

# NSVS1002SL

## Product Preview Bipolar Transistor

### 100 V, 3 A, Low VCE(sat) NPN Single DPAK

This device is 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 NSVS1001SL
- 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

#### Specifications

##### ABSOLUTE MAXIMUM RATING at Ta = 25°C

Parameter	Symbol	Value	Unit
Collector to Base Voltage	V <sub>CBO</sub>	120	V
Collector to Emitter Voltage	V <sub>CEO</sub>	100	V
Emitter to Base Voltage	V <sub>EBO</sub>	7	V
Collector Current	I <sub>C</sub>	3	A
Collector Current (Pulse)	I <sub>CP</sub>	5	A
Collector Dissipation (Note 1)	P <sub>C</sub>	1	W
	PC (Tc = 25°C)	15	
Junction Temperature	T <sub>j</sub>	175	°C
Storage Temperature	T <sub>stg</sub>	-55 to +175	°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.

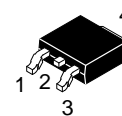
1. Surface mounted on FR board.

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



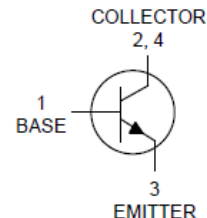
ON Semiconductor®

[www.onsemi.com](http://www.onsemi.com)

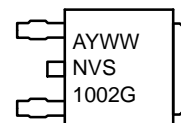


DPAK  
CASE 369C

#### ELECTRICAL CONNECTION



#### MARKING DIAGRAM



A = Assembly Location  
Y = Year  
WW = Work Week  
G = Pb-Free Package

#### ORDERING INFORMATION

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

# NSVS1002SL

## ELECTRICAL CHARACTERISTICS at Ta = 25°C

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Collector Cutoff Current	ICBO	V <sub>CB</sub> = 120 V I <sub>E</sub> = 0 A			0.1	μA
Emitter Cutoff Current	IEBO	VEB = 7 V I <sub>C</sub> = 0 A			0.1	μA
DC Current Gain	hFE1	V <sub>CE</sub> = 5 V I <sub>C</sub> = 100 mA	300		600	
	hFE2	V <sub>CE</sub> = 5 V I <sub>C</sub> = 1.5A	200			
Gain–Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = 10 V I <sub>C</sub> = 500 mA		TBD		MHz
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> = 10 V f = 1 MHz		15		pF
Collector to Emitter Saturation Voltage	V <sub>CE(sat)1</sub>	I <sub>C</sub> = 100 mA I <sub>B</sub> = 10 mA		0.018	0.036	V
	V <sub>CE(sat)2</sub>	I <sub>C</sub> = 1 A I <sub>B</sub> = 100 mA		0.07	0.14	V
	V <sub>CE(sat)3</sub>	I <sub>C</sub> = 3 A I <sub>B</sub> = 300 mA		0.18	0.36	V
Base to Emitter Saturation Voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> = 1 A I <sub>B</sub> = 100 mA		0.8	1.2	V
Collector to Base Breakdown Voltage	V(BR)CBO	I <sub>C</sub> = 10 μA, I <sub>E</sub> = 0 A	120			V
Collector to Emitter Breakdown Voltage	V(BR)CEO	I <sub>C</sub> = 1 mA, R <sub>BE</sub> = ∞	100			V
Emitter to Base Breakdown Voltage	V(BR)EBO	I <sub>E</sub> = 10 μA, I <sub>C</sub> = 0 A	7			V
Turn–On Time	t <sub>on</sub>	See Figure 1		TBD		ns
Storage Time	t <sub>stg</sub>			TBD		ns
Fall Time	t <sub>f</sub>			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.

