

# Principle of laser welding of photovoltaic panels

How is laser welding used for metallization and interconnection of solar cells?

Laser welding is used for the metallization and interconnection of solar cells. Figure 21 (Schulte-Huxel et al. 2016) shows the interconnection of two cells using laser welding of Al foil. A glass plate is mounted on top of the foil to keep the aluminum foil flat during the laser welding process, and the laser beam is passed through the plate.

How a solar cell is laser welded?

A glass plate is mounted on top of the foil to keep the aluminum foil flat during the laser welding process, and the laser beam is passed through the plate. The solar cell interconnection is achieved by the Al foil contacting the rear side which is laser welded to the Ag screen-printed front side metallization of the next cell.

Can lasers be used in the processing of solar cell structures?

The use of lasers in the processing of solar cell structures has been known for many years both for c-Si and thin-film solar technologies.

How does laser technology affect the production of high-quality solar cells?

Laser technology plays a key role in the economical industrial-scale production of high-quality solar cells. Fraunhofer ILT develops industrial laser processes and the requisite mechanical components for a cost-effective solar cell manufacturing process with high process efficiencies.

How can laser beam welding reduce processing times?

Using a setup with two beam paths simultaneous soldering of the front and back contacts is possible, which enables process times below three seconds per cell. For future cell concepts laser beam welding allows a decrease of the processing times by a factor of ten compared to soldering.

Can laser drilling be used for solar cell devices?

Laser drilling has also been used for solar cell devices, as shown in Fig. 19 (Gupta and Carlson 2015). Small holes allow the emitter current generated in the front of the cell to be transferred to the back of the cell for bus bar connections. Silicon solar cell device with laser formed buried contacts. (Reproduced from Bruton et al. 2003)

Principles of laser welding. Changing the intensity and spot size of the laser beam emitted by a laser processing machine makes it possible to weld and draw letters and patterns on the surface of base materials, and to perform cutting. Laser ...

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