

## N-type i-TOPCon Ultra

BACKSHEET MONOCRYSTALLINE MODULE

TSM-NE19R 615-650W

**650W** / MAXIMUM POWER OUTPUT

**24.1%** / MAXIMUM EFFICIENCY



### High customer value

- Standardized module size with flagship module power, 30W higher compared with conventional technology
- Low Voltage design with higher string power, effectively reducing BOS (Balance of System) and LCOE (Levelized Cost of Energy) by 1%~5%
- Suitable for all scenario, especially C&I, residential, and ground applications
- Higher container space utilization effectively reduces the freight cost
- Excellent compatibility with existing mainstream system components



### High power up to 650W

- Up to 24.1% 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



### High reliability

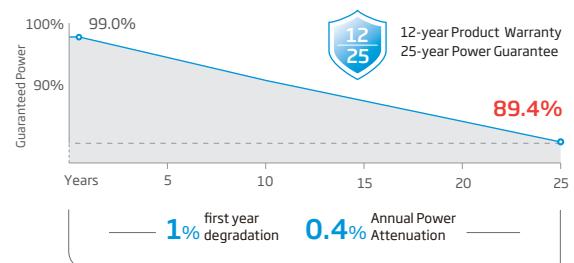
- Minimized micro-cracks with innovative non-destructive cutting technology and high-density packaging
- Reduced risks of hot-spot with half-cut technology
- Certified high resistance against salt, ammonia, sand, PID, LID, LeTID
- Sustainable in harsh environments and extreme weather conditions



### High energy yield

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

### Performance Warranty



\* Please refer to product warranty for details

### Comprehensive Products and System Certificates

IEC61215/IEC61730/IEC61701/IEC62716/UL61730

ISO 9001: Quality Management System

ISO 14001: Environmental Management System

ISO14064: Greenhouse Gases Emissions Verification

ISO45001: Occupational Health and Safety Management System



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

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### ELECTRICAL DATA (STC)

Peak Power Watts-PMAX(Wp)*	615	620	625	630	635	640	645	650
Power Selection (W)**	0 ~ +5							
Maximum Power Voltage-VMPP (V)	41.10	41.40	41.60	42.00	42.30	42.60	42.90	43.20
Maximum Power Current-IMPP (A)	14.98	14.99	15.00	15.01	15.02	15.03	15.04	15.05
Open Circuit Voltage-Voc (V)	49.30	49.60	49.80	50.30	50.50	50.90	51.20	51.50
Short Circuit Current-Isc (A)	15.89	15.91	15.93	15.94	15.95	15.97	15.99	16.01
Module Efficiency $\eta$ m (%)	22.8	23.0	23.1	23.3	23.5	23.7	23.8	24.1

STC: Irradiance 1000W/m<sup>2</sup>, Cell Temperature 25°C, Air Mass AM1.5. \*Measuring tolerance: ±3%. \*\*Power selection up to: ±3%.

### ELECTRICAL DATA (NOCT)

Peak Power Watts-PMAX(Wp)	470	474	477	482	487	490	494	498
Maximum Power Voltage-VMPP (V)	38.60	38.80	39.00	39.40	39.80	40.00	40.30	40.60
Maximum Power Current-IMPP (A)	12.19	12.20	12.21	12.23	12.24	12.25	12.26	12.27
Open Circuit Voltage-Voc (V)	46.80	47.10	47.30	47.60	47.90	48.30	48.60	48.80
Short Circuit Current-Isc (A)	12.80	12.82	12.84	12.85	12.86	12.87	12.89	12.91

NOCT: Irradiance at 800W/m<sup>2</sup>, Ambient Temperature 20°C, Wind Speed 1m/s.

### TEMPERATURE RATINGS

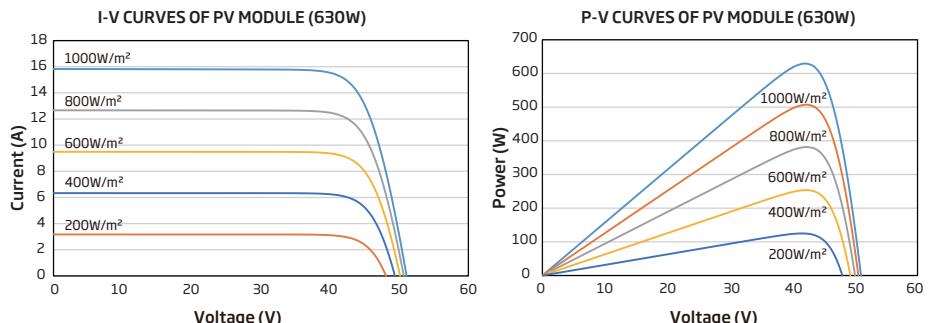
NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of Pmax	-0.29% /°C
Temperature Coefficient of Voc	-0.24% /°C
Temperature Coefficient of Isc	0.04% /°C

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

### APPLICATION CONDITIONS

Operating Temperature	-40~+70°C
Maximum System Voltage	1500V DC (IEC)
Max Series Fuse Rating	30A

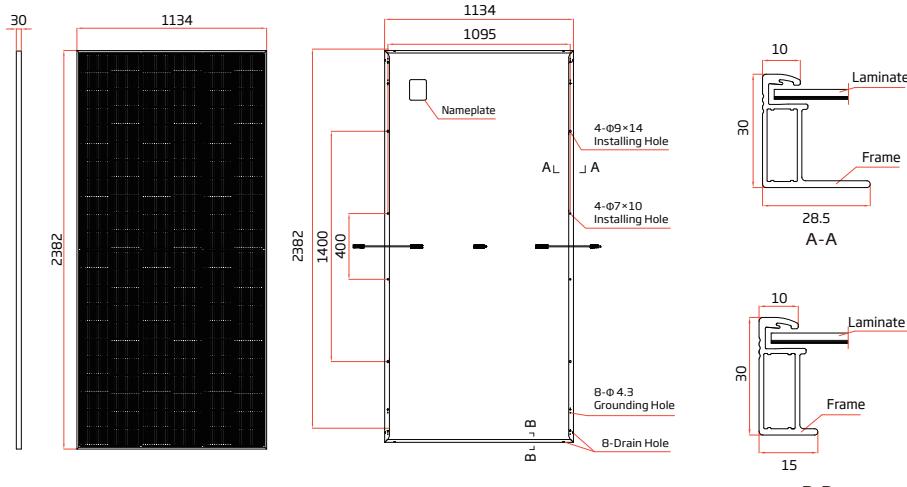
### CURVES OF PV MODULE



### MECHANICAL DATA

Solar Cells	N-type i-TOPCon Monocrystalline
No. of cells	132 cells
Module Dimensions	2382×1134×30 mm (93.78×44.65×1.18 inches)
Weight	27.9 kg (61.51 lb)
Front Glass	3.2mm (0.12 inches), AR Coating Tempered Glass
Backsheet	White
Frame	30mm (1.18 inches) Anodized Aluminum Alloy
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm <sup>2</sup> (0.06 inches <sup>2</sup> ) Portrait:200/320 mm(7.87/12.60 inches) Length can be customized
Connector	TS4 / TS4 Plus / MC4 EVO2*
Packaging	Modules per box: 36 pieces Modules per 40' container: 720 pieces

\*The connector names listed are general names; specific types are subject to the certification documents.



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