



**THE DATASHEET OF  
SPNH200.X2XLDLMS**



# 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 multiple ampere ratings to match specific requirements in a variety of applications.

### Features/Benefits

- Full range, fast-acting fuse helps eliminate common low-overload faults
- Prevents power generation losses due to nuisance tripping from changes in temperature
- Both PCB mount and dead-front holder options available

### Applications

- Inverters
- Combiner boxes
- Battery charge controllers

### Recommended Accessories

Fuse Holder: LPHV 1000 V dc POWR-Safe Series  
 Fuse Clips: 125003

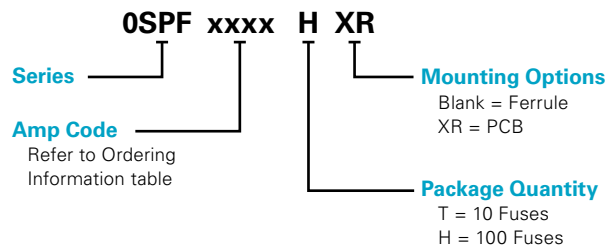
### Web Resources

Download technical documents: [Littelfuse.com/SPF](http://Littelfuse.com/SPF)

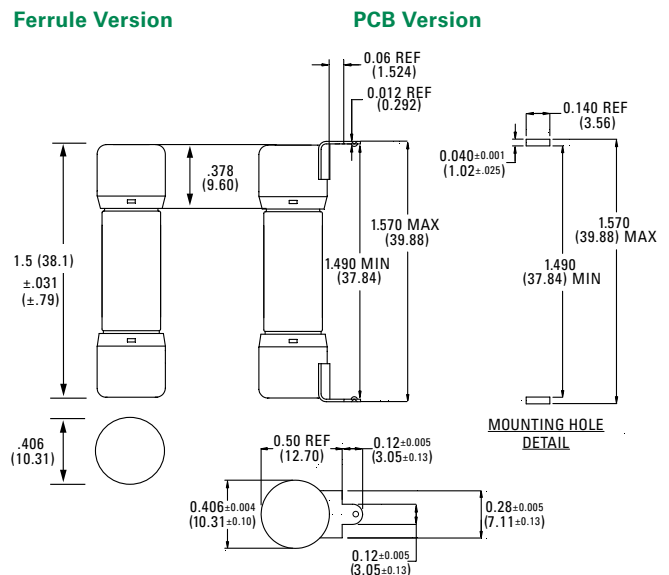
### Specifications

<b>Voltage Rating</b>	1000 V dc
<b>Amperage Rating</b>	1, 2, 3, 3.5, 4, 5, 6, 8, 10, 12, 15, 20, 25, 30
<b>Max. Interrupting Rating</b>	20 kA - 1 A - 20 A 50 kA - 25 A - 30 A
<b>Time Constant</b>	≤ 2ms
<b>Material</b>	Body: Melamine Caps: Copper Alloy
<b>Approvals</b>	UL Listed (File: E339112) CSA Certified (File: 029862_0_000) TUV (Cert: J 50494849)
<b>Applicable Standards</b>	UL 248-1, 248-19 IEC 60269-6
<b>Environmental</b>	RoHS Compliant
<b>Country of Origin</b>	Mexico

### Part Numbering System



### Dimensions Inches (mm)



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

# POWR-GARD® Fuse Datasheet

## SPF SERIES SOLAR FUSES

### Ordering Information

Ferrule Version

SERIES	AMPERAGE	AMPERE CODE	CATALOG NUMBER	PRODUCT MARKING	PACKING QUANTITY	ORDERING NUMBER	UPC CODE
SPF	1	001.	SPF001	SPF 1A	10	OSPF001.T	07945816907
					100	OSPF001.H	07945816908
SPF	2	002.	SPF002	SPF 2A	10	OSPF002.T	07945816910
					100	OSPF002.H	07945816911
SPF	3	003.	SPF003	SPF 3A	10	OSPF003.T	07945816913
					100	OSPF003.H	07945816914
SPF	3.5	03.5	SPF03.5	SPF 3-½A	10	OSPF03.5T	07945880087
					100	OSPF03.5H	07945880088
SPF	4	004.	SPF004	SPF 4A	10	OSPF004.T	07945816916
					100	OSPF004.H	07945816917
SPF	5	005.	SPF005	SPF 5A	10	OSPF005.T	07945816919
					100	OSPF005.H	07945816920
SPF	6	006.	SPF006	SPF 6A	10	OSPF006.T	07945816922
					100	OSPF006.H	07945816923
SPF	8	008.	SPF008	SPF 8A	10	OSPF008.T	07945816925
					100	OSPF008.H	07945816926
SPF	10	010.	SPF010	SPF 10A	10	OSPF010.T	07945816928
					100	OSPF010.H	07945816929
SPF	12	012.	SPF012	SPF 12A	10	OSPF012.T	07945816931
					100	OSPF012.H	07945816932
SPF	15	015.	SPF015	SPF 15A	10	OSPF015.T	07945816934
					100	OSPF015.H	07945816935
SPF	20	020.	SPF020	SPF 20A	10	OSPF020.T	07945816937
					100	OSPF020.H	07945816938
SPF	25	025.	SPF025	SPF 25A	10	OSPF025.T	07945817595
					100	OSPF025.H	07945817596
SPF	30	030.	SPF030	SPF 30A	10	OSPF030.T	07945817598
					100	OSPF030.H	07945817599

# POWR-GARD® Fuse Datasheet

## SPF SERIES SOLAR FUSES

### Ordering Information

PCB Version

SERIES	AMPERAGE	AMPERE CODE	CATALOG NUMBER	PRODUCT MARKING	PACKING QUANTITY	ORDERING NUMBER	UPC CODE
SPF	1	001.	SPF001R	SPF 1A-R	100	OSPF001.HXR	07945816909
SPF	2	002.	SPF002R	SPF 2A-R	100	OSPF002.HXR	07945816912
SPF	3	003.	SPF003R	SPF 3A-R	100	OSPF003.HXR	07945816915
SPF	3.5	03.5	SPF03.5R	SPF 3-½A-R	100	OSPF03.5.HXR	07945880089
SPF	4	004.	SPF004R	SPF 4A-R	100	OSPF004.HXR	07945816918
SPF	5	005.	SPF005R	SPF 5A-R	100	OSPF005.HXR	07945816921
SPF	6	006.	SPF006R	SPF 6A-R	100	OSPF006.HXR	07945816924
SPF	8	008.	SPF008R	SPF 8A-R	100	OSPF008.HXR	07945816927
SPF	10	010.	SPF010R	SPF 10A-R	100	OSPF010.HXR	07945816930
SPF	12	012.	SPF012R	SPF 12A-R	100	OSPF012.HXR	07945816933
SPF	15	015.	SPF015R	SPF 15A-R	100	OSPF015.HXR	07945816936
SPF	20	020.	SPF020R	SPF 20A-R	100	OSPF020.HXR	07945817594
SPF	25	025.	SPF025R	SPF 25A-R	100	OSPF025.HXR	07945817597
SPF	30	030.	SPF030R	SPF 30A-R	100	OSPF030.HXR	07945817600

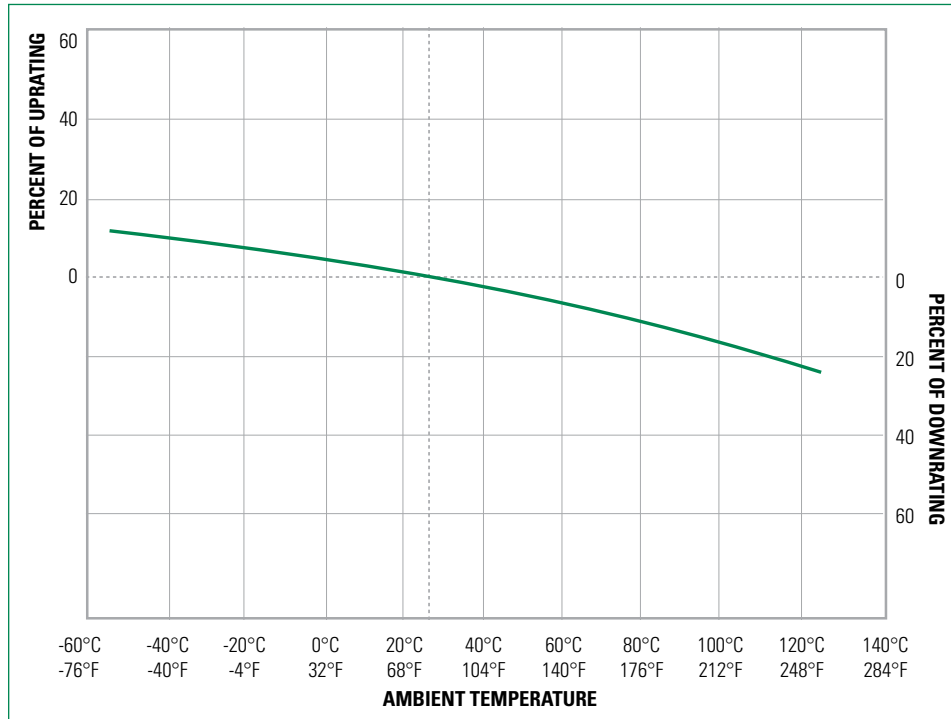
### Electrical Specifications

AMPERAGE	AMPERE CODE	CATALOG NUMBER (FERRULE)	CATALOG NUMBER (PCB)	VOLTAGE		NOM COLD RESISTANCE (OHM)	WATTS LOSS AT 100 % RATED CURRENT (W)	WATTS LOSS AT 80 % RATED CURRENT (W)	TOTAL CLEARING I²T (A2S) 20 KA	TOTAL CLEARING I²T (A2S) 50 KA	AGENCY APPROVALS		
				DC	INTERRUPTING RATING (KA)						DC	UL	CSA
1	001.	SPF001	SPF001R	1000	20	0.394	0.60	0.41	0.6	–	•	•	•
2	002.	SPF002	SPF002R	1000	20	0.154	1.59	0.85	4.8	–	•	•	•
3	003.	SPF003	SPF003R	1000	20	0.110	1.50	0.82	7.9	–	•	•	•
3.5	03.5	SPF03.5	SPF03.5R	1000	20	0.078	1.37	0.78	11	–	•	•	•
4	004.	SPF004	SPF004R	1000	20	0.061	1.49	0.84	23	–	•	•	•
5	005.	SPF005	SPF005R	1000	20	0.041	1.47	0.86	43	–	•	•	•
6	006.	SPF006	SPF006R	1000	20	0.028	1.35	0.77	80	–	•	•	•
8	008.	SPF008	SPF008R	1000	20	0.018	1.61	0.91	199	–	•	•	•
10	010.	SPF010	SPF010R	1000	20	0.013	1.76	1.00	401	–	•	•	•
12	012.	SPF012	SPF012R	1000	20	0.010	1.97	1.11	642	–	•	•	•
15	015.	SPF015	SPF015R	1000	20	0.008	2.28	1.38	505	–	•	•	•
20	020.	SPF020	SPF020R	1000	20	0.005	2.81	1.57	1313	–	•	•	•
25	025.	SPF025	SPF025R	1000	20	0.004	3.33	1.88	2141	2433	•	•	•
30	030.	SPF030	SPF030R	1000	20	0.003	3.85	2.15	3290	3810	•	•	•

### Electrical Specification – Agency Requirements

AMPERAGE RATING	OPENING TIME (MINUTES)			
	100 % of Amp Rating per UL	105 % of Amp Rating per IEC	135 % of Amp Rating per UL	200 % of Amp Rating per UL
1–30	Temperature Stabilization	60 Min	60 Max	4 Max

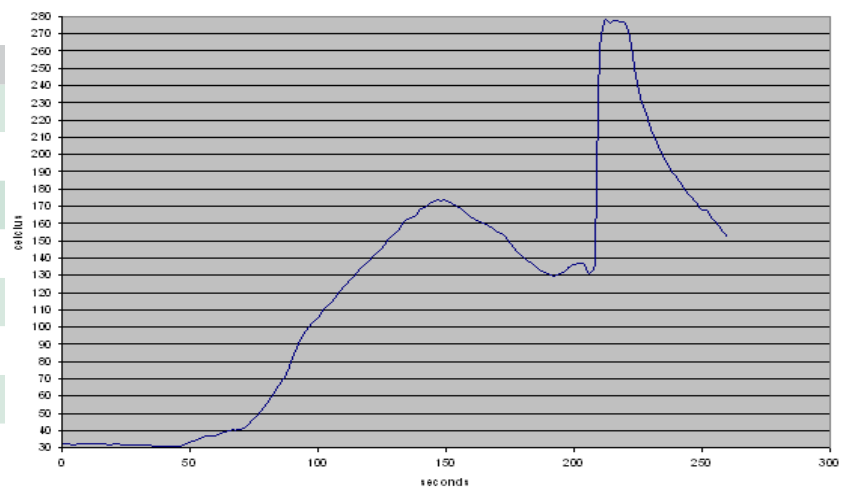
### Temperature Derating Curve (temperature of air immediately surrounding fuse)



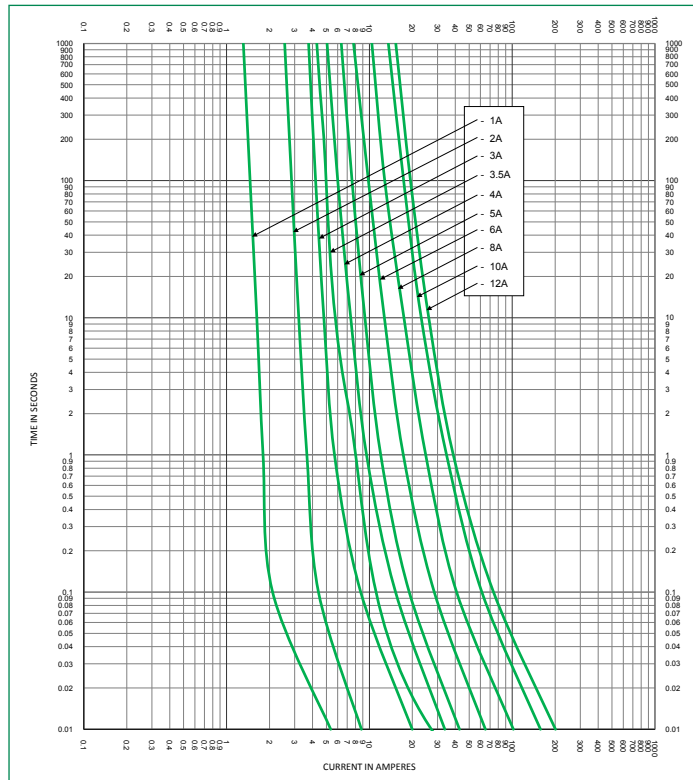
### Recommended Process Parameters

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

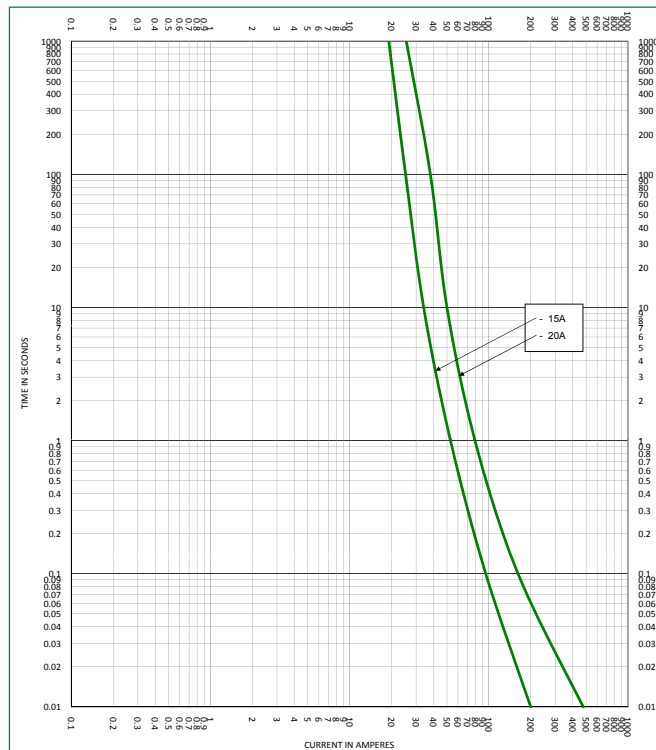
### Soldering Parameters



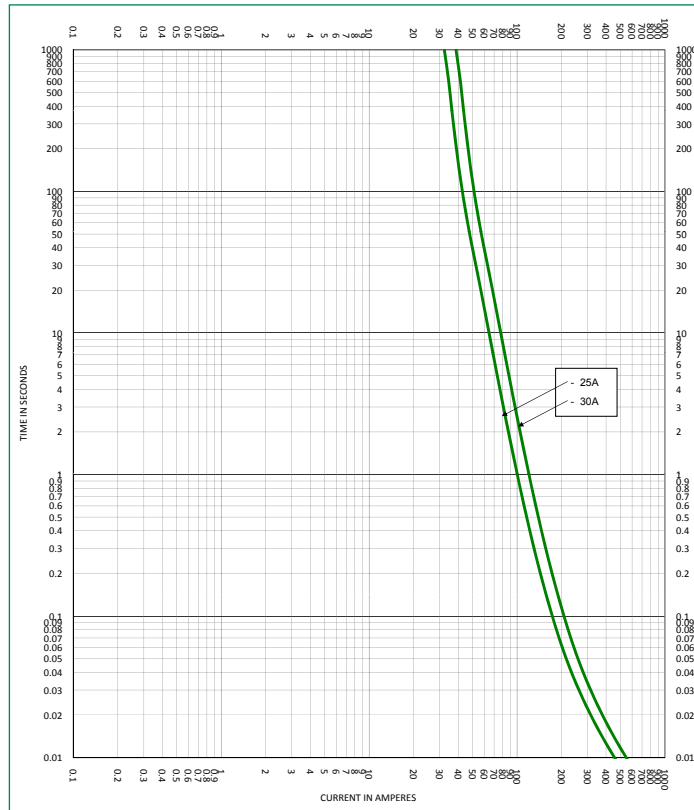
**Time Current Curve (1–12 A)**



**Time Current Curve (15–20 A)**



**Time Current Curve (25–30 A)**



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