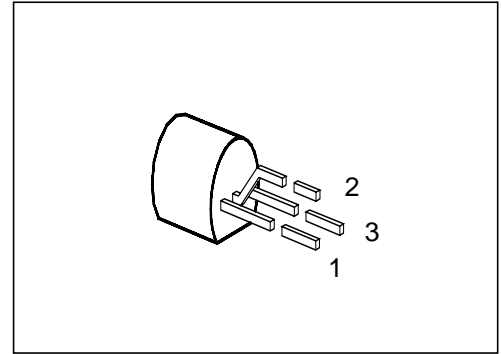


PNP Silicon AF Transistors

BCX 78
BCX 79

- High current gain
- Low collector-emitter saturation voltage
- Low noise at 1 kHz
- Low noise at low frequencies
- Complementary types: BCX 58, BCX 59 (NPN)



| Type | Marking | Ordering Code | Pin Configuration | | | Package ¹⁾ |
|-------------|---------|---------------|-------------------|---|---|-----------------------|
| | | | 1 | 2 | 3 | |
| BCX 78 | — | Q62702-C717 | C | B | E | TO-92 |
| BCX 78-VII | | Q62702-C626 | | | | |
| BCX 78-VIII | | Q62702-C627 | | | | |
| BCX 78-IX | | Q62702-C628 | | | | |
| BCX 78-X | | Q62702-C629 | | | | |
| BCX 79 | | Q62702-C718 | | | | |
| BCX 79-VII | | Q62702-C630 | | | | |
| BCX 79-VIII | | Q62702-C631 | | | | |
| BCX 79-IX | | Q62702-C632 | | | | |
| BCX 79-X | | Q62702-C633 | | | | |

¹⁾ For detailed information see chapter Package Outlines.

Maximum Ratings

| Parameter | Symbol | Values | | Unit |
|---|-----------|----------------|--------|------|
| | | BCX 78 | BCX 79 | |
| Collector-emitter voltage | V_{CE0} | 32 | 45 | V |
| Collector-base voltage | V_{CB0} | 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, $T_C = 70\text{ °C}$ | P_{tot} | 500 | | mW |
| Junction temperature | T_j | 150 | | °C |
| Storage temperature range | T_{stg} | - 65 ... + 150 | | |

Thermal Resistance

| | | | |
|-------------------------------|-------------|-------|-----|
| Junction - ambient | $R_{th JA}$ | ≤ 250 | K/W |
| Junction - case ¹⁾ | $R_{th JC}$ | ≤ 160 | |

¹⁾ Mounted on Al heat sink 15 mm × 25 mm × 0.5 mm.

Electrical Characteristics

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

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

DC characteristics

| | | | | | |
|--|---------------|--------------------------|--------------------------|--------------------------|--|
| Collector-emitter breakdown voltage $I_C = 2\text{ mA}$ | $V_{(BR)CE0}$ | 32 45 | – – | – – | V |
| Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$ | $V_{(BR)CB0}$ | 32 45 | – – | – – | |
| Emitter-base breakdown voltage $I_E = 1\text{ }\mu\text{A}$ | $V_{(BR)EB0}$ | 5 | – | – | |
| Collector cutoff current $V_{CB} = 32\text{ V}$ $V_{CB} = 45\text{ V}$ $V_{CB} = 32\text{ V}, T_A = 150\text{ }^\circ\text{C}$ $V_{CB} = 45\text{ V}, T_A = 150\text{ }^\circ\text{C}$ | I_{CB0} | – – – – | – – – – | 20 20 10 10 | nA nA μA μA |
| Collector cutoff current $V_{CB} = 32\text{ V}, V_{BE} = 0.2\text{ V}, T_A = 100\text{ }^\circ\text{C}$ $V_{CB} = 45\text{ V}, V_{BE} = 0.2\text{ V}, T_A = 100\text{ }^\circ\text{C}$ | I_{CE0} | – – | – – | 20 20 | μA |
| Emitter cutoff current $V_{EB} = 4\text{ V}$ | I_{EB0} | – | – | 20 | nA |
| DC current gain $I_C = 10\text{ }\mu\text{A}, V_{CE} = 5\text{ V}$ | h_{FE} | 20 30 40 100 | 140 200 270 340 | – – – – | – |
| $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}$ | | 120 180 250 380 | 170 250 350 500 | 220 310 460 630 | |
| $I_C = 100\text{ mA}, V_{CE} = 1\text{ V}^{1)}$ | | 40 45 60 60 | – – – – | – – – – | |

