

BCX70

SOT23 NPN SILICON PLANAR SMALL SIGNAL TRANSISTOR

ISSUE 2 – FEBRUARY 95

BCX70

ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | CONDITIONS. |
|---------------------------------------|---|------|------|------|---------------|--|
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | 45 | | | V | $I_C=2\text{mA}$ |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | 5 | | | V | $I_{EBO}=1\mu\text{A}$ |
| Collector-Emitter Cut-off Current | I_{CES} | 20 | | | nA | $V_{CES}=45\text{V}$ |
| | | 20 | | | μA | $V_{CES}=45\text{V}$, $T_{amb}=150^{\circ}\text{C}$ |
| Emitter-Base Cut-Off Current | I_{EBO} | 20 | | | nA | $V_{EBO}=4\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | 0.12 | 0.12 | 0.35 | V | $I_C=10\text{mA}$, $I_B=0.25\text{mA}$ |
| | | 0.20 | 0.20 | 0.55 | V | $I_C=50\text{mA}$, $I_B=1.25\text{mA}$ |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | 0.60 | 0.70 | 0.85 | V | $I_C=10\text{mA}$, $I_B=0.25\text{mA}$ |
| | | 0.70 | 0.83 | 1.05 | V | $I_C=50\text{mA}$, $I_B=1.25\text{mA}$ |
| Base - Emitter Voltage | V_{BE} | 0.52 | 0.65 | 0.75 | V | $I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$ |
| | | 0.55 | 0.78 | 0.78 | V | $I_C=2\text{mA}$, $V_{CE}=5\text{V}$ |
| Static Forward Current Transfer Ratio | h_{FE} | 120 | 170 | 220 | | $V_{CE}=5\text{V}$ |
| | | 50 | | | | $V_{CE}=5\text{V}$ |
| BCX70H | h_{FE} | 20 | 145 | 310 | | $V_{CE}=5\text{V}$ |
| | | 180 | 250 | | | $V_{CE}=5\text{V}$ |
| BCX70J | h_{FE} | 40 | 220 | 460 | | $V_{CE}=5\text{V}$ |
| | | 250 | 350 | | | $V_{CE}=5\text{V}$ |
| BCX70K | h_{FE} | 100 | 300 | 630 | | $V_{CE}=5\text{V}$ |
| | | 380 | 500 | | | $V_{CE}=5\text{V}$ |
| Transition Frequency | f_T | 125 | 250 | | MHz | $I_C=10\text{mA}$, $V_{CE}=5\text{V}$ $f=100\text{MHz}$ |
| | | | | | | $V_{EBO}=0.5\text{V}$, $f=1\text{MHz}$ |
| Emitter-Base Capacitance | C_{ebo} | | 8 | | pF | $V_{CBO}=10\text{V}$, $f=1\text{MHz}$ |
| Collector-Base Capacitance | C_{cbo} | | 2 | 4.5 | pF | $I_C=0.2\text{mA}$, $V_{CE}=5\text{V}$ $R_G=2\text{K}\Omega$, $f=1\text{KH}$ $\Delta f=200\text{Hz}$ |
| Noise Figure | N | | 6 | | dB | |
| Switching times: | t_d t_r t_{on} t_s t_f t_{off} | 35 | | | ns | $I_C=10\text{mA}$, $I_B=10:1:1\text{mA}$ $R_1=5\text{K}\Omega$, $R_2=5\text{K}\Omega$ $V_{BB}=3.6\text{V}$, $R_L=990\Omega$ |
| | | 50 | | | ns | |
| | | 85 | 150 | | ns | |
| | | 400 | | | ns | |
| | | 400 | | | ns | |
| | | 80 | 800 | | ns | |

*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle
Spice parameter data is available upon request for this device

