

Montgomery County Historic Preservation

Staff Report

ADDRESS: 30 Pine Ave., Takoma Park RESOURCE: Takoma Park Historic District APPLICANT: Justin Evans REVIEW: HAWP CASE NO.: 1155727 PROPOSAL: Solar Panel Installation	MEETING DATE: 5/27/2026 REPORT DATE: 5/20/2026 PUBLIC NOTICE: 5/13/2026 TAX CREDIT ELIGIBLE: No STAFF: Dan Bruechert
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Staff Recommendation

Staff recommends the HPC approve with one (1) condition the HAWP application with final approval delegated to Staff:

1. Approval of the HAWP does not extend to the easternmost solar panel. A revised roof plan must be submitted before issuance of the final approval documents.

Architectural Description

Significance: Outstanding Resource to the Takoma Park Historic District

Date: 1923

Style: Craftsman



Figure 1: The location of the subject property (outlined in blue) is located near the southwestern corner of the Takoma Park Historic District (hatched and outlined in red).

Proposal

The applicant proposes to install 12 (twelve) roof-mounted solar panels.

Applicable Guidelines

When reviewing alterations and new construction within the Takoma Park Historic District several documents are to be utilized as guidelines to assist the Commission in developing their decision. These documents include the Approved and Adopted Amendment to the Master Plan for Historic Preservation in Montgomery County Maryland for Takoma Park (*Design Guidelines*), Montgomery County Code Chapter 24A-8 (*Chapter 24A-8*), and the Secretary of the Interior's Standards for Rehabilitation (*Standards*). The pertinent information in these documents is outlined below. Additionally, as this project involves the installation of roof mounted solar panels, the HPC's decision is guided by HPC Policy #20-01 ADDRESSING EMERGENCY CLIMATE MOBILIZATION THROUGH THE INSTALLATION OF ROOF-MOUNTED SOLAR PANELS (*HPC Solar Policy*).

Montgomery County Code Chapter 24A-8

- (a) The commission shall instruct the director to deny a permit if it finds, based on the evidence and information presented to or before the commission that the alteration for which the permit is sought would be inappropriate, inconsistent with or detrimental to the preservation, enhancement or ultimate protection of the historic site or historic resource within an historic district, and to the purposes of this chapter.
- (b) The commission shall instruct the director to issue a permit, or issue a permit subject to such conditions as are found to be necessary to ensure conformity with the purposes and requirements of this chapter, if it finds that:
 - 1) The proposal will not substantially alter the exterior features of an historic site or historic resource within an historic district; or
 - 2) The proposal is compatible in character and nature with the historical, archeological, architectural or cultural features of the historic site or the historic district in which an historic resource is located and would not be detrimental thereto or to the achievement of the purposes of this chapter; or
- (d) In the case of an application for work on an historic resource located within an historic district, the commission shall be lenient in its judgment of plans for structures of little historical or design significance or for plans involving new construction, unless such plans would seriously impair the historic or architectural value of surrounding historic resources or would impair the character of the historic district. (Ord. No. 9-4, § 1; Ord. No. 11-59.)

Design Guidelines

There are two very general, broad planning and design concepts which apply to all categories. These are:

The design review emphasis will be restricted to changes that are at all visible from the public right-of-way, irrespective of landscaping or vegetation (it is expected that the majority of new additions will be reviewed for their impact on the overall district), and,

The importance of assuring that additions and other changes to existing structures act to reinforce and continue existing streetscape, landscape, and building patterns rather than to impair the character of the district.

Outstanding Resources have the highest level of architectural and/or historical significance. While they will receive the most detailed level of design review, it is permissible to make sympathetic alterations, changes and additions. The guiding principles to be utilized by the Historic Preservation Commission are the *Secretary of the Interior's Standards for Rehabilitation*

Specifically, some of the factors to be considered in reviewing HAWPs on Outstanding Resources:

- Plans for all alterations should be compatible with the resource's original design; additions, specifically, should be sympathetic to existing architectural character, including massing, height, setback, and materials

- Emphasize placement of major additions to the rear of existing structures so that they are less visible from the public right-of-way
- While additions should be compatible, they are not required to be replicative of earlier architectural styles
- Preservation of original and distinctive architectural features, such as porches, dormers, decorative details, shutters, etc..is encouraged
- Preservation of original windows and doors, particularly those with specific architectural importance, and of original size and shape of openings is encouraged
- Preservation of original building materials and use of appropriate, compatible new materials is encourages
- All changes and additions should respect existing environmental settings, landscaping, and patterns of open space

Secretary of the Interior's Standards for Rehabilitation

2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, space and spatial relationships that characterize a property will be avoided.
9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportions, and massing to protect the integrity of the property and its environment.
10. New additions and adjacent or related new construction will 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.

HPC Policy #20-01 ADDRESSING EMEERGENCY CLIMATE MOBILIZATION THROUGH THE INSTALLATION OF ROOF-MOUNTED SOLAR PANELS

1. The preferred locations for solar panel installation(s) on a designated historic site or an historic resource located within an historic district is a) on the rear of the property, b) on non-historic building additions, c) on accessory structures, or d) in ground-mounted arrays;
2. If it is not feasible to install solar panels in one of the identified preferred locations due to resource orientation or other site limitations; and,
3. The roof is determined to be neither architecturally significant, nor a character-defining feature of the resource, nor is it a slate or tile roof, that unless it can be demonstrated that the solar array will be installed without damaging the historic character of the resource or historic fabric; then
4. The public welfare is better served by approving a Historic Area Work Permit for solar panels on all visible side or front roof slopes under Section 24A-8(b)(6).

5. A Historic Area Work Permit (HAWP) is required for all work referenced

Staff Discussion

The subject property is a one-story, Craftsman bungalow at the intersection of Pine Ave. and Elm Ave. categorized as an ‘Outstanding Resource.’ The Master Plan Amendment does not provide any additional comments justifying the significance. Based on Staff’s observations on a site visit, Staff suspects that determination was based on the high-style Craftsman design elements, including decorative brackets and stylized columns (see *Fig. 2*).



Figure 2: Undated file photo of the subject house.

The applicant proposes to install 12 (twelve) roof-mounted solar panels on the south-facing roof slope (facing Elm Ave.). The inverter and service panel will be located on the north side of the house.

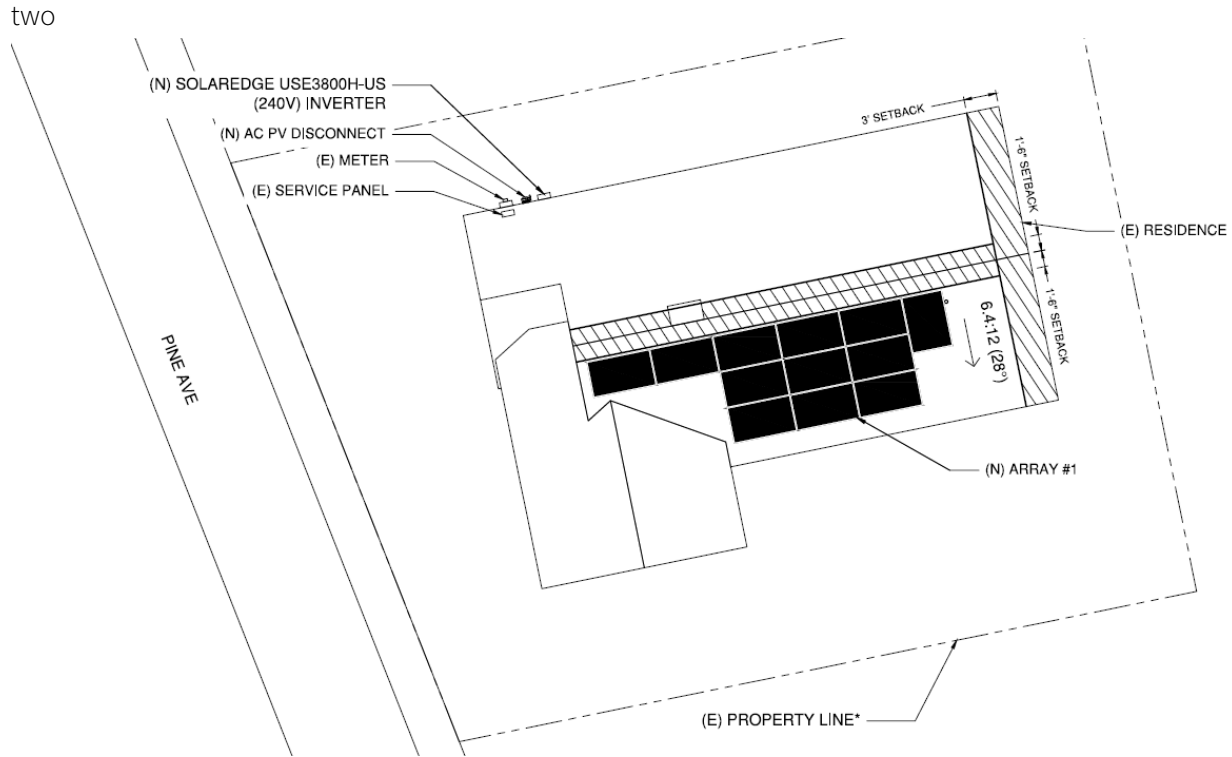


Figure 3: The proposed roof-mounted solar panels

The HPC’s Solar Policy provides guidance on how to evaluate the appropriateness of roof-mounted solar panels on designated historic resources. The first consideration is the availability of the identified preferred locations. These locations include the rear of the property/building, on a non-historic addition, on accessory structures, and on ground-mounted arrays. None of the preferred locations is available at the subject property. There are no additions to the house, the lot contains no accessory structures, and there is not sufficient space to install a ground-mounted array. The subject house does not have a true ‘rear’ roof slope, due to its corner lot location. The least architecturally significant roof slope faces north, where solar collection is substantially limited.

The next consideration is the architectural significance of the roof form and its material. The roof of the subject house has a front gable roof (oriented toward Pine Ave.), with a south projecting porch covered by a south-facing gable roof. All roof surfaces are covered with architectural shingles. Staff finds the simple roof planes are not character-defining features and that the architectural shingles are not historic fabric, and will not be irreparably damaged by the installation of the solar panels. Based on this analysis, Staff finds that the public welfare is better served in approving the HAWP under 24A-8(b)(6).

The outstanding question is the appropriateness of the arrangement of the solar panels. The illustrated design guidelines for solar panels stress the importance of installing the panels in an organized configuration, usually a rectangle or square, thereby avoiding a disjointed appearance. Staff finds, for the most part, that this proposed arrangement succeeds. The nine panels in the center of the proposed array are arranged in a three-by-three pattern. The two panels that project to the western side of the house will

be largely obscured by the porch's gable roof and therefore will not have a substantial visual impact on the house's historic character. However, staff finds that the easternmost panel rotated 90° from the other panels and is not consistent with the rest of the array. This panel appears to be oriented in this way to avoid an existing roof vent. Staff recommends that the HPC add a condition to the approval of this HAWP that eliminates this panel (see Fig. 4, below). Staff would also support the relocation of this vent and the installation of additional panels, creating a four-panel wide by three-panel tall arrangement, plus the two panels that extend to the west. With the recommended condition, Staff finds the proposal is consistent with 24A-8(b)(2) and (6); the Design Guidelines; *Standard #2, 9, and 10*; and the HPC Solar Policy.

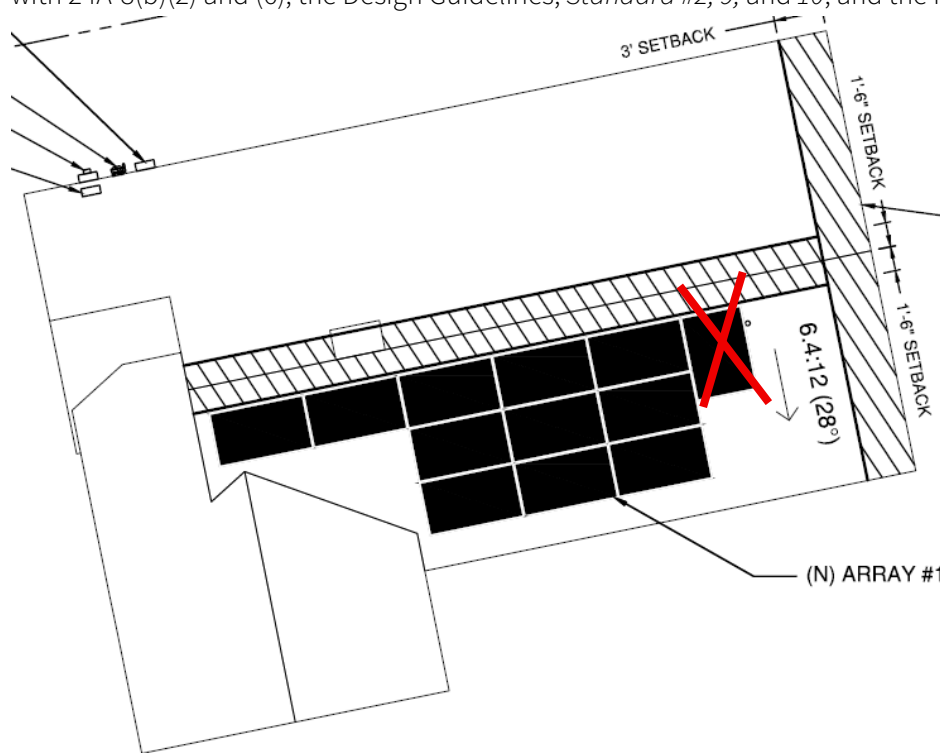


Figure 4: Staff recommends the HPC condition the approval of the HAWP to eliminate the panel marked with a red 'X'.

Staff Recommendation

Staff recommends that the Commission approve with one (1) condition the HAWP application;

1. Approval of the HAWP does not extend to the easternmost solar panel. A revised roof plan must be submitted before issuance of the final approval documents;

under the Criteria for Issuance in Chapter 24A-8(b)(2) and (6) having found that the proposal is consistent with the *Takoma Park Historic District Guidelines* identified above, and therefore will not substantially alter the exterior features of the historic resource and is compatible in character with the district and the purposes of Chapter 24A;

and with the *Secretary of the Interior's Standards for Rehabilitation #2, #9, and #10*;

and with HPC Policy #20-01 ADDRESSING EMERGENCY CLIMATE MOBILIZATION THROUGH THE INSTALLATION OF ROOF-MOUNTED SOLAR PANELS;

and with the general condition that the applicant shall present an electronic set of drawings, if applicable, to Historic Preservation Commission (HPC) staff for review and stamping prior to submission for the Montgomery County Department of Permitting Services (DPS) building permits;

and with the general condition that final project design details, not specifically delineated by the Commission, shall be approved by HPC staff or brought back to the Commission as a revised HAWP application at staff's discretion;

and with the general condition that the applicant shall notify the Historic Preservation Staff if they propose to make any alterations to the approved plans. Once the work is completed the applicant will contact the staff person assigned to this application at 301-563-3400 or dan.bruechert@montgomeryplanning.org to schedule a follow-up site visit.

Description of Property: Please describe the building and surrounding environment. Include information on significant structures, landscape features, or other significant features of the property:

The subject property located at 30 Pine Avenue, Takoma Park, Maryland 20912 is developed with a detached single-family residential dwelling situated on an improved lot within an established residential neighborhood. The structure appears to be of conventional wood-frame construction and is representative of the surrounding housing stock, which is characterized by early- to mid-20th-century development patterns.

The property is located on a public, improved roadway and is served by typical public utilities. The immediate area is zoned and utilized for residential purposes, with surrounding properties improved with similar detached dwellings of comparable scale, massing, and use.

Site features include maintained yard areas with grass coverage, mature trees, and typical residential landscaping elements. The lot is generally level to gently sloping and does not contain any significant topographic anomalies. There are no notable accessory structures or unique site improvements observed that would significantly alter the character of the property.

Description of Work Proposed: Please give an overview of the work to be undertaken:

The proposed work consists of the installation of a residential rooftop solar photovoltaic (PV) system designed to provide on-site renewable energy generation for the existing single-family dwelling. The system will include the installation of twelve (12) photovoltaic modules rated at approximately 445 watts each, arranged in a single roof-mounted array.

The array will be affixed to the existing roof structure using an engineered racking system designed to meet applicable structural and wind load requirements. The installation will include associated electrical equipment, including module-level wiring, inverter(s), disconnects, and interconnection to the existing electrical service panel in accordance with applicable codes and utility requirements.

All work will be performed in compliance with the Montgomery County building and electrical codes, as well as applicable National Electrical Code (NEC) standards. The system is intended to reduce the property's reliance on grid-supplied electricity and improve overall energy efficiency through the use of renewable energy technology. The installation will not significantly alter the building footprint, height, or overall character of the structure.

Work Item 1: _____	
Description of Current Condition:	Proposed Work:

Work Item 2: _____	
Description of Current Condition:	Proposed Work:

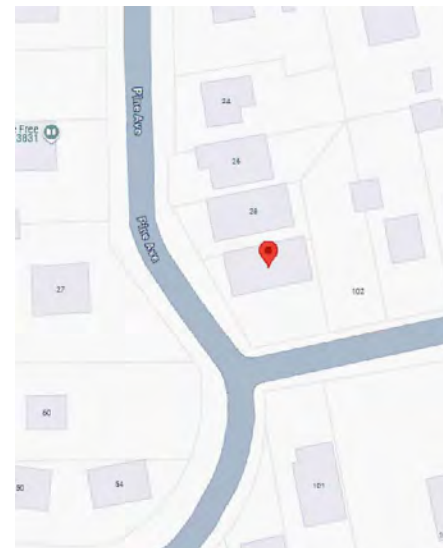
Work Item 3: _____	
Description of Current Condition:	Proposed Work:

PROJECT INFORMATION	
OWNER	EVANS, JUSTIN RESIDENCE 30 PINE AVE, TAKOMA PARK, MD 20912 (717) 798-6607
SCOPE OF WORK	RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION CANADIAN SOLAR INC. CS6.1-54TM-445H SOLAR MODULES (12) X445W = 5.34 KWdc (12) U650 POWER OPTIMIZERS (1) SOLAREEDGE USE3800H-US (240V) INVERTER
BUILDING OCCUPANCY GROUP	R-3 (SINGLE-FAMILY RESIDENTIAL)
CODES AND STANDARDS	2017 NATIONAL ELECTRICAL CODE 2021 INTERNATIONAL BUILDING CODE 2021 INTERNATIONAL FIRE CODE 2021 INTERNATIONAL RESIDENTIAL CODE
MODULE SPECS	CANADIAN SOLAR INC. CS6.1-54TM-445H (L) 70.9" X (W) 44.6" X (H) 1.38" WEIGHT = 50.7 LBS COMBINED WEIGHT OF MODULES AND RACKING: 3.00 PSF ≤ 4.5 PSF
EQUIPMENT CONTRACTOR	ROI CONSTRUCTION 8378 VETERANS HWY MILLERSVILLE, MD 21108 CONTACT: JORGE ESCOBAR PHONE: 202-694-9890
SITE DETAILS	COMP. SHINGLE ROOF, 2X6 RAFTERS @ 24" O.C., DF#2 ROOF SLOPE(S): 6.4:12 (28°) AREA OF ROOF (PLAN VIEW) = 1770 SF AREA OF NEW ARRAY = 263 SF = 13% OF ROOF AREA (ARRAY <66% OF ROOF AREA) CLIMATE DATA SOURCE: WASHINGTON DC REAGAN AP, 38.87N, 77.03W ASHRAE EXTREME LOW: -12.3°C ASHRAE 2% HIGH: 36°C ASHRAE EXTREME HIGH: 40.9°C WIND SPEED: 115 MPH RISK CATEGORY: II WIND EXPOSURE CATEGORY: B GROUND SNOW LOAD: 35 PSF ROOF SNOW LOAD: 25 PSF ROOF ASSEMBLY FIRE CLASS RATING: A HISTORIC DISTRICT: NONE FIRE SPRINKLES: NO

SOLAR ARRAY PROPOSED				
ARRAY #	MODS	TILT	AZIMUTH	MAX. HEIGHT
ARRAY #1	12	6.4:12 (28°)	169°	0'-7"

DRAWINGS INDEX	
G-1	COVER SHEET
PV-1	SITE PLAN
PV-2	ROOF LAYOUT
PV-2.1	STRUCTURAL DETAILS
PV-3	ELECTRICAL PLAN
PV-4	SINGLE LINE DIAGRAM
PV-5	LABELS
SUPPORTING DOCUMENTS	DATA SHEETS, STRUCTURAL CALCULATIONS

OFFICIAL USE



VICINITY MAP



ROOF

PE STAMP



STAMPED 01/19/2026

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland:
License No. 52692
Expiration Date: 05/24/2026

CONTRACTOR
ROI CONSTRUCTION
8378 VETERANS HWY
MILLERSVILLE MD 21108
Ph: (202) 694-9890
Contractor# 420219000135



EVANS, JUSTIN RESIDENCE
RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION
30 PINE AVE, TAKOMA PARK, MD 20912
PH: (717) 798-6607
PEPCO: 5504 0521 415

COVER SHEET

System AC Size @ STC: 3.8 kW System DC Size @ STC: 5.34 kW
(12) CANADIAN SOLAR INC. CS6.1-54TM-445H SOLAR MODULES
(1) SOLAREEDGE USE3800H-US (240V) INVERTER RGM CERTIFIED

Drawn by:
LM

Rev: PERMIT SET

Date:
01/14/2026

Page:

G-1

SOLAR ARRAY PROPOSED

ARRAY #	MODS	TILT	AZIMUTH	MAX. HEIGHT
ARRAY #1	12	6.4:12 (28°)	169°	0'-7"

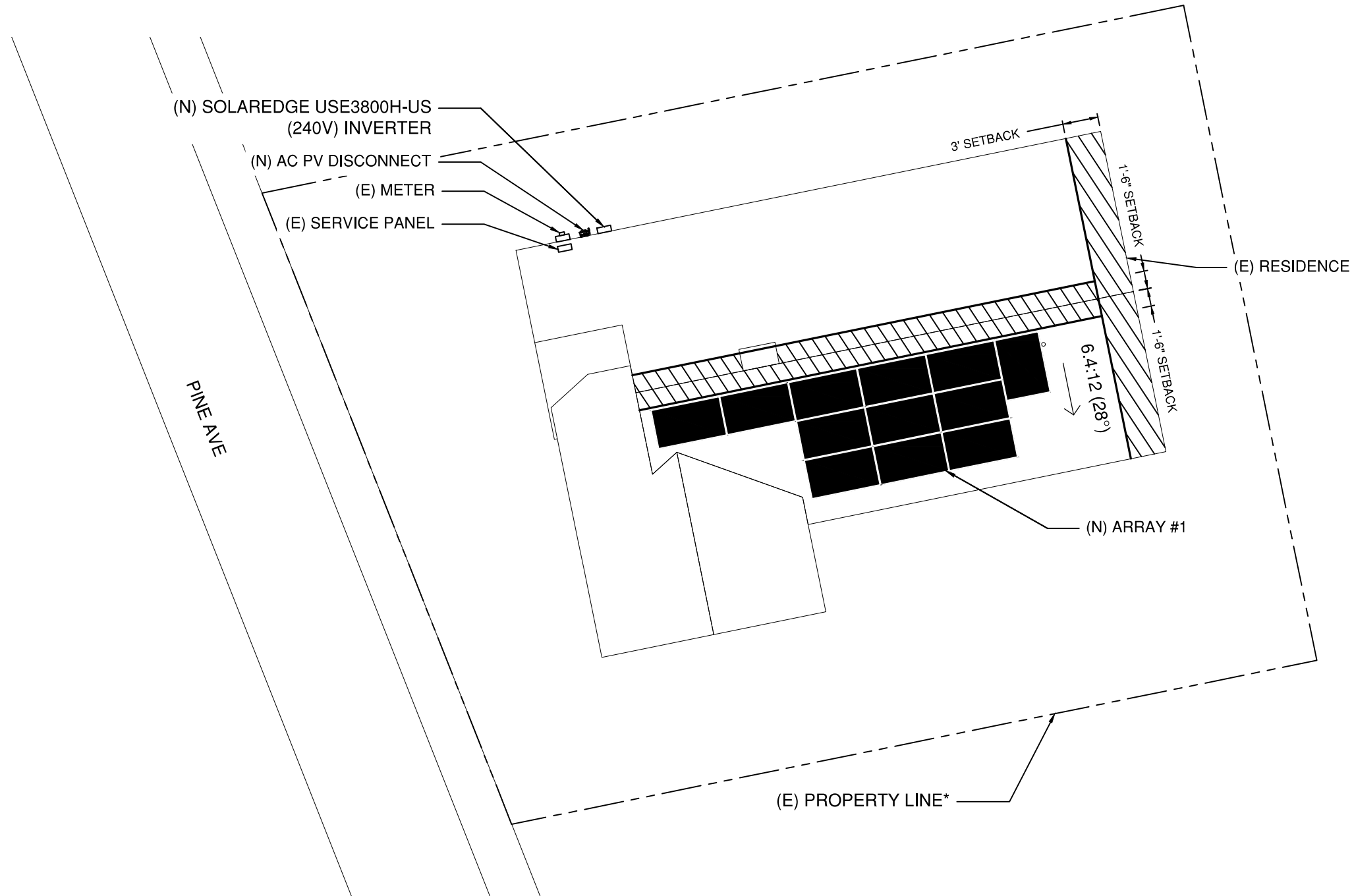
NOTE: *CHECK WITH CITY/COUNTY OR LAND SURVEYOR FOR ACCURATE PROPERTY LOCATE.

NOTE: HEIGHT FROM ROOF TO TOP OF PANEL IS 0'-7".

