



Test Report issued under the responsibility of:



TEST REPORT IEC 61215 series:2021 Terrestrial photovoltaic (PV) modules – Design qualification and type approval	
Report Number..... :	E535259-4790855920.1.1-D3
Date of issue..... :	2024-04-22; Amendment-1 2024-09-24; Amendment-2 2024-10-23
Total number of pages	127
Name of Testing Laboratory preparing the Report	UL India Pvt Ltd.
Applicant's name	PIXON GREEN ENERGY PRIVATE LIMITED
Address..... :	R.S. NO. 157/1, 158/1, 158/2, 165/1 166 OF KHIJADIYA NANA R.S. NO. 15/1 OF DEPALIYA, RAJKOT - JAMNAGAR HIGHWAY, PADADHARI, RAJKOT, GUJARAT, 360110, INDIA
Test specification:	
Standard	☒ IEC 61215-1:2021 ☒ IEC 61215-2:2021 ☒ IEC 61215-1-1:2021 ☐ IEC 61215-1-2:2021 ☐ IEC 61215-1-3:2021 ☐ IEC 61215-1-4:2021
Test procedure	CB Scheme
Non-standard test method	N/A
TRF template used	IECEE OD-2020-F1:2021, Ed.1.4
Test Report Form No.	IEC61215F_SE
Test Report Form(s) Originator	TÜV SÜD Product Service GmbH
Master TRF	2021-08-31
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General disclaimer:

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description..... :	Photovoltaic (PV) Module(s)
Trade Mark..... :	
Manufacturer	PIXON GREEN ENERGY PRIVATE LIMITED R.S. NO. 157/1, 158/1, 158/2, 165/1 166 OF KHIJADIYA NANA R.S. NO. 15/1 OF DEPALIYA, RAJKOT - JAMNAGAR HIGHWAY, PADADHARI, RAJKOT, GUJARAT, 360110, INDIA
Model/Type reference	<u>Mono Crystalline (PERC):</u> <u>Glass-Transparent backsheet Models (210mm Family):-</u> 132 cells module: PIX MBHTB 132 AAA, AAA stands for power range from 625~660, in step of 5 W. 120 cells module: PIX MBHTB 120 AAA, AAA stands for power range from 570~600, in step of 5 W. 108 cells module: PIX MBHTB 108 AAA, AAA stands for power range from 510~540, in step of 5 W. 96 cells module: PIX MBHTB 96 AAA, AAA stands for power range from 450~480, in step of 5 W <u>Glass-White backsheet Models (210mm Family):-</u> 132 cells module: PIX MPH 132 AAA, AAA stands for power range from 625~660, in step of 5 W. 120 cells module: PIX MPH 120 AAA, AAA stands for power range from 570~600, in step of 5 W. 108 cells module: PIX MPH 108 AAA, AAA stands for power range from 510~540, in step of 5 W. 96 cells module: PIX MPH 96 AAA, AAA stands for power range from 450~480, in step of 5 W. <u>Glass-Black backsheet Models (210mm Family):-</u> 132 cells module: PIX MPH 132 AAA, AAA stands for power range from 625~660, in step of 5 W. 120 cells module: PIX MPH 120 AAA, AAA stands for power range from 570~600, in step of 5 W. 108 cells module: PIX MPH 108 AAA, AAA stands for power range from 510~540, in step of 5 W. 96 cells module: PIX MPH 96 AAA, AAA stands for power range from 450~480, in step of 5 W <u>Glass-Transparent backsheet Models (182mm Family):-</u> 156 cells module: PIX MBHTB 156 AAA, AAA stands for power range from 560~595, in step of 5 W. 144 cells module: PIX MBHTB 144 AAA, AAA stands for power range from 510~560, in step of 5 W. 132 cells module: PIX MBHTB 132 AAA, AAA stands for power range from 470~510, in step of 5 W. 120 cells module: PIX MBHTB 120 AAA, AAA stands for power range from 420~460, in step of 5 W. 108 cells module: PIX MBHTB 108 AAA, AAA stands for power range from 370~410, in step of 5 W. <u>Glass-White backsheet Models (182mm Family):-</u> 156 cells module: PIX MPH 156 AAA, AAA stands for power range from 560~595, in step of 5 W. 144 cells module: PIX MPH 144 AAA, AAA stands for power range from 510~560, in step of 5 W. 132 cells module: PIX MPH 132 AAA, AAA stands for power range from 470~510, in step of 5 W. 120 cells module: PIX MPH 120 AAA, AAA stands for power range from 420~460, in step of 5 W.

108 cells module: PIX MPH 108 AAA, AAA stands for power range from 370~410, in step of 5 W.

Glass-Black backsheet Models (182mm Family):-

156 cells module: PIX MPHB 156 AAA, AAA stands for power range from 560~595, in step of 5 W.

144 cells module: PIX MPHB 144 AAA, AAA stands for power range from 510~560, in step of 5 W.

132 cells module: PIX MPHB 132 AAA, AAA stands for power range from 470~510, in step of 5 W.

120 cells module: PIX MPHB 120 AAA, AAA stands for power range from 420~460, in step of 5 W.

108 cells module: PIX MPHB 108 AAA, AAA stands for power range from 370~410, in step of 5 W.

Glass-Transparent backsheet Models (DCR-182mm Family):-

156 cells module: PIX MBHDTB 156 AAA, AAA stands for power range from 560~595, in step of 5 W.

144 cells module: PIX MBHDTB 144 AAA, AAA stands for power range from 510~560, in step of 5 W.

132 cells module: PIX MBHDTB 132 AAA, AAA stands for power range from 470~510, in step of 5 W.

120 cells module: PIX MBHDTB 120 AAA, AAA stands for power range from 420~460, in step of 5 W.

108 cells module: PIX MBHDTB 108 AAA, AAA stands for power range from 370~410, in step of 5 W.

Glass-White backsheet Models (DCR-182mm Family):-

156 cells module: PIX MPHD 156 AAA, AAA stands for power range from 560~595, in step of 5 W.

144 cells module: PIX MPHD 144 AAA, AAA stands for power range from 510~560, in step of 5 W.

132 cells module: PIX MPHD 132 AAA, AAA stands for power range from 470~510, in step of 5 W.

120 cells module: PIX MPHD 120 AAA, AAA stands for power range from 420~460, in step of 5 W.

108 cells module: PIX MPHD 108 AAA, AAA stands for power range from 370~410, in step of 5 W.

Glass-Black backsheet Models (DCR-182mm Family):-

156 cells module: PIX MPHBD 156 AAA, AAA stands for power range from 560~595, in step of 5 W.

144 cells module: PIX MPHBD 144 AAA, AAA stands for power range from 510~560, in step of 5 W.

132 cells module: PIX MPHBD 132 AAA, AAA stands for power range from 470~510, in step of 5 W.

120 cells module: PIX MPHBD 120 AAA, AAA stands for power range from 420~460, in step of 5 W.

108 cells module: PIX MPHBD 108 AAA, AAA stands for power range from 370~410, in step of 5 W.

Glass-Transparent backsheet Models (166mm Family):-

156 cells module: PIX MBHTB 156 AAA, AAA stands for power range from 460~490, in step of 5 W.

144 cells module: PIX MBHTB 144 AAA, AAA stands for power range from 420~450, in step of 5 W.

132 cells module: PIX MBHTB 132 AAA, AAA stands for power range from 380~410, in step of 5 W.

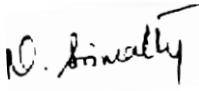
120 cells module: PIX MBHTB 120 AAA, AAA stands for power range from 340~375, in step of 5 W.

Glass-White backsheet Models (166mm Family):-

156 cells module: PIX MPH 156 AAA, AAA stands for power range from 460~490, in step of 5 W.

144 cells module: PIX MPH 144 AAA, AAA stands for power range from 420~450, in step of 5 W.

132 cells module: PIX MPH 132 AAA, AAA stands for power range from 380~410, in step of 5 W.

	120 cells module: PIX MPH 120 AAA, AAA stands for power range from 340~375, in step of 5 W Glass-Black backsheet Models (166mm Family):- 156 cells module: PIX MPH 156 AAA, AAA stands for power range from 460~490, in step of 5 W. 144 cells module: PIX MPH 144 AAA, AAA stands for power range from 420~450, in step of 5 W. 132 cells module: PIX MPH 132 AAA, AAA stands for power range from 380~410, in step of 5 W. 120 cells module: PIX MPH 120 AAA, AAA stands for power range from 340~375, in step of 5 W.	
Ratings	Maximum System Voltage: 1500V Maximum over current protection rating: 30 A See "Product Electrical Ratings" for electrical ratings	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	CB Testing Laboratory:	UL India Pvt Ltd.
Testing location/address.....:		Kalyani Platina Campus, Survey. No. 129/4, EPIP Zone, Phase II, Whitefield, IN-560066, Bangalore, India
Tested by (name, function, signature).....:		Kantha Raju H S, Project Handler 
Approved by (name, function, signature)....:		N Srimathy, Reviewer 
☐	Testing procedure: CTF Stage 1:	
Testing location/address.....:		
Tested by (name, function, signature).....:		
Approved by (name, function, signature)....:		
☐	Testing procedure: CTF Stage 2:	
Testing location/address.....:		
Tested by (name + signature)		
Witnessed by (name, function, signature) .:		
Approved by (name, function, signature)....:		
☐	Testing procedure: CTF Stage 3 or 4:	
Testing location/address.....:		
Tested by (name, function, signature).....:		
Witnessed by (name, function, signature) .:		
Approved by (name, function, signature)....:		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment):	
	attachment number / number of pages
Installation manual	Annex 5, Enclosure 2-01 / 37 pages
Drawings mechanical	N/A
Circuit diagram	N/A
Photographs	02 pages
Component datasheets / certificates	5 pages
Others:	Annex 6, 7 pages
Product Description Sheet (Manufacturers and type references)	Annex 1, 16 pages
Test table for verifying other stabilization procedure	Annex 2, 2 pages, N/A
Lower and higher output power modules	Annex 3, 5 pages, N/A
List of test equipment used	Annex 4, 1 page, N/A

Summary of testing:

Test program is combined with IEC 61730-2:2016 test sequence.

The Models PIX MBHTB 156 585 & PIX MBHTB 144 530 (Cxx & Exx), were used as Modification to encapsulation system, Modification to cell technology, Modification to Back sheet, considered representative of the 182mm Family series.

Tests performed (name of test and test clause):

Model PIX MBHTB 156 585 & PIX MBHTB 144 530 from Mono crystalline (PERC) 182mm family cell families were used for test purposes cover material combinations used for Cxx and Exx BOM addition.

All models are same in construction except number of cells, overall dimension, output power, electrical ratings, BOM combinations.

MQT 01 Visual Inspection
 MQT 02 Maximum Power determination
 MQT 03 Insulation Test
 MQT 04 Measurement of Temperature Coefficients
 MQT 06.1 Performance at STC
 MQT 07 Performance at Low Irradiance
 MQT 09 Hot-spot endurance test
 MQT 10 UV precondition test
 MQT 11 Thermal cycling test (50) or (200)
 MQT 12 Humidity freeze test
 MQT 13 Damp heat test
 MQT 14 Retention of junction box test
 MQT 15 Wet leakage current test

Testing location:

UL India Pvt. Ltd.
 Kalyani Platina Campus, Survey. No. 129/4, EPIP Zone, Phase II, Whitefield, IN-560066, Bangalore, India

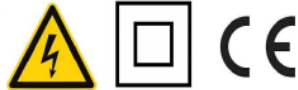
MQT 16 Static mechanical load test MQT 17 Hail test MQT 18.1 Bypass diode thermal test MQT 18.2 Bypass diode functionality test MQT 19.1 Initial Stabilization	
Summary of compliance with National Differences (List of countries addressed): EU Group: No National or group Differences declared. ☒ The product fulfils the requirements of EN IEC 61215-1:2021, EN IEC 61215-1-1:2021 & EN IEC 61215-2:2021.	
Use of uncertainty of measurement for decisions on conformity (decision rule) : ☐ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method"). ☒ Other:... Procedure number, issue date and title: SOP ULID-000496, 2022-11-09, Evaluation of Measurement Uncertainty (to be specified, for example when required by the standard or client, or if national accreditation requirements apply) Information on uncertainty of measurement: The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE. IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer. Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.	

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

(Note: The marking plate represents all models covered by this report except for difference in electrical ratings and model designation. See "General product information" for electrical ratings for all models. As there will be other lower wattages to be covered under same report which follows same back label format.)

 ISO 9001:2015, ISO 14001:2015 ISO 45001:2018 Certified PIXON GREEN ENERGY PVT LTD R.S. No. 157/1, 158/1, 158/2, 165/1 166 of Khijadiya Nana, R.S. No. 15/1 of Depaliya, Rajkot - Jamnagar Highway, Padadhari, Rajkot - 360110, Gujarat India. Contact Number: 1800 108 8800 E Mail id: sales@pixonenergy.com MADE IN INDIA	SOLAR PV MODULE Module : PIX MBHTB 156 575		ISC at BSI (± 5%) Bifaciality Coefficient (Ø Pmax) Bifaciality Coefficient (Ø Voc) Bifaciality Coefficient (Ø ISC) Maximum System Voltage Application Class Safety Class Series Fuse Rating Module Fire Rating Module Weight Module Dimension	17.06 A 75±10% 100±5% 75±10% 1500 VDC A II 30A Type-4 29KG 2469X1134X35mm	IS 14286:2010 / IEC 61215 IS / IEC 61730 (Part 1) IS / IEC 61730 (Part 2)  R-72004570	 Solar PV module produce DC Electricity when they exposed to sunlight * Read and follow safety instructions in the installation manual prior * Do not connect/disconnect cable-conductor under load * Dispose-of the module as ewaste after end of its working life
	Parameters	STC	BNPI			

 ISO 9001:2015 ISO 14001:2015 ISO 45001:2018 Certified facility MADE IN INDIA	sales@pixonenergy.com www.pixonenergy.com 1800 108 8800	SOLAR PV MODULE PIX MPH 156 575																								
Electrical Parameters <table> <tr><td>Maximum power(Pmax) ± 3 %</td><td>575</td></tr> <tr><td>Open circuit voltage (Voc) ± 5%</td><td>53.82 V</td></tr> <tr><td>Short circuit current(Isc)±5%</td><td>13.65 A</td></tr> <tr><td>Voltage at Pmax</td><td>45.65 V</td></tr> <tr><td>Current at Pmax</td><td>12.6 A</td></tr> <tr><td>Maximum system voltage</td><td>1500 VDC</td></tr> <tr><td>Application class</td><td>A</td></tr> <tr><td>Safety class</td><td>II</td></tr> <tr><td>Series Fuse Rating</td><td>30A</td></tr> <tr><td>Module Fire rating</td><td>Type-4</td></tr> <tr><td>Module weight</td><td>29 KG</td></tr> <tr><td>Module Dimension</td><td>2469x1134x35mm</td></tr> </table> Measured at STC : 1000 W/m2, AM1.5, 25°C Cell Temperature.		Maximum power(Pmax) ± 3 %	575	Open circuit voltage (Voc) ± 5%	53.82 V	Short circuit current(Isc)±5%	13.65 A	Voltage at Pmax	45.65 V	Current at Pmax	12.6 A	Maximum system voltage	1500 VDC	Application class	A	Safety class	II	Series Fuse Rating	30A	Module Fire rating	Type-4	Module weight	29 KG	Module Dimension	2469x1134x35mm	IS 14286:2010 / IEC 61215 IS / IEC 61730 (Part 1) IS / IEC 61730 (Part 2)  R-72004570
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WARNING  * Solar PV module produce DC Electricity when they exposed to sunlight * Read and follow safety instructions in the installation manual prior * Do not connect/disconnect cable-conductor under load * Dispose-off the module as ewaste after end of its working life																										
PIXON GREEN ENERGY PVT LTD R.S. No. 157/1, 158/1, 158/2, 165/1 166 of Khijadiya Nana, R.S. No. 15/1 of Depaliya, Rajkot - Jamnagar Highway, Padadhari, Rajkot - 360110, Gujarat India.																										

 ISO 9001:2015 ISO 14001:2015 ISO 45001:2018 Certified facility MADE IN INDIA	sales@pixonenergy.com www.pixonenergy.com 1800 108 8800	SOLAR PV MODULE PIX MPHB 156 575																								
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WARNING    ★ Solar PV module produce DC Electricity when they exposed to sunlight ★ Read and follow safety instructions in the installation manual prior ★ Do not connect/disconnect cable-connector under load ★ Dispose-off the module as ewaste after end of its working life																										
PIXON GREEN ENERGY PVT LTD R.S. No. 157/1, 158/1, 158/2, 165/1 166 of Khijadiya Nana, R.S. No. 15/1 of Depaliya, Rajkot - Jamnagar Highway, Padadhari, Rajkot - 360110, Gujarat India.																										

Test item particulars.....	: PV wire with mating connectors.
Accessories and detachable parts included in the evaluation	: N/A
Mounting system used.....	: The modules have been evaluated for mounting using the 8 provided mounting holes in the frame. For More details, Refer to Installation Manual.
Other options included	: N/A
Possible test case verdicts:	
- test case does not apply to the test object.....	: N/A
- test object does meet the requirement.....	: P (Pass)
- test object does not meet the requirement	: F (Fail)
Abbreviations used in the report:	
P_{max} – Maximum power	HF – Humidity Freeze
V_{mp} – Maximum power voltage	DH – Damp Heat
I_{mp} – Maximum power current	TC – Thermal Cycling
I_{sc} – Short circuit current	α – Current temperature coefficient
V_{oc} – Open circuit voltage	β – Voltage temperature coefficient
FF – Fill factor	δ – power temperature coefficient
STC – Standard Test Conditions (25°C, 1 000 W/m ²)	TCO – Transparent conductive oxide
	TRF – Test report form
MQT – Module Quality Tests	V _{FM} rated – Rated diode(s) forward voltage
V _{FM} – Measured diode(s) forward voltage	NP – Nameplate
P_{max} (Lab) – the measured maximum power of each module	P_{max} (NP) – the minimum rated nameplate power of each module without tolerances
$\bar{P}_{max}$ (Lab) – the arithmetic average of the measured maximum power of the modules	V_{oc} (Lab) – the measured maximum V_{oc}
I_{sc} (Lab) – the measured maximum I_{sc}	V_{oc} (NP) – the maximum rated nameplate V_{oc} of each module without tolerances
I_{sc} (NP) – the maximum rated nameplate I_{sc} without tolerances	P_{max4} (NP) – the maximum rated nameplate power of each lowest power class module, without tolerances
m_1 – the measurement uncertainty in % of laboratory for P_{max}	m_2 – the measurement uncertainty in % of laboratory for V_{oc}
m_3 – the measurement uncertainty in % of laboratory for I_{sc}	t_1 – the manufacturer's rated lower production tolerance in % for P_{max}
t_2 – the manufacturer's rated upper production tolerance in % for V_{oc}	t_3 – the manufacturer's rated upper production tolerance in % for I_{sc}

$r - P_{\max}$ measurement reproducibility	t_4 – the manufacturer's rated upper production tolerance in % for $P_{\max4}(\text{NP})$
ϕV_{oc} - open-circuit voltage bifaciality coefficient	$\phi P_{\max}$ - the maximum power bifaciality coefficient
ϕI_{sc} – the short circuit current bifaciality coefficient	BSI - for stress on bifacial modules, corresponding to 1 000 W/m ² on the module front and 300 W/m ² on the module rear
BNPI - for bifacial modules, corresponding to 1 000 W/m ² on the module front and 135 W/m ² on the module rear	RTE – Relative thermal endurance index
RTI – Relative temperature index	
TI – Temperature index	
Testing Dates (YYYY-MM-DD)	
Date of first test item received : 2023-06-22	
Dates of tests (beginning/end)..... : 2024-04-15/2024-08-13	

GENERAL REMARKS:

"(See Enclosure #)" refers to additional information appended to the report.

"(See appended table)" refers to a table appended to the report.

This TRF has been created in cooperation with CTL ETF-9 and German National Committee (DKE).

The originator's responsibility of this TRF in IECCE CB Scheme has been assigned to TÜV SÜD Product Service GmbH.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECCE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided

☐ Yes

☒ Not applicable

When differences exist; they shall be identified in the General product information section.

