THE DATASHEET OF

NP1500SBT3G

NP Series

Preferred Devices

Thyristor Surge Protectors

High Voltage Bidirectional

NP 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 NP 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	$V_{(BO)}$ V	V_T V	I_{DRM} μA	$I_{(BO)}$ mA	I_T A	I_H mA
NP0640SxT3G	58	77	4	5	800	2.2	150
NP0720SxT3G	65	88	4	5	800	2.2	150
NP0900SxT3G	75	98	4	5	800	2.2	150
NP1100SxT3G	90	130	4	5	800	2.2	150
NP1300SxT3G	120	160	4	5	800	2.2	150
NP1500SxT3G	140	180	4	5	800	2.2	150
NP1800SxT3G	170	220	4	5	800	2.2	150
NP2100SxT3G	180	240	4	5	800	2.2	150
NP2300SxT3G	190	260	4	5	800	2.2	150
NP2600SxT3G	220	300	4	5	800	2.2	150
NP3100SxT3G	275	350	4	5	800	2.2	150
NP3500SxT3G	320	400	4	5	800	2.2	150

G = indicates leadfree, RoHS compliant

SURGE DATA RATINGS

Specification	Waveform Voltage μs	Waveform Current μs	x = series ratings 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	

*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.

Preferred devices are recommended choices for future use and best overall value.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristics (Note 1)	Symbol	Min	Typ	Max	Unit
Breakover Voltage (Both Polarities)	$V_{(BO)}$				V
NP0640SxT3G				77	
NP0720SxT3G				88	
NP0900SxT3G				98	
NP1100SxT3G				130	
NP1300SxT3G				160	
NP1500SxT3G				180	
NP1800SxT3G				220	
NP2100SxT3G				240	
NP2300SxT3G				260	
NP2600SxT3G				300	
NP3100SxT3G				350	
NP3500SxT3G				400	
Off−State Voltage (Both Polarities)	V_{DRM}				V
NP0640SxT3G		58			
NP0720SxT3G		65			
NP0900SxT3G		75			
NP1100SxT3G		90			
NP1300SxT3G		120			
NP1500SxT3G		140			
NP1800SxT3G		170			
NP2100SxT3G		180			
NP2300SxT3G		190			
NP2600SxT3G		220			
NP3100SxT3G		275			
NP3500SxT3G		320			
Off State Current (V_{D1} = 50 V) Both Polarities	I_{DRM1}			2.0	μA
($V_{D2} = V_{DRM}$) Both Polarities	I_{DRM2}			5.0	μA
Holding Current (Both Polarities) (Note 4) 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)	C_o				pF
NP0640SxT3G		84	129	222	
NP0720SxT3G		79	123	198	
NP0900SxT3G		65	122	122	
NP1100SxT3G		58	95	154	
NP1300SxT3G		46	75	120	
NP1500SxT3G		44	70	113	
NP1800SxT3G		39	59	99	
NP2100SxT3G		37	59	97	
NP2300SxT3G		36	56	56	
NP2600SxT3G		33	52	81	
NP3100SxT3G		31	47	76	
NP3500SxT3G		28	44	71	

1. Electrical parameters are based on pulsed test methods.
2. di/dt must not be exceeded of a maximum of 100 A/μSec in this application.
3. Measured under pulsed conditions to reduce heating
4. Allow cooling before testing second polarity.

SURGE RATINGS

Characteristics	Symbol	A	B	C	Unit
Nominal Pulse Surge Short Circuit Current Non − Repetitive Double Exponential Decay Waveform (Notes 5, 6 and 7)					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	

5. Allow cooling before testing second polarity.
6. Measured under pulse conditions to reduce heating.
7. 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

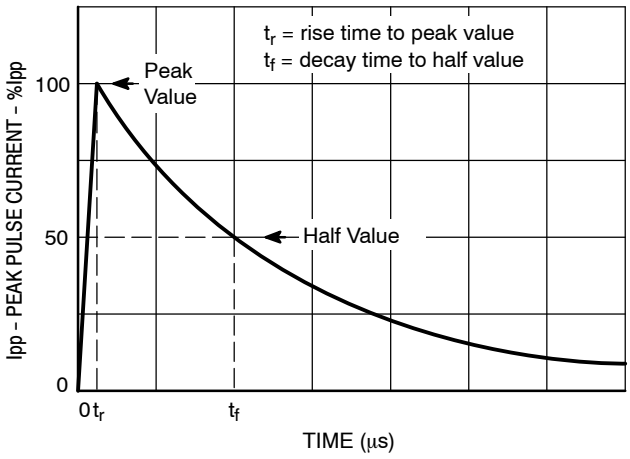


Figure 1. Exponential Decay Pulse Waveform

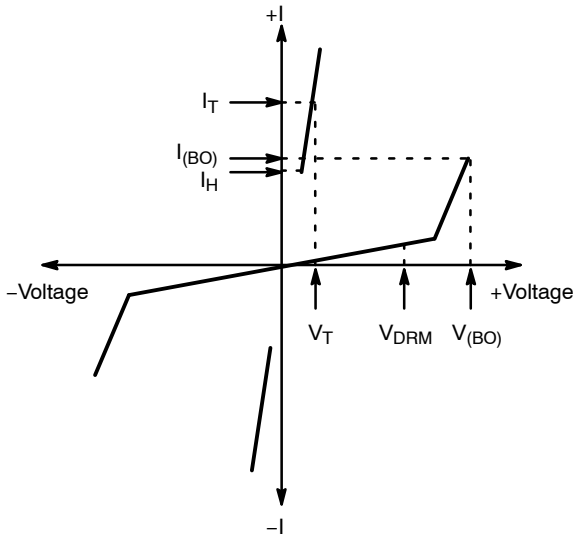


Figure 2. Voltage Current Characteristics of TSPD

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

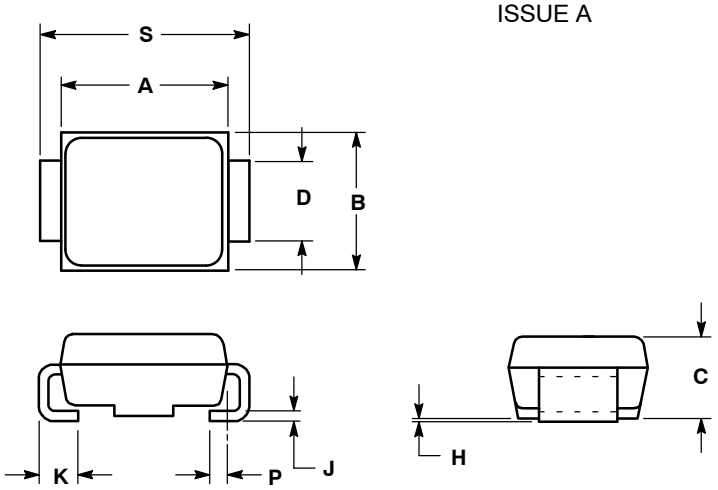
ORDERING INFORMATION

Part Number	Marking	Case	Shipping†
NP0640SAT3G	064A	SMB (Pb−Free)	2500 / Tape and Reel
NP0640SBT3G	064B		
NP0640SCT3G	064C		
NP0720SAT3G	072A		
NP0720SBT3G	072B		
NP0720SCT3G	072C		
NP0900SAT3G	090A		
NP0900SBT3G	090B		
NP0900SCT3G	090C		
NP1100SAT3G	110A		
NP1100SBT3G	110B		
NP1100SCT3G	110C		
NP1300SAT3G	130A		
NP1300SBT3G	130B		
NP1300SCT3G	130C		
NP1500SAT3G	150A		
NP1500SBT3G	150B		
NP1500SCT3G	150C		
NP1800SAT3G	180A		
NP1800SBT3G	180B		
NP1800SCT3G	180C		
NP2100SAT3G	210A		
NP2100SBT3G	210B		
NP2100SCT3G	210C		
NP2300SAT3G	230A		
NP2300SBT3G	230B		
NP2300SCT3G	230C		
NP2600SAT3G	260A		
NP2600SBT3G	260B		
NP2600SCT3G	260C		
NP3100SAT3G	310A		
NP3100SBT3G	310B		
NP3100SCT3G	310C		
NP3500SAT3G	350A		
NP3500SBT3G	350B		
NP3500SCT3G	350C		

†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

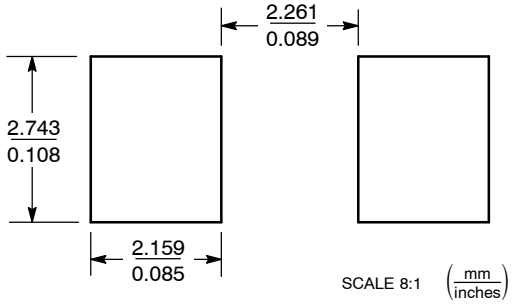
SMB
CASE 403C−01
ISSUE A



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

	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

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.

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
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Order Literature: http://www.onsemi.com/orderlit

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NP0640S/D

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