HEWLETT hp PACKARD
COMPONENTS

HIGH CONDUCTANCE DIODES

5082-1001 (1N4456)
5082-1002
5082-1003
5082-1004
5082-1006

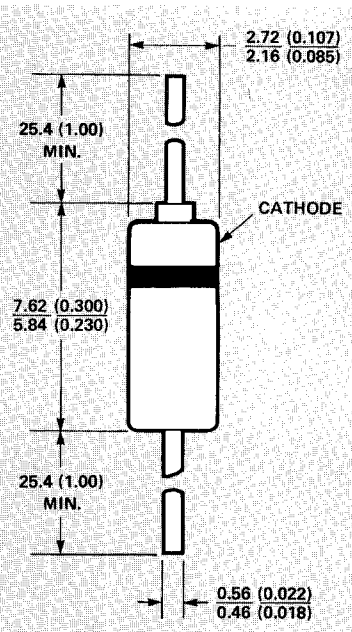
Features

FAST SWITCHING
LOW CAPACITANCE
HIGH CURRENT CAPABILITY

Description/Applications

The 5082-1000 series of diodes feature planar silicon epitaxial construction to provide high conductance, low capacitance, and nanosecond turn-on and turn-off. Process control of the diode manufacturing enables specification of effective minority carrier lifetime. Turn-on time and voltage overshoot are minimized in these diodes of low conductivity modulation.

These diodes are ideally suited for applications such as core drivers, pulse generators, input gates or wherever high conductance without loss of speed is required.



OUTLINE 11

DIMENSIONS IN MILLIMETERS AND (INCHES)

Maximum Ratings at T_{CASE} = 25°C

WIV — Working Inverse Voltage
1006 ..... 40 Volts
1001/1002 ..... 30 Volts
1003/1004 ..... 20 Volts

I_F (Surge) — Forward Current Surge, 1.0 Second Duration ..... 0.75 Amp

I_F (Surge) — Forward Current Surge, 1.0 Microsecond Duration ..... 7.50 Amp

P_{DISS} — Power Dissipation[1] ..... 500 mW

T_A — Operating Temperature Range -65°C to +175°C

T_{STG} — Storage Temperature Range -65°C to +200°C

Operation of these devices within the above temperature ratings will assure a device Mean Time Between Failure (MTBF) of approximately 1 x 10^7 hours.

Mechanical Specifications

The HP Outline 11 package has a glass hermetic seal with dumet leads. The package will meet MIL-STD-750, Method 2036, Condition A (2 lbs. tension for 15 sec.) and E. The maximum soldering temperature is 230°C for 5 seconds. Outline 11 package capacitance and inductance are typically 0.15 pF and 4 nH respectively.

Electrical Specifications at T_A = 25°C

Part Number 5082-	Minimum Breakdown Voltage V_{BR} (V)	Minimum Forward Current I_F (mA)	Minimum Forward Current I_F (mA)	Maximum Reverse Leakage Current I_R (nA)	Maximum Reverse Leakage Current I_R (μA)	Maximum Total Capacitance C_O (pF)	Maximum Reverse Recovery Time t_{rr} (ns)	Maximum Turn-On Time t_{on} (ns)
1001 (1N4456)	35	150	500	200	200	1.5	1.5	2.5
1002	35	300	800	200	200	3.0	2.0	2.5
1003	25	100	300	200	200	2.0	1.5	2.0
1004	25	200	600	200	200	4.0	2.0	2.0
1006	50	150	500	200	200	1.1	1.5	—
Test Conditions	I_R=10μA	V_F=1.0V [2]	V_F=1.4V [2]	[3]	150°C[3]	V_R=0V, f=1.0 MHz	(Figure 9)	(Figure 10)

NOTES:
1. Mounted on a printed circuit board in still air.
2. Measured at a repetition rate not to exceed the power dissipation.
3. V_R=35V for 1006; V_R=30V for 1001, 1002; V_R=20V for 1003, 1004.
4. Inductance measured at the edge of the glass package seal is typically 4.0 nH for all devices.
5. Rectification Efficiency is typically 65% for all devices (Figure 8).

