PNP Silicon Epitaxial Planar Transistors
for switching and AF amplifier applications.

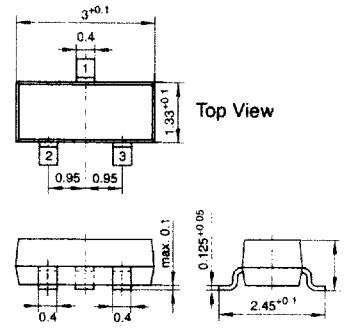
Especially suited for automatic insertion in thick- and thin-film circuits.

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.

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

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		



SOT-23 Plastic Package
Weight approx. 0.008 g
Dimensions in mm

Absolute Maximum Ratings

		Symbol	Value	Unit
Collector-Base Voltage	**BC856**	$-V_{CBO}$	80	V
	BC857	$-V_{CBO}$	50	V
	BC858, BC859	$-V_{CBO}$	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 °C		P_{tot}	310[1]	mW
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_S	−65 ... +150	°C

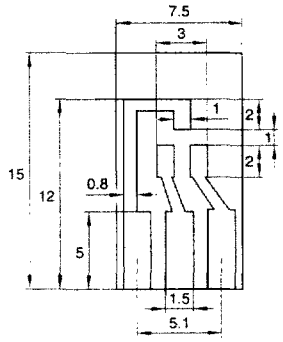
Characteristics at T_{amb} = 25 °C

	Symbol	Min.	Typ.	Max.	Unit
h-Parameters					
at $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 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	kΩ
B	h_{ie}	3.2	4.5	8.5	kΩ
C	h_{ie}	6	8.7	15	kΩ
Output Admittance **Current Gain Group A**	h_{oe}	–	18	30	µS
B	h_{oe}	–	30	60	µS
C	h_{oe}	–	60	110	µS
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 V, $-I_C$ = 10 µA					
Current Gain Group A	h_{FE}	–	90	–	–
B	h_{FE}	–	150	–	–
C	h_{FE}	–	270	–	–
at $-V_{CE}$ = 5 V, $-I_C$ = 2 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_{thA}	–	–	450[1]	K/W
Collector Saturation Voltage					
at $-I_C$ = 10 mA, $-I_B$ = 0.5 mA	$-V_{CEsat}$	–	90	300	mV
at $-I_C$ = 100 mA, $-I_B$ = 5 mA	$-V_{CEsat}$	–	250	650	mV
Base Saturation Voltage					
at $-I_C$ = 10 mA, $-I_B$ = 0.5 mA	$-V_{BEsat}$	–	700	–	mV
at $-I_C$ = 100 mA, $-I_B$ = 5 mA	$-V_{BEsat}$	–	900	–	mV
Base-Emitter Voltage					
at $-V_{CE}$ = 5 V, $-I_C$ = 2 mA	$-V_{BE}$	600	660	750	mV
at $-V_{CE}$ = 5 V, $-I_C$ = 10 mA	$-V_{BE}$	–	–	800	mV
Collector-Emitter Cutoff Current					
at $-V_{CE}$ = 80 V **BC856**	$-I_{CES}$	–	0.2	15	nA
at $-V_{CE}$ = 50 V **BC857**	$-I_{CES}$	–	0.2	15	nA
at $-V_{CE}$ = 30 V **BC858, BC859**	$-I_{CES}$	–	0.2	15	nA
at $-V_{CE}$ = 80 V, T_j = 125 °C **BC856**	$-I_{CES}$	–	–	4	µA
at $-V_{CE}$ = 50 V, T_j = 125 °C **BC857**	$-I_{CES}$	–	–	4	µA
at $-V_{CE}$ = 30 V, T_j = 125 °C **BC858, BC859**	$-I_{CES}$	–	–	4	µA
at $-V_{CB}$ = 30 V	$-I_{CBO}$	–	–	15	nA
at $-V_{CB}$ = 30 V, T_j = 150 °C	$-I_{CBO}$	–	–	5	µA
Gain-Bandwidth Product at $-V_{CE}$ = 5 V, $-I_C$ = 10 mA, f = 100 MHz	f_T	–	150	–	MHz

[1] Device on fiberglass substrate, see layout

Characteristics, continuation

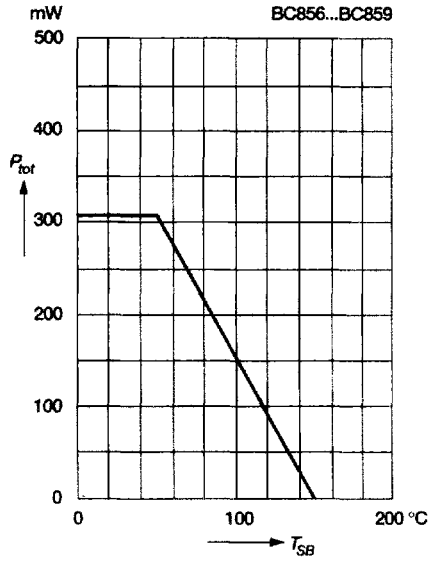
	Symbol	Min.	Typ.	Max.	Unit
Collector-Base Capacitance at $-V_{CB}$ = 10 V, f = 1 MHz	C_{CBO}	–	–	6	pF
Noise Figure at $-V_{CE}$ = 5 V, $-I_C$ = 200 µA, R_G = 2 kΩ, f = 1 kHz, Δf = 200 Hz **BC856, BC857, BC858** **BC859**	F F	– –	2 1	10 4	dB dB
Noise Figure at $-V_{CE}$ = 5 V, $-I_C$ = 200 µA, R_G = 2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



Layout for R_{thA} test
Thickness: Fiberglass 1.5 mm
Copper leads 0.3 mm

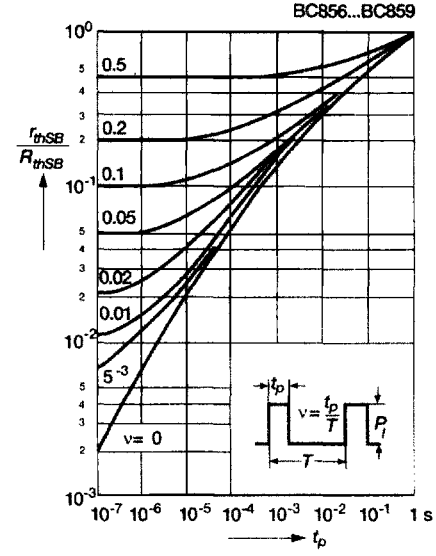
Admissible power dissipation versus temperature of substrate backside

Device on fiberglass substrate, see layout

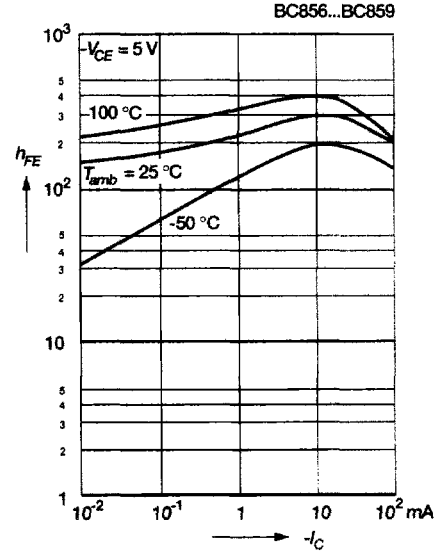


Pulse thermal resistance versus pulse duration (normalized)

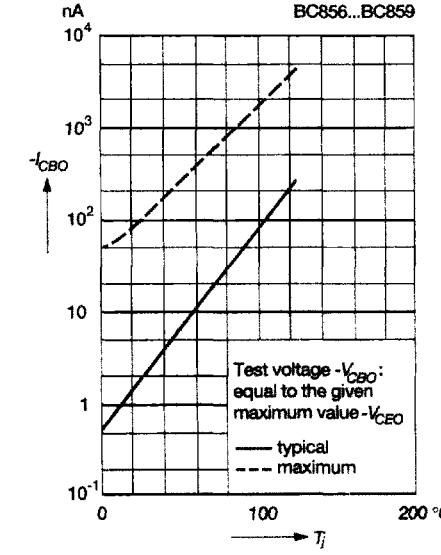
Device on fiberglass substrate, see layout



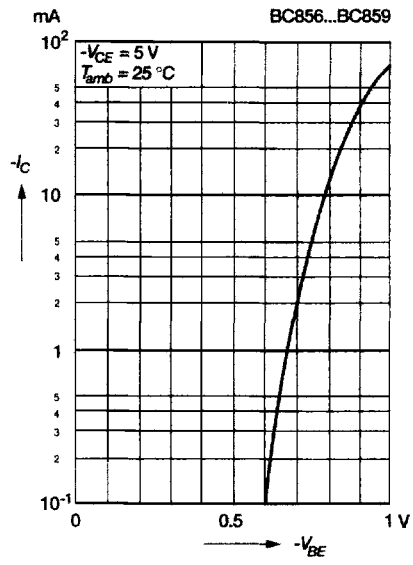
DC current gain versus collector current



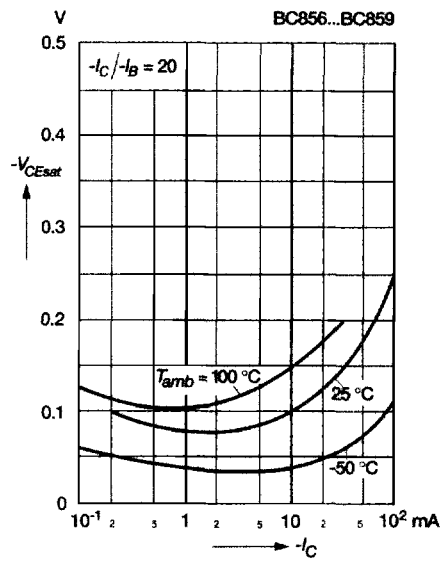
Collector-base cutoff current versus junction temperature



