

COPAL ELECTRONICS

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 only
**** UL/TÜV only

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, Condition A	No change

Test Procedures And Requirements For Model PRCP-NSMF Series

Test	Test Conditions	Accept/Reject Criteria
Visual/Mech.	Verify dimensions and materials	Per PRCP physical description
Resistance	In still air @ 23 °C	Rmin ≤ R ≤ R1max
Time to Trip	At specified current, Vmax, 23 °C	T ≤ max. time to trip (seconds)
Hold Current	30 min. at Ihold	No trip
Trip Cycle Life	Vmax, Imax, 100 cycles	No arcing or burning
Trip Endurance	Vmax, 48 hours	No arcing or burning
Solderability	ANSI/J-STD-002	95 % min. coverage

UL File Number E300792

CSA File Number CA1730526

TÜV Certificate Number ..... R 50075506

* RoHS Directive 2002/95/EC Jan. 27, 2003 including annex and RoHS Recast 2011/65/EU June 8,
COPAL follows the prevailing definition of "halogen free" in the industy. 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.
Specifications are subject to change without notice.
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Customers should verify actual device performance in their specific applications.

Applications

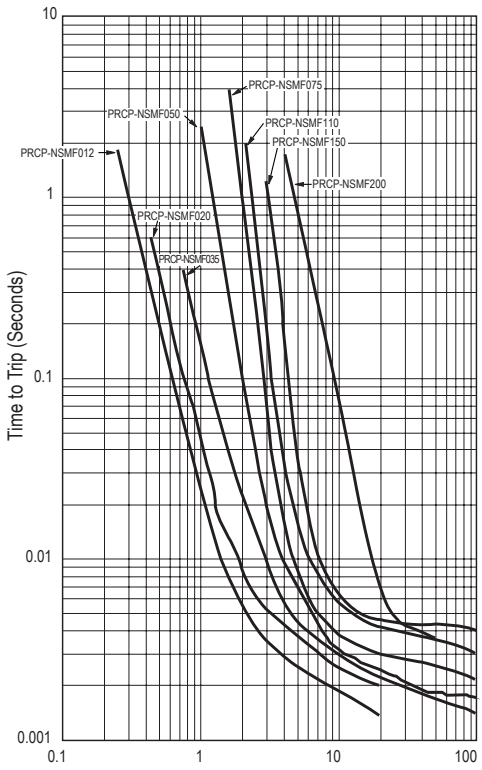
- USB port protection - USB 2.0, 3.0 & OTG
- HDMI 1.4 Source protection
- PC motherboards - Plug and Play protection
- Mobile phones - Battery and port protection
- PDAs / digital cameras
- Game console port protection
- Automotive electronic control modules

PRCP-NSMF Series - Polymer Resettable Circuit Protectors COPAL ELECTRONICS

Thermal Derating Chart - I_{hold} (Amps)

Model	Ambient Operating Temperatu re								
	-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. Actula 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 C

Product Designator

Series
NSMF = 1206 Surface Mount Component

Hold Current, Ihold
012-200 (0.12 Amps - 2.00 Amps)

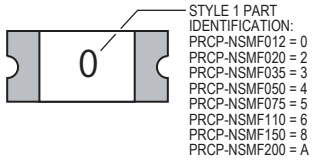
High Voltage Options
__ = Standard
/16 = 16 Volt Rated
/30 = 30 Volt Rated
X = Product Shape

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

Halogen Free

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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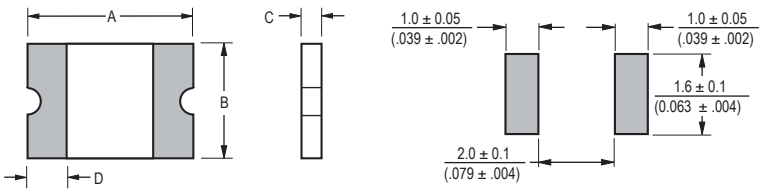
Product Dimensions

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: MM (INCHES)

