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PRODUCT DATASHEET

PTC Devices · Surface Mount

## ASMD1812 Series Surface Mount PTC Devices

## Description

The ASMD1812 series provides surface mount resettable overcurrent protection with holding current from 0.1A to 4.0A.

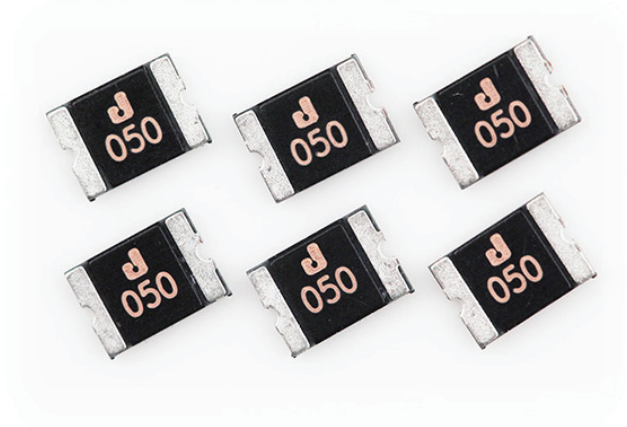
This series offers complete portfolio in terms of holding current and working voltage, and is suitable for wide range of applications.

## Features

- RoHS compliant and lead-free
- Low profile
- Halogen-free
- Fast response to fault current
- Compact design saves board space
- Compatible with high temperature solders



## Applications

- USB hubs, ports and peripherals
- Motherboard USB & IEEE 1394 protection
- Set-top-box and HDMI
- Optical disk drives
- Game console port protection
- General electronics



## Agency Approvals

Agency	File Number
	E472196

Regulation	Standard
	2002/95/EC
	EN14582

## Performance Specification

Model	V <sub>max</sub> (V dc)	I <sub>max</sub> (A)	I <sub>hold</sub> @25°C (A)	I <sub>trip</sub> @25°C (A)	P <sub>d</sub> Typ. (W)	Maximum Time To Trip		Resistance	
						Current (A)	Time (Sec)	R <sub>i min</sub> (Ω)	R <sub>1max</sub> (Ω)
ASMD1812-010	30.0	100	0.10	0.30	0.8	0.5	1.50	0.75	15.0
ASMD1812-010-33V	33.0	100	0.10	0.30	0.8	0.5	1.50	0.75	15.0
ASMD1812-010-60V	60.0	100	0.10	0.30	0.8	0.5	1.50	0.75	15.0
ASMD1812-014	60.0	100	0.14	0.34	0.8	1.5	0.15	0.65	6.00
ASMD1812-014-33V	33.0	100	0.14	0.34	0.8	1.5	0.15	0.65	6.00
ASMD1812-020	30.0	100	0.20	0.40	0.8	8.0	0.02	0.35	5.00
ASMD1812-020-33V	33.0	100	0.20	0.40	0.8	8.0	0.02	0.35	5.00
ASMD1812-020-60V	60.0	100	0.20	0.40	0.8	8.0	0.02	0.35	5.00
ASMD1812-030	30.0	100	0.30	0.60	0.8	8.0	0.10	0.25	3.00
ASMD1812-030-33V	33.0	100	0.30	0.60	0.8	8.0	0.10	0.25	3.00
ASMD1812-030-60V	60.0	100	0.30	0.60	0.8	8.0	0.10	0.25	3.00
ASMD1812-050	15.0	100	0.50	1.00	0.8	8.0	0.15	0.15	1.00
ASMD1812-050-33V	33.0	100	0.50	1.00	0.8	8.0	0.15	0.15	1.00
ASMD1812-050-60V	60.0	100	0.50	1.00	0.8	8.0	0.15	0.15	1.40
ASMD1812-075	13.2	100	0.75	1.50	0.8	8.0	0.20	0.09	0.45
ASMD1812-075-24V	24.0	100	0.75	1.50	0.8	8.0	0.20	0.09	0.45
ASMD1812-075-33V	33.0	100	0.75	1.50	0.8	8.0	0.20	0.09	0.45
ASMD1812-110	8.00	100	1.10	2.20	0.8	8.0	0.30	0.045	0.25
ASMD1812-110-16V	16.0	100	1.10	2.20	0.8	8.0	0.30	0.045	0.25
ASMD1812-110-24V	24.0	100	1.10	2.20	0.8	8.0	0.30	0.045	0.25
ASMD1812-110-33V	33.0	100	1.10	2.20	0.8	8.0	0.30	0.045	0.25
ASMD1812-125	16.0	100	1.25	2.50	0.8	8.0	0.40	0.05	0.20
ASMD1812-150	8.00	100	1.50	3.00	0.8	8.0	0.50	0.04	0.16
ASMD1812-150-12V	12.0	100	1.50	3.00	0.8	8.0	0.50	0.04	0.16
ASMD1812-150-24V	24.0	100	1.50	3.00	0.8	8.0	0.50	0.04	0.16
ASMD1812-160	8.00	100	1.60	2.80	0.8	8.0	1.00	0.03	0.13
ASMD1812-200	8.00	100	2.00	4.00	0.8	8.0	2.00	0.02	0.10
ASMD1812-200-16V	16.0	100	2.00	4.00	0.8	8.0	2.00	0.02	0.10
ASMD1812-200-24V	24.0	100	2.00	4.00	0.8	8.0	2.00	0.02	0.10
ASMD1812-200-30V	30.0	100	2.00	4.00	0.8	8.0	2.00	0.02	0.10
ASMD1812-260	8.00	100	2.60	5.00	0.8	8.0	2.50	0.01	0.05
ASMD1812-260-16V	16.0	100	2.60	5.00	0.8	8.0	2.50	0.01	0.05
ASMD1812-300	8.00	100	3.00	5.00	0.8	8.0	4.00	0.01	0.04
ASMD1812-300-12V	12.0	100	3.00	5.00	0.8	8.0	4.00	0.01	0.04
ASMD1812-300-16V	16.0	100	3.00	5.00	0.8	8.0	4.00	0.01	0.04
ASMD1812-350	6.00	100	3.50	6.00	2.0	10.0	4.00	0.008	0.035
ASMD1812-350-16V	16.0	100	3.50	6.00	2.0	10.0	4.00	0.008	0.035
ASMD1812-400	6.00	100	4.00	7.00	2.0	10.0	4.00	0.005	0.025

$I_{hold}$  = Hold Current. Maximum current device will not trip in 25°C still air.

$I_{trip}$  = Trip Current. Minimum current at which the device will always trip in 25°C still air.

$V_{max}$  = Maximum operating voltage device can withstand without damage at rated current ( $I_{max}$ ).

$I_{max}$  = Maximum fault current device can withstand without damage at rated voltage ( $V_{max}$ ).

$P_d$  = Power dissipation when device is in the tripped state in 25°C still air environment at rated voltage.

$R_{i\ min/max}$  = Minimum/Maximum device resistance prior to tripping at 25°C.

$R_{1\ max}$  = Maximum device resistance is measured one hour post reflow.

**CAUTION :** Operation beyond the specified ratings may result in damage and possible arcing and flame.

### Environmental Specifications

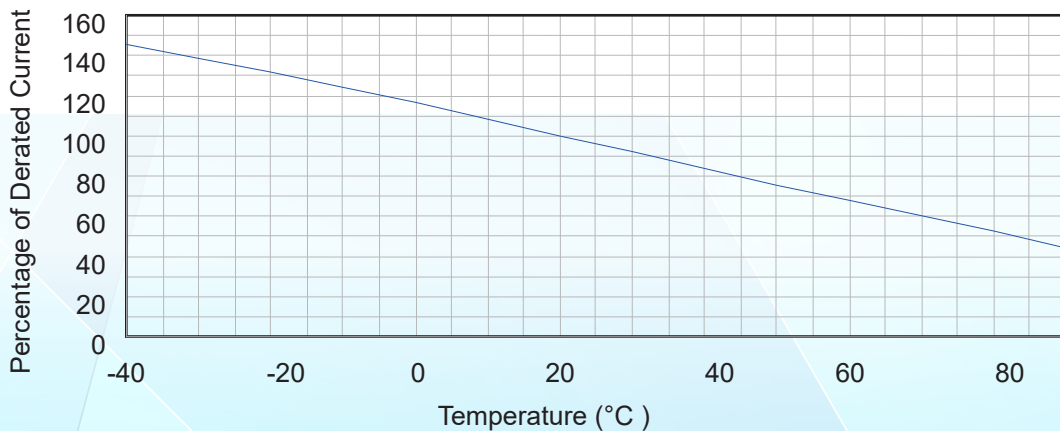
	Conditions	Resistance change
Passive aging	+85°C, 1000 hrs.	±5% typical
Humidity aging	+85°C, 85% R.H. , 168 hours	±5% typical
Thermal shock	+85°C to -40°C, 20 times	±33% typical
Resistance to solvent	MIL-STD-202,Method 215	No change
Vibration	MIL-STD-202,Method 201	No change

