

**PRODUCT
DATASHEET**



SMFFH2410 Series Surface Mount Fuses Devices

SMFFH2410 Series Surface Mount Fuses Devices

Description

Polytronics SMFFH2410 series square shape surface mount High Inrush 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 both AC and DC circuits using surface mount technology. SMFFH2410 series is also RoHS compliant and halogen-free to meet global environmental standard.






Features

- High inrush withstand capability
- Wire-In-Air performance
- Wide operating temperature
- Wide range of current rating available
- Higher temperature profiles
- Excellent environmental integrity


Application

- Battery pack
- Power supply
- Industrial equipment
- Telecom system
- LCD monitors and modules
- PC related equipment / peripherals
- Medical equipment
- Wireless base station

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 |
|---------------|--------------------|----------------|--------------------------------------|------------------------------------|--|---|
| | | | | | |  |
| SMFFH2410P100 | 1.00 | 125V | UL 50A / 125V AC 50A / 125V DC | 115 | 3.12 | ✓ |
| SMFFH2410P125 | 1.25 | | | 85 | 4.21 | ✓ |
| SMFFH2410P150 | 1.50 | | | 78 | 4.98 | ✓ |
| SMFFH2410P160 | 1.60 | | | 68 | 5.85 | ✓ |
| SMFFH2410P200 | 2.00 | | | 52 | 7.20 | ✓ |
| SMFFH2410P250 | 2.50 | | | 36 | 14.05 | ✓ |
| SMFFH2410P300 | 3.00 | | | 28 | 16.92 | ✓ |
| SMFFH2410P315 | 3.15 | | | 24 | 18.68 | ✓ |
| SMFFH2410P350 | 3.50 | | | 22 | 21.95 | ✓ |
| SMFFH2410P400 | 4.00 | | | 20 | 32.80 | ✓ |
| SMFFH2410P500 | 5.00 | | | 12 | 37.57 | ✓ |

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

[‡] Melting I²T at 10 times of rated current

SMFFH2410 Series Surface Mount Fuses Devices

Electrical Specification

| Ampere Rating | % of Current Rating | Opening Time |
|---------------|---------------------|------------------|
| 1A~5A | 100% | 4 Hours Min. |
| 1A~5A | 200% | 120 Seconds Max. |

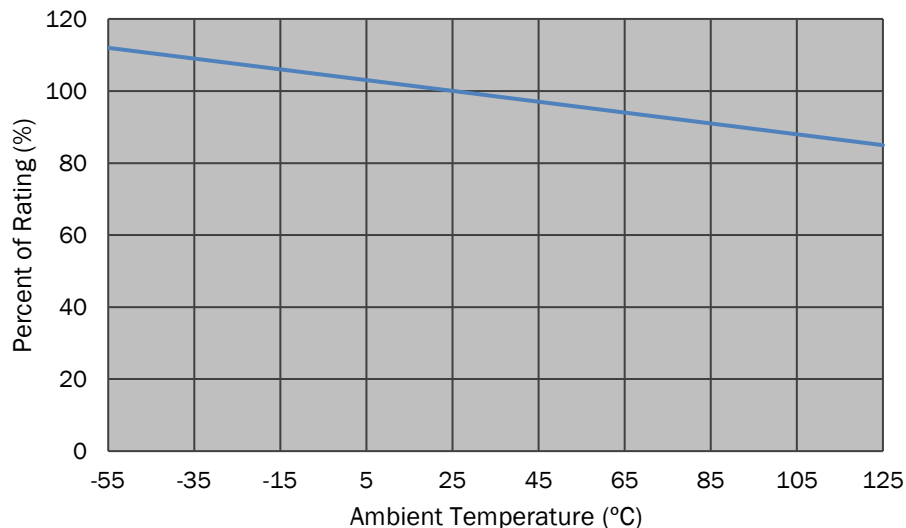
Physical Specifications

| | |
|-----------------------------|--|
| Materials | Substrate: Ceramic Terminations: Au Plated Brass Cap Element: Nickel alloy or Copper alloy |
| Solderability | MIL-STD-202 |
| Soldering Parameters | Wave Solder: 260°C, 10 seconds max. Reflow Solder: 260°C, 5 seconds max. (Thickness of solder paste: 0.2mm Max) Hand Solder: 300°C, 2 seconds max. (Soldering iron avoid touch Brass Cap.) |

