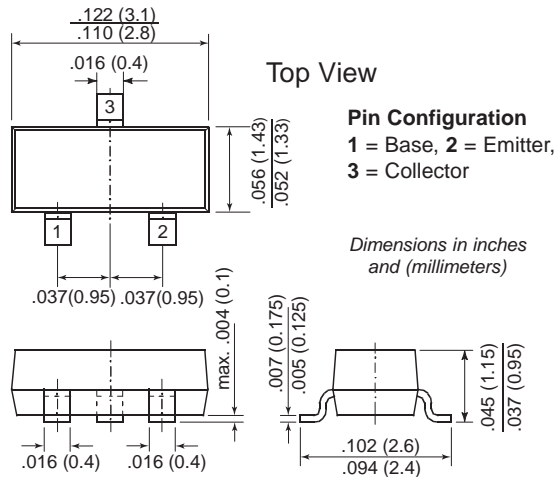


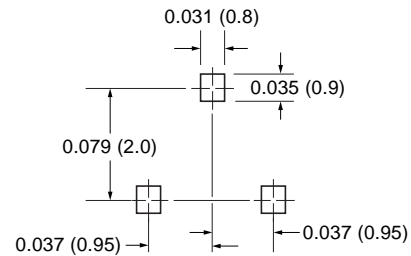


TO-236AB (SOT-23)

## Small Signal Transistors (PNP)



### 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

### 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 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

### Maximum Ratings and Thermal Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-Base Voltage	-V <sub>CB0</sub>	BC856	80
		BC857	50
		BC858, BC859	30
Collector-Emitter Voltage (Base shorted)	-V <sub>CES</sub>	BC856	80
		BC857	50
		BC858, BC859	30
Collector-Emitter Voltage (Base open)	-V <sub>CEO</sub>	BC856: 65 BC857: 45 BC858, BC859: 30	V
Emitter-Base Voltage	-V <sub>EBO</sub>	5	V
Collector Current	-I <sub>C</sub>	100	mA
Peak Collector Current	-I <sub>CM</sub>	200	mA
Peak Base Current	-I <sub>BM</sub>	200	mA
Peak Emitter Current	I <sub>EM</sub>	200	mA
Power Dissipation at T <sub>SB</sub> = 50°C	P <sub>tot</sub>	310 <sup>(1)</sup>	mW
Thermal Resistance Junction to Ambient Air	R <sub>θJA</sub>	450 <sup>(1)</sup>	°C/W
Thermal Resistance Junction to Substrate Backside	R <sub>θSB</sub>	320 <sup>(1)</sup>	°C/W
Junction Temperature	T <sub>j</sub>	150	°C
Storage Temperature Range	T <sub>s</sub>	-65 to +150	°C

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

# BC856 thru BC859

Vishay Semiconductors  
formerly General Semiconductor



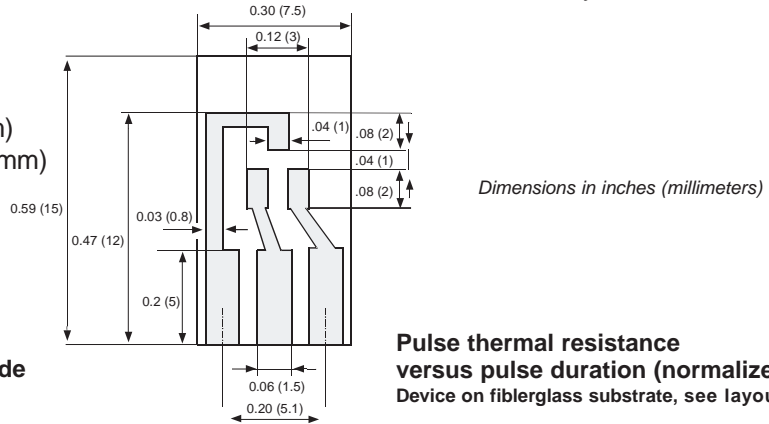
## Electrical Characteristics (T<sub>J</sub> = 25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Current Gain	Current Gain Group A B C	$-V_{CE} = 5V, -I_C = 2mA$ $f = 1kHz$	—	220	—	—
			—	330	—	—
			—	600	—	—
Input Impedance	Current Gain Group A B C	$-V_{CE} = 5V, -I_C = 2mA$ $f = 1kHz$	1.6	2.7	4.5	k $\Omega$
			3.2	4.5	8.5	
			6.0	8.7	15.0	
Output Admittance	Current Gain Group A B C	$-V_{CE} = 5V, -I_C = 2mA$ $f = 1kHz$	—	18	30	$\mu S$
			—	30	60	
			—	60	110	
Reverse Voltage Transfer Ratio	Current Gain Group A B C	$-V_{CE} = 5V, -I_C = 2mA$ $f = 1kHz$	—	$1.5 \cdot 10^{-4}$	—	—
			—	$2 \cdot 10^{-4}$	—	—
			—	$3 \cdot 10^{-4}$	—	—
DC Current Gain	Current Gain Group A B C	$-V_{CE} = 5V, -I_C = 10\mu A$	—	90	—	—
			—	150	—	—
			—	270	—	—
	Current Gain Group A B C	$-V_{CE} = 5V, -I_C = 2mA$	110	180	220	—
			200	290	450	—
			420	520	800	—
Collector Saturation Voltage	$-V_{CEsat}$	$-I_C = 10mA, -I_B = 0.5mA$	—	90	300	mV
		$-I_C = 100mA, -I_B = 5mA$	—	250	650	
Base Saturation Voltage	$-V_{BEsat}$	$-I_C = 10mA, -I_B = 0.5mA$	—	700	—	mV
		$-I_C = 100mA, -I_B = 5mA$	—	900	—	
Base-Emitter Voltage $-V_{BEon}$	$-V_{CE} = 5V, -I_C = 2mA$	600	660	750	820	mV
Collector-Base Cutoff Current	$-I_{CBO}$	$-V_{CB} = 30V$	—	—	15	nA
		$-V_{CB} = 30V, T_J = 150^\circ C$	—	—	5	$\mu A$
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 BC859	$-V_{CE} = 5V, -I_C = 200\mu A$ $R_G = 2k\Omega, f = 1kHz, \Delta f = 200Hz$	—	2	10	dB
			—	1	4	
			—	1.2	4	
	BC859	$-V_{CE} = 5V, -I_C = 200\mu A$ $R_G = 2k\Omega, f = 30...15000Hz$	—	1.2	4	

