SMD0603 Series Surface Mount PTC Devices

Description

The 0603 series provides miniature surface mount resettable overcurrent protection with holding current from 10mA to 1000mA. This world's smallest PTC is suitable for ultra portable applications where space is at a premium and the device current is low.

Features:

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

Applications:

- Mobile phones and PDAs
- Portable MP3 and media player
- Mobile Internet Device (MID)
- USB peripherals
- IC VCC protection

Circuit Diagram & Pin Configuration:

SMD 0603 R □□□ S F □□V

- special voltage Rating(Optional)
- Lead-Free
- Tin-plated Nickel-Copper
- Holding Current Rating
- Semiteh
- Device Dimensions: Length/width(Unit:1/100 inch)
- Size1608mm / 0603 inch
- Surface Mount Device

Performance Specification

Model	Marking	V_{max} (V dc)	I_{max} (A)	I_{hold} @25°C (A)	I_{trip} @25°C (A)	P_d Typ. (W)	Maximum Time To Trip		Resistance		UL
							Current (A)	Time (Sec)	$R_{i\ min}$ (W)	R1max (W)	
SMD0603R001SF	X	60	20	0.01	0.03	0.5	0.2	1.00	15.000	100.000	
SMD0603R002SF	Y	60	20	0.02	0.06	0.5	0.2	1.00	12.000	70.000	
SMD0603R002SF9V	Y	9	20	0.02	0.06	0.5	0.2	1.00	12.000	70.000	√
SMD0603R003SF	Z	30	20	0.03	0.09	0.5	0.2	1.00	6.000	50.000	
SMD0603R003SF9V	Z	9	20	0.03	0.09	0.5	0.2	1.00	6.000	50.000	√
SMD0603R004SF	-	24.0	20	0.04	0.12	0.5	0.20	1.00	4.000	40.000	
SMD0603R005SF	-	15.0	20	0.05	0.15	0.5	0.25	1.00	3.800	30.000	
SMD0603R005SF9V	-	9.0	20	0.05	0.15	0.5	0.25	1.00	3.800	30.000	√
SMD0603R010SF	1	15.0	35	0.10	0.30	0.5	0.5	1.00	0.900	6.000	
SMD0603R010SF9V	1	9.0	35	0.10	0.30	0.5	0.5	1.00	0.900	6.000	√
SMD0603R020SF	2	9.0	35	0.20	0.50	0.5	1.0	0.60	0.550	3.500	√
SMD0603R020SF16V	2	16.0	35	0.20	0.50	0.5	1.0	0.60	0.550	3.500	
SMD0603R025SF	2	9.0	35	0.25	0.55	0.5	8.0	0.08	0.500	3.000	√
SMD0603R025SF16V	2	16.0	35	0.25	0.55	0.5	8.0	0.08	0.500	3.000	
SMD0603R035SF	3	6.0	35	0.35	0.75	0.5	8.0	0.10	0.200	1.000	
SMD0603R040SF	5	6.0	35	0.40	0.80	0.5	8.0	0.10	0.150	0.900	
SMD0603R050SF	5	6.0	35	0.50	1.00	0.5	8.0	0.10	0.100	0.800	
SMD0603R050SF12V	5	12.0	35	0.50	1.00	0.5	8.0	0.10	0.100	0.800	
SMD0603R060SF	7	6.0	35	0.60	1.20	0.5	8.0	0.10	0.080	0.600	
SMD0603R065SF	7	6.0	35	0.65	1.30	0.5	8.0	0.10	0.070	0.550	
SMD0603R075SF	7	6.0	35	0.75	1.40	0.5	8.0	0.10	0.060	0.450	
SMD0603R100SF	0	6.0	35	1.00	2.00	0.5	8.0	0.10	0.050	0.300	

- V max = Maximum operating voltage device 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.
- Pd = 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.
- R1max = 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

Test	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		

Agency Approval and Environmental Complianc

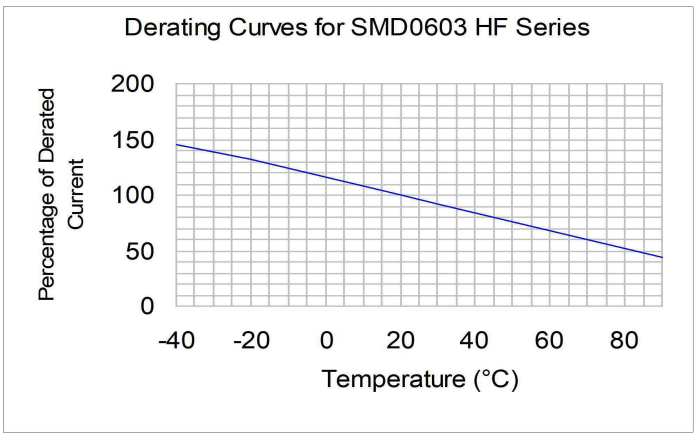
Agency	File Number	Regulation	Standard
UL	E486890	Pb RoHS	2011/65/EU
TUV	pending	HF	EN14582

