



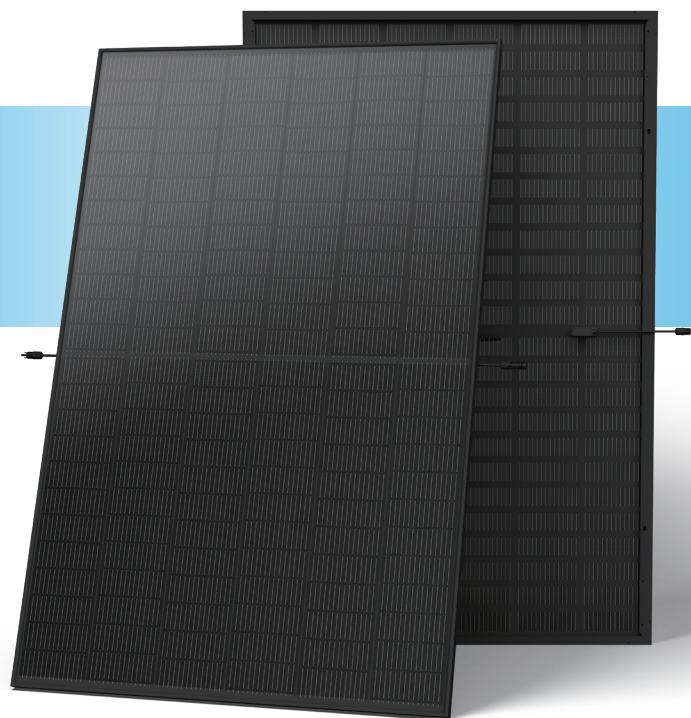
N-type TOPCon

BACKSHEET MONOCRYSTALLINE MODULE

TSM-NE09RC.05 400-430W

430_W / MAXIMUM
POWER OUTPUT

21.5% / MAXIMUM
EFFICIENCY



High Customer Value

- Full black design, suitable for residential and C&I rooftop
- Easy for integration, designed for compatibility with existing mainstream inverters and diverse mounting systems
- Perfect size and low weight for handling and installation
- Mechanical performance up to 6000 Pa positive load and 4000 Pa negative load



High Performance

- Up to 21.5% module efficiency with high density interconnect technology
- Reduce installation cost with higher power bin and efficiency
- Boost performance in warm weather with low temperature coefficient and operating temperature



High Reliability

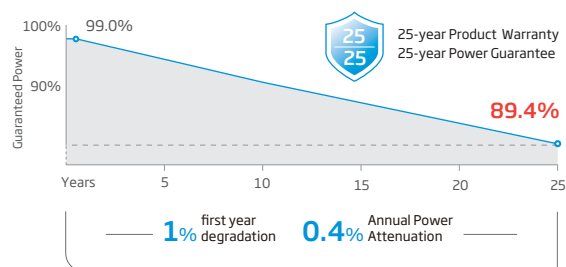
- Innovative non-destructive cutting for improved mechanical resistance and strength
- Excellent fire rating, weather resistance, salt spray, sand dust, ammonia performance which is fully applicable in coastal, high temperature, humidity area and harsh environment



High energy yield

- First-year degradation 1% and annual degradation at 0.4%
- Up to 25 years product warranty and 25 years power warranty

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



ELECTRICAL DATA (STC & NOCT)

Testing Condition	STC		NOCT		STC		NOCT		STC		NOCT		STC		NOCT		STC		NOCT	
Peak Power Watts- $P_{MAX}(W_p)^*$	400	305	405	309	410	312	415	317	420	320	425	324	430	328	435	332	440	336	445	336
Power Selection (W)**	0 ~ +5																			
Maximum Power Voltage- V_{MPP} (V)	41.3	38.6	41.7	39.0	42.1	39.4	42.5	39.8	42.8	40.1	43.2	40.5	43.6	40.8	44.0	41.1	44.4	41.5	41.8	
Maximum Power Current- I_{MPP} (A)	9.68	7.88	9.71	7.91	9.73	7.93	9.77	7.96	9.80	7.98	9.84	8.01	9.87	8.04	9.90	8.07	9.93	8.10	8.13	
Open Circuit Voltage- V_{oc} (V)	49.2	46.7	49.6	47.1	50.1	47.6	50.5	47.9	50.9	48.3	51.4	48.8	51.8	49.1	52.3	49.3	52.7	49.5	49.8	
Short Circuit Current- I_{sc} (A)	10.30	8.30	10.33	8.32	10.37	8.36	10.40	8.38	10.43	8.41	10.47	8.44	10.50	8.46	10.53	8.49	10.56	8.52	8.54	
Module Efficiency η_m (%)	20.0		20.3		20.5		20.8		21.0		21.3		21.5		21.8		22.0		22.2	

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. *Measuring tolerance: $\pm 3\%$. **Power selection up to: +3%.

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%	
Peak Power Watts- $P_{MAX}(W_p)$	420	440	425	446	431	451	436	457	441	462	446	468	452	473	457	479	463	484	468	493
Maximum Power Voltage- V_{MPP} (V)	41.3	41.3	41.7	41.7	42.1	42.1	42.5	42.5	42.8	42.8	43.2	43.2	43.6	43.6	44.0	44.0	44.4	44.4	44.8	44.8
Maximum Power Current- I_{MPP} (A)	10.16	10.65	10.20	10.68	10.22	10.70	10.26	10.75	10.29	10.78	10.33	10.82	10.36	10.86	10.39	10.90	10.43	10.94	10.47	10.97
Open Circuit Voltage- V_{oc} (V)	49.2	49.2	49.6	49.6	50.1	50.1	50.5	50.5	50.9	50.9	51.4	51.4	51.8	51.8	52.3	52.3	52.7	52.7	53.1	53.1
Short Circuit Current- I_{sc} (A)	10.82	11.33	10.85	11.36	10.89	11.41	10.92	11.44	10.95	11.47	10.99	11.52	11.03	11.55	11.06	11.58	11.10	11.61	11.14	11.64

Power Bifaciality: $65 \pm 10\%$.

TEMPERATURE RATINGS

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

Temperature Coefficient of P_{MAX} -0.29% /°C

Temperature Coefficient of V_{oc} -0.24% /°C

Temperature Coefficient of I_{sc} 0.04% /°C

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

MAXIMUM RATINGS

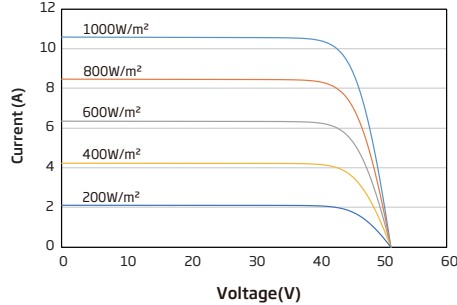
Operational Temperature -40~+85°C

Maximum System Voltage 1500V DC (IEC)
1500V DC (UL)

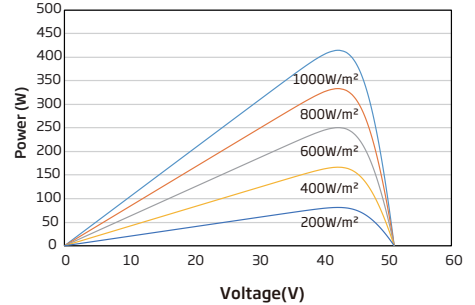
Max Series Fuse Rating 25A

CURVES OF PV MODULE

I-V CURVES OF PV MODULE(415W)



P-V CURVES OF PV MODULE(415W)



MECHANICAL DATA

Solar Cells	N-type TOPCon Monocrystalline
No. of cells	144 cells
Module Dimensions	1762×1134×30 mm (69.37×44.65×1.18 inches)
Weight	21.3 kg (47.0 lb)
Front Glass	3.2mm (0.13inches), AR Coating Tempered Glass
Backsheet	Transparent Backsheet Black Grid
Frame	30mm(1.18inches) Anodized Aluminium Alloy, Black
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm ² (0.006 inches ²) Landscape: 1100 mm/1100 mm (43.31/43.31 inches)
Connector	MC4 EV02
Fire Type	Type 1 or Type2
Packaging	Modules per box: 36 pieces Modules per 40' container: 792 pieces

