

REGIONE BASILICATA



COMUNE DI TOLVE



IMPIANTO AGRO - FOTOVOLTAICO

PROGETTO REALIZZAZIONE IMPIANTO FOTOVOLTAICO E RELATIVE OPERE DI CONNESSIONE IN AGRO DI TOLVE - PZ
LOCALITÀ FONTANA VASCILEDDEI

POTENZA NOMINALE 20 MW

N° ALLEGATO A.12. b3

Schema funzionale pannelli e inverter

COMMITTENTE

MILANO ENERGY SRLS

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Il Tecnico Ing. Francesco Dinota

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Rev n°1



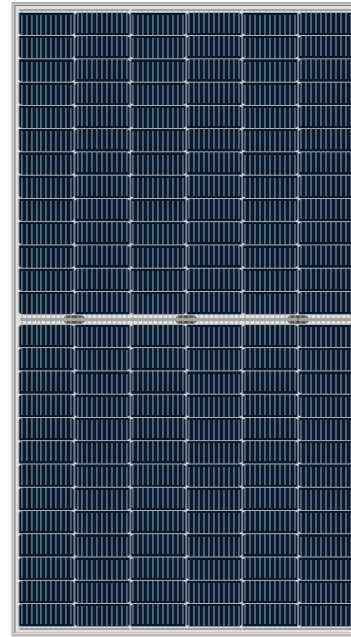
NTOPCon Cell Technology

JW-HD156N

N-type Bifacial High Efficiency Mono Silicon Half-Cell Double Glass Module

595-620W

Cell Type 11BB



620W
Maximum Power Output

22.18%
Maximum Module Efficiency

0~+5W
Power Output Guarantee

- Additional Power Generation Gain**
At least 30-year product life, more than 10%- 30% additional power gain comparing with conventional module
- ZERO LID (Light Induced Degradation)**
N-type solar cell has no LID naturally, can increase power generation
- Lower LCOE**
High power and 1500V system voltage, saving BOS cost

- Better Weak Illumination Response**
Wide spectral response, higher power output even under low-light settings like smog or cloudy days
- Better Temperature Coefficient**
Higher power generation under working conditions, thanks to passivating contact cell technology
- Wider Applicability**
BIPV, vertical installation, snowfield, high-humid area, windy and dusty area

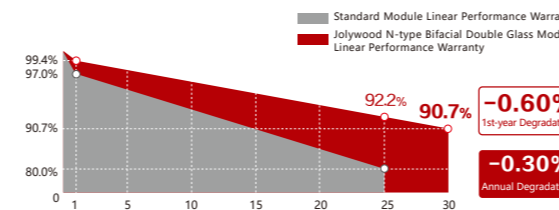
Jolywood Delivers Reliable Performance Over Time

- Leader of n-type bifacial technology
- Fully automatic facility and world-class technology
- Long term reliability tests
- 100% EL inspection ensuring defect-free modules

Additional Insurance Backed by Munich Re



Linear Performance Warranty



12 Years Product Material & Workmanship, 30 Years Linear Performance Warranty



Jolywood (Taizhou) Solar Technology Co., Ltd., a subsidiary under Jolywood Group (stock code: SZ300393), is the world leading n-type bifacial solar cells and modules manufacture. The technology of company NTOPCon, NIBC, TBC, etc, and the annual n-type bifacial production capacity reaches 2.1GW cells and 3GW modules. With vision of "Cultivator of Green Energy", Jolywood adheres to the road of advanced and high efficiency solar technology industrialization.



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Electrical Properties STC*		Front Side	Front Side	Front Side	Front Side	Front Side	Front Side
Testing Condition		595	600	605	610	615	620
Peak Power (Pmax) (W)		45.3	45.5	45.7	45.9	46.1	46.2
MPP Voltage (Vmp) (V)		13.14	13.19	13.24	13.29	13.35	13.42
MPP Current (Imp) (A)		54.3	54.5	54.7	54.9	55.1	55.2
Open Circuit Voltage (Voc) (V)		13.86	13.92	13.98	14.04	14.10	14.17
Short Circuit Current (Isc) (A)		21.29	21.46	21.64	21.82	22.00	22.18
Module Efficiency (%)							

*STC: Irradiance 1000 W/m², Cell Temperature 25°C, AM1.5
The data above is for reference only and the actual data is in accordance with the practical testing

Electrical Properties NOCT*		Front Side	Front Side	Front Side	Front Side	Front Side	Front Side
Testing Condition		450	454	458	461	465	469
Peak Power (Pmax) (W)		42.5	42.7	42.9	43.1	43.2	43.3
MPP Voltage (Vmp) (V)		10.59	10.63	10.67	10.72	10.76	10.82
MPP Current (Imp) (A)		51.9	52.1	52.3	52.5	52.7	52.8
Open Circuit Voltage (Voc) (V)		11.17	11.22	11.27	11.32	11.37	11.42
Short Circuit Current (Isc) (A)							

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

Operating Properties		
Operating Temperature (°C)		-40°C ~ +85°C
Maximum System Voltage (V)		1500V (IEC)
Maximum Series Fuse Rating(A)		25
Power Tolerance		0~+5W
Bifaciality*		80%

*Bifaciality = Pmaxrear (STC) / Pmaxfront (STC), Bifaciality tolerance: ±5%

Temperature Coefficient		
Temperature Coefficient of Pmax*		-0.320%/°C
Temperature Coefficient of Voc		-0.260%/°C
Temperature Coefficient of Isc		+0.046%/°C
Nominal Operating Cell Temperature (NOCT)		42±2°C

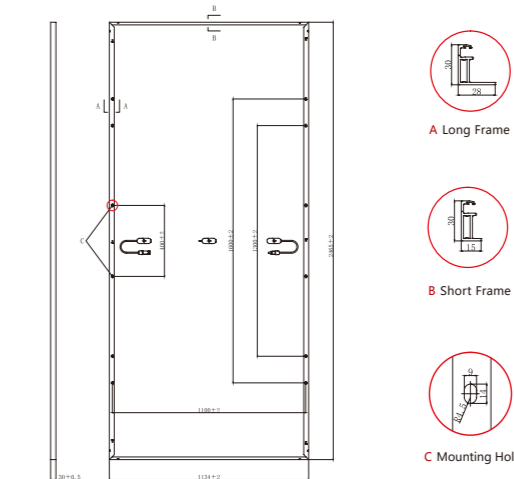
*Temperature Coefficient of Pmax: 0.03%/°C

Mechanical Properties		
Cell Type		182.00mm*91.00mm
Number of Cells		156pcs(12*13)
Dimension		2465mm*1134mm*30mm
Weight		34.5kg
Front /Rear Glass*		2.0mm/2.0mm
Frame		Anodized Aluminium
Junction Box		IP67 (3 diodes)
Length of Cable*		4.0mm², 300mm
Connector		MC4 Compatible

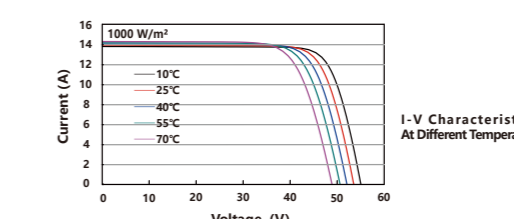
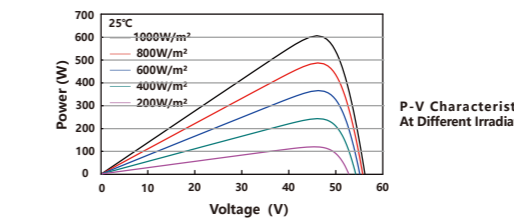
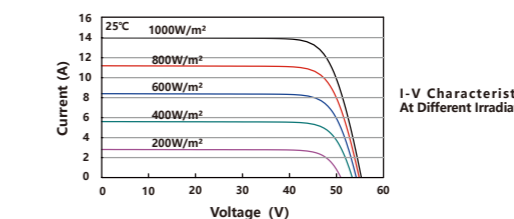
*Heat strengthened glass
*Cable length can be customized

With Different Power Generation Gain (regarding 605W as an example)						
Power Gain (%)	Peak Power (Pmax) (W)	MPP Voltage (Vmp) (V)	MPP Current (Imp) (A)	Open Circuit Voltage (Voc) (V)	Short Circuit Current (Isc) (A)	
10	653	45.7	14.29	54.7	15.08	
15	678	45.8	14.81	54.8	15.64	
20	702	45.8	15.33	54.8	16.19	
25	726	45.8	15.85	54.8	16.74	
30	750	45.8	16.38	54.8	17.29	

Engineering Drawing (unit: mm)



Characteristic Curves | HD156N-605



Packaging Configuration

Packing Type	20'GP	40'GP	40'HQ
Piece/Pallet		35	
Pallet/Container	4	9	18
Piece/Container	140	315	630

*The specification and key features described in this datasheet may deviate slightly and are not guaranteed. Due to ongoing innovation, R&D enhancement, Jolywood (Taizhou) Solar Technology Co., Ltd. reserves the right to make any adjustment to the information described herein at any time without notice. Please always obtain the most recent version of the datasheet which shall be duly incorporated into the binding contract made by the parties governing all transactions related to the purchase and sale of the products described herein.

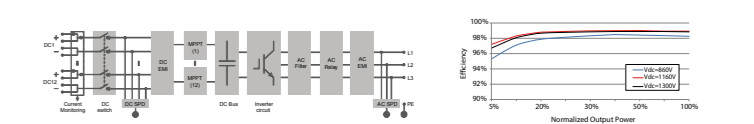
SG250HX New

Multi-MPPT String Inverter for 1500 Vdc System



- HIGH YIELD**
 - 12 MPPTs with max. efficiency 99%
 - Compatible with bifacial module
 - Built-in Anti-PID and PID recovery function
- SMART O&M**
 - Touch free commissioning and remote firmware upgrade
 - Online IV curve scan and diagnosis*
 - Fuse free design with smart string current monitoring
- LOW COST**
 - Compatible with Al and Cu AC cables
 - DC 2 in 1 connection enabled
 - Power line communication (PLC)
 - Q at night function
- PROVEN SAFETY**
 - IP66 and C5 protection
 - Type II SPD for both DC and AC
 - Compliant with global safety and grid code

CIRCUIT DIAGRAM



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Type designation	SG250HX
Input (DC)	
Max. PV input voltage	1500 V
Min. PV input voltage / Startup input voltage	600 V / 600 V
Nominal PV input voltage	1160 V
MPP voltage range	600 V - 1500 V
MPP voltage range for nominal power	860 V - 1300 V
No. of independent MPPT inputs	12
Max. number of input connectors per MPPT	2
Max. PV input current	36 A *12
Max. current for input connector	30 A
Max. DC short-circuit current	50 A *12
Output (AC)	
AC output power	250 kVA @ 50 °C / 225 kVA @40 °C / 200 kVA @ 50 °C
Max. AC output current	180.5 A
Nominal AC voltage	3 / PE, 800 V
AC voltage range	480 - 880 V
Nominal grid frequency / Grid frequency range	50 Hz / 45 - 55 Hz, 60 Hz / 55 - 65 Hz
THD	+ 3 % (at nominal power)
DC current injection	< ±0.3 %
Power factor at nominal power / Adjustable power factor	> 0.99 / 0.8 leading - 0.8 lagging
Feed-in phases / Connection phases	3 / 3
Efficiency	
Max. efficiency	99.0 %
European efficiency	98.8 %
Protection	
DC reverse connection protection	Yes
AC short circuit protection	Yes
Leakage current protection	Yes
Grid monitoring	Yes
Ground fault monitoring	Yes
DC switch	Yes
AC switch	No
PV string current monitoring	Yes
Q at night function	Yes
PID protection	Anti-PID or PID recovery
Overvoltage protection	DC Type II / AC Type II
General Data	
Dimensions (W*H*D)	1051 * 640 * 183 mm
Weight	59kg
Isolation method	Transformerless
Ingress protection rating	IP66
Night power consumption	< 2 W
Operating ambient temperature range	-30 to 60 °C
Allowable relative humidity range (non-condensing)	0 - 100 %
Cooling method	Smart forced air cooling
Max. operating altitude	4000 m (P: 3000 m derating)
Display	LED, Bluetooth-APP
Communication	RS485 / PLC
DC connection type	Amphenol UTX (Max. 6 mm²)
AC connection type	OT terminal (Max. 300 mm²)
Compliance	IEC 62076, IEC 61777, IEC 62106, IEC 60086, IEC 60088, IEC 61881, VDE AR-N 4130:2018, VDE-AR-N 4130:2018, IEC 61000-6-3, EN 50549, UNE 206607-1:2013, P1012.3, ULTE C15-712-1:2013
Grid Support	Q at night function, LVRT, Inverter active & reactive power control and power ramp rate control

*Only compatible with Sungrow logger and SolarCloud