INSTALLATION MANUAL

FOR JA Solar PHOTOVOLTAICMODULES

JAM72D00-*/BP, ***=330 to 370, in increment of 5;**

JAM60D00-*/BP, ***=275 to 310, in increment of 5;**

JAM72D00-*/PR, ***=340 to 370, in increment of 5;**

JAM60D00-*/PR, ***=285 to 315, in increment of 5;**

JAP60D00-*/SC, ***=260 to 285, in increment of 5;**

JAP72D00-*/SC, ***=310 to 330, in increment of 5;**

JAP60D00-*/PR, ***=275 to 290, in increment of 5;**

JAP72D00-*/PR, ***=330 to 345, in increment of 5;**

IMPORTANT SAFETY INSTRUCTIONS

This manual contains important safety instructions for the PV module that must be followed during theinstallation and the maintenance of PV modules.

PLEASE READ THIS MANUAL CAREFULLY BEFORE INSTALLING OR USING THE MODULES.

PLEASE PASS ALONG THIS MANUAL TO YOUR CUSTOMER.

1. INTRODUCTION

Thank you for choosing JA SOALR Modules!

This Installation Manual contains essential information for electrical and mechanical installation that you must know before handling, installing JA Solar Modules. This Manual also contains safety information you need to be familiar with. All the information described in this Manual is the intellectual property of JA Solar and is based on the technologies and experience that have been acquired and accumulated by JA Solar.

This Manual does not constitute a warranty, expressed or implied. JA Solar does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of or in any way connected with installation, operation, use or maintenance of Modules. No responsibility is assumed by JA Solar for any infringement of patents or other rights of third parties that may result from use of Modules. JA Solar reserves the right to make changes to the product, specifications or installation manual without prior notice.

Failure to comply with the requirements listed in this manual will invalidate the Limited Warranty for Modules as provided by JA Solar at the same time of sale to the direct customer. Additional recommendations are provided to enhance safety practices and performance results. Please provide a copy of this manual to the PV system owner for their reference, and inform them of all relevant aspects of safety, operation, and maintenance.

2. Codes and Regulations

The mechanical and electrical installation of PV systems should be performed in accordance with all applicable codes, including electrical codes, building codes and electric utility interconnect requirements. Such requirements may vary for mounting location, such as building rooftop or motor vehicle applications. Requirements may also vary with system voltage, and for DC or AC application. Contact local authorities for governing regulations.

3. General

3.1 Product identification

Each module has three labels providing the following information:

1. Nameplate: describes the product type; Peak power, Max. power current, Max. power voltage,open circuit voltage, short circuit current, all as measured under standard testconditions; Certifications mark, the maximum system voltageetc.
2. Current Sorting: Modules are sorted out according totheir Max. power current, referred as a corresponding symbol "Current class X" attached, in which x takesthe value H, M or L(H marks physically the highest current). To get optimal performanceout of a string of Modules it is recommended to connect only Modules of the same "Current class X"class (for example only H Modules) in one given string.
3. Barcode: each individual module has a unique serial number. The serial number has15 digits. The 1st and the 2nddigits are the year code, and the 3th is the month code. For example, 121PXXXXXXXXXX means the module wasassembled and tested in the January of 2012. Each module has only one bar code. Itis permanently attached to the interior of the module and is visible from the top frontof the module. This bar code is inserted prior to laminating.In addition, you can finda same barcode at the nameplate beside.

3.2 Conventional Safety

JA Solar Modules are designed to meet the requirements of IEC 61215:2016 and IEC 61730:2016, application class A. Modules rated for use in this application class may be used in system operating at greater than 50V DC or 240W, where general contact access is anticipated. Modules qualified for safety through IEC 61730-1:2016 and IEC 61730-2:2016 and are designed to meet the requirements for safety class II equipments.

When Modules are mounted on rooftops, the roof must have a fire resistant covering suitable for this application. Rooftop PV systems should only be installed on rooftop to be capable of handling the additional weighted load of PV system components, including Modules, by a certified building specialist or engineer and have a formal structure of the complete analysis result.

For your safety, do not attempt to work on a rooftop until safety precautions have been identified and taken, including without limitation fall protection measures, ladders or stairways, and personal protective equipment.

For your safety, do not install or handle Modules under adverse conditions, including without limitation strong or gusty winds, and wet or frosted roof surfaces.

3.3 Electrical performance Safety

Photovoltaic Modules can produce DC electricity when exposed to light and therefore can produce an electrical shock or burn. DC voltage of 30 Volts or higher is potentially lethal.

Modules produce voltage even when not connected to an electrical circuit or load. Please use insulated tools and rubber gloves when working with Modules in sunlight.

Modules have no on/off switch. Modules can be rendered inoperative only by removing them from

sunlight, or by fully covering their front surface with cloth, cardboard, or other completely opaque material, or by working with Modules face down on a smooth, flat surface.

In order to avoid arcs and electrical shock, please do not disconnect electrical connections under load. Faulty connections can also result in arcs and electrical shock. So please keep connectors dry and clean, and ensure that they are in proper working condition. Never insert metal objects into the connector, or modify them in any way in order to secure an electrical connection.

Modules can produce higher output than the rated specifications. Industry standard ratings are made at Standard Test Conditions of 1000 W/m² Irradiance, 25°CCellTemperature and 1.5 Air Mass.

Reflection from snow or water can increase sunlight and therefore boost current and power. In addition, colder temperatures can substantially increase voltage and power.

If the glass or other material is damaged, please wear personal protection equipment and separated the nodule from the circuit.

Do not touch the Modules if it's wet, unless during the cleaning procedure. At the same time the cleaning operation must according to the manual.

Do not touch the wet connector without protecting yourself with personal protection equipment or rubber gloves.

Do not use mirrors or other magnifiers to concentrate sunlight onto the Modules.

3.4 Operating Safety

Do not open the package of JA Solar Modules until they are ready to be installed during transportation and storing.

At the same time please protect the package against exposure to damage. Secure pallets from falling over.

Do not exceed the maximum height of pallets to be stacked, as indicated on the pallet packaging.

Store pallets in a ventilated,rain-proof and dry location until the Modules are ready to be unpackaged.

Please unpack the package of JA Solar Modules according to "JA Solar Modules Un-Pack Instruction".

Do not lift the Modules by grasping the Module's junction box or electrical leads in any condition.

Do not stand or step on the Modules.

Do not drop the Modules on another Module.

Do not place any heavy objects on the Modules to avoid glass breakage.

Be cautious when setting the Modules down on to a surface, especially on the corner of the Modules.

Inappropriate transport and installation may break the Modules.

Do not attempt to disassemble the Modules, and do not remove any attached nameplates or components from the Modules.

Do not apply paint or adhesive to the Modules top surface.

To avoid damage to the backsheet, do not scratch or hit the backsheet.

Do not drill holes in the frame. This may compromise the frame strength and cause corrosion of the frame.

Do not scratch the anodized coating of the frame (except for grounding connection). It may cause corrosion of the frame or compromise the frame strength.

Do not attempt to repair the Modules with damaged glass or backsheet.

Work only under dry conditions, and use only dry tools. Do not handle Modules when they are wet unless wearing appropriate protective equipment.

When storing uninstalled Modules outdoor for any period of time, always cover the Modules and ensure that the glass faces down to stop water from collecting inside the Modules and causing damage to exposed connectors.

3.5 Fire Safety

Consult your local authority for guidelines and requirements for building or structural fire safety.JA Solar modules have been listed as Class A(Both flame spread class A and burning brand class A) according to UL790 standard. Also, the building covering material fire resistance should be taken into consideration based on national buildingcode.

Roof constructions and installations may affect the fire safety of building. Improper installation may create hazards in the event of a fire.

