



DESCRIPTION

The BC856_BC857_BC858_BC859 are PNP general purpose transistors, available in SOT-23 package.

- Low Current: 100mA (max)
- Low Voltage: 65V (max)
- Complementary NPN Type:
BC846_BC847_BC848_BC849

Application: General-purpose switching and amplification.

FEATURES

Case : SOT-23

Terminals: Finish-Matte Tin Plated Leads,
Solderable per MIL-STD-202, Method 208

Polarity: PNP

ESD Rating - Human Body Model: >4000V

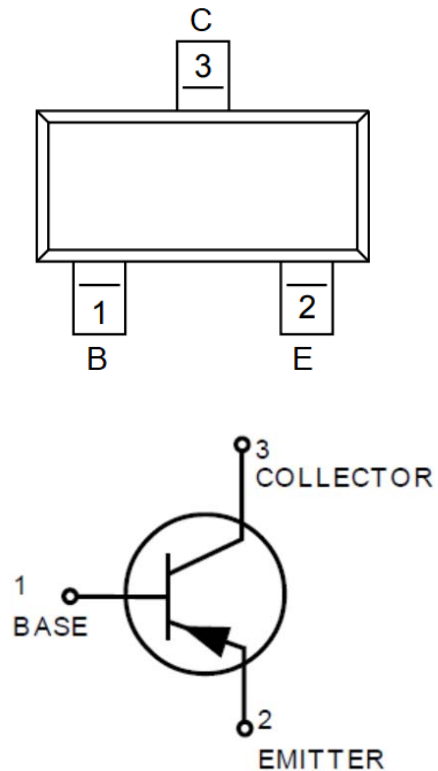
Machine Model: >400V

ORDERING INFORMATION

Package Type	Part Number
SOT-23	BC856AL
	BC856BL
	BC857AL
	BC857BL
	BC857CL
	BC858AL
	BC858BL
	BC858CL
	BC859BL
	BC859CL
Package	A,B,C = h_{FE} See Classification Table SPQ: 3000pcs/Reel
AiT provides all RoHS Compliant Products	

Classification Table	h_{FE}		
	Min	Typ	Max
A	125	180	250
B	220	290	475
C	420	520	800

PIN DESCRIPTION





ABSOLUTE MAXIMUM RATINGS

T_A = 25°C, unless otherwise noted.

Parameter	Symbol	BC856	BC857	BC858	BC859	Unit
Collector-Emitter Voltage	V _{CEO}	-65	-45	-30	-30	V
Collector-Base Voltage	V _{CBO}	-80	-50	-30	-30	V
Emitter-Base Voltage	V _{EBO}	-5.0				V
Collector Current – Continuous	I _C	-100				mAdc

THERMAL CHARACTERISTICS

Parameter	Symbol	Max	Unit
Total Device Dissipation FR-5 Board ⁽¹⁾ T _A = 25°C Derate above 25°C	P _D	225 1.8	mW mW/°C
Thermal Resistance, Junction to Ambient	R _{θJA}	556	°C/W
Total Device Dissipation Alumina Substrate ⁽²⁾ T _A = 25°C Derate above 25°C	P _D	300 2.4	mW mW/°C
Thermal Resistance, Junction to Ambient	R _{θJA}	417	°C/W
Junction and Storage Temperature	T _J , T _{STG}	-55 ~ +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.



ELECTRICAL CHARACTERISTICS

T_A = 25°C, unless otherwise noted

Parameter	Symbol	Characteristic		Min	Typ	Max	Unit
OFF CHARACTERISTICS							
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=-10mA$	BC856	-65	-	-	V
			BC857	-45			
			BC858/859	-30			
Collector-Emitter Breakdown Voltage	$V_{(BR)CES}$	$I_C=-10\mu A, V_{EB}=0$	BC856	-80	-	-	V
			BC857	-50			
			BC858/859	-30			
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=-10\mu A$	BC856	-80	-	-	V
			BC857	-50			
			BC858/859	-30			
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=-1.0\mu A$	BC856	-5.0	-	-	V
			BC857	-5.0			
			BC858/859	-5.0			
Collector Cutoff Current	I_{CBO}	$V_{CB}=-30V$		-	-	-15	nA
		$V_{CB}=-30V, T_A=150^{\circ}C$		-	-	-4.0	μA



