



**KNOXVILLE HISTORIC ZONING COMMISSION  
STAFF REPORT - CERTIFICATE OF APPROPRIATENESS APPLICATION**

**PROPERTY ADDRESS:** 416 Oklahoma Ave 3917  
**DISTRICT:** Old North Knoxville H-1

**FILE NO.:** 6-F-14-HZ

**MEETING DATE:** 6/19/2014  
**APPLICANT:** Scott Noethen, Principal Appalachian Renewable Resources  
**LEVEL OF WORK:** Level II. Construction of addition or outbuilding

**PROPERTY DESCRIPTION:** new construction wooden gazebo

► **DESCRIPTION OF WORK:**

The project will consist of three 270 watt Suniva Optimus 60 Black frame modules (or something similar) on a black powder coated aluminum racking system that will mount horizontally to the roof deck at a distance of approximately 4" to 6". There are three roof panels indicated in the Google Earth Gazebo Overview Mockup. They are labeled as 1, 2, and 3. Roof panel 1 faces directly east. Roof panel 2 faces south-southeast. Roof panel 3 faces directly south. Each roof panel will support one Suniva Optimus 60 solar module. Each module will power an Enphase M250 micro-inverter which will be mounted underneath the solar module and hidden from ground view.

The first photo is the proposed location of three Suniva solar photovoltaic modules (designated by the numbers 1, 2, and 3) on the attachment titled, "Google Earth Gazebo Overview Mockup". Included with the application are the spec sheets for the Suniva Optimus 60 solar module that is planned for the project and the spec sheet for the Enphase M250 microinverter that has been approved by the TVA Green Power Provider engineering department. The panels proposed to be used will be slightly wider and shorter than that pictured in the photo. The panels will be slightly raised off roof on brackets as well.

► **APPLICABLE DESIGN GUIDELINES:**

Old North Knoxville Design Guidelines, adopted by the Knoxville City Council on November 25, 2004.  
5. Do not place solar collectors or modern skylights on roof areas that are visible from the street, and do not install them where they interfere with decorative roof elements.

