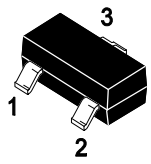
General Purpose Transistors

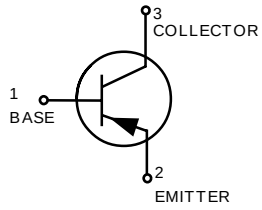
PNP Silicon

BC857 Series
S-BC857 Series

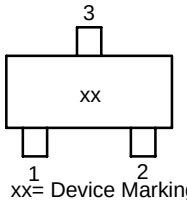
- Moisture Sensitivity Level: 1
- ESD Rating – Human Body Model: >4000 V
  – Machine Model: >400 V
- We declare that the material of product compliance with RoHS requirements.
- S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.



SOT–23



MARKING DIAGRAM



xx= Device Marking
(See Table Below)

MAXIMUM RATINGS (T_A = 25°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

THERMAL CHARACTERISTICS

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

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.

BC857 Series , S-BC857 Series

DEVICE MARKING AND ORDERING INFORMATION

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

BC857 Series , S-BC857 Series

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage (I_C = –10 mA)	BC856 Series BC857 Series BC858, BC859 Series	$V_{(BR)CEO}$	–65 –45 –30	– – –	– – –	V
Collector–Emitter Breakdown Voltage (I_C = –10 μA, V_{EB} = 0)	BC856 Series BC857 Series BC858, BC859 Series	$V_{(BR)CES}$	–80 –50 –30	– – –	– – –	V
Collector–Base Breakdown Voltage (I_C = –10 μA)	BC856 Series BC857 Series BC858, BC859 Series	$V_{(BR)CBO}$	–80 –50 –30	– – –	– – –	V
Emitter–Base Breakdown Voltage (I_E = –1.0 μA)	BC856 Series BC857 Series BC858, BC859 Series	$V_{(BR)EBO}$	–5.0 –5.0 –5.0	– – –	– – –	V
Collector Cutoff Current (V_{CB} = –30 V) (V_{CB} = –30 V, T_A = 150°C)		I_{CBO}	– –	– –	–15 –4.0	nA μA
ON CHARACTERISTICS						
DC Current Gain (I_C = –2.0 mA, V_{CE} = –5.0 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 mA, I_B = –0.5 mA) (I_C = –100 mA, I_B = –5.0 mA)		$V_{CE(sat)}$	 – –	 – –	 –0.3 –0.65	V
Base–Emitter Saturation Voltage (I_C = –10 mA, I_B = –0.5 mA) (I_C = –100 mA, I_B = –5.0 mA)		$V_{BE(sat)}$	 – –	 –0.7 –0.9	 – –	V
Base–Emitter On Voltage (I_C = –2.0 mA, V_{CE} = –5.0 V) (I_C = –10 mA, V_{CE} = –5.0 V)		$V_{BE(on)}$	 –0.6 –	 – –	 –0.75 –0.82	V
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_{ob}	–	–	4.5	pF
Noise Figure (I_C = –0.2 mA, V_{CE} = –5.0 Vdc, R_S = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz) BC856, BC857, BC858 Series BC859 Series		NF	 – –	 – –	 10 4.0	dB

