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**STUDIES ON EMITTER- BASE AND BASE-COLLECTOR JUNCTIONS OF A HIGH FREQUENCY TRANSISTOR**

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**ABSTRACT :**

In this work the analysis of emitter base and base-collection junctions of a high frequency transistor BF- 200 has been reported. The important feature of the investigation is the use of Helium-Neon Laser (0.50 watt, Make Spectra Laser) for the illumination of the junctions cited above. Further such junctions are obtained by cutting the top of the high frequency transistor BF 200 and preparing the junctions for exposure from the He-Ne Laser light. It is observed that output as measured by a multimeter is more in the case of base emitter junction compared to base -collector junction. Further the analysis is extended using polarised laser beam through different angles. A clear cut demarkation is observed in the e-b and b-c voltages. This has been explained on the basis of the mechanism of the fabrication of different electrodes of the transistor. The study is further extended to view the diffusion between different electrodes of the transistor.

**KEYWORD :** Base-Emmitter junction,Emitter,Polarized laser beam, Base-collector junction.

**INTRODUCTION:**

BF- 200 is a silicon transistor of NPN type much useful in high frequency applications. The present investigations are centered upon the study of PN and NP junctions of such a transistor with special reference to illumination with laser beam, As the illuminated junctions produce photo voltage and with the emitter base and collector base junctions are illuminated, a study of two such PN junctions is important to know the mechanism of the generation of carriers, charge transport, recombination and diffusion.

**EXPERIMENTAL DETAILS**

A transistor BF- 200 was taken and cut at its top. Further it was washed with benzene so as to remove the packing materials and impurities etc, if any on the silicon surfaces, then the PN junctions were ready for exposure with light of suitable wavelength (Helium- Neon Laser 0.5 watt, Spectra Laser). Out of the two PN pairs of the transistor one pair was initially chosen for illumination and further connections to a sensitive circuit which amplifies the signals and finally the out put was measured by a sensitive digital meter. There was a provision for recording the variations in the signal by acoustic means. The experiment was repeated with the other PN junction of the transistor.

**RESULT AND DISCUSSIONS:**

The output measured by digital meter of PN junctions forming the base emitter combination is more here compared to the base collector combination when studied on illumination with a laser beam focussed on such junctions. This is so because in NPN type of such a transistor BF 200, the presence of holes in the P-type material in the base play an important role when NP combination is taken (emitter base) yielding more voltage on illumination (Fig.1) while the PN combination i.e., base collector yields low on the contrary because of the inversion of the polarity.

**CONCLUSION;**

The method is useful in the studies on the semiconducting junctions and obtaining the properties like photo voltage, diffusion, recombination and charge transport.

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