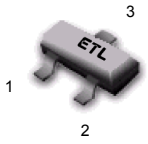
ETL SEMICONDUCTOR

General Purpose Transistors

NPN Silicon

BC846ALT1,BLT1
BC847ALT1,BLT1
CLT1 thru
BC850BLT1,CLT1



CASE 318–08, STYLE 6
SOT–23 (TO–236AB)

MAXIMUM RATINGS

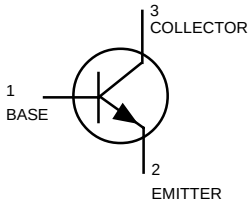
Rating	Symbol	BC846	BC847 BC850	BC848 BC849	Unit
Collector–Emitter Voltage	V_{CEO}	65	45	30	V
Collector–Base Voltage	V_{CBO}	80	50	30	V
Emitter–Base Voltage	V_{EBO}	6.0	6.0	5.0	V
Collector Current — Continuous	I_C	100	100	100	mAdc
Collector Current(Peak value)	I_{CM}	200	200	200	mAdc
Emitter Current(Peak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

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

BC846ALT1 = 1A; BC846BLT1 = 1B; BC847ALT1 = 1E; BC847BLT1 = 1F;
BC847CLT1 = 1G; BC848ALT1 = 1J; BC848BLT1 = 1K; BC848CLT1 = 1L

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.

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	NF				dB
	BC846B, BC847B, BC848B					
	BC847C, BC848C		—	—	10	
	BC849B,C, BC850B,C		—	—	4.0	

