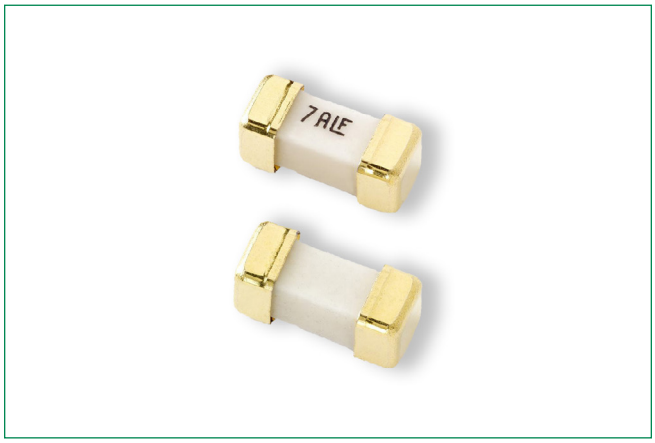
448 Series

NANO²® Fuse > Very Fast-Acting



Description

The lead-free Nano²® SMF Fuse is a very small, square surface mount fuse that 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.

Features & Benefits

- RoHS compliant, Lead-free and Halogen Free
- Very fast-acting
- Small size
- Wide range of current rating available (0.062A to 15A)
- 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

- 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

Additional Information

Resources | Accessories | Samples

Agency Approvals

Agency	Agency File Number	Ampere Range
	E10480	0.062A - 15A
	29862	0.062A - 15A
	NBK030205-E10480A NBK030205-E10480B NBK101105-E184655	1A - 1.6A 2A - 5A 6.3A - 10A
	N/A	0.062A - 15A
	N/A	0.062A - 15A

Electrical Characteristics for Series

% of Ampere Rating	Ampere Rating	Opening Time
100%	0.062A –15	4 hours, Minimum
200%	0.062A –10	5 sec., Maximum
	12 –15	20 sec., Maximum

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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			
0.062	.062	125	50A @125VAC/VDC 300A @32 VDC PSE: 100A @100VAC	5.50	0.00023	x	x	x	x	-
0.080	.080	125		4.42	0.00043	x	x	x	x	-
0.100	.100	125		2.90	0.00082	x	x	x	x	-
0.125	.125	125		2.58	0.00130	x	x	x	x	-
0.160	.160	125		1.76	0.00280	x	x	x	x	-
0.200	.200	125		1.65	0.00380	x	x	x	x	-
0.250	.250	125		0.95	0.01520	x	x	x	x	-
0.315	.315	125		0.7015	0.02650	x	x	x	x	-
0.375	.375	125		0.6155	0.02400	x	x	x	x	-
0.400	.400	125		0.4895	0.04160	x	x	x	x	-
0.500	.500	125		0.3800	0.10000	x	x	x	x	-
0.630	.630	125		0.3125	0.121	x	x	x	x	-
0.750	.750	125		0.2290	0.206	x	x	x	x	-
0.800	.800	125		0.1907	0.272	x	x	x	x	-
1.00	001.	125		0.08630	0.441	x	x	x	x	x
1.25	1.25	125		0.06619	0.900	x	x	x	x	x
1.50	01.5	125		0.06514	0.900	x	x	x	x	x
1.60	01.6	125		0.06261	1.122	x	x	x	x	x
2.00	002.	125		0.03529	0.812	x	x	x	x	x
2.50	02.5	125		0.02934	1.156	x	x	x	x	x
3.00	003.	125		0.02445	1.720	x	x	x	x	x
3.15	3.15	125		0.02300	1.810	x	x	x	x	x
3.50	03.5	125		0.02100	2.300	x	x	x	x	x
4.00	004.	125		0.01577	3.970	x	x	x	x	x
5.00	005.	125		0.01531	4.490	x	x	x	x	x
6.30	06.3	125		0.01044	12.10	x	x	x	x	x
7.00	007.	125		0.00900	13.92	x	x	x	x	x
8.00	008.	125		0.00780	18.33	x	x	x	x	x
10.00	010.	125	35A @125 VAC 50A @125 VDC 300A @32 VDC PSE: 100A @100VAC	0.00700	28.00	x	x	x	x	x
12.00	012.	85	50A @65 VAC/VDC 300A @24 VDC 200A @85 VDC	0.00533	47.59	x	x	x	x	-
15.00	015.	85		0.00394	78.4	x	x	x	x	-

