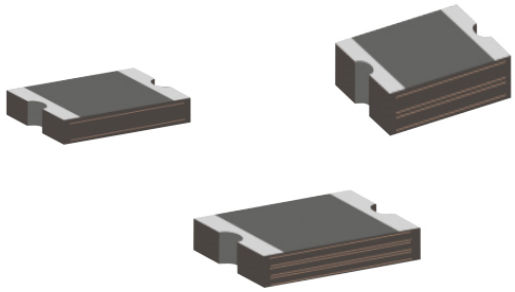
mSMD Series

POSITIVE THERMAL COEFFICIENT(PTC)

Description

The mSMD series provides miniature surface mount resettable over-current protection with holding current from 0.1A to 3.0A. This series is suitable for ultra portable applications where space is at a premium and the device current is low.



Features

- I(hold): 0.1~3.0A
- Very high voltage surge capabilities
- Available in lead-free version
- Fast response to fault current
- RoHS compliant, Lead- Free and Halogen-Free
- Low resistance
- Compact design saves board space
- Compatible with high temperature solders

Applications

- USB peripherals
- Disk drives
- CD-ROMs
- General electronics
- Disk drives
- Set-top-box and HDMI
- Mobile Internet Device (MID)
- PDAs / digital cameras
- Game console port protection
- Plug and play protection for motherboards and peripherals
- Mobile phones - battery and port protection

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+85 ,1000 hrs	10%typical
Humidity aging	+85℃，85%R.H.,168 hours	10%typical
Thermal shock	+85 to -40℃，20times	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

℃ ±

Physical Characteristics and Environmental Specifications

Terminal materials :	Tin-Plated Nickle-copper	
Soldering zone	Meets EIA specification RS 186-9E and ANSI/J-STD-002 Category 3.	
Environmental Specifications		
Test	Conditions	Resistance Change
Passive aging	85℃,1000hours	±10%
Humidity aging	85℃/85%RH.1000 hours	±5%
Thermal shock	MIL-STD-202,Method 107G +85℃/-40℃,20times	-30% typical resistance change
Solvent Resistance	MIL-STD-202,Method 215	no change
Vibration	ML-STD-883C,Test Condition A	No chage

Electrical Characteristic

Part Number	V_{Max}	I_{Max}	I_{Hold}	I_{Trip}	Maximum Time-to-trip		R25	
	(Vdc)	(A)	(A)	(A)	Current (A)	Time (Sec)	R_{Min} (Ω)	$R1_{Max}$ (Ω)
mSMD010	30.0	100	0.10	0.30	0.5	1.50	0.750	15.000
mSMD010-60	60.0	100	0.10	0.30	0.5	1.50	0.750	15.000
mSMD014-33	33.0	100	0.14	0.34	1.5	0.15	0.650	6.000
mSMD014	60.0	100	0.14	0.34	1.5	0.15	0.650	6.000
mSMD020	30.0	100	0.20	0.40	8.0	0.02	0.350	5.000
mSMD030	30.0	100	0.30	0.60	8.0	0.10	0.250	3.000
mSMD050	15.0	100	0.50	1.00	8.0	0.15	0.150	1.000
mSMD050-24	24.0	100	0.50	1.00	8.0	0.15	0.150	1.000
mSMD050-30	30.0	100	0.50	1.00	8.0	0.15	0.150	1.000
mSMD075	13.2	100	0.75	1.50	8.0	0.20	0.090	0.450
mSMD075-24	24	100	0.75	1.50	8.0	0.20	0.090	0.450
mSMD075-33	33	100	0.75	1.50	8.0	0.20	0.090	0.450
mSMD110	8.0	100	1.10	2.20	8.0	0.30	0.050	0.250
mSMD110-16	16.0	100	1.10	2.20	8.0	0.30	0.050	0.250
mSMD110-24	24.0	100	1.10	2.20	8.0	0.30	0.050	0.250
mSMD110-33	33.0	100	1.10	2.20	8.0	0.30	0.050	0.250
mSMD125-8	8.0	100	1.25	2.50	8.0	0.40	0.050	0.200
mSMD125	16.0	100	1.25	2.50	8.0	0.40	0.050	0.200
mSMD150	8.0	100	1.50	3.00	8.0	0.50	0.040	0.160
mSMD150-16	16.0	100	1.50	3.00	8.0	0.50	0.040	0.160
mSMD150-24	24.0	100	1.50	3.00	8.0	0.50	0.040	0.160
mSMD160	8.0	100	1.60	2.80	8.0	1.00	0.030	0.130
mSMD200	8.0	100	2.00	4.00	8.0	2.00	0.020	0.100
mSMD200-12	12.0	100	2.00	4.00	8.0	2.00	0.020	0.100

mSMD200-16	16.0	100	2.00	4.00	8.0	2.00	0.020	0.100
mSMD260	8.0	100	2.60	5.00	8.0	2.50	0.015	0.050
mSMD260-12	12.0	100	2.60	5.00	8.0	2.50	0.015	0.060
mSMD260-16	16.0	100	2.60	5.00	8.0	2.50	0.015	0.060
mSMD300	6.0	100	3.00	5.00	8.0	4.00	0.012	0.040

