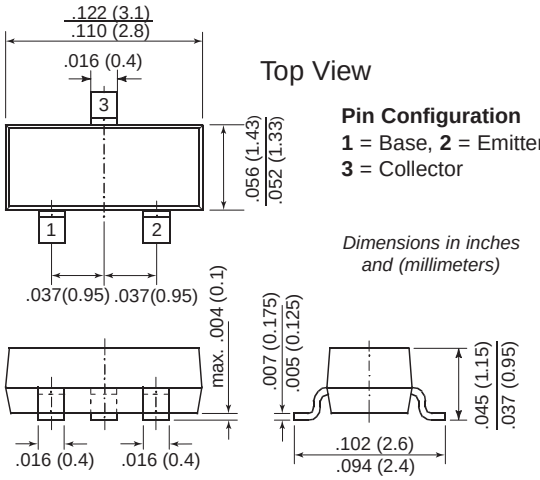
Small Signal Transistors (PNP)

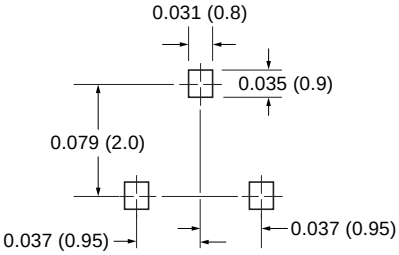
TO-236AB (SOT-23)



Pin Configuration
1 = Base, **2** = Emitter,
3 = Collector

Dimensions in inches and (millimeters)

Mounting Pad Layout



Type	Marking	Type	Marking
BC856A	3A	BC858A	3J
B	3B	B	3K
		C	3L
BC857A	3E	BC859A	4A
B	3F	B	4B
C	3G	C	4C

Mechanical Data

Case: SOT-23 Plastic Package
Weight: approx. 0.008g
Packaging Codes/Options:
E8/10K per 13” reel (8mm tape), 30K/box
E9/3K per 7” reel (8mm tape), 30K/box

Features

- PNP Silicon Epitaxial Planar Transistors for switching and AF amplifier applications.
- Especially suited for automatic insertion in thick and thin-film circuits.
- These transistors are subdivided into three groups (A, B, and C) according to their current gain. The type BC856 is available in groups A and B, however, the types BC857, BC558 and BC859 can be supplied in all three groups. The BC849 is a low noise type.
- As complementary types, the NPN transistors BC846...BC849 are recomended.

Maximum Ratings and Thermal Characteristics (T_A = 25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Collector-Base Voltage	BC856 BC857 BC858, BC859	$-V_{CBO}$	80 50 30	V
Collector-Emitter Voltage (Base shorted)	BC856 BC857 BC858, BC859	$-V_{CES}$	80 50 30	V
Collector-Emitter Voltage (Base open)	BC856 BC857 BC858, BC859	$-V_{CEO}$	65 45 30	V
Emitter-Base Voltage		$-V_{EBO}$	5	V
Collector Current		$-I_C$	100	mA
Peak Collector Current		$-I_{CM}$	200	mA
Peak Base Current		$-I_{BM}$	200	mA
Peak Emitter Current		I_{EM}	200	mA
Power Dissipation at T_{SB} = 50°C		P_{tot}	310(1)	mW
Thermal Resistance Junction to Ambient Air		$R_{\theta JA}$	450(1)	°C/W
Thermal Resistance Junction to Substrate Backside		$R_{\theta SB}$	320(1)	°C/W
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_S	–65 to +150	°C

Note: (1) Device on fiberglass substrate, see layout on third page.

