

# NPN General-Purpose Amplifier

## NSVT5551MR6

### Features

- This Device Has Matched Dies
- AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### ABSOLUTE MAXIMUM RATINGS

(T<sub>A</sub> = 25°C, unless otherwise noted)

Rating	Symbol	Value	Unit
Collector – Emitter Voltage	V <sub>CEO</sub>	160	V
Collector – Base Voltage	V <sub>CBO</sub>	180	V
Emitter – Base Voltage	V <sub>EBO</sub>	6	V
Collector Current – Continuous	I <sub>C</sub>	600	mA
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature Range	T <sub>STG</sub>	–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.

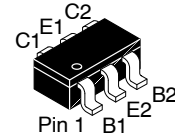
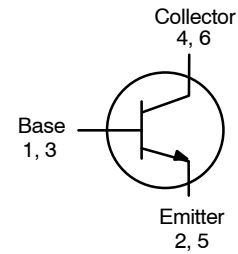
### THERMAL CHARACTERISTICS (Notes 1, 2)

(T<sub>A</sub> = 25°C, unless otherwise noted)

Characteristic	Symbol	Max	Unit
Power Dissipation (T <sub>C</sub> = 25°C)	P <sub>D</sub>	0.7	W
Derate Above 25°C		5.6	mW/°C
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	180	°C/W

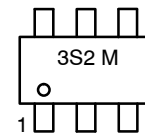
1. P<sub>D</sub> total, for both transistors. For each transistor, P<sub>D</sub> = 350 mW.
2. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

### ELECTRICAL CONNECTION



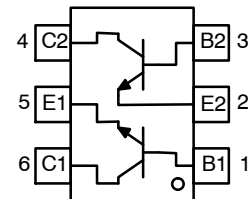
TSOT23 6-Lead  
CASE 419BL

### MARKING DIAGRAM



3S2 = Specific Device Code  
M = Date Code

### PIN ASSIGNMENT



### ORDERING INFORMATION

Device	Package	Shipping†
NSVT5551MR6T1G	TSOT23-6 (Pb-Free)	3000 / Tape & Reel

†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.

# NSVT5551MR6

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

Parameter	Symbol	Test Condition	Min	Max	Unit
Collector–Emitter Breakdown Voltage	BV <sub>CEO</sub>	I <sub>C</sub> = 1 mA, I <sub>B</sub> = 0	160	–	V
Collector–Base Breakdown Voltage	BV <sub>CBO</sub>	I <sub>C</sub> = 100 µA, I <sub>E</sub> = 0	180	–	V
Emitter–Base Breakdown Voltage	BV <sub>EBO</sub>	I <sub>E</sub> = 10 µA, I <sub>C</sub> = 0	6	–	V
Collector Cut–Off Current	I <sub>CBO</sub>	V <sub>CB</sub> = 120 V, I <sub>E</sub> = 0	–	50	nA
		V <sub>CB</sub> = 120 V, I <sub>E</sub> = 0, T <sub>A</sub> = 100°C	–	50	µA
Emitter Cut–Off Current	I <sub>EBO</sub>	V <sub>EB</sub> = 4 V, I <sub>C</sub> = 0	–	50	nA
DC Current Gain	h <sub>FE1</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 1 mA	80	–	–
Variation Ratio of h <sub>FE1</sub> Between Die 1 and Die 2	DIVID1	h <sub>FE1</sub> (Die1) / h <sub>FE1</sub> (Die2)	0.9	1.1	–
DC Current Gain	h <sub>FE2</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 10 mA	80	250	–
Variation Ratio of h <sub>FE2</sub> Between Die 1 and Die 2	DIVID2	h <sub>FE2</sub> (Die1) / h <sub>FE2</sub> (Die2)	0.95	1.05	–
DC Current Gain	h <sub>FE3</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 50 mA	30	–	–
Variation Ratio of h <sub>FE3</sub> Between Die 1 and Die 2	DIVID3	h <sub>FE3</sub> (Die1) / h <sub>FE3</sub> (Die2)	0.9	1.1	–
Collector–Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = 10 mA, I <sub>B</sub> = 1 mA	–	0.15	V
		I <sub>C</sub> = 50 mA, I <sub>B</sub> = 5 mA	–	0.20	
Base–Emitter Saturation Voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> = 10 mA, I <sub>B</sub> = 1 mA	–	1	V
		I <sub>C</sub> = 50 mA, I <sub>B</sub> = 5 mA	–	1	
Base–Emitter On Voltage	V <sub>BE(on)</sub>	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 10 mA	–	1	V
Difference of V <sub>BE(on)</sub> Between Die1 and Die 2	DEL	V <sub>BE(on)</sub> (Die1) – V <sub>BE(on)</sub> (Die2)	–8	8	mV
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0, f = 1 MHz	–	6	pF
Input Capacitance	C <sub>ib</sub>	V <sub>EB</sub> = 0.5 V, I <sub>C</sub> = 0, f = 1 MHz	–	20	pF
Current Gain Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 10 mA, f = 100 MHz	100	300	MHz
Noise Figure	NF	V <sub>CE</sub> = 5 V, I <sub>C</sub> = 200 µA, f = 1 MHz, R <sub>S</sub> = 20 kΩ, B = 200 Hz	–	8	dB
Small Signal Current Gain	h <sub>fe</sub>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 1.0 mA, f = 10 kHz	50	250	–