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

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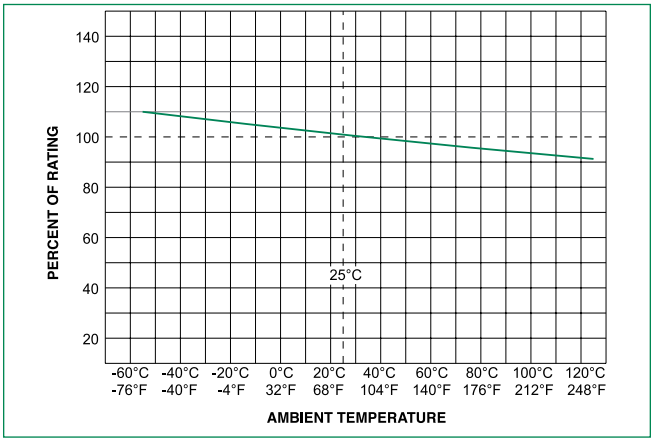
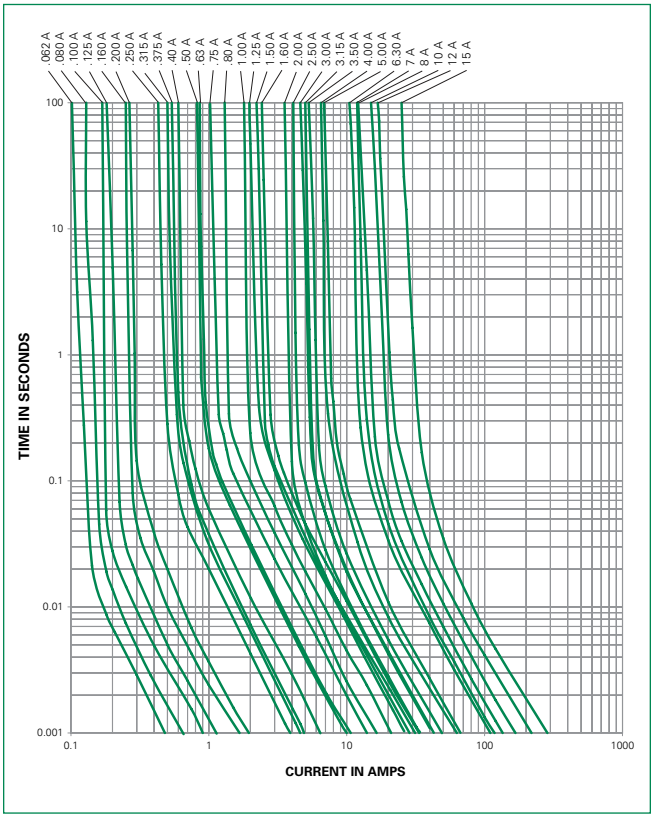
Temperature Re-rating Curve



Note:

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

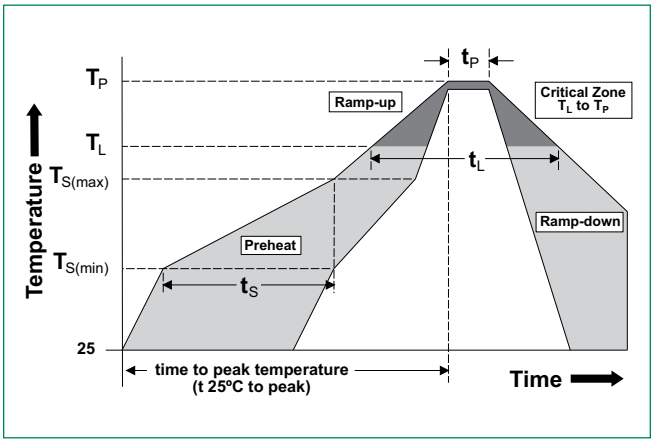
Average Time Current Curves



Soldering Parameters

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 – 180 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 – 150 seconds
Peak Temperature (T_p)		$260^{+0/-5}$ °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.
Do not exceed		260°C

Wave Soldering Parameters	260°C Peak Temperature, 10 seconds max.



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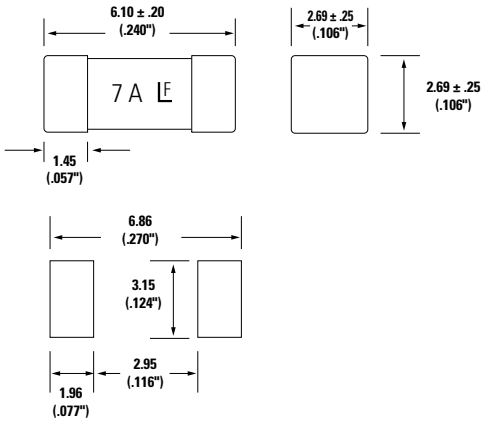
Product Characteristics

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-020
Solderability	MIL-STD-202, Method 208
Insulation Resistance (after Opening)	MIL-STD-202, Method 302, Test Condition A (10,000 ohms minimum)

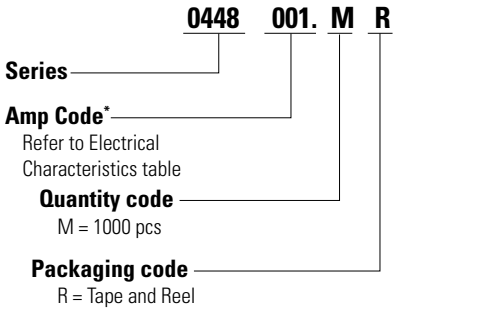
Thermal Shock	MIL-STD-202, Method 107, Test Condition B, 5 cycles, -65°C to 125°C, 15 minutes @ each extreme
Mechanical Shock	MIL-STD-202, Method 213, Test I: Deenergized. 100G's pk amplitude, sawtooth wave 6ms duration, 3 cycles XYZ+xyz = 18 shocks
Vibration	MIL-STD-202, Method 201: 0.03" amplitude, 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 mm(inches)



Recommended pad layout

Part Numbering System



***Example:**
1.5 amp product is 0448**01.5**MR (1 amp product shown above).

Packaging

Packaging Option	Packaging Specification	Quantity	Quantity & Packaging Code
12mm Tape and Reel	EIA RS-481-1 (IEC 600286-3)	1000	MR

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