

BC856ALT1 Series

Preferred Devices

General Purpose Transistors

PNP Silicon

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	mA _{dc}

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	$^\circ\text{C}$

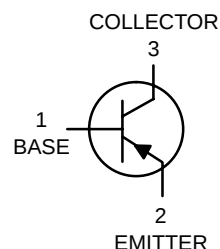
1. FR-5 = $1.0 \times 0.75 \times 0.062$ in

2. Alumina = $0.4 \times 0.3 \times 0.024$ in. 99.5% alumina.

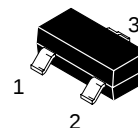


ON Semiconductor™

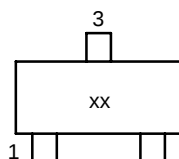
<http://onsemi.com>



MARKING DIAGRAM



SOT-23
CASE 318
STYLE 6



xx = Device Code
(See Table Below)

ORDERING INFORMATION

Device	Package	Mark	Shipping
BC856ALT1	SOT-23	3A	3000/Tape & Reel
BC856BLT1	SOT-23	3B	3000/Tape & Reel
BC857ALT1	SOT-23	3E	3000/Tape & Reel
BC857BLT1	SOT-23	3F	3000/Tape & Reel
BC858ALT1	SOT-23	3J	3000/Tape & Reel
BC858BLT1	SOT-23	3K	3000/Tape & Reel
BC858CLT1	SOT-23	3L	3000/Tape & Reel
BC859BLT1	SOT-23	4B	3000/Tape & Reel
BC859CLT1	SOT-23	4C	3000/Tape & Reel

Preferred devices are recommended choices for future use and best overall value.

BC856ALT1 Series

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

Characteristic	Symbol	Min	Typ	Max	Unit
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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 = –10 μA, V _{CE} = –5.0 V)	BC856A, BC857A, BC858A BC856B, BC857B, BC858B BC858C	h _{FE}	– – –	90 150 270	– – –	–
(I _C = –2.0 mA, V _{CE} = –5.0 V)	BC856A, BC857A, BC858A BC856B, BC857B, BC858B, BC859B BC858C, BC859C		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)	NF	– –	– –	10 4.0	–	dB

