

NST846BF3T5G

NPN General Purpose Transistor

The NST846BF3T5G 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-1123 surface mount package. This device is ideal for low-power surface mount applications where board space is at a premium.

Features

- h_{FE} , 200–450
- Low $V_{CE(sat)}$, ≤ 0.25 V
- Reduces Board Space
- This is a Halide-Free Device
- This is a Pb-Free Device

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	65	Vdc
Collector–Base Voltage	V_{CBO}	80	Vdc
Emitter–Base Voltage	V_{EBO}	6.0	Vdc
Collector Current – Continuous	I_C	100	mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation, $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D (Note 1)	290 2.3	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to–Ambient	$R_{\theta JA}$ (Note 1)	432	$^\circ\text{C}/\text{W}$
Total Device Dissipation, $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D (Note 2)	347 2.8	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to–Ambient	$R_{\theta JA}$ (Note 2)	360	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to–Lead 3	$R_{\theta JL}$ (Note 2)	143	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{stg}	–55 to +150	$^\circ\text{C}$

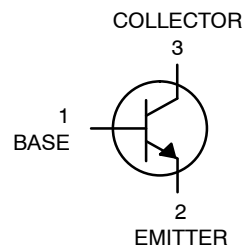
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. 100 mm² 1 oz, copper traces.
2. 500 mm² 1 oz, copper traces.

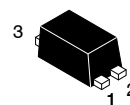


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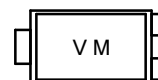
NST846BF3T5G



SOT-1123
CASE 524AA
STYLE 1

(Rotated 90° Clockwise)

MARKING DIAGRAM



V = Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
NST846BF3T5G	SOT-1123 (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.

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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector – Emitter Breakdown Voltage ($I_C = 10\text{ mA}$)	$V_{(BR)CEO}$	65	–	–	V
Collector – Emitter Breakdown Voltage ($I_C = 10\text{ }\mu\text{A}$, $V_{EB} = 0$)	$V_{(BR)CES}$	80	–	–	V
Collector – Base Breakdown Voltage ($I_C = 10\text{ }\mu\text{A}$)	$V_{(BR)CBO}$	80	–	–	V
Emitter – Base Breakdown Voltage ($I_E = 1.0\text{ }\mu\text{A}$)	$V_{(BR)EBO}$	6.0	–	–	V
Collector Cutoff Current ($V_{CB} = 30\text{ V}$) ($V_{CB} = 30\text{ V}$, $T_A = 150^\circ\text{C}$)	I_{CBO}	–	–	15	nA
		–	–	5.0	μA

ON CHARACTERISTICS

DC Current Gain ($I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$)	h_{FE}	–	150	–	–
		200	290	450	–
Collector – Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$) ($I_C = 100\text{ mA}$, $I_B = 5.0\text{ mA}$)	$V_{CE(sat)}$	–	–	0.25	V
		–	–	0.6	V
Base – Emitter Saturation Voltage ($I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$) ($I_C = 100\text{ mA}$, $I_B = 5.0\text{ mA}$)	$V_{BE(sat)}$	–	0.7	–	V
		–	0.9	–	V
Base – Emitter Voltage ($I_C = 2.0\text{ mA}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ V}$)	$V_{BE(on)}$	580	660	700	mV
		–	–	770	mV

SMALL-SIGNAL CHARACTERISTICS

Current – Gain – Bandwidth Product ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$, $f = 100\text{ MHz}$)	f_T	100	–	–	MHz
Output Capacitance ($V_{CB} = 10\text{ V}$, $f = 1.0\text{ MHz}$)	C_{obo}	–	–	4.5	pF
Input Capacitance ($V_{EB} = 0.5\text{ V}$, $I_C = 0\text{ mA}$, $f = 1.0\text{ MHz}$)	C_{ibo}	–	–	10	pF
Noise Figure ($I_C = 0.2\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$, $R_S = 2.0\text{ k}\Omega$, $f = 1.0\text{ kHz}$, $BW = 200\text{ Hz}$)	NF	–	–	10	dB

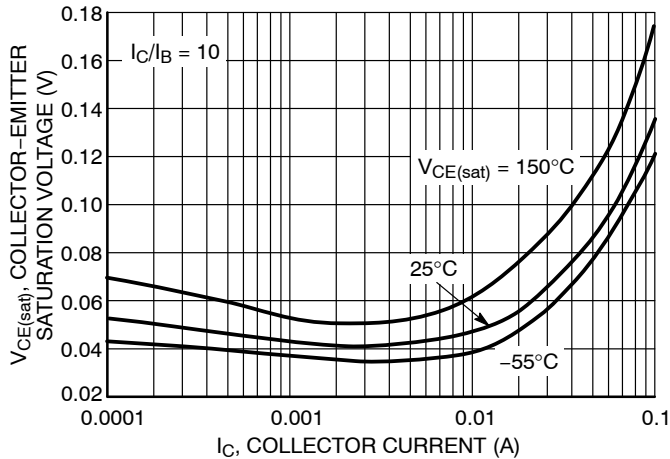


Figure 1. Collector Emitter Saturation Voltage vs. Collector Current

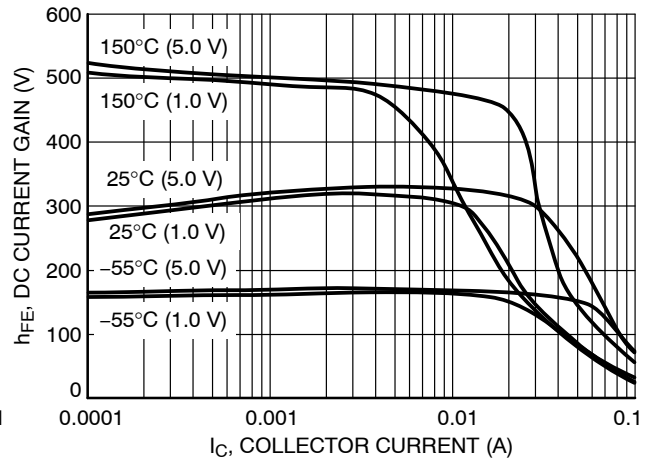


Figure 2. DC Current Gain vs. Collector Current

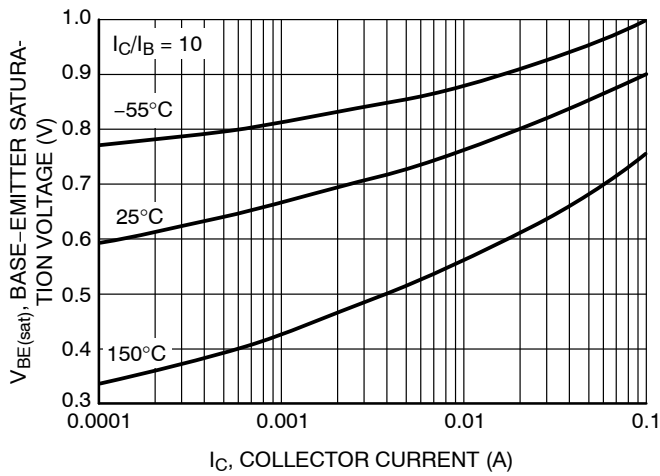


Figure 3. Base Emitter Saturation Voltage vs. Collector Current

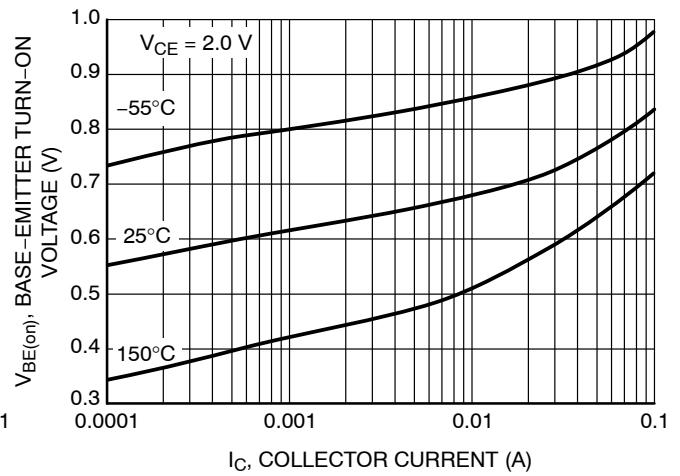


Figure 4. Base Emitter Turn-On Voltage vs. Collector Current

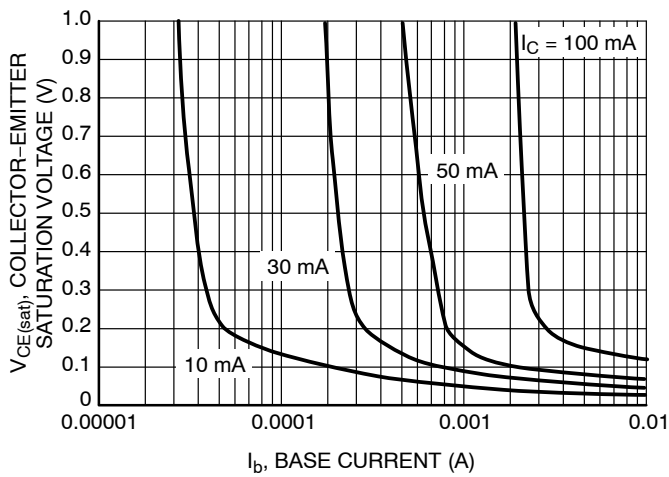


Figure 5. Saturation Region

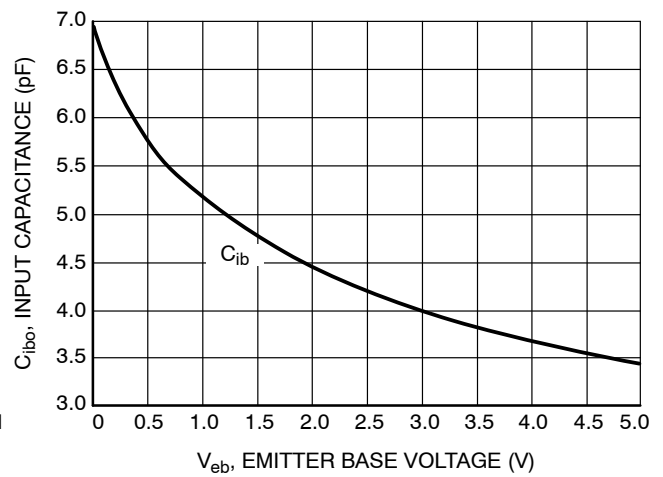


Figure 6. Input Capacitance

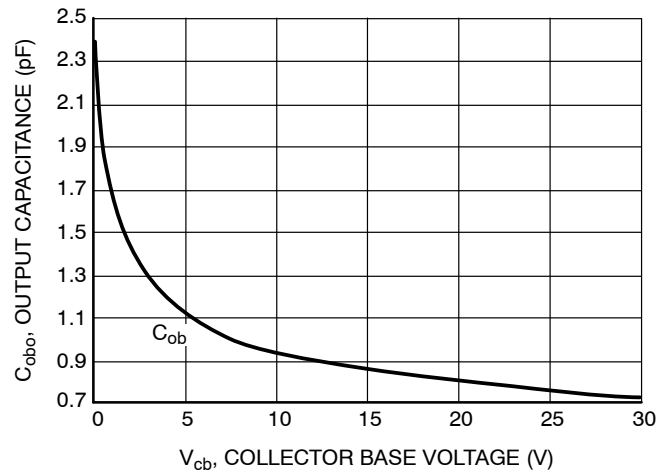
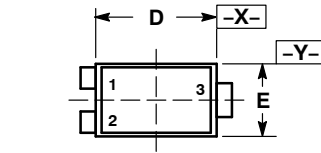


Figure 7. Output Capacitance

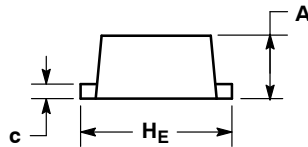
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PACKAGE DIMENSIONS

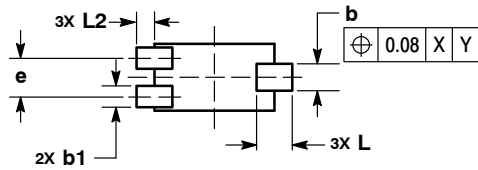
SOT-1123
CASE 524AA
ISSUE C



TOP VIEW



SIDE VIEW



BOTTOM VIEW

NOTES:

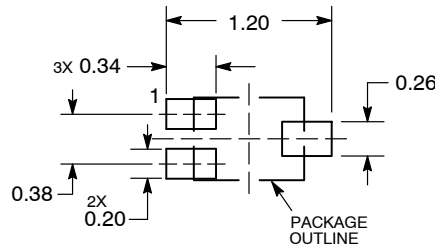
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS	
	MIN	MAX
A	0.34	0.40
b	0.15	0.28
b1	0.10	0.20
c	0.07	0.17
D	0.75	0.85
E	0.55	0.65
e	0.35	0.40
H _E	0.95	1.05
L	0.185 REF	
L2	0.05	0.15

STYLE 1:

1. BASE
2. EMITTER
3. COLLECTOR

SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*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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