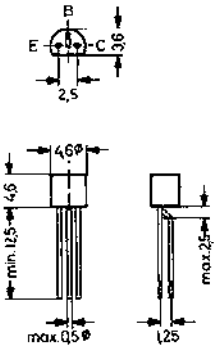
BC171 . . ., BC237 . . .

NPN Silicon Epitaxial Planar Transistors
for switching and amplifier applications

The transistors are subdivided into three groups, A, B an C according to their current gain. Types BC171, BC174 and BC237 are available in groups A and B, types BC172 and BC238 in groups A, B, and C, and types BC173 and BC239 in groups B and C.

BC173 and BC239 are low noise types.



Plastic package ≈ JEDEC TO-92
TO-18 compatible
The case is impervious to light

Weight approximately 0.18 g
Dimensions in mm

Absolute Maximum Ratings

		Symbol	Value	Unit
Collector Emitter Voltage	**BC174**	V_{CES}	70	V
	BC171, BC237	V_{CES}	50	V
	BC172, BC173, BC238	V_{CES}	30	V
	BC239			
Collector Emitter Voltage	**BC174**	V_{CEO}	70	V
	BC171, BC237	V_{CEO}	45	V
	BC172, BC173, BC238	V_{CEO}	25	V
	BC239			
Emitter Base Voltage	**BC171, BC237**	V_{EBO}	6	V
	BC172, BC173, BC238	V_{EBO}	5	V
	BC239, BC174			
Collector Current		I_C	100	mA
Peak Collector Current		I_{CM}	200	mA
Base Current		I_B	50	mA
Power Dissipation at T_{amb} = 25 °C		P_{tot}	300[1)]	mW
Junction temperature		T_j	150	°C
Storage Temperature Range		T_S	−55 . . . +150	°C

[1)] Valid provided that leads are kept at ambient temperature at a distance of 2 mm from case

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						
Small Signal Current Gain	**Current Gain Group A**	h_{fe}	125	220	260	–
	B	h_{fe}	240	330	500	–
	C	h_{fe}	450	600	900	–
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 = 0.01 mA	**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}	–	170	–	–
	B	h_{FE}	–	290	–	–
	C	h_{FE}	–	500	–	–
at V_{CE} = 5 V, I_C = 100 mA	**Current Gain Group A**	h_{FE}	–	120[1]	–	–
	B	h_{FE}	–	200[1]	–	–
	C	h_{FE}	–	400[1]	–	–
Collector Saturation Voltage						
at I_C = 10 mA, I_B = 0.5 mA		V_{CEsat}	–	0.07	0.2	V
at I_C = 100 mA, I_B = 5 mA		V_{CEsat}	–	0.2	0.6[1]	V
Base Saturation Voltage						
at I_C = 10 mA, I_B = 0.5 mA		V_{BEsat}	–	0.73	0.83	V
at I_C = 100 mA, I_B = 5 mA		V_{BEsat}	–	0.87	1.05[1]	V
Base Emitter Voltage						
at V_{CE} = 5 V, I_C = 0.1 mA		V_{BE}	–	0.55	–	V
at V_{CE} = 5 V, I_C = 2 mA		V_{BE}	0.55	0.62	0.7	V
at V_{CE} = 5 V, I_C = 100 mA		V_{BE}	–	0.83[1]	–	V
Collector Cutoff Current						
at V_{CE} = 60 V	**BC174**	I_{CES}	–	0.2	15	nA
at V_{CE} = 50 V	**BC171, BC237**	I_{CES}		0.2	15	nA
at V_{CE} = 30 V	**BC172, BC173, BC238 BC239**	I_{CES}	–	0.2	15	nA
at V_{CE} = 60 V, T_{amb} = 125 °C	**BC174**	I_{CES}	–	0.2	4	µA
at V_{CE} = 50 V, T_{amb} = 125 °C	**BC171, BC237**	I_{CES}	–	0.2	4	µA
at V_{CE} = 30 V, T_{amb} = 125 °C	**BC172, BC173, BC238 BC239**	I_{CES}	–	0.2	4	µA
Collector Emitter Breakdown Voltage at I_C = 2 mA						
	BC174	$V_{(BR)CEO}$	64	–	–	V
	BC171, BC237	$V_{(BR)CEO}$	45	–	–	V
	BC172, BC173, BC238 BC239	$V_{(BR)CEO}$	25	–	–	V
Emitter Base Breakdown Voltage at I_E = 1 µA						
	BC174, BC172, BC173 BC238, BC239	$V_{(BR)EBO}$	5	–	–	V
	BC171, BC237	$V_{(BR)EBO}$	6	–	–	V

