

MAX SYSTEM 1000V CIGS MODULES

CIGS competitive advantages

- No Potential Induced Degradation (PID- free)
- No Light Induced Degradation (LID-free)
- No Snail Track problem
- Rare existence of solder joint (as compared with hundreds of solder joints for c-Si)
- No Glint/Glare problem
- Low Shadow Effect (which affects electricity yield); does not induce hot spot issue)
- Lead(Pb)free, Cadmium(Cd) free, RoHS compliant
- Royal Black Color
- Having Positive Light Soaking Effect

Excellent Performance Ratio (More power output)
High Powered Module (300W+ per module, lower BoS)

IRR up
(Internal Return Rate)

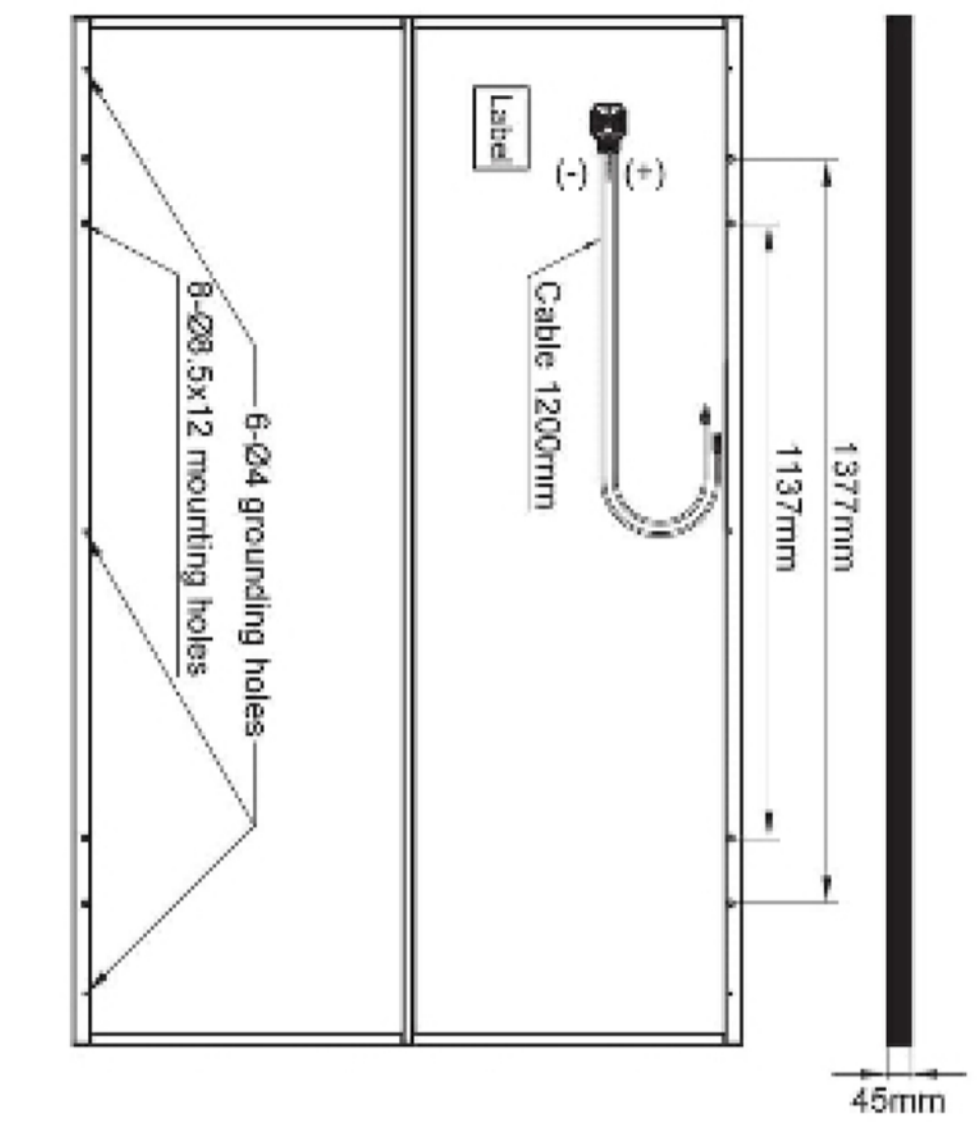
LCOE down
(Levelized Cost of Electricity)



