Type 0680L

Square Ceramic Surface Mount Slow Blow Fuse

HF 0680L Series – 2410 Size RoHS Compliant

Features

- Slow Blow, 2410 SMD
- Compatible with 260℃, IR Pb-free solder process
- Wide range of current rating from 375mA to 12A
- Wide operating temperature range, -55℃ to 125℃
- Tape & Reel for auto-insert SMD process
- AEC-Q Compliant
- RoHS compliant with exemption 7(a)
- Halogen Free, (MSL = 1)
- Meets Bel automotive qualification*
  * - Largely based on internal AEC-Q test plan

AEC-Q Compliant

Applications

- Notebook
- LCD monitor
- PC computer
- Office electronic equipment
- Industrial equipment
- Medical equipment
- POE, POE+
- LCD / LED monitor
- Power supply
- LCD / LED TV
- Storage system
- Telecom system
- Wireless basestation
- White goods
- Game console
- Battery charging circuit protection

HALOGEN FREE = HF

Electrical Characteristics

(UL/CSA/STD.248-14)

Testing Current	Blow Time	
	Minimum	Maximum
100%	4 Hrs.	N/A
200%	N/A	120 Sec
300%	0.15 Sec	3 Sec
800%	0.01 Sec	0.1 Sec

Safety Agency Approvals

Safety Agency	Safety Agency Certificate	Voltage Rating (V)	Ampere Range / Volt @ I.R. ability*
cULus	E506667	375mA-7A/125V AC 125V DC >7A-12A/50V AC 75V DC	375mA-7A/125V AC @50A 125V DC @100A 75V DC @500A >7A-12A/50V AC @100A 75V DC @500A
TÜV	50268578 EN 60127-1: 2006+A1+A2 EN 60127-4: 2005+A1+A2	375mA-7A/125V AC 125V DC >7A-12A/50V AC 75V DC	375mA-7A/125V AC @50A 125V DC @100A 75V DC @500A >7A-12A/50V AC @100A 75V DC @500A

*I.R.= Interrupting Rating = Short Circuit Rating(Amps)

Physical Specifications

Materials	Body : Ceramic
	Terminations : Silver Plated Caps /Gold Plated Caps/Palladium Plated Caps
Marking	On Fuse :
	"Current Rating", "T", "L"—laser marked on ceramic tube, "bel" stamped in end caps.
	On Label :
	"bel", "0680L", "Current Rating", "Voltage Rating", "Interrupting Rating", "Appropriate Safety Logos" and " ", " "(China RoHS compliant).

Environmental Specifications

Shock Resistance	MIL-STD-202G Method 213,Test condition A (50G's peak for 11 milliseconds : Half-sine 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.
Thermal Shock	MIL-STD-202G, Method 107G, Test Condition B (-65℃ to +125℃).
Operating Temperature	-55℃ to +125℃
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-202G Method 204 Test condition D（10-2k HZ ,20G's for 20minutes）
Resistance to soldering heat	MIL-STD-202 Method 210,Test condition B
Thermal shock	MIL-STD-202 Method 107
Solderability	J-STD-002 Test B
Board flex(SMD)	AEC-Q200-005
Terminal strength	AEC-Q200-006
Electrical characterization	3 Temperature Electrical

Electrical Specifications

Part Number	Ampere Rating	Typical Cold Resistance (ohms)	Volt-drop @100% In (Volt) max.	Voltage and Interrupting Ratings	Melting I^2T @10 In (A^2 Sec)	Melting I^2T <10ms (A^2 Sec)	Maximum Power Dissipation (W)	Agency Approvals	
								c UL us	TÜV
0680L0375-XX	375mA	0.93	1.20	See Table of Safety Approvals on Page 1 for Voltage and associated Interrupting Ratings	0.14	0.10	0.45	Y	Y
0680L0500-XX	500mA	0.58	0.90		0.27	0.35	0.45	Y	Y
0680L0630-XX	630mA	0.41	0.80		0.43	0.42	0.50	Y	Y
0680L0750-XX	750mA	0.33	0.75		0.62	0.61	0.56	Y	Y
0680L1000-XX	1A	0.175	0.60		1.5	1.3	0.60	Y	Y
0680L1500-XX	1.5A	0.095	0.40		3.3	3.2	0.60	Y	Y
0680L2000-XX	2A	0.068	0.35		6	5	0.70	Y	Y
0680L2500-XX	2.5A	0.048	0.34		9	7	0.85	Y	Y
0680L3000-XX	3A	0.037	0.27		13	12	0.81	Y	Y
0680L3500-XX	3.5A	0.030	0.26		18	17	0.91	Y	Y
0680L4000-XX	4A	0.026	0.25		24	22	1.00	Y	Y
0680L5000-XX	5A	0.019	0.23		37	36	1.15	Y	Y
0680L6300-XX	6.3A	0.015	0.22		43	50	1.39	Y	Y
0680L7000-XX	7A	0.012	0.21		68	77	1.47	Y	Y
0680L8000-XX	8A	0.0099	0.20		108	105	1.60	Y	Y
0680L9100-XX	10A	0.0084	0.19		170	150	1.90	Y	Y
0680L9120-XX	12A	0.0063	0.18		244	180	2.16	Y	Y