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

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⁾ $I_C = 100\text{ mA}, I_B = 2.5\text{ mA}$ | V_{CEsat} | – | – | 0.6 | V |
| Base-emitter saturation voltage ¹⁾ $I_C = 100\text{ mA}, I_B = 2.5\text{ mA}$ | V_{BEsat} | – | – | 1.0 | |
| Base-emitter voltage $I_C = 10\text{ }\mu\text{A}, V_{CE} = 5\text{ V}$ $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}$ $I_C = 100\text{ mA}, V_{CE} = 1\text{ V}$ ¹⁾ | $V_{BE(on)}$ | – 0.55 – | 0.52 0.65 0.93 | – 0.75 – | |

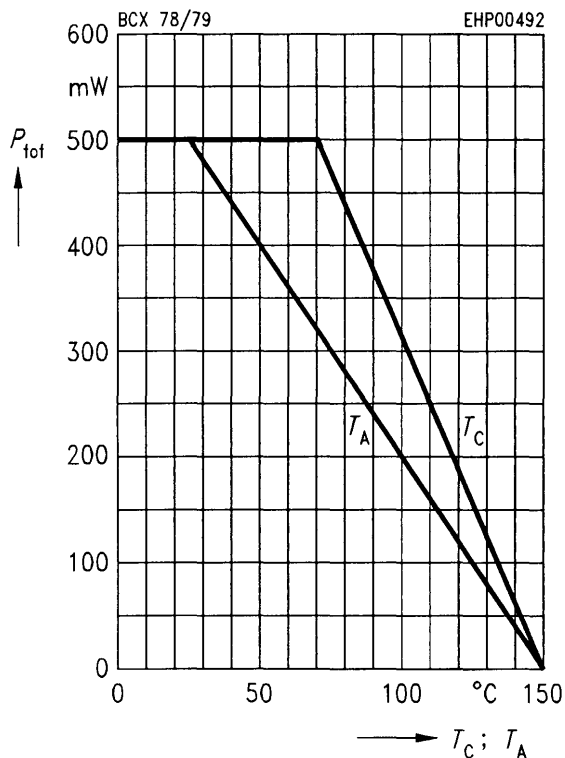
¹⁾ Pulse test: $t \leq 300\text{ }\mu\text{s}, D \leq 2\%$.

Electrical Characteristics

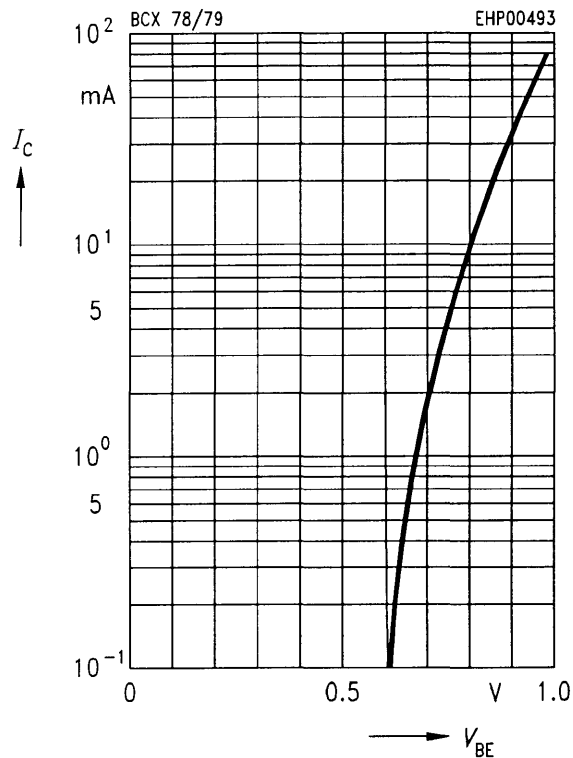
 at $T_A = 25\text{ }^\circ\text{C}$, unless otherwise specified.

