

 FUZETEC TECHNOLOGY CO., LTD.	NO.	PQ04-01E		
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Surface Mountable PTC Resettable Fuse: FSMD Series

1. Summary

- (a) **RoHS Compliant & Halogen Free**
- (b) **Applications: All high-density boards**
- (c) **Product Features: Small surface mountable, Solid state, Faster time to trip than standard SMD devices, Lower resistance than standard SMD devices**
- (d) **Operation Current: 0.10A~3.0A**
- (e) **Maximum Voltage: 6V_{DC}~60V_{DC}**
- (f) **Temperature Range : -40°C to 85°C**

2. Agency Recognition

UL: File No. E211981

C-UL: File No. E211981

TÜV: File No. R50004084, R50090556

3. Electrical Characteristics (23°C)

Part Number	Hold Current	Trip Current	Rated Voltage	Max Current	Typical Power	Max Time to Trip		Resistance	
	I _H , A	I _T , A	V _{MAX} , VDC	I _{MAX} , A	P _d , W	Current	Time	R _{MIN}	R _{1MAX}
	I _H , A	I _T , A	V _{MAX} , VDC	I _{MAX} , A	P _d , W	Amp	Sec	Ohms	Ohms
FSMD010	0.10	0.30	60	10	0.8	8.0	0.020	1.600	15.00
FSMD010-R	0.10	0.30	60	100	0.8	8.0	0.020	1.600	15.00
FSMD014	0.14	0.30	60	100	0.8	8.0	0.008	1.200	6.500
FSMD014-R	0.14	0.30	60	100	0.8	8.0	0.008	1.200	6.500
FSMD020	0.20	0.40	30	100	0.8	8.0	0.020	0.800	5.000
FSMD020-R	0.20	0.40	30	100	0.8	8.0	0.020	0.800	5.000
FSMD020-60-R	0.20	0.40	60	40	0.8	8.0	0.020	0.800	5.000
FSMD030-R	0.30	0.60	30	100	0.8	8.0	0.100	0.200	1.750
FSMD035	0.35	0.70	16	100	0.8	8.0	0.100	0.320	1.500
FSMD035-R	0.35	0.70	16	100	0.8	8.0	0.100	0.320	1.500
FSMD035-30-R	0.35	0.70	30	100	0.8	8.0	0.100	0.320	1.500
FSMD050	0.50	1.00	16	100	0.8	8.0	0.150	0.150	1.000
FSMD050-R	0.50	1.00	16	100	0.8	8.0	0.150	0.150	1.000
FSMD050-30-R	0.50	1.00	30	100	0.8	8.0	0.150	0.150	1.000
FSMD075	0.75	1.50	16	100	0.8	8.0	0.200	0.110	0.450
FSMD075-R	0.75	1.50	16	100	0.8	8.0	0.200	0.110	0.450
FSMD075-24R	0.75	1.50	24	40	1.0	8.0	0.200	0.110	0.290
FSMD075-33R	0.75	1.50	33	40	1.0	8.0	0.200	0.110	0.400
FSMD110	1.10	2.20	8	100	0.8	8.0	0.300	0.040	0.210
FSMD110-R	1.10	2.20	8	100	0.8	8.0	0.300	0.040	0.210
FSMD110-16	1.10	2.20	16	100	0.8	8.0	0.500	0.040	0.180
FSMD110-16-R	1.10	2.20	16	100	0.8	8.0	0.500	0.040	0.180
FSMD110-24R	1.10	2.20	24	100	1.0	8.0	0.500	0.060	0.200
FSMD125	1.25	2.50	6	40	0.8	8.0	0.400	0.050	0.140
FSMD125-R	1.25	2.50	6	100	0.8	8.0	0.400	0.050	0.140
FSMD125-16R	1.25	2.50	16	100	0.8	8.0	0.400	0.050	0.140
FSMD150	1.50	3.00	8	100	0.8	8.0	0.500	0.040	0.110
FSMD150-R	1.50	3.00	8	100	0.8	8.0	0.500	0.040	0.110

