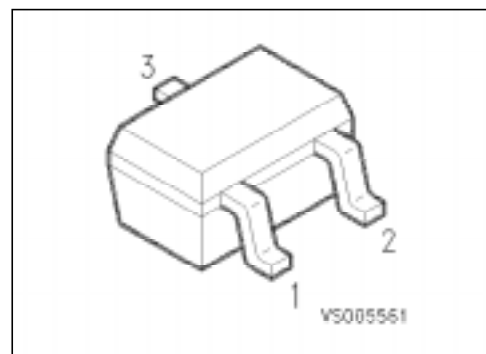


NPN Silicon AF Transistor

BC 846 W ... BC 850 W

Features

- For AF input stages and driver applications
- High current gain
- Low collector-emitter saturation voltage
- Low noise between 30Hz and 15 kHz
- Complementary types: BC 856 W, BC 857 W, BC 858 W, BC 859 W, BC 860 W (PNP)



Type	Marking	Ordering code (tape and reel)	Pin Configuration			Package
			1	2	3	
BC 846 AW	1 As	Q62702-C2319	B	E	C	SOT 323
BC 846 BW	1 Bs	Q62702-C2279				SOT 323
BC 847 AW	1 Es	Q62702-C2304				SOT 323
BC 847 BW	1 Fs	Q62702-C2305				SOT 323
BC 847 CW	1 Gs	Q62702-C2306				SOT 323
BC 848 AW	1 Js	Q62702-C2307				SOT 323
BC 848 BW	1 Ks	Q62702-C2308				SOT 323
BC 848 CW	1 Ls	Q62702-C2309				SOT 323
BC 849 BW	2 Bs	Q62702-C2310				SOT 323
BC 849 CW	2 Cs	Q62702-C2311				SOT 323
BC 850 BW	2 Fs	Q62702-C2312				SOT 323
BC 850 CW	2 Gs	Q62702-C2313				SOT 323

Maximum Ratings

Description	Symbol	BC846W BC 849 W BC 840 W	BC 847 W BC 848 W	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}	6	6 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

¹⁾Package mounted on epoxy pcb 40 mm × 40 mm × 1.5 mm/1 cm² Cu.

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

Description	Symbol	Ratings			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage <i>I</i> _C = 10 mA BC 846 W BC 847 W, BC 850 W BC 848 W, BC 849 W	<i>V</i> _{(BR)CEO}	65 45 30	— — —	— — —	V
Collector-base breakdown voltage ¹⁾ <i>I</i> _C = 100 μA BC 846 W BC 847 W, BC 850 W BC 848 W, BC 849 W	<i>V</i> _{(BR)CBO}	80 50 30	— — —	— — —	V
Collector-emitter breakdown voltage <i>I</i> _C = 10 μA, <i>V</i> _{BE} = 0 BC 846 W BC 847 W, BC 850 W BC 848 W, BC 849 W	<i>V</i> _{(BR)CBO}	80 50 30	— — —	— — —	V
Emitter-base breakdown voltage <i>I</i> _E = 10 μA BC 846 W, BC 847 W BC 848 W, BC 849 W BC 850	<i>V</i> _{(BR)EBO}	6 5 —	— — —	— — —	V
Collector-base cutoff current <i>V</i> _{CB} = 30 V <i>V</i> _{CB} = 30 V, <i>T</i> _A = 150 °C	<i>I</i> _{CBO}	— —	— —	15 5	nA μA
DC current gain <i>I</i> _C = 10 μA, <i>V</i> _{CE} = 5 V BC 846 AW ... BC 848 AW BC 846 BW ... BC 850 BW BC 847 CW ... BC 850 CW <i>I</i> _C = 2 mA, <i>V</i> _{CE} = 5 V BC 846 AW ... BC 848 AW BC 846 BW ... BC 850 BW BC 847 CW ... BC 850 CW	<i>h</i> _{FE}	— — — 110 200 420	140 250 480 180 290 520	— — — 220 450 800	—
Collector-emitter saturation voltage ¹⁾ <i>I</i> _C = 10 mA, <i>I</i> _B = 0.5 mA <i>I</i> _C = 100 mA, <i>I</i> _B = 5 mA	<i>V</i> _{CEsat}	— —	90 900	250 650	mV
Base-emitter saturation voltage ¹⁾ <i>I</i> _C = 10 mA, <i>I</i> _B = 0.5 mA <i>I</i> _C = 100 mA, <i>I</i> _B = 5 mA	<i>V</i> _{CEsat}	— —	700 900	— —	mV
Base-emitter voltage ¹⁾ <i>I</i> _C = 2 mA, <i>V</i> _{CE} = 0.5 mA <i>I</i> _C = 10 mA, <i>V</i> _{CE} = 5 mA	<i>V</i> _{CEsat}	580 —	660 —	700 770	mV

