

SPF SERIES SOLAR FUSES

1000 V dc • 1-30 A



Description

The SPF Solar Protection Fuse series has been specifically designed for the protection of photovoltaic (PV) systems. This family of Midget style fuses (10 x 38 mm) can safely protect PV modules and conductors from reverse-overcurrent conditions.

As PV systems have grown in size, so have the corresponding voltage requirements. This increase in system voltage has typically been intended to minimize power loss associated with long conductor runs. Standard circuit protection devices are not designed to completely protect photovoltaic panels. However, the SPF series is UL Listed to safely interrupt faulted circuits up to this demanding voltage level.

Littelfuse offers 14 ampere ratings to match specific requirements in a variety of applications.

Features/Benefits

- Meets UL and IEC photovoltaic standards
- UL 248-19 Listed 1000 Vdc maximum
- 1-30 A ratings available
- 20,000 A Interrupting Rating - 1 A - 20 A
- 50,000 A Interrupting Rating - 25 A - 30 A
- Both PCB mount and dead-front holder options available

Applications

- Inverters
- Combiner boxes
- Battery charge controllers

Recommended Accessories

Fuse Holder: LPHV 1000 Vdc POWR-Safe Series
 Fuse Clips: 125004/125005

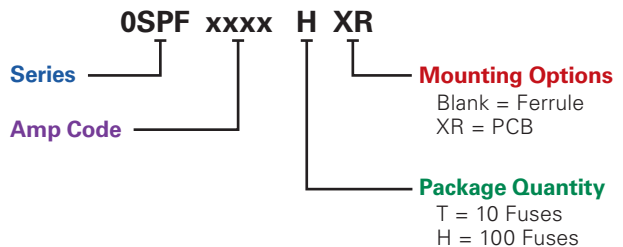
Web Resources

Download technical documents: littelfuse.com/spf

Specifications

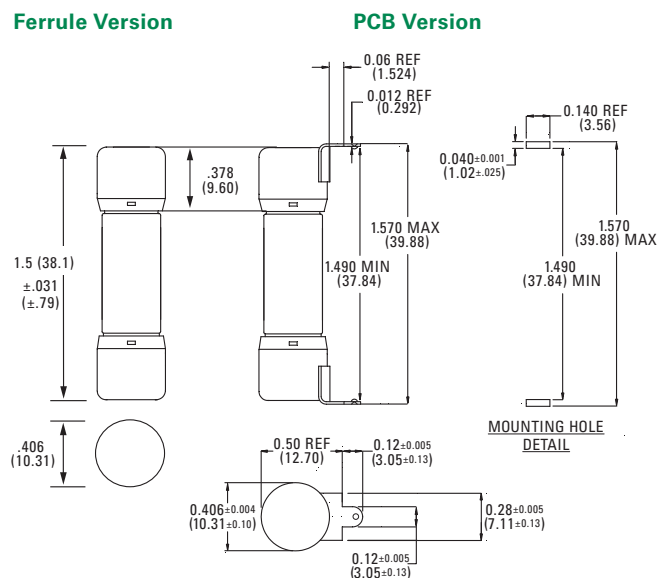
| | |
|---------------------------------|--|
| Voltage Rating | 1000 V dc |
| Amperage Rating | 1, 2, 3, 3.5, 4, 5, 6, 8, 10, 12, 15, 20, 25, 30 |
| Max. Interrupting Rating | 20 kA - 1 A - 20 A 50 kA - 25 A - 30 A |
| Time Constant | ≤ 2ms |
| Material | Body: Melamine Caps: Copper Alloy |
| Approvals | UL 248-19 Listed (File: E339112) IEC 60269-6 (1-30 A) CSA Certified (File: 029862_0_000) |
| Environmental | RoHS Compliant |
| Country of Origin | Mexico |

Part Numbering System



| SERIES | AMP | PACKAGE QUANTITY | MOUNTING METHOD | CATALOG NUMBER | ORDERING NUMBER |
|--------|-----|------------------|-----------------|----------------|-----------------|
| SPF | 2 | 10 | FERRULE | SPF002 | OSPF002.T |
| SPF | 3.5 | 10 | FERRULE | SPF03.5 | OSPF03.5T |
| SPF | 30 | 100 | PCB TABS | SPF030R | OSPF030.HXR |

Dimensions Inches (mm)



Look for this logo to indicate products that are used in solar applications. Visit our website littelfuse.com/solar for the latest updates on approvals, certifications, and new products.