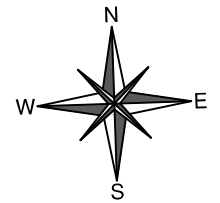
LEGEND:

(E) = EXISTING

(N) = NEW

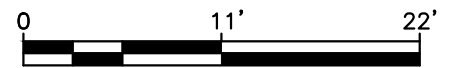


OFFICIAL USE



SITE PLAN

SCALE: 3/32" = 1'-0"



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by Arash

Zandieh

Date:

2026.01.19

08:09:26 -08'00'

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
 LICENSE NUMBER: 53954
 EXPIRATION DATE: 02/14/2027

CONTRACTOR
 ROI CONSTRUCTION
 8378 VETERANS HWY
 MILLERSVILLE MD 21108
 Ph: (202) 694-9890
 Contractor# 420219000135



EVANS, JUSTIN RESIDENCE

RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION
 30 PINE AVE, TAKOMA PARK, MD 20912
 PH: (717) 798-6607
 PEPSCO: 5504 0521 415

SITE PLAN

System AC Size @ STC: 3.8 kW System DC Size @ STC: 5.34 kW
 (12) CANADIAN SOLAR INC. CS6.1-54TM-445H SOLAR MODULES
 (1) SOLAREEDGE USE3800H-US (240V) INVERTER RGM CERTIFIED

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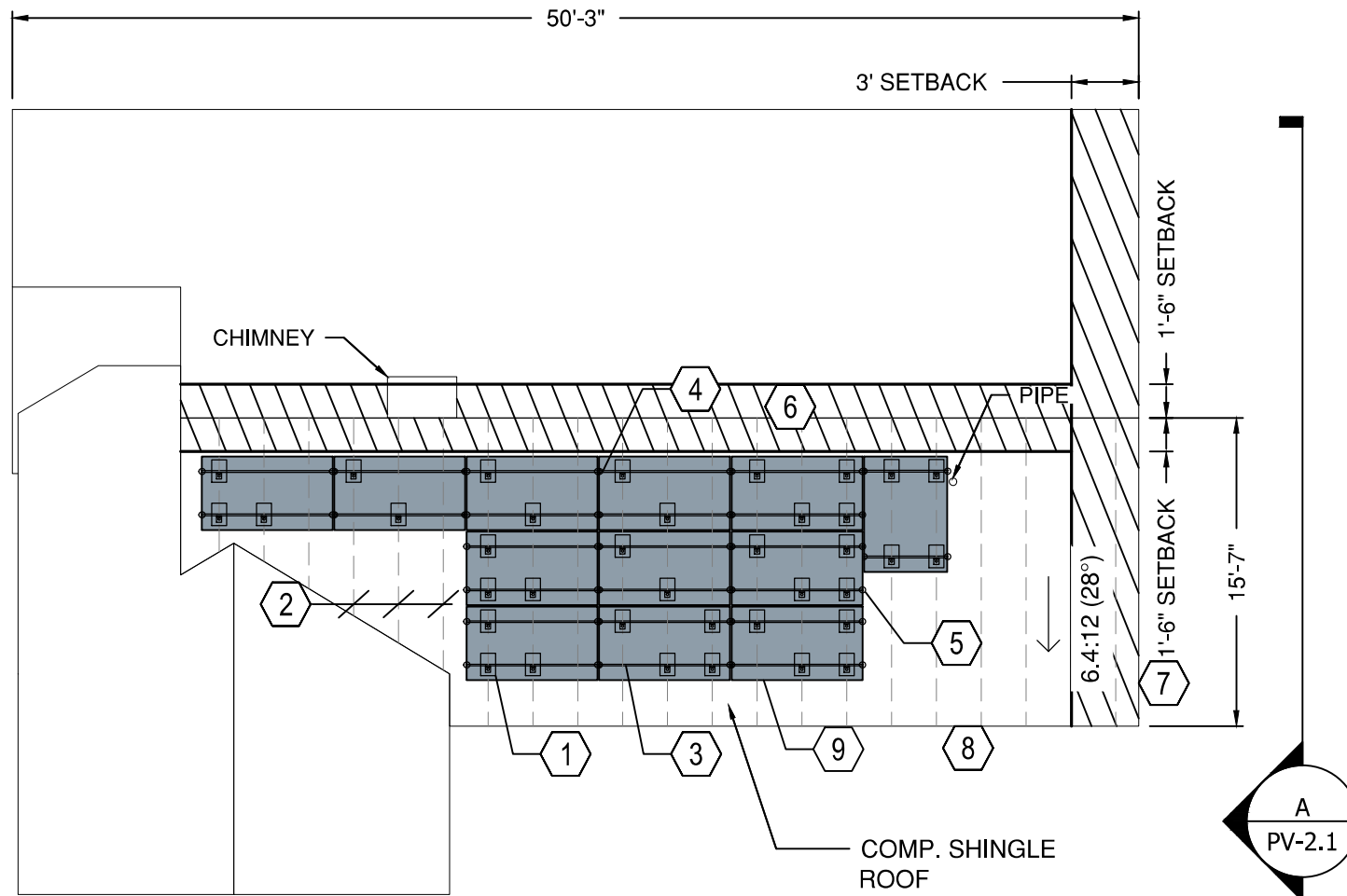
PV-1

KEYED NOTES:

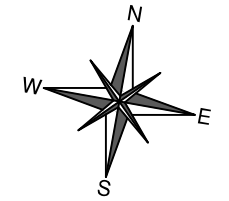
- ① IRONRIDGE HUG L, TYP. OF 37
- ② 2X6 RAFTERS @ 24" O.C. TYP.
- ③ IRONRIDGE XR10 RAIL, TYP.
- ④ IRONRIDGE MID CLAMP, TYP. OF 18
- ⑤ IRONRIDGE END CLAMP, TYP. OF 16
- ⑥ RIDGE
- ⑦ RAKE
- ⑧ EAVE
- ⑨ PV MODULE WITH FIRE SAFETY CLASS A ACCORDING TO UL1703 AND TABLE 1505.1

GENERAL NOTES:

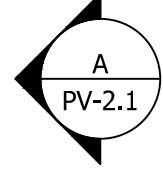
- A. RAFTERS LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS MAY DIFFER AND CONTRACTOR MAY NEED TO ADJUST MOUNT LOCATIONS. IN NO CASE SHALL THE MOUNT SPACING EXCEED OF 48", MAX. CANTILEVER IS 1/2 MOUNT SPACING OR 24". TYPICAL MOUNT SPACING OF 4' FOR MODULES IN PORTRAIT POSITION AND 6' FOR MODULES IN LANDSCAPE POSITION.
- B. THE MEMBRANE COVERING THE ROOF HAS A MINIMUM FIRE CLASS C RATING.
- C. THE ATTACHMENT ASSEMBLIES INSTALLED FIREPLACE RATING IS A MINIMUM OF C.
- D. HEIGHT FROM ROOF TO TOP OF PANEL IS 0'-7".
- E. FOR STRUCTURAL DETAILS REFER TO THE STRUCTURAL CALCULATION BY THE EOR.



OFFICIAL USE

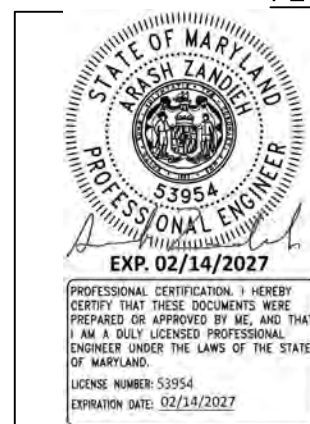


ROOF LAYOUT
SCALE: 1/8" = 1'-0"



NOTE TO INSTALL: ADD (N) RAFTER SISTERING WHERE THE MAX UNSUPPORTED SPAN FOR 2x6 RAFTERS EXCEEDS 11 FT UNDER THE ARRAY - SEE STRUCTURAL CALCS FOR DETAILS

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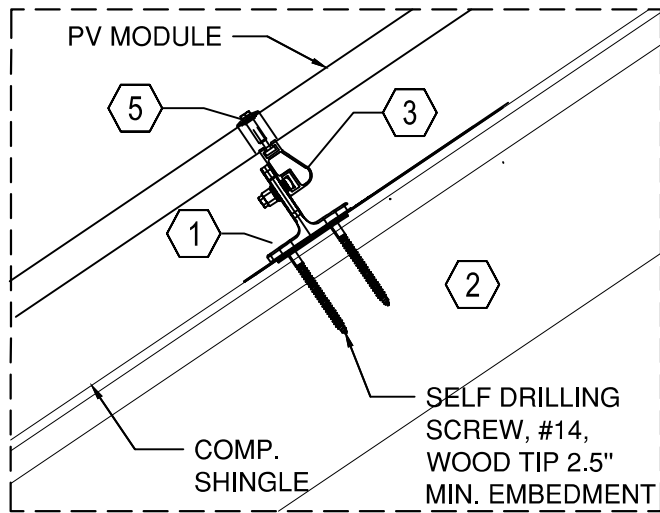
ROOF PROPERTIES		MODULE MECHANICAL PROPERTIES	
ROOF MATERIAL	COMP. SHINGLE	MODEL	CANADIAN SOLAR INC. CS6.1-54TM-445H
ROOF SLOPE	6.4:12 (28°)	DIMENSIONS	(L) 70.9" X (W) 44.6" X (H) 1.38"
MEAN ROOF HEIGHT	~20 FT	WEIGHT	50.7 LB
DECK SHEATING	7/16" OR THICKER OSB OR PLYWOOD		
CONSTRUCTION	RAFTERS 2X6 @ 24" O.C.		

CONTRACTOR
ROI CONSTRUCTION
8378 VETERANS HWY
MILLERSVILLE MD 21108
Ph: (202) 694-9890
Contractor# 420219000135



EVANS, JUSTIN RESIDENCE
RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION
30 PINE AVE, TAKOMA PARK, MD 20912
PH: (717) 798-6607
PEPCO: 5504 0521 415

ROOF LAYOUT		Page:
System AC Size @ STC: 3.8 kW	System DC Size @ STC: 5.34 kW	PV-2
(12) CANADIAN SOLAR INC. CS6.1-54TM-445H SOLAR MODULES	(1) SOLAREEDGE USE3800H-US (240V) INVERTER RGM CERTIFIED	
Drawn by: LM	Rev: PERMIT SET	Date: 01/14/2026



B MOUNTING DETAIL
PV-2.1 Scale: NTS

GENERAL NOTES:

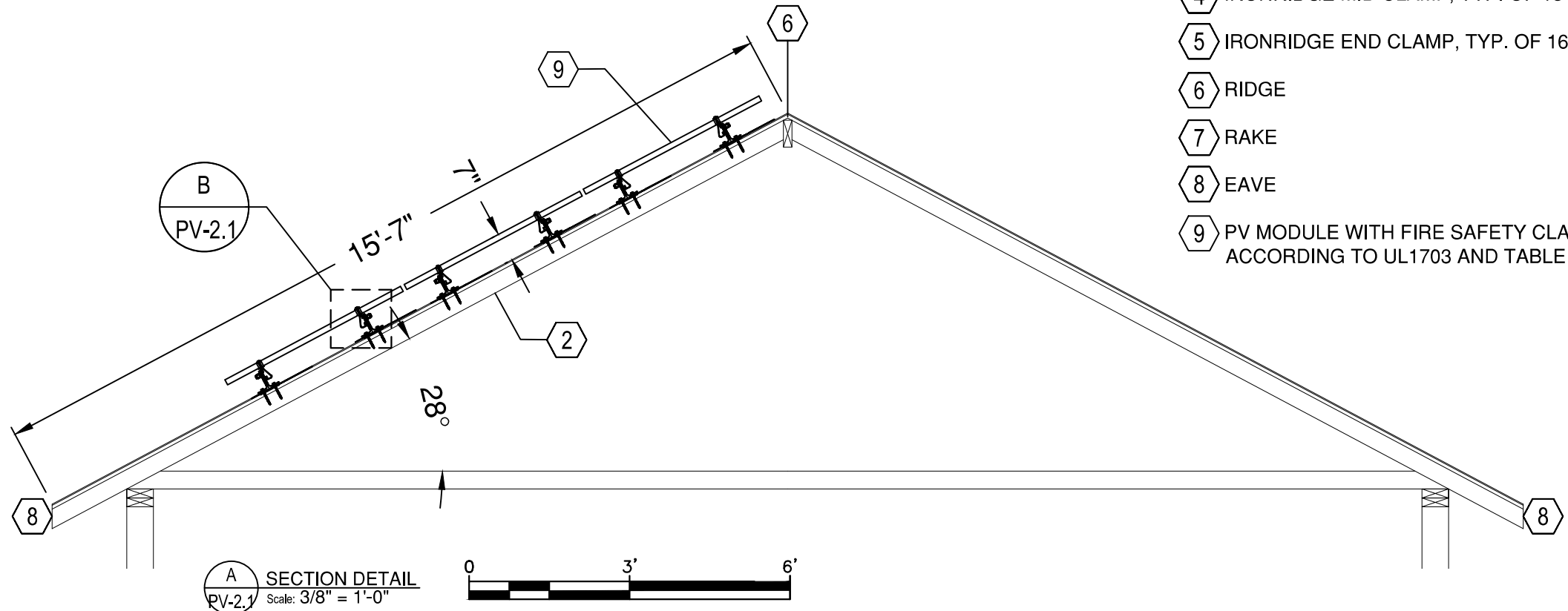
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- D. HEIGHT FROM ROOF TO TOP OF PANEL IS 0'-7".
- E. FOR STRUCTURAL DETAILS REFER TO THE STRUCTURAL CALCULATION BY THE EOR.

KEYED NOTES:

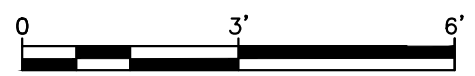
- 1 IRONRIDGE HUG L, TYP. OF 37
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- 6 RIDGE
- 7 RAKE
- 8 EAVE
- 9 PV MODULE WITH FIRE SAFETY CLASS A ACCORDING TO UL1703 AND TABLE 1505.1

NOTE TO INSTALL: ADD (N) RAFTER SISTERING WHERE THE MAX UNSUPPORTED SPAN FOR 2x6 RAFTERS EXCEEDS 11 FT UNDER THE ARRAY - SEE STRUCTURAL CALCS FOR DETAILS

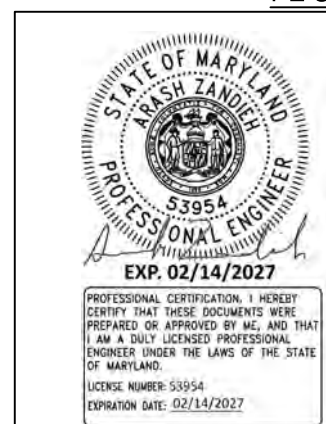
OFFICIAL USE



A SECTION DETAIL
PV-2.1 Scale: 3/8" = 1'-0"



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CONTRACTOR
ROI CONSTRUCTION
8378 VETERANS HWY
MILLERSVILLE MD 21108
Ph: (202) 694-9890
Contractor# 420219000135

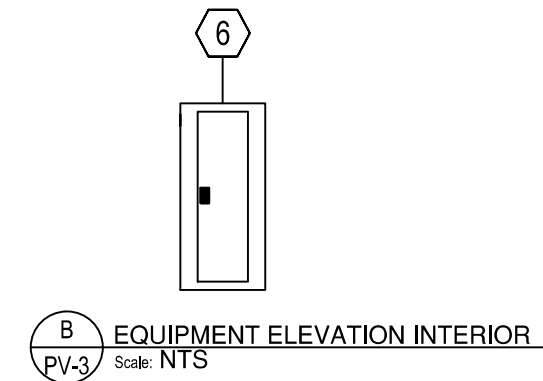
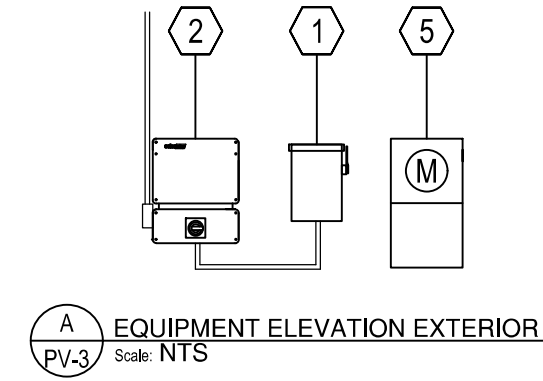
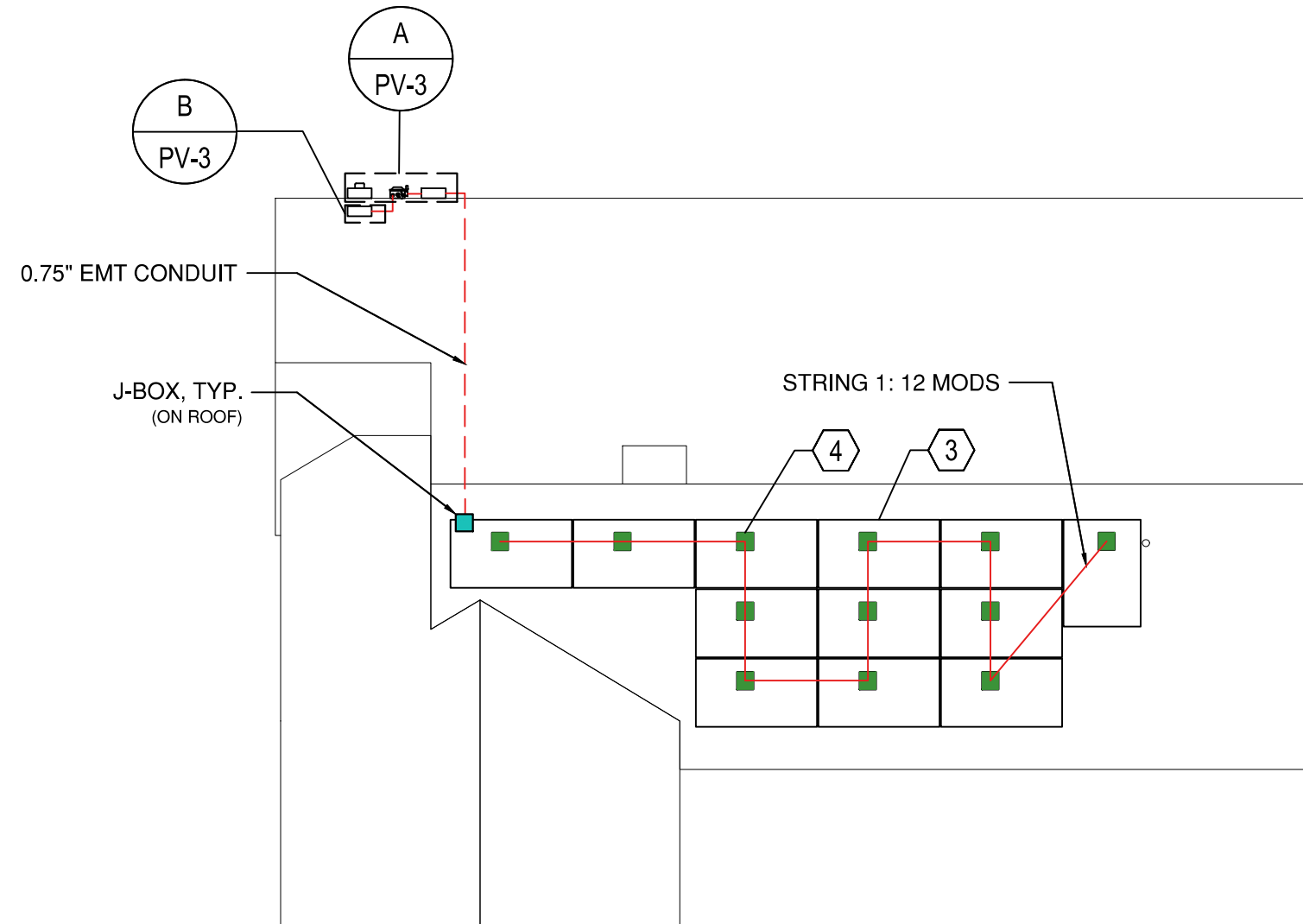


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PEPCO: 5504 0521 415

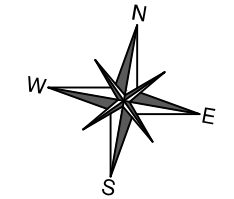
STRUCTURAL DETAILS		Page:
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(12) CANADIAN SOLAR INC. CS6.1-54TM-445H SOLAR MODULES (1) SOLAREEDGE USE3800H-US (240V) INVERTER RGM CERTIFIED		
Drawn by: LM	Rev: PERMIT SET	Date: 01/14/2026

GENERAL NOTES:

A. CONDUIT AND WIRING IS DIAGRAMMATIC. FINAL ROUTING TO BE DETERMINED BY INSTALLER.



OFFICIAL USE



ELECTRICAL PLAN
SCALE: 1/8" = 1'-0"



KEYED NOTES:

- ① (N) AC DISCONNECT
- ② (N) SOLAREEDGE USE3800H-US (240V) INVERTER
- ③ (N) PV MODULE
- ④ (N) U650 POWER OPTIMIZER
- ⑤ (E) METER
- ⑥ (E) SERVICE PANEL

PE STAMP



STAMPED 01/19/2026

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland:
License No. 52692
Expiration Date: 05/24/2026

CONTRACTOR
ROI CONSTRUCTION
8378 VETERANS HWY
MILLERSVILLE MD 21108
Ph: (202) 694-9890
Contractor# 420219000135



EVANS, JUSTIN RESIDENCE
RESIDENTIAL GRID INTERACTIVE SOLAR INSTALLATION
30 PINE AVE, TAKOMA PARK, MD 20912
PH: (717) 798-6607
PEPCO: 5504 0521 415

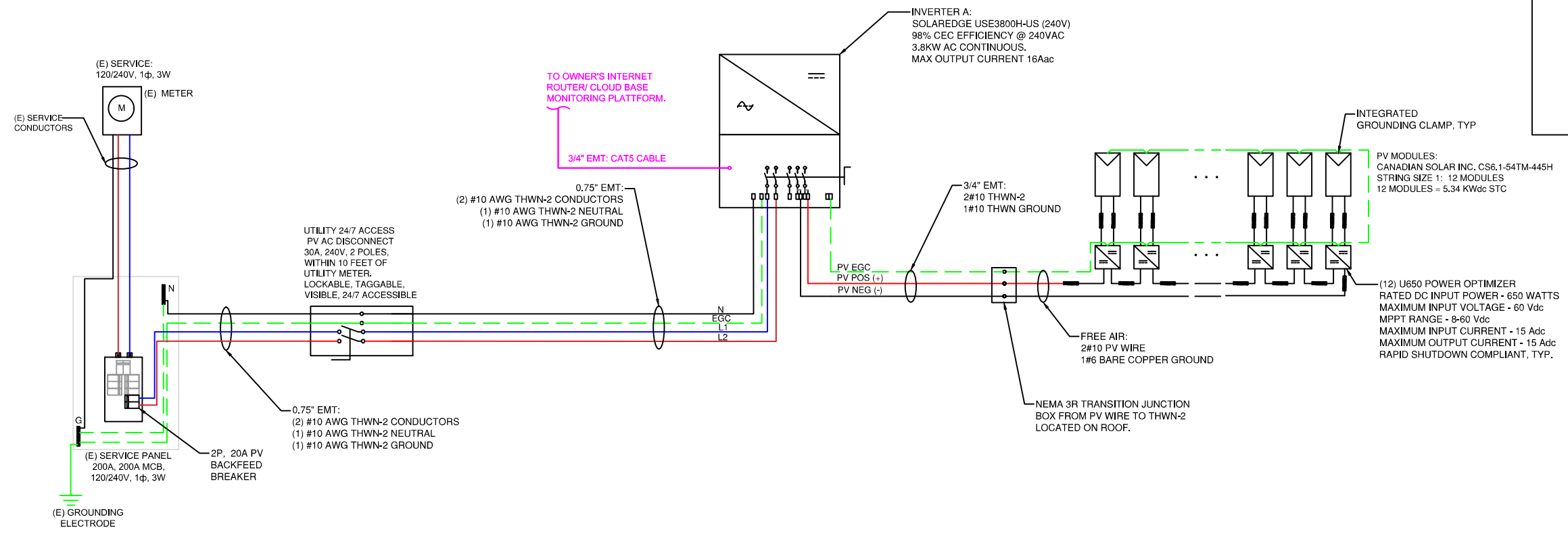
ELECTRICAL PLAN

System AC Size @ STC: 3.8 kW System DC Size @ STC: 5.34 kW
(12) CANADIAN SOLAR INC. CS6.1-54TM-445H SOLAR MODULES
(1) SOLAREEDGE USE3800H-US (240V) INVERTER RGM CERTIFIED

Drawn by: LM Date: 01/14/2026
Rev: PERMIT SET

Page:
PV-3

CONDUCTOR AND CONDUIT SCHEDULE W/ELECTRICAL CALCULATIONS															INVERTER SPECIFICATIONS		OPTIMIZER SPECIFICATIONS		MODULE SPECIFICATIONS		
CIRCUIT	TYPICAL	CONDUCTOR	CONDUIT	CURRENT-CARRYING CONDUCTORS IN CONDUIT	OCPD	EGC	TEMP. CORR. FACTOR	CONDUIT FILL FACTOR	CONT. CURRENT	MAX. CURRENT	BASE AMP.	DERATED AMP.	TERM. TEMP. RATING	LENGTH	VOLTAGE DROP	MAKE AND MODEL	SOLAREEDGE USE3800H-US (240V)	MAKE AND MODEL	U650	MAKE AND MODEL	CANADIAN SOLAR INC. CS6.1-54TM-445H
PV STRING TO J-BOX	1	10 AWG PV WIRE, CU	FREE AIR	2	N/A	6 AWG BARE, COPPER	0.87 (40.9°C)	1	15A	15A	35A	30.45A	75°C	45FT	0.50%	POWER STC	3.8KW	POWER STC	650W	POWER STC	445W
J-BOX TO INVERTER	1	10 AWG THWN-2, CU	0.75" DIA. EMT	2	N/A	10 AWG THWN-2, CU	0.87 (40.9°C)	1	15A	15A	35A	30.45A	75°C	30FT	0.33%	Max. Output AC Current	16A	Max. Input Voltage	60V, 42.31 @ LOW TEMP.	Imp	13.59A
INVERTER TO AC DISCONNECT	1	10 AWG THWN-2, CU	0.75" DIA. EMT	2	20A	10 AWG THWN-2, CU	0.91 (36°C)	1	16A	20A	35A	31.85A	75°C	10FT	0.17%	AC Operating Voltage	240V	MPPT Voltage Range	8-60V	Vmp	32.8V
AC DISCONNECT TO SERVICE PANEL	1	10 AWG THWN-2, CU	0.75" DIA. EMT	2	20A	10 AWG THWN-2, CU	0.91 (36°C)	1	16A	20A	35A	31.85A	75°C	10FT	0.17%	Max. MPP Voltage	350V	Max. Input Current	15A	Voc	38.7V 42.31 @ LOW TEMP.
																Max. System Voltage	500V	Max. Output Current	15A	Isc	14.48A
																MAX. DC VOLTAGE DROP: 0.83%, MAX. AC VOLTAGE DROP: 0.34%					
																*MAX OPTIMIZER OUTPUT CURRENT LIMITED TO:		15 AMPS			

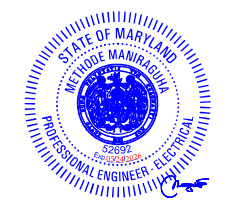


OFFICIAL USE

ELECTRICAL NOTES:

1. THE SYSTEM IS EQUIPPED WITH A RAPID SHUTDOWN FEATURE WHICH CONFORMS TO NEC 690.12 , WHICH REQUIRES THAT A RAPID SHUTDOWN FEATURE EXISTS TO DE-ENERGIZE PV SOURCE CIRCUITS FROM ALL SOURCES TO LESS THAN 30 VOLTS WITHIN 10 SECONDS.
2. MAX DC VOLTAGE OF THE PV MODULE IS EXPECTED TO BE 42.31V AT -12.3°C (-12.3°C - 25°C) X -0.25%/V/C + 38.7V = 42.31V) WHICH IS LESS THAN U650 POWER OPTIMIZER MAX INPUT VOLTAGE OF 60V.
3. PER MANUFACTURERS RECOMMENDATIONS FOR SINGLE-PHASE 3-7.6KW INVERTERS, USE ONLY COPPER CONDUCTORS RATED FOR A MINIMUM OF 75°C/ 167°F.
4. 200A X 1.2 = 240A (120% BUS RATING). 240A - 200A (MCB RATING)= 40A MAX. PV BREAKER.
5. THIS INVERTER IS A REVENUE GRADE METER RGM CERTIFIED PERSUANT TO ANSI C 12.3.
6. SMART INVERTER UL-1741-SB AND IEEE 1547-2018 COMPLIANT.
7. INVERTER COMPLAINT WITH CAL. RULE 21 SMART INVERTER SETTINGS.

