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Semiconductor: Semiconductors are a special class of elements having a conductivity between that of a good conductor and that of an insulator.

Valence: The term valence is used to indicate that the potential required to remove any one of the electron from the atomic structure is significantly lower than that required for any other electron in the structure.

Co-vallent bonding: The bonding of atoms, strengthened by the sharing of electrons is called co-vallent bonding.

Intrinsic materials: The semiconductor material that has been carefully refined to reduce the number of impurities to a very low level — as pure as can be made possible is called intrinsic material.

Relative mobility: The relative mobility (μ_s) of the free carriers in the material is the ability to move throughout the material.

Entrinsic material: A semiconductor material that has been subjected to the doping process is called an entrinsic material.

Depletion region: The region of uncovered positive and negative ions is called the depletion region due to the depletion of free carriers in the region. The region near th

Bias: The term bias refers to the application of an external voltage across the two terminals to extract a response.

Reverse saturation current: The current that exists under reverse-bias conditions is called the reverse saturation current. It is represented by I_s.

Zener region: The current increases at a very rapid rate in a direction opposite to that of the positive voltage region. The reverse bias potential that results in this dramatic change in characteristics is zener potential and this change at any level is called the Zener region.

PIV rating: the maximum reverse-bias potential that can be applied before entering the Zener region is called the peak inverse voltage (simply as PIV rating) or PRV rating.

Equivalent circuit: An equivalent circuit is a combination of elements properly chosen to best represent the actual terminals characteristics of a device or system in a particular operating region.

Clippers: clippers are networks that employ diodes to clip away a portion of an input signal without distorting the remaining part of the applied waveform.

Clampers: A clamper is a network constructed of a diode a resistor and a capacitor that shifts a waveform to a different dc level without changing the appearance of the applied signal.

Voltage Buffer: A voltage buffer circuit provides a means of isolating an input signal from a load by using a stage having unity voltage gain, with no phase or polarity inversion. A voltage buffer acts as an ideal ~~of op-amp connected to pr~~ circuit with very high input impedance and low output impedance.

Active filter: Active filter is a popular application of op-amp. It can be constructed using passive components: resistors and capacitors. An active filter additionally uses an amplifier to provide voltage amplification and signal isolation or buffering.

Low pass filter: A filter that provides a constant output from dc up to a cut off frequency is called an ideal low pass filter.

High pass filter: A filter that provides or passes signals above a cut off frequency for is called a high pass filter.

Bandpass filter: When the filter circuit provides or passes signals that are above one ideal cut off frequency and below a second cut off frequency, it is called a band pass filter.

Bandwidth: The Bandwidth of an amplifier is defined as the range of frequency between a high and a low frequency level.

Bipolar device: The device where both holes and electron participate in the injection process into the oppositely polarized material is called bipolar device.

Leakage current: The minority current component is called the leakage current. It is designated as I_{CO} (I_C current with emitter open).

Alpha: In the dc ~~Levels~~ mode the levels of I_C and I_E due to the majority carriers are related by a quantity called alpha.

$$\alpha_{dc} = \frac{I_E}{I_E}$$

Beta: In the dc mode the levels of I_C and I_B are related by a quantity called beta and defined by the following equation:

$$\beta_{dc} = \frac{I_C}{I_B}$$