# Reliability of High Power Modules

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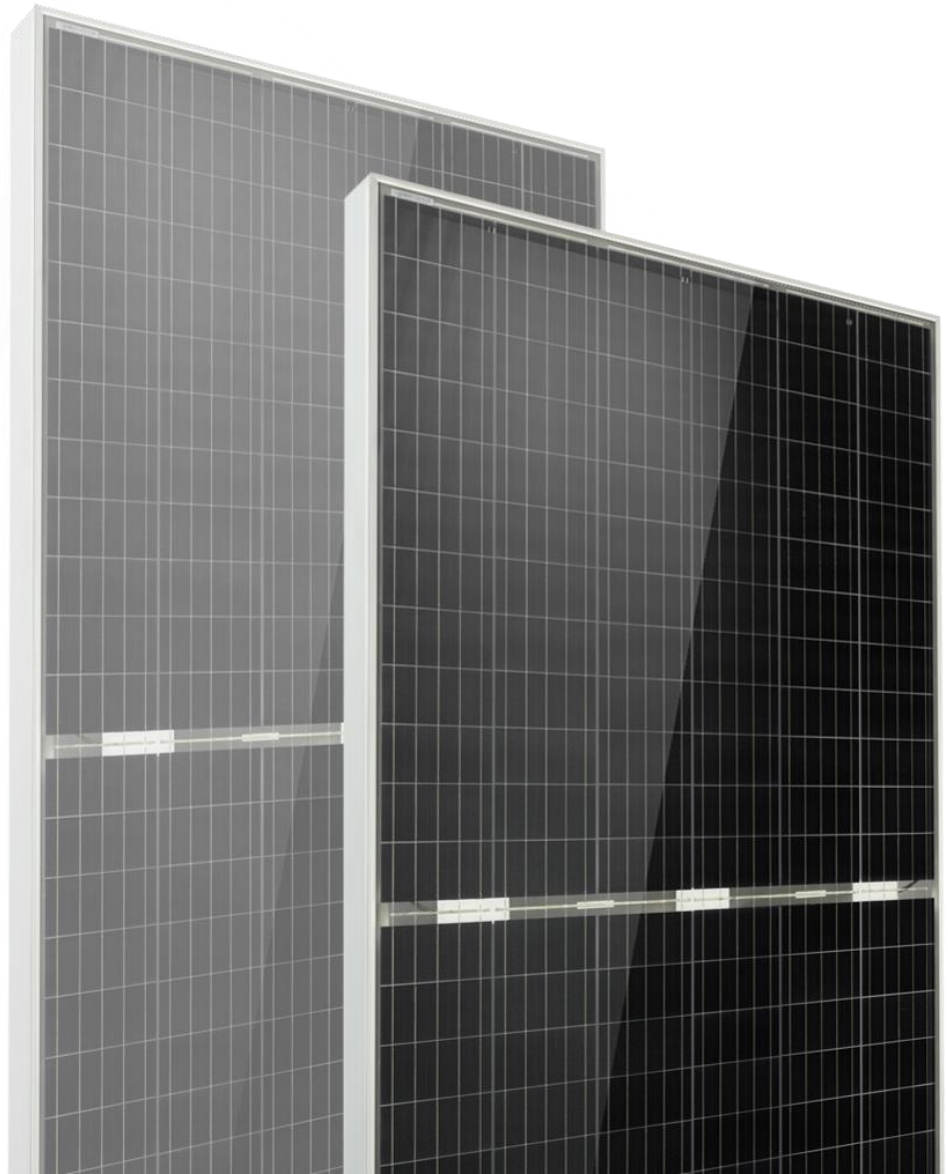
- ABOUT JKS
- BOM CONCERNS
- RELIABILITY TESTS



