Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

1SMB10CAT3 Series

600 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.

Specification Features:

- Working Peak Reverse Voltage Range – 10 V to 78 V
- Standard Zener Breakdown Voltage Range – 11.7 V to 91.3 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

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

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

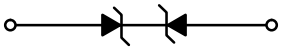
1. 10 X 1000 μs, non–repetitive
2. 1″ square copper pad, FR–4 board
3. FR–4 board, using ON Semiconductor minimum recommended footprint, as shown in 403A case outline dimensions spec.

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

ON Semiconductor™

http://onsemi.com

PLASTIC SURFACE MOUNT ZENER OVERVOLTAGE TRANSIENT SUPPRESSORS 10–78 VOLTS 600 WATT PEAK POWER



SMB
CASE 403A
PLASTIC

MARKING DIAGRAM

Y = Year
WW = Work Week
xxC = Specific Device Code (See Table Next Page)

ORDERING INFORMATION

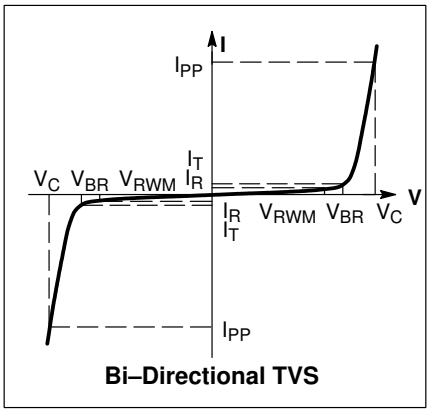
Device †	Package	Shipping
1SMBxxCAT3	SMB	2500/Tape & Reel

Devices listed in ***bold, italic*** are ON Semiconductor **Preferred** devices. **Preferred** devices are recommended choices for future use and best overall value.

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

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.)	
				V_{BR} (Note 5.) Volts			@ I_T	V_C	I_{PP}
		Volts	μA	Min	Nom	Max	mA	Volts	Amps
1SMB10CAT3	KXC	10	5.0	11.1	11.69	12.27	1.0	17.0	35.3
1SMB11CAT3	KZC	11	5.0	12.2	12.84	13.5	1.0	18.2	33.0
1SMB12CAT3	LEC	12	5.0	13.3	14.00	14.7	1.0	19.9	30.2
1SMB13CAT3	LGC	13	5.0	14.4	15.16	15.9	1.0	21.5	27.9
1SMB14CAT3	LKC	14	5.0	15.6	16.42	17.2	1.0	23.2	25.8
1SMB15CAT3	***LMC***	***15***	***5.0***	***16.7***	***17.58***	***18.5***	***1.0***	***24.4***	***24.0***
1SMB16CAT3	LPC	16	5.0	17.8	18.74	19.7	1.0	26.0	23.1
1SMB17CAT3	LRC	17	5.0	18.9	19.90	20.9	1.0	27.6	21.7
1SMB18CAT3	LTC	18	5.0	20.0	21.06	22.1	1.0	29.2	20.5
1SMB20CAT3	LVC	20	5.0	22.2	23.37	24.5	1.0	32.4	18.5
1SMB22CAT3	LXC	22	5.0	24.4	25.69	27.0	1.0	35.5	16.9
1SMB24CAT3	LZC	24	5.0	26.7	28.11	29.5	1.0	38.9	15.4
1SMB26CAT3	MEC	26	5.0	28.9	30.42	31.9	1.0	42.1	14.2
1SMB28CAT3	MGC	28	5.0	31.1	32.74	34.4	1.0	45.4	13.2
1SMB30CAT3	MKC	30	5.0	33.3	35.06	36.8	1.0	48.4	12.4
1SMB33CAT3	MMC	33	5.0	36.7	38.63	40.6	1.0	53.3	11.3
1SMB36CAT3	MPC	36	5.0	40.0	42.11	44.2	1.0	58.1	10.3
1SMB40CAT3	MRC	40	5.0	44.4	46.74	49.1	1.0	64.5	9.3
1SMB43CAT3	MTC	43	5.0	47.8	50.32	52.8	1.0	69.4	8.6
1SMB45CAT3	MVC	45	5.0	50.0	52.63	55.3	1.0	72.2	8.3
1SMB48CAT3	MXC	48	5.0	53.3	56.11	58.9	1.0	77.4	7.7
1SMB51CAT3	MZC	51	5.0	56.7	59.69	62.7	1.0	82.4	7.3
1SMB54CAT3	NEC	54	5.0	60.0	63.16	66.32	1.0	87.1	6.9
1SMB58CAT3	NGC	58	5.0	64.4	67.79	71.18	1.0	93.6	6.4
1SMB60CAT3	NKC	60	5.0	66.7	70.21	73.72	1.0	96.8	6.2
1SMB64CAT3	NMC	64	5.0	71.1	74.84	78.58	1.0	103	5.8
1SMB70CAT3	NPC	70	5.0	77.8	81.90	85.99	1.0	113	5.3
1SMB75CAT3	NRC	75	5.0	83.3	91.65	92.07	1.0	121	4.9
1SMB78CAT3	NTC	78	5.0	86.7	91.26	95.83	1.0	126	4.7

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.

