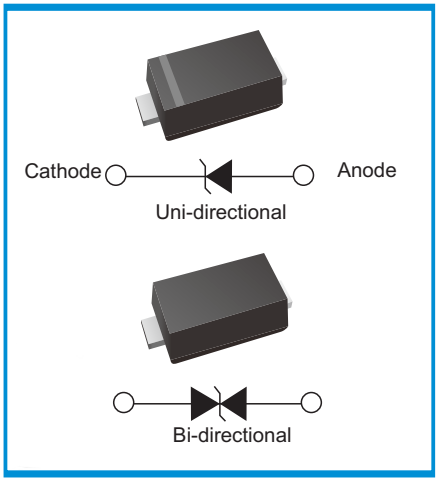
Transient Voltage Suppressors (TVS) Data Sheet

Features

- 400W peak pulse power capability at 10/1000μs waveform, repetition rate (duty cycle): 0.01%
- High Temperature soldering: 260℃/10 seconds at terminals
- Plastic package has underwriters laboratory flammability 94V-0
- Meets MSL level 1, per J-STD-020
- Typical I_R less than 1μA above 10V
- For surface mounted applications in order to optimize board space
- Low inductance
- Fast response time
- Low profile package
- Glass passivated junction
- Excellent clamping capability

Functional Diagram



Mechanical Data

- Case: SMAF
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 27mg / 0.00095oz
- Polarity: For uni-directional types the band denotes cathode end, no marking on bi-directional types

Applications

- I/O interface
- AC/DC power supply
- Vcc bus
- Low frequency signal transmission line (RS232, RS485, etc.)

Maximum Ratings and Characteristics

Ratings at 25℃ ambient temperature unless otherwise specified.

Rating	Symbol	Value	Units
Peak pulse power dissipation at 10/1000μs waveform (Note1, Note2, Fig.1)	P_{PPM}	Minimum 400	Watts
Peak pulse current of at 10/1000μs waveform (Note 1, Fig.3)	I_{PPM}	See Table	Amps
Steady state power dissipation at T_A=50℃ (Fig.5)	$P_{M(AV)}$	3.3	Watts
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3, Fig.6)	I_{FSM}	40	Amps
Operating junction and Storage Temperature Range.	T_J,T_{STG}	-65 to +150	℃
Typical thermal resistance junction to lead	$R_{\theta JL}$	30	℃/W
Typical thermal resistance junction to ambient	$R_{\theta JA}$	120	℃/W

Notes: 1. Non-repetitive current pulse, per Fig.3 and derated above T_A=25℃ per Fig.2.
2. Mounted on 5.0mm×5.0mm (0.03mm thick) copper pads to each terminal.
3. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.

Electrical Characteristics (T_A=25℃)

