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Semiconductor and diodes

Diodes transistors and similar semiconductor devices. Semiconductor and diodes pdf. Semiconductor diodes and applications. Semiconductor diodes and transistors pdf. Semiconductor diodes and their applications ppt. Semiconductor diodes and applications pdf. Semiconductor and diodes ppt. Basics of semiconductor diodes and transistors and characteristics.

A P N joint is known as a semiconductor diode. The P N junction is used for the purpose of grinding as it leads only in one direction. It is also known as crystal diode as it is made of a silicon or a germanium similar to a crystal. Below is the symbol of the semiconductor diode. He's got two terminals. It leads only when it is ahead of prevent. This means when the terminal connected with the arrow tip is at a higher potential than the terminal connected to the bar as shown in the figure above. When the semiconductor diode is reversed, practically, practically does not conduct any current through it. VOLT-AMPERE Features of a semiconductor diode The Volt-Ampere or V-I V-I characteristics of a semiconductor diode is a curve between the tension through the junction and the current of the circuit. The layout of the circuit is shown below. The R resistor is connected in series with the PN junction which limits the current forward diode from the overcoming of the prescribed limit value. The features are studied under three I.E. Zero external voltage, advanced prevention and reverse prevention heads. They are described below in detail. Zero External voltage When an external voltage is not applied that the circuit is open to K key, no current flows through the circuit. It is indicated from point 0 on the chart below: Biasing forward when the K key is closed and the double shooting switch is launched in position 1 as shown in the circuit diagram above A. The PN junction is forward as a type P semiconductor is connected to the positive terminal and type N to the negative terminal of the supply. Now, when the power voltage is increased by changing the variable resistance RH. The current of the circuit increases very slowly and the curve is not linear shown in the feature above figure B as OA. The slow rise in current in this region is because the externally applied voltage is used to exceed the potential barrier of 0.3 V for GE and 0.7 for SI of the PN junction. However, once the potential barrier is eliminated and the external power voltage has increased further. The PN junction behaves as a normal conductor and the current of the circuit increases very clearly represented by the AB region. At this moment, the current is limited by the Resistance R series and a small value of the forward resistance of the RF junction. The curve is almost linear. If the current rises more than the nominal value of the diode, the diode may be damaged. Knee tension The attack voltage (0.3 V for GE and 0.7 V for SI diodes) to which the current through the diode or the P N joint begin to grow sharply is known as the knee tension. Retrose Biasing When the double pole Double shot (DPDT) comesposition 2 as shown in Figure A. The PN junction is inverse to BiaSed as a type P semiconductor is connected to the negative terminal and type N to the positive terminal of the supply. Under this condition, the potential barrier to the junction has increased. Therefore, the joint strength rr rr Very high and practically no current flows through the circuit. However, in practice a very small current of the order of the flow of microamberries in the circuit actually does. This current is known as reverse current and is due to minority media available at room temperature. The reverse current increases slightly as the supply voltage of the reverse bias increases. If the reverse voltage is continuously increased, a stage is reached when the kinetic energy of the electrons (minority vectors) becomes so high that they remove the electrons from the bonds of the semiconductors. At end c, breakage occurs and the strength of the RR barrier region suddenly falls. As a result, the reverse current rises tremendously at a great value. This can permanently destroy the crossing. The inverse voltage at which junction interruptions P N is known as breaking voltage. The following points are concluded from all the above discussion. At zero external voltage, no current flows through the circuit or diode. At bias forward, the current increases slightly until the potential of the barrier is cleared. After knee tension, the forward current increases dramatically. The forward current is limited by the Resistance R series and a small value of the resistance to the RF junction. The diode is destroyed as the forward current increases beyond the nominal value of the diode. Reverse current increases slightly with increasing voltage due to minority carriers. The maximum value of the reverse current for SI diode is less than 1 microameters. For GE, it's about 100 microamberries. The reverse voltage at which junction interruptions are known as breaking voltage. At reverse voltage, when the junction breaks the diode can be destroyed. This is all on the semiconductor diode. If you are seeing this message, it means that we have trouble uploading external resources to our website. If you're behind a web filter, make sure the * .kastatic.org and * .kasandbox.org domains are unlocked. A P-N junction diode is a two-terminal or two-electrode semiconductor device that allows electric current in one direction while blocking electric current in the opposite or opposite direction. If the diode is forward, it allows the flow of electric current. On the other hand, if the diode is decorated in reverse, it blocks the flow of electric current. The P-N junction semiconductor diode is also called as a P-N junction semiconductor device. In N-type semiconductors, the free electrons are the majority charge carriers, while in P-type semiconductors, the holes are the majority charge carriers. When the N-type semiconductor is joined with the P-type semiconductor, a P-N junction is formed. The P-N