

ANN ARBOR HISTORIC DISTRICT COMMISSION

Staff Report

ADDRESS: 538 Fifth Street, Application Number HDC16-151

DISTRICT: Old West Side Historic District

REPORT DATE: August 11, 2016

REPORT PREPARED BY: Jill Thacher, Historic Preservation Coordinator

REVIEW COMMITTEE DATE: Monday, August 8, 2016

	OWNER	APPLICANT
Name:	John Rietz and Rachel Thompson	Same
Address:	538 Fifth Street Ann Arbor, MI 48103	
Phone:	(734) 930-0880	

BACKGROUND: This one-and-a-half vernacular house features a front porch that spans approximately one-half of the front elevation, a cut stone foundation, wood window and door surrounds, and small rear and side additions. The house first appears in the 1886-1887 Ann Arbor City Directory and lists John Krauss, a carpenter at Luick Brothers, as the resident. Until 1898 the address of the house was 38 Fifth Street.

In 2012 the HDC approved a request to add rear and side additions, a screen porch, and related work.

LOCATION: The site is located on the west side of Fifth Street, south of West Jefferson and north of West Madison.

APPLICATION: The applicant seeks HDC approval to install a solar array on the south-facing roof of the main body of the house and replace the roof's asphalt shingles with Owens Corning Durational Dimensional Teak shingles to match those of the house's 2013 addition.

APPLICABLE REGULATIONS:

From the Secretary of the Interior's Standards for Rehabilitation:

- (2) The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.



- (9) New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
- (10) New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

From the Secretary of the Interior's Guidelines for Rehabilitating Historic Buildings:

Roofs

Recommended: Identifying, retaining, and preserving roofs--and their functional and decorative features—that are important in defining the overall historic character of the building.

Not Recommended: Changing the configuration of a roof by adding new features such as dormer windows, vents, or skylights so that the historic character is diminished.

Energy Efficiency

Recommended: Placing a new addition that may be necessary to increase energy efficiency on non-character-defining elevations.

Not Recommended: Designing a new addition which obscures, damages, or destroys character-defining features.

Mechanical Equipment

Recommended: Providing adequate structural support for new mechanical equipment.

Not Recommended: Failing to consider the weight and design of new mechanical equipment so that, as a result, historic structural members or finished surfaces are weakened or cracked.

Installing a new mechanical system so that character-defining structural or interior features are radically changed, damaged, or destroyed.

From the Ann Arbor Historic District Design Guidelines (other Guidelines may apply):

Solar

Appropriate: Mounting solar panels at grade or on ground pole mountings. In the absence of an appropriate ground-based mounting location, panels should be mounted on side or rear facing roof surfaces.

Installing mechanical and service equipment on the roof related to the solar units and their related devices so that they are inconspicuous from the public right-of-way and do not damage or obscure character-defining features.

For sloped roof installations, mounting solar panels parallel to and within 8" of roof surface.

Not Appropriate: Mounting solar panels and their related devices on primary elevations or roofs that face the primary elevation or in planes that are highly visible from the street view. This location has the highest impact on the historic character of the historic building and all other options should be thoroughly explored.

Any other alteration or installation procedure that will cause irreversible changes to historic features or materials.

STAFF FINDINGS:

1. The application proposes to reroof the historic house with dark gray shingles to match the 2012 addition, then add an array of solar panels to the south face of the roof on the house's main body. The panels would nearly completely cover the roof, exposing only 3 inches of asphalt roofing from the ridge and 3 inches from the eave, and 8 inches on each side. Black modules with black framing are appropriately proposed. Because the panels are confined to the south face of the roof, are one consistent color, and cover the entire roof surface, staff believes the panels will not be a visual distraction from the historic structure.
2. Staff believes that the materials and design of the solar panels are compatible with the existing structure, neighboring buildings, and the surrounding historic district, and meet both the Secretary of the Interior's Standards and the *Ann Arbor Historic District Design Guidelines*.

POSSIBLE MOTIONS: (Note that the motion is only a suggestion. The Review Committee, consisting of staff and at least two Commissioners, will meet with the applicant on site and then make a recommendation at the meeting.)

I move that the Commission issue a certificate of appropriateness for the application at 538 Fifth Street, a contributing property in the Old West Side Historic District, to reroof the house and install a solar array on the south-facing roof, as proposed. The work is compatible in exterior design, arrangement, texture, material and relationship to the rest of the building and the surrounding area and meets *The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*, in particular standards 2, 9 and 10 and the guidelines for roofs, energy efficiency, and mechanical systems, as well as the *Ann Arbor Historic District Design Guidelines*, particularly as they pertain to solar installations.

MOTION WORKSHEET:

I move that the Commission issue a Certificate of Appropriateness for the work at 538 Fifth Street in the Old West Side Historic District

_____ Provided the following condition(S) is (ARE) met: 1) STATE CONDITION(s)

The work is generally compatible with the size, scale, massing, and materials and meets the Secretary of the Interior's Standards for Rehabilitation, standard(S) number(S) (*circle all that apply*): 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

ATTACHMENTS: application, photos, drawings, and technical information.