V_{max} = Maximum operating voltage vice can withstand without damage at rated current (Imax).

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

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.

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

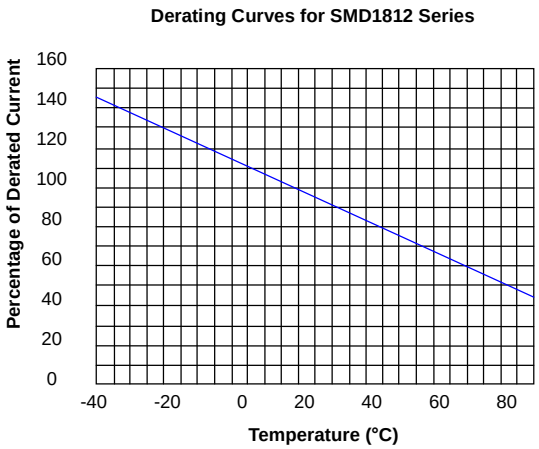
$Ri_{min/max}$ = Minimum/Maximum device resistance prior to tripping at 25°C.

$R1_{max}$ = Maximum device resistance is measured one hour post reflow.

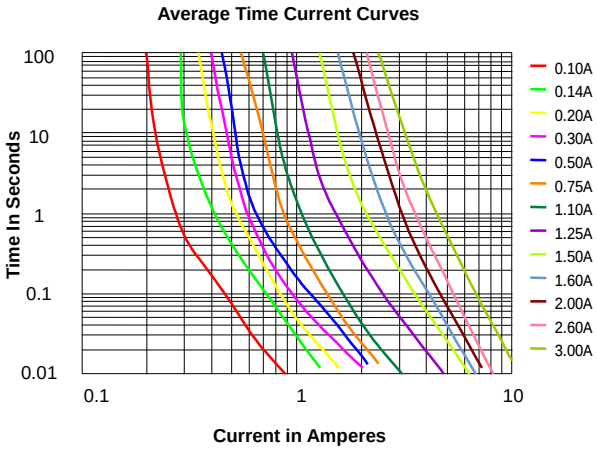
Thermal Derating Chart-I_H (A)

Part Number	Maximum ambient operating temperatures (℃)								
	-40	-20	0	25	40	50	60	70	85
mSMD010	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.03
mSMD014	0.23	0.19	0.17	0.14	0.12	0.10	0.09	0.08	0.06
mSMD020	0.29	0.26	0.23	0.20	0.17	0.15	0.14	0.12	0.10
mSMD030	0.44	0.39	0.35	0.30	0.26	0.23	0.21	0.18	0.15
mSMD050	0.59	0.57	0.55	0.50	0.45	0.43	0.35	0.30	0.23
mSMD075	1.10	0.99	0.87	0.75	0.63	0.57	0.49	0.45	0.35
mSMD110	1.60	1.45	1.28	1.10	0.92	0.83	0.71	0.66	0.52
mSMD110-16	1.60	1.45	1.28	1.10	0.92	0.83	0.71	0.66	0.52
mSMD110-24	1.60	1.45	1.28	1.10	0.92	0.83	0.71	0.66	0.52
mSMD110-33	1.60	1.45	1.28	1.10	0.92	0.83	0.71	0.66	0.52
mSMD125	2.00	1.75	1.52	1.25	1.00	0.95	0.90	0.75	0.53
mSMD125-8	2.00	1.75	1.52	1.25	1.00	0.95	0.90	0.75	0.53
mSMD150	2.30	2.05	1.77	1.50	1.23	1.09	0.95	0.82	0.61
mSMD150-16	2.30	2.05	1.77	1.50	1.23	1.09	0.95	0.82	0.61
mSMD150-24	2.30	2.05	1.77	1.50	1.23	1.09	0.95	0.82	0.61
mSMD160	2.45	2.15	1.89	1.60	1.34	1.25	1.15	0.96	0.79
mSMD200	2.89	2.61	2.30	2.00	1.75	1.66	1.45	1.39	1.19
mSMD200-12	2.89	2.61	2.30	2.00	1.75	1.66	1.45	1.39	1.19
mSMD200-16	2.89	2.61	2.30	2.00	1.75	1.66	1.45	1.39	1.19
mSMD260	3.76	3.39	2.99	2.60	2.28	2.16	1.89	1.81	1.55
mSMD260-12	3.38	3.05	2.69	2.60	2.05	1.94	1.70	1.63	1.39
mSMD260-16	3.38	3.05	2.69	2.60	2.05	1.94	1.70	1.63	1.39
mSMD300	4.34	3.92	3.45	3.00	2.63	2.49	2.18	2.09	1.79

