# 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

($T_A$ = 25°C, unless otherwise noted)

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector − Emitter Voltage | $V_{CEO}$ | 160 | V |
| Collector − Base Voltage | $V_{CBO}$ | 180 | V |
| Emitter − Base Voltage | $V_{EBO}$ | 6 | V |
| Collector Current − Continuous | $I_C$ | 600 | mA |
| Junction Temperature | $T_J$ | 150 | °C |
| Storage Temperature Range | $T_{STG}$ | −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.

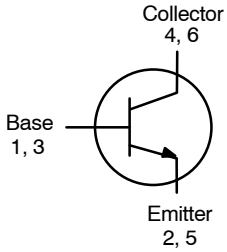
### THERMAL CHARACTERISTICS (Notes 1, 2)

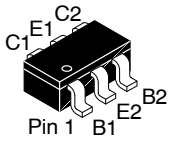
($T_A$ = 25°C, unless otherwise noted)

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Power Dissipation ($T_C$ = 25°C) | $P_D$ | 0.7 | W |
| Derate Above 25°C | | 5.6 | mW/°C |
| Thermal Resistance, Junction−to−Ambient | $R_{\theta JA}$ | 180 | °C/W |

1. $P_D$ total, for both transistors. For each transistor, $P_D$ = 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.

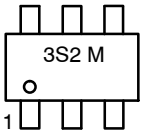
### ELECTRICAL CONNECTION



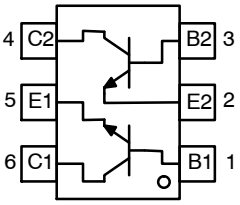

**TSOT23 6−Lead**
**CASE 419BL**

### 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.

**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C unless otherwise noted)

| Parameter | Symbol | Test Condition | Min | Max | Unit |
|---|---|---|---|---|---|
| Collector−Emitter Breakdown Voltage | $BV_{CEO}$ | $I_C$ = 1 mA, $I_B$ = 0 | 160 | – | V |
| Collector−Base Breakdown Voltage | $BV_{CBO}$ | $I_C$ = 100 μA, $I_E$ = 0 | 180 | – | V |
| Emitter−Base Breakdown Voltage | $BV_{EBO}$ | $I_E$ = 10 μA, $I_C$ = 0 | 6 | – | V |
| Collector Cut−Off Current | $I_{CBO}$ | $V_{CB}$ = 120 V, $I_E$ = 0 | – | 50 | nA |
| | | $V_{CB}$ = 120 V, $I_E$ = 0, $T_A$ = 100°C | – | 50 | μA |
| Emitter Cut−Off Current | $I_{EBO}$ | $V_{EB}$ = 4 V, $I_C$ = 0 | – | 50 | nA |
| DC Current Gain | $h_{FE1}$ | $V_{CE}$ = 5 V, $I_C$ = 1 mA | 80 | – | – |
| Variation Ratio of $h_{FE1}$ Between Die 1 and Die 2 | DIVID1 | $h_{FE1}$(Die1) / $h_{FE1}$(Die2) | 0.9 | 1.1 | – |
| DC Current Gain | $h_{FE2}$ | $V_{CE}$ = 5 V, $I_C$ = 10 mA | 80 | 250 | – |
| Variation Ratio of $h_{FE2}$ Between Die 1 and Die 2 | DIVID2 | $h_{FE2}$(Die1) / $h_{FE2}$(Die2) | 0.95 | 1.05 | – |
| DC Current Gain | $h_{FE3}$ | $V_{CE}$ = 5 V, $I_C$ = 50 mA | 30 | – | – |
| Variation Ratio of $h_{FE3}$ Between Die 1 and Die 2 | DIVID3 | $h_{FE3}$(Die1) / $h_{FE3}$(Die2) | 0.9 | 1.1 | – |
| Collector−Emitter Saturation Voltage | $V_{CE}$(sat) | $I_C$ = 10 mA, $I_B$ = 1 mA | – | 0.15 | V |
| | | $I_C$ = 50 mA, $I_B$ = 5 mA | – | 0.20 | |
| Base−Emitter Saturation Voltage | $V_{BE}$(sat) | $I_C$ = 10 mA, $I_B$ = 1 mA | – | 1 | V |
| | | $I_C$ = 50 mA, $I_B$ = 5 mA | – | 1 | |
| Base−Emitter On Voltage | $V_{BE}$(on) | $V_{CE}$ = 5 V, $I_C$ = 10 mA | – | 1 | V |
| Difference of $V_{BE}$(on) Between Die1 and Die 2 | DEL | $V_{BE}$(on)(Die) − $V_{BE}$(on)(Die2) | −8 | 8 | mV |
| Output Capacitance | $C_{ob}$ | $V_{CB}$ = 10 V, $I_E$ = 0, f = 1 MHz | – | 6 | pF |
| Input Capacitance | $C_{ib}$ | $V_{EB}$ = 0.5 V, $I_C$ = 0, f = 1 MHz | – | 20 | pF |
| Current Gain Bandwidth Product | $f_T$ | $V_{CE}$ = 10 V, $I_C$ = 10 mA, f = 100 MHz | 100 | 300 | MHz |
| Noise Figure | NF | $V_{CE}$ = 5 V, $I_C$ = 200 μA, f = 1 MHz, $R_S$ = 20 kΩ, B = 200 Hz | – | 8 | dB |
| Small Signal Current Gain | $h_{fe}$ | $V_{CE}$ = 10 V, $I_C$ = 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

