

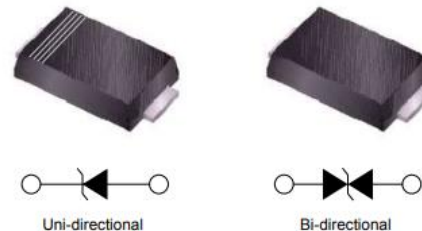
Transient Voltage Suppression Diodes: SM4F Series

SMD Type 400 W



■ Features

1. Glass passivated chip
2. 400W peak pulse power capability at 10/1000μs waveform, repetition rate (duty cycle): 0.01%
3. Excellent clamping capability
4. Very fast response time
5. Low clamping voltage
6. Low leakage current
7. Meets MSL level 1, per J-STD-020, LF maximum peak of 260°C
8. JESD22-A114-B ESD Voltage: HBM 15KV
9. JEDEC EIA/JESD22-C101F ESD Voltage: CDM 500V
10. JEDEC EIA/JESD22-A115 ESD Voltage: MM 400V
11. ESD-immunity acc. IEC 61000-4-2 ±30kV(contact), ±30kV(air)
12. Halogen free and RoHS compliant



■ Recommended Applications

1. Computers
2. Telecom system
3. Industrial equipment
4. Consumer electronic applications
5. Other VCC bus and I/O interfaces

■ Mechanical Data

1. Case: Molded plastic, SOD-123FL
2. Epoxy: UL 94V-0 rate flame retardant
3. Terminals: Solderable per MIL-STD-750, method 2026
4. Polarity: Color band denotes cathode end
5. Mounting Position: Any

■ Part Number Code

S	M	4	F	5	.	0	C	A	Y
1	2	3	4	5	6	7	8	9	10

Product Series	
SM4F	THINKING Transient Voltage Suppression Diodes SM4F Series

Reverse Stand off Voltage (V_{RWM})	
5.0	5V
70	70V
170	170V

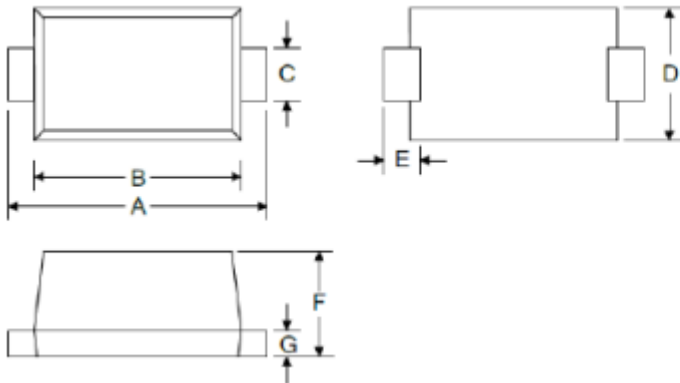
Type Code	
AY	Uni-directional, 5% V_{BR} Voltage Tolerance
CAY	Bi-directional 5% V_{BR} Voltage Tolerance

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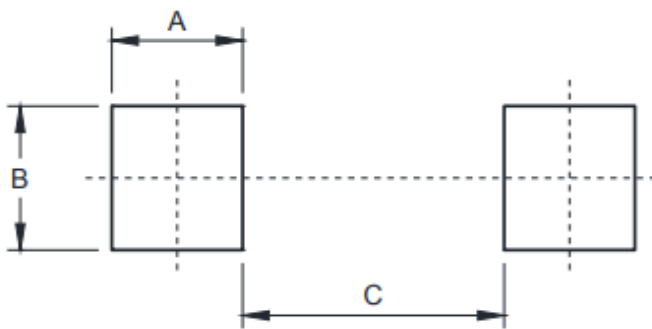
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Structures and Dimensions



Symbol	Dimensions in millimeters	
	Min	Max
A	3.50	3.90
B	2.60	3.00
C	0.90	1.10
D	1.60	2.00
E	0.80 Typ.	
F	0.90	1.40
G	0.12	0.22



Symbol	Unit (mm)	Unit (inch)
A	1.0	0.039
B	1.1	0.043
C	2.0	0.079

Maximum Rating ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak power dissipation with a 10/1000 μs waveform (Note 1,2)	P_{PPM}	400	W
Peak pulse current with 10/1000 μs waveform (Note 1)	I_{PPM}	See next table	A
Peak forward surge current, 8.3 ms single half sine-wave (Note 3)	I_{FSM}	40	A
Power dissipation on infinite heatsink at $T_L=50^\circ\text{C}$	P_D	1	W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	220	$^\circ\text{C/W}$
Typical thermal resistance junction to lead	$R_{\theta JL}$	100	$^\circ\text{C/W}$
Operating junction and storage temperature range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Note:

1. Non-repetitive current pulse, per Fig. 3 and derated above $T_A=25^\circ\text{C}$ per Fig. 2.
2. Mounted on 5.0 x 5.0mm copper pad to each terminal.
3. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.

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■ Electrical Characteristics (T_A=25°C unless otherwise noted)

Part No. (Uni)	Part No. (Bi)	Reverse Stand off Voltage V _{RWM} (V)	Breakage Voltage V _{BR} @ I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @ I _{pp}	Maximum Peak Pulse Current I _{pp} (A)	Maximum Reverse Leakage I _R @ V _{RWM}	Marking Code	
			Min(V)	Max(V)					Uni	Bi
SM4F5.0AY	SM4F5.0CAY	5	6.4	7.07	10	9.2	43.5	400	4AE	4WE
SM4F6.0AY	SM4F6.0CAY	6	6.67	7.37	10	10.3	38.8	400	4AG	4WG
SM4F6.5AY	SM4F6.5CAY	6.5	7.22	7.98	10	11.2	35.7	250	4AK	4WK
SM4F7.0AY	SM4F7.0CAY	7	7.78	8.6	10	12	33.3	100	4AM	4WM
SM4F7.5AY	SM4F7.5CAY	7.5	8.33	9.21	1	12.9	31	50	4AP	4WP
SM4F8.0AY	SM4F8.0CAY	8	8.89	9.83	1	13.6	29.4	25	4AR	4WR
SM4F8.5AY	SM4F8.5CAY	8.5	9.44	10.4	1	14.4	27.8	10	4AT	4WT
SM4F9.0AY	SM4F9.0CAY	9	10	11.1	1	15.4	26	5	4AV	4WV
SM4F10AY	SM4F10CAY	10	11.1	12.3	1	17	23.5	1	4AX	4WX
SM4F11AY	SM4F11CAY	11	12.2	13.5	1	18.2	22	1	4AZ	4WZ
SM4F12AY	SM4F12CAY	12	13.3	14.7	1	19.9	20.1	1	4BE	4XE
SM4F13AY	SM4F13CAY	13	14.4	15.9	1	21.5	18.6	1	4BG	4XG
SM4F14AY	SM4F14CAY	14	15.6	17.2	1	23.2	17.2	1	4BK	4XK
SM4F15AY	SM4F15CAY	15	16.7	18.5	1	24.4	16.4	1	4BM	4XM
SM4F16AY	SM4F16CAY	16	17.8	19.7	1	26	15.4	1	4BP	4XP
SM4F17AY	SM4F17CAY	17	18.9	20.9	1	27.6	14.5	1	4BR	4XR
SM4F18AY	SM4F18CAY	18	20	22.1	1	29.2	13.7	1	4BT	4XT
SM4F20AY	SM4F20CAY	20	22.2	24.5	1	32.4	12.3	1	4BV	4XV
SM4F22AY	SM4F22CAY	22	24.4	26.9	1	35.5	11.3	1	4BX	4XX
SM4F24AY	SM4F24CAY	24	26.7	29.5	1	38.9	10.3	1	4BZ	4XZ
SM4F26AY	SM4F26CAY	26	28.9	31.9	1	42.1	9.5	1	4CE	4YE
SM4F28AY	SM4F28CAY	28	31.1	34.4	1	45.4	8.8	1	4CG	4YG
SM4F30AY	SM4F30CAY	30	33.3	36.8	1	48.4	8.3	1	4CK	4YK
SM4F33AY	SM4F33CAY	33	36.7	40.6	1	53.3	7.5	1	4CM	4YM
SM4F36AY	SM4F36CAY	36	40	44.2	1	58.1	6.9	1	4CP	4YP
SM4F40AY	SM4F40CAY	40	44.4	49.1	1	64.5	6.2	1	4CR	4YR
SM4F43AY	SM4F43CAY	43	47.8	52.8	1	69.4	5.8	1	4CT	4YT
SM4F45AY	SM4F45CAY	45	50	55.3	1	72.7	5.5	1	4CV	4YV
SM4F48AY	SM4F48CAY	48	53.3	58.9	1	77.4	5.2	1	4CX	4YX

