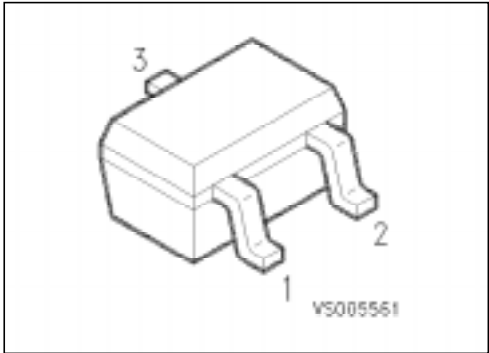


PNP Silicon AF Transistors

BC 856W ... BC 860W

Features

- For AF input stages and driver applications
- High current gain
- Low collector-emitter saturation voltage
- Low noise between 30 Hz and 15 kHz
- Complementary types: BC 847W, BC 848W, BC 849W, BC 850W (NPN)



Type	Marking	Ordering Code (tape and reel)	Pin Configuration			Package ¹⁾
			1	2	3	
BC 856 AW	3As	Q62702-C2335	B	E	C	SOT-323
BC 856 BW	3Bs	Q62702-C2292				
BC 857 AW	3Es	Q62702-C2293				
BC 857 BW	3Fs	Q62702-C2294				
BC 857 CW	3Gs	Q62702-C2295				
BC 858 AW	3Js	Q62702-C2296				
BC 858 BW	3Ks	Q62702-C2297				
BC 858 CW	3Ls	Q62702-C2298				
BC 859 AW	4As	Q62702-C2299				
BC 859 BW	4Bs	Q62702-C2300				
BC 859 CW	4Cs	Q62702-C2301				
BC 860 BW	4Fs	Q62702-C2302				
BC 860 CW	4Gs	Q62702-C2303				

¹⁾For detailed information see chapter Package Outlines.

Maximum Ratings

Description	Symbol	BC 856W	BC 857W BC 860W	BC 858W BC 859W	Unit
Collector-emitter voltage	V_{CEO}	65	45	30	V
Collector-base voltage	V_{CBO}	80	50	30	V
Collector-emitter voltage	V_{CES}	80	50	30	V
Emitter-base voltage	V_{EBO}	5	5	5	V
Collector current	I_C	100			mA
Collector peak current	I_{CM}	200			mA
Total power dissipation, $T_s = 115\text{ °C}$	P_{tot}	250			mW
Junction temperature	T_j	150			°C
Storage temperature range	T_{stg}	-65 to 150			°C

Thermal Resistance

Junction - ambient ¹⁾	$R_{th JA}$	≤ 240	K/W
Junction - soldering point	$R_{th JS}$	≤ 105	K/W

Electrical Characteristics

at $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

DC characteristics

Collector-emitter breakdown voltage $I_C = 10\text{ mA}$ BC 856W BC 857W, BC 860W BC 858W, BC 859W	$V_{(BR)CE0}$	65 45 30	— — —	— — —	V
Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$ BC 856W BC 857W, BC 860W BC 858W, BC 859W	$V_{(BR)CB0}$	80 50 30	— — —	— — —	
Collector-emitter breakdown voltage $I_C = 10\text{ }\mu\text{A}$, $V_{BE} = 0$ BC 856W BC 857W, BC 860W BC 858W, BC 859W	$V_{(BR)CES}$	80 50 30	— — —	— — —	
Emitter-base breakdown voltage $I_E = 1\text{ }\mu\text{A}$	$V_{(BR)EB0}$	5	—	—	
Collector cutoff current $V_{CB} = 30\text{ V}$ $V_{CB} = 30\text{ V}$, $T_A = 150\text{ }^{\circ}\text{C}$	I_{CB0}	— —	— —	15 5	nA μA
DC current gain $I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$ BC 856 AW ... BC 859 AW BC 856 BW ... BC 860 BW BC 857 CW ... BC 860 CW $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$ BC 856 AW ... BC 859 AW BC 856 BW ... BC 860 BW BC 857 CW ... BC 860 CW	h_{FE}	— — — 125 220 420	140 250 480 180 290 520	— — — 250 475 800	—
Collector-emitter saturation voltage ¹⁾ $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$, $I_B = 5\text{ mA}$	V_{CEsat}	— —	75 250	300 650	mV
Base-emitter saturation voltage ¹⁾ $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$, $I_B = 5\text{ mA}$	V_{BEsat}	— —	700 850	— —	
Base-emitter voltage $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$ $I_C = 10\text{ mA}$, $V_{CE} = 5\text{ V}$	$V_{BE(on)}$	600 —	650 —	750 820	

¹⁾Pulse test: $t \leq 300\text{ }\mu\text{s}$, $D = 2\text{ }\%$.

