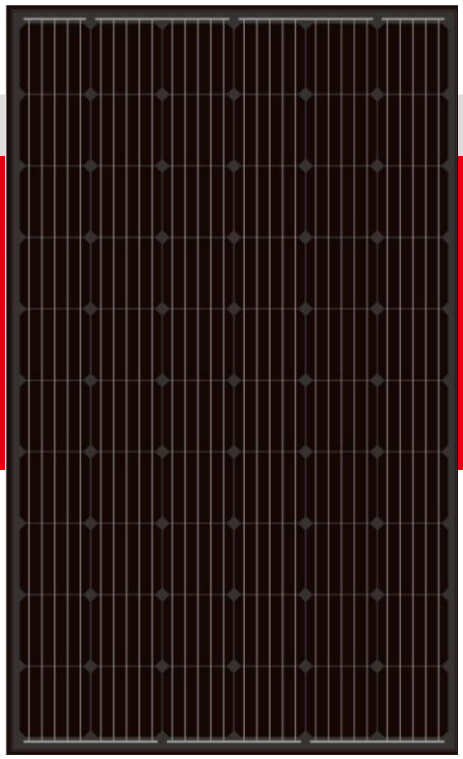
VSUN

Innovative & Smart



VSUN315-60M-BB

VSUN315-60M-BB VSUN310-60M-BB
VSUN305-60M-BB VSUN300-60M-BB
VSUN295-60M-BB

19.40%
Module efficiency

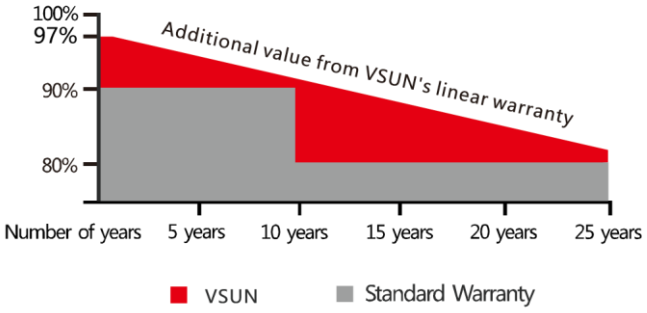
12years
Material & Workmanship warranty

25years
Linear power output warranty

Highest power output
315W

- PID-free
- World class mono efficiency
- Tighter product performance distribution and current sorting reduces the mismatch power loss in system operation
- Positive tolerance offer
- Good temperature coefficient enables higher output in high temperature regions
- Excellent performance under low light conditions
- Certified for salt/ammonia corrosion resistance

Load certificates: wind to 2400Pa and snow to 5400Pa



Munich RE

- 12-year product warranty
- 25-year linear power output warranty

Invested by Fuji Solar, VSUN is a Japanese solar module solutions provider located in Tokyo that offers Japanese quality solar technologies globally. The group's business started in Japan in 2006, later spreading to North America, Southeast Asia, and EMEA.

Innovative & Smart – VSUN has been committed to providing greener, cleaner, and more intelligent renewable energy solutions. It is focusing on the new energy market and the development of customized and high-efficiency products.

A Sub-company of FUJI SOLAR

Engineered in Japan
vsun @vietnamsunergy.com
www.vsun-solar.com

Electrical Characteristics at Standard Test Conditions(STC)

Module Type	VSUN315-60M-BB	VSUN310-60M-BB	VSUN305-60M-BB	VSUN300-60M-BB	VSUN295-60M-BB
Maximum Power - Pmax (W)	315	310	305	300	295
Open Circuit Voltage - Voc (V)	40.2	40.1	39.9	39.8	39.6
Short Circuit Current - Isc (A)	9.95	9.87	9.72	9.6	9.54
Maximum Power Voltage - Vmpp (V)	32.8	32.6	32.4	32.2	32
Maximum Power Current - Impp (A)	9.61	9.52	9.42	9.31	9.22
Module Efficiency	19.40%	19.09%	18.79%	18.48%	18.17%

Standard Test Conditions (STC): irradiance 1,000 W/m²; AM 1,5; module temperature 25°C. Tolerance of Pmpp: 0~+3%.
Measuring uncertainty of power: ±3%.