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

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

Description	Symbol	Ratings			Unit
		min.	typ.	max.	

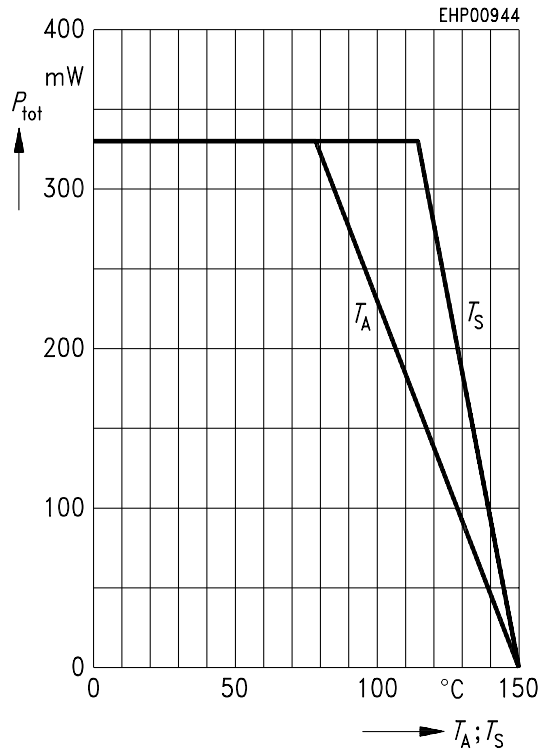
AC Characteristics

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}	—	2	—	pF
Input capacitance $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$	C_{ibo}	—	10	—	pF
Short-circuit input impedance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BC 846 AW ... BC 849 AW BC 846 BW ... BC 850 BW BC 847 CW ... BC 850 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 846 AW ... BC 849 AW BC 846 BW ... BC 850 BW BC 847 CW ... BC 850 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 846 AW ... BC 849 AW BC 846 BW ... BC 850 BW BC 847 CW ... BC 850 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 846 AW ... BC 849 AW BC 846 BW ... BC 850 BW BC 847 CW ... BC 850 CW	h_{22e}	— — —	18 30 60	— — —	μS
Noise figure $I_C = 0.2\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_S = 2\text{ k}\Omega$ $f = 30\text{ Hz} \dots 15\text{ kHz}$ $f = 1\text{ kHz}$, $\Delta f = 200\text{ Hz}$ BC 849 W BC 850 W BC 849 W BC 850 W	F	— — — —	1.4 1.4 1.2 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 850 W	V_n	—	—	0.135	μV

