

**PRODUCT
DATASHEET**

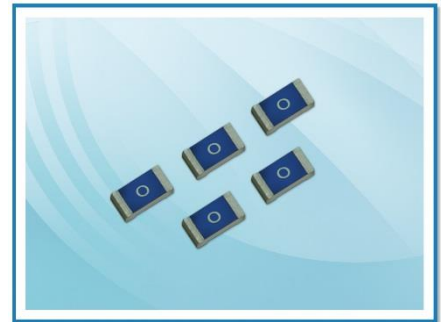


SMFS0603 Series Surface Mount Fuses Devices

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Description

Polytronics SMFS0603 series surface mount slow-blow fuse utilizes thick film process with extremely stable fusing element. The glass over coating can tolerate higher temperature profile, and the non-flammable ceramic substrate offers better heat conductivity and safety. SMFS0603 series is also RoHS compliant and halogen-free to meet global environmental standard.






Features

- Slow-blow
- Compact size
- Thick film manufacturing method
- Ceramic substrate with silver fusing element
- Excellent environmental integrity


Application

- Battery pack
- Digital camera
- Game equipment
- Wireless base station
- LCD monitors and modules
- PC related equipment / peripherals
- Power supply
- Medical device

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	Marking	Current Rating (A)	Voltage Rating	Interrupting Rating	Typical Cold DCR† (Ω)	Typical I ² T‡ (A ² S)	Agency Approval
							
SMFS0603P100	H	1.0	32V DC	50A / 32V DC	0.235	0.0746	✓
SMFS0603P150	K	1.5			0.093	0.1125	✓
SMFS0603P200	N	2.0			0.047	0.1752	✓
SMFS0603P250	O	2.5			0.031	0.4001	✓
SMFS0603P300	P	3.0			0.023	0.7329	✓
SMFS0603P350	R	3.5			0.019	0.9758	✓
SMFS0603P400	S	4.0	32V DC	35A / 32V DC	0.013	2.1722	✓
SMFS0603P500	T	5.0			0.0087	3.3128	✓
SMFS0603P600	6	6.0			0.0063	7.8480	✓

† 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
1A~6A	100%	4 Hours Min.
	200%	60 Seconds Max.
1A~3A	1000%	0.3 msec. Min.
3.5A~6A	1000%	0.6 msec. Min.

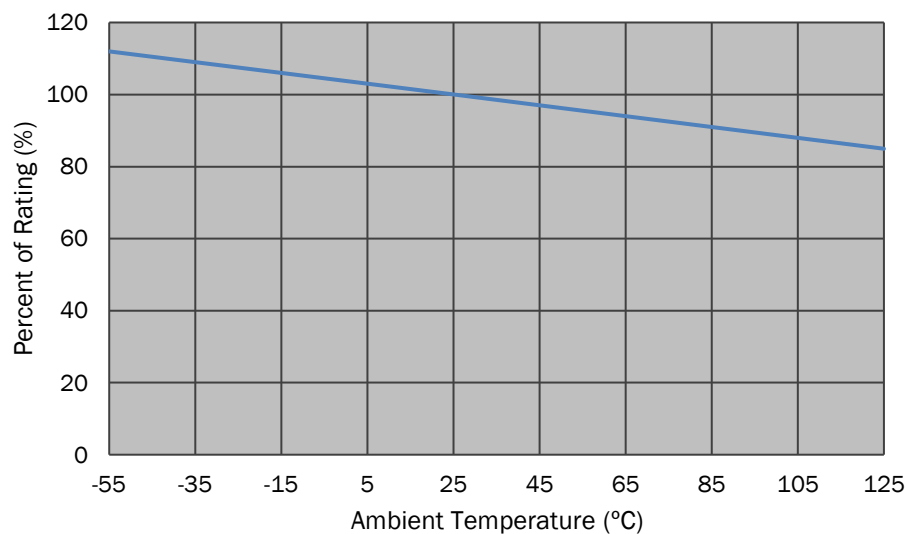
Physical Specifications

Materials	Substrate: Ceramic Terminations: Silver over-plated with 100% tin Element: Silver or Silver/palladium
Solderability	MIL-STD-202
Soldering Parameters	Wave Solder: 260 °C, 10 seconds max. Reflow Solder: 260 °C, 20 seconds max. Hand Solder: 350 °C, 5 seconds max.