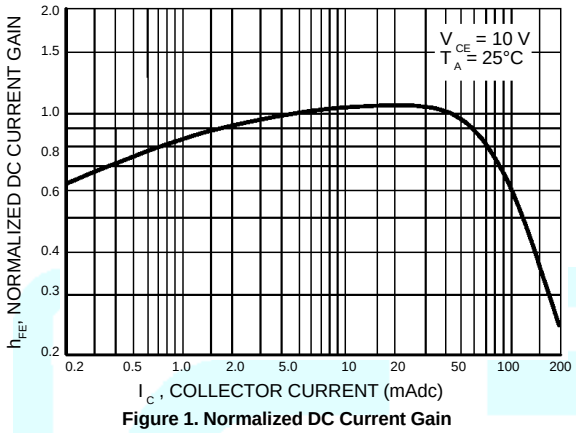


Figure 1. Normalized DC Current Gain

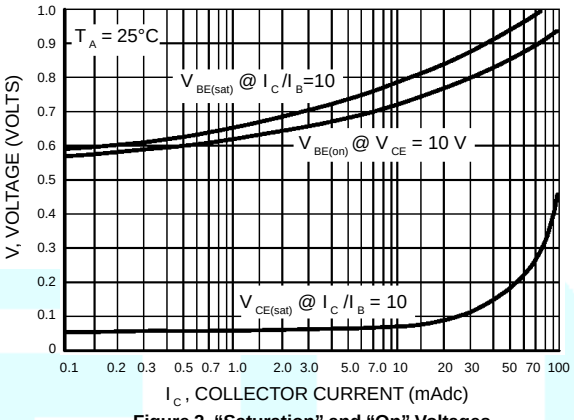


Figure 2. "Saturation" and "On" Voltages

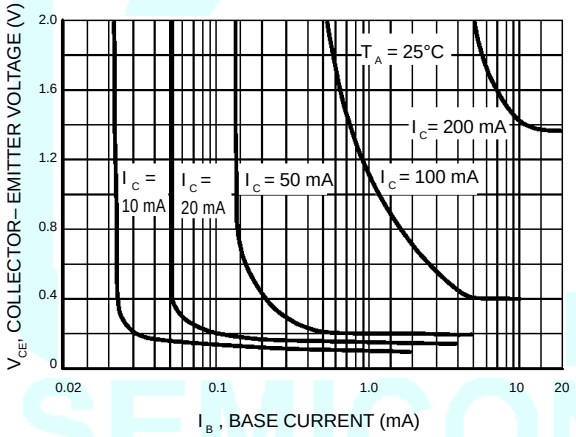


Figure 3. Collector Saturation Region

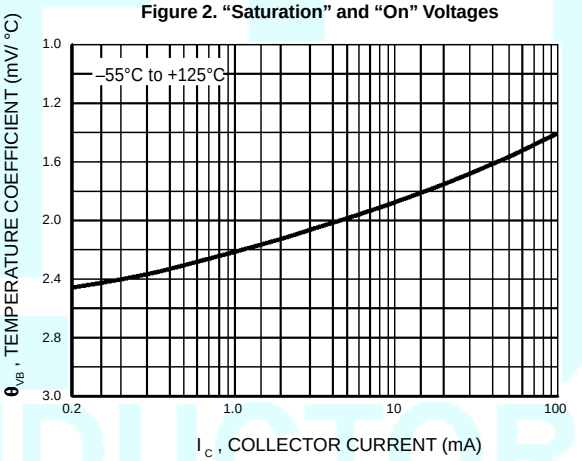


Figure 4. Base–Emitter Temperature Coefficient

BC847/BC848

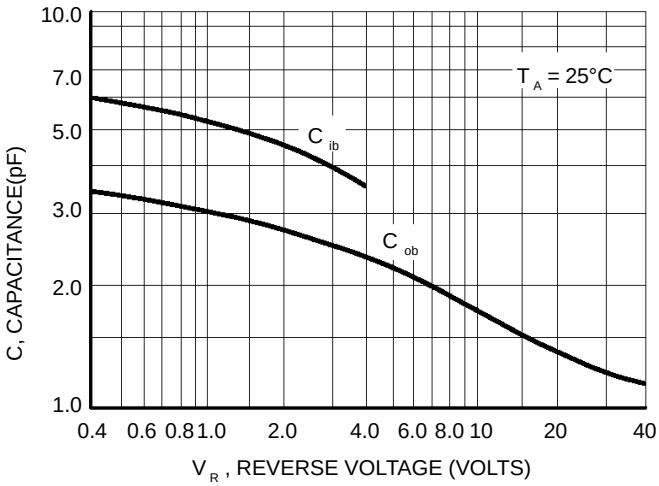


Figure 5. Capacitances

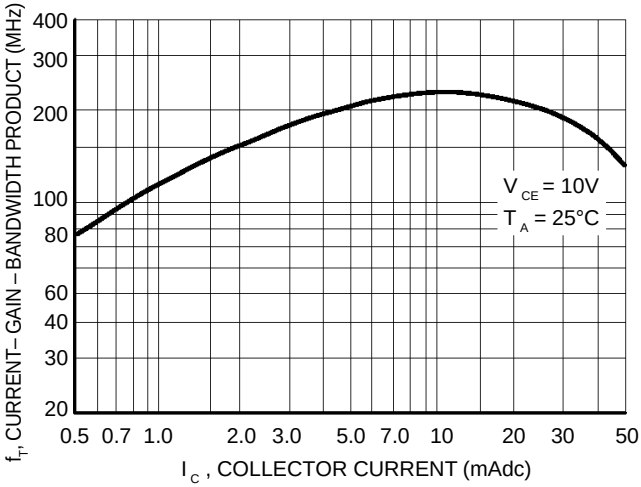


Figure 6. Current–Gain – Bandwidth Product

