

## Preliminary Specification Sheet CIGS Thin Film Solar Modules

### **Photovoltaic CIGS Module XSC (Initial Product)**

- **High Power Module:** 160watt @ 10% conversion efficiency using interconnected 125mm thin film CIGS wafers
- **Module Size:** 1 X 1.6 meters comprising 96 interconnected CIGS solar cells
- **Environmentally Friendly:** No reportable heavy metals such as cadmium or lead
- **UL Certifiable:** All components have previously received UL, IEC and TUV certification
- **High Performance:** Module efficiencies of 10% to 15% or more compared to other thin films. Performance similar to polycrystalline silicon providing great energy densities at lower costs

### **CIGS Technology**

Copper Indium Gallium Diselenide (abbreviated CIGS) is a thin film solar cell based on the copper indium diselenide (CIS) family of chalcopyrite semiconductors. CIS and CIGS are often used interchangeably within the CIS/CIGS community. The CIGS solar cell structure is a n-type semiconductor on a p-type semiconductor along with a back electrical contact and transparent front electrical contact.

There are a number of key elements that differentiate CIGS from other solar cell technologies. Three notable differences are:

- CIGS is approximately 1/100<sup>th</sup> the thickness of conventional silicon solar cell technologies
- Materials necessary for assembly are readily available, and are less costly per watt of solar cell
- CIGS has been demonstrated conversion efficiencies of 20 similar to that of conventional crystalline silicon while providing between a 25% to 100% improvement over the two other primary thin film technologies such as CdTe and amorphous silicon
- CIGS based solar devices resist performance degradation over time and are highly stable in the field





<b>PRODUCT TYPE</b>	<b>PRODUCT RANGE</b>	
<b>CIGS THIN FILM SOLAR MODULE</b>	<b>XSC 150 - 185</b>	

### PHYSICAL SPECIFICATIONS\*

<b>Dimensions, length x width x thickness</b>	1000 mm x 1600mm x 65 mm (39 in x 69 in x 2 in)
<b>Weight</b>	28 kg (56 lb)
<b>Minimum Lot Packaging</b>	Crate of 16 modules
<b>Front Glass</b>	3.2 mm tempered low iron glass
<b>Back Glass</b>	3.2 mm float glass
<b>Cell Type</b>	125 x 125 x 0.127 mm CIGS on 430 stainless steel
<b>Junction Box</b>	Dual Listed (UL/IEC) with 1000V overmolded by-pass diode
<b>Connectors</b>	Solarlok™ or equivalent (Opposite gender per connector)
<b>Cables</b>	Two 900 mm, 12 gauge, dual rated (TUV, IEC, UL)

### MAXIMUM TEMPERATURE RATINGS

<b>Operating Temperature</b>	-40 to 180°F/-40 to 82°C
<b>Storage Temperature</b>	-40 to 180°F/-40 to 82°C

### ELECTRICAL SPECIFICATIONS\*

PERFORMANCE AT STANDARD TEST CONDITIONS (STC 1000 W/m <sup>2</sup> , 25°C, AM 1.5 SPECTRUM)							
PRODUCT NAME		Unit			XSC-150	XSC-170	XSC-185
<b>Nominal Power (±5%)</b>	P <sub>mpp</sub>	W			150	170	185
<b>Open Circuit Voltage</b>	V <sub>oc</sub>	V			54.9	56.2	57.60
<b>Short Circuit Current</b>	I <sub>sc</sub>	A			3.91	4.19	4.38
<b>Maximum Power Point Voltage</b>	V <sub>mpp</sub>	V			42.6	44.6	46.5
<b>Maximum Power Point Current</b>	I <sub>mpp</sub>	A			3.52	3.81	3.98

### THERMAL PROPERTIES

<b>Short Circuit Thermal Coefficient</b>	%I <sub>sc</sub> /°C	+0.02 ± 0.04
<b>Open Circuit Voltage Thermal Coefficient</b>	%V <sub>oc</sub> /°C	-0.36 ± 0.04
<b>Nominal Power Thermal Coefficient</b>	%W/°C	-0.45 ± 0.04

### SAFETY CLASS AND CERTIFICATIONS

<b>Safety Class</b>	UL Fire Class B
<b>Certifications</b>	TUV Class II, IEC 61646 and IEC 61730

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\*Specification are subject to technical changes → XsunX Solar/English: Rev01, April 2009

