

**Low Resistance, Low Distortion, RF Switching PIN Diode**

**DESCRIPTION**

The UM9701 PIN diode was designed for low resistance at low forward bias current and low reverse bias capacitance. This unique Microsemi design results in both forward and reverse bias.

These PIN diodes are characterized for low current drain RF and microwave switch applications particularly for digital filter switch designs. The construction and geometry of these devices provide good voltage and power handling capability.

These devices are constructed using a metallurgical full face bond to both

surfaces of the silicon chip. A glass enclosure houses this bond in a reliable and hermetic package. The axial leads are attached to refractory pins and do not touch the glass enclosure.

Environmentally these, and all Microsemi PIN diodes, can withstand thermal cycling from -195 °C to + 300 °C and exceed all military environmental specifications for shock, vibration, acceleration, and moisture resistance.

**KEY FEATURES**

- Specified low distortion
- Low Forward Resistance
- High Reverse Resistance
- High Voltage Capability
- Good Power Handling
- Microsemi Ruggedness and reliability
- Compatible with automatic insertion equipment

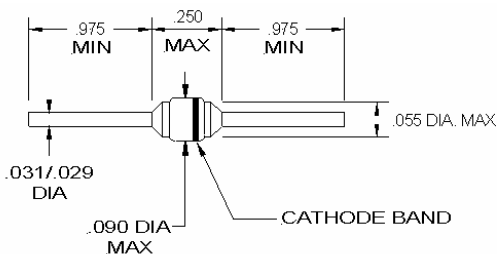
**IMPORTANT:** For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>

**ABSOLUTE MAXIMUM RATINGS AT 25° C  
(UNLESS OTHERWISE SPECIFIED)**

| Rating  | Symbol | Value                               | Unit  |
|---|--------|-------------------------------------|-------|
| Reverse Voltage   | $V_R$  | 100                                 | Volts |
| AVERAGE Power Dissipation<br>Free Air at 25 °C                                    | $P_A$  | 500                                 | mW    |
| Average Power Dissipation<br>½ " (12.7 mm) Total lead Length<br>to 25 °C Contacts | $P_A$  | 2.5<br>Derate linearly<br>To 175 °C | Watts |
| Storage Temperature   | T stg  | -65 to 175                          | °C    |
| Operating Temperature   | T op   | -65 to 175                          | °C    |