538 Fifth Street (2008 Survey Photo)



538 Fifth Street, View of South Roof Face (Submitted by applicant, 2016)





City of Ann Arbor
PLANNING & DEVELOPMENT SERVICES — PLANNING SERVICES

301 E. Huron Street | P.O. Box 8647 | Ann Arbor, Michigan 48107-8647
p. 734.794.6265 | f. 734.994.8312 | planning@a2gov.org

ANN ARBOR HISTORIC DISTRICT COMMISSION APPLICATION

Section 1: Property Being Reviewed and Ownership Information
Address of Property: <u>538 Fifth Street</u>
Historic District: <u>Old West Side</u>
Name of Property Owner (If different than the applicant): _____
Address of Property Owner: _____
Daytime Phone and E-mail of Property Owner: _____
Signature of Property Owner: _____ Date: _____
Section 2: Applicant Information
Name of Applicant: <u>John Rietz and Rachel Thompson</u>
Address of Applicant: <u>538 Fifth St.</u>
Daytime Phone: (<u>734</u>) <u>930-0880</u> Fax:(<u> </u>) _____
E-mail: <u>jrietz@hfcc.edu</u>
Applicant's Relationship to Property: <input checked="" type="checkbox"/> owner <input type="checkbox"/> architect <input type="checkbox"/> contractor <input type="checkbox"/> other
Signature of applicant: _____ Date: _____
Section 3: Building Use (check all that apply)
<input checked="" type="checkbox"/> Residential <input checked="" type="checkbox"/> Single Family <input type="checkbox"/> Multiple Family <input type="checkbox"/> Rental <input type="checkbox"/> Commercial <input type="checkbox"/> Institutional
Section 4: Stille-DeRossett-Hale Single State Construction Code Act (This item MUST BE INITIALED for your application to be PROCESSED)
Public Act 169, Michigan's Local Historic Districts Act, was amended April 2004 to include the following language: " <i>the applicant has certified in the application that the property where the work will be undertaken has, or will have before the proposed completion date, a a fire alarm or smoke alarm complying with the requirements of the Stille-DeRossett-Hale Single State Construction Code Act, 1972 PA 230, MCL 125.1501 to 125.1531.</i> "
Please initial here: _____

Section 5: Description of Proposed Changes (attach additional sheets as necessary)

1. Provide a brief summary of proposed changes. An array of solar panels to be installed on the south face of the roof on the main body of the house. The roof, being 22 years old, will need to be redone first, with asphalt shingles to match the shingles on our 2012/13 addition exactly: Owens Corning Duration Dimensional—Teak. The cable (in metal conduit) to the basement will trace the downspout and corner below.

2. Provide a description of existing conditions. The roof is currently open but for a vent and plumbing stack, both of which will be relocated to the north face of the roof.

The shingles (from 1994) are rated for 40 years but are showing signs of wear and would need to be replaced in 5 - 10 years. The north face of the roof is mossy and damaged from tree branches; we plan to have all of the 1994 shingles replaced.

3. What are the reasons for the proposed changes? To generate approximately 100% of the electricity that we consume annually. The shingles need to be replaced so that the solar array will not need to be removed and remounted in order to reshingle in 5 - 10 years.

4. Attach any additional information that will further explain or clarify the proposal, and indicate these attachments here.

1) Cut sheet for Suniva solar panels; optimizers; mounting hardware; and shingles.

2) Depiction of proposed array superimposed on photograph of roof;

3) Site plan, showing locations of panels, disconnect, and inverter.

5. Attach photographs of the existing property, including at least one general photo and detailed photos of proposed work area.

STAFF USE ONLY

Date Submitted: _____ Application to _____ Staff or _____ HDC

Project No.: _____ **HDC** _____ Fee Paid: _____

Pre-filing Staff Reviewer & Date: _____ Date of Public Hearing: _____

Application Filing Date: _____ Action: _____ HDC COA _____ HDC Denial

Staff signature: _____ _____ HDC NTP _____ Staff COA

Comments:



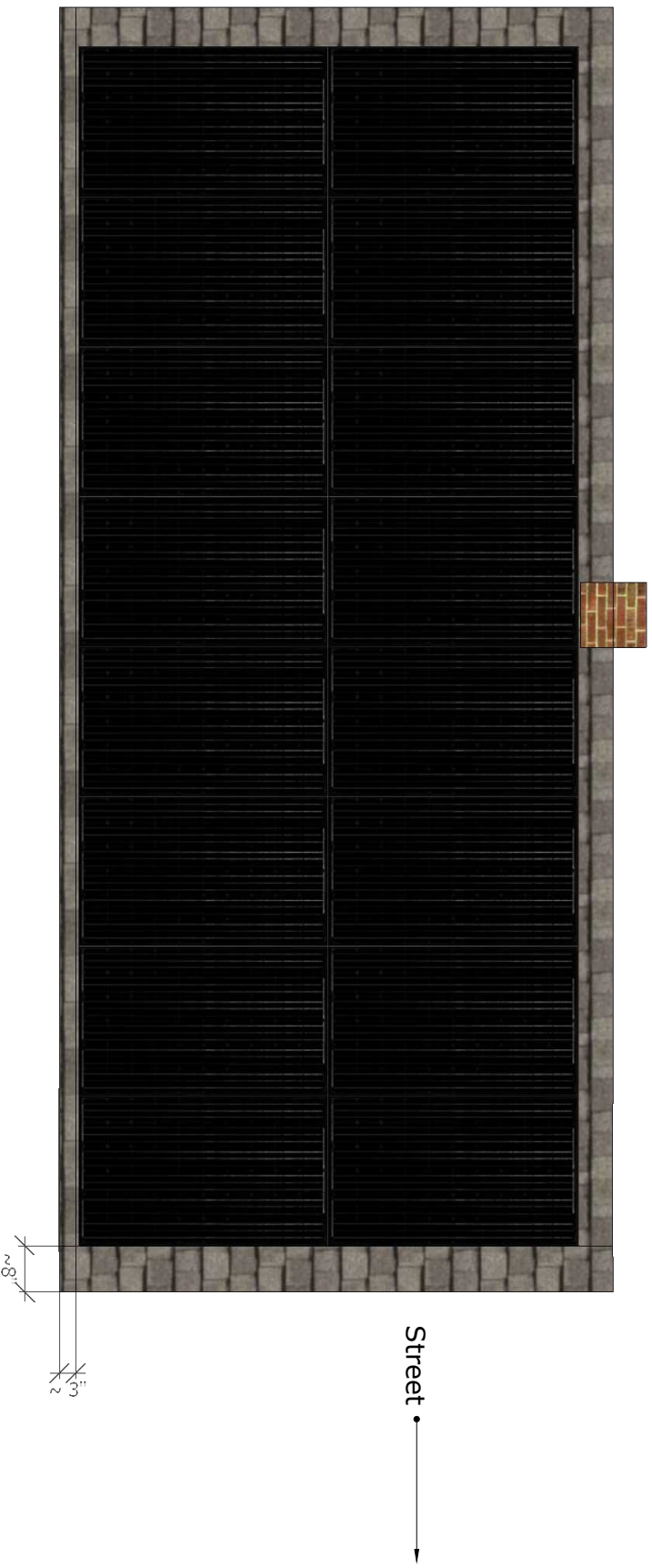




PV Panel Layout John Rietz 538 5th Street, Ann Arbor, MI 48103

Solar Panels: 16 panels, two rows of eight in portrait mode, 275W Suniva monocrystalline with black frame and back sheet, using black mounting hardware

Panels centered on roof in E-W direction with about 8" space at ends
Panels close to chimney, about 3" space at eave end



BOLD CONTRAST. DEEP DIMENSION. OUTSTANDING PERFORMANCE.

TruDefinition Duration Shingles are specially formulated to provide dramatic color contrast and dimension to any roof and are available in all the popular colors. Beyond the impressive curb appeal, they also come with the advanced performance of patented SureNail Technology—a technological breakthrough in roofing.

DURATION

SHINGLES

📷 [VIEW PHOTO GALLERY](#)

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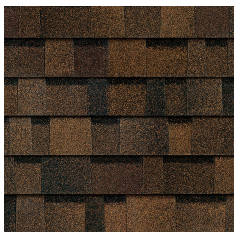
[Roofing \(/roofing\)](#) / [Pick Your Shingles \(/roofing/pick-your-shingles\)](#) / [Duration \(/roofing/trudefinition-duration\)](#)



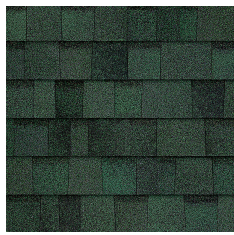
COLOR OPTIONS



(/roofing/trudefinition
duration/amber)



(/roofing/trudefinition
duration/brownwood)



(/roofing/trudefinition
duration/chateau-
green)



(/roofing/trudefinition
duration/colonial-
slate)



(/roofing/trudefinition
duration/desert-
tan)



(/roofing/trudefinition
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blue)



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duration/onyx-
black)



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gray)



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white)



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duration/sierra-
gray)



(/roofing/trudefinition
duration/teak)



(/roofing/trudefinition
duration/terra-
cotta)

TruDefinition Duration Shingles

ESTATE GRAY

FIND A CONTRACTOR



WHERE TO BUY



FAVORITE

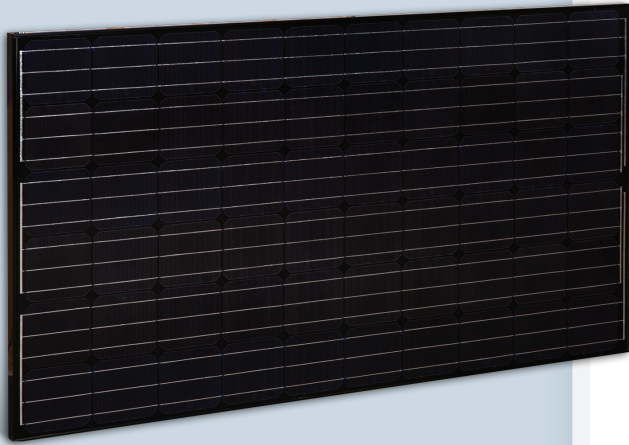


SHARE



ORDER PRINTED SAMPLE





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
- **The leading US-born, US-operated crystalline silicon cell and module manufacturer**, spun out of Georgia Tech's 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
- Performance longevity with advanced polymer backsheet
- UL1703 listed Type 2 PV module
- Passed the most stringent salt spray tests based on IEC 61701
- Passed enhanced stress tests¹ based on IEC 61215 conducted at Fraunhofer ISE²
- PAN files are independently validated



SUNIVA OPTIMUS® SERIES MONOCRYSTALLINE SOLAR MODULES

OPT SERIES: OPT 60 CELL MODULES (BLACK FRAME)

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. and North America using our pioneering ion implantation technology. Suniva's high power-density Optimus modules provide excellent performance and value.

