



**HEWLETT
PACKARD**

SCHOTTKY BARRIER DIODES FOR MIXERS AND DETECTORS

5082-2273/74
5082-2295-98
5082-2350/51
5082-2400/01
5082-2520/21/65/66
5082-2701/02/06/07
5082-2711-14/23-24
5082-2817/18

Features

LOW NOISE FIGURE

HIGH BURNOUT RATING
15 W RF Pulse Power Incident

RUGGED DESIGN

HIGH UNIFORMITY

**BOTH MEDIUM AND LOW BARRIER
DIODES AVAILABLE**

Description / Applications

These Schottky diodes are optimized for use in broad band and narrow band microstrip, coaxial, or waveguide mixer assemblies operating to 18 GHz. The low barrier diodes give optimum noise figure performance at low local oscillator drive levels. Medium barrier diodes provide a wider dynamic range for lower distortion mixer designs. The 5082-2350, -2400, -2520 and -2565 have extremely low $1/f$ noise, making them ideal for use as Doppler mixers.

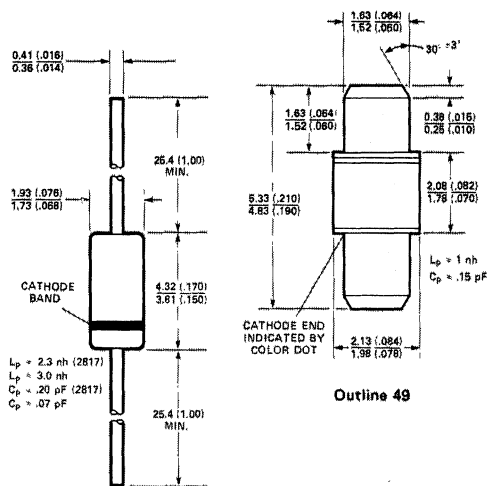
Maximum Ratings

Junction Operating and Storage Temperature Range
5082-2400, -2401, -2565, -2566, -2350, -2351, -2520, -2521 -60°C to +100°C
5082-2817, -2818 -60°C to +200°C
All other diodes -60°C to +150°C

Operation of these devices within the above temperature ratings will assure a device Median Time To Failure (MTTF) of approximately 1×10^7 hours.

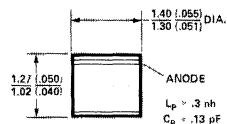
CW Power Dissipation (Measured in an infinite heat sink)
Derate linearly to 0 W at max. rated temperature at $T_{CASE} = 25^\circ\text{C}$
5082-2300, -2400, -2500 Series 100 mW
5082-2817, -2818 250 mW
Others 200 mW
Pulse Power Dissipation
Peak power absorbed by the diode at $T_{CASE} = 25^\circ\text{C}$
1 μs pulse, $D_u = 0.001$ 1 W
Soldering Temperature 230°C for 5 sec.

Note: The 5082-2200, -2500 and -2700 series are ESD sensitive. Handle with care to avoid static discharge through the diode.



Outline 15

Outline 49



DIMENSIONS IN
MILLIMETERS AND (INCHES).

Outline 44

Package Characteristics

The HP Outline 15 package has a glass hermetic seal with plated Dumet leads which should be restricted so that the bend starts at least 1/16" (1.6 mm) from the glass body. With this restriction, it will meet MIL-STD-750. Method 2036, Conditions A and E (4 lb. [1.8 kg] tension for 30 minutes). The maximum soldering temperature is 230°C for 5 seconds. Marking is by digital coding with a cathode band.

The HP Outline 49 package has a metal-ceramic hermetic seal. The anode and cathode studs are gold-plated Kovar. The maximum soldering temperature is 230°C for 5 seconds. Stud-stud T/R is 0.010" max.

The HP Outline 44 package is a hermetically sealed ceramic package. The anode and cathode are gold-plated Kovar. The maximum soldering temperature is 230°C for 5 seconds.

