DESCRIPTION

The BC856-857-858-859AL/BL/CL are available in SOT-23 package.

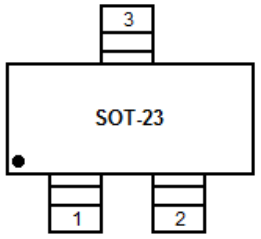
FEATURES

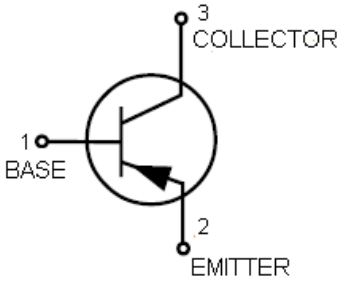
- Moisture Sensitivity Level: 1
- ESD Rating - Human Body Model: >4000V
  Machine Model: >400V
- Available in SOT-23 package

ORDERING INFORMATION

Package Type	Part Number
SOT-23	BC856AL
	BC856BL
	BC857AL
	BC857BL
	BC857CL
	BC858AL
	BC858BL
	BC858CL
	BC859BL
	BC859CL
Package	SPQ: 3000pcs/Reel
AiT provides all RoHS Compliant Products	

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[NOTE1]			
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 Alumina Substrate[NOTE2]			
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
Junction and Storage Temperature	T_J, T_{STG}	-55 ~ +150	°C

NOTE1: FR-5 = 1.0 x 0.75 x 0.062 in

NOTE2: 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=-10μA, V_{EB}=0	BC856	-80	-	-	V
			BC857	-50			
			BC858/859	-30			
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=-10μA	BC856	-80	-	-	V
			BC857	-50			
			BC858/859	-30			
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=-1.0μA	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°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				
			BC857CL	420	520	800	
			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	Cob	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

