ENGLISH

www.shinsungeng.com

# SHINSUNG E&G
# SOLAR MODULE

SHINSUNG E&G

40 Anniversary SINCE 1977

# **Shinsung E&G,** the Pioneer of PV Technology in Korea

## PERC Technology

Better power performance than the existing PERC technology through ingenious thin film technology process.

## Made in Korea

1st generation in Korean PV industry. Our cell & module provide an excellent quality as well as high efficiency & output.

## Trustworthy Partner, 41 years

Shinsung E&G provides 10 years of product warranty and 25 years of linear power warranty.

## Highest Efficiency

Excellence in customer satisfaction for the highest module efficiency and top-end voltage level by the optimized productivity.

## Excellent Quality Control

Strict quality control via 15 official tests, EL inspection (x2) and Anti PID & LID technology to guarantee PV performance.

## Product Certificates

Shinsung E&G has international major certificates such as UL, TUV, which guarantee world no 1. quality level.

## High Quality Tempered Frame

Best durability (7,200Pa) via using tempered glass and special frame to withstand in harsh environment conditions.

## Innovative Technology

Optimized for high output regardless of low temperature-coefficients. Qualified in performance test under extreme environment conditions (Salt field, reclamation and on water)

## Certified in new IEC Standard.

(IEC 61215 / 61730 3rd version)

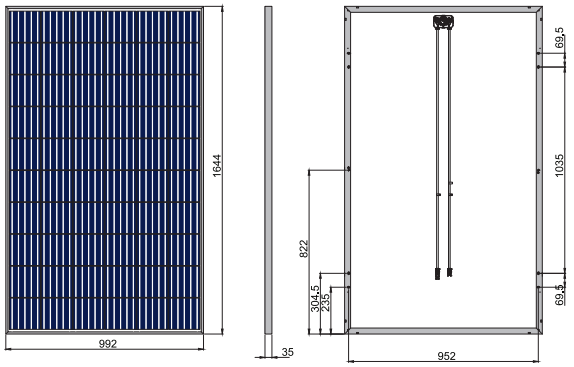
**Reinforced evaluation standard of PV module performance and reliability.**
**(Hot spot, NOCT, TC, MLT, pre-Conditioning, etc.)**

Extraordinary reliability in both module performance and durability (0~+3% output uniformity).

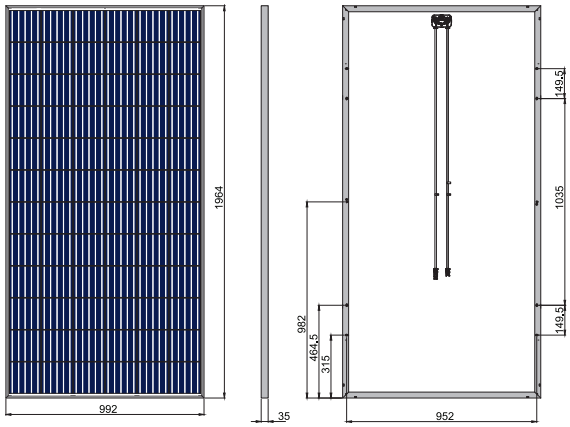
# PRODUCT

# Mono 60cell/72cell

## 60cell




## 72cell




| Item | SS-BM300 | SS-BM305 | SS-BM310 |
|---|---|---|---|
| Peak Power(Wp) | 300 | 305 | 310 |
| Open Circuit Voltage(V) | 39.10 | 39.78 | 40.18 |
| Short Circuit Current(A) | 10.04 | 10.06 | 10.09 |
| Voltage at Pmax(V) | 31.29 | 31.84 | 32.19 |
| Current at Pmax(A) | 9.59 | 9.61 | 9.65 |
| Efficiency(%) | 18.40 | 18.70 | 19.01 |
| Dimension(mm) | 992 X 1,644 X 35 | | |
| Weight(Kg) | 18.4±0.1 | | |

