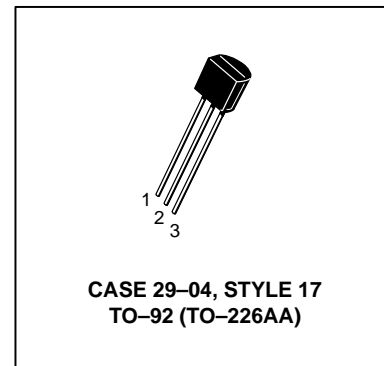
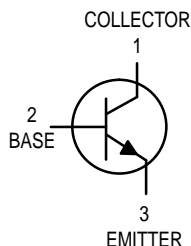


# Amplifier Transistors

## NPN Silicon

**BC546, B**  
**BC547, A, B, C**  
**BC548, A, B, C**



### MAXIMUM RATINGS

| Rating   | Symbol         | BC 546      | BC 547 | BC 548 | Unit          |
|--|----------------|-------------|--------|--------|---------------|
| Collector–Emitter Voltage  | $V_{CEO}$      | 65          | 45     | 30     | Vdc           |
| Collector–Base Voltage   | $V_{CBO}$      | 80          | 50     | 30     | Vdc           |
| Emitter–Base Voltage   | $V_{EBO}$      | 6.0         |        |        | Vdc           |
| Collector Current — Continuous   | $I_C$          | 100         |        |        | mAdc          |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 625<br>5.0  |        |        | mW<br>mW/°C   |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.5<br>12   |        |        | Watt<br>mW/°C |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ | –55 to +150 |        |        | °C            |

### THERMAL CHARACTERISTICS

| Characteristic                          | Symbol          | Max  | Unit |
|---|-----------------|------|------|
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 200  | °C/W |
| Thermal Resistance, Junction to Case    | $R_{\theta JC}$ | 83.3 | °C/W |

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

### OFF CHARACTERISTICS

|   |  |               |                   |                        |                       |                             |
|---|--|---------------|-------------------|------------------------|-----------------------|-----------------------------|
| Collector–Emitter Breakdown Voltage<br>( $I_C = 1.0\text{ mA}, I_B = 0$ )   | BC546<br>BC547<br>BC548                  | $V_{(BR)CEO}$ | 65<br>45<br>30    | —<br>—<br>—            | —<br>—<br>—           | V                           |
| Collector–Base Breakdown Voltage<br>( $I_C = 100\ \mu\text{Adc}$ )  | BC546<br>BC547<br>BC548                  | $V_{(BR)CBO}$ | 80<br>50<br>30    | —<br>—<br>—            | —<br>—<br>—           | V                           |
| Emitter–Base Breakdown Voltage<br>( $I_E = 10\ \mu\text{A}, I_C = 0$ )  | BC546<br>BC547<br>BC548                  | $V_{(BR)EBO}$ | 6.0<br>6.0<br>6.0 | —<br>—<br>—            | —<br>—<br>—           | V                           |
| Collector Cutoff Current<br>( $V_{CE} = 70\text{ V}, V_{BE} = 0$ )<br>( $V_{CE} = 50\text{ V}, V_{BE} = 0$ )<br>( $V_{CE} = 35\text{ V}, V_{BE} = 0$ )<br>( $V_{CE} = 30\text{ V}, T_A = 125^\circ\text{C}$ ) | BC546<br>BC547<br>BC548<br>BC546/547/548 | $I_{CES}$     | —<br>—<br>—<br>—  | 0.2<br>0.2<br>0.2<br>— | 15<br>15<br>15<br>4.0 | nA<br><br><br>$\mu\text{A}$ |

