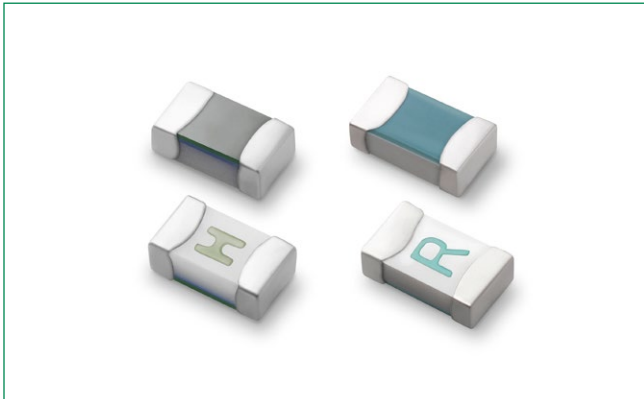




### 438A Series – 0603 Fast-Acting Fuse



#### Agency Approvals

Agency	Agency File Number	Ampere Range
	E10480	0.25A – 6A
	29862	0.25A – 6A

#### Electrical Characteristics for Series

% of Ampere Rating	Ampere Rating	Opening Time at 25°C
100%	0.250A – 6A	4 Hours, Minimum
250%	0.250A – 6A	5 Seconds, Maximum

#### Description

The 438A series AECQ-compliant fuses are specifically tested to cater secondary circuit protection needs of compact auto electronics application.

The general design ensures excellent temperature stability and performance reliability.

The high I<sup>2</sup>t values which is typical in the Littelfuse ceramic fuse family ensure high inrush current withstand capability.

#### Features

- Operating Temperature from -55°C to +150°C
- 100% Lead-free, RoHS compliant and Halogen-free
- Suitable for both leaded and lead-free reflow/wave soldering
- Meets Littelfuse's Automotive qualifications\*
- Recognized to UL/CSA/NMX 248-1 and UL/CSA/NMX 248-14

\* Largely based on Littelfuse internal AECQ-200 test plan.

#### Applications

- Li-ion Battery
- LED Head-Lights
- Automotive Navigation System
- TFT Display
- Battery Management System (BMS)
- Clusters

#### Additional Information



Datasheet





Resources



Samples

#### Electrical Specifications by Item

Ampere Rating (A)	Amp Code	Max. Voltage Rating (V)	Interrupting Rating (AC/DC) <sup>1</sup>	Nominal Resistance (Ohms) <sup>2</sup>	Nominal Melting I <sup>2</sup> t (A <sup>2</sup> Sec.) <sup>3</sup>	Nominal Voltage Drop At Rated Current (V) <sup>4</sup>	Nominal Power Dissipation At Rated Current (W)	Agency Approvals	
									
0.25	.250	63VDC	50A @ 63VDC 50A @ 32VAC	2.218	0.0017	0.550	0.138	x	x
0.375	.375	63VDC		1.247	0.0041	0.488	0.183	x	x
0.5	.500	63VDC		0.829	0.0100	0.486	0.243	x	x
0.75	.750	63VDC		0.466	0.0281	0.378	0.284	x	x
1	001.	63VDC		0.310	0.0593	0.351	0.351	x	x
1.25	1.25	63VDC		0.200	0.0510	0.365	0.456	x	x
1.75	1.75	32VDC	50A@32VAC/32VDC	0.1405	0.1440	0.360	0.540	x	x
2	002.	32	50A @ 32VDC/12VAC	0.0490	0.181	0.107	0.214	x	x
2.5	02.5	32		0.0364	0.240	0.095	0.238	x	x
3	003.	32		0.0264	0.439	0.093	0.279	x	x
3.5	03.5	32		0.0210	0.647	0.082	0.287	x	x
4	004.	32		0.0177	0.730	0.079	0.316	x	x
5	005.	32		0.0127	0.747	0.074	0.370	x	x
6	006.	24	50A @ 24VDC/12VAC	0.0086	1.444	0.072	0.432	x	x

