

# General Purpose Transistors

## NPN Silicon

We declare that the material of product compliance with RoHS requirements.  
S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

### ORDERING INFORMATION (Pb-Free)

Device	Package	Shipping
BC846/7/8A/B/CW	SOT-323	3000/Tape&Reel
S-BC846/7/8A/B/CW	SOT-323	3000/Tape&Reel

### MAXIMUM RATINGS

Rating	Symbol	BC846	BC847	BC848	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

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation	$P_D$	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

### DEVICE MARKING

BC846AW= 1A; BC846BW = 1B; BC847AW = 1E; BC847BW = 1F;  
BC847CW= 1G; BC848AW = 1J; BC848BW = 1K; BC848CW = 1L;

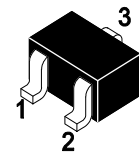
### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
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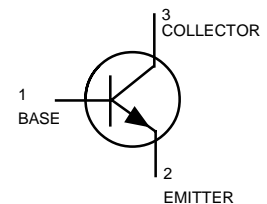
#### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage ( $I_C = 10\text{ mA}$ )	BC846 Series	65	—	—	v
	BC847 Series	45	—	—	
	BC848 Series	30	—	—	
Collector-Emitter Breakdown Voltage ( $I_C = 10\ \mu\text{A}, V_{EB} = 0$ )	BC846 Series	80	—	—	v
	BC847 Series	50	—	—	
	BC848 Series	30	—	—	
Collector-Base Breakdown Voltage ( $I_C = 10\ \mu\text{A}$ )	BC846 Series	80	—	—	v
	BC847 Series	50	—	—	
	BC848 Series	30	—	—	
Emitter-Base Breakdown Voltage ( $I_E = 1.0\ \mu\text{A}$ )	BC846 Series	6.0	—	—	v
	BC847 Series	6.0	—	—	
	BC848 Series	5.0	—	—	
Collector Cutoff Current ( $V_{CB} = 30\text{ V}$ ) ( $V_{CB} = 30\text{ V}, T_A = 150^\circ\text{C}$ )		—	—	15	nA
				5.0	$\mu\text{A}$

BC846AW,BW  
BC847AW,BW,CW  
BC848AW,BW,CW  
S-BC846AW,BW  
S-BC847AW,BW,CW  
S-BC848AW,BW,CW



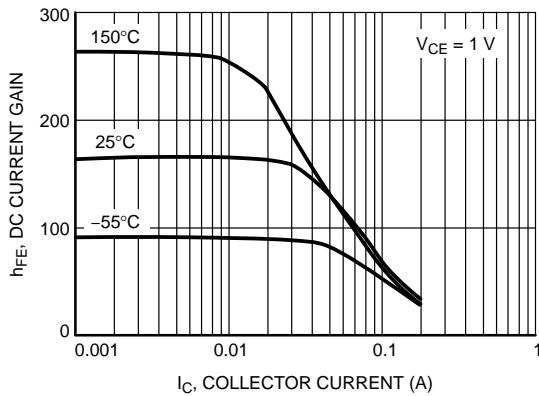
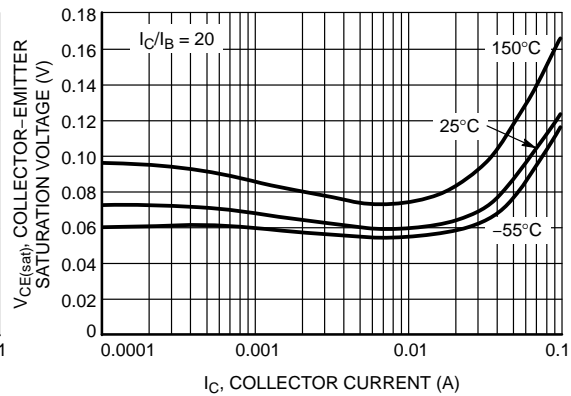
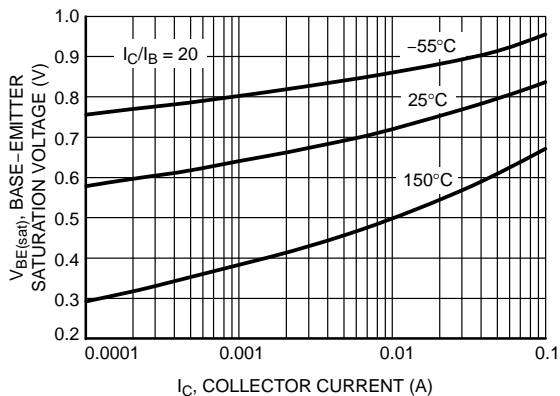
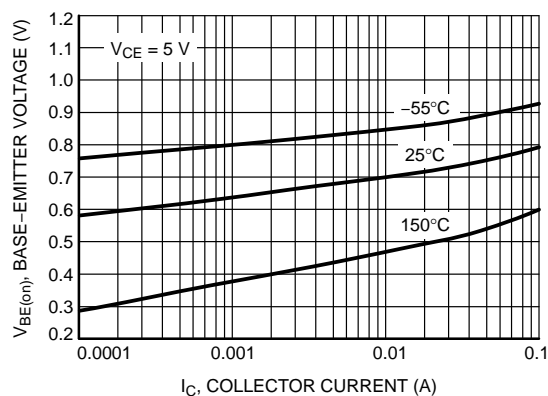
SOT-323



