Description

The 0603 series provides miniature surface mount resettable Over-current protection with holding current from 0.01A to 0.75A. This world's smallest PTC is suitable for ultra portable applications where space is at a premium and the device current is low.

Features

- I(hold): 0.01~0.75A
- 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
- 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

Part Number Code

S	M	D	0	6	0	3	P	0	1	0	T	F	/	x	x

- SMD: Surface Mount Device
- 0603: Device size code
- P: Polytronics Symbol
- 010: Current Rating
- T: Thin Version (Optional)
- F: Lead-free
- xx: Special Voltage Rating (Optional)

Environmental Specifications

Test	Conditions	Resistance change
Passive aging	+85℃,1000 hrs	±5% typical
Humidity aging	+85℃，85%R.H.,168 hours	±5% 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		

Performance Specification

Type Number	I_{hold}	I_{trip}	V_{max}	Max. Time to Trip		I_{max}	$P_{d\ typ}$	Ri_{min}	$R1_{max}$
	A	A	V_{DC}	Current A	T_{max} S	A	W	Ω	Ω
SMD0603P001TF	0.01	0.03	60	0.2	1	20	0.5	4.0	40
SMD0603P002TF	0.02	0.06	60	0.2	1	20	0.5	4.0	40
SMD0603P003TF	0.03	0.09	30	0.2	1	20	0.5	4.0	40
SMD0603P004TF	0.04	0.12	24	0.2	1	20	0.5	4.0	40
SMD0603P004TF/30	0.04	0.12	30	0.2	1	20	0.5	4.0	40
SMD0603P005TF	0.05	0.15	15	0.25	1	20	0.5	3.8	35
SMD0603P010TF	0.1	0.3	15	0.5	1	40	0.5	0.9	8
SMD0603P010TF/24	0.1	0.3	24	0.5	0.6	40	0.5	0.9	8
SMD0603P020TF	0.2	0.5	9	1	0.6	40	0.5	0.55	3.5
SMD0603P020TF/16	0.2	0.5	16	1	0.6	40	0.5	0.55	3.5
SMD0603P025TF	0.25	0.55	9	8	0.08	40	0.5	0.5	3.0
SMD0603P025TF/16	0.25	0.55	16	8	0.08	40	0.5	0.5	3.0
SMD0603P035TF	0.35	0.75	6	8	0.1	40	0.5	0.2	1.4
SMD0603P040TF	0.4	0.8	6	8	0.1	35	0.5	0.5	3.5
SMD0603P050TF	0.5	1	6	8	0.1	35	0.5	0.09	0.7
SMD0603P050TF/12	0.5	1	12	8	0.1	35	0.5	0.09	0.7
SMD0603P060TF	0.6	1.2	6	8	0.1	35	0.5	0.45	3.0
SMD0603P065TF	0.65	1.3	6	8	0.1	35	0.5	0.2	1.0
SMD0603P075TF	0.75	1.4	6	8	0.1	35	0.5	0.06	0.45

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.

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

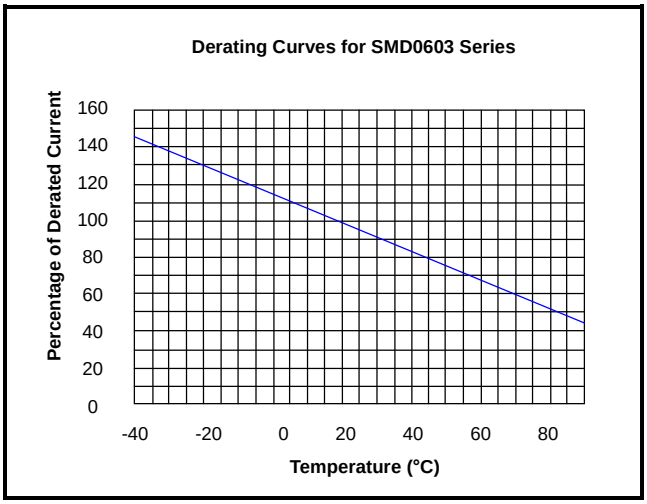
$Ri_{min/max}$ = Minimum/Maximum device resistance prior to tripping at 25°C.

