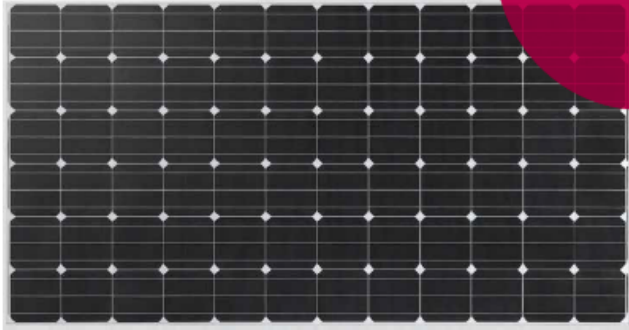




Innovation for  
a Better Life™



LG Mono X<sup>®</sup> 72cell LG335S2W-G4

72 cell

LG Mono X<sup>®</sup> Plus is LG Electronics' high-quality monocrystalline module. The quality is the result of our strong commitment to developing a module to improve benefits for customers. Features of Mono X<sup>®</sup> Plus include durability, convenient installation, and aesthetic exterior.



### Enhanced Performance Warranty

LG Mono X<sup>®</sup> 72cell comes with the enhanced performance limited warranty. The initial degradation has been improved from -3% to -2%, and the annual degradation has also changed from -0.7%/yr to -0.6%/yr.



### Improved Product Warranty

In addition to the enhanced performance limited warranty, LG has extended the limited product warranty of LG Mono X<sup>®</sup> 72cell for additional 2 years with its newly reinforced frame design.



### Convenient Installation

LG modules are carefully designed to benefit installers by allowing quick and easy installations throughout the carrying, grounding, and connecting stages of modules.



### Reduced LID (LiLY Technology)

LG Mono X<sup>®</sup> 72cell has improved the initial degradation by applying LG's new LiLY (LID-improvement for Lifetime Yield) Technology, which controls formation of Boron-Oxygen pair, the key factor of LID.



### Light and Convenient

LG Mono X<sup>®</sup> 72cell is carefully designed to benefit installers by allowing quick installation with a weight of just 44.75 lb. and better grips.

LG Mono X<sup>®</sup> 72cell LG335S2W-G4

### Mechanical Properties

Cells	6 x 12
Cell Vendor	LG
Cell Type	Monocrystalline / P-type
Cell Dimensions	156.75 x 156.75 mm / 6 inches
# of Busbar	3
Dimensions (L x W x H)	1960 x 1000 x 46 mm 77.17 x 39.37 x 1.81 inch
Front Load	60 psf
Rear Load	60 psf
Weight	20.3 ± 0.5 kg / 44.75 ± 1.1 lb
Connector Type	MC4
Junction Box	IP67 with 3 Bypass Diodes
Length of Cables	1200mm x 2 ea / 47.24 x 2 ea
Glass	High Transmission Tempered Glass
Frame	Anodized Aluminum

### Certifications and Warranty

Certifications	UL 1703 ISO 9001 IEC 62716 (Ammonia Corrosion Test)* IEC 61701 (Salt Mist Corrosion Test)*
Module Fire Performance (USA)	Type 2 (UL1703)
Fire Rating (for CANADA)	Class C (ULC/ORD C1703)
Product Warranty	12 years
Output Warranty of Pmax	Linear warranty**

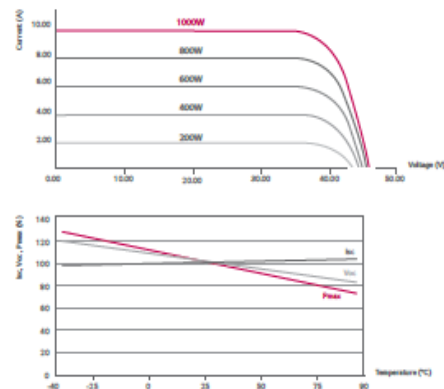
\* In progress

\*\* 1) 1st year: -0.6%, 2) after 2nd year: 0.6% annual degradation, 3) 0.6% for 25 years

### Temperature Characteristics

NOCT	46 ± 3 °C
Pmax	-0.42 %/°C
Voc	-0.30 %/°C
Isc	0.03 %/°C

### Characteristic Curves



### Electrical Properties (STC \*)

Module Type	335 W
MPP Voltage (Vmpp)	37.5
MPP Current (Impp)	8.94
Open Circuit Voltage (Voc)	46.2
Short Circuit Current (Isc)	9.48
Module Efficiency (%)	17.1
Operating Temperature (°C)	-40 ~ +90
Maximum System Voltage (V)	1000
Maximum Series Fuse Rating (A)	20A
Power Tolerance (%)	0 ~ +3

