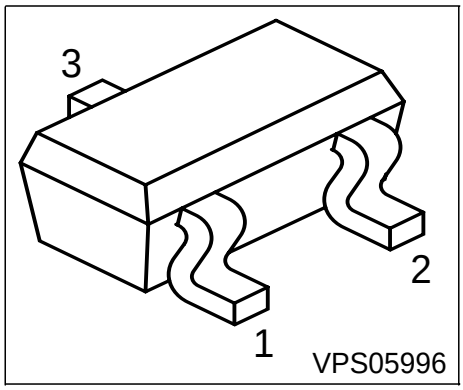
NPN Silicon AF Transistors

- 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:
  BC856T, BC857T,
  BC858T, BC859T, BC860T



Type	Marking	Pin Configuration			Package
BC846AT	1As	1 = B	2 = E	3 = C	SC75
BC847BT	1Fs	1 = B	2 = E	3 = C	SC75
BC847CT	1Gs	1 = B	2 = E	3 = C	SC75
BC848AT	1Js	1 = B	2 = E	3 = C	SC75
BC848BT	1Ks	1 = B	2 = E	3 = C	SC75
BC848CT	1Ls	1 = B	2 = E	3 = C	SC75
BC849BT	2Bs	1 = B	2 = E	3 = C	SC75
BC849CT	2cs	1 = B	2 = E	3 = C	SC75
BC850BT	2Fs	1 = B	2 = E	3 = C	SC75
BC850CT	2Gs	1 = B	2 = E	3 = C	SC75

Maximum Ratings

Parameter	Symbol	BC846T	BC847T BC850T	BC848T BC849T	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 = 109 °C	P_{tot}	250			mW
Junction temperature	T_j	150			°C
Storage temperature	T_{stg}	-65 ... 150			

Thermal Resistance

Junction - soldering point[1)]	R_{thJS}	≤165	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 BC846T		65	-	-	
I_C = 10 mA, I_B = 0 BC847T/BC850T		45	-	-	
I_C = 10 mA, I_B = 0 BC848T/BC849T		30	-	-	
Collector-base breakdown voltage	$V_{(BR)CBO}$				
I_C = 10 µA, I_E = 0 BC846T		80	-	-	
I_C = 10 µA, I_E = 0 BC847T/850T		50	-	-	
I_C = 10 µA, I_E = 0 BC848T/849T		30	-	-	

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

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 BC846T		65	-	-	
I_C = 10 µA, V_{BE} = 0 BC847T/850T		50	-	-	
I_C = 10 µA, V_{BE} = 0 BC848T/849T		30	-	-	
Emitter-base breakdown voltage	$V_{(BR)EBO}$				
I_E = 1 µA, I_C = 0 BC846T		6	-	-	
I_E = 1 µA, I_C = 0 BC847T/BC850T		6	-	-	
I_E = 1 µA, I_C = 0 BC848T/BC849T		5	-	-	
Collector cutoff current	I_{CBO}	-	-	15	nA
V_{CB} = 30 V, I_E = 0					
Collector cutoff current	I_{CBO}	-	-	5	µA
V_{CB} = 30 V, I_E = 0 , T_A = 150 °C					
DC current gain 1)	h_{FE}				-
I_C = 10 µA, V_{CE} = 5 V h_{FE}-group A		-	140	-	
I_C = 10 µA, V_{CE} = 5 V h_{FE}-group B		-	250	-	
I_C = 10 µA, V_{CE} = 5 V 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	
I_C = 2 mA, V_{CE} = 5 V h_{FE}-group B		200	290	450	
I_C = 2 mA, V_{CE} = 5 V 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%

