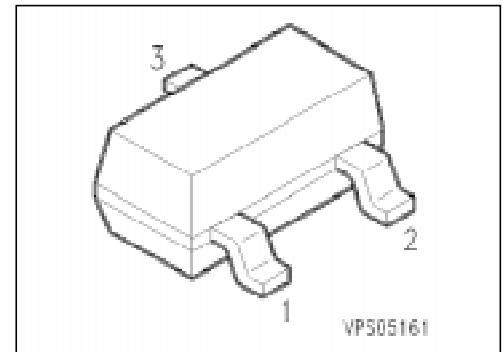


Features

- 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 859, BC 860 (PNP)



| Type | Marking | Ordering Code (tape and reel) | Pin Configuration | | | Package ¹⁾ |
|----------|---------|----------------------------------|-------------------|---|---|-----------------------|
| | | | 1 | 2 | 3 | |
| BC 846 A | 1As | Q62702-C1772 | B | E | C | SOT-23 |
| BC 846 B | 1Bs | Q62702-C1746 | | | | |
| BC 847 A | 1Es | Q62702-C1884 | | | | |
| BC 847 B | 1Fs | Q62702-C1687 | | | | |
| BC 847 C | 1Gs | Q62702-C1715 | | | | |
| BC 848 A | 1Js | Q62702-C1741 | | | | |
| BC 848 B | 1Ks | Q62702-C1704 | | | | |
| BC 848 C | 1Ls | Q62702-C1506 | | | | |
| BC 849 B | 2Bs | Q62702-C1727 | | | | |
| BC 849 C | 2Cs | Q62702-C1713 | | | | |
| BC 850 B | 2Fs | Q62702-C1885 | | | | |
| BC 850 C | 2Gs | Q62702-C1712 | | | | |

¹⁾For detailed information see chapter Package Outlines.

Maximum Ratings

| Parameter | Symbol | Values | | | Unit |
|---|-----------|----------------|------------------|------------------|------|
| | | BC 846 | BC 847 BC 850 | BC 848 BC 849 | |
| Collector-emitter voltage | V_{CE0} | 65 | 45 | 30 | V |
| Collector-base voltage | V_{CB0} | 80 | 50 | 30 | |
| Collector-emitter voltage | V_{CES} | 80 | 50 | 30 | |
| Emitter-base voltage | V_{EB0} | 6 | 6 | 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 | | | |
| Total power dissipation, $T_s = 71\text{ °C}$ | P_{tot} | 330 | | | mW |
| Junction temperature | T_j | 150 | | | °C |
| Storage temperature range | T_{stg} | - 65 ... + 150 | | | |

Thermal Resistance

| | | | |
|----------------------------------|--------------|-------|-----|
| Junction - ambient ¹⁾ | $R_{th\ JA}$ | ≤ 310 | K/W |
| Junction - soldering point | $R_{th\ JS}$ | ≤ 240 | |

¹⁾Package mounted on epoxy pcb 40 mm × 40 mm × 1.5 mm/6 cm² Cu.

Electrical Characteristics

at $T_A = 25\text{ °C}$, unless otherwise specified.

| Parameter | Symbol | Values | | | Unit |
|-----------|--------|--------|------|------|------|
| | | min. | typ. | max. | |

