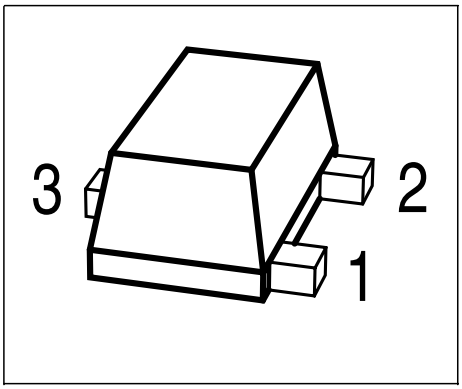
PNP Silicon AF Transistor



- 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: BC847BF, BC848BF
  BC849BF, BC850BF (NPN)

Type	Marking	Pin Configuration			Package
BC857BF	3Fs	1 = B	2 = E	3 = C	TSFP-3
BC858BF	3Ks	1 = B	2 = E	3 = C	TSFP-3
BC859BF	4Bs	1 = B	2 = E	3 = C	TSFP-3
BC860BF	4Fs	1 = B	2 = E	3 = C	TSFP-3

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}		V
BC857BF, BC860BF		45	
BC858BF, BC859BF		30	
Collector-emitter voltage	V_{CES}		
BC857BF, BC860BF		50	
BC858BF, BC859BF		30	
Collector-base voltage	V_{CBO}		
BC857BF, BC860BF		50	
BC858BF, BC859BF		30	
Emitter-base voltage	V_{EBO}		
BC857BF, BC860BF		5	
BC858BF, BC859BF		5	
Collector current	I_C	100	mA
Peak collector current	I_{CM}	200	
Peak base current	I_{BM}	200	
Peak emitter current	I_{EM}	200	mA
Total power dissipation, $T_S \leq 128°C$	P_{tot}	250	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[1)]	R_{thJS}	≤ 90	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	$V_{(BR)CEO}$				V
I_C = 10 mA, I_B = 0 mA, BC857BF, BC860BF		45	-	-	
I_C = 10 mA, I_B = 0 mA, BC858BF, BC859BF		30	-	-	
Collector-base breakdown voltage	$V_{(BR)CBO}$				
I_C = 10 µA, I_E = 0 mA, BC857BF, BC860BF		50	-	-	
I_C = 10 µA, I_E = 0 mA, BC858BF, BC859BF		30	-	-	
Collector-emitter breakdown voltage	$V_{(BR)CES}$				
I_C = 10 µA, V_{BE} = 0 V, BC857BF, BC860BF		50	-	-	
I_C = 10 µA, V_{BE} = 0 V, BC858BF, BC859BF		30	-	-	
Emitter-base breakdown voltage	$V_{(BR)EBO}$	5	-	-	
I_E = 1 µA, I_C = 0 µA					
Collector-base cutoff current	I_{CBO}				µA
V_{CB} = 30 V, I_E = 0 A		-	-	0.015	
V_{CB} = 30 V, I_E = 0 A, T_A = 150 °C		-	-	5	
DC current gain[2)]	h_{FE}				-
I_C = 10 µA, V_{CE} = 5 V		-	250	-	
I_C = 2 mA, V_{CE} = 5 V		220	290	475	
Collector-emitter saturation voltage[2)]	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[2)]	V_{BEsat}				
I_C = 10 mA, I_B = 0.5 mA		-	700	-	
I_C = 100 mA, I_B = 5 mA		-	850	-	
Base-emitter voltage[2)]	$V_{BE(ON)}$				
I_C = 2 mA, V_{CE} = 5 V		600	650	750	
I_C = 10 mA, V_{CE} = 5 V		-	-	820	

[1]For calculation of R_{thJA} please refer to Application Note Thermal Resistance

