

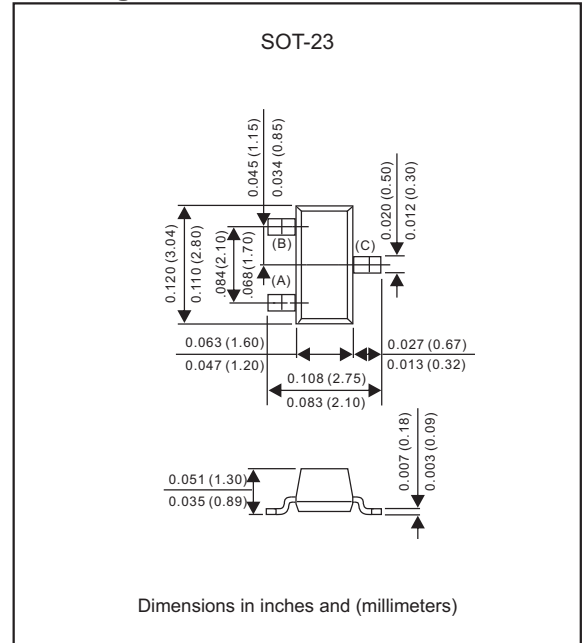
Features

- Moisture sensitivity level: 1
- ESD rating – human body model: >4000 V, machine model: >400 V
- Epitaxial plana chip construction
- Ideal for medium power application and switching
- Capable of 225mW power dissipation.
- Lead-free parts for green partner, exceeds environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen-free part, ex. BC856A-H.

Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-23
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.008 gram

Package outline



Maximum ratings (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

Rating		Symbol	Value	UNIT
Collector-Base voltage	BC856 BC857 BC858,BC859	V_{CBO}	-80 -50 -30	V
Collector-Emitter voltage	BC856 BC857 BC858 ,BC859	V_{CEO}	-65 -45 -30	V
Emitter-Base voltage		V_{EBO}	-5.0	V
Collector current-continuous		I_C	-100	mAdc

Thermal characteristics

PARAMETER		Symbol	MIN.	TYP.	MAX.	UNIT
Total device dissipation FR-5 board (1)	$T_A = 25^\circ\text{C}$	P_D			225	mW
	Derate above 25°C				1.8	mW/ $^\circ\text{C}$
Thermal resistance	Junction to ambient	R_{BJA}			556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate (2)	$T_A = 25^\circ\text{C}$	P_D			300	mW
	Derate above 25°C				2.4	mW/ $^\circ\text{C}$
Thermal resistance	Junction to ambient	R_{BJA}			417	$^\circ\text{C}/\text{W}$
Operating junction temperature range		T_J	-55		+150	$^\circ\text{C}$
Storage temperature range		T_{STG}	-55		+150	$^\circ\text{C}$

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

Off characteristics

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
Collector-Base breakdown voltage	BC856 SERIES BC857 SERIES BC858 ,BC859 SERIES	$I_c = -10\mu\text{A}$	$V_{(BR)CBO}$	-80 -50 -30		V
Collector-Emitter breakdown voltage	BC856 SERIES BC857 SERIES BC858 ,BC859 SERIES	$I_c = -10\text{mA}$	$V_{(BR)CEO}$	-65 -45 -30		V
Collector-Emitter breakdown voltage	BC856 SERIES BC857 SERIES BC858 ,BC859 SERIES	$I_c = -10\mu\text{A}, V_{EB} = 0$	$V_{(BR)CES}$	-80 -50 -30		V
Emitter-Base breakdown voltage	BC856 SERIES BC857 SERIES BC858 ,BC859 SERIES	$I_E = -1.0\mu\text{A}$	$V_{(BR)EBO}$	-5.0 -5.0 -5.0		V
Collect Cutoff Current	BC856 SERIES BC857 SERIES BC858 ,BC859 SERIES	$V_{CB} = -30\text{V}$ $V_{CB} = -30\text{V}, T_A = 150^\circ\text{C}$	I_{CBO}		-15 -4.0	nA mA

On characteristics

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
DC current gain	BC856A, BC857A, BC858A BC856B, BC857B, BC858B BC858C	h_{FE}		90 150 270		-
	BC856A, BC857A, BC858A BC856B, BC857B, BC858B,BC859B BC857C, BC858C, BC859C			$I_c = -2.0\text{mA}, V_{CE} = -5.0\text{V}$	125 220 420	
Collector-Emitter saturation voltage	$I_c = -10\text{mA}, I_B = -0.5\text{mA}$ $I_c = -100\text{mA}, I_B = -5.0\text{mA}$	$V_{CE(sat)}$			-0.30 -0.65	V
Base-Emitter saturation voltage	$I_c = -10\text{mA}, I_B = -0.5\text{mA}$ $I_c = -100\text{mA}, I_B = -5.0\text{mA}$	$V_{BE(sat)}$		-0.70 -0.90		V
Base-Emitter on voltage	$I_c = -2.0\text{mA}, V_{CE} = -5.0\text{V}$ $I_c = -10\text{mA}, V_{CE} = -5.0\text{V}$	$V_{BE(on)}$	-0.60		-0.75 -0.82	V

Small-signal characteristics

PARAMETER	CONDITIONS	Symbol	MIN.	TYP.	MAX.	UNIT
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_{obo}			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=200Hz BC856,BC857,BC858 SERIES BC859 SERIES	NF			10 4.0	dB

Rating and characteristic curves

BC856 Series

Fig.1- DC CURRENT GAIN

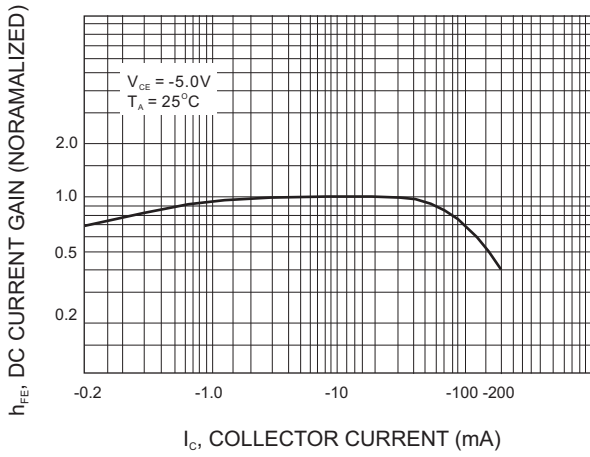


Fig. 2-"ON" VOLTAGE

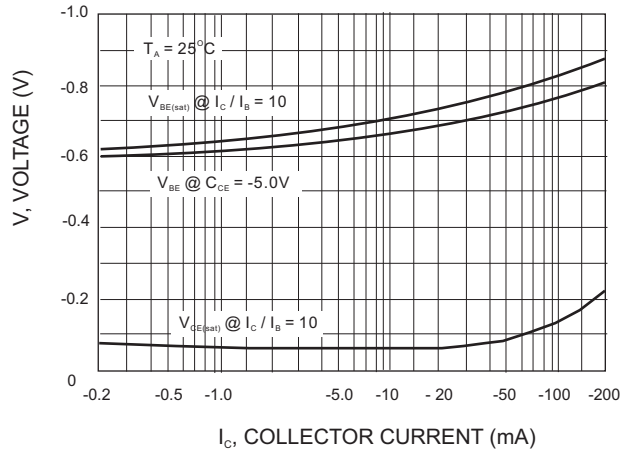


FIG.3- COLLECTOR SATURATION REGION

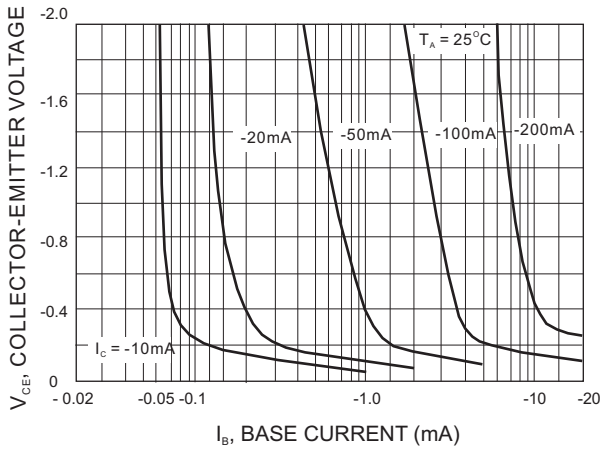


Fig. 4-BASE-EMITTER TEMPERATURE COEFFICIENT

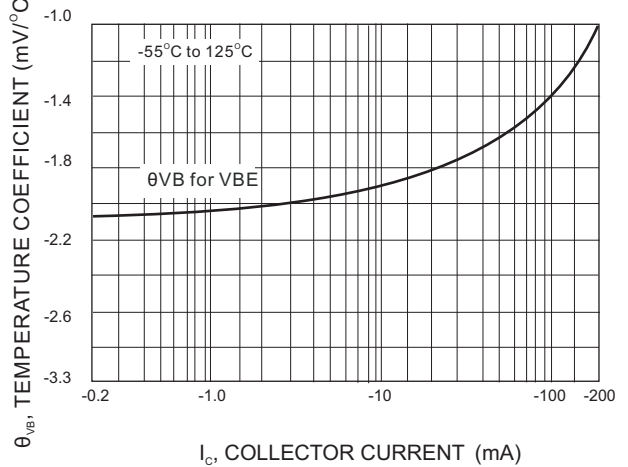


Fig. 5.-CAPACITANCE

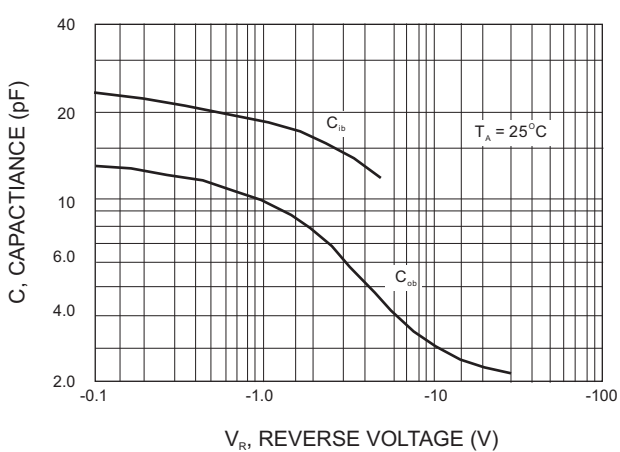
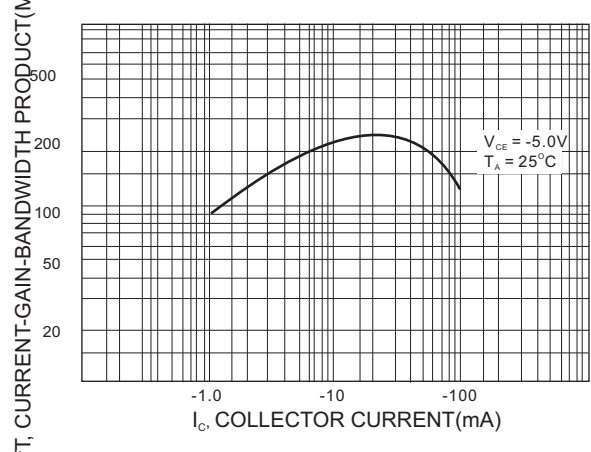


