

Datasheet • Solar panels

5th generation a-Si solar panels



IEC 1646 Certified

Free Energy solar panels are fully certified by TÜV Rheinland in April/May 2004, according to the IEC 1646 standard for amorphous silicon solar panels.

Reliable cell technology

Free Energy produces stable and reliable amorphous silicon cells. After initial stabilization during the first two months of outdoor use, the amorphous silicon cell will be stable for decades. The expected lifetime of the advanced amorphous silicon solar cells is at least 20 years.

High energy yield

The amorphous silicon solar cells, produced by Free Energy, function better than crystalline silicon solar cells in partial or indirect sunlight. Tests have shown that the annual energy output is approximately 15% higher per rated Watt-peak power.

Outdoor performance

Free Energy applies an injected polymer frame, with a very high moisture barrier. This advanced framing technology is unique to the Free Energy solar panels and makes them reliable for outdoor use with 10 years warranty on power output.

$$S_{\text{utile}} = 0,29 * 0,25 \text{ m}^2$$



Free Energy solar panel product range:

- 5 Watt solar panel • FEE-5-12C
- 7 Watt solar panel • FEE-7-12C
- 14 Watt solar panel • FEE-14-12C
- 19 Watt solar panel • FEE-20-12C

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gamme des panneaux
que nous avons



Specifications

| Main characteristics | FEE-20-12C | FEE-14-12C | FEE-7-12C | FEE-5-12C |
|----------------------|--|----------------------------|----------------------------|----------------------------|
| Cell technology | tandem aSi | single aSi | single aSi | single aSi |
| Module framing | 5 th generation | 5 th generation | 5 th generation | 5 th generation |
| Encapsulation | Glass-to-glass encapsulation with moulded polymer injection framing. | | | |
| Expected lifetime | > 20 years | | | |
| Operating conditions | -40 °C to +85 °C | | | |

Maximum power electrical characteristics

| at Standard Test Conditions ¹ | FEE-20-12C | FEE-14-12C | FEE-7-12C | FEE-5-12C |
|--|-------------|-------------|-------------|-------------|
| Maximum peak power | 19 Watt | 14 Watt | 7 Watt | 5 Watt |
| Maximum current at 16V | 1.18 Ampere | 0.87 Ampere | 0.43 Ampere | 0.29 Ampere |
| Short circuit | 1.45 Ampere | 1.05 Amp | 0.52 Ampere | 0.35 Ampere |
| Open circuit | 22.8 Volt | 22.0 Volt | 22.0 Volt | 22.0 Volt |

1) Data refers to Standard Test Conditions (STC), an approximation of operation in full sunlight (STC: 1000 W/m² irradiance, 25 °C cell temperature, spectrum AM 1.5). Rated parameters may vary +/- 10%.

Stabilized electrical characteristics

| at Standard Test Conditions ¹ | FEE-20-12C | FEE-14-12C | FEE-7-12C | FEE-5-12C |
|--|-------------|-------------|-------------|-------------|
| Stabilized peak power | 16 Watt | 12 Watt | 6 Watt | 4 Watt |
| Current at 16V | 0.99 Ampere | 0.75 Ampere | 0.38 Ampere | 0.25 Ampere |
| Short circuit current | 1.22 Ampere | 0.90 Ampere | 0.45 Ampere | 0.30 Ampere |
| Open circuit voltage | 22.8 Volt | 22.0 Volt | 22.0 Volt | 22.0 Volt |

2) Data refers to Standard Test Conditions (STC), an approximation of operation in full sunlight (STC: 1000 W/m² irradiance, 25 °C cell temperature, spectrum AM 1.5). Rated parameters may vary +/- 10%.

Stabilized electrical characteristics

| at Average Operating Conditions ³ | FEE-20-12C | FEE-14-12C | FEE-7-12C | FEE-5-12C |
|--|------------|------------|-----------|-----------|
| Peak power | 18 Watt | 14 Watt | 6.9 Watt | 4.6 Watt |

3) Data refers to real annual average irradiation in the Netherlands, normalized on average performance of crystalline silicon technology. Rated parameters may vary +/- 10%.

Dimensions

| | FEE-20-12C | FEE-14-12C | FEE-7-12C | FEE-5-12C |
|--------------------|---------------|--------------|--------------|--------------|
| Dimensions (H X W) | 1015 x 312 mm | 930 x 317 mm | 495 x 317 mm | 343 x 317 mm |
| Thickness | 14.3 mm | 12.5 mm | 12.5 mm | 12.5 mm |
| Weight | 4.6 kg | 4.1 kg | 2.1 kg | 1.5 kg |
| Fixation | 4 clips | 4 clips | 4 holes | 4 holes |

Temperature coefficients

| | |
|-----------------------------------|---|
| Voltage | - 0.29% / °C |
| Current | + 0.08% / °C |
| Normal operating cell temperature | 45°C (at 800 W/m ² , ambient temperature 21°C) |

Special options (on request)

- 6 Volt version
- 5 m cable
- premounted special connectors