Electrical Characteristics

at $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified.

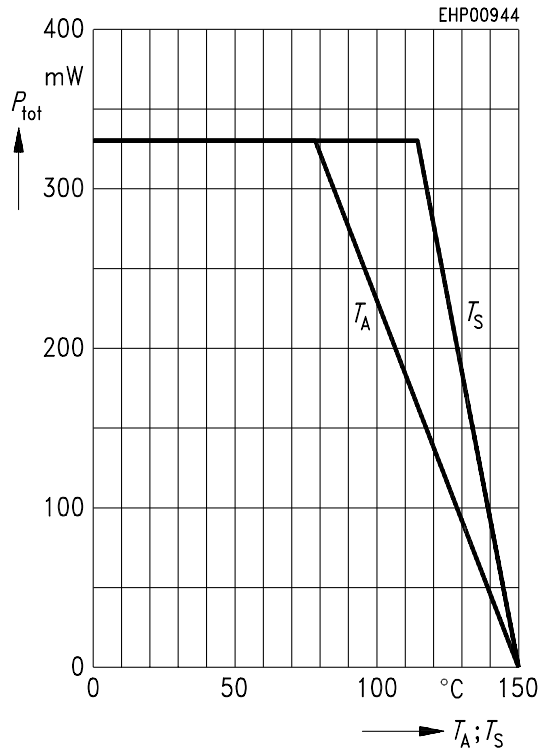
Parameter	Symbol	Values			Unit
		min.	typ.	max.	

AC characteristics

Transition frequency $I_C = 20\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 100\text{ MHz}$	f_T	—	250	—	MHz
Output capacitance $V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$	C_{obo}	—	3	—	pF
Input capacitance $V_{CB} = 0.5\text{ V}$, $f = 1\text{ MHz}$	C_{ibo}	—	10	—	
Short-circuit input impedance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BC 856 AW ... BC 859 AW BC 856 BW ... BC 860 BW BC 857 CW ... BC 860 CW	h_{11e}	— — —	2.7 4.5 8.7	— — —	k Ω
Open-circuit reverse voltage transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BC 856 AW ... BC 859 AW BC 856 BW ... BC 860 BW BC 857 CW ... BC 860 CW	h_{12e}	— — —	1.5 2.0 3.0	— — —	10^{-4}
Short-circuit forward current transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BC 856 AW ... BC 859 AW BC 856 BW ... BC 860 BW BC 857 CW ... BC 860 CW	h_{21e}	— — —	200 330 600	— — —	—
Open-circuit output admittance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BC 856 AW ... BC 859 AW BC 856 BW ... BC 860 BW BC 857 CW ... BC 860 CW	h_{22e}	— — —	18 30 60	— — —	μS
Noise figure $I_C = 0.2\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_S = 2\text{ k}\Omega$ $f = 30\text{ Hz} \dots 15\text{ kHz}$ BC 859W BC 860W $f = 1\text{ kHz}$, $\Delta f = 200\text{ Hz}$ BC 859W BC 860W	F	— — — —	1.2 1.0 1.0 1.0	4 3 4 4	dB
Equivalent noise voltage $I_C = 0.2\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_S = 2\text{ k}\Omega$ $f = 10\text{ Hz} \dots 50\text{ Hz}$ BC 860W	V_n	—	—	0.110	μV