Parameter	Symbol	Characteristic		Min	Typ	Max	Unit
ON CHARACTERISTICS							
DC Current Gain	h _{FE}	I _C =-2.0mA, V _{CE} =-5.0V	BC856AL	125	180	250	
			BC857AL				
			BC858AL				
			BC856BL	220	290	475	
			BC857BL				
			BC858BL				
			BC859BL	420	520	800	
			BC857CL				
			BC858CL				
			BC859CL				
Collector-Emitter Saturation Voltage	V _{CE(sat)}	I _C =-10mA, I _B =-0.5mA	-	-	-0.3	V	
		I _C =-100mA, I _B =-5.0mA	-	-	-0.65		
Base-Emitter Saturation Voltage	V _{BE(sat)}	I _C =-10mA, I _B =-0.5mA	-	-0.7	-	V	
		I _C =-100mA, I _B =-5.0mA	-	-0.9	-		
Base-Emitter On Voltage	V _{BE(on)}	I _C =-2.0mA, V _{CE} =-5.0V	-0.6	-	-0.75	V	
		I _C =-10mA, V _{CE} =-5.0V	-	-	-0.82		
SMALL-SIGNAL CHARACTERISTICS							
Current-Gain-Bandwidth Product	f _T	I _C =-10mA, V _{CE} =-5.0Vdc f=100MHz		100	-	-	MHz
Output Capacitance	C _{ob}	V _{CB} =-10V, f=1.0MHz		-	-	4.5	pF
Noise Figure	NF	I _C =-0.2mA V _{CE} =-5.0Vdc R _S =2.0kΩ f=1.0kHz BW=200Hz	BC856	-	-	10	dB
			BC857				
			BC858				
			BC859	-	-	4.0	



