BC846A/B-BC847A/B/C
BC848A/B/C-BC849B/C-BC850B/C

General Purpose Transistors
NPN Silicon

Features

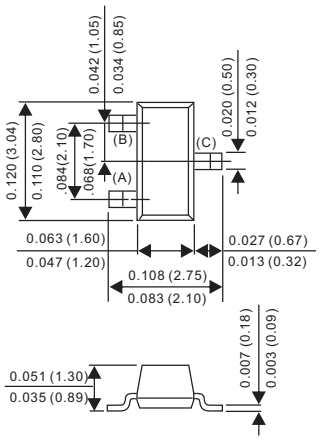
- Moisture sensitivity level: 1
- ESD rating – human body model: >4000 V,machine model: >400 V
- Epitaxial plana chip construction
- Ideal for medium power application and switching
- Capable of 225mW power dissipation
- Lead-free parts meet RoHS requirments
- Suffix "-H" indicates Halogen-free part, ex.BC846A-H

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.008 gram

Package outline

SOT-23



Dimensions in inches and (millimeters)

Maximum ratings (AT T_A=25°C unless otherwise noted)

Rating	Rating	Symbol	Value	UNIT
Collector-base voltage	BC846 BC847, BC850 BC848, BC849	V_{CBO}	80 50 30	Vdc
Collector-emitter voltage	BC846 BC847, BC850 BC848, BC849	V_{CEO}	65 45 30	Vdc
Emitter-base voltage	BC846 BC847, BC850 BC848, BC849	V_{EBO}	6.0 6.0 5.0	Vdc
Collector current-continuous		I_C	100	mAdc

Thermal characteristics

PARAMETER		Symbol	MIN.	TYP.	MAX.	UNIT
Total device dissipation FR-5 board (1)	T_A = 25°C	P_D			225	mW
	Derate above 25°C				1.8	mW/°C
Thermal resistance	Junction to ambient	$R_{\theta JA}$			556	°C/W
Total device dissipation aluminum substrate(2)	T_A = 25°C	P_D			300	mW
	Derate above 25°C				2.4	mW/°C
Thermal resistance	Junction to ambient	$R_{\theta JA}$			417	°C/W
Operating junction temperature range		T_J	-55		+150	°C
Storage temperature range		T_{STG}	-55		+150	°C

1.FR-5 = 1.0 x 0.75 x0.062 in.
2. Aluminum=0.4 x 0.3 x 0.024 in., 99.5% aluminum

BC846A/B-BC847A/B/C
BC848A/B/C-BC849B/C-BC850B/C

Electrical characteristics (AT T_A=25°C unless otherwise noted)

Off characteristics

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Collector-base breakdown voltage	I_c = 10uA BC846A,B / BC847A,B,C BC850B,C / BC848A,B,C BC849B,C	$V_{(BR)CBO}$	80 50 30			V
Collector-emitter breakdown voltage	I_c = 10mA BC846A,B / BC847A,B,C BC850B,C / BC848A,B,C BC849B,C	$V_{(BR)CEO}$	65 45 30			V
Emitter-base breakdown voltage	I_E = 1.0uA BC846A,B / BC847A,B,C BC850B,C / BC848A,B,C BC849B,C	$V_{(BR)EBO}$	6.0 6.0 5.0			V
Collector-emitter breakdown voltage	I_C = 10uA, V_{EB} = 0 BC846A,B / BC847A,B,C BC850B,C / BC848A,B,C BC849B,C	$V_{(BR)CES}$	80 50 30			V
Collector cutoff current	V_{CB} = 30V	I_{CBO}			15	nA
	V_{CB} = 30V, T_A = 150°C				5.0	uA

On characteristics

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
DC current gain(I_c = 2.0mA, V_{CE} = 5.0V)	BC846A, BC847A, BC848A	h_{FE}	110	180	220	
	BC846B, BC847B, BC848B BC849B, BC850B		200	290	450	
	BC847C, BC848C, BC849C, BC850C		420	520	800	
Collector-emitter saturation voltage	I_c = 10mA, I_B = 0.5mA	$V_{CE(sat)}$			0.25	V
	I_c = 100mA, I_B = 5.0mA				0.6	
Base-emitter saturation voltage	I_c = 10mA, I_B = 0.5mA	$V_{BE(sat)}$		0.7		V
	I_c = 100mA, I_B = 5.0mA			0.9		
Base-emitter on voltage	I_c = 2.0mA, V_{CE} = 5.0V	$V_{BE(on)}$	580	660	700	mV
	I_c = 10mA, V_{CE} = 5.0V				770	

Small-signal characteristics

PARAMETER	CONDITIONS		Symbol	MIN.	TYP.	MAX.	UNIT
Current-gain-bandwidth product	I_C = 10mA, V_{CE} = 5.0V, f = 100MHz		f_T	100			MHz
Output capacitance	V_{CB} = 10V, f = 1.0MHz		C_{obo}			4.5	pF
Noise figure	(I_C = 0.2mA, V_{CE} = 5.0V, R_S = 2.0KΩ, f = 1.0KHz, BW = 200Hz)	BC846A,B BC847A,B,C BC848A,B,C	NF			10	dB
		BC849B,C BC850B,C				4	

