

Glass Packaged Step Recovery Diodes

Technical Data

5082-0112/13/14

5082-0151

5082-0153

5082-0180

5082-0833

5082-0840

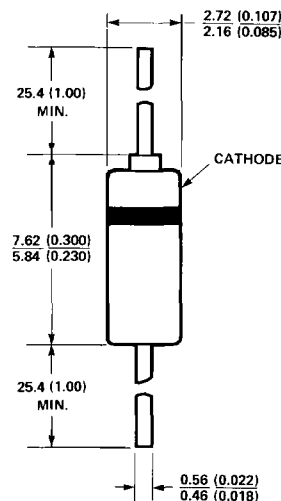
Features

- Optimized for Both Low and High Order Multiplier Designs from UHF through Ku Band
- Passivated Chip for Maximum Stability and Reliability
- Available in a Variety of Packages

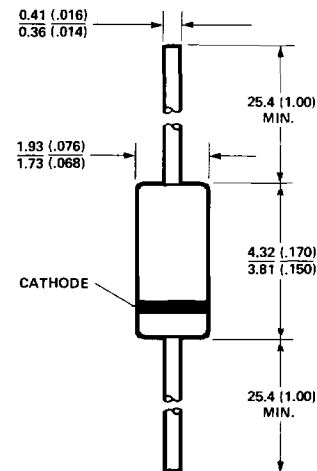
Description/ Applications

These diodes are manufactured using modern epitaxial growth techniques. The diodes are passivated with a thermal oxide for maximum stability. The result is a family of devices offering highly repeatable, efficient and reliable performance which are designed to meet the general requirements of MIL-S-19500.

These diodes are intended for medium and low power multipliers. Typical applications are in local oscillators, especially where low phase noise is required, in terrestrial communications, satellite communications, TVRO, mobile communications and test equipment. Input frequencies extend down to 10 MHz with output frequencies reaching 26 GHz.



Outline 11



Outline 15

Mechanical Specifications

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 inch (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 five seconds. Marking is by digital

coding with a cathode band. Outline 15 package capacitance and inductance are typically 0.18 pF and 1.8 nH respectively.

The HP Outline 11 package has a glass hermetic seal with plated 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 five seconds. Outline 11 package capacitance and inductance are typically 0.15 pF and 4 nH, respectively.

Maximum Ratings

Junction Operating and Storage

Temperature Range -65°C to 200°C

DC Power Dissipation at $T_{CASE} = 25^{\circ}C$ $\frac{200^{\circ}C - T_{CASE}}{\theta_{jc}}$

Soldering Temperature 230°C for 5 sec.

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

| Part Number 5082- | Max. Junction Capacitance C_j (pF) | Min. Breakdown Voltage V_{BR} (V) | Min. Cutoff Frequency f_c (GHz) | Transition Time ⁽¹⁾ | | Min. Lifetime τ (nsec) | Package Outline |
|----------------------|--|--|--------------------------------------|--------------------------------|-------------------|--------------------------------|-----------------|
| | | | | Max. t_t (psec) | Charge Level (pc) | | |
| 0840 | 0.60* | 15 | 300 | 75 | 100 | 10 | 15 |
| 0151 | 0.65 | 15 | — | 100 | 200 | 10 | 15 |
| 0153 | 0.40 | 25 | — | 95 | 200 | 10 | 15 |
| 0833 | 1.6* | 25 | 175 | 90 | 300 | 10 | 15 |
| 0112 | 1.55 | 35 | — | 175 | 1000 | 50 | 11 |
| 0114 | 3.85 | 35 | — | 225 | 1500 | 80 | 11 |
| 0113 | 4.85 | 35 | — | 250 | 1500 | 80 | 11 |
| 0180 | 4.45 | 50 | — | 225 | 1500 | 100 | 11 |
| Test Conditions | $f = 1$ MHz $V_R = 10$ V * $V_R = 6$ V | $I_R = 10 \mu A$ | $f_c = \frac{1}{2\pi R_S C_j}$ | | | $I_F = 10$ mA $I_R = 6$ mA | |

Notes:

1. The transition times shown for the package 15 devices are limited by the package inductance to a minimum of 100 ps. The lower transition times shown for the -0833, -0840, -0151, and -0153 are based on the performance of the chip.
2. Typical θ_{jc} for Outline 15 is 600°C/W and for Outline 11 is 300°C/W.