Environmental Specifications

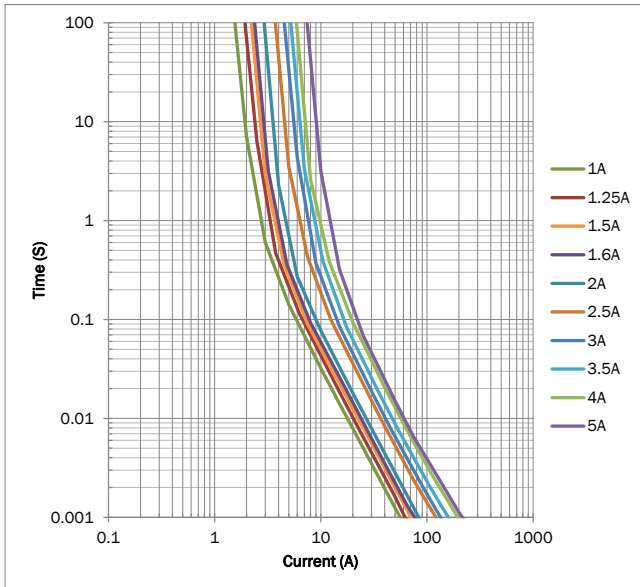
| | |
|------------------------------|-----------------|
| Operating Temperature | -55°C to 125 °C |
|------------------------------|-----------------|

Thermal Derating Curve

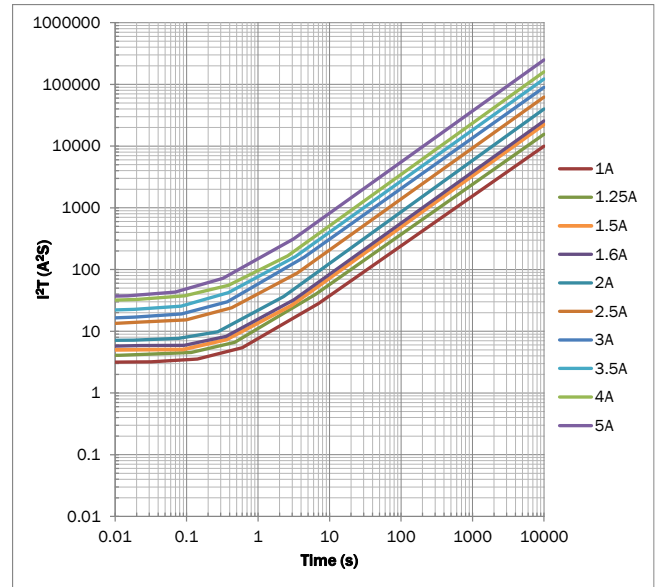


SMFFH2410 Series Surface Mount Fuses Devices

Time-Current Curve



I²T vs Time Curve



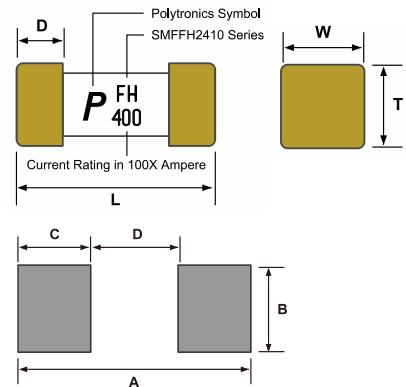
Physical Dimensions (mm.)

