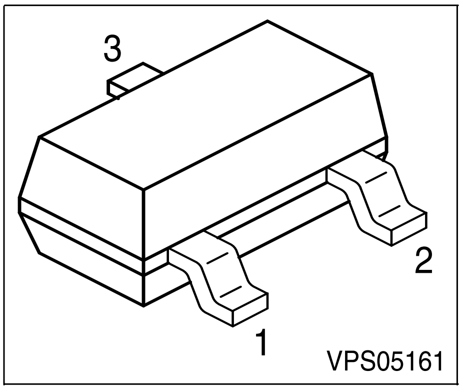
NPN Silicon AF Transistors

- 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 856, BC 857, BC 858 BC 859, BC 860 (PNP)



Type	Marking	Pin Configuration			Package
BC 846A	1As	1 = B	2 = E	3 = C	SOT-23
BC 846B	1Bs	B = 1	2 = E	3 = C	SOT-23
BC 847A	1Es	B = 1	2 = E	3 = C	SOT-23
BC 847B	1Fs	1 = B	2 = E	3 = C	SOT-23
BC 847C	1Gs	1 = B	2 = E	3 = C	SOT-23
BC 848A	1Js	1 = B	2 = E	3 = C	SOT-23
BC 848B	1Ks	1 = B	2 = E	3 = C	SOT-23
BC 848C	1Ls	1 = B	2 = E	3 = C	SOT-23
BC 849B	2Bs	1 = B	2 = E	3 = C	SOT-23
BC 849C	2Cs	1 = B	2 = E	3 = C	SOT-23
BC 850B	2Fs	1 = B	2 = E	3 = C	SOT-23
BC 850C	2Gs	1 = B	2 = E	3 = C	SOT-23

Maximum Ratings

Parameter	Symbol	BC 846	BC 847 BC 850	BC 848 BC 849	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	
Emitter-base voltage	V_{EBO}	6	6	5	
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 = 71 °C	P_{tot}	330			mW
Junction temperature	T_j	150			°C
Storage temperature	T_{stg}	-65 ... 150			

Thermal Resistance

Junction ambient 1)	R_{thJA}	≤310	K/W
Junction - soldering point	R_{thJS}	≤240	

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	BC 846		65	-	-	
	BC 847/850		45	-	-	
	BC 848/849		30	-	-	
Collector-base breakdown voltage		$V_{(BR)CBO}$				
I_C = 10 µA, I_B = 0	BC 846		80	-	-	
	BC 847/850		50	-	-	
	BC 848/849		30	-	-	

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1) Package mounted on pcb 40mm x 40mm x 1.5mm / 6cm^2 Cu

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

Parameter		Symbol	Values			Unit
			min.	typ.	max.	
DC Characteristics						
Collector-emitter breakdown voltage		$V_{(BR)CES}$				V
I_C = 10 µA, V_{BE} = 0	BC 846		80	-	-	
	BC 847/850		50	-	-	
	BC 848/849		30	-	-	
Emitter-base breakdown voltage		$V_{(BR)EBO}$				
I_E = 1 µA, I_C = 0	BC 846/847		6	-	-	
	BC 848-850		5	-	-	
Collector cutoff current V_{CB} = 40 V, I_E = 0		I_{CBO}	-	-	15	nA
Collector cutoff current V_{CB} = 30 V, I_E = 0 , T_A = 150 °C		I_{CBO}	-	-	5	µA
DC current gain 1)		h_{FE}				-
I_C = 10 µA, V_{CE} = 5 V	h_{FE}-group **A**		-	140	-	
	h_{FE}-group **B**		-	250	-	
	h_{FE}-group **C**		-	480	-	
DC current gain 1)		h_{FE}				
I_C = 2 mA, V_{CE} = 5 V	h_{FE}-group **A**		110	180	220	
	h_{FE}-group **B**		200	290	450	
	h_{FE}-group **C**		420	520	800	
Collector-emitter saturation voltage1)		V_{CEsat}				mV
I_C = 10 mA, I_B = 0.5 mA			-	90	250	
I_C = 100 mA, I_B = 5 mA			-	200	600	
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			-	900	-	
Base-emitter voltage 1)		$V_{BE(ON)}$				
I_C = 2 mA, V_{CE} = 5 V			580	660	700	
I_C = 10 mA, V_{CE} = 5 V			-	-	770	

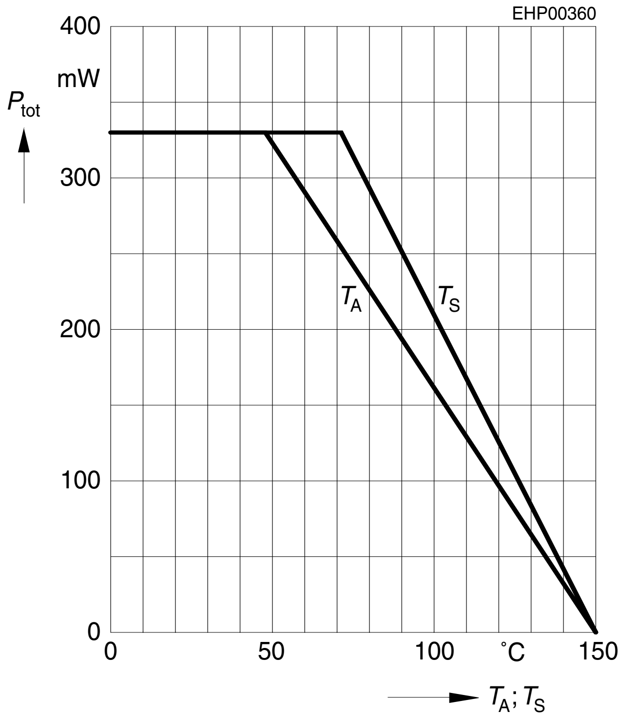
1) Pulse test: t ≤ 300µs, D = 2%

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

Parameter		Symbol	Values			Unit
			min.	typ.	max.	
AC Characteristics						
Transition frequency I_C = 10 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}	-	8	-	
Short-circuit input impedance		h_{11e}				kΩ
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{FE}-gr.**A**		-	2.7	-	
	h_{FE}-gr.**B**		-	4.5	-	
	h_{FE}-gr.**C**		-	8.7	-	
Open-circuit reverse voltage transf.ratio		h_{12e}				10^{-4}
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{FE}-gr.**A**		-	1.5	-	
	h_{FE}-gr.**B**		-	2	-	
	h_{FE}-gr.**C**		-	3	-	
Short-circuit forward current transf.ratio		h_{21e}				-
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{FE}-gr.**A**		-	200	-	
	h_{FE}-gr.**B**		-	330	-	
	h_{FE}-gr.**C**		-	600	-	
Open-circuit output admittance		h_{22e}				µS
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{FE}-gr.**A**		-	18	-	
	h_{FE}-gr.**B**		-	30	-	
	h_{FE}-gr.**C**		-	60	-	
Noise figure I_C = 100 µA, V_{CE} = 5 V, R_S = 1 kΩ, f = 1 kHz, Δ f = 200 Hz	BC 849 BC 850	F	-	1.2	4	dB
Equivalent noise voltage I_C = 200 µA, V_{CE} = 5 V, R_S = 2 kΩ, f = 10 ... 50 Hz	BC 850	V_n	-	-	0.135	µV

