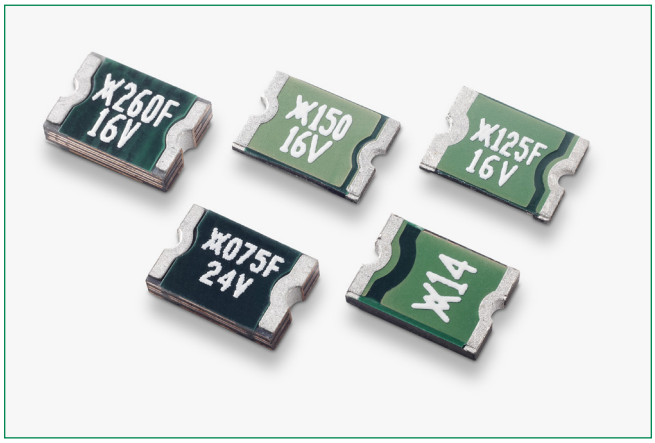
Automotive miniASMDC Series
Surface Mount



Additional Information

Resources | Accessories | Samples

Agency Approvals

Agency	Agency File Number
	E74889

Description

The miniASMDC is small-sized 1812 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 – 1812 size
- Resettable solution against overcurrent and short-circuit
- AEC-Q200 qualified, RoHS compliant, and ISO/TS16949 certified
- Surface-mount form factor
- High Performance
- Expertise from the world's leading resettable overcurrent protection manufacturer
- Wide range of dedicated automotive surface-mount and radial-leaded resettable overcurrent devices
- High performance transient voltage protection devices

Applications

- High Performance
- Expertise from the world's leading resettable overcurrent protection manufacturer
- Wide range of dedicated automotive surface-mount and radial-leaded resettable overcurrent devices
- High performance transient voltage protection devices

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Electrical Characteristics

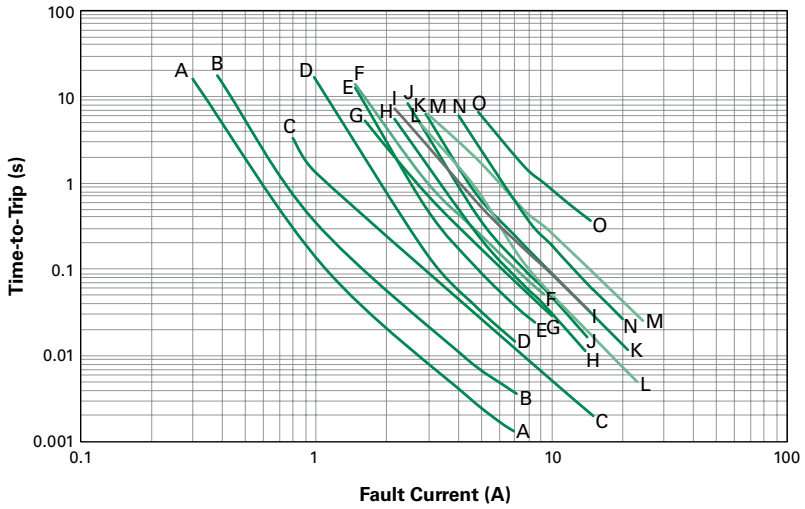
Part Number	Ordering Part Number	I_H(A)@ (R_{1MAX})	I_H(A)@ (R_{aMAX})	I_T (A)	V_{MAX} (V_{DC})	I_{MAX} (A)	$P_{D\ Typ}$ (W)	Max Time-to-trip (A)	Max Time-to-trip (s)	R_{MIN} (Ω)	R_{MAX} (Ω)	R_{1MAX} (Ω)
miniASMDC – 12-60V												
miniASMDC010F	RF2151-000	0.10	0.10	0.30	60	40	0.75	0.50	5.00	0.70	12.70	12.70
miniASMDC014F	RF2152-000	0.14	0.14	0.28	60	10	0.75	8.00	0.01	1.50	6.00	6.00
miniASMDC020F	RF2153-000	0.20	0.20	0.40	30	10	0.80	8.00	0.02	0.60	3.30	3.30
miniASMDC030F	RF2154-000	0.30	0.30	0.60	30	40	0.80	8.00	0.10	0.20	1.75	1.75
miniASMDC050F	RF2155-000	0.50	0.50	1.00	24	100	0.80	8.00	0.15	0.15	1.00	1.00
miniASMDC075F	RF4566-000	0.75	0.75	1.50	13.2	100	1.00	8.00	0.20	0.11	0.45	0.45
miniASMDC075F/24	RF2156-000	0.75	0.75	1.50	24	40	0.80	8.00	0.30	0.09	0.29	0.29
miniASMDC075F/33	RF4567-000	0.75	0.75	1.60	33	100	1.00	8.00	1.00	0.11	0.39	0.39
miniASMDC110F/16	RF2157-000	1.10	1.10	2.20	16	100	0.80	8.00	0.30	0.06	0.18	0.18
miniASMDC110F/24	RF2158-000	1.10	1.10	2.20	24	20	0.80	8.00	0.50	0.06	0.18	0.18
miniASMDC125F/16	RF2159-000	1.25	1.25	2.50	16	100	0.80	8.00	0.40	0.05	0.14	0.14
miniASMDC150F/12	RF4568-000	1.50	1.50	2.80	12	100	0.80	8.00	0.50	0.04	0.11	0.11
miniASMDC150F/16	RF2160-000	1.50	1.50	2.80	16	100	0.80	8.00	0.50	0.04	0.11	0.11
miniASMDC150F/24	RF2161-000	1.50	1.50	3.00	24	20	1.00	8.00	1.50	0.04	0.12	0.12
miniASMDC200F/16	RF4161-000	2.00	2.00	4.00	16	40	1.20	8.00	5.00	0.02	0.085	0.085
miniASMDC260F/12	RF4569-000	2.60	2.60	5.00	12	100	1.00	8.00	5.00	0.015	0.047	0.047
miniASMDC260F/13.2	RF4570-000	2.60	2.60	5.00	13.2	100	1.20	8.00	5.00	0.015	0.05	0.05
miniASMDC260F/16	RF2162-000	2.60	2.60	5.00	16	100	1.20	8.00	5.00	0.015	0.05	0.05

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 25°C, unless otherwise specified.

Typical Time-to-Trip Curves at 25°C

miniASMDC

A = miniASMDC010F, miniASMDC014F
B = miniASMDC020F
C = miniASMDC030F
D = miniASMDC050F
E = miniASMDC075F
F = miniASMDC075F/24
G = miniASMDC075F/33
H = miniASMDC110F/16
I = miniASMDC110F/24
J = miniASMDC125F/16
K = miniASMDC150F/12
L = miniASMDC150F/16
M = miniASMDC150F/24
N = miniASMDC200F/16
O = miniASMDC260F/12, miniASMDC260F/13.2, miniASMDC260F/16



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.

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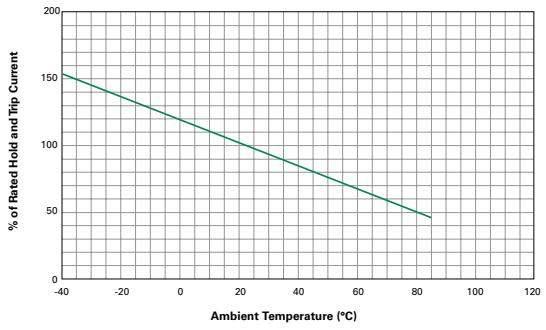
Typical Time-to-Trip Curves at 25°C

Maximum Ambient Temperature										
Part Number	-40°C	-20°C	0°C	20°C	25°C	40°C	50°C	60°C	70°C	85°C
Hold Current (A)										
miniASMDC – 12-60V										
miniASMDC010F	0.17	0.15	0.13	0.11	0.10	0.09	0.08	0.07	0.06	0.04
miniASMDC014F	0.23	0.20	0.17	0.14	0.13	0.11	0.10	0.09	0.07	0.05
miniASMDC020F	0.30	0.27	0.23	0.20	0.19	0.17	0.15	0.13	0.12	0.09
miniASMDC030F	0.49	0.44	0.39	0.32	0.30	0.27	0.24	0.22	0.18	0.14
miniASMDC050F	0.59	0.57	0.55	0.50	0.48	0.45	0.43	0.35	0.30	0.23
miniASMDC075F	1.10	0.99	0.87	0.75	0.72	0.63	0.57	0.49	0.45	0.35
miniASMDC075F/24	1.50	1.25	1.00	0.75	0.73	0.65	0.60	0.55	0.50	0.43
miniASMDC075F/33	1.09	0.98	0.87	0.77	0.75	0.66	0.61	0.55	0.50	0.41
miniASMDC110F/16	1.68	1.49	1.30	1.10	1.05	0.92	0.83	0.75	0.64	0.50
miniASMDC110F/24	2.00	1.70	1.40	1.10	1.06	0.95	0.88	0.80	0.73	0.61
miniASMDC125F/16	2.00	1.69	1.47	1.25	1.17	1.03	0.92	0.90	0.69	0.53
miniASMDC150F/12	2.40	2.10	1.80	1.50	1.44	1.25	1.13	1.00	0.88	0.69
miniASMDC150F/16	2.40	2.10	1.80	1.50	1.44	1.25	1.13	1.00	0.88	0.69
miniASMDC150F/24	2.10	1.90	1.70	1.50	1.44	1.25	1.13	1.00	0.88	0.69
miniASMDC200F/16	3.07	2.74	2.40	2.07	2.00	1.74	1.57	1.40	1.24	0.99
miniASMDC260F/12	3.40	3.16	3.00	2.60	2.54	2.32	2.18	2.00	1.90	1.69
miniASMDC260F/13.2	3.40	3.16	3.00	2.60	2.54	2.32	2.18	2.00	1.90	1.69
miniASMDC260F/16	3.50	3.20	3.00	2.60	2.53	2.30	2.15	2.00	1.85	1.63

Temperature Rerating Curve



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

Note: See PS400 for other environmental specifications.

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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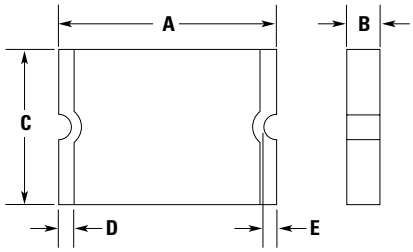
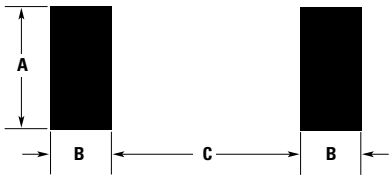
Dimension

Part Number	Dimensions in Millimeters (Inches)										Figure
	A		B		C		D		E		
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
miniASMDC – 12-60V											
miniASMDC010	4.37 (0.172)	4.73 (0.186)	0.635 (0.025)	0.89 (0.035)	3.07 (0.121)	3.41 (0.134)	0.25 (0.010)	0.95 (0.040)	0.20 (0.008)	—	1
miniASMDC014F											
miniASMDC020F											
miniASMDC030F											
miniASMDC050F			0.38 (0.015)	0.62 (0.025)							
miniASMDC075F											
miniASMDC075F/24		4.83 (0.190)	0.81 (0.032)	1.46 (0.057)							
miniASMDC075F/33		4.73 (0.190)	0.94 (0.037)								
miniASMDC110F/16			0.28 (0.011)	0.48 (0.019)							
miniASMDC110F/24			0.81 (0.032)	1.46 (0.057)							
miniASMDC125F/16		4.83 (0.190)	0.28 (0.011)	0.48 (0.019)							
miniASMDC150F/12											
miniASMDC150F/16											
miniASMDC150F/24			1.00 (0.040)	1.94 (0.077)							
miniASMDC200F/16		4.73 (0.186)	0.51 (0.020)	1.22 (0.048)							
miniASMDC260F/12		4.83 (0.190)	1.02 (0.042)	1.52 (0.060)							
miniASMDC260F/13.2											
miniASMDC260F/16											



Recommended Pad Layout



Part Number	Tape and Reel Quantity	Standard Package	Part Marking	Recommended Pad Layout Figures [mm (in)]		
				Dimension A (Min*/Nom)	Dimension B (Nom)	Dimension C (Nom)
miniASMDC – 12-60V						
miniASMDC010F	2,000	10,000	10	3.15 (0.124)	1.68 (0.066)	3.10 (0.122)
miniASMDC014F			14			
miniASMDC020F			2			
miniASMDC030F			3			
miniASMDC050F			5			
miniASMDC075F			7			
miniASMDC075F/24	1,500	7,500	075F 24V			
miniASMDC075F/33			075F 33V			
miniASMDC110F/16	2,000	10,000	110F 16V			
miniASMDC110F/24	1,500	7,500	110F 24V			
miniASMDC125F/16	2,000	10,000	125F 16V			
miniASMDC150F/12			150F 12V			
miniASMDC150F/16			150 16V			
miniASMDC150F/24	1,000	5,000	150F 24V			
miniASMDC200F/16	2,000	10,000	200F 16V			
miniASMDC260F/12	1,500	7,500	260F 12V			
miniASMDC260F/13.2			260F 13V			
miniASMDC260F/16			260F 16V			

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

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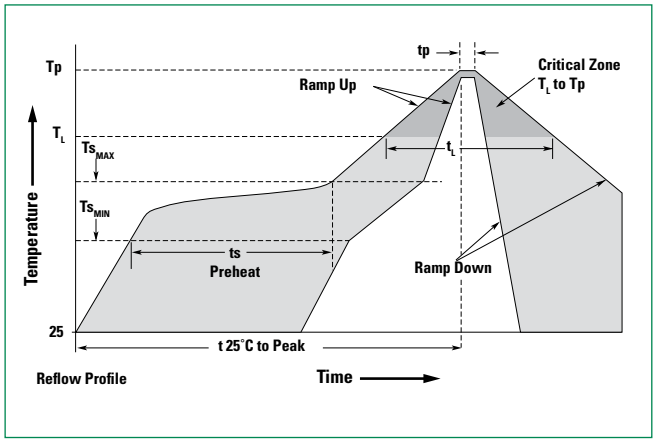
Solder Reflow Recommendations

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.



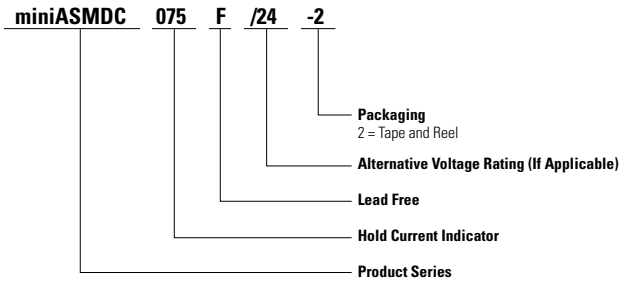
Solder Reflow

- 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



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Tape and Reel Specifications

