

Introducing the next generation

# 350W SHINGLED MODULE



Outstanding  
performance under  
the hot Australian sun!



Enjoy the peace of mind of long-term performance and reliability from Hyundai's superior technology

- ① Low temperature coefficient and reduced risk of hot spots
- ② Electrically Conductive Adhesive for higher reliability
- ③ Improved shade resilience
- ④ Better space utilisation delivers higher efficiency
- ⑤ Improved mechanical load resilience



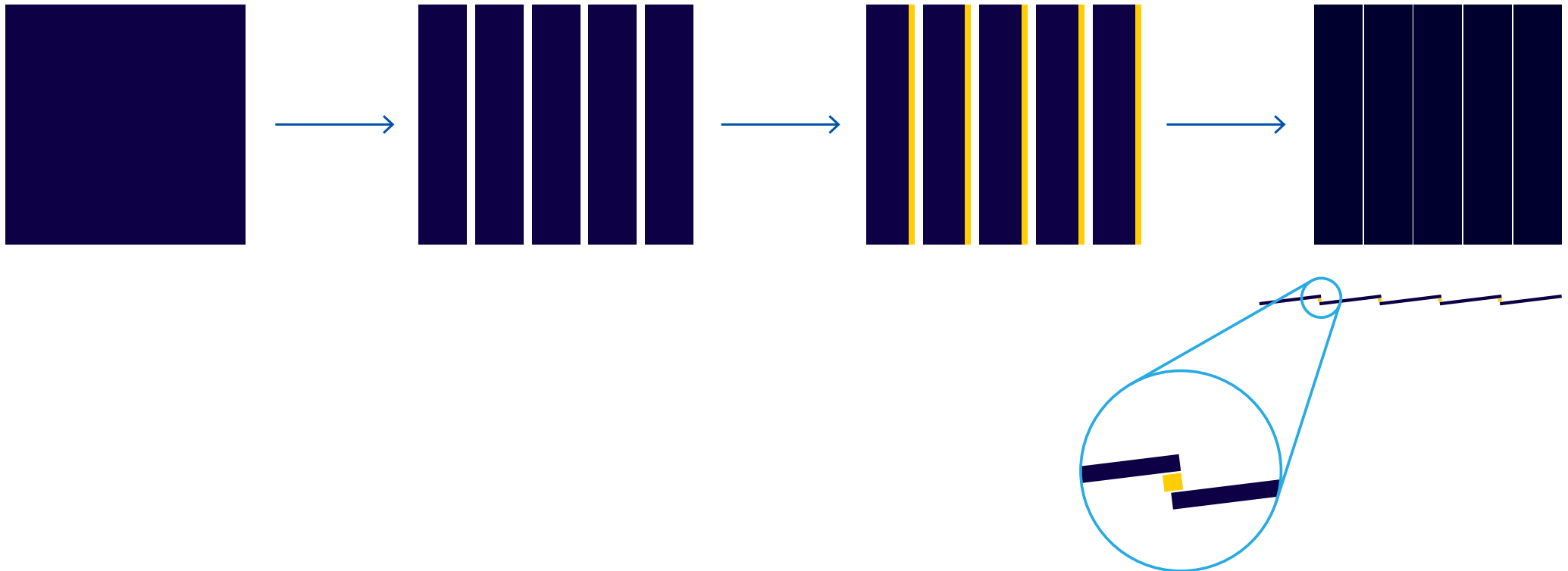
# What is Shingled Cell Technology?

Start with a high performance Mono PERC cell

Laser cut the cell into five strips

Apply Electrically Conductive Adhesive to each strip

Overlap the cells in a shingled arrangement in the module



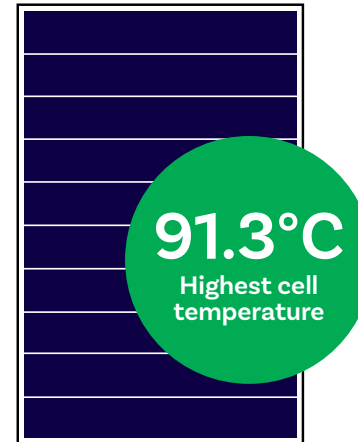
### ① Lower Hot Spot Risk

Hyundai shingled cells carry just 1/5 the electrical current of the original full cell, meaning that every circuit **operates at a lower current** and hence **a lower temperature**.

