#### RoHS PO HF **449 Series Fuse**







### **Agency Approvals**

AGENCY	AGENCY FILE NUMBER	AMPERE RANGE
c <b>FL</b> °us	E10480	375mA - 5A
PS	NBK030205	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 lead free NANO<sup>2</sup> 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® design 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**

- Lead-free and Halogen Free
- Slo-Blo®
- Small size
- Wide range of current ratings available
- Wide operating temperature range
- Low temperature de-rating

### **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
- Medical equipment
- Automotive

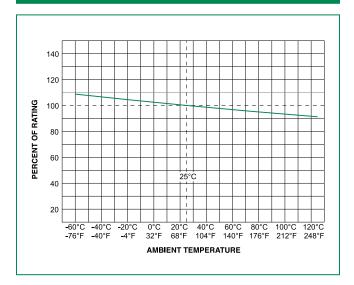
# **Electrical Specifications by Item**

Ampere		Max	Nominal C		Nominal	Agency Approvals	
Rating (A)	Amp Code	Voltage Rating (V)	Interrupting Rating	Resistance (Ohms)	Melting I²t (A²sec)	c <b>711</b> ° us	PS E
0.375	0.375	125		1.5130	0.088	X	
0.500	0.500	125		0.7633	0.258	X	
0.750	0.750	125	50 amperes @125 VAC/ VDC PSE: 100 amperes @100 VAC	0.4080	0.847	Х	
1.00	001.	125		0.2516	1.76	х	х
1.50	01.5	125		0.1186	4.70	х	X
2.00	002.	125		0.0708	6.76	х	×
2.50	02.5	125		0.0400	13.18	Х	X
3.00	003.	125		0.0352	19.55	Х	X
3.50	03.5	125		0.0261	32.70	Х	X
4.00	004.	125		0.0227	40.80	Х	X
5.00	005.	125		0.0171	59.59	Х	х

Notes: - I2t calculated at 8ms. Resistance is measured at 10% of rated current, 25°C



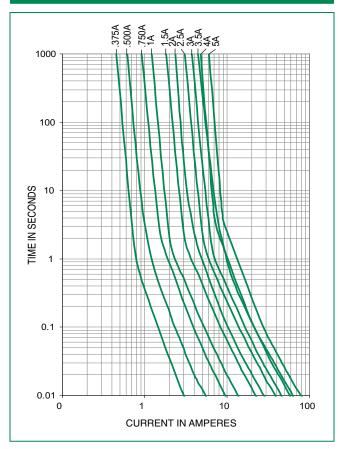
## **Temperature Rerating Curve**



#### Note:

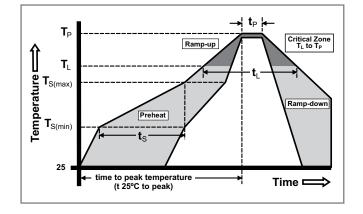
1. Derating depicted in this curve is in addition to the standard derating of 25% for continuous operation.

## **Average Time Current Curves**



# **Soldering Parameters**

$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Reflow Condition		Pb – Free assembly	
$- \text{Time (Min to Max) (t}_s) \qquad \qquad 60-120  \text{secs}$ $ \text{Average ramp up rate (Liquidus Temp} \\ (T_L) \text{ to peak} \qquad \qquad 3^{\circ}\text{C/second max.} $ $ T_{S(\text{max})} \text{ to } T_L \text{ - Ramp-up Rate} \qquad \qquad 3^{\circ}\text{C/second max.} $ $ \text{Reflow} \qquad \qquad - \text{Temperature (} T_L) \text{ (Liquidus)} \qquad 217^{\circ}\text{C} $ $ - \text{Temperature (} t_L) \qquad \qquad 60-90  \text{seconds} $ $ \text{Peak Temperature (} T_p) \qquad \qquad 250^{+0/5}  {}^{\circ}\text{C} $ $ \text{Time within 5°C of actual peak} \qquad \qquad 20-40  \text{seconds} $ $ \text{Temperature (} t_p) \qquad \qquad \qquad 250^{-0/5}  {}^{\circ}\text{C} $ $ \text{Ramp-down Rate} \qquad \qquad 5^{\circ}\text{C/second max.} $ $ \text{Time 25°C to peak Temperature (} T_p) \qquad \qquad 8  \text{minutes max.} $		-Temperature Min (T <sub>s(min)</sub> )	150°C	
	Pre Heat	-Temperature Max (T <sub>s(max)</sub> )	200°C	
$ \begin{array}{c} (T_L) \ \text{to peak} \\ \hline \\ T_{\text{S(max)}} \ \text{to T}_L - \text{Ramp-up Rate} \\ \hline \\ Reflow \\ \hline \\ -\text{Temperature } (T_L) \ (\text{Liquidus}) \\ \hline \\ -\text{Temperature } (t_L) \\ \hline \\ -\text{Temperature } (t_P) \\ \hline \\ \text{Peak Temperature } (T_P) \\ \hline \\ \text{Time within 5°C of actual peak} \\ \hline \\ \text{Temperature } (t_P) \\ \hline \\ \text{Ramp-down Rate} \\ \hline \\ \text{Time 25°C to peak Temperature } (T_P) \\ \hline \\ \text{8 minutes max.} \\ \hline \end{array} $		-Time (Min to Max) (t <sub>s</sub> )	60 – 120 secs	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			3°C/second max.	
Peak Temperature $(t_L)$ 60 – 90 seconds  Peak Temperature $(T_p)$ 250 $^{+0/5}$ °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.	$T_{S(max)}$ to $T_L$ - Ramp-up Rate		3°C/second max.	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	D (1	-Temperature (T <sub>L</sub> ) (Liquidus)	217°C	
Time within 5°C of actual peak Temperature (t <sub>p</sub> )  Ramp-down Rate  Time 25°C to peakTemperature (T <sub>p</sub> )  8 minutes max.	nellow	-Temperature (t <sub>L</sub> )	60 - 90 seconds	
Temperature (t <sub>p</sub> )  Ramp-down Rate  5°C/second max.  Time 25°C to peak Temperature (T <sub>p</sub> )  8 minutes max.	PeakTemp	erature (T <sub>P</sub> )	250 <sup>+0/-5</sup> °C	
Time 25°C to peakTemperature (T <sub>P</sub> ) 8 minutes max.	·		20 - 40 seconds	
·	Ramp-down Rate		5°C/second max.	
Do not exceed 260°C	Time 25°C to peakTemperature (T <sub>P</sub> )		8 minutes max.	
	Do not exceed		260°C	
260°C Peak			260°C Peak	



Temperature, 3 seconds max.

Wave Soldering Parameters

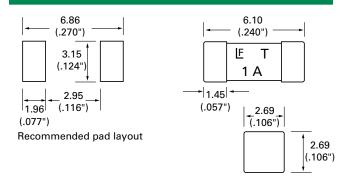


## **Product Characteristics**

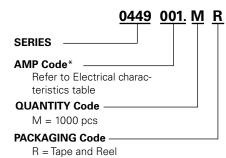
Materials	Body: Ceramic Terminations: Gold-plated Caps		
Product Marking Brand, Amperage Rating			
Operating Temperature	-55°C to 125°C		
Moisture Sensitivity Level	Level 1, J-STD-020C		
Solderability	MIL-STD-202, Method 208		
Insulation Resistance (after Opening)	MIL-STD-202, Method 302, Test Condition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

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

### **Dimensions**



# **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 286, part 3)	1000	MR