\* STC (Standard Test Condition): Irradiance 1000 W/m<sup>2</sup>, module temperature 25 °C, AM 1.5

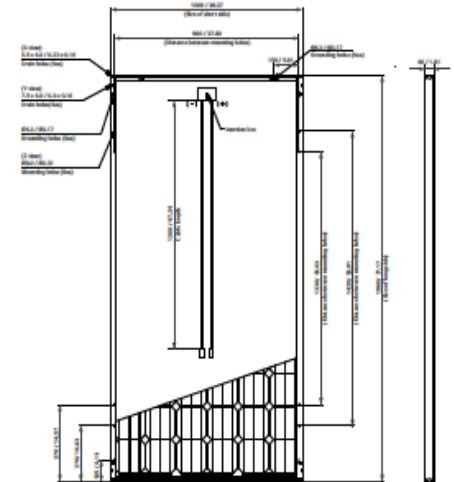
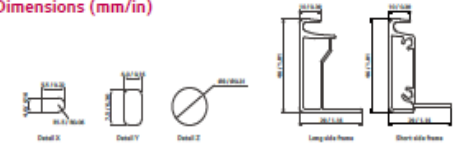
\* The nameplate power output is measured and determined by LG Electronics at its sole and absolute discretion.

### Electrical Properties (NOCT\*)

Module Type	335 W
Maximum Power (Pmax)	248
MPP Voltage (Vmpp)	34.4
MPP Current (Impp)	7.20
Open Circuit Voltage (Voc)	43.1
Short Circuit Current (Isc)	7.63

\* NOCT (Nominal Operating Cell Temperature): Irradiance 800 W/m<sup>2</sup>, ambient temperature 20°C, wind speed 1 m/s

### Dimensions (mm/in)



The distance between the center of the mounting/grounding holes.

### About LG Electronics

LG Electronics is a global player who has been committed to expanding its capacity, based on solar energy business as its future growth engine. We embarked on a solar energy source research program in 1985, supported by LG Group's rich experience in semi-conductor, LCD, chemistry, and materials industry. We successfully released the first Mono X<sup>®</sup> series to the market in 2010, which were exported to 32 countries in the following 2 years, thereafter. In 2013, NeON<sup>™</sup> (previously known as Mono X<sup>®</sup> NeON) & 2015 NeON2 with CELLO technology won "Intersolar Award", which proved LG is the leader of innovation in the industry.



North America Solar Business Team  
LG Electronics U.S.A. Inc  
1000 Sylvan Ave, Englewood Cliffs, NJ 07632

Contact: lg.solar@lge.com  
www.lgsolarusa.com

Product specifications are subject to change without notice.  
DS-N2-60-C-Ca-P-EN-50305

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01/01/16

Innovation for a Better Life



## Enphase IQ 6 and IQ 6+ Microinverters

The high-powered smart grid-ready **Enphase IQ 6 Micro™** and **Enphase IQ 6+ Micro™** dramatically simplify the installation process while achieving the highest efficiency for module-level power electronics.

Part of the Enphase IQ System, the IQ 6 and IQ 6+ Micro integrate seamlessly with the Enphase IQ Envoy™, Enphase Q Aggregator™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

The IQ 6 and IQ 6+ Micro extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.



### Easy to Install

- Lightweight and simple
- Faster installation with improved two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

### Productive and Reliable

- Optimized for high powered 60-cell and 72-cell\* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

### Smart Grid Ready

- Complies with fixed power factor, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

\* The IQ 6+ Micro is required to support 72-cell modules

## Enphase IQ 6 and IQ 6+ Microinverters

INPUT DATA (DC)	IQ6-60-2-US		IQ6PLUS-72-2-US	
Commonly used module pairings <sup>1</sup>	195 W - 330 W +		235 W - 400 W +	
Module compatibility	60-cell PV modules only		60-cell and 72-cell PV modules	
Maximum input DC voltage	48 V		62 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 62 V	
Min/Max start voltage	22 V / 48 V		22 V / 62 V	
Max DC short circuit current (module Isc)	15 A		15 A	
Overvoltage class DC port	II		II	
DC port backfeed under single fault	0 A		0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			
OUTPUT DATA (AC)	IQ 6 Microinverter		IQ 6+ Microinverter	
Peak output power	240 VA		290 VA	
Maximum continuous output power	230 VA		280 VA	
Nominal (L-L) voltage/range <sup>2</sup>	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	0.96 A	1.11 A	1.17 A	1.35 A
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
Power factor at rated power	1.0		1.0	
Maximum units per 20 A (L-L) branch circuit	16 (240 VAC) 14 (208 VAC)		13 (240 VAC) 11 (208 VAC)	
Overvoltage class AC port	III		III	
AC port backfeed under single fault	0 A		0 A	
Power factor (adjustable)	0.7 leading ... 0.7 lagging		0.7 leading ... 0.7 lagging	
EFFICIENCY	@240 V		@208 V	
CEC weighted efficiency	97.0 %		97.0 %	

### MECHANICAL DATA

Ambient temperature range	-40°C to +65°C
Relative humidity range	4% to 100% (condensing)
Connector type	MC4 locking type
Dimensions (WxHxD)	219 mm x 191 mm x 37.9 mm (without bracket)
Weight	1.29 kg (2.84 lbs)
Cooling	Natural convection - No fans
Approved for wet locations	Yes
Pollution degree	PD3
Enclosure	Class II double-insulated
Environmental category / UV exposure rating	NEMA Type 6 / outdoor

### FEATURES

Communication	Power line
Monitoring	Enlighten Manager and MyEnlighten monitoring options Compatible with Enphase IQ Envoy
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.

1. No enforced DC/AC ratio. See the compatibility calculator at <https://enphase.com/en-us/support/module-compatibility>.
2. Nominal voltage range can be extended beyond nominal if required by the utility.

To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)

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2018-01-25



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# Rapid shutdown is built-in

The 2014 edition of the National Electrical Code (NEC 2014) added new rapid shutdown requirements for PV systems installed on buildings. Enphase Microinverters fully meet rapid shutdown requirements in the new code without the need to install any additional electrical equipment.

**What's new in NEC 2014?**  
NEC 2014, Section 690.12 applies to PV conductors over 10 feet from the PV array and requires that the conductors power down to 30 volts and 240 volt-amperes within 10 seconds of rapid shutdown initiation.

## String inverters require work arounds for rapid shutdown

**Work around.**

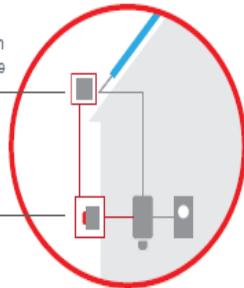
Specialized Rapid Shutdown electrical box installed on the roof within 10 feet of array.

**Work around.**

Shutoff switch that is easily accessible to first responders on the ground.

**Work around.**

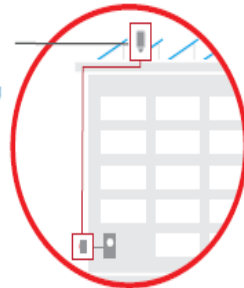
Extra conduit in installation.



Residential String Inverter

**Work around.**

String inverter installed on roof, a hostile environment that string inverters are not built to live in.



Commercial String Inverter

## Enphase comes standard with rapid shutdown capability

All Enphase microinverters, even those that were previously installed, inherently meet rapid shutdown requirements, no additional equipment or workarounds needed.



Residential Microinverter

Enphase microinverters can safely shut down automatically, leaving only low-voltage DC electricity isolated to the PV module.