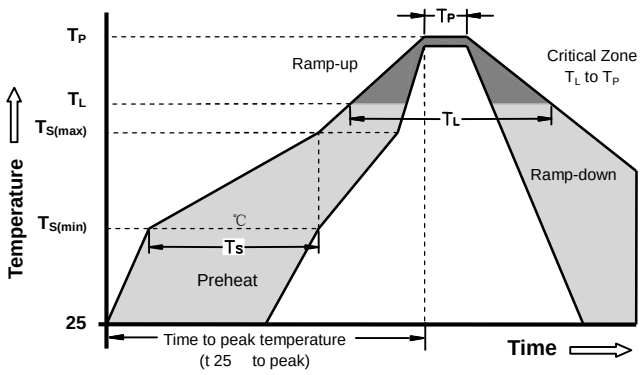
Thermal Derating Curve



Average Time-Current Curve

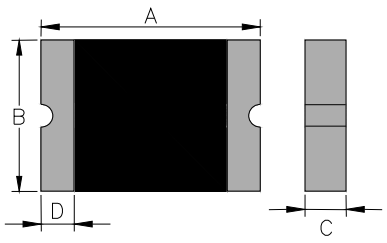
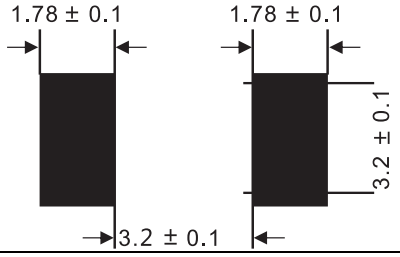


Soldering Parameters



Reflow Condition		Pb - Free assembly
Pre Heat	-Temperature Min ($T_{s(min)}$)	150°C
	-Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 -180 Seconds
Average ramp up rate (Liquids Temp T_L) to peak		3°C/second max
$T_{S(max)}$ to TL - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_L) (Liquids)	217°C
	- Time (min to max) (t_s)	60 -150 Seconds
Peak Temperature (T_P)		260 +0/-5°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 (T_P)		8 minutes Max
Do not exceed		260°C

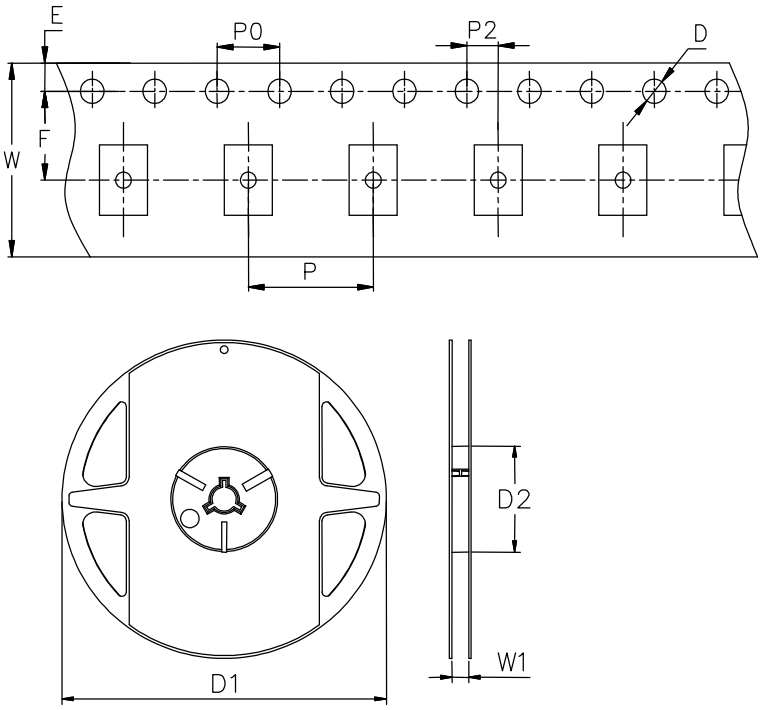
Recommended pad layout (mm)

Lead style code	Recommended Pad Layout (mm.)
	