TYPICAL PERFORMANCE CHARACTERISTICS

BC857, BC858

Figure 1. Normalized DC Current Gain

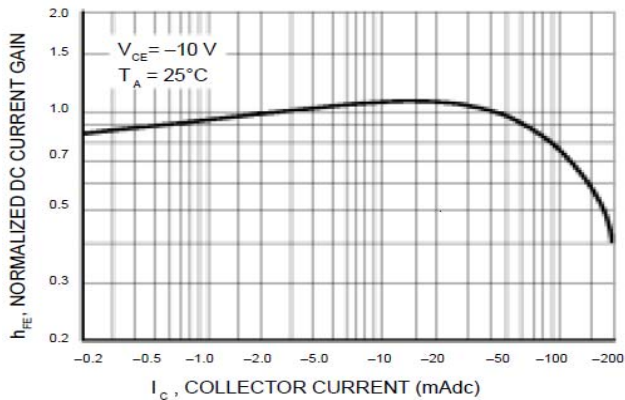


Figure 2. "Saturation" and "On" Voltages

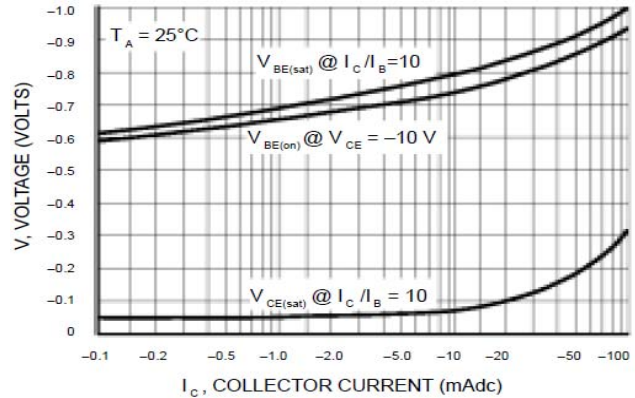


Figure 3. Collector Saturation Region

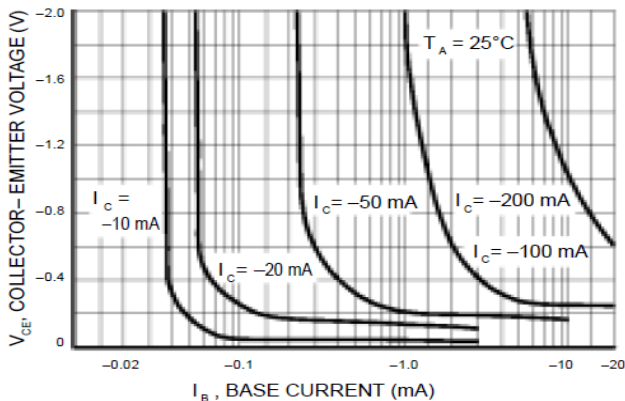


Figure 4. Base-Emitter Temperature Coefficient

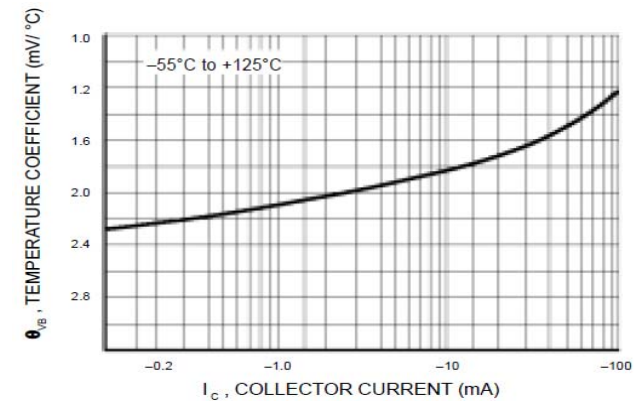


Figure 5. Capacitances

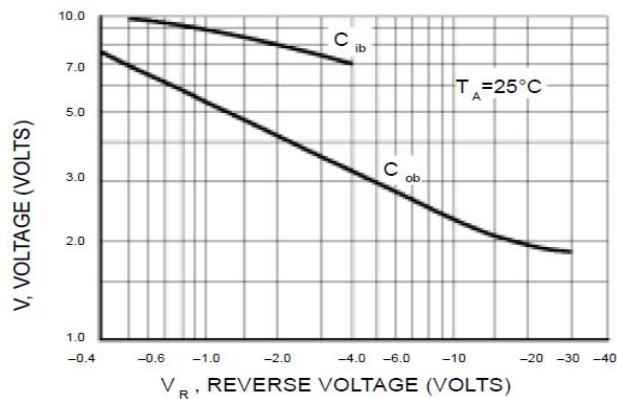
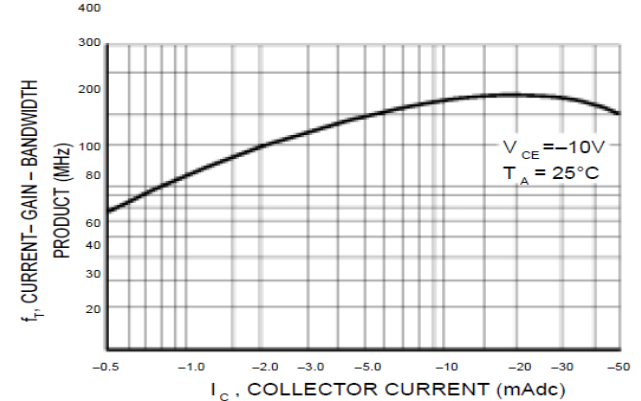