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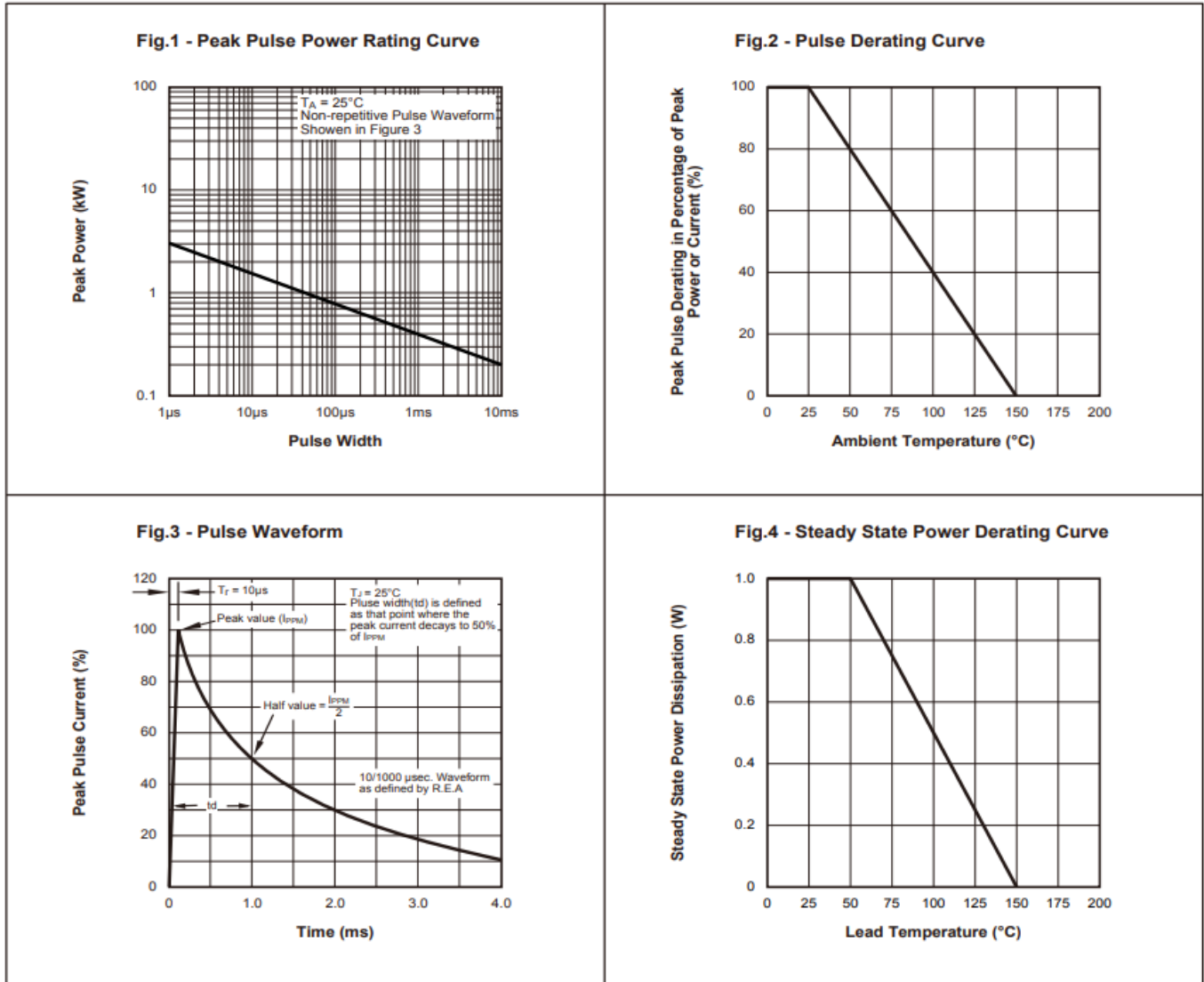
Part No. (Uni)	Part No. (Bi)	Reverse Stand off Voltage	Breakage Voltage V _{BR} @ I _T		Test Current I _T (mA)	Maximum Clamping Voltage V _C @ I _{pp}	Maximum Peak Pulse Current I _R (μA)	Maximum Reverse Leakage I _R @V _{RWM}	Marking Code	
			V _{RWM} (V)	Min(V)					Max(V)	Uni
SM4F51AY	SM4F51CAY	51	56.7	62.7	1	82.4	4.9	1	4CZ	4YZ
SM4F54AY	SM4F54CAY	54	60	66.3	1	87.1	4.6	1	4RE	4ZE
SM4F58AY	SM4F58CAY	58	64.4	71.2	1	93.6	4.3	1	4RG	4ZG
SM4F60AY	SM4F60CAY	60	66.7	73.7	1	96.8	4.1	1	4RK	4ZK
SM4F64AY	SM4F64CAY	64	71.1	78.6	1	103	3.9	1	4RM	4ZM
SM4F70AY	SM4F70CAY	70	77.8	86	1	113	3.5	1	4RP	4ZP
