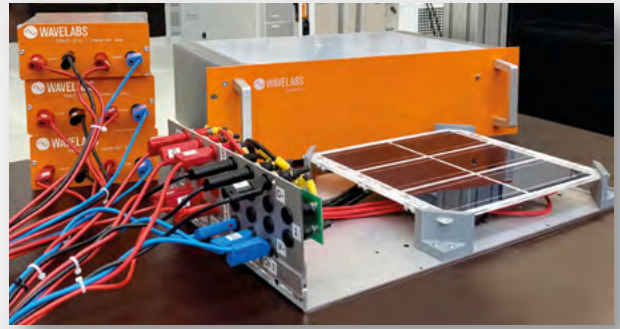# WAVELABS

Cut-Cell Measurement

LED's ENHANCE YOUR SOLAR SIMULATOR

WAVELABS Cut-Cell Measurement

For even faster measurement of cut cells

WAVELABS **Cut-Cell Measurement** is the innovative WAVELABS solution that allows for the parallel yet separate measurement of up to three cut cells at a time. It enables companies to both increase throughput rates of cut-cell production lines and achieves better cut-cell matching on module level.

FEATURES

- **Faster cut-cell measurement**
- **Better cut-cell matching**
- **Reduced rejects at module level**

"This highly efficient WAVELABS solution enables the exact characterization of up to three cut cells with one flash while providing individual measurement data sets for each cut cell. PV manufacturers can rest assured that they get their cut-cell measurements done fast, precisely, and cost-efficiently, achieving correct cut-cell binning, and hence higher efficiencies on module level.

Manfred Steinberger,
Cut-Cell Measurement
Project Manager,
WAVELABS

WAVELABS is a proud partner of:

THE CHALLENGE: HOW TO ACCELERATE CUT-CELL MEASUREMENT WHILE REDUCING MISMATCHES AND REJECTS?

In the past, manufacturers of cut cells had limited options for the efficient measurement of cut cells.

One option was to measure the entire cell before cutting it. This allowed for fast measurement cycles but came with the risk of mismatches on module level as well as undetected damages during the downstream cutting process.

The second option was to cut the cell first and measure the separate cut cells either simultaneously under separate flashers or sequentially under one flasher. While simultaneous measurement required additional equipment and space, sequential measurement resulted in delayed production and reduced throughput.

Ultimately, all past options had an impact on the profitability of cut-cell production.

BACKGROUND: WHY IS THE ACCURATE YET FAST MEASUREMENT OF CUT CELLS SO IMPORTANT?

In solar cell production, time equals throughput equals money. In the past, manufacturers of high-quality, reliable cut cells could not avoid measuring their cut cells at the cost of time.
That is because the requirement of accuracy lies at the heart of why cut cells were developed in the first place: to increase the energy yield of PV modules.

Cut-cell modules can produce more energy per area because they utilize more single cells per module. In addition, the cut cells are typically connected in six instead of three strings. This design not only reduces serial resistance. The increase in strings also provides a more stable yield under partial shading conditions.

To fully profit from this new design, it is paramount for manufacturers to ensure the perfect matching of cut cells within a string, the integrity of each cut cell, i.e. the absence of any damages or defects, as well as profitability for both the manufacturer and the end user.

