

Field Test in Kagoshima, Japan: TOPCon Shows 10.79% Yield Gain Over BC in Low Light Condition

The conversion efficiency of the solar cells or the power of the photovoltaic modules are measured under the standard conditions: AM 1.5G spectrum, 1000 W/m², and the temperature at 25 °C. However, in the process of outdoor field, due to the factors of light conditions and irradiation angle, the light intensity irradiated on the modules cannot reach a standard light intensity. So low light performance has become a key factor in the actual power generation of the modules. Module exhibits same power under STC, the one with better weak light response can naturally generate more electricity in practical applications and has more advantages in terms of income.

Project Purpose

To examine the weak light response of different module, different technology, a target purposed field test comparing Jinkosolar TOPCon and N-type BC was carried out from June 02 to June 30 by TÜV Nord in Kagoshima, Japan, where is well known for its gloomy days.





Project Picture

Project Introduction:

This field test was conducted at the Kagoshima Field Testing Base in Japan (32 ° 3 ′ 57 ″ N, 130 ° 19 ′ 53 ″ E). Two types of modules were installed: N-type TOPCon modules and N-type BC modules. The test setup consisted of two modules from each manufacturer installed on fixed mounts at a height of 1.2 meters from the ground and a tilt angle of 32 °. The initial power of the modules was measured using the SAT method, and spectral correction was not considered in the test results. Energy yield (DC) data were collected using the high-precision CR1000X acquisition system, with a sampling interval of one minute. Additionally, module plane irradiance, backsheet temperature, ambient temperature, humidity, atmospheric pressure, and other data were recorded at the same sampling interval.

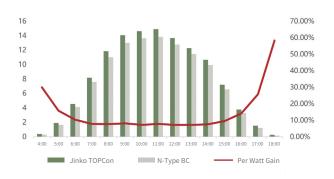
Technology	Power/W	Module type	Size (mm)
Jinko TOPCon	590	Dual Glass	2278×1134×30
N-type BC	605	Single Glass	2278×1134×30

Sample component parameters

Test Results:

From June 2 to June 30, 2025, the performance of the two types of modules was comprehensively tested. Results showed that the normalized energy yield of TOPCon modules reached 119.61 kWh/kW over the 30 days, compared to 110.47kWh/kW for N-type BC modules. On average, the long-term energy yield gain per watt for TOPCon modules was 8.27%.

Dive deep into daily change, it reveals that the earlier in the morning and the later in the afternoon when light intensity is the lowest level in a day, the yield gain over n-type BC is more obvious, highest gain period occurring in low-light irradiation (0-400W/m²) of 10.79%.



Conclusion:

Thanks to its optimized leakage current path distribution, good parallel resistance, passivation layer reducing carrier recombination losses, plus fill factor advantage, TOPCon panel produced by Jinkosolar exhibit exceptional efficiency in electricity production under low-light conditions, such as on cloudy days or in high-latitude areas with low light.