## **Dual Complementary General Purpose Transistor**

The NST847BPDP6T5G device is a spin-off of our popular SOT-23/SOT-323/SOT-563 three-leaded device. It is designed for general purpose amplifier applications and is housed in the SOT-963 six-leaded 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<sub>FE</sub>, 200-450
- 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 <sub>CEO</sub>	45	Vdc
Collector – Base Voltage		V <sub>CBO</sub>	50	Vdc
Emitter-Base Voltage		V <sub>EBO</sub>	6.0	Vdc
Collector Current – Continuous		Ι <sub>C</sub>	100	mAdc
Electrostatic Discharge	HBM MM	ESD Class	2 B	

#### **THERMAL CHARACTERISTICS**

Characteristic (Single Heated)	Symbol	Max	Unit
Total Device Dissipation T <sub>A</sub> = 25°C Derate above 25°C (Note 1)	PD	240 1.9	mW mW/°C
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{\thetaJA}$	520	°C/W
Total Device Dissipation T <sub>A</sub> = 25°C Derate above 25°C (Note 2)	P <sub>D</sub>	280 2.2	mW mW/°C
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	446	°C/W
Characteristic (Dual Heated) (Note 3)	Symbol	Мах	Unit
Total Device Dissipation T <sub>A</sub> = 25°C Derate above 25°C (Note 1)	PD	350 2.8	mW mW/°C
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{\theta JA}$	357	°C/W
Total Device Dissipation T <sub>A</sub> = 25°C Derate above 25°C (Note 2)	P <sub>D</sub>	420 3.4	mW mW/°C
Thermal Resistance, Junction-to-Ambient (Note 2)	R <sub>θJA</sub>	297	°C/W
Junction and Storage Temperature Range	T <sub>J</sub> , 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.

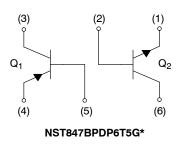
FR-4 @ 100 mm<sup>2</sup>, 1 oz. copper traces, still air.
FR-4 @ 500 mm<sup>2</sup>, 1 oz. copper traces, still air.

3. Dual heated values assume total power is sum of two equally powered channels



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\*Q1 PNP Q2 NPN



SOT-963 CASE 527AD

### **MARKING DIAGRAM**



А = Device Code Μ = Date Code

### **ORDERING INFORMATION**

Device	Package	Shipping $^{\dagger}$
NST847BPDP6T5G	SOT-963 (Pb-Free)	8000/Tape & Reel

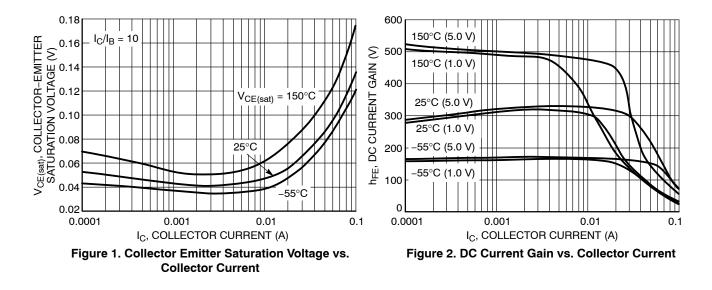
+For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