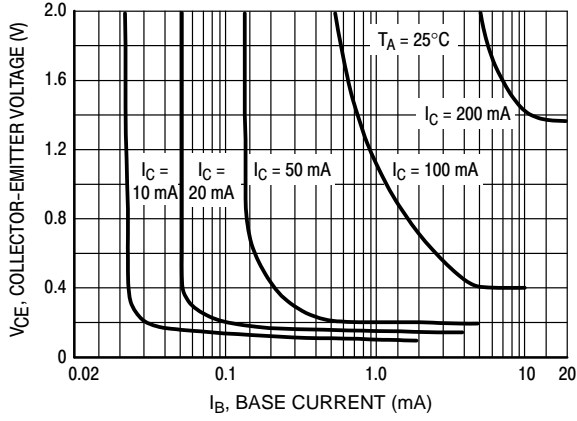
Characteristic	Symbol	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS</b>					
DC Current Gain ( $I_C = 2.0 \text{ mA}$ , $V_{CE} = 5.0 \text{ V}$ )	$h_{FE}$				
BC846A, BC847A, BC848A		110	180	220	
BC846B, BC847B, BC848B		200	290	450	
BC847C, BC848C		420	520	800	
Collector–Emitter Saturation Voltage ( $I_C = 10 \text{ mA}$ , $I_B = 0.5 \text{ mA}$ ) ( $I_C = 100 \text{ mA}$ , $I_B = 5.0 \text{ mA}$ )	$V_{CE(sat)}$	—	—	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**

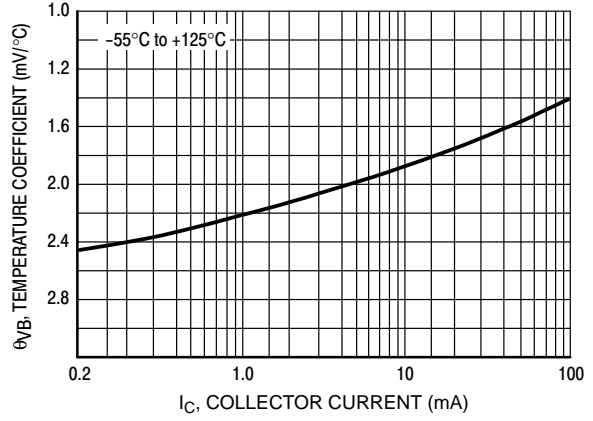
Current–Gain — Bandwidth Product ( $I_C = 10 \text{ mA}$ , $V_{CE} = 5.0 \text{ Vdc}$ , $f = 100 \text{ MHz}$ )	$f_T$	100	—	—	MHz
Output Capacitance ( $V_{CB} = 10 \text{ V}$ , $f = 1.0 \text{ MHz}$ )	$C_{obo}$	—	—	4.5	pF
Noise Figure ( $I_C = 0.2 \text{ mA}$ , $V_{CE} = 5.0 \text{ Vdc}$ , $R_S = 2.0 \text{ k}\Omega$ , $f = 1.0 \text{ kHz}$ , $BW = 200 \text{ Hz}$ )	BC846A, BC847A, BC848A BC846B, BC847B, BC848B BC847C, BC848C	—	—	10 4.0	dB

**BC846A, BC847A, BC848A**

**Figure 1. DC Current Gain vs. Collector Current**

**Figure 2. Collector Emitter Saturation Voltage vs. Collector Current**

**Figure 3. Base Emitter Saturation Voltage vs. Collector Current**

**Figure 4. Base Emitter Voltage vs. Collector Current**

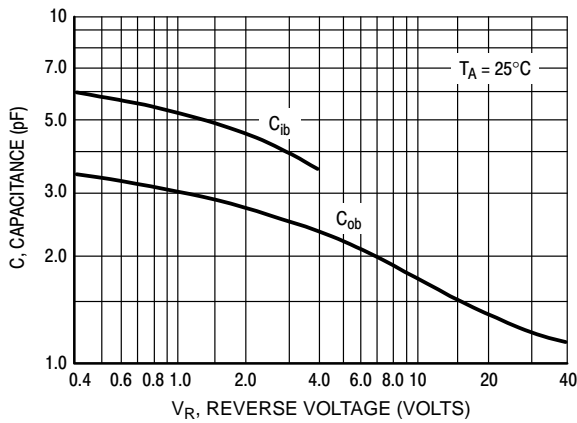

**BC846A, BC847A, BC848A**



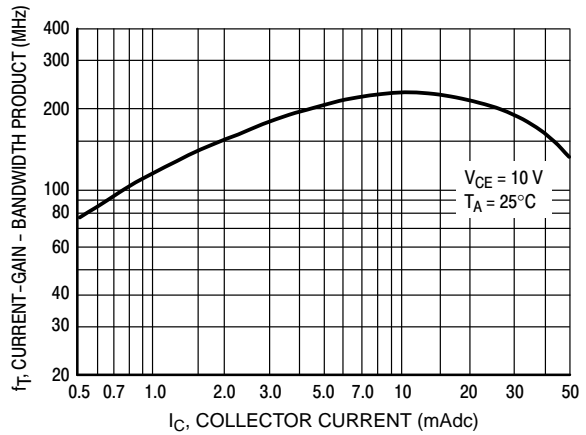
**Figure 5. Collector Saturation Region**



