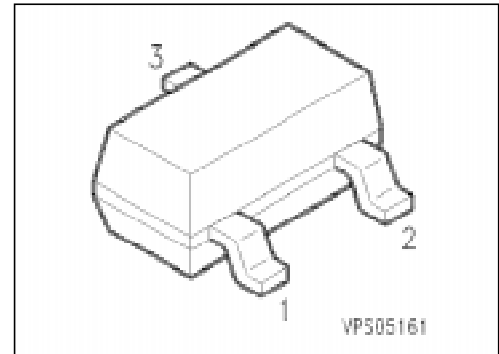


PNP Silicon AF Transistors

BCW 61
BCX 71

- 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: BCW 60, BCX 70 (NPN)



| Type | Marking | Ordering Code (tape and reel) | Pin Configuration | | | Package ¹⁾ |
|-----------|---------|----------------------------------|-------------------|---|---|-----------------------|
| | | | 1 | 2 | 3 | |
| BCW 61 A | BAs | Q62702-C452 | B | E | C | SOT-23 |
| BCW 61 B | BBs | Q62702-C1585 | | | | |
| BCW 61 C | BCs | Q62702-C1478 | | | | |
| BCW 61 D | BDs | Q62702-C1556 | | | | |
| BCW 61 FF | BFs | Q62702-C1890 | | | | |
| BCW 61 FN | BNs | Q62702-C1891 | | | | |
| BCX 71G | BGs | Q62702-C1482 | | | | |
| BCX 71H | BHs | Q62702-C1586 | | | | |
| BCX 71J | BJs | Q62702-C1554 | | | | |
| BCX 71 K | BKs | Q62702-C1654 | | | | |

¹⁾ For detailed information see chapter Package Outlines.

Maximum Ratings

| Parameter | Symbol | Values | | | Unit |
|---|-----------|----------------|-----------|--------|------|
| | | BCW 61 | BCW 61 FF | BCX 71 | |
| Collector-emitter voltage | V_{CE0} | 32 | 32 | 45 | V |
| Collector-base voltage | V_{CB0} | 32 | 32 | 45 | |
| Emitter-base voltage | V_{EB0} | 5 | | | |
| Collector current | I_C | 100 | | | mA |
| Peak collector current | I_{CM} | 200 | | | |
| Peak base current | I_{BM} | 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 $I_C = 10\text{ mA}$ BCW 61, BCW 61 FF BCX 71 | $V_{(BR)CE0}$ | 32 45 | — — | — — | V |
| Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$ BCW 61, BCW 61 FF BCX 71 | $V_{(BR)CB0}$ | 32 45 | — — | — — | |
| Emitter-base breakdown voltage $I_E = 1\text{ }\mu\text{A}$ | $V_{(BR)EB0}$ | 5 | — | — | |
| Collector cutoff current $V_{CB} = 32\text{ V}$ BCW 61, BCW 61 FF $V_{CB} = 45\text{ V}$ BCX 71 $V_{CB} = 32\text{ V}, T_A = 150\text{ °C}$ BCW 61, BCW 61 FF $V_{CB} = 45\text{ V}, T_A = 150\text{ °C}$ BCX 71 | I_{CB0} | — — — — | — — — — | 20 20 20 20 | nA nA μA μA |
| Emitter cutoff current $V_{EB} = 4\text{ V}$ | I_{EB0} | — | — | 20 | nA |
| DC current gain ¹⁾ $I_C = 10\text{ }\mu\text{A}, V_{CE} = 5\text{ V}$ BCW 61 A, BCX 71 G BCW 61 B, BCX 71 H BCW 61 FF, BCW 61 C, BCX 71 J BCW 61 FN, BCW 61 D, BCX 71 K $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}$ BCW 61 A, BCX 71 G BCW 61 B, BCX 71 H BCW 61 FF, BCW 61 C, BCX 71 J BCW 61 FN, BCW 61 D, BCX 71 K $I_C = 50\text{ mA}, V_{CE} = 1\text{ V}$ BCW 61 A, BCX 71 G BCW 61 B, BCX 71 H BCW 61 FF, BCW 61 C, BCX 71 J BCW 61 FN, BCW 61 D, BCX 71 K | h_{FE} | 20 30 40 100 120 180 250 380 60 80 100 110 | 140 200 300 460 170 250 350 500 — — — — | — — — — 220 310 460 630 — — — — | — |

