter ‘L’ to end of packaging suffix. Example: 0452001.MRL (RoHS Compliant 1A, 1,000 per reel).

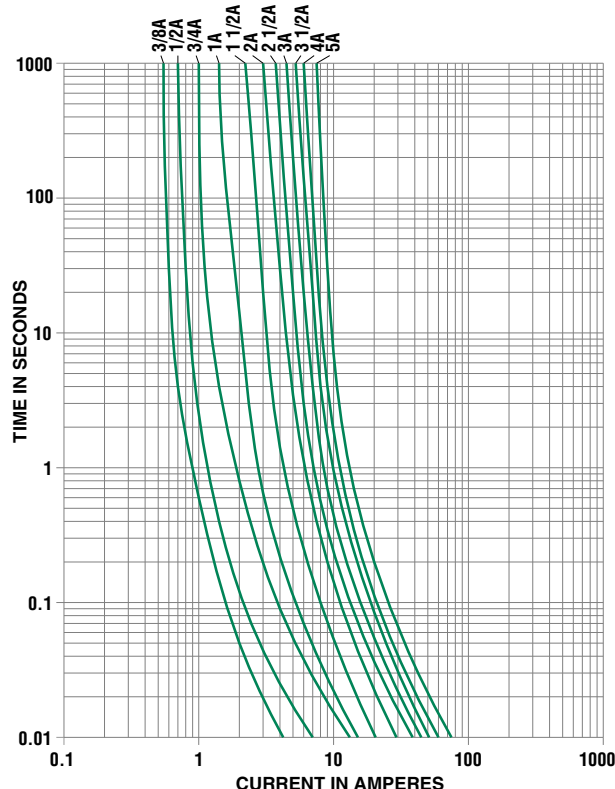
#### PATENTED

#### ORDERING INFORMATION:

Tin-Lead Plated Catalog #	Silver Plated Catalog #	Ampere Rating	Voltage Rating	Nominal Resistance Cold Ohms	Nominal Melting I <sup>2</sup> t A <sup>2</sup> Sec.
0452.375	0454.375	3/8	125	1.20	0.101
0452.500	0454.500	1/2	125	0.700	0.240
0452.750	0454.750	3/4	125	0.360	0.904
0452 001.	0454 001.	1	125	0.225	1.98
0452 01.5	0454 01.5	1 1/2	125	0.0930	3.65
0452 002.	0454 002.	2	125	0.0625	8.20
0452 02.5	0454 02.5	2 1/2	125	0.0450	15.0
0452 003.	0454 003.	3	125	0.0340	20.16
0452 03.5	0454 03.5	3 1/2	125	0.0224	26.53
0452 004.	0454 004.	4	125	0.0186	34.40
0452 005.	0454 005.	5	125	0.0136	53.72



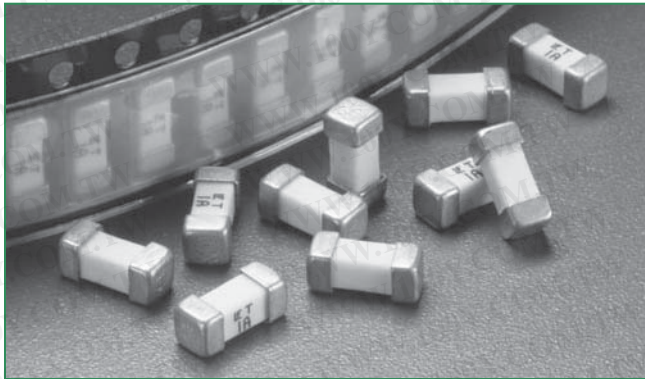
#### Average Time Current Curves






Refer to pg. 271 for SMF Omni-Blok<sup>®</sup> Holder, Series 154 000T.

10  
SURFACE MOUNT FUSES

**RoHS HF 452/454 Series Fuse**



### Agency Approvals

AGENCY	AGENCY FILE NUMBER	AMPERE RANGE
	E10480	375mA - 7A
	LR29862	375mA - 7A
	NBK030205-E10480B	1A - 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%	0.02 sec., Min.; 0.1 sec., Max.

