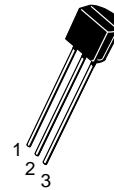
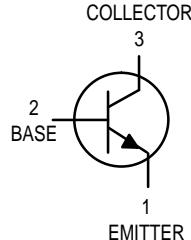


# Amplifier Transistor

## NPN Silicon

**MPS6428**



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

### MAXIMUM RATINGS

| Rating   | Symbol         | Value       | Unit                          |
|--|----------------|-------------|-------------------------------|
| Collector-Emitter Voltage  | $V_{CEO}$      | 50          | Vdc                           |
| Collector-Base Voltage   | $V_{CBO}$      | 60          | Vdc                           |
| Emitter-Base Voltage   | $V_{EBO}$      | 6.0         | Vdc                           |
| Collector Current — Continuous   | $I_C$          | 200         | 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/ $^\circ\text{C}$    |
| 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  | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case    | $R_{\theta JC}$ | 83.3 | $^\circ\text{C/W}$ |

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

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

### OFF CHARACTERISTICS

|  |               |    |       |               |
|--|---------------|----|-------|---------------|
| Collector-Emitter Breakdown Voltage<br>( $I_C = 1.0$ mAdc, $I_B = 0$ ) | $V_{(BR)CEO}$ | 50 | —     | Vdc           |
| Collector-Base Breakdown Voltage<br>( $I_C = 0.1$ mAdc, $I_E = 0$ )    | $V_{(BR)CBO}$ | 60 | —     | Vdc           |
| Collector Cutoff Current<br>( $V_{CE} = 30$ Vdc)                       | $I_{CES}$     | —  | 0.025 | $\mu\text{A}$ |
| Collector Cutoff Current<br>( $V_{CB} = 30$ Vdc, $I_E = 0$ )           | $I_{CBO}$     | —  | 0.01  | $\mu\text{A}$ |
| Emitter Cutoff Current<br>( $V_{EB} = 5.0$ Vdc, $I_C = 0$ )            | $I_{EBO}$     | —  | 0.01  | $\mu\text{A}$ |

**MPS6428****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>( $V_{CE} = 5.0 \text{ Vdc}$ , $I_C = 0.01 \text{ mA}$ )<br>( $V_{CE} = 5.0 \text{ Vdc}$ , $I_C = 0.1 \text{ mA}$ )<br>( $V_{CE} = 5.0 \text{ Vdc}$ , $I_C = 1.0 \text{ mA}$ )<br>( $V_{CE} = 5.0 \text{ Vdc}$ , $I_C = 10 \text{ mA}$ ) | $h_{FE}$             | 250<br>250<br>250<br>250 | —<br>650<br>—<br>— | —    |
| Collector-Emitter Saturation Voltage<br>( $I_C = 10 \text{ mA}$ , $I_B = 0.5 \text{ mA}$ )<br>( $I_C = 100 \text{ mA}$ , $I_B = 5.0 \text{ mA}$ )   | $V_{CE(\text{sat})}$ | —<br>—                   | 0.2<br>0.6         | Vdc  |
| Base-Emitter On Voltage<br>( $I_C = 1.0 \text{ mA}$ , $V_{CE} = 5.0 \text{ Vdc}$ )  | $V_{BE(\text{on})}$  | 0.56                     | 0.66               | Vdc  |

**SMALL-SIGNAL CHARACTERISTICS**

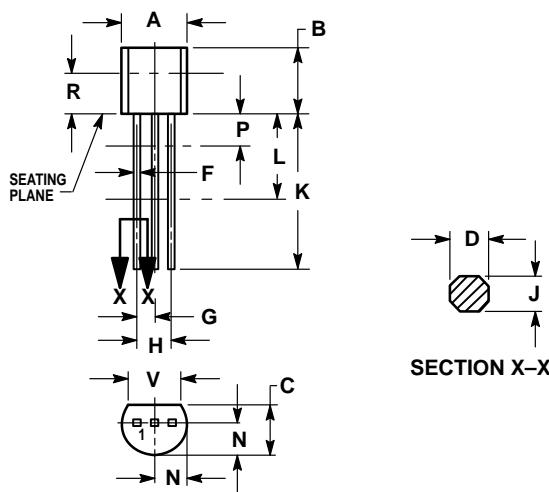
|   |           |     |     |                  |
|---|-----------|-----|-----|------------------|
| Current-Gain — Bandwidth Product<br>( $I_C = 1.0 \text{ mA}$ , $V_{CE} = 5.0 \text{ V}$ , $f = 100 \text{ MHz}$ ) | $f_T$     | 100 | 700 | MHz              |
| Output Capacitance<br>( $V_{CB} = 10 \text{ Vdc}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )                           | $C_{obo}$ | —   | 3.0 | pF               |
| Input Capacitance<br>( $V_{EB} = 0.5 \text{ Vdc}$ , $I_C = 0$ , $f = 1.0 \text{ MHz}$ )                           | $C_{ibo}$ | —   | 8.0 | pF               |
| Input Impedance<br>( $I_C = 1.0 \text{ mA}$ , $V_{CE} = 5.0 \text{ Vdc}$ , $f = 1.0 \text{ kHz}$ )                | $h_{ie}$  | 3.0 | 30  | k $\Omega$       |
| Voltage Feedback Ratio<br>( $I_C = 1.0 \text{ mA}$ , $V_{CE} = 5.0 \text{ Vdc}$ , $f = 1.0 \text{ kHz}$ )         | $h_{re}$  | 2.0 | 20  | $\times 10^{-4}$ |
| Small-Signal Current Gain<br>( $I_C = 1.0 \text{ mA}$ , $V_{CE} = 5.0 \text{ Vdc}$ , $f = 1.0 \text{ kHz}$ )      | $h_{fe}$  | 200 | 800 | —                |
| Output Admittance<br>( $I_C = 1.0 \text{ mA}$ , $V_{CE} = 5.0 \text{ Vdc}$ , $f = 1.0 \text{ kHz}$ )              | $h_{oe}$  | 5.0 | 50  | $\mu\text{mhos}$ |

**NOISE FIGURE/TOTAL NOISE VOLTAGE CHARACTERISTICS**

|  | NF<br>Max (1) |      | NF<br>Max (2) |      | NF<br>Max (3) |     | Unit |    |
|--|---------------|------|---------------|------|---------------|-----|------|----|
| Noise Figure/Voltage<br>( $V_{CE} = 5.0 \text{ V}$ , $I_C = 0.1 \text{ mA}$ , $T_A = 25^\circ\text{C}$ ) | 7.0           | 18.1 | 6.0           | 5700 | 3.5           | 4.3 | dB   | nV |

- $R_S = 10 \text{ k}\Omega$ ,  $\text{BW} = 1.0 \text{ Hz}$ ,  $f = 100 \text{ Hz}$
- $R_S = 50 \text{ k}\Omega$ ,  $\text{BW} = 15.7 \text{ kHz}$ ,  $f = 10 \text{ Hz}$ – $10 \text{ kHz}$
- $R_S = 500 \Omega$ ,  $\text{BW} = 1.0 \text{ Hz}$ ,  $f = 10 \text{ Hz}$

## PACKAGE DIMENSIONS



## 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        | —    |

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

STYLE 1:  
 1. Emitter  
 2. Base  
 3. Collector

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