

**PRODUCT
DATASHEET**



SMFF4012 Series Surface Mount Fuses Devices

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Description

Polytronics SMFF4012 series square shape surface mount fast-acting fuses adopt Wire-in-Air (WIR) construction. Small footprint with wide range of available current rating makes the fuse ideal for over-current protection applications, in DC circuits using surface mount technology. SMFF4012 series is also RoHS compliant and halogen-free to meet global environmental standard..






Features

- Fast acting
- Surface mount high current fuse
- Square shape surface mount
- Wide Operating temperature
- Enhanced thermal cycling endurance


Application

- Storage system power
- Cooling fan system for PC server
- Voltage regulator module
- Base station power supply
- Voltage regulator module for PC server
- High end servers/Blade computing
- Battery Management System

Agency Approval and Environmental Compliance

Agency	File Number	Regulation	Standard
	UL/CSA:E331807		2011/65/EU
			IEC 61249-2-21:2003

Electrical Characteristics

Part Number	Current Rating (A)	Voltage Rating	Interrupting Rating	Typical Cold DCR [†] (mΩ)	Nominal I ² T [‡] (A ² S)	Agency Approval
						
SMFF4012P2000	20	100V DC	300A / 100V DC	3.08	264	✓
SMFF4012P2500	25		500A / 72V DC	2.15	413	✓
SMFF4012P3000	30		1000A / 32V DC	2.08	594	✓
SMFF4012P4000	40	72V DC	180A / 72V DC 600A / 60V DC	1.23	1024	✓
SMFF4012P5000	50			1.00	1650	✓
SMFF4012P6000	60			0.88	2376	✓

[†] Measured at ≤10% rated current and 25°C

[‡] Melting I²T at 10 times of rated current

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Electrical Specification

Ampere Rating	% of Current Rating	Opening Time
20A~60A	100%	4 Hours Min.
	200%	60 Seconds Max.
	1000%	>1ms

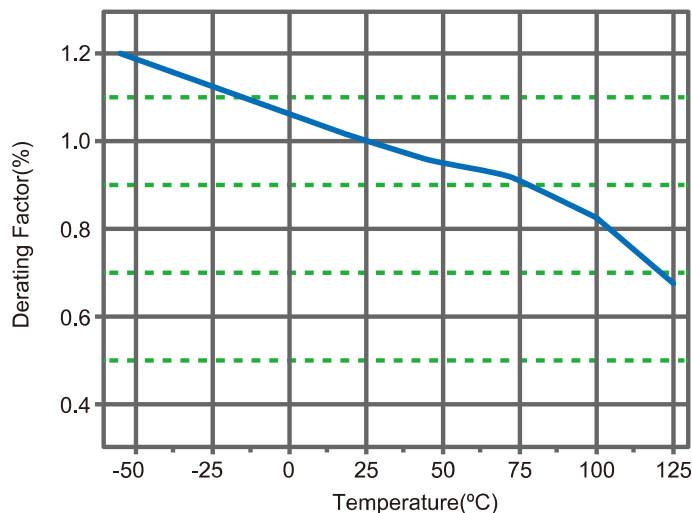
Physical Specifications

Materials	Substrate: Ceramic Terminations: Au Plated Brass Cap Element: Tin Plated Copper
Solderability	MIL-STD-202
Soldering Parameters	Wave Solder: 260°C, 10 seconds max. Reflow Solder: 260°C, 5 seconds max. Hand Solder: 350°C, 3 seconds max.

Environmental Specifications

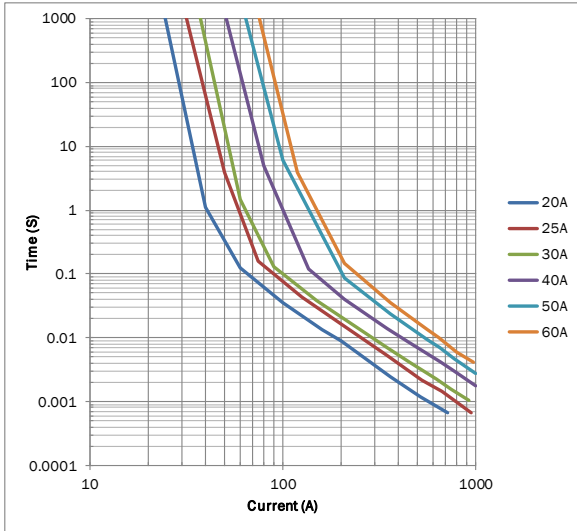
Operating Temperature	-55°C to 125 °C
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Thermal Derating Curve

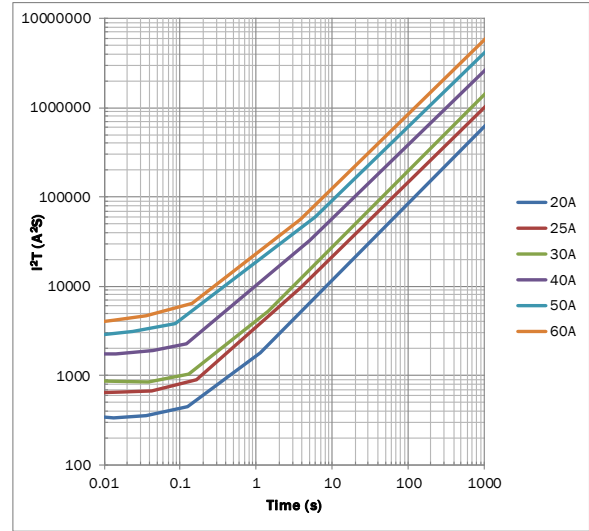


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Time-Current Curve



i²T vs Time Curve



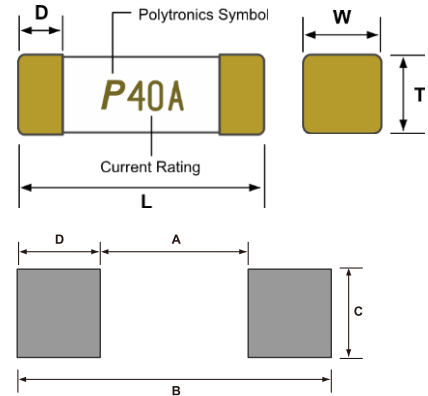
Physical Dimensions (mm.)

Dimensions (mm)

L	W	T	D
10.25±0.20	3.20±0.15	3.20±0.15	1.75±0.15

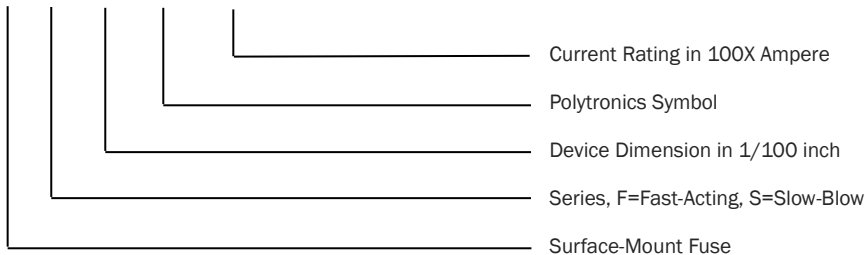
Recommended Solder Pad Dimension (mm)

A	B	C	D
5.72±0.3	12.6±0.3	3.43±0.3	3.25±0.3



Part Number

SMF F 4012 P □□□□



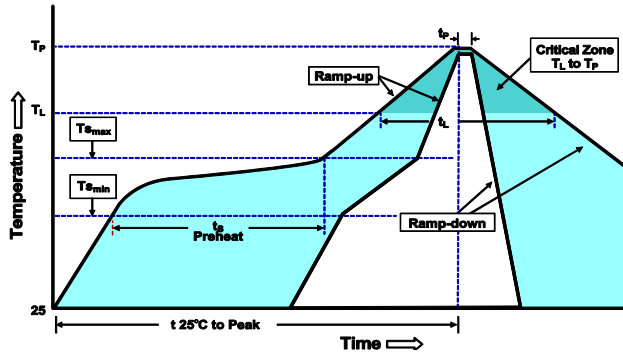
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Reliability Test