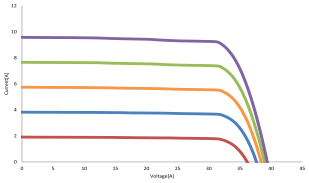
| Item | SS-DM360 | SS-DM365 | SS-DM370 |
|---|---|---|---|
| Peak Power(Wp) | 360 | 365 | 370 |
| Open Circuit Voltage(V) | 47.20 | 47.41 | 47.87 |
| Short Circuit Current(A) | 9.98 | 10.05 | 10.07 |
| Voltage at Pmax(V) | 38.23 | 38.44 | 38.79 |
| Current at Pmax(A) | 9.43 | 9.51 | 9.54 |
| Efficiency(%) | 18.48 | 18.73 | 18.99 |
| Dimension(mm) | 992 X 1,964 X 35 | | |
| Weight(Kg) | 21.6±0.1 | | |

※ All data is tested under STC(Standard Test Conditions). ※ Peak power tolerance 0 ~ +3.0 ※ Please make sure to check the output range per certification.

### • Temperature Coefficient

| | |
|---|---|
| NOCT | 45±2(℃) |
| α Δ ISC | 0.05(%/degree) |
| β Δ VOC | -0.31(%/degree) |
| γ Δ Pmax | -0.38(%/degree) |

### • I-V Curve



### • Temperature Coefficient

| | |
|---|---|
| NOCT | 45±2(℃) |
| α Δ ISC | 0.05(%/degree) |
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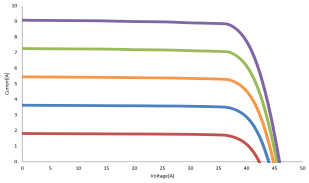
| γ Δ Pmax | -0.38(%/degree) |

### • I-V Curve



### • Mechanical Characteristics

| | |
|---|---|
| Solar Cells | 156.75 x 156.75mm |
| Front Glass | Low Iron Tempered Glass |
| Junction Box | JM13D: IP67 / 3Bypass Diode |
| Output Cable | 4mm² Cable, MC 4(Compatible) Type |
| Frame | AL Alloy Type(Anodized) |

### • Tested Operation Conditions

| | |
|---|---|
| Max Load | 550kgf/m²(5400Pa) |
| Impact Resistance | 25mm, 23m/s |
| Operating Temperature | -40~+85℃ |
| System Voltage | 1,000V |

### • Safety Ratings & Warranties

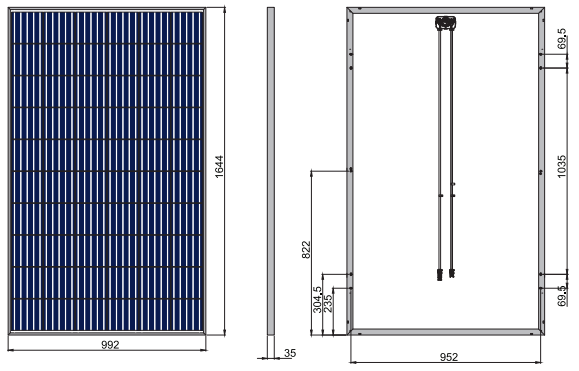
| | |
|---|---|
| Fire Safety Classification | Class "C" |
| Application Classes | Class "A" |
| Salt-Mist Corrosion Test | Pass |
| Visible Light Reflected | ( ~ 5.00%)<br>For more information, please contact us. |
| Warranty | 10 Years limited Product Warranty |
| | 10 Years limited Power Warranty : 90% |
| | 25 Years limited Power Warranty : 80% |
| Certifications | IEC 61215 / IEC 61730 |

※ Above data may be changed without prior notice.

