# 1N5719, 1N5767, 5082-3001, 5082-3039, 5082-3077, 5082-3080/81, 5082-3188, 5082-3379

PIN Diodes for RF Switching and Attenuating

## Data Sheet

### Description/Applications

These general purpose switching diodes are intended for low power switching applications such as RF duplexers, antenna switching matrices, digital phase shifters, and time multiplex filters. The 5082-3188 is optimized for VHF/UHF bandswitching.

The RF resistance of a PIN diode is a function of the current flowing in the diode. These current controlled resistors are specified for use in control applications such as variable RF attenuators, automatic gain control circuits, RF modulators, electrically tuned filters, analog phase shifters, and RF limiters.

Outline 15 diodes are available on tape and reel. The tape and reel specification is patterned after RS-296-D.

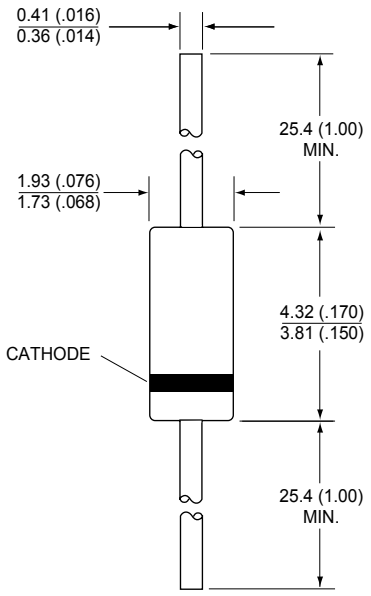
### Maximum Ratings

Junction Operating and
Storage Temperature Range.....-65°C to +150°C
Power Dissipation 25°C .....250 mW
*(Derate linearly to zero at 150°C)*
Peak Inverse Voltage (PIV) ..... same as $V_{BR}$
Maximum Soldering Temperature ..... 260°C for 5 sec

### Features

- Low Harmonic Distortion
- Large Dynamic Range
- Low Series Resistance
- Low Capacitance

**Outline 15**




DIMENSIONS IN MILLIMETERS AND (INCHES).

## Mechanical Specifications

The Avago Outline 15 package has a glass hermetic seal with dumet leads. The lead finish is 95-5 tin-lead (SnPb) for all PIN diodes. The leads on the Outline 15 package should be restricted so that the bend starts at least 1/16 inch (1.6 mm) from the glass body. Typical package inductance and capacitance are 2.5 nH and 0.13 pF, respectively. Marking is by digital coding with a cathode band.

## General Purpose Diodes
## Electrical Specifications at $T_A = 25°C$

| Part Number 5082- | Maximum Total Capacitance $C_T$ (pF) | Minimum Breakdown Voltage $V_{BR}$ (V) | Maximum Residual Series Resistance $R_S$ (Ω) | Effective Carrier Lifetime τ (ns) | Reverse Recovery Time $t_{rr}$ (ns) |
|---|---|---|---|---|---|
| General Purpose Switching and Attenuating | | | | | |
| 3001 | 0.25 | 200 | 1.0 | 100 (min.) | 100 (typ.) |
| 3039 | 0.25 | 150 | 1.25 | 100 (min.) | 100 (typ.) |
| 1N5719 | 0.3** | 150 | 1.25 | 100 (min.) | 100 (typ.) |
| 3077 | 0.3 | 200 | 1.5 | 100 (min.) | 100 (typ) |
| Band Switching | | | | | |
| 3188 | 1.0* | 35 | 0.6** | 70 (typ.)* | 12 (typ.) |
| Test Conditions | $V_R = 50$ V<br>*$V_R = 20$ V<br>**$V_R = 100$ V<br>f = 1 MHz | $V_R = V_{BR}$<br>Measure<br>$I_R \leq 10$ µA | $I_F$ =100 mA<br>*$I_F = 20$ mA<br>**$I_F = 10$ mA<br>f = 100 MHz | $I_F = 50$ mA<br>$I_R = 250$ mA<br>*$I_F = 10$ mA<br>*$I_R = 6$ mA | $I_F = 20$ mA<br>$V_R = 10$ V<br>90% Recovery |

