# SIEMENS
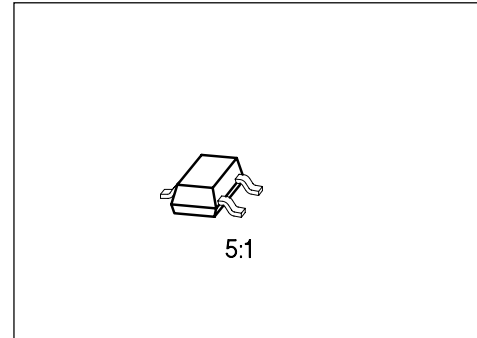
## NPN Silicon RF Transistor                                           BF 599

● Common emitter IF/RF amplifier

● Low feedback capacitance
  due to shield diffusion

5:1

| Type | Marking | Ordering Code (tape and reel) | Pin Configuration | | | Package[1] |
|------|---------|-------------------------------|-----|-----|-----|-----------|
| | | | 1 | 2 | 3 | |
| BF 599 | NB | Q62702-F979 | B | E | C | SOT-23 |

## Maximum Ratings

| Parameter | Symbol | Values | Unit |
|-----------|--------|--------|------|
| Collector-emitter voltage | $V_{CE0}$ | 25 | V |
| Collector-base voltage | $V_{CB0}$ | 40 | |
| Emitter-base voltage | $V_{EB0}$ | 4 | |
| Collector current | $I_C$ | 25 | mA |
| Base current | $I_B$ | 5 | |
| Total power dissipation, $T_A \leq 25\ °C$ | $P_{tot}$ | 280 | mW |
| Junction temperature | $T_j$ | 150 | °C |
| Storage temperature range | $T_{stg}$ | $-65 \ldots +150$ | |

## Thermal Resistance

| | | | |
|-----------|--------|--------|------|
| Junction - ambient[2] | $R_{th\ JA}$ | $\leq 450$ | K/W |

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[1] For detailed information see chapter Package Outlines.
[2] Package mounted on alumina 15 mm $\times$ 16.7 mm $\times$ 0.7 mm.

## Electrical Characteristics

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

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

**DC Characteristics**

| Parameter | Symbol | min. | typ. | max. | Unit |
|---|---|---|---|---|---|
| Collector-emitter breakdown voltage $I_C = 1$ mA, $I_B = 0$ | $V_{(BR)\ CE0}$ | 25 | – | – | V |
| Collector cutoff current $V_{CB} = 20$ V, $I_E = 0$ | $I_{CB0}$ | – | – | 100 | nA |
| DC current gain $I_C = 7$ mA, $V_{CE} = 10$ V | $h_{FE}$ | 38 | 70 | – | – |
| Collector-emitter saturation voltage $I_C = 10$ mA, $I_B = 1$ mA | $V_{CE\ sat}$ | – | 0.15 | – | V |
| Base-emitter voltage $I_C = 7$ mA, $V_{CE} = 10$ V | $V_{BE}$ | – | 0.78 | – | |

**AC Characteristics**

| Parameter | Symbol | min. | typ. | max. | Unit |
|---|---|---|---|---|---|
| Transition frequency $I_C = 5$ mA, $V_{CE} = 10$ V, $f = 100$ MHz | $f_T$ | – | 550 | – | MHz |
| Collector-base capacitance $V_{CB} = 10$ V, $V_{BE} = 0$ V, $f = 1$ MHz | $C_{cb}$ | – | 0.35 | – | pF |
| Collector-emitter capacitance $V_{CE} = 10$ V, $V_{BE} = 0$ V, $f = 1$ MHz | $C_{ce}$ | – | 0.68 | – | |
| Optimum power gain $I_C = 7$ mA, $V_{CE} = 10$ V, $f = 35$ MHz | $G_{pe\ opt}$ | – | 43 | – | dB |
| Forward transfer admittance $I_C = 7$ mA, $V_{CE} = 10$ V, $f = 35$ MHz | $|\,y_{21e}\,|$ | – | 175 | – | mS |

