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November 2014

# BC546 / BC547 / BC548 / BC549 / BC550 NPN Epitaxial Silicon Transistor

## Features

- Switching and Amplifier
- High-Voltage: BC546,  $V_{CEO} = 65\text{ V}$
- Low-Noise: BC549, BC550
- Complement to BC556, BC557, BC558, BC559, and BC560



## Ordering Information

| Part Number | Marking | Package  | Packing Method |
|-------------|---------|----------|----------------|
| BC546ABU    | BC546A  | TO-92 3L | Bulk           |
| BC546ATA    | BC546A  | TO-92 3L | Ammo           |
| BC546BTA    | BC546B  | TO-92 3L | Ammo           |
| BC546BTF    | BC546B  | TO-92 3L | Tape and Reel  |
| BC546CTA    | BC546C  | TO-92 3L | Ammo           |
| BC547ATA    | BC547A  | TO-92 3L | Ammo           |
| BC547B      | BC547B  | TO-92 3L | Bulk           |
| BC547BBU    | BC547B  | TO-92 3L | Bulk           |
| BC547BTA    | BC547B  | TO-92 3L | Ammo           |
| BC547BTF    | BC547B  | TO-92 3L | Tape and Reel  |
| BC547CBU    | BC547C  | TO-92 3L | Bulk           |
| BC547CTA    | BC547C  | TO-92 3L | Ammo           |
| BC547CTFR   | BC547C  | TO-92 3L | Tape and Reel  |
| BC548BU     | BC548   | TO-92 3L | Bulk           |
| BC548BTA    | BC548B  | TO-92 3L | Ammo           |
| BC548CTA    | BC548C  | TO-92 3L | Ammo           |
| BC549BTA    | BC549B  | TO-92 3L | Ammo           |
| BC549BTF    | BC549B  | TO-92 3L | Tape and Reel  |
| BC549CTA    | BC549C  | TO-92 3L | Ammo           |
| BC550CBU    | BC550C  | TO-92 3L | Bulk           |
| BC550CTA    | BC550C  | TO-92 3L | Ammo           |

BC546 / BC547 / BC548 / BC549 / BC550 — NPN Epitaxial Silicon Transistor

## Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol    | Parameter                   | Value                 | Unit             |   |
|-----------|-----------------------------|-----------------------|------------------|---|
| $V_{CBO}$ | Collector-Base Voltage      | BC546                 | 80               | V |
|           |                             | BC547 / BC550         | 50               |   |
|           |                             | BC548 / BC549         | 30               |   |
| $V_{CEO}$ | Collector-Emitter Voltage   | BC546                 | 65               | V |
|           |                             | BC547 / BC550         | 45               |   |
|           |                             | BC548 / BC549         | 30               |   |
| $V_{EBO}$ | Emitter-Base Voltage        | BC546 / BC547         | 6                | V |
|           |                             | BC548 / BC549 / BC550 | 5                |   |
| $I_C$     | Collector Current (DC)      | 100                   | mA               |   |
| $P_C$     | Collector Power Dissipation | 500                   | mW               |   |
| $T_J$     | Junction Temperature        | 150                   | $^\circ\text{C}$ |   |
| $T_{STG}$ | Storage Temperature Range   | -65 to +150           | $^\circ\text{C}$ |   |

## Electrical Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol        | Parameter                            | Conditions  | Min.   | Typ. | Max. | Unit |
|---------------|--------------------------------------|---|--|------|------|------|
| $I_{CBO}$     | Collector Cut-Off Current            | $V_{CB} = 30\text{ V}, I_E = 0$                               |  |      | 15   | nA   |
| $h_{FE}$      | DC Current Gain                      | $V_{CE} = 5\text{ V}, I_C = 2\text{ mA}$                      | 110  |      | 800  |      |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 10\text{ mA}, I_B = 0.5\text{ mA}$                     |  | 90   | 250  | mV   |
|               |                                      | $I_C = 100\text{ mA}, I_B = 5\text{ mA}$                      |  | 250  | 600  |      |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage      | $I_C = 10\text{ mA}, I_B = 0.5\text{ mA}$                     |  | 700  |      | mV   |
|               |                                      | $I_C = 100\text{ mA}, I_B = 5\text{ mA}$                      |  | 900  |      |      |
| $V_{BE(on)}$  | Base-Emitter On Voltage              | $V_{CE} = 5\text{ V}, I_C = 2\text{ mA}$                      | 580  | 660  | 700  | mV   |
|               |                                      | $V_{CE} = 5\text{ V}, I_C = 10\text{ mA}$                     |  |      | 720  |      |
| $f_T$         | Current Gain Bandwidth Product       | $V_{CE} = 5\text{ V}, I_C = 10\text{ mA}, f = 100\text{ MHz}$ |  | 300  |      | MHz  |
| $C_{ob}$      | Output Capacitance                   | $V_{CB} = 10\text{ V}, I_E = 0, f = 1\text{ MHz}$             |  | 3.5  | 6.0  | pF   |
| $C_{ib}$      | Input Capacitance                    | $V_{EB} = 0.5\text{ V}, I_C = 0, f = 1\text{ MHz}$            |  | 9    |      | pF   |
| NF            | Noise Figure                         | BC546 / BC547 / BC548   | $V_{CE} = 5\text{ V}, I_C = 200\text{ }\mu\text{A}, f = 1\text{ kHz}, R_G = 2\text{ k}\Omega$                  | 2.0  | 10.0 | dB   |
|               |                                      | BC549 / BC550   |  | 1.2  | 4.0  |      |
|               |                                      | BC549   | $V_{CE} = 5\text{ V}, I_C = 200\text{ }\mu\text{A}, R_G = 2\text{ k}\Omega, f = 30\text{ to }15000\text{ MHz}$ | 1.4  | 4.0  |      |
|               |                                      | BC550   |  | 1.4  | 3.0  |      |