**Figure 6. Base-Emitter Temperature Coefficient**

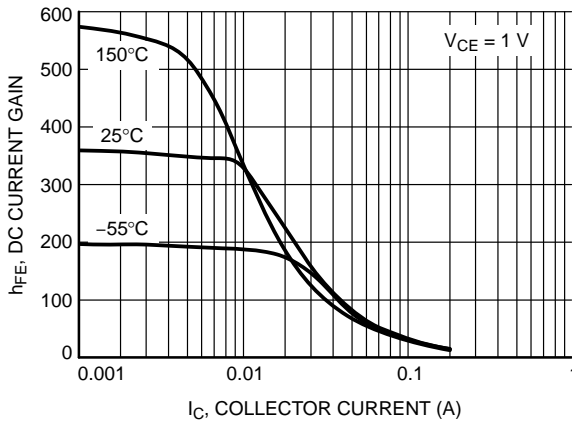


**Figure 7. Capacitances**

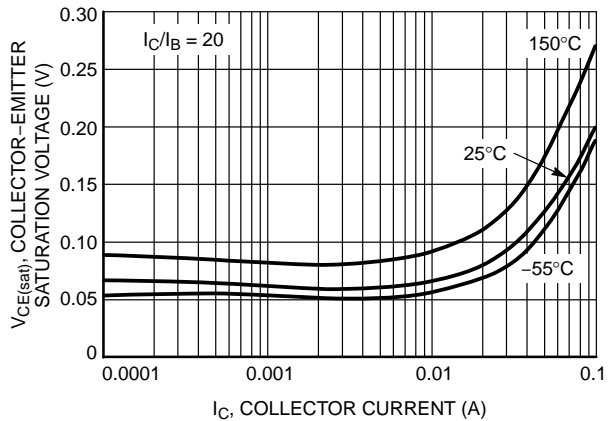


**Figure 8. Current-Gain - Bandwidth Product**

**BC846B**



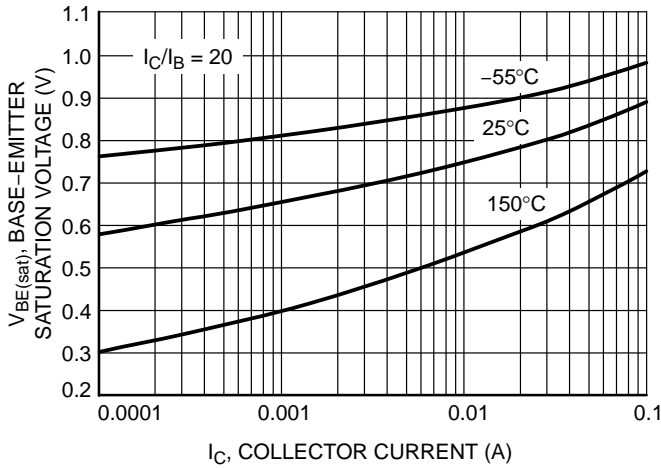
**Figure 9. DC Current Gain vs. Collector Current**



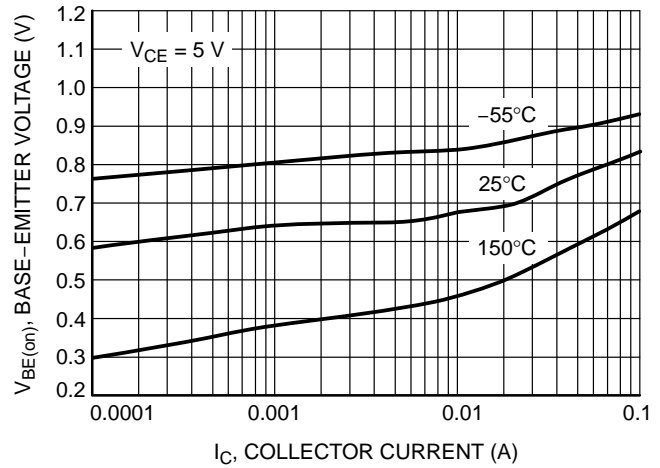
**Figure 10. Collector Emitter Saturation Voltage vs. Collector Current**



