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## Is Now

# onsemi™

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# NTVB Series

## Thyristor Surge Protectors

### High Voltage Bidirectional

NTVB Series Thyristor Surge Protector Devices (TSPD) protect telecommunication circuits such as central office, access, and customer premises equipment from overvoltage conditions. These are bidirectional devices so they are able to have functionality of 2 devices in one package, saving valuable space on board layout.

These devices will act as a crowbar when overvoltage occurs and will divert the energy away from circuit or device that is being protected.

Use of the NTVB Series in equipment will help meet various regulatory requirements including: GR-1089-CORE, IEC 61000-4-5, ITU K.20/21/45, IEC 60950, TIA-968-A, FCC Part 68, EN 60950, UL 1950.

#### ELECTRICAL PARAMETERS

Device	V <sub>DRM</sub>	V <sub>(BO)</sub>	V <sub>T</sub>	I <sub>DRM</sub>	I <sub>(BO)</sub>	I <sub>T</sub>	I <sub>H</sub>
	V	V	V	μA	mA	A	mA
NTVB058NSx-L	58	77	4	5	800	2.2	150
NTVB065NSx-L	65	88	4	5	800	2.2	150
NTVB090NSx-L	90	130	4	5	800	2.2	150
NTVB170Sx-L	170	265	4	5	800	2.2	150
NTVB170NSx-L	170	220	4	5	800	2.2	150
NTVB180Sx-L	170	240	4	5	800	2.2	150
NTVB200Sx-L	200	320	4	5	800	2.2	150
NTVB220NSx-L	220	300	4	5	800	2.2	150
NTVB270Sx-L	270	365	4	5	800	2.2	150
NTVB275NSx-L	275	350	4	5	800	2.2	150
NTVB300Sx-L	300	400	4	5	800	2.2	150

#### SURGE DATA RATINGS

Specification	Waveform		x = series ratings			Unit
	Voltage μs	Current μs	A	B	C	
GR-1089-CORE	2x10	2x10	150	250	500	A(pk)
TIA-968-A	10x160	10x160	90	150	200	
GR-1089-CORE	10x360	10x360	75	125	175	
TIA-968-A	10x560	10x560	50	100	150	
ITU-T K.20/21	10x700	5x310	75	100	200	
GR-1089-CORE	10x1000	10x1000	50	80	100	

\* Recognized Components



**ON Semiconductor®**

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### BIDIRECTIONAL SURFACE MOUNT THYRISTOR 64 – 350 VOLTS



**SMB**  
JEDEC DO-214AA  
CASE 403C

#### MARKING DIAGRAM



XXXX = Specific Device Code  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package  
(Note: Microdot may be in either location)

#### ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

## NTVB Series

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristics (Notes 1, 2, 3)	Symbol	Min	Typ	Max	Unit
Breakover Voltage (Both Polarities) NTVB058NSx-L NTVB065NSx-L NTVB090NSx-L NTVB170Sx-L NTVB170NSx-L NTVB180Sx-L NTVB200Sx-L NTVB220NSx-L NTVB270Sx-L NTVB275NSx-L NTVB300Sx-L	V <sub>(BO)</sub>			77 88 130 265 220 240 320 300 365 350 400	V
Off-State Voltage (Both Polarities) NTVB058NSx-L NTVB065NSx-L NTVB090NSx-L NTVB170Sx-L NTVB170NSx-L NTVB180Sx-L NTVB200Sx-L NTVB220NSx-L NTVB270Sx-L NTVB275NSx-L NTVB300Sx-L	V <sub>DRM</sub>	58 65 90 170 170 170 200 220 270 275 300			V
Off State Current (V <sub>D1</sub> = 50 V) Both Polarities (V <sub>D2</sub> = V <sub>DRM</sub> ) Both Polarities	I <sub>DRM1</sub> I <sub>DRM2</sub>			2.0 5.0	μA μA
Holding Current (Both Polarities) (Note 3) V <sub>S</sub> = 500 V; I <sub>T</sub> = 2.2 A	I <sub>H</sub>	150	250	-	mA
On-State Voltage I <sub>T</sub> = 1.0 A(pk) (PW = 300 μSec, DC = 2%)	V <sub>T</sub>	-	-	4.0	V
Maximum Non-Repetitive Rate of Change of On-State Current (Note 1) (Haefely test method, 1.0 pk < 100 A)	di/dt	-	-	500	A/μSec
Critical Rate of Rise of Off-State Voltage (Linear Waveform, V <sub>D</sub> = 0.8 V <sub>DRM</sub> , T <sub>J</sub> = 25°C)	dv/dt	5.0	-	-	kV/μSec

