

# 1SMF16BT1, 1SMF16BT3, 1SMF16BT3G

## Zener Transient Voltage Suppressor SOD-123 Flat Lead Package

The 1SMF16B is designed to protect voltage sensitive components from high voltage, high energy transients. Excellent clamping capability, high surge capability, low Zener impedance and fast response time. Because of its small size, it is ideal for use in cellular phones, portable devices, business machines, power supplies and many other industrial/consumer applications.

### Specification Features:

- Stand-off Voltage: 16 Volt
- Peak Power – 175 Watts @ 1 ms
- Maximum Clamp Voltage @ Peak Pulse Current
- Low Leakage
- Response Time is Typically < 1 ns
- IEC61000-4-2 Level 4 ESD Protection
- Low Profile – Maximum Height of 1.0 mm
- Small Footprint
- Cathode Indicated by Polarity Band
- Pb-Free Package is Available

### Mechanical Characteristics:

**CASE:** Void-free, transfer-molded, thermosetting plastic

**LEAD FINISH:** 100% Matte Sn (Tin)

**MOUNTING POSITION:** Any

**QUALIFIED MAX REFLOW TEMPERATURE:** 260°C

Device Meets MSL 1 Requirements

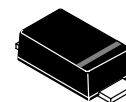
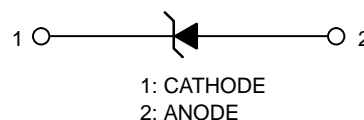
Epoxy Meets UL 94, V-0



ON Semiconductor®

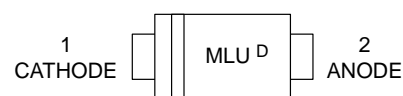
<http://onsemi.com>

## PLASTIC SURFACE MOUNT ZENER OVERVOLTAGE TRANSIENT SUPPRESSOR 175 WATT PEAK POWER



SOD-123FL  
CASE 498  
PLASTIC

### MARKING DIAGRAM



MLU = Specific Device Code  
D = Date Code

### ORDERING INFORMATION

Device	Package	Shipping†
1SMF16BT1	SOD-123FL	3,000/Tape & Reel
1SMF16BT3	SOD-123FL	10,000/Tape & Reel
1SMF16BT3G	SOD-123FL (Pb-Free)	10,000/Tape & 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.

# 1SMF16BT1, 1SMF16BT3, 1SMF16BT3G

## MAXIMUM RATINGS

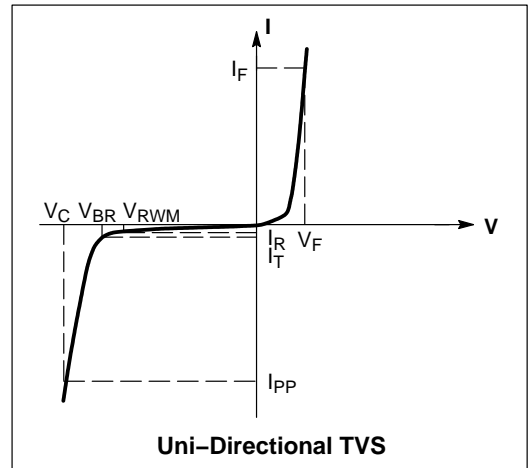
Rating	Symbol	Value	Unit
Maximum $P_{pk}$ Dissipation @ $T_A = 25^\circ\text{C}$ , (PW–10/1000 $\mu\text{s}$ ) (Note 1)	$P_{pk}$	175	W
Maximum $P_{pk}$ Dissipation @ $T_A = 25^\circ\text{C}$ , (PW–8/20 $\mu\text{s}$ ) (Note 2)	$P_{pk}$	1000	W
Operating and Storage Temperature Range	$T_J, T_{stg}$	–55 to +150	$^\circ\text{C}$

1. Non–repetitive current pulse at  $T_A = 25^\circ\text{C}$ , per waveform of Figure 3.
2. Non–repetitive current pulse at  $T_A = 25^\circ\text{C}$ , per waveform of Figure 4.

