CLAIMS

1. A system for performing fault localization in device under test (DUT), wherein the DUT is stimulated by a tester, comprising:

a laser source providing laser beam pulses of femtosecond pulsewidth and wavelength above silicon bandgap;

optical elements receiving the laser beam pulses and directing the laser beam pulses onto an area of interest in the DUT;

timing electronics receiving a sync signal from the tester and controlling the timing of the laser source according to the sync signal;

wherein the pulsewidth and wavelength of the laser beam pulses are selected so as to cause two-photon absorption in the DUT.

2. The system of claim 1, wherein the laser source provides laser beam pulses of wavelength between 1250nm to 1550nm.

3. The system of claim 2, wherein the laser source provides laser beam pulses of about 100 femtosecond pulse width.

4. The system of claim 2, wherein the optical elements comprise a laser scanning microscope (LSM).

5. The system of claim 4, wherein the optical elements further comprise a solid immersion lens.

6. The system of claim 1, wherein the timing electronics control the timing of the laser pulses so as to increase or decrease the DUT switching time.

7. A method for altering the switching time of a device under test, the device being stimulated by test vectors from a tester, comprising:

generating laser beam pulses of femtosecond pulsewidth and wavelength above silicon bandgap;

directing the laser beam pulses onto an area of interest in the DUT;

controlling the timing of the laser source according to sync signal from the tester;

wherein the pulsewidth and wavelength of the laser beam pulses are selected so as to cause two-photon absorption in the DUT.

8. The method of claim 7, wherein the laser beam pulses are of wavelength between 1250nm to 1550nm.

9. The method of claim 7, wherein the laser beam pulses are of about 100 femtosecond pulse width.

10. The method of claim 7, wherein controlling the timing comprises controlling the timing of the laser pulses so as to increase or decrease the DUT switching time.

11. A method for testing a device under test (DUT), the DUT being stimulated by a tester, comprising:

applying a first set of test vectors from the tester to the DUT to determine the marginal settings of the DUT;

setting voltage and frequency of a second set of test vectors of the tester according to the marginal settings of the DUT;

repeatedly applying the second set of test vectors from the tester to the DUT;

obtaining a sync signal from the tester;

applying the sync signal to a laser source to obtain laser pulses of femtosecond pulse width and wavelength higher than silicon band gap;

applying the laser pulses to an area of interest in the DUT to thereby increase or decrease the DUT switching time;

monitoring the DUT output to determine location of failure.

12. The method of claim 11, wherein monitoring the DUT output comprises at each point in time monitoring a pass-fail of the DUT and correlating the pass-fail result to the location the laser pulses illuminate at that point in time.

13. The method of claim 11, wherein determine the marginal settings comprises determining the voltage and frequency of a test vector such that the DUT is just about to fail the test, or has just failed the test.

CLAIMS

1. A system for performing fault localization in device under test (DUT), wherein the DUT is stimulated by a tester, comprising:

a laser source providing laser beam pulses of femtosecond pulsewidth and wavelength above silicon bandgap;

optical elements receiving the laser beam pulses and directing the laser beam pulses onto an area of interest in the DUT;

timing electronics receiving a sync signal from the tester and controlling the timing of the laser source according to the sync signal wherein the timing electronics control the timing of the laser pulses so as to increase or decrease the DUT switching time;

wherein the pulsewidth and wavelength of the laser beam pulses are selected so as to cause two-photon absorption in the DUT.

2. The system of claim 1, wherein the laser source provides laser beam pulses of wavelength between 1250nm to 1550nm.

3. The system of claim 2, wherein the laser source provides laser beam pulses of about 100 femtosecond pulse width.

4. The system of claim 2, wherein the optical elements comprise a laser scanning microscope (LSM).

5. The system of claim 4, wherein the optical elements further comprise a solid immersion lens.

6. A method for altering the switching time of a device under test, the device being stimulated by test vectors from a tester, comprising:

generating laser beam pulses of femtosecond pulsewidth and wavelength above silicon bandgap;

directing the laser beam pulses onto an area of interest in the DUT;

controlling the timing of the laser source according to sync signal from the tester;

wherein the pulsewidth and wavelength of the laser beam pulses are selected so as to cause two-photon absorption in the DUT.

7. The method of claim 6, wherein the laser beam pulses are of wavelength between 1250nm to 1550nm.

8. The method of claim 6, wherein the laser beam pulses are of about 100 femtosecond pulse width.

9. The method of claim 6, wherein controlling the timing comprises controlling the timing of the laser pulses so as to increase or decrease the DUT switching time.

10. A method for testing a device under test (DUT), the DUT being stimulated by a tester, comprising:

applying a first set of test vectors from the tester to the DUT to determine the marginal settings of the DUT;

setting voltage and frequency of a second set of test vectors of the tester according to the marginal settings of the DUT;

repeatedly applying the second set of test vectors from the tester to the DUT;

obtaining a sync signal from the tester;

applying the sync signal to a laser source to obtain laser pulses of femtosecond pulse width and wavelength higher than silicon band gap;

applying the laser pulses to an area of interest in the DUT to thereby increase or decrease the DUT switching time;

monitoring the DUT output to determine location of failure.

11. The method of claim 10, wherein monitoring the DUT output comprises at each point in time monitoring a pass-fail of the DUT and correlating the pass-fail result to the location the laser pulses illuminate at that point in time.

12. The method of claim 10, wherein determine the marginal settings comprises determining the voltage and frequency of a test vector such that the DUT is just about to fail the test, or has just failed the test.