» **Fig. 1:** Q.PEAK DUO solar module with cut-cells technology from Hanwha Q CELLS
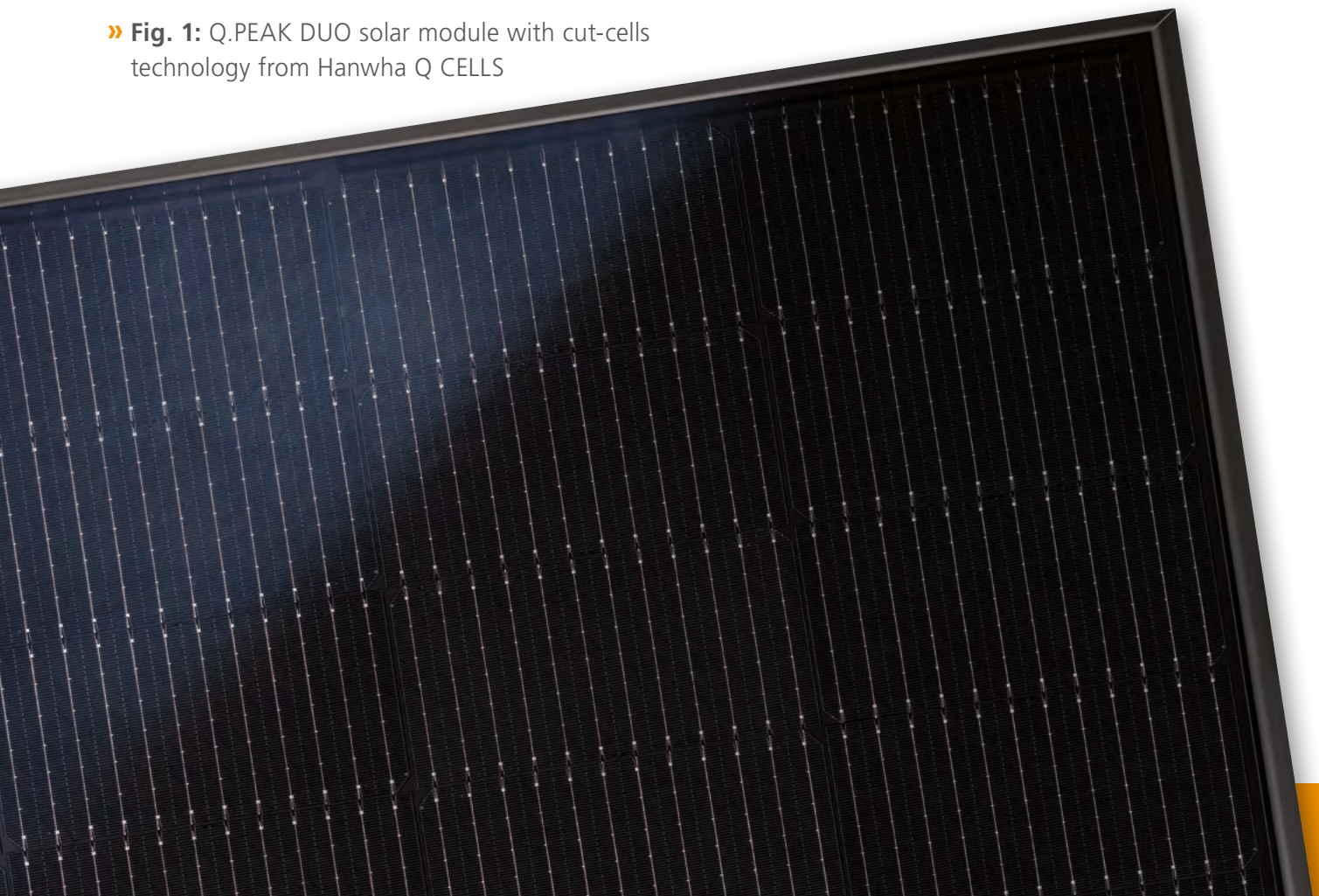
THE SOLUTION: ONE FOR ALL AND ALL IN ONE WITH WAVELABS CUT-CELL MEASUREMENT

WAVELABS Cut-Cell Measurement combines speed and accuracy in cut-cell measurement. WAVELABS flasher systems equipped with the innovative solution allow for the simultaneous characterization of up to three cut cells under one flash. The cut cells are measured via separate connector boxes with galvanically isolated contacts. To ensure accurate and constant cut-cell measurement irrespective of its position, all cell parameters can be adjusted separately. Optionally, EL and IR imaging can be added for defect detection. This new WAVELABS design enables an accelerated, same footprint, cut-cell measurement for new production lines and a drop-in upgrade. Together with our advanced RapidWAVE® I-V classification, we unlock a throughput of 3,600 - 4,500 full cell equivalent per hour on individual cut-cell binning, depending on the level of comprehensiveness of the desired recipe.

Each I-V measurement is stored as a separate data set linked to the exact cut-cell's ID. This allows for the analysis of each cut cell, enabling the most precise and accurate binning. Additionally, measuring the cut cells after the cutting allows for defect detection before moving into the module manufacturing process. On module level, this ensures reduced rejects as well as optimized current matching for higher module efficiency.
All measurement data is stored in a local SQL database, allowing both easy querying by as well as export to external analysis and planning tools such as automation or manufacturing execution systems (MES). The data sets can also be enriched by external information such as previous measurement data and IDs derived during production. Additionally, WAVELABS Cut-Cell Measurement supports the definition of alerts if measurement values indicate problems in the production or cell batch. This enables operators to optimize production and quality assurance processes quickly, and fully trace the cut cells.