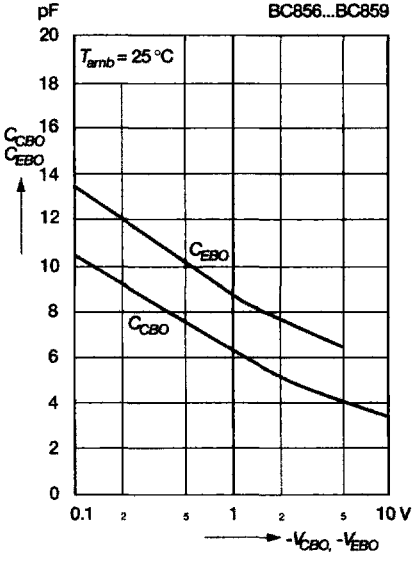
Collector current versus base-emitter voltage



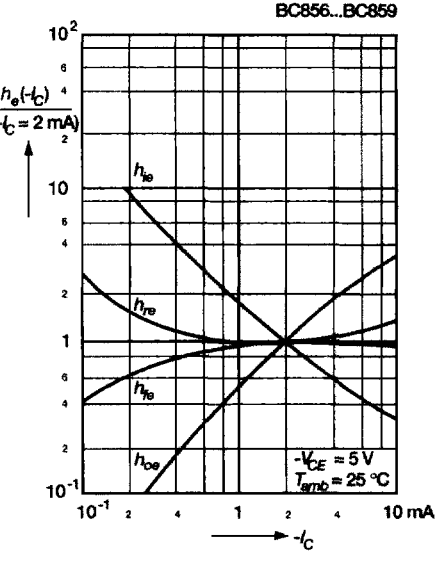
Collector saturation voltage versus collector current



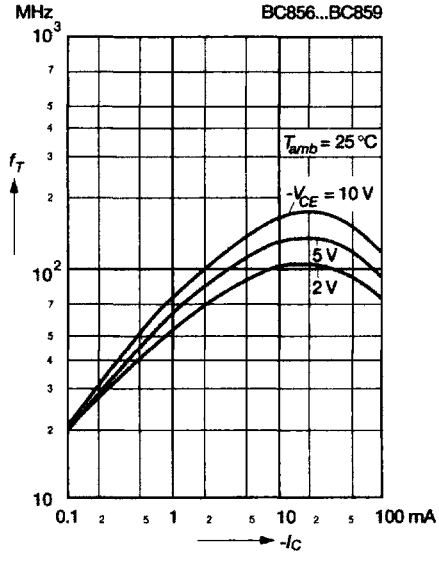
Collector-base capacitance, Emitter-base capacitance versus reverse bias voltage



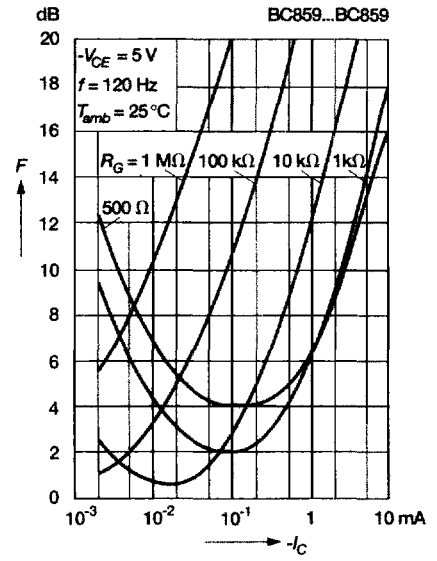
Relative h-parameters versus collector current



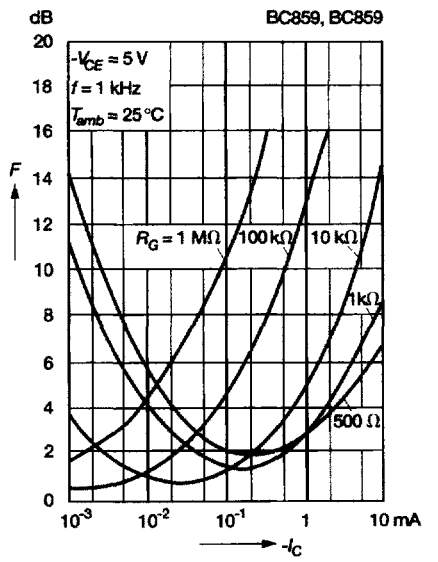
Gain-bandwidth product versus collector current



Noise figure versus collector current



Noise figure versus collector current



Noise figure versus collector-emitter voltage