**Notes:**
Typical CW power switching capability for a shunt switch in a 50Ω system is 2.5 W.

## RF Current Controlled Resistor Diodes
## Electrical Specifications at $T_A = 25°C$

| Part Number | Effective Carrier Lifetime τ (ns) | Min. Breakdown Voltage $V_{BR}$ (V) | Max. Residual Series Resistance $R_S$ (Ω) | Max. Total Capacitance $C_T$ (pF) | High Resistance Limit, $R_H$ (Ω) | | Low Resistance Limit, $R_L$ (Ω) | | Max. Difference in Resistance vs. Bias Slope, Dc |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Min. | Max. | Min. | Max. | |
| 5082-3080 | 1300 (typ.) | 100 | 2.5 | 0.4 | 1000 | | | 8** | |
| 1N5767* | 1300 (typ.) | 100 | 2.5 | 0.4 | 1000 | | | 8** | |
| 5082-3379 | 1300 (typ.) | 50 | | 0.4 | | | | 8** | |
| 5082-3081 | 2500 (typ.) | 100 | 3.5 | 0.4 | 1500 | | | 8** | |
| Test Conditions | $I_F = 50$ mA<br>$I_R = 250$ mA | $V_R = V_{BR}$,<br>Measure<br>$I_R \leq 10$ µA | $I_F = 100$ mA<br>f = 100 MHz | $V_R = 50$ V<br>f = 1 MHz | $I_F = 0.01$ mA<br>f = 100 MHz | | $I_F = 1.0$ mA<br>$I_F = 20$ mA**<br>f = 100 MHz | | Batch Matched at<br>$I_F = 0.01$ mA<br>and 1.0 mA<br>f = 100 MHz |

*The 1N5767 has the additional specifications: τ = 1.0 msec minimum
$I_R = 1$ µA maximum at $V_R = 50$ V
$V_F = 1$ V maximum at $I_F = 100$ mA.