PE STAMP



STAMPED 01/19/2026

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 PEPCO: 5504 0521 415

SINGLE LINE DIAGRAM

System AC Size @ STC: 3.8 kW	System DC Size @ STC: 5.34 kW	Page:
(12) CANADIAN SOLAR INC. CS6.1-54TM-445H SOLAR MODULES		PV-4
(1) SOLAREEDGE USE3800H-US (240V) INVERTER RGM CERTIFIED		
Drawn by: LM	Date: 01/14/2026	Rev: PERMIT SET

MAIN SERVICE PANEL

⚠ DANGER
ARC FLASH AND SHOCK HAZARD
 FOLLOW ALL REQUIREMENT IN NFPA 70E FOR SAFE WORK PRACTICES AND FOR PERSONAL PROTECTIVE EQUIPMENT

ON PANEL COVER

⚠ WARNING
 DUAL POWER SUPPLY
 SOURCES: UTILITY GRID, AND PV SOLAR ELECTRIC SYSTEM

⚠ WARNING
 TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

NEXT TO THE MAIN CIRCUIT BREAKER

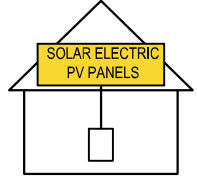
PV SOLAR BREAKER
 DO NOT RELOCATE THIS OVERCURRENT DEVICE

NEXT TO PV BREAKER FOR LOAD SIDE CONNECTIONS ONLY

STRING INVERTER

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY



LABEL 6: FOR PV SYSTEMS THAT SHUT DOWN THE ARRAY AND THE CONDUCTORS LEAVING THE ARRAY.

THE LABEL SHALL UTILIZE CAPITALIZED CHARACTERS WITH A MINIMUM HEIGHT OF 3/8" IN BLACK ON YELLOW BACKGROUND, AND THE REMAINING CHARACTERS SHALL BE CAPITALIZED WITH A MINIMUM HEIGHT OF 3/16" IN BLACK ON WHITE BACKGROUND.

DIRECT CURRENT PHOTOVOLTAIC POWER SOURCE

MAXIMUM VOLTAGE 500 VDC
 MAX CIRCUIT CURRENT 13 AMPS

NEXT TO DC DISCONNECT

AC DISCONNECT

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

PHOTOVOLTAIC SYSTEM AC DISCONNECT

⚠ WARNING

DUAL POWER SUPPLY
 SOURCES: UTILITY GRID AND PV SOLAR ELECTRIC SYSTEM

ELECTRIC SHOCK HAZARD
 DO NOT TOUCH TERMINALS. TERMINALS ON BOTH SIDE THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

OPERATING VOLTAGE 240 VOLTS
 OPERATING CURRENT 16 AMPS

OFFICIAL USE

JUNCTION OR PULL BOXES

DC JUNCTION BOX

⚠ WARNING

ELECTRIC SHOCK HAZARD
 THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

PHOTOVOLTAIC POWER SOURCE

2-3/4" X 2-1/4"
 DC JUNCTION BOXES (STRING INVERTERS) ONLY

UTILITY METER

⚠ WARNING
 THIS SERVICE METER IS ALSO SERVED BY A PHOTOVOLTAIC SYSTEM

EXTERIOR CONDUITS

CAUTION SOLAR CIRCUIT

PE STAMP



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LABELS

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 (12) CANADIAN SOLAR INC. CS6.1-54TM-445H SOLAR MODULES
 (1) SOLAREEDGE USE3800H-US (240V) INVERTER RGM CERTIFIED

Drawn by:
 LM

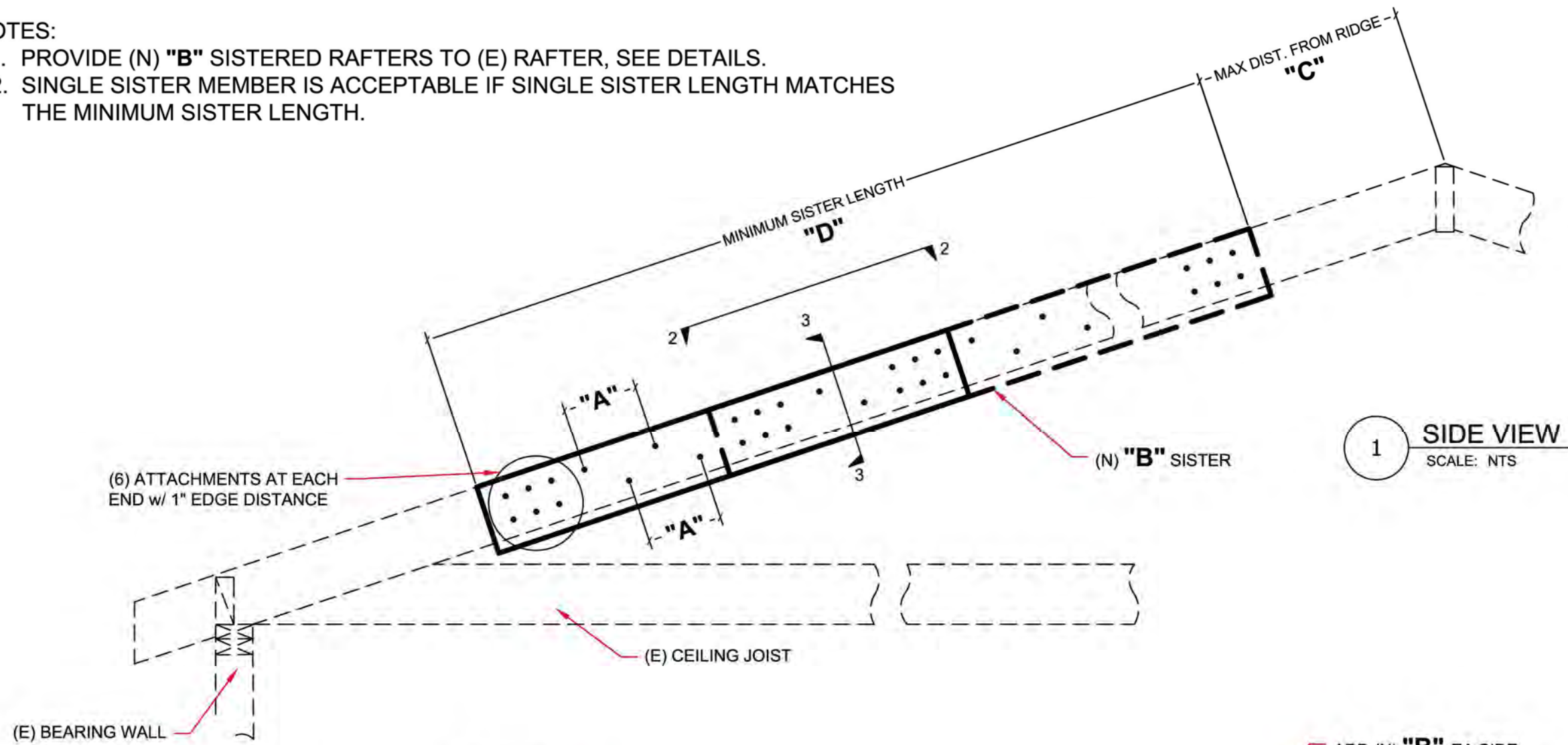
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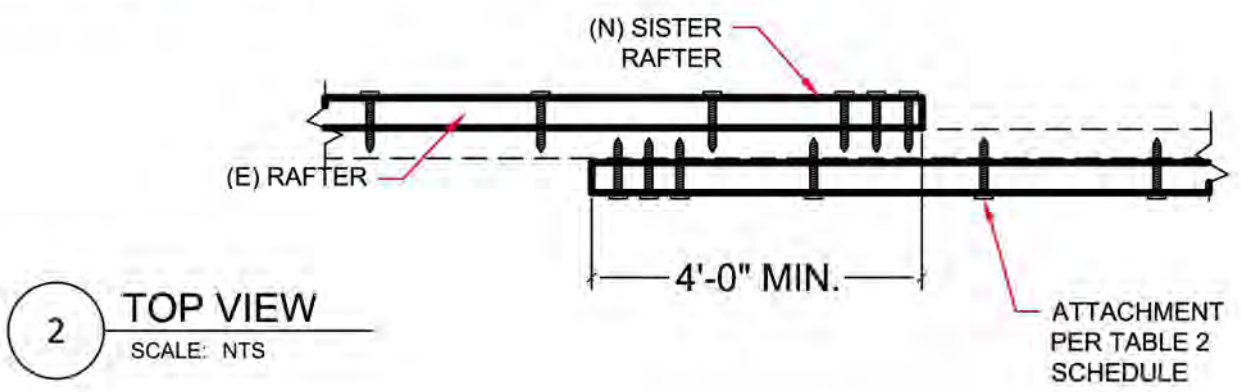
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PV-5

NOTES:

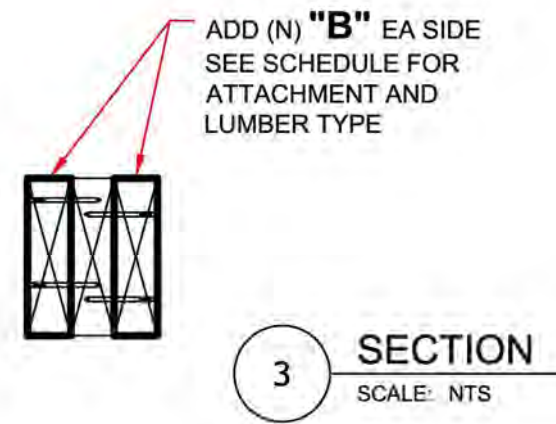
1. PROVIDE (N) "B" SISTERED RAFTERS TO (E) RAFTER, SEE DETAILS.
2. SINGLE SISTER MEMBER IS ACCEPTABLE IF SINGLE SISTER LENGTH MATCHES THE MINIMUM SISTER LENGTH.



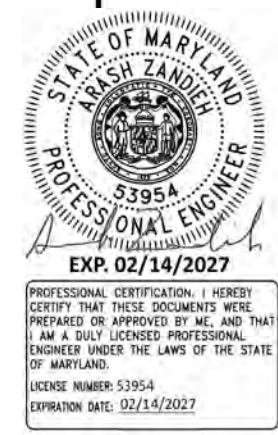
1 SIDE VIEW
SCALE: NTS



2 TOP VIEW
SCALE: NTS



3 SECTION
SCALE: NTS



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Date: 2026.01.19 08:10:20 -08'00'

SISTERING DETAILS
SCALE: NTS

LUMBER SPECIES & GRADE	MIN. BENDING Fb (psi)
DOUG FIR-LARCH #2	900
SOUTHERN PINE #1	1000
HEM-FIR #2	850
SPRUCE PINE FIR #2	875

OPTION	TYPE	FIELD SPACING "A"
1	SIMPSON SDWS TIMBER SCREW	12" OC
2	COMMON 10d	6" OC

CALLOUT	VARIABLE
RAFTER SIZE "B"	2x6
MAX. DIST. FROM RIDGE "C"	1'-0"
MIN. SISTER LENGTH "D"	full length-2



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Shade Report - 30 Pine Ave, Takoma Park, MD 20912, USA

Customer
Justin Evans

Designer
Carlos Bustos

Organization
ROI Construction

Address
30 Pine Ave, Takoma Park, MD 20912,
USA

Coordinates
38.9736034, -77.0085703

Date
Jan 19, 2026

Annual irradiance



Summary

Array ID	Panel count	Azimuth	Pitch	Annual TOF	Annual solar access	Annual TSRF
1	12	169°	28°	99%	70%	70%
Weighted average by panel count:					70%	70%

Monthly solar access % across arrays

Array ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	33	54	73	80	84	86	87	82	76	64	39	23

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Date
Jan 19, 2026

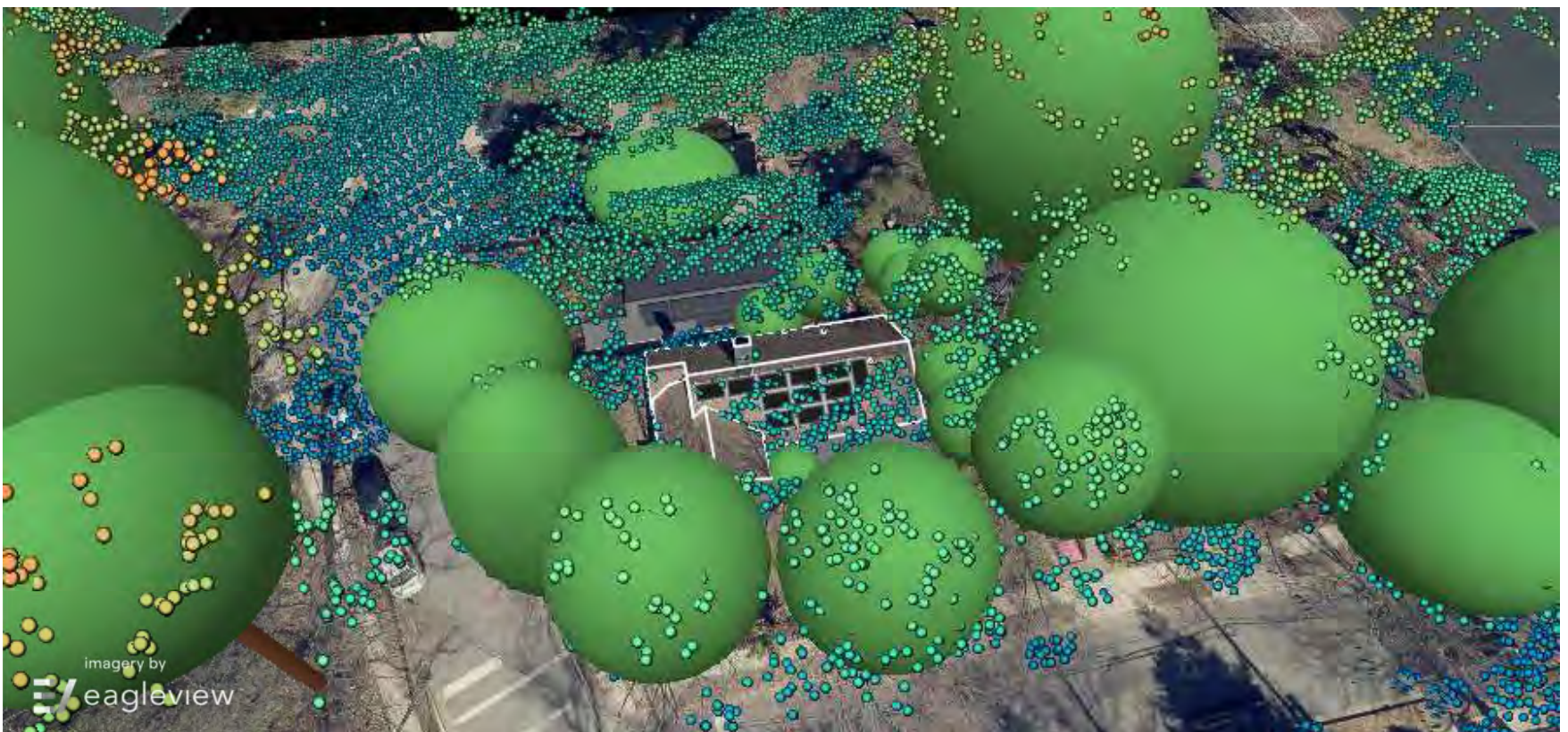
Zoomed out satellite view



3D model



3D model with LIDAR overlay



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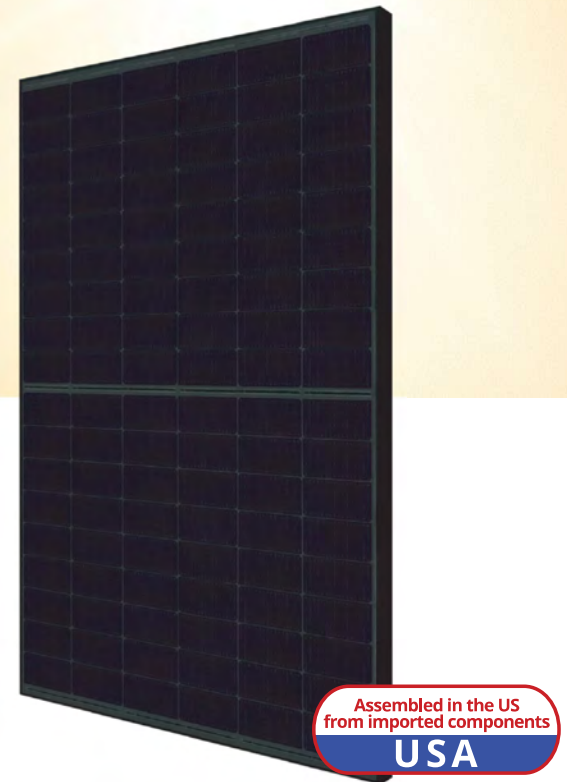
Coordinates
38.9736034, -77.0085703

Date
Jan 19, 2026

Street view with corresponding 3D model



I, **Carlos Bustos**, certify that I have generated this shading report to the best of my abilities, and I believe its contents to be accurate.



TOPHiKu6 (All-Black)

N-type TOPCon Technology

445 W ~ 470 W

CS6.1-54TM-445 | 450 | 455 | 460 | 465 | 470H

MORE POWER



Module power up to 470 W
Module efficiency up to 23.0 %



Excellent anti-LeTID & anti-PID performance.
Low power degradation, high energy yield



Lower temperature coefficient (Pmax): -0.29%/°C,
increases energy yield in hot climate



Lower LCOE & system cost

MORE RELIABLE



Minimizes micro-crack impacts



Heavy snow load up to 8100 Pa,
wind load up to 6000 Pa*



Industry Leading Product Warranty on Materials and Workmanship*



Linear Power Performance Warranty*

1st year power degradation no more than 1%
Subsequent annual power degradation no more than 0.4%

*Subject to the terms and conditions contained in the applicable Canadian Solar Limited Warranty Statement. Also this 25-year limited product warranty is available only for products installed and operating on rooftops in certain regions.

MANAGEMENT SYSTEM CERTIFICATES*

ISO 9001:2015 / Quality management system
ISO 14001:2015 / Standards for environmental management system
ISO 45001: 2018 / International standards for occupational health & safety
IEC62941: 2019 / Photovoltaic module manufacturing quality system

PRODUCT CERTIFICATES*

IEC 61215 / IEC 61730
IEC 61701 / IEC 62716 / IEC 60068-2-68
Take-e-way



* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates available for your Product and applicable in the regions in which the products will be used.

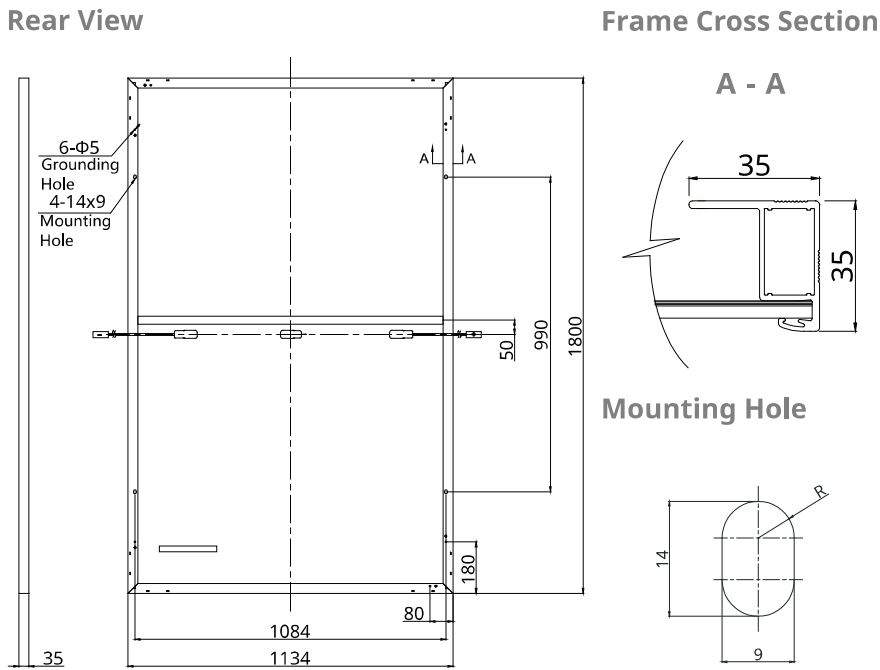
CSI Solar Co., Ltd. is committed to providing high quality solar photovoltaic modules, solar energy and battery storage solutions to customers. The company was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey. Over the past 22 years, it has successfully delivered over 100 GW of premium-quality solar modules across the world.

* For detailed information, please refer to the Installation Manual.

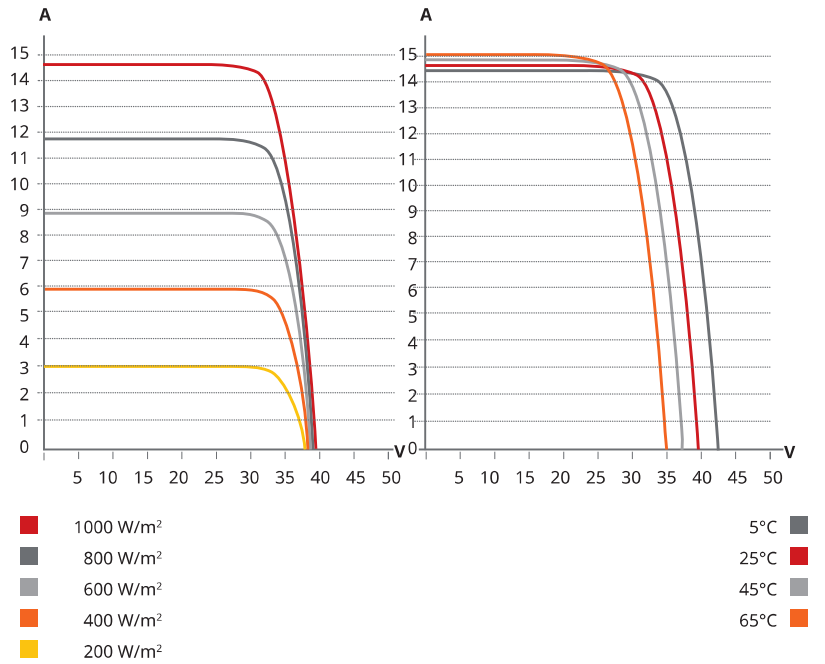
Canadian Solar (USA) Inc.

