

# Global Full-cell Solar Panel Supply, Demand and Key Producers, 2026-2032

<https://marketpublishers.com/r/G3856436D341EN.html>

Date: June 2026

Pages: 142

Price: US\$ 4,480.00 (Single User License)

ID: G3856436D341EN

## Abstracts

The global Full-cell Solar Panel market size is expected to reach \$ 12331 million by 2032, rising at a market growth of 7.4% CAGR during the forecast period (2026-2032).

Full-cell solar panels are photovoltaic modules built from standard, uncut silicon wafers (typically 156mm<sup>2</sup>156mm or larger) with complete square or pseudo-square cells. Unlike half-cell modules resulting from laser-scribed cell division, full-cell modules retain original cell dimensions and electrical characteristics, providing simpler busbar design and lower manufacturing complexity. Full-cell panels typically feature 60 cells (for 20-24% efficiency, ~270-330W) or 72 cells (for ~320-400W) configurations. Key characteristics include lower internal resistance, easier manufacturing, higher tolerance to micro-cracks, and more uniform current distribution compared to half-cut designs. Main full-cell module types include monocrystalline PERC, polycrystalline (discontinued but still in secondary markets), and emerging full-cell TOPCon modules. From a value chain perspective, upstream includes silicon feedstock suppliers, ingot/wafer manufacturers, cell makers that keep full-square format; midstream involves tabber-stringer assembly, lamination, framing, junction box attachment, and flash testing; downstream demand spans utility-scale solar plants, commercial rooftops, residential installations (in cost-sensitive regions), and off-grid systems. In 2025, the average selling price is approximately US\$120 per kW, global sales volume is about 60,800 MW, and gross margins generally range from 15% to 25%, driven by raw material costs (polysilicon, silver paste, glass, EVA), manufacturing yields, and competitive pricing pressure.

The full-cell solar panel market is transitioning through a mature phase of technology substitution, where half-cut cell, shingled, and multi-busbar technologies have captured the majority of new utility-scale and rooftop installations. However, full-cell modules

remain relevant for applications prioritizing low manufacturing complexity, lower repair cost, and immediate availability at very low price points.

### Technology Migration to Half-Cell and Beyond

The broader PV module industry has experienced a rapid shift away from standard full-cell modules. By increasing the number of cell cuts, manufacturers reduce series resistance and improve module power output by 5-10W. Yet this comes at the cost of additional processing steps (laser cutting) and increased risk of cell micro-cracks around cut edges. Consequently, full-cell designs maintain a foothold in regions where simple, robust, long-proven technology is valued over marginal efficiency gains.

### Manufacturing Simplicity and Lower Investment Barriers

Full-cell module production requires less capital-intensive equipment compared to advanced half-cell or shingled lines. Smaller manufacturers, particularly in emerging markets with limited access to state-of-the-art tooling, continue to rely on full-cell assembly because they can use standard tabber-stringers and laminators. This lower entry barrier sustains full-cell production capacity in some regions even as global average selling prices compress.

This report studies the global Full-cell Solar Panel production, demand, key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for Full-cell Solar Panel and provides market size (US\$ million) and Year-over-Year (YoY) Growth, considering 2025 as the base year. This report explores demand trends and competition, as well as details the characteristics of Full-cell Solar Panel that contribute to its increasing demand across many markets.

### Highlights and key features of the study

Global Full-cell Solar Panel total production and demand, 2021-2032, (MW)

Global Full-cell Solar Panel total production value, 2021-2032, (USD Million)

Global Full-cell Solar Panel production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (MW), (based on production site)

Global Full-cell Solar Panel consumption by region & country, CAGR, 2021-2032 & (MW)

U.S. VS China: Full-cell Solar Panel domestic production, consumption, key domestic manufacturers and share

Global Full-cell Solar Panel production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (MW)

Global Full-cell Solar Panel production by Type, production, value, CAGR, 2021-2032, (USD Million) & (MW)

Global Full-cell Solar Panel production by Application, production, value, CAGR, 2021-2032, (USD Million) & (MW)

This report profiles key players in the global Full-cell Solar Panel market based on the following parameters - company overview, production, value, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include JinkoSolar Holding Co., Ltd., Trina Solar Co., Ltd., JA Solar Technology Co., Ltd., Canadian Solar Inc., Longi Green Energy Technology Co., Ltd., Risen Energy Co., Ltd., Chint Solar (Astronergy), First Solar, Inc., Hanwha Q CELLS, Sharp Energy Solutions Corporation, etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the World Full-cell Solar Panel market

Detailed Segmentation:

Each section contains quantitative market data including market by value (US\$ Millions), volume (production, consumption) & (MW) and average price (US\$/Kw) by manufacturer, by Type, and by Application. Data is given for the years 2021-2032 by year with 2025 as the base year, 2026 as the estimate year, and 2027-2032 as the forecast year.

Global Full-cell Solar Panel Market, By Region:

United States

China

Europe

Japan

South Korea

ASEAN

India

Rest of World

#### Global Full-cell Solar Panel Market, Segmentation by Type:

Monocrystalline Full-Cell (PERC/TOPCon/HJT)

Polycrystalline Full-Cell

N-Type Full-Cell

#### Global Full-cell Solar Panel Market, Segmentation by Cell Count:

60-cell (6?10)

66-cell (6?11)

72-cell (6?12)

#### Global Full-cell Solar Panel Market, Segmentation by Cell Interconnection / Busbar:

5 Busbars (5BB)

9 Busbars (9BB)

Multi-Busbar (MBB, >12)

#### Global Full-cell Solar Panel Market, Segmentation by Application:

Commercial

Industrial

Residential

Companies Profiled:

JinkoSolar Holding Co., Ltd.

Trina Solar Co., Ltd.

JA Solar Technology Co., Ltd.

Canadian Solar Inc.

Longi Green Energy Technology Co., Ltd.

