

## BIFACIAL MONO CRYSTALLINE DOUBLE GLASS MODULE - SHINGLED CELL TECHNOLOGY

645 / 650 / 655 / 660 / 665 / 670 Watts

# Puma Series



## Superior Performance and Reliability

Shingled technology eliminates traditional ribbon connection with shingles connected in series. By removing the soldered ribbons, the active area of the module is improved and thermal stresses are reduced - resulting in exceptional efficiency and reliability over standard interconnections.



Outstanding performance under extreme heat as well as low intensity solar radiation



Significantly low Pmax thermal coefficient

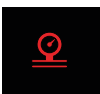


Positive Tolerance



100 % electro-luminescence tested

## Key Benefits



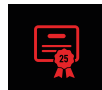
Higher yield per surface area



Low Pmax Temperature Coefficient



Higher yield in hot climate



25 Years Limited Product Warranty



Low LCOE

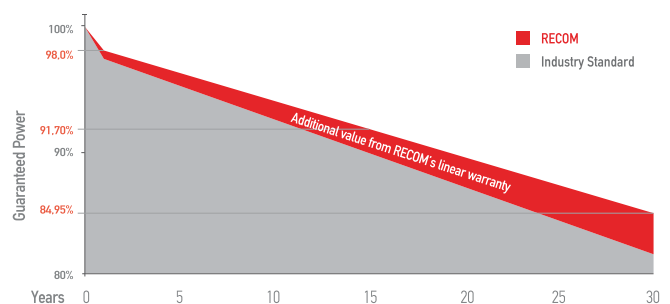


Low Resistive Losses

## Tests, Certifications and Warranties

Standard Tests	IEC 61215, IEC 61730
Factory Quality Tests	ISO 9001: 2015, ISO 14001: 2015
Certifications	Conformity to CE, PV CYCLE
Insurance	Third party liability insurance provided by Liberty Mutual
Wind and Snow Loads Testing	Module certified to withstand extreme wind (2400 Pascal) and snow loads (5400 Pascal)
Power Tolerance	Guaranteed +0%/+5% (STC condition)
Warranties	<ul style="list-style-type: none"> <li>• 25-year limited product warranty</li> <li>• 15-year manufacturer warranty on 91.70% of the nominal performance</li> <li>• 30-year transferable linear power output warranty</li> </ul>

## Linear Performance Warranty



First Year Output  $\geq 98.0\%$  | 2-30 Year Decline  $\leq 0.45\%$  | 30 Year Output  $\geq 84.95\%$

# BIFACIAL MONO CRYSTALLINE DOUBLE GLASS MODULE - SHINGLED CELL TECHNOLOGY

RCM-xxx-SDMT2 (xxx=645-670)

## Electrical Characteristics

POWER CLASS <sup>(1)</sup>			645		650		655		660		665		670	
Testing Condition			STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT	STC	NMOT
Maximum Power	P <sub>max</sub>	[Wp]	645	486	650	489	655	493	660	497	665	501	670	504
Maximum Power Voltage	V <sub>mp</sub>	[V]	38,7	36,9	38,8	37,0	38,8	37,0	38,9	37,1	39,0	37,2	39,1	37,3
Maximum Power Current	I <sub>mp</sub>	[A]	16,68	13,17	16,77	13,25	16,89	13,32	16,98	13,39	17,07	13,46	17,16	13,54
Open Circuit Voltage	V <sub>oc</sub>	[V]	46,6	44,3	46,7	44,4	46,8	44,5	46,9	44,7	47,0	44,8	47,1	44,9
Short Circuit Current	I <sub>sc</sub>	[A]	17,74	14,29	17,84	14,37	17,97	14,45	18,06	14,53	18,16	14,61	18,26	14,71
Module Efficiency	Eff	[%]	20,8		20,9		21,1		21,2		21,4		21,6	
Maximum Series Fuse	I <sub>R</sub>	[A]	30											
Maximum System Voltage	V <sub>sys</sub>	[V]	1500V DC											

(1) Measurement Tolerances: P<sub>max</sub> (± 3%), I<sub>sc</sub> & V<sub>oc</sub> (± 3%) - Power Classification 0/+5W

(2) STC (Standard Testing Condition): Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, AM 1.5

(3) NMOT (Nominal Operating Module Temperature): Irradiance 800W/m<sup>2</sup>, NMOT, Ambient Temperature 20°C, AM 1.5, Wind Speed 1m/s