1350 Treat Blvd. Suite 500, Walnut Creek, CA 94597 | www.csisolar.com/na | service.ca@csisolar.com

ENGINEERING DRAWING (mm)



CS6.1-54TM-455H / I-V CURVES



ELECTRICAL DATA | STC*

CS6.1-54TM	445H	450H	455H	460H	465H	470H
Nominal Max. Power (Pmax)	445 W	450 W	455 W	460 W	465 W	470 W
Opt. Operating Voltage (Vmp)	32.8 V	33.0 V	33.2 V	33.4 V	33.6 V	33.8 V
Opt. Operating Current (Imp)	13.59 A	13.66 A	13.72 A	13.78 A	13.85 A	13.91 A
Open Circuit Voltage (Voc)	38.7 V	38.9 V	39.1 V	39.3 V	39.5 V	39.7 V
Short Circuit Current (Isc)	14.48 A	14.55 A	14.61 A	14.69 A	14.77 A	14.86 A
Module Efficiency	21.8%	22.0%	22.3%	22.5%	22.8%	23.0%
Operating Temperature	-40°C ~ +85°C					
Max. System Voltage	1500V (IEC/UL) or 1000V (IEC/UL)					
Module Fire Performance	TYPE 1 (UL 61730 1500V) or TYPE 2 (UL 61730 1000V) or CLASS C (IEC 61730)					
Max. Series Fuse Rating	25 A					
Application Classification	Class A					
Power Tolerance	0 ~ + 10 W					

* Under Standard Test Conditions (STC) of irradiance of 1000 W/m², spectrum AM 1.5 and cell temperature of 25°C.

MECHANICAL DATA

Specification	Data
Cell Type	TOPCon cells
Cell Arrangement	108 [2 X (9 X 6)]
Dimensions	1800 × 1134 × 35 mm (70.9 × 44.6 × 1.38 in)
Weight	23 kg (50.7 lbs)
Front Cover	3.2 mm tempered glass with anti-reflective coating
Frame	Anodized aluminium alloy
J-Box	IP68, 3 bypass diodes
Cable	4 mm ² (IEC), 12 AWG (UL)
Connector	T6, MC4, MC4-EVO2 or MC4- EVO2A
Cable Length	1550 mm (61.0 in) (+) / 1100 mm (43.3 in) (-)
Per Pallet	30 pieces
Per Container (40' HQ)	720 pieces

ELECTRICAL DATA | NMOT*

CS6.1-54TM	445H	450H	455H	460H	465H	470H
Nominal Max. Power (Pmax)	335 W	339 W	343 W	347 W	351 W	354 W
Opt. Operating Voltage (Vmp)	30.9 V	31.1 V	31.3 V	31.5 V	31.7 V	31.9 V
Opt. Operating Current (Imp)	10.85 A	10.91 A	10.96 A	11.02 A	11.07 A	11.12 A
Open Circuit Voltage (Voc)	36.5 V	36.7 V	36.9 V	37.1 V	37.3 V	37.5 V
Short Circuit Current (Isc)	11.68 A	11.74 A	11.79 A	11.85 A	11.92 A	11.99 A

* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m², spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.29 % / °C
Temperature Coefficient (Voc)	-0.25 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	42 ± 3°C

PARTNER SECTION



* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. CSI Solar Co., Ltd. reserves the right to make necessary adjustment to the information described herein at any time without further notice. Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

Residential Power Optimizer

USA Domestic Content Eligible*

For North America

U650



POWER OPTIMIZER



SolarEdge's USA-manufactured residential offering for PV power optimization at the module level

- Eligible for domestic content: SolarEdge USA-manufactured Power Optimizers*, when paired with certain SolarEdge inverters, are intended to be eligible for the enhanced federal income tax credit for domestic content
- Specifically designed to work with SolarEdge residential inverters
- Superior efficiency (99.5%)
- Mitigates diverse types of module mismatch loss, from manufacturing tolerance to partial shading
- Faster installations with simplified wire management and easy assembly using a single bolt
- Flexible system design for maximum space utilization
- Compatible with a wide range of modules, including high-powered and bifacial PV modules
- Advanced safety:
 - Patented Sense Connect technology, designed to automatically detect and prevent potential electric arcs at the connector level before an arc is created
 - Patented SafeDC™ – module-level voltage shutdown, for installer and firefighter safety
 - Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)

* Manufactured by SolarEdge with the intent to be eligible for inclusion under the elective safe harbor in calculating the Domestic Content Percentage under the "Rooftop (MLPE)" category (under IRS Notice 2024-41). The PCBA, Electrical Parts, Enclosure and Production are domestically manufactured to meet the requirements of eligibility to be considered for the ITC domestic content bonus adder. SolarEdge does not provide tax and/or legal advice. You should consult with your own legal and/or tax advisor(s) regarding the eligibility of your project for the ITC or PTC, including the 10% domestic content bonus, to determine how the applicable rules apply to your particular project. The forward-looking statements in this datasheet are accurate as of the date herein and are subject to change. For more information, please contact your local SolarEdge sales representative.

/ Residential Power Optimizer

USA Domestic Content Eligible for North America

U650

	U650	Units
INPUT		
Rated Input DC Power ⁽¹⁾	650	W
Absolute Maximum Input Voltage (Voc)	60	Vdc
MPPT Operating Range	8 – 60	Vdc
Maximum Input Current (Maximum Isc of Connected PV Module)	15	Adc
Maximum Input Short Circuit Current ⁽²⁾	18.75	Adc
Maximum Efficiency	99.5	%
Weighted Efficiency	98.6	%
Overvoltage Category	II	
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)		
Maximum Output Current	15	Adc
Maximum Output Voltage	60	Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR INVERTER OFF)		
Safety Output Voltage per Power Optimizer	1 ± 0.1	Vdc
STANDARD COMPLIANCE		
Photovoltaic Rapid Shutdown System	CSA C22.2#330; NEC 2014 – 2023	
EMC	FCC Part 15 Class B; IEC 61000-6-2; IEC 61000-6-3	
Safety	CSA C22.2#107.1; IEC 62109-1 (Class II safety); UL 1741	
Material	UL 94 V-0, UV Resistant	
RoHS	Yes	
Fire Safety	VDE-AR-E 2100-712:2013-05	
INSTALLATION SPECIFICATIONS		
Maximum Allowed System Voltage	1000	Vdc
Dimensions (W x L x H)	129 x 155 x 30 / 5.07 x 6.10 x 1.18	mm / in
Weight	720 / 1.6	gr / lb
Input Connector	MC4	
Input Wire Length	0.1 / 0.32	m / ft
Output Connector	MC4	
Output Wire Length	(+) 2.3, (-) 0.10 / (+) 7.54, (-) 0.32	m / ft
Operating Temperature Range ⁽³⁾	-40 to +85	°C
Protection Rating	IP68 / NEMA6P	
Relative Humidity	0 – 100	%

- (1) The Rated Power of the module at STC will not exceed the power optimizer's Rated Input DC Power. Modules with up to +5% power tolerance are allowed.
(2) The Maximum Input Short Circuit Current is adjusted for worst case conditions of ambient temperature, irradiance, bifacial gain, and so on, in accordance with NEC and CSA.
(3) Power derating is applied for ambient temperatures above +85°C / +185°F. Refer to the [Power Optimizers Temperature Derating](#) technical note for details.

PV System Design Using a SolarEdge Inverter ⁽⁴⁾		SolarEdge Home Wave / Hub Single Phase	Three Phase for 208V Grid	Three Phase for 277/480V Grid	Units
Minimum String Length (Power Optimizers)		8	10	18	
Maximum String Length (Power Optimizers)		25		50 ⁽⁵⁾	
Maximum Usable Power Delivered per String		5700	6000	12,750	W
Maximum Allowed Connected Power per String ⁽⁶⁾⁽⁷⁾	Inverters with Rated AC Power ≤ 5700W	Per the inverter's maximum input DC power ⁽⁸⁾		15,000	W
	Inverters with Rated AC Power of 6000W	5700			
	Inverters with Rated AC Power ≥ 7600W	6800, only when connected to at least two strings			
Parallel Strings of Different Lengths or Orientations		Yes			

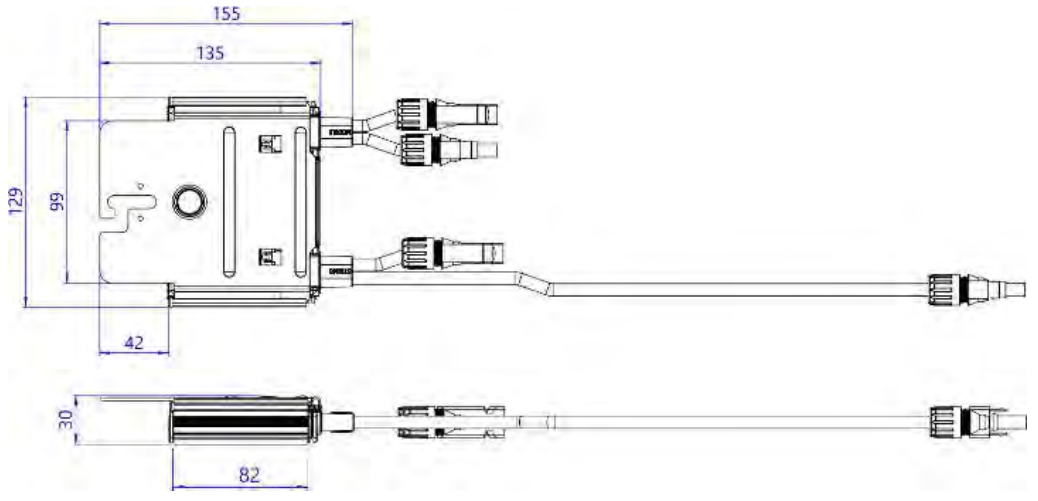
- (4) It is not allowed to mix S-series and P-series Power Optimizers in new installations in the same string.
(5) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement.
(6) For the 208V grid, the maximum is permitted only when the difference in connected power between strings is 1,000W or less.
(7) For the 240V or 277/480V grids, the maximum is permitted only when the difference in connected power between strings 2,000W or less.
(8) Refer to the [Single String Design Guidelines](#) application note for more details.

/ Residential Power Optimizer

USA Domestic Content Eligible for North America

U650

U650 (Flat Bracket)



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.

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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.



solaredge

SolarEdge Home Hub Inverter USA Domestic Content Eligible* Single Phase, for North America

SE3800H-US / SE5700H-US / SE7600H-US / SE10000H-US /
SE11400H-US



SolarEdge's USA-manufactured residential single phase inverter offering for storage and backup applications

- / Eligible for domestic content: SolarEdge USA-manufactured inverters*, when paired with certain SolarEdge power optimizers, are intended to be eligible for the enhanced federal income tax credit for domestic content
- / The ultimate home energy manager in charge of PV production, battery storage, backup operation during a power outage**, EV Charging, and smart energy devices
- / Record-breaking 99% weighted efficiency with up to 200% DC oversizing
- / Able to start high LRA HVAC systems during backup operation
- / Integrates seamlessly with the complete SolarEdge Home Smart Energy Ecosystem, through SolarEdge Home Network
- / Module-level monitoring and visibility of battery status, PV production, and self-consumption data
- / Fast and easy installation – small and lightweight, with reduced commissioning time
- / A scalable solution that supports future homeowner needs through easy connection to a growing ecosystem of products
- / Advanced safety features with integrated arc fault protection and rapid shutdown for 690.11 and 690.12
- / Advanced reliability with automotive-grade components
- / Embedded revenue grade production data, ANSI C12.20 Class 0.5
- / NEMA 4X-rated, for indoor and outdoor installations
- / Embedded Power Control System (PCS) – install larger systems while avoiding main panel upgrade

* Manufactured by SolarEdge with the intent to be eligible for inclusion under the elective safe harbor in calculating the Domestic Content Percentage under the "Rooftop (MLPE)" category (under IRS Notice 2024-41). For inverters with part number USExxxxH-USMNB75, the PCBA, Electrical Parts, and Enclosure are domestically produced and manufactured to meet the requirements of eligibility to be considered for the ITC domestic content bonus adder. For inverters with part number SExxxxH-USMNxBLx5, the PCBA and Enclosure are domestically manufactured to meet the requirements of eligibility to be considered for the ITC domestic content bonus adder. SolarEdge does not provide tax and/or legal advice. You should consult with your own legal and/or tax advisor(s) regarding the eligibility of your project for the ITC or PTC, including the 10% domestic content bonus, to determine how the applicable rules apply to your particular project. The forward-looking statements in this datasheet are accurate as of the date herein and are subject to change. For more information, please contact your local SolarEdge sales representative.

** Requires additional hardware and firmware version upgrade.

/ SolarEdge Home Hub Inverter

USA Domestic Content Eligible

Single Phase, for North America

SE3800H-US / SE5700H-US / SE7600H-US / SE10000H-US / SE11400H-US

Applicable to inverters with part number	SExxxxxH-USMNxBLx5 / USExxxxxH-USMNB75					
Model Number ⁽¹⁾	SE3800H-US	SE5700H-US	SE7600H-US	SE10000H-US	SE11400H-US	
OUTPUT – AC ON GRID						
Maximum AC Power Output	3800 @ 240V 3300 @ 208V	5760 @ 240V 5000 @ 208V	7600 @ 240V	10,000 @ 240V	11,400 @ 240V 10,000 @ 208V	W
AC Output Voltage (Nominal)	208 / 240					Vac
AC Output Voltage (Range)	183 – 264					Vac
AC Frequency Range (min - nom - max)	59.3 – 60 – 60.5 ⁽²⁾					Hz
Maximum Continuous Output Current	16 @ 240V 16 @ 208V	24 @ 240V 24 @ 208V	32 @ 240V	42 @ 240V	47.5 @ 240V 48 @ 208V	A
GFDI Threshold	1					A
Total Harmonic Distortion (THD)	< 3					%
Power Factor	1, adjustable -0.85 to 0.85					
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes					
Charge Battery from AC (if allowed)	Yes					
Typical Nighttime Power Consumption	< 2.5					W
OUTPUT – AC STANDALONE (BACKUP)⁽³⁾						
Rated AC Power in Standalone Operation ⁽⁴⁾	11,400					W
Maximum Continuous Output Current in Standalone Operation	48					A
Locked Rotor Amperage (LRA) ⁽⁵⁾	Up to 106					A
AC L-L Output Voltage Range in Standalone Operation	211 – 264					Vac
AC L-N Output Voltage Range in Standalone Operation	105 – 132					Vac
AC Frequency Range in Standalone Operation (min - nom - max)	55 – 60 – 65					Hz
GFDI	1					A
THD	< 5					%
INPUT – DC (PV AND BATTERY)						
Transformer-less, Ungrounded	Yes					
Maximum Input Voltage	480					Vdc
Nominal DC Input Voltage	380					Vdc
Reverse-Polarity Protection	Yes					
Ground-Fault Isolation Detection	600kΩ Sensitivity					
Maximum Input Short Circuit Current	45					Adc
Maximum Inverter Efficiency	99.2					%
CEC Weighted Efficiency	98.5		99		99 @ 240V 98.5 @ 208V	%
2-Pole Disconnection	Yes					
DC CONNECTION – PV						
Maximum Input Power	7600 @ 240V 6600 @ 208V	11,520 @ 240V 10,000 @ 208V	15,200 @ 240V	20,000 @ 240V	22,800 @ 240V 20,000 @ 208V	W
Maximum Input Current	20 @ 240V 17 @ 208V	30 @ 240V 26 @ 208V	40 @ 240V	53 @ 240V	60 @ 240V 53 @ 208V	Adc
Number of Ports	3					
Maximum Current per Port	40					Adc

(1) These specifications apply to inverters with part number SExxxxxH-USMNxBLx5 and USExxxxxH-USMNB75 and connection unit model number DCD-1PH-US-PxH-F-x.

(2) For other regional settings please refer to the [SolarEdge Inverters, Power Control Options](#) application note.

(3) Not designed for non-grid connected applications and requires AC for commissioning. Standalone (backup) functionality is only supported for the 240V grid.

(4) For models SE7600H-US and below, the Rated AC Power in Standalone Operation is configurable between 7,600W with a Maximum Continuous Output Current of 32A or 11,400W with a Maximum Continuous Output Current of 48A, from firmware version 4.20.xx.

(5) For more information about LRA (Locked Rotor Amperage) values, see the [SolarEdge Home Hub Inverter LRA](#) application note.

/ SolarEdge Home Hub Inverter

USA Domestic Content Eligible

Single Phase, for North America

SE3800H-US / SE5700H-US / SE7600H-US / SE10000H-US / SE11400H-US

Applicable to inverters with part number	SExxxxxH-USMNxBLx5 / USExxxxxH-USMNB75					
Model Number ⁽¹⁾	SE3800H-US	SE5700H-US	SE7600H-US	SE10000H-US	SE11400H-US	
DC CONNECTION – BATTERY						
Supported Battery Types	SolarEdge Home Battery 400V					
Number of Batteries per Inverter	Up to 3					
Maximum Continuous Power (Charge and Discharge) ⁽⁶⁾	11,400					W
Number of Ports	2					
Maximum Current per Port	40					Adc
2-pole Disconnection	Up to the inverter's rated standalone power					
SMART ENERGY CAPABILITIES						
Consumption Metering	Built-in ⁽⁷⁾					
Standalone & Battery Storage	With Backup Interface (purchased separately) for service up to 200A; up to 3 inverters					
EV Charging	Direct connection to the SolarEdge Home EV Charger ⁽⁸⁾					
ADDITIONAL FEATURES						
Supported Communication Interfaces	RS485, Ethernet, Cellular ⁽⁹⁾ , Wi-Fi ⁽¹⁰⁾ (optional), SolarEdge Home Network ⁽¹⁰⁾ (optional)					
Revenue Grade Metering, ANSI C12.20	Built-in ⁽⁷⁾					
Integrated AC, DC, and Communication Connection Unit	Yes					
Inverter Commissioning	With the SetApp mobile application using built-in Wi-Fi Access Point for local connection					
DC Voltage Rapid Shutdown (PV and Battery)	Yes, NEC 690.12					
STANDARD COMPLIANCE						
Safety	UL 1741, UL 1741SA, UL 1741SB, UL 1699B, CSA 22.2#107.1, C22.2#330, C22.3#9, ANSI/CAN/UL 9540					
Grid Connection Standards	IEEE1547-2018 and IEEE-1547.1 Rule 21, Rule 14H					
Emissions	FCC Part 15 Class B					
Power Control System (PCS)	UL 1741 PCS ⁽¹¹⁾					
INSTALLATION SPECIFICATIONS						
AC Terminals	L1, L2, N terminal blocks, PE busbar for inverter connection L1, L2 terminal blocks, PE busbar for EV Charger AC connection					
DC Terminals	3 x terminal block pairs for PV input, 2 x terminal block pair for battery input					
AC Output and EV AC Output Conduit Size / AWG Range	1" maximum / 14 – 4 AWG					
DC Input (PV and Battery) Conduit Size / AWG Range	1" maximum / 14 – 6 AWG					
Dimensions with Connection Unit (H x W x D)	21.06 x 14.6 x 8.2 / 535 x 370 x 208					in / mm
Weight with Connection Unit	44.9 / 20.3					lb / kg
Noise	< 50					dBA
Cooling	Natural Convection					
Operating Temperature Range	-40 to +140 / -40 to +60 ⁽¹²⁾					°F / °C
Protection Rating	NEMA 4X					

(6) Discharge power is limited up to the inverter's rated AC power for on-grid and standalone applications, as well as up to the installed batteries' rating.

(7) For consumption metering current transformers should be ordered separately: SECT-SPL-225A-T-20 or SEACT1250-400NA-20. Revenue grade metering is only for production metering.

(8) For more information about the SolarEdge Home EV Charger, refer to the [SolarEdge Home EV Charger](#) datasheet.

(9) Information concerning the data plan terms & conditions is available in [SolarEdge Communication Plan Terms and Conditions](#).

(10) SolarEdge Home Network Plugin ENET-HBNP-01 and Wi-Fi Antenna SE-ANT-ZBWIFI-KIT purchased separately. For more information, refer to the [SolarEdge Home Network Plugin](#) datasheet and the [Antenna for Wi-Fi and ZigBee Wireless Communications](#) datasheet.

(11) Only part numbers SExxxxH-USMNxx7x and USExxxxH-USMNB75 support the PCS meter.

(12) Full power up to at least 122°F / 50°C; for power derating information refer to the [Temperature Derating for North America](#) technical note.

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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.

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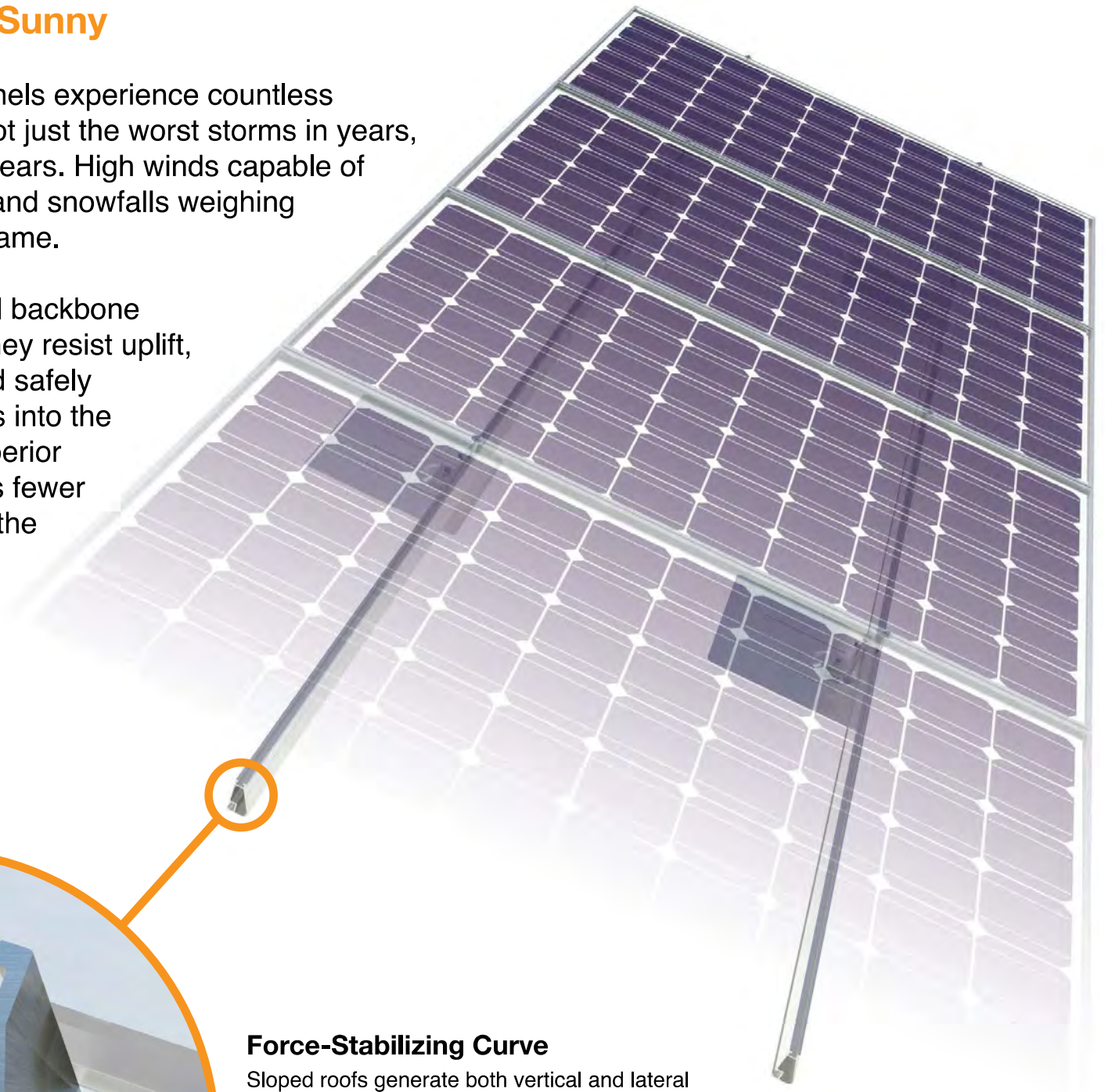


XR Rail® Family

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 6000-series 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 spans up to 6 feet, while remaining light and economical.

- 6' spanning capability
- Moderate load capability
- Clear & black anodized finish
- Internal splices available



XR100

XR100 is a residential and commercial mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 10 feet.

- 10' 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 up to 12 feet for commercial applications.

