# UM9301/UM9301SM

## Commercial Attenuator Diode

**PRODUCT PREVIEW**

## DESCRIPTION

The UM9301 PIN Diode utilizes special overall chip geometry with an extremely thick intrinsic "I" region, to offer unique capabilities in both RF switch and attenuator applications.
Volume production also makes the diode an economical choice suitable for many commercial low power equipments.
The UM9301 has been designed for use in bridged TEE attenuator circuits commonly utilized for gain and slope control in CATV amplifiers.
Low distortion and high dynamic range are characteristic of the diodes' outstanding performance.

The UM9301 is also appropriate for switch applications, when little or no bias voltage is available. Frequent applications occur in portable 12 volt-powered communications equipments, operating at frequencies as low as 2 MHz.

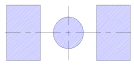
## KEY FEATURES

- Specified low distortion
- Low distortion properties at low reverse bias
- Resistance specified at 3 current points
- High reliability fused-in-glass construction

## APPLICATIONS/BENEFITS

- Little or no Bias required.
- Operates as low as $2MH_Z$.
- Available in leaded or surface mount packages.

**UM9301SM**

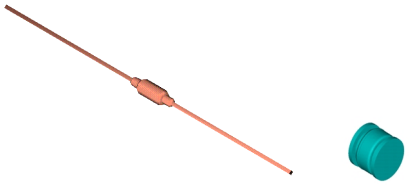


**IMPORTANT:** For the most current data, consult *MICROSEMI*'s website: **http://www.microsemi.com**

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

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Reverse Voltage | $V_R$ | 75 | Volts |
| Reverse Current | $I_R$ | 10 | µA |
| Average Power Dissipation (1, 2) | $P_A$ | 1.0 | Watts |
| Storage Temperature | T stg | -65 to 175 | ºC |
| Operating Temperature | T op | -65 to 175 | ºC |

**UM9301**



**UM9301SM**

(1) Mounted on 2" square by 0.06' thick FR4 board with a 1" x 1" square 2-ounce copper pattern..
(2) Lead ½ inch. (12.7mm) Total to 25°C Contact.







**Microsemi**
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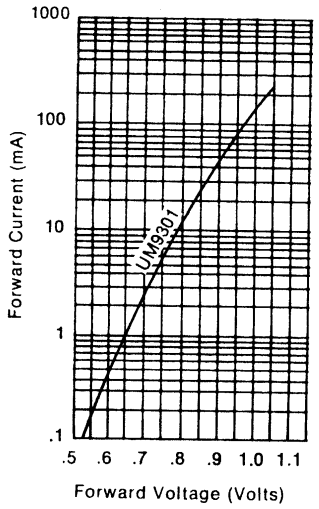
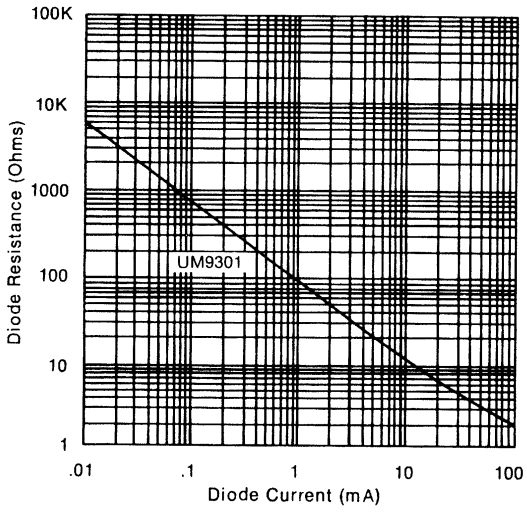
## ELECTRICAL PARAMETERS @ 25°C (unless otherwise specified)

