Type SMM

Square Ceramic Surface Mount Medium Blow Fuse

HF 🗭 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 $^{\rm o}{\rm C}$ to 125 $^{\rm o}{\rm C}$
- 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

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

Safety Agency Approvals

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

SAFETY AGENCY	SAFETY AGENCY CERTIFICATE	VOLTAGE RATING (V)	AMPERE RANGE / VOLT @ I.R. ABILITY*			
c RN ° 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
waterials	Terminations : Matte Tin plated Brass Caps
	On Fuse :
	"bel", "Current Rating" in black color.
Marking	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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LEAD FREE = PO HALOGEN FREE = HF



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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
Thermal Shock	(-65 °C to +125 °C).
Operating Temperature	(-65 °C to +125 °C). -55 °C to +125 °C

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		50	1.8	Y
SMM 15	15A	0.0036	0.12	See Table of Safety Approvals on Page 1 for Voltage and associated Interrupting Ratings	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 wih 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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TIME IN SECONDS

RoHS 6 Compliant

Average Time Current Curve

Τp





Soldering Parameters

IR Reflow Profile				
Preheat & Soak Temperature min (Tsmin) Temperature max (Tsmax) Time (Tsmin to Tsmax) (ts)	150 °C 200 °C 60 -120 seconds			
Average ramp-up rate (Tsmax to Tp)	3 °C/second max.			
Liquidous temperature (TL) Time at liquidous (tL)	217 °C 60 - 150 seconds			
Peak temperature (Tp)	240 °C max			
Time (tp) within 5 °C of the specified classification temperture (Tc)	30 seconds			
Average ramp-down rate (Tp to Tsmax)	6 °C/second max.			
Time 25 °C to peak temperature	8 minutes max.			

Soldering Guidelines

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

NOT Recommended for Wave solder / Direct immersion / Hand Solder



Î Τı Tsmax Preheat Area TEMPERATURE Tsmin 25 Time 25 °C to Peak ⇒ TIME

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Max. Ramp Up Rate = 3 °C/S Max. Ramp Down Rate = 6 °C

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-T₀ -5 °C

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Temperature Derating Curve



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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-XXX-M2

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