

# 449 Series

## NANO2® > Slo-Blo®



### 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 I²t (A²sec) | Agency Approvals |    |         |   |
|-------------------|----------|------------------------|----------------------------------------|--------------------------------|-----------------------------|------------------|----|---------|---|
|                   |          |                        |                                        |                                |                             | UK CA            | CE | c UL US |   |
| 0.375             | .375     | 125                    | 50A @125 VAC/VDC<br>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 - I²t calculated at 8ms. Resistance is measured at 10% of rated current, 25°C

### 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

### Applications

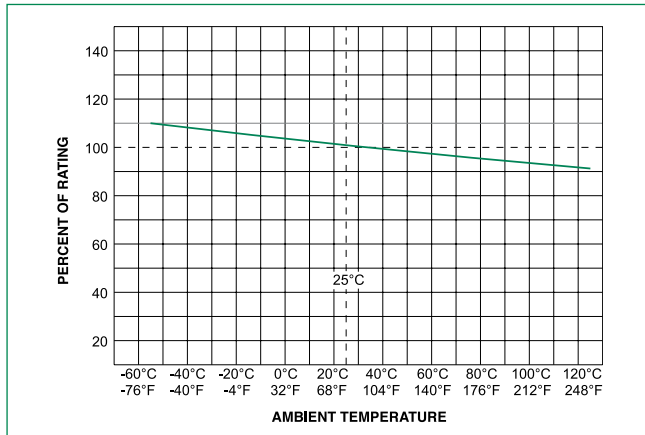
Secondary protection for space constrained applications:

- 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

# 449 Series

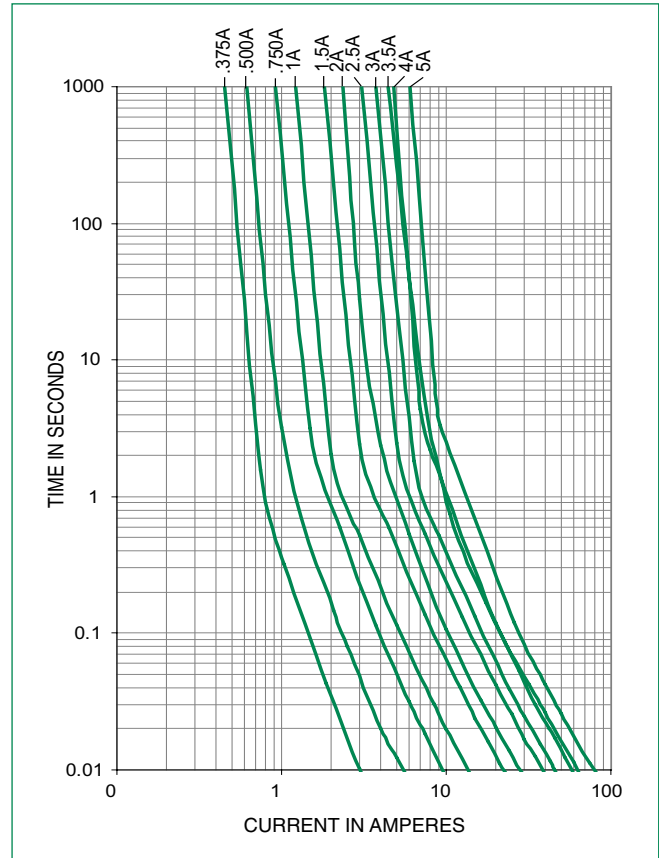
## NANO2® > Slo-Blo®

### Temperature Re-rating Curve


**Note:**

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

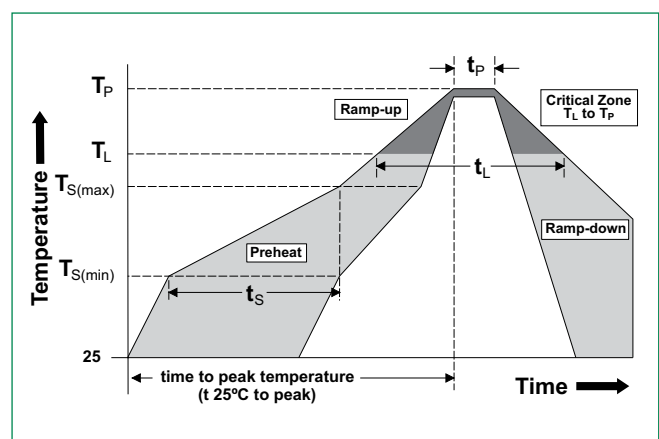
### Average Time Current Curves



### 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                   |

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



# 449 Series

## NANO2® > Slo-Blo®

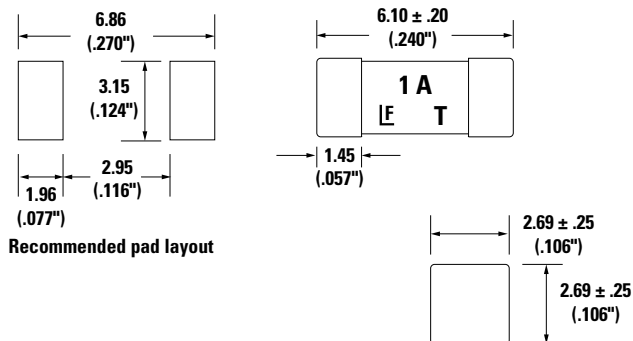
### Product Characteristics

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

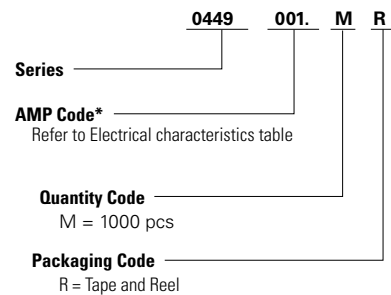
|                                     |                                                                                                                             |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <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)



### 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                        |

**Disclaimer Notice** - Littelfuse products are not designed for, and shall not be used for, any purpose (including, without limitation, automotive, military, aerospace, medical, life-saving, life-sustaining or nuclear facility applications, devices intended for surgical implant into the body, or any other application in which the failure or lack of desired operation of the product may result in personal injury, death, or property damage) other than those expressly set forth in applicable Littelfuse product documentation. Warranties granted by Littelfuse shall be deemed void for products used for any purpose not expressly set forth in applicable Littelfuse documentation. Littelfuse shall not be liable for any claims or damages arising out of products used in applications not expressly intended by Littelfuse as set forth in applicable Littelfuse documentation. The sale and use of Littelfuse products is subject to Littelfuse Terms and Conditions of Sale, unless otherwise agreed by Littelfuse. Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).