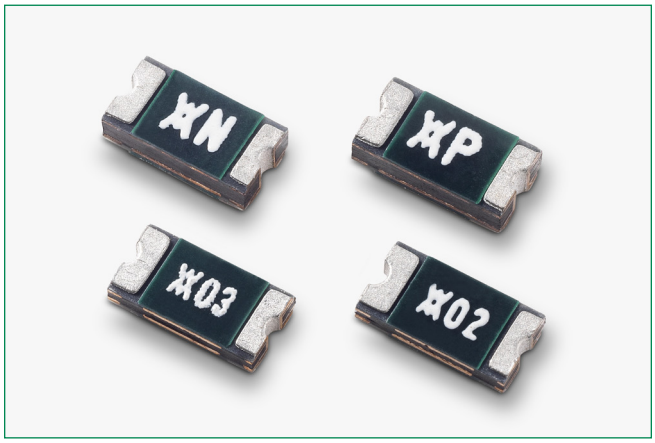
Automotive nanoASMDC Series
Surface Mount

HF RoHS



Additional Information

Resources | Accessories | Samples

Description

The nanoASMDC is small-sized 1206 PPTC series, helping to reduce weight of wire harnesses. PPTC devices distributed in a circuit can allow the use of smaller wire sizes with the resulting harnesses. Forego looping back and forth around a fuse box and place your protection wherever you see fit. The solid state composition of PPTC devices helps provide reliability.

Features & Benefits

- Products meet applicable automotive industry standards
- Compatible with high-volume electronics assembly
- Small footprint – 1206 size
- Resettable solution against overcurrent and short-circuit
- AEC-Q200 qualified, RoHS compliant, and ISO/TS16949 certified
- Surface-mount form factor
- Automotive and industrial transportation
- Actuators and medium motors
- Trace protection
- Harness/junction box protection
- Powered outputs
- Electronic control modules
- Telematics/Infotainment

Applications

- Automotive and industrial transportation
- Actuators and medium motors
- Trace protection
- Harness/junction box protection
- Powered outputs
- Electronic control modules
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Electrical Characteristics

Part Number	Ordering Part Number	I_H(A)@ (R_{1MAX})	I_H(A)@ (R_{aMAX})	I_T (A)	V_{MAX} (V_{DC})	I_{MAX} (A)	$P_{D\ Typ}$ (W)	Max Time-to-trip (A)	Max Time-to-trip (s)	R_{MIN} (Ω)	R_{1MAX} (Ω)	R_{aMAX} (Ω)
nanoASMDC – 13.2- 60V												
nanoASMDC010F	RF4563-000	0.10	0.10	0.25	60	10	0.80	0.50	1.00	1.60	15.00	15.00
nanoASMDC012F	RF2145-000	0.12	0.12	0.39	48	10	0.50	1.00	0.20	1.40	6.50	6.50
nanoASMDC016F	RF2146-000	0.16	0.16	0.45	48	10	0.50	1.00	0.30	1.10	5.00	5.00
nanoASMDC020F	RF2147-000	0.20	0.20	0.42	24	100	0.60	8.00	0.10	0.65	3.10	3.10
nanoASMDC025F	RF4525-000	0.25	0.25	0.58	16	100	0.60	8.00	0.01	0.40	2.10	2.10
nanoASMDC035F	RF2148-000	0.35	0.35	0.75	16	20	0.60	3.50	0.10	0.45	1.35	1.35
nanoASMDC050F/13.2	RF4564-000	0.50	0.50	1.10	13.2	70	0.80	8.00	0.10	0.20	0.75	0.75

Notes:

I_H - Hold current: maximum current device will pass without interruption in 25°C, unless otherwise specified

I_T - Trip current: minimum current that will switch the device from low-resistance to high-resistance in 25°C still air, unless otherwise specified.

V_{MAX} - Maximum voltage device can withstand without damage at rated current.

I_{MAX} - Maximum fault current device can withstand without damage at rated voltage.

P_D - Power dissipated from device when in the tripped state in 25°C still air, unless otherwise specified.

R_{MIN} - Minimum resistance of device as supplied at 25°C, unless otherwise specified.

R_{1MAX} - Maximum resistance of device when measured one hour post reflow, unless otherwise specified.

R_{aMAX} - Maximum functional resistance of device after being subjected to the stresses described in PS400 at 5°C, unless otherwise specified.