Risen Energy Co., Ltd.

Chint Solar (Astronergy)

First Solar, Inc.

Hanwha Q CELLS

Sharp Energy Solutions Corporation

Panasonic Corporation

Kyocera Corporation

Tata Power Solar Systems Ltd.

Vikram Solar Ltd.

Adani Solar

Waaree Energies Ltd.

## Seraphim Energy Group Co., Ltd.

### Key Questions Answered:

1. How big is the global Full-cell Solar Panel market?
2. What is the demand of the global Full-cell Solar Panel market?
3. What is the year over year growth of the global Full-cell Solar Panel market?
4. What is the production and production value of the global Full-cell Solar Panel market?
5. Who are the key producers in the global Full-cell Solar Panel market?
6. What are the growth factors driving the market demand?

## Contents

### 1 SUPPLY SUMMARY

- 1.1 Full-cell Solar Panel Introduction
- 1.2 World Full-cell Solar Panel Supply & Forecast
  - 1.2.1 World Full-cell Solar Panel Production Value (2021 & 2025 & 2032)
  - 1.2.2 World Full-cell Solar Panel Production (2021-2032)
  - 1.2.3 World Full-cell Solar Panel Pricing Trends (2021-2032)
- 1.3 World Full-cell Solar Panel Production by Region (Based on Production Site)
  - 1.3.1 World Full-cell Solar Panel Production Value by Region (2021-2032)
  - 1.3.2 World Full-cell Solar Panel Production by Region (2021-2032)
  - 1.3.3 World Full-cell Solar Panel Average Price by Region (2021-2032)
  - 1.3.4 North America Full-cell Solar Panel Production (2021-2032)
  - 1.3.5 Europe Full-cell Solar Panel Production (2021-2032)
  - 1.3.6 China Full-cell Solar Panel Production (2021-2032)
  - 1.3.7 Japan Full-cell Solar Panel Production (2021-2032)
- 1.4 Market Drivers, Restraints and Trends
  - 1.4.1 Full-cell Solar Panel Market Drivers
  - 1.4.2 Factors Affecting Demand
  - 1.4.3 Full-cell Solar Panel Major Market Trends

### 2 DEMAND SUMMARY

- 2.1 World Full-cell Solar Panel Demand (2021-2032)
- 2.2 World Full-cell Solar Panel Consumption by Region
  - 2.2.1 World Full-cell Solar Panel Consumption by Region (2021-2026)
  - 2.2.2 World Full-cell Solar Panel Consumption Forecast by Region (2027-2032)
- 2.3 United States Full-cell Solar Panel Consumption (2021-2032)
- 2.4 China Full-cell Solar Panel Consumption (2021-2032)
- 2.5 Europe Full-cell Solar Panel Consumption (2021-2032)
- 2.6 Japan Full-cell Solar Panel Consumption (2021-2032)
- 2.7 South Korea Full-cell Solar Panel Consumption (2021-2032)
- 2.8 ASEAN Full-cell Solar Panel Consumption (2021-2032)
- 2.9 India Full-cell Solar Panel Consumption (2021-2032)

### 3 WORLD MANUFACTURERS COMPETITIVE ANALYSIS

- 3.1 World Full-cell Solar Panel Production Value by Manufacturer (2021-2026)

- 3.2 World Full-cell Solar Panel Production by Manufacturer (2021-2026)
- 3.3 World Full-cell Solar Panel Average Price by Manufacturer (2021-2026)
- 3.4 Full-cell Solar Panel Company Evaluation Quadrant
- 3.5 Industry Rank and Concentration Rate (CR)
  - 3.5.1 Global Full-cell Solar Panel Industry Rank of Major Manufacturers
  - 3.5.2 Global Concentration Ratios (CR4) for Full-cell Solar Panel in 2025
  - 3.5.3 Global Concentration Ratios (CR8) for Full-cell Solar Panel in 2025
- 3.6 Full-cell Solar Panel Market: Overall Company Footprint Analysis
  - 3.6.1 Full-cell Solar Panel Market: Region Footprint
  - 3.6.2 Full-cell Solar Panel Market: Company Product Type Footprint
  - 3.6.3 Full-cell Solar Panel Market: Company Product Application Footprint
- 3.7 Competitive Environment
  - 3.7.1 Historical Structure of the Industry
  - 3.7.2 Barriers of Market Entry
  - 3.7.3 Factors of Competition
- 3.8 New Entrant and Capacity Expansion Plans
- 3.9 Mergers, Acquisition, Agreements, and Collaborations

## **4 UNITED STATES VS CHINA VS REST OF THE WORLD**

- 4.1 United States VS China: Full-cell Solar Panel Production Value Comparison
  - 4.1.1 United States VS China: Full-cell Solar Panel Production Value Comparison (2021 & 2025 & 2032)
  - 4.1.2 United States VS China: Full-cell Solar Panel Production Value Market Share Comparison (2021 & 2025 & 2032)
- 4.2 United States VS China: Full-cell Solar Panel Production Comparison
  - 4.2.1 United States VS China: Full-cell Solar Panel Production Comparison (2021 & 2025 & 2032)
  - 4.2.2 United States VS China: Full-cell Solar Panel Production Market Share Comparison (2021 & 2025 & 2032)
- 4.3 United States VS China: Full-cell Solar Panel Consumption Comparison
  - 4.3.1 United States VS China: Full-cell Solar Panel Consumption Comparison (2021 & 2025 & 2032)
  - 4.3.2 United States VS China: Full-cell Solar Panel Consumption Market Share Comparison (2021 & 2025 & 2032)
- 4.4 United States Based Full-cell Solar Panel Manufacturers and Market Share, 2021-2026
  - 4.4.1 United States Based Full-cell Solar Panel Manufacturers, Headquarters and Production Site (States, Country)

4.4.2 United States Based Manufacturers Full-cell Solar Panel Production Value (2021-2026)

4.4.3 United States Based Manufacturers Full-cell Solar Panel Production (2021-2026)

4.5 China Based Full-cell Solar Panel Manufacturers and Market Share

4.5.1 China Based Full-cell Solar Panel Manufacturers, Headquarters and Production Site (Province, Country)

4.5.2 China Based Manufacturers Full-cell Solar Panel Production Value (2021-2026)

4.5.3 China Based Manufacturers Full-cell Solar Panel Production (2021-2026)

4.6 Rest of World Based Full-cell Solar Panel Manufacturers and Market Share, 2021-2026

4.6.1 Rest of World Based Full-cell Solar Panel Manufacturers, Headquarters and Production Site (State, Country)

4.6.2 Rest of World Based Manufacturers Full-cell Solar Panel Production Value (2021-2026)

4.6.3 Rest of World Based Manufacturers Full-cell Solar Panel Production (2021-2026)

## **5 MARKET ANALYSIS BY TYPE**

5.1 World Full-cell Solar Panel Market Size Overview by Type: 2021 VS 2025 VS 2032

5.2 Segment Introduction by Type

5.2.1 Monocrystalline Full-Cell (PERC/TOPCon/HJT)

5.2.2 Polycrystalline Full-Cell

5.2.3 N-Type Full-Cell

5.3 Market Segment by Type

5.3.1 World Full-cell Solar Panel Production by Type (2021-2032)

5.3.2 World Full-cell Solar Panel Production Value by Type (2021-2032)

5.3.3 World Full-cell Solar Panel Average Price by Type (2021-2032)

## **6 MARKET ANALYSIS BY CELL COUNT**

6.1 World Full-cell Solar Panel Market Size Overview by Cell Count: 2021 VS 2025 VS 2032

6.2 Segment Introduction by Cell Count

6.2.1 60-cell (6?10)

6.2.2 66-cell (6?11)

6.2.3 72-cell (6?12)

6.3 Market Segment by Cell Count

6.3.1 World Full-cell Solar Panel Production by Cell Count (2021-2032)

6.3.2 World Full-cell Solar Panel Production Value by Cell Count (2021-2032)

6.3.3 World Full-cell Solar Panel Average Price by Cell Count (2021-2032)

## **7 MARKET ANALYSIS BY CELL INTERCONNECTION / BUSBAR**

7.1 World Full-cell Solar Panel Market Size Overview by Cell Interconnection / Busbar: 2021 VS 2025 VS 2032

7.2 Segment Introduction by Cell Interconnection / Busbar

7.2.1 5 Busbars (5BB)

7.2.2 9 Busbars (9BB)

7.2.3 Multi-Busbar (MBB, >12)

7.3 Market Segment by Cell Interconnection / Busbar

7.3.1 World Full-cell Solar Panel Production by Cell Interconnection / Busbar (2021-2032)

7.3.2 World Full-cell Solar Panel Production Value by Cell Interconnection / Busbar (2021-2032)

7.3.3 World Full-cell Solar Panel Average Price by Cell Interconnection / Busbar (2021-2032)

## **8 MARKET ANALYSIS BY APPLICATION**

8.1 World Full-cell Solar Panel Market Size Overview by Application: 2021 VS 2025 VS 2032

8.2 Segment Introduction by Application

8.2.1 Commercial

8.2.2 Industrial

8.2.3 Residential

8.3 Market Segment by Application

8.3.1 World Full-cell Solar Panel Production by Application (2021-2032)

8.3.2 World Full-cell Solar Panel Production Value by Application (2021-2032)

8.3.3 World Full-cell Solar Panel Average Price by Application (2021-2032)

## **9 COMPANY PROFILES**

9.1 JinkoSolar Holding Co., Ltd.

9.1.1 JinkoSolar Holding Co., Ltd. Details

9.1.2 JinkoSolar Holding Co., Ltd. Major Business

9.1.3 JinkoSolar Holding Co., Ltd. Full-cell Solar Panel Product and Services

9.1.4 JinkoSolar Holding Co., Ltd. Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)

- 9.1.5 JinkoSolar Holding Co., Ltd. Recent Developments/Updates
- 9.1.6 JinkoSolar Holding Co., Ltd. Competitive Strengths & Weaknesses
- 9.2 Trina Solar Co., Ltd.
  - 9.2.1 Trina Solar Co., Ltd. Details
  - 9.2.2 Trina Solar Co., Ltd. Major Business
  - 9.2.3 Trina Solar Co., Ltd. Full-cell Solar Panel Product and Services
  - 9.2.4 Trina Solar Co., Ltd. Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)
  - 9.2.5 Trina Solar Co., Ltd. Recent Developments/Updates
  - 9.2.6 Trina Solar Co., Ltd. Competitive Strengths & Weaknesses
- 9.3 JA Solar Technology Co., Ltd.
  - 9.3.1 JA Solar Technology Co., Ltd. Details
  - 9.3.2 JA Solar Technology Co., Ltd. Major Business
  - 9.3.3 JA Solar Technology Co., Ltd. Full-cell Solar Panel Product and Services
  - 9.3.4 JA Solar Technology Co., Ltd. Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)
  - 9.3.5 JA Solar Technology Co., Ltd. Recent Developments/Updates
  - 9.3.6 JA Solar Technology Co., Ltd. Competitive Strengths & Weaknesses
- 9.4 Canadian Solar Inc.
  - 9.4.1 Canadian Solar Inc. Details
  - 9.4.2 Canadian Solar Inc. Major Business
  - 9.4.3 Canadian Solar Inc. Full-cell Solar Panel Product and Services
  - 9.4.4 Canadian Solar Inc. Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)
  - 9.4.5 Canadian Solar Inc. Recent Developments/Updates
  - 9.4.6 Canadian Solar Inc. Competitive Strengths & Weaknesses
- 9.5 Longi Green Energy Technology Co., Ltd.
  - 9.5.1 Longi Green Energy Technology Co., Ltd. Details
  - 9.5.2 Longi Green Energy Technology Co., Ltd. Major Business
  - 9.5.3 Longi Green Energy Technology Co., Ltd. Full-cell Solar Panel Product and Services
  - 9.5.4 Longi Green Energy Technology Co., Ltd. Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)
  - 9.5.5 Longi Green Energy Technology Co., Ltd. Recent Developments/Updates
  - 9.5.6 Longi Green Energy Technology Co., Ltd. Competitive Strengths & Weaknesses
- 9.6 Risen Energy Co., Ltd.
  - 9.6.1 Risen Energy Co., Ltd. Details
  - 9.6.2 Risen Energy Co., Ltd. Major Business
  - 9.6.3 Risen Energy Co., Ltd. Full-cell Solar Panel Product and Services