FEATURES

- ☀ Utilizes our premier American-made cell technology, ARTisun Select®
- ☀ Superior performance and reliability; enhanced stress tests conducted at Fraunhofer ISE
- ☀ Module families ranging from 275-290W
- ☀ Marine grade aluminum frame with hard anodization or powder coating
- ☀ Certified PID-free by PV Evolution Labs (PVEL)
- ☀ Made in North America
- ☀ Qualifies for Ex-Im Financing
- ☀ 1000V UL
- ☀ 25 year linear power warranty; 10 year product warranty



CERTIFICATIONS



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	OPT275-60-4-1B0	OPT280-60-4-1B0	OPT285-60-4-1B0	OPT290-60-4-1B0
Power Classification (Pmax)	275 W	280 W	285 W	290 W
Module Efficiency (%)	16.73%	17.04%	17.34%	17.65%
Voltage at Max. Power Point (Vmp)	31.5 V	32.1 V	32.6 V	32.7 V
Current at Max. Power Point (Imp)	8.74 A	8.72 A	8.74 A	8.86 A
Open Circuit Voltage (Voc)	38.6 V	39.2 V	39.8 V	40.0 V
Short Circuit Current (Isc)	9.28 A	9.47 A	9.49 A	9.63 A

The electrical data apply to standard test conditions (STC): Irradiance of 1000 W/m² with AM 1.5 spectra at 25°C.

CHARACTERISTIC DATA

Type of Solar Cell	High-efficiency ARTisun Select cells, 3 and 5 busbar options available
Frame	Anodized or powder coated aluminum alloy
Glass	Tempered (low-iron), anti-reflective coating
Junction Box	NEMA IP67 rated; 3 internal bypass diodes
Cable & Connectors	12 AWG (4 mm ²) PV Wire cable with multiple connector options available; cable length approx. 1000 mm

MECHANICALS

Cells / Module	60 (6 x 10)
Module Dimensions	1660 x 990 mm (65.35 x 38.98 in.)
Module Thickness (Depth)	35 mm (1.37 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)	-0.42
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

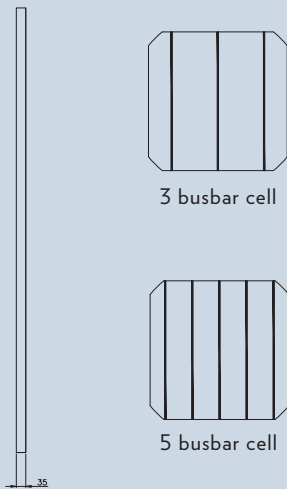
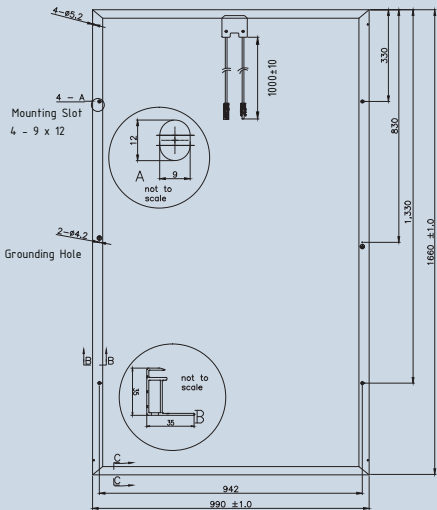
Suniva® reserves the right to change the data at any time. View manual at suniva.com.

¹UV 90 kWh, TC 400, DH 2000. ²Tests were conducted on module type OPT 60 silver frame.

Please read installation manual before installing or working with module.

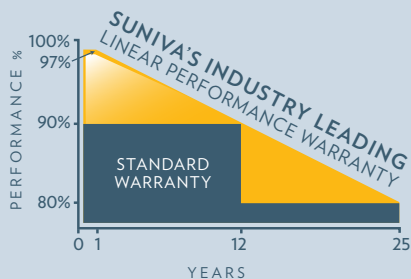
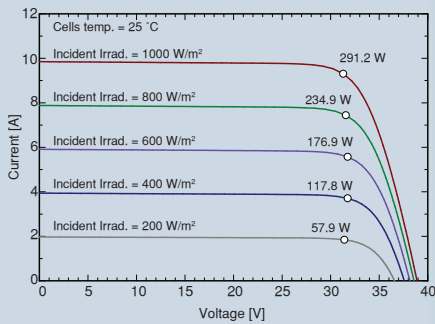
Product	Modules per pallet	Pallets per 53' truck	Total modules
OPT - 60 cell (silver and black)	25	36	900

