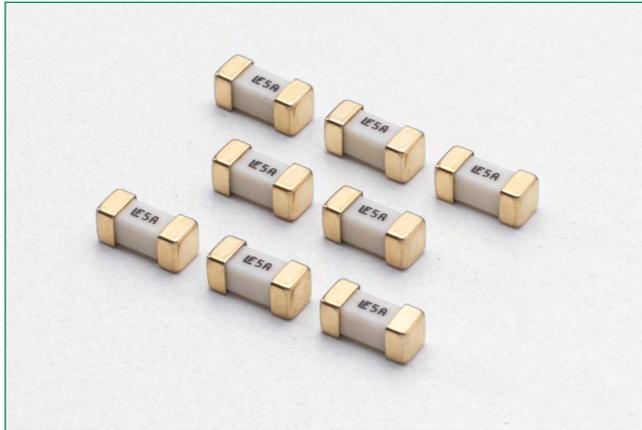


451/453 Series

Very Fast-Acting Fuse



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 & Benefits

- 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 IEC/EN 60127-1 and IEC/EN 60127-7

Additional Information



Resources
451 Series



Accessories
451 Series



Samples
451 Series



Resources
453 Series



Accessories
453 Series



Samples
453 Series

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

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

Agency Approvals

Agency	Agency File Number	Ampere Range
UL US	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
UL US	E10480	0.062A - 5A
	NA	0.062A - 20A
	NA	0.062A - 20A

451/453 Series

Very Fast-Acting Fuse

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

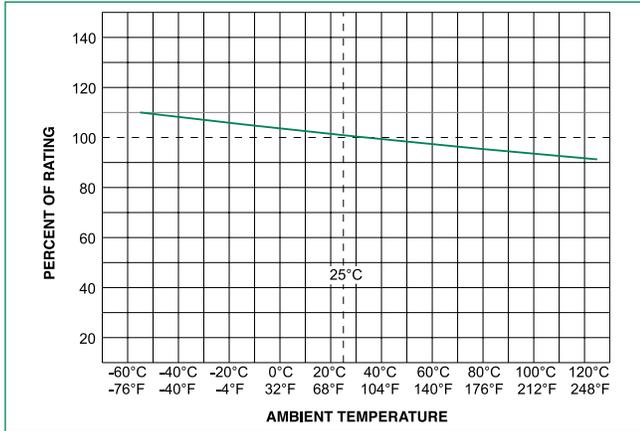
Notes:- I²t calculated at 8ms.

- Resistance is measured at 10% of rated current, 25°C

451/453 Series

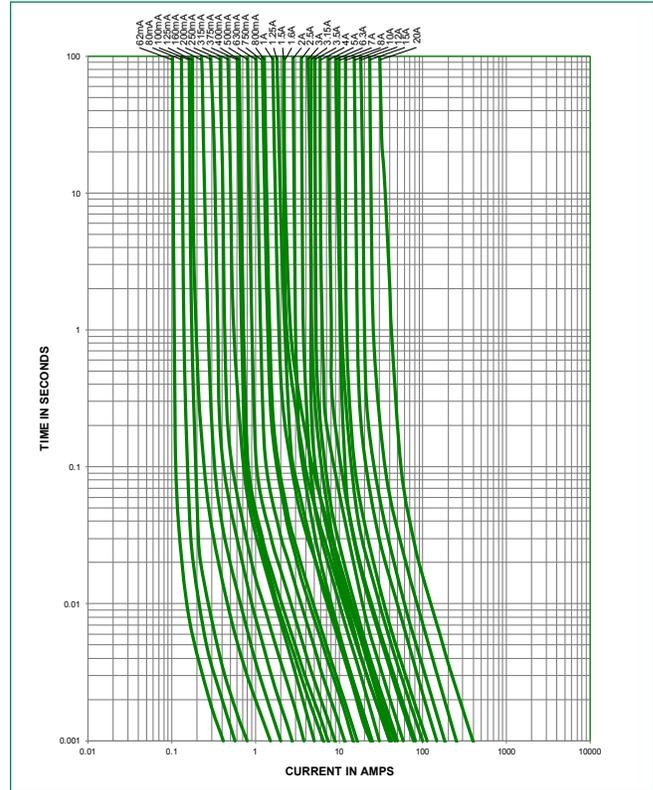
Very Fast-Acting Fuse

Temperature Re-rating Curve



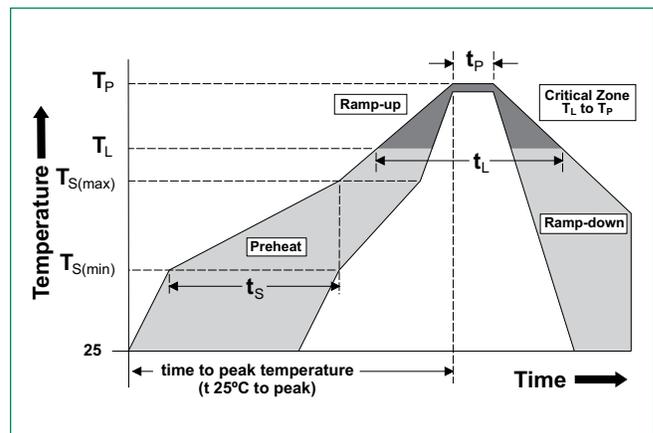
Note:
1. Rerating depicted in this curve is in addition to the standard derating of 25% for continuous operation.

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.	



451/453 Series

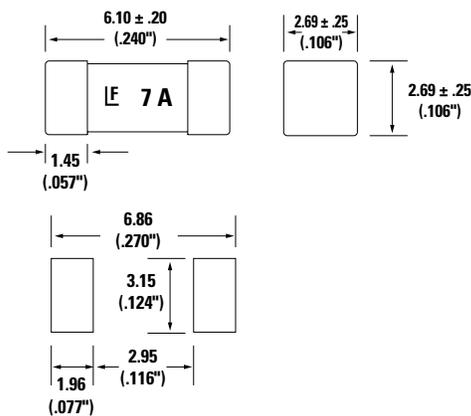
Very Fast-Acting Fuse

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)

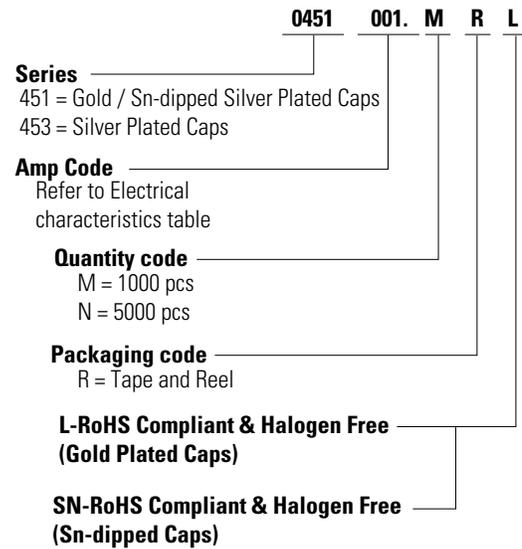
Thermal Shock	MIL-STD-202, Method 107, Test Condition B, 5 cycles, -65°C / +125°C, 15 minutes @ each extreme
Mechanical Shock	MIL-STD-202, Method 213, Test I: Deenergized. 100G's pk amplitude, sawtooth wave 6ms duration, 3 cycles XYZ+xyz = 18 shocks
Vibration	MIL-STD-202, Method 201: 0.03" amplitude,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



Recommended pad layout

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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