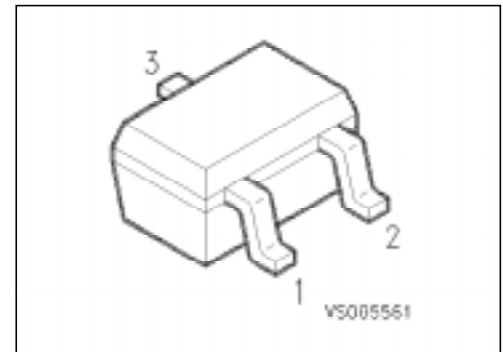


## NPN Silicon AF Transistor

## 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 847 W BC 849 W BC 848 W BC 840 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 <sup>1)</sup>	$R_{th JA}$	≤ 240	K/W
Junction - soldering point	$R_{th JS}$	≤ 105	K/W

<sup>1)</sup>Package mounted on epoxy pcb 40 mm × 40 mm × 1.5 mm/1 cm<sup>2</sup> Cu.

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

Description	Symbol	Ratings			Unit
		min.	typ.	max.	
<b>DC Characteristics</b>					
Collector-emitter breakdown voltage $I_C = 10\text{ mA}$ BC 846 W BC 847 W, BC 850 W BC 848 W, BC 849 W	$V_{(BR)CEO}$	65 45 30	– – –	– – –	V
Collector-base breakdown voltage <sup>1)</sup> $I_C = 100\text{ }\mu\text{A}$ BC 846 W BC 847 W, BC 850 W BC 848 W, BC 849 W	$V_{(BR)CBO}$	80 50 30	– – –	– – –	V
Collector-emitter breakdown voltage $I_C = 10\text{ }\mu\text{A}$ , $V_{BE} = 0$ BC 846 W BC 847 W, BC 850 W BC 848 W, BC 849 W	$V_{(BR)CBO}$	80 50 30	– – –	– – –	V
Emitter-base breakdown voltage $I_E = 10\text{ }\mu\text{A}$ BC 846 W, BC 847 W BC 848 W, BC 849 W BC 850	$V_{(BR)EBO}$	6 5	– –	– –	V
Collector-base cutoff current $V_{CB} = 30\text{ V}$ $V_{CB} = 30\text{ V}$ , $T_A = 150\text{ °C}$	$I_{CBO}$	– –	– –	15 5	nA $\mu\text{A}$
DC current gain $I_C = 10\text{ }\mu\text{A}$ , $V_{CE} = 5\text{ V}$ BC 846 AW ... BC 848 AW BC 846 BW ... BC 850 BW BC 847 CW ... BC 850 CW  $I_C = 2\text{ mA}$ , $V_{CE} = 5\text{ V}$ BC 846 AW ... BC 848 AW BC 846 BW ... BC 850 BW BC 847 CW ... BC 850 CW	$h_{FE}$	– – – 110 200 420	140 250 480 180 290 520	– – – 220 450 800	–
Collector-emitter saturation voltage <sup>1)</sup> $I_C = 10\text{ mA}$ , $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$ , $I_B = 5\text{ mA}$	$V_{CEsat}$	– –	90 900	250 650	mV
Base-emitter saturation voltage <sup>1)</sup> $I_C = 10\text{ mA}$ , $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$ , $I_B = 5\text{ mA}$	$V_{CEsat}$	– –	700 900	– –	mV
Base-emitter voltage <sup>1)</sup> $I_C = 2\text{ mA}$ , $V_{CE} = 0.5\text{ mA}$ $I_C = 10\text{ mA}$ , $V_{CE} = 5\text{ mA}$	$V_{CEsat}$	580 –	660 –	700 770	mV

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

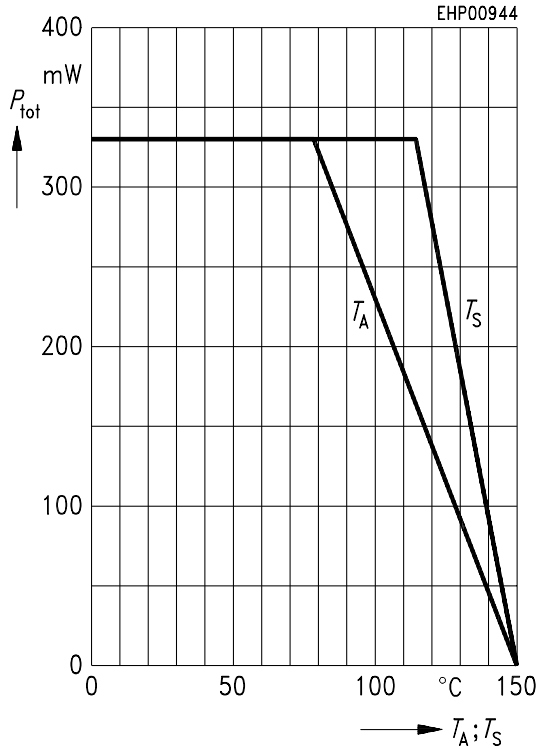
**Characteristics** at  $T_A = 25\text{ °C}$ , unless otherwise specified.

Description	Symbol	Ratings			Unit
		min.	typ.	max.	
<b>AC Characteristics</b>					
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 $\Omega$
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	–	$\mu\text{S}$
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	$\mu\text{V}$

**Curves see BC 846 ... BC 840**

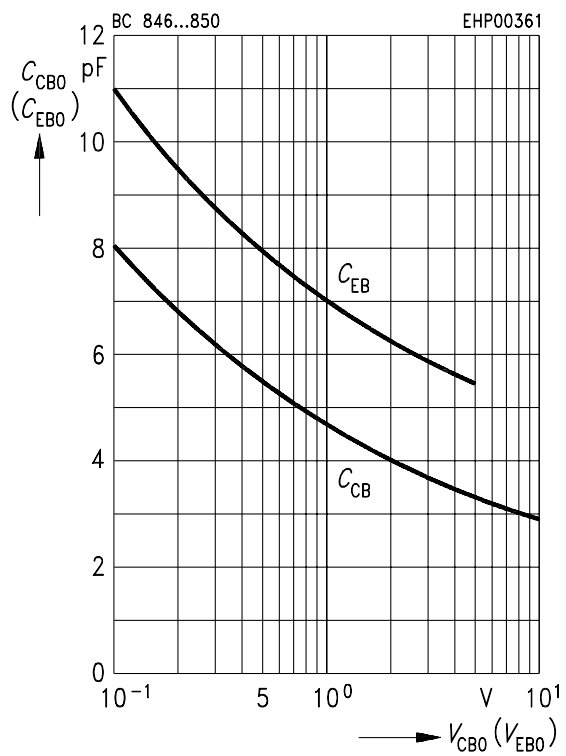
**Total power dissipation  $P_{tot} = f(T_A^*; T_S)$**

\* Package mounted on epoxy

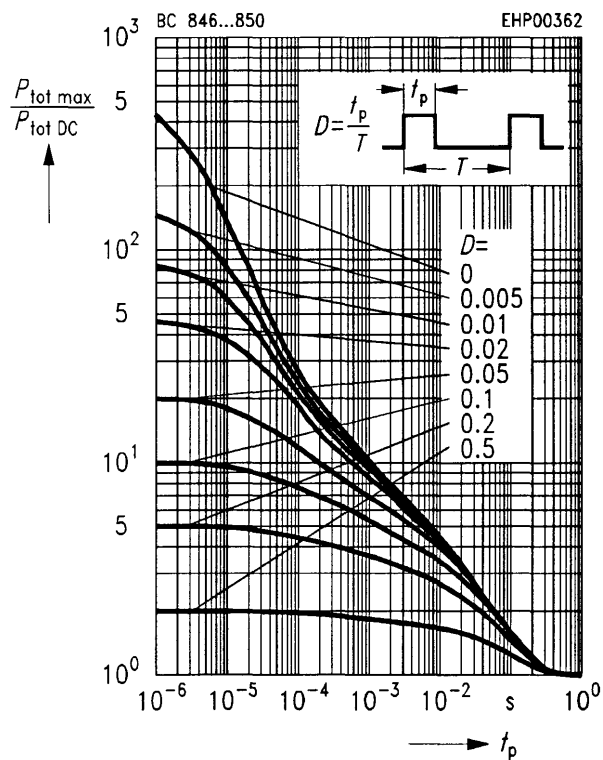


**Collector-base capacitance  $C_{CB0} = f(V_{CB0})$**

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

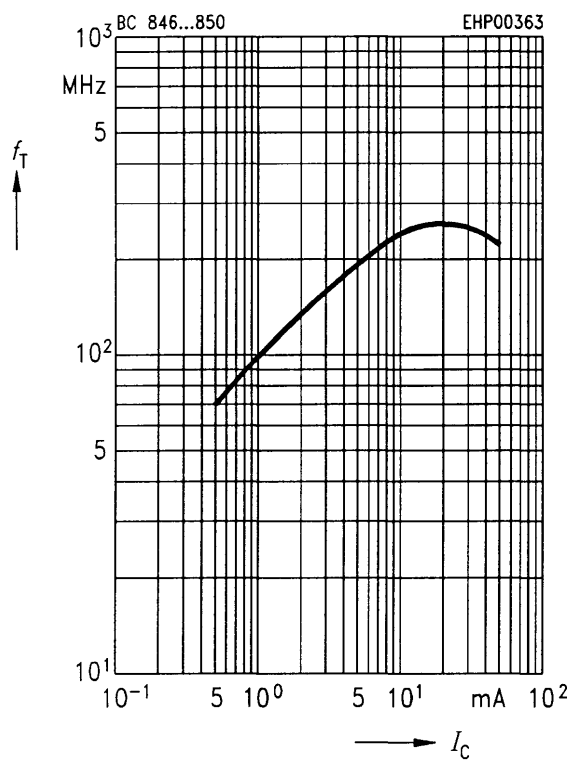


**Permissible pulse load  $P_{tot max}/P_{tot DC} = f(t_p)$**



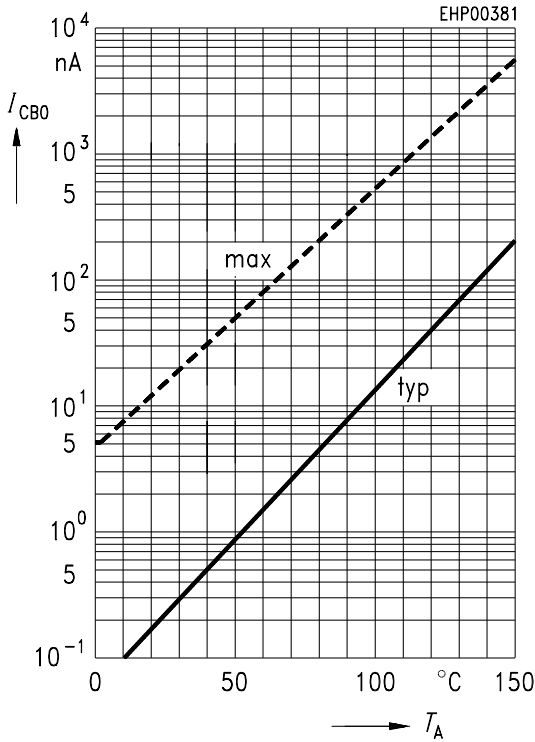
**Transition frequency  $f_T = f(I_C)$**

$V_{CE} = 5 V$



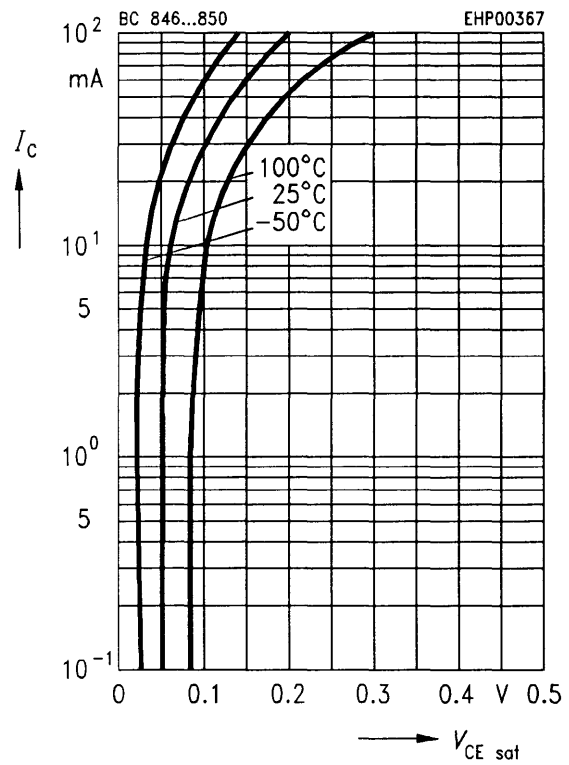
**Collector cutoff current  $I_{CB0} = f(T_A)$**

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



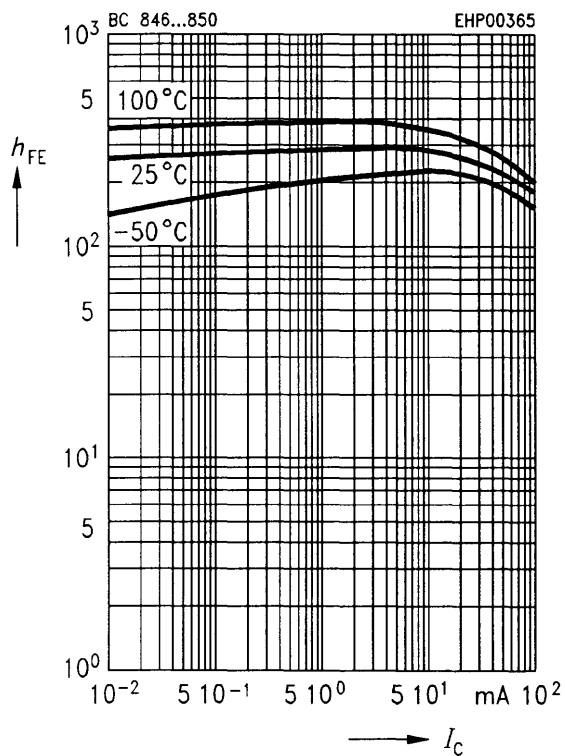
**Collector-emitter saturation voltage**

