POLYTRONICS
POLYTRONICS TECHNOLOGY CORP.

PRODUCT
DATASHEET

SMFF5040 Series Surface Mount Fuses Devices

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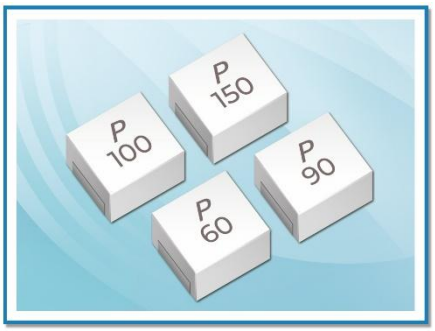
Description

Polytronics SMFF5040 series of surface-mount fuses features a compact, miniature rectangular design, offering up to a 150A/125VDC rating with a high interrupting rating of up to 10 kA at 80 VDC to meet the demands of various applications, particularly for hyperscalers. The fusing element and terminals are integrally stamped and formed for utmost reliability. A thermosetting adhesive filling ensures a completely lead-free, RoHS, and REACH compliant design. Additionally, the product is AEC-Q200 qualified for automotive applications.



Features

- Fast Acting
- Compact rectangular size
- Enhanced thermal cycling endurance
- Ceramic body design
- Excellent environmental integrity
- AEC-Q200 compliant

Application

- AI, blade, and edge servers
- High-end power supplies
- Power Distribution Units
- Industrial power tools
- Battery Management System
- Energy Storage System
- Cooling fan system
- Voltage regulator module

Agency Approval and Environmental Compliance

Agency	File Number
c UL us	UL/CSA: E542435
TÜV	TÜV: J50659397

Regulation	Standard
RoHS	2011/65/EU
Halogen Free	IEC 61249-2-21:2003

Electrical Characteristics

Part Number	Marking	Current Rating (A)	Voltage Rating	Interrupting Rating	Typical Cold DCR† (mΩ)	Typical I²T‡ (A²S)	Agency Approval	
							c UL us	
SMFF5040P050	50	50	125V	1000A @ 125VDC 2000A @ 125VDC § 5000A @ 100VDC 10kA @ 80VDC	1.10	920	✓	-
SMFF5040P060	60	60			0.98	2100	✓	✓
SMFF5040P070	70	70			0.75	2800	✓	✓
SMFF5040P080	80	80			0.57	3400	✓	✓
SMFF5040P090	90	90			0.52	4000	✓	✓
SMFF5040P100	100	100			0.46	4300	✓	✓
SMFF5040P125	125	125		1000A @ 125VDC 5000A @ 100VDC 10kA @ 80VDC	0.33	6250	✓	✓
SMFF5040P150	150	150			0.29	11250	✓	✓
SMFF5040P175	175	175	80V	10kA @ 80VDC	0.26	27259	✓	-
SMFF5040P200	200	200			0.22	34765	✓	-

† Measured at ≤ 10% rated current and 25°C
‡ Melting I²T at 10 times of rated current
§ TÜV certified only. All other ratings carry both UL and TÜV certifications.
♦ **Specifications are subject to change without notice.** ♦

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Electrical Specification

Ampere Rating	% of Current Rating	Opening Time
50A~200A	100%	4 Hours Min.
	200%	60 Seconds Max.
	1000%	10 mSec. Max.

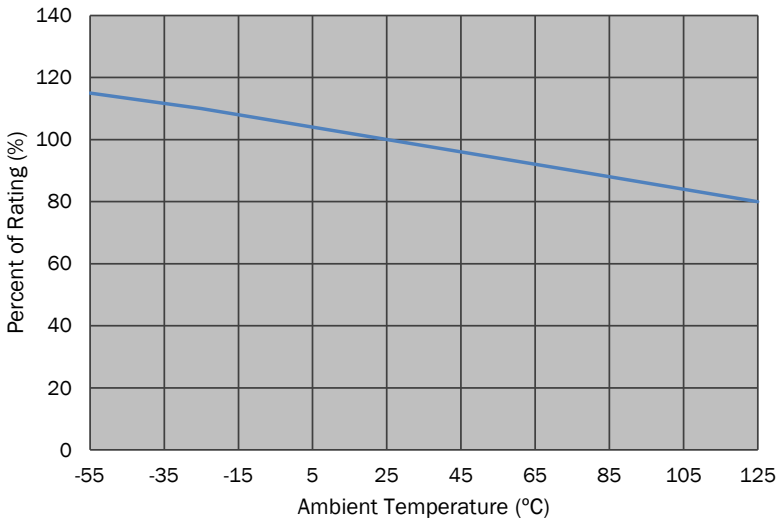
Physical Specifications

Materials	Body: Ceramic Element: Copper over-plated with 100% tin
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
Moisture Sensitivity Level	Level 1, JEDEC J-STD-020F

Thermal Derating Curve



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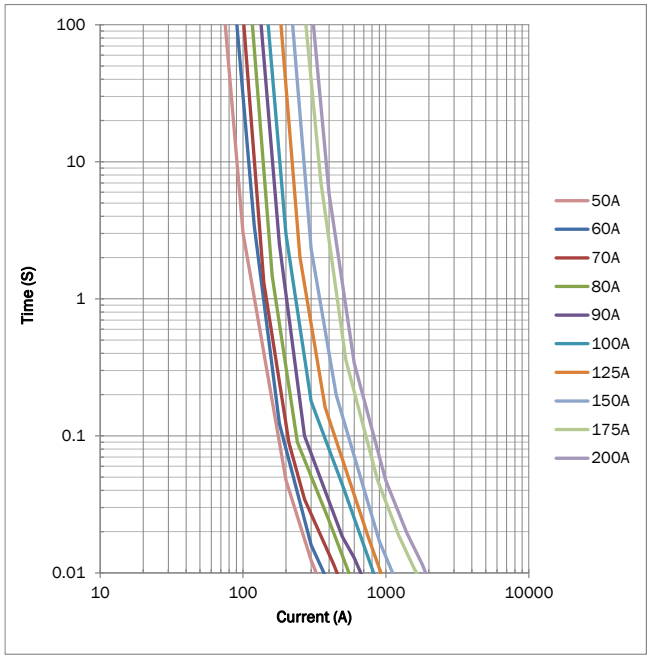
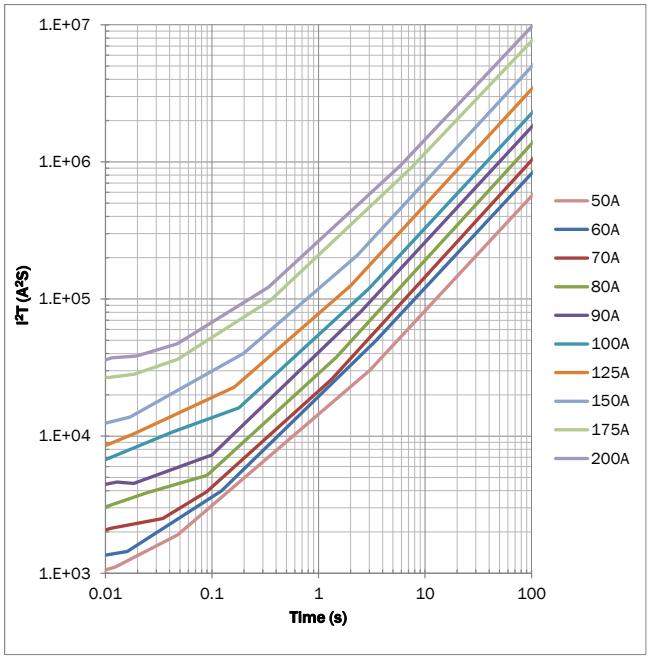
Time-Current Curve



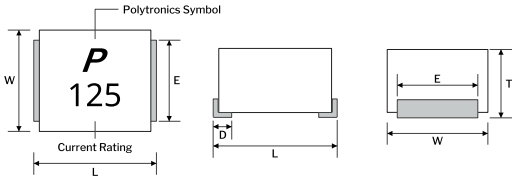
I²T vs Time Curve



Physical Dimensions (mm.)

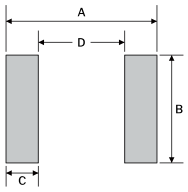
Dimensions (mm)

L	W	T	D	E
12.00±0.50	10.00±0.30	6.50±0.30	1.80±0.30	6.30±0.30



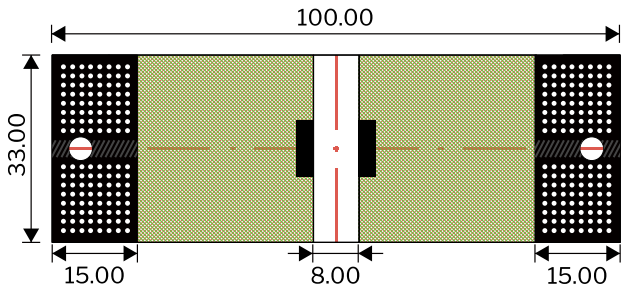
Recommended Solder Pad Dimension (mm)

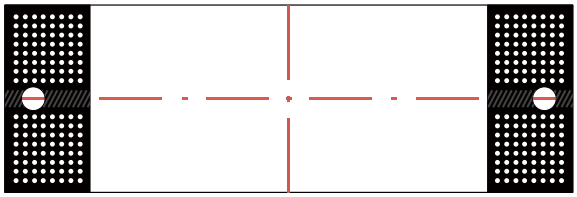
A	B	C	D
14.00±0.30	10.00±0.30	3.00±0.30	8.00±0.30



Dimensionsof Standard Test Board (mm)

Ampere Rating	Board Thickness	Copper Layer Thickness	Copper Trace Width
50A~200A	1.6	0.280	33





