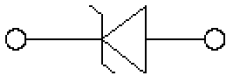
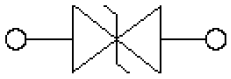
Surface Mount Transient Voltage Suppressor

Uni-directional



Bi-directional



Features

- For surface mounted applications
- Low-profile package
- Ideal for automated placement
- Available in Unidirectional
- 400 W peak pulse power capability with a 10/1000 μs waveform
- Low incremental surge resistance, excellent clamping capability
- Very fast response time
- High temperature soldering guaranteed: 260 °C/10 s at terminals
- Meets MSL level 1
- ESD protection of data lines in accordance with IEC 61000-4-2, 30kV(Air),30kV (Contact)
- Part no. with suffix “Q” means AEC-Q101 qualified

Typical Applications

Use in sensitive electronics protection against voltage transients induced by inductive load switching and lighting on ICs, MOSFET, signal lines of sensor units for consumer, computer, industrial, automotive and telecommunication.

Mechanical Date

- **Package**: SOD-123FL
  Molding compound meets UL 94 V-0 flammability rating, RoHS-compliant, halogen-free
- **Terminals**: Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Polarity:** For uni-directional types the band denotes cathode end, no marking on bi-directional types

■Maximum Ratings (T_a=25℃ Unless otherwise specified）

PARAMETER	SYMBOL	UNIT	Conditions	Max
Peak power dissipation(1) (2) (Fig.1)	P_{PPM}	W	with a 10/1000us waveform	400
Peak pulse current(1)	I_{PPM}	A	with a 10/1000us waveform	(See Next Table)
Power dissipation, on infinite heat sink	P_D	W	T_A=25℃	1
Peak forward surge current, 8.3 ms single (3)	I_{FSM}	A	8.3 ms single half sine-wave	30
Operating junction and	T_J	℃	-	-55 to +175
Storage temperature range	T_{STG}	℃	-	-55 to +175
Thermal resistance	$R_{\theta JL}$	℃/W	Between junction and lead	30
	$R_{\theta JA}$		Between junction and ambient	150
	$R_{\theta JC}$		Between junction and curve	50

Notes:

(1). Non-repetitive current pulse at T_J=25℃， per waveform of Fig2. and derated per Fig.3.

(2). T_L=30℃ unless otherwise noted , VF ≤1.25V@200mA.

(3). Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum

(4). Mounted on 0.31 x 0.35" (8.0 x 9.0 mm) copper pads to each terminal

■ Electrical Characteristics (Ta=25℃ unless otherwise noted)

