

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_{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

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®

<http://onsemi.com>

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_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					A(pk)
Surge Short Circuit Current Non – Repetitive					
Double Exponential Decay Waveform (Notes 4, 5 and 6)					
2 x 10 μ Sec	I _{PPS1}	150	250	500	
10 x 160 μ Sec	I _{PPS3}	90	150	200	
10 x 360 μ Sec	I _{PPS4}	75	125	150	
10 x 560 μ Sec	I _{PPS5}	50	100	150	
10 x 700 μ Sec	I _{PPS6}	75	100	200	
10 x 1000 μ Sec	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 _{ΘJA}	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

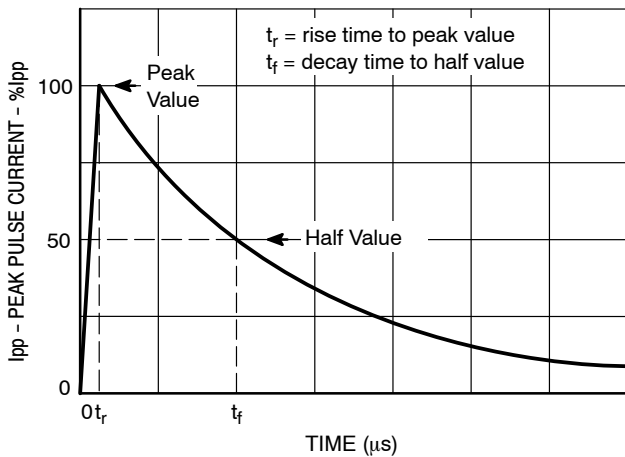


Figure 1. Exponential Decay Pulse Waveform

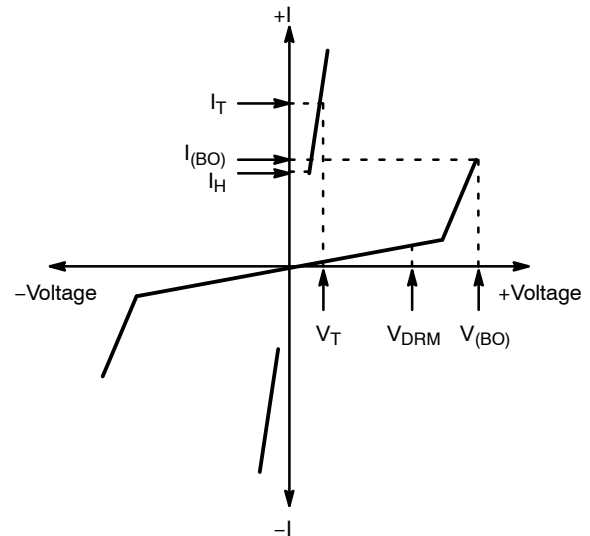


Figure 2. Voltage Current Characteristics of TSPD

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

NTVB Series

ORDERING INFORMATION

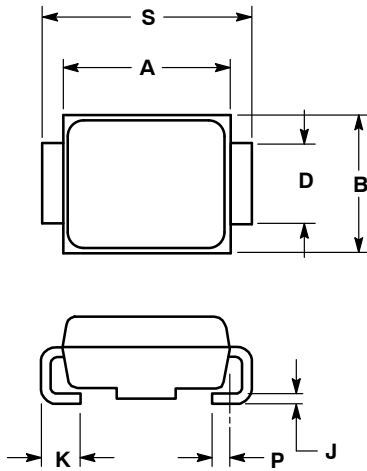
Part Number	Marking	Case	Shipping†
NTVB058NSB-L	58NB	SMB (Pb-Free)	2500 / Tape and Reel
NTVB058NSC-L	58NC		
NTVB065NSA-L	65NA		
NTVB065NSC-L	65NC		
NTVB090NSA-L	90NA		
NTVB170SA-L	170A		
NTVB170SC-L	170C		
NTVB170NSC-L	17NC		
NTVB180SA-L	180A		
NTVB200SA-L	200A		
NTVB200SB-L	200B		
NTVB200SC-L	200C		
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

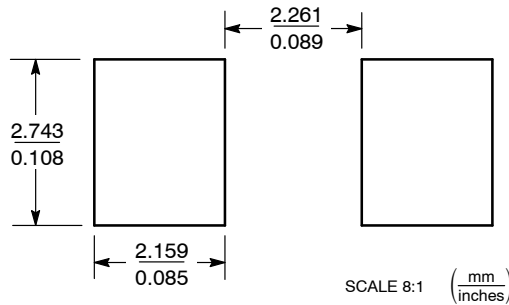


NOTES:

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.

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
Europe, Middle East and Africa Technical Support:
 Phone: 421 33 790 2910
Japan Customer Focus Center
 Phone: 81-3-5773-3850

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>
 For additional information, please contact your local Sales Representative