

# MBD701, MMBD701LT1

Preferred Device

## Silicon Hot-Carrier Diodes

### Schottky Barrier Diodes

These devices are designed primarily for high-efficiency UHF and VHF detector applications. They are readily adaptable to many other fast switching RF and digital applications. They are supplied in an inexpensive plastic package for low-cost, high-volume consumer and industrial/commercial requirements. They are also available in a Surface Mount package.

#### Features

- Extremely Low Minority Carrier Lifetime – 15 ps (Typ)
- Very Low Capacitance – 1.0 pF @  $V_R = 20$  V
- High Reverse Voltage – to 70 V
- Low Reverse Leakage – 200 nA (Max)
- Pb-Free Packages are Available

#### MAXIMUM RATINGS

| Rating  | Symbol    | Value       | Unit                 |
|---|-----------|-------------|----------------------|
| Reverse Voltage   | $V_R$     | 70          | V                    |
| Forward Power Dissipation<br>@ $T_A = 25^\circ\text{C}$ | $P_F$     | 280<br>200  | mW                   |
| Derate above $25^\circ\text{C}$                         |           | 2.8<br>2.0  | mW/ $^\circ\text{C}$ |
| Operating Junction Temperature Range                    | $T_J$     | -55 to +125 | $^\circ\text{C}$     |
| Storage Temperature Range                               | $T_{stg}$ | -55 to +150 | $^\circ\text{C}$     |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

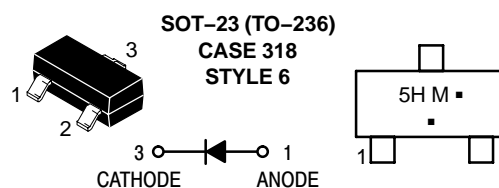
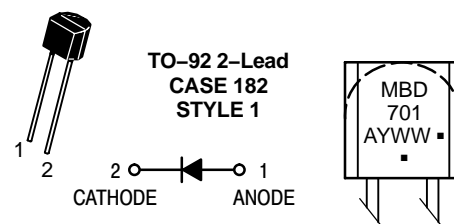
| Characteristic   | Symbol      | Min | Typ  | Max | Unit |
|--|-------------|-----|------|-----|------|
| Reverse Breakdown Voltage<br>( $I_R = 10 \mu\text{A}$ )      | $V_{(BR)R}$ | 70  | -    | -   | V    |
| Total Capacitance<br>( $V_R = 20$ V, $f = 1.0$ MHz) Figure 1 | $C_T$       | -   | 0.5  | 1.0 | pF   |
| Reverse Leakage<br>( $V_R = 35$ V) Figure 3                  | $I_R$       | -   | 9.0  | 200 | nA   |
| Forward Voltage<br>( $I_F = 1.0$ mA) Figure 4                | $V_F$       | -   | 0.42 | 0.5 | Vdc  |
| Forward Voltage<br>( $I_F = 10$ mA) Figure 4                 | $V_F$       | -   | 0.7  | 1.0 | Vdc  |



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#### MARKING DIAGRAMS



A = Assembly Location  
 Y = Year  
 WW = Work Week  
 5H = Device Code (SOT-23)  
 M = Date Code\*  
 ■ = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation and/or overbar may vary depending upon manufacturing location.

#### ORDERING INFORMATION

| Device      | Package             | Shipping†           |
|-------------|---------------------|---------------------|
| MBD701      | TO-92               | 1,000 Units / Box   |
| MBD701G     | TO-92<br>(Pb-Free)  | 1,000 Units / Box   |
| MMBD701LT1  | SOT-23              | 3,000 / Tape & Reel |
| MMBD701LT1G | SOT-23<br>(Pb-Free) | 3,000 / Tape & Reel |
| MMBD701LT3  | SOT-23              | 10,000/Tape & Reel  |
| MMBD701LT3G | SOT-23<br>(Pb-Free) | 10,000/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.

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## TYPICAL ELECTRICAL CHARACTERISTICS

