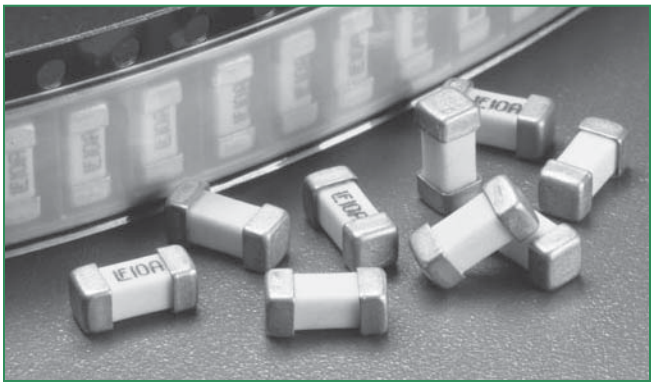
RoHS HF 451/453 Series Fuse



Agency Approvals

AGENCY	AGENCY FILE NUMBER	AMPERE RANGE
	E10480	6.3A - 15A
	LR29862	62mA - 15A
	NBK030205-E10480B NBK101105-E184655	1A - 5A 6.3A - 10A
	E10480	62mA - 5A

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

Description

The Nano² SMF Fuse is a very small, Wire-in-Air (WIA) square shape surface mount fuse which is very suitable for the secondary side circuit over-current protection applications and is designed for PCB using surface mount technology.

Features

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

Applications

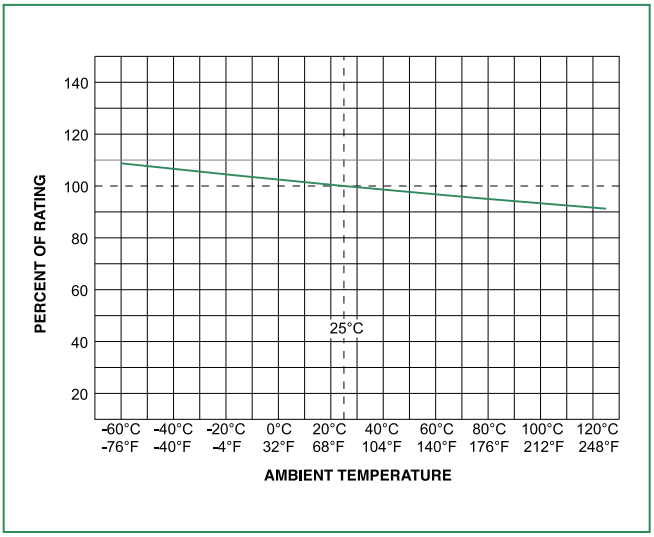
- Notebook PC
- LCD/PDP TV
- LCD monitor
- LCD/PDP panel
- LCD backlight inverter
- Portable DVD player
- Power supply
- Networking
- PC server
- Cooling fan system
- Storage system
- Telecom system
- Wireless basestation
- White goods
- Game console
- Office Automation equipment
- Battery charging circuit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

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			
0.062	.062	125	50 amperes @125VAC/VDC 300 amperes @32VDC PSE: 100 amperes @100VAC	5.5000	0.00019		x		x
0.080	.080	125		4.0500	0.00033		x		x
0.100	.100	125		3.1000	0.00138		x		x
0.125	.125	125		1.7000	0.00286		x		x
0.160	.160	125		1.2157	0.0048		x		x
0.200	.200	125		0.8372	0.0089		x		x
0.250	.250	125		0.5765	0.0158		x		x
0.315	.315	125		0.3918	0.0311		x		x
0.375	.375	125		0.6100	0.0425		x		x
0.400	.400	125		0.5600	0.0484		x		x
0.500	.500	125		0.4200	0.0795		x		x
0.630	.630	125		0.3050	0.143		x		x
0.750	.750	125		0.2450	0.185		x		x
0.800	.800	125		0.2120	0.271		x		x
1.00	001.	125		0.1530	0.459		x	x	x
1.25	1.25	125		0.0780	0.664		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		0.0367	0.530		x	x	x
2.50	02.5	125		0.0286	1.029		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
3.50	03.5	125		0.0200	2.469		x	x	x
4.00	004.	125		0.0160	3.152		x	x	x
5.00	005.	125		0.0125	5.566		x	x	x
6.30	06.3	125		0.0096	9.170	x	x	x	
7.00	007.	125		0.0090	10.32	x	x	x	
8.00	008.	125		0.0077	20.23	x	x	x	
10.0	010.	125	35 amperes @125 VAC/ 50 amperes @125 VDC 300 amperes @32 VDC PSE: 100 amperes @100VAC	0.0056	26.46	x	x	x	
12.0	012.	65	50 amperes @65 VAC/VDC 300 amperes @24 VDC	0.0049	47.97	x	x		
15.0	015.	65		0.0037	97.82	x	x		

Notes:
- I^2t calculated at 8ms.
- Resistance is measured at 10% of rated current, 25°C

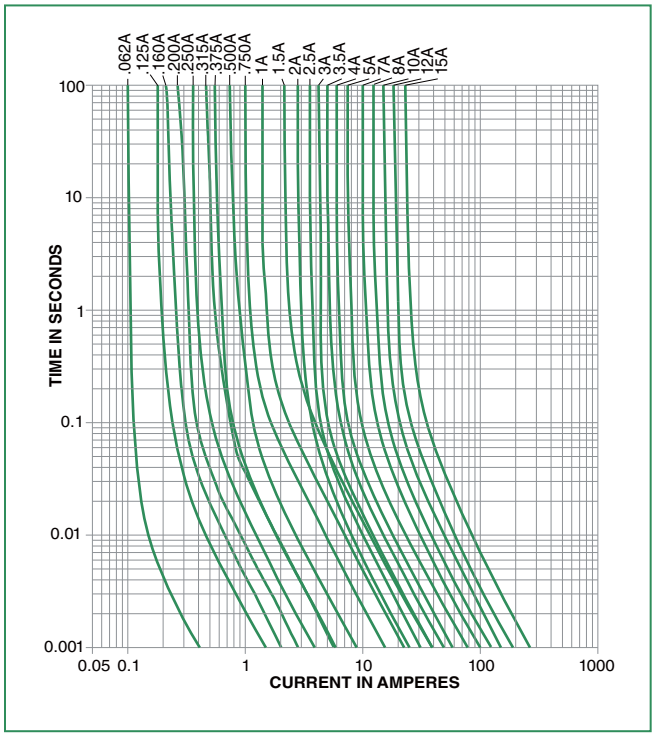
Temperature Rerating Curve



Note:

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

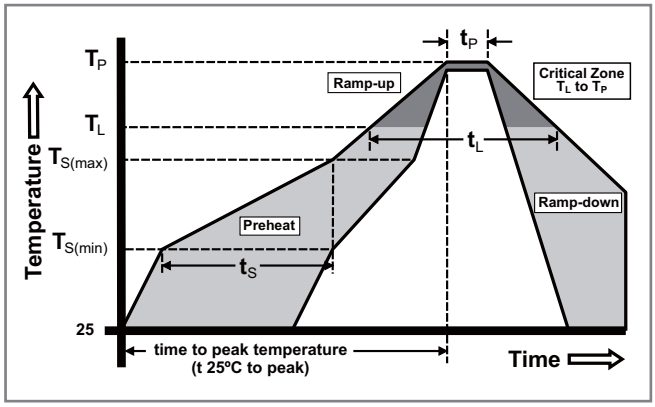
Average Time Current Curves



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.



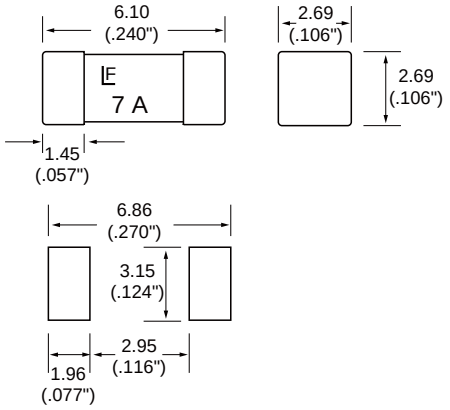
451/453 Series

Product Characteristics

Materials	**Body:** Ceramic **Terminations**: Gold-Plated Caps (for 451 RoHS/HF series) SnPb Plated Caps (for 451 Non-RoHS series) Silver-plated Caps (for 451 RoHS below 200mA Rating & 453 Series)
Product Marking	Brand, Ampere 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 / +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

0451 001. M R L

SERIES
451 = Gold / SnPb / Silver Plated Caps
453 = Silver Plated Caps

AMP Code
Refer to Electrical characteristics table

QUANTITY Code
M = 1000 pcs
N = 5000 pcs

PACKAGING Code
R = Tape and Reel

RoHS Compliant & Halogen Free

NOTE: "L" suffix applies to 451 series only

- 451 series may be ordered as either "RoHS and HF" ("L" suffix) or non-RoHS (no suffix) version.
- 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.
  453 series is only available from 200mA up to the highest rating specified. For ratings below 200mA, please use 451 series for ordering.

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