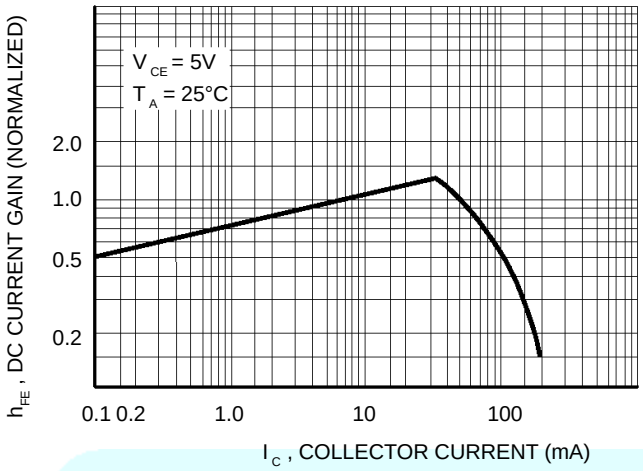


Figure 7. DC Current Gain

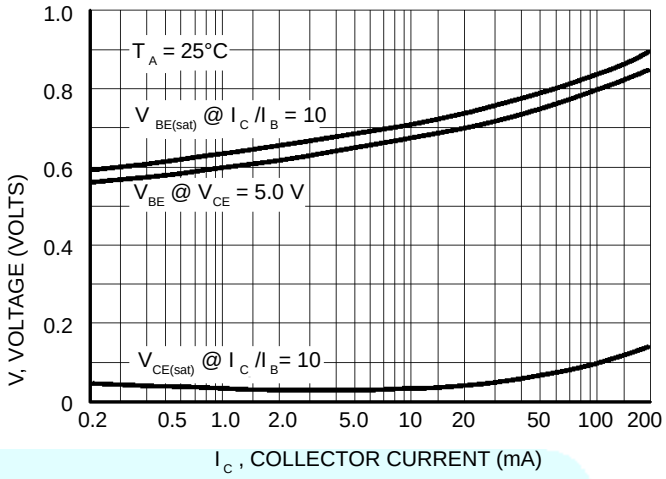


Figure 8. "On" Voltage

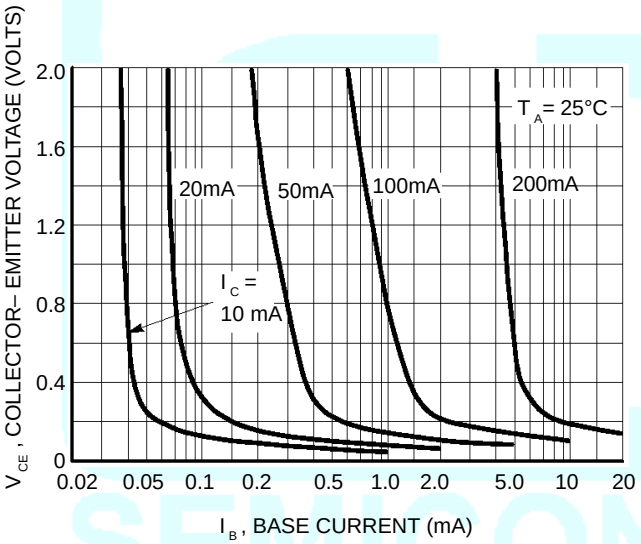


Figure 9. Collector Saturation Region

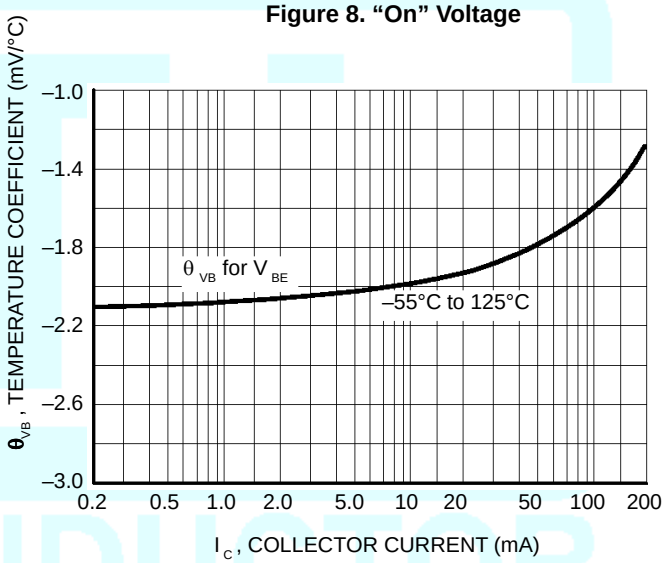


Figure 10. Base–Emitter Temperature Coefficient

BC846

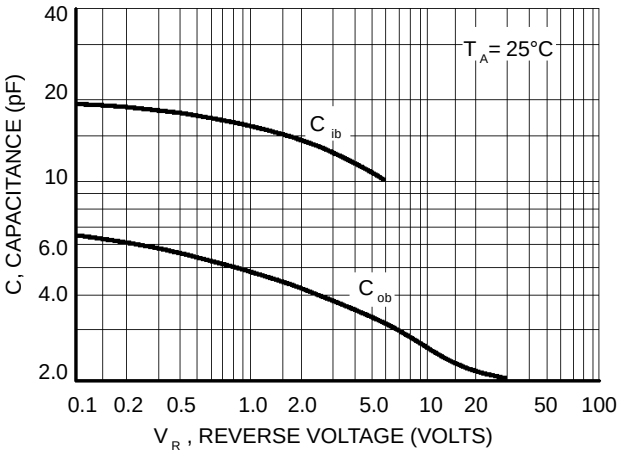


Figure 11. Capacitance

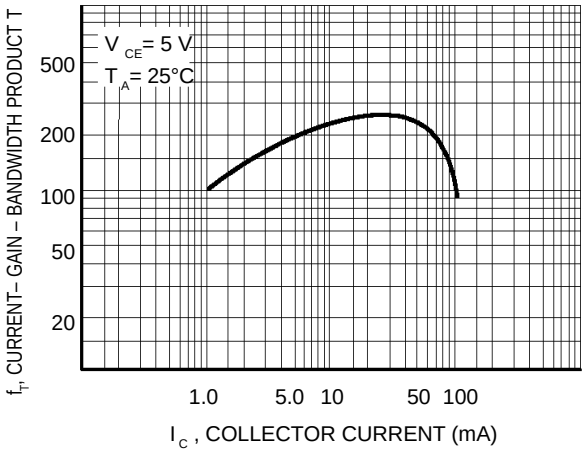


Figure 12. Current–Gain – Bandwidth Product