Electrical Specifications at $T_A = 25^\circ\text{C}$

Typical Parameters

Part Number 5082-	Matched Pair 5082-	Barrier	LO Test Frequency (GHz)	Maximum SSB Noise Figure NF (dB)	IF Impedance Z_{IF} (Ω) Min. Max.		Maximum SWR	Package Outline	Junction Capacitance C_{JO} (pF)	Breakdown Voltage V_{BR} (V)
2817	2818	Medium	2.0	6.0	250	400	1.5:1	15	1.0	15
2400	2401	Medium	2.0	6.0	150	250	1.3:1		0.7	30
2350	2351	Medium	2.0	7.0	150	250	1.5:1		0.9	30
2565	2566	Medium	3.0	6.0	100	250	1.5:1		0.7	5
2520	2521	Medium	3.0	7.0	100	250	1.5:1		0.7	5
2713	2714	Medium	9.375	6.0	200	400	1.5:1	49	0.10	4
2711	2712	Medium	9.375	6.5	200	400	2.0:1			
2701	2706	Medium	9.375	6.0	200	400	1.5:1			
2702	2707	Medium	9.375	6.5	200	400	1.5:1			
2296	2296	Low	9.375	6.0	100	250	1.5:1			
2297	2298	Low	9.375	6.5	100	250	2.0:1			
2723	2724	Medium	16	6.5	200	400	1.5:1	49		3
2273	2274	Medium	16	6.5	200	400	1.5:1	44		3
Test Conditions	$\Delta NF \leq 0.3\text{dB}$ $\Delta Z_{IF} \leq 25\Omega$		LO Power = 1 mW IF=30 MHz, 1.5 dB NF Zero DC Load Resistance (100 Ω for 5082-2817)		Same as for NF except IF = 10 KHz		Same as for NF		V = 0	$I_R = 10 \mu A$

Schottky Barrier
Diodes

Typical Parameters

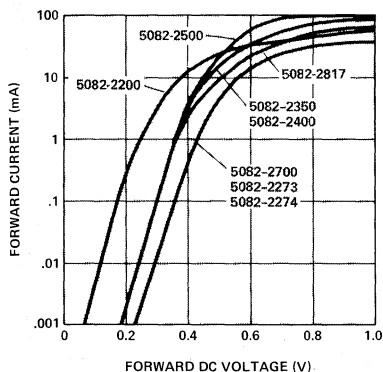


Figure 1. Typical Forward Characteristics at $T_A = 25^\circ\text{C}$.

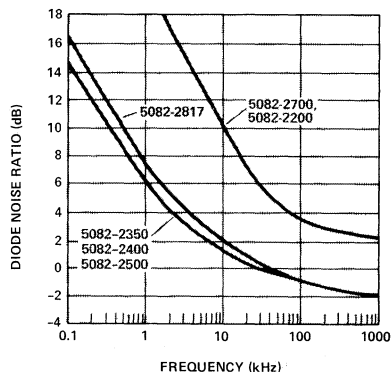


Figure 2. Typical Diode Noise Ratio vs. Frequency at 1 mA Current.

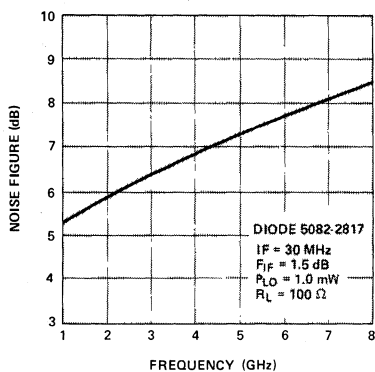


Figure 3. Typical Noise Figure vs. Frequency. The mount is tuned for minimum noise figure at each frequency.