Ambient operating conditions : - 40 °C to +85 °C

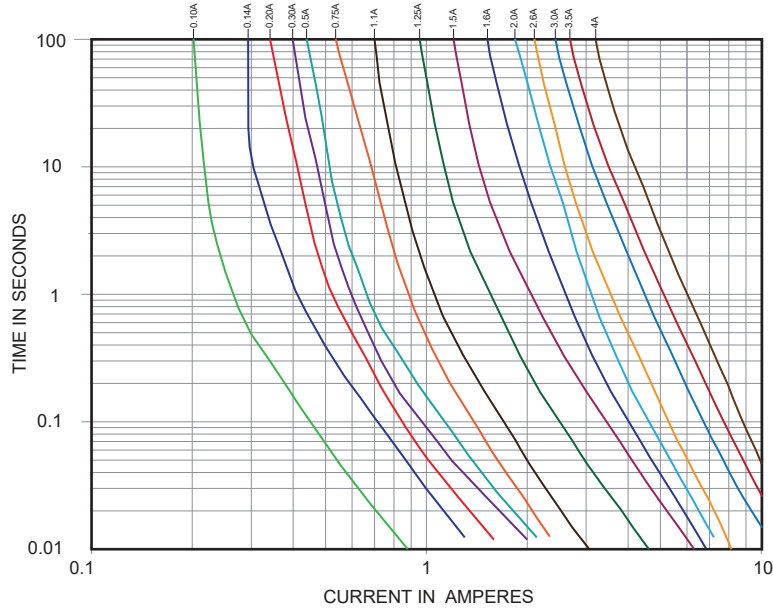
Maximum surface temperature of the device in the tripped state is 125 °C

### Thermal Derating Curve

Derating Curves for ASMD1812 Series



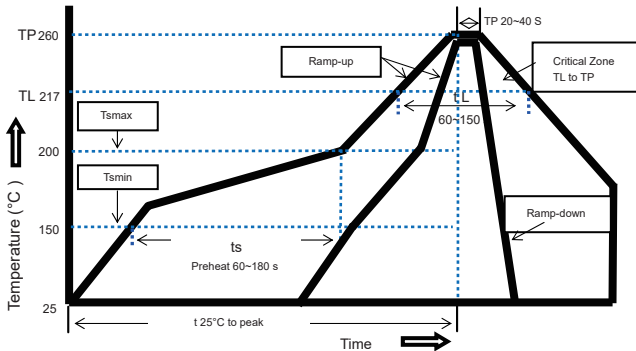
## Average Time-Current Curve



## Thermal Derating Chart

Model	Maximum ambient operating temperature ( $T_{\text{max}}$ ) vs. hold current ( $I_{\text{hold}}$ )								
	- 40°C	- 20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
ASMD1812-010	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.03
ASMD1812-014	0.23	0.19	0.17	0.14	0.12	0.10	0.09	0.08	0.06
ASMD1812-020	0.29	0.26	0.23	0.20	0.17	0.15	0.14	0.12	0.10
ASMD1812-030	0.44	0.39	0.35	0.30	0.26	0.23	0.21	0.18	0.15
ASMD1812-050	0.59	0.57	0.55	0.50	0.45	0.43	0.35	0.30	0.23
ASMD1812-075	1.10	0.99	0.87	0.75	0.63	0.57	0.49	0.45	0.35
ASMD1812-110	1.60	1.45	1.28	1.10	0.92	0.83	0.71	0.66	0.52
ASMD1812-125	2.00	1.75	1.52	1.25	1.00	0.95	0.90	0.75	0.53
ASMD1812-150	2.10	1.96	1.77	1.50	1.23	1.09	0.95	0.82	0.61
ASMD1812-160	2.30	2.05	1.88	1.60	1.26	1.12	0.98	0.84	0.63
ASMD1812-200	2.88	2.61	2.25	2.00	1.80	1.66	1.45	1.09	0.80
ASMD1812-260	3.90	3.42	2.96	2.60	2.33	2.07	1.94	1.35	1.00
ASMD1812-300	4.15	3.76	3.46	3.00	2.55	2.28	2.01	1.61	1.33
ASMD1812-350	4.84	4.39	4.04	3.50	2.98	2.66	2.35	1.88	1.55
ASMD1812-400	5.80	5.20	4.60	4.00	3.35	3.12	2.75	2.45	2.10

