

Type SMM

Square Ceramic Surface Mount Medium Blow Fuse

HF **Pb** SMM Series - 3912 Size

RoHS 6 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 reflow process
- Halogen Free
- Leadfree

Applications

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

LEAD FREE = **Pb**
 HALOGEN FREE = **HF**



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



Safety Agency Approvals

Testing Current	Blow Time	
	Minimum	Maximum
100%	4 Hrs.	N/A
200%	N/A	60 Sec

SAFETY AGENCY	SAFETY AGENCY CERTIFICATE	VOLTAGE RATING (V)	AMPERE RANGE / VOLT @ I.R. ABILITY*
UL US	E20624	10A - 30A / 250 VAC 72 VDC	10A - 30A / 250V @ 100A AC 125V @ 150A AC 72V @ 130A DC 65V @ 300A DC

* I.R. = INTERRUPTING RATING = SHORT CIRCUIT RATING (AMPS)

Physical Specifications

Materials	Body : Ceramic
	Terminations : Matte Tin plated Brass Caps
Marking	On Fuse :
	"bel", "Current Rating" in black color.
	On Label :
	"bel", "SMM", "Current Rating", "Voltage Rating", "Interrupting Rating", "Appropriate Safety Logos" and "  ", "  " (China RoHS compliant).

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
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 (Peak Temperature at 240 °C for 30 seconds max)

Electrical Specifications

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

Consult manufacturer for other ratings

Soldering Guidelines

Reflow Conditions Recommended **240 °C**, 30 sec. max.

When soldered to test boards using IR reflow in accordance with above 240 °C, SMM samples exhibited DCR change of + 10% to -20% from initial values , the fuse may emit solder.

Subsequent tests showed all samples complied with the stated electrical characteristics on this data sheet.

NOTES:

Test Conditions

For all SMM 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 SMM 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 SMM 30 rating was 69 °C(48 °C rise).

Caution:

- Minimum fusing point:

The SMM Series fuses 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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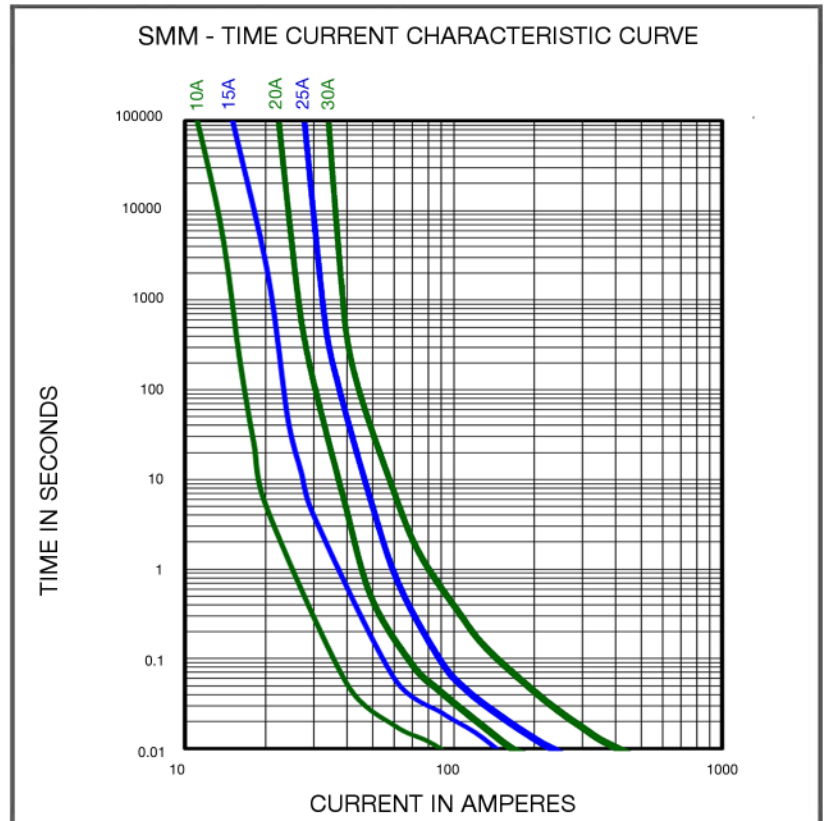
Type SMM