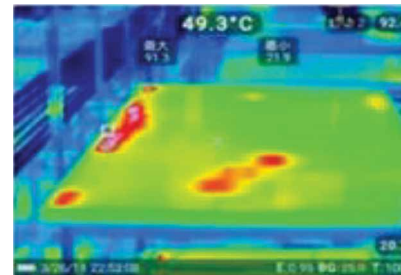
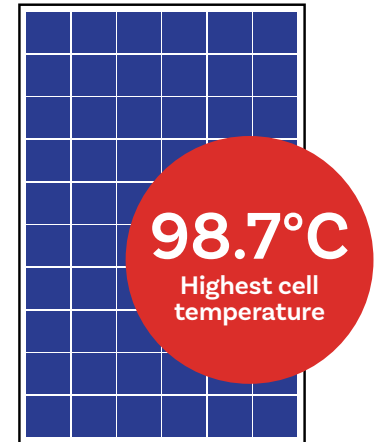
There are two **critical outcomes** of this lower temperature operation,

- a) **outstanding performance in high temperatures**, and
- b) **reduces the risk of hot spots**.

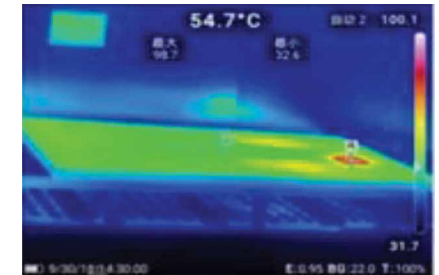
Shingled  
Module



Standard  
Module



IR Image



Lower current per cell means **lower hot spot risk**...

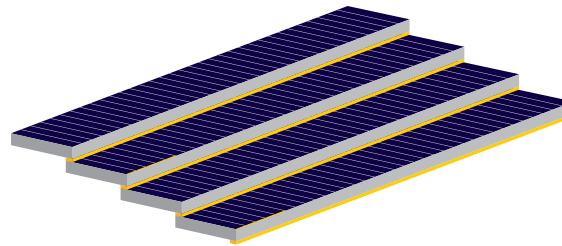
and a **low temperature coefficient** of power of  $-0.34\% / ^\circ\text{C}$

### ② ECA for higher reliability

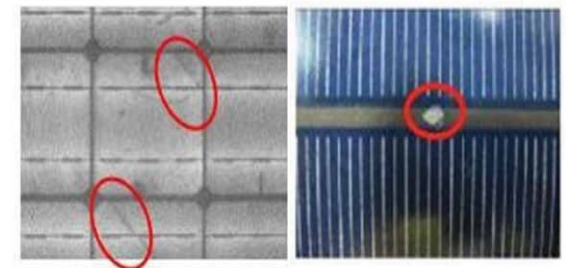
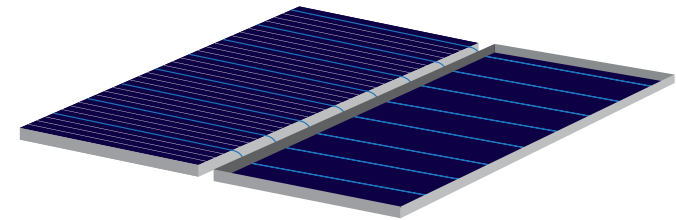
Shingled modules use **Electrically Conductive Adhesive** instead of solder ribbon to electrically connect the cells. This **reduces stress on the cells** during manufacturing.

As panels **get hot in the day and cold at night**, traditional solder ribbon expands and contracts but the silicon cells don't causing more stress.

Hyundai Conductive Adhesive Method



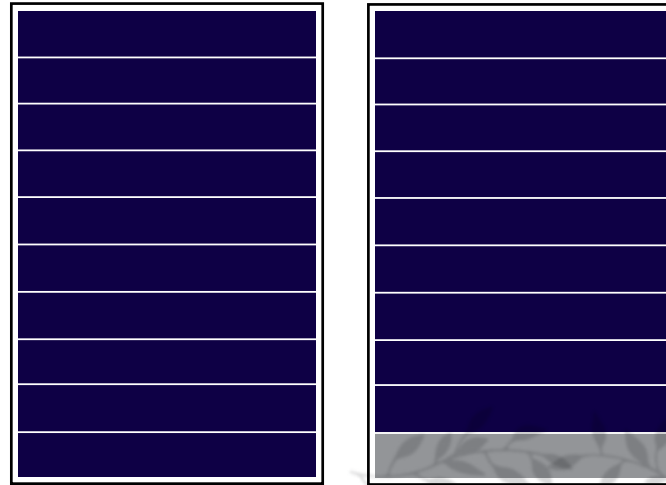
Conventional Welding Method



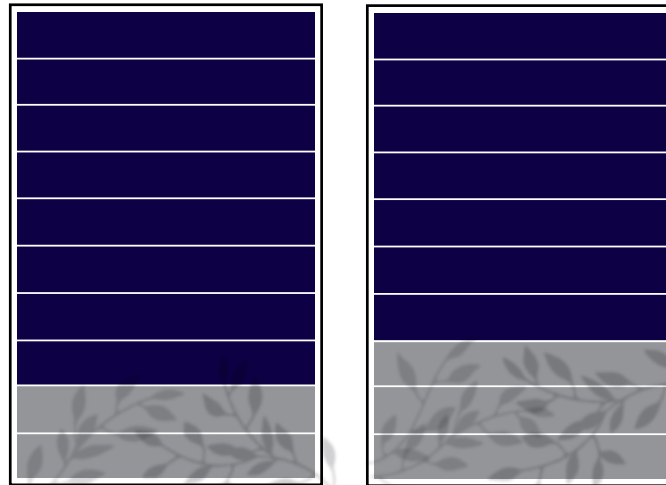
Hyundai shingled solar modules are made in parallel with a brickwork layout circuits design.

The optimal layout results in lower impacts from shade as compared to common full cell modules.

### 3 Better Shade Resilience



Parallel  
circuits...



means **lower  
loss of power**  
in rising shade

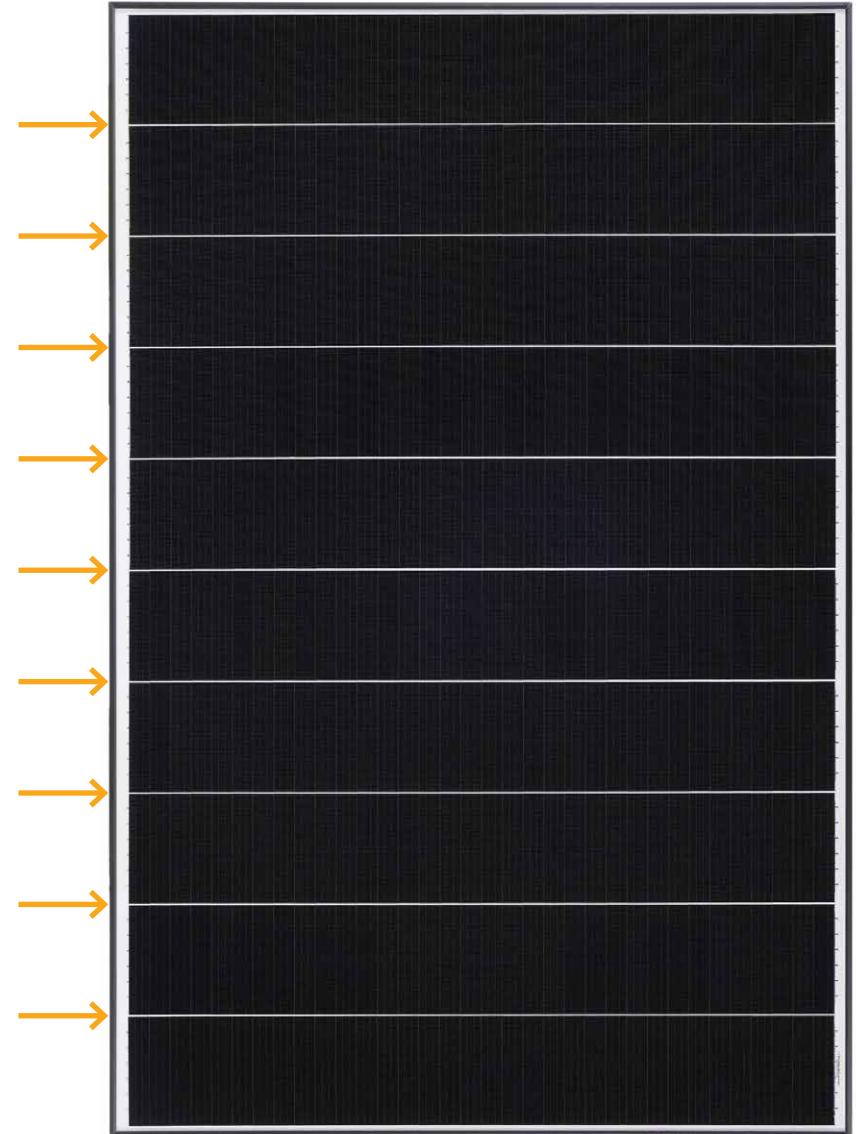
Nearly 100% of the module is covered with solar cells to deliver higher power and outstanding **20.2% efficiency**.

Higher efficiency means that **less total solar panel area** is required to deliver a given power output, **leading to savings** on balance of systems components and labour.

### ④ Better space utilisation

Less space  
between the  
cells...