Part Number (Uni)	Part Number (Bi)	Marking	Reverse Stand off Voltage V_R (Volts)	Breakdown Voltage V_{BR} (Volts)@ I_T		Test Current I_T (MA)	Maximum Clamping Voltage V_C @I_{PP} (V)	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R @V_R (μA)
				MIN	MAX				
LTVF5.0AG	LTVF5.0CG	5G	5.0	6.40	7.00	10	9.2	43.5	800
LTVF6.0AG	LTVF6.0CG	6G	6.0	6.67	7.37	10	10.3	38.8	800
LTVF6.5AG	LTVF6.5CG	6G5	6.5	7.22	7.98	10	11.2	35.7	500
LTVF7.0AG	LTVF7.0CG	7G	7.0	7.78	8.60	10	12.0	33.3	200
LTVF7.5AG	LTVF7.5CG	7G5	7.5	8.33	9.21	1	12.9	31.0	100
LTVF8.0AG	LTVF8.0CG	8G	8.0	8.89	9.83	1	13.6	29.4	50
LTVF8.5AG	LTVF8.5CG	8G5	8.5	9.44	10.40	1	14.4	27.8	20
LTVF9.0AG	LTVF9.0CG	9G	9.0	10.0	11.10	1	15.4	26.0	10
LTVF10AG	LTVF10CG	10G	10.0	11.10	12.30	1	17.0	23.5	5
LTVF11AG	LTVF11CG	11G	11.0	12.20	13.50	1	18.2	22.0	1
LTVF12AG	LTVF12CG	12G	12.0	13.30	14.70	1	19.9	20.1	1
LTVF13AG	LTVF13CG	13G	13.0	14.40	15.90	1	21.5	18.6	1
LTVF14AG	LTVF14CG	14G	14.0	15.60	17.20	1	23.2	17.2	1
LTVF15AG	LTVF15CG	15G	15.0	16.70	18.50	1	24.4	16.4	1
LTVF16AG	LTVF16CG	16G	16.0	17.80	19.70	1	26.0	15.4	1
LTVF17AG	LTVF17CG	17G	17.0	18.90	20.90	1	27.6	14.5	1
LTVF18AG	LTVF18CG	18G	18.0	20.00	22.10	1	29.2	13.7	1
LTVF20AG	LTVF20CG	20G	20.0	22.20	24.50	1	32.4	12.3	1
LTVF22AG	LTVF22CG	22G	22.0	24.40	26.90	1	35.5	11.3	1
LTVF24AG	LTVF24CG	24G	24.0	26.70	29.50	1	38.9	10.3	1
LTVF26AG	LTVF26CG	26G	26.0	28.90	31.90	1	42.1	9.5	1
LTVF28AG	LTVF28CG	28G	28.0	31.10	34.40	1	45.4	8.8	1
LTVF30AG	LTVF30CG	30G	30.0	33.30	36.80	1	48.4	8.3	1
LTVF33AG	LTVF33CG	33G	33.0	36.70	40.60	1	53.3	7.5	1
LTVF36AG	LTVF36CG	36G	36.0	40.00	44.20	1	58.1	6.9	1
LTVF40AG	LTVF40CG	40G	40.0	44.40	49.10	1	64.5	6.2	1
LTVF43AG	LTVF46CG	43G	43.0	47.80	52.80	1	69.4	5.8	1
LTVF45AG	LTVF45CG	45G	45.0	50.00	55.30	1	72.7	5.5	1
LTVF48AG	LTVF48CG	48G	48.0	53.30	58.9	1	77.4	5.2	1
LTVF51AG	LTVF51CG	51G	51.0	56.70	62.70	1	82.4	4.9	1
LTVF54AG	LTVF54CG	54G	54.0	60.00	66.30	1	87.1	4.6	1
LTVF58AG	LTVF58CG	58G	58.0	64.40	71.20	1	93.6	4.3	1
LTVF60AG	LTVF60CG	60G	60.0	66.70	73.70	1	96.8	4.1	1
LTVF64AG	LTVF64CG	64G	64.0	71.10	78.60	1	103.0	3.9	1
LTVF70AG	LTVF70CG	70G	70.0	77.80	86.00	1	113.0	3.5	1
LTVF75AG	LTVF75CG	75G	75.0	83.30	92.10	1	121.0	3.3	1
LTVF78AG	LTVF78CG	78G	78.0	86.70	95.80	1	126.0	3.2	1
LTVF85AG	LTVF85CG	85G	85.0	94.40	104.00	1	137.0	2.9	1
LTVF90AG	LTVF90CG	90G	90.0	100.00	111.00	1	146.0	2.7	1
LTVF100AG	LTVF100CG	100G	100.0	111.00	123.00	1	162.0	2.5	1
LTVF110AG	LTVF110CG	110G	110.0	122.00	135.00	1	177.0	2.3	1
LTVF120AG	LTVF120CG	120G	120.0	133.00	147.00	1	193.0	2.1	1
LTVF130AG	LTVF130CG	130G	130.0	144.00	159.00	1	209.0	1.9	1
LTVF150AG	LTVF150CG	150G	150.0	167.00	185.00	1	243.0	1.6	1
LTVF160AG	LTVF160CG	160G	160.0	178.00	197.00	1	259.0	1.5	1
LTVF170AG	LTVF170CG	170G	170.0	189.00	209.00	1	275.0	1.5	1
LTVF180AG	LTVF180CG	180G	180.0	201.00	222.00	1	292.0	1.4	1
LTVF190AG	LTVF190CG	190G	190.0	211.00	233.00	1	308.0	1.3	1
LTVF200AG	LTVF200CG	200G	200.0	224.00	247.00	1	324.0	1.2	1
LTVF210AG	LTVF210CG	210G	210.0	237.00	263.00	1	340.0	1.2	1
LTVF220AG	LTVF220CG	220G	220.0	246.00	272.00	1	356.0	1.1	1

Notes: For bidirectional type having V_R of 10V and less, the I_R limit is double.