SM4F75AY	SM4F75CAY	75	83.3	92.1	1	121	3.3	1	4RR	4ZR
SM4F78AY	SM4F78CAY	78	86.7	95.8	1	126	3.2	1	4RT	4ZT
SM4F85AY	SM4F85CAY	85	94.4	104	1	137	2.2	1	4RV	4ZV
SM4F90AY	SM4F90CAY	90	100	111	1	146	2.1	1	4RX	4ZX
SM4F100AY	SM4F100CAY	100	111	123	1	162	1.9	1	4RZ	4ZZ
SM4F110AY	SM4F110CAY	110	122	135	1	177	1.7	1	4SE	4VE
SM4F120AY	SM4F120CAY	120	133	147	1	193	1.6	1	4SG	4VG
SM4F130AY	SM4F130CAY	130	144	159	1	209	1.4	1	4SK	4VK
SM4F150AY	SM4F150CAY	150	167	185	1	243	1.2	1	4SM	4VM
SM4F160AY	SM4F160CAY	160	178	197	1	259	1.2	1	4SP	4VP
SM4F170AY	SM4F170CAY	170	189	209	1	275	1.09	1	4SR	4VR
SM4F180AY	SM4F180CAY	180	201	222	1	292	1.4	1	4ST	4VT
SM4F200AY	SM4F200CAY	200	224	247	1	324	1.2	1	4SV	4VV

