


Features

- Compliant with AEC-Q200 Rev-C Stress Test Qualification for Passive Components in Automotive Applications
- Compact design to save board space - 1206 footprint
- Small size results in very fast time to react to fault events
- Symmetrical design
- Low profile
- RoHS compliant* and halogen free**
- Agency recognition: 

PRCP-NSMF Series - Polymer Resettable Circuit Protectors

Electrical Characteristics

Model	V max. Volts	I max. Amps	I _{hold}	I _{trip}	Resistance		Max. Time To Trip		Tripped Power Dissipation
			Amperes at 23 °C		Ohms at 23 °C		Amperes at 23 °C	Seconds at 23 °C	Watts at 23 °C
			Hold	Trip	R _{Min.}	R _{1Max.}			Typ.
PRCP-NSMF012	30.0	10	0.12	0.29	1.35	8.50	1.0	0.20	0.4
PRCP-NSMF020	24.0	10	0.20	0.46	0.60	2.60	1.0	0.60	0.6
PRCP-NSMF020/30X***	30.0	60	0.20	0.40	0.60	3.30	1.0	0.60	0.6
PRCP-NSMF035	6.0	100	0.35	0.75	0.30	1.20	8.0	0.10	0.6
PRCP-NSMF035/16X***	16.0	20	0.35	0.75	0.30	1.40	3.5	0.14	0.6
PRCP-NSMF050	13.2	100	0.50	1.00	0.15	0.70	8.0	0.10	0.4
PRCP-NSMF075	6.0	100	0.75	1.50	0.10	0.40	8.0	0.10	0.4
PRCP-NSMF110	6.0	100	1.10	2.20	0.06	0.20	8.0	0.10	0.6
PRCP-NSMF150	6.0	100	1.50	3.00	0.03	0.13	8.0	0.30	0.6
PRCP-NSMF200	6.0	100	2.00	4.00	0.02	0.085	8.0	1.00	0.7

*** UL and TÜV

Environmental Characteristics

Operating Temperature.....	-40 °C to +85 °C
Maximum Device Surface Temperature in Tripped State	125 °C
Passive Aging	+85 °C, 1000 hours..... ±5 % typical resistance change
Humidity Aging	+85 °C, 85 % R.H. 1000 hours ±5 % typical resistance change
Thermal Shock	+85 °C to -40 °C, 20 times ±10 % typical resistance change
Solvent Resistance.....	MIL-STD-202, Method 215 No change
Vibration	MIL-STD-883C, Method 2007.1, No change Condition A

Test Procedures And Requirements For Model PRCP-NSMF Series

Test	Test Conditions	Accept/Reject Criteria
Visual/Mech.	Verify dimensions and materials	Per P.R.C.P. physical description
Resistance.....	In still air @ 23 °C.....	R _{min} ≤ R ≤ R _{1max}
Time to Trip.....	At specified current, V _{max} , 23 °C	T ≤ max. time to trip (seconds)
Hold Current	30 min. at I _{hold}	No trip
Trip Cycle Life	V _{max} , I _{max} , 100 cycles.....	No arcing or burning
Trip Endurance	V _{max} , 48 hours.....	No arcing or burning
Solderability.....	ANSI/J-STD-002	95 % min. coverage

UL File Number E300792

TÜV Certificate Number R50383882

* RoHS Directive 2015/863, Mar. 31, 2015 and Annex.

COPAL follows the prevailing definition of "halogen free" in the industry. COPAL considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less.