DC characteristics

| | | | | | |
|---|---------------|----------------------------------|--|----------------------------------|---------------------|
| Collector-emitter breakdown voltage $I_C = 10\text{ mA}$ BC 846 BC 847, BC 850 BC 848, BC 849 | $V_{(BR)CE0}$ | 65 45 30 | — — — | — — — | V |
| Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$ BC 846 BC 847, BC 850 BC 848, BC 849 | $V_{(BR)CB0}$ | 80 50 30 | — — — | — — — | |
| Collector-emitter breakdown voltage $I_C = 10\text{ }\mu\text{A}$, $V_{BE} = 0$ BC 846 BC 847, BC 850 BC 848, BC 849 | $V_{(BR)CES}$ | 80 50 30 | — — — | — — — | |
| Emitter-base breakdown voltage $I_E = 1\text{ }\mu\text{A}$ BC 846, BC 847 BC 848, BC 849, BC 850 | $V_{(BR)EB0}$ | 6 5 | — — | — — | |
| Collector cutoff current $V_{CB} = 30\text{ V}$ $V_{CB} = 30\text{ V}$, $T_A = 150\text{ °C}$ | I_{CB0} | — — | — — | 15 5 | nA μA |
| DC current gain $I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$ BC 846 A, BC 847 A, BC 848 A BC 846 B ... BC 850 B BC 847 C, BC 848 C, BC 849 C, BC 850 C $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$ BC 846 A, BC 847 A, BC 848 A BC 846 B ... BC 850 B BC 847 C, BC 848 C, BC 849 C, BC 850 C | h_{FE} | — — — 110 200 420 | 140 250 480 180 290 520 | — — — 220 450 800 | — |
| Collector-emitter saturation voltage ¹⁾ $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$, $I_B = 5\text{ mA}$ | V_{CEsat} | — — | 90 200 | 250 600 | mV |
| Base-emitter saturation voltage ¹⁾ $I_C = 10\text{ mA}$, $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$, $I_B = 5\text{ mA}$ | V_{BEsat} | — — | 700 900 | — — | |
| Base-emitter voltage $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$ $I_C = 10\text{ mA}$, $V_{CE} = 5\text{ V}$ | $V_{BE(on)}$ | 580 — | 660 — | 700 770 | |

¹⁾Pulse test: $t \leq 300\text{ }\mu\text{s}$, $D = 2\text{ %}$.

Electrical Characteristics

at $T_A = 25\text{ °C}$, unless otherwise specified.

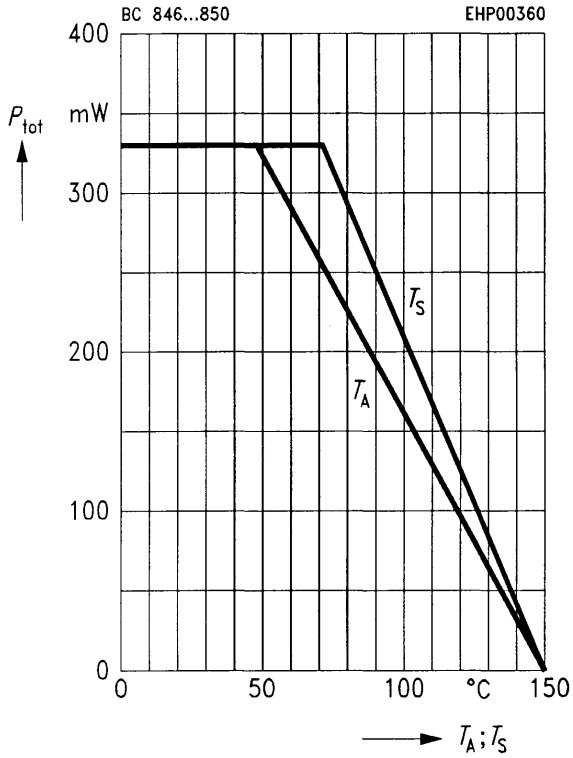
| Parameter | Symbol | Values | | | Unit |
|-----------|--------|--------|------|------|------|
| | | min. | typ. | max. | |

AC characteristics

| | | | | | |
|--|-----------|-----|-----|-------|---------------|
| Transition frequency $I_C = 20\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 100\text{ MHz}$ | f_T | – | 250 | – | MHz |
| Output capacitance $V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$ | C_{obo} | – | 3 | – | pF |
| Input capacitance $V_{CB} = 0.5\text{ V}$, $f = 1\text{ MHz}$ | C_{ibo} | – | 8 | – | |
| Short-circuit input impedance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ | h_{11e} | | | | k Ω |
| BC 846 A ... BC 848 A | – | 2.7 | – | | |
| BC 846 B ... BC 850 B | – | 4.5 | – | | |
| BC 847 C ... BC 850 C | – | 8.7 | – | | |
| Open-circuit reverse voltage transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ | h_{12e} | | | | 10^{-4} |
| BC 846 A ... BC 848 A | – | 1.5 | – | | |
| BC 846 B ... BC 850 B | – | 2.0 | – | | |
| BC 847 C ... BC 850 C | – | 3.0 | – | | |
| Short-circuit forward current transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ | h_{21e} | | | | – |
| BC 846 A ... BC 848 A | – | 200 | – | | |
| BC 846 B ... BC 850 B | – | 330 | – | | |
| BC 847 C ... BC 850 C | – | 600 | – | | |
| Open-circuit output admittance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ | h_{22e} | | | | μS |
| BC 846 A ... BC 848 A | – | 18 | – | | |
| BC 846 B ... BC 850 B | – | 30 | – | | |
| BC 847 C ... BC 850 C | – | 60 | – | | |
| Noise figure $I_C = 0.2\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_S = 2\text{ k}\Omega$ | F | | | | dB |
| $f = 30\text{ Hz} \dots 15\text{ kHz}$ | | | | | |
| BC 849 | – | 1.4 | 4 | | |
| BC 850 | – | 1.4 | 3 | | |
| $f = 1\text{ kHz}$, $\Delta f = 200\text{ Hz}$ | | | | | |
| BC 849 | – | 1.2 | 4 | | |
| BC 850 | – | 1.0 | 4 | | |
| Equivalent noise voltage $I_C = 0.2\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_S = 2\text{ k}\Omega$ | V_n | – | – | 0.135 | μV |
| $f = 10\text{ Hz} \dots 50\text{ Hz}$ | | | | | |
| BC 850 | | | | | |

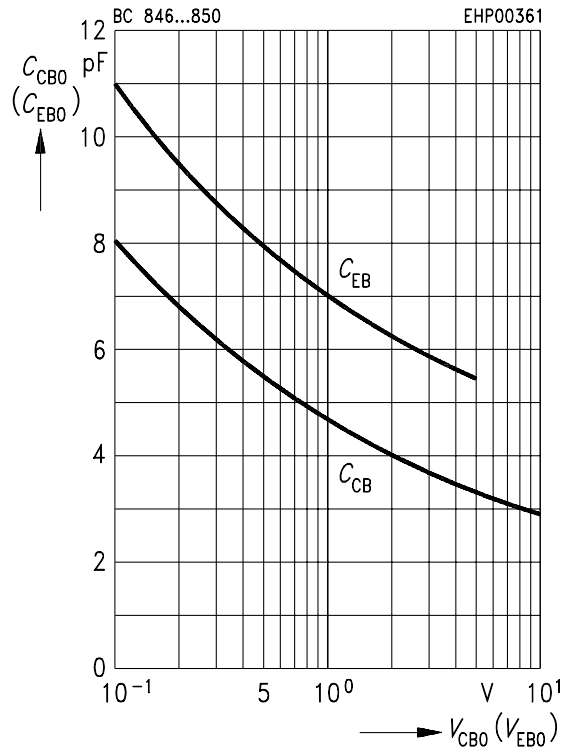
Total power dissipation $P_{tot} = f(T_A^*; T_S)$

