



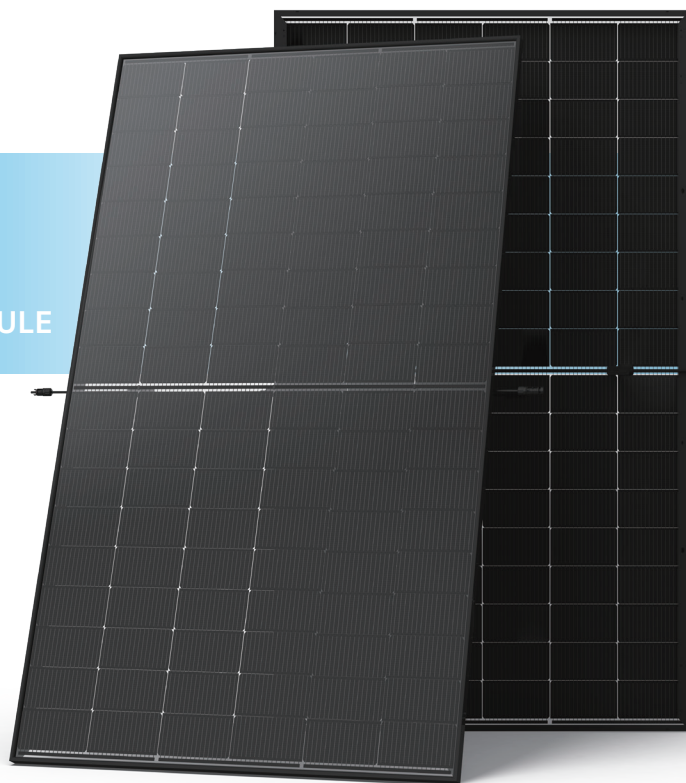
N-type i-TOPCon

BIFACIAL DUAL GLASS MONOCRYSTALLINE MODULE

TSM-XXXNEG18RC.27 490-515W

515_W / MAXIMUM
POWER OUTPUT

23.2% / MAXIMUM
EFFICIENCY



High customer value

- Lower LCOE (levelized cost of energy), reduced BOS (balance of system) cost, shorter payback time
- Designed for compatibility with existing mainstream system components
- High module power, high string power and low voltage design
- Easy to handle and install on roofs with excellent size and light weight



High power up to 515W

- Up to 23.2% module efficiency, on 210 innovation platform
- Patented i-TOPCon technology with continuous efficiency improvement, including contact resistance reduction, rear reflection enhancement and edge quality repairment



Dual-glass design, high reliability

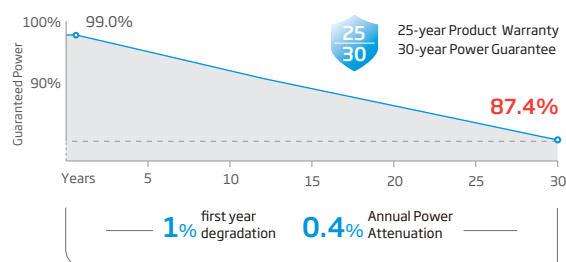
- Less prone to micro-cracks and scratches on the back during installation
- Fire Class rating C, Safety Class II
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load



High energy yield

- Excellent low irradiation performance, validated by 3rd party
- Lower temperature coefficient (-0.29%/°C) and operating temperature

Performance Warranty



(*Please refer to Limited Warranty Supplement that applies to the TSM-***NEG18RC.27. Products installed within Australia and New Zealand market. Power degradation values above apply to frontside, refer to product warranty for power degradation for backside and other details)

Comprehensive Products and System Certificates

IEC61215/IEC61730

ISO 9001: Quality Management System

ISO 14001: Environmental Management System

ISO14064: Greenhouse Gases Emissions Verification

ISO45001: Occupational Health and Safety Management System



ELECTRICAL DATA (STC & NOCT & BNPI) TSM-XXXNEG18RC.27 (XXX = 490-515)

Testing Condition	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI	STC	NOCT	BNPI
Peak Power Watts- $P_{MAX}(W_p)^*$	490	375	542	495	378	548	500	382	554	505	386	559	510	390	565	515	394	570
Power Selection (W)	0 ~ +5																	
Maximum Power Voltage- V_{MPP} (V)	32.9	31.0	32.9	33.1	31.3	33.1	33.3	31.5	33.3	33.5	31.8	33.5	33.7	31.9	33.7	33.9	32.2	33.9
Maximum Power Current- I_{MPP} (A)	14.91	12.06	16.47	14.97	12.08	16.55	15.03	12.11	16.63	15.09	12.15	16.68	15.14	12.21	16.78	15.2	12.23	16.83
Open Circuit Voltage- V_{oc} (V)	39.6	37.6	39.6	39.8	37.7	39.8	40.1	38.0	40.1	40.3	38.3	40.3	40.6	38.5	40.6	40.9	38.8	40.9
Short Circuit Current- I_{sc} (A)	15.80	12.74	17.51	15.83	12.76	17.57	15.86	12.78	17.61	15.89	12.81	17.65	15.93	12.84	17.65	15.96	12.86	17.68
Module Efficiency η_m (%)	22.0			22.3			22.5			22.7			22.9			23.2		

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass AM1.5. NOCT: Irradiance at 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s. BNPI: Irradiance: front 1000W/m², rear 135W/m², Temperature 25°C, Air Mass AM1.5
 *Measuring tolerance: $P_{max} \pm 3\%$, $V_{oc} \pm 3\%$ and $I_{sc} \pm 5\%$