| Parameter | Symbol | Conditions | Min | Typ. | Max | Units |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Diode Resistance | $R_S$ | I = 100 mA; f = 100 MHz<br>I = 1 mA; f = 100 MHz<br>I = 0.01 mA; f = 100 MHz | <br><br>3000 | 1.7<br>80<br>5000 | 3.0<br>150 | Ω |
| Current for $R_S$ = 75 Ω $I_R$ | $R_S$ | f = 100 MHz | 0.5 | 1.1 | 2.0 | mA |
| Return Loss | I | Frequency Range: 10-300MHz<br>$R_S$ = 75 Ω @ 100MHz<br>Diode Terminates 75 Ω line | 25 | | | dB |
| Second Order Distortion | V | $f_1$ = 10 MHz; $f_2$ = 13 MHz<br>P = 50 dBmV; See Test Circuit | | 55 | 50 | -dB |
| | | $F_1$ = 67 MHz; $f_2$ = 77 MHz<br>P = 50 dBmV; See Test Circuit | | 70 | | -dB |
| Third Order Distortion | V | $F_1$ = 10 MHz; $F_2$ = 13 MHz<br>P = 50 dBmV; See Test Circuit | | 75 | 65 | -dB |
| | | Triple Beat; 205 +67 –77MHz<br>P = 50 dBmV; See Test Circuit | | 95 | | -dB |
| Cross Modulation Distortion | V | 12 Channel Test<br>P = 50 dBmV; See Test Circuit<br>Dix Hills Test Set | | 75 | | -dB |
| Reverse Current | $I_R$ | V = 75 V | | | 10 | µA |
| Carrier Lifetime | τ | I = 10 mA | 4.0 | | | µs |
| **Dynamic characteristics** | | | | | | |
| Capacitance | $C_T$ | V = 0V; f = 100 MHz | | | 0.8 | pF |

**FORWARD CURRENT VS FORWARD VOLTAGE (TYPICAL)**

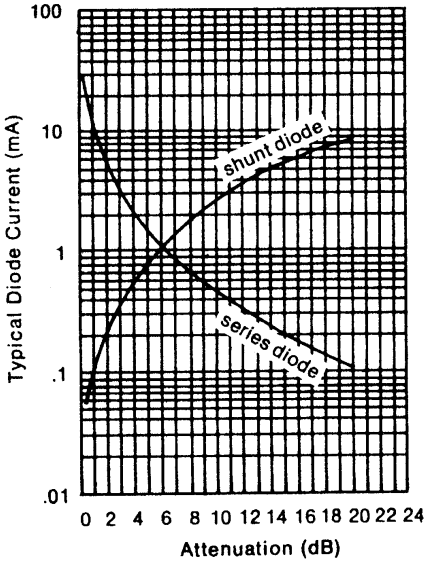



**DIODE RESIDANCE VS DIODE CURRENT (TYPICAL)**

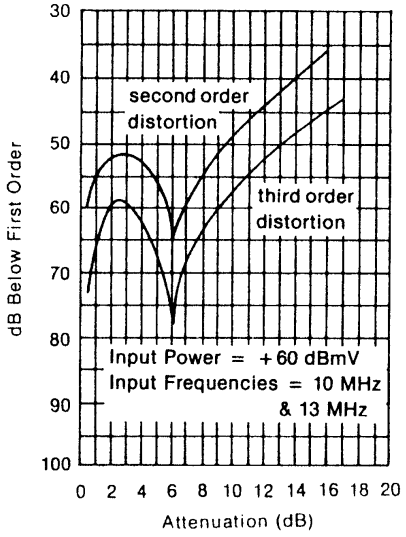


## TYPICAL BRIDGED TEE ATTENUATOR PERFORMANCE

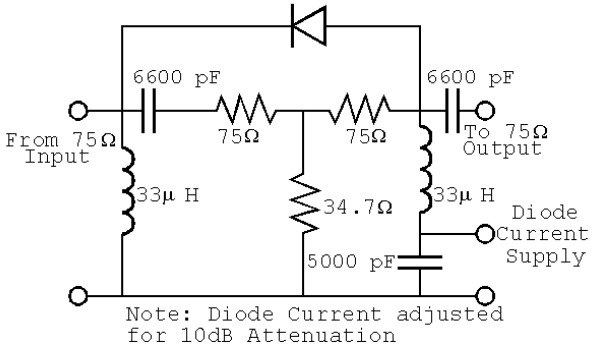
### DIODE CURRENT VS ATTENUATION UM9301



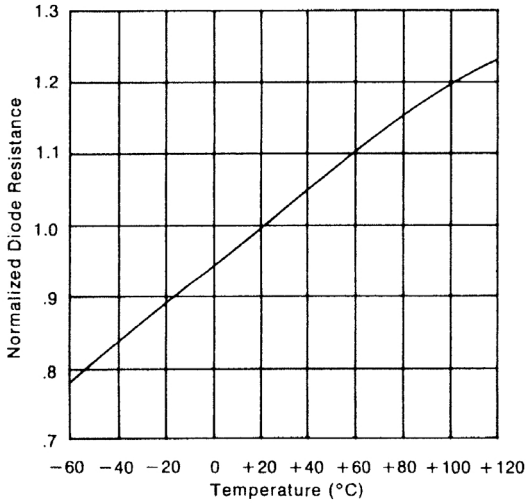

### DISTORTION ATTENUATION



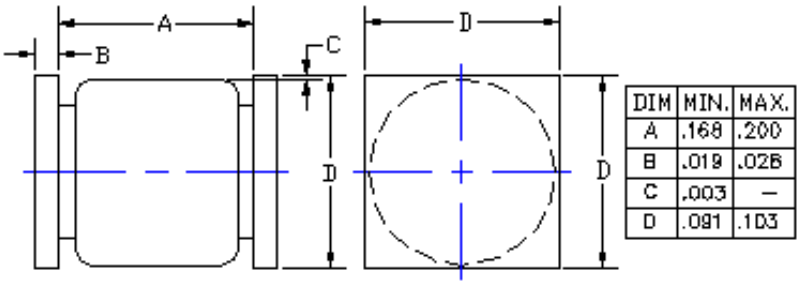

TEST CIRCUIT FOR DISTORTION MEASUREMENTS




### NORMALIZED $R_S$ VS TEMPERATURE



## UM9301SM

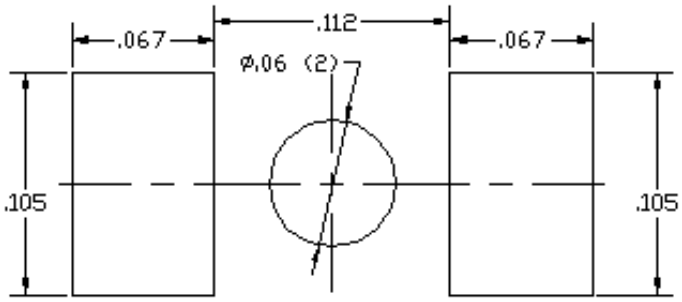



| DIM | MIN. | MAX. |
|---|---|---|
| A | .168 | .200 |
| B | .019 | .026 |
| C | .003 | — |
| D | .091 | .103 |

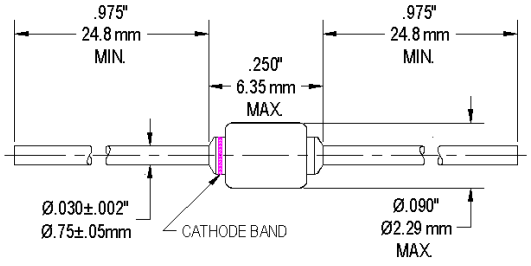
NOTES:

1. These dimensions will match the terminals and provide for additional solder fillets at the outboard ends at least as wide as the terminals themselves, assuming accuracy of device placement within .005 inches.
2. If the mounting method chosen requires use of an adhesive separate from the solder compound, a round (or square) spot of cement as shown should be sartorially located.
3. Dimensions shown are in inches.

STANDARD SMALL SQUARE END CAP OUTLINE




## UM9301




NOTES:

1. BAND INDICATE CATHODE END.

PACKAGE DATA

www.Microsemi.com

NOTES



Microsemi
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