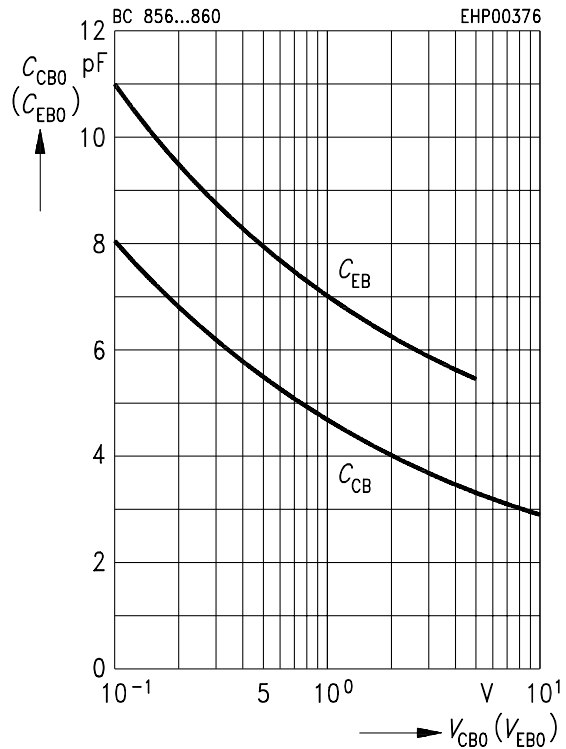
Total power dissipation $P_{\text{tot}} = f(T_A^*; T_S)$