| 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 $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$ | C_{ibo} | – | 10 | – | |
| Short-circuit input impedance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BCX 78 VII, BCX 79 VII BCX 78 VIII, BCX 79 VIII BCX 78 IX, BCX 79 IX BCX 78 X, BCX 79 X | h_{11e} | – | 2.7 3.6 4.5 7.5 | – | k Ω |
| Open-circuit reverse voltage transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BCX 78 VII, BCX 79 VII BCX 78 VIII, BCX 79 VIII BCX 78 IX, BCX 79 IX BCX 78 X, BCX 79 X | h_{12e} | – | 1.5 2 2 3 | – | 10^{-4} |
| Short-circuit forward current transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BCX 78 VII, BCX 79 VII BCX 78 VIII, BCX 79 VIII BCX 78 IX, BCX 79 IX BCX 78 X, BCX 79 X | h_{21e} | – | 200 260 330 520 | – | – |
| Open-circuit output admittance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BCX 78 VII, BCX 79 VII BCX 78 VIII, BCX 79 VIII BCX 78 IX, BCX 79 IX BCX 78 X, BCX 79 X | h_{22e} | – | 18 24 30 50 | – | μS |
| Noise figure $I_C = 0.2\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_S = 2\text{ k}\Omega$ $f = 1\text{ kHz}$, $\Delta f = 200\text{ Hz}$ | F | – | 2 | – | dB |

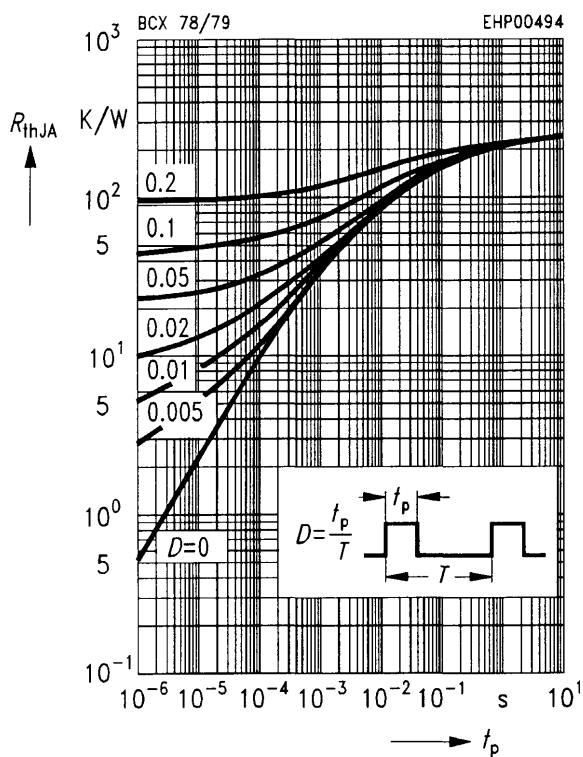
Total power dissipation $P_{tot} = f(T_A; T_C)$



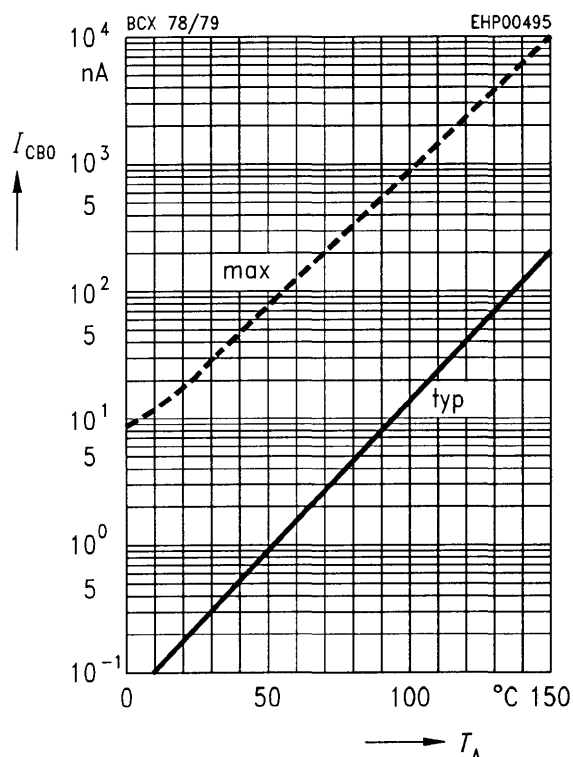
Collector current $I_C = f(V_{BE})$
 $V_{CE} = 5 V$



