BC846AWT1, BC847AWT1, BC848AWT1 Series

General Purpose Transistors

NPN Silicon

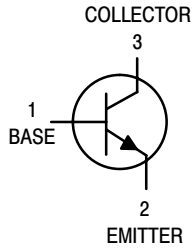
ON Semiconductor®

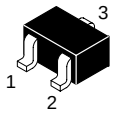
http://onsemi.com

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

- Pb−Free Packages are Available





SC−70/SOT−323
CASE 419
STYLE 3

MAXIMUM RATINGS

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

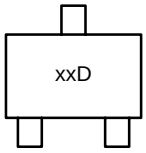
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR−5 Board, (Note 1) T_A = 25°C	P_D	150	°C/W
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	833	°C/W
Total Device Dissipation	P_D	2.4	mW/°C
Junction and Storage Temperature	T_J, T_{stg}	−55 to +150	°C

1. FR−5 = 1.0 x 0.75 x 0.062 in.

MARKING DIAGRAM



xx = Specific Device Code
D = Date Code

ORDERING INFORMATION

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

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)	BC846 Series BC847 Series BC848 Series	$V_{(BR)CEO}$	65 45 30	− − −	− − −	V
Collector−Emitter Breakdown Voltage (I_C = 10 μA, V_{EB} = 0)	BC846 Series BC847 Series BC848 Series	$V_{(BR)CES}$	80 50 30	− − −	− − −	V
Collector−Base Breakdown Voltage (I_C = 10 μA)	BC846 Series BC847 Series BC848 Series	$V_{(BR)CBO}$	80 50 30	− − −	− − −	V
Emitter−Base Breakdown Voltage (I_E = 1.0 μA)	BC846 Series BC847 Series BC848 Series	$V_{(BR)EBO}$	6.0 6.0 5.0	− − −	− − −	V
Collector Cutoff Current (V_{CB} = 30 V) (V_{CB} = 30 V, T_A = 150°C)		I_{CBO}	− −	− −	15 5.0	nA μA
ON CHARACTERISTICS						
DC Current Gain (I_C = 10 μA, V_{CE} = 5.0 V) (I_C = 2.0 mA, V_{CE} = 5.0 V)	BC846A, BC847A, BC848A BC846B, BC847B, BC848B BC847C, BC848C BC846A, BC847A, BC848A BC846B, BC847B, BC848B BC847C, BC848C	h_{FE}	− − − 110 200 420	90 150 270 180 290 520	− − − 220 450 800	−
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 = 2.0 mA, V_{CE} = 5.0 V) (I_C = 10 mA, V_{CE} = 5.0 V)		$V_{BE(on)}$	580 −	660 −	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

BC847 SERIES & BC848 SERIES

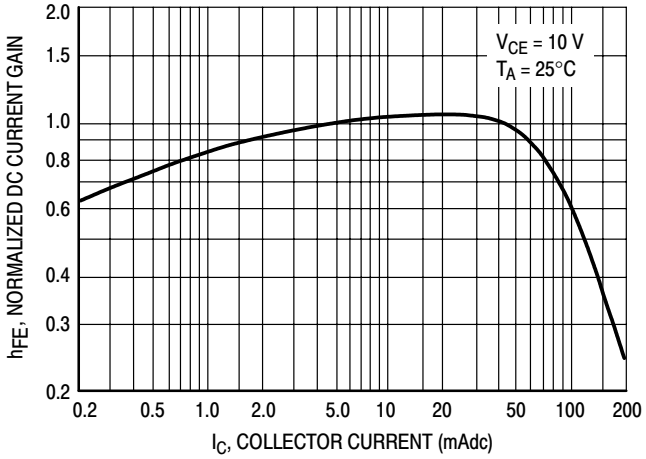


Figure 1. Normalized DC Current Gain

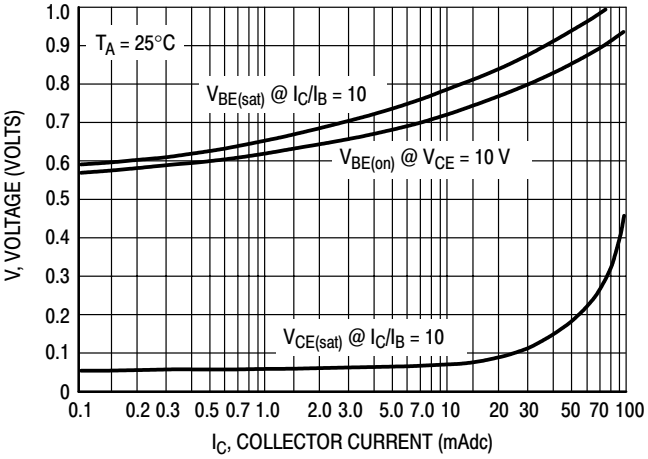


Figure 2. “Saturation” and “On” Voltages

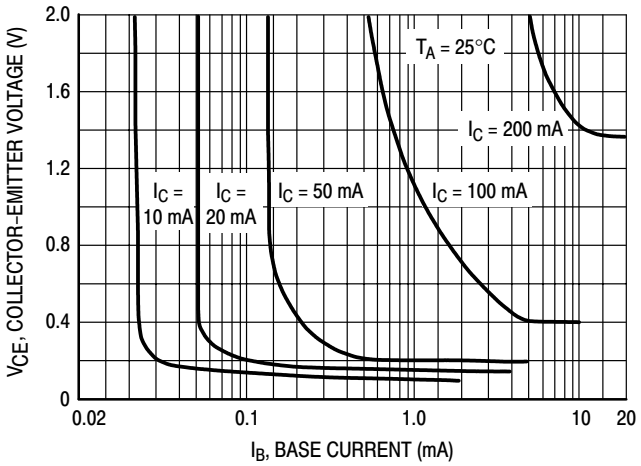


Figure 3. Collector Saturation Region

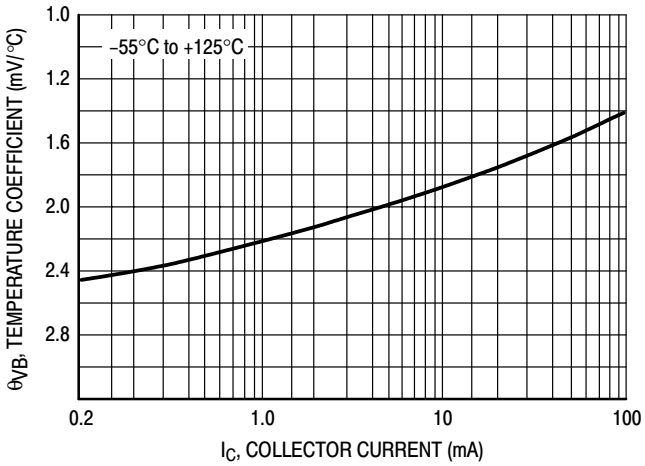


Figure 4. Base−Emitter Temperature Coefficient

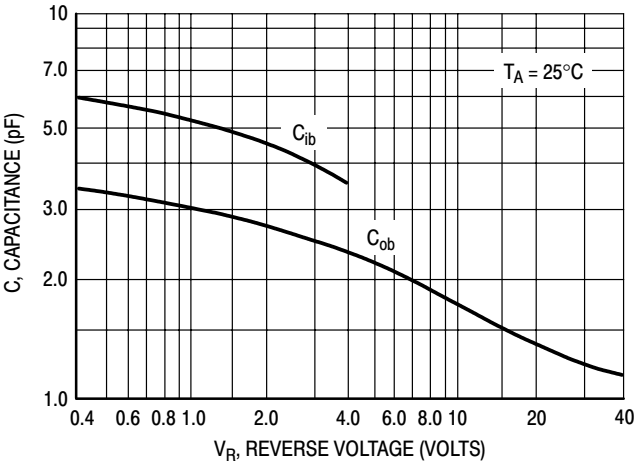


Figure 5. Capacitances

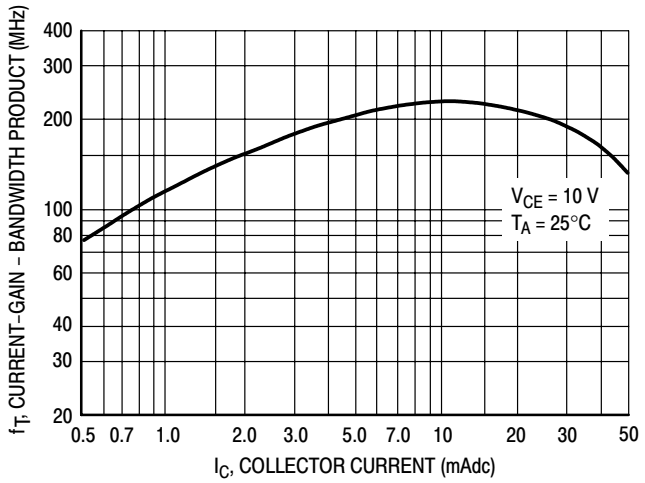


Figure 6. Current−Gain − Bandwidth Product

BC846 SERIES

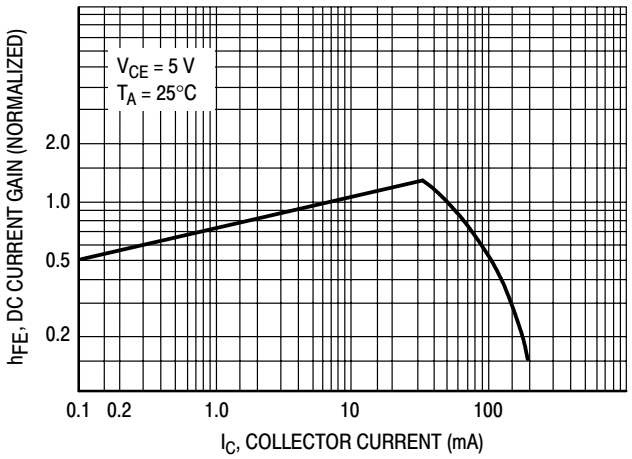


Figure 7. DC Current Gain

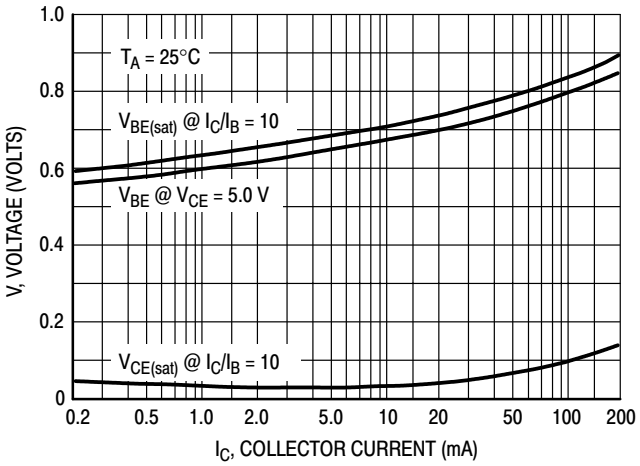


Figure 8. “On” Voltage

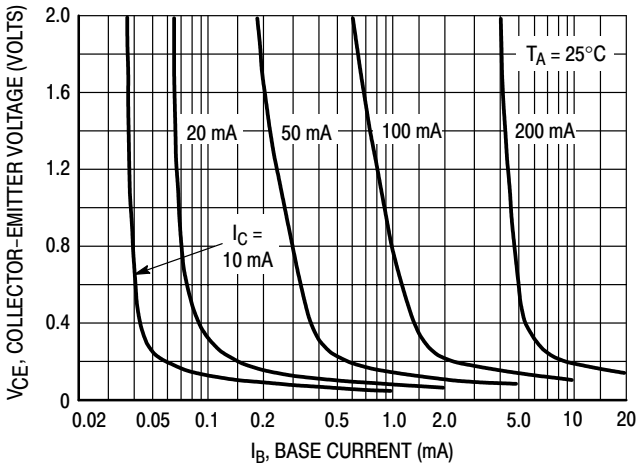


Figure 9. Collector Saturation Region

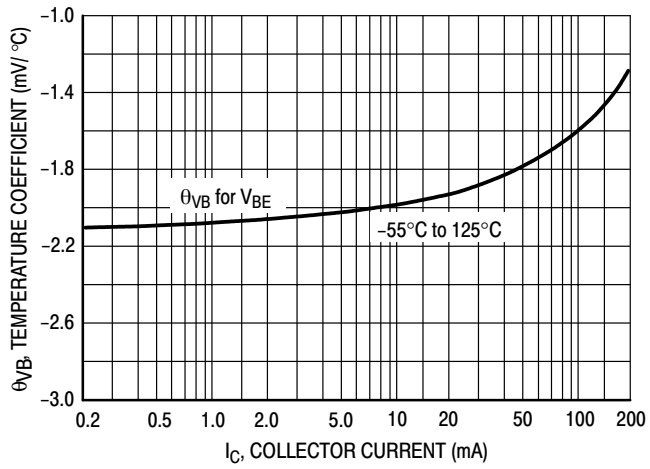


Figure 10. Base−Emitter Temperature Coefficient

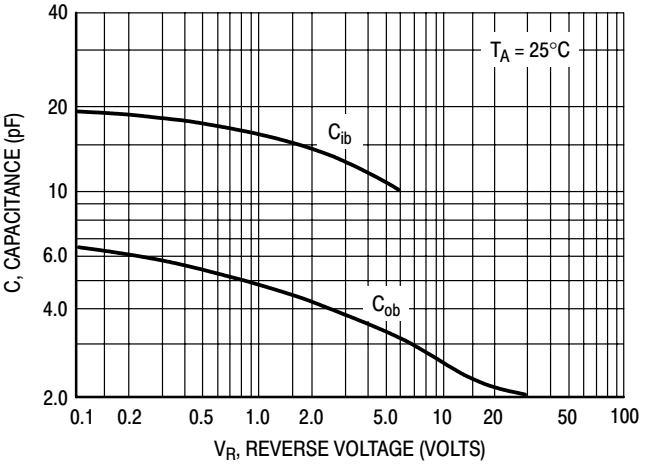


Figure 11. Capacitance

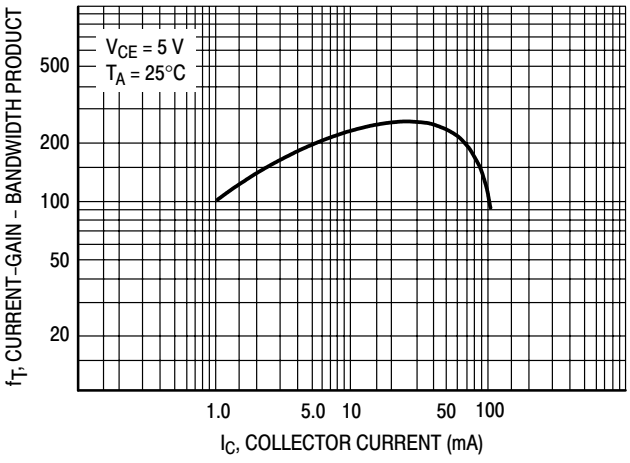


Figure 12. Current−Gain − Bandwidth Product

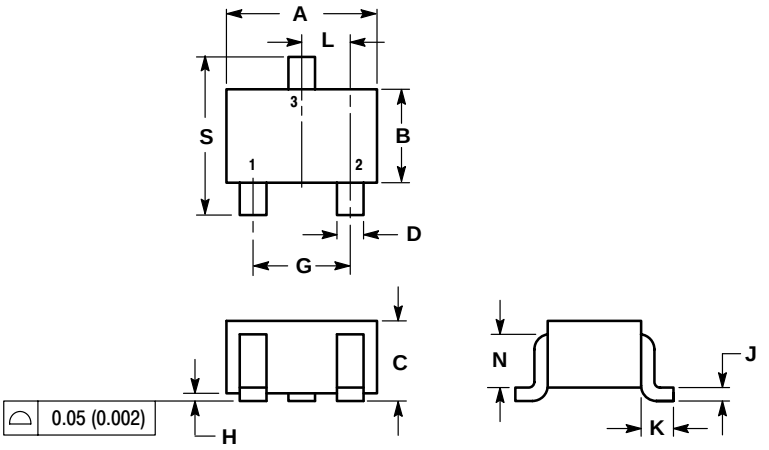
DEVICE ORDERING AND SPECIFIC MARKING INFORMATION

Device	Specific Marking Code	Package	Shipping†
BC846AWT1	1A	SC−70 (SOT−323)	3,000 / Tape & Reel
BC846AWT1G	1A	SC−70 (SOT−323) (Pb−Free)	
BC846BWT1	1B	SC−70 (SOT−323)	3,000 / Tape & Reel
BC847AWT1	1E	SC−70 (SOT−323)	3,000 / Tape & Reel
BC847BWT1	1F	SC−70 (SOT−323)	3,000 / Tape & Reel
BC847BWT1G	1F	SC−70 (SOT−323) (Pb−Free)	
BC847CWT1	1G	SC−70 (SOT−323)	3,000 / Tape & Reel
BC847CWT1G	1G	SC−70 (SOT−323) (Pb−Free)	
BC848AWT1	1J	SC−70 (SOT−323)	3,000 / Tape & Reel
BC848BWT1	1K	SC−70 (SOT−323)	3,000 / Tape & Reel
BC848BWT1G	1K	SC−70 (SOT−323) (Pb−Free)	
BC848CWT1	1L	SC−70 (SOT−323)	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.

PACKAGE DIMENSIONS

SC−70 (SOT−323)
CASE 419−04
ISSUE L

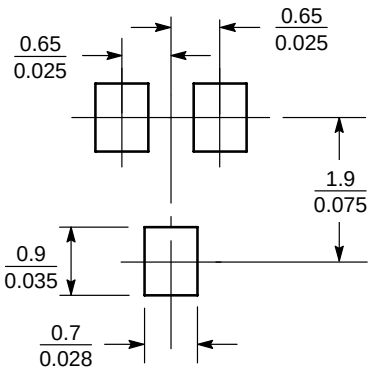


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.032	0.040	0.80	1.00
D	0.012	0.016	0.30	0.40
G	0.047	0.055	1.20	1.40
H	0.000	0.004	0.00	0.10
J	0.004	0.010	0.10	0.25
K	0.017 REF		0.425 REF	
L	0.026 BSC		0.650 BSC	
N	0.028 REF		0.700 REF	
S	0.079	0.095	2.00	2.40

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

SOLDERING FOOTPRINT*



SCALE 10:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 61312, Phoenix, Arizona 85082−1312 USA
Phone: 480−829−7710 or 800−344−3860 Toll Free USA/Canada
Fax: 480−829−7709 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2−9−1 Kamimeguro, Meguro−ku, Tokyo, Japan 153−0051
Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

For additional information, please contact your local Sales Representative.

BC846AWT1/D