

## Surface Mount Monolithic PIN Diode Switches 50 MHz-4 GHz

M/A-COM Products  
Final Release - Rev. 2.01

### Features

- Low Cost/High Volume
- Broadband Performance 50 MHz - 4 GHz
- Low Insertion Loss/ High Isolation
- Low Distortion
- Available in Tape & Reel

### Description

Using M/A-COM's HMIC monolithic technology, M/ACOM has developed a family of broadband PIN diode MMIC switches packaged in popular, industry standard surface mount packages. The MA4SW101-287T is an SPST SOT-23 packaged switch utilizing two PIN diodes in a series-shunt configuration.

These switches offer broadband (50 MHz-4 GHz) performance, fast switching speed and low distortion. The switches have been designed for low cost, high volume applications. These switches are available for tape and reel insertion.

### Ordering Information

| Part Number   | Package        |
|---------------|----------------|
| MA4SW101-287T | Plastic SOT-23 |

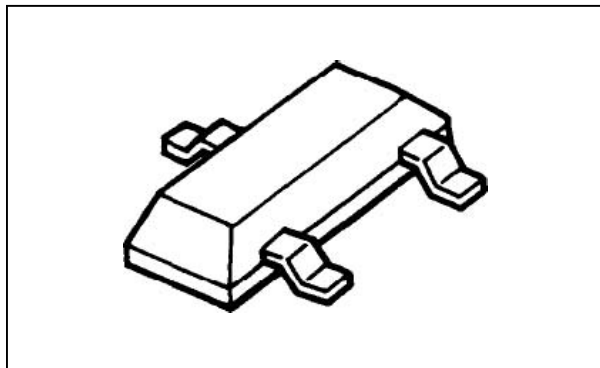
### Typical Performance: $Z_0 = 50\Omega$ , $I_{bias} = \pm 20\text{mA}$

| Parameter      | Units | Typical |
|----------------|-------|---------|
|                |       | 25°C    |
| Frequency      | MHz   | 2000    |
| Insertion Loss | dB    | 0.30    |
| Isolation      | dB    | 36      |
| Return Loss    | dB    | 21      |

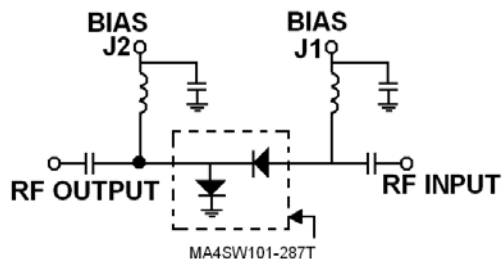
### Absolute Maximum Ratings

| Parameter                | Absolute Maximum |
|--------------------------|------------------|
| Operating Temperature    | -65°C to +85°C   |
| Storage Temperature      | -65°C to +125°C  |
| Applied DC Voltage       | 50V              |
| Power Dissipation @+25°C | 50 mW max        |
| Incident Power @+25°C    | 100 mW max       |

### Product Image



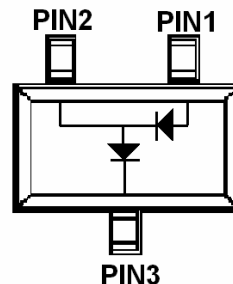
### Schematic and Bias Connections



### Truth Table

| Control Level (DC Current) at | Condition of Switch |
|-------------------------------|---------------------|
| J2                            | RF in to RF out     |
| - 20 mA                       | Loss State          |
| +20 mA                        | Isolation           |

### TOP View



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**Electrical Specifications at +25°C**

| Parameter <sup>1</sup>            | Frequency | MA4SW101-287T |      |     |       |
|-----------------------------------|-----------|---------------|------|-----|-------|
|                                   |           | Min.          | Typ. | Max | Units |
| Insertion Loss                    | 50MHz     | -             | 0.3  | 0.4 | dB    |
|                                   | 1 GHz     | -             | 0.3  | 0.5 | dB    |
|                                   | 2 GHz     | -             | 0.3  | 0.5 | dB    |
|                                   | 3 GHz     | -             | 0.4  | -   | dB    |
|                                   | 4 GHz     | -             | 0.5  | -   | dB    |
| Isolation                         | 50MHz     | 60            | 70   | -   | dB    |
|                                   | 1 GHz     | 40            | 46   | -   | dB    |
|                                   | 2 GHz     | 30            | 36   | -   | dB    |
|                                   | 3 GHz     | -             | 30   | -   | dB    |
|                                   | 4 GHz     | -             | 26   | -   | dB    |
| Input Return Loss                 | 50MHz     | 25            | 28   | -   | dB    |
|                                   | 1 GHz     | 20            | 23   | -   | dB    |
|                                   | 2 GHz     | 17            | 21   | -   | dB    |
|                                   | 3 GHz     | -             | 18   | -   | dB    |
|                                   | 4 GHz     | -             | 15   | -   | dB    |
| Voltage Rating <sup>2</sup>       | -         | 50            | -    | -   | Volts |
| Second Harmonic Distortion @ 0dBm | 1 GHz     | -             | 75   | -   | dBc   |
| Third Harmonic Distortion @ 0dBm  | 1 GHz     | -             | 90   | -   | dBc   |
| Switching Speed                   |           | -             | 50   | -   | nsec  |
| Signal Compression @ 100mW        | 1 GHz     | -             | 0.1  | -   | dB    |

**Notes:**

- Parameters (except for voltage rating) are specified with +/-20mA at all output ports in 50 Ω microstrip test fixture.
- Reverse current will not exceed 10 μA at the rated voltage.