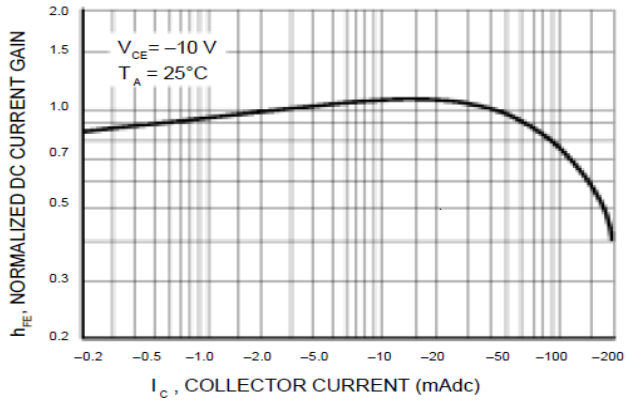


Figure 2. “Saturation” and “On” Voltages

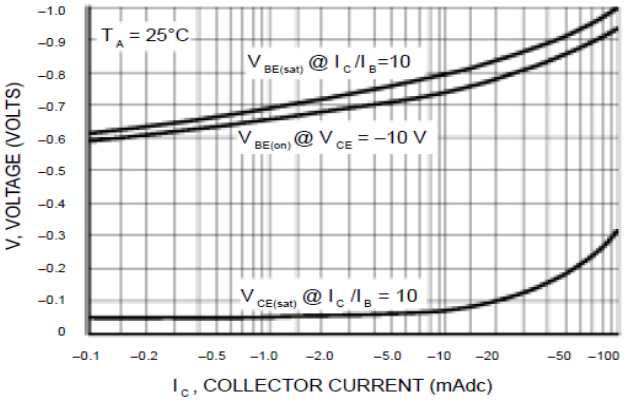


Figure 3. Collector Saturation Region

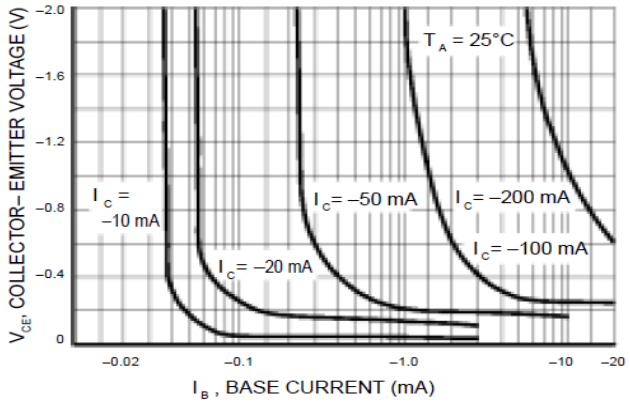


Figure 4. Base-Emitter Temperature Coefficient

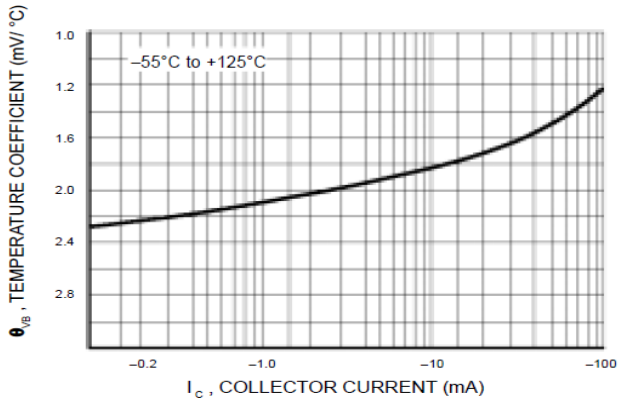


Figure 5. Capacitances

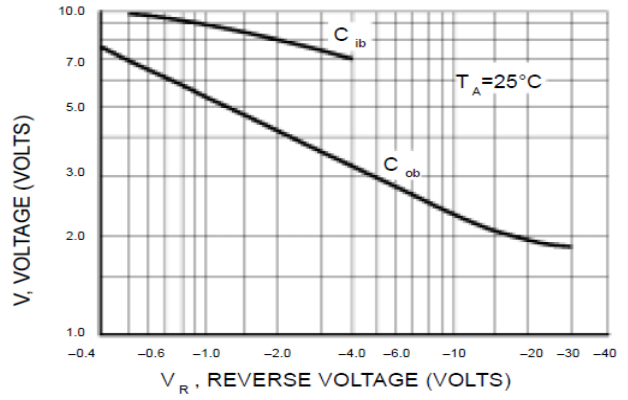
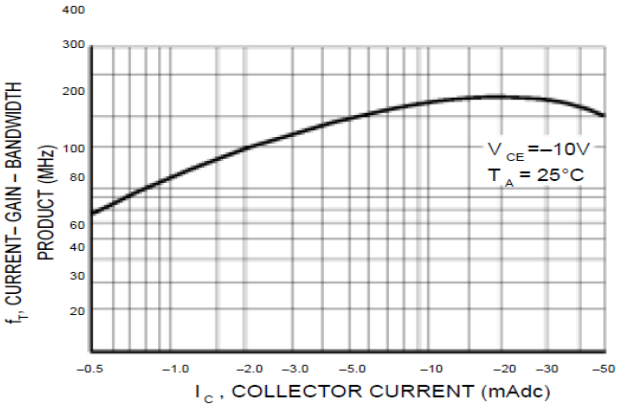


