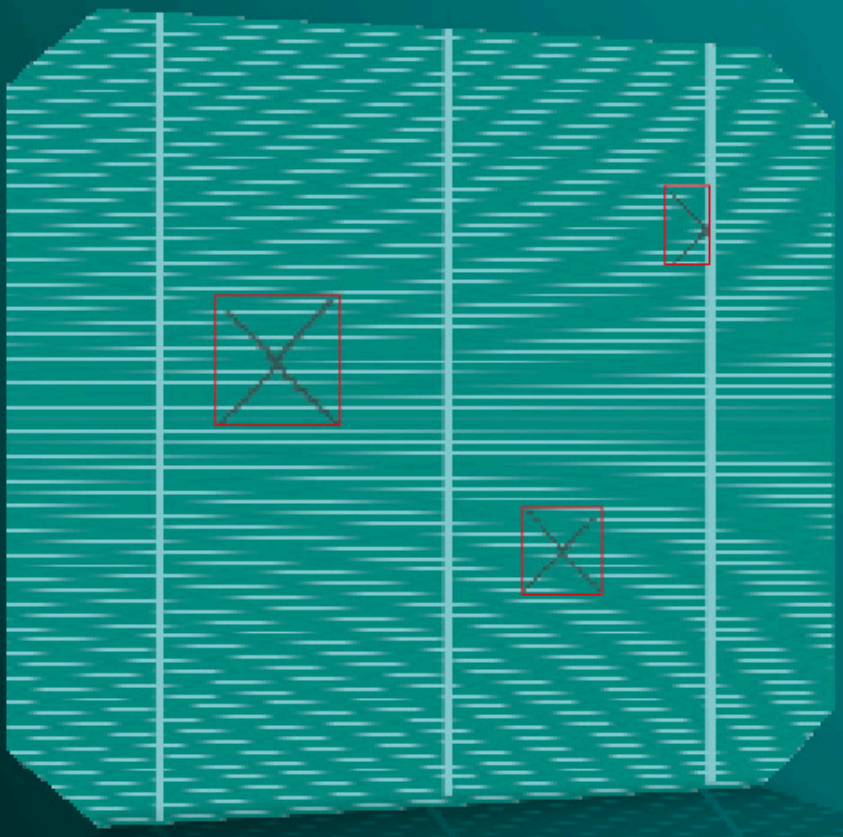
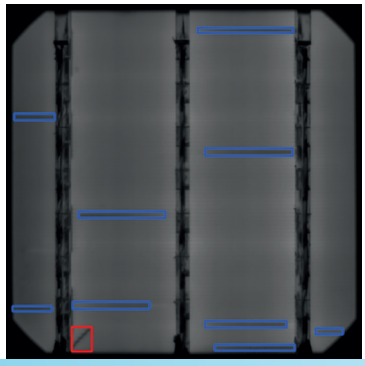
.h.a.l.m.

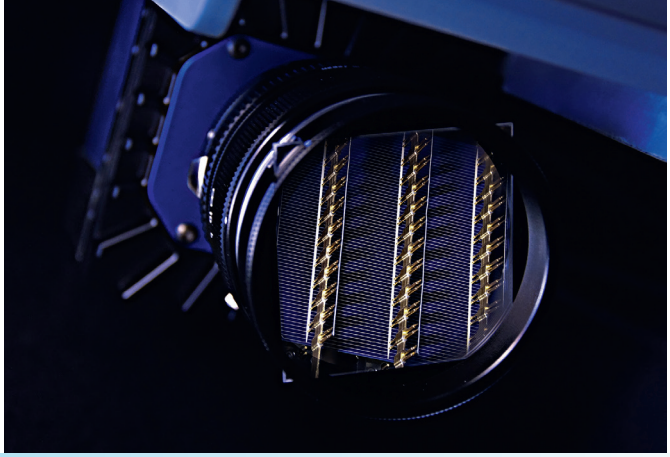
# cetisPV-EL-package

Integrated electroluminescence image capturing and evaluation



cetisPV product line





Automatic detection of microcracks and finger defects on typical monocrystalline solar cell

# cetisPV-EL-package

## Integrated electroluminescence image capturing and evaluation

Inline electroluminescence inspection is an effective method to monitor the cell manufacturing process and to enable the improvement of product quality. The h.a.l.m. high-speed cetisPV-EL-package fulfills this demand on process and quality control.

The cetisPV-EL-package integrates electroluminescence imaging and automated error detection into any h.a.l.m. IV cell tester like the cetisPV-IUCT series for production or the cetisPV-Celltest3 for lab use. Controlled via PVControl the combination of electrical testing and visual inspection in one device delivers a flexible and sophisticated tool without any further need for additional mechanical handling and electric contacting. This means: No cost of additional machinery and sensitive PV devices are not subjected to further mechanical stresses.

The evaluation option PVControl-EL-eval automatically detects a wide range of cell defects like micro cracks, finger interruptions or dark spots. The product quality is increased significantly by classifying the cells according to the evaluation result and sorting out defective cells. In addition, the inspection of defects helps to control, monitor and improve process quality.

## Technical specifications

| | | | | |
|---|---|---|---|---|
| **Typical image acquisition time** | 150 ms | multicrystalline Si | 100 ms | monocrystalline Si |
| | 60 ms | multicrystalline Si, PERC | 40 ms | monocrystalline Si, PERC |
| | <20 ms | heterojunction | | |
| **Resolution** (for 156 mm x 156 mm solar cells) | 320 µm / pixel | | | |
| **Power supply** | 0–10 V and 0–20 A | | | |
| **Throughput** | up to 3,600 w/h | | | |

### PVControl-EL-eval (option)

| | |
|---|---|
| **Min. crack length** (mono) | ≥ 5 mm |
| **Typical crack detection quality** (mono) | < 10 % underkill (ratio of defect cells that are not detected)<br>< 0.2 % overkill (ratio of good cells that are detected to all cells) |
| **Finger defects** | finger interruptions and constrictions, detection rate depends on cell material |
| **Dark areas** | classification by dark area ratio |

Technical data are subject to change without notice.

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