* Package mounted on epoxy

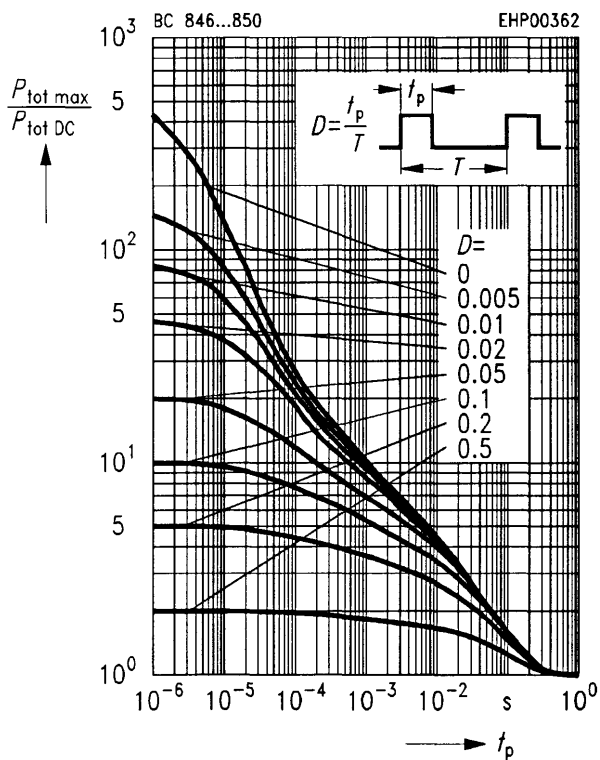


Collector-base capacitance $C_{CB0} = f(V_{CB0})$

Emitter-base capacitance $C_{EB0} = f(V_{EB0})$

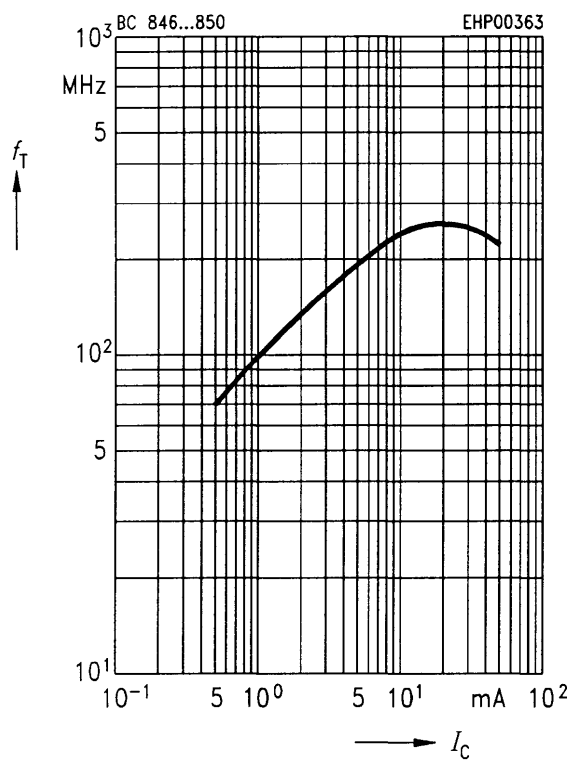


Permissible pulse load $P_{tot max}/P_{tot DC} = f(t_p)$



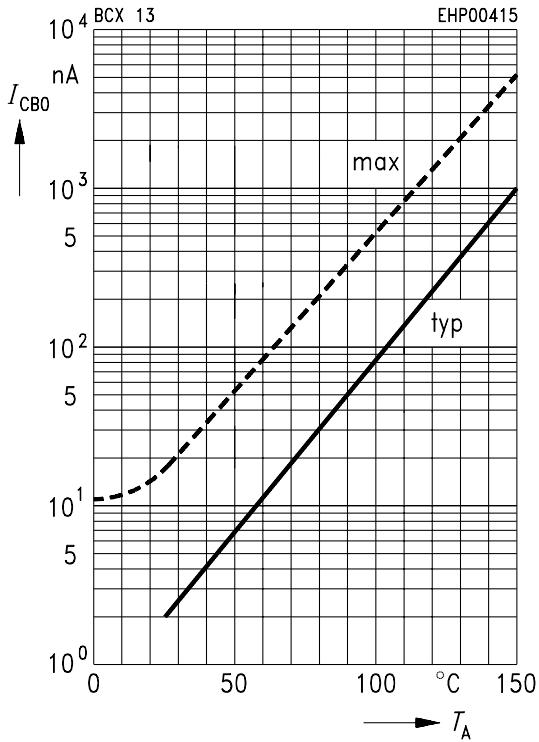
Transition frequency $f_T = f(I_C)$

$V_{CE} = 5 V$



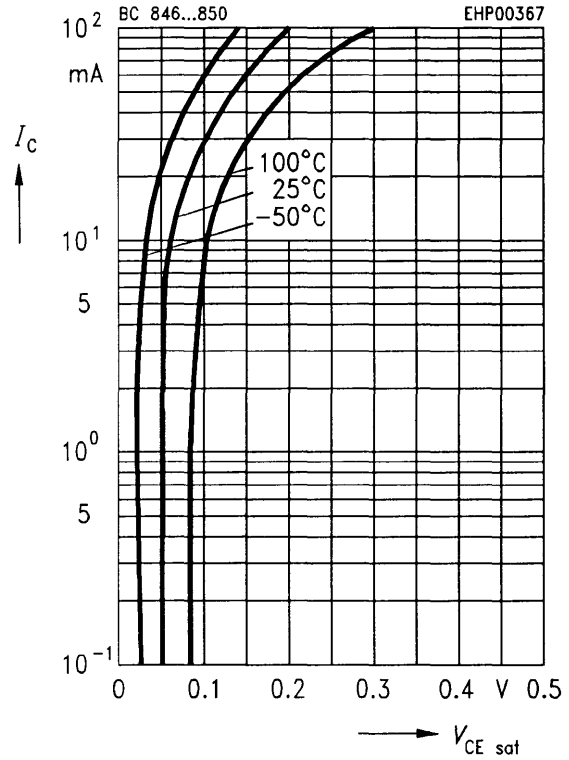
Collector cutoff current $I_{CB0} = f(T_A)$

$V_{CB} = 30\text{ V}$



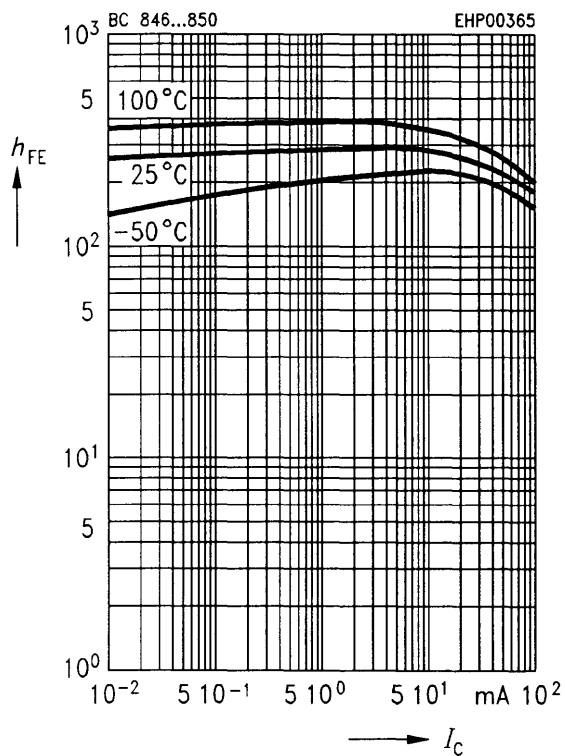
Collector-emitter saturation voltage $I_C = f(V_{CEsat}, h_{FE} = 20)$

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



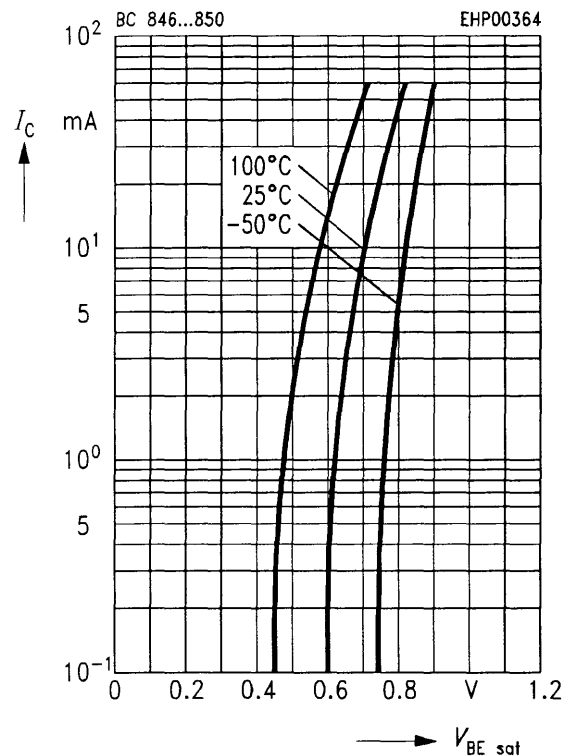
DC current gain $h_{FE} = f(I_C)$

$V_{CE} = 5\text{ V}$



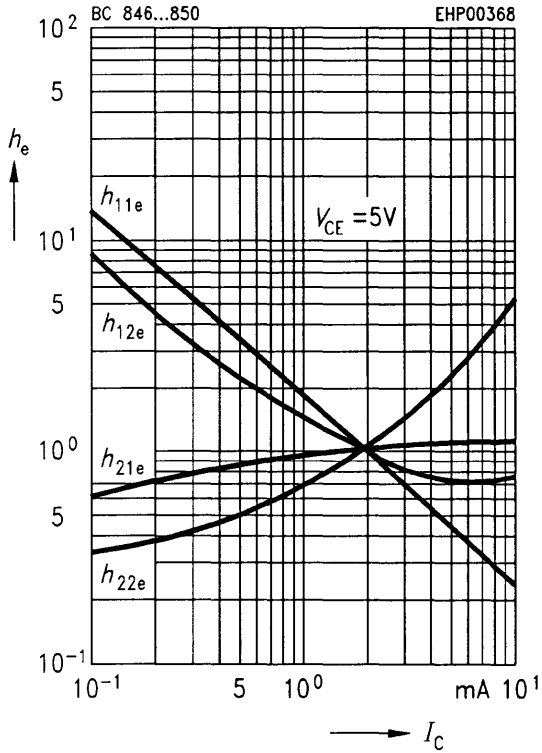
Base-emitter saturation voltage $I_C = f(V_{BEsat}, h_{FE} = 20)$

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



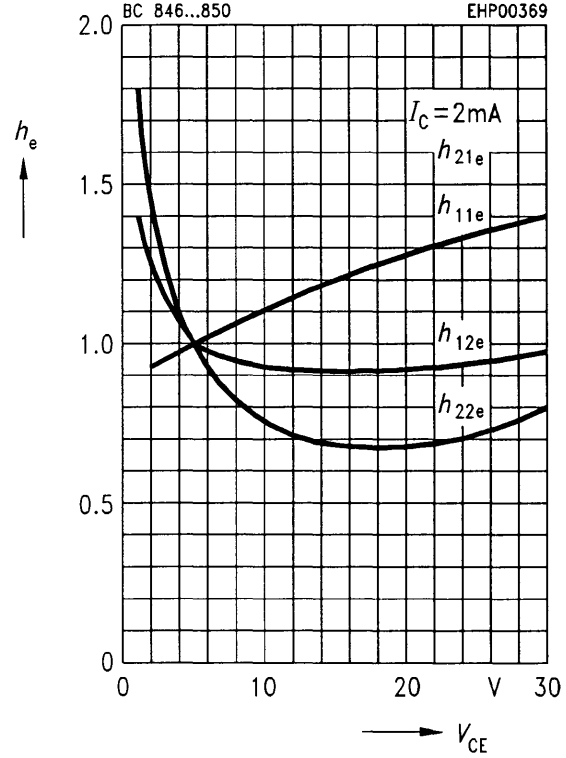
h parameter $h_e = f(I_C)$ normalized

$V_{CE} = 5\text{ V}$



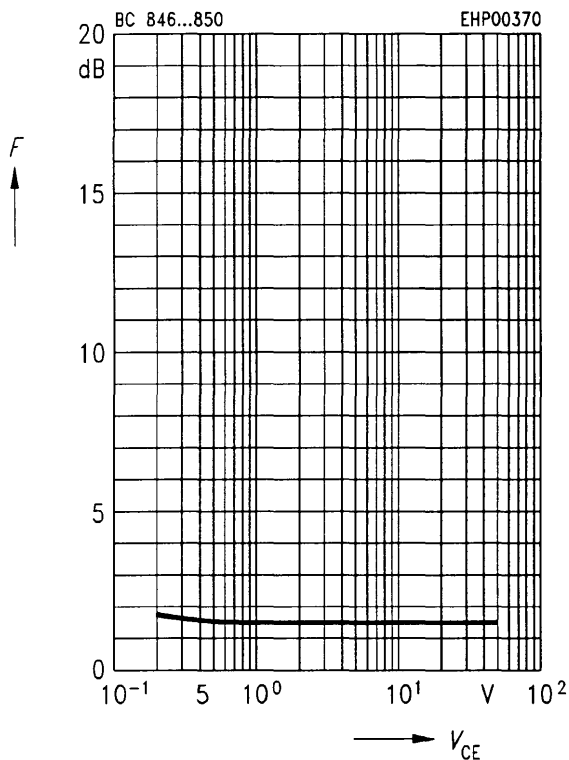
h parameter $h_e = f(V_{CE})$ normalized

$I_C = 2\text{ mA}$



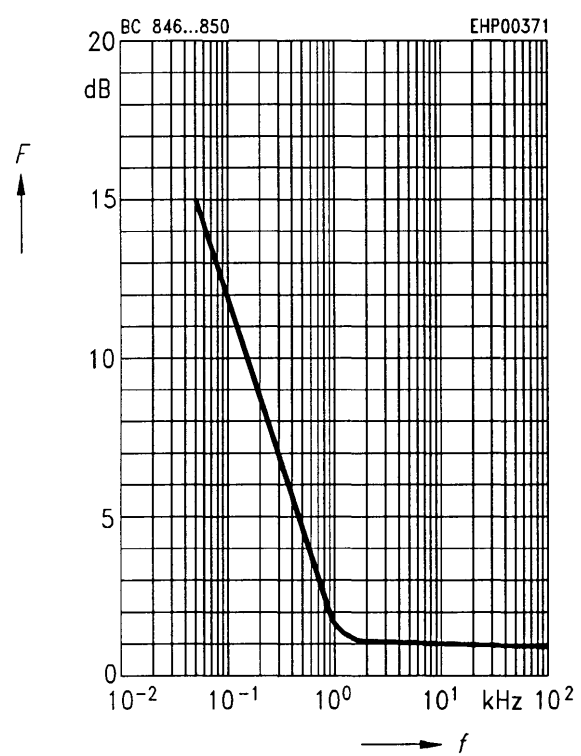
Noise figure $F = f(V_{CE})$

$I_C = 0.2\text{ mA}$, $R_S = 2\text{ k}\Omega$, $f = 1\text{ kHz}$



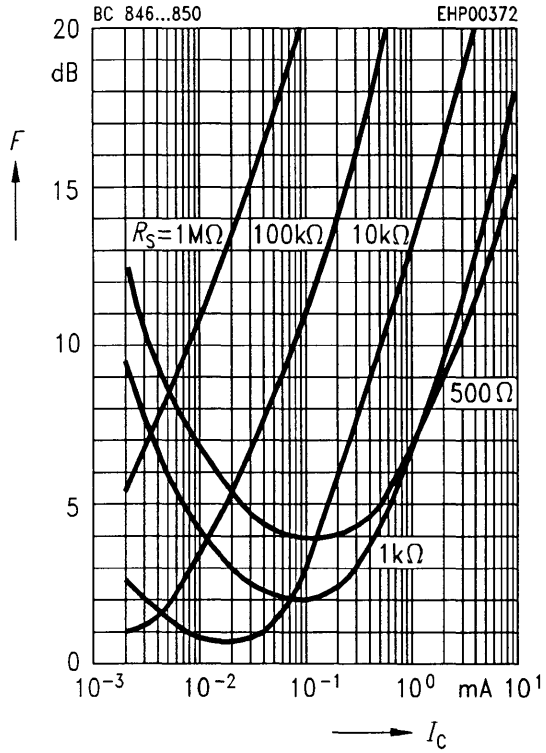
Noise figure $F = f(f)$

$I_C = 0.2\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_S = 2\text{ k}\Omega$



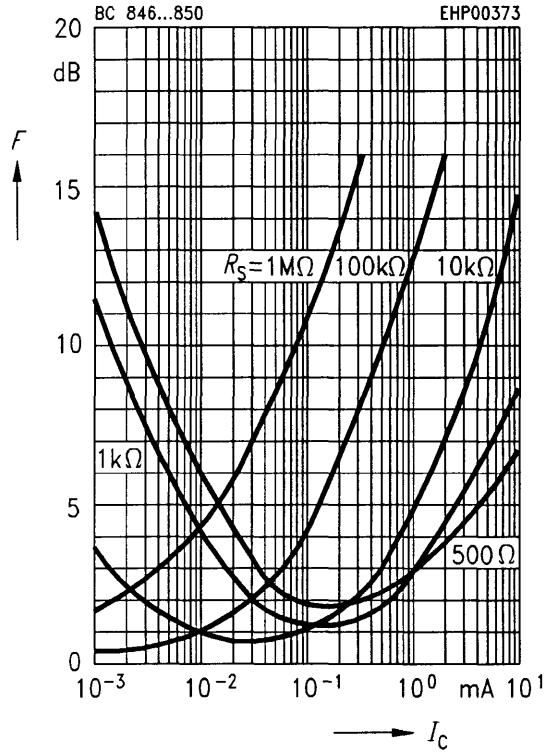
Noise figure $F = f(I_C)$

$V_{CE} = 5\text{ V}, f = 120\text{ Hz}$



Noise figure $F = f(I_C)$

$V_{CE} = 5\text{ V}, f = 1\text{ kHz}$



Noise figure $F = f(I_C)$

$V_{CE} = 5\text{ V}, f = 10\text{ kHz}$