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.

TYPICAL PERFORMANCE CHARACTERISTICS

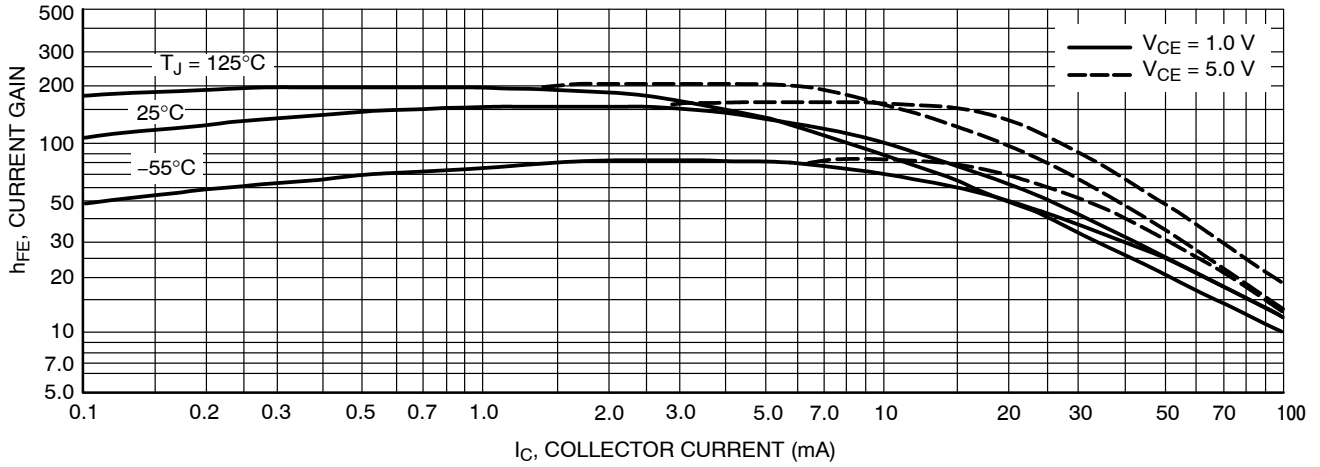


Figure 1. DC Current Gain

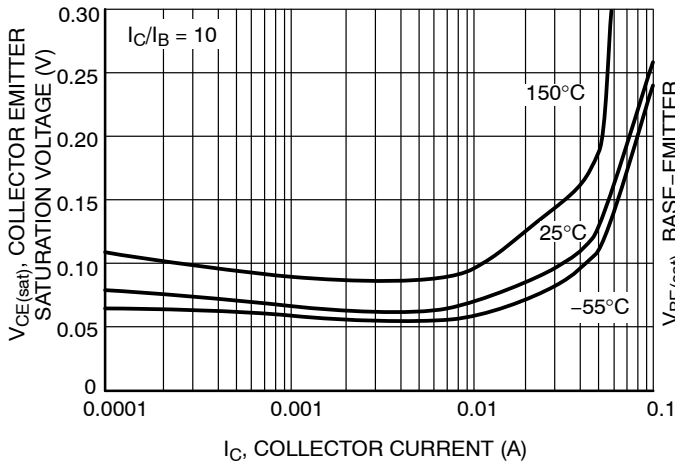


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

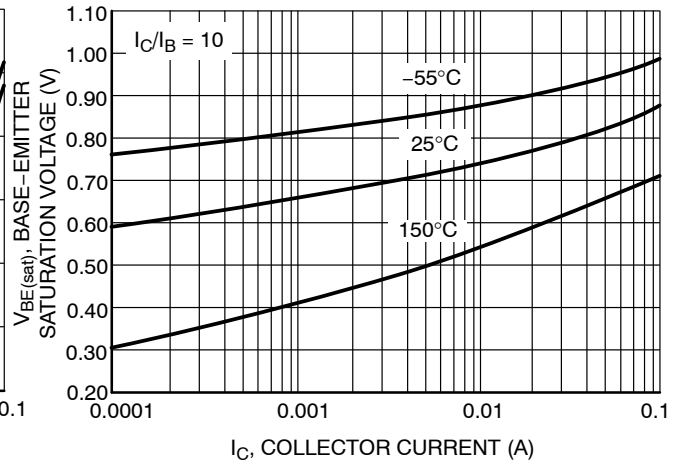


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

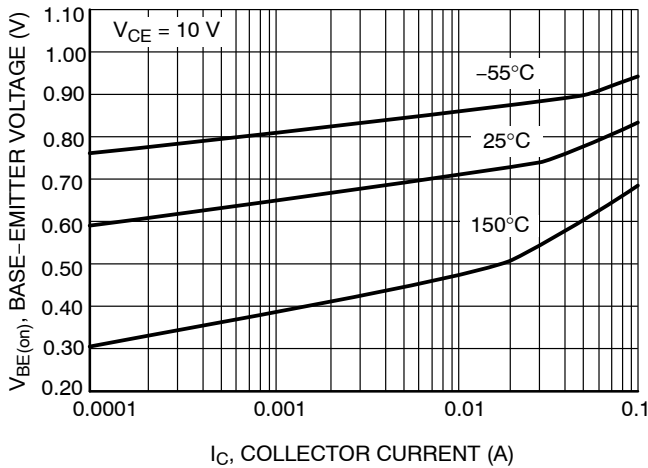


Figure 4. Base-Emitter On Voltage vs. Collector Current

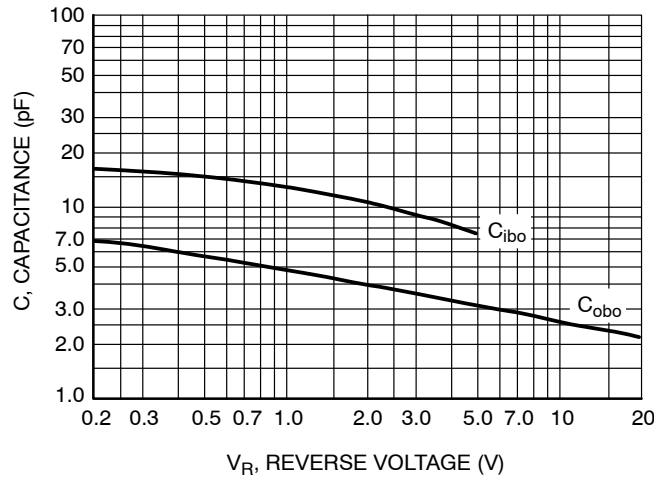


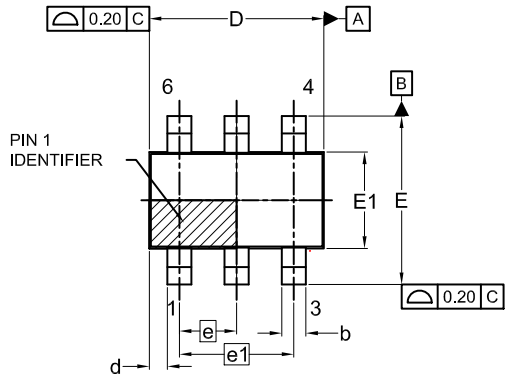
Figure 5. Capacitances



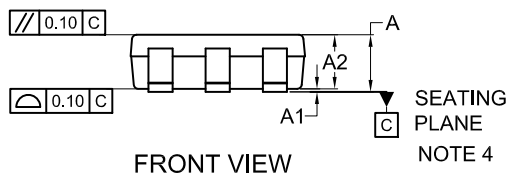
SCALE 2:1

**TSOT23 6-Lead**  
**CASE 419BL**  
**ISSUE A**

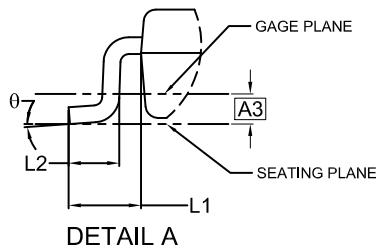
DATE 31 AUG 2020



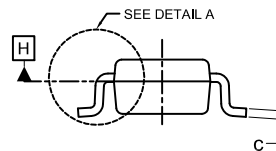
TOP VIEW



FRONT VIEW

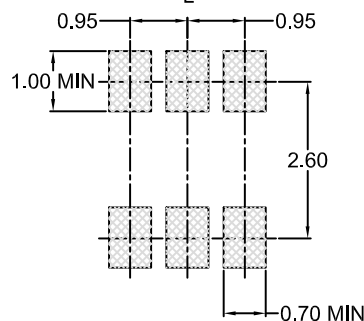


DETAIL A



SIDE VIEW

SYMM

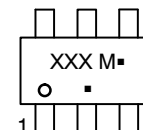

**LAND PATTERN**  
**RECOMMENDATION**

\*FOR ADDITIONAL INFORMATION ON OUR  
PB-FREE STRATEGY AND SOLDERING DETAILS,  