### Soldering Parameters



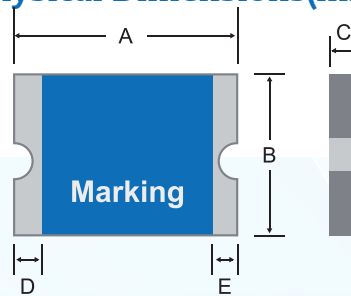
Recommended reflow methods: IR, vapor phase oven, hot air oven, N2 environment for lead-free  
 Recommended maximum paste thickness is 0.25mm  
 Devices can be cleaned using standard industry methods and solvents.

Note 1: All temperature refer to topside of the package, measured on the package body surface.

Note 2: If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (Ts max to T p)	3 C/second mac.
Preheat	
-Temperature Min(Ts min)	150 C
-Temperature Max(Ts max)	200 C
-Time(Ts min to Ts max)	60~180 seconds
Time maintained above:	
-Temperature(TL)	217 C
-Time(tL)	60~150 seconds
Peak Temperature(Tp)	260 C
Ramp-Down Rate	6 C/second max.
Time 25 C to Peak Temperature	8 minutes max
Storage Condition	0 C ~35 C , ≤70%RH

### Physical Dimensions(mm.)

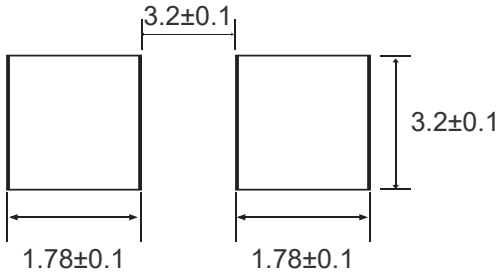


#### Termination Pad Characteristics

Terminal pad materials: Tin-plated Nickel-Copper

Terminal pad solder ability: Meets EIA specification RS186-9E and ANSI/J-STD-002 Category 3.

Model	A		B		C		D	E
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.
ASMD1812-010	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-010-33V	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-010-60V	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-014	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-014-33V	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-020	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-020-33V	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-020-60V	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-030	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-030-33V	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-030-60V	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-050	4.37	4.73	3.07	3.41	0.4	1.0	0.3	0.25
ASMD1812-050-33V	4.37	4.73	3.07	3.41	0.4	1.0	0.3	0.25
ASMD1812-050-60V	4.37	4.73	3.07	3.41	0.6	1.5	0.3	0.25
ASMD1812-075	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-075-24V	4.37	4.73	3.07	3.41	0.6	1.3	0.3	0.25
ASMD1812-075-33V	4.37	4.73	3.07	3.41	0.6	1.3	0.3	0.25
ASMD1812-110	4.37	4.73	3.07	3.41	0.4	1.0	0.3	0.25
ASMD1812-110-16V	4.37	4.73	3.07	3.41	0.4	1.0	0.3	0.25
ASMD1812-110-24V	4.37	4.73	3.07	3.41	0.6	1.3	0.3	0.25
ASMD1812-110-33V	4.37	4.73	3.07	3.41	0.6	1.3	0.3	0.25
ASMD1812-125	4.37	4.73	3.07	3.41	0.4	1.0	0.3	0.25
ASMD1812-150	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-150-12V	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-150-24V	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-160	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-200	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-200-16V	4.37	4.73	3.07	3.41	0.5	1.1	0.3	0.25
ASMD1812-200-24V	4.37	4.73	3.07	3.41	0.5	1.5	0.3	0.25
ASMD1812-200-30V	4.37	4.73	3.07	3.41	0.5	1.5	0.3	0.25
ASMD1812-260	4.37	4.73	3.07	3.41	0.5	1.5	0.3	0.25
ASMD1812-260-16V	4.37	4.73	3.07	3.41	0.5	1.5	0.3	0.25
ASMD1812-300	4.37	4.73	3.07	3.41	0.8	1.5	0.3	0.25
ASMD1812-300-12V	4.37	4.73	3.07	3.41	0.8	1.5	0.3	0.25
ASMD1812-300-16V	4.37	4.73	3.07	3.41	0.8	1.5	0.3	0.25
ASMD1812-350	4.37	4.73	3.07	3.41	0.8	1.5	0.3	0.25
ASMD1812-350-16V	4.37	4.73	3.07	3.41	0.8	1.5	0.3	0.25
ASMD1812-400	4.37	4.73	3.07	3.41	0.8	1.5	0.3	0.25