Characteristics	Test condition / Methods		Requirement	Test Reference
Time/Current	100% In		No fusing, 4 hours min.	UL248-14
	200% In		60s Max.	Refer to Spec.
	1000% In		>1ms	
Endurance Test	100% In for 4hour and testing Temperature rise at the last 5 min		No fusing; 20~40A: <90°C 50~60A: <105°C	IEC 60127-4
Interrupting Ability	20A-30A	100VDC 300A 72VDC 500A 32VDC 1000A	No permanent arcing, ignition and bursting of fuse link	UL248-14 IEC 60127-4
	40A-60A	72VDC 180A 60VDC 600A		
Solderability	240°C ± 5°C, 3sec ± 0.5sec		95% coverage min	IEC 60127-4 IEC 60068-2-20 MIL-STD-202
Resistance to Soldering	260°C ± 5°C, 10sec ± 0.5sec		No Breaking	MIL-STD-202 Method 210
Moisture resistance	Temperature Humidity Duration: 85°C ± 3°C: 85 ± 5%RH: 1000h		ΔR : <10% No mechanical damage	MIL-STD-202 Method 106
Low Temperature Storage	-55°C ± 3°C, 1000 hours		ΔR : <10%	IEC 60068-2-1
High temperature Storage	125°C ± 2°C, 1000 hours		ΔR : <10%	IEC 60068-2-2
Salt Spray	5% ± 1% salt solution, 48 hours exposure		ΔR : <10%	MIL-STD-202 Method 101
Thermal Shock	100 cycles between -55°C / +125°C 60 minutes; each extreme		ΔR : <10%	IEC 60068-2-14
Vibration	Amplitude 10-55Hz in 1 min. 2 hours. each XYZ=6 hours (10-55Hz)		ΔR : <10% No mechanical damage	MIL-STD-202F Method 201
Mechanical shock	100G's peak amplitude, saw tooth wave 6ms duration, 3 cycles XYZ + xyz = 18		ΔR : <10% No mechanical damage	MIL-STD-202 Method 213

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Soldering Parameters



Average Ramp-Up Rate (T _{Smax} to T _P)	3°C/second max.
Preheat	
-Temperature Min (T _{Smin})	150°C
-Temperature Max (T _{Smax})	200°C
-Time (T _{Smin} to T _{Smax})	60-120 seconds
Time maintained above:	
-Temperature (T _L)	217°C
-Time (t _L)	20-40 seconds
Peak Temperature (T _P)	260°C
Time within 5°C of actual Peak Temperature (t _P)	5 seconds
Ramp-Down Rate	6°C /second max.
Time 25°C to Peak Temperature	8 minutes max.

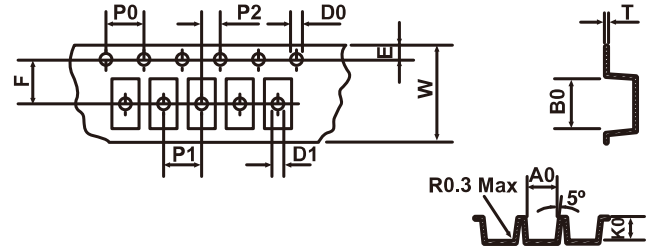
Note 1: All temperature refer to topside of the package, measured on the package body surface.

Note 2: If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

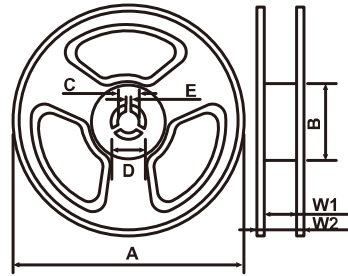
Packaging Quantity

Part Number	Tape & Reel Quantity
SMFF4012PXXXX	2000

Tape & Reel Specification (mm.)



A0	3.50 ± 0.10	P0	4.00 ± 0.10
B0	10.60 ± 0.15	P1	8.00 ± 0.10
E	1.75 ± 0.10	P2	2.00 ± 0.10
F	11.50 ± 0.10	D0	1.50 ± 0.10
W	24.00 ± 0.30	D1	1.50 ± 0.10
K0	3.50 ± 0.10	T	0.35 ± 0.05



A	330.0 ± 2.0
B	100.0 ± 1.5
C	13.0 ± 0.5
D	21.0 ± 0.5
E	2.2 ± 0.2
W1	24.5 ± 1.5
W2	28.5 ± 2.0