General Purpose Transistor

NPN Silicon

BC846BM3T5G, NSVBC846BM3T5G

Features

- Moisture Sensitivity Level: 1
- ESD Rating: Human Body Model: >4000 V
  Machine Model: >400 V
- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- 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 FR−5 Board (Note 1) $T_A = 25°C$ Derate above 25°C	P_D	265 2.1	mW mW/°C
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	470	°C/W
Total Device Dissipation Alumina Substrate (Note 2) $T_A = 25°C$ Derate above 25°C	P_D	640 5.1	mW mW/°C
Thermal Resistance, Junction to Ambient (Note 2)	$R_{\theta JA}$	195	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−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.

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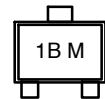2. Alumina = 0.4 $\times$ 0.3 $\times$ 0.024 in. 99.5% alumina.

ON Semiconductor®

COLLECTOR
3
1
BASE
2
EMITTER
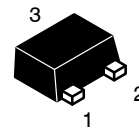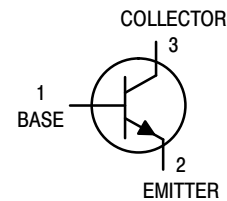
MARKING DIAGRAM

SOT−723
CASE 631AA
STYLE 1

1B M

1B = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping[†]
BC846BM3T5G	SOT−723 (Pb−Free)	8000 / Tape & Reel
NSVBC846BM3T5G	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.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector – Emitter Breakdown Voltage (I_C = 10 mA)	$V_{(BR)CEO}$	65	–	–	V
Collector – Emitter Breakdown Voltage (I_C = 10 μA, V_{EB} = 0)	$V_{(BR)CES}$	80	–	–	V
Collector – Base Breakdown Voltage (I_C = 10 μA)	$V_{(BR)CBO}$	80	–	–	V
Emitter – Base Breakdown Voltage (I_E = 1.0 μA)	$V_{(BR)EBO}$	6.0	–	–	V
Collector Cutoff Current (V_{CB} = 30 V) (V_{CB} = 30 V, T_A = 150°C)	I_{CBO}	– –	– –	15 5.0	nA μA
Base Peak Current (t ≤ 1 s)	I_{BM}	–	–	200	mA
ON CHARACTERISTICS					
DC Current Gain (I_C = 10 μA, V_{CE} = 5.0 V) (I_C = 2.0 mA, V_{CE} = 5.0 V)	h_{FE}	– 200	150 290	– 450	–
Collector – Emitter Saturation Voltage (I_C = 10 mA, I_B = 0.5 mA) (I_C = 100 mA, I_B = 5.0 mA)	$V_{CE(sat)}$	– –	– –	0.25 0.6	V
Base – Emitter Saturation Voltage (I_C = 10 mA, I_B = 0.5 mA) (I_C = 100 mA, I_B = 5.0 mA)	$V_{BE(sat)}$	– –	0.7 0.9	– –	V
Base – Emitter Voltage (I_C = 1.0 mA, V_{CE} = 5.0 V) (I_C = 2.0 mA, V_{CE} = 5.0 V) (I_C = 10 mA, V_{CE} = 5.0 V)	$V_{BE(on)}$	550 580 –	645 660 –	700 700 770	mV
SMALL – SIGNAL CHARACTERISTICS					
Current – Gain – Bandwidth Product (I_C = 10 mA, V_{CE} = 5.0 Vdc, f = 100 MHz)	f_T	100	–	–	MHz
Output Capacitance (V_{CB} = 10 V, f = 1.0 MHz)	C_{obo}	–	–	4.5	pF
Noise Figure (I_C = 0.2 mA, V_{CE} = 5.0 Vdc, R_S = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz)	NF	–	–	10	dB

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.
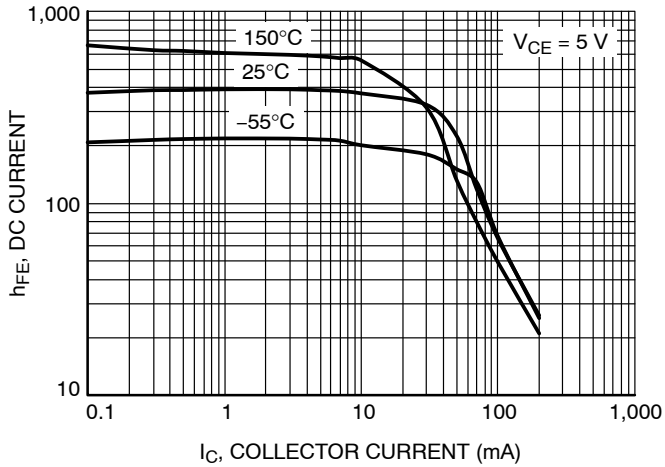
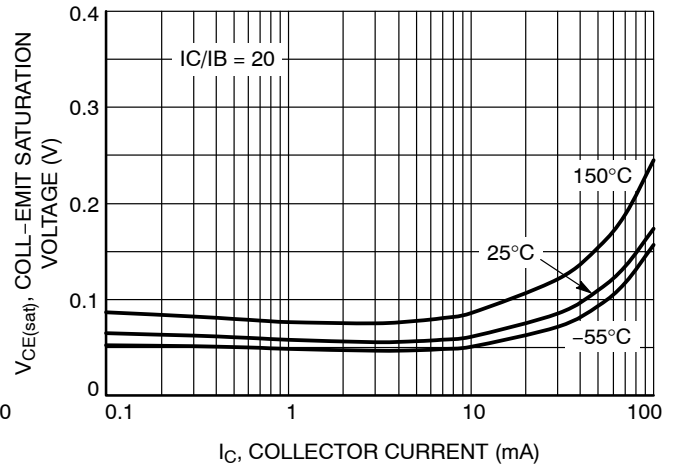## TYPICAL CHARACTERISTICS

Figure 1. DC Current Gain

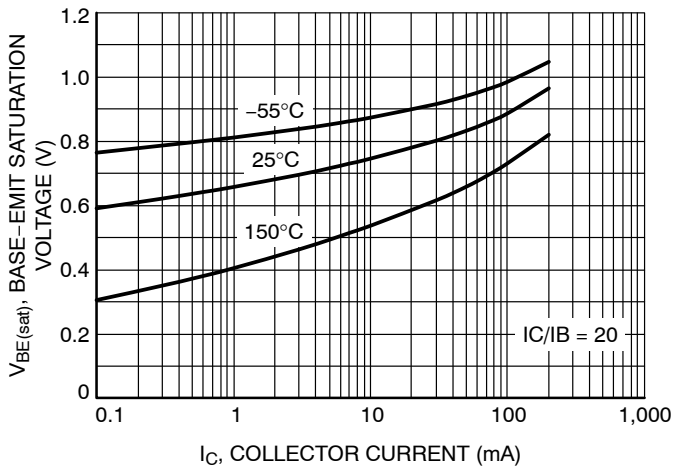Figure 2. Collector−Emitter Saturation Voltage
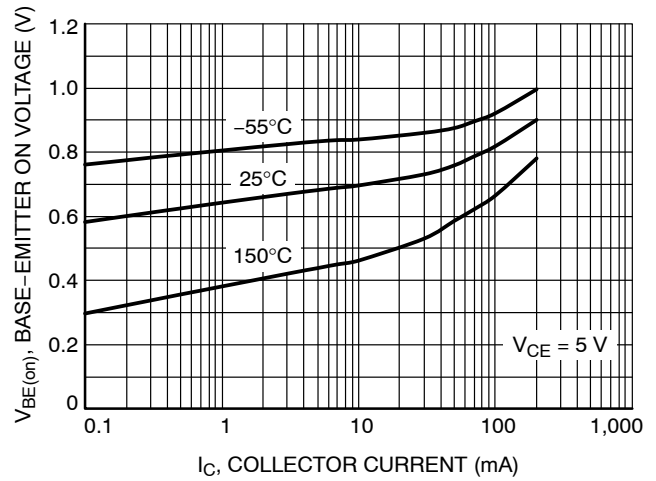
Figure 3. Base−Emitter Saturation Voltage