### CAPACITANCE

Characteristics	Symbol	Typ			Unit
		A	B	C	
(f=1.0 MHz, 1.0 V <sub>rms</sub> , 2 Vdc bias) NTVB058NSx-L NTVB065NSx-L NTVB090NSx-L NTVB170Sx-L NTVB170NSx-L NTVB180Sx-L NTVB200Sx-L NTVB220NSx-L NTVB270Sx-L NTVB275NSx-L NTVB300Sx-L	C <sub>o</sub>	84 79 58 39 39 37 36 33 31 28 28	129 123 95 150 59 59 56 52 47 44 44	222 198 154 195 99 97 110 81 76 97 71	pF

1. Electrical parameters are based on pulsed test methods.
2. Measured under pulsed conditions to reduce heating
3. Allow cooling before testing second polarity.

# NTVB Series

## SURGE RATINGS

Characteristics	Symbol	A	B	C	Unit
Nominal Pulse					A(pk)
Surge Short Circuit Current Non – Repetitive					
Double Exponential Decay Waveform (Notes 4, 5 and 6)					
2 x 10 $\mu$ Sec	I <sub>PPS1</sub>	150	250	500	
10 x 160 $\mu$ Sec	I <sub>PPS3</sub>	90	150	200	
10 x 360 $\mu$ Sec	I <sub>PPS4</sub>	75	125	150	
10 x 560 $\mu$ Sec	I <sub>PPS5</sub>	50	100	150	
10 x 700 $\mu$ Sec	I <sub>PPS6</sub>	75	100	200	
10 x 1000 $\mu$ Sec	I <sub>PPS7</sub>	50	80	100	

4. Allow cooling before testing second polarity.
5. Measured under pulse conditions to reduce heating.
6. Nominal values may not represent the maximum capability of a device.

## THERMAL CHARACTERISTICS

Symbol	Rating	Value	Unit
T <sub>STG</sub>	Storage Temperature Range	-65 to +150	°C
T <sub>J</sub>	Operating Temperature Range	-40 to +150	°C
R <sub>0JA</sub>	Thermal Resistance: Junction-to-Ambient Per EIA/JESD51-3, PCB = FR4 3"x4.5"x0.06" Fan out in a 3x3 inch pattern, 2 oz copper track.	90	°C/W