Fig. 6- CURRENT-GAIN-BANDEIDTH PRODUCT



Rating and characteristic curves

BC857/BC858/BC859 Series

Fig.7- DC CURRENT GAIN

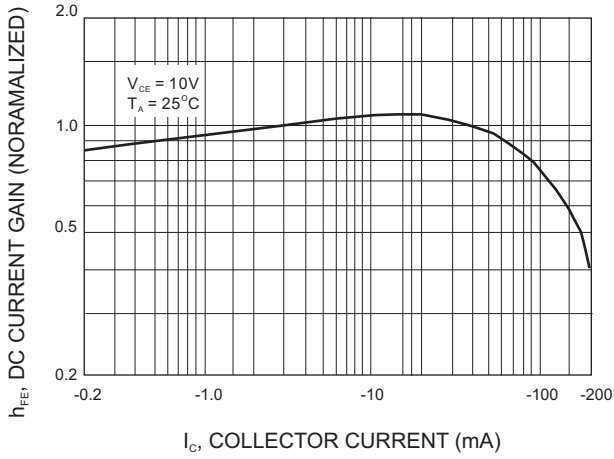


Fig. 8-"SATURATION" AND "ON" VOLTAGE

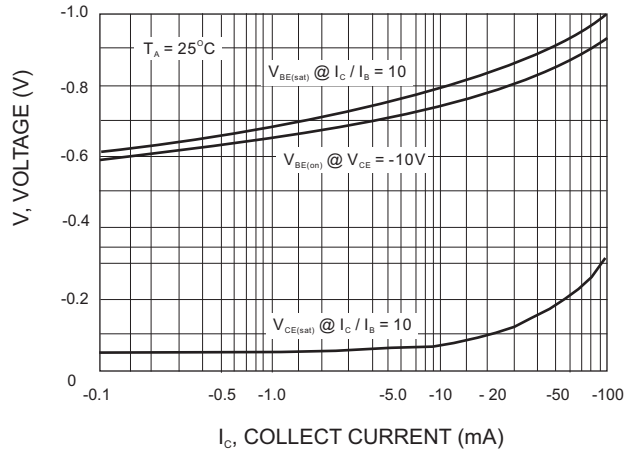


FIG.9- COLLECTOR SATURATION REGION

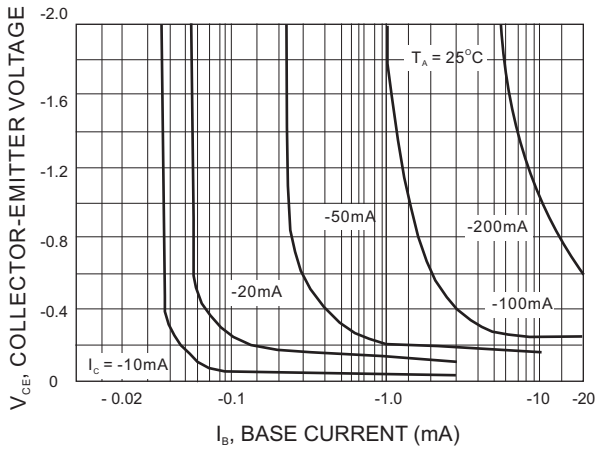


Fig. 10-BASE-EMITTER TEMPERATURE COEFFICIENT

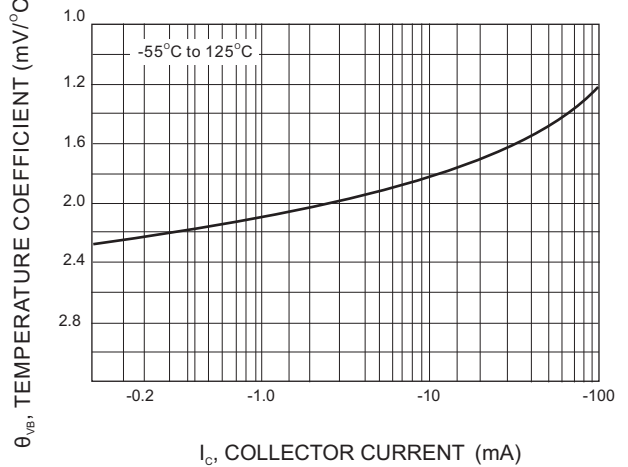


Fig. 11.-CAPACITANCE

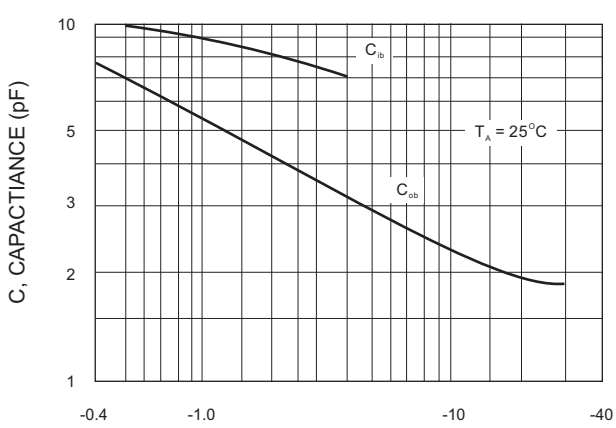
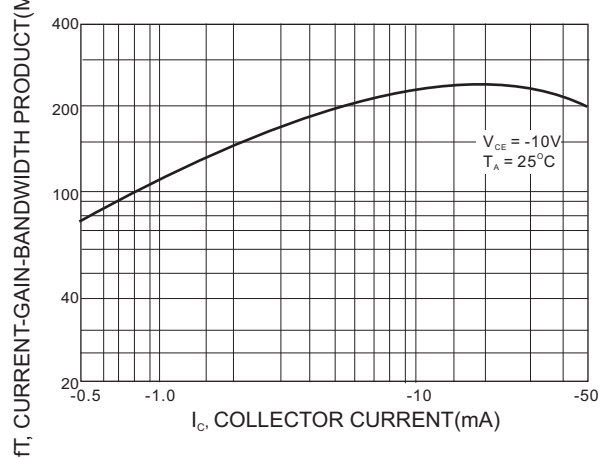
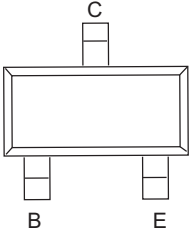
