

Mass solar

美日新能源

MS-05-40P
POLY-CRYSTALLINE MODULE
05/10/20/30/40WP



Applications >>



On-grid residential roof-tops



On-grid commercial/ industrial roof-tops



.High Customer Value

- Lower LCOE (Levelized Cost Of Energy), reduced BOS (Balance Of System) cost, shorter payback time
- Lower guaranteed first year and annual degradation
- Designed for compatibility with existing mainstream system components
- Higher return on Investment

.High Energy Yield

- Excellent IAM(Incidet Angle Modifier) and low irradiation performance, validated by 3rd party certifications
- The unique design provides optimized energy production under inter-rowshading conditions

.High Reliability

- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load

.High Power Up to 40W

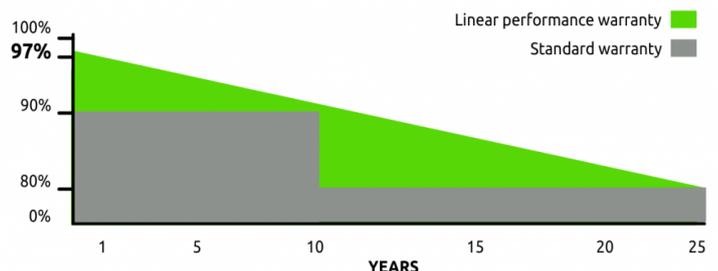
- Up to 40W front power and 16.75% module efficiency and MBB (Multi Busbar) technology bringing more BOS savings
- Lower resistance of and good reflection effect of MBB ensure high power

MAXIMUM EFFICIENCY

16.75%

POWER TOLERANCE

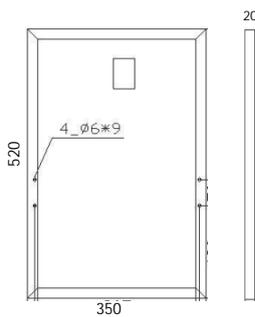
0~+3W



DIMENSION OF PV MODULE 20W (mm)

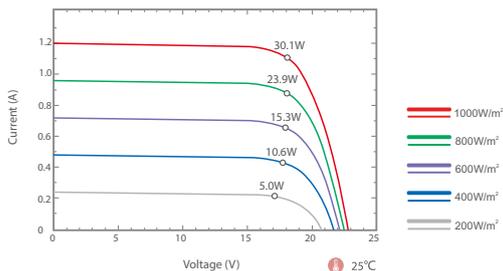


Front View

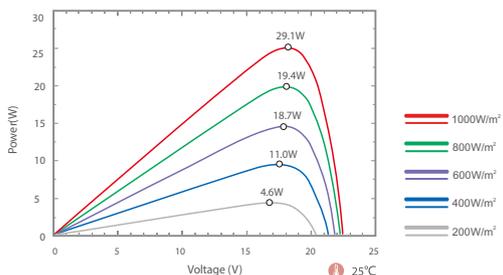


Back View

I-V CURVES OF PV MODULE (30W)



P-V CURVES OF PV MODULE (30W)



ELECTRICAL DATA (STC)

Maximum Power (Pmax)	5W	10W	20W
Maximum Power Voltage (Vmp)	17.8V	17.9V	18.0V
Maximum Power Current (Imp)	0.28A	0.55A	1.12A
Open Circuit Voltage (Voc)	21.6V	21.8V	22.9V
Short Circuit Current (Isc)	0.30A	0.61A	1.22A
Power Tolerance(Positive)	0-3%		
Module Efficiency	15.76%		
Operating Temperature Range	-40°C to +85°C		
Maximum System Voltage	1000V		
Series Fuse Rating	10A		
Temperature Coefficient of Pmax	-0.40 %/°C		
Temperature Coefficient of Voc	-0.30 %/°C		
Temperature Coefficient of Isc	0.05 %/°C		
Nominal Operating Cell Temperature	45±2°C		

Cell Type	Poly-Crystalline 156.75 mm		
Cell Orientation	36 cells (4x9)		36 cells (2x18)
Dimensions (mm)	240x190x17	350x240x17	410x350x20
Weight (Kg)	0.7Kg	1.3Kg	1.5Kg
Front Glass	3.2 mm, High Transmission, Low Iron, Tempered Glass		
Frame Type	Anodized Aluminium Alloy		
Junction Box Protection Class	IP 68 Rated		
Connector Type	MC4		
Cable	Photovoltaic Technology Cable 4.0mm ²		

ELECTRICAL DATA (STC)