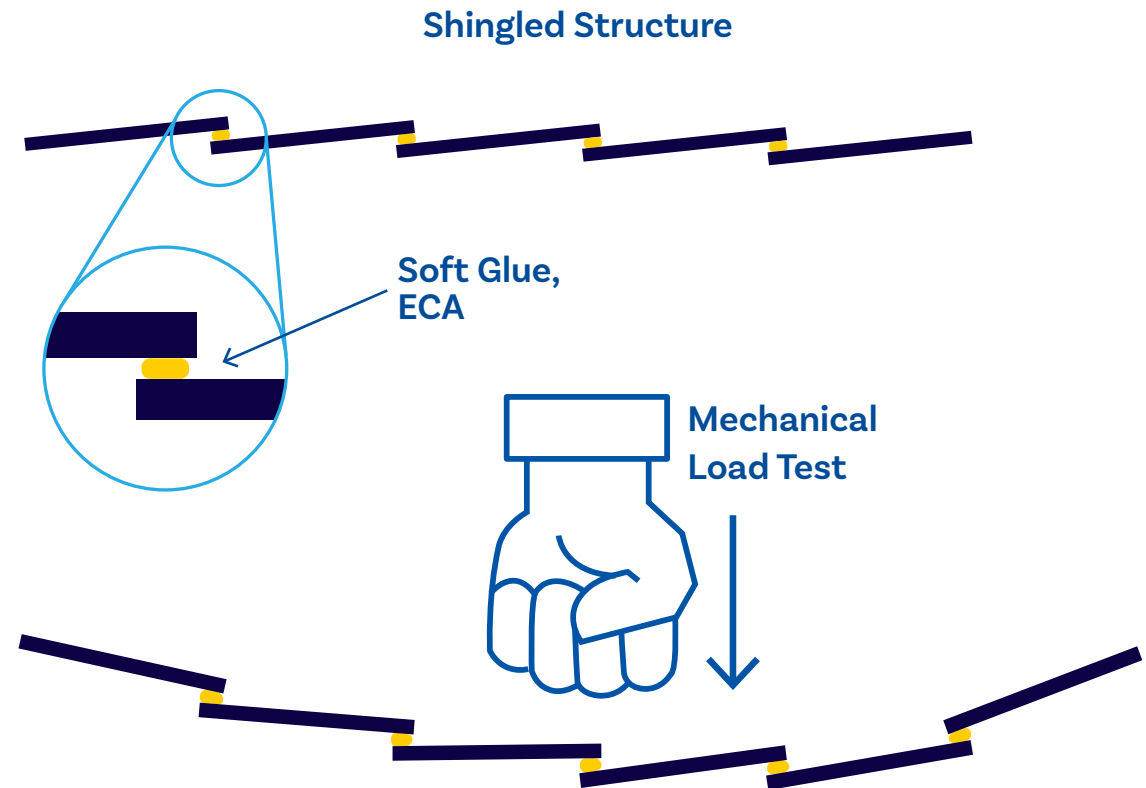
means  
**more power  
per panel**



Hyundai shingled module cell joints have **superior flexibility** compared to standard solder ribbon with the Electrically Conductive Adhesive absorbing bending energy.

During periods of high wind or under mechanical loads such as snow, Hyundai modules are **less likely to develop cell cracks** that hamper long term reliability.

### 5 Improved Load Resilience



Less cell  
cracking under  
pressure...

means **better**  
**long term**  
**reliability**

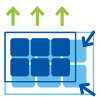




There has been no noticeable drop in electricity production in 8 years!

**K. BENN - 2019**  
60KW Ground Mount  
St George, QLD Australia

## Why choose Hyundai shingled solar panels?



### PERC SHINGLED TECHNOLOGY

PERC Shingled Technology provides ultra-high efficiency with better performance in low irradiation. Maximises installation capacity in limited space.



### ANTI-LID / PID

Both LID (Light Induced Degradation) and PID (Potential Induced Degradation) are strictly eliminated to ensure higher actual yield during lifetime.



### MECHANICAL STRENGTH

Tempered glass and reinforced frame design withstand rigorous weather conditions such as heavy snow and strong wind.



### 25 YEAR PRODUCT WARRANTY

Hyundai Energy Solutions have a market leading product warranty for all our solar panels.



### CORROSION RESISTANT

Various tests under harsh environmental conditions such as ammonia and salt-mist passed.



### UL / VDE TEST LABS

Hyundai's Research and Development Centre is an accredited test laboratory of both UL and VDE global safety certifications.



### SUPERIOR TEMPERATURE COEFFICIENT

Lower internal cell current results in superior performance in hot climates.