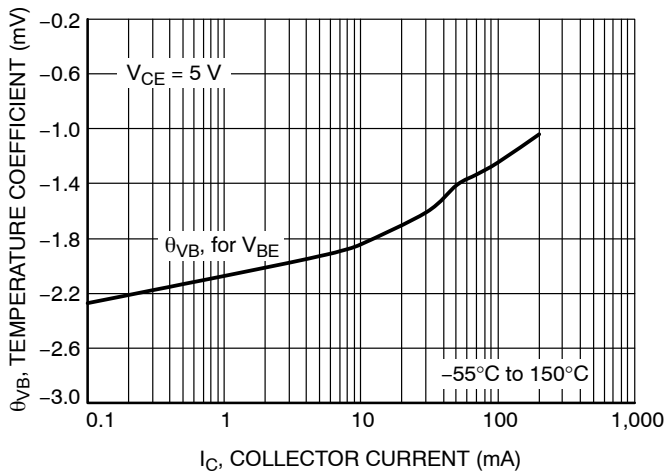Figure 4. Base−Emitter "On" Voltage
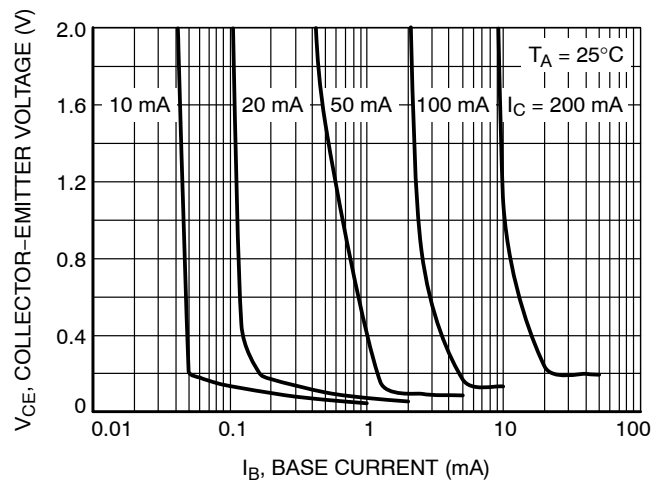
Figure 5. Base−Emitter Temperature Coefficient

Figure 6. Collector Saturation Region

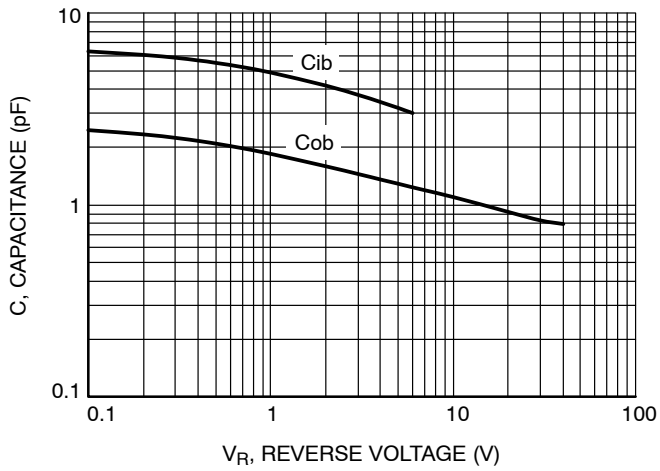**BC846BM3T5G, NSVBC846BM3T5G**
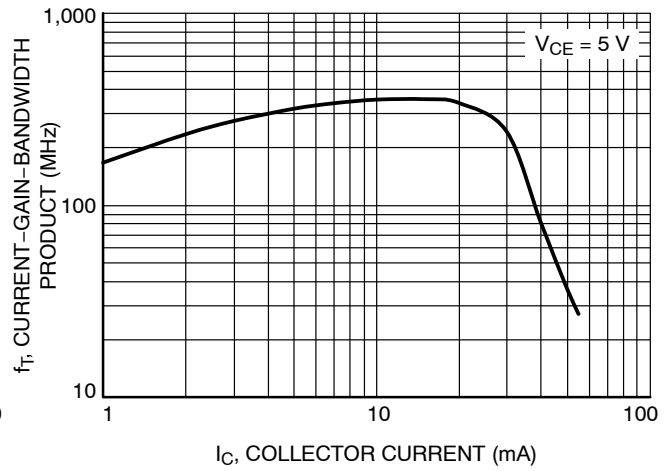
TYPICAL CHARACTERISTICS

Figure 7. Capacitances

Figure 8. Current−Gain−Bandwidth Product

SOT−723
CASE 631AA−01
ISSUE D

DATE 10 AUG 2009

SCALE 4:1

TOP VIEW

SIDE VIEW

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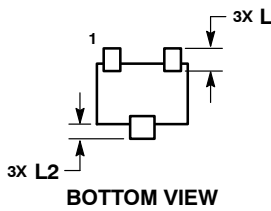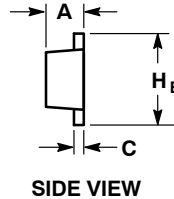
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

DIM	MILLIMETERS		
	MIN	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

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

**GENERIC
MARKING DIAGRAM***

XX M

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XX   = Specific Device Code
M   = Date Code

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

**RECOMMENDED
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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DESCRIPTION:	SOT−723		PAGE 1 OF 1

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