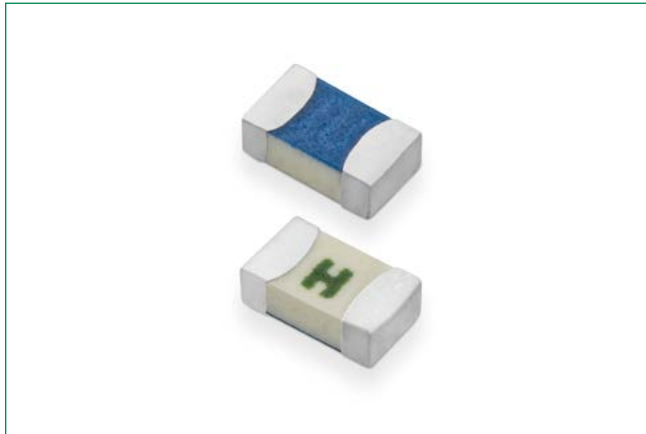


438 Series

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 I²t 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

Web Resources



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

Agency Approvals

Agency	Agency File Number	Ampere Range
	E10480	0.250A – 6A
	29862	0.250A – 6A
	J50489122	0.250A - 6A
	N/A	0.250A - 6A
	N/A	0.250A - 6A

Applications

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

Electrical Characteristics for Series

% of Ampere Rating	Ampere Rating	Opening Time at 25°C
100%	0.25A – 6A	4 Hours, Minimum
250%	0.25A – 6A	5 Seconds, Maximum

Electrical Specifications by Item

Ampere Rating (A)	Amp Code	Max. Voltage Rating (V)	Interrupting Rating	Nominal Resistance (Ohms) ²	Nominal Melting I ² t (A ² Sec.) ³	Nominal Voltage Drop At Rated Current (V) ⁴	Nominal Power Dissipation At Rated Current (W)	Agency Approvals				
0.250	.250	63VDC	50A @ 63VDC 50A @ 32VAC	2.218	0.0017	0.550	0.138	x	x	x	x	x
0.375	.375	63VDC		1.247	0.0041	0.488	0.183	x	x	x	x	x
0.500	.500	63VDC		0.829	0.0100	0.486	0.243	x	x	x	x	x
0.750	.750	63VDC		0.415	0.0340	0.378	0.284	x	x	x	x	x
1.00	001.	63VDC		0.265	0.0620	0.351	0.351	x	x	x	x	x
1.25	1.25	63VDC		0.136	0.0580	0.365	0.456	x	x	x	x	x
1.50	01.5	63VDC	50A @ 63VDC 50A @ 24VAC	0.097	0.1190	0.368	0.552	x	x	x	x	x
1.75	1.75	63VDC		0.076	0.1600	0.360	0.540	x	x	x	x	x
2.00	002.	32	50A @ 32VDC/12VAC	0.051	0.1490	0.107	0.214	x	x	x	x	x
2.50	02.5	32		0.0324	0.1977	0.095	0.238	x	x	x	x	x
3.00	003.	32		0.0255	0.2922	0.093	0.279	x	x	x	x	x
3.50	03.5	32		0.0205	0.4752	0.082	0.287	x	x	x	x	x
4.00	004.	32		0.0170	0.6920	0.079	0.316	x	x	x	x	x
5.00	005.	32		0.0115	0.7398	0.074	0.370	x	x	x	x	x
6.00	006.	24	50A @ 24VDC/12VAC	0.0085	1.3838	0.072	0.432	x	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 I²t measured at 1 msec. opening time.
4. Nominal Voltage Drop measured at rated current after temperature has stabilized.

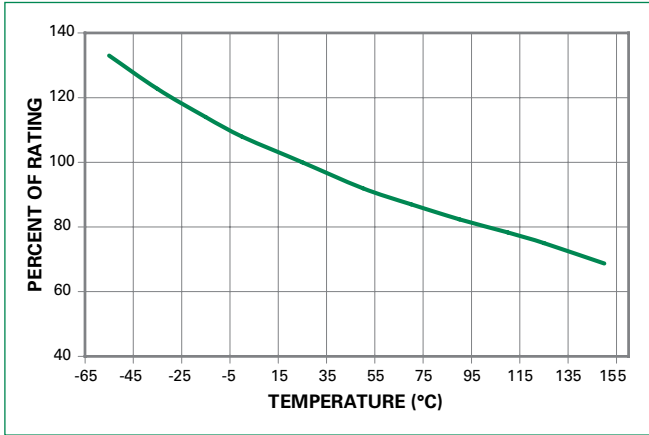
Devices designed to carry rated current for 4 hours minimum. It is recommended that devices be operated continuously at no more than 80% rated current. See "Temperature Re-rating Curve" for additional re-rating information.

Devices designed to be mounted with marking code facing up.