Name and address of factory (factories)

PIXON GREEN ENERGY PRIVATE LIMITED
R.S. NO. 157/1, 158/1, 158/2, 165/1 166 OF
KHIJADIYA NANA
R.S. NO. 15/1 OF DEPALIYA, RAJKOT - JAMNAGAR
HIGHWAY, PADADHARI, RAJKOT, GUJARAT,
360110, INDIA

PRODUCT ELECTRICAL RATINGS:**Monofacial Module:****Product Electrical Ratings: at STC conditions**

Module type	PIX MPH 132 660/ PIX MPHB 132 660	PIX MPH 132 655/ PIX MPHB 132 655	PIX MPH 132 650/ PIX MPHB 132 650	PIX MPH 132 645/ PIX MPHB 132 645
P_{max} [W] /Tolerance	660/±3%	655/±3%	650/±3%	645/±3%
Voc [V] /Tolerance	46.3/±5%	46.20/±5%	46.10/±5%	46.00/±5%
Isc [Adc] /Tolerance	18.17/±5%	18.10/±5%	18.02/±5%	17.93/±5%
Vmp [V]	37.8	37.7	37.6	37.5
Imp [Adc]	17.47	17.38	17.29	17.20
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over- Current Protection Rating [A]	30 A	30 A	30 A	30 A
Module type	PIX MPH 132 640/ PIX MPHB 132 640	PIX MPH 132 635/ PIX MPHB 132 635	PIX MPH 132 630/ PIX MPHB 132 630	PIX MPH 132 625/ PIX MPHB 132 625
P_{max} [W] /Tolerance	640/±3%	635/±3%	630/±3%	625/±3%
Voc [V] /Tolerance	45.90/±5%	45.80/±5%	45.70/±5%	45.60/±5%
Isc [Adc] /Tolerance	17.85/±5%	17.76/±5%	17.65/±5%	17.55/±5%
Vmp [V]	37.4	37.3	37.2	37.1
Imp [Adc]	17.12	17.03	16.94	16.85

Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
Module type	PIX MPH 120 600/ PIX MPHB 120 600	PIX MPH 120 595/ PIX MPHB 120 595	PIX MPH 120 590/ PIX MPHB 120 590	PIX MPH 120 585/ PIX MPHB 120 585
P_{max} [W] /Tolerance	600/±3%	595/±3%	590/±3%	585/±3%
Voc [V] /Tolerance	41.85/±5%	41.65/±5%	41.45/±5%	41.25/±5%
Isc [Adc] /Tolerance	18.31/±5%	18.27/±5%	18.22/±5%	18.18/±5%
Vmp [V]	34.65	34.45	34.25	34.05
Imp [Adc]	17.32	17.28	17.23	17.19
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
Module type	PIX MPH 120 580/ PIX MPHB 120 580	PIX MPH 120 575/ PIX MPHB 120 575	PIX MPH 120 570/ PIX MPHB 120 570	—
P_{max} [W] /Tolerance	580/±3%	575/±3%	570/±3%	—
Voc [V] /Tolerance	41.05/±5%	40.95/±5%	40.91/±5%	—
Isc [Adc] /Tolerance	18.13	18.07	18.00	—
Vmp [V]	33.85	33.65	33.55	—
Imp [Adc]	17.14	17.08	16.99	—
Maximum system voltage [V]	1500	1500	1500	—
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	—
Module type	PIX MPH 108 540/ PIX MPHB 108 540	PIX MPH 108 535/ PIX MPHB 108 535	PIX MPH 108 530/ PIX MPHB 108 530	PIX MPH 108 525/ PIX MPHB 108 525
P_{max} [W] /Tolerance	540 /±3%	535/±3%	530 /±3%	525 /±3%
Voc [V] /Tolerance	36.88/±5%	36.77/±5%	36.65/±5%	36.58/±5%
Isc [Adc] /Tolerance	18.52/±5%	18.37/±5%	18.26/±5%	18.16/±5%
Vmp [V]	31.07	30.82	30.7	30.62
Imp [Adc]	17.39	17.37	17.28	17.15
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
Module type	PIX MPH 108 520/ PIX MPHB 108 520	PIX MPH 108 515/ PIX MPHB 108 515	PIX MPH 108 510/ PIX MPHB 108 510	—
P_{max} [W] /Tolerance	520 /±3%	515 /±3%	510 /±3%	—
Voc [V] /Tolerance	36.48/±5%	36.38/±5%	36.27/±5%	—
Isc [Adc] /Tolerance	18.06/±5%	17.95/±5%	17.85/±5%	—
Vmp [V]	30.53	30.42	30.33	—
Imp [Adc]	17.04	16.94	16.83	—

Maximum system voltage [V]	1500	1500	1500	—
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	—
Module type	PIX MPH 96 480/ PIX MPHB 96 480	PIX MPH 96 475/ PIX MPHB 96 475	PIX MPH 96 470/ PIX MPHB 96 470	PIX MPH 96 465/ PIX MPHB 96 465
$P_{\max}$ [W] /Tolerance	480/±3%	475/±3%	470/±3%	465/±3%
Voc [V] /Tolerance	33.68/±5%	33.59/±5%	33.46/±5%	33.35/±5%
Isc [Adc] /Tolerance	18.31/±5%	18.21/±5%	18.13/±5%	18.05/±5%
Vmp [V]	28.47	28.34	28.25	28.17
Imp [Adc]	16.87	16.76	16.65	16.52
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
Module type	PIX MPH 96 460/ PIX MPHB 96 460	PIX MPH 96 455/ PIX MPHB 96 455	PIX MPH 96 450/ PIX MPHB 96 450	—
Voc [V] /Tolerance	460/±3%	455/±3%	450/±3%	—
Vmp [V]	33.24/±5%	33.15/±5%	33.03/±5%	—
Imp [Adc]	17.94/±5%	17.81/±5%	17.69/±5%	—
Isc [Adc] /Tolerance	28.05	27.91	27.78	—
Pmax [W] /Tolerance	16.41	16.32	16.21	—
Maximum system voltage [V]	1500	1500	1500	—
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	—
Module type	PIX MPH 156 595 / PIX MPHB 156 595 / PIX MPHBD 156 595 / PIX MPHD 156 595	PIX MPH 156 590 / PIX MPHB 156 590 / PIX MPHBD 156 590 / PIX MPHD 156 590	PIX MPH 156 585 / PIX MPHB 156 585 / PIX MPHBD 156 585 / PIX MPHD 156 585	PIX MPH 156 580 / PIX MPHB 156 580 / PIX MPHBD 156 580 / PIX MPHD 156 580
$P_{\max}$ [W] /Tolerance	595/±3%	655/±3%	585/±3%	580/±3%
Voc [V] /Tolerance	54.23/±5%	54.14/±5%	54.02/±5%	53.92/±5%
Isc [Adc] /Tolerance	13.95/±5%	13.95/±5%	13.85/±5%	13.76/±5%
Vmp [V]	46.13	45.97	45.87	45.76
Imp [Adc]	12.9	12.84	12.76	12.68

Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 156 575 / PIX MPHB 156 575 / PIX MPHBD 156 575 / PIX MPHD 156 575	PIX MPH 156 570 / PIX MPHB 156 570 / PIX MPHBD 156 570 / PIX MPHD 156 570	PIX MPH 156 565 / PIX MPHB 156 565 / PIX MPHBD 156 565 / PIX MPHD 156 565	PIX MPH 156 560 / PIX MPHB 156 560 / PIX MPHBD 156 560 / PIX MPHD 156 560
P_{max} [W] /Tolerance	575/±3%	570/±3%	565/±3%	560/±3%
Voc [V] /Tolerance	53.82/±5%	53.72/±5%	53.63/±5%	53.51/±5%
Isc [Adc] /Tolerance	13.65/±5%	13.56/±5%	13.45/±5%	13.34/±5%
Vmp [V]	45.65	45.57	45.46	45.36
Imp [Adc]	12.6	12.51	12.43	12.35
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 144 545 / PIX MPHB 144 545 / PIX MPHBD 144 545 / PIX MPHD 144 545	PIX MPH 144 540 / PIX MPHB 144 540 / PIX MPHBD 144 540 / PIX MPHD 144 540	PIX MPH 144 535 / PIX MPHB 144 535 / PIX MPHBD 144 535 / PIX MPHD 144 535	PIX MPH 144 530 / PIX MPHB 144 530 / PIX MPHBD 144 530 / PIX MPHD 144 530
Voc [V] /Tolerance	545/±3%	540/±3%	535/±3%	530/±3%
Vmp [V]	49.65/±5%	49.50/±5%	49.35/±5%	49.20/±5%
Imp [Adc]	13.92/±5%	13.85/±5%	13.78/±5%	13.71/±5%
Isc [Adc] /Tolerance	41.80	41.65	41.50	41.35
Pmax [W] /Tolerance	13.04	12.97	12.90	12.82
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 144 525 / PIX MPHB 144 525 / PIX MPHBD 144 525 / PIX MPHD 144 525	PIX MPH 144 520 / PIX MPHB 156 520 / PIX MPHBD 144 520 / PIX MPHD 144 520	PIX MPH 144 515 / PIX MPHB 144 515 / PIX MPHBD 144 515 / PIX MPHD 144 515	PIX MPH 144 510 / PIX MPHB 144 510 / PIX MPHBD 144 510 / PIX MPHD 144 510
Voc [V] /Tolerance	525/±3%	520/±3%	515/±3%	510/±3%

Vmp [V]	49.05/±5%	48.85/±5%	48.62/±5%	48.47/±5%
Imp [Adc]	13.65/±5%	13.61/±5%	13.55/±5%	13.45/±5%
Isc [Adc] /Tolerance	41.20	41.05	40.91	40.86
Pmax [W] /Tolerance	12.75	12.67	12.59	12.49
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over- Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 132 500 / PIX MPHB 132 500 / PIX MPHBD 132 500 / PIX MPHD 132 500	PIX MPH 156 495 / PIX MPHB 132 495 / PIX MPHBD 132 495 / PIX MPHD 156 495	PIX MPH 132 490 / PIX MPHB 132 490 / PIX MPHBD 132 490 / PIX MPHD 132 490	PIX MPH 132 485 / PIX MPHB 132 485 / PIX MPHBD 132 485 / PIX MPHD 132 485
Voc [V] /Tolerance	500/±3%	495/±3%	490/±3%	485/±3%
Vmp [V]	46.46/±5%	46.37/±5%	46.26/±5%	46.15/±5%
Imp [Adc]	13.49/±5%	13.36/±5%	13.27/±5%	13.19/±5%
Isc [Adc] /Tolerance	38.89	38.76	38.53	38.43
Pmax [W] /Tolerance	12.86	12.78	12.72	12.63
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over- Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 132 480 / PIX MPHB 132 480 / PIX MPHBD 132 480 / PIX MPHD 132 480	PIX MPH 132 475 / PIX MPHB 132 475 / PIX MPHBD 132 475 / PIX MPHD 132 475	PIX MPH 132 470 / PIX MPHB 132 470 / PIX MPHBD 132 470 / PIX MPHD 132 470	—
Voc [V] /Tolerance	480/±3%	475/±3%	470/±3%	—
Vmp [V]	46.06/±5%	45.96/±5%	45.87/±5%	—
Imp [Adc]	13.1/±5%	12.99/±5%	12.88/±5%	—
Isc [Adc] /Tolerance	38.32	38.22	38.12	—
Pmax [W] /Tolerance	12.53	12.43	12.33	—

Maximum system voltage [V]	1500	1500	1500	—
Maximum Over-Current Protection Rating [A]	30	30	30	—
Module type	PIX MPH 120 455 / PIX MPHB 120 455 / PIX MPHBD 120 455 / PIX MPHD 120 455	PIX MPH 120 450 / PIX MPHB 120 450 / PIX MPHBD 120 450 / PIX MPHD 120 450	PIX MPH 120 445 / PIX MPHB 120 445 / PIX MPHBD 120 445 / PIX MPHD 120 445	PIX MPH 120 440 / PIX MPHB 120 440 / PIX MPHBD 120 440 / PIX MPHD 120 440
Voc [V] /Tolerance	455/±3%	450/±3%	445/±3%	440/±3%
Vmp [V]	41.62/±5%	41.52/±5%	41.43/±5%	41.31/±5%
Imp [Adc]	13.97/±5%	13.89/±5%	13.79/±5%	13.68/±5%
Isc [Adc] /Tolerance	36.52	36.42	36.29	36.18
Pmax [W] /Tolerance	12.46	12.36	12.27	12.17
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 120 435 / PIX MPHB 120 435 / PIX MPHBD 120 435 / PIX MPHD 120 435	PIX MPH 120 430 / PIX MPHB 120 430 / PIX MPHBD 120 430 / PIX MPHD 120 430	PIX MPH 120 425 / PIX MPHB 120 425 / PIX MPHBD 120 425 / PIX MPHD 120 425	PIX MPH 120 420 / PIX MPHB 120 420 / PIX MPHBD 120 420 / PIX MPHD 120 420
Voc [V] /Tolerance	435/±3%	430/±3%	425/±3%	420/±3%
Vmp [V]	41.22/±5%	41.11/±5%	40.98/±5%	40.87/±5%
Imp [Adc]	13.57/±5%	13.47/±5%	13.38/±5%	13.27/±5%
Isc [Adc] /Tolerance	36.05	35.98	35.81	35.69
Pmax [W] /Tolerance	12.07	11.96	11.87	11.77
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 108 410 / PIX MPHB 108 410 / PIX MPHBD 108 410 / PIX MPHD 108 410	PIX MPH 108 405 / PIX MPHB 108 405 / PIX MPHBD 108 405 / PIX MPHD 108 405	PIX MPH 108 400 / PIX MPHB 108 400 / PIX MPHBD 108 400 / PIX MPHD 108 400	PIX MPH 108 395 / PIX MPHB 108 395 / PIX MPHBD 108 395 / PIX MPHD 108 395
Voc [V] /Tolerance	410 /±3%	405 /±3%	400 /±3%	395 /±3%
Vmp [V]	37.34/±5%	37.14/±5%	36.94/±5%	36.75/±5%

Imp [Adc]	13.76/±5%	13.65/±5%	13.58/±5%	13.47/±5%
Isc [Adc] /Tolerance	31.22	31.02	30.82	30.65
Pmax [W] /Tolerance	13.14	13.06	12.99	12.89
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over- Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 108 390 / PIX MPHB 108 390 / PIX MPHBD 108 390 / PIX MPHD 108 390	PIX MPH 108 385 / PIX MPHB 108 385 / PIX MPHBD 108 385 / PIX MPHD 108 385	PIX MPH 108 380 / PIX MPHB 108 380 / PIX MPHBD 108 380 / PIX MPHD 108 380	PIX MPH 108 375 / PIX MPHB 108 375 / PIX MPHBD 108 375 / PIX MPHD 108 375
Voc [V] /Tolerance	390 /±3%	385 /±3%	380 /±3%	375 /±3%
Vmp [V]	36.65/±5%	36.54/±5%	36.45/±5%	36.34/±5%
Imp [Adc]	13.38/±5%	13.33/±5%	13.17/±5%	13.07/±5%
Isc [Adc] /Tolerance	30.55	30.42	30.25	30.13
Pmax [W] /Tolerance	12.78	12.67	12.55	12.46
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over- Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 156 490 / PIX MPHB 156 490	PIX MPH 156 485 / PIX MPHB 156 485	PIX MPH 156 480 / PIX MPHB 156 480	PIX MPH 156 475 / PIX MPHB 156 475
Pmax [W] /Tolerance	490/±3%	485/±3%	480/±3%	475/±3%
Voc [V] /Tolerance	53.72/±5%	53.63/±5%	53.52/±5%	53.41/±5%
Isc [Adc] /Tolerance	11.78/±5%	11.67/±5%	11.56/±5%	11.48/±5%
Vmp [V]	45.94	45.85	45.78	45.69
Imp [Adc]	10.67	10.58	10.49	10.4
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over- Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 156 470 / PIX MPHB 156 470	PIX MPH 156 465 / PIX MPHB 156 465	PIX MPH 156 460 / PIX MPHB 156 460	—
Pmax [W] /Tolerance	470/±3%	465/±3%	460/±3%	—
Voc [V] /Tolerance	53.29/±5%	53.23/±5%	53.16/±5%	—

Isc [A] /Tolerance	11.39/±5%	11.28/±5%	11.18/±5%	—
Vmp [V]	45.6	45.5	45.41	—
Imp [A]	10.31	10.22	10.13	—
Maximum system voltage [V]	1500	1500	1500	—
Maximum Over-Current Protection Rating [A]	30	30	30	—
Module type	PIX MPH 144 450 / PIX MPHB 144 450	PIX MPH 144 445 / PIX MPHB 144 445	PIX MPH 144 440 / PIX MPHB 144 440	PIX MPH 144 435 / PIX MPHB 144 435
Pmax [W] /Tolerance	450 /±3%	445/±3%	440 /±3%	435 /±3%
Voc [V] /Tolerance	49.3/±5%	49.1/±5%	48.9/±5%	48.7/±5%
Isc [A] /Tolerance	11.6/±5%	11.53/±5%	11.46/±5%	11.39/±5%
Vmp [V]	41.48	41.28	41.09	40.89
Imp [A]	10.85	10.78	10.71	10.64
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 144 430 / PIX MPHB 144 430	PIX MPH 144 425 / PIX MPHB 144 425	PIX MPH 144 420 / PIX MPHB 144 420	—
Pmax [W] /Tolerance	430/±3%	425/±3%	420/±3%	—
Voc [V] /Tolerance	48.5/±5%	48.3/±5%	48.1/±5%	—
Isc [A] /Tolerance	11.31/±5%	11.22/±5%	11.15/±5%	—
Vmp [V]	40.61	40.44	40.32	—
Imp [A]	10.59	10.51	10.42	—
Maximum system voltage [V]	1500	1500	1500	—
Maximum Over-Current Protection Rating [A]	30	30	30	—
Module type	PIX MPH 132 410 / PIX MPHB 144 410	PIX MPH 132 405 / PIX MPHB 144 405	PIX MPH 132 400 / PIX MPHB 144 400	PIX MPH 132 395 / PIX MPHB 144 395
Pmax [W] /Tolerance	410/±3%	405/±3%	400/±3%	395/±3%
Voc [V] /Tolerance	45.42/±5%	45.3/±5%	45.18/±5%	45.09/±5%
Isc [A] /Tolerance	11.62/±5%	11.53/±5%	11.43/±5%	11.35/±5%
Vmp [V]	38.76	38.65	38.58	38.47
Imp [A]	10.58	10.49	10.37	10.29

Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 132 390 / PIX MPHB 144 390	PIX MPH 132 385 / PIX MPHB 144 385	PIX MPH 132 380 / PIX MPHB 144 380	—
Pmax [W] /Tolerance	390 /±3%	385/±3%	380 /±3%	—
Voc [V] /Tolerance	44.58/±5%	44.47/±5%	44.38/±5%	—
Isc [Adc] /Tolerance	11.24/±5%	11.12/±5%	11.01/±5%	—
Vmp [V]	38.37	38.25	38.01	—
Imp [Adc]	10.17	10.07	10.01	—
Maximum system voltage [V]	1500	1500	1500	—
Maximum Over-Current Protection Rating [A]	30	30	30	—
Module type	PIX MPH 120 375 / PIX MPHB 144 375	PIX MPH 120 370 / PIX MPHB 144 370	PIX MPH 120 365 / PIX MPHB 144 365	PIX MPH 120 360 / PIX MPHB 144 360
Pmax [W] /Tolerance	375/±3%	370/±3%	365 /±3%	360 /±3%
Voc [V] /Tolerance	41.4/±5%	41.3/±5%	41.2/±5%	41.1/±5%
Isc [Adc] /Tolerance	11.75/±5%	11.67/±5%	11.48/±5%	11.37/±5%
Vmp [V]	35.54	35.22	35.13	35.02
Imp [Adc]	10.62	10.51	10.39	10.28
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 120 355 / PIX MPHB 144 355	PIX MPH 120 350 / PIX MPHB 144 350	PIX MPH 120 345 / PIX MPHB 144 345	PIX MPH 120 340 / PIX MPHB 144 340
Pmax [W] /Tolerance	355 /±3%	350 /±3%	345 /±3%	340 /±3%
Voc [V] /Tolerance	41/±5%	40.9/±5%	40.8/±5%	40.7/±5%
Isc [Adc] /Tolerance	11.25/±5%	11.12/±5%	11.03/±5%	10.89/±5%
Vmp [V]	34.95	34.8	34.68	34.52
Imp [Adc]	10.17	10.06	9.95	9.86
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Note: Further qualification for higher and/or lower output power see E535259-4790855920.1.1-D1				

Bifacial Module:

	Module type	PIX MBHTB 132 660	PIX MBHTB 132 655	PIX MBHTB 132 650	PIX MBHTB 132 645
STC condition	$P_{\max}$ [W] /Tolerance	660/±3%	655/±3%	650/±3%	645/±3%
	V_{oc} [V] /Tolerance	46.3/±5%	46.20/±5%	46.10/±5%	46.00/±5%
	I_{sc} [A]dc /Tolerance	18.17/±5%	18.10/±5%	18.02/±5%	17.93/±5%
	V_{mp} [V]	37.8	37.7	37.6	37.5
	I_{mp} [A]dc	17.47	17.38	17.29	17.20
BNPI condition	$P_{\max}$ [W] /Tolerance	725/±3%	720/±3%	715/±3%	710/±3%
	V_{oc} [V] /Tolerance	46.30/±5%	46.20/±5%	46.10/±5%	46.00/±5%
	I_{sc} [A]dc /Tolerance	20.02/±5%	19.95/±5%	19.88/±5%	19.79/±5%
Bifaciality coefficient	$\phi P_{\max}$	75±10%	75±10%	75±10%	75±10%
	ϕV_{oc}	100±10%	100±10%	100±10%	100±10%
	ϕI_{sc}	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over- Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 132 640	PIX MBHTB 132 635	PIX MBHTB 132 630	PIX MBHTB 132 625
STC condition	$P_{\max}$ [W] /Tolerance	640/±3%	635/±3%	630/±3%	625/±3%
	V_{oc} [V] /Tolerance	45.90/±5%	45.80/±5%	45.70/±5%	45.60/±5%
	I_{sc} [A]dc /Tolerance	17.85/±5%	17.76/±5%	17.65/±5%	17.55/±5%
	V_{mp} [V]	37.4	37.3	37.2	37.1
	I_{mp} [A]dc	17.12	17.03	16.94	16.85
BNPI condition	$P_{\max}$ [W] /Tolerance	705/±3%	700/±3%	695/±3%	690/±3%
	V_{oc} [V] /Tolerance	45.90/±5%	45.80/±5%	45.70/±5%	45.60/±5%
	I_{sc} [A]dc /Tolerance	19.69/±5%	19.58/±5%	19.47/±5%	19.38/±5%
Bifaciality coefficient	$\phi P_{\max}$	75±10%	75±10%	75±10%	75±10%

	ϕV_{oc}	100 $\pm$ 10%	100 $\pm$ 10%	100 $\pm$ 10%	100 $\pm$ 10%
	ϕI_{sc}	75 $\pm$ 10%	75 $\pm$ 10%	75 $\pm$ 10%	75 $\pm$ 10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 120 600	PIX MBHTB 120 595	PIX MBHTB 120 590	PIX MBHTB 120 585
STC condition	Pmax [W] /Tolerance	600/ $\pm$ 3%	595/ $\pm$ 3%	590/ $\pm$ 3%	585/ $\pm$ 3%
	Voc [V] /Tolerance	41.85/ $\pm$ 5%	41.65/ $\pm$ 5%	41.45/ $\pm$ 5%	41.25/ $\pm$ 5%
	Isc [Adc] /Tolerance	18.31/ $\pm$ 5%	18.27/ $\pm$ 5%	18.22/ $\pm$ 5%	18.18/ $\pm$ 5%
	Vmp [V]	34.65	34.45	34.25	34.05
	Imp [Adc]	17.32	17.28	17.23	17.19
BNPI condition	Pmax [W] /Tolerance	660/ $\pm$ 3%	655/ $\pm$ 3%	650/ $\pm$ 3%	645/ $\pm$ 3%
	Voc [V] /Tolerance	41.85/ $\pm$ 5%	41.65 / $\pm$ 5%	41.45 / $\pm$ 5%	41.25/ $\pm$ 5%
	Isc [Adc] /Tolerance	20.06/ $\pm$ 5%	20.02/ $\pm$ 5%	19.97/ $\pm$ 5%	19.91/ $\pm$ 5%
Bifaciality coefficient	ϕP_{max}	75 $\pm$ 10%	75 $\pm$ 10%	75 $\pm$ 10%	75 $\pm$ 10%
	ϕV_{oc}	100 $\pm$ 10%	100 $\pm$ 10%	100 $\pm$ 10%	100 $\pm$ 10%
	ϕI_{sc}	75 $\pm$ 10%	75 $\pm$ 10%	75 $\pm$ 10%	75 $\pm$ 10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 120 580	PIX MBHTB 120 575	PIX MBHTB 120 570	—
STC condition	Pmax [W] /Tolerance	580/ $\pm$ 3%	575/ $\pm$ 3%	570/ $\pm$ 3%	—
	Voc [V] /Tolerance	41.05/ $\pm$ 5%	40.95/ $\pm$ 5%	40.91/ $\pm$ 5%	—
	Isc [Adc] /Tolerance	18.13	18.07	18.00	—
	Vmp [V]	33.85	33.65	33.55	—
	Imp [Adc]	17.14	17.08	16.99	—
BNPI condition	Pmax [W] /Tolerance	640/ $\pm$ 3%	630/ $\pm$ 3%	625/ $\pm$ 3%	—
	Voc [V] /Tolerance	41.05/ $\pm$ 5%	40.95/ $\pm$ 5%	40.91/ $\pm$ 5%	—
	Isc [Adc] /Tolerance	19.87/ $\pm$ 5%	19.72/ $\pm$ 5%	19.59/ $\pm$ 5%	—
	ϕP_{max}	75 $\pm$ 10%	75 $\pm$ 10%	75 $\pm$ 10%	—

