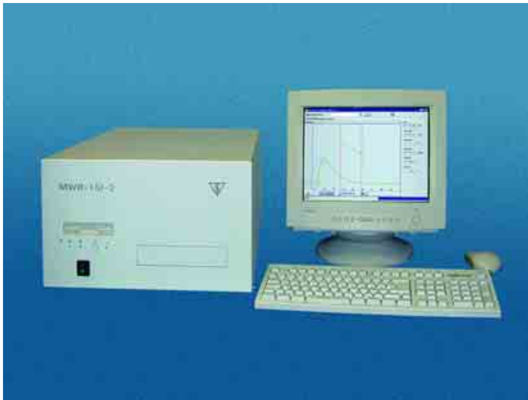
MICROWAVE RELAXOMETER

The device is designed for express non-destructive contactless local measurement of non-equilibrium charge carrier effective lifetime in silicon substrates, epi-wafers and solar cells at different stages of manufacturing cycle. It can be used for incoming and outcoming inspection of silicon ingots and wafers, tuning and periodic inspection of semiconductor and solar cell technology quality.

Lifetime determination is based on measuring photoconductivity decay after pulse-light photo-exciting with usage of reflected microwave as a probe.



MWR-SI

Semi-Industrial version:

- attestation of incoming materials, equipment and technology quality;
- manual specimen loading, manual signal level adjustment, automatic specimen movement following pre-set inspection pattern (including wafer topograph);

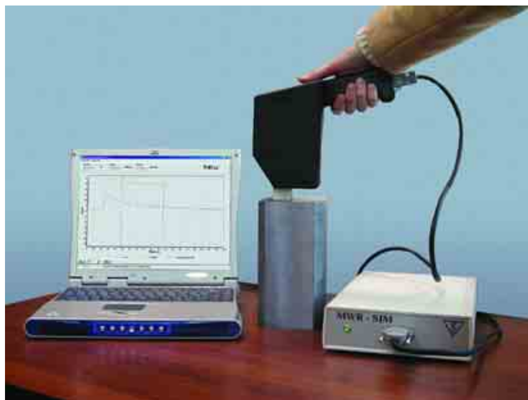
This version is recommended for incoming and diffused wafer inspections.

MWR-SIM

Semi-Industrial version for ingots:

- remote probe for large ingot inspection on flat and round surfaces;
- automatic adjustment;

This version is recommended for silicon ingots I/O quality inspection



MWR-E

Engineering version:

- measurement of true non-equilibrium carrier bulk lifetime, surface recombination velocity, electro-active defect density;
- manual specimen loading and moving, manual signal level adjustment;

This version is recommended for scientific laboratories, quality assurance laboratories at manufacturing fabs and also for ingot inspection.

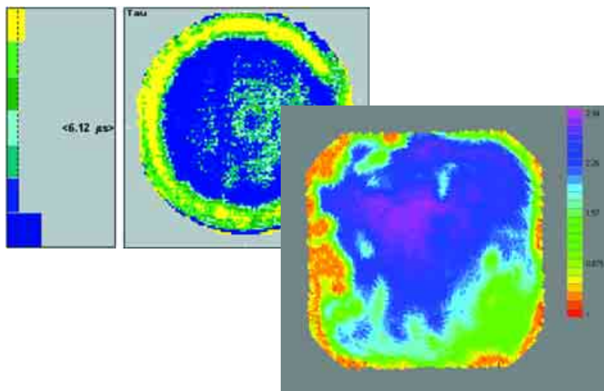
MWR-I

Industrial version:

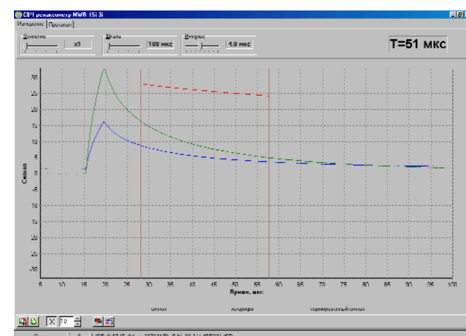
- routine automated inspection of silicon wafers;
- automatic cassette-to-cassette loading, automatic signal level adjustment, automatic wafer sorting;

This version is recommended for automated semiconductor and solar cell manufacturing lines.

Lifetime measurement process is automated on the basis of PC.



Mapping results



Relaxation curve

CONTACTLESS RESISTIVITY TESTER FOR SEMICONDUCTOR INGOTS

The Contactless Resistivity Tester is a device meant for testing electrical resistance on flat and bubble surfaces of semiconductor ingots.

Measuring of the resistivity of the silicon ingots is based on the determination of magnetic energy power losses caused by eddy currents inside the ingot.

It enables repidity and contactlessness of measurement and does not require special surface treatment before measurement.

Tester operation and measurement data processing are carried out by a PC.

Main technical parameters

Parameter	Value
Measured resistivity range, Ohm·cm	0.1 - 100 (±3%)
	0.001 - 0.5 (±3%)
Measurement duration, sec	3
Minimal Diameter of measured surface, mm	20
Consumed power (220v, 50 Hz), W	< 5
Dimensions (without probe), mm	280 x 200 x 60

Device is equipped with a set of standard samples for calibration.

SOLAR CELL TESTER

The tester is designed for terrestrial solar cell incoming/outcoming inspection with the purpose of checking and optimizing parameters and preventing manufacture defects of solar modules.

Solar cells are not heated in process of inspection due to the use of xenon pulse lamp installed in the tester.

The tester is IBM PC controlled and enables to select inspection options ranging from simple check in a particular I-V curve point up to full I-V curve recording and statistical processing of measurement results.

Parameter	Value
Uniform illumination field, mm	150x150 (±1%) / 200x200 (±2%)
Light flux intensity, W/m^2	1000 (±1%)
Intensity adjustment range, W/m^2	600-1200
Light spectrum	AM 1.5 (IEC 904-9)
Measured current range, A	0.3 - 7.0 (±1%)/0.1 - 0.3 (±3%)
Measured voltage range, V	0.1 - 6.0 (±0.5%)
Light pulse width, ms	7
Measurement duration, s	8
Reference sample	Monocrystalline Solar Cell
Dimensions, mm	550x320x1000

The tester can be involved into automatic testing/ sorting station.