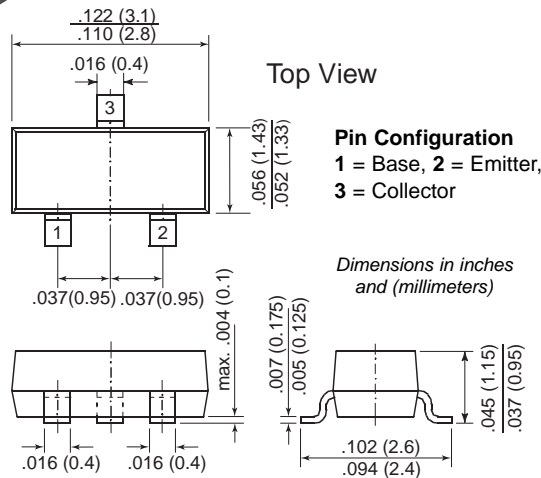


BC856 thru BC859

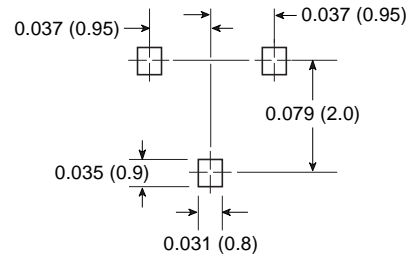
Small Signal Transistors (PNP)



TO-236AB (SOT-23)



Mounting Pad Layout



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, BC858 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 recommended.

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

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

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

Parameter	Symbol	Value	Unit
Collector-Base Voltage	BC856 BC857 BC858, BC859	80 50 30	V
Collector-Emitter Voltage (Base shorted)	BC856 BC857 BC858, BC859	80 50 30	V
Collector-Emitter Voltage (Base open)	BC856 BC857 BC858, BC859	65 45 30	V
Emitter-Base Voltage	—V _{EB0}	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 _{θJA}	450 ⁽¹⁾	°C/W
Thermal Resistance Junction to Substrate Backside	R _{θSB}	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.

BC856 thru BC859

Small Signal Transistors (PNP)

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

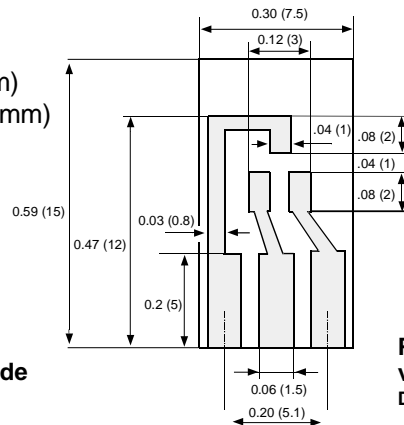
Parameter		Symbol	Test Condition	Min	Typ	Max	Unit
Current Gain	Current Gain Group A B C	h _{fe}	-V _{CE} = 5V, -I _C = 2mA f = 1kHz	—	220	—	—
				—	330	—	—
				—	600	—	—
Input Impedance	Current Gain Group A B C	h _{ie}	-V _{CE} = 5V, -I _C = 2mA f = 1kHz	1.6	2.7	4.5	kΩ
				3.2	4.5	8.5	
				6.0	8.7	15.0	
Output Admittance	Current Gain Group A B C	h _{oe}	-V _{CE} = 5V, -I _C = 2mA f = 1kHz	—	18	30	μS
				—	30	60	
				—	60	110	
Reverse Voltage Transfer Ratio	Current Gain Group A B C	h _{re}	-V _{CE} = 5V, -I _C = 2mA f = 1kHz	—	1.5 · 10 ⁻⁴	—	—
				—	2 · 10 ⁻⁴	—	—
				—	3 · 10 ⁻⁴	—	—
DC Current Gain	Current Gain Group A B C	h _{FE}	-V _{CE} = 5V, -I _C = 10μA	—	90	—	—
				—	150	—	—
				—	270	—	—
	Current Gain Group A B C	h _{FE}	-V _{CE} = 5 V, -I _C = 2mA	110	180	220	—
				200	290	450	—
				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-Emitter Cutoff Current	BC856 BC857 BC858, BC859	-I _{CES}	-V _{CE} = 80V	—	0.2	15	nA
			-V _{CE} = 50V	—	0.2	15	nA
			-V _{CE} = 30V	—	0.2	15	nA
			-V _{CE} = 80V, T _J = 125°C	—	—	4	μA
	BC856 BC857		-V _{CE} = 50V, T _J = 125°C	—	—	4	μA
			-V _{CE} = 30V, T _J = 125°C	—	—	4	μA
	BC858, BC859	-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 _{CB0}	-V _{CB} = 10V, f = 1MHz	—	—	6	pF
Noise Figure	BC856, BC857, BC858 BC859	F	-V _{CE} = 5V, -I _C = 200μA R _G = 2kΩ, f = 1kHz, Δf = 200Hz	—	2	10	dB
				—	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