In order to maintain the fire class rating, the distance between the modulesframe surface (glass) and the roof surface shall be at least 10 cm.

Use appropriate components such as fuses, circuit breaker and grounding connector as requires by local authority.

Do not use Modules where flammable gasses may be generated.

4 Installation Condition

4.1 Installation position and working environment

JA Solar Modules are intended for use in terrestrial applications only—no outer space use.

Modules must not be installed nor operated in areas where, salt, hail, snow, sand, dust, air pollution, chemically active vapors, acid rain, soot, etc., are excessive.

Please adopt appropriate measures to ensure the performance and safety of the Modules when they are installed or operated in the areas where produces heavy snow, extremely cold, strong wind ,or near the island or desert where is prone to produce salt fog, or near water.

Modules must be mounted on appropriate mounting structures positioned on suitable buildings, the ground, or other structures suitable for Modules (e.g. carports, building facades or PV trackers). Modules must not be mounted on moving vehicles of any kind.

Modules must not be installed in locations where they could be submerged in water.

Modules should be installed in locations where the altitude is less than 2000m

The PV modules of JA Solar are suitable for operation in outdoor non-weather protected locations, exposed to direct and indirect solar radiation, in an environmental temperature range of at least –40 °C to +40 °C and up to 100 % relative humidity as well as rain.

Ensure Modules are not subject to wind or snow loads exceeding the maximum permissible loads.

The Modules should be installed in a location where there's no shading throughout the year. Ensure there's no obstacle to block light near the installation site.

Lightning protection is recommended for PV systems that are to be installed in locations with high probability of lightning strikes.

Do not use Modules near equipment or in locations where flammable gasses may be generated or collected.

JA Solar Modules must not be sited in locations where aggressive substances such as salt or salt-water, or any other type of corrosive agent, could affect the safety and/or performance of the Modules.

JA Solar Modules have passed salt mist corrosion resistance test according to IEC 61701, but galvanic corrosion can occur in mounting or grounding hardware if such hardware is comprised of dissimilar metals. JA Solar recommends that metal parts designed shall not be in contact to metal parts that have a difference of their electrochemical potentials of more than 600 mV.

4.2 Tilt Angle Selection

The tilt angle of the Modules is measured between the surface of the Modules and a horizontal ground surface. The Modules generates maximum power output when it faces the sun directly.

In the northern hemisphere, Modules should typically face south, and in the southern hemisphere, Modules should typically face north.

For detailed information on the best installation angle, please refer to standard solar photovoltaic installation guides or consult a reputable solar installer or systems integrator.

In order to maintain corresponding fire rating, the angle should be not less than 5 in/ft (127 mm/305 mm) when Modules are installed on the rooftop.

Dust building up on the surface of the Modules can impair with Modules performance. JA solar recommends installing the Modules with a tilt angle of at least10 degrees, making it easier for dust to be washed off by rain.

5 Mechanical Installation

5.1 Conventional requirements

Ensure the installation method and supporting system of Modules is strong enough to make the nodules can withstand all the load conditions. The Installer must provide this guarantee. The installation supporting system must be tested by the third-party organization with the analysis ability of Static Mechanical.

The Modules mounting structure must be made of durable, corrosion-resistant and UV-resistant material.

Modules must be securely attached to the mounting structure.

In regions with heavy snowfall in winter, select the height of the mounting system. So that the lowest edge of the Modules is not covered by snow for any length of time. In addition, ensure that the lowest portion of the Modules is placed high enough so that it is not shaded by plants or trees or damaged by

flying sand.

When the Modules are supported parallel to the surface of the building wall or roof, a minimum clearance of 10 mm between the Modules frame and the surface of the wall or the roof is required to allow air to circulate behind the Modules and to prevent wiring damage.

Do not attempt to drill holes in the glass surface and the Modules frames of the Modules as this will void the warranty.

Before installing Modules on a roof, ensure that the roof construction is suitable. In addition, any roof penetration required to mount the Modules must be properly sealed to prevent leaks.

Observe the linear thermal expansion of the Modules frames (the recommended minimum distance between two Modules is 1 cm).

Always keep the back sheet of the panel free from foreign objects or structural elements, which could come into contact with the panel, especially when the panel is under mechanical load.

JA Solar Modules have been certified for a maximum design static load on the back side of 1600 Pa with safety factorγ_m=1.5 (i.e. wind load) and a maximum design static load on the front side of 3600 Pa with safety factorγ_m=1.5 (i.e. wind and snow load), depending on the Modules type (please refer to Figure 3 for detailed installation method)

The mounting method should not result in the direct contact of dissimilar metals with the aluminum frame of the Modules that will result in galvanic corrosion. An addendum to IEC 60950-1 Table J.1 recommends metal combinations not exceed an electrochemical potential difference of 0.6 Volts.

JA Solar Modules can be mounted in landscape or portrait orientation.

5.2 Installation methods

Modules can be installed to the racks by clamps or hooks. Modules must be installed according to the following examples and recommendation. If not mounting the Modules according to these instructions, please in advance consult JA Solar and must be approved by JA solar, otherwise may damage Modules and void the warranty.

5.2.1 Modules be installed with clamps

Module can be installed by specified clamps as shown in Figure 1.

Module need metal clamp to be fixed on the racks JA Solar recommend you use clamp as below Specifications or clamps approved by system installer（recommend supplier Jiang yin haida）

Length :80mm 、120mm or 150mm

Thickness: ≥3mm

Material: Aluminium alloy

Rubber washer: ethylene-propylene-diene misch-polymere（EPDM）

Bolt: M8

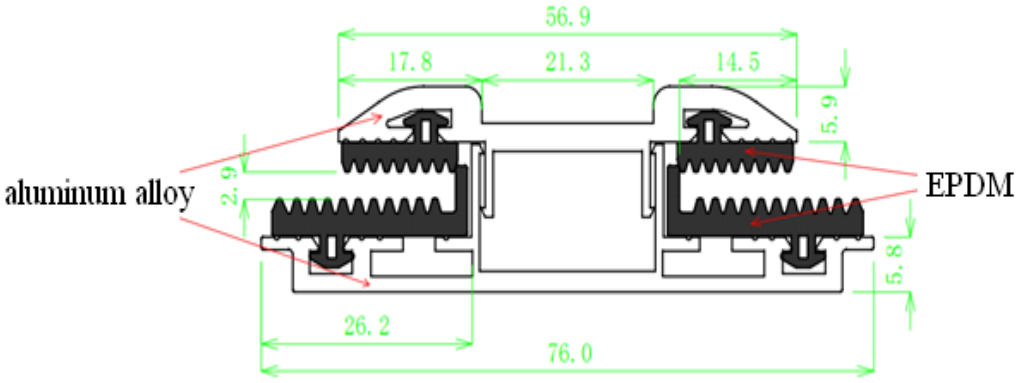


Figure 1Clamp structure

The Modules clamps must not contact the glass directly or deform and damage the glass in any cases, clamp need embedded with the rubber washer, which play a buffer function when install double glass module the contact area of clamp with the glass surface must be smooth, otherwise maybe damage the modules Avoid shading effects from the Modules clamps. We recommend you use M8Bolt to fix the clamp and the torque should between 16N・m and 20 N・m, suggest you use the bolt show in figure 3 also need to make sure the bolt not too high to cause the shading problem.

