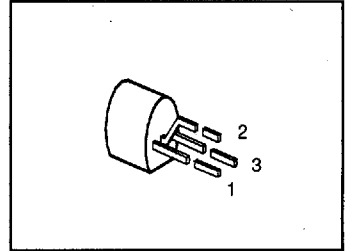


PNP Silicon AF Transistors

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 $I_C = 2\text{ mA}$ | $V_{(BR)CEO}$ | 32 45 | — — | — — | V |
| Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$ | $V_{(BR)CBO}$ | 32 45 | — — | — — | |
| Emitter-base breakdown voltage $I_E = 1\text{ }\mu\text{A}$ | $V_{(BR)EBO}$ | 5 | — | — | |
| Collector cutoff current $V_{CB} = 32\text{ V}$ | I_{CBO} | — | — | 20 | nA |
| $V_{CB} = 45\text{ V}$ | | — | — | 20 | nA |
| $V_{CB} = 32\text{ V}, T_A = 150\text{ }^\circ\text{C}$ | | — | — | 10 | μA |
| $V_{CB} = 45\text{ V}, T_A = 150\text{ }^\circ\text{C}$ | | — | — | 10 | μA |
| Collector cutoff current $V_{CB} = 32\text{ V}, V_{BE} = 0.2\text{ V}, T_A = 100\text{ }^\circ\text{C}$ | I_{CEO} | — | — | 20 | μA |
| $V_{CB} = 45\text{ V}, V_{BE} = 0.2\text{ V}, T_A = 100\text{ }^\circ\text{C}$ | | — | — | 20 | |
| Emitter cutoff current $V_{EB} = 4\text{ V}$ | I_{EBO} | — | — | 20 | nA |
| DC current gain $I_C = 10\text{ }\mu\text{A}, V_{CE} = 5\text{ V}$ | h_{FE} | BCX 78 VII, BCX 79 VII | 20 | 140 | — |
| | | BCX 78 VIII, BCX 79 VIII | 30 | 200 | — |
| | | BCX 78 IX, BCX 79 IX | 40 | 270 | — |
| | | BCX 78 X, BCX 79 X | 100 | 340 | — |
| $I_C = 2\text{ mA}, V_{CE} = 5\text{ V}$ | | BCX 78 VII, BCX 79 VII | 120 | 170 | 220 |
| | | BCX 78 VIII, BCX 79 VIII | 180 | 250 | 310 |
| | | BCX 78 IX, BCX 79 IX | 250 | 350 | 460 |
| | | BCX 78 X, BCX 79 X | 380 | 500 | 630 |
| $I_C = 100\text{ mA}, V_{CE} = 1\text{ V}^1)$ | | BCX 78 VII, BCX 79 VII | 40 | — | — |
| | | BCX 78 VIII, BCX 79 VIII | 45 | — | — |
| | | BCX 78 IX, BCX 79 IX | 60 | — | — |
| | | BCX 78 X, BCX 79 X | 60 | — | — |

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

Electrical Characteristics

at $T_A = 25^\circ\text{C}$, 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 — | |

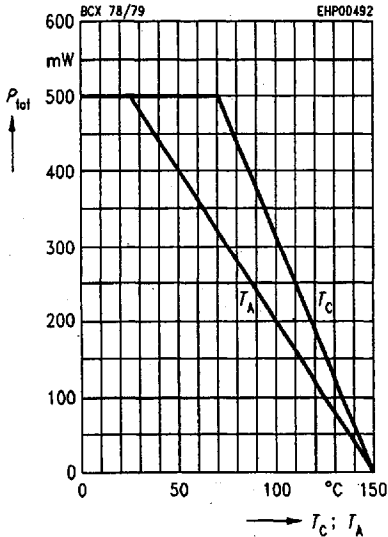
¹⁾ Pulse test: $t \leq 300\text{ }\mu\text{s}$, $D \leq 2\%$.

Electrical Characteristics

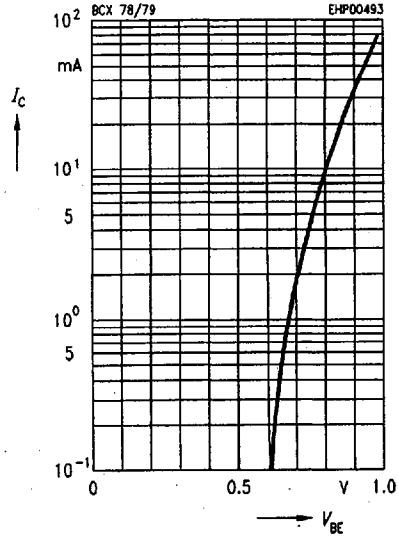
at $T_A = 25^\circ\text{C}$, unless otherwise specified.

