

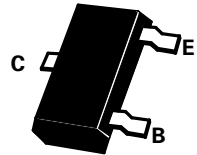
# SOT23 PNP SILICON PLANAR SMALL SIGNAL TRANSISTORS

## BCX71

### ISSUE 2 – FEBRUARY 95

PARTMARKING DETAIL –

- BCX71G – BG
- BCX71H – BH
- BCX71J – BJ
- BCX71K – BK
- BCX71GR – CG
- BCX71HR – 6P
- BCX71JR – J8
- BCX71KR – CK

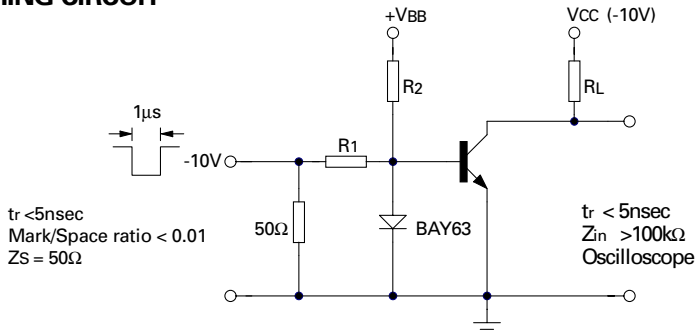


SOT23

### ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                  | SYMBOL        | VALUE       | UNIT        |
|--|---------------|-------------|-------------|
| Collector-Base 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 $T_{amb}=25^{\circ}C$ | $P_{TOT}$     | 330         | mW          |
| Operating and Storage Temperature Range    | $T_J:T_{stg}$ | -55 to +150 | $^{\circ}C$ |

### SWITCHING CIRCUIT



### 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 F |      |      | $h_{FE}$ Group J |      |      | $h_{FE}$ Group K |      |      |               |
|-----------|------------------|------|------|------------------|------|------|------------------|------|------|------------------|------|------|---------------|
|           | Min.             | Typ. | Max. | Min.             | Typ. | Max. | Min.             | Typ. | Max. | Min.             | Typ. | Max. |               |
| $h_{11e}$ | 1.6              | 2.7  | 4.5  | 2.5              | 3.6  | 6.0  | 3.2              | 4.5  | 8.5  | 4.5              | 7.5  | 12   | K             |
| $h_{12e}$ |                  | 1.5  |      |                  | 2    |      |                  | 2    |      |                  | 3    |      | $10^{-4}$     |
| $h_{21e}$ |                  | 200  |      |                  | 260  |      |                  | 330  |      |                  | 520  |      |               |
| $h_{22e}$ |                  | 18   | 30   |                  | 24   | 50   |                  | 30   | 60   |                  | 50   | 100  | $\mu\text{s}$ |