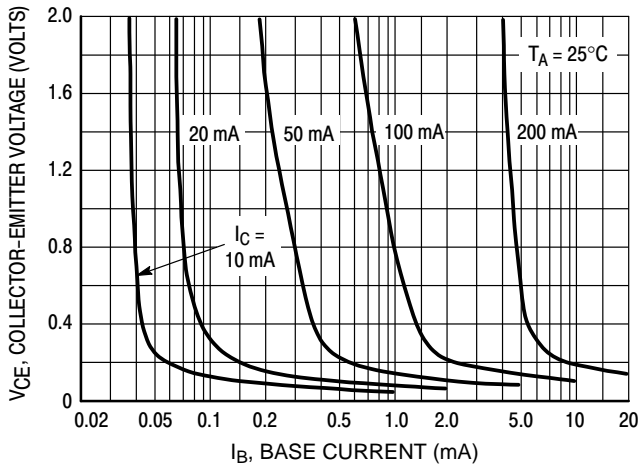
**BC846B**



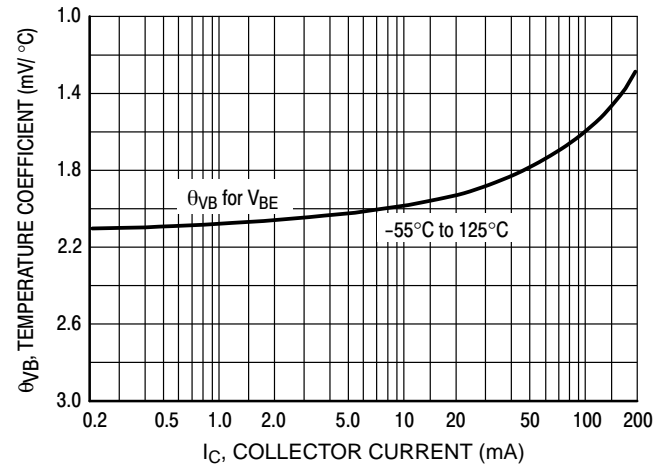
**Figure 11. Base Emitter Saturation Voltage vs. Collector Current**



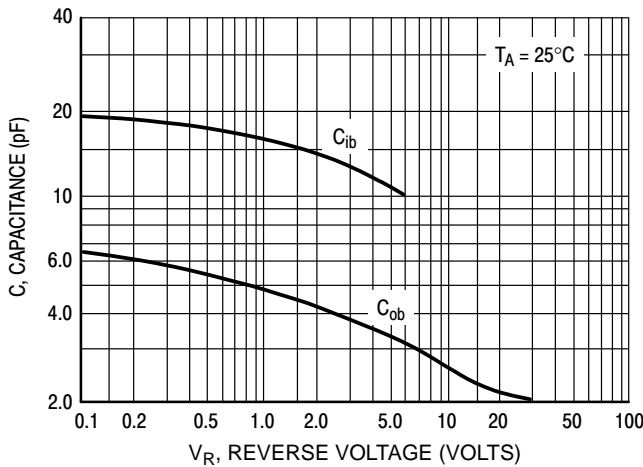
**Figure 12. Base Emitter Voltage vs. Collector Current**



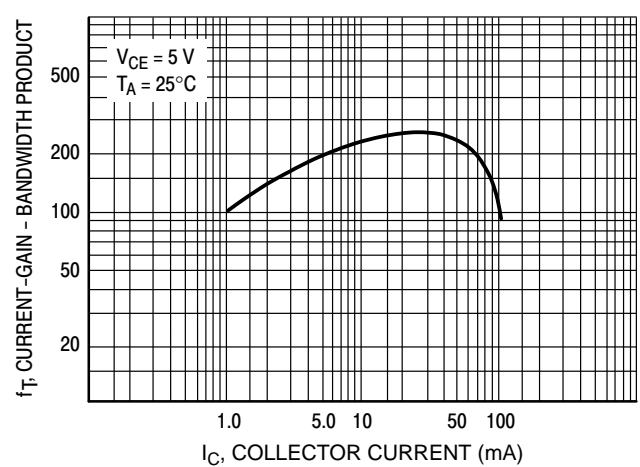
**Figure 13. Collector Saturation Region**