Electrical Characteristics at Normal Operating Cell Temperature(NOCT)

Module Type	VSUN315-60M-BB	VSUN310-60M-BB	VSUN305-60M-BB	VSUN300-60M-BB	VSUN295-60M-BB
Maximum Power - Pmax (W)	233.7	230.3	226.8	223	219.2
Open Circuit Voltage - Voc (V)	37.2	37.1	36.9	36.8	36.6
Short Circuit Current - Isc (A)	8.04	7.98	7.86	7.76	7.71
Maximum Power Voltage - Vmpp (V)	30.8	30.6	30.5	30.4	30.2
Maximum Power Current - Impp (A)	7.59	7.52	7.42	7.33	7.27

Normal Operating Cell Temperature((NOCT) : irradiance 800W/m^2; wind speed 1 m/s ; cell temperature 45°C; ambient temperature 20°C.
Measuring uncertainty of power: ±3%.

Temperature Characteristics

NOCT	45°C(±2°C)
Voltage Temperature Coefficient	-0.29%/K
Current Temperature Coefficient	+0.05%/K
Power Temperature Coefficient	-0.39%/K

Maximum Ratings

Maximum System Voltage [V]	1000
Series Fuse Rating [A]	20

Material Characteristics

Dimensions	1640×990×35mm (L×W×H)
Weight	18.3kg
Frame	Black anodized aluminum profile
Front Glass	White toughened safety glass, 3.2 mm
Cell Encapsulation	EVA (Ethylene-Vinyl-Acetate)
Back Sheet	Composite film
Cells	6×10 pieces monocrystalline solar cells series strings (156.75mm×156.75mm)
Junction Box	Rated current≧13A, IP≧67, TUV&UL
Cable&Connector	Length 900 mm, 1×4 mm^2, compatible with MC4

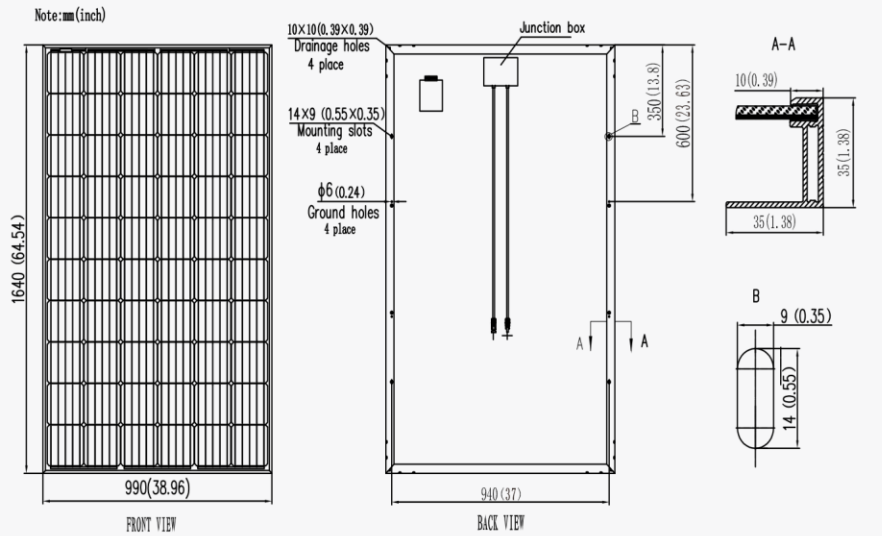
Packaging

Dimensions	1680×1110×1120mm
Container 20'	360
Container 40'	840
Container 40'HC	910

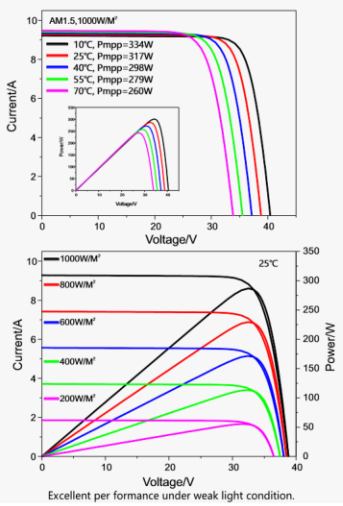
System Design

Temperature Range	-40 °C to + 85 °C
Withstanding Hail	Maximum diameter of 25 mm with impact speed of 23 m/s
Maximum Surface Load	5,400 Pa
Application class	class A

Dimensions



IV-Curves



Excellent per formance under weak light condition.