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



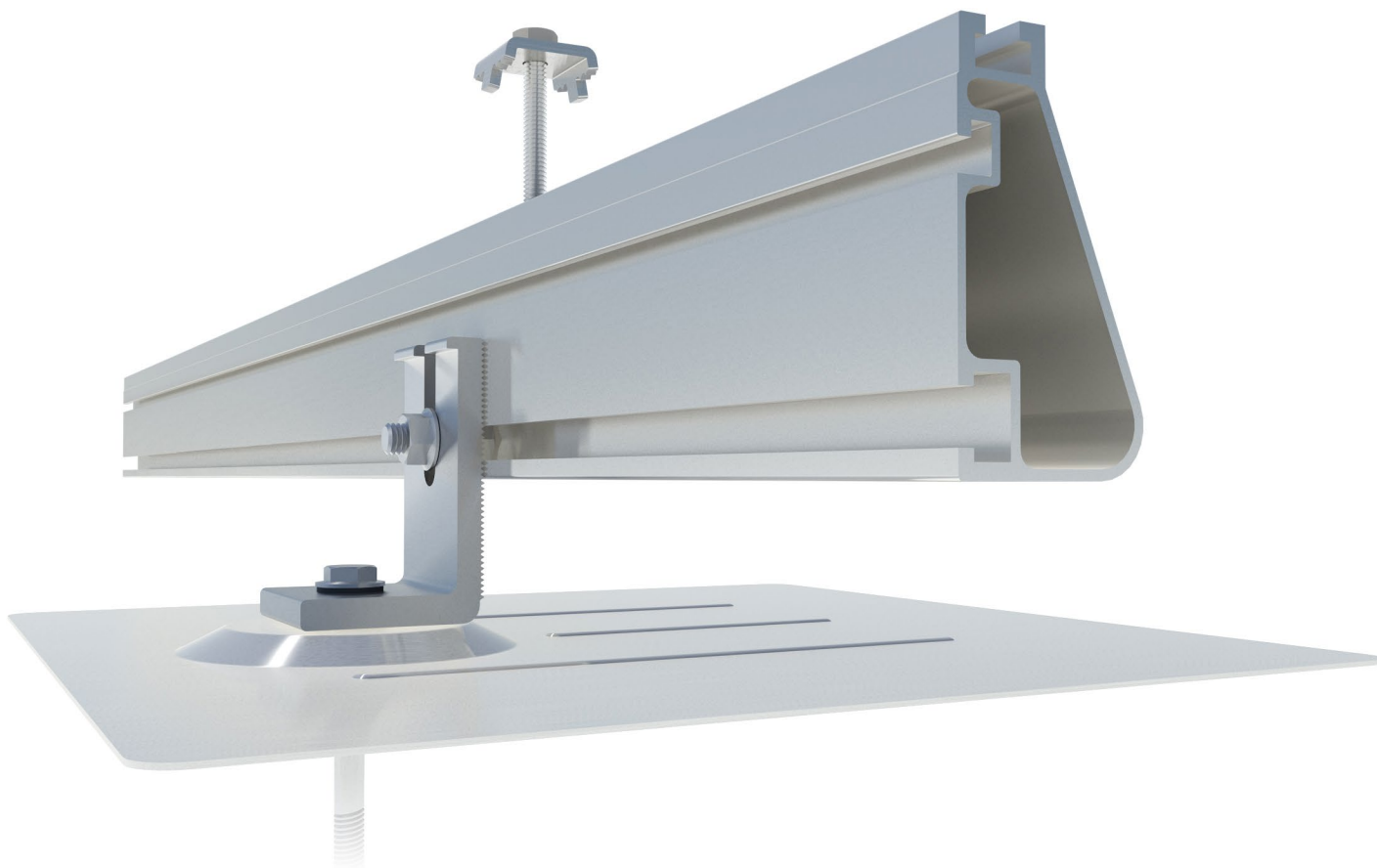
PV module: Suniva, OPT290-60-4-100

Current-Voltage (IV) as a Function of Isolation (W/m²) and Temperature



PLEASE RECYCLE

FEBRUARY 2, 2016 (REV. 2) [SAM0_0061]



Built for solar's toughest roofs.

IronRidge builds the strongest roof mounting system in solar. Every component has been tested to the limit and proven in extreme environments.

Our rigorous approach has led to unique structural features, such as curved rails and reinforced flashings, and is also why our products are fully certified, code compliant and backed by a 20-year warranty.



Strength Tested

All components evaluated for superior structural performance.



PE Certified

Pre-stamped engineering letters available in most states.



Class A Fire Rating

Certified to maintain the fire resistance rating of the existing roof.



Design Software

Online tool generates a complete bill of materials in minutes.



Integrated Grounding

UL 2703 system eliminates separate module grounding components.



20 Year Warranty

Twice the protection offered by competitors.

XR Rails

XR10 Rail



A low-profile mounting rail for regions with light snow.

- 6' spanning capability
- Moderate load capability
- Clear & black anod. finish

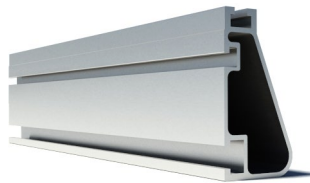
XR100 Rail



The ultimate residential solar mounting rail.

- 8' spanning capability
- Heavy load capability
- Clear & black anod. finish

XR1000 Rail



A heavyweight mounting rail for commercial projects.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish

Internal Splices

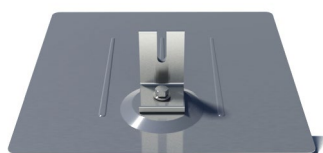


All rails use internal splices for seamless connections.

- Self-tapping screws
- Varying versions for rails
- Grounding Straps offered

Attachments

FlashFoot



Anchor, flash, and mount with all-in-one attachments.