**Figure 14. Base-Emitter Temperature Coefficient**

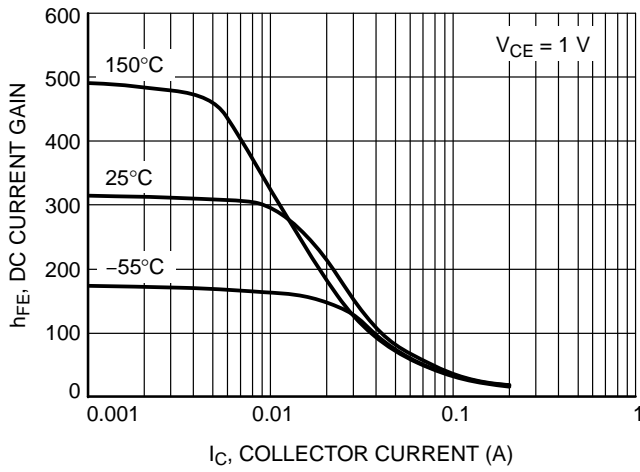


**Figure 15. Capacitance**

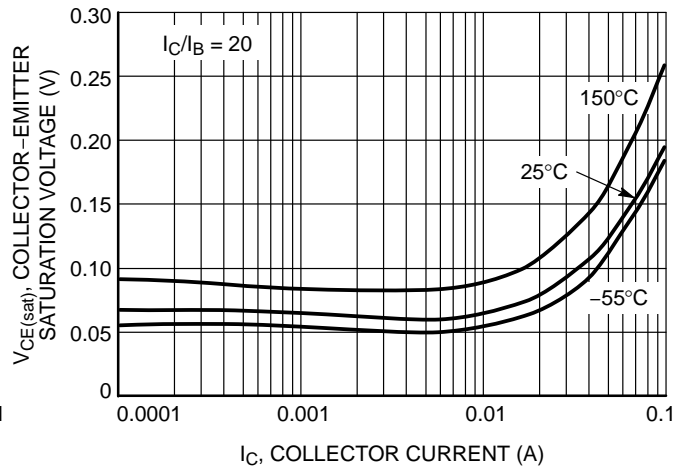


**Figure 16. Current-Gain - Bandwidth Product**

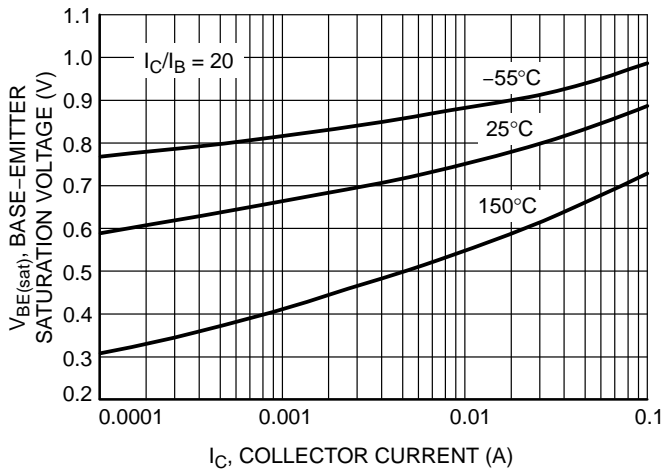




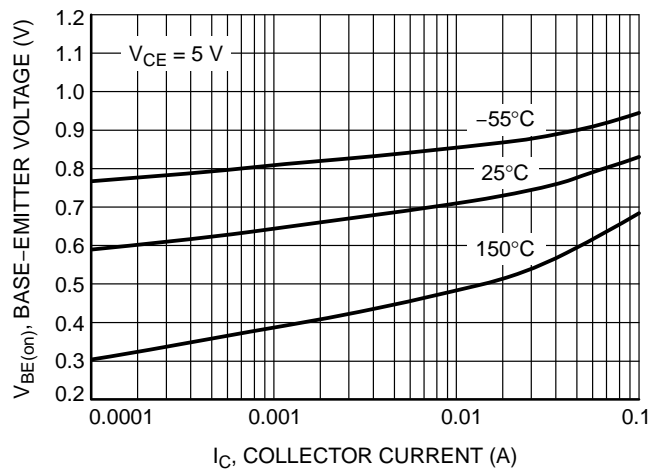
**Figure 17. DC Current Gain vs. Collector Current**



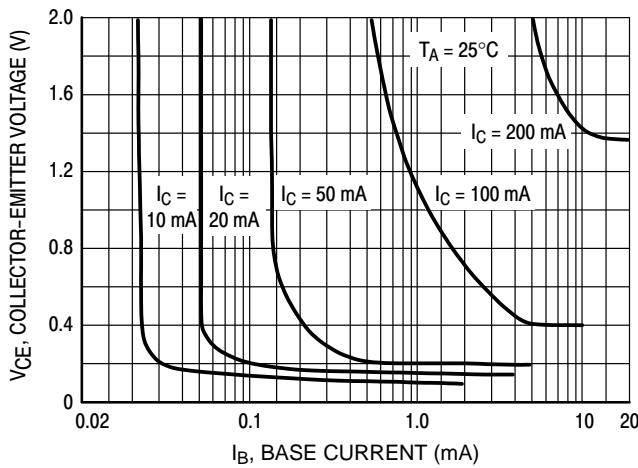
**Figure 18. Collector Emitter Saturation Voltage vs. Collector Current**



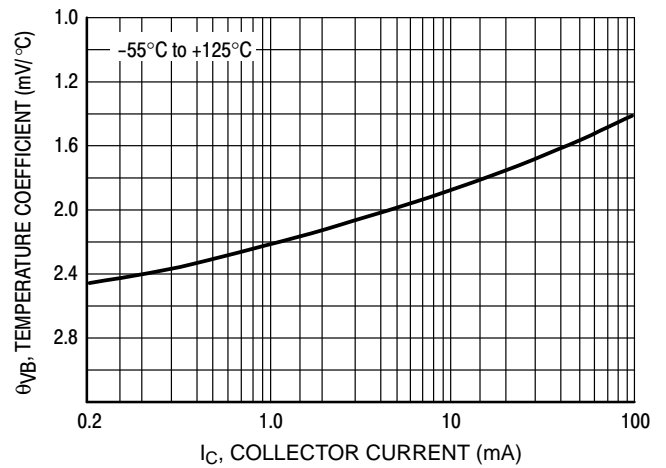
**Figure 19. Base Emitter Saturation Voltage vs. Collector Current**



