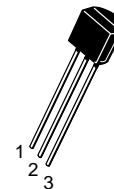
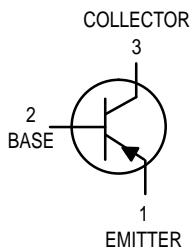


# High Voltage Transistor

## PNP Silicon

**BF493S**



CASE 29-04, STYLE 1  
TO-92 (TO-226AA)

### MAXIMUM RATINGS

| Rating   | Symbol         | Value       | Unit                          |
|--|----------------|-------------|-------------------------------|
| Collector–Emitter Voltage  | $V_{CEO}$      | –350        | Vdc                           |
| Collector–Base Voltage   | $V_{CBO}$      | –350        | Vdc                           |
| Emitter–Base Voltage   | $V_{EBO}$      | –6.0        | Vdc                           |
| Collector Current — Continuous   | $I_C$          | –500        | mAdc                          |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 625<br>5.0  | Watts<br>mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.5<br>12   | Watts<br>mW/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ | –55 to +150 | $^\circ\text{C}$              |

### THERMAL CHARACTERISTICS

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

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

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

### OFF CHARACTERISTICS

|   |               |        |                |           |
|---|---------------|--------|----------------|-----------|
| Collector–Emitter Breakdown Voltage <sup>(1)</sup><br>( $I_C = -1.0$ mAdc, $I_E = 0$ )  | $V_{(BR)CEO}$ | –350   | —              | Vdc       |
| Collector–Base Breakdown Voltage<br>( $I_C = -100$ $\mu$ Adc, $I_E = 0$ )   | $V_{(BR)CBO}$ | –350   | —              | Vdc       |
| Emitter–Base Breakdown Voltage<br>( $I_E = -100$ $\mu$ Adc, $I_C = 0$ )   | $V_{(BR)EBO}$ | –6.0   | —              | Vdc       |
| Collector Cutoff Current<br>( $V_{CE} = -250$ Vdc)  | $I_{CES}$     | —      | –10            | nAdc      |
| Emitter Cutoff Current<br>( $V_{EB} = -6.0$ Vdc, $I_C = 0$ )  | $I_{EBO}$     | —      | 0.1            | $\mu$ Adc |
| Collector Cutoff Current<br>( $V_{CB} = -250$ Vdc, $I_E = 0$ , $T_A = 25^\circ\text{C}$ )<br>( $V_{CB} = -250$ Vdc, $I_E = 0$ , $T_A = 100^\circ\text{C}$ ) | $I_{CBO}$     | —<br>— | –0.005<br>–1.0 | $\mu$ Adc |

1. Pulse Test: Pulse Width  $\leq 300$   $\mu$ s; Duty Cycle  $\leq 2.0\%$ .

**BF493S****ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted) (Continued)

| Characteristic   | Symbol               | Min      | Max    | Unit |
|--|----------------------|----------|--------|------|
| <b>ON CHARACTERISTICS</b>  |                      |          |        |      |
| DC Current Gain<br>( $I_C = -1.0 \text{ mAdc}$ , $V_{CE} = -10 \text{ Vdc}$ )<br>( $I_C = -10 \text{ mAdc}$ , $V_{CE} = -10 \text{ Vdc}$ ) | $h_{FE}$             | 25<br>40 | —<br>— | —    |
| Collector–Emitter Saturation Voltage<br>( $I_C = -20 \text{ mAdc}$ , $I_B = -2.0 \text{ mAdc}$ )   | $V_{CE(\text{sat})}$ | —        | -2.0   | Vdc  |
| Base–Emitter On Voltage<br>( $I_C = -20 \text{ mA}$ , $I_B = -2.0 \text{ mA}$ )  | $V_{BE(\text{sat})}$ | —        | -2.0   | Vdc  |
| <b>DYNAMIC CHARACTERISTICS</b>   |                      |          |        |      |
| Current–Gain — Bandwidth Product<br>( $I_C = -10 \text{ mAdc}$ , $V_{CE} = -20 \text{ Vdc}$ , $f = 20 \text{ MHz}$ )                       | $f_T$                | 50       | —      | MHz  |
| Common–Emitter Feedback Capacitance<br>( $V_{CB} = -100 \text{ Vdc}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )                                 | $C_{re}$             | —        | 1.6    | pF   |

