

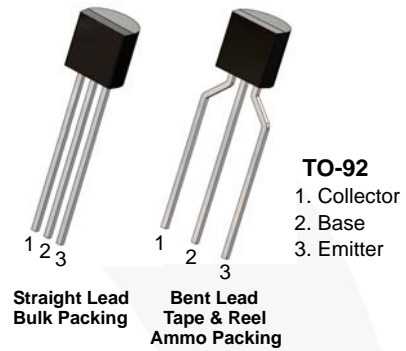


January 2016

# BC556 / BC557 / BC558 / BC559 / BC560 PNP Epitaxial Silicon Transistor

## Features

- Switching and Amplifier
- High-Voltage: BC556,  $V_{CEO} = -65\text{ V}$
- Low-Noise: BC559, BC560
- Complement to BC546, BC547, BC548, BC549, and BC550



## Ordering Information

| Part Number | Marking | Package  | Packing Method |
|-------------|---------|----------|----------------|
| BC556ABU    | BC556A  | TO-92 3L | Bulk           |
| BC556ATA    | BC556A  | TO-92 3L | Ammo           |
| BC556BTA    | BC556B  | TO-92 3L | Ammo           |
| BC556BTF    | BC556B  | TO-92 3L | Tape and Reel  |
| BC556BTFR   | BC556B  | TO-92 3L | Tape and Reel  |
| BC557ATA    | BC557A  | TO-92 3L | Ammo           |
| BC557BTA    | BC557B  | TO-92 3L | Ammo           |
| BC557BTF    | BC557B  | TO-92 3L | Tape and Reel  |
| BC558BTA    | BC558B  | TO-92 3L | Ammo           |
| BC559BTA    | BC559B  | TO-92 3L | Ammo           |
| BC559CTA    | BC559C  | TO-92 3L | Ammo           |
| BC560CTA    | BC560C  | TO-92 3L | Ammo           |

BC556 / BC557 / BC558 / BC559 / BC560 — PNP 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         | BC556         | -80              | V |
|           |                                | BC557 / BC560 | -50              |   |
|           |                                | BC558 / BC559 | -30              |   |
| $V_{CEO}$ | Collector-Emitter Voltage      | BC556         | -65              | V |
|           |                                | BC557 / BC560 | -45              |   |
|           |                                | BC558 / BC559 | -30              |   |
| $V_{EBO}$ | Emitter-Base Voltage           | -5            | V                |   |
| $I_C$     | Collector Current (DC)         | -100          | mA               |   |
| $I_{CP}$  | Peak Collector Current (Pulse) | -200          | mA               |   |
| $I_{BP}$  | Peak Base Current (Pulse)      | -200          | mA               |   |
| $T_J$     | Junction Temperature           | 150           | $^\circ\text{C}$ |   |
| $T_{STG}$ | Storage Temperature Range      | -65 to +150   | $^\circ\text{C}$ |   |

## Thermal Characteristics<sup>(1)</sup>

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

| Symbol          | Parameter                               | Max. | Unit                      |
|-----------------|---|------|---------------------------|
| $P_D$           | Total Power Dissipation                 | 500  | mW                        |
|                 | Derate Above $25^\circ\text{C}$         | 4.0  | mW/ $^\circ\text{C}$      |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 250  | $^\circ\text{C}/\text{W}$ |

### Note:

1. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

## 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  | -300 | mV   |
|               |                                      | $I_C = -100\text{ mA}, I_B = -5\text{ mA}$                     |  | -250 | -650 |      |
| $V_{BE(sat)}$ | Collector-Base 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              | $V_{CE} = -5\text{ V}, I_C = -2\text{ mA}$                     | -600   | -660 | -750 | mV   |
|               |                                      | $V_{CE} = -5\text{ V}, I_C = -10\text{ mA}$                    |  |      | -800 |      |
| $f_T$         | Current Gain Bandwidth Product       | $V_{CE} = -5\text{ V}, I_C = -10\text{ mA}, f = 10\text{ MHz}$ |  | 150  |      | MHz  |
| $C_{ob}$      | Output Capacitance                   | $V_{CB} = -10\text{ V}, I_E = 0, f = 1\text{ MHz}$             |  |      | 6    | pF   |
| NF            | Noise Figure                         | BC556 / BC557 / BC558  | $V_{CE} = -5\text{ V}, I_C = -200\text{ }\mu\text{A}, f = 1\text{ kHz}, R_G = 2\text{ k}\Omega$                  | 2    | 10   | dB   |
|               |                                      | BC559 / BC560  |  | 1    | 4    |      |
|               |                                      | BC559  | $V_{CE} = -5\text{ V}, I_C = -200\text{ }\mu\text{A}, R_G = 2\text{ k}\Omega, f = 30\text{ to }15000\text{ MHz}$ | 1.2  | 4.0  |      |
|               |                                      | BC560  |  | 1.2  | 2.0  |      |