#### Notes:

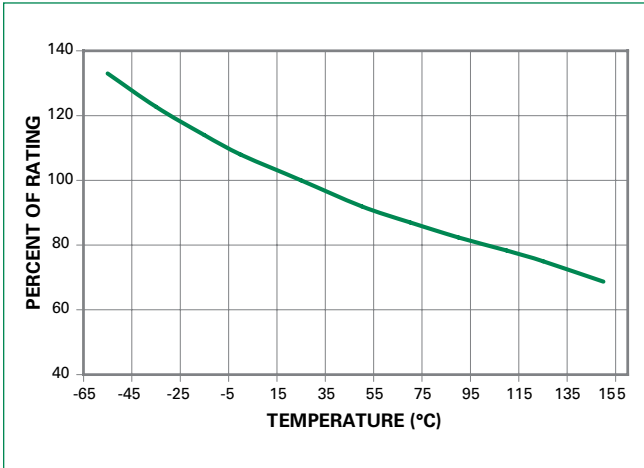
1. AC Interrupting Rating tested at rated voltage with unity power factor. DC Interrupting Rating tested at rated voltage with time constant < 0.8 msec.
2. Nominal Resistance measured with < 10% rated current.
3. Nominal Melting I<sup>2</sup>t measured at 1 msec. opening time.

#### 4. Nominal Voltage Drop measured at rated current after temperature has stabilized.

Devices designed to carry rated current for 4 hours minimum. It is recommended that devices be operated continuously at no more than 80% rated current. See "Temperature Re-rating Curve" for additional re-rating information.

Devices designed to be mounted with marking code facing up.

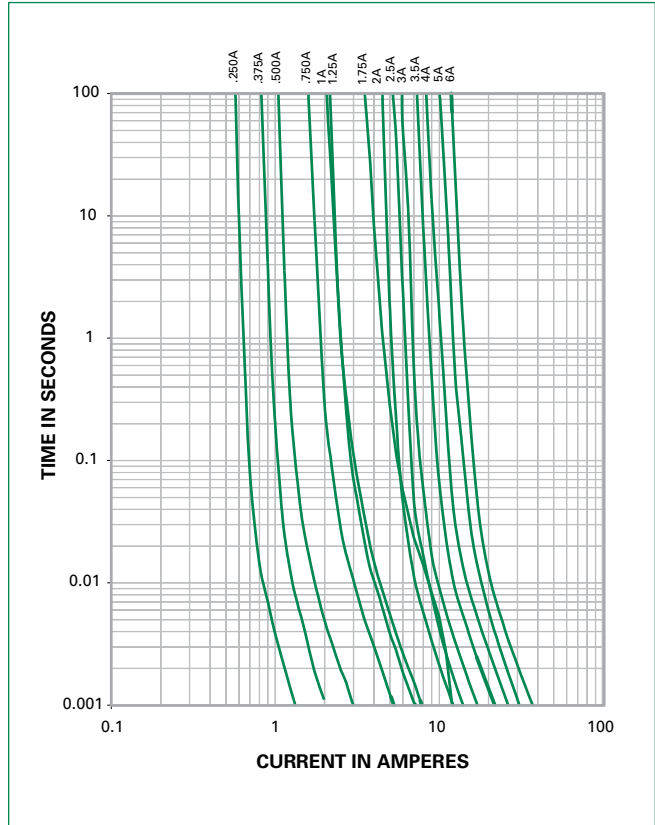
**Temperature Re-rating Curve**



**Note:**  
1. Re-rating depicted in this curve is in addition to the standard re-rating of 20% for continuous operation.

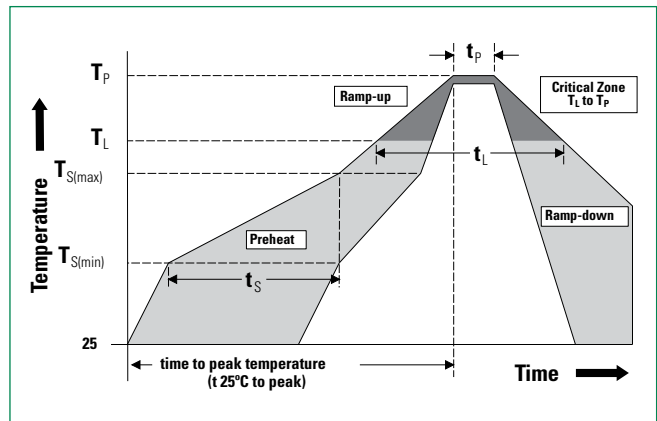
**Example:**  
For continuous operation at 75 degrees celsius, the fuse should be rerated as follows:  
 $I = (0.80)(0.85)_{RAT} = (0.68)_{RAT}$

**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>		3°C/second max.
<b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>		5°C/second max.
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Temperature ( $t_i$ )	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>		10 - 30 seconds
<b>Ramp-down Rate</b>		6°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
<b>Wave Soldering</b>	260°C, 10 seconds max.	



