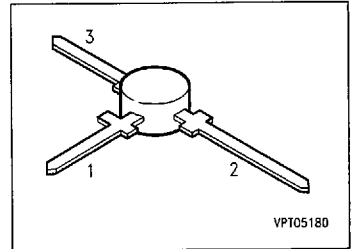


NPN Silicon RF Transistor

BFT 65

- For low-distortion broadband amplifiers up to 1 GHz at collector currents from 10 mA to 30 mA.



ESD: Electrostatic discharge sensitive device, observe handling precautions!

| Type | Marking | Ordering Code | Pin Configuration | | | Package ¹⁾ |
|--------|---------|---------------|-------------------|---|---|-----------------------|
| | | | 1 | 2 | 3 | |
| BFT 65 | BFT 65 | Q62702-F451 | E | C | B | T-plast |

Maximum Ratings

| Parameter | Symbol | Values | Unit |
|---|-----------|----------------|------|
| Collector-emitter voltage | V_{CE0} | 15 | V |
| Collector-emitter voltage, $V_{BE} = 0$ | V_{CES} | 20 | |
| Emitter-base voltage | V_{EB0} | 2.5 | |
| Collector current | I_C | 50 | mA |
| Base current | I_B | 10 | |
| Total power dissipation, $T_S \leq 94^\circ\text{C}^{3)}$ | P_{tot} | 400 | mW |
| Junction temperature | T_J | 150 | °C |
| Ambient temperature range | T_A | - 65 ... + 150 | |
| Storage temperature range | T_{stg} | - 65 ... + 150 | |

Thermal Resistance

| | | | |
|--|-------------|-------|-----|
| Junction - ambient ²⁾ | $R_{th JA}$ | ≤ 220 | K/W |
| Junction - soldering point ³⁾ | $R_{th JS}$ | ≤ 140 | |

1) For detailed information see chapter Package Outlines.

2) Package mounted on alumina 15 mm × 16.7 mm × 0.7 mm.

3) T_S is measured on the collector lead at the soldering point to the pcb.

Electrical Characteristicsat $T_A = 25^\circ\text{C}$, unless otherwise specified.

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

DC Characteristics

| | | | | | |
|---|---------------|----------|--------|--------|---------------|
| Collector-emitter breakdown voltage $I_C = 1\text{ mA}, I_B = 0$ | $V_{(BR)CEO}$ | 15 | — | — | V |
| Collector-emitter cutoff current $V_{CE} = 20\text{ V}, V_{BE} = 0$ | I_{CES} | — | — | 10 | μA |
| Collector-base cutoff current $V_{CB} = 10\text{ V}, I_E = 0$ | I_{CBO} | — | — | 50 | nA |
| Emitter-base cutoff current $V_{EB} = 2.5\text{ V}, I_C = 0$ | I_{EBO} | — | — | 100 | μA |
| DC current gain $I_C = 25\text{ mA}, V_{CE} = 8\text{ V}$ $I_C = 50\text{ mA}, V_{CE} = 5\text{ V}$ | h_{FE} | 30 30 | — — | — — | — |

Electrical Characteristicsat $T_A = 25^\circ\text{C}$, unless otherwise specified.

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

AC Characteristics

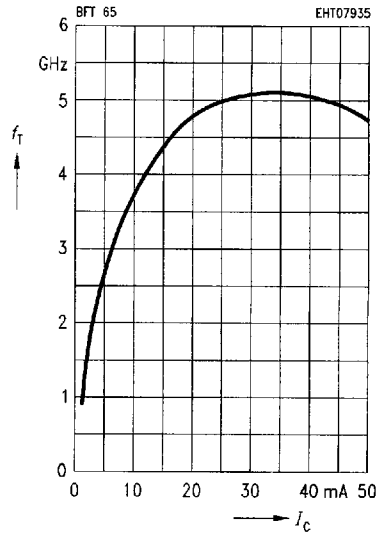
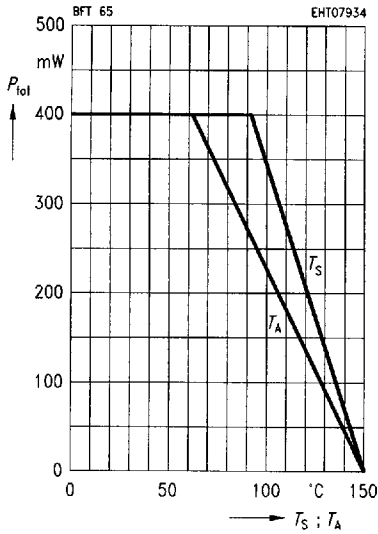
| | | | | | |
|--|-------------------|---|------|---|-----|
| Transition frequency $I_C = 25\text{ mA}$, $V_{CE} = 8\text{ V}$, $f = 200\text{ MHz}$ | f_T | – | 5 | – | GHz |
| Collector-base capacitance $V_{CB} = 10\text{ V}$, $V_{BE} = v_{be} = 0$, $f = 1\text{ MHz}$ | C_{cb} | – | 0.53 | – | pF |
| Collector-emitter capacitance $V_{CE} = 10\text{ V}$, $V_{BE} = v_{be} = 0$, $f = 1\text{ MHz}$ | C_{ce} | – | 0.3 | – | |
| Output capacitance $V_{CE} = 10\text{ V}$, $V_{BE} = v_{be} = 0$, $f = 1\text{ MHz}$ | C_{obs} | – | 0.85 | – | |
| Noise figure $I_C = 10\text{ mA}$, $V_{CE} = 8\text{ V}$, $f = 800\text{ MHz}$, $Z_S = 60\ \Omega$ | F | – | 2.8 | – | dB |
| Power gain $I_C = 25\text{ mA}$, $V_{CE} = 8\text{ V}$, $f = 800\text{ MHz}$, $Z_S = 60\ \Omega$, $Z_L = Z_{Lopt}$ | G_{pe} | – | 12 | – | |
| Transducer gain $I_C = 25\text{ mA}$, $V_{CE} = 8\text{ V}$, $f = 500\text{ MHz}$, $Z_0 = 50\ \Omega$ | $ S_{21e} ^2$ | – | 16 | – | |
| Linear output voltage two-tone intermodulation test $I_C = 25\text{ mA}$, $V_{CE} = 8\text{ V}$, $d_{im} = 60\text{ dB}$ $f_1 = 806\text{ MHz}$, $f_2 = 810\text{ MHz}$, $Z_S = Z_L = 50\ \Omega$ | $V_{O1} = V_{O2}$ | – | 240 | – | mV |
| Third order intercept point $I_C = 25\text{ mA}$, $V_{CE} = 8\text{ V}$, $f = 800\text{ MHz}$ | IP_3 | – | 30.5 | – | dBm |

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

*Package mounted on alumina

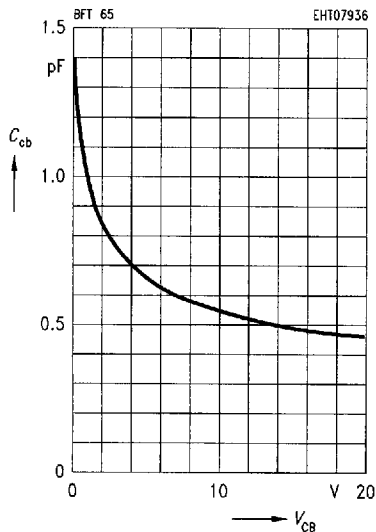
Transition frequency $f_T = f(I_C)$

$V_{CE} = 5\text{ V}, f = 200\text{ MHz}$



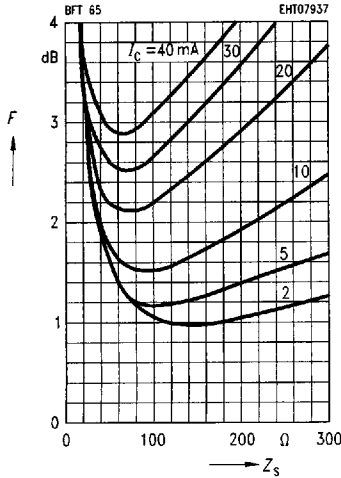
Collector-base capacitance $C_{cb} = f(V_{CB})$

$V_{BE} = v_{be} = 0, f = 1\text{ MHz}$



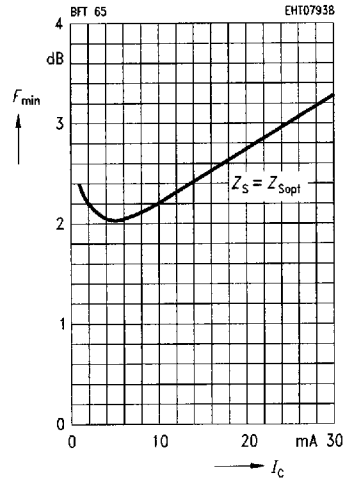
Noise figure $F = f(Z_s)$

$V_{CE} = 8 \text{ V}$, $f = 10 \text{ MHz}$



Noise figure $F_{min} = f(I_c)$

$V_{CE} = 8 \text{ V}$, $f = 800 \text{ MHz}$, $Z_{Lopt}(G)$



Common Emitter S Parameters

| f | S_{11} | | S_{21} | | S_{12} | | S_{22} | |
|-----|----------|-----|----------|-----|----------|-----|----------|-----|
| | MAG | ANG | MAG | ANG | MAG | ANG | MAG | ANG |

$I_C = 25 \text{ mA}$, $V_{CE} = 8 \text{ V}$, $Z_0 = 50 \Omega$

| | | | | | | | | |
|-----|-------|------|--------|-----|-------|----|-------|-----|
| 0.1 | 0.347 | -101 | 25.813 | 122 | 0.017 | 64 | 0.668 | -27 |
| 0.2 | 0.330 | -140 | 15.191 | 103 | 0.027 | 64 | 0.453 | -25 |
| 0.3 | 0.323 | -159 | 10.430 | 98 | 0.038 | 68 | 0.361 | -31 |
| 0.4 | 0.341 | -169 | 7.915 | 89 | 0.047 | 72 | 0.411 | -35 |
| 0.5 | 0.343 | -174 | 6.311 | 85 | 0.058 | 72 | 0.441 | -23 |
| 0.6 | 0.347 | 179 | 5.236 | 80 | 0.068 | 71 | 0.340 | -19 |
| 0.7 | 0.347 | 174 | 4.604 | 76 | 0.081 | 72 | 0.346 | -35 |
| 0.8 | 0.351 | 168 | 3.994 | 74 | 0.093 | 71 | 0.403 | -34 |
| 0.9 | 0.392 | 169 | 3.629 | 71 | 0.099 | 73 | 0.362 | -28 |
| 1.0 | 0.386 | 168 | 3.254 | 67 | 0.109 | 72 | 0.340 | -36 |
| 1.1 | 0.377 | 161 | 2.969 | 64 | 0.118 | 71 | 0.355 | -37 |
| 1.2 | 0.410 | 157 | 2.125 | 61 | 0.127 | 70 | 0.332 | -41 |
| 1.3 | 0.415 | 156 | 2.538 | 59 | 0.133 | 70 | 0.346 | -43 |
| 1.4 | 0.438 | 152 | 2.383 | 57 | 0.151 | 70 | 0.327 | -46 |
| 1.5 | 0.439 | 153 | 2.212 | 54 | 0.157 | 69 | 0.345 | -49 |
| 1.6 | 0.458 | 150 | 2.083 | 51 | 0.163 | 69 | 0.326 | -48 |
| 1.7 | 0.461 | 149 | 1.963 | 49 | 0.175 | 68 | 0.312 | -51 |
| 1.8 | 0.492 | 146 | 1.832 | 47 | 0.162 | 68 | 0.284 | -57 |
| 1.9 | 0.502 | 147 | 1.749 | 44 | 0.191 | 66 | 0.317 | -64 |
| 2.0 | 0.503 | 146 | 1.683 | 41 | 0.202 | 65 | 0.295 | -61 |