

# Type 0678L

## Square Ceramic Surface Mount Medium Blow Fuse

HF 0678L Series-3912 Size

RoHS Compliant

### Features

- Medium blow, Surface mount high current fuse
- Current rating from 10A to 30A
- Wide operating temperature range from -55°C to 125°C
- Tape & Reel for auto-insert SMD process
- Compatible with 260°C, IR Pb-free solder process
- RoHS compliant with exemption 7(a)
- Full compliance with EU Directive 2011/65/EU and amending directive 2015/863
- Halogen Free, (MSL=1)
- AEC-Q Compliant
- Meets Bel automotive qualification\*
- \* - Largely based on internal AEC-Q test plan

### Applications



- Voltage regulator module
- PC server
- Office electronic equipment
- Industrial equipment
- Medical equipment
- POE, POE+
- Power supply
- DC-DC converter

HALOGEN FREE = HF



UK  
CA cRU<sup>US</sup> CE  
**AEC-Q Compliant**


### Physical Specifications

Materials	Body : Ceramic
	Terminations : Silver Plated Caps /Palladium Plated Caps
Marking	On Fuse :
	"Current Rating", "L" – laser marked on ceramic tube, "bel" stamped in end caps.
	On Label :
	"bel", "0678L", "Current Rating", "Voltage Rating", "Interrupting Rating", "Appropriate Safety Logos" and "  ", "  "(China RoHS compliant).

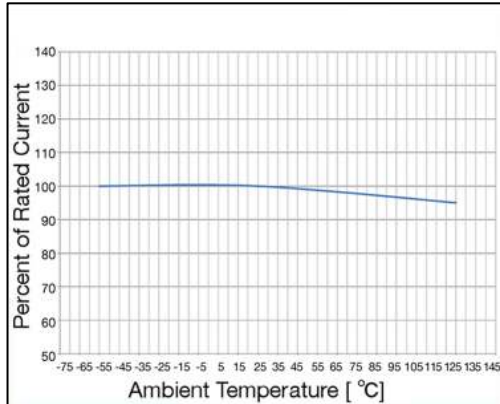
### Electrical Characteristics (UL/CSA STD.248-14)

Testing Current	Blow Time	
	Minimum	Maximum
100%	4 hrs.	N/A
200%	N/A	60 sec

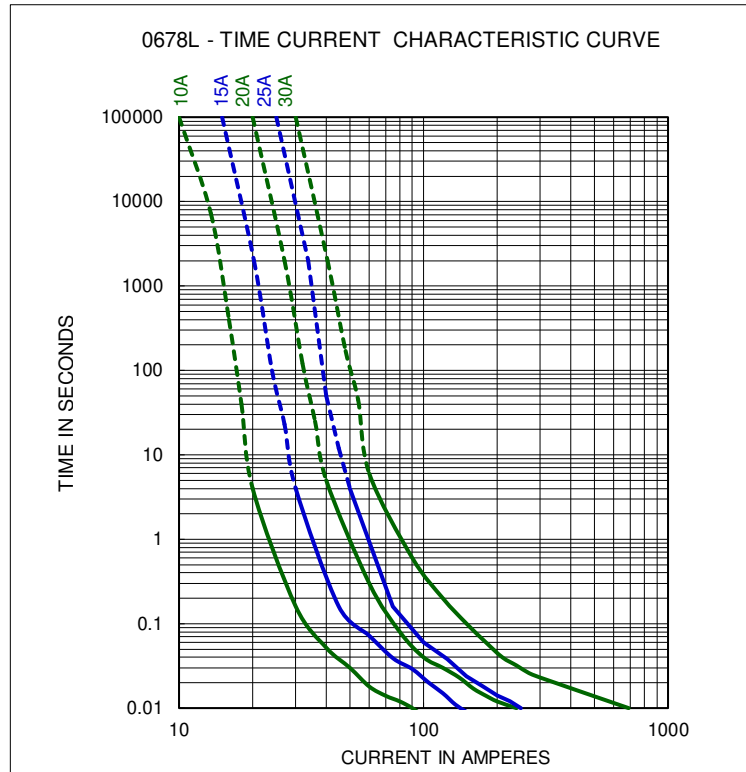
### Safety Agency Approvals

Safety Agency	Safety Agency Certificate	Ampere Rating / Voltage Rating	Ampere Range / Volt @ I.R. ability*
	E20624	10A-30A / 250V AC 72V DC	10A-30A /250V @ 100A AC 125V @ 150A AC 72V @ 130A DC 65V @ 300A DC
*I.R.= Interrupting Rating = Short Circuit Rating(Amps)			