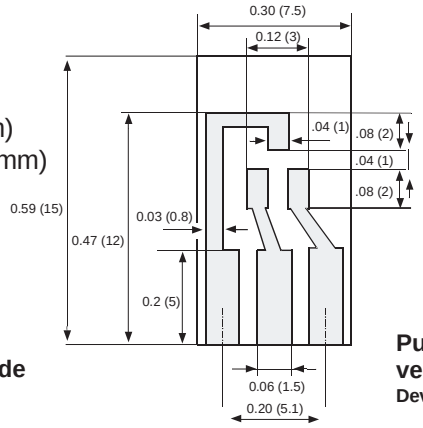
Electrical Characteristics (T_J = 25°C unless otherwise noted)

Parameter		Symbol	Test Condition	Min	Typ	Max	Unit
Current Gain	Current Gain Group A	h_{fe}	$-V_{CE}$ = 5V, $-I_C$ = 2mA f = 1kHz	—	220	—	—
	B			—	330	—	—
	C			—	600	—	—
Input Impedance	Current Gain Group A	h_{ie}	$-V_{CE}$ = 5V, $-I_C$ = 2mA f = 1kHz	1.6	2.7	4.5	kΩ
	B			3.2	4.5	8.5	
	C			6.0	8.7	15.0	
Output Admittance	Current Gain Group A	h_{oe}	$-V_{CE}$ = 5V, $-I_C$ = 2mA f = 1kHz	—	18	30	µS
	B			—	30	60	
	C			—	60	110	
Reverse Voltage Transfer Ratio	Current Gain Group A	h_{re}	$-V_{CE}$ = 5V, $-I_C$ = 2mA f = 1kHz	—	$1.5 \cdot 10^{-4}$	—	—
	B			—	$2 \cdot 10^{-4}$	—	—
	C			—	$3 \cdot 10^{-4}$	—	—
DC Current Gain	Current Gain Group A	h_{FE}	$-V_{CE}$ = 5V, $-I_C$ = 10µA	—	90	—	—
	B			—	150	—	—
	C			—	270	—	—
	Current Gain Group A	h_{FE}	$-V_{CE}$ = 5 V, $-I_C$ = 2mA	110	180	220	—
	B			200	290	450	—
	C			420	520	800	—
Collector Saturation Voltage		$-V_{CEsat}$	$-I_C$ = 10 mA, $-I_B$ = 0.5mA	—	90	300	mV
			$-I_C$ = 100 mA, $-I_B$ = 5mA	—	250	650	
Base Saturation Voltage		$-V_{BEsat}$	$-I_C$ = 10 mA, $-I_B$ = 0.5mA	—	700	—	mV
			$-I_C$ = 100 mA, $-I_B$ = 5mA	—	900	—	
Base-Emitter Voltage		$-V_{BEon}$	$-V_{CE}$ = 5 V, $-I_C$ = 2mA	600	660	750	mV
			$-V_{CE}$ = 5 V, $-I_C$ = 10mA	—	—	820	
Collector-Base Cutoff Current		$-I_{CBO}$	$-V_{CB}$ = 30V	—	—	15	nA
			$-V_{CB}$ = 30V, T_J = 150°C	—	—	5	µA
Gain-Bandwidth Product		f_T	$-V_{CE}$ = 5V, $-I_C$ = 10mA f = 100MHz	—	150	—	MHz
Collector-Base Capacitance		C_{CBO}	$-V_{CB}$ = 10V, f = 1MHz	—	—	6	pF
Noise Figure	BC856, BC857, BC858	F	$-V_{CE}$ = 5V, $-I_C$ = 200µA	—	2	10	dB
	BC859		R_G = 2kΩ, f = 1kHz, Δf = 200 Hz	—	1	4	
	BC859		$-V_{CE}$ = 5V, $-I_C$ = 200µA R_G = 2kΩ, f = 30...15000Hz	—	1.2	4	

Note: (1) Device on fiberglass substrate, see layout on next page

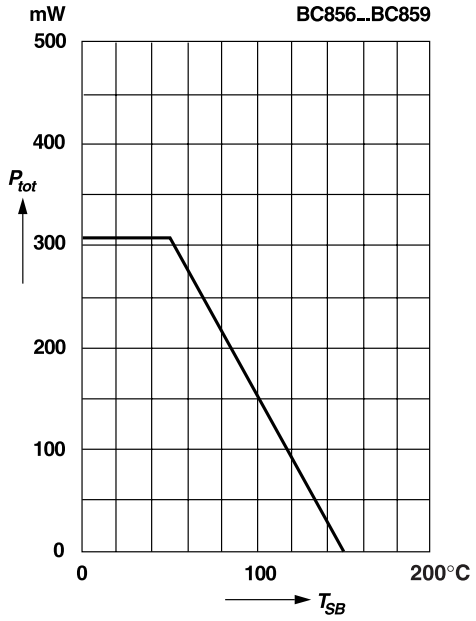
Layout for $R_{\theta JA}$ test

Thickness: Fiberglass 0.059 in. (1.5 mm)
Copper leads 0.012 in. (0.3 mm)

