**Product:** TSM-DE09R.08  
**Power Range:** 415–435 W

**Maximum Power Output:** 435 W+  
**Positive Power Tolerance:** 0/+5 W  
**Maximum Efficiency:** 21.8%

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**Small in size, big on power**
- Generates up to 435 W, 21.8% module efficiency with high density interconnect technology
- Multi-busbar technology for better light trapping, lower series resistance, improved current collection and enhanced reliability
- Excellent low light performance (IAM) with cell process and module material optimization

**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, optimized transportation cost
- Reduces installation cost with higher power bin and efficiency
- Flexible installation solutions for system deployment

**High Reliability**
- Positive load up to 6,000 Pa (snow)
- Negative load up to 4,000 Pa (wind)

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**Extended Vertex S Warranty**
- 2% 1st year max. degradation
- 0.55% max. annual degradation from year 2 to 25
- 15 Years Product Workmanship Warranty

**Conventional products**
- 0.55% (Max. annual degradation)
- 0.6% (Max. annual degradation)
- 84.8% 
- 83.1% 
- 87.5% 
- 100%

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**Comprehensive Product and System Certificates**
- IEC61215/IEC61730/IEC61701/IEC62716
- ISO 9001: Quality Management System
- ISO 14001: Environmental Management System
- ISO14064: Greenhouse Gases Emissions Verification
- ISO45001: Occupational Health and Safety Management System
DIMENSIONS OF PV MODULE (mm)

![Module Dimensions Diagram]

ELECTRICAL DATA (STC)

<table>
<thead>
<tr>
<th>Module</th>
<th>TSM-415</th>
<th>TSM-420</th>
<th>TSM-425</th>
<th>TSM-430</th>
<th>TSM-435</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>
</tr>
<tr>
<td>Power Tolerance-PMAX (W)</td>
<td>±5</td>
<td>±5</td>
<td>±5</td>
<td>±5</td>
<td>±5</td>
</tr>
<tr>
<td>Maximum Power Voltage-Vmpp (V)</td>
<td>41.7</td>
<td>42.0</td>
<td>42.2</td>
<td>42.3</td>
<td>42.5</td>
</tr>
<tr>
<td>Maximum Power Current-Impp (A)</td>
<td>9.94</td>
<td>10.01</td>
<td>10.08</td>
<td>10.17</td>
<td>10.24</td>
</tr>
<tr>
<td>Open Circuit Voltage-Voc (V)</td>
<td>50.0</td>
<td>50.1</td>
<td>50.2</td>
<td>50.3</td>
<td>50.4</td>
</tr>
<tr>
<td>Short Circuit Current-Iscc (A)</td>
<td>10.55</td>
<td>10.58</td>
<td>10.61</td>
<td>10.64</td>
<td>10.67</td>
</tr>
<tr>
<td>Module Efficiency η (m) (%)</td>
<td>20.8</td>
<td>21.0</td>
<td>21.3</td>
<td>21.5</td>
<td>21.8</td>
</tr>
</tbody>
</table>

**MECHANICAL DATA**

- Solar Cells: Monocrystalline
- No. of cells: 144 cells
- Module Dimensions: 1762×1134×30 mm
- Weight: 21.8 kg
- Glass: 3.2 mm, High Transmission, AR Coated Heat Strengthened Glass
- Encapsulant material: EVA/POE
- Backsheet: White
- Frame: 30 mm Anodized Aluminium Alloy
- J-Box: IP 68 rated
- Connector: TS4/MC4 EVO2*

PACKAGING CONFIGURATION

- Modules per box: 36 pieces
- Modules per 40’ container: 936 pieces

WARRANTY

- 15 Year product workmanship warranty
- 25 Year power warranty
- 2% First year degradation
- 0.55% Annual power degradation

**TEMPERATURE RATINGS**

- NOCT (Nominal Operating Cell Temperature): 43°C (±2 K)
- Temperature Coefficient of Pmpp: -0.34 %/K
- Temperature Coefficient of Voc: -0.25 %/K
- Temperature Coefficient of Iscc: 0.04 %/K

**MAXIMUM RATINGS**

- Operational Temperature: -40 to +85°C
- Maximum System Voltage: 1500 V DC (IEC)
- Max Series Fuse Rating: 20 A

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