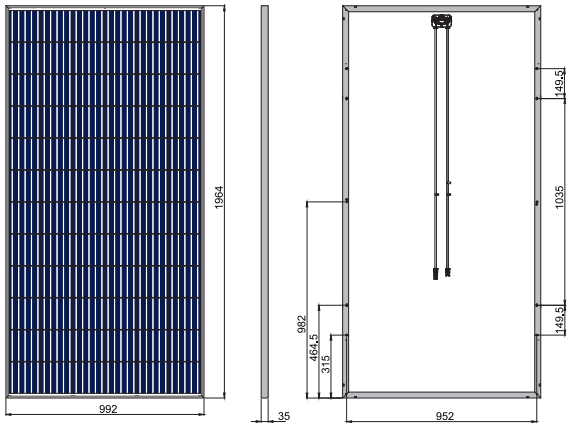
# Multi

# 60cell/72cell

## 60cell




## 72cell




| Item | SS-BP270 | SS-BP275 | SS-BP280 |
|---|---|---|---|
| Peak Power(Wp) | 270 | 275 | 280 |
| Open Circuit Voltage(V) | 38.32 | 38.48 | 38.64 |
| Short Circuit Current(A) | 9.33 | 9.37 | 9.41 |
| Voltage at Pmax(V) | 30.47 | 30.98 | 31.49 |
| Current at Pmax(A) | 8.87 | 8.90 | 8.91 |
| Efficiency(%) | 16.56 | 16.86 | 17.17 |
| Dimension(mm) | 992 X 1,644 X 35 | | |
| Weight(Kg) | 18.4±0.1 | | |

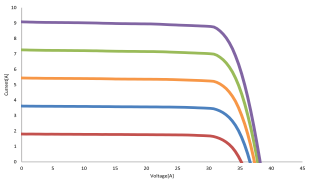
| Item | SS-DP325 | SS-DP330 | SS-DP335 |
|---|---|---|---|
| Peak Power(Wp) | 325 | 330 | 335 |
| Open Circuit Voltage(V) | 45.72 | 45.98 | 46.24 |
| Short Circuit Current(A) | 9.28 | 9.29 | 9.30 |
| Voltage at Pmax(V) | 37.12 | 37.65 | 38.12 |
| Current at Pmax(A) | 8.76 | 8.78 | 8.79 |
| Efficiency(%) | 16.68 | 16.94 | 17.19 |
| Dimension(mm) | 992 X 1,964 X 35 | | |
| Weight(Kg) | 21.6 ± 0.1 | | |

※ All data is tested under STC(Standard Test Conditions). ※ Peak power tolerance 0 ~ +3.0 ※ Please make sure to check the output range per certification.

### • Temperature Coefficient

| | |
|---|---|
| NOCT | 45±2(℃) |
| α Δ ISC | 0.05(%/degree) |
| β Δ VOC | -0.33(%/degree) |
| γ Δ Pmax | -0.42(%/degree) |

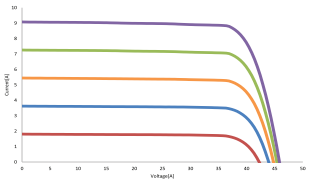
### • I-V Curve



### • Temperature Coefficient

| | |
|---|---|
| NOCT | 45±2(℃) |
| α Δ ISC | 0.05(%/degree) |
| β Δ VOC | -0.33(%/degree) |
| γ Δ Pmax | -0.42(%/degree) |

### • I-V Curve



### • Mechanical Characteristics

| | |
|---|---|
| Solar Cells | 156.75 x 156.75mm |
| Front Glass | Low Iron Tempered Glass |
| Junction Box | JM13D: IP67 / 3Bypass Diode |
| Output Cable | 4mm² Cable, MC 4(Compatible) Type |
| Frame | AL Alloy Type(Anodized) |

### • Tested Operation Conditions

| | |
|---|---|
| Max Load | 734kgf/m²(7200Pa) |
| Impact Resistance | 25mm, 23m/s |
| Operating Temperature | -40~+85℃ |
| System Voltage | 1,000V |

### • Safety Ratings & Warranties

| | |
|---|---|
| Fire Safety Classification | Class "C" |
| Application Classes | Class "A" |
| Salt-Mist Corrosion Test | Pass |
| Visible Light Reflected | ( ~ 5.00%)<br>For more information, please contact us. |
| Warranty | 10 Years limited Product Warranty |
| | 10 Years limited Power Warranty : 90% |
| | 25 Years limited Power Warranty : 80% |
| Certifications | IEC 61215 / IEC 61730 |

※ Above data may be changed without prior notice.

