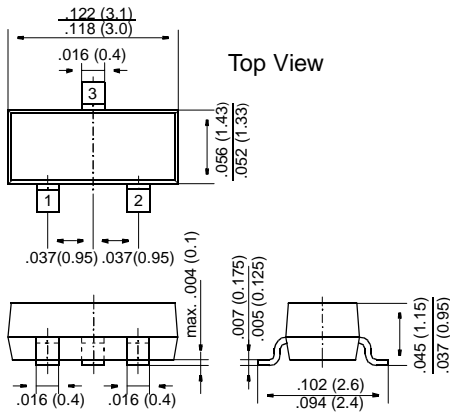


BC856 THRU BC859

Small Signal Transistors (PNP)

SOT-23



Dimensions in inches and (millimeters)

Pin configuration

1 = Base, 2 = Emitter, 3 = Collector.

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 BC859 is a low noise type.
- ◆ As complementary types, the NPN transistors BC846 ... BC849 are recommended.



MECHANICAL DATA

Case: SOT-23 Plastic Package

Weight: approx. 0.008 g

Marking code

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

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified

	Symbol	Value	Unit	
Collector-Base Voltage	BC856	$-V_{CB0}$	80	V
	BC857	$-V_{CB0}$	50	V
	BC858, BC859	$-V_{CB0}$	30	V
Collector-Emitter Voltage	BC856	$-V_{CES}$	80	V
	BC857	$-V_{CES}$	50	V
	BC858, BC859	$-V_{CES}$	30	V
Collector-Emitter Voltage	BC856	$-V_{CEO}$	65	V
	BC857	$-V_{CEO}$	45	V
	BC858, BC859	$-V_{CEO}$	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 $T_{SB} = 50\text{ °C}$	P_{tot}	310 ⁽¹⁾	mW	
Junction Temperature	T_j	150	°C	
Storage Temperature Range	T_S	-65 to +150	°C	

BC856 THRU BC859

ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified

	Symbol	Min.	Typ.	Max.	Unit
h-Parameters at $-V_{CE} = 5\text{ V}$, $-I_C = 2\text{ mA}$, $f = 1\text{ kHz}$					
Current Gain	Current Gain Group A	h_{fe}	—	220	—
	B	h_{fe}	—	330	—
	C	h_{fe}	—	600	—
Input Impedance	Current Gain Group A	h_{ie}	1.6	2.7	4.5
	B	h_{ie}	3.2	4.5	8.5
	C	h_{ie}	6	8.7	15
Output Admittance	Current Gain Group A	h_{oe}	—	18	30
	B	h_{oe}	—	30	60
	C	h_{oe}	—	60	110
Reverse Voltage Transfer Ratio	Current Gain Group A	h_{re}	—	$1.5 \cdot 10^{-4}$	—
	B	h_{re}	—	$2 \cdot 10^{-4}$	—
	C	h_{re}	—	$3 \cdot 10^{-4}$	—
DC Current Gain at $-V_{CE} = 5\text{ V}$, $-I_C = 10\text{ }\mu\text{A}$					
	Current Gain Group A	h_{FE}	—	90	—
	B	h_{FE}	—	150	—
	C	h_{FE}	—	270	—
at $-V_{CE} = 5\text{ V}$, $-I_C = 2\text{ mA}$					
	Current Gain Group A	h_{FE}	110	180	220
	B	h_{FE}	200	290	450
	C	h_{FE}	420	520	800
Thermal Resistance Junction to Substrate Backside	R_{thSB}	—	—	320 ¹⁾	K/W
Thermal Resistance Junction to Ambient Air	R_{thJA}	—	—	450 ¹⁾	K/W
Collector Saturation Voltage at $-I_C = 10\text{ mA}$, $-I_B = 0.5\text{ mA}$					
	$-V_{CEsat}$	—	90	300	mV
at $-I_C = 100\text{ mA}$, $-I_B = 5\text{ mA}$					
	$-V_{CEsat}$	—	250	650	mV
Base Saturation Voltage at $-I_C = 10\text{ mA}$, $-I_B = 0.5\text{ mA}$					
	$-V_{BEsat}$	—	700	—	mV
at $-I_C = 100\text{ mA}$, $-I_B = 5\text{ mA}$					
	$-V_{BEsat}$	—	900	—	mV
Base-Emitter Voltage at $-V_{CE} = 5\text{ V}$, $-I_C = 2\text{ mA}$					
	$-V_{BE}$	600	660	750	mV
at $-V_{CE} = 5\text{ V}$, $-I_C = 10\text{ mA}$					
	$-V_{BE}$	—	—	800	mV
Collector-Emitter Cutoff Current at $-V_{CE} = 80\text{ V}$					
	BC856	$-I_{CES}$	—	0.2	15
at $-V_{CE} = 50\text{ V}$					
	BC857	$-I_{CES}$	—	0.2	15
at $-V_{CE} = 30\text{ V}$					
	BC858, BC859	$-I_{CES}$	—	0.2	15
at $-V_{CE} = 80\text{ V}$, $T_j = 125\text{ }^\circ\text{C}$					
	BC856	$-I_{CES}$	—	—	4
at $-V_{CE} = 50\text{ V}$, $T_j = 125\text{ }^\circ\text{C}$					
	BC857	$-I_{CES}$	—	—	4
at $-V_{CE} = 30\text{ V}$, $T_j = 125\text{ }^\circ\text{C}$					
	BC858, BC859	$-I_{CES}$	—	—	4
at $-V_{CB} = 30\text{ V}$					
		$-I_{CBO}$	—	—	15
at $-V_{CB} = 30\text{ V}$, $T_j = 150\text{ }^\circ\text{C}$					
		$-I_{CBO}$	—	—	5
Gain-Bandwidth Product at $-V_{CE} = 5\text{ V}$, $-I_C = 10\text{ mA}$, $f = 100\text{ MHz}$	f_T	—	150	—	MHz