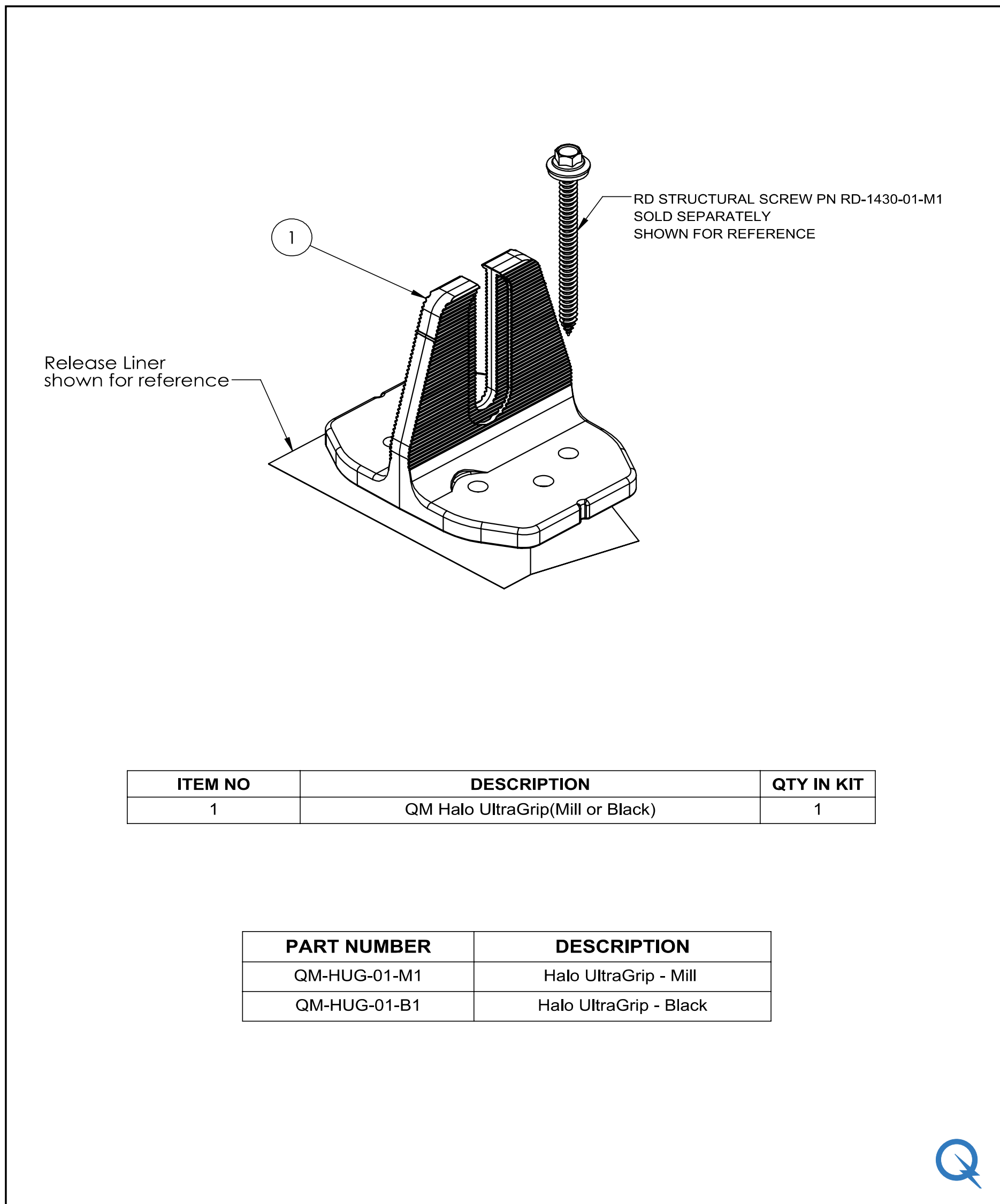
- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The table below was prepared in compliance with applicable engineering codes and standards.* Values are based on the following criteria: ASCE 7-16, Gable Roof Flush Mount, Roof Zones 1 & 2e, Exposure B, Roof Slope of 8 to 20 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed certification letters.

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

*Table is meant to be a simplified span chart for conveying general rail capabilities. Use approved certification letters for actual design guidance.

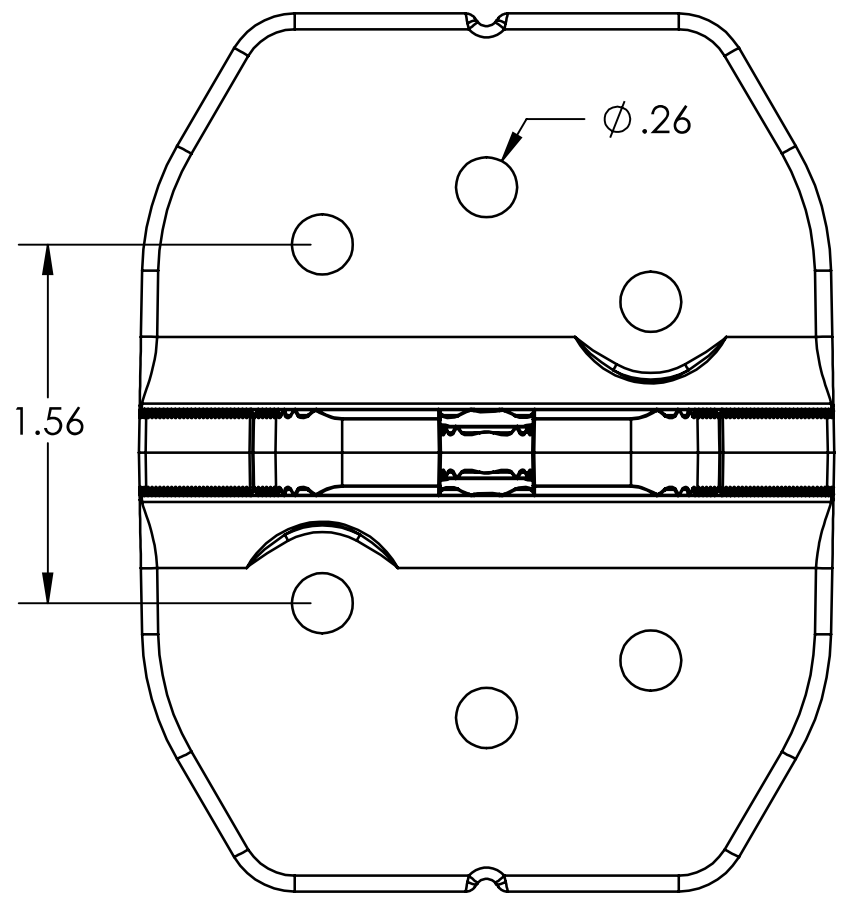
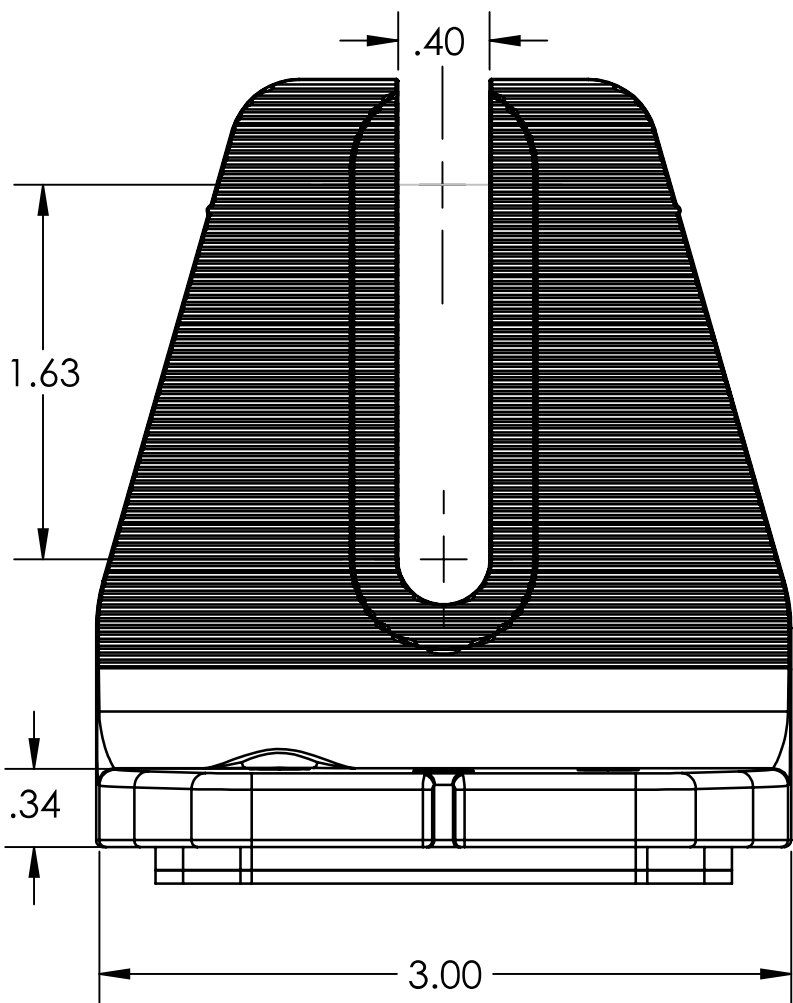
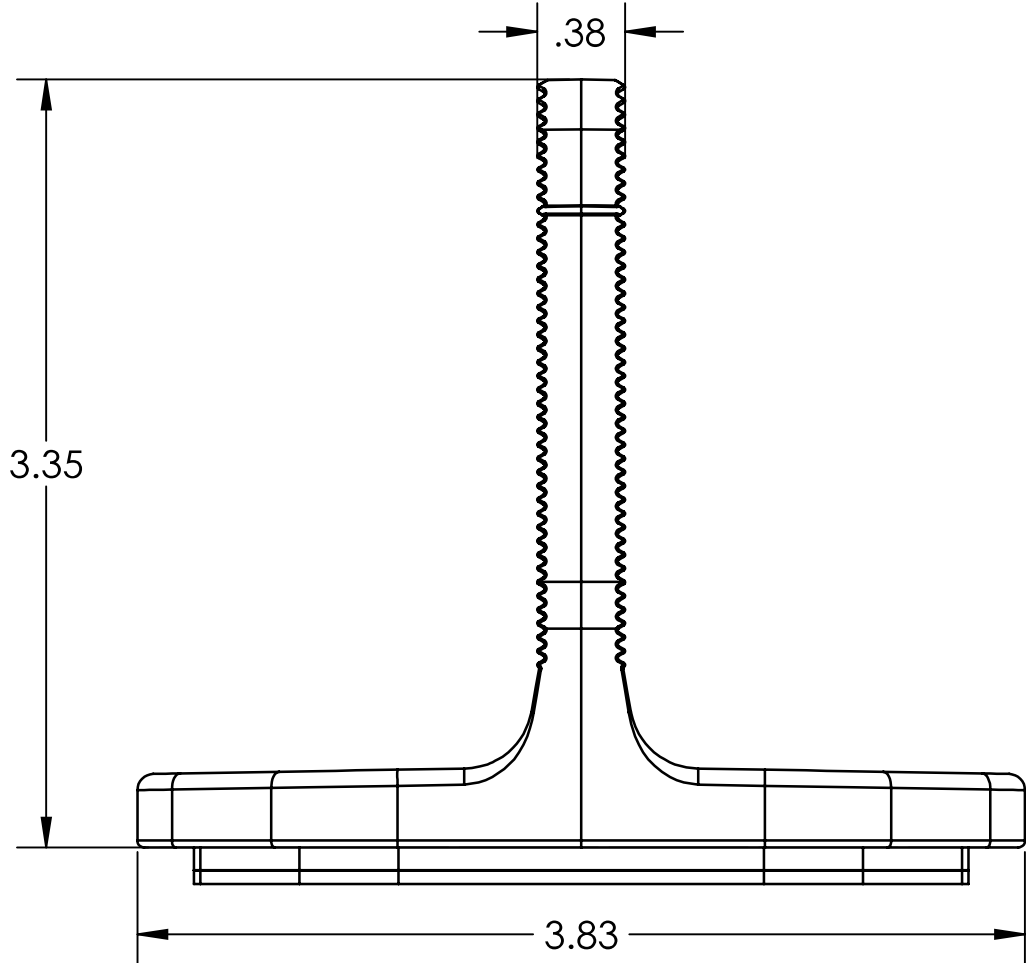


ITEM NO	DESCRIPTION	QTY IN KIT
1	QM Halo UltraGrip(Mill or Black)	1

PART NUMBER	DESCRIPTION
QM-HUG-01-M1	Halo UltraGrip - Mill
QM-HUG-01-B1	Halo UltraGrip - Black



1. Halo UltraGrip



Property	Value
Material	300 Series Aluminium
Finish	Mill or Black





28357 Industrial Blvd.
Hayward, CA 94545
1-800-227-9523
IronRidge.com

Attn: Corey Geiger, COO, IronRidge Inc.

Date: August 31st, 2021

Re: Structural Certification and Span Tables for IronRidge Flush Mount System

This letter addresses the structural performance and code compliance of IronRidge's Flush Mount System. The contents of the letter shall be read in its entirety before being applied to any project design. The Flush Mount System is a proprietary rooftop mounting system used to support photovoltaic (PV) modules installed in portrait or landscape orientation and set parallel to the underlying roof surface. PV modules are supported by extruded aluminum XR Rails and secured to the rails with IronRidge mounting clamps. The XR Rails are side mounted to a selected roof attachment with 3/8" stainless steel bonding hardware and then attached directly to the roof structure or to a stanchion that is fastened to the underlying roof structure. Assembly details of a typical Flush Mount installation and its core components are shown in Exhibit EX-0015.

The IronRidge Flush Mount System is designed and certified to the structural requirements of the reference standards listed below, for the load conditions and configurations tabulated in the attached span tables.

- ASCE/SEI 7-10 Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)
- 2015 International Building Code (IBC-2015)
- 2017 District of Columbia Building Code
- 2015 Aluminum Design Manual (ADM-2015)

The tables included in this letter provide the maximum allowable spans of XR Rails in the Flush Mount System for the respective loads and configurations listed, covering wind exposure categories B, C, & D, roof zones 1, 2 & 3, and roof slopes from 8° to 45°. The span tables are applicable provided that the following conditions are met:

1. *Span* is the distance between two adjacent roof attachment points (measured at the center of the attachment fastener)
2. The underlying roof slope, measured between roof surface and horizontal plane, is 8° to 45°.
3. Each module shall be supported by 2 rails (2 rail system) or 3 rails (3 rail system). Spans are calculated based on 2 rail systems, and conservatively deemed acceptable for 3 rail systems.
4. The *mean roof height*, defined as the average of the roof eave height and the roof ridge height measured from grade, does not exceed 30 feet.
5. Module length and area shall not exceed the maximum values listed on the respective span tables.
6. All Flush Mount components shall be installed in a professional workmanlike manner per IronRidge's *Flush Mount installation manual* and other applicable standards for general roof construction practice.

The parameters and adjustments allowed in the span tables are defined as the following:

1. The Flush Mount System is designed as a Risk Category II structure as defined by ASCE 7-10 Chart 1.5-1.
2. The wind speed selection shall conform to ASCE 7-10 Fig. 26.5-1A (Risk Category II wind) and any state & local county/city amendments to the IBC. No special wind topographic features are included in the span tables and the topographic coefficient (K_{zt}) is taken as 1.0.
3. The snow load used in the span tables is the *ground snow* and shall conform to ASCE 7-10 Fig. 7-1 and applicable state & local county/city amendments to the IBC. If the local jurisdiction specified snow load is in the format of a flat roof snow load, it shall first be converted to a ground snow following the local building code/amendment before the application of the attached span tables. No special snow conditions are considered including unbalanced, drifting, sliding, retention, or ponding snow. The span tables do not include buildings which are intentionally kept below freezing, kept just above freezing, or unheated.
4. The span tables reflect the ASCE 7 prescribed earthquake loads with the maximum magnitudes being:
 - 1) For ground snow no greater than 42psf: $S_s \leq 2.0g$ for Site Class A, B, C, or D.
 - 2) For ground snow greater than 65psf: $S_s \leq 1.0g$ for Site Class A, B, C, or D.
 - 3) For ground snow between 42 and 65psf: $S_s \leq 1.5g$ for Site Class A, B, C, or D.
5. Roof zone size and definition conforms to ASCE 7-10 Fig. 30.4-2A to 30.4-2C.
6. Allowable span length in the charts may be multiplied by a factor of 1.08 if the rails are continuous over a minimum of three spans.
7. The maximum rail cantilever length, measured from the rail end to the nearest attachment point, shall be the lesser of the following two conditions: 40% of the allowable span provided for the respective load & configuration condition from the span tables, or 36".
8. An array to roof clearance of 2" minimum must be provided.
9. No splices are allowed in the rail cantilever. For each XR splice type install per the following requirements:
 - a) XR Bonded Splice cannot be installed in the center 1/3 of interior spans, or the outer 2/3 of end spans.
 - b) BOSS Splice can be installed at any location within a span.
10. Shaded cells of the span tables indicate conditions in which UFO Mid Clamp connection capacity is exceeded. If such conditions are encountered contact support@ironridge.com.
11. When a roof attachment listed in IronRidge's Flush Mount *installation manual* is considered, the span values provided in this letter can be adjusted using IronRidge's online Design Assistant by checking the capacity of the selected roof attachment against the reaction forces provided in Design Assistant.

12. Systems using CAMO module clamps shall be installed with the following guidance:

- 1) For single module installations (“orphan modules”) using modules with a length greater than 67.5”, CAMO clamps shall not be installed in regions that experience ground snow loads of 70psf and greater: such scenarios are shown by asterisks in the applicable span table.
- 2) CAMO will function within a module’s design load ratings. Be sure the specific module being used with CAMO meets the dimensional requirements shown in the figure below and that the module selected is suitable for the environmental conditions of a particular project.

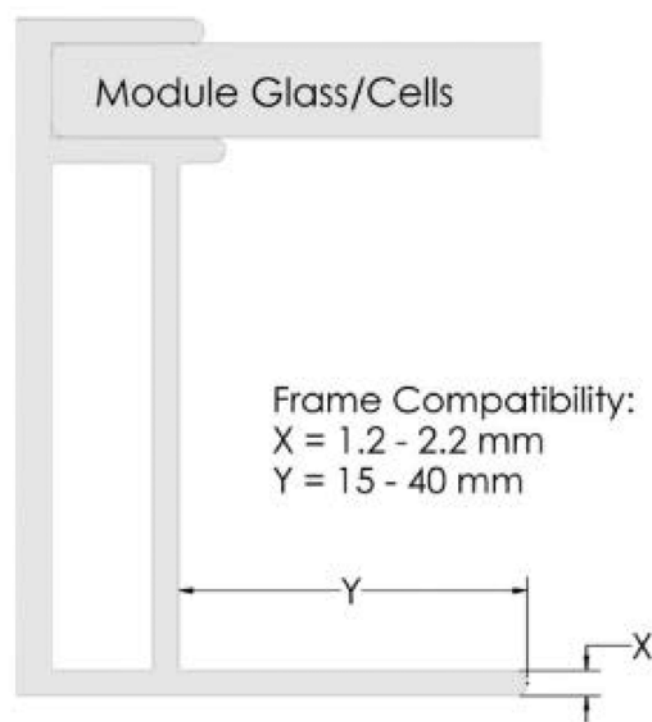


Figure 1: CAMO Module Frame Dimensional Requirements



28357 Industrial Blvd.
Hayward, CA 94545
1-800-227-9523
IronRidge.com

The span tables provided in this letter are certified based on the structural performance of IronRidge XR Rails only with no consideration of the structural adequacy of the chosen roof attachments, PV modules, or the underlying roof supporting members. It is the responsibility of the installer or system designer to verify the structural capacity and adequacy of the aforementioned system components in regards to the applied or resultant loads of any chosen array configuration.

Sincerely,



2021.08.31

17:49:51

-07'00'

Gang Xuan, PE
Senior Structural Engineer

Flush Mount System Span Table (inches) - Portrait or Landscape Installation
Max Module Length: 67.5", Max Module SF: 21 SF
Exposure B

Rail:
XR100

Wind Speed (mph)	Roof Slope (deg.)	Ground Snow: 0 psf			10 psf			20 psf			30 psf			40 psf			50 psf			60 psf			70 psf			80 psf			90 psf			100 psf			110 psf			120 psf		
		Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3			
110	8-27	129	116	96	105	105	96	89	89	89	87	87	87	81	81	81	74	74	74	68	68	68	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	124	124	124	103	103	103	88	88	88	87	87	87	80	80	80	75	75	75	72	72	72	67	67	67	64	64	64	60	60	60	57	57	57	55	55	55	53	53	53
115	8-27	129	111	90	105	105	90	89	89	89	87	87	87	81	81	81	74	74	74	68	68	68	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	121	121	121	103	103	103	88	88	88	87	87	87	80	80	80	75	75	75	72	72	72	67	67	67	64	64	64	60	60	60	57	57	57	55	55	55	53	53	53
120	8-27	129	107	86	105	105	86	89	89	86	87	87	86	81	81	81	74	74	74	68	68	68	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	118	118	118	103	103	103	88	88	88	87	87	87	80	80	80	75	75	75	72	72	72	67	67	67	64	64	64	60	60	60	57	57	57	55	55	55	53	53	53
130	8-27	129	98	79	105	98	79	89	89	79	87	87	79	81	81	79	74	74	74	68	68	68	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	112	110	110	103	103	103	88	88	88	87	87	87	80	80	80	75	75	75	72	72	72	67	67	67	64	64	64	60	60	60	57	57	57	55	55	55	53	53	53
140	8-27	123	91	73	103	91	73	89	89	73	87	87	73	81	81	73	74	74	73	68	68	68	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	106	103	103	100	100	100	88	88	88	87	87	87	80	80	80	75	75	75	72	72	72	67	67	67	64	64	64	60	60	60	57	57	57	55	55	55	53	53	53
150	8-27	115	85	69	105	85	69	89	85	69	87	85	69	81	81	69	74	74	69	68	68	68	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	101	97	97	97	97	97	85	85	85	84	84	84	79	79	79	74	74	74	72	72	72	67	67	67	64	64	64	60	60	60	57	57	57	55	55	55	53	53	53
160	8-27	108	80	64	105	80	64	89	80	64	87	80	64	81	80	64	74	74	64	68	68	68	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	96	91	91	96	91	91	83	83	83	82	82	82	77	77	77	73	73	73	69	69	69	66	66	66	64	64	64	60	60	60	57	57	57	55	55	55	53	53	53
170	8-27	102	75	60	102	75	60	89	75	60	87	75	60	80	75	60	74	74	60	68	68	68	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	92	86	86	90	86	86	81	81	81	80	80	80	75	75	75	72	72	72	67	67	67	64	64	64	64	64	64	60	60	60	57	57	57	55	55	55	53	53	53
180	8-27	96	72	56	96	72	56	87	72	56	86	72	56	79	72	56	73	72	56	68	68	68	64	64	64	56	59	56	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	88	82	82	87	82	82	79	79	79	78	78	78	73	73	73	72	72	72	66	66	66	64	64	64	61	61	61	58	58	58	56	56	56	55	55	55	53	53	53

Flush Mount System Span Table (inches) - Portrait or Landscape Installation
Max Module Length: 67.5", Max Module SF: 21 SF
Exposure C

Rail:
XR100

Wind Speed (mph)	Roof Slope (deg.)	Ground Snow: 0 psf			10 psf			20 psf			30 psf			40 psf			50 psf			60 psf			70 psf			80 psf			90 psf			100 psf			110 psf			120 psf		
		Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3			
110	8-27	129	98	79	105	98	79	89	89	79	87	87	79	81	81	79	74	74	74	68	68	68	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	112	110	110	103	103	103	88	88	88	87	87	87	80	80	80	75	75	75	72	72	72	67	67	67	64	64	64	60	60	60	57	57	57	55	55	55	53	53	53
115	8-27	126	96	76	105	96	76	89	89	76	87	87	76	81	81	76	74	74	74	68	68	68	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	108	106	106	102	102	102	88	88	88	87	87	87	80	80	80	75	75	75	72	72	72	67	67	67	64	64	64	60	60	60	57	57	57	55	55	55	53	53	53
120	8-27	121	90	72	105	90	72	89	89	72	87	87	72	81	81	72	74	74	74	68	68	68	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	105	102	102	99	99	99	87	87	87	86	86	86	80	80	80	75	75	75	72	72	72	67	67	67	64	64	64	60	60	60	57	57	57	55	55	55	53	53	53
130	8-27	112	83	67	105	83	67	89	83	67	87	83	67	81	81	67	74	74	67	68	68	68	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	99	96	96	96	96	96	85	85	85	84	84	84	78	78	78	73	73	73	72	72	72	66	66	66	64	64	64	60	60	60	57	57	57	55	55	55	53	53	53
140	8-27	104	77	64	104	77	64	89	77	64	87	77	64	81	81	77	74	74	64	68	68	68	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	98	88	88	92	88	88	82	82	82	81	81	81	76	76	76	72	72	72	68	68	68	65	65	65	64	64	64	60	60	60	57	57	57	55	55	55	53	53	53
150	8-27	98	72	58	98	72	58	88	72	58	87	72	58	79	72	58	74	72	58	68	68	68	64	64	64	58	59	58	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	89	83	83	88	83	83	79	79	79	79	79	79	74	74	74	72	72	72	67	67	67	64	64	64	61	61	61	59	59	59	57	57	57	55	55	55	53	53	53
160	8-27	92	67	50	92	67	50	86	67	50	85	67	50	78	78	67	73	73	67	68	68	68	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	84	78	78	84	78	78	77	77	77	76	76	76	72	72	72	68	68	68	65	65	65	64	64	64	60	60	60	58	58	58	56	56	56	54	54	54	52	52	52
170	8-27	86	64	44	86	64	44	84	64	44	83	64	44	77	77	64	72	72	64	67	67	67	64	64	64	59	59	59	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	80	73	73	80	73	73	74	73	73	73	73	73	72	72	72	66	66	66	64	64	64	64	64	64	61	61	61	59	59	59	57	57	57	55	55	55	53	53	53
180	8-27	82	60	40	82	60	40	82	60	40	81	60	40	75	75	60	72	72	60	66	66	66	64	64	64	60	60	60	56	56	56	53	53	53	51	51	51	49	49	49
mph	28-45	76	72	72	76	72	72	72	72	72	72	72	72	68	68	68	65	65	65	64	64	64	64	64	64	60	60	60	56	56	56	54	54	54	52	52	52	51	51	51

Flush Mount System Span Table (inches) - Portrait or Landscape Installation
Max Module Length: 67.5", Max Module SF: 21 SF
Exposure D

Rail:
XR100

Wind Speed (mph)	Roof Slope (deg.)	Ground Snow: 0 psf			10 psf			20 psf			30 psf			40 psf		
------------------	-------------------	--------------------	--	--	--------	--	--	--------	--	--	--------	--	--	--------	--	--

Flush Mount System Span Table (inches) - Portrait or Landscape Installation
Max Module Length: 78.5", Max Module SF: 24 SF
Exposure B

