

## n-type

TECHNOLOGY  
INSIDE

# 460 W 23.02 %

Maximum power

Maximum efficiency

## KEY BENEFITS AND FEATURES



Power from **445 to 460 Watt**



96 G12R HC **n-type** half-cut cells



The **new standard** in photovoltaic technology



**High efficiency** and enhanced low light performance



Excellent temperature coefficient **-0.29%/°C**



1762 x 1134 x 30 mm

### Performance guarantee

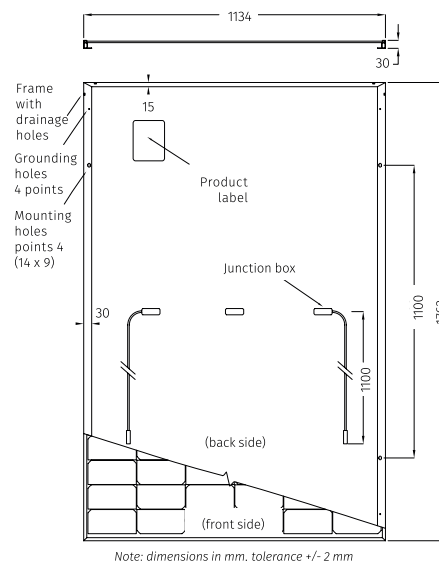
- **25-years** performance warranty with max power decrease from 2<sup>nd</sup> year **0.4%/year**
- **99%** at the end of first year
- **92%** at the end of 20<sup>th</sup> year
- **89%** at the end of 25<sup>th</sup> year

### Product guarantees

- **15-year** product warranty
- Third-party product **liability** insurance
- All FuturaSun's modules are designed and guaranteed by the **Italian** headquarters

## Mechanical Specifications

Dimensions	1762 x 1134 x 30 mm
Weight	21.3 kg
Glass	High transmission, Low iron, Tempered, ARC, Thickness 3.2 mm
Cells	96 monocrystalline half-cut MBB n-type cells 182 x105 mm
Frame	Black anodized aluminium frame with mounting and drainage holes
Junction boxes	Certified according to IEC 62790, IP 68 approved, 3 bypass diodes
Cables	Solar cable, length 1100 mm or customized assembled with 4mm <sup>2</sup> compatible connectors
Backsheet	Composite multilayer film - white
Maximum reverse current (I <sub>r</sub> )	25 A
Maximum system voltage	1000 V (1500 V on request)
Mechanical load (snow)	Design load: 3600 Pa, (5400 Pa including safety factor 1.5)
Mechanical load (wind)	Design load: 1600 Pa, (2400 Pa including safety factor 1.5)



## Electrical data - STC\*

		FU 445 M	FU 450 M	FU 455 M	FU 460 M <sup>1</sup>
Sorting tolerance	W	0/+5			
Module power (P <sub>max</sub> )	W	445	450	455	460
Open circuit voltage (V <sub>oc</sub> )	V	35.30	35.47	35.63	35.84
Short circuit current (I <sub>sc</sub> )	A	15.91	15.97	16.02	16.10
Maximum power voltage (V <sub>mpp</sub> )	V	29.81	30.01	30.17	30.43
Maximum power current (I <sub>mpp</sub> )	A	14.93	15.00	15.08	15.13
Module efficiency	%	22.27	22.52	22.77	23.02

## Electrical data - NOCT\*\*

		FU 445 M	FU 450 M	FU 455 M	FU 460 M <sup>1</sup>
Module power (P <sub>max</sub> )	W	334.60	338.40	342.30	346.20
Open circuit voltage (V <sub>oc</sub> )	V	33.56	33.72	33.87	34.18
Short circuit current (I <sub>sc</sub> )	A	12.84	12.90	12.95	12.98
Maximum power voltage (V <sub>mpp</sub> )	V	27.75	27.89	28.00	28.32
Maximum power current (I <sub>mpp</sub> )	A	12.06	12.12	12.19	12.23

## Temperature ratings

Temperature coefficient I <sub>sc</sub>	%/°C	0.045
Temperature coefficient V <sub>oc</sub>	%/°C	-0.25
Temperature coefficient P <sub>max</sub>	%/°C	-0.29
NOCT**	°C	45 ± 2
Operating temperature	°C	from -40 to +85

## Certifications

Factory	ISO 9001 - 14001 - 45001
Product	IEC EN 61215, IEC EN 61730, Fire Class C, Class 1 UNI9177 <sup>1</sup> certifications ongoing

## Packaging

Quantity / Pallet	36 pcs
Container 40' HC	936 pcs / 26 pallets

The information included in this module datasheet is subject to change without notice and is provided for informational purposes only. No contractual rights are established or should be inferred because of user's reliance on the information contained in this module datasheet. Please refer to the appropriate module user guide and module product specification document for more detailed technical information regarding module performance, installation and use.

\*Standard Test Conditions STC: 1000 W/m<sup>2</sup> - AM 1.5 - 25 °C - tolerance: P<sub>max</sub> (±3%), V<sub>oc</sub> (±4%), I<sub>sc</sub> (±5%)  
 \*\*Nominal Operating Cell Temperature NOCT: 800 W/m<sup>2</sup> - T=45 °C - AM 1.5

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