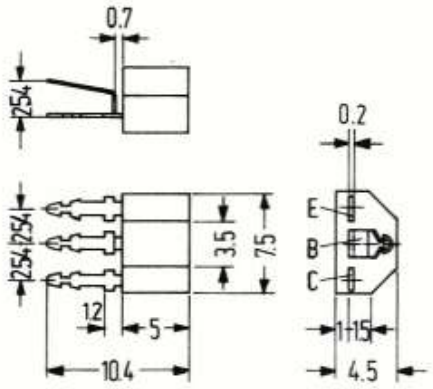
BC 157
BC 158
BC 159

For AF pre- and driver stages as well as for universal application

BC 157, BC 158 and BC 159 are PNP planar epitaxial transistors in plastic case 11 A 3, DIN 41 869 page 3 (SOT 25) suitable as complementary transistors to BC 147, BC 148 and BC 149

BC 159 is specially suitable for low-noise pre-stages

Type	Order number
BC 157 A	Q62702-C162
BC 157 B	Q62702-C163
BC 158 A	Q62702-C157
BC 158 B	Q62702-C158
BC 158 C	Q62702-C436
BC 159 B	Q62702-C161
BC 159 C	Q62702-C437



Weight approx. 0.33 g Dimensions in mm

Maximum ratings		BC 157	BC 158	BC 159	
Collector-emitter voltage	U_{CES}	50	30	25	V
Collector-emitter voltage	$-U_{CEO}$	45	25	20	V
Emitter-base	$-U_{EBO}$	5	5	5	V
Collector current	$-I_C$	100	100	50	mA
Collector peak current	$-I_{CM}$	200	200	–	mA
Base current	$-I_B$	50	50	5	mA
Base peak current	$-I_{BM}$	100	100	–	mA
Junction temperature	T_j	150	150	150	°C
Storage temperature	T_S	–55 to +150			°C
Total power dissipation	P_{tot}	300	300	300	mW
Thermal resistance					
Junction to ambient air	R_{thJamb}	≦ 420	≦ 420	≦ 420	K/W

Static characteristics (T_{amb} = 25 °C)

The transistors are classified in groups of static forward current transfer ratio h_{FE} which are indicated by letters A, B and C. The following values apply at $-V_{CE}$ = 5 V and the following collector currents.

h_{FE} groups	A	B	C
Type	**BC 157** **BC 158** –	**BC 157** **BC 158** **BC 159**	– **BC 158** **BC 159**
$-I_C$ mA	h_{FE} I_C/I_B	h_{FE} I_C/I_B	h_{FE} I_C/I_B
0.01 2 100[1])	90 170 (120 to 220) 120[3])	150 290 (180 to 460) 200[3])	270 500 (380 to 800) 400[3])

Static characteristics (T_{amb} = 25 °C)

For the condition stated below, the following data apply:

Type			**BC 157, BC 158, BC 159**		
V_{CE} V	$-I_C$ mA	$-I_B$ mA	$-V_{BE}$ V	$-V_{CEsat}$ V	$-V_{CEsat}$ V
5	0.1	–	0.57	–	–
5	2	–	0.62 (0.55 to 0.7)	–	–
–	10	0.5	–	0.1 (< 0.2)[1])	0.7 (< 0,8)
5	100	–	0.8	–	–
–	100[3])	5	–	0.2 (< 0.6)[1])[3])	0.85 (< 1)[3])
5	10	–	–	0.2 (< 0.6)[2])	–

		BC 157	BC 158	BC 159	
Collector-emitter cutoff current ($-V_{CES}$ = 20 V)	$-I_{CES}$	2 (< 100)	2 (< 100)	2 (< 100)	nA
Collector-emitter cutoff current ($-V_{CES}$ = 20 V; T_{amb} = 125 °C)	$-I_{CES}$	< 4	< 4	< 4	µA
Emitter-base breakdown voltage ($-I_{EB}$ = 10 µA)	$-V_{(BR)EBO}$	> 5	> 5	> 5	V
Collector-emitter breakdown voltage ($-I_{CE}$ = 2 mA)	$-V_{(BR)CEO}$	> 45	> 25	> 20	V
Collector-emitter breakdown voltage ($-I_{CE}$ = 10 µA)	$-V_{(BR)CES}$	> 50	> 30	> 25	V

[1]) The transistor is overdriven to such a degree that the forward current transfer ratio has decreased to h_{FE} = 20

[2]) I_C = 10 mA applies for the characteristic which, at constant base current, passes the point I_C = 11 mA, U_{CE} = 1 V

[3]) Measuring values not for BC 169

Dynamic characteristics (T_{amb} = 25 °C)		**BC 157**	**BC 158**	**BC 159**	
Current gain-bandwidth product ($-I_C$ = 10 mA; $-V_{CE}$ = 5 V; f = 50 MHz)	f_T	130	130	130	MHz
Collector-base capacitance ($-V_{CBO}$ = 10 V; f = 1 MHz)	C_{CBO}	< 6	< 6	< 6	pf
Noise figure ($-I_C$ = 0.2 mA; $-V_{CE}$ = 5 V; R_g = 2 kΩ; Δf = 200 Hz; f = 1 kHz)	*NF*	< 10	< 10	< 4	db
f = 30 to 15 000 Hz	*NF*	–	–	2 (< 4)	db

