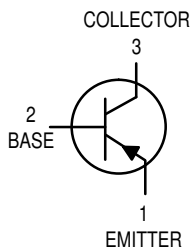


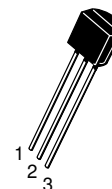
# High Voltage Transistors

## PNP Silicon



**MPSA92\***  
**MPSA93**

\*Motorola Preferred Device



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

### MAXIMUM RATINGS

| Rating   | Symbol         | MPSA92      | MPSA93 | Unit                          |
|--|----------------|-------------|--------|-------------------------------|
| Collector–Emitter Voltage  | $V_{CEO}$      | -300        | -200   | Vdc                           |
| Collector–Base Voltage   | $V_{CBO}$      | -300        | -200   | Vdc                           |
| Emitter–Base Voltage   | $V_{EBO}$      | -5.0        |        | 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         | 5.0    | mW<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         | 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>( $I_C = -1.0 \text{ mAdc}, I_E = 0$ )                     | MPSA92<br>MPSA93 | $V_{(BR)CEO}$ | -300<br>-200 | —<br>—         | Vdc             |
| Collector–Base Breakdown Voltage<br>( $I_C = -100 \mu\text{Adc}, I_E = 0$ )                                      | MPSA92<br>MPSA93 | $V_{(BR)CBO}$ | -300<br>-200 | —<br>—         | Vdc             |
| Emitter–Base Breakdown Voltage<br>( $I_E = -100 \mu\text{Adc}, I_C = 0$ )  |                  | $V_{(BR)EBO}$ | -5.0         | —              | Vdc             |
| Collector Cutoff Current<br>( $V_{CB} = -200 \text{ Vdc}, I_E = 0$ )<br>( $V_{CB} = -160 \text{ Vdc}, I_E = 0$ ) | MPSA92<br>MPSA93 | $I_{CBO}$     | —<br>—       | -0.25<br>-0.25 | $\mu\text{Adc}$ |
| Emitter Cutoff Current<br>( $V_{EB} = -3.0 \text{ Vdc}, I_C = 0$ )   |                  | $I_{EBO}$     | —            | -0.1           | $\mu\text{Adc}$ |

1. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

Preferred devices are Motorola recommended choices for future use and best overall value.

## MPSA92 MPSA93

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

| Characteristic   | Symbol                   | Min      | Max          | Unit |
|--|--------------------------|----------|--------------|------|
| <b>ON CHARACTERISTICS(1)</b>   |                          |          |              |      |
| DC Current Gain<br>( $I_C = -1.0\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )<br>( $I_C = -10\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ ) | Both Types<br>Both Types | 25<br>40 | —<br>—       | —    |
| ( $I_C = -30\text{ mAdc}$ , $V_{CE} = -10\text{ Vdc}$ )  | MPSA92<br>MPSA93         | 25<br>25 | —<br>—       | —    |
| Collector–Emitter Saturation Voltage<br>( $I_C = -20\text{ mAdc}$ , $I_B = -2.0\text{ mAdc}$ )   | MPSA92<br>MPSA93         | —<br>—   | -0.5<br>-0.4 | Vdc  |
| Base–Emitter Saturation Voltage<br>( $I_C = -20\text{ mAdc}$ , $I_B = -2.0\text{ mAdc}$ )  |                          | —        | -0.9         | Vdc  |
| <b>SMALL–SIGNAL CHARACTERISTICS</b>  |                          |          |              |      |
| Current–Gain — Bandwidth Product<br>( $I_C = -10\text{ mAdc}$ , $V_{CE} = -20\text{ Vdc}$ , $f = 100\text{ MHz}$ )                     |                          | 50       | —            | MHz  |
| Collector–Base Capacitance<br>( $V_{CB} = -20\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )   | MPSA92<br>MPSA93         | —<br>—   | 6.0<br>8.0   | pF   |

1. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

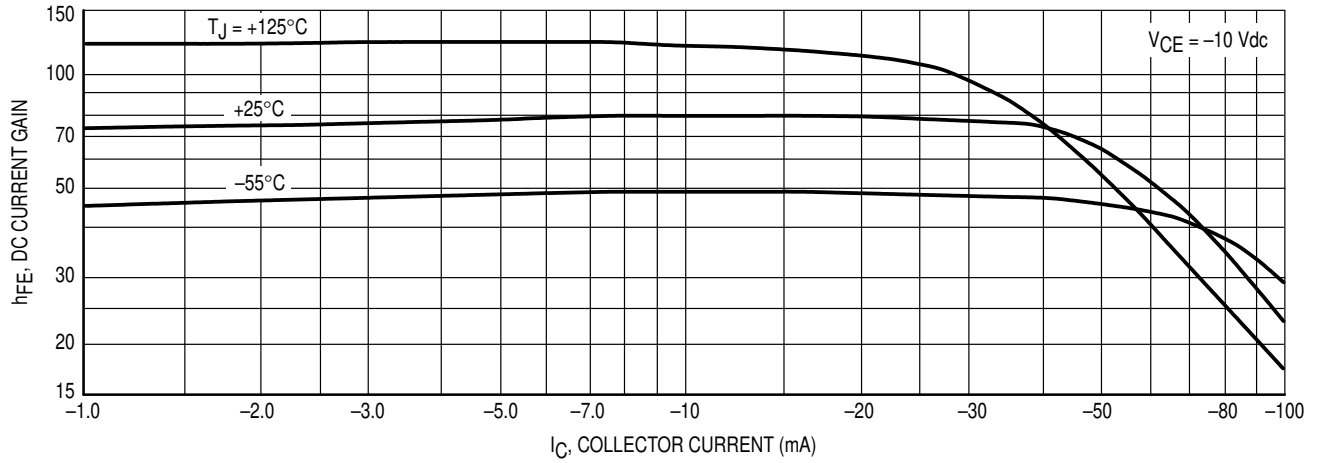


Figure 1. DC Current Gain

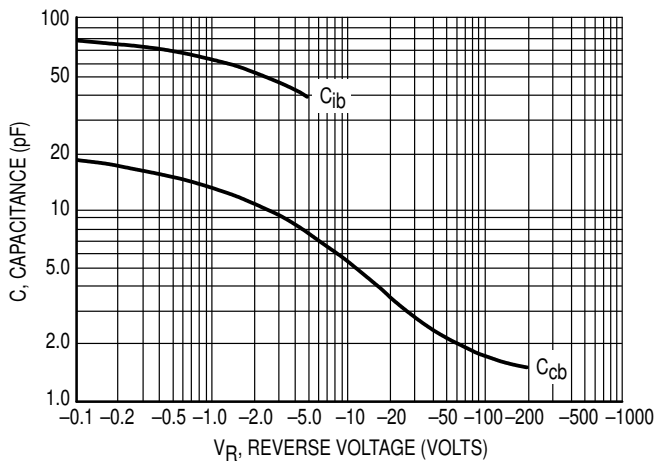


Figure 2. Capacitances

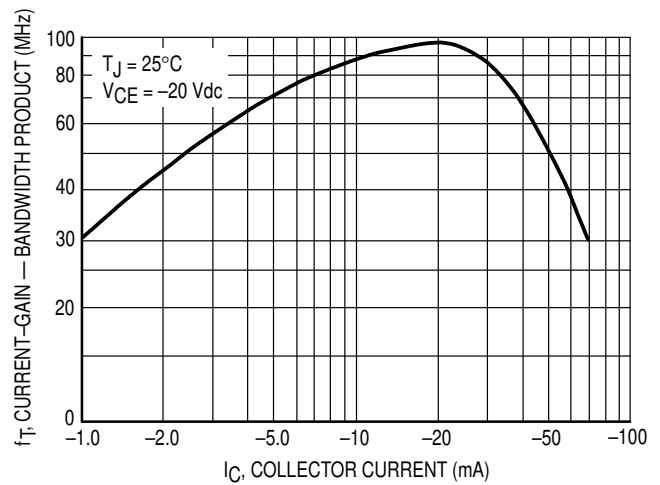


Figure 3. Current-Gain — Bandwidth Product

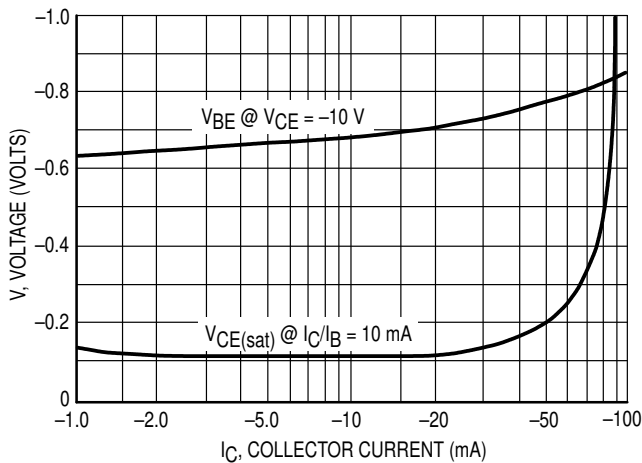


Figure 4. "On" Voltages

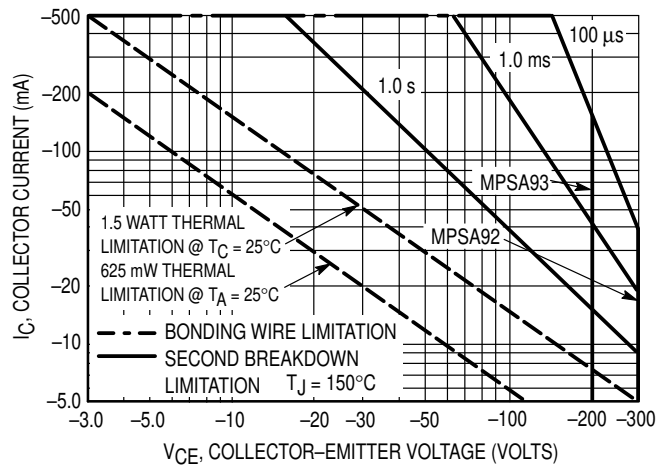
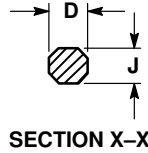
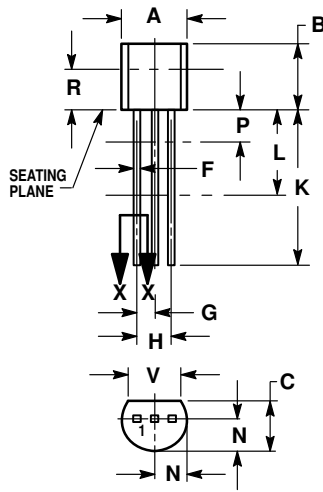


Figure 5. Active Region — Safe Operating Area

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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