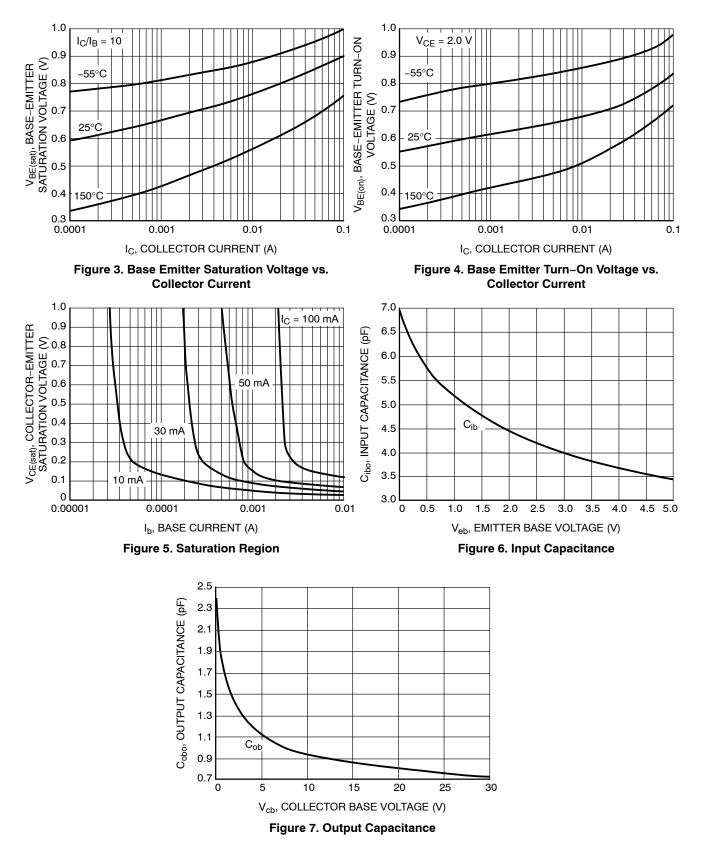
Characteristic		Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS						
Collector – Emitter Breakdown Voltage ( $I_C = 1.0 \text{ mA}, I_B = 0$ ) ( $I_C = -1.0 \text{ mA}, I_B = 0$ )	(NPN) (PNP)	V <sub>(BR)CEO</sub>	45 -45			V
Collector – Base Breakdown Voltage $(I_C = 10 \ \mu\text{A}, I_E = 0)$ $(I_C = -10 \ \mu\text{A}, I_E = 0)$	(NPN) (PNP)	V <sub>(BR)CBO</sub>	50 –50			V
Collector – Emitter Breakdown Voltage ( $I_C = 10 \ \mu A$ ) ( $I_C = -10 \ \mu A$ )	(NPN) (PNP)	V <sub>(BR)CES</sub>	50 -50			V
Emitter – Base Breakdown Voltage ( $I_E = 1.0 \ \mu A, I_C = 0$ ) ( $I_E = -1.0 \ \mu A, I_C = 0$ )	(NPN) (PNP)	V <sub>(BR)EBO</sub>	6.0 -5.0	-	-	V
Collector Cutoff Current $(V_{CB} = 30 \text{ V})$ $(V_{CB} = 30 \text{ V}, T_A = 150^{\circ}\text{C})$ $(V_{CB} = -30 \text{ V})$ $(V_{CB} = -30 \text{ V}, T_A = 150^{\circ}\text{C})$	(NPN) (NPN) (PNP) (PNP)	I <sub>CBO</sub>	- - -	- - -	15 5.0 –15 –4.0	nA μA nA μA
ON CHARACTERISTICS (Note 4)						
DC Current Gain $(I_C = 2.0 \text{ mA}, V_{CE} = 5.0 \text{ V})$	(NPN)	h <sub>FE</sub>	200	290	450	-
$(I_C = -2.0 \text{ mA}, V_{CE} = -5.0 \text{ V})$	(PNP)		220	290	475	
Collector – Emitter Saturation Voltage ( $I_C = 10 \text{ mA}, I_B = 0.5 \text{ mA}$ ) ( $I_C = 100 \text{ mA}, I_B = 5.0 \text{ mA}$ )	(NPN)	V <sub>CE(sat)</sub>			0.25 0.60	V
(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)	(PNP)		-	-	-0.30 -0.70	
Base – Emitter Saturation Voltage ( $I_C = 10 \text{ mA}, I_B = 0.5 \text{ mA}$ ) ( $I_C = 100 \text{ mA}, I_B = 5.0 \text{ mA}$ )	(NPN)	V <sub>BE(sat)</sub>	-	0.70 0.90	-	V
(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)	(PNP)		- -	-0.70 -0.90	- -	
Base – Emitter On Voltage ( $I_C = 2.0 \text{ mA}, V_{CE} = 5.0 \text{ V}$ ) ( $I_C = 10 \text{ mA}, V_{CE} = 5.0 \text{ V}$ )	(NPN)	V <sub>BE(on)</sub>	0.58 -	0.66 -	0.70 0.77	V
$(I_{C} = -2.0 \text{ mA}, V_{CE} = -5.0 \text{ V})$ $(I_{C} = -10 \text{ mA}, V_{CE} = -5.0 \text{ V})$	(PNP)		-0.60 -	- -	-0.75 -0.82	
SMALL-SIGNAL CHARACTERISTICS						
Current–Gain – Bandwidth Product $(I_C = 10 \text{ mA}, V_{CE} = 5.0 \text{ V}, f = 100 \text{ MHz})$	(NPN)	f <sub>T</sub>	100	_	_	MHz
$(I_{C} = -10 \text{ mA}, V_{CE} = -5.0 \text{ V}, \text{ f} = 100 \text{ MHz})$	(PNP)		100	-	-	
Output Capacitance (V <sub>CB</sub> = 10 V, f = 1.0 MHz)	(NPN)	C <sub>ob</sub>	-	-	4.5	pF
(V <sub>CB</sub> = -10 V, f = 1.0 MHz)	(PNP)		-	-	4.5	
Noise Figure (I <sub>C</sub> = 0.2 mA, V <sub>CE</sub> = 5.0 V, R <sub>S</sub> = 2 kΩ, f = 1 kHz, BW = 200 Hz)	(NPN)	NF	-	-	10	dB
$(I_{C} = -0.2 \text{ mA}, V_{CE} = -5.0 \text{ V}, R_{S} = 2 \text{ k}\Omega, \text{ f} = 1 \text{ kHz}, BW = 200 \text{ Hz})$	(PNP)		-	-	10	

4. Pulse Test: Pulse Width  $\leq$  300  $\mu s;$  Duty Cycle  $\leq$  2.0%.

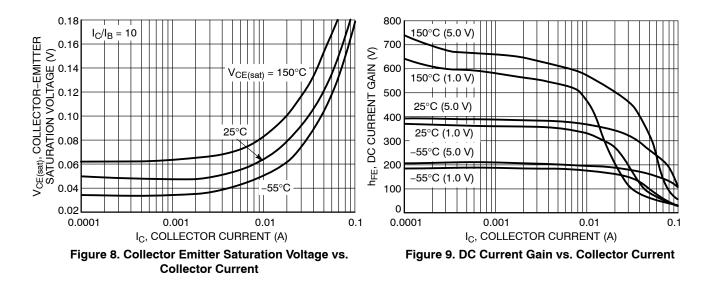
### NPN TRANSISTOR



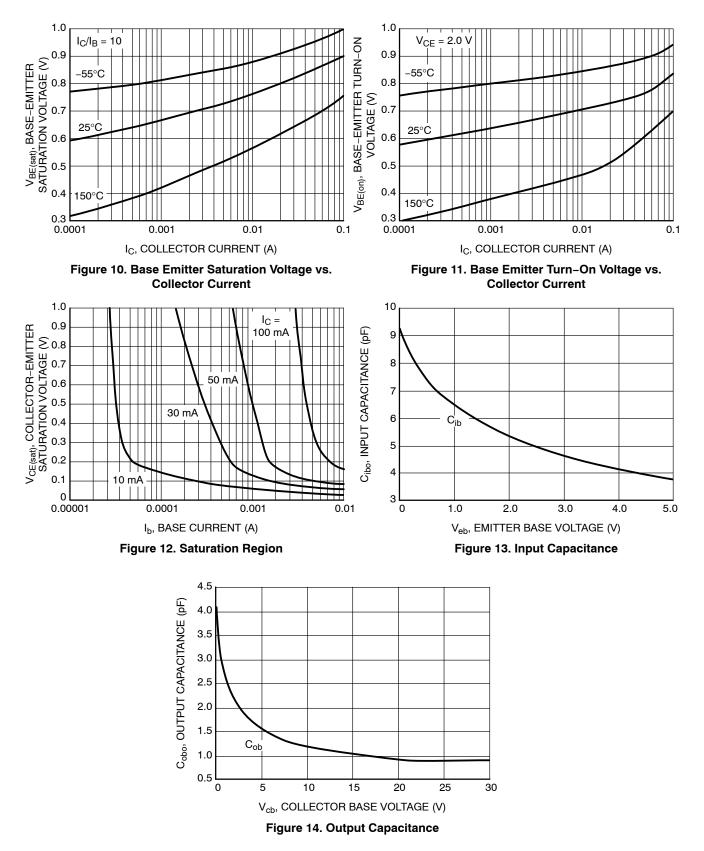
NPN TRANSISTOR



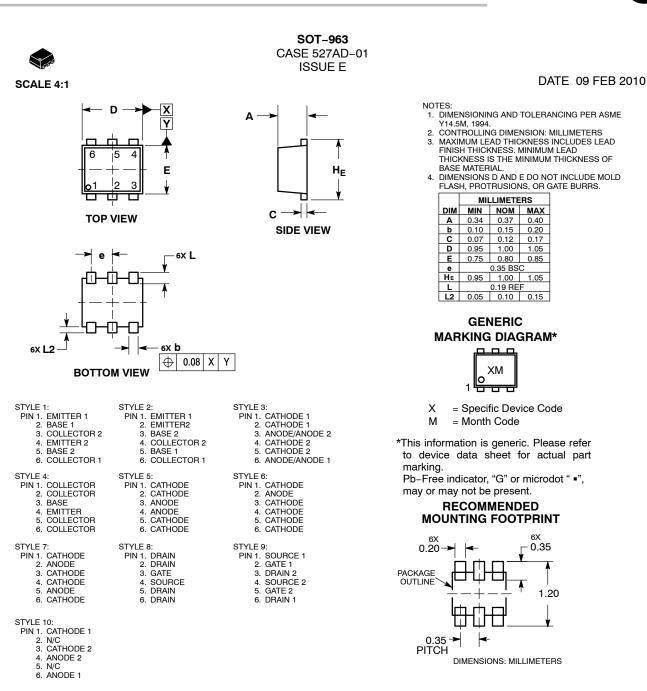
#### **PNP TRANSISTOR**



**PNP TRANSISTOR** 







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