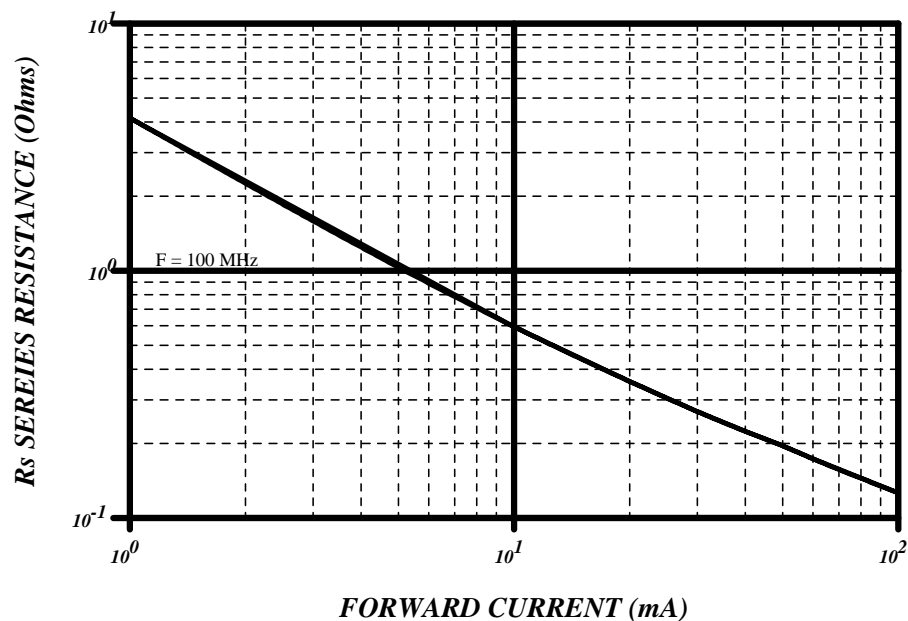
**APPLICATIONS/BENEFITS**

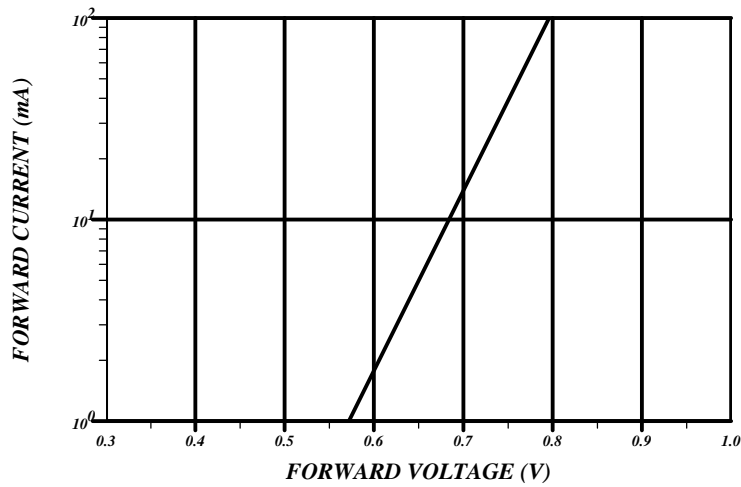
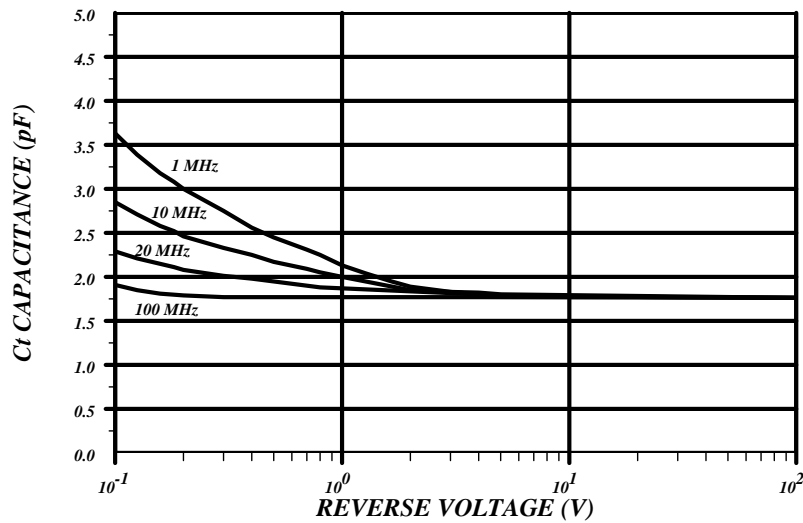
- Little or no Bias required.
- Available in leaded or surface mount packages.
- RoHS compliant packaging available: use UMX9701B, etc.

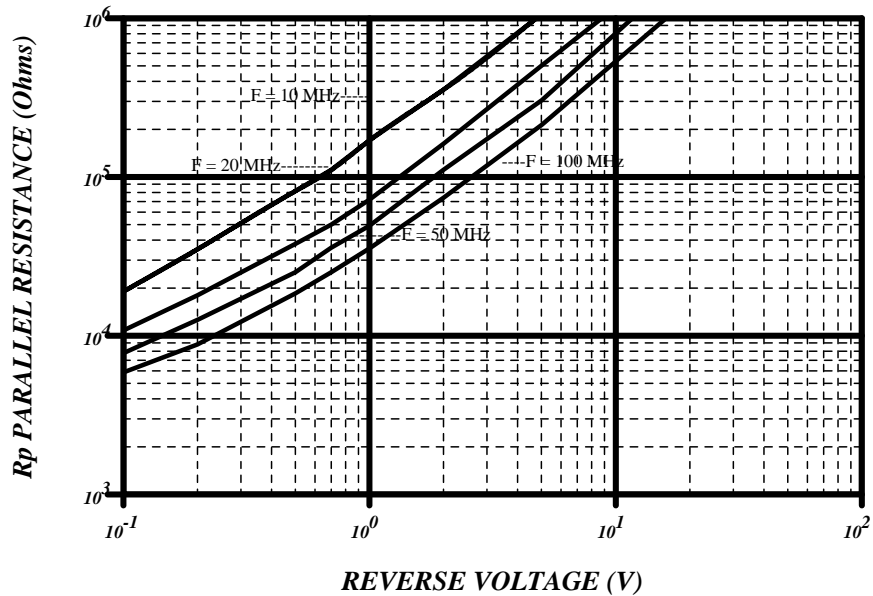
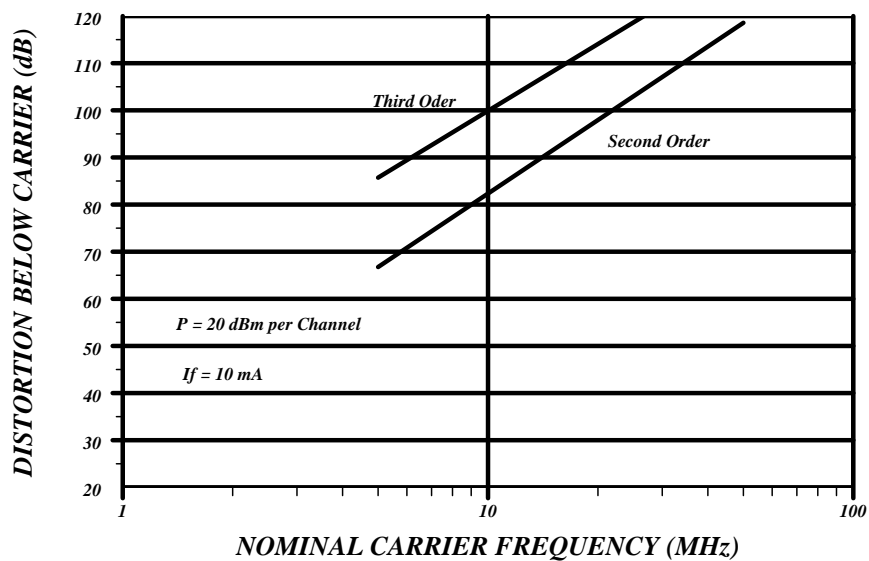


