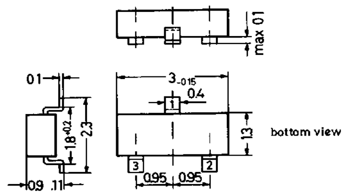
T-29-15

BC856 . . . BC860

PNP Silicon Epitaxial Planar Transistor
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. BC856 is available in groups A and B however, the types BC857, BC858, BC859 and BC860 can be supplied in all three groups. The BC859 is a low noise type and the BC860 a extremely low noise type. As complementary types the NPN transistors BC846 . . . BC850 are recommended.
Normally the pinconfiguration of these types is the following: 1 = Collector, 2 = Base, 3 = Emitter. All types are also available with the pinconfiguration 1 = Collector, 2 = Emitter, 3 = Base. The suffix "R" is then added to the type designation, for example, BC856AR, marked 3AR.



Plastic package 23A3
according to DIN 41869 (≈ TO-236)
The case is impervious to light.

Weight approximately 0.01 g
Dimensions in mm

Marking code

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

Marking code

Type	Marking
BC859A	4A
B	4B
C	4C
BC860A	4E
B	4F
C	4G

Absolute Maximum Ratings

		Symbol	Value	Unit
Collector Base Voltage	**BC856**	$-V_{CBO}$	80	V
	BC857, BC860	$-V_{CBO}$	50	V
	BC858, BC859	$-V_{CBO}$	30	V
Collector Emitter Voltage	**BC856**	$-V_{CES}$	80	V
	BC857, BC860	$-V_{CES}$	50	V
	BC858, BC859	$-V_{CES}$	30	V
Collector Emitter Voltage	**BC856**	$-V_{CEO}$	65	V
	BC857, BC860	$-V_{CEO}$	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 Substrate Backside	R_{thSB}	–	–	320[1)]	K/W
Thermal Resistance Junction to Ambient	R_{thA}	–	–	450	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 Cutoff Current					
at $-V_{CE}$ = 80 V **BC846**	$-I_{CES}$	–	0.2	15	nA
at $-V_{CE}$ = 50 V **BC847, BC850**	$-I_{CES}$	–	0.2	15	nA
at $-V_{CE}$ = 30 V **BC848, BC849**	$-I_{CES}$	–	0.2	15	nA
at $-V_{CE}$ = 80 V, T_j = 125 °C **BC846**	$-I_{CES}$	–	–	4	μA
at $-V_{CE}$ = 50 V, T_j = 125 °C **BC847, BC850**	$-I_{CES}$	–	–	4	μA
at $-V_{CE}$ = 30 V, T_j = 125 °C **BC848, BC849**	$-I_{CES}$	–	–	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
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,					
△f = 200Hz **BC856, BC857, BC858**	F	–	2	10	dB
BC859, BC860	F	–	1	4	dB

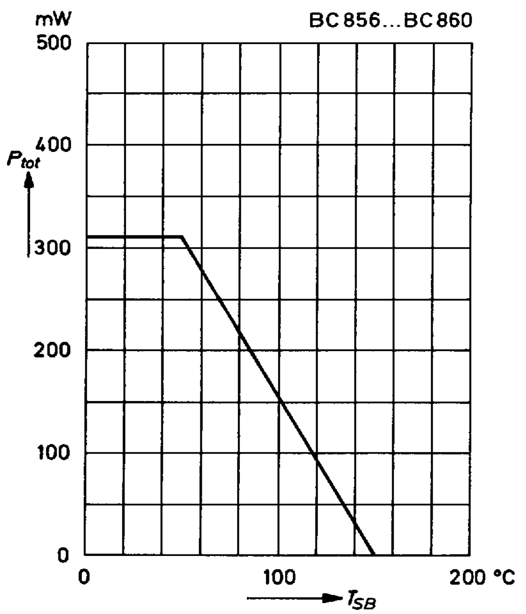
1) Ceramic Substrate 0.7 mm; 2.5 cm^2 area

BC856 . . . BC860

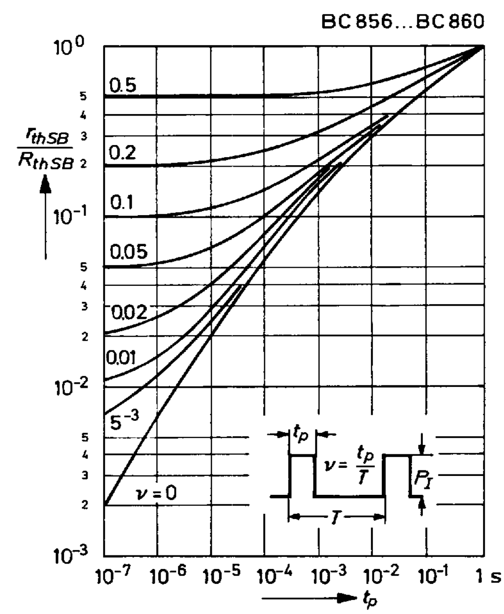
Characteristics, continuation

	Symbol	Min.	Typ.	Max.	Unit
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
BC860	F	–	1.2	2	dB
Equivalent Noise EMF **BC860** at $-V_{CE}$ = 5 V, $-I_C$ = 200 μA, R_G = 2 kΩ, f = 10 . . . 50 Hz	v_r	–	–	0.11	μV

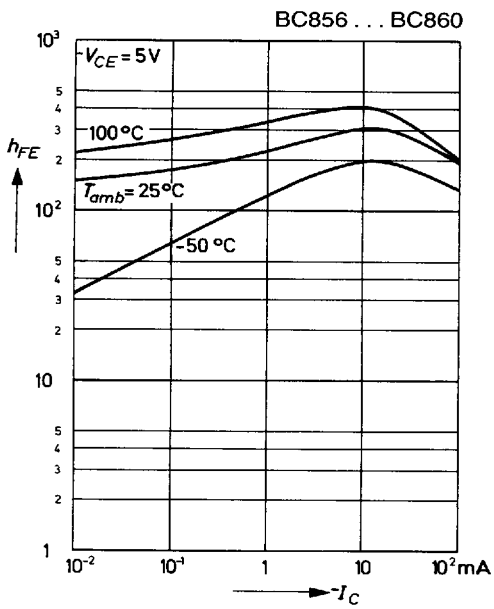
Admissible power dissipation versus temperature of substrate backside
Ceramic substrate 0.7 mm; 2.5 cm² area.



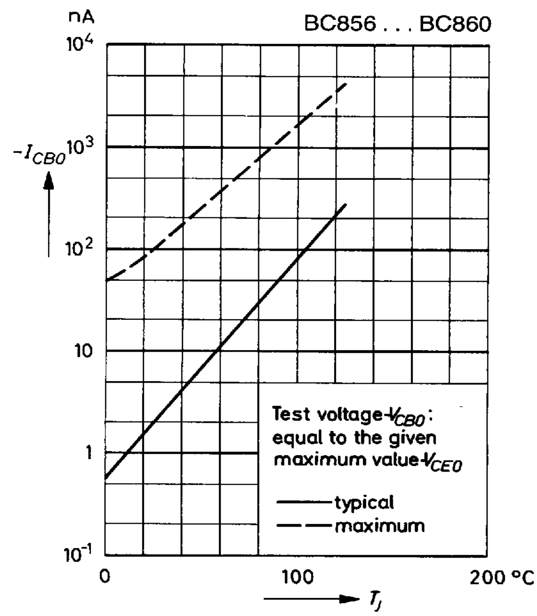
Pulse thermal resistance versus pulse duration (normalized)
Ceramic substrate 0.7 mm; 2.5 cm² area.



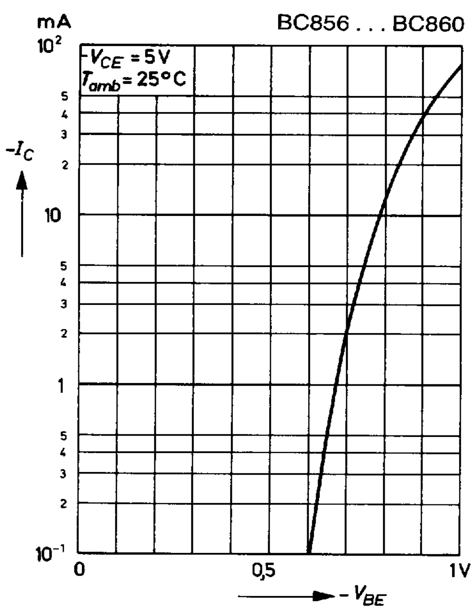
DC current gain versus collector current



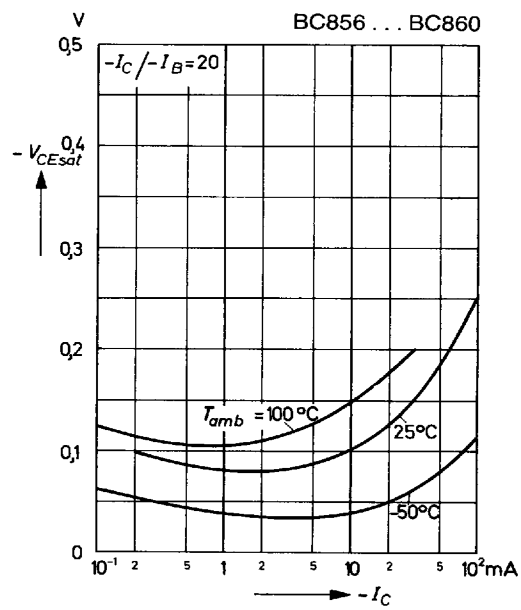
Collector cutoff current versus junction temperature



Collector current versus base emitter voltage



Collector saturation voltage versus collector current



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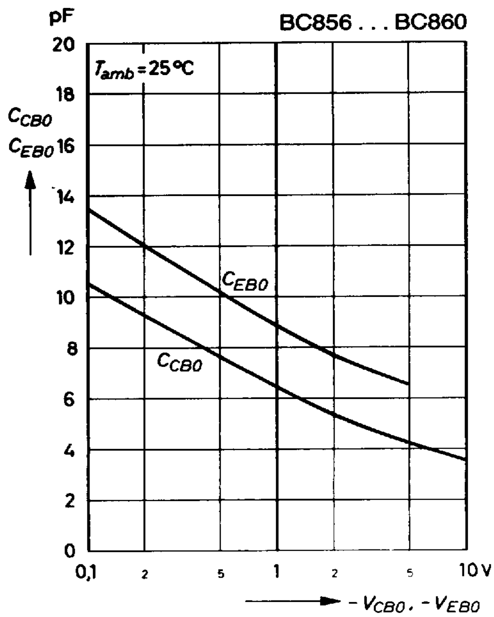
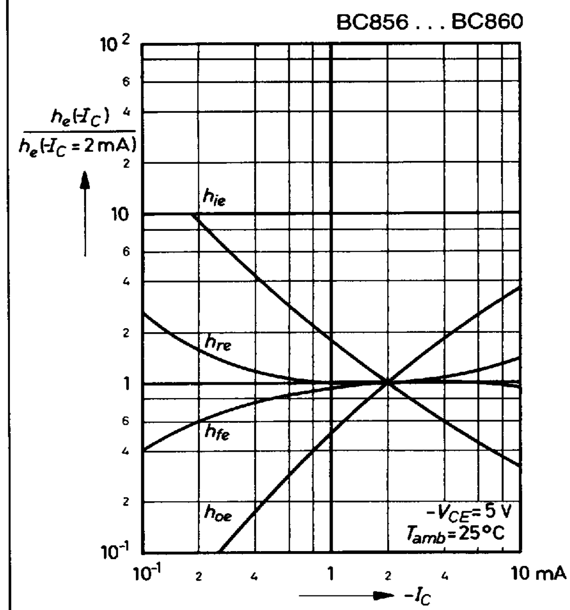
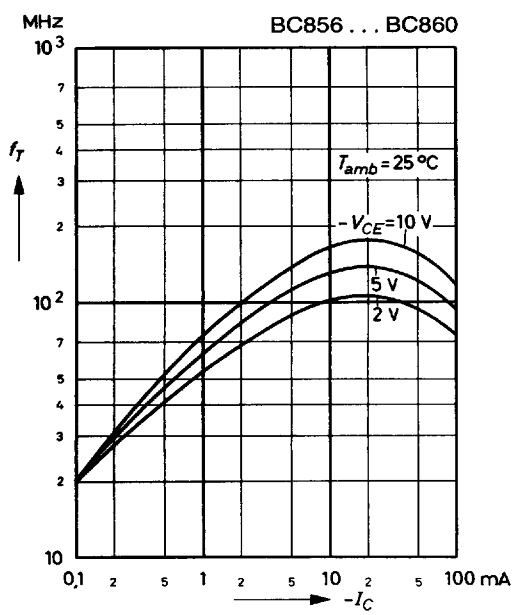
Collector base capacitance, Emitter base capacitance versus reverse bias voltage



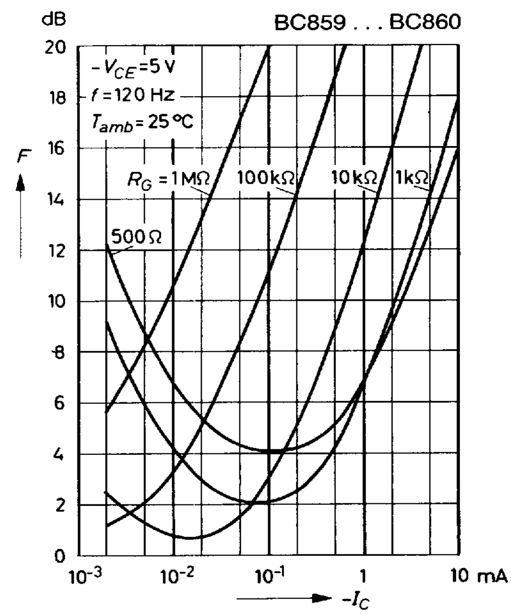
Relative h-parameters versus collector current



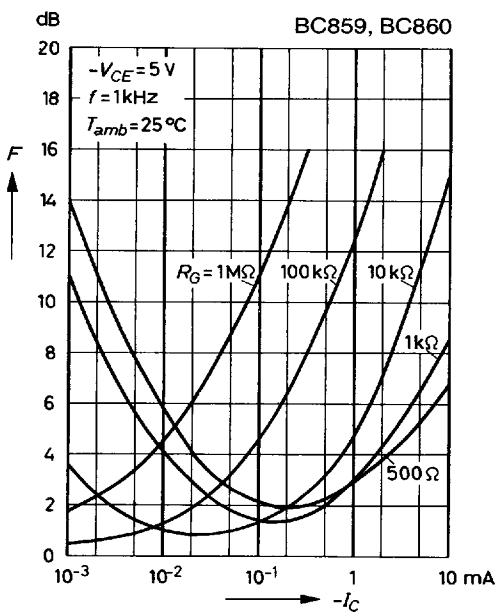
Gain bandwidth product versus collector current



Noise figure versus collector current



Noise figure
versus collector current



Noise figure
versus collector emitter voltage