HDT solar modules use high efficiency mono-crystalline hetero-junction double-sided solar cells technology (HDT). HDT solar cells can generate power from both sides. It uses N-type mono-crystalline silicon as substrate. A thin layer of undoped (intrinsic) hydrogenated amorphous silicon is deposited on both sides of the silicon substrate followed by the p-type and n-type thin film silicon. This process improves the performance of PN junction, enabling HDT solar cells to achieve one of the highest conversion efficiency in the world. HDT solar cells have low manufacturing process temperature, high conversion efficiency and low temperature coefficient. Today HDT solar module provides the best value among all mass produced high efficiency solar modules in the market. It is the best choice for optimizing all type of solar projects for performance, cost and reliability.

HDT Solar Module Characteristics:

1. **High Efficiency**: HDT solar module’s conversion efficiency is **10-20%** higher than those of traditional crystalline solar module, therefore, it greatly reduces the required cost of land, mounting frames, cable, transportation, installation and maintenance for the same installation capacity.

2. **Excellent Temperature Performance**: HDT solar module’s power-temperature coefficient is **40%** lower than traditional crystalline silicon solar modules (-0.45%), therefore, it can have a much higher power output than traditional crystalline silicon solar module in high temperature environment.

3. **High Stability**: Compared to traditional crystalline silicon solar modules, HDT solar module’s LID (Light induced degradation) is **50%** lower. This leads to higher output over 25 years.

4. **Double-sided Power Generation**: HDT solar cells have symmetrical structure and are suitable for double glass encapsulation, thus generating power from both sides of the cell, this increases the power output by at least **10%** over conventional single glass crystalline modules.

5. **High ROI**: Compared to solar projects built with traditional crystalline silicon solar module, HDT solar module has a lower levelized cost of electricity (LCOE), therefore, producing higher overall return on investment.
HDT solar
Module Performance Data

Electrical Data (at STC)

<table>
<thead>
<tr>
<th>Module</th>
<th>HDT-310</th>
<th>HDT-315</th>
<th>HDT-320</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Power (Pmax) [W]</td>
<td>310</td>
<td>315</td>
<td>320</td>
</tr>
<tr>
<td>Open Circuit Voltage (Voc) [V]</td>
<td>44</td>
<td>44.1</td>
<td>44.2</td>
</tr>
<tr>
<td>Max Power Voltage (Vmp) [V]</td>
<td>35.8</td>
<td>36.1</td>
<td>36.4</td>
</tr>
<tr>
<td>Short Circuit Current (Isc) [A]</td>
<td>9.2</td>
<td>9.24</td>
<td>9.28</td>
</tr>
<tr>
<td>Max Power Current (Imp) [A]</td>
<td>8.66</td>
<td>8.73</td>
<td>8.8</td>
</tr>
<tr>
<td>Module Efficiency (%)</td>
<td>19.05</td>
<td>19.36</td>
<td>19.67</td>
</tr>
</tbody>
</table>

Output Power Tolerance [W] ± 0.5 W
Temperature Coefficient Isc α [%/°C] 0.025
Temperature Coefficient Voc β [%/°C] -0.26
Temperature Coefficient Pmax γ [%/°C] -0.3

Test Conditions [STC] Air Mass 1.5: Irradiance 1000W/m², Cell temperature 25 °C

Electrical Data (at NOCT)

<table>
<thead>
<tr>
<th>Module</th>
<th>HDT-310</th>
<th>HDT-315</th>
<th>HDT-320</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Operating Cell Temperature (NOCT)</td>
<td>45°C ± 2°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Power (Pmax) [W]</td>
<td>222</td>
<td>225</td>
<td>229</td>
</tr>
<tr>
<td>Open Circuit Voltage (Voc) [V]</td>
<td>41.85</td>
<td>41.95</td>
<td>42.04</td>
</tr>
<tr>
<td>Max Power Voltage (Vmp) [V]</td>
<td>32.38</td>
<td>32.48</td>
<td>32.58</td>
</tr>
<tr>
<td>Short Circuit Current (Isc) [A]</td>
<td>7.365</td>
<td>7.413</td>
<td>7.416</td>
</tr>
<tr>
<td>Max Power Current (Imp) [A]</td>
<td>6.87</td>
<td>6.93</td>
<td>7.03</td>
</tr>
</tbody>
</table>

Test Conditions [NOCT] Air Mass 1.5: Irradiance 800W/m², Air temperature 20°C, Wind speed 1m/s

Module I-V curves at different irradiance

Module I-V curves at different temperature

Operating Conditions

- Maximum System Voltage: 1000VDC(IEC)
- Operating Temperature: -40°C ~ 85°C
- Maximum Fuse Rating: 15A
- Front Static Load Test (Snow): 5400Pa
- Rear Static Load Test (Wind): 2400Pa
- Hail Stone Impact Test: Distance 1000mm, Hailstone Diameter 25mm, Speed 23m/s
- Nominal Operating Cell Temperature: 45°C ± 2°C

Mechanical Data

- Solar Cells: 6×10 HDT Cells 156.75mm*156.75mm 4 Busbar
- Dimensions: 1640mm*992mm*40mm
- Weight: 19kg
- Front Glass: ARC 3.2mm High Transmission Tempered
- Encapsulation: EVA/0.5mm
- Frame: Anodized Aluminum Alloy (Silver, Grey, Black)
- Junction Box: IP67 rated with 3 bypass diodes
- Output Cables: 4mm² 1000mm/ MC4 Connectors
- Electrical Protection Class: Class II

Packaging Data

- Modules per Pallet: 26
- Packaging Dimensions: 1670mm*1080mm*1125mm
- Weight per Pallet: 504kg
- Pallets per 40' HQ Container: 28
- Pallets per Shipping Flat Car(17.5m): 40

Certifications

- TUV NORD/IEC61215,IEC61730
- Fire Safety Class: Class C

Warranty

- Product: 10 years product warranty
- Power Output: 10 years(90% of Pmin), 25 years(80% of Pmin)

Note:
- Due to ongoing research and development, innovation and product upgrading, the content in the product specification can be changed without prior notice. These data are not for a single HDT solar module, they are used to differentiate various types of solar modules.
- GOLDSSTONE Company reserves the right to interpret changes in technologies and testing methods.

Warning: Please read installation manuals carefully before handling, installing and using HDT solar module.

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