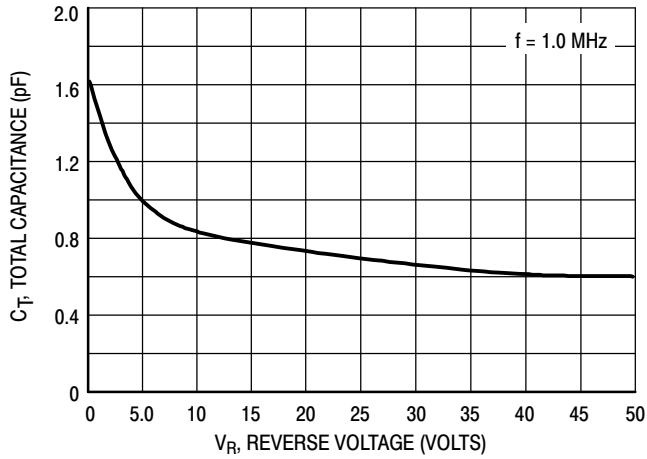


Figure 1. Total Capacitance

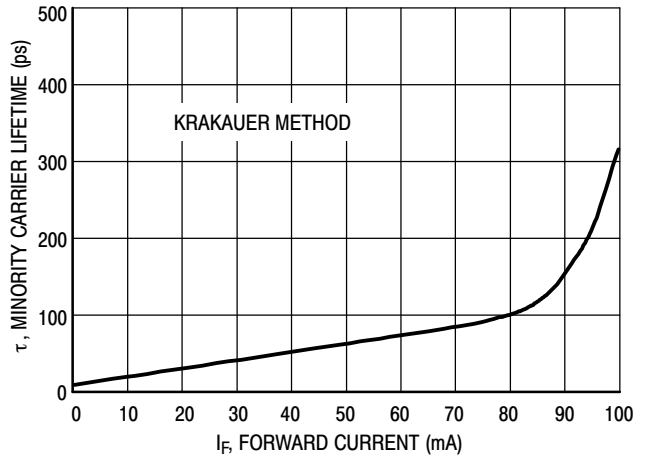


Figure 2. Minority Carrier Lifetime

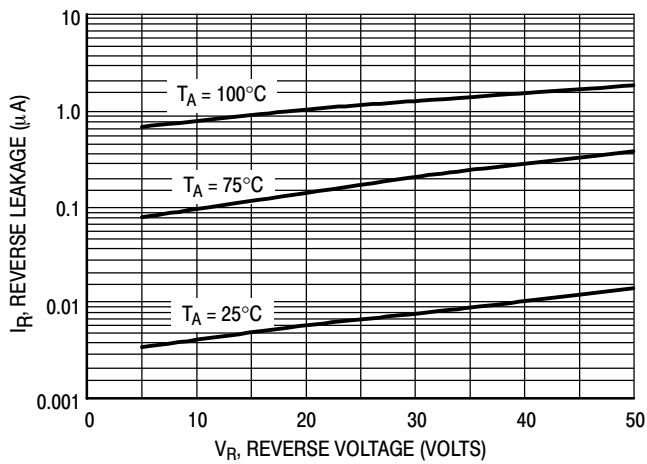


Figure 3. Reverse Leakage

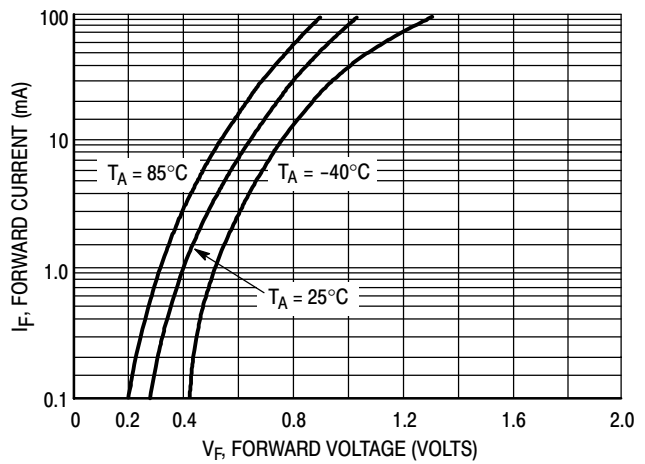


Figure 4. Forward Voltage

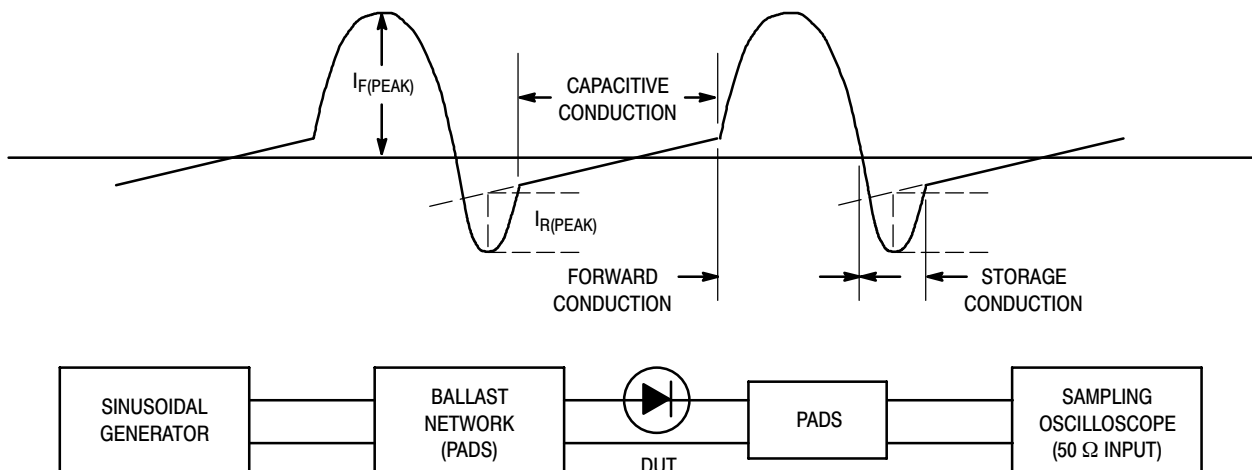
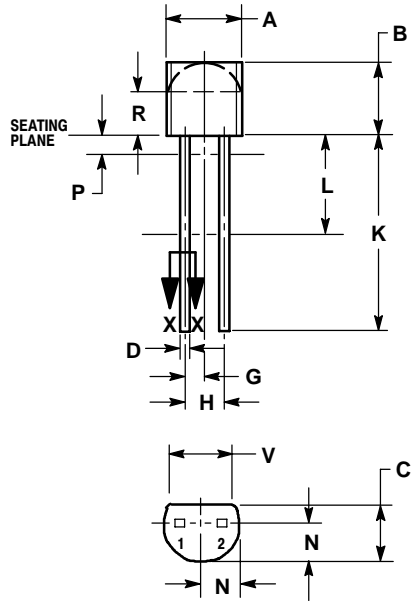


