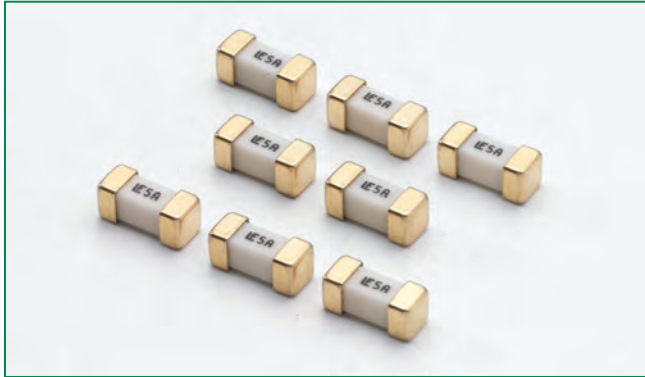


RoHS  HF **448 Series Fuse**






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

- Lead-free and Halogen Free
- Very fast acting
- Small size
- Wide range of current rating available (62mA to 15A)
- Wide operating temperature range
- Low temperature de-rating

Agency Approvals

| AGENCY | AGENCY FILE NUMBER | AMPERE RANGE |
|---|--------------------|--------------|
|  | E10480 | 62mA - 15A |
|  | LR29862 | 62mA - 15A |
|  | NBK030205 | 1A - 10A |

Electrical Characteristics for Series




| % of Ampere Rating | Ampere Rating | Opening Time |
|--------------------|---------------|------------------|
| 100% | 1/16 –15 | 4 hours, Minimum |
| 200% | 1/16 –10 | 5 sec., Maximum |
| | 12 –15 | 20 sec., Maximum |

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

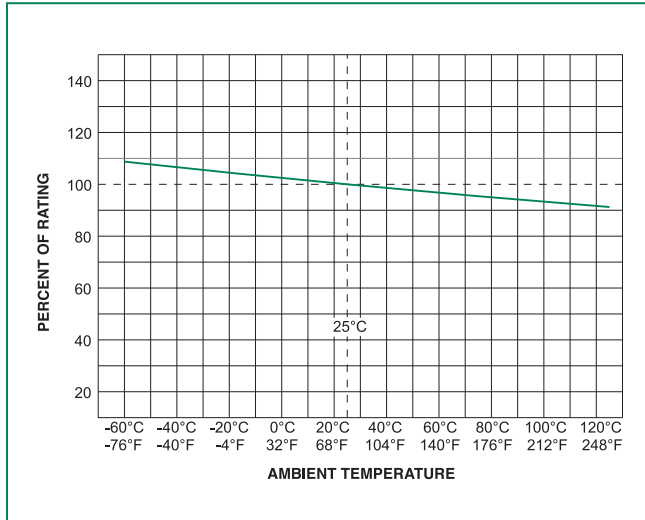
448 Series

Electrical Specifications by Item

| Ampere Rating (A) | Amp Code | Max Voltage Rating (V) | Interrupting Rating | Nominal Cold Resistance (Ohms) | Nominal Melting I ² t (A ² sec) | Agency Approvals | | |
|-------------------|----------|------------------------|---|--------------------------------|---|---|---|---|
| | | | | | |  |  |  |
| 0.062 | .062 | 125 | 50 amperes @125 VAC/VDC 300 amperes @32 VDC PSE: 100 amperes @100VAC | 5.50 | 0.00023 | x | x | |
| 0.080 | .080 | 125 | | 4.42 | 0.00043 | x | x | |
| 0.100 | .100 | 125 | | 2.90 | 0.00082 | x | x | |
| 0.125 | .125 | 125 | | 2.58 | 0.00130 | x | x | |
| 0.160 | .160 | 125 | | 1.76 | 0.00280 | x | x | |
| 0.200 | .200 | 125 | | 1.40 | 0.00380 | x | x | |
| 0.250 | .250 | 125 | | 1.05 | 0.01520 | x | x | |
| 0.315 | .315 | 125 | | 0.7900 | 0.02650 | x | x | |
| 0.375 | .375 | 125 | | 0.7300 | 0.02400 | x | x | |
| 0.400 | .400 | 125 | | 0.4895 | 0.04160 | x | x | |
| 0.500 | .500 | 125 | | 0.3800 | 0.10000 | x | x | |
| 0.630 | .630 | 125 | | 0.2821 | 0.121 | x | x | |
| 0.750 | .750 | 125 | | 0.2475 | 0.206 | x | x | |
| 0.800 | .800 | 125 | | 0.1907 | 0.272 | x | x | |
| 1.00 | 001. | 125 | | 0.08630 | 0.441 | x | x | x |
| 1.25 | 1.25 | 125 | | 0.06619 | 0.900 | x | x | x |
| 1.50 | 01.5 | 125 | | 0.06514 | 0.900 | x | x | x |
| 1.60 | 01.6 | 125 | | 0.06261 | 1.122 | x | x | x |
| 2.00 | 002. | 125 | | 0.03529 | 0.812 | x | x | x |
| 2.50 | 02.5 | 125 | | 0.02934 | 1.156 | x | x | x |
| 3.00 | 003. | 125 | | 0.02445 | 1.720 | x | x | x |
| 3.15 | 3.15 | 125 | | 0.02300 | 1.810 | x | x | x |
| 3.50 | 03.5 | 125 | | 0.02100 | 2.300 | x | x | x |
| 4.00 | 004. | 125 | | 0.01577 | 3.970 | x | x | x |
| 5.00 | 005. | 125 | 0.01531 | 4.490 | x | x | x | |
| 6.30 | 06.3 | 125 | 0.01044 | 12.10 | x | x | x | |
| 7.00 | 007. | 125 | 0.00900 | 13.92 | x | x | x | |
| 8.00 | 008. | 125 | 0.00780 | 18.33 | x | x | x | |
| 10.00 | 010. | 125 | 35 amperes @125 VAC 50 amperes @125 VDC 300 amperes @32 VDC PSE: 100 amperes @100VAC | 0.00700 | 28.00 | x | x | x |
| 12.00 | 012. | 85 | 50 amperes @65 VAC/VDC 300 amperes @24 VDC 200 amperes @85 VDC | 0.00533 | 47.59 | x | x | |
| 15.00 | 015. | 85 | | 0.00394 | 96.10 | x | x | |

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

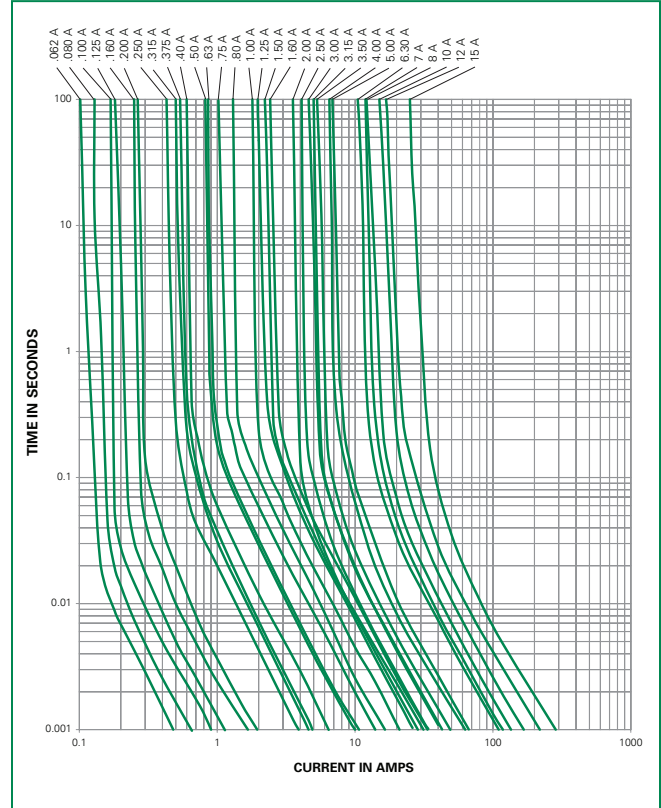
Temperature Derating Curve



Note:

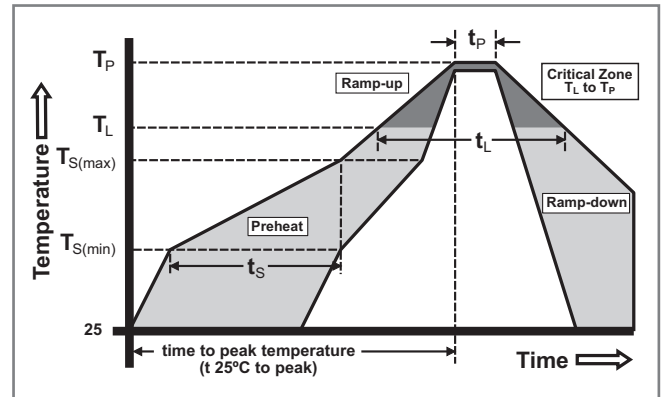
- Derating depicted in this curve is in addition to the standard derating of 25% for continuous operation.

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 ^{+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. | |

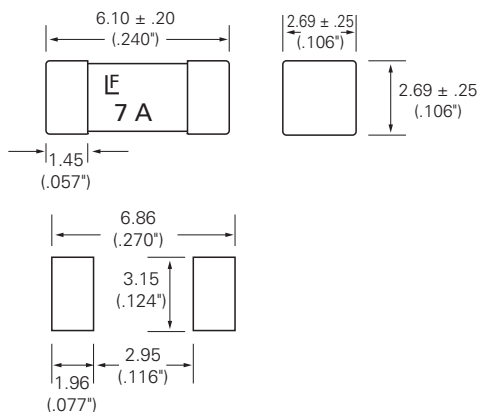


Product Characteristics

| | |
|--|---|
| 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) |

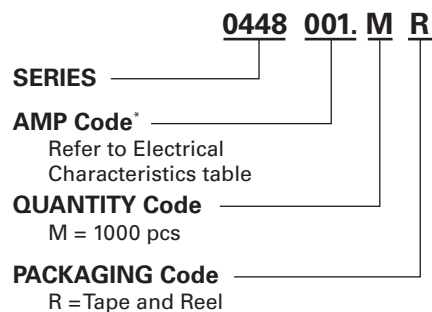
| | |
|-------------------------------------|---|
| Thermal Shock | MIL-STD-202, Method 107, Test Condition B, 5 cycles, -65°C to 125°C, 15 minutes @ each extreme |
| Mechanical Shock | MIL-STD-202, Method 213, Test I: Deenergized. 100G's pk amplitude, sawtooth wave 6ms duration, 3 cycles XYZ+xyz = 18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



Recommended pad layout

Part Numbering System



***Example:**
1.5 amp product is 044801.5MR
(1 amp product shown above).

Packaging

| Packaging Option | Packaging Specification | Quantity | Quantity & Packaging Code |
|--------------------|--------------------------------|----------|---------------------------|
| 12mm Tape and Reel | EIA RS-481-1 (IEC 286, part 3) | 1000 | MR |