

Smart Module

Monocrystalline TOPCon Module with Half-Cut Cell Technology and Integrated Power Optimizer

SPV425-R54PDTL



SolarEdge Smart Modules with Integrated S-Series Power Optimizers for maximum energy production

- / Advanced N-type TOPCon technology, designed to provide greater module efficiency, quality, high power, bifaciality, and long-term reliability
- / Optimized energy output by constantly tracking the Maximum Power Point (MPPT) of each module individually
- / Fast and easy installation with the pre-assembled Power Optimizer, with simplified cable management
- / Built-in SafeDC™ enable module-level voltage shutdown whenever inverter or AC power is turned off, for maximum installer and firefighter safety
- / Sense Connect patented technology – the safety feature designed to automatically detect and prevent potential electric arcs at the connector level* that may cause fire events
- / Module Level Monitoring Platform for full visibility of system performance from roof to grid
- / Integrates seamlessly with the complete SolarEdge Home ecosystem using SolarEdge Home Network
- / High durability to extreme weather hazards, in addition to 1.6mm double glass
- / 25-year module warranty and linear performance warranty

* Functionality subject to inverter model and firmware version

Smart Module

SPV425-R54PDTL

| MODULE ELECTRICAL PROPERTIES | SPV425-R54PDTL | UNITS |
|------------------------------|----------------|-------|
| STC⁽¹⁾ | | |
| Module Power | 425 | W |
| Maximum Power Voltage (Vmp) | 32.10 | V |
| Maximum Power Current (Imp) | 13.24 | A |
| Open Circuit Voltage (Voc) | 38.73 | V |
| Short Circuit Current (Isc) | 13.89 | A |
| Maximum System Voltage | 1000 | Vdc |
| Maximum Series Fuse Rating | 30 | A |
| Module Efficiency | 21.76 | % |
| NMOT⁽²⁾ | | |
| Module Power | 323 | W |
| Maximum Power Voltage (Vmp) | 30.23 | V |
| Maximum Power Current (Imp) | 10.67 | A |
| Open Circuit Voltage (Voc) | 37.10 | V |
| Short Circuit Current (Isc) | 11.20 | A |

| BIFACIAL ELECTRICAL VALUES* | | | |
|-----------------------------|-------------------|-------|---|
| 5% | Maximum Power | 442 | W |
| | Module Efficiency | 22.63 | % |
| 15% | Maximum Power | 476 | W |
| | Module Efficiency | 24.38 | % |
| 25% | Maximum Power | 510 | W |
| | Module Efficiency | 26.12 | % |

*Power Bifaciality: 80±5%

| MODULE MECHANICAL PROPERTIES | | |
|------------------------------------------|--------------------------------------------|----|
| Cells | 108 (6 x 18) | |
| Cell Type | Monocrystalline | |
| Cell Dimensions | 182 x 91 | mm |
| Dimensions (L x W x H) | 1722 x 1134 x 30 | mm |
| Front Side Maximum Load (Snow) | 5400 | Pa |
| Rear Side Maximum Load (Wind) | 2400 | Pa |
| Weight (with Power Optimizer) | 21.74 | kg |
| Front/Rear Glass | 1.6mm/1.6mm dual layered tempered glass | |
| Frame | Black anodized aluminum | |
| Junction Box | IP68 | |
| Connector Type | MC4 | |
| Operating Temperature | -40 to +85 | °C |
| Packaging Information (units per pallet) | 36 | |

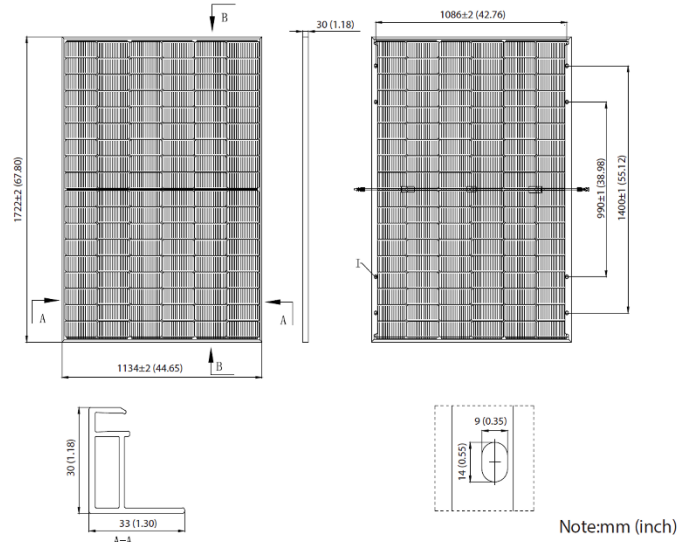
| TEMPERATURE CHARACTERISTICS | | |
|---------------------------------------|--------|--------|
| Temperature Coefficient Power (Pm) | -0.30 | % / °C |
| Temperature Coefficient Voltage (Voc) | -0.25 | % / °C |
| Temperature Coefficient Current (Isc) | 0.045 | % / °C |
| Operating Cell Temperature (NMOT) | 42 ± 2 | °C |

| CERTIFICATIONS & WARRANTY | |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module Certifications | IEC 61215:2016, IEC 61730:2016 Ammonia test according to IEC 62716:2013 Salt mist test according to IEC 61701:2016 PID testing method according to IEC TS 62804-1:2015 35mm hail test according to IEC 61215-2:2016 |
| Product Warranty | Power Optimizer – 25-year warranty Module – 25-year warranty |
| Output Warranty of Pmax | 25-year linear performance warranty ⁽³⁾ |

