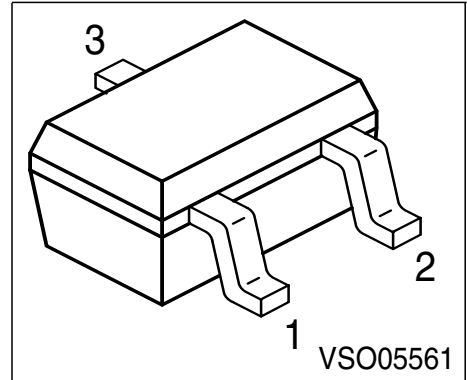


PNP Silicon AF Transistors

- 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 846W, BC 847W, BC 848W
BC 849W, BC 850W (NPN)



Type	Marking	Pin Configuration			Package
BC 856AW	3As	1 = B	2 = E	3 = C	SOT-323
BC 856BW	3Bs	1 = B	2 = E	3 = C	SOT-323
BC 857AW	3Es	1 = B	2 = E	3 = C	SOT-323
BC 857BW	3Fs	1 = B	2 = E	3 = C	SOT-323
BC 857CW	3Gs	1 = B	2 = E	3 = C	SOT-323
BC 858AW	3Js	1 = B	2 = E	3 = C	SOT-323
BC 858BW	3Ks	1 = B	2 = E	3 = C	SOT-323
BC 858CW	3Ls	1 = B	2 = E	3 = C	SOT-323
BC 859AW	4As	1 = B	2 = E	3 = C	SOT-323
BC 859BW	4Bs	1 = B	2 = E	3 = C	SOT-323
BC 859CW	4Cs	1 = B	2 = E	3 = C	SOT-323
BC 860BW	4Fs	1 = B	2 = E	3 = C	SOT-323
BC 860CW	4Gs	1 = B	2 = E	3 = C	SOT-323

Maximum Ratings

Parameter	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	
Collector-emitter voltage	V_{CES}	80	50	30	V
Emitter-base voltage	V_{EBO}	5	5	5	V
DC collector current	I_C	100			mA
Peak collector current	I_{CM}	200			mA
Peak base current	I_{BM}	200			
Peak emitter current	I_{EM}	200			
Total power dissipation, $T_S = 124\text{ °C}$	P_{tot}	250			mW
Junction temperature	T_j	150			°C
Storage temperature	T_{sta}	-65 ... 150			

Thermal Resistance

Junction ambient ¹⁾	R_{thJA}	≤240	K/W
Junction - soldering point	R_{thJS}	≤105	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

DC Characteristics

Collector-emitter breakdown voltage $I_C = 10\text{ mA}$, $I_B = 0$	BC856W	$V_{(BR)CEO}$	65	-	-	V
	BC857/860W		45	-	-	
	BC858/859W		30	-	-	
Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$, $I_B = 0$	BC 856W	$V_{(BR)CBO}$	80	-	-	
	BC 857/860W		50	-	-	
	BC 858/859W		30	-	-	

1) Package mounted on pcb 40mm x 40mm x 1.5mm / 1cm² Cu

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

Parameter	Symbol	Values			Unit	
		min.	typ.	max.		
DC Characteristics						
Collector-emitter breakdown voltage $I_C = 10\text{ }\mu\text{A}$, $V_{BE} = 0$ BC 856W BC 857/860W BC 858/859W	$V_{(BR)CES}$	80 50 30	- - -	- - -	V	
Emitter-base breakdown voltage $I_E = 1\text{ }\mu\text{A}$, $I_C = 0$	$V_{(BR)EBO}$	5	-	-		
Collector cutoff current $V_{CB} = 30\text{ V}$, $I_E = 0$	I_{CBO}	-	-	15		nA
Collector cutoff current $V_{CB} = 30\text{ V}$, $I_E = 0$, $T_A = 150\text{ }^\circ\text{C}$	I_{CBO}	-	-	5		μA
DC current gain 1) $I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$ h_{FE}-group A h_{FE}-group B h_{FE}-group C	h_{FE}	- - -	140 250 480	- - -	-	
DC current gain 1) $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$ h_{FE}-group A h_{FE}-group B h_{FE}-group C	h_{FE}	125 220 420	180 290 520	250 475 800		
Collector-emitter saturation voltage1) $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$, $I_B = 5\text{ mA}$	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 1) $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$ $I_C = 10\text{ mA}$, $V_{CE} = 5\text{ V}$	$V_{BE(ON)}$	600 -	650 -	750 820		

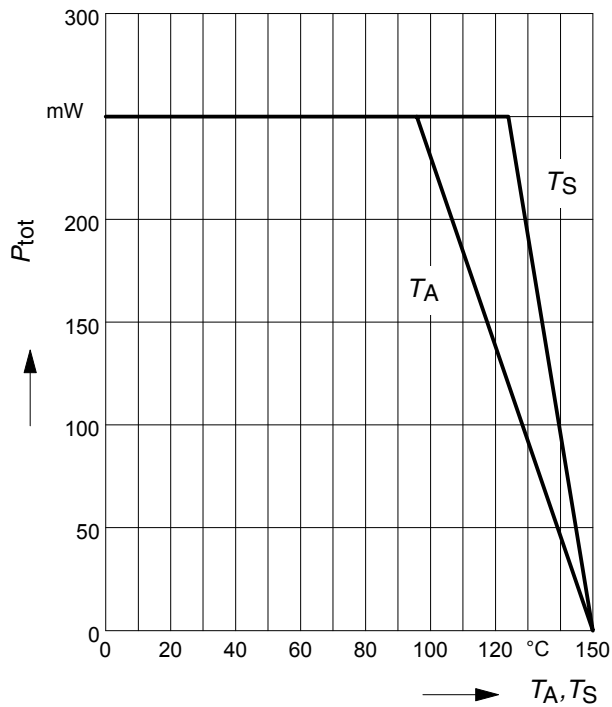
1) Pulse test: $t \leq 300\mu\text{s}$, $D = 2\%$

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
Collector-base capacitance $V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$	C_{cb}	-	3	5	pF
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$	C_{eb}	-	10	15	
Short-circuit input impedance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$	h_{11e}				kΩ
$h_{FE}\text{-gr.A}$		-	2.7	-	
$h_{FE}\text{-gr.B}$		-	4.5	-	
$h_{FE}\text{-gr.C}$		-	8.7	-	
Open-circuit reverse voltage transf.ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$	h_{12e}				10^{-4}
$h_{FE}\text{-gr.A}$		-	1.5	-	
$h_{FE}\text{-gr.B}$		-	2	-	
$h_{FE}\text{-gr.C}$		-	3	-	
Short-circuit forward current transf.ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$	h_{21e}				-
$h_{FE}\text{-gr.A}$		-	200	-	
$h_{FE}\text{-gr.B}$		-	330	-	
$h_{FE}\text{-gr.C}$		-	600	-	
Open-circuit output admittance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$	h_{22e}				μS
$h_{FE}\text{-gr.A}$		-	18	-	
$h_{FE}\text{-gr.B}$		-	30	-	
$h_{FE}\text{-gr.C}$		-	60	-	
Noise figure $I_C = 200\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$, $R_S = 2\text{ k}\Omega$, $f = 1\text{ kHz}$, $\Delta f = 200\text{ Hz}$	F	-	-	10	dB
Noise figure $I_C = 200\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$, $R_S = 2\text{ k}\Omega$, $f = 1\text{ kHz}$, $\Delta f = 200\text{ Hz}$	F				

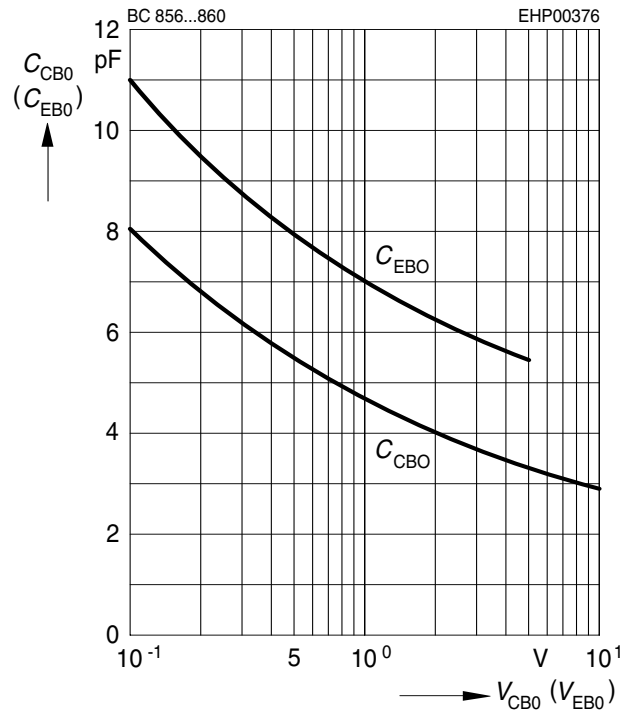
Total power dissipation $P_{\text{tot}} = f(T_A^*; T_S)$

* Package mounted on epoxy



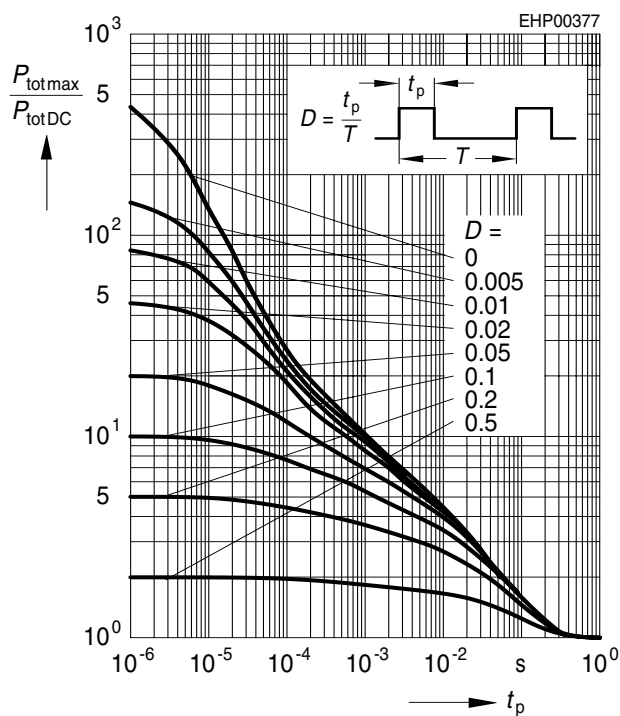
Collector-base capacitance $C_{\text{CB}} = f(V_{\text{CBO}})$

Emitter-base capacitance $C_{\text{EB}} = f(V_{\text{EBO}})$



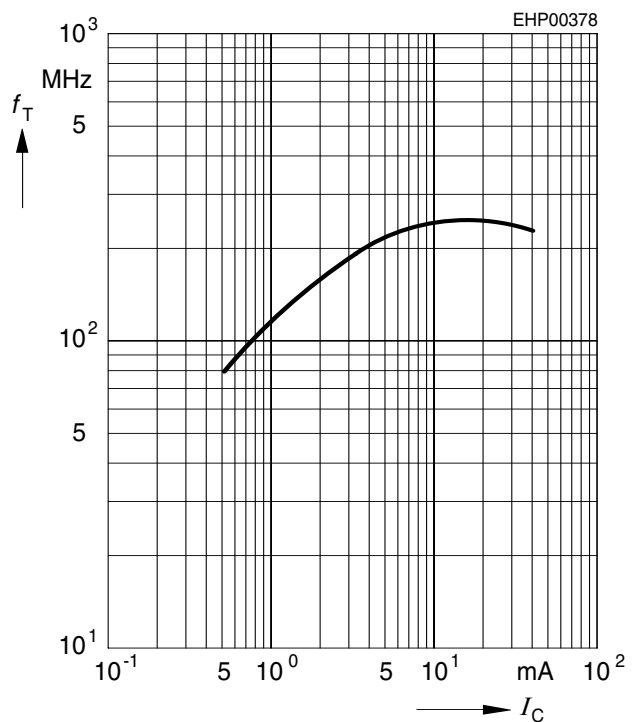
Permissible pulse load

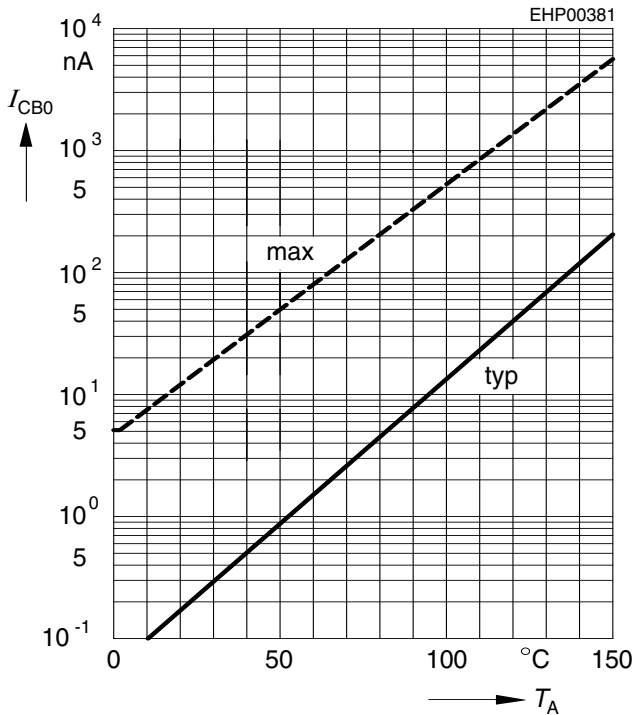
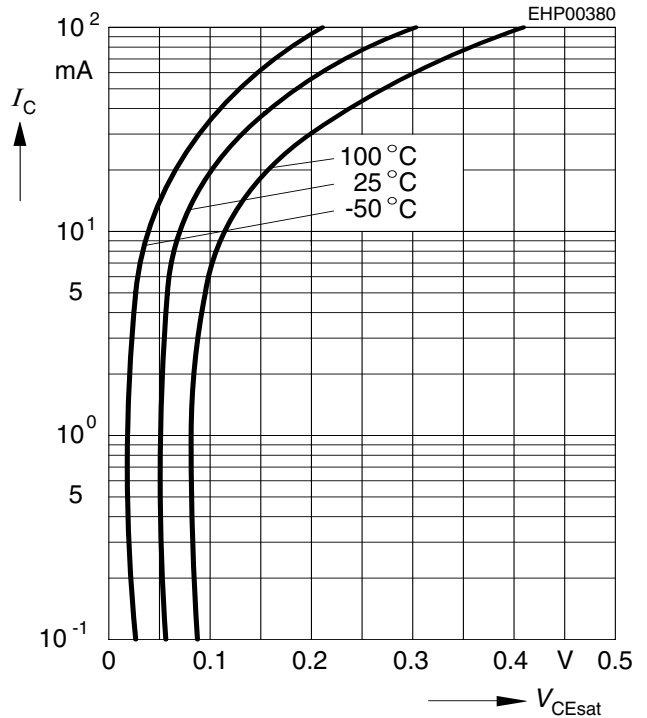
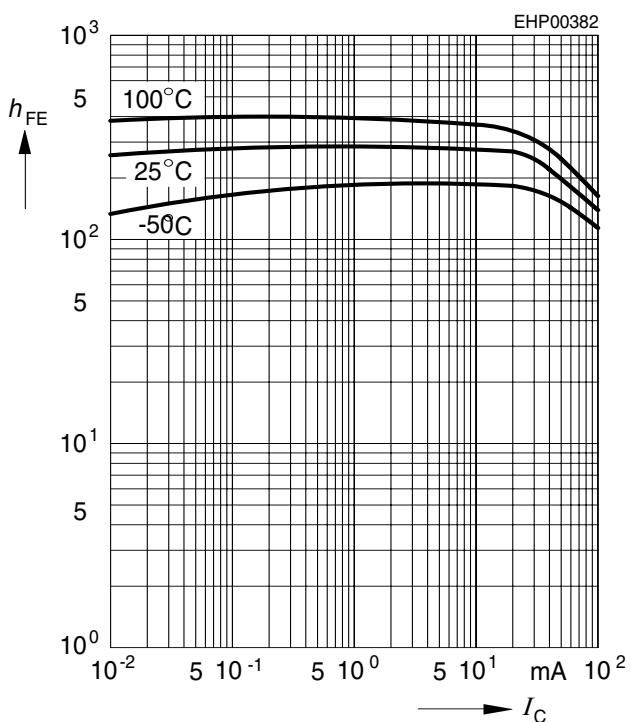
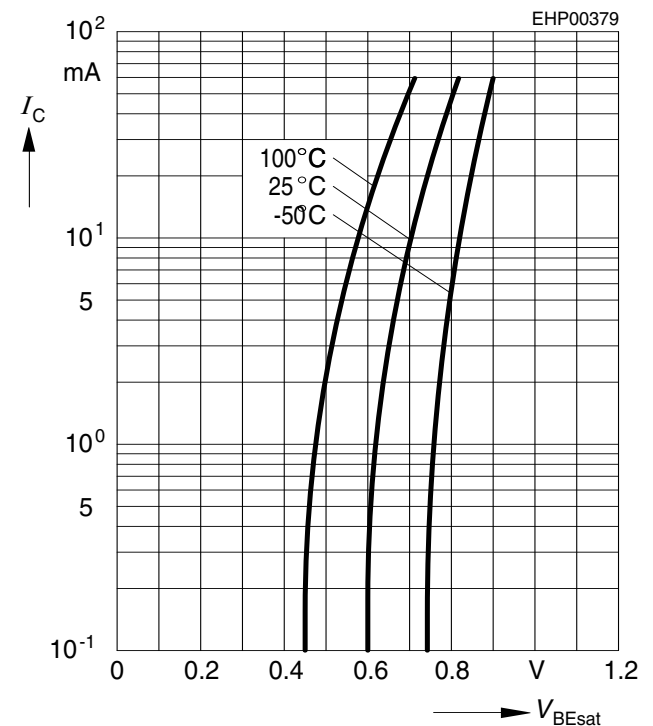
$P_{\text{totmax}} / P_{\text{totDC}} = f(t_p)$



Transition frequency $f_T = f(I_C)$

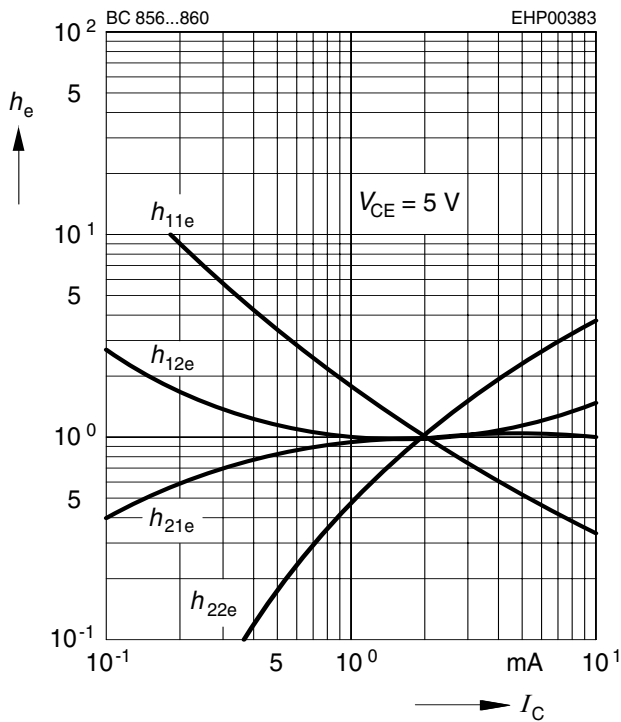
$V_{\text{CE}} = 5\text{V}$



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

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

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

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


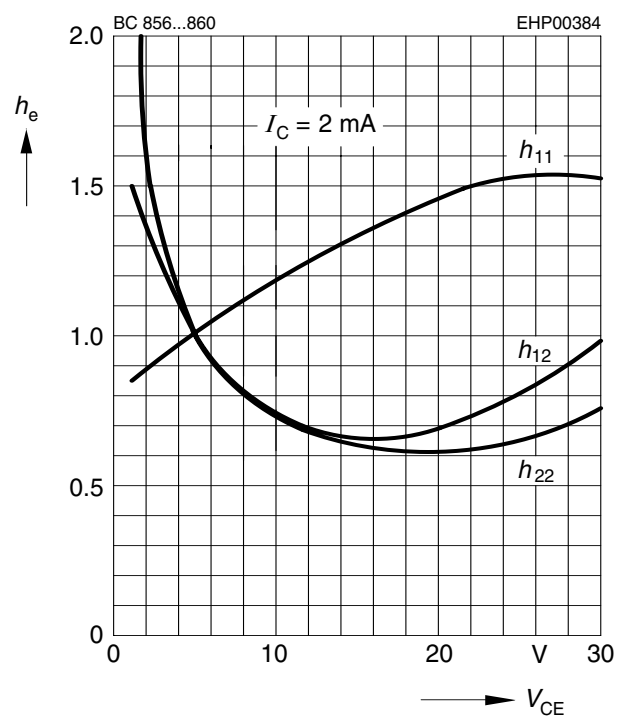
h parameter $h_e = f(I_C)$ normalized

$V_{CE} = 5V$



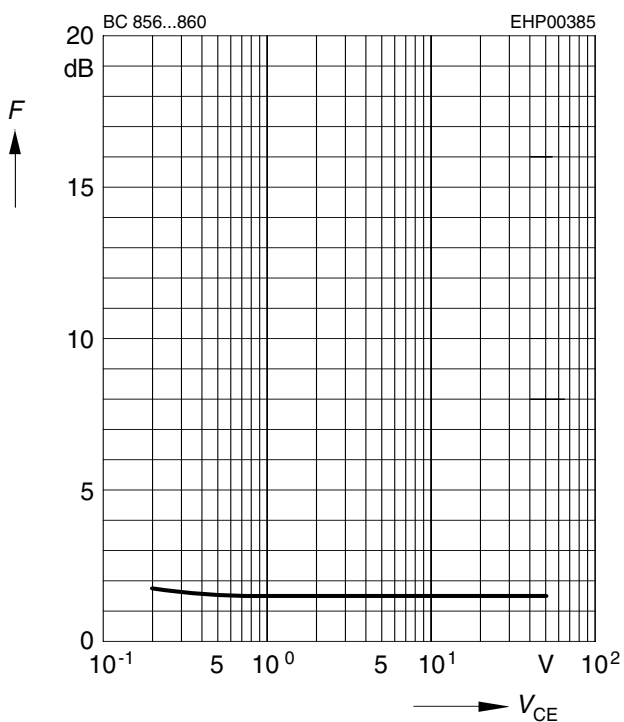
h parameter $h_e = f(V_{CE})$ normalized

$I_C = 2mA$



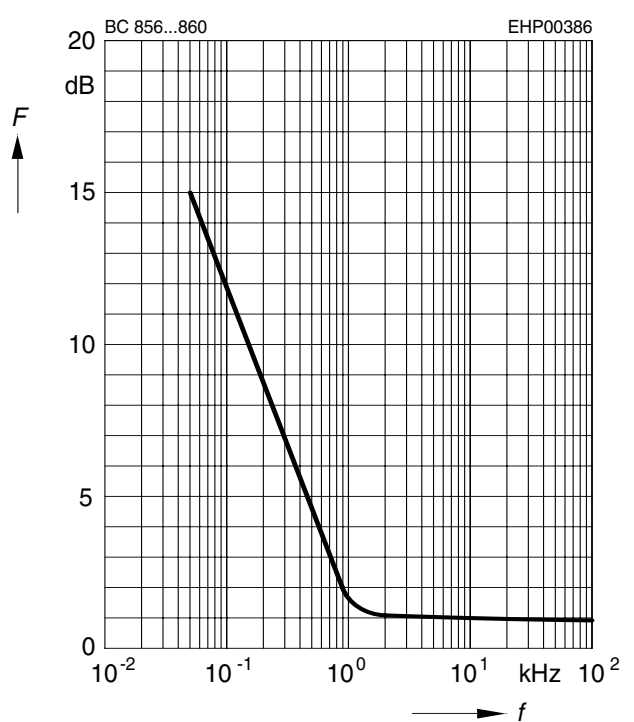
Noise figure $F = f(V_{CE})$

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



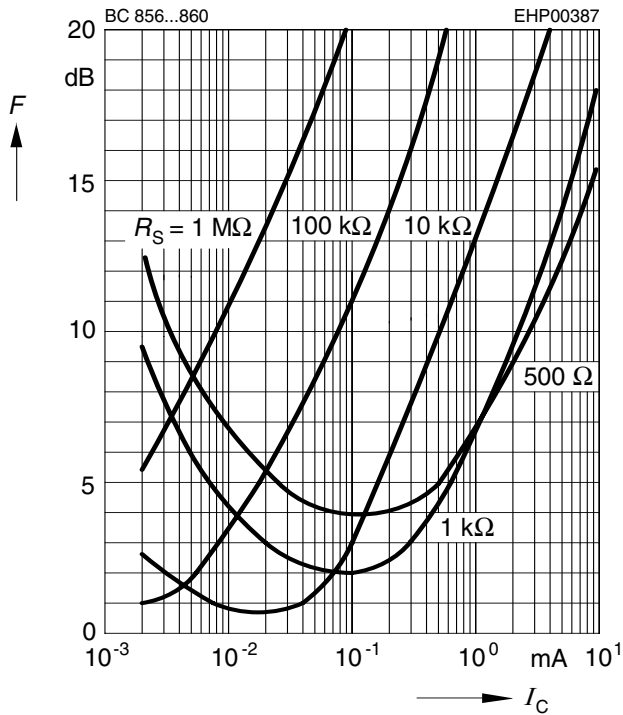
Noise figure $F = f(f)$

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



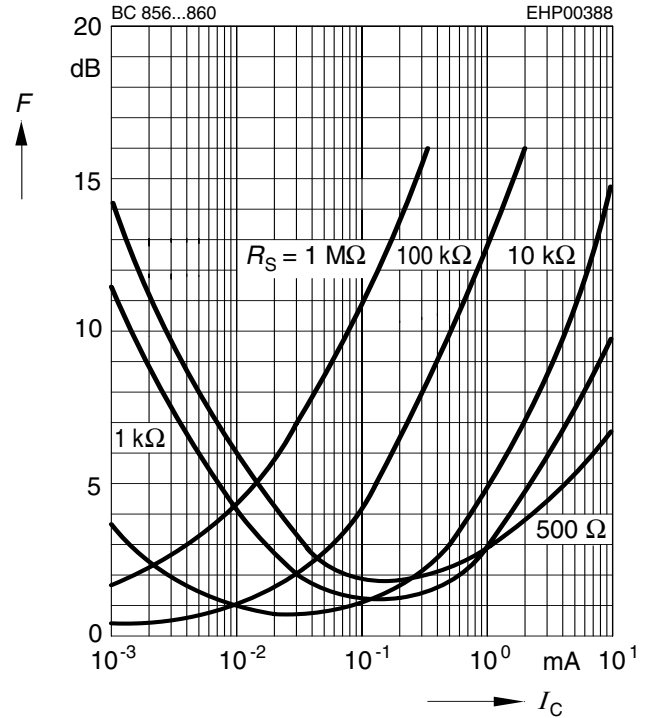
Noise figure $F = f(I_C)$

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



Noise figure $F = f(I_C)$

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



Noise figure $F = f(I_C)$

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