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

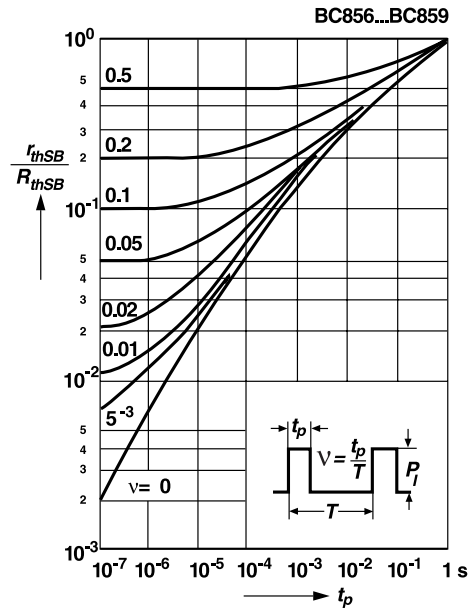
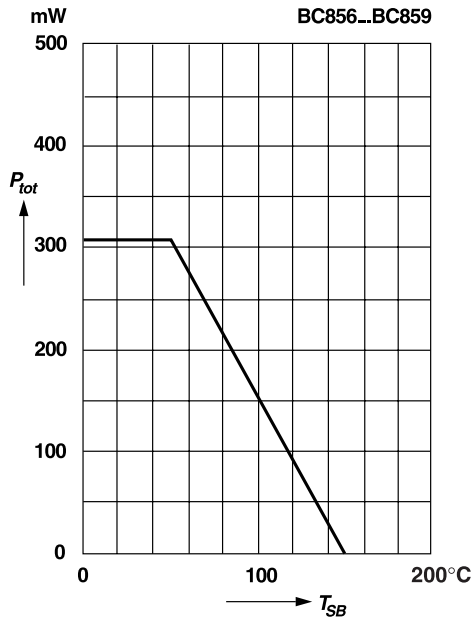
## Layout for $R_{\theta JA}$ test

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



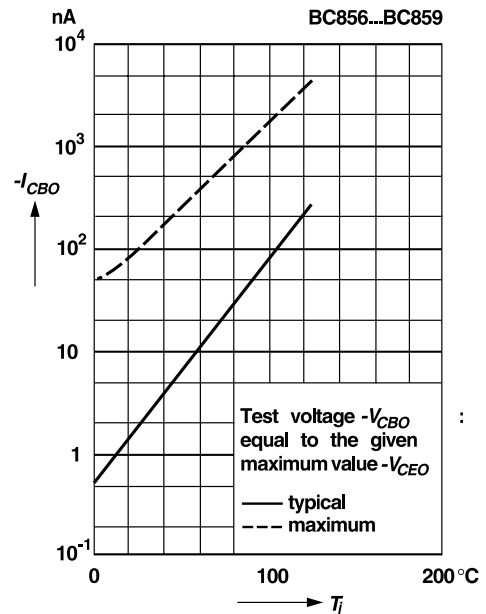
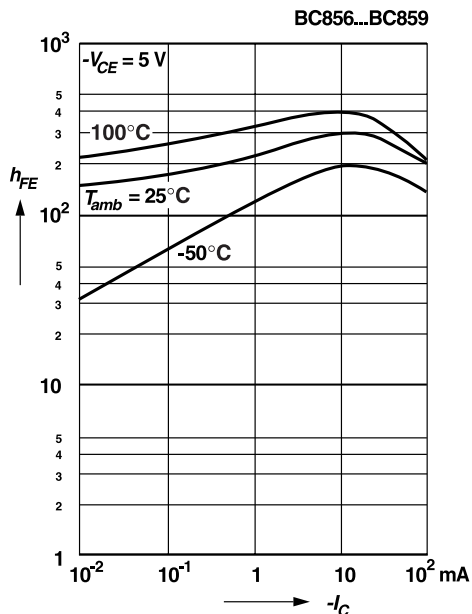
**Admissible power dissipation versus temperature of substrate backside**  
Device on fiberglass substrate, see layout

**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**



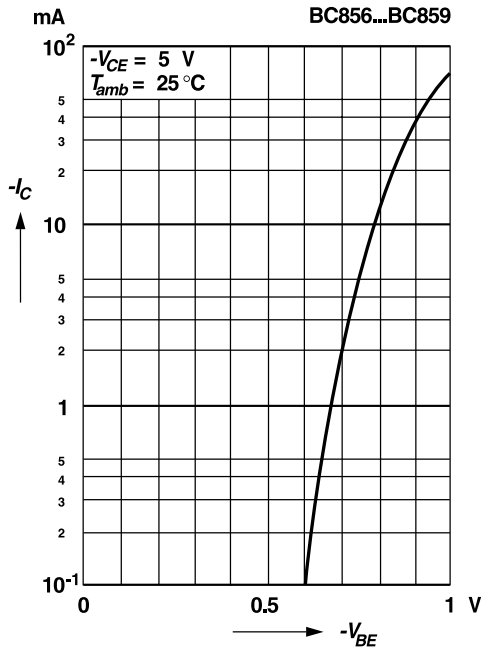
# BC856 thru BC859



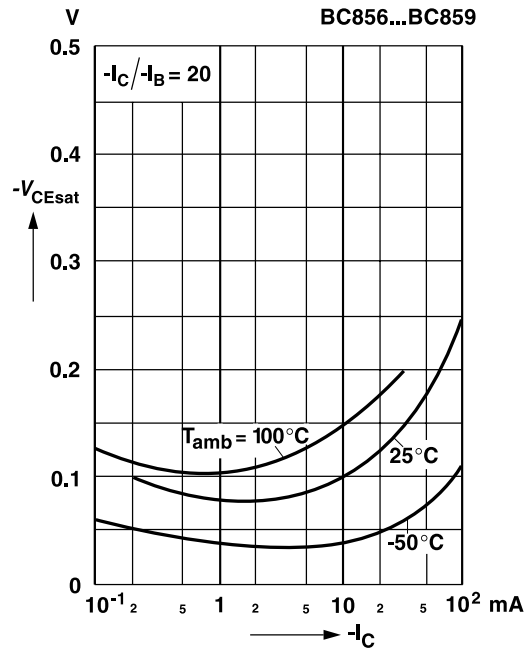
Vishay Semiconductors  
formerly General Semiconductor

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

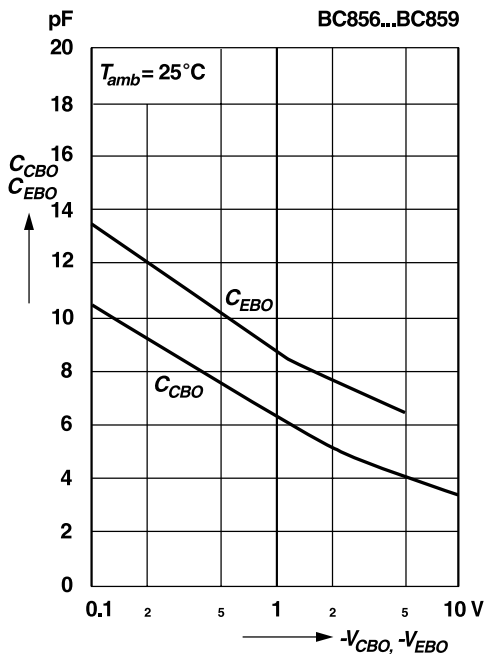
**Collector current versus base-emitter voltage**



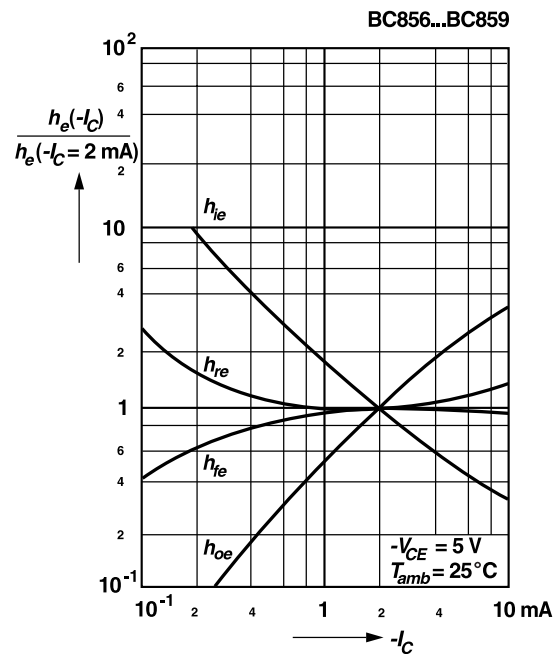
**Collector saturation voltage versus collector current**



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

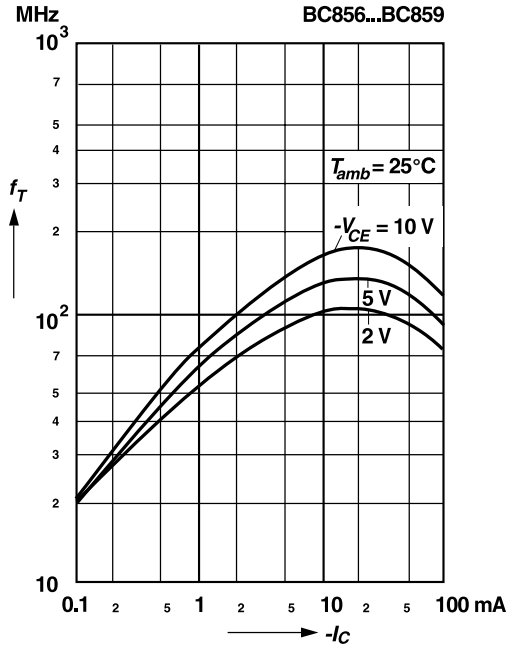


**Relative h-parameters versus collector current**

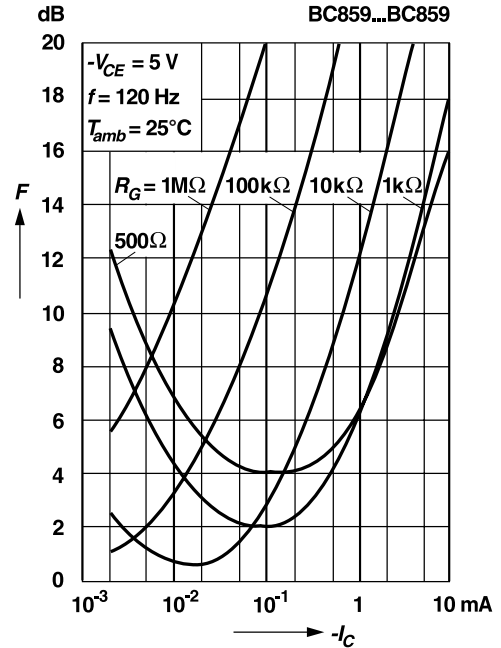


## Ratings and Characteristic Curves ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

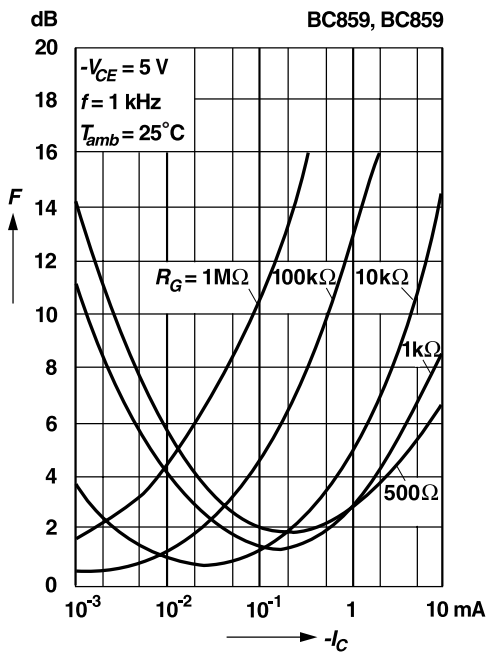
**Gain-bandwidth product versus collector current**



**Noise figure versus collector current**



**Noise figure versus collector current**



**Noise figure versus collector-emitter voltage**

