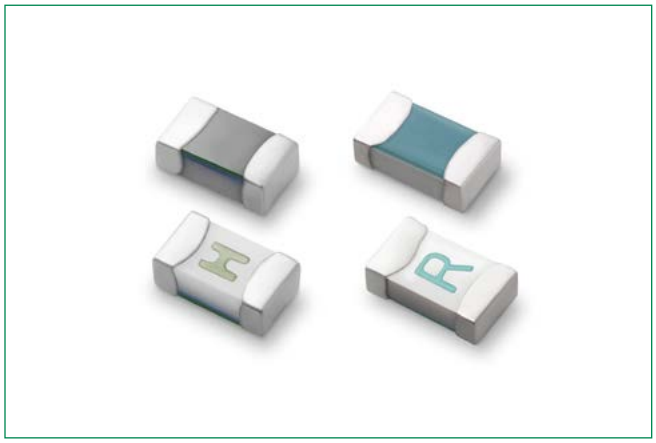
438A Series

AEC-Q200 Qualified > Ceramic Fuse



Description

The 438A series AEC-Q200 Qualified 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^2t values which is typical in the Littelfuse ceramic fuse family ensure high inrush current withstand capability.

Features & Benefits

- 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
- Recognized to UL/CSA/NMX 248-1 and UL/CSA/NMX 248-14
- Conforms to EN 60127-1 and EN 60127-7
- CE Mark indicates suitability for the European Market
- UKCA Mark indicates suitability for the UK Market
- AEC-Q200 Qualified

Web Resources

Download ECAD models, order samples, and find technical recources at www.littelfuse.com

Applications

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

Agency Approvals

Agency	Agency File Number	Ampere Range
c UL us	E10480	0.25A – 6A
SP	29862	0.25A – 6A
△	J50489122	0.25A – 6A
UKCA	N/A	0.25A – 6A
CE	N/A	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

Electrical Specifications by Item

Ampere Rating (A)	Amp Code	Max. Voltage Rating (V)	Interrupting Rating (AC/DC)[1]	Nominal Resistance (Ohms)[2]	Nominal Melting I^2t ($A^2Sec.$)[3]	Nominal Voltage Drop At Rated Current (V)[4]	Nominal Power Dissipation At Rated Current (W)	Agency Approvals			
								△	UKCA	CE	c UL us
0.25	.250	63VDC	50A @ 63VDC 50A @ 32VAC	2.218	0.0017	0.550	0.138	x	x	x	x
0.375	.375	63VDC		1.247	0.0041	0.488	0.183	x	x	x	x
0.5	.500	63VDC		0.829	0.0100	0.486	0.243	x	x	x	x
0.75	.750	63VDC		0.466	0.0281	0.378	0.284	x	x	x	x
1	001.	63VDC		0.310	0.0593	0.351	0.351	x	x	x	x
1.25	1.25	63VDC		0.200	0.0510	0.365	0.456	x	x	x	x
1.5	1.50	48VDC	50A @ 48VDC/32VAC	0.090	0.0903	0.175	0.260	x	x	x	x
1.75	1.75	32VDC	50A@32VAC/32VDC	0.1405	0.1440	0.360	0.540	x	x	x	x
2	002.	32	50A @ 32VDC/12VAC	0.0490	0.181	0.107	0.214	x	x	x	x
2.5	02.5	32		0.0364	0.240	0.095	0.238	x	x	x	x
3	003.	32		0.0264	0.439	0.093	0.279	x	x	x	x
3.5	03.5	32		0.0210	0.647	0.082	0.287	x	x	x	x
4	004.	32		0.0177	0.730	0.079	0.316	x	x	x	x
5	005.	32		0.0127	0.747	0.074	0.370	x	x	x	x
6	006.	24	50A @ 24VDC/12VAC	0.0086	1.444	0.072	0.432	x	x	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^2t 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.

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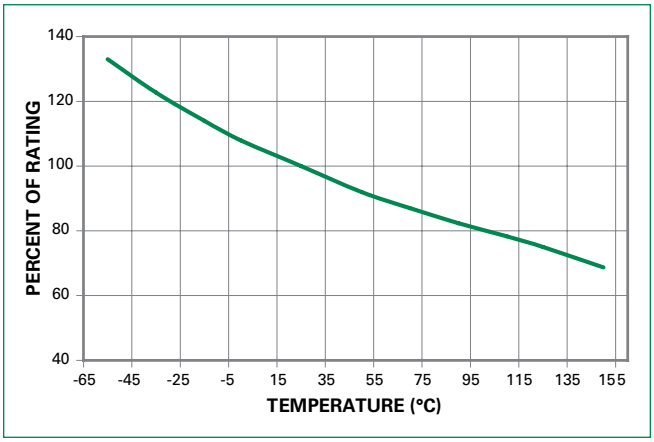
Temperature Re-rating Curve