WAVELABS Cut-Cell Measurement works with all solar cell types currently available. Being an upgrade feature for our SINUS family, it is even ready for HJT cells.
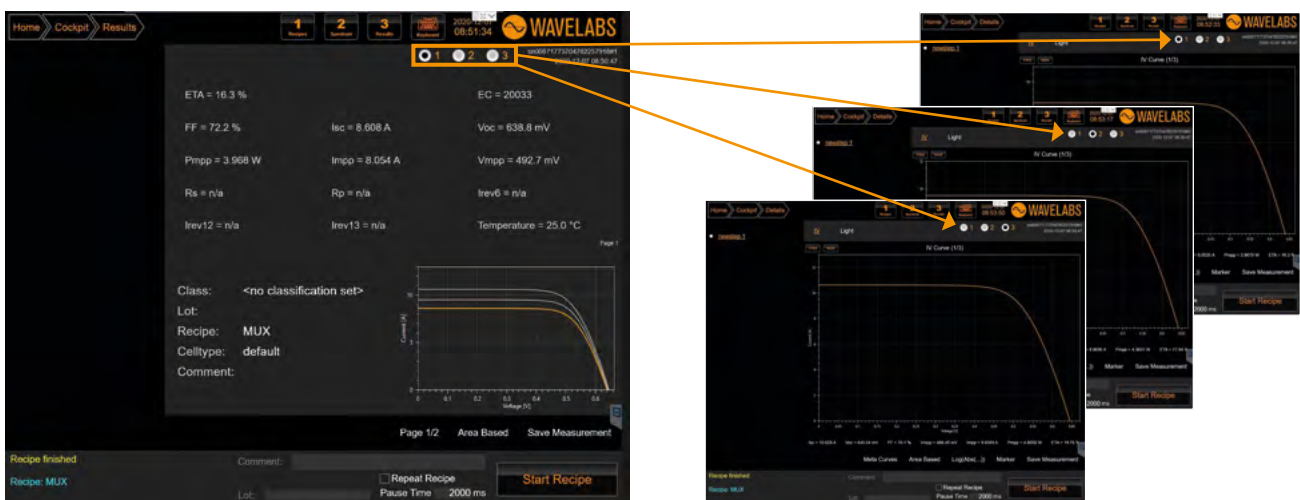
WAVELABS CUT-CELL MEASUREMENT IS AVAILABLE FOR THE FOLLOWING WAVELABS SOLAR SIMULATOR:

SINUS-300
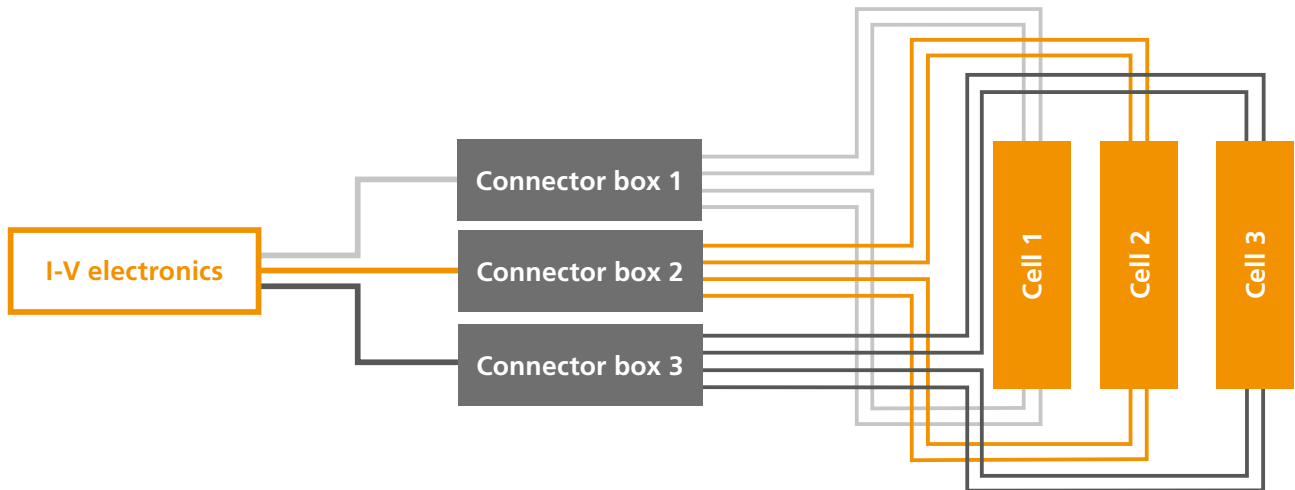
» Fig. 2: The three independent connector boxes of the WAVELABS Cut-Cell Measurement solution enable the individual measurement of up to 3 cut cells under one flash

» Fig. 3: The individual measurement results for each cut cell are saved and stored separately and can be easily accessed, analyzed and managed on the WAVELABS dashboard

LED's GET IN TOUCH

WAVELABS

> **ACCELERATE YOUR CUT-CELL PRODUCTION. GET IN TOUCH FOR FASTER AND MORE ACCURATE CUT-CELL MEASUREMENT.**

CONTACT

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