Mechanical Specification

Dimensions	1900mm x 1235mm x 45mm (74.8 inches x 48.6 inches x 1.8 inches)
Weight	33.3 kg (73.41lbs)
Cell type	CIGS thin film
Front cover	2.5mm tempered glass with ARC
Cell substrates	1.8mm ultra-thin soda lime glass x 3
Back cover	Al back sheet
Encapsulant	EVA
Frame	Anodized Al frame (black) with screw mounting
Junction Box	IP67 rated with bypass diode
Connectors	MC4 compatible
Cable length	1200mm (47.2 inches)

Module Drawing



Electrical Specification

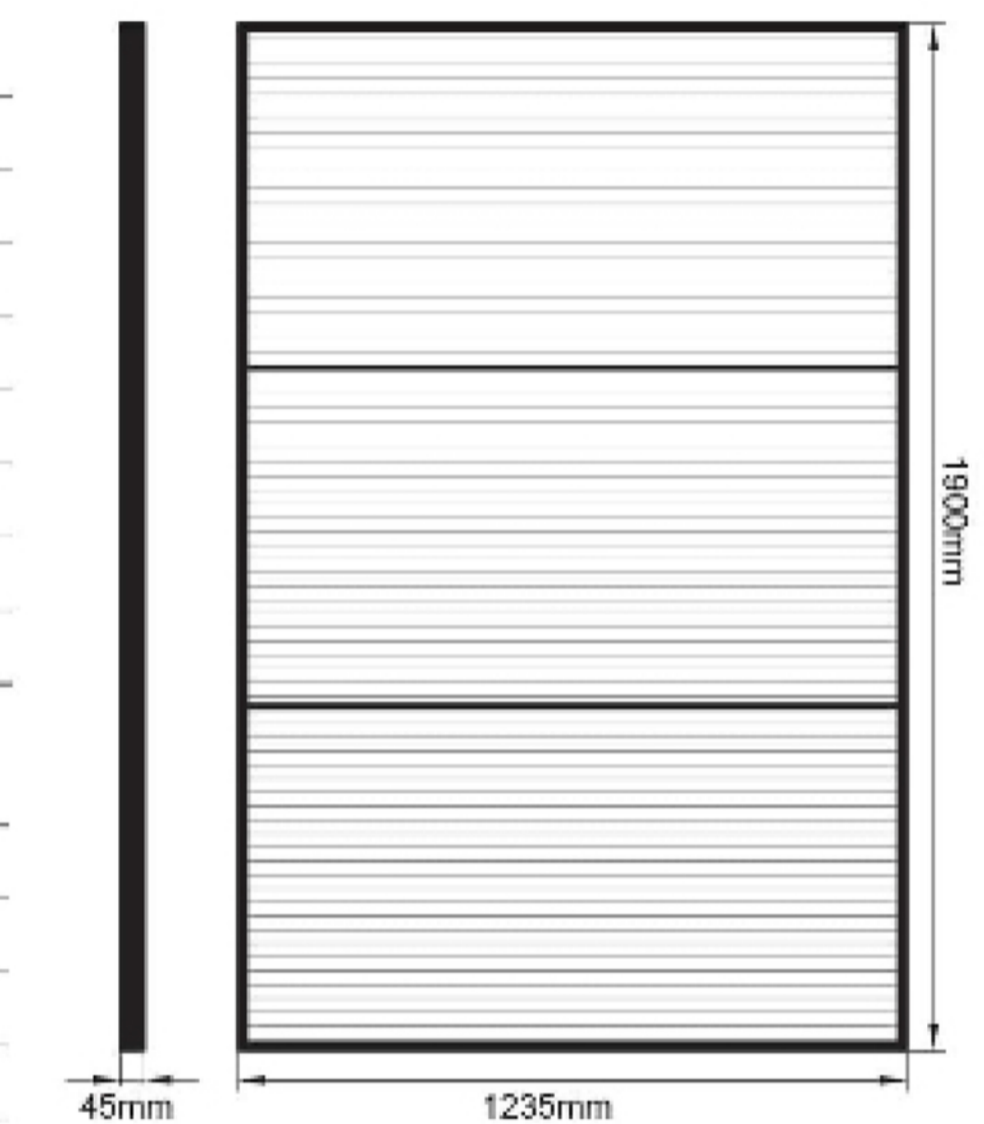
Power performance at STC (STC: 1000W/m², 25°C/77°F, AM 1.5)*

Module Models	Cigs-	3200A1	3250A1	3300A	3350A1	3400A1	3450A1
Nominal power	P _{MPP} [W]	320	325	330	335	340	345
Power tolerance	[W]	0~+5	0~+5	0~+5	0~+5	0~+5	0~+5
Open circuit voltage	V _{OC} [V]	74.5	74.8	75.0	75.3	75.6	75.8
Short circuit current	I _{SC} [A]	6.44	6.44	6.44	6.44	6.44	6.44
Voltage at P _{MPP}	V _{MPP} [V]	54.9	55.6	56.2	56.8	57.4	58.1
Current at P _{MPP}	I _{MPP} [A]	5.81	5.84	5.86	5.89	5.91	5.93
Module efficiency	[%]	≥ 13.6	≥ 13.8	≥ 14.0	≥ 14.2	≥ 14.4	≥ 14.6

Power performance at NOCT (NOCT: 800W/m², 20°C/68°F, AM 1.5)*

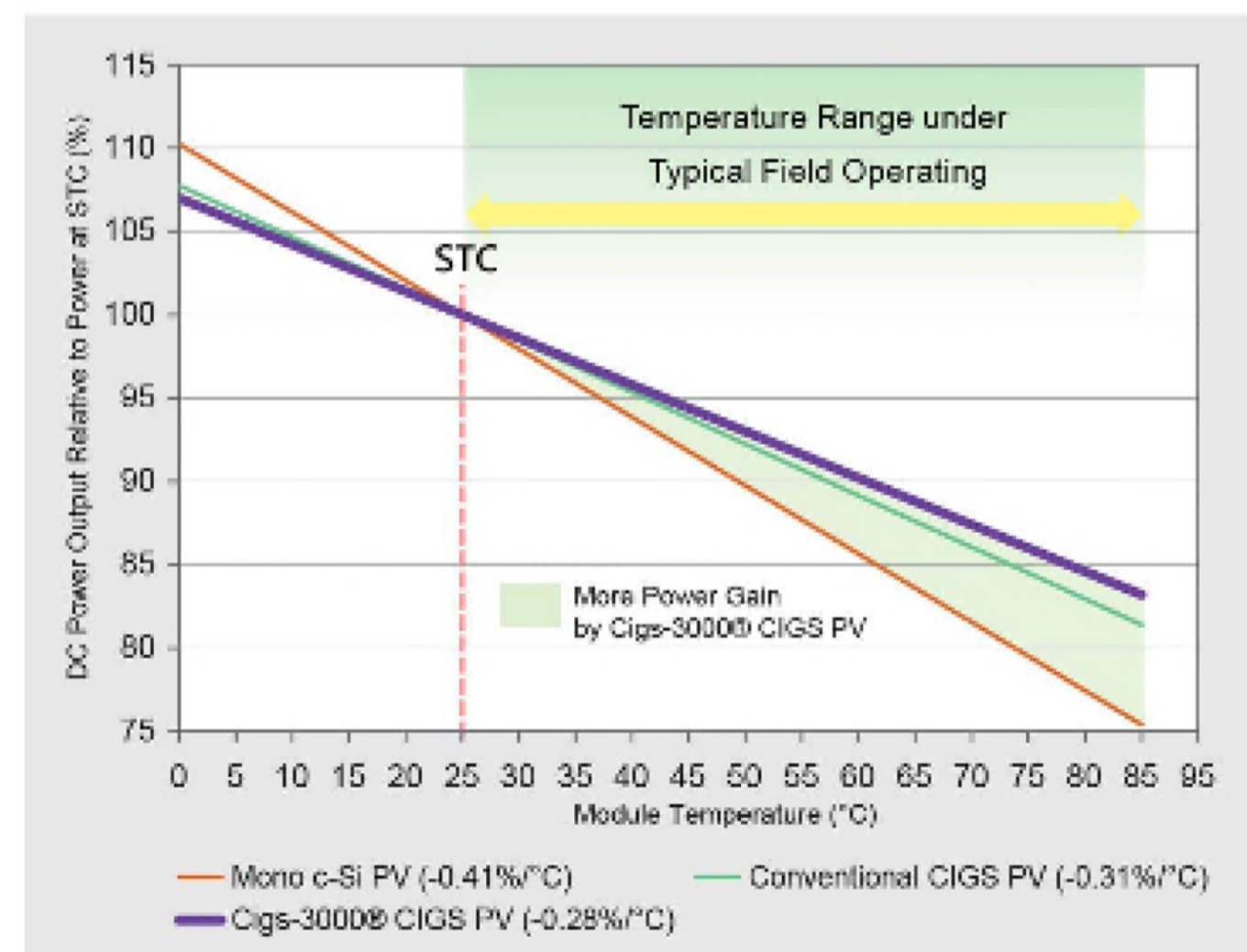
Module Models	Cigs-	3200A1	3250A1	3300A	3350A1	3400A1	3450A1
Nominal power	P _{MPP} [W]	244.7	248.5	252.4	256.1	259.8	263.6
Open circuit voltage	V _{OC} [V]	71.0	71.3	71.5	71.8	72.0	72.2
Short circuit current	I _{SC} [A]	5.16	5.16	5.16	5.16	5.16	5.16
Voltage at P _{MPP}	V _{MPP} [V]	52.9	53.5	54.1	54.7	55.3	55.8
Current at P _{MPP}	I _{MPP} [A]	4.62	4.64	4.66	4.68	4.69	4.72

