1SMB10CAT3 Series

Watt Peak Power Zener Transient Voltage Suppressors

Bidirectional*

The SMB series is designed to protect voltage sensitive components from high voltage, high energy transients. They have excellent clamping capability, high surge capability, low zener impedance and fast response time. The SMB series is supplied in ON Semiconductor's exclusive, cost-effective, highly reliable Surmetic™ package and is ideally suited for use in communication systems, automotive, numerical controls, process controls, medical equipment, business machines, power supplies and many other industrial/consumer applications.

Features

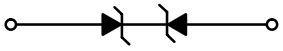
- Working Peak Reverse Voltage Range − 10 V to 75 V
- Standard Zener Breakdown Voltage Range − 11.7 V to 91.7 V
- Peak Power − 600 Watts @ 1 ms
- ESD Rating of Class 3 (> 16 KV) per Human Body Model
- Maximum Clamp Voltage @ Peak Pulse Current
- Low Leakage < 5 μA Above 10 V
- UL 497B for Isolated Loop Circuit Protection
- Response Time is Typically < 1 ns
- Pb−Free Packages are Available

Mechanical Characteristics

CASE: Void-free, transfer-molded, thermosetting plastic
FINISH: All external surfaces are corrosion resistant and leads are readily solderable
MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES: 260°C for 10 Seconds
LEADS: Modified L−Bend providing more contact area to bond pads
POLARITY: Polarity band will not be indicated
MOUNTING POSITION: Any

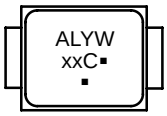
ON Semiconductor®

PLASTIC SURFACE MOUNT ZENER OVERVOLTAGE TRANSIENT SUPPRESSORS 10−78 V, 600 W PEAK POWER



SMB
CASE 403C
PLASTIC

MARKING DIAGRAM



A = Assembly Location
Y = Year
WW = Work Week
xxC = Specific Device Code (See Table on Page 3)
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

Device*	Package	Shipping†
1SMBxxCAT3	SMB	2500/Tape & Reel
1SMBxxCAT3G	SMB (Pb−Free)	2500/Tape & Reel

*The "T3" suffix refers to a 13 inch reel.

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

Individual devices are listed on page 3 of this data sheet.

Publication Order Number:
1SMB10CAT3/D

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak Power Dissipation (Note 1) @ T_L = 25°C, Pulse Width = 1 ms	P_{PK}	600	W
DC Power Dissipation @ T_L = 75°C Measured Zero Lead Length (Note 2) Derate Above 75°C Thermal Resistance from Junction−to−Lead	P_D $R_{\theta JL}$	3.0 40 25	W mW/°C °C/W
DC Power Dissipation (Note 3) @ T_A = 25°C Derate Above 25°C Thermal Resistance from Junction−to−Ambient	P_D $R_{\theta JA}$	0.55 4.4 226	W mW/°C °C/W
Operating and Storage Temperature Range	T_J, T_{stg}	−65 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

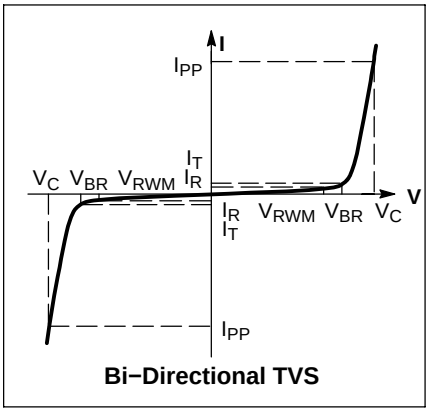
1. 10 X 1000 μs, non−repetitive
2. 1″ square copper pad, FR−4 board
3. FR−4 board, using ON Semiconductor minimum recommended footprint, as shown in 403A case outline dimensions spec

*Please see 1SMB5.0AT3 to 1SMB170AT3 for Unidirectional devices

ELECTRICAL CHARACTERISTICS

(T_A = 25°C unless otherwise noted)

Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Working Peak Reverse Voltage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current



Bi−Directional TVS

ELECTRICAL CHARACTERISTICS (Devices listed in ***bold, italic*** are ON Semiconductor Preferred devices.)

