Type 0678H

Enhanced-breaking Capability Brick Fuse

HF 0678H Series-3912 Size RoHS Compliant



AEC-Q Compliant

Features

- Enhanced – Breaking capacity
- Surface mount high current fuse
- Current rating from 500mA to 40A
- Wide operating temperature range from -55℃ to 125℃
- Tape & Reel for auto-insert SMD process
- Compatible with 260℃, 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
- Mass storage systems

HALOGEN FREE = HF

Physical Specifications

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

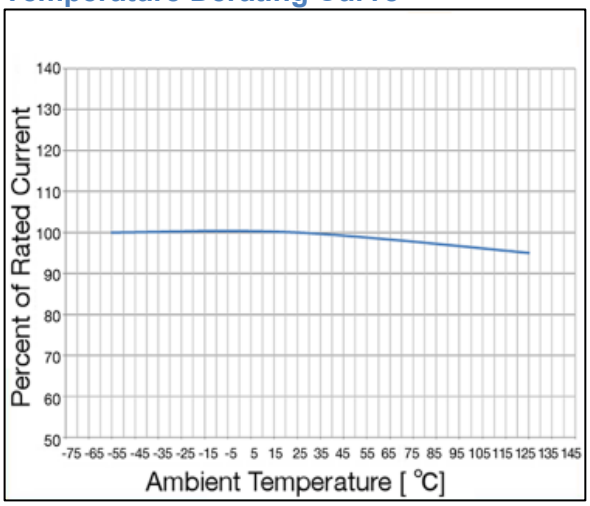
Safety Agency Approvals

Safety Agency	Safety Agency Certificate	Ampere Rating/ Voltage Rating	Ampere Range / Volt @ I.R. ability*
cULus	E506667	500mA-40A/250V AC 125V DC	500mA-5A /125V@1000A AC 250V@300A AC 125V@2000A DC >5A-20A /250V@100A AC 125V@500A AC 125V@1000A DC 100V@1500A DC >20A-30A /250V@100A AC 125V@200A AC 125V@1000A DC 35A-40A /250V@100A AC 125V@500A AC 125V@1000A DC 40A / 100V@1500A DC
TÜV	R 50544942 EN 60127-1: 2006+A1+A2 EN 60127-4: 2005+A1+A2 J 50545350 EN 60127-1: 2006+A1+A2 EN 60127-7: 2016		
cULus	E506667		35A / 100V@1500A DC
*I.R.= Interrupting Rating = Short Circuit Rating(Amps)			

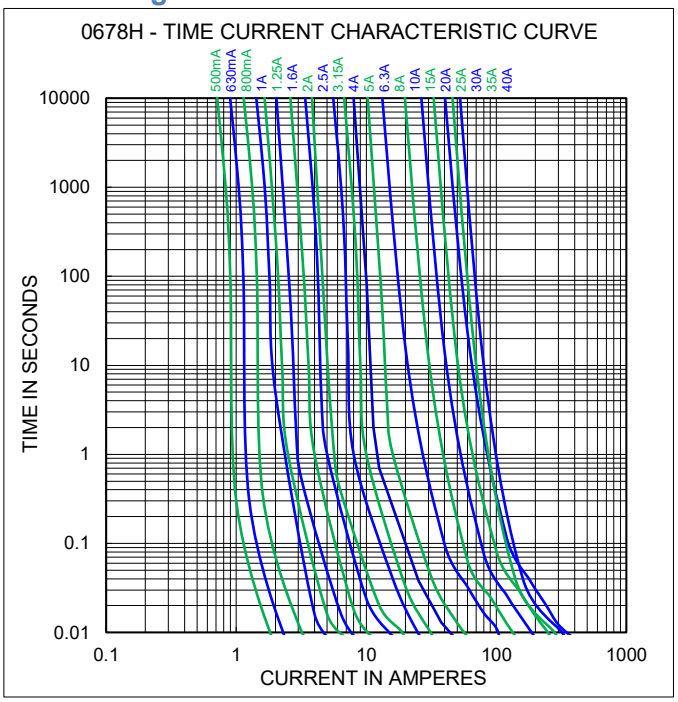
Electrical Characteristics (UL/CSA STD.248-14)

