

Which 650–670 W solar panel should I choose?

Six Tier-1 brands scored with stars, backed by independent tests and real field results

AIKO · LONGi · Jinko · Tongwei · Trina · JA Solar

1 Quick pick

BEST FOR HOME & SHOP ROOFS



LONGi Hi-MO X10

or AIKO Comet 3N72 · back contact

- Loses far less power when partly shaded
- More kWh from the same roof
- Lightest panels (28.5–29 kg)
- 15-year product warranty

BEST FOR CARPORTS & GROUND MOUNTS



Jinko Tiger Neo 3.0

or Tongwei TNC 2.0 · bifacial TOPCon

- Rear side adds output (85–88%)
- Tough dual-glass build
- Top independent reliability results

SAFE ALL-ROUNDERS



Trina · JA Solar

Tier 1 · TOPCon

- Solid, widely used brands
- Passed fewer top-level tests in 2026 (5–6)
- Fine for open, unshaded sites

2 Scorecard

Brand / model	Efficiency	Shade handling	Heat & roof weight	Proven reliability	Warranty	Rear-side gain	Roof score	Open-site score
AIKO Comet 3N72 (ABC)	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★☆☆☆☆	4.7	3.9
LONGi Hi-MO X10 (HPBC 2.0)	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★☆☆☆☆	4.6	3.9
Jinko Tiger Neo 3.0 (TOPCon)	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	4.1	4.4
Tongwei TNC 2.0 (TOPCon)	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	4.0	4.4
Trina Vertex N (i-TOPCon)	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	3.7	4.0
JA Solar DeepBlue 5.0 (TOPCon)	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	3.6	3.9

Solar ESS assessment, 5 = best. Roof score = efficiency, shade, heat & weight, reliability, warranty. Open-site score swaps shade handling for rear-side gain. Reliability is based on Kiwa PVEL 2026 and RETC 2026 independent tests.

3 What independent testers say

Kiwa PVEL 2026: Top Performer tests passed

AIKO	7–8 tests
LONGi	7–8 tests
Jinko	7–8 tests
Tongwei	7–8 tests
Trina	6 tests
JA Solar	5 tests

87% of all manufacturers had at least one failure in 2026, so brand choice matters. All six brands are also on the BNEF Tier 1 list (Q3 2026).

RETC 2026 "Overall Highest Achiever"

Jinko	7th year in a row
Tongwei	2026 winner

TÜV studies: back contact vs TOPCon

One shaded cell: back contact loses **12.9%**, TOPCon loses **33.9%** (TÜV NORD).

Same roof area: back contact makes **+4.11%** more energy and runs 0.5 °C cooler (TÜV Rheinland).

4 Real field results

Back contact beat TOPCon

AIKO · tree shading (China)	+12.04%
AIKO · partial shading (China)	+9.55%
LONGi · Seville, Spain (Enertis Applus+)	+3.4%
LONGi · desert (China)	+2.45%
AIKO · Japan, no shade	+2.6%
LONGi · France/Denmark (IPVF)	+1.84%
LONGi · hot & humid Sanya (CGC)	+1.54%

Yield gain per kW. Biggest gains under shade.

TOPCon beat back contact

Trina · Kagoshima, Japan (TÜV Nord cert.)	+8.82%
Trina · low light, China (CPVT)	+4.38%
Jinko · rooftop, China (own data)	+1.7%

TOPCon tends to win in low light, cold or open sites. Each maker wins its own tests, so trust independent results first.

 **In Thailand:** a 974 kW LONGi Hi-MO X10 rooftop has run in Samut Sakhon since April 2025. Thai rooftops are hot and often partly shaded by trees, air-con units and nearby buildings, which is where back-contact panels gain the most.

5 Key specifications

Item	 AIKO Comet 3N72 (ABC)	 LONGi Hi-MO X10 (HPBC 2.0)	 Jinko Tiger Neo 3.0 (TOPCon)	 Tongwei TNC 2.0 (TOPCon)	 Trina Vertex N (i-TOPCon)	 JA Solar DeepBlue 5.0 (TOPCon)
Power	655–680 W	650–670 W	≤ 670 W	≤ 670 W	650–670 W*	≤ 650 W
Efficiency	up to 25.2%	≈ 24.2–24.8%	24.1–24.8%	up to 24.8%	≈ 24%*	24.07%
Heat loss	–0.26%/°C	–0.26%/°C	–0.26%/°C	n/c	–0.26%/°C*	–0.26%/°C
Glass	single	single	dual	dual	dual	dual
Weight	≈ 29 kg	28.5 kg	32.5 kg	32.5 kg	heavier*	n/c
Rear-side gain	no	no	85%	up to 88%	85%	85%
Size	2382×1134	2382×1134	2382×1134	2382×1134	—	n/c
Warranty (product / power)	15 / 30 yrs	15 / 30 yrs	12 / 30 yrs	n/c	12 / 30 yrs	n/c

n/c = not confirmed. * Trina 650–670 W figures not confirmed from a current datasheet; dual-glass Trina panels are heavier. All six have similar heat loss (about –0.26%/°C), so none has a real edge on hot days.

6 Choose in 30 seconds



Any shade on the roof?

Trees, air-con units, chimneys, nearby buildings, dust on edges.

Yes → AIKO or LONGi



Small roof or light metal sheet?

You need the most power per square metre and the lightest panel.

Yes → LONGi Hi-MO X10



Raised carport or ground mount?

Light reflects onto the back of the panel from the ground.

Yes → Jinko or Tongwei

7 Good to know

- **All six are Tier 1** and Kiwa PVEL 2026 Top Performers. You are choosing between good options.
- **Back-contact panels are not smaller.** They are the same size (2382 × 1134 mm); they are lighter because they use single glass.
- **Bifacial panels on a roof** gain little, because the roof blocks light from reaching the back.
- **Workmanship matters as much as the brand:** correct cables, connectors, breakers and earthing protect your warranty.

Sources: Kiwa PVEL 2026 Scorecard (scorecard.pvel.com), RETC PVMI 2026, BNEF Tier 1 Q3 2026, TÜV Rheinland LCOE study, TÜV NORD shading study (Solar Energy 2026), LONGi global BC field data, AIKO field results, Trina TOPCon vs BC data, JinkoSolar case study, maker datasheets (AIKO, LONGi, Jinko, Tongwei, Trina, JA Solar). October 2026.