junction, formed when semiconductors type and n of the type n are united, it is called as a p-n junction diode. The P-N junction diode is made with semiconductor materials such as silicon, germanium and the arsenide of the gallium. To design diodes, silicon is more preferred above germanium. P-N junction diodes have done Silicon semiconductors operate at higher temperatures than p-n junction diodes made with germanium semiconductors. The basic symbol of the p-n junction diode with forward polarization and reverse polarization is shown in the figure below In the figure above, arrowhead of a diode indicates the conventional direction of electric current when the diode is polarized forwards (from the positive terminal to the negative terminal). Holes moving from the positive terminal (anode) to the negative terminal (cathode) represent the conventional direction of current. The free electrons moving from the negative terminal (catedus) to the positive terminal (anode) actually carry the electric current. However, because of the convention we have to assume that the current direction is from the positive terminal to the negative terminal. Biasing of the semiconductor p-n junction diode The process of applying the external voltage to a semiconductor p-n junction diode is called biasing. The external voltage of the junction diode p-n is applied by one of two methods: forward polarization or reverse polarization. If the junction diode p-n is polarized forward, it allows the flow of electric current. In forward polarized conditions, the semiconductor of type p is connected to the positive terminal of the battery while the semiconductor of type n is connected to the negative terminal of the battery. If the junction diode p-n is inverted, it blocks the flow of electric current. Under reverse polarization conditions, the semiconductor of type p is connected to the negative terminal of the battery while the semiconductor of type n is connected to the positive terminal of the battery. Pn junction diode terminals Generally, terminal refers to a point or place where any object begins or ends. For example, the bus terminal is a place where all buses start or end. Similarly, in a p-n junction diode, terminal refers to a point where the charge carriers begin or end. The junction diode P-n consists of two terminals: positive and negative. At the positive terminal, all the free electrons will end and all the holes will begin while at the negative terminal, all the free electrons will begin and all the holes will end. In the forward polarized p-n junction diode (type p connected to the positive terminal and type n connected to the negative terminal), the end of the anode is a positive terminal while the end of the cathode is a negative terminal. The end of the anode is a positively charged electrode or conductor, which provides holes to the p-n junction. In other words, the anode or anode terminal or the positive terminal is the source of positive charge carriers (holes), the positive charge carriers (holes) begin their journey to the anode terminal and travel through the diode and ends at the terminal Ã, Ã, Ã, Ã, Ã, ã, Ã, Ã, Ã, Ã, Ã, Ã, Ã, Ã, Ã, Ã, Ã, Ã, Ã, Ã, Ã, Ã, Ã, Ã, is, Ã, Ã, Ã, Ã, Ã, is, which supplies free electrons to the junction pn. In other words, the cathodic terminal or negative terminal is the source of free electrons, negative charge carriers (free electrons) starts begins trip to the cathode terminal and travel through the diode and ends at the anodo terminal. The free electrons are attracted to the terminal of the anode or the positive terminal while the holes are attracted to the cathode terminal or negative terminal. If the diode is inverted biased (p-type connected to the negative terminal and n-type connected to the positive terminal,) the anode terminal becomes a negative terminal while the cathode terminal becomes a positive terminal. Terminal anod or negative terminal provides free electrons to the p-n connection. In other words, the anode terminal is the source of free electrons, free electrons begin their journey to negative terminal or anod and fills the large number of holes in the semiconductor type p. The holes of the semiconductor type p draw towards the negative terminal. The free electrons from the negative terminal cannot move towards the positive terminal because the wide depletion region at the p-n intersection resists or opposes the flow of free electrons. The Cathode terminal or the positive terminal provides holes to the p-n connection. In other words, the cathode terminal is the source of holes, the holes begin their journey in positive terminal or cathode and occupies the position of the electrons in the semiconductor type n. The free electrons in the type n semiconductor draw towards the positive terminal. The holes in the positive terminal cannot move towards the negative terminal because the wide exhaustion region to the p-n connection is opposed to the flow of holes. Semiconductor deions of silicon and germanium For the design of diodes, silicon is more preferred than the germanium. P-n joint diodes made of silicon semiconductors work at high temperature compared to semiconductor diodes of germanium. Tension bias forward for the semiconductor diode of silicon is about 0.7 volts while for the semiconductor diode of germanium is about 0.3 volts. Semiconductor silicon diodes do not allow electrical current flow, if the voltage applied on silicon diode is less than 0.7 volts. Semiconductor silicion diodes begin to allow the current flow, if the applied voltage on the diode reaches 0.7 volts. Germanium's semiconductor diodes do not allow electrical current flow, if the voltage applied on the germanium diode is less than 0.3 volts. Germanium semiconductor diodes begin to allow the current flow, if the voltage applied on the germanium diode reaches 0.3 volts. The cost of silicon semiconductors is low compared to the semiconductors of germanium. The advantages of the P-n p-n joint diode are the simplest form of all semiconductor devices. However, diodes play an important role in many electronic devices. devices.