**BC546, B BC547, A, B, C BC548, A, B, C**
**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted) (Continued)

| Characteristic   | Symbol  | Min                                    | Typ                              | Max                                    | Unit |
|--|---|--|----------------------------------|--|------|
| <b>ON CHARACTERISTICS</b>  |   |  |                                  |  |      |
| DC Current Gain<br>( $I_C = 10\ \mu\text{A}$ , $V_{CE} = 5.0\ \text{V}$ )  | BC547A/548A<br>BC546B/547B/548B<br>BC548C                                   | —<br>—<br>—                            | 90<br>150<br>270                 | —<br>—<br>—                            | —    |
| ( $I_C = 2.0\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ )  | BC546<br>BC547<br>BC548<br>BC547A/548A<br>BC546B/547B/548B<br>BC547C/BC548C | 110<br>110<br>110<br>110<br>200<br>420 | —<br>—<br>—<br>180<br>290<br>520 | 450<br>800<br>800<br>220<br>450<br>800 |      |
| ( $I_C = 100\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ )  | BC547A/548A<br>BC546B/547B/548B<br>BC548C                                   | —<br>—<br>—                            | 120<br>180<br>300                | —<br>—<br>—                            |      |
| Collector–Emitter Saturation Voltage<br>( $I_C = 10\ \text{mA}$ , $I_B = 0.5\ \text{mA}$ )<br>( $I_C = 100\ \text{mA}$ , $I_B = 5.0\ \text{mA}$ )<br>( $I_C = 10\ \text{mA}$ , $I_B = \text{See Note 1}$ ) | $V_{CE(\text{sat})}$  | —<br>—<br>—                            | 0.09<br>0.2<br>0.3               | 0.25<br>0.6<br>0.6                     | V    |
| Base–Emitter Saturation Voltage<br>( $I_C = 10\ \text{mA}$ , $I_B = 0.5\ \text{mA}$ )  | $V_{BE(\text{sat})}$  | —                                      | 0.7                              | —                                      | V    |
| Base–Emitter On Voltage<br>( $I_C = 2.0\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ )<br>( $I_C = 10\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ )   | $V_{BE(\text{on})}$   | 0.55<br>—                              | —<br>—                           | 0.7<br>0.77                            | V    |

**SMALL–SIGNAL CHARACTERISTICS**

|  |  |           |                                 |                             |                                 |     |
|--|--|-----------|---------------------------------|-----------------------------|---------------------------------|-----|
| Current–Gain — Bandwidth Product<br>( $I_C = 10\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ , $f = 100\ \text{MHz}$ )   | BC546<br>BC547<br>BC548  | $f_T$     | 150<br>150<br>150               | 300<br>300<br>300           | —<br>—<br>—                     | MHz |
| Output Capacitance<br>( $V_{CB} = 10\ \text{V}$ , $I_C = 0$ , $f = 1.0\ \text{MHz}$ )  |  | $C_{obo}$ | —                               | 1.7                         | 4.5                             | pF  |
| Input Capacitance<br>( $V_{EB} = 0.5\ \text{V}$ , $I_C = 0$ , $f = 1.0\ \text{MHz}$ )  |  | $C_{ibo}$ | —                               | 10                          | —                               | pF  |
| Small–Signal Current Gain<br>( $I_C = 2.0\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ , $f = 1.0\ \text{kHz}$ )   | BC546<br>BC547/548<br>BC547A/548A<br>BC546B/547B/548B<br>BC547C/548C | $h_{fe}$  | 125<br>125<br>125<br>240<br>450 | —<br>—<br>220<br>330<br>600 | 500<br>900<br>260<br>500<br>900 | —   |
| Noise Figure<br>( $I_C = 0.2\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ , $R_S = 2\ \text{k}\Omega$ ,<br>$f = 1.0\ \text{kHz}$ , $\Delta f = 200\ \text{Hz}$ ) | BC546<br>BC547<br>BC548  | NF        | —<br>—<br>—                     | 2.0<br>2.0<br>2.0           | 10<br>10<br>10                  | dB  |

Note 1:  $I_B$  is value for which  $I_C = 11\ \text{mA}$  at  $V_{CE} = 1.0\ \text{V}$ .