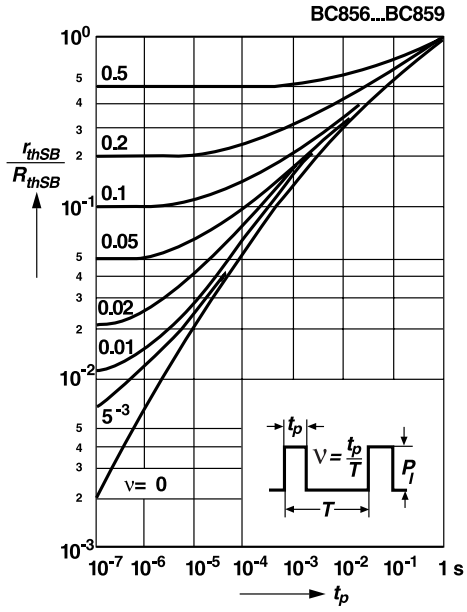


Dimensions in inches (millimeters)

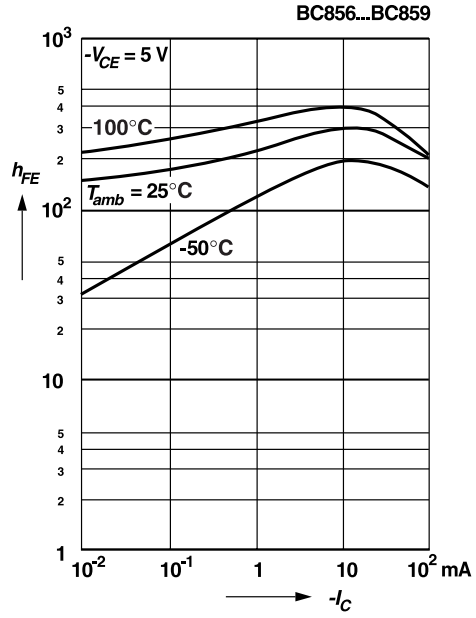
Admissible power dissipation versus temperature of substrate backside
Device on fiblerglass substrate, see layout



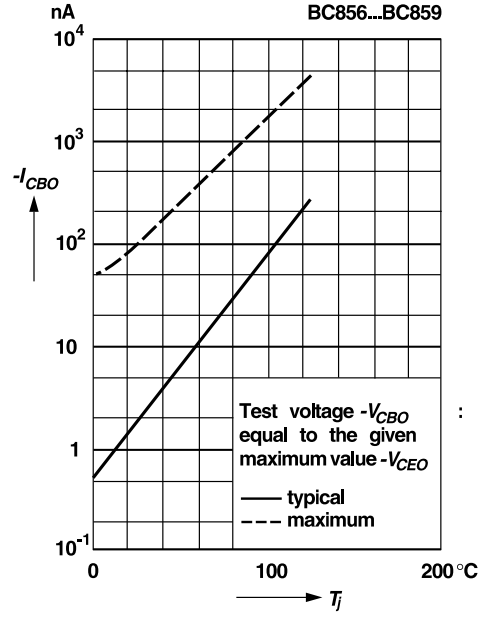
Pulse thermal resistance versus pulse duration (normalized)
Device on fiblerglass substrate, see layout