Bifaciality coefficient					
	ϕV_{oc}	100±10%	100±10%	100±10%	—
	ϕI_{sc}	75±10%	75±10%	75±10%	—
	Maximum system voltage [V]	1500	1500	1500	—
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	—
	Module type	PIX MBHTB 108 540	PIX MBHTB 108 535	PIX MBHTB 108 530	PIX MBHTB 108 525
STC condition	Pmax [W] /Tolerance	540 /±3%	535/±3%	530 /±3%	525 /±3%
	Voc [V] /Tolerance	36.88/±5%	36.77/±5%	36.65/±5%	36.58/±5%
	Isc [Adc] /Tolerance	18.52/±5%	18.37/±5%	18.26/±5%	18.16/±5%
	Vmp [V]	31.07	30.82	30.7	30.62
	Imp [Adc]	17.39	17.37	17.28	17.15
BNPI condition	Pmax [W] /Tolerance	595/±3%	590/±3%	585/±3%	580/±3%
	Voc [V] /Tolerance	36.88/±5%	36.77/±5%	36.65/±5%	36.58/±5%
	Isc [Adc] /Tolerance	20.19/±5%	20.08/±5%	19.96/±5%	19.87/±5%
Bifaciality coefficient	ϕP_{max}	75±10%	75±10%	75±10%	75±10%
	ϕV_{oc}	100±10%	100±10%	100±10%	100±10%
	ϕI_{sc}	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 108 520	PIX MBHTB 108 515	PIX MBHTB 108 510	—
STC condition	Pmax [W] /Tolerance	520 /±3%	515 /±3%	510 /±3%	—
	Voc [V] /Tolerance	36.48/±5%	36.38/±5%	36.27/±5%	—
	Isc [Adc] /Tolerance	18.06/±5%	17.95/±5%	17.85/±5%	—
	Vmp [V]	30.53	30.42	30.33	—

	Imp [Adc]	17.04	16.94	16.83	—
BNPI condition	Pmax [W] /Tolerance	570/±3%	565/±3%	560/±3%	—
	Voc [V] /Tolerance	36.48/±5%	36.38/±5%	36.27/±5%	—
	Isc [Adc] /Tolerance	19.69/±5%	19.62/±5%	19.59/±5%	—
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	—
	φVoc	100±10%	100±10%	100±10%	—
	φIsc	75±10%	75±10%	75±10%	—
	Maximum system voltage [V]	1500	1500	1500	—
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	—
	Module type	PIX MBHTB 96 480	PIX MBHTB 96 475	PIX MBHTB 96 470	PIX MBHTB 96 465
STC condition	Pmax [W] /Tolerance	480/±3%	475/±3%	470/±3%	465/±3%
	Voc [V] /Tolerance	33.68/±5%	33.59/±5%	33.46/±5%	33.35/±5%
	Isc [Adc] /Tolerance	18.31/±5%	18.21/±5%	18.13/±5%	18.05/±5%
	Vmp [V]	28.47	28.34	28.25	28.17
	Imp [Adc]	16.87	16.76	16.65	16.52
BNPI condition	Pmax [W] /Tolerance	530/±3%	520/±3%	515/±3%	510/±3%
	Voc [V] /Tolerance	33.68/±5%	33.59/±5%	33.46/±5%	33.35/±5%
	Isc [Adc] /Tolerance	19.78/±5%	19.39/±5%	19.21/±5%	19.03/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 96 460	PIX MBHTB 96 455	PIX MBHTB 96 450	—
STC condition	Pmax [W] /Tolerance	460/±3%	455/±3%	450/±3%	—
	Voc [V] /Tolerance	33.24/±5%	33.15/±5%	33.03/±5%	—
	Isc [Adc] /Tolerance	17.94/±5%	17.81/±5%	17.69/±5%	—
	Vmp [V]	28.05	27.91	27.78	—
	Imp [Adc]	16.41	16.32	16.21	—

BNPI condition	Pmax [W] /Tolerance	505/±3%	500/±3%	495/±3%	—
	Voc [V] /Tolerance	33.24/±5%	33.15/±5%	33.03/±5%	—
	Isc [Adc] /Tolerance	18.95/±5%	18.87/±5%	18.79/±5%	—
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	—
	φVoc	100±10%	100±10%	100±10%	—
	φIsc	75±10%	75±10%	75±10%	—
	Maximum system voltage [V]	1500	1500	1500	—
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	—
	Module type	PIX MBHTB 156 595 / PIX MBHDTB 156 595	PIX MBHTB 156 590 / PIX MBHDTB 156 590	PIX MBHTB 156 585 / PIX MBHDTB 156 585	PIX MBHTB 156 580 / PIX MBHDTB 156 580
STC condition	Pmax [W] /Tolerance	593/±5%	590/±3%	585/±3%	580/±3%
	Voc [V] /Tolerance	54.23/±5%	54.14/±5%	54.02/±5%	53.92/±5%
	Isc [Adc] /Tolerance	13.95/±5%	13.95/±5%	13.85/±5%	13.76/±5%
	Vmp [V]	46.13	45.97	45.87	45.76
	Imp [Adc]	12.9	12.84	12.76	12.68
BNPI condition	Pmax [W] /Tolerance	655/±3%	650/±3%	645/±3%	640/±3%
	Voc [V] /Tolerance	54.23/±5%	54.14/±5%	54.02/±5%	53.92/±5%
	Isc [Adc] /Tolerance	15.48/±5%	15.39/±5%	15.28/±5%	15.19/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 156 575 / PIX MBHDTB 156 575	PIX MBHTB 156 570 / PIX MBHDTB 156 570	PIX MBHTB 156 565 / PIX MBHDTB 156 565	PIX MBHTB 156 560 / PIX MBHDTB 156 560
STC condition	Pmax [W] /Tolerance	575/±3%	570/±3%	565/±3%	560/±3%
	Voc [V] /Tolerance	53.82/±5%	53.72/±5%	53.63/±5%	53.51/±5%
	Isc [Adc] /Tolerance	13.65/±5%	13.56/±5%	13.45/±5%	13.34/±5%

	Vmp [V]	45.65	45.57	45.46	45.36
	Imp [Adc]	12.6	12.51	12.43	12.35
BNPI condition	Pmax [W] /Tolerance	630/±3%	625/±3%	620/±3%	615/±3%
	Voc [V] /Tolerance	53.82/±5%	53.72/±5%	53.63/±5%	53.51/±5%
	Isc [Adc] /Tolerance	15.08/±5%	14.97/±5%	14.88/±5%	14.81/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 144 545 / PIX MBHDTB 144 545	PIX MBHTB 144 540 / PIX MBHDTB 144 540	PIX MBHTB 144 535 / PIX MBHDTB 144 535	PIX MBHTB 144 530 / PIX MBHDTB 144 530
STC condition	Pmax [W] /Tolerance	545/±3%	540/±3%	535/±3%	530/±3%
	Voc [V] /Tolerance	49.65/±5%	49.50/±5%	49.35/±5%	49.20/±5%
	Isc [Adc] /Tolerance	13.92/±5%	13.85/±5%	13.78/±5%	13.71/±5%
	Vmp [V]	41.80	41.65	41.50	41.35
	Imp [Adc]	13.04	12.97	12.90	12.82
BNPI condition	Pmax [W] /Tolerance	600/±3%	595/±3%	590/±3%	585/±3%
	Voc [V] /Tolerance	49.65/±5%	49.50/±5%	49.35/±5%	49.20/±5%
	Isc [Adc] /Tolerance	15.31/±5%	15.21/±5%	15.15/±5%	15.06/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 144 525/ PIX MBHDTB 144 525	PIX MBHTB 144 520 / PIX MBHDTB 144 520	PIX MBHTB 144 515 / PIX MBHDTB 144 515	PIX MBHTB 144 510 / PIX MBHDTB 144 510

STC condition	Pmax [W] /Tolerance	525/±3%	520/±3%	515/±3%	510/±3%
	Voc [V] /Tolerance	49.05/±5%	48.85/±5%	48.62/±5%	48.47/±5%
	Isc [Adc] /Tolerance	13.65/±5%	13.61/±5%	13.55/±5%	13.45/±5%
	Vmp [V]	41.20	41.05	40.91	40.86
	Imp [Adc]	12.75	12.67	12.59	12.49
BNPI condition	Pmax [W] /Tolerance	580/±3%	570/±3%	565/±3%	560/±3%
	Voc [V] /Tolerance	49.05/±5%	48.85/±5%	48.62/±5%	48.47/±5%
	Isc [Adc] /Tolerance	14.96/±5%	14.86/±5%	14.76/±5%	14.66/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 132 500 / PIX MBHDTB 132 500	PIX MBHTB 132 495 / PIX MBHDTB 132 495	PIX MBHTB 132 490 / PIX MBHDTB 132 490	PIX MBHTB 132 485 / PIX MBHDTB 132 485
STC condition	Pmax [W] /Tolerance	500/±3%	495/±3%	490/±3%	485/±3%
	Voc [V] /Tolerance	46.46/±5%	46.37/±5%	46.26/±5%	46.15/±5%
	Isc [Adc] /Tolerance	13.49/±5%	13.36/±5%	13.27/±5%	13.19/±5%
	Vmp [V]	38.89	38.76	38.53	38.43
	Imp [Adc]	12.86	12.78	12.72	12.63
BNPI condition	Pmax [W] /Tolerance	550/±3%	545/±3%	540/±3%	535/±3%
	Voc [V] /Tolerance	46.46/±5%	46.37/±5%	46.26/±5%	46.15/±5%
	Isc [Adc] /Tolerance	15.1/±5%	15.01/±5%	14.92/±5%	14.83/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 132 480 / PIX	PIX MBHTB 132 475 / PIX	PIX MBHTB 132 470 / PIX	—

		MBHDTB 132 480	MBHDTB 132 475	MBHDTB 132 470	
STC condition	Pmax [W] /Tolerance	480/±3%	475/±3%	470/±3%	—
	Voc [V] /Tolerance	46.06/±5%	45.96/±5%	45.87/±5%	—
	Isc [Adc] /Tolerance	13.1/±5%	12.99/±5%	12.88/±5%	—
	Vmp [V]	38.32	38.22	38.12	—
	Imp [Adc]	12.53	12.43	12.33	—
BNPI condition	Pmax [W] /Tolerance	530/±3%	520/±3%	515/±3%	—
	Voc [V] /Tolerance	46.06/±5%	45.96/±5%	45.87/±5%	—
	Isc [Adc] /Tolerance	14.7/±5%	14.57/±5%	14.45/±5%	—
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	—
	φVoc	100±10%	100±10%	100±10%	—
	φIsc	75±10%	75±10%	75±10%	—
	Maximum system voltage [V]	1500	1500	1500	—
	Maximum Over- Current Protection Rating [A]	30 A	30 A	30 A	—
	Module type	PIX MBHTB 120 455 / PIX MBHDTB 120 455	PIX MBHTB 120 450 / PIX MBHDTB 120 450	PIX MBHTB 120 445 / PIX MBHDTB 120 445	PIX MBHTB 120 440 / PIX MBHDTB 120 440
STC condition	Pmax [W] /Tolerance	455/±3%	450/±3%	445/±3%	440/±3%
	Voc [V] /Tolerance	41.62/±5%	41.52/±5%	41.43/±5%	41.31/±5%
	Isc [Adc] /Tolerance	13.97/±5%	13.89/±5%	13.79/±5%	13.68/±5%
	Vmp [V]	36.52	36.42	36.29	36.18
	Imp [Adc]	12.46	12.36	12.27	12.17
BNPI condition	Pmax [W] /Tolerance	500/±3%	495/±3%	490/±3%	485/±3%
	Voc [V] /Tolerance	41.62/±5%	41.52/±5%	41.43/±5%	41.31/±5%
	Isc [Adc] /Tolerance	15.38/±5%	15.26/±5%	15.14/±5%	15.02/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500

	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 120 435 / PIX MBHDTB 120 435	PIX MBHTB 120 430 / PIX MBHDTB 120 430	PIX MBHTB 120 425 / PIX MBHDTB 120 425	PIX MBHTB 120 420 / PIX MBHDTB 120 420
STC condition	Pmax [W] /Tolerance	435/±3%	430/±3%	425/±3%	420/±3%
	Voc [V] /Tolerance	41.22/±5%	41.11/±5%	40.98/±5%	40.87/±5%
	Isc [Adc] /Tolerance	13.57/±5%	13.47/±5%	13.38/±5%	13.27/±5%
	Vmp [V]	36.05	35.98	35.81	35.69
	Imp [Adc]	12.07	11.96	11.87	11.77
BNPI condition	Pmax [W] /Tolerance	480/±3%	475/±3%	470/±3%	465/±3%
	Voc [V] /Tolerance	41.22/±5%	41.11/±5%	40.98/±5%	40.87/±5%
	Isc [Adc] /Tolerance	14.9/±5%	14.78/±5%	14.66/±5%	14.54/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 108 410 / PIX MBHDTB 108 410	PIX MBHTB 108 405 / PIX MBHDTB 108 405	PIX MBHTB 108 400 / PIX MBHDTB 108 400	PIX MBHTB 108 395 / PIX MBHDTB 108 395
STC condition	Pmax [W] /Tolerance	410 /±3%	405 /±3%	400 /±3%	395 /±3%
	Voc [V] /Tolerance	37.34/±5%	37.14/±5%	36.94/±5%	36.75/±5%
	Isc [Adc] /Tolerance	13.76/±5%	13.65/±5%	13.58/±5%	13.47/±5%
	Vmp [V]	31.22	31.02	30.82	30.65
	Imp [Adc]	13.14	13.06	12.99	12.89
BNPI condition	Pmax [W] /Tolerance	450/±3%	445/±3%	440/±3%	435/±3%
	Voc [V] /Tolerance	37.34/±5%	37.14/±5%	36.94/±5%	36.75/±5%
	Isc [Adc] /Tolerance	15.35/±5%	15.23/±5%	15.11/±5%	14.99/±5%
	ΦPmax	75±10%	75±10%	75±10%	75±10%

Bifaciality coefficient	ϕV_{oc}	100±10%	100±10%	100±10%	100±10%
	ϕI_{sc}	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 108 390 / PIX MBHDTB 108 390	PIX MBHTB 120 385 / PIX MBHDTB 108 385	PIX MBHTB 120 380 / PIX MBHDTB 108 380	PIX MBHTB 120 375 / PIX MBHDTB 108 375
STC condition	Pmax [W] /Tolerance	390 /±3%	385 /±3%	380 /±3%	375 /±3%
	Voc [V] /Tolerance	36.65/±5%	36.54/±5%	36.45/±5%	36.34/±5%
	Isc [Adc] /Tolerance	13.38/±5%	13.33/±5%	13.17/±5%	13.07/±5%
	Vmp [V]	30.55	30.42	30.25	30.13
	Imp [Adc]	12.78	12.67	12.55	12.46
BNPI condition	Pmax [W] /Tolerance	430/±3%	425/±3%	420/±3%	455/±3%
	Voc [V] /Tolerance	36.65/±5%	36.54/±5%	36.45/±5%	36.34/±5%
	Isc [Adc] /Tolerance	14.87/±5%	14.76/±5%	14.64/±5%	14.53/±5%
Bifaciality coefficient	ϕP_{max}	75±10%	75±10%	75±10%	75±10%
	ϕV_{oc}	100±10%	100±10%	100±10%	100±10%
	ϕI_{sc}	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 156 490	PIX MBHTB 156 485	PIX MBHTB 156 480	PIX MBHTB 156 475
STC condition	Pmax [W] /Tolerance	490/±3%	485/±3%	480/±3%	475/±3%
	Voc [V] /Tolerance	53.72/±5%	53.63/±5%	53.52/±5%	53.41/±5%
	Isc [Adc] /Tolerance	11.78/±5%	11.67/±5%	11.56/±5%	11.48/±5%
	Vmp [V]	45.94	45.85	45.78	45.69
	Imp [Adc]	10.67	10.58	10.49	10.4
BNPI condition	Pmax [W] /Tolerance	540/±3%	535/±3%	530/±3%	520/±3%
	Voc [V] /Tolerance	53.72/±5%	53.63/±5%	53.52/±5%	53.41/±5%
	Isc [Adc] /Tolerance	12.78/±5%	12.66/±5%	12.55/±5%	12.44/±5%
	ϕP_{max}	75±10%	75±10%	75±10%	75±10%

Bifaciality coefficient	ϕV_{oc}	100±10%	100±10%	100±10%	100±10%
	ϕI_{sc}	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 156 470	PIX MBHTB 156 465	PIX MBHTB 156 460	—
STC condition	Pmax [W] /Tolerance	470/±3%	465/±3%	460/±3%	—
	Voc [V] /Tolerance	53.29/±5%	53.23/±5%	53.16/±5%	—
	Isc [A _{dc}] /Tolerance	11.39/±5%	11.28/±5%	11.18/±5%	—
	V _{mp} [V]	45.6	45.5	45.41	—
	I _{mp} [A _{dc}]	10.31	10.22	10.13	—
BNPI condition	Pmax [W] /Tolerance	515/±3%	510/±3%	505/±3%	—
	Voc [V] /Tolerance	53.29/±5%	53.23/±5%	53.16/±5%	—
	Isc [A _{dc}] /Tolerance	12.39/±5%	12.21/±5%	12.12/±5%	—
Bifaciality coefficient	ϕP_{max}	75±10%	75±10%	75±10%	—
	ϕV_{oc}	100±10%	100±10%	100±10%	—
	ϕI_{sc}	75±10%	75±10%	75±10%	—
	Maximum system voltage [V]	1500	1500	1500	—
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	
	Module type	PIX MBHTB 144 450	PIX MBHTB 144 445	PIX MBHTB 144 440	PIX MBHTB 144 435
STC condition	Pmax [W] /Tolerance	450 /±3%	445/±3%	440 /±3%	435 /±3%
	Voc [V] /Tolerance	49.3/±5%	49.1/±5%	48.9/±5%	48.7/±5%
	Isc [A _{dc}] /Tolerance	11.6/±5%	11.53/±5%	11.46/±5%	11.39/±5%
	V _{mp} [V]	41.48	41.28	41.09	40.89
	I _{mp} [A _{dc}]	10.85	10.78	10.71	10.64
BNPI condition	Pmax [W] /Tolerance	495/±3%	490/±3%	485/±3%	480/±3%
	Voc [V] /Tolerance	49.3/±5%	49.1/±5%	48.9/±5%	48.7/±5%
	Isc [A _{dc}] /Tolerance	12.73/±5%	12.63/±5%	12.54/±5%	12.47/±5%
Bifaciality coefficient	ϕP_{max}	75±10%	75±10%	75±10%	75±10%
	ϕV_{oc}	100±10%	100±10%	100±10%	100±10%
	ϕI_{sc}	75±10%	75±10%	75±10%	75±10%

	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 144 430	PIX MBHTB 144 425	PIX MBHTB 144 420	—
STC condition	Pmax [W] /Tolerance	430/±3%	425/±3%	420/±3%	—
	Voc [V] /Tolerance	48.5/±5%	48.3/±5%	48.1/±5%	—
	Isc [Adc] /Tolerance	11.31/±5%	11.22/±5%	11.15/±5%	—
	Vmp [V]	40.61	40.44	40.32	—
	Imp [Adc]	10.59	10.51	10.42	—
BNPI condition	Pmax [W] /Tolerance	475/±3%	465/±3%	460/±3%	—
	Voc [V] /Tolerance	48.5/±5%	48.3/±5%	48.1/±5%	—
	Isc [Adc] /Tolerance	12.41/±5%	12.25/±5%	12.14/±5%	—
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	—
	φVoc	100±10%	100±10%	100±10%	—
	φIsc	75±10%	75±10%	75±10%	—
	Maximum system voltage [V]	1500	1500	1500	—
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	—
	Module type	PIX MBHTB 132 410	PIX MBHTB 132 405	PIX MBHTB 132 400	PIX MBHTB 132 395
STC condition	Pmax [W] /Tolerance	410/±3%	405/±3%	400/±3%	395/±3%
	Voc [V] /Tolerance	45.42/±5%	45.3/±5%	45.18/±5%	45.09/±5%
	Isc [Adc] /Tolerance	11.62/±5%	11.53/±5%	11.43/±5%	11.35/±5%
	Vmp [V]	38.76	38.65	38.58	38.47
	Imp [Adc]	10.58	10.49	10.37	10.29
BNPI condition	Pmax [W] /Tolerance	450/±3%	445/±3%	440/±3%	435/±3%
	Voc [V] /Tolerance	45.42/±5%	45.3/±5%	45.18/±5%	45.09/±5%
	Isc [Adc] /Tolerance	12.68/±5%	12.58/±5%	12.48/±5%	12.37/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500

	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 132 390	PIX MBHTB 132 385	PIX MBHTB 132 380	–
STC condition	Pmax [W] /Tolerance	390 /±3%	385/±3%	380 /±3%	–
	Voc [V] /Tolerance	44.58/±5%	44.47/±5%	44.38/±5%	–
	Isc [Adc] /Tolerance	11.24/±5%	11.12/±5%	11.01/±5%	–
	Vmp [V]	38.37	38.25	38.01	–
	Imp [Adc]	10.17	10.07	10.01	–
BNPI condition	Pmax [W] /Tolerance	430/±5%	425/±5%	420/±5%	–
	Voc [V] /Tolerance	44.58/±5%	44.47/±5%	44.38/±5%	–
	Isc [Adc] /Tolerance	12.33/±5%	12.23/±5%	12.0/±5%1	–
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	–
	φVoc	100±10%	100±10%	100±10%	–
	φIsc	75±10%	75±10%	75±10%	–
	Maximum system voltage [V]	1500	1500	1500	–
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	–
	Module type	PIX MBHTB 120 375	PIX MBHTB 120 370	PIX MBHTB 120 365	PIX MBHTB 120 360
STC condition	Pmax [W] /Tolerance	375/±3%	370/±3%	365 /±3%	360 /±3%
	Voc [V] /Tolerance	41.4/±5%	41.3/±5%	41.2/±5%	41.1/±5%
	Isc [Adc] /Tolerance	11.75/±5%	11.67/±5%	11.48/±5%	11.37/±5%
	Vmp [V]	35.54	35.22	35.13	35.02
	Imp [Adc]	10.62	10.51	10.39	10.28
BNPI condition	Pmax [W] /Tolerance	410/±3%	405/±3%	400/±3%	395/±3%
	Voc [V] /Tolerance	41.4/±5%	41.3/±5%	41.2/±5%	41.1/±5%
	Isc [Adc] /Tolerance	12.55/±5%	12.43/±5%	12.31/±5%	12.17/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A

	Module type	PIX MBHTB 120 355	PIX MBHTB 120 350	PIX MBHTB 120 345	PIX MBHTB 120 340
STC condition	Pmax [W] /Tolerance	355 /±3%	350 /±3%	345 /±3%	340 /±3%
	Voc [V] /Tolerance	41/±5%	40.9/±5%	40.8/±5%	40.7/±5%
	Isc [Adc] /Tolerance	11.25/±5%	11.12/±5%	11.03/±5%	10.89/±5%
	Vmp [V]	34.95	34.8	34.68	34.52
	Imp [Adc]	10.17	10.06	9.95	9.86
BNPI condition	Pmax [W] /Tolerance	390/±3%	385/±3%	380/±3%	375/±3%
	Voc [V] /Tolerance	41/±5%	40.9/±5%	40.8/±5%	40.7/±5%
	Isc [Adc] /Tolerance	12.05/±5%	11.93/±5%	11.81/±5%	11.71/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over- Current Protection Rating [A]	30 A	30 A	30 A	30 A

GENERAL PRODUCT INFORMATION AND OTHER REMARKS:

Amendment Report 2: E535259-4790855920.1.1-D3

This technical amendment report is issued to add below listed components/BOM combinations with respect to the original report number as mentioned below.

Original Report: Report No. E535259-4790855920.1.1-D1 dated 2024-04-22 issued by UL and E535259-4790855920.1.1-D1-A1 dated 2024-09-24 issued by UL

The below material combinations were added to 182mm family BOM.