Commercial Microinverter

**ENPHASE ENERGY INC**

1420 N McDowell Blvd  
Petaluma, CA 94954-6515 USA

E341165

Cat. No.	Function	Ratings
<b>Photovoltaic rapid shutdown system equipment</b>		
M190-60, -72	Inverter/AC Attenuator	Input: 16-48VDC Output: 120/208 or 120/240, 190W
M210-84	Inverter/AC Attenuator	Input: 16-48VDC Output: 120/208 or 120/240, 210 W
M215-60	Inverter/AC Attenuator	Input: 16-48VDC Output: 120/208 or 120/240, 215W
M250-60, -72	Inverter/AC Attenuator	Input: 16-48VDC Output: 120/208 or 120/240, 250W
S230-60-LL-X-US	Inverter/AC Attenuator	Input: 22-48VDC Output: 208 or 240, 220W
S280-60-LL-X-US	Inverter/AC Attenuator	Input: 22-48VDC Output: 208 or 240, 270W
IQ6PLUS-72-X-US*(a)(b) IQ6PLUS-72-ACM*(b)	Inverter/AC Attenuator	Input: 16-62VDC Output: 208 or 240, 280W
IQ6-60-X-US*(a)(b) IQ6-60-ACM-US*(b)	Inverter/AC Attenuator	Input: 16-62VDC Output: 208 or 240, 230W
IQ7PLUS-72-X-US*(a)(b) IQ7PLUS-72-ACM*(b)	Inverter/AC Attenuator	Input: 16-62VDC Output: 208 or 240, 290W
IQ7-60-X-US*(a)(b) IQ7-60-ACM-US*(b)	Inverter/AC Attenuator	Input: 16-48VDC Output: 208 or 240, 240W
IQ7X-92-X-US*(a)(b), IQ7X-92-ACM-US*(b)	Inverter/AC Attenuator	Input: 16-48VDC Output: 208 or 240, 240W

(a) - Where X may be 2 or 5

(b) - Where \* may be any combination of letters or numbers or hyphen or none

To learn more, visit [enphase.com](http://enphase.com)





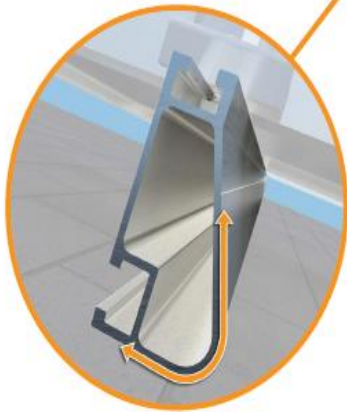
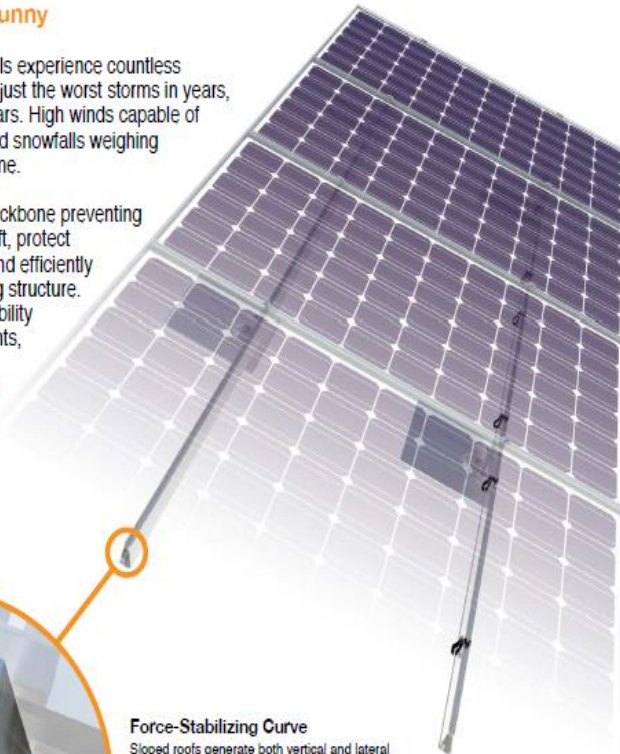


## XR Rail Family

### Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



#### Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

**Compatible with Flat & Pitched Roofs**

XR Rails are compatible with FlashFoot and other pitched roof attachments.

IronRidge offers a range of tilt leg options for flat roof mounting applications.

**Corrosion-Resistant Materials**

All XR Rails are made of marine-grade aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.

### XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.



**XR10**

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves 8 foot spans, while remaining light and economical.

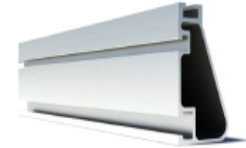
- 8' spanning capability
- Moderate load capability
- Clear anodized finish
- Internal splices available



**XR100**

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 8 feet.