BC856ALT1 Series

BC857/BC858/BC859

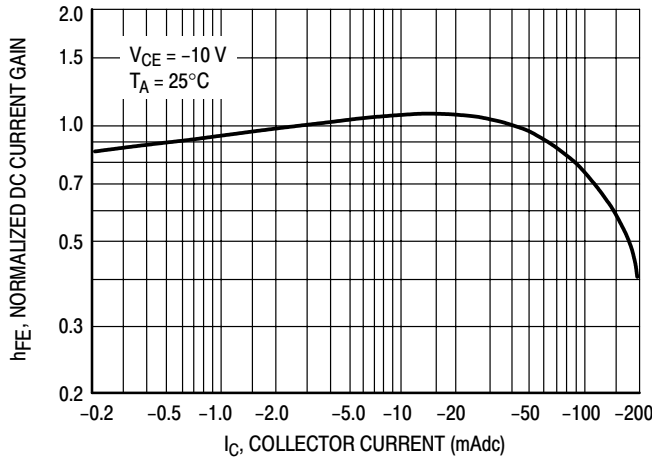


Figure 1. Normalized DC Current Gain

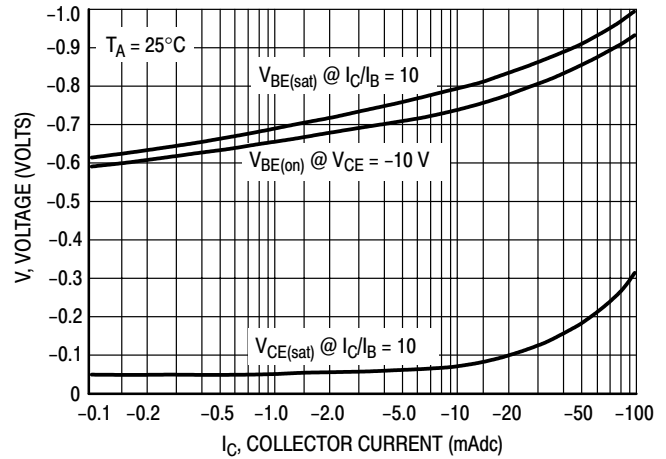


Figure 2. "Saturation" and "On" Voltages

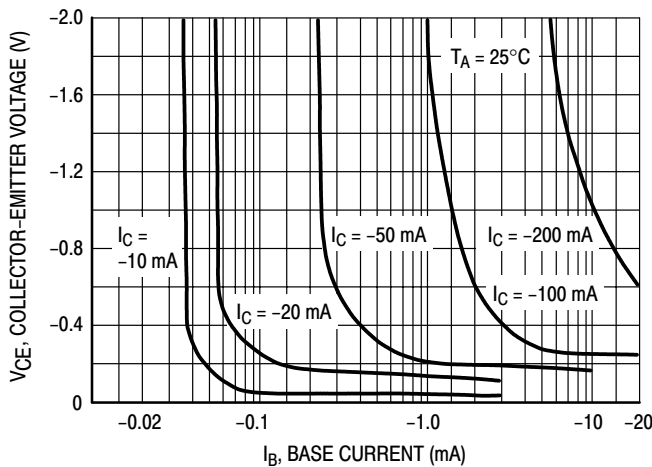


Figure 3. Collector Saturation Region

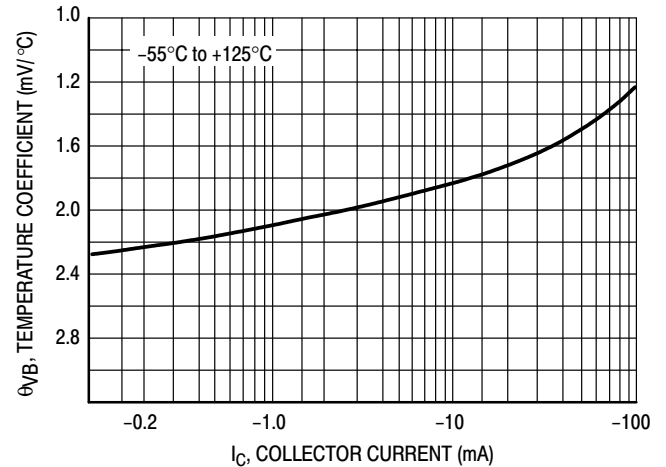


Figure 4. Base-Emitter Temperature Coefficient

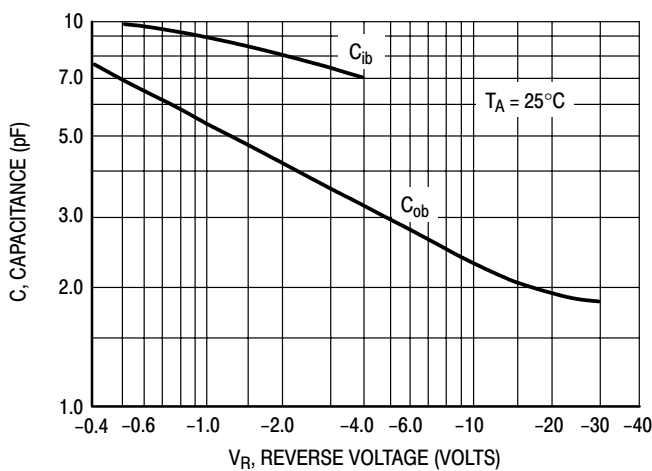