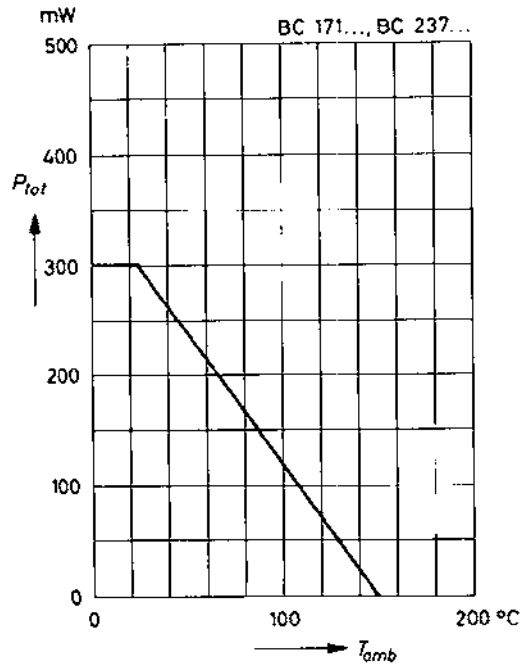
Characteristics, continuation

	Symbol	Min.	Typ.	Max.	Unit
Gain Bandwidth Product at V_{CE} = 3 V, I_C = 0.5 mA, f = 100 MHz at V_{CE} = 5 V, I_C = 10 mA, F = 100 MHz	 f_T f_T	 – 150	 85 250	 – –	 MHz MHz
Collector Base Capacitance at V_{CBO} = 10 V, f = 1 MHz	C_{CBO}	–	3.5	6	pF
Emitter Base Capacitance at V_{EBO} = 0.5 V, f = 1 MHz	C_{EBO}	–	8	–	pF
Noise Figure at V_{CE} = 5 V, I_C = 0.2 mA, R_G = 2 kΩ, f = 1 kHz **BC174, BC171, BC172** **BC237, BC238** **BC173, BC239** at V_{CE} = 5 V, I_C = 0.2 mA, R_G = 2 kΩ, f = 30 Hz . . . 15 kHz **BC173, BC239**	 F F F	 – – –	 2 – –	 10 4 4	 dB dB dB
Thermal Resistance Junction to Ambient	R_{thA}	–	–	420[2]	K/W

[1] Not valid for BC173 and BC239
[2] Valid provided that leads are kept at ambient temperature at a distance of 2 mm from case

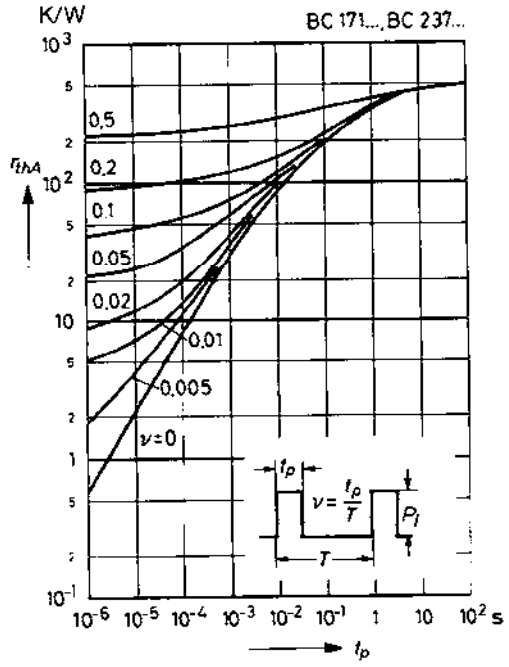
Admissible power dissipation versus ambient temperature

Valid provided that leads are kept at ambient temperature at a distance of 2 mm from case

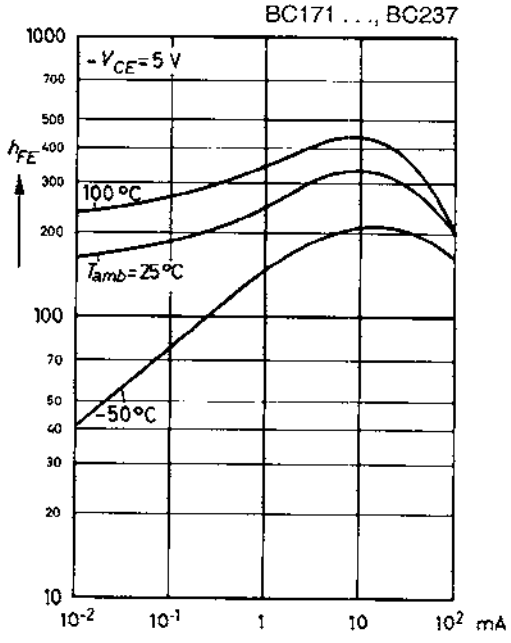


Pulse thermal resistance versus pulse duration

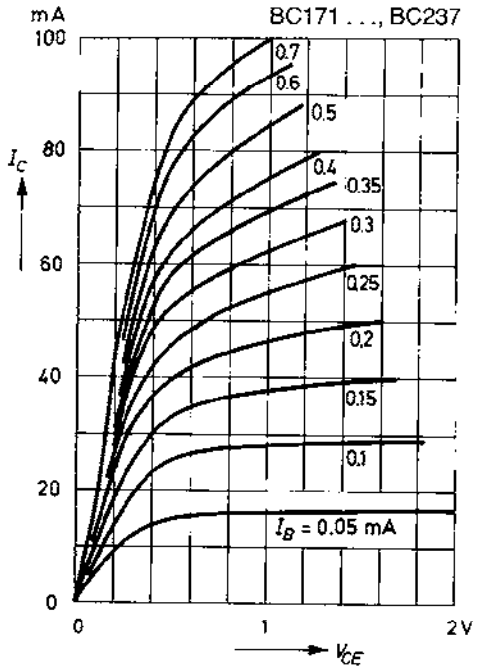
Valid provided that leads are kept at ambient temperature at a distance of 2 mm from case



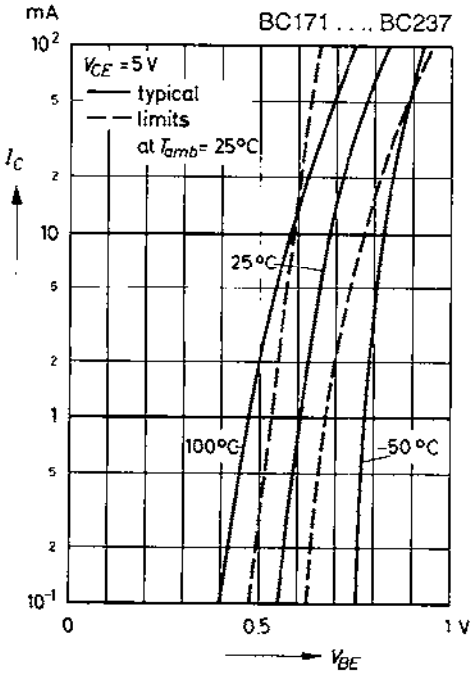
DC current gain versus collector current



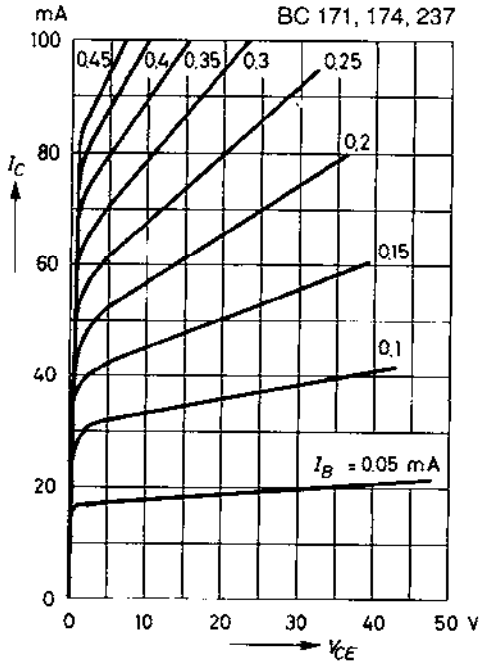
Common emitter collector characteristics



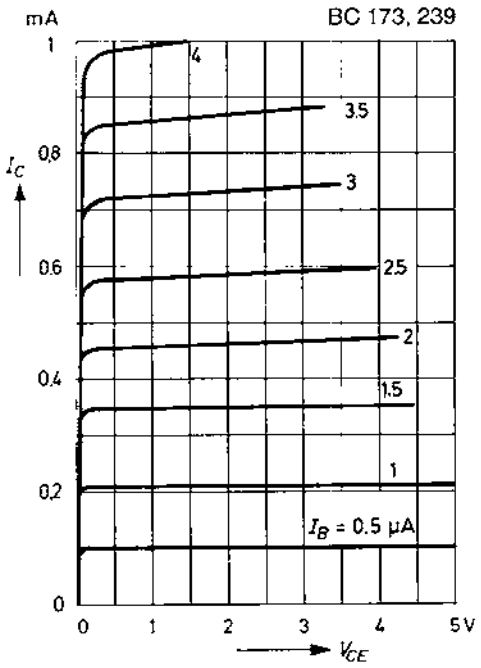
Collector current versus base emitter voltage



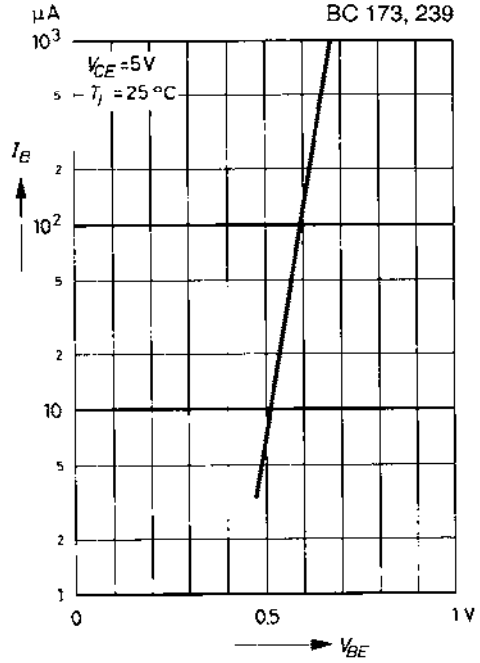
Common emitter collector characteristics



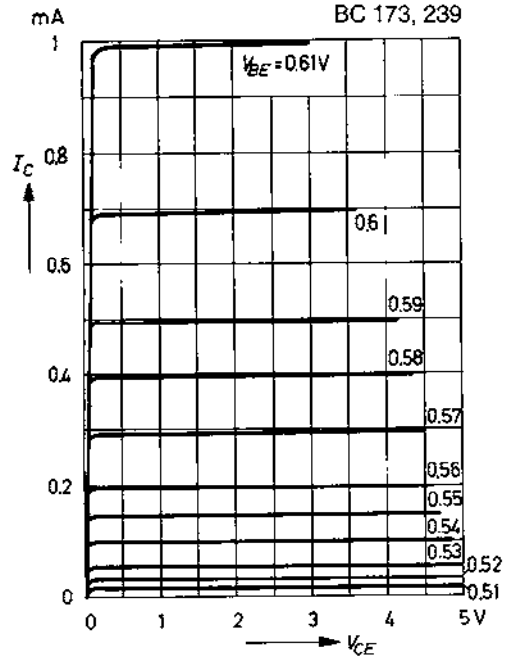
Common emitter collector characteristics



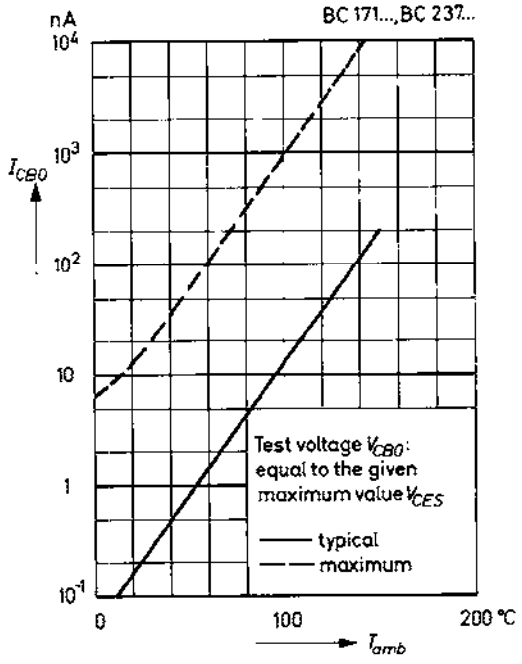
Common emitter input characteristic



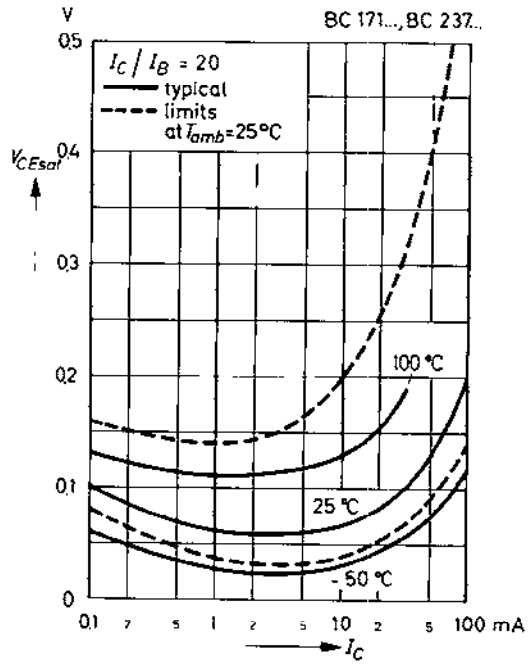
Common emitter collector characteristics



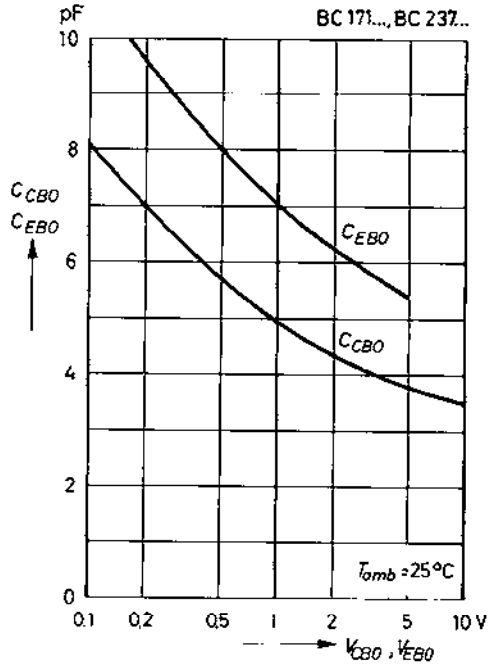
Collector cutoff current versus ambient temperature



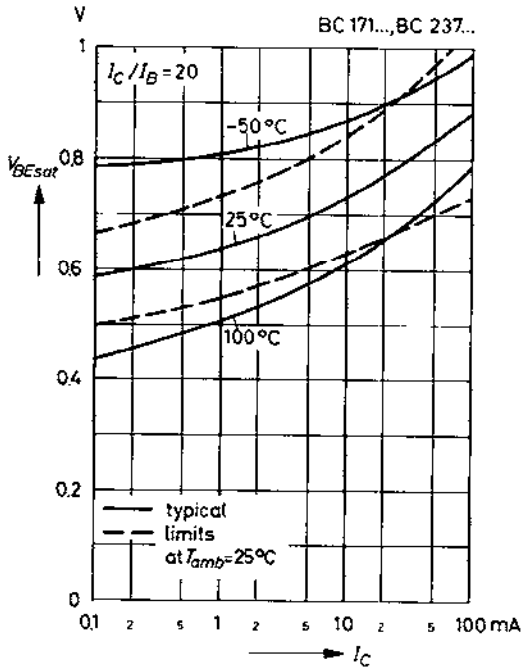
Collector saturation voltage versus collector current



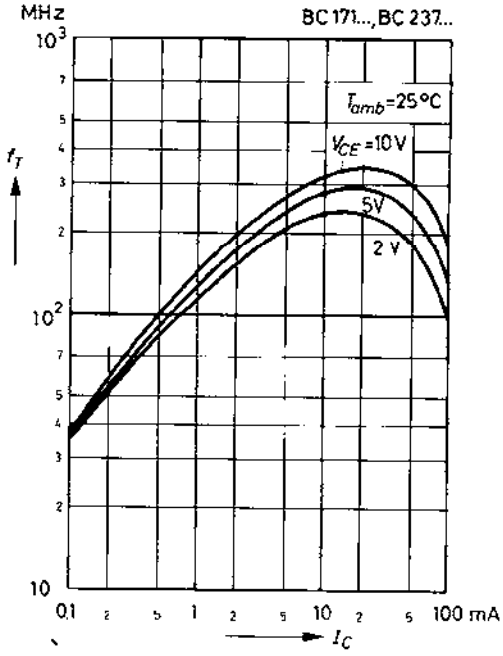
Collector base capacitance, Emitter base capacitance versus reverse bias voltage



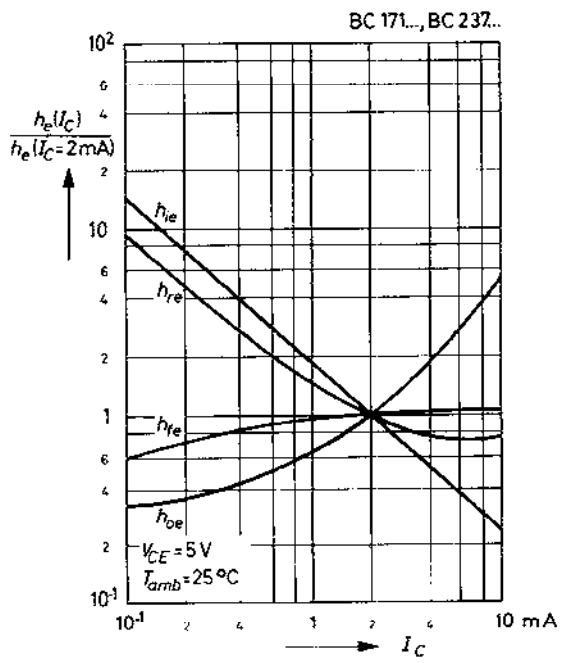
Base saturation voltage versus collector current



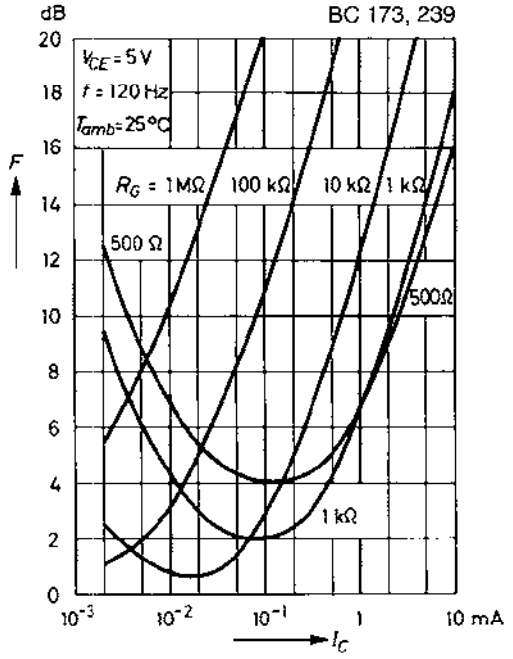
Gain bandwidth product versus collector current



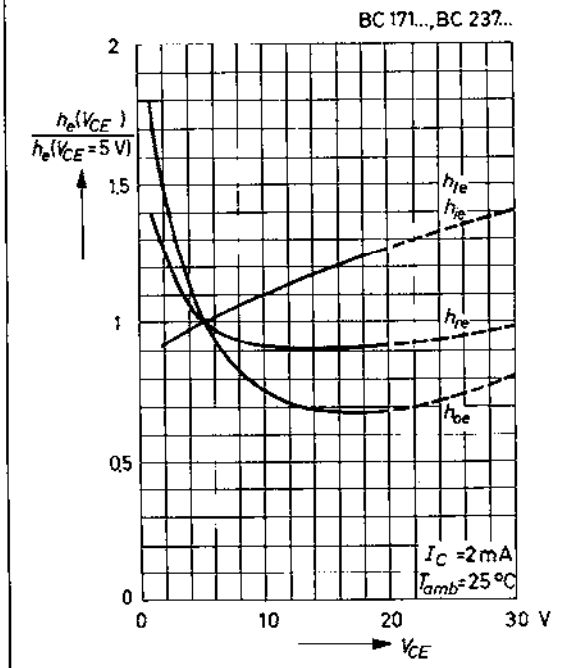
Relative h-parameters versus collector current



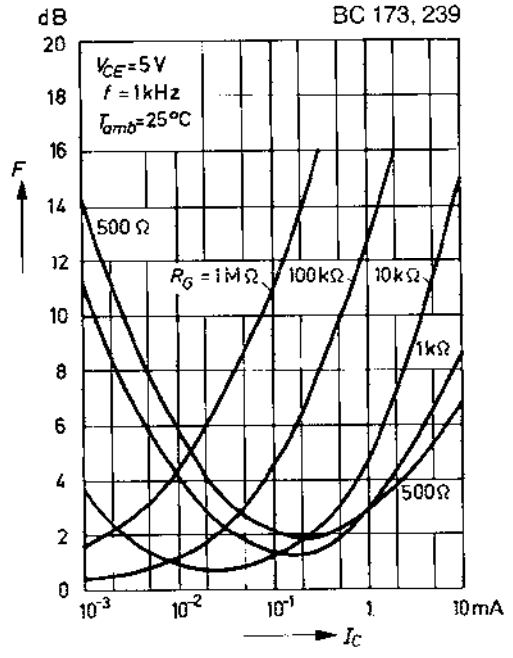
Noise figure versus collector current



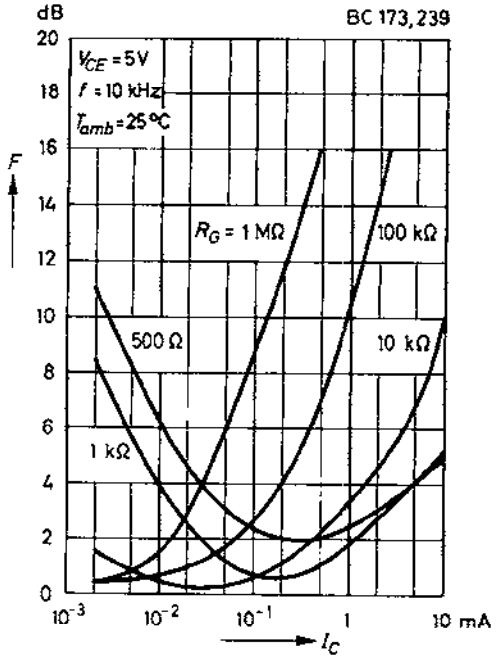
Relative h-parameters versus collector emitter voltage



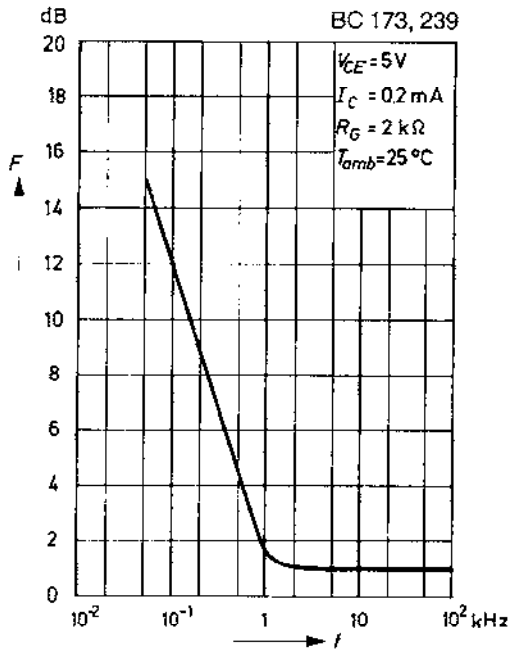
Noise figure versus collector current



Noise figure
versus collector current



Noise figure
versus frequency



Noise figure
versus collector emitter voltage