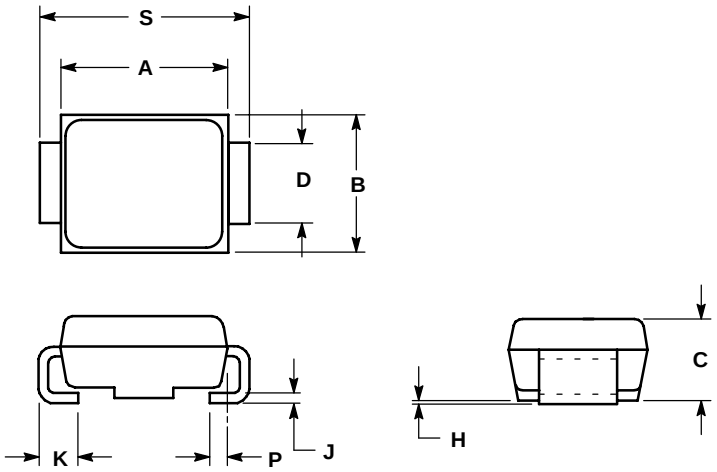
Device*	Device Marking	V_{RWM} (Note 4)	I_R @ V_{RWM}	Breakdown Voltage				V_C @ I_{PP} (Note 6)		C_{typ} (Note 7)
				V_{BR} (Note 5) Volts			@ I_T	V_C	I_{PP}	
		Volts	μA	Min	Nom	Max	mA	Volts	Amps	pF
1SMB10CAT3, G	KXC	10	5.0	11.1	11.69	12.27	1.0	17.0	35.3	805
1SMB11CAT3, G	KZC	11	5.0	12.2	12.84	13.5	1.0	18.2	33.0	740
1SMB12CAT3, G	LEC	12	5.0	13.3	14.00	14.7	1.0	19.9	30.2	680
1SMB13CAT3, G	LGC	13	5.0	14.4	15.16	15.9	1.0	21.5	27.9	630
1SMB14CAT3, G	LKC	14	5.0	15.6	16.42	17.2	1.0	23.2	25.8	590
1SMB15CAT3, G	***LMC***	***15***	***5.0***	***16.7***	***17.58***	***18.5***	***1.0***	***24.4***	***24.0***	***555***
1SMB16CAT3, G	LPC	16	5.0	17.8	18.74	19.7	1.0	26.0	23.1	520
1SMB17CAT3, G	LRC	17	5.0	18.9	19.90	20.9	1.0	27.6	21.7	490
1SMB18CAT3, G	LTC	18	5.0	20.0	21.06	22.1	1.0	29.2	20.5	465
1SMB20CAT3, G	LVC	20	5.0	22.2	23.37	24.5	1.0	32.4	18.5	425
1SMB22CAT3, G	LXC	22	5.0	24.4	25.69	27.0	1.0	35.5	16.9	390
1SMB24CAT3, G	LZC	24	5.0	26.7	28.11	29.5	1.0	38.9	15.4	366
1SMB26CAT3, G	MEC	26	5.0	28.9	30.42	31.9	1.0	42.1	14.2	330
1SMB28CAT3, G	MGC	28	5.0	31.1	32.74	34.4	1.0	45.4	13.2	310
1SMB30CAT3, G	MKC	30	5.0	33.3	35.06	36.8	1.0	48.4	12.4	290
1SMB33CAT3, G	MMC	33	5.0	36.7	38.63	40.6	1.0	53.3	11.3	265
1SMB36CAT3, G	MPC	36	5.0	40.0	42.11	44.2	1.0	58.1	10.3	245
1SMB40CAT3, G	MRC	40	5.0	44.4	46.74	49.1	1.0	64.5	9.3	220
1SMB43CAT3, G	MTC	43	5.0	47.8	50.32	52.8	1.0	69.4	8.6	210
1SMB45CAT3, G	MVC	45	5.0	50.0	52.63	55.3	1.0	72.2	8.3	200
1SMB48CAT3, G	MXC	48	5.0	53.3	56.11	58.9	1.0	77.4	7.7	190
1SMB51CAT3, G	MZC	51	5.0	56.7	59.69	62.7	1.0	82.4	7.3	175
1SMB54CAT3, G	NEC	54	5.0	60.0	63.16	66.32	1.0	87.1	6.9	170
1SMB58CAT3, G	NGC	58	5.0	64.4	67.79	71.18	1.0	93.6	6.4	155
1SMB60CAT3, G	NKC	60	5.0	66.7	70.21	73.72	1.0	96.8	6.2	150
1SMB64CAT3, G	NMC	64	5.0	71.1	74.84	78.58	1.0	103	5.8	145
1SMB75CAT3, G	NRC	75	5.0	83.3	91.65	92.07	1.0	121	4.9	125

4. A transient suppressor is normally selected according to the working peak reverse voltage (V_{RWM}), which should be equal to or greater than the DC or continuous peak operating voltage level.
5. V_{BR} measured at pulse test current I_T at an ambient temperature of 25°C.
6. Surge current waveform per Figure 2 and derate per Figure 3 of the General Data − 600 Watt at the beginning of this group.
7. Bias Voltage = 0 V, F = 1 MHz, T_J = 25°C

*The “G” suffix indicates Pb−Free package available.

PACKAGE DIMENSIONS

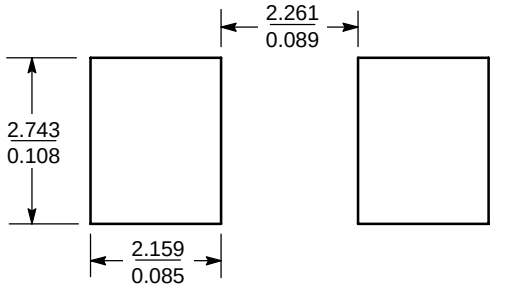
SMB
CASE 403C−01
ISSUE A



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. D DIMENSION SHALL BE MEASURED WITHIN DIMENSION P.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.160	0.180	4.06	4.57
B	0.130	0.150	3.30	3.81
C	0.075	0.095	1.90	2.41
D	0.077	0.083	1.96	2.11
H	0.0020	0.0060	0.051	0.152
J	0.006	0.012	0.15	0.30
K	0.030	0.050	0.76	1.27
P	0.020 REF		0.51 REF	
S	0.205	0.220	5.21	5.59

SOLDERING FOOTPRINT*



SCALE 8:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.