

# NST857BDP6T5G

## Dual General Purpose Transistor

The NST857BDP6T5G device is a spin-off of our popular SOT-23/SOT-323/SOT-563 three-lead device. It is designed for general purpose amplifier applications and is housed in the SOT-963 six-lead surface mount package. By putting two discrete devices in one package, this device is ideal for low-power surface mount applications where board space is at a premium.

### Features

- $h_{FE}$ , 220–475
- Low  $V_{CE(sat)}$ ,  $\leq 0.3$  V
- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- This is a Pb-Free Device

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	–45	Vdc
Collector–Base Voltage	$V_{CBO}$	–50	Vdc
Emitter–Base Voltage	$V_{EBO}$	–6.0	Vdc
Collector Current – Continuous	$I_C$	–100	mAdc
Electrostatic Discharge	HBM MM	ESD Class	2 B

### THERMAL CHARACTERISTICS

Characteristic (Single Heated)	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$ (Note 1)	$P_D$	240 1.9	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{\theta JA}$	520	$^\circ\text{C}/\text{W}$
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$ (Note 2)	$P_D$	280 2.2	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	446	$^\circ\text{C}/\text{W}$
Characteristic (Dual Heated) (Note 3)	Symbol	Max	Unit
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$ (Note 1)	$P_D$	350 2.8	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{\theta JA}$	357	$^\circ\text{C}/\text{W}$
Total Device Dissipation $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$ (Note 2)	$P_D$	420 3.4	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	297	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	$T_J, T_{stg}$	–55 to +150	$^\circ\text{C}$

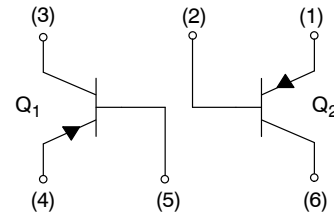
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. FR-4 @ 100 mm<sup>2</sup>, 1 oz. copper traces, still air.
2. FR-4 @ 500 mm<sup>2</sup>, 1 oz. copper traces, still air.
3. Dual heated values assume total power is sum of two equally powered channels.

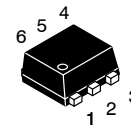


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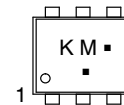


NST857BDP6T5G



SOT-963  
CASE 527AD  
PLASTIC

### MARKING DIAGRAM



K = Device Code  
M = Date Code  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

Device	Package	Shipping†
NST857BDP6T5G	SOT-963 (Pb-Free)	8000/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.

# NST857BDP6T5G

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

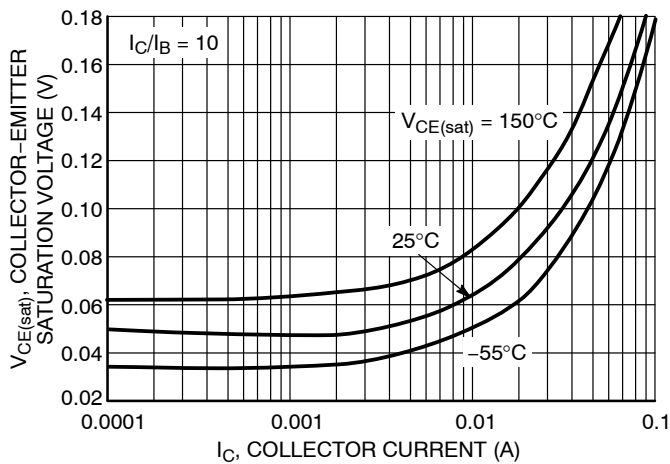
Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = -10 mA)	V <sub>(BR)CEO</sub>	-45	-	-	V
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = -10 μA, V <sub>EB</sub> = 0)	V <sub>(BR)CES</sub>	-50	-	-	V
Collector–Base Breakdown Voltage (I <sub>C</sub> = -10 μA)	V <sub>(BR)CBO</sub>	-50	-	-	V
Emitter–Base Breakdown Voltage (I <sub>E</sub> = -1.0 μA)	V <sub>(BR)EBO</sub>	-5.0	-	-	V
Collector Cutoff Current (V <sub>CB</sub> = -30 V) (V <sub>CB</sub> = -30 V, T <sub>A</sub> = 150°C)	I <sub>CBO</sub>	-	-	-15 -4.0	nA μA

## ON CHARACTERISTICS

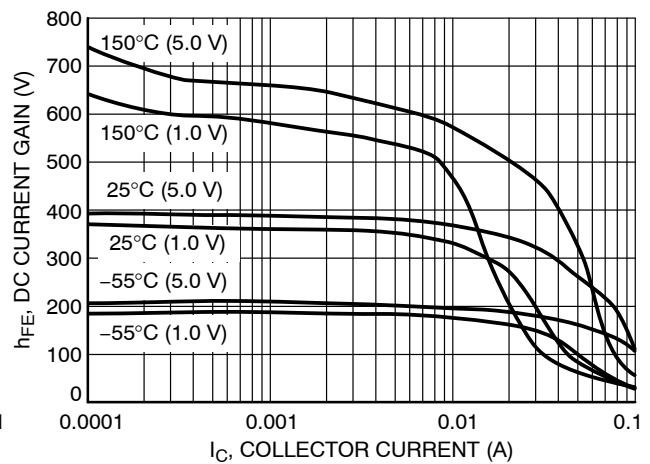
DC Current Gain (I <sub>C</sub> = -10 μA, V <sub>CE</sub> = -5.0 V) (I <sub>C</sub> = -2.0 mA, V <sub>CE</sub> = -5.0 V)	h <sub>FE</sub>	- 220	150 290	- 475	-
Collector–Emitter Saturation Voltage (I <sub>C</sub> = -10 mA, I <sub>B</sub> = -0.5 mA) (I <sub>C</sub> = -100 mA, I <sub>B</sub> = -5.0 mA)	V <sub>CE(sat)</sub>	- -	- -	-0.3 -0.7	V
Base–Emitter Saturation Voltage (I <sub>C</sub> = -10 mA, I <sub>B</sub> = -0.5 mA) (I <sub>C</sub> = -100 mA, I <sub>B</sub> = -5.0 mA)	V <sub>BE(sat)</sub>	- -	-0.7 -0.9	- -	V
Base–Emitter On Voltage (I <sub>C</sub> = -2.0 mA, V <sub>CE</sub> = -5.0 V) (I <sub>C</sub> = -10 mA, V <sub>CE</sub> = -5.0 V)	V <sub>BE(on)</sub>	-0.6 -	- -	-0.75 -0.82	V

## SMALL-SIGNAL CHARACTERISTICS

Current–Gain – Bandwidth Product (I <sub>C</sub> = -10 mA, V <sub>CE</sub> = -5.0 Vdc, f = 100 MHz)	f <sub>T</sub>	100	-	-	MHz
Output Capacitance (V <sub>CB</sub> = -10 V, f = 1.0 MHz)	C <sub>obo</sub>	-	-	4.5	pF
Input Capacitance (V <sub>EB</sub> = -0.5 V, f = 1.0 MHz)	C <sub>ibo</sub>	-	-	10	pF
Noise Figure (I <sub>C</sub> = -0.2 mA, V <sub>CE</sub> = -5.0 Vdc, R <sub>S</sub> = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz)	NF	-	-	10	dB

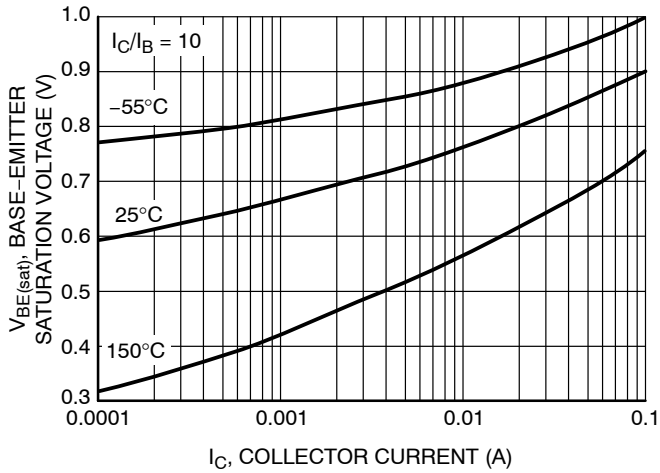


**Figure 1. Collector Emitter Saturation Voltage vs. Collector Current**

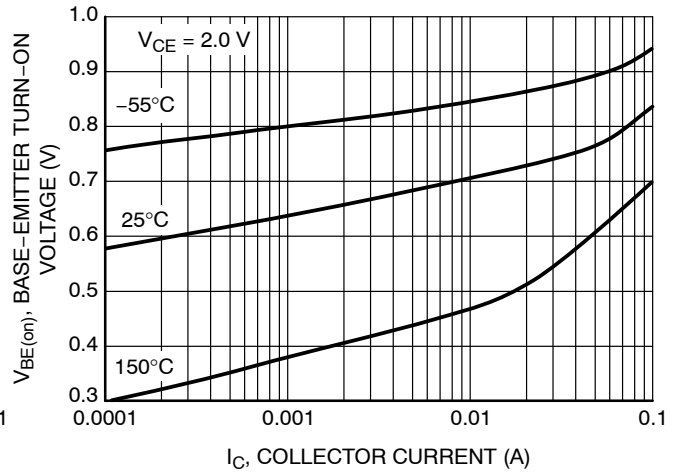


**Figure 2. DC Current Gain vs. Collector Current**

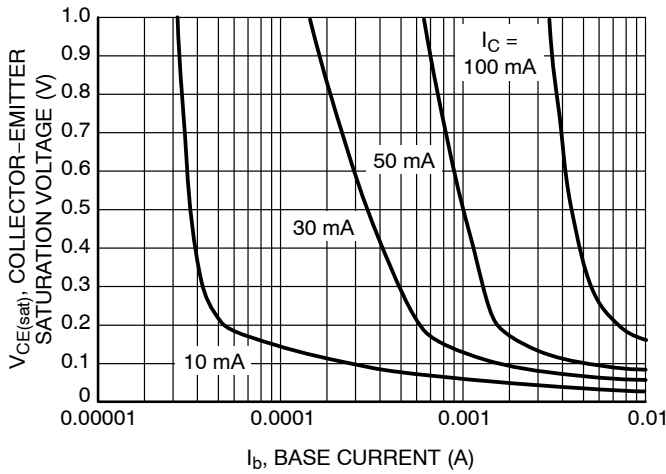
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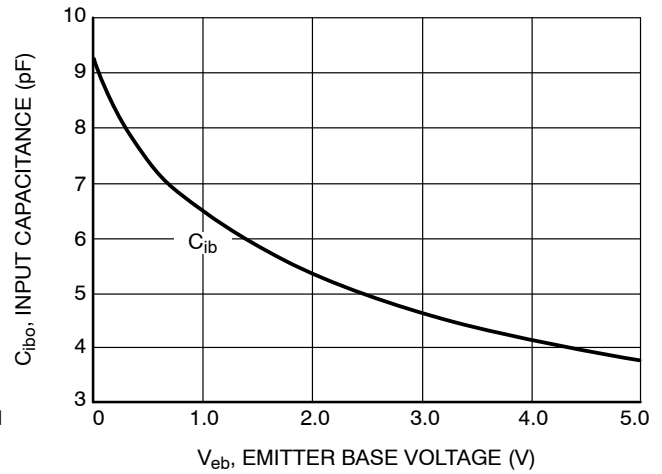
**Figure 3. Base Emitter Saturation Voltage vs. Collector Current**



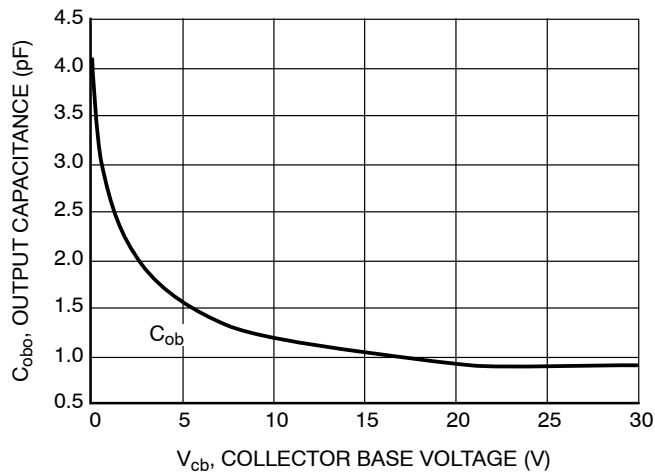
**Figure 4. Base Emitter Turn-On Voltage vs. Collector Current**



**Figure 5. Saturation Region**



**Figure 6. Input Capacitance**

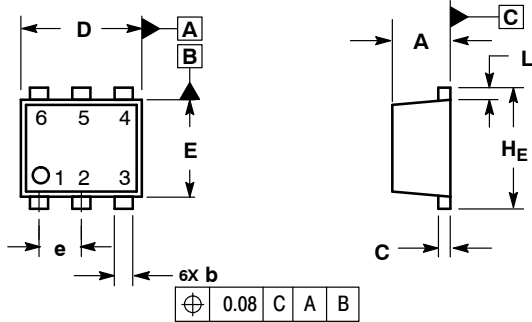


**Figure 7. Output Capacitance**

# NST857BDP6T5G

## PACKAGE DIMENSIONS

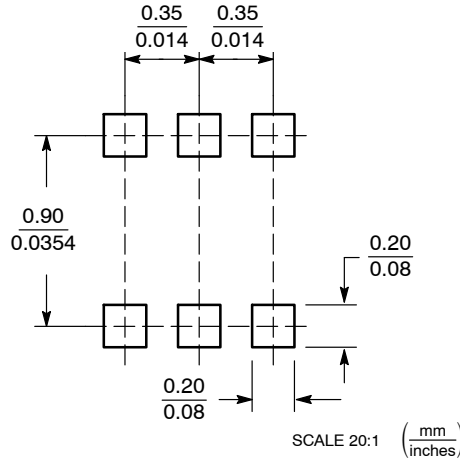
SOT-963  
CASE 527AD-01  
ISSUE B



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: MILLIMETERS
  3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.34	0.37	0.40			
b	0.10	0.15	0.20	0.004	0.006	0.008
C	0.07	0.12	0.17	0.003	0.005	0.007
D	0.95	1.00	1.05	0.037	0.039	0.041
E	0.75	0.80	0.85	0.03	0.032	0.034
e	0.35 BSC			0.014 BSC		
L	0.05	0.10	0.15	0.002	0.004	0.006
H <sub>E</sub>	0.95	1.00	1.05	0.037	0.039	0.041

### SOLDERING FOOTPRINT\*



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

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