

## **DUAL GLASS** MONOCRYSTALLINE MODULE

PRODUCT: TSM-NEG9R.28

PRODUCT RANGE: 425-450W

450W

MAXIMUM POWER OUTPUT

0~+5W

POSITIVE POWER TOLERANCE

22.5%

**MAXIMUM EFFICIENCY** 



## Small in size, bigger on power

- Up to 450W, 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
- Reduce installation cost with higher power bin and efficiency
- Boost performance in warm weather with low temperature coefficient and operating temperature



## Dual-glass Design, more secure and sustainable

- Upgraded dual glass of Vertex S, less prone to micro-cracks and scratches on the back during installation
- Excellent fire rating, weather resistance, salt spray, sand dust, ammonia performance which is fully applicable in coastal, high temperature, humidity area and harsh environment



## Ultra-low Degradation, longer warranty, higher output

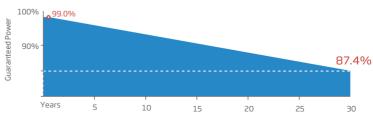
- First-year degradation 1% and annual degradation at 0.4%
- Up to 15 years product warranty and 30 years power warranty



## Universal solution for residential and C&I rooftops

- Easy for integration, designed for compatibility with existing mainstream inverters and diverse mounting systems
- Perfect size and low weight for handling and installation
- Most valuable solution on low load capacity rooftops (weight similar to backsheet version)
- Mechanical performance up to 5400 Pa positive load and 4000 Pa negative load

## Trina Solar's Dual Glass Performance Warranty



# Comprehensive Products and System Certificates

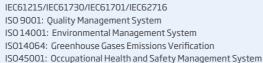




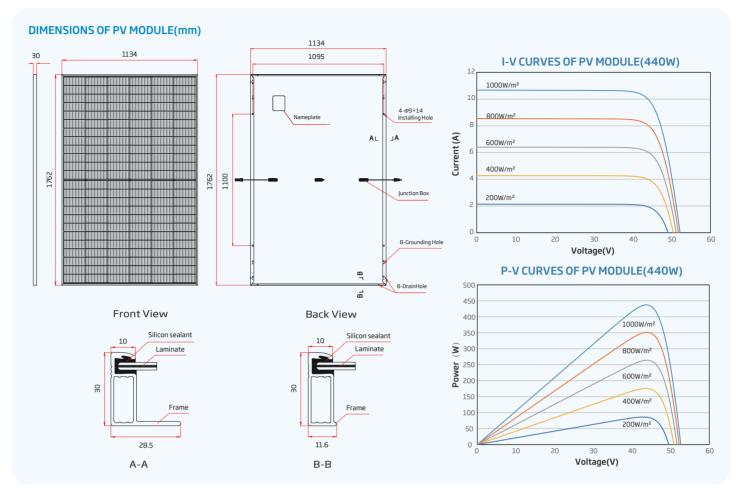












#### ELECTRICAL DATA (STC)

Peak Power Watts-PMAX (Wp)*	425	430	435	440	445	450
Power Tolerance-PMAX (W)			(	0 ~ +5		
Maximum Power Voltage-V <sub>MPP</sub> (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 $_{\eta}$ m (%)	21.3	21.5	21.8	22.0	22.3	22.5

### **ELECTRICAL DATA (NOCT)**

324	328	332	335	339	343
40.0	40.4	40.7	41.0	41.3	41.6
8.09	8.11	8.15	8.17	8.20	8.24
48.2	48.7	49.1	49.4	49.8	50.1
8.51	8.53	8.57	8.60	8.63	8.65
	40.0 8.09 48.2	40.0 40.4 8.09 8.11 48.2 48.7	40.0 40.4 40.7   8.09 8.11 8.15   48.2 48.7 49.1	40.0 40.4 40.7 41.0   8.09 8.11 8.15 8.17   48.2 48.7 49.1 49.4	40.0   40.4   40.7   41.0   41.3     8.09   8.11   8.15   8.17   8.20     48.2   48.7   49.1   49.4   49.8

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

STC: Irrdiance 1000W/m2, Cell Temperature 25°C, Air Mass AM1.5. \*Measuring tolerance: ±3%

#### MECHANICAL DATA

Solar Cells	Monocrystalline
No. of cells	144 cells
Module Dimensions	1762×1134×30 mm (69.06×43.15×1.18 inches)
Weight	21.0kg (46.30 lb)
Front Glass	$1.6mm(0.06inches), {\it High Transmission}, {\it AR Coated Heat Strengthened Glass}$
Encapsulant material	POE/EVA
Back Glass	1.6mm(0.06 inches), Heat Strengthened Glass
Frame	30mm (0.06 inches) Anodized Aluminium Alloy, Black
J-Box	IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm² (0.006 inches²), Portrait: 350/280 mm(13.78/11.02 inches) Length can be customized
Connector	MC4 EVO2 / TS4 Plus / TS4*

<sup>\*</sup>Please refer to regional datasheet for specified connecto

### TEMPERATURE RATINGS

NOCT (Nominal Operating Cell Temperature)	43°C (±2°C)
Temperature Coefficient of PMAX	- 0.30%/°C
Temperature Coefficient of Voc	- 0.24%/°C
Temperature Coefficient of Isc	U U40%/0C

-40~+85°C		
1500V DC (IEC)		
20A		

#### WARRANTY

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

se refer to product warranty for details)

#### PACKAGING CONFIGURATION

**MAXIMUM RATINGS** 

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