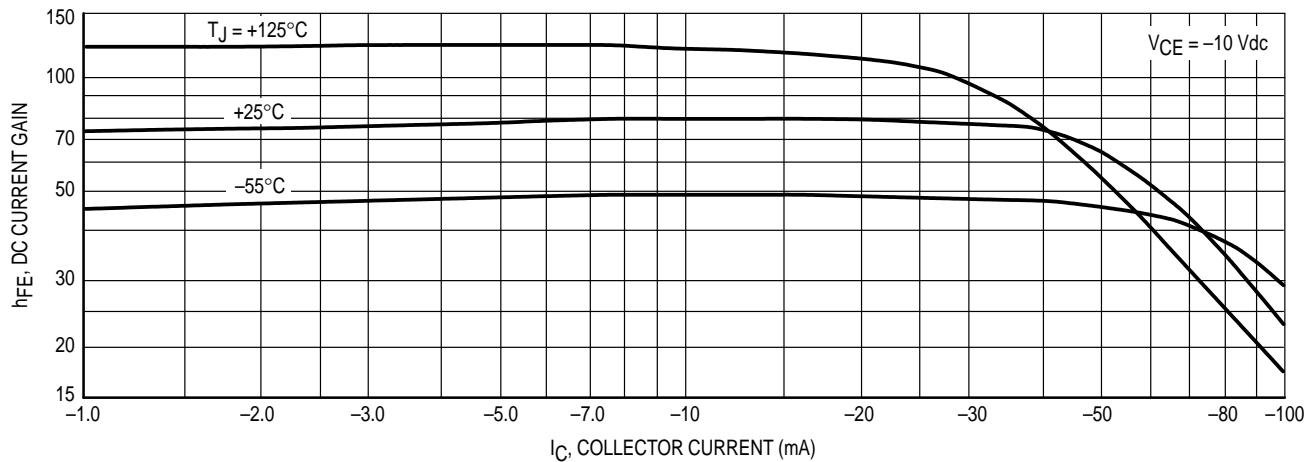


Figure 1. DC Current Gain

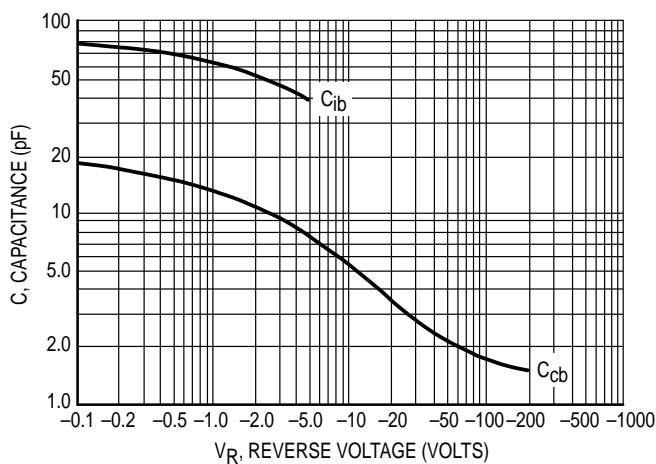


Figure 2. Capacitances

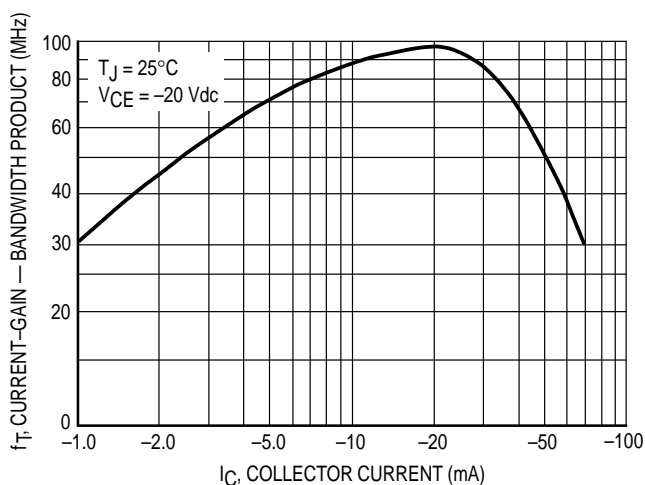


Figure 3. Current-Gain — Bandwidth Product

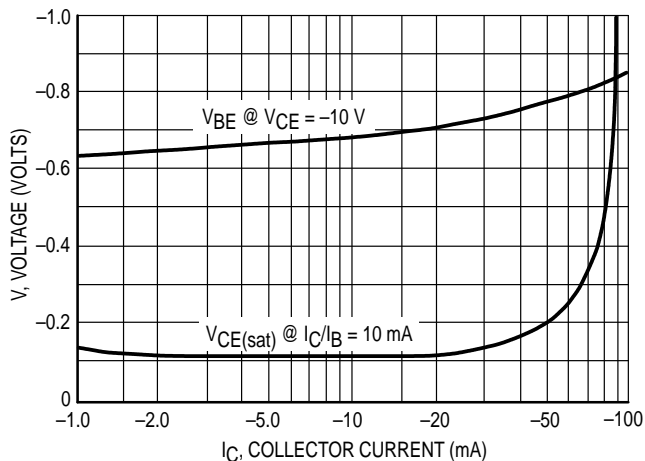


Figure 4. "On" Voltages

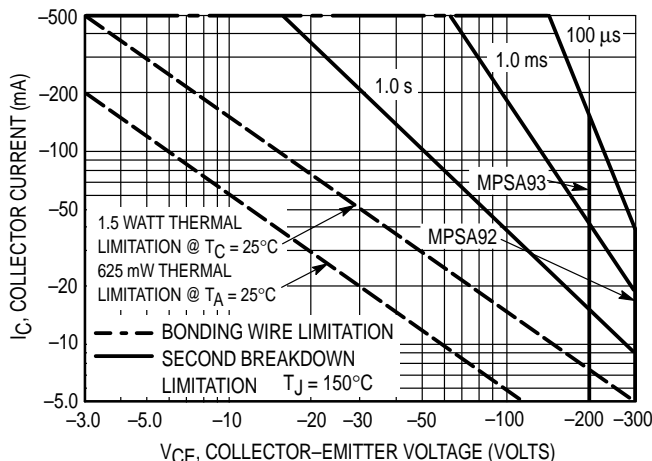
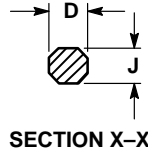
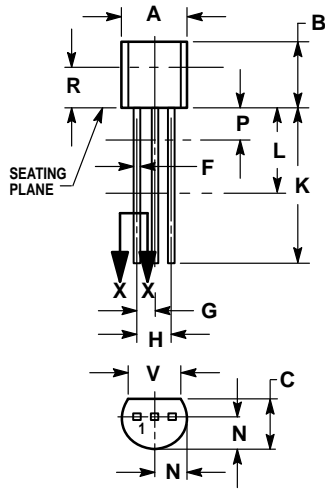


Figure 5. Active Region — Safe Operating Area

**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 1:**

1. EMITTER
2. BASE
3. COLLECTOR

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