## $h_{FE}$ Classification

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

## Typical Performance Characteristics

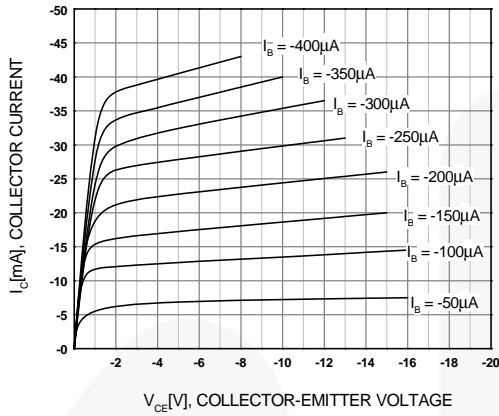


Figure 1. Static Characteristic

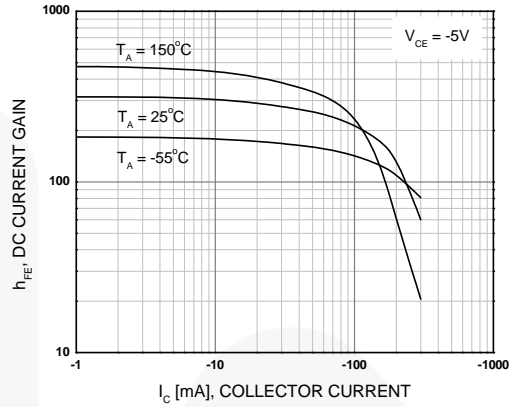


Figure 2. DC Current Gain

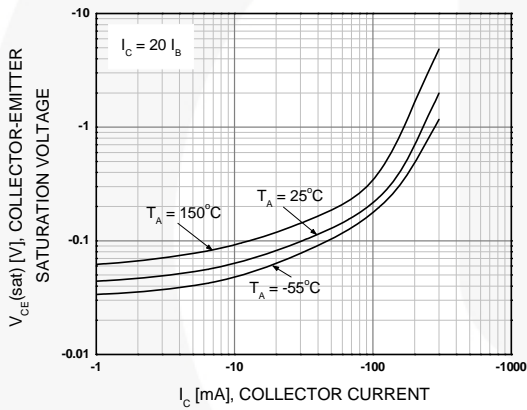


Figure 3. Collector-Emitter Saturation Voltage

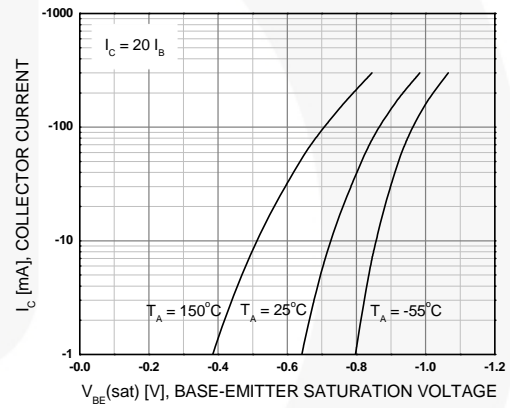


Figure 4. Base-Emitter Saturation Voltage

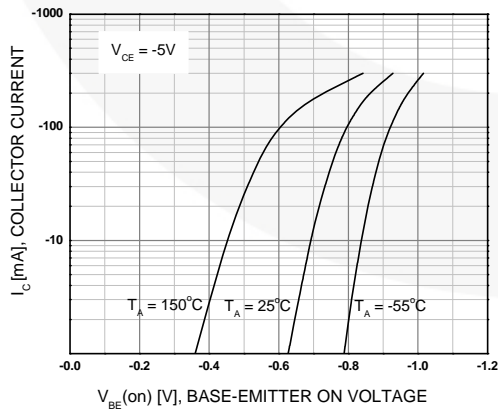


Figure 5. Base-Emitter On Voltage

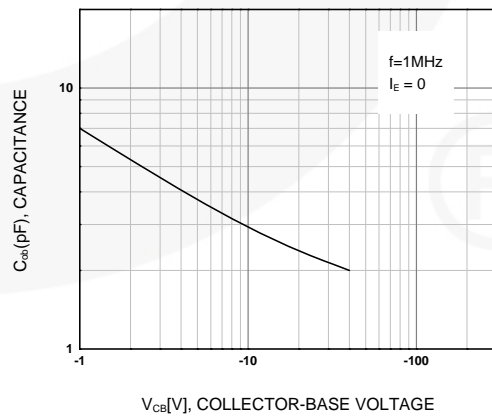


Figure 6. Collector Output Capacitance

Typical Performance Characteristics (Continued)

