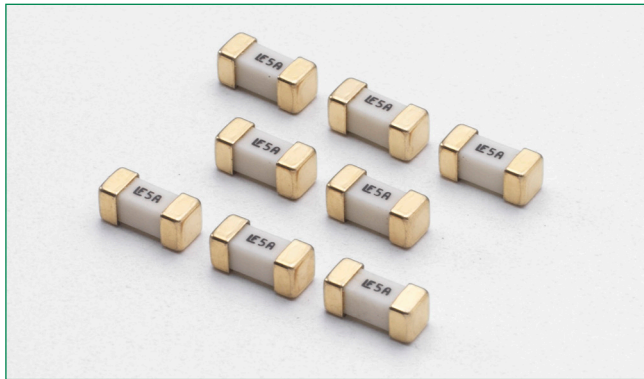


451/453 Series Fuse



Agency Approvals

| Agency | Agency File Number | Ampere Range |
|--------|---|---|
| | E10480 | 6.3A - 20A |
| | 29862 | 0.062A - 15A |
| | J50446731 | 1A, 1.25A, 2A, 2.5A, 3.15A, 4A, 5A, 7A, 8A, 10A, 12A, 20A |
| | NBK030205-E10480A NBK030205-E10480B NBK101105-E184655 | 1A-1.6A 2A-5A 6.3A - 10A |
| | E10480 | 0.062A - 5A |
| | NA | 1A, 1.25A, 2A, 2.5A, 3.15A, 4A, 5A, 7A, 8A, 10A, 12A, 20A |

Electrical Characteristics for Series

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

Additional Information



**Datasheet
451 Series**



**Resources
451 Series**



**Samples
451 Series**



**Datasheet
453 Series**



**Resources
453 Series**



**Samples
453 Series**

Description

The Nano² SMF Fuse is a very small, Wire-in-Air (WIA) square shape surface mount fuse that was designed for secondary side circuit over-current protection applications. These fuses are designed for PCB using surface mount technology.







Features

- Very fast-acting
- Small size
- Wide range of current rating available (0.062A to 20A)
- Wide operating temperature range
- RoHS compliant and Halogen Free
- UL Listed and Recognized to UL/CSA/NMX UL 248-1 and UL/CSA/NMX UL 248-14 (see Agency Approvals)
- Conforms to DENAN's Appendix 3
- Conforms to EN 60127-1 and EN 60127-7

Applications

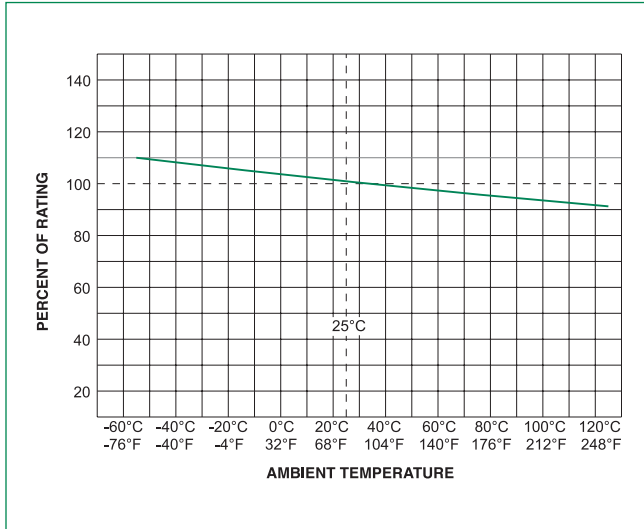
- Notebook PC
- LCD/PDPTV
- LCD monitor
- LCD/PDP panel
- LCD backlight inverter
- Portable DVD player
- Power supply
- Networking
- PC server
- Cooling fan system
- Storage system
- Telecom system
- Wireless basestation
- White goods
- Game console
- Office Automation equipment
- Battery charging circuit protection
- Industrial equipment