*All STC characteristics are measured after pre-treatment of 43kWh/m² light soaking. Measurement uncertainty: (P_{MPP}: +5%/ -3%; I_{SC}, V_{OC}, I_{MPP}, V_{MPP}: ±10%)



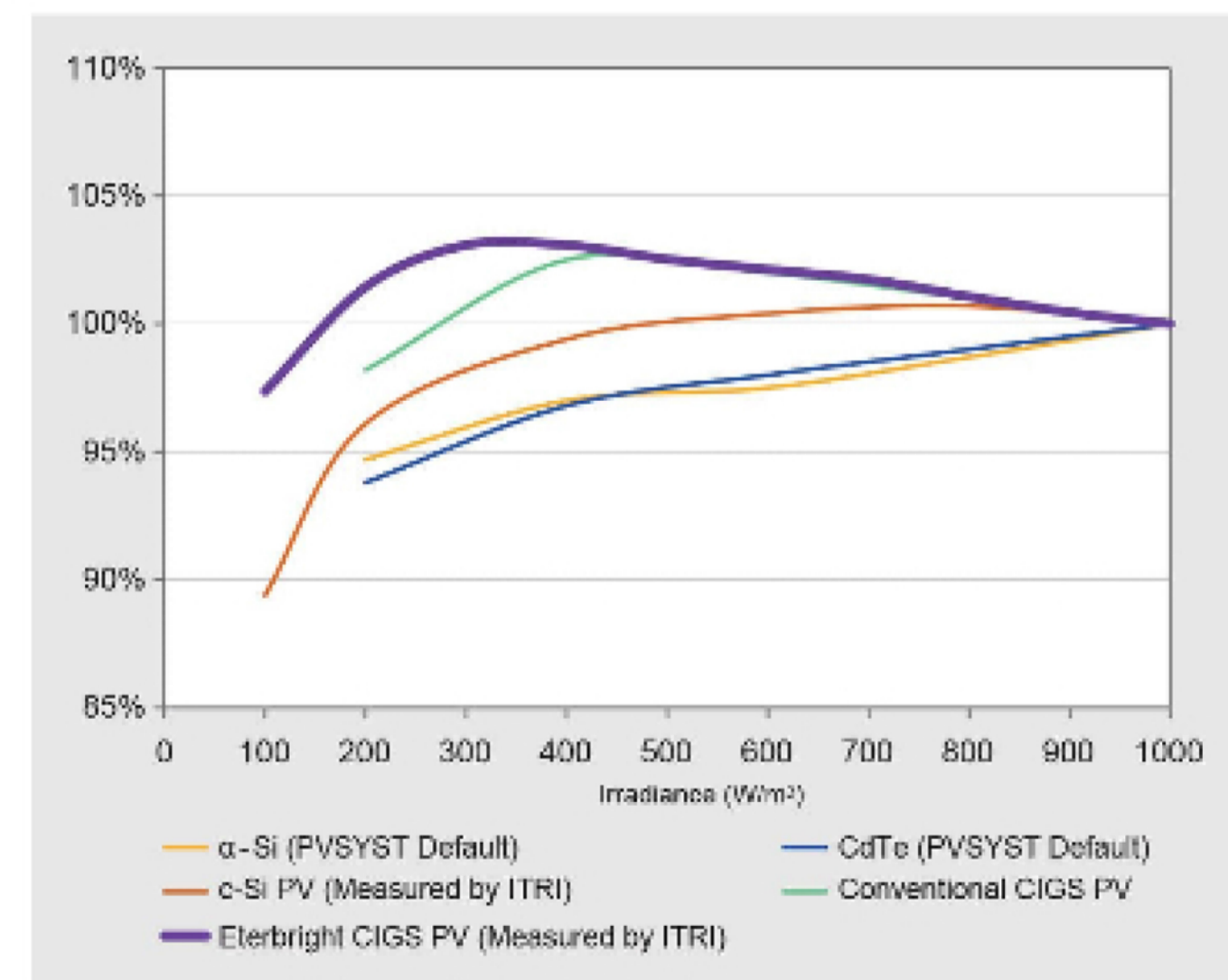
Lowest Temperature Coefficient (-0.28%/°C)

