MBB Half-cell Bifacial Module (72)\textsuperscript{30}

**TW535~560MBAP**

**M10-144-D**

**PRODUCT FEATURES**

- High Power Output
- Low LCOE
- Maximum Power 560W\textsuperscript{*}
- High Reliability
- Low LID

**POWER WARRANTY**

1st year <2%, 0.45% power degradation per year from 2 to 30 years

12-year warranty for materials

30-year warranty for linear power output

**PRODUCT CERTIFICATIONS**

ISO 9001: 2015/Quality Management System

ISO 14001: 2015/Environment Management System

ISO 45001: 2018/Occupational Health and Safety

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Front

Rear
**Electrical Characteristics (STC)**

Module type: TW-M-60P-144-D

<table>
<thead>
<tr>
<th>Maximum power: Pm (W)</th>
<th>535</th>
<th>540</th>
<th>545</th>
<th>550</th>
<th>555</th>
<th>560</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open circuit voltage: Voc (V)</td>
<td>49.50</td>
<td>49.70</td>
<td>49.90</td>
<td>50.10</td>
<td>50.30</td>
<td>50.50</td>
</tr>
<tr>
<td>Voltage at maximum power point: Vmp (V)</td>
<td>41.36</td>
<td>41.56</td>
<td>41.76</td>
<td>41.96</td>
<td>42.16</td>
<td>42.36</td>
</tr>
<tr>
<td>Current at maximum power point: Imp (A)</td>
<td>12.94</td>
<td>13.00</td>
<td>13.05</td>
<td>13.11</td>
<td>13.16</td>
<td>13.23</td>
</tr>
<tr>
<td>Module efficiency: η (%)</td>
<td>20.7</td>
<td>20.9</td>
<td>21.1</td>
<td>21.1</td>
<td>21.5</td>
<td>21.7</td>
</tr>
</tbody>
</table>

STC: Irradiance 1000W/m², Cell Temperature 25°C, Air Mass 1.5, Measuring tolerance: ±3%

**Electrical Characteristics (NMOT)**

<table>
<thead>
<tr>
<th>Maximum power: Pm (W)</th>
<th>404.8</th>
<th>408.6</th>
<th>412.4</th>
<th>416.2</th>
<th>420.0</th>
<th>423.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open circuit voltage: Voc (V)</td>
<td>46.21</td>
<td>46.48</td>
<td>46.76</td>
<td>47.01</td>
<td>47.28</td>
<td>47.54</td>
</tr>
<tr>
<td>Short circuit current: Isc (A)</td>
<td>11.00</td>
<td>11.04</td>
<td>11.08</td>
<td>11.12</td>
<td>11.16</td>
<td>11.20</td>
</tr>
<tr>
<td>Voltage at maximum power point: Vmp (V)</td>
<td>38.23</td>
<td>38.45</td>
<td>38.67</td>
<td>38.90</td>
<td>39.12</td>
<td>39.25</td>
</tr>
<tr>
<td>Current at maximum power point: Imp (A)</td>
<td>10.58</td>
<td>10.62</td>
<td>10.66</td>
<td>10.70</td>
<td>10.74</td>
<td>10.78</td>
</tr>
</tbody>
</table>

NMOT: Irradiance 800W/m², Ambient Temperature 20°C, AMA=1.5, Wind Speed 1m/s

**Electrical characteristics with different power bin (reference to different Irradiance ratio)**

<table>
<thead>
<tr>
<th>Irradiance (%)</th>
<th>Maximum power: Pm (W)</th>
<th>Module efficiency: η (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>561.8</td>
<td>21.7</td>
</tr>
<tr>
<td>15%</td>
<td>615.3</td>
<td>23.8</td>
</tr>
<tr>
<td>25%</td>
<td>668.8</td>
<td>25.9</td>
</tr>
</tbody>
</table>

**Mechanical Parameters**

- **Cells**: P-TPC
- **Orientation**: 144 (6×24)
- **Size**: 2273×1134×30mm
- **Weight**: 32.9kg
- **Front Glass**: 2.0mm AR coated heat strengthened glass
- **Rear Glass**: 2.0mm heat strengthened glass
- **Frame**: Anodized aluminum alloy frame
- **Junction Box**: F88, 3 diodes
- **Cable**: 4.0mm², Positive: 280mm, Negative: 280mm, length can be customized
- **Connector**: MC4 Compatible or MC4 Original
- **Wind/Snow Load**: 2400Pa/5400Pa
- **Packaging**: 36pcs per pallet, 720pcs per 40HC

**Operating Parameters**

- **Operational Temperature**: -40°C to +85°C
- **Maximum System Voltage**: 1500V DC
- **Maximum Series Fuse Rating**: 30A
- **Power Output Tolerance**: 0±5W
- **Efficiency**: 70±5%

**Temperature Ratings**

- **Temperature Coefficient of Pmax**: -0.35%/°C
- **Temperature Coefficient of Voc**: -0.28%/°C
- **Temperature Coefficient of Isc**: +0.05%/°C
- **NMOT**: 45±2°C

**Drawings (Unit: mm)**

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With technological progress and product updates, there may be deviations between the technical parameters of Tongwei’s module products and the technical parameters contained in this specification, and Tongwei Solar has the right to adjust the technical parameters at any time without notifying the customer, the final interpretation of the technical specification is vested in Tongwei Solar.