Electrical characteristics with different power bin (reference to 5% & 10% backside power gain)

Backside Power Gain	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%
Peak Power Watts- $P_{MAX}(W_p)$	515	539	520	545	525	550	530	556	536	561	541	567
Maximum Power Voltage- V_{MPP} (V)	32.9	32.9	33.1	33.1	33.3	33.3	33.5	33.5	33.7	33.7	33.9	33.9
Maximum Power Current- I_{MPP} (A)	15.66	16.40	15.72	16.47	15.78	16.53	15.84	16.60	15.90	16.65	15.96	16.72
Open Circuit Voltage- V_{oc} (V)	39.6	39.6	39.8	39.8	40.1	40.1	40.3	40.3	40.6	40.6	40.9	40.9
Short Circuit Current- I_{sc} (A)	16.59	17.38	16.62	17.41	16.65	17.45	16.68	17.48	16.73	17.52	16.76	17.56

ϕP_{max} : 80% $\pm$ 5%; ϕV_{oc} : 100% $\pm$ 3%; ϕI_{sc} : 80% $\pm$ 5%

TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature) 43°C ($\pm 2^\circ\text{C}$)

Temperature Coefficient of P_{MAX} - 0.29% / $^\circ\text{C}$

Temperature Coefficient of V_{oc} - 0.24% / $^\circ\text{C}$

Temperature Coefficient of I_{sc} 0.04% / $^\circ\text{C}$

Due to different testing methods, the actual performances might differ from the declared specifications.

MAXIMUM RATINGS

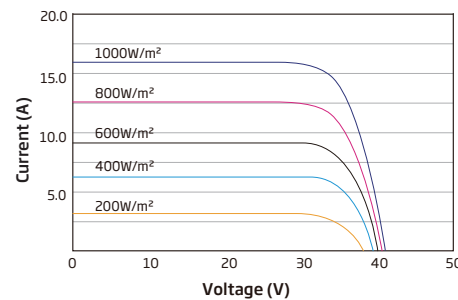
Operational Temperature -40~+70°C

Maximum System Voltage 1500V DC (IEC)

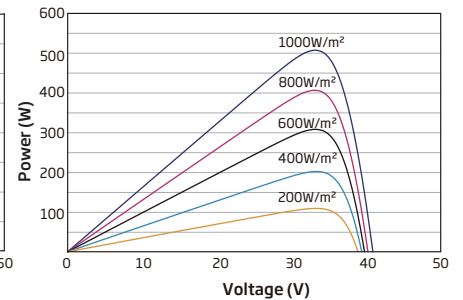
Max Series Fuse Rating 30A

CURVES OF PV MODULE (Cell Temperature (25 $\pm$ 2) $^\circ\text{C}$)

I-V CURVES OF PV MODULE (505W)

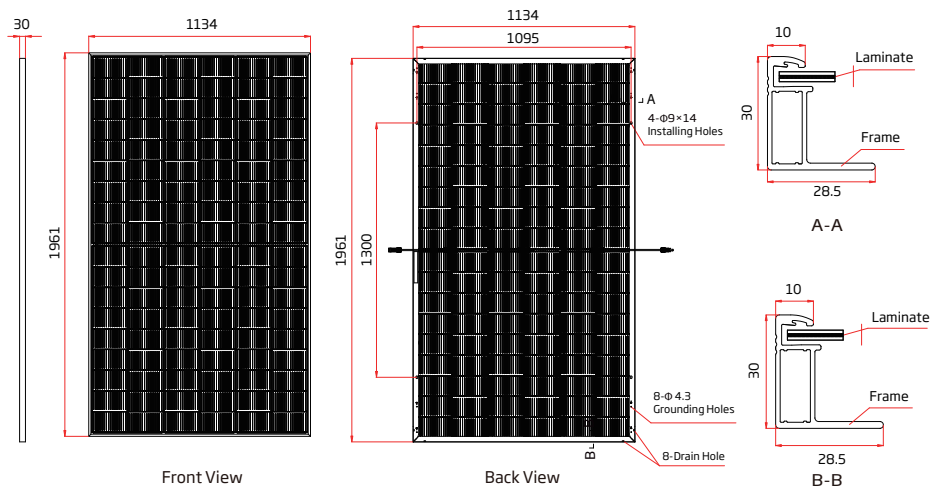


P-V CURVES OF PV MODULE (505W)



MECHANICAL DATA

Solar Cells	N-type i-TOPCon Monocrystalline
No. of cells	108 cells
Module Dimensions	1961 $\times$ 1134 $\times$ 30 mm (77.20 $\times$ 44.65 $\times$ 1.18 inches)
Weight	23.5 kg (51.8 lb)
Front Glass	1.6mm (0.06inches), AR Coating Heat Strengthened Glass
Back Glass	1.6mm (0.06inches), Heat Strengthened Glass
Frame	30mm (1.18inches) Anodized Aluminium Alloy, Black
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm ² (0.006 inches ²) Length: 1300/1300 mm (51.1/51.1 inches)
Connector	Stäubli Electrical Connectors AG PV-KST4-EV02/xy_UR; PV-KBT4-EV02/xy_UR PV-KST4-EV02A/xy; PV-KBT4-EV02A/xy
Packaging	Modules per box: 36 pieces Modules per 40' container: 864 pieces



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CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.
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