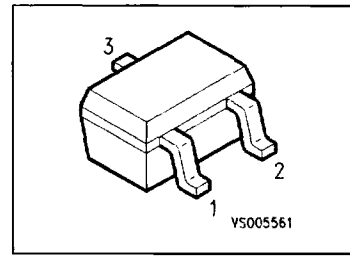
SIEMENS

NPN Silicon AF Transistor

BC 846 W ... BC 850 W

Features

- For AF input stages and driver applications
- High current gain
- Low collector-emitter saturation voltage
- Low noise between 30Hz and 15 kHz
- Complementary types: BC 856 W, BC 857 W, BC 858 W,BC 859 W, BC 860 W (PNP)



Type	Marking	Ordering code (tape and reel)	Pin Configuration 1	2	3	Package
BC 846 AW	1 As	Q62702-C2319	B	E	C	SOT 323
BC 846 BW	1 Bs	Q62702-C2279				SOT 323
BC 847 AW	1 Es	Q62702-C2304				SOT 323
BC 847 BW	1 Fs	Q62702-C2305				SOT 323
BC 847 CW	1 Gs	Q62702-C2306				SOT 323
BC 848 AW	1 Js	Q62702-C2307				SOT 323
BC 848 BW	1 Ks	Q62702-C2308				SOT 323
BC 848 CW	1 Ls	Q62702-C2309				SOT 323
BC 849 BW	2 Bs	Q62702-C2310				SOT 323
BC 849 CW	2 Cs	Q62702-C2311				SOT 323
BC 850 BW	2 Fs	Q62702-C2312				SOT 323
BC 850 CW	2 Gs	Q62702-C2313				SOT 323

Maximum Ratings

Description	Symbol	BC846W BC 847 W BC 849 W BC 848 W BC 840 W			Unit
Collector-emitter voltage	V_{CEO}	65	45	30	V
Collector-base voltage	V_{CBO}	80	50	30	V
Collector-emitter voltage	V_{CES}	80	50	30	V
Emitter-base voltage	V_{EBO}	6	6	5	V
Collector current	I_C	100			mA
Collector peak current	I_{CM}	200			mA
Total power dissipation, $T_S = 115$ °C	P_{tot}	250			mW
Junction temperature	T_j	150			°C
Storage temperature range	T_{stg}	–65 to 150			°C

Thermal Resistance

Junction - ambient[1)]	$R_{th\,JA}$	≤ 240	K/W
Junction - soldering point	$R_{th\,JS}$	≤ 105	K/W

[1)]Package mounted on epoxy pcb 40 mm × 40 mm × 1.5 mm/1 cm² Cu.

Characteristic at T_A = 25 °C, unless otherwise specified.

Description	Symbol	Ratings			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage	$V_{(BR)CEO}$				V
I_C = 10 mA BC 846 W		65	–	–	
BC 847 W, BC 850 W		45	–	–	
BC 848 W, BC 849 W		30	–	–	
Collector-base breakdown voltage[1]	$V_{(BR)CBO}$				V
I_C = 100 µA BC 846 W		80	–	–	
BC 847 W, BC 850 W		50	–	–	
BC 848 W, BC 849 W		30	–	–	
Collector-emitter breakdown voltage	$V_{(BR)CBO}$				V
I_C = 10 µA, V_{BE} = 0 BC 846 W		80	–	–	
BC 847 W, BC 850 W		50	–	–	
BC 848 W, BC 849 W		30	–	–	
Emitter-base breakdown voltage	$V_{(BR)EBO}$				V
I_E = 10 µA BC 846 W, BC 847 W		6			
BC 848 W, BC 849 W		5	–	–	
BC 850			–	–	
Collector-base cutoff current	I_{CBO}				
V_{CB} = 30 V		–	–	15	nA
V_{CB} = 30 V, T_A = 150 °C		–	–	5	µA
DC current gain	h_{FE}				–
I_C = 10 µA, V_{CE} = 5 V BC 846 AW ... BC 848 AW		–	140	–	
BC 846 BW ... BC 850 BW		–	250	–	
BC 847 CW ... BC 850 CW		–	480	–	
I_C = 2 mA, V_{CE} = 5 V BC 846 AW ... BC 848 AW		110	180	220	
BC 846 BW ... BC 850 BW		200	290	450	
BC 847 CW ... BC 850 CW		420	520	800	
Collector-emitter saturation voltage[1]	V_{CEsat}				mV
I_C = 10 mA, I_B = 0.5 mA		–	90	250	
I_C = 100 mA, I_B = 5 mA		–	900	650	
Base-emitter saturation voltage[1]	V_{CEsat}				mV
I_C = 10 mA, I_B = 0.5 mA		–	700	–	
I_C = 100 mA, I_B = 5 mA		–	900	–	
Base-emitter voltage[1]	V_{CEsat}				mV
I_C = 2 mA, V_{CE} = 0.5 mA		580	660	700	
I_C = 10 mA, V_{CE} = 5 mA		–	–	770	

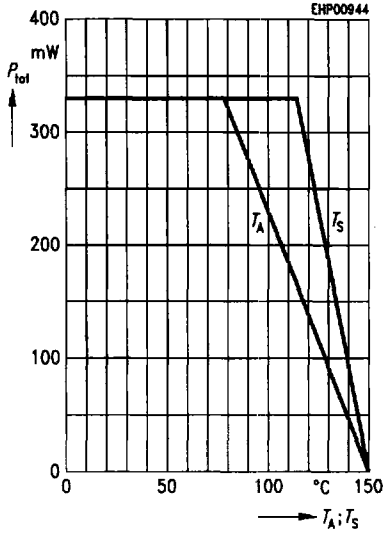
[1] Pulse test : $t \leq 300$ µs, $D = 2$ %.

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

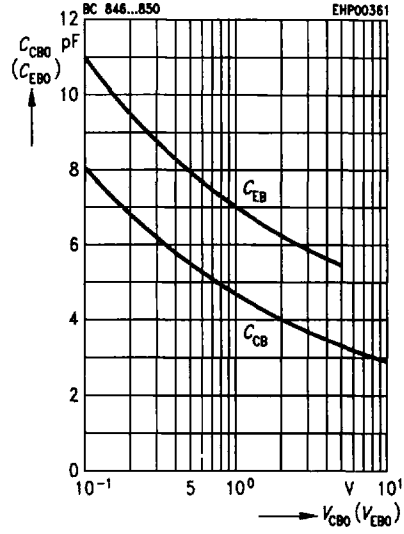
Description	Symbol	Ratings			Unit
		min.	typ.	max.	
AC Characteristics					
Transition frequency I_C = 20 mA, V_{CE} = 5 V, f = 100 MHz	f_T	–	250	–	MHz
Output capacitance V_{CB} = 10 V, f = 1 MHz	C_{obo}	–	2	–	pF
Input capacitance V_{EB} = 0.5 V, f = 1 MHz	C_{ibo}	–	10	–	pF
Short-circuit input impedance I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{11e}				kΩ
BC 846 AW ... BC 849 AW		–	2.7	–	
BC 846 BW ... BC 850 BW		–	4.5	–	
BC 847 CW ... BC 850 CW		–	8.7	–	
Open-circuit reverse voltage transfer ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{12e}				10^{-4}
BC 846 AW ... BC 849 AW		–	1.5	–	
BC 846 BW ... BC 850 BW		–	2.0	–	
BC 847 CW ... BC 850 CW		–	3.0	–	
Short-circuit forward current transfer ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{21e}				
BC 846 AW ... BC 849 AW		–	200	–	
BC 846 BW ... BC 850 BW		–	330	–	
BC 847 CW ... BC 850 CW		–	600	–	
Open-circuit output admittance I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{22e}				µS
BC 846 AW ... BC 849 AW		–	18	–	
BC 846 BW ... BC 850 BW		–	30	–	
BC 847 CW ... BC 850 CW		–	60	–	
Noise figure	F				dB
I_C = 0.2 mA, V_{CE} = 5 V, R_S = 2 kΩ BC 849 W			1.4	4	
f = 30 Hz ... 15 kHz BC 850 W		–	1.4	3	
f = 1 kHz, Δf = 200 Hz BC 849 W		–	1.2	4	
BC 850 W		–	1.0	4	
Equivalent noise voltage	V_n				µV
I_C = 0.2 mA, V_{CE} = 5 V, R_S = 2 kΩ					
f = 10 Hz ... 50 Hz BC 850 W		–	–	0.135	

Curves see BC 846 ... BC 840

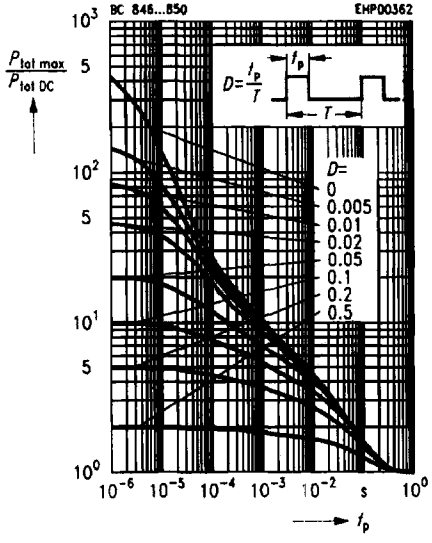
Total power dissipation $P_{tot} = f(T_A^*; T_S)$
* Package mounted on epoxy



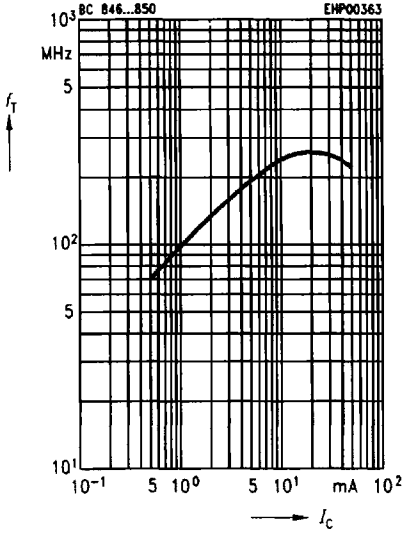
Collector-base capacitance $C_{CBO} = f(V_{CBO})$
Emitter-base capacitance $C_{EBO} = f(V_{EBO})$



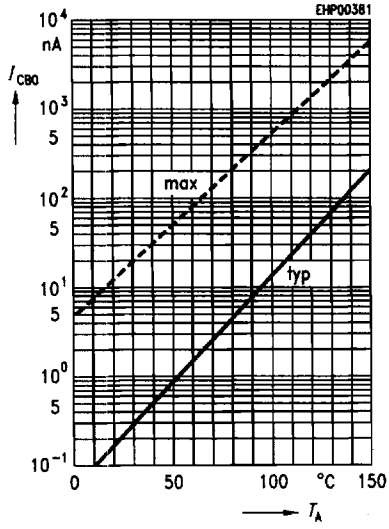
Permissible pulse load $P_{tot\,max}/P_{tot\,DC} = f(t_p)$



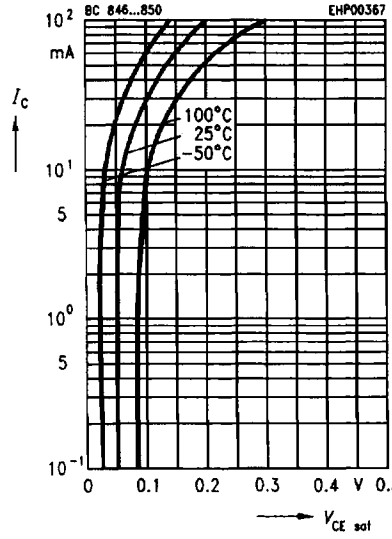
Transition frequency $f_T = f(I_C)$
$V_{CE} = 5$ V



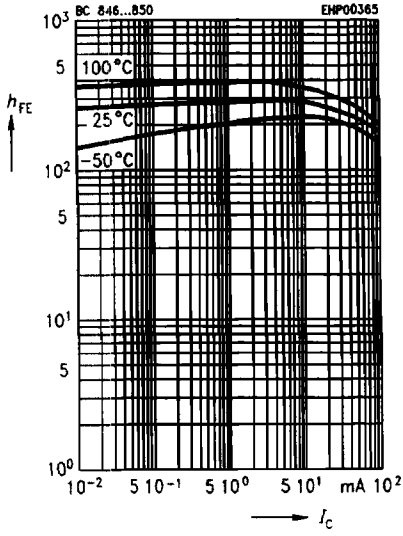
Collector cutoff current $I_{CBO} = f(T_A)$
V_{CB} = 30 V



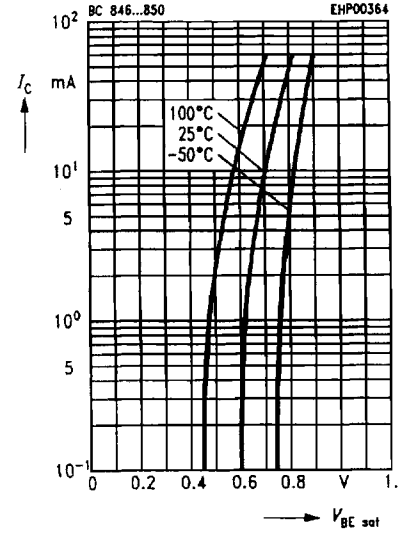
Collector-emitter saturation voltage
$I_C = f(V_{CEsat})$, h_{FE} = 20



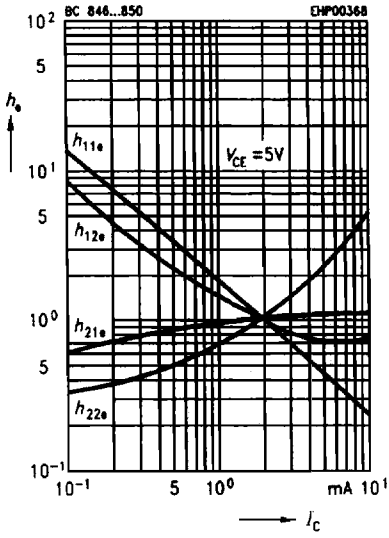
DC current gain $h_{FE} = f(I_C)$
V_{CE} = 5 V



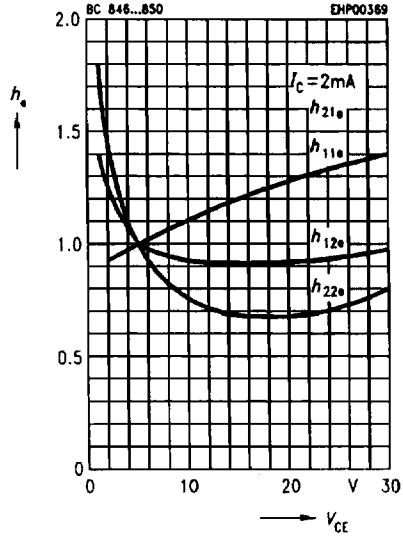
Base-emitter saturation voltage
$I_C = f(V_{BEsat})$, h_{FE} = 20



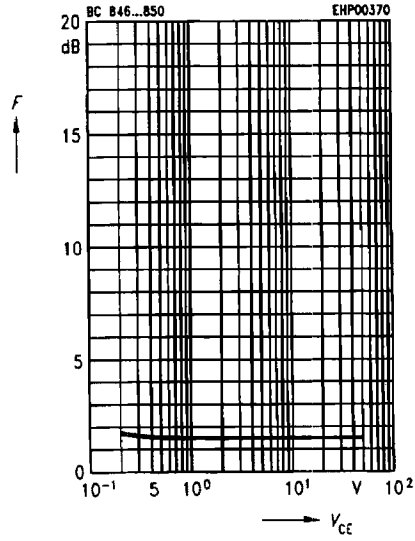
h parameter $h_e = f(I_C)$ normalized
V_{CE} = 5 V



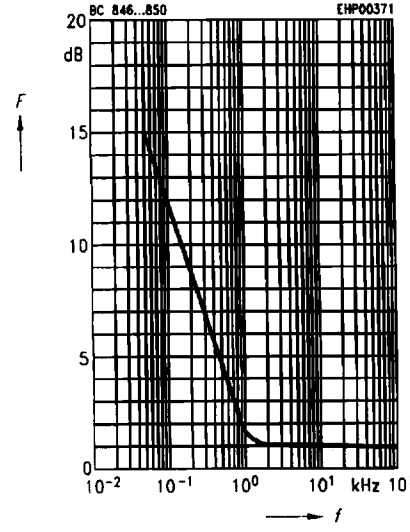
h parameter $h_e = f(V_{CE})$ normalized
I_C = 2 mA



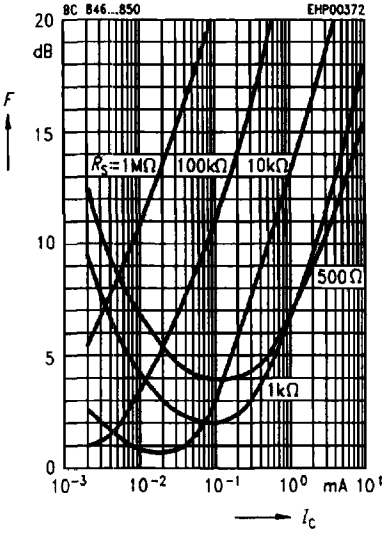
Noise figure $F = f(V_{CE})$
I_C = 0.2 mA, R_S = 2 kΩ, f = 1 kHz



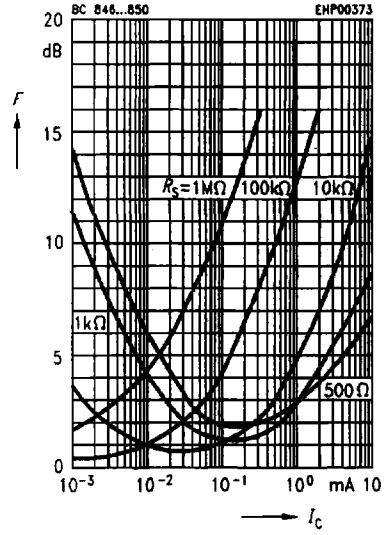
Noise figure $F = f(f)$
I_C = 0.2 mA, V_{CE} = 5 V, R_S = 2 kΩ



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



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



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