Spice parameter data is available upon request for this device

# BCX71

## 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                   | $I_{CEO} = -2\text{mA}$  |
| Emitter-Base Breakdown Voltage        |           | $V_{(BR)EBO}$ | -5                |                         |                | V                   | $I_{EBO} = -1\mu\text{A}$  |
| Collector-Emitter Cut-off Current     |           | $I_{CES}$     |                   |                         | -20<br>-20     | nA<br>$\mu\text{A}$ | $V_{CE} = -45\text{V}$<br>$V_{CE} = -45\text{V}, T_{amb} = 150^{\circ}\text{C}$  |
| Emitter-Base Cut-Off Current          |           | $I_{EBO}$     |                   |                         | -20            | nA                  | $V_{EBO} = -4\text{V}$   |
| Collector-Emitter Saturation Voltage  |           | $V_{CE(sat)}$ |                   | -0.12<br>-0.25          | -0.25<br>-0.55 | V<br>V              | $I_C = -10\text{mA}, I_B = -0.25\text{mA}$<br>$I_C = -50\text{mA}, I_B = -1.25\text{mA}$   |
| Base-Emitter Saturation Voltage       |           | $V_{BE(sat)}$ | -0.60<br>-0.68    | -0.70<br>-0.80          | -0.85<br>-1.05 | V<br>V              | $I_C = -10\text{mA}, I_B = -0.25\text{mA}$<br>$I_C = -50\text{mA}, I_B = -1.25\text{mA}$   |
| Base - Emitter Voltage                |           | $V_{BE}$      | -0.6              | -0.55<br>-0.65<br>-0.72 | -0.75          | V<br>V<br>V         | $I_C = -10\mu\text{A}, V_{CE} = -5\text{V}$<br>$I_C = -2\text{mA}, V_{CE} = -5\text{V}$<br>$I_C = -50\text{mA}, V_{CE} = -1\text{V}$ |
| Static Forward Current Transfer Ratio | BCX71G    | $h_{FE}$      | 120<br>60         | 140<br>170              | 220            |                     | $I_C = -10\mu\text{A}, V_{CE} = -5\text{V}$<br>$I_C = -2\text{mA}, V_{CE} = -5\text{V}$<br>$I_C = -50\text{mA}, V_{CE} = -1\text{V}$ |
|                                       | BCX71H    |               | 30<br>180<br>80   | 200<br>250              | 310            |                     | $I_C = -10\mu\text{A}, V_{CE} = -5\text{V}$<br>$I_C = -2\text{mA}, V_{CE} = -5\text{V}$<br>$I_C = -50\text{mA}, V_{CE} = -1\text{V}$ |
|                                       | BCX71J    |               | 40<br>250<br>100  | 270<br>350              | 460            |                     | $I_C = -10\mu\text{A}, V_{CE} = -5\text{V}$<br>$I_C = -2\text{mA}, V_{CE} = -5\text{V}$<br>$I_C = -50\text{mA}, V_{CE} = -1\text{V}$ |
|                                       | BCX71K    |               | 100<br>380<br>110 | 340<br>500              | 630            |                     | $I_C = -10\mu\text{A}, V_{CE} = -5\text{V}$<br>$I_C = -2\text{mA}, V_{CE} = -5\text{V}$<br>$I_C = -50\text{mA}, V_{CE} = -1\text{V}$ |
| Transition Frequency                  |           | $f_T$         |                   | 180                     |                | MHz                 | $I_C = -10\text{mA}, V_{CE} = -5\text{V}$<br>$f = 100\text{MHz}$   |
| Emitter-Base Capacitance              |           | $C_{ebo}$     |                   | 11                      |                | pF                  | $V_{EBO} = -0.5\text{V}, f = 1\text{MHz}$  |
| Collector-Base Capacitance            |           | $C_{cbo}$     |                   |                         | 6              | pF                  | $V_{CBO} = -10\text{V}, f = 1\text{MHz}$   |
| Noise Figure                          |           | N             |                   | 2                       | 6              | dB                  | $I_C = -0.2\text{mA}, V_{CE} = -5\text{V}$<br>$R_G = 2\text{K}\Omega, f = 1\text{KHz}$<br>$\Delta f = 200\text{Hz}$                  |
| Switching times:                      |           |               |                   |                         |                |                     |  |
| Delay Time                            | $t_d$     |               |                   | 35                      |                | ns                  |  |
| Rise Time                             | $t_r$     |               |                   | 50                      |                | ns                  |  |
| Turn-on Time                          | $t_{on}$  |               |                   | 85                      | 150            | ns                  |  |
| Storage Time                          | $t_s$     |               |                   | 400                     |                | ns                  |  |
| Fall Time                             | $t_f$     |               |                   | 80                      |                | ns                  |  |
| Turn-Off Time                         | $t_{off}$ |               |                   | 480                     | 800            | ns                  |  |
|                                       |           |               |                   |                         |                |                     | $-I_C : I_{B1} : -I_{B2} = 10:1:1\text{mA}$<br>$R_1 = R_2 = 5\text{K}\Omega$<br>$V_{BB} = -3.6\text{V}, R_L = 990\Omega$             |

\*Measured under pulsed conditions. Pulse width=300 $\mu\text{s}$ . Duty cycle



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