

# 463 Series NANO2® Fuse



## Description

The 463 series NANO2® is a fast-acting, very high current fuse designed for high operating current applications. It offers superior thermal cycling endurance of 500 cycles with its low temperature rise and excellent temperature stability characteristics. It is ideal to be used in datacom and telecom equipment such as high end servers, base stations, power supplies, and blade computing applications.

The 463 series offers high-amp circuit protection, ultra-high interrupting ratings (up to 500A@ 72VDC) and small size (10.1 mm x 3.12 mm x 3.12 mm) and surface-mount form-factor to help space saving.

## Features & Benefits

- Surface mount fuse in a small footprint
- High current rating 15A-30A
- Higher voltage rating up to 100VDC and 250VAC
- High melting i2t
- Enhanced thermal cycling endurance
- Operating temperature range from -55°C to 125°C
- RoHS Compliant and Halogen-Free
- Recognized to UL/CSA/NMX 248-1 and UL/CSA/NMX 248-14
- Conforms to EN/IEC 60127-1 and EN/IEC 60127-7

## Web Resources



Download ECAD models, order samples, and find technical resources at [www.littelfuse.com](http://www.littelfuse.com)

### Agency Approvals

Agency	Agency File/Certificate Number	Ampere Range
	E10480	15A - 30A
	NBK101105-E184655	15A
	J50478975	15A - 30A
	NA	15A - 30A
	NA	15A - 30A

## Applications

- High end servers / Blade computing
- Base station power supply
- Voltage regulator module
- Cooling fan system for PC Server
- Advance Telecommunication Computing Architecture (ATCA) applications for cloud computing
- Battery Management System (Industrial Tools)

### Electrical Characteristics for Series

% of Ampere Rating	Opening Time
100%	4 Hours, Min.
200%	60 Second, Max.

### Electrical Characteristic Specifications by Item

Ampere Rating (A)	Ampere Code	Max Voltage Rating (V)	Interrupting Rating <sup>4</sup>	Nominal Cold Resistance (Ohms)	Nominal Melting I <sup>2</sup> t (A <sup>2</sup> sec)	Agency Approvals				
15	015.	250	100A@250VAC 300A@65VAC	0.0047	142	x	x	x	x	x
20	020.	250	500A @ 72VDC 50A@100VDC	0.0027	433	x	-	x	x	x
25	025.	250	1000A @ 32VDC 800A @ 57VDC	0.00215	668	x	-	x	x	x
30	030.	250	1400A @ 48VDC 2500A @ 12VDC	0.00193	916	x	-	x	x	x

**Notes:**

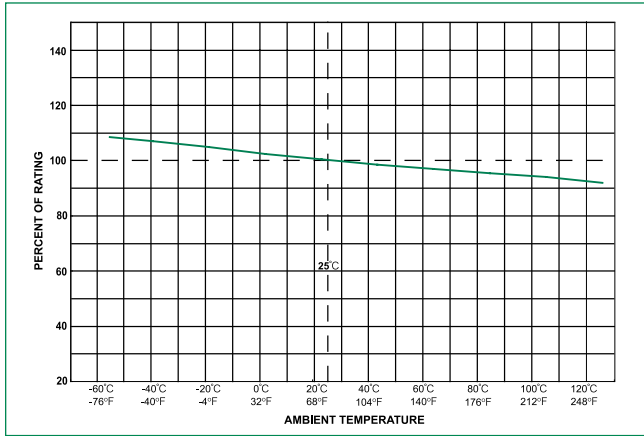
1. Cold resistance measured at less than 10% of rated current at 23°C.
2. Agency Approval Table Key: X=Approved or Certified, P=Pending and Blank=Not Approved.

3. I<sup>2</sup>t values stated for 10 msec opening time.
4. Interrupting Rating may differ based on Agency Approval. See Agency Approval certificate for more details.