Part Number		Breakdown Voltage V_{BR}@I_T			Maximum Reverse Leakage I_R @ V_{RWM} (μA)	Working Peak Reverse Voltage V_{RWM} (V)	Maximum Reverse Surge Current I_{PP} (2) (A)	Maximum Clamping Voltage Vc @ I_{PP} (V)
（Uni）	（Bi）	Min(V)	Max (V)	I_T(1)(mA)				
SM4F6.0AQ	SM4F6.0CAQ	6.67	7.37	10	800	6.0	38.8	10.3
SM4F6.5AQ	SM4F6.5CAQ	7.22	7.98	10	500	6.5	35.7	11.2
SM4F7.0AQ	SM4F7.0CAQ	7.78	8.60	10	200	7.0	33.3	12.0
SM4F7.5AQ	SM4F7.5CAQ	8.33	9.21	1	100	7.5	31.0	12.9
SM4F8.0AQ	SM4F8.0CAQ	8.89	9.83	1	50	8.0	29.4	13.6
SM4F8.5AQ	SM4F8.5CAQ	9.44	10.40	1	10	8.5	27.8	14.4
SM4F9.0AQ	SM4F9.0CAQ	10.00	11.10	1	5	9.0	26.0	15.4
SM4F10AQ	SM4F10CAQ	11.10	12.30	1	2.5	10.0	23.5	17.0
SM4F11AQ	SM4F11CAQ	12.20	13.50	1	2.5	11.0	22.0	18.2
SM4F12AQ	SM4F12CAQ	13.30	14.70	1	2.5	12.0	20.1	19.9
SM4F13AQ	SM4F13CAQ	14.40	15.90	1	1.0	13.0	18.6	20.0
SM4F14AQ	SM4F14CAQ	15.60	17.20	1	1.0	14.0	17.2	23.2
SM4F15AQ	SM4F15CAQ	16.70	18.50	1	1.0	15.0	16.4	24.4
SM4F16AQ	SM4F16CAQ	17.80	19.70	1	1.0	16.0	15.4	26.0
SM4F17AQ	SM4F17CAQ	18.90	20.90	1	1.0	17.0	14.5	27.6
SM4F18AQ	SM4F18CAQ	20.00	22.10	1	1.0	18.0	13.7	29.2
SM4F19AQ	SM4F19CAQ	21.10	23.30	1	1.0	19.0	13.1	30.6
SM4F20AQ	SM4F20CAQ	22.20	24.50	1	1.0	20.0	12.3	32.4
SM4F22AQ	SM4F22CAQ	24.40	26.90	1	1.0	22.0	11.3	35.5
SM4F24AQ	SM4F24CAQ	26.70	29.50	1	1.0	24.0	10.3	38.9
SM4F26AQ	SM4F26CAQ	28.90	31.90	1	1.0	26.0	9.5	42.1
SM4F28AQ	SM4F28CAQ	31.10	34.40	1	1.0	28.0	8.8	45.4
SM4F30AQ	SM4F30CAQ	33.30	36.80	1	1.0	30.0	8.3	48.4
SM4F33AQ	SM4F33CAQ	36.70	40.60	1	1.0	33.0	7.5	53.3
SM4F36AQ	SM4F36CAQ	40.00	44.20	1	1.0	36.0	6.9	58.1
SM4F40AQ	SM4F40CAQ	44.40	49.10	1	1.0	40.0	6.2	64.5
SM4F43AQ	SM4F43CAQ	47.80	52.80	1	1.0	43.0	5.8	69.4
SM4F45AQ	SM4F45CAQ	50.00	55.30	1	1.0	45.0	5.5	72.7
SM4F48AQ	/	53.30	58.90	1	1.0	48.0	5.2	77.4
SM4F51AQ	/	56.70	62.70	1	1.0	51.0	4.9	82.4
SM4F54AQ	/	60.00	66.30	1	1.0	54.0	4.6	87.1
SM4F58AQ	/	64.40	71.20	1	1.0	58.0	4.3	93.6
SM4F60AQ	/	66.70	73.70	1	1.0	60.0	4.1	96.8
SM4F64AQ	/	71.10	78.60	1	1.0	64.0	3.9	103.0
SM4F70AQ	/	77.80	86.00	1	1.0	70.0	3.5	113.0
SM4F75AQ	/	83.30	92.10	1	1.0	75.0	3.3	121.0
SM4F78AQ	/	86.70	95.80	1	1.0	78.0	3.2	126.0
SM4F80AQ	/	88.80	97.60	1	1.0	80.0	3.1	129.0
SM4F85AQ	/	94.40	104.00	1	1.0	85.0	2.9	137.0
SM4F90AQ	/	100.00	111.00	1	1.0	90.0	2.7	146.0
SM4F100AQ	/	111.00	123.00	1	1.0	100.0	2.5	162.0

Notes:

(1) t_p≤50ms Pulse test: t_p≤50ms.

(2) Surge current waveform per Fig. 2 and derated per Fig.3.

■ **Characteristics**(Typical)

