

# Large area industrial crystalline silicon n-PERT solar cell with 22 percent efficiency

January 14 2015, by Hanne Degans

---



Nano-electronics research center imec announced today that it has improved its large area n-type PERT (passivated emitter, rear totally

diffused) crystalline silicon (Si) solar cell on 6" commercially available n-type Cz-Si wafers, now reaching a top conversion efficiency of 22.02 percent (calibrated at ISE CalLab). This is the highest efficiency achieved for this type of 2-side-contacted solar cell on an industrial large area wafer size.

Compared to p-type [silicon solar cells](#), n-type cells do not suffer from light induced degradation and feature a higher tolerance to common metal impurities. As a result, n-type silicon [solar cells](#) are considered as promising alternatives to p-type solar cells for next generation highly efficient solar cells.

Looking into increasing the [conversion efficiency](#) of its large-area n-PERT silicon cells using advanced industrial processes, imec has further improved the conversion efficiency of its n-PERT solar cell, reaching a record 22 percent, featuring an open-circuit voltage (Voc) of 684mV, a short-circuit current (Jsc) of 39.9 mA/cm<sup>2</sup>, and 80.7 percent fill factor (FF). Efficiency improvements were obtained by the introduction of a selective front surface field through laser doping, giving a boost in open circuit voltage and short circuit current.

"Our new developments, resulting in additional improvement of the conversion efficiency, further confirm the potential of n-type PERT cells for next-generation highly efficient silicon solar cells" said Filip Duerinckx, manager of imec's n-PERT technology platform. "This new efficiency record has been achieved while simultaneously simplifying the process, relying only on simplified cleans and without any expensive Forming Gas Anneal (FGA). We are committed to further increasing the efficiency of this cell concept and adding to the industrial value of the technology. This will enable bringing this technology to the market in short term."

Imec's n-PERT silicon solar cells feature Ni/Cu/Ag front contacts,

applied using an industrial plating tool from Meco, and rear local contacts obtained by laser ablation of the rear passivation stack and subsequent metallization. The rear passivation stack includes a thin (

Citation: Large area industrial crystalline silicon n-PERT solar cell with 22 percent efficiency (2015, January 14) retrieved 23 April 2024 from <https://phys.org/news/2015-01-large-area-industrial-crystalline-silicon.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.