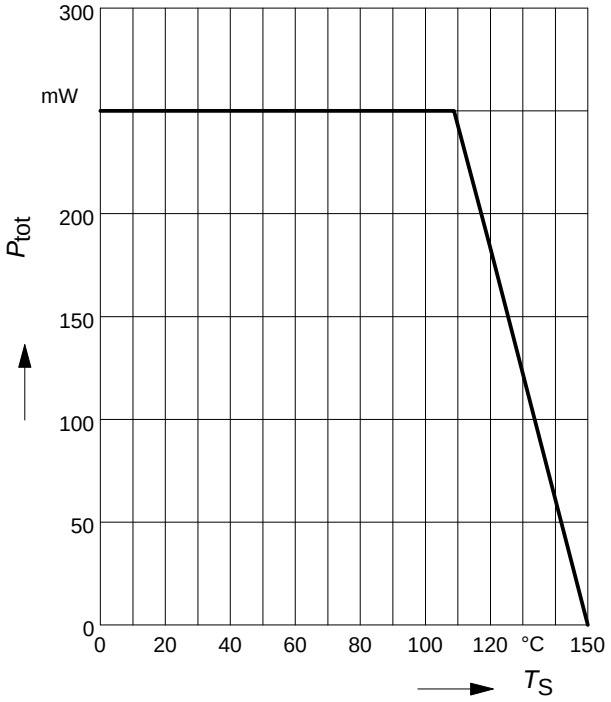
Electrical Characteristics at T_A = 25°C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Transition frequency I_C = 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}	-	8	-	
Short-circuit input impedance	h_{11e}				kΩ
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz hFE-group A		-	2.7	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz hFE-group B		-	4.7	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz hFE-group C		-	8.7	-	
Open-circuit reverse voltage transf.ratio	h_{12e}				10^{-4}
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz hFE-group A		-	1.5	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz hFE-group B		-	2	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz hFE-group C		-	3	-	
Short-circuit forward current transf.ratio	h_{21e}				-
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz hFE-group A		-	200	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz hFE-group B		-	330	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz hFE-group C		-	600	-	
Open-circuit output admittance	h_{22e}				µS
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz hFE-group A		-	18	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz hFE-group B		-	30	-	
I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz hFE-group C		-	60	-	

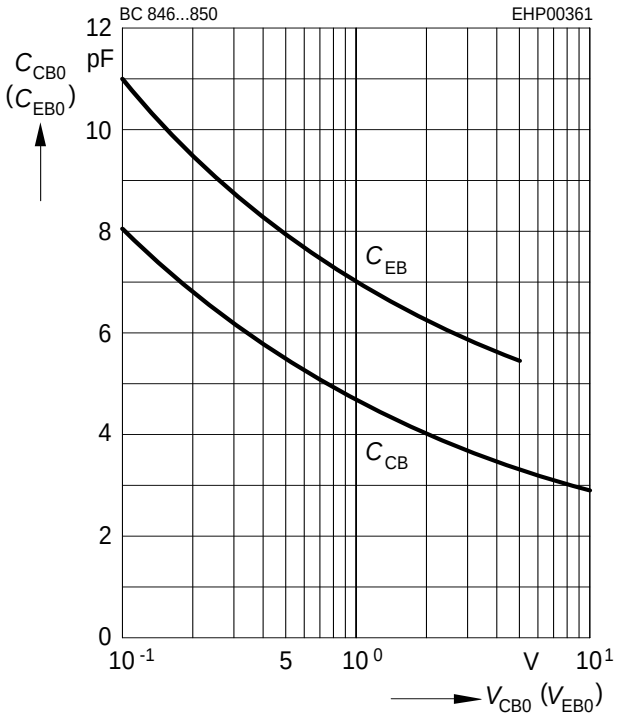
Electrical Characteristics at T_A = 25°C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Noise figure	F				dB
I_C = 200 µA, V_{CE} = 5 V, R_S = 2 kΩ,					
f = 1 kHz, Δ f = 200 Hz BC849T		-	1.2	4	
I_C = 200 µA, V_{CE} = 5 V, R_S = 2 kΩ,					
f = 1 kHz, Δ f = 200 Hz BC850T		-	1	4	
Equivalent noise voltage	V_n	-	-	0.135	µV
I_C = 200 µA, V_{CE} = 5 V, R_S = 2 kΩ,					
f = 10 ... 50 Hz BC850T					