| 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 $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ | h_{11e} | | | | k Ω |
| BCX 78 VII, BCX 79 VII | — | 2.7 | — | | |
| BCX 78 VIII, BCX 79 VIII | — | 3.6 | — | | |
| BCX 78 IX, BCX 79 IX | — | 4.5 | — | | |
| BCX 78 X, BCX 79 X | — | 7.5 | — | | |
| Open-circuit reverse voltage transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ | h_{12e} | | | | 10^{-4} |
| BCX 78 VII, BCX 79 VII | — | 1.5 | — | | |
| BCX 78 VIII, BCX 79 VIII | — | 2 | — | | |
| BCX 78 IX, BCX 79 IX | — | 2 | — | | |
| BCX 78 X, BCX 79 X | — | 3 | — | | |
| Short-circuit forward current transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ | h_{21e} | | | | — |
| BCX 78 VII, BCX 79 VII | — | 200 | — | | |
| BCX 78 VIII, BCX 79 VIII | — | 260 | — | | |
| BCX 78 IX, BCX 79 IX | — | 330 | — | | |
| BCX 78 X, BCX 79 X | — | 520 | — | | |
| Open-circuit output admittance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ | h_{22e} | | | | μS |
| BCX 78 VII, BCX 79 VII | — | 18 | — | | |
| BCX 78 VIII, BCX 79 VIII | — | 24 | — | | |
| BCX 78 IX, BCX 79 IX | — | 30 | — | | |
| BCX 78 X, BCX 79 X | — | 50 | — | | |
| 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 |

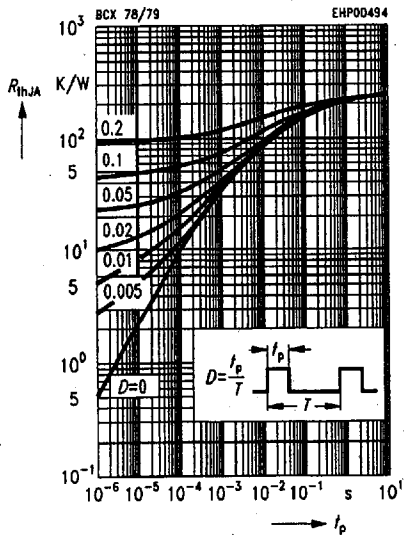
Total power dissipation $P_{tot} = f(T_A; T_C)$



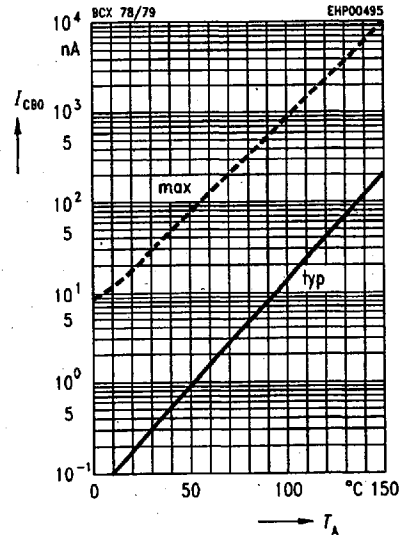
**Collector current $I_C = f(V_{BE})$
 $V_{CE} = 5 V$**



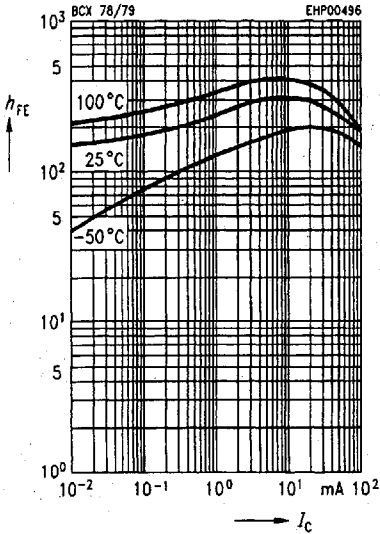
Permissible pulse load $R_{thJA} = f(t_p)$



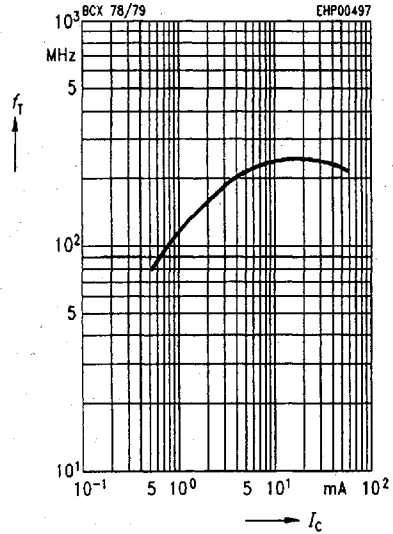
**Collector cutoff current $I_{CBO} = f(T_A)$
for max. permissible reverse voltage**



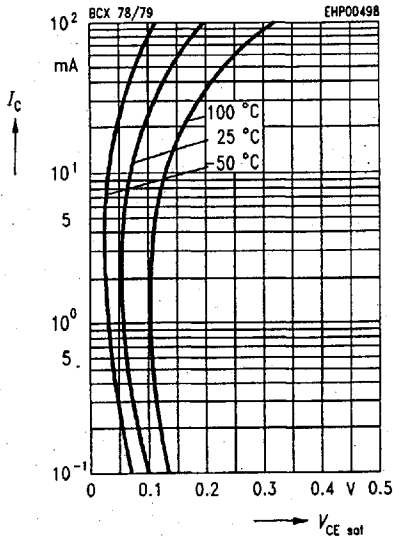
DC current gain $h_{FE} = f(I_C)$
 $V_{CE} = 5\text{ V}$ (common emitter configuration)



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