Rail:
XR100

Wind Speed (mph)	Ground Snow: 0 psf			10 psf			20 psf			30 psf			40 psf			50 psf			60 psf			70 psf*			80 psf*			90 psf*			100 psf*			110 psf*			120 psf*		
	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3			
110	8-27	121	109	87	100	100	84	84	84	83	83	83	76	76	76	72	72	72	64	64	64	59	59	59	55	55	52	52	50	50	48	48	48	48					
mph	28-45	118	118	118	98	98	84	84	84	83	83	83	76	76	76	72	72	72	67	67	64	64	64	59	59	59	55	55	52	52	50	50	49	49	49				
115	8-27	121	104	83	100	100	84	84	84	83	83	83	76	76	76	72	72	72	67	67	64	64	64	59	59	59	55	55	52	52	50	50	48	48	48				
mph	28-45	114	114	114	98	98	84	84	84	83	83	83	76	76	76	72	72	72	67	67	64	64	64	59	59	59	55	55	52	52	50	50	49	49	49				
120	8-27	121	100	80	100	100	84	84	84	80	80	80	74	74	74	72	72	72	64	64	64	64	64	59	59	59	55	55	52	52	50	50	48	48	48				
mph	28-45	111	110	110	98	98	84	84	84	83	83	83	76	76	76	72	72	72	67	67	64	64	64	59	59	59	55	55	52	52	50	50	49	49	49				
130	8-27	118	105	103	97	97	84	84	84	83	83	83	76	76	76	72	72	72	64	64	64	64	64	59	59	59	55	55	52	52	50	50	48	48	48				
mph	28-45	115	115	115	103	103	88	88	88	83	83	83	76	76	76	72	72	72	68	68	64	64	64	59	59	59	55	55	52	52	50	50	49	49	49				
140	8-27	115	85	68	100	100	85	84	84	83	83	83	76	76	76	72	72	72	68	68	64	64	64	59	59	59	55	55	52	52	50	50	48	48	48				
mph	28-45	100	96	96	96	96	82	82	82	81	81	81	75	75	75	72	72	72	67	67	64	64	64	59	59	59	55	55	52	52	50	50	49	49	49				
150	8-27	107	79	64	100	100	79	79	79	79	79	79	74	74	74	72	72	72	65	65	64	64	64	59	59	59	55	55	52	52	50	50	48	48	48				
mph	28-45	96	90	90	90	90	80	80	80	80	80	80	74	74	74	72	72	72	65	65	64	64	64	59	59	59	55	55	52	52	50	50	49	49	49				
160	8-27	101	74	60	100	100	74	74	74	74	74	74	69	69	69	65	65	65	64	64	64	64	64	59	59	59	55	55	52	52	50	50	48	48	48				
mph	28-45	90	85	85	85	85	78	78	78	77	77	77	72	72	72	68	68	68	64	64	64	64	64	59	59	59	55	55	52	52	50	50	49	49	49				
170	8-27	96	72	55	96	96	72	72	72	72	72	72	66	66	66	62	62	62	64	64	64	64	64	59	59	59	55	55	52	52	50	50	48	48	48				
mph	28-45	86	80	80	80	80	76	76	76	75	75	75	72	72	72	66	66	66	64	64	64	64	64	59	59	59	55	55	52	52	50	50	49	49	49				
180	8-27	90	66	48	90	90	66	66	66	66	66	66	64	64	64	64	64	64	64	64	64	64	64	59	59	59	55	55	52	52	50	50	48	48	48				
mph	28-45	82	76	76	82	76	76	74	74	73	73	73	69	69	69	65	65	65	64	64	64	64	64	59	59	59	57	57	55	55	53	53	51	51	49				

Flush Mount System Span Table (inches) - Portrait or Landscape Installation
Max Module Length: 78.5", Max Module SF: 24 SF
Exposure C

Rail:
XR100

Wind Speed (mph)	Ground Snow: 0 psf			10 psf			20 psf			30 psf			40 psf			50 psf			60 psf			70 psf*			80 psf*			90 psf*			100 psf*			110 psf*			120 psf*		
	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3			
110	8-27	119	91	73	100	100	84	84	84	83	83	83	75	75	73	68	68	68	64	64	64	59	59	59	55	55	52	52	49	49	48	48	48						
mph	28-45	104	102	102	96	96	83	83	83	83	83	83	76	76	76	72	72	72	67	67	64	64	64	59	59	59	55	55	53	53	51	51	49	49	49				
115	8-27	117	87	72	100	100	87	87	87	83	83	83	75	75	72	68	68	68	64	64	64	64	59	59	59	55	55	52	52	49	49	48	48	48					
mph	28-45	101	98	98	96	96	82	82	82	81	81	81	75	75	75	72	72	72	67	67	64	64	64	59	59	59	55	55	53	53	51	51	49	49	49				
120	8-27	113	84	67	100	100	84	84	84	83	83	83	75	75	74	74	74	74	66	66	64	64	64	59	59	59	55	55	52	52	49	49	48	48	48				
mph	28-45	98	96	96	92	92	81	81	81	80	80	80	74	74	74	72	72	72	66	66	64	64	64	59	59	59	55	55	53	53	51	51	49	49	49				
130	8-27	104	77	64	100	100	77	77	77	77	77	77	74	74	74	74	74	74	64	64	64	64	64	59	59	59	55	55	52	52	49	49	48	48	48				
mph	28-45	92	88	88	88	88	88	88	88	88	88	88	84	84	84	80	80	80	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78					
140	8-27	97	72	58	97	97	72	72	72	72	72	72	66	66	66	62	62	62	64	64	64	64	64	59	59	59	55	55	52	52	50	50	48	48	48				
mph	28-45	87	82	82	82	82	76	76	76	75	75	75	72	72	72	66	66	66	64	64	64	64	64	59	59	59	55	55	53	53	51	51	49	49	49				
150	8-27	91	67	50	91	91	67	67	67	67	67	67	64	64	64	64	64	64	64	64	64	64	64	59	59	59	55	55	52	52	50	50	48	48	48				
mph	28-45	82	77	77	82	77	77	77	77	77	77	77	74	74	74	74	74	74	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68					
160	8-27	85	64	43	85	85	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	59	59	59	55	55	52	52	49	49	48	48	48				
mph	28-45	78	72	72	78	78	72	72	72	72	72	72	67	67	67	64	64	64	60	60	60	60	60	59	59	59	55	55	53	53	51	51	49	49	49				
170	8-27	80	59	38	80	80	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59					
mph	28-45	74	68	68	74	74	68	68	68	68	68	68	65	65	65	64	64	64	64	64	64	64	64	59	59	59	55	55	53	53	51	51	49	49	49				
180	8-27	76	53	34	76	76	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53					
mph	28-45	72	65	65	72	72	65	65	65	65	65	65	64	64	64	60	60	60	60	60	60	60	60	59	59	59	55	55	53	53	51	51	49	49	49				

Flush Mount System Span Table (inches) - Portrait or Landscape Installation
Max Module Length: 78.5", Max Module SF: 24 SF
Exposure D

Rail:
XR100

Wind Speed (mph)	Ground Snow: 0 psf			10 psf			20 psf			30 psf			40 psf			50 psf			60 psf			70 psf*			80 psf*			90 psf*			100 psf*			110 psf*			120 psf*		
	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3			
110	8-27	113	84	67	100	100	84	84	84	83	83	83	76	76	76	72	72	72	67	67	64	64	64	59	59	59	55	55	52	52	50	50	48	48					
mph	28-45	98	96	96	92	92	81	81	81	81	81	81	75	75	75	72	72	72	66	66	64	64	64	59	59	59	55	55	53	53	51	51	49	49	49				
115	8-27	108	80	64	100	100	80	80	80	80	80	80	74	74	74	72	72	72	64	64	64	64	64	59	59	59	55	55	52	52	50	50	48	48	48				
mph	28-45	96	91	91	90	90	80	80	80	80	80	80	79	79	79	74	74	74	66	66	64	64	64	59	59</														

Flush Mount System Span Table (inches) - Portrait or Landscape Installation
Max Module Length: 86", Max Module SF: 24.5 SF
Exposure B

Rail:
XR100

Wind Speed (mph)	Ground Snow: 0 psf			10 psf			20 psf			30 psf			40 psf			50 psf			60 psf			70 psf*			80 psf*			90 psf*			100 psf*			110 psf*			120 psf*				
	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3					
110	8-27	114	104	83	97	97	83	82	82	80	80	80	72	72	72	65	65	65	60	60	60	56	56	56	53	53	53	50	50	50	48	48	48	45	45	45	43	43	43		
mph	28-45	110	110	110	96	96	96	81	81	80	80	80	74	74	74	72	72	72	64	64	64	60	60	60	56	56	56	53	53	53	51	51	51	48	48	48	48	48	48		
115	8-27	114	99	80	97	97	80	82	82	80	80	80	72	72	72	65	65	65	60	60	60	56	56	56	53	53	53	50	50	50	48	48	48	45	45	45	43	43	43		
mph	28-45	107	107	107	96	96	96	81	81	80	80	80	74	74	74	72	72	72	64	64	64	60	60	60	56	56	56	53	53	53	51	51	51	48	48	48	48	48	48	48	
120	8-27	114	96	76	97	96	76	82	82	80	80	76	72	72	72	65	65	65	60	60	60	56	56	56	53	53	53	50	50	50	48	48	48	45	45	45	43	43	43		
mph	28-45	105	105	105	96	96	96	81	81	80	80	80	74	74	74	72	72	72	64	64	64	60	60	60	56	56	56	53	53	53	51	51	51	48	48	48	48	48	48	48	
130	8-27	114	88	72	97	88	72	82	82	80	80	72	72	72	72	65	65	65	60	60	60	56	56	56	53	53	53	50	50	50	48	48	48	45	45	45	43	43	43		
mph	28-45	99	98	92	92	92	92	82	82	80	80	79	79	73	73	73	68	68	68	64	64	64	60	60	60	56	56	56	53	53	53	51	51	51	48	48	48	48	48	48	48
140	8-27	109	81	65	97	81	65	82	81	80	80	65	72	72	72	65	65	65	60	60	60	56	56	56	53	53	53	50	50	50	48	48	48	45	45	45	43	43	43		
mph	28-45	96	91	89	89	89	89	78	78	78	78	77	77	72	72	72	67	67	67	64	64	64	60	60	60	56	56	56	53	53	53	51	51	51	48	48	48	48	48	48	48
150	8-27	102	76	61	97	76	61	82	76	80	76	61	72	72	72	65	65	65	60	60	60	56	56	56	53	53	53	50	50	50	48	48	48	45	45	45	43	43	43		
mph	28-45	90	86	86	86	86	86	76	76	76	76	75	75	72	72	72	66	66	66	64	64	64	60	60	60	56	56	56	53	53	53	51	51	51	48	48	48	48	48	48	48
160	8-27	96	72	57	96	72	57	80	72	79	72	57	72	72	72	65	65	65	60	60	60	56	56	56	53	53	53	50	50	50	48	48	48	45	45	45	43	43	43		
mph	28-45	85	81	81	81	81	81	74	74	74	74	73	73	68	68	68	64	64	64	64	64	64	60	60	60	56	56	56	53	53	53	51	51	51	48	48	48	48	48	48	48
170	8-27	90	67	50	90	67	50	79	67	78	67	50	72	72	72	65	65	65	60	60	60	56	56	56	53	53	53	50	50	50	48	48	48	45	45	45	43	43	43		
mph	28-45	81	76	76	80	76	76	72	72	72	72	72	72	67	67	67	64	64	64	64	64	64	60	60	60	56	56	56	53	53	53	51	51	51	48	48	48	48	48	48	48
180	8-27	85	64	44	85	64	44	77	64	84	44	76	64	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	
mph	28-45	78	72	72	77	72	72	72	72	72	72	72	72	65	65	65	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	

Flush Mount System Span Table (inches) - Portrait or Landscape Installation
Max Module Length: 86", Max Module SF: 24.5 SF
Exposure C

Rail:
XR100

Wind Speed (mph)	Ground Snow: 0 psf			10 psf			20 psf			30 psf			40 psf			50 psf			60 psf			70 psf*			80 psf*			90 psf*			100 psf*			110 psf*			120 psf*				
	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3		
110	8-27	114	87	72	97	87	72	82	82	80	80	72	72	72	65	65	65	60	60	60	56	56	56	53	53	53	50	50	50	48	48	48	45	45	45	43	43	43			
mph	28-45	99	98	98	92	92	92	80	80	80	80	79	79	73	73	73	68	68	68	64	64	64	60	60	60	56	56	56	53	53	53	51	51	51	48	48	48	48	48	48	
115	8-27	112	84	67	97	84	67	82	82	80	80	67	72	72	72	65	65	65	60	60	60	56	56	56	53	53	53	50	50	50	48	48	48	45	45	45	43	43	43		
mph	28-45	96	96	96	90	90	90	78	78	78	78	78	78	72	72	72	67	67	67	64	64	64	60	60	60	56	56	56	53	53	53	51	51	51	48	48	48	48	48	48	48
120	8-27	108	80	64	97	80	64	82	80	80	64	72	72	72	64	65	65	65	60	60	60	56	56	56	53	53	53	50	50	50	48	48	48	45	45	45	43	43	43		
mph	28-45	96	90	90	88	88	88	77	77	77	77	76	76	72	72	72	67	67	67	64	64	64	60	60	60	56	56	56	53	53	53	51	51	51	48	48	48	48	48	48	48
130	8-27	100	74	59	97	74	59	81	74	80	74	59	72	72	72	65	65	65	60	60	60	56	56	56	53	53	53	50	50	50	48	48	48	45	45	45	43	43	43		
mph	28-45	88	84	84	85	84	84	75	75	75	74	74	74	72	72	72	65	65	65	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	
140	8-27	93	68	53	93	68	53	79	68	80	68	53	72	72	72	65	65	65	60	60	60	56	56	56	53	53	53	50	50	50	48	48	48	45	45	45	43	43	43		
mph	28-45	83	78	78	81	78	78	73	73	73	73	72	72	67	67	67	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	
150	8-27	87	64	45	87	64	45	78	64	80	45	77	64	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45		
mph	28-45	79	73	73	78	73	73	72	72	72	72	72	72	65	65	65	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	
160	8-27	81	60	40	81	60	40	76	60	80	40	75	60	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40		
mph	28-45	75	69	69	75	69	69	68	68	68	67	67	67	64	64	64	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
170	8-27	77	55	35	77	55	35	74	55	74	55	35	68	55	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35		
mph	28-45	72	65	65	72	65	65	66	66	66	66	66	66	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	
180	8-27	72	49	32	72	49	32	72	49	72	49	32	67	49	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32		
mph	28-45	67	64	64	67	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64		

Flush Mount System Span Table (inches) - Portrait or Landscape Installation
Max Module Length: 86", Max Module SF: 24.5 SF
Exposure D

Rail:
XR100

Wind Speed (mph)	Ground Snow: 0 psf			10 psf			20 psf			30 psf			40 psf			50 psf			60 psf			70 psf*			80 psf*			90 psf*			100 psf*			110 psf*			120 psf*		
	Zone 1	Zone 2	Zone 3	Zone 1	Zone 2	Zone 3	Zone 1																																

MODULE MOUNTING SYSTEM
 BONDING END CLAMP, UFO

PV MODULE

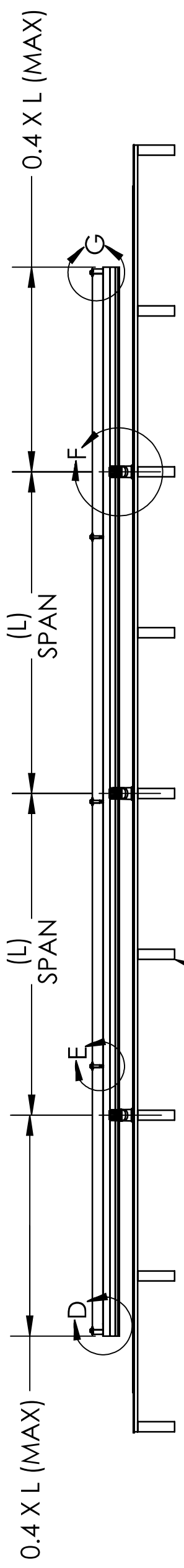
XR RAIL

DETAIL G

MODULE MOUNTING SYSTEM
 BONDING END CLAMP, CAMO

DETAIL D
 (MODULE REMOVED FOR CLARITY)

PLAN VIEW



EXISTING ROOF STRUCTURE

MODULE MOUNTING SYSTEM
 BONDING MID CLAMP, UFO

PV MODULE

ROOF ATTACHMENT
 (FLASHFOOT2 SHOWN
 FOR REFERENCE)

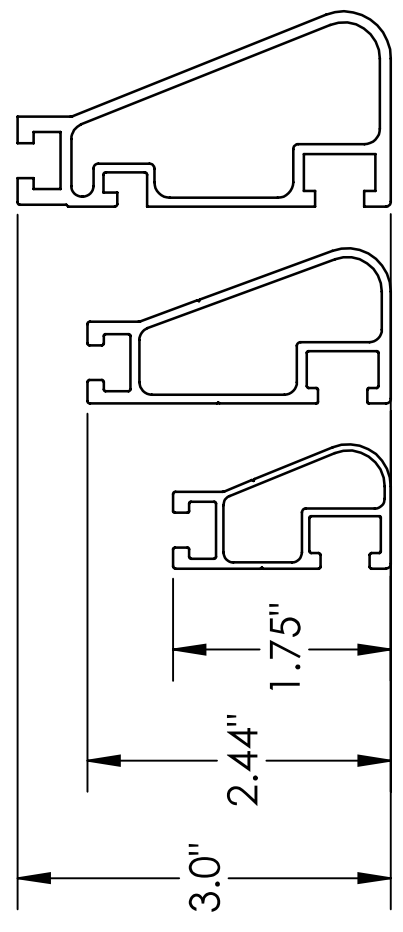
XR RAIL OPTIONS, TYP:

3/8" BOLT AND
 NUT, (TYP)

ROOF COVERING
 (BY OTHERS)

ROOF FRAMING
 (BY OTHERS)

DETAIL F



3/8" MODULE GAP
 (TYP)

PV MODULE

XR RAIL

DETAIL E



FLUSH MOUNT SYSTEM

SIZE	DWG. NO.	EX-0015
SCALE: NTS	WEIGHT: N/A	SHEET 2 OF 2



Certificate of Compliance

Certificate: 80039108

Master Contract: 249143

Project: 80182955

Date Issued: 2023-12-01

Issued to: CSI Solar Co., Ltd.
199 Lushan Road, SND
Suzhou, Jiangsu 215129
China
Attention: Yuan Zhou

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only



Issued by: *Simon Shen*
Simon Shen

PRODUCTS

CLASS - C531190 - POWER SUPPLIES-Photovoltaic Modules and Panels - Certified to US Standards

CLASS - C531110 - POWER SUPPLIES-Photovoltaic Modules and Panels

Photovoltaic modules with maximum DC system voltage of 1500 V or 1000V, Safety Class II, Module Fire Performance Type 1 or Type 2.

Model Series:

CS3Y-xxxMS (xxx = 470 to 515 W),
CS3Y-xxxP (xxx = 435 to 485 W),
CS3N-xxxMS (xxx = 375 to 435 W),
CS3W-xxxP (xxx = 385 to 450 W),
CS3L-xxxP (xxx = 340 to 375 W),
CS3W-xxxMS (xxx = 405 to 470 W),
CS3L-xxxMS (xxx = 345 to 390 W),
CS3U-xxxMS (xxx = 350 to 410 W),
CS3K-xxxMS (xxx = 295 to 345 W),
CS3U-xxxP (xxx = 345 to 405 W),
CS3K-xxxP (xxx = 290 to 340 W),



Certificate: 80039108
Project: 80182955

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CS1H-xxxMS (xxx = 310 to 345 W),
 CS6U-xxxP (xxx = 310 to 340 W),
 CS6XH-xxxP (xxx = 295 to 345 W),
 CS6XH-xxxM (xxx = 330 to 375 W),
 CS6PH-xxxP (xxx = 240 to 280 W),
 CS6PH-xxxM (xxx = 270 to 310 W),
 CS6AH-xxxP (xxx = 185 to 220 W),
 CS6AH-xxxM (xxx = 215 to 235 W),
 CS5PH-xxxP (xxx = 235 to 260 W),
 CS5PH-xxxM (xxx = 250 to 275 W),
 CS1Y-xxxMS (xxx = 380 to 415 W),
 CS1W-xxxMS (xxx = 350 to 385 W),
 CS6Y-xxxMS (xxx = 570 to 605 W),
 CS6W-xxxMS (xxx = 530 to 560 W),
 CS6L-xxxMS (xxx = 440 to 460 W),
 CS6R-xxxMS (xxx = 380 to 420 W),
 CS6R-xxxMS-HL (xxx = 380 to 420 W),
 CS7N-xxxMS (xxx = 635 to 680 W),
 CS7L-xxxMS (xxx = 575 to 620 W),
 CS7L-xxxMS-R (xxx = 575 to 620 W),
 CS5A-xxxM-PLUS (xxx = 200 to 220 W),
 CS5P-xxxM-PLUS (xxx = 250 to 270 W),
 CS6A-xxxP-PLUS (xxx = 200 to 250 W),
 CS6P-xxxP-PLUS (xxx = 255 to 320 W),
 CS6X-xxxP-PLUS (xxx = 310 to 375 W),
 CS6W-xxxT (xxx = 540 to 605 W),
 CS6R-xxxT (xxx = 400 to 455 W),
 CS6R-xxxMB (xxx = 380 to 420 W),
 CS6R-xxxMB-HL (xxx = 380 to 420 W),
 CS6W-xxxMB (xxx = 510 to 560 W),
 CS6.1-72TM-xxx (xxx = 575 to 635 W),
 CS6.1-60TM-xxxH (xxx = 470 to 525 W),
 CS6.1-60TM-xxx (xxx = 470 to 525 W),
 CS6.1-54TM-xxxH (xxx = 430 to 480 W),
 CS6.1-54TM-xxx (xxx = 430 to 480 W).

Model Type	Maximum DC System Voltage (V)	Open Circuit Voltage (V)	Maximum power voltage (V)	Short Circuit Current (A)	Maximum power current (A)	Maximum Power (Watts)	Maximum overcurrent protection rating (A)
CS3W-385P	1500	46.6	38.1	10.66	10.11	385	20
CS3W-390P	1500	46.8	38.3	10.74	10.19	390	20
CS3W-395P	1500	47.0	38.5	10.82	10.26	395	20
CS3W-400P	1500	47.2	38.7	10.90	10.34	400	20



Certificate: 80039108
Project: 80182955

Master Contract: 249143
Date Issued: 2023-12-01

Model Type	Maximum DC System Voltage (V)	Open Circuit Voltage (V)	Maximum power voltage (V)	Short Circuit Current (A)	Maximum power current (A)	Maximum Power (Watts)	Maximum overcurrent protection rating (A)
CS3W-405P	1500	47.4	38.9	10.98	10.42	405	20
CS3W-410P	1500	47.6	39.1	11.06	10.49	410	20
CS3W-415P	1500	47.8	39.3	11.14	10.56	415	20
CS3W-420P	1500	48.0	39.5	11.26	10.64	420	20
CS3W-425P	1500	48.2	39.7	11.29	10.71	425	20
CS3W-430P	1500	48.4	39.9	11.32	10.78	430	20
CS3W-435P	1500	48.6	40.1	11.35	10.85	435	20
CS3W-440P	1500	48.7	40.3	11.40	10.92	440	20
CS3W-445P	1500	48.8	40.5	11.45	10.99	445	20
CS3W-450P	1500	49.0	40.7	11.53	11.06	450	20
CS3L-340P	1500	39.6	32.6	10.98	10.43	340	20
CS3L-345P	1500	39.8	32.8	11.06	10.52	345	20
CS3L-350P	1500	40.2	33.0	11.24	10.61	350	20
CS3L-355P	1500	40.4	33.2	11.31	10.70	355	20
CS3L-360P	1500	40.6	33.4	11.37	10.78	360	20
CS3L-365P	1500	40.8	33.6	11.44	10.87	365	20
CS3L-370P	1500	41.0	33.8	11.51	10.95	370	20
CS3L-375P	1500	41.2	34.0	11.59	11.03	375	20
CS1H-310MS	1000	43.8	35.4	9.52	8.76	310	16
CS1H-315MS	1000	43.9	35.8	9.56	8.80	315	16
CS1H-320MS	1000	44.0	36.2	9.60	8.85	320	16
CS1H-325MS	1000	44.1	36.6	9.64	8.88	325	16
CS1H-330MS	1000	44.2	37.0	9.68	8.92	330	16
CS1H-335MS	1000	44.3	37.4	9.72	8.96	335	16
CS1H-340MS	1000	44.5	37.8	9.76	9.00	340	16
CS1H-345MS	1000	44.6	38.2	9.80	9.04	345	16
CS3W-405MS	1500	47.3	39.3	11.12	10.31	405	20
CS3W-410MS	1500	47.5	39.5	11.17	10.38	410	20
CS3W-415MS	1500	47.7	39.7	11.22	10.46	415	20
CS3W-420MS	1500	47.9	39.9	11.27	10.53	420	20
CS3W-425MS	1500	48.1	40.1	11.32	10.6	425	20
CS3W-430MS	1500	48.3	40.3	11.37	10.68	430	20
CS3W-435MS	1500	48.5	40.5	11.42	10.75	435	20
CS3W-440MS	1500	48.7	40.7	11.48	10.82	440	20
CS3W-445MS	1500	48.9	40.9	11.54	10.89	445	20
CS3W-450MS	1500	49.1	41.1	11.6	10.96	450	20
CS3W-455MS	1500	49.3	41.3	11.66	11.02	455	20
CS3W-460MS	1500	49.5	41.5	11.72	11.09	460	20