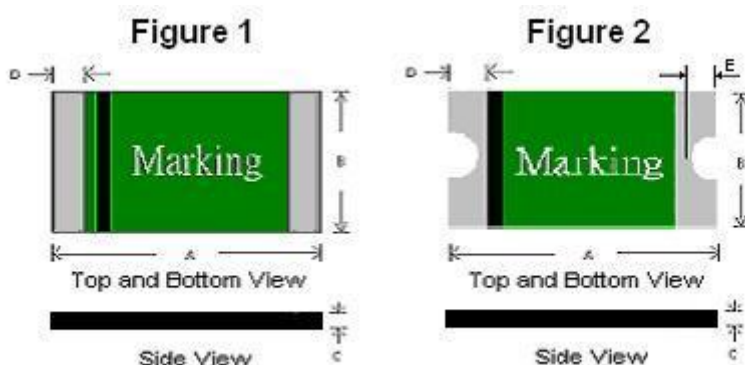
NOTE : Specification subject to change without notice.

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FSMD150-12R	1.50	3.00	12	100	1.0	8.0	0.500	0.040	0.110
FSMD150-24R	1.50	3.00	24	100	1.0	8.0	1.500	0.040	0.120
FSMD160	1.60	3.20	8	100	0.8	8.0	0.500	0.030	0.100
FSMD160-R	1.60	3.20	8	100	0.8	8.0	0.500	0.030	0.100
FSMD160-12R	1.60	3.20	12	100	1.0	8.0	1.000	0.030	0.100
FSMD160-16R	1.60	3.20	16	100	1.0	8.0	1.000	0.030	0.100
FSMD200R	2.00	3.50	8	100	1.0	8.0	2.000	0.020	0.070
FSMD260R	2.60	5.00	6	100	1.0	8.0	2.500	0.015	0.047
FSMD260-13R	2.60	5.00	13.2	100	1.3	8.0	5.000	0.015	0.050
FSMD260-16R	2.60	5.00	16	100	1.3	8.0	5.000	0.015	0.050
FSMD300R	3.00	5.00	6	100	1.0	8.0	4.000	0.012	0.040

I_H =Hold current-maximum current at which the device will not trip at 23°C still air.
 I_T =Trip current-minimum current at which the device will always trip at 23°C still air.
 V_{MAX} =Maximum voltage device can withstand without damage at it rated current.(I_{MAX})
 I_{MAX} = Maximum fault current device can withstand without damage at rated voltage (V_{MAX}).
 P_d =Typical power dissipated-type amount of power dissipated by the device when in the tripped state in 23°C still air environment.
 R_{MIN} =Minimum device resistance at 23°C prior to tripping.
 R_{1MAX} =Maximum device resistance at 23°C measured 1 hour after tripping or reflow soldering of 260°C for 20 seconds.
Termination pad characteristics
Termination pad materials: Pure Tin