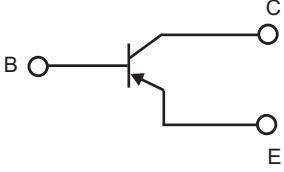


Fig. 12- CURRENT-GAIN-BANDEIDTH PRODUCT



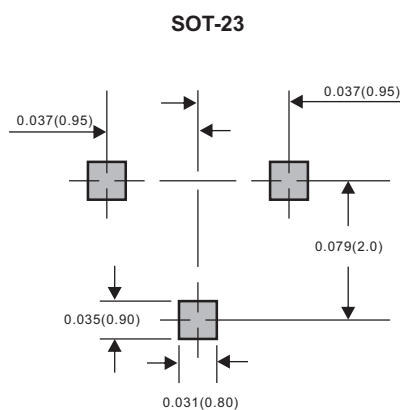
Pinning information

Pin	Simplified outline	Symbol
PinB Base PinC Collector PinE Emitter		

Marking

Type number	Marking code
BC856A	3A
BC856B	3B
BC857A	3E
BC857B	3F
BC857C	3G
BC858A	3J
BC858B	3K
BC858C	3L
BC859B	4B
BC859C	4C

Suggested solder pad layout



Dimensions in inches and (millimeters)

Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOT-23	7"	3,000	4.0	30,000	183*123*183	178	382*257*387	240,000	11.6