## Temperature Derating Curve



## Average Time Current Curve



## Electrical Specifications

Part Number	Ampere Rating	Nominal Cold Resistance (ohms)	Nominal Volt-drop @100%In (Volt) max.	Voltage and Interrupting Ratings	Melting I <sup>2</sup> T @10 In (A <sup>2</sup> Sec) Min.	Nominal Power Dissipation (W)	Agency Approvals
0678L9100-XX	10A	0.0056	0.18	See Table of Safety Approvals on Page 1 for Voltage and associated Interrupting Ratings	50	1.8	Y
0678L9150-XX	15A	0.0036	0.12		110	1.8	Y
0678L9200-XX	20A	0.0025	0.09		270	1.8	Y
0678L9250-XX	25A	0.0019	0.08		420	2.0	Y
0678L9300-XX	30A	0.0013	0.07		1000	2.1	Y

Consult manufacturer for other ratings  
XX-Packaging code (see "ordering information")

### NOTES:

#### Test Conditions

For all 0678L data, as well as UL Component investigation, all tests were conducted with fuse samples soldered on a PCB (1.6mm thick) test board with copper traces measuring 0.1mm nominal thickness (3 oz. clad), 10mm wide and 100mm overall length.

- UL Condition of Acceptability

- The following information is contained in the UL Component Recognition for 0678L Fuse Series:

The maximum temperature recorded in open air was 100°C in a 21°C ambient (79°C rise). Consideration should be given to checking operating temperatures in end-use application with regard to thermal index of surrounding materials and components.

(Maximum temperature recorded at 80% of rating (24A) for the 0678L 30 rating was 69°C (48°C rise).

#### Caution:

- Minimum fusing point:

The 0678L Series fuse are NOT intended to be operated at currents between 100% and 200% of ampere rating. Prolonged operation at currents in this range may result in overheating of the fuse and/or desoldering of the fuse caps from the PCB pad.



Specifications subject to change without notice

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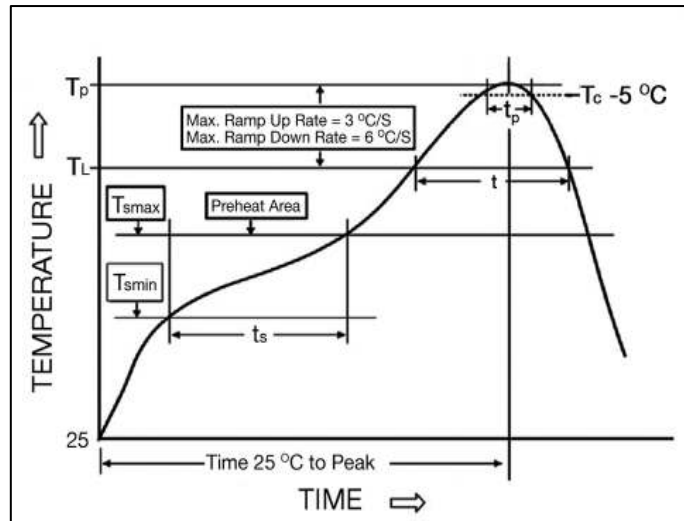
## Environmental Specifications

Shock Resistance	MIL-STD-202G, Method 213B, Test Condition 1 (100 G's peak for 6 milliseconds; Sawtooth waveform)
Vibration Resistance	MIL-STD-202G, Method 201A (10-55 Hz, 0.06 inch, total excursion).
Salt Spray Resistance	MIL-STD-202G, Method 101E, Test Condition B (48 hrs.).
Insulation Resistance	MIL-STD-202G, Method 302, Test Condition A (After Opening) 10,000 ohms minimum.
Solderability	MIL-STD-202G, Method 208H
Resistance to solder Heat	MIL-STD-202G, Method 210F, Test Condition C. Top Side (260°C, 20 sec) MIL-STD-202G, Method 210F, Test Condition D. Bottom Side (260°C, 10 sec)
Thermal Shock	MIL-STD-202G, Method 107G, Test Condition B (-65°C to +125°C).
Operating Temperature	-55°C to +125°C
Moisture Sensitivity Level	1 (According to IPC J-Std-020)