PLEASE DOWNLOAD THE ON SEMICONDUCTOR  
SOLDERING AND MOUNTING TECHNIQUES  
REFERENCE MANUAL, SOLDERM/D.

## NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.25MM PER END. DIMENSIONS D AND E1 ARE DETERMINED AT DATUM H.
4. SEATING PLANE IS DEFINED BY THE TERMINALS. "A1" IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0.00	0.05	0.10
A2	0.70	0.85	1.00
A3	0.25 BSC		
b	0.25	0.38	0.50
c	0.10	0.18	0.26
D	2.80	2.95	3.10
d	0.30 REF		
E	2.50	2.75	3.00
E1	1.30	1.50	1.70
e	0.95 BSC		
e1	1.90 BSC		
L1	0.60 REF		
L2	0.20	0.40	0.60
Θ	0°	—	10°

**GENERIC**  
**MARKING DIAGRAM\***


XXX = Specific Device Code

M = Date Code

▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*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.

<b>DOCUMENT NUMBER:</b>	<b>98AON83292G</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>TSOT23 6-Lead</b>	<b>PAGE 1 OF 1</b>

onsemi and Onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi 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. onsemi does not convey any license under its patent rights nor the rights of others.

**onsemi**, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'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). **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** 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 **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** 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. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** 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 **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** 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 **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## ADDITIONAL INFORMATION

### TECHNICAL PUBLICATIONS:

Technical Library: [www.onsemi.com/design/resources/technical-documentation](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

### ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at  
[www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)