Dimensions (mm)

| L | W | T | D |
|-----------|----------|----------|----------|
| 6.10±0.20 | 2.5±0.10 | 2.5±0.10 | 1.4±0.10 |

Recommended Solder Pad Dimension (mm)

| A | B | C | D |
|---------|---------|---------|---------|
| 8.0±0.3 | 3.0±0.3 | 2.5±0.3 | 3.0±0.3 |

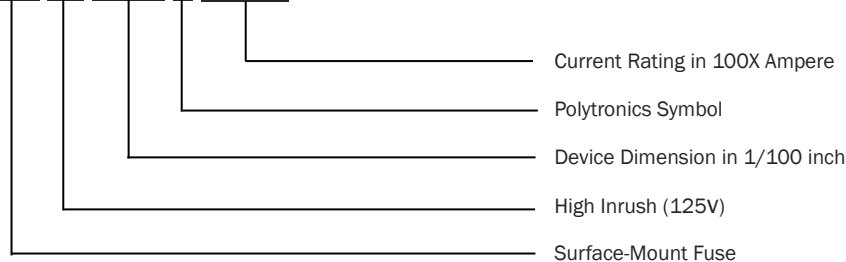


Dimensions of Standard Test Board (mm)

| Ampere Rating | Board Thickness | Copper Layer Thickness | Copper Trace Width |
|---------------|-----------------|------------------------|--------------------|
| 1A~5A | 1.6 | 0.035 | 5 |

Part Number

SMF FH 2410 P □□□



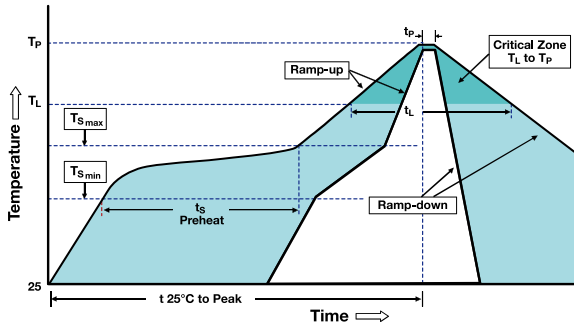
SMFFH2410 Series Surface Mount Fuses Devices

Reliability Test

| Characteristics | Test condition / Methods | Requirement | Test Reference |
|---------------------------------|--|--|--|
| Time/Current | 100% In | No Fusing; 4 hours min. | UL248-14 |
| | 200% In | <120sec | Refer to Spec |
| | 1000% In | >10ms | 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 | 50A@125V AC 50A@125V 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 |
| 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 |

SMFFH2410 Series Surface Mount Fuses Devices

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) | 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. |

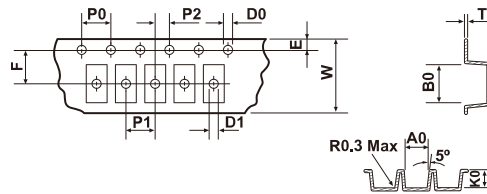
Note 1: All temperature refer to topside of the package, measured on the package body surface.

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

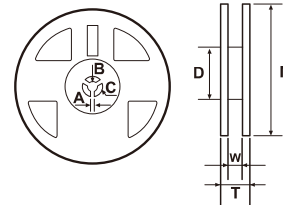
Packaging Quantity

| Part Number | Tape & Reel Quantity |
|---------------|----------------------|
| SMFFH2410PXXX | 1000 |

Tape & Reel Specification (mm.)



| | | | |
|----|-------------|----|---------------|
| A0 | 2.70 ± 0.10 | E | 1.75 ± 0.10 |
| B0 | 6.40 ± 0.10 | F | 5.50 ± 0.10 |
| K0 | 2.70 ± 0.10 | D0 | ∅ 1.50 ± 0.10 |
| P0 | 4.00 ± 0.10 | D1 | 1.50 ± 0.25 |
| P1 | 4.00 ± 0.10 | W | 12.0 ± 0.15 |
| P2 | 2.00 ± 0.10 | T | 0.25 ± 0.05 |



| | |
|---|---------------|
| M | ∅ 178.0 ± 2.0 |
| W | 12.5 ± 1.0 |
| T | 14.5 ± 1.5 |
| A | 2.0 ± 0.5 |
| B | ∅ 13.0 ± 0.5 |
| C | ∅ 21.0 ± 0.5 |
| D | ∅ 58.0 ± 2.0 |

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.