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# BC856BM3, NSVBC856BM3

## General Purpose Transistor

### PNP Silicon

This transistor is designed for general purpose amplifier applications. It is housed in the SOT-723 which is designed for low power surface mount applications.

#### Features

- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### MAXIMUM RATINGS

| Rating                         | Symbol    | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector-Emitter Voltage      | $V_{CEO}$ | -65   | V    |
| Collector-Base Voltage         | $V_{CBO}$ | -80   | V    |
| Emitter-Base Voltage           | $V_{EBO}$ | -5.0  | V    |
| Collector Current - Continuous | $I_C$     | -100  | mA   |

#### THERMAL CHARACTERISTICS

| Characteristic   | Symbol          | Max         | Unit                      |
|--|-----------------|-------------|---------------------------|
| Total Device Dissipation FR-5 Board (Note 1)<br>$T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$        | $P_D$           | 265         | mW                        |
| Thermal Resistance, Junction to Ambient (Note 1)   | $R_{\theta JA}$ | 470         | $^\circ\text{C}/\text{W}$ |
| Total Device Dissipation Alumina Substrate (Note 2)<br>$T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$           | 640         | mW                        |
| Thermal Resistance, Junction to Ambient (Note 2)   | $R_{\theta JA}$ | 195         | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range   | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$          |

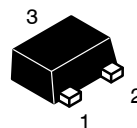
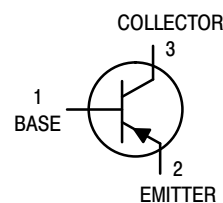
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. FR-5 =  $1.0 \times 0.75 \times 0.062$  in.
2. Alumina =  $0.4 \times 0.3 \times 0.024$  in. 99.5% alumina.



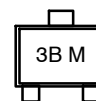
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SOT-723  
CASE 631AA  
STYLE 1

#### MARKING DIAGRAM



3B = Specific Device Code  
M = Date Code

#### ORDERING INFORMATION

| Device         | Package           | Shipping†          |
|----------------|-------------------|--------------------|
| BC856BM3T5G    | SOT-723 (Pb-Free) | 8000 / Tape & Reel |
| NSVBC856BM3T5G | SOT-723 (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.

# BC856BM3, NSVBC856BM3

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

### OFF CHARACTERISTICS

|   |                      |      |   |             |          |
|---|----------------------|------|---|-------------|----------|
| Collector – Emitter Breakdown Voltage<br>(I <sub>C</sub> = -10 mA)                                      | V <sub>(BR)CEO</sub> | -65  | - | -           | V        |
| Collector – Emitter Breakdown Voltage<br>(I <sub>C</sub> = -10 μA, V <sub>EB</sub> = 0)                 | V <sub>(BR)CES</sub> | -80  | - | -           | V        |
| Collector – Base Breakdown Voltage<br>(I <sub>C</sub> = -10 μA)   | V <sub>(BR)CBO</sub> | -80  | - | -           | V        |
| Emitter – Base Breakdown Voltage<br>(I <sub>E</sub> = -1.0 μA)  | V <sub>(BR)EBO</sub> | -5.0 | - | -           | V        |
| Collector Cutoff Current (V <sub>CB</sub> = -30 V)<br>(V <sub>CB</sub> = -30 V, T <sub>A</sub> = 150°C) | I <sub>CBO</sub>     | -    | - | -15<br>-4.0 | nA<br>μA |

### ON CHARACTERISTICS

|  |                      |           |              |                |    |
|--|----------------------|-----------|--------------|----------------|----|
| DC Current Gain<br>(I <sub>C</sub> = -10 μA, V <sub>CE</sub> = -5.0 V)<br>(I <sub>C</sub> = -2.0 mA, V <sub>CE</sub> = -5.0 V)                     | h <sub>FE</sub>      | -<br>220  | 150<br>290   | -<br>475       | -  |
| Collector – Emitter Saturation Voltage (I <sub>C</sub> = -10 mA, I <sub>B</sub> = -0.5 mA)<br>(I <sub>C</sub> = -100 mA, I <sub>B</sub> = -5.0 mA) | V <sub>CE(sat)</sub> | -<br>-    | -<br>-       | -0.3<br>-0.65  | V  |
| Base – Emitter Saturation Voltage (I <sub>C</sub> = -10 mA, I <sub>B</sub> = -0.5 mA)<br>(I <sub>C</sub> = -100 mA, I <sub>B</sub> = -5.0 mA)      | V <sub>BE(sat)</sub> | -<br>-    | -0.7<br>-0.9 | -<br>-         | V  |
| Base – Emitter Voltage (I <sub>C</sub> = -2.0 mA, V <sub>CE</sub> = -5.0 V)<br>(I <sub>C</sub> = -10 mA, V <sub>CE</sub> = -5.0 V)                 | V <sub>BE(on)</sub>  | -0.6<br>- | -<br>-       | -0.75<br>-0.82 | mV |

### SMALL-SIGNAL CHARACTERISTICS

|   |                  |     |   |     |     |
|---|------------------|-----|---|-----|-----|
| Current – Gain – Bandwidth Product<br>(I <sub>C</sub> = -10 mA, V <sub>CE</sub> = -5.0 Vdc, f = 100 MHz)                  | f <sub>T</sub>   | 100 | - | -   | MHz |
| Output Capacitance<br>(V <sub>CB</sub> = -10 V, f = 1.0 MHz)  | C <sub>obo</sub> | -   | - | 4.5 | pF  |
| Noise Figure<br>(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  |

# BC856BM3, NSVBC856BM3

## TYPICAL CHARACTERISTICS

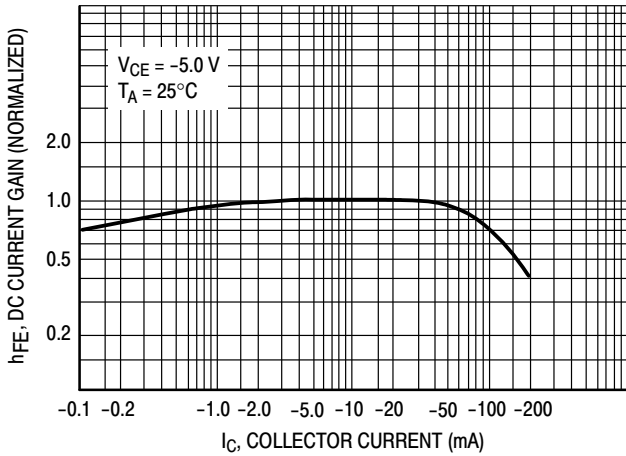


Figure 1. DC Current Gain

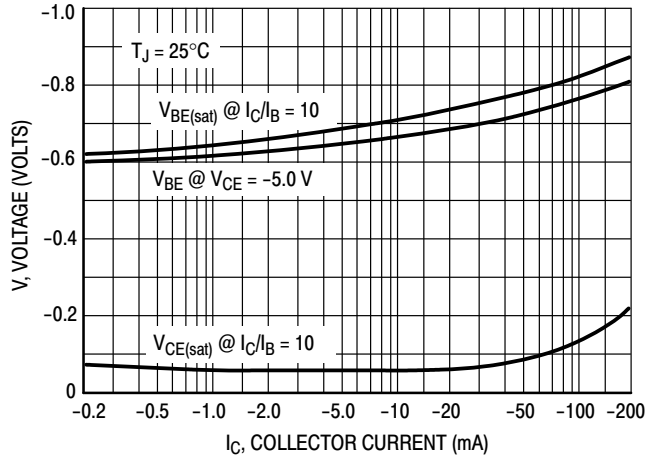


Figure 2. "On" Voltage

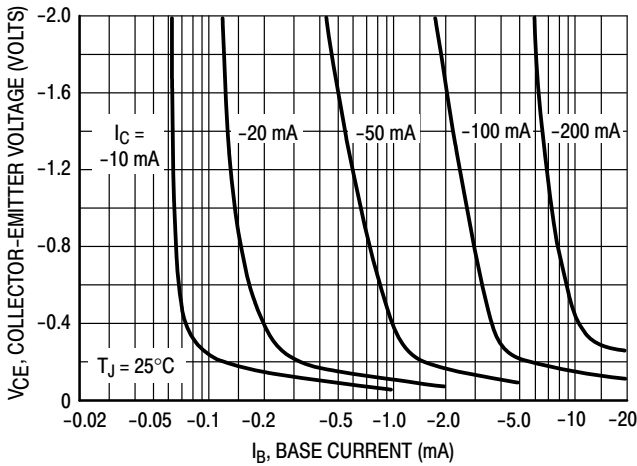


Figure 3. Collector Saturation Region

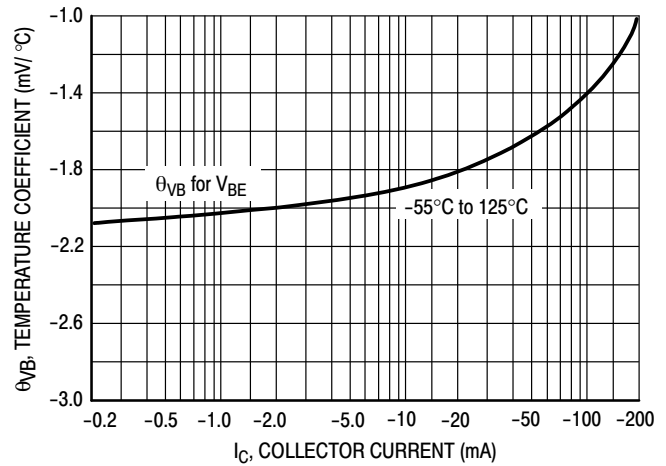


Figure 4. Base-Emitter Temperature Coefficient

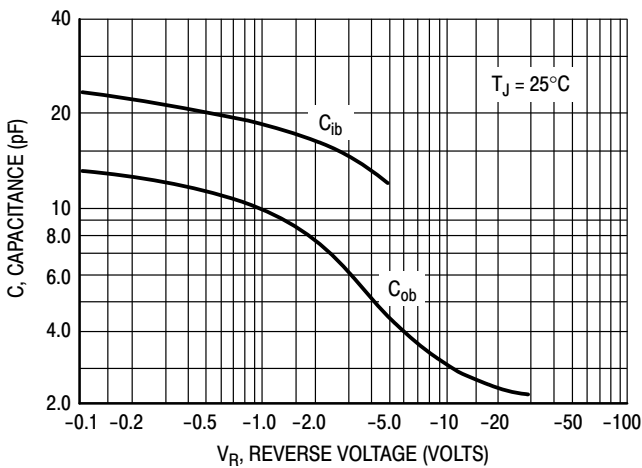


Figure 5. Capacitance

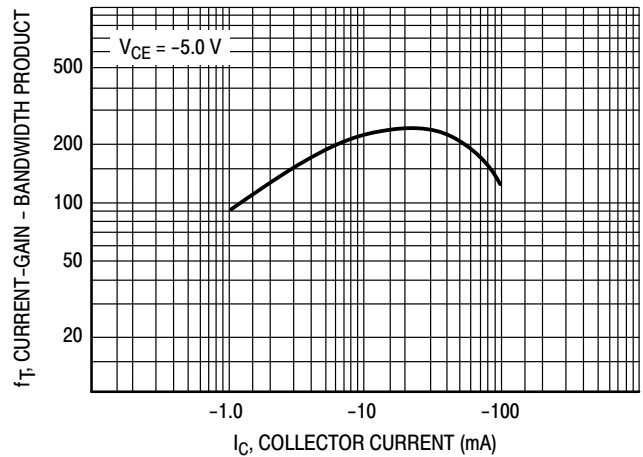


Figure 6. Current-Gain - Bandwidth Product

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

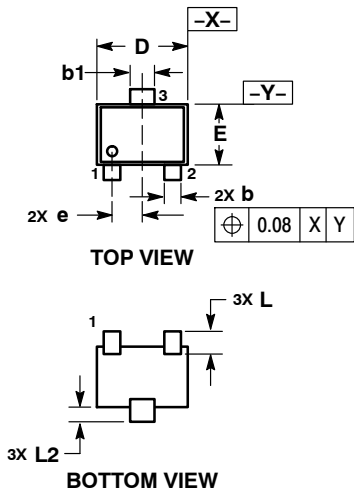
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SCALE 4:1

**SOT-723**  
CASE 631AA-01  
ISSUE D

DATE 10 AUG 2009

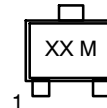


**NOTES:**

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         | NOM  | MAX  |
| A   | 0.45        | 0.50 | 0.55 |
| b   | 0.15        | 0.21 | 0.27 |
| b1  | 0.25        | 0.31 | 0.37 |
| C   | 0.07        | 0.12 | 0.17 |
| D   | 1.15        | 1.20 | 1.25 |
| E   | 0.75        | 0.80 | 0.85 |
| e   | 0.40 BSC    |      |      |
| H E | 1.15        | 1.20 | 1.25 |
| L   | 0.29 REF    |      |      |
| L2  | 0.15        | 0.20 | 0.25 |

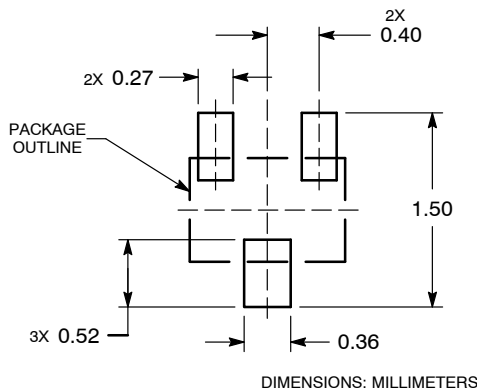
**GENERIC MARKING DIAGRAM\***



XX = Specific Device Code  
M = Date Code

- |   |  |  |  |  |
|---|--|--|--|--|
| 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 |
|---|--|--|--|--|

**RECOMMENDED SOLDERING FOOTPRINT\***



\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G", may or not be present.

\*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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| <b>DESCRIPTION:</b>     | <b>SOT-723</b>     | <b>PAGE 1 OF 1</b>   |

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