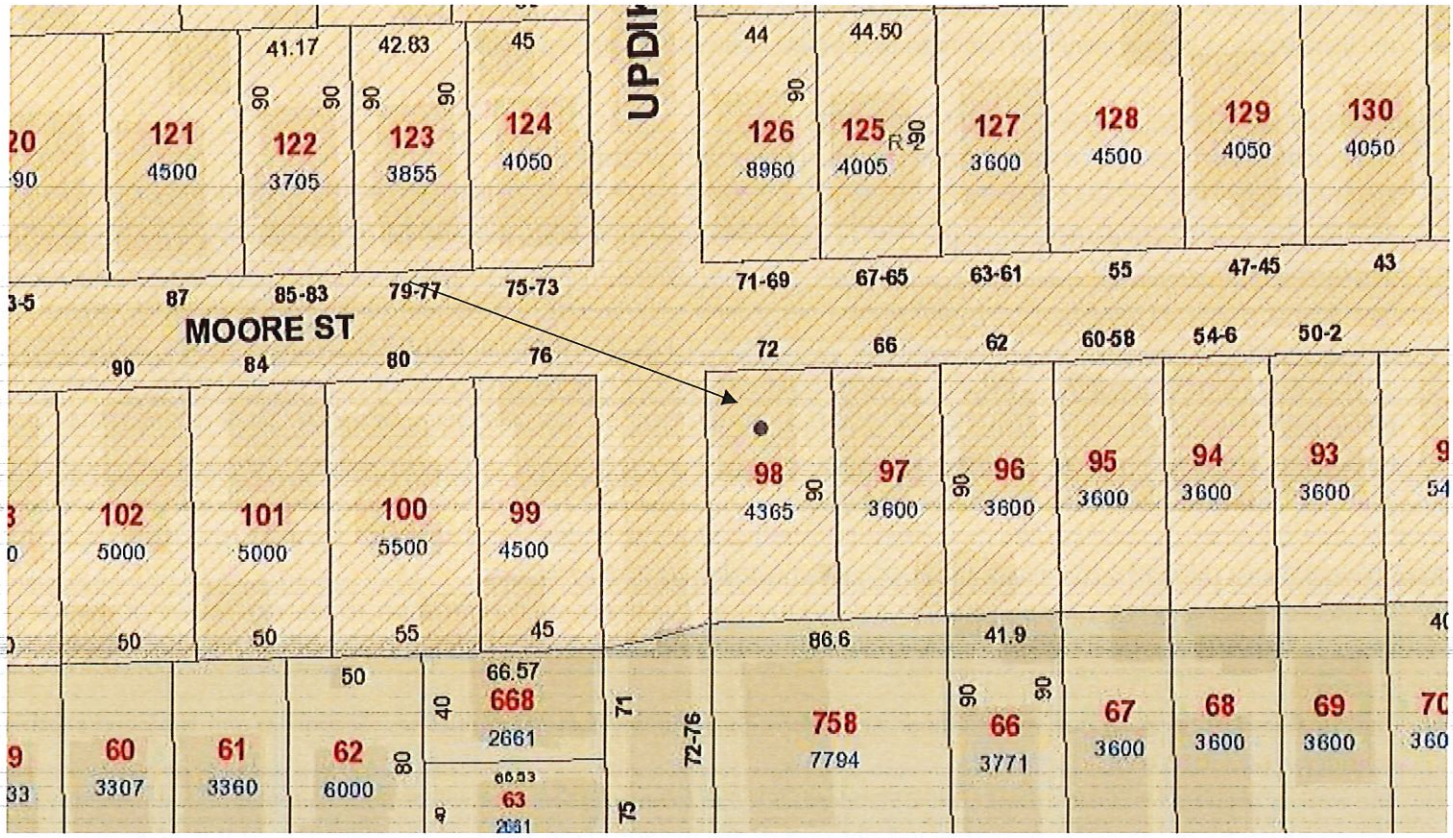
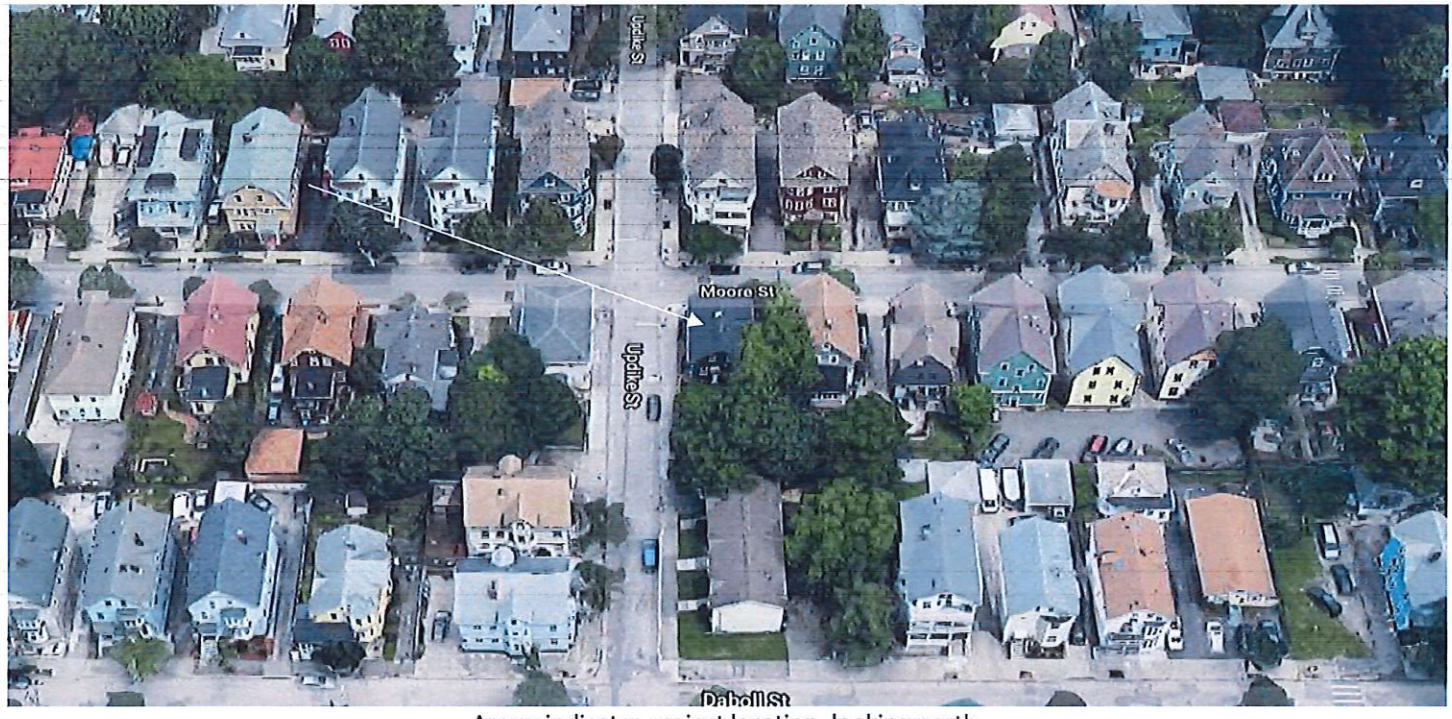
6. CASE 22. 041, 72 MOORE STREET, House, c1895 (NORTH ELMWOOD)
1½-story; end-gable house with bay windows on front and side, bracketed entry hood and trim, shingles over clapboards.
CONTRIBUTING



