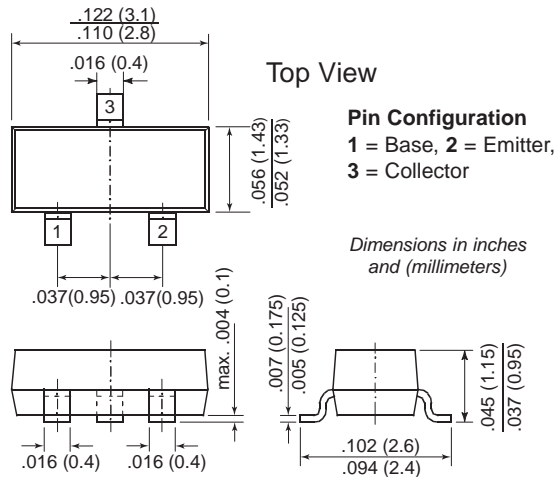


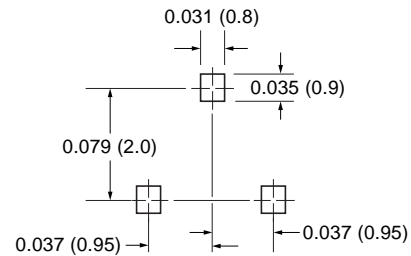


TO-236AB (SOT-23)

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_A = 25°C unless otherwise noted)

Parameter	Symbol	Value	Unit	
Collector-Base Voltage	BC856 BC857 BC858, BC859	-V _{CB0}	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 _{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

Vishay Semiconductors
formerly General Semiconductor



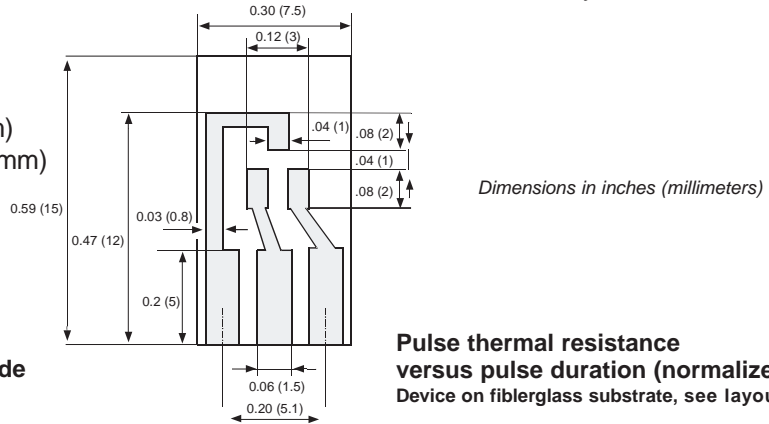
Electrical Characteristics (T_J = 25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Current Gain	Current Gain Group A B C	$-V_{CE} = 5V, -I_C = 2mA$ $f = 1kHz$	—	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 Ω
			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	μS
			—	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	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 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

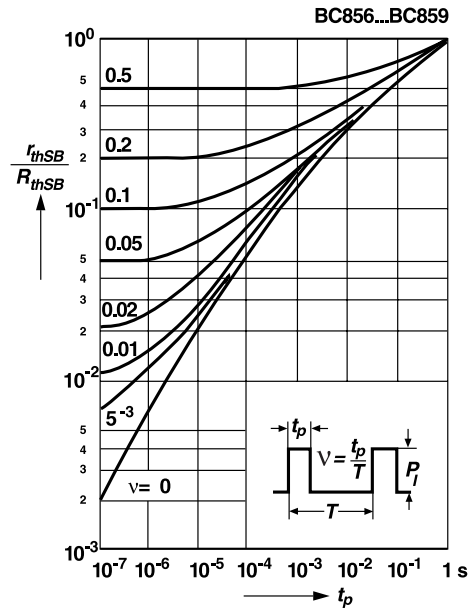
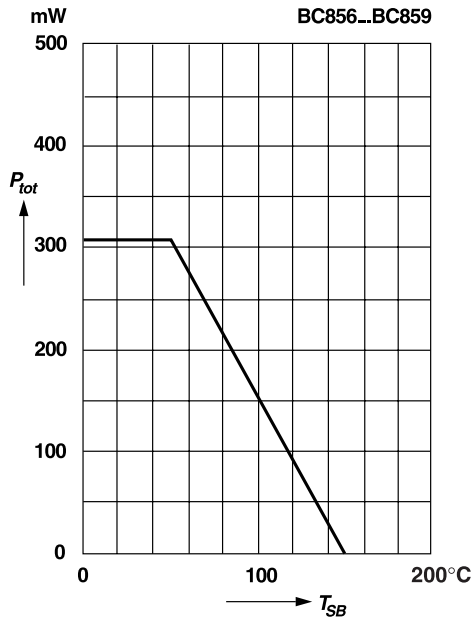
Layout for $R_{\theta JA}$ test

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



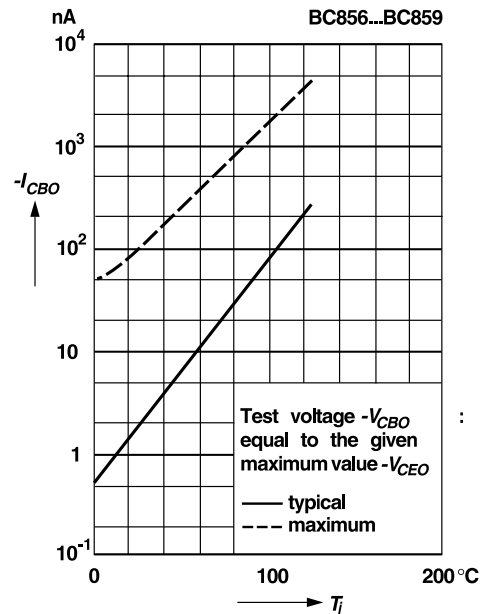
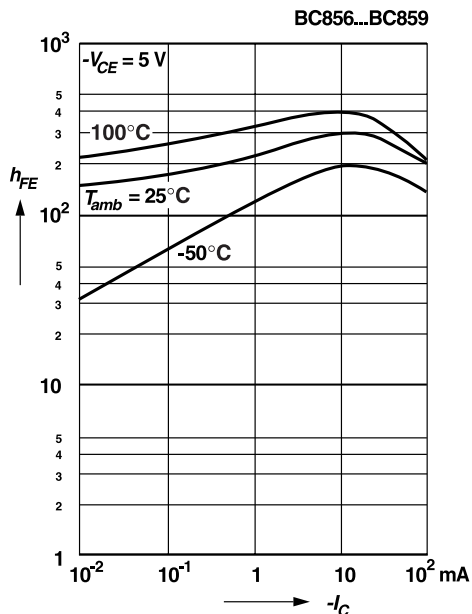
Admissible power dissipation versus temperature of substrate backside
Device on fiberglass substrate, see layout

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



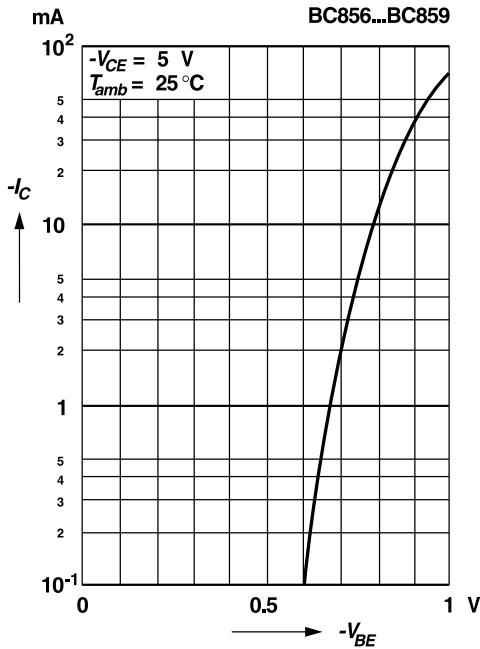
BC856 thru BC859



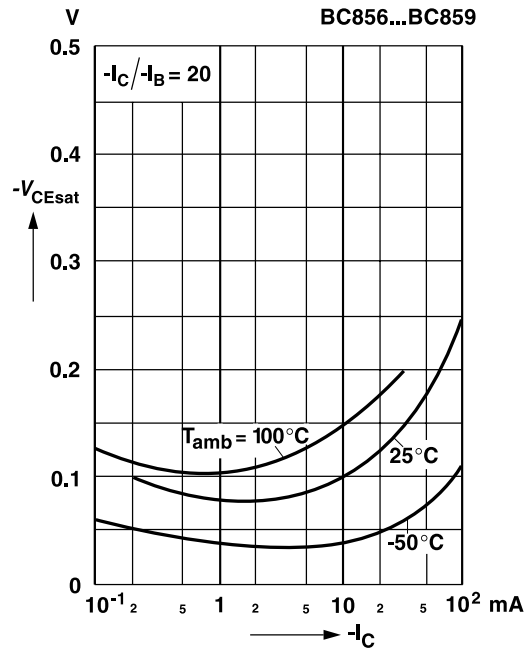
Vishay Semiconductors
formerly General Semiconductor

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

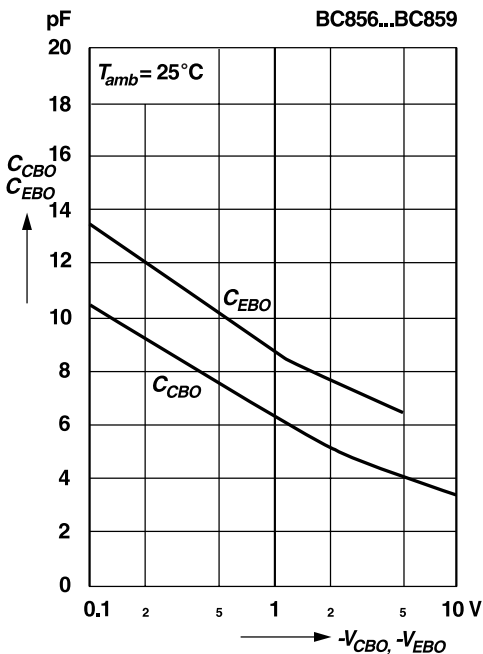
Collector current versus base-emitter voltage



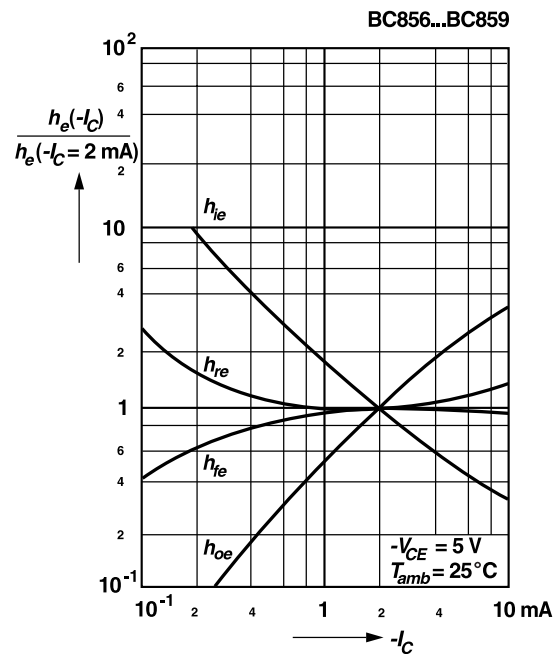
Collector saturation voltage versus collector current



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

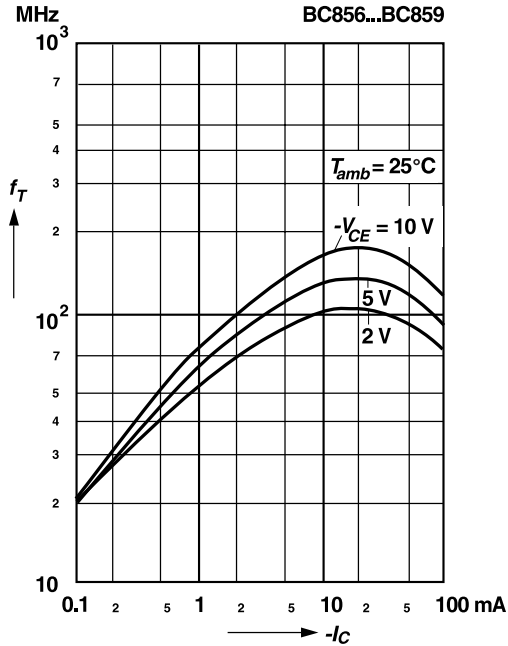


Relative h-parameters versus collector current

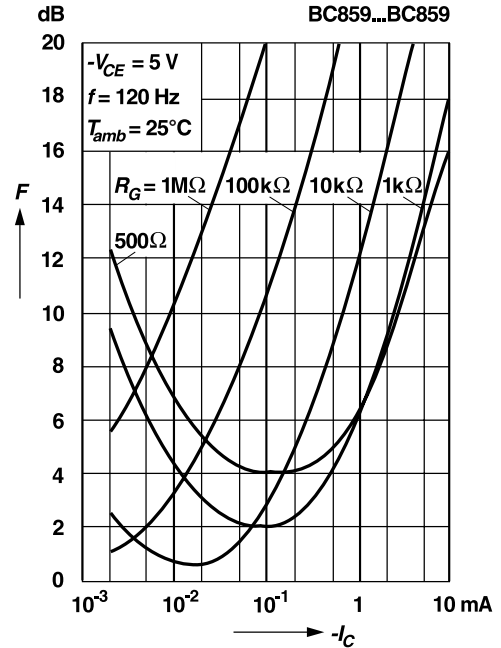


Ratings and Characteristic Curves ($T_A = 25^\circ\text{C}$ unless otherwise noted)

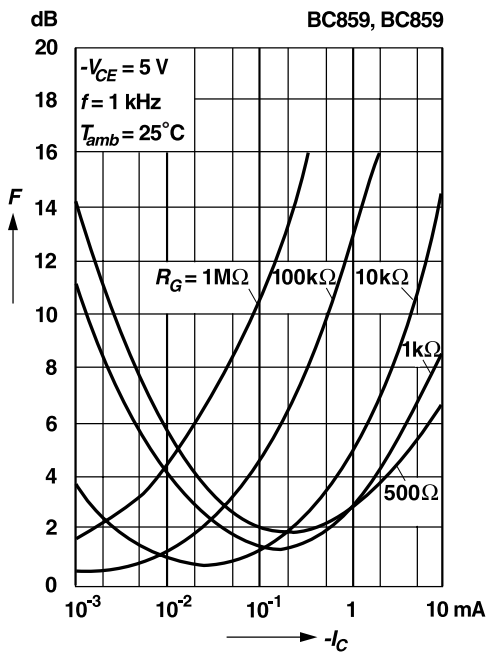
Gain-bandwidth product versus collector current



Noise figure versus collector current



Noise figure versus collector current



Noise figure versus collector-emitter voltage