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

NOTES 1:
All tests were conducted with the fuses soldered to a printed circuit boards with a nominal thickness of 1.6 mm. The copper test circuit trace was a printed circuit with an overall length of 100 mm, copper thickness/width as described below. The printed circuit boards were mounted by screws to a test fixture having brass blocks for connection of the test leads. All samples were soldered to the test boards by the manufacturer.

Fuse rating	Test Board Trace Dimensions
375mA-5A	1 oz. copper, 5.0mm wide.
6A-12A	3 oz. copper, 10mm wide.

NOTES 2:
Conventional (Ambient Pressure) Reflow Process is recommended for this device. The sale and use of product is subject to bel terms and condition of sale，unless otherwise agreed .User should independently evaluate the suitability of and test each product selected for their own application. product are not designed for ，and may not be used in，all applications.

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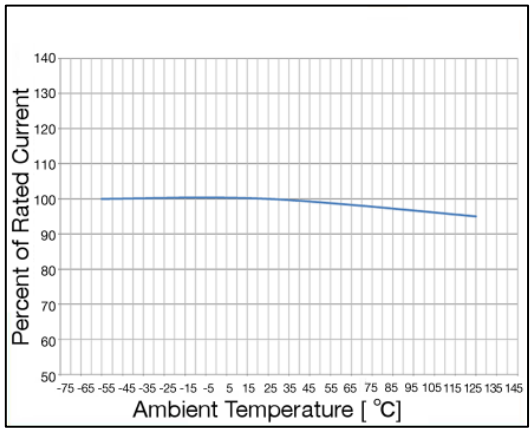
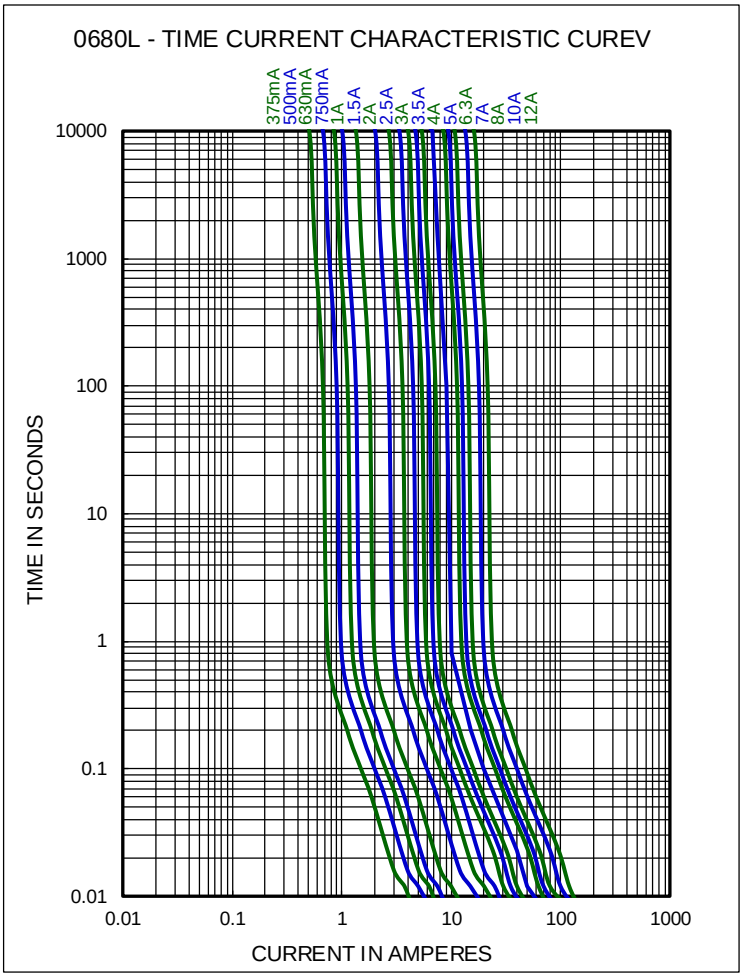
Temperature Derating Curve

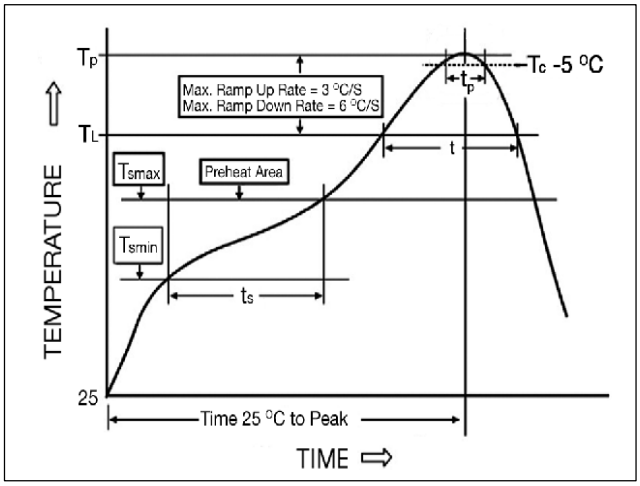


Average Time Current Curve



Soldering Parameters

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



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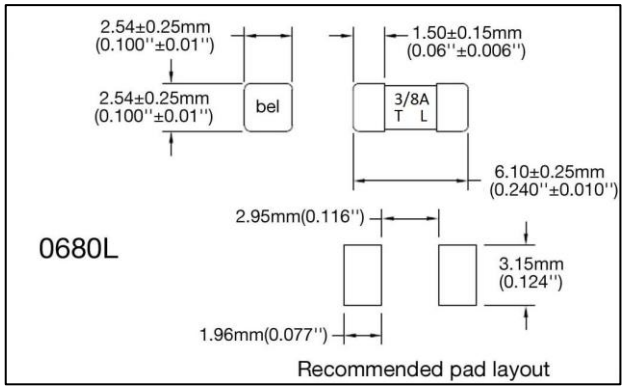
Fuse FGNO Explanation
0680 L [XXXX] -XX
0680L=0680L; [XXXX]=Ampere Rating; XX=See Ordering Information as below

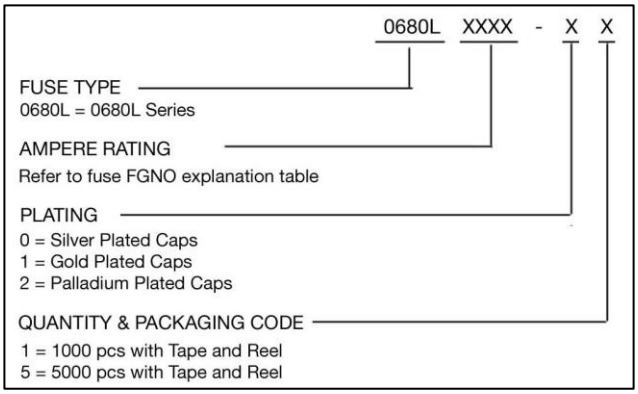
Fraction	Decimal	Milliamps	Bel FGNO[XXXX]
3/8	0.375	375	0375
1/2	.500	500	0500
	.630	630	0630
3/4	.750	750	0750

Fraction	Decimal	Amps	Bel FGNO[XXXX]
	1.0	1	1000
1-1/2	1.5	1.5	1500
	2.0	2	2000
2-1/2	2.5	2.5	2500
	3.0	3	3000
3-1/2	3.5	3.5	3500
	4.0	4	4000
	5.0	5	5000
	6.3	6.3	6300
	7.0	7	7000
	8.0	8	8000
		10	9100
		12	9120

Mechanical Dimensions



Ordering Information



Packaging

Packaging Tape & Reel	Packaging Specification	Quantity	Quantity & Packaging Code
12 mm wide tape with 13 inches Diameter reel	EIA Standard 481-E	5000	5
12 mm wide tape with 7 inches Diameter reel	EIA Standard 481-E	1000	1

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