# Multi

# 60cell/72cell

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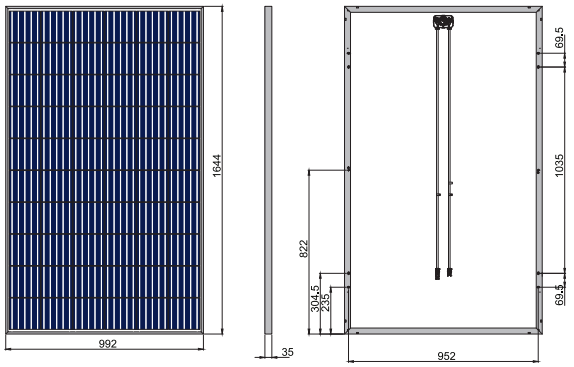
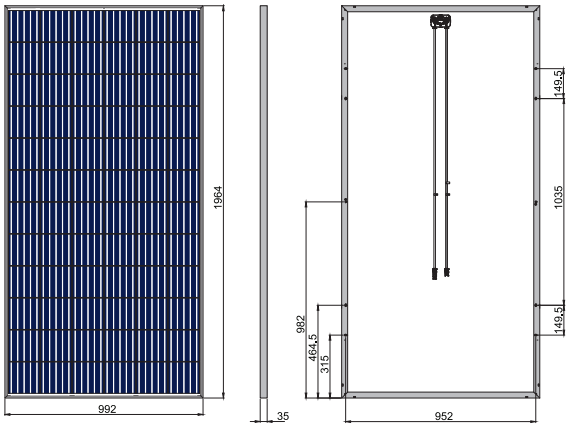
## 60 Cell




## 72 Cell




| Item | SS-BP270 | SS-BP275 | SS-BP280 |
|---|---|---|---|
| Peak Power(Wp) | 270 | 275 | 280 |
| Open Circuit Voltage(V) | 38.3 | 38.7 | 39.0 |
| Short Circuit Current(A) | 9.16 | 9.22 | 9.29 |
| Voltage at Pmax(V) | 31.2 | 31.5 | 31.8 |
| Current at Pmax(A) | 8.66 | 8.74 | 8.81 |
| Efficiency(%) | 16.50 / 16.56 | 16.80 / 16.86 | 17.11 / 17.17 |
| Dimension(mm) | 992 X 1,650 X 40 / 992 X 1,644 X 35 | | |
| Weight(Kg) | 18.8±0.2 | | |

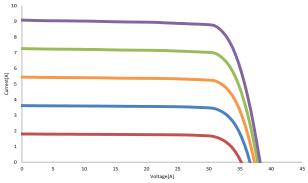
| Item | SS-DP315 | SS-DP320 | SS-DP325 |
|---|---|---|---|
| Peak Power(Wp) | 315 | 320 | 325 |
| Open Circuit Voltage(V) | 45.4 | 45.7 | 45.9 |
| Short Circuit Current(A) | 9.08 | 9.14 | 9.19 |
| Voltage at Pmax(V) | 37.0 | 37.3 | 37.6 |
| Current at Pmax(A) | 8.53 | 8.6 | 8.66 |
| Efficiency(%) | 16.12 / 16.17 | 16.37 / 16.42 | 16.63 / 16.68 |
| Dimension(mm) | 992 X 1,970 X 40 / 992 X 1,964 X 35 | | |
| Weight(Kg) | 21.8±0.2 | | |

※ All data is tested under STC(Standard Test Conditions). ※ Peak power tolerance 0 ~ +3.0 ※ Please make sure to check the output range per certification.

### • Temperature Coefficient (Cell)

| | |
|---|---|
| NOCT | 45±3(℃) |
| α Δ ISC | 0.0476(%/degree) |
| β Δ VOC | -0.3070(%/degree) |
| γ Δ Pmax | -0.3753(%/degree) |

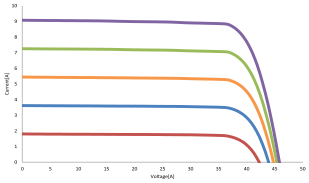
### • I-V Curve



### • Temperature Coefficient (Cell)

| | |
|---|---|
| NOCT | 45±3(℃) |
| α Δ ISC | 0.049(%/degree) |
| β Δ VOC | -0.333(%/degree) |
| γ Δ Pmax | -0.42(%/degree) |