Component\Samples	Cxx	Exx
Solar Cell	Manufacturer By: Zhejiang Aiko Solar Energy Technology Co., Ltd. (AIKOSOLAR) Type: 182 Monocrystalline	Manufacturer By: Jiangsu Longheng new energy Co., Ltd (Solar Space) Type: 182 Monocrystalline, Bifacial PERC Solar Cell
Encapsulation System	Manufactured By: Hangzhou First APPLIED Material Co.,Ltd (FIRST) Front: F406PS Thickness: 0.50±0.05mm	Manufactured By: PIXON GREEN ENERGY PRIVATE LIMITED Type: Front: PIX FC T, PIX Fast Cure, Thickness: 0.55±0.10mm Type: Rear: PIX FC B, PIX Fast Cure, Thickness: 0.55±0.10mm
Front Cover/ Superstrate	Manufactured By: Guangxi Xinyi Photovoltaic Industry Co., Ltd Type: Tempered Glass, ARC Coated, Thickness: 3.2 mm	Manufactured By: Guangxi Xinyi Photovoltaic Industry Co., Ltd Type: Tempered Glass, ARC Coated, Thickness: 3.2 mm
Backsheet/Substrate	Manufactured by: COVEME Engineered Films Zhangjiagang Co., Ltd Type: dyMat Clr KL 50/285, Polyvinylidene Fluoride (PVDF)/Polyethylene Terephthalate film (PET), Colour: Transparent (For PIX MBHTB series) Alternate (*): Type: dyMat KL 50/285 Colour: White (For PIX MPH series) Type: dyMat BK KL 50/285 Colour: Black (For PIX MPH series)	Manufactured by: COVEME Engineered Films Zhangjiagang Co., Ltd Type: dyMat Clr KL 50/285, Polyvinylidene Fluoride (PVDF)/Polyethylene Terephthalate film (PET), Colour: Transparent (For PIX MBHTB series) Alternate (*): Type: dyMat KL 50/285 Colour: White (For PIX MPH series) Type: dyMat BK KL 50/285 Colour: Black (For PIX MPH series)
Junction Box/Electrical Termination	Junction box: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: PV-ZH011C-5, 1500 VDC, Current Rated : 30A Cable: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: 62930 IEC 131, 1x4mm ² , DC 1.5kV Connector: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: PV-ZH202B, Rated 1500 VDC, 40A max Potting material Type: ADSIL JB 597, Thickness: 6.0mm min, Flame Class: HB, HWI: 2, HAI:0, RTI:105, IPT:2.5kV	Junction box: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: PV-ZH011C-5, 1500 VDC, Current Rated : 30A Cable: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: 62930 IEC 131, 1x4mm ² , DC 1.5kV Connector: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: PV-ZH202B, Rated 1500 VDC, 40A max Potting material : Manufactured by: Tonsan Adhesive Inc Type: 1521, Thickness: 3.0mm min, Flame Class: HB, HWI: 2, HAI:0, RTI:105, IPT:2.5kV

	Adhesive for junction box : Manufactured by: Adarsha Specialty Chemicals Pvt Ltd Type: Adsil PV 555; Thickness=3.0mm; Flame class=HB; HWI=2; HAI=0; RTI=105°C	Adhesive for junction box : Manufactured by: Tonsan Adhesive Inc; Type: 1527; Thickness=3.0mm; Flame class=HB; HWI=2; HAI=0; RTI=105°C
Cell Interconnect / String Interconnects	Manufactured By: Xi'an Telison New Materials Co., Ltd. (TELISON) Dimension: 0.5mm X 0.20mm Coating Sn60/Pb40 Manufactured By: Xi'an Telison New Materials Co., Ltd. (TELISON) Dimension: 5.0mm X 0.40mm Coating Sn60/Pb40	Manufactured By: Xi'an Telison New Materials Co., Ltd. (TELISON) Dimension: 0.5mm X 0.20mm Coating Sn60/Pb40 Manufactured By: Xi'an Telison New Materials Co., Ltd. (TELISON) Dimension: 5.0mm X 0.40mm Coating Sn60/Pb40
Soldering Material	Manufactured By: Trivista Metals Type: SN63/PB37, Diameter 0.8mm	Manufactured By: KESTER (ALPHA) Type: KESTER 245, SN63/PB37, Diameter 0.8mm
Fluxing Agent:	Manufactured By: Walton Trading	Manufactured By: KESTER (ALPHA) Type: ALPHA PV-71
By-Pass Diode:	Manufactured by: Zhejiang Zhonghuan Sunter PV technology private Limited Type: 40SQ045, 40A, 45V	Manufactured by: Zhejiang Zhonghuan Sunter PV technology private Limited Type: 40SQ045, 40A, 45V
Adhesive For Frame:	Manufactured by: Manufactured by: Adarsha Specialty Chemicals Pvt Ltd Type: Adsil PV 555; Thickness=3.0mm; Flame class=HB; HWI=2; HAI=0; RTI=105°C	Manufactured by: Tonsan Adhesive Inc; Type: 1527; Thickness=3.0mm; Flame class=HB; HWI=2; HAI=0; RTI=105°C
Cell Positioning Tape:	Suzhou Temosun Glue Products Co., Ltd.	3M India Limited

Amendment Report 1: E535259-4790855920.1.1-D1-A1

This technical amendment report is issued for the below corrections with respect to the original report number as mentioned below.

Original Report: Report No. E535259-4790855920.1.1-D1 dated 2024-04-22 issued by UL

The corrections with respect to above mentioned reports are:

- 1) Page 1: Name of Testing Laboratory preparing the Report is changed to UL-CCIC Company Limited
- 2) Page 107: Typo corrections in TABLE 23.3 Performance at STC before final stabilization
- 3) Test result of MQT 06.1 for Bxx, Dxx, Fxx, Gxx samples are added in Annex 6.

The above inaccuracies were fixed: No changes to the originally tested products were made. The test results referred from original report number E535259-4790855920.1.1-D1 dated 2024-04-22 issued by UL

Original Report: E535259-4790855920.1.1-D1

210mm Family:

The Models PIX MBHTB 132 640 (Axx) were used as full test program samples and considered representative of the 210mm Family series.

Lower end (PIX MBHTB 132 625) and higher end (PIX MBHTB 132 660) were tested for power class testing for label verification.

182mm Family:

The Models PIX MBHTB 156 575 (Bxx) were used as Modification to encapsulation system, Modification to cell technology, Modification to cell and string interconnect material or technique and Modification to electrical circuitry considered representative of the 182mm Family series.

Lower end (PIX MBHTB 156 560) and higher end (PIX MBHTB 156 595) were tested for power class testing for label verification.

The Models PIX MBHTB 156 575 (Dxx) were used as, Modification to cell technology considered representative of the 182mm Family series.

The Models PIX MBHDTB 156 560 (Fxx) were used as, Modification to cell technology and Modification to electrical termination considered representative of the DCR-182mm Family series.

166mm Family: Samples (Gxx)

The Models PIX MBHTB 156 475 (Gxx) were used as Modification to cell technology and considered representative of the 166mm Family series.

166mm Family: Lower end (460W) and higher end (490W) power class testing for label verification was not conducted considering that the difference is not higher than 5% of the tested power class (475W).

BOM combinations used for testing:

Component\Samples	Axx	Bxx
Solar Cell	Manufacturer By: Tongwei Solar (Meishan) Co.,Ltd. Type: M210CBPERCBP	Manufacturer By: Tongwei Solar Co., Ltd. Type: Tongwei Solar M182ABPERCBP
Encapsulation System	Manufactured By: PIXON GREEN ENERGY PRIVATE LIMITED Type: Front: PIX FC T, PIX Fast Cure, Type: Rear: PIX FC B, PIX Fast Cure,	Manufactured By: Hangzhou First APPLIED Material Co.,Ltd (FIRST) Front: F406PS Rear: F806PS,
Front Cover/ Superstrate	Manufactured By: Guangxi Xinyi Photovoltaic Industry Co., Ltd Type: Tempered Glass, ARC Coated, Thickness: 3.2 mm	Manufactured By: Guangxi Xinyi Photovoltaic Industry Co., Ltd Type: Tempered Glass, ARC Coated, Thickness: 3.2 mm
Backsheet/Substrate	Manufactured by: Cybrid Technologies Inc Type: Cynagard465A(R), PVDF/PET/Fluorine resin coating, Colour: Transparent (For PIX MBHTB series) Alternate (*): Type: Cynagard 205A(R), Colour: White (For PIX MPH series) Type: Cynagard 205A(R), Colour: Black (For PIX MPH series)	Manufactured by: Cybrid Technologies Inc Type: Cynagard465A(R), PVDF/PET/Fluorine resin coating, Colour: Transparent (For PIX MBHTB series) Alternate (*): Type: Cynagard 205A(R), Colour: White (For PIX MPH series) Type: Cynagard 205A(R), Colour: Black (For PIX MPH series)
Junction Box/Electrical Termination	Junction box: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: PV-ZH011C-5, 1500 VDC, Current Rated : 30A Cable: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: 62930 IEC 131, 1x4mm ² , DC 1.5kV Connector: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: PV-ZH202B, Rated 1500 VDC, 40A max Potting material : Manufactured by: Tonsan Adhesive Inc	Junction box: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: PV-ZH011C-5, 1500 VDC, Current Rated : 30A Cable: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: 62930 IEC 131, 1x4mm ² , DC 1.5kV Connector: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: PV-ZH202B, Rated 1500 VDC, 40A max Potting material : Manufactured by: Tonsan Adhesive Inc

	Type: 1521, Thickness: 3.0mm min, Flame Class: HB, HWI: 2, HAI:0, RTI:105, IPT:2.5kV Adhesive for junction box : Manufactured by: Tonsan Adhesive Inc; Type: 1527; Thickness=3.0mm; Flame class=HB; HWI=2; HAI=0; RTI=105°C	Type: 1521, Thickness: 3.0mm min, Flame Class: HB, HWI: 2, HAI:0, RTI:105, IPT:2.5kV Adhesive for junction box : Manufactured by: Tonsan Adhesive Inc; Type: 1527; Thickness=3.0mm; Flame class=HB; HWI=2; HAI=0; RTI=105°C
Cell Interconnect / String Interconnects	Manufactured By: Xi'an Telison New Materials Co.,Ltd. (TELISON) Dimension: 0.5mm X 0.20mm Coating Sn60/Pb40 Manufactured By: Xi'an Telison New Materials Co.,Ltd. (TELISON) Dimension: 5.0mm X 0.40mm Coating Sn60/Pb40	Manufactured By: Xi'an Telison New Materials Co.,Ltd. (TELISON) Dimension: 0.5mm X 0.20mm Coating Sn60/Pb40 Manufactured By: Xi'an Telison New Materials Co.,Ltd. (TELISON) Dimension: 5.0mm X 0.40mm Coating Sn60/Pb40
Soldering Material	Manufactured By: KESTER (ALPHA) Type: KESTER 245, SN63/PB37, Diameter 0.8mm,	Manufactured By: Metal Connect Enterprises, METAL CHEM CONNECT Type: SN63/PB37, Diameter 0.8mm,
Fluxing Agent :	Manufactured By: KESTER (ALPHA) Type: ALPHA PV-71	Manufactured By: Metal Connect Enterprises, METAL CHEM CONNECT
By-Pass Diode:	Manufactured by: Zhejiang Zhonghuan Sunter PV technology private Limited Type: 40SQ045, 40A, 45V	Manufactured by: Zhejiang Zhonghuan Sunter PV technology private Limited Type: 40SQ045, 40A, 45V
Adhesive For Frame :	Manufactured by: Tonsan Adhesive Inc; Type: 1527; Thickness=3.0mm; Flame class=HB; HWI=2; HAI=0; RTI=105°C	Manufactured by: Tonsan Adhesive Inc; Type: 1527; Thickness=3.0mm; Flame class=HB; HWI=2; HAI=0; RTI=105°C
Cell Positioning Tape :	3M India Limited	Shanghai Yanger technologies

Component\Samples	Dxx	Fxx
Solar Cell	Manufacturer By: Tongwei Solar Co., Ltd. Type: Tongwei Solar M182ABPERCBP	Manufacturer By: Jupiter International Limited Type: 182x182 MM-10BB, MONO PERC, Model: 182
Encapsulation System	Manufactured By: PIXON GREEN ENERGY PRIVATE LIMITED Type: Front: PIX FC T, PIX Fast Cure, Type: Rear: PIX FC B, PIX Fast Cure,	Manufactured By: PIXON GREEN ENERGY PRIVATE LIMITED Type: Front: PIX FC T, PIX Fast Cure, Type: Rear: PIX FC B, PIX Fast Cure,
Front Cover/ Superstrate	Manufactured By: Guangxi Xinyi Photovoltaic Industry Co., Ltd Type: Tempered Glass, ARC Coated, Thickness: 3.2 mm	Manufactured By: Guangxi Xinyi Photovoltaic Industry Co., Ltd Type: Tempered Glass, ARC Coated, Thickness: 3.2 mm
Backsheet/Substrate	Manufactured by: Cybrid Technologies Inc Type: Cynagard465A(R), PVDF/PET/Fluorine resin coating, Colour: Transparent (For PIX MBHTB series) Alternate (*): Type: Cynagard 205A(R), Colour: White (For PIX MPH series) Type: Cynagard 205A(R), Colour: Black	Manufactured by: Cybrid Technologies Inc Type: Cynagard465A(R), PVDF/PET/Fluorine resin coating, Colour: Transparent (For PIX MBHTB series) Alternate (*): Type: Cynagard 205A(R), Colour: White (For PIX MPH series) Type: Cynagard 205A(R), Colour: Black

	(For PIX MPHB series)	(For PIX MPHB series)
Junction Box/Electrical Termination	Junction box: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: PV-ZH011C-5, 1500 VDC, Current Rated : 30A Cable: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: 62930 IEC 131, 1x4mm², DC 1.5kV Connector: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: PV-ZH202B, Rated 1500 VDC, 40A max Potting material : Manufactured by: Adarsha Specialty Chemicals Pvt Ltd Type: ADSIL JB 597, Thickness: 6.0mm min, Flame Class: HB, HWI: 2, HAI:0, RTI:105, IPT:2.5kV Adhesive for junction box : Manufactured by: Adarsha Specialty Chemicals Pvt Ltd	Junction box: Manufactured By: Dhash PV Technologies Private Limited (DHASH) Type: DSJB12C, 1500 VDC, Current Rated : 30A Cable: Manufactured By: Dhash PV Technologies Private Limited (DHASH) Type: 62930 IEC 131, 1x4mm², DC 1.5kV Connector: Manufactured By: Dhash PV Technologies Private Limited (DHASH) Type: DS-01, Rated 1500 VDC, 35A max Potting material : Manufactured by: Tonsan Adhesive Inc Type: 1521, Thickness: 3.0mm min, Flame Class: HB, HWI: 2, HAI:0, RTI:105, IPT:2.5kV Adhesive for junction box : Manufactured by: Tonsan Adhesive Inc; Type: 1527; Thickness=3.0mm; Flame class=HB; HWI=2; HAI=0; RTI=105°C
Cell Interconnect / String Interconnects	Manufactured By: Xi'an Telison New Materials Co.,Ltd. (TELISON) Dimension: 0.5mm X 0.20mm Coating Sn60/Pb40 Manufactured By: Xi'an Telison New Materials Co.,Ltd. (TELISON) Dimension: 5.0mm X 0.40mm Coating Sn60/Pb40	Manufactured By: Xi'an Telison New Materials Co.,Ltd. (TELISON) Dimension: 0.5mm X 0.20mm Coating Sn60/Pb40 Manufactured By: Xi'an Telison New Materials Co.,Ltd. (TELISON) Dimension: 5.0mm X 0.40mm Coating Sn60/Pb40
Soldering Material	Manufactured By: KESTER (ALPHA) Type: KESTER 245, SN63/PB37, Diameter 0.8mm,	Manufactured By: KESTER (ALPHA) Type: KESTER 245, SN63/PB37, Diameter 0.8mm,
Fluxing Agent :	Manufactured By: KESTER (ALPHA) Type: ALPHA PV-71	Manufactured By: KESTER (ALPHA) Type: ALPHA PV-71
By-Pass Diode:	Manufactured by: Zhejiang Zhonghuan Sunter PV technology private Limited Type: 40SQ045, 40A, 45V	Manufactured by: SMC Diode Solutions Type: DS5045T, 50A, 45V
Adhesive For Frame :	Manufactured by: Manufactured by: Adarsha Specialty Chemicals Pvt Ltd Type: Adsil PV 555; Thickness=3.0mm; Flame class=HB; HWI=2; HAI=0; RTI=105°C	Manufactured by: Tonsan Adhesive Inc; Type: 1527; Thickness=3.0mm; Flame class=HB; HWI=2; HAI=0; RTI=105°C
Cell Positioning Tape :	3M India Limited	3M India Limited
Component	Samples	Gxx
Solar Cell	Manufacturer By: Tongwei Solar (Chengdu)Co.,Ltd Type: M1669BPERCBP SE SOLAR CELL	
Encapsulation System	Manufactured By: PIXON GREEN ENERGY PRIVATE LIMITED Type: Front: PIX FC T, PIX Fast Cure, Type: Rear: PIX FC B, PIX Fast Cure,	

Front Cover/ Superstrate	Manufactured By: Guangxi Xinyi Photovoltaic Industry Co., Ltd Type: Tempered Glass, ARC Coated, Thickness: 3.2 mm	
Backsheet/Substrate	Manufactured by: Cybrid Technologies Inc Type: Cynagard465A(R), PVDF/PET/Fluorine resin coating, Colour: Transparent (For PIX MBHTB series) Alternate (*): Type: Cynagard 205A(R), Colour: White (For PIX MPH series) Type: Cynagard 205A(R), Colour: Black (For PIX MPH series)	
Junction Box/Electrical Termination	Junction box: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: PV-ZH011C-5, 1500 VDC, Current Rated : 30A Cable: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: 62930 IEC 131, 1x4mm ² , DC 1.5kV Connector: Manufactured By: Zhonghuan Sunter Pv Technology Co Ltd Type: PV-ZH202B, Rated 1500 VDC, 40A max Potting material : Manufactured by: Adarsha Specialty Chemicals Pvt Ltd Type: ADSIL JB 597, Thickness: 6.0mm min, Flame Class: HB, HWI: 2, HAI:0, RTI:105, IPT:2.5kV Adhesive for junction box : Manufactured by: Adarsha Specialty Chemicals Pvt Ltd	
Cell Interconnect / String Interconnects	Manufactured By: Xi'an Telison New Materials Co.,Ltd. (TELISON) Dimension: 0.5mm X 0.20mm Coating Sn60/Pb40 Manufactured By: Xi'an Telison New Materials Co.,Ltd. (TELISON) Dimension: 5.0mm X 0.40mm Coating Sn60/Pb40	
Soldering Material	Manufactured By: KESTER (ALPHA) Type: KESTER 245, SN63/PB37, Diameter 0.8mm,	
Fluxing Agent :	Manufactured By: KESTER (ALPHA) Type: ALPHA PV-71	
By-Pass Diode:	Manufactured by: Zhejiang Zhonghuan Sunter PV technology private Limited Type: 40SQ045, 40A, 45V	

Adhesive For Frame :	Manufactured by: Manufactured by: Adarsha Specialty Chemicals Pvt Ltd Type: Adsil PV 555; Thickness=3.0mm; Flame class=HB; HWI=2; HAI=0; RTI=105°C
Cell Positioning Tape :	3M India Limited

Modifications:

☐ Initial module design qualification

☒ Extension of module design qualification

☒ Original test report ref. No. : E535259-4790855920.1.1-D1 and E535259-4790855920.1.1-D1-A1

Model differences and modification:

☒ Test programs for crystalline silicon PV modules ☐ Test programs for thin-film PV modules

☐ 4.2.1 Modification to frontsheet	☐ 4.3.1 Modification to frontsheet
☒ 4.2.2 Modification to encapsulation system	☐ 4.3.2 Modification to encapsulation system
☒ 4.2.3 Modification to cell technology	☐ 4.3.3 Modification to front contact (e. g. TCO)
☒ 4.2.4 Modification to cell and string interconnect material or technique	☐ 4.3.4 Modification to cell technology
☐ 4.2.5 Modification to backsheet	☐ 4.3.5 Modification to cell layout
☒ 4.2.6 Modification to electrical termination	☐ 4.3.6 Modification to back contact
☒ 4.2.7 Modification to bypass diode	☐ 4.3.7 Modification to edge deletion
☒ 4.2.8 Modification to electrical circuitry	☐ 4.3.8 Modification to interconnect material or technique
☐ 4.2.9 Modification to edge sealing	☐ 4.3.9 Modification to backsheet
☐ 4.2.10 Modification to frame and/or mounting structure	☐ 4.3.10 Modification to electrical termination
☐ 4.2.11 Change in PV module size	☐ 4.3.11 Modification to bypass diode
☐ 4.2.12 Higher or lower output power (by 10 % or more) with the identical design and size and using the identical cell process	☐ 4.3.12 Modification to edge sealing
☐ 4.2.13 Increase of over-current protection rating	☐ 4.3.13 Modification to frame and/or mounting structure
☐ 4.2.14 Increase of system voltage	☐ 4.3.14 Change in PV module size
☒ 4.2.15 Change in cell fixing tape	☐ 4.3.15 Higher or lower output power (by 10 % or more) with the identical design and size
	☐ 4.3.16 Increase of over-current protection rating
	☐ 4.3.17 Increase of system voltage

Note: This clause refers to modifications extracted from IEC TS 62915

MODULE GROUP ASSIGNMENT:				
Sample #	Sample Group ID	Type/model	Sample S/N	Remark
C04	C	PIX MBHTB 144 530	PG230610161103	6595863
C05	C	PIX MBHTB 144 530	PG230610161079	6595864
C06	E	PIX MBHTB 144 530	PG230610161080	6595865
C07	E	PIX MBHTB 144 530	PQ230610161068	6595866
C08	D	PIX MBHTB 144 530	PG230610161074	6595867
C09	D	PIX MBHTB 144 530	PG230610161076	6595868
C10	A	PIX MBHTB 156 585	PG230510150082	6206902
C13	B	PIX MBHTB 156 585	PG230610157805	6207058
C18	F	PIX MBHTB 144 530	PG230610161085	6595869
C19	F	PIX MBHTB 144 530	PG230610161087	6595871
C20	F	PIX MBHTB 144 530	PG230610161072	6595872
C21	F	PIX MBHTB 144 530	PG230610161069	6595873
E04	C	PIX MBHTB 144 530	PG230610161089	6595880
E05	C	PIX MBHTB 144 530	PG230610161115	6595881
E06	E	PIX MBHTB 144 530	PG230610161114	6595882
E07	E	PIX MBHTB 144 530	PG230610161096	6595883
E08	D	PIX MBHTB 144 530	PG230610161091	6595884
E09	D	PIX MBHTB 144 530	PG230610161102	6595885
E10	A	PIX MBHTB 144 530	PG230510150092	6206904
E13	B	PIX MBHTB 156 585	PG230510155968	6206873
E18	F	PIX MBHTB 144 530	PG230610161077	6595886
E19	F	PIX MBHTB 144 530	PG230610161112	6595887
E20	F	PIX MBHTB 144 530	PG230610161094	6595888
E21	F	PIX MBHTB 144 530	PG230610161108	6595889
^a C28	E (Mechanical Load)	PIX MBHTB 156 585	PG230510155986	7326629
^a E28	E (Mechanical Load)	PIX MBHTB 156 585	PG230410143728	7326633
Supplementary information: Further qualification for higher and/or lower output power see annex 3 Remark column includes UL Sample IDs. ^a Undergone only limited tests in the sequence.				

