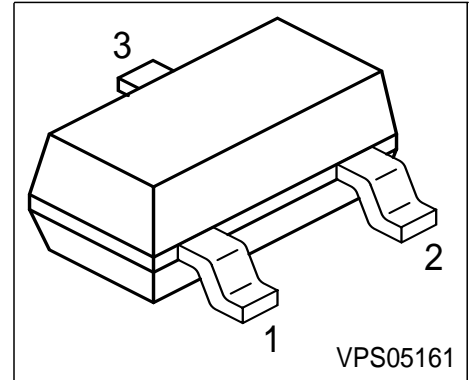**NPN Silicon AF Transistors**

- 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: BC856, BC857, BC858
  BC859, BC860 (PNP)

VPS05161

Type	Marking	Pin Configuration			Package
BC846A	1As	1 = B	2 = E	3 = C	SOT23
BC846B	1Bs	B = 1	2 = E	3 = C	SOT23
BC847A	1Es	B = 1	2 = E	3 = C	SOT23
BC847B	1Fs	1 = B	2 = E	3 = C	SOT23
BC847C	1Gs	1 = B	2 = E	3 = C	SOT23
BC848A	1Js	1 = B	2 = E	3 = C	SOT23
BC848B	1Ks	1 = B	2 = E	3 = C	SOT23
BC848C	1Ls	1 = B	2 = E	3 = C	SOT23
BC849B	2Bs	1 = B	2 = E	3 = C	SOT23
BC849C	2Cs	1 = B	2 = E	3 = C	SOT23
BC850B	2Fs	1 = B	2 = E	3 = C	SOT23
BC850C	2Gs	1 = B	2 = E	3 = C	SOT23

Maximum Ratings

Parameter	Symbol	BC846	BC847 BC850	BC848 BC849	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 - soldering point[1]	R_{thJS}	≤240	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 BC846		65	-	-	
BC847/850		45	-	-	
BC848/849		30	-	-	
Collector-base breakdown voltage	$V_{(BR)CBO}$				
I_C = 10 µA, I_E = 0 BC846		80	-	-	
BC847/850		50	-	-	
BC848/849		30	-	-	

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

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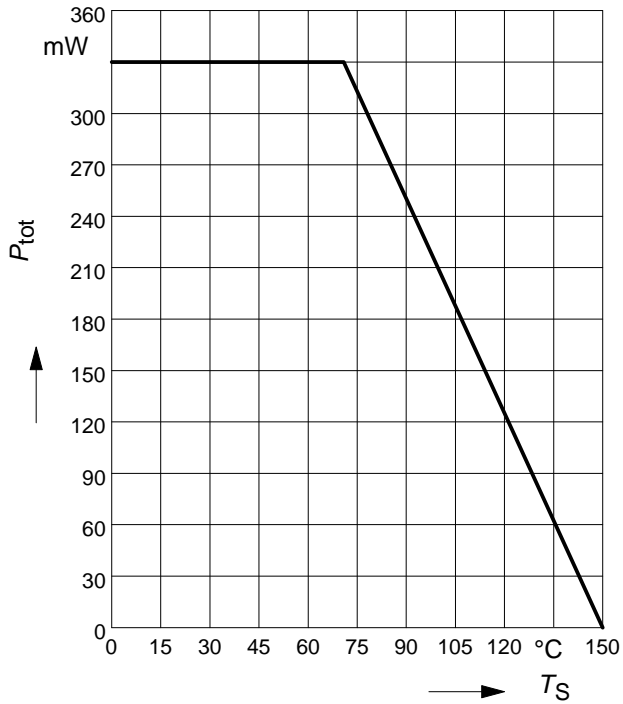**Electrical Characteristics** at T_A = 25°C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage	$V_{(BR)CES}$				V
I_C = 10 µA, V_{BE} = 0 BC846		80	-	-	
BC847/850		50	-	-	
BC848/849		30	-	-	
Emitter-base breakdown voltage	$V_{(BR)EBO}$				
I_E = 1 µA, I_C = 0 BC846/847		6	-	-	
BC848-850		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%

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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 I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz h_{FE}-gr.**A** h_{FE}-gr.**B** h_{FE}-gr.**C**	h_{11e}	 - - -	 2.7 4.5 8.7	 - - -	kΩ
Open-circuit reverse voltage transf.ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz h_{FE}-gr.**A** h_{FE}-gr.**B** h_{FE}-gr.**C**	h_{12e}	 - - -	 1.5 2 3	 - - -	10^{-4}
Short-circuit forward current transf.ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz h_{FE}-gr.**A** h_{FE}-gr.**B** h_{FE}-gr.**C**	h_{21e}	 - - -	 200 330 600	 - - -	-
Open-circuit output admittance I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz h_{FE}-gr.**A** h_{FE}-gr.**B** h_{FE}-gr.**C**	h_{22e}	 - - -	 18 30 60	 - - -	µS
Noise figure I_C = 100 µA, V_{CE} = 5 V, R_S = 1 kΩ, BC849 f = 1 kHz, Δ f = 200 Hz BC850	F	-	1.2	4	dB
Equivalent noise voltage I_C = 200 µA, V_{CE} = 5 V, R_S = 2 kΩ, BC850 f = 10 ... 50 Hz	V_n	-	-	0.135	µV

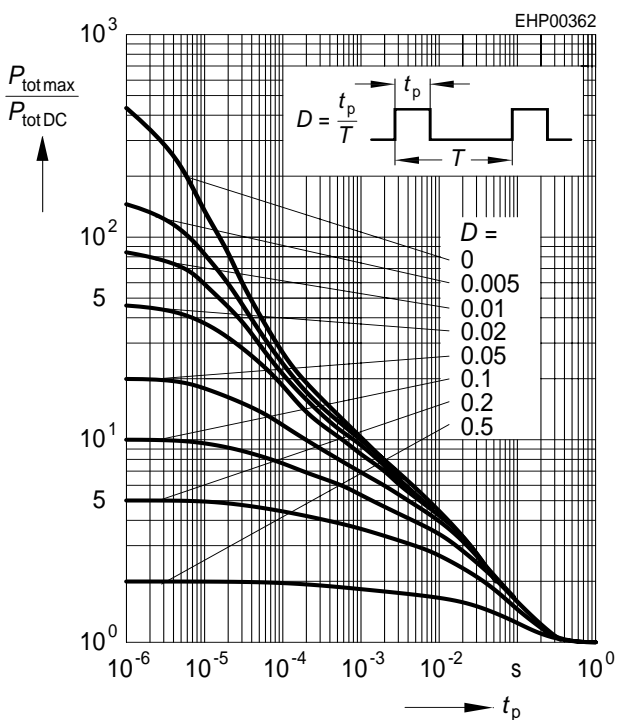**Total power dissipation** $P_{tot} = f(T_S)$

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

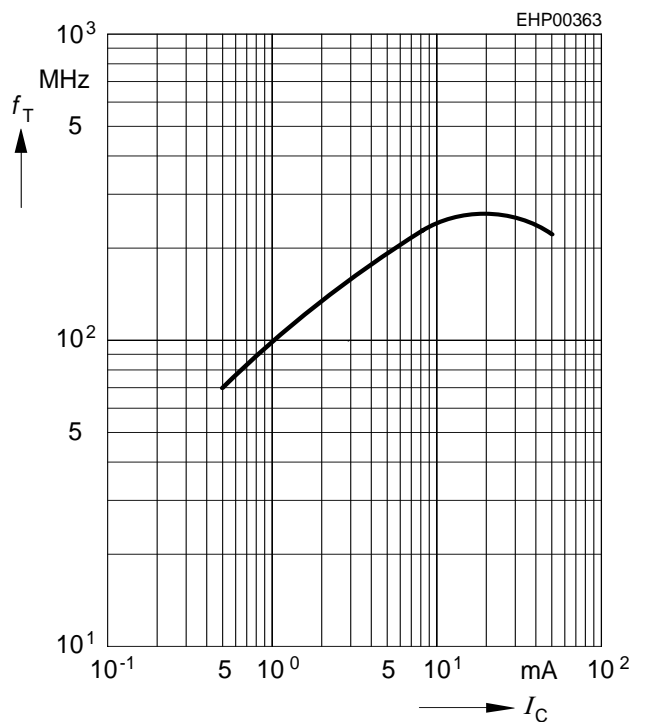**Emitter-base capacitance** $C_{EB} = f(V_{EBO})$
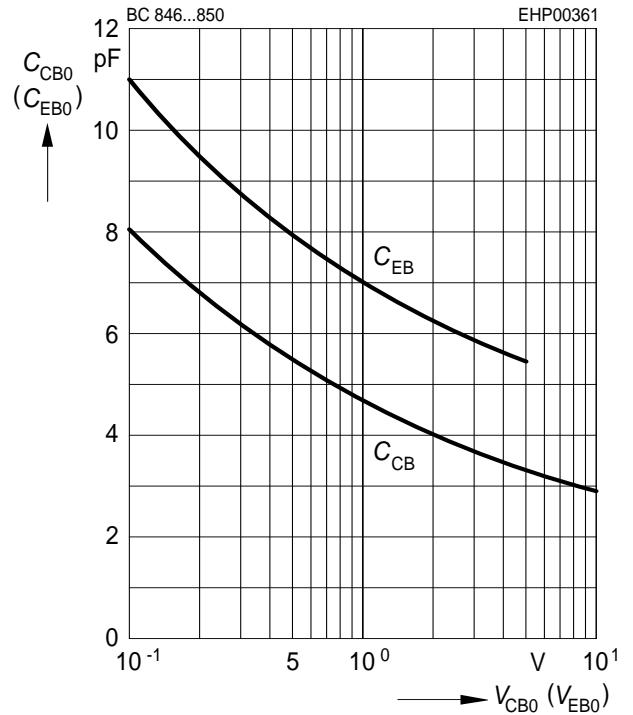
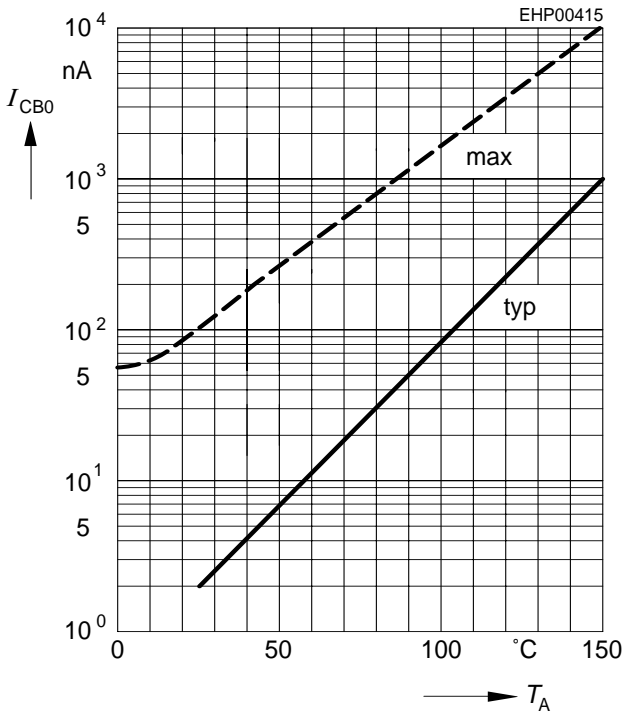**Permissible pulse load**

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

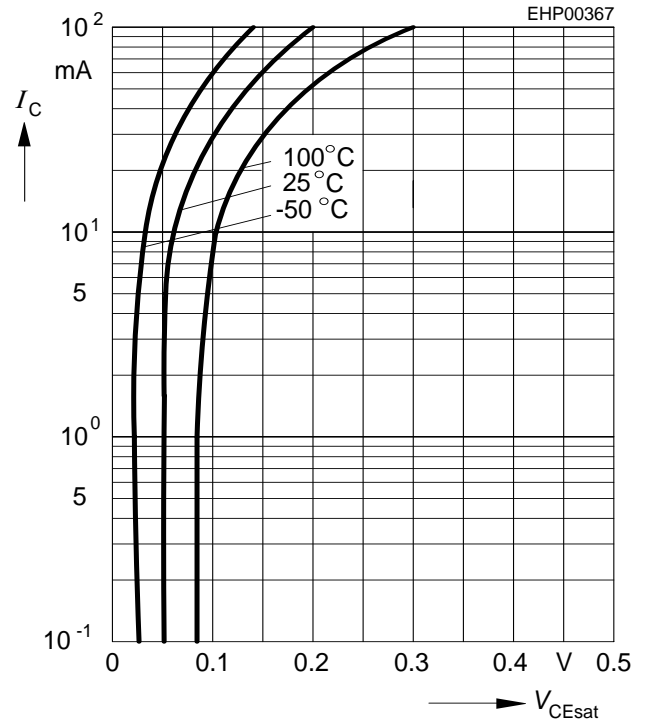**Transition frequency** $f_T = f(I_C)$

$V_{CE} = 5V$

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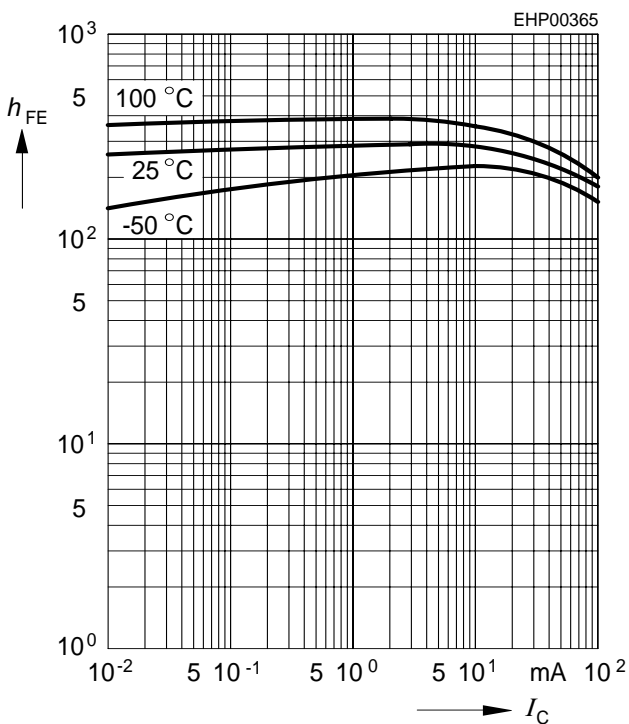
Collector cutoff current $I_{CBO} = f(T_A)$

$V_{CB} = 30V$

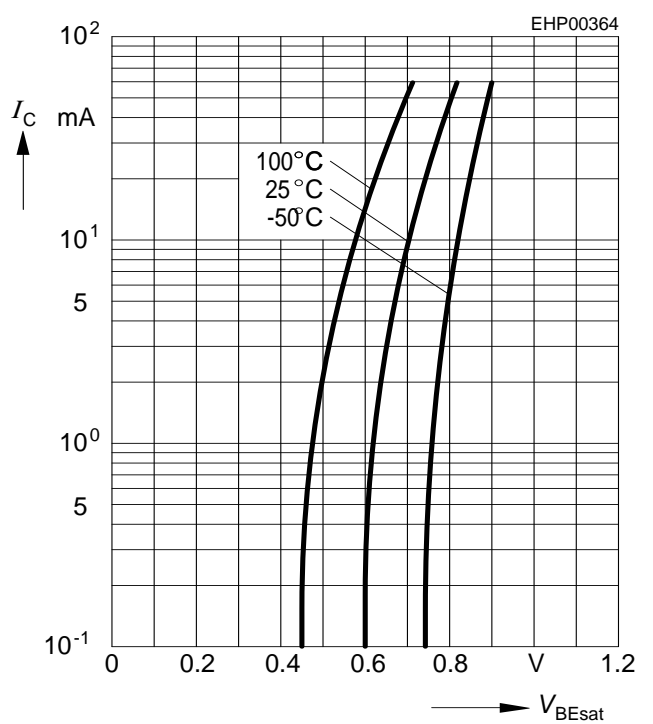**Collector-emitter saturation voltage**

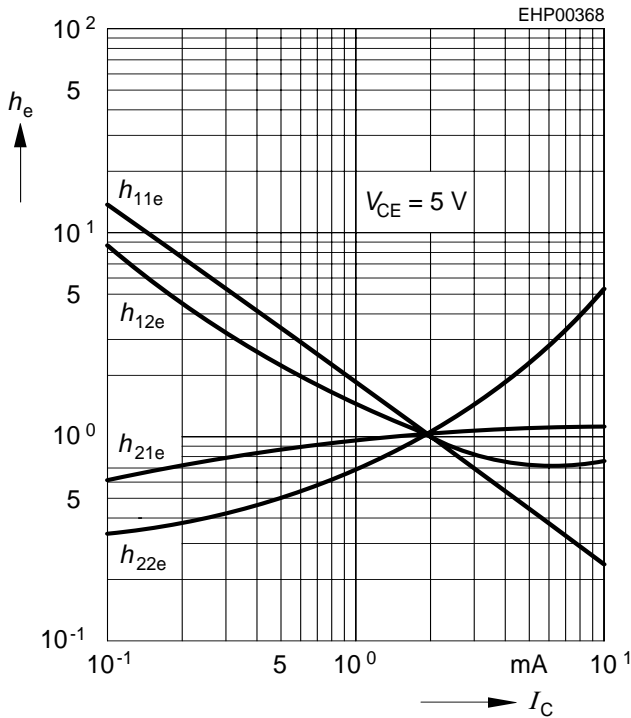$I_C = f(V_{CEsat})$, $h_{FE} = 20$

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

$V_{CE} = 5V$

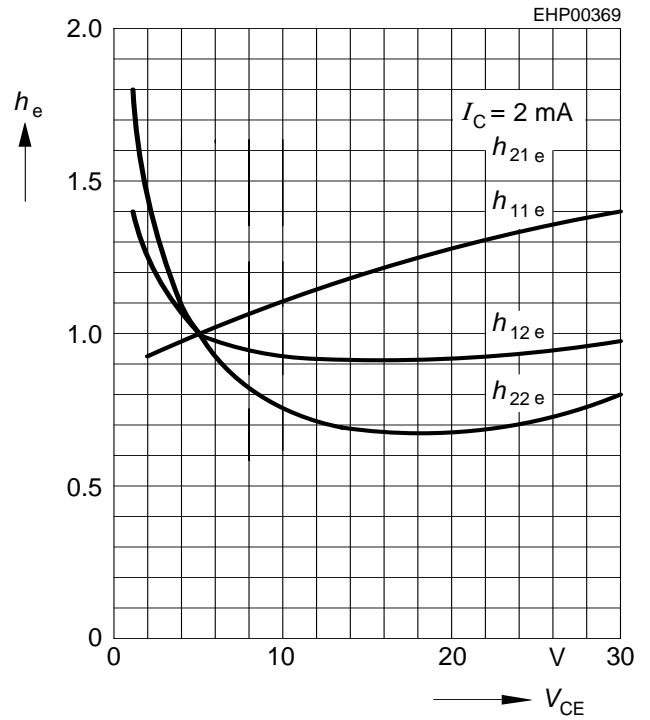**Base-emitter saturation voltage**

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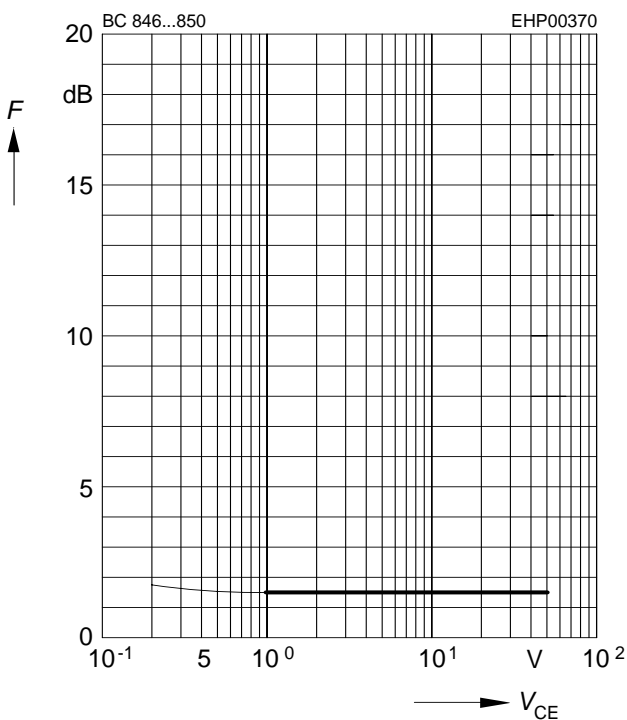

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h parameter $h_e = f(I_C)$ **normalized**

V_{CE} = 5V

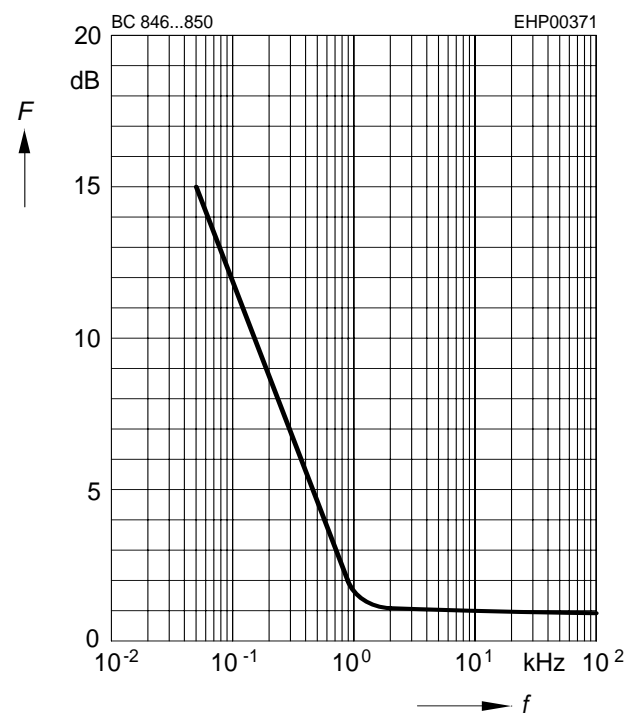**h parameter** $h_e = f(V_{CE})$ **normalized**

I_C = 2mA

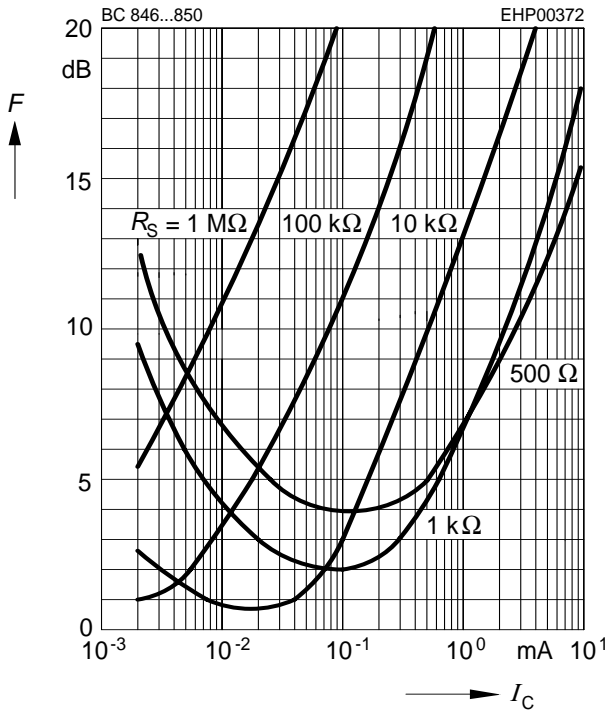**Noise figure** $F = f(V_{CE})$

I_C = 0.2mA, R_S = 2kΩ, f = 1kHz

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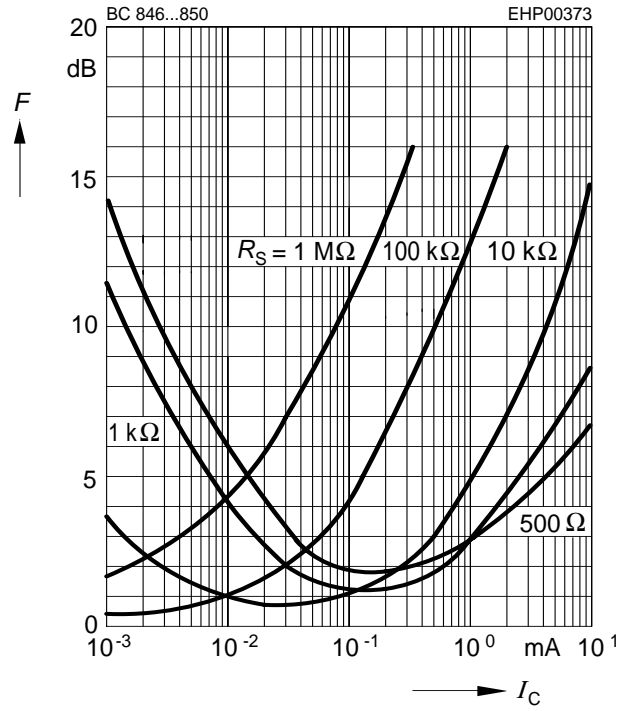
I_C = 0.2mA, V_{CE} = 5V, R_S = 2kΩ

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Noise figure $F = f(I_C)$

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

BC 846...850   EHP00372

Noise figure $F = f(I_C)$

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

BC 846...850   EHP00373

Noise figure $F = f(I_C)$

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

BC 846...850   EHP00374

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