HEWLETT PACKARD

PIN Diode Limiter

Technical Data

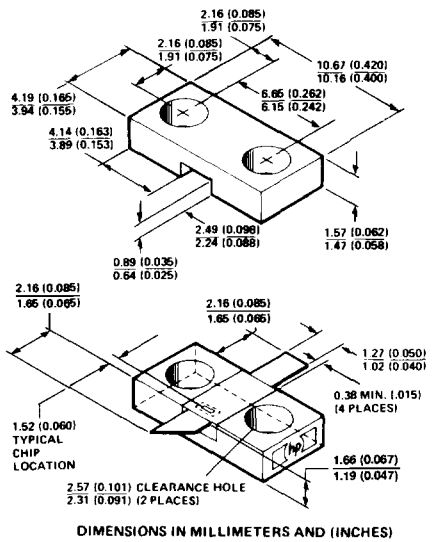
5082-3071

Features

- **High Power Handling Capability**
  50 W Peak Pulse Power
- **Low Intermodulation Products**
  Typical 0.2 W Threshold
  Assures Wide Dynamic Linear Range
- **Broad Bandwidth**
  500 MHz to 10 GHz
- **Low Insertion Loss**
  Less than 1 dB in X-band
- **Easy to Use**
  Package Compatible with Stripline and Microstrip
- **Negligible Spike Leakage**

Description/ Applications

The HP 5082-3071 passive limiter chip is functionally integrated into a 50 Ω transmission line to provide a broadband, linear, low insertion loss transfer characteristic for small signal levels. At higher signal levels self-rectification reduces the diode resistance to provide limiting as shown in Figure 2. Limiter performance is practically independent of temperature over the rated temperature range.



DIMENSIONS IN MILLIMETERS AND (INCHES)

Outline 61

Maximum Ratings

Junction Operating and Storage Temperature Range ..... -65°C to +125°C
Power Dissipation[1] ..... 1.0 W
Peak Incident Pulse Power[2] ..... 50 W
Peak Inverse Voltage ..... 50 V
Soldering Temperature ..... 230°C for 5 sec

Notes:

1. Device properly mounted in sufficient heat sink at T_A = 25°C, derate linearly to zero at maximum operating temperature.
2. t_p = 1 μs, f = 10 GHz, Du = 0.001, Z_O = 50 Ω, T_A = 25°C.

The 5082-3071 limiter module is designed for applications in telecommunication equipment, ECM receivers, distance measuring equipment, radar receivers, telemetry equipment, and transponders operating anywhere in the frequency range from 500 MHz through 10 GHz. An external dc return is required for self bias operation. This dc return is often present in the existing circuit, i.e. inductively coupled antennas, or it can be provided by a $\lambda/4$ resonant shunt transmission line. Selection of a high characteristic impedance for the shunt transmission line affords broadband operation. Another easy to realize dc return consists of a small diameter wire connected at a right angle to the electric field in a microstrip or stripline circuit. A 10 mA forward current will actuate the PIN diode as a shunt switch providing approximately 20 dB of isolation.

Mechanical Specifications

The cover channel supplied with each diode should be used in balanced stripline circuits in order to provide good electrical continuity from the upper to the lower ground plane through the package base metal. Higher order modes will be excited if this cover is left off or if poor electrical contact is made to the ground plane.

The package transmission channel is filled with epoxy resin which combines a low expansion coefficient with high chemical stability. Outline 61 has a gold plated copper body with gold plated Kovar leads.

Electrical Specifications at $T_A = 25°C$

Part Number 5082-	Package Outline	Heat Sink	Maximum Insertion Loss (dB)	Maximum SWR	Maximum RF Leakage Power (W)	Typical Recovery Time (ns)
3071	61	Cathode	1.2	2.0	1.0	100
Test Conditions			P_{in} = 0 dBm f = 9.4 GHz	P_{in} = 0 dBm f = 9.4 GHz	P_{in} = 50 W 1 µsec f = 9.4 GHz	P_{in} = 50 W 1 µsec

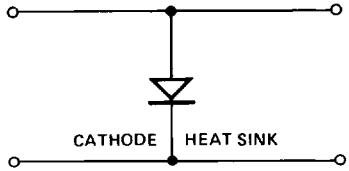


Figure 1. Heat Sink Polarity.

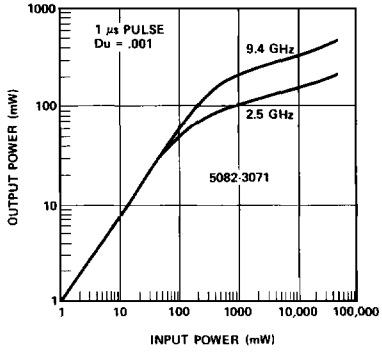


Figure 2. Typical Pulse Limiting Characteristics.

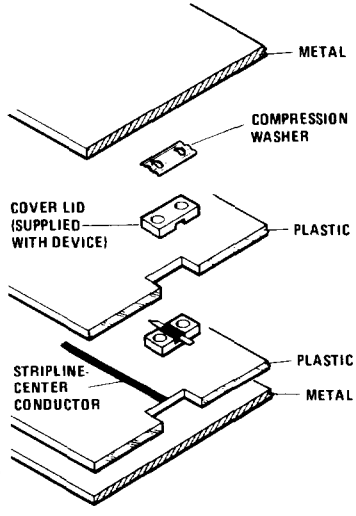


Figure 3. Suggested Stripline Assembly.