

## **DUAL GLASS N type i-TOPCon MODULE**

PRODUCT: TSM-NEG9R.28

POWER RANGE: 425-450 W

450 W

MAXIMUM POWER OUTPUT

0/+5W

POSITIVE POWER TOLERANCE

22.5%

**MAXIMUM EFFICIENCY** 



## Small in size, bigger on power

- Generates up to 450 W, 22.5 % module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping, lower series resistance, improved current collection and enhanced reliability
- Reduces installation cost with higher power bin and efficiency



## Dual-glass Design, High Reliability

- Excellent fire rating and resistance to harsh environmental conditions
- 5,400 Pa snow load and 4,000 Pa wind load (test loads)

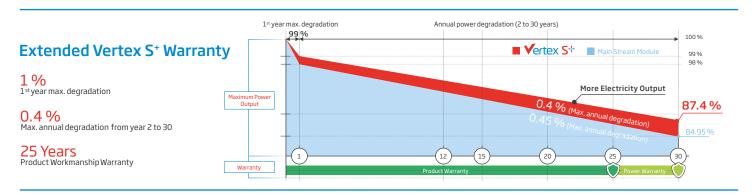


### **Maximize Energy Harvest**

- Up to 25 years product warranty and 30 years power warranty
- 1 % first-year degradation and 0.4 % annual degradation enabled by N-type technology

# Universal solution for residential and C&I rooftops

- Designed for compatibility with existing mainstream inverters, optimizers and mounting systems
- Perfect size and low weight for easy handling. Optimized transportation cost
- Flexible installation solutions for system deployment



## Comprehensive Products and System Certificates











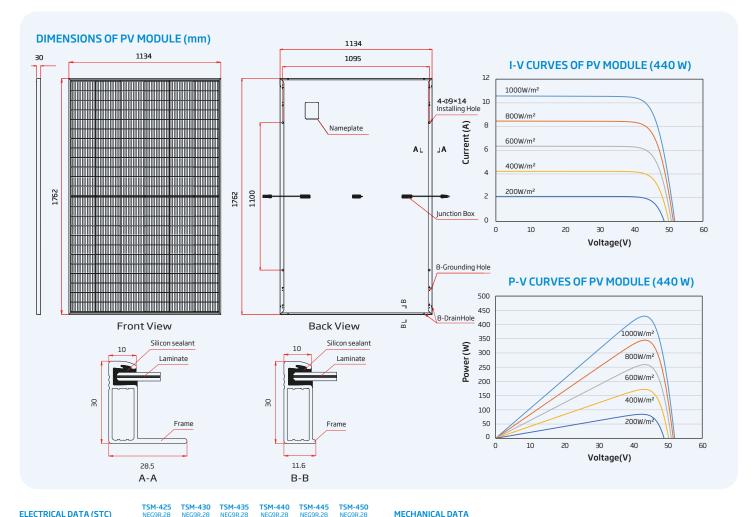


IEC61215/IEC61730/IEC61701/IEC62716

ISO14064: Greenhouse Gases Emissions Verification
ISO45001: Occupational Health and Safety Management System







ELECTRICAL DATA (STC)	TSM-425 NEG9R.28	<b>TSM-430</b> NEG9R.28	<b>TSM-435</b> NEG9R.28	<b>TSM-440</b> NEG9R.28	<b>TSM-445</b> NEG9R.28	<b>TSM-450</b> NEG9R.28
Peak Power Watts-PMAX (Wp)*	425	430	435	440	445	450
Power Tolerance-PMAX (W)			0/	+5		
Maximum Power Voltage-VMPP (V)	42.9	43.2	43.6	44.0	44.3	44.6
Maximum Power Current-Impp (A)	9.92	9.96	9.99	10.01	10.05	10.09
Open Circuit Voltage-Voc (V)	50.9	51.4	51.8	52.2	52.6	52.9
Short Circuit Current-Isc(A)	10.56	10.59	10.64	10.67	10.71	10.74
Module Efficiency ₁ m (%)	21.3	21.5	21.8	22.0	22.3	22.5
STC: Irrdiance 1000 W/m², Cell Temperature 25 °C, Air Mass AM 1.5. *Measuring tolerance: ±3 %.						
ELECTRICAL DATA (NOCT)	<b>TSM-425</b> NEG9R.28	<b>TSM-430</b> NEG9R.28	TSM-435 NEG9R.28	<b>TSM-440</b> NEG9R.28	TSM-445 NEG9R.28	<b>TSM-450</b> NEG9R.28
Maximum Power-PMAX (Wp)	324	328	332	335	339	343
Maximum Power Voltage-VMPP (V)	40.0	40.4	40.7	41.0	41.3	41.6
Maximum Power Current-Impp (A)	8.09	8.11	8.15	8.17	8.20	8.24
Open Circuit Voltage-Voc (V)	48.2	48.7	49.1	49.4	49.8	50.1
Short Circuit Current-Isc (A)	8.51	8.53	8.57	8.60	8.63	8.65

#### NOCT: Irradiance at 800 W/m2, Ambient Temperature 20 °C, Wind Speed 1 m/s.

#### MECHANICAL DATA

Solar Cells	Monocrystalline	
No. of cells	144 cells	
Module Dimensions	1762×1134×30 mm	
Weight	21.0 kg	
Front Glass	1.6 mm, High Transmission, AR Coated Heat Strengthened Glass	
Encapsulant material	POE/EVA	
Back Glass	1.6 mm, Heat Strengthened Glass	
Frame	30 mm Anodized Aluminium Alloy, Black	
J-Box	IP 68 rated	
Cables	Photovoltaic Technology Cable 4.0 mm² Landscape: 1100/1100 mm Portrait: 280/350 mm*	
Connector	TS4 / MC4 EVO2*	
*Special order only		

#### **TEMPERATURE RATINGS**

NOCT (Nominal Operating Cell Temperature)	43 °C (±2 K)
Temperature Coefficient of PMAX	-0.30 %/ K
Temperature Coefficient of Voc	-0.24 %/ K
Temperature Coefficient of Isc	0.04 %/K

## WARRANTY

25 year Product Workmanship Warranty	
30 year Power Warranty	
1 % first year degradation	
0.4 % Annual Power Attenuation	

(Please refer to product warranty for details)

#### MAXIMUM RATINGS

Operational Temperature	-40 to +85 °C	
Maximum System Voltage	1500 V DC (IEC)	
Max Series Fuse Rating	20 A	

#### PACKAGING CONFIGURATION

Modules per box:	36 pieces
Modules per 40' container:	936 pieces



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