Product Dimensions

Part Number	Marking	A		B		C		D	E
		Max	Min	Max	Min	Max	Min	Min	Min
mSMD010	010	4.37	4.73	3.07	3.41	0.50	1.00	0.30	0.15
mSMD010-60	010	4.37	4.73	3.07	3.41	0.50	1.00	0.30	0.15
mSMD014-33	014	4.37	4.73	3.07	3.41	0.50	1.00	0.30	0.15
mSMD014	014	4.37	4.73	3.07	3.41	0.50	1.10	0.30	0.15
mSMD020	020	4.37	4.73	3.07	3.41	0.50	1.00	0.30	0.15
mSMD030	030	4.37	4.73	3.07	3.41	0.50	1.00	0.30	0.15
mSMD050	050	4.37	4.73	3.07	3.41	0.40	0.90	0.30	0.15
mSMD050-24	050	4.37	4.73	3.07	3.41	0.40	0.90	0.30	0.15
mSMD050-30	050	4.37	4.73	3.07	3.41	0.40	1.00	0.30	0.15
mSMD075	075	4.37	4.73	3.07	3.41	0.40	0.90	0.30	0.15
mSMD075-24	075	4.37	4.73	3.07	3.41	0.50	1.20	0.30	0.15
mSMD075-33	075	4.37	4.73	3.07	3.41	0.60	1.20	0.30	0.15
mSMD110	110	4.37	4.73	3.07	3.41	0.40	0.90	0.30	0.15
mSMD110-16	110	4.37	4.73	3.07	3.41	0.40	0.90	0.30	0.15
mSMD110-24	110	4.37	4.73	3.07	3.41	0.60	1.30	0.30	0.15
mSMD110-33	110	4.37	4.73	3.07	3.41	0.70	1.70	0.30	0.15
mSMD125	125	4.37	4.73	3.07	3.41	0.50	1.20	0.30	0.15
mSMD125-8	125	4.37	4.73	3.07	3.41	0.30	0.90	0.30	0.15
mSMD150	150	4.37	4.73	3.07	3.41	0.30	0.90	0.30	0.15
mSMD150-16	150	4.37	4.73	3.07	3.41	0.50	1.20	0.30	0.15
mSMD150-24	150	4.37	4.73	3.07	3.41	0.80	1.70	0.30	0.15
mSMD160	160	4.37	4.73	3.07	3.41	0.30	0.80	0.30	0.15
mSMD200	200	4.37	4.73	3.07	3.41	0.40	1.20	0.30	0.15
mSMD200-12	200	4.37	4.73	3.07	3.41	0.50	1.20	0.30	0.15
mSMD200-16	200	4.37	4.73	3.07	3.41	0.50	1.20	0.30	0.15
mSMD260	260	4.37	4.73	3.07	3.41	0.50	1.20	0.30	0.15
mSMD260-12	260	4.37	4.73	3.07	3.41	0.60	1.50	0.30	0.15
mSMD260-16	260	4.37	4.73	3.07	3.41	0.80	1.70	0.30	0.15
mSMD300	300	4.37	4.73	3.07	3.41	0.50	1.50	0.30	0.15

Taping and Reel Specifications



Symbol	Millimeters	Inches
W	12.0±0.3	0.472±0.012
P	8.0±0.1	0.315±0.004
F	5.5±0.05	0.217±0.002
E	1.75±0.1	0.069±0.004
D	1.55±0.05	0.061±0.002
P0	4.0±0.1	0.157±0.004
P2	2.0±0.05	0.079±0.002
D1(max.)	178.0	7.007
D2(min.)	60	2.362
W1	12.4±0.5	0.488±0.02

Packaging Quantity

Quantity	1500		2000	
Part Number	mSMD010	mSMD075-33	mSMD125-8	mSMD150
	mSMD010-60	mSMD110-24	mSMD075	mSMD075-24
	mSMD014-33	mSMD150-24	mSMD110	mSMD110-16
	mSMD014	mSMD200-12	mSMD160	mSMD200
	mSMD020	mSMD200-16	mSMD050	mSMD050-24
	mSMD110-33	mSMD260	mSMD050-30	
	mSMD125	mSMD260-12		
	mSMD150-16	mSMD260-16		
	mSMD030	mSMD300		