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

Temperature Derating Curve



Average Time Current Curve



Electrical Specifications

Part Number	Ampere Rating	Nominal Cold Resistance (ohms)	Nominal Volt-drop @100%In (Volt)	Voltage and Interrupting Ratings	Nominal Melting I²T @10 In (A² Sec)	Nominal Power Dissipation (W)	Agency Approvals	
							cULus	TÜV
0678H0500-XX	500mA	0.66	1.00	See Table of Safety Approvals on Page 1 for Voltage and associated Interrupting Ratings	0.03	0.5	Y	Y
0678H0630-XX	630mA	0.54	1.30		0.06	0.8	Y	Y
0678H0800-XX	800mA	0.38	1.10		0.08	0.9	Y	Y
0678H1000-XX	1A	0.21	0.70		0.3	0.7	Y	Y
0678H1250-XX	1.25A	0.10	0.20		0.4	0.3	Y	Y
0678H1600-XX	1.6A	0.08	0.19		0.5	0.3	Y	Y
0678H2000-XX	2A	0.059	0.18		1.0	0.4	Y	Y
0678H2500-XX	2.5A	0.043	0.18		1.8	0.5	Y	Y
0678H3150-XX	3.15A	0.035	0.18		2.8	0.6	Y	Y
0678H4000-XX	4A	0.021	0.18		7.8	0.7	Y	Y
0678H5000-XX	5A	0.016	0.18		10	0.9	Y	Y
0678H6300-XX	6.3A	0.013	0.17		20	1.1	Y	Y
0678H8000-XX	8A	0.010	0.15		34	1.2	Y	Y
0678H9100-XX	10A	0.0060	0.13		90	1.3	Y	Y
0678H9150-XX	15A	0.0045	0.12		178	1.8	Y	Y
0678H9200-XX	20A	0.0030	0.09		345	1.8	Y	Y
0678H9250-XX	25A	0.0025	0.09		600	2.25	Y	Y
0678H9300-XX	30A	0.0016	0.09		990	2.7	Y	Y
0678H9350-XX	35A	0.0016	0.11		735	3.9	Y	Y
0678H9400-XX	40A	0.0015	0.11		1000	4.4	Y	Y

Consult manufacturer for other ratings

XX - Packaging code (see “ordering information”)

NOTES:

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
500mA-5A	1 oz. copper, 5.0mm wide.
>5A-30A	3 oz. copper, 10mm wide.
>30A-40A	3 oz. copper, 15mm wide.

Caution

- Minimum fusing point:

The 0678H 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.

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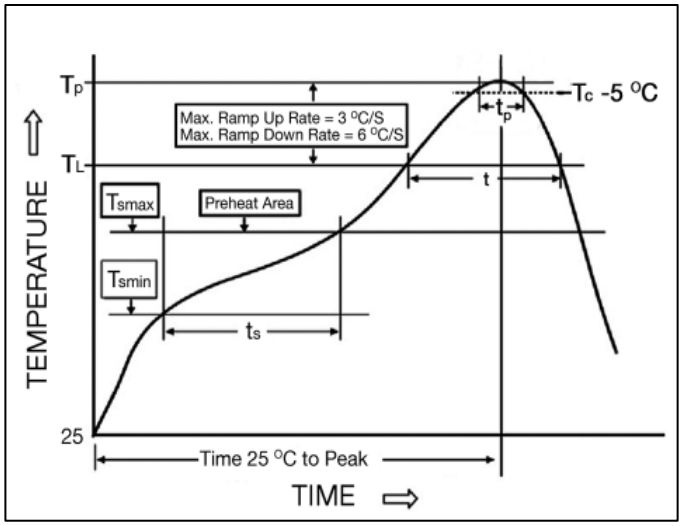
Environmental Specifications

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℃, 20 sec) MIL-STD-202G, Method 210F, Test Condition D. Bottom Side (260℃, 10 sec)
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)

