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Study on PID resistance of HIT® PV modules

Tasuku Ishiguro[1], Hiroshi Kanno[1], Mikio Taguchi[1]
Shingo Okamoto[2]
[1] Energy Research Center, Energy Company, SANYO Electric Co., Ltd.
[2] Solar Business Unit, Energy Company, SANYO Electric Co., Ltd.
Phone: +81-78-993-1018, Fax: +81-78-993-1096, e-mail: ishiguro.tasuku@jp.panasonic.com

Motivation

1. For increasing request in reliability, it is important to demonstrate that high-efficiency HIT module shows high PID resistance as originally designed.
2. For customer benefit, we aim for increasing high efficiency and reliability at the same time to maximize the lifetime power generation.

Conclusion

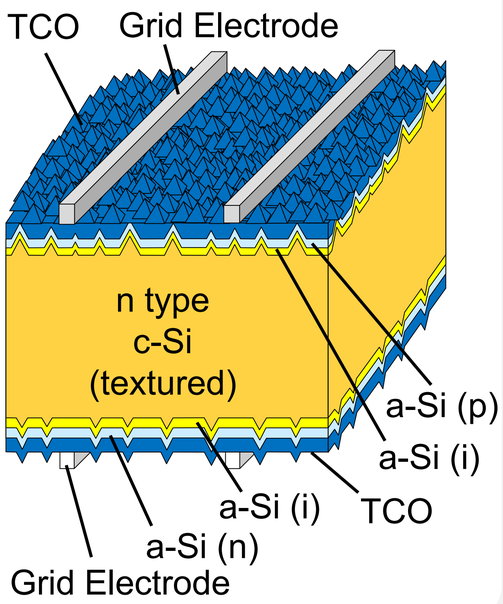
1. All HIT PV modules have exhibited no sign of degradation under several PID tests.
2. Surface layer of HIT cell is TCO without insulating layer which does not cause accumulation of charges.
3. No incidences of PID have been reported from the European, U.S. or Japanese markets.

These facts confirm the high quality and high reliability of HIT modules.

Maximizing the advantages of the HIT structure

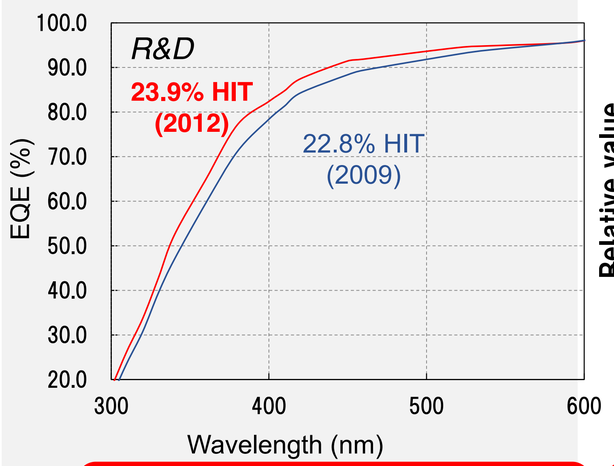
Panasonic HIT®

Heterojunction with Intrinsic Thin layer



(1) Improved optical confinement

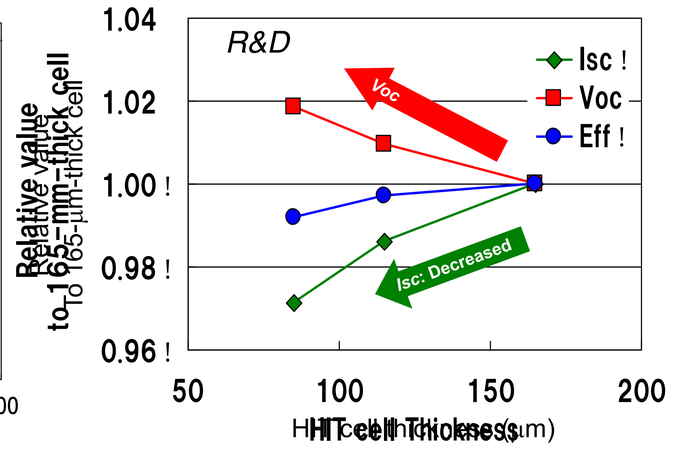
- Optimized textured structure
- High mobility TCO layer
- Wide gap a-Si layer