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



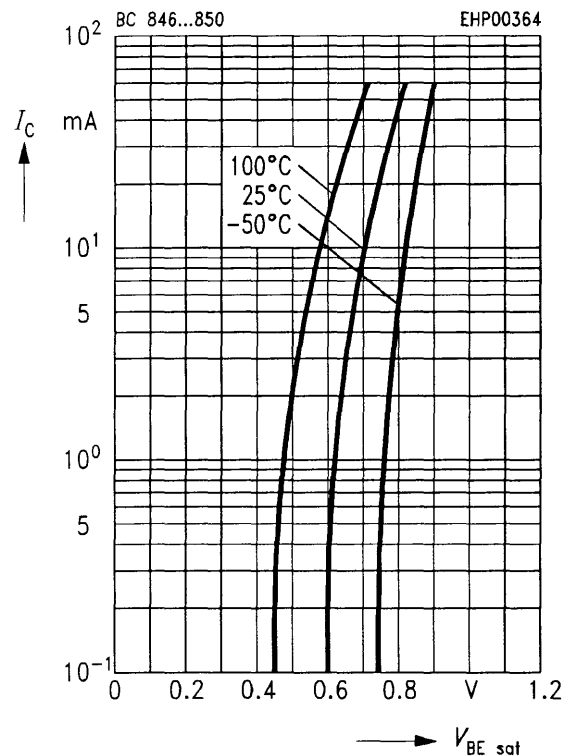
**DC current gain  $h_{FE} = f(I_C)$**

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



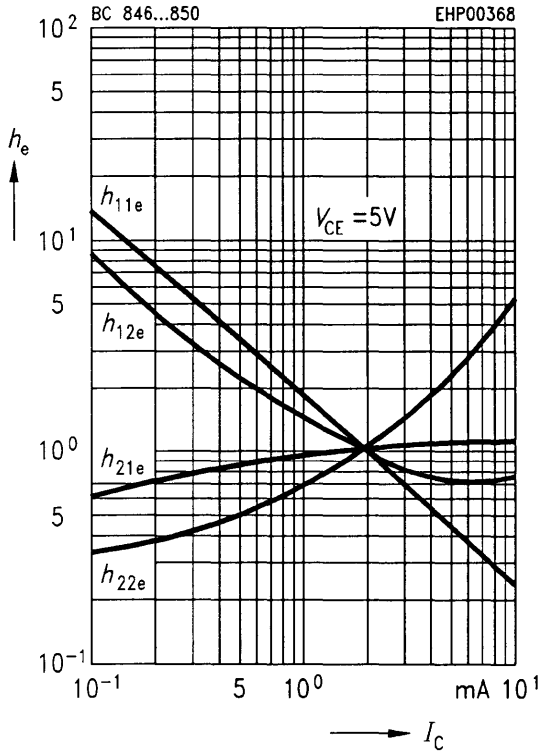
**Base-emitter saturation voltage**

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



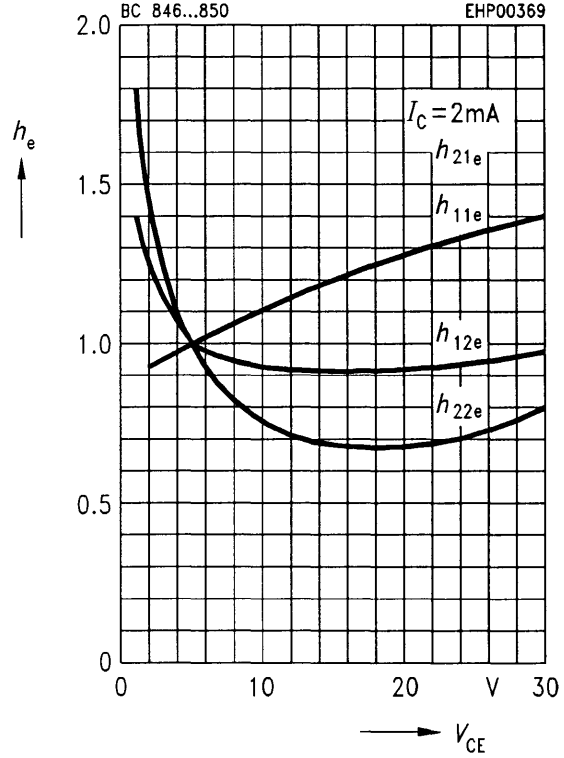
**h parameter  $h_e = f(I_C)$  normalized**

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



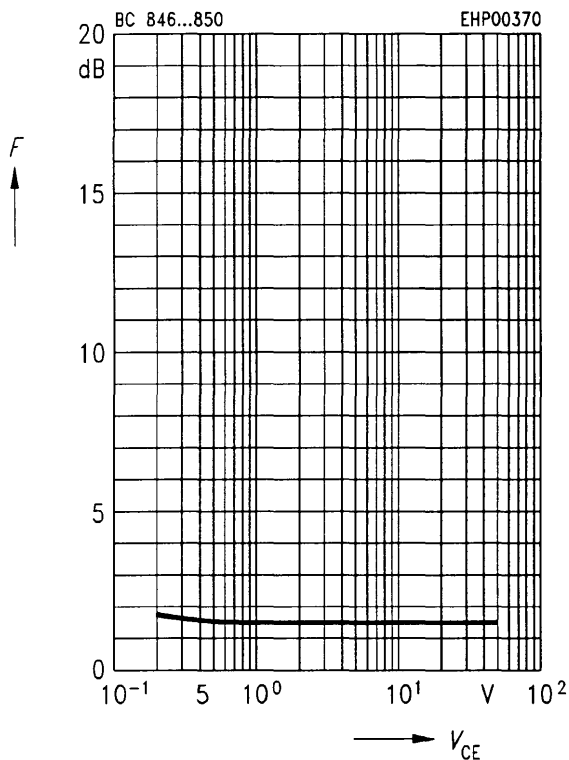
**h parameter  $h_e = f(V_{CE})$  normalized**

$I_C = 2\text{ mA}$



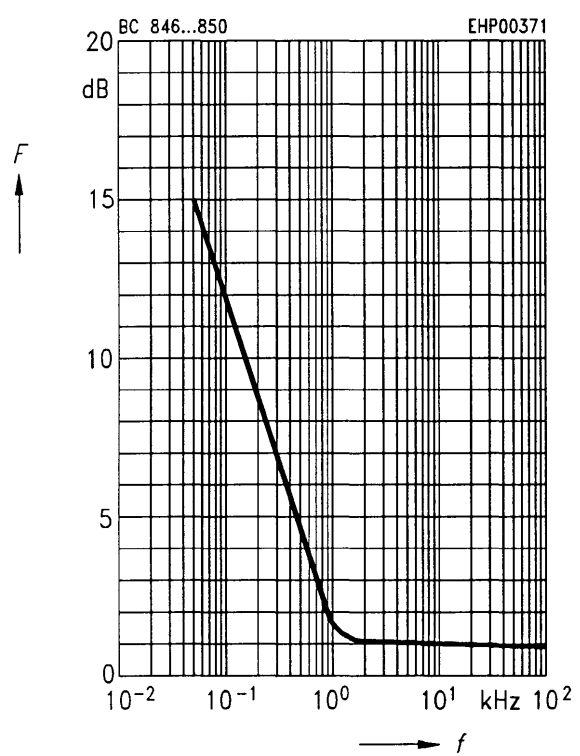
**Noise figure  $F = f(V_{CE})$**

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



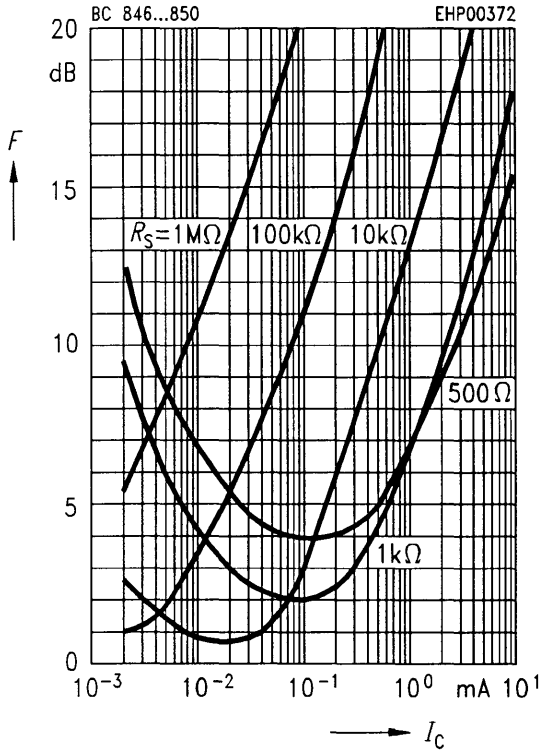
**Noise figure  $F = f(f)$**

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



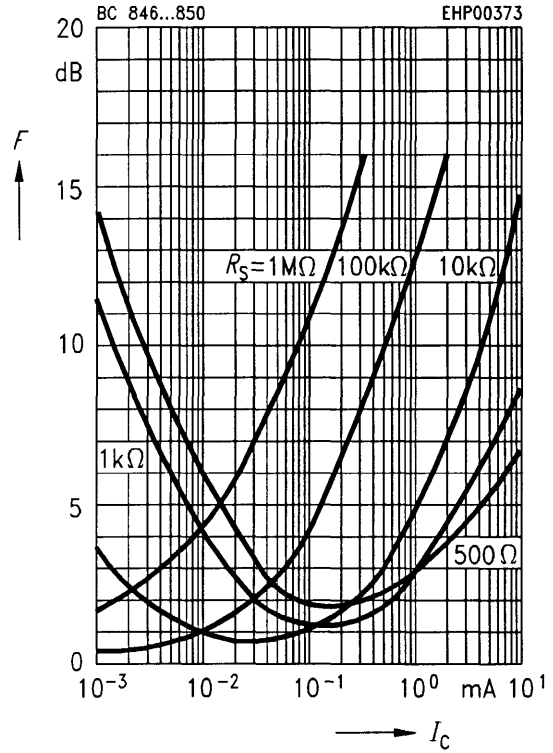
**Noise figure  $F = f(I_C)$**

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



**Noise figure  $F = f(I_C)$**

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



**Noise figure  $F = f(I_C)$**

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