## ELECTRICAL CHARACTERISTICS

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

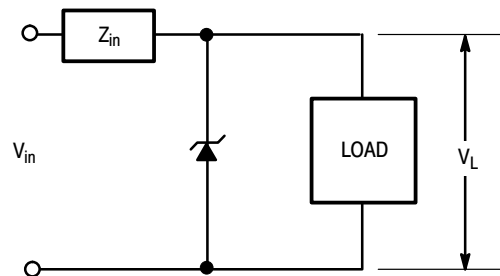
Symbol	Parameter
$I_{PP}$	Maximum Reverse Peak Pulse Current
$V_C$	Clamping Voltage @ $I_{PP}$
$V_{RWM}$	Working Peak Reverse Voltage
$I_R$	Maximum Reverse Leakage Current @ $V_{RWM}$
$V_{BR}$	Breakdown Voltage @ $I_T$
$I_T$	Test Current
$I_F$	Forward Current
$V_F$	Forward Voltage @ $I_F$



## ELECTRICAL CHARACTERISTICS ( $T_L = 30^\circ\text{C}$ unless otherwise noted, $V_F = 1.3$ Volts @ 850 mA)

Device	Marking	$V_{RWM}$ (Note 3)	$V_{BR} @ I_T$ (V) (Note 4)			$I_T$	$I_R @ V_{RWM}$	Max $V_C @$ $I_{PP} = 1$ Amp	Max $V_C @$ $I_{PP} = 7$ Amp
		(V)	Min	Nom	Max	(mA)	( $\mu\text{A}$ )	(V)	(V)
1SMF16B	MLU	16	16.7	17.6	18.5	1.0	1.0	20	26

3. 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.
4.  $V_{BR}$  measured at pulse test current  $I_T$  at ambient temperature of  $25^\circ\text{C}$ .