SPF SERIES SOLAR FUSES

Electrical Specifications Ferrule Version

| AMPERAGE | AMP CODE | ORDERING NUMBER | FUSE LABEL ID | UPC | VOLTAGE | | NOM COLD RESISTANCE (ohm) | WATTS LOSS AT 100% RATED CURRENT (W) | WATTS LOSS AT 80% RATED CURRENT (W) | TOTAL CLEARING I ² t (A ² s) 10 kA | TOTAL CLEARING I ² t (A ² s) 20 kA | TOTAL CLEARING I ² t (A ² s) 50 kA | AGENCY APPROVALS | |
|----------|----------|-----------------|---------------|-------------|---------|----|---------------------------|--------------------------------------|-------------------------------------|--|--|--|------------------|-----|
| | | | | | DC | DC | | | | | | | UL | CSA |
| 1 | 001. | OSPF001.T | SPF 1A | 07945816907 | 1000 | 20 | 0.394 | 0.602 | 0.410 | 0.554 | 0.554 | - | • | • |
| 2 | 002. | OSPF002.T | SPF 2A | 07945816910 | 1000 | 20 | 0.237 | 1.586 | 0.851 | 1.175 | 4.755 | - | • | • |
| 3 | 003. | OSPF003.T | SPF 3A | 07945816913 | 1000 | 20 | 0.11 | 1.504 | 0.824 | 5.007 | 7.882 | - | • | • |
| 3.5 | 03.5 | OSPF03.5T | SPF 3-½A | 07945880087 | 1000 | 20 | 0.07787 | 1.365 | 0.778 | 11.297 | 11.297 | - | • | • |
| 4 | 004. | OSPF004.T | SPF 4A | 07945816916 | 1000 | 20 | 0.06127 | 1.491 | 0.839 | 23.031 | 23.031 | - | • | • |
| 5 | 005. | OSPF005.T | SPF 5A | 07945816919 | 1000 | 20 | 0.04086 | 1.465 | 0.859 | 42.600 | 42.600 | - | • | • |
| 6 | 006. | OSPF006.T | SPF 6A | 07945816922 | 1000 | 20 | 0.0281 | 1.348 | 0.769 | 76.270 | 80.254 | - | • | • |
| 8 | 008. | OSPF008.T | SPF 8A | 07945816925 | 1000 | 20 | 0.0178 | 1.610 | 0.914 | 193.323 | 198.960 | - | • | • |
| 10 | 010. | OSPF010.T | SPF 10A | 07945816928 | 1000 | 20 | 0.0125 | 1.760 | 1.000 | 395.556 | 401.208 | - | • | • |
| 12 | 012. | OSPF012.T | SPF 12A | 07945816931 | 1000 | 20 | 0.00993 | 1.965 | 1.109 | 599.198 | 641.940 | - | • | • |
| 15 | 015. | OSPF015.T | SPF 15A | 07945816934 | 1000 | 20 | 0.007855 | 2.282 | 1.382 | 457.740 | 504.770 | - | • | • |
| 20 | 020. | OSPF020.T | SPF 20A | 07945816937 | 1000 | 20 | 0.0045 | 2.810 | 1.574 | 1173.990 | 1312.850 | - | • | • |
| 25 | 025. | OSPF025.T | SPF 25A | 07945817595 | 1000 | 50 | 0.003779 | 3.331 | 1.878 | - | 2141.000 | 2433.000 | • | • |
| 30 | 030. | OSPF030.T | SPF 30A | 07945817598 | 1000 | 50 | 0.002898 | 3.845 | 2.147 | - | 3290.000 | 3810.000 | • | • |

Electrical Specifications PCB Version

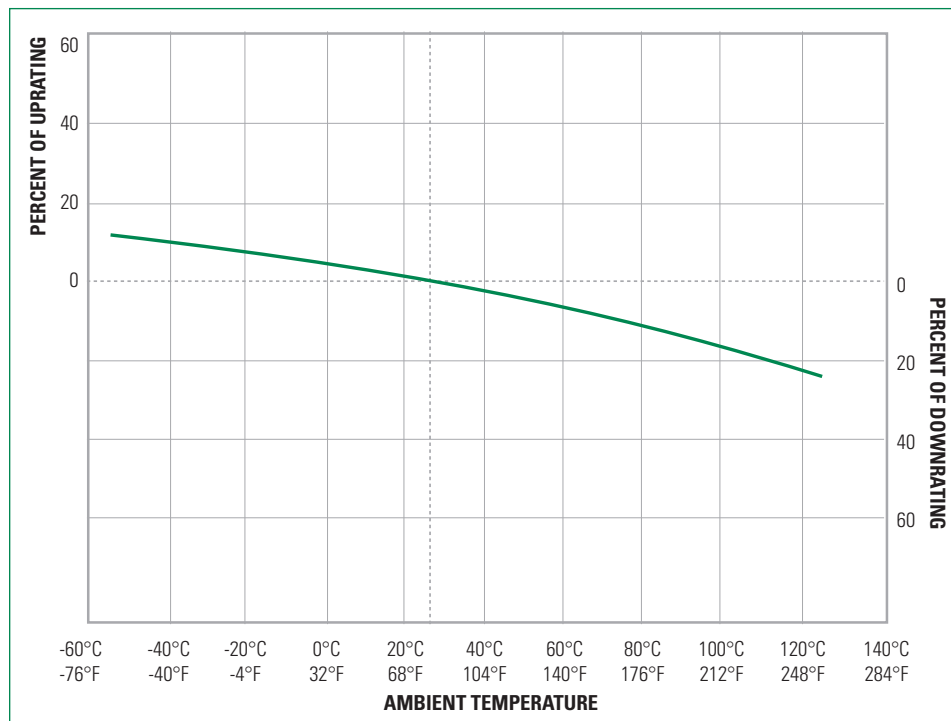
| AMPERAGE | AMP CODE | ORDERING NUMBER | FUSE LABEL ID | UPC | VOLTAGE | | NOM COLD RESISTANCE (ohm) | WATTS LOSS AT 100% RATED CURRENT (W) | WATTS LOSS AT 80% RATED CURRENT (W) | TOTAL CLEARING I ² t (A ² s) 10 kA | TOTAL CLEARING I ² t (A ² s) 20 kA | TOTAL CLEARING I ² t (A ² s) 50 kA | AGENCY APPROVALS | |
|----------|----------|-----------------|---------------|-------------|---------|----|---------------------------|--------------------------------------|-------------------------------------|--|--|--|------------------|-----|
| | | | | | DC | DC | | | | | | | UL | CSA |
| 1 | 001. | OSPF001.HXR | SPF 1A-R | 07945816909 | 1000 | 20 | 0.394 | 0.602 | 0.410 | 0.554 | 0.554 | - | • | • |
| 2 | 002. | OSPF002.HXR | SPF 2A-R | 07945816912 | 1000 | 20 | 0.237 | 1.586 | 0.851 | 1.175 | 4.755 | - | • | • |
| 3 | 003. | OSPF003.HXR | SPF 3A-R | 07945816915 | 1000 | 20 | 0.11 | 1.504 | 0.824 | 5.007 | 7.882 | - | • | • |
| 3.5 | 03.5 | OSPF03.5HXR | SPF 3-½A-R | 07945880089 | 1000 | 20 | 0.07787 | 1.365 | 0.778 | 11.297 | 11.297 | - | • | • |
| 4 | 004. | OSPF004.HXR | SPF 4A-R | 07945816918 | 1000 | 20 | 0.06127 | 1.491 | 0.839 | 23.031 | 23.031 | - | • | • |
| 5 | 005. | OSPF005.HXR | SPF 5A-R | 07945816921 | 1000 | 20 | 0.04086 | 1.465 | 0.859 | 42.600 | 42.600 | - | • | • |
| 6 | 006. | OSPF006.HXR | SPF 6A-R | 07945816924 | 1000 | 20 | 0.0281 | 1.348 | 0.769 | 76.270 | 80.254 | - | • | • |
| 8 | 008. | OSPF008.HXR | SPF 8A-R | 07945816927 | 1000 | 20 | 0.0178 | 1.610 | 0.914 | 193.323 | 198.960 | - | • | • |
| 10 | 010. | OSPF010.HXR | SPF 10A-R | 07945816930 | 1000 | 20 | 0.0125 | 1.760 | 1.000 | 395.556 | 401.208 | - | • | • |
| 12 | 012. | OSPF012.HXR | SPF 12A-R | 07945816933 | 1000 | 20 | 0.00993 | 1.965 | 1.109 | 599.198 | 641.940 | - | • | • |
| 15 | 015. | OSPF015.HXR | SPF 15A-R | 07945816936 | 1000 | 20 | 0.007855 | 2.282 | 1.382 | 457.740 | 504.770 | - | • | • |
| 20 | 020. | OSPF020.HXR | SPF 20A-R | 07945817594 | 1000 | 20 | 0.0045 | 2.810 | 1.574 | 1173.990 | 1312.850 | - | • | • |
| 25 | 025. | OSPF025.HXR | SPF 25A-R | 07945817597 | 1000 | 50 | 0.003779 | 3.331 | 1.878 | - | 2141.000 | 2433.000 | • | • |
| 30 | 030. | OSPF030.HXR | SPF 30A-R | 07945817600 | 1000 | 50 | 0.002898 | 3.845 | 2.147 | - | 3290.000 | 3810.000 | • | • |

SPF SERIES SOLAR FUSES

Electrical Specification – Agency Requirements

| AMPERAGE RATING | OPENING TIME (MINUTES) | | | | |
|-----------------|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|
| | 100% of Amp Rating per UL | 113% of Amp Rating per IEC | 135% of Amp Rating per UL | 145% of Amp Rating per IEC | 200% of Amp Rating per UL |
| 1-30 | Temperature Stabilization | 60 Min | 60 Max | 60 Max | 4 Max |

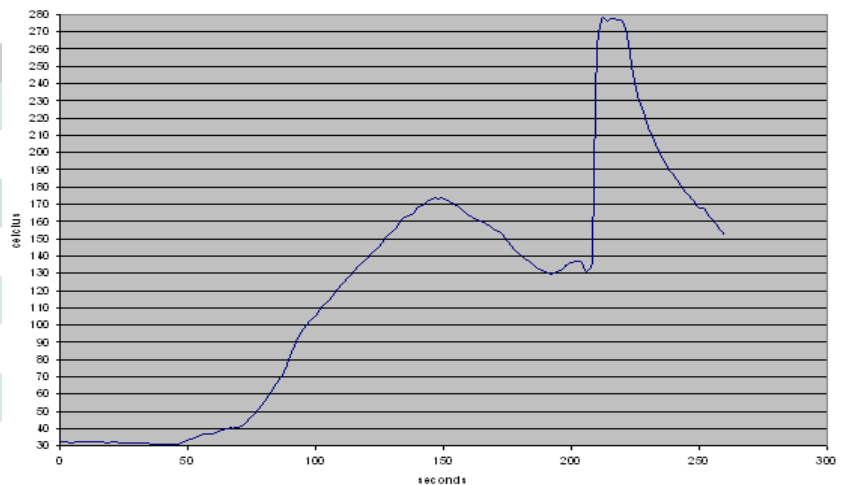
Temperature Derating Curve (Temperature of Air Immediately Surrounding Fuse)



Recommended Process Parameters

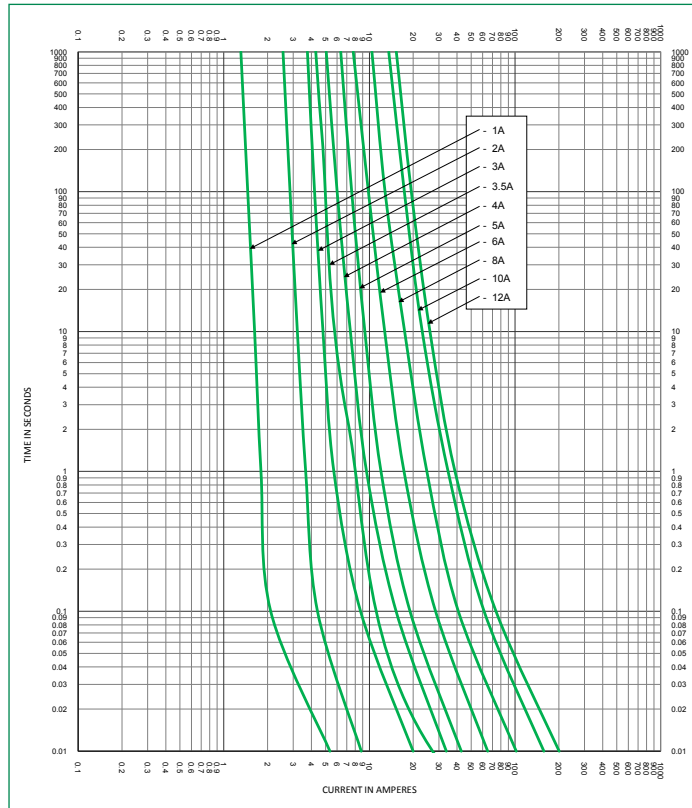
Soldering Parameters

| WAVE PARAMETER | LEAD FREE RECOMMENDATION |
|------------------------|-----------------------------------|
| PREHEAT: | (Typical Industry Recommendation) |
| TEMPERATURE MINIMUM: | 130° C |
| TEMPERATURE MAXIMUM: | — |
| PRE-HEAT TIME | 75 Seconds Maximum |
| SOLDER POT TEMPERATURE | 280° C Maximum |
| SOLDER DWELL TIME | 270° C for 8 Seconds Maximum |
| COMPLETE CYCLE TIME | 250 Seconds Maximum |

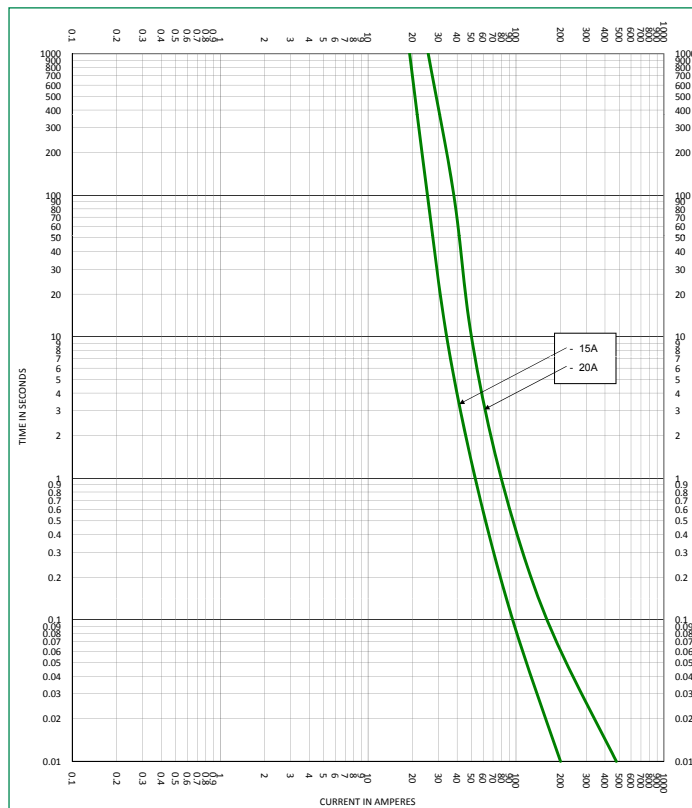


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Time Current Curve (1-12 A)

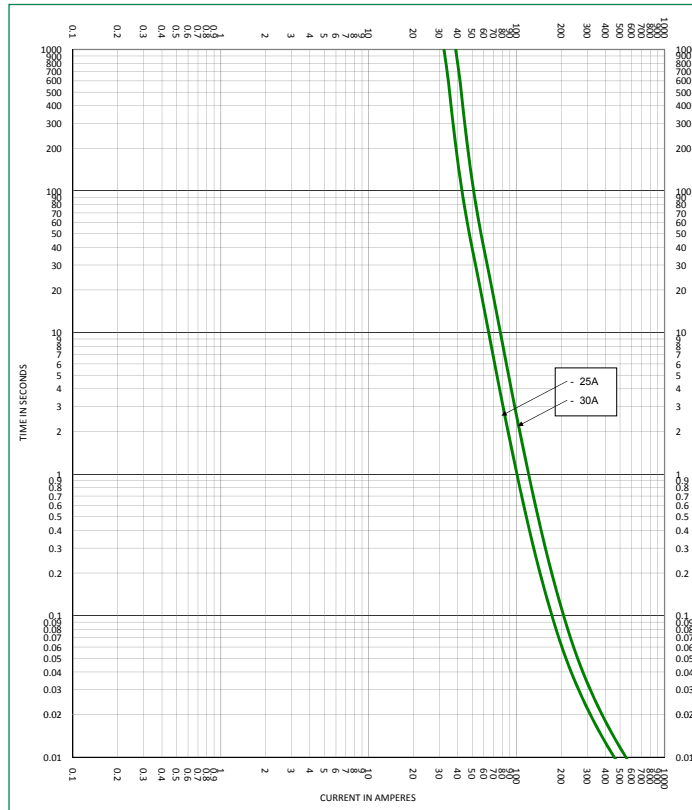


Time Current Curve (15-20 A)



SPF SERIES SOLAR FUSES

Time Current Curve (25-30 A)



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