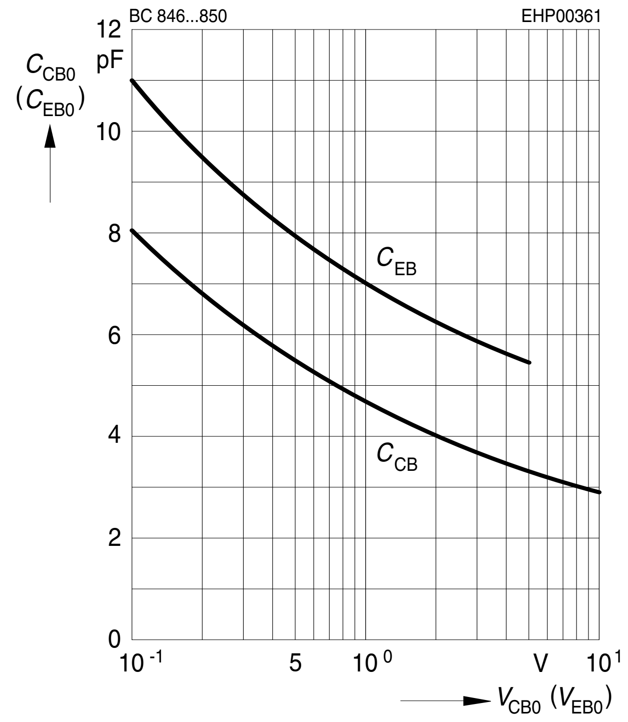
Total power dissipation $P_{tot} = f (T_A{}^*;T_S)$

* Package mounted on epoxy



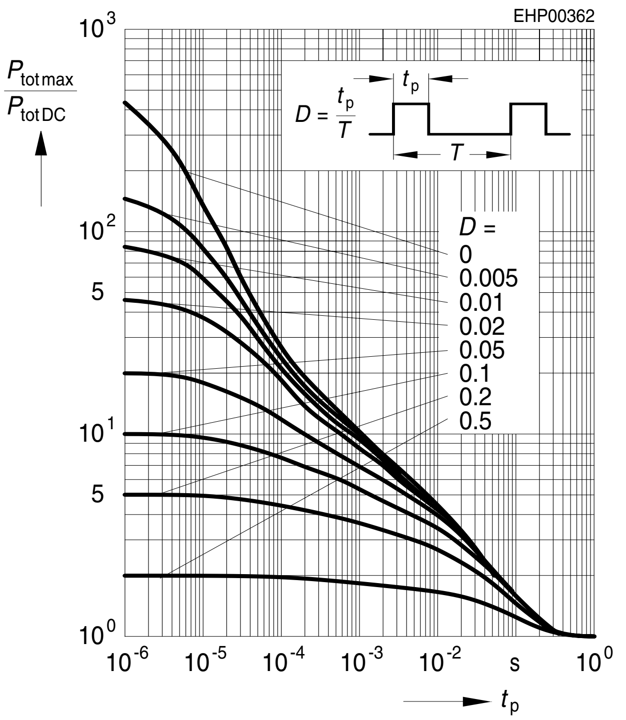
Collector-base capacitance $C_{CB} = f (V_{CBO}$

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



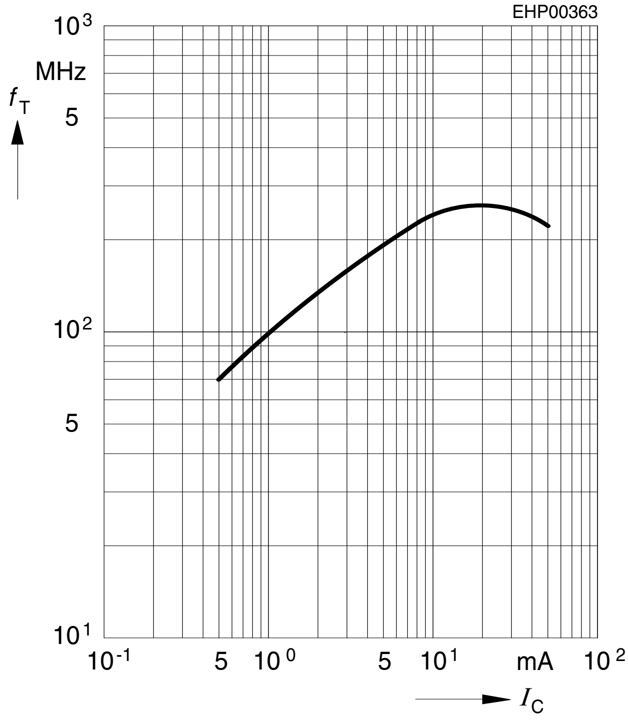
Permissible pulse load

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



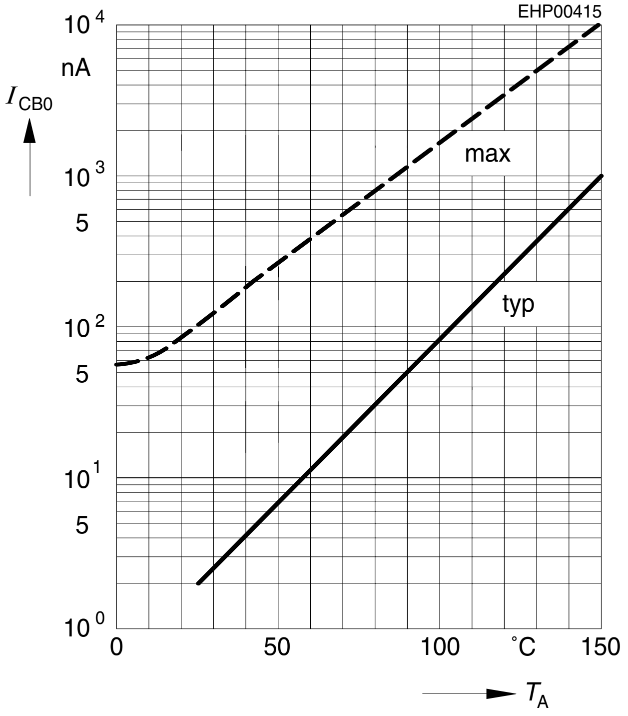
Transition frequency $f_T = f (I_C)$

$V_{CE} = 5V$



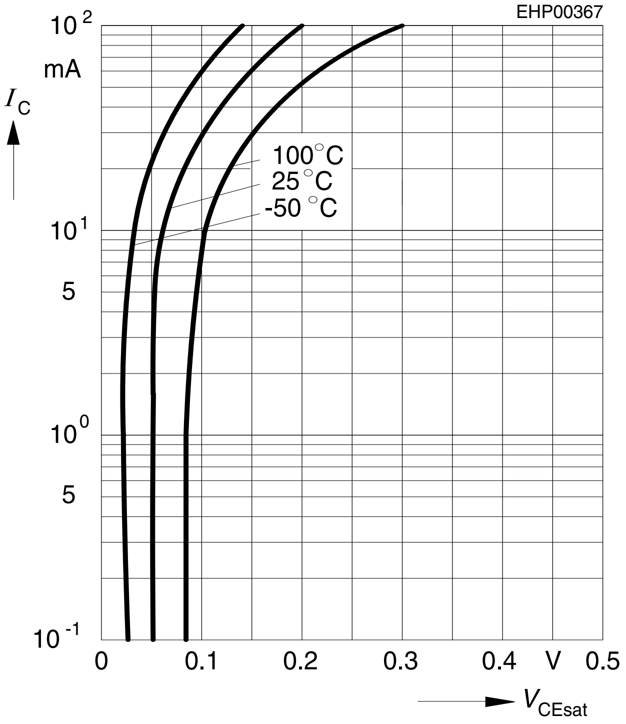
Collector cutoff current $I_{CBO} = f(T_A)$

V_{CB} = 30V



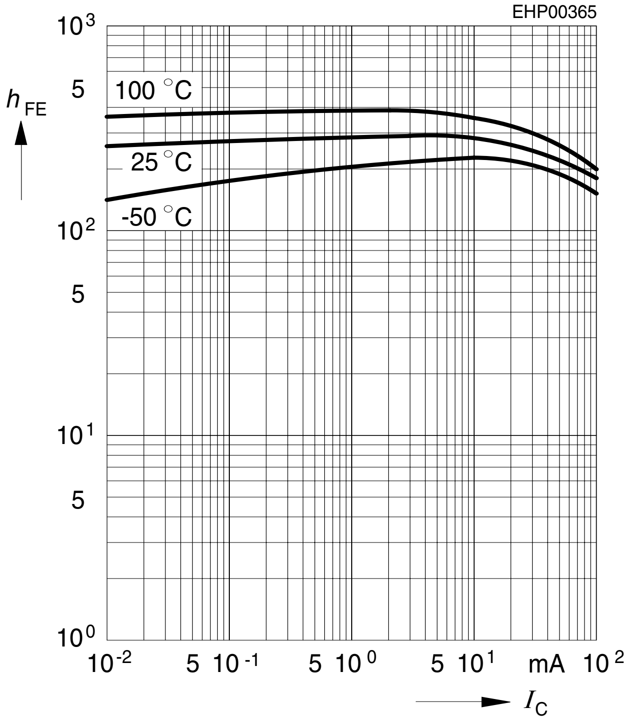
Collector-emitter saturation voltage

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



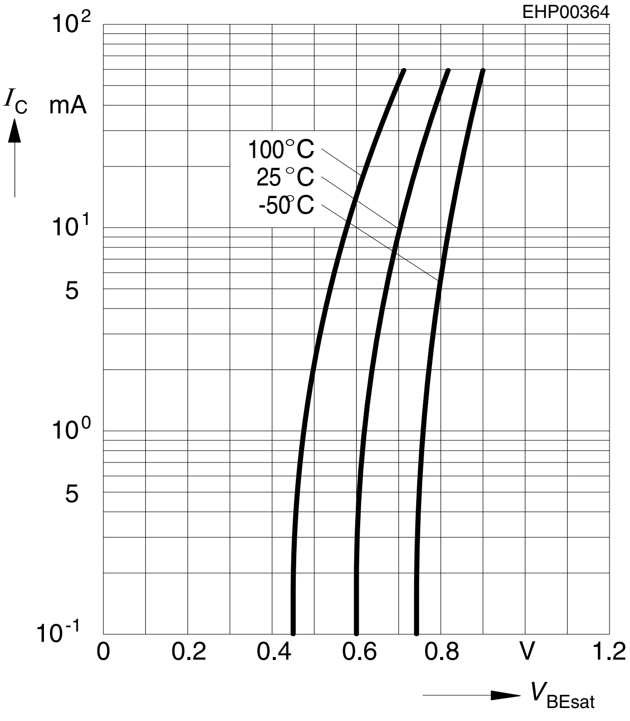
DC current gain $h_{FE} = f(I_C)$

V_{CE} = 5V

