BC846, BC847, BC848 Series

General Purpose Transistors

NPN Silicon

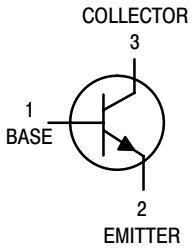
ON Semiconductor®

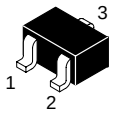
http://onsemi.com

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

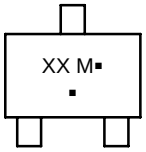
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR−5 Board, (Note 1) T_A = 25°C	P_D	150	mW
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	833	°C/W
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
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.

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)	BC846A, BC847A, BC848A BC846B, BC847B, BC848B BC847C, BC848C	h_{FE}	− − −	90 150 270	− − −	−
(I_C = 2.0 mA, V_{CE} = 5.0 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 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

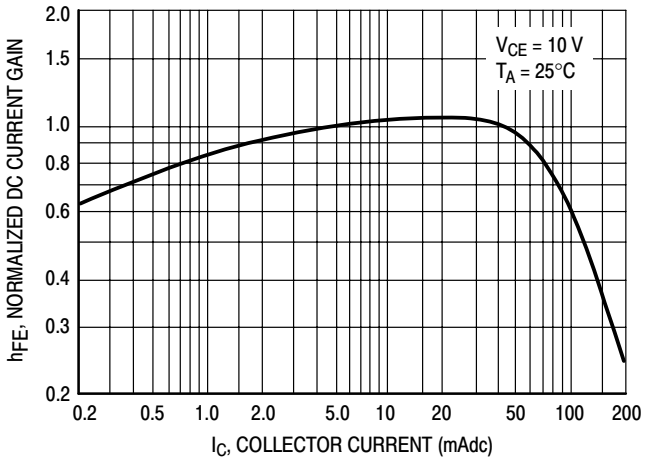


Figure 1. Normalized DC Current Gain

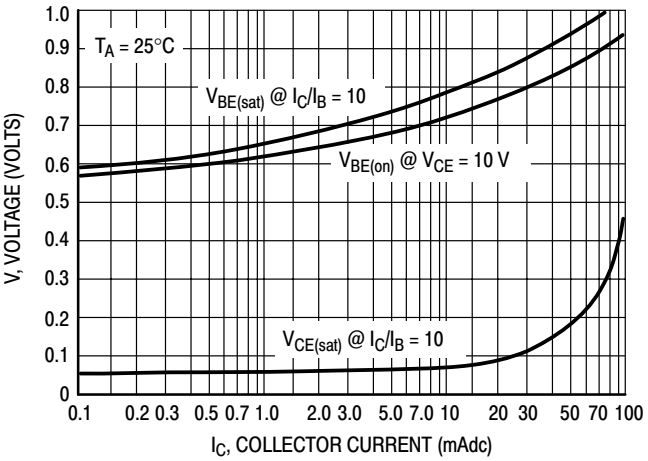


Figure 2. "Saturation" and "On" Voltages

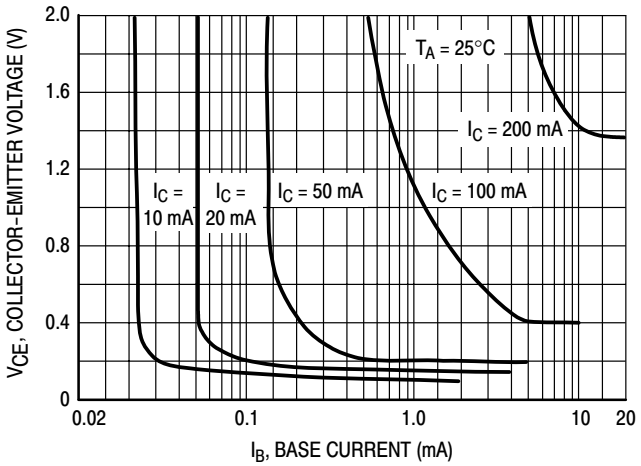


Figure 3. Collector Saturation Region

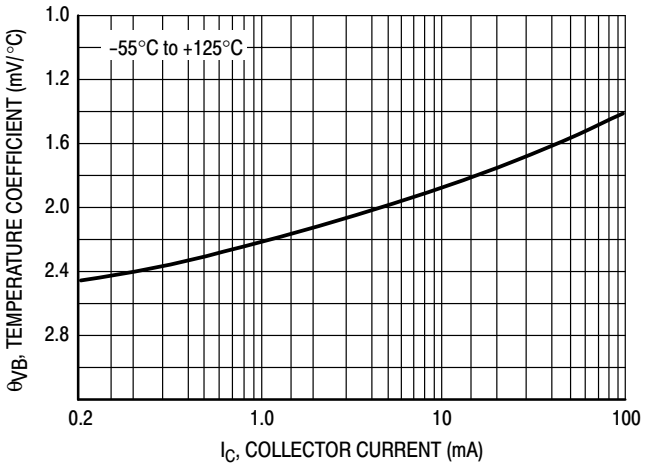


Figure 4. Base−Emitter Temperature Coefficient

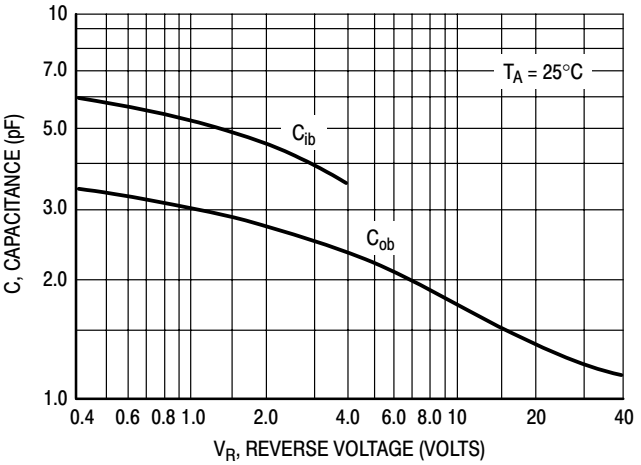


Figure 5. Capacitances

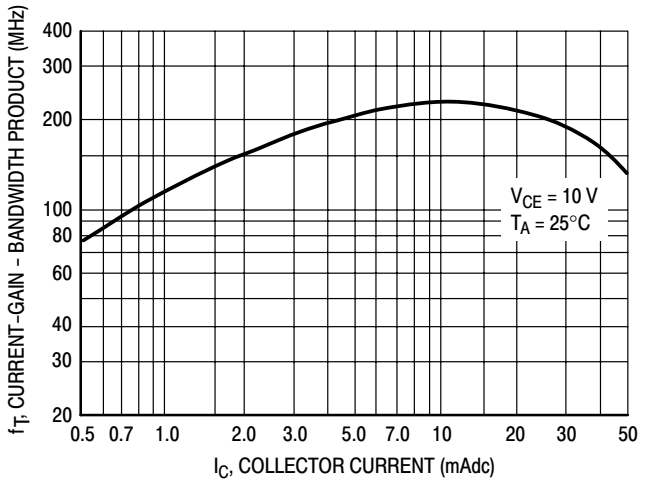


Figure 6. Current−Gain − Bandwidth Product

BC846 SERIES

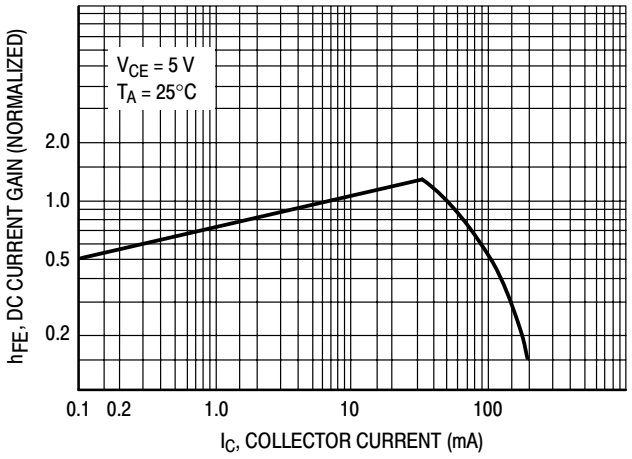


Figure 7. DC Current Gain

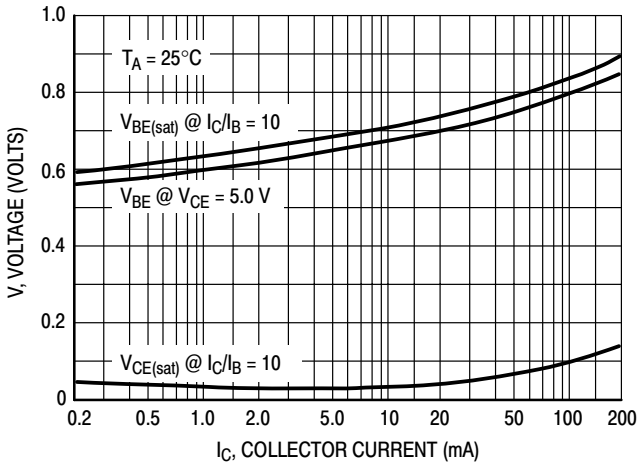


Figure 8. “On” Voltage

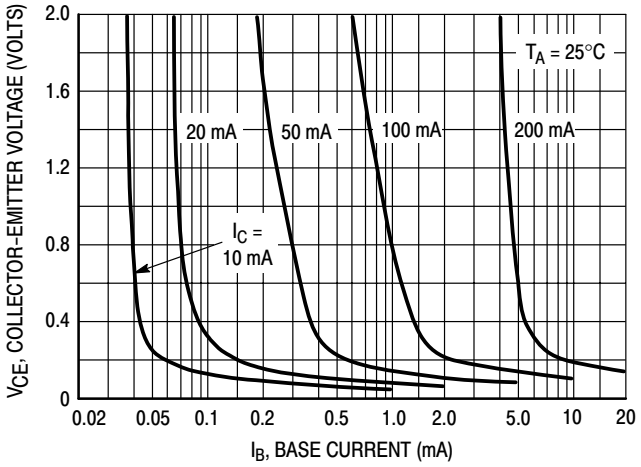


Figure 9. Collector Saturation Region

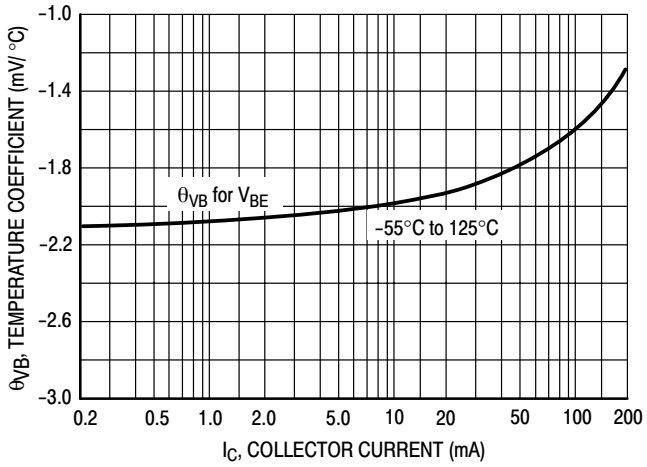


Figure 10. Base−Emitter Temperature Coefficient

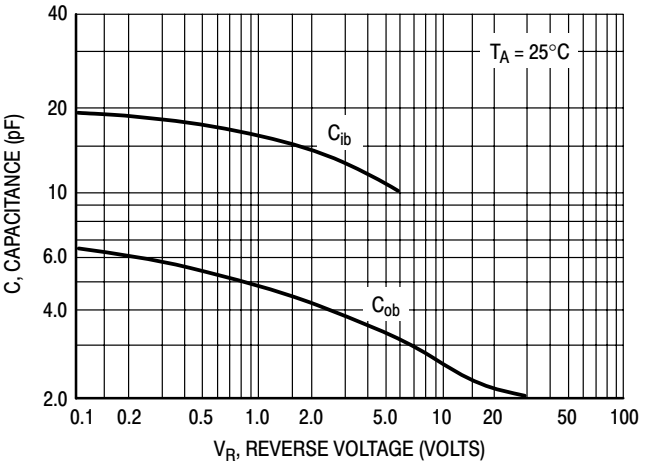


Figure 11. Capacitance

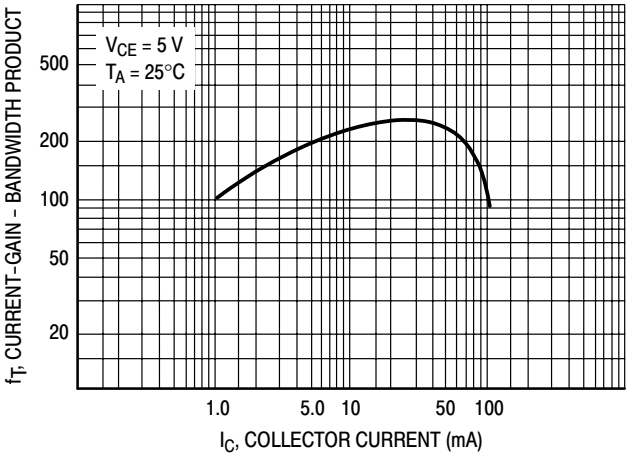


Figure 12. Current−Gain − Bandwidth Product

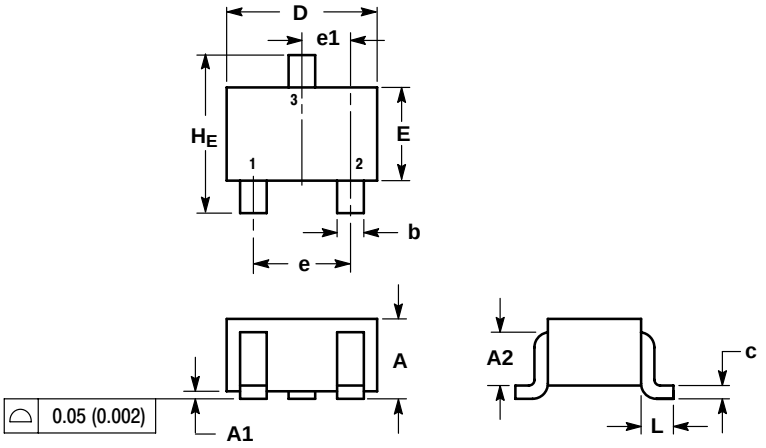
DEVICE ORDERING AND SPECIFIC MARKING INFORMATION

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
BC846BWT1G	1B	SC−70 (SOT−323) (Pb−Free)	3,000 / Tape & Reel
BC847AWT1	1E	SC−70 (SOT−323)	3,000 / Tape & Reel
BC847AWT1G	1E	SC−70 (SOT−323) (Pb−Free)	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)	
BC847CWT3G	1G	SC−70 (SOT−323) (Pb−Free)	10,000 / Tape & Reel
BC848AWT1	1J	SC−70 (SOT−323)	3,000 / Tape & Reel
BC848AWT1G	1J	SC−70 (SOT−323) (Pb−Free)	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
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.

PACKAGE DIMENSIONS

SC−70 (SOT−323)
CASE 419−04
ISSUE M

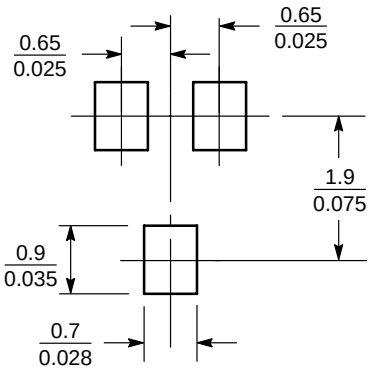


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

	MILLIMETERS			INCHES		
DIM	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		0.7 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		0.425 REF			0.017 REF	
H_E	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.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303−675−2175 or 800−344−3860 Toll Free USA/Canada
Fax: 303−675−2176 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81−3−5773−3850

ON Semiconductor Website: **www.onsemi.com**

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

For additional information, please contact your local Sales Representative

BC846AWT1/D