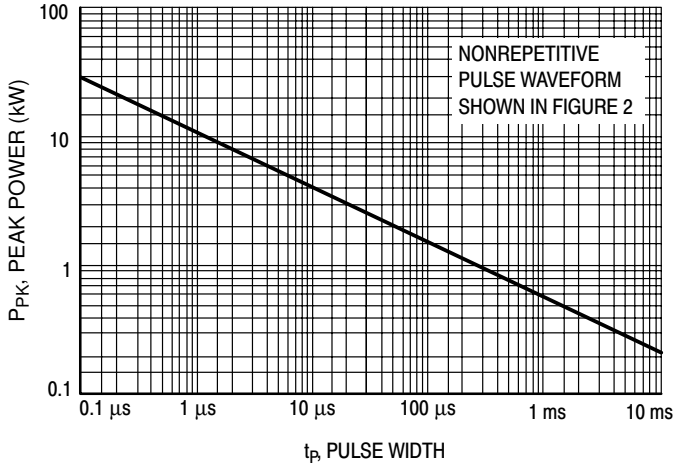


Figure 1. Pulse Rating Curve

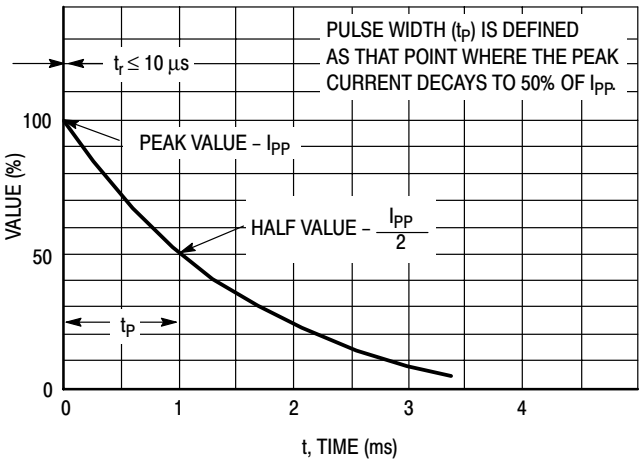


Figure 2. Pulse Waveform

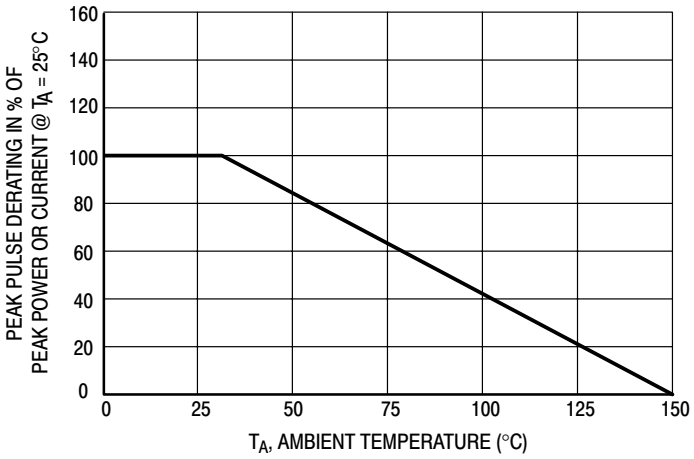
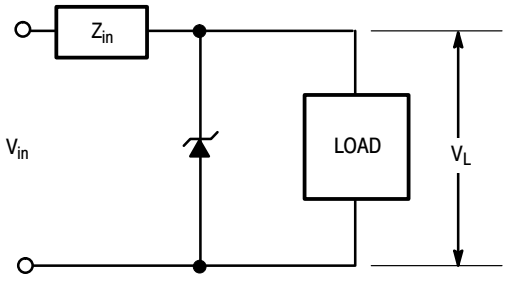


Figure 3. Pulse Derating Curve

TYPICAL PROTECTION CIRCUIT



APPLICATION NOTES

RESPONSE TIME

In most applications, the transient suppressor device is placed in parallel with the equipment or component to be protected. In this situation, there is a time delay associated with the capacitance of the device and an overshoot condition associated with the inductance of the device and the inductance of the connection method. The capacitive effect is of minor importance in the parallel protection scheme because it only produces a time delay in the transition from the operating voltage to the clamp voltage as shown in Figure 4.

