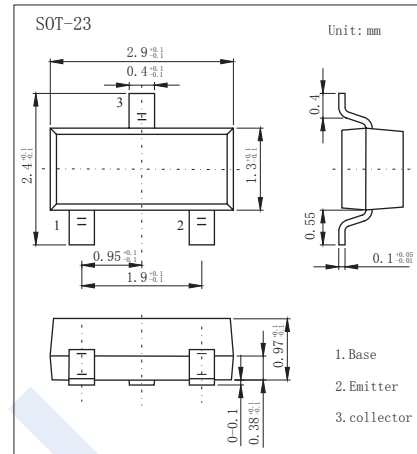


## NPN Transistors

## BCW31~BCW33 (KCW31~KCW33)

## ■ Features

- Low current (100 mA)
- Low voltage (32 V).
- PNP complements: BCW29 and BCW30.

■ Absolute Maximum Ratings  $T_a = 25^\circ\text{C}$ 

| Parameter  | Symbol     | Rating     | Unit             |
|--|------------|------------|------------------|
| Collector - Base Voltage                             | $V_{CB0}$  | 32         | V                |
| Collector - Emitter Voltage                          | $V_{CE0}$  | 32         |                  |
| Emitter - Base Voltage                               | $V_{EB0}$  | 5          |                  |
| Collector Current - Continuous                       | $I_C$      | 100        | mA               |
| Peak Collector Current                               | $I_{CM}$   | 200        |                  |
| Peak Base Current                                    | $I_{BM}$   | 200        |                  |
| Collector Power Dissipation                          | $P_C$      | 250        | mW               |
| Thermal Resistance From Junction to Ambient (Note.1) | $R_{thja}$ | 500        | K/W              |
| Junction Temperature                                 | $T_J$      | 150        | $^\circ\text{C}$ |
| Storage Temperature Range                            | $T_{stg}$  | -55 to 150 |                  |

Note. 1: Transistor mounted on an FR4 printed-circuit.

## NPN Transistors

## BCW31~BCW33 (KCW31~KCW33)

## ■ Electrical Characteristics Ta = 25°C

| Parameter                            | Symbol                  | Test Conditions  | Min   | Typ | Max | Unit |
|--------------------------------------|-------------------------|--|---|-----|-----|------|
| Collector- base breakdown voltage    | V <sub>CBO</sub>        | I <sub>c</sub> = 100 μA, I <sub>E</sub> = 0  | 32  |     |     | V    |
| Collector- emitter breakdown voltage | V <sub>CEO</sub>        | I <sub>c</sub> = 2 mA, I <sub>B</sub> = 0  | 32  |     |     |      |
| Emitter - base breakdown voltage     | V <sub>EBO</sub>        | I <sub>E</sub> = 100 μA, I <sub>c</sub> = 0  | 5   |     |     |      |
| Collector-base cut-off current       | I <sub>CBO</sub>        | V <sub>CB</sub> = 32 V, I <sub>E</sub> = 0   |   |     | 100 | nA   |
|                                      |                         | V <sub>CB</sub> = 32 V, I <sub>E</sub> = 0, T <sub>J</sub> =100°C                              |   |     | 10  | μA   |
| Emitter cut-off current              | I <sub>EBO</sub>        | V <sub>EB</sub> = 5V, I <sub>c</sub> =0  |   |     | 100 | nA   |
| Collector-emitter saturation voltage | V <sub>CE(sat)</sub>    | I <sub>c</sub> =10 mA, I <sub>B</sub> =0.5mA   |   | 120 | 250 | mV   |
|                                      |                         | I <sub>c</sub> =50 mA, I <sub>B</sub> =2.5mA   |   | 210 |     |      |
| Base - emitter saturation voltage    | V <sub>BE(sat)</sub>    | I <sub>c</sub> =10 mA, I <sub>B</sub> =0.5mA   |   | 750 |     |      |
|                                      |                         | I <sub>c</sub> =50 mA, I <sub>B</sub> =2.5mA   |   | 850 |     |      |
| Base - emitter voltage               | V <sub>BE</sub>         | V <sub>CE</sub> = 5V, I <sub>c</sub> = 2mA   | 550   |     | 700 |      |
| DC current gain                      | BCW31<br>BCW32<br>BCW33 | h <sub>FE</sub>  | V <sub>CE</sub> = 5V, I <sub>c</sub> = 10μA |     | 90  |      |
|                                      |                         |  |   |     | 150 |      |
|                                      |                         |  |   |     | 270 |      |
| DC current gain                      | BCW31<br>BCW32<br>BCW33 | h <sub>FE</sub>  | V <sub>CE</sub> = 5V, I <sub>c</sub> = 2mA  | 110 |     | 220  |
|                                      |                         |  |   | 200 |     | 450  |
|                                      |                         |  |   | 420 |     | 800  |
| Collector output capacitance         | C <sub>c</sub>          | V <sub>CB</sub> = 10V, I <sub>E</sub> =I <sub>c</sub> =0, f=10MHz                              |   | 2.5 |     | pF   |
| Noise figure                         | NF                      | I <sub>c</sub> = 200 μA; V <sub>CE</sub> = 5 V;<br>R <sub>s</sub> = 2kΩ; f = 1 kHz; B = 200 Hz |   |     | 10  | dB   |
| Transition frequency                 | f <sub>T</sub>          | V <sub>CE</sub> = 5V, I <sub>c</sub> = 10mA, f=100MHz  | 100   |     |     | MHz  |

■ Classification of h<sub>FE</sub>(2)

| Type    | BCW31   | BCW32   | BCW33   |
|---------|---------|---------|---------|
| Range   | 110-220 | 200-450 | 420-800 |
| Marking | D1*     | D2*     | D3*     |