9.6.4 Risen Energy Co., Ltd. Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)

9.6.5 Risen Energy Co., Ltd. Recent Developments/Updates

9.6.6 Risen Energy Co., Ltd. Competitive Strengths & Weaknesses

9.7 Chint Solar (Astronergy)

9.7.1 Chint Solar (Astronergy) Details

9.7.2 Chint Solar (Astronergy) Major Business

9.7.3 Chint Solar (Astronergy) Full-cell Solar Panel Product and Services

9.7.4 Chint Solar (Astronergy) Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)

9.7.5 Chint Solar (Astronergy) Recent Developments/Updates

9.7.6 Chint Solar (Astronergy) Competitive Strengths & Weaknesses

9.8 First Solar, Inc.

9.8.1 First Solar, Inc. Details

9.8.2 First Solar, Inc. Major Business

9.8.3 First Solar, Inc. Full-cell Solar Panel Product and Services

9.8.4 First Solar, Inc. Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)

9.8.5 First Solar, Inc. Recent Developments/Updates

9.8.6 First Solar, Inc. Competitive Strengths & Weaknesses

9.9 Hanwha Q CELLS

9.9.1 Hanwha Q CELLS Details

9.9.2 Hanwha Q CELLS Major Business

9.9.3 Hanwha Q CELLS Full-cell Solar Panel Product and Services

9.9.4 Hanwha Q CELLS Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)

9.9.5 Hanwha Q CELLS Recent Developments/Updates

9.9.6 Hanwha Q CELLS Competitive Strengths & Weaknesses

9.10 Sharp Energy Solutions Corporation

9.10.1 Sharp Energy Solutions Corporation Details

9.10.2 Sharp Energy Solutions Corporation Major Business

9.10.3 Sharp Energy Solutions Corporation Full-cell Solar Panel Product and Services

9.10.4 Sharp Energy Solutions Corporation Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)

9.10.5 Sharp Energy Solutions Corporation Recent Developments/Updates

9.10.6 Sharp Energy Solutions Corporation Competitive Strengths & Weaknesses

9.11 Panasonic Corporation

9.11.1 Panasonic Corporation Details

9.11.2 Panasonic Corporation Major Business

- 9.11.3 Panasonic Corporation Full-cell Solar Panel Product and Services
- 9.11.4 Panasonic Corporation Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)
- 9.11.5 Panasonic Corporation Recent Developments/Updates
- 9.11.6 Panasonic Corporation Competitive Strengths & Weaknesses
- 9.12 Kyocera Corporation
  - 9.12.1 Kyocera Corporation Details
  - 9.12.2 Kyocera Corporation Major Business
  - 9.12.3 Kyocera Corporation Full-cell Solar Panel Product and Services
  - 9.12.4 Kyocera Corporation Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)
  - 9.12.5 Kyocera Corporation Recent Developments/Updates
  - 9.12.6 Kyocera Corporation Competitive Strengths & Weaknesses
- 9.13 Tata Power Solar Systems Ltd.
  - 9.13.1 Tata Power Solar Systems Ltd. Details
  - 9.13.2 Tata Power Solar Systems Ltd. Major Business
  - 9.13.3 Tata Power Solar Systems Ltd. Full-cell Solar Panel Product and Services
  - 9.13.4 Tata Power Solar Systems Ltd. Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)
  - 9.13.5 Tata Power Solar Systems Ltd. Recent Developments/Updates
  - 9.13.6 Tata Power Solar Systems Ltd. Competitive Strengths & Weaknesses
- 9.14 Vikram Solar Ltd.
  - 9.14.1 Vikram Solar Ltd. Details
  - 9.14.2 Vikram Solar Ltd. Major Business
  - 9.14.3 Vikram Solar Ltd. Full-cell Solar Panel Product and Services
  - 9.14.4 Vikram Solar Ltd. Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)
  - 9.14.5 Vikram Solar Ltd. Recent Developments/Updates
  - 9.14.6 Vikram Solar Ltd. Competitive Strengths & Weaknesses
- 9.15 Adani Solar
  - 9.15.1 Adani Solar Details
  - 9.15.2 Adani Solar Major Business
  - 9.15.3 Adani Solar Full-cell Solar Panel Product and Services
  - 9.15.4 Adani Solar Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)
  - 9.15.5 Adani Solar Recent Developments/Updates
  - 9.15.6 Adani Solar Competitive Strengths & Weaknesses
- 9.16 Waaree Energies Ltd.
  - 9.16.1 Waaree Energies Ltd. Details

- 9.16.2 Waaree Energies Ltd. Major Business
- 9.16.3 Waaree Energies Ltd. Full-cell Solar Panel Product and Services
- 9.16.4 Waaree Energies Ltd. Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)
- 9.16.5 Waaree Energies Ltd. Recent Developments/Updates
- 9.16.6 Waaree Energies Ltd. Competitive Strengths & Weaknesses
- 9.17 Seraphim Energy Group Co., Ltd.
  - 9.17.1 Seraphim Energy Group Co., Ltd. Details
  - 9.17.2 Seraphim Energy Group Co., Ltd. Major Business
  - 9.17.3 Seraphim Energy Group Co., Ltd. Full-cell Solar Panel Product and Services
  - 9.17.4 Seraphim Energy Group Co., Ltd. Full-cell Solar Panel Production, Price, Value, Gross Margin and Market Share (2021-2026)
  - 9.17.5 Seraphim Energy Group Co., Ltd. Recent Developments/Updates
  - 9.17.6 Seraphim Energy Group Co., Ltd. Competitive Strengths & Weaknesses