- | | |
|----------|--|
| Note (1) | Use the “General product information” field to give any information on model differences within a product type family covered by the test report and to describe the range of electrical and safety ratings, if the TRF covers a type family of modules. |
| Note (3) | Use Annex 1 to list the used materials and components of the module (manufacturer/supplier and type reference). |
| Note (4) | The module numbers/identifiers are set in accordance to IEC TS 62915 Photovoltaic (PV) modules – Retesting for type approval, design and safety qualification, Annex A3 |

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict
5. MARKING AND DOCUMENTATION			P
5.1	Name Plate		P
	All electrical data shall be shown as relative to STC (1 000 W/m ² , 25 °C, AM1.5 according to IEC TS 61836), except for bifacial modules where two irradiance levels are required, 1 000 W/m ² and BNPI (higher irradiance at which nameplate verification is performed for bifacial modules, corresponding to 1 000 W/m ² on the module front and 135 W/m ² on the module rear, applied in any method allowed by IEC TS 60904-1-2).	Marked on label	P
	International symbols are used where applicable.	Marked on label	P
	The module includes clear and indelible markings:		P
	a. Name, registered trade name or registered trade mark of manufacturer	PIXON GREEN ENERGY PRIVATE LIMITED 	P
	b. Type or model number designation	PIX MBHTB 156 585, for example,	P
	c. Serial number (unless marked on other part of product)	Provided under superstrate. near the top rail of frame	P
	d. Date and place of manufacture, alternatively serial number allowing to trace the date and place of manufacture;	Serial number allowing to trace the date and place of manufacture. For Example: "PG230510150082" : PG- Pixon Green, 23- Year of Manufacturing 05- Month of Manufacturing, 10 – PO Generation date, 150082 – Serial No Place of manufacture are marked on the module back label	P
	e. Maximum system voltage	1500Vdc	P
	f. Class of protection against electrical shock	Class II	P
	g. Voltage at open-circuit or V_{oc} including tolerances. For bifacial modules, open-circuit voltage shall be reported at two irradiance levels. The first required irradiance level is 1 000 W/m ² . The second required irradiance is BNPI	V_{oc} at STC and BNPI: 54.02/±5% for example	P

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict
	h. Current at short-circuit or I_{sc} including tolerances. For bifacial modules, short-circuit current shall be reported at two irradiance levels, defined in 5.1g	I_{sc} at STC 13.85/±5% for example I_{sc} at BNPI 15.28/±5% for example	P
	i. Module maximum power or P_{max} including tolerances. For bifacial modules, P_{max} shall be reported at the two irradiance levels, defined in 5.1g	P_{max} at STC 585/±3% for example, P_{max} at BNPI 645/±3% for example	P
	j. For bifacial modules the following information including tolerances, shall be given on the nameplate: The values for the short-circuit current bifaciality coefficient ϕI_{sc} , the open-circuit voltage bifaciality coefficient ϕV_{oc} , and the maximum power bifaciality coefficient ϕP_{max} , measured at STC as defined in IEC TS 60904-1-2	ϕP_{max} : 75±10% ϕV_{oc} : 100±10% ϕI_{sc} : 75±10%	P
	k. For flexible modules, the minimum radius of curvature	Modules not flexible	N/A
5.2	Documentation		P
5.2.1	Minimum requirements		P
	Modules are supplied with documentation describing the methods of electrical and mechanical installation as well as the electrical ratings of the module	Provided in Installation Manual	P
	The documentation states the class of protection against electrical shock under which the module has been qualified and any specific limitations required for that class.	Provided in Installation Manual	P
	The documentation assures that installers and operators receive appropriate and sufficient documentation for safe installation, use, and maintenance of the PV modules.	Provided in Installation Manual	P
5.2.2	Information given in the documentation		P
	a. All information required under 5.1 e) to i)	Provided in Installation Manual	P
	b. Overcurrent protection device type and rating are e.g. given in IEC 60269-6	Provided in Installation Manual	P
	Maximum series/parallel module configuration is recommended	Provided in Installation Manual	P
	c. Manufacturer's stated tolerance for V_{oc} , I_{sc} and maximum power output under standard test conditions	Provided in Installation Manual	P
	d. Temperature coefficient for voltage at open-circuit	Provided in Installation Manual	P
	e. Temperature coefficient for maximum power	Provided in Installation Manual	P

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict
	f. Temperature coefficient for short-circuit current	Provided in Installation Manual	P
	All electrical data mentioned above shown as relative to standard test conditions (1 000 W/m ² , 25 °C, AM 1,5 according to IEC TS 61836)	Provided in Installation Manual	P
	g. Performance at low irradiance (MQT 07) is specified	Provided in Installation Manual	P
	International symbols used where applicable	Provided in Installation Manual	P
	Compliance checked by inspection and MQT 04 through MQT 07	Provided in Installation Manual	P
	The electrical documentation includes a detailed description of the electrical installation wiring method to be used		P
	h. The minimum cable diameters for modules intended for field wiring		N/A
	i. Any limitations on wiring methods and wire management that apply to the wiring compartment or box;		N/A
	j. The size, type, material and temperature rating of the conductors to be used		N/A
	k. Type of terminals for field wiring		N/A
	l. Specific PV connector model/types and manufacturer to which the module connectors are mated	Provided in Installation Manual	P
	m. The bonding method(s) to be used (if applicable); all provided or specified hardware is identified in the documentation	Provided in Installation Manual	P
	n. The type and ratings of bypass diode to be used (if applicable)		N/A
	o. limitations to the mounting situation (e.g., slope, orientation, mounting means, cooling)		N/A
	p. A statement indicating the fire rating(s) and the applied standard and the limitations to that rating (e.g., installation slope, sub-structure or other applicable installation information)	Provided in Installation Manual	P
	q. A statement indicating the design load per each mechanical means for securing the module as evaluated during the static mechanical load test according to MQT 16. At discretion of the manufacturer the test load and/or the safety factor γ_m may be noted, too	Provided in Installation Manual	P

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict
	The installation instructions include relevant parameters specified by manufacturer or the following statement or the equivalent: <i>"Under normal conditions, a photovoltaic module is likely to experience conditions that produce more current and/or voltage than reported at standard test conditions. Accordingly, the values of I_{sc} and V_{oc} marked on this module should be multiplied by a factor of 1,25 when determining component voltage ratings, conductor current ratings, and size of controls connected to the PV output."</i>	Provided in Installation Manual	P
5.2.3	Assembly instructions		N/A
	Provided with a product shipped in subassemblies, detailed and adequate to the degree required to facilitate complete and safe assembly of the product		N/A
Supplementary information: N/A			

7. PASS CRITERIA						P
7.2	Power output and electric circuitry					P
7.2.1	Verification of rated label values (Gate No. 1)					P
	Manufacturer's tolerances and Laboratory uncertainties					P
		t_1	t_2	t_3	t_4	—
	manufacturer's rated lower/upper production tolerance in %	3	5	5	3	
		m_1	m_2	m_3		
	measurement uncertainty in % of the laboratory	2.4	1.5	2.0		
	Laboratory reproducibility r:	0.03%				
	After stabilization, each individual module meets the requirements					P
	$P_{\max}$:		See Table 03.1, Table 03.3			P
	V_{oc} :		See Table 03.1, Table 03.3			P
	I_{sc} : :		See Table 03.1, Table 03.3			P
	After stabilization the arithmetic average $\bar{P}_{\max}$ $\bar{P}_{\max}$ of all modules meet the requirements.		See Table 03.1, Table 03.3			P

IEC 61215-1			
Clause	Requirement + Test	Result - Remark	Verdict
7.2.2	Maximum power degradation during type approval testing (Gate #2)		P
	At the end of each test sequence or for sequence B after bypass diode test, each test sample meets the requirements for P_{max}		P
7.2.3	Electrical circuitry		P
	Samples do not exhibit an open-circuit during the tests		P
7.3	Visual defects		P
	There is no visual evidence of a major defect.		P
7.4	Electrical safety		P
	The insulation test (MQT 03) requirements are met at the beginning and the end of each sequence		P
	The wet leakage current test (MQT 15) requirements met at the beginning and at the end of each sequence		P
	Specific requirements of the individual tests are met		P
Supplementary information: N/A			

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

4. TESTING OVERVIEW			P
	Initial examination	All modules	P
4.1	Visual inspection (MQT 01)	See Table 01	P
4.19.5	Initial stabilization (MQT 19.1)	See Table 02.1 - 02.4 and Table A.4.1 - A.4.4	P
4.6	Performance at STC & BNPI (MQT 06.1)	See Table 03.1 - 03.3 and Tables A.4.7 – A.4.9	P
4.3	Insulation test (MQT 03)	See Table 04	P
4.15	Wet leakage current test (MQT 15)	See Table 05	P

Sequence A	3 Module	Sample C10, E10	P
4.7	Performance at low irradiance (MQT 07).....	See Table 06.1 - 06.2	P
4.4	Measurement of temperature coefficients (MQT 04)	See Table 07	P

Sequence B	4 Module	Sample C13, E13	P
4.8	Outdoor exposure test (MQT 08)	See Table 08	N/A
4.18.1	Bypass diode thermal test (MQT 18.1)		P
	Maximum allowed junction temperature	200°C	—
	Calculated junction temperature	135.9°C	—
	Final measurements.....	See Table 09	P
4.18.2	Bypass diode functionality test (MQT 18.2)	See Table 10	P
4.19.6	Final stabilization (MQT 19.2)	See Table 10.1 – 10.3	P
4.9	Hot spot endurance test (MQT 09)	See Table 11	P

Sequence C	4 Modules	Samples C04, C05, E04, E05	P
4.10	UV preconditioning test (MQT 10)	See Table 12.1 - 12.6	P
4.20	Cyclic (dynamic) mechanical load test (MQT 20)	See Table 13	P
4.11	Thermal cycling test 50 cycles (MQT 11).....	See Table 14	P
4.12	Humidity-freeze test (MQT 12).....	See Table 15	P

Sequence C1	2 Module	Sample C04, E04	P
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IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
4.14.2	Retention of junction box on mounting surface (MQT 14.1)	See Table 16	P
4.14.3	Test of cord anchorage (MQT 14.2)		P
4.14.3.1	The junction box, separate from the module, shall be tested to IEC 62790 "Test of cord anchorage" and shall meet the requirements therein	See list of attachments	P

Sequence D	4 Modules	Samples C08, C09, E08, E09	P
4.11	Thermal cycling test 200 cycles (MQT 11)	See Table 17	P

Sequence E	4 Modules	Samples C06, C07, E06, E07	P
4.13	Damp heat test (MQT 13)	See Table 18	P
4.19.6	Final stabilization (MQT 19.2)	See Table 23.3	P

Sequence E1	4 Module	Sample C06, E06 C28, E28	P
4.16	Static mechanical load test (MQT 16)	See Table 19	P
4.22	Bending test (MQT 22)	See Table 20	N/A

Sequence E2	2 Module	Sample C07, E07	P
4.17	Hail test (MQT 17)	See Table 21	P

Sequence F	8 Modules	Samples C18, C19, C20, C21 E18, E19, E20, E21	P
4.21	Potential induced degradation test (MQT 21)	See Table 22	P
4.19.6	Final stabilization (MQT 19.2)	See Table 23.4, 23.6, 23.7	P

	Final measurement	All modules for Sequence C, D, E, F; Control module for Sequence A	P
4.19.6	Final stabilization (MQT 19.2)	See Table 23.1 - 23.2	N/A
4.6	Performance at STC&BNPI (MQT 06.1)	See Table 23.5, 23.8	P
4.3	Insulation test (MQT 03)	See Table 23.9	P
4.15	Wet leakage current test (MQT 15)	See Table 23.10	P

IEC 61215-2				
Clause	Requirement + Test		Result - Remark	Verdict
TABLE 01: MQT 01 ini: Initial Visual inspection				P
Test Date [YYYY-MM-DD]..... :		2024-04-15 2024-07-15*	—	
Sample #	Nature and position of initial findings – comments or attach photos			—
C04	No visual defects were found			P
C05	No visual defects were found			P
C06	No visual defects were found			P
C07	No visual defects were found			P
C08	No visual defects were found			P
C09	No visual defects were found			P
C10	No visual defects were found			P
C13	No visual defects were found			P
C18	No visual defects were found			P
C19	No visual defects were found			P
C20	No visual defects were found			P
C21	No visual defects were found			P
E04	No visual defects were found			P
E05	No visual defects were found			P
E06	No visual defects were found			P
E07	No visual defects were found			P
E08	No visual defects were found			P
E09	No visual defects were found			P
E10	No visual defects were found			P
E13	No visual defects were found			P
E18	No visual defects were found			P
E19	No visual defects were found			P
E20	No visual defects were found			P
E21	No visual defects were found			P
C28*	No visual defects were found			P
E28*	No visual defects were found			P
Supplementary information: N/A				

IEC 61215-2							
Clause	Requirement + Test			Result - Remark			Verdict
TABLE 02: MQT 19.1 ini: Initial stabilization							P
TABLE 02.1: MQT 06.1 ini: Performance at STC before initial stabilization (Front side)							P
Test Date [YYYY-MM-DD]..... :			2024-04-19, Sample C04, C05, C06, C07, C20, C21: 2024-04-15, Sample C28, E28: 2024-07-15				—
Test method..... :			■ Solar simulator □ Natural sunlight				—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Result
C04	13.24	49.94	12.56	42.10	528.76	79.96	P
C05	13.25	49.91	12.53	42.21	528.77	79.93	P
C06	13.19	50.04	12.50	42.32	528.88	80.14	P
C07	13.19	50.03	12.51	42.34	529.64	80.28	P
C08	13.24	50.01	13.24	42.33	530.70	80.16	P
C09	13.22	49.84	12.53	42.07	527.33	80.03	P
C10	13.60	54.11	12.88	45.69	588.47	79.97	P
C13	13.58	54.29	12.88	45.69	588.56	79.84	P
C18	13.25	49.92	12.53	42.20	528.90	79.94	P
C19	13.21	49.44	12.51	42.32	529.37	80.17	P
C20	13.18	49.98	12.50	42.20	527.41	80.05	P
C21	13.18	49.93	12.48	42.33	528.37	80.27	P
E04	13.23	49.96	12.53	42.21	528.97	80.05	P
E05	13.21	50.16	12.53	42.33	530.57	80.09	P
E06	13.24	49.89	12.54	42.17	528.73	80.03	P
E07	13.24	49.88	12.55	42.07	527.91	79.95	P
E08	13.24	49.98	12.54	42.20	529.08	79.98	P
E09	13.26	49.95	12.55	42.06	527.65	79.69	P
E10	13.22	50.02	12.55	42.21	529.76	80.09	P
E13	13.58	54.29	12.88	45.69	588.56	79.84	P
E18	13.25	49.90	12.56	42.07	528.38	79.91	P
E19	13.20	49.86	12.53	42.06	527.09	80.08	P
E20	13.23	49.91	12.56	42.07	528.40	80.00	P
E21	13.23	49.91	12.52	42.19	528.10	79.95	P
C28	13.56	54.21	12.87	45.74	588.70	80.11	P

IEC 61215-2							
Clause	Requirement + Test				Result - Remark		Verdict
E28	13.64	54.33	12.90	45.60	588.33	79.41	P
Supplementary information: N/A							
TABLE 02.2: MQT 06.1 ini: Performance at STC before initial stabilization (Back side)							P
Test Date [YYYY-MM-DD]..... :			2024-04-19, Sample C04, C05, C06, C07, C20, C21: 2024-04-15				—
Test method..... :			☒ Solar simulator ☐ Natural sunlight				—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
C04	9.70	49.43	8.65	43.19	373.77	77.98	P
C05	9.73	49.38	8.86	42.82	379.25	78.92	P
C06	9.80	49.48	8.90	42.84	381.47	78.67	P
C07	9.59	49.45	8.88	42.58	378.18	79.73	P
C08	9.65	49.42	8.85	42.82	379.13	79.48	P
C09	9.84	49.36	8.99	42.57	382.63	78.77	P
C10	10.11	53.53	9.17	46.70	428.21	79.09	P
C13	10.24	53.72	9.21	46.70	430.09	78.15	P
C18	9.77	49.35	8.90	42.84	381.31	79.09	P
C19	9.64	49.44	8.68	43.04	373.58	78.36	P
C20	9.63	49.42	8.77	42.81	375.44	78.87	P
C21	9.66	49.38	8.74	43.09	376.49	78.93	P
E04	9.70	49.40	8.79	42.93	377.25	78.71	P
E05	9.85	49.55	8.87	43.09	382.27	78.28	P
E06	9.71	49.34	8.85	42.67	377.47	78.82	P
E07	9.68	49.35	8.84	42.68	377.49	79.04	P
E08	9.87	49.46	8.99	42.85	385.36	78.94	P
E09	9.81	49.52	8.83	43.20	381.27	78.51	P
E10	9.80	49.45	8.81	42.93	378.28	78.02	P
E13	10.24	53.72	9.21	46.70	430.09	78.15	P
E18	9.78	49.42	8.75	43.05	376.51	77.88	P
E19	9.68	49.32	8.91	42.57	379.29	79.43	P
E20	9.73	49.45	8.64	43.28	373.78	77.70	P
E21	9.65	49.39	8.72	42.90	374.02	78.44	P
Supplementary information: N/A							

IEC 61215-2							
Clause	Requirement + Test				Result - Remark		Verdict
TABLE 02.3: MQT 06.1 ini: Performance at BNPI (front side irradiance 1 000 W/m², back side irradiance 135 W/m², 25 °C, AM 1.5) before initial stabilization							N/A
Test Date [YYYY-MM-DD]..... :							—
Test method				☐ Solar simulator ☐ Natural sunlight			—
Sample #	<i>I</i> _{sc} [A]	<i>V</i> _{oc} [V]	<i>I</i> _{mp} [A]	<i>V</i> _{mp} [V]	<i>P</i> _{max} [W]	FF [%]	Result
Supplementary information: Not performed as it's not mandatory before initial stabilization.							
TABLE 02.4: MQT 19.1: Initial Stabilization procedure							P
Light exposure method				☐ Solar simulator ☒ Natural sunlight			
Stabilization criterion x per IEC 61215-1-x				0.01 (1%)			
Sample #	C04	Test Date (YYYY-MM-DD) start/end			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	<i>P</i> _{max} (W) at the end of cycle	(<i>P</i> _{max} – <i>P</i> _{min}) / <i>P</i> _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	528.76	—	—
1	5.06	971.56	57.55	4	527.86	—	—
2	5.37	952.88	54.58	4	526.63	0.40	Yes
Sample #	C05	Test Date (YYYY-MM-DD) start/end			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	<i>P</i> _{max} (W) at the end of cycle	(<i>P</i> _{max} – <i>P</i> _{min}) / <i>P</i> _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	528.77	—	—
1	5.06	971.56	57.55	4	527.84	—	—
2	5.37	952.88	54.58	4	526.32	0.46	Yes
Sample #	C06	Test Date (YYYY-MM-DD) start/end			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	<i>P</i> _{max} (W) at the end of cycle	(<i>P</i> _{max} – <i>P</i> _{min}) / <i>P</i> _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	528.88	—	—
1	5.06	971.56	57.55	4	527.71	—	—
2	5.37	952.88	54.58	4	526.70	0.41	Yes
Sample #	C07	Test Date (YYYY-MM-DD) start/end			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	<i>P</i> _{max} (W) at the end of cycle	(<i>P</i> _{max} – <i>P</i> _{min}) / <i>P</i> _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	529.64	—	—
1	5.06	971.56	57.55	4	528.58	—	—
2	5.37	952.88	54.58	4	527.22	0.46	yes

IEC 61215-2							
Clause	Requirement + Test				Result - Remark		Verdict
Sample #	C08	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} - P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	530.70	—	—
1	5.06	971.56	57.55	4	529.66	—	—
2	5.37	952.88	54.58	4	528.15	0.48	Yes
Sample #	C09	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} - P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	527.33	—	—
1	5.06	971.56	57.55	4	526.34	—	—
2	5.37	952.88	54.58	4	525.20	0.40	Yes
Sample #	C10	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} - P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	588.47	—	—
1	5.06	971.56	57.55	4	587.57	—	—
2	5.37	952.88	54.58	4	586.50	0.34	Yes
Sample #	C13	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} - P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	588.56	—	—
1	5.06	971.56	57.55	4	587.46	—	—
2	5.37	952.88	54.58	4	586.14	0.41	Yes
Sample #	C18	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} - P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	528.90	—	—
1	5.06	971.56	57.55	4	527.84	—	—
2	5.37	952.88	54.58	4	526.25	0.50	Yes

IEC 61215-2							
Clause	Requirement + Test				Result - Remark		Verdict
Sample #	C19	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	529.37	—	—
1	5.06	971.56	57.55	4	528.34	—	—
2	5.37	952.88	54.58	4	527.09	0.43	Yes
Sample #	C20	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	527.41	—	—
1	5.06	971.56	57.55	4	526.47	—	—
2	5.37	952.88	54.58	4	525.45	0.37	Yes
Sample #	C21	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	528.37	—	—
1	5.06	971.56	57.55	4	527.09	—	—
2	5.37	952.88	54.58	4	525.49	0.55	Yes
Sample #	E04	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	528.97	—	—
1	5.06	971.56	57.55	4	528.00	—	—
2	5.37	952.88	54.58	4	526.72	0.43	Yes
Sample #	E05	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	530.57	—	—
1	5.06	971.56	57.55	4	529.52	—	—
2	5.37	952.88	54.58	4	528.41	0.41	Yes

IEC 61215-2							
Clause	Requirement + Test				Result - Remark		Verdict
Sample #	E06	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} - P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	528.73	—	—
1	5.06	971.56	57.55	4	527.60	—	—
2	5.37	952.88	54.58	4	526.50	0.42	Yes
Sample #	E07	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} - P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	527.91	—	—
1	5.06	971.56	57.55	4	526.88	—	—
2	5.37	952.88	54.58	4	525.69	0.42	Yes
Sample #	E08	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} - P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	529.08	—	—
1	5.06	971.56	57.55	4	528.09	—	—
2	5.37	952.88	54.58	4	526.87	0.42	Yes
Sample #	E09	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} - P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	527.65	—	—
1	5.06	971.56	57.55	4	526.60	—	—
2	5.37	952.88	54.58	4	525.46	0.42	Yes
Sample #	E10	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} - P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	529.76	—	—
1	5.06	971.56	57.55	4	527.89	—	—
2	5.37	952.88	54.58	4	526.54	0.61	Yes

IEC 61215-2							
Clause	Requirement + Test				Result - Remark		Verdict
Sample #	E13	Test Date (YYYY-MM-DD) start/end :			2024-07-15 / 2024-07-24		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	588.66	—	—
1	5.24	871.56	45.55	4	587.44	—	—
2	5.10	782.88	48.58	4	586.16	0.43	Yes
Sample #	E18	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	528.38	—	—
1	5.06	971.56	57.55	4	527.39	—	—
2	5.37	952.88	54.58	4	525.97	0.46	Yes
Sample #	E19	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	527.09	—	—
1	5.06	971.56	57.55	4	526.06	—	—
2	5.37	952.88	54.58	4	524.99	0.40	Yes
Sample #	E20	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	528.40	—	—
1	5.06	971.56	57.55	4	527.36	—	—
2	5.37	952.88	54.58	4	526.14	0.43	Yes
Sample #	E21	Test Date (YYYY-MM-DD) start/end :			2024-04-20 / 2024-04-23		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	528.10	—	—
1	5.06	971.56	57.55	4	527.14	—	—
2	5.37	952.88	54.58	4	526.06	0.39	Yes

IEC 61215-2							
Clause	Requirement + Test				Result - Remark		Verdict
Sample #	C28	Test Date (YYYY-MM-DD) start/end :			2024-07-15 / 2024-07-24		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	588.70	—	—
1	5.24	871.56	45.55	4	587.42	—	—
2	5.10	782.88	48.58	4	586.09	0.44	Yes
Sample #	E28	Test Date (YYYY-MM-DD) start/end :			2024-07-15 / 2024-07-24		
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—	588.33	—	—
1	5.24	871.56	45.55	4	587.24	—	—
2	5.10	782.88	48.58	4	586.07	0.38	Yes
Supplementary information: N/A							
☐ Other stabilization procedures							
Sample #	Test Date (YYYY-MM-DD) start/end						
N/A	N/A						
Supplementary information: N/A							

TABLE 03.1: MQT 06.1 ini: Performance at STC after initial stabilization (Front side)										P
Test Date [YYYY-MM-DD]..... :					2024-04-24, for Sample E13, C28, E28 : 2024-07-25					—
P _{max} lower limit (W)					See table below: P _{max} [W] – Min calc.					—
P _{max} (lab) lower limit (V)					Refer below					—
V _{oc} (lab) upper limit (V)					See table below: V _{oc} [V] Max. calc.					—
I _{sc} (lab) upper limit (A)					See table below: I _{sc} [A] Max. calc.					—
Test method					☒ Solar simulator ☐ Natural sunlight					—
Sample #	I _{sc} [A]		V _{oc} [V]		I _{mp} [A]	V _{mp} [V]	P _{max} [W]		FF [%]	Result
	Meas.	Max. calc.	Meas.	Max. calc.			Meas.	Min. calc.		
C04	13.10	14.11	50.08	50.90	12.41	42.43	526.63	502.05	80.26	P
C05	13.11	14.11	50.08	50.90	12.44	42.32	526.32	502.05	80.19	P
C06	13.12	14.11	50.06	50.90	12.44	42.32	526.70	502.05	80.19	P
C07	13.14	14.11	50.03	50.90	12.46	42.31	527.22	502.05	80.22	P

IEC 61215-2										
Clause	Requirement + Test						Result - Remark			Verdict
C08	13.17	14.11	50.05	50.90	12.48	42.32	528.15	502.05	80.13	P
C09	13.09	14.11	50.02	50.90	12.41	42.33	525.20	502.05	80.23	P
C18	13.12	14.11	50.05	50.90	12.44	42.30	526.25	502.05	80.14	P
C19	13.13	14.11	50.13	50.90	12.46	42.31	527.09	502.05	80.10	P
C20	13.09	14.11	50.09	50.90	12.42	42.31	525.45	502.05	80.17	P
C21	13.22	14.11	49.98	50.90	12.49	42.08	525.49	502.05	79.52	P
Average	—						526.45	517.58		P
C10	13.50	14.26	54.23	55.88	12.80	45.83	586.50	542.73	80.11	P
C13	13.60	14.26	54.35	55.88	12.88	45.51	586.14	542.73	79.30	P
C28	13.52	14.26	54.20	55.88	12.82	45.72	586.09	542.73	80.01	P
Average	—						586.24	571.29		P
E04	13.08	14.11	50.14	50.90	12.42	42.41	526.72	502.05	80.31	P
E05	13.13	14.11	50.12	50.90	12.45	42.43	528.41	502.05	80.29	P
E06	13.09	14.11	50.10	50.90	12.45	42.29	526.50	502.05	80.27	P
E07	13.08	14.11	50.08	50.90	12.39	42.41	525.69	502.05	80.25	P
E08	13.11	14.11	50.12	50.90	12.45	42.32	526.87	502.05	80.20	P
E09	13.07	14.11	50.08	50.90	12.42	42.31	525.46	502.05	80.25	P
E18	13.10	14.11	50.14	50.90	12.40	42.43	525.97	502.05	80.07	P
E19	13.06	14.11	50.08	50.90	12.41	42.29	524.99	502.05	80.25	P
E20	13.06	14.11	50.20	50.90	12.40	42.43	526.14	502.05	80.25	P
E21	13.09	14.11	50.06	50.90	12.40	42.42	526.06	502.05	80.29	P
E10	13.10	14.11	50.08	50.90	12.45	42.30	526.54	502.05	80.28	P
Average	—						526.30	517.58		P
E13	13.60	14.26	54.11	55.88	12.88	45.69	588.47	554.15	79.97	P
E28	13.60	14.26	54.31	55.88	12.85	45.60	586.07	554.15	79.32	P
Average	—						587.27	571.29		P
Supplementary information: The limit values are calculated considering manufacturer's tolerances <i>t</i> of rated nameplate values and laboratory measurement uncertainties <i>m</i> .										

IEC 61215-2										
Clause		Requirement + Test					Result - Remark			Verdict
TABLE 03.2: MQT 06.1: Performance at STC after initial stabilization (Back side)										P
Test Date [YYYY-MM-DD]..... :				2024-04-24, for Sample E13, C28, F28 : 2024-07-25						—
Test method :				■ Solar simulator □ Natural sunlight						—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	φ _{I_{sc}}	φV _{oc}	φP _{max}	Result
C04	9.63	49.42	-	-	373.87	-	0.735	0.987	0.710	P
C05	9.62	49.6	-	-	378.55	-	0.734	0.990	0.719	P
C06	9.68	49.6	-	-	381.02	-	0.738	0.991	0.723	P
C07	9.62	49.56	-	-	378.32	-	0.732	0.991	0.718	P
C08	9.63	49.57	-	-	378.83	-	0.731	0.990	0.717	P
C09	9.71	49.57	-	-	382.11	-	0.742	0.991	0.728	P
C10	10.06	53.63	-	-	428.27	-	0.745	0.989	0.730	P
C13	10.25	53.77	-	-	430.76	-	0.753	0.991	0.730	P
C18	9.69	49.57	-	-	381.17	-	0.739	0.990	0.724	P
C19	9.6	49.43	-	-	372.73	-	0.731	0.986	0.707	P
C20	9.64	49.46	-	-	374.24	-	0.736	0.987	0.712	P
C21	9.65	49.41	-	-	373.36	-	0.729	0.988	0.710	P
C28	9.84	53.56	-	-	411.59	-	0.736	0.987	0.702	P
E04	9.63	49.51	-	-	378.07	-	0.736	0.987	0.718	P
E05	9.72	49.63	-	-	382.39	-	0.740	0.990	0.724	P
E06	9.63	49.58	-	-	376.82	-	0.736	0.990	0.716	P
E07	9.64	49.58	-	-	376.8	-	0.737	0.990	0.717	P
E08	9.78	49.69	-	-	385.13	-	0.746	0.991	0.731	P
E09	9.71	49.56	-	-	381.29	-	0.743	0.990	0.726	P
E10	9.67	49.57	-	-	378.34	-	0.739	0.989	0.718	P
E13	10.32	53.77	-	-	434.72	-	0.763	0.989	0.741	P
E18	9.67	49.54	-	-	372.66	-	0.738	0.988	0.709	P
E19	9.68	49.57	-	-	378.30	-	0.741	0.990	0.721	P
E20	9.59	49.56	-	-	373.31	-	0.734	0.987	0.710	P

IEC 61215-2										
Clause	Requirement + Test						Result - Remark			Verdict
E21	9.60	49.54	-	-	373.28	-	0.736	0.987	0.718	P
E28	10.23	53.72	-	-	427.30	-	0.752	0.989	0.729	P
Supplementary information: N/A										

TABLE 03.3: MQT 06.1: Performance at BNPI (front side irradiance 1 000 W/m², backside irradiance 135 W/m², 25 °C, AM 1.5) after initial stabilization										P
Test Date [YYYY-MM-DD]					2024-04-24 for Sample E13, C28, E28 : 2024-07-25					—
$P_{\max}$ lower limit (W)					See table below: $P_{\max}$ [W] – Min calc.					—
$\bar{P}_{\max}$ (lab) lower limit (V)					Refer Below					—
V_{oc} (lab) upper limit (V)					See table below: V_{oc} [V] Max. calc.					—
I_{sc} (lab) upper limit (A)					See table below: I_{sc} [A] Max. calc.					—
Test method					☒ Solar simulator ☐ Natural sunlight					—
Sample #	I_{sc} [A]		V_{oc} [V]		I_{mp} [A]	V_{mp} [V]	$P_{\max}$ [W]		FF [%]	Result
	Meas.	Max. calc.	Meas.	Max. calc.			Meas.	Min. calc.		
C04	14.37	15.50	50.21	50.90	13.63	42.17	574.8	554.15	79.65	P
C05	14.38	15.50	50.21	50.90	13.64	42.17	575.38	554.15	79.68	P
C06	14.4	15.50	50.23	50.90	13.62	42.28	576.02	554.15	79.63	P
C07	14.38	15.50	50.21	50.90	13.61	42.28	575.32	554.15	79.68	P
C08	14.38	15.50	50.2	50.90	13.61	42.28	575.24	554.15	79.67	P
C09	14.39	15.50	50.21	50.90	13.62	42.29	576.01	554.15	79.69	P
C18	14.4	15.50	50.21	50.90	13.62	42.28	575.92	554.15	79.65	P
C19	14.35	15.50	50.19	50.90	13.58	42.28	574.03	554.15	79.69	P
C20	14.37	15.50	50.19	50.90	13.59	42.29	574.89	554.15	79.72	P
C21	14.62	15.50	50.06	50.90	13.78	41.78	575.66	554.15	78.67	P
Average							575.32	571.28		P
C10	14.91	15.73	54.35	55.88	14.14	45.51	643.7	610.99	79.44	P
C13	14.90	15.73	54.50	55.88	14.11	45.49	641.96	610.99	79.06	P
C28	14.91	15.73	54.47	55.88	14.13	45.65	645.10	610.99	79.41	P
Average							643.58	629.88		P
E04	14.40	15.50	50.23	50.90	13.63	42.28	576.21	554.15	79.68	P

IEC 61215-2										
Clause	Requirement + Test						Result - Remark			Verdict
E05	14.40	15.50	50.16	50.90	13.64	42.28	576.53	554.15	79.81	P
E06	14.41	15.50	50.18	50.90	13.63	42.29	576.49	554.15	79.72	P
E07	14.41	15.50	50.27	50.90	13.67	42.41	579.97	554.15	80.04	P
E08	14.40	15.50	50.26	50.90	13.64	42.28	576.64	554.15	79.66	P
E09	14.39	15.50	50.16	50.90	13.62	42.29	576.20	554.15	79.81	P
E10	14.37	15.50	50.22	50.90	13.63	42.41	577.85	554.15	80.09	P
E18	14.38	15.50	50.20	50.90	13.60	42.28	575.17	554.15	79.69	P
E19	14.41	15.50	50.16	50.90	13.63	42.29	576.56	554.15	79.78	P
E20	14.36	15.50	50.20	50.90	13.60	42.26	574.80	554.15	79.73	P
E21	14.33	15.50	50.20	50.90	13.60	42.16	573.30	554.15	79.68	P
Average							576.33	571.29		P
E13	14.91	16.48	54.47	58.54	14.15	45.65	645.79	566.90	79.52	P
E28	14.90	16.48	54.48	58.54	14.15	45.65	645.85	566.90	79.59	P
Average							645.82	629.88		P
Supplementary information: The limit values are calculated considering manufacturer's tolerances <i>t</i> of rated nameplate values and laboratory measurement uncertainties <i>m</i> .										

IEC 61215-2				
Clause	Requirement + Test		Result - Remark	Verdict
TABLE 04: MQT 03: Initial Insulation test				P
Test Date [YYYY-MM-DD].....:		2024-04-25, Sample E13, C28, F28 : 2024-07-25		—
Test Voltage applied [V]		IR – 2025, Dielectric - 10800		—
Size of module [m²].....:		2.58, ^a 2.80		—
Required Resistance [MΩ].....:		15.50, ^a 14.28		—
Sample #	Measured	Dielectric breakdown		Result
	MΩ	Yes (description)	No	
C04	9340	-	No	P
C05	10000	-	No	P
C06	8970	-	No	P
C07	10000	-	No	P
C08	9830	-	No	P
C09	7890	-	No	P
^a C10	9450	-	No	P
^a C13	7980	-	No	P
C18	8940	-	No	P
C19	8530	-	No	P
C20	8120	-	No	P
C21	8190	-	No	P
E04	9830	-	No	P
E05	7890	-	No	P
E06	10000	-	No	P
E07	7920	-	No	P
E08	9950	-	No	P
E09	8940	-	No	P
E10	10000	-	No	P
^a E13	9830	-	No	P
E18	7840	-	No	P
E19	9450	-	No	P
E20	7970	-	No	P
E21	9940	-	No	P
^a C28	7900	-	No	P
^a E28	9900	-	No	P
Supplementary information: Size of module [m²]: ^a 2.469x1.134 m = 2.80 m², 2.278x1.134 m = 2.58 m²				

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
Lab Ambient: 23.9°C, 49.3%RH			

TABLE 05: MQT 15: Initial Wet leakage current test			P
Test Date [YYYY-MM-DD]	2024-04-25, Sample E13, C28, E28 : 2024-07-25		—
Test Voltage applied [V]	2025		—
Solution temperature [°C]	2024-04-25: 23.5, 2024-07-25: 23.0		—
Solution resistivity [Ω cm]	2024-04-25: 1990, 2024-07-25: 2000		—
Size of module [m^2]	^a 2.80, 2.58		—
Sample #	Required Resistance [$M\Omega$]	Measured [$M\Omega$]	Result
C04	15.50	2230	P
C05	15.50	2060	P
C06	15.50	3210	P
C07	15.50	2500	P
C08	15.50	2100	P
C09	15.50	3050	P
^a C10	14.28	2340	P
^a C13	14.28	3200	P
C18	15.50	2000	P
C19	15.50	3210	P
C20	15.50	2500	P
C21	15.50	2100	P
E04	15.50	2390	P
E05	15.50	3210	P
E06	15.50	2290	P
E07	15.50	2040	P
E08	15.50	3260	P
E09	15.50	2520	P
E10	15.50	3050	P
^a E13	14.28	2390	P
E18	15.50	3250	P
E19	15.50	2210	P
E20	15.50	2350	P

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
E21	15.50	3210	P
^a C28	14.28	2380	P
^a E28	14.28	3200	P
Supplementary information: Size of module [m ²]: ^a 2.469x1.134 m = 2.80 m ² , 2.278x1.134 m = 2.58 m ²			

TABLE 06.1: MQT 07 - Performance at low irradiance (Front side)							P
Test Date [YYYY-MM-DD]				C10: 2024-07-19, E10: 2024-08-02			—
Test method ...:	☐ Outdoor measurement						—
	Ambient air temperature [°C]:			N/A			
	Irradiance [W/m²]:			N/A			
	Module temperature [°C]:			N/A			
	☐ Data corrected to a 25°C cell temperature and 200 W/m² irradiance						—
	☒ Directly measured						
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	
C10	2.71	50.75	2.53	43.38	109.57	79.55	
E10	2.61	46.92	2.44	40.17	97.90	79.80	
Supplementary information: N/A							

TABLE 06.2: MQT 07 - Performance at low irradiance (Back side)				P
Test Date [YYYY-MM-DD]		C10: 2024-07-19, E10: 2024-08-02		—
Test method ..:	☐ Outdoor measurement			—
	Ambient air temperature [°C]:		N/A	
	Irradiance [W/m²]:		N/A	
	Module temperature [°C]:		N/A	
	☐ Data corrected to a 25°C cell temperature and 200 W/m² irradiance			—
☒ Directly measured				

IEC 61215-2									
Clause	Requirement + Test					Result - Remark			Verdict
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	ϕI_{sc}	ϕV_{oc}	ϕP_{max}
C10	2.02	50.31	1.81	43.40	78.44	77.30	0.74	0.99	0.71
E10	1.97	46.48	1.71	40.91	70.08	76.49	0.75	0.99	0.78
Supplementary information: N/A									
TABLE 07: MQT 04 - Measurement of temperature coefficients									P
Test Date [YYYY-MM-DD]				C10: 2024-07-19, E10: 2024-08-02					—
Ambient air temperature [°C] high/low				24.8					—
Irradiance [W/m²] high/low				1000					—
Module temperature [°C] high/low.....				70 / 30					—
Sample #		α [%/°C]		β [%/°C]		δ [%/°C]		—	
C10		0.0361		-0.2586		-0.3248		P	
E10		0.0322		-0.2611		-0.3225		P	
Supplementary information: N/A									

TABLE 08: MQT 08 - Outdoor exposure test	N/A
Table 08.1: MQT 01: Visual inspection after outdoor exposure test	N/A
Table 08.2: MQT 15: Wet leakage current test after outdoor exposure test	N/A
Table 08.3: MQT 02 - Maximum power determination after outdoor exposure test - Optional	N/A
Table 08.4: MQT 03 - Insulation test after outdoor exposure test - Optional	N/A

TABLE 09: MQT 18: Bypass diode thermal test		P
Test Date [YYYY-MM-DD] start/end	2024-05-22	—
Sample #	C13	—
Module temperature [°C].....	75.7	—
Number of diodes in junction box	03	—
Diode manufacturer	SUNTER	—
Diode type designation	40SQ045	—
Max. permissible junction temperature, T_{Jmax} [°C] (according to diode datasheet)	200	—
Detailed description of sample preparation procedure	Sense wires was connected to each diode	—
Step 1, Determination of V_D versus T_J characteristic		—

IEC 61215-2					
Clause	Requirement + Test	Result - Remark			Verdict
		30 ± 2 °C	50 ± 2 °C	70 ± 2 °C	90 ± 2 °C
	Ambient temperature of the junction box ... :	30.5	50.4	71.0	90.7
	Pulsed current.....:	15.0	15.0	15.0	15.0
	Voltage drop, V _D [V]	0.448	0.435	0.413	0.393
	Voltage drop, V _D [V]	0.449	0.434	0.413	0.395
	Voltage drop, V _D [V]	0.448	0.435	0.413	0.394
	V _D versus T _J characteristic	y = -1058.4x + 506.93			
	V _D versus T _J characteristic	y = -1088.8x + 520.29			
	V _D versus T _J characteristic	y = -1076.7x + 514.89			
	Max. permissible junction temperature T _{Jmax} [°C] (according to diode datasheet)	200			
Step 2, Bypass diode thermal test					
		Diode 1	Diode 2	Diode 3	Result
	Current flow applied [A]	15.0	15.0	15.0	P
	Max. diode surface temperature allowed T _{Jmax} [°C] :	200	200	200	P
	Voltage drop, V _D [V] after 1h.....:	0.3133	0.3011	0.3171	P
	Calculated max. junction temperature T _{Jcalc} [°C]	132.4	135.9	130.2	P
	T _{Jcalc} < T _{Jmax} (test passed)? yes/no	YES	YES	YES	P
	Current flow (1.25 * I _{sc}) [A]	18.75	18.75	18.75	P
	Bypass diode remain(s) functional (yes/no)	Yes	Yes	yes	P
Remarks: See Table 10 for the test details of bypass diode functionality test. 3 Diodes are considered as representative number. These diodes have to be selected as worst case. In case that additional bypass diodes tests are performed the results shall be listed in an attachment. For bifacial modules, use the value of the short-circuit current at elevated irradiance BSI (equivalent to 1 000 W/m ² on the front side and 300 W/m ² on the back side). Extrapolate I _{sc} -BSI, these quantities are combined as follows: I _{sc} -BSI=I _{sc} -BNPI+(I _{sc} -BNPI-I _{sc})(G _{BSI} -G _{BNPI})/(G _{BNPI} -1 000), G _{BSI} =1 000+300φ, G _{BNPI} =1 000+135φ, φ=Min(φ _{I_{sc}} , φ _{P_{max}}) Note: Refer to Annex 5 for E13 measurement results.					

TABLE 09.1: MQT 01 - Visual inspection after bypass diode thermal test			P
Test Date [YYYY-MM-DD]..... :		C13: 2024-05-22, E13: 2024-07-26,	—
Sample #	Nature and position of initial findings – comments or attach photos		—
C13	No visual defects found		P
E13	No visual defects were found		P
Supplementary information: N/A			

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE 09.2: MQT 15 - Wet leakage current test after bypass diode thermal test			P
Test Date [YYYY-MM-DD]	C13: 2024-05-22 E13: 2024-07-26		—
Test Voltage applied [V].....	2025		—
Solution temperature [°C]	2024-05-22: 23.1 2024-07-26: 23.4		—
Size of module [m ²]	2.80		—
Solution resistivity [Ω cm].....	2024-05-22: 2000 2024-07-26: 2030		—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
C13	1640	14.28	P
E13	1560	14.28	P
Supplementary information: Size of module [m ²]: 2.469x1.134 m = 2.80 m ²			

TABLE 09.3: MQT 02 – Max. power determination after bypass diode thermal test - Optional	N/A
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TABLE 09.4: MQT 03 - Insulation test after bypass diode thermal test - Optional			P
Test Date [YYYY-MM-DD].....	C13: 2024-05-22 E13: 2024-07-26		—
Test Voltage applied [V]	IR – 2025, Dielectric - 10800		—
Size of module [m ²]	2.80		—
Required Resistance [MΩ].....	14.80		—

IEC 61215-2					
Clause	Requirement + Test			Result - Remark	Verdict
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
C13	8300	14.28	-	No	P
E13	6500	14.28	-	No	P
Supplementary information: Size of module [m²]: 2.469x1.134 m = 2.80 m²					

TABLE 10: MQT 18.2 - Bypass diode functionality test after bypass diode thermal test					P
Test Date [YYYY-MM-DD].....:			C13: 2024-05-22 E13: 2024-07-29		—
☐ Method A					—
Ambient temperature [°C]			N/A		—
Current flow applied [A]			N/A		—
Sample #	VFM	VFM _{rated}	VFM = (N × VFM _{rated}) ± 10 %		Result
N/A	N/A	N/A	☐ Yes ☐ No		N/A
Supplementary information: N/A					

■ Method B		—
	IV curve after shading	Result
Diode 1	Shaded one cell and then have a power drop to roughly 2/3.	P
Diode 2	Shaded one cell and then have a power drop to roughly 2/3.	P
Diode 3	Shaded one cell and then have a power drop to roughly 2/3.	P
Supplementary information: N/A		

TABLE 10.1: MQT 19.1: Final stabilization	N/A
Supplementary information: Final stabilization not required as per IEC 61215-1-1.	

TABLE 10.3: MQT 19.1 Final Stabilization procedure	N/A
Supplementary information: Final stabilization not required as per IEC 61215-1-1.	

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
TABLE 11: MQT 09 - Hot-spot endurance test			
Test Date [YYYY-MM-DD] start/end	2024-05-24 to 2024-08-05		—
Sample #	C13		—
Procedure of technology	☒ wafer-based technologies (WBT) MQT 09.1 ☐ monolithically integrated (MLI) thin film technologies MQT 09.2		—
Cell interconnection circuit	☐ S ☒ SP ☐ PS		—
Type of light source	☐ Pulse solar simulator ☒ Steady state solar simulator ☐ Natural sunlight		—
Module temperature at thermal equilibrium [°C] .:	48.9		—

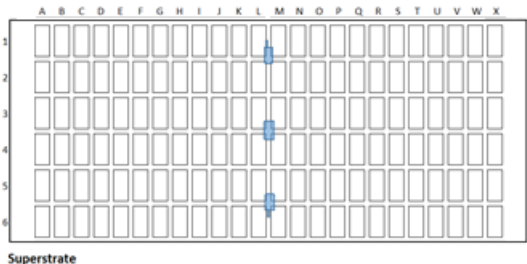
TABLE 11.1: MQT 09 - Hot-spot endurance test for WBT						
Selected hot-spot cells	Low	Low	Low	High	Permanent	—
	1A	2A	3B	2N	N/A	
Shading rate [%]	23	27	24	13	N/A	—
Max. measured cell temperature in each cell [°C]:	144.6	134.3	135.5	73.2	N/A	—
Test duration of each shading [h]	1	1	1	1	N/A	—
Irradiance during shading [W/m ²]	1197	1201	1196	1199	N/A	—
Supplementary information: For bifacial modules, determination of the cell shading percent and the prolonged exposure are performed at the elevated irradiance BSI. If double-side illumination is used to produce BSI, both the back and the front of the cell are shaded in the same way. During cell selection, any cell that is permanently shaded by a module feature (such as the junction box) is added to the list of selected cells						
						
Note: Refer to Annex 5 for E13 measurement results.						

TABLE 11.2: MQT 09 - Hot-spot endurance test for MLI	N/A
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TABLE 11.3: MQT 01 - Visual inspection after hot-spot endurance test		P
Test Date [YYYY-MM-DD]	C13, E13: 2024-08-05,	—

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sample #	Nature and position of initial findings – comments or attach photos		—
C13	No visual defects were found		P
E13	No visual defects were found		P
Supplementary information: N/A			

TABLE 11.4: MQT 02 - Maximum power determination after hot-spot endurance test							P
Test Date [YYYY-MM-DD].....:				C13, E13: 2024-08-06			—
Module temperature [°C].....:				25.0			—
Irradiance [W/m ²]				1000			—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	—
C13	13.56	54.32	12.83	45.50	583.81	79.27	P
E13	13.49	54.30	12.79	45.50	582.09	79.44	P
Supplementary information: N/A							

TABLE 11.5: MQT 02 - Maximum power determination after hot-spot endurance test (at BNPI)	N/A
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TABLE 11.6: MQT 03 - Insulation test after hot-spot endurance test					P
Test Date [YYYY-MM-DD].....:		2024-08-06,			—
Test Voltage applied [V]		IR – 2025, Dielectric - 10800			—
Size of module [m ²]		2.80			—
Required Resistance [MΩ].....:		14.28			—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
C13	6480	14.28	-	No	P
E13	8990	14.28	-	No	P

TABLE 11.7: MQT 15 - Wet leakage current test after hot-spot endurance test				P
Test Date [YYYY-MM-DD].....:		C13, E13: 2024-08-06		—
Test Voltage applied [V]		2025		—
Solution temperature [°C].....:		23.0		—
Size of module [m ²]		2.80		—
Solution resistivity [Ω cm].....:		1990		—
Sample #	Measured [MΩ]	Limit [MΩ]		Result

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
C13	2000	14.28	P
E13	2300	14.28	P
Supplementary information: Size of module [m ²]: 2.278x1.134 m = 2.58 m ²			

TABLE 11.8: MQT 18.2 - Bypass diode functionality test after Hot-spot endurance test					P
Test Date [YYYY-MM-DD].....:		2024-08-06			—
☐ Method A					—
Ambient temperature [°C]		N/A			—
Current flow applied [A]		N/A			—
Sample #	VFM	VFMrated	VFM = (N × VFMrated) ± 10 %		Result
Supplementary information: N/A					
☒ Method B					—
	IV curve after shading				Result
Diode 1	Shaded one cell and then have a power drop to roughly 2/3.				P
Diode 2	Shaded one cell and then have a power drop to roughly 2/3.				P
Diode 3	Shaded one cell and then have a power drop to roughly 2/3.				P
Supplementary information: N/A					

TABLE 12.1: MQT 10 - UV preconditioning test (Front side)		P
Test Date (YYYY-MM-DD) start/end	C04, C05, E04, E05 : 2024-05-04 / 2024-05-10	—
Module temperature [°C]	62.8	—
UV irradiance (280-400nm) [W/m²]	117	—
UV dose (280-320nm) [kWh/ m²]	15.71, 15.80	—
Module operation condition	■ Short circuited □ Open circuited	—
Supplementary information: N/A		

TABLE 12.2: MQT 10 - UV preconditioning test (Back side)				P
Test Date (YYYY-MM-DD) start/end		C04, C05, E04, E05: 2024-05-11 / 2024-05-20		—
Module temperature [°C]		64.3		—
UV irradiance (280-400nm) [W/m ²]		78, 75		—
UV dose (280-320nm) [kWh/ m ²]		16.38, 15.75		—
Module operation condition		☒ Short circuited ☐ Open circuited		—

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information: For bifacial modules repeat the procedure of UV irradiation on the rear-side of the modules.

TABLE 12.3: MQT 01 - Visual inspection after UV preconditioning test			P
Test Date [YYYY-MM-DD].....:		2024-05-20	—
Sample #	Nature and position of initial findings – comments or attach photos		—
C04	No visual defects found		P
C05	No visual defects found		P
E04	No visual defects found		P
E05	No visual defects found		P

TABLE 12.4: MQT 15 - Wet leakage current test after UV preconditioning test			P
Test Date [YYYY-MM-DD]..... :		2024-05-20	—
Test Voltage applied [V]		2025	—
Solution temperature [°C].....:		23.0	—
Size of module [m²]		2.58	—
Solution resistivity [Ω cm]..... :		1990	—
Sample #	Measured [MΩ]	Required Resistance [MΩ]	Result
C04	1310	15.50	P
C05	1230	15.50	P
E04	1560	15.50	P
E05	2300	15.50	P
Supplementary information: Size of module [m²]: 2.278x1.134 m = 2.58 m²			

TABLE 12.5: MQT 02 – Max. power determination after UV preconditioning test - Optional	N/A
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TABLE 12.6: MQT 03 - Insulation test after UV preconditioning test - Optional				P
Test Date [YYYY-MM-DD].....:		2024-05-20		—
Test Voltage applied [V]		IR – 2025, Dielectric - 10800		—
Size of module [m²]		2.58		—
Required Resistance [MΩ].....:		15.50		—
Sample #	Measured	Dielectric breakdown		Result
	[MΩ]	Yes (description)	No	
C04	8190	-	No	P
E04	7320	-	No	P

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information: Size of module [m²]: 2.278x1.134 m = 2.58 m²

TABLE 13: MQT 20 - Cyclic (dynamic) mechanical Load test		P
Test Date [MM/DD/YYYY].....:	2024-05-22	—
Sample #	C04	—
Temperature of tested module(°C):	27.5	—
Maximum pressure (Pa) :	1000	—
Pressure tolerance(Pa) :	1000±100	—
Monitoring current (A) :	0.14	—
Rate per minute(cycles) :	6	—
Number of cycles	1000	—
Pressure provider (Air pressure or vacuum).....:	vacuum	—
Cell and alive part broken/ not	Not	P
Current continuous (continuous/ disconnection occurred)	continuous	P
Supplementary information: N/A		
Note: Refer to Annex 5 for C05, E04, E05 measurement results.		

TABLE 13.1: MQT 01 - Visual inspection after Cyclic (dynamic) mechanical Load test		P
Test Date [YYYY-MM-DD].....:	C04, C05: 2024-05-22 E04, E05: 2024-05-23	—
Sample #	Nature and position of initial findings – comments or attach photos	—
C04	No visual defects were found	P
C05	No visual defects were found	P
E04	No visual defects were found	P
E05	No visual defects were found	P
Supplementary information: N/A		

TABLE 13.2: MQT 15 - Wet leakage current test after Cyclic (dynamic) mechanical Load test		P
Test Date [YYYY-MM-DD]..... :	C04, C05: 2024-05-22 E04, E05: 2024-05-23	—
Test Voltage applied [V]	2025	—
Solution temperature [°C]	2024-05-22: 23.5 2024-05-23: 23.0	—
Size of module [m ²]	2.58	—

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
Solution resistivity [Ω cm]		2024-05-22: 1990 2024-05-23: 2030	—
Sample #	Measured [$M\Omega$]	Required Resistance [$M\Omega$]	Result
C04	2100	15.50	P
C05	1890	15.50	P
E04	1980	15.50	P
E05	1500	15.50	P
Supplementary information: Size of module [m^2]: 2.278x1.134 m = 2.58 m^2			

TABLE 14: MQT 11 - Thermal cycling 50 test			P
Test Date [YYYY-MM-DD] start/end :		2024-06-27 / 2024-07-10	—
Total cycles (50)..... :		50	—
Weight attached (N) :		5	—
Applied current (A) :	During the heat up cycle from 40 °C to 80 °C	15.0	—
	Other stages	0.15	—
Dwell time at high temperature..... :		10 min	
Dwell time at low temperature..... :		10 min	
Sample #	Open circuits (yes/no)		—
C04	No		P
C05	No		P
E04	No		P
E05	No		P
Supplementary information: N/A			

TABLE 14.1: MQT 01 - Visual inspection after thermal cycling 50 test		P
Test Date [YYYY-MM-DD].....: 2024-07-10		—
Sample #	Nature and position of initial findings – comments or attach photos	—
C04	No visual defects were found	P
C05	No visual defects were found	P
E04	No visual defects were found	P
E05	No visual defects were found	P
Supplementary information: N/A		

TABLE 14.2: MQT 15 - Wet leakage current test after thermal cycling 50 test			P
Test Date [YYYY-MM-DD]	2024-07-10		—

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
Test Voltage applied [V]		2025	—
Solution temperature [°C]		23.4	—
Size of module [m ²]		2.58	—
Solution resistivity [Ω cm]		2000	—
Sample #	Measured [MΩ]	Required Resistance [MΩ]	Result
C04	1650	15.50	P
C05	1550	15.50	P
E04	1900	15.50	P
E05	2500	15.50	P
Supplementary information: Size of module [m ²]: 2.278x1.134 m = 2.58 m ²			

TABLE 14.3: MQT 03 – Max. power determination after thermal cycling 50 test - Optional	N/A
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IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE 14.4: MQT 03 - Insulation test after thermal cycling 50 test - Optional				P
Test Date [YYYY-MM-DD]..... :		2024-07-10		—
Test Voltage applied [V]		IR – 2025, Dielectric - 10800		—
Size of module [m²]		2.58		—
Required Resistance [MΩ]..... :		15.50		—
Sample #	Measured	Dielectric breakdown		Result
	[MΩ]	Yes (description)	No	
C04	5670	-	NO	P
E04	6730	-	NO	P
Supplementary information: 2.278x1.134 m = 2.58 m²				
TABLE 15: MQT 12 - Humidity freeze 10 test				P
Test Date [YYYY-MM-DD] start/end		2024-07-19 / 2024-07-29		—
Total cycles (10)		10		—
Applied current (A)		0.12		—
Dwell time at high temperature		20 h		—
Dwell time at low temperature..... :		30 min		—
Sample #	Open circuits (yes/no)			—
C04	No			P
C05	No			P
E04	No			P
E05	No			P
Supplementary information: N/A				

TABLE 15.1: MQT 01 - Visual inspection after humidity freeze 10 test		P
Test Date [YYYY-MM-DD].....: 2024-07-29		—
Sample #	Nature and position of initial findings – comments or attach photos	—
C04	No visual defects were found	P
C05	No visual defects were found	P
E04	No visual defects were found	P
E05	No visual defects were found	P
Supplementary information: N/A		
TABLE 15.2: MQT 15 - Wet leakage current test after humidity freeze 10 test		P
Test Date [YYYY-MM-DD].....: 2024-07-29		—

IEC 61215-2			
Clause	Requirement + Test		Verdict
Test Voltage applied [V]	2025		—
Solution temperature [°C].....	23.0		—
Size of module [m²]	2.58		—
Solution resistivity [Ω cm].....	2080		—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
C04	2000	15.50	P
C05	2200	15.50	P
E04	1420	15.50	P
E05	1430	15.50	P
Supplementary information: Size of module [m²]: 2.278x1.134 m = 2.58 m²			

TABLE 15.3: MQT 02 - Maximum power determination after humidity freeze 10 test -Optional	N/A
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TABLE 15.4: MQT 03 Insulation test after humidity freeze 10 test -Optional					P
Test Date [YYYY-MM-DD]	2024-07-29				—
Test Voltage applied [V]	IR – 2025, Dielectric - 10800				—
Size of module [m²]	2.58				—
Required Resistance [MΩ].....	15.50				—
Sample #	Measured	Required	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
C04	5000	15.50	-	No	P
E04	7290	15.50	-	No	P
Supplementary information: 2.278x1.134 m = 2.58 m²					

TABLE 16: MQT 14.1 Retention of junction box on mounting surface		P
Test Date [YYYY-MM-DD] start/end: 2024-07-29		—
Sample #	C04, E04	—
Supplementary information: Test force applied is 156N due to combined certification program with UL 61730-2. For UL 61730-2, Clause 10.27DV testing - The test is equivalent to MQT 14.1 in IEC 61215-2 with the exceptions that the force used in the retention of junction box on mounting surface shall be increased from 40 N to 156.		

TABLE 16.1: MQT 01 - Visual inspection after retention of junction box on mounting surface					P
Test Date [YYYY-MM-DD]	2024-07-29				—

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sample #	Nature and position of initial findings – comments or attach photos		—
C04	No visual defects were found		P
E04	No visual defects were found		P
Supplementary information: N/A			

TABLE 16.2: MQT 15 - Wet leakage current test after retention of junction box on mounting surface			P
Test Date [YYYY-MM-DD]	2024-07-29		—
Test Voltage applied [V]	2025		—
Solution temperature [°C].....	23.3		—
Size of module [m²]	2.58		—
Solution resistivity [Ω cm].....	2000		—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
C04	1340	15.50	P
E04	1650	15.50	P
Supplementary information: Size of module [m²]: 2.278x1.134 m = 2.58 m²			

TABLE 17: MQT 11 - Thermal cycling 200 test			P
Test Date [YYYY-MM-DD] start/end	2024-05-22 / 2024-07-12		—
Total cycles (200).....	200		—
Weight attached (N)	5		—
Applied current (A)	During the heat up cycle from – 40 °C to 80 °C	15.0	—
	Other stages	0.15	—
Dwell time at high temperature	10 min		—
Dwell time at low temperature.....	10 min		—
Sample #	Open circuits (yes/no)		—
C08	No		P
C09	No		P
E08	No		P
E09	No		P
Supplementary information: N/A			

TABLE 17.1: MQT 01 - Visual inspection after thermal cycling 200 test			P
Test Date [YYYY-MM-DD]	2024-07-12		—

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sample #	Nature and position of initial findings – comments or attach photos		—
C08	No visual defects were found		P
C09	No visual defects were found		P
E08	No visual defects were found		P
E09	No visual defects were found		P
Supplementary information: N/A			

TABLE 17.2: MQT 15 - Wet leakage current test after thermal cycling 200 test			P
Test Date [YYYY-MM-DD]	2024-07-12		—
Test Voltage applied [V]	2025		—
Solution temperature [°C]	23.0		—
Size of module [m²]	2.58		—
Solution resistivity [Ω cm]	2090		—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
C08	1300	15.50	P
C09	1400	15.50	P
E08	1550	15.50	P
E09	1780	15.50	P
Supplementary information: Size of module [m²]: 2.278x1.134 m = 2.58 m²			

TABLE 18: MQT 13 - Damp heat 1000 test			P
Test Date [YYYY-MM-DD] start/end	2024-04-30 / 2024-06-13		—
Total hours (1000h)	1000		—
Sample #			—
C06	—		P
C07	—		P
E06	—		P
E07	—		P
Supplementary information: N/A			

TABLE 18.1: MQT 01 - Visual inspection after damp heat 1000 test			P
Test Date [YYYY-MM-DD]	2024-06-13		—
Sample #	Nature and position of initial findings – comments or attach photos		—
C06	No visual defects were found		P

IEC 61215-2				
Clause	Requirement + Test		Result - Remark	Verdict
C07	No visual defects were found			P
E06	No visual defects were found			P
E07	No visual defects were found			P
Supplementary information: N/A				
TABLE 18.2: MQT 15 - Wet leakage current test after damp heat 1000 test				P
Test Date [YYYY-MM-DD].....:		2024-06-13		—
Test Voltage applied [V].....:		2025		—
Solution temperature [°C].....:		23.6		—
Size of module [m²]		2.58		—
Solution resistivity [Ω cm].....:		2000		—
Sample #	Measured [MΩ]		Limit [MΩ]	Result
C06	2210		15.50	P
C07	2490		15.50	P
E06	1890		15.50	P
E07	1900		15.50	P
Supplementary information: Size of module [m²]: 2.278x1.134 m = 2.58 m²				

TABLE 18.3: MQT 02 - Maximum power determination after damp heat 1000 test - Optional	N/A
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TABLE 18.4: MQT 03 - Insulation test after damp heat 1000 test - Optional					P
Test Date [YYYY-MM-DD].....:		2024-06-13		—	
Test Voltage applied [V]		IR – 2025, Dielectric - 10800		—	
Size of module [m²]		2.58		—	
Sample #	Measured	Required Resistance	Dielectric breakdown		Result
	[MΩ]	[MΩ]	Yes (description)	No	
C06	9000	15.50	-	No	P
E06	7500	15.50	-	No	P
Supplementary information: Size of module [m²]: 2.278x1.134 m = 2.58 m²					

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
TABLE 19: MQT 16 Static mechanical load test			P
Sample # :	C06		—
Design load(front side/ back side)..... :	3600/1600		—
Safety factors..... :	1.5		—
Test Date [YYYY-MM-DD]..... :	2024-06-14		—
Mounting method..... :	Nut and bolt (Refer Manual)		—
Load applied to..... :	front side	back side	—
Mechanical load [Pa]..... :	5400	2400	—
First cycle time (start/end)..... :	08:45/09:45	09:55/10:55	—
Intermittent open-circuit (yes/no)..... :	No	No	P
Second cycle time (start/end)..... :	11:05/12:05	12:15/13:15	—
Intermittent open-circuit (yes/no)..... :	No	No	P
Third cycle time (start/end)..... :	13:30/14:30	14:40/15:40	—
Intermittent open-circuit (yes/no)..... :	No	No	P
Supplementary information: may need to be performed with each mounting situation			
Note: Refer to Annex 5 for E06, ^a C28, ^a E28 measurement results.			

TABLE 19.1: MQT 01 - Visual inspection after static mechanical load test		P	
Test Date [YYYY-MM-DD].....:		C06: 2024-06-14, E06: 2024-06-17, C28: 2024-08-01, E28: 2024-08-02	—
Sample #	Nature and position of initial findings – comments or attach photos		—
C06	No visual defects were found		P
E06	No visual defects were found		P
C28	No visual defects were found		P
E28	No visual defects were found		P
Supplementary information: N/A			

TABLE 19.2: MQT 15 - Wet leakage current test after static mechanical load test			P
Test Date [YYYY-MM-DD]..... :	C06: 2024-06-14, E06: 2024-06-17, C28: 2024-08-01, E28: 2024-08-02		—
Test Voltage applied [V]..... :	2025		—
Solution temperature [°C]..... :	C06: 23.5, E06: 23.0, C28: 23.6, E28: 23.0		—
Size of module [m²]..... :	2.58, ^a 2.80		—
Solution resistivity [Ω cm]..... :	C06: 2000, E06: 2040, C28: 2020, E28: 1990		—

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sample #	Measured [MΩ]	Limit [MΩ]	Result
C06	1590	15.50	P
E06	1900	15.50	P
^a C28	2300	14.28	P
^a E28	2500	14.28	P
Supplementary information: Size of module [m²]: 2.278x1.134 m = 2.58 m² ^a 2.469x1.134 m = 2.80 m²			

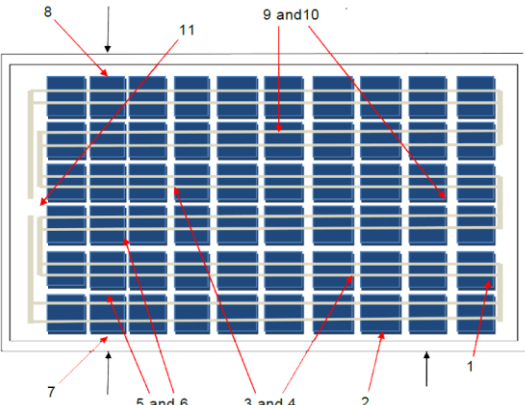
TABLE 20: MQT 22 Bending test	N/A
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TABLE 20.1: MQT 01 - Visual inspection after bending test	N/A
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TABLE 20.2: MQT 15 - Wet leakage current test after bending test	N/A
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TABLE 21: MQT 17 - Hail impact test							P
Test Date [YYYY-MM-DD]..... :	C07: 2024-06-14						—
Sample #							—
Ice ball size [mm] :	1	2	3	4	5	6	—
	24.95	24.96	25.08	24.99	25.09	25.00	
	7	8	9	10	11		
	25.00	25.05	24.93	24.94	25.00		
Ice ball weight [g] :	1	2	3	4	5	6	—
	7.48	7.49	7.54	7.50	7.43	7.45	
	7	8	9	10	11		
	7.51	7.55	7.53	7.56	7.52		
Ice ball velocity [m/s] :	1	2	3	4	5	6	—
	23.77	22.80	23.43	23.23	23.56	23.50	
	7	8	9	10	11		
	23.10	23.20	22.90	23.55	23.33		
Number of impact locations :	11						—
Supplementary information: (impact location descriptions)							

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict



Note: Refer to Annex 5 for E07 measurement results.

TABLE 21.1: MQT 01 - Visual inspection after hail impact test			P
Test Date [YYYY-MM-DD].....: 2024-06-14			—
Sample #	Nature and position of initial findings – comments or attach photos		—
C07	No visual defects were found		P
E07	No visual defects were found		P
Supplementary information: N/A			

TABLE 21.2: MQT 15 - Wet leakage current test after hail impact test			P
Test Date [YYYY-MM-DD].....: 2024-06-14			—
Test Voltage applied [V].....: 2025			—
Solution temperature [°C].....: 23.5			—
Size of module [m²]: 2.58			—
Solution resistivity [Ω cm]: 2000			—
Sample #	Measured [MΩ]	Required Resistance [MΩ]	Result
C07	1550	15.50	P
E07	1980	15.50	P
Supplementary information: Size of module [m²]: 2.278x1.134 m = 2.58 m²			

TABLE 22: MQT 21 -Potential induced degradation test			P
Test Date [MM/DD/YYYY] start/end.....: C20, C21, E20, E21: 2024-08-03 / 2024-08-07 C18, C19, E18, E19: 2024-08-09 / 2024-08-13			—
Chamber air temperature (°C): 85			—
Chamber relative humidity (% RH): 85			—
Test duration hours (h): 96			—

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sample #	Applied voltage stress (V) and polarities		—
C18	1500 and Positive polarity		P
C19	1500 and Positive polarity		P
C20	1500 and Negative polarity		P
C21	1500 and Negative polarity		P
E18	1500 and Positive polarity		P
E19	1500 and Positive polarity		P
E20	1500 and Negative polarity		P
E21	1500 and Negative polarity		P
Supplementary information: N/A			

TABLE 22.1: MQT 01 - Visual inspection after potential induced degradation test		P
Test Date [YYYY-MM-DD].....: C20, C21, E20, E21: 2024-08-07 C18, C19, E18, E19: 2024-08-13		—
Sample #	Nature and position of initial findings – comments or attach photos	—
C18	No visual defects were found	P
C19	No visual defects were found	P
C20	No visual defects were found	P
C21	No visual defects were found	P
E18	No visual defects were found	P
E19	No visual defects were found	P
E20	No visual defects were found	P
E21	No visual defects were found	P
Supplementary information: N/A		

TABLE 22.2: MQT 15 - Wet leakage current test after potential induced degradation test			P
Test Date [YYYY-MM-DD].....:	C20, C21, E20, E21: 2024-08-07 C18, C19, E18, E19: 2024-08-13		—
Test Voltage applied [V].....:	2025		—
Solution temperature [°C].....:	2024-08-07: 23.5 2024-08-13: 23.4		—
Size of module [m²].....:	2.58		—
Solution resistivity [Ω cm]	2024-08-07: 2000 2024-08-13: 2050		—

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
Sample #	Measured [MΩ]	Required Resistance [MΩ]	Result
C18	2300	15.50	P
C19	2000	15.50	P
C20	1980	15.50	P
C21	2100	15.50	P
E18	2000	15.50	P
E19	2340	15.50	P
E20	2100	15.50	P
E21	1780	15.50	P
Supplementary information: Size of module [m ²]: 2.278x1.134 m = 2.58 m ²			

TABLE 23: MQT 19.2: Final stabilization							P
TABLE 23.1: MQT 06.1: Performance at STC before final stabilization							P
Test Date [YYYY-MM-DD]..... :		C06, C07, E07: 2024-06-18 C18, C19, E18, E19: 2024-08-13 C20, C21, E20, E21: 2024-08-07 E06: 2024-06-21					—
Test method		☒ Solar simulator ☐ Natural sunlight					—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
C06	12.96	50.17	12.25	42.13	516.22	79.38	P
C07	12.25	49.83	12.25	41.84	512.44	79.55	P
C18	13.02	49.80	12.26	41.88	513.28	79.17	P
C19	13.03	49.83	12.29	42.01	516.43	79.52	P
C20	12.88	49.88	12.16	42.24	513.79	79.95	P
C21	12.89	49.88	12.17	42.24	514.20	79.98	P
E06	12.94	50.14	12.20	42.11	513.85	79.20	P
E07	12.91	49.63	12.22	41.55	507.60	79.23	P
E18	13.04	49.80	12.26	41.89	513.50	79.10	P
E19	13.03	49.78	12.29	41.87	514.42	79.31	P
E20	12.87	49.78	12.19	41.99	511.76	79.90	P
E21	12.85	49.92	12.16	42.24	513.64	80.08	P
Supplementary information: N/A							

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
TABLE 23.2: MQT 19.1 Final Stabilization procedure			N/A
☐ IEC 61215-1-2 ☐ IEC 61215-1-3 ☐ IEC 61215-1-4			N/A
Supplementary information: This test is not applicable as the PV modules under investigation are crystalline silicon PV modules and falls under scope of IEC 61215-1-1.			

TABLE 23.3: MQT 19.2: Final stabilization									N/A
☒ IEC 61215-1-1									P
☐ Method 1									N/A
Stress-specific stabilization – BO LID (MQT 19.3)									N/A
Test Date [YYYY-MM-DD]..... :				N/A					—
Applied current (A)				N/A					—
Module temperature [°C]..... :				N/A					—
Total hours (48h)				N/A					—
Performance at STC after final stabilization— for monofacial modules									N/A
Test Date [YYYY-MM-DD]..... :				N/A					—
Test method..... :				☐ Solar simulator ☐ Natural sunlight					—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Pmax [W] (Lab Gate No.1)	Power Degradation	Result
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Performance at BNPI after final stabilization — for bifacial modules									—
Test Date [YYYY-MM-DD]..... :				N/A					—
Test method..... :				☐ Solar simulator ☐ Natural sunlight					—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Pmax [W] (LabGateNo.1)	Power Degradation	Result
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
☒ Method 2									—
Performance at STC before final stabilization— for monofacial modules									P
Test Date [YYYY-MM-DD]..... :				C06, C07, E07: 2024-06-18 E06: 2024-06-21					—
Test method..... :				☒ Solar simulator ☐ Natural sunlight					—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Pmax [W] (Lab Gate No.1)	Power Degradation	Result
C06	12.96	50.17	12.25	42.13	516.22	79.38	526.70	-1.99	P

IEC 61215-2									
Clause	Requirement + Test						Result - Remark	Verdict	
C07	12.25	49.83	12.25	41.84	512.44	79.55	527.22	-2.80	P
E06	12.94	50.14	12.20	42.11	513.85	79.20	526.50	-2.40	P
E07	12.91	49.63	12.22	41.55	507.60	79.23	525.69	-3.44	P
Performance at BNPI before final stabilization — for bifacial modules									—
Test Date [YYYY-MM-DD]..... :				C06, C07, E07: 2024-06-18 E06: 2024-06-21					—
Test method..... :				☒ Solar simulator ☐ Natural sunlight					—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	P_{max} [W] (Lab Gate No.1)	Power Degradation	Result
C06	14.19	50.10	13.44	41.85	562.34	79.11	576.02	-2.37	P
C07	14.15	50.06	13.37	41.83	559.10	78.96	575.32	-2.82	P
E06	14.21	50.11	13.46	41.85	563.36	79.11	576.53	-2.28	P
E07	14.14	50.03	13.36	41.83	558.76	79.01	576.49	-3.08	P
Supplementary information: This module was not stabilized, and therefore the amount of degradation observed may be larger than what would have been obtained if the module had been stabilized, due to destabilization artifacts.									
If Power Degradation $\geq$ 5%, then perform stress-specific stabilization MQT 19.3 in method 1									
Stress-specific stabilization – BO LID (MQT 19.3)									N/A
Test Date [YYYY-MM-DD]..... :				N/A					—
Applied current (A)				N/A					—
Module temperature [°C]..... :				N/A					—
Total hours (48h)				N/A					—
Performance at STC after final stabilization — for monofacial modules									N/A
Test Date [YYYY-MM-DD]..... :				N/A					—
Test method..... :				☐ Solar simulator ☐ Natural sunlight					—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	P_{max} [W] (Lab Gate No.1)	Power Degradation	Result
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Performance at BNPI after final stabilization — for bifacial modules									N/A
Test Date [YYYY-MM-DD]..... :									—
Test method..... :				☐ Solar simulator ☐ Natural sunlight					—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	P_{max} [W] (Lab Gate No.1)	Power Degradation	Result

IEC 61215-2									
Clause	Requirement + Test						Result - Remark	Verdict	
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Supplementary information:									
TABLE 23.4: MQT 19.2: Final stabilization									N/A
☐ Method 3									N/A
Test Date (YYYY-MM-DD) start/end				N/A				—	
Test duration (h)				N/A				—	
Module temperature [°C]				N/A				—	
UV irradiance (280-400nm) [W/m ²]				N/A				—	
UV dose (280-320nm) [kWh/ m ²]				N/A				—	
UV dose (280-400nm) [kWh/ m ²]				N/A				—	
Side exposed				☐ Front side ☐ Rear side				—	
Module operation condition				☐ Short circuited ☐ Open circuited				—	
Supplementary information: For bifacial modules, the irradiance shall be applied to the rear side, whereas for monofacial modules, the irradiance shall be applied to the front side.									
Performance at STC after final stabilization— for monofacial modules									N/A
Test Date [YYYY-MM-DD]				N/A				—	
Test method				☐ Solar simulator ☐ Natural sunlight				—	
Sample #	<i>I</i> _{sc} [A]	<i>V</i> _{oc} [V]	<i>I</i> _{mp} [A]	<i>V</i> _{mp} [V]	<i>P</i> _{max} [W]	FF [%]	<i>P</i> _{max} [W] (Lab Gate No.1)	Power Degradation	Result
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Performance at BNPI after final stabilization — for bifacial modules									N/A
Test Date [YYYY-MM-DD]				N/A				—	
Test method				☐ Solar simulator ☐ Natural sunlight				—	
Sample #	<i>I</i> _{sc} [A]	<i>V</i> _{oc} [V]	<i>I</i> _{mp} [A]	<i>V</i> _{mp} [V]	<i>P</i> _{max} [W]	FF [%]	<i>P</i> _{max} [W] (Lab Gate No.1)	Power Degradation	Result
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Supplementary information:									
☒ Method 4									
Performance at STC before final stabilization— for monofacial modules									P
Test Date [YYYY-MM-DD]				C18, C19, E18, E19: 2024-08-13 C20, C21, E20, E21: 2024-08-07				—	
Test method				☒ Solar simulator ☐ Natural sunlight				—	

IEC 61215-2									
Clause	Requirement + Test					Result - Remark		Verdict	
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	P_{max} [W] (Lab Gate No.1)	Power Degradation	Result
C18	13.02	49.80	12.26	41.88	513.28	79.17	526.25	-2.46	P
C19	13.03	49.83	12.29	42.01	516.43	79.52	527.09	-2.02	P
C20	12.88	49.88	12.16	42.24	513.79	79.95	525.45	-2.22	P
C21	12.89	49.88	12.17	42.24	514.20	79.98	528.37	-2.68	P
E18	13.04	49.80	12.26	41.89	513.50	79.10	525.97	-2.37	P
E19	13.03	49.78	12.29	41.87	514.42	79.31	524.99	-2.01	P
E20	12.87	49.78	12.19	41.99	511.76	79.90	526.14	-2.73	P
E21	12.85	49.92	12.16	42.24	513.64	80.08	526.06	-2.36	P
Performance at BNPI before final stabilization — for bifacial modules									P
Test Date [YYYY-MM-DD]..... :					C18, C19, E18, E19: 2024-08-13 C20, C21, E20, E21: 2024-08-07				—
Test method..... :					☒ Solar simulator ☐ Natural sunlight				—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	P_{max} [W] (Lab Gate No.1)	Power Degradation	Result
C18	14.36	50.01	13.54	41.72	564.79	78.67	575.92	-1.93	P
C19	14.36	49.99	13.53	41.72	564.55	78.65	574.03	-1.65	P
C20	14.34	50.01	13.53	41.72	564.23	78.70	574.89	-1.85	P
C21	14.33	50.02	13.53	41.72	564.39	78.70	575.66	-1.96	P
E18	14.36	50.01	13.54	41.72	564.81	78.67	575.17	-1.80	P
E19	14.36	50.01	13.56	41.73	565.69	78.76	576.56	-1.89	P
E20	14.36	50.02	13.56	41.73	565.80	78.75	574.80	-1.57	P
E21	14.32	50.01	13.53	41.72	564.47	78.79	573.30	-1.54	P
Supplementary information: This module was not stabilized, and therefore the amount of degradation observed may be larger than what would have been obtained if the module had been stabilized, due to polarization artifacts									
If Power Degradation $\geq$ 5%, then perform method 3 final stabilization									
Method 3									N/A
Test Date [YYYY-MM-DD]..... :					N/A				—
Test duration (h)..... :					N/A				—
Module temperature [°C]					N/A				—

IEC 61215-2									
Clause	Requirement + Test					Result - Remark			Verdict
UV irradiance (280-400nm) [W/m²] :					N/A			—	
UV dose (280-320nm) [kWh/ m²] :					N/A			—	
UV dose (280-400nm) [kWh/ m²] :					N/A			—	
Side exposed :					☐ Front side ☐ Rear side			—	
Module operation condition :					☐ Short circuited ☐ Open circuited			—	
Performance at STC after final stabilization — for monofacial modules									
Test Date [YYYY-MM-DD]..... :					N/A			—	
Test method..... :					☐ Solar simulator ☐ Natural sunlight			—	
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Pmax [W] (Lab Gate No.1)	Power Degradation	Result
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Performance at BNPI after final stabilization — for bifacial modules									N/A
Test Date [YYYY-MM-DD]..... :					N/A			—	
Test method..... :					☐ Solar simulator ☐ Natural sunlight			—	
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Pmax [W] (Lab Gate No.1)	Power Degradation	Result
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Supplementary information: N/A									

TABLE 23.5: MQT 06.1: Final Performance at STC									P
Test Date [YYYY-MM-DD]				C04, C05, E04, E05: 2024-08-02 C08, C09, E08, E09: 2024-07-16 C06, C07, E07: 2024-06-18 E06: 2024-06-21 C18, C19, E18, E19: 2024-08-13 C20, C21, E20, E21: 2024-08-07 C13: 2024-05-22 E13: 2024-07-29					—
Test method				☒ Solar simulator ☐ Natural sunlight					—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	P_{max} [W] (Lab Gate No.1)	Power Degradation [%]	Result
C04	13.01	49.73	12.28	41.41	508.73	78.44	526.63	-3.40	P
C05	13.08	49.78	12.27	41.27	506.31	77.78	526.32	-3.80	P

IEC 61215-2									
Clause	Requirement + Test					Result - Remark			Verdict
C06	12.96	50.17	12.25	42.13	516.22	79.38	526.70	-1.99	P
C07	12.25	49.83	12.25	41.84	512.44	79.55	527.22	-2.80	P
C08	13.25	49.90	12.53	41.91	525.04	79.39	528.15	-0.59	P
C09	13.22	49.96	12.50	41.91	523.79	79.31	525.20	-0.27	P
C13	13.57	54.32	12.85	45.50	584.93	79.34	586.14	-0.21	P
C18	13.02	49.80	12.26	41.88	513.28	79.17	526.25	-2.46	P
C19	13.03	49.83	12.29	42.01	516.43	79.52	527.09	-2.02	P
C20	12.88	49.88	12.16	42.24	513.79	79.95	525.45	-2.22	P
C21	12.89	49.88	12.17	42.24	514.20	79.98	528.37	-2.68	P
C28	13.53	54.34	12.84	45.50	584.07	79.43	586.09	-0.35	P
E04	13.25	49.66	12.38	41.01	507.87	77.20	526.72	-3.58	P
E05	13.07	49.77	12.26	41.27	505.94	77.80	528.41	-4.25	P
E06	12.94	50.14	12.20	42.11	513.85	79.20	526.50	-2.40	P
E07	12.91	49.63	12.22	41.55	507.60	79.23	525.69	-3.44	P
E08	13.21	49.95	12.51	41.76	522.51	79.20	526.87	-0.83	P
E09	13.21	50.00	12.49	41.90	523.55	79.28	525.46	-0.36	P
E18	13.04	49.80	12.26	41.89	513.50	79.10	525.97	-2.37	P
E19	13.03	49.78	12.29	41.87	514.42	79.31	524.99	-2.01	P
E20	12.87	49.78	12.19	41.99	511.76	79.90	526.14	-2.73	P
E21	12.85	49.92	12.16	42.24	513.64	80.08	526.06	-2.36	P
E13	13.53	54.34	12.84	45.50	584.07	79.43	586.16	-0.36	P
E28	13.57	54.32	12.85	45.50	584.93	79.34	586.07	-0.19	P
Supplementary information: Pmax [W] (Lab_GateNo.1) is calculated by considering the reproducibility r of control module.									

For bifacial modules		P
TABLE 23.6: MQT 06.1 ini: Performance at STC after final stabilization (Front side)		P
Test Date [YYYY-MM-DD].....:	C04, C05, E04, E05: 2024-08-02 C08, C09, E08, E09: 2024-07-16 C06, C07, E07: 2024-06-18 E06: 2024-06-21 C18, C19, E18, E19: 2024-08-13	—

IEC 61215-2							
Clause	Requirement + Test				Result - Remark		Verdict
				C20, C21, E20, E21: 2024-08-07 C13: 2024-05-22 C28, E28: 2024-08-02 E13: 2024-07-29			
Test method.....:				☒ Solar simulator ☐ Natural sunlight			—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	Result
C04	13.01	49.73	12.28	41.41	508.73	78.44	P
C05	13.08	49.78	12.27	41.27	506.31	77.78	P
C06	12.96	50.17	12.25	42.13	516.22	79.38	P
C07	12.25	49.83	12.25	41.84	512.44	79.55	P
C08	13.25	49.90	12.53	41.91	525.04	79.39	P
C09	13.22	49.96	12.50	41.91	523.79	79.31	P
C13	13.57	54.32	12.85	45.50	584.93	79.34	P
C18	13.02	49.80	12.26	41.88	513.28	79.17	P
C19	13.03	49.83	12.29	42.01	516.43	79.52	P
C20	12.88	49.88	12.16	42.24	513.79	79.95	P
C21	12.89	49.88	12.17	42.24	514.20	79.98	P
C28	13.53	54.34	12.84	45.50	584.07	79.43	P
E04	13.25	49.66	12.38	41.01	507.87	77.20	P
E05	13.07	49.77	12.26	41.27	505.94	77.80	P
E06	12.94	50.14	12.20	42.11	513.85	79.20	P
E07	12.91	49.63	12.22	41.55	507.60	79.23	P
E08	13.21	49.95	12.51	41.76	522.51	79.20	P
E09	13.21	50.00	12.49	41.90	523.55	79.28	P
E18	13.04	49.80	12.26	41.89	513.50	79.10	P
E19	13.03	49.78	12.29	41.87	514.42	79.31	P
E20	12.87	49.78	12.19	41.99	511.76	79.90	P
E21	12.85	49.92	12.16	42.24	513.64	80.08	P
E13	13.53	54.34	12.84	45.50	584.07	79.43	P
E28	13.57	54.32	12.85	45.50	584.93	79.34	P
Supplementary information: N/A							
TABLE 23.7: MQT 06.1 ini: Performance at STC after final stabilization (Back side)							
Test Date [YYYY-MM-DD].....:			C04, C05, E04, E05: 2024-08-02 C08, C09, E08, E09: 2024-07-16 C06, C07, E07: 2024-06-18				—

IEC 61215-2														
Clause		Requirement + Test					Result - Remark			Verdict				
					E06: 2024-06-21 C18, C19, E18, E19: 2024-08-13 C20, C21, E20, E21: 2024-08-07 C13: 2024-05-22 C28, E28: 2024-08-02 E13: 2024-07-29									
					Test method :						■ Solar simulator □ Natural sunlight			—
Sample #	I _{sc} [A]	V _{oc} [V]	I _{mp} [A]	V _{mp} [V]	P _{max} [W]	FF [%]	ϕI _{sc}	ϕV _{oc}	ϕP _{max}	Result				
C04	9.60	49.35	-	-	363.69	-	0.74	0.99	0.71	P				
C05	9.82	49.20	-	-	358.22	-	0.75	0.99	0.71	P				
C06	9.68	49.60	-	-	376.86	-	0.75	0.99	0.73	P				
C07	9.49	49.31	-	-	372.52	-	0.77	0.99	0.73	P				
C08	9.84	49.54	-	-	384.20	-	0.74	0.99	0.73	P				
C09	9.84	49.53	-	-	384.10	-	0.74	0.99	0.73	P				
C13	10.31	53.85	-	-	428.92	-	0.76	0.99	0.73	P				
C18	9.46	49.27	-	-	366.38	-	0.73	0.99	0.71	P				
C19	9.50	49.27	-	-	367.77	-	0.73	0.99	0.71	P				
C20	9.43	49.27	-	-	365.48	-	0.73	0.99	0.71	P				
C21	9.45	49.28	-	-	365.92	-	0.73	0.99	0.71	P				
C28	10.33	53.85	-	-	429.10	-	0.76	0.99	0.73	P				
E04	9.86	49.04	-	-	357.23	-	0.74	0.99	0.70	P				
E05	9.82	49.19	-	-	357.56	-	0.75	0.99	0.71	P				
E06	9.58	49.56	-	-	370.14	-	0.74	0.99	0.72	P				
E07	9.55	49.22	-	-	370.31	-	0.74	0.99	0.73	P				
E08	9.85	49.51	-	-	383.72	-	0.75	0.99	0.73	P				
E09	9.85	49.53	-	-	383.86	-	0.75	0.99	0.73	P				
E18	9.45	49.27	-	-	366.05	-	0.72	0.99	0.71	P				
E19	9.48	49.28	-	-	366.46	-	0.73	0.99	0.71	P				
E20	9.39	49.26	-	-	363.24	-	0.73	0.99	0.71	P				
E21	9.45	49.27	-	-	365.74	-	0.74	0.99	0.71	P				

IEC 61215-2										
Clause	Requirement + Test					Result - Remark				Verdict
E13	10.33	53.85	-	-	429.10	-	0.76	0.99	0.73	P
E28	10.31	53.85	-	-	428.92	-	0.76	0.99	0.73	P
Supplementary information: N/A										

TABLE 23.8: MQT 06.1: Final Performance at BNPI									P
Test Date [YYYY-MM-DD]..... :					C04, C05, E04, E05: 2024-08-02 C08, C09, E08, E09: 2024-07-16 C06, C07, E07: 2024-06-18 E06: 2024-06-21 C18, C19, E18, E19: 2024-08-13 C20, C21, E20, E21: 2024-08-07 C13: 2024-05-22 C28, E28: 2024-08-02 E13: 2024-07-29				—
Test method :					☒ Solar simulator ☐ Natural sunlight				—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	P_{max} [W] (Lab Gate No.1)	Power Degradation [%]	Result
C04	14.21	50.10	13.46	41.85	563.22	79.08	574.8	-2.01	P
C05	14.23	50.17	13.48	41.23	564.26	79.03	575.38	-1.93	P
C06	14.19	50.10	13.44	41.85	562.34	79.11	576.02	-2.37	P
C07	14.15	50.06	13.37	41.83	559.10	78.96	575.32	-2.82	P
C08	14.41	50.25	13.65	41.90	571.81	78.98	575.24	-0.60	P
C09	14.45	50.24	13.66	41.90	572.51	78.88	576.01	-0.61	P
C13	14.82	54.58	14.04	45.62	640.29	79.17	641.96	-0.26	P
C18	14.36	50.01	13.54	41.72	564.79	78.67	575.92	-1.93	P
C19	14.36	49.99	13.53	41.72	564.55	78.65	574.03	-1.65	P
C20	14.34	50.01	13.53	41.72	564.23	78.70	574.89	-1.85	P
C21	14.33	50.02	13.53	41.72	564.39	78.70	575.66	-1.96	P
C28	14.84	54.58	14.09	45.49	640.92	79.12	645.10	-0.65	P
E04	14.22	50.08	13.44	41.85	562.64	79.01	577.85	-2.63	P
E05	14.24	50.19	13.45	41.99	564.74	79.03	576.21	-1.99	P
E06	14.21	50.11	13.46	41.85	563.36	79.11	576.53	-2.28	P

IEC 61215-2									
Clause	Requirement + Test						Result - Remark		Verdict
E07	14.14	50.03	13.36	41.83	558.76	79.01	576.49	-3.08	P
E08	14.43	50.20	13.65	41.90	572.00	78.96	579.97	-1.37	P
E09	14.45	50.21	13.65	41.90	572.12	78.87	576.64	-0.78	P
E18	14.36	50.01	13.54	41.72	564.81	78.67	575.17	-1.80	P
E19	14.36	50.01	13.56	41.73	565.69	78.76	576.56	-1.89	P
E20	14.36	50.02	13.56	41.73	565.80	78.75	574.80	-1.57	P
E21	14.32	50.01	13.53	41.72	564.47	78.79	573.30	-1.54	P
E13	14.84	54.58	14.09	45.49	640.92	79.12	645.79	-0.75	P
E28	14.82	54.58	14.04	45.62	640.29	79.17	645.85	-0.87	P
Supplementary information: Pmax [W] (Lab_GateNo.1) is calculated by considering the reproducibility <i>r</i> of control module.									

TABLE 23.9: MQT 03 fin: Final Insulation test					
Test Date [YYYY-MM-DD]..... :			C04, C05, E04, E05: 2024-08-02 C08, C09, E08, E09: 2024-07-16 C06, C07, E07: 2024-06-18 E06: 2024-06-21 C18, C19, E18, E19: 2024-08-13 C20, C21, E20, E21: 2024-08-07 C13: 2024-05-22 C28, E28: