

# BC846, BC847, BC848 Series

## General Purpose Transistors

### NPN Silicon

These transistors are designed for general purpose amplifier applications. They are housed in the SC-70/SOT-323 which is designed for low power surface mount applications.

#### Features

- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	BC846	65
		BC847	45
		BC848	30
Collector-Base Voltage	$V_{CBO}$	BC846	80
		BC847	50
		BC848	30
Emitter-Base Voltage	$V_{EBO}$	BC846	6.0
		BC847	6.0
		BC848	5.0
Collector Current - Continuous	$I_C$	100	mAdc

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.

#### THERMAL CHARACTERISTICS

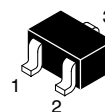
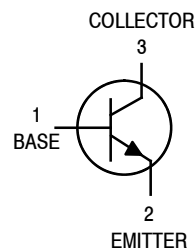
Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board, (Note 1) $T_A = 25^\circ\text{C}$	$P_D$	150	mW
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	833	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

1. FR-5 = 1.0 x 0.75 x 0.062 in.



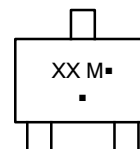
ON Semiconductor®

<http://onsemi.com>



SC-70/SOT-323  
CASE 419  
STYLE 3

#### MARKING DIAGRAM



XX = Specific Device Code  
M = Month Code  
▪ = Pb-Free Package  
(Note: Microdot may be in either location)

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

## BC846, BC847, BC848 Series

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

Characteristic		Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Collector - Emitter Breakdown Voltage ( $I_C = 10\text{ mA}$ )	BC846 Series BC847 Series BC848 Series	$V_{(BR)CEO}$	65 45 30	- - -	- - -	V
Collector - Emitter Breakdown Voltage ( $I_C = 10\text{ }\mu\text{A}$ , $V_{EB} = 0$ )	BC846 Series BC847 Series BC848 Series	$V_{(BR)CES}$	80 50 30	- - -	- - -	V
Collector - Base Breakdown Voltage ( $I_C = 10\text{ }\mu\text{A}$ )	BC846 Series BC847 Series BC848 Series	$V_{(BR)CBO}$	80 50 30	- - -	- - -	V
Emitter - Base Breakdown Voltage ( $I_E = 1.0\text{ }\mu\text{A}$ )	BC846 Series BC847 Series BC848 Series	$V_{(BR)EBO}$	6.0 6.0 5.0	- - -	- - -	V
Collector Cutoff Current ( $V_{CB} = 30\text{ V}$ ) ( $V_{CB} = 30\text{ V}$ , $T_A = 150^\circ\text{C}$ )		$I_{CBO}$	- -	- -	15 5.0	nA $\mu\text{A}$

### ON CHARACTERISTICS

DC Current Gain ( $I_C = 10\text{ }\mu\text{A}$ , $V_{CE} = 5.0\text{ V}$ )	BC846A, BC847A, BC848A BC846B, BC847B, BC848B BC847C, BC848C	$h_{FE}$	- - -	90 150 270	- - -	-
( $I_C = 2.0\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ )	BC846A, BC847A, BC848A BC846B, BC847B, BC848B BC847C, BC848C		110 200 420	180 290 520	220 450 800	
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 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 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 -	700 770	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
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

# BC846, BC847, BC848 Series

## BC847 SERIES & BC848 SERIES

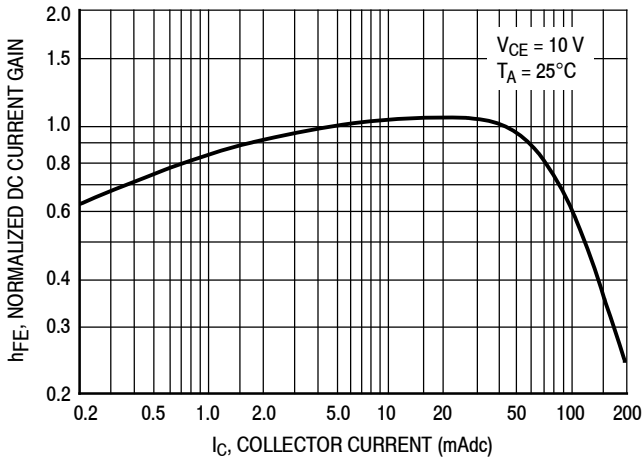


Figure 1. Normalized DC Current Gain

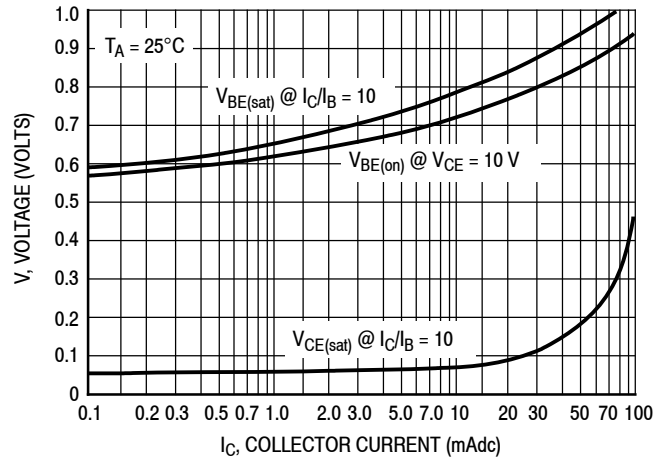


Figure 2. "Saturation" and "On" Voltages

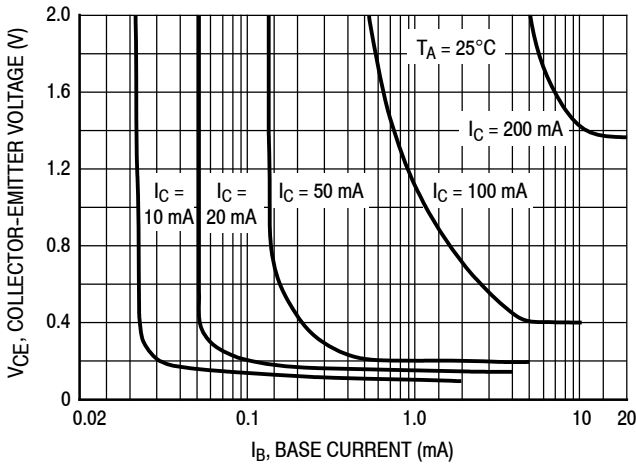


Figure 3. Collector Saturation Region

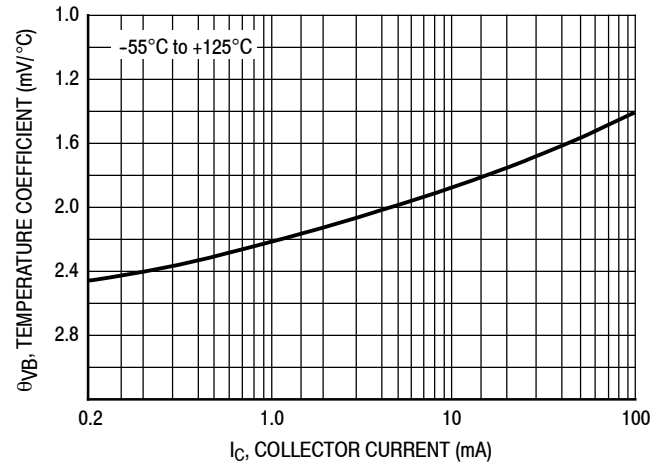


Figure 4. Base-Emitter Temperature Coefficient

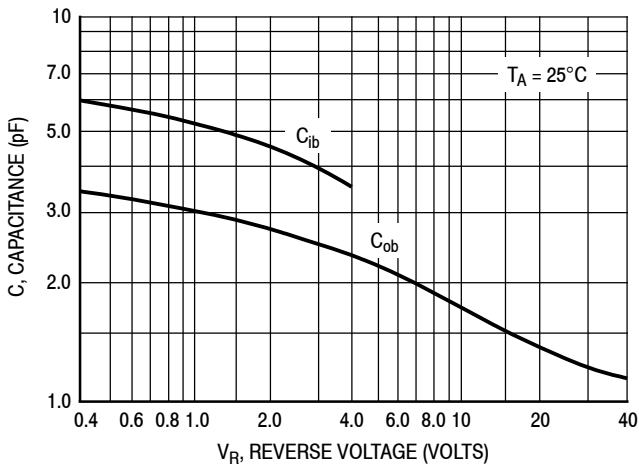


Figure 5. Capacitances

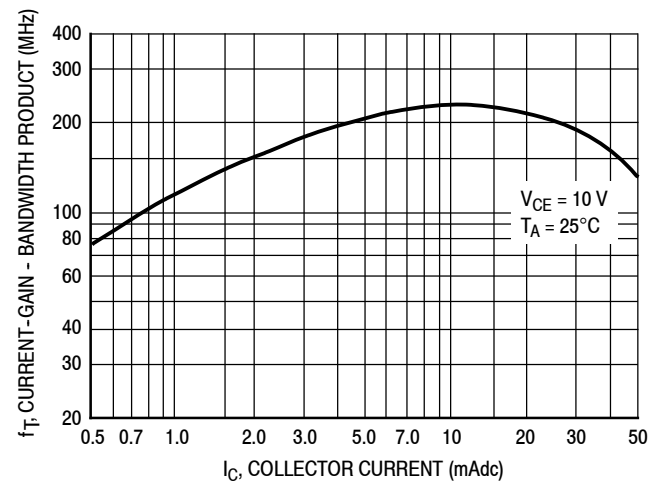


Figure 6. Current-Gain - Bandwidth Product

# BC846, BC847, BC848 Series

## BC846 SERIES

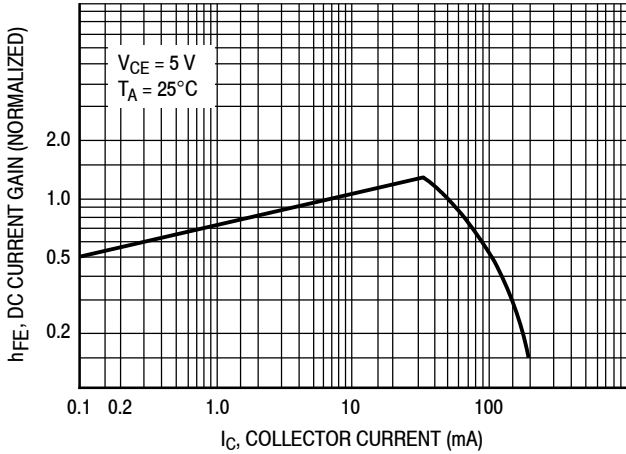


Figure 7. DC Current Gain

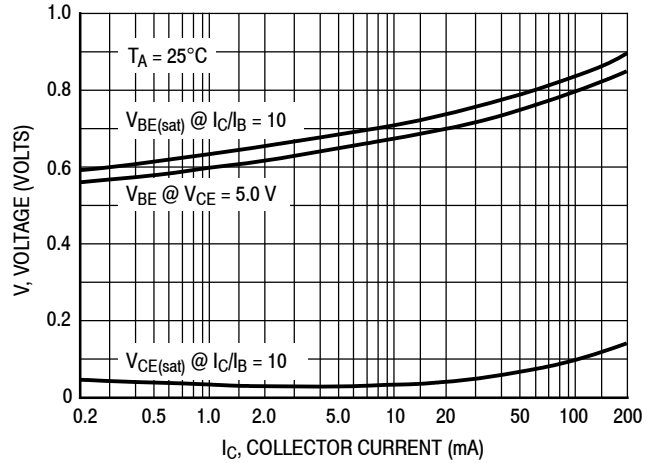


Figure 8. "On" Voltage

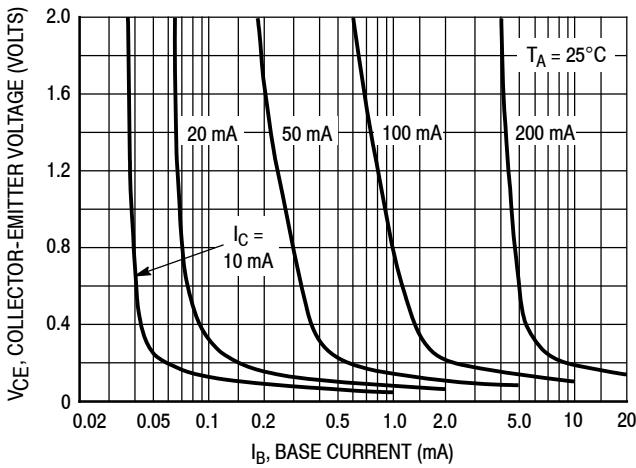


Figure 9. Collector Saturation Region

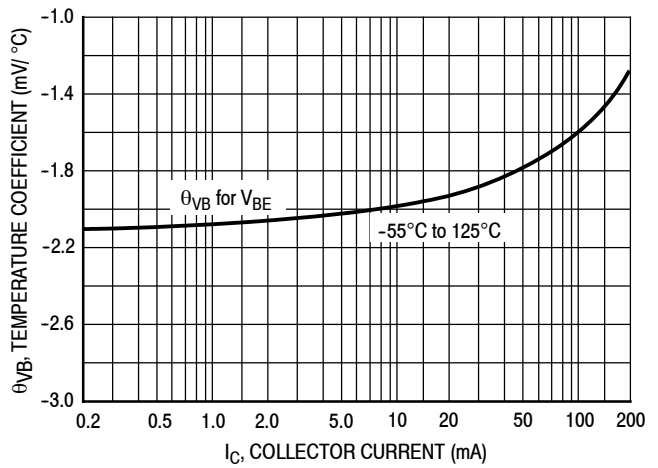


Figure 10. Base-Emitter Temperature Coefficient

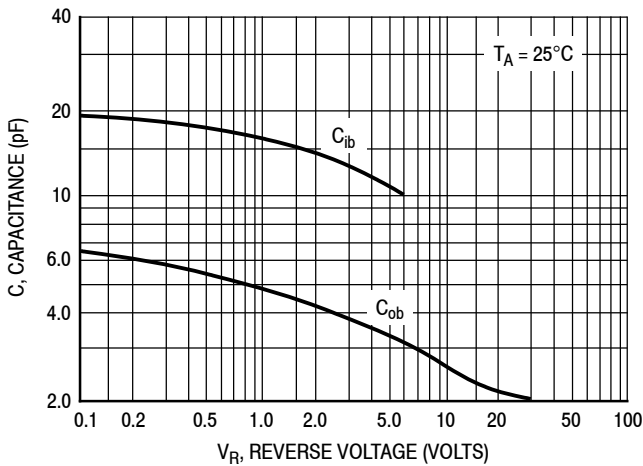


Figure 11. Capacitance

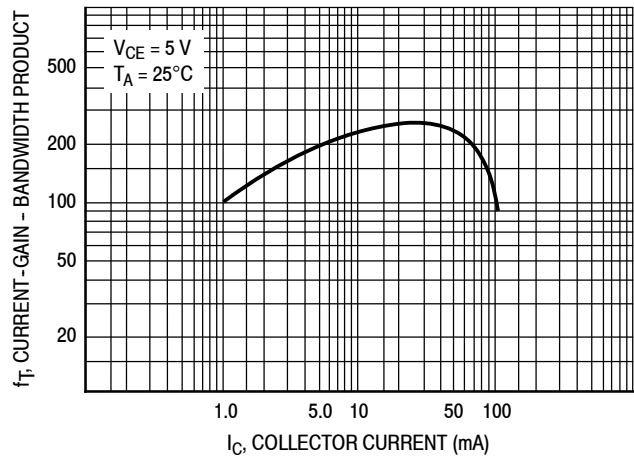


Figure 12. Current-Gain - Bandwidth Product

## BC846, BC847, BC848 Series

### DEVICE ORDERING AND SPECIFIC MARKING INFORMATION

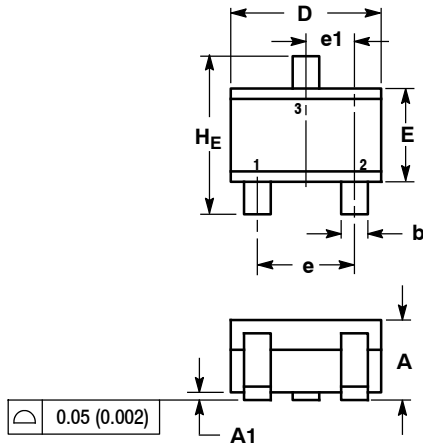
Device	Specific Marking Code	Package	Shipping†
BC846AWT1G	1A	SC-70 (SOT-323) (Pb-Free)	3,000 / Tape & Reel
BC846BWT1G	1B	SC-70 (SOT-323) (Pb-Free)	3,000 / Tape & Reel
BC847AWT1G	1E	SC-70 (SOT-323) (Pb-Free)	3,000 / Tape & Reel
BC847BWT1G	1F	SC-70 (SOT-323) (Pb-Free)	3,000 / Tape & Reel
BC847CWT1G	1G	SC-70 (SOT-323) (Pb-Free)	3,000 / Tape & Reel
BC847CWT3G	1G	SC-70 (SOT-323) (Pb-Free)	10,000 / Tape & Reel
BC848AWT1G	1J	SC-70 (SOT-323) (Pb-Free)	3,000 / Tape & Reel
BC848BWT1G	1K	SC-70 (SOT-323) (Pb-Free)	3,000 / Tape & Reel
BC848CWT1G	1L	SC-70 (SOT-323) (Pb-Free)	3,000 / 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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## PACKAGE DIMENSIONS

### SC-70 (SOT-323) CASE 419-04 ISSUE N



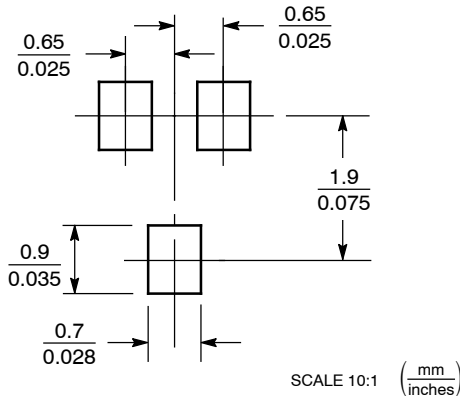
#### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.


DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.90	1.00	0.032	0.035	0.040
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2	0.70 REF			0.028 REF		
b	0.30	0.35	0.40	0.012	0.014	0.016
c	0.10	0.18	0.25	0.004	0.007	0.010
D	1.80	2.10	2.20	0.071	0.083	0.087
E	1.15	1.24	1.35	0.045	0.049	0.053
e	1.20	1.30	1.40	0.047	0.051	0.055
e1	0.65 BSC			0.026 BSC		
L	0.20	0.38	0.56	0.008	0.015	0.022
HE	2.00	2.10	2.40	0.079	0.083	0.095

STYLE 3:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

#### SOLDERING FOOTPRINT\*



\*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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