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 | | | | | |
|-------------------|----------|------------------------|---|--------------------------------|---|---|---|---|---|---|---|
| | | | | | |  |  |  |  |  |  |
| .062 | .062 | 125 | 50A @125VAC/VDC 300A @32VDC PSE: 100A @100VAC | 5.5000 | 0.00019 | - | x | - | x | - | - |
| .080 | .080 | 125 | | 4.0500 | 0.00033 | - | x | - | x | - | - |
| .100 | .100 | 125 | | 3.1000 | 0.00138 | - | x | - | x | - | - |
| .125 | .125 | 125 | | 1.7000 | 0.00286 | - | x | - | x | - | - |
| .160 | .160 | 125 | | 1.2157 | 0.0048 | - | x | - | x | - | - |
| .200 | .200 | 125 | | 0.8372 | 0.0089 | - | x | - | x | - | - |
| .250 | .250 | 125 | | 0.5765 | 0.0158 | - | x | - | x | - | - |
| .315 | .315 | 125 | | 0.3918 | 0.0311 | - | x | - | x | - | - |
| .375 | .375 | 125 | | 0.4541 | 0.0442 | - | x | - | x | - | - |
| .400 | .400 | 125 | | 0.4233 | 0.0551 | - | x | - | x | - | - |
| .500 | .500 | 125 | | 0.3046 | 0.0824 | - | x | - | x | - | - |
| .630 | .630 | 125 | | 0.2022 | 0.1381 | - | x | - | x | - | - |
| .750 | .750 | 125 | | 0.1444 | 0.2143 | - | x | - | x | - | - |
| .800 | .800 | 125 | | 0.1355 | 0.2654 | - | x | - | x | - | - |
| 1.00 | 001. | 125 | | 0.0780 | 0.6029 | - | x | x | x | x | x |
| 1.25 | 1.25 | 125 | | 0.0780 | 0.664 | - | x | x | x | x | x |
| 1.50 | 01.5 | 125 | | 0.0630 | 0.853 | - | x | x | x | - | - |
| 1.60 | 01.6 | 125 | | 0.0580 | 1.060 | - | x | x | x | - | - |
| 2.00 | 002. | 125 | 50A @125VAC/VDC 10,000A @75VDC 300A @32VDC PSE: 100A @100VAC | 0.0367 | 0.530 | - | x | x | x | x | x |
| 2.50 | 02.5 | 125 | | 0.0286 | 1.029 | - | x | x | x | x | x |
| 3.00 | 003. | 125 | | 0.0227 | 1.650 | - | x | x | x | - | - |
| 3.15 | 3.15 | 125 | | 0.0215 | 1.920 | - | x | x | x | x | x |
| 3.50 | 03.5 | 125 | | 0.0200 | 2.469 | - | x | x | x | - | - |
| 4.00 | 004. | 125 | | 0.0160 | 3.152 | - | x | x | x | x | x |
| 5.00 | 005. | 125 | | 0.0125 | 5.566 | - | x | x | x | x | x |
| 6.30 | 06.3 | 125 | 50A @125VAC/VDC 400A @32VDC PSE: 100A @100VAC | 0.0096 | 9.170 | x | x | x | - | - | - |
| 7.00 | 007. | 125 | | 0.0090 | 10.32 | x | x | x | - | x | x |
| 8.00 | 008. | 125 | | 0.0077 | 20.23 | x | x | x | - | x | x |
| 10.0 | 010. | 125 | 35A @125 VAC/ 50A @125 VDC 400A @32 VDC PSE: 100A @100VAC | 0.0056 | 26.46 | x | x | x | - | x | x |
| 12.0 | 012. | 65 | 150A @65VDC 100A @65VAC 400A @32VDC | 0.0049 | 47.97 | x | x | - | - | x | x |
| 15.0 | 015. | 65 | | 0.0037 | 97.82 | x | x | - | - | - | - |
| 20.0 | 020. | 65 | | 0.00244 | 154 | x | - | - | - | x | x |

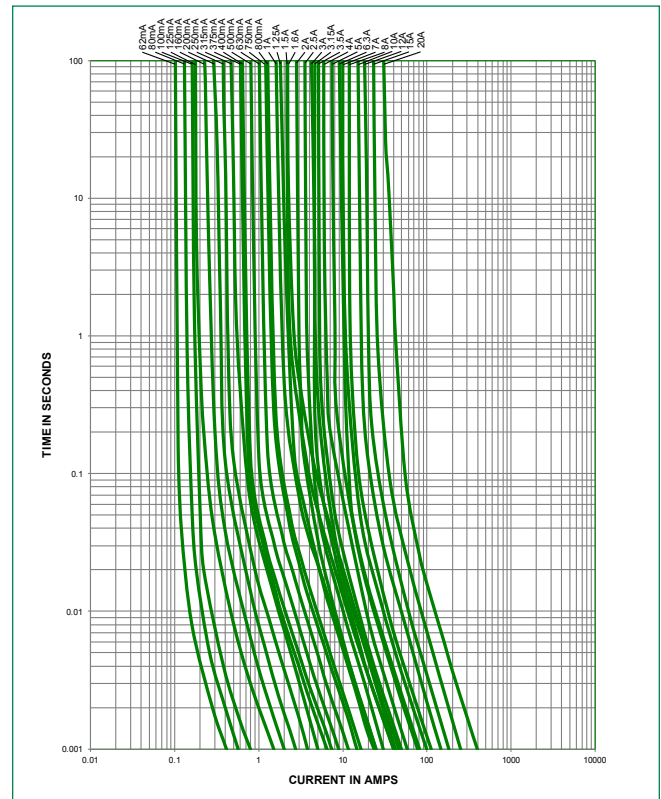
Notes:
 - I²t calculated at 8ms.
 - Resistance is measured at 10% of rated current, 25°C

Temperature Re-rating Curve



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

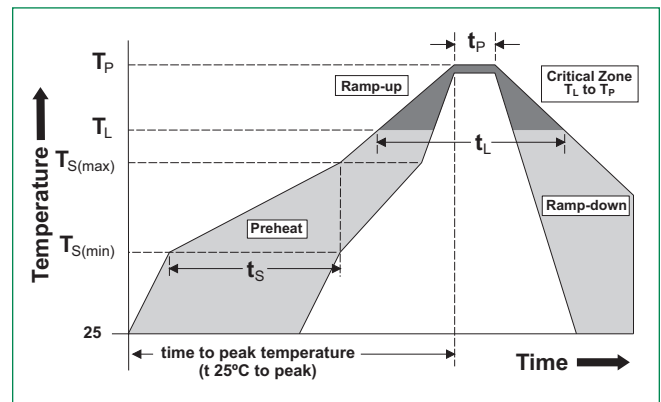
Average Time Current Curves



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.

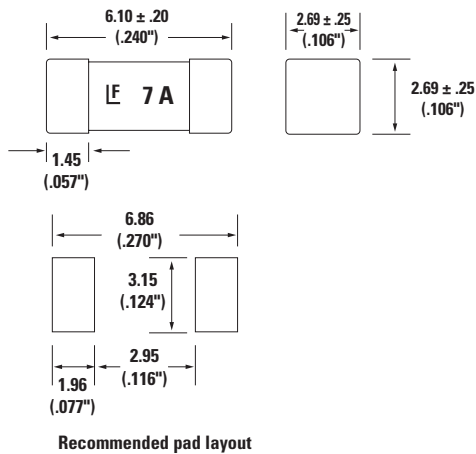


Product Characteristics

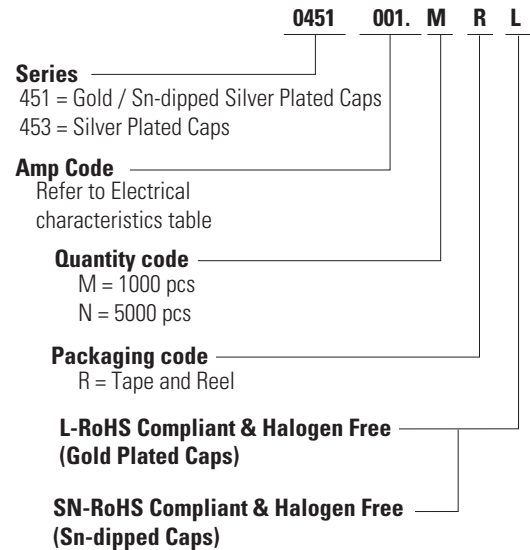
| | |
|--|---|
| Materials | Body: Ceramic Terminations: Gold-Plated Caps / Sn-dipped Silver Plated Caps (451 RoHS/HF series) Silver-plated Caps (451MR RoHS ratings below 375mA and 453 RoHS Series) |
| Product Marking | Brand, Ampere Rating |
| Operating Temperature | -55°C to 125°C |
| Moisture Sensitivity 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 / +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



NOTE: "L" suffix applies to 451 series only
 - 453 series is available only as RoHS compliant version and does not require "L" suffix. Please do not include "L" suffix within 453 series ordering instructions.

Packaging

| Packaging Option | Packaging Specification | Quantity | Quantity & Packaging Code |
|--------------------|--------------------------------|----------|---------------------------|
| 12mm Tape and Reel | EIA RS-481-2 (IEC 286, part 3) | 5000 | NR |
| 12mm Tape and Reel | EIA RS-481-2 (IEC 286, part 3) | 1000 | MR |

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