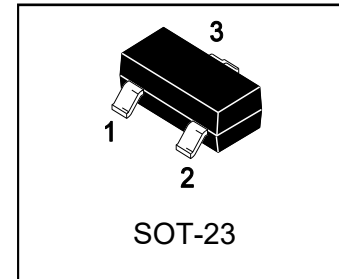


# General Purpose Transistors

## NPN Silicon

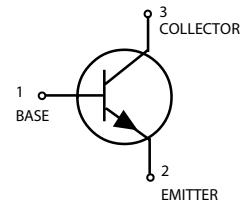
### BC817 Series

- 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.



#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO}$	45	V
Collector–Base Voltage	$V_{CBO}$	50	V
Emitter–Base Voltage	$V_{EBO}$	5.0	V
Collector Current — Continuous	$I_C$	500	mAdc



#### THERMAL CHARACTERISTICS

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

#### DEVICE MARKING

BC817–16 = 6A; BC817–25 = 6B; BC817–40 = 6C

#### 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 ( $I_C = 10\text{ mA}$ )	$V_{(BR)CEO}$	45	—	—	V
Collector–Emitter Breakdown Voltage ( $V_{EB} = 0, I_C = 10\ \mu\text{A}$ )	$V_{(BR)CES}$	50	—	—	V
Emitter–Base Breakdown Voltage ( $I_E = 1.0\ \mu\text{A}$ )	$V_{(BR)EBO}$	5.0	—	—	V
Collector Cutoff Current ( $V_{CB} = 20\text{ V}$ )	$I_{CBO}$	—	—	100	nA
( $V_{CB} = 20\text{ V}, T_A = 150^\circ\text{C}$ )		—	—	5.0	$\mu\text{A}$

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** ( $T_A = 25^\circ\text{C}$  unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Typ	Max	Unit
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**ON CHARACTERISTICS**

DC Current Gain ( $I_C = 100\text{ mA}$ , $V_{CE} = 1.0\text{ V}$ )	$h_{FE}$	100	—	250	
	BC817-16	160	—	400	
	BC817-25	250	—	600	
	BC817-40	40	—	—	
Collector-Emitter Saturation Voltage ( $I_C = 500\text{ mA}$ , $I_B = 50\text{ mA}$ )	$V_{CE(sat)}$	—	—	0.7	V
Base-Emitter On Voltage ( $I_C = 500\text{ mA}$ , $V_{CE} = 1.0\text{ V}$ )	$V_{BE(on)}$	—	—	1.2	V

**SMALL-SIGNAL CHARACTERISTICS**

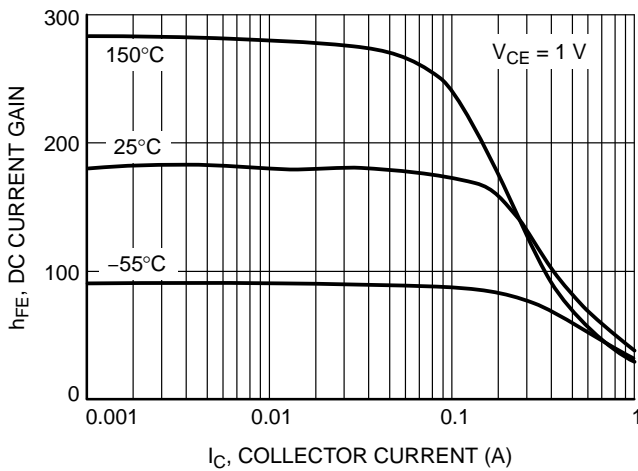
Current-Gain — Bandwidth Product ( $I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ V}_{dc}$ , $f = 100\text{ MHz}$ )	$f_T$	100	—	—	MHz
Output Capacitance ( $V_{CB} = 10\text{ V}$ , $f = 1.0\text{ MHz}$ )	$C_{obo}$	—	10	—	pF