438 Series

0603 Fast-Acting Fuse

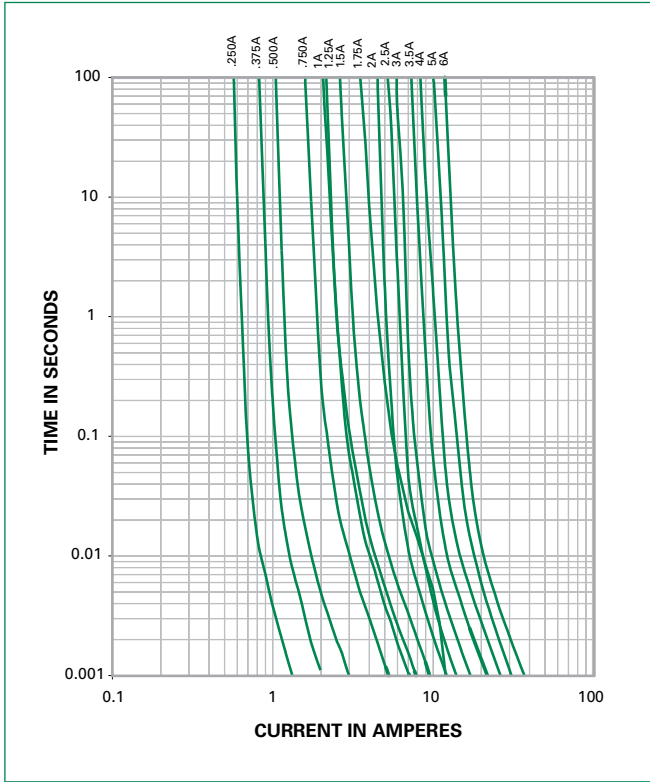
Temperature Re-rating Curve



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

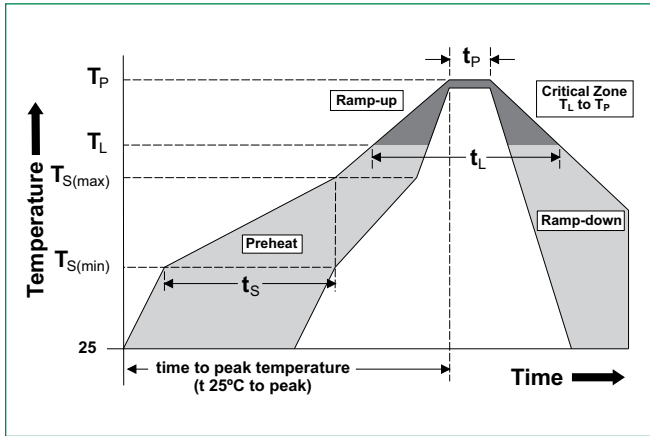
Example:
 For continuous operation at 75 degrees celsius, the fuse should be rerated as follows:
 $I = (0.80)(0.85)_{\text{RAT}} = (0.68)_{\text{RAT}}$

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_p)	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_t)	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.	



438 Series

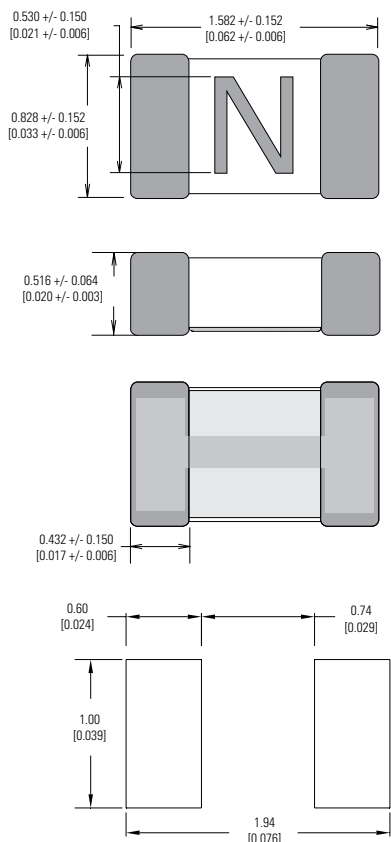
0603 Fast-Acting Fuse

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

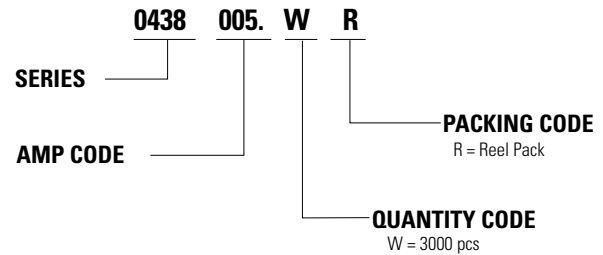
Dimensions mm [in]



Part Marking System

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

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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