DC current gain versus collector current

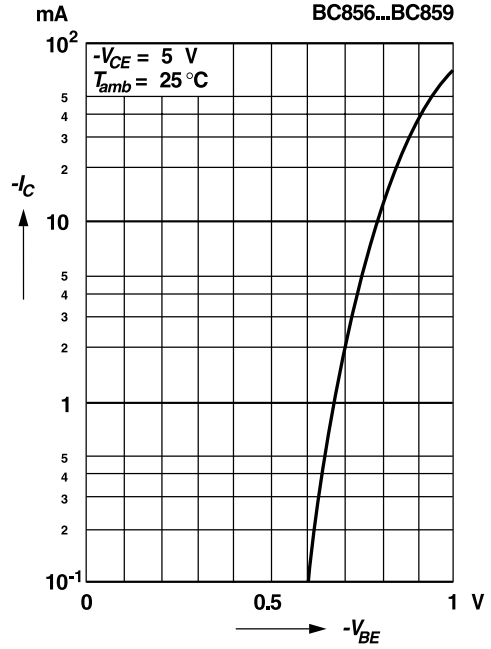


Collector–Base cutoff current versus ambient temperature

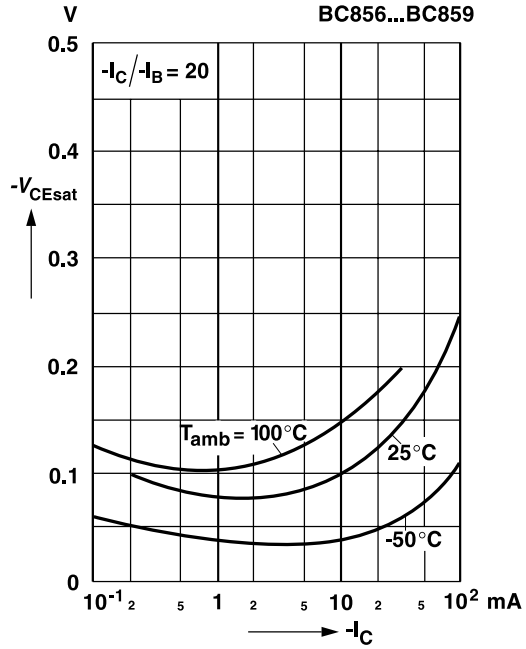


Ratings and Characteristic Curves (TA = 25°C unless otherwise noted)

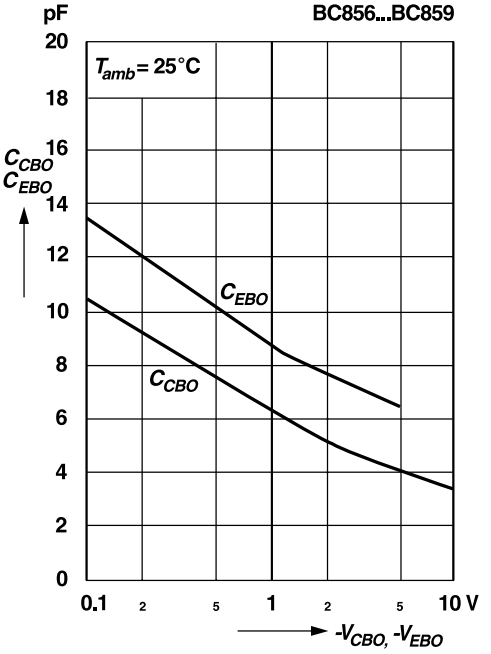
Collector current versus base-emitter voltage



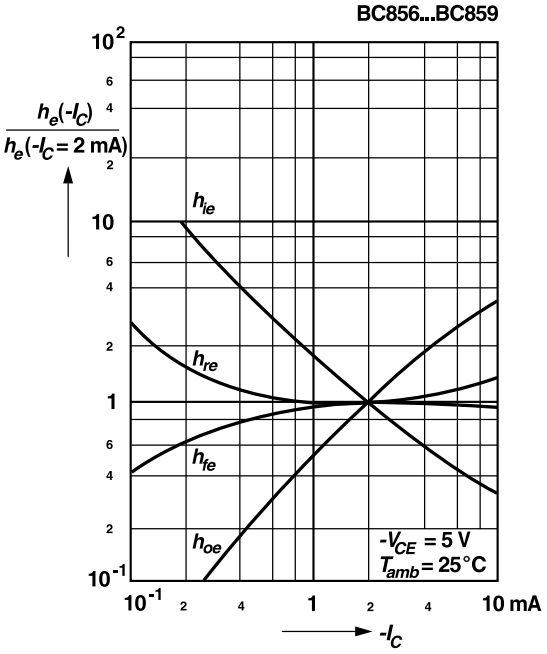
Collector saturation voltage versus collector current