BC857/ BC858

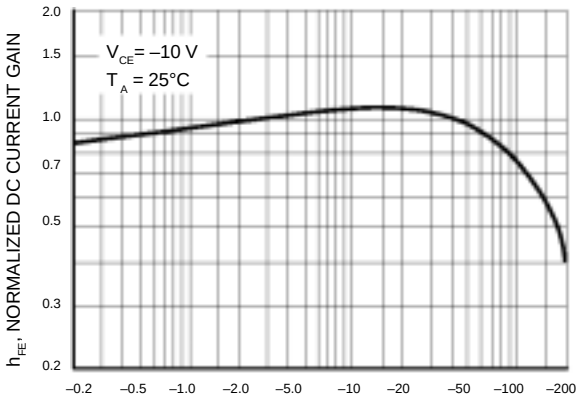


Figure 1. Normalized DC Current Gain

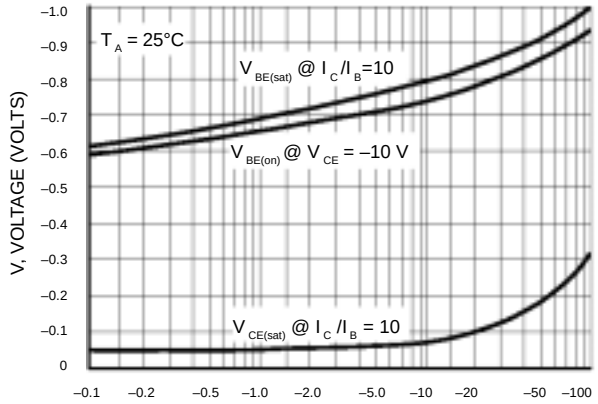


Figure 2. “Saturation” and “On” Voltages

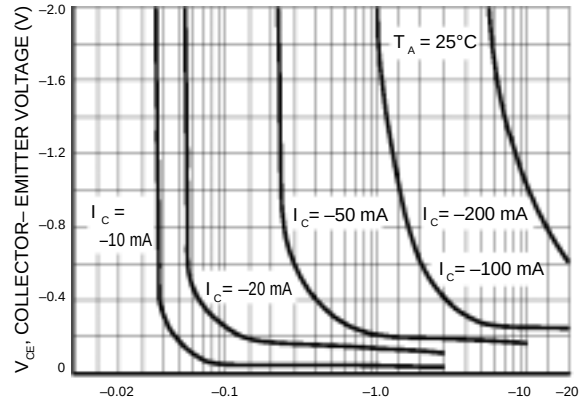


Figure 3. Collector Saturation Region

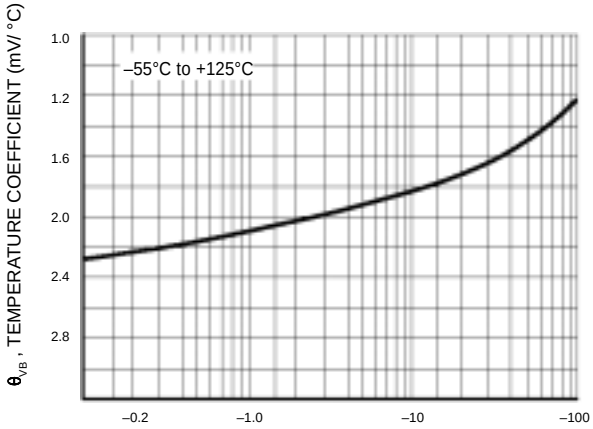
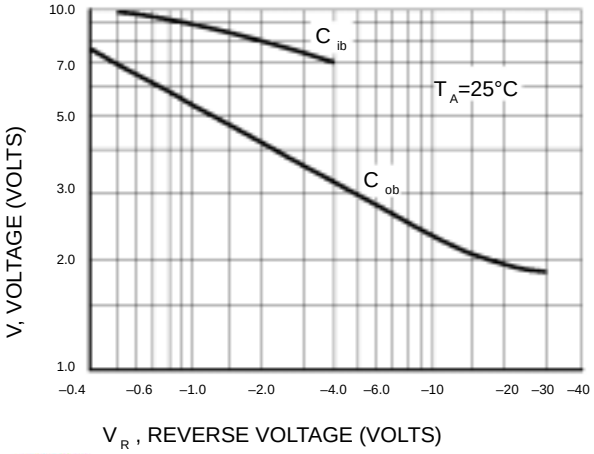
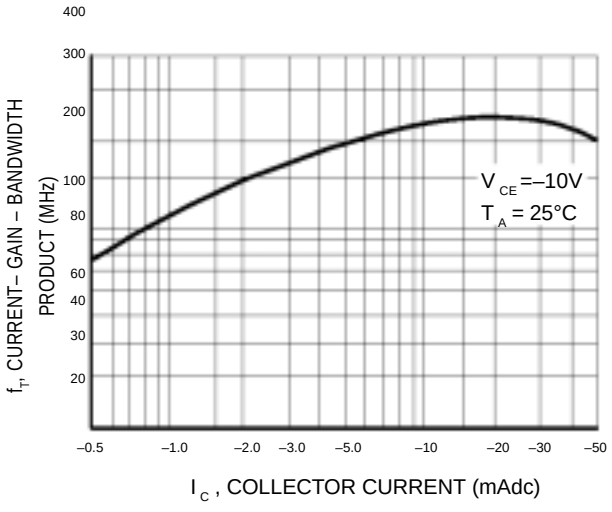