Figure 6. Current-Gain-Bandwidth Product



BC856

Figure 7. DC Current Gain

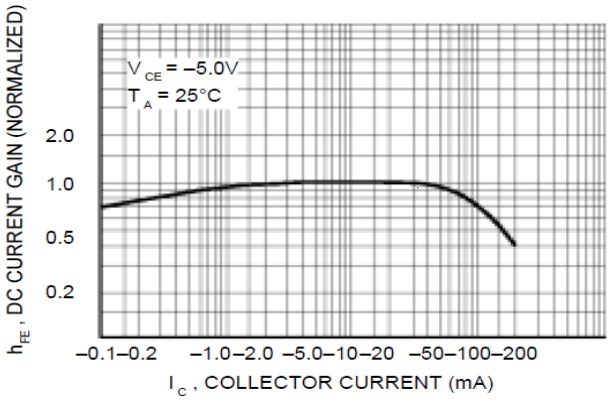


Figure 8. “On” Voltage

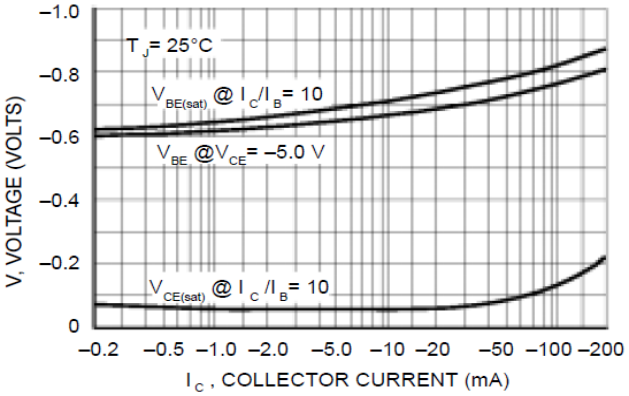


Figure 9. Collector Saturation Region

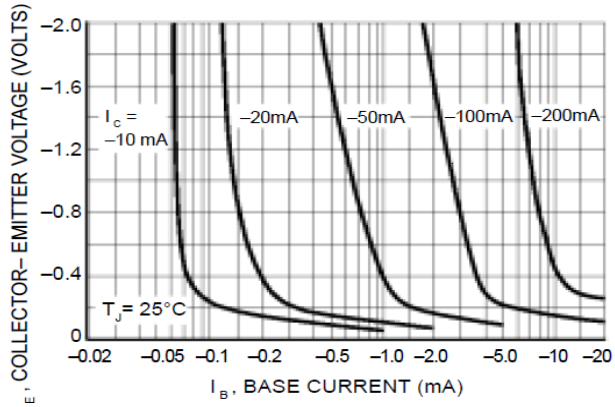


Figure 10. Base-Emitter Temperature Coefficient

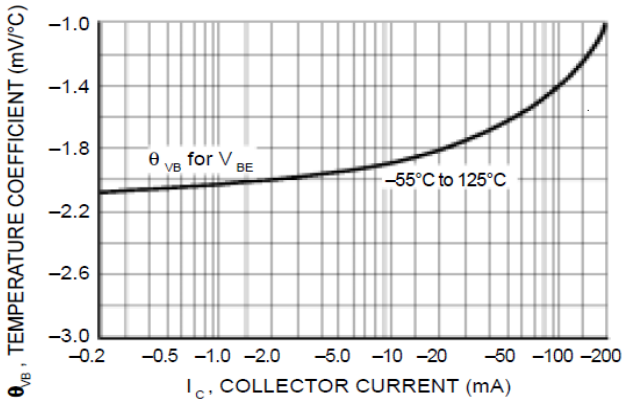


Figure 11. Capacitance

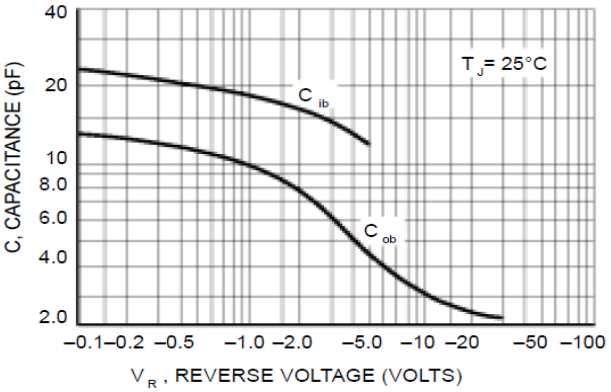


Figure 12. Current-Gain-Bandwidth Product

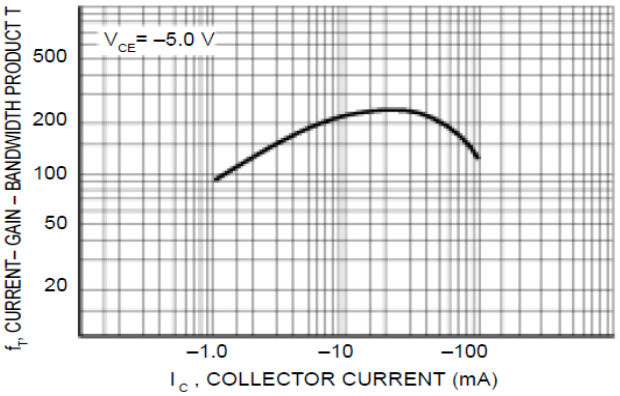


Figure 13. Thermal Response

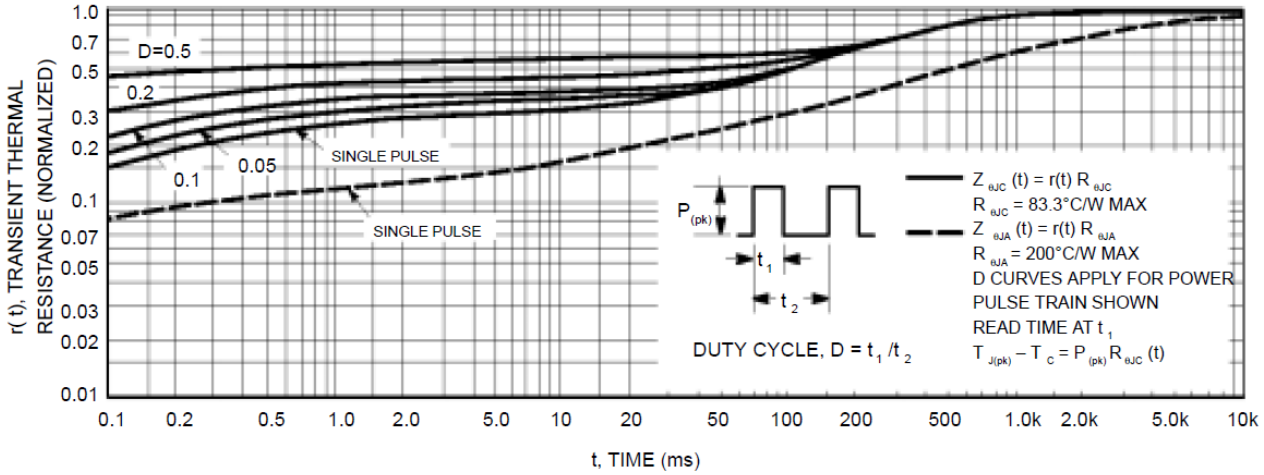
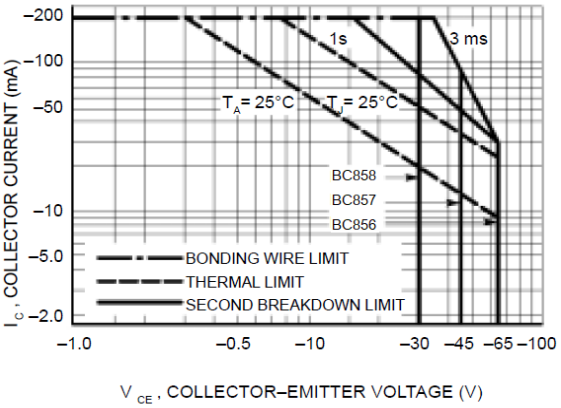