SunPower® E-Series Residential Solar Panels | E20-327

More than 20% Efficiency

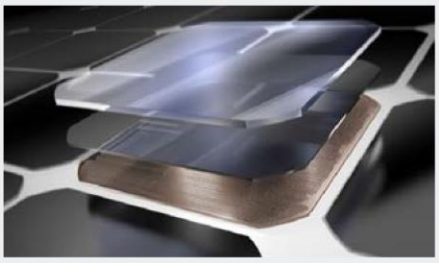
Ideal for roofs where space is at a premium or where future expansion might be needed.

High Performance

Delivers excellent performance in real-world conditions, such as high temperatures, clouds and low light.[1,2,4]

Proven Value

Designed for residential rooftops, E-Series panels deliver the features, value and performance for any home.



Maxeon® Solar Cells: Fundamentally better
Engineered for performance, designed for durability.

Engineered for Peace of Mind

Designed to deliver consistent, trouble-free energy over a very long lifetime. [3,4]

Designed for Durability

The SunPower Maxeon Solar Cell is the only cell built on a solid copper foundation. Virtually impervious to the corrosion and cracking that degrade conventional panels. [3]

#1 Rank in Fraunhofer durability test.[9]
100% power maintained in Atlas 25+ comprehensive durability test.[10]

High Performance & Excellent Durability

SPR-E20-327

E20 SERIES

High Efficiency[5]

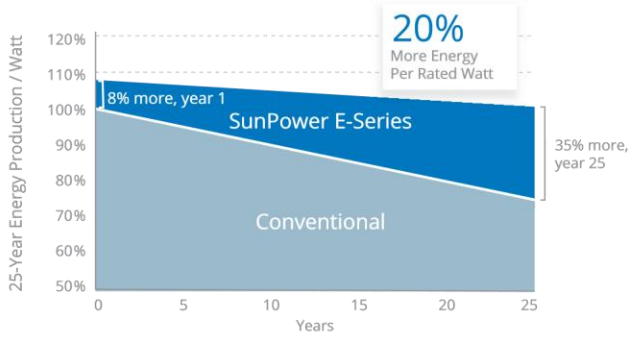
Generate more energy per square foot

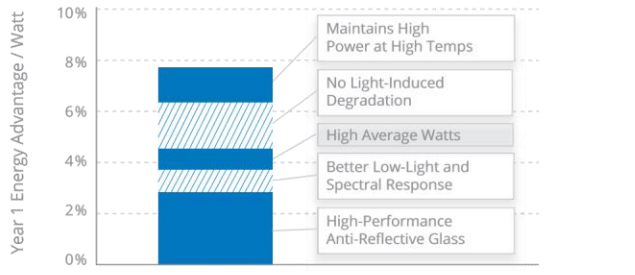
E-Series residential panels convert more sunlight to electricity by producing 31% more power per panel[1] and 60% more energy per square foot over 25 years.[1,2,3]

High Energy Production[6]

Produce more energy per rated watt

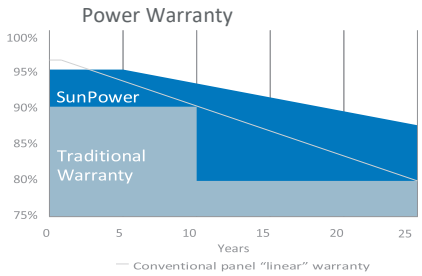
High year-one performance delivers 7–9% more energy per rated watt.[2] This advantage increases over time, producing 20% more energy over the first 25 years to meet your needs.[3]



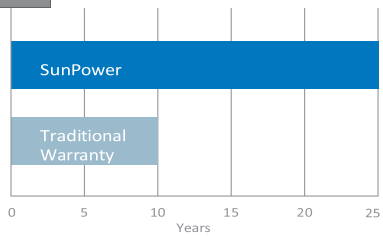


SunPower ® E-Series Residential Solar Panels | E20-327

SunPower Offers The Best Combined Power And Product Warranty



More guaranteed power: 95% for first 5 years, –0.4%/yr. to year 25 [7]



Combined Power and Product defect 25-year coverage [8]

Electrical Data		
	SPR-E20-327	SPR-E19-320
Nominal Power (Pnom)[11]	327 W	320 W
Power Tolerance	+5/–0%	+5/–0%
Avg. Panel Efficiency[12]	20.4%	19.9%
Rated Voltage (Vmpp)	54.7 V	54.7 V
Rated Current (Impp)	5.98 A	5.86 A
Open-Circuit Voltage (Voc)	64.9 V	64.8 V
Short-Circuit Current (Isc)	6.46 A	6.24 A
Max. System Voltage	600 V UL & 1000 V IEC	
Maximum Series Fuse	15 A	
Power Temp Coef.	–0.35% / °C	
Voltage Temp Coef.	–176.6 mV / °C	
Current Temp Coef.	2.6 mA / °C	