### • I-V Curve



### • Mechanical Characteristics

| | |
|---|---|
| Solar Cells | 156.75 x 156.75mm |
| Front Glass | Low Iron Tempered Glass |
| Junction Box | JM13D: IP67 / 3Bypass Diode |
| Output Cable | 4mm² Cable, MC 4(Compatible) Type |
| Frame | AL Alloy Type(Anodized) |

### • Tested Operation Conditions

| | |
|---|---|
| Max Load | 40 lbs/ft2 |
| Impact Resistance | 25mm, 23m/s |
| Operating Temperature | -40~+85℃ |
| System Voltage | 1,500V (Smart J/Box : 1000V) |

### • Safety Ratings & Warranties

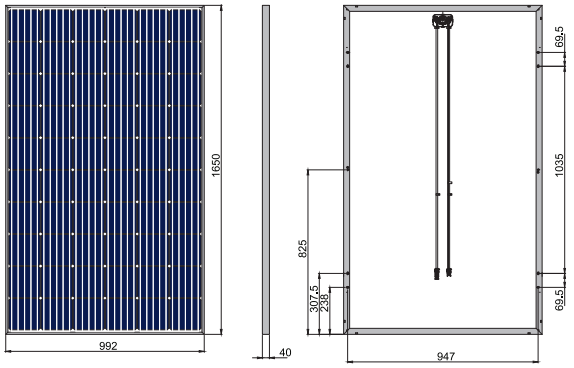
| | |
|---|---|
| Fire Safety Classification | Type 1 |
| Salt-Mist Corrosion Test | Pass |
| Visible Light Reflected | ( ~ 5.00%)<br>For more information, please contact us. |
| Warranty | 10 Years limited Product Warranty |
| | 10 Years limited Power Warranty : 90% |
| | 25 Years limited Power Warranty : 80% |
| Certifications | UL 1703 |

※ Above data may be changed without prior notice.

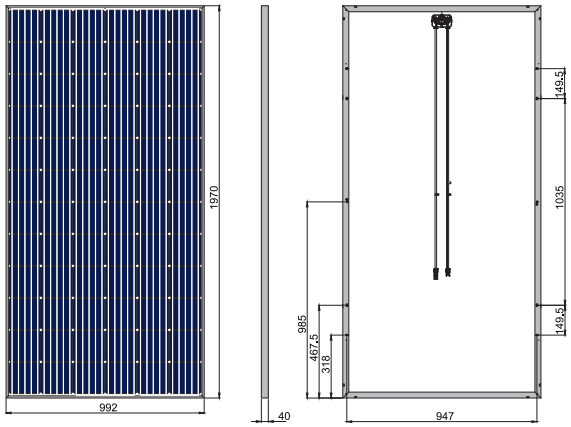
# Mono 60cell/72cell

c UL us LISTED

## 60 Cell




## 72 Cell




| Item | SS-BM290 | SS-BM295 | SS-BM300 |
|---|---|---|---|
| Peak Power(Wp) | 290 | 295 | 300 |
| Open Circuit Voltage(V) | 38.74 | 38.92 | 39.10 |
| Short Circuit Current(A) | 9.90 | 9.97 | 10.04 |
| Voltage at Pmax(V) | 30.9 | 31.07 | 31.29 |
| Current at Pmax(A) | 9.43 | 9.51 | 9.59 |
| Efficiency(%) | 17.72 / 17.78 | 18.02 / 18.09 | 18.33 / 18.40 |
| Dimension(mm) | 992 X 1,650 X 40 / 992 X 1,644 X 35 | | |
| Weight(Kg) | 18.8±0.2 | | |

