# onsemi

# Bipolar Transistor -160 V, -1 A, Low V<sub>CE</sub>(sat), PNP Single NSVT1418L



CASE 318-08

# ELECTRICAL CONNECTION



## MARKING DIAGRAM



CMM = Specific Device Code M = Single Digit Date Code

## **ORDERING INFORMATION**

See detailed ordering and shipping information on page 5 of this data sheet.

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

- Large Current Capacitance
- Low Collector to Emitter Saturation Voltage
- High Speed Switching
- High Allowable Power Dissipation
- AEC-Q101 Qualified and PPAP Capable
- Pb-Free, Halogen Free and RoHS Compliant
- Ultra Small Package Facilitates Miniaturization in End Products

## **Typical Applications**

- High Side Switch
- Lighting, Infotainment

## **ABSOLUTE MAXIMUM RATINGS** at $T_A = 25^{\circ}C$

Parameter	Symbol	Value	Unit
Collector to Base Voltage	V <sub>CBO</sub>	-180	V
Collector to Emitter Voltage	V <sub>CEO</sub>	-160	V
Emitter to Base Voltage	V <sub>EBO</sub>	-6	V
Collector Current	۱ <sub>C</sub>	-1	А
Collector Current (Pulse)	I <sub>CP</sub>	-2	А
Collector Dissipation (Note 1)	P <sub>C</sub>	0.42	W
Junction Temperature	Tj	150	°C
Storage Temperature Range	Tstg	–55 to +150	°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 substrate. (250 mm<sup>2</sup> x 0.8 mm)

# **ELECTRICAL CHARACTERISTICS** (T<sub>A</sub> = 25°C unless otherwise noted)

			Value			
Parameter	Symbol	Conditions	Min	Тур	Max	Unit
Collector Cutoff Current	I <sub>CBO</sub>	$V_{CB} = -120 \text{ V}, \text{ I}_{E} = 0 \text{ A}$			-0.1	μΑ
Emitter Cutoff Current	I <sub>EBO</sub>	$V_{EB} = -4 \text{ V}, \text{ I}_{C} = 0 \text{ A}$			-0.1	μA
DC Current Gain	h <sub>FE1</sub>	V <sub>CE</sub> = -5 V, I <sub>C</sub> = -100 mA	100		400	
	h <sub>FE2</sub>	V <sub>CE</sub> = -5 V, I <sub>C</sub> = -10 mA	90			
Gain-Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = -10 V, I <sub>C</sub> = -50 mA		120		MHz
Output Capacitance	Cob	V <sub>CB</sub> = -10 V, f = 1 MHz		11		pF
Collector to Emitter Saturation Voltage	V <sub>CE</sub> (sat)1	I <sub>C</sub> = -250 mA, I <sub>B</sub> = -25 mA		-0.1	-0.5	V
	V <sub>CE</sub> (sat)2	I <sub>C</sub> = -250 mA, I <sub>B</sub> = -50 mA		-0.08	-0.13	V
Base to Emitter Saturation Voltage	V <sub>BE</sub> (sat)	I <sub>C</sub> = -250 mA, I <sub>B</sub> = -25 mA		-0.8	-1.2	V
Collector to Base Breakdown Voltage	V <sub>(BR)CBO</sub>	$I_{C} = -10 \ \mu A, \ I_{E} = 0 \ A$	-180			V
Collector to Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	$I_C = -1 \text{ mA}, \text{ R}_{BE} = \infty$	-160			V
Emitter to Base Breakdown Voltage	V <sub>(BR)EBO</sub>	$I_{E} = -10 \ \mu A,$ $I_{C} = 0 \ A$	-6			V
Turn-On Time	t <sub>on</sub>	See Figure 1		90		ns
Storage Time	t <sub>stg</sub>	]		1000		ns
Fall Time	t <sub>f</sub>			70		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





V<sub>CE</sub>, COLLECTOR-TO-EMITTER VOLTAGE (mV)