4. FSMD Product Dimensions (Millimeters)



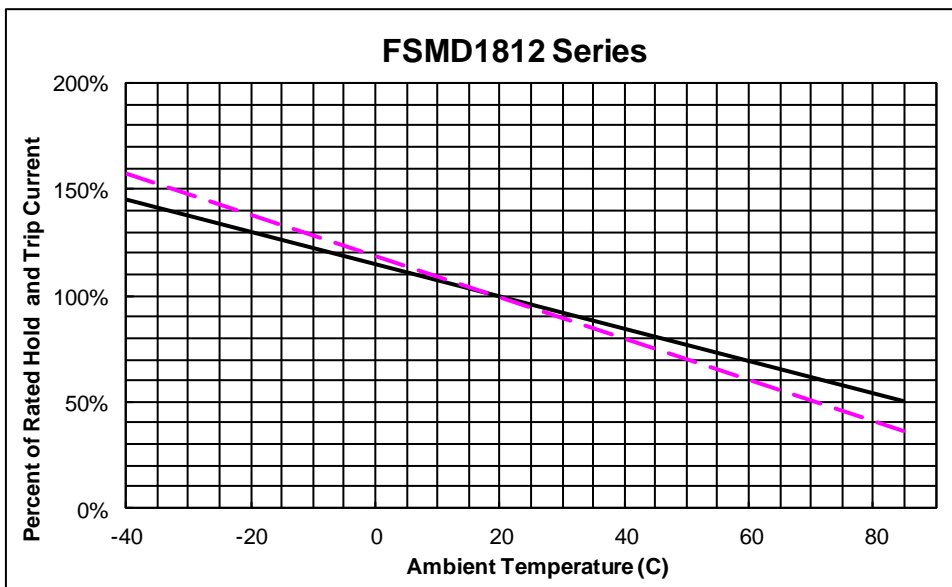
Part Number	Figure	A		B		C		D		E	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
FSMD010	1	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	—	—
FSMD010-R	2	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	0.25	0.65
FSMD014	1	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	—	—
FSMD014-R	2	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	0.25	0.65
FSMD020	1	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	—	—
FSMD020-R	2	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	0.25	0.65
FSMD020-60-R	2	4.37	4.73	3.07	3.41	0.60	0.90	0.30	0.95	0.25	0.65
FSMD030-R	2	4.37	4.73	3.07	3.41	0.40	0.70	0.30	0.95	0.25	0.65
FSMD035	1	4.37	4.73	3.07	3.41	0.40	0.70	0.30	0.95	—	—
FSMD035-R	2	4.37	4.73	3.07	3.41	0.40	0.70	0.30	0.95	0.25	0.65
FSMD035-30-R	2	4.37	4.73	3.07	3.41	0.40	0.70	0.30	0.95	0.25	0.65
FSMD050	1	4.37	4.73	3.07	3.41	0.35	0.65	0.30	0.95	—	—
FSMD050-R	2	4.37	4.73	3.07	3.41	0.35	0.65	0.30	0.95	0.25	0.65
FSMD050-30-R	2	4.37	4.73	3.07	3.41	0.45	0.75	0.30	0.95	0.25	0.65
FSMD075	1	4.37	4.73	3.07	3.41	0.35	0.65	0.30	0.95	—	—
FSMD075-R	2	4.37	4.73	3.07	3.41	0.35	0.65	0.30	0.95	0.25	0.65
FSMD075-24R	2	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65

NOTE : Specification subject to change without notice.



FSMD075-33R	2	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65
FSMD110	1	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	—	—
FSMD110-R	2	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	0.25	0.65
FSMD110-16	1	4.37	4.73	3.07	3.41	0.25	0.90	0.30	0.95	—	—
FSMD110-16-R	2	4.37	4.73	3.07	3.41	0.25	0.90	0.30	0.95	0.25	0.65
FSMD110-24R	2	4.37	4.73	3.07	3.41	0.80	1.30	0.25	0.95	0.25	0.65
FSMD125	1	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	—	—
FSMD125-R	2	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	0.25	0.65
FSMD125-16R	2	4.37	4.73	3.07	3.41	0.50	1.00	0.30	0.95	0.25	0.65
FSMD150	1	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	—	—
FSMD150-R	2	4.37	4.73	3.07	3.41	0.25	0.55	0.30	0.95	0.25	0.65
FSMD150-12R	2	4.37	4.73	3.07	3.41	0.60	1.10	0.25	0.95	0.25	0.65
FSMD150-24R	2	4.37	4.73	3.07	3.41	0.60	1.55	0.25	0.95	0.25	0.65
FSMD160	1	4.37	4.73	3.07	3.41	0.25	0.90	0.30	0.95	—	—
FSMD160-R	2	4.37	4.73	3.07	3.41	0.25	0.90	0.30	0.95	0.25	0.65
FSMD160-12R	2	4.37	4.73	3.07	3.41	0.60	1.35	0.25	0.95	0.25	0.65
FSMD160-16R	2	4.37	4.73	3.07	3.41	0.60	1.35	0.25	0.95	0.25	0.65
FSMD200R	2	4.37	4.73	3.07	3.41	0.40	0.90	0.25	0.95	0.25	0.65
FSMD260R	2	4.37	4.73	3.07	3.41	0.55	1.20	0.25	0.95	0.25	0.65
FSMD260-13R	2	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65
FSMD260-16R	2	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65
FSMD300R	2	4.37	4.73	3.07	3.41	0.80	1.55	0.25	0.95	0.25	0.65

