

**PRODUCT
DATASHEET**



SMFF0402 Series Surface Mount Fuses Devices

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Description

Polytronics SMFF0402 series surface mount fast-acting 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. SMFF0402 series is also RoHS compliant and halogen-free to meet global environmental standard






Features

- Fast acting
- 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
- Wearable devices
- PC related equipment / peripherals
- LCD monitors and modules
- 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	Current Rating (A)	Voltage Rating	Interrupting Rating	Typical Cold DCR [†] (mΩ)	Nominal Melting I ² T [‡] (A ² S)	Agency Approval
						
SMFF0402P100	1.0	32V	35A / 32V DC	145.0	0.030	✓
SMFF0402P150	1.5			75.0	0.061	✓
SMFF0402P200	2.0			33.7	0.078	✓
SMFF0402P250	2.5			24.3	0.186	✓
SMFF0402P300	3.0			25.3	0.205	✓
SMFF0402P350	3.5			23.4	0.196	✓
SMFF0402P400	4.0			16.5	0.341	✓
SMFF0402P500	5.0			12.0	0.745	✓

[†] 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~5A	100%	4 Hours Min.
	250%	5 Seconds Max.
	1000%	0.1 mSec. Min.

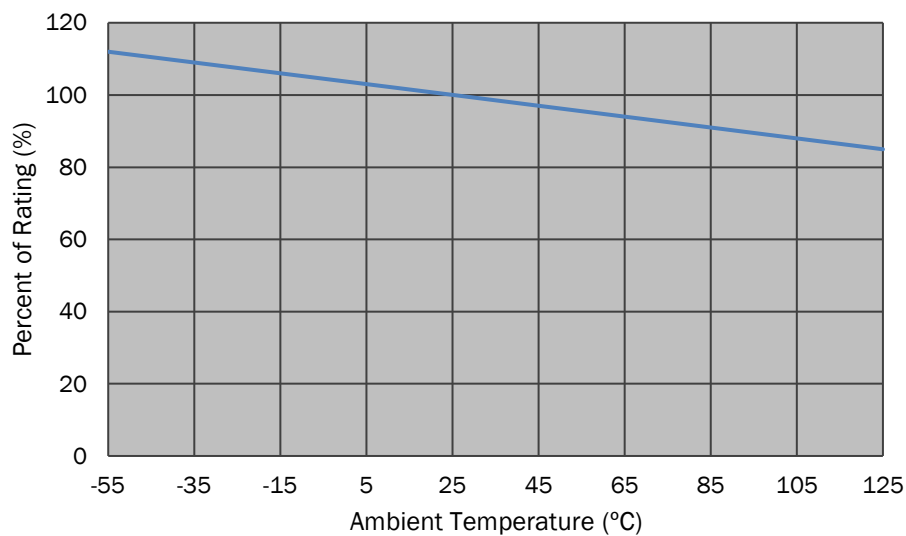
Physical Specifications

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

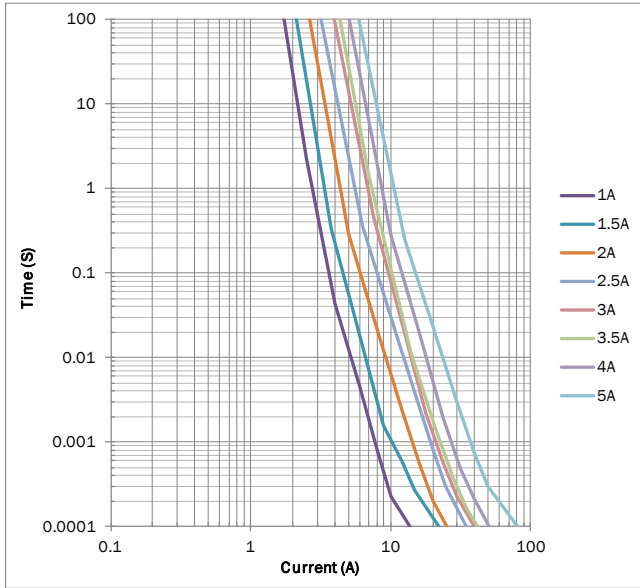
Operating Temperature	-55°C to 125°C
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Thermal Derating Curve

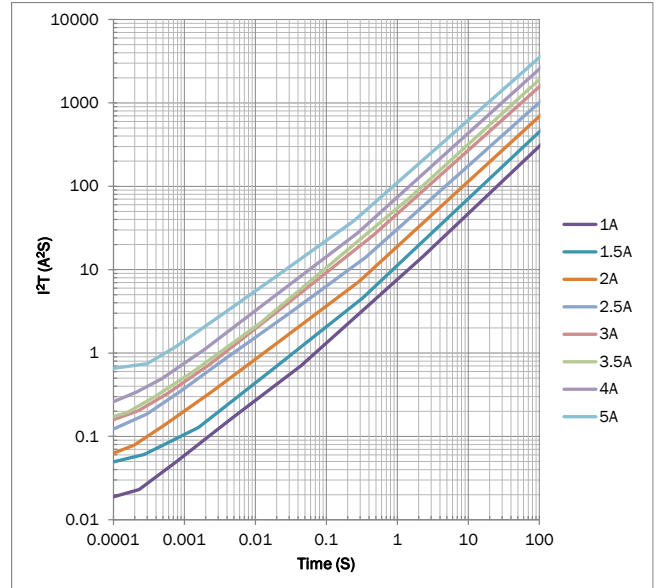


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Time-Current Curve



I²T vs Time Curve



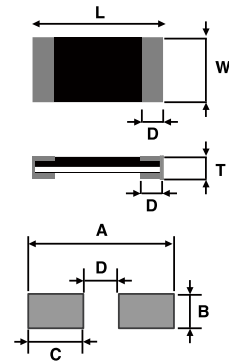
Physical Dimensions (mm.)