# ABOUT JINKO SOLAR


11 Global Factories | 30+ Service Centers

100+ Covered Countries | 8000+ Annual Orders

# Robust Quality Certified

Jinko Solar

TOP PERFORMER 2018 DNV·GL PV MODULE RELIABILITY SCORECARD

TOP PERFORMER 2017 DNV·GL PV MODULE RELIABILITY SCORECARD

TOP PERFORMER 2016 DNV·GL PV MODULE RELIABILITY SCORECARD

TOP PERFORMER 2014 DNV·GL PV MODULE RELIABILITY SCORECARD

2019 TOP PERFORMER PVEL DNV·GL PV MODULE RELIABILITY SCORECARD

2020 TOP PERFORMER PVEL DNV·GL PV MODULE RELIABILITY SCORECARD


RETC

## Overall High Achievers

Jinko Solar

PID-Free – High Achievement Manufacturers

LID – High Achievement Manufacturers

PAN File – High Achievement Manufacturers

DH2000 - High Achievement Manufacturers

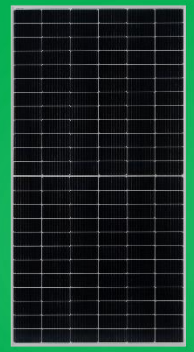
Thresher Test – High Achievement Manufacturers