High Performance of Temperature Coefficient



High Performance Cd-Free CIGS PV Technology Comparison of Normalized Efficiency

Normalized Efficiency

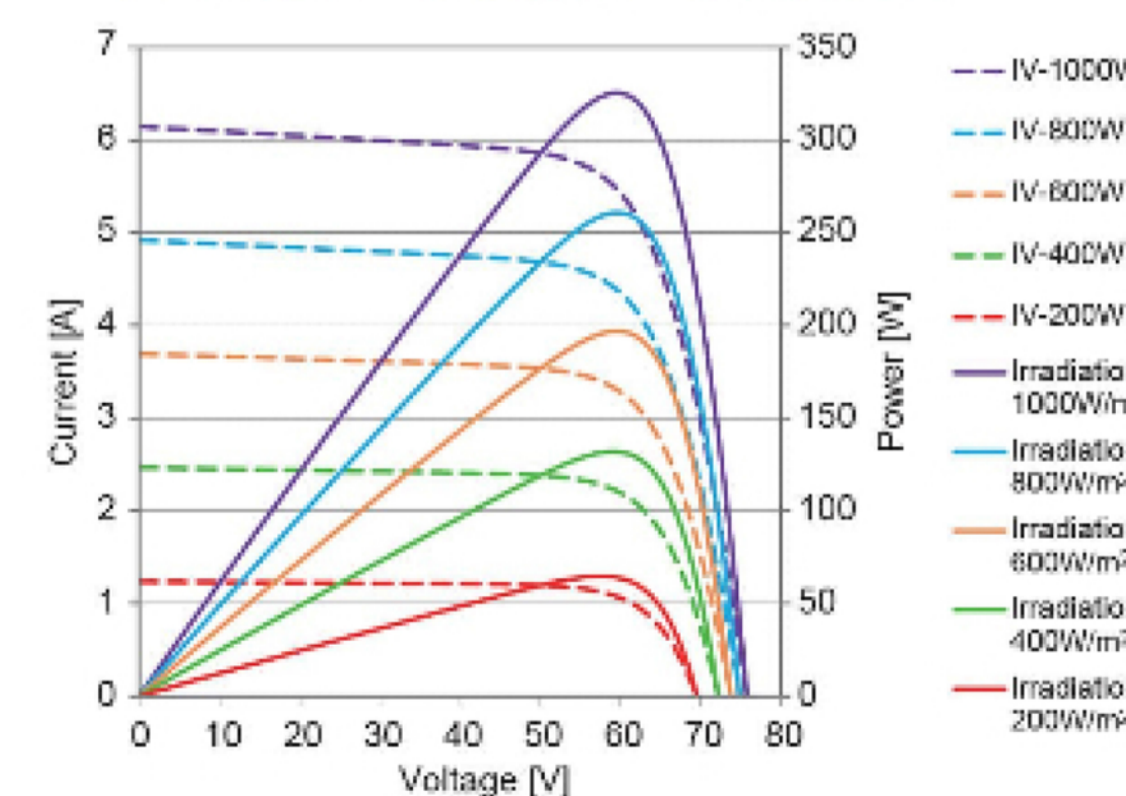


Cd-Free CIGS PV performs better normalized efficiency under lower irradiance.