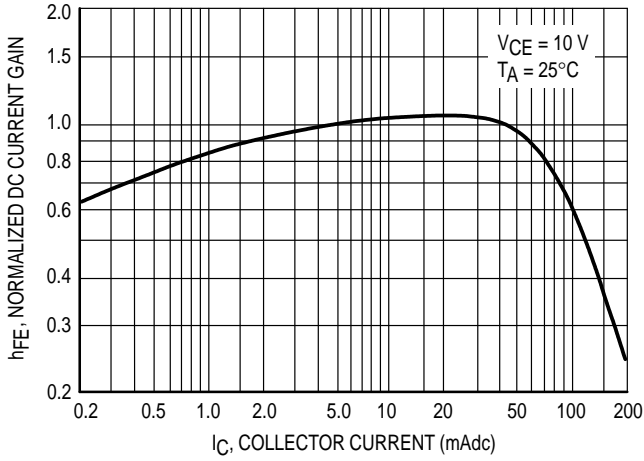


Figure 1. Normalized DC Current Gain

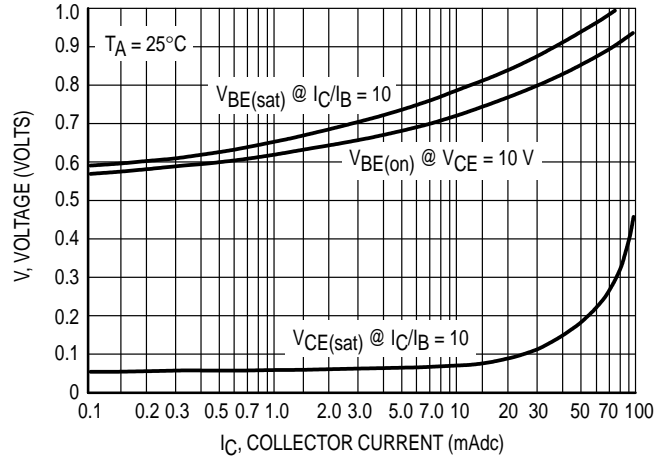


Figure 2. "Saturation" and "On" Voltages

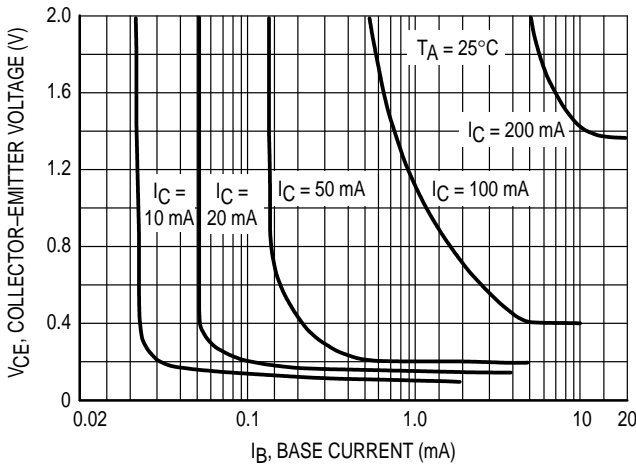


Figure 3. Collector Saturation Region

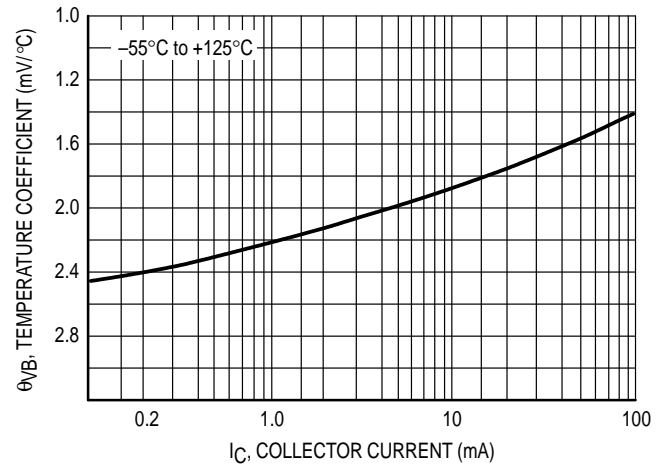


Figure 4. Base-Emitter Temperature Coefficient

BC547/BC548

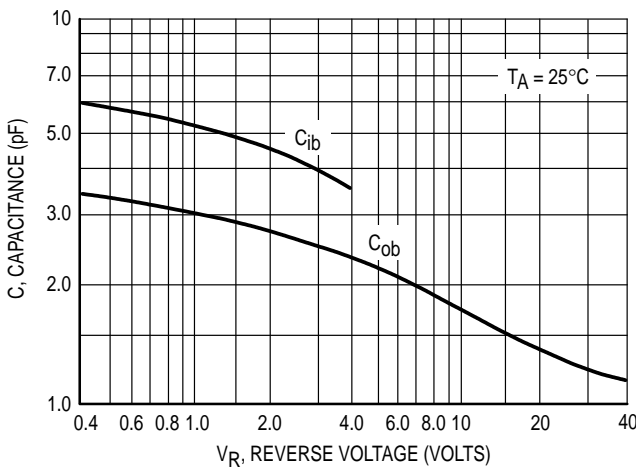


Figure 5. Capacitances

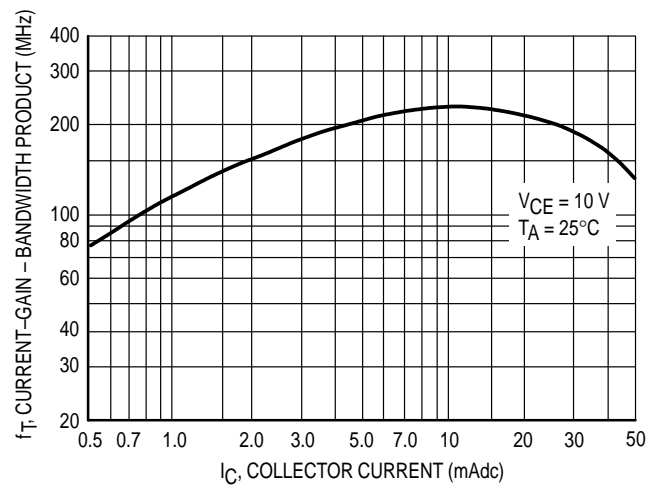


Figure 6. Current-Gain - Bandwidth Product

BC547/BC548

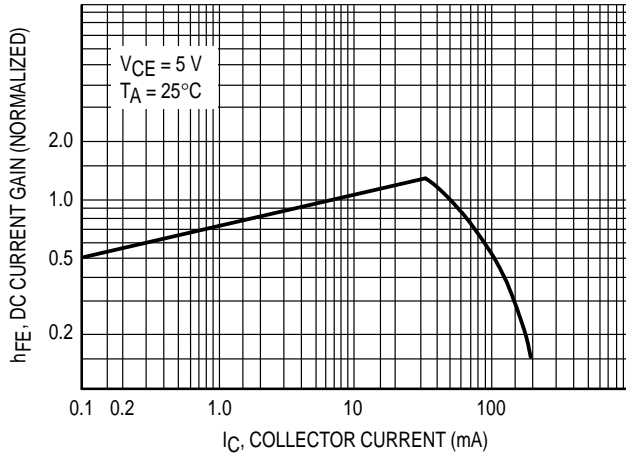


Figure 7. DC Current Gain

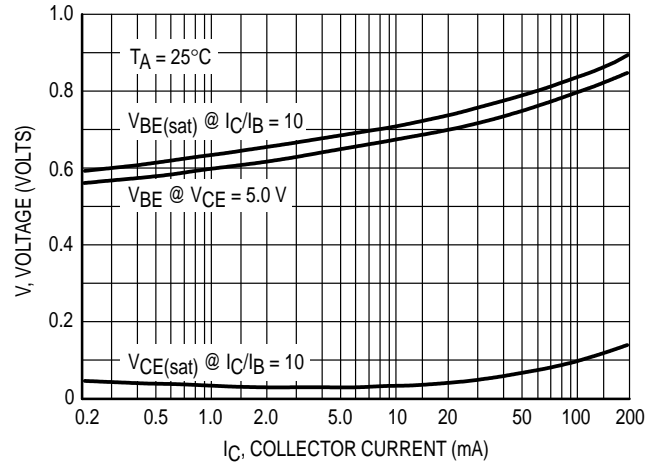


Figure 8. "On" Voltage

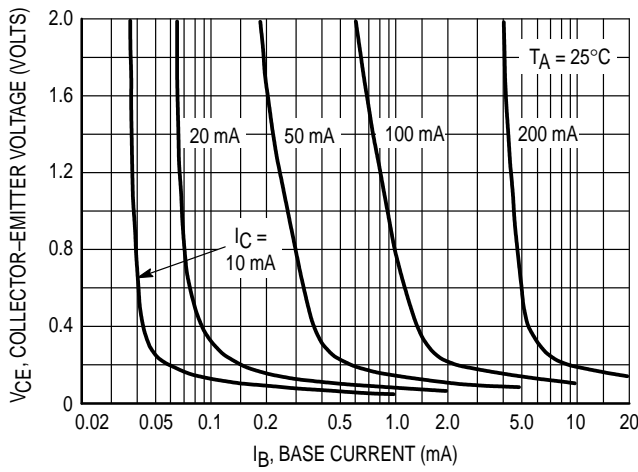


Figure 9. Collector Saturation Region

