

# NP2600SA1, NP2600SB1, NP2600SC1

Preferred Devices

## Advance Information Thyristor Surge Protector

### High Voltage Bidirectional TSPD

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

#### Features

- High Surge Current Capability: 50 A, 80 A & 100 A, 10 x 1000  $\mu$ sec, for Controlled Temperature Environments
- The NP2600Sx 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
- $\mathcal{N}$  Indicates UL Registered - File #E210057
- This is a Pb-Free Device

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

Rating	Value			Unit	
Off-State Voltage - Maximum	$\pm 220$			V	
NP2600Sx1	x = Series Ratings				
	A	B	C		
Maximum Pulse Surge Short Circuit Current Non-Repetitive Double Exponential Decay Waveform (Notes 1 and 2)				A(pk)	
	2 x 10 $\mu$ s	150	250		500
	10 x 160 $\mu$ s	90	150		200
	10 x 560 $\mu$ s	50	100		150
	5 x 310 $\mu$ s	75	100		200
	10 x 1000 $\mu$ s	50	80		100

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. Half-cycle test method.

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



ON Semiconductor®

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**BIDIRECTIONAL TSPD ( $\mathcal{N}$ )**  
**50, 80, AND 100 AMP SURGE**  
**260 VOLTS**  
**HIGH HOLD CURRENT**  
**270 mA MIN**



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

#### MARKING DIAGRAM



261x = Device Code  
x = A, B or C  
A = Assembly Location  
Y = Year  
WW = Work Week  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
NP2600SA1T3G	SMB (Pb-Free)	2500/Tape & Reel
NP2600SB1T3G	SMB (Pb-Free)	2500/Tape & Reel
NP2600SC1T3G	SMB (Pb-Free)	2500/Tape & 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.

# NP2600SA1, NP2600SB1, NP2600SC1

## 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 ( $I_{pk} = 80$ A, $10 \times 1000 \mu\text{sec}$ @ $25^\circ\text{C}$ )	$P_{PK}$	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/ $\mu\text{s}$ , $I_{SC} = 1.0$ A, $V_{dc} = 1000$ V)	$V_{(BO)}$	-	-	300	V
Breakdown Voltage ( $I_{(BR)} = 1.0$ mA) Both Polarities	$V_{DRM}$	220	-	-	V
Off State Current ( $V_{D1} = 50$ V) Both Polarities ( $V_{D2} = V_{DRM}$ ) Both Polarities	$I_{D1}$ $I_{D2}$	-	-	2.0 5.0	$\mu\text{A}$
On-State Voltage ( $I_T = 2.2$ A) ( $PW \leq 300 \mu\text{s}$ , Duty Cycle $\leq 2\%$ ) (Note 4)	$V_T$	-	1.53	4.0	V
Breakover Current ( $f = 60$ Hz, $V_{DRM} = 1000$ V <sub>RMS</sub> , $R_S = 1.0$ k $\Omega$ ) Both polarities	$I_{(BO)}$	-	260	800	mA
Holding Current (Both Polarities) (Note 4) $V_S = 500$ V; $I_T$ (Initiating Current) = $\pm 1.0$ A	$I_H$	270	-	-	mA
Critical Rate of Rise of Off-State Voltage (Linear waveform, $V_D = \text{Rated } V_{(BO)}$ , $T_J = 25^\circ\text{C}$ )	$dv/dt$	2000	-	-	V/ $\mu\text{s}$
Capacitance ( $f = 1.0$ MHz, $2.0$ Vdc) (Note 5)	$C_0$	-	80	-	pF
	NP2600SA1	-	60	-	
	NP2600SB1	-	30	-	
	NP2600SC1	-	-	-	

4. Measured under pulse conditions to reduce heating.

5. Signal level  $1.0$  V<sub>RMS</sub>.

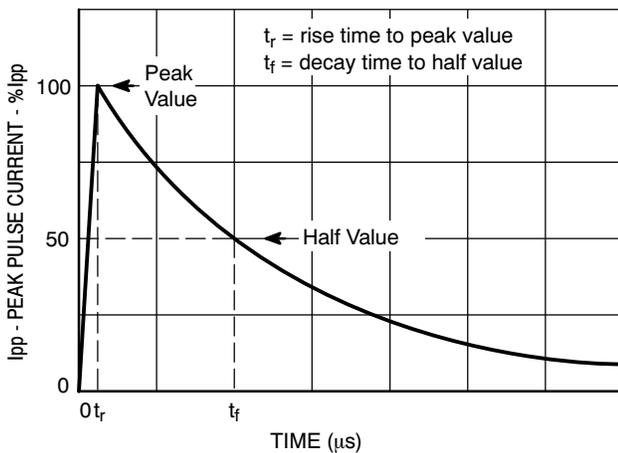


Figure 1. Exponential Decay Pulse Waveform

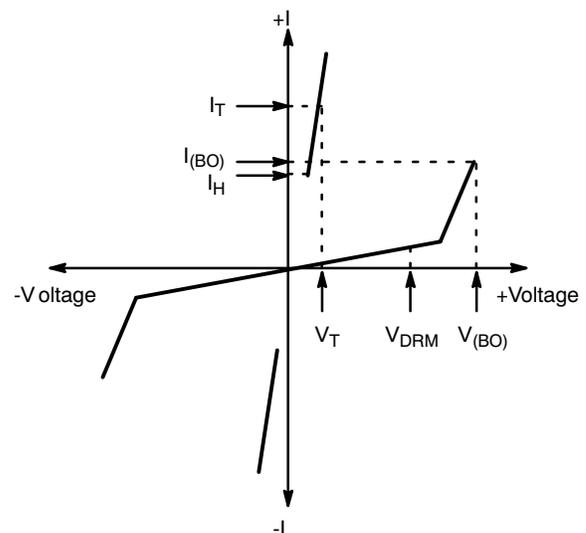


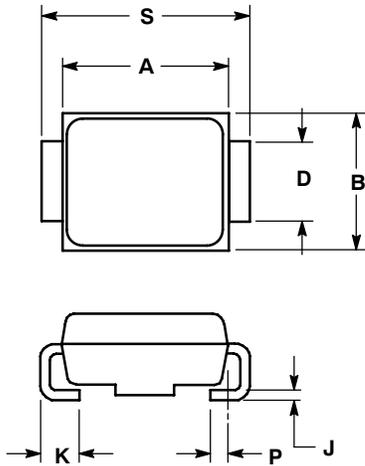
Figure 2. Voltage Current Characteristic of TSPD

Symbol	Parameters
$V_{DRM}$	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

# NP2600SA1, NP2600SB1, NP2600SC1

## PACKAGE DIMENSIONS

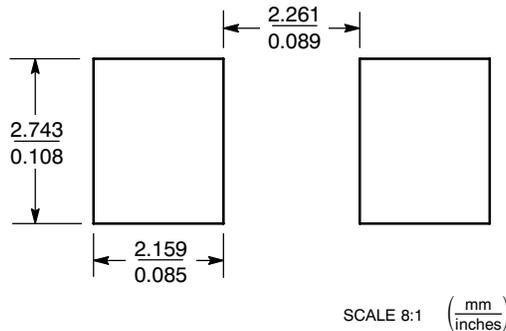
**SMB**  
CASE 403C-01  
ISSUE A



- 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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