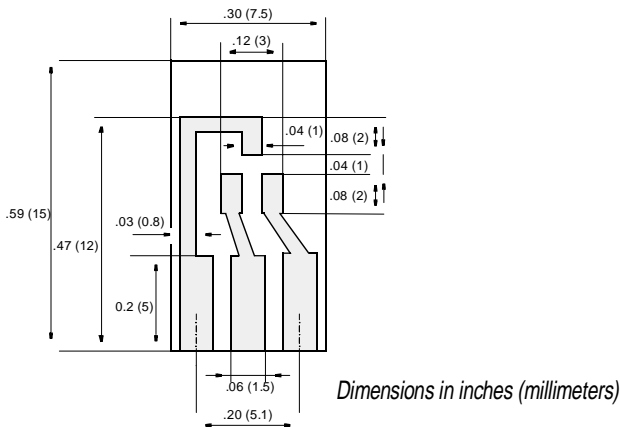
¹⁾ Device on fiberglass substrate, see layout

BC856 THRU BC859

ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified

	Symbol	Min.	Typ.	Max.	Unit
Collector-Base Capacitance at $-V_{CB} = 10 \text{ V}$, $f = 1 \text{ MHz}$	C_{CBO}	–	–	6	pF
Noise Figure at $-V_{CE} = 5 \text{ V}$, $-I_C = 200 \mu\text{A}$, $R_G = 2 \text{ k}\Omega$, $f = 1 \text{ kHz}$, $\Delta f = 200 \text{ Hz}$ BC856, BC857, BC858	F	–	2	10	dB
BC859	F	–	1	4	dB
Noise Figure at $-V_{CE} = 5 \text{ V}$, $-I_C = 200 \mu\text{A}$, $R_G = 2 \text{ k}\Omega$, $f = 30 \dots 15000 \text{ Hz}$ BC859	F	–	1.2	4	dB



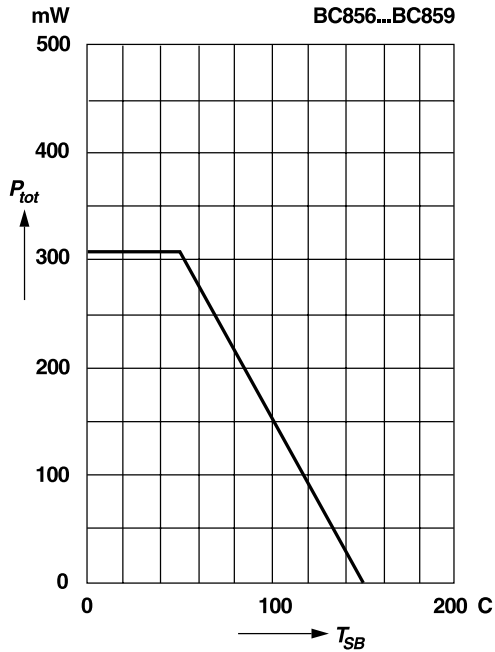
Layout for R_{thJA} test

Thickness: Fiberglass 0.059 in (1.5 mm)

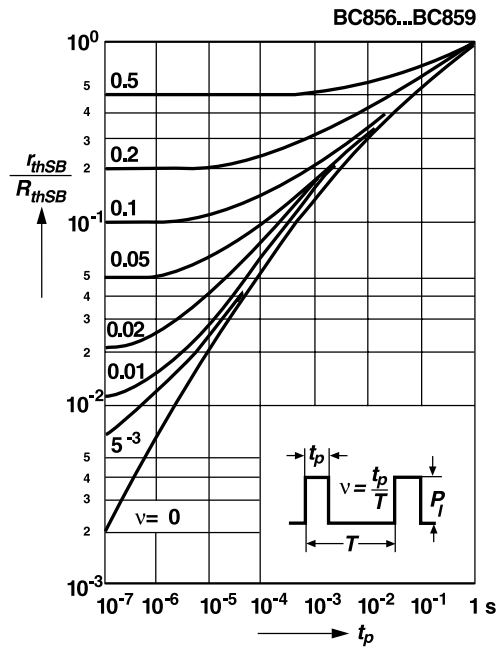
Copper leads 0.012 in (0.3 mm)

RATINGS AND CHARACTERISTIC CURVES BC856 THRU BC859

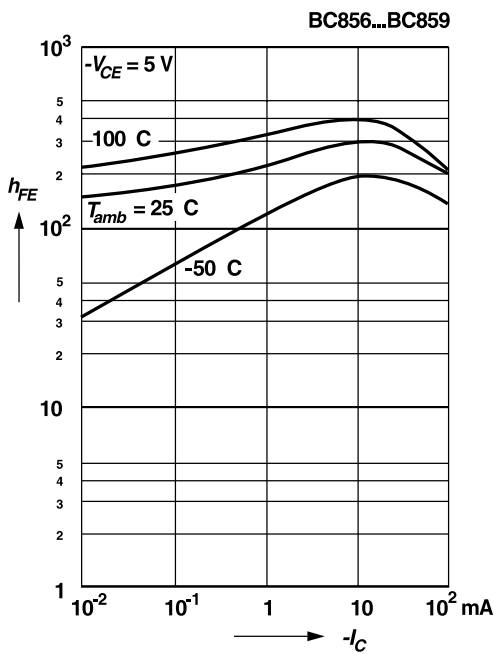
Admissible power dissipation versus temperature of substrate backside
Device on fiberglass substrate, see layout



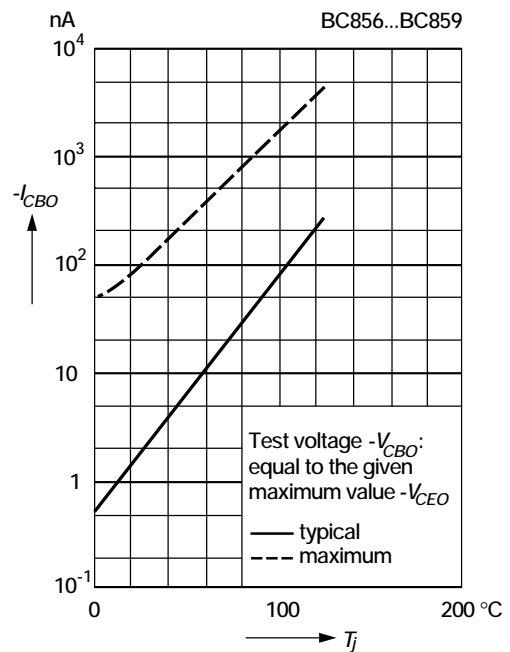
Pulse thermal resistance versus pulse duration (normalized)
Device on fiberglass substrate, see layout



DC current gain versus collector current

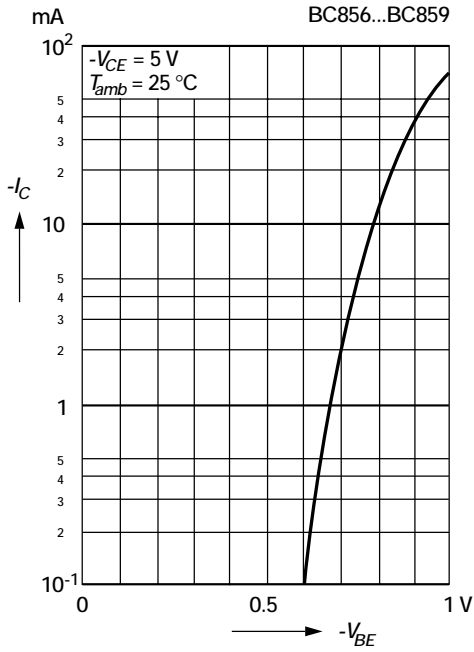


Collector-base cutoff current versus junction temperature

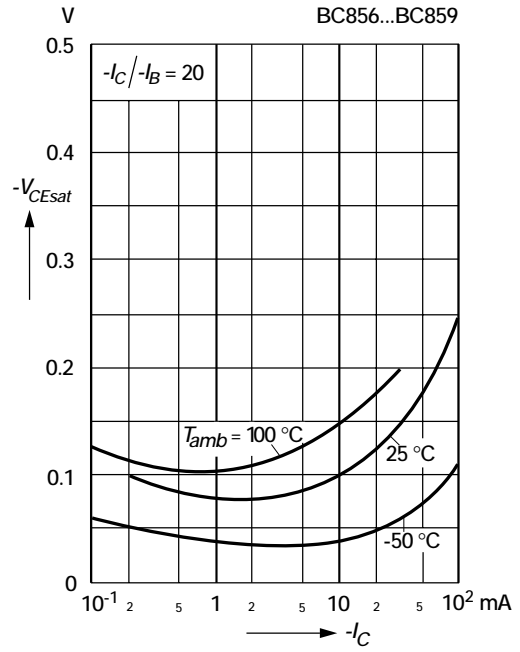


RATINGS AND CHARACTERISTIC CURVES BC856 THRU BC859

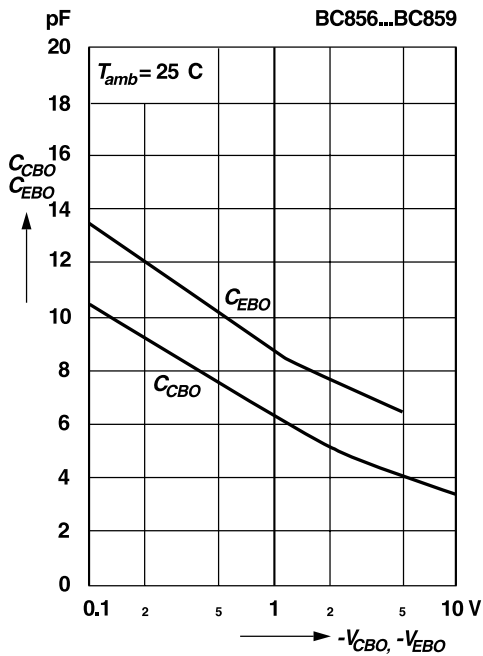
Collector current versus base-emitter voltage



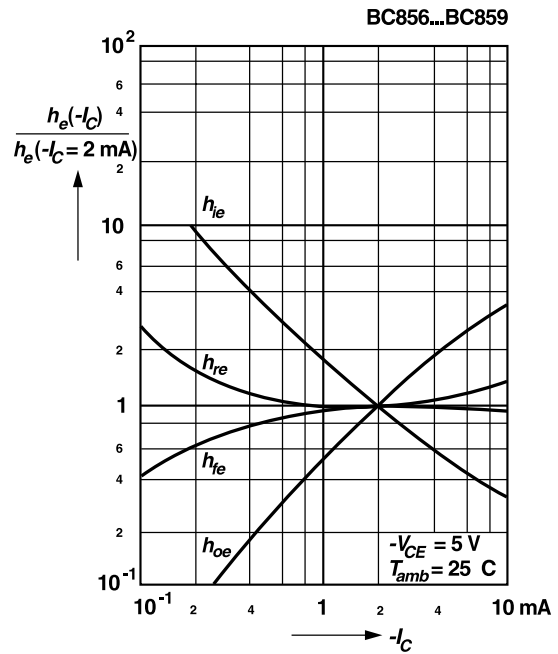
Collector saturation voltage versus collector current



