

# 2N5550, 2N5551

Preferred Device

## Amplifier Transistors

### NPN Silicon

#### Features

- Pb-Free Packages are Available\*
- Device Marking: Device Type, e.g., 2N5550, Date Code

#### MAXIMUM RATINGS

Rating	Symbol	2N5550	2N5551	Unit
Collector – Emitter Voltage	$V_{CE0}$	140	160	Vdc
Collector – Base Voltage	$V_{CB0}$	160	180	Vdc
Emitter – Base Voltage	$V_{EB0}$	6.0		Vdc
Collector Current – Continuous	$I_C$	600		mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	625		mW
		5.0		mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.5		W
		12		mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150		$^\circ\text{C}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

#### THERMAL CHARACTERISTICS

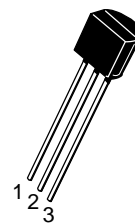
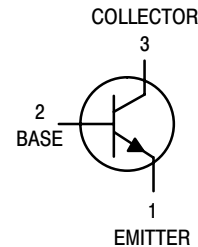
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{W}$

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



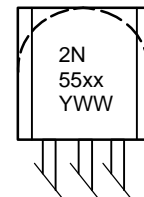
ON Semiconductor®

<http://onsemi.com>



TO-92  
CASE 29  
STYLE 1

#### MARKING DIAGRAM



55xx Specific Device Code  
Y = Year  
WW = Work Week

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

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

## 2N5550, 2N5551

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

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector–Emitter Breakdown Voltage (Note 1) (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , I <sub>B</sub> = 0)	V <sub>(BR)CEO</sub>	140 160	– –	V <sub>dc</sub>
Collector–Base Breakdown Voltage (I <sub>C</sub> = 100 μA <sub>dc</sub> , I <sub>E</sub> = 0)	V <sub>(BR)CBO</sub>	160 180	– –	V <sub>dc</sub>
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 10 μA <sub>dc</sub> , I <sub>C</sub> = 0)	V <sub>(BR)EBO</sub>	6.0	–	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CB</sub> = 100 V <sub>dc</sub> , I <sub>E</sub> = 0) (V <sub>CB</sub> = 120 V <sub>dc</sub> , I <sub>E</sub> = 0) (V <sub>CB</sub> = 100 V <sub>dc</sub> , I <sub>E</sub> = 0, T <sub>A</sub> = 100°C) (V <sub>CB</sub> = 120 V <sub>dc</sub> , I <sub>E</sub> = 0, T <sub>A</sub> = 100°C)	I <sub>CBO</sub>	– – – –	100 50 100 50	nA <sub>dc</sub> μA <sub>dc</sub>
Emitter Cutoff Current (V <sub>EB</sub> = 4.0 V <sub>dc</sub> , I <sub>C</sub> = 0)	I <sub>EBO</sub>	–	50	nA <sub>dc</sub>
<b>ON CHARACTERISTICS (Note 1)</b>				
DC Current Gain (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )  (I <sub>C</sub> = 10 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )  (I <sub>C</sub> = 50 mA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> )	h <sub>FE</sub>	60 80  60 80  20 30	– –  250 250  – –	–
Collector–Emitter Saturation Voltage (I <sub>C</sub> = 10 mA <sub>dc</sub> , I <sub>B</sub> = 1.0 mA <sub>dc</sub> )  (I <sub>C</sub> = 50 mA <sub>dc</sub> , I <sub>B</sub> = 5.0 mA <sub>dc</sub> )	V <sub>CE(sat)</sub>	– – –	0.15 0.25 0.20	V <sub>dc</sub>
Base–Emitter Saturation Voltage (I <sub>C</sub> = 10 mA <sub>dc</sub> , I <sub>B</sub> = 1.0 mA <sub>dc</sub> )  (I <sub>C</sub> = 50 mA <sub>dc</sub> , I <sub>B</sub> = 5.0 mA <sub>dc</sub> )	V <sub>BE(sat)</sub>	– – –	1.0 1.2 1.0	V <sub>dc</sub>
<b>SMALL–SIGNAL CHARACTERISTICS</b>				
Current–Gain — Bandwidth Product (I <sub>C</sub> = 10 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 100 MHz)	f <sub>T</sub>	100	300	MHz
Output Capacitance (V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)	C <sub>obo</sub>	–	6.0	pF
Input Capacitance (V <sub>EB</sub> = 0.5 V <sub>dc</sub> , I <sub>C</sub> = 0, f = 1.0 MHz)	C <sub>ibo</sub>	– –	30 20	pF
Small–Signal Current Gain (I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 1.0 kHz)	h <sub>fe</sub>	50	200	–
Noise Figure (I <sub>C</sub> = 250 μA <sub>dc</sub> , V <sub>CE</sub> = 5.0 V <sub>dc</sub> , R <sub>S</sub> = 1.0 kΩ, f = 1.0 kHz)	NF	– –	10 8.0	dB

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

# 2N5550, 2N5551

## ORDERING INFORMATION

Device	Package	Shipping†
2N5550	TO-92	5,000 Unit / Bulk
2N5550RLRA	TO-92	2,000 Tape & Reel
2N5550RLRP	TO-92	2,000 Tape & Ammo Box
2N5550RLRPG	TO-92 (Pb-Free)	2,000 Tape & Ammo Box
2N5551	TO-92	5,000 Unit / Bulk
2N5551G	TO-92 (Pb-Free)	5,000 Unit / Bulk
2N5551RL1	TO-92	2,000 Tape & Reel
2N5551RLRA	TO-92	2,000 Tape & Reel
2N5551RLRM	TO-92	2,000 Tape & Ammo Box
2N5551RLRP	TO-92	2,000 Tape & Ammo Box
2N5551ZL1	TO-92	2,000 Tape & Ammo Box

†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.

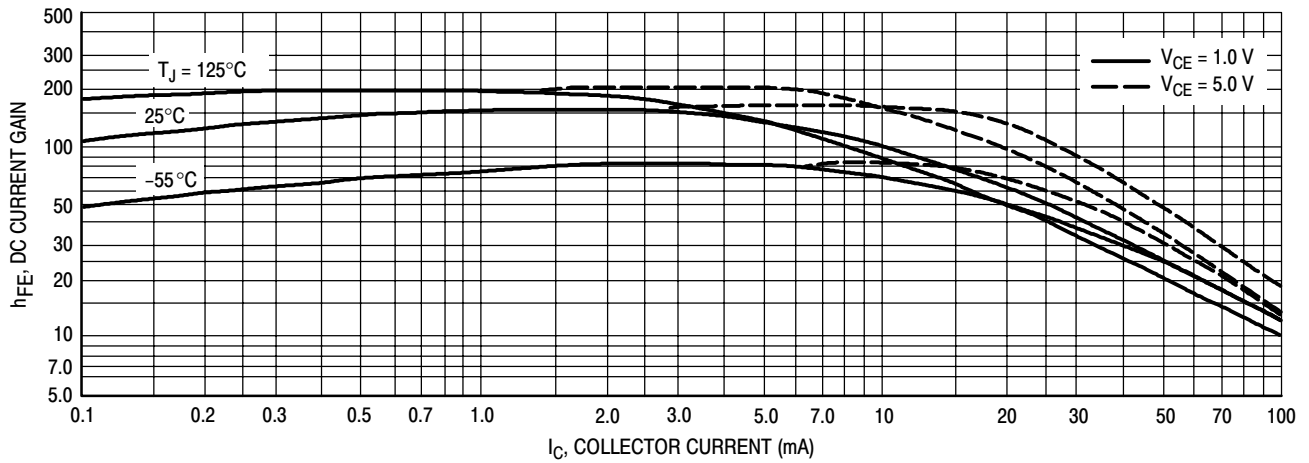


Figure 1. DC Current Gain

# 2N5550, 2N5551

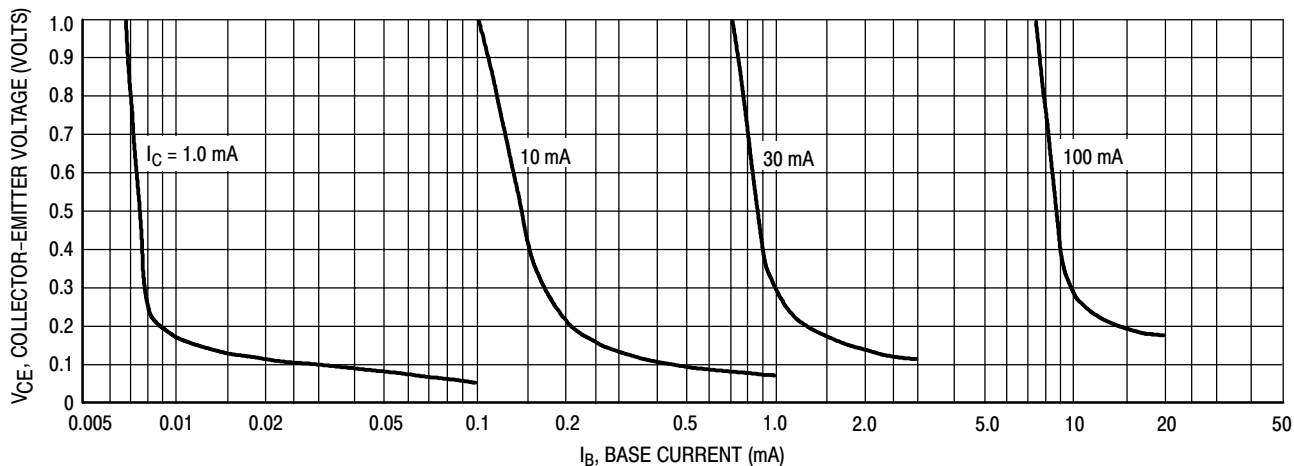


Figure 2. Collector Saturation Region

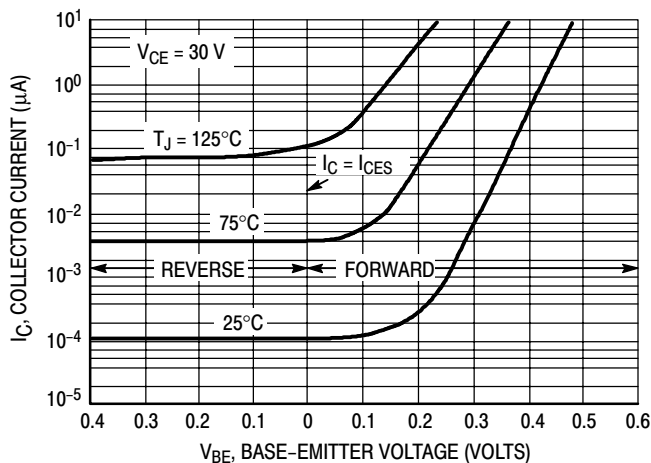


Figure 3. Collector Cut-Off Region

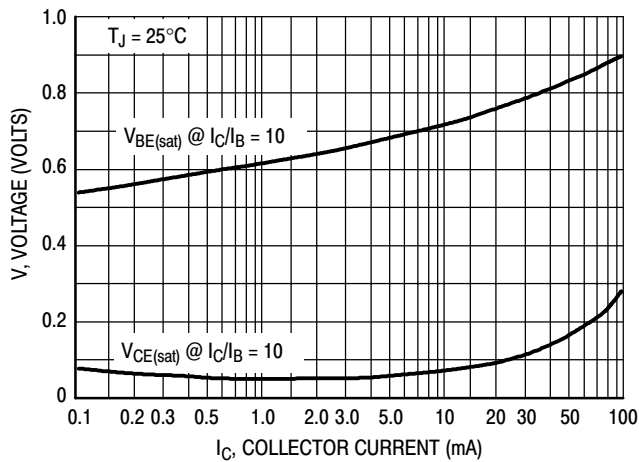


Figure 4. "On" Voltages

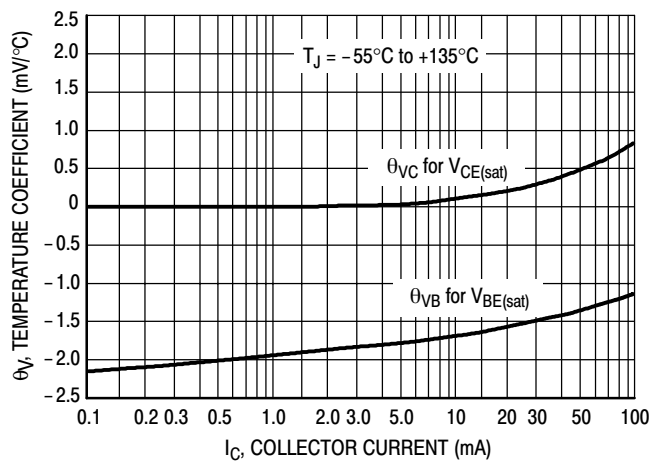
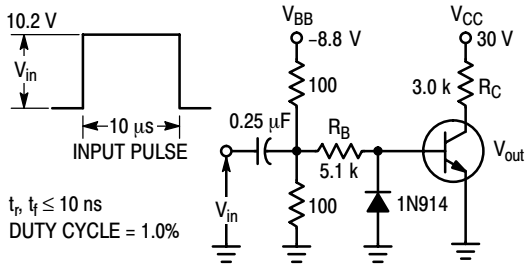


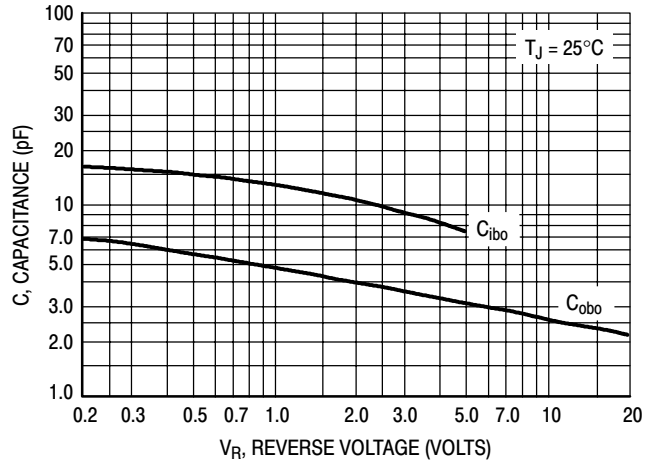
Figure 5. Temperature Coefficients

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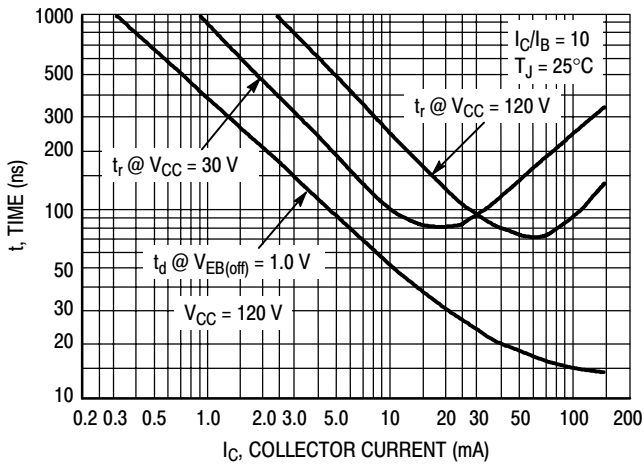


Values Shown are for  $I_C$  @ 10 mA

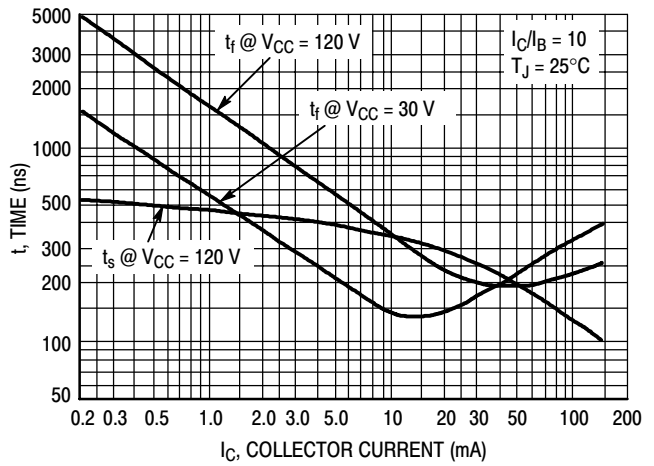
**Figure 6. Switching Time Test Circuit**



**Figure 7. Capacitances**



**Figure 8. Turn-On Time**

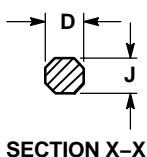
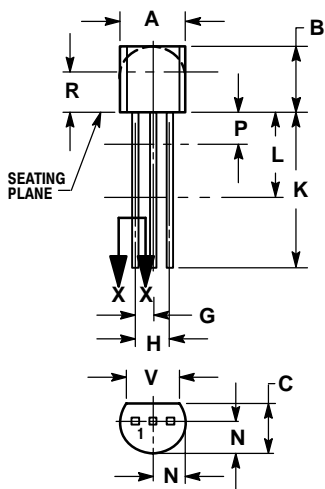


**Figure 9. Turn-Off Time**

# 2N5550, 2N5551

## 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.

DIM	INCHES		MILLIMETERS	
	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:

1. EMITTER
2. BASE
3. COLLECTOR

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