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Most Powerful, Lightweight, Flexible Thin-film CIGS Solar Modules

Flexible* Powerful* Lightweight Solar Solution

Features:

-Why flexible solar?

Flexible lightweight solar cells and modules can go where rigid glass modules can't. This makes it possible to add solar energy generation to low load capacity roofs, structures such as carports and storage facilities, curved surfaces, vehicles, floating reservoir covers, landfill membrane covers and many other applications.

-Technology

Our flexible solar panel adopts CIGS technology, which has an aperature efficiency as high as 17%, rivaling that of rigid glass pan

-General production process

We begin with high–grade stainless steel foil and use an advanced semiconductor deposition process, PVD, to produce the most controlled, stable, and powerful flexible stainless steel CIGS cell in the world. Once the cell structure is deposited on the foil, special transparent conductive oxides are applied, and a specialized plastic—cell interconnect mesh—wire system is laminated to the cell, which is in turn protected by special water barrier plastics. The transparent water barrier is key to the longevity of the Flexi module series. The special plastic backsheet has an internal aluminum film to prevent water transmission from eroding the powerful stainless steel CIGS cells.

Benefits:

-Light weight:

Less than 2.4 kg/m(<0.5 lb/ft). Because flexible solar modules are so much lighter than heavy rigid silicon panels mounted with racks,
they are best solution for building structures with low dead load and environmental load limitations(such as snow).
The modules are also ideal for other structures, such as autos, trucks, and RVs, that are not constructed to support the weight of traditional solar panels.

-Powerful:

Flex modules are the hightest efficiency flexible thin-film CIGS modules in production today, with aperature efficiencies as high as 17%,
providing over four times the power generation per kilogram of silicon.

-Easy to install:

Flexible solar modules are peel-and-stick application. This eliminates penetrations into the structure, reducing the chance of leaks.
Peel-and-stick application also allows for installation on surfaces such as autos, trucks and RVs where racks would not feasible, and lowers the balance-of-systems (BOS) costs and complexity when mounting FLEX modules on rooftops.

-Flexible:

FLEX modules conform to curved surfaces, enabling solar power generation on surfaces not suited to traditional rigid silicon panel

-Resistant to Natural Disasters:

Flexible solar modules are thin (2.5mm) and adhere directly to surfaces, providing excellent wind and seismic resistance.
The modules are also shatterproof, and won't break if struck by debris.

-Reliable:

Flex solar modules' unique redundant interconnect design enables industry—leading reliability.

KEY FEATURES-FLEX Series Modules

-Record efficiency levels in a fl exible form factor
-Low installed weight at less than 2.4 kg/m2(<0.5lb/ft)
-No penetrations, ballast or racking required
-Applicable for high wind load and high seismic hazard areas
-Bypass diodes reduce PV system shading losses
-Directly bonds to many approved surfaces

WARRANTY

-5 year workmanship
-10/25 year warranty against power loss

CIGS MODULE-370MM WIDTH, Model No.: FLEX–02N

Electrical Performance at STC		
Nominal Power(W)	Pmpp(W	**120**
Aperture Efficiency(%)	(%)	15.7
Power Output Tolerance(W)	(W)	+5/-0
Maximum Power Voltage(V)	Vmpp(V)	31.1
Maximum Power Current(A)	Impp(A)	3.86
Open Circuit Voltage(V)	Voc(V)	39.1
Short Circuit Current(A)	Isc(A)	4.34
Maximum Series Fuse Rating	(A)	10
Maximum System Voltage	IEC/UL(V	1000/600
Physical and Mechanical Specifications		
Length	mm	2598
Width	mm	370
Thickness(Max at J-BOX/Module)	mm	17mm/2.5mm
Weight(without adhesive)	kg	2
Weight(with adhesive)	kg	2.7
Weight Area(without adhesive)	kg/m²	2.08
Weight Area(with adhesive)	kg/m²	2.4

Junction Box Type	IP68
Cable Connections	AmphenolH4/ MC4 Compatible
Cell Type	Copper Indium Gallium Diselenide(CIGS)
Warranty	5 years workmanship;10/25 years power output
Certification	CE