- Ships with all hardware
- IBC & IRC compliant
- Certified with XR Rails

Slotted L-Feet



Drop-in design for rapid rail attachment.

- High-friction serrated face
- Heavy-duty profile shape
- Clear & black anod. finish

Standoffs



Raise flush or tilted systems to various heights.

- Works with vent flashing
- Ships pre-assembled
- 4" and 7" Lengths

Tilt Legs



Tilt assembly to desired angle, up to 45 degrees.

- Attaches directly to rail
- Ships with all hardware
- Fixed and adjustable

Clamps & Grounding

End Clamps



Slide in clamps and secure modules at ends of rails.

- Mill finish & black anod.
- Sizes from 1.22" to 2.3"
- Optional Under Clamps

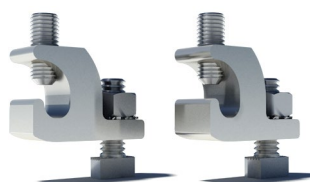
Grounding Mid Clamps



Attach and ground modules in the middle of the rail.

- Parallel bonding T-bolt
- Reusable up to 10 times
- Mill & black stainless

T-Bolt Grounding Lugs



Ground system using the rail's top slot.

- Easy top-slot mounting
- Eliminates pre-drilling
- Swivels in any direction

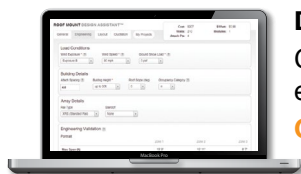
Accessories



Provide a finished and organized look for rails.

- Snap-in Wire Clips
- Perfected End Caps
- UV-protected polymer

Free Resources



Design Assistant

Go from rough layout to fully engineered system. For free.

[Go to IronRidge.com/rm](http://IronRidge.com/rm)



NABCEP Certified Training

Earn free continuing education credits, while learning more about our systems.

[Go to IronRidge.com/training](http://IronRidge.com/training)

Classic Composition Mount | QMSC

2.50 THIS EDGE TOWARDS ROOF RIDGE

12.00

1.50

3.00

6.00

12.00

1.30

3.00

RACKING COMPONENTS NOT INCLUDED

6

5

4

3

2

1

5

8

7

ITEM NO.	DESCRIPTION	QTY.
1	FLASHING, 12" X 12" X .050", 5052, MILL	1
2	QBLOCK, CLASSIC, A360.1 CAST AL, MILL	1
3	HANGER BOLT, PLAIN CENTER, 5/16" x 6", 18-8 SS	1
4	WASHER, SEALING, 5/16" ID X 3/4" OD, EPDM BONDED SS	1
5	NUT, HEX, 5/16-18, UNC-2B, 18-8 SS	2
6	WASHER, FLAT, 19/64" ID x 7/8" OD x 1/8" EPDM	1
7	WASHER, FENDER, 5/16" ID X 1" OD, 18-8 SS	1
8	WASHER, SPLIT-LOCK, 5/16" ID, 18-8 SS	1

Quick Mount PV®

TITLE:
QMSC: CLASSIC COMPOSITION MOUNT

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/8
TWO PLACE DECIMAL ±.18
THREE PLACE DECIMAL ±.125

SIZE **A**

DRAWN BY: RAD

DATE: 7/23/2013

REV **6**

SCALE: 1:4 WEIGHT: 1.24 SHEET 1 OF 1

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF QUICK MOUNT PV. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF QUICK MOUNT PV IS PROHIBITED.

DO NOT SCALE DRAWING

5 4 3 2 1

AVAILABLE IN MILL, CLEAR ANODIZED, AND BRONZE ANODIZED FINISHES.

Lag pull-out (withdrawal) capacities (lbs) in typical lumber:

	Lag Bolt Specifications		
	Specific Gravity	5/16" shaft per 3" thread depth	5/16" shaft per 1" thread depth
Douglas Fir, Larch	.50	798	266
Douglas Fir, South	.46	705	235
Engelmann Spruce, Lodgepole Pine (MSR 1650 f & higher)	.46	705	235
Hem, Fir	.43	636	212
Hem, Fir (North)	.46	705	235
Southern Pine	.55	921	307
Spruce, Pine, Fir	.42	615	205
Spruce, Pine, Fir (E of 2 million psi and higher grades of MSR and MEL)	.50	798	266

Sources: American Wood Council, NDS 2005, Table 11.2 A, 11.3.2 A

Notes:

- 1) Thread must be embedded in a rafter or other structural roof member.
- 2) See NDS Table 11.5.1C for required edge distances.



Classic Composition Mounting Instructions

Installation Tools Required: tape measure, roofing bar, chalk line, stud finder, caulking gun, sealant compatible with roofing materials, drill with 7/32" long-style bit, drill or impact gun with 1/2" deep socket.

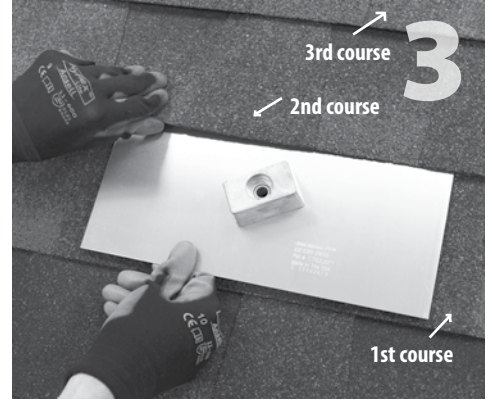
WARNING: Quick Mount PV products are NOT designed for and should NOT be used to anchor fall protection equipment.