# Product Portfolio

Jinko Solar

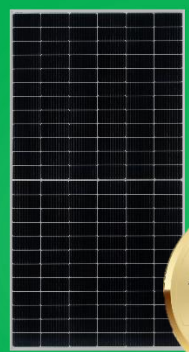
## Tiger Pro Mono-facial

- Up to 410 Wp
- 66 cells
- 163 mm wafer
- Efficiency up to 21.48%
- 25 Year Linear Power Warranty



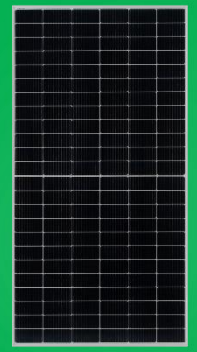
## Tiger Mono-facial

- Up to 475 Wp
- 78 cells
- 163 mm wafer
- Efficiency up to 21.16%
- 25 Year Linear Power Warranty



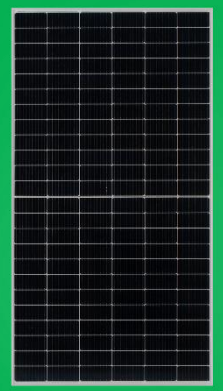

## Tiger Pro Mono-facial

- Up to 415 Wp
- 54 cells
- 182 mm wafer
- Efficiency 21.30%
- 25 Year Linear Power Warranty



## Tiger Pro Mono-facial

- Up to 550 Wp
- 72 cells
- 182 mm wafer
- Efficiency 21.33%
- 25 Year Linear Power Warranty



## Tiger Pro Bifacial

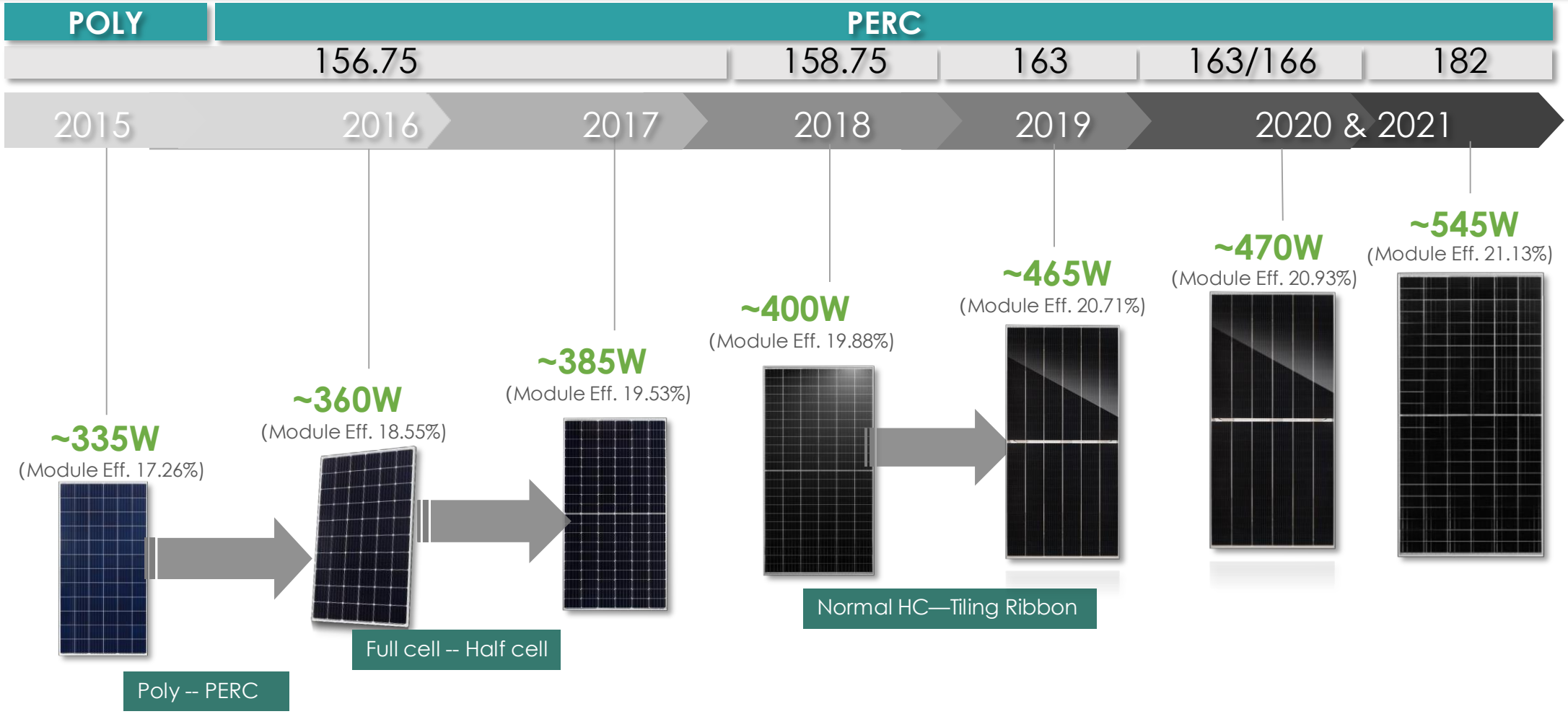
- Up to 545 Wp
- 72 cells
- 182 mm wafer
- Efficiency 21.13%
- Dual Glass or TB
- 30 Year Linear Power Warranty