Figure 4. Base–Emitter Temperature Coefficient





BC856

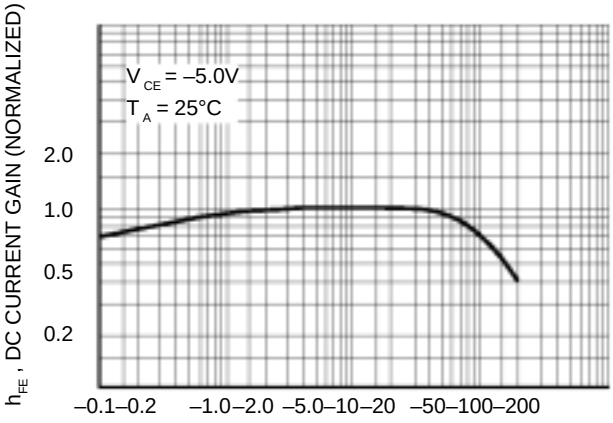


Figure 7. DC Current Gain

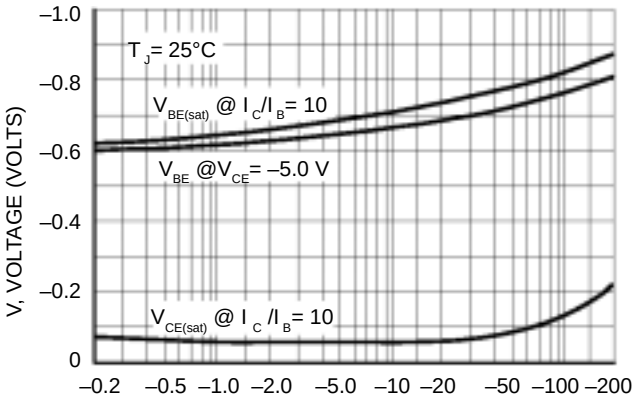


Figure 8. “On” Voltage

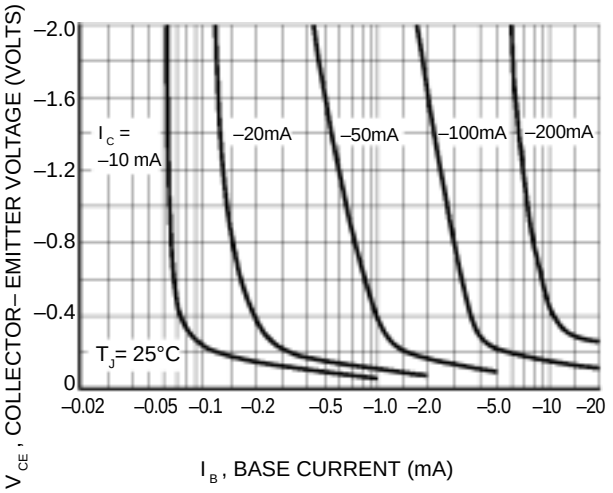


Figure 9. Collector Saturation Region

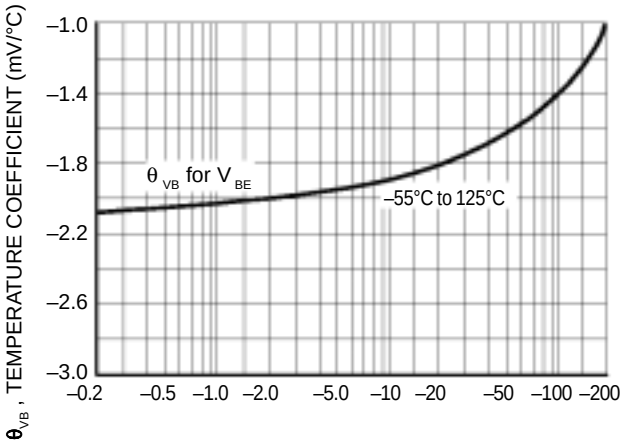


Figure 10. Base–Emitter Temperature Coefficient

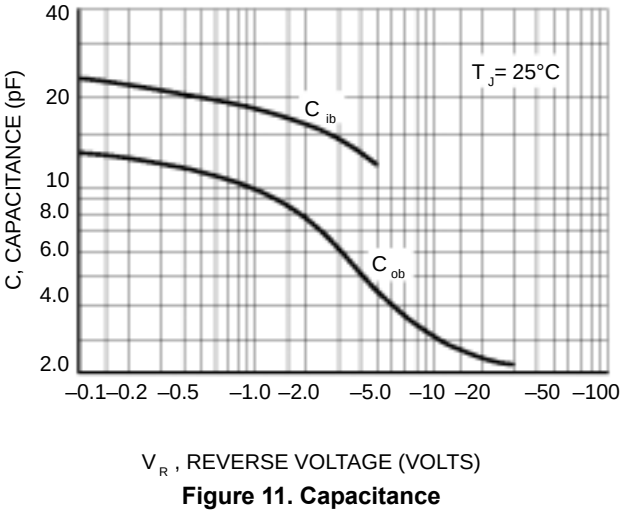


Figure 11. Capacitance

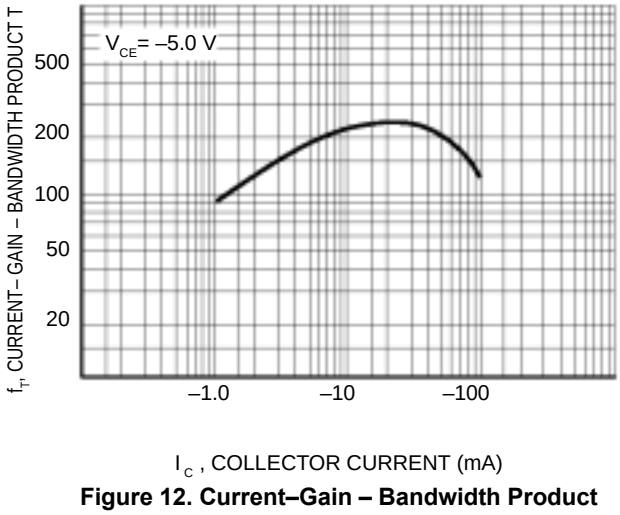