Rating and characteristic curves

BC846A, BC847A, BC848A

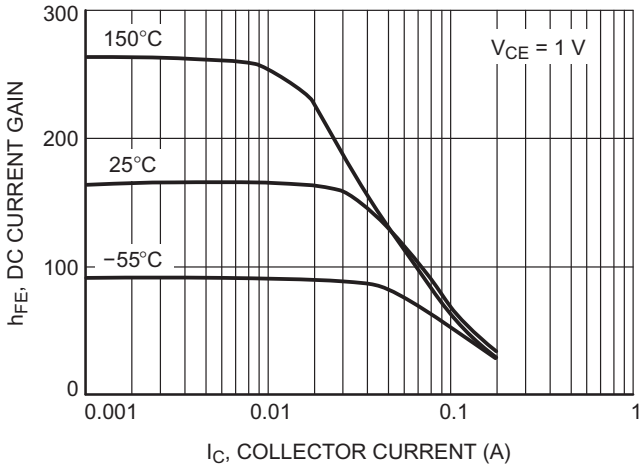


Figure 1. DC Current Gain vs. Collector Current

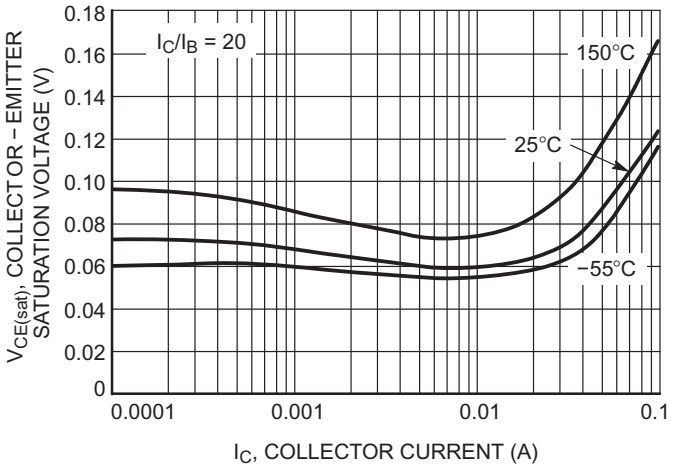


Figure 2. Collector Emitter Saturation Voltage vs. Collector Current

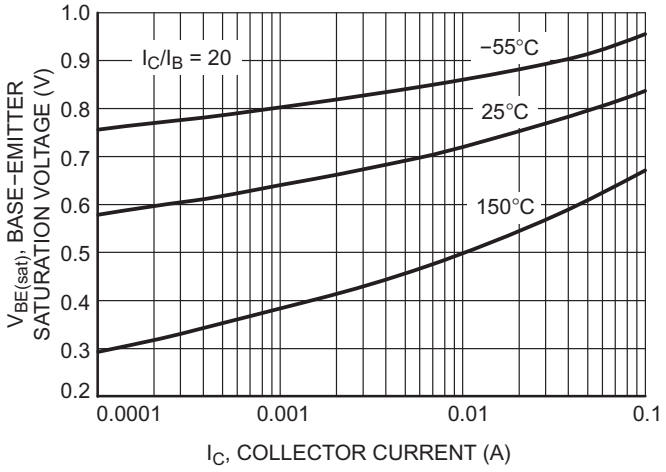


Figure 3. Base Emitter Saturation Voltage vs. Collector Current

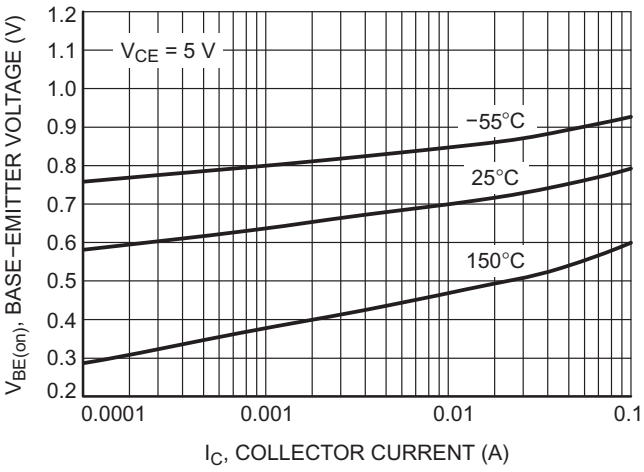


Figure 4. Base Emitter Voltage vs. Collector Current

Rating and characteristic curves

BC846A, BC847A, BC848A

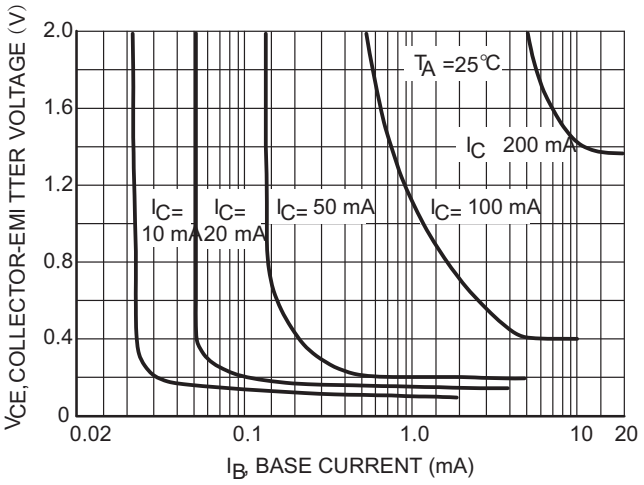


Figure 5. Collector Saturation Region