CIGS MODULE-1000MM WIDTH, Model No.: FLEX–02W

Electrical Performance at STC		
Nominal Power(W)	Pmpp(W)	**360**
Aperture Efficiency(%)	(%)	15.7
Power Output Tolerance(W)	(W)	+10/-0
Maximum Power Voltage(V)	Vmpp(V)	30.4
Maximum Power Current(A)	Impp(A)	11.83
Open Circuit Voltage(V)	Voc(V)	38.3
Short Circuit Current(A)	Isc(A)	13.56
Maximum Series Fuse Rating	(A)	25
Maximum System Voltage	IEC/UL(V)	1000/600
Physical and Mechanical Specifications		
Length	mm	2598
Width	mm	1000
Thickness(Max at J-BOX/Module)	mm	17mm/2.5mm
Weight(without adhesive)	kg	5.1
Weight(with adhesive)	kg	6.2
Weight Area(without adhesive)	kg/m²	2

Weight Area(with adhesive)	kg/m²	2.4

Junction Box Type	IP68
Cable Connections	AmphenolH4/ MC4 Compatible
Cell Type	Copper Indium Gallium Diselenide(CIGS)
Warranty	5 years workmanship;10/25 years power output
Certification	CE

Thermal Characteristics	
NOCT	48
Temperature Coefiicient of Pmpp(%/℃)	-0.4
Temperature Coefiicient of Voc(%/℃)	-0.36
Temperature Coefiicient of Isc(%/℃)	0.003

Solar Engineered for Today's Membrane Roof Systems

High Performance Solar Roofing in a Lightweight Format

Th e FLEX—02W Series modules are designedfor low–slope commercial roofs. The FLEX modules bond directly onto the membrane
roof system, eliminating the need for solar racking, concrete ballasts, and roof penetrations. Integration of the low–profi le, thin–film modules onto the membrane roof surface protects against seismic movement and high winds.
FLEX solar modules simplify project logistics and reduce labor costs and installation times.
The final installed solar solution is lightweight, making it ideal for low weight bearing building structures.

Features and Benefits

■Factory Applied Self-Adhesive—Simple Peel–and–Stick Application
■Aperature Efficiency Rating of up to 17%
■Lightweight—2.4 kg/m (0.5 lb/ft)
■High Wind Zone Performance
■Low Labor and Balance–of–System (BOS) Costs
■Direct Bonding on TPO with some roof manufactures
■Optional: Secondary Membrane Panel Option for Older TPO Roofs
■Provides four times the wattage per kilogram than silicon panels
■No ballast or racking/No rails or custom purlins
■No module grounding
■Non–penetrating
■Building–integrated PV module
■Designed for high wind & seismic zones

Metal Roofing Systems with High Efficiency Thin Film Solar

High Performance of Thin–film Solar in a Lightweight and Flexible Form Factor

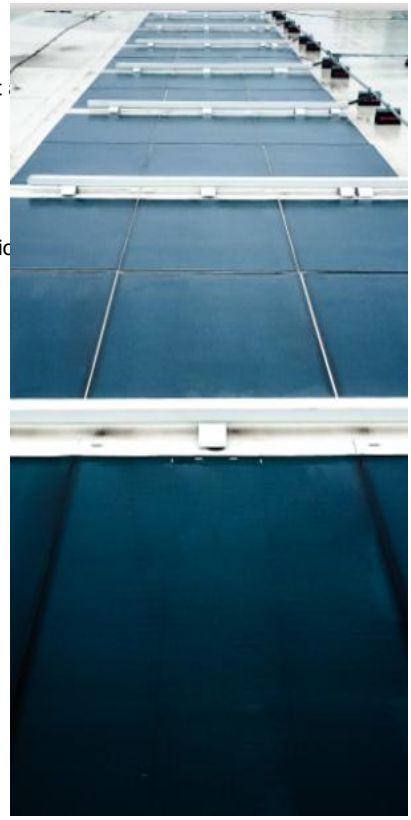
Th e FLEX Series product is the ideal solar solution for metal roofs. These panels are lightweight and can be directly bonded to the roof—eliminating racking, reducing weight load, and signifi cantly lowering labor and project costs. FLEX modules can be installed over a wide range of standard architectural and specific exposed fastener metal roof panels. For example, the FLEX Series modules can be directly applied to industry—standard 7.2 trapezoid rib corrugated panels to create solar parking and RV canopies.

Features and Benefits

■Factory Applied Self-Adhesive—Simple Peel–and–Stick Application
■Aperature Efficiency Rating of up to 17%
■Lightweight—2.9 kg/m (0.6 lb/ft)
■High Wind Zone Performance
■Lowest Solar Rooftop Installation Cost
■Optional: Factory–laminated on Metal Panel for Rapid Installation
■Optional: Field–applied Modules and On–site Roll Forming to retrofi t existing roofs
■Integrated profi le for aesthetic appeal
■Low installation cost
■Provides four times the wattage per kilogram than silicon panels
■Superior resistance to wind

FLEX Modules for Carports

FLEX-02W Series—the world's most powerful lightweight and flexible thin-film solar module—is a perfect fit for new and existing carports.



Solar Carport Benefits:

■Provide highly desirable shade for parked cars, delivering increased owner comfort a lower carbon footprint when the car is started and cooled.
■Sun, rain, snow and hail protection
■Reduced parking lot temperatures and a lower heat–island effect
■Large power–generation area when compared to traditional roofs
■Fewer engineering and inspection challenges than traditional rooftop solar installatio
■Fewer shading issues than traditional roofs

FLEX Solar Module for Carport Benefits:

■Lightweight: less than 2.4 kg/m (<0.5 lb/ft)—Ideal for today's cost–optimized carport structures
■Easy to install—simply peel–and–stick
■Bonds directly to 7.2 inch corrugated metal panels and standing–seam metal roofi ng
■Ideal for retrofi tting solar onto existing carports
■Resistant to wind and seismic events; won't detach or shatter if struck by debris
■Blends into the carport—minimal protrusion above the carport structure
■Th eft and vandalism resistant
■Conforms to curved carport surfaces
■Low weight—four times the wattage per kilogram than silicon
■No rails or custom purlins
■No module grounding
■Non–penetrating
■Building–integrated PV module
■Designed for high wind and seismic zones

Geomembrane Covers for Water Reservoirs and Landfills

Placing solar modules on water reservoir and landfill covers is an ideal way to boost power generation capability.

Water Reservoir and Landfi ll Cover Benefi ts:

■ Both are located on large, open areas with no commercial or agriculture use or value—perfect for solar installations.

■ Large power–generation area and fewer shading issues when compared to rooftop solar.
■ Excellent complement to landfi ll gas technology and hydro-based power generation to increase overall energy output.

For Reservoirs:

■ Reduced evaporation due to the solar covering—a three—acre storage pond covered with solar panels could save over four milli gallons of water each year.
■ Less water contamination and algae growth, minimizing water treatment and associated labor costs.
■ Modules are naturally cooled by the water for better performance.

For landfi lls:

■ Closing and sealing landfi lls with a synthetic TPO membrane cover reduces costs compared to conventional standard subtitle D methods. Flexible modules can be bonded directly to the membrane cover.
■ Membrane covers and fl exible modules are a perfect combination for sloped landfi ll sites where conventional solar arrays cannc be installed due to slope and live—load limitations.

FLEX solar module off ers these benefi ts when used on geomembrane covers:

■ Easy to install—simply peel–and–stick module onto the membrane used to cover the reservoir or landfill
■ Non—penetration installation means no increased risk of leakage, protecting the environ
■ Flexible—conforms to the contours of the landfi ll and accommodates diff erential settlen
■ Lightweight: less than 2.4 kg/m2 (<0.5 lb/ft2)—Ideal for floating structures
■ Provides four times the wattage per kilogram than silicon
■ Resistant to theft and vandalism
■ Wind– and seismic–resistant
■ Shatter–proof won't break if struck by debris

Off-grid

Many solar applications are considered "off –grid" when the power they generate is self–contained. Following are a few examples of off –grid applications where our FLEX modules provide unique

Trucking and Transportation

■ Lightweight panels curve around the chassis of trucks and other vehicles without additional supp
■ Integrated design means less chance of damage
■ Doesn’t interfere with vehicle aerodynamics at high speeds
■ Most powerful fl exible solar panel on the market today for maximum power generation

Consumer Applications

- Flexible panels work with many types of devices and formats
- Lightweight panels keep overall weight of the device low
- Dark color is aesthetically appealing
- Most powerful flexible panel on the market today

Off –grid Lighting

- Flexible modules curve around light and charging pole structures for an unobstructive look
- Modules can withstand 150+ mph winds and have low risk of theft and vandalism
- Generates four times the wattage per kilogram compared to silicon panels
- Powerful enough to charge the battery to power the light for multiple days

photos courtesy of ClearWorld

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One-stop Solar Energy Solution Provider

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