



**THE DATASHEET OF  
MSD2714AT1**



# MSD2714AT1

Preferred Device

## VHF/UHF Transistor

### NPN Silicon

#### Features

- Pb-Free Package is Available

#### MAXIMUM RATINGS

| Rating                    | Symbol    | Max | Unit |
|---------------------------|-----------|-----|------|
| Collector-Emitter Voltage | $V_{CEO}$ | 25  | Vdc  |
| Collector-Base Voltage    | $V_{CBO}$ | 30  | Vdc  |
| Emitter-Base Voltage      | $V_{EBO}$ | 3.0 | Vdc  |

#### THERMAL CHARACTERISTICS

| Characteristic   | Symbol            | Max         | Unit                       |
|--|-------------------|-------------|----------------------------|
| Total Device Dissipation FR-5 Board<br>$T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$         | $P_D$<br>(Note 1) | 225<br>1.8  | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient  | $R_{\theta JA}$   | 556         | $^\circ\text{C}/\text{W}$  |
| Total Device Dissipation Alumina<br>Substrate, $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$<br>(Note 2) | 300<br>2.4  | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Ambient  | $R_{\theta JA}$   | 625         | $^\circ\text{C}/\text{W}$  |
| Junction and Storage Temperature Range   | $T_J, T_{stg}$    | -55 to +150 | $^\circ\text{C}$           |

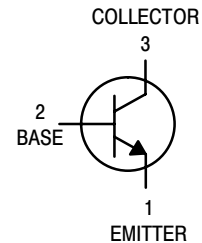
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

- FR-5 = 1.0 X 0.75 X 0.062 in.
- Alumina = 0.4 X 0.3 X 0.024 in. 99.5% alumina



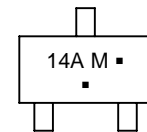
ON Semiconductor®

<http://onsemi.com>



SC-59  
CASE 318D  
STYLE 1

#### MARKING DIAGRAM



14A = Specific Device Code

M = Date Code\*

▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation may vary depending upon manufacturing location

#### ORDERING INFORMATION

| Device      | Package            | Shipping†          |
|-------------|--------------------|--------------------|
| MSD2714AT1  | SC-59              | 3000 / Tape & Reel |
| MSD2714AT1G | SC-59<br>(Pb-Free) | 3000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

# MSD2714AT1

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

| Characteristic   | Symbol               | Min | Typ | Max  | Unit             |
|--|----------------------|-----|-----|------|------------------|
| <b>OFF CHARACTERISTICS</b>   |                      |     |     |      |                  |
| Collector–Emitter Breakdown Voltage<br>(I <sub>C</sub> = 1.0 mA <sub>dc</sub> , I <sub>B</sub> = 0)                              | V <sub>(BR)CEO</sub> | 25  | –   | –    | V <sub>dc</sub>  |
| Collector–Base Breakdown Voltage<br>(I <sub>C</sub> = 10 μA <sub>dc</sub> , I <sub>E</sub> = 0)                                  | V <sub>(BR)CBO</sub> | 30  | –   | –    | V <sub>dc</sub>  |
| Emitter–Base Breakdown Voltage<br>(I <sub>E</sub> = 10 μA <sub>dc</sub> , I <sub>C</sub> = 0)                                    | V <sub>(BR)EBO</sub> | 3.0 | –   | –    | V <sub>dc</sub>  |
| Collector Cutoff Current<br>(V <sub>CB</sub> = 35 V <sub>dc</sub> , I <sub>E</sub> = 0)  | I <sub>CBO</sub>     | –   | –   | 500  | nA <sub>dc</sub> |
| Emitter Cutoff Current<br>(V <sub>EB</sub> = 3.5 V <sub>dc</sub> , I <sub>C</sub> = 0)   | I <sub>EBO</sub>     | –   | –   | 500  | nA <sub>dc</sub> |
| <b>ON CHARACTERISTICS</b>  |                      |     |     |      |                  |
| DC Current Gain<br>(I <sub>C</sub> = 1.0 mA <sub>dc</sub> , V <sub>CE</sub> = 6.0 V <sub>dc</sub> )                              | h <sub>FE</sub>      | 90  | –   | 180  | –                |
| Base–Emitter On Voltage<br>(I <sub>C</sub> = 4.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> )                       | V <sub>BE</sub>      | –   | –   | 0.95 | V <sub>dc</sub>  |
| <b>SMALL-SIGNAL CHARACTERISTICS</b>  |                      |     |     |      |                  |
| Current–Gain – Bandwidth Product<br>(I <sub>C</sub> = 4.0 mA <sub>dc</sub> , V <sub>CE</sub> = 10 V <sub>dc</sub> , f = 100 MHz) | f <sub>T</sub>       | 650 | –   | –    | MHz              |
| Collector–Base Capacitance<br>(V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)                           | C <sub>cb</sub>      | –   | –   | 0.7  | pF               |
| Common–Base Feedback Capacitance<br>(V <sub>CB</sub> = 10 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)                     | C <sub>fb</sub>      | –   | –   | 0.65 | pF               |
| Collector Base Time Constant<br>(I <sub>C</sub> = 4.0 mA <sub>dc</sub> , V <sub>CB</sub> = 10 V <sub>dc</sub> , f = 31.8 MHz)    | rb'C <sub>c</sub>    | –   | –   | 9.0  | ps               |