* Package mounted on epoxy

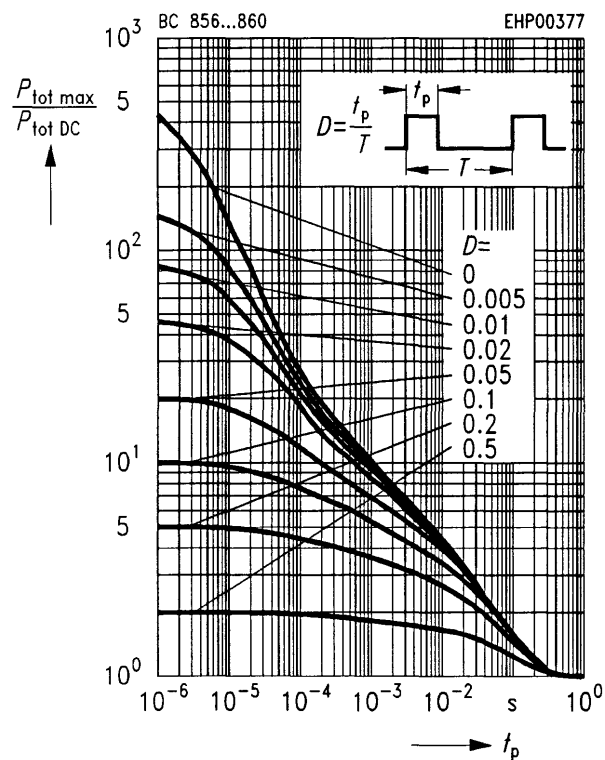


Collector-base capacitance $C_{CB0} = f(V_{CB0})$

Emitter-base capacitance $C_{EB0} = f(V_{EB0})$

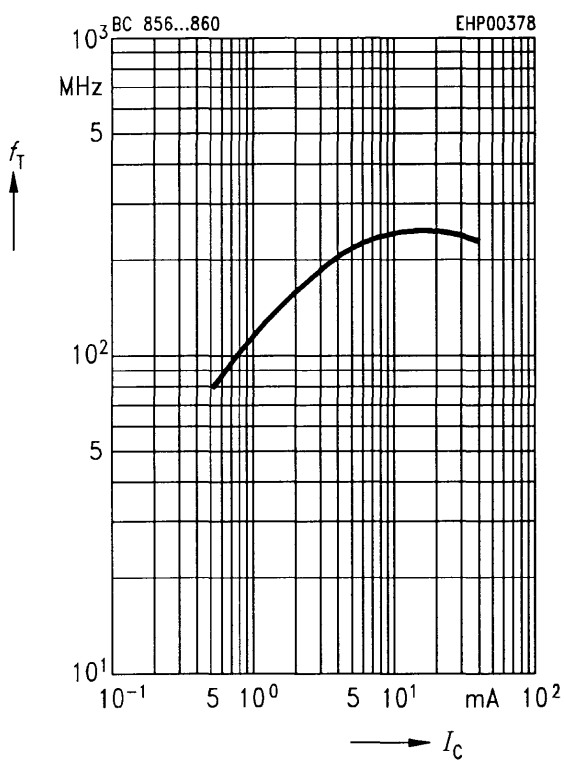


Permissible pulse load $P_{\text{tot max}}/P_{\text{tot DC}} = f(t_p)$



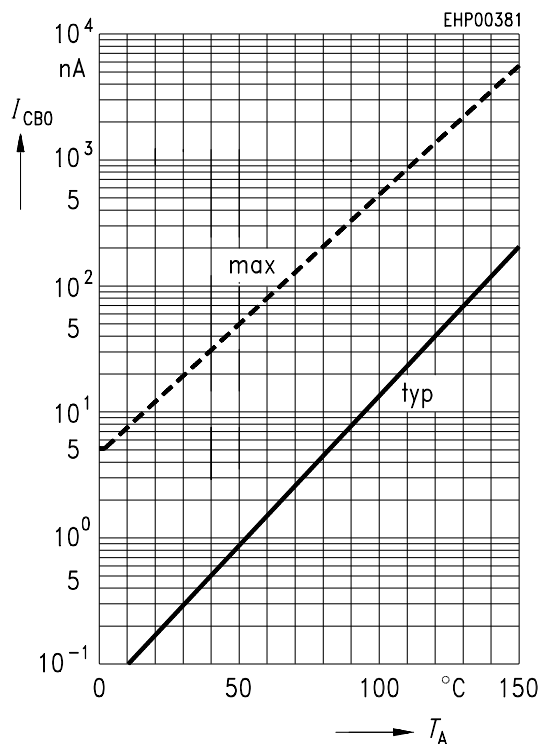
Transition frequency $f_T = f(I_C)$

$V_{CE} = 5 \text{ V}$



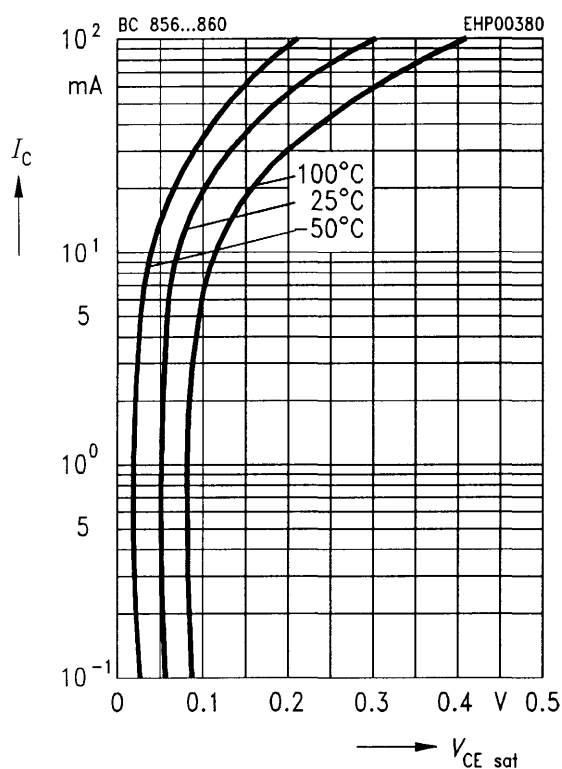
Collector cutoff current $I_{CB0} = f(T_A)$