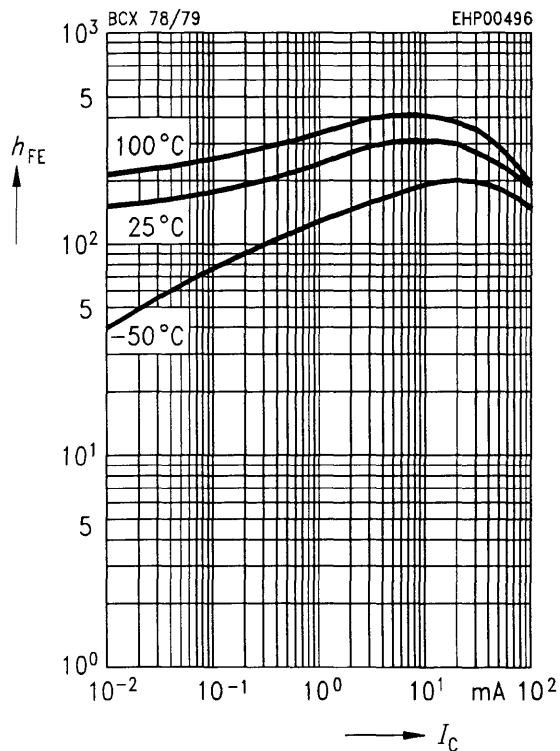
Permissible pulse load $R_{thJA} = f(t_p)$



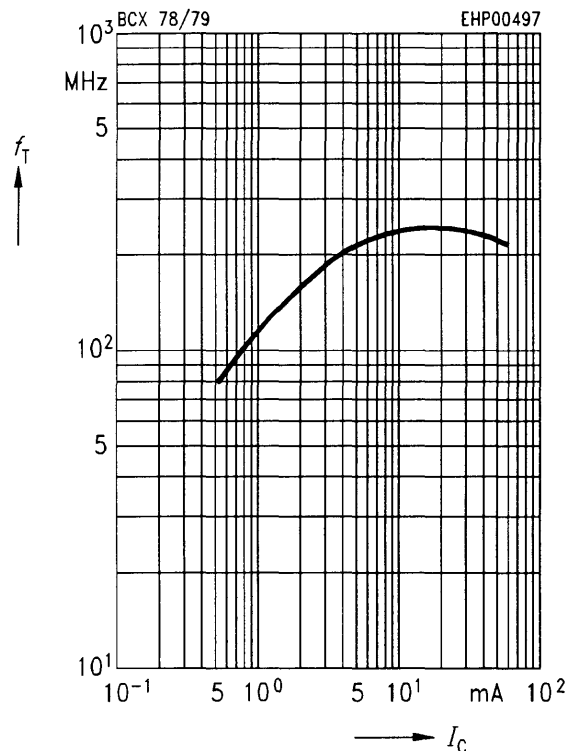
Collector cutoff current $I_{CB0} = f(T_A)$
for max. permissible reverse voltage



DC current gain $h_{FE} = f(I_C)$
 $V_{CE} = 5\text{ V}$ (common emitter configuration)

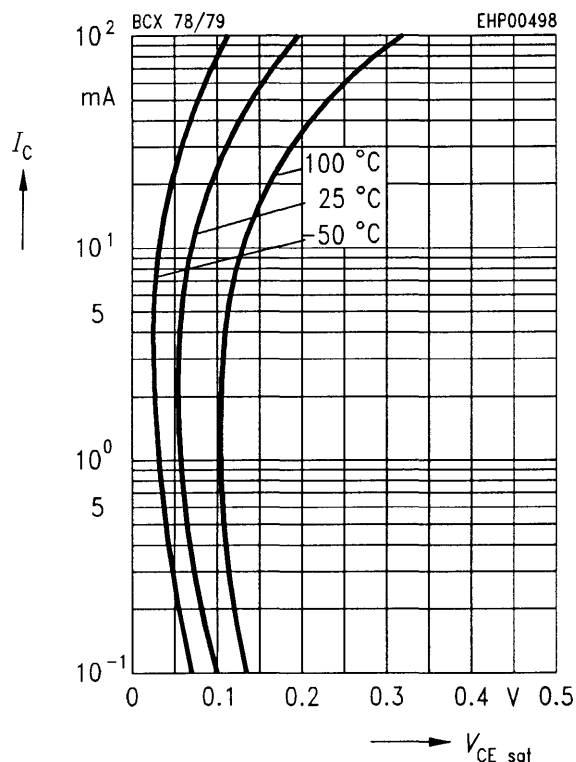


Transition frequency $f_T = f(I_C)$
 $V_{CE} = 5\text{ V}$



Collector-emitter saturation voltage

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



Base-emitter saturation voltage

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