Figure 12. Current–Gain – Bandwidth Product

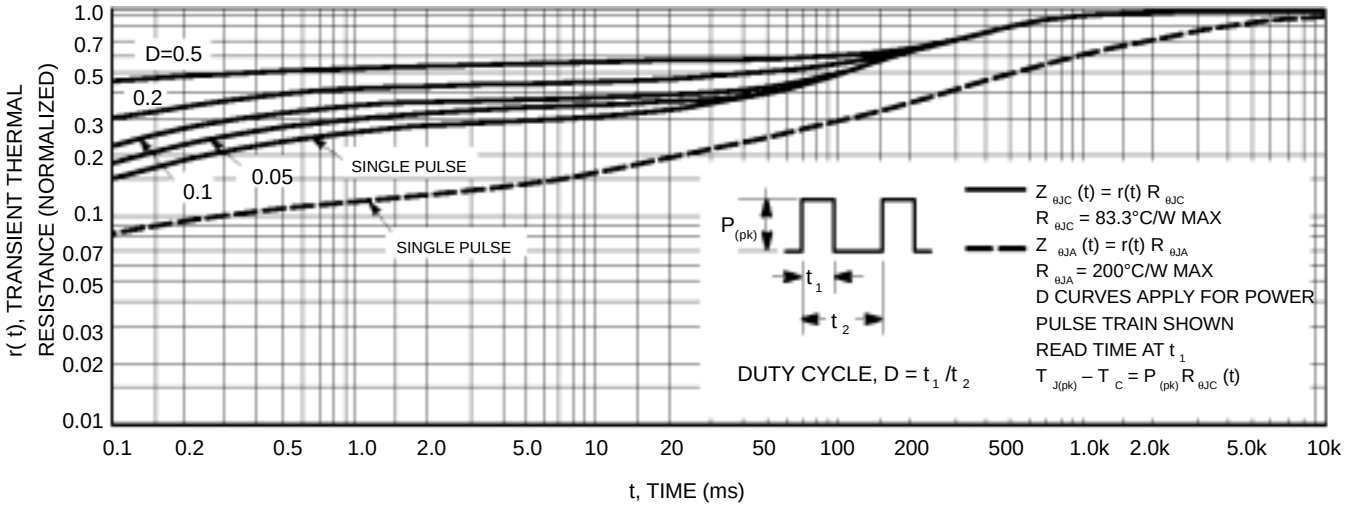


Figure 13. Thermal Response

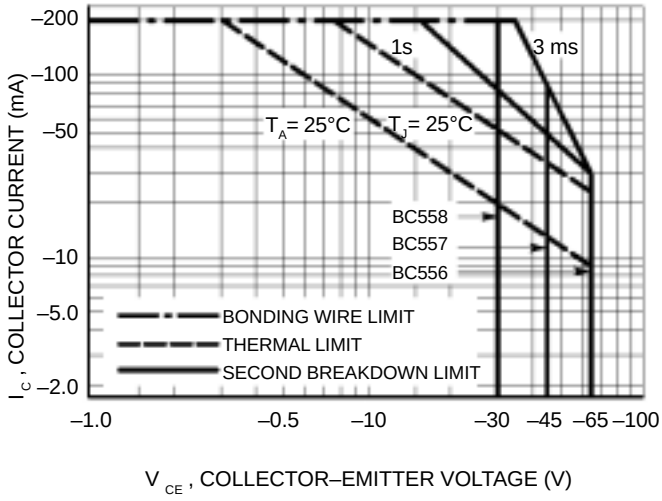


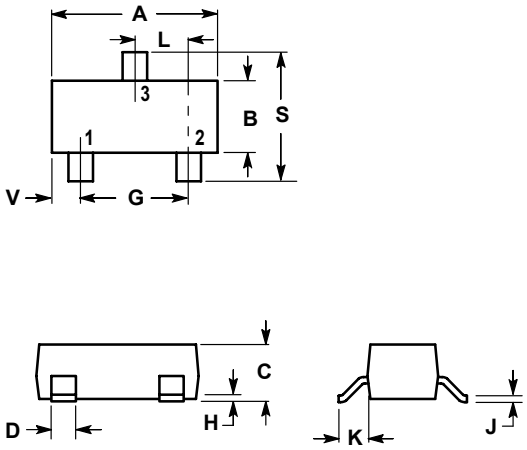
Figure 14. Active Region Safe Operating Area

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°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°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.

BC857 Series , S-BC857 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