5. Thermal Derating Curve



A= FSMD075, 075-R, 075-24R, 075-33R, 110, 110-R, 110-16, 110-16-R, 110-24R, 125, 125-R, 125-16R, 150, 150-R, 150-12R, 150-24R, 160, 160-R, 160-12R, 160-16R, 200R, 260R, 260-13R, 260-16R 300R

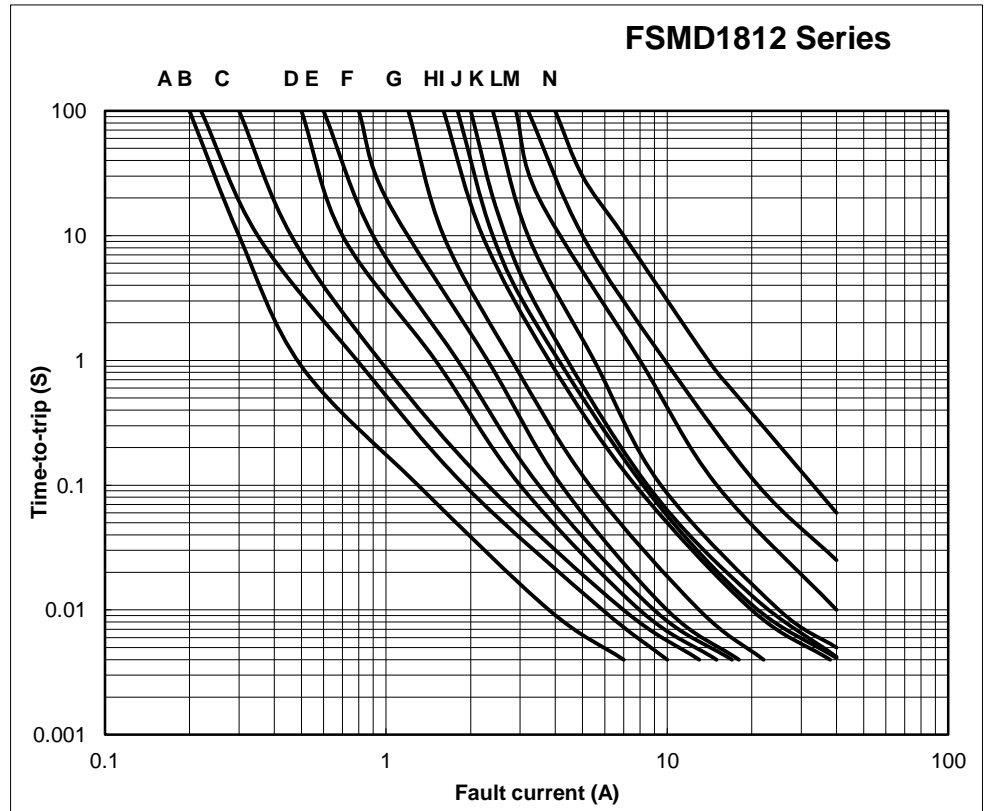
B= FSMD010, 010-R, 014, 014-R, 020, 020-R, 020-60-R, 030-R, 035, 035-R, 035-30-R, 050, 050-R, 050-30-R

NOTE : Specification subject to change without notice.



6. Typical Time-To-Trip at 23°C

- A = FSMD010/010-R
- B = FSMD014/014-R
- C = FSMD020/020-R/020-60-R
- D = FSMD030-R
- E = FSMD035/035-R/035-30-R
- F = FSMD050/050-R/050-30-R
- G = FSMD075/075-R/
075-24R/075-33R
- H = FSMD110/110-R/110-16/
110-16-R/110-24R
- I = FSMD125/125-R/125-16R
- J = FSMD150/150-R/
150-12R/150-24R
- K = FSMD160/160-R/
160-12R/160-16R
- L = FSMD200R
- M = FSMD260R/260-13R/
260-16R
- N = FSMD300R



7. Material Specification

Terminal pad material: Pure Tin

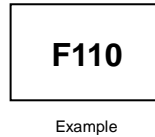
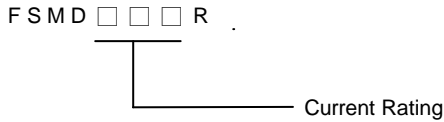
Soldering characteristics: Meets EIA specification RS 186-9E, ANSI/J-std-002 Category 3



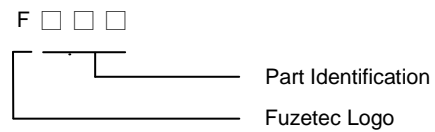
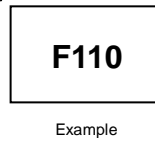
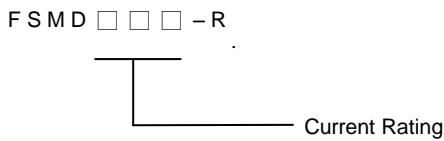
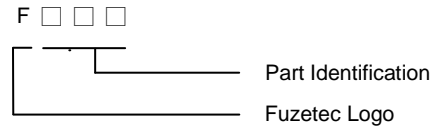
8. Part Numbering and Marking System

Part Numbering System

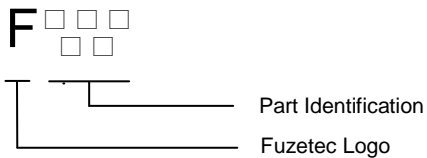
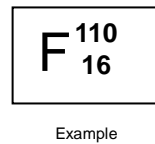
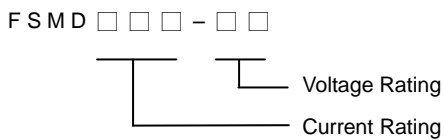
FSMD014~FSMD300R



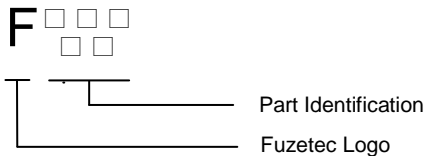
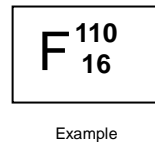
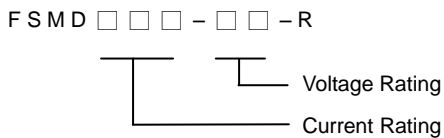
Part Marking System



FSMD110-16



FSMD110-16-R



Warning: -Operation beyond the specified maximum ratings or improper use may result in damage and possible electrical arcing and/or flame.



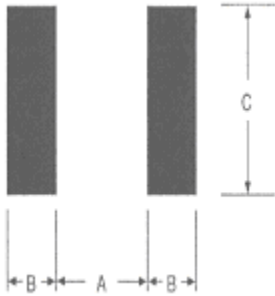
-PPTC device are intended for occasional overcurrent protection. Application for repeated overcurrent condition and/or prolonged trip are not anticipated.

-Avoid contact of PPTC device with chemical solvent. Prolonged contact will damage the device performance.



9. Pad Layouts 、 Solder Reflow and Rework Recommendations

The dimension in the table below provide the recommended pad layout for each FSMD1812 device



Pad dimensions (millimeters)

Device	A Nominal	B Nominal	C Nominal
All 1812 Series	3.45	1.78	3.50

Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (T _{smax} to T _p)	3 °C/second max.
Preheat :	
Temperature Min (T _{smin})	150 °C
Temperature Max (T _{smax})	200 °C
Time (t _{smin} to t _{smax})	60-180 seconds
Time maintained above:	
Temperature(T _L)	217 °C
Time (t _L)	60-150 seconds
Peak/Classification 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.