## **10 INDUSTRY CHAIN ANALYSIS**

- 10.1 Full-cell Solar Panel Industry Chain
- 10.2 Full-cell Solar Panel Upstream Analysis
  - 10.2.1 Full-cell Solar Panel Core Raw Materials
  - 10.2.2 Main Manufacturers of Full-cell Solar Panel Core Raw Materials
- 10.3 Midstream Analysis
- 10.4 Downstream Analysis
- 10.5 Full-cell Solar Panel Production Mode
- 10.6 Full-cell Solar Panel Procurement Model
- 10.7 Full-cell Solar Panel Industry Sales Model and Sales Channels
  - 10.7.1 Full-cell Solar Panel Sales Model
  - 10.7.2 Full-cell Solar Panel Typical Distributors

## **11 RESEARCH FINDINGS AND CONCLUSION**

## **12 APPENDIX**

- 12.1 Methodology
- 12.2 Research Process and Data Source
- 12.3 Disclaimer

## List Of Tables

### LIST OF TABLES

Table 1. World Full-cell Solar Panel Production Value by Region (2021, 2025 and 2032) & (USD Million)

Table 2. World Full-cell Solar Panel Production Value by Region (2021-2026) & (USD Million)

Table 3. World Full-cell Solar Panel Production Value by Region (2027-2032) & (USD Million)

Table 4. World Full-cell Solar Panel Production Value Market Share by Region (2021-2026)

Table 5. World Full-cell Solar Panel Production Value Market Share by Region (2027-2032)

Table 6. World Full-cell Solar Panel Production by Region (2021-2026) & (MW)

Table 7. World Full-cell Solar Panel Production by Region (2027-2032) & (MW)

Table 8. World Full-cell Solar Panel Production Market Share by Region (2021-2026)

Table 9. World Full-cell Solar Panel Production Market Share by Region (2027-2032)

Table 10. World Full-cell Solar Panel Average Price by Region (2021-2026) & (US\$/Kw)

Table 11. World Full-cell Solar Panel Average Price by Region (2027-2032) & (US\$/Kw)

Table 12. Full-cell Solar Panel Major Market Trends

Table 13. World Full-cell Solar Panel Consumption Growth Rate Forecast by Region (2021 & 2025 & 2032) & (MW)

Table 14. World Full-cell Solar Panel Consumption by Region (2021-2026) & (MW)

Table 15. World Full-cell Solar Panel Consumption Forecast by Region (2027-2032) & (MW)

Table 16. World Full-cell Solar Panel Production Value by Manufacturer (2021-2026) & (USD Million)

Table 17. Production Value Market Share of Key Full-cell Solar Panel Producers in 2025

Table 18. World Full-cell Solar Panel Production by Manufacturer (2021-2026) & (MW)

Table 19. Production Market Share of Key Full-cell Solar Panel Producers in 2025

Table 20. World Full-cell Solar Panel Average Price by Manufacturer (2021-2026) & (US\$/Kw)

Table 21. Global Full-cell Solar Panel Company Evaluation Quadrant

Table 22. World Full-cell Solar Panel Industry Rank of Major Manufacturers, Based on Production Value in 2025

Table 23. Head Office and Full-cell Solar Panel Production Site of Key Manufacturer

Table 24. Full-cell Solar Panel Market: Company Product Type Footprint

- Table 25. Full-cell Solar Panel Market: Company Product Application Footprint
- Table 26. Full-cell Solar Panel Competitive Factors
- Table 27. Full-cell Solar Panel New Entrant and Capacity Expansion Plans
- Table 28. Full-cell Solar Panel Mergers & Acquisitions Activity
- Table 29. United States VS China Full-cell Solar Panel Production Value Comparison, (2021 & 2025 & 2032) & (USD Million)
- Table 30. United States VS China Full-cell Solar Panel Production Comparison, (2021 & 2025 & 2032) & (MW)
- Table 31. United States VS China Full-cell Solar Panel Consumption Comparison, (2021 & 2025 & 2032) & (MW)
- Table 32. United States Based Full-cell Solar Panel Manufacturers, Headquarters and Production Site (States, Country)
- Table 33. United States Based Manufacturers Full-cell Solar Panel Production Value, (2021-2026) & (USD Million)
- Table 34. United States Based Manufacturers Full-cell Solar Panel Production Value Market Share (2021-2026)
- Table 35. United States Based Manufacturers Full-cell Solar Panel Production (2021-2026) & (MW)
- Table 36. United States Based Manufacturers Full-cell Solar Panel Production Market Share (2021-2026)
- Table 37. China Based Full-cell Solar Panel Manufacturers, Headquarters and Production Site (Province, Country)
- Table 38. China Based Manufacturers Full-cell Solar Panel Production Value, (2021-2026) & (USD Million)
- Table 39. China Based Manufacturers Full-cell Solar Panel Production Value Market Share (2021-2026)
- Table 40. China Based Manufacturers Full-cell Solar Panel Production, (2021-2026) & (MW)
- Table 41. China Based Manufacturers Full-cell Solar Panel Production Market Share (2021-2026)
- Table 42. Rest of World Based Full-cell Solar Panel Manufacturers, Headquarters and Production Site (State, Country)
- Table 43. Rest of World Based Manufacturers Full-cell Solar Panel Production Value, (2021-2026) & (USD Million)
- Table 44. Rest of World Based Manufacturers Full-cell Solar Panel Production Value Market Share (2021-2026)
- Table 45. Rest of World Based Manufacturers Full-cell Solar Panel Production, (2021-2026) & (MW)
- Table 46. Rest of World Based Manufacturers Full-cell Solar Panel Production Market

Share (2021-2026)

Table 47. World Full-cell Solar Panel Production Value by Type, (USD Million), 2021 & 2025 & 2032

Table 48. World Full-cell Solar Panel Production by Type (2021-2026) & (MW)

Table 49. World Full-cell Solar Panel Production by Type (2027-2032) & (MW)

Table 50. World Full-cell Solar Panel Production Value by Type (2021-2026) & (USD Million)

Table 51. World Full-cell Solar Panel Production Value by Type (2027-2032) & (USD Million)

Table 52. World Full-cell Solar Panel Average Price by Type (2021-2026) & (US\$/Kw)

Table 53. World Full-cell Solar Panel Average Price by Type (2027-2032) & (US\$/Kw)

Table 54. World Full-cell Solar Panel Production Value by Cell Count, (USD Million), 2021 & 2025 & 2032

Table 55. World Full-cell Solar Panel Production by Cell Count (2021-2026) & (MW)

Table 56. World Full-cell Solar Panel Production by Cell Count (2027-2032) & (MW)

Table 57. World Full-cell Solar Panel Production Value by Cell Count (2021-2026) & (USD Million)

Table 58. World Full-cell Solar Panel Production Value by Cell Count (2027-2032) & (USD Million)

Table 59. World Full-cell Solar Panel Average Price by Cell Count (2021-2026) & (US\$/Kw)

Table 60. World Full-cell Solar Panel Average Price by Cell Count (2027-2032) & (US\$/Kw)

Table 61. World Full-cell Solar Panel Production Value by Cell Interconnection / Busbar, (USD Million), 2021 & 2025 & 2032

Table 62. World Full-cell Solar Panel Production by Cell Interconnection / Busbar (2021-2026) & (MW)

Table 63. World Full-cell Solar Panel Production by Cell Interconnection / Busbar (2027-2032) & (MW)

Table 64. World Full-cell Solar Panel Production Value by Cell Interconnection / Busbar (2021-2026) & (USD Million)

Table 65. World Full-cell Solar Panel Production Value by Cell Interconnection / Busbar (2027-2032) & (USD Million)

Table 66. World Full-cell Solar Panel Average Price by Cell Interconnection / Busbar (2021-2026) & (US\$/Kw)

Table 67. World Full-cell Solar Panel Average Price by Cell Interconnection / Busbar (2027-2032) & (US\$/Kw)

Table 68. World Full-cell Solar Panel Production Value by Application, (USD Million), 2021 & 2025 & 2032

Table 69. World Full-cell Solar Panel Production by Application (2021-2026) & (MW)

Table 70. World Full-cell Solar Panel Production by Application (2027-2032) & (MW)

Table 71. World Full-cell Solar Panel Production Value by Application (2021-2026) & (USD Million)

Table 72. World Full-cell Solar Panel Production Value by Application (2027-2032) & (USD Million)

Table 73. World Full-cell Solar Panel Average Price by Application (2021-2026) & (US\$/Kw)

Table 74. World Full-cell Solar Panel Average Price by Application (2027-2032) & (US\$/Kw)

Table 75. JinkoSolar Holding Co., Ltd. Basic Information, Manufacturing Base and Competitors

Table 76. JinkoSolar Holding Co., Ltd. Major Business

Table 77. JinkoSolar Holding Co., Ltd. Full-cell Solar Panel Product and Services

Table 78. JinkoSolar Holding Co., Ltd. Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 79. JinkoSolar Holding Co., Ltd. Recent Developments/Updates

Table 80. JinkoSolar Holding Co., Ltd. Competitive Strengths & Weaknesses

Table 81. Trina Solar Co., Ltd. Basic Information, Manufacturing Base and Competitors

Table 82. Trina Solar Co., Ltd. Major Business

Table 83. Trina Solar Co., Ltd. Full-cell Solar Panel Product and Services

Table 84. Trina Solar Co., Ltd. Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 85. Trina Solar Co., Ltd. Recent Developments/Updates

Table 86. Trina Solar Co., Ltd. Competitive Strengths & Weaknesses

Table 87. JA Solar Technology Co., Ltd. Basic Information, Manufacturing Base and Competitors

Table 88. JA Solar Technology Co., Ltd. Major Business

Table 89. JA Solar Technology Co., Ltd. Full-cell Solar Panel Product and Services

Table 90. JA Solar Technology Co., Ltd. Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 91. JA Solar Technology Co., Ltd. Recent Developments/Updates

Table 92. JA Solar Technology Co., Ltd. Competitive Strengths & Weaknesses

Table 93. Canadian Solar Inc. Basic Information, Manufacturing Base and Competitors

Table 94. Canadian Solar Inc. Major Business

Table 95. Canadian Solar Inc. Full-cell Solar Panel Product and Services

Table 96. Canadian Solar Inc. Full-cell Solar Panel Production (MW), Price (US\$/Kw),

Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 97. Canadian Solar Inc. Recent Developments/Updates

Table 98. Canadian Solar Inc. Competitive Strengths & Weaknesses

Table 99. Longi Green Energy Technology Co., Ltd. Basic Information, Manufacturing Base and Competitors

Table 100. Longi Green Energy Technology Co., Ltd. Major Business

Table 101. Longi Green Energy Technology Co., Ltd. Full-cell Solar Panel Product and Services

Table 102. Longi Green Energy Technology Co., Ltd. Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 103. Longi Green Energy Technology Co., Ltd. Recent Developments/Updates

Table 104. Longi Green Energy Technology Co., Ltd. Competitive Strengths & Weaknesses

Table 105. Risen Energy Co., Ltd. Basic Information, Manufacturing Base and Competitors

Table 106. Risen Energy Co., Ltd. Major Business

Table 107. Risen Energy Co., Ltd. Full-cell Solar Panel Product and Services

Table 108. Risen Energy Co., Ltd. Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 109. Risen Energy Co., Ltd. Recent Developments/Updates

Table 110. Risen Energy Co., Ltd. Competitive Strengths & Weaknesses

Table 111. Chint Solar (Astronergy) Basic Information, Manufacturing Base and Competitors

Table 112. Chint Solar (Astronergy) Major Business

Table 113. Chint Solar (Astronergy) Full-cell Solar Panel Product and Services

Table 114. Chint Solar (Astronergy) Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 115. Chint Solar (Astronergy) Recent Developments/Updates

Table 116. Chint Solar (Astronergy) Competitive Strengths & Weaknesses

Table 117. First Solar, Inc. Basic Information, Manufacturing Base and Competitors

Table 118. First Solar, Inc. Major Business

Table 119. First Solar, Inc. Full-cell Solar Panel Product and Services

Table 120. First Solar, Inc. Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 121. First Solar, Inc. Recent Developments/Updates

Table 122. First Solar, Inc. Competitive Strengths & Weaknesses

Table 123. Hanwha Q CELLS Basic Information, Manufacturing Base and Competitors

Table 124. Hanwha Q CELLS Major Business

Table 125. Hanwha Q CELLS Full-cell Solar Panel Product and Services

Table 126. Hanwha Q CELLS Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 127. Hanwha Q CELLS Recent Developments/Updates

Table 128. Hanwha Q CELLS Competitive Strengths & Weaknesses

Table 129. Sharp Energy Solutions Corporation Basic Information, Manufacturing Base and Competitors

Table 130. Sharp Energy Solutions Corporation Major Business

Table 131. Sharp Energy Solutions Corporation Full-cell Solar Panel Product and Services

Table 132. Sharp Energy Solutions Corporation Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 133. Sharp Energy Solutions Corporation Recent Developments/Updates

Table 134. Sharp Energy Solutions Corporation Competitive Strengths & Weaknesses

Table 135. Panasonic Corporation Basic Information, Manufacturing Base and Competitors

Table 136. Panasonic Corporation Major Business

Table 137. Panasonic Corporation Full-cell Solar Panel Product and Services

Table 138. Panasonic Corporation Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 139. Panasonic Corporation Recent Developments/Updates

Table 140. Panasonic Corporation Competitive Strengths & Weaknesses

Table 141. Kyocera Corporation Basic Information, Manufacturing Base and Competitors

Table 142. Kyocera Corporation Major Business

Table 143. Kyocera Corporation Full-cell Solar Panel Product and Services

Table 144. Kyocera Corporation Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 145. Kyocera Corporation Recent Developments/Updates

Table 146. Kyocera Corporation Competitive Strengths & Weaknesses

Table 147. Tata Power Solar Systems Ltd. Basic Information, Manufacturing Base and Competitors

Table 148. Tata Power Solar Systems Ltd. Major Business

Table 149. Tata Power Solar Systems Ltd. Full-cell Solar Panel Product and Services

Table 150. Tata Power Solar Systems Ltd. Full-cell Solar Panel Production (MW), Price

(US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 151. Tata Power Solar Systems Ltd. Recent Developments/Updates

Table 152. Tata Power Solar Systems Ltd. Competitive Strengths & Weaknesses

Table 153. Vikram Solar Ltd. Basic Information, Manufacturing Base and Competitors

Table 154. Vikram Solar Ltd. Major Business

Table 155. Vikram Solar Ltd. Full-cell Solar Panel Product and Services

Table 156. Vikram Solar Ltd. Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 157. Vikram Solar Ltd. Recent Developments/Updates

Table 158. Vikram Solar Ltd. Competitive Strengths & Weaknesses

Table 159. Adani Solar Basic Information, Manufacturing Base and Competitors

Table 160. Adani Solar Major Business

Table 161. Adani Solar Full-cell Solar Panel Product and Services

Table 162. Adani Solar Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 163. Adani Solar Recent Developments/Updates

Table 164. Adani Solar Competitive Strengths & Weaknesses

Table 165. Waaree Energies Ltd. Basic Information, Manufacturing Base and Competitors

Table 166. Waaree Energies Ltd. Major Business

Table 167. Waaree Energies Ltd. Full-cell Solar Panel Product and Services

Table 168. Waaree Energies Ltd. Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 169. Waaree Energies Ltd. Recent Developments/Updates

Table 170. Waaree Energies Ltd. Competitive Strengths & Weaknesses

Table 171. Seraphim Energy Group Co., Ltd. Basic Information, Manufacturing Base and Competitors

Table 172. Seraphim Energy Group Co., Ltd. Major Business

Table 173. Seraphim Energy Group Co., Ltd. Full-cell Solar Panel Product and Services

Table 174. Seraphim Energy Group Co., Ltd. Full-cell Solar Panel Production (MW), Price (US\$/Kw), Production Value (USD Million), Gross Margin and Market Share (2021-2026)

Table 175. Seraphim Energy Group Co., Ltd. Recent Developments/Updates

Table 176. Seraphim Energy Group Co., Ltd. Competitive Strengths & Weaknesses

Table 177. Global Key Players of Full-cell Solar Panel Upstream (Raw Materials)

Table 178. Global Full-cell Solar Panel Typical Customers

Table 179. Full-cell Solar Panel Typical Distributors



## List Of Figures

### LIST OF FIGURES

Figure 1. Full-cell Solar Panel Picture

Figure 2. World Full-cell Solar Panel Production Value: 2021 & 2025 & 2032, (USD Million)

Figure 3. World Full-cell Solar Panel Production Value and Forecast (2021-2032) & (USD Million)

Figure 4. World Full-cell Solar Panel Production (2021-2032) & (MW)

Figure 5. World Full-cell Solar Panel Average Price (2021-2032) & (US\$/Kw)

Figure 6. World Full-cell Solar Panel Production Value Market Share by Region (2021-2032)

Figure 7. World Full-cell Solar Panel Production Market Share by Region (2021-2032)

Figure 8. North America Full-cell Solar Panel Production (2021-2032) & (MW)

Figure 9. Europe Full-cell Solar Panel Production (2021-2032) & (MW)

Figure 10. China Full-cell Solar Panel Production (2021-2032) & (MW)

Figure 11. Japan Full-cell Solar Panel Production (2021-2032) & (MW)

Figure 12. Full-cell Solar Panel Market Drivers

Figure 13. Factors Affecting Demand

Figure 14. World Full-cell Solar Panel Consumption (2021-2032) & (MW)

Figure 15. World Full-cell Solar Panel Consumption Market Share by Region (2021-2032)

Figure 16. United States Full-cell Solar Panel Consumption (2021-2032) & (MW)

Figure 17. China Full-cell Solar Panel Consumption (2021-2032) & (MW)

Figure 18. Europe Full-cell Solar Panel Consumption (2021-2032) & (MW)

Figure 19. Japan Full-cell Solar Panel Consumption (2021-2032) & (MW)

Figure 20. South Korea Full-cell Solar Panel Consumption (2021-2032) & (MW)

Figure 21. ASEAN Full-cell Solar Panel Consumption (2021-2032) & (MW)

Figure 22. India Full-cell Solar Panel Consumption (2021-2032) & (MW)

Figure 23. Producer Shipments of Full-cell Solar Panel by Manufacturer Revenue (\$MM) and Market Share (%): 2025

Figure 24. Global Four-firm Concentration Ratios (CR4) for Full-cell Solar Panel Markets in 2025

Figure 25. Global Four-firm Concentration Ratios (CR8) for Full-cell Solar Panel Markets in 2025

Figure 26. United States VS China: Full-cell Solar Panel Production Value Market Share Comparison (2021 & 2025 & 2032)

Figure 27. United States VS China: Full-cell Solar Panel Production Market Share

Comparison (2021 & 2025 & 2032)

Figure 28. United States VS China: Full-cell Solar Panel Consumption Market Share Comparison (2021 & 2025 & 2032)

Figure 29. United States Based Manufacturers Full-cell Solar Panel Production Market Share 2025

Figure 30. China Based Manufacturers Full-cell Solar Panel Production Market Share 2025

Figure 31. Rest of World Based Manufacturers Full-cell Solar Panel Production Market Share 2025

Figure 32. World Full-cell Solar Panel Production Value by Type, (USD Million), 2021 & 2025 & 2032

Figure 33. World Full-cell Solar Panel Production Value Market Share by Type in 2025

Figure 34. Monocrystalline Full-Cell (PERC/TOPCon/HJT)

Figure 35. Polycrystalline Full-Cell

Figure 36. N-Type Full-Cell

Figure 37. World Full-cell Solar Panel Production Market Share by Type (2021-2032)

Figure 38. World Full-cell Solar Panel Production Value Market Share by Type (2021-2032)

Figure 39. World Full-cell Solar Panel Average Price by Type (2021-2032) & (US\$/Kw)

Figure 40. World Full-cell Solar Panel Production Value by Cell Count, (USD Million), 2021 & 2025 & 2032

Figure 41. World Full-cell Solar Panel Production Value Market Share by Cell Count in 2025

Figure 42. 60-cell (6?10)

Figure 43. 66-cell (6?11)

Figure 44. 72-cell (6?12)

Figure 45. World Full-cell Solar Panel Production Market Share by Cell Count (2021-2032)

Figure 46. World Full-cell Solar Panel Production Value Market Share by Cell Count (2021-2032)

Figure 47. World Full-cell Solar Panel Average Price by Cell Count (2021-2032) & (US\$/Kw)

Figure 48. World Full-cell Solar Panel Production Value by Cell Interconnection / Busbar, (USD Million), 2021 & 2025 & 2032

Figure 49. World Full-cell Solar Panel Production Value Market Share by Cell Interconnection / Busbar in 2025

Figure 50. 5 Busbars (5BB)

Figure 51. 9 Busbars (9BB)

Figure 52. Multi-Busbar (MBB, >12)

Figure 53. World Full-cell Solar Panel Production Market Share by Cell Interconnection / Busbar (2021-2032)

Figure 54. World Full-cell Solar Panel Production Value Market Share by Cell Interconnection / Busbar (2021-2032)

Figure 55. World Full-cell Solar Panel Average Price by Cell Interconnection / Busbar (2021-2032) & (US\$/Kw)

Figure 56. World Full-cell Solar Panel Production Value by Application, (USD Million), 2021 & 2025 & 2032

Figure 57. World Full-cell Solar Panel Production Value Market Share by Application in 2025

Figure 58. Commercial

Figure 59. Industrial

Figure 60. Residential

Figure 61. World Full-cell Solar Panel Production Market Share by Application (2021-2032)

Figure 62. World Full-cell Solar Panel Production Value Market Share by Application (2021-2032)

Figure 63. World Full-cell Solar Panel Average Price by Application (2021-2032) & (US\$/Kw)

Figure 64. Full-cell Solar Panel Industry Chain

Figure 65. Full-cell Solar Panel Procurement Model

Figure 66. Full-cell Solar Panel Sales Model

Figure 67. Full-cell Solar Panel Sales Channels, Direct Sales, and Distribution

Figure 68. Methodology

Figure 69. Research Process and Data Source

## I would like to order

Product name: Global Full-cell Solar Panel Supply, Demand and Key Producers, 2026-2032

Product link: <https://marketpublishers.com/r/G3856436D341EN.html>

Price: US\$ 4,480.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

[info@marketpublishers.com](mailto:info@marketpublishers.com)

## Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/G3856436D341EN.html>