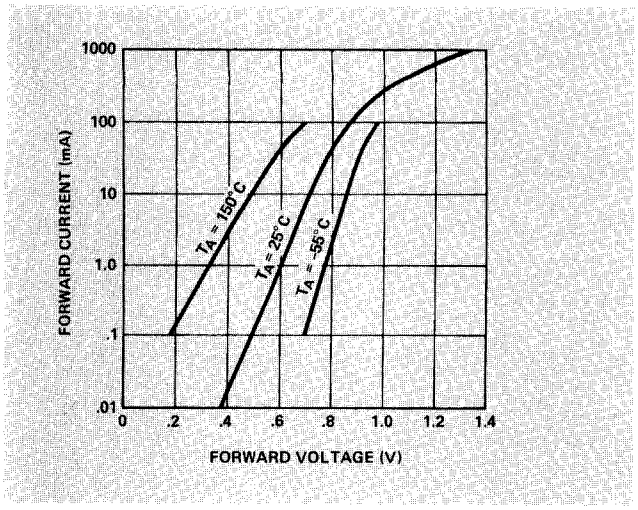


Figure 1. Typical Forward Conduction Characteristics, 5082-1001, 1003, and 1006.

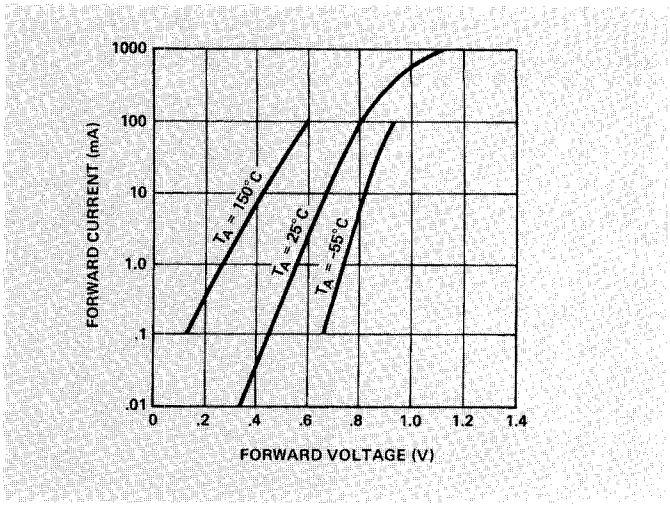


Figure 2. Typical Forward Conduction Characteristics, 5082-1002 and 1004.

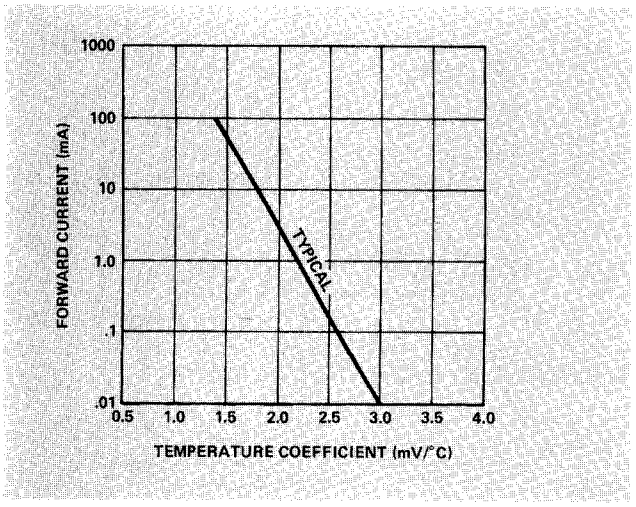


Figure 3. Typical Forward Current Temperature Coefficient.

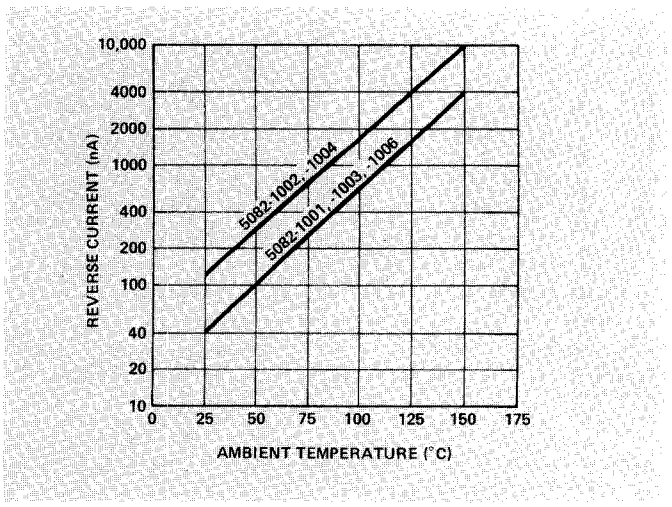


Figure 4. Typical Reverse Current at Specified V_R vs. Increasing Temperature.