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■ Typical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

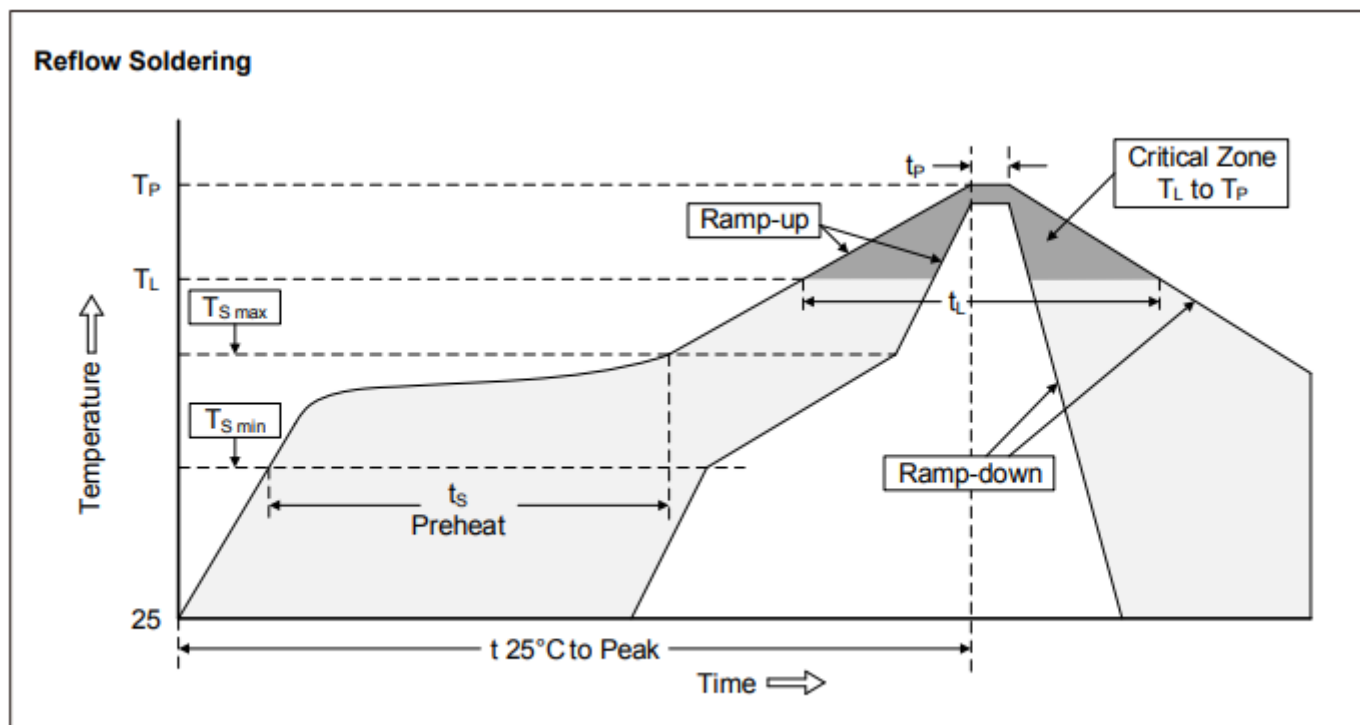


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■ Soldering Recommendation



Recommended Conditions

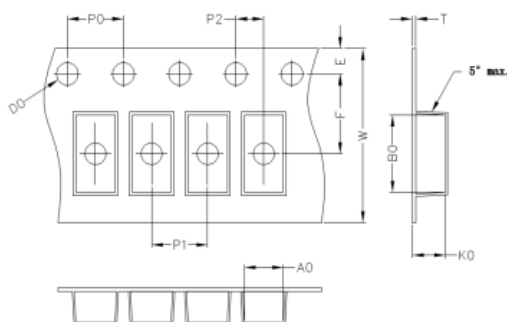
Profile Feature	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	3°C/second max.
Preheat	
-Temperature Min ($T_{S\ min}$)	150°C
-Temperature Max ($T_{S\ max}$)	200°C
-Time (min to max) (t_s)	60-180 seconds
$T_{S\ max}$ to T_L	
-Ramp-up Rate	3°C/second max.
Time maintained above:	
-Temperature (T_L)	217°C
-Time (t_L)	60-150 seconds
Peak 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.

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■ Packaging



Symbol	A0	B0	K0	D0	E	F
Unit (mm)	2.15±0.1	3.95±0.1	13.5±0.1	1.5±0.1	1.75±0.1	3.5±0.1
Symbol	P0	P1	P2	T	W	
Unit (mm)	4.0±0.1	4.0±0.1	2.0±0.1	0.25±0.1	8.0±0.3	

■ Quantity

Series Type	Packaging option	Base quantity	Packaging specification
SM4F	Tape and reel	3000pcs / reel	EIA STD RS-481

■ Warehouse Storage Conditions of Product

- Storage Condition:
 1. Storage Temperature: -10°C~+40°C
 2. Relative Humidity: \cong 75%RH
 3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage: 1 year.