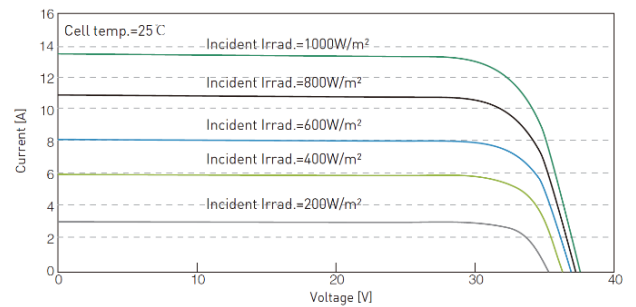
(1) STC: Irradiance 1000 W/m², Cell Temperature 25°C, Air Mass AM1.5.

(2) NMOT: Irradiance at 800 W/m², Ambient Temperature 20°C, Wind Speed 1 m/s.

(3) 1st year: 99%, 89.4% power output over 25 years.



Module I-V Curve



Warranty

25-Year Product Warranty
+25-Year Linear Performance Warranty



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| | S440 | UNITS |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-------|
| INPUT | | |
| Rated Input DC Power ⁽¹⁾ | 440 | W |
| Absolute Maximum Input Voltage (Voc) | 60 | Vdc |
| MPPT Operating Range | 8 – 60 | Vdc |
| Maximum Short Circuit Current (Isc) of Connected PV Module | 14.5 | Adc |
| Maximum Efficiency | 99.5 | % |
| Weighted Efficiency | 98.6 | % |
| Overvoltage Category | II | |
| OUTPUT DURING OPERATION | | |
| Maximum Output Current | 15 | Adc |
| Maximum Output Voltage | 60 | Vdc |
| OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM INVERTER OR INVERTER OFF) | | |
| Safety Output Voltage per Power Optimizer | 1 ± 0.1 | Vdc |
| STANDARD COMPLIANCE⁽²⁾ | | |
| EMC | FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3, CISPR11, EN-55011 | |
| Safety | IEC62109-1 (class II safety), UL1741 | |
| Material | UL94 V-0, UV Resistant | |
| RoHS | Yes | |
| Fire Safety | VDE-AR-E 2100-712:2018-12 | |
| INSTALLATION SPECIFICATIONS | | |
| Maximum Allowed System Voltage | 1000 | Vdc |
| Dimensions (W x L x H) | 129 x 155 x 30 | mm |
| Weight (including cables) | 740 | gr |
| Input Connector | MC4 ⁽³⁾ | |
| Input Wire Length | 0.1 | m |
| Output Connector | MC4 | |
| Output Wire Length | (+) 2.3, (-) 0.10 | m |
| Operating Temperature Range ⁽⁴⁾ | -40 to +85 | °C |
| Protection Rating | IP68 | |
| Relative Humidity | 0 – 100 | % |

(1) Rated power of the module at STC will not exceed the Power Optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed.

(2) For details about CE compliance, see [Declaration of Conformity – CE](#).

(3) For other connector types please contact SolarEdge.

(4) Power derating is applied for ambient temperatures above +85°C. For details, see the [Power Optimizers Temperature Derating](#) technical note.

| PV System Design Using a SolarEdge Inverter ⁽⁵⁾ | SolarEdge Home Wave Inverter Single Phase | SolarEdge Home Short String Inverter Three Phase | Three Phase for 230/400V Grid | Three Phase for 277/480V Grid | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------|-------------------------------|-------------------------------|---|
| Minimum String Length (Power Optimizers) | 8 | 9 | 16 | 18 | |
| Maximum String Length (Power Optimizers) | 25 | 20 | 50 | | |
| Maximum Continuous Power per String | 5700 | 5625 | 11,250 | 12,750 | W |
| Maximum Allowed Connected Power per String ⁽⁶⁾ (In multiple string designs, the maximum is permitted only when the difference in connected power between strings is 2,000W or less) | 6800 ⁽⁷⁾ | See ⁽⁶⁾ | 13,500 | 15,000 | W |
| Parallel Strings of Different Lengths or Orientations | Yes | | | | |

(5) It is not allowed to mix S-series and P-series Power Optimizers in new installations in the same string.

(6) If the inverter's rated AC power ≤ maximum continuous power per string, then the maximum connected power per string will be able to reach up to the inverter's maximum input DC power. For details, see the [Single String Design Guidelines](#) application note.

(7) For inverters with a rated AC power ≥ 8000W that are connected to at least two strings.

SolarEdge is a global leader in smart energy technology. By leveraging world-class engineering capabilities and with a relentless focus on innovation, SolarEdge creates smart energy solutions that power our lives and drive future progress.

SolarEdge developed an intelligent inverter solution that changed the way power is harvested and managed in photovoltaic (PV) systems. The SolarEdge DC optimized inverter maximizes power generation while lowering the cost of energy produced by the PV system.

Continuing to advance smart energy, SolarEdge addresses a broad range of energy market segments through its PV, storage, EV charging, UPS, and grid services solutions.

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