

448 Series Fuse



Agency Approvals

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

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 |

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

- 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/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

Additional Information



Datasheet



Resources



Samples

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 | 50A @125VAC/ VDC 300A @32 VDC PSE: 100A @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 | | 1.65 | 0.00380 | x | x | |
| 0.250 | .250 | 125 | | 0.95 | 0.01520 | x | x | |
| 0.315 | .315 | 125 | | 0.7015 | 0.02650 | x | x | |
| 0.375 | .375 | 125 | | 0.6155 | 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 | | 0.3125 | 0.121 | x | x | |
| 0.750 | .750 | 125 | | 0.2290 | 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 | 35A @125 VAC 50A @125 VDC 300A @32 VDC PSE: 100A @100VAC | 0.00700 | 28.00 | x | x | x |
| 12.00 | 012. | 85 | 50A @65 VAC/ VDC | 0.00533 | 47.59 | x | x | |
| 15.00 | 015. | 85 | 300A @24 VDC 200A @85 VDC | 0.00394 | 78.4 | x | x | |

Notes:

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

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.



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



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 600286-3) | 1000 | MR |

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Тел: +7 (812) 336 43 04 (многоканальный)
Email: org@lifeelectronics.ru