## TYPICAL CHARACTERISTICS

### COMMON-BASE y PARAMETERS versus FREQUENCY

(V<sub>CB</sub> = 10 V<sub>dc</sub>, I<sub>C</sub> = 4.0 mA<sub>dc</sub>, T<sub>A</sub> = 25°C)

#### y<sub>ib</sub>, INPUT ADMITTANCE

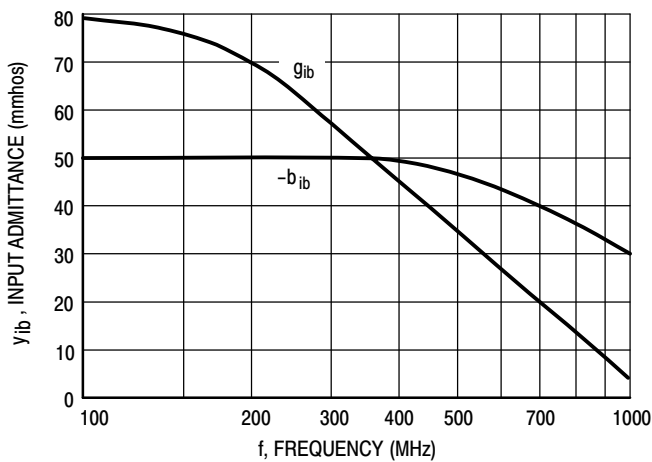


Figure 1. Rectangular Form

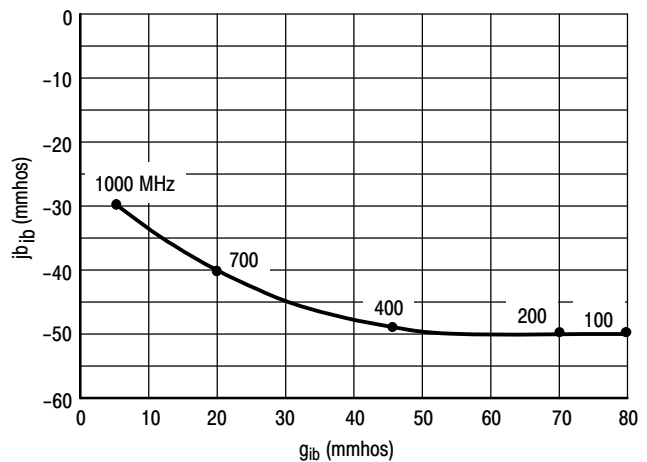


Figure 2. Polar Form

# MSD2714AT1

## TYPICAL CHARACTERISTICS

### $y_{fb}$ , FORWARD TRANSFER ADMITTANCE

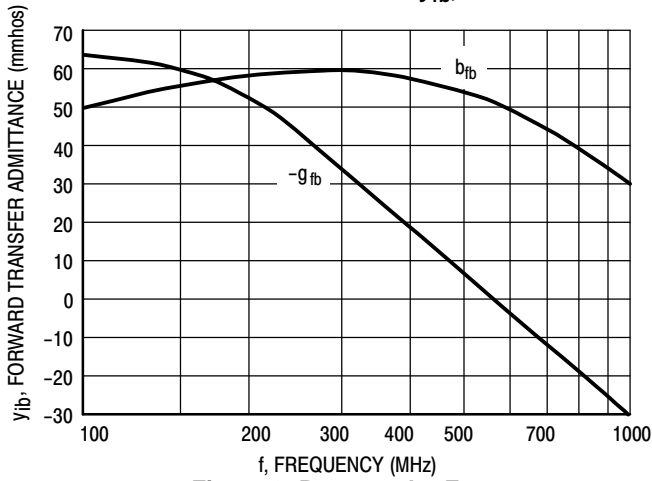


Figure 3. Rectangular Form

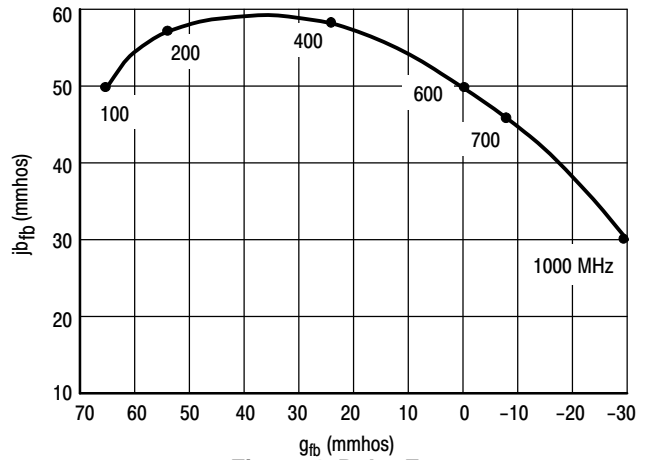


Figure 4. Polar Form

### COMMON-BASE $y$ PARAMETERS versus FREQUENCY

( $V_{CB} = 10$  Vdc,  $I_C = 4.0$  mAdc,  $T_A = 25^\circ\text{C}$ )

