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.

ON Semiconductor®

http://onsemi.com

BIDIRECTIONAL SURFACE MOUNT THYRISTOR 64 − 350 VOLTS

MT1 o———|N|———o MT2

SMB
JEDEC DO−214AA
CASE 403C

MARKING DIAGRAM

AYWW
XXXX▪

XXXX	= Specific Device Code
Y	= Year
WW	= Work Week
▪	= Pb−Free Package

(Note: Microdot may be in either location)

ELECTRICAL PARAMETERS

Device	V_{DRM}	$V_{(BO)}$	V_T	I_{DRM}	$I_{(BO)}$	I_T	I_H
	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

	Waveform		x = series ratings			
Specification	Voltage μs	Current μs	A	B	C	Unit
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	

*ᴿᵁ Recognized Components

ELECTRICAL CHARACTERISTICS (T_A = 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	$V_{(BO)}$			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_{DRM}	58 65 90 170 170 170 200 220 270 275 300			V
Off State Current (V_{D1} = 50 V) Both Polarities (V_{D2} = V_{DRM}) Both Polarities	I_{DRM1} I_{DRM2}			2.0 5.0	μA μA
Holding Current (Both Polarities) (Note 3) V_S = 500 V; I_T = 2.2 A	I_H	150	250	–	mA
On–State Voltage I_T = 1.0 A(pk) (PW = 300 μSec, DC = 2%)	V_T	–	–	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_D = 0.8 V_{DRM}, T_J = 25°C)	dv/dt	5.0	–	–	kV/μSec

CAPACITANCE

Characteristics	Symbol	Typ			Unit
		A	B	C	
(f=1.0 MHz, 1.0 V_{rms}, 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_o	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
    Surge Short Circuit Current Non − Repetitive
    Double Exponential Decay Waveform (Notes 4, 5 and 6)
					A(pk)

2 x 10 μSec	I_{PPS1}	150	250	500	
10 x 160 μSec	I_{PPS3}	90	150	200	
10 x 360 μSec	I_{PPS4}	75	125	150	
10 x 560 μSec	I_{PPS5}	50	100	150	
10 x 700 μSec	I_{PPS6}	75	100	200	
10 x 1000 μSec	I_{PPS7}	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_{STG}	Storage Temperature Range	−65 to +150	°C
T_J	Operating Temperature Range	−40 to +150	°C
$R_{\theta JA}$	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
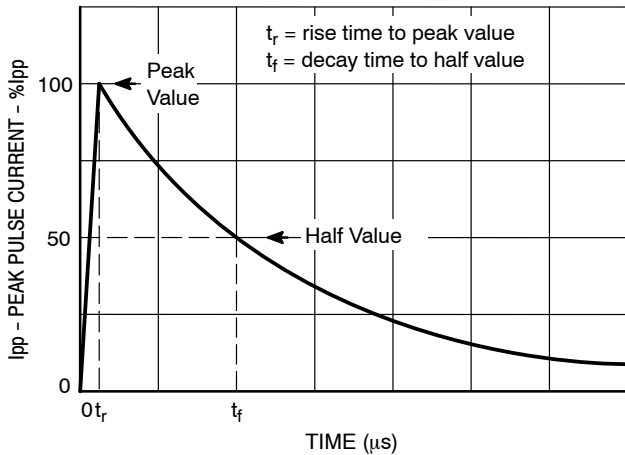
Figure 1. Exponential Decay Pulse Waveform
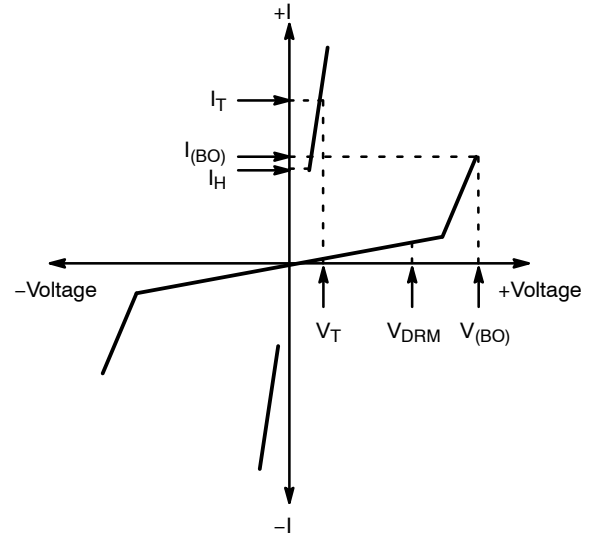
Figure 2. Voltage Current Characteristics of TSPD

Symbol	Parameter
V_{DRM}	Peak Off State Voltage
$V_{(BO)}$	Breakover Voltage
$I_{(BO)}$	Breakover Current
I_H	Holding Current
V_T	On State Voltage
I_T	On State Current

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.

PACKAGE DIMENSIONS

SMB
CASE 403C–01
ISSUE A
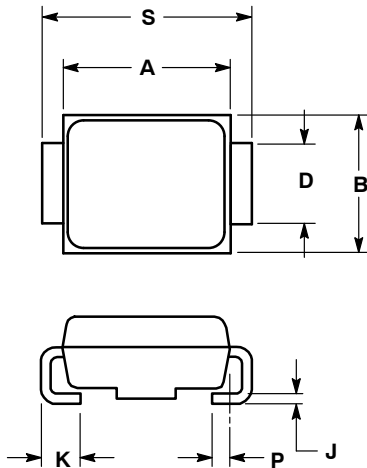
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. D DIMENSION SHALL BE MEASURED WITHIN DIMENSION P.

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*

2.261 / 0.089

2.743 / 0.108

2.159 / 0.085

SCALE 8:1   (mm / inches)
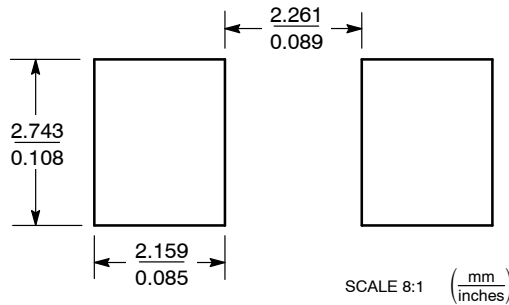
*For additional information on our Pb–Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.