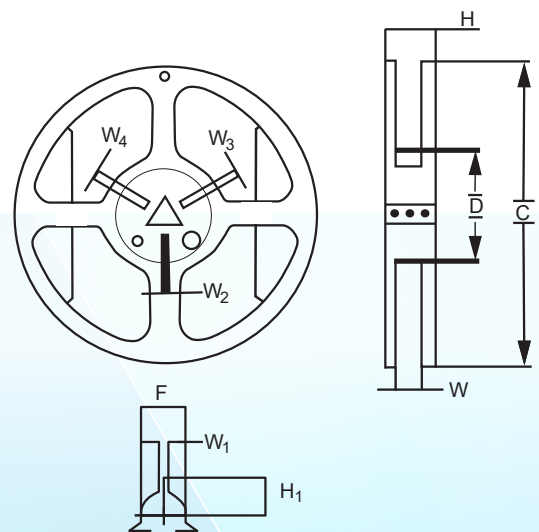
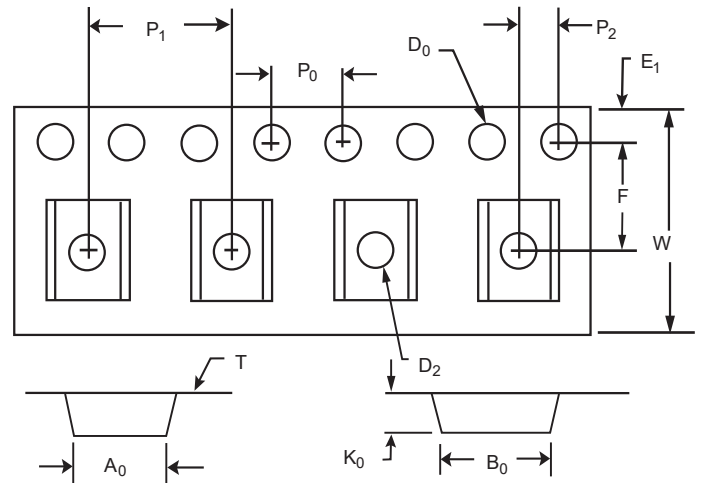
**Packaging Quantity and Marking**


Part Number	Quantity
ASMD1812 Series	1,500 pcs/reel
ASMD1812-350-16V	1,000 pcs/reel
ASMD1812-400	1,000 pcs/reel