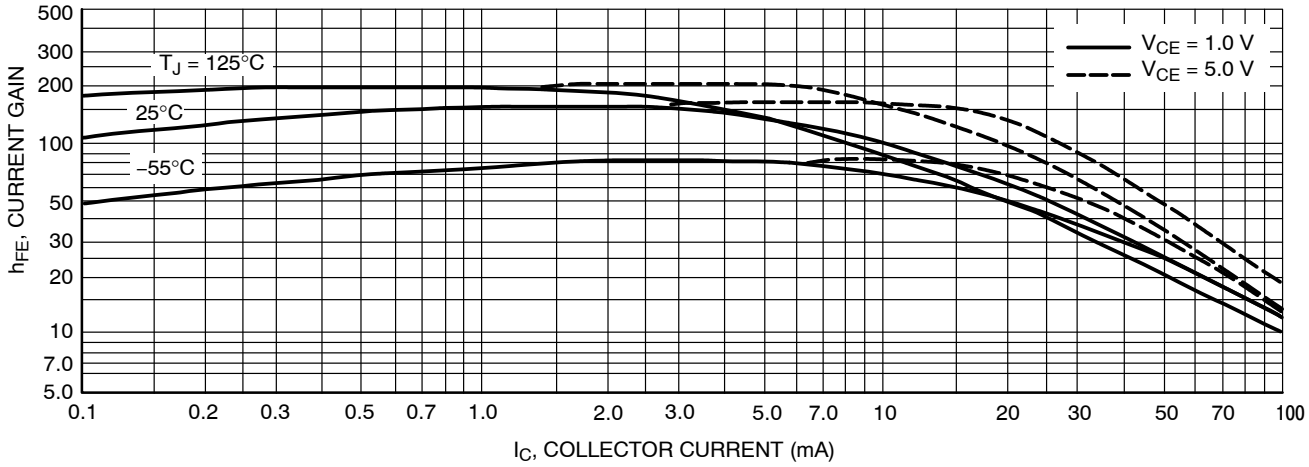



**Figure 1. DC Current Gain**

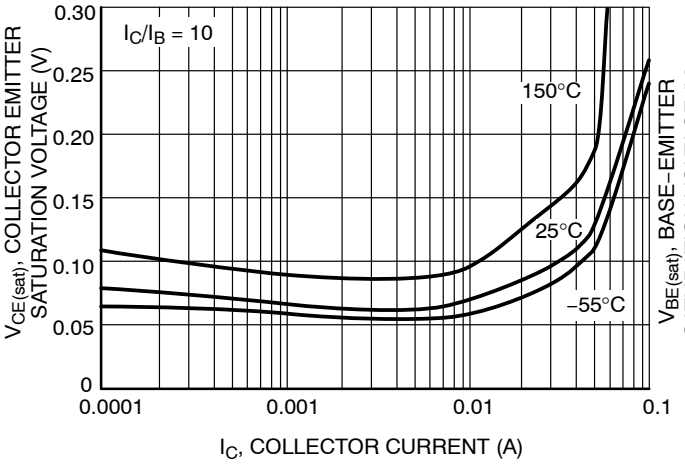



**Figure 2. Collector−Emitter Saturation Voltage vs. Collector Current**

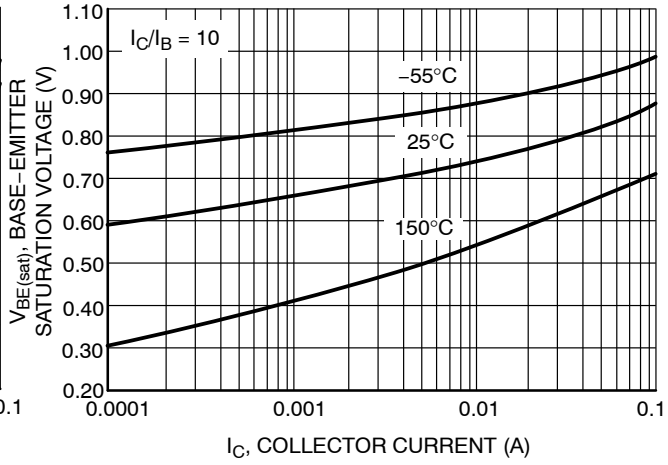



**Figure 3. Base−Emitter Saturation Voltage vs. Collector Current**

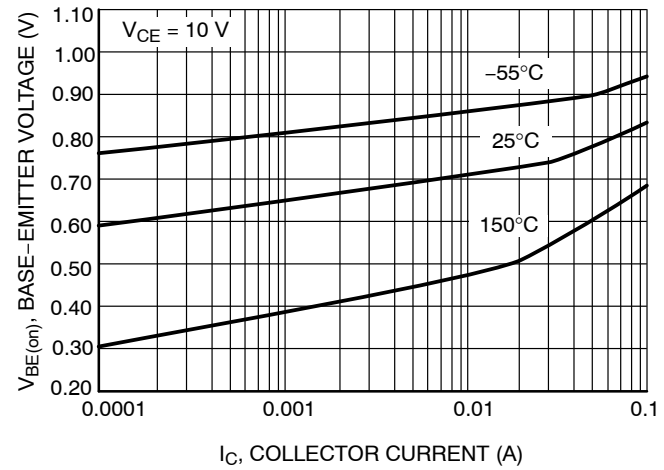



**Figure 4. Base−Emitter On Voltage vs. Collector Current**

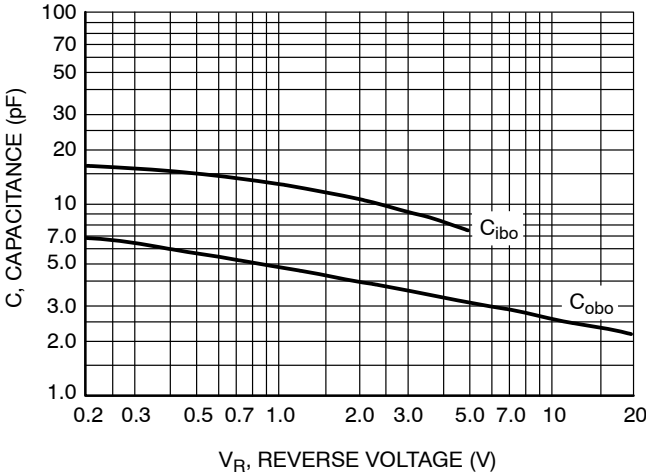



**Figure 5. Capacitances**

# MECHANICAL CASE OUTLINE
## PACKAGE DIMENSIONS

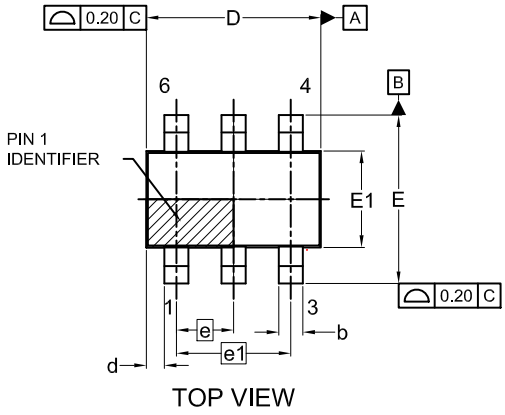
ON Semiconductor®

1

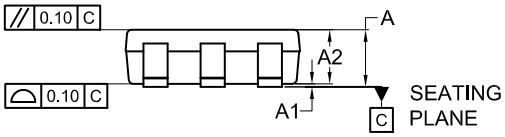
**SCALE 2:1**

**TSOT23 6−Lead**
CASE 419BL
ISSUE A

DATE 31 AUG 2020

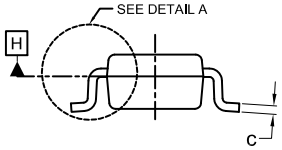



TOP VIEW

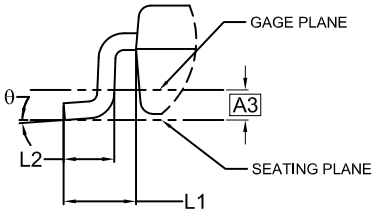



FRONT VIEW

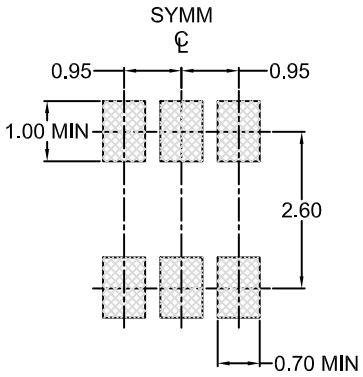
NOTE 4




SIDE VIEW




DETAIL A




LAND PATTERN
RECOMMENDATION

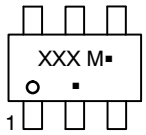
*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

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.

| | | |
|---|---|---|
| **DOCUMENT NUMBER:** | **98AON83292G** | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red. |
| **DESCRIPTION:** | **TSOT23 6−Lead** | **PAGE 1 OF 1** |

## ADDITIONAL INFORMATION

**TECHNICAL PUBLICATIONS**:
**Technical Library:** www.onsemi.com/design/resources/technical−documentation
**onsemi Website:** www.onsemi.com

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**For additional information, please contact your local Sales Representative at** www.onsemi.com/support/sales