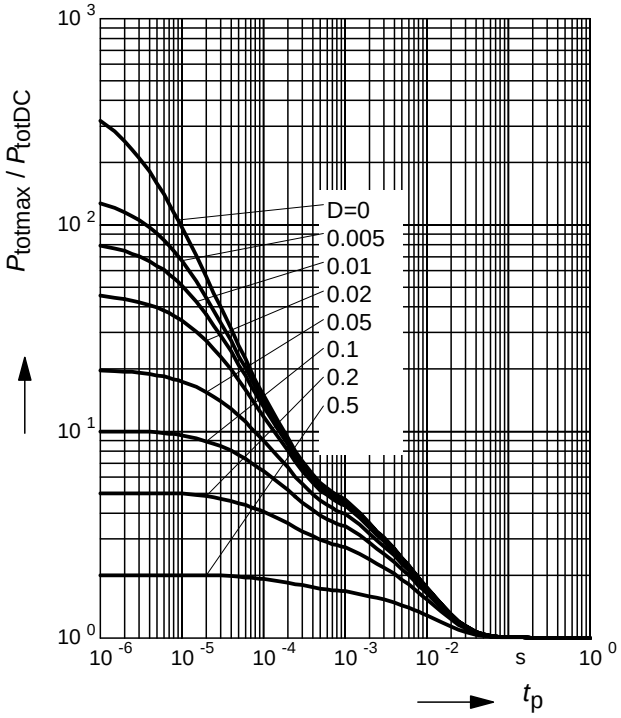
Total power dissipation $P_{tot} = f(T_S)$



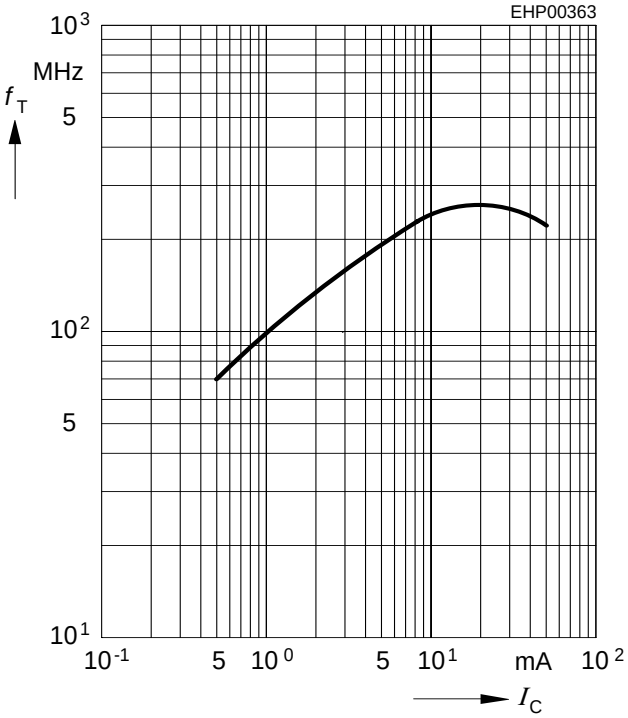
Collector-base capacitance $C_{CB} = f(V_{CBO})$
Emitter-base capacitance $C_{EB} = f(V_{EBO})$



