

Features

- LOW COST
- FAST SWITCHING
- HIGH BREAKDOWN

Description

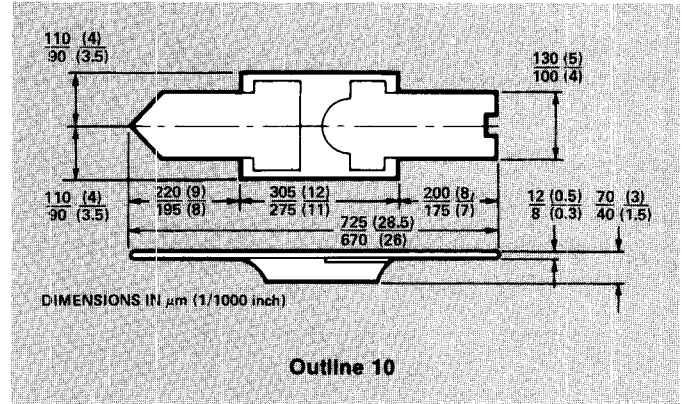
The HP 5082-2837 is an epitaxial planar passivated Beam Lead Diode whose construction utilizes a unique combination of both a conventional PN junction and a Schottky barrier. This manufacturing process results in a device which has the high breakdown and temperature characteristics of silicon, the turn-on voltage of germanium and the speed of a Schottky diode majority carrier device.

This device is intended for high volume, low cost applications, and is the beam lead equivalent of the HP 5082-2800 glass packaged diode.

Applications

High level detection, switching, or gating; logarithmic or A-D converting; sampling or wave shaping are jobs the 5082-2837 will do better than conventional PN junction diodes. The low turn-on voltage and subnanosecond switching makes it extremely attractive in digital circuits for DTL gates, pulse shaping circuits or other low level applications. Its high PIV allows wide dynamic range for fast high voltage sampling gates.

The 5082-2837 low turn-on voltage gives low offsets. The extremely low stored charge minimizes output offsets caused by the charge flow in the storage capacitor. At UHF,



the diodes exhibit 95% rectification efficiencies. Both their low loss and their high PIV allow the diodes to be used in mixer and modulator applications which require wide dynamic ranges.

The combination of these technical features with the low price make these devices the prime consideration for any hybrid dc or RF circuit requiring nonlinear elements.

Absolute Maximum Ratings at $T_A = 25^\circ\text{C}$

- Operating Temperature Range -60°C to $+150^\circ\text{C}$
- Storage Temperature Range -60°C to $+150^\circ\text{C}$
- Maximum Lead Pull 2 Gms

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

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

Specification	Symbol	Min.	Max.	Units	Test Conditions
Breakdown Voltage	V_{BR}	70	—	Volts	$I_R = 10\mu\text{A}$
Forward Voltage	V_{F1}	—	410	mV	$I_{F1} = 1\text{mA}$
Forward Voltage	V_{F2}	—	1.0	V	$I_{F2} = 15\text{mA}$
Reverse Leakage Current	I_R	—	200	nA	$V_R = 50\text{V}$
Capacitance	C_o	—	2.0	pF	$V_R = 0\text{V}$ and $f = 1\text{MHz}$
Effective Minority Carrier Lifetime	τ	—	100*	pS	$I_F = 5\text{mA}$ Krakauer Method

* Typical

Bonding Recommendations

Beam lead devices are silicon chips with coplanar plated gold tabs that extend parallel to the top surface of the chip approximately 8 mils beyond the edge. The leads are approximately 4 mils wide by 1/2 mil thick and are mounted by thermocompression bonding to the substrate metallization. The bonding is accomplished by placing the device face down with the tabs resting flat on the pad area and using heated wedge (and/or substrate), or parallel-gap (spot-welding) techniques.

The heated wedge may be continuously heated, as in most standard equipment, or it may be pulse resistance heated where a high current, short duration pulse is used to raise the wedge to the required temperature. In the spot-welding operation, current is passed through the substrate metallization and the device lead. Most of the heat is generated at the interface between the two, where the bond is formed.

The major advantage of pulse heating techniques is that a cold ambient may be used, generating only localized heating in the vicinity of the bond itself. The electrodes (or wedge) can be placed on the device lead while the bond area is cold, and maintain a constant force through the heating and cooling cycle.

Handling Instructions

The mechanical and electrical performance characteristics of beam lead diodes require careful and considerate handling during inspection, testing, and assembly. The handling techniques described here are necessary so that the diodes will not be mechanically or electrically damaged, particularly where reverse voltages approach the diode breakdown rating.

Visual Inspection

The enclosed beam lead diodes may be viewed through the transparent underside of the shipping tray without its being opened.

Unloading

1. Open the lid, remove the foam pad, and carefully lift off the antistatic fabric liner.
2. A vacuum pickup with a #27 tip is recommended for picking up single beam lead devices. This should be done under 20X magnification for accurate positioning of the tip on the die.
3. Replace the fabric and pad for storage of unused devices.