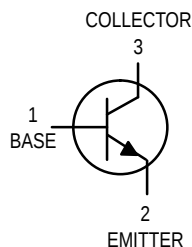


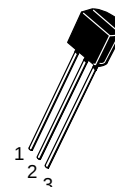
# VHF/UHF Transistors

## NPN Silicon



**MPSH10**  
**MPSH11**

Motorola Preferred Devices



CASE 29-04, STYLE 2  
TO-92 (TO-226AA)

### MAXIMUM RATINGS

| Rating                                                                                 | Symbol         | Value           | Unit                          |
|----------------------------------------------------------------------------------------|----------------|-----------------|-------------------------------|
| Collector–Emitter Voltage                                                              | $V_{CEO}$      | 25              | Vdc                           |
| Collector–Base Voltage                                                                 | $V_{CBO}$      | 30              | Vdc                           |
| Emitter–Base Voltage                                                                   | $V_{EBO}$      | 3.0             | Vdc                           |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 350<br>2.8      | mW<br>mW/ $^\circ\text{C}$    |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 1.0<br>8.0      | 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 | $R_{\theta JA}$ | 357 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case    | $R_{\theta JC}$ | 125 | $^\circ\text{C/W}$ |

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

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

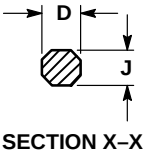
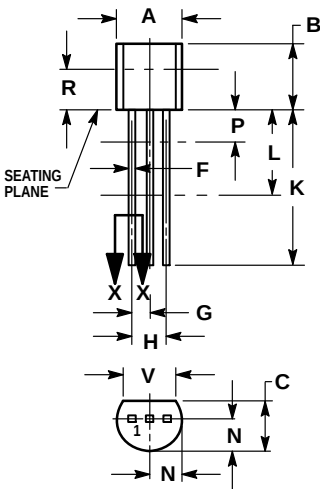
### OFF CHARACTERISTICS

|                                                                          |               |     |     |      |
|--------------------------------------------------------------------------|---------------|-----|-----|------|
| Collector–Emitter Breakdown Voltage<br>( $I_C = 1.0$ mAdc, $I_E = 0$ )   | $V_{(BR)CEO}$ | 25  | —   | Vdc  |
| Collector–Base Breakdown Voltage<br>( $I_C = 100$ $\mu$ Adc, $I_E = 0$ ) | $V_{(BR)CBO}$ | 30  | —   | Vdc  |
| Emitter–Base Breakdown Voltage<br>( $I_E = 10$ $\mu$ Adc, $I_C = 0$ )    | $V_{(BR)EBO}$ | 3.0 | —   | Vdc  |
| Collector Cutoff Current<br>( $V_{CB} = 25$ Vdc, $I_E = 0$ )             | $I_{CBO}$     | —   | 100 | nAdc |
| Emitter Cutoff Current<br>( $V_{EB} = 2.0$ Vdc, $I_C = 0$ )              | $I_{EBO}$     | —   | 100 | nAdc |

**MPSH10 MPSH11****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>( $I_C = 4.0\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )                                         | $h_{FE}$      | 60          | —           | —    |
| Collector–Emitter Saturation Voltage<br>( $I_C = 4.0\text{ mA}$ , $I_B = 0.4\text{ mA}$ )                       | $V_{CE(sat)}$ | —           | 0.5         | Vdc  |
| Base–Emitter On Voltage<br>( $I_C = 4.0\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )                                 | $V_{BE(on)}$  | —           | 0.95        | Vdc  |
| <b>SMALL–SIGNAL CHARACTERISTICS</b>                                                                             |               |             |             |      |
| Current–Gain — Bandwidth Product<br>( $I_C = 4.0\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 100\text{ MHz}$ ) | $f_T$         | 650         | —           | MHz  |
| Collector–Base Capacitance<br>( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )                   | $C_{cb}$      | —           | 0.7         | pF   |
| Common–Base Feedback Capacitance<br>( $V_{CB} = 10\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )             | $C_{rb}$      | 0.35<br>0.6 | 0.65<br>0.9 | pF   |
| Collector Base Time Constant<br>( $I_C = 4.0\text{ mA}$ , $V_{CB} = 10\text{ Vdc}$ , $f = 31.8\text{ MHz}$ )    | $r_b'C_c$     | —           | 9.0         | ps   |

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