Environmental Specifications

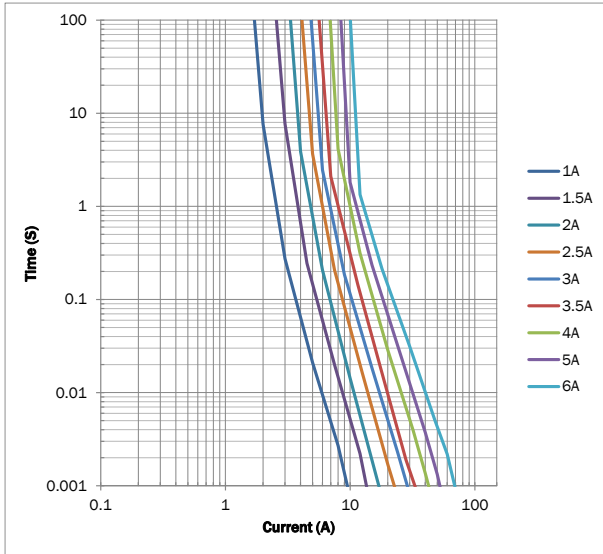
Operating Temperature	-55°C to 125°C
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Thermal Derating Curve

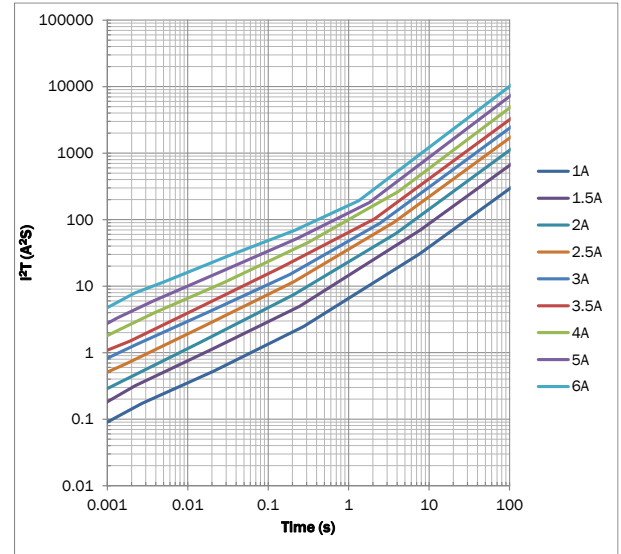


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Time-Current Curve



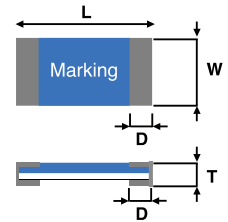
I²T vs Time Curve



Physical Dimensions (mm.)

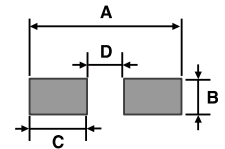
Dimensions (mm)

L	W	T	D
1.60±0.15	0.80±0.15	0.40±0.10	0.30±0.20



Recommended Solder Pad Dimension (mm)

A	B	C	D
2.05±0.05	1.2±0.10	0.6±0.10	0.85±0.05

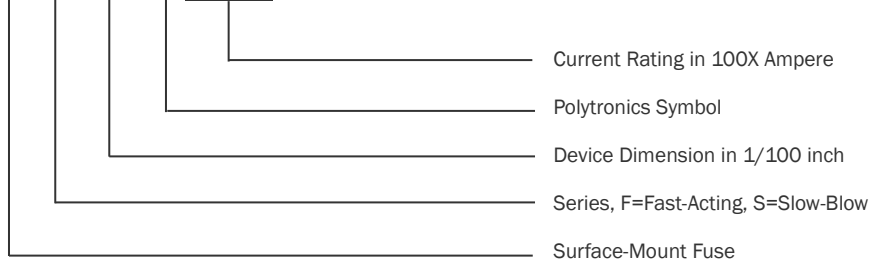


Dimensions of Standard Test Board (mm)

Ampere Rating	Board Thickness	Copper Layer Thickness	Copper Trace Width
1A~6A	1.6	0.035	5.0

Part Number System

SMF S 0603 P □□□



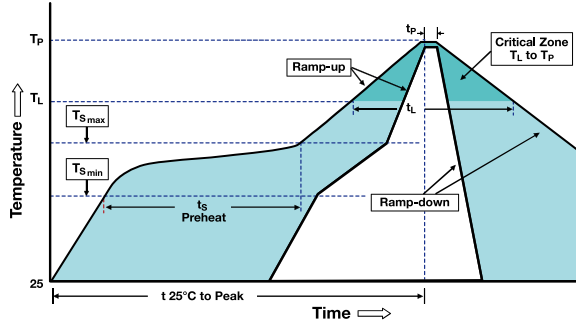
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Reliability Test