Figure 5. Capacitances

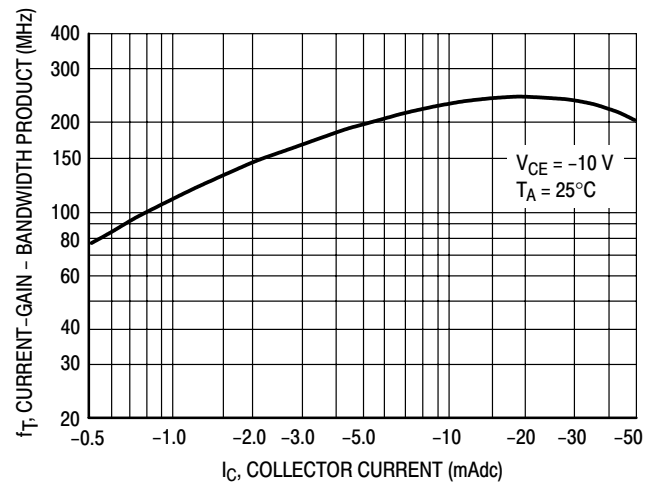


Figure 6. Current-Gain - Bandwidth Product

BC856ALT1 Series

BC856

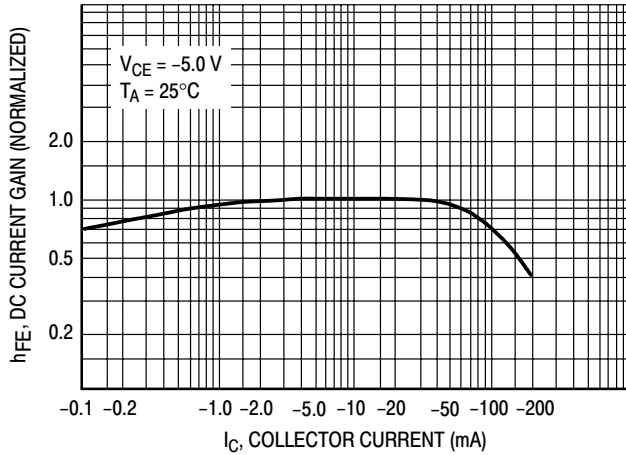


Figure 7. DC Current Gain

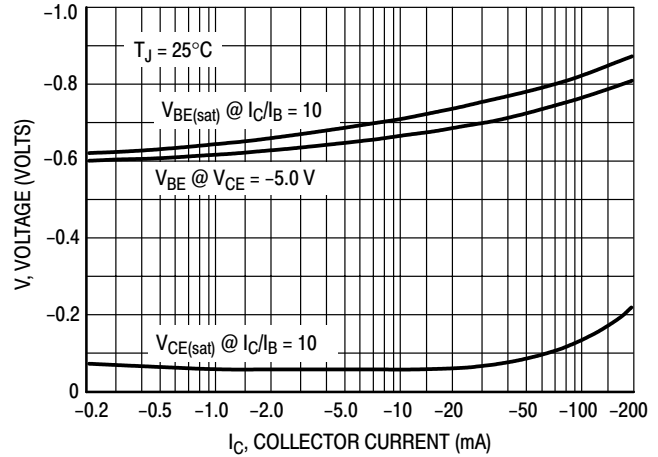


Figure 8. "On" Voltage

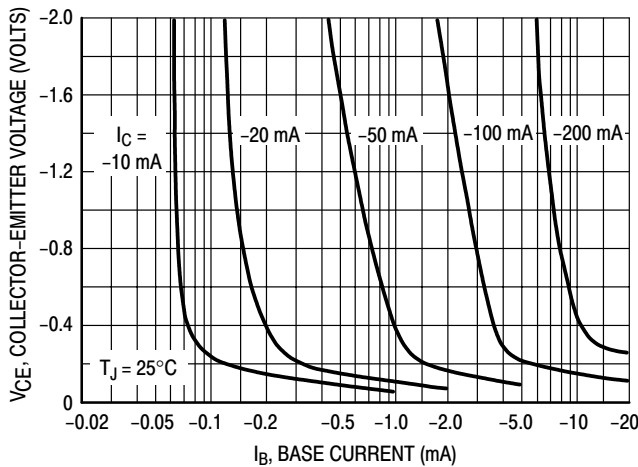


Figure 9. Collector Saturation Region

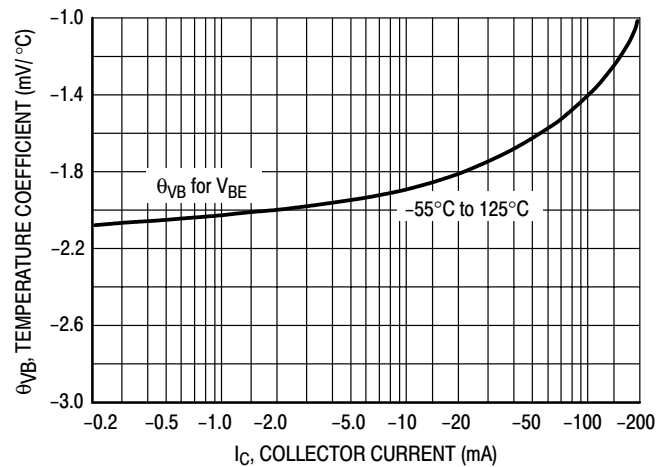