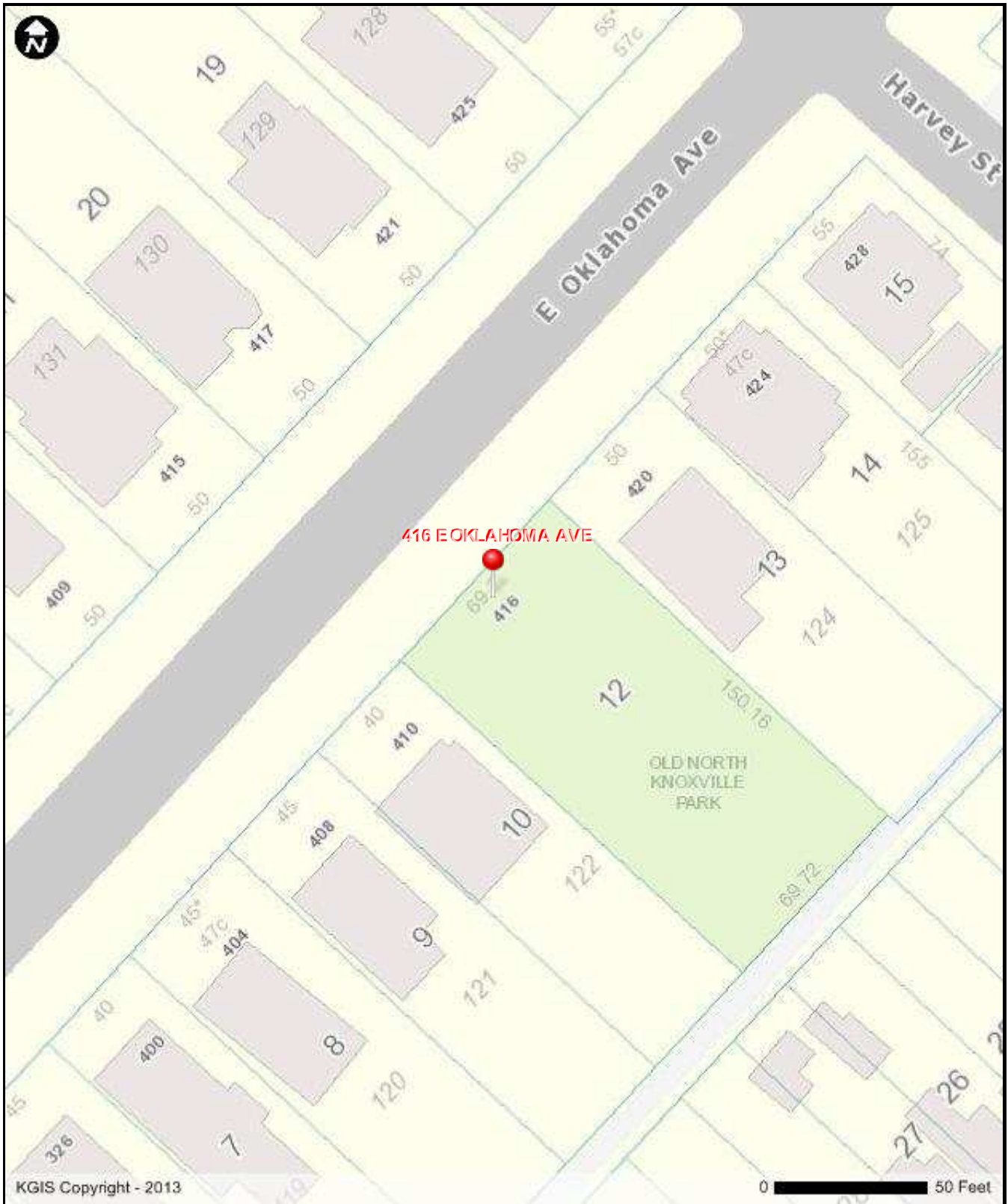
**COMMENTS:**

**STAFF FINDINGS:**

- 1) The gazebo was approved by the HZC and constructed in 2013 and is therefore not historically significant.
- 2) The solar collectors will not be readily seen from the street right-of-way.
- 3) The installation of the solar collectors will not interfere with decorative roof elements

► **STAFF RECOMMENDATION:**

Approval to install solar collectors as submitted based on design guidelines and findings of fact.



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0 50 Feet

**416 E Oklahoma Ave.**  
 Old North Knoxville Park  
 H-1 Overlay

KGIS - 606 Main St - Suite 150 - Knoxville, TN 37902 - www.kgis.org

Printed: 9/9/2013 at 5:11 PM

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416 E Oklahoma A



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Tour Guide

1992

Imagery Date: 11/9/2013

35°59'08.61" N 83°55'33.56" W



Knoxville/Knox County Metropolitan Planning Commission  
Knoxville/Knox County Historic Zoning Commission

Certificate (File) No.:

Date Filed:

**APPLICATION FOR  
CERTIFICATE OF APPROPRIATENESS**

I (we) make application for a Certificate of Appropriateness for the plans and proposals described for the following property.

1. **NAME OF APPLICANT:** Joe Walsh  
Address: 400 Main St.  
Knoxville TN 37902  
Telephone: 215-2091 Fax: 215-2408  
Relationship to Owner: Director of Parks + Recreation Dept
2. **NAME OF OWNER:** City of Knoxville  
Address: same as #1  
Telephone: Fax:

3. **LOCATION OF PROPERTY (Address, Lot, and Parcel No.):**  
Address: 416 E Oklahoma Tax ID:

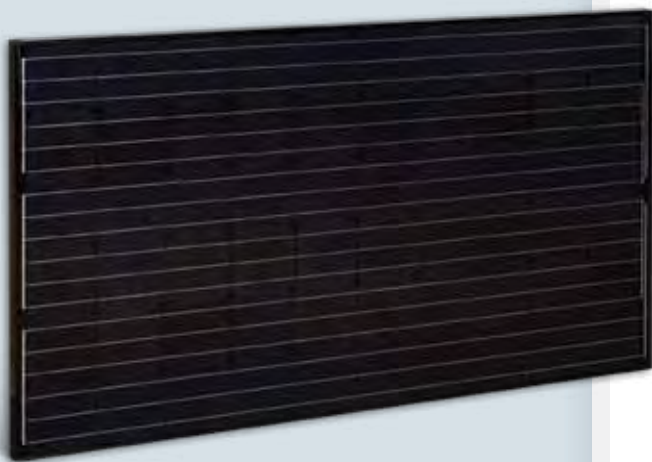
4. **TYPE OF WORK:**  
Level: III

5. **DESCRIPTION OF WORK:** (See Part 2 of this application for additional information to be submitted with the application. A copy of all information which is submitted with an application must be retained by the Knoxville/Knox County Historic Zoning Commission.)  
Building a gazebo in Old North Knoxville Park; wooden structure to be provided by ONK Park group and built by manufacturer.