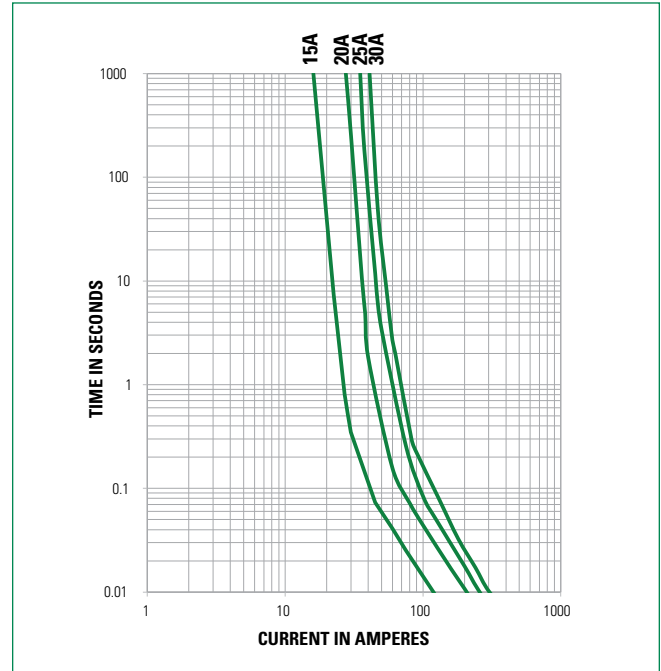
# 463 Series

## NAN02® Fuse

Temperature Derating Curve

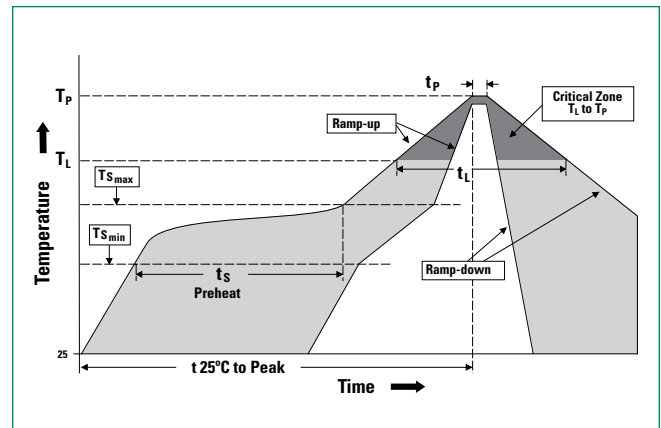


Average Time Current Curves



Soldering Parameters

<b>Reflow Condition</b>	Pb-free assembly	
<b>Pre Heat</b>	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (Min to Max) ( $t_s$ )	60 – 180 seconds
<b>Average Ramp-up Rate (Liquidus Temp (<math>T_L</math>) to peak)</b>	5°C/second max.	
$T_{s(max)}$ to $T_L$ - Ramp-up Rate	5°C/second max.	
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Temperature ( $t_L$ )	60 – 150 seconds
<b>Peak Temperature (<math>T_p</math>)</b>	260 <sup>+0/-5</sup> °C	
<b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>	20 – 40 seconds	
<b>Ramp-down Rate</b>	5°C/second max.	
<b>Time 25°C to peak Temperature (<math>T_p</math>)</b>	8 minutes max.	
<b>Do not exceed</b>	260°C	



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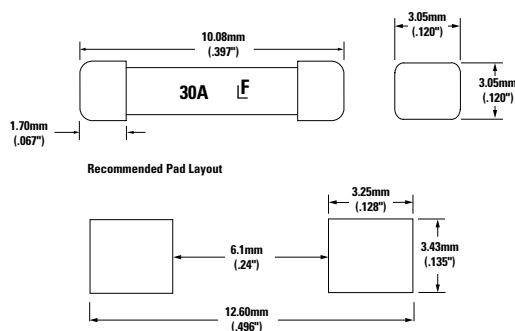
## NAN02® Fuse

### Product Characteristics

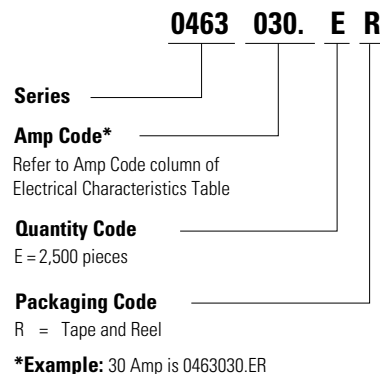
<b>Materials</b>	Body : Ceramic Cap : Silver Plated Brass
<b>Product Marking</b>	Body: Brand Logo, Current Rating
<b>Insulation Resistance (after Opening)</b>	MIL-STD-202, Method 302, Test Condition A (10,000 ohms, Minimum)
<b>Solderability</b>	MIL-STD-202, Method 208
<b>Resistance to Soldering Heat</b>	MIL-STD-202, Method 210, Test Condition B (10 sec at 260°C)
<b>PCB Recommendation for Thermal Management</b>	Min. copper layer thickness = 100µm Minimum copper trace width = 10mm
	Alternate methods of thermal management may be used. In such cases, under normal operations, the maximum temperature of the fuse body should not exceed 80°C in a 25°C environment.
<b>Operating Temperature</b>	-55°C to 125°C with proper derating

<b>Thermal Shock</b>	MIL-STD-202, Method 107, Test Condition B, 5 cycles, -65°C to 125°C, 15 minutes @ each extreme
<b>Mechanical Shock</b>	MIL-STD-202, Method 213, Test Condition I: De-energized. 100G's peak amplitude, sawtooth wave 6ms duration, 3 cycles XYZ+xyz = 18
<b>Vibration</b>	MIL-STD-202, Method 201: 0.03" amplitude, 10-55 Hz in 1 min. 2 hrs. each XYZ = 6hrs (10- 55 Hz)
<b>Moisture Resistance</b>	MIL-STD-202F, Method 106, 10 cycles
<b>Salt Spray</b>	MIL-STD-202, Method 101, Test Condition B (48hrs)
<b>Thermal Cycling</b>	500 cycles: 15 minutes at -30°C (+0/-5°C), 5°C / minute ramp rate up to 80°C, 15 minutes at 80°C (+3/-0°C), 5°C / minute ramp rate back down to -30°C.

### Dimensions



### Part Numbering System



### Packaging

Packaging Option	Packaging Specification	Quantity	Quantity & Packaging Code
<b>463 Series</b>			
24mm Tape and Reel	EIA-RS-481-2	2500	ER

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