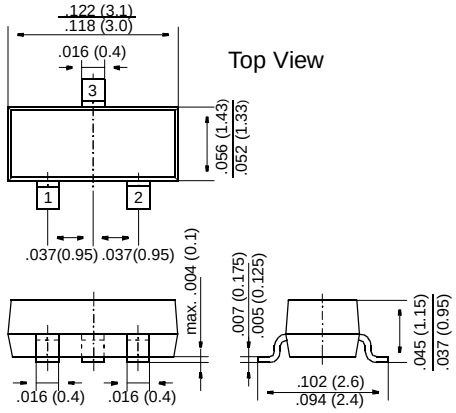
BC856 THRU BC859

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
BC856A	3A
B	3B
BC857A	3E
B	3F
C	3G
BC858A	3J
B	3K
C	3L

Type	Marking
BC859A	4A
B	4B
C	4C

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified

		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 to +150	°C

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ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified

	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_{thJA}	–	–	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

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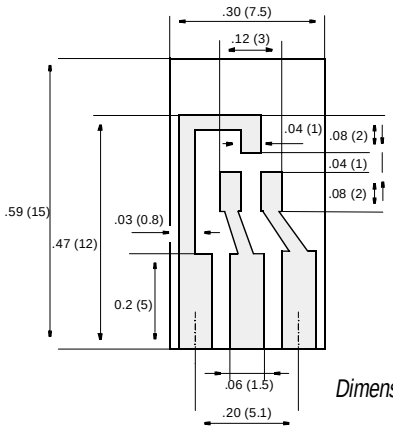
ELECTRICAL CHARACTERISTICS

Ratings at 25 °C ambient temperature unless otherwise specified

	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**	F	–	2	10	dB
BC859	F	–	1	4	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



Dimensions in inches (millimeters)

Layout for R_{thJA} test

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

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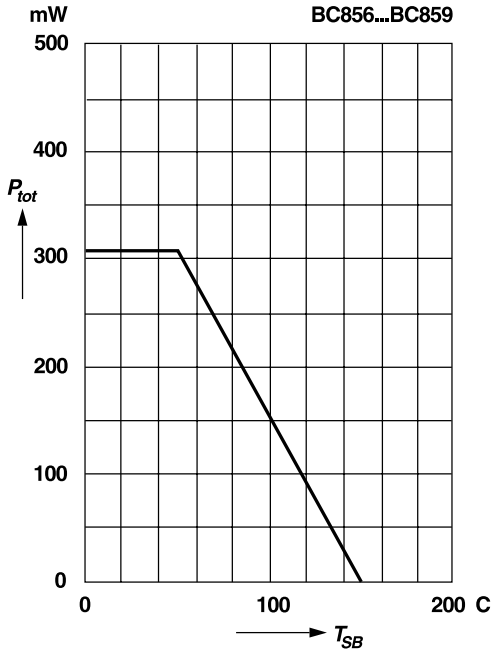
RATINGS AND CHARACTERISTIC CURVES BC856 THRU BC859

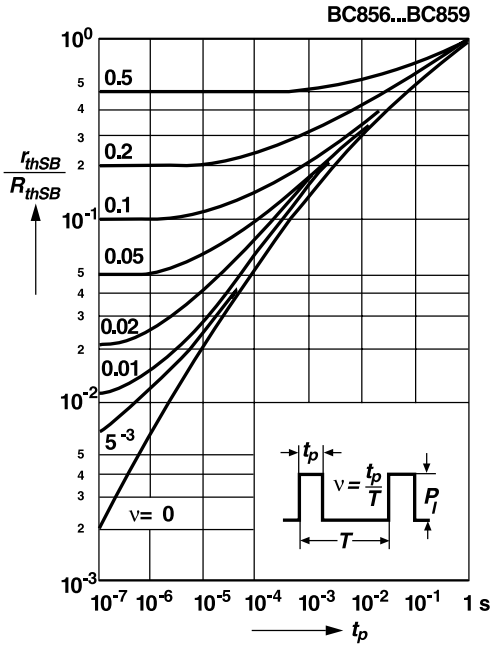
Admissible power dissipation versus temperature of substrate backside

Device on fiberglass substrate, see layout

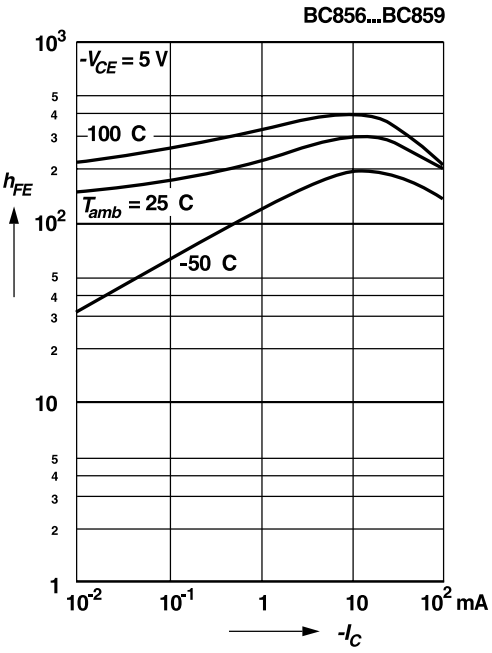


Pulse thermal resistance versus pulse duration (normalized)

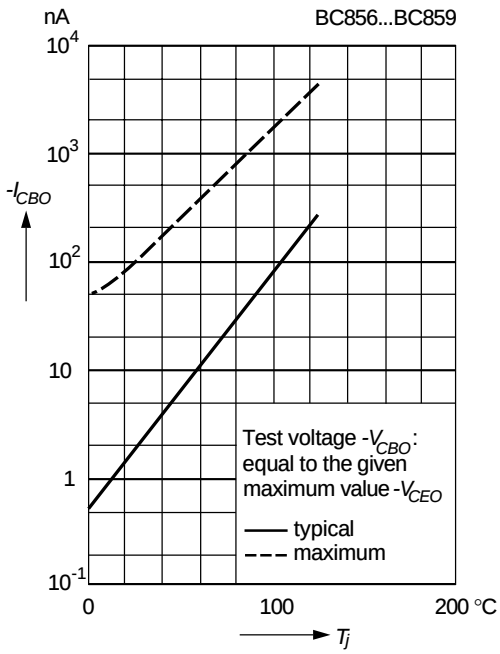
Device on fiberglass substrate, see layout



DC current gain versus collector current



Collector-base cutoff current versus junction temperature



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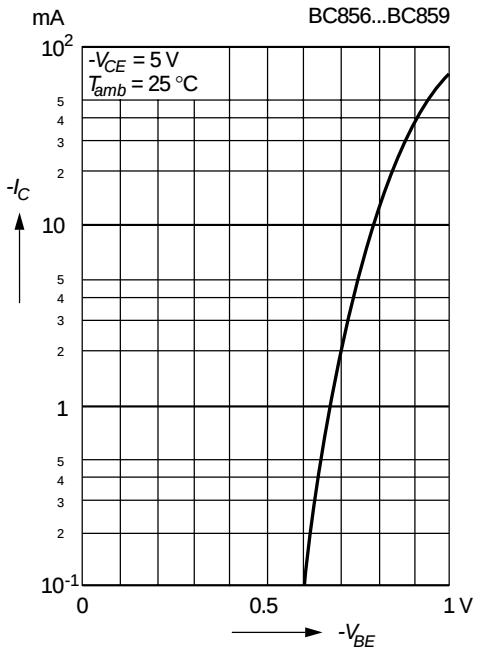
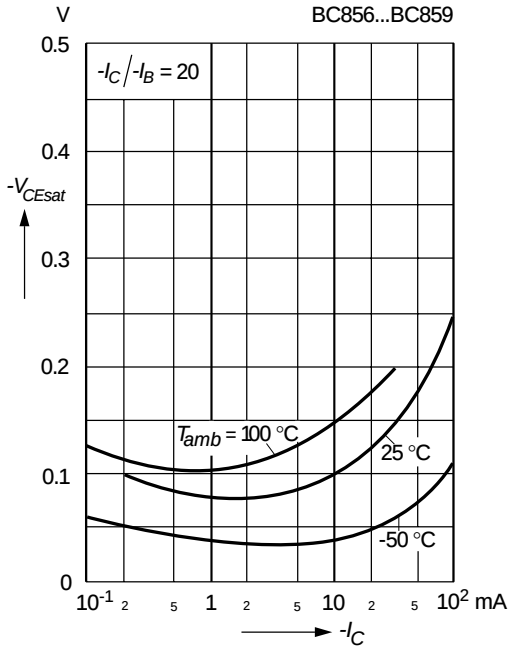
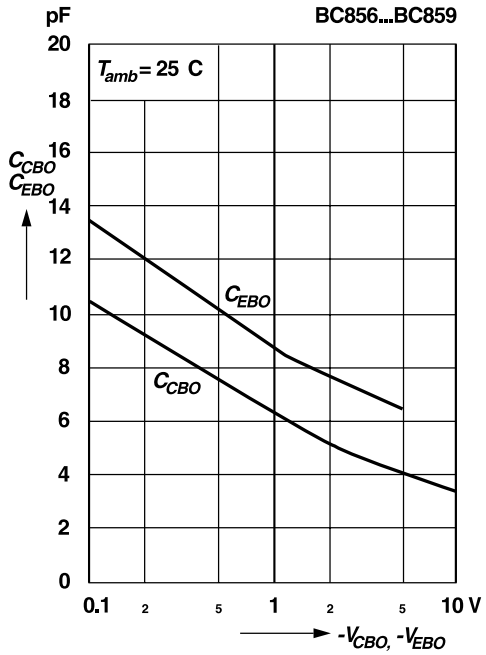
Collector current versus base-emitter voltage



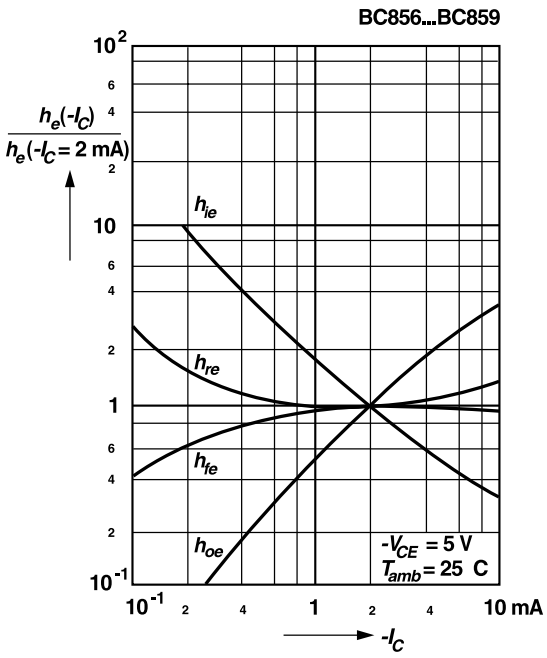
Collector saturation voltage versus collector current



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



Relative h-parameters versus collector current



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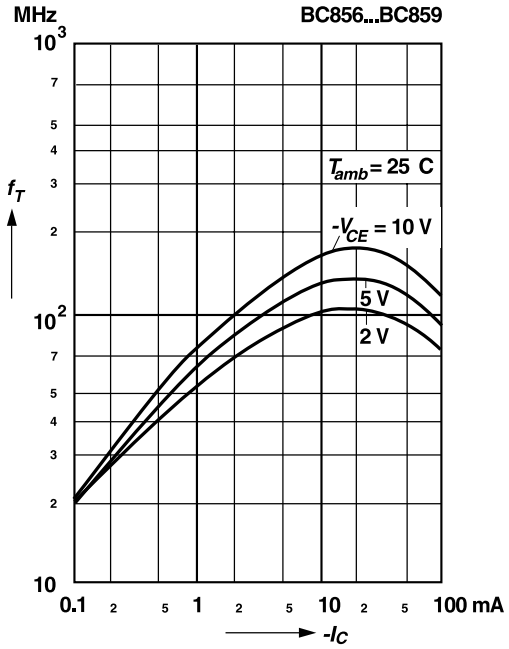
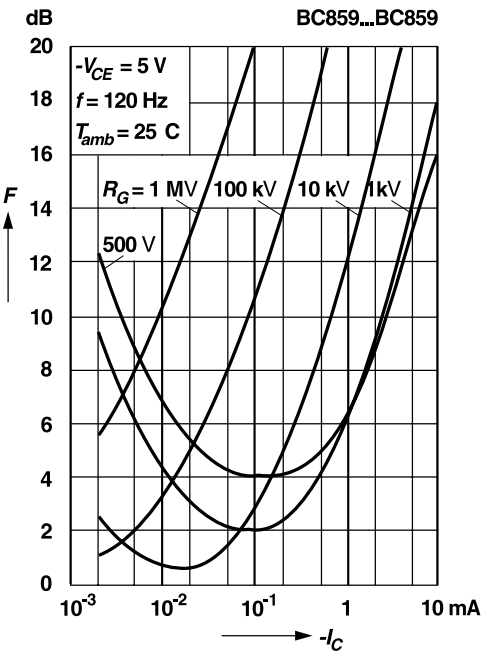
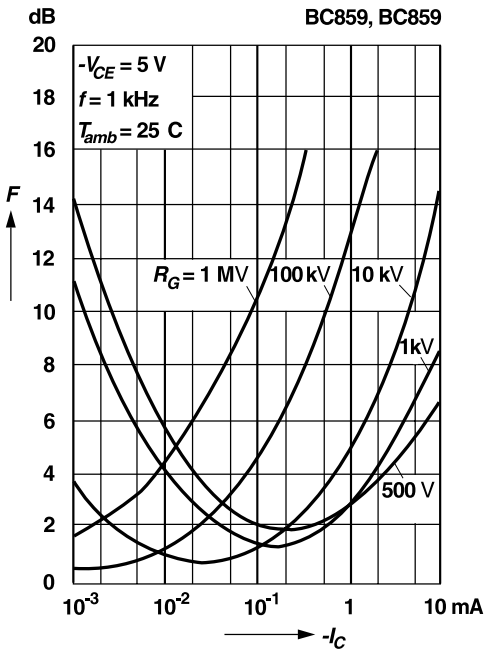
Gain-bandwidth product versus collector current



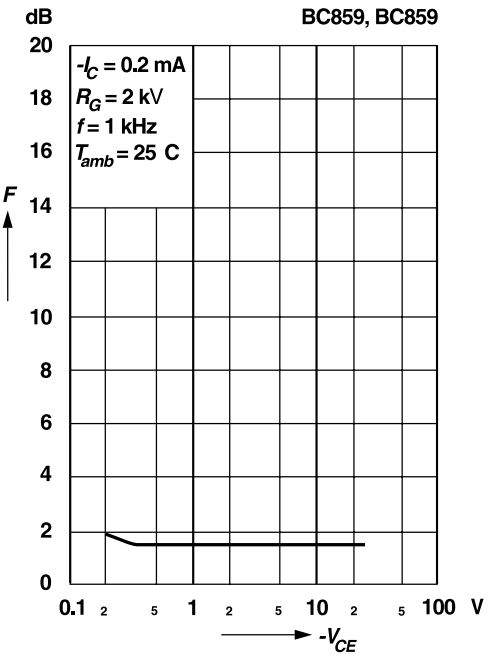
Noise figure versus collector current



Noise figure versus collector current



Noise figure versus collector-emitter voltage



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