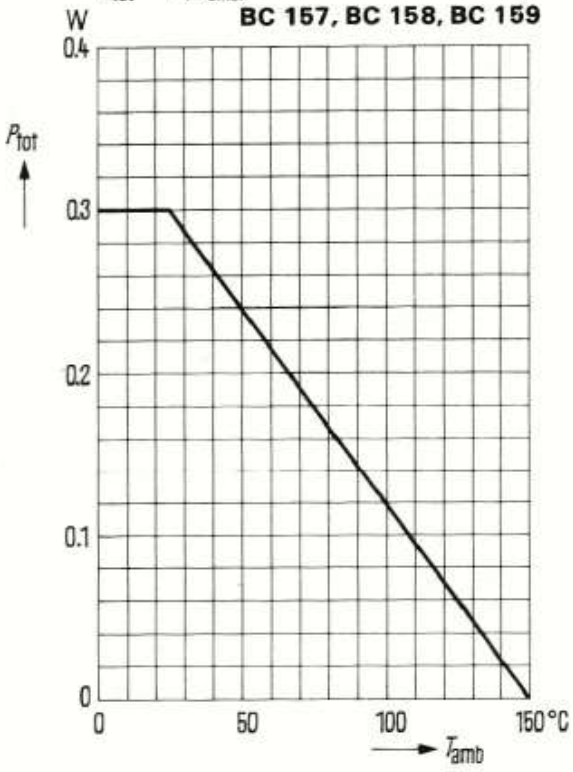
Dynamic characteristics (T_{amb} = 25 °C)
I_C = 2 mA; U_{CB} = 5 V; f = 1 kHz

h_{FE} group	**A**	**B**	**C**	
Type	**BC 157** **BC 158** –	**BC 157** **BC 158** **BC 159**	– **BC 158** **BC 159**	
h_{11e}	2.7 (1.6 to 4.5)	4.5 (3.2 to 8.5)	8.7 (6 to 15)	kΩ
h_{12e}	1.5	2	3	10^{-4}
h_{21e}	220 (125 to 260)	330 (240 to 500)	600 (450 to 900)	–
h_{22e}	18 (< 30)	35 (< 60)	60 (< 110)	μmhos

Maximum power dissipation

$P_{tot} = f(T_{amb})$

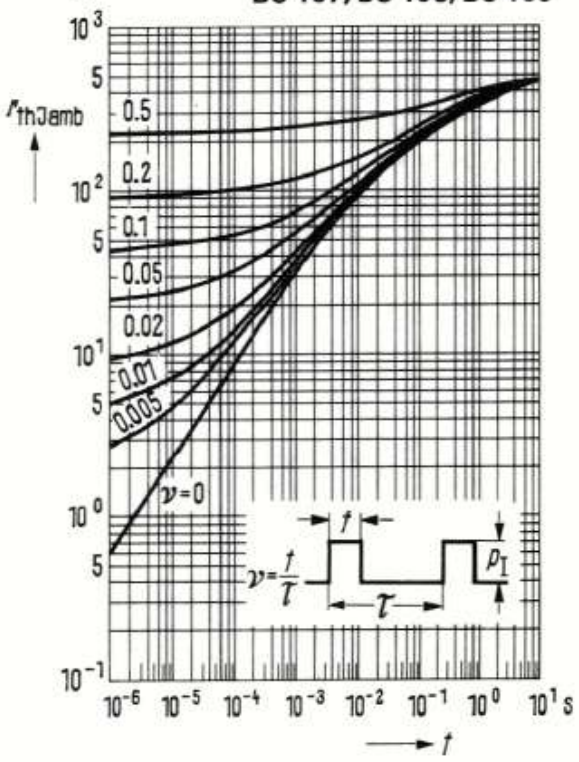
BC 157, BC 158, BC 159



Permissible pulse load

$\frac{K}{W}$ $r_{thJamb} = f(t)$; ν = parameter

BC 157, BC 158, BC 159



Collector current $I_C = f(V_{BE})$
V_{CE} = 5 V (common emitter circuit)
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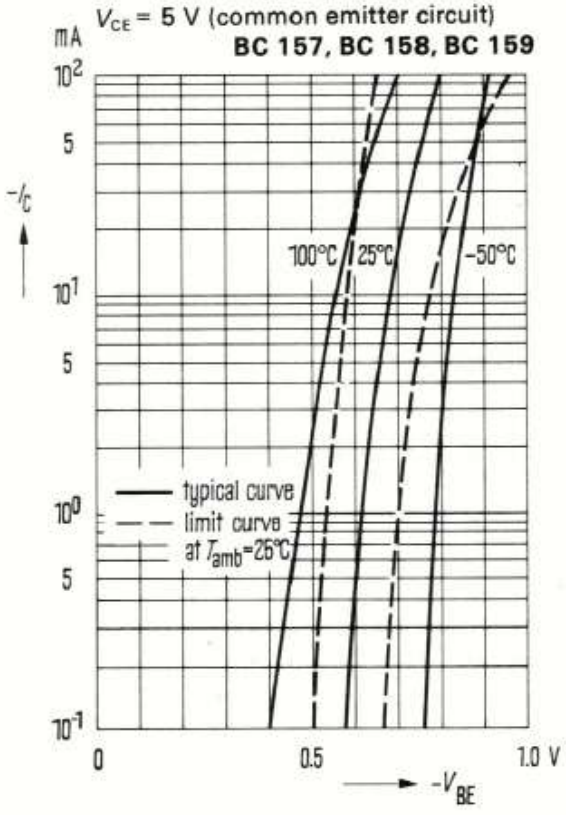
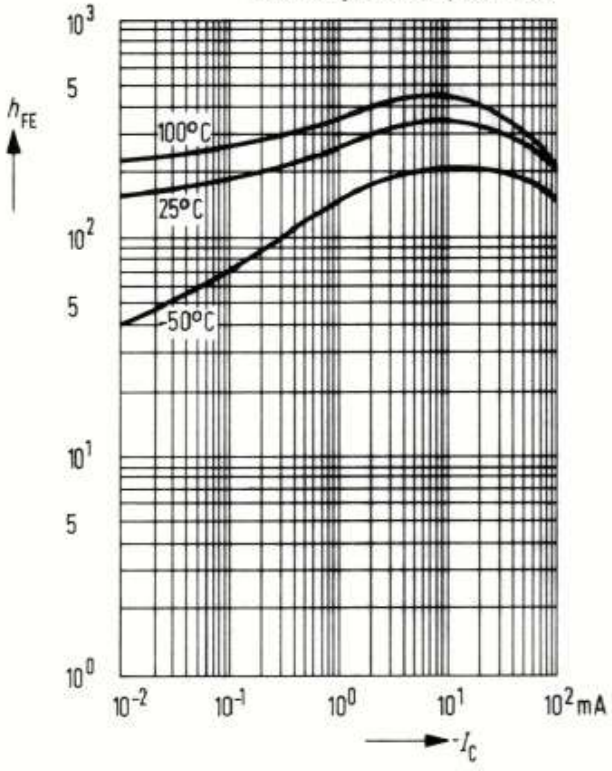
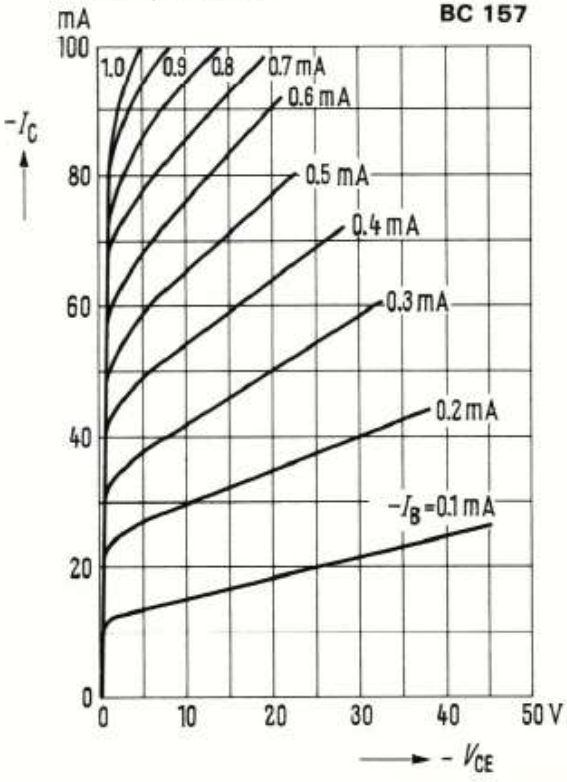


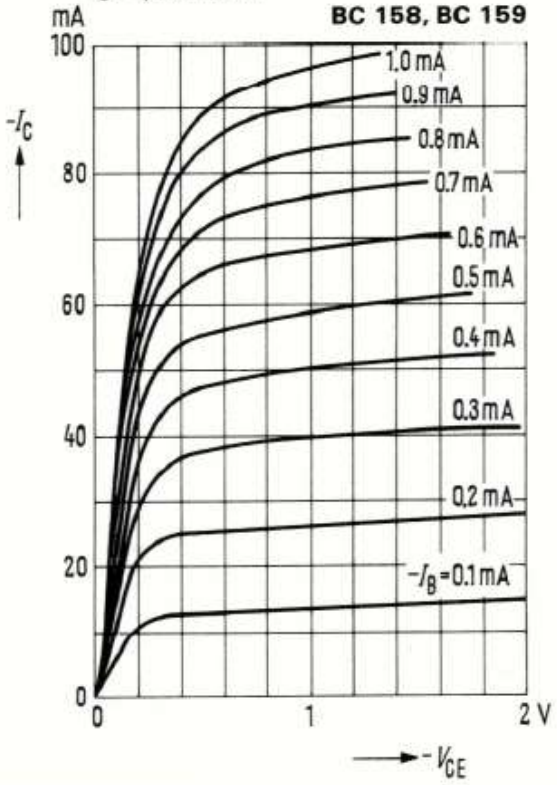
Static forward current transfer ratio
$h_{FE} = f(I_C)$; (common emitter circuit)
V_{CE} = 5 V; T_{amb} = parameter
BC 157, BC 158, BC 159



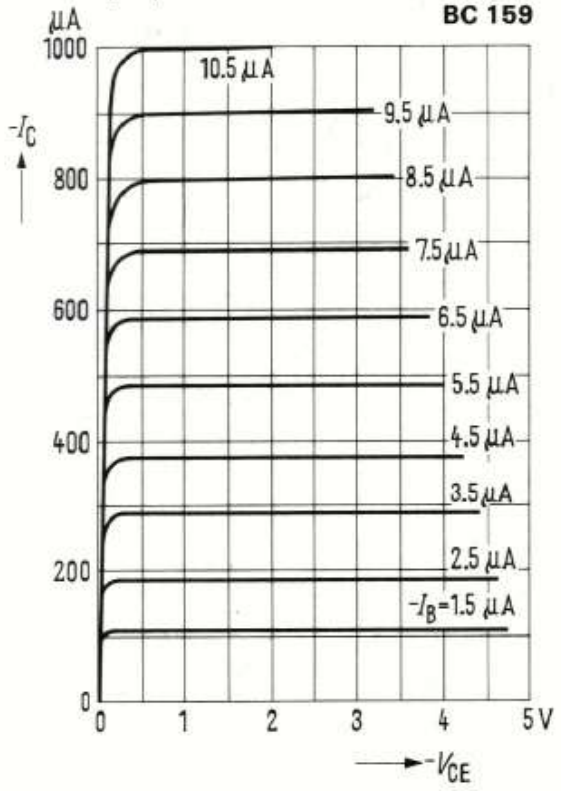
Output characteristics $I_C = f(V_{CE})$;
I_B = parameter
BC 157



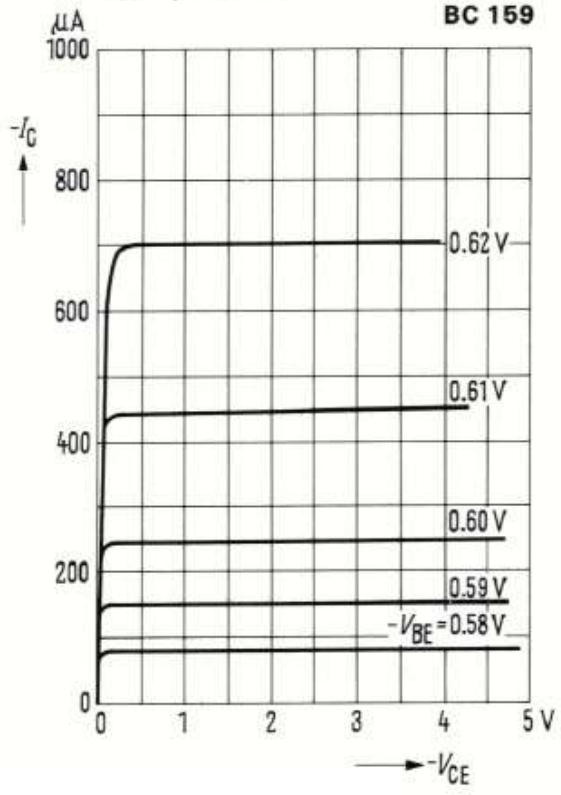
Output characteristics $I_C = f(V_{CE})$
I_B = parameter
BC 158, BC 159



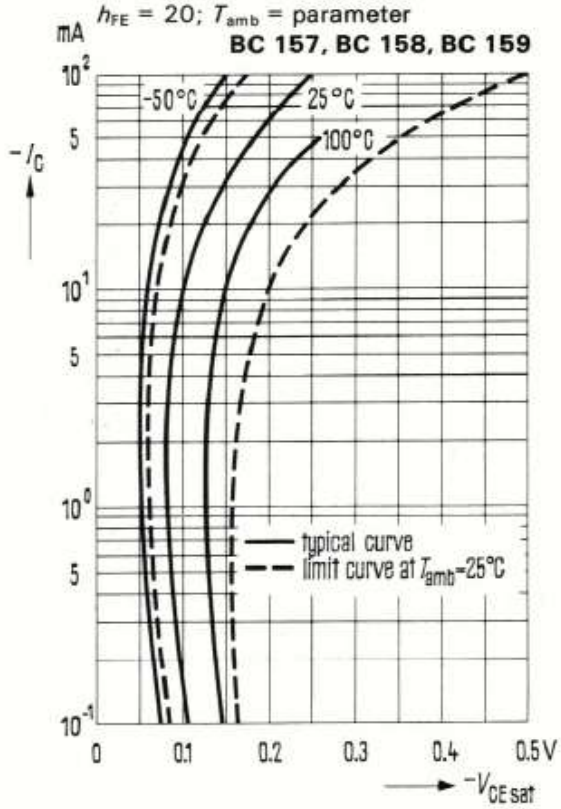
Output characteristics $I_C = f(V_{CE})$;
I_B = parameter



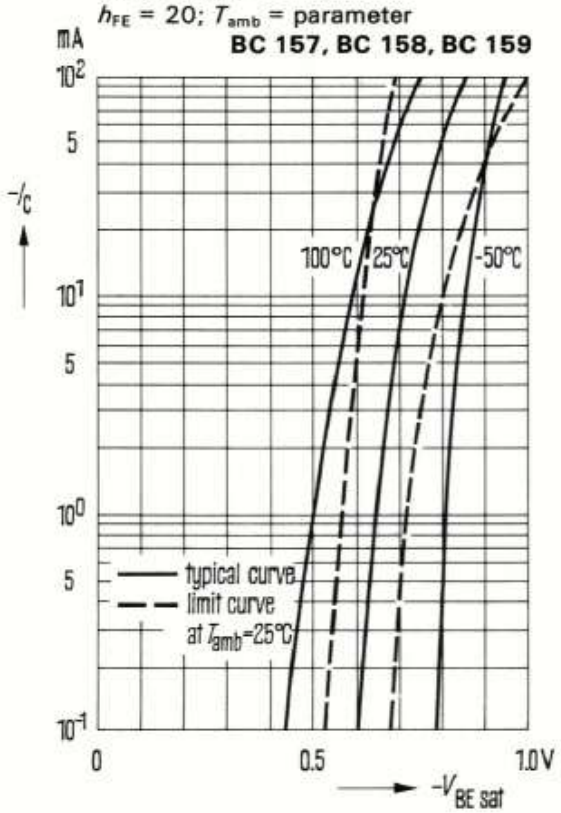
Output characteristics $I_C = f(V_{CE})$
V_{BE} = parameter



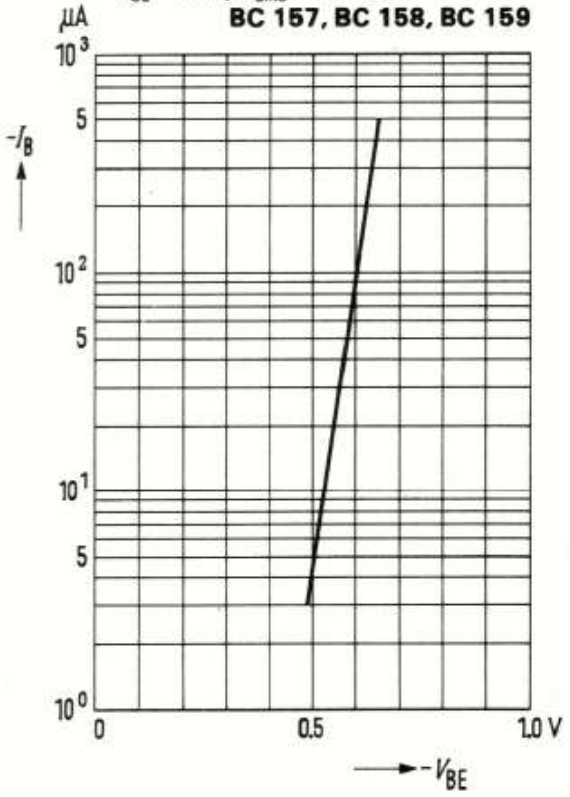
Collector-emitter saturation voltage $V_{CEsat} = f(I_C)$
h_{FE} = 20; T_{amb} = parameter
BC 157, BC 158, BC 159



Base-emitter saturation voltage
$V_{BEsat} = f(I_C)$
h_{FE} = 20; T_{amb} = parameter
BC 157, BC 158, BC 159



Input characteristics $I_B = f(V_{BE})$;
$-V_{CE} = 5$ V; $T_{amb} = 25$ °C
BC 157, BC 158, BC 159



Cutoff current versus temperature
$I_{CBO} = f(T_{amb})$
for max. permissible reverse voltage
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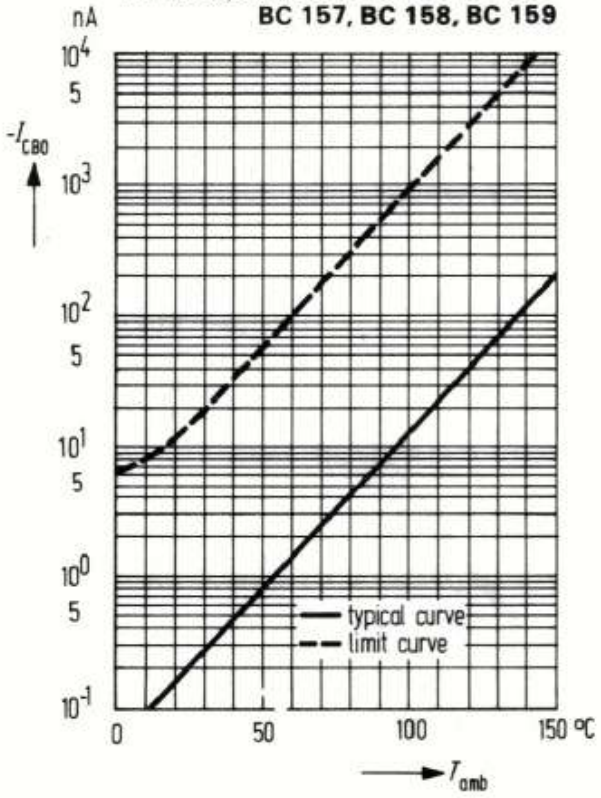

***h*-parameter vs. collector current**
$-V_{CE} = 5$ V; $T_{amb} = 25$ °C

$$H_e = \frac{h_e(I_C)}{h_e(I_C = 2\text{ mA})} = f(I_C)$$

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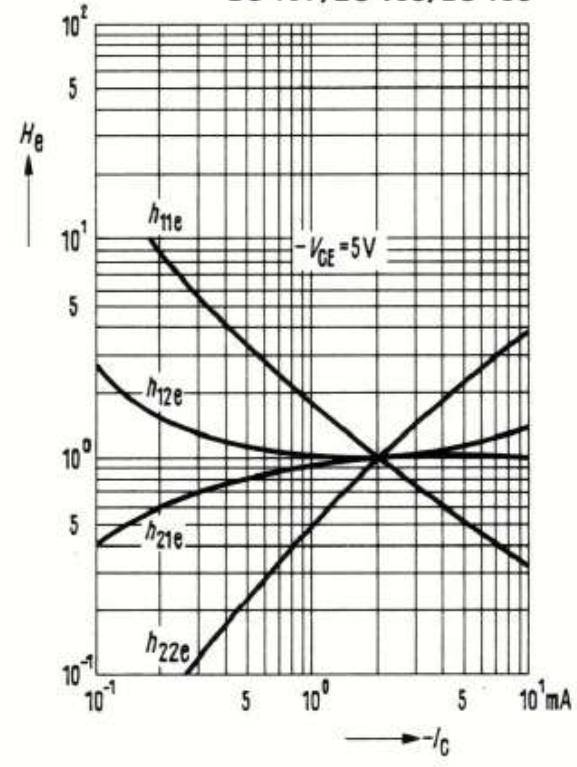
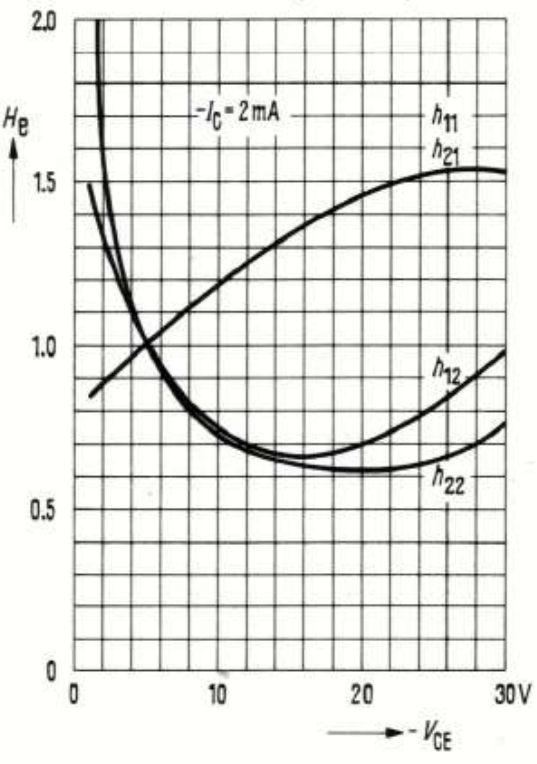


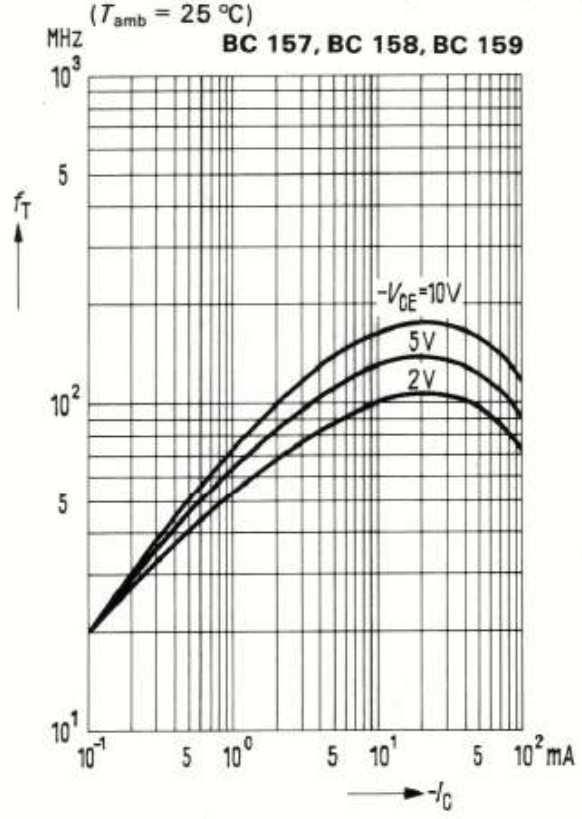
***h*-parameter vs. collector-emitter voltage** – $I_C = 2$ mA; $T_{amb} = 25$ °C

$$H_e = \frac{h_e(V_{CE})}{h_e(V_{CE} = 5\text{ V})} = f(V_{CE})$$

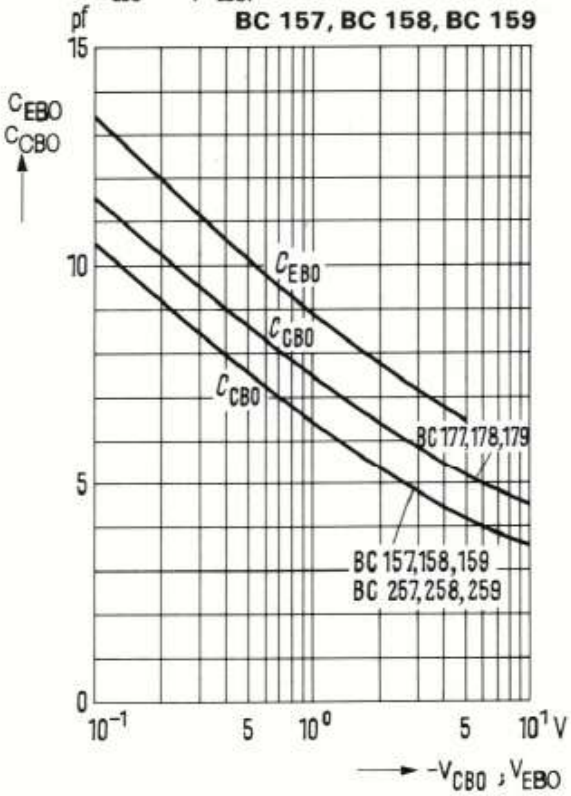
BC 157, BC 158, BC 159



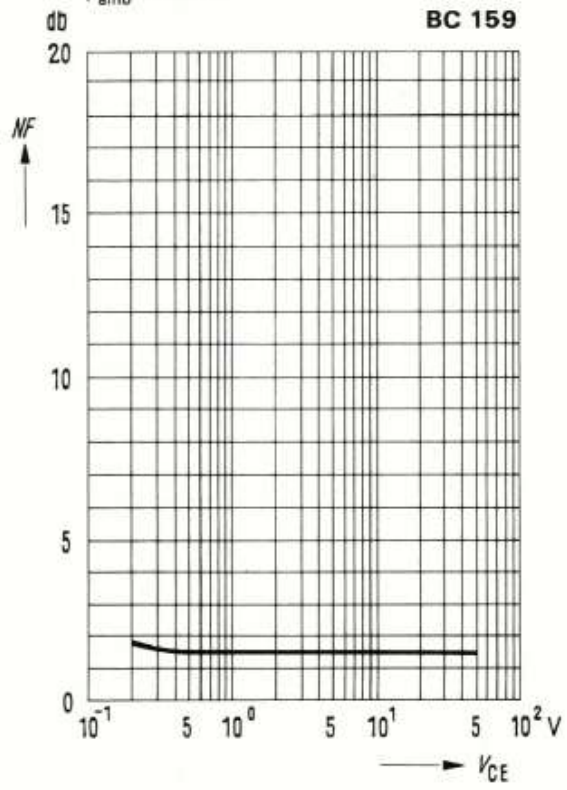
Current gain-bandwidth product $f_T = f(I_C)$
(T_{amb} = 25 °C)



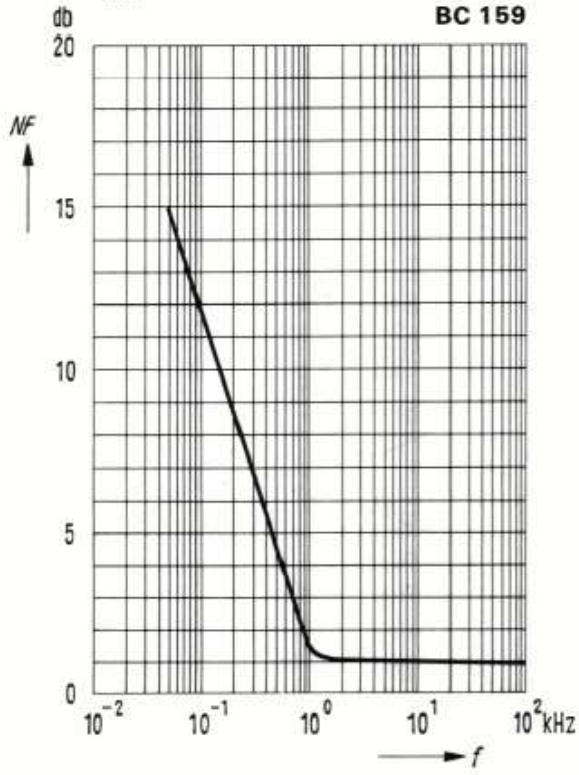
Collector-base capacitance
$C_{CBO} = f(V_{CBO})$
Emitter-base capacitance
$C_{EBO} = f(V_{EBO})$



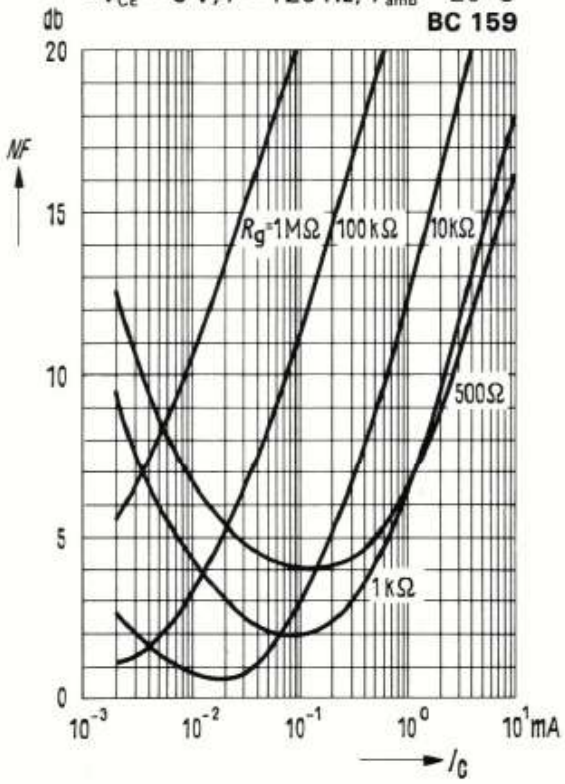
Noise figure $NF = f(V_{CE})$
$-I_C$ = 0,2 mA; R_g = 2 kΩ; f = 1 kHz
T_{amb} = 25 °C



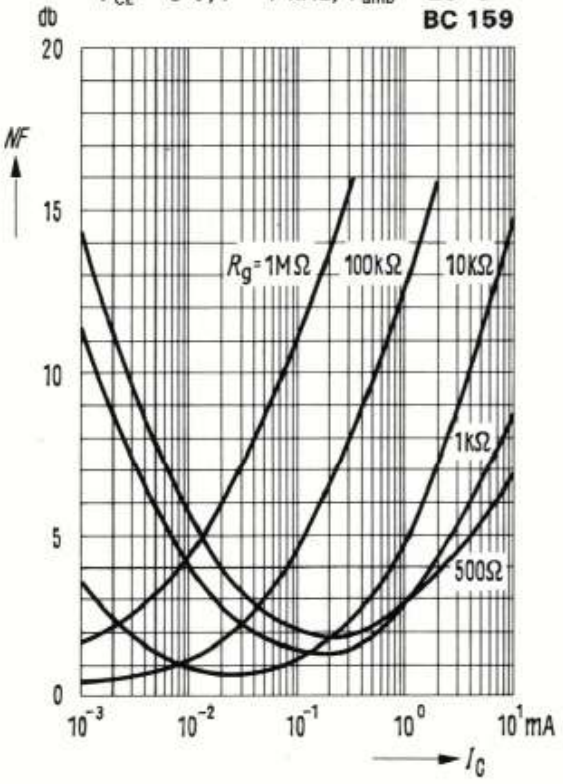
Noise figure $NF = f(f)$
R_g = 2 kΩ; $-V_{CE}$ = 5 V; $-I_C$ = 0,2 mA
T_{amb} = 25 °C



Noise figure $NF = f(I_C)$
$-V_{CE} = 5$ V; $f = 120$ Hz; $T_{amb} = 25$ °C
BC 159



Noise figure $NF = f(I_C)$
$-V_{CE} = 5$ V; $f = 1$ kHz; $T_{amb} = 25$ °C
BC 159



Noise figure $NF = f(I_C)$
$-V_{CE} = 5$ V; $f = 10$ kHz; $T_{amb} = 25$ °C
BC 159