BREAKING THE 21% EFFICIENCY BARRIER
Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 21.4%.

LOW ELECTRICITY GENERATION COSTS
Higher yield per surface area, lower BOS costs and up to 75 watts more module power than standard 144 half-cell modules.

ENDURING HIGH PERFORMANCE
Long-term yield security with Anti LID Technology, Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING
High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (3000 Pa).

A RELIABLE INVESTMENT
Inclusive 12-year product warranty and 25-year linear performance warranty³.

STATE OF THE ART MODULE TECHNOLOGY
Q.ANTUM DUO combines cutting edge cell separation and innovative 12-busbar design with Q.ANTUM Technology.

³ See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:
Ground-mounted solar power plants

Engineered in Germany
**MECHANICAL SPECIFICATION**

- **Format**: 2216mm × 1045mm × 35mm (including frame)
- **Weight**: 26.5kg
- **Front Cover**: 3.2mm thermally pre-stressed glass with anti-reflection technology
- **Back Cover**: Composite film
- **Frame**: Anodised aluminium
- **Cell**: 6 × 26 monocrystalline Q.ANTUM solar half cells
- **Junction box**: 53-101 mm × 32-60 mm × 15-18 mm
- **Protection class**: IP67, with bypass diodes
- **Connector**: Stäubli MC4-Evo2, Hanwha Q CELLS HQC4; IP68
- **Cable**: 4 mm² Solar cable; (+) ≥ 700 mm, (−) ≥ 350 mm*
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- **Cable**: 4 mm² Solar cable; (+) ≥ 700 mm, (−) ≥ 350 mm*

**ELECTRICAL CHARACTERISTICS**

**POWER CLASS**

<table>
<thead>
<tr>
<th>475</th>
<th>480</th>
<th>485</th>
<th>490</th>
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</thead>
<tbody>
<tr>
<td><strong>MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power at MPP</td>
<td>P_{MP} [W]</td>
<td>475</td>
<td>480</td>
</tr>
<tr>
<td>Short Circuit Current</td>
<td>I_{SC} [A]</td>
<td>11.24</td>
<td>11.26</td>
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<tr>
<td>Open Circuit Voltage</td>
<td>V_{OC} [V]</td>
<td>53.58</td>
<td>53.61</td>
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<tr>
<td>Current at MPP</td>
<td>I_{MP} [A]</td>
<td>10.68</td>
<td>10.71</td>
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<tr>
<td>Voltage at MPP</td>
<td>V_{MP} [V]</td>
<td>44.54</td>
<td>44.81</td>
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<tr>
<td>Efficiency</td>
<td>η [%]</td>
<td>≥ 20.5</td>
<td>≥ 20.7</td>
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**MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT**

<table>
<thead>
<tr>
<th>475</th>
<th>480</th>
<th>485</th>
<th>490</th>
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</thead>
<tbody>
<tr>
<td><strong>Power at MPP</strong></td>
<td>P_{MP} [W]</td>
<td>356.4</td>
<td>360.1</td>
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<tr>
<td>Open Circuit Voltage</td>
<td>V_{OC} [V]</td>
<td>50.53</td>
<td>50.56</td>
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<tr>
<td>Current at MPP</td>
<td>I_{MP} [A]</td>
<td>8.39</td>
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<tr>
<td>Voltage at MPP</td>
<td>V_{MP} [V]</td>
<td>42.49</td>
<td>42.72</td>
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</tbody>
</table>

**Q CELLS PERFORMANCE WARRANTY**

- At least 98% of nominal power during first year. Thereafter maximum 0.5% degradation per year. At least 93.5% of nominal power up to 25 years. At least 86% of nominal power up to 25 years.
- All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

**TEMPERATURE COEFFICIENTS**

- Temperature Coefficient of I_{SC}: α [%/K] = +0.04
- Temperature Coefficient of V_{OC}: β [%/K] = −0.27
- Temperature Coefficient of P_{MP}: γ [%/K] = −0.34

**PROPERS FOR SYSTEM DESIGN**

- **Maximum System Voltage**: V_{SYS} [V] = 1500 (PV module classification: Class II)
- **Maximum Reverse Current**: I_{S} [A] = 20 (Fire Rating based on ANSI / UL 61730: C / TYPE 1)
- **Max. Design Load, Push / Pull**: P_{E} [W] = 3600 / 2000 (Permitted Module Temperature on Continuous Duty: −40 °C - +85 °C)
- **Max. Test Load, Push / Pull**: P_{E} [W] = 5400 / 3000

**QUALIFICATIONS AND CERTIFICATES**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Requirement</th>
<th>Class / Type</th>
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<tbody>
<tr>
<td>IEC 61215-2016</td>
<td>100% compliance</td>
<td>Class II</td>
</tr>
<tr>
<td>IEC 61730-2016</td>
<td>100% compliance</td>
<td>C / TYPE 1</td>
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</tbody>
</table>

**PACKAGING INFORMATION**

- **Packaging**: Vertical packaging
  - 2306mm × 1150mm × 1215mm
  - 836kg
  - 12 pallets
  - 20 pallets
  - 30 modules

**Note**: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

**Made in Malaysia**

Hanwha Q CELLS Australia Pty Ltd
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