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

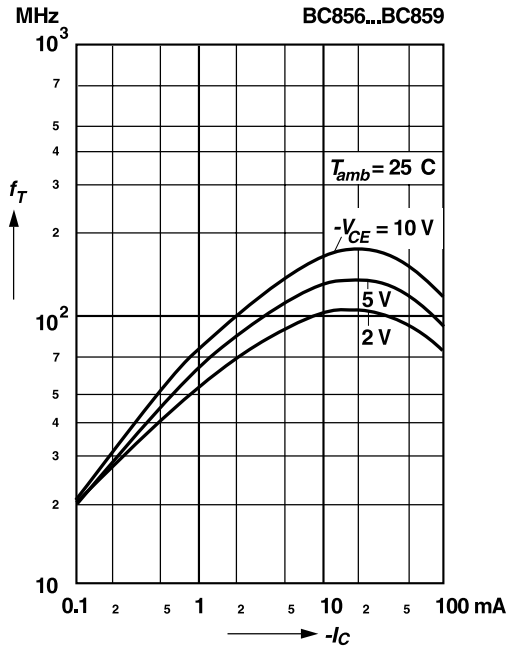


Relative h-parameters versus collector current

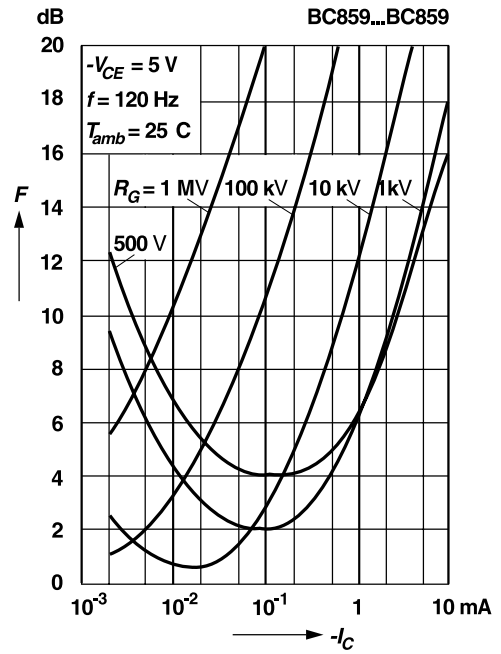


RATINGS AND CHARACTERISTIC CURVES BC856 THRU BC859

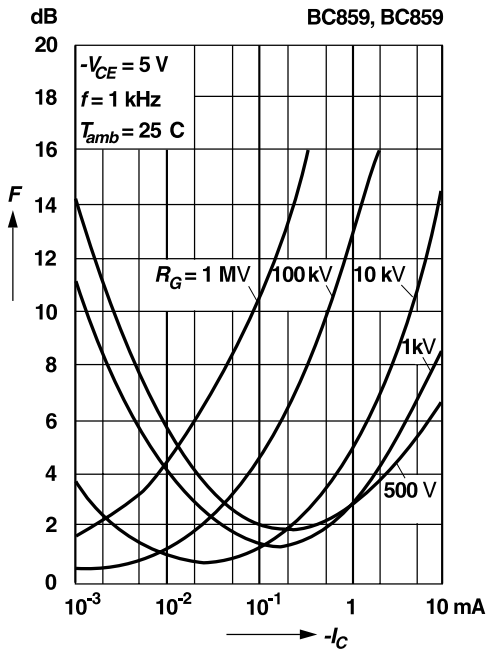
Gain-bandwidth product
versus collector current



Noise figure
versus collector current



Noise figure
versus collector current



Noise figure
versus collector-emitter voltage