### Description

The NANO<sup>2</sup> Slo-Blo® 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

- Time-Lag (Slo-Blo)
- Small size
- Wide range of current rating available (375mA to 5A)
- Wide operating temperature range
- Low temperature de-rating
- RoHS compliant
- Halogen Free

### Applications

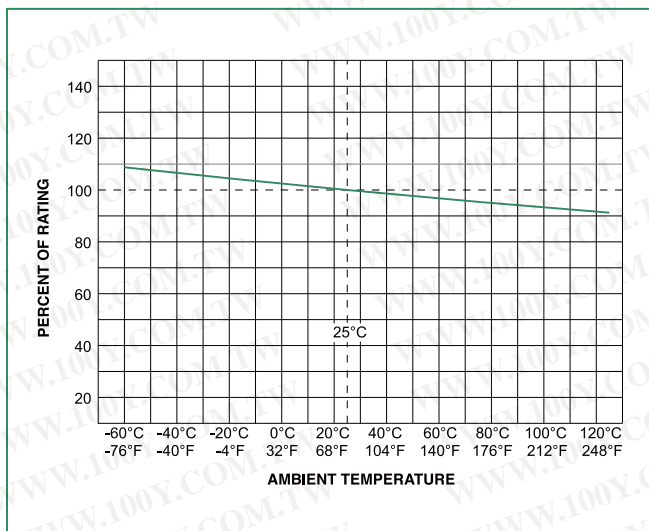
- Notebook PC
- LCD/PDP TV
- LCD monitor
- LCD/PDP panel
- LCD backlight inverter
- Portable DVD player
- Power supply
- Networking
- PC server
- Cooling fan system
- Storage system
- Telecom system
- Wireless basestation
- White goods
- Game console
- Office Automation equipment
- Battery charging circuit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

### 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			
									
0.375	.375	125	50 amperes @ 125 VAC/VDC 300 amperes @ 32 VDC PSE: 100 amperes @ 100 VAC	1.2000	0.101	x	x		
0.500	.500	125		0.7000	0.240	x	x		
0.750	.750	125		0.3600	0.904	x	x		
001.	001.	125		0.2250	1.98	x	x	x	
1.50	01.5	125		0.0930	3.65	x	x	x	
2.00	002.	125		0.0625	8.20	x	x	x	
2.50	02.5	125		0.0450	15.0	x	x	x	
3.00	003.	125		0.0340	20.16	x	x	x	
3.50	03.5	125		0.0224	26.53	x	x	x	
4.00	004.	125		0.0186	34.40	x	x	x	
5.00	005.	125		0.0136	53.72	x	x	x	
7.00	007.	72		50 amperes @ 72 VAC 50 amperes @ 60 VDC	0.0105	123.83	x	x	

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

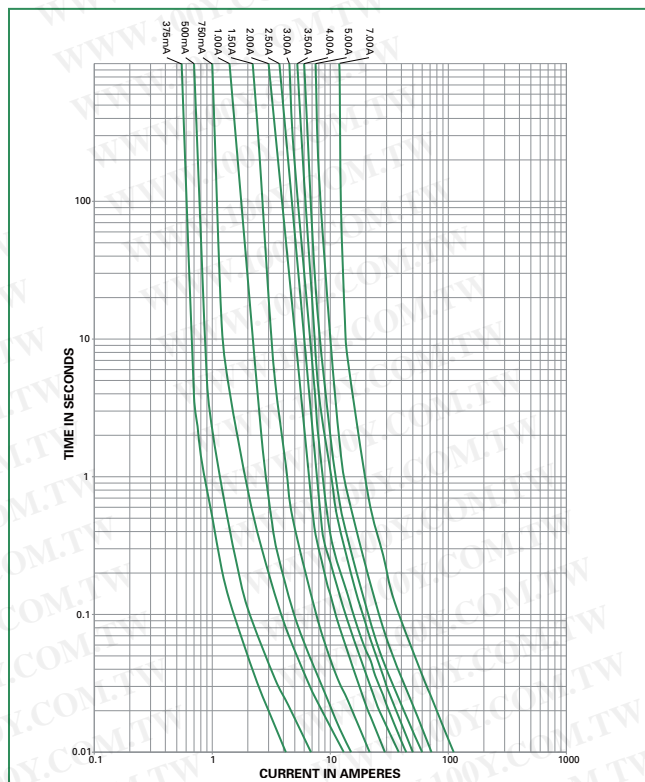
### Temperature Derating Curve



Note:

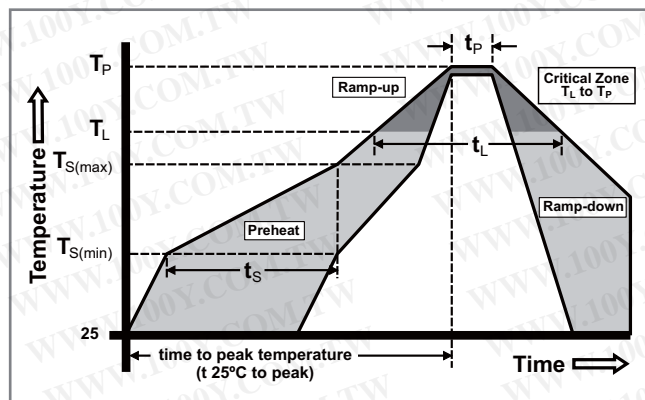
- Derating depicted in this curve is in addition to the standard derating of 25% for continuous operation.

### Average Time Current Curves



### Soldering Parameters

Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (Min to Max) ( $t_s$ )	60 – 120 secs
Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak)		5°C/second max.
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		5°C/second max.
Reflow	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Temperature ( $t_l$ )	60 – 90 seconds
Peak Temperature ( $T_p$ )		250 <sup>+0/-5</sup> °C
Time within 5°C of actual peak Temperature ( $t_p$ )		20 – 40 seconds
Ramp-down Rate		5°C/second max.
Time 25°C to peak Temperature ( $T_p$ )		8 minutes max.
Do not exceed		260°C
Wave Soldering Parameters		260°C Peak Temperature, 3 seconds max.

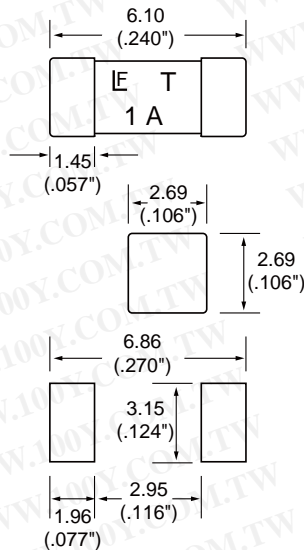


### Product Characteristics

<b>Materials</b>	Body: Ceramic Terminations: Gold-plated Caps (452) / Silver-plated Caps (454)
<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-020C
<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)

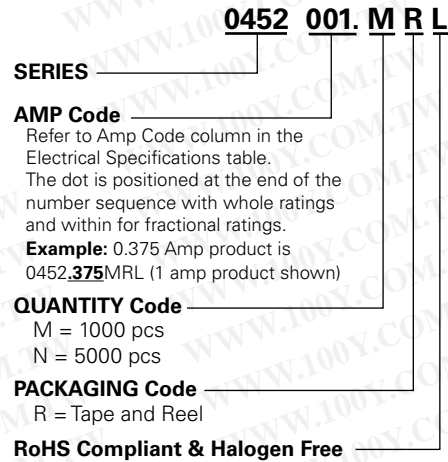
<b>Thermal Shock</b>	MIL-STD-202, Method 107, Test Condition B, 5 cycles, -65°C / +125°C, 15 minutes @ each extreme
<b>Mechanical Shock</b>	MIL-STD-202, Method 213, Test I: Deenergized. 100G's pk amplitude, sawtooth wave 6ms duration, 3 cycles XYZ+xyz = 18 shocks
<b>Vibration</b>	MIL-STD-202, Method 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)

### Dimensions



Recommended pad layout

### Part Numbering System



**NOTE: "L" suffix applies to 452 series only**

452 series may be ordered as either "RoHS and HF" ("L" suffix) or non-RoHS (no suffix) version.  
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 RS-481-1 (IEC 286, part 3)	5000	NR
12mm Tape and Reel	EIA RS-481-1 (IEC 286, part 3)	1000	MR

勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-34970699  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)