Fig.1 Peak Pulse Power Rating Curve

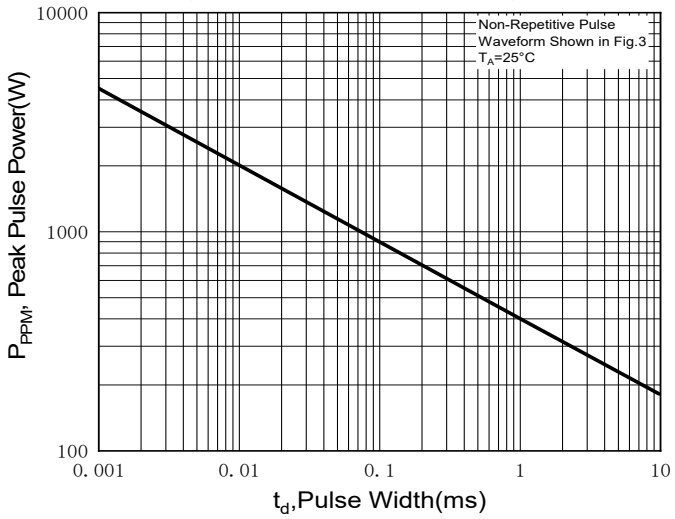


Fig.2 Pulse Waveform

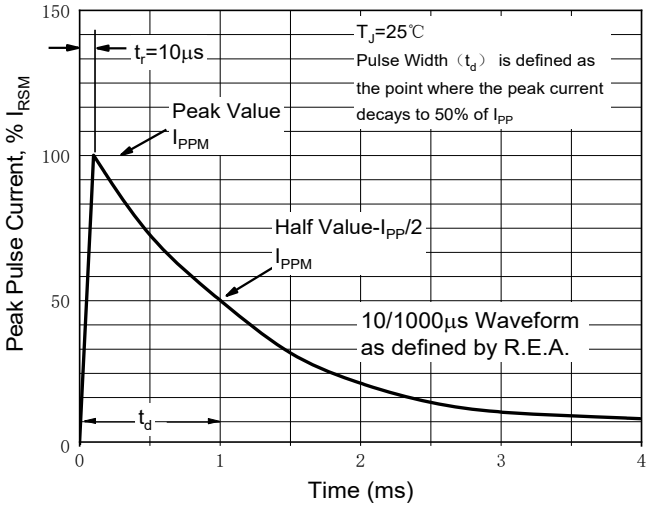


Fig.3 Pulse Power or Current vs. Initial Junction Temperature

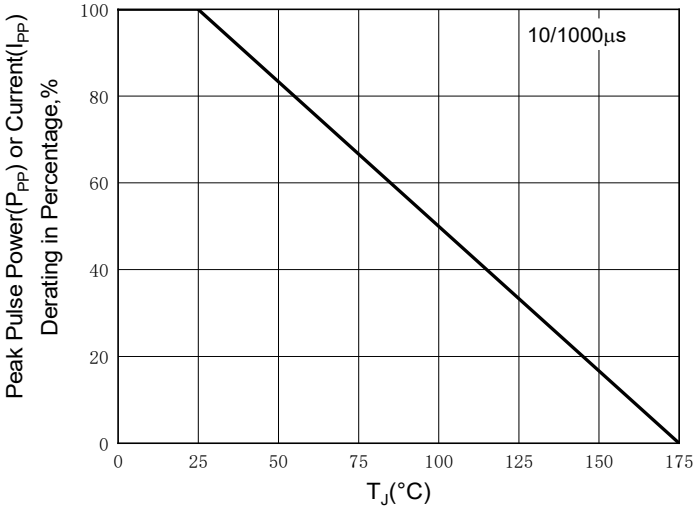


Fig.4 Maximum Non-Repetitive Forward Surge Current

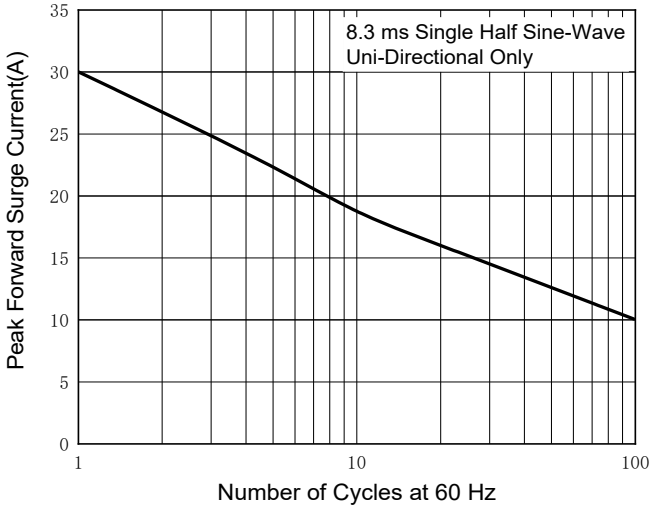


Fig.5 Typical Junction Capacitance

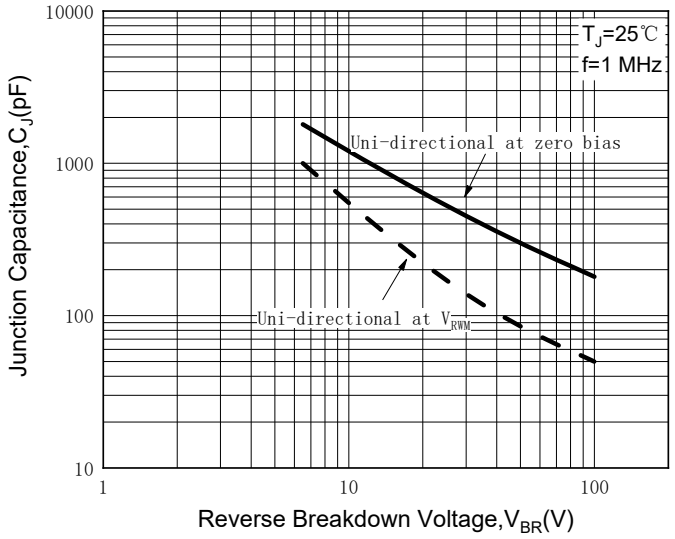
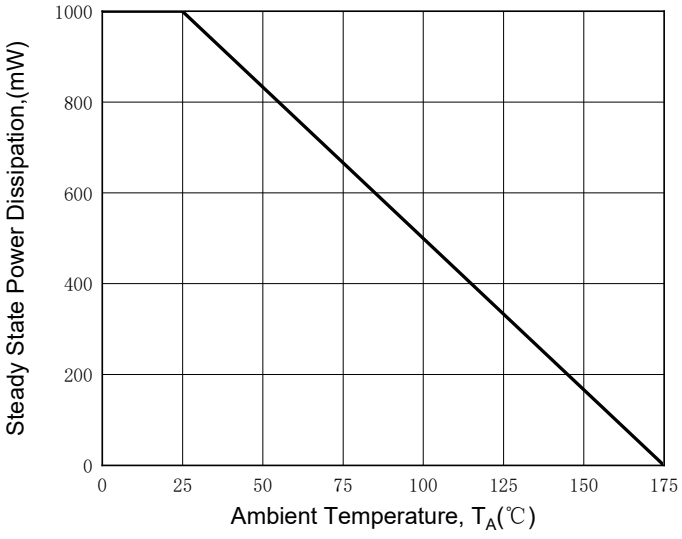