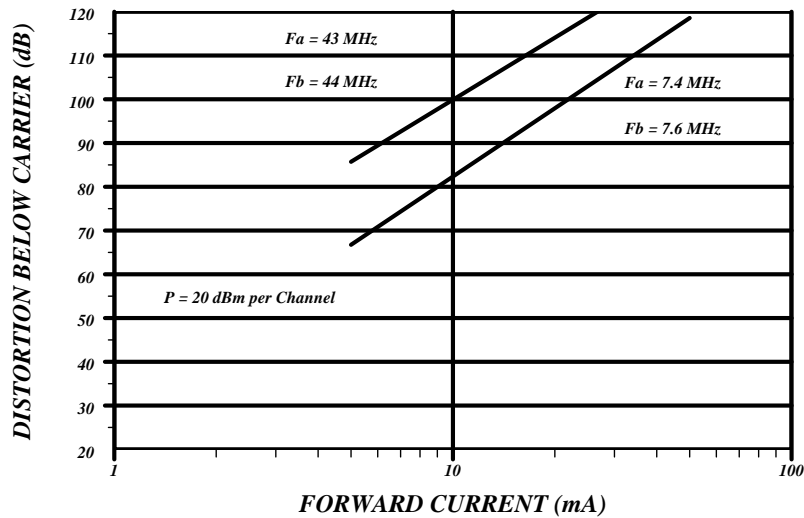
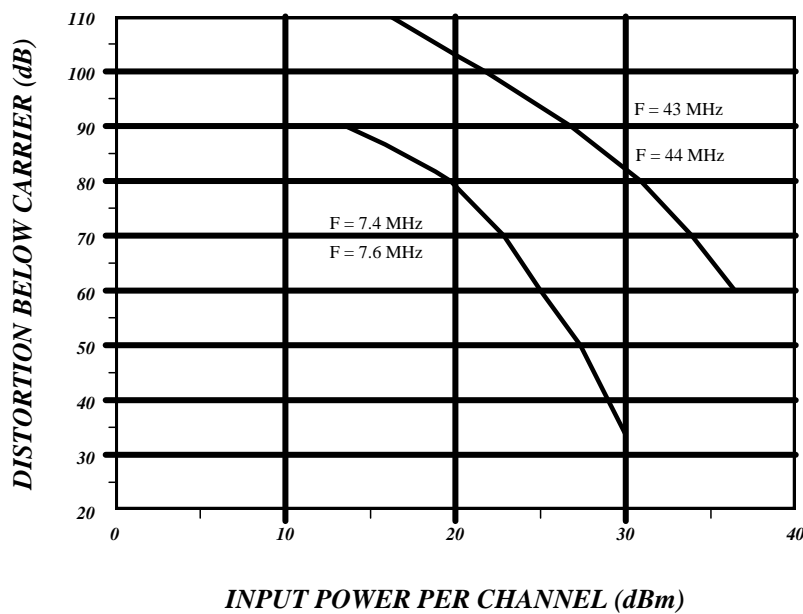
**Electrical Specifications**

