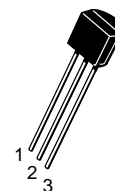
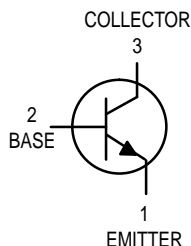


# Amplifier Transistor

## NPN Silicon

**MPS4124**



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

### MAXIMUM RATINGS

| Rating  | Symbol         | Value       | Unit                       |
|---|----------------|-------------|----------------------------|
| Collector–Emitter Voltage   | $V_{CE}$       | 25          | Vdc                        |
| Collector–Base Voltage  | $V_{CB}$       | 30          | Vdc                        |
| Emitter–Base Voltage  | $V_{EB}$       | 5.0         | Vdc                        |
| Collector Current — Continuous  | $I_C$          | 200         | mAdc                       |
| Total Power 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 Power Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.5<br>12   | W<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<br>( $I_C = 1.0\text{ mA}$ , $I_E = 0$ )      | $V_{(BR)CEO}$ | 25  | —  | Vdc  |
| Collector–Base Breakdown Voltage<br>( $I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$ ) | $V_{(BR)CBO}$ | 30  | —  | Vdc  |
| Emitter–Base Breakdown Voltage<br>( $I_C = 0$ , $I_E = 10\text{ }\mu\text{A}$ )   | $V_{(BR)EBO}$ | 5.0 | —  | Vdc  |
| Collector Cutoff Current<br>( $V_{CB} = 20\text{ V}$ , $I_E = 0$ )                | $I_{CBO}$     | —   | 50 | nAdc |
| Emitter Cutoff Current<br>( $V_{EB} = 3.0\text{ V}$ , $I_C = 0$ )                 | $I_{EBO}$     | —   | 50 | nAdc |

(Replaces MPS4123/D)

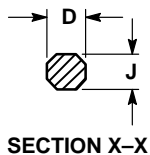
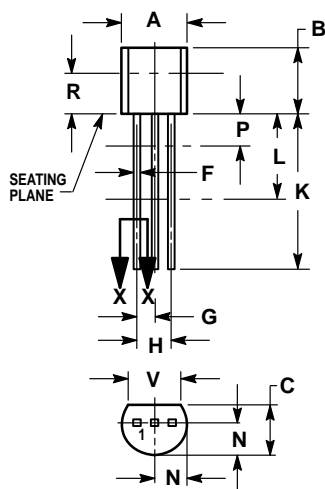
**MPS4124****ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted) (Continued)

| Characteristic   | Symbol        | Min       | Max      | Unit |
|--|---------------|-----------|----------|------|
| <b>ON CHARACTERISTICS</b>  |               |           |          |      |
| DC Current Gain<br>( $I_C = 2.0\text{ mA}$ , $V_{CE} = 1.0\text{ V}$ )<br>( $I_C = 50\text{ mA}$ , $V_{CE} = 1.0\text{ V}$ ) | $h_{FE}$      | 120<br>60 | 360<br>— | —    |
| Collector–Emitter Saturation Voltage<br>( $I_C = 50\text{ mA}$ , $I_B = 5.0\text{ mA}$ )                                     | $V_{CE(sat)}$ | —         | 0.3      | Vdc  |
| Base–Emitter Saturation Voltage<br>( $I_C = 50\text{ mA}$ , $I_B = 5.0\text{ mA}$ )  | $V_{BE(sat)}$ | —         | 0.95     | Vdc  |

**SMALL–SIGNAL CHARACTERISTICS**

|  |          |     |      |     |
|--|----------|-----|------|-----|
| Current–Gain — Bandwidth Product<br>( $I_C = 10\text{ mA}$ , $V_{CE} = 20\text{ V}$ , $f = 100\text{ MHz}$ )                     | $f_T$    | 170 | —    | MHz |
| Output Capacitance<br>( $V_{CB} = 5.0\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )   | $C_{ob}$ | —   | 4.0  | pF  |
| Input Capacitance<br>( $V_{EB} = 0.5\text{ V}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$ )  | $C_{ib}$ | —   | 13.5 | pF  |
| Small–Signal Current Gain<br>( $I_C = 2.0\text{ mA}$ , $V_{CE} = 1.0\text{ V}$ , $f = 1.0\text{ kHz}$ )                          | $h_{fe}$ | 120 | 480  | —   |
| Noise Figure<br>( $I_C = 100\text{ }\mu\text{A}$ , $V_{CE} = 5.0\text{ V}$ , $R_S = 1.0\text{ k}\Omega$ , $f = 1.0\text{ kHz}$ ) | NF       | —   | 5.0  | dB  |

## PACKAGE DIMENSIONS



SECTION X-X

**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. PIN 1. EMITTER
2. BASE
3. COLLECTOR

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