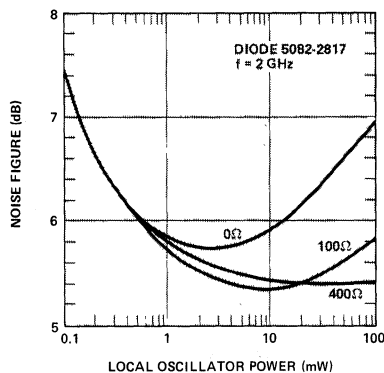


Figure 4. Single Sideband Noise Figure (including an IF-amplifier noise figure of 1.5 dB) vs. Incident LO Power for Various dc-load Resistances R_L . (The mount is tuned for minimum noise figure at each LO power level).

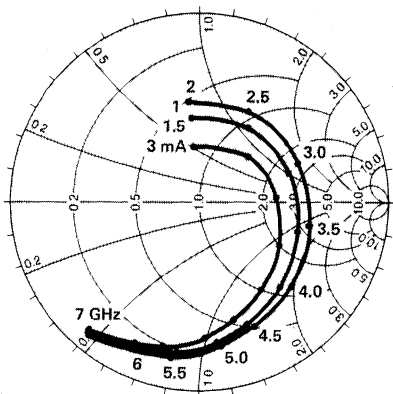


Figure 5. Typical Admittance Characteristics, 5082-2817 with Self Bias.

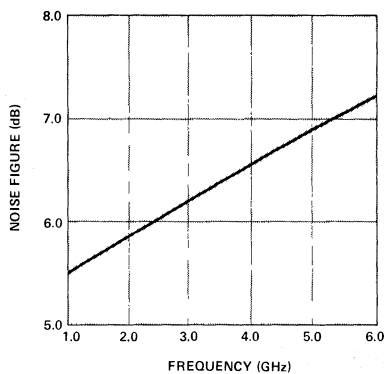


Figure 6. Typical HP 5082-2400 Noise Figure vs. Frequency with $P_{LO} = 1.0$ mW, $IF = 30$ MHz, and $NF_{IF} = 1.5$ dB. Mount Tuned at Each Frequency.

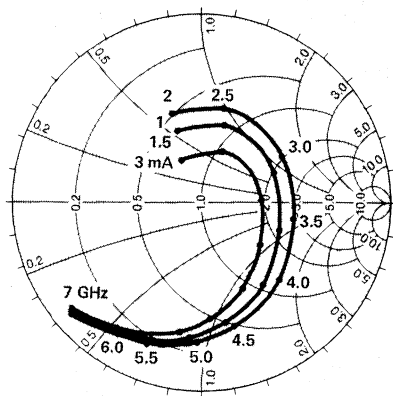


Figure 7. Typical Admittance Characteristics, 5082-2400 with Self Bias.

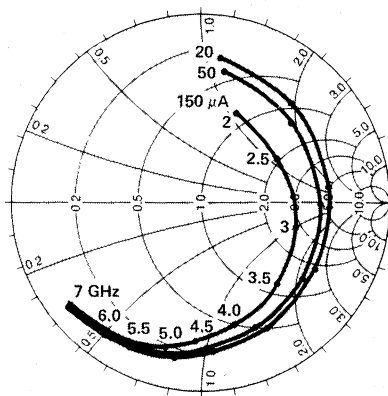


Figure 8. Typical Admittance Characteristics, 5082-2400 with External Bias.

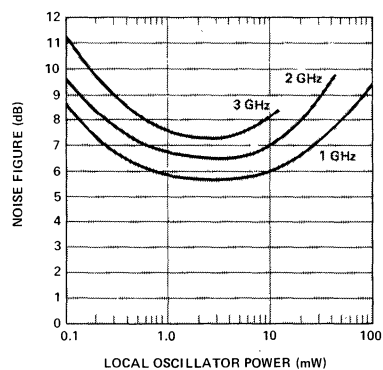


Figure 9. Typical HP 5082-2350 Noise Figure vs. Local Oscillator Power at 1.0, 2.0 and 3.0 GHz with IF = 30 MHz and $N_{FIF} = 1.5$ dB. (The Mount is tuned for Minimum Noise Figure at each LO Level).

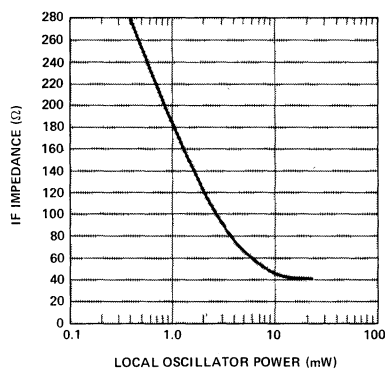


Figure 10. Typical HP 5082-2300 and 2400 Series IF Impedance vs. Local Oscillator Power with $f_{LO} = 2.0$ GHz and IF = 30 MHz. (The Mount is tuned for Minimum Noise Figure at each LO Level).

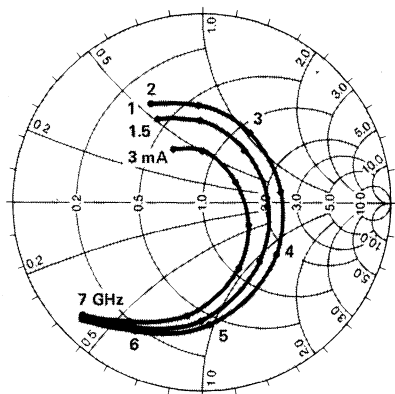


Figure 11. Typical Admittance Characteristics, 5082-2350 with Self Bias.

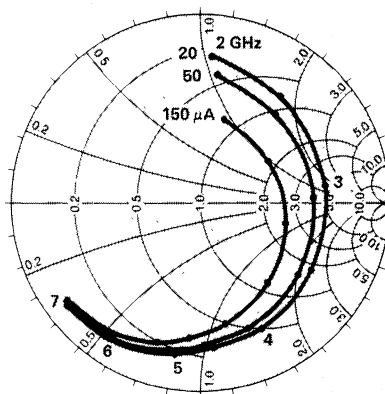


Figure 12. Typical Admittance Characteristics, 5082-2350 with External Bias.

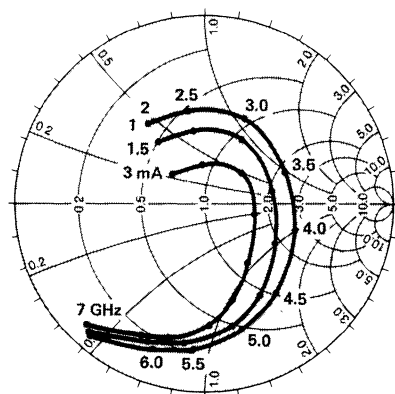


Figure 13. Typical Admittance Characteristics, 5082-2565 with Self Bias.

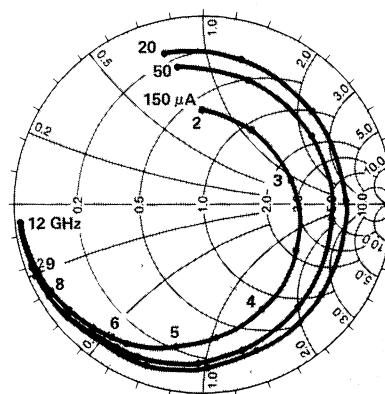


Figure 14. Typical Admittance Characteristics, 5082-2565 with External Bias.

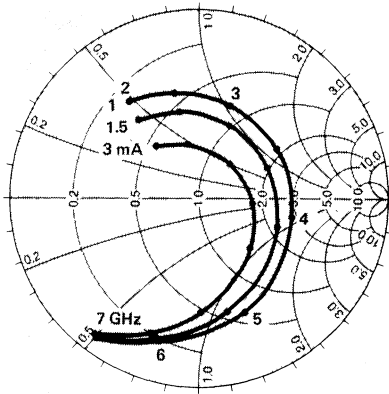


Figure 15. Typical Admittance Characteristics, 5082-2520 with Self Bias.