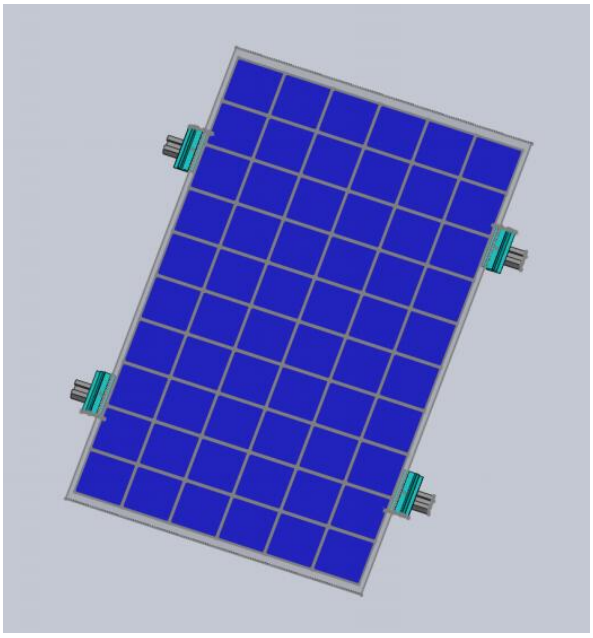


Figure 2module installed with clamp

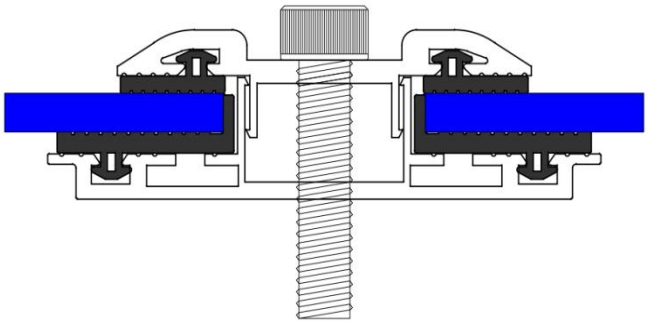


Figure 3 cross-section structure of clamp

5.2.2Modules be installed with hooks

Double glass module backside attached with hooks it can be installed on the U shape steel racks

directly structure as show in Figure 5

When double glass module be installed with hooks the maximum static load on the backside of the Modules is 2400 Pa (i.e. wind load), and the maximum static load on the front of the Modules is 3600 Pa (i.e. wind and snow load).

A、Double glass module with hooks it can be installed on steel racks directly，then use Bolt fixed between hooks and U shape steel

Bolt: M6

B、Bolt cause the deformation of mounting holes at hooks is forbidden

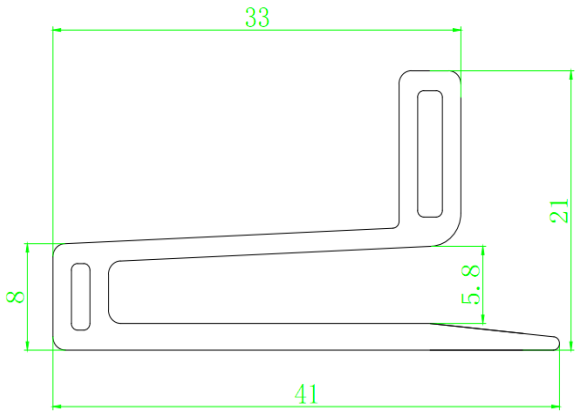


Figure 4 cross-section structure of hook

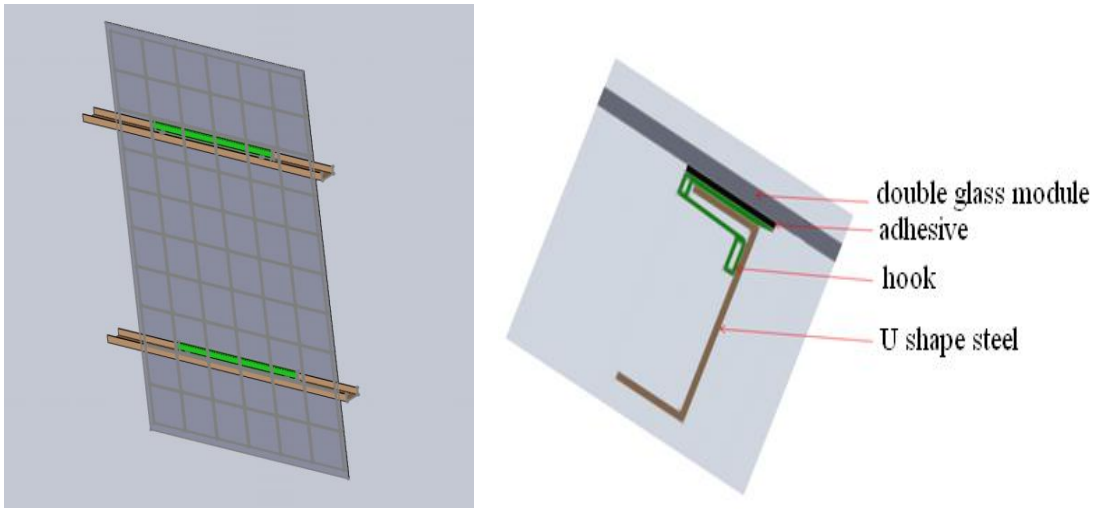


Figure 5 diagram of module be installed with hook

5.2.3 Description of the installation position

✧ The following normal level of load conditions is applicable to the installation in extreme environment: the maximum design static load with safety factory γ_m=1.5 on the backside of the Double glass Modules

is1600 Pa (i.e. wind load) and the maximum design static load with safety factorγ_m=1.5 on the front of the Double glass Modules is 3600 Pa (i.e. wind and snow load).

✧ The higher level of load conditions is applicable to the installation in extreme environment: the maximum static load on the backside of the Double glass Modules is 2400 Pa (i.e. wind load) and the maximum static load on the front of the Double glass Modules is 5400 Pa (i.e. wind and snow load), this is the highest pressure level that module would endure according to IEC standard.

✧ For the dynamic loads, such as blast of wind, the safety factor needs to be increased to 3 times. It means that the maximum dynamic load is 800 Pa and the wind speed should less than 130 km/h.

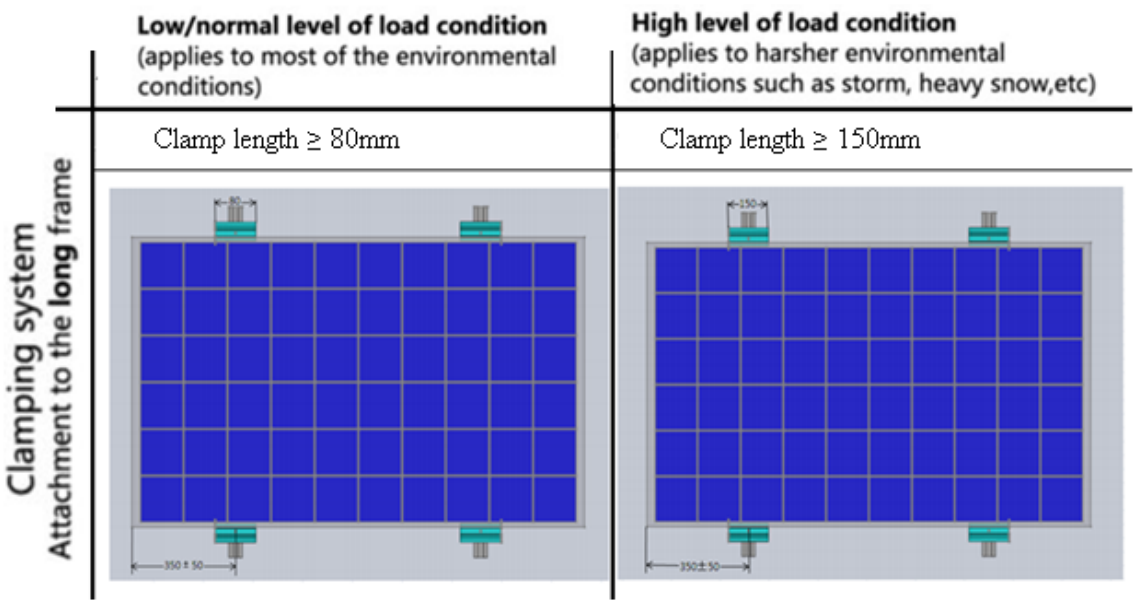


Figure 6 Position requirements for Clamps installation of 60 DG module

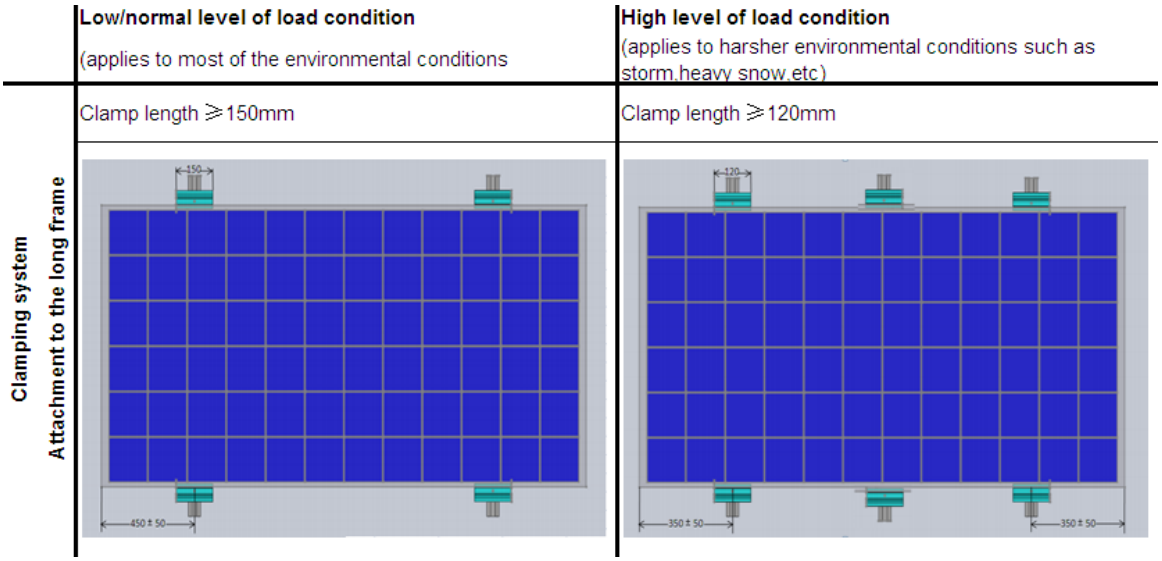


Figure 7 Position requirements for Clamps installation of 72 DG module

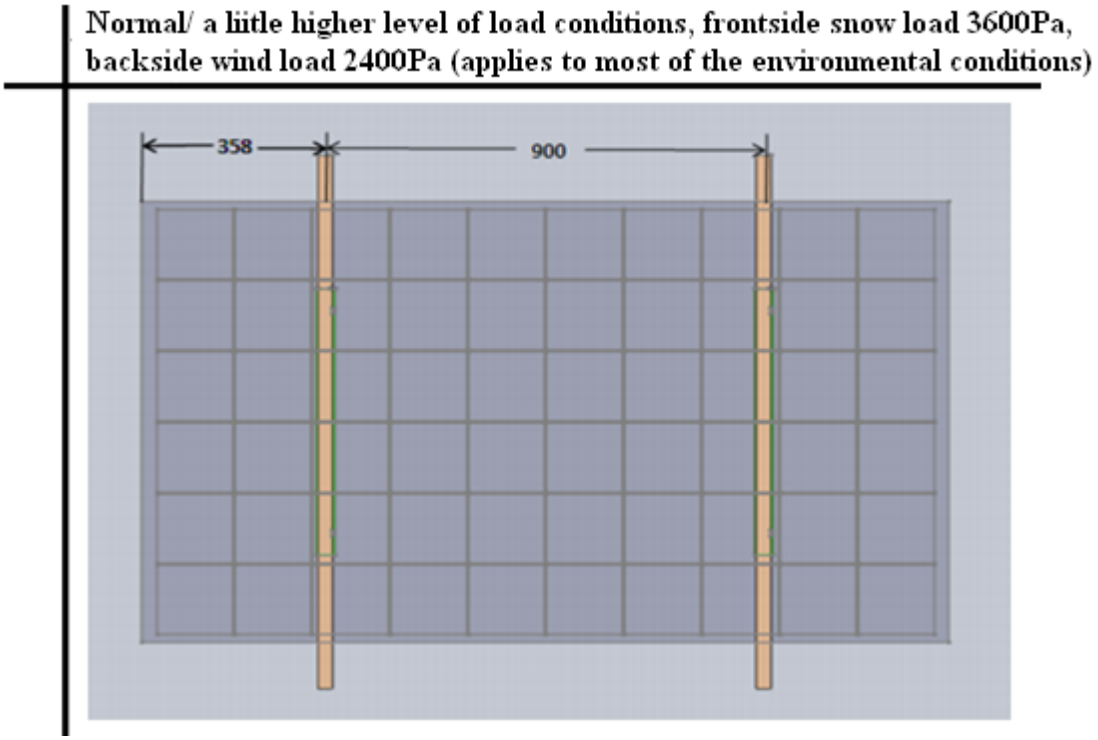


Figure 8 Position requirements for hooks installation

6 Electrical Installation

6.1 Electrical Property

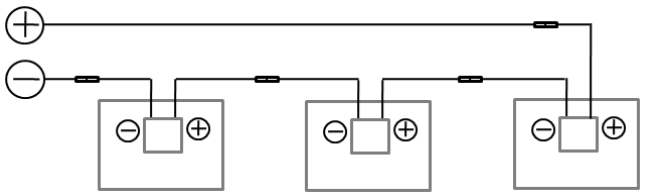
Rated electrical characteristics such as Isc within +/- 4 %, Voc within +/- 2 % and Pmax +/- 3 % production tolerance values at Standard Test Conditions. Under normal conditions, the photovoltaic Modules may experience conditions that produce more current and/or voltage than reported at Standard Test Conditions. Accordingly, "Under normal conditions, a photovoltaic module is likely to experience conditions that produce higher current and/or voltage than reported at standard test conditions. Accordingly, the values of I sc and Voc marked on this PV module should be multiplied by a factor of 1,25when determining component voltage ratings, conductor current ratings, and size of controls(e.g. inverter) connected to the PV output."

The safety factor of 1.25 for the minimum voltage rating of the components can be modified during the design of a system according to the minimum temperature of the location of the installation and the temperature coefficient for Voc I sc can be adjusted based on maximal temperature, irradiance and orientation of the module. To this end a full simulation for the specific location is required using long term weather data.

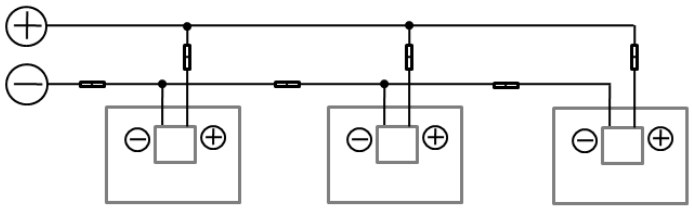
Voltages are additive when Modules are connected directly in series, and Modules currents are additive when Modules are connected directly in parallel, as illustrated in Figure 9.

Modules with different electrical characteristics must not be connected directly in series.

Series wiring



Parallel wiring



Series wiring and Parallel wiring

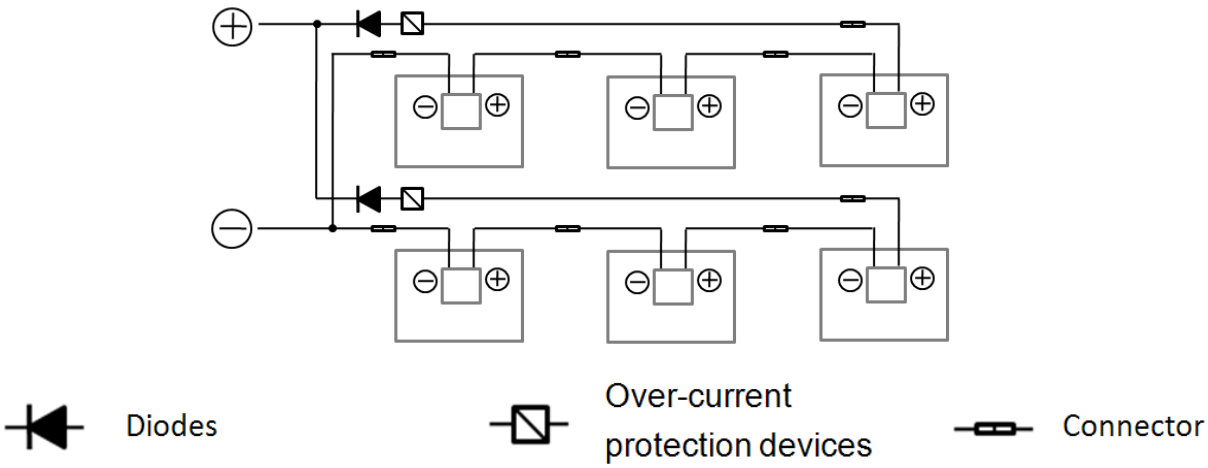


Figure 9: Electrical diagrams of series and parallel wiring

The maximum number of Modules that can be connected in a series string must be calculated in accordance with applicable regulations in such a way that the specified maximum system voltage (The maximum system voltage of JA Solar Modules is DC 1500V according to the safety appraisal of the IEC61730: 2016) of the Modules and all other electrical DC components will not be exceeded in open-circuit operation at the lowest temperature expected at the PV system location.

Correction factor for the open-circuit voltage can be calculated based on the following formula: $C_{Voc}=1-\alpha_{Voc}\times(25-T)$. T is the lowest expected ambient temperature at the system location. α (%/°C) is the temperature coefficient of the selected module Voc(Refer to corresponding datasheet).

An appropriately rated over-current protection device must be used when the reverse current could exceed the value of the maximum fuse rating of the Modules. An over-current protection device is required for each series string if more than two series strings are connected in parallel, in Figure 9.

6.2 Cables and Wiring

These junction boxes have been designed to be easily interconnected in series for their well-connected cable and the connector with IP67 protection grade. Each Modules has two single-conductor wires, one positive and one negative, which are pre-wired inside the junction box. The connectors at the opposite end of these wires allow easy series connection of adjacent Modules by firmly inserting the positive connector of a Module into the negative connector of an adjacent Module until the connector is fully seated.

Use field wiring with suitable cross-sectional areas that are approved for use at the maximum short-circuit current of the Modules. JA Solar recommends installers use only sunlight resistant cables qualified for direct current (DC) wiring in PV systems. The minimum wire size should be 4mm^2.

RatingRequired Minimum Field Wiring

Testing Standard	Wire size	System voltage	Temperature Rating
EN 50618:2014	H1Z2Z2-K 1×4mm^2	DC:1500V AC: 1000V	-40ºC to +90ºC

Cables should be fixed to the mounting structure in such a way that mechanical damage of the cable and/or the Modules is avoided. Do not apply stress to the cables. For fixing, use appropriate means, such as sunlight resistant cable ties and/or wire management clips specifically designed to attach to the Modules frame. While the cables are sunlight resistant and waterproof, where possible, avoid direct sunlight exposure and water immersion of the cables.

6.3 Connectors

Keep connectors dry and clean, and ensure that connector caps are hand tight before connecting the Modules. Do not attempt making an electrical connection with wet, soiled, or otherwise faulty connectors. Avoid sunlight exposure and water immersion of the connectors. Avoid connectors resting on the ground or roof surface.

Faulty connections can result in arcs and electrical shock. Check that all electrical connections are securely fastened. Make sure that all locking connectors are fully engaged and locked. Besides, the connector should be mated with its original female or male connector of the same supplier.

For the detailed electrical parameter, see the below list:

Testing Standard	Manufacture	Type	System Voltage	Rated Current	Temperature Rating
IEC 62852:2014	ZHEJIANG ZHONGHUAN SUNTER PV TECHNOLOGYCO LTD http://www.pvzh.com	PV-ZH202B	DC 1500V	30A	-40ºC to +85ºC
IEC 62852:2014	AMPHENOL TECHNOLOGY (SHENZHEN) CO LTD http://www.amphenol.com	UTXCFabcd(female) UTXCMabcd(male)	DC 1500V	35A	-40ºC to +85ºC
IEC 62852:2014	Multi-Contact Essen GmbH http://www.multi-contact.com/	PV-KST4-EV02-XY PV-KBT4-EV02-XY	DC 1500V	45A	-40ºC to +85ºC
IEC 62852:2014	Jiangsu Tonglin ElectricCo., Ltd. http://www.jstl.com.cn/	TL-Cable01S-F	DC 1500V	30A	-40ºC to +85ºC
IEC 62852:2014	QC Solar (Suzhou) Corporation http://www.qc-solar.com/	QC4.10-35/45	DC 1500V	41A	-40ºC to +85ºC

6.4 Bypass Diodes

The junction boxes used with JA Solar Modules contain bypass diodes wired in parallel with the PV cell strings. In the case of partial shading, the diodes bypass the current generated by the non-shaded cells, thereby limiting Modules heating and performance losses. Bypass diodes are not over-current protection devices.

In the event of a known or suspected diode failure, installers or maintenance providers should contact JA Solar. Never attempt to open the junction box by yourself.

7 Operation and Maintenance

It is required to perform regular inspection and maintenance of the Modules, especially within warranty scope. It is the user's responsibility to report to the supplier regarding the damages found within 2 weeks.

7.1 Cleaning

The dust accumulated on the front transparent substrate may reduce the power output, and may even cause regional hot-spot effect. The industrial effluents or bird drops may be serious cases, and the extent of the severity depends on the transparency of the foreign objects. It's usually not dangerous of the accumulated dust to reduce the sunshine, because the light intensity is still homogeneous and the power reduction usually is not obvious.

When Modules are the work, there should exist environmental influence factors to cast shadows and cover part or even all of the Modules, such as other Modules, system support, bird drops and a lot of dust, clay or plant and so on, these may distinctly reduce the power output. JA Solar advises that there should be no obstructed object over the Modules surface at any time.

The cleaning frequency depends on the accumulating velocity of the fouling. In many instances the front subs substrate goes cleaned with the rain, and we can decrease the cleaning frequency. It is recommended to wipe the glass surface with wet sponge or soft cloth. Please do not clean the glass with cleaning agent which contains acid or alkali.

7.2 The visual inspection of the Modules

Inspect the Modules visually to find if there are appearance defect, the following two types need more attention especially:

A) Whether the glass is broken;
B) Corrosion along the cells' bus-bar.
   The corrosion is caused by the dampness in filtrated into the Modules when the surface encapsulation material damaged during the installation or transportation.
C) If there is burning vestige on the back sheet

7.3 Inspection of the connector and the cable

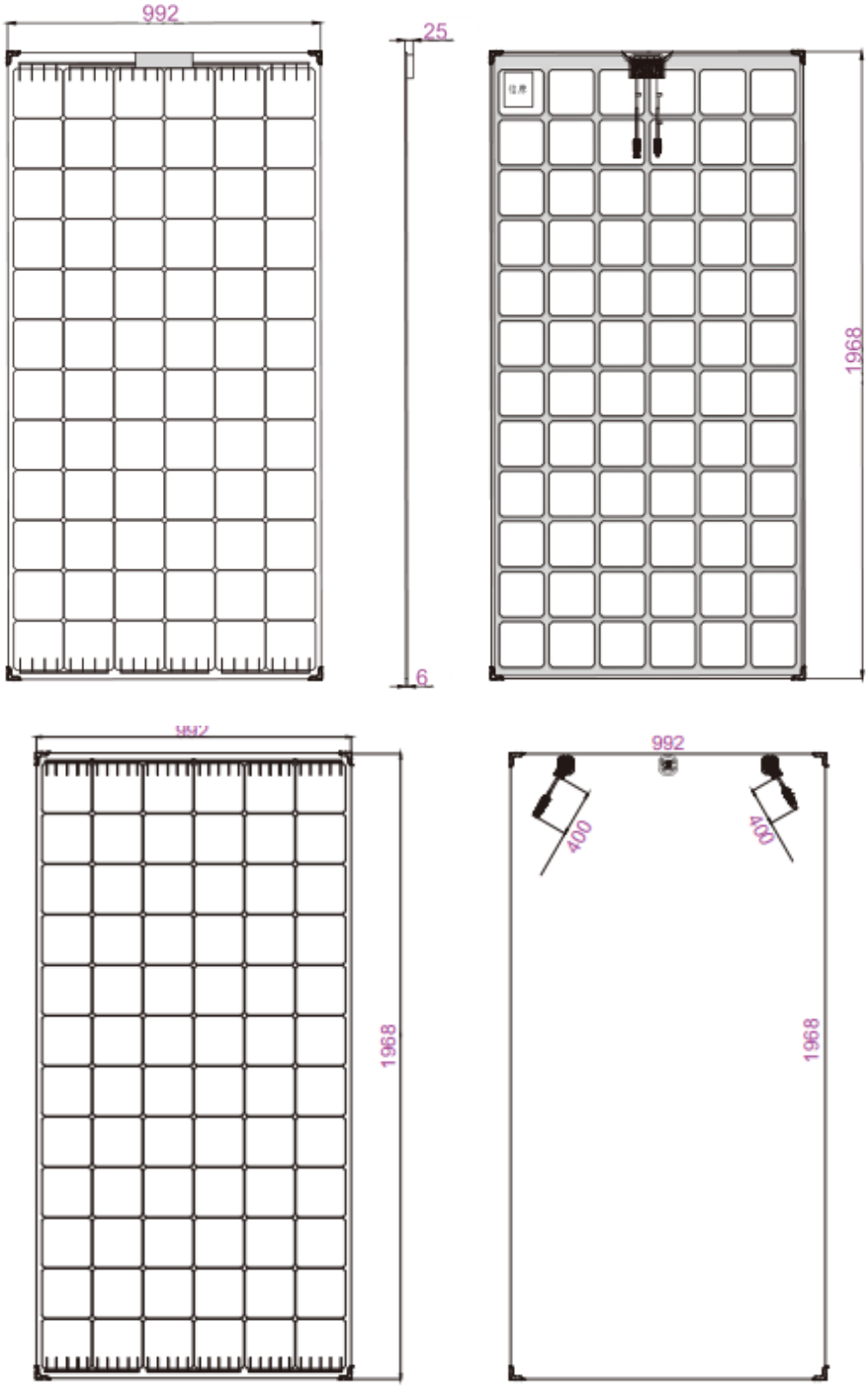
It's recommended to implement the following preventive maintenance every 6 months:

A) Check the encapsulation of the connector with the cable.

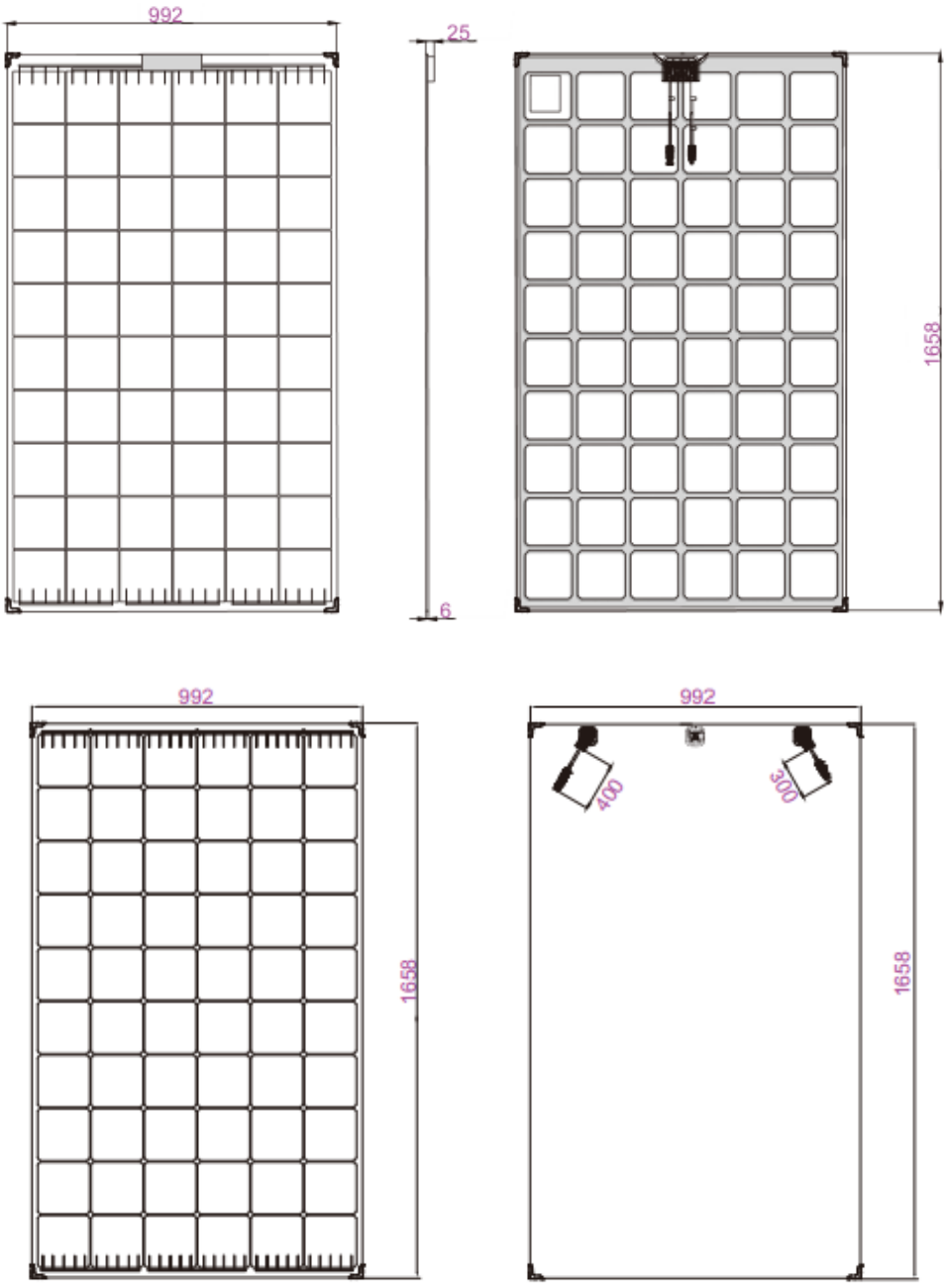
B) Check the sealing gel of the junction box to ensure if it is crack or crevice.

Appendix 1

1 Size information of double glass module



72 Cells Diagram



60 Cells Diagram

Appendix 2 Electrical Characteristics

Model	Module weight (kg)	Max. Power at STC condition	Max. system voltage(V)	Voc (V)	Isc (A)	Vpm (V)	Ipm (A)	Maximum Series Fuse(A)
JAM72D00-330/BP	28.3±3% or 29.5±3%	330	1500	46.63	9.27	38.51	8.57	20
JAM72D00-335/BP		335	1500	46.81	9.33	38.86	8.63	20
JAM72D00-340/BP		340	1500	47.03	9.39	39.13	8.69	20
JAM72D00-345/BP		345	1500	47.25	9.46	39.34	8.77	20
JAM72D00-350/BP		350	1500	47.48	9.53	39.59	8.85	20
JAM72D00-355/BP		355	1500	47.66	9.60	39.76	8.93	20
JAM72D00-360/BP		360	1500	47.84	9.67	39.96	9.01	20
JAM72D00-365/BP		365	1500	48.15	9.74	40.25	9.07	20
JAM72D00-370/BP		370	1500	48.44	9.80	40.53	9.13	20
Temperature Coefficient of Isc (α Isc)： +0.040% /℃			The tolerance of Voc is ±2%					
Temperature Coefficient of Voc (β Voc)：-0.360% /℃			The tolerance of Isc is ±4%					
Temperature Coefficient of Pmax (γPmp)：-0.360% /℃			The tolerance of Pmax is ±3%					
Dimensions (L×W×H) (mm): 1987x992x25mm, 1993x998x25/30mm (with frame)								

Model	Module weight (kg)	Max. Power at STC condition	Max. system voltage(V)	Voc (V)	Isc (A)	Vpm (V)	Ipm (A)	Maximum Series Fuse(A)
JAM60D00-275/BP	23.2±3% or 24.9±3%	275	1500	38.98	9.26	31.82	8.64	20
JAM60D00-280/BP		280	1500	39.18	9.33	32.15	8.71	20
JAM60D00-285/BP		285	1500	39.40	9.40	32.47	8.78	20
JAM60D00-290/BP		290	1500	39.58	9.49	32.77	8.85	20
JAM60D00-295/BP		295	1500	39.74	9.57	33.08	8.92	20
JAM60D00-300/BP		300	1500	39.98	9.66	33.45	8.97	20
JAM60D00-305/BP		305	1500	40.15	9.76	33.81	9.02	20
JAM60D00-310/BP		310	1500	40.48	9.82	34.16	9.08	20
Temperature Coefficient of Isc (α Isc)： +0.040% /℃			The tolerance of Voc is ±2%					
Temperature Coefficient of Voc (β Voc)：-0.360% /℃			The tolerance of Isc is ±4%					
Temperature Coefficient of Pmax (γPmp)：-0.360% /℃			The tolerance of Pmax is ±3%					
Dimensions (L×W×H) (mm): 1669x992x25mm, 1675x998x25/30mm (with frame)								

Model	Module weight (kg)	Max. Power at STC condition	Max. system voltage(V)	Voc (V)	Isc (A)	Vpm (V)	Ipm (A)	Maximum Series Fuse(A)
JAM72D00-340/PR	28±3% or 29.5±3%	340	1500	46.70	9.38	38.25	8.89	20
JAM72D00-345/PR		345	1500	46.99	9.45	38.47	8.97	20
JAM72D00-350/PR		350	1500	47.28	9.52	38.72	9.04	20
JAM72D00-355/PR		355	1500	47.59	9.58	38.93	9.12	20
JAM72D00-360/PR		360	1500	47.90	9.65	39.18	9.19	20

JAM72D00-365/PR		365	1500	48.18	9.72	39.45	9.26	20
JAM72D00-370/PR		370	1500	48.43	9.78	39.70	9.32	20
Temperature Coefficient of Isc (α Isc)： +0.060% /℃			The tolerance of Voc is ±2%					
Temperature Coefficient of Voc (β Voc)：-0.300% /℃			The tolerance of Isc is ±4%					
Temperature Coefficient of Pmax (γPmp)：-0.390% /℃			The tolerance of Pmax is ±3%					
Dimensions (L×W×H) (mm): 1968/1987x992x25mm, 1993x998x25/30mm (with frame)								

Model	Module weight (kg)	Max. Power at STC condition	Max. system voltage(V)	Voc (V)	Isc (A)	Vpm (V)	Ipm (A)	Maximum Series Fuse(A)
JAM60D00-285/PR	23±3% or 24.9±3%	285	1500	39.11	9.43	31.85	8.95	20
JAM60D00-290/PR		290	1500	39.42	9.51	32.16	9.02	20
JAM60D00-295/PR		295	1500	39.71	9.58	32.42	9.10	20
JAM60D00-300/PR		300	1500	40.02	9.65	32.72	9.17	20
JAM60D00-305/PR		305	1500	40.35	9.72	32.98	9.25	20
JAM60D00-310/PR		310	1500	40.63	9.80	33.27	9.32	20
JAM60D00-315/PR		315	1500	40.91	9.87	33.52	9.40	20
Temperature Coefficient of Isc (α Isc)： +0.060% /℃			The tolerance of Voc is ±2%					
Temperature Coefficient of Voc (β Voc)：-0.300% /℃			The tolerance of Isc is ±4%					
Temperature Coefficient of Pmax (γPmp)：-0.390% /℃			The tolerance of Pmax is ±3%					
Dimensions (L×W×H) (mm): 1658/1669x992x25mm, 1675x998x25/30mm (with frame)								

Model	Module weight (kg)	Max. Power at STC condition	Max. system voltage(V)	Voc (V)	Isc (A)	Vpm (V)	Ipm (A)	Maximum Series Fuse(A)
JAP60D00-260/SC	23±3% or 24.9±3%	260	1500	37.88	8.94	30.85	8.51	20
JAP60D00-265/SC		265	1500	38.16	9.02	31.14	8.58	20
JAP60D00-270/SC		270	1500	38.45	9.10	31.48	8.66	20
JAP60D00-275/SC		275	1500	38.72	9.18	31.76	8.74	20
JAP60D00-280/SC		280	1500	38.97	9.26	32.05	8.80	20
JAP60D00-285/SC		285	1500					
Temperature Coefficient of Isc (α Isc)： +0.058% /℃			The tolerance of Voc is ±2%					
Temperature Coefficient of Voc (β Voc)：-0.330% /℃			The tolerance of Isc is ±4%					
Temperature Coefficient of Pmax (γPmp)：-0.410% /℃			The tolerance of Pmax is ±3%					
Dimensions (L×W×H) (mm): 1658/1669x992x25mm, 1675x998x25/30mm (with frame)								

Model	Module weight (kg)	Max. Power at STC condition	Max. system voltage(V)	Voc (V)	Isc (A)	Vpm (V)	Ipm (A)	Maximum Series Fuse(A)
JAP72D00-310/SC	28±3% or 29.5±3%	310	1500	45.16	8.83	37.18	8.34	20
JAP72D00-315/SC		315	1500	45.47	8.90	37.46	8.41	20
JAP72D00-320/SC		320	1500	45.75	8.97	37.75	8.48	20
JAP72D00-325/SC		325	1500	46.04	9.04	38.06	8.54	20
JAP72D00-330/SC		330	1500	46.36	9.11	38.33	8.61	20

Temperature Coefficient of Isc (α Isc)： +0.058% /℃	The tolerance of Voc is ±2%
Temperature Coefficient of Voc (β Voc)：-0.330% /℃	The tolerance of Isc is ±4%
Temperature Coefficient of Pmax (γPmp)：-0.410% /℃	The tolerance of Pmax is ±3%
Dimensions (L×W×H) (mm): 1968/1987x992x25mm, 1993x998x25/30mm (with frame)	

Model	Module weight (kg)	Max. Power at STC condition	Max. system voltage(V)	Voc (V)	Isc (A)	Vpm (V)	Ipm (A)	Maximum Series Fuse(A)
JAP60D00-275/PR	23±3% or 24.9±3%	275	1500	38.47	9.37	31.28	8.80	20
JAP60D00-280/PR		280	1500	38.75	9.43	31.62	8.86	20
JAP60D00-285/PR		285	1500	39.05	9.48	31.91	8.94	20
Temperature Coefficient of Isc (α Isc)： +0.058% /℃			The tolerance of Voc is ±2%					
Temperature Coefficient of Voc (β Voc)：-0.330% /℃			The tolerance of Isc is ±4%					
Temperature Coefficient of Pmax (γPmp)：-0.410% /℃			The tolerance of Pmax is ±3%					
Dimensions (L×W×H) (mm): 1658/1669x992x25mm, 1675x998x25/30mm (with frame)								

Model	Module weight (kg)	Max. Power at STC condition	Max. system voltage(V)	Voc (V)	Isc (A)	Vpm (V)	Ipm (A)	Maximum Series Fuse(A)
JAP72D00-330/PR	28±3% or 29.5±3%	330	1500	46.04	9.35	37.58	8.79	20
JAP72D00-335/PR		335	1500	46.35	9.41	37.87	8.86	20
JAP72D00-340/PR		340	1500	46.66	9.47	38.19	8.91	20
JAP72D00-345/PR		345	1500	46.95	9.53	38.45	8.98	20
Temperature Coefficient of Isc (α Isc)： +0.058% /℃			The tolerance of Voc is ±2%					
Temperature Coefficient of Voc (β Voc)：-0.330% /℃			The tolerance of Isc is ±4%					
Temperature Coefficient of Pmax (γPmp)：-0.410% /℃			The tolerance of Pmax is ±3%					
Dimensions (L×W×H) (mm): 1968/1987x992x25mm, 1993x998x25/30mm (with frame)								

Appendix 3 The Parameter of Diode

J-box: PV-ZH011-1A, J-box diode: 20SQ045, supplied by Sunter

20SQ045

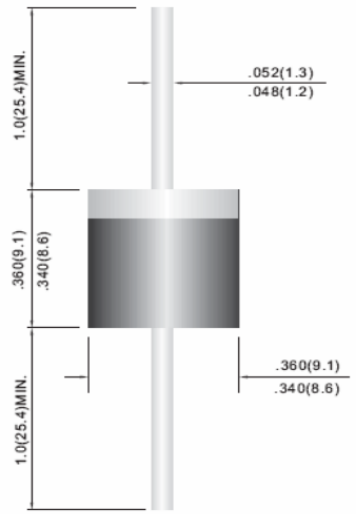
Ultra low VF Schottky Barrier Rectifier

VOLTAGE	45 Volts	CURRENT	20 Amperes

FEATURES

. Plastic package has Underwriters Laboratory
Flammability Classification 94V-O
Flame Retardant Epoxy Molding Compound
. Exceeds environmental tandards of MIL-S-19500/228
. Low power loss,high efficiency
. Ultralow forward voltge,high current capabilty
. High surge capacity
. For use in low voltage,high frequency inverters
free wheeling,and polarlity protection applications
. Pb free product:99% Sn above can meet RoHS environment
subatance directive request

P-600 Unit: inch(mm)



MECHANICAL DATA

. Case:**P-600** Molded plastic
. Terminals:Axial leads,solderable to MIL-STD-202,Method 208
. Polarity:Color Band denotes cathode end
. Standard packaging:Any
. Weight:0.07 ounces,2.1grams.

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

. Ratings at 25℃ ambient temperature unless otherwise specified.Single phase,half wave,60HZ,resistive or inductive load.
For capacitive load,derate current by 20%

PARAMETER	SYMBOL	20SQ045	UNITS
Maximum Recurrent Peak Reverse Voltage	V_{RRM}	45	V
Maximum RMS Voltage	V_{RMS}	32	V
Maximum DC Blocking Voltage	V_{DC}	45	V
Maximum Average Forward Current	$I_{F(AV)}$	20	A
Peak Forward Surge Current :8.3mS single half sine-wave superimposed on rated load(JEDEC method)	I_{FSM}	300	A
Maximum Forward Voltage at 20A	V_F	0. 55	V
Maximum DC Revers Current Tj=25'C at Rated DC blocking voltage Tj=100'C	I_R	0.5 100	mA
Typical Thermal Resistance	RθJC RθJL	2. 2 2. 0	℃/W
Operating Junction Temperature Range	T_J	-50 TO +200	℃
Storage Temperature Range	T_{STG}	-50 TO +175	℃

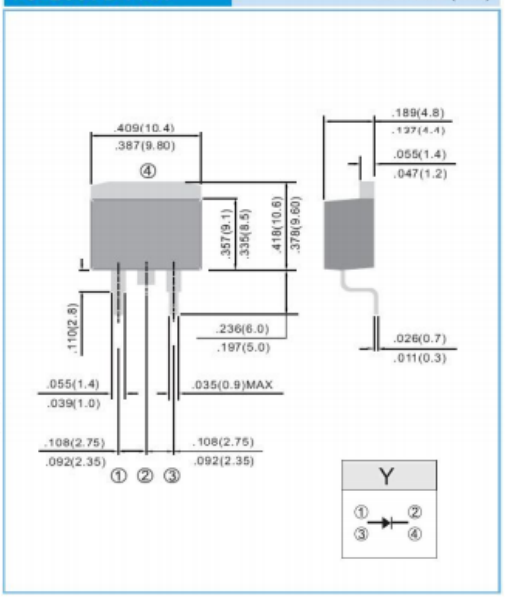
J-box: LSB-00173, J-box diode: SB3045DY, supplied by Panjit

SB3045DY

ByPass Diode for PV-Solar

VOLTAGE 45 Volts **CURRENT** 30 Amperes

TO-263 / D²PAK Unit: inch (mm)



FEATURES

. Plastic package has Underwriters Laboratory Flammability Classification 94V-O Flame Retardant Epoxy Molding Compound
. Exceeds environmental tandards of MIL-S-19500/228
. Low power loss,high efficiency
. Low forward voltge,high current capabilty
. High surge capacity
. For use in low voltage,high frequency inverters free wheeling,and polarlity protection applications
. Pb free product:99% Sn above can meet RoHS environment subatance directive request

MECHANICAL DATA

. Case:TO-263/D2PAK Molded plastic
. Terminals:Solder plated,solderable per MIL-STD-750,Method 2026
. Polarity:As marked.
. Standard packaging:Any
. Weight:0.06 ounces,2.24grams.

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

. Ratings at 25℃ ambient temperature unless otherwise specified.Single phase,half wave,60HZ,resistive or inductive load. For capacitive load,derate current by 20%

PARAMETER	SYMBOL	SB3045DY	UNITS
Maximum Recurrent Peak Reverse Voltage	V_{RRM}	45	V
Maximum RMS Voltage	V_{RMS}	36	V
Maximum DC Blocking Voltage	V_{DC}	45	V
Maximum Average Forward Current (see Fig.1)	$I_{F(AV)}$	30	A
Peak Forward Surge Current :8.3mS single half sine-wave superimposed on rated load(JEDEC method)	I_{FSM}	300	A
Maximum Forward Voltage at 30A	V_F	0.6	V
Maximum DC Revers Current (VR=45V) Tj=25'C Maximum DC Revers Current (VR=36V) Tj=100'C	I_R	0.5 100	mA
Typical Thermal Resistance	$R\theta JC$	2.0	℃/W
Junction temperature in DC forward current without reverse bias, t ≤1 h	T_J	-50 TO +200	℃
Storage Temperature Range	T_{STG}	-50 TO +150	℃

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