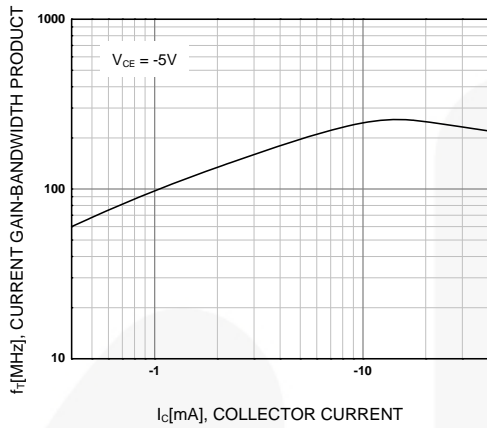


Figure 7. Current Gain Bandwidth Product

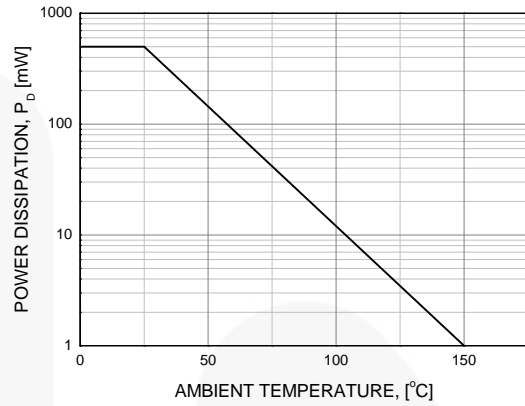


Figure 8. Power Deration

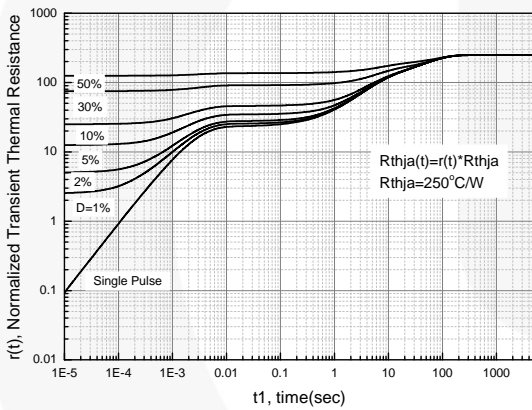
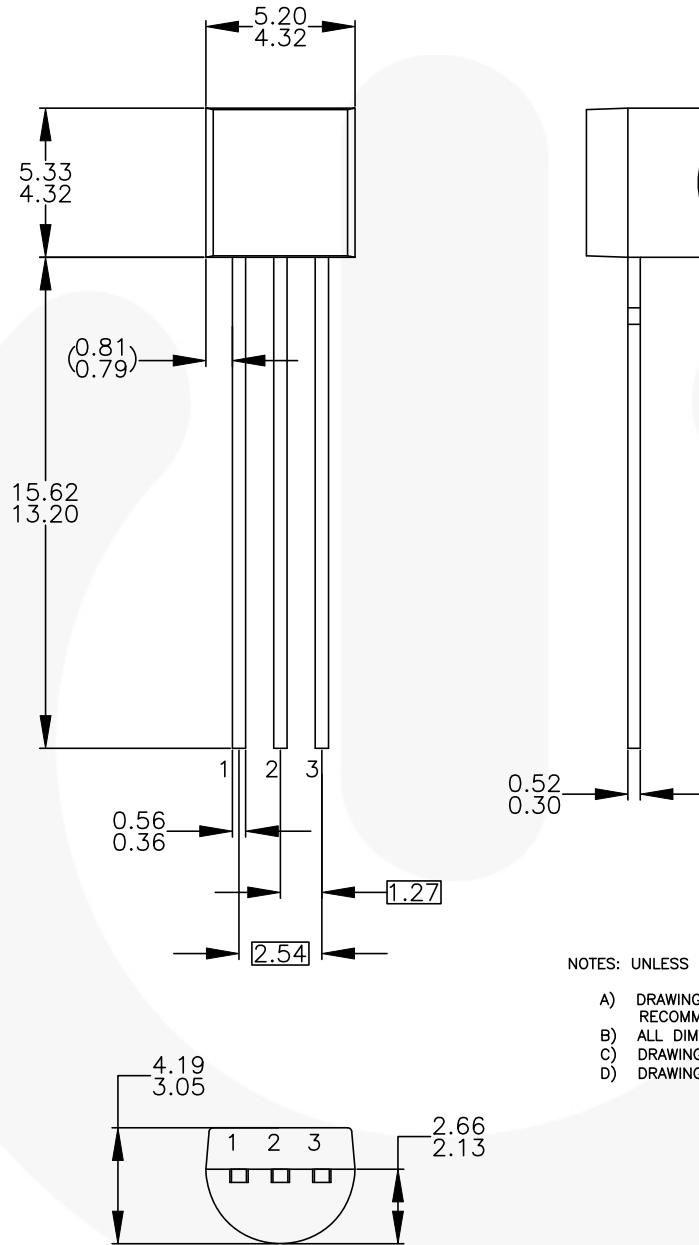