### Product Characteristics

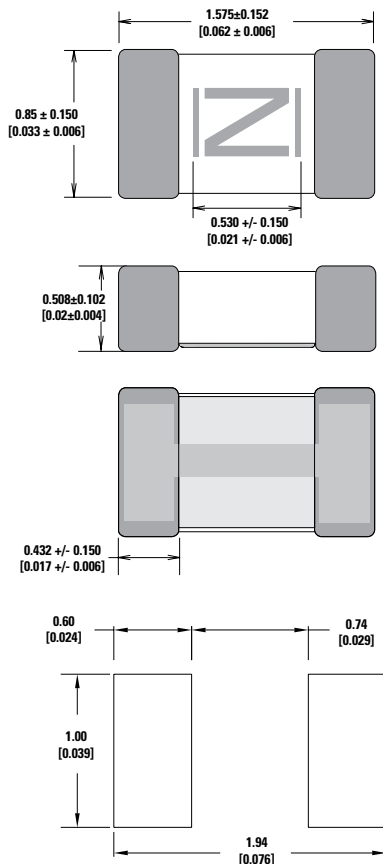
<b>Materials</b>	<b>Body:</b> Advanced Ceramic <b>Terminations:</b> Ag/Ni/Sn (100% Lead-free) <b>Element Cover Coating:</b> Lead-free Glass
<b>Moisture Sensitivity Level</b>	IPC/JEDEC J-STD-020, Level 1
<b>Solderability</b>	IPC/EIC/JEDEC J-STD-002, Condition C
<b>Humidity Test</b>	MIL-STD-202, Method 103, Conditions D
<b>Resistance to Solder Heat</b>	MIL-STD-202, Method 210, Condition B
<b>Moisture Resistance</b>	MIL-STD-202, Method 106

<b>Thermal Shock</b>	MIL-STD-202, Method 107, Condition B
<b>Mechanical Shock</b>	MIL-STD-202, Method 213, Condition A
<b>Vibration</b>	MIL-STD-202, Method 201
<b>Vibration, High Frequency</b>	MIL-STD-202, Method 204, Condition D
<b>Dissolution of Metallization</b>	IPC/EIC/JEDEC J-STD-002, Condition D
<b>Terminal Strength</b>	IEC 60127-4

<b>High Temperature Storage</b>	MIL-STD-202 Method 108 with exemptions
<b>Thermal Shock Test</b>	JESD22 Method JA-104, Test Conditions B and N
<b>Biased Humidity</b>	MIL-STD-202 Method 103, 85°C/85% RH with 10% operating power for 1000 hrs
<b>Operational Life</b>	MIL-STD-202 Method 108, Test Condition D
<b>Resistance To Solvents</b>	MIL-STD-202 Method 215
<b>Mechanical Shock</b>	MIL-STD-202 Method 213, Test Condition C

<b>High Frequency Vibration</b>	MIL-STD-202, Method 204
<b>Resistance To Soldering Heat</b>	MIL-STD-202 Method 210, Test Condition B
<b>Solderability</b>	JESD22-B102E Method 1
<b>Terminal Strength For SMD</b>	AEC Q200-006
<b>Board Flex</b>	AEC Q200-005
<b>Electrical Characterization</b>	3 Temperature Electrical Characterization

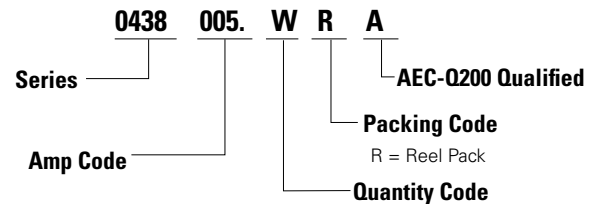
### Dimensions



### Part Marking System

Amp Code	Marking Code
.250	D
.375	E
.500	F
.750	G
001.	H
1.25	J
1.75	L
002.	N
02.5	O
003.	P
03.5	R
004.	S
005.	T
006.	U

### Part Numbering System



### Packaging

Packaging Option	Packaging Specification	Quantity	Quantity & Packaging Code
8mm Tape and Reel	EIA-481, IEC 60286, Part 3	3000	WR

**Disclaimer Notice** - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at: [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).