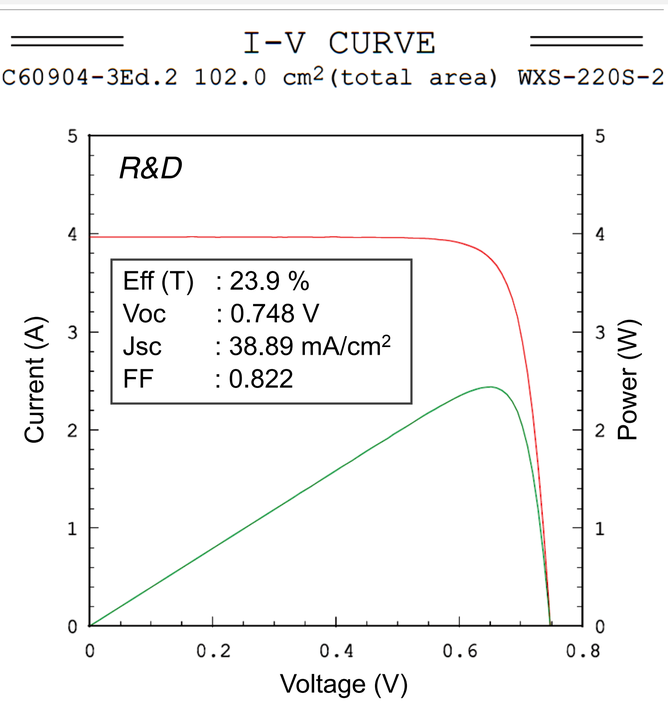
Improved Q.E. at shorter wavelengths

(2) Improved heterostructure

- Clean Si surface
- Low damage, high quality a-Si deposition



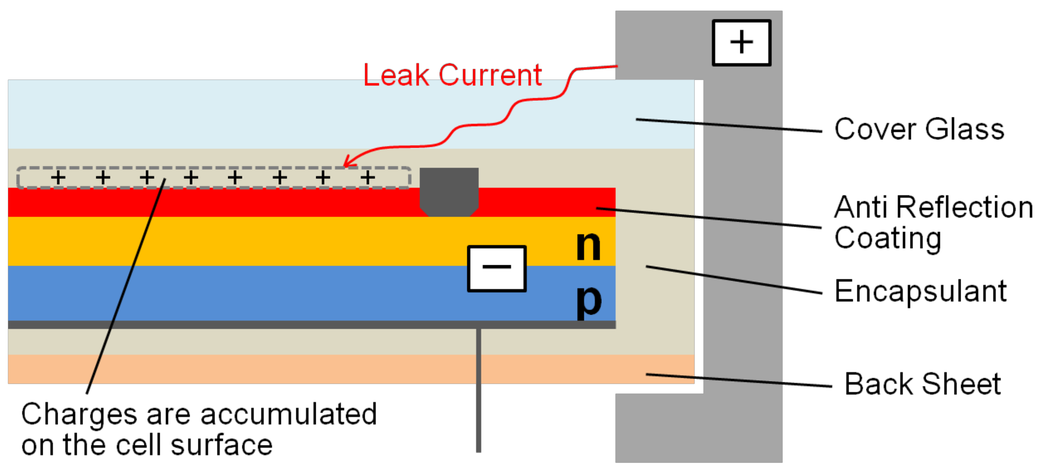
Increased Voc can compensate for the drop in Isc



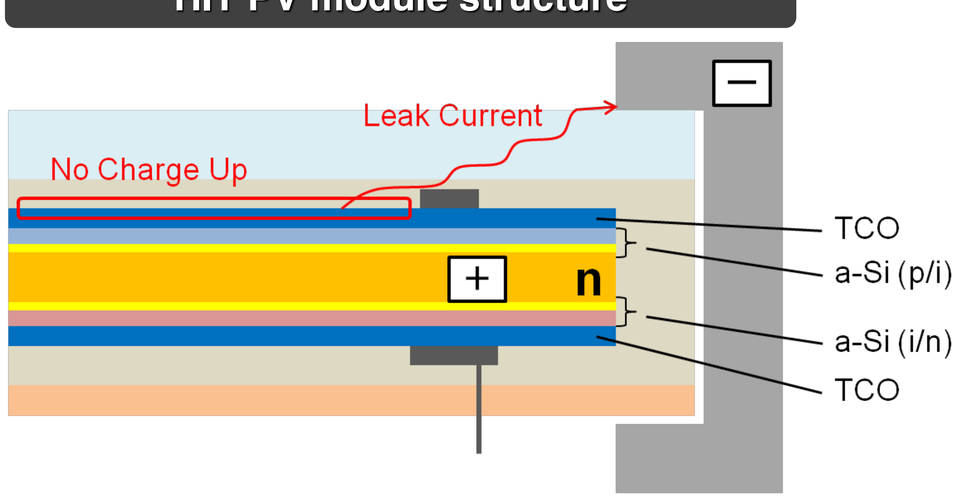
23.9% efficiency with 98-μm thickness

PID resistance of HIT structure

Conventional c-Si PV module structure

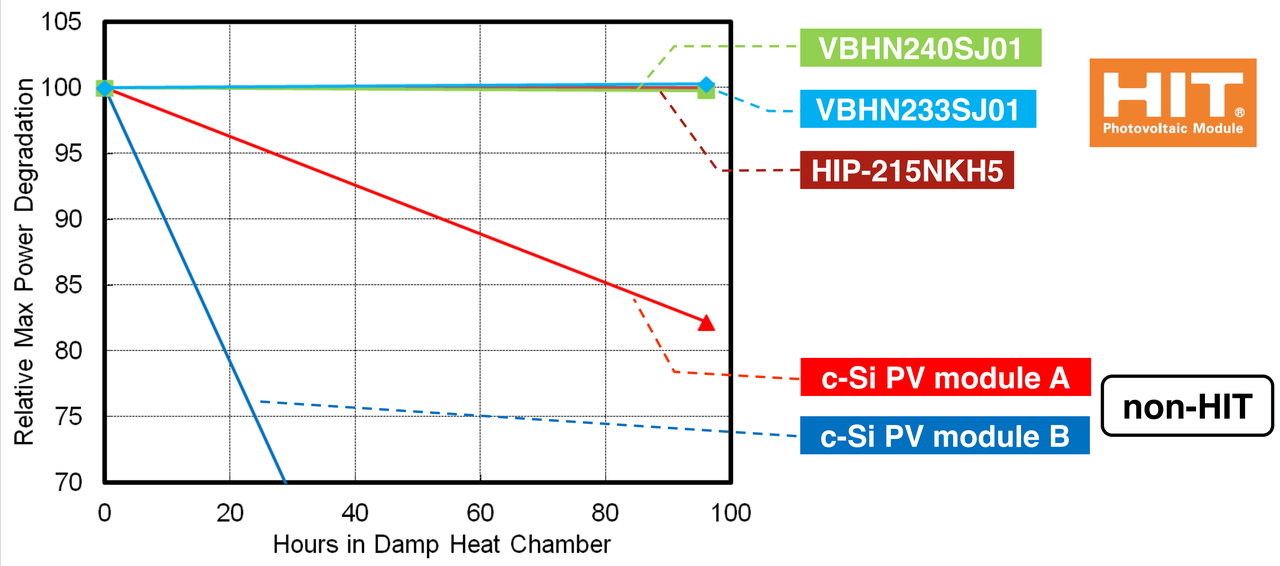


HIT PV module structure



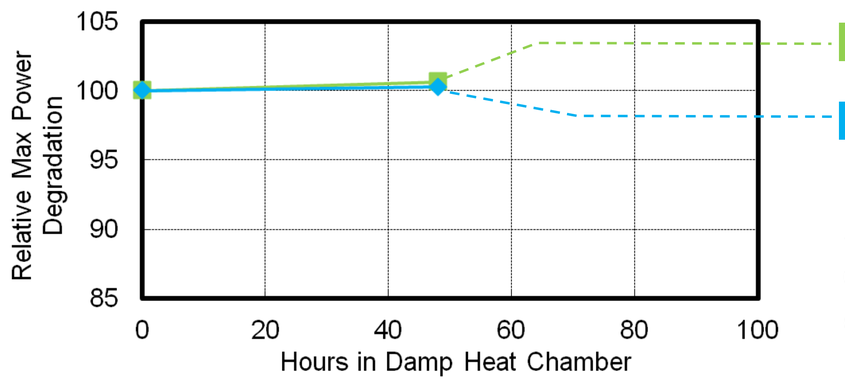
Results of PID test by Chemitox Inc.

60℃ 85%RH +1000V



Results of PID test by Fraunhofer CSP

50℃ 50%RH +1000V, -1000V



All HIT solar modules exhibited no sign of degradation

Conventional c-Si module structure
(1)Front surface is covered with insulating anti-reflection coating.
(2)Positive/negative charges are accumulated on the cell surface, that result in the power degradation.

HIT structure
(1)Both surfaces are transparent conductive oxide (TCO) layers.
(2)There is no insulating layer that accumulates electric charges under high-voltage biased condition.

PID resistance of HIT PV modules is confirmed.

SANYO Electric Co., Ltd. Energy Company