D III (H) II 'B'

Zener diode →

Zener diode are more heavily doped than ordinary diodes and they have narrow depletion region. Zener diodes are designed so as to exhibit break down at a very low voltage (~5V). The breakdown is not due to Avalanche effect but due to Zener effect which doesn't involve ionization by collision.

Zener Breakdown is due to the rupture of covalent bonds due to strong electric field and spontaneous generation of hole electron pair in the depletion region take place.

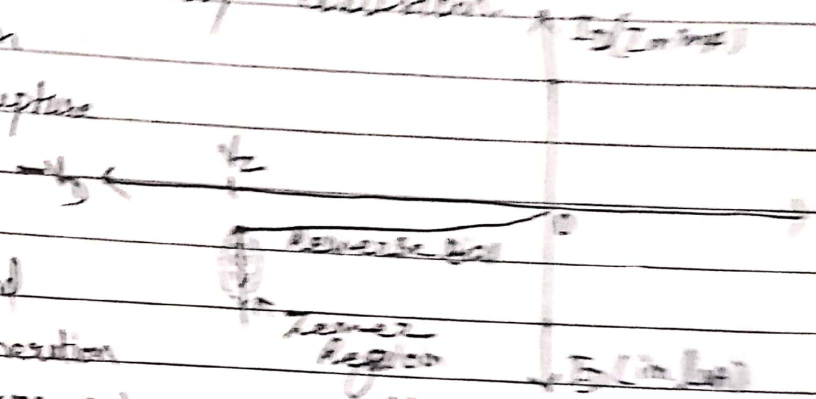

fig-(a)

The vertical characteristic in the breakdown region means the voltage (V_Z) across the diode remains constant in that region, independent of the current (reverse) flowing through it. This property is useful in many applications where the zener diode serves as a voltage reference, similar to an ideal voltage source.

The I-V characteristic of a zener diode ...

In fig(b) the symbols and the required polarity of the applied voltage of semiconductor diode and zener diode is in fig(a) fig(c) and fig(d).

Reversed Zener diode

Forward biased diode

fig(b)

For a semiconductor diode, the 'ON' state will support a current in a direction of arrow, and the diode is in forward bias. On the contrary the same polarity and the same direction of conduction current I_z, the zener is connected in reverse bias.