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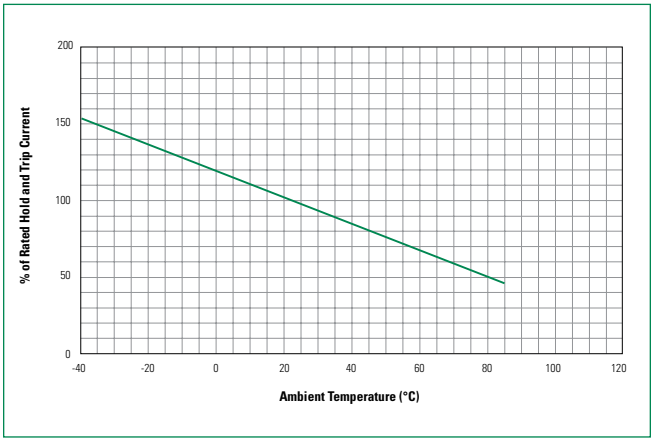
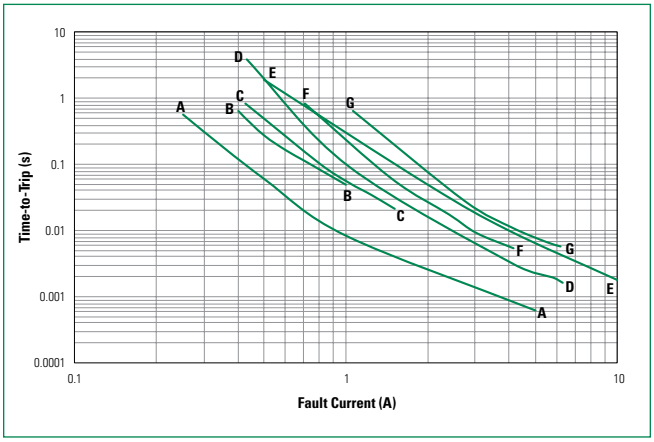
Temperature Rerating

Part Number	Maximum Ambient Temperature									
	-40°C	-20°C	0°C	20°C	25°C	40°C	50°C	60°C	70°C	85°C
	Hold Current (A)									
nanoASMDC – 13.2- 60V										
nanoASMDC010F	0.15	0.14	0.12	0.10	0.10	0.09	0.08	0.07	0.06	0.05
nanoASMDC012F	0.20	0.17	0.15	0.13	0.12	0.11	0.10	0.09	0.08	0.07
nanoASMDC016F	0.21	0.20	0.18	0.16	0.16	0.14	0.13	0.12	0.11	0.09
nanoASMDC020F	0.34	0.30	0.26	0.22	0.20	0.17	0.15	0.13	0.11	0.08
nanoASMDC025F	0.38	0.33	0.30	0.26	0.25	0.22	0.20	0.19	0.16	0.11
nanoASMDC035F	0.58	0.51	0.44	0.38	0.35	0.31	0.28	0.24	0.21	0.16
nanoASMDC050F/13.2	0.78	0.69	0.61	0.52	0.50	0.44	0.39	0.35	0.30	0.24

Temperature Rerating Curve



Typical Time-to-Trip Curves at 25°C



Note: The average time current curves and Temperature Rerating curve performance is affected by a number or variables, and these curves provided as guidance only. Customer must verify the performance in their application.

nanoASMDC			
A	=nanoASMDC010F	**E**	=nanoASMDC025F
B	=nanoASMDC012F	**F**	=nanoASMDC035F
C	=nanoASMDC016F	**G**	=nanoASMDC050F/13.2
D	=nanoASMDC020F		

Physical Specifications

Terminal Pad Material	100% Matte Tin with Nickel Underplate
Soldering Characteristics	Solderability per ANSI-J-STD-002 Category 3
Solder Heat Withstand	per IEC 60068-2-20, Test Tb, Section 5, Method 1a
Flammability	per IEC 60695-11-5 Needle Flame Test for 20 seconds
Recommended Storage Conditions	40°C max, 70% RH max; Devices May Not Meet Specified Ratings if Storage Conditions are Exceeded
Operation Temperature	-40°C to 85°C

Note: See PS400 for other physical specifications.

Environmental Specifications

Test	Conditions	Resistance Change
Passive Aging	60°C, 1000 hrs 85°C, 1000 hrs	±3% Typical ±5% Typical
Humidity Aging	85°C, 85% R.H., 100 hrs	±1.2% Typical
Thermal Shock	85°C, -40°C 20 times	-33% Typical
Solvent Resistance	Freon Trichloroethane Hydrocarbons	No change No change No change

Moisture Resistance Level	Level 2a, J-STD-020
Storage Conditions	40°C max, 70% RH max; devices should remain in original sealed bags prior to use. Devices may not meet specified values if these storage conditions are exceeded.

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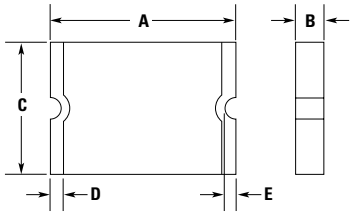
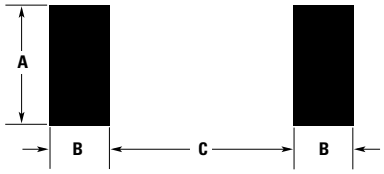
Dimensions

Figure 1



Recommended Pad Layout

Figure 2



Part Number	Dimensions in Millimeters (Inches)										Figure
	A		B		C		D		E		
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
nanoASMDC – 13.2-60V											
nanoASMDC010F	3.00 (0.118)	3.40 (0.134)	0.62 (0.024)	1.00 (0.039)	1.37 (0.054)	1.80 (0.071)	0.25 (0.010)	0.75 (0.030)	0.076 (0.003)	—	1
nanoASMDC012F										—	1
nanoASMDC016F										—	1
nanoASMDC020F			0.58 (0.023)	0.82 (0.032)						—	1
nanoASMDC025F										—	1
nanoASMDC035F										—	1
nanoASMDC050F/13.2			0.50 (0.019)	0.74 (0.029)						—	1

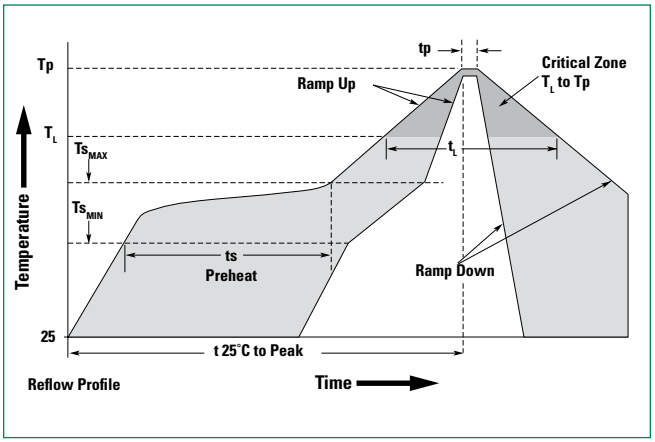
Packaging & Marking Information

Part Number	Tape & Reel Quantity	Standard Package	Part Marking	Dimension A (Min*/Nom)	Dimension B (Nom)	Dimension C (Nom)
nanoASMDC – 13.2-60V						
nanoASMDC010F	3,000	15,000	A	1.60 (0.063)	1.00 (0.039)	2.00 (0.079)
nanoASMDC012F	3,000	15,000	P	1.60 (0.063)	1.00 (0.039)	2.00 (0.079)
nanoASMDC016F	3,000	15,000	N	1.60 (0.063)	1.00 (0.039)	2.00 (0.079)
nanoASMDC020F	3,000	15,000	02	1.60 (0.063)	1.00 (0.039)	2.00 (0.079)
nanoASMDC025F	3,000	15,000	C	1.60 (0.063)	1.00 (0.039)	2.00 (0.079)
nanoASMDC035F	3,000	15,000	03	1.60 (0.063)	1.00 (0.039)	2.00 (0.079)
nanoASMDC050F/13.2	3,000	15,000	M	1.60 (0.063)	1.00 (0.039)	2.00 (0.079)

***** These devices are intended for use in automotive applications.

Packaging & Marking Information

Profile Feature	Pb-Free Assembly
Average ramp up rate (Ts_{MAX} to Tp)	3°C/s max
Preheat:	-
• Temperature min (Ts_{MIN})	150°C
• Temperature max (Ts_{MAX})	200°C
• Time (ts_{MIN} to ts_{MAX})	60-120 s
Time maintained above:	-
• Temperature (T_L)	217°C
• Time (t_L)	60-150 s
Peak/Classification temperature (Tp)	260°C
Time within 5°C of actual peak temperature:	-
Time (tp)	30 s max
Ramp down rate	3°C/s max
Time 25°C to peak temperature	8 min max



Note: All temperatures refer to topside of the package, measured on the package body surface.

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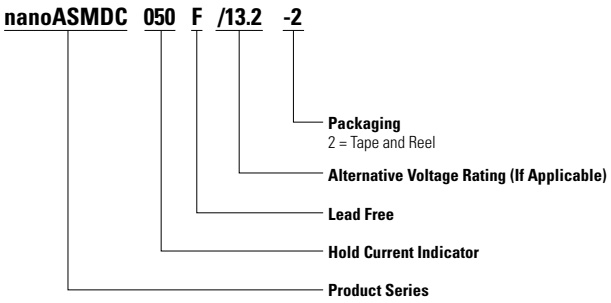
Solder Reflow Recommendations

Solder Reflow
■ Recommended reflow method: IR, hot air, nitrogen.
■ Recommended maximum paste thickness: 0.25mm (0.010in)
■ Devices can be cleaned using standard methods and aqueous solvents.
■ Experience has shown the optimum conditions for forming acceptable solder fillets occur when a reasonable amount of solder paste is placed underneath each device's termination. As such, we request that customers comply with our recommended solder pad layouts.
■ Customer should validate that the solder paste amount and reflow recommendations meet its application.
■ We request that customer board layouts refrain from placing raised features (e.g. vias, nomenclature, traces, etc.) underneath PolySwitch devices. It is possible that raised features could negatively impact solderability performance of our devices.

Rework
■ Standard industry practices. (Please also avoid direct contact to the device.)

Part Ordering Number System



Tape & Reel Specifications

Description	nanoASMDC EIA 481-1 (mm)	
	nanoASMDC010F nanoASMDC012F nanoASMDC016F	nanoASMDC020F nanoASMDC025F nanoASMDC035F nanoASMDC050F/13.2
W	8.0 ± 0.30	8.0 ± 0.30
P_0	4.0 ± 0.10	4.0 ± 0.10
P_1	4.0 ± 0.10	4.0 ± 0.10
P_2	2.0 ± 0.05	2.0 ± 0.05
A_0	1.95 ± 0.10	1.95 ± 0.10
B_0	3.5 ± 0.1	3.50 +0.1/-0.08
B_1 max	4.35	4.35
D_0	1.55 ± .05	1.55 ± .05
F	3.50 ± 0.05	3.50 ± 0.05
E_1	1.75 ± 0.10	1.75 ± 0.10
E_2 min	6.25	6.25
T max	0.3	0.3
T_1 max	0.1	0.1
K_0	1.27 ± 0.1	0.89 ± 0.1
A max	185	185
N min	50	50
W_1	8.4 + 1.5/-.00	8.4 + 1.5/-.00
W_2 max	14.4	14.4

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Tape & Reel Diagrams

Figure 2

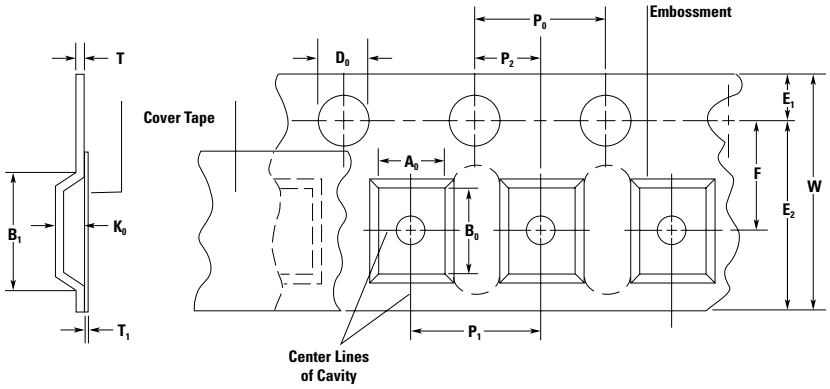
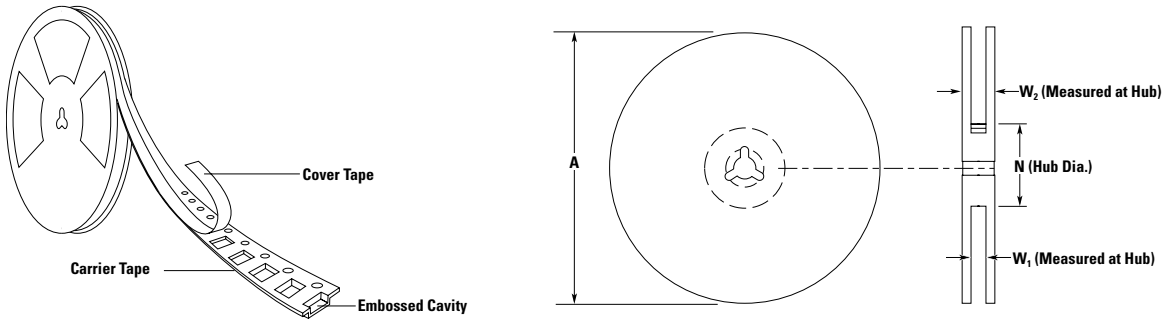


Figure 2



WARNING

- Users should independently evaluate the suitability of and test each product selected for their own application.
- Operation beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- These devices are intended for protection against damage caused by occasional overcurrent or overtemperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Contamination of the PPTC material with certain silicone-based oils or some aggressive solvents can adversely impact the performance of the devices.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- PPTC devices are not recommended for installation in applications where the device is constrained such that its PTC properties are inhibited, for example in rigid potting materials or in rigid housings, which lack adequate clearance to accommodate device expansion.
- Operation in circuits with a large inductance can generate a circuit voltage (Ldi/dt) above the rated voltage of the device.