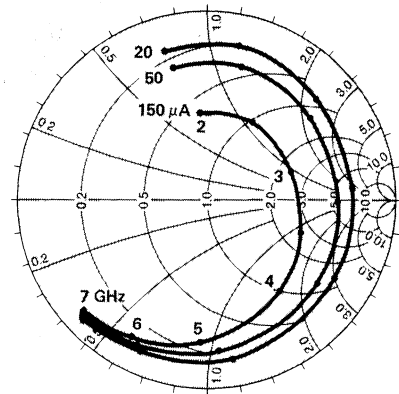


Figure 16. Typical Admittance Characteristics, 5082-2520 with External Bias.

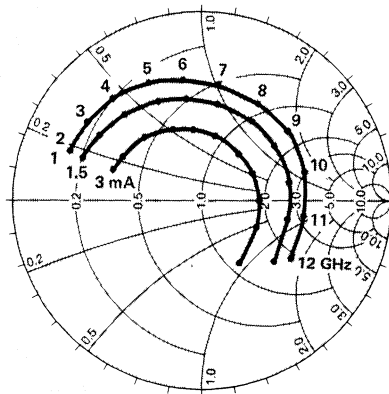


Figure 17. Typical Admittance Characteristics, 5082-2713 with Self Bias.

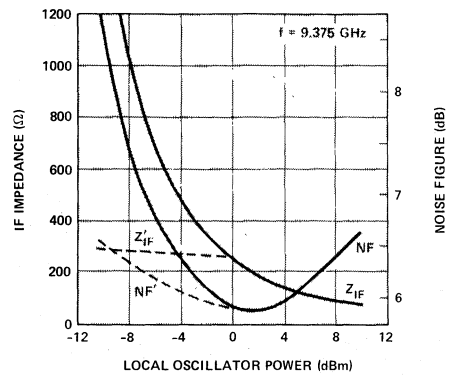


Figure 18. Typical Noise Figure and IF Impedance for 5082-2711 vs. Local Oscillator Power. Note the improved performance at low levels of LO power when dc bias is superimposed (dashed curves). (The Mount is tuned for Minimum Noise Figure at each LO Level).

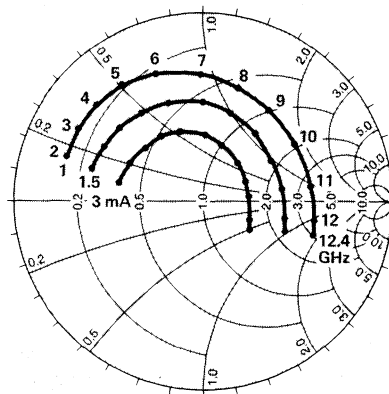


Figure 19. Typical Admittance Characteristics, 5082-2711 with Self Bias.

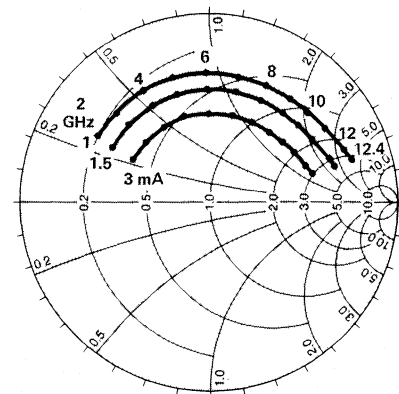


Figure 20. Typical Admittance Characteristics, 5082-2701 with Self Bias.

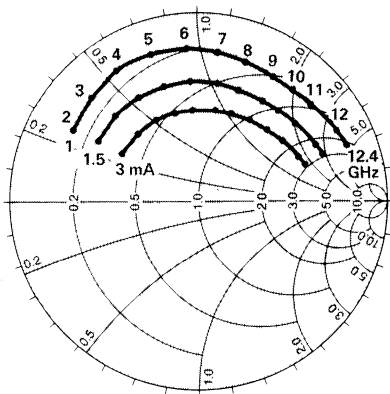


Figure 21. Typical Admittance Characteristics, 5082-2702 with Self Bias.

