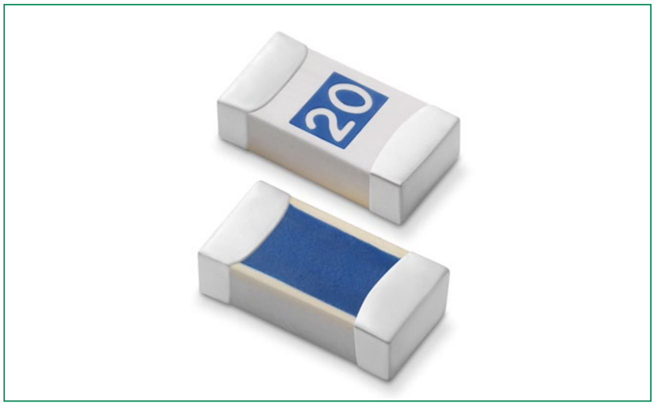
501A Series – High Current 1206 Fast-Acting Fuse



Agency Approvals

Agency	Agency File Number	Ampere Range
c RU us	E10480	10A - 20A
CSA	29862	10A - 20A

Electrical Characteristics for Series

% of Ampere Rating	Ampere Rating	Opening Time at 25°C
100%	10A – 20A	4 Hours, Minimum
350%	10A – 20A	5 Seconds, Maximum

Additional Information

Datasheet

Resources

Samples

Description

The 501A series AECQ-Compliant fuses and Halogen free fuse series are specifically tested to cater to 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 are typical in the Littelfuse Ceramic Fuse family, ensure high inrush current withstanding capability.

Features

- Operating Temperature from -55°C to +150°C
- Meets Littelfuse's automotive qualifications*
- 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

* Largely based on Littelfuse internal AEC-Q200 test plan

Applications

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

Electrical Specifications by Item

Ampere Rating (A)	Amp Code	Max. Voltage Rating (V)	Interrupting Rating (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	
								c RU us	CSA
10	010.	32	150A @ 32VDC	0.00362	10.385	0.04407	0.4407	x	x
12	012.	32		0.00311	20.341	0.04927	0.5912	x	x
15	015.	32		0.00250	39.700	0.04843	0.7265	x	x
20	020.	32		0.00194	86.360	0.05888	1.1776	x	x

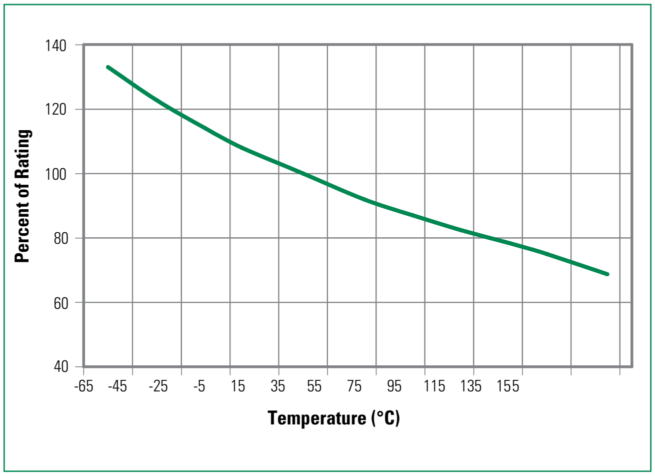
Notes:

1. DC Interrupting Rating tested at rated voltage with time constant <0.5msec.
2. Nominal Resistance measured with <10% rated current.
3. Nominal Melting I^2t measured at 1 msec. opening time. For other I^2t data refer to chart.
4. Nominal Voltage Drop measured at rated current after temperature has stabilized and with fuse mounted on board with 3oz Cu trace.

Devices designed to carry rated current for four 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.