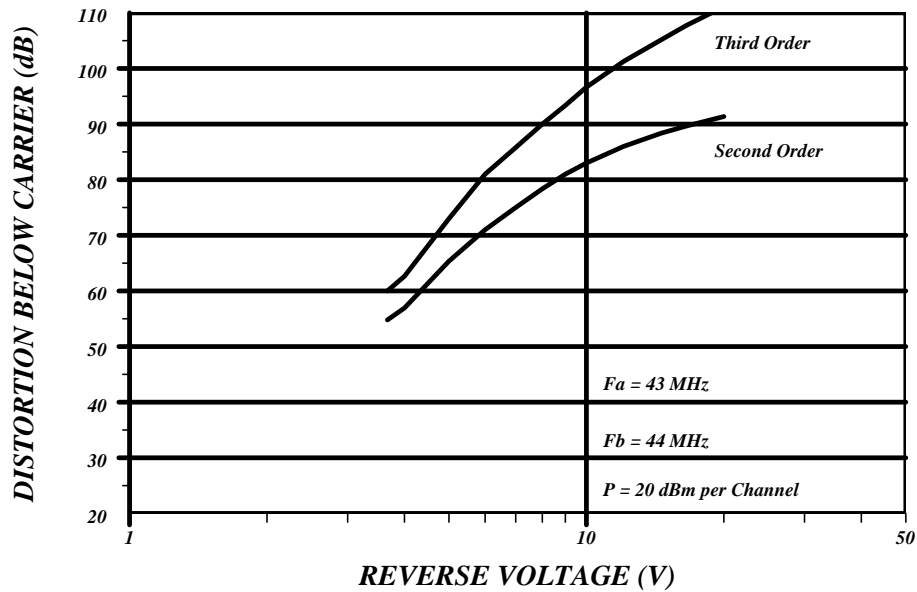
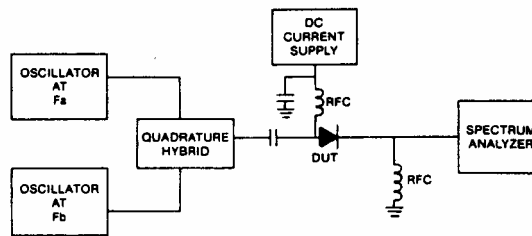
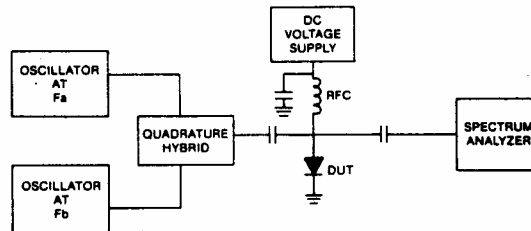
| Test   | Symbol  | UM9701            | Conditions   |
|--|---------|-------------------|--|
| Series Resistance (MAX)                      | $R_S$   | 0.8 $\Omega$      | $F = 100 \text{ MHz}, I_F = 10 \text{ mA}$   |
| Total Capacitance (MAX)                      | $C_T$   | 1.8 pF            | $F = 1 \text{ MHz}, V_R = 50 \text{ V}$  |
| Parallel Resistance (MIN)                    | $R_P$   | 100 k $\Omega$    | $F = 100 \text{ MHz}, V_R = 50 \text{ V}$  |
| Carrier Lifetime (MIN)                       | $\tau$  | 1.5 $\mu\text{s}$ | $I_F = 10 \text{ mA}$  |
| Reverse Current (MAX)                        | $I_R$   | 10 $\mu\text{A}$  | $V_R = 100 \text{ V}$  |
| Forward Voltage (MAX)                        | $V_F$   | 0.8 V             | $I_F = 10 \text{ mA}$  |
| Forward Bias Third Order IM Distortion (MAX) | R 2ab/a | -90 dB            | $I_F = 10 \text{ mA}$<br>$P_A = P_B = +20 \text{ dBm}$<br>$f_A = 43 \text{ MHz}, f_B = 44 \text{ MHz}$ |
| Reverse Bias Third Order IM Distortion (MAX) | R 2ab/a | -90 dB            | $V_R = 50 \text{ V}$<br>$P_A = P_B = +20 \text{ dBm}$<br>$f_A = 43 \text{ MHz}, f_B = 44 \text{ MHz}$  |

**TYPICAL SERIES RESISTANCE VS FORWARD CURRENT**


**TYPICAL DC CHARACTERISTIC**

**TYPICAL CAPACITANCE CHARACTERISTIC**


**TYPICAL PARALLEL RESISTANCE VS REVERSE VOLTAGE**

**TYPICAL FORWARD BIAS INTERMODULATION DISTORTION VERSUS NOMINAL CARRIER FREQUENCY**


**TYPICAL THIRD ORDER INTERMODULATION DISTORTION  
(R 2ab/a) VERSUS FORWARD BIAS CURRENT**

**FORWARD BIAS THIRD ORDER INTERMODULATION  
DISTORTION (R 2ab/a) VS INPUT POWER PER CHANNEL**


**TYPICAL REVERSE BIAS INTERMODULATION DISTORTION**

**Forward Bias Distortion Test Set**

**Reverse Bias Distortion Test Set**




UM9701

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www.Microsemi.com

NOTES

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Authorized Distributor

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