



Partial shade, managed down to the cell level.

<5 V

Reverse-bias response

Why it matters?

Reduced hotspot stress under partial shade

<100 °C

Shaded cell temperature¹

Lower thermal exposure for panel materials

16 200

Bypass-like micro-paths per panel²

More power retained during localized shade events

1-2.5 %/yr

Avg. advantage in moderate shade
Versus conventional BC³

Incremental yield in comparable conditions

Class A+

TÜV Rheinland shade resistance certification⁴



Third-party validation of shading reliability performance

For homeowners, the value of **partial-shade resilience** is not limited to instantaneous power output. It can support:

- More **resilient savings assumptions** where predictable or intermittent shading is present
- **Reduced material stress** during system lifetime
- **Lower dependence on** substring-level **bypass** activation
- More confidence in **long-term performance**⁵

Safer, more predictable savings for residential customers.

Footnotes:

¹Conventional TOPCon cell temperature is typically 170 °C and can exceed 550 °C when diode is broken. Hotspots in PV modules caused by defective or non-connected bypass diodes, White Paper, TÜV 2026

²150 bypass area per cell x 108 cells

³Combination of shading loss and string mismatch advantage. +1.39% more energy under light shading. +1.87% under moderate shading, which is the most common. +2.81% under heavy shading versus conventional BC. Helioscope simulation.

⁴TÜV Rheinland certificate: AK 50737993 0001

⁵The financial effect should be quantified using actual shading profile, layout, module configuration and operating assumptions of the specific PV system.



Partial shade, managed down to the cell level.

Partial shading is a recurring reality in residential solar installations. TCL Solar C2 is designed to manage these conditions through distributed, bypass-like cell behavior—supporting more resilient production and lower hotspot-related risk.

LIGHTLY SHADED



Bird droppings



Leaves



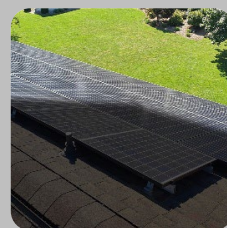
Vegetation

MODERATELY SHADED



Chimney,
antenna

HEAVILY SHADED



Other building

Distributed bypass-like behavior



Rear-side current routing

With all electrodes located on the rear of the cell, current can redistribute across the back contact architecture when a local area is shaded.

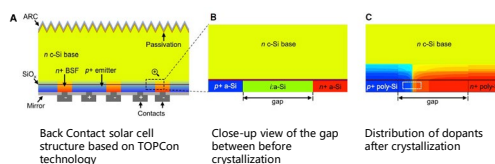
Lithographically patterned micro-circuit

This laser-free approach avoids laser-induced microcrack formation during cell manufacturing.



Low-voltage reverse-bias behavior

The cell is designed to maintain a more uniform reverse-bias response of below 5 V.



Cell-level continuity rather than sub-string shutdown

Distributed cell-scale current pathways keep affected areas producing rather than bypassing an entire sub-string. 16,200 bypass-like micro-paths per panel².