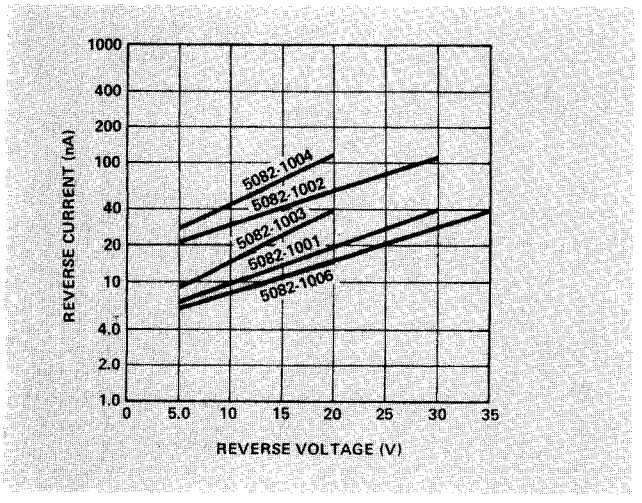


Figure 5. Typical Reverse Current vs. Reverse Voltage.

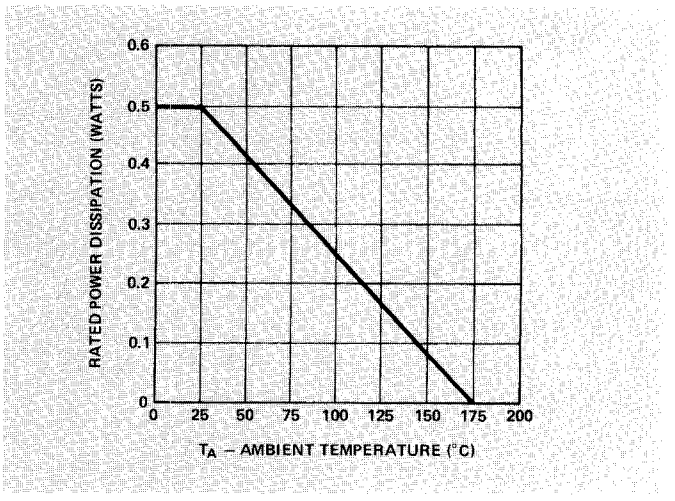


Figure 6. Power Dissipation Derating Characteristics.

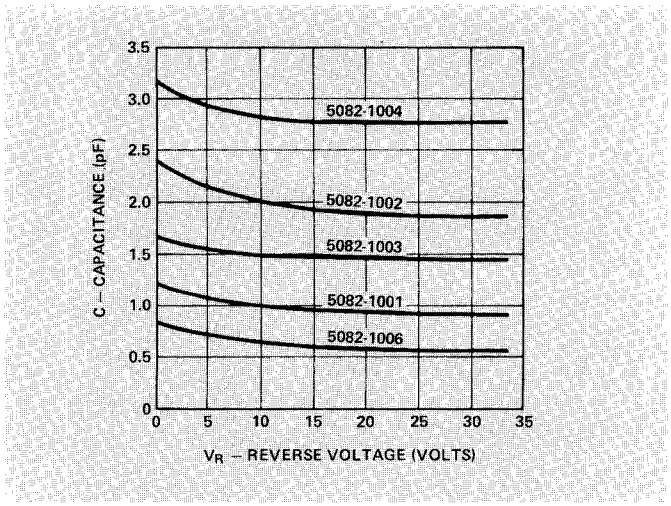


Figure 7. Typical Capacitance vs. Reverse Voltage Characteristics.