Style 1

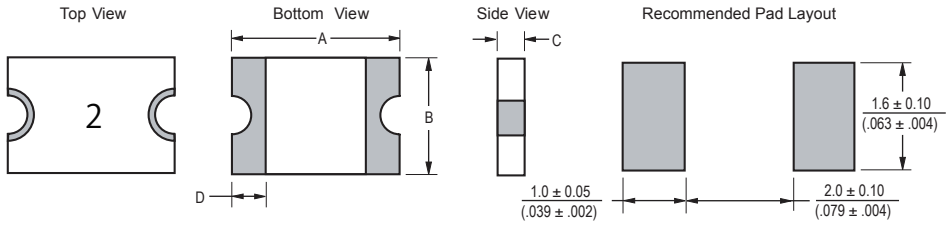


Terminal material:
Electroless Ni under immersion Au

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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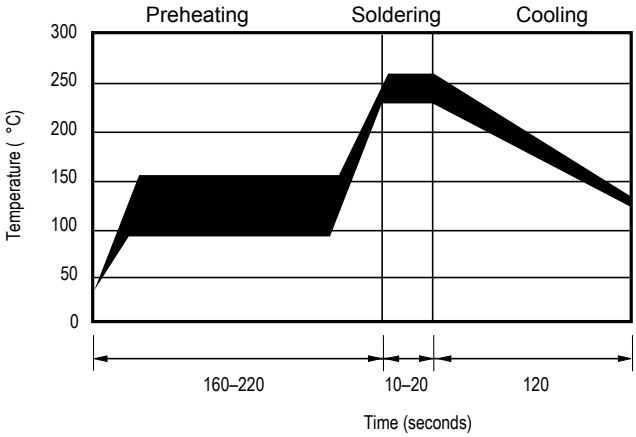
Solder Reflow Recommendations



Notes :

- PRCP-NSMF models cannot be wave soldered. Please contact COPAL ELECTRONICS for hand soldering recommendations.
- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.
- Compatible with Pb and Pb-free solder reflow profiles.

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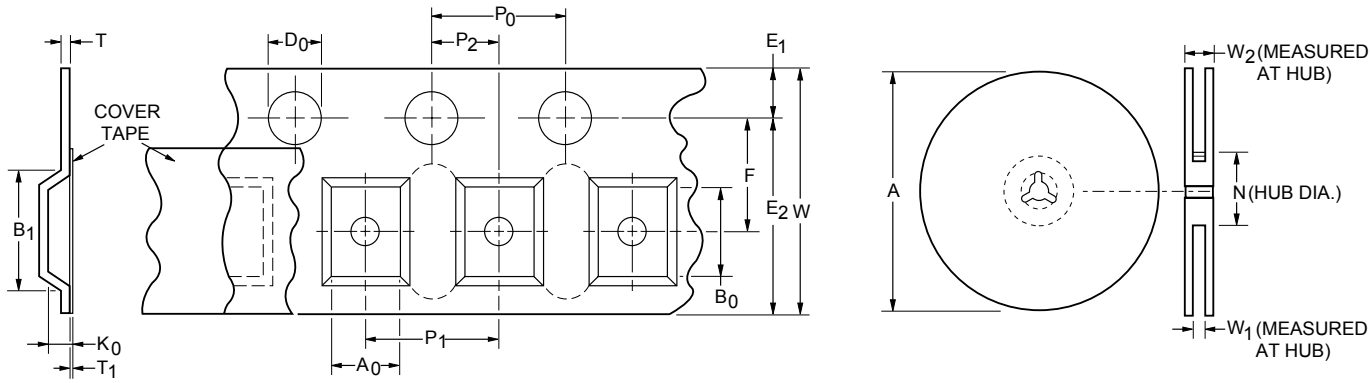
Tape Dimensions	PRCP-NSMF012 & PRCP-NSMF200 per EIA 481-1	PRCP-NSMF020 ~ PRCP-NSMF050 per EIA 481-1	PRCP-NSMF075 ~ PRCP-NSMF150 per EIA 481-1	PRCP-NSMF020/30X & PRCP-NSMF035/16X per EIA 481-1
W	8.0 ± 0.30 (0.315 ± 0.012)	8.0 ± 0.30 (0.315 ± 0.012)	8.0 ± 0.30 (0.315 ± 0.012)	8.0 ± 0.30 (0.315 ± 0.012)
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/-0.0)	8.4 + 1.5/-0.0 (0.331 + 0.059/-0.0)	8.4 + 1.5/-0.0 (0.331 + 0.059/-0.0)	8.4 + 1.5/-0.0 (0.331 + 0.059/-0.0)
W_2 max.	14.4 (0.567)	14.4 (0.567)	14.4 (0.567)	14.4 (0.567)

DIMENSIONS: MM (INCHES)



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Revision History

Date	Rev.	Reason
11/02/2005	A	Initial issue
12/12/2005	B	Updated UL, CSA, TÜV File Number
12/27/2005	C	Added NSMF200 model
07/31/2007	D	Updated Thermal Derating Chart
01/08/2009	E	Updated How to Order
08/05/2009	F	Updated Electrical Characteristics and Typical Time to trip at 23 ℃
07/05/2010	G	Added NSMF020/30X model
12/09/2010	H	Updated Thermal Derating Chart Added NSMF035/16X model
01/08/2013	I	Updated Features and Tape and Reel Specifications
07/22/2015	J	Updated notice