Figure 6. Current-Gain-Bandwidth Product





BC856

Figure 7. DC Current Gain

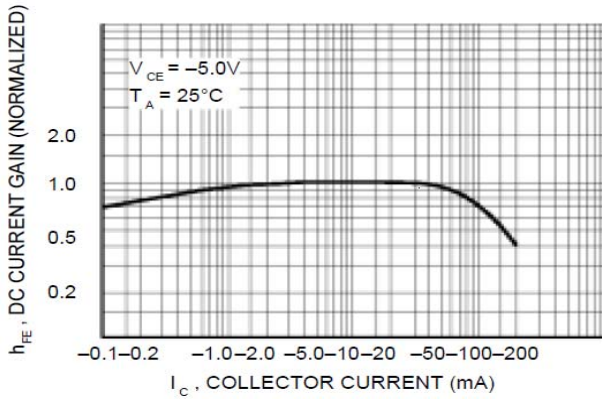


Figure 8. "On" Voltage

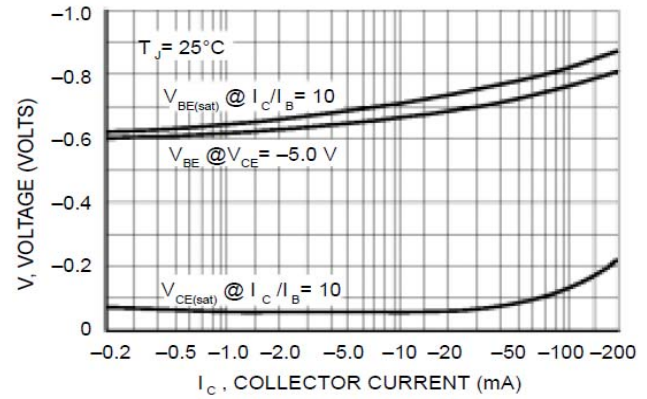


Figure 9. Collector Saturation Region

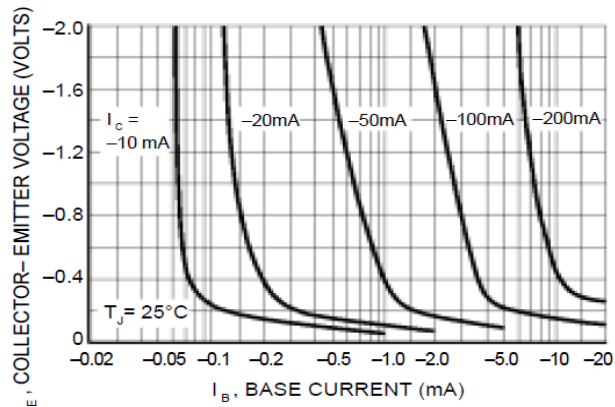


Figure 10. Base-Emitter Temperature Coefficient