PARTMARKING DETAIL – BCX70G – AG

- BCX70H – AH
- BCX70J – AJ
- BCX70K – AK
- BCX70GR – AW
- BCX70HR – 9P
- BCX70JR – AX
- BCX70KR – P9

COMPLEMENTARY TYPE – BCX71

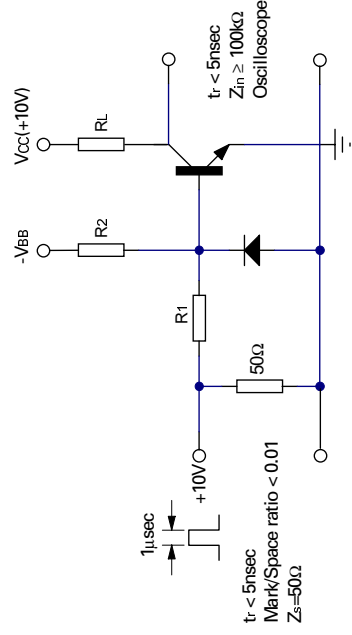
ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|------------|-------------|--------------------|
| Collector-Emitter Voltage | V_{CES} | 45 | V |
| Collector-Emitter Voltage | V_{CEO} | 45 | V |
| Emitter-Base Voltage | V_{EBO} | 5 | V |
| Continuous Collector Current | I_C | 200 | mA |
| Base Current | I_B | 50 | mA |
| Power Dissipation at $T_{amb}=25^{\circ}\text{C}$ | P_{TOT} | 330 | mW |
| Operating and Storage Temperature Range | t_j :stg | -55 to +150 | $^{\circ}\text{C}$ |

FOUR TERMINAL NETWORK DATA ($I_C=2\text{mA}$, $V_{CE}=5\text{V}$, $f=1\text{kHz}$)

| | h_{FE} Group G | | h_{FE} Group H | | h_{FE} Group J | | h_{FE} Group K | |
|-----------|------------------|------|------------------|------|------------------|------|------------------|-----------|
| | Min. | Typ. | Min. | Typ. | Min. | Typ. | Min. | Max. |
| h_{11e} | 1.6 | 2.7 | 2.5 | 3.6 | 4.5 | 8.5 | 4.5 | 12 |
| h_{12e} | 1.5 | | 2 | | 2 | | 3 | 10^{-4} |
| h_{21e} | 200 | | 260 | | 330 | | 520 | |
| h_{22e} | 18 | 30 | 24 | 50 | 30 | 60 | 50 | 100 |

SWITCHING CIRCUIT



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| | | 0.55 | 0.65 | 0.78 | V | $I_C=2\text{mA}$, $V_{CE}=5\text{V}$ |
| Static Forward Current Transfer Ratio | h_{FE} | 78 | 170 | 220 | | $I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$ |
| | | 120 | 170 | 220 | | $I_C=2\text{mA}$, $V_{CE}=5\text{V}$ |
| BCX70H | h_{FE} | 20 | 145 | 310 | | $I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$ |
| | | 180 | 250 | 310 | | $I_C=2\text{mA}$, $V_{CE}=5\text{V}$ |
| BCX70J | h_{FE} | 40 | 220 | 460 | | $I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$ |
| | | 250 | 350 | 460 | | $I_C=2\text{mA}$, $V_{CE}=5\text{V}$ |
| BCX70K | h_{FE} | 100 | 300 | 630 | | $I_C=10\mu\text{A}$, $V_{CE}=5\text{V}$ |
| | | 380 | 500 | 630 | | $I_C=2\text{mA}$, $V_{CE}=5\text{V}$ |
| Transition Frequency | f_T | 125 | 250 | | MHz | $I_C=10\text{mA}$, $V_{CE}=5\text{V}$, $f=100\text{MHz}$ |
| | | | | | | $V_{EBO}=0.5\text{V}$, $f=1\text{MHz}$ |
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| Noise Figure | N | | 6 | | dB | $\Delta f=200\text{Hz}$ |
| Switching times: | t_d t_r t_{on} t_s t_f t_{off} | 35 | | | ns | $I_C=10\text{mA}$, $I_B=10:1:1\text{mA}$, $R_1=5\text{K}\Omega$, $R_2=5\text{K}\Omega$, $V_{BB}=3.6\text{V}$, $R_L=990\Omega$ |
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