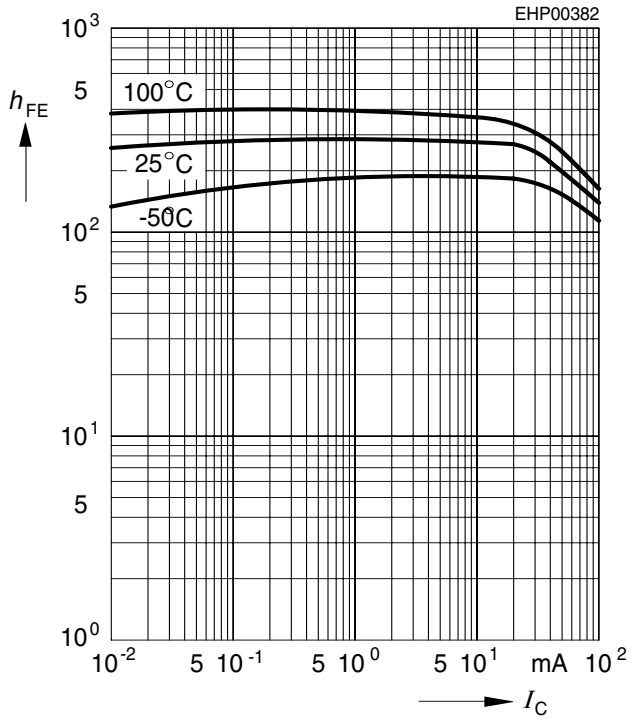
[2]Pulse test: t < 300µs; D < 2%

AC Characteristics

Transition frequency I_C = 20 mA, V_{CE} = 5 V, f = 100 MHz	f_T	-	250	-	MHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz	C_{cb}	-	3	-	pF
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz	C_{eb}	-	10	-	
Short-circuit input impedance I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{11e}	-	4.5	-	kΩ
Open-circuit reverse voltage transf. ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{12e}	-	2	-	10^{-4}
Short-circuit forward current transf. ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{21e}	-	330	-	-
Open-circuit output admittance I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{22e}	-	30	-	µS
Noise figure I_C = 200 µA, V_{CE} = 5 V, f = 1 kHz, Δ f = 200 Hz, R_S = 2 kΩ, BC859BF I_C = 200 µA, V_{CE} = 5 V, f = 1 kHz, Δ f = 200 Hz, R_S = 2 kΩ, BC860BF	F	 - -	 1 1	 4 4	dB
Equivalent noise voltage I_C = 200 µA, V_{CE} = 5 V, R_S = 2 kΩ, f = 10...50 Hz , BF860BF	V_n	-	-	0.11	µV

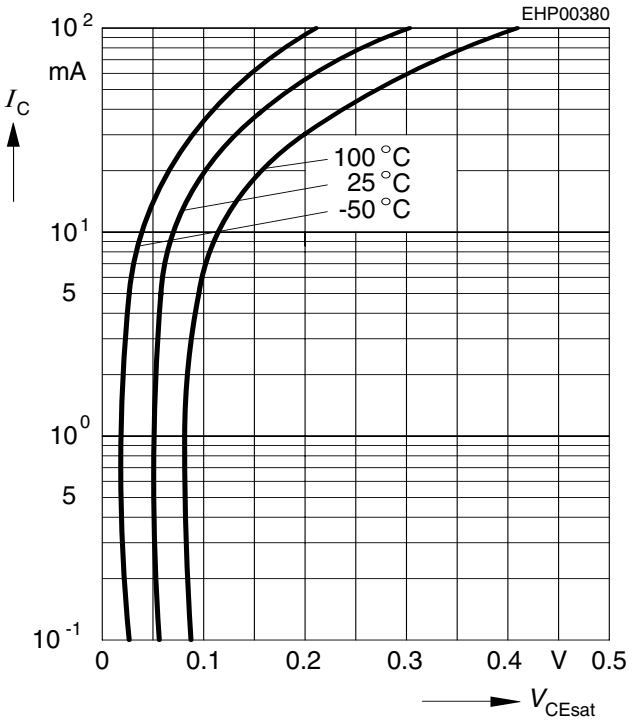
DC current gain $h_{FE} = f(I_C)$

V_{CE} = 5 V



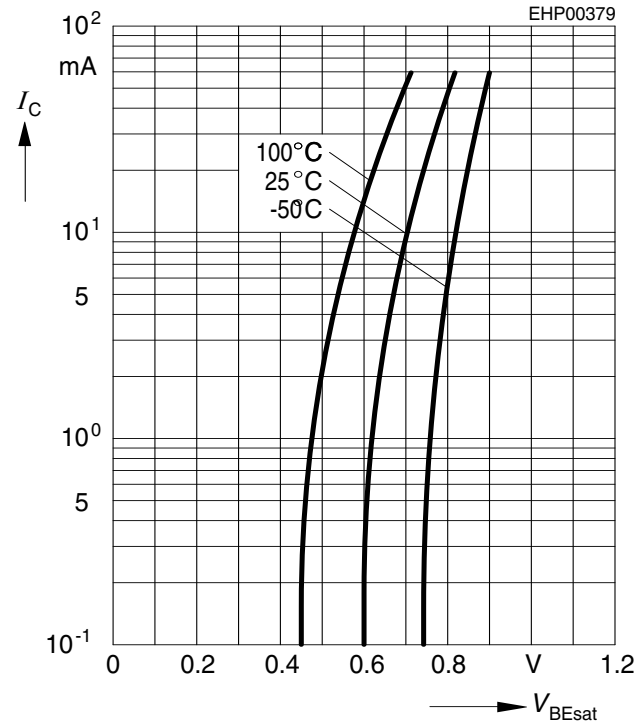
Collector-emitter saturation voltage

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



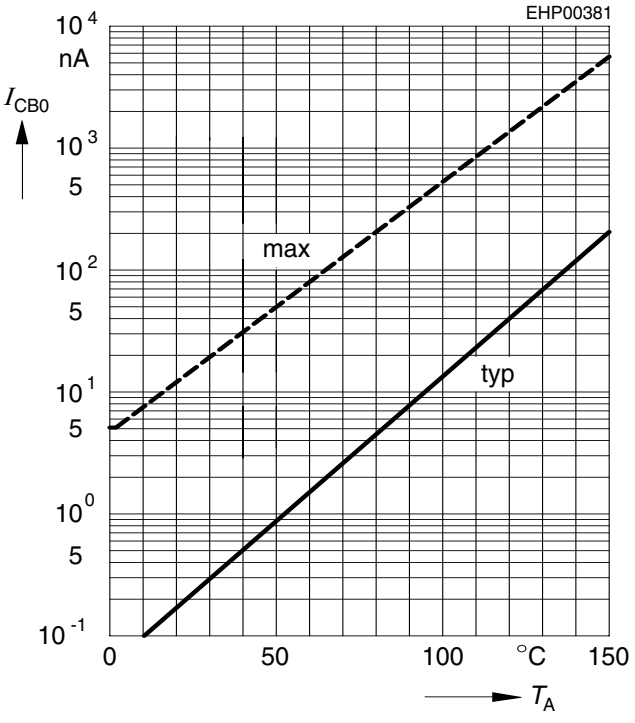
Base-emitter saturation voltage

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

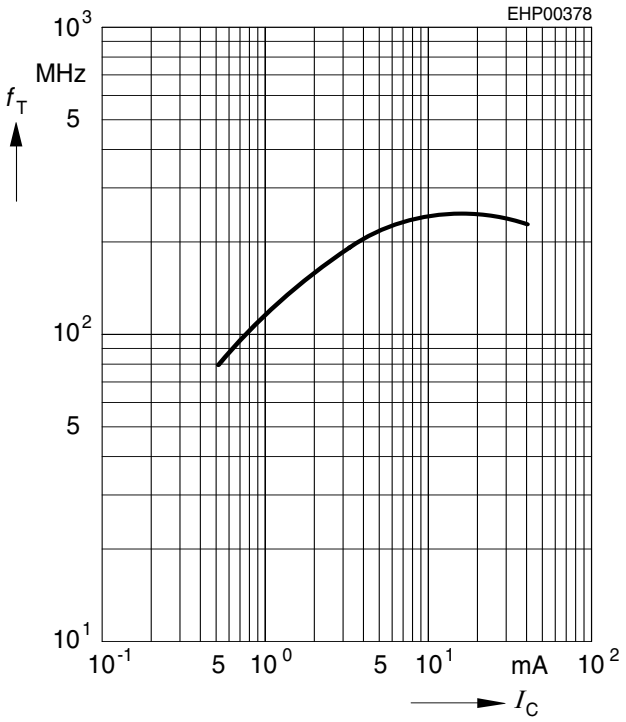


Collector cutoff current $I_{CBO} = f(T_A)$

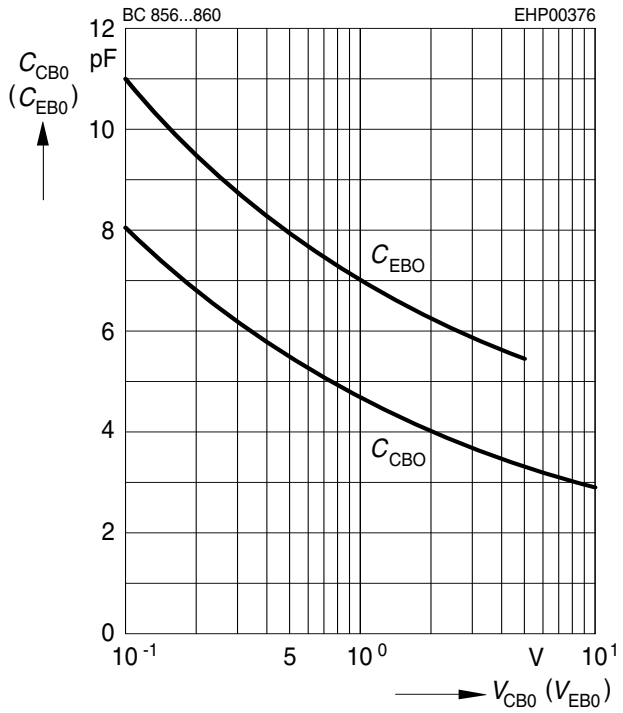
V_{CB} = 30 V



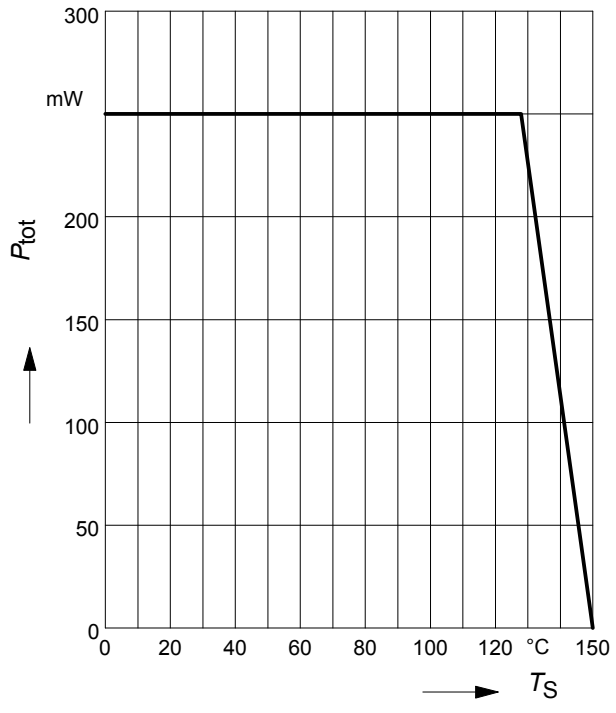
Transition frequency $f_T = f(I_C)$
V_{CE} = 5 V



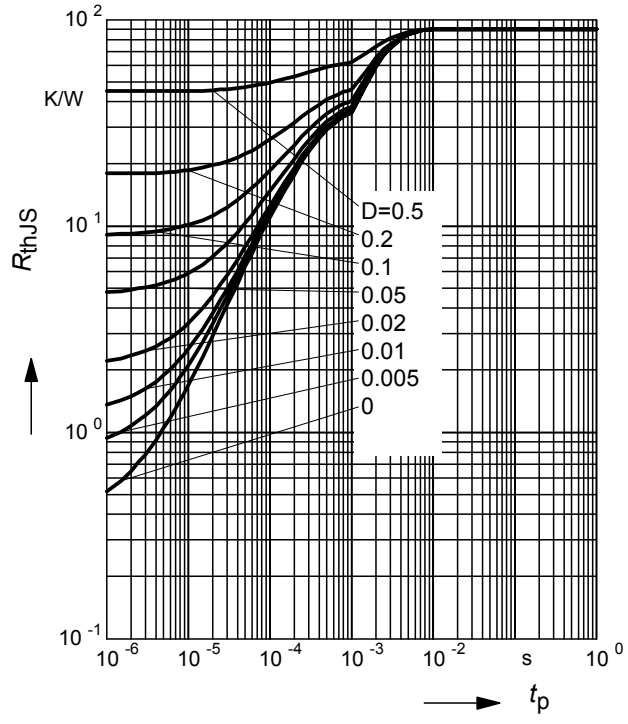
Collector-base capacitance $C_{CB} = f(V_{CB0})$
Emitter-base capacitance $C_{EB} = f(V_{EB0})$



Total power dissipation $P_{tot} = f(T_S)$

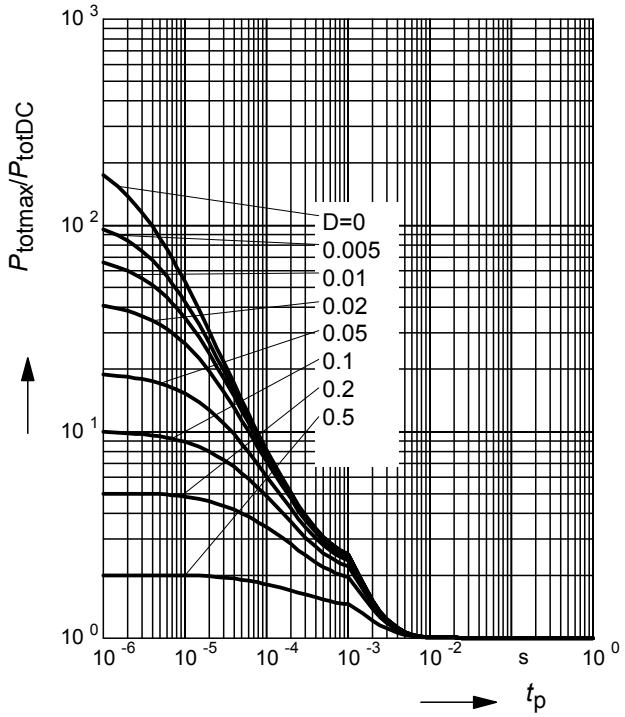


Permissible Pulse Load $R_{thJS} = f(t_p)$



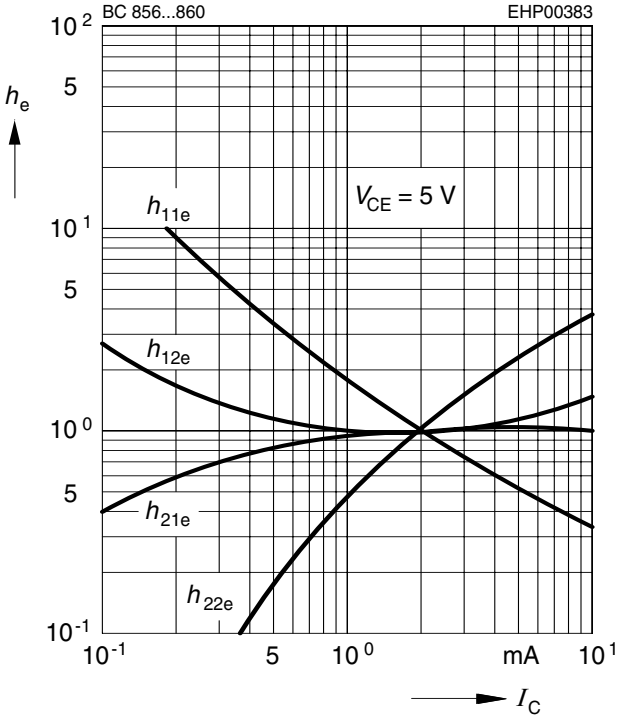
Permissible Pulse Load

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



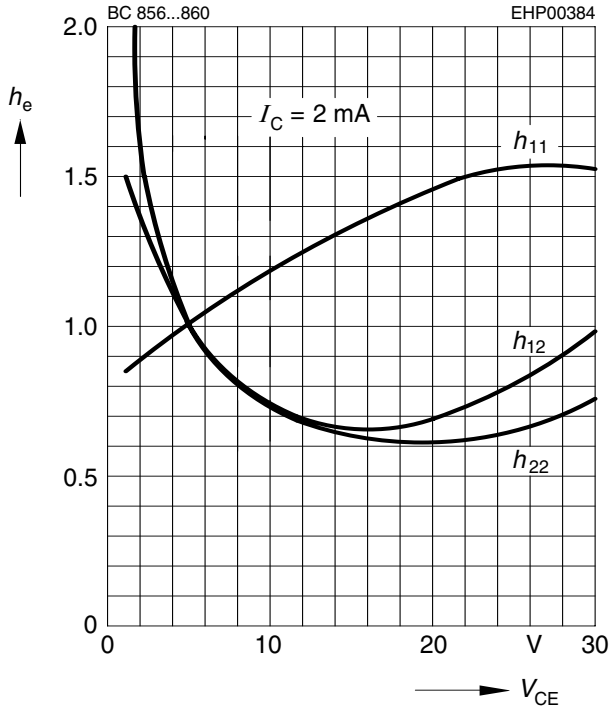
h parameter $h_e = f(I_C)$ normalized

V_{CE} = 5V



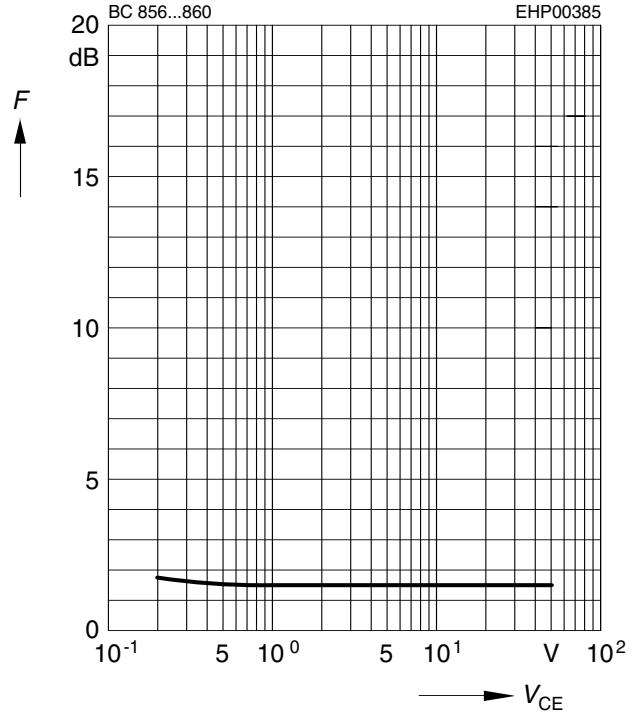
h parameter $h_e = f(V_{CE})$ normalized

I_C = 2mA



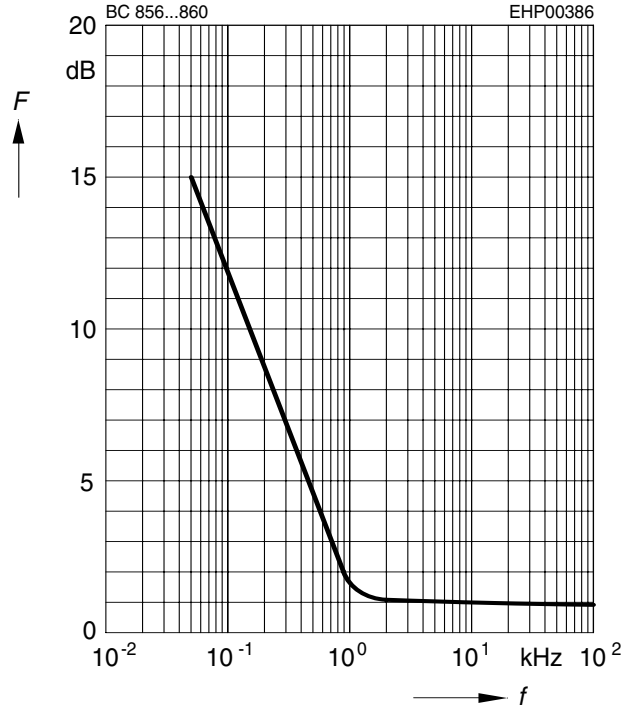
Noise figure $F = f(V_{CE})$

I_C = 0.2mA, R_S = 2kΩ , f = 1kHz



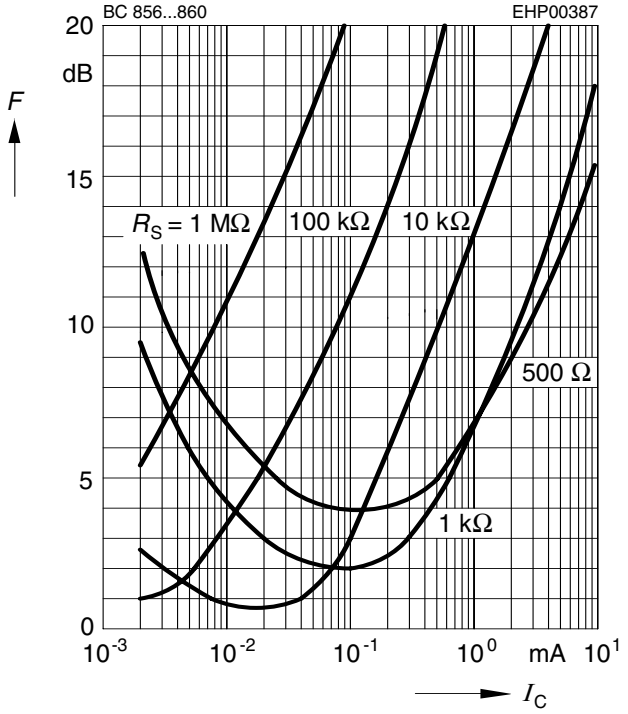
Noise figure $F = f(f)$

I_C = 0.2mA, V_{CE} = 5V, R_S = 2 kΩ



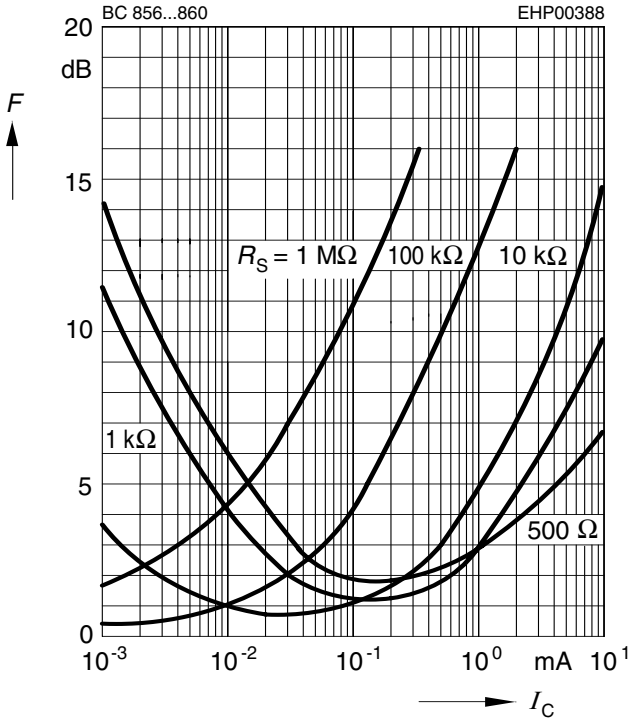
Noise figure $F = f(I_C)$

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



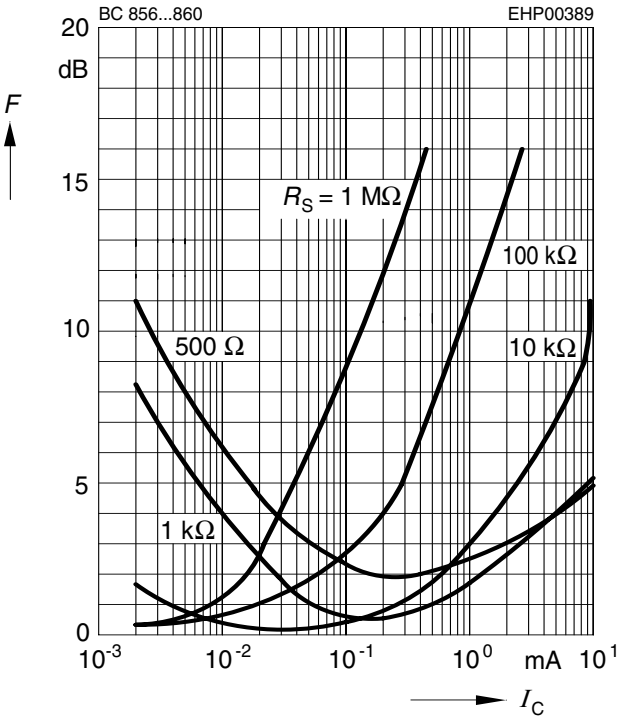
Noise figure $F = f(I_C)$

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



Noise figure $F = f(I_C)$

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



Published by Infineon Technologies AG,
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