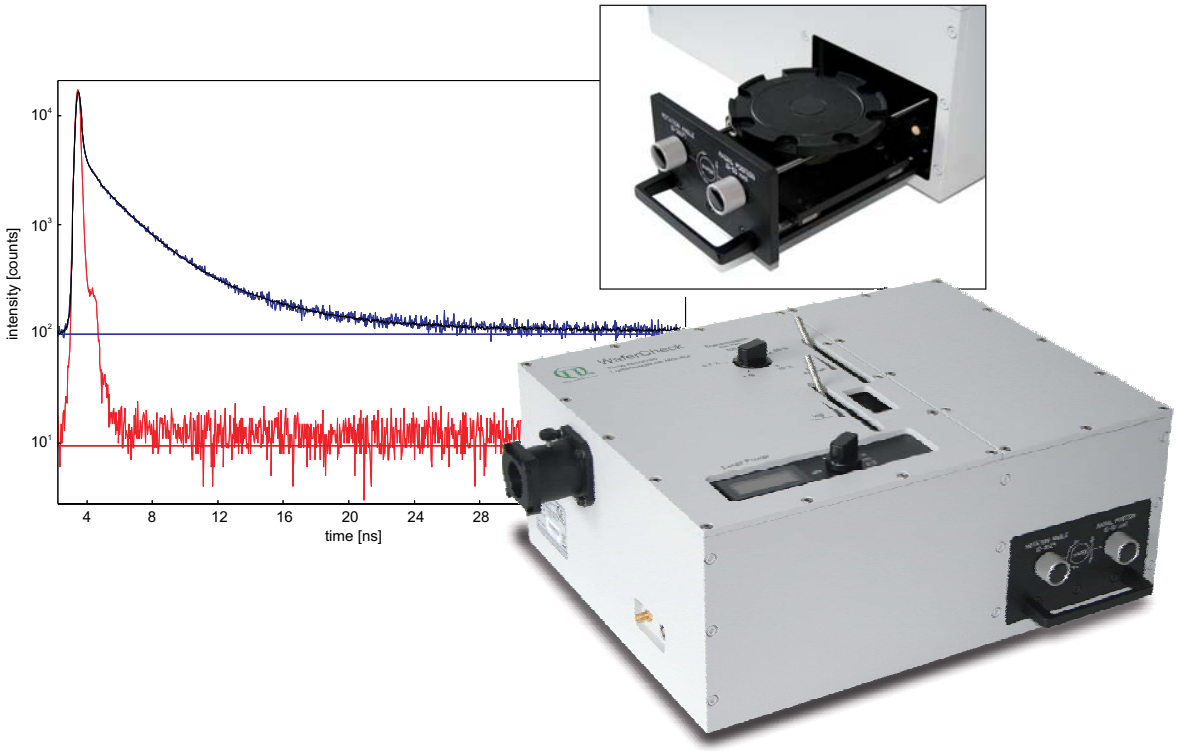
WaferCheck 150

PicoQuant

Semiconductor Wafer Analyzer

- Excitation with diode laser pulses as short as 50 ps (FWHM)
- Excitation wavelengths: 375 to 810 nm
- Emission wavelength selection with easily exchangeable filters
- Detector options: PMT or MCP-PMT
- Data acquisition based on Time-Correlated Single Photon Counting
- Integrated laser power meter



Applications

- Monitoring Time-Resolved Photoluminescence (TRPL) from semiconductors
- Online semiconductor process analysis and quality control
- Time response characterization of optoelectronic devices
- Specifically designed for GaAs/GaN wafers (e.g. solar cells)
- Photovoltaic
- LEDs, OLEDs

Semiconductor Wafer Analyzer

The WaferCheck 150 system is a complete and easy to use system for Time-Resolved Photoluminescence (TRPL) measurements. TRPL is a very powerful tool for the contact-free characterization and investigation of semiconductor materials. It is non-destructive and involves only light as a probe. It can be used for everything from raw materials to in-process intermediates to finished devices. These capabilities qualify TRPL as a valuable analysis tool for research, testing and quality control.

The application of TRPL in the semiconductor industry is focused mainly on the measurement and identification of electron-hole recombination rates. The length of time a photo-excited carrier can remain in the conduction (or valence) band is an important parameter directly related to material quality and device performance. The fluorescence lifetime decay value is an indicator for characterizing semiconductor materials for use in e.g. photovoltaic devices (solar cells), photodetectors, LEDs, etc.

The WaferCheck 150 is designed for 10 cm wafers (other sizes on request), which are placed on a manually rotatable table that allows to measure at different spots of the wafer. The system uses miniaturized picosecond pulsed light sources along with electronics for recording fluorescence decays by means of Time-Correlated Single Photon Counting (TCSPC). The fluorescence emission is spectrally filtered by different high quality filters. As standard detector a fast and reliable photomultiplier (PMT) allows detection of decay times down to 60 picoseconds. Even faster decays down to 10 picoseconds can be resolved using a Multichannel Plate Photomultiplier (MCP-PMT) as detector. All data acquisition functions of the WaferCheck 150 are controlled by an easy to use software for Windows. Data analysis is done using PicoQuant's FluoFit, which allows reconvolution of complex decays, saving of results and parameters, etc.

Specifications

System

Mode of operation	Time-Correlated Single Photon Counting (TCSPC)

Excitation Sources

Light source	Laser Diode Heads (LDH Series)
Wavelengths[1)]	375 - 510 nm, 530 nm, 595 nm, 635 - 810 nm
Pulse width	50 - 500 ps
Repetition rate	up to 40 MHz (optional 80 MHz)

Detectors

Type[2)]	PMT	MCP-PMT
Spectral range	185 - 900 nm	160 - 850 nm

Data Acquisition Unit

Type	PicoHarp 300	NanoHarp 250
Time resolution (bin width)	4 ps	4 ns, 32 ns
Lifetime resolution	< 30 ps	< 10 ns
Time channels per curve	65536	1024 to 262144
Discriminator level, zero cross adjust	software adjustable	
Collection time	1 ms - 10 h	

Data Analysis Software

Type	FluoFit (FluoFit Basic, FluoFit Professional)
Analysis possibilities	exponential decay, lifetime distribution, global analysis for all methods

Operation Environment

Operating system	Windows™ 2000/XP/Vista/7
Power Requirements	110 to 230 V 50/60 Hz
Dimensions	300 × 375 × 150 mm (w × d × h)

1) other wavelengths available upon request
2) other detectors and cooling available upon request

Further available are Fluorescence Lifetime Spectrometer; Time-resolved Fluorescence Microscopes; Upgrade kits for Laser Scanning Microscopes; Picosecond / Nanosecond Pulsed, and Modulated Diode Lasers; PC Modules for TCSPC. Please call for detailed information and data sheets. OEM Modules of all products are available upon request.

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