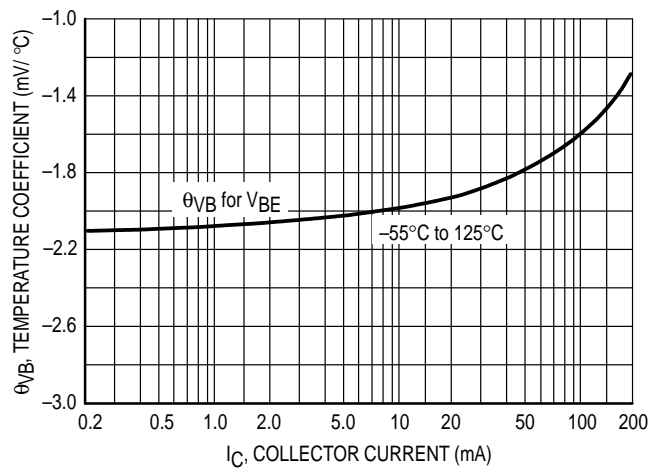


Figure 10. Base-Emitter Temperature Coefficient

BC546

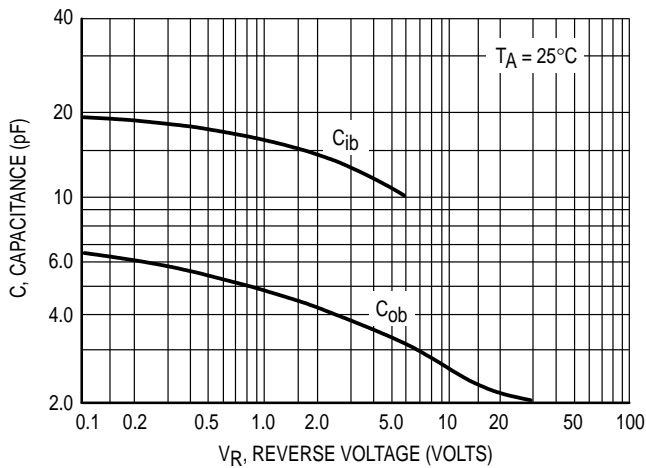


Figure 11. Capacitance

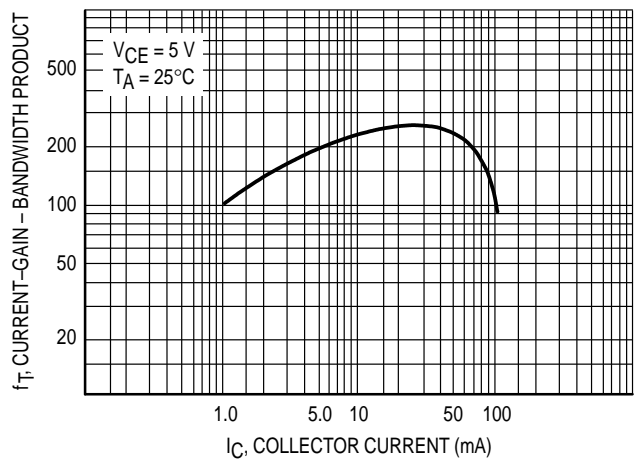
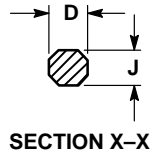
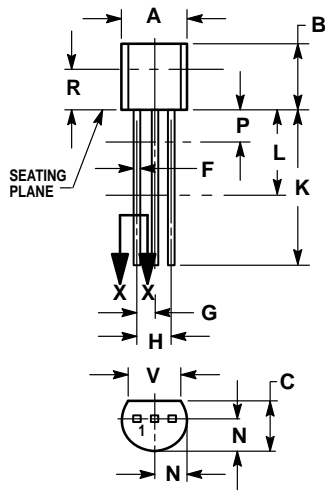


Figure 12. Current-Gain - Bandwidth Product

PACKAGE DIMENSIONS




CASE 029-04  
(TO-226AA)  
ISSUE AD

- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
  4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K MINIMUM. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES |       | MILLIMETERS |      |
|-----|--------|-------|-------------|------|
|     | MIN    | MAX   | MIN         | MAX  |
| A   | 0.175  | 0.205 | 4.45        | 5.20 |
| B   | 0.170  | 0.210 | 4.32        | 5.33 |
| C   | 0.125  | 0.165 | 3.18        | 4.19 |
| D   | 0.016  | 0.022 | 0.41        | 0.55 |
| F   | 0.016  | 0.019 | 0.41        | 0.48 |
| G   | 0.045  | 0.055 | 1.15        | 1.39 |
| H   | 0.095  | 0.105 | 2.42        | 2.66 |
| J   | 0.015  | 0.020 | 0.39        | 0.50 |
| K   | 0.500  | —     | 12.70       | —    |
| L   | 0.250  | —     | 6.35        | —    |
| N   | 0.080  | 0.105 | 2.04        | 2.66 |
| P   | —      | 0.100 | —           | 2.54 |
| R   | 0.115  | —     | 2.93        | —    |
| V   | 0.135  | —     | 3.43        | —    |

- STYLE 17:
1. PIN 1. COLLECTOR
  2. BASE
  3. EMITTER

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