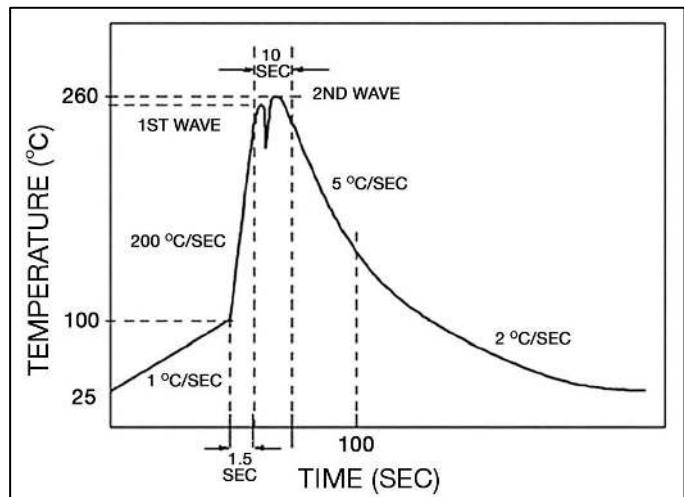
High temperature storage	MIL-STD-202 Method 108
Temperature cycling	JESD22 Method JA-104, Test Condition B
Biased humidity	MIL-STD-202 Method 103, 85C/85% RH with 10% operating power for 1000 hrs.
Operational life	MIL-STD-202 Method 108, Test Condition D
Resistance to solvents	MIL-STD-202 Method 215
Mechanical shock	MIL-STD-202 Method 213, Test Condition C
Vibration	MIL-STD-202 Method 204
Resistance to soldering heat	MIL-STD-202 Method 210, Test condition B
Thermal shock	MIL-STD-202 Method 107
Solderability	J-STD-002
Board flex(SMD)	AEC-Q200-005
Terminal strength	AEC-Q200-006
Electrical characterization	3 temperature electrical

## Soldering Parameters

IR Reflow Profile (IPC/JEDEC J-STD-020D)	
<b>Preheat &amp; Soak</b>	
Temperature min ( $T_{smin}$ )	150°C
Temperature max ( $T_{smax}$ )	200°C
Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	60-120 seconds
Average ramp-up rate( $T_{smax}$ to $T_p$ )	3°C / second max.
Liquidous temperature( $T_L$ )	217°C
Time at liquidous ( $t_L$ )	60 – 150 seconds
Peak temperature ( $T_p$ )	260°C max
Time ( $t_p$ ) within 5°C of the specified classification temperature ( $T_c$ )	30 seconds
Average ramp-down rate( $T_p$ to $T_{smax}$ )	6°C / second max.
Time 25°C to peak temperature	8 minutes max.



Lead-free Wave Soldering Profile	
Wave Soldering Parameter	
Average ramp-up rate	200°C / second
Heating rate during preheat	typical 1 - 2°C / second Max 4°C / second
Final preheat temperature	within 125°C of soldering temperature
Peak temperature $T_p$	260°C
Time within +0°C / -5°C of actual peak temperature	10 seconds
Ramp-down rate	5°C / second max.



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# Type 0678L

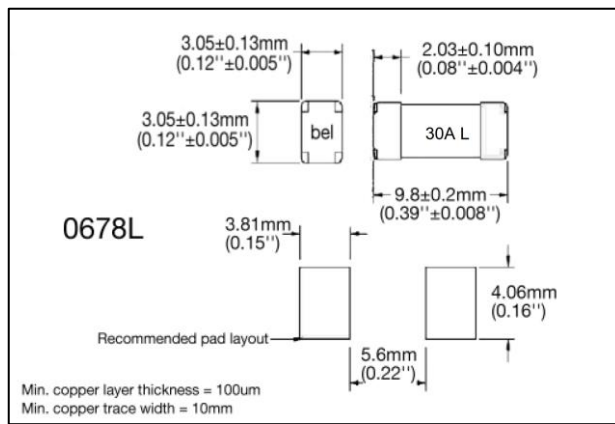
## Fuse FGNO Explanation

0678L [XXXX] -XX

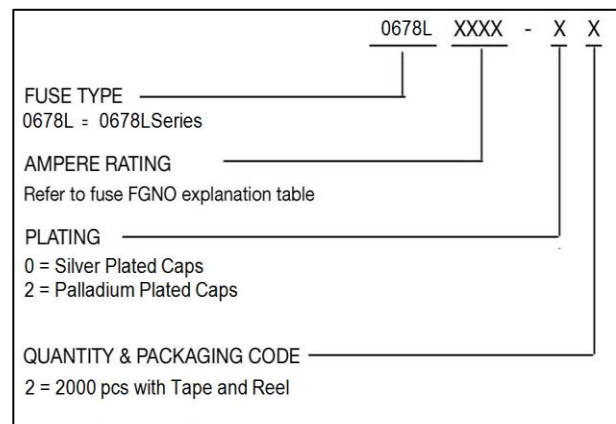
0678L=0678L Series; [XXXX]=Ampere Rating; XX=See Ordering Information as below

Amps	Bel FGNO[XXXX]
10	9100
15	9150
20	9200
25	9250
30	9300

## Mechanical Dimensions



## Ordering Information



## Packaging

Packaging Tape & Reel	Packaging Specification	Quantity	Quantity & Packaging Code
16mm wide tape with 13 inches Diameter reel	EIA Standard 481-E	2000	2



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