Figure 9. Normalized Transient Thermal Resistance

Physical Dimensions



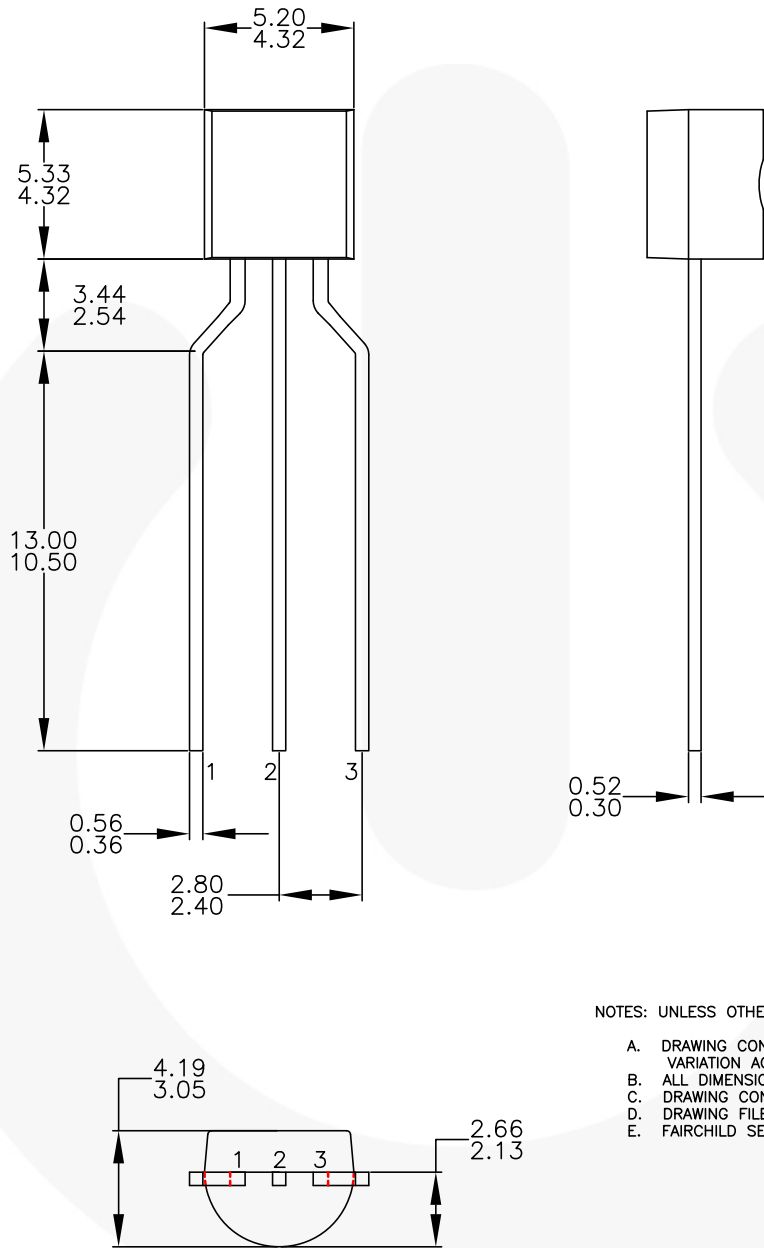
NOTES: UNLESS OTHERWISE SPECIFIED

- A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DRAWING CONFORMS TO ASME Y14.5M-2009.
- D) DRAWING FILENAME: MKT-ZA03DREV4.



Figure 10. 3-LEAD, TO92, JEDEC TO-92 COMPLIANT STRAIGHT LEAD CONFIGURATION, BULK

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 11. 3-LEAD, TO92, MOLDED 0.200 IN LINE SPACING LEAD FORM, AMMO, TAPE AND REEL





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