Thermal Derading Chart

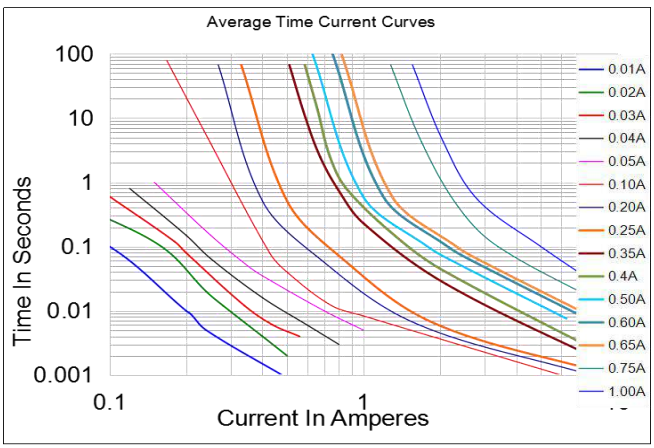
Recommended Hold Current(A) at Ambient Temperature(℃)

Model	Ambient Operation Temperature								
	-40°C	-20°C	0°C	25°C	40°C	50°C	60°C	70°C	85°C
SMD0603R001SF	0.016	0.014	0.012	0.010	0.008	0.007	0.006	0.005	0.0035
SMD0603R002SF	0.031	0.027	0.024	0.020	0.016	0.014	0.012	0.011	0.007
SMD0603R003SF	0.047	0.041	0.036	0.030	0.024	0.021	0.018	0.016	0.0108
SMD0603R004SF	0.052	0.048	0.044	0.040	0.032	0.028	0.024	0.020	0.012
SMD0603R005SF	0.065	0.060	0.055	0.050	0.040	0.035	0.031	0.025	0.015
SMD0603R010SF	0.13	0.12	0.11	0.10	0.08	0.07	0.06	0.05	0.03
SMD0603R020SF	0.27	0.25	0.23	0.20	0.17	0.14	0.12	0.10	0.07
SMD0603R025SF	0.32	0.29	0.27	0.25	0.21	0.18	0.16	0.14	0.10
SMD0603R035SF	0.47	0.41	0.38	0.35	0.29	0.26	0.24	0.20	0.14
SMD0603R040SF	0.54	0.47	0.43	0.40	0.33	0.29	0.27	0.22	0.16
SMD0603R050SF	0.67	0.59	0.54	0.50	0.41	0.37	0.34	0.29	0.20
SMD0603R060SF	0.81	0.70	0.651	0.60	0.49	0.44	0.41	0.34	0.24
SMD0603R065SF	0.87	0.76	0.71	0.65	0.54	0.48	0.44	0.37	0.26
SMD0603R075SF	0.98	0.85	0.81	0.75	0.60	0.54	0.44	0.40	0.31
SMD0603R100SF	1.19	1.13	1.08	1.00	0.80	0.72	0.59	0.54	0.43

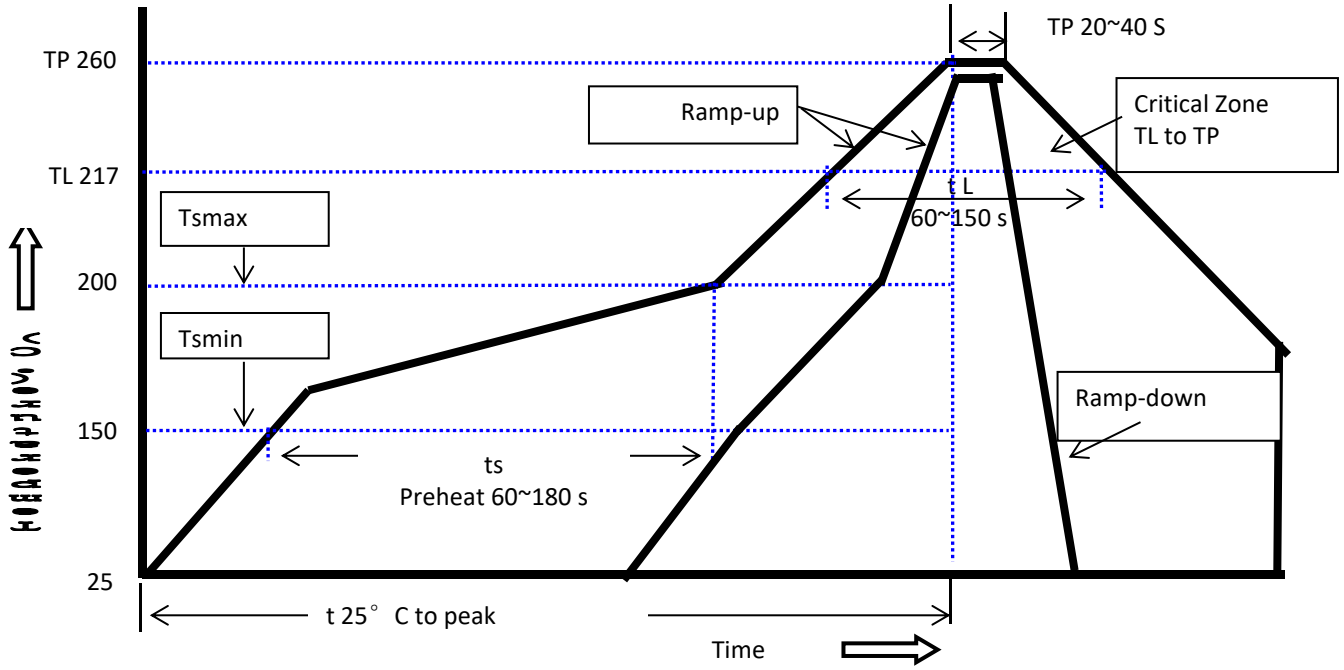
Thermal Derating Curve



Average Time-Current Curve



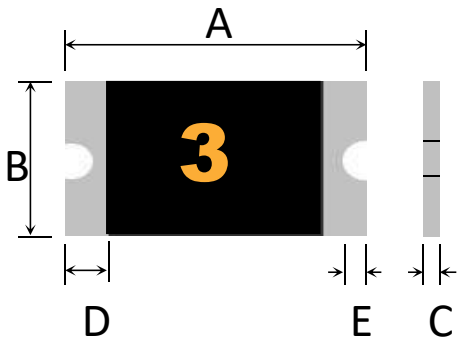
Soldering Parameters



Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate(Ts max to T p)	3℃/second mac.
Preheat -Temperature Min(Ts min) -Temperature Max(Ts max) -Time(Ts min to Ts max)	 150℃ 200℃ 60~180 seconds
Time maintained above: -Temperature(TL) -Time(tL)	 217℃ 60~150 seconds
Peak Temperature(Tp)	260℃
Ramp-Down Rate	6℃/second max.
Time 25℃ to Peak Temperature	8 minutes max
Storage Condition	0℃~35℃,30%-60%RH

- 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

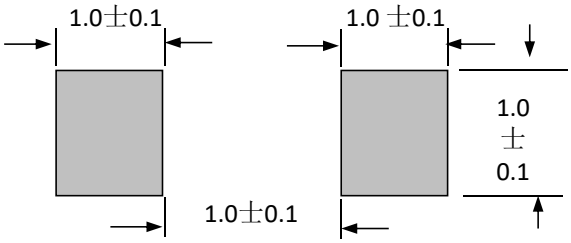
Physical Dimensions(mm.)



Model	A		B		C		D	E
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.
SMD0603R001SF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603R002SF9v	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603R002SF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603R003SF9v	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603R003SF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603R004SF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603R005SF9v	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603R005SF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603R010SF9v	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603R010SF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603R020SF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603R020SF16v	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603R025SF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603R025SF16v	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.10
SMD0603R035SF	1.45	1.85	0.65	1.05	0.35	0.90	0.15	0.10
SMD0603R040SF	1.45	1.85	0.65	1.05	0.40	0.90	0.15	0.10
SMD0603R050SF	1.45	1.85	0.65	1.05	0.55	1.15	0.15	0.10
SMD0603R050SF12v	1.45	1.85	0.65	1.05	0.55	1.15	0.15	0.10
SMD0603R060SF	1.45	1.85	0.65	1.05	0.55	1.15	0.15	0.10
SMD0603R065SF	1.45	1.85	0.65	1.05	0.55	1.15	0.15	0.10
SMD0603R075SF	1.45	1.85	0.65	1.05	0.55	1.15	0.15	0.10
SMD0603R100SF	1.45	1.85	0.65	1.05	0.55	1.15	0.15	0.10

- 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.

Recommended Pad Layout (mm.)



Packaging Quantity

Part Number	Quantity
SMD0603 Series	4,000 pcs/reel

NOTICE

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The product listed herein is designed to be used with ordinary electronic equipment or devices, and not designed to be used with equipment or devices which require high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), Semiteh Semiconductor Co., Ltd., or anyone on its behalf, assumes no responsibility or liability for any damagers resulting from such improper use of sale.

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