

# NP1500SC-T3G

Preferred Devices

## Advance Information Thyristor Surge Protectors

### High Voltage Bidirectional TSPD

This Thyristor Surge Protective device (TSPD) prevents overvoltage damage to sensitive circuits by lightning, induction and power line crossings. This device is a breakover-triggered crowbar protector. Turn-off occurs when the surge current falls below the holding current value.

#### Features

- High Surge Current Capability: 100 A 10 x 1000  $\mu$ sec, for Controlled Temperature Environments
- The NP1500SC-T3G is used to help equipment meet various regulatory requirements including: Bellcore 1089, ITU K.20 & K.21, IEC 950, UL 1459 & 1950 and FCC Part 68.
- Bidirectional Protection in a Single Device
- Little Change of Voltage Limit with Transient Amplitude or Rate
- Freedom from Wearout Mechanisms Present in Non-Semiconductor Devices
- Fail-Safe, Shorts When Overstressed, Preventing Continued Unprotected Operation
- Surface Mount Technology
- $\mathcal{R}$  Indicates UL Registered – File #E210057

#### MAXIMUM RATINGS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Off-State Voltage	$V_{DRM}$	$\pm 140$	V
Maximum Pulse Surge Short Circuit Current Non-Repetitive Double Exponential Decay Waveform (Notes 1 and 2)			A(pk)
10 x 160 $\mu$ sec	$I_{PPS1}$	$\pm 200$	
10 x 360 $\mu$ sec	$I_{PPS2}$	$\pm 175$	
10 x 560 $\mu$ sec	$I_{PPS3}$	$\pm 150$	
10 x 700 $\mu$ sec	$I_{PPS4}$	$\pm 200$	
10 x 1000 $\mu$ sec	$I_{PPS5}$	$\pm 100$	
Maximum Non-Repetitive Rate of Change of On-State Current (Note 3)	$di/dt$	$\pm 500$	A/ $\mu$ s

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Allow cooling before testing second polarity.
2. Measured under pulse conditions to reduce heating.
3. Haefely test method.

This document contains information on a new product. Specifications and information herein are subject to change without notice.



**ON Semiconductor**<sup>®</sup>

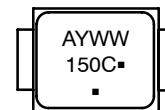
<http://onsemi.com>

### BIDIRECTIONAL TSPD ( $\mathcal{R}$ ) 100 AMP SURGE 150 VOLTS



**SMB**  
(No Polarity)  
(Essentially JEDEC DO-214AA)  
CASE 403C

#### MARKING DIAGRAM



150C = Specific Device Code  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package  
(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
NP1500SC-T3G	SMB (Pb-Free)	2500 / Tape and Reel

<sup>†</sup>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.

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

# NP1500SC-T3G

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Operating Temperature Range Blocking or Conducting State	$T_{J1}$	-40 to +125	°C
Overload Junction Temperature – Maximum Conducting State Only	$T_{J2}$	+175	°C
Instantaneous Peak Power Dissipation ( $I_{pk} = 100$ A, $10 \times 1000$ $\mu$ sec @ 25°C)	$P_{PK}$	4000	W
Maximum Lead Temperature for Soldering Purposes 1/8" from Case for 10 Seconds	$T_L$	260	°C

## ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Devices are bidirectional. All electrical parameters apply to forward and reverse polarities.

Characteristics	Symbol	Min	Typ	Max	Unit
Breakover Voltage (Both polarities) ( $dv/dt = 100$ V/ $\mu$ s, $I_{SC} = 1.0$ A, $V_{dc} = 1000$ V)	$V_{(BO)}$	-	-	180	V
Off State Current ( $V_{D1} = 50$ V) Both polarities ( $V_{D2} = V_{DRM}$ ) Both polarities	$I_{D1}$ $I_{D2}$	- -	- -	2.0 5.0	$\mu$ A
Holding Current (Both polarities) (Note 4) $V_S = 500$ V; $I_T = \pm 2.2$ A	$I_H$	150	250	-	mA
On-State Voltage ( $I_T = 1.0$ A(pk)) ( $PW = 300$ $\mu$ s, Duty Cycle = 2%) (Note 4)	$V_T$	-	1.53	4.0	V
Maximum Non-Repetitive Rate of Change of On-State Current (Note 4) (Haefely test method, $1.0$ pk < $100$ A)	$di/dt$	-	-	500	A/ $\mu$ Sec
Critical Rate of Rise of Off-State Voltage (Linear Waveform, $V_D = 0.8 V_{DRM}$ , $T_J = 25^\circ\text{C}$ )	$dv/dt$	5.0	-	-	kV/ $\mu$ Sec
Capacitance ( $f = 1.0$ MHz, $2.0$ Vdc)	$C_O$	-	-	180	pF

4. Measured under pulse conditions to reduce heating.

5. Signal level 1.0 V.

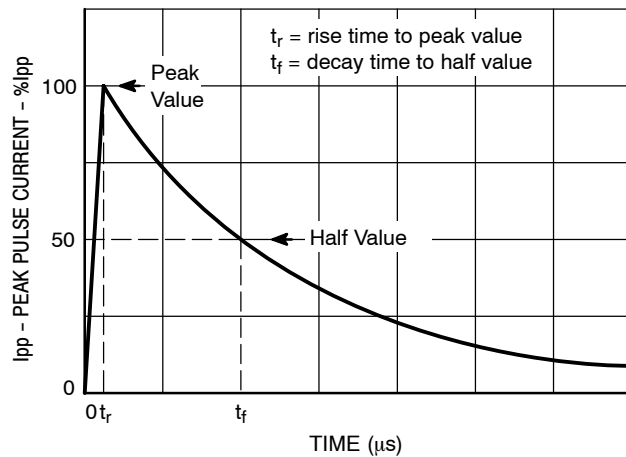


Figure 1. Exponential Decay Pulse Waveform

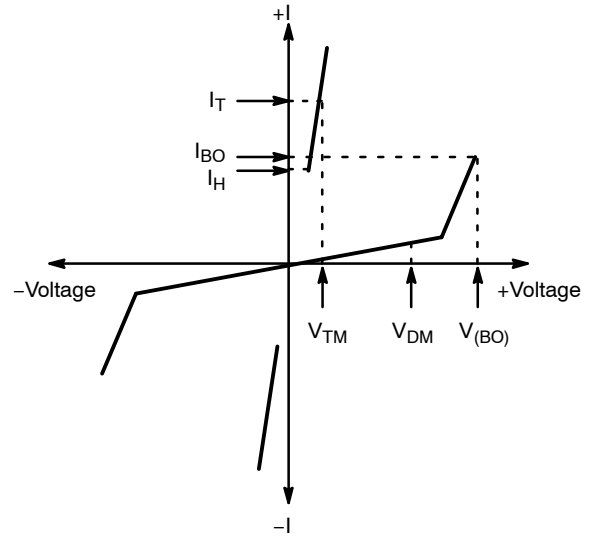


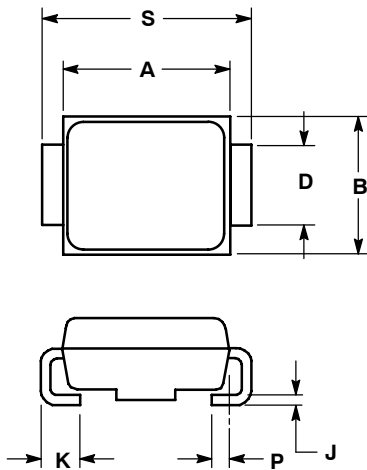
Figure 2. Voltage Characteristic of TSPD

Symbol	Parameter
$V_{DM}$	Peak Off State Voltage
$V_{BO}$	Breakover Voltage
$I_{BO}$	Breakover Current
$I_H$	Holding Current
$V_{TM}$	On State Voltage
$I_T$	On State Current

# NP1500SC-T3G

## PACKAGE DIMENSIONS

SMB  
CASE 403C-01  
ISSUE A

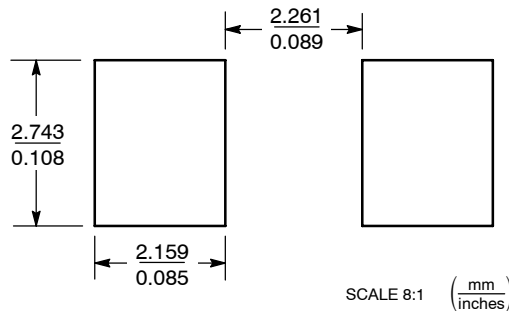


NOTES:


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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