**ORDERING INFORMATION**

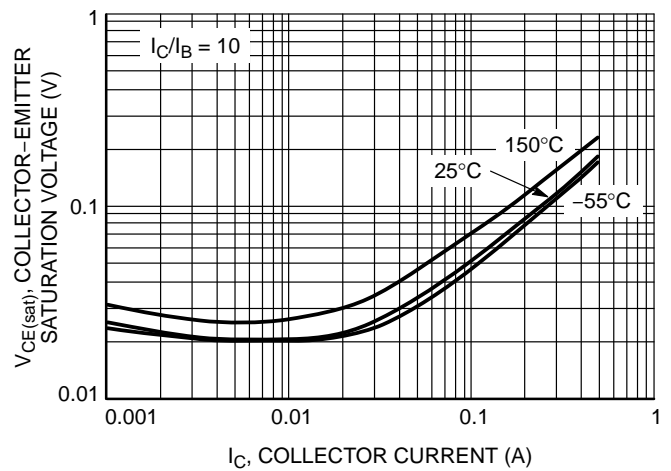
Device	Marking	Shipping
BC817-16	6A	3000/Tape&Reel
BC817-25	6B	3000/Tape&Reel
BC817-40	6C	300/Tape&Reel



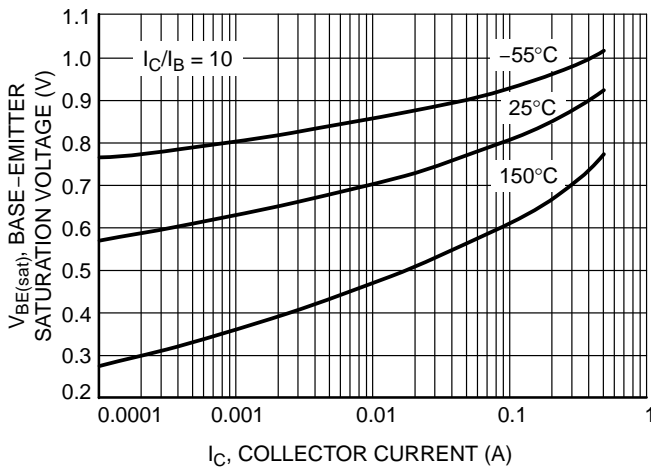
**TYPICAL CHARACTERISTICS – BC817-16**



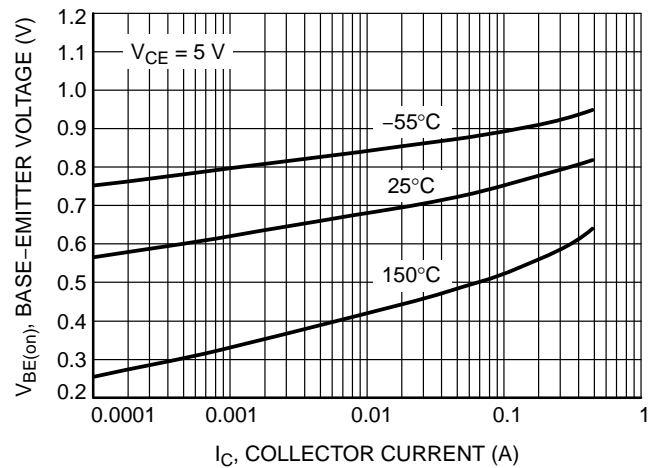
**Figure 1. DC Current Gain vs. Collector Current**



