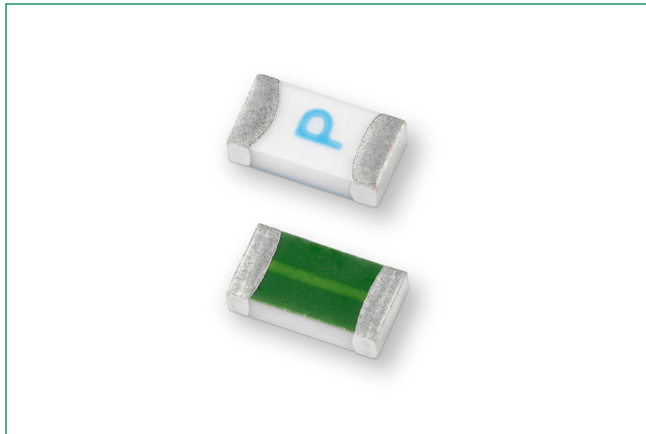


# 440A Series

## AEC-Q200 Qualified > Ceramic Fuse



### Description

The 440A Series AEC-Qualified 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 I2t fuse series is designed to have ultra high inrush current withstand capability to avoid nuisance fuse open.

### Features & Benefits

- Operating Temperature from -55°C to +150°C
- 100% Lead-free, RoHS compliant and Halogen-free
- AEC-Q200 Qualified
- Ultra high I2t values
- Fast response to faulty current to ensure over-current protection to sensitive electronic component
- Recognized to UL/CSA/NMX 248-1 and UL/CSA/NMX 248-14

### Additional Information



Resources



Accessories



Samples

### Applications

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

### 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

### Agency Approvals

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

### 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	50A @ 32VAC/63VDC	0.02850	0.8191	0.0747	0.187	x	x
3	003.	63		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:

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 1msec. opening time.
4. Nominal Voltage Drop measured at rated current after temperature has stabilized.

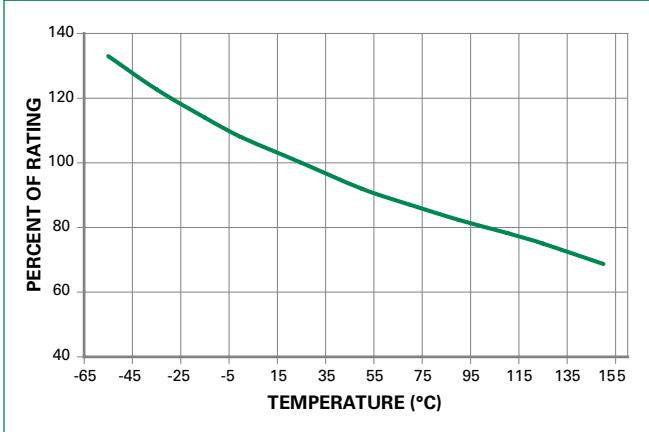
Devices designed to carry rated current for 4 hours minimum. It is recommended that devices be operated continuously at no more than 80% rated current. See "Temperature Derating Curve" for additional derating information.

Devices designed to be mounted with marking code facing up.

# 440A Series

## AEC-Q200 Qualified > Ceramic Fuse

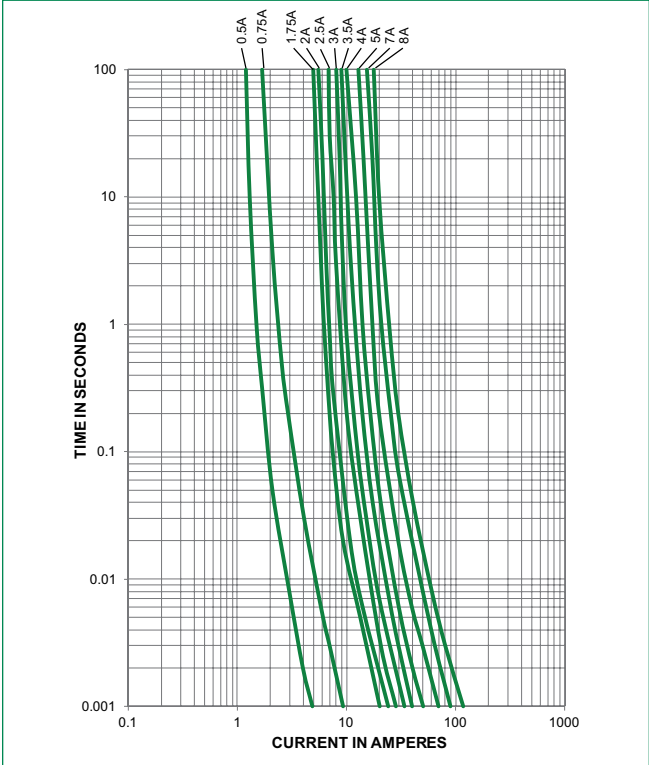
Temperature Derating Curve



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

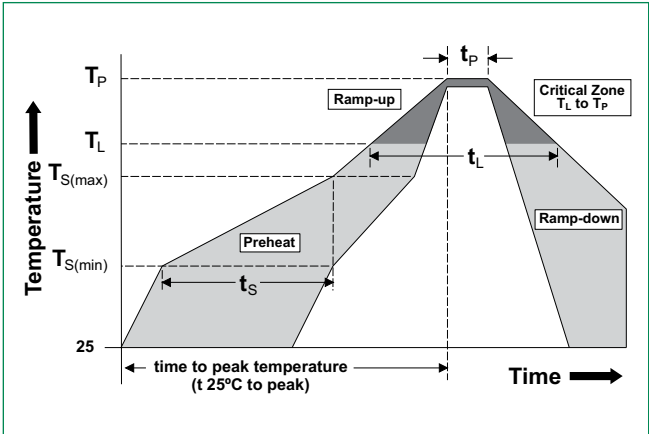
**Example:**  
 For continuous operation at 75 degrees celsius, the fuse should be derated as follows:  
 $I = (0.80)(0.85)_{RAT} = (0.68)_{RAT}$

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 ( $t_L$ )	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>		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.	



# 440A Series

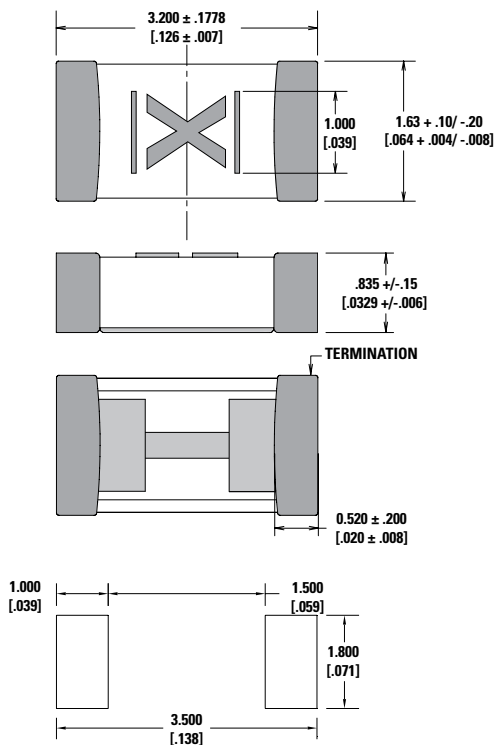
## AEC-Q200 Qualified > Ceramic Fuse

### 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>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>	Conducted at minimum, ambient and maximum temperatures

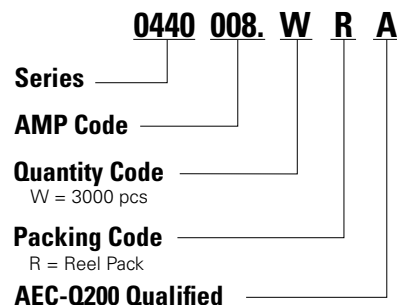
### Dimensions mm (in.)



### 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



### Packaging

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

**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)