2

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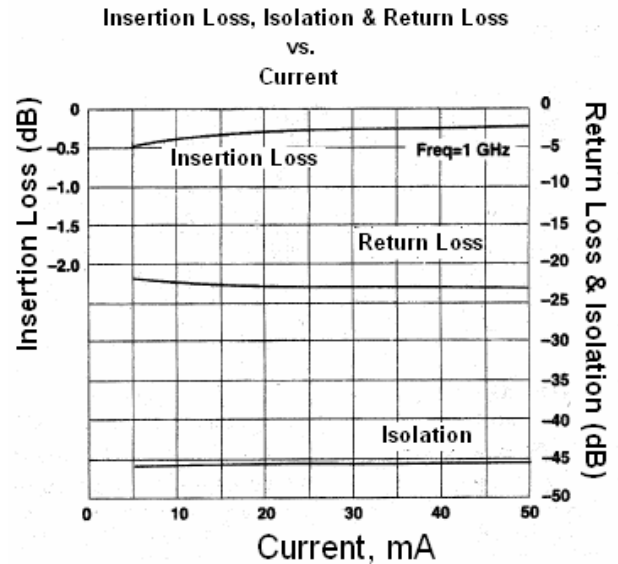
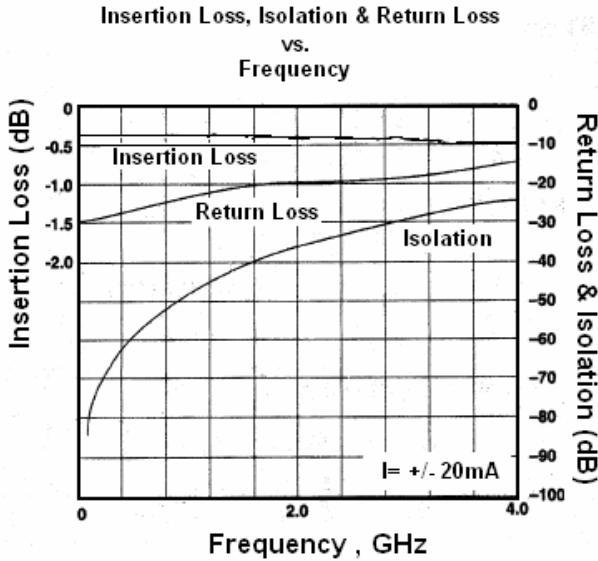
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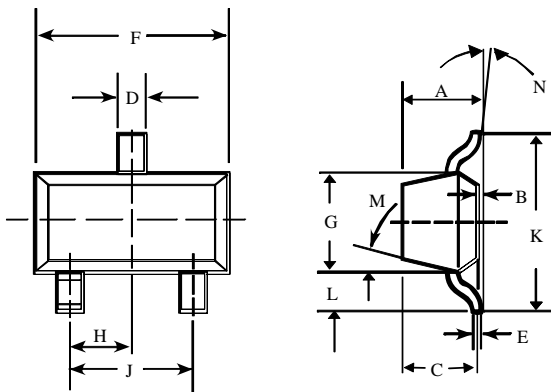
**Typical Performance Curves at +25°C**



**Case Styles**

**SOT-23**

**Case Style 287**



**SOT-23 (Case Style 287)**

| DIM.        | INCHES                |       | MILLIMETERS  |      |
|-------------|-----------------------|-------|--------------|------|
|             | MIN.                  | MAX.  | MIN.         | MAX. |
| A           | —                     | 0.048 | —            | 1.22 |
| B           | —                     | 0.008 | —            | 0.20 |
| C           | —                     | 0.040 | —            | 1.00 |
| D           | 0.013                 | 0.020 | 0.35         | 0.50 |
| E           | 0.003                 | 0.006 | 0.08         | 0.15 |
| F           | 0.110                 | 0.119 | 2.80         | 3.00 |
| G           | 0.047                 | 0.056 | 1.20         | 1.40 |
| H           | 0.037 typical         |       | 0.95 typical |      |
| J           | 0.075 typical         |       | 1.90 typical |      |
| K           | —                     | 0.103 | —            | 2.60 |
| L           | —                     | 0.024 | —            | 0.60 |
| <b>DIM.</b> | <b>GRADIENT</b>       |       |              |      |
| M           | 10° max. <sup>1</sup> |       |              |      |
| N           | 2° . . . 30°          |       |              |      |

Note: 1. Applicable on all sides

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### Mounting Information

The illustration indicates the recommended mounting pad configuration for the SOT-23 package. Solder paste containing flux should be screened onto the pads to a thickness of 0.005- 0.007 inches. The plastic package is placed in position, firmly adhering to the solder paste.

Permanent attachment is performed by a reflow soldering procedure during which the tab temperature does not exceed +275 °C and the body temperature does not exceed +250 °C.

Please refer to Application Note M538 for surface mounting instructions.

### SOT-23