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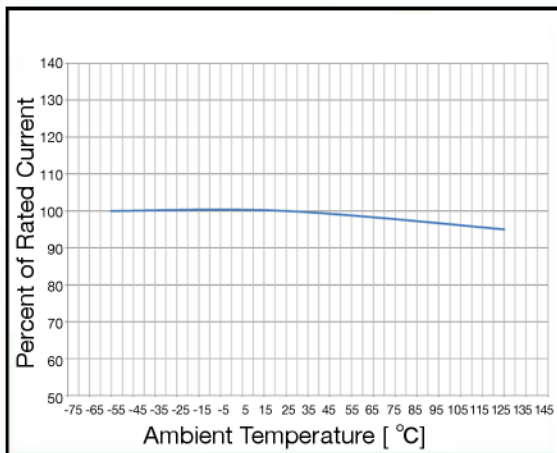
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Average Time Current Curve

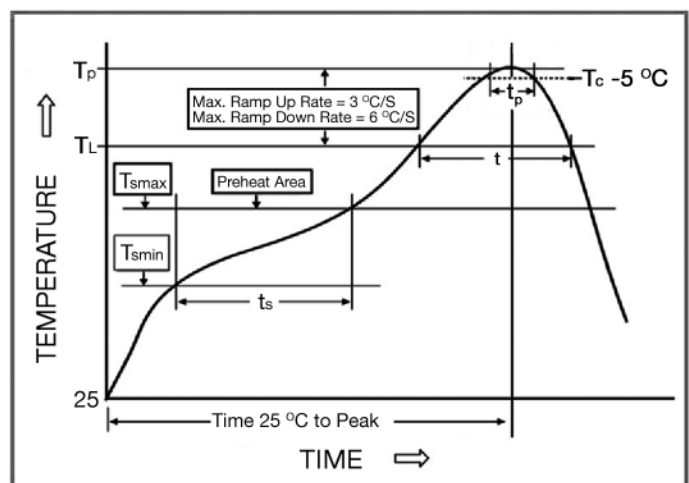


Temperature Derating Curve



Soldering Parameters

IR Reflow Profile	
Preheat & Soak	
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)	240 °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.



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Soldering Guidelines

Reflow Conditions Recommended **240 °C**, 30 sec. max.

NOT Recommended for Wave solder / Direct immersion / Hand Solder



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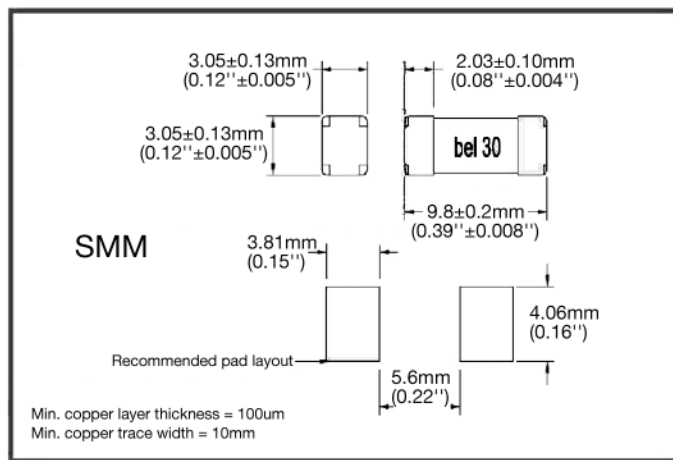
Fuse FGNO Explanation

0678 - [XXXX] - XX

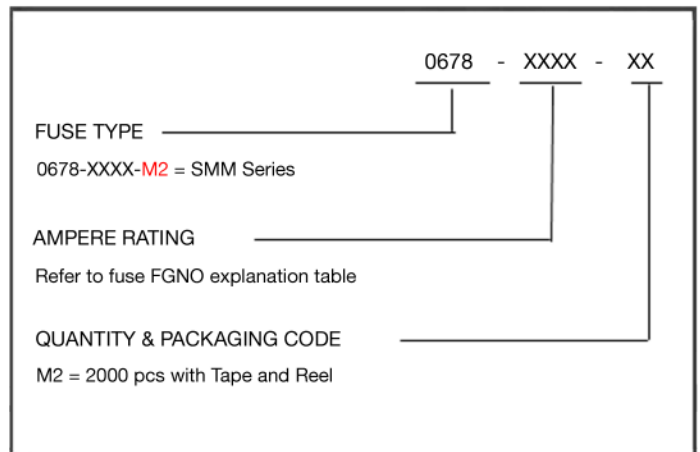
[XXXX]=Ampere Rating; XX=See Ordering Information as below

Amps	Bel FGNO[XXXX]
10	9100
12	9120
15	9150
20	9200
25	9250
30	9300

Mechanical Dimensions



Ordering Information



Packaging

Packaging Tape & Reel	Packaging Specification	Quantity	Quantity & Packaging Code
16 mm wide tape with 13 inches Diameter reel	EIA Standard 481-E	2000	0678-XXXX-M2

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