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

Electrical Characteristics

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

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

DC characteristics

| | | | | | |
|--|--------------|------|------|------|---|
| Collector-emitter saturation voltage ¹⁾ $I_C = 10\text{ mA}$, $I_B = 0.25\text{ mA}$ $I_C = 50\text{ mA}$, $I_B = 1.25\text{ mA}$ | V_{CEsat} | – | 0.12 | 0.25 | V |
| | | – | 0.20 | 0.55 | |
| Base-emitter saturation voltage ¹⁾ $I_C = 10\text{ mA}$, $I_B = 0.25\text{ mA}$ $I_C = 50\text{ mA}$, $I_B = 1.25\text{ mA}$ | V_{BEsat} | – | 0.70 | 0.85 | |
| | | – | 0.83 | 1.05 | |
| Base-emitter voltage ¹⁾ $I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$ $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$ $I_C = 50\text{ mA}$, $V_{CE} = 1\text{ V}$ | $V_{BE(on)}$ | – | 0.52 | – | |
| | | 0.55 | 0.65 | 0.75 | |
| | | – | 0.78 | – | |

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 $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BCW 61 A, BCX 71 G BCW 61 B, BCX 71 H BCW 61 FF, BCW 61 C, BCX 71 J BCW 61 FN, BCW 61 D, BCX 71 K | h_{11e} | – | 2.7 | – | k Ω |
| | | – | 3.6 | – | |
| | | – | 4.5 | – | |
| | | – | 7.5 | – | |
| Open-circuit reverse voltage transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BCW 61 A, BCX 71 G BCW 61 B, BCX 71 H BCW 61 FF, BCW 61 C, BCX 71 J BCW 61 FN, BCW 61 D, BCX 71 K | h_{12e} | – | 1.5 | – | 10^{-4} |
| | | – | 2.0 | – | |
| | | – | 2.0 | – | |
| | | – | 3.0 | – | |

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

Electrical Characteristics

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

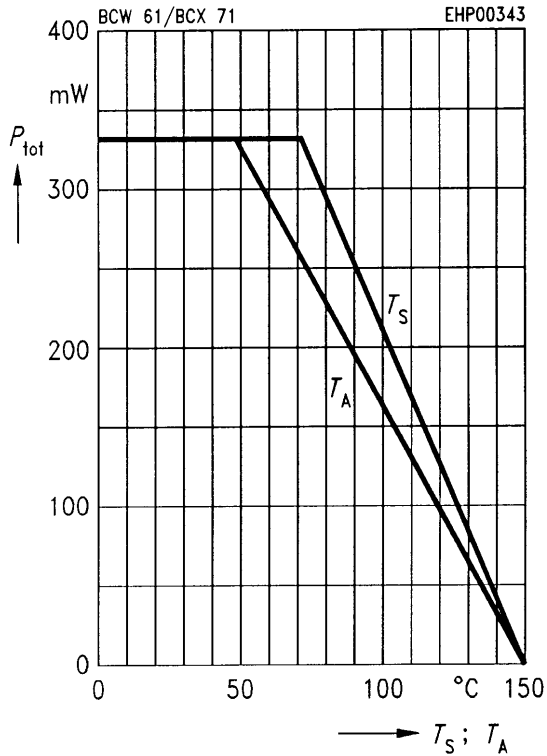
| Parameter | Symbol | Values | | | Unit |
|-----------|--------|--------|------|------|------|
| | | min. | typ. | max. | |

AC characteristics

| | | | | | |
|--|-----------|---|-----|------|---------------|
| Short-circuit forward current transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BCW 61 A, BCX 71 G BCW 61 B, BCX 71 H BCW 61 FF, BCW 61 C, BCX 71 J BCW 61 FN, BCW 61 D, BCX 71 K | h_{21e} | — | 200 | — | — |
| Open-circuit output admittance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BCW 61 A, BCX 71 G BCW 61 B, BCX 71 H BCW 61 FF, BCW 61 C, BCX 71 J BCW 61 FN, BCW 61 D, BCX 71 K | h_{22e} | — | 18 | — | μS |
| Noise figure $I_C = 0.2\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_S = 2\text{ k}\Omega$ $f = 1\text{ kHz}$, $\Delta f = 200\text{ Hz}$ BCW 61 A to BCX 71 K BCW 61 FF, BCW 61 FN | F | — | 2 | — | dB |
| Equivalent noise voltage $I_C = 0.2\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_S = 2\text{ k}\Omega$ $f = 10\text{ Hz} \dots 50\text{ Hz}$ BCW 61 FF, BCW 61 FN | V_n | — | — | 0.11 | μV |

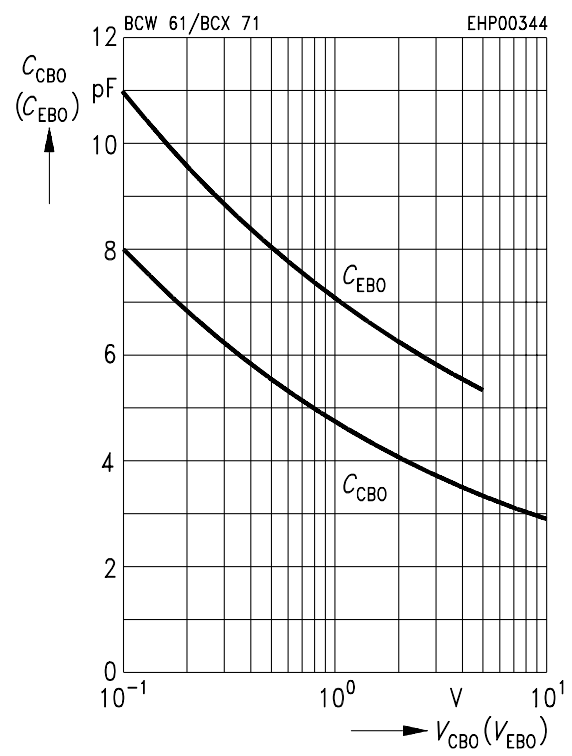
Total power dissipation $P_{tot} = f(T_A^*; T_S)$

* Package mounted on epoxy



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

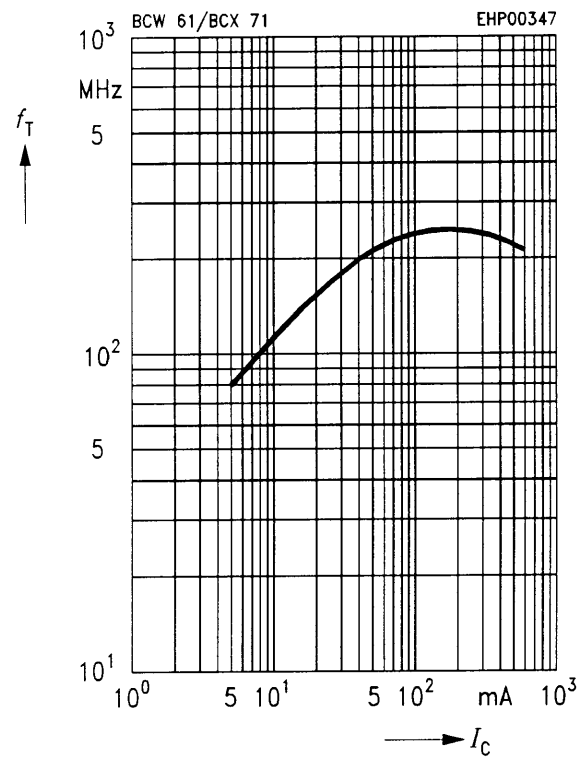
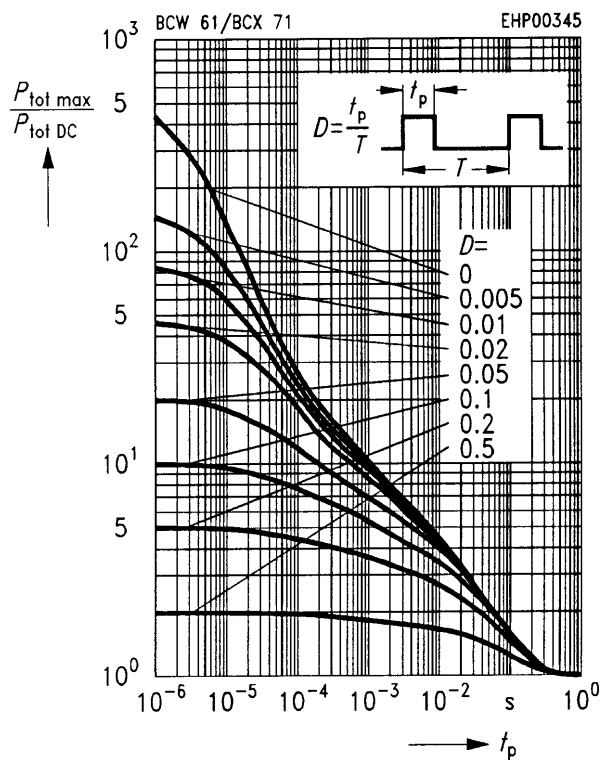
Emitter-base capacitance $C_{EB0} = f(V_{EB0})$