Ratings and Characteristics Curves(T_A =25℃unless otherwise noted)

Figure 1. Peak Pulse Power Rating Curve

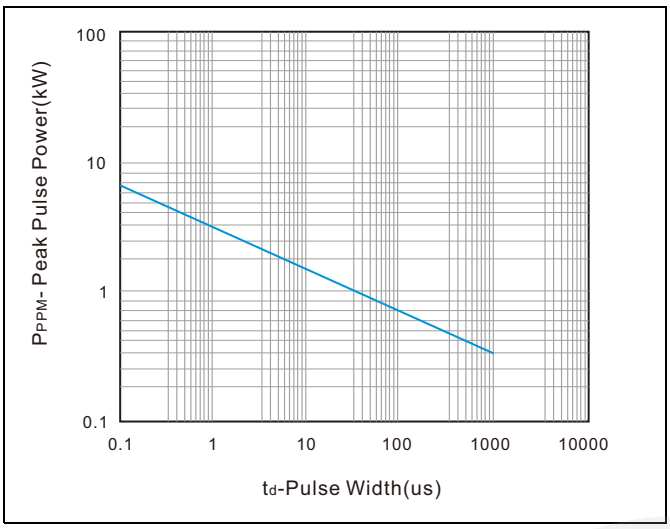


Figure 2. Pulse Derating Curve

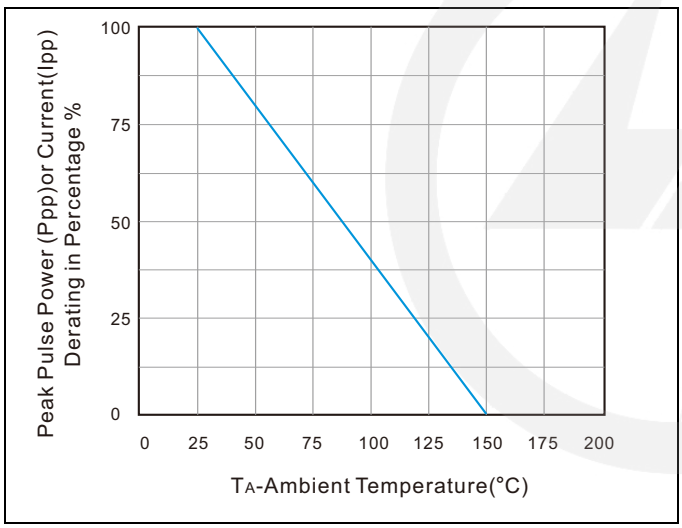


Figure 3. Pulse Waveform

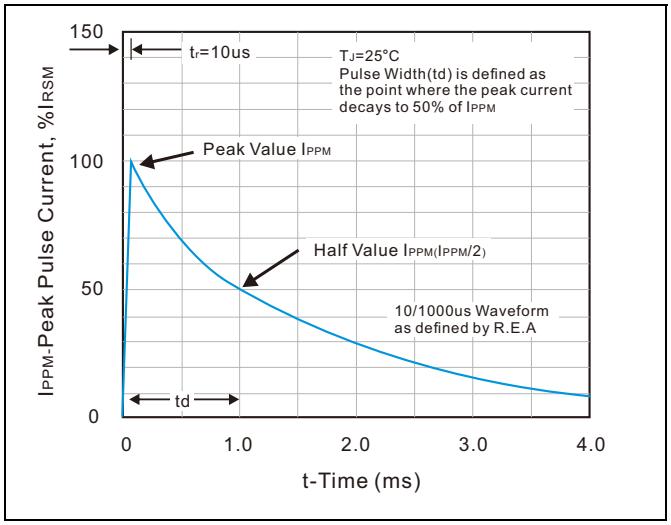


