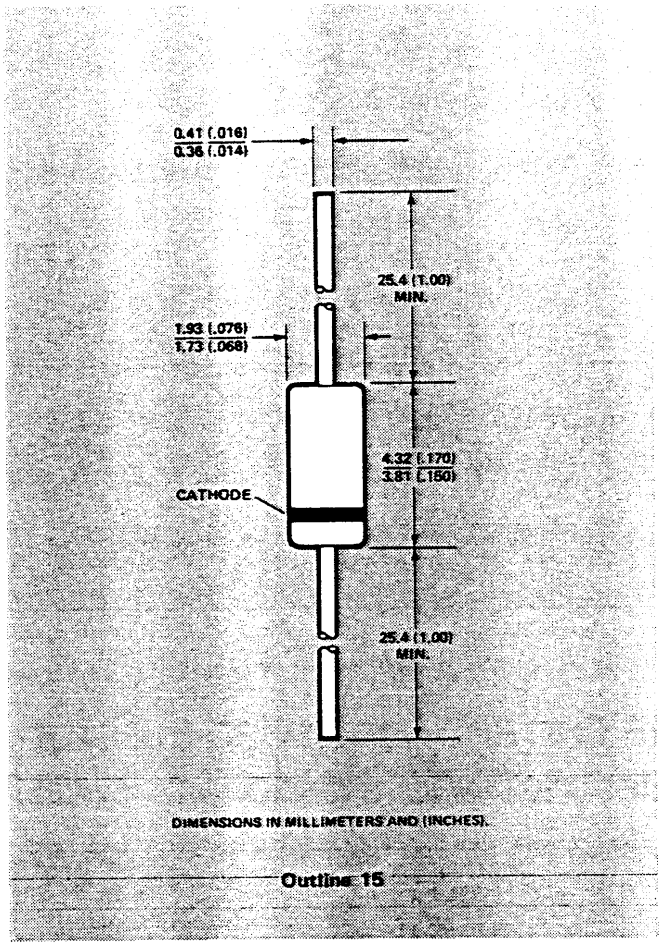
HEWLETT PACKARD

PIN DIODES FOR RF SWITCHING AND ATTENUATING

1N5719 5082-3080
1N5767 5082-3081
5082-3001/02 5082-3168/88
5082-3039 5082-3379
5082-3042/43 HPND-4165/66
5082-3077

Features

- LOW HARMONIC DISTORTION
- LARGE DYNAMIC RANGE
- LOW SERIES RESISTANCE
- LOW CAPACITANCE
- LOW TEMPERATURE COEFFICIENT
  Typically Less Than 20%
  Resistance Change from
  25°C to 100°C



Outline 15

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 5082-3168/3188 are 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.

Maximum Ratings

Junction Operating and Storage Temperature Range ..... -65°C to +150°C

Power Dissipation at 25°C ..... 250 mW
(Derate linearly to zero at 150°C)

Peak Inverse Voltage (PIV) ..... same as V_{BR}

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

Mechanical Specifications

The HP Outline 15 package has a glass hermetic seal with dumet leads. The lead finish is 95-5 tin-lead (SnPb) for all PIN diode products except the 5082-3042 and -3043, which have gold plated leads. 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. With this restriction, Outline 15 package will meet MIL-STD-750, Method 2036, Conditions A (4 lbs., [1.8 kg.], tension for 30 minutes) and E. The maximum soldering temperature is 230°C for five seconds. 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					
-3002	0.25	300	1.0	100 (min.)	100 (typ.)
-3001	0.25	200	1.0	100 (min.)	100 (typ.)
-3039	0.25	150	1.25	100 (min.)	100 (typ.)
IN5719	0.3**	150	1.25	100 (min.)	100 (typ.)
-3077	0.3	200	1.5	100 (min.)	100 (typ.)
FAST SWITCHING					
-3042	0.4*	70	1.0*	35 (typ.)*	5 (max.)
-3043	0.4*	50	1.5*	35 (typ.)*	10 (max.)
BAND SWITCHING					
-3188	1.0*	35	0.6**	70 (typ.)*	12 (typ.)
-3168	2.0*	35	0.5**	70 (typ.)*	12 (typ.)
Test Conditions	V_R = 50 V *V_R = 20 V **V_R = 100 V f = 1 MHz	$V_R = V_{BR}$ Measure $I_R \leq 10\ \mu A$	I_F = 100 mA *I_F = 20 mA **I_F = 10 mA f = 100 MHz	I_F = 50 mA I_R = 250 mA *I_F = 10 mA *I_R = 6 mA	I_F = 20 mA V_R = 10 V 90% Recovery

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

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

Part Number	Effective Carrier Lifetime τ (ns)	Minimum Breakdown Voltage V_{BR} (V)	Maximum Residual Series Resistance R_S (Ω)	Maximum Total Capacitance C_T (pF)	High Resistance Limit, R_H (Ω)		Low Resistance Limit, R_L (Ω)		Maximum Difference in Resistance vs. Bias Slope, $\Delta\chi$
					Min.	Max.	Min.	Max.	
HPND-4165	100	100	1.5	0.3	1100	1660	16	24	.04
HPND-4166	100	100	1.5	0.3	830	1250	12	18	.04
5082-3080	2000 (typ.)	100	2.5	0.4	1000			8**	
IN5767*	1300 (typ.)	100	2.5	0.4	1000			8**	
5082-3379	2000 (typ.)	50		0.4				8**	—
5082-3081	2500 (typ.)	100	3.5	0.4	1500			8**	
Test Conditions	I_F = 50 mA I_R = 250 mA	$V_R = V_{BR}$, Measure $I_R \leq 10\ \mu A$	I_F = 100 mA f = 100 MHz	V_R = 50 V f = 1 MHz	I_F = 0.01 mA f = 100 MHz		I_F = 1.0 mA **I_F = 20 mA f = 100 MHz		Batch Matched at I_F = 0.01 mA and 1.0 mA f = 100 MHz