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Applications

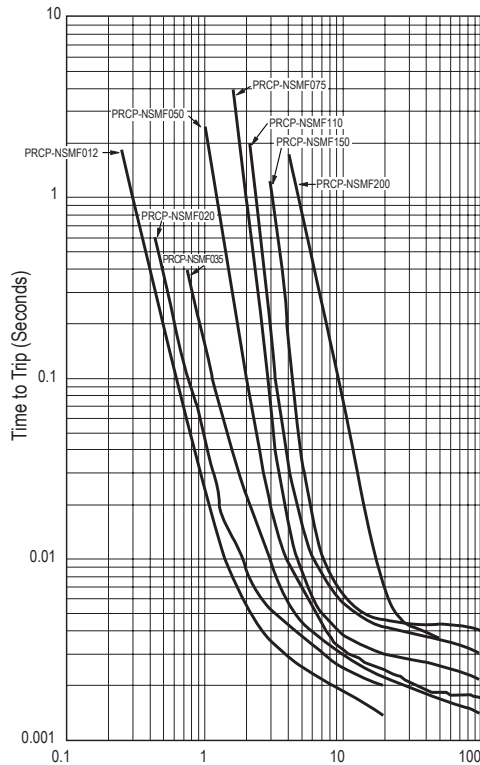
- USB port protection - USB 2.0, 3.0 & OTG
- Automotive electronic control modules
- HDMI 1.4 Source protection
- PC motherboards - Plug and Play protection
- Mobile phones - Battery and port protection
- PDAs / digital cameras
- Game console port protection

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Thermal Derating Chart - I_{hold} (Amps)

Model	Ambient Operating Temperature								
	-40 °C	-20 °C	0 °C	23 °C	40 °C	50 °C	60 °C	70 °C	85 °C
PRCP-NSMF012	0.19 / 0.46	0.17 / 0.41	0.15 / 0.36	0.12 / 0.29	0.11 / 0.27	0.10 / 0.24	0.09 / 0.22	0.08 / 0.19	0.07 / 0.17
PRCP-NSMF020	0.30 / 0.69	0.27 / 0.62	0.24 / 0.55	0.20 / 0.46	0.18 / 0.42	0.16 / 0.38	0.14 / 0.34	0.12 / 0.30	0.11 / 0.25
PRCP-NSMF020/30X	0.30 / 0.60	0.27 / 0.54	0.24 / 0.28	0.20 / 0.40	0.18 / 0.36	0.16 / 0.32	0.14 / 0.28	0.12 / 0.24	0.10 / 0.20
PRCP-NSMF035	0.51 / 1.25	0.46 / 1.16	0.40 / 0.95	0.35 / 0.75	0.30 / 0.70	0.27 / 0.66	0.24 / 0.60	0.22 / 0.55	0.18 / 0.44
PRCP-NSMF035/16X	0.58 / 1.24	0.51 / 1.09	0.44 / 0.94	0.35 / 0.75	0.31 / 0.66	0.28 / 0.60	0.24 / 0.51	0.21 / 0.45	0.16 / 0.34
PRCP-NSMF050	0.76 / 1.52	0.68 / 1.36	0.59 / 1.18	0.50 / 1.00	0.44 / 0.88	0.40 / 0.80	0.35 / 0.70	0.32 / 0.64	0.26 / 0.52
PRCP-NSMF075	1.11 / 2.22	1.00 / 2.00	0.85 / 1.70	0.75 / 1.50	0.67 / 1.34	0.61 / 1.22	0.52 / 1.04	0.50 / 1.00	0.42 / 0.84
PRCP-NSMF110	1.64 / 3.28	1.46 / 2.92	1.30 / 2.60	1.10 / 2.20	0.92 / 1.84	0.83 / 1.66	0.80 / 1.60	0.65 / 1.30	0.52 / 1.04
PRCP-NSMF150	2.20 / 4.40	1.99 / 3.98	1.77 / 3.54	1.50 / 3.00	1.34 / 2.68	1.23 / 2.46	1.10 / 2.20	1.01 / 2.02	0.84 / 1.68
PRCP-NSMF200	2.88 / 5.76	2.61 / 5.22	2.28 / 4.56	2.00 / 4.00	1.80 / 3.60	1.66 / 3.32	1.51 / 3.02	1.39 / 2.78	1.19 / 2.38

Typical Time to Trip at 23 °C



The Time to Trip curves represent typical performance of a device in a simulated application environment. Actual performance in specific customer applications may differ from these values due to the influence of other variables.

How to Order

PRCP - NSMF 020/30 X - 2 E

Product Designator _____

Series _____
 NSMF = 1206 Surface Mount Component

Hold Current, I_{hold} _____
 012-200 (0.12 Amps - 2.00 Amps)

High Voltage Options _____
 = Standard
 /16 = 16 Volt Rated
 /30 = 30 Volt Rated
 X = Product Shape

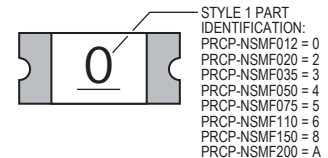
Packaging _____
 Packaged per EIA 481-1
 -2 = Tape and Reel

Halogen Free _____

Non Hidden Foil _____

Typical Part Marking

Represents total content. Layout may vary.



BIWEEKLY DATE CODE WILL APPEAR ON THE PACKAGING LABEL:
 WEEK 1 AND 2 = A
 WEEK 51 AND 52 = Z

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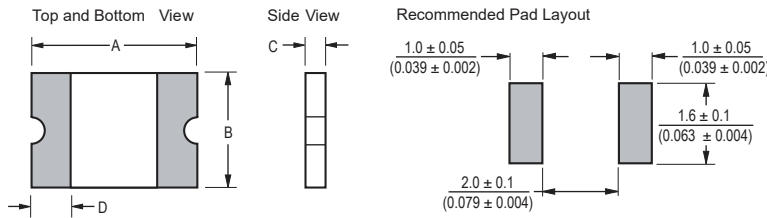
Product Dimensions

Model	A		B		C		D	Style
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
PRCP-NSMF012	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.70 (0.028)	1.10 (0.043)	0.25 (0.010)	1
PRCP-NSMF020	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.48 (0.019)	0.85 (0.033)	0.25 (0.010)	1
PRCP-NSMF020/30X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.40 (0.016)	0.85 (0.033)	0.25 (0.010)	2
PRCP-NSMF035	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.48 (0.019)	0.85 (0.033)	0.25 (0.010)	1
PRCP-NSMF035/16X	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.40 (0.016)	0.85 (0.033)	0.25 (0.010)	2
PRCP-NSMF050	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.48 (0.019)	0.85 (0.033)	0.25 (0.010)	1
PRCP-NSMF075	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.40 (0.016)	0.70 (0.028)	0.25 (0.010)	1
PRCP-NSMF110	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.40 (0.016)	0.70 (0.028)	0.25 (0.010)	1
PRCP-NSMF150	3.00 (0.118)	3.40 (0.134)	1.40 (0.055)	1.80 (0.071)	0.40 (0.016)	0.70 (0.028)	0.25 (0.010)	1
PRCP-NSMF200	3.00 (0.118)	3.50 (0.138)	1.40 (0.055)	1.80 (0.071)	0.70 (0.028)	1.60 (0.063)	0.25 (0.010)	1

Packaging: 3000 pcs. per reel.

DIMENSIONS: $\frac{\text{MM}}{\text{(INCHES)}}$

Style 1

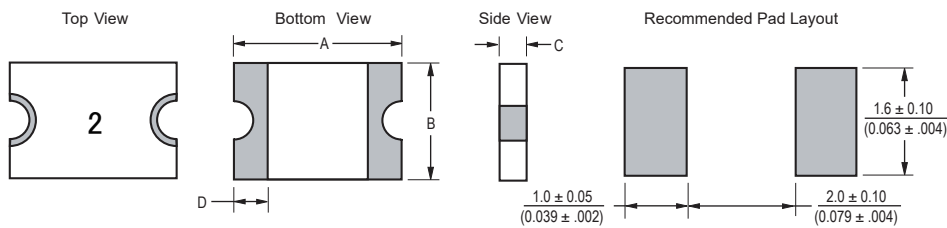


Terminal material:
Electroless Ni under immersion Au

Termination pad solderability:
Standard Au finish:
Meets ANSI/J-STD-002 Category 2.

Recommended Storage:
40 °C max./70 % RH max.

Style 2

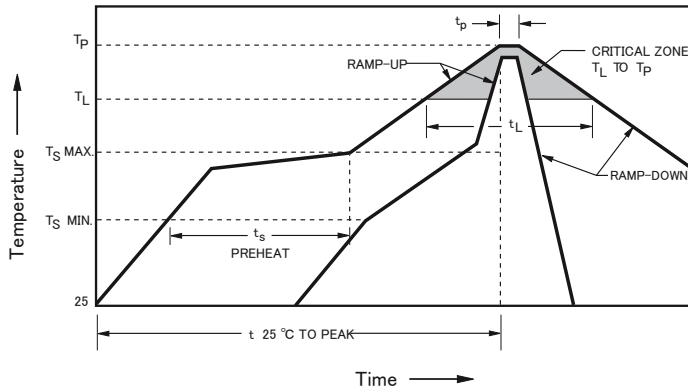


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Solder Reflow Recommendations



Notes:

- PRCP-NSMF models are intended for reflow soldering (including, but not limited to heating plate, hot air, IR, nitrogen, and vapor phase).
 - Wave soldering is permissible only if the device is on the top of the PCB, opposite the heat source.
 - Hand soldering is not recommended for these devices.
 - All temperatures refer to the topside of the device, measured on the device body surface.
- If reflow temperatures exceed the recommended profile, devices may not meet the published specifications.
- Compatible with Pb and Pb-free solder reflow profile.
- Excess solder may cause a short circuit.

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate ($T_{s\ max}$ to T_p)	3 °C/ second max.
PREHEAT: Temperature Min. ($T_{s\ min}$) Temperature Max. ($T_{s\ max}$) Time ($T_{s\ min}$ to $T_{s\ max}$) (ts)	150 °C 200 °C 60~180 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)	20~40 seconds
Ramp-Down Rate	6 °C / second max.
Time 25 °C to Peak Temperature	8 minutes max.

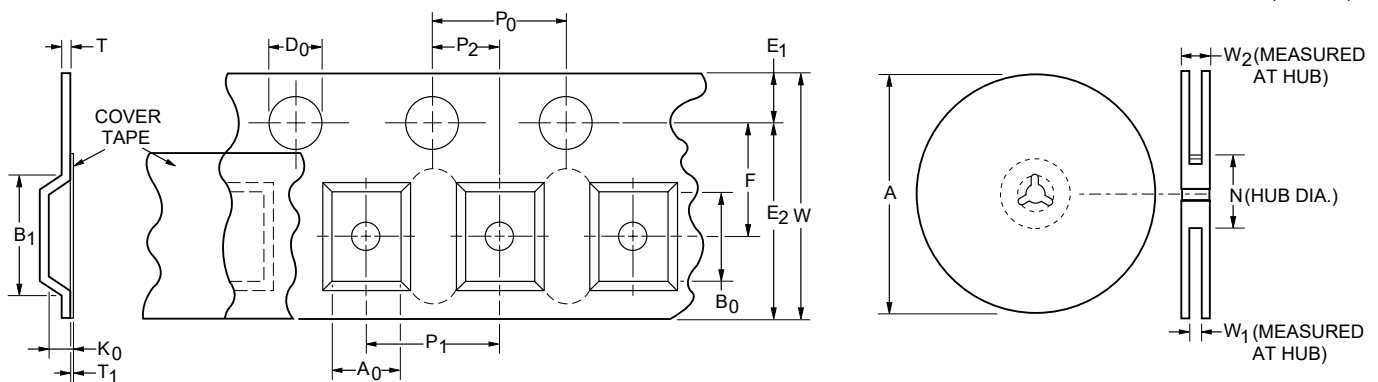
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PRCP-NSMF Series Tape and Reel Specifications

Tape Dimensions	PRCP-NSMF012 & PRCP-NSMF200 per EIA 481-1	PRCP-NSMF020 ~ PRCP-NSMF050 per EIA 481-1	PRCP-NSMF075 ~ PRCP-NSMF150 per EIA 481-1	PRCP-NSMF020/30X & PRCP-NSMF035/16X per EIA 481-1
W	8.0 ± 0.30 (0.315 ± 0.012)	8.0 ± 0.30 (0.315 ± 0.012)	8.0 ± 0.30 (0.315 ± 0.012)	8.0 ± 0.30 (0.315 ± 0.012)
P ₀	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)
P ₁	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)	4.0 ± 0.10 (0.157 ± 0.004)
P ₂	2.0 ± 0.05 (0.079 ± 0.002)	2.0 ± 0.05 (0.079 ± 0.002)	2.0 ± 0.05 (0.079 ± 0.002)	2.0 ± 0.05 (0.079 ± 0.002)
A ₀	1.90 ± 0.10 (0.075 ± 0.004)	1.90 ± 0.10 (0.075 ± 0.004)	1.90 ± 0.10 (0.075 ± 0.004)	1.90 ± 0.10 (0.075 ± 0.004)
B ₀	3.50 ± 0.10 (0.138 ± 0.004)	3.45 ± 0.10 (0.136 ± 0.004)	3.45 ± 0.10 (0.136 ± 0.004)	3.55 ± 0.10 (0.140 ± 0.004)
B ₁ max.	4.35 (0.171)	4.35 (0.171)	4.35 (0.171)	4.35 (0.171)
D ₀	$1.5 + 0.10/-0.0$ (0.059 + 0.004/-0)	$1.5 + 0.10/-0.0$ (0.059 + 0.004/-0)	$1.5 + 0.10/-0.0$ (0.059 + 0.004/-0)	$1.5 + 0.10/-0.0$ (0.059 + 0.004/-0)
F	3.5 ± 0.05 (0.138 + 0.002)	3.5 ± 0.05 (0.138 + 0.002)	3.5 ± 0.05 (0.138 + 0.002)	3.5 ± 0.05 (0.138 + 0.002)
E ₁	1.75 ± 0.10 (0.069 ± 0.004)	1.75 ± 0.10 (0.069 ± 0.004)	1.75 ± 0.10 (0.069 ± 0.004)	1.75 ± 0.10 (0.069 ± 0.004)
E ₂ min.	6.25 (0.246)	6.25 (0.246)	6.25 (0.246)	6.25 (0.246)
T max.	0.6 (0.024)	0.6 (0.024)	0.6 (0.024)	0.6 (0.024)
T ₁ max.	0.1 (0.004)	0.1 (0.004)	0.1 (0.004)	0.1 (0.004)
K ₀	1.35 ± 0.10 (0.053 ± 0.004)	1.04 ± 0.10 (0.041 ± 0.004)	0.85 ± 0.10 (0.033 ± 0.004)	0.80 ± 0.10 (0.032 ± 0.004)
Leader min.	390 (15.35)	390 (15.35)	390 (15.35)	390 (15.35)
Trailer min.	160 (6.30)	160 (6.30)	160 (6.30)	160 (6.30)
Reel Dimensions				
A max.	185 (7.28)	185 (7.28)	185 (7.28)	185 (7.28)
N min.	50 (1.97)	50 (1.97)	50 (1.97)	50 (1.97)
W ₁	$8.4 + 1.5/-0.0$ (0.331 + 0.059/-0)	$8.4 + 1.5/-0.0$ (0.331 + 0.059/-0)	$8.4 + 1.5/-0.0$ (0.331 + 0.059/-0)	$8.4 + 1.5/-0.0$ (0.331 + 0.059/-0)
W ₂ max.	14.4 (0.567)	14.4 (0.567)	14.4 (0.567)	14.4 (0.567)

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