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

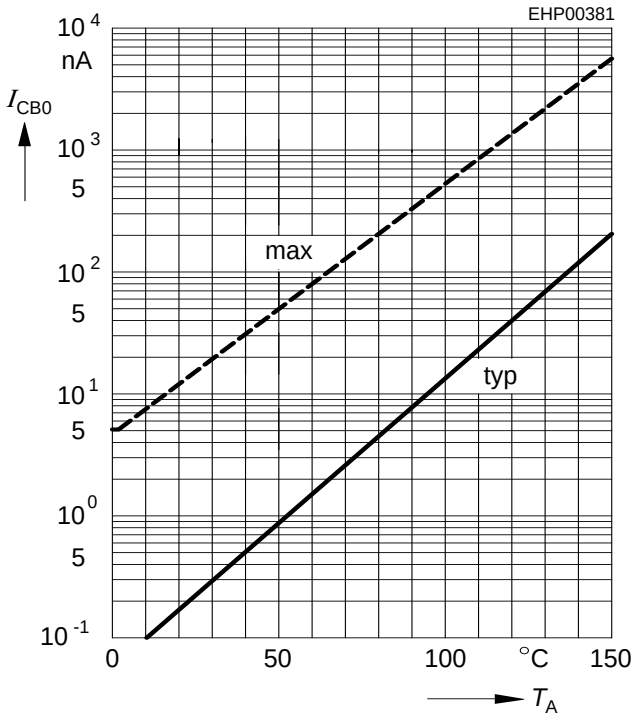


Transition frequency $f_T = f(I_C)$
$V_{CE} = 5V$



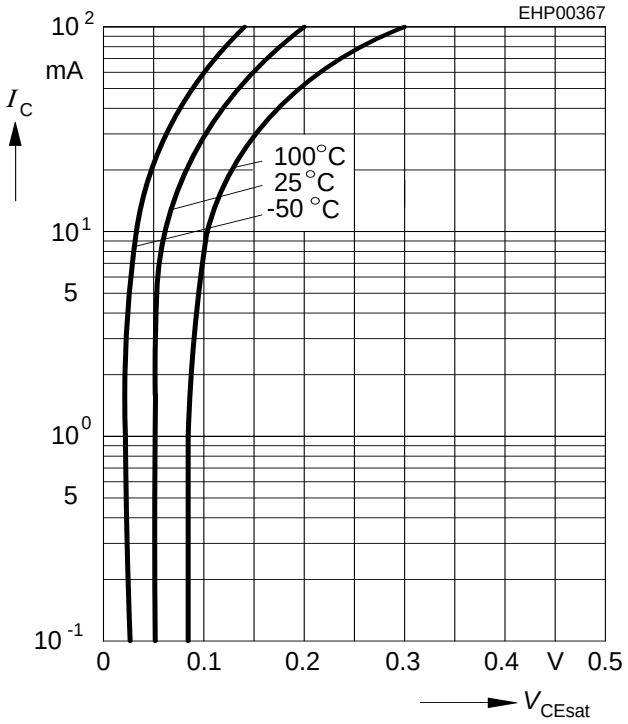
Collector cutoff current $I_{CBO} = f(T_A)$

V_{CB} = 30V



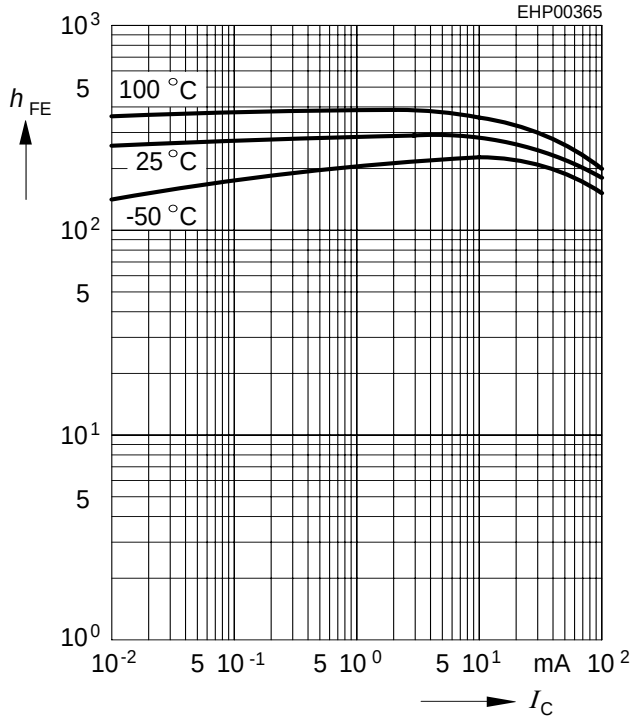
Collector-emitter saturation voltage

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



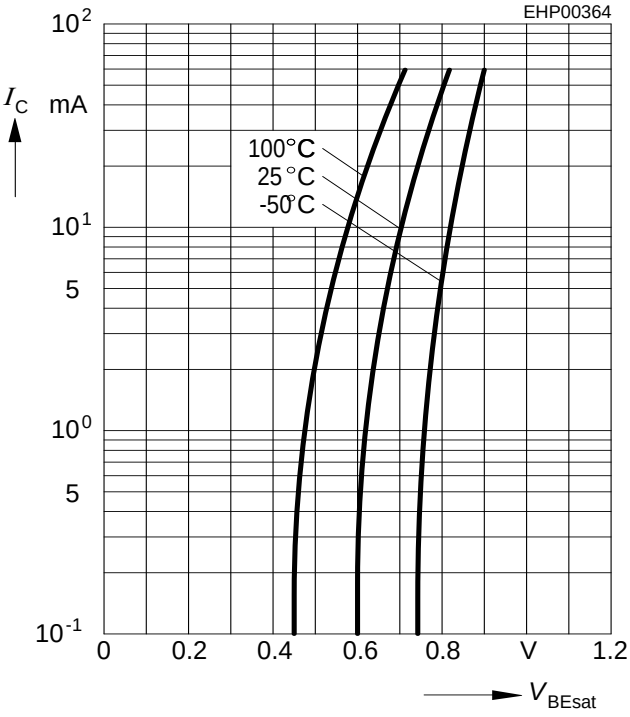
DC current gain $h_{FE} = f(I_C)$

V_{CE} = 5V



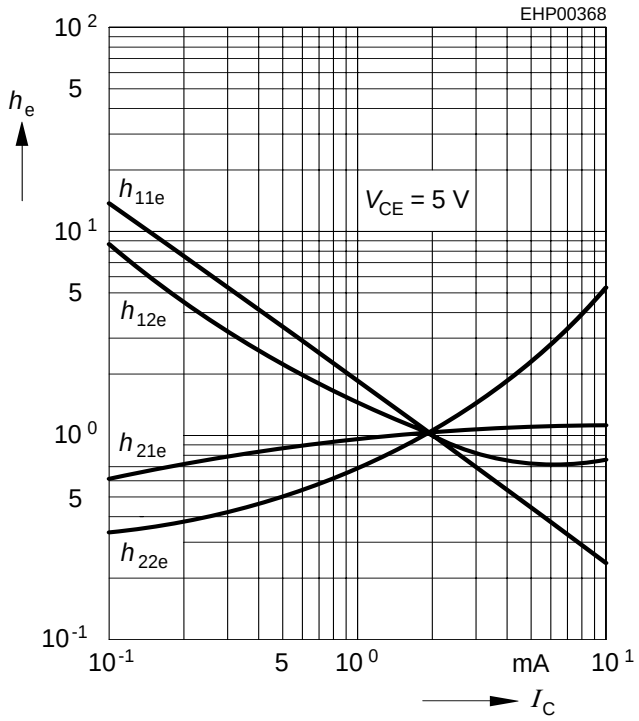
Base-emitter saturation voltage

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



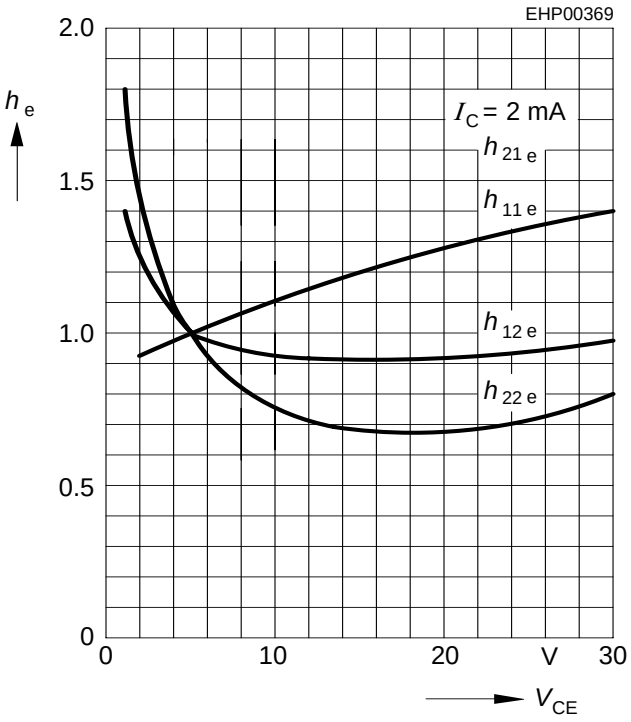
h parameter $h_e = f(I_C)$ normalized

V_{CE} = 5V



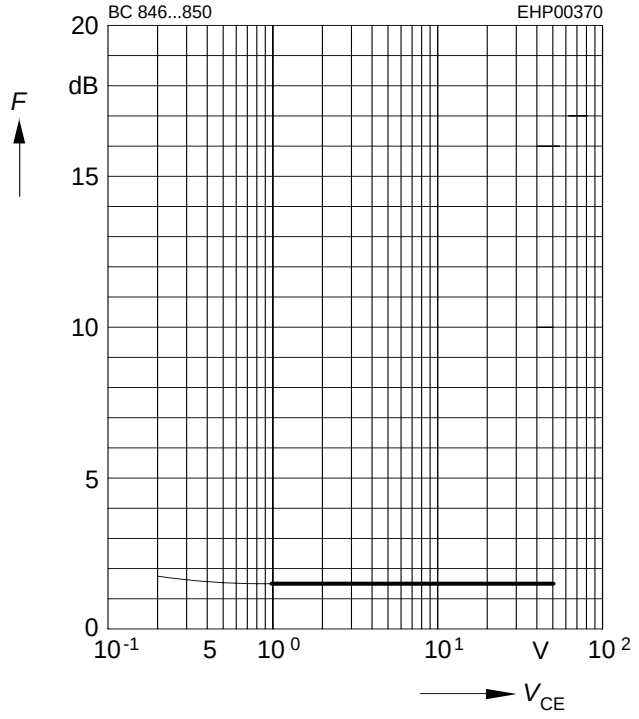
h parameter $h_e = f(V_{CE})$ normalized

I_C = 2mA



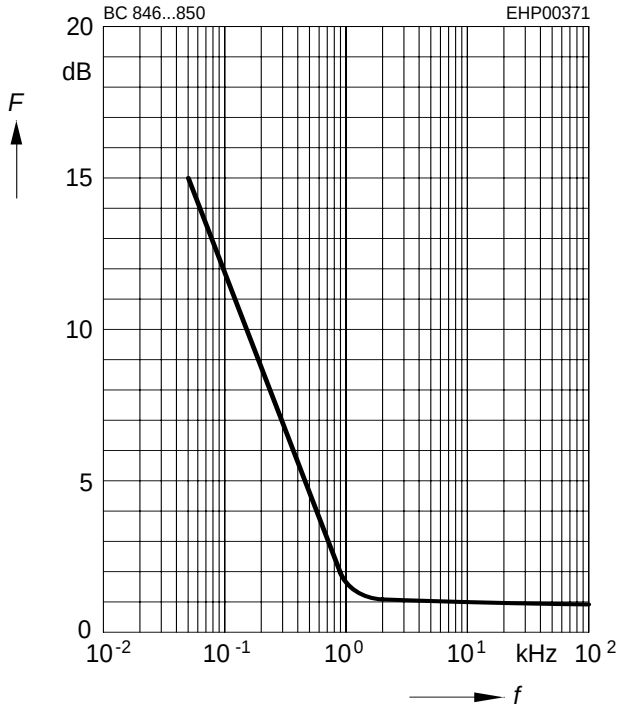
Noise figure $F = f(V_{CE})$

I_C = 0.2mA, R_S = 2kΩ, f = 1kHz

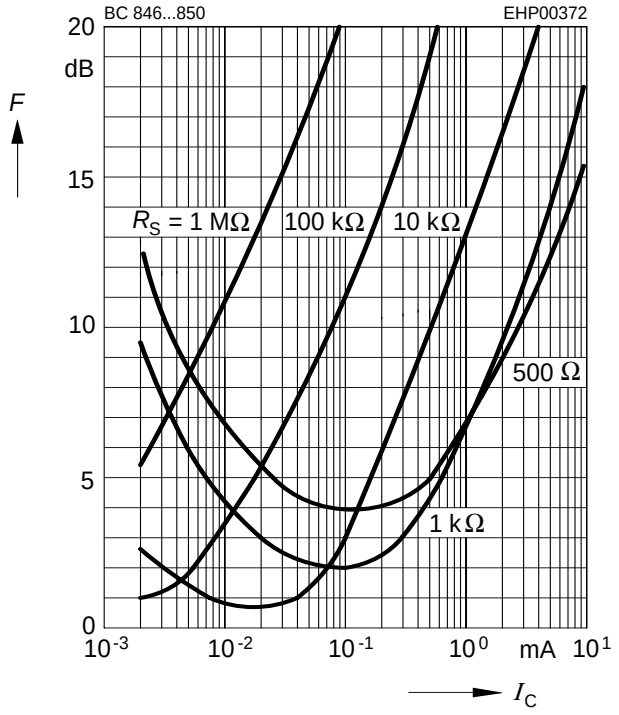


Noise figure $F = f(f)$

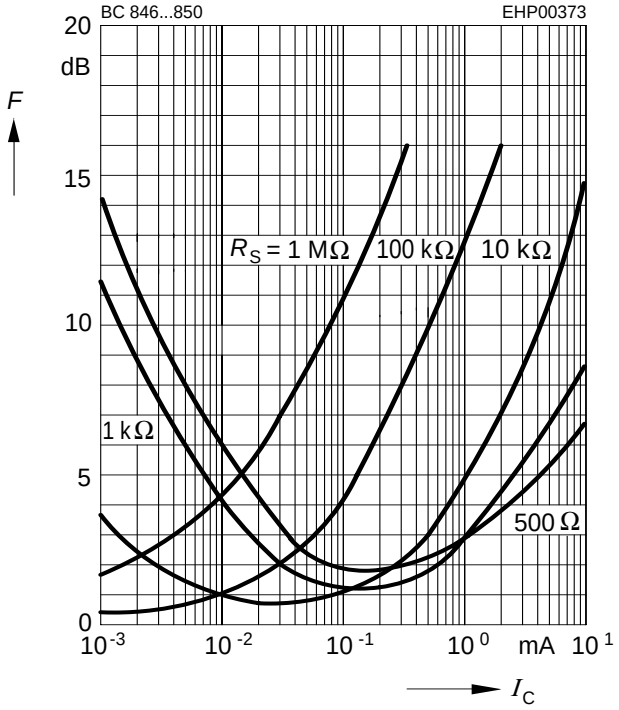
I_C = 0.2mA, V_{CE} = 5V, R_S = 2kΩ



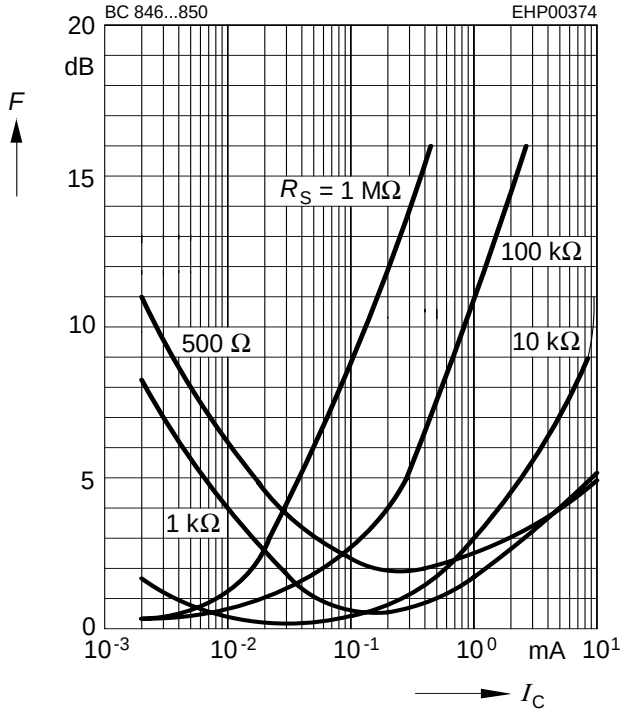
Noise figure $F = f(I_C)$
V_{CE} = 5V, f = 120Hz



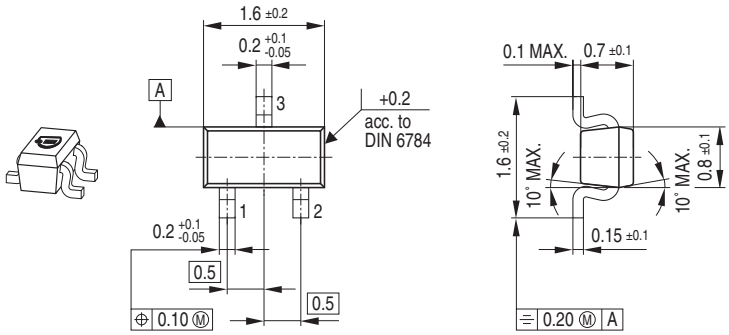
Noise figure $F = f(I_C)$
V_{CE} = 5V, f = 1kHz



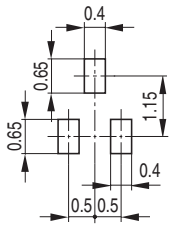
Noise figure $F = f(I_C)$
V_{CE} = 5V, f = 10kHz



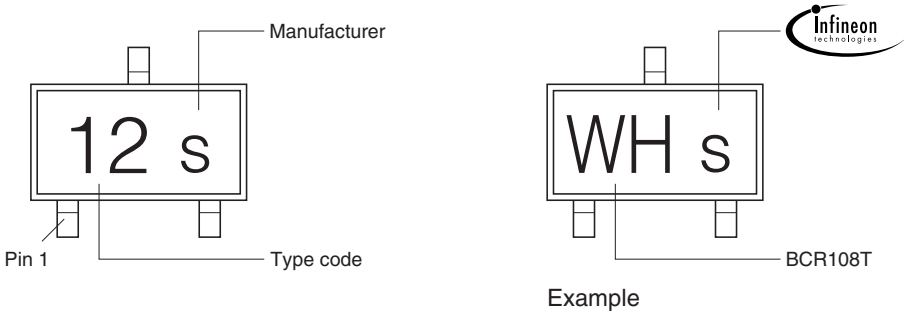
Package Outline



Foot Print



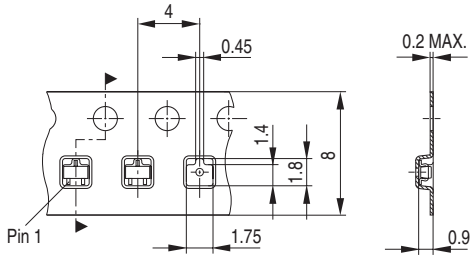
Marking Layout



Example

Packing

Code E6327: Reel ø180 mm = 3.000 Pieces/Reel
Code E6433: Reel ø330 mm = 10.000 Pieces/Reel



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