The inductive effects in the device are due to actual turn-on time (time required for the device to go from zero current to full current) and lead inductance. This inductive effect produces an overshoot in the voltage across the equipment or component being protected as shown in Figure 5. Minimizing this overshoot is very important in the application, since the main purpose for adding a transient suppressor is to clamp voltage spikes. The SMB series have a very good response time, typically < 1 ns and negligible inductance. However, external inductive effects could produce unacceptable overshoot. Proper circuit layout, minimum lead lengths and placing the suppressor device as close as possible to the equipment or components to be protected will minimize this overshoot.

Some input impedance represented by Z_{in} is essential to prevent overstress of the protection device. This impedance should be as high as possible, without restricting the circuit operation.

DUTY CYCLE DERATING

The data of Figure 1 applies for non-repetitive conditions and at a lead temperature of 25°C. If the duty cycle increases, the peak power must be reduced as indicated by the curves of Figure 6. Average power must be derated as the lead or ambient temperature rises above 25°C. The average power derating curve normally given on data sheets may be normalized and used for this purpose.

At first glance the derating curves of Figure 6 appear to be in error as the 10 ms pulse has a higher derating factor than the 10 μs pulse. However, when the derating factor for a given pulse of Figure 6 is multiplied by the peak power value of Figure 1 for the same pulse, the results follow the expected trend.

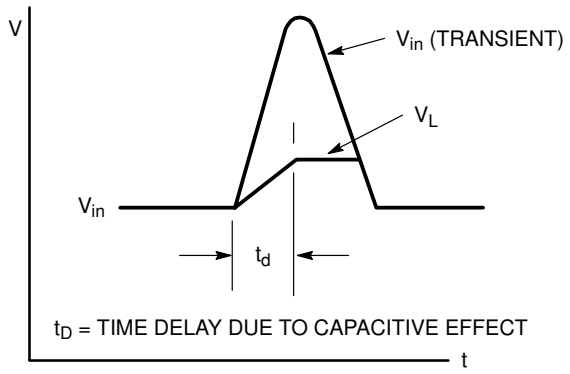


Figure 4.

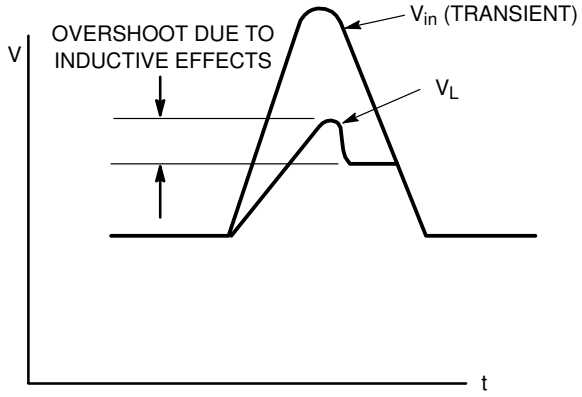


Figure 5.

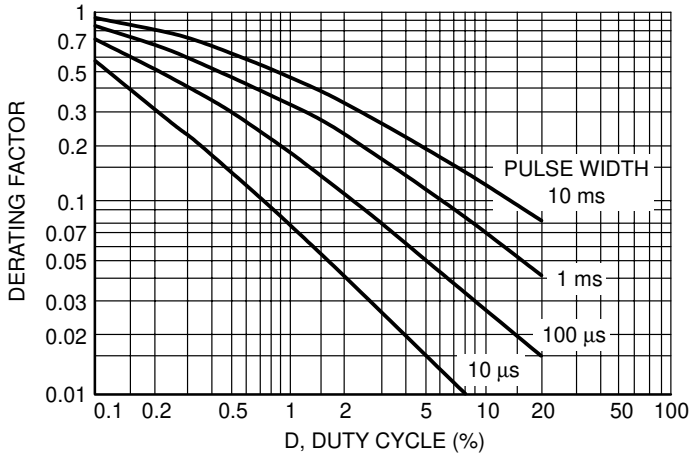


Figure 6. Typical Derating Factor for Duty Cycle

UL RECOGNITION

The entire series has *Underwriters Laboratory Recognition* for the classification of protectors (QVGV2) under the UL standard for safety 497B and File #116110. Many competitors only have one or two devices recognized or have recognition in a non-protective category. Some competitors have no recognition at all. With the UL497B recognition, our parts successfully passed several tests including Strike Voltage Breakdown test, Endurance Conditioning, Temperature test, Dielectric Voltage-Withstand test, Discharge test and several more.

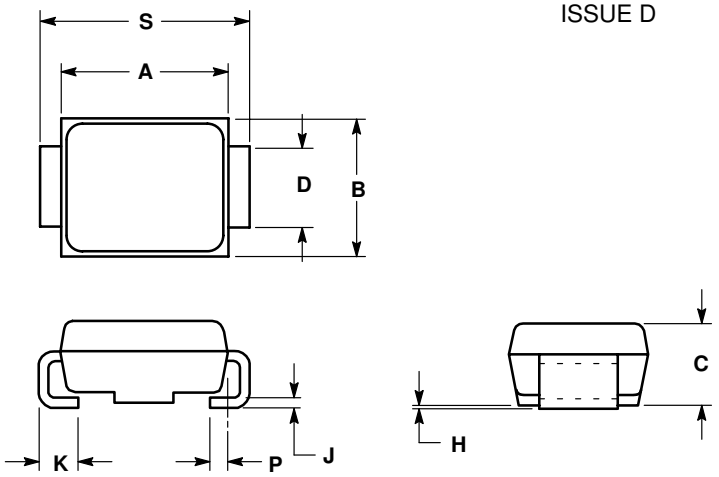
Whereas, some competitors have only passed a flammability test for the package material, we have been recognized for much more to be included in their Protector category.

OUTLINE DIMENSIONS

Transient Voltage Suppressors – Surface Mounted

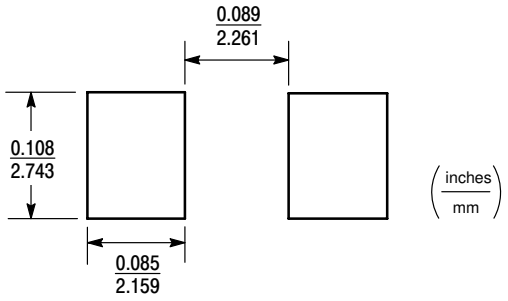
600 Watt Peak Power

SMB
DO–214AA
CASE 403A–03
ISSUE D



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



SMB Footprint

Notes

Surmetic is a trademark of Semiconductor Components Industries, LLC.

PUBLICATION ORDERING INFORMATION

NORTH AMERICA Literature Fulfillment:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303–675–2175 or 800–344–3860 Toll Free USA/Canada
Fax: 303–675–2176 or 800–344–3867 Toll Free USA/Canada
Email: ONlit@hibbertco.com
Fax Response Line: 303–675–2167 or 800–344–3810 Toll Free USA/Canada

N. American Technical Support: 800–282–9855 Toll Free USA/Canada

EUROPE: LDC for ON Semiconductor – European Support
German Phone: (+1) 303–308–7140 (Mon–Fri 2:30pm to 7:00pm CET)
Email: ONlit–german@hibbertco.com
French Phone: (+1) 303–308–7141 (Mon–Fri 2:00pm to 7:00pm CET)
Email: ONlit–french@hibbertco.com
English Phone: (+1) 303–308–7142 (Mon–Fri 12:00pm to 5:00pm GMT)
Email: ONlit@hibbertco.com

EUROPEAN TOLL–FREE ACCESS*: 00–800–4422–3781
*Available from Germany, France, Italy, UK, Ireland

CENTRAL/SOUTH AMERICA:
Spanish Phone: 303–308–7143 (Mon–Fri 8:00am to 5:00pm MST)
Email: ONlit–spanish@hibbertco.com
Toll–Free from Mexico: Dial 01–800–288–2872 for Access –
then Dial 866–297–9322

ASIA/PACIFIC: LDC for ON Semiconductor – Asia Support
Phone: 1–303–675–2121 (Tue–Fri 9:00am to 1:00pm, Hong Kong Time)
Toll Free from Hong Kong & Singapore:
001–800–4422–3781
Email: ONlit–asia@hibbertco.com

JAPAN: ON Semiconductor, Japan Customer Focus Center
4–32–1 Nishi–Gotanda, Shinagawa–ku, Tokyo, Japan 141–0031
Phone: 81–3–5740–2700
Email: r14525@onsemi.com

ON Semiconductor Website: http://onsemi.com

For additional information, please contact your local
Sales Representative.