### $y_{rb}$ , REVERSE TRANSFER ADMITTANCE

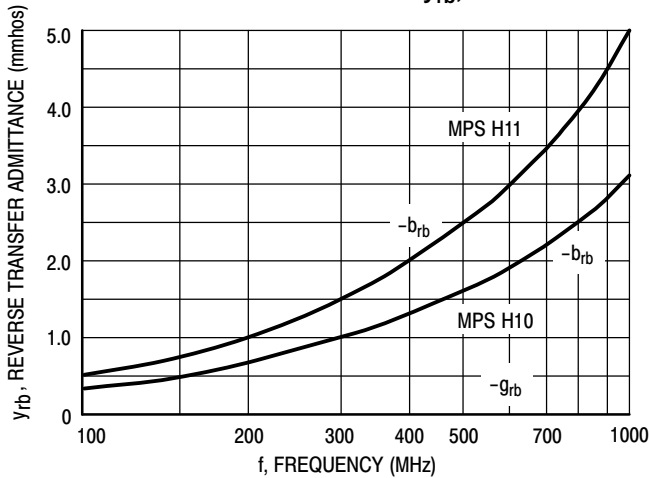


Figure 5. Rectangular Form

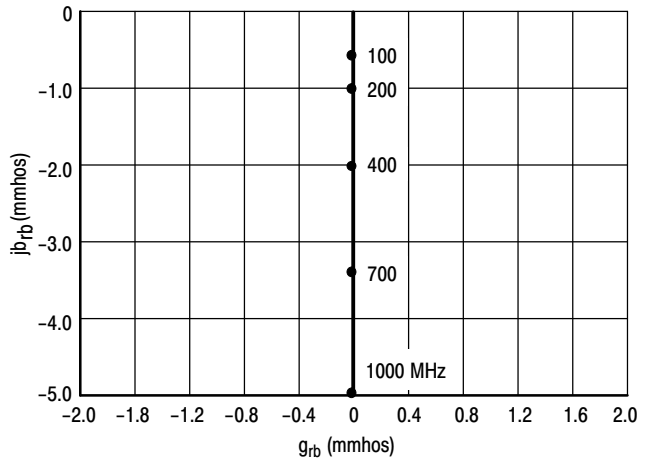


Figure 6. Polar Form

### $y_{ob}$ , OUTPUT ADMITTANCE

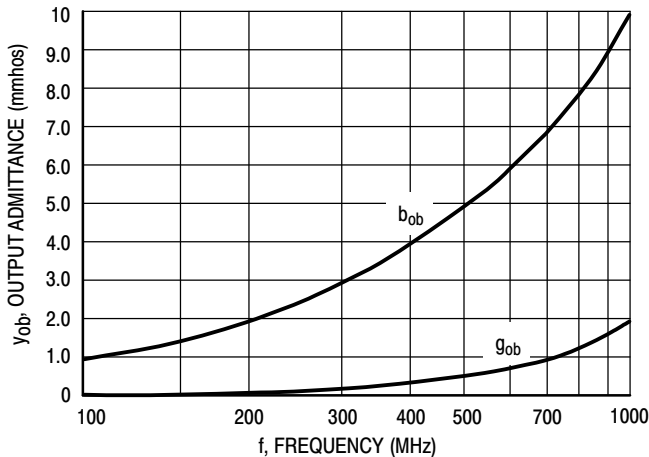


Figure 7. Rectangular Form

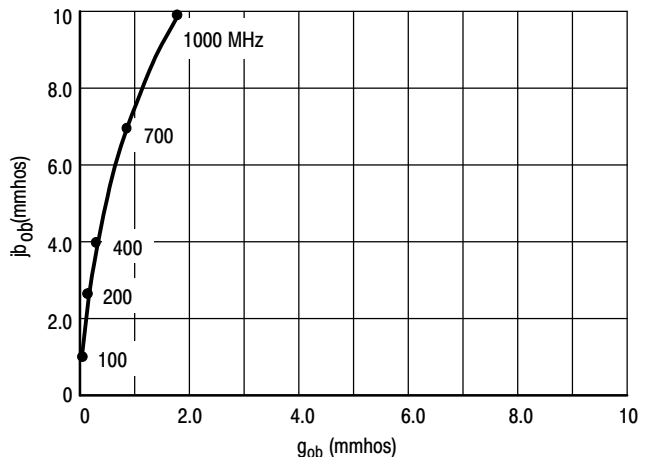
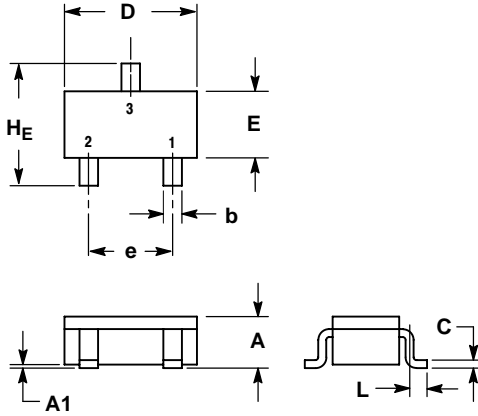


Figure 8. Polar Form

# MSD2714AT1

## PACKAGE DIMENSIONS

SC-59  
CASE 318D-04  
ISSUE G



NOTES:

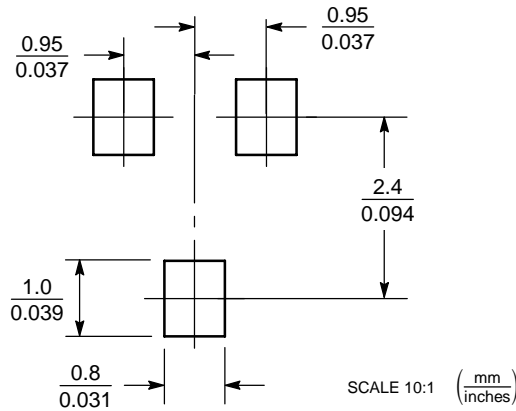
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.

| DIM | MILLIMETERS |      |      | INCHES |       |       |
|-----|-------------|------|------|--------|-------|-------|
|     | MIN         | NOM  | MAX  | MIN    | NOM   | MAX   |
| A   | 1.00        | 1.15 | 1.30 | 0.039  | 0.045 | 0.051 |
| A1  | 0.01        | 0.06 | 0.10 | 0.001  | 0.002 | 0.004 |
| b   | 0.35        | 0.43 | 0.50 | 0.014  | 0.017 | 0.020 |
| c   | 0.09        | 0.14 | 0.18 | 0.003  | 0.005 | 0.007 |
| D   | 2.70        | 2.90 | 3.10 | 0.106  | 0.114 | 0.122 |
| E   | 1.30        | 1.50 | 1.70 | 0.051  | 0.059 | 0.067 |
| e   | 1.70        | 1.90 | 2.10 | 0.067  | 0.075 | 0.083 |
| L   | 0.20        | 0.40 | 0.60 | 0.008  | 0.016 | 0.024 |
| HE  | 2.50        | 2.80 | 3.00 | 0.099  | 0.110 | 0.118 |


STYLE 1:

1. EMITTER
2. BASE
3. COLLECTOR

### SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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