Tape &amp; reel packaging per EIA481-1

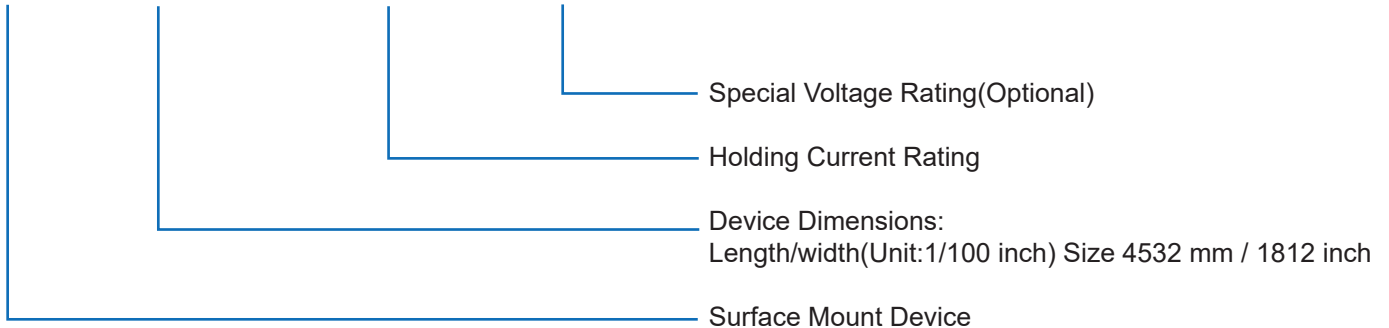
**Tape And Reel Specifications (mm)**

Governing Specifications	EIA 481-1
W	12 ± 0.3
P0	4.0 ± 0.10
P1	8.0 ± 0.10
P2	2.0 ± 0.05
A0	3.5 ± 0.10
B0	5.1 ± 0.10
B1max.	5.9
D0	1.50 + 0.1, -0
F	5.5 ± 0.05
E1	1.75 ± 0.10
E2min.	10.25
T	0.6
T1max.	0.1
K0	0.9 ± 0.1
Leader min.	390
Trailer min.	160
Reel Dimensions	
A max.	178
N min.	60
W1	12.4 ± 0.5
W2	18.4


**Storage And Handling**

- Storage conditions: 40°C max, 70% R.H.
- Devices may not meet specified performance if storage conditions are exceeded. Technology Corp.



**Part Number System**
**ASMD 1812 - □□□ - □□**

**Cross Reference**

Model	Cross Reference		
	Tyco / PolySwitch®	Littelfuse / POLY-FUSE®	Polytronics / EVERFUSE®
ASMD1812-010	miniSMDC010F	1812L010	SMD1812P010TF
ASMD1812-014	miniSMDC014F	1812L014	SMD1812P014TF
ASMD1812-020	miniSMDC020F	1812L020	SMD1812P020TF
ASMD1812-030	-	1812L035	SMD1812P030TF
ASMD1812-050	miniSMDC050F	1812L050	SMD1812P050TF
ASMD1812-050-33V	miniSMDC050F/33V	1812L050/30	SMD1812P050TF/30
ASMD1812-050-60V	-	-	-
ASMD1812-075	miniSMDC750F	1812L075	SMD1812P075TF
ASMD1812-075-24V	miniSMDC750F/24V	1812L075/24	SMD1812P075TF/24
ASMD1812-110	miniSMDC110F	1812L110	SMD1812P110TF
ASMD1812-110-16V	miniSMDC110F/16	1812L110/16	SMD1812P110TF/16
ASMD1812-110-24V	miniSMDC110F/24	1812L110/24	SMD1812P110TF/24
ASMD1812-110-33V	miniSMDC110F/33	1812L110/33	SMD1812P110TF/33
ASMD1812-125	miniSMDC125F	1812L125	SMD1812P125TF
ASMD1812-150	miniSMDC150F	1812L150	SMD1812P150TF
ASMD1812-150-16V	miniSMDC150F/12	1812L150/12	SMD1812P150TF/12
ASMD1812-150-24V	miniSMDC150F/24	1812L150/24	SMD1812P150TF/24
ASMD1812-160	miniSMDC160F	1812L160	SMD1812P160TF
ASMD1812-200	miniSMDC200F	1812L200	SMD1812P200TF
ASMD1812-260	miniSMDC260F	1812L260	SMD1812P260TF
ASMD1812-300	miniSMDC300F	1812L300	SMD1812P300TF
ASMD1812-300-30V	miniSMDC300F/30	1812L300/30	SMD1812P300TF/30
ASMD1812-350	-	-	-
ASMD1812-400	-	-	-

"PolySwitch" is a registered trademark of Tyco Electronics.

"POLY-FUSE" is a registered trademark of Littelfuse, Inc.

"EVERFUSE" is a registered trademark of Polytronics Technology Corp.

## X-ON Electronics

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