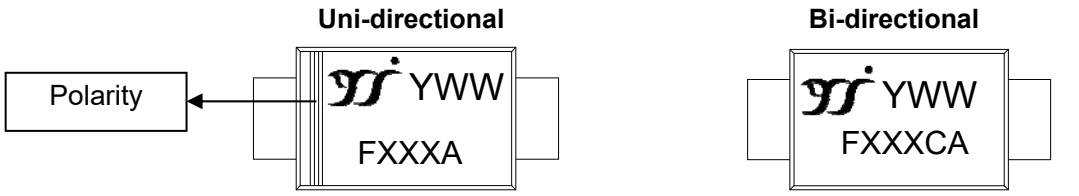
Fig.6 Steady State Power Derating Curve



■Ordering Information (Example)

PREFERED P/N	PACKING CODE	UNIT WEIGHT(g)	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
SM4F SERIES	F1	0.0177	3000	30000	120000	7" reel

■ Marking Information

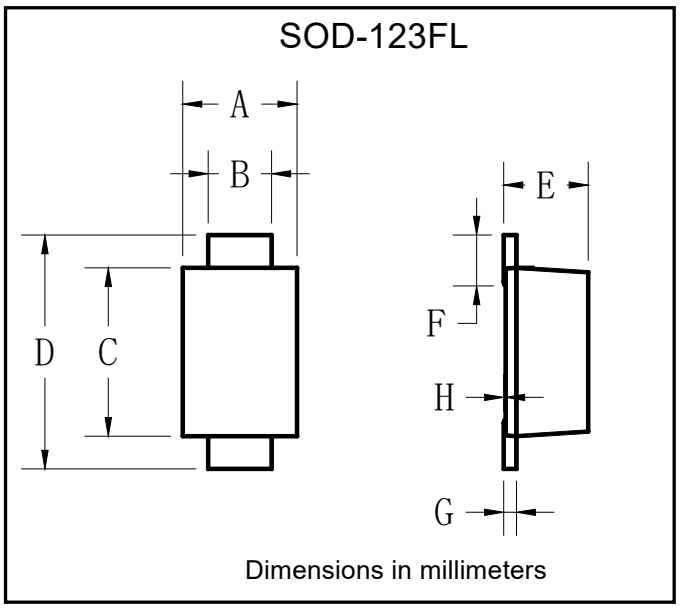


Note:
1. All marking is at middle of the product body
2. All marking is in laser printing
3. XXX is marking code, like 6.0A/6.0CA marking code is 6.0
4. Body color: Black
5. YWW is date code, "Y" is year. "WW" is week.

For instance:

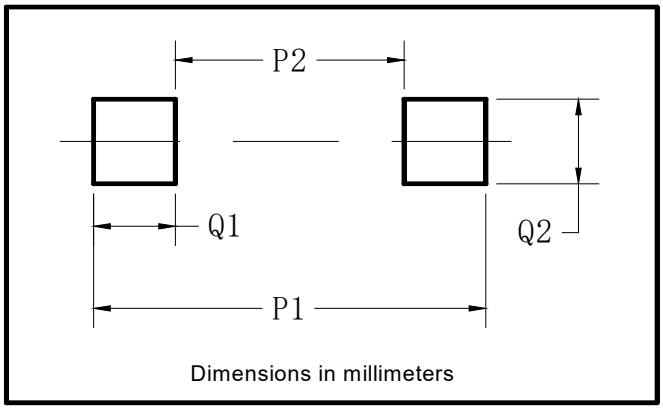
The 17th week of 2022, date code is 217
The 17th week of 2023, date code is 317

■ Outline Dimensions



SOD-123FL		
Dim	Min	Max
A	1.60	1.90
B	0.90	1.10
C	2.55	2.85
D	3.60	3.90
E	1.00	1.20
F	0.40	0.90
G	0.10	0.25
H	0.02	0.05

■ Suggested pad layout



SOD-123FL	
Dim	Millimeters
P1	3.90
P2	1.90
Q1	1.00
Q2	1.50

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