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

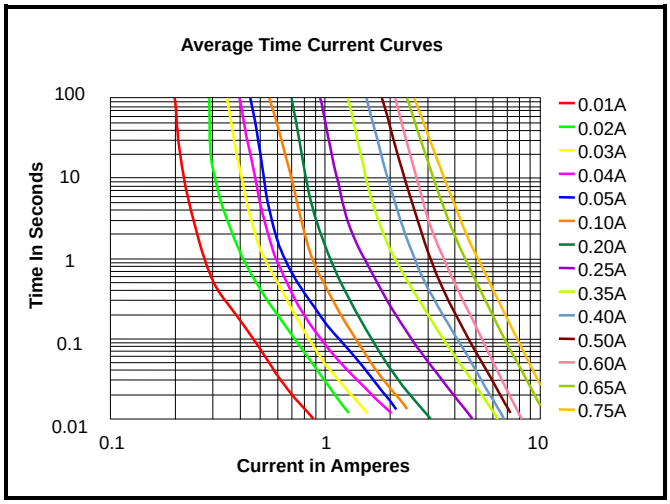
Thermal Derating Chart-Ih(A)

Part Number	Ambient Operation Temperature								
	-40 ºC	-20 ºC	0 ºC	25 ºC	40 ºC	50 ºC	60 ºC	70 ºC	85 ºC
SMD0603P001TF	0.016	0.014	0.012	0.010	0.008	0.007	0.006	0.005	0.0035
SMD0603P002TF	0.031	0.027	0.024	0.020	0.016	0.014	0.012	0.011	0.007
SMD0603P003TF	0.047	0.041	0.036	0.030	0.024	0.021	0.018	0.016	0.0108
SMD0603P004TF	0.052	0.048	0.044	0.040	0.032	0.028	0.024	0.020	0.012
SMD0603P004TF/30	0.052	0.048	0.044	0.040	0.032	0.028	0.024	0.020	0.012
SMD0603P005TF	0.065	0.060	0.055	0.050	0.040	0.035	0.031	0.025	0.015
SMD0603P010TF	0.13	0.12	0.11	0.10	0.08	0.07	0.06	0.05	0.03
SMD0603P010TF/24	0.13	0.12	0.11	0.10	0.08	0.07	0.06	0.05	0.03
SMD0603P020TF	0.27	0.25	0.23	0.20	0.17	0.14	0.12	0.10	0.07
SMD0603P020TF/16	0.27	0.25	0.23	0.20	0.17	0.14	0.12	0.10	0.07
SMD0603P025TF	0.32	0.29	0.27	0.25	0.21	0.18	0.16	0.14	0.10
SMD0603P025TF/16	0.32	0.29	0.27	0.25	0.21	0.18	0.16	0.14	0.10
SMD0603P035TF	0.47	0.41	0.38	0.35	0.29	0.26	0.24	0.20	0.14
SMD0603P040TF	0.54	0.47	0.43	0.40	0.33	0.29	0.27	0.22	0.16
SMD0603P050TF	0.67	0.59	0.54	0.50	0.41	0.37	0.34	0.29	0.20
SMD0603P050TF/12	0.67	0.59	0.54	0.50	0.41	0.37	0.34	0.29	0.20
SMD0603P060TF	0.81	0.70	0.651	0.60	0.49	0.44	0.41	0.34	0.24
SMD0603P065TF	0.87	0.76	0.71	0.65	0.54	0.48	0.44	0.37	0.26
SMD0603P075TF	0.98	0.85	0.81	0.75	0.60	0.54	0.44	0.40	0.31

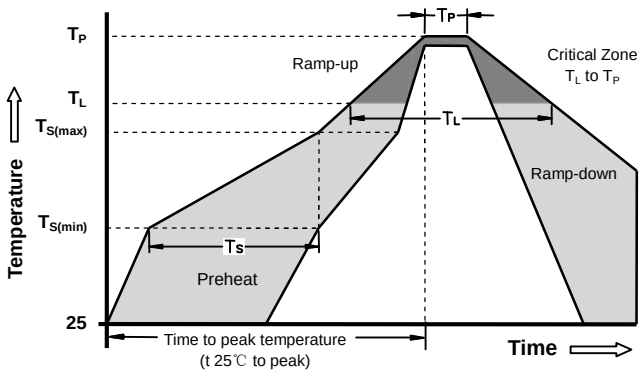
Thermal Derating Curve



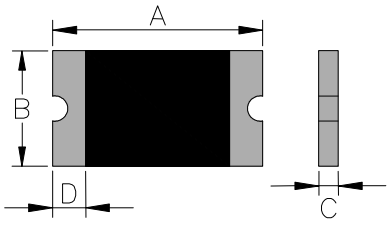
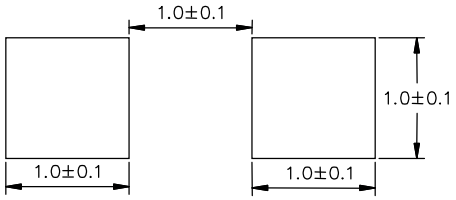
Average Time-Current Curve



