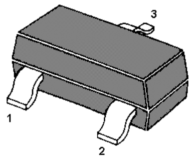
# NPN Silicon Epitaxial Planar Transistors

for general purpose switching and amplification.

These transistors are subdivided into three groups B, C and D, according to their current gain.

As complementary types the PNP transistors BCW61 are recommended.



1.Base 2.Emitter 3.Collector
SOT-23 Plastic Package

## Absolute Maximum Ratings ($T_a$ = 25 °C)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 32 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 32 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 5 | V |
| Collector Current | $I_C$ | 100 | mA |
| Peak Collector Current | $I_{CM}$ | 200 | mA |
| Peak Base Current | $I_{BM}$ | 200 | mA |
| Total Power Dissipation | $P_{tot}$ | 200 | mW |
| Junction Temperature | $T_J$ | 150 | °C |
| Storage Temperature Range | $T_S$ | -65 to +150 | °C |

## Characteristics at $T_a$ =25 °C

| Parameter | | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| DC Current Gain<br>at $V_{CE}$ = 5 V, $I_C$ = 10 μA | BCW60B | $h_{FE}$ | 20 | - | - | - |
| | BCW60C | $h_{FE}$ | 40 | - | - | - |
| | BCW60D | $h_{FE}$ | 100 | - | - | - |
| at $V_{CE}$ = 5 V, $I_C$ = 2 mA | BCW60B | $h_{FE}$ | 180 | - | 310 | - |
| | BCW60C | $h_{FE}$ | 250 | - | 460 | - |
| | BCW60D | $h_{FE}$ | 380 | - | 630 | - |
| at $V_{CE}$ = 1 V, $I_C$ = 50 mA | BCW60B | $h_{FE}$ | 70 | - | - | - |
| | BCW60C | $h_{FE}$ | 90 | - | - | - |
| | BCW60D | $h_{FE}$ | 100 | - | - | - |
| Collector Saturation Voltage<br>at $I_C$ = 10 mA, $I_B$ = 0.25 mA | | $V_{CEsat}$ | 0.05 | - | 0.35 | V |
| Collector Saturation Voltage<br>at $I_C$ = 50 mA, $I_B$ = 1.25 mA | | $V_{CEsat}$ | 0.1 | - | 0.55 | V |
| Base Saturation Voltage<br>at $I_C$ = 10 mA, $I_B$ = 0.25 mA | | $V_{BEsat}$ | 0.6 | - | 0.85 | V |
| Base Saturation Voltage<br>at $I_C$ = 50 mA, $I_B$ = 1.25 mA | | $V_{BEsat}$ | 0.7 | - | 1.05 | V |
| Base-Emitter Voltage<br>at $I_C$ = 2 mA, $V_{CE}$ = 5V | | $V_{BE(on)}$ | 0.55 | - | 0.75 | V |
| Collector Base Cutoff Current<br>at $V_{CB}$ = 32 V | | $I_{CBO}$ | - | - | 20 | nA |
| at $V_{CB}$ = 32 V， $T_j$ =150 °C | | $I_{CBO}$ | - | - | 20 | μA |
| Emitter-Base Cutoff Current<br>at $V_{EB}$ = 4 V | | $I_{EBO}$ | - | - | 20 | nA |
| Gain -Bandwidth Product<br>at $V_{CE}$ = 5 V, $I_C$ = 10 mA, f = 100 MHz | | $f_T$ | 100 | 250 | - | MHz |
| Collector-Base Capacitance<br>at $V_{CB}$ = 10 V, f = 1 MHz | | $C_{CBO}$ | - | 1.7 | - | pF |
| Emitter-Base Capacitance<br>at $V_{EB}$ = 0.5 V, f = 1 MHz | | $C_{EBO}$ | - | 11 | - | pF |
| Noise figure<br>at $I_C$ = 200 μA, $V_{CE}$ = 5 V, $R_S$ = 2 KΩ, f =1 KHz, Δf=200Hz | | NF | - | 2 | 6 | dB |
| Thermal Resistance, Junction to Ambient | | $R_{\theta JA}$ | - | - | 500 [1] | K/W |

[1] Transistor mounted on an FR4 printed-circuit board.