Description	miniASMDC EIA 481-1 (mm)			
	miniASMDC010F miniASMDC014F miniASMDC020F miniASMDC030F miniASMDC050F miniASMDC075F	**miniASMDC110F/16 miniASMDC125F/16 miniASMDC150F/12 miniASMDC150F/16 miniASMDC200F/16**	**miniASMDC075F/24 miniASMDC075F/33 miniASMDC110F/24 miniASMDC260F/12 miniASMDC260F/13.2 miniASMDC260F/16**	**miniASMDC150F/24**
W	12.0 ± 0.30		12.0 ± 0.30	12.0 ± 0.30
P_0	4.0 ± 0.10		4.0 ± 0.10	4.0 ± 0.10
P_1	8.0 ± 0.10		8.0 ± 0.10	8.0 ± 0.10
P_2	2.0 ± 0.05		2.0 ± 0.05	2.0 ± 0.05
A_0	3.5 ± 0.1		3.7 ± 0.1	3.7 ± 0.1
B_0	4.95 ± 0.1		4.9 ± 0.1	4.9 ± 0.1
B_1 max	6.15		6.15	6.15
D_0	1.5 + 0.10/ -.00		1.5 + 0.10/ -.00	1.5 + 0.10/ -.00
F	5.50 ± 0.05		5.50 ± 0.05	5.50 ± 0.05
E_1	1.75 ± 0.10		1.75 ± 0.10	1.75 ± 0.10
E_2 min	10.25		10.25	10.25
T max	0.35		0.35	0.35
T_1 max	0.1		0.1	0.1
K_0	0.9 ± 0.1		1.4 ± 0.1	1.78 ± 0.1
A max	185		185	185
N min	50		50	50
W_1	12.4 + 2.0/-.00		12.4 + 2.0/-.00	12.4 + 2.0/-.00
W_2 max	18.4		18.4	18.4

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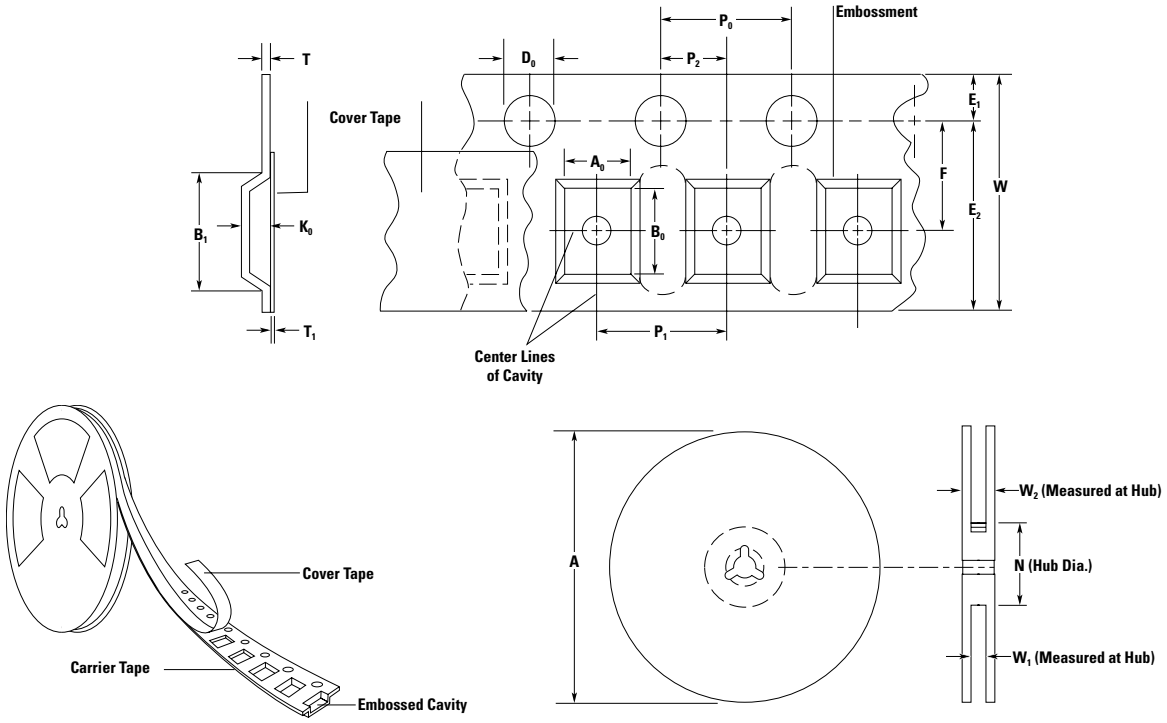
Tape and Reel Diagrams



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.

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