**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**



TYPICAL CHARACTERISTICS – BC817–16

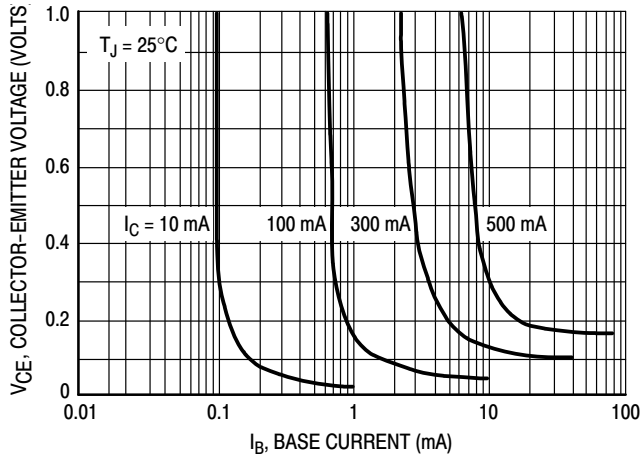


Figure 5. Saturation Region

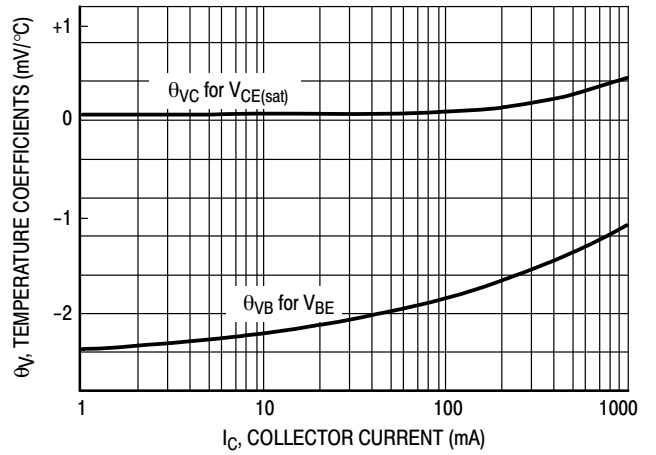


Figure 6. Temperature Coefficients

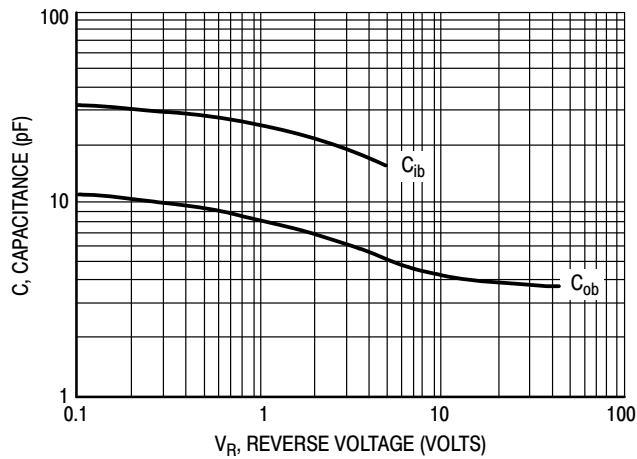


Figure 7. Capacitances



TYPICAL CHARACTERISTICS – BC817-25

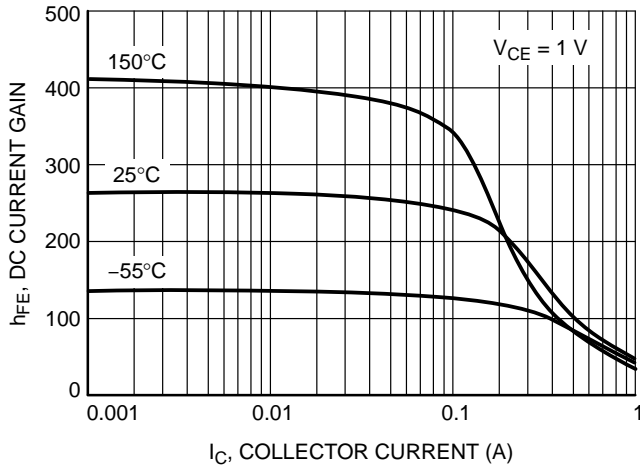


Figure 8. DC Current Gain vs. Collector Current

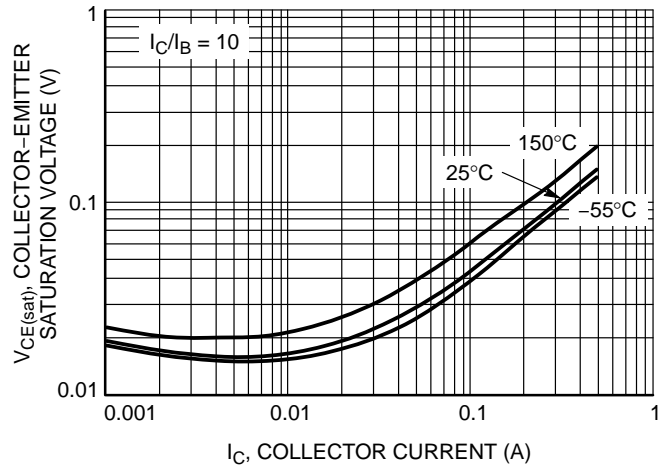


Figure 9. Collector Emitter Saturation Voltage vs. Collector Current

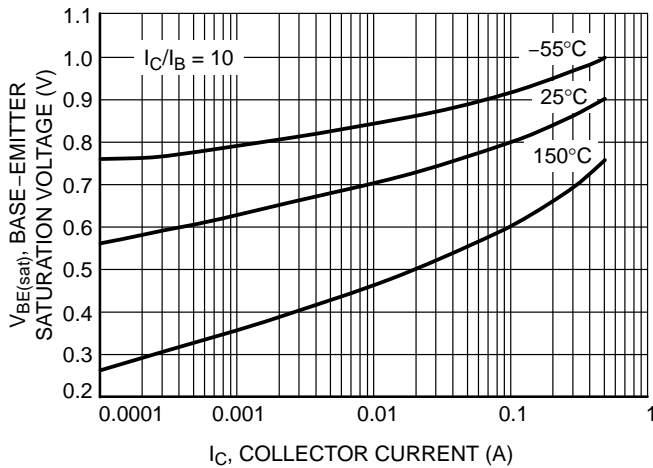


Figure 10. Base Emitter Saturation Voltage vs. Collector Current

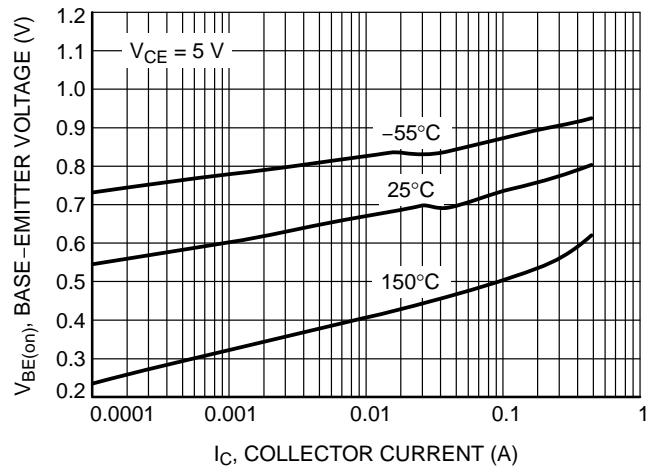


Figure 11. Base Emitter Voltage vs. Collector Current

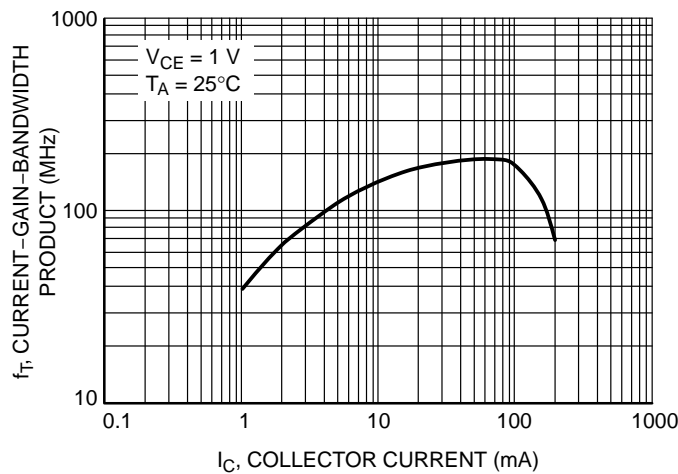


