HULK CdF® CIGS THIN-FILM PHOTOVOLTAIC MODULE SERIES

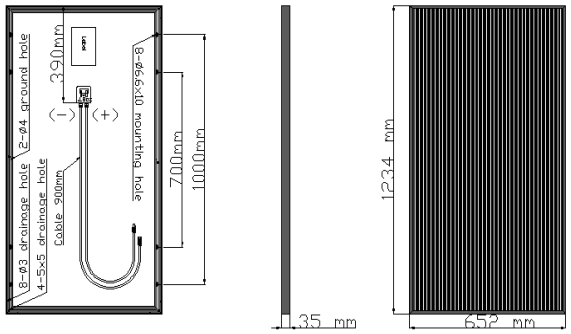
The **CdF® CIGS PV module series** is a green solar photovoltaic product of Copper-Indium-Gallium-Selenide (I-III-IV_2) compound semiconductor with Cadmium-free process and RoHS compliant that is manufactured by Hulk Energy Technology Co., Ltd.. We believe that the following competitive strengths enable us to offer high quality and clean solar power solution for customers.

- Zero content of cadmium & lead, and no contamination in products & manufacturing waste.
- More kilowatt hours per watt peak than other competition PV modules regarding to lower temperature coefficient and better low-irradiance effect.
- Lower energy consumption for CIGS thin film formation via ultra rapid thermal-reaction process.
- Ultra-thin & low-stress t1.8mm cell soda-lime glass substrate for higher reliability & lower material consumption.
- High reliability module performance with unique assembly technologies for humidity proof.
- Low weight for easy installation and maintenance.

Mechanical Specification

Dimensions	1234mm x 652mm x 35mm (48.6inches x 25.7inches x 1.4iches)
Weight	12.9kg (28.44lbs)
Cell type	CIGS thin film
Front cover	3.2mm tempered glass
Cell substrate	1.8mm ultra-thin soda lime glass
Back cover	Al back sheet
Encapsulant	EVA
Frame	Anodized Al frame with L-key mounting
Junction box	IP67 rated with bypass diode
Connectors	MC4 compatible
Cable length	900mm (35.4inches)

Module Drawing



Electrical Characteristics

Power performance at STC (STC: 1000W/cm², 25°C/77°F, AM1.5)*

Module models	CdF-1000E1	CdF-1025E1	CdF-1050E1	CdF-1075E1	CdF-1100E1
Minimum power (P_{MPP}) [W]	100	102.5	105	107.5	110
Power tolerance [W]	+2.5/-0	+2.5/-0	+2.5/-0	+2.5/-0	+2.5/-0
Open circuit voltage (V_{OC}) [V]	73	73.1	73.2	73.3	73.4
Short circuit current (I_{SC}) [A]	2.1	2.1	2.1	2.1	2.1
Voltage at P_{MPP} [V]	54.6	55.2	55.7	56.3	56.9
Current at P_{MPP} [A]	1.83	1.86	1.88	1.91	1.93
Module efficiency [%]	≥12.4	≥12.7	≥13.1	≥13.4	≥13.7

Power performance at NOCT (NOCT: 800W/cm2. 20°C/68°F, AM1.5)*

Module models	CdF-1000E1	CdF-1025E1	CdF-1050E1	CdF-1075E1	CdF-1100E1
Minimum power (P_{MPP}) [W]	76.1	78.0	79.9	81.8	83.7
Open circuit voltage (V_{OC}) [V]	67.4	67.5	67.6	67.7	67.8
Short circuit current (I_{SC}) [A]	1.69	1.69	1.69	1.69	1.69
Voltage at P_{MPP} [V]	51.6	52.1	52.8	53.2	53.9
Current at P_{MPP} [A]	1.47	1.50	1.51	1.54	1.55

***All STC characteristics are measured after pre-treatment of 43kWh/m2 light soaking. Accuray:(PMPP: ±5%; ISC, VOC,IMPP, VMPP: ±10%)**

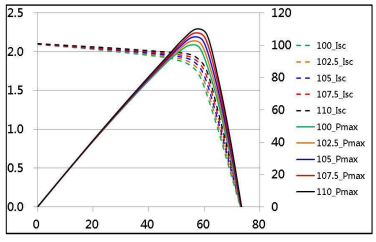
Temperature coefficients (At 1000W/m², AM1.5)

Temp. coefficient of short circuit current		Temp. coefficient of open circuit voltage		Temp. coefficient of minimum power	
α	+0.01%/K	β	-0.31%/K	δ	-0.23%/K

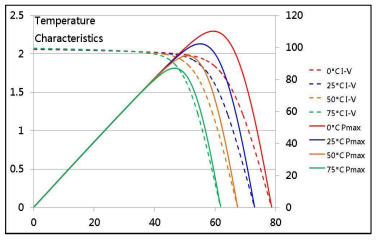
Properties for solar system construction design

Max. system voltage (V_{SYS})	Max. series overcurrent protective devices	Mechanical load	Safety class	Fire rating	Operating Temperature
1000V(IEC),600V(UL)	5A	2400Pa	II	C	-40 ~ 85°C

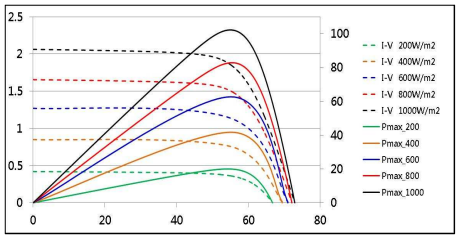
I-V curves at STC



I-V curves at various temperature



I-V curves at low irradiance



Hulk Energy Technology Co., Ltd.

No.442-1, Zhonghua Rd., Toufen Township, Miaoli County 351, Taiwan
TEL: +886-37-627668 FAX:+886-37-627778
E-mail: service@hulket.com
Website: www.hulket.com

HULKet