

# NSVT1602SH

## Product Preview

### Bipolar Transistor

#### 160 V, 2 A, Low $V_{CE(sat)}$ NPN Single SOT-89

This device is a bipolar junction transistor featuring high current, low saturation voltage, and high speed switching.

Suitable for automotive applications. AEC-Q101 qualified and PPAP capable.

#### Features

- Complement to NSVT1601SH
- Large Current Capacitance
- Low Collector-to-Emitter Saturation Voltage
- High-Speed Switching
- High Allowable Power Dissipation
- AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### Typical Applications

- Load Switch
- Gate Driver Buffer
- DC-DC Converters

#### ABSOLUTE MAXIMUM RATING at $T_A = 25^\circ\text{C}$

Parameter	Symbol	Value	Unit
Collector-to-Base Voltage	$V_{CBO}$	180	V
Collector-to-Emitter Voltage	$V_{CEO}$	160	V
Emitter-to-Base Voltage	$V_{EBO}$	6	V
Collector Current	$I_C$	2	A
Collector Current (Pulse)	$I_{CP}$	4	A
Collector Dissipation	$P_C$	0.5	W
Collector Dissipation (Note 1)	$P_C$	1.5	W
Collector Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_C$	3.5	W
Junction Temperature	$T_J$	175	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 to +175	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

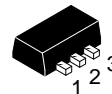
1. Surface mounted on ceramic board (250 mm<sup>2</sup> x 0.8 mm).

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.



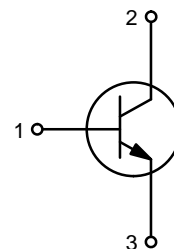
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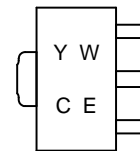


SOT-89  
CASE 528AG

#### ELECTRICAL CONNECTION



#### MARKING DIAGRAM



Y = Year  
W = Work Week  
CE = Specific Device Code

#### ORDERING INFORMATION

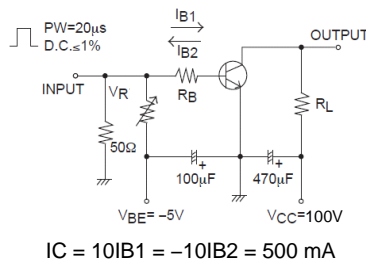
See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

# NSVT1602SH

## ELECTRICAL CHARACTERISTICS at $T_A = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = 180\text{ V}$ $I_E = 0\text{ A}$			0.1	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = 6\text{ V}$ $I_C = 0\text{ A}$			0.1	$\mu\text{A}$
DC Current Gain	$h_{FE1}$	$V_{CE} = 5\text{ V}$ $I_C = 100\text{ mA}$	140		400	
	$h_{FE2}$	$V_{CE} = 5\text{ V}$ $I_C = 500\text{ mA}$	130			
Gain-Bandwidth Product	$f_T$	$V_{CE} = 10\text{ V}$ $I_C = 50\text{ mA}$		120		MHz
Output Capacitance	$C_{ob}$	$V_{CB} = 10\text{ V}$ $f = 1\text{ MHz}$		14		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)1}$	$I_C = 250\text{ mA}$ $I_B = 25\text{ mA}$		0.04	0.08	V
	$V_{CE(sat)2}$	$I_C = 250\text{ mA}$ $I_B = 50\text{ mA}$		0.035	0.07	V
	$V_{CE(sat)3}$	$I_C = 500\text{ mA}$ $I_B = 50\text{ mA}$		0.07	0.14	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 250\text{ mA}$ $I_B = 25\text{ mA}$		0.8	1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 10\ \mu\text{A}$ , $I_E = 0\text{ A}$	180			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1\text{ mA}$ , $R_{BE} = \infty$	160			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10\ \mu\text{A}$ , $I_C = 0\text{ A}$	6			V
Turn-On Time	$t_{on}$	See Figure 1		TBD		ns
Storage Time	$t_{stg}$			TBD		ns
Fall Time	$t_f$			TBD		ns

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.



**Figure 1. Switching Time Test Circuit**

## ESD RATING

Parameter	Symbol	Value	Unit	Class
Electrostatic Discharge – Human Body Model	HBM	4000	V	H3
Electrostatic Discharge – Machine Model	MM	400	V	M4

## ORDERING INFORMATION

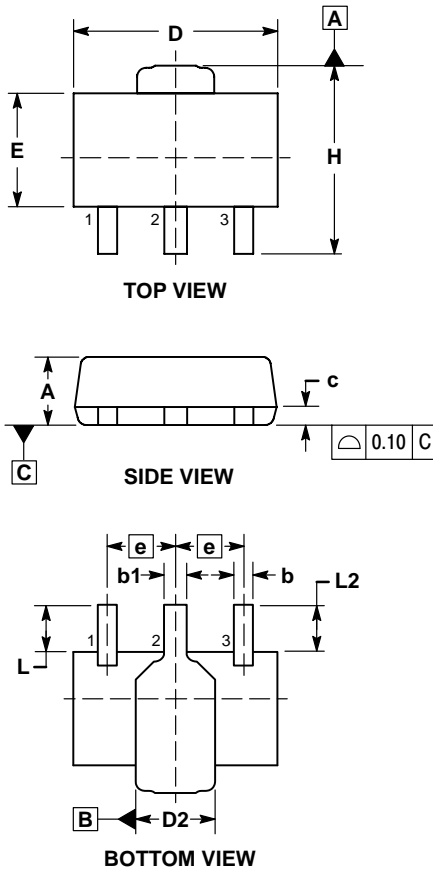
Device	Marking	Package	Shipping (Qty / Packing) <sup>†</sup>
NSVT1602SHT1G	CE	SOT-89 (Pb-Free / Halogen Free)	1,000 / Tape & Reel

<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

# NSVT1602SH

## PACKAGE DIMENSIONS

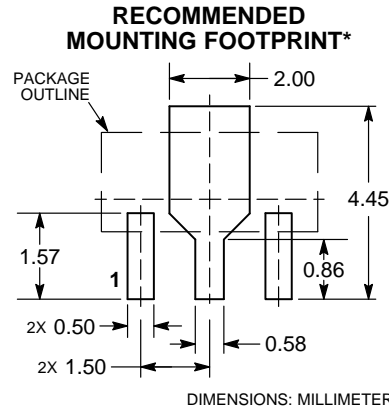
### SOT-89, 3 LEAD CASE 528AG ISSUE O



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. LEAD THICKNESS INCLUDES LEAD FINISH.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
5. DIMENSIONS L, L2, D2, AND H ARE MEASURED AT DATUM PLANE C.
6. CENTER LEAD CONTOUR MAY VARY WITHIN THE REGION DEFINED BY DIMENSION E.
7. DIMENSION D2 IS DEFINED AT ITS WIDEST POINT.

MILLIMETERS		
DIM	MIN	MAX
A	1.40	1.60
b	0.38	0.47
b1	0.46	0.55
c	0.40	0.44
D	4.40	4.60
D2	1.60	1.90
E	2.40	2.60
e	1.50 BSC	
H	4.05	4.25
L	0.89	1.20



\*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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