Figure 5. Krakauer Method of Measuring Lifetime

# MBD701, MMBD701LT1

## PACKAGE DIMENSIONS

TO-92 (TO-226AC)  
CASE 182-06  
ISSUE L



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND ZONE R IS UNCONTROLLED.
4. 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        | 5.21  |
| B   | 0.170     | 0.210 | 4.32        | 5.33  |
| C   | 0.125     | 0.165 | 3.18        | 4.19  |
| D   | 0.016     | 0.021 | 0.407       | 0.533 |
| G   | 0.050 BSC |       | 1.27 BSC    |       |
| H   | 0.100 BSC |       | 2.54 BSC    |       |
| J   | 0.014     | 0.016 | 0.36        | 0.41  |
| K   | 0.500     | ---   | 12.70       | ---   |
| L   | 0.250     | ---   | 6.35        | ---   |
| N   | 0.080     | 0.105 | 2.03        | 2.66  |
| P   | ---       | 0.050 | ---         | 1.27  |
| R   | 0.115     | ---   | 2.93        | ---   |
| V   | 0.135     | ---   | 3.43        | ---   |

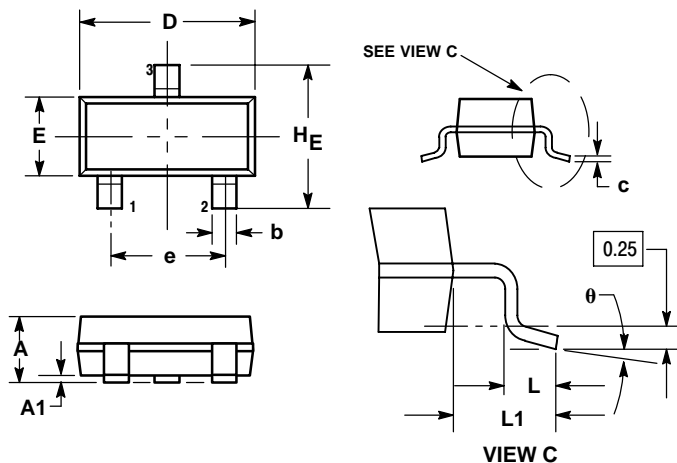
### STYLE 1:

1. ANODE
2. CATHODE

# MBD701, MMBD701LT1

## PACKAGE DIMENSIONS

SOT-23 (TO-236)  
CASE 318-08  
ISSUE AN



### NOTES:

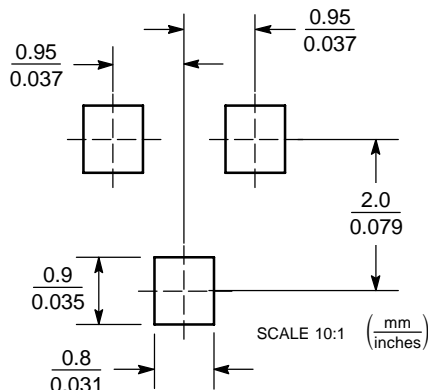
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

| DIM | MILLIMETERS |      |      | INCHES |       |       |
|-----|-------------|------|------|--------|-------|-------|
|     | MIN         | NOM  | MAX  | MIN    | NOM   | MAX   |
| A   | 0.89        | 1.00 | 1.11 | 0.035  | 0.040 | 0.044 |
| A1  | 0.01        | 0.06 | 0.10 | 0.001  | 0.002 | 0.004 |
| b   | 0.37        | 0.44 | 0.50 | 0.015  | 0.018 | 0.020 |
| c   | 0.09        | 0.13 | 0.18 | 0.003  | 0.005 | 0.007 |
| D   | 2.80        | 2.90 | 3.04 | 0.110  | 0.114 | 0.120 |
| E   | 1.20        | 1.30 | 1.40 | 0.047  | 0.051 | 0.055 |
| e   | 1.78        | 1.90 | 2.04 | 0.070  | 0.075 | 0.081 |
| L   | 0.10        | 0.20 | 0.30 | 0.004  | 0.008 | 0.012 |
| L1  | 0.35        | 0.54 | 0.69 | 0.014  | 0.021 | 0.029 |
| HE  | 2.10        | 2.40 | 2.64 | 0.083  | 0.094 | 0.104 |

### STYLE 6:

1. BASE
2. EMITTER
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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