## $h_{FE}$ Classification

| Classification | A         | B         | C         |
|----------------|-----------|-----------|-----------|
| $h_{FE}$       | 110 ~ 220 | 200 ~ 450 | 420 ~ 800 |

## Typical Performance Characteristics



Figure 1. Static Characteristic



Figure 2. Transfer Characteristic



Figure 3. DC Current Gain

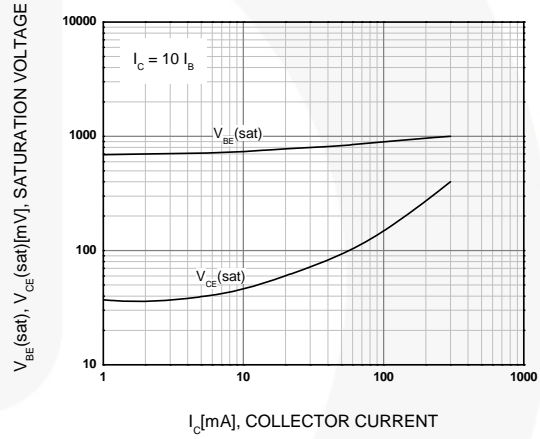


Figure 4. Base-Emitter Saturation Voltage and Collector-Emitter Saturation Voltage



Figure 5. Output Capacitance



Figure 6. Current Gain Bandwidth Product

Physical Dimensions



NOTES: UNLESS OTHERWISE SPECIFIED

- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DRAWING CONFORMS TO ASME Y14.5M-1994.
- D) TO-92 (92,94,96,97,98) PIN CONFIGURATION:

| PIN | 92 |   |   | 94 |   |   | 96 |   |   | 97 |   |   | 98 |   |   |
|-----|----|---|---|----|---|---|----|---|---|----|---|---|----|---|---|
|     | P  | F | M | P  | F | M | B  | F | M | P  | F | M | P  | F | M |
| 1   | E  | S | S | E  | S | S | B  | D | G | C  | G | D | C  | G | D |
| 2   | B  | D | G | C  | G | D | E  | S | S | B  | D | G | E  | S | S |
| 3   | C  | G | D | B  | D | G | C  | G | D | E  | S | S | B  | D | G |

LEGEND:

- P - BIPOLAR
- F - JFET
- M - DMOS
- E - EMITTER
- B - BASE
- C - COLLECTOR
- D - DRAIN
- S - SOURCE
- G - GATE

- E) FOR PACKAGE 92, 94, 96, 97 AND 98: PIN CONFIGURATION DRAIN "D" AND SOURCE "S" ARE INTERCHANGEABLE AT JFET "F" OPTION.
- F) DRAWING FILENAME: MKT-ZA03DREV3.

Figure 7. 3-Lead, TO-92, JEDEC TO-92 Compliant Straight Lead Configuration, Bulk Type

Physical Dimensions (Continued)



NOTES: UNLESS OTHERWISE SPECIFIED

- A. DRAWING CONFORMS TO JEDEC MS-013, VARIATION AC.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DRAWING CONFORMS TO ASME Y14.5M-2009.
- D. DRAWING FILENAME: MKT-ZA03FREV3.
- E. FAIRCHILD SEMICONDUCTOR.

Figure 8. 3-Lead, TO-92, Molded, 0.2 In Line Spacing Lead Form, Ammo, Tape and Reel Type



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