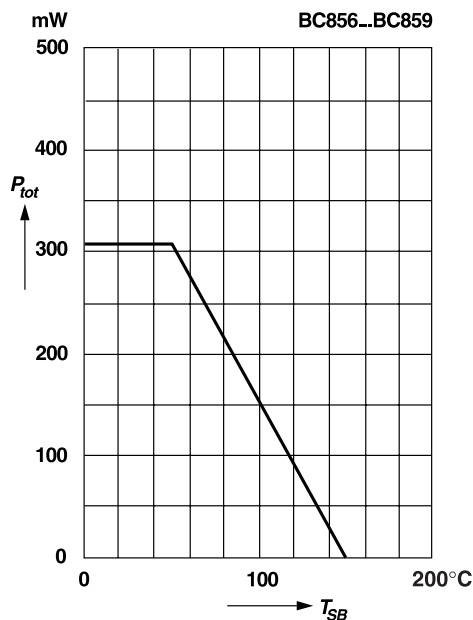
Small Signal Transistors (PNP)

Layout for $R_{\theta JA}$ test

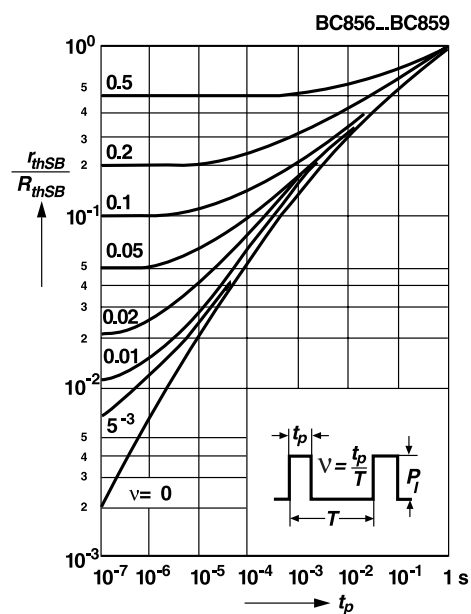
Thickness: Fiberglass 0.059 in. (1.5 mm)
Copper leads 0.012 in. (0.3 mm)



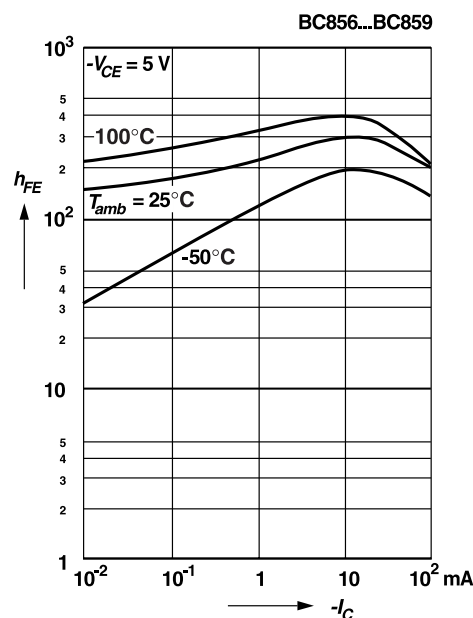
**Admissible power dissipation
versus temperature of substrate backside**
Device on fiberglass substrate, see layout



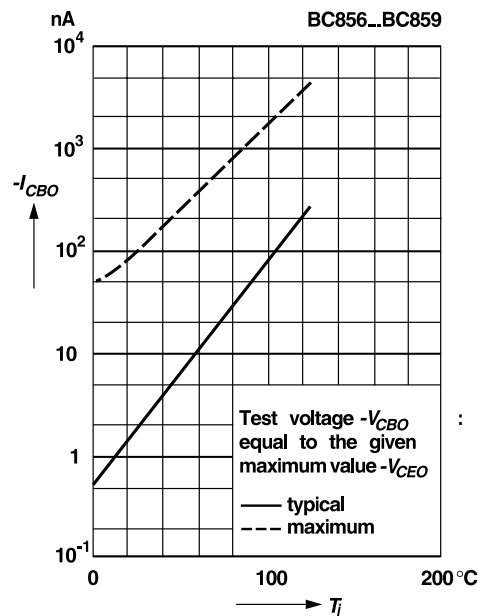
**Pulse thermal resistance
versus pulse duration (normalized)**
Device on fiberglass substrate, see layout



