

# Type SMP

## Surface Mount Power Cross Protection Fuse

**HF** **Pb** SMP Series - 3912 Size

RoHS 6 Compliant

### Description

SMP Surface mount Power Cross Protection Fuses are primarily intended for use in telecommunication circuit applications requiring low current protection with high surge tolerance.

These fuses will withstand transient surge currents generated by lightning in accordance with the attached table.

SMP fuse guard protected circuitry against sustained overload or short circuit conditions. Such sustained overloads may be generated by accidental contact between utility cables and phone lines (power line cross).

SMP fuse are intended for use in circuits which require compliance with the test requirements specified in UL/IEC 1950/60950 and Telcordia GR 1089, Issue 3.

### Features

- Surface mount power cross protection fuse.
- Designed to allow compliance with Telcordia GR-1089-Core
- Designed to serve the requirements of a wide range of telecommunication and networking equipment.
- Product is RoHS 6 Compliant

LEAD FREE = **Pb**

HALOGEN FREE = **HF**

### 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 J.(235 °C ,30 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 ( Peak Temperature at 240 °C for 30 seconds max )



### Safety Agency Approvals

SAFETY AGENCY	SAFETY AGENCY CERTIFICATE	VOLTAGE RATING (V)	AMPERE RANGE / VOLT @ I.R. ABILITY*
<b>UL</b> US	E20624	500mA - 2A/125V DC 600V AC	500mA - 2A /125V @ 100A DC 600V @ 60A AC

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

Caution – see soldering parameters and note on Page 3.

### Physical Specifications

Materials	Body : Ceramic
	Terminations : Matte Tin plated Brass Caps (100% Lead-free)
Marking	On Fuse : "bel", "Current Rating" in black color.
	On Label : "bel", "SMP", "Current Rating", "Voltage Rating", "Interrupting Rating", "Appropriate Safety Logos" and "UL", "CE" (China RoHS compliant).

Specifications subject to change without notice



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### AC Power fault Tests

GR-1089 1st Level Test	Voltage (Vrms)	Short Circuit Current (A)	Applications	Durations	Time For Fuse To Open		
					SMP 500	SMP 1.25	SMP 2
1	50	0.33	1	15 minutes	Will not open	Will not open	Will not open
2	100	0.17	1	15 minutes	Will not open	Will not open	Will not open
3	200,400,600	1	60	1 Sec	Will not open	Will not open	Will not open
4	1000	1	60	1 Sec	Will not open	Will not open	Will not open
5	Diagram	N/A For Fuses	60	5 Sec	N/A	N/A	N/A
6	600	0.5	1	30 Sec	Will not open	Will not open	Will not open
7	440	2.2	5	2 Sec	Will open	Will not open	Will not open
8	600	3	5	1.1 Sec	Will open	Will not open	Will not open
9	1000	5	5	0.4 Sec	Will open	Will not open	Will not open


### Lightning Surge Withstand Capabilities

Max. Rise / Min. Decay (us)	Repetitions		Minimum Peak Voltage (V)	Minimum Withstand Peak Current (A)		
	Total	Each Polarity		SMP 500	SMP 1.25	SMP 2
10/1000	50	25	600	25	115	120
10/360	50	25	1000	30	125	150
10/1000	50	25	1000	25	110	120
2/10	20	10	2500	120	500	600
10/360	10	5	1000	30	125	150
2/10	2	1	5000	120	500	600
8/20	2	1	5000	75	300	350

### AC Current Limiting Protector Tests / Fusing Coordination Tests

Voltage (Vac)	Current (A)	Duration	Time For Fuse To Open		
			SMP 500	SMP 1.25	SMP 2
600V	2.2	Up to 15 Minutes	1.0 Sec Max.	900 Sec Max.	Will not open
600V	2.6		0.8 Sec Max.	50 Sec Max.	2000 Sec Max.
600V	3		0.5 Sec Max.	10 Sec Max.	100 Sec Max.
600V	3.75		0.3 Sec Max.	5 Sec Max.	10 Sec Max.
600V	5		0.2 Sec Max.	2 Sec Max.	3 Sec Max.
600V	7		0.08 Sec Max.	1 Sec Max.	2 Sec Max.
600V	10		0.04 Sec Max.	0.5 Sec Max.	0.7 Sec Max.
600V	12.5		0.01 Sec Max.	0.2 Sec Max.	0.3 Sec Max.
600V	20		0.005 Sec Max.	0.07 Sec Max.	0.1 Sec Max.
600V	25		0.004 Sec Max.	0.04 Sec Max.	0.07 Sec Max.
600V	30		0.003 Sec Max.	0.02 Sec Max.	0.05 Sec Max.

### Electrical Specifications

Catalog Number	Ampere Rating (A)	Typical Cold Resistance (ohm)	Volt-drop @100% In (Volt) max.	Voltage and Interrupting Ratings	Melting I <sup>2</sup> T <10m Sec (A <sup>2</sup> Sec)	Melting I <sup>2</sup> T @10 In (A <sup>2</sup> Sec)	Maximum Power Dissipation (W)	Agency Approvals
								
SMP 500	500mA	0.320	0.25	See Table of Safety Approvals on Page 1 for Voltage and associated Interrupting Ratings	2.0	2.3	0.20	Y
SMP 1.25	1.25A	0.079	0.16		14.0	17.0	0.40	Y
SMP 2	2A	0.063	0.22		33.0	37.0	0.52	Y

Consult manufacturer for other ratings

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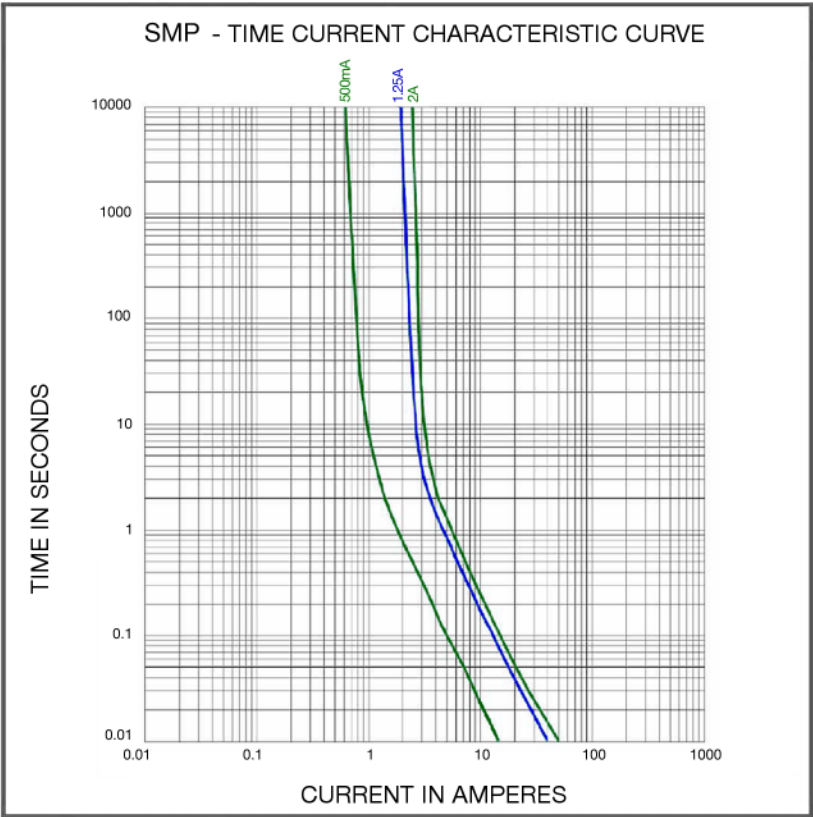
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## Surface Mount Power Cross Protection Fuse

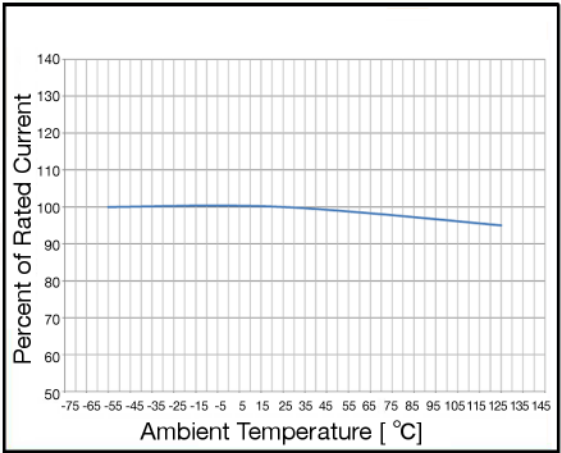
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### Average Time Current Curve



### Temperature Derating Curve

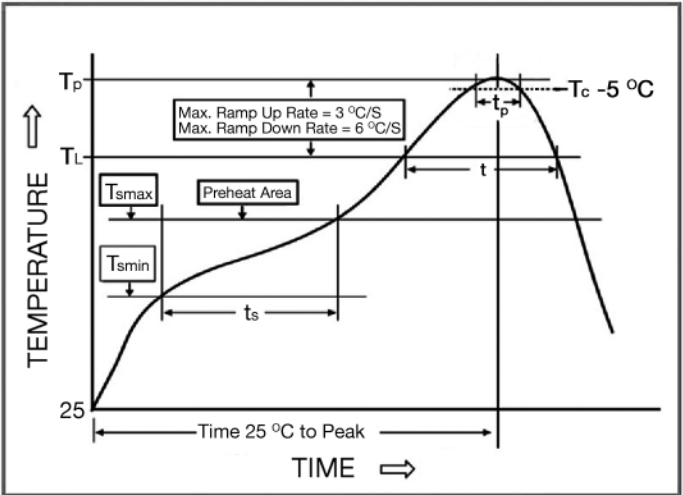


### Soldering Parameters

IR Reflow Profile	
<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 ( $T_p$ )	<b>240 °C max</b>
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.

#### Soldering note :

Fuse function and reliability may be affected if Peak IR solder temperature exceeds 240 °C. Contact Bel factory for more details.



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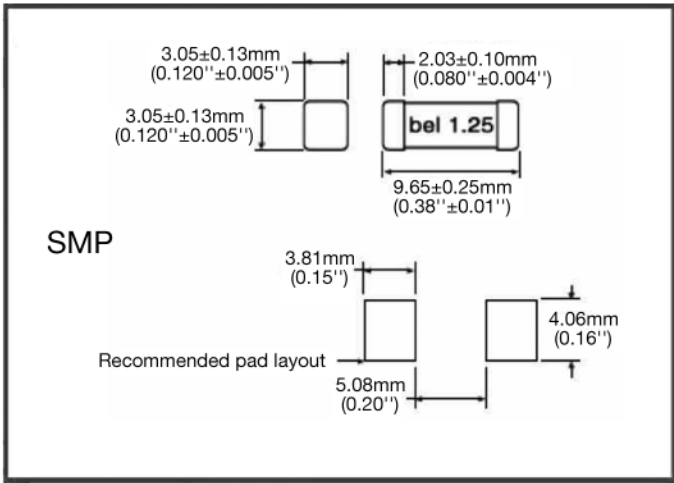
### Fuse FGNO Explanation

0678 - [XXXX] - XX

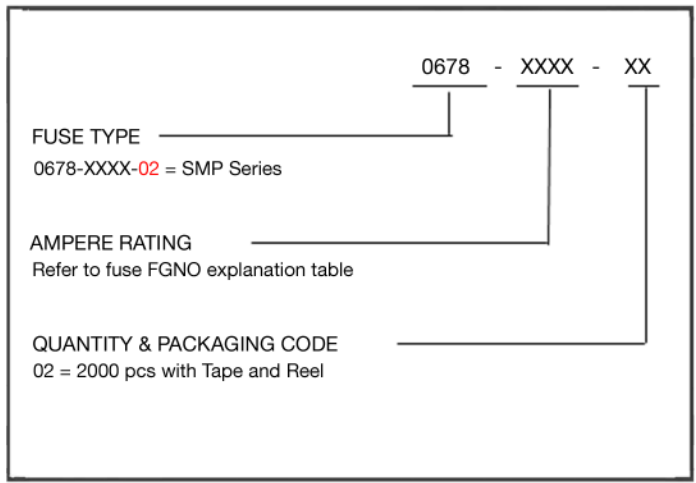
[XXXX]=Ampere Rating; XX=See Ordering Information as below

Fraction	Decimal	Milliamps	Bel FGNO[XXXX]	Fraction	Decimal	Amps	Bel FGNO[XXXX]
1/2	0.500	500	0500	1-1/4	1.25	1.25	1250
					2.0	2	2000

### 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-02

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