Curves see BC 846 ... BC 840

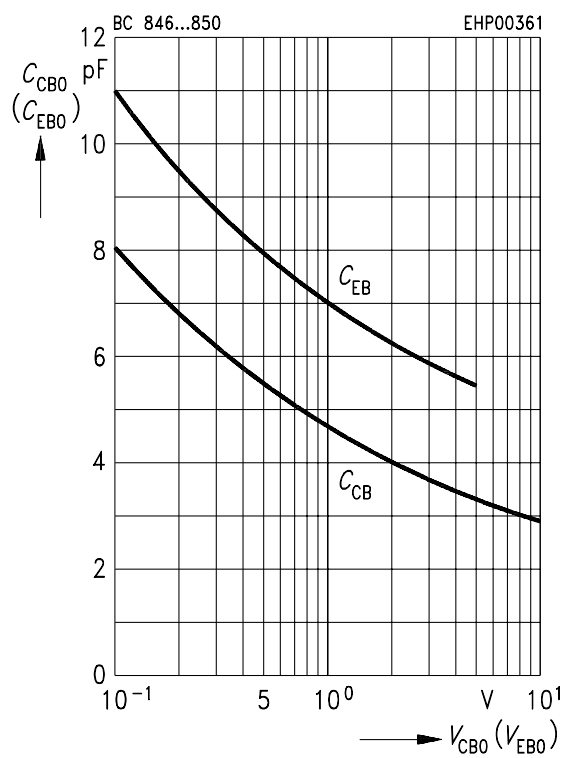
Total power dissipation $P_{\text{tot}} = f(T_A^*; T_S)$

* Package mounted on epoxy

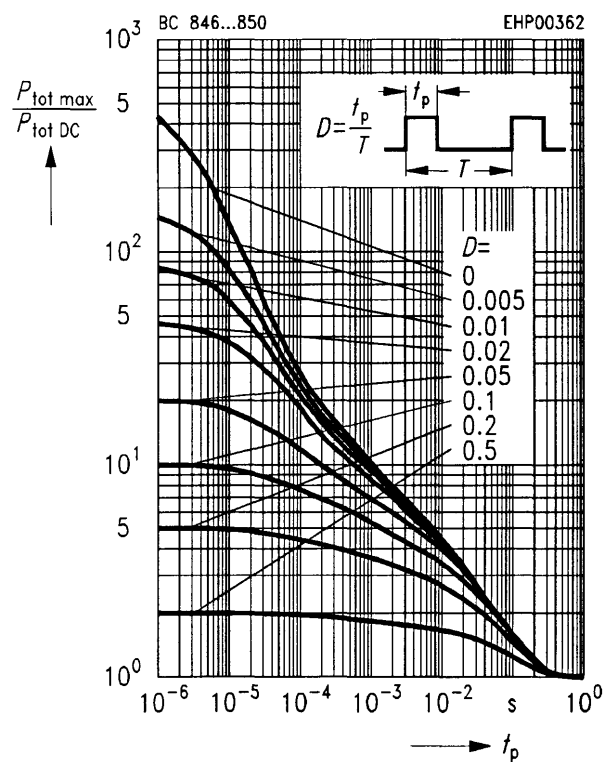


Collector-base capacitance $C_{CB0} = f(V_{CB0})$

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

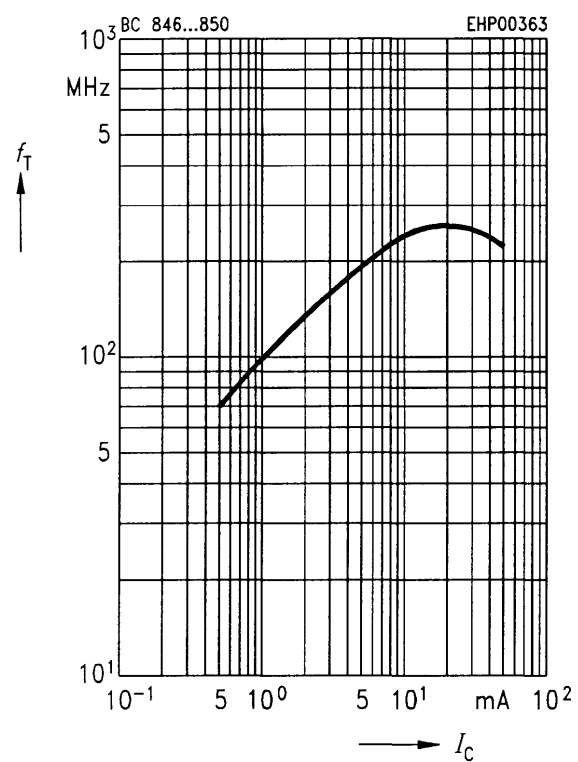


Permissible pulse load $P_{\text{tot max}}/P_{\text{tot DC}} = f(t_p)$



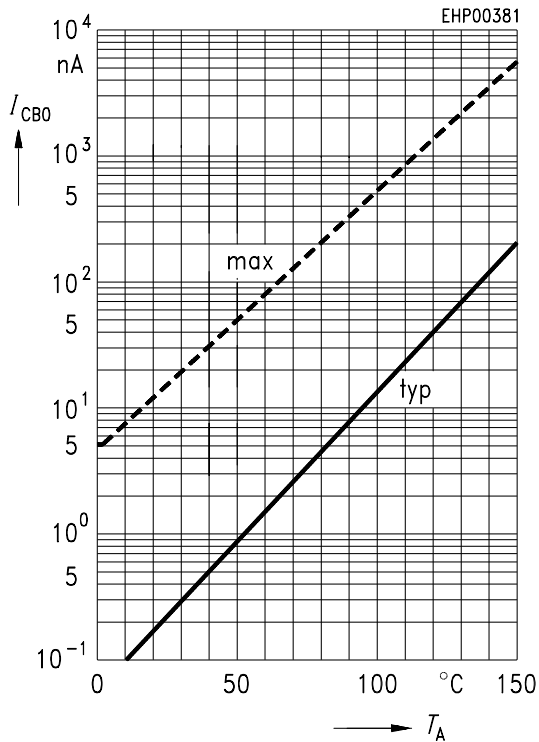
Transition frequency $f_T = f(I_C)$

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



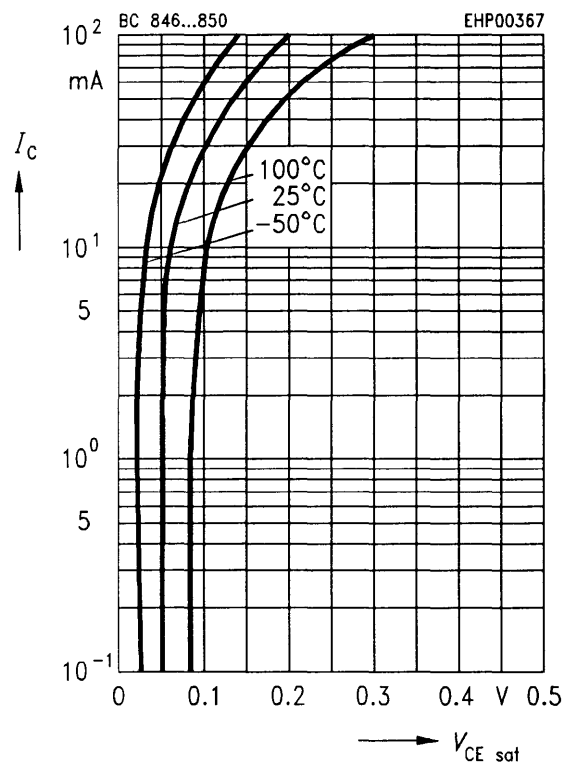
Collector cutoff current $I_{CB0} = f(T_A)$

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



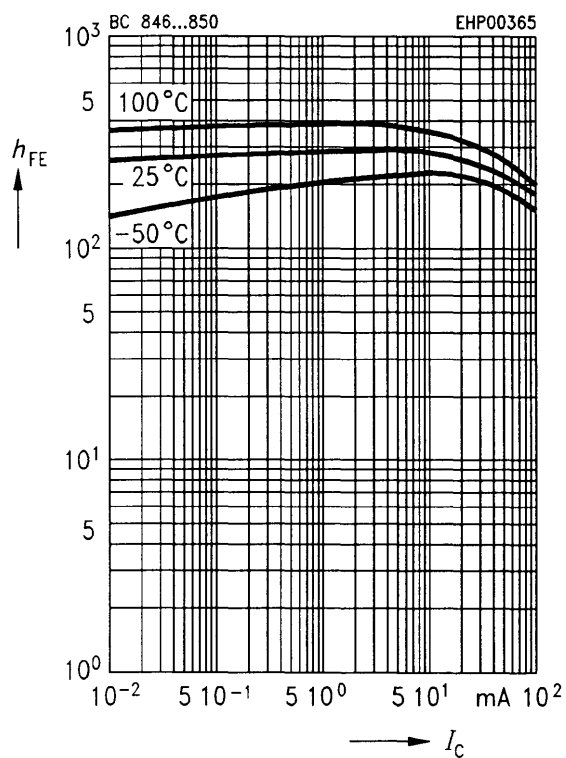
Collector-emitter saturation voltage

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



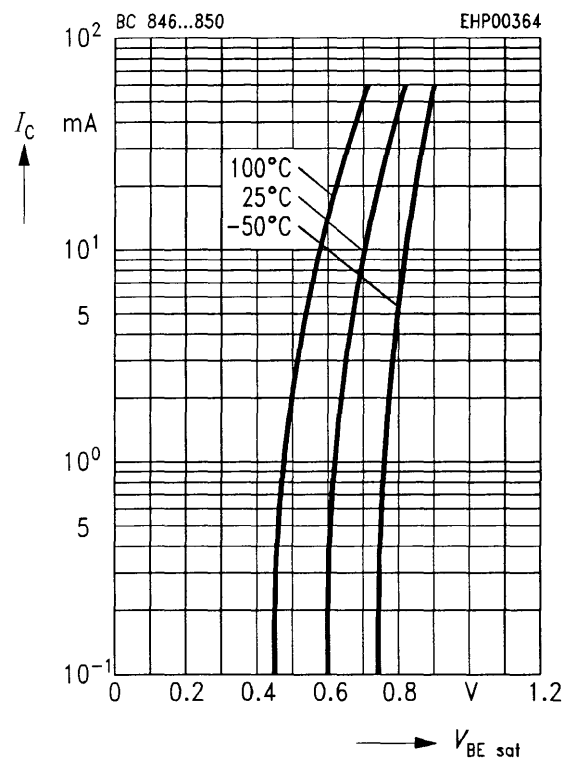
DC current gain $h_{FE} = f(I_C)$

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



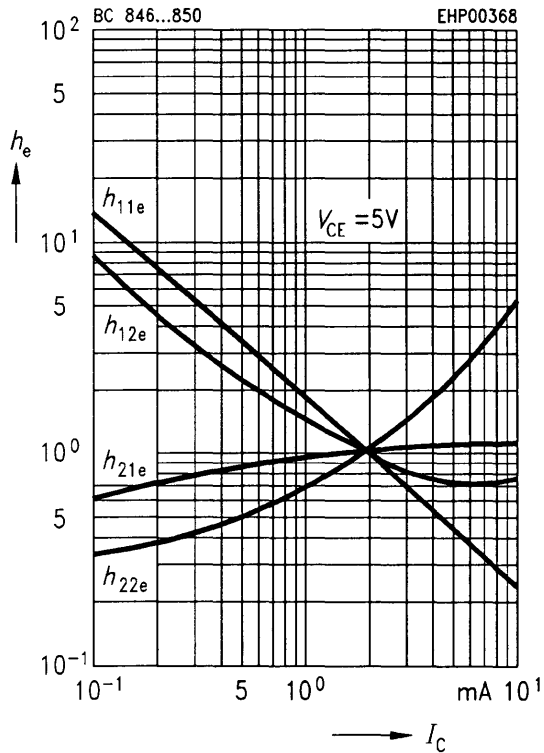
Base-emitter saturation voltage

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



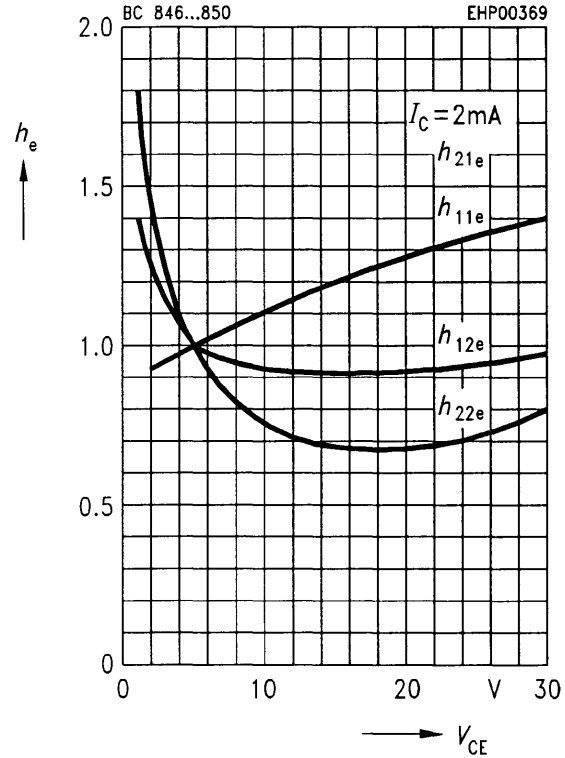
h parameter $h_e = f(I_C)$ normalized

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



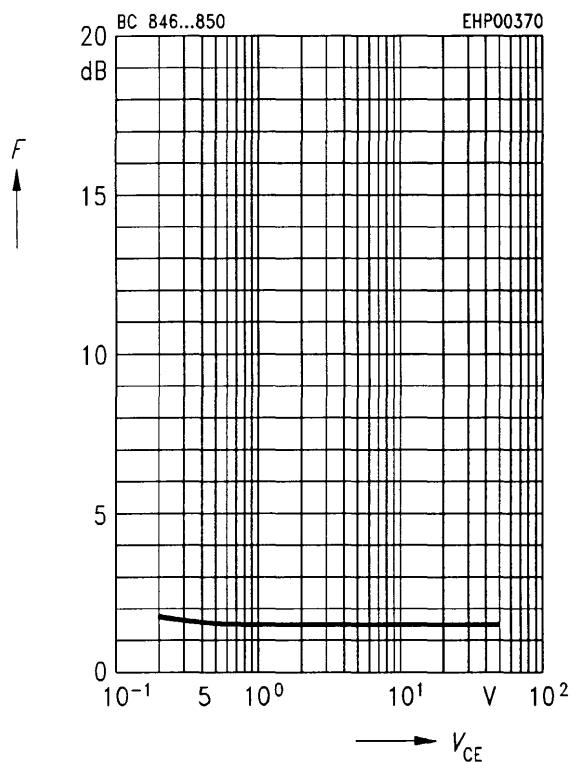
h parameter $h_e = f(V_{CE})$ normalized