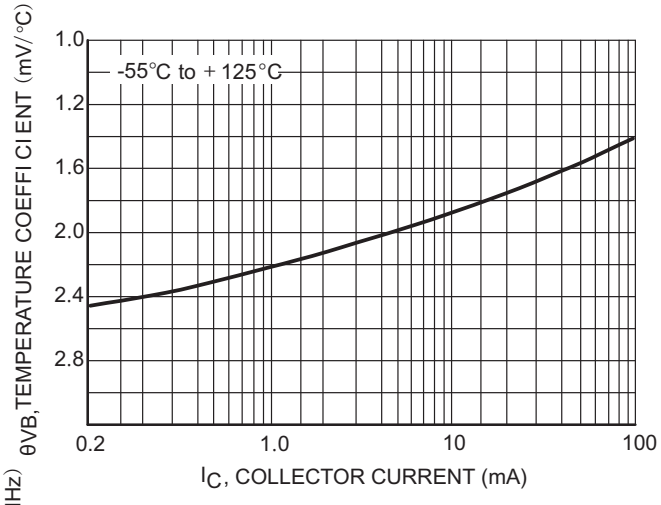


Figure 6. Base−Emitter Temperature Coefficient

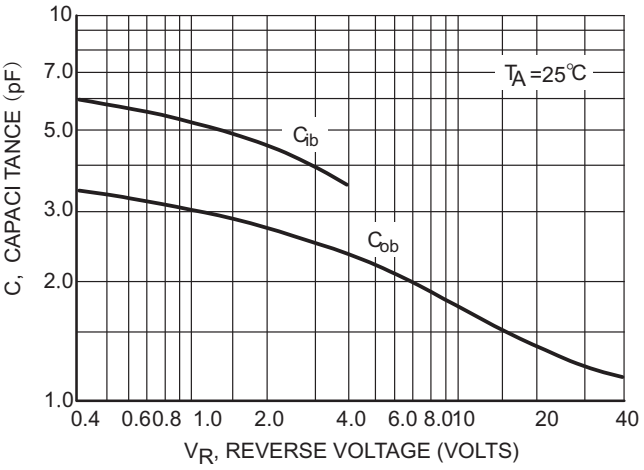


Figure 7. Capacitances

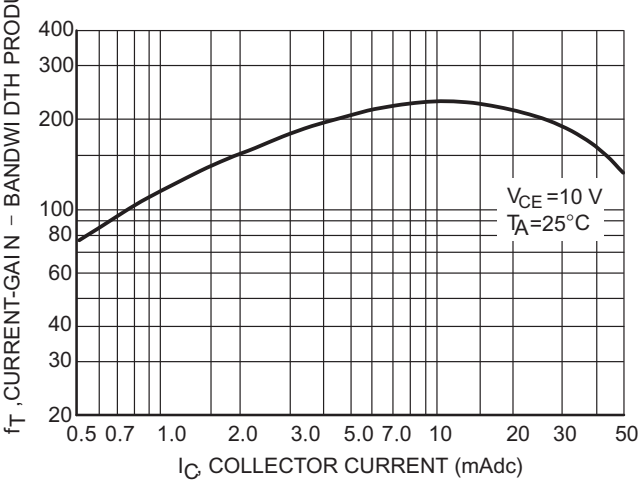


Figure 8. Current−Gain − Bandwidth Product

Rating and characteristic curves

BC846B

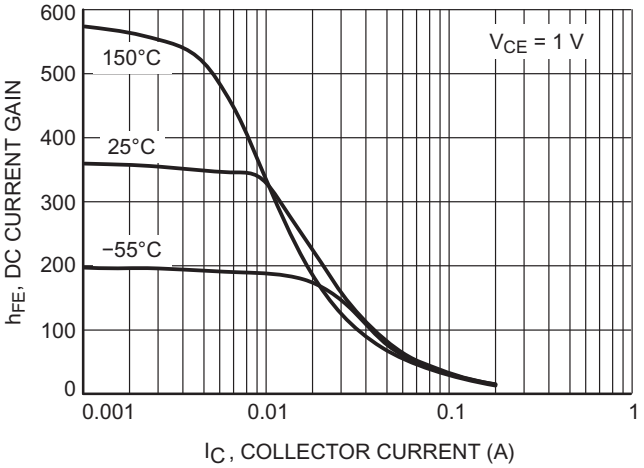


Figure 9. DC Current Gain vs. Collector Current

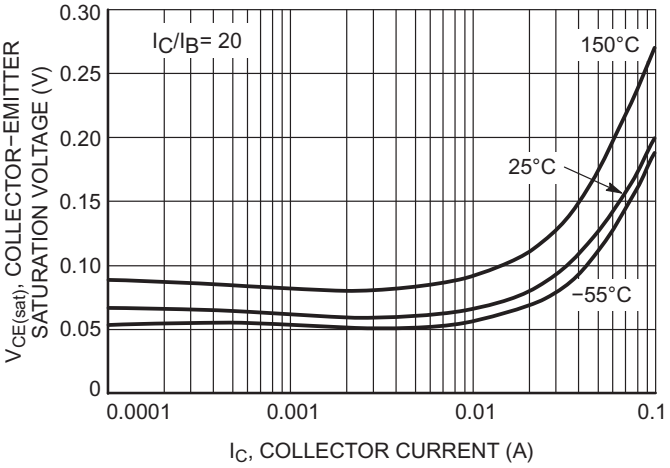


Figure 10. Collector Emitter Saturation Voltage vs. Collector Current

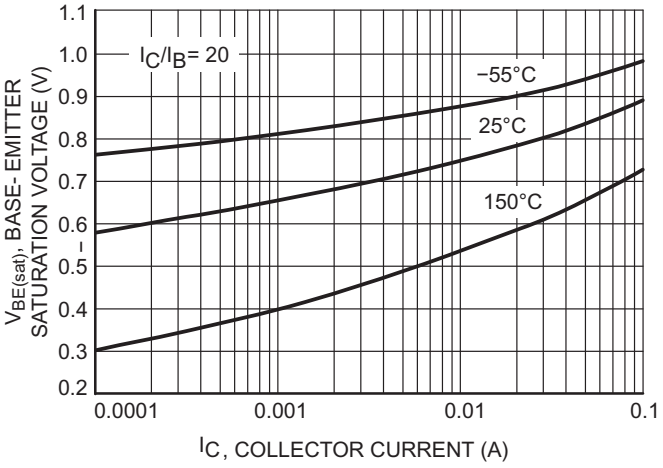


Figure 11. Base Emitter Saturation Voltage vs. Collector Current

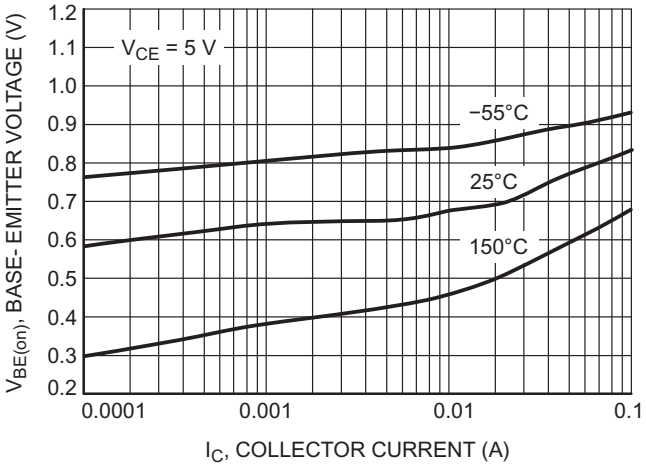


Figure 12. Base Emitter Voltage vs. Collector Current

Rating and characteristic curves

BC846B

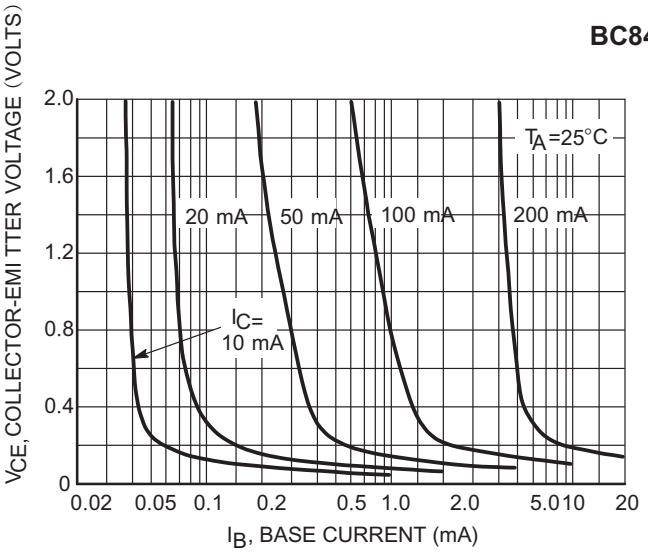


Figure 13. Collector Saturation Region

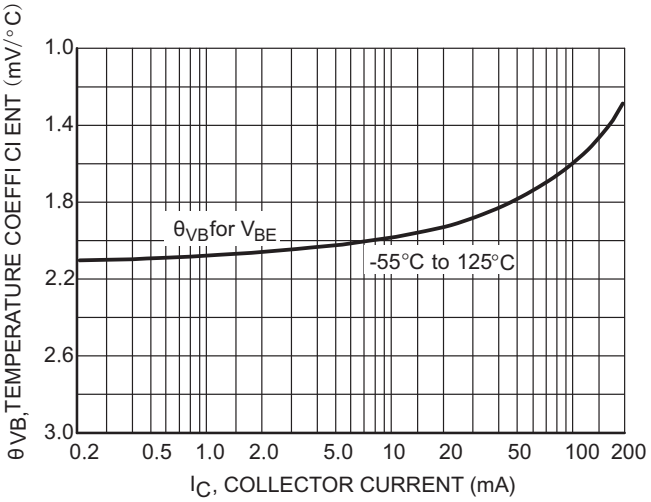


Figure 14. Base–Emitter Temperature Coefficient

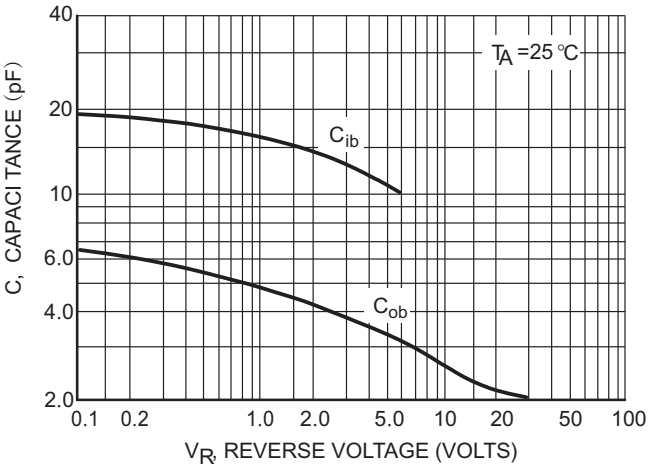


Figure 15. Capacitance

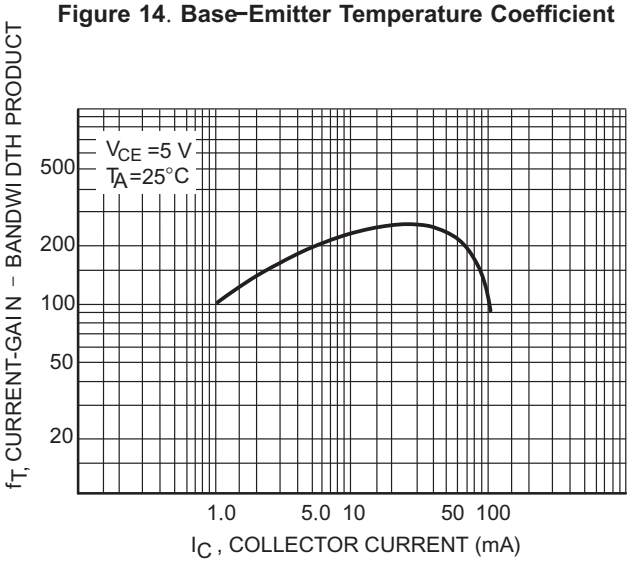


Figure 16. Current–Gain – Bandwidth Product

Rating and characteristic curves

BC847B, BC848B, BC849B, BC850B

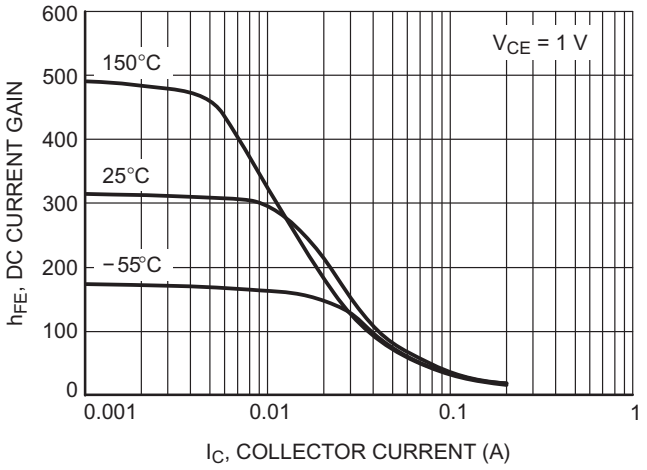


Figure 17. DC Current Gain vs. Collector Current

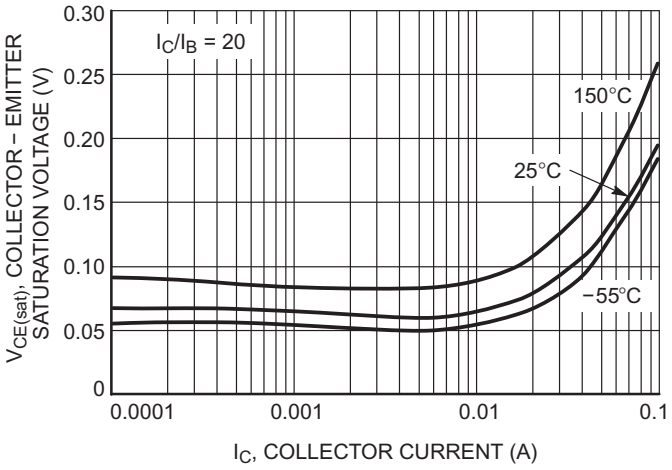


Figure 18. Collector Emitter Saturation Voltage vs. Collector Current

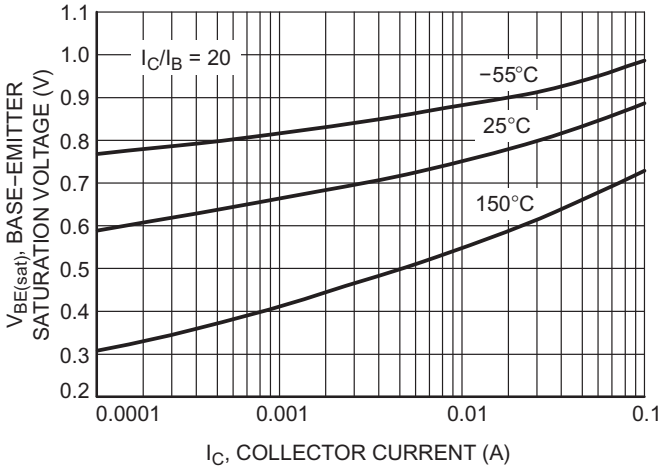


Figure 19. Base Emitter Saturation Voltage vs. Collector Current

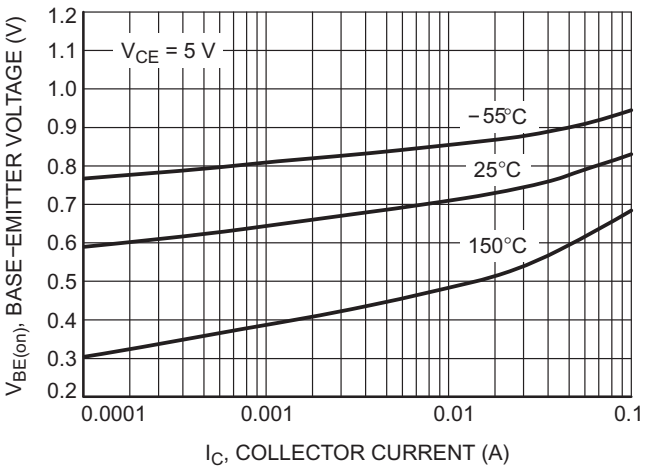


Figure 20. Base Emitter Voltage vs. Collector Current

Rating and characteristic curves

BC847B, BC848B, BC849B, BC850B

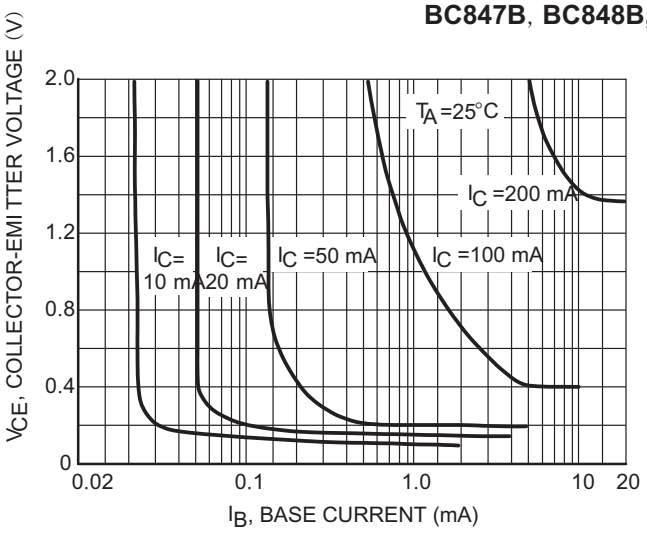


Figure 21. Collector Saturation Region

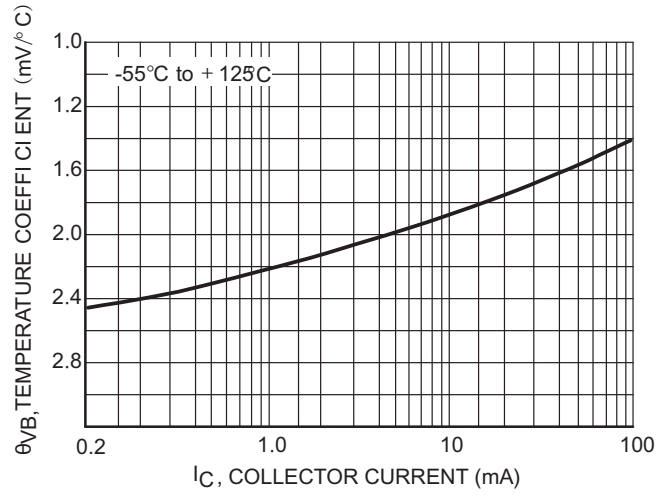


Figure 22. Base–Emitter Temperature Coefficient

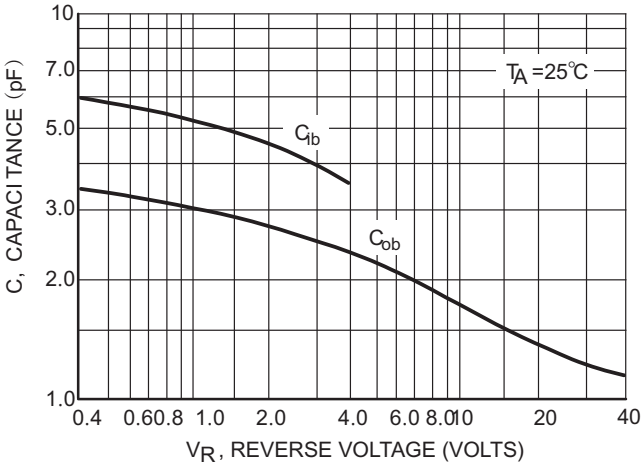


Figure 23. Capacitances

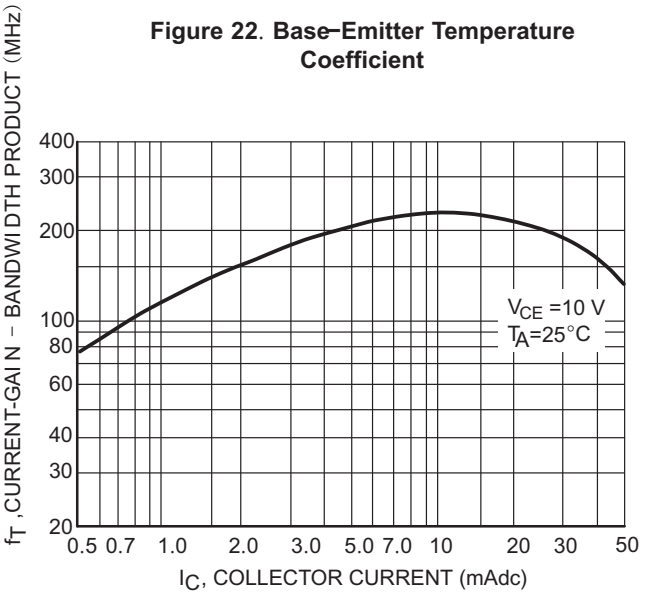


Figure 24. Current–Gain – Bandwidth Product

Rating and characteristic curves

BC847C, BC848C, BC849C, BC850C

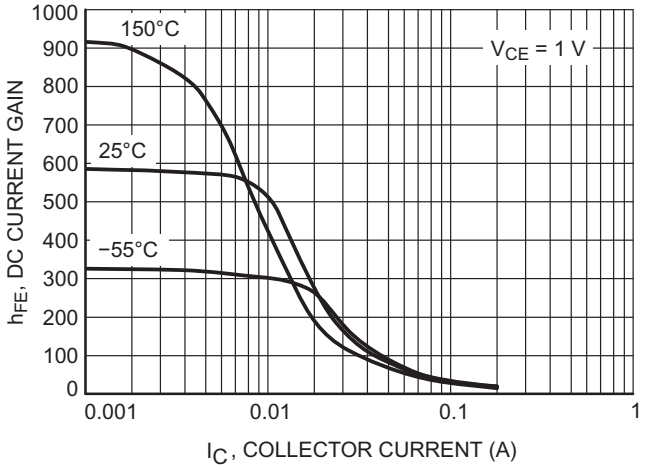


Figure 25. DC Current Gain vs. Collector Current

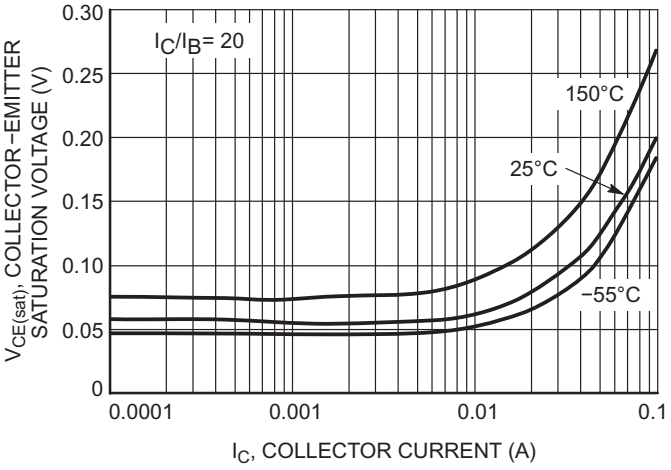


Figure 26. Collector Emitter Saturation Voltage vs. Collector Current

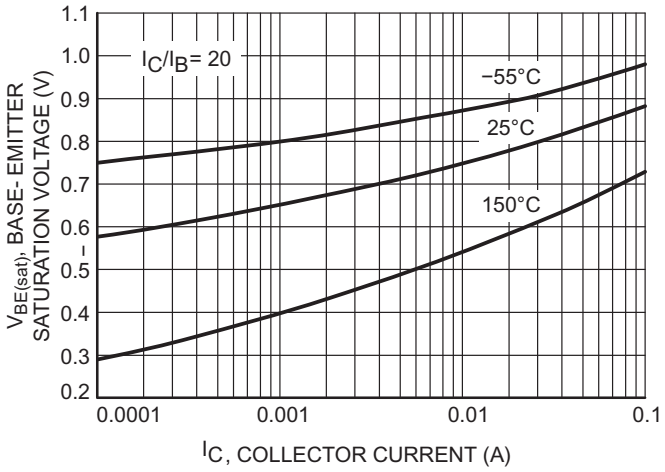


Figure 27. Base Emitter Saturation Voltage vs. Collector Current

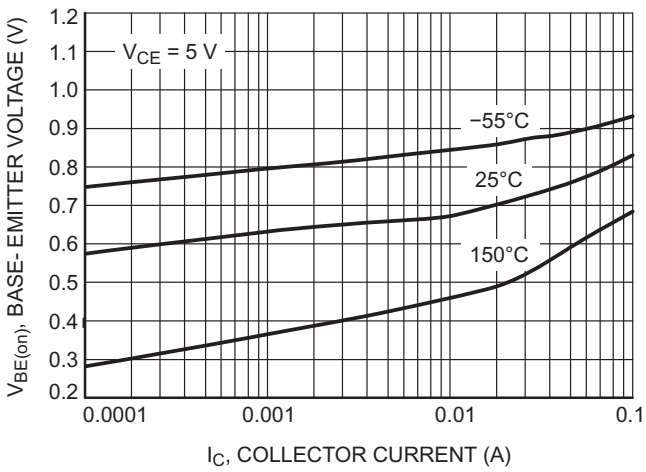


Figure 28. Base Emitter Voltage vs. Collector Current

Rating and characteristic curves

BC847C, BC848C, BC849C, BC850C

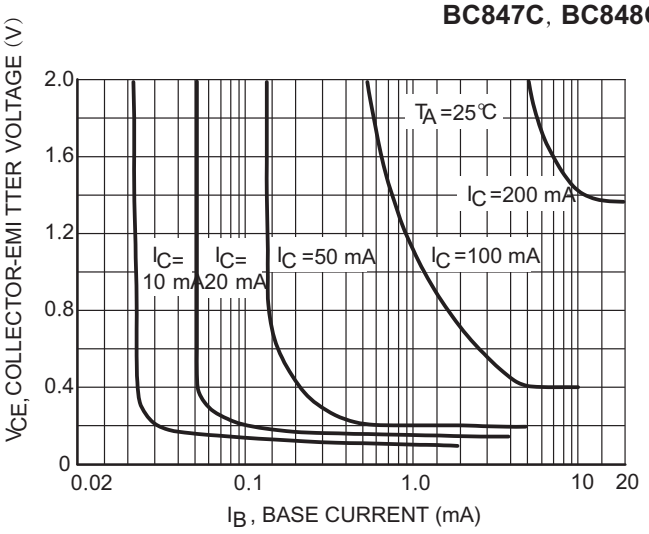


Figure 29. Collector Saturation Region

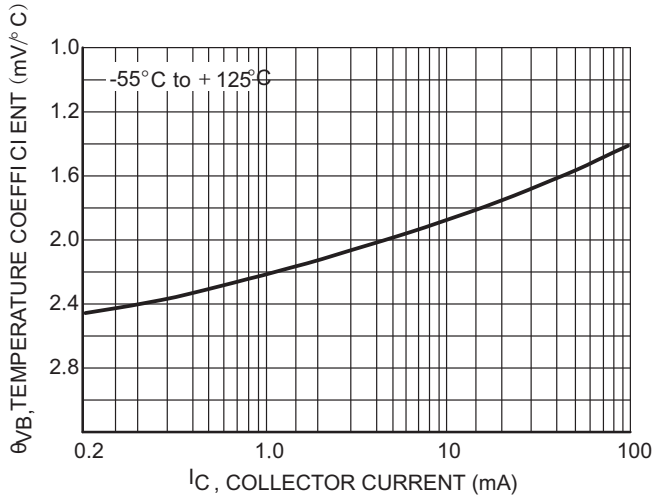


Figure 30. Base–Emitter Temperature Coefficient

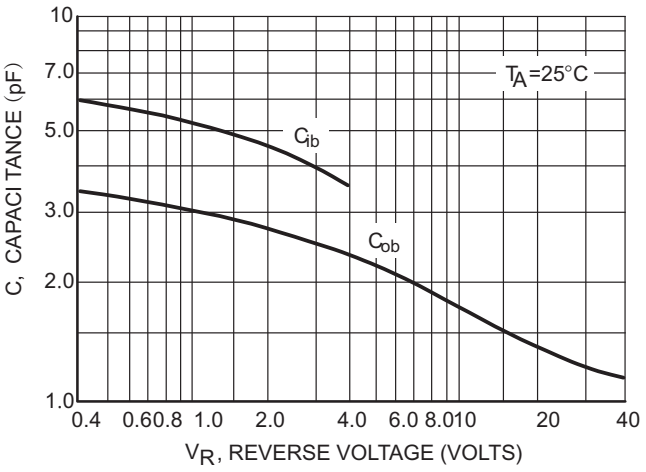


Figure 31. Capacitances

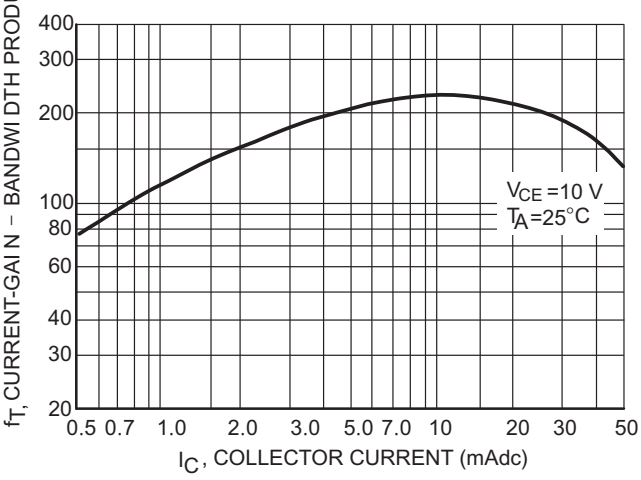


Figure 32. Current–Gain – Bandwidth Product

Rating and characteristic curves

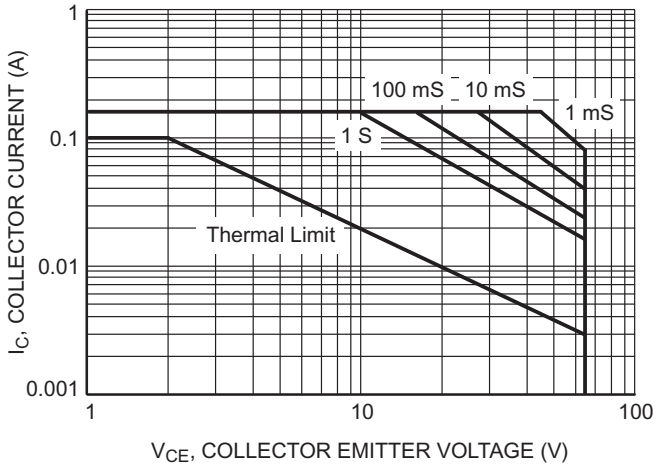


Figure 33. Safe Operating Area for BC846A, BC846B

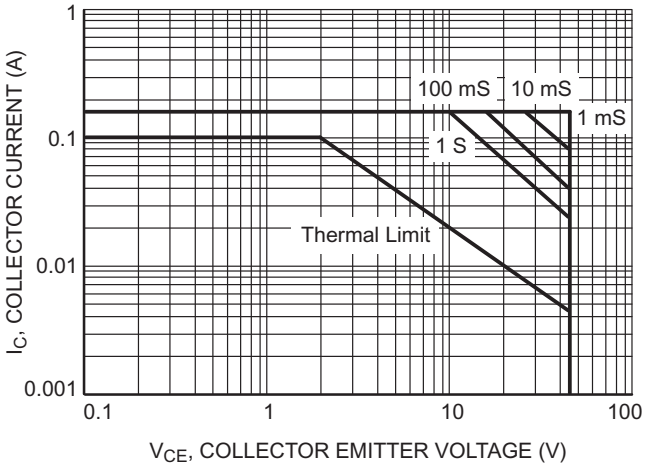


Figure 34. Safe Operating Area for BC847A, BC847B, BC847C, BC850B, BC850C

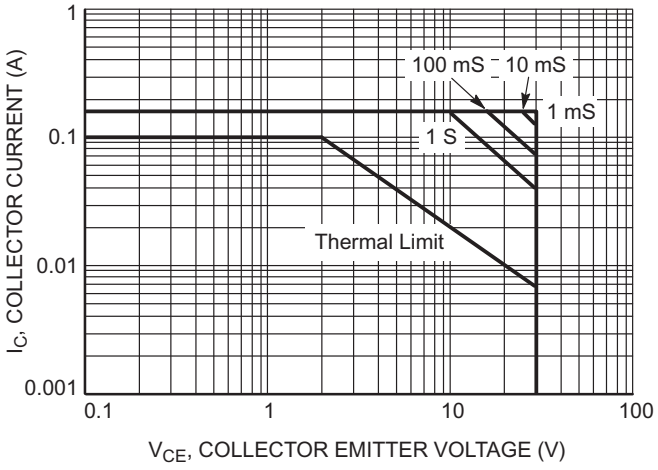
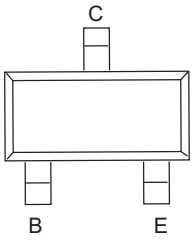
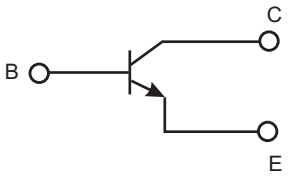


Figure 35. Safe Operating Area for BC848A, BC848B, BC848C, BC849B, BC849C

BC846A/B-BC847A/B/C
BC848A/B/C-BC849B/C-BC850B/C

Pinning information

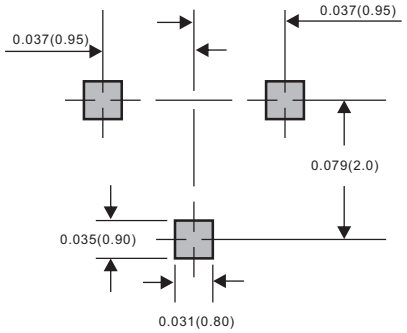
Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

Marking

Type number	Marking code
BC846A	1A
BC846B	1B
BC847A	1E
BC847B	1F
BC847C	1G
BC848A	1J
BC848B	1K
BC848C	1L
BC849B	2B
BC849C	2C
BC850B	2E
BC850C	2G

Suggested solder pad layout

SOT-23



Dimensions in inches and (millimeters)