$V_{CB} = 30 \text{ V}$



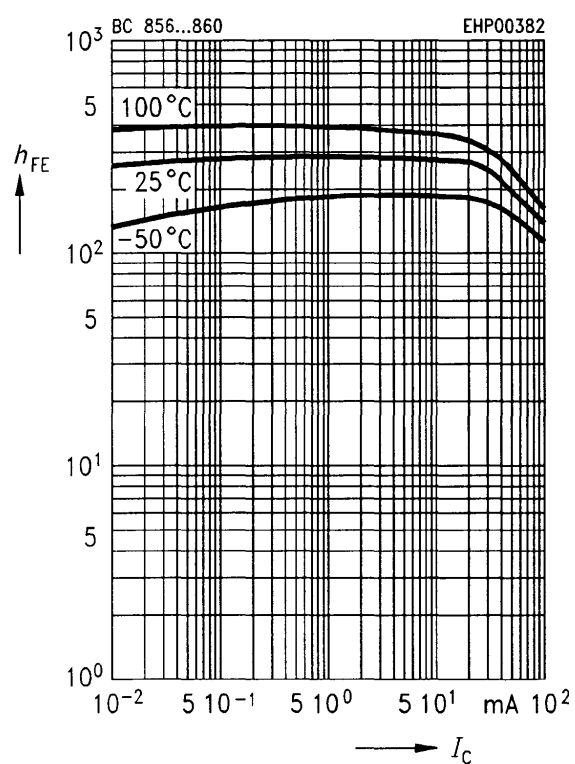
Collector-emitter saturation voltage

$I_C = f(V_{CEsat}), h_{FE} = 20$



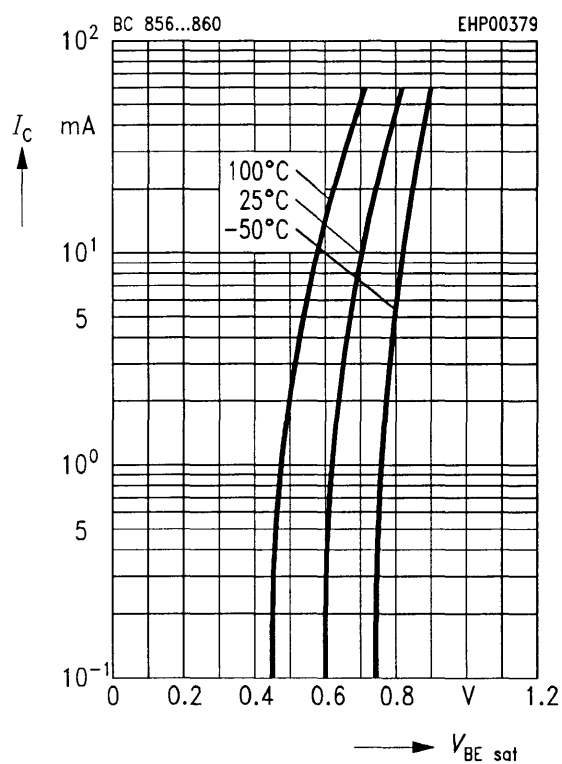
DC current gain $h_{FE} = f(I_C)$

$V_{CE} = 5 \text{ V}$



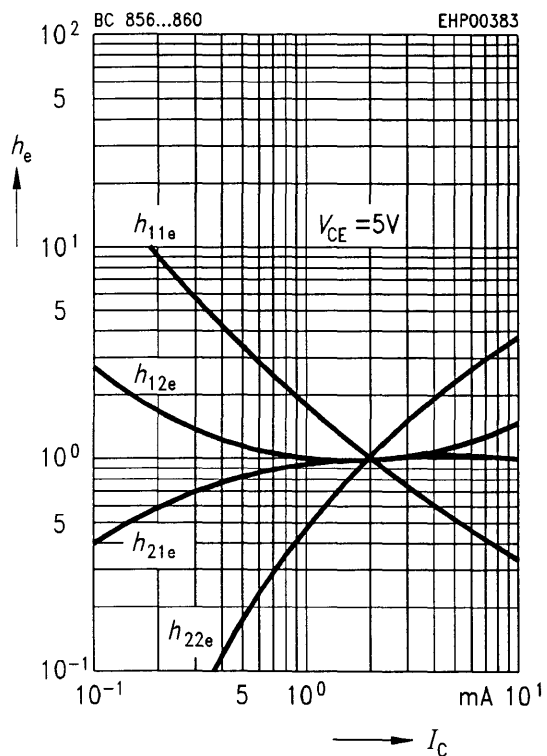
