

Smart Module

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

SPV410-R54PWML / SPV415-R54PWML



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

- 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™ designed to 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
- 25-year module warranty and linear performance warranty

* Functionality subject to inverter model and firmware version

Smart Module

SPV410-R54PWML / SPV415-R54PWML

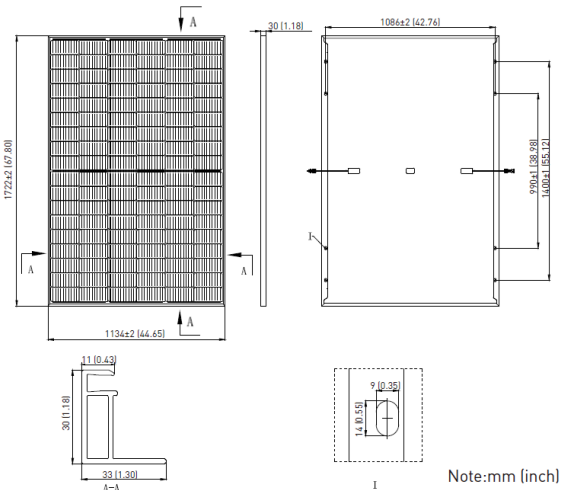
MODULE ELECTRICAL PROPERTIES	SPV410-R54PWML	SPV415-R54PWML	UNITS
STC⁽¹⁾			
Module Power	410	415	W
Maximum Power Voltage (Vmp)	31.18	31.35	V
Maximum Power Current (Imp)	13.15	13.24	A
Open Circuit Voltage (Voc)	37.23	37.42	V
Short Circuit Current (Isc)	13.72	13.82	A
Maximum System Voltage		1000	Vdc
Maximum Series Fuse Rating		25	A
Module Efficiency	21.00	21.25	%
NMOT⁽²⁾			
Module Power	305	309	W
Maximum Power Voltage (Vmp)	28.71	28.86	V
Maximum Power Current (Imp)	10.63	10.70	A
Open Circuit Voltage (Voc)	35.15	35.32	V
Short Circuit Current (Isc)	11.09	11.17	A

MODULE MECHANICAL PROPERTIES		
Cells	108 (6 x 18)	
Cell Type	Monocrystalline PERC	
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)	22.24	kg
Front Glass	3.2mm, coated tempered glass	
Frame	Black anodized aluminum	
Junction Box	IP68	
Connector Type	MC4	
Operating Temperature	-40 to +85	°C
Packaging Information (units per pallet)	36	

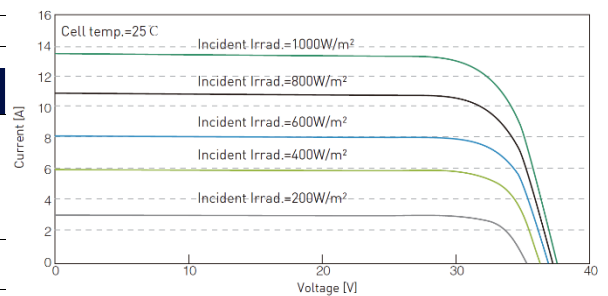
TEMPERATURE CHARACTERISTICS		
Temperature Coefficient Power (Pm)	-0.35	% / °C
Temperature Coefficient Voltage (Voc)	-0.28	% / °C
Temperature Coefficient Current (Isc)	0.05	% / °C
Operating Cell Temperature (NMOT)	45 ± 2	°C

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⁾

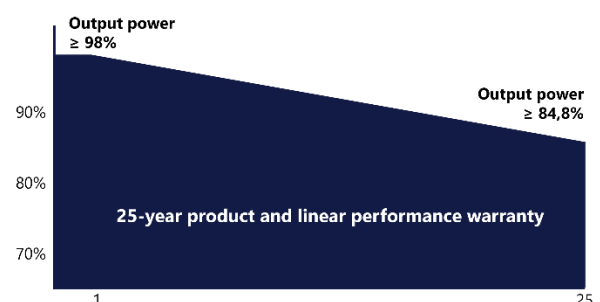
(1) STC: Irradiance 1000 W/m², Cell Temperature 25°C, Air Mass AM1.5.
 (2) NMOT: Irradiance at 800 W/m², Ambient Temperature 20°C, Wind Speed 1 m/s.
 (3) 1st year: 98%, 84.8% power output over 25 years.



Module I-V Curve



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



/ Smart Module

SPV410-R54PWML / SPV415-R54PWML

	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 de-rating 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 inverters 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.

-  SolarEdge
-  @SolarEdgePV
-  @SolarEdgePV
-  SolarEdgePV
-  SolarEdge
-  www.solaredge.com/corporate/contact

solaredge.com

© SolarEdge Technologies, Ltd. All rights reserved. SOLAREEDGE, the SolarEdge logo, OPTIMIZED BY SOLAREEDGE are trademarks or registered trademarks of SolarEdge Technologies, Inc. All other trademarks mentioned herein are trademarks of their respective owners. Date: January 30, 2024 DS-000225-ENG Subject to change without notice.

Cautionary Note Regarding Market Data and Industry Forecasts: This brochure may contain market data and industry forecasts from certain third-party sources. This information is based on industry surveys and the preparer's expertise in the industry and there can be no assurance that any such market data is accurate or that any such industry forecasts will be achieved. Although we have not independently verified the accuracy of such market data and industry forecasts, we believe that the market data is reliable and that the industry forecasts are reasonable.