Collector-base capacitance, Emitter-base capacitance versus reverse bias voltage

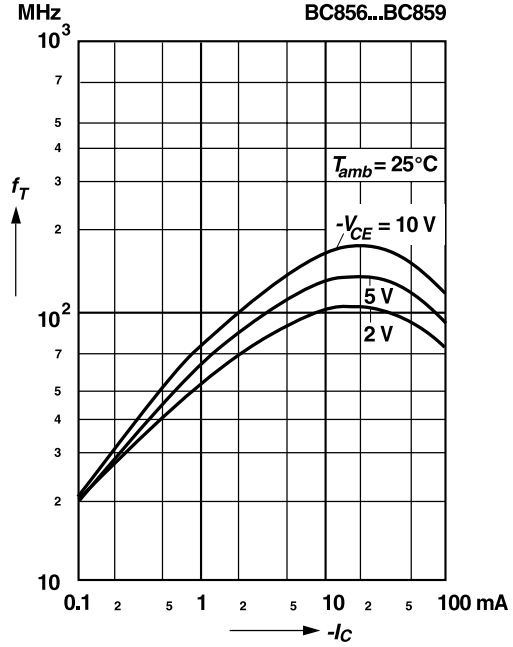


Relative h-parameters versus collector current

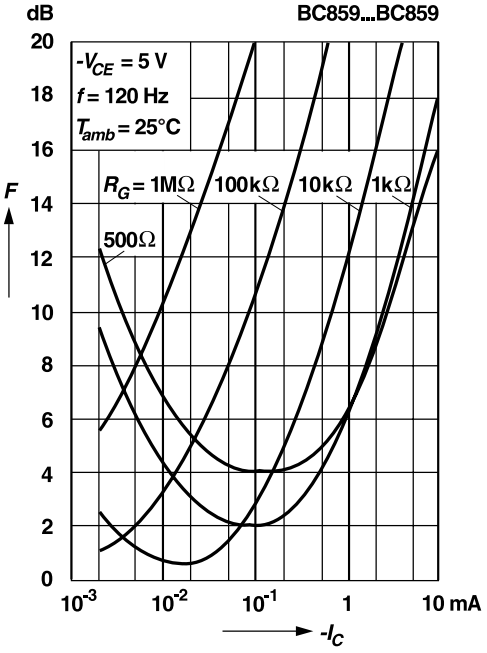


Ratings and Characteristic Curves (T_A = 25°C unless otherwise noted)

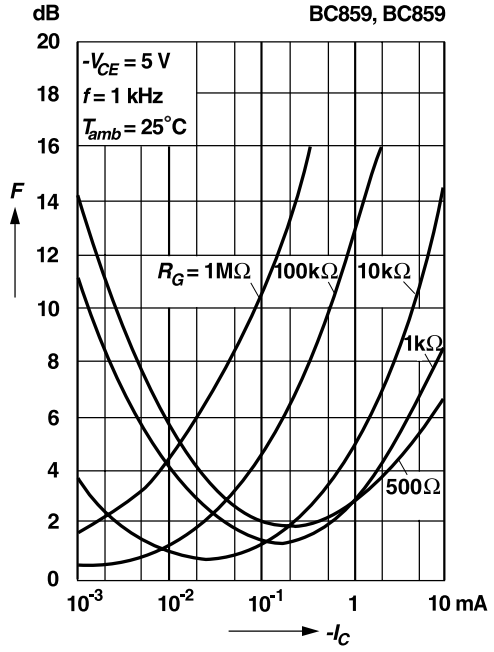
Gain-bandwidth product versus collector current



Noise figure versus collector current



Noise figure versus collector current



Noise figure versus collector-emitter voltage