**Tiger Series**

**Tiger Pro Series**

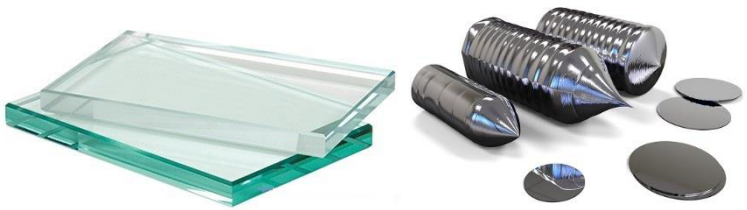
# BOM CONCERNS

# Product Roadmap - Power



# Triple Challenge

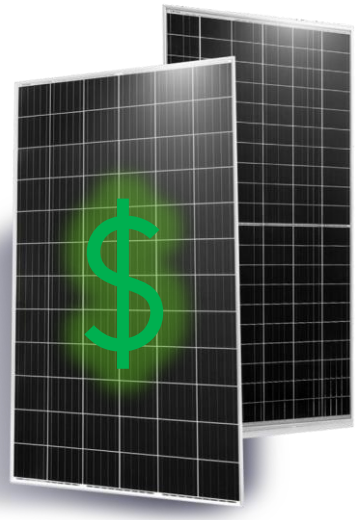
## COSTS



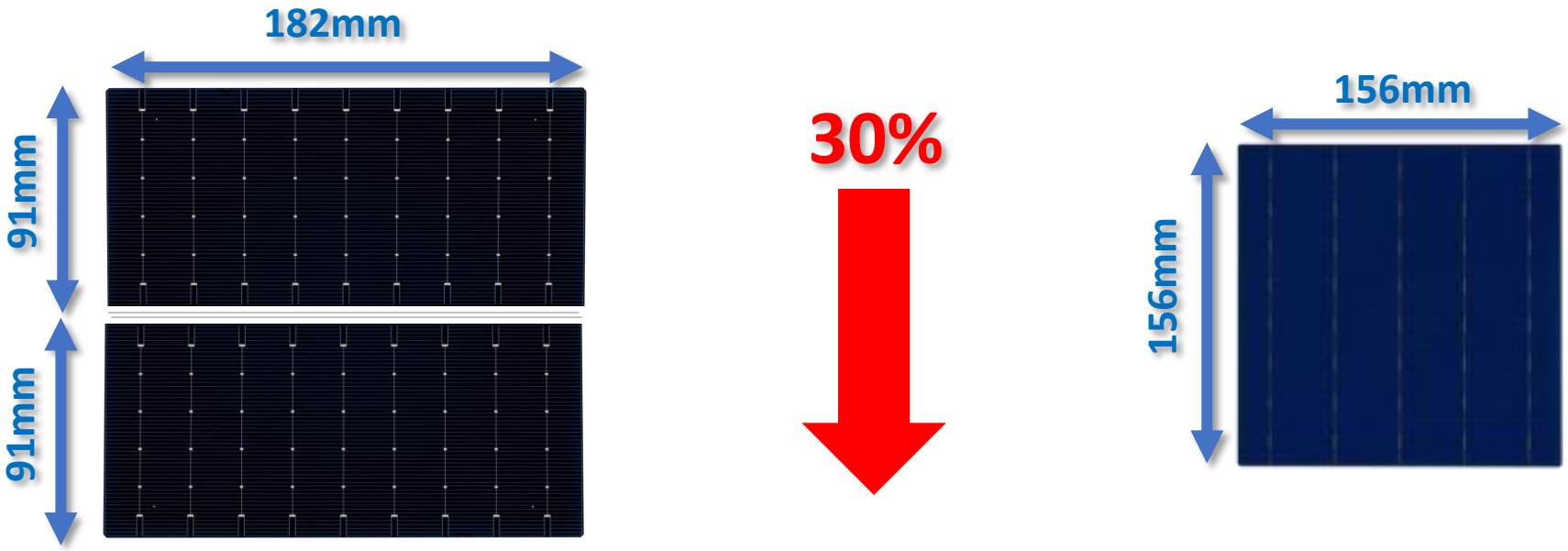
## Market Demands

- Power
- Efficiency
- Degradation
- BOM
- Technology

## PRICES



# Cells

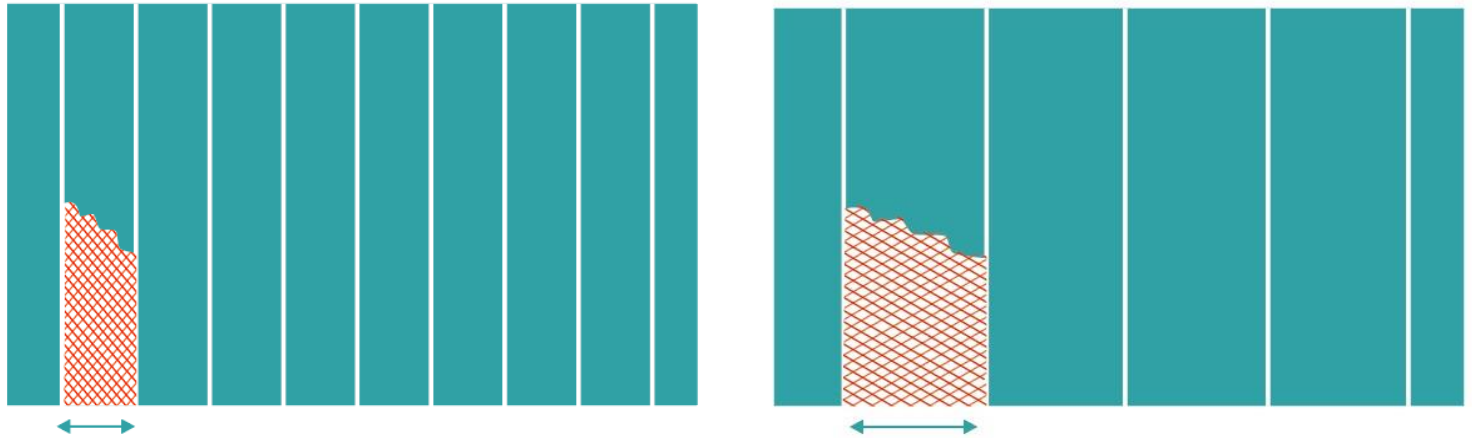



- The adoption of half cut technology (and in some cases third cut) and MBB for big wafers have improved the mechanical strength and reduced the possibility of having micro-cracks.
- The M10 half cell is 30% smaller than the M0 full cell.
- The 3.2mm glass used for mono-facial modules provides very strong protection to the solar cells

