

# Solar Photovoltaic Modules

USP10 / USP12 / USP15

*USL Solar modules provides cost-effective photovoltaic power for general use, operating DC directly or, in an inverter-equipped system, AC loads. The 36 cells in series provides 10W, 12W & 15 watts of maximum power, it is used primarily in telecommunications, remote villages, clinics and load-based aids to navigation.*



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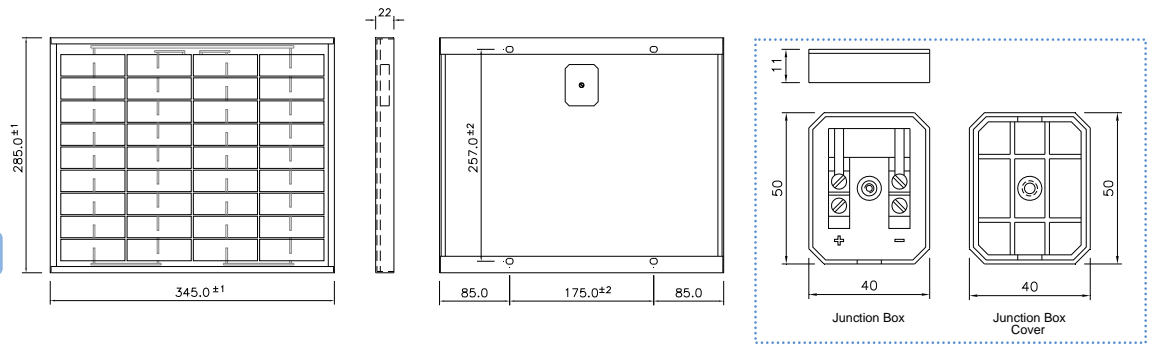
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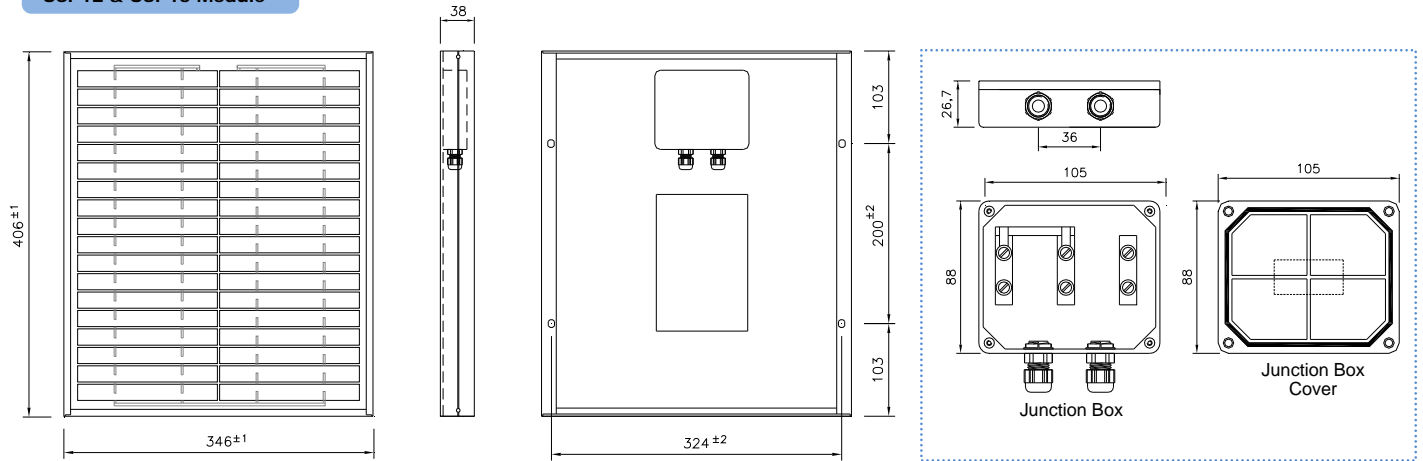
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*Polycrystalline  
Modules*

### USP10 Module



### USP12 & USP15 Module



### Electrical and Mechanical Data

Model	USP10	USP12	USP15
Maximum power (Pmax)	10Wp	12Wp	15Wp
Open Circuit Voltage (Voc)	21.5 V	21.5 V	21.5 V
Maximum power point voltage (Vmpp)	17.1 V	17.1 V	17.1 V
Short circuit current (Isc)	0.65 A	0.79 A	0.98 A
Maximum power point current (Impp)	0.59 A	0.70 A	0.88 A
Tolerance	±10%	±10%	±10%
Cell Size (mm)	26 X 78	18 X 156	18 X 156
No. of cells	36	36	36
Dimensions (mm) ± 1	345 x 285 x 22	406 x 346 x 38	406 x 346x 38
Maximum system voltage	600	600	600
Temperature co-efficient	NOCT (°C)45	NOCT (°C)45	NOCT (°C)45
$\frac{dV}{dT}$ (Voc) (mV/°C)	- 105	- 105	- 105
$\frac{dI}{dT}$ (Isc) (mA/°C)	- 0.32	- 0.32	- 0.32
$\frac{dP}{dT}$ (Pmax) (%/°C)	- 0.45	- 0.45	- 0.45
Weight (kgs)	1.2	1.9	1.9

Standard Test Condition : Irradiance 1,000 W/sq.m, Temperature 25deg C Air mass 1.5 spectrum)

#### Proven Materials and Construction

USL experience shows in every aspect of this module's construction and materials

- ❖ Anodized aluminum frame offers required strength and allows for quick and easy installation on standard array structures.
- ❖ 36 Crystalline silicon solar cells in series.
- ❖ Modules are laminated in toughened low iron content PV grade glass – Ethyl Vinyl Acetate films – PV module back sheet.
- ❖ Optimized lamination process parameters ensure a stable laminate. Junction Box with PG Cable glands are standard in 12W & 15W modules.
- ❖ Each module is flash tested in a Sun simulator to ensure conformity to specification.

#### Udhaya Semiconductors Limited

Coimbatore: 641 062. INDIA.

Phone: +91 422 2627003 Fax : +91 422 2628504

Email: info@uslsolar.com; Website : www.uslsolar.com