Arrow indicates 72 Moore Street.



Arrow indicates project location, looking north.

Applicants/Owners: Alex Purdue & April Donahower, 72 Moore Street, Providence, RI 02907
Contractor: Alex Purdue – NEC Solar, 121 Broadcommon Rd, Bristol, RI 02809

Proposal: The scope of work proposed consists of Major Alterations and includes:

- the installation of 14 solar panels in two rows to the west slope of the gable-end roof.

Issues: The following issues are relevant to this application:

- The modifications as proposed will be visible from the public rights-of-way;
- The modifications as proposed meets Minor Alterations: Solar Energy Systems Guidelines, Section 2, in the following manner: Panel layout shall be sympathetic or appropriate to design and scale of building. Rectangular configurations are preferred, with ample setback from edge of roof, dormers, chimneys, etc. (2.A); Panels shall be installed parallel to the existing roof slope and matched as closely as possible to the roof plane (2.B); Panels shall be installed without destroying or replacing original or historic materials or significantly compromising or altering the building's structural integrity (2.C); Panels shall be compatible in color to existing roofing insofar as possible (2.D); Installation of panels shall be as inconspicuous as possible when viewed from public right-of-way (2.E); Installation shall be reversible. Panels shall be removed when no longer viable or functioning and roofing restored to pre-existing conditions (2.F); and,
- Plans, specifications and pictures have been submitted.