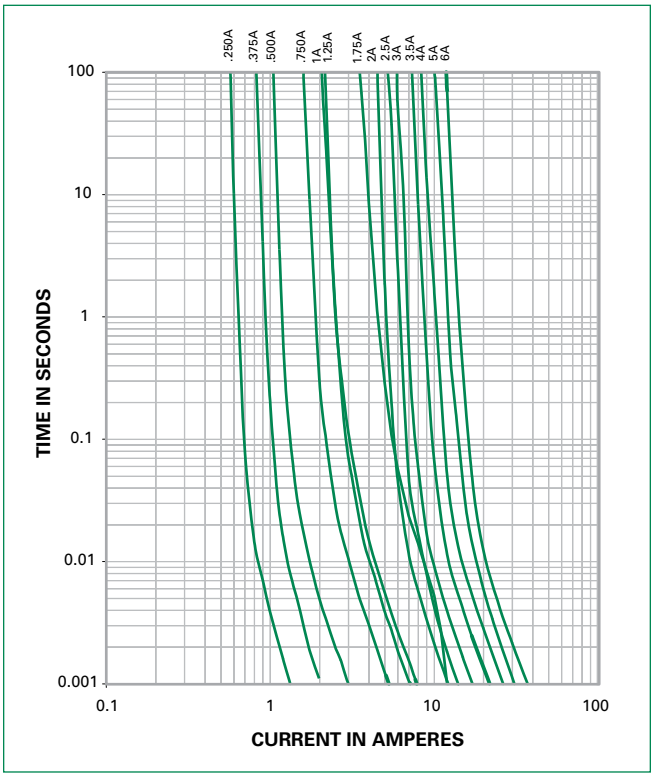
Note:

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:
$I = (0.80)(0.85)I_n = (0.68)I_n$

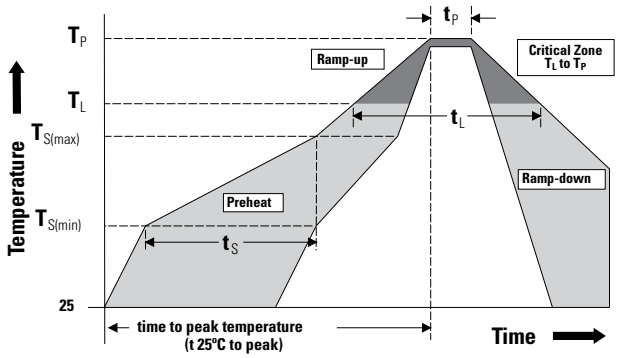
Average Time Current Curves



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 – 180 seconds
Average Ramp-up Rate (Liquidus Temp (T_L) to peak)		3°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 – 150 seconds
Peak Temperature (T_P)		$260^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		10 – 30 seconds
Ramp-down Rate		6°C/second max.
Time 25°C to peak Temperature (T_P)		8 minutes max.
Do not exceed		260°C

Wave Soldering	260°C, 10 seconds max.



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Product Characteristics

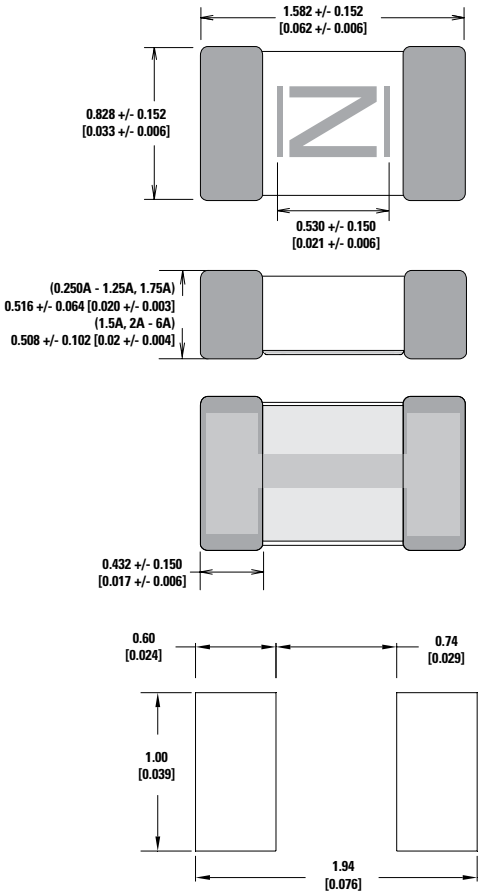
Materials	**Body:** Advanced Ceramic **Terminations:** Ag/Ni/Sn (100% Lead-free) **Element Cover Coating:** Lead-free Glass
Moisture Sensitivity Level	IPC/JEDEC J-STD-020, Level 1
Solderability	IPC/EIC/JEDEC J-STD-002, Condition C
Humidity Test	MIL-STD-202, Method 103, Conditions D
Resistance to Solder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

Thermal Shock	MIL-STD-202, Method 107, Condition B
Mechanical Shock	MIL-STD-202, Method 213, Condition A
Vibration	MIL-STD-202, Method 201
Vibration, High Frequency	MIL-STD-202, Method 204, Condition D
Dissolution of Metallization	IPC/EIC/JEDEC J-STD-002, Condition D

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

High Frequency Vibration	MIL-STD-202, Method 204
Resistance To Soldering Heat	MIL-STD-202 Method 210, Test Condition B
Solderability	JESD22-B102E Method 1
Terminal Strength For SMD	AEC-Q200-006
Board Flex	AEC-Q200-005
Electrical Characterization	Conducted at minimum, ambient, and maximum temperatures

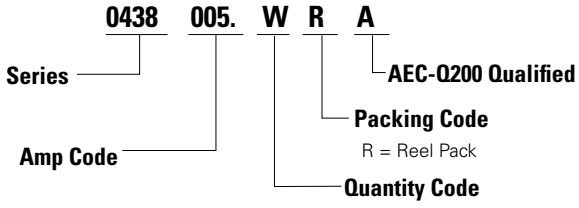
Dimensions mm [in]



Part Marking System

Amp Code	Marking Code
.250	D
.375	E
.500	F
.750	G
001.	H
1.25	J
1.75	L
002.	N̲
02.5	O̲
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 60286-3	3000	WR

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