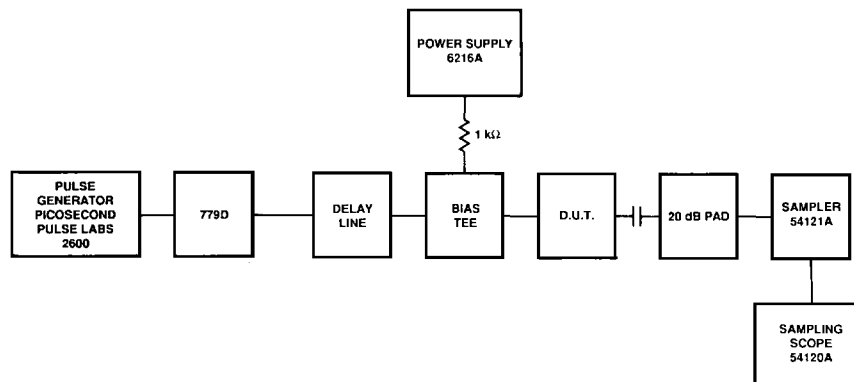


Figure 1. Test circuit for transition time. The pulse generator circuit is adjusted for a 0.5 A pulse when testing 5082-0151 and -0840. A pulse of 1.0 A is used for all other diodes. The bias current is adjusted for the specified stored charge level. The transition time is read between the 20% and the 80% points on the oscilloscope.

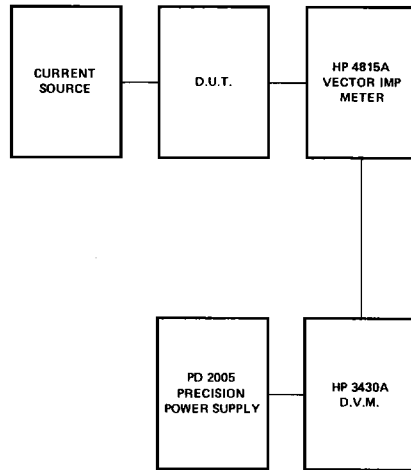


Figure 2. Test set-up for measurement of series resistance. The D.U.T. is forward biased (I_F) and the real part of the diode impedance is measured at 100 MHz. The D.V.M. is set up to read the real part on the Vector voltmeter. The precision power supply is used to offset the test circuit resistance. R_s is measured at $I_F = 100$ mA.

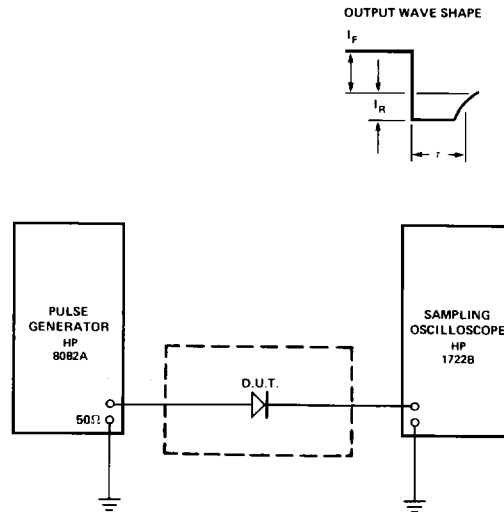


Figure 3. The circuit for measurement of the effective minority carrier lifetime. The value of the reverse current (I_R) is approximately 6 mA and the forward current (I_F) is 10 mA. The lifetime (τ) is measured across the 50% points of the observed wave shape. The input pulse is provided by a pulse generator having a rise time of less than one nanosecond. The output pulse is amplified and observed on a sampling oscilloscope.