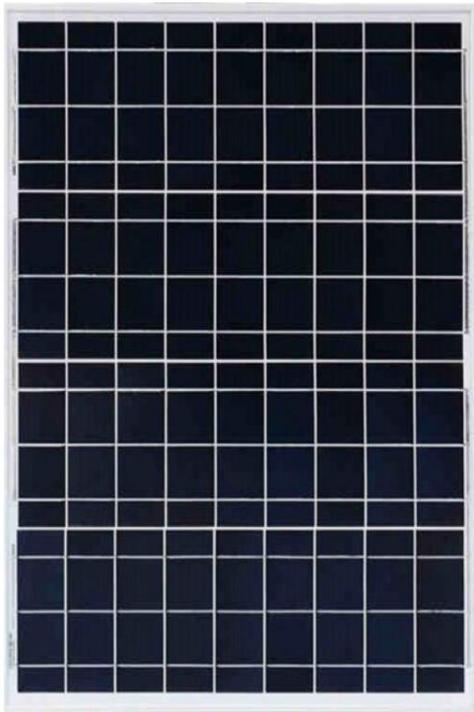
Maximum Power (Pmax)	30W	40W
Maximum Power Voltage (Vmp)	18.2V	18.4V
Maximum Power Current (Imp)	1.65A	2.17A
Open Circuit Voltage (Voc)	23.1V	23.3V
Short Circuit Current (Isc)	1.81A	2.38A
Power Tolerance(Positive)	0-3%	
Module Efficiency	15.85%	
Operating Temperature Range	-40°C to +85°C	
Maximum System Voltage	1000V	
Series Fuse Rating	10A	
Temperature Coefficient of Pmax	-0.40 %/°C	
Temperature Coefficient of Voc	-0.30 %/°C	
Temperature Coefficient of Isc	0.05 %/°C	
Nominal Operating Cell Temperature	45±2°C	

Cell Type	Poly-Crystalline 156.75 mm	
Cell Orientation	36 cells (4x9)	
Dimensions (mm)	650x350x20	670x450x20
Weight (Kg)	3.0Kg	3.5Kg
Front Glass	3.2 mm, High Transmission, Low Iron, Tempered Glass	
Frame Type	Anodized Aluminium Alloy	
Junction Box Protection Class	IP 68 Rated	
Connector Type	MC4	
Cable	Photovoltaic Technology Cable 4.0mm ²	

MS-50-90P

POLY-CRYSTALLINE MODULE

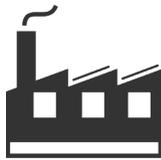
50/60/70/80/90WP



Applications >>



On-grid residential roof-tops



On-grid commercial/ industrial roof-tops



High Customer Value

- Lower LCOE (Levelized Cost Of Energy), reduced BOS (Balance Of System) cost, shorter payback time
- Lower guaranteed first year and annual degradation
- Designed for compatibility with existing mainstream system components
- Higher return on Investment

High Energy Yield

- Excellent IAM (Incident Angle Modifier) and low irradiation performance, validated by 3rd party certifications
- The unique design provides optimized energy production under inter-row shading conditions

High Reliability

- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load

High Power Up to 90W

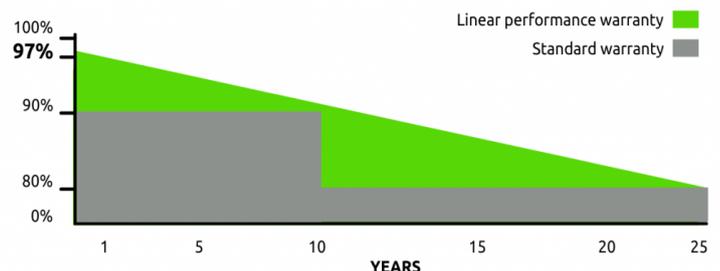
- Up to 90W front power and 16.9% module efficiency and MBB (Multi Busbar) technology bringing more BOS savings
- Lower resistance of and good reflection effect of MBB ensure high power

MAXIMUM EFFICIENCY

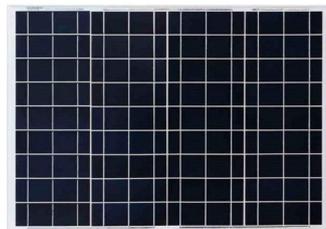
16.9%

POWER TOLERANCE

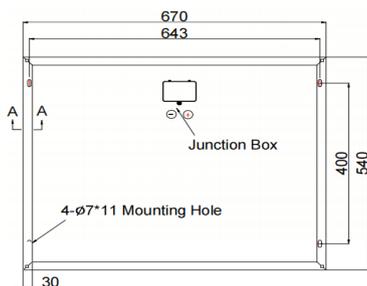
0~+3W



DIMENSION OF PV MODULE 50W (mm)

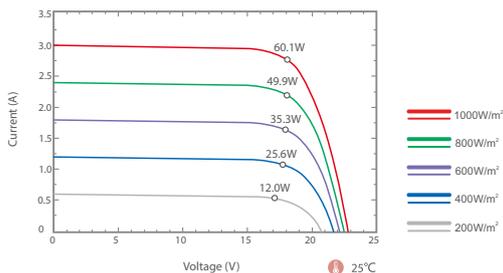


Front View

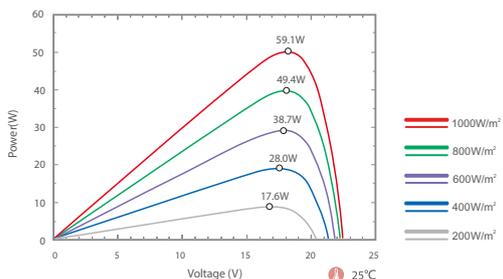


Back View

I-V CURVES OF PV MODULE (60W)



P-V CURVES OF PV MODULE (60W)



ELECTRICAL DATA (STC)

Maximum Power (Pmax)	50W	60W	70W
Maximum Power Voltage (Vmp)	17.8V	17.9V	18.0V
Maximum Power Current (Imp)	2.80A	3.35A	3.88A
Open Circuit Voltage (Voc)	21.6V	21.8V	22.9V
Short Circuit Current (Isc)	3.08A	3.65A	4.27A
Power Tolerance(Positive)	0-3%		
Module Efficiency	15.56%		
Operating Temperature Range	-40°C to +85°C		
Maximum System Voltage	1000V		
Series Fuse Rating	10A		
Temperature Coefficient of Pmax	-0.40 %/°C		
Temperature Coefficient of Voc	-0.30 %/°C		
Temperature Coefficient of Isc	0.05 %/°C		
Nominal Operating Cell Temperature	45±2°C		

Cell Type	Poly-Crystalline 156.75 mm		
Cell Orientation	36 cells (4x9)		
Dimensions (mm)	670x540x30	670x650x30	770x670x30
Weight (Kg)	3.5Kg	4.5Kg	5.5Kg
Front Glass	3.2 mm, High Transmission, Low Iron, Tempered Glass		
Frame Type	Anodized Aluminium Alloy		
Junction Box Protection Class	IP 68 Rated		
Connector Type	MC4		
Cable	Photovoltaic Technology Cable 4.0mm²		

ELECTRICAL DATA (STC)

Maximum Power (Pmax)	80W	90W
Maximum Power Voltage (Vmp)	18.2V	18.4V
Maximum Power Current (Imp)	4.38A	4.89A
Open Circuit Voltage (Voc)	23.1V	23.3V
Short Circuit Current (Isc)	4.85A	5.38A
Power Tolerance(Positive)	0-3%	
Module Efficiency	15.85%	
Operating Temperature Range	-40°C to +85°C	
Maximum System Voltage	1000V	
Series Fuse Rating	10A	
Temperature Coefficient of Pmax	-0.40 %/°C	
Temperature Coefficient of Voc	-0.30 %/°C	
Temperature Coefficient of Isc	0.05 %/°C	
Nominal Operating Cell Temperature	45±2°C	

Cell Type	Poly-Crystalline 156.75 mm	
Cell Orientation	36 cells (4x9)	
Dimensions (mm)	770x670x30	1000x670x30
Weight (Kg)	5.5Kg	7.0Kg
Front Glass	3.2 mm, High Transmission, Low Iron, Tempered Glass	
Frame Type	Anodized Aluminium Alloy	
Junction Box Protection Class	IP 68 Rated	
Connector Type	MC4	
Cable	Photovoltaic Technology Cable 4.0mm²	

MS-100-140P
POLY-CRYSTALLINE MODULE
100/110/120/130/140WP



Applications >>



On-grid residential roof-tops



On-grid commercial/ industrial roof-tops



.High Customer Value

- Lower LCOE (Levelized Cost Of Energy), reduced BOS (Balance Of System) cost, shorter payback time
- Lower guaranteed first year and annual degradation
- Designed for compatibility with existing mainstream system components
- Higher return on Investment

.High Energy Yield

- Excellent IAM(Incidet Angle Modifier) and low irradiation performance, validated by 3rd party certifications
- The unique design provides optimized energy production under inter-rowshading conditions

.High Reliability

- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load

.High Power Up to 140W

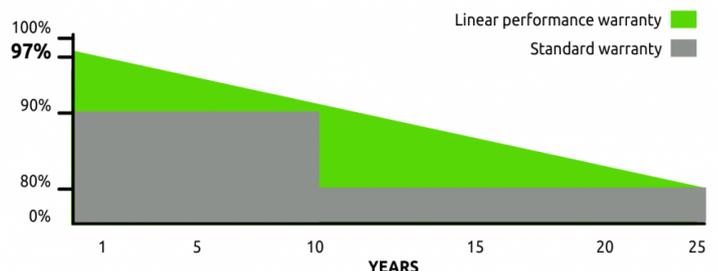
- Up to 140W front power and 17.5% module efficiency and MBB (Multi Busbar) technology bringing more BOS savings
- Lower resistance of and good reflection effect of MBB ensure high power

MAXIMUM EFFICIENCY

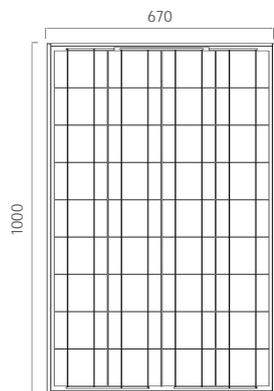
17.5%

POWER TOLERANCE

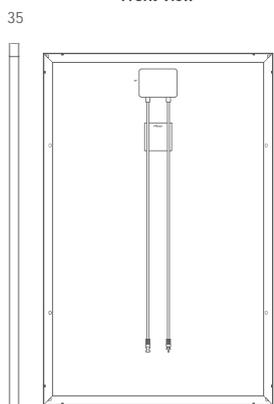
0~+5W



DIMENSION OF PV MODULE (mm)



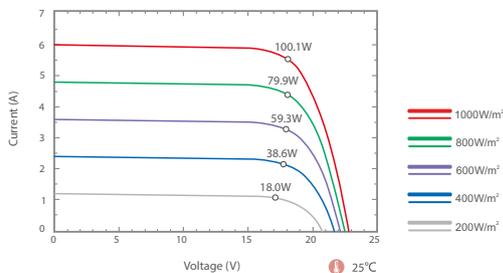
Front View



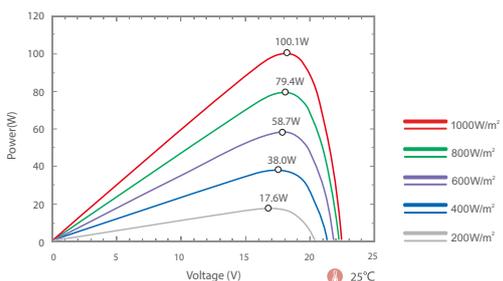
Back View

Side

I-V CURVES OF PV MODULE (100W)



P-V CURVES OF PV MODULE (100W)



ELECTRICAL DATA (STC)

Maximum Power (Pmax)	100W	110W	120W
Maximum Power Voltage (Vmp)	18.0V	18.2V	18.4V
Maximum Power Current (Imp)	5.56A	6.04A	6.52A
Open Circuit Voltage (Voc)	22.5V	22.7V	22.9V
Short Circuit Current (Isc)	6.00A	6.65A	7.15A
Power Tolerance(Positive)	0-3%		
Module Efficiency	16.96%		
Operating Temperature Range	-40°C to +85°C		
Maximum System Voltage	1000V		
Series Fuse Rating	10A		
Temperature Coefficient of Pmax	-0.40 %/°C		
Temperature Coefficient of Voc	-0.30 %/°C		
Temperature Coefficient of Isc	0.05 %/°C		
Nominal Operating Cell Temperature	45±2°C		

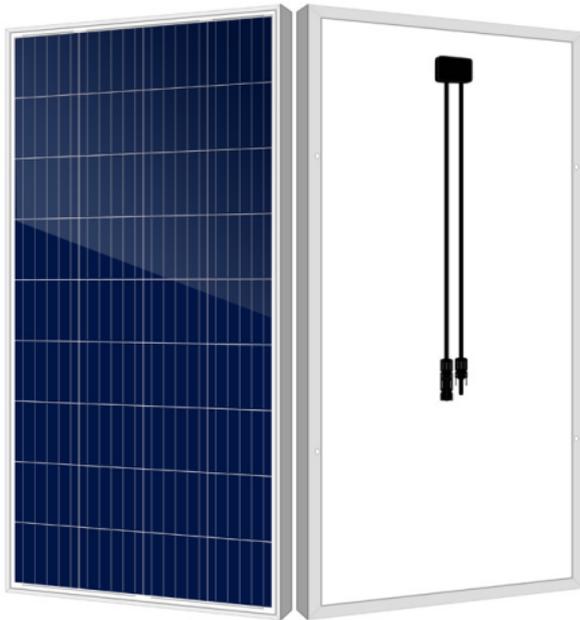
Cell Type	Mono-Crystalline 156.75 mm		
Cell Orientation	36 cells (4x9)		
Dimensions (mm)	1000x670x35	1100x670x35	1200x670x35
Weight (Kg)	6.5Kg	7.5Kg	8.5Kg
Front Glass	3.2 mm, High Transmission, Low Iron, Tempered Glass		
Frame Type	Anodized Aluminium Alloy		
Junction Box Protection Class	IP 68 Rated		
Connector Type	MC4		
Cable	Photovoltaic Technology Cable 4.0mm²		

ELECTRICAL DATA (STC)

Maximum Power (Pmax)	130W	140W
Maximum Power Voltage (Vmp)	18.6V	18.8V
Maximum Power Current (Imp)	6.98A	7.44A
Open Circuit Voltage (Voc)	23.1V	23.3V
Short Circuit Current (Isc)	7.68A	8.19A
Power Tolerance(Positive)	0-3%	
Module Efficiency	17.85%	
Operating Temperature Range	-40°C to +85°C	
Maximum System Voltage	1000V	
Series Fuse Rating	10A	
Temperature Coefficient of Pmax	-0.40 %/°C	
Temperature Coefficient of Voc	-0.30 %/°C	
Temperature Coefficient of Isc	0.05 %/°C	
Nominal Operating Cell Temperature	45±2°C	

Cell Type	Poly-Crystalline 156.75 mm	
Cell Orientation	36 cells (4x9)	
Dimensions (mm)	1250x670x35	1320x670x35
Weight (Kg)	9.0Kg	9.5Kg
Front Glass	3.2 mm, High Transmission, Low Iron, Tempered Glass	
Frame Type	Anodized Aluminium Alloy	
Junction Box Protection Class	IP 68 Rated	
Connector Type	MC4	
Cable	Photovoltaic Technology Cable 4.0mm²	

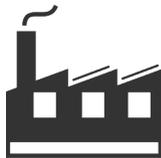
MS-150-180P
POLY-CRYSTALLINE MODULE
150/160/170/180WP



Applications >>



On-grid residential roof-tops



On-grid commercial/ industrial roof-tops



High Customer Value

- Lower LCOE (Levelized Cost Of Energy), reduced BOS (Balance Of System) cost, shorter payback time
- Lower guaranteed first year and annual degradation
- Designed for compatibility with existing mainstream system components
- Higher return on Investment

High Energy Yield

- Excellent IAM (Incident Angle Modifier) and low irradiation performance, validated by 3rd party certifications
- The unique design provides optimized energy production under inter-row shading conditions

High Reliability

- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load

High Power Up to 180W

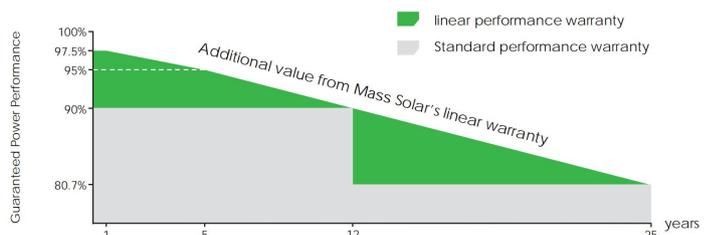
- Up to 180W front power and 17.8% module efficiency and MBB (Multi Busbar) technology bringing more BOS savings
- Lower resistance of and good reflection effect of MBB ensure high power

MAXIMUM EFFICIENCY

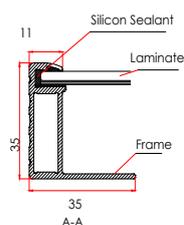
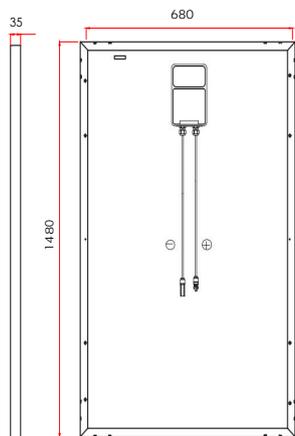
17.8%

POWER TOLERANCE

0~+3W

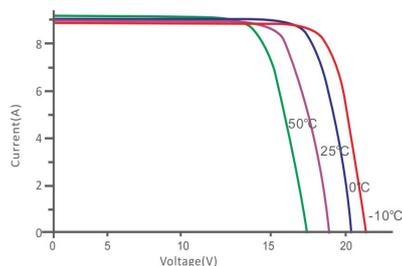


DIMENSIONS OF PV MODULE (mm)

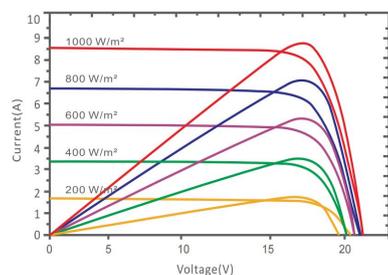


I-V CURVES OF PV MODULE (150W)

I-V characteristics at different temperature



P-V CURVES OF PV MODULE (150W)



ELECTRICAL DATA (STC)

Peak Power Watts-PMAX (Wp)	150	160	170	180
Power Output Tolerance-PMAX (W)	0 - +5			
Maximum Power Voltage-VMPP (V)	18.4	18.6	18.8	18.9
Maximum Power Current-IMPP (A)	8.17	8.60	9.41	9.73
Open Circuit Voltage-VOC (V)	22.1	22.6	22.8	23.1
Short Circuit Current-ISC (A)	8.58	9.08	9.26	9.78
Module Efficiency (%)	15.6	15.9	16.2	16.5

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

ELECTRICAL DATA (NOCT)

Maximum Power-PMAX (Wp)	112	120	128	136
Maximum Power Voltage-VMPP (V)	17.2	17.4	17.6	17.8
Maximum Power Current-IMPP (A)	6.51	6.61	6.79	6.97
Open Circuit Voltage-Voc (V)	20.6	20.9	21.1	21.3
Short Circuit Current-Isc (A)	7.12	7.23	7.35	7.41

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

MECHANICAL DATA

Solar Cells	Poly-crystalline 156.75 × 156.75 mm
Cell Orientation	36 cells (4 × 9)
Module Dimensions	1480 × 680 × 35 mm
Weight	11.5 kg
Glass	3.2 mm, High Transmission, AR Coated Tempered Glass
Backsheet	White OR Black
Frame	Anodized Aluminum Alloy
J-Box	IP 67 or IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm ²
Connector	MC4

TEMPERATURE RATINGS

Nominal Operating Cell Temperature (NOCT)	44°C (±2°C)
Temperature Coefficient of P _{MAX} Tem	- 0.41%/°C
Temperature Coefficient of Voc Temperat	-0.32%/°C
Temperature Coefficient of Isc	0.05%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1000V DC (IEC) 1000V DC (UL)
Max Series Fuse Rating	10A

WARRANTY

10 year Product Workmanship Warranty
25 year Linear Power Warranty

(Please refer to product warranty for details)

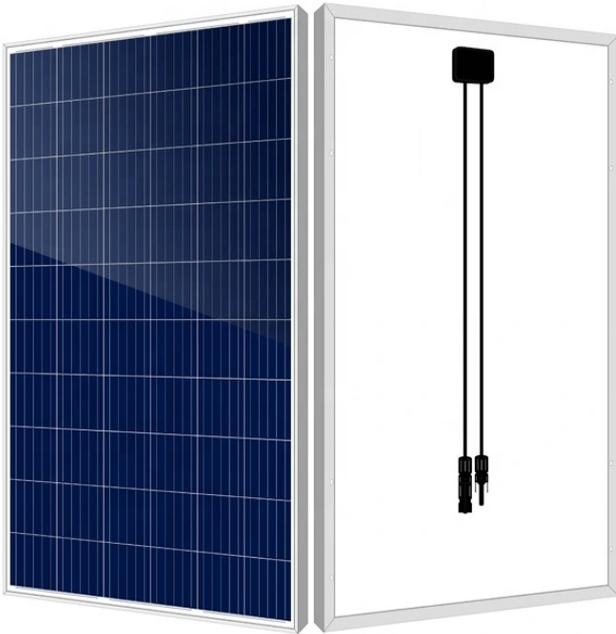
PACKAGING CONFIGURATION

Modules per box:	30 pcs
Modules per 40' container:	1680 pcs

MS-255-270P

POLY-CRYSTALLINE MODULE

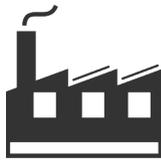
255/260/265/270WP



Applications >>



On-grid residential roof-tops



On-grid commercial/ industrial roof-tops



High Customer Value

- Lower LCOE (Levelized Cost Of Energy), reduced BOS (Balance Of System) cost, shorter payback time
- Lower guaranteed first year and annual degradation
- Designed for compatibility with existing mainstream system components
- Higher return on Investment

High Energy Yield

- Excellent IAM (Incident Angle Modifier) and low irradiation performance, validated by 3rd party certifications
- The unique design provides optimized energy production under inter-row shading conditions

High Reliability

- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load

High Power Up to 270W

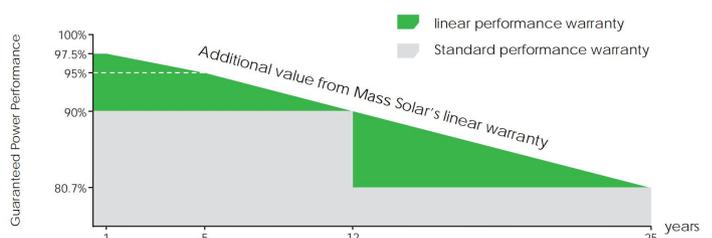
- Up to 270W front power and 17.5% module efficiency and MBB (Multi Busbar) technology bringing more BOS savings
- Lower resistance of and good reflection effect of MBB ensure high power

MAXIMUM EFFICIENCY

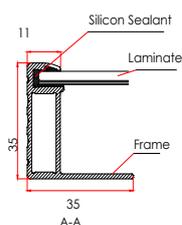
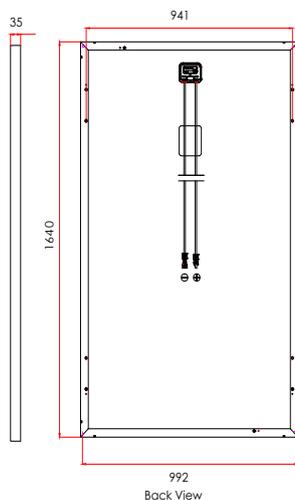
17.5%

POWER TOLERANCE

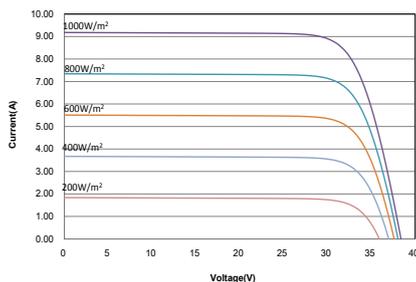
0~+5W



DIMENSIONS OF PV MODULE (mm)

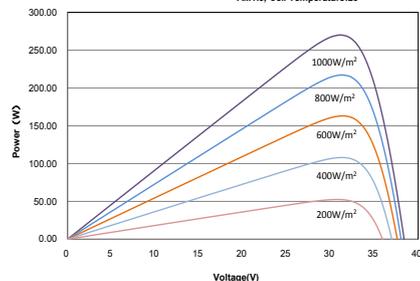


I-V CURVES OF PV MODULE (270W)



P-V CURVES OF PV MODULE (270W)

AM1.5, Cell Temperature:25



ELECTRICAL DATA (STC)

Peak Power Watts-PMAX (Wp)	255	260	265	270
Power Output Tolerance-PMAX (W)	0 - +5			
Maximum Power Voltage-VMPP (V)	30.5	30.6	30.8	30.9
Maximum Power Current-IMPP (A)	8.37	8.50	8.61	8.73
Open Circuit Voltage-VOC (V)	38.1	38.2	38.3	38.4
Short Circuit Current-ISC (A)	8.88	9.00	9.10	9.18
Module Efficiency (%)	15.6	15.9	16.2	16.5

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

ELECTRICAL DATA (NOCT)

Maximum Power-PMAX (Wp)	189	193	197	200
Maximum Power Voltage-VMPP (V)	28.2	28.4	28.6	28.7
Maximum Power Current-IMPP (A)	6.71	6.81	6.89	6.97
Open Circuit Voltage-Voc (V)	35.3	35.4	35.5	35.6
Short Circuit Current-Isc (A)	7.17	7.27	7.35	7.41

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

MECHANICAL DATA

Solar Cells	Poly-crystalline 156.75 × 156.75 mm
Cell Orientation	60 cells (6 × 10)
Module Dimensions	1640 × 992 × 35 mm
Weight	21.5 kg
Glass	3.2 mm, High Transmission, AR Coated Tempered Glass
Backsheet	White OR Black
Frame	Anodized Aluminium Alloy
J-Box	IP 67 or IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm ²
Connector	MC4

TEMPERATURE RATINGS

Nominal Operating Cell Temperature (NOCT)	44°C (±2°C)
Temperature Coefficient of P _{MAX} Tem	- 0.41%/°C
Temperature Coefficient of Voc Temperat	-0.32%/°C
Temperature Coefficient of Isc	0.05%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1000V DC (IEC) 1000V DC (UL)
Max Series Fuse Rating	15A

WARRANTY

10 year Product Workmanship Warranty
25 year Linear Power Warranty
(Please refer to product warranty for details)

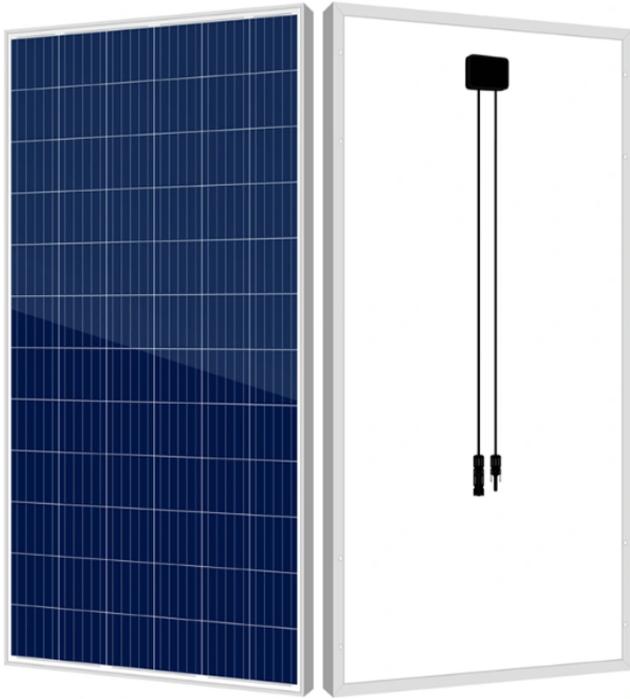
PACKAGING CONFIGURATION

Modules per box: 30 pcs
Modules per 40' container: 840 pcs

MS-320-340P

POLY-CRYSTALLINE MODULE

320/325/330/335/340WP



High Customer Value

- Lower LCOE (Levelized Cost Of Energy), reduced BOS (Balance Of System) cost, shorter payback time
- Lower guaranteed first year and annual degradation
- Designed for compatibility with existing mainstream system components
- Higher return on Investment

High Energy Yield

- Excellent IAM (Incident Angle Modifier) and low irradiation performance, validated by 3rd party certifications
- The unique design provides optimized energy production under inter-row shading conditions

High Reliability

- Minimized micro-cracks with innovative non-destructive cutting technology
- Ensured PID resistance through cell process and module material control
- Resistant to harsh environments such as salt, ammonia, sand, high temperature and high humidity areas
- Mechanical performance up to 5400 Pa positive load and 2400 Pa negative load

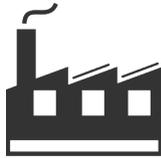
High Power Up to 340W

- Up to 340W front power and 18.5% module efficiency and MBB (Multi Busbar) technology bringing more BOS savings
- Lower resistance of and good reflection effect of MBB ensure high power

Applications >>



On-grid residential roof-tops



On-grid commercial/ industrial roof-tops

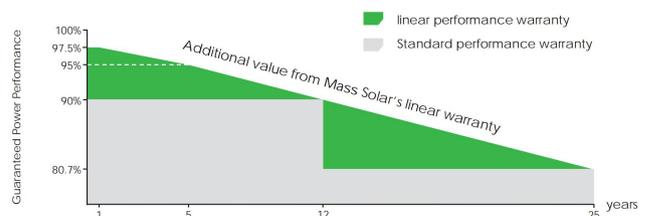


MAXIMUM EFFICIENCY

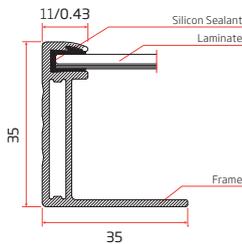
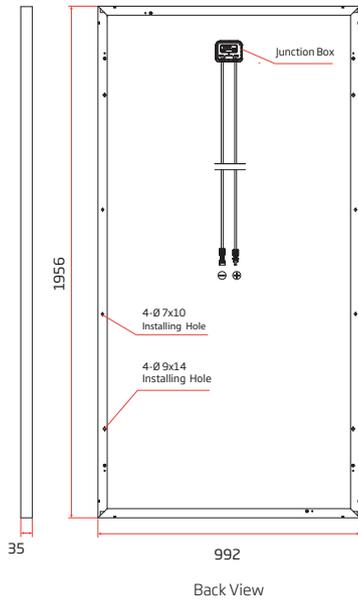
18.5%

POWER TOLERANCE

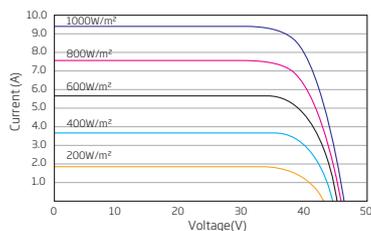
0~+5W



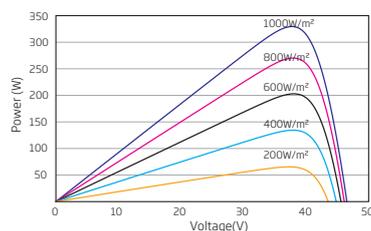
DIMENSIONS OF PV MODULE(mm)



I-V CURVES OF PV MODULE (335W)



P-V CURVES OF PV MODULE (335W)



ELECTRICAL DATA (STC)

Peak Power Watts- P_{MAX} (Wp)	320	325	330	335	340
Power Output Tolerance- P_{MAX} (W)	0 ~ +5				
Maximum Power Voltage- V_{MPP} (V)	37.1	37.2	37.4	37.6	37.8
Maximum Power Current- I_{MPP} (A)	8.63	8.73	8.83	8.91	8.99
Open Circuit Voltage- V_{OC} (V)	45.5	45.6	45.8	46.0	46.2
Short Circuit Current- I_{SC} (A)	9.15	9.19	9.28	9.35	9.42
Module Efficiency (%)	16.5	16.7	17.0	17.2	17.5

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

ELECTRICAL DATA (NOCT)

Maximum Power- P_{MAX} (Wp)	237	241	245	249	252
Maximum Power Voltage- V_{MPP} (V)	34.3	34.4	34.6	34.8	35.0
Maximum Power Current- I_{MPP} (A)	6.92	7.00	7.08	7.14	7.21
Open Circuit Voltage- V_{OC} (V)	42.1	42.2	42.4	42.6	42.8
Short Circuit Current- I_{SC} (A)	7.39	7.42	7.49	7.55	7.60

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

MECHANICAL DATA

Solar Cells	Poly-crystalline 156.75 × 156.75 mm
Cell Orientation	72 cells (6 × 12)
Module Dimensions	1956 × 992 × 35 mm
Weight	22.5 kg
Glass	3.2 mm, High Transmission, AR Coated Tempered Glass
Backsheet	White
Frame	Anodized Aluminium Alloy
J-Box	IP 67 or IP 68 rated
Cables	Photovoltaic Technology Cable 4.0mm ²
Connector	MC4

TEMPERATURE RATINGS

NOCT(Nominal Operating Cell Temperature)	44°C (±2°C)
Temperature Coefficient of P_{MAX}	- 0.41%/°C
Temperature Coefficient of V_{OC}	- 0.32%/°C
Temperature Coefficient of I_{SC}	0.05%/°C

MAXIMUM RATINGS

Operational Temperature	-40~+85°C
Maximum System Voltage	1000V DC (IEC) 1000V DC (UL)
Max Series Fuse Rating	15A

(DO NOT connect Fuse in Combiner Box with two or more strings in parallel connection)

WARRANTY

10 year Product Workmanship Warranty
25 year Linear Power Warranty

(Please refer to product warranty for details)

PACKAGING CONFIGURATION

Modules per box: 31 pcs
Modules per 40' container: 744 pcs