- 8' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available



**XR1000**

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans 12 feet or more for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

### Rail Selection

The following table was prepared in compliance with applicable engineering codes and standards. Values are based on the following criteria: ASCE 7-10, Roof Zone 1, Exposure B, Roof Slope of 7 to 27 degrees and Mean Building Height of 30 ft. Visit [IronRidge.com](http://IronRidge.com) for detailed span tables and certifications.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	100						
	120						
	140	XR10		XR100		XR1000	
	160						
10-20	100						
	120						
	140						
30	100						
	160						
40	100						
	160						
50-70	160						
80-90	160						





## Tech Specs sonnenBatterie eco

The sonnenBatterie eco is an energy storage solution for your home that uses intelligent software to manage energy throughout the day – saving you money, providing backup power and enabling you to use your solar power at night.

	eco 4	eco 6	eco 8	eco10	eco 12	eco 14	eco 16
Usable capacity (100% DOD)	4 kWh	6 kWh	8 kWh	10 kWh	12 kWh	14 kWh	16 kWh
Nominal power rating (at 25 deg C)	3 kW	4 kW	4 kW	7 kW	8 kW	8 kW	8 kW
Weight (approximate)	377 lbs	437 lbs	496 lbs	622 lbs	683 lbs	741 lbs	800 lbs
Dimensions W"/H"/D" (approximate)	26"/55"/14"			26"/75"/14"			

### Off-grid specifications

Continuous AC output current	11.5 A	15 A	15 A	28 A	30 A	30 A	30 A
Max power	100 ms – 8.5 KVA 5 s – 6 KVA 30 m – 4.5 KVA			100ms – 17 KVA 5 s – 12 KVA 30 m – 9 KVA			
Max AC current (charge/discharge)	1 ms – 50 A 100 ms – 35.35 A 5 s – 25 A 30 m – 18.75 A			1 ms – 100 A 100 ms – 70.7 A 5 s – 50 A 30 m – 37.5 A			

### General specifications

Grid integration	AC coupled
Applications	On-grid: self-consumption Off-grid: backup
Transfer switch	Automatic, integrated
Backup capacity	2 kilowatt-hours per battery module, up to 16
Listed and recognized components	Certified to UL 1741 (inverter) and UL 1973 (batteries)
Warranty*	Inverter, 10 years; battery modules, 10 years or 10,000 cycles; cabinet and components, 1 year
Inverter efficiency	92.5% CEC weighted, 95.0% peak
Roundtrip EFF% (Grid < > Battery)	> = 86%
Ventilation	Forced Air
Comm. ports	Serial, Ethernet
Communication protocols	Modbus, Z-Wave, CANbus (ready), WiFi (ready)
Communication and control standards	Open ADR 2.0, SunSpec Alliance
EMC / EMI protection	FCC Part 15B

### Transfer switch specifications

Current rating	200 amps switching and overcurrent protection
Voltage rating	120/240 VAC
Certification	UL Recognized Component
Fault Current @ 240VAC	22,000 amps
Nominal frequency	60 Hz

### Battery Specifications

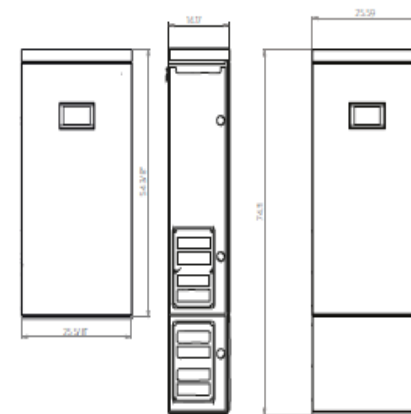
DC battery input voltage	48-56 VDC
Max charge current	70 A per module
Nominal charge current	30 A per module
Cell discharge	100% DoD
Overcharge Protection	Fuse protection

sonnen Inc.  
10800 Burbank Blvd, Suite C  
Los Angeles, CA 91601  
Phone: +1 (310) 853-2404

### AC Specifications

AC grid voltage	120/240 volts
Max AC grid current	eco 4/6/8 15 amps eco 10/12/14/16 30 amps
Nominal AC output current	33.33 amps
Nominal frequency	60 Hz
Adjustable frequency range	+/- 0.7 Hz from nominal
Metering capability	Power meter for load and PV production (not meter-grade)
Tare losses (W)	60 watts
Transient protection	IEEE C62.41 Class B
Protect loads backup	50 amps

### Measurements



We reserve the right to make technical changes. The values, outputs, other technical data, images, and diagrams in this prospectus and in data sheets, advertisements, and other promotional documents are approximate guidelines in all cases where they have not been identified as binding.

\*Please observe our applicable warranty conditions.