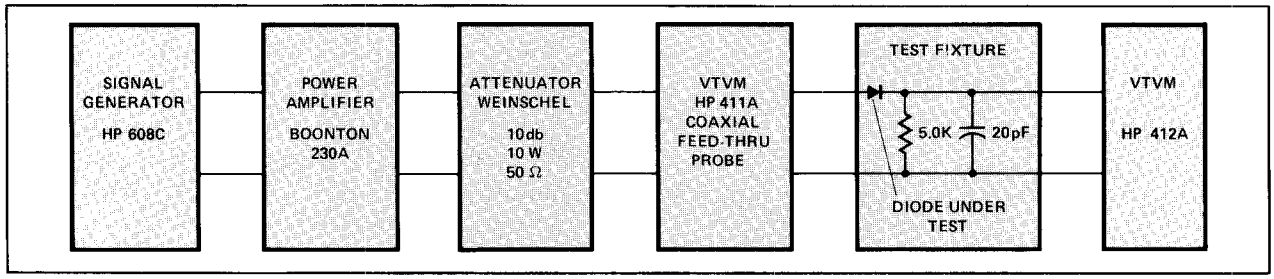


Figure 8. Test Circuit for Measuring the Rectification Efficiency. Signal source is adjusted to 100 MHz and 2V RMS as read on the 411A. The rectification efficiency calculated from the DC output voltage by RE = V_{DC}/2.83 is typically 65% for all devices.

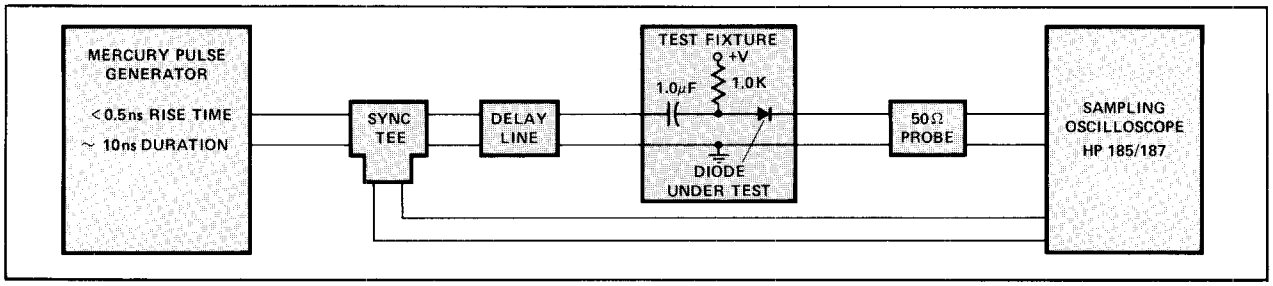


Figure 9. Test Circuit for Measuring Reverse Recovery Time. I_F is set equal to I_R (anywhere from 10 to 400 mA). t_{RR} is measured as the time required to recover to 0.1 I_R as timed from the zero crossover. The observed waveform will be determined more by diode capacitance than by minority carrier storage.

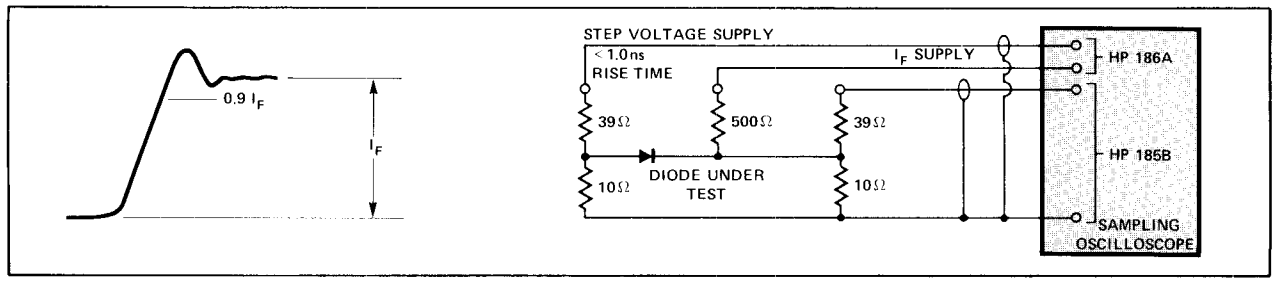


Figure 10. Test Circuit for Measuring Turn-On Time. I_F is adjusted for 10 mA after applying the step voltage. t_{ON} is measured as the time required to reach 0.9 I_F from initial application of the step voltage. For high excitation levels the t_{ON} value is significantly lower than the value specified, i.e., at 100 mA t_{ON} is typically less than 1.0 ns.