**Figure 1. Typical Protection Circuit**

# 1SMF16BT1, 1SMF16BT3, 1SMF16BT3G

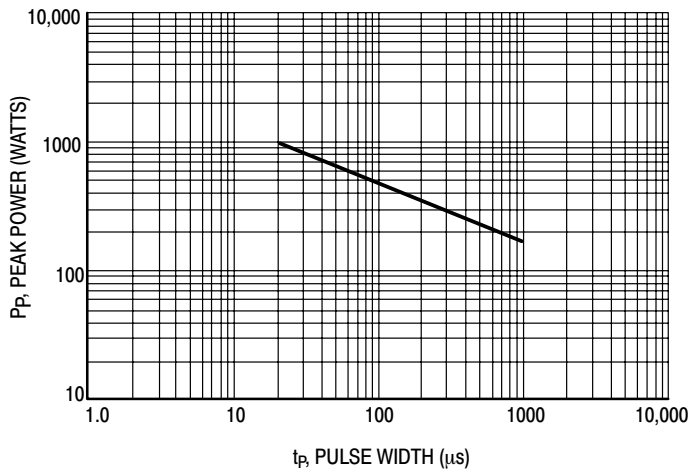


Figure 2. Pulse Rating Curve

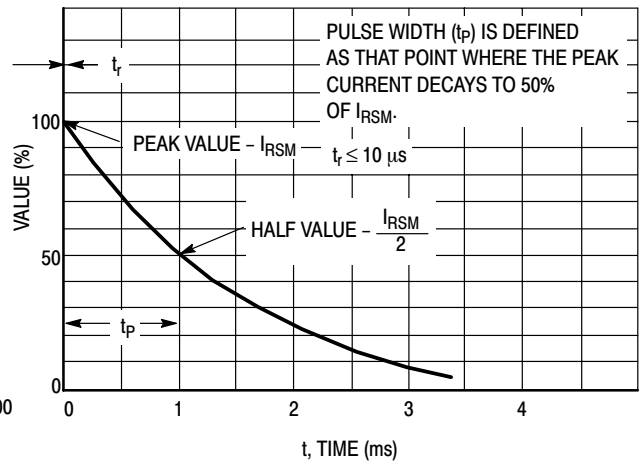


Figure 3. 10 X 1000  $\mu$ s Pulse Waveform

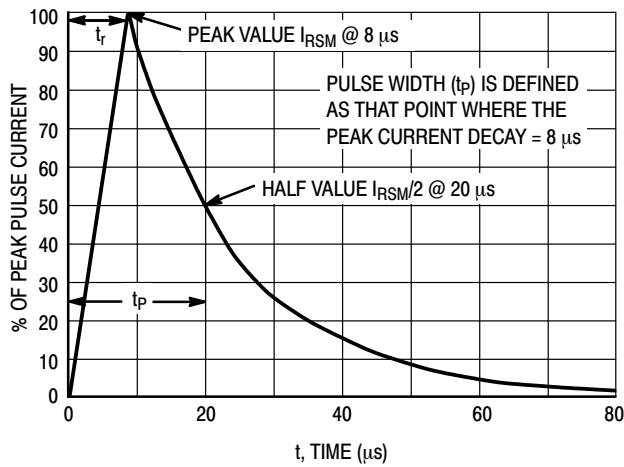


Figure 4. 8 X 20  $\mu$ s Pulse Waveform

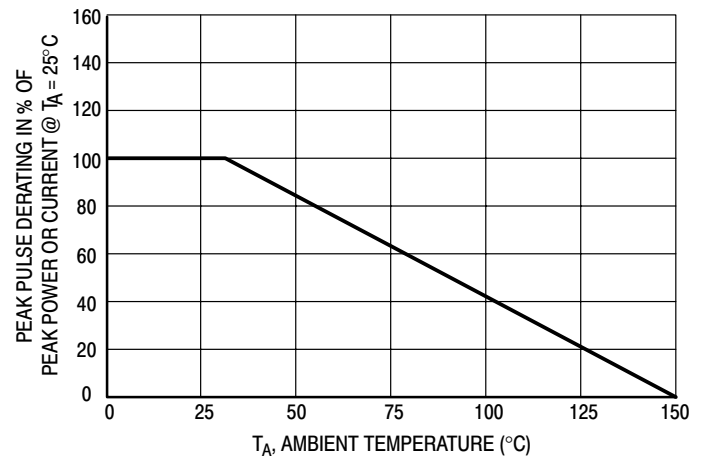


Figure 5. Pulse Derating Curve

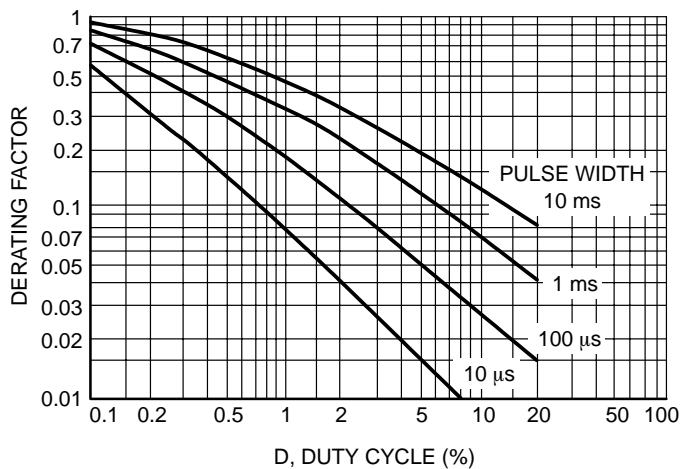


Figure 6. Typical Derating Factor for Duty Cycle

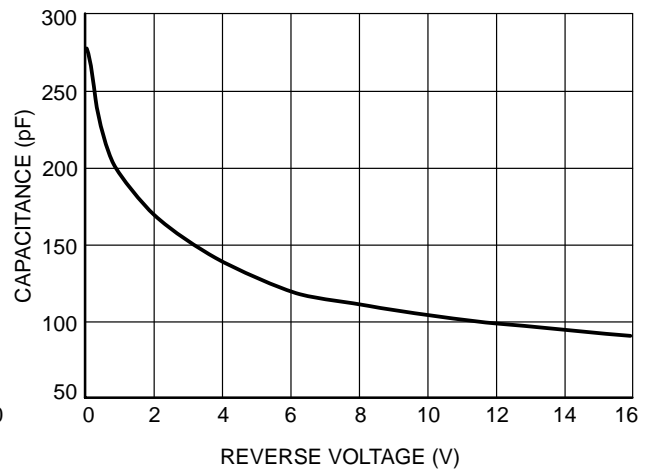
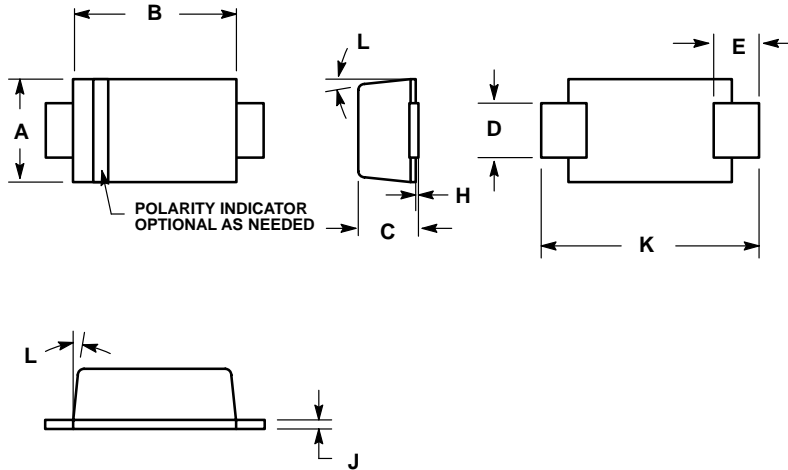


Figure 7. Capacitance versus Reverse Voltage

# 1SMF16BT1, 1SMF16BT3, 1SMF16BT3G

## PACKAGE DIMENSIONS

SOD-123FL  
CASE 498-01  
ISSUE O

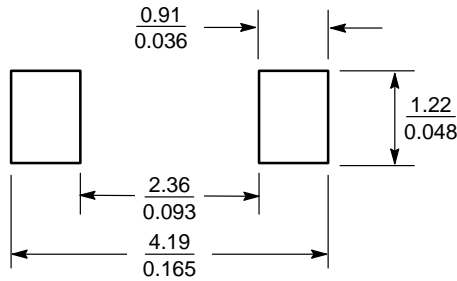


### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH.
4. DIMENSIONS D AND J ARE TO BE MEASURED ON FLAT SECTION OF THE LEAD: BETWEEN 0.10 AND 0.25 MM FROM THE LEAD TIP.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.50	1.80	0.059	0.071
B	2.50	2.90	0.098	0.114
C	0.90	1.00	0.035	0.039
D	0.70	1.10	0.028	0.043
E	0.55	0.95	0.022	0.037
H	0.00	0.10	0.000	0.004
J	0.10	0.20	0.004	0.008
K	3.40	3.80	0.134	0.150
L	0°	8°	0°	8°


### SOLDERING FOOTPRINT\*



SCALE 10:1 (mm / inches)

### SOD-123

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

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

### PUBLICATION ORDERING INFORMATION

**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:** orderlit@onsemi.com

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

**Japan:** ON Semiconductor, Japan Customer Focus Center  
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051  
**Phone:** 81-3-5773-3850

**ON Semiconductor Website:** <http://onsemi.com>

**Order Literature:** <http://www.onsemi.com/litorder>

For additional information, please contact your local Sales Representative.