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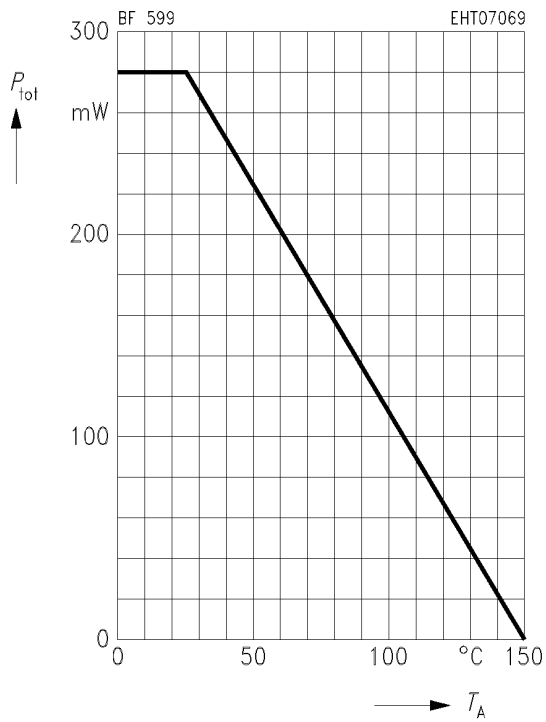


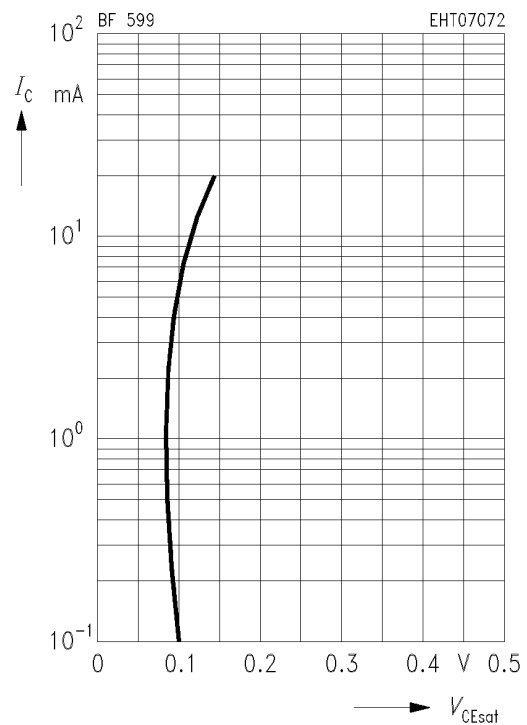## DC current gain $h_{FE} = f(I_C)$
$V_{CE} = 10$ V
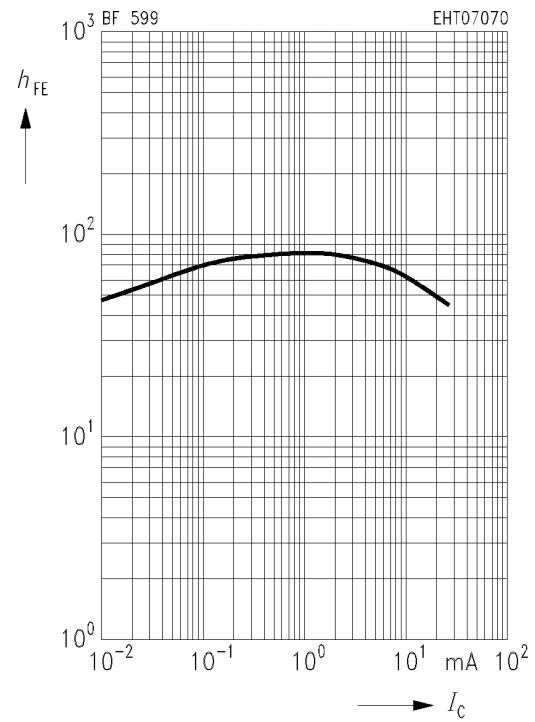


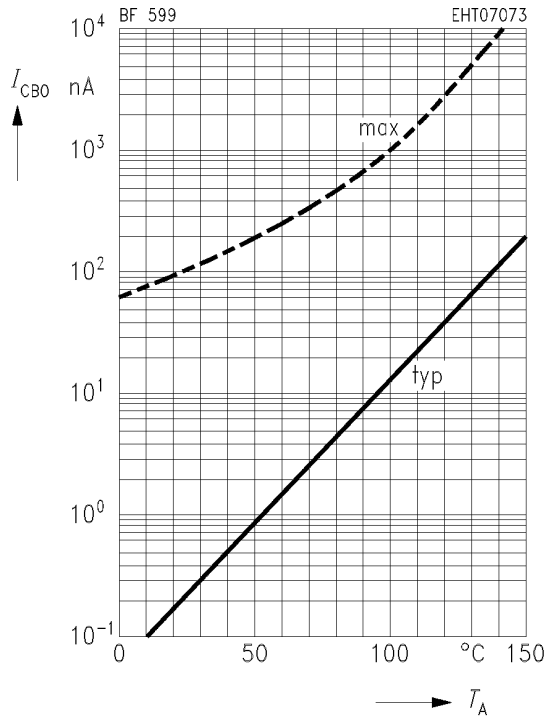## Collector current $I_C = f(V_{BE})$
$V_{CE} = 10$ V
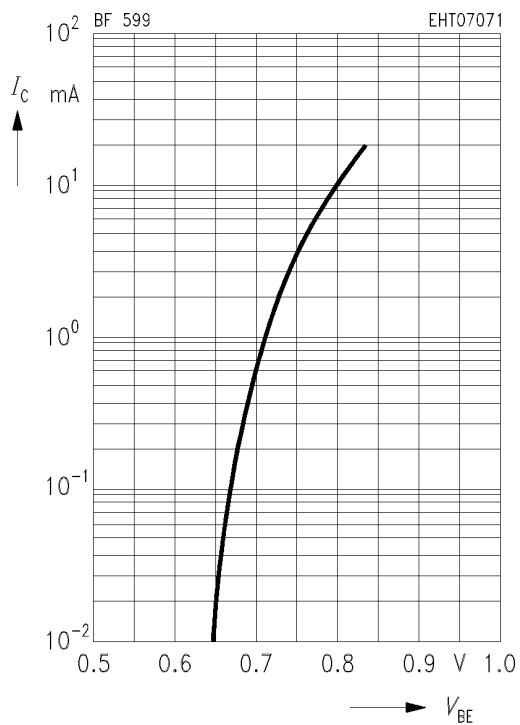


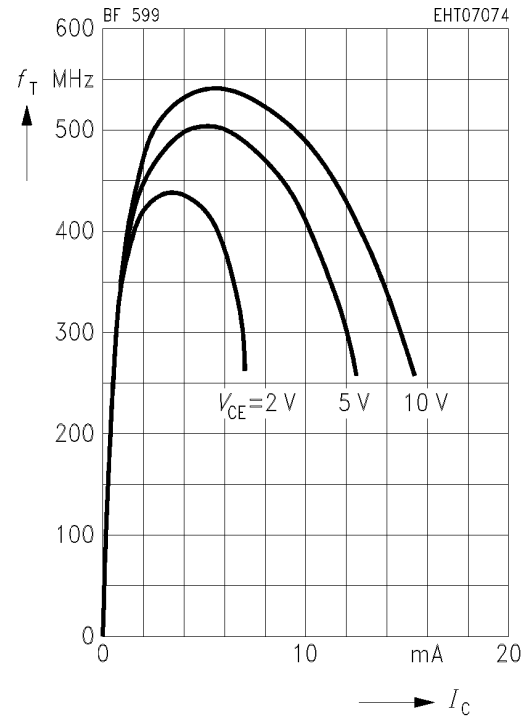## Collector-emitter saturation voltage
$I_C = f(V_{CEsat})$
$h_{FE} = 10$

**Collector cutoff current $I_{CB0} = f(T_A)$**
$V_{CB} = 20$ V



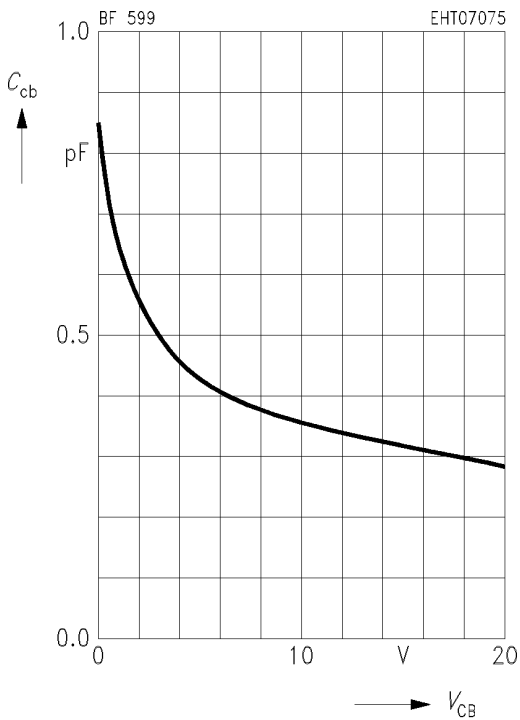**Transition frequency $f_T = f(I_C)$**
$f = 100$ MHz



**Collector-base capacitance $C_{cb} = f(V_{CB})$**
$f = 1$ MHz



**Forward transfer admittance $|y_{21e}| = f(I_C)$**