Certificate: 80039108
Project: 80182955

Master Contract: 249143
Date Issued: 2023-12-01

Model Type	Maximum DC System Voltage (V)	Open Circuit Voltage (V)	Maximum power voltage (V)	Short Circuit Current (A)	Maximum power current (A)	Maximum Power (Watts)	Maximum overcurrent protection rating (A)
CS3W-465MS	1500	49.7	41.7	11.78	11.16	465	20
CS3W-470MS	1500	49.9	41.9	11.84	11.22	470	20
CS3L-345MS	1500	39.8	33.1	11.23	10.43	345	20
CS3L-350MS	1500	40	33.3	11.28	10.52	350	20
CS3L-355MS	1500	40.2	33.5	11.33	10.61	355	20
CS3L-360MS	1500	40.4	33.7	11.4	10.69	360	20
CS3L-365MS	1500	40.6	33.9	11.47	10.78	365	20
CS3L-370MS	1500	40.8	34.1	11.54	10.86	370	20
CS3L-375MS	1500	41	34.3	11.61	10.94	375	20
CS3L-380MS	1500	41.2	34.5	11.68	11.02	380	20
CS3L-385MS	1500	41.4	34.7	11.75	11.1	385	20
CS3L-390MS	1500	41.6	34.9	11.82	11.18	390	20
CS3U-350MS	1500	46.6	38.8	9.53	9.03	350	30
CS3U-355MS	1500	46.8	39	9.61	9.11	355	30
CS3U-360MS	1500	47	39.2	9.69	9.19	360	30
CS3U-365MS	1500	47.2	39.4	9.77	9.27	365	30
CS3U-370MS	1500	47.4	39.6	9.85	9.35	370	30
CS3U-375MS	1500	47.6	39.8	9.93	9.43	375	30
CS3U-380MS	1500	47.8	40	10.01	9.5	380	30
CS3U-385MS	1500	48	40.2	10.09	9.58	385	30
CS3U-390MS	1500	48.2	40.4	10.17	9.66	390	30
CS3U-395MS	1500	48.4	40.6	10.25	9.73	395	30
CS3U-400MS	1500	48.6	40.8	10.33	9.81	400	30
CS3U-405MS	1500	49.3	41	10.44	9.88	405	30
CS3U-410MS	1500	49.5	41.2	10.52	9.96	410	30
CS3K-295MS	1500	39.1	32.3	9.73	9.14	295	30
CS3K-300MS	1500	39.3	32.5	9.82	9.24	300	30
CS3K-305MS	1500	39.5	32.7	9.9	9.33	305	30
CS3K-310MS	1500	39.7	32.9	9.98	9.43	310	30
CS3K-315MS	1500	39.9	33.1	10.06	9.52	315	30
CS3K-320MS	1500	40.1	33.3	10.14	9.61	320	30
CS3K-325MS	1500	40.3	33.5	10.22	9.71	325	30
CS3K-330MS	1500	40.5	33.7	10.3	9.8	330	30
CS3K-335MS	1500	41.2	33.9	10.39	9.89	335	30
CS3K-340MS	1500	41.4	34.1	10.49	9.98	340	30
CS3K-345MS	1500	41.6	34.3	10.58	10.06	345	30
CS3U-345P	1500	46.1	38.6	9.44	8.94	345	30
CS3U-350P	1500	46.6	39.2	9.51	8.94	350	30



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CS3U-355P	1500	46.8	39.4	9.59	9.02	355	30
CS3U-360P	1500	47.0	39.6	9.67	9.10	360	30
CS3U-365P	1500	47.2	39.8	9.75	9.18	365	30
CS3U-370P	1500	47.4	40.0	9.83	9.26	370	30
CS3U-375P	1500	47.6	40.2	9.91	9.34	375	30
CS3U-380P	1500	47.8	40.4	9.99	9.42	380	30
CS3U-385P	1500	48.0	40.6	10.07	9.50	385	30
CS3U-390P	1500	48.6	40.8	10.17	9.56	390	30
CS3U-395P	1500	48.8	41.0	10.24	9.64	395	30
CS3U-400P	1500	49.0	41.2	10.30	9.71	400	30
CS3U-405P	1500	49.2	41.4	10.37	9.79	405	30
CS3K-290P	1500	38.9	32.3	9.49	8.98	290	30
CS3K-295P	1500	39.1	32.5	9.57	9.08	295	30
CS3K-300P	1500	39.3	32.7	9.65	9.18	300	30
CS3K-305P	1500	39.5	32.9	9.73	9.28	305	30
CS3K-310P	1500	39.7	33.1	9.81	9.37	310	30
CS3K-315P	1500	39.9	33.3	9.89	9.46	315	30
CS3K-320P	1500	40.1	33.5	9.97	9.56	320	30
CS3K-325P	1500	40.9	33.7	10.21	9.65	325	30
CS3K-330P	1500	41.1	33.9	10.29	9.74	330	30
CS3Y-470MS	1500	52.5	43.8	11.47	10.74	470	20
CS3Y-475MS	1500	52.7	44.0	11.52	10.81	475	20
CS3Y-480MS	1500	52.9	44.2	11.57	10.87	480	20
CS3Y-485MS	1500	53.1	44.4	11.62	10.94	485	20
CS3Y-490MS	1500	53.3	44.6	11.67	11.00	490	20
CS3Y-495MS	1500	53.5	44.8	11.72	11.06	495	20
CS3Y-500MS	1500	53.7	45.0	11.77	11.12	500	20
CS3Y-505MS	1500	53.9	45.2	11.82	11.18	505	20
CS3Y-510MS	1500	54.1	45.4	11.87	11.24	510	20
CS3Y-515MS	1500	54.3	45.6	11.92	11.30	515	20
CS3Y-435P	1500	51.0	41.8	11.13	10.41	435	20
CS3Y-440P	1500	51.2	42.0	11.18	10.48	440	20
CS3Y-445P	1500	51.4	42.2	11.23	10.55	445	20
CS3Y-450P	1500	51.6	42.4	11.28	10.62	450	20
CS3Y-455P	1500	51.8	42.6	11.33	10.69	455	20
CS3Y-460P	1500	52.0	42.8	11.38	10.75	460	20
CS3Y-465P	1500	52.2	43.0	11.43	10.82	465	20
CS3Y-470P	1500	52.4	43.2	11.48	10.88	470	20



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CS3Y-475P	1500	52.6	43.4	11.53	10.95	475	20
CS3Y-480P	1500	52.8	43.6	11.58	11.01	480	20
CS3Y-485P	1500	53.0	43.8	11.63	11.08	485	20
CS3N-375MS	1500	43.5	36.2	11.20	10.36	375	20
CS3N-380MS	1500	43.7	36.4	11.26	10.44	380	20
CS3N-385MS	1500	43.9	36.6	11.32	10.52	385	20
CS3N-390MS	1500	44.1	36.8	11.38	10.60	390	20
CS3N-395MS	1500	44.3	37.0	11.44	10.68	395	20
CS3N-400MS	1500	44.5	37.2	11.50	10.76	400	20
CS3N-405MS	1500	44.7	37.4	11.56	10.83	405	20
CS3N-410MS	1500	44.9	37.6	11.62	10.92	410	20
CS3N-415MS	1500	45.1	37.8	11.68	10.98	415	20
CS3N-420MS	1500	45.3	38.0	11.74	11.06	420	20
CS3N-425MS	1500	45.5	38.2	11.80	11.13	425	20
CS3N-430MS	1500	45.7	38.4	11.86	11.20	430	20
CS3N-435MS	1500	45.9	38.6	11.92	11.27	435	20
CS6U-310P	1500	44.9	36.4	9.08	8.52	310	15
CS6U-315P	1500	45.1	36.6	9.18	8.61	315	15
CS6U-320P	1500	45.3	36.8	9.26	8.69	320	15
CS6U-325P	1500	45.5	37.0	9.34	8.78	325	15
CS6U-330P	1500	45.6	37.2	9.45	8.88	330	15
CS6U-335P	1500	45.8	37.4	9.54	8.96	335	15
CS6U-340P	1500	45.9	37.6	9.62	9.05	340	15
CS6XH-295P	1500	41.4	34.4	9.52	8.58	295	20
CS6XH-300P	1500	41.6	34.6	9.56	8.68	300	20
CS6XH-305P	1500	41.8	34.8	9.60	8.77	305	20
CS6XH-310P	1500	42.0	35.0	9.64	8.86	310	20
CS6XH-315P	1500	42.2	35.2	9.68	8.95	315	20
CS6XH-320P	1500	42.4	35.4	9.72	9.04	320	20
CS6XH-325P	1500	42.6	35.6	9.76	9.13	325	20
CS6XH-330P	1500	42.8	35.8	9.83	9.22	330	20
CS6XH-335P	1500	43.0	36.0	9.90	9.31	335	20
CS6XH-340P	1500	43.2	36.2	9.97	9.40	340	20
CS6XH-345P	1500	43.4	36.4	10.04	9.49	345	20
CS6XH-330M	1500	43.8	35.6	9.76	9.27	330	20
CS6XH-335M	1500	44.0	35.9	9.82	9.34	335	20
CS6XH-340M	1500	44.2	36.2	9.88	9.40	340	20
CS6XH-345M	1500	44.4	36.5	9.94	9.46	345	20



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CS6XH-350M	1500	44.6	36.8	10.00	9.52	350	20
CS6XH-355M	1500	44.8	37.1	10.06	9.57	355	20
CS6XH-360M	1500	45.0	37.4	10.12	9.63	360	20
CS6XH-365M	1500	45.2	37.7	10.18	9.69	365	20
CS6XH-370M	1500	45.4	38.0	10.24	9.74	370	20
CS6XH-375M	1500	45.6	38.3	10.30	9.80	375	20
CS6PH-240P	1500	33.8	28.2	9.41	8.52	240	20
CS6PH-245P	1500	34.0	28.4	9.48	8.63	245	20
CS6PH-250P	1500	34.2	28.6	9.55	8.75	250	20
CS6PH-255P	1500	34.4	28.8	9.62	8.86	255	20
CS6PH-260P	1500	34.6	29.0	9.69	8.97	260	20
CS6PH-265P	1500	34.8	29.2	9.76	9.08	265	20
CS6PH-270P	1500	35.0	29.4	9.83	9.19	270	20
CS6PH-275P	1500	35.2	29.6	9.90	9.30	275	20
CS6PH-280P	1500	35.4	29.8	9.97	9.40	280	20
CS6PH-270M	1500	36.1	29.4	9.85	9.20	270	20
CS6PH-275M	1500	36.3	29.7	9.90	9.27	275	20
CS6PH-280M	1500	36.5	30.0	9.96	9.34	280	20
CS6PH-285M	1500	36.7	30.3	10.02	9.41	285	20
CS6PH-290M	1500	36.9	30.6	10.08	9.48	290	20
CS6PH-295M	1500	37.1	30.9	10.14	9.55	295	20
CS6PH-300M	1500	37.3	31.2	10.19	9.62	300	20
CS6PH-305M	1500	37.5	31.5	10.25	9.69	305	20
CS6PH-310M	1500	37.7	31.8	10.31	9.75	310	20
CS6AH-185P	1500	25.8	21.8	9.48	8.49	185	20
CS6AH-190P	1500	26.1	22.0	9.55	8.64	190	20
CS6AH-195P	1500	26.4	22.2	9.62	8.79	195	20
CS6AH-200P	1500	26.7	22.4	9.69	8.93	200	20
CS6AH-205P	1500	27.0	22.6	9.76	9.08	205	20
CS6AH-210P	1500	27.3	22.8	9.83	9.22	210	20
CS6AH-215P	1500	27.6	23.0	9.90	9.36	215	20
CS6AH-220P	1500	27.9	23.2	9.97	9.49	220	20
CS6AH-215M	1500	27.8	22.9	9.97	9.39	215	20
CS6AH-220M	1500	28.1	23.3	10.03	9.45	220	20
CS6AH-225M	1500	28.4	23.7	10.09	9.50	225	20
CS6AH-230M	1500	28.7	24.1	10.15	9.55	230	20
CS6AH-235M	1500	29.0	24.5	10.21	9.60	235	20
CS5PH-235P	1500	62.6	50.8	4.93	4.63	235	15



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CS5PH-240P	1500	62.8	51.0	5.00	4.71	240	15
CS5PH-245P	1500	63.0	51.4	5.07	4.79	245	15
CS5PH-250P	1500	63.2	51.4	5.14	4.87	250	15
CS5PH-255P	1500	63.4	51.6	5.21	4.95	255	15
CS5PH-260P	1500	63.6	51.8	5.28	5.02	260	15
CS5PH-250M	1500	63.4	53.4	5.00	4.69	250	15
CS5PH-255M	1500	63.6	53.6	5.06	4.76	255	15
CS5PH-260M	1500	63.8	53.8	5.13	4.84	260	15
CS5PH-265M	1500	64.0	54.0	5.20	4.91	265	15
CS5PH-270M	1500	64.2	54.2	5.27	4.99	270	15
CS5PH-275M	1500	64.4	54.4	5.34	5.06	275	15
CS1Y-380MS	1500	51.5	42.7	9.74	8.89	380	16
CS1Y-385MS	1500	51.7	42.9	9.78	8.97	385	16
CS1Y-390MS	1500	51.9	43.1	9.82	9.05	390	16
CS1Y-395MS	1500	52.1	43.3	9.86	9.13	395	16
CS1Y-400MS	1500	52.3	43.5	9.90	9.20	400	16
CS1Y-405MS	1500	52.5	43.7	9.94	9.27	405	16
CS1Y-410MS	1500	52.7	43.8	9.98	9.37	410	16
CS1Y-415MS	1500	52.8	44.0	10.02	9.44	415	16
CS1W-350MS	1500	46.5	39.3	9.74	8.91	350	16
CS1W-355MS	1500	47.2	39.5	9.78	9.00	355	16
CS1W-360MS	1500	47.9	39.7	9.82	9.07	360	16
CS1W-365MS	1500	48.1	39.9	9.86	9.15	365	16
CS1W-370MS	1500	48.3	40.1	9.90	9.23	370	16
CS1W-375MS	1500	48.5	40.3	9.94	9.31	375	16
CS1W-380MS	1500	48.7	40.5	9.98	9.39	380	16
CS1W-385MS	1500	48.9	40.7	10.03	9.46	385	16
CS6Y-570MS	1500	52.8	43.8	13.77	13.02	570	25
CS6Y-575MS	1500	53	44	13.82	13.07	575	25
CS6Y-580MS	1500	53.2	44.2	13.87	13.13	580	25
CS6Y-585MS	1500	53.4	44.4	13.92	13.18	585	25
CS6Y-590MS	1500	53.6	44.6	13.97	13.23	590	25
CS6Y-595MS	1500	53.8	44.8	14.02	13.29	595	25
CS6Y-600MS	1500	54	45	14.07	13.34	600	25
CS6Y-605MS	1500	54.2	45.2	14.12	13.39	605	25
CS6W-530MS	1500	48.8	40.9	13.8	12.96	530	25
CS6W-535MS	1500	49	41.1	13.85	13.02	535	25
CS6W-540MS	1500	49.2	41.3	13.9	13.08	540	25



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CS6W-545MS	1500	49.4	41.5	13.95	13.14	545	25
CS6W-550MS	1500	49.6	41.7	14	13.2	550	25
CS6W-555MS	1500	49.8	41.9	14.05	13.25	555	25
CS6W-560MS	1500	50.0	42.1	14.10	13.31	560	25
CS6L-440MS	1500	40.6	34.0	13.82	12.95	440	25
CS6L-445MS	1500	40.8	34.2	13.86	13.03	445	25
CS6L-450MS	1500	41.0	34.4	13.90	13.10	450	25
CS6L-455MS	1500	41.2	34.6	13.95	13.17	455	25
CS6L-460MS	1500	41.4	34.8	14.00	13.24	460	25
CS6R-380MS	1500	36.0	30.0	13.55	12.69	380	25
CS6R-385MS	1500	36.2	30.2	13.63	12.77	385	25
CS6R-390MS	1500	36.4	30.4	13.70	12.84	390	25
CS6R-395MS	1500	36.6	30.6	13.77	12.91	395	25
CS6R-400MS	1500	36.8	30.8	13.85	12.99	400	25
CS6R-405MS	1500	37.0	31.0	13.93	13.07	405	25
CS6R-410MS	1500	37.2	31.2	14.01	13.15	410	25
CS6R-415MS	1500	37.4	31.4	14.09	13.23	415	25
CS6R-420MS	1500	37.6	31.6	14.17	13.31	420	25
CS6R-380MS-HL	1500	36.0	30.0	13.55	12.69	380	25
CS6R-385MS-HL	1500	36.2	30.2	13.63	12.77	385	25
CS6R-390MS-HL	1500	36.4	30.4	13.70	12.84	390	25
CS6R-395MS-HL	1500	36.6	30.6	13.77	12.91	395	25
CS6R-400MS-HL	1500	36.8	30.8	13.85	12.99	400	25
CS6R-405MS-HL	1500	37.0	31.0	13.93	13.07	405	25
CS6R-410MS-HL	1500	37.2	31.2	14.01	13.15	410	25
CS6R-415MS-HL	1500	37.4	31.4	14.09	13.23	415	25
CS6R-420MS-HL	1500	37.6	31.6	14.17	13.31	420	25
CS7N-635MS	1500	44.4	37.3	18.27	17.03	635	30
CS7N-640MS	1500	44.6	37.5	18.31	17.07	640	30
CS7N-645MS	1500	44.8	37.7	18.35	17.11	645	30
CS7N-650MS	1500	45	37.9	18.39	17.16	650	30
CS7N-655MS	1500	45.2	38.1	18.43	17.2	655	30
CS7N-660MS	1500	45.4	38.3	18.47	17.24	660	30
CS7N-665MS	1500	45.6	38.5	18.51	17.28	665	30
CS7N-670MS	1500	45.8	38.7	18.55	17.32	670	30
CS7N-675MS	1500	46.0	38.9	18.59	17.36	675	30
CS7N-680MS	1500	46.2	39.1	18.63	17.40	680	30
CS7L-575MS	1500	40.3	33.9	18.22	16.97	575	30



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CS7L-580MS	1500	40.5	34.1	18.27	17.02	580	30
CS7L-585MS	1500	40.7	34.3	18.32	17.06	585	30
CS7L-590MS	1500	40.9	34.5	18.37	17.11	590	30
CS7L-595MS	1500	41.1	34.7	18.42	17.15	595	30
CS7L-600MS	1500	41.3	34.9	18.47	17.2	600	30
CS7L-605MS	1500	41.5	35.1	18.52	17.25	605	30
CS7L-610MS	1500	41.7	35.3	18.57	17.29	610	30
CS7L-615MS	1500	41.9	35.4	18.62	17.38	615	30
CS7L-620MS	1500	42.1	35.5	18.67	17.47	620	30
CS7L-575MS-R	1500	40.3	33.9	18.22	16.97	575	30
CS7L-580MS-R	1500	40.5	34.1	18.27	17.02	580	30
CS7L-585MS-R	1500	40.7	34.3	18.32	17.06	585	30
CS7L-590MS-R	1500	40.9	34.5	18.37	17.11	590	30
CS7L-595MS-R	1500	41.1	34.7	18.42	17.15	595	30
CS7L-600MS-R	1500	41.3	34.9	18.47	17.2	600	30
CS7L-605MS-R	1500	41.5	35.1	18.52	17.25	605	30
CS7L-610MS-R	1500	41.7	35.3	18.57	17.29	610	30
CS7L-615MS-R	1500	41.9	35.4	18.62	17.38	615	30
CS7L-620MS-R	1500	42.1	35.5	18.67	17.47	620	30
CS5A-200M-PLUS	1500	45.7	37.9	5.66	5.28	200	15
CS5A-205M-PLUS	1500	45.9	38.1	5.74	5.39	205	15
CS5A-210M-PLUS	1500	46.1	38.3	5.82	5.49	210	15
CS5A-215M-PLUS	1500	46.3	38.5	5.90	5.59	215	15
CS5A-220M-PLUS	1500	46.5	38.7	5.98	5.69	220	15
CS5P-250M-PLUS	1500	56.9	47.2	5.66	5.30	250	15
CS5P-255M-PLUS	1500	57.1	47.4	5.74	5.39	255	15
CS5P-260M-PLUS	1500	57.3	47.6	5.82	5.47	260	15
CS5P-265M-PLUS	1500	57.5	47.8	5.90	5.55	265	15
CS5P-270M-PLUS	1500	57.7	48.0	5.98	5.63	270	15
CS6A-200P-PLUS	1500	29.3	24.1	9.05	8.31	200	20
CS6A-205P-PLUS	1500	29.5	24.3	9.11	8.45	205	20
CS6A-210P-PLUS	1500	29.7	24.5	9.17	8.58	210	20
CS6A-215P-PLUS	1500	29.9	24.7	9.23	8.71	215	20
CS6A-220P-PLUS	1500	30.1	24.9	9.29	8.84	220	20
CS6A-225P-PLUS	1500	30.3	25.1	9.42	8.97	225	20
CS6A-230P-PLUS	1500	30.5	25.3	9.56	9.10	230	20
CS6A-235P-PLUS	1500	30.7	25.5	9.70	9.23	235	20
CS6A-240P-PLUS	1500	30.9	25.7	9.81	9.34	240	20



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CS6A-245P-PLUS	1500	31.1	25.9	9.95	9.47	245	20
CS6A-250P-PLUS	1500	31.3	26.1	10.08	9.59	250	20
CS6P-255P-PLUS	1500	37.3	30.8	8.94	8.29	255	20
CS6P-260P-PLUS	1500	37.5	31.0	9.01	8.40	260	20
CS6P-265P-PLUS	1500	37.7	31.2	9.09	8.51	265	20
CS6P-270P-PLUS	1500	37.9	31.4	9.17	8.61	270	20
CS6P-275P-PLUS	1500	38.1	31.6	9.23	8.71	275	20
CS6P-280P-PLUS	1500	38.3	31.8	9.29	8.82	280	20
CS6P-285P-PLUS	1500	38.5	32.0	9.40	8.92	285	20
CS6P-290P-PLUS	1500	38.7	32.2	9.48	9.01	290	20
CS6P-295P-PLUS	1500	38.9	32.4	9.60	9.11	295	20
CS6P-300P-PLUS	1500	39.1	32.6	9.71	9.22	300	20
CS6P-305P-PLUS	1500	39.3	32.8	9.82	9.30	305	20
CS6P-310P-PLUS	1500	39.5	33.0	9.93	9.40	310	20
CS6P-315P-PLUS	1500	39.7	33.2	10.04	9.50	315	20
CS6P-320P-PLUS	1500	39.9	33.4	10.15	9.59	320	20
CS6X-310P-PLUS	1500	45.3	37.9	8.94	8.19	310	20
CS6X-315P-PLUS	1500	45.5	38.1	9.00	8.28	315	20
CS6X-320P-PLUS	1500	45.7	38.3	9.06	8.37	320	20
CS6X-325P-PLUS	1500	45.9	38.5	9.12	8.46	325	20
CS6X-330P-PLUS	1500	46.1	38.7	9.17	8.54	330	20
CS6X-335P-PLUS	1500	46.3	38.9	9.23	8.62	335	20
CS6X-340P-PLUS	1500	46.5	39.1	9.29	8.71	340	20
CS6X-345P-PLUS	1500	46.7	39.3	9.35	8.79	345	20
CS6X-350P-PLUS	1500	46.9	39.5	9.40	8.87	350	20
CS6X-355P-PLUS	1500	47.1	39.7	9.47	8.95	355	20
CS6X-360P-PLUS	1500	47.3	39.9	9.52	9.03	360	20
CS6X-365P-PLUS	1500	47.5	40.1	9.58	9.12	365	20
CS6X-370P-PLUS	1500	47.7	40.3	9.66	9.20	370	20
CS6X-375P-PLUS	1500	47.9	40.5	9.74	9.27	375	20
CS6W-540T	1500	50.6	41.5	13.47	13.02	540	25
CS6W-545T	1500	50.8	41.7	13.54	13.07	545	25
CS6W-550T	1500	51.0	41.9	13.59	13.13	550	25
CS6W-555T	1500	51.2	42.1	13.64	13.19	555	25
CS6W-560T	1500	51.4	42.3	13.69	13.24	560	25
CS6W-565T	1500	51.6	42.5	13.75	13.30	565	25
CS6W-570T	1500	51.8	42.7	13.81	13.35	570	25
CS6W-575T	1500	52.0	42.9	13.88	13.41	575	25



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Model Type	Maximum DC System Voltage (V)	Open Circuit Voltage (V)	Maximum power voltage (V)	Short Circuit Current (A)	Maximum power current (A)	Maximum Power (Watts)	Maximum overcurrent protection rating (A)
CS6W-580T	1500	52.2	43.1	13.93	13.46	580	25
CS6W-585T	1500	52.4	43.3	14.00	13.52	585	25
CS6W-590T	1500	52.6	43.5	14.06	13.57	590	25
CS6W-595T	1500	52.8	43.7	14.12	13.62	595	25
CS6W-600T	1500	53.0	43.9	14.18	13.68	600	25
CS6W-605T	1500	53.2	44.1	14.24	13.73	605	25
CS6R-400T	1500	37.8	30.8	13.51	13.01	400	25
CS6R-405T	1500	38.0	31.0	13.56	13.08	405	25
CS6R-410T	1500	38.2	31.2	13.61	13.15	410	25
CS6R-415T	1500	38.4	31.4	13.66	13.22	415	25
CS6R-420T	1500	38.6	31.6	13.71	13.30	420	25
CS6R-425T	1500	38.8	31.8	13.78	13.37	425	25
CS6R-430T	1500	39.0	32.0	13.86	13.44	430	25
CS6R-435T	1500	39.2	32.2	13.94	13.51	435	25
CS6R-440T	1500	39.4	32.4	14.01	13.59	440	25
CS6R-445T	1500	39.6	32.6	14.09	13.66	445	25
CS6R-450T	1500	39.8	32.8	14.16	13.72	450	25
CS6R-455T	1500	40.0	33.0	14.24	13.79	455	25
CS6R-380MB	1500	36.8	30.6	13.09	12.44	380	30
CS6R-385MB	1500	37.0	30.8	13.17	12.52	385	30
CS6R-390MB	1500	37.2	31.0	13.25	12.60	390	30
CS6R-395MB	1500	37.4	31.2	13.33	12.68	395	30
CS6R-400MB	1500	37.6	31.4	13.41	12.76	400	30
CS6R-405MB	1500	37.8	31.6	13.49	12.84	405	30
CS6R-410MB	1500	38.0	31.8	13.57	12.91	410	30
CS6R-415MB	1500	38.2	32.0	13.65	12.98	415	30
CS6R-420MB	1500	38.4	32.2	13.73	13.05	420	30
CS6R-380MB-HL	1500	36.8	30.6	13.09	12.44	380	30
CS6R-385MB-HL	1500	37.0	30.8	13.17	12.52	385	30
CS6R-390MB-HL	1500	37.2	31.0	13.25	12.60	390	30
CS6R-395MB-HL	1500	37.4	31.2	13.33	12.68	395	30
CS6R-400MB-HL	1500	37.6	31.4	13.41	12.76	400	30
CS6R-405MB-HL	1500	37.8	31.6	13.49	12.84	405	30
CS6R-410MB-HL	1500	38.0	31.8	13.57	12.91	410	30
CS6R-415MB-HL	1500	38.2	32.0	13.65	12.98	415	30
CS6R-420MB-HL	1500	38.4	32.2	13.73	13.05	420	30
CS6W-510MB	1500	48.0	40.1	13.60	12.72	510	30
CS6W-515MB	1500	48.2	40.3	13.65	12.78	515	30



