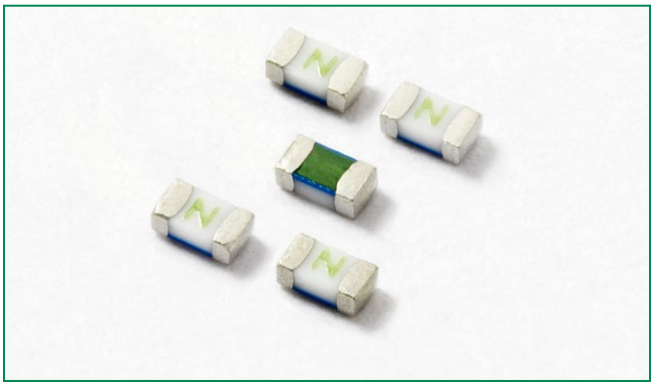
438 Series – 0603 Fast-Acting Fuse



Description

The 438 Series is a 100% Lead-free, RoHS compliant and Halogen-free fuse series designed specifically to provide over-current protection to circuits that operate under high working ambient temperature up to 150°C.

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

- 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

Applications

- Handheld Electronics
- LCD Displays
- Battery Packs
- Hard Disk Drives
- SD Memory Cards

Agency Approvals

AGENCY	AGENCY FILE NUMBER	AMPERE RANGE
c UL us	E10480	0.250A – 6A
CSA	29862	0.250A – 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

Additional Information

Datasheet | Resources | Samples

Electrical Specifications by Item

Ampere Rating (A)	Amp Code	Max. Voltage Rating (V)	Interrupting Rating	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	
								c UL us	CSA
0.250	.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
0.500	.500	63VDC		0.829	0.0100	0.486	0.243	x	x
0.750	.750	63VDC		0.466	0.0281	0.378	0.284	x	x
1.00	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
1.50	01.5	63VDC		0.174	0.0902	0.368	0.552	x	x
1.75	1.75	63VDC		1.405	0.1440	0.360	0.540	x	x
2.00	002.	32	50A @ 32VDC/12VAC	0.051	0.1490	0.107	0.214	x	x
2.50	02.5	32		0.0324	0.1977	0.095	0.238	x	x
3.00	003.	32		0.0255	0.2922	0.093	0.279	x	x
3.50	03.5	32		0.0205	0.4752	0.082	0.287	x	x
4.00	004.	32		0.0170	0.6920	0.079	0.316	x	x
5.00	005.	32		0.0115	0.7398	0.074	0.370	x	x
6.00	006.	24	50A @ 24VDC/12VAC	0.0085	1.3838	0.072	0.432	x	x

Notes:

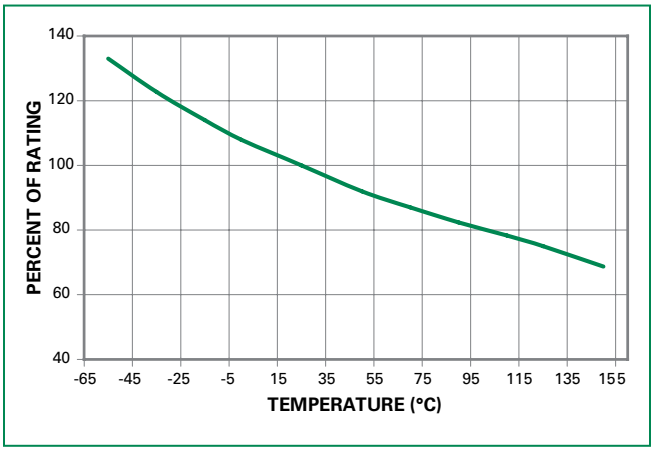
1. AC Interrupting Rating tested at rated voltage with unity power factor. DC Interrupting Rating tested at rated voltage with time constant < 0.8 msec.
2. Nominal Resistance measured with < 10% rated current.
3. Nominal Melting I^2t measured at 1 msec. opening time.
4. Nominal Voltage Drop measured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

Revised: 12/13/18

Temperature Re-rating Curve



Note:

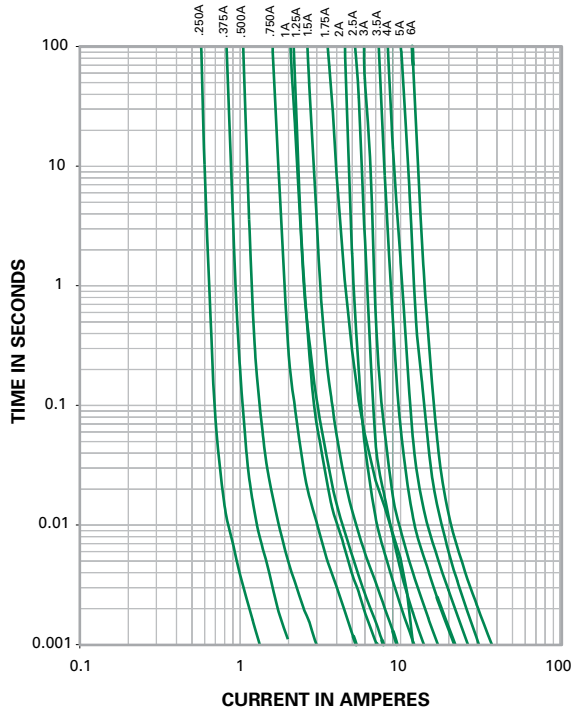
1. Re-rating depicted in this curve is in addition to the standard re-rating of 20% for continuous operation.

Example:

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

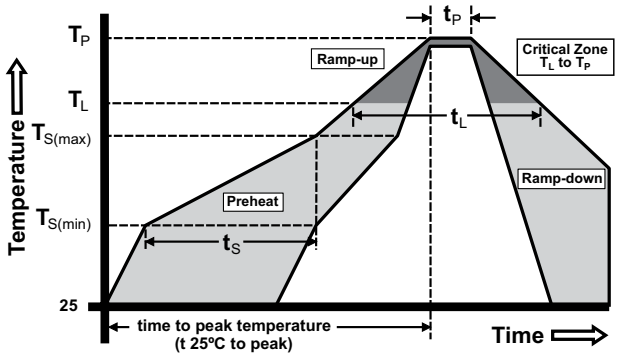
$I = (0.80)(0.85)I_{RAT} = (0.68)I_{RAT}$

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.

Revised: 12/13/18

Surface Mount Fuses

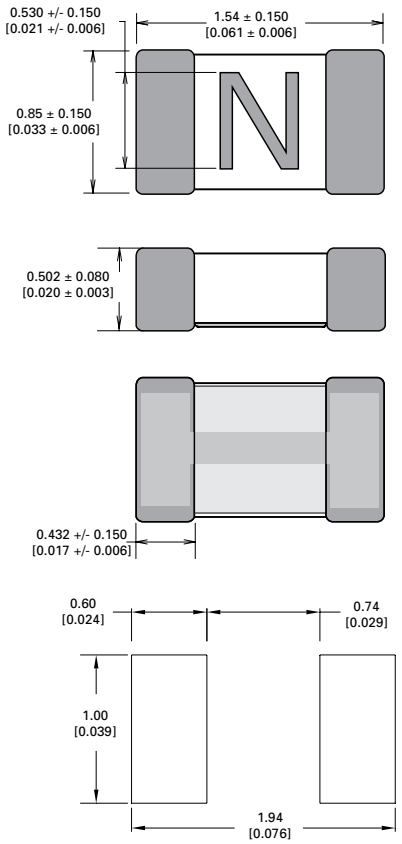
Ceramic Fuse > 438 Series

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 B
Humidity	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-3
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
Terminal Strength	IEC 60127-4

Dimensions



Part Marking System

Amp Code	Marking Code
.250	**D**
.375	**E**
.500	**F**
.750	**G**
001.	**H**
1.25	**J**
01.5	**K**
1.75	**L**

Amp Code	Marking Code
002.	**N**
02.5	**O**
003.	**P**
03.5	**R**
004.	**S**
005.	**T**
006.	**U**

Part Numbering System

0438 005. W R

SERIES

AMP CODE

PACKING CODE
R = Reel Pack

QUANTITY CODE
W = 3000 pcs

Packaging

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