Base-emitter saturation voltage

$I_C = f(V_{BEsat}), h_{FE} = 20$



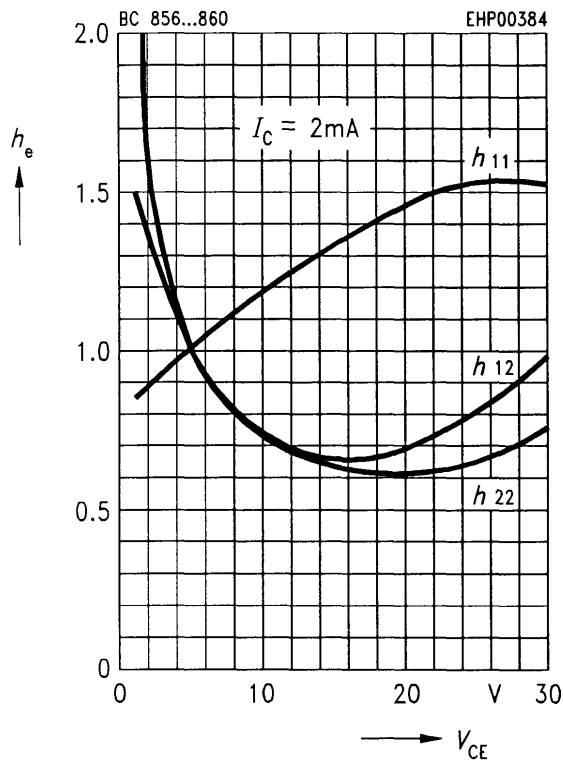
h parameter $h_e = f(I_C)$ normalized

$V_{CE} = 5 \text{ V}$



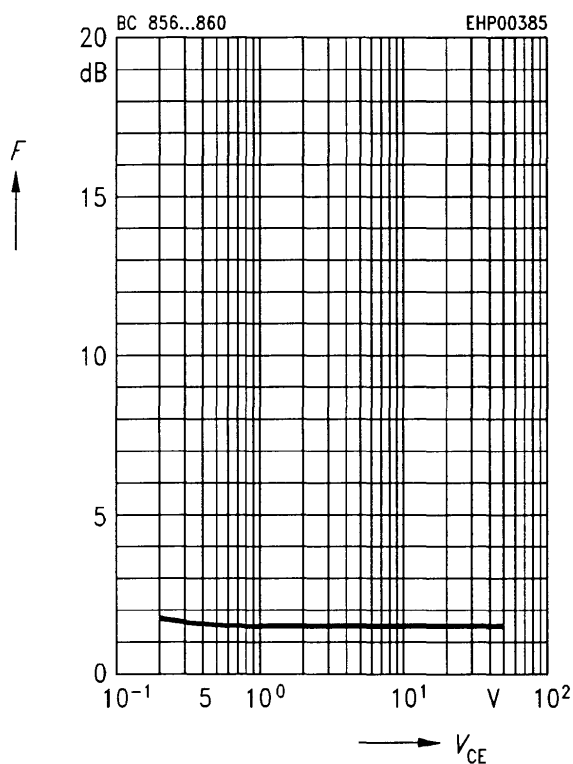
h parameter $h_e = f(V_{CE})$ normalized

$I_C = 2 \text{ mA}$



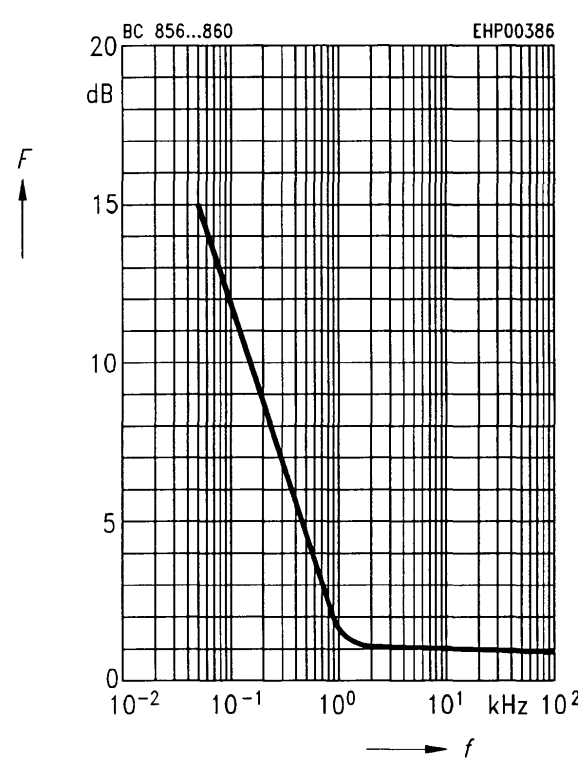
Noise figure $F = f(V_{CE})$

$I_C = 0.2 \text{ mA}$, $R_S = 2 \text{ k}\Omega$, $f = 1 \text{ kHz}$



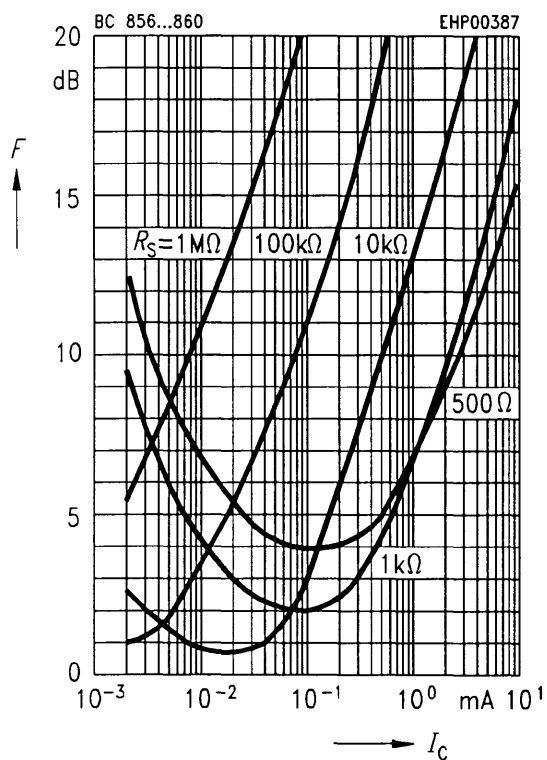
Noise figure $F = f(f)$

$I_C = 0.2 \text{ mA}$, $V_{CE} = 5 \text{ V}$, $R_S = 2 \text{ k}\Omega$



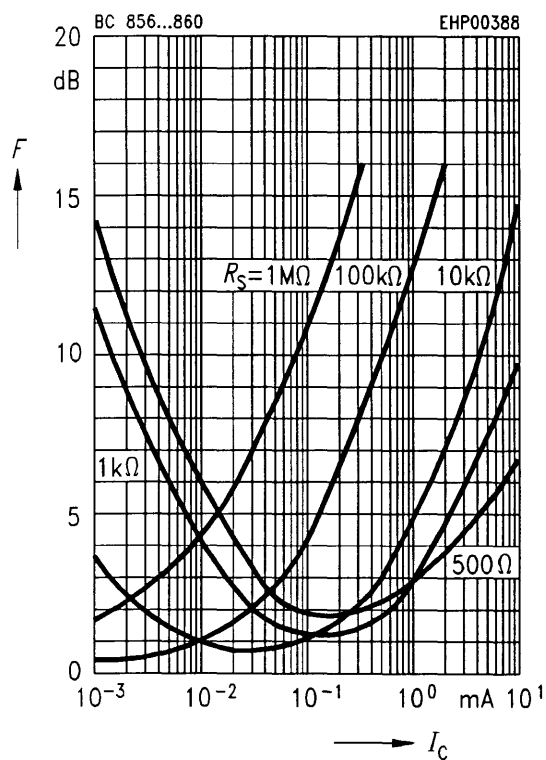
Noise figure $F = f(I_C)$

$V_{CE} = 5 \text{ V}$, $f = 120 \text{ Hz}$



Noise figure $F = f(I_C)$

$V_{CE} = 5 \text{ V}$, $f = 1 \text{ kHz}$



Noise figure $F = f(I_C)$

$V_{CE} = 5 \text{ V}$, $f = 10 \text{ kHz}$