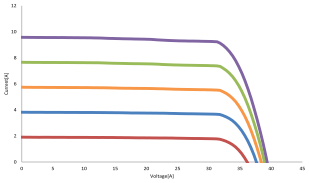
| Item | SS-DM360 | SS-DM365 | SS-DM370 |
|---|---|---|---|
| Peak Power(Wp) | 360 | 365 | 370 |
| Open Circuit Voltage(V) | 47.20 | 47.41 | 47.62 |
| Short Circuit Current(A) | 9.98 | 10.05 | 10.12 |
| Voltage at Pmax(V) | 38.23 | 38.42 | 38.62 |
| Current at Pmax(A) | 9.43 | 9.50 | 9.58 |
| Efficiency(%) | 18.42 / 18.48 | 18.68 / 18.73 | 18.93 / 18.99 |
| Dimension(mm) | 992 X 1,970 X 40 / 992 X 1,964 X 35 | | |
| Weight(Kg) | 21.8±0.2 | | |

※ All data is tested under STC(Standard Test Conditions). ※ Peak power tolerance 0 ~ +3.0 ※ Please make sure to check the output range per certification.

### • Temperature Coefficient

| | |
|---|---|
| NOCT | 45±2(℃) |
| α Δ ISC | 0.05(%/degree) |
| β Δ VOC | -0.31(%/degree) |
| γ Δ Pmax | -0.38(%/degree) |

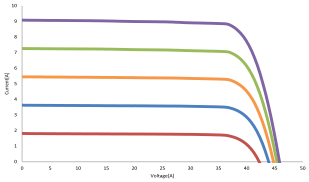
### • I-V Curve



### • Temperature Coefficient

| | |
|---|---|
| NOCT | 45±2(℃) |
| α Δ ISC | 0.05(%/degree) |
| β Δ VOC | -0.31(%/degree) |
| γ Δ Pmax | -0.38(%/degree) |

### • I-V Curve



### • Mechanical Characteristics

| | |
|---|---|
| Solar Cells | 156.75 x 156.75mm |
| Front Glass | Low Iron Tempered Glass |
| Junction Box | JM13D: IP67 / 3Bypass Diode |
| Output Cable | 4mm² Cable, MC 4(Compatible) Type |
| Frame | AL Alloy Type(Anodized) |

### • Tested Operation Conditions

| | |
|---|---|
| Max Load | 40 lbs/ft2 |
| Impact Resistance | 25mm, 23m/s |
| Operating Temperature | -40~+85℃ |
| System Voltage | 1,500V (Smart J/Box : 1000V) |

### • Safety Ratings & Warranties

| | |
|---|---|
| Fire Safety Classification | Type 1 |
| Salt-Mist Corrosion Test | Pass |
| Visible Light Reflected | ( ~ 5.00%)<br>For more information, please contact us. |
| Warranty | 10 Years limited Product Warranty |
| | 10 Years limited Power Warranty : 90% |
| | 25 Years limited Power Warranty : 80% |
| Certifications | UL 1703 |

※ Above data may be changed without prior notice.

# COMPANY INFO

**Shinsung E&G** was established in 1977 and has started PV business, the key field of renewable energy since 2007. Currently, we have obtained 600MW annual capacity of solar cells at Jeungpyeong factory and 200MW annual capacity of solar module at Eumseong factory. In the first half of 2017, we newly developed a high-efficiency PERC solar cell achieved 21.7% efficiency rate through our mass producing. Shinsung E&G will continue its efforts to make a difference in the global solar industry.