## Typical Parameters at $T_A = 25°C$ (unless otherwise noted)

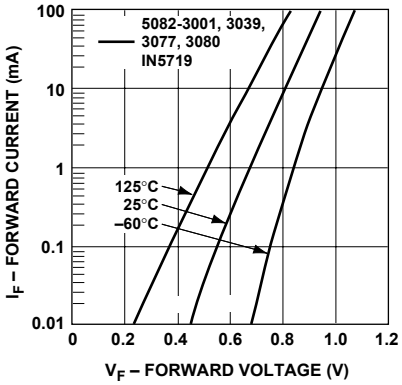



**Figure 1. Forward Current vs. Forward Voltage.**

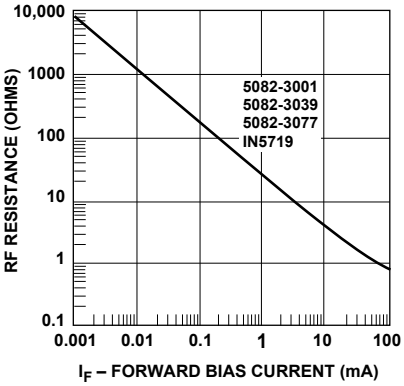



**Figure 2. Typical RF Resistance vs. Forward Bias Current.**

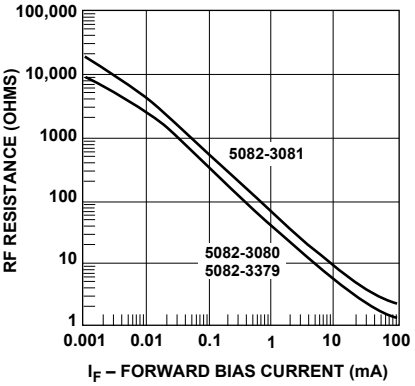



**Figure 3. Typical RF Resistance vs. Forward Bias Current.**

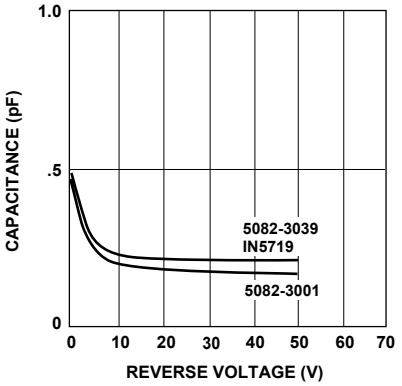



**Figure 4. Typical Capacitance vs. Reverse Voltage.**

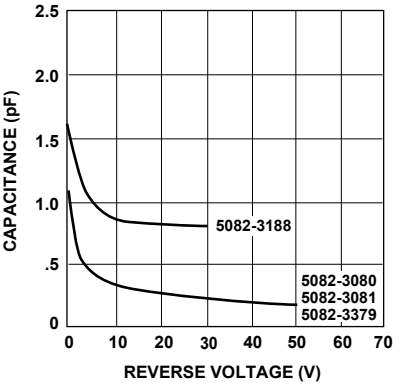



**Figure 5. Typical Capacitance vs. Reverse Voltage.**

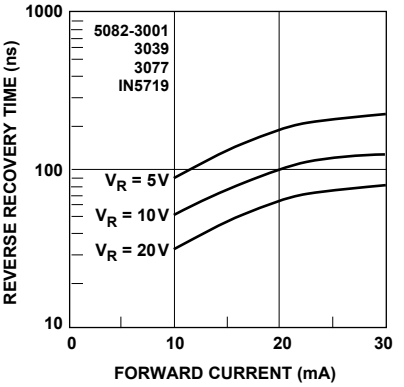



**Figure 6. Typical Reverse Recovery Time vs. Forward Current for Various Reverse Driving Voltages.**

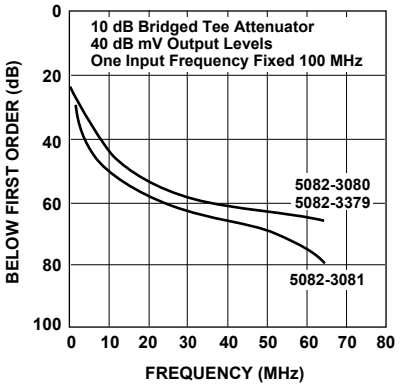



**Figure 7. Typical Second Order Intermodulation Distortion.**

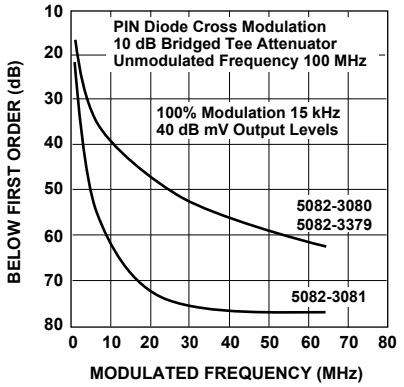



**Figure 8. Typical Cross Intermodulation Distortion.**

## Diode Package Marking

| | |
|---|---|
| 1N5xxx | 5082-xxxx |
| would be marked: | |
| 1Nx | xx |
| xxx | xx |
| YWW | YWW |

where xxxx are the last four digits of the 1Nxxxx or the 5082-xxxx part number. Y is the last digit of the calendar year. WW is the work week of manufacture.

Examples of diodes manufactured during workweek 45 of 1999:

| | |
|---|---|
| 1N5712 | 5082-3080 |
| would be marked: | |
| 1N5 | 30 |
| 712 | 80 |
| 945 | 945 |

## Part Number Ordering Information

| Part Number | No. of devices | Container |
|---|---|---|
| 5082-3xxx#T25/1N57xx#T25 | 2500 | Tape & Reel |
| 5082-3xxx#T50/ 1N57xx#T50 | 5000 | Tape & Reel |
| 5082-3xxx/ 1N57xx | 100 | Antistatic bag |

For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**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