**Figure 20. Base Emitter Voltage vs. Collector Current**



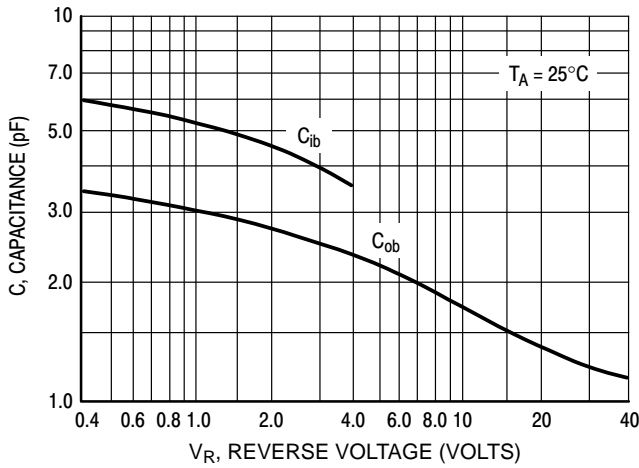
**Figure 21. Collector Saturation Region**



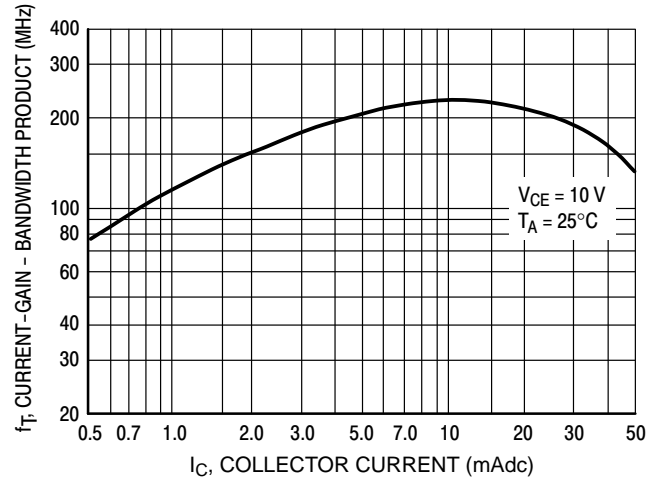
**Figure 22. Base-Emitter Temperature Coefficient**