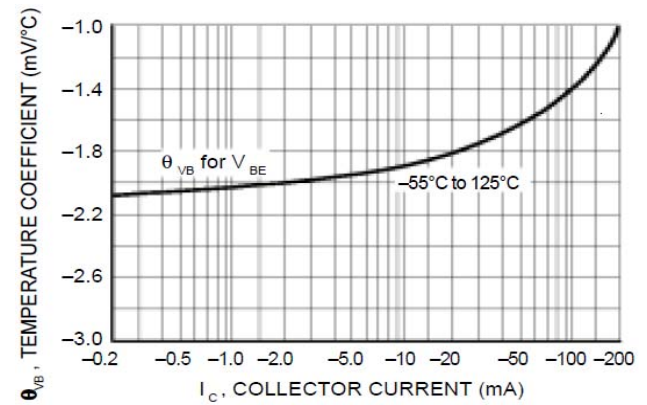


Figure 11. Capacitance

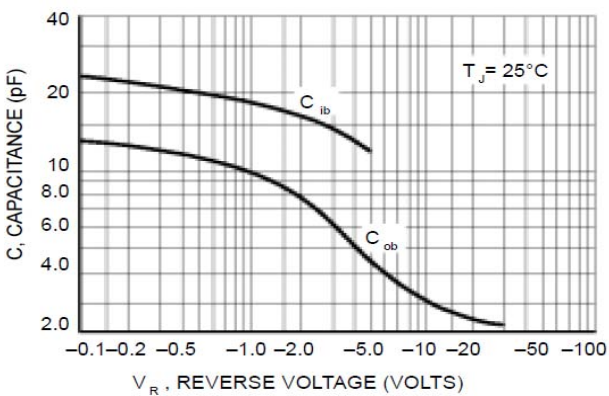


Figure 12. Current-Gain-Bandwidth Product

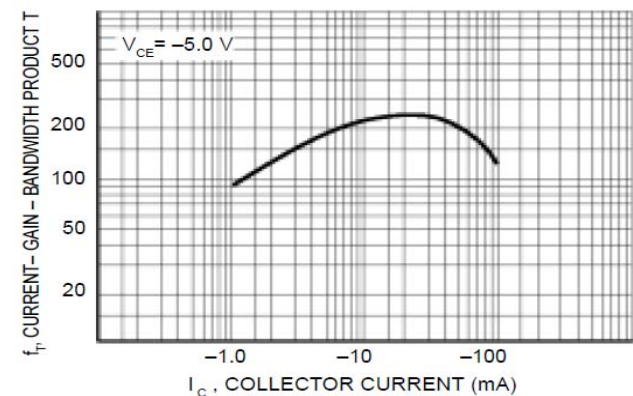




Figure 13. Thermal Response

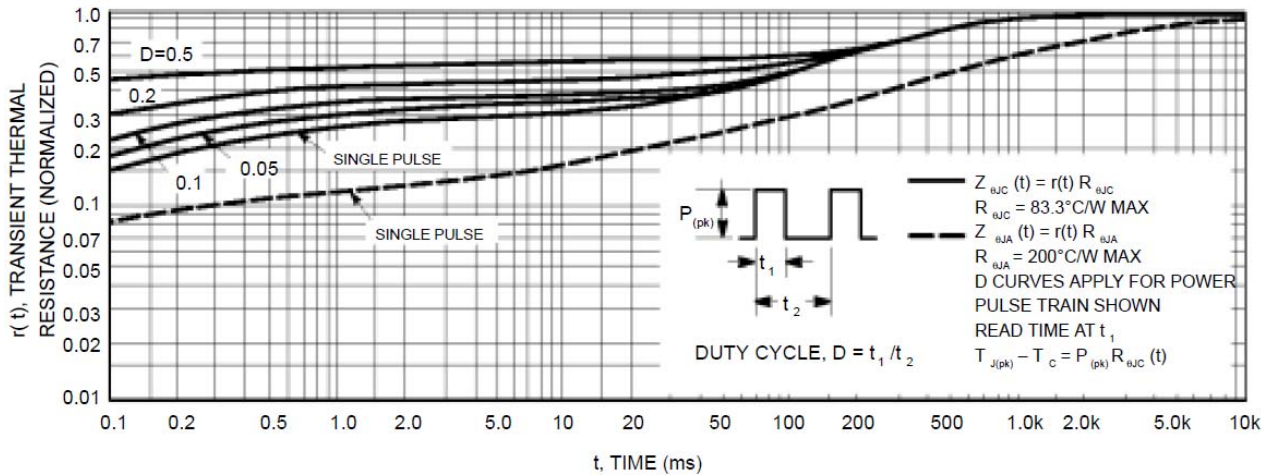
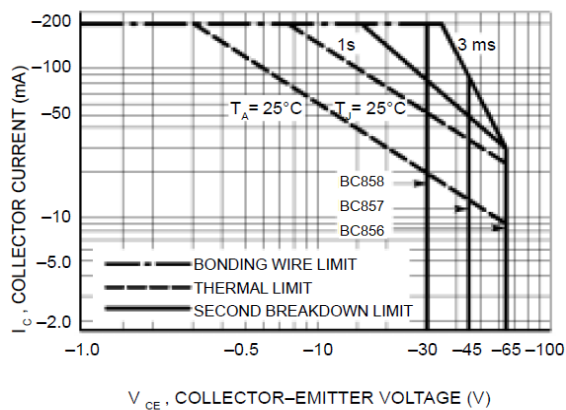


