SEMICONDUCTOR

DATA SHEET

BC846 Thru BC850 Series

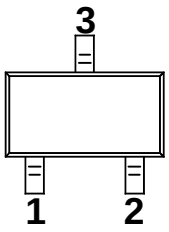
General Purpose Transistors

NPN Silicon

MAXIMUM RATINGS

Rating	Symbol	BC846	BC847 BC850	BC848 BC849	Unit
Collector–Emitter Voltage	V_{CEO}	65	45	30	V
Collector–Base Voltage	V_{CBO}	80	50	30	V
Emitter–Base Voltage	V_{EBO}	6.0	6.0	5.0	V
Collector Current — Continuous	I_C	100	100	100	mAdc
Collector Current(Peak value)	I_{CM}	200	200	200	mAdc
Emitter Current(Peak value)	I_{EM}	200	200	200	mAdc
Base Current(Peak value)	I_{BM}	200	200	200	mAdc

SOT–23 (TO–236AB)

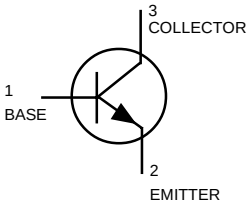


SOLDERING CHARACTERISTICS

Characteristic	Symbol	Unit
Solder Heat Resistance	265	°C
Solderability	240 to 265	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR– 5 Board, (1)	P_D		
T_A = 25°C		225	mW
Derate above 25°C		1.8	mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation	P_D		
Alumina Substrate, (2) T_A = 25°C		300	mW
Derate above 25°C		2.4	mW/°C
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T_J , T_{stg}	–55 to +150	°C



DEVICE MARKING

BC846= 1A; BC846B = 1B; BC847A = 1E; BC847B = 1F;
BC847C= 1G; BC848A= 1J; BC848B= 1K; BC848C= 1L;BC850C= 2G

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage	BC846A,B		65	—	—	
(I_C = 10 mA)	BC847A,B,C, BC850B,C	$V_{(BR)CEO}$	45	—	—	v
	BC848A,B,C, BC849B,C		30	—	—	
Collector–Emitter Breakdown Voltage	BC846A,B		80	—	—	
(I_C = 10 μA, V_{EB} = 0)	BC847A,B,C, BC850B,C	$V_{(BR)CES}$	50	—	—	v
	BC848A,B,C, BC849B,C		30	—	—	
Collector–Base Breakdown Voltage	BC846A,B		80	—	—	
(I_C = 10 μA)	BC847A,B,C, BC850B,C	$V_{(BR)CBO}$	50	—	—	v
	BC848A,B,C, BC849B,C		30	—	—	
Emitter–Base Breakdown Voltage	BC846A,B BC847A,B,C		6.0			
(I_E = 1.0 μA)	BC848A,B,C, BC849B,C,	$V_{(BR)EBO}$	5.0			
	BC850B,C		5.0			
Collector Cutoff Current	(V_{CB} = 30 V)	I_{CBO}	—	—	15	nA
	(V_{CB} = 30 V, T_A = 150°C)		—	—	5.0	μA

1. FR–5 = 1.0 x 0.75 x 0.062 in
2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

DEVICE CHARACTERISTICS

BC846 Thru BC850 Series

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

Characteristic		Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS						
DC Current Gain	BC846A, BC847A, BC848A	h_{FE}	—	90	—	—
(I_C = 10 μA, V_{CE} = 5.0 V)	BC846B, BC847B, BC848B		—	150	—	
	BC847C, BC848C		—	270	—	
(I_C = 2.0 mA, V_{CE} = 5.0 V)	BC846A, BC847A, BC848A		110	180	220	
	BC846B, BC847B, BC848B, BC849B, BC850B		200	290	450	
	BC847C, BC848C, BC849C, BC850C		420	520	800	
Collector–Emitter Saturation Voltage (I_C = 10 mA, I_B = 0.5 mA)		$V_{CE(sat)}$	—	—	0.25	V
(I_C = 100 mA, I_B = 5.0 mA)			—	—	0.6	
Base–Emitter Saturation Voltage (I_C = 10 mA, I_B = 0.5 mA)		$V_{BE(sat)}$	—	0.7	—	V
(I_C = 100 mA, I_B = 5.0 mA)			—	0.9	—	
Base–Emitter Voltage (I_C = 2.0 mA, V_{CE} = 5.0 V)		$V_{BE(on)}$	580	660	700	mV
(I_C = 10 mA, V_{CE} = 5.0 V)			—	—	770	
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 V_{dc}, R_S = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz)	BC846A, BC847A, BC848A BC846B, BC847B, BC848B	NF				dB
	BC847C, BC848C		—	—	10	
	BC849B,C, BC850B,C		—	—	4.0	

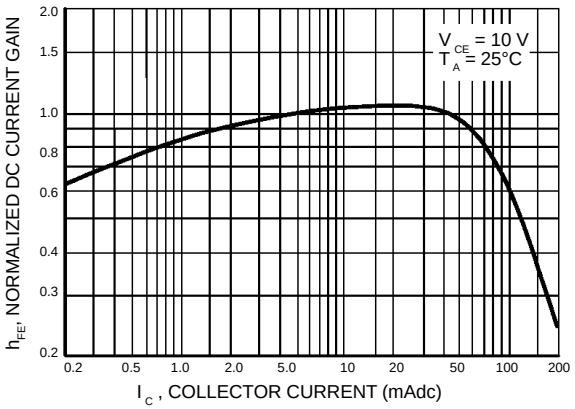


Figure 1. Normalized DC Current Gain

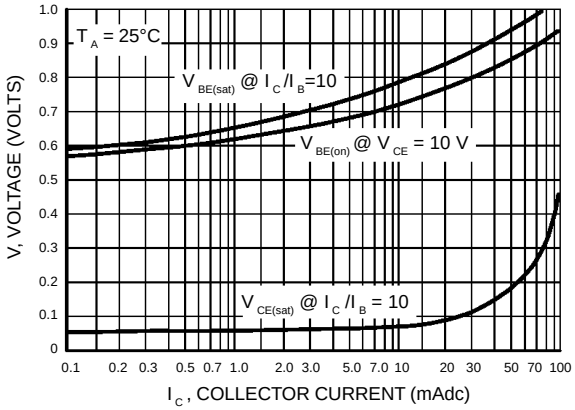


Figure 2. "Saturation" and "On" Voltages

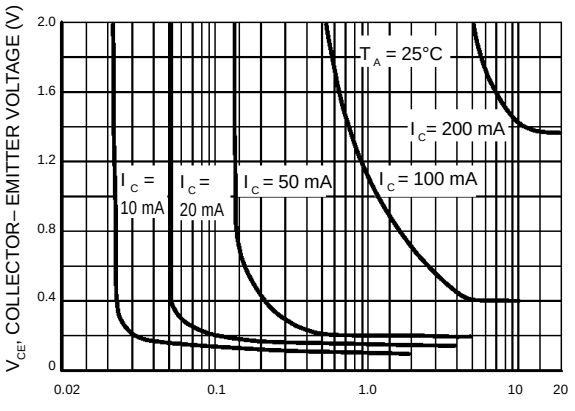


Figure 3. Collector Saturation Region

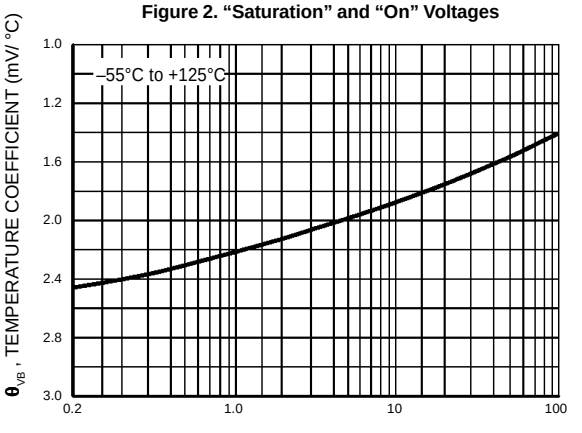


Figure 4. Base–Emitter Temperature Coefficient

DEVICE CHARACTERISTICS

BC846 Thru BC850 Series

BC847/BC848

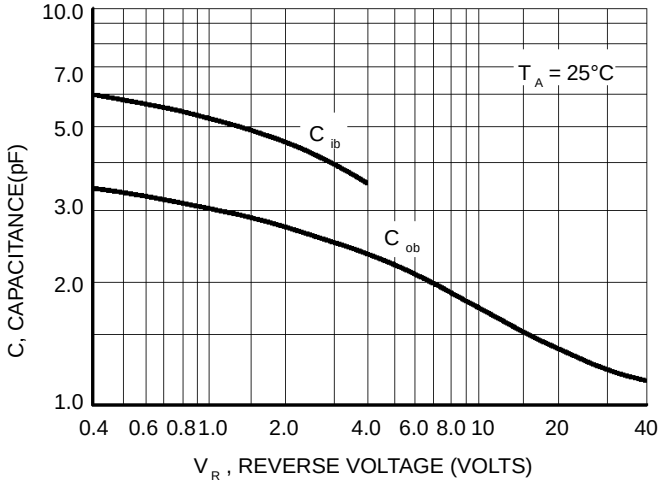


Figure 5. Capacitances

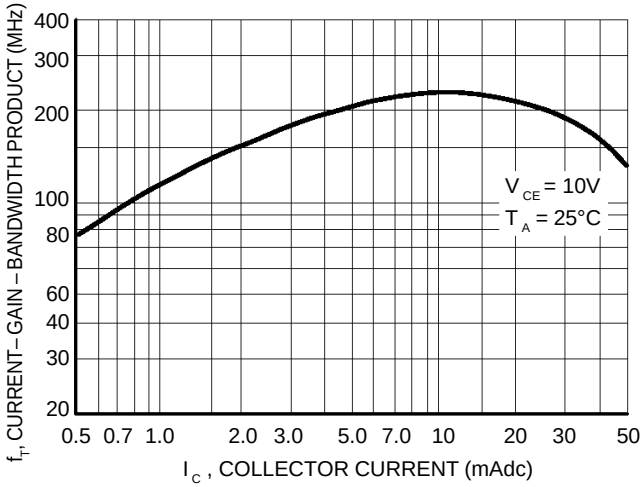


Figure 6. Current–Gain – Bandwidth Product

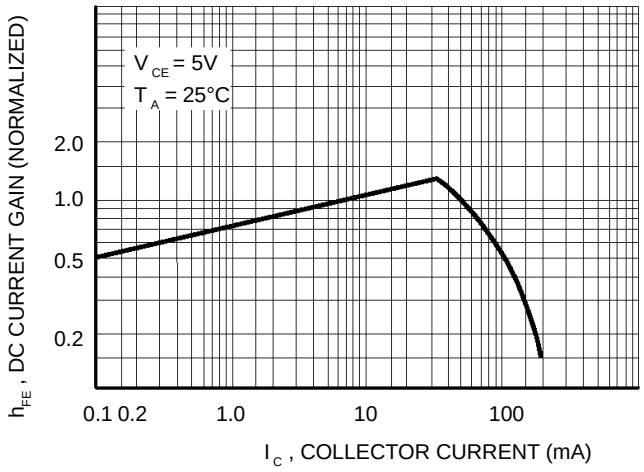


Figure 7. DC Current Gain

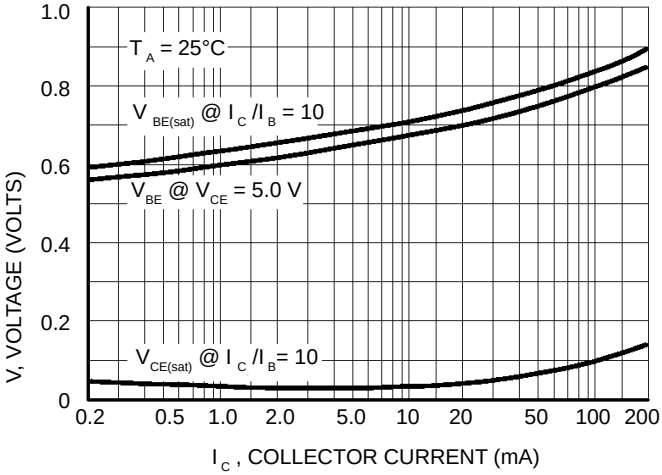


Figure 8. "On" Voltage

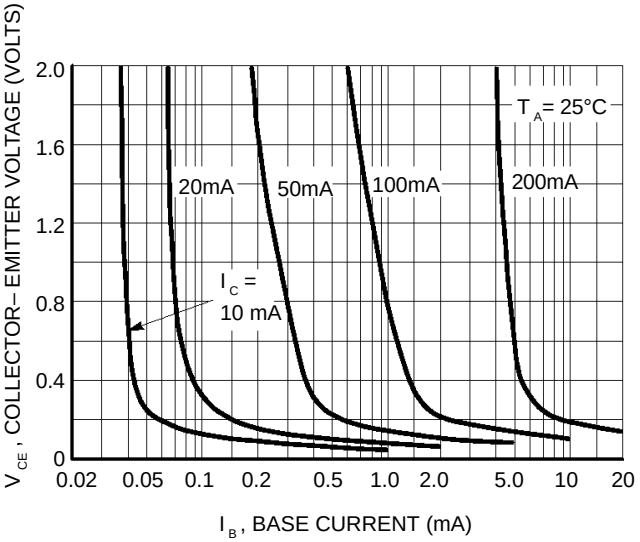


Figure 9. Collector Saturation Region

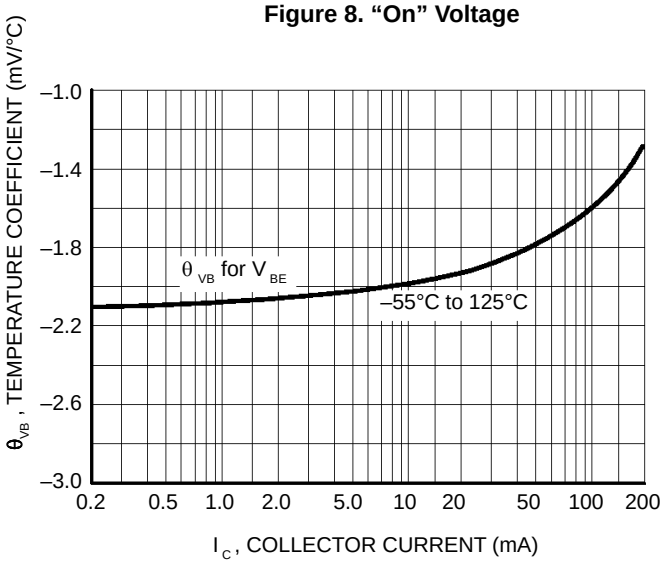


Figure 10. Base–Emitter Temperature Coefficient

DEVICE CHARACTERISTICS

BC846 Thru BC850 Series

BC846

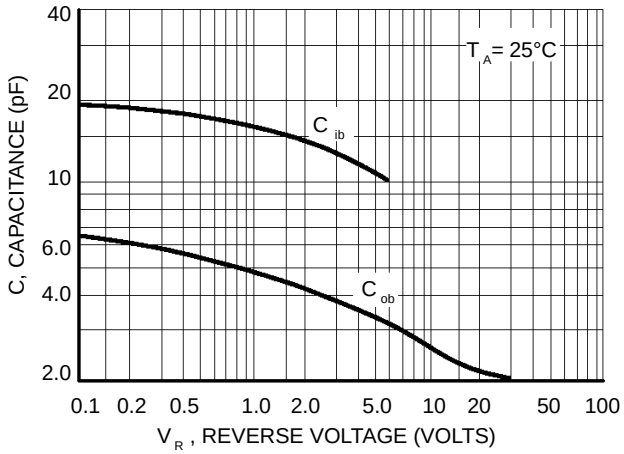


Figure 11. Capacitance

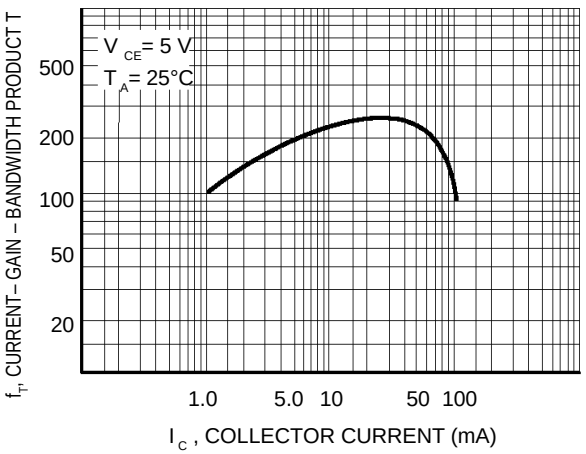
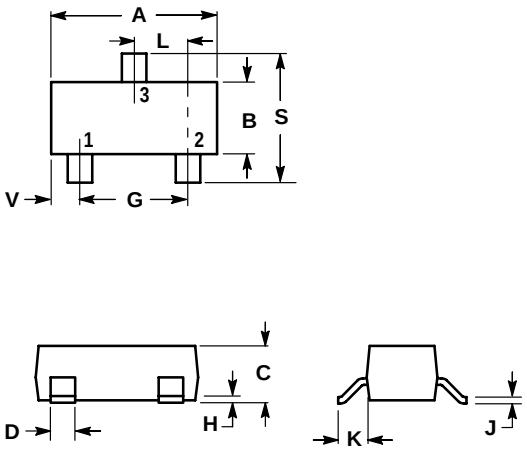


Figure 12. Current–Gain – Bandwidth Product

PACKAGE OUTLINE & DIMENSIONS

BC846 Thru BC850 Series

SOT–23



NOTES:

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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60