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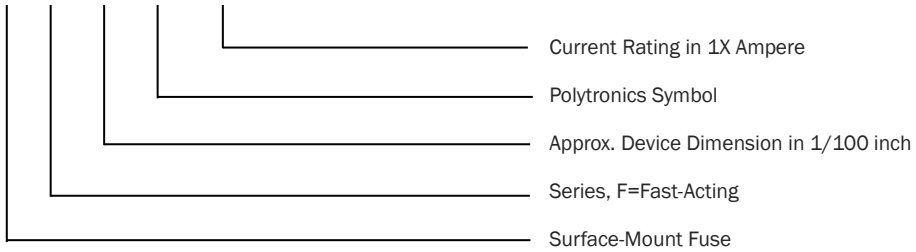
Part Number System

SMF F 5040 P □□□



Reliability Test

Characteristics	Test condition / Methods	Requirement	Test Reference
Time/Current	100% In	No Fusing; 4 hours min.	UL248-14
	200% In	≤ 60 sec	Refer to Spec
	1000% In	≤ 10 msec	Refer to Spec
Insulation Resistance	Test Condition A, 0.01MΩ Min.	0.01MΩ Min.	MIL-STD-202 Method 302
Interrupting Ability	1000A/125V DC 2000A/125V DC (60A~100A, TÜV only) 5000A/100V DC 1000A/80V DC	Without permanent arcing, ignition and bursting of fuse link	UL 248-14
Solderability	240°C ± 5°C, 3 sec ± 0.5sec	95% coverage min	IEC 60127-4 IEC 60068-2-20 MIL-STD-202
Resistance to Soldering	260°C ± 5°C, 10 sec ± 0.5sec	|ΔR|: <10%	MIL-STD-202 Method 210
Moisture Resistance	85°C ± 3°C, 85% ± 5% RH, 1000 hours	|ΔR|: <10%	MIL-STD-202 Method 106
Low Temperature Storage	55°C ± 3°C, 1000 hours	|ΔR|: <10%	IEC60068-2-1
High temperature Storage	125°C ± 2°C, 1000 hours	|ΔR|: <10%	IEC60068-2-2
Salt Spray	5% salt solution, 72 hours	|ΔR|: <10%	MIL-STD-202 Method 101
Thermal Shock	100 cycles, 65°C / +125°C 30 min. at each temperature zone	|ΔR|: <10%	IEC 60068-2-14
Vibration	Amplitude 10Hz ~ 55Hz in 1 min. 2 hours each XYZ, total 6 hours.	|ΔR|: <10%	MIL-STD-202 Method 201
Mechanical shock	100G's peak amplitude, saw tooth wave 6ms duration, 3 cycles XYZ+xyz = 18	|ΔR|: <10%	MIL-STD-202 Method 213

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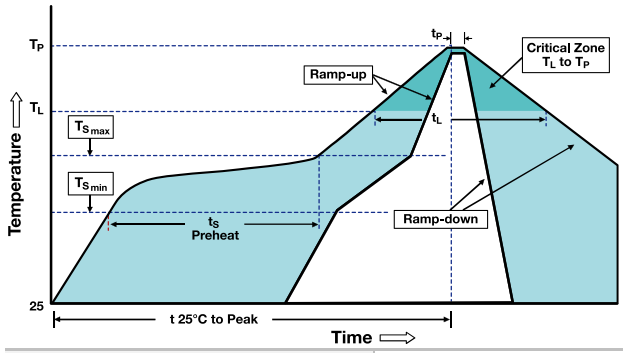
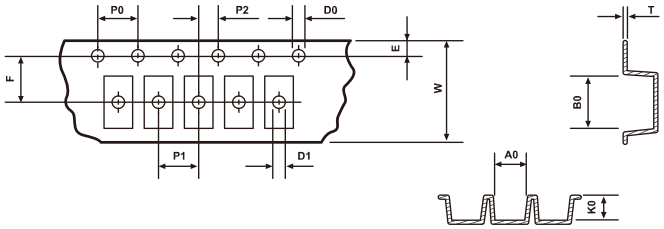
Soldering Parameters



Average Ramp-Up Rate (Ts_{max} to T_P)	3°C/second max.
Preheat -Temperature Min (Ts_{min}) -Temperature Max (Ts_{max}) -Time (Ts_{min} to Ts_{max})	 150°C 200°C 60-120 seconds
Time maintained above: -Temperature (T_L) -Time (t_L)	 217°C 60-150 seconds
Peak Temperature (T_P)	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.

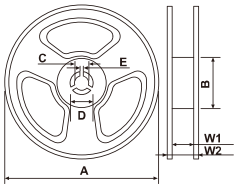
Note 1: All temperature refer to topside of the package, measured on the package body surface.
Note 2: If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

Tape & Reel Specification (mm.)



A0	10.30 ± 0.10
B0	13.00 ± 0.15
W	24.00 ± 0.30
F	11.50 ± 0.10
E	1.75 ± 0.10
D1	1.50 ± 0.10

P0	4.00 ± 0.10
P1	16.00 ± 0.10
P2	2.00 ± 0.10
D0	1.50 ± 0.10
K0	7.20 ± 0.10
T	0.35 ± 0.05



A	330.0 ± 2.0
B	100.0 ± 2.0
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

Packaging Quantity

Part Number	Tape & Reel Quantity
SMFF5040PXXX	500

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.
- Sealed plastic bags with desiccant shall be used to reduce the oxidation of the termination and shall only be opened prior to use.
- 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.