CLAIMS

1. A method of capturing inspection data from a silicon substrate comprising:

illuminating a substrate having a top surface and a bottom surface with radiation to which the substrate is at least partially transparent;

sensing illumination radiation to which the substrate is at least partially transparent with a sensor to form an image, at least a portion of the image being comprised of radiation returned from at least one of the upper surface and the bottom surface of the substrate and at least another portion of the image being comprised of radiation returned from a structure located at or beyond the bottom surface of the substrate with respect to the sensor;

subtracting from the image an image reference representative of radiation returned from at least one of the upper and ~~lower~~ bottom surfaces of the substrate to form an intermediate image;

and, summing multiple intermediate images to create a final image of the silicon substrate suitable for inspection.

2. The method of capturing inspection data from a silicon substrate of claim 1 wherein the sensor is one of a CCD and a CMOS camera.

3. The method of capturing inspection data from a silicon substrate of claim 1 wherein the radiation to which the substrate is at least partially transparent has a wavelength of approximately 1 micron to 1.3 microns.

4. The method of capturing inspection data from a silicon substrate of claim 1 further comprising selectively using the sensor to perform an inspection of ~~a~~ the silicon substrate using visible wavelengths.

5. The method of capturing inspection data from a silicon substrate of claim 1 wherein the illuminator is provided with a filter that omits radiation having wavelengths less than about 1 micron.

6. The method of capturing inspection data from a silicon substrate of ~~claim 5 wherein the filter in the illuminator may be employed to selectively allow broadband or filtered The method of capturing inspection data from a silicon substrate of~~ claim 1 wherein the image reference is formed by capturing at least one image of a reference location of the silicon substrate.

7. The method of capturing inspection data from a silicon substrate of claim 6 wherein the image reference is formed by capturing at least one image of a reference location of the silicon substrate having no structure located at or beyond the bottom surface of the substrate with respect to the sensor.

8. The method of capturing inspection data from a silicon substrate of claim 6 wherein the image reference is formed by capturing at least one image of a reference substrate formed of a substance that is optically similar to the silicon substrate, the reference substrate having an upper and a lower surface and no structure located at or beyond the bottom surface of the substrate with respect to the sensor.

9. The method of capturing inspection data from a silicon substrate of claim 1 wherein an intermediate image is gamma corrected.

10. The method of capturing inspection data from a silicon substrate of claim 9 wherein each intermediate image is gamma corrected before being summed.

11. The method of capturing inspection data from a silicon substrate of claim 1 wherein the final image is gamma corrected.

12. The method of capturing inspection data from a silicon substrate of claim 1 wherein the final image is blurred to remove individual pixel noise.

13. The method of capturing inspection data from a silicon substrate of claim 1 wherein the image reference is a frequency domain filter obtained from a Fourier transform of the image sensed by the sensor.

14. The method of capturing inspection data from a silicon substrate of claim 1 wherein the frequency domain filter comprises a physical mask placed at the back focal plane of the optical system.

15. The method of capturing inspection data from a silicon substrate of claim 1 wherein the frequency domain filter is applied mathematically to the image sensed by the sensor on a pixel by pixel basis.

16. The method of capturing inspection data from a silicon substrate of claim 1 wherein the inspection data is used to identify defects in the silicon substrate.

17. The method of capturing inspection data from a silicon substrate of claim 1 wherein the defects in the silicon substrate are selected from a group consisting of chips, cracks, voids, particles, and dimensional deviation.

18. The method of capturing inspection data from a silicon substrate of claim 1 wherein the inspection data is used to identify process excursions, quantify process excursions and to modify process variables to modify subsequently processed silicon substrates.

19. A semiconductor device formed from a silicon substrate formed according to claim 18.

20. An imaging system for capturing inspection data comprising:

a camera having a sensor sensitive to radiation in the visible wavelengths and infrared wavelengths of approximately 1 micron to 1.3 microns;

an illuminator for directing radiation to which the camera sensor is sensitive onto a substrate having an upper surface, a lower surface, at least one area with a

structure of interest formed at or below the lower surface of the substrate relative to the position of the camera, at least a portion of the radiation from the illuminator being returned from the upper surface of the substrate to the camera, at least another portion of the radiation from the illuminator being returned from the lower surface of the substrate.