

# NST848BF3T5G

## NPN General Purpose Transistor

The NST848BF3T5G 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  $V_{CE(sat)}$ ,  $\leq 0.25$  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      | $V_{CEO}$ | 30    | Vdc  |
| Collector–Base Voltage         | $V_{CBO}$ | 30    | Vdc  |
| Emitter–Base Voltage           | $V_{EBO}$ | 5.0   | Vdc  |
| Collector Current – Continuous | $I_C$     | 100   | mAdc |

### THERMAL CHARACTERISTICS

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

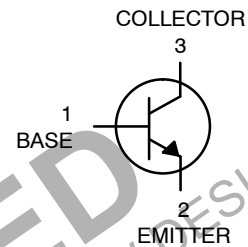
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. 100 mm<sup>2</sup> 1 oz, copper traces.
2. 500 mm<sup>2</sup> 1 oz, copper traces.

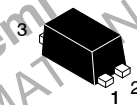


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<http://onsemi.com>



NST848BF3T5G



SOT-1123  
CASE 524AA  
STYLE 1

### MARKING DIAGRAM



Y = Device Code  
M = Date Code

### ORDERING INFORMATION

| Device       | Package               | Shipping†        |
|--------------|-----------------------|------------------|
| NST848BF3T5G | SOT-1123<br>(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.

# NST848BF3T5G

## 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> | 30  | –   | –   | V    |
| Collector – Emitter Breakdown Voltage (I <sub>C</sub> = 10 μA, V <sub>EB</sub> = 0) | V <sub>(BR)CES</sub> | 30  | –   | –   | V    |
| Collector – Base Breakdown Voltage (I <sub>C</sub> = 10 μA)                         | V <sub>(BR)CBO</sub> | 30  | –   | –   | 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)                                   | I <sub>CBO</sub>     | –   | –   | 15  | nA   |
| (V <sub>CB</sub> = 30 V, T <sub>A</sub> = 150°C)                                    |                      | –   | –   | 5.0 | μA   |

## ON CHARACTERISTICS

|  |                      |     |     |      |    |
|--|----------------------|-----|-----|------|----|
| DC Current Gain (I <sub>C</sub> = 10 μA, V <sub>CE</sub> = 5.0 V)                        | h <sub>FE</sub>      | –   | 150 | –    | –  |
| (I <sub>C</sub> = 2.0 mA, V <sub>CE</sub> = 5.0 V)                                       |                      | 200 | 290 | 450  | –  |
| Collector – Emitter Saturation Voltage (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0.5 mA) | V <sub>CE(sat)</sub> | –   | –   | 0.25 | V  |
| (I <sub>C</sub> = 100 mA, I <sub>B</sub> = 5.0 mA)                                       |                      | –   | –   | 0.6  |    |
| Base – Emitter Saturation Voltage (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0.5 mA)      | V <sub>BE(sat)</sub> | –   | 0.7 | –    | V  |
| (I <sub>C</sub> = 100 mA, I <sub>B</sub> = 5.0 mA)                                       |                      | –   | 0.9 | –    |    |
| Base – Emitter Voltage (I <sub>C</sub> = 2.0 mA, V <sub>CE</sub> = 5.0 V)                | V <sub>BE(on)</sub>  | 580 | 660 | 700  | mV |
| (I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 5.0 V)  |                      | –   | –   | 770  |    |

## 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, I <sub>C</sub> = 0 mA, 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  |

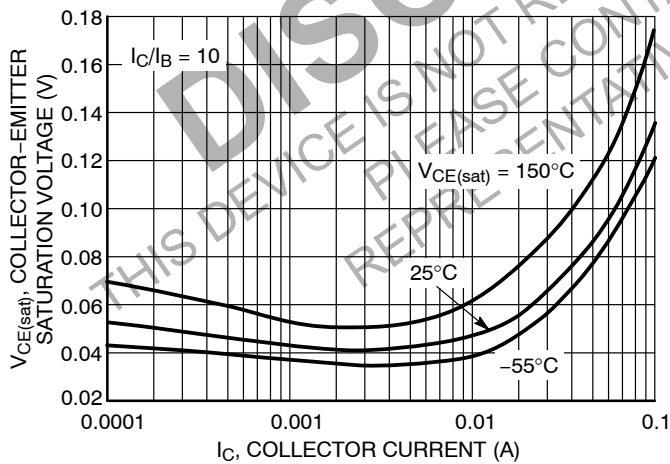


Figure 1. Collector Emitter Saturation Voltage vs. Collector Current

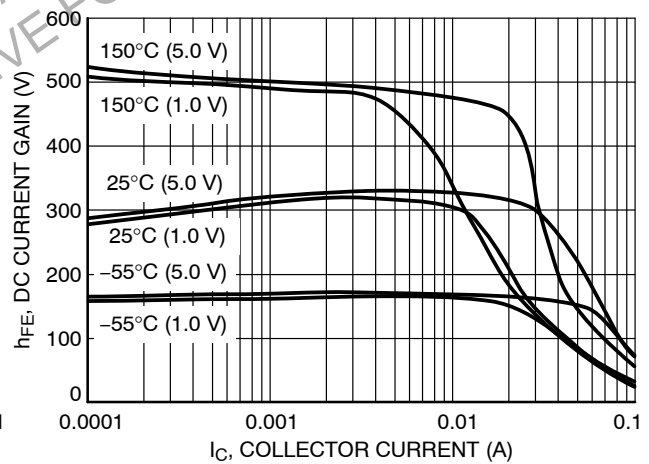
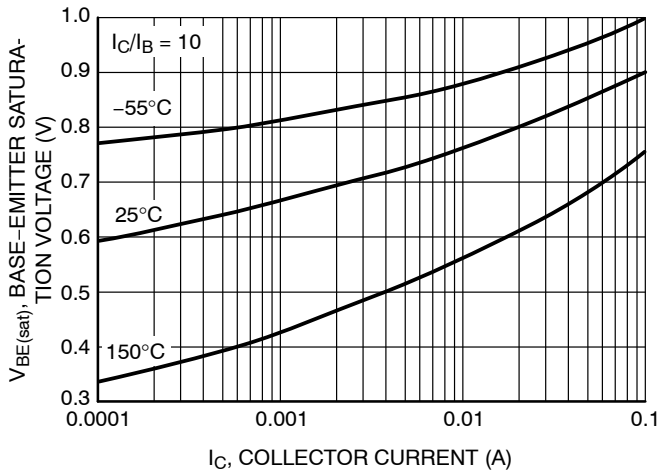
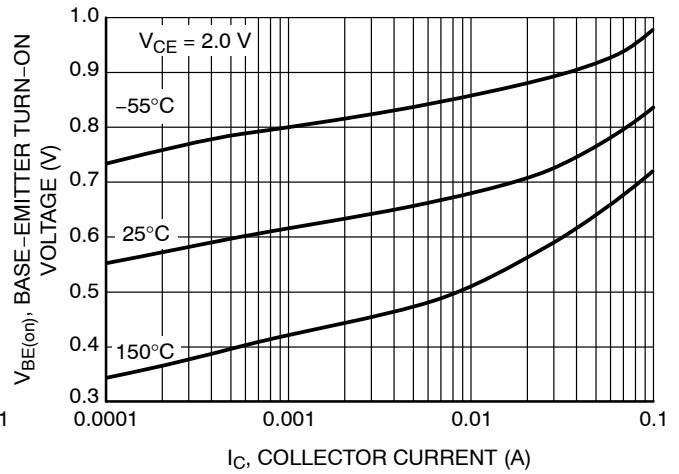


Figure 2. DC Current Gain vs. Collector Current

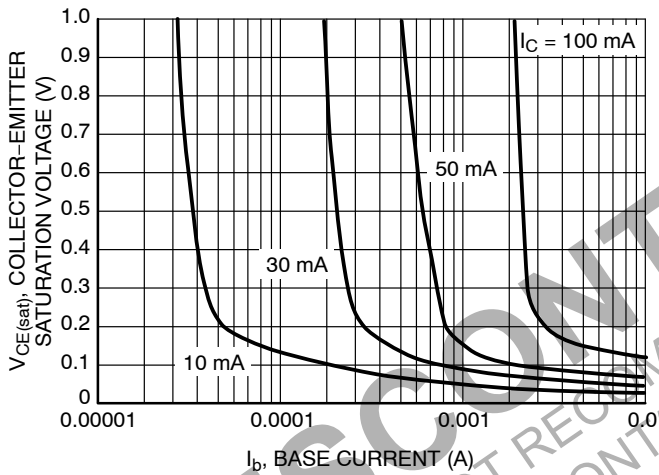
# NST848BF3T5G



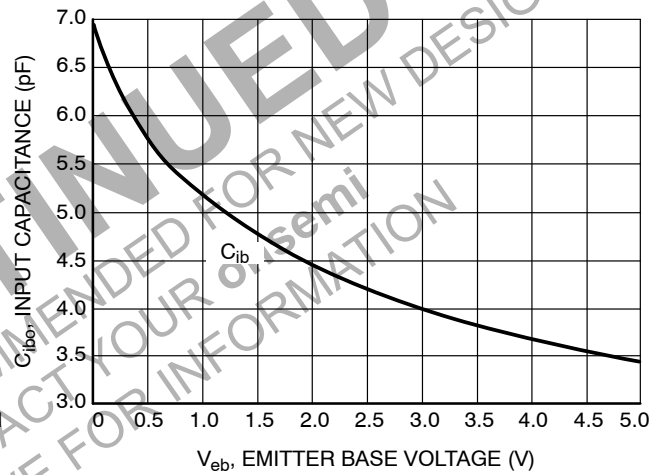
**Figure 3. Base Emitter Saturation Voltage vs. Collector Current**



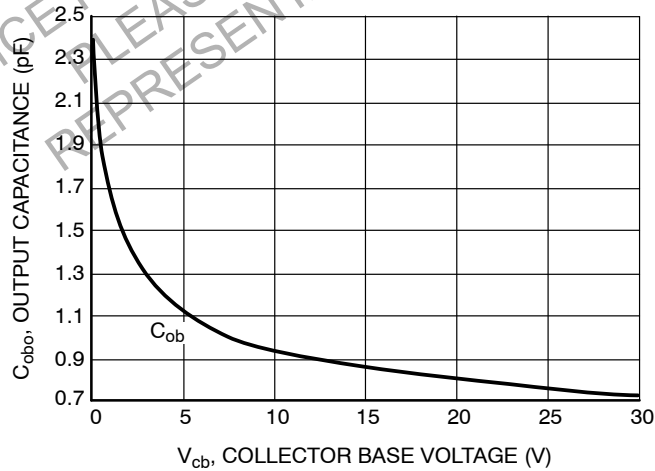
**Figure 4. Base Emitter Turn-On Voltage vs. Collector Current**



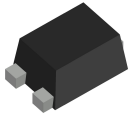
**Figure 5. Saturation Region**



**Figure 6. Input Capacitance**

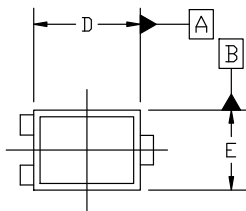


**Figure 7. Output Capacitance**

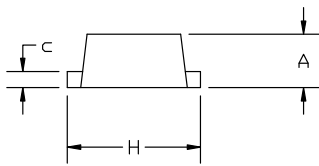


**SOT-1123 0.80x0.60x0.37, 0.35P**  
**CASE 524AA**  
**ISSUE D**

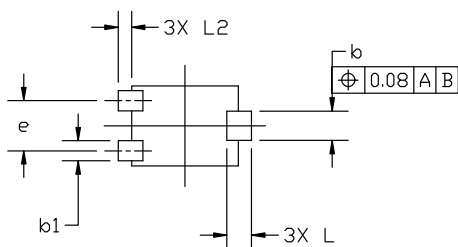
DATE 18 JAN 2024



TOP VIEW



SIDE VIEW



BOTTOM VIEW

**GENERIC MARKING DIAGRAM\***



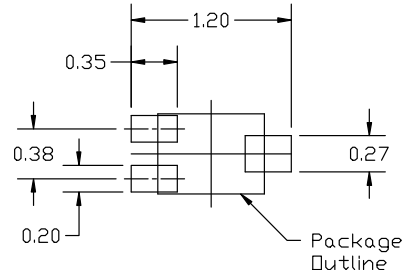
X = Specific Device Code  
M = Date Code

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
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.

| MILLIMETERS |           |       |       |
|-------------|-----------|-------|-------|
| DIM         | MIN       | NOM   | MAX   |
| A           | 0.34      | 0.37  | 0.40  |
| b           | 0.15      | 0.22  | 0.28  |
| b1          | 0.10      | 0.15  | 0.20  |
| c           | 0.07      | 0.12  | 0.17  |
| D           | 0.75      | 0.80  | 0.85  |
| E           | 0.55      | 0.60  | 0.65  |
| e           | 0.35      | 0.38  | 0.40  |
| H           | 0.950     | 1.000 | 1.050 |
| L           | 0.185 REF |       |       |
| L2          | 0.05      | 0.10  | 0.15  |



**RECOMMENDED MOUNTING FOOTPRINT**

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

|   |  |  |  |  |
|---|--|--|--|--|
| STYLE 1:<br>PIN 1. BASE<br>2. EMITTER<br>3. COLLECTOR | STYLE 2:<br>PIN 1. ANODE<br>2. N/C<br>3. CATHODE | STYLE 3:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE | STYLE 4:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. ANODE | STYLE 5:<br>PIN 1. GATE<br>2. SOURCE<br>3. DRAIN |
|---|--|--|--|--|

|                         |                                       |  |
|-------------------------|---------------------------------------|--|
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| <b>DESCRIPTION:</b>     | <b>SOT-1123 0.80x0.60x0.37, 0.35P</b> | <b>PAGE 1 OF 1</b>   |

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