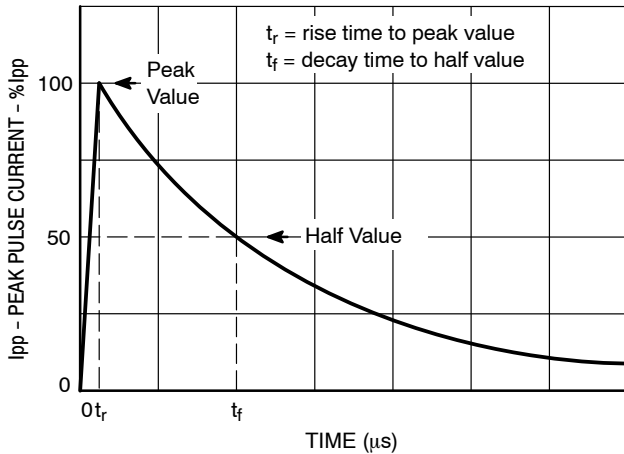


Figure 1. Exponential Decay Pulse Waveform

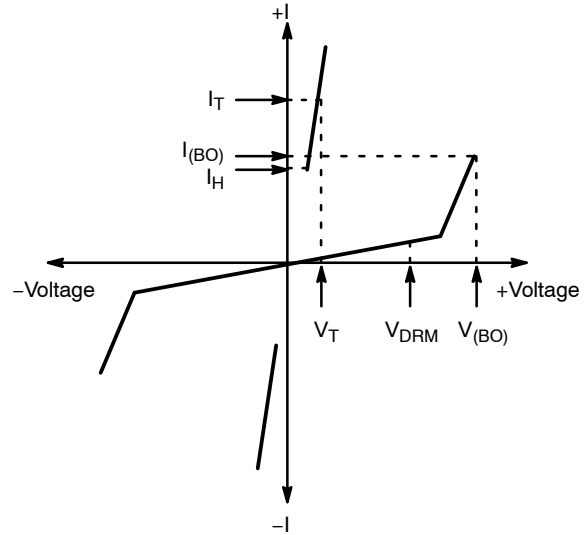


Figure 2. Voltage Current Characteristics of TSPD

Symbol	Parameter
V <sub>DRM</sub>	Peak Off State Voltage
V <sub>(BO)</sub>	Breakover Voltage
I <sub>(BO)</sub>	Breakover Current
I <sub>H</sub>	Holding Current
V <sub>T</sub>	On State Voltage
I <sub>T</sub>	On State Current

## NTVB Series

### ORDERING INFORMATION

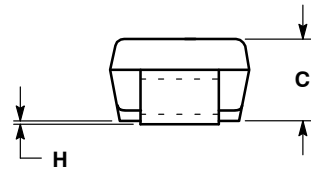
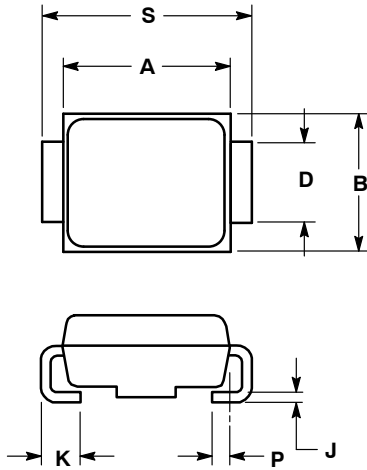
Part Number	Marking	Case	Shipping†
NTVB058NSB-L	58NB	SMB (Pb-Free)	2500 / Tape and Reel
NTVB058NSC-L	58NC		
NTVB065NSA-L	65NA		
NTVB065NSC-L	65NC		
NTVB090NSA-L	90NA		
NTVB170SA-L	170A		
NTVB170SC-L	170C		
NTVB170NSC-L	17NC		
NTVB180SA-L	180A		
NTVB200SA-L	200A		
NTVB200SB-L	200B		
NTVB200SC-L	200C		
NTVB220NSC-L	22NC		
NTVB270SA-L	270A		
NTVB270SB-L	270B		
NTVB270SC-L	270C		
NTVB275NSC-L	27NC		
NTVB300SA-L	300A		
NTVB300SB-L	300B		
NTVB300SC-L	300C		

†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.

# NTVB Series

## PACKAGE DIMENSIONS

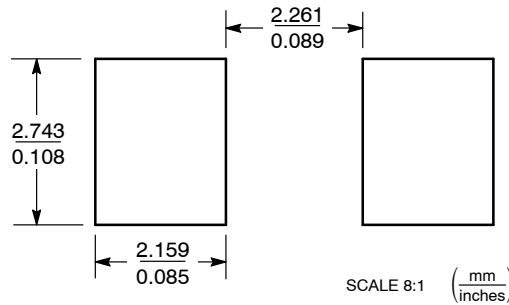
### SMB CASE 403C-01 ISSUE A



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

DIM	INCHES		MILLIMETERS	
	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\*



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

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**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
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