Figure 10. Base-Emitter Temperature Coefficient

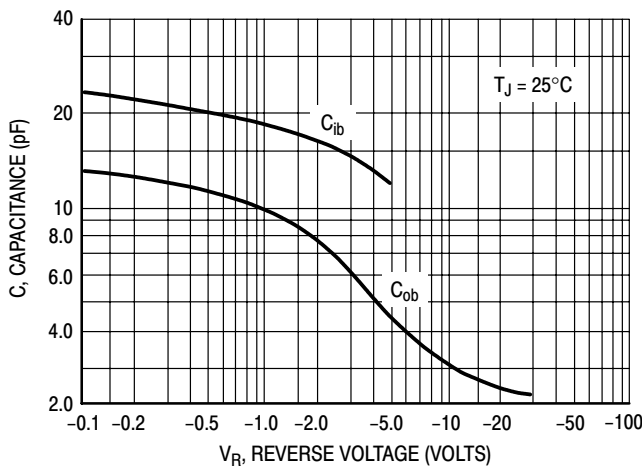


Figure 11. Capacitance

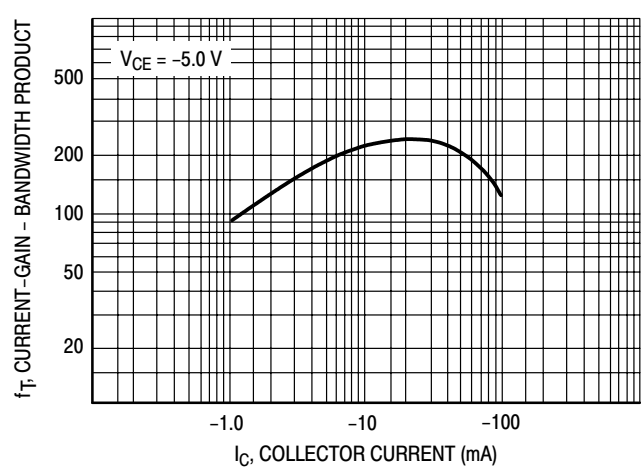


Figure 12. Current-Gain - Bandwidth Product

BC856ALT1 Series

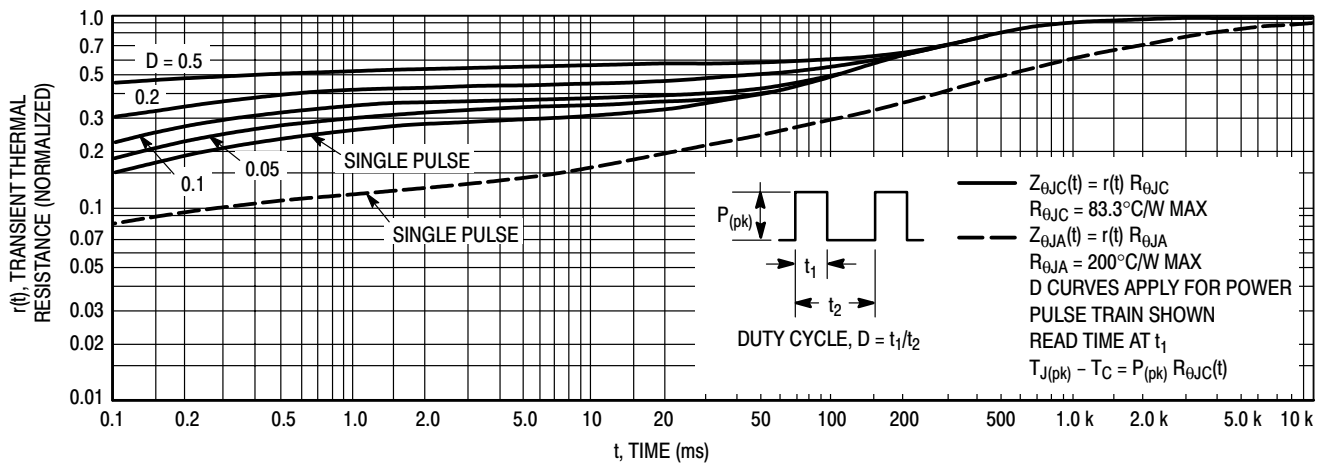


Figure 13. Thermal Response

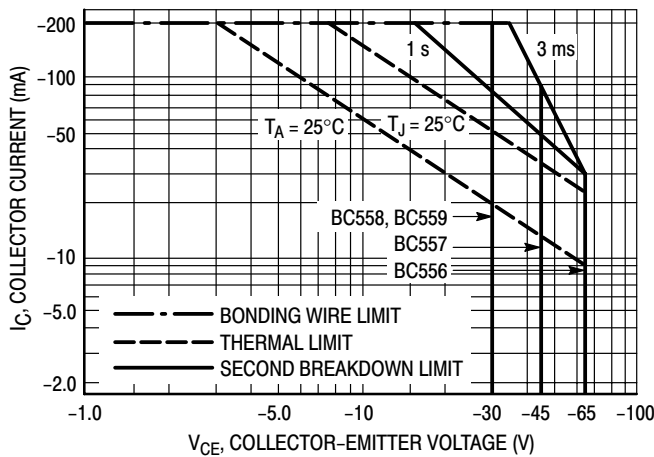


Figure 14. Active Region Safe Operating Area

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.