Figure 4. Typical Junction Capacitance

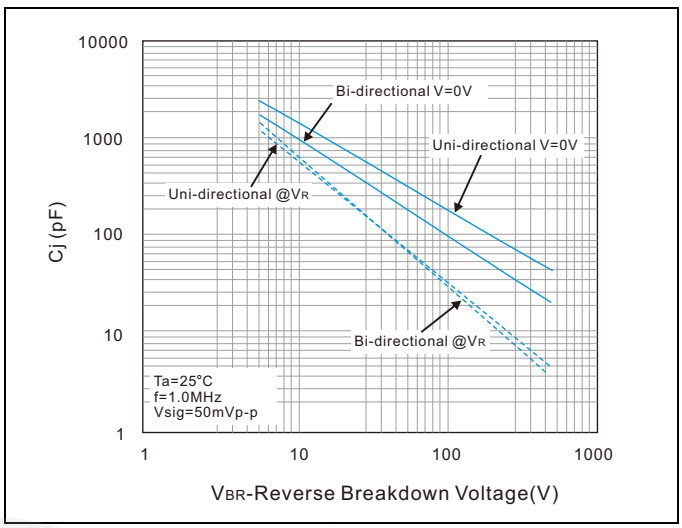


Figure 5. Steady State Power Dissipation Derating Curve

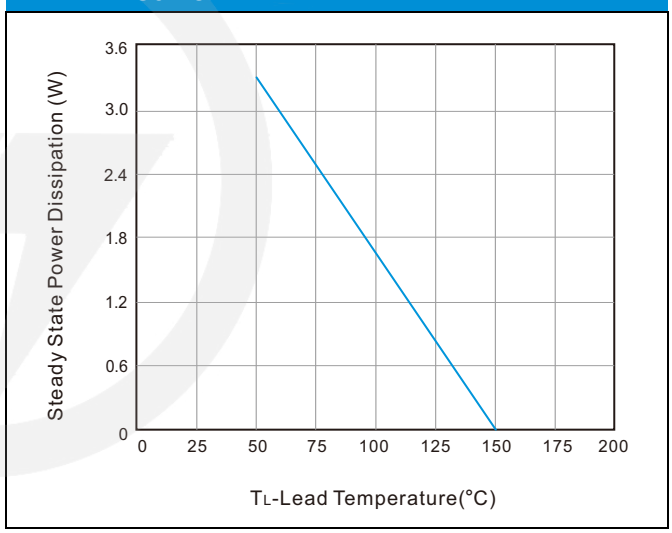
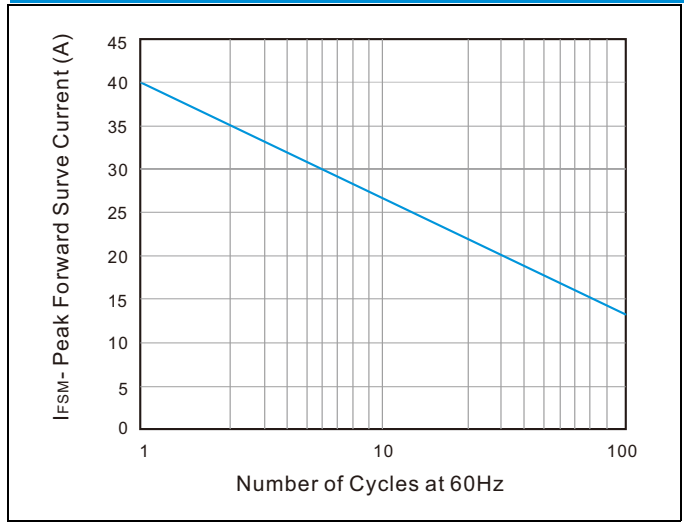
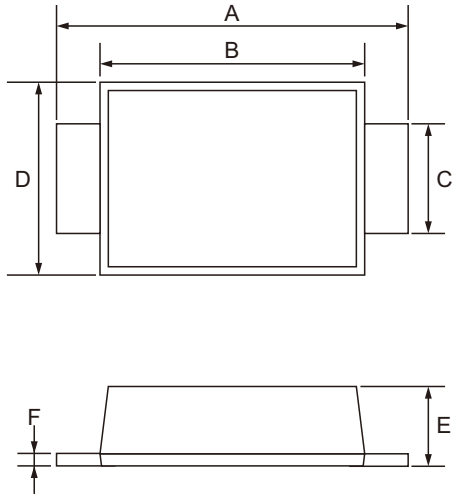


Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only

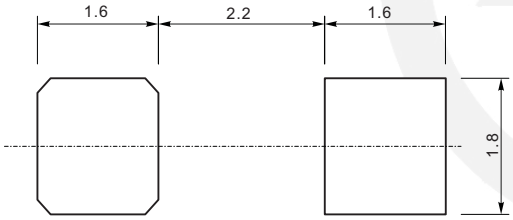


SMAF Package Outline



SYMBOL	DIMENSIONS	
	MIN.	MAX.
A	4.40	4.90
B	3.30	3.70
C	1.30	1.60
D	2.40	2.70
E	0.90	1.20
F	0.12	0.20

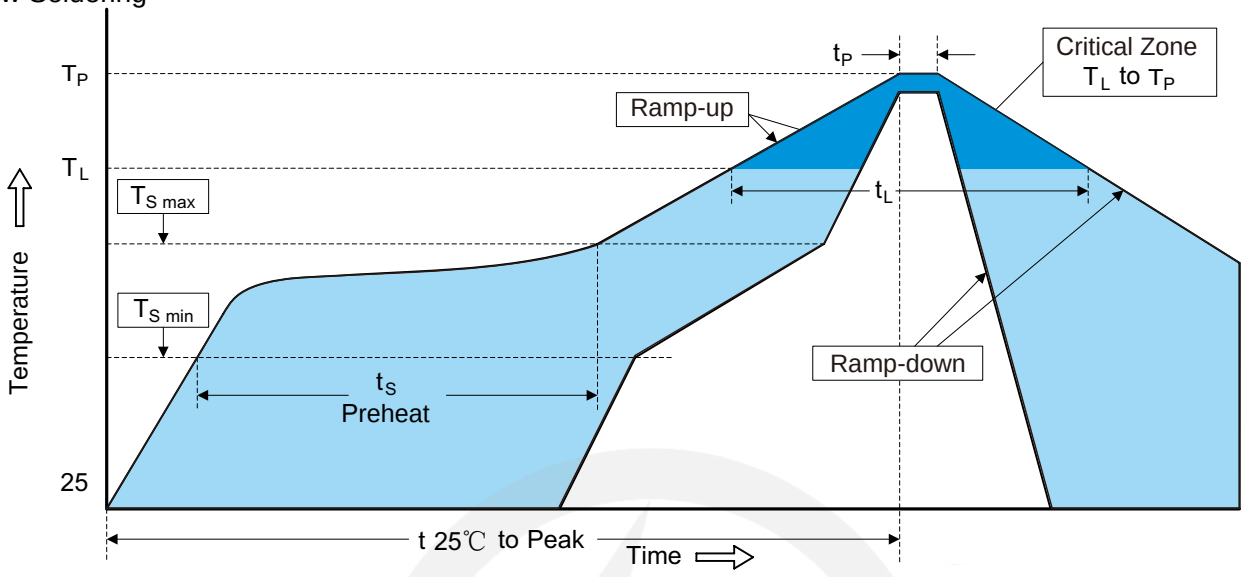
SMAF Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm
3.The pad layout is for reference purpose only.

Recommended Soldering Conditions

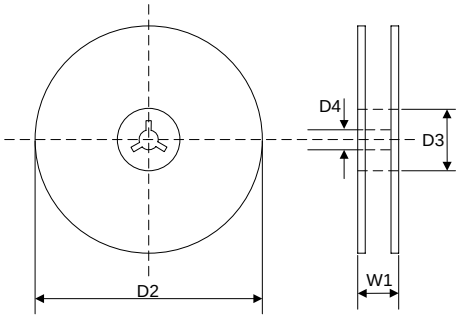
Reflow Soldering



Recommended Conditions

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	3℃/second max.
Preheat -Temperature Min ($T_{S\ min}$) -Temperature Max ($T_{S\ max}$) -Time (min to max) (t_S)	 150℃ 200℃ 60-180 seconds
$T_{S\ max}$ to T_L -Ramp-up Rate	 3℃/second max.
Time maintained above: -Temperature (T_L) -Time (t_L)	 217℃ 60-150 seconds
Peak Temperature (T_P)	260℃
Time within 5℃ of actual Peak Temperature (t_P)	20-40 seconds
Ramp-down Rate	6℃/second max.
Time 25℃ to Peak Temperature	8 minutes max.

7” Reel



D2	Φ178.0±2.0
D3	Φ50.0Min.
D4	Φ13.0±0.5
W1	16.0±2.0
Quantity: 3000PCS	