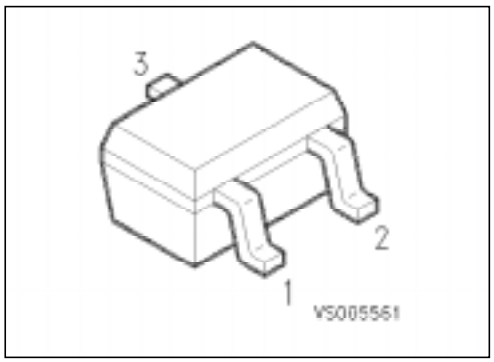
SIEMENS

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 1	2	3	Package[1)]
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, $T_S = 115$ °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 °C, unless otherwise specified.

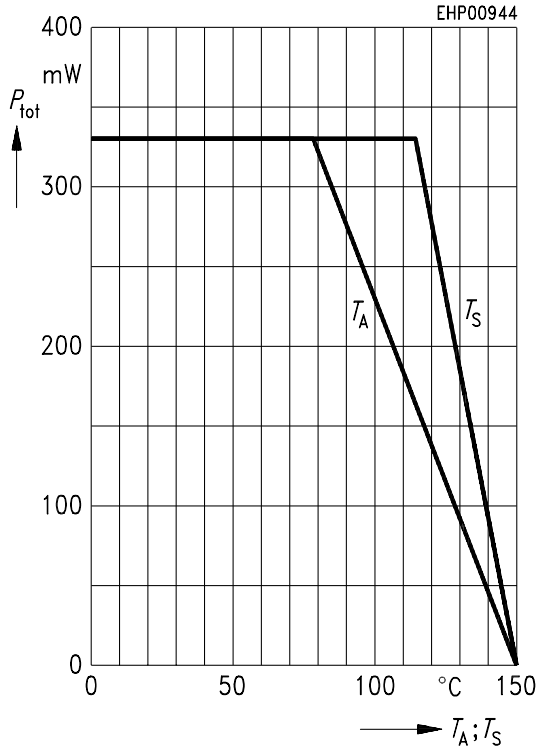
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC characteristics					
Collector-emitter breakdown voltage	$V_{(BR)CE0}$				V
I_C = 10 mA BC 856W		65	–	–	
BC 857W, BC 860W		45	–	–	
BC 858W, BC 859W		30	–	–	
Collector-base breakdown voltage	$V_{(BR)CB0}$				
I_C = 10 µA BC 856W		80	–	–	
BC 857W, BC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

[1)] Pulse test: $t \leq 300$ µs, D = 2 %.

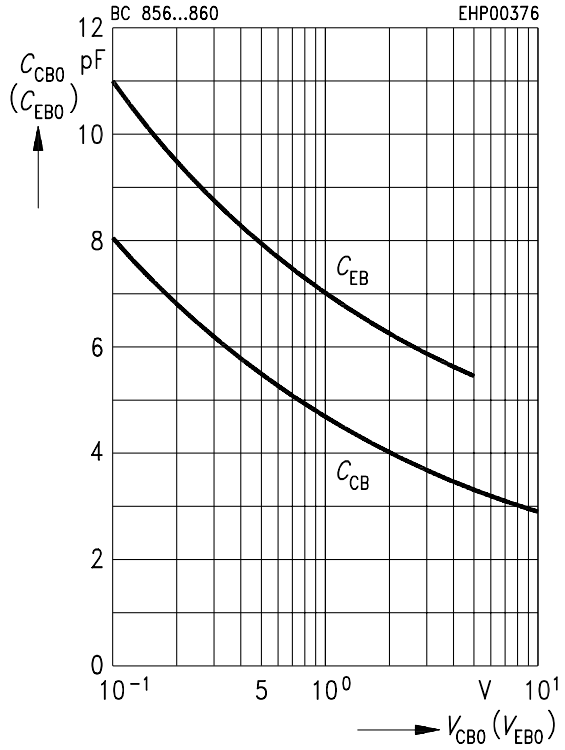
Electrical Characteristics
at T_A = 25 °C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC characteristics					
Transition frequency I_C = 20 mA, V_{CE} = 5 V, f = 100 MHz	f_t	–	250	–	MHz
Output capacitance V_{CB} = 10 V, f = 1 MHz	C_{obo}	–	3	–	pF
Input capacitance V_{CB} = 0.5 V, f = 1 MHz	C_{ibo}	–	10	–	
Short-circuit input impedance I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{11e}				kΩ
BC 856 AW … BC 859 AW		–	2.7	–	
BC 856 BW … BC 860 BW		–	4.5	–	
BC 857 CW … BC 860 CW		–	8.7	–	
Open-circuit reverse voltage transfer ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{12e}				10^{-4}
BC 856 AW … BC 859 AW		–	1.5	–	
BC 856 BW … BC 860 BW		–	2.0	–	
BC 857 CW … BC 860 CW		–	3.0	–	
Short-circuit forward current transfer ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{21e}				–
BC 856 AW … BC 859 AW		–	200	–	
BC 856 BW … BC 860 BW		–	330	–	
BC 857 CW … BC 860 CW		–	600	–	
Open-circuit output admittance I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{22e}				µS
BC 856 AW … BC 859 AW		–	18	–	
BC 856 BW … BC 860 BW		–	30	–	
BC 857 CW … BC 860 CW		–	60	–	
Noise figure I_C = 0.2 mA, V_{CE} = 5 V, R_S = 2 kΩ	F				dB
f= 30 Hz … 15 kHz BC 859W		–	1.2	4	
BC 860W		–	1.0	3	
f= 1 kHz, Δf = 200 Hz BC 859W		–	1.0	4	
BC 860W		–	1.0	4	
Equivalent noise voltage I_C = 0.2 mA, V_{CE} = 5 V, R_S = 2 kΩ f= 10 Hz … 50 Hz	V_n				µV
BC 860W		–	–	0.110	

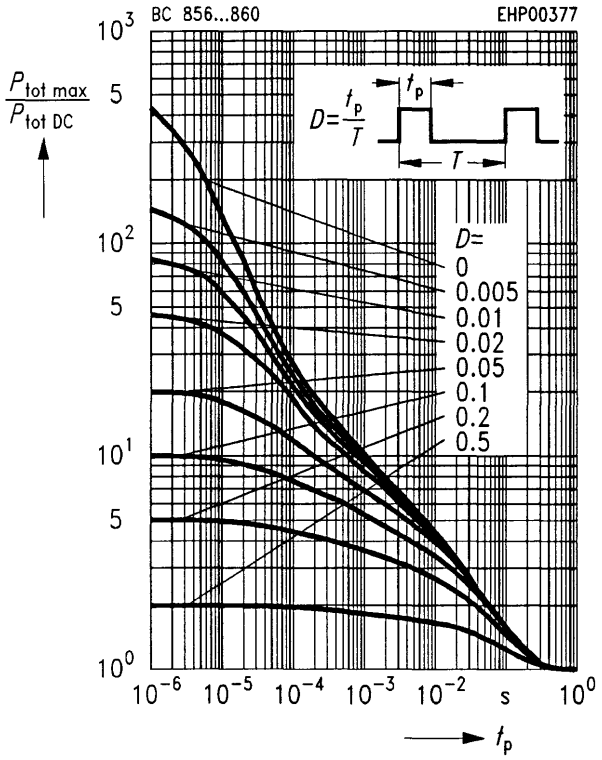
Total power dissipation $P_{tot} = f(T_A^*; T_S)$
* Package mounted on epoxy



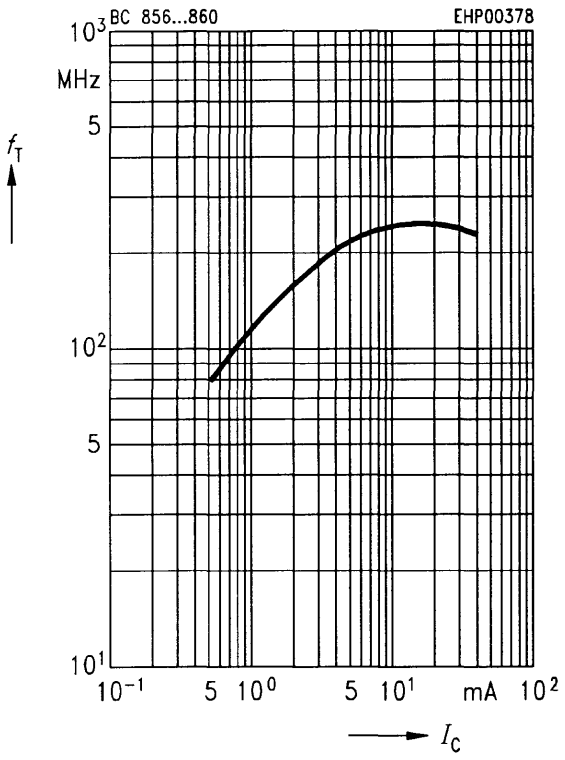
Collector-base capacitance $C_{CB0} = f(V_{CB0})$
Emitter-base capacitance $C_{EB0} = f(V_{EB0})$



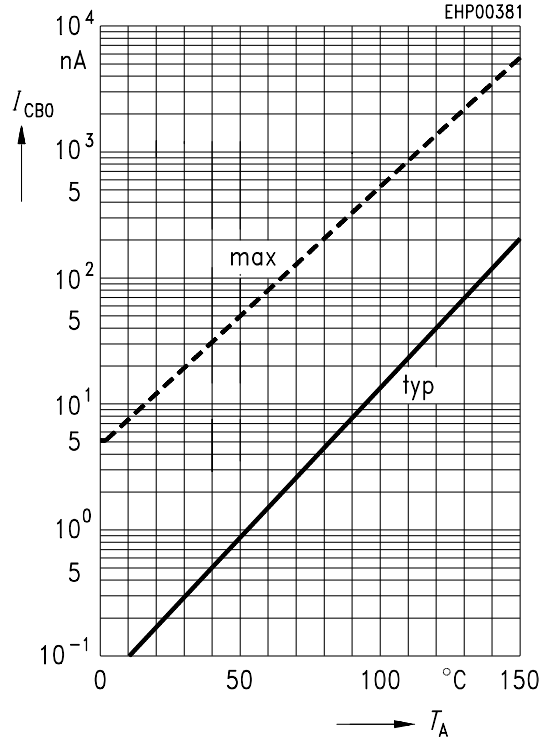
Permissible pulse load $P_{tot\,max}/P_{tot\,DC} = f(t_p)$



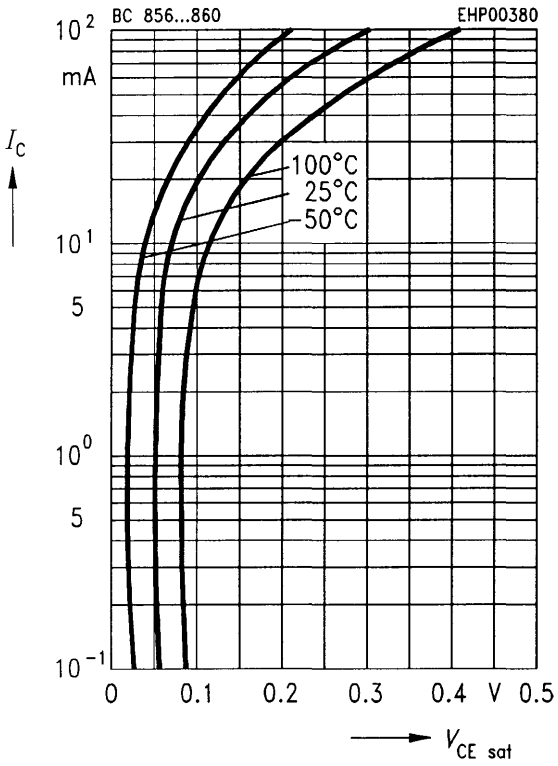
Transition frequency $f_T = f(I_C)$
$V_{CE} = 5$ V



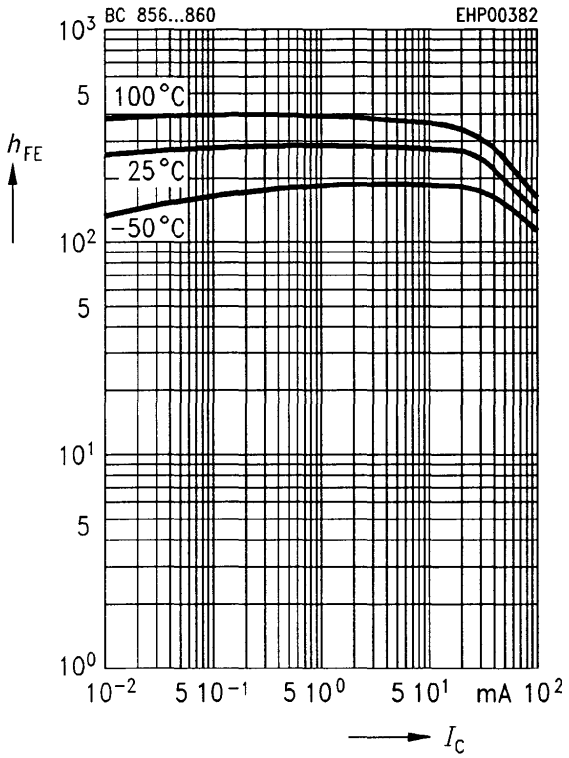
Collector cutoff current $I_{CB0} = f(T_A)$
V_{CB} = 30 V



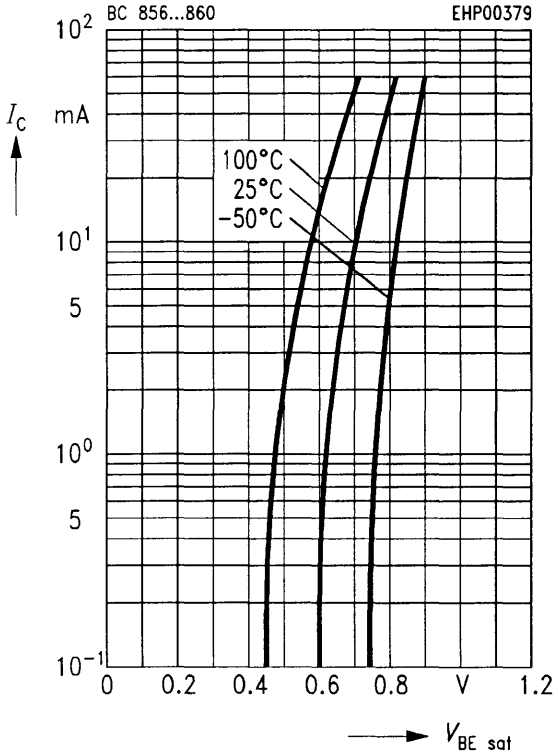
Collector-emitter saturation voltage
$I_C = f(V_{CEsat})$, h_{FE} = 20



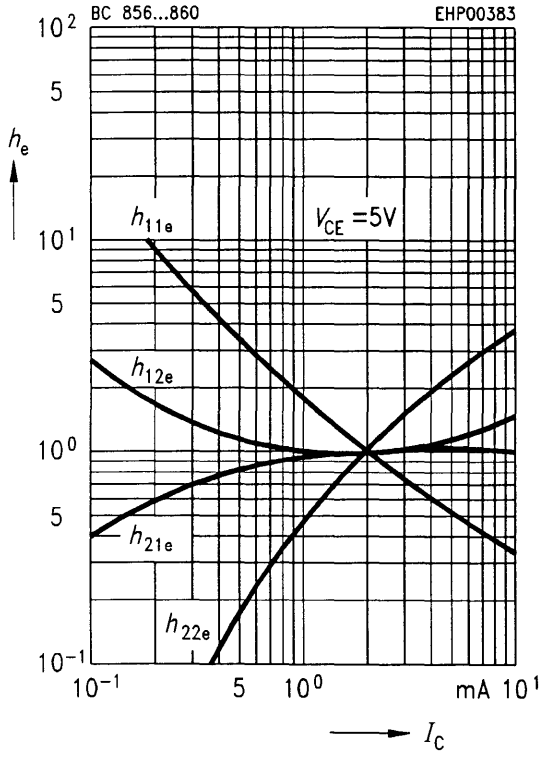
DC current gain $h_{FE} = f(I_C)$
V_{CE} = 5 V



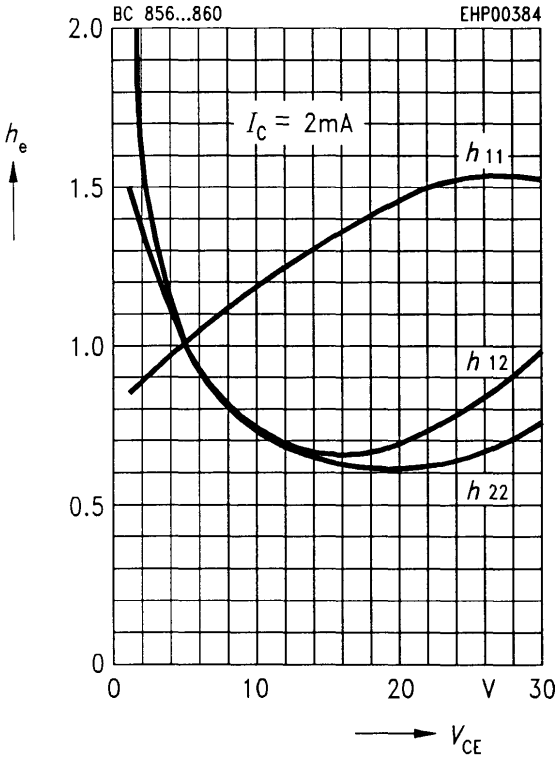
Base-emitter saturation voltage
$I_C = f(V_{BEsat})$, h_{FE} = 20



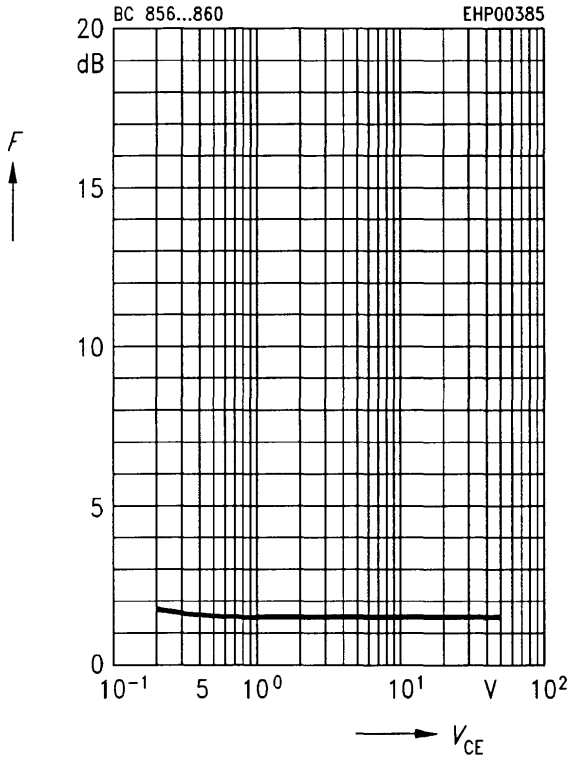
h parameter $h_e = f(I_C)$ **normalized**
V_{CE} = 5 V



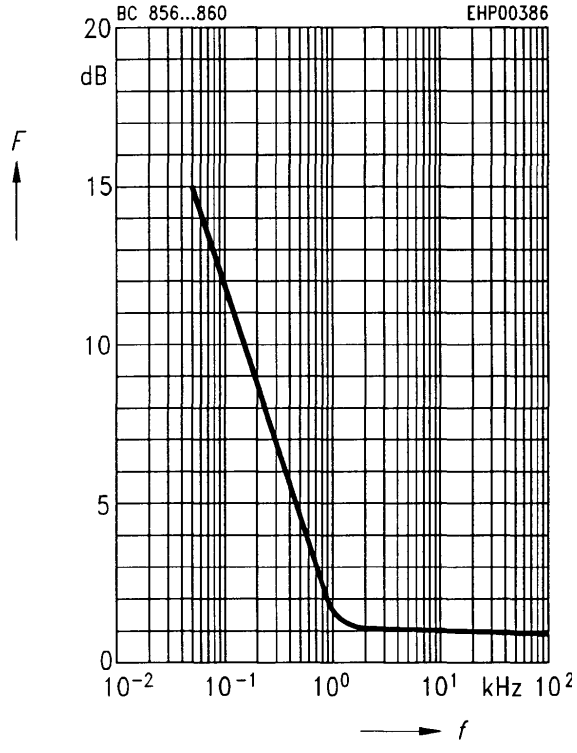
h parameter $h_e = f(V_{CE})$ **normalized**
I_C = 2 mA



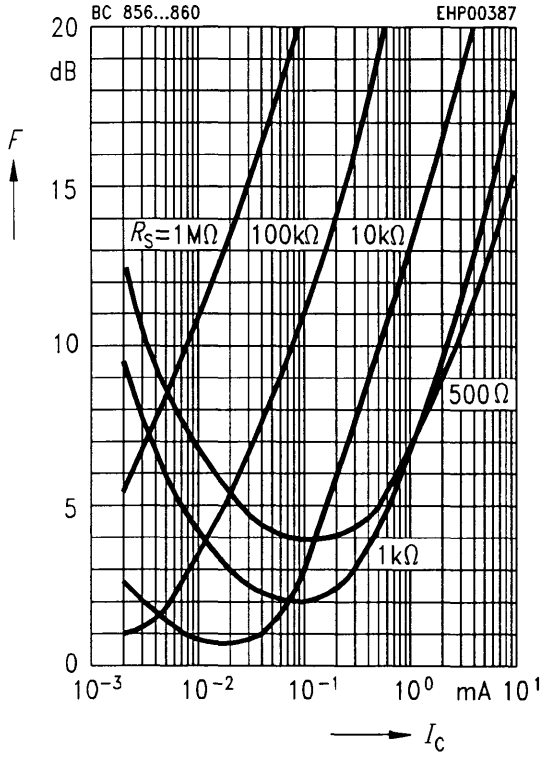
Noise figure $F = f(V_{CE})$
I_C = 0.2 mA, R_S = 2 kΩ, f = 1 kHz



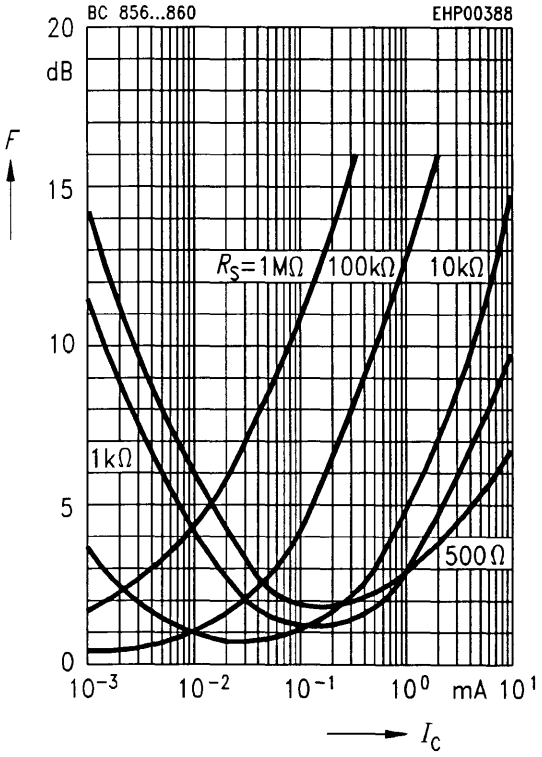
Noise figure $F = f(f)$
I_C = 0.2 mA, V_{CE} = 5 V, R_S = 2 kΩ



Noise figure $F = f(I_C)$
V_{CE} = 5 V, f = 120 Hz



Noise figure $F = f(I_C)$
V_{CE} = 5 V, f = 1 kHz



Noise figure $F = f(I_C)$
V_{CE} = 5 V, f = 10 kHz