Recommendations: The staff recommends the PHDC make the following findings of fact:

a) 72 Moore Street is a structure of historical and architectural significance that contributes to the significance of the North Elmwood local historic district having been recognized as a contributing structure to the Elmwood National Register Historic District;
b) The modifications as proposed meets Minor Alterations: Solar Energy Systems Guidelines, Section 2, and the application is considered complete; and,
c) The work as proposed is in accord with PHDC Standards 8 & 9 as follows: 8) the work will be done so that it does not destroy the historic character of the property as they will not disturb any historic fabric and are reversible; and, 9) Whenever possible... alterations to structures shall be done in such a manner that if removed in the future, the essential form and integrity of the structure and the site will be unimpaired.

Staff recommends a motion be made stating that: The application is considered complete. 72 Moore Street is a structure of historical and architectural significance that contributes to the significance of the North Elmwood local historic district having been recognized as a contributing structure to the Elmwood National Register Historic District. The Commission grants Final Approval of the proposal as submitted as the proposed alteration is appropriate having determined that the proposed alteration does not destroy the historic character of the property or the district and are historically and architecturally compatible with the property and district as the proposed alteration meets Minor Alterations: Solar Energy Systems Guidelines, Section 2, is reversible and will not have an adverse effect on the property or district as the will not adversely affect any historic materials and is reversible (Standards 8 & 9), and the recommendations in the staff report, with staff to review any additional required details.

PROJECT DESCRIPTION:

(14) HANWHA Q-CELLS Q.PEAK DUO BLK-G6 340W
ROOF MOUNTED SOLAR PHOTOVOLTAIC MODULES
SYSTEM SIZE: 4.76 kW DC
SYSTEM SIZE: 4.06 kW AC

EQUIPMENT SUMMARY
14 HANWHA Q-CELLS Q.PEAK DUO BLK-G6 340W
14 ENPHASE IQ7PLUS-72-2-US MICROINVERTERS

DESIGN CRITERIA	
WIND SPEED	133
EXPOSURE CATEGORY	B
RISK CATEGORY	II
MOUNTING METHOD	ROOF MOUNT
GROUND SNOW LOAD	35

CODE COMPLIANCE

ALL WORK SHALL COMPLY WITH ALL STATE AND LOCAL CODES AND ANY OTHER REGULATING AUTHORITIES WHICH HAVE AUTHORITY OVER ANY PORTION OF THE WORK.

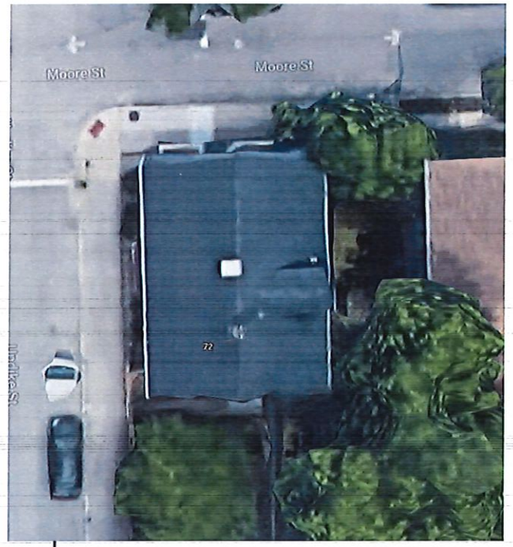
BUILDING CODE:
ALL WORK SHALL COMPLY WITH THE 2015 INTERNATIONAL BUILDING CODE.
2015 INTERNATIONAL RESIDENTIAL CODE.

ELECTRICAL CODE:
ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2017 NATIONAL ELECTRIC CODE.