Tests And Certifications	
Standard Tests[13]	UL1703 (Type 2 Fire Rating), IEC 61215, IEC 61730
Quality Certs	ISO 9001:2008, ISO 14001:2004
EHS Compliance	RoHS, OHSAS 18001:2007, lead free, REACH SVHC-163, PV Cycle
Sustainability	Cradle to Cradle Certified™ Silver (eligible for LEED points)[14]
Ammonia Test	IEC 62716
Desert Test	10.1109/PVSC.2013.6744437
Salt Spray Test	IEC 61701 (maximum severity)
PID Test	Potential-Induced Degradation free: 1000 V[9]
Available Listings[15]	UL, TUV, JET, MCS, FSEC, CEC

Operating Condition And Mechanical Data	
Temperature	–40° F to +185° F (–40° C to +85° C)
Impact Resistance	1 inch (25 mm) diameter hail at 52 mph (23 m/s)
Appearance	Class A
Solar Cells	96 Monocrystalline Maxeon Gen II
Tempered Glass	High-transmission tempered anti-reflective
Junction Box	IP-65, MC4 compatible
Weight	41 lbs (18.6 kg)
Max. Load	G5 Frame: Wind: 62 psf, 3000 Pa front & back Snow: 125 psf, 6000 Pa front G3 Frame: Wind: 50 psf, 2400 Pa front & back Snow: 112 psf, 5400 Pa front
Frame	Class 1 black anodized (highest AAMA rating)

REFERENCES:

1 All comparisons are SPR-E20-327 vs. a representative conventional panel: 250 W, approx. 1.6 m², 15.3% efficiency.

32 SunPower 0.25%/yr degradation vs. 1.0%/yr conv. panel. Campeau, Z. et al. "SunPower Module Typically 7–9% more energy per watt, BEW/DNV Engineering "SunPower Yield Report," Jan 2013. Degradation Rate," SunPower white paper, Feb 2013; Jordan, Dirk "SunPower Test Report," NREL,

Q1-2015. 4 "SunPower Module 40-Year Useful Life" SunPower white paper, May 2015. Useful life is 99 out of 100 panels operating at more than 70% of rated power.

5Survey, Feb 2014. Second highest, after SunPower X-Series, of over 3,200 silicon solar panels, Photon Module

6 8% more energy than the average of the top 10 panel companies tested in 2012 (151 panels, 102 companies), Photon International, Feb 2013.

7 Compared with the top 15 manufacturers. SunPower Warranty Review, May 2015.

8 Some restrictions and exclusions may apply. See warranty for details.

9 5 of top 8 panel manufacturers tested in 2013 report, 3 additional panels in 2014. Ferrara, C., et al. "Fraunhofer PV Durability Initiative for Solar Modules: Part 2". Photovoltaics International, 2014.

10 Compared with the non-stress-tested control panel. Atlas 25+ Durability test report, Feb 2013.

11 Standard Test Conditions (1000 W/m² irradiance, AM 1.5, 25° C). NREL calibration Standard:

Product Warranty

SUNPOWER®

SOLARIA®

Solaria PowerXT® | Residential

ww.sunp Solaria PowerXT®-360R-PD | Solaria PowerXT®-355R-BD

Achieving up to 20% efficiency, Solaria PowerXT solar modules are one of the highest power modules in the residential solar market. Compared to conventional modules, Solaria PowerXT modules have fewer gaps between the solar cells; this leads to higher power and superior aesthetics. Solaria PowerXT pure black residential modules are manufactured with black backsheet and frames, enhancing a home's architectural beauty.

Developed in California, Solaria's patented cell cutting and module assembly takes processed solar wafers and turns them into PowerXT solar modules. The process starts by creating a highly reliable PowerXT cell where busbars and ribbon interconnections are eliminated. Solaria then packages the cells into the PowerXT solar module, reducing inactive space between the cells. This process leads to an exceptionally cost effective and efficient solar module.

Higher Efficiency, Higher Power

Solaria PowerXT modules achieve up to 20% efficiency; conventional modules achieve 15% – 17% efficiency. Solaria PowerXT modules are one of the highest power modules available.

Lower System Costs

Solaria PowerXT modules produce more power per square meter area. This reduces installation costs due to fewer balance of system components.