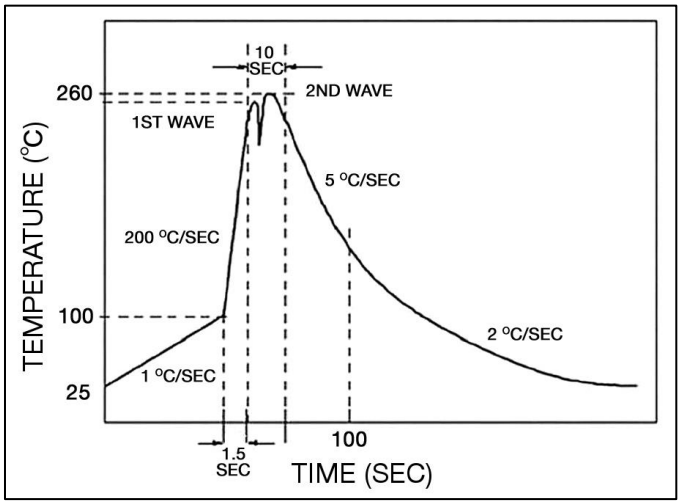
High temperature storage	MIL-STD-202 Method 108
Temperature cycling	JESD22 Method JA-104,Test Condition B
Biased humidity	MIL-STD-202 Method 103, 85C/85% RH with 10% operating power for 1000 hrs.
Operational life	MIL-STD-202 Method 108, Test Condition D
Resistance to solvents	MIL-STD-202 Method 215
Mechanical shock	MIL-STD-202 Method 213,Test Condition C
Vibration	MIL-STD-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)	
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 (T_c)	30 seconds
Average ramp-down rate(T_p to T_{smax})	6℃ / second max.
Time 25℃ to peak temperature	8 minutes max.



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



Specifications subject to change without notice

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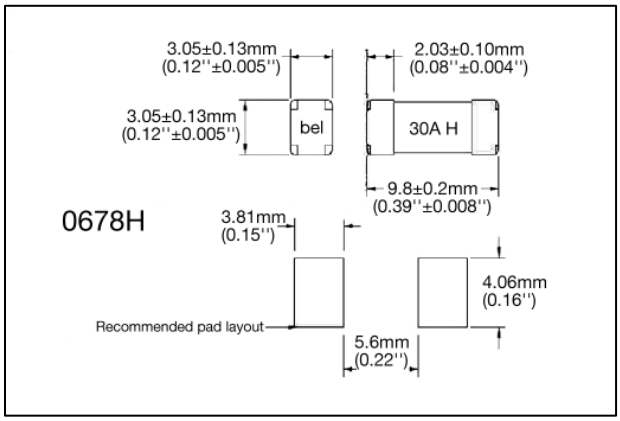
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Fuse FGNO Explanation
0678H [XXXX] -XX
0678H=0678H Series; [XXXX]=Ampere Rating; XX=See Ordering Information as below

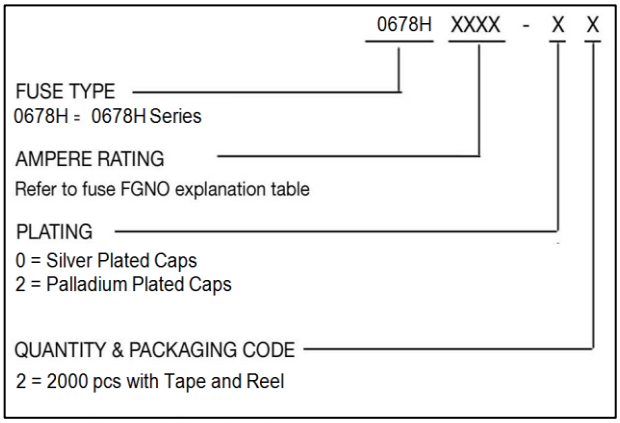
Fraction	Decimal	Milliamps	Bel FGNO[XXXX]
1/2	0.500	500	0500
	.630	630	0630
8/10	.800	800	0800

Fraction	Decimal	Amps	Bel FGNO[XXXX]
	1.0	1	1000
1-1/4	1.25	1.25	1250
	1.60	1.6	1600
	2.0	2	2000
2-1/2	2.5	2.5	2500
	3.15	3.15	3150
	4.0	4	4000
	5.0	5	5000
	6.3	6.3	6300
	8.0	8	8000
		10	9100
		15	9150
		20	9200
		25	9250
		30	9300
		35	9350
		40	9400

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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