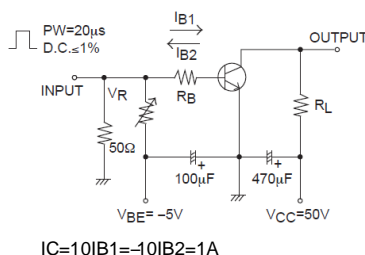


Figure 1. Switching Time Test Circuit

## 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

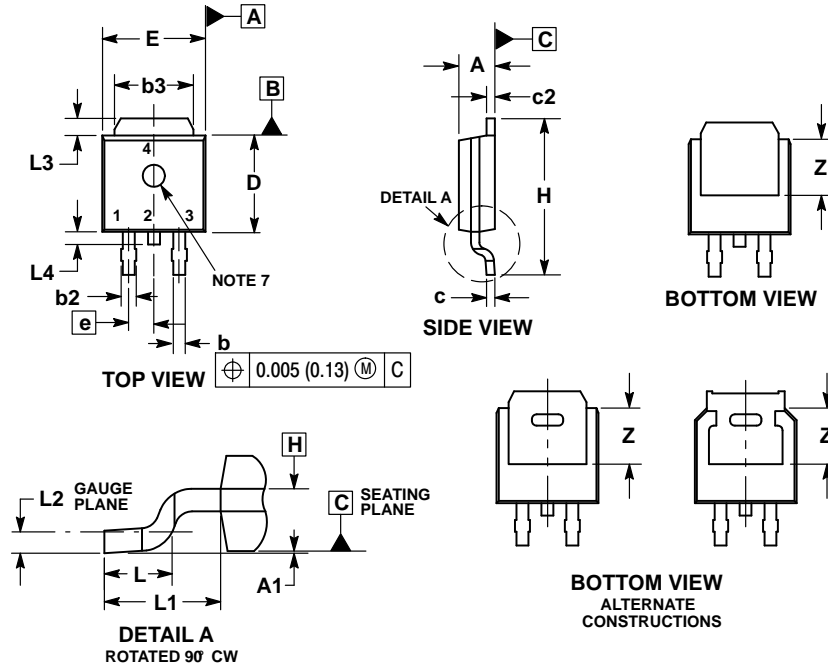
Device	Marking	Package	Shipping (Qty / Packing) <sup>†</sup>
NSVS1002SLT4G	NVS1002	DPAK (Pb–Free / Halogen Free)	2,500 / Tape & Reel

<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

# NSVS1002SL

## PACKAGE DIMENSIONS

### DPAK (SINGLE GAUGE) CASE 369C ISSUE F



**NOTES:**

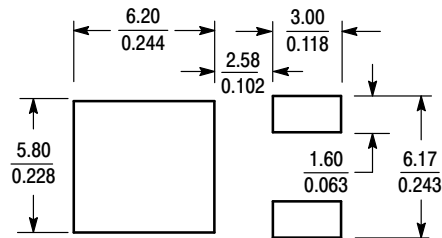
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCHES.
3. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS b3, L3 and Z.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.006 INCHES PER SIDE.
5. DIMENSIONS D AND E ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
6. DATUMS A AND B ARE DETERMINED AT DATUM PLANE H.
7. OPTIONAL MOLD FEATURE.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.086	0.094	2.18	2.38
A1	0.000	0.005	0.00	0.13
b	0.025	0.035	0.63	0.89
b2	0.028	0.045	0.72	1.14
b3	0.180	0.215	4.57	5.46
c	0.018	0.024	0.46	0.61
c2	0.018	0.024	0.46	0.61
D	0.235	0.245	5.97	6.22
E	0.250	0.265	6.35	6.73
e	0.090 BSC		2.29 BSC	
H	0.370	0.410	9.40	10.41
L	0.055	0.070	1.40	1.78
L1	0.114 REF		2.90 REF	
L2	0.020 BSC		0.51 BSC	
L3	0.035	0.050	0.89	1.27
L4	---	0.040	---	1.01
Z	0.155	---	3.93	---

**STYLE 1:**


1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

### SOLDERING FOOTPRINT\*



SCALE 3:1 (mm/inches)

\*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 trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor 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. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor 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 ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor 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  
19521 E. 32nd Pkwy, Aurora, Colorado 80011 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](mailto: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

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)

**Order Literature:** <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative