



DATA SHEET

SEMICONDUCTOR

BC85x Series

General Purpose Transistors PNP Silicon



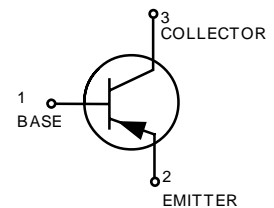
- Moisture Sensitivity Level: 1
- ESD Rating – Human Body Model: >4000 V
– Machine Model: >400 V
- We declare that the material of product compliance with RoHS requirements.

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

Rating	Symbol	Value	Unit
Collector-Emitter Voltage BC856 BC857 BC858, BC859	V_{CEO}	-65 -45 -30	V
Collector-Base Voltage BC856 BC857 BC858, BC859	V_{CBO}	-80 -50 -30	V
Emitter-Base Voltage	V_{EBO}	-5.0	V
Collector Current – Continuous	I_C	-100	mAdc



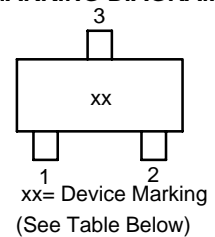
SOT-23



THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board, (Note 1.) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	225 1.8	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate, (Note 2.) $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	300 2.4	mW 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	$^\circ\text{C}$

MARKING DIAGRAM



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 MARKING AND ORDERING INFORMATION

Device	Marking	Package	Shipping
BC856A	3A	SOT-23	3000/Tape&Reel
BC856A	3A	SOT-23	10000/Tape&Reel
BC856B	3B	SOT-23	3000/Tape&Reel
BC856B	3B	SOT-23	10000/Tape&Reel
BC857A	3E	SOT-23	3000/Tape&Reel
BC857A	3E	SOT-23	10000/Tape&Reel
BC857B	3F	SOT-23	3000/Tape&Reel
BC857B	3F	SOT-23	10000/Tape&Reel
BC857C	3G	SOT-23	3000/Tape&Reel
BC857C	3G	SOT-23	10000/Tape&Reel
BC858A	3J	SOT-23	3000/Tape&Reel
BC858A	3J	SOT-23	10000/Tape&Reel
BC858B	3K	SOT-23	3000/Tape&Reel
BC858B	3K	SOT-23	10000/Tape&Reel
BC858C	3L	SOT-23	3000/Tape&Reel
BC858C	3L	SOT-23	10000/Tape&Reel
BC859B	4B	SOT-23	3000/Tape&Reel
BC859B	4B	SOT-23	10000/Tape&Reel
BC859C	4C	SOT-23	3000/Tape&Reel
BC859C	4C	SOT-23	10000/Tape&Reel

BC85x Series

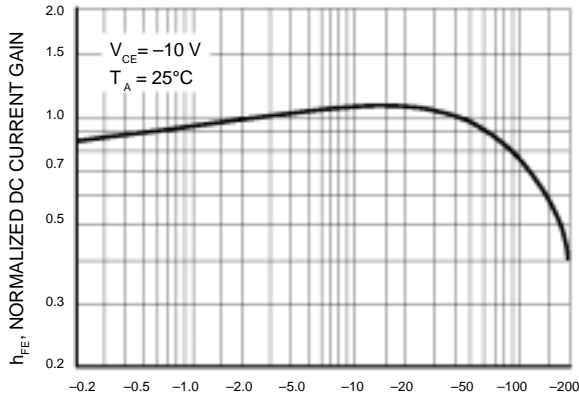
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit	
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage ($I_C = -10\text{ mA}$)	BC856 Series BC857 Series BC858, BC859 Series	$V_{(BR)CEO}$	-65 -45 -30	- - -	- - -	V
Collector–Emitter Breakdown Voltage ($I_C = -10\text{ }\mu\text{A}$, $V_{EB} = 0$)	BC856 Series BC857 Series BC858, BC859 Series	$V_{(BR)CES}$	-80 -50 -30	- - -	- - -	V
Collector–Base Breakdown Voltage ($I_C = -10\text{ }\mu\text{A}$)	BC856 Series BC857 Series BC858, BC859 Series	$V_{(BR)CBO}$	-80 -50 -30	- - -	- - -	V
Emitter–Base Breakdown Voltage ($I_E = -1.0\text{ }\mu\text{A}$)	BC856 Series BC857 Series BC858, BC859 Series	$V_{(BR)EBO}$	-5.0 -5.0 -5.0	- - -	- - -	V
Collector Cutoff Current ($V_{CB} = -30\text{ V}$) ($V_{CB} = -30\text{ V}$, $T_A = 150^\circ\text{C}$)		I_{CBO}	- -	- -	-15 -4.0	nA μA
ON CHARACTERISTICS						
DC Current Gain ($I_C = -2.0\text{ mA}$, $V_{CE} = -5.0\text{ V}$)	BC856A, BC857A, BC858A BC856B, BC857B, BC858B, BC859B BC857C, BC858C, BC859C	h_{FE}	125 220 420	180 290 520	250 475 800	-
Collector–Emitter Saturation Voltage ($I_C = -10\text{ mA}$, $I_B = -0.5\text{ mA}$) ($I_C = -100\text{ mA}$, $I_B = -5.0\text{ mA}$)		$V_{CE(sat)}$	- -	- -	-0.3 -0.65	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 On Voltage ($I_C = -2.0\text{ mA}$, $V_{CE} = -5.0\text{ V}$) ($I_C = -10\text{ mA}$, $V_{CE} = -5.0\text{ V}$)		$V_{BE(on)}$	-0.6 -	- -	-0.75 -0.82	V
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_{ob}	-	-	4.5	pF
Noise Figure ($I_C = -0.2\text{ mA}$, $V_{CE} = -5.0\text{ Vdc}$, $R_S = 2.0\text{ k}\Omega$, $f = 1.0\text{ kHz}$, $BW = 200\text{ Hz}$)	BC856, BC857, BC858 Series BC859 Series	NF	- -	- -	10 4.0	dB

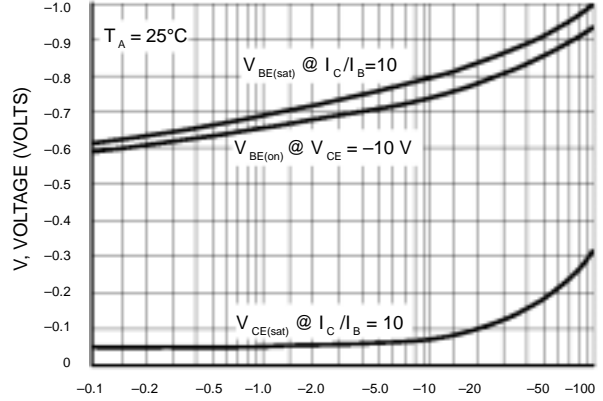
DEVICE CHARACTERISTICS

BC85xSeries

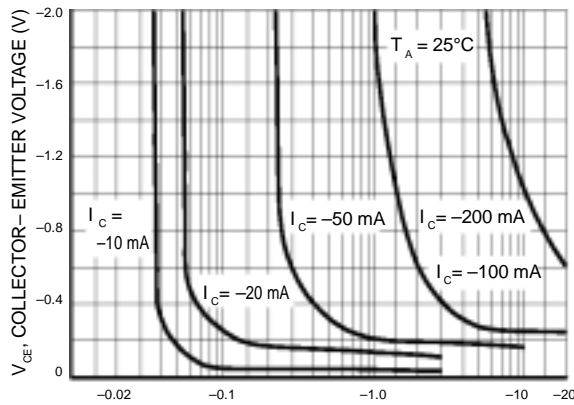
BC857/ BC858



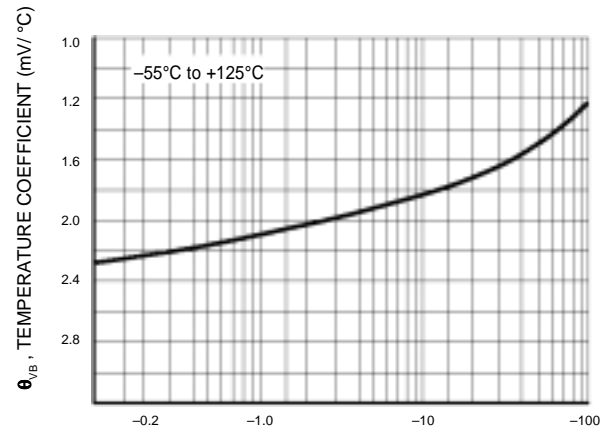
I_C , COLLECTOR CURRENT (mAdc)
Figure 1. Normalized DC Current Gain



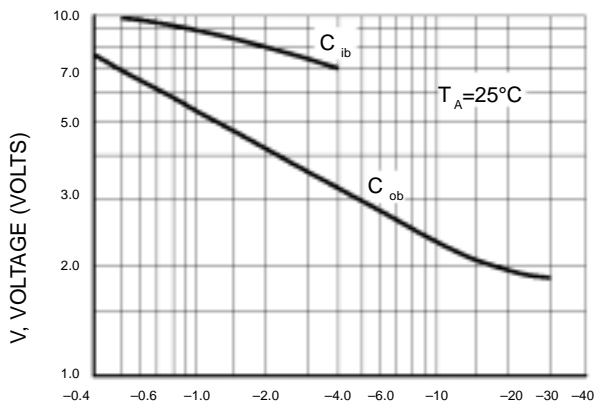
I_C , COLLECTOR CURRENT (mAdc)
Figure 2. "Saturation" and "On" Voltages



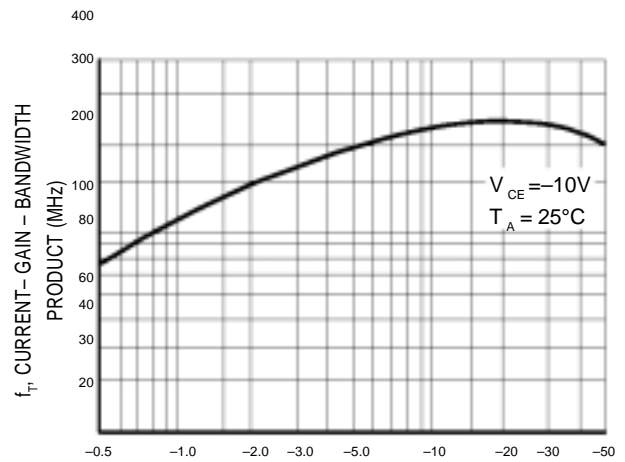
I_B , BASE CURRENT (mA)
Figure 3. Collector Saturation Region



I_C , COLLECTOR CURRENT (mA)
Figure 4. Base-Emitter Temperature Coefficient



V_R , REVERSE VOLTAGE (VOLTS)
Figure 5. Capacitances

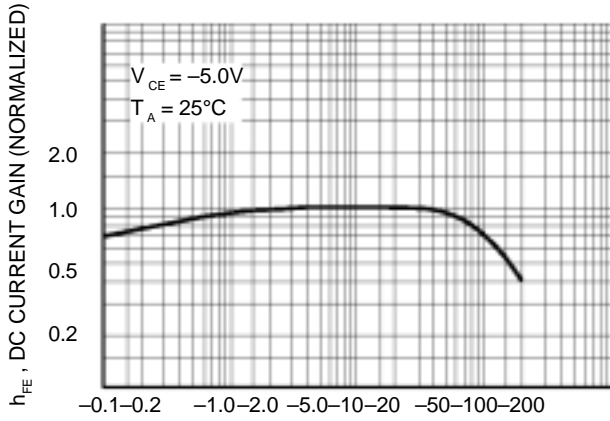


I_C , COLLECTOR CURRENT (mAdc)
Figure 6. Current-Gain - Bandwidth Product

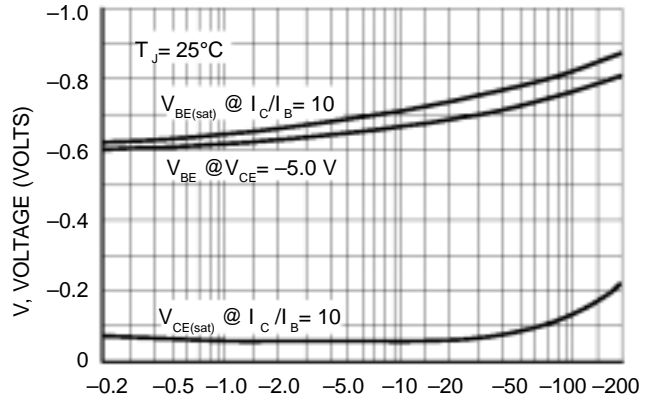
DEVICE CHARACTERISTICS

BC85x Series

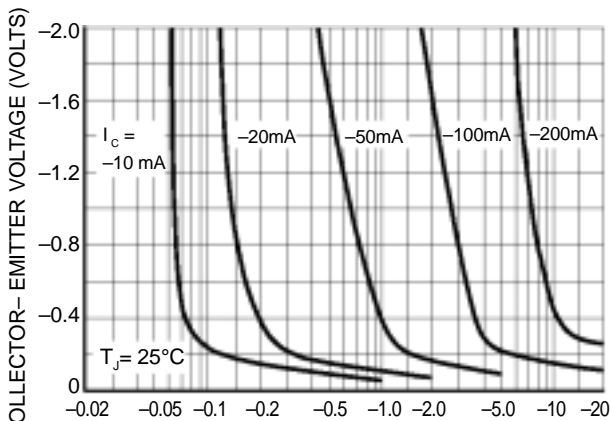
BC856



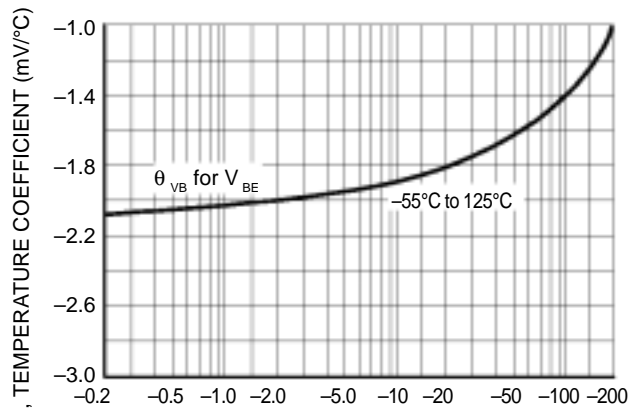
I_C , COLLECTOR CURRENT (mA)
Figure 7. DC Current Gain



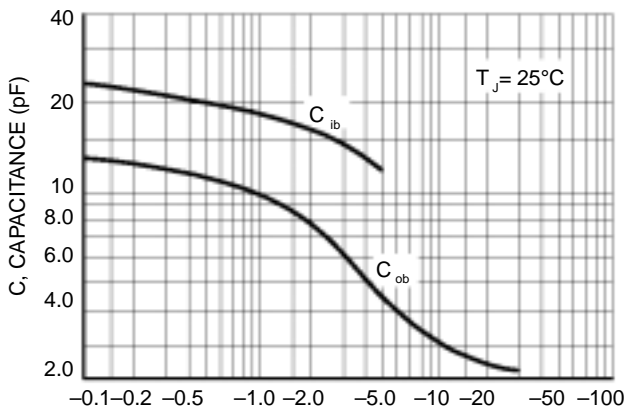
I_C , COLLECTOR CURRENT (mA)
Figure 8. "On" Voltage



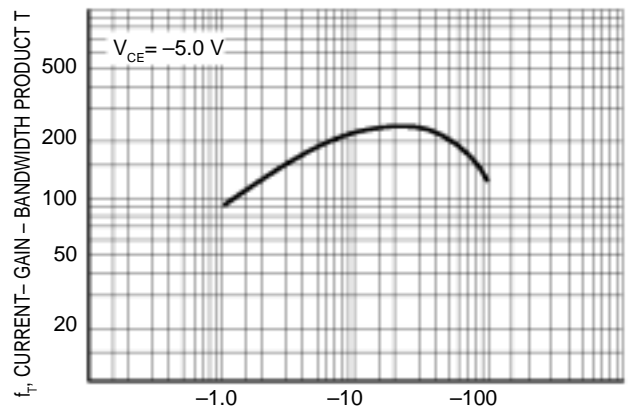
I_B , BASE CURRENT (mA)
Figure 9. Collector Saturation Region



I_C , COLLECTOR CURRENT (mA)
Figure 10. Base-Emitter Temperature Coefficient



V_R , REVERSE VOLTAGE (VOLTS)
Figure 11. Capacitance



I_C , COLLECTOR CURRENT (mA)
Figure 12. Current-Gain - Bandwidth Product

DEVICE CHARACTERISTICS

BC85x Series

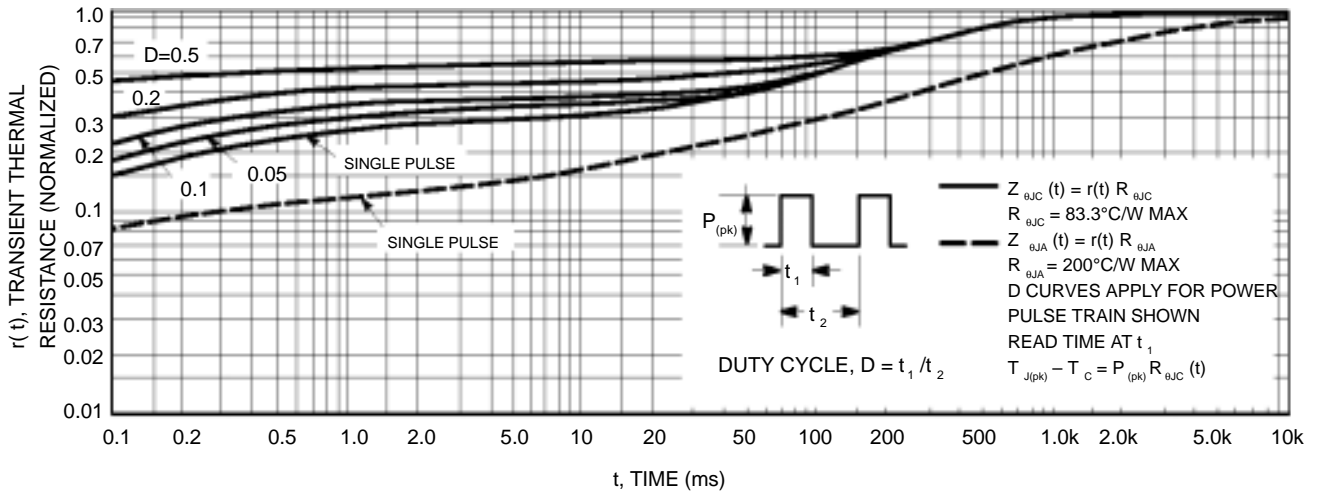


Figure 13. Thermal Response

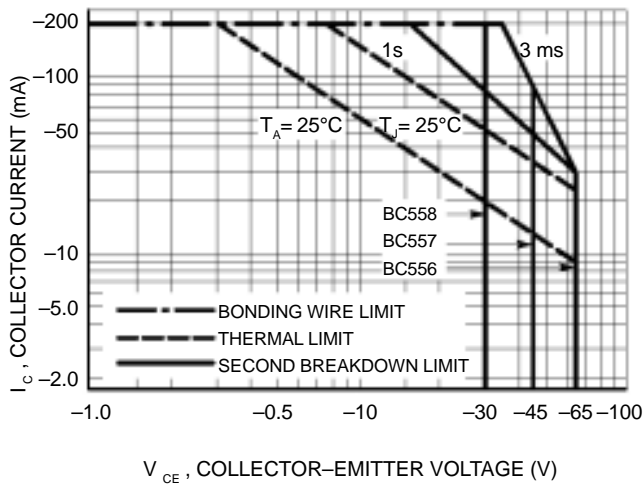


Figure 14. Active Region Safe Operating Area

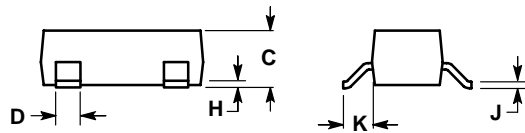
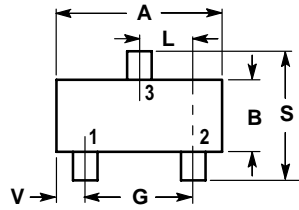
The safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation. Collector load lines for specific circuits must fall below the limits indicated by the applicable curve.

The data of Figure 14 is based upon $T_{J(pk)} = 150^\circ\text{C}$; T_C or T_A is variable depending upon conditions. Pulse curves are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$. $T_{J(pk)}$ may be calculated from the data in Figure 13. At high case or ambient temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by the secondary breakdown.

PACKAGE OUTLINE & DIMENSIONS

BC85x 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