Dimensions (mm)

L	W	T	D
0.95±0.15	0.50±0.10	0.28±0.10	0.20±0.10

Recommended Solder Pad Dimension (mm)

A	B	C	D
1.50±0.10	0.75±0.10	0.50±0.10	0.50±0.10

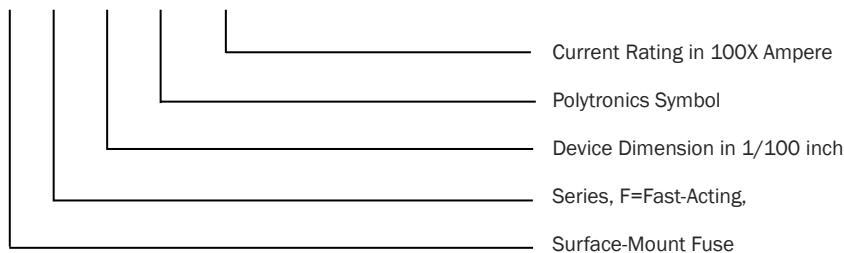


Dimensions of Standard Test Board (mm)

Ampere Rating	Board Thickness	Copper Layer Thickness	Copper Trace Width
1A~2.5A	1.6	0.035	1.0
3A~5A	1.6	0.035	5.0

Part Number System

SMF F 0402 P □□□



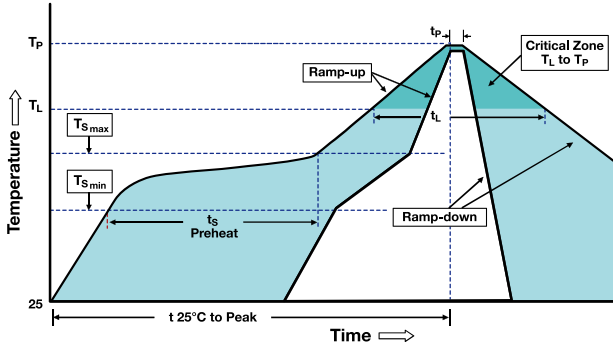
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Reliability Test

Characteristics	Test condition / Methods	Requirement	Test Reference
Time/Current	100% In	No Fusing; 4 hours min.	UL248-14
	250% In	≤ 5 sec	Refer to Spec
	1000% In	> 0.1 msec	IEC60127-4
Voltage Drop	100% In	< 300mV	IEC 60127-4
Endurance Test	Repeating 100 cycles of 1In for 1 h and switching off for 15min, following by 1 h at 1.25In and testing temperature rise	ΔR : <10% ΔT<75°C	IEC 60127-4
Interrupting Ability	35A/32V DC	Without permanent arcing, ignition and bursting of fuse link	UL 248-14 IEC60127-4
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	ΔR : <10%	MIL-STD-202 Method 210
Bending Test	Distance between holding points: 90mm Bending: 1 mm; Time: 10 second	ΔR : <10% No mechanical damages	IEC 60127-4
High Temperature Operating Life	96 hours, 70°C ± 2°C at 0.6 In.	ΔR : <10%	MIL-STD-202 Method 108
Humidity (Steady State)	1000 hours at 40°C ± 2°C 90~95%RH	ΔR : <10%	MIL-STD-202 Method 103
Low Temperature Storage	96 hours at -55°C ± 3°C.	ΔR : <10%	IEC60068-2-1
High temperature Storage	96 hours at 125°C ± 2°C.	ΔR : <10%	IEC60068-2-2
Salt Spray	5% salt solution, 48 hours	ΔR : <10%	MIL-STD-202 Method 101
Thermal Shock	100 cycles between -65°C /+125°C 30 minutes at each extreme zone	ΔR I: <(10%R+0.005Ω)	IEC 60068-2-14

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Soldering Parameters

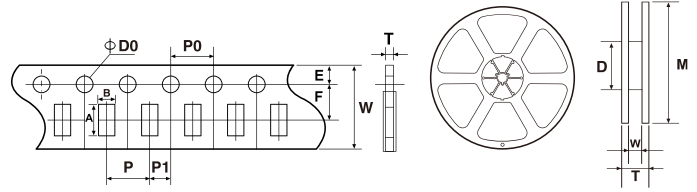


Average Ramp-Up Rate (Ts _{max} to Tp)	3°C/second max.
Preheat	
-Temperature Min (Ts _{min})	150°C
-Temperature Max (Ts _{max})	200°C
-Time (Ts _{min} to Ts _{max})	60-120 seconds
Time maintained above:	
-Temperature (T _L)	217°C
-Time (t _L)	60-150 seconds
Peak Temperature (Tp)	260°C
Time within 5°C of actual Peak Temperature (t _p)	20 seconds max.
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	1.20 ± 0.10
B	0.70 ± 0.10
W	8.00 ± 0.20
F	3.50 ± 0.05
E	1.75 ± 0.10
P	2.00 ± 0.10
P0	4.00 ± 0.10
P1	2.00 ± 0.10
D0	Ø1.50 ± 0.10
T	0.42 ± 0.10

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

Packaging Quantity

Part Number	Tape & Reel Quantity
SMFF0402PXXX	10,000

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.