1 Locate, choose, and mark centers of rafters to be mounted. Select the courses of shingles where mounts will be placed.



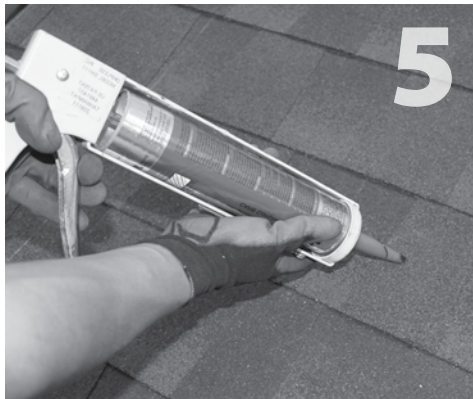
2 Carefully lift composition roof shingle with roofing bar, just above placement of mount. Remove nails as required. See "Proper Flashing Placement" on next page.



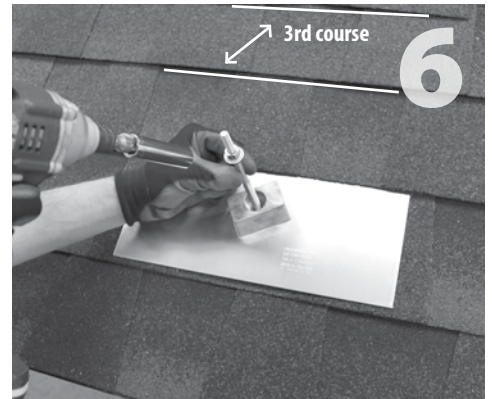
3 Insert flashing between 1st and 2nd course. Slide up so top edge of flashing is at least 3/4" higher than the drip edge of the 3rd course and lower flashing edge is above the drip edge of 1st course. Mark center for drilling.



4 Using drill with 7/32" bit, drill pilot hole into roof and rafter, taking care to drill square to the roof. Do not use mount as a drill guide. Drill should be 'long style bit' aka 'aircraft extension bit' to drill a 3" deep hole into rafter.



5 Clean off any sawdust, and fill hole with sealant compatible with roofing materials.



6 Slide flashing into position. Prepare hanger bolt with hex nut and sealing washer. Insert into hole and drive hanger bolt until QBlock stops rotating easily. **Do NOT over torque.**