Solder reflow

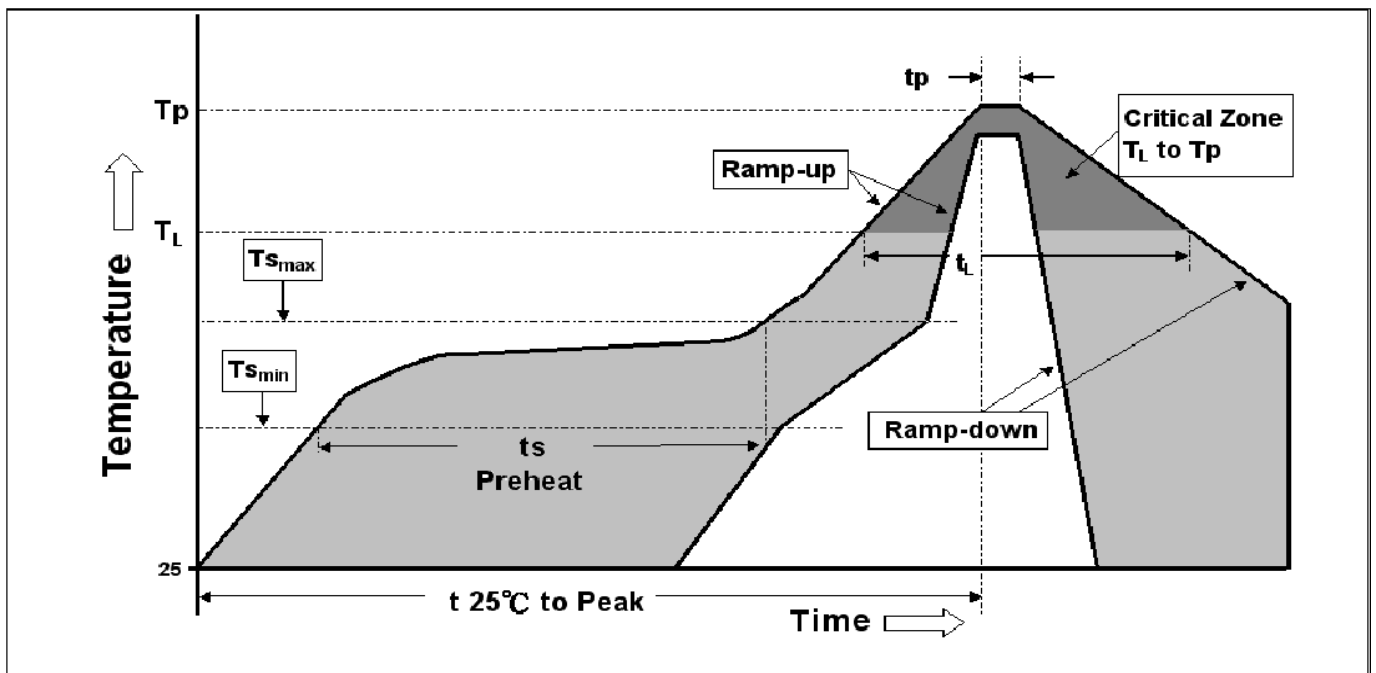
- ※ Due to "Lead Free" nature, Temperature and Dwelling time for the soldering zone is higher than those for Regular. This may cause damage to other components.
- 1. Recommended max past thickness > 0.25mm.
- 2. Devices can be cleaned using standard methods and aqueous solvent.
- 3. Rework use standard industry practices.
- 4. Storage Environment : < 30°C / 60%RH

Caution:

- 1. If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.
- 2. Devices are not designed to be wave soldered to the bottom side of the board.

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

Reflow Profile



NOTE : Specification subject to change without notice.