Figure 14. Active Region Safe Operating Area

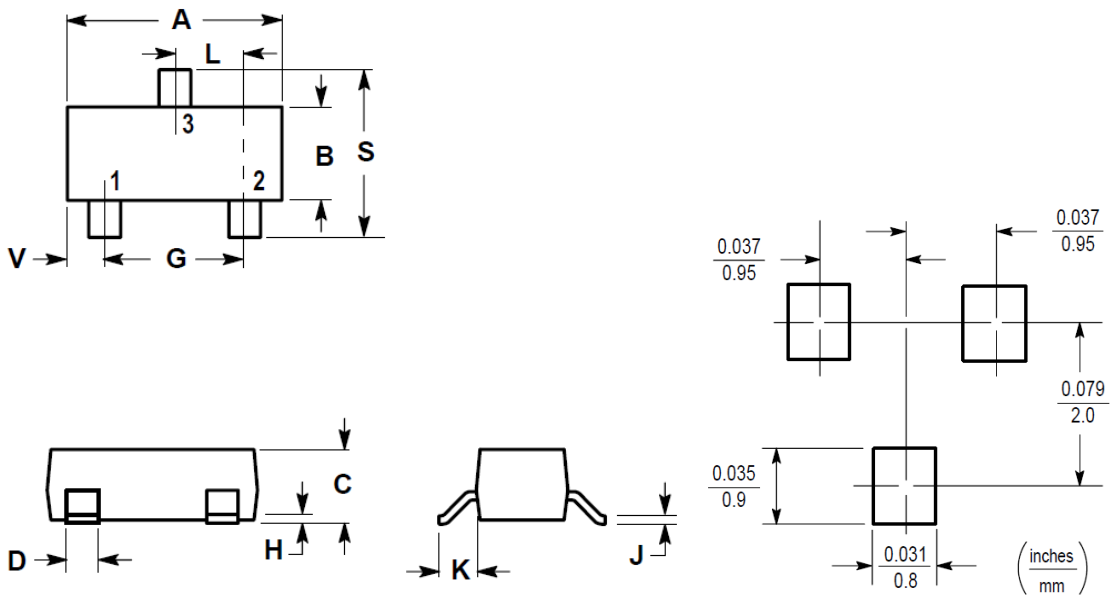


NOTE: The safe operating area curves indicate I_C -V_{CE} limits of the transistor that must be observed for reliable operation. Collector load lines for specific circuits must fall below the limits indicated by the applicable curve.

The data of Figure 14 is based upon $T_{J(pk)}$ = 150°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°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)



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

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