$I_C = 2 \text{ mA}$



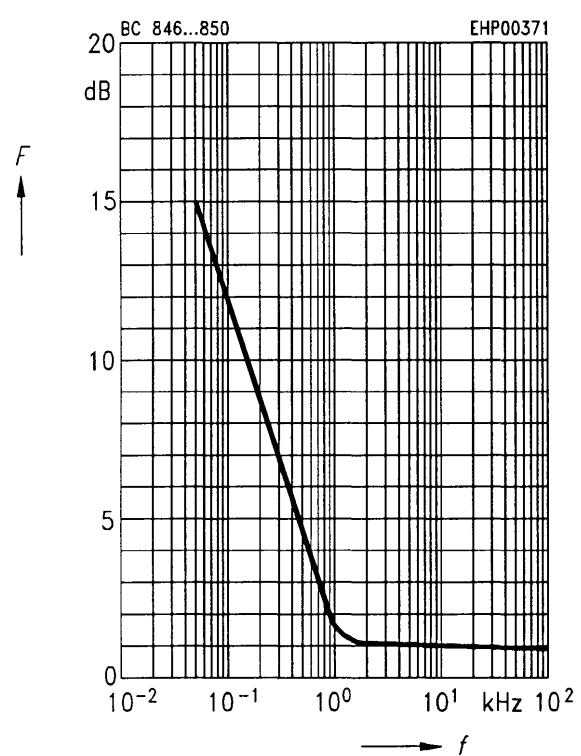
Noise figure $F = f(V_{CE})$

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



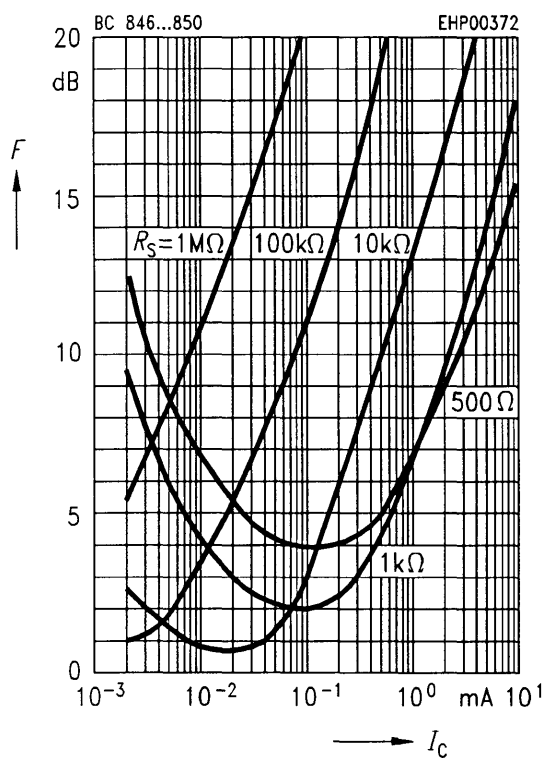
Noise figure $F = f(f)$

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



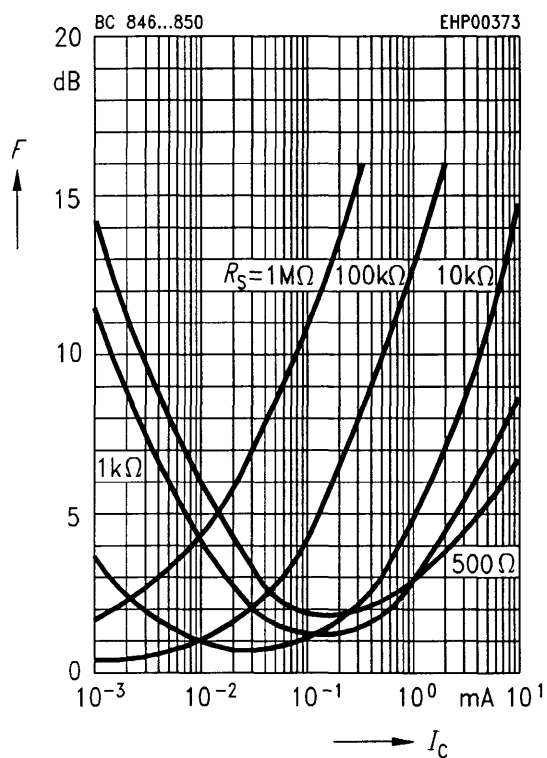
Noise figure $F = f(I_C)$

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



Noise figure $F = f(I_C)$

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



Noise figure $F = f(I_C)$

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