# Busbars

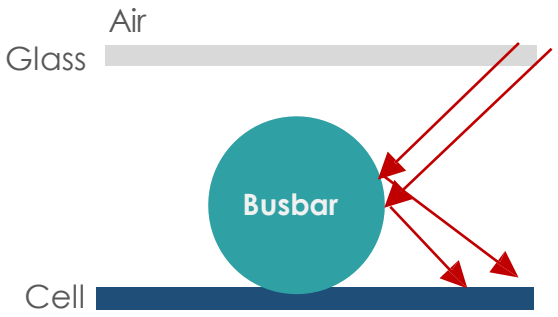
## Multi-Busbar Technology

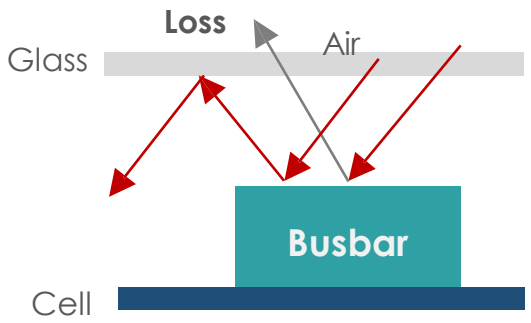
- Cell efficiency increased by 0.4%
- current path decreased by 50%
- Lower micro-crack risk

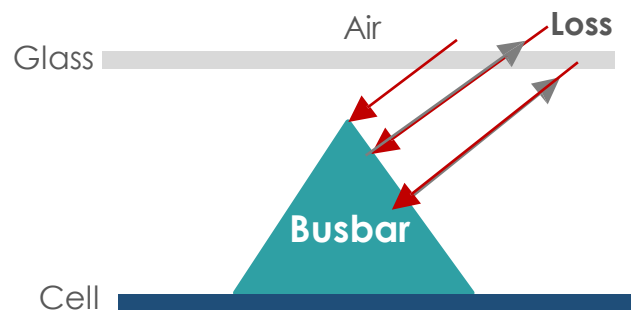


## Circular Ribbon

- Improved light utilization
- Better performance when inclined incidence

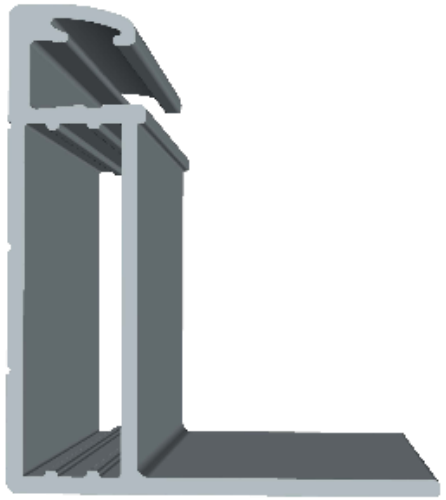


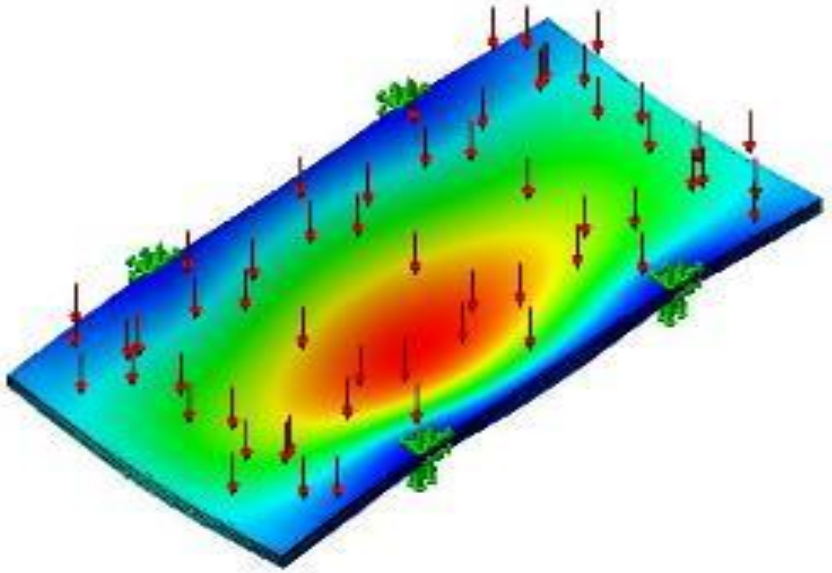




Triangle ribbon
Light loss when inclined incidence;
Long-term reliability risk

# Frame

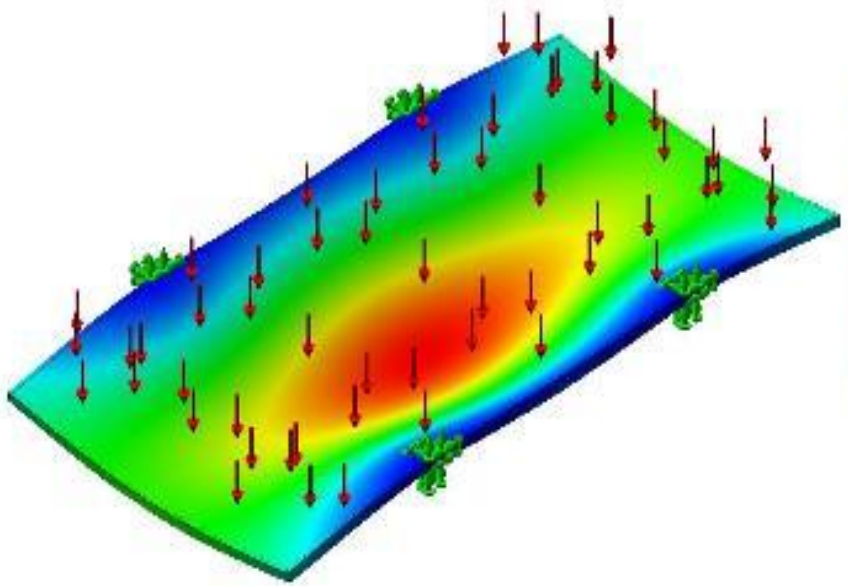


- Increased the internal thickness of the frame by 30%
- Added multiple wavy stiffeners
- 50% increase in frame cavity



Better Mechanical Strength

Less deformation



# Connector

| | |
|---|---|
| Cable Diameter | 4~6 mm |
| Upper limit temperature | 100°C |
| Rated Current | 30A |
| Contact Resistance | <0.5 mΩ |

Integrate the negative pin and chip ring into one piece, so the risk of assembly fail is reduced

The conductor is integrated molding so no need to assemble extra mesh circle

The capacity of the connector improved by 5%


| | |
|---|---|
| Cable Diameter | 5~8 mm |
| Upper limit temperature | 115°C |
| Rated Current | 55A |
| Contact Resistance | <0.2 mΩ |

# Junction Box


**First digit – solid particle protection**

| Level | Description |
|---|---|
| 0 | No protection |
| 1 | Protected against solids larger than 50 mm |
| 2 | Protected against solids larger than 12.5 mm |
| 3 | Protected against solids larger than 2.5 mm |
| 4 | Protected against solids larger than 1 mm |
| 5 | Dust protected (no harmful deposit) |
| 6 | No ingress of dust |

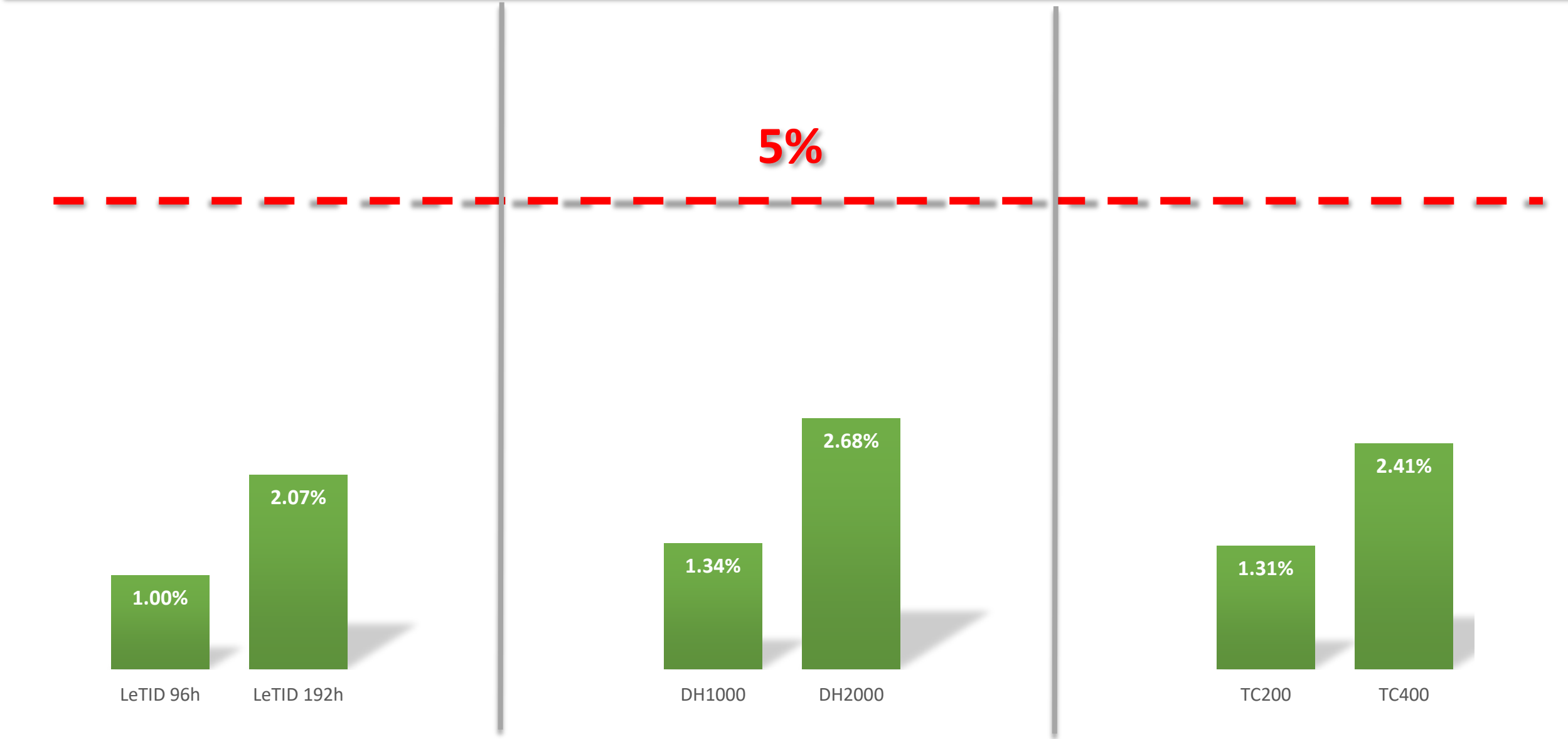
IP 6 8

**Second digit – Liquid ingress protection**

| Level | Description |
|---|---|
| 0 | No protection |
| 1 | Protected against vertically falling water drops |
| 2 | Protected against vertically falling water drops when tilted up to 15 degrees |
| 3 | Protected against vertically falling water drops when tilted up to 60 degrees |
| 4 | Protected against water spray from all directions |
| 5 | Protected against water jets from all directions |
| 6 | Protected against powerful water jets from all directions |
| 7 | Protected against temporary immersion in water (up to 1 m) |
| 8 | Protected against prolonged immersion in water (more than 1 m) |

# RELIABILITY TESTS

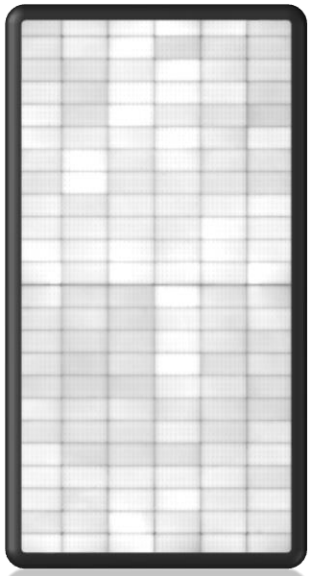
# Double IEC Tests



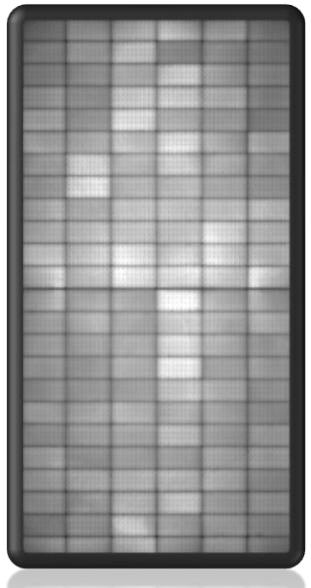
# Mechanical Tests

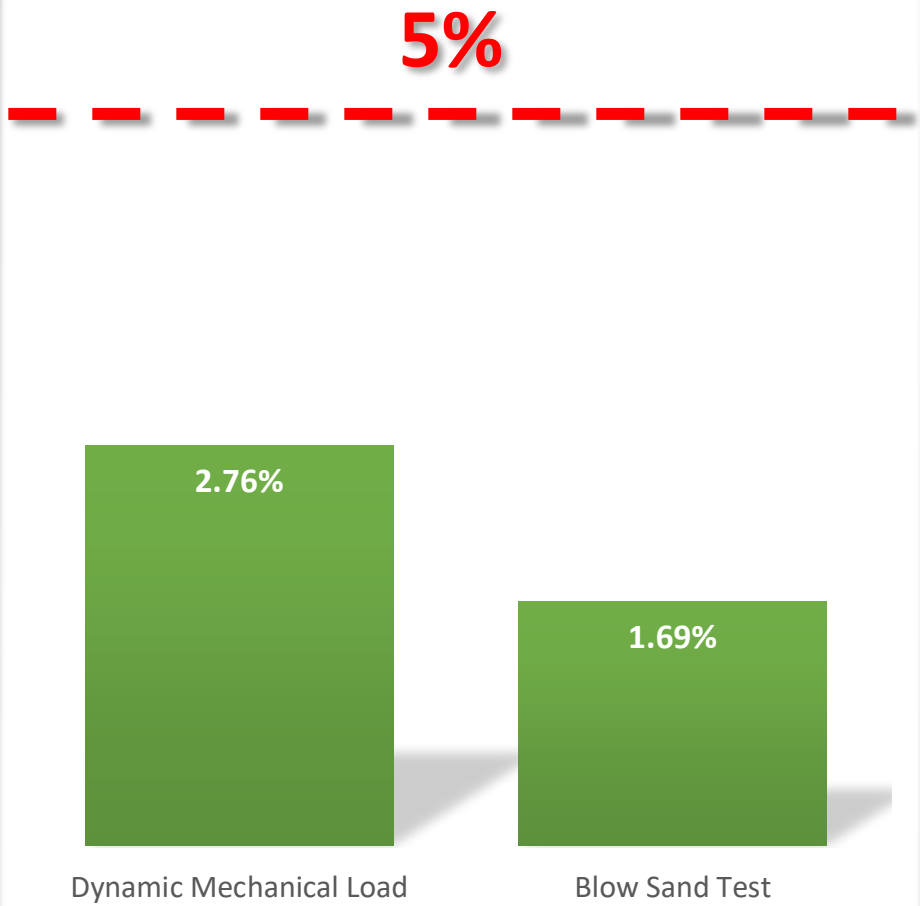
## Dynamic Mechanical Load

before



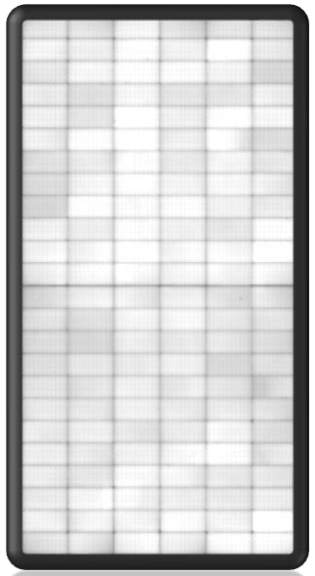
after



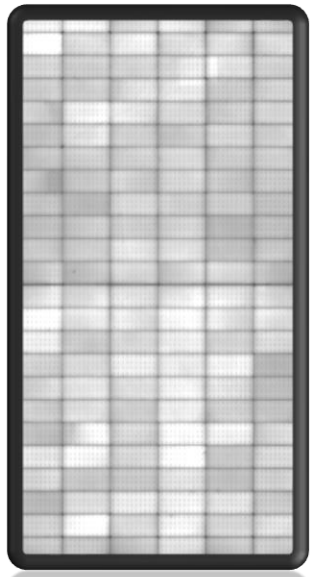



## Blow Sand Test

before



after

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