BIFACIAL DUAL GLASS N type i-TOPCon MODULE

440 W
MAXIMUM POWER OUTPUT

0/+5 W
POSITIVE POWER TOLERANCE

22.0%
MAXIMUM EFFICIENCY

Small in size, bigger on power
- Generates up to 440 W, 22.0 % module efficiency with high density interconnect technology
- Boost performance at high temperature environments with better thermal behavior

Transparent Dual-glass Design
- Designed with aesthetics in mind
- Excellent fire rating and resistance to harsh environmental conditions
- 5,400 Pa snow load and 4,000 Pa wind load (test loads)

Maximize Energy Harvest
- Higher bifaciality up to 85 %
- Up to 25 years product warranty and 30 years power warranty
- 1 % first-year degradation and 0.4 % annual degradation enabled by N-type technology

Universal solution for residential and C&I rooftops
- Designed for compatibility with existing mainstream inverters, optimizers and mounting systems
- Perfect size and low weight for easy handling

Extended Vertex S+ Warranty

1 %
1st year max. degradation

0.4 %
Max. annual degradation from year 2 to 30

25 Years
Product Workmanship Warranty

Comprehensive Products and System Certificates
IEC61215/IEC61730/IEC61701/IEC62716/UL61730
ISO 9001: Quality Management System
ISO 14001: Environmental Management System
ISO 14064: Greenhouse Gas Emissions Verification
ISO 45001: Occupational Health and Safety Management System
**DIMENSIONS OF PV MODULE (mm)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Front View</th>
<th>Back View</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSM-415</td>
<td>1134</td>
<td>1134</td>
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<tr>
<td>TSM-420</td>
<td>1134</td>
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<td>TSM-425</td>
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<tr>
<td>TSM-430</td>
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<td>TSM-435</td>
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<td>TSM-440</td>
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</tbody>
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**ELECTRICAL DATA (STC)**

<table>
<thead>
<tr>
<th>Model</th>
<th>TSM-415</th>
<th>TSM-420</th>
<th>TSM-425</th>
<th>TSM-430</th>
<th>TSM-435</th>
<th>TSM-440</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Power Watts - Pmax (Wp)</td>
<td>415</td>
<td>420</td>
<td>425</td>
<td>430</td>
<td>435</td>
<td>440</td>
</tr>
<tr>
<td>Power Tolerance - Pmax (%T)</td>
<td>0/+5</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Maximum Power Voltage - Vmp (V)</td>
<td>42.1</td>
<td>42.5</td>
<td>42.9</td>
<td>43.2</td>
<td>43.6</td>
<td>44.0</td>
</tr>
<tr>
<td>Open Circuit Voltage - Voc (V)</td>
<td>50.1</td>
<td>50.5</td>
<td>50.9</td>
<td>51.4</td>
<td>51.8</td>
<td>52.2</td>
</tr>
<tr>
<td>Short Circuit Current - Isc (A)</td>
<td>10.50</td>
<td>10.53</td>
<td>10.56</td>
<td>10.59</td>
<td>10.64</td>
<td>10.67</td>
</tr>
<tr>
<td>Module Efficiency - η (%)</td>
<td>20.8</td>
<td>21.0</td>
<td>21.3</td>
<td>21.5</td>
<td>21.8</td>
<td>22.0</td>
</tr>
</tbody>
</table>

**MECHANICAL DATA**

- **Solar Cells:** Monocrystalline
- **No. of cells:** 144 cells
- **Module Dimensions:** 1762 x 1134 + 30 mm
- **Weight:** 21.0 kg
- **Front Glass:** 1.6 mm, High Transmission, AR Coated Heat Strengthened Glass
- **Encapsulant material:** POE/EVA
- **Back Glass:** 1.6 mm, High Transmission, Heat Strengthened Glass
- **Frame:** 30 mm Anodized Aluminium Alloy, Black
- **J-Box:** IP 68 rated
- **Cables:** Photovoltaic Technology Cable 4.0 mm²
- **Connector:** TS4 / MC4 EVO2

**WARRANTY**

- **25 year Product Workmanship Warranty**
- **30 year Power Warranty**
- **1% first year degradation**
- **0.4% Annual Power Attenuation**

**MAXIMUM RATINGS**

- **Operational Temperature:** -40 to +85 °C
- **Maximum System Voltage:** 1500 V DC (IEC)
- **Max Series Fuse Rating:** 25 A

**PACKAGING CONFIGURATION**

- **Modules per box:** 36 pieces
- **Modules per 40' container:** 936 pieces

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**TEMPERATURE RATINGS**

- **NDC (Nominal Operating Cell Temperature):** 43 °C (±2 K)
- **Temperature Coefficient of Pmax:** -0.30% / K
- **Temperature Coefficient of Voc:** -0.24% / K
- **Temperature Coefficient of Isc:** 0.04% / K

**P-V CURVES OF PV MODULE (430 W)**

- **Module Efficiency:**
  - 20.8%
  - 21.0%
  - 21.3%
  - 21.5%
  - 21.8%

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**CAUTION:** READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.

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