

3ET-HD156N Series

410/415/420/425/430W

N-type Ultra-high Efficiency Monocrystalline Silicon Bifacial Paving Module

ON TOP INT'L CO.,LTD



Additional Power Generation Gain

30-year linear performance warranty, more than 10% - 30% additional power gain



ZERO LID (Light Induced Degradation)

No LID, more power generation



PID Free (Potential Induced Degradation)

PID free, due to the POE material and double glass design



Lower Micro-crack Risk

No internal stress from the symmetrical N-Bifacial cell scheme



Higher Reliability

Successfully passed various strict tests

- IEC Test
- 6 Salt Mist Corrosion Test
- 6-time PID Test



Better Weak Illumination Response

Wide spectral response, higher power output even under low-light illumination



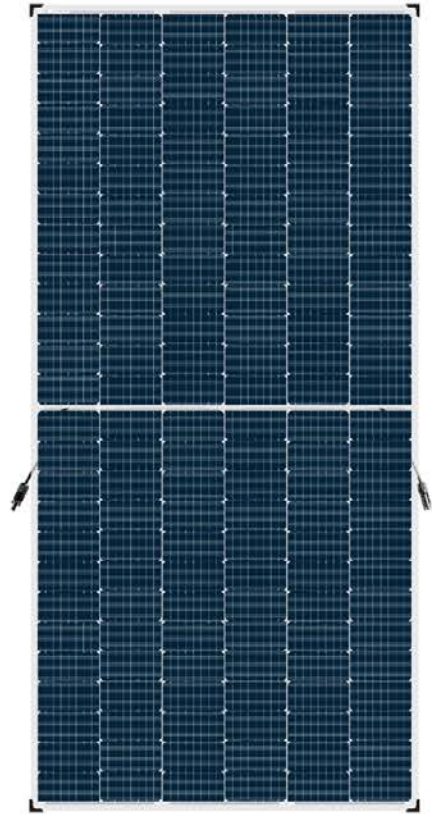
Better Weak Illumination Response

Higher power generation under working conditions

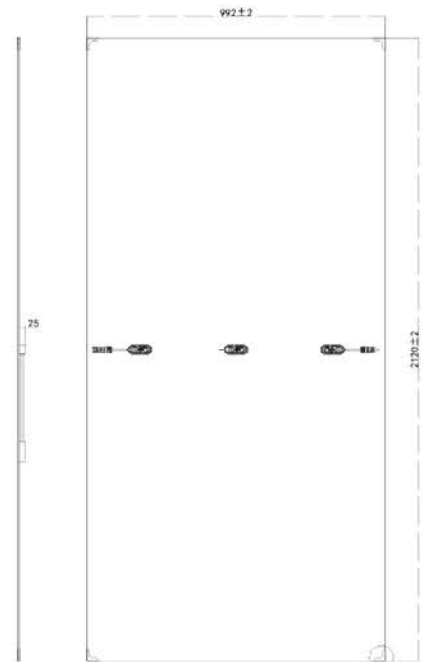


Special Application

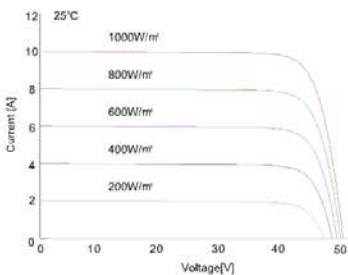
- BIPV
- Vertical Installation
- Snowfield
- High-humid Area
- Windy and dusty area



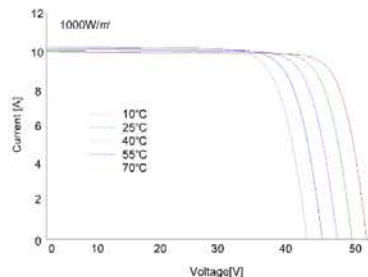
ENGINEERING DRAWING (unit: mm)



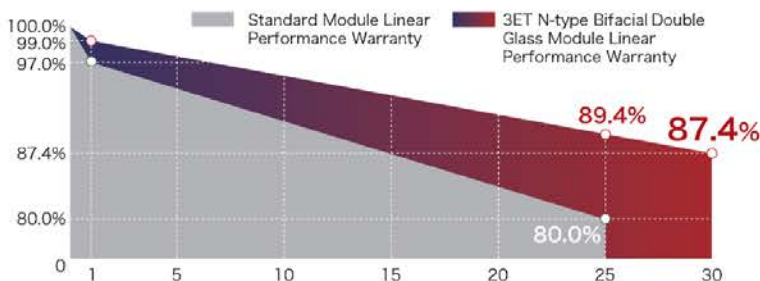
Irradiance Dependence of Isc, Voc and Pmax



Temperature Dependence of Isc, Voc and Pmax



-1.00% 1st-year Degradation | **15** Years Product Material & Workmanship
-0.40% Annual Degradation | **30** Years Linear Performance Warranty



ELECTRICAL PROPERTIES | STC*

Module Type	3ET-HD156N-410		3ET-HD156N-415		3ET-HD156N-420		3ET-HD156N-425		3ET-HD156N-430	
	Front Side	Rear Side	Front Side	Rear Side	Front Side	Rear Side	Front Side	Rear Side	Front Side	Rear Side
Peak Power (Pmax) (W)	410	325	415	329	420	333	425	336	430	340
MPP Voltage (Vmp) (V)	43.5	44.2	43.7	44.4	43.9	44.6	44.1	44.8	44.3	45.0
MPP Current (Imp) (A)	9.43	7.36	9.50	7.41	9.57	7.46	9.64	7.52	9.71	7.57
Open Circuit Voltage (Voc) (V)	52.9	51.8	53.1	51.8	53.3	52.0	53.5	52.2	53.7	52.4
Short Circuit Current (Isc) (A)	9.92	7.74	9.97	7.78	10.02	7.82	10.07	7.85	10.12	7.89
Module Efficiency (%)	19.50	15.4	19.73	15.62	19.97	15.81	20.21	16.00	20.45	16.19

*STC (Standard Test Condition): Irradiance 1000W/m², Module Temperature 25°C, AM 1.5
*The data above is for reference only and the actual data is in accordance with the practical testing

ELECTRICAL PROPERTIES | NOCT*

Testing Condition	Front Side	Rear Side	Front Side	Rear Side	Front Side	Rear Side	Front Side	Rear Side	Front Side	Rear Side
Peak Power (Pmax) (W)	310	246	314	249	318	252	322	255	325	258
MPP Voltage (Vmp) (V)	40.8	41.4	41.0	41.6	41.2	41.8	41.4	42.0	41.6	42.2
MPP Current (Imp) (A)	7.60	5.93	7.66	5.97	7.72	6.02	7.77	6.06	7.83	6.11
Open Circuit Voltage (Voc) (V)	50.6	49.3	50.8	49.5	50.9	49.7	51.1	49.9	51.3	50.0
Short Circuit Current (Isc) (A)	8.00	6.24	8.04	6.27	8.08	6.30	8.12	6.33	8.16	6.36

*NOCT (Nominal Operating Cell Temperature): Irradiance 800W/m², Ambient Temperature 20°C, AM 1.5, Wind Speed 1m/s
*The data above is for reference only and the actual data is in accordance with the practical testing

With Different Power Generation Gain (regarding 420W 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	454	43.9	10.33	53.3	10.81
15	470	43.9	10.70	53.3	11.21
20	487	44.0	11.08	53.4	11.60
25	504	44.0	11.46	53.4	12.00
30	521	44.0	11.84	53.4	12.39

OPERATING PROPERTIES

Operating Temperature (°C)	-40°C~+85°C
Maximum System Voltage (V)	1500V(IEC)/1000V(UL)
Maximum Series Fuse Rating (A)	15
Fire Safety	Class A
Power Tolerance	0~+5Wp

MECHANICAL PROPERTIES

Cell Type	157.35mm*78.675mm
Number of Cells	156pcs (13*12)
Dimension	2120mm*992mm*6mm
Weight	30Kg
Front/Rear Glass	2.5mm/2.5mm
Frame	Frameless
Junction Box	IP67 (3 diodes)
Length of Cable	4.0mm ² ,300mm
Connector	MC4 Compatible

TEMPERATURE COEFFICIENT

Temp. Coeff. Of Pmax (TK Pmax)	-0.32%/°C
Temp. Coeff. Of Voc (TK Voc)	-0.26%/°C
Temp. Coeff. Of Isc (TK Isc)	+0.046%/°C
NOCT	42±2°C

*The specification and key features described in this datasheet may deviate slightly and are not guaranteed. Due to ongoing innovation, R&D enhancement, 3ET.US. 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.



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3ET-HD156N系列

410/415/420/425/430W

N-TYPE单晶超高效拼片双面双玻组件

ON TOP INT'L CO.,LTD



具有 30 年生命周期, 额外发电量比常规组件高约 10%-30%



0 光致衰减

N-TYPE组件无光致衰减(LID)特性, 提升组件发电量



无 PID 衰减

采用 POE 材质, 透水率仅为传统 EVA 的 1/10, 配合双玻设计, 无须担心 PID 带来的组件功率衰减



更低隐裂风险

N-TYPE双面电池的对称设计, 无内应力, 因此更低隐裂风险



更高可靠性

产品顺利通过多项测试(IEC, 6 级盐雾测试、6 倍PID测试等)



更优弱光效应

在雾霾、阴天等弱光条件下更高功率输出



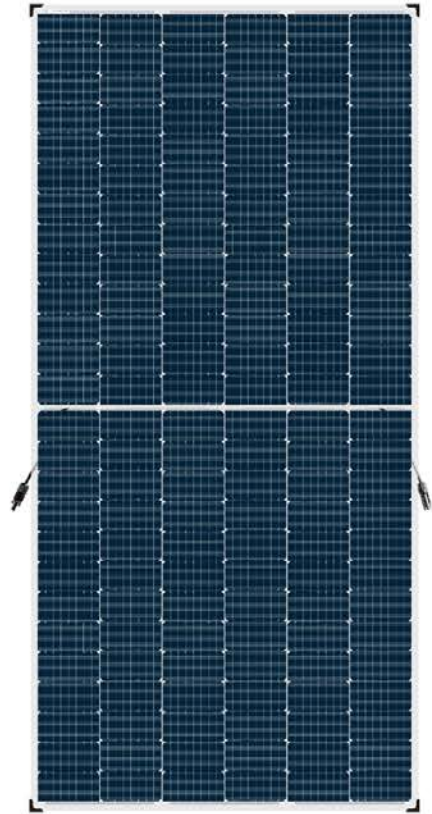
更优的温度系数

工作状态下, 发电量更高

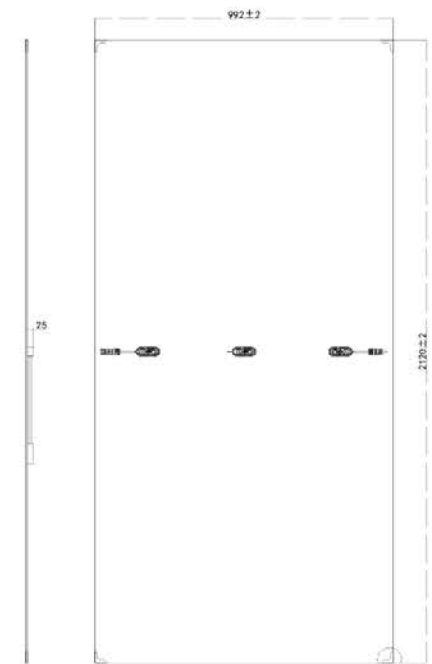


更广泛的应用性

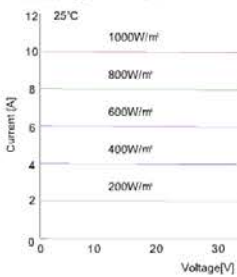
双面双玻设计, 应用范围更加广泛, 如 BIPV、垂直安装、雪地、高湿度及强风沙地带等



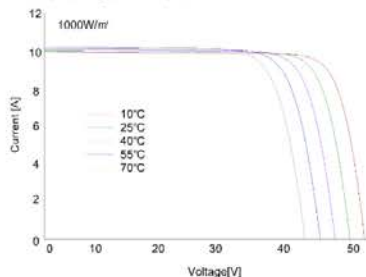
尺寸图 (mm)



不同辐照度下I-V曲线图

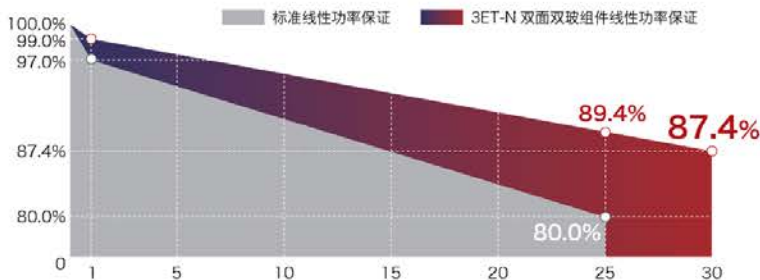


不同工作温度下I-V曲线图



-1.00% 首年衰减率 | 15 年产品材料与工艺质保

-0.40% 功率年衰减率 | 30 年功率线性质保



电性能参数 | STC*

组件型号	3ET-HD156N-410		3ET-HD156N-415		3ET-HD156N-420		3ET-HD156N-425		3ET-HD156N-430	
	正面	背面	正面	背面	正面	背面	正面	背面	正面	背面
测试条件										
最大输出功率 (Pmax) (W)	410	325	415	329	420	333	425	336	430	340
最佳工作电压 (Vmp) (V)	43.5	44.2	43.7	44.4	43.9	44.6	44.1	44.8	44.3	45.0
最佳工作电流 (Imp) (A)	9.43	7.36	9.50	7.41	9.57	7.46	9.64	7.52	9.71	7.57
开路电压 (Voc) (V)	52.9	51.6	53.1	51.8	53.3	52.0	53.5	52.2	53.7	52.4
短路电流 (Isc) (A)	9.92	7.74	9.97	7.78	10.02	7.82	10.07	7.85	10.12	7.89
组件效率 (%)	19.50	15.43	19.73	15.62	19.97	15.81	20.21	16.00	20.45	16.19

*标准测试条件 (STC): 辐照度 = 1000W/m², 电池温度 = 25°C, AM=1.5; 以上数据均为理论值, 组件功率以实际测试数据为准

电性能参数 | NOCT*

测试条件	正面	背面	正面	背面	正面	背面	正面	背面	正面	背面
最大输出功率 (Pmax) (W)	310	246	314	249	318	252	322	255	325	258
最佳工作电压 (Vmp) (V)	40.8	41.4	41.0	41.6	41.2	41.8	41.4	42.0	41.6	42.2
最佳工作电流 (Imp) (A)	7.60	5.93	7.66	5.97	7.72	6.02	7.77	6.06	7.83	6.11
开路电压 (Voc) (V)	50.6	49.3	50.8	49.5	50.9	49.7	51.1	49.9	51.3	50.0
短路电流 (Isc) (A)	8.00	6.24	8.04	6.27	8.08	6.30	8.12	6.33	8.16	6.36

*电池片标准工作温度条件 (NOCT): 辐照度 = 800W/m², 环境温度 = 20°C, AM=1.5, 风速 = 1m/s; 以上数据均为理论值, 组件以实际测试数据为准

不同背面功率增益(以 420W 为例)

功率增益 (Power Gain) (%)	最大输出功率 (Pmax) (W)	最佳工作电压 (Vmp) (V)	最佳工作电流 (Imp) (A)	开路电压 (Voc) (V)	短路电流 (Isc) (A)
10	454	43.9	10.33	53.3	10.81
15	470	43.9	10.70	53.3	11.21
20	487	44.0	11.08	53.4	11.60
25	504	44.0	11.46	53.4	12.00
30	521	44.0	11.84	53.4	12.39

工作参数

工作温度 (°C)	-40°C~+85°C
最大系统电压 (V)	1500V(IEC)/1000V(UL)
最大保险丝额定值 (A)	15
组件防火等级	Class A
输出功率公差	0~+5Wp

温度系数

峰值功率 (Pmax) 温度系数	-0.32%/°C
开路电压 (Voc) 温度系数	-0.26%/°C
短路电流 (Isc) 温度系数	+0.046%/°C
标称温度工作温度 (NOCT)	42±2°C

机械参数

电池规格	157.35mm*78.675mm
电池数量	156pcs (13*12)
组件尺寸	2120mm*992mm*6mm
组件重量	30Kg
正面 / 背面玻璃	2.5mm/2.5mm
组件边框	无边框
接线盒	分体式接线盒, IP67 (3个二极管)
电缆类型	4.0mm ² , 300mm 光伏专用线缆
连接器	MC4 兼容连接器

* 申明: 本技术参数文件中包含的技术参数可能略有偏差, 3ET公司并不保证其完全准确无误。由于不断的技术创新、产品优化, 3ET公司有权在不事先通知的情况下, 随时调整本技术参数文件中的信息。客户签订合同时应获取最新的技术参数文件, 并将其作为双方当事人签订的有约束力的合同组成部分。



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