**BC847B, BC848B**

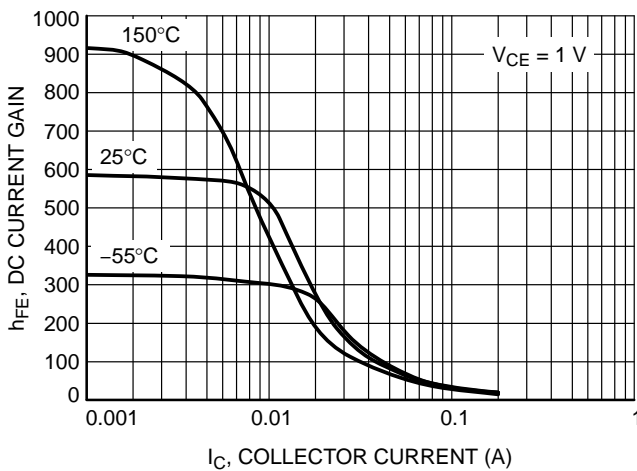


**Figure 23. Capacitances**

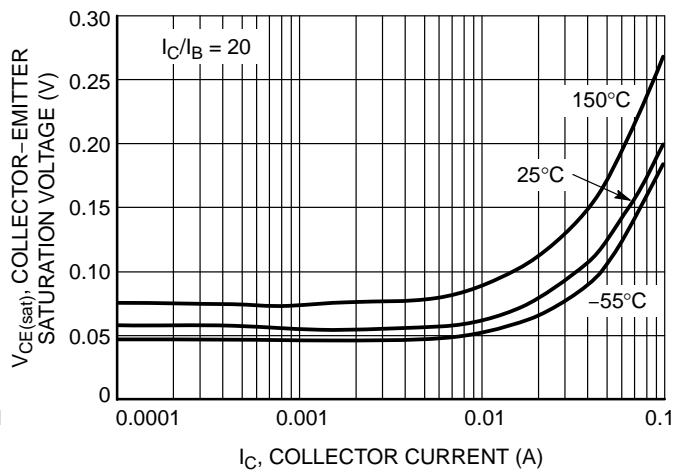


**Figure 24. Current-Gain - Bandwidth Product**

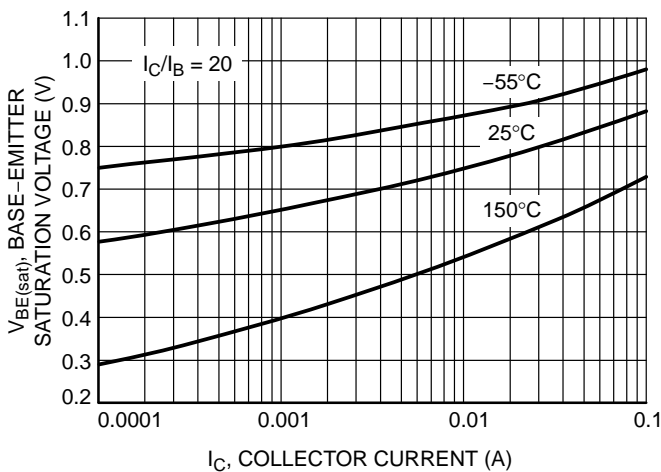
**BC847C, BC848C**



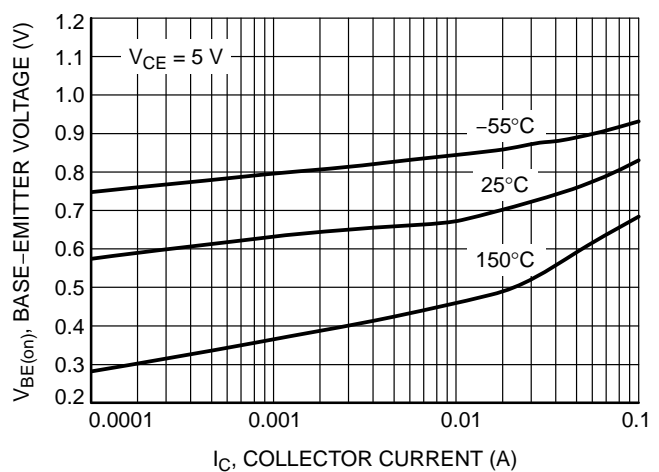
**Figure 25. DC Current Gain vs. Collector Current**



**Figure 26. Collector Emitter Saturation Voltage vs. Collector Current**



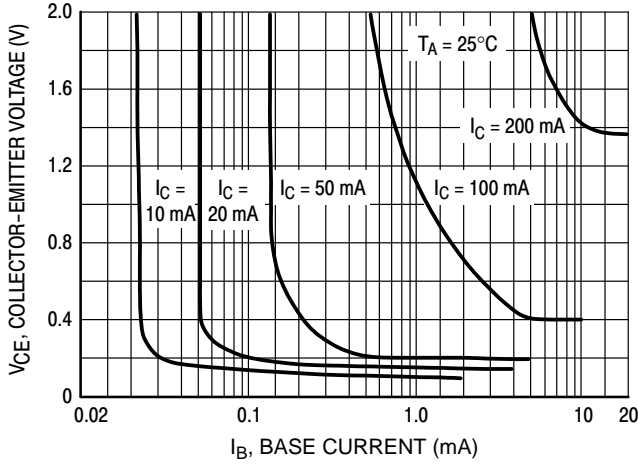
**Figure 27. Base Emitter Saturation Voltage vs.**



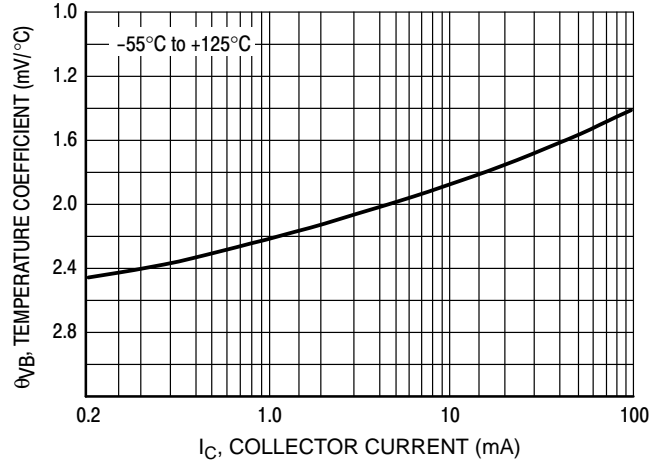
**Figure 28. Base Emitter Voltage vs. Collector**



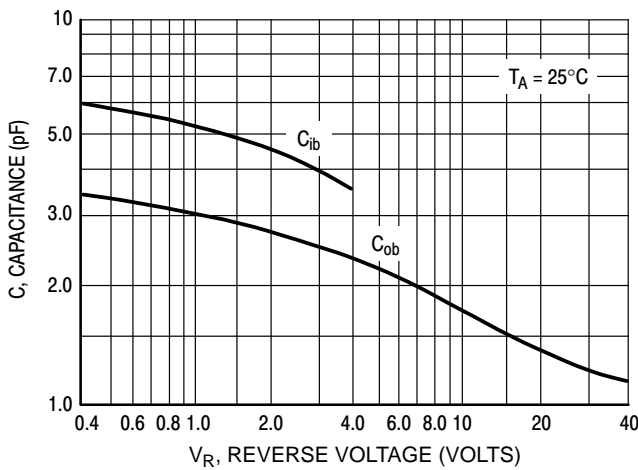
**BC847C, BC848C**



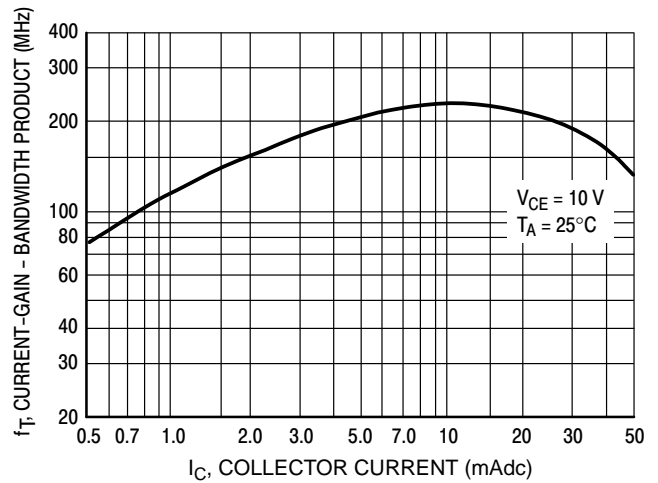
**Figure 29. Collector Saturation Region**