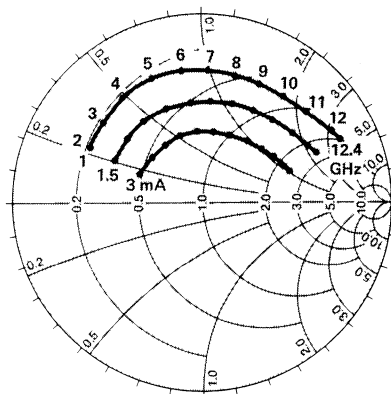


Figure 22. Typical Admittance Characteristics, 5082-2295 with Self Bias.

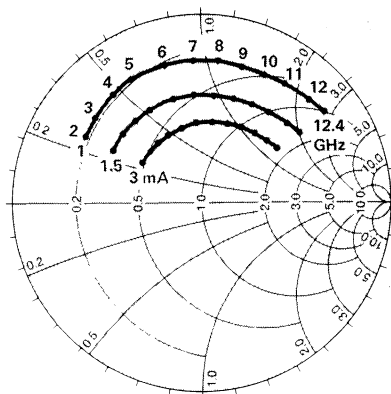


Figure 23. Typical Admittance Characteristics, 5082-2297 with Self Bias.

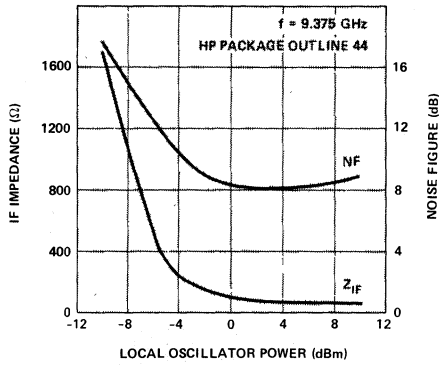


Figure 24. Typical Noise Figure and IF Impedance vs. Local Oscillator Power, 5082-2295 through -2298. Diode unmatched in 50 Ω line..

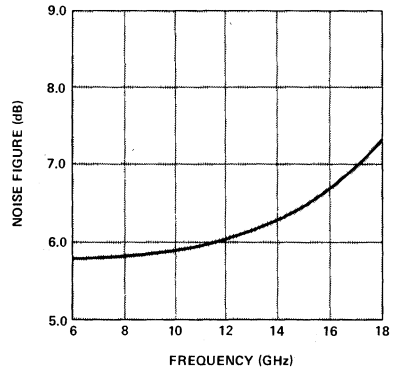


Figure 25. Typical Noise Figure vs. Frequency. IF = 30 MHz, $N_{FIF} = 1.5 \text{ dB}$, $P_{LO} = 1 \text{ mW}$. Diode tuned at each frequency (5082-2200, -2700 series).

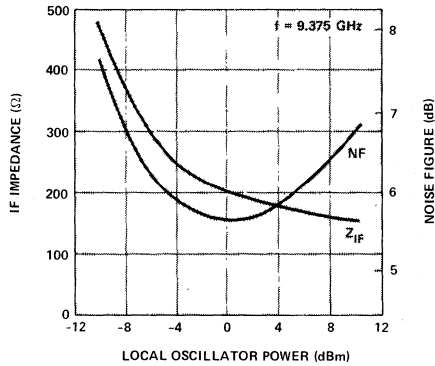


Figure 26. Typical Noise Figure and IF Impedance vs. Local Oscillator Power. Diode tuned at each local oscillator power level (5082-2295).

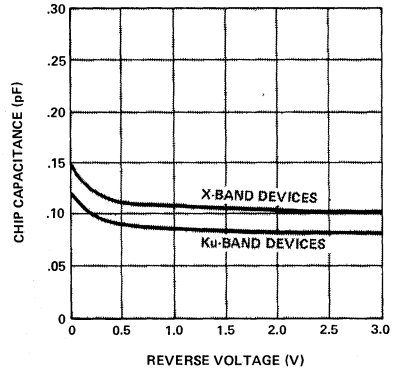


Figure 27. Typical Chip Capacitance vs. Reverse Voltage, -2700 Series.