Improved Shading Tolerance

Sub-strings are interconnected in parallel, within each of the four module quadrants, which dramatically lowers the shading losses and boosts energy yield.

Improved Aesthetics

Compared to conventional modules, Solaria PowerXT modules have a more uniform appearance and superior aesthetics.

Durability and Reliability

Solder-less cell interconnections are highly reliable and designed to far exceed the industry leading 25 year warranty.

TOP PERFORMER 2018 DNV·GL PV MODULE RELIABILITY SCORECARD

TÜVRhein Precisely R

About Solaria

About Solaria

Established in 2000, The Solaria Corporation has created one of the industry's most respected

Established in 2000, The Solaria Corporation has created one of the industry's most respected IP portfolios, with over 100 patents encompassing materials, processes, applications,

IP portfolios, with over 100 patents encompassing materials, processes, applications,

Max Power (P_{max})	[W]	350	355	355	360
Efficiency	[%]	19.4	19.6	19.6	19.9
Open Circuit Voltage (V_{oc})	[V]	47.4	47.7	47.4	47.7
Short Circuit Current (I_{sc})	[A]	9.44	9.48	9.53	9.56
Max Power Voltage (V_{mp})	[V]	39.2	39.5	39.1	39.5
Max Power Current (I_{mp})	[A]	8.94	8.99	9.09	9.13
Power Tolerance	[%]	-0/+3	-0/+3	-0/+3	-0/+3

products, manufacturing automation and equipment. Headquartered in Fremont, California, products, manufacturing automation and equipment. Headquartered in Oakland, CA, Solaria

Solaria has developed a technology platform that unlocks the potential of solar energy has developed a technology platform that unlocks the potential of solar energy. allowing it to be ubiquitous and universally accessed.

The Solaria Corporation 1700 Broadway, Oakland, CA 94612 P: (510) 270-2500 www.solaria.com

Product specifications are subject to change without notice.

Rev 1J 09-11-2018

Dimensions (L x W x H)	1621mm x 1116mm x 40mm
Weight	21 kg / 46 lbs
Glass Type / Thickness	AR Coated, Tempered / 3.2mm
Frame Type	Anodized Aluminum
Cable Type / Length	12 AWG PV Wire (UL) / 1000mm
Connector Type	Amphenol H4 (MC4 compatible)
Junction Box	IP67 / 4 diodes
Front Load (UL 1703)	5400 Pa / 113 psf*
Rear Load (UL 1703)	2400 Pa / 50 psf*

Performance at NOCT (800W/m², 20°C Amb, Wind 1 m/s, AM 1.5)

Max Power (Pmax)	[W]	258	261	261	265
Open Circuit Voltage (V_{oc})	[V]	44.6	44.8	44.6	44.8
Short Circuit Current (I_{sc})	[A]	7.61	7.64	7.68	7.71
Max Power Voltage (V_{mp})	[V]	36.1	36.3	36.0	36.3
Max Power Current (I_{mp})	[A]	7.15	7.19	7.27	7.30

Temperature Characteristics

NOCT	[ºC]	45 +/-2
Temp. Coeff. of P_{max}	[% / ºC]	-0.39
Temp. Coeff. of V_{oc}	[% / ºC]	-0.29
Temp. Coeff. of Isc	[% / ºC]	0.04

Design Parameters

Operating temperature	[ºC]	-40 to +85
Max System Voltage	[V]	1000
Max Fuse Rating	[A]	15
Bypass Diodes	[#]	4

IV Curves vs. Irradiance (350W Module)

Performance at STC (1000W/m², 25° C, AM 1.5)

Solaria PowerXT-	350R-BD	355R-BD	355R-PD	360R-PD

Mechanical Characteristics

Cell Type	Monocrystalline Silicon

Refer to Solaria Installation Manual for details

Certifications / Warranty

Certifications	UL 1703/IEC 61215/IEC 61730 CAN/CSA-C22.2
Fire Type (UL 1703)	1
Power & Product Warranty	25 years*

Warranty details at www.solaria.com

Packaging

Stacking Method	Horizontal / Palletized
Pcs / Pallet	25
Pallet Dims	1668 x 1150 x 1230 mm
Pallet Weight	590 kg / 1300 lbs
Pallets / 40-ft Container	28
Pcs / 40-ft Container	700

SOLARIA®

Solaria PowerXT®-360R-PD
Solaria PowerXT®-355R-BD