**Figure 30. Base-Emitter Temperature Coefficient**

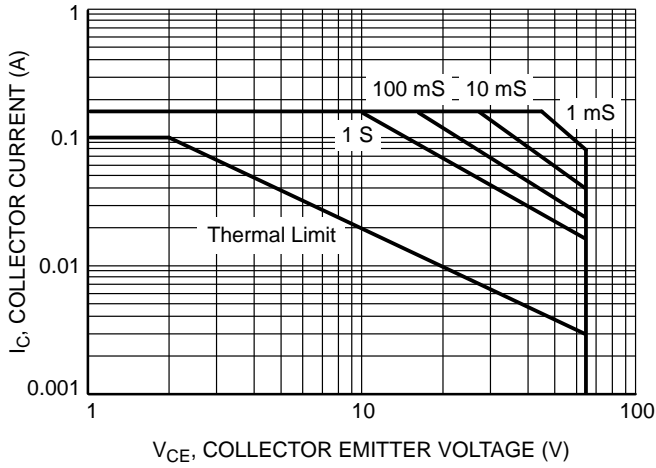


**Figure 31. Capacitances**

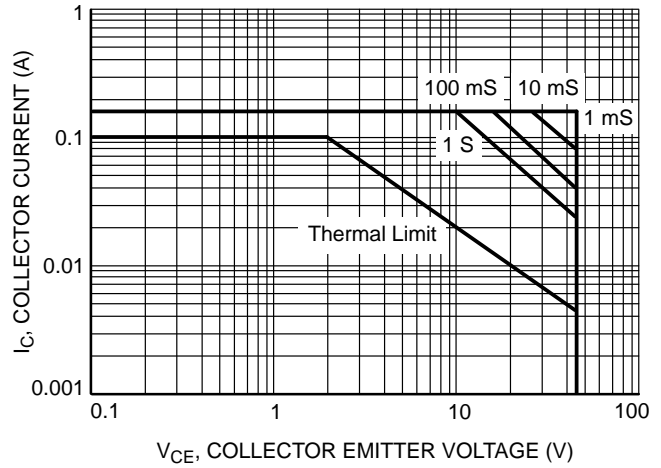


**Figure 32. Current-Gain - Bandwidth Product**

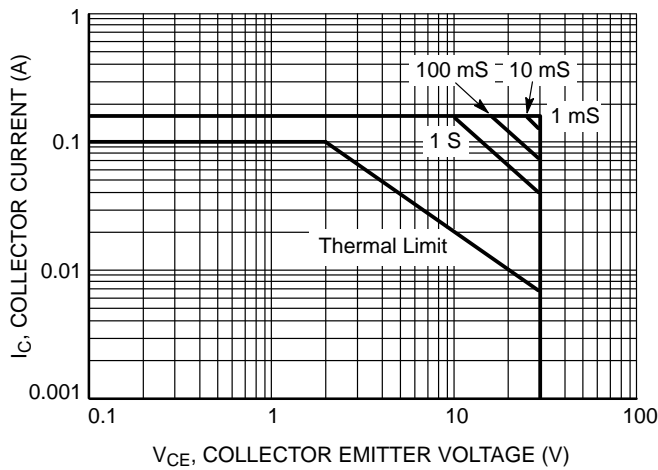




**Figure 33. Safe Operating Area for BC846A, BC846B**



**Figure 34. Safe Operating Area for BC847A, BC847B, BC847C**

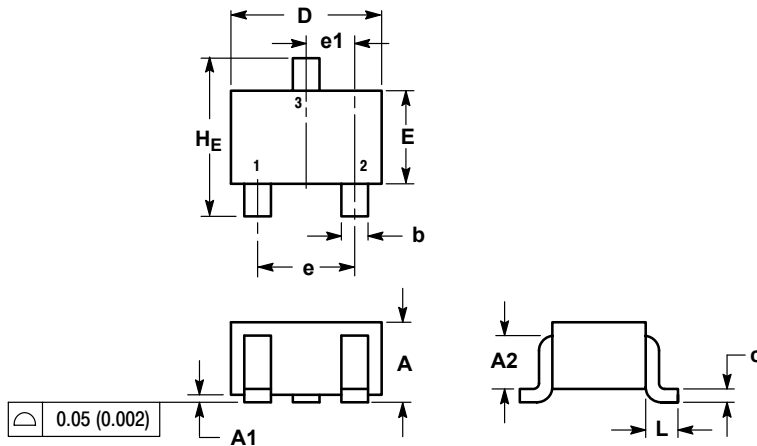


**Figure 35. Safe Operating Area for BC848A, BC848B, BC848C**





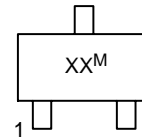
**SOT-323**



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	0.7 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		
HE	2.00	2.10	2.40	0.079	0.083	0.095

**GENERIC MARKING DIAGRAM**



XX = Specific Device Code  
 M = Date Code  
 ▪ = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present.

**SOLDERING FOOTPRINT\***