7 Insert EPDM rubber washer over hanger bolt into block.

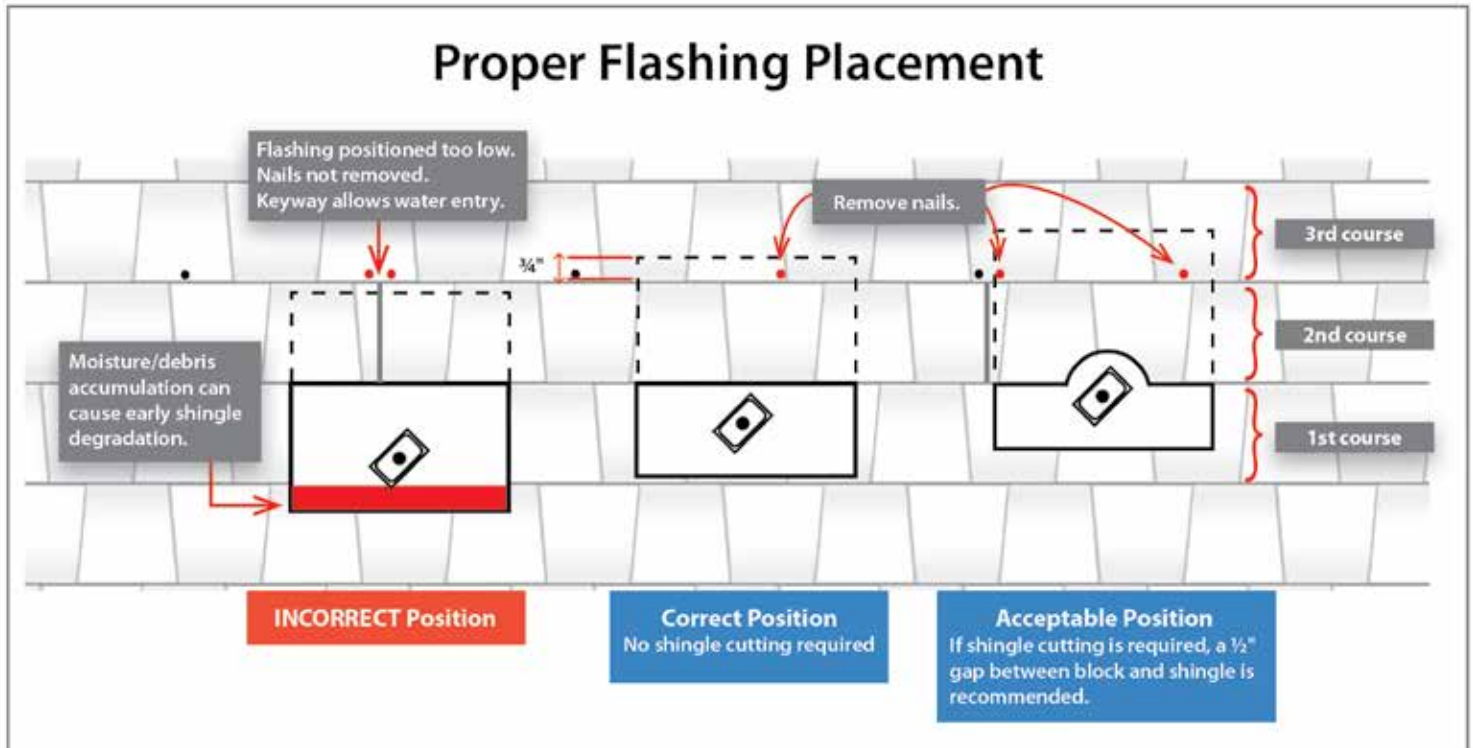


8 Using the rack kit hardware, secure the racking (L-foot) to the mount using torque specs from racking manufacturer. If racking manufacturer does not specify torque setting, tighten to 13 ft.-lbs.

You are now ready for the rack of your choice. Follow all the directions of the rack manufacturer as well as the module manufacturer.

All roofing manufacturers' written instructions must also be followed by anyone modifying a roof system. Please consult the roof manufacturer's specs and instructions prior to touching the roof.

Reference and Tips



Additional tips and information for installing mounts:

- See Classic Composition Mount install and Quick Tips videos on nail removal, bolt prep, and more at: www.quickmountpv.com/support/videos.html
- It is not necessary or advisable to use nails or other fasteners to secure the perimeter of the flashing.
- The Classic Composition Mount is made to work with standard and high-definition composition/asphalt and wood shingle roofs with 5" to 5-5/8" courses. If the exposed surface of the course exceeds this measurement you may need to use our Classic Shake Mount instead.
- Depending on the season and climate, size and location of seal tabs, and quality of the shingles, the seal tabs that adhere the shingle courses together may not effectively seal the shingles to the flashings. If this is the case, simply add several quarter-sized dabs of manufacturer accepted sealant or asphalt roofing cement, meeting ASTM D 4586 Type II, between the flashing and the shingle above.
- Mounts should not be installed in areas of the roof susceptible to ice damming. Water ponding under the shingles can reach the bolt penetration.
- Take care not to damage the roofing material while working on the roof. Removing stone granules and deforming the shingles in any way can shorten the lifespan of the roofing. The value of the solar array is directly affected by the condition of the roof it is attached to.



SolarEdge Power Optimizer

Module Add-On For North America

P300 / P320 / P400 / P405



POWER OPTIMIZER

PV power optimization at the module-level

- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Module-level voltage shutdown for installer and firefighter safety



SolarEdge Power Optimizer

Module Add-On for North America

P300 / P320 / P400 / P405

	P300 (for 60-cell modules)	P320 (for high-power 60-cell modules)	P400 (for 72 & 96-cell modules)	P405 (for thin film modules)	
INPUT					
Rated Input DC Power ⁽¹⁾	300	320	400	405	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	48		80	125	Vdc
MPPT Operating Range	8 - 48		8 - 80	12.5 - 105	Vdc
Maximum Short Circuit Current (Isc)	10	11	10		Adc
Maximum DC Input Current	12.5	13.75	12.5		Adc
Maximum Efficiency	99.5				%
Weighted Efficiency	98.8				%
Overtoltage Category	II				
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)					
Maximum Output Current	15				Adc
Maximum Output Voltage	60		85		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR SOLAREEDGE INVERTER OFF)					
Safety Output Voltage per Power Optimizer	1				Vdc
STANDARD COMPLIANCE					
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3				
Safety	IEC62109-1 (class II safety), UL1741				
RoHS	Yes				
INSTALLATION SPECIFICATIONS					
Maximum Allowed System Voltage	1000				Vdc
Compatible inverters	All SolarEdge Single Phase and Three Phase inverters				
Dimensions (W x L x H)	128 x 152 x 27.5 / 5 x 5.97 x 1.08		128 x 152 x 35 / 5 x 5.97 x 1.37	128 x 152 x 48 / 5 x 5.97 x 1.89	mm / in
Weight (including cables)	770 / 1.7		930 / 2.05	930 / 2.05	gr / lb
Input Connector	MC4 Compatible				
Output Wire Type / Connector	Double Insulated; MC4 Compatible				
Output Wire Length	0.95 / 3.0		1.2 / 3.9		m / ft
Operating Temperature Range	-40 - +85 / -40 - +185				°C / °F
Protection Rating	IP68 / NEMA6P				
Relative Humidity	0 - 100				%

⁽¹⁾ Rated STC power of the module. Module of up to +5% power tolerance allowed.

PV SYSTEM DESIGN USING A SOLAREEDGE INVERTER ⁽²⁾	SINGLE PHASE	THREE PHASE 208V	THREE PHASE 480V	
Minimum String Length (Power Optimizers)	8	10	18	
Maximum String Length (Power Optimizers)	25	25	50	
Maximum Power per String	5250	6000	12750	W
Parallel Strings of Different Lengths or Orientations	Yes			

⁽²⁾ It is not allowed to mix P405 with P300/P400/P600/P700 in one string.