Soldering Parameters



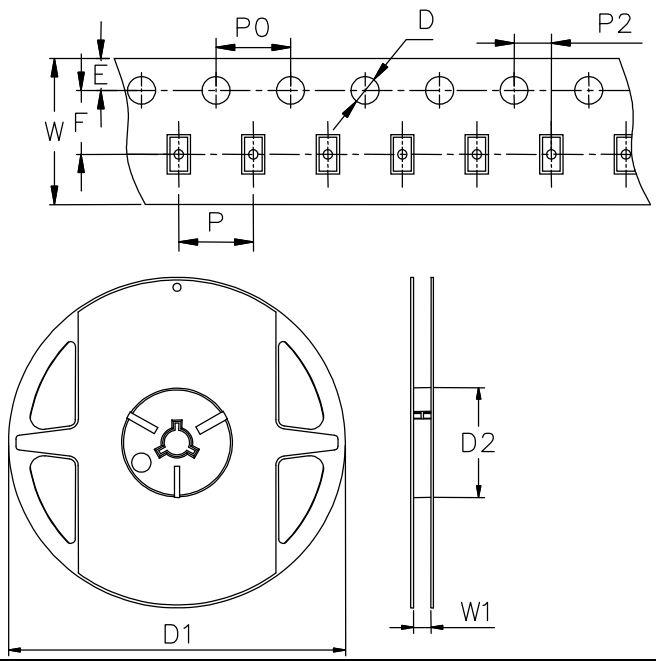
Reflow Condition		Pb - Free assembly
Pre Heat	-Temperature Min ($T_{s(min)}$)	150°C
	-Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 -180 Seconds
Average ramp up rate (Liquids Temp T_L) to peak		3°C/second max
$T_{S(max)}$ to TL - Ramp-up Rate		3°C/second max
Reflow	- Temperature (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

Average Time Current Curves (mm)	Recommended pad layout (mm)
	

Dimensions

Type Number	Package Dimensions (mm)							Package Dimensions (in)						
	A		B		C		D	A		B		C		D
	min	max	min	max	min	max	min	min	max	min	max	min	max	min
SMD0603P001TF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.057	0.073	0.026	0.041	0.016	0.039	0.006
SMD0603P002TF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.057	0.073	0.026	0.041	0.016	0.039	0.006
SMD0603P003TF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.057	0.073	0.026	0.041	0.016	0.039	0.006
SMD0603P004TF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.057	0.073	0.026	0.041	0.016	0.039	0.006
SMD0603P004TF/30	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.057	0.073	0.026	0.041	0.016	0.039	0.006
SMD0603P005TF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.057	0.073	0.026	0.041	0.016	0.039	0.006
SMD0603P010TF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.057	0.073	0.026	0.041	0.016	0.039	0.006
SMD0603P010TF/24	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.057	0.073	0.026	0.041	0.016	0.039	0.006
SMD0603P020TF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.057	0.073	0.026	0.041	0.016	0.039	0.006
SMD0603P020TF/16	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.057	0.073	0.026	0.041	0.016	0.039	0.006
SMD0603P025TF	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.057	0.073	0.026	0.041	0.016	0.039	0.006
SMD0603P025TF/16	1.45	1.85	0.65	1.05	0.40	1.00	0.15	0.057	0.073	0.026	0.041	0.016	0.039	0.006
SMD0603P035TF	1.45	1.85	0.65	1.05	0.35	0.90	0.15	0.057	0.073	0.026	0.041	0.014	0.035	0.006
SMD0603P040TF	1.45	1.85	0.65	1.05	0.40	0.90	0.15	0.057	0.073	0.026	0.041	0.016	0.035	0.006
SMD0603P050TF	1.45	1.85	0.65	1.05	0.55	1.15	0.15	0.057	0.073	0.026	0.041	0.022	0.045	0.006
SMD0603P050TF/12	1.45	1.85	0.65	1.05	0.55	1.15	0.15	0.057	0.073	0.026	0.041	0.022	0.045	0.006
SMD0603P060TF	1.45	1.85	0.65	1.05	0.55	1.15	0.15	0.057	0.073	0.026	0.041	0.022	0.045	0.006
SMD0603P065TF	1.45	1.85	0.65	1.05	0.55	1.15	0.15	0.057	0.073	0.026	0.041	0.022	0.045	0.006
SMD0603P075TF	1.45	1.85	0.65	1.05	0.55	1.15	0.15	0.057	0.073	0.026	0.041	0.022	0.045	0.006

Taping and Reel Specifications



Symbol	Millimeters	Inches
W	8±0.2	0.315±0.008
P	4±0.1	0.157±0.004
P0	4±0.1	0.157±0.004
P2	2±0.05	0.079±0.002
F	3.5±0.05	0.138±0.002
E	1.75±0.1	0.069±0.004
D	1.55±0.05	0.061±0.002
D1(max)	178	7.007
D2(min)	60	2.362
W1	9.0±0.5	0.354±0.02

Model	Quantity
SMD0603 Series	4000PCS