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

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

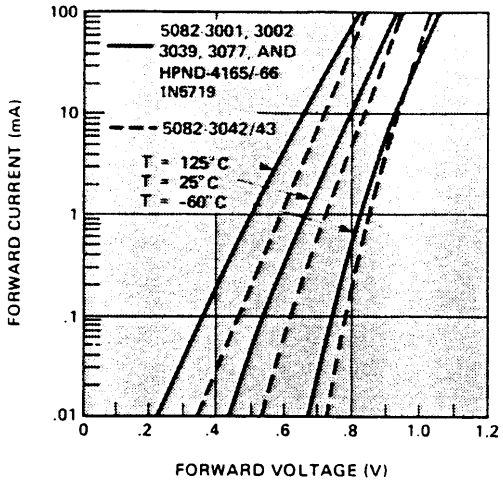


Figure 1. Typical Forward Current vs. Forward Voltage.

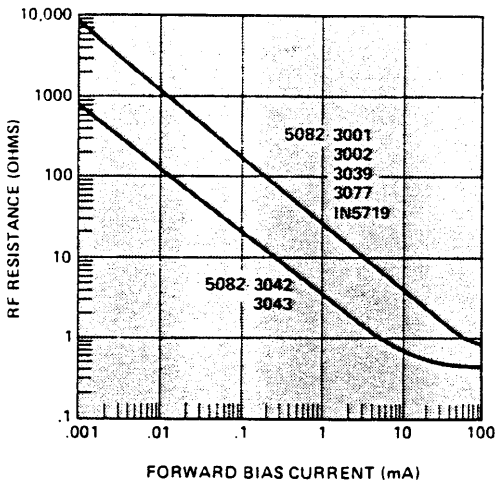


Figure 2. Typical RF Resistance vs. Forward Bias Current.

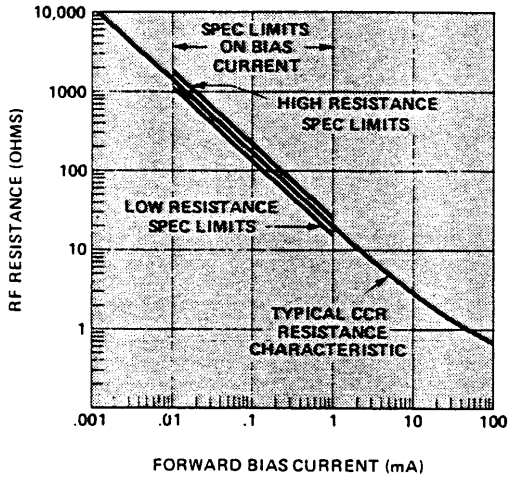


Figure 3. Typical RF Resistance vs. Bias for HPND-4165.

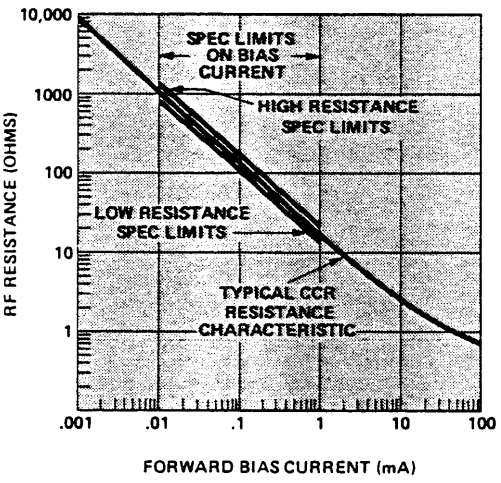


Figure 4. Typical RF Resistance vs. Bias for HPND-4166.

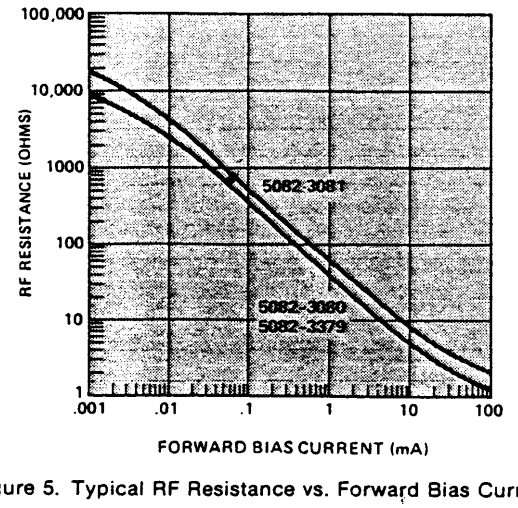


Figure 5. Typical RF Resistance vs. Forward Bias Current.

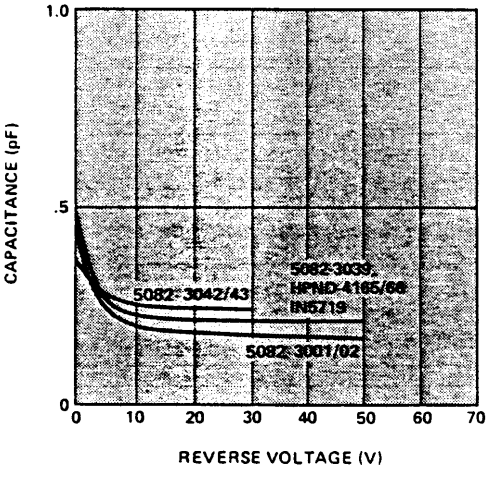


Figure 6. Typical Capacitance vs. Reverse Voltage.