#### **TYPICAL CHARACTERISTICS**

#### **ORDERING INFORMATION**

Device	Marking	Package	Shipping (Qty / Packing) †
NSVT1418LT1G	СММ	SOT–23 (Pb–Free / Halogen Free)	3,000 / Tape & Reel

+For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

#### **MECHANICAL CASE OUTLINE** PACKAGE DIMENSIONS

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TOP VIEW

SIDE VIEW

Η<sub>E</sub>

DETAIL A

-3X b

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SCALE 4:1

Α A1SOT-23 (TO-236) **CASE 318 ISSUE AT** 

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DETAIL A

END VIEW

DATE 01 MAR 2023

NDTES:

- 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
- CONTROLLING DIMENSION: MILLIMETERS 2.
- MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL. З.

4,		ILINS D A ISIONS, [	IR GATE	BURRS.	LUDE MUL	J FLASH
	MILLIMETERS			INCHES		
DIM	MIN.	NDM.	MAX.	MIN.	NDM.	MAX.
Α	0.89	1.00	1.11	0.035	0.039	0.044
A1	0.01	0.06	0.10	0.000	0.002	0.004
b	0.37	0.44	0.50	0.015	0.017	0.020
с	0.08	0.14	0.20	0.003	0.006	0.008
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.080
L	0.30	0.43	0.55	0.012	0.017	0.022
L1	0.35	0.54	0.69	0.014	0.021	0.027
HE	2.10	2.40	2.64	0.083	0.094	0.104
Т	0*		10*	0*		10*



RECOMMENDED MOUNTING FOOTPRINT

For additional information on our Pb-Free strategy and soldering details, please download the DN Semiconductor Soldering and Mounting Techniques Reference Manual, SDLDERRM/D. \*

# GENERIC **MARKING DIAGRAM\***



XXX = Specific Device Code

Μ = Date Code

= Pb-Free Package .

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

## **STYLES ON PAGE 2**

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# MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

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#### SOT-23 (TO-236) CASE 318 ISSUE AT

#### DATE 01 MAR 2023

STYLE 1 THRU 5: CANCELLED	STYLE 6: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 7: PIN 1. EMITTER 2. BASE 3. COLLECTOR	STYLE 8: PIN 1. ANODE 2. NO CONNECTION 3. CATHODE		
STYLE 9:	STYLE 10:	STYLE 11:	STYLE 12:	STYLE 13:	STYLE 14:
PIN 1. ANODE	PIN 1. DRAIN	PIN 1. ANODE	PIN 1. CATHODE	PIN 1. SOURCE	PIN 1. CATHODE
2. ANODE	2. SOURCE	2. CATHODE	2. CATHODE	2. DRAIN	2. GATE
3. CATHODE	3. GATE	3. CATHODE-ANODE	3. ANODE	3. GATE	3. ANODE
STYLE 15:	STYLE 16:	STYLE 17:	STYLE 18:	STYLE 19:	STYLE 20:
PIN 1. GATE	PIN 1. ANODE	PIN 1. NO CONNECTION	PIN 1. NO CONNECTION	PIN 1. CATHODE	PIN 1. CATHODE
2. CATHODE	2. CATHODE	2. ANODE	2. CATHODE	2. ANODE	2. ANODE
3. ANODE	3. CATHODE	3. CATHODE	3. ANODE	3. CATHODE-ANODE	3. GATE
STYLE 21:	Style 22:	STYLE 23:	STYLE 24:	STYLE 25:	STYLE 26:
PIN 1. GATE	Pin 1. Return	PIN 1. ANODE	PIN 1. GATE	PIN 1. ANODE	PIN 1. CATHODE
2. SOURCE	2. Output	2. ANODE	2. DRAIN	2. CATHODE	2. ANODE
3. DRAIN	3. Input	3. CATHODE	3. SOURCE	3. GATE	3. NO CONNECTION
STYLE 27: PIN 1. CATHODE 2. CATHODE 3. CATHODE	STYLE 28: PIN 1. ANODE 2. ANODE 3. ANODE				

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