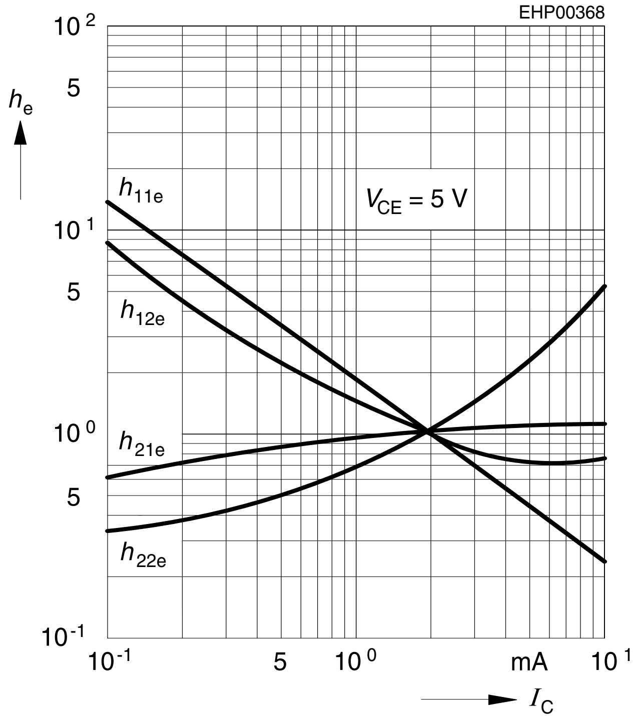


Base-emitter saturation voltage

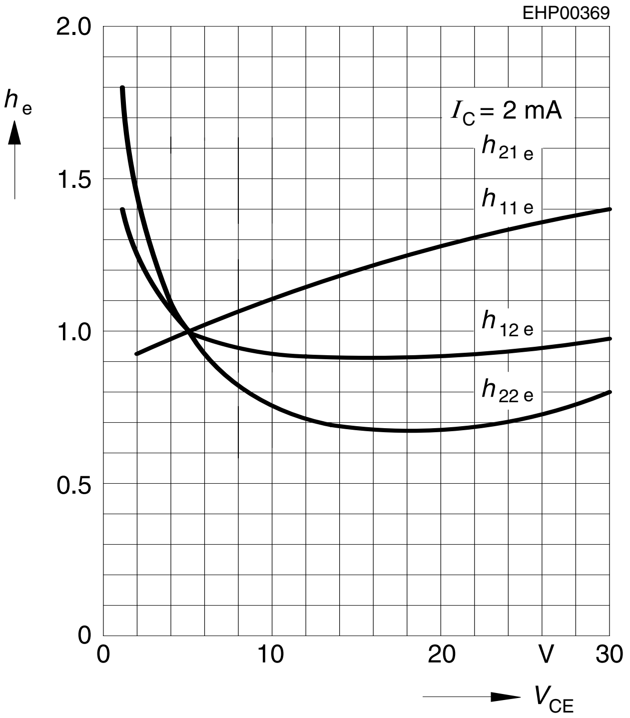
$I_C = f(V_{BEsat})$, h_{FE} = 20



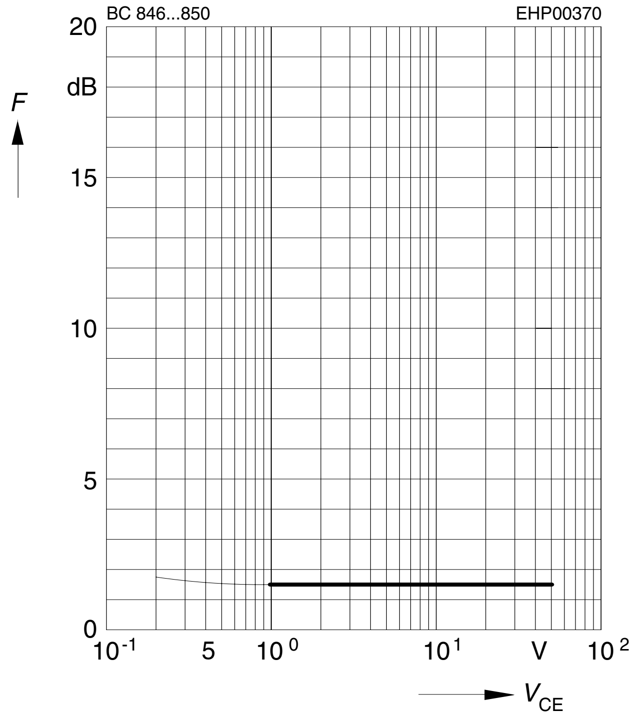
h parameter $h_e = f(I_C)$ normalized
V_{CE} = 5V



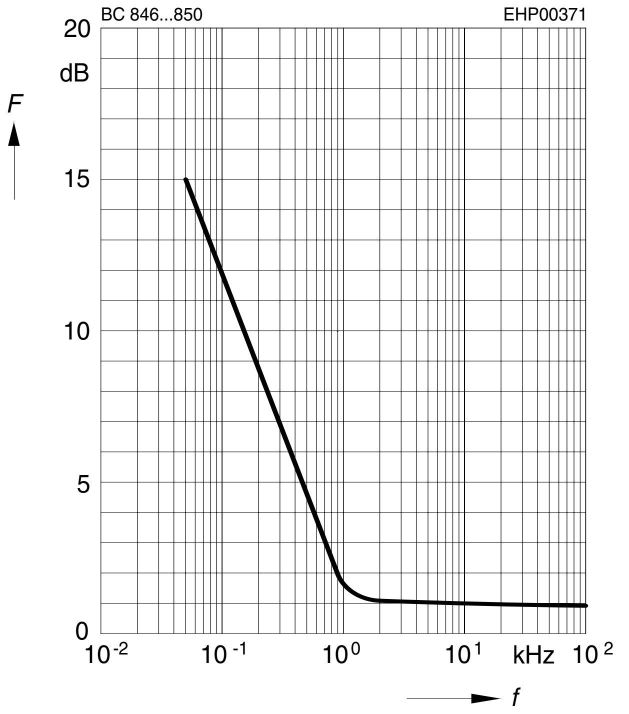
h parameter $h_e = f(V_{CE})$ normalized
I_C = 2mA



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

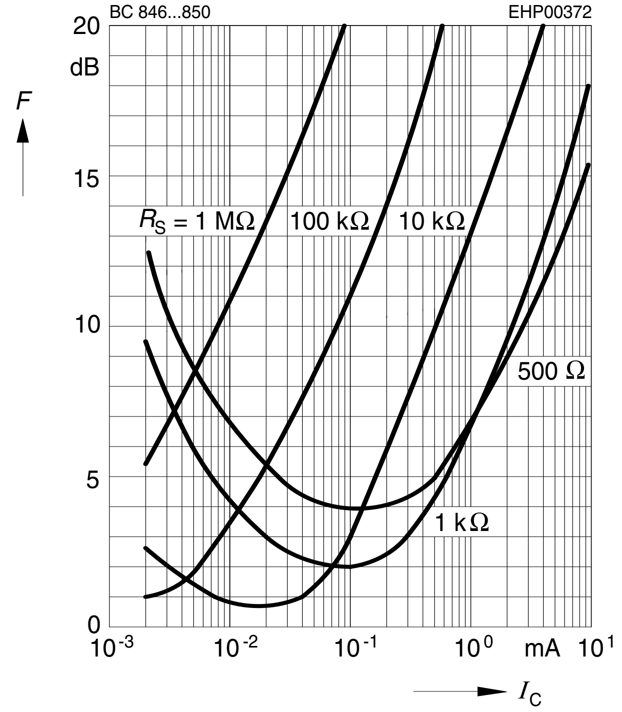


Noise figure $F = f(f)$
I_C = 0.2mA, V_{CE} = 5V, R_S = 2kΩ



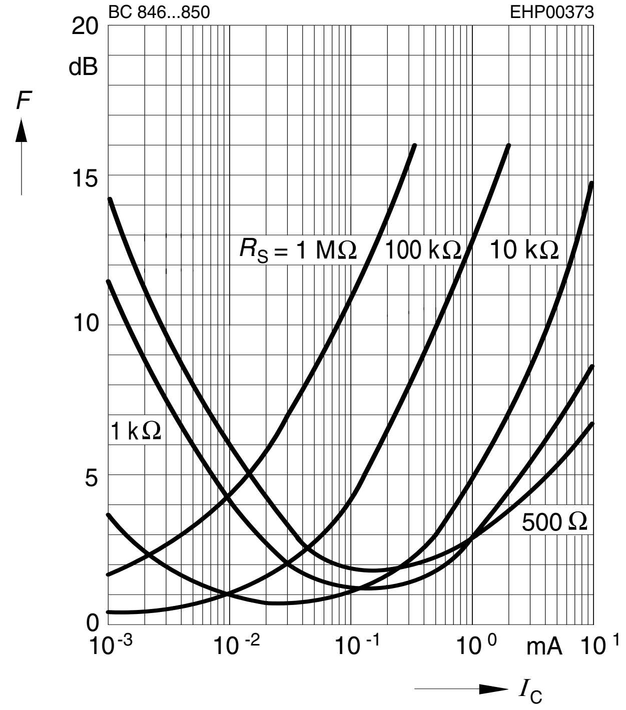
Noise figure $F = f(I_C)$

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