### Bi Facial Output (4)

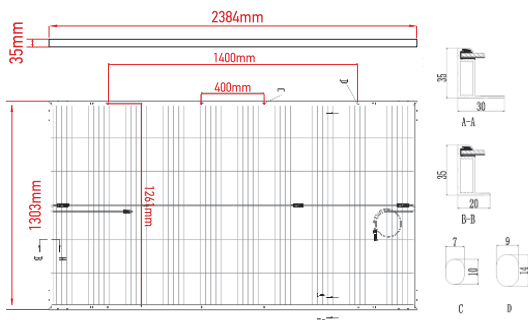
POWER CLASS			645		650		655		660		665		670	
			P <sub>max</sub> [Wp]	Eff [%]	P <sub>max</sub> [Wp]	Eff [%]	P <sub>max</sub> [Wp]	Eff [%]	P <sub>max</sub> [Wp]	Eff [%]	P <sub>max</sub> [Wp]	Eff [%]	P <sub>max</sub> [Wp]	Eff [%]
Power with Backside Gain	+5	[%]	677,3	21,8%	682,5	22,0%	687,8	22,1%	693,0	22,3%	698,3	22,5%	703,5	22,6%
	+10	[%]	709,5	22,8%	715,0	23,0%	720,5	23,2%	726,0	23,4%	731,5	23,5%	737,0	23,7%
	+15	[%]	741,8	23,9%	747,5	24,1%	753,3	24,2%	759,0	24,4%	764,8	24,6%	770,5	24,8%
	+20	[%]	774,0	24,9%	780,0	25,1%	786,0	25,3%	792,0	25,5%	798,0	25,7%	804,0	25,9%
	+25	[%]	806,3	26,0%	812,5	26,2%	818,8	26,4%	825,0	26,6%	831,3	26,8%	837,5	27,0%
	+30	[%]	838,5	27,0%	845,0	27,2%	851,5	27,4%	858,0	27,6%	864,5	27,8%	871,0	28,0%

(4) Bifaciality Factor > 70% - Back-side power gain depends upon the specific project albedo - Efficiency is according to the surface of the module

## Mechanical Data

Dimensions	2384mm x 1303mm x 35mm
Weight	38,5 Kg
Cell Type	PERC Mono - 210 x 35 mm - 414 pcs - G12
Front Glass	2.0mm Tempered and low iron glass + ARC
Rear Side	2.0mm Tempered and low iron glass
Frame	Anodized Aluminium Alloy
Junction Box	IP68 - 3 bypass diodes
Connector	MC4 compatible
Cable	4mm <sup>2</sup> , +500mm/-1000mm (V), +220/-180mm (H) or customized

## Dimensions

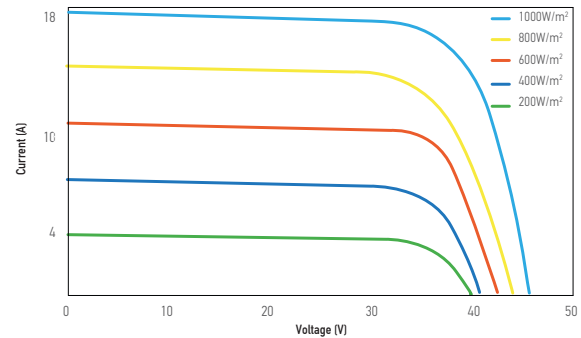


RECOM assumes no liability or responsibility for any typographical error, layout error, misinformation, any other error, omission, contained herein.

[www.recom-tech.com](http://www.recom-tech.com)

## I-V Curve

The module relative power loss at low light irradiance of 200W/m<sup>2</sup> is less than 3%.



## Temperature Characteristics

P <sub>max</sub> Temperature Coefficient	-0.34% / °C
V <sub>oc</sub> Temperature Coefficient	-0.27% / °C
I <sub>sc</sub> Temperature Coefficient	+0.04% / °C
Operating Temperature	-40~+85 °C
(NMOT) Nominal Module Operating Temperature	42.3 ± 2 °C

## Packing Configuration

Container	40'HC
Pieces per Pallet	31
Pallets per Container	18
Pieces per Container	558

The specification and key features described in this datasheet may deviate slightly and are not guaranteed. Due to on-going innovation, research and product enhancement, RECOM Technologies reserves the right to make any adjustment to the information described herein at any time without notice. Please always obtain the most recent version of the datasheet which shall be duly incorporated into the binding contract made by the parties governing all transactions related to the purchase and sale of the products described herein. Please read the safety and installation instructions before using the modules.