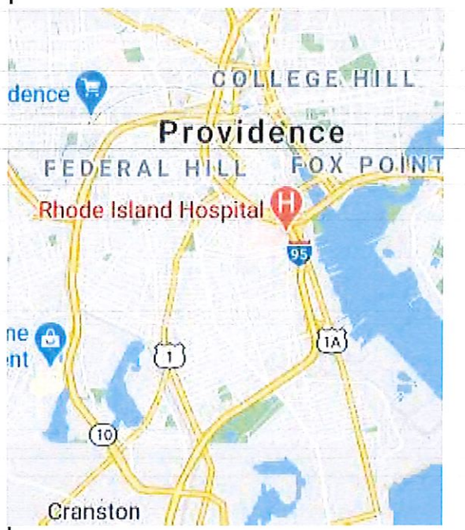
GENERAL INSTALLATION NOTES

1. INSTALLER SHALL ASSUME FULL RESPONSIBILITY AND LIABILITY FOR COMPLIANCE WITH REGULATIONS PER FEDERAL OSHA AND LOCAL REGULATIONS PERTAINING TO WORK PRACTICES, PROTECTION OF WORKERS AND VISITORS TO THE SITE.
2. INSTALLER SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AT SITE BEFORE COMMENCING WORK.
3. CONTRACTOR SHALL FURNISH ALL MATERIAL EXCEPT AS SPECIFIED IN THE CONTRACT AND/OR THESE DRAWINGS.
4. ALL MATERIALS SHALL BE IN NEW AND UNUSED CONDITION.
5. MANUFACTURER'S MATERIAL EQUIPMENT, ETC. SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.
6. THE INSTALLER SHALL BECOME FAMILIAR WITH ALL UTILITY AS-BUILT PLANS AND THE LOCATIONS OF ALL EXISTING UTILITIES, STRUCTURES, PAVEMENT OR IMPROVEMENTS.
7. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND NOTIFY THE OWNER OF DISCREPANCIES REQUIRING FURTHER CLARI FICATION BEFORE PROCEEDING WITH THE WORKS.
8. INSTALL ALL ASPECTS OF THIS PROJECT IN ACCORDANCE WITH THE SPECIFICATIONS AND AS NOTED ON DRAWINGS ISSUED FOR CONSTRUCTION.
9. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER 310.0(D)
10. WORKING CLEARANCES AROUND THE EXISTING AND NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC 110.26
11. EXACT CONDUIT RUN LOCATIONS SUBJECT TO CHANGE
12. ROOF PENETRATIONS ARE SEALED.
13. INVERTER IS LISTED TO UL-1741 "UTILITY INTERACTIVE"

SHEET INDEX



1 HOUSE PHOTO
PV-0 SCALE: NTS



2 VICINITY MAP
PV-0 SCALE: NTS

NEC SOLAR
200 HIGHPOINT AVE
SUITE B12 PORTSMOUTH,
RI 02871
(401) 644-5692
RI AC 4585
MA 20803

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ALEX PERDUE
72 Moore St
Providence, RI 02907

SHEET NAME
COVER SHEET

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-0


STOP

MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 14 MODULES
MODULE TYPE = HANWHA Q-CELLS Q.PEAK DUO BLK-G6 340W

MODULE WEIGHT = 43.87 LBS
MODULE DIMENSIONS = 68.5"x 40.55" = 19.29 SF
UNIT WEIGHT OF ARRAY = 2.27 PSF

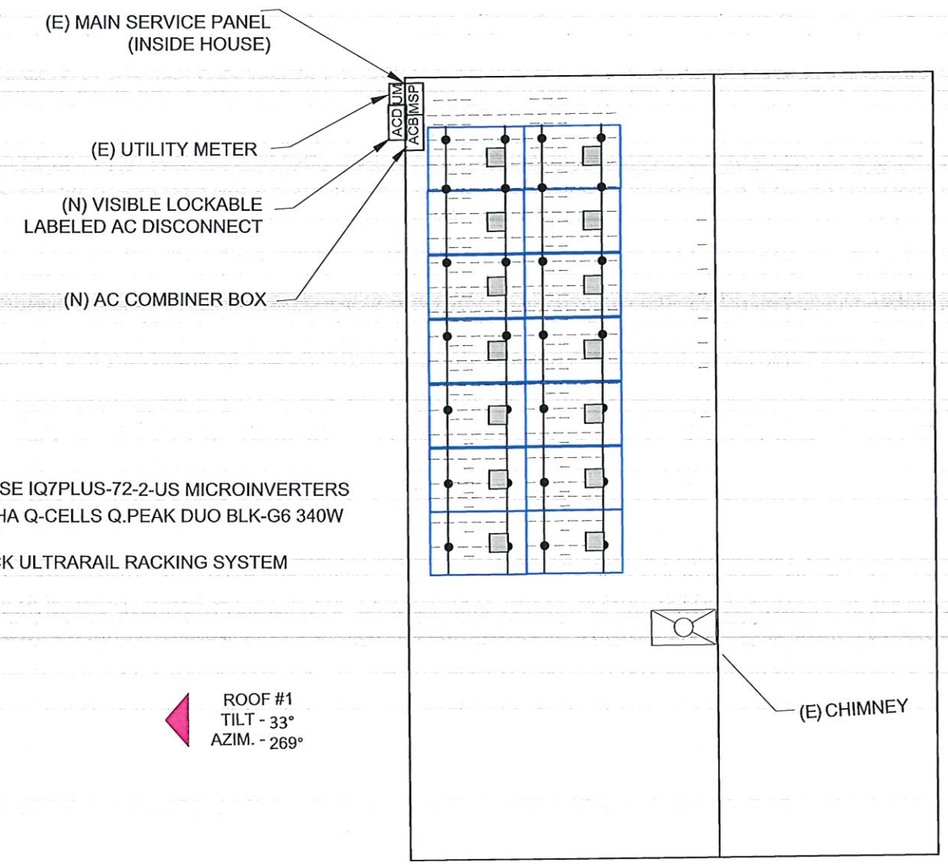
NOTE
AC DISCONNECT LOCATED 10' LESS FROM UTILITY METER
PV MODULES CANNOT BE INSTALLED OVER VENTS