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Model Type	Maximum DC System Voltage (V)	Open Circuit Voltage (V)	Maximum power voltage (V)	Short Circuit Current (A)	Maximum power current (A)	Maximum Power (Watts)	Maximum overcurrent protection rating (A)
CS6W-520MB	1500	48.4	40.5	13.70	12.84	520	30
CS6W-525MB	1500	48.6	40.7	13.75	12.90	525	30
CS6W-530MB	1500	48.8	40.9	13.80	12.96	530	30
CS6W-535MB	1500	49.0	41.1	13.85	13.02	535	30
CS6W-540MB	1500	49.2	41.3	13.90	13.08	540	30
CS6W-545MB	1500	49.4	41.5	13.95	13.14	545	30
CS6W-550MB	1500	49.6	41.7	14.00	13.20	550	30
CS6W-555MB	1500	49.8	41.9	14.05	13.25	555	30
CS6W-560MB	1500	50.0	42.1	14.10	13.31	560	30
CS6.1-72TM-575	1500	50.8	43.0	14.24	13.38	575	25
CS6.1-72TM-580	1500	51.0	43.2	14.30	13.43	580	25
CS6.1-72TM-585	1500	51.2	43.4	14.36	13.48	585	25
CS6.1-72TM-590	1500	51.4	43.6	14.42	13.54	590	25
CS6.1-72TM-595	1500	51.6	43.8	14.48	13.59	595	25
CS6.1-72TM-600	1500	51.8	44.0	14.54	13.64	600	25
CS6.1-72TM-605	1500	52.0	44.2	14.60	13.69	605	25
CS6.1-72TM-610	1500	52.2	44.4	14.66	13.74	610	25
CS6.1-72TM-615	1500	52.4	44.6	14.72	13.79	615	25
CS6.1-72TM-620	1500	52.6	44.8	14.78	13.84	620	25
CS6.1-72TM-625	1500	52.8	45.0	14.84	13.89	625	25
CS6.1-72TM-630	1500	53.0	45.2	14.90	13.94	630	25
CS6.1-72TM-635	1500	53.2	45.4	14.96	13.99	635	25
CS6.1-60TM-470H	1500	42.0	35.4	14.09	13.28	470	25
CS6.1-60TM-475H	1500	42.2	35.6	14.16	13.35	475	25
CS6.1-60TM-480H	1500	42.4	35.8	14.23	13.42	480	25
CS6.1-60TM-485H	1500	42.6	36.0	14.30	13.49	485	25
CS6.1-60TM-490H	1500	42.8	36.2	14.37	13.55	490	25
CS6.1-60TM-495H	1500	43.0	36.4	14.44	13.61	495	25
CS6.1-60TM-500H	1500	43.2	36.6	14.51	13.67	500	25
CS6.1-60TM-505H	1500	43.4	36.8	14.58	13.73	505	25
CS6.1-60TM-510H	1500	43.6	37.0	14.65	13.79	510	25
CS6.1-60TM-515H	1500	43.8	37.2	14.72	13.85	515	25
CS6.1-60TM-520H	1500	44.0	37.4	14.79	13.91	520	25
CS6.1-60TM-525H	1500	44.2	37.6	14.86	13.97	525	25
CS6.1-60TM-470	1500	42.0	35.4	14.09	13.28	470	25
CS6.1-60TM-475	1500	42.2	35.6	14.16	13.35	475	25
CS6.1-60TM-480	1500	42.4	35.8	14.23	13.42	480	25
CS6.1-60TM-485	1500	42.6	36.0	14.30	13.49	485	25



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Model Type	Maximum DC System Voltage (V)	Open Circuit Voltage (V)	Maximum power voltage (V)	Short Circuit Current (A)	Maximum power current (A)	Maximum Power (Watts)	Maximum overcurrent protection rating (A)
CS6.1-60TM-490	1500	42.8	36.2	14.37	13.55	490	25
CS6.1-60TM-495	1500	43.0	36.4	14.44	13.61	495	25
CS6.1-60TM-500	1500	43.2	36.6	14.51	13.67	500	25
CS6.1-60TM-505	1500	43.4	36.8	14.58	13.73	505	25
CS6.1-60TM-510	1500	43.6	37.0	14.65	13.79	510	25
CS6.1-60TM-515	1500	43.8	37.2	14.72	13.85	515	25
CS6.1-60TM-520	1500	44.0	37.4	14.79	13.91	520	25
CS6.1-60TM-525	1500	44.2	37.6	14.86	13.97	525	25
CS6.1-54TM-430H	1500	38.1	32.2	14.25	13.38	430	25
CS6.1-54TM-435H	1500	38.3	32.4	14.33	13.45	435	25
CS6.1-54TM-440H	1500	38.5	32.6	14.41	13.52	440	25
CS6.1-54TM-445H	1500	38.7	32.8	14.48	13.59	445	25
CS6.1-54TM-450H	1500	38.9	33.0	14.55	13.66	450	25
CS6.1-54TM-455H	1500	39.1	33.2	14.61	13.72	455	25
CS6.1-54TM-460H	1500	39.3	33.4	14.69	13.78	460	25
CS6.1-54TM-465H	1500	39.5	33.6	14.77	13.85	465	25
CS6.1-54TM-470H	1500	39.7	33.8	14.86	13.91	470	25
CS6.1-54TM-475H	1500	39.9	34.0	14.94	13.98	475	25
CS6.1-54TM-480H	1500	40.1	34.2	15.03	14.05	480	25
CS6.1-54TM-430	1500	38.1	32.2	14.25	13.38	430	25
CS6.1-54TM-435	1500	38.3	32.4	14.33	13.45	435	25
CS6.1-54TM-440	1500	38.5	32.6	14.41	13.52	440	25
CS6.1-54TM-445	1500	38.7	32.8	14.48	13.59	445	25
CS6.1-54TM-450	1500	38.9	33.0	14.55	13.66	450	25
CS6.1-54TM-455	1500	39.1	33.2	14.61	13.72	455	25
CS6.1-54TM-460	1500	39.3	33.4	14.69	13.78	460	25
CS6.1-54TM-465	1500	39.5	33.6	14.77	13.85	465	25
CS6.1-54TM-470	1500	39.7	33.8	14.86	13.91	470	25
CS6.1-54TM-475	1500	39.9	34.0	14.94	13.98	475	25
CS6.1-54TM-480	1500	40.1	34.2	15.03	14.05	480	25

Note:

1. All electrical data are shown as relative to standard test conditions (STC) (1000 W/m², (25 ± 2) °C, AM 1.5 according to IEC 60904-3).
2. The manufacturer declared tolerance of Open-circuit voltage, Short-circuit current is ±5%, the manufacturer declared tolerance of Maximum power is ±3%.
3. The operating ambient temperature of these devices may exceed 40 °C at full load for all wire sizes if it is determined suitable in the field use application.



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4. The electrical power performance of the CS6R-xxxMB, CS6R-xxxMB-HL, CS6W-xxxMB model series is only generated by front side of the PV module, more power may be generated if considering back side of the module.



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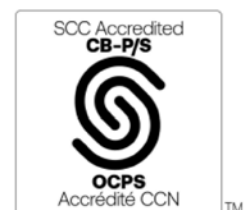
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APPLICABLE REQUIREMENTS

CAN/CSA-C22.2 No. 61730-1:19	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction, 2019-12
CAN/CSA-C22.2 No. 61730-2:19	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing, 2019-12
UL 61730-1 First Edition	Photovoltaic (PV) Module Safety Qualification - Part 1: Requirements for Construction, 2017-12-04, revision date 2020-04-30
UL 61730-2 First Edition	Photovoltaic (PV) Module Safety Qualification - Part 2: Requirements for Testing, 2017-12-04, revision date 2020-04-30

Notes:

Products certified under Class C531110 have been certified under CSA's ISO/IEC 17065 accreditation with the Standards Council of Canada (SCC). www.scc.ca





7/22/2025

ROI CONSTRUCTION
8312 SAVAGE GUILFORD RD
SAVAGE MD 20763

Attn.: To Whom It May Concern

re job: EVANS, JUSTIN RESIDENCE
30 PINE AVE
TAKOMA PARK, MD 20912

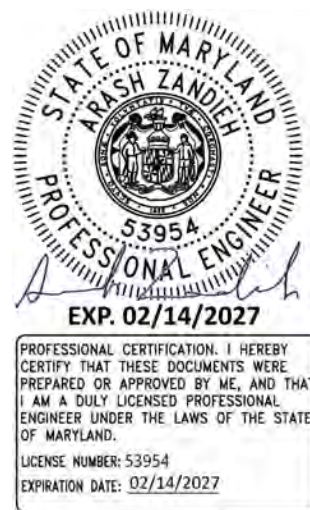
The following calculations are for the structural engineering design of the photovoltaic panels and are valid only for the structural info referenced in the stamped plan set. The verification of such info is the responsibility of others.

After review, I certify that the roof structure lacks sufficient structural capacity for the applied PV loads. See the following calculations and Plan Sheets for upgrade details to bring the roof structure up to the required All mounting equipment shall be designed and installed per manufacturer's approved installation specifications.

Design Criteria:

Code:	2021 IRC		
	ASCE 7-16		
Live Load:	20	psf	
Ult Wind Speed:	115	mph	
Exposure Cat:	B		
Ground Snow:	35	psf	Min Roof Snow: 30

AHZ Consulting Engineers Inc.
Professional Engineer
projects@ahzengineers.com



Digitally
signed by
Arash Zandieh
Date:

2025.10.20
22:43:29 -07'00'



Roof Properties:

	Roof 1	Roof 2
Roof Type =	Shingle	Shingle
Roof Pitch (deg) =	28	28
Mean Roof Height (ft) =	23	23
Attachment Trib Width (ft) =	2.2	2.2
Attachment Spacing (ft) =	4	4
Framing Type =	Rafter	Rafter
Framing Size =	2x6	2x6
Framing OC Spacing (in.) =	24	24
Section Thickness, b (in.) =	1.5	1.5
Section Depth, d (in.) =	5.5	5.5
Section Modulus, S _x (in. ³) =	7.6	7.6
Moment of Inertia, I _x (in. ⁴) =	20.8	20.8
Framing Span (ft) =	14.5	10
Deflection Limit D+L (in.) =	2.9	2
Deflection Limit S or W (in.) =	1.93	1.33
Attachments Pattern =	Fully Staggered	Fully Staggered
Framing Upgrade =	Sistering	Adequate
Sister Size =	2x6	NA
Wood Species =	DF #2	DF #2
Wood F _b (psi) =	900	900
Wood F _v (psi) =	180	180
Wood E (psi) =	1600000	1600000
C _D (Wind) =	1.6	1.6
C _D (Snow) =	1.15	1.15
C _{LS} =	1.15	1.15
C _M = C _t = C _L = C _i =	1.0	1.0
C _F =	1.3	1.3
C _{fu} =	1.00	1.00
C _r =	1.15	1.15
F' _{b_wind} (psi) =	2476	2476
F' _{b_snow} (psi) =	1779	1779
F' _{v_wind} (psi) =	288	288
F' _{v_snow} (psi) =	207	207
M _{allowable_wind} (lb-ft) =	3120	1560
M _{allowable_snow} (lb-ft) =	2243	1121
V _{allowable_wind} (lbs) =	1584	1584
V _{allowable_snow} (lbs) =	1139	1139



E' (psi) = | 1600000 1600000

Load Calculation:

Dead Load Calculations:

Panels Dead Load (psf) =	2.7	
	Roof 1	Roof 2
Roofing Weight (psf) =	3.0	3.0
Decking Weight (psf) =	2.0	2.0
Framing Weight (psf) =	1.9	0.9
Misc. Additional Weight (psf) =	1.0	1.0
Existing Dead Load (psf) =	7.9	6.9
Total Dead Load (psf) =	10.6	9.6

Snow Load Calculations:

Ground Snow Load, pg (psf) =	35	
Min Flat Snow, pf_min (psf) =	30	
Min Sloped Snow, ps_min (psf) =	NA	
Snow Importance Factor, Ic =	1.0	
Exposure Factor, Ce =	0.9	
	Roof 1	Roof 2
Thermal Factor, Ct =	1.2	1.2
Flat Roof Snow, pf (psf) =	30	30
Slope Factor, Cs =	1.00	1.00
Sloped Roof Snow, ps (psf) =	30	30

Wind Load Calculations:

Ultimate Wind Speed (mph) =	115	
Directionality Factor, kd =	0.85	
Topographic Factor, kzt =	1.0	
	Roof 1	Roof 2
Velocity Press Exp Factor, kz =	0.70	0.70
Ground Elevation Factor, ke =	1.00	
Velocity Pressure, qz (psf) =	20.2	20.2
Array Edge Factor, γE =	1.25	
Solar Equalization Factor, γa =	0.64	0.64
External Pressure Up, GCp_1 =	-1.5	-1.5
External Pressure Up, GCp_2 =	-1.8	-1.8
External Pressure Up, GCp_3 =	-2.2	-2.2
External Pressure Down, GCp =	0.8	0.8
Design Pressure Up, p_1 (psf) =	-24.4	-24.4
Design Pressure Up, p_2 (psf) =	-29.2	-29.2



Design Pressure Up, p ₃ (psf) =	-35.7	-35.7
Design Pressure Down, p (psf) =	16.0	16.0

Hardware Checks:

Attachment Checks:

	Roof 1	Roof 2
Attachment Type =	Ironridge HUG	Ironridge HUG
Allowable Up Force (lbs) =	1004	1004
	2056	2056
Allowable Side Force (lbs) =	240	240
Applied Uplift Force (lbs) =	-177	-177
Uplift DCR =	0.18	0.18
Applied Down Force (lbs) =	340	340
Down DCR =	0.17	0.17
Applied Lateral Force (lbs) =	169	169
Lateral DCR =	0.70	0.70

Roof Framing Checks:

Force Checks:

	Roof 1	Roof 2
LC1: D+S		
Applied Moment (lb-ft) =	2134	991
Applied Shear (lbs) =	589	396
Allowable Moment (lb-ft) =	2243	1121
Allowable Shear (lbs) =	1139	1139
Moment DCR =	0.95	0.88
Shear DCR =	0.52	0.35
LC2: D+0.6W		
Applied Moment (lb-ft) =	1061	481
Applied Shear (lbs) =	293	192
Allowable Moment (lb-ft) =	3120	1560
Allowable Shear (lbs) =	1584	1584
Moment DCR =	0.34	0.31
Shear DCR =	0.18	0.12
LC3: D+0.75(S+0.6W)		
Applied Moment (lb-ft) =	2118	984
Applied Shear (lbs) =	584	393
Allowable Moment (lb-ft) =	3120	1560
Allowable Shear (lbs) =	1584	1584



	Moment DCR =	0.68	0.63
	Shear DCR =	0.37	0.25
LC4: 0.6D+0.6W			
	Applied Moment (lb-ft) =	435	221
	Applied Shear (lbs) =	120	88
	Allowable Moment (lb-ft) =	3120	1560
	Allowable Shear (lbs) =	1584	1584
	Moment DCR =	0.14	0.14
	Shear DCR =	0.08	0.06

Deflection Checks (Service Level):

	Roof 1	Roof 2
LC1: D+L		
	Deflection (in.) =	0.47 0.20
	Deflection Limit (in.) =	3.335 2.3
	Deflection DCR =	0.14 0.09
LC2: S		
	Deflection (in.) =	0.90 0.41
	Deflection Limit (in.) =	2.22 1.53
	Deflection DCR =	0.40 0.26
LC3: W (Down)		
	Deflection (in.) =	0.20 0.09
	Deflection Limit (in.) =	2.22 1.53
	Deflection DCR =	0.09 0.06
LC4: W (Up)		
	Deflection (in.) =	-0.31 -0.14
	Deflection Limit (in.) =	2.22 1.53
	Deflection DCR =	0.14 0.09

Seismic Check:

Existing Weight:

Wall Weight (psf) =	17	
Tributary Wall Area (ft ²) =	2550	
Total Wall Weight (lbs) =	43350	
Roof Weight (psf) =	8	
Roof Area (ft ²) =	1750	
Total Roof Weight (lbs) =	13809	
Total Existing Weight (lbs) =	57159	

Additional PV Weight:



PV Panel Weight (lbs) =	49
Number of Panels =	12
Total Additional PV Weight (lbs) =	588

Weight Increase:

$$\frac{(\text{Existing } W + \text{Additional } W)}{(\text{Existing } W)} = 1.01$$

The increase in weight as a result of the solar system is less than 10% of the existing structure and therefore no further seismic analysis is required.

Limits of Scope of Work and Liability:

Existing structure is assumed to have been designed and constructed following appropriate codes at time of erection, and assumed to have appropriate permits. The calculations produced are only for the roof framing supporting the proposed PV installation referenced in the stamped planset and were completed according to generally recognized structural analysis standards and procedures, professional engineering and design experience, opinions and judgements. Existing deficiencies which are unknown or were not observable during time of inspection are not included in this scope of work. All PV modules, racking, and mounting equipment shall be designed and installed per manufacturer's approved installation specifications. The Engineer of Record and the engineering consulting firm assume no responsibility for misuse or improper installation. This analysis is not stamped for water leakage. Framing was determined based on information in provided plans and/or photos, along with engineering judgement. Prior to commencement of work, the contractor shall verify the framing sizes, spacings, and spans noted in the stamped plans, calculations, and cert letter (where applicable) and notify the Engineer of Record of any discrepancies prior to starting construction. Contractor shall also verify that there is no damaged framing that was not addressed in stamped plans, calculations, and cert letter (where applicable) and notify the Engineer of Record of any concerns prior to starting construction.

NOTES:

1. PROVIDE (N) "B" SISTERED RAFTERS TO (E) RAFTER, SEE DETAILS.
2. SINGLE SISTER MEMBER IS ACCEPTABLE IF SINGLE SISTER LENGTH MATCHES THE MINIMUM SISTER LENGTH.

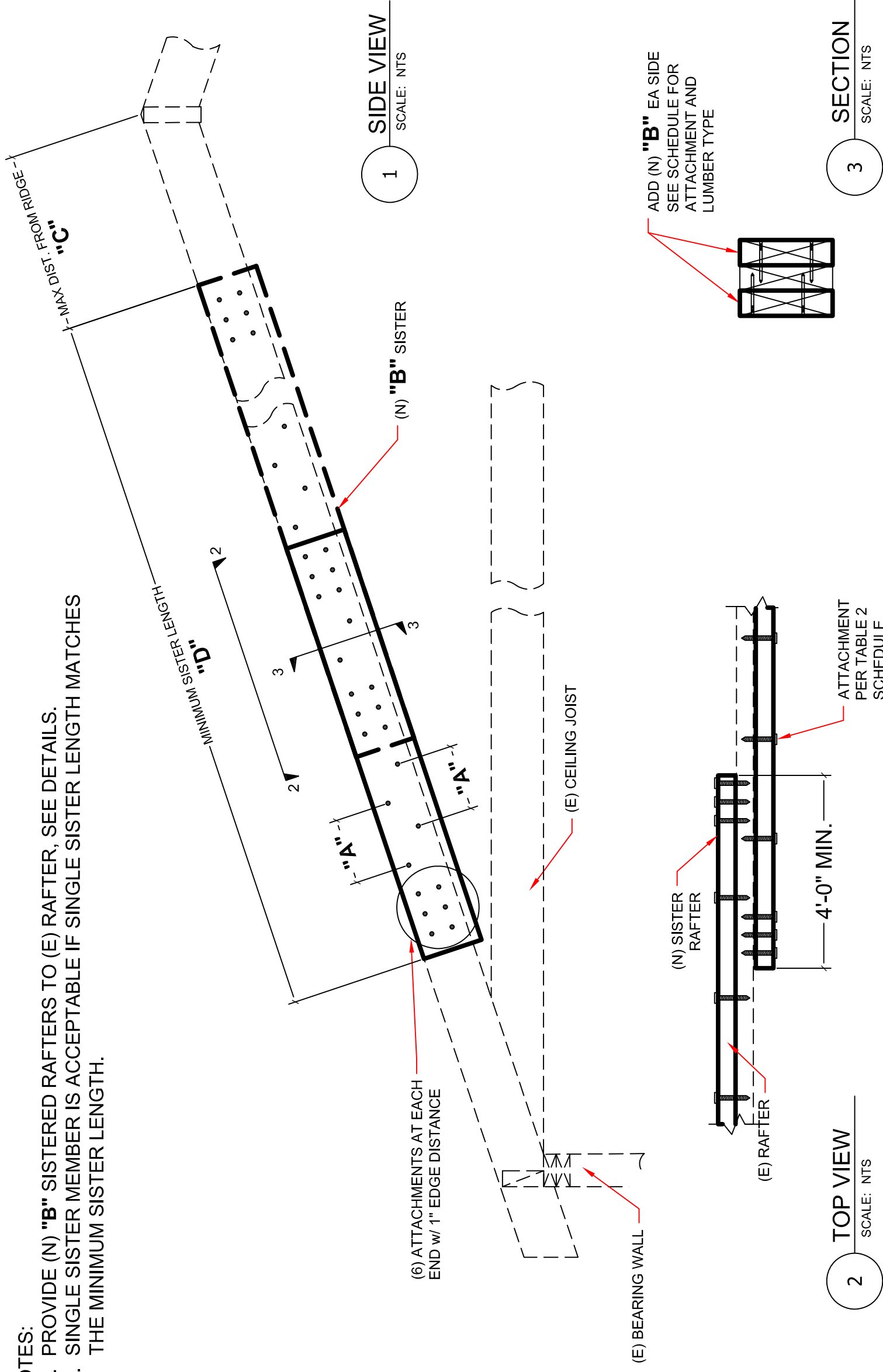


TABLE 1: ACCEPTABLE MIN. LUMBER TYPE

LUMBER SPECIES & GRADE	MIN. BENDING F _b (psi)
DOUG FIR-LARCH #2	900
SOUTHERN PINE #1	1000
HEM-FIR #2	850
SPRUCE PINE FIR #2	875

TABLE 2: ACCEPTABLE ATTACHMENT SCHEDULE

OPTION	TYPE	FIELD SPACING "A"
1	SIMPSON SDWS TIMBER SCREW	12" OC
2	COMMON 10d	6" OC

TABLE 3: UPGRADE SPECIFICATIONS

CALLOUT	VARIABLE
RAFTER SIZE "B"	2x6
MAX DIST. FROM RIDGE "C"	1'-0"
MIN. SISTER LENGTH "D"	full length-2

SISTERING DETAILS

SCALE: NTS



111 Rodeo
Irvine, CA 92602

Project EVANS, JUSTIN RESIDENCE Property Owner EVANS, JUSTIN RESIDENCE

Address 30 PINE AVE, TAKOMA PARK, MD 20912

I reviewed the design of the photovoltaic (PV) system, as designed by the manufacturer, and the design criteria utilized for the mounting equipment and panel mounting assembly (rack system) for the installation of 12 (#) panels supported by the rack system, as shown on the drawings prepared for the above referenced address. I certify that the configurations and design criteria meet the standards and requirements of the International Residential Code (IRC) in COMCOR 08.00.02.

The attachment of the rack system to the building at the above address, including the location, number, and type of attachment points; the number of fasteners per attachment point; and the specific type of fasteners (size, diameter, length, minimum embedment into structural framing, etc.) meets the standards and requirements of the IRC adopted by Montgomery County in COMCOR 08.00.02.

I evaluated the existing roof structure of the building at the above address and analyzed its capacity to support the additional loads imposed by the PV system. I certify that no structural modifications of the existing roof structure are required. The existing roof structure meets the standards and requirements of the IRC, adopted by Montgomery County in COMCOR 08.00.02, necessary to support the PV system.

I evaluated the existing roof structure of the building at the above address and analyzed its capacity to support the additional loads imposed by the PV system. Structural modifications of the existing roof structure are required. I certify that the roof structure, as modified on the drawings for this project, will support the additional loads imposed by the PV system. I further certify that design of the modified roof structure meets the standards and requirements of the IRC, adopted by Montgomery County in COMCOR 08.00.02.

I prepared or approved the construction documents for the mounting equipment, rack system, roof structure for this project.


Re-installations:

I certify that the reinstallation of the photovoltaic system (PV) as shown on the approved drawings for permit _____ (show original permit #) does not alter the approval under the permit or make the PV system, attachment to the building, and roof framing unsafe.

53954

Maryland PE License Number

Date 11/26/2025

Signature 
Digitally signed by Arash Zandieh
Date: 2025.11.26 09:16:20 -08'00'

Seal



Digitally signed by Arash Zandieh
Date: 2025.11.26 09:16:30 -08'00'

Updated 11/14/2024

