

POWR-GARD® Fuse Datasheet

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 V dc 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
- Meets IEC 60269-6 electrical performance requirements

Applications

- Inverters
- Combiner boxes
- Battery charge controllers

Recommended Accessories

Fuse Holder: LPHV 1000 V dc POWR-Safe Series

Fuse Clips: 125004/125005

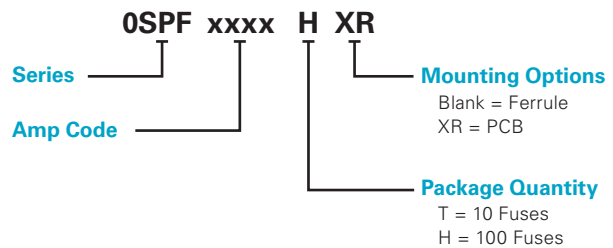
Web Resources

Download technical documents: Littelfuse.com/spf

Specifications

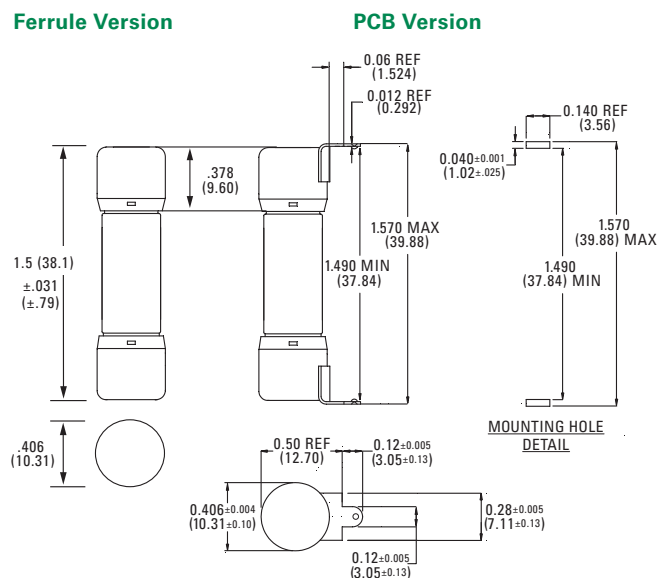
Voltage Rating	1000 V dc
Amperage Rating	1, 2, 3, 3.5, 4, 5, 6, 8, 10, 12, 15, 20, 25, 30
Max. Interrupting Rating	20 kA - 1 A - 20 A 50 kA - 25 A - 30 A
Time Constant	≤ 2ms
Material	Body: Melamine Caps: Copper Alloy
Approvals	UL 248-19 Listed (File: E339112) CSA Certified (File: 029862_0_000)
Environmental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

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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

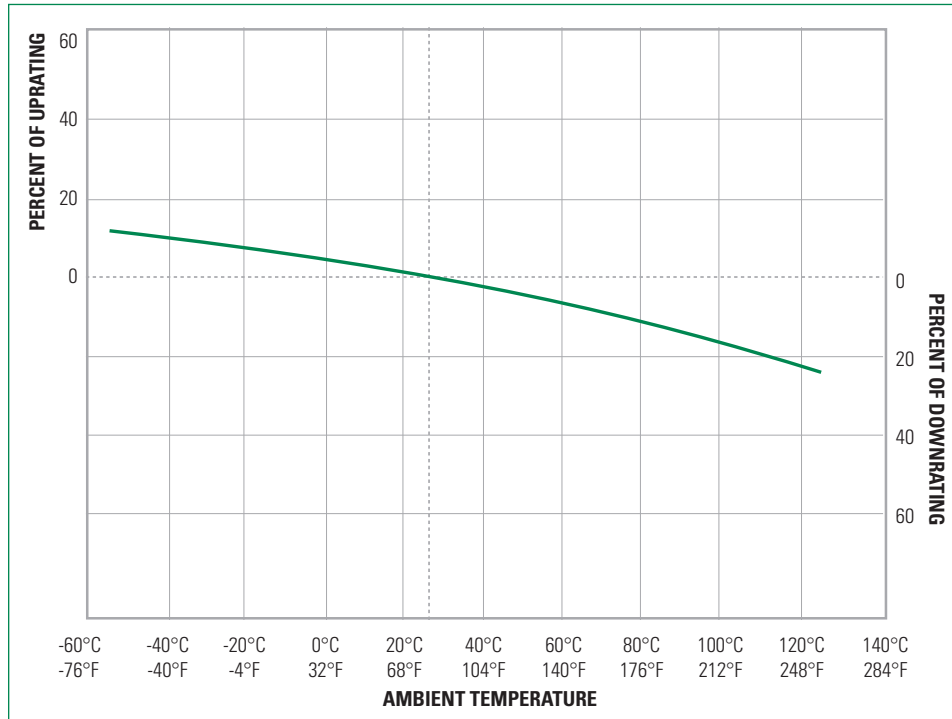
PCB Version

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	•	•

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

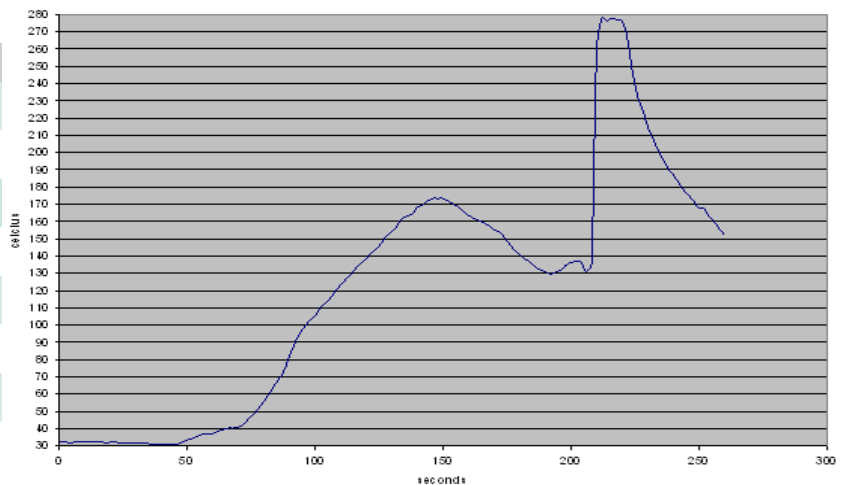
Temperature Derating Curve (temperature of air immediately surrounding fuse)



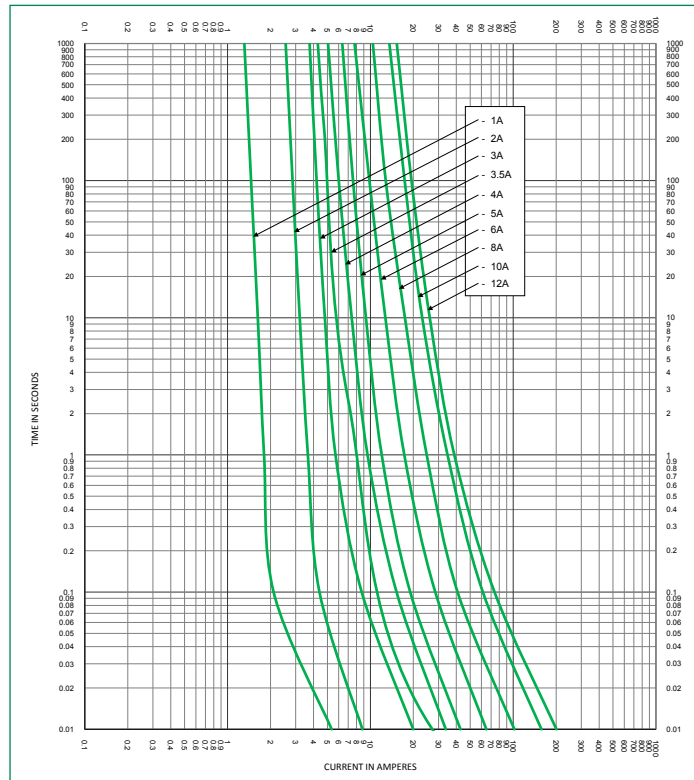
Recommended Process Parameters

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

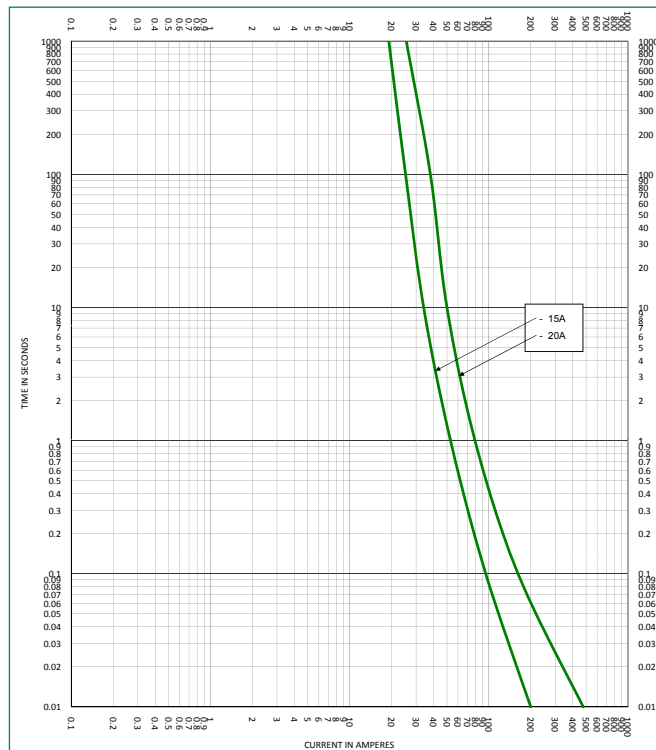
Soldering Parameters



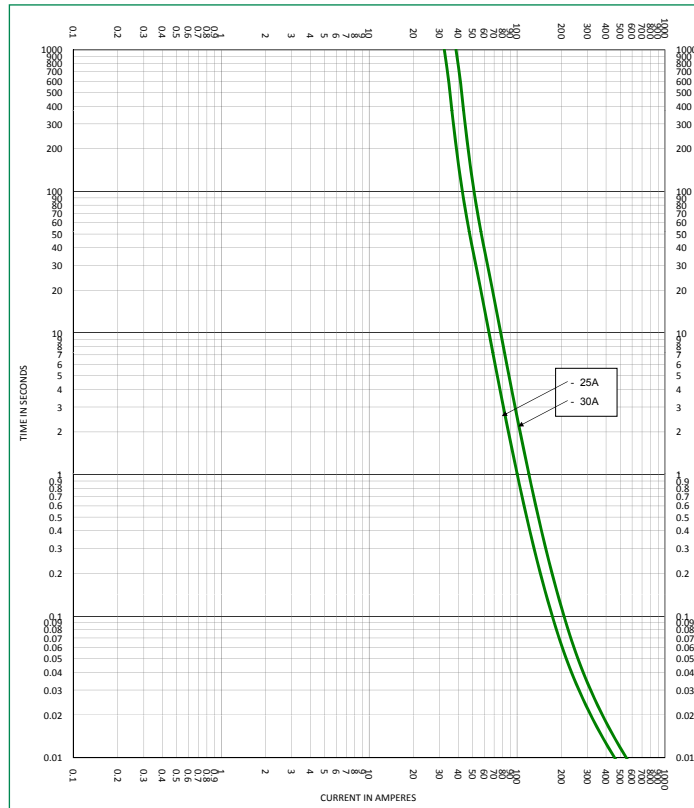
Time Current Curve (1–12 A)



Time Current Curve (15–20 A)



Time Current Curve (25–30 A)



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