

ABSTRACT OF THE DISCLOSURE

PULSED SINGLE CONTACT OPTICAL BEAM INDUCED CURRENT ANALYSIS OF INTEGRATED CIRCUITS

An improved method of performing optical beam induced current imaging of semiconductor junctions. According to the method, a single wired contact to an integrated circuit (for example through use of a conventional conductive probe) is made at a point that makes electrical contact to a first side of a junction to be analyzed. A first line connects the wired contact to an amplifier, and a second line carries return current from the amplifier to a ground connection. A capacitive return connection is then used to couple return current from a second side of the junction to ground. The actual value of capacitance in the return connection is not of fundamental importance in the practice of the invention, but generally larger capacitance values are preferred and allow increased induced current flow. An increase in the optical beam power also results in more induced current being generated. This causes a faster decay and results in a better signal-to-noise ratio at a higher scanning beam rate. With the connections described above to the amplifier and the processing circuitry, a pulsed particle or optical beam is applied to the junction. In response to the pulsed beam, the junction generates a corresponding pulse of induced current. Since the current in response to the pulsed beam has an alternating current component, it passes through the capacitive junction return connection as well as through the single wired contact to the amplifier. The amplifier outputs a magnified replica of the current which is then analyzed by the processing circuit to provide a useful form of data for analysis of the junction.

Figure 2 of the Drawing is to accompany the Abstract when published.