Figure 12. Current Gain Bandwidth Product vs. Collector Current



TYPICAL CHARACTERISTICS – BC817-25

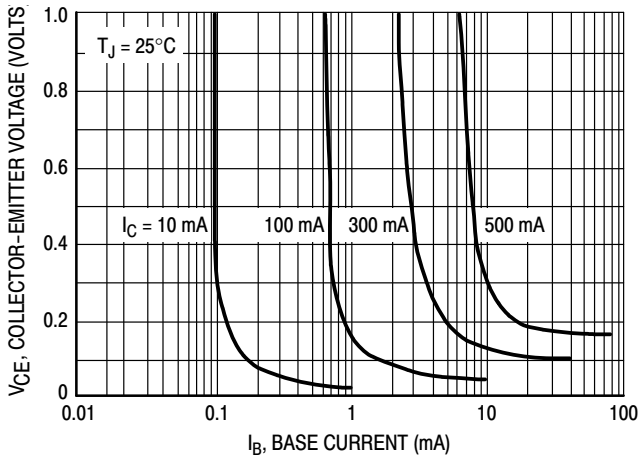


Figure 13. Saturation Region

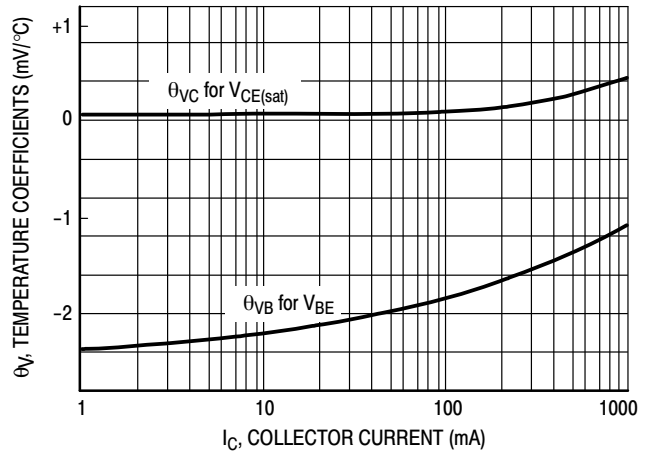


Figure 14. Temperature Coefficients

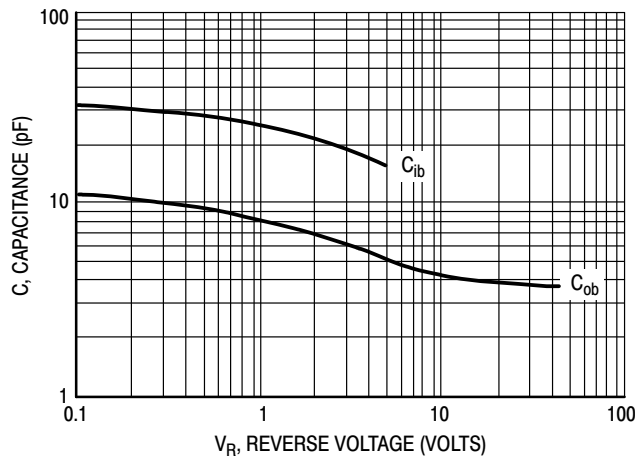


Figure 15. Capacitances



TYPICAL CHARACTERISTICS – BC817-40

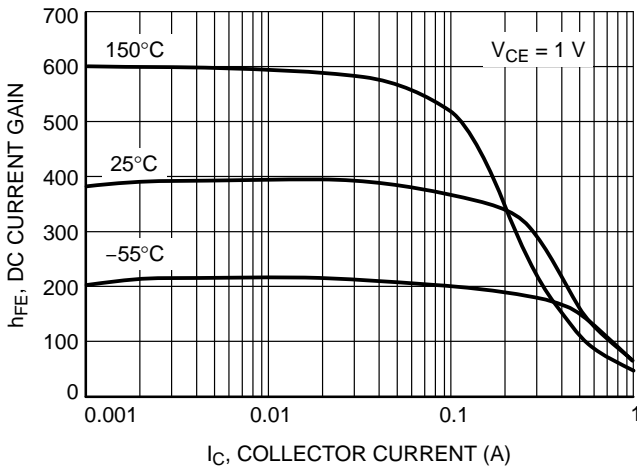


Figure 16. DC Current Gain vs. Collector Current

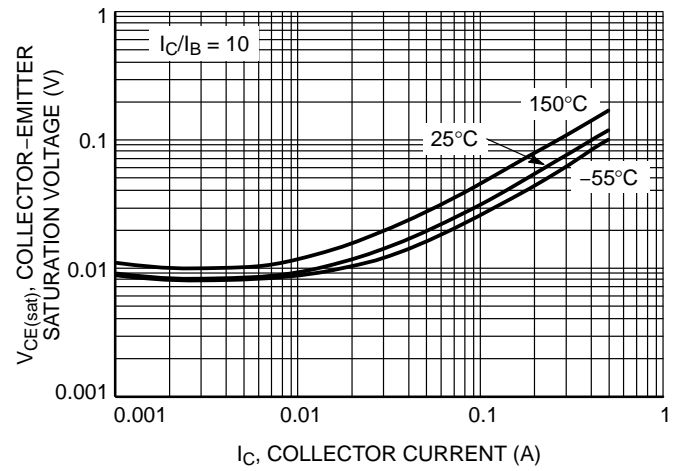


Figure 17. Collector Emitter Saturation Voltage vs. Collector Current

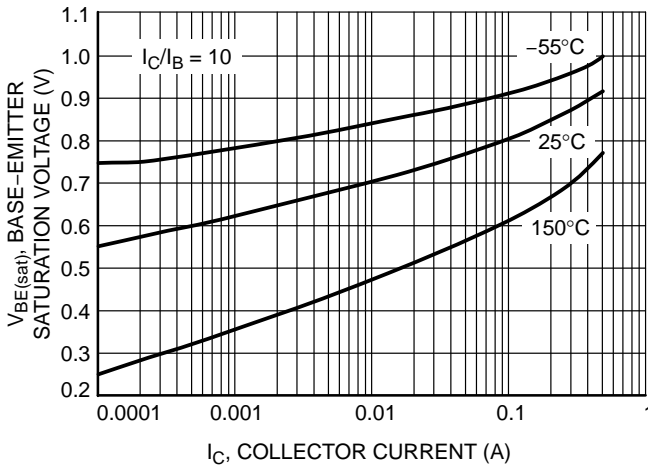


Figure 18. Base Emitter Saturation Voltage vs. Collector Current

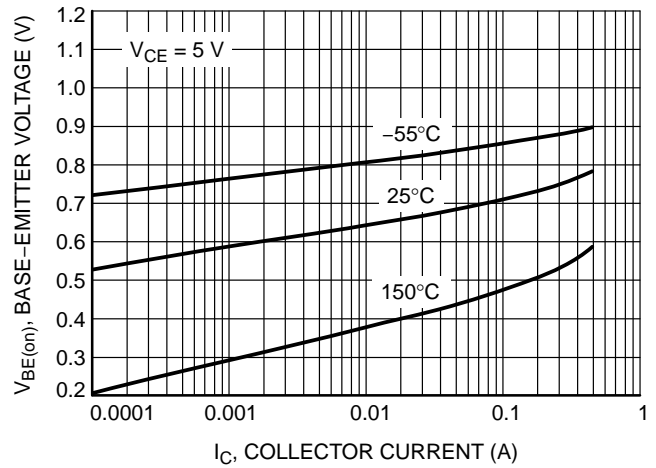


Figure 19. Base Emitter Voltage vs. Collector Current

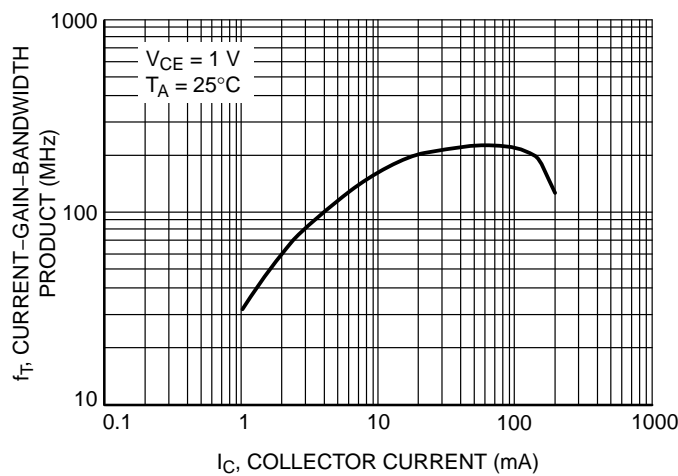
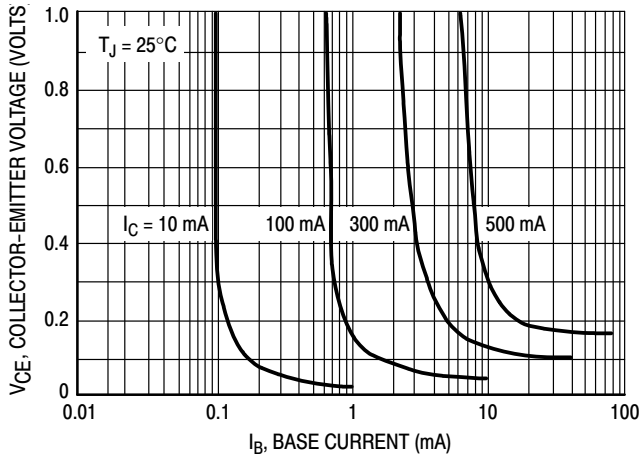


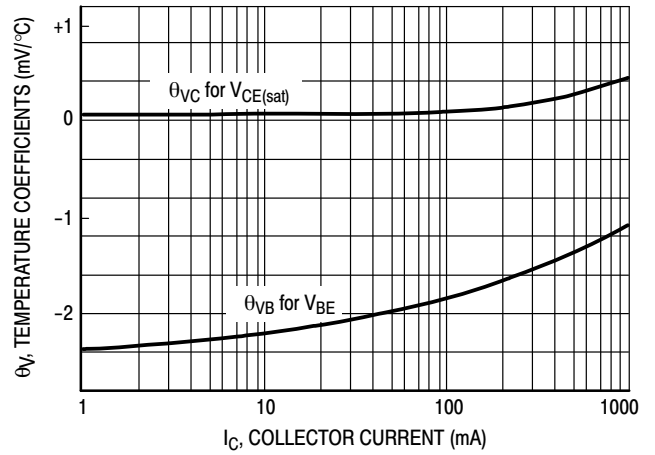
Figure 20. Current Gain Bandwidth Product vs. Collector Current



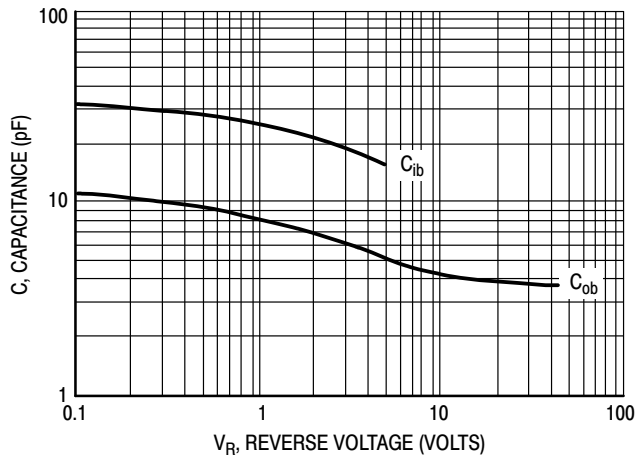
**TYPICAL CHARACTERISTICS - BC817-40**



**Figure 21. Saturation Region**



**Figure 22. Temperature Coefficients**



**Figure 23. Capacitances**





TYPICAL CHARACTERISTICS – BC817-16 BC817-25 BC817-40

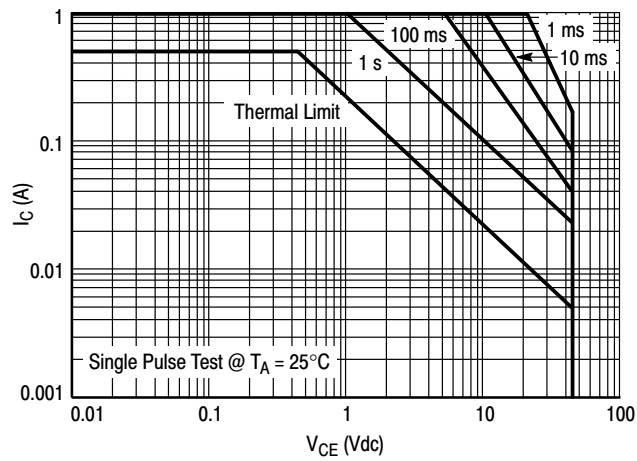
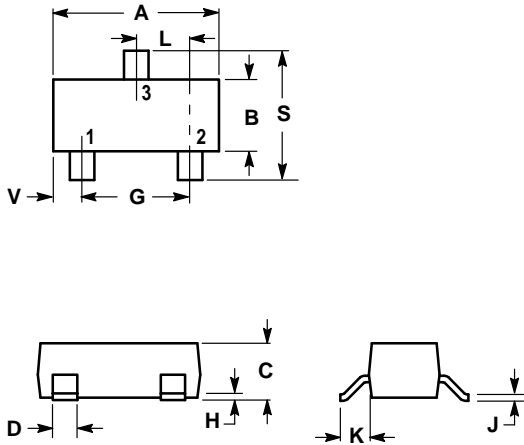


Figure 24. Safe Operating Area



### 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

- PIN 1. BASE  
 2. EMITTER  
 3. COLLECTOR