Temperature coefficients

NOCT	TC I _{SC} (α)	TC V _{OC} (β)	TC P _{MPP} (δ)
46°C	+0.01%/°C	-0.27%/°C	-0.28%/°C

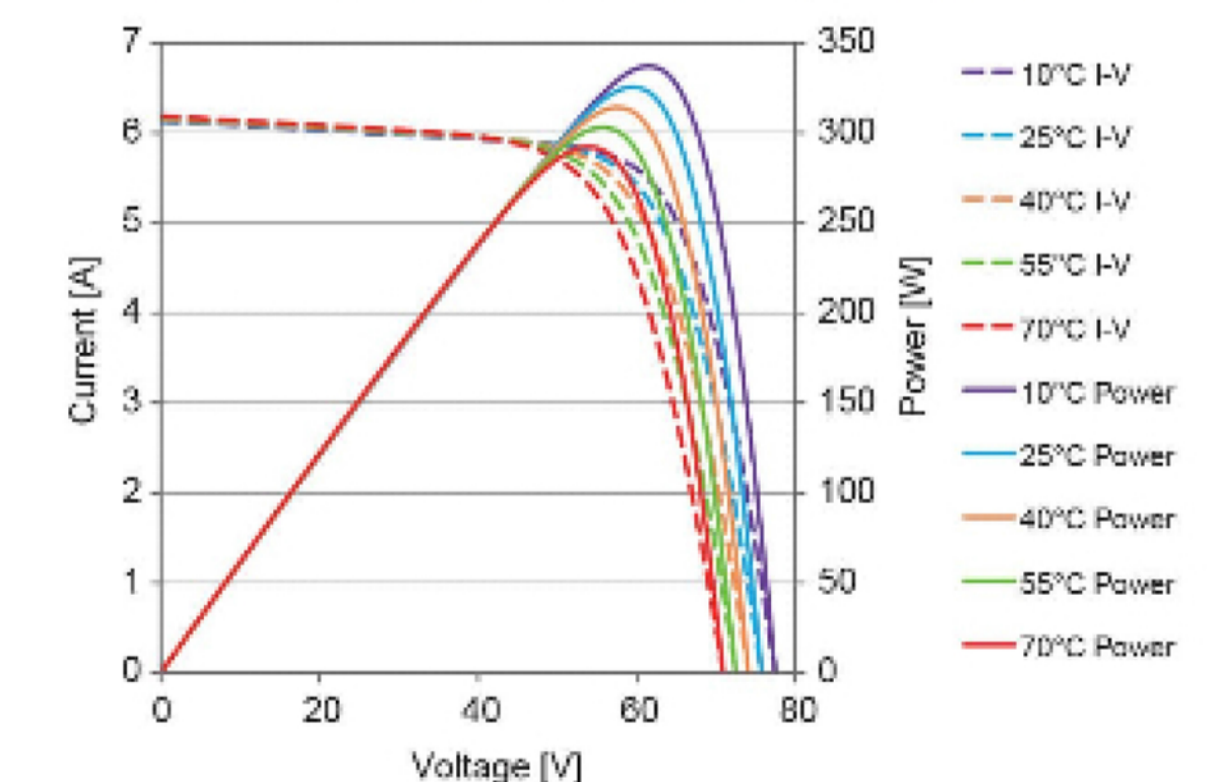
I-V curves at various irradiation



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	8A	5400Pa	II	Class C(IEC) Type 1(UL)	-40 ~ 85°C

I-V curves at various temperature



In Tropical areas i.e. Desert regions, Equatorial regions, Subtropical regions or high temperature areas, CIGS module will be the only choice.