Temperature Re-rating Curve



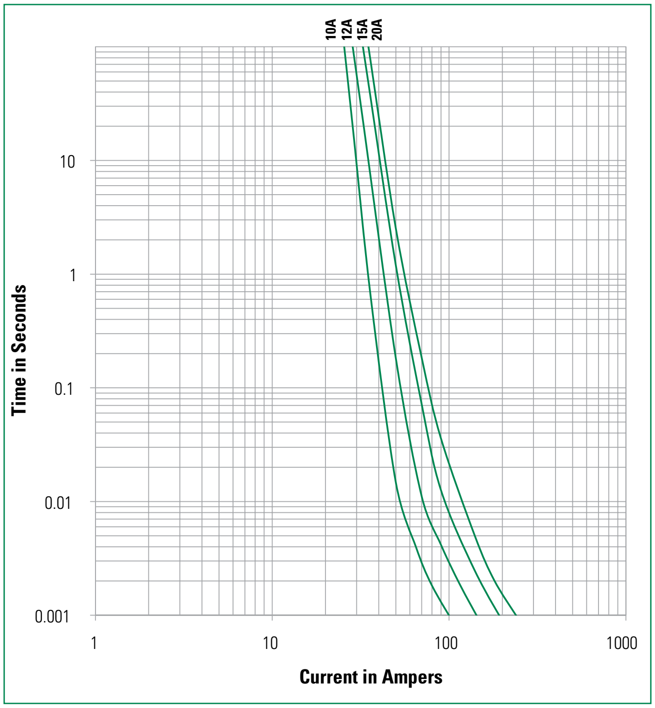
Note:

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

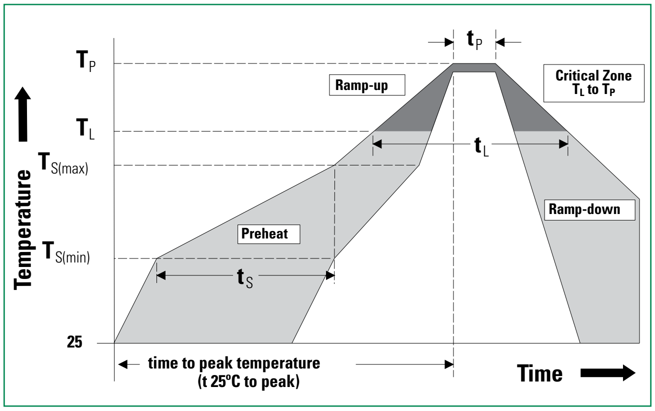
Average Time Current Curves



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

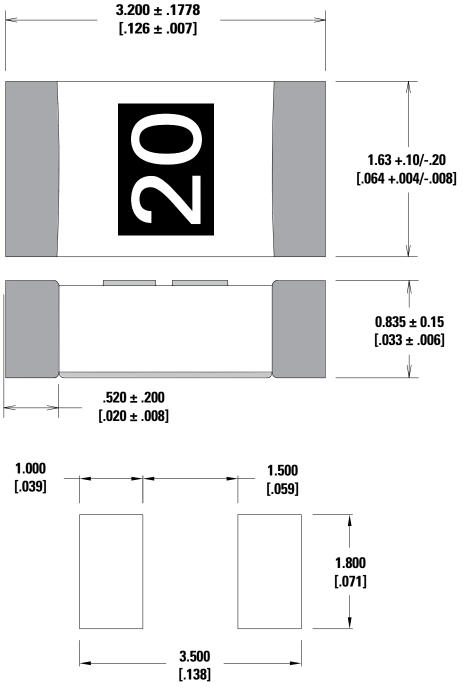
Wave Soldering	260°C, 10 seconds max.



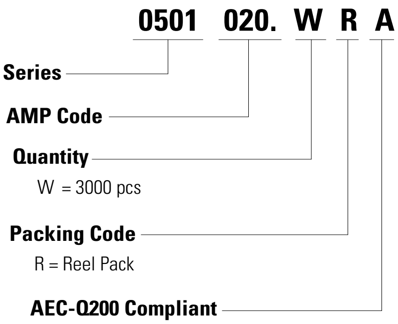
Product Characteristics

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/ECA/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/ECA/JEDEC J-STD-002, Condition D
Terminal Strength	IEC 60127-4
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 1000hrs
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	Three Temperature Electrical

Dimensions



Part Numbering System



Part Marking System

Amp Code	Marking Code
010.	10
012.	12
015.	15
020.	20

Packaging

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