# 2N5550, 2N5551

**Preferred Device**

# Amplifier Transistors

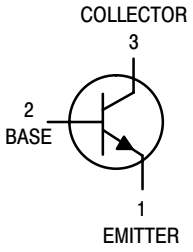
## NPN Silicon

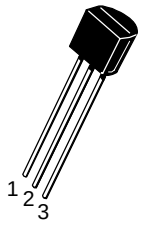
**ON Semiconductor®**

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### Features

- Pb−Free Packages are Available*




**TO−92**
**CASE 29**
**STYLE 1**

### MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector − Emitter Voltage<br>2N5550<br>2N5551 | $V_{CEO}$ | <br>140<br>160 | Vdc |
| Collector − Base Voltage<br>2N5550<br>2N5551 | $V_{CBO}$ | <br>160<br>180 | Vdc |
| Emitter − Base Voltage | $V_{EBO}$ | 6.0 | Vdc |
| Collector Current − Continuous | $I_C$ | 600 | mAdc |
| Total Device Dissipation @ $T_A$ = 25°C<br>Derate above 25°C | $P_D$ | 625<br>5.0 | mW<br>mW/°C |
| Total Device Dissipation @ $T_C$ = 25°C<br>Derate above 25°C | $P_D$ | 1.5<br>12 | W<br>mW/°C |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{stg}$ | −55 to +150 | °C |

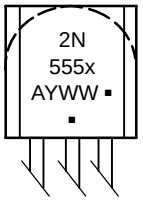
### THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance, Junction−to−Ambient | $R_{\theta JA}$ | 200 | °C/W |
| Thermal Resistance, Junction−to−Case | $R_{\theta JC}$ | 83.3 | °C/W |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

### MARKING DIAGRAM




x = 0 or 1
A = Assembly Location
Y = Year
WW = Work Week
▪ = Pb−Free Package
(Note: Microdot may be in either location)

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

**Preferred** devices are recommended choices for future use and best overall value.

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

| Characteristic | | Symbol | Min | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| Collector−Emitter Breakdown Voltage (Note 1) | | $V_{(BR)CEO}$ | | | |
| ($I_C$ = 1.0 mAdc, $I_B$ = 0) | 2N5550 | | 140 | − | Vdc |
| | 2N5551 | | 160 | − | |
| Collector−Base Breakdown Voltage | | $V_{(BR)CBO}$ | | | |
| ($I_C$ = 100 μAdc, $I_E$ = 0 ) | 2N5550 | | 160 | − | Vdc |
| | 2N5551 | | 180 | − | |
| Emitter−Base Breakdown Voltage | | $V_{(BR)EBO}$ | | | |
| ($I_E$ = 10 μAdc, $I_C$ = 0) | | | 6.0 | − | Vdc |
| Collector Cutoff Current | | $I_{CBO}$ | | | |
| ($V_{CB}$ = 100 Vdc, $I_E$ = 0) | 2N5550 | | − | 100 | nAdc |
| ($V_{CB}$ = 120 Vdc, $I_E$ = 0) | 2N5551 | | − | 50 | |
| ($V_{CB}$ = 100 Vdc, $I_E$ = 0, $T_A$ = 100°C) | 2N5550 | | − | 100 | μAdc |
| ($V_{CB}$ = 120 Vdc, $I_E$ = 0, $T_A$ = 100°C) | 2N5551 | | − | 50 | |
| Emitter Cutoff Current | | $I_{EBO}$ | − | 50 | nAdc |
| ($V_{EB}$ = 4.0 Vdc, $I_C$ = 0) | | | | | |
| **ON CHARACTERISTICS** (Note 1) | | | | | |
| DC Current Gain | | $h_{FE}$ | | | |
| ($I_C$ = 1.0 mAdc, $V_{CE}$ = 5.0 Vdc) | 2N5550 | | 60 | − | − |
| | 2N5551 | | 80 | − | |
| ($I_C$ = 10 mAdc, $V_{CE}$ = 5.0 Vdc) | 2N5550 | | 60 | 250 | |
| | 2N5551 | | 80 | 250 | |
| ($I_C$ = 50 mAdc, $V_{CE}$ = 5.0 Vdc) | 2N5550 | | 20 | − | |
| | 2N5551 | | 30 | − | |
| Collector−Emitter Saturation Voltage | | $V_{CE(sat)}$ | | | |
| ($I_C$ = 10 mAdc, $I_B$ = 1.0 mAdc) | Both Types | | − | 0.15 | Vdc |
| ($I_C$ = 50 mAdc, $I_B$ = 5.0 mAdc) | 2N5550 | | − | 0.25 | |
| | 2N5551 | | − | 0.20 | |
| Base−Emitter Saturation Voltage | | $V_{BE(sat)}$ | | | |
| ($I_C$ = 10 mAdc, $I_B$ = 1.0 mAdc) | Both Types | | − | 1.0 | Vdc |
| ($I_C$ = 50 mAdc, $I_B$ = 5.0 mAdc) | 2N5550 | | − | 1.2 | |
| | 2N5551 | | − | 1.0 | |
| **SMALL−SIGNAL CHARACTERISTICS** | | | | | |
| Current−Gain — Bandwidth Product | | $f_T$ | 100 | 300 | MHz |
| ($I_C$ = 10 mAdc, $V_{CE}$ = 10 Vdc, f = 100 MHz) | | | | | |
| Output Capacitance | | $C_{obo}$ | − | 6.0 | pF |
| ($V_{CB}$ = 10 Vdc, $I_E$ = 0, f = 1.0 MHz) | | | | | |
| Input Capacitance | | $C_{ibo}$ | | | pF |
| ($V_{EB}$ = 0.5 Vdc, $I_C$ = 0, f = 1.0 MHz) | 2N5550 | | − | 30 | |
| | 2N5551 | | − | 20 | |
| Small−Signal Current Gain | | $h_{fe}$ | 50 | 200 | − |
| ($I_C$ = 1.0 mAdc, $V_{CE}$ = 10 Vdc, f = 1.0 kHz) | | | | | |
| Noise Figure | | NF | | | dB |
| ($I_C$ = 250 μAdc, $V_{CE}$ = 5.0 Vdc, $R_S$ = 1.0 kΩ, f = 1.0 kHz) | 2N5550 | | − | 10 | |
| | 2N5551 | | − | 8.0 | |

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

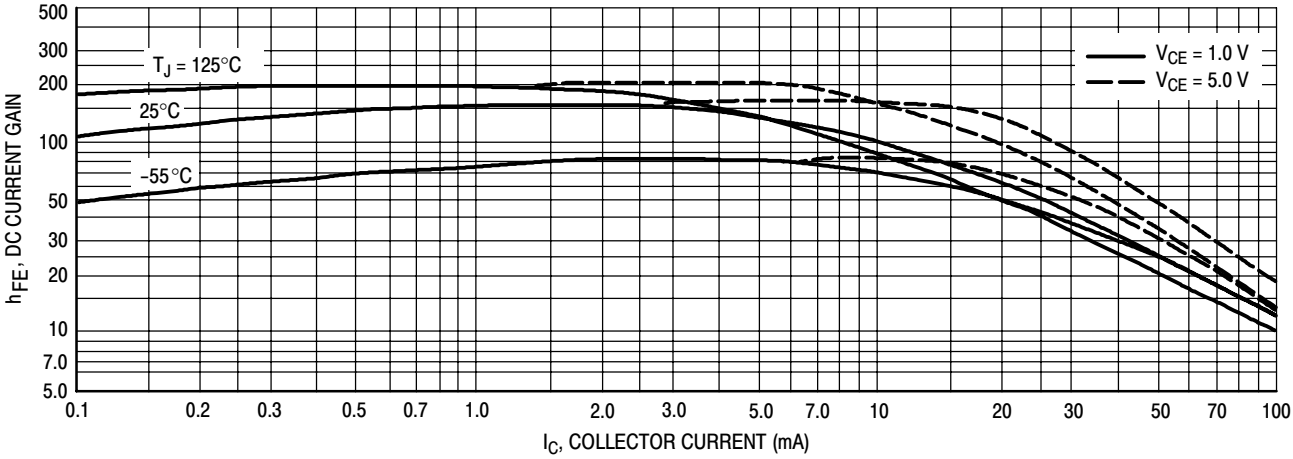



**Figure 1. DC Current Gain**

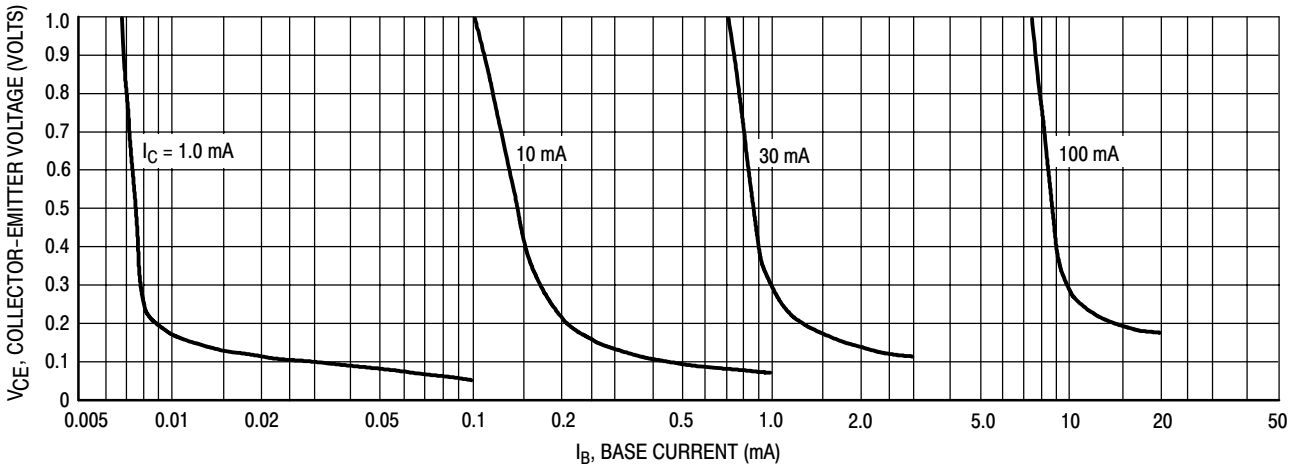



**Figure 2. Collector Saturation Region**

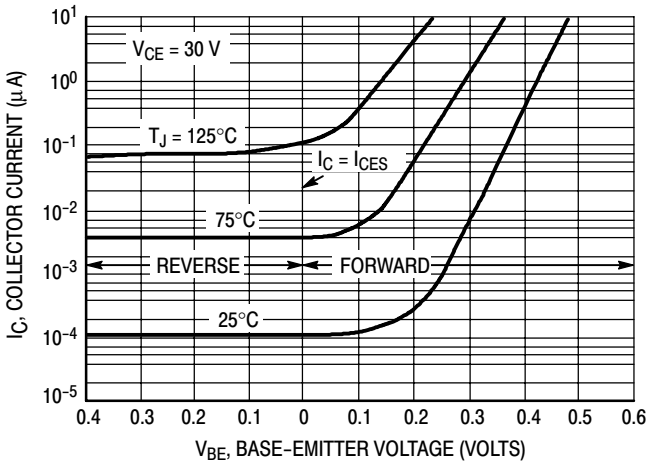



**Figure 3. Collector Cut−Off Region**

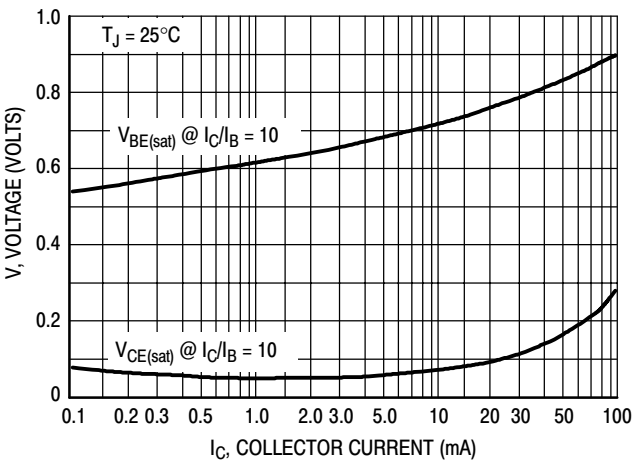



**Figure 4. “On” Voltages**

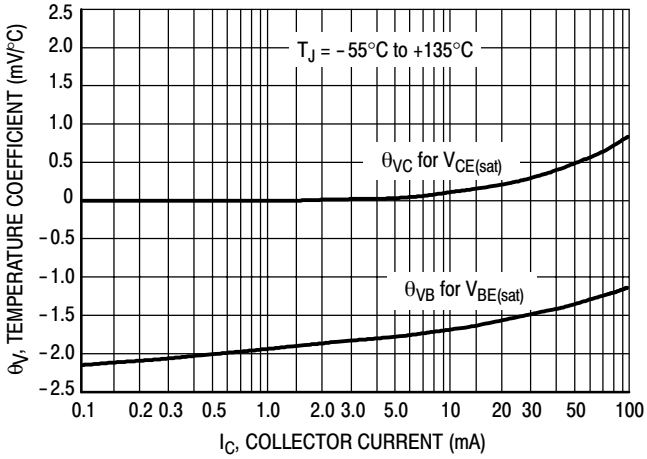
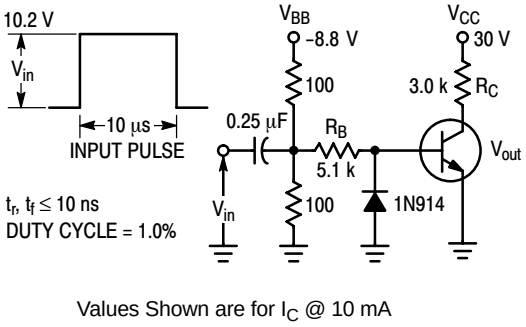



**Figure 5. Temperature Coefficients**




Values Shown are for $I_C$ @ 10 mA

**Figure 6. Switching Time Test Circuit**

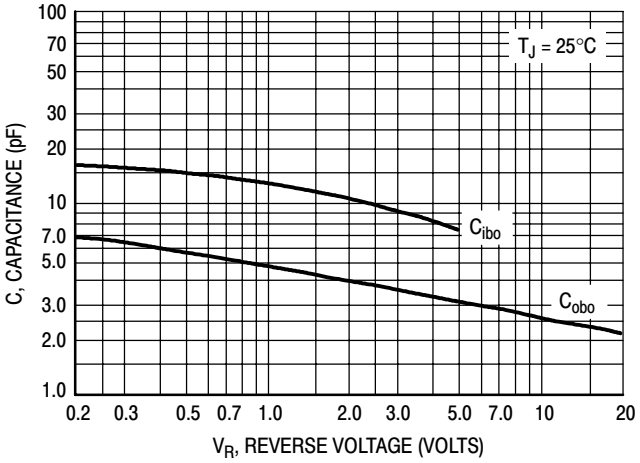



**Figure 7. Capacitances**

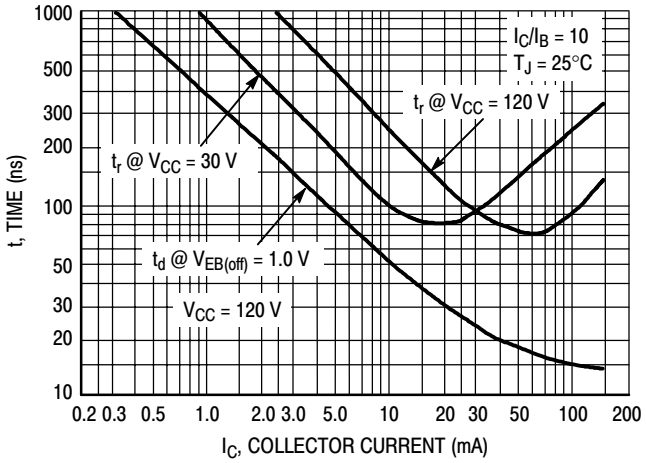



**Figure 8. Turn−On Time**

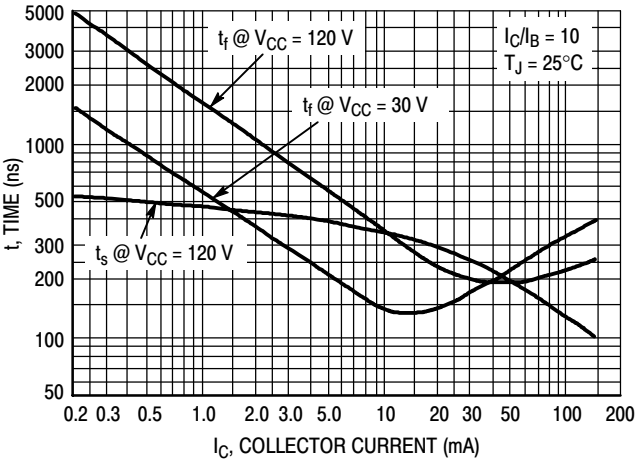



**Figure 9. Turn−Off Time**

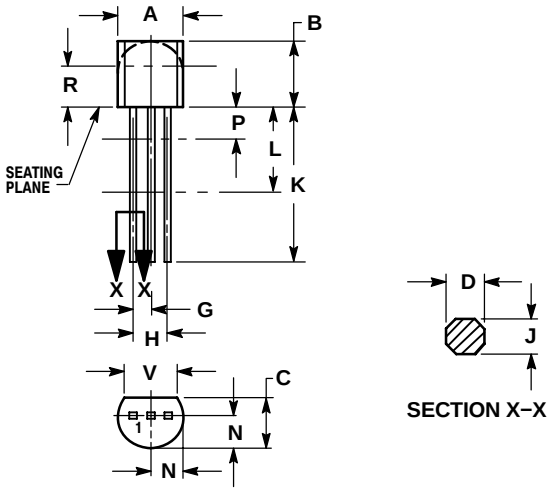
**ORDERING INFORMATION**

| Device | Package | Shipping† |
|---|---|---|
| 2N5550 | TO−92 | 5000 Units / Box |
| 2N5550G | TO−92 (Pb−Free) | |
| 2N5550RLRA | TO−92 | 2000 / Tape & Reel |
| 2N5550RLRAG | TO−92 (Pb−Free) | |
| 2N5550RLRP | TO−92 | 2000 / Tape & Ammo Box |
| 2N5550RLRPG | TO−92 (Pb−Free) | |
| 2N5551 | TO−92 | 5000 Units / Box |
| 2N5551G | TO−92 (Pb−Free) | |
| 2N5551RL1 | TO−92 | 2000 / Tape & Reel |
| 2N5551RL1G | TO−92 (Pb−Free) | |
| 2N5551RLRA | TO−92 | |
| 2N5551RLRAG | TO−92 (Pb−Free) | |
| 2N5551RLRM | TO−92 | 2000 / Tape & Ammo Box |
| 2N5551RLRMG | TO−92 (Pb−Free) | |
| 2N5551RLRP | TO−92 | |
| 2N5551RLRPG | TO−92 (Pb−Free) | |
| 2N55551ZL1 | TO−92 | |
| 2N55551ZL1G | TO−92 (Pb−Free) | |

†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.

## PACKAGE DIMENSIONS

**TO−92**
**TO−226AA**
CASE 29−11
ISSUE AL




NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | MIN | MAX | MIN | MAX |
| A | 0.175 | 0.205 | 4.45 | 5.20 |
| B | 0.170 | 0.210 | 4.32 | 5.33 |
| C | 0.125 | 0.165 | 3.18 | 4.19 |
| D | 0.016 | 0.021 | 0.407 | 0.533 |
| G | 0.045 | 0.055 | 1.15 | 1.39 |
| H | 0.095 | 0.105 | 2.42 | 2.66 |
| J | 0.015 | 0.020 | 0.39 | 0.50 |
| K | 0.500 | --- | 12.70 | --- |
| L | 0.250 | --- | 6.35 | --- |
| N | 0.080 | 0.105 | 2.04 | 2.66 |
| P | --- | 0.100 | --- | 2.54 |
| R | 0.115 | --- | 2.93 | --- |
| V | 0.135 | --- | 3.43 | --- |

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

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