6. **SIGNATURE OF APPLICANT:** [Signature] Date: 9-3-13

Return application to: Knoxville/Knox County Historic Zoning Commission,  
Suite 403, City/County Building, 400 Main Street,  
Knoxville, Tennessee 37902.

FOR STAFF USE ONLY			
Date Received _____	Approved _____	Disapproved _____	
Approved As Modified _____	Date Acted On _____		



# SUNIVA OPTIMUS® SERIES MONOCRYSTALLINE SOLAR MODULES

OPT SERIES: OPT 60 CELL MODULES (BLACK FRAME)

## ENGINEERING EXCELLENCE

- Built exclusively with Suniva's premium ARTisun Select cells, providing one of the highest power outputs per square meter at an affordable price
- Suniva is a U.S.- based company spun out from the Georgia Tech University Center of Excellence in Photovoltaics; one of only two such research centers in the U.S.
- Suniva's state-of-the art manufacturing and module lab facilities feature the most advanced equipment and technology

## QUALITY & RELIABILITY

- Suniva Optimus modules are manufactured and warranted to our specifications assuring consistent high performance and high quality.
- Rigorous in-house quality management tests beyond standard UL and IEC standards
- Produced in an ISO 9001: 2008 certified facility
- Performance longevity with advanced polymer backsheets
- Passed the most stringent salt spray tests based on IEC 61701
- Passed enhanced stress tests<sup>1</sup> based on IEC 61215 conducted at Fraunhofer ISE<sup>2</sup>
- Certified PID free by PV Evolution Labs (PVEL)
- PAN files are independently validated

**Optimus® modules are known for their superior quality and long-term reliability.** These high-powered modules consist of Suniva's premium ARTisun® Select cell technology and are designed and manufactured in the U.S.A. using our pioneering ion implantation technology. Suniva's high power-density Optimus modules provide excellent performance and value.

## FEATURES

- ☀ Contains premium ARTisun Select cell technology - over 19%
- ☀ Extensive materials testing and certifications safeguard reliability
- ☀ Marine grade aluminum frame with hard anodized coating
- ☀ Buy America-compliant upon request
- ☀ Qualifies for U.S. EXIM financing
- ☀ System and design services available
- ☀ Industry leading linear warranty: 10 year warranty on workmanship and materials; 25 year linear performance warranty delivering 80% power at STC



## CERTIFICATIONS



AS5033  
Compliant



# OPTIMUS SERIES: OPT 60 CELL MODULES

## ELECTRICAL DATA (NOMINAL)

The rated power may only vary by +/- 2.5Wp and all other electrical parameters by ± 5%

Model Number	OPT 255-60-4-1B0	OPT 260-60-4-1B0	OPT 265-60-4-1B0	OPT 270-60-4-1B0
Power Classification (Pmax)	255 W	260 W	265 W	270 W
Module Efficiency (%)	15.71%	16.02%	16.33%	16.63%
Voltage at Max. Power Point (Vmp)	30.20 V	30.50 V	30.70 V	31.00 V
Current at Max. Power Point (Imp)	8.45 A	8.52 A	8.64 A	8.70 A
Open Circuit Voltage (Voc)	38.10 V	38.30 V	38.30 V	38.40 V
Short Circuit Current (Isc)	8.96 A	9.01 A	9.12 A	9.18 A

The electrical data apply to standard test conditions (STC): Irradiance of 1000 W/m<sup>2</sup> with AM 1.5 spectra at 25°C.

## CHARACTERISTIC DATA

Type of Solar Cell	High-efficiency ARTisun Select cells of 156 x 156 mm (6 in.)
Frame	Black anodized aluminum alloy
Glass	Tempered (low-iron), anti-reflective coating
Junction Box	NEMA IP67 rated; 3 internal bypass diodes
Cable & Connectors	12 AWG (4 mm <sup>2</sup> ) PV Wire cable with multiple connector options available; cable length approx. 1200 mm

## MECHANICALS

Cells / Module	60 (6 x 10)
Module Dimensions	1652 x 982 mm (65.04 x 38.66 in.)
Module Thickness (Depth)	40 mm (1.57 in.)
Approximate Weight	17.9 +/- 0.25 kg. (39.5 +/- 0.5 lb.)

## TEMPERATURE COEFFICIENTS

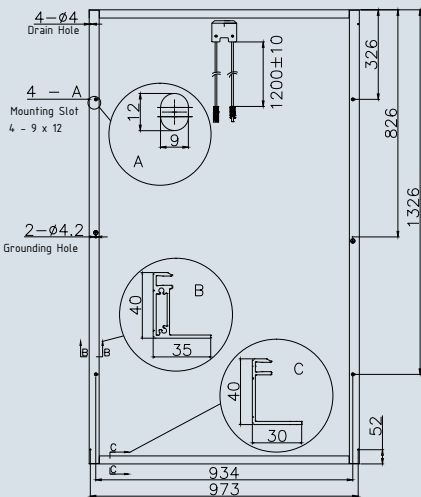
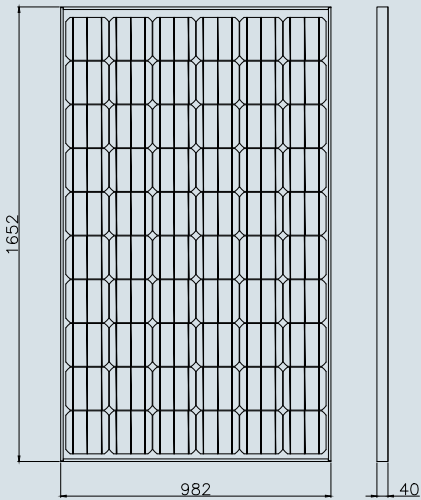
Voltage	β, Voc (%/°C)	-0.335
Current	α, Isc (%/°C)	+0.047
Power	γ, Pmax (%/°C)	-0.420
NOCT Avg	(+/- 2 °C)	46.0

## LIMITS

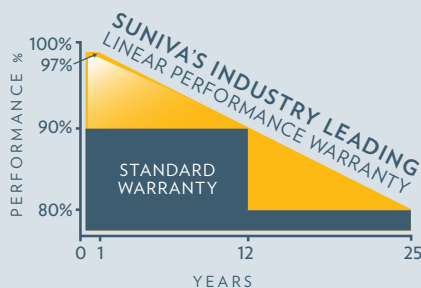
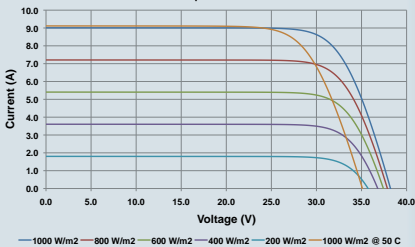
Max. System Voltage	1000 VDC for IEC, 1000 VDC for UL
Max Series Fuse Rating	15 Amps
Operating Module Temperature	-40°C to +85°C (-40°F to +185°F)
Storm Resistance/Static Load	Tested to IEC 61215 for loads of 5400 Pa (113 psf); hail and wind resistant

Suniva® reserves the right to change the data at any time. View manual at suniva.com.  
<sup>1</sup>UV 90 kWh, TC 400, DH 2000. <sup>2</sup>Tests were conducted on module type OPT 60 silver frame.

**Please read installation manual before installing or working with module.**



Suniva OPT260 Black Back Sheet: 260 Watt, 60 Cell Solar Module  
 Current-Voltage (IV) as a Function of Insolation (W/m<sup>2</sup>) and Temperature



**PLEASE RECYCLE**

JANUARY 17, 2014 (REV. 16) [SAM\_D\_0016]

Product	Modules per pallet	Pallets per Container	Total Modules
OPT - 60 cell (silver and black)	25	28	700

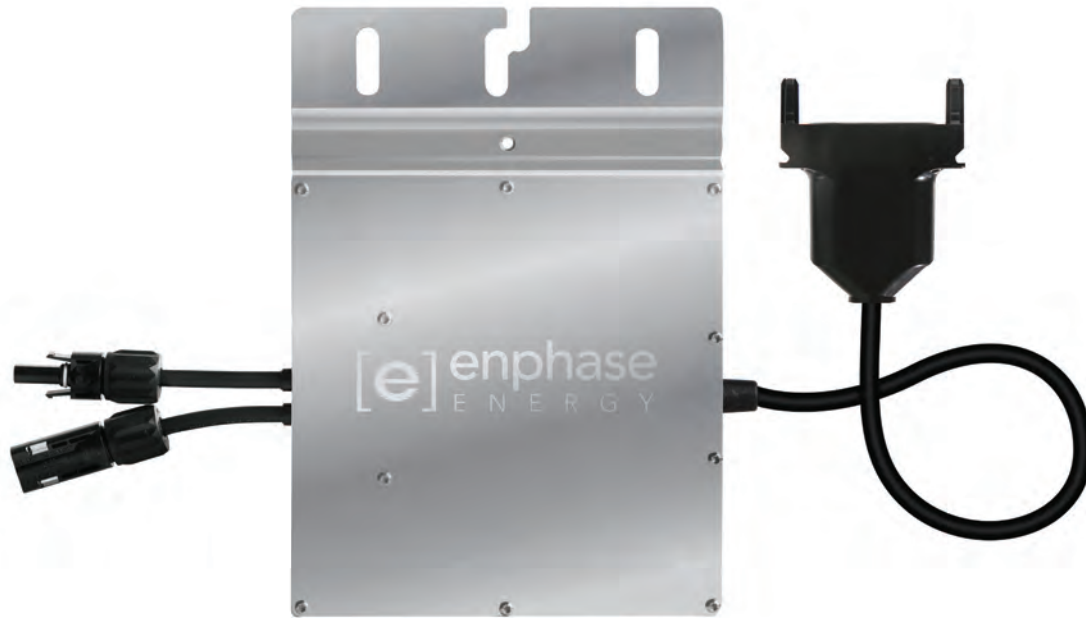
### HEADQUARTERS

5765 Peachtree Industrial Blvd.,  
 Norcross, Georgia 30092 USA  
 Tel: +1 404 477 2700

[www.suniva.com](http://www.suniva.com)



# Enphase® M250



The **Enphase® M250 Microinverter** delivers increased energy harvest and reduces design and installation complexity with its all-AC approach. With the M250, the DC circuit is isolated and insulated from ground, so **no Ground Electrode Conductor (GEC) is required for the microinverter**. This further simplifies installation, enhances safety, and saves on labor and materials costs.

The Enphase M250 integrates seamlessly with the Engage® Cable, the Envoy® Communications Gateway™, and Enlighten®, Enphase's monitoring and analysis software.

## PRODUCTIVE

- Optimized for higher-power modules
- Maximizes energy production
- Minimizes impact of shading, dust, and debris

## SIMPLE

- No GEC needed for microinverter
- No DC design or string calculation required
- Easy installation with Engage Cable

## RELIABLE

- 4th-generation product
- More than 1 million hours of testing and 3 million units shipped
- Industry-leading warranty, up to 25 years

<b>INPUT DATA (DC)</b>	<b>M250-60-2LL-S22/S23/S24</b>	
Recommended input power (STC)	210 - 300 W	
Maximum input DC voltage	48 V	
Peak power tracking voltage	27 V - 39 V	
Operating range	16 V - 48 V	
Min/Max start voltage	22 V / 48 V	
Max DC short circuit current	15 A	
Max input current	9.8 A	
<b>OUTPUT DATA (AC)</b>	<b>@208 VAC</b>	<b>@240 VAC</b>
Peak output power	250 W	250 W
Rated (continuous) output power	240 W	240 W
Nominal output current	1.15 A (A rms at nominal duration)	1.0 A (A rms at nominal duration)
Nominal voltage/range	208 V / 183-229 V	240 V / 211-264 V
Nominal frequency/range	60.0 / 57-61 Hz	60.0 / 57-61 Hz
Extended frequency range*	57-62.5 Hz	57-62.5 Hz
Power factor	>0.95	>0.95
Maximum units per 20 A branch circuit	24 (three phase)	16 (single phase)
Maximum output fault current	850 mA rms for 6 cycles	850 mA rms for 6 cycles
<b>EFFICIENCY</b>		
CEC weighted efficiency, 240 VAC	96.5%	
CEC weighted efficiency, 208 VAC	96.0%	
Peak inverter efficiency	96.5%	
Static MPPT efficiency (weighted, reference EN50530)	99.4 %	
Night time power consumption	65 mW max	
<b>MECHANICAL DATA</b>		
Ambient temperature range	-40°C to +65°C	
Operating temperature range (internal)	-40°C to +85°C	
Dimensions (WxHxD)	171 mm x 173 mm x 30 mm (without mounting bracket)	
Weight	2.0 kg	
Cooling	Natural convection - No fans	
Enclosure environmental rating	Outdoor - NEMA 6	
<b>FEATURES</b>		
Compatibility	Compatible with 60-cell PV modules.	
Communication	Power line	
Integrated ground	The DC circuit meets the requirements for ungrounded PV arrays in NEC 690.35. Equipment ground is provided in the Engage Cable. No additional GEC or ground is required.	
Monitoring	Free lifetime monitoring via Enlighten software	
Compliance	UL1741/IEEE1547, FCC Part 15 Class B, CAN/CSA-C22.2 NO. 0-M91, 0.4-04, and 107.1-01	

\* Frequency ranges can be extended beyond nominal if required by the utility

To learn more about Enphase Microinverter technology, visit [enphase.com](http://enphase.com)







ONK Gazebo



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