Figure 14. Active Region Safe Operating Area



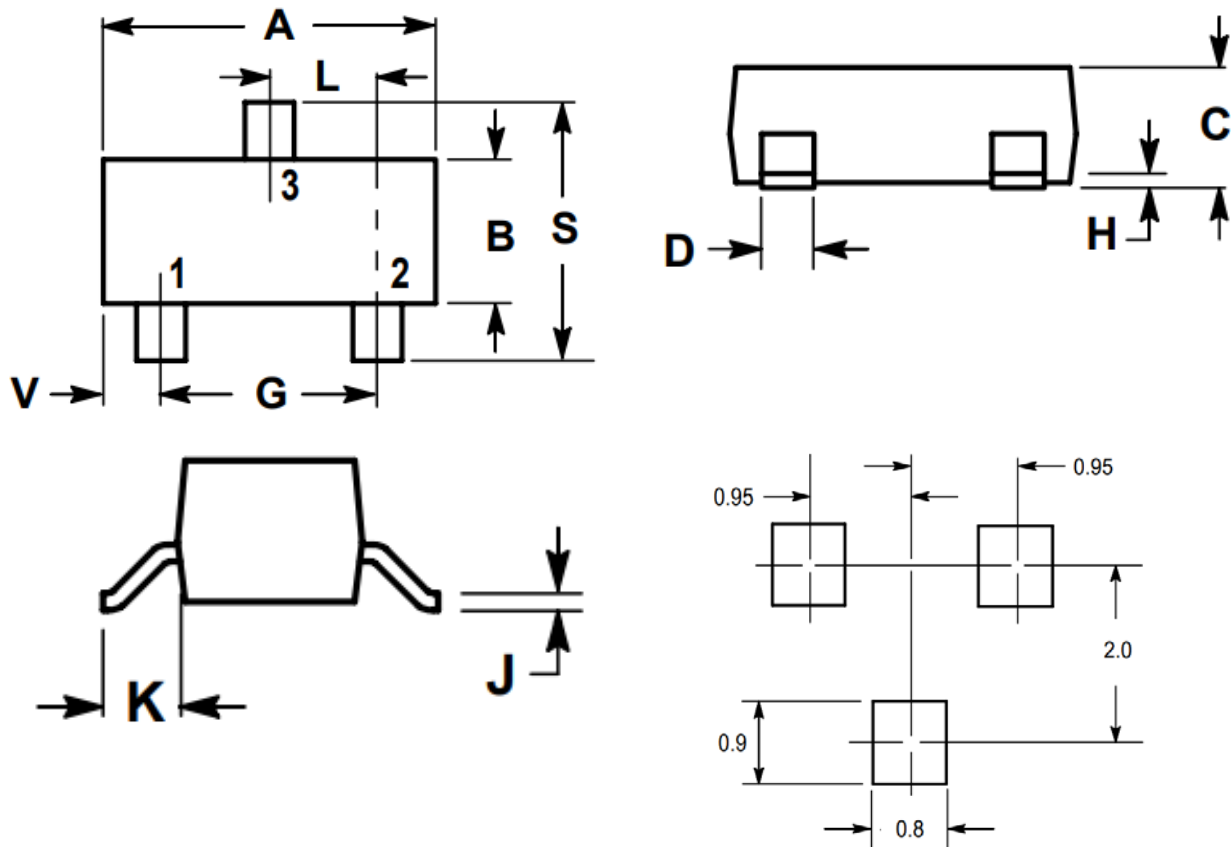
NOTE: The safe operating area curves indicate I_C - V_{CE} limits of the transistor that must be observed for reliable operation. Collector load lines for specific circuits must fall below the limits indicated by the applicable curve.

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 $T_{J(pk)} < 150^\circ\text{C}$. $T_{J(pk)}$ 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 INFORMATION

Dimension in SOT-23 Package (Unit: mm)



Symbol	Min	Max
A	0.1102	0.1197
B	0.0472	0.0551
C	0.0350	0.0440
D	0.0150	0.0200
G	0.0701	0.0807
H	0.0005	0.0040
J	0.0034	0.0070
K	0.0140	0.0285
L	0.0350	0.0401
S	0.0830	0.1039
V	0.0177	0.0236



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