



PRODUCT: TSM-NEG9RC.27

BIFACIALES DOPPELGLAS N-Type i-TOPCon MODULE

POWER RANGE: 410-440W

440W

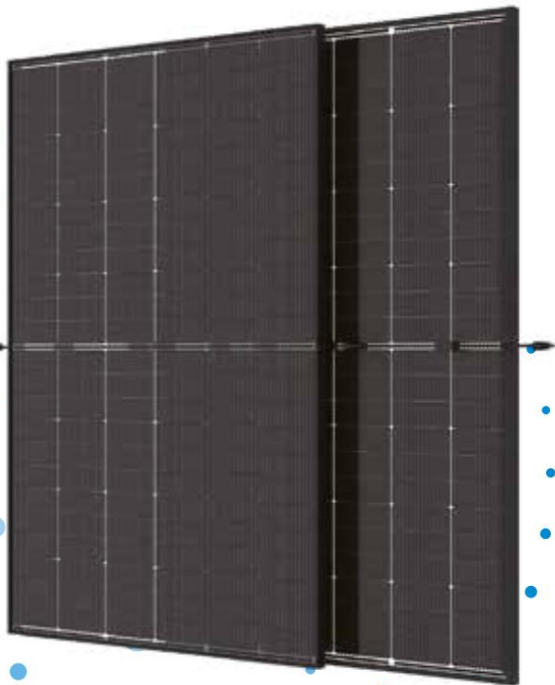
MAXIMUM RATED POWER

0/+5W

POSITIVE PERFORMANCE TOLERANCE

22,0%

MAXIMUM EFFICIENCY



Small dimensions, big performance

- Up to 440 W peak power, 22.0% module efficiency with high-density cell connection technology
- Better temperature behavior at high ambient temperatures for more performance



Transparent double glass concept

- Developed with a focus on aesthetics
- Excellent resistance to fire and at difficult environmental conditions
- 5,400 Pa snow load and 4,000 Pa wind load (test loads)



Maximum yield

- Bifaciality factor up to 85%
- 25 year product guarantee on processing and 30 year performance guarantee
- N-type technology with 1% degradation in the first year and 0.4% in years 2-30



Universal solution for residential and commercial roofs

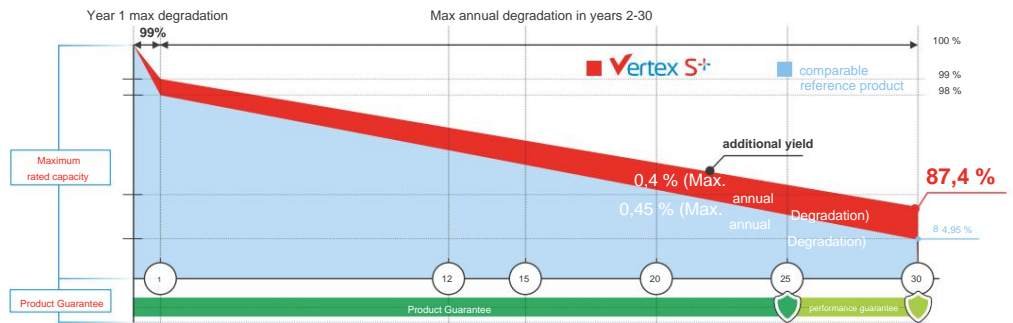
- High compatibility with available inverters, optimizers and assembly systems
- Easy handling due to perfect size and low weight

Extended Warranty for Vertex S+

1 %
Max degradation in year 1

0,4 %
Max annual degradation in years 2-30

25 years
Product Guarantee



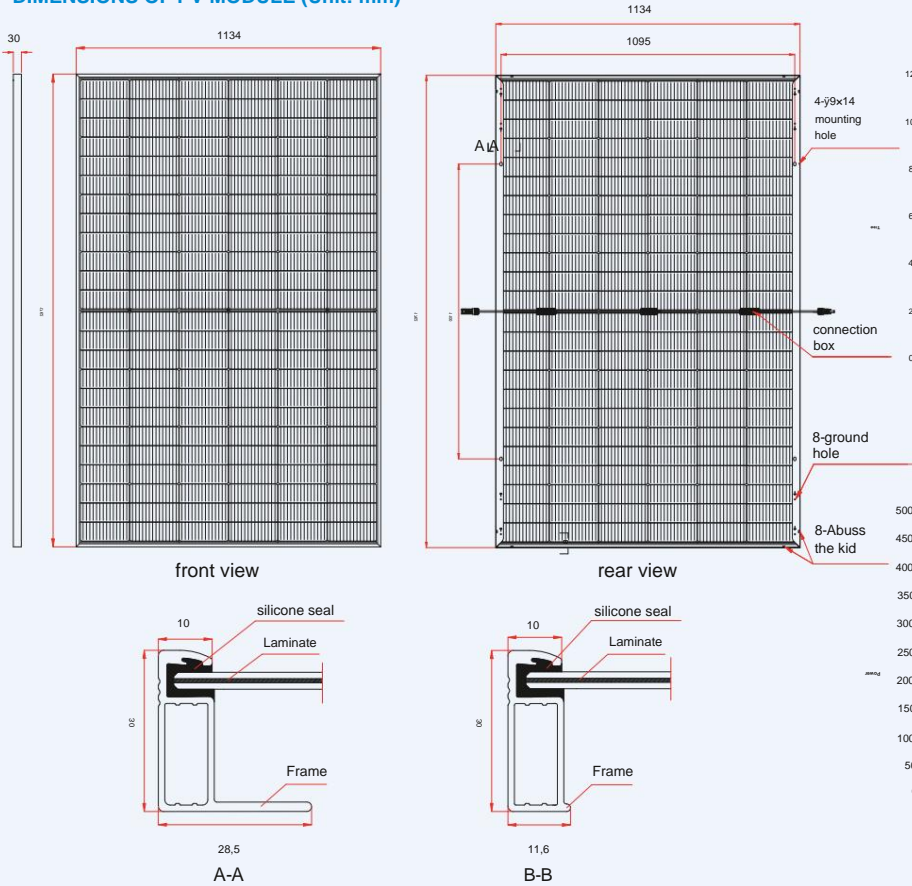
Comprehensive product and system certificates



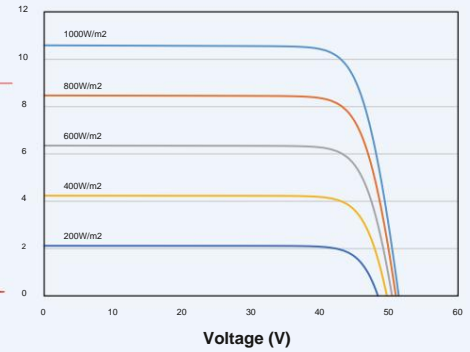
IEC61215/IEC61730/IEC61701/IEC62716/UL61730
 ISO 9001: Quality Management System
 ISO 14001: Environmental Management System
 ISO14064: Verification of the carbon footprint
 ISO45001: Occupational Health and Safety Management System



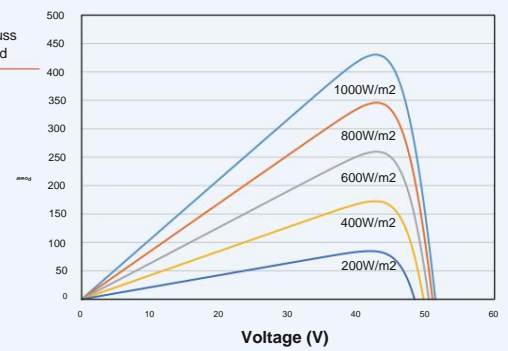
DIMENSIONS OF PV MODULE (Unit: mm)



IV CURVES OF THE PV MODULE (430 W)



PV CURVES OF THE PV MODULE (430 W)



ELECTRICAL DATA (STC)

	TSM-415 NEG9RC.27	TSM-420 NEG9RC.27	TSM-425 NEG9RC.27	TSM-430 NEG9RC.27	TSM-435 NEG9RC.27	TSM-440 NEG9RC.27
Nominaleistung-PMAX (Wp)*	415	420	425	430	435	440
Power Tolerance-PMAX (W)	0/+5	0/+5	0/+5	0/+5	0/+5	
Voltage in MPP-UMPP (V)	42,1	42,5	42,9	43,2	43,6	44,0
Strom im MPP-IMPP (A)	9,86	9,89	9,92	9,96	9,99	10,01
No-load voltage-UOC (V)	50,1	50,5	50,9	51,4	51,8	52,2
Short circuit current ISC (A)	10,50	10,53	10,56	10,59	10,64	10,67
Module efficiency η_m (%)	20,8	21,0	21,3	21,5	21,8	22,0

STC: Irradiance 1000 W/m², cell temperature 25 °C, spectral distribution of AM 1.5. *Measurement tolerance: ±3%.

Electrical properties of different power classes (reference is 10% irradiation ratio)

Resulting total power-PMAX (Wp)	448	454	459	464	470	475
Voltage in MPP-UMPP (V)	42,1	42,5	42,9	43,2	43,6	44,0
Strom im MPP-IMPP (A)	10,65	10,68	10,71	10,76	10,79	10,81
No-load voltage-UOC (V)	50,1	50,5	50,9	51,4	51,8	52,2
Short circuit current ISC (A)	11,34	11,37	11,40	11,44	11,49	11,52
Irradiance Ratio (Rear/Front)	10 %					

Bifaciality factor (performance): 80 ±5%.

ELECTRICAL DATA (NOCT)

	TSM-415 NEG9RC.27	TSM-420 NEG9RC.27	TSM-425 NEG9RC.27	TSM-430 NEG9RC.27	TSM-435 NEG9RC.27	TSM-440 NEG9RC.27
Voltage in MPP-PMAX (Wp)	316	320	324	328	332	335
Voltage in MPP-UMPP (V)	39,3	39,7	40,0	40,4	40,7	41,0
Strom im MPP-IMPP (A)	8,03	8,07	8,09	8,11	8,15	8,17
No-load voltage-UOC (V)	47,5	47,8	48,2	48,7	49,1	49,4
Short circuit current ISC (A)	8,46	8,49	8,51	8,53	8,57	8,60

NOCT: irradiance 800 W/m², ambient temperature 20°C, wind speed 1 m/s.

MECHANICAL DATA

solar cells	Monocrystalline
Zellanordnung	144 cells
Modulmaße	1762x1134x30 mm
Weight	21,0 kg
Vote	1.6mm, high clarity, anti-reex coated, heat toughened glass
encapsulation material	POE/EVA
back	1.6mm Heat Tempered Glass
Frame	30mm Anodized Aluminum Alloy, Black
junction box	IP 68
Cable	Photovoltaikkabel: 4,0 mm ² Portrait: 1100/1100mm Landscape format: 280/350 mm*
Plug	TS4 / MC4 EVO2*

*Only on order.

TEMPERATURE VALUES

NOCT(cell nominal operating temperature)	43 °C (±2 K)
Temperature coeicent of PMAX	-0,30 %/ K
Temperature coeicent of VOC	-0,24 %/ K
Temperature coeicent of ISC	0,04 %/ K

APPLICATION

operating temperatur	-40 bis +85 °C
Maximum system voltage	1500 V DC (IEC)
Maximum protection	25 A

GUARANTEE

- 25-year product guarantee on workmanship
- 30 year performance guarantee
- 1% maximum degradation in the first year
- 0.4% maximum annual degradation

(See Limited Warranty Terms for more details)

PACKING UNITS

Module pro Karton:	36 pcs.
Modules per 40ft container:	936 pcs.