



### 440A Series, 1206 High I<sup>2</sup>t Fuse



#### Agency Approvals

Agency	Agency File Number	Ampere Range
	E10480	0.500A - 8A
	29862	0.500A - 8A

#### Electrical Characteristics for Series

% of Ampere Rating	Ampere Rating	Opening Time at 25°C
100%	0.50A - 0.75A 1.75A - 8A	4 hours, Minimum
350%	0.50A - 0.75A 1.75A - 8A	5 secs., Maximum

#### Description

The 440A Series AEC-Compliant fuses are specifically tested to cater to secondary circuit protection needs of compact auto electronics applications.

The general design ensures excellent temperature stability and performance reliability. This high I<sup>2</sup>t fuse series is designed to have ultra high inrush current withstand capability to avoid nuisance fuse open.

#### Features

- Operating Temperature from -55°C to +150°C
- 100% Lead-free, RoHS compliant and Halogen-free
- Meets Littelfuse's automotive qualifications\*
- Ultra high I<sup>2</sup>t values
- Fast response to faulty current to ensure over-current protection to sensitive electronic component

\* - Largely based on Littelfuse internal AEC-Q200 test plan.

#### Applications

- Li-ion Battery
- LED Lighting
- Automotive Navigation System
- TFT Display
- Battery Management System (BMS)
- Cluster

#### 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	
									
0.5	.500	63	50A @ 63VAC/DC	0.8140	0.02642	0.4831	0.242	x	x
0.75	.750	63		0.4624	0.09312	0.3983	0.299	x	x
1.75	1.75	63		0.0450	0.3312	0.0777	0.136	x	x
2	002.	63		0.0385	0.4326	0.0792	0.158	x	x
2.5	02.5	63		0.02850	0.8191	0.0747	0.187	x	x
3	003.	63	50A @ 32VAC/63VDC	0.02252	1.232	0.0742	0.223	x	x
3.5	03.5	63		0.01845	1.789	0.0757	0.265	x	x
4	004.	63		0.01553	2.601	0.0709	0.284	x	x
5	005.	63		0.0120	4.761	0.0654	0.327	x	x
7	007.	63		0.00753	8.464	0.0696	0.487	x	x
8	008.	63		0.00634	12.95	0.0655	0.524	x	x

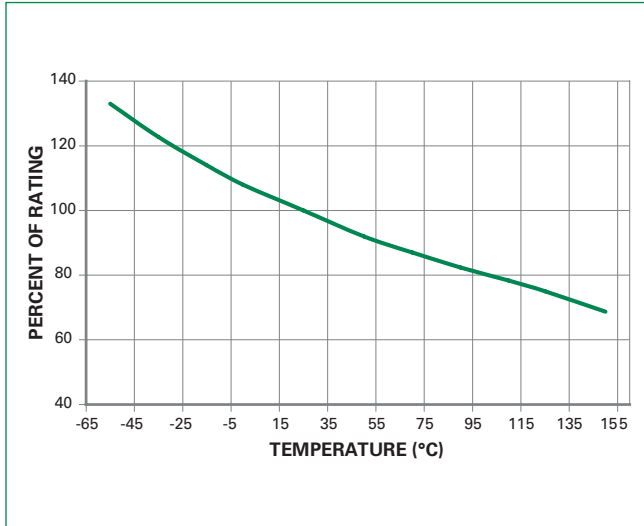
#### Notes:

- AC Interrupting Rating tested at rated voltage with unity power factor. DC Interrupting Rating tested at rated voltage with time constant < 0.8 msec.
- Nominal Resistance measured with < 10% rated current.
- Nominal Melting I<sup>2</sup>t measured at 1msec. opening time.
- 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 Derating Curve" for additional derating information.

Devices designed to be mounted with marking code facing up.

### Temperature Derating Curve



**Note:**

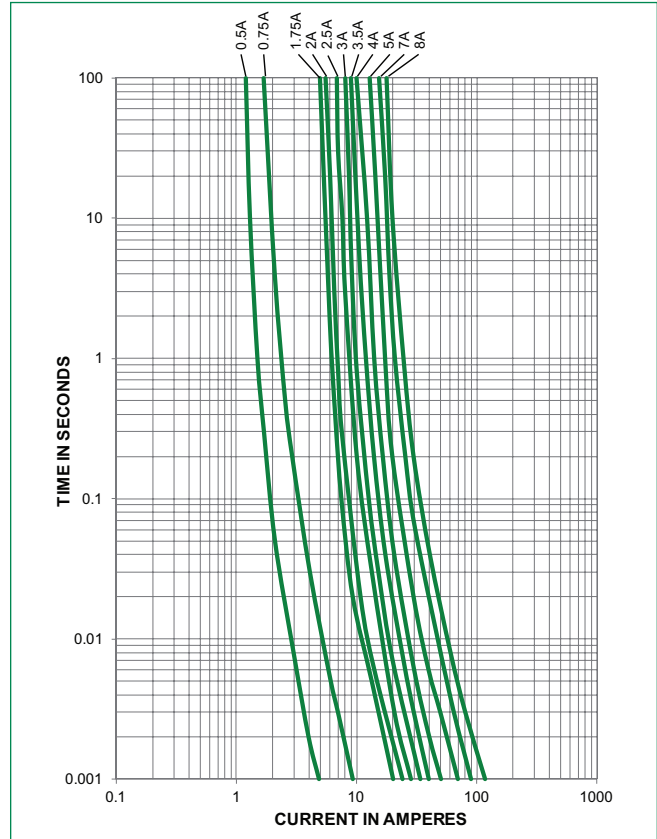
1. Derating depicted in this curve is in addition to the standard derating of 20% for continuous operation.

**Example:**

For continuous operation at 75 degrees celsius, the fuse should be derated as follows:

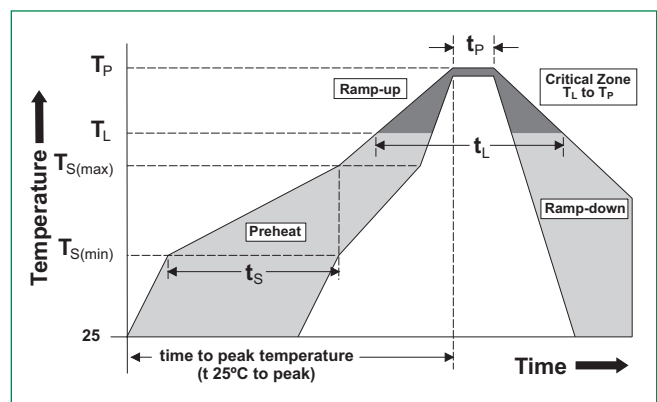
$$I = (0.80)(0.85)I_{\text{RAT}} = (0.68)I_{\text{RAT}}$$

### Average Time Current Curves



### Soldering Parameters

<b>Reflow Condition</b>		Pb-free assembly
<b>Pre Heat</b>	- Temperature Min ( $T_{s(\text{min})}$ )	150°C
	- Temperature Max ( $T_{s(\text{max})}$ )	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(\text{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 ( $t_L$ )	60 – 150 seconds
<b>Peak Temperature (<math>T_p</math>)</b>		260 $^{+0/-5}$ °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



### Wave Soldering

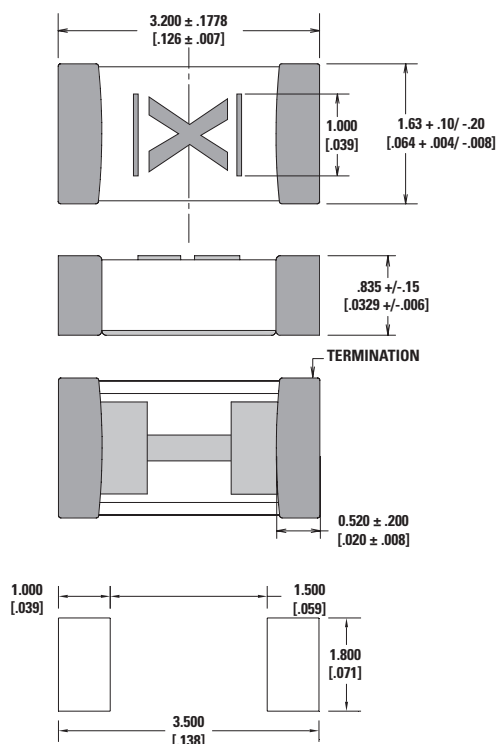
260°C, 10 seconds max.

### 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/ECA/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/ECA/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, 85C/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

### Dimensions



### Part Marking System

Amp Code	Marking Code
0.500	F
0.750	G
1.75	L
002.0	N
02.5	Q
003.0	P
03.5	R
004.0	S
005.0	T
007.0	W
008.0	X

### Part Numbering System

<b>Series</b>	<b>4440</b>
<b>AMP Code</b>	<b>008.</b>
<b>Quantity Code</b> W = 3000 pcs	<b>W</b>
<b>Packing Code</b> R = Reel Pack	<b>R</b>
<b>AEC-Q200 Qualified</b>	<b>A</b>

### Packaging

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

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