## OUR WORKS

## HISTORY

- **1977** • Establishment of Shinsung Industry
- **1991** • Awarded with Iron Tower Order of Industrial Service Merit
- **1998** • Received 10 Million Dollars Exporting Award
- **2005** • Awarded with Gold Tower Order ofIndustrial Service Merit
- **2007** • Launching solar cell business
- **2008** • Split of Shinsung into three independent companies - Shinsung Holdings, Shinsung ENG and Shinsung FA
  • Change listing and resume listing on the stock market
- **2009** • Opened Solar Energy Promotion Center
  • Achieved ISO 9001, ISO 14001, IEC 61215, IEC 61730
- **2010** • Developed the world's first 19.6% in solar energy conversion efficiency of solar cell
  • Received 30 Million Dollars Exporting Award
  • Received Prime Minister Commendation
  • Received the President Commendation in Outstanding Job Creating Company
- **2011** • Changed the company name to Shinsung Solar Energy
  • Expansion of solar cell line (total 350MW)
  • Entered module industry (total 150MW)
  • Established 'solar cell → module → installation' system
  • Recieved the top Korean certification in 250W, 255W and 260W module efficiency
- **2012** • Achieved research performance of 20.03% for energy conversion efficiency in solar cells
  • Launched solar energy EPC business
  • Certified to OHSAS 18001
- **2013** • Registered Program-CDM Business with the UN
  • Received 0% in efficiency reduction ratio of PID test
  • Program CDM business registered by UN Achieved 0% of efficiency reduction on PID test
- **2014** • '50 Million-dollar Export Tower' Award
- **2015** • '100 Million-dollar Export Tower' Award
- **2016** • Achieved research performance of 20.29% for energy conversion efficiency in solar cells
  • Improving production lines by the end of 2016 (Solar cells : 600MW, Modules : 200MW)
  • Shinsung Solar Energy affiliated with ShinsungENG, ShinsungFA
- **2017** • Changed the company name to Shinsung E&G Co.,Ltd
  • Achieved in mass producing of mono-crystalline PERC solar cells with 21.7% efficiency
  • '300 Million-dollar Export Tower' Award

SHINSUNG E&G

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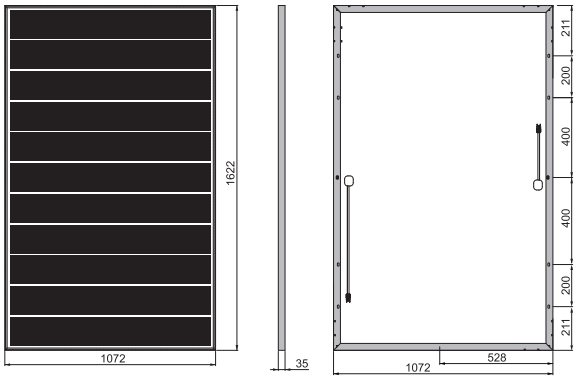
# NEW

# 60cell

## SAM (Shinsung Advanced Module)




| Item | 320W Black | 325W Black | 330W Black | 335W Black | 340W Black |
|---|---|---|---|---|---|
| Peak Power(Wp) | 320 | 325 | 330 | 335 | 340 |
| Open Circuit Voltage(V) | 44.30 | 44.50 | 44.80 | 45.00 | 45.20 |
| Short Circuit Current(A) | 9.36 | 9.40 | 9.47 | 9.53 | 9.59 |
| Voltage at Pmax(V) | 36.50 | 36.70 | 36.90 | 37.10 | 37.30 |
| Current at Pmax(A) | 8.77 | 8.86 | 8.95 | 9.03 | 9.12 |
| **Efficiency(%)** | **18.40** | **18.70** | **19.00** | **19.30** | **19.60** |
| Dimension(mm) | 1,622 X 1,072 X 35 | | | | |
| Weight(Kg) | 19.0 | | | | |

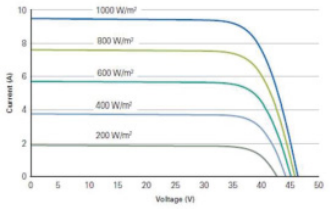
※ All data is tested under STC(Standard Test Conditions). ※ Peak power tolerance 0~+5Wp ※ Please make sure to check the output range per certification.

### • Mechanical Characteristics

| | |
|---|---|
| Solar Cells | Monocrystalline PERC |
| Front Glass | 3.2mm High Transmission, AR Coated Tempered Glass |
| Junction Box | IP65/IP67 rated, with bypass diodes |
| Output Cable | 4mm² (EU) / 12 AWG (US), 900mm |
| Frame | Black Anodized Aluminum |

### • Temperature Coefficient

| | |
|---|---|
| NOCT | 45±2(℃) |
| α Δ ISC | 0.04% / ℃ |
| β Δ VOC | -0.31% / ℃ |
| γ Δ Pmax | -0.41% / ℃ |




### • Maximum Ratings

| | |
|---|---|
| Operational Temperature | -40℃ ~ +85℃ |
| Maximum Series Fuse Rating | 13A |
| Maximum System Voltage | 1,000V |

※ Above data may be changed without prior notice.