MODULE: (14) HANWHA Q-CELLS Q.PEAK DUO BLK-G6 340W
INVERTER: (14) ENPHASE IQ7PLUS-72-2-US MICRO INVERTERS 240VAC

ROOF DESCRIPTION				
ROOF TYPE			COMPOSITE SHINGLE	
ROOF	ROOF TILT	AZIMUTH	FRAMING SIZE	FRAMING SPACING
#1	30°	269°	2"x6"	31" O.C.

ARRAY AREA WITH MOUNTING ROOF AREA				
ROOF	# OF MODULES	ARRAY AREA (Sq. Ft.)	MOUNTING ROOF AREA (Sq. Ft.)	ROOF AREA COVERED BY ARRAY (%)
#1	14	270.05	686.88	39.3%

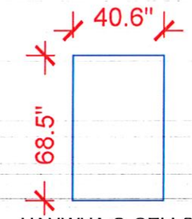
MOORE STREET
FRONT OF HOUSE



(14) ENPHASE IQ7PLUS-72-2-US MICROINVERTERS
(14) HANWHA Q-CELLS Q.PEAK DUO BLK-G6 340W

SNAPNRACK ULTRARAIL RACKING SYSTEM

ROOF #1
TILT - 33°
AZIM. - 269°



HANWHA Q-CELLS
Q PEAK DUO BLK-
G6 340W MODULE

BACK OF HOUSE

LEGEND

- UM - UTILITY METER
- JB - JUNCTION BOX
- ACB - AC COMBINER BOX
- ACD - AC DISCONNECT
- MSP - MAIN SERVICE PANEL
- - MICRO INVERTER
- - VENT, CHIMNEY (ROOF OBSTRUCTION)
- - ROOF ATTACHMENT
- - RAFTERS

1 ROOF PLAN WITH MODULES
PV-2 SCALE: 1/8" = 1'-0"

NEC SOLAR
200 HIGHPOINT AVE
SUITE B12 PORTSMOUTH,
RI 02871
(401) 644-5692
RI AC 4585
MA 20803

REVISIONS		
DESCRIPTION	DATE	REV

Signature with Seal

CUSTOMER INFORMATION

ALEX PERDUE
72 Moore St
Providence, RI 02907

SHEET NAME
ROOF PLAN WITH MODULES

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-2

powered by Q.ANTUM DUO

Q.PEAK DUO BLK-G6

330-345

ENDURING HIGH PERFORMANCE

pv magazine award 2017 top innovation

VDE Quality Tested
www.VDEenfo.com
ID. 40032587

ntv Germany's most popular provider Life & Living Award 2020 1st Place Solar Technology

EUPD RESEARCH TOP BRAND PV MODULES EUROPE 2020

Q CELLS YIELD SECURITY
- ANTI PID TECHNOLOGY (APT)
- HOT-SPOT PROTECT (HSP)
- TRACEABLE QUALITY (TRA.Q™)
- ANTI LID TECHNOLOGY (ALT)

Q.ANTUM TECHNOLOGY: LOW LEVELISED COST OF ELECTRICITY
Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 19.5%.

INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behaviour.

ENDURING HIGH PERFORMANCE
Long-term yield security with Anti LID Technology, Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING
High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).

A RELIABLE INVESTMENT
Inclusive 12-year product warranty and 25-year linear performance warranty[2].

STATE OF THE ART MODULE TECHNOLOGY
Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

[1] APT test conditions according to IEC/TS 62804-1:2015, method B (−1500 V, 168 h)
[2] See data sheet on rear for further information.

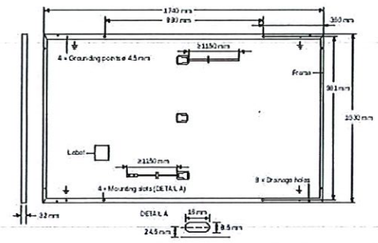
THE IDEAL SOLUTION FOR:
Rooftop arrays on residential buildings

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	1740 mm × 1030 mm × 32 mm (including frame)
Weight	19.9 kg
Front Cover	3.2 mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 20 monocrystalline Q.ANTUM solar half cells
Junction box	53-101 mm × 32-60 mm × 15-18 mm Protection class IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥ 1150 mm, (−) ≥ 1150 mm
Connector	Stäubli MC4, Hanwha Q CELLS HQC4; IP68

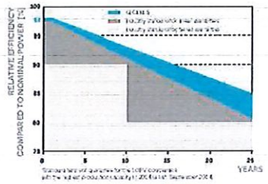


ELECTRICAL CHARACTERISTICS

POWER CLASS			330	335	340	345
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / −0 W)						
Minimum Power at MPP[1]	P_{MPP}	[W]	330	335	340	345
Minimum Short Circuit Current[1]	I_{SC}	[A]	10.41	10.47	10.52	10.58
Minimum Open Circuit Voltage[1]	V_{OC}	[V]	40.15	40.41	40.66	40.92
Minimum Current at MPP	I_{MPP}	[A]	9.91	9.97	10.02	10.07
Minimum Voltage at MPP	V_{MPP}	[V]	33.29	33.62	33.94	34.25
Minimum Efficiency[1]	η	[%]	≥ 18.4	≥ 18.7	≥ 19.0	≥ 19.3
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]						
Minimum Power at MPP	P_{MPP}	[W]	247.0	250.7	254.5	258.2
Minimum Short Circuit Current	I_{SC}	[A]	8.39	8.43	8.48	8.52
Minimum Open Circuit Voltage	V_{OC}	[V]	37.86	38.10	38.34	38.59
Minimum Current at MPP	I_{MPP}	[A]	7.80	7.84	7.89	7.93
Minimum Voltage at MPP	V_{MPP}	[V]	31.66	31.97	32.27	32.57

[1] Measurement tolerances P_{MPP} ± 3%; I_{SC}; V_{OC} ± 5% at STC: 1000 W/m², 25 ± 2 °C, AM 1.5 according to IEC 60904-3 • [2] 800 W/m², NMOT, spectrum AM 1.5

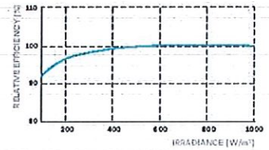
Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.54% degradation per year. At least 93.1% of nominal power up to 10 years. At least 85% of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²).

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	−0.27
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.36	Nominal Module Operating Temperature	NMOT	[°C]	43 ± 3

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage	V_{SYS}	[V]	1000	PV module classification		Class II
Maximum Reverse Current	I_R	[A]	20	Fire Rating based on ANSI / UL 61730		C / TYPE 2
Max. Design Load, Push / Pull		[Pa]	3600 / 2667	Permitted Module Temperature on Continuous Duty		−40 °C - +85 °C
Max. Test Load, Push / Pull		[Pa]	5400 / 4000			

QUALIFICATIONS AND CERTIFICATES

VDE Quality Tested
IEC 61215:2016;
IEC 61730:2016
This data sheet complies with DIN EN 50380.

ID 111125077

CE

PACKAGING INFORMATION

Horizontal packaging	1780 mm	1080 mm	1208 mm	673.8 kg	28 pallets	26 pallets	32 modules
Vertical packaging	1815 mm	1150 mm	1220 mm	683 kg	28 pallets	24 pallets	32 modules

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product. Q CELLS supplies solar modules in two different stacking methods, depending on the location of manufacture (modules are packed horizontally or vertically). You can find more detailed information in the document "Packaging and Transport Information", available from Q CELLS.

Hanwha Q CELLS GmbH
Sonnenallee 17-21, 06766 Bitterfeld-Wolfen, Germany | **TEL** +49 (0) 3494 66 99-23444 | **FAX** +49 (0) 3494 66 99-23000 | **EMAIL** sales@q-cells.com | **WEB** www.q-cells.com

Engineered in Germany

Q CELLS