DC current gain versus collector current



**Collector-Base cutoff current versus
ambient temperature**

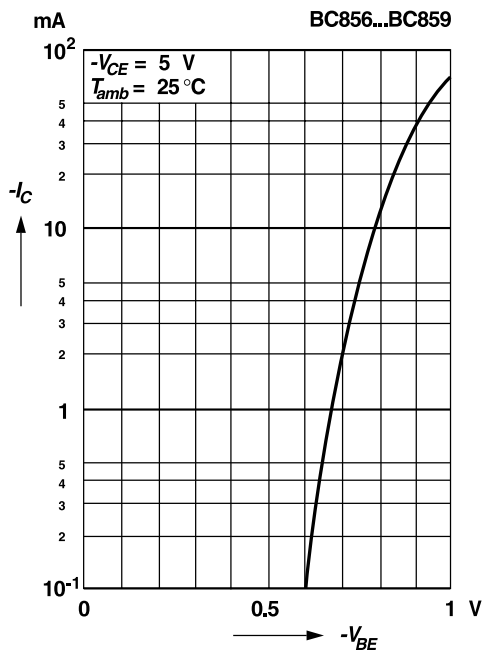


BC856 thru BC859

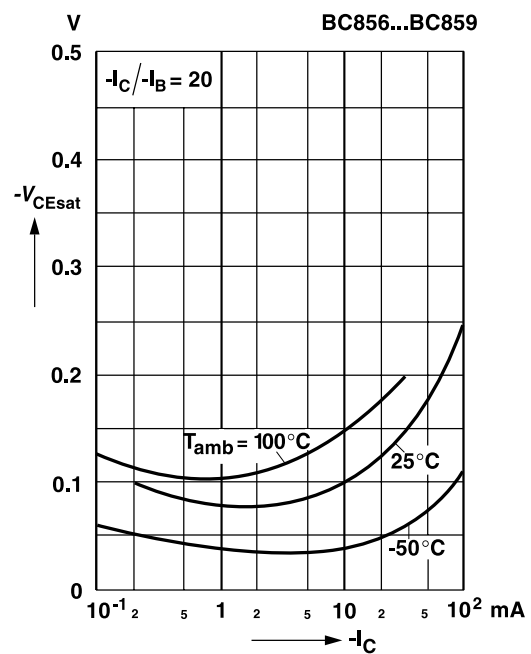
Small Signal Transistors (PNP)

Ratings and Characteristic Curves ($T_A = 25^\circ\text{C}$ unless otherwise noted)

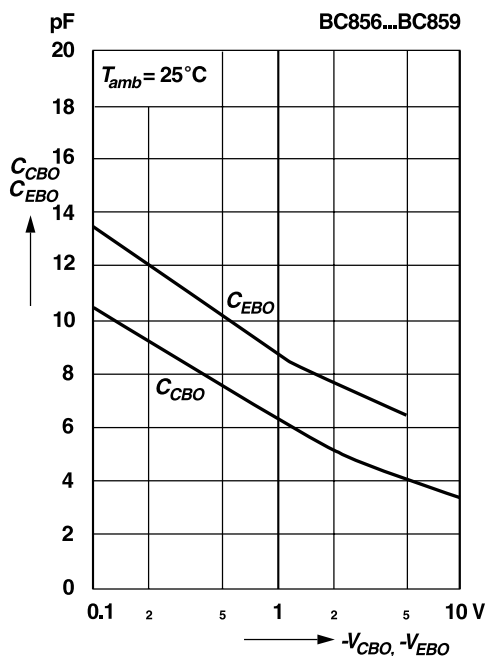
Collector current
versus base-emitter voltage



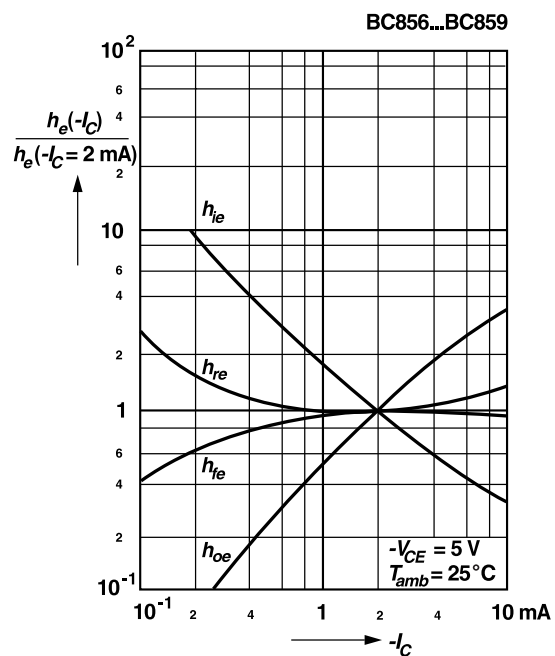
Collector saturation voltage
versus collector current



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



Relative h-parameters
versus collector current

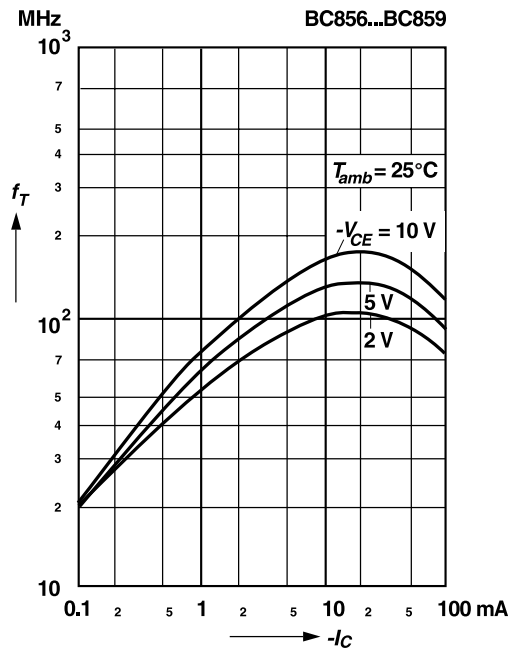


BC856 thru BC859

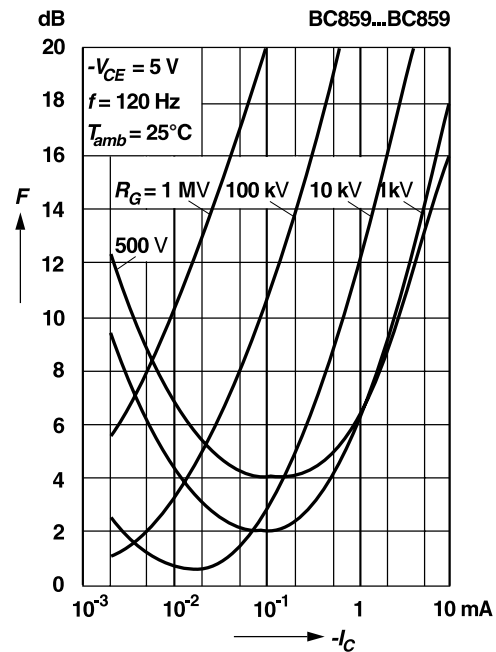
Small Signal Transistors (PNP)

Ratings and Characteristic Curves ($T_A = 25^\circ\text{C}$ unless otherwise noted)

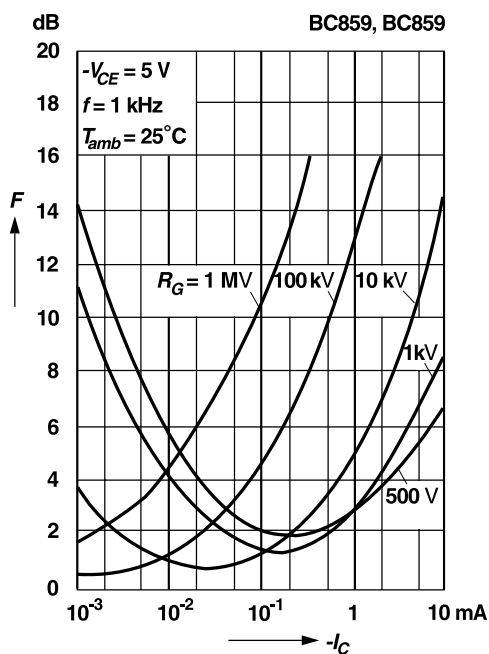
Gain-bandwidth product
versus collector current



Noise figure
versus collector current



Noise figure
versus collector current



Noise figure
versus collector-emitter voltage