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

Transition frequency $f_T = f(I_C)$

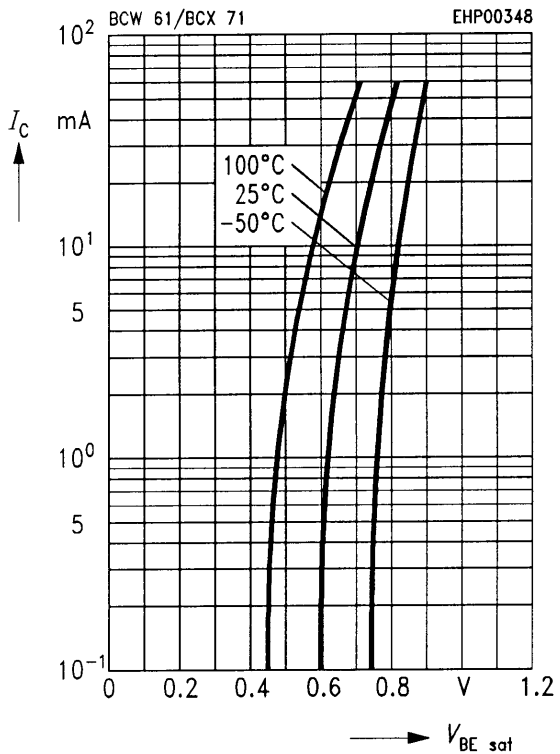
$V_{CE} = 5 V$



Base-emitter saturation voltage

$I_C = f(V_{BEsat})$

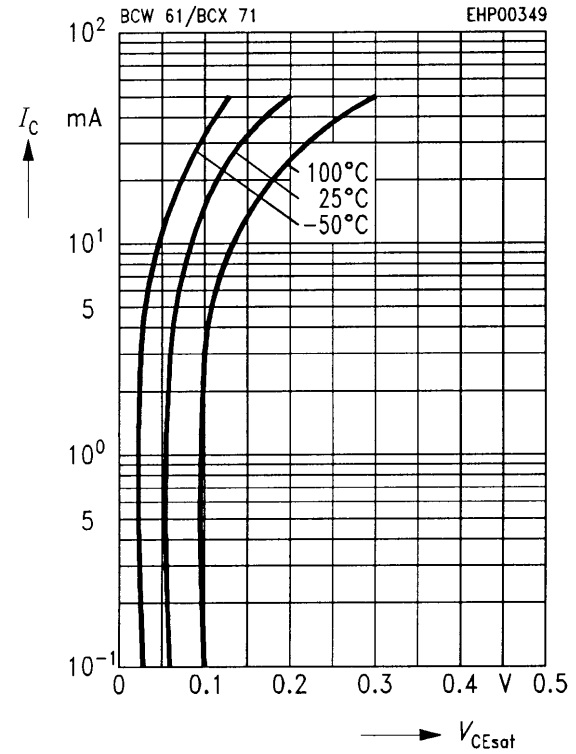
$h_{FE} = 40$



Collector-emitter saturation voltage

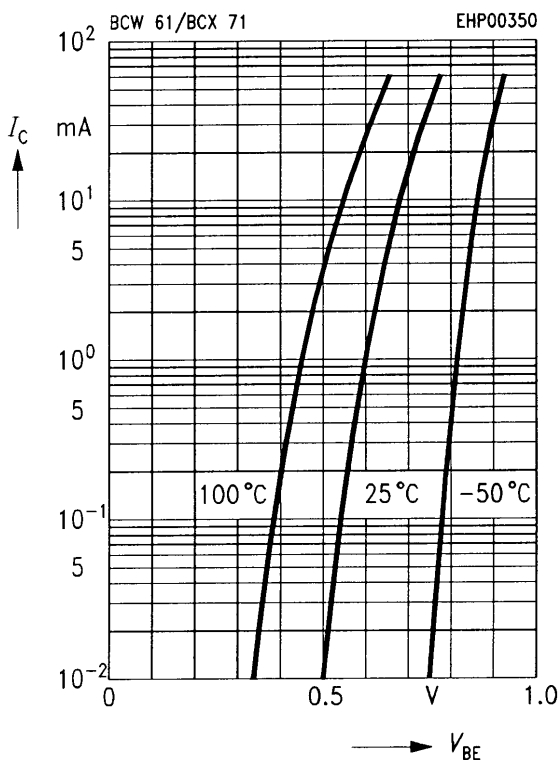
$I_C = f(V_{CEsat})$

$h_{FE} = 40$



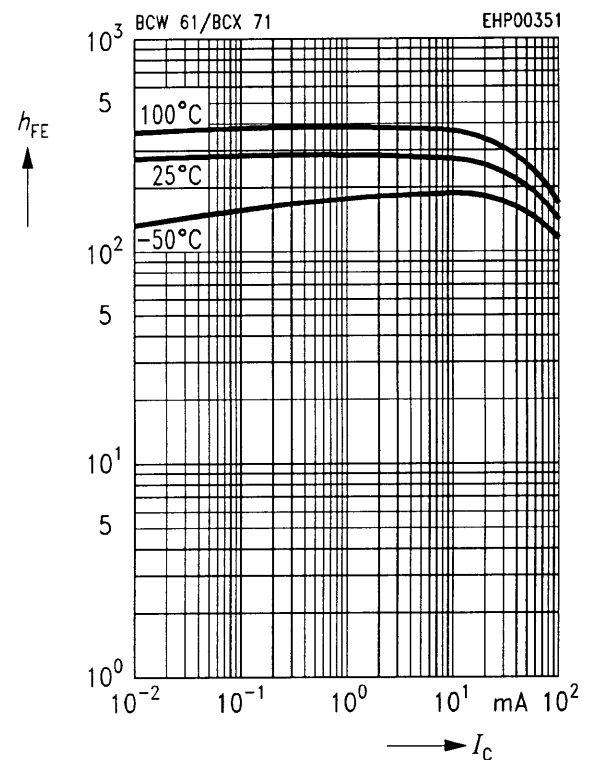
Collector current $I_C = f(V_{BE})$

$V_{CE} = 5 V$

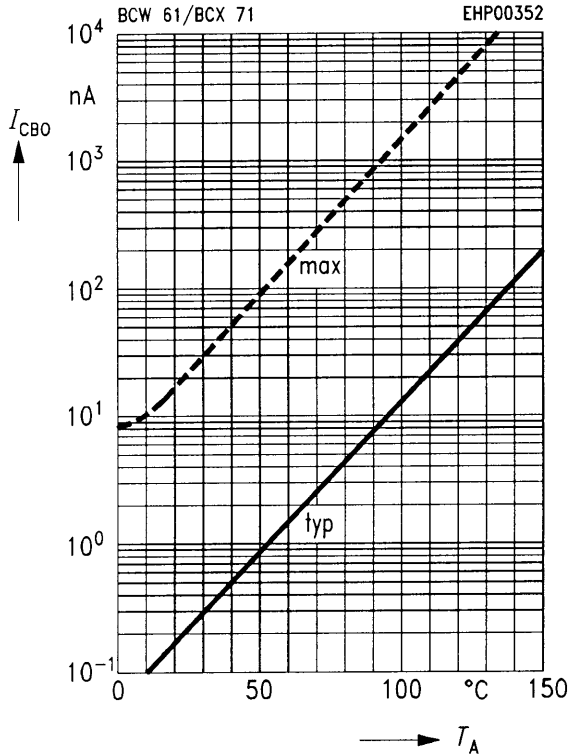


DC current gain $h_{FE} = f(I_C)$

$V_{CE} = 5 V$

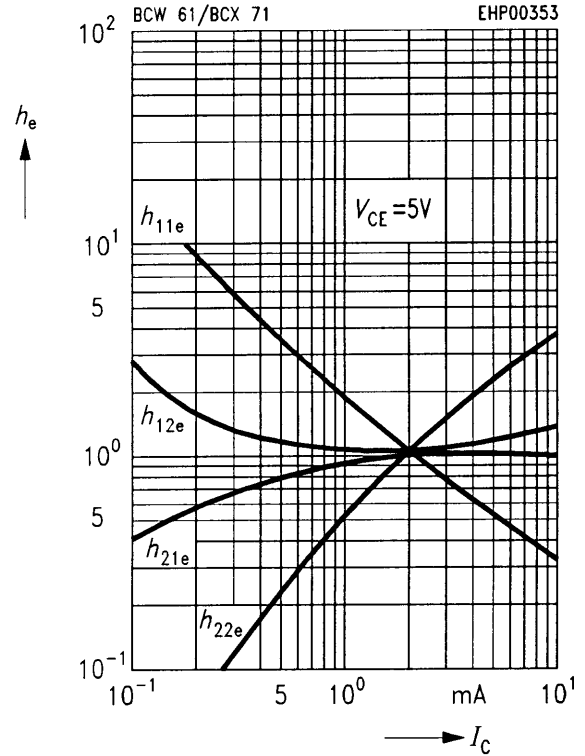


Collector cutoff current $I_{CB0} = f(T_A)$



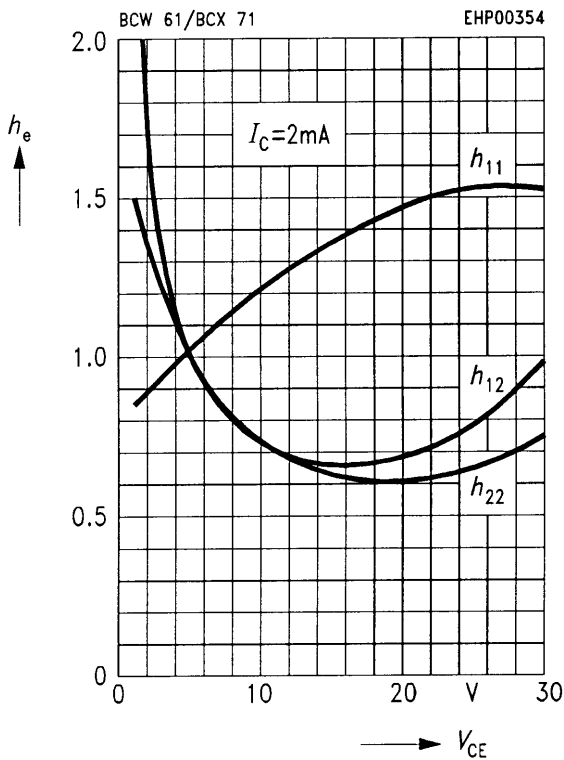
h parameter $h_e = f(I_C)$

$V_{CE} = 5 V$



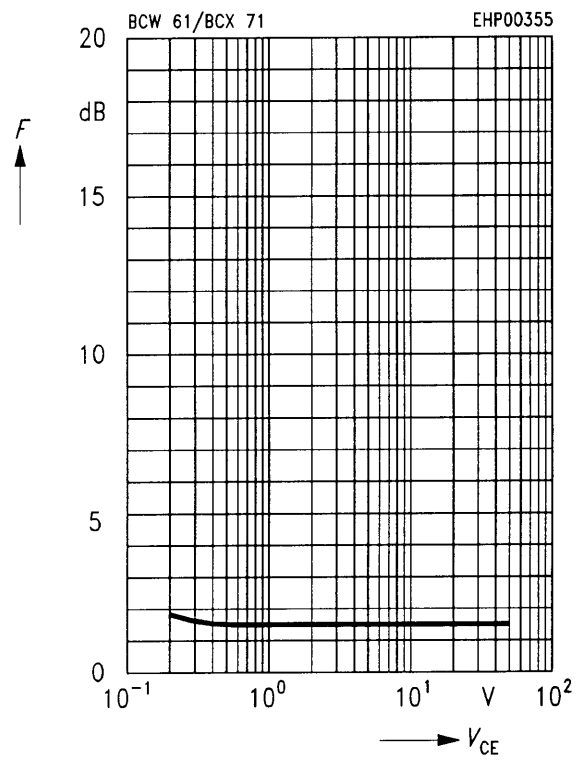
h parameter $h_e = f(V_{CE})$

$I_C = 2 mA$



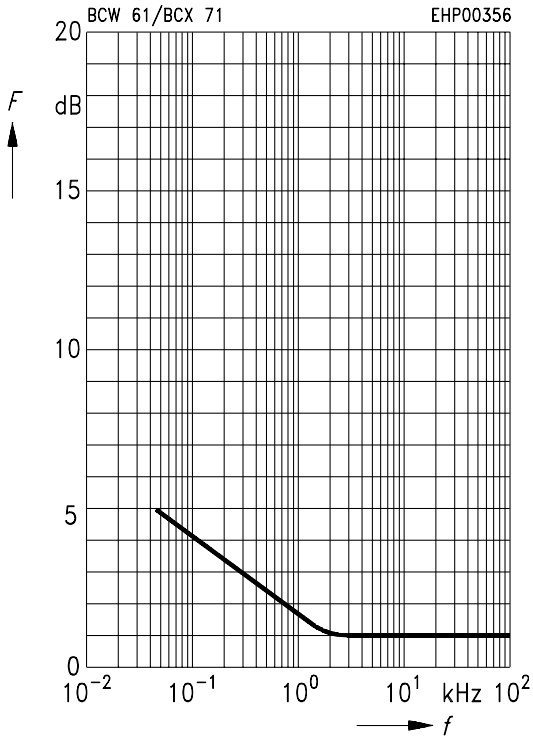
Noise figure $F = f(V_{CE})$

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



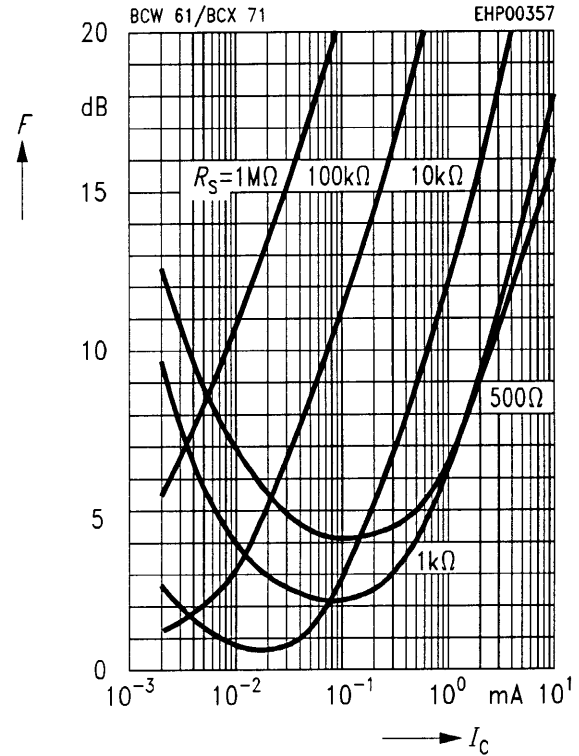
Noise figure $F = f(f)$

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



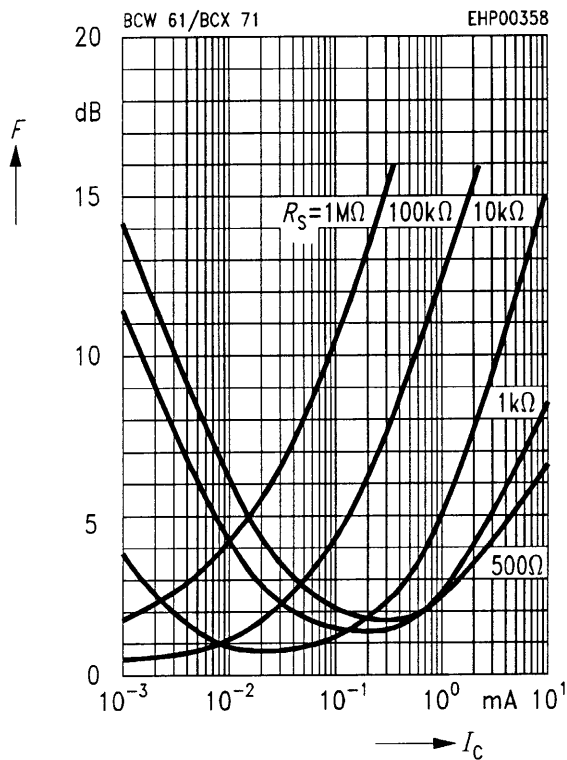
Noise figure $F = f(I_C)$

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



Noise figure $F = f(I_C)$

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



Noise figure $F = f(I_C)$

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

