

# 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.

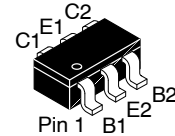
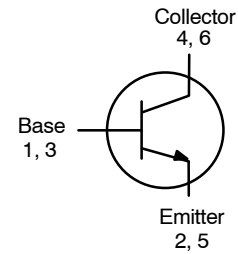
### THERMAL CHARACTERISTICS (Notes 1, 2)

(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  |

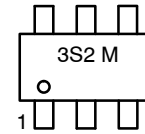
1. P<sub>D</sub> total, for both transistors. For each transistor, P<sub>D</sub> = 350 mW.
2. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

### ELECTRICAL CONNECTION



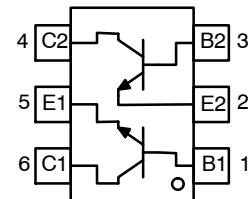
TSOT23 6-Lead  
CASE 419BL

### 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><br>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><br>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><br>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><br>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,<br>f = 100 MHz                                      | 100  | 300  | MHz  |
| Noise Figure   | NF                   | V <sub>CE</sub> = 5 V, I <sub>C</sub> = 200 µA,<br>f = 1 MHz, R <sub>S</sub> = 20 kΩ,<br>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,<br>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

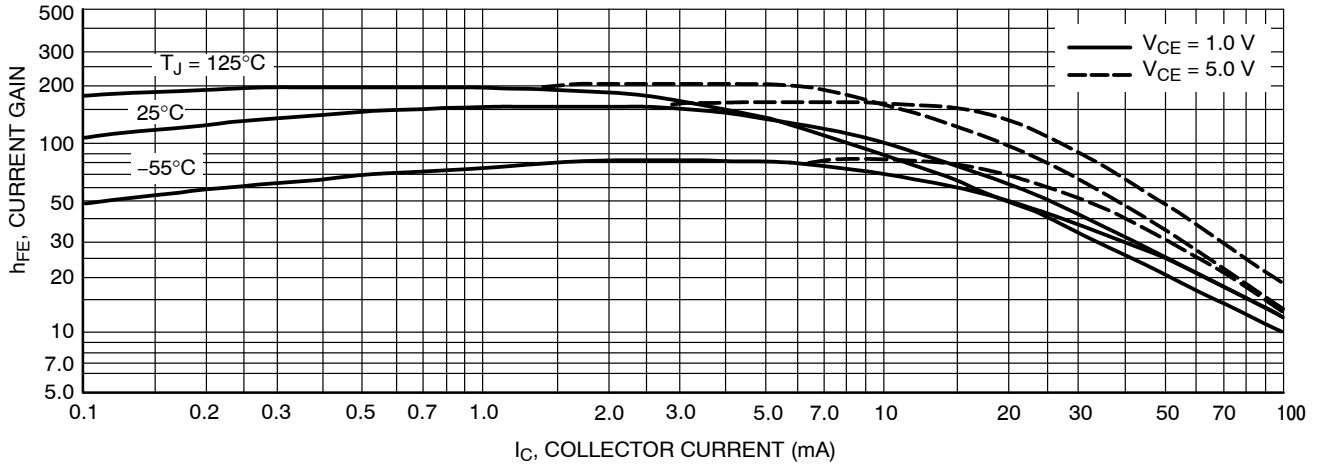


Figure 1. DC Current Gain

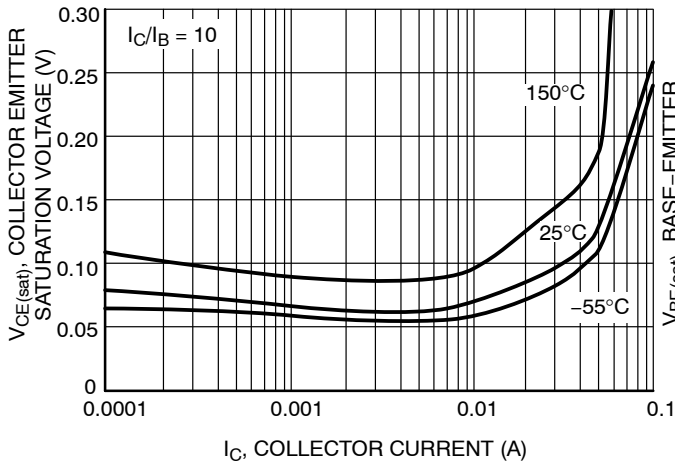


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

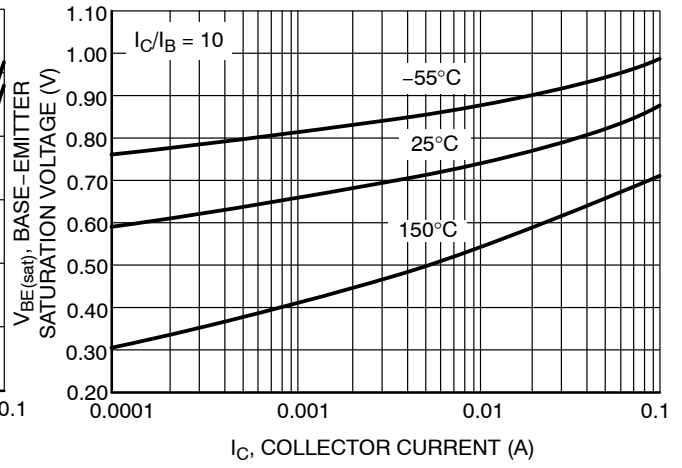


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

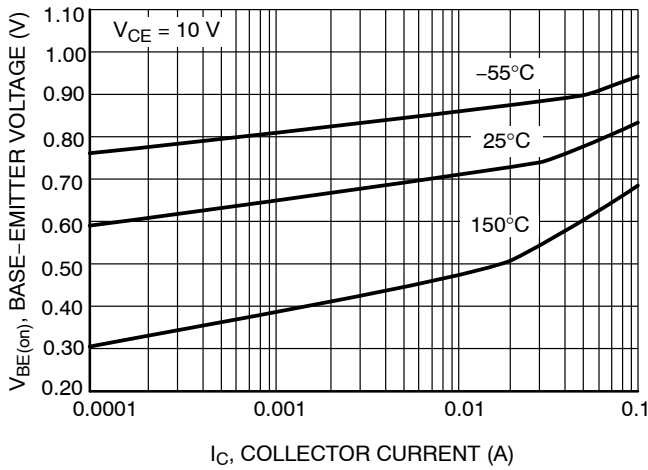


Figure 4. Base-Emitter On Voltage vs. Collector Current

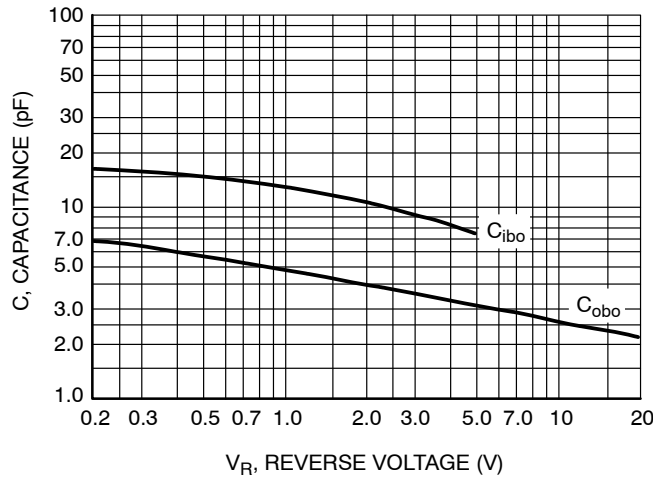


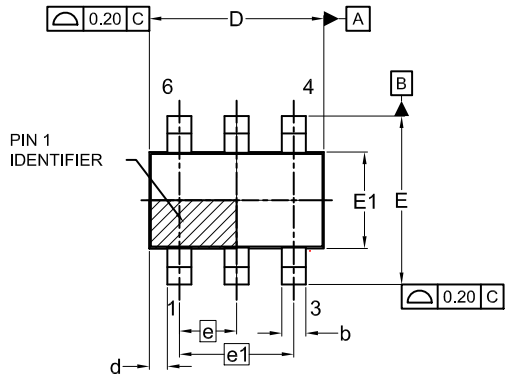
Figure 5. Capacitances



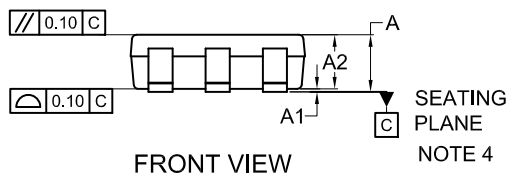
SCALE 2:1

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

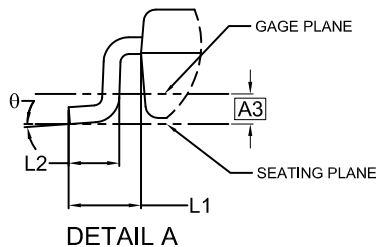
DATE 31 AUG 2020



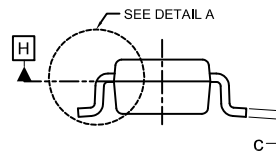
TOP VIEW



FRONT VIEW

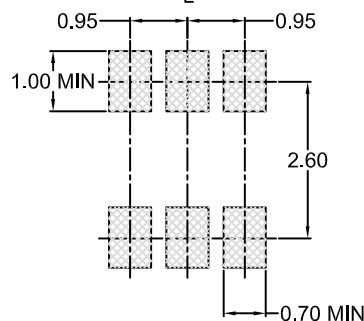


DETAIL A



SIDE VIEW

SYMM

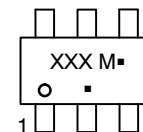

**LAND PATTERN**  
**RECOMMENDATION**

\*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.

|                         |                      |  |
|-------------------------|----------------------|--|
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| <b>DESCRIPTION:</b>     | <b>TSOT23 6-Lead</b> | <b>PAGE 1 OF 1</b>   |

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