Characteristics	Test condition / Methods	Requirement	Test Reference
Voltage Drop	100% In	Deviation between the mean value: <15%	IEC 60127-4
Time/Current	100% In	No Fusing, 4 hours min.	UL248-14
	200% In	≤ 60 sec.	Refer to Spec.
	1000% In (1A~3A) 1000% In (3.5A~6A)	> 0.3 msec. > 0.6 msec.	
Endurance Test	100% In, 1hour on, 15min off, 100cycles; followed by 1hour at 125% In	ΔR <10%	IEC60127-4
Temperature Rise	100% In	ΔT : <75 °C	IEC60127-4
Interrupting Ability	50A/32V DC (1A~3.5A) 35A/32V DC (4A~6A)	Without permanent arcing, ignition, and bursting of fuse link	UL 248-14 IEC 60127-4
Solderability	240 °C ± 5 °C, 3sec ± 0.5sec	95% coverage min	IEC 60127-4 MIL-STD-202 Method 208
Resistance to Soldering	260 °C ± 5 °C, 10sec ± 0.5sec	ΔR : <10% Legible appearance	MIL-STD-202 Method 210
Bending Test	Distance between holding points: 90mm Bending: 1 mm; Time: 10 seconds	ΔR : <10% No mechanical damages	IEC 60127-4
High Temperature Operating Life	70 °C ± 2 °C at 60% In for 96 hours	ΔR : <10%; no fusing	MIL-STD-202 Method 108
Low Temperature Storage	-55 °C ± 3 °C for 96 hours	ΔR : <10%	IEC60068-2-1
High Temperature Storage	125 °C ± 2 °C for 96 hours	ΔR : <10%	IEC60068-2-2
Humidity (Steady State)	40 °C ± 2 °C, 90~95%RH for 1000 hours	ΔR : <10%	MIL-STD-202 Method 103
Salt Spray	5% salt solution, 48 hours exposure	ΔR : <10% Legible appearance	MIL-STD-202 Method 101
Thermal Shock	100 cycles between -65 °C /+125 °C 60 minutes at each extreme zone	ΔR : <10% No mechanical damages	MIL-STD-202 Method 107

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Soldering Parameters

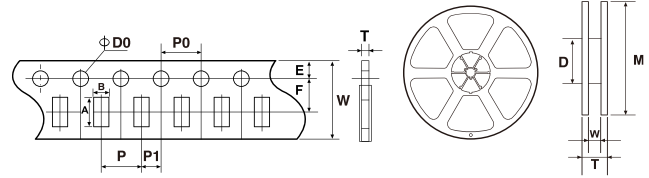


Average Ramp-Up Rate ($T_{s_{max}}$ to T_P)	3°C/second max.
Preheat	
-Temperature Min ($T_{s_{min}}$)	150°C
-Temperature Max ($T_{s_{max}}$)	200°C
-Time ($T_{s_{min}}$ to $T_{s_{max}}$)	60-120 seconds
Time maintained above:	
-Temperature (T_L)	217°C
-Time (t_L)	60-150 seconds
Peak Temperature (T_P)	260°C
Time within 5°C of actual Peak Temperature (t_P)	20 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.

Tape & Reel Specification (mm.)



A	1.85 ± 0.10
B	1.10 ± 0.10
W	8.00 ± 0.20
F	3.50 ± 0.05
E	1.75 ± 0.10
P	4.00 ± 0.10
P0	4.00 ± 0.10
P1	2.00 ± 0.10
D0	∅ 1.50 ± 0.10
T	0.60 ± 0.10

M	∅ 178.0 ± 2.0
W	9.5 ± 1.0
T	12.5 ± 1.5
A	2.0 ± 0.5
B	∅ 13.0 ± 0.5
C	∅ 21.0 ± 0.5
D	∅ 58.0 ± 2.0

Packaging Quantity

Part Number	Tape & Reel Quantity
SMFS0603PXXX	5000

Storage

- The ambient temperature recommended for storage shall be between 5°C ~30°C.
- The relative humidity recommended for storage shall be between 25%RH~60%RH.
- The products shall not be stored in areas where harmful gases containing sulfur or chlorine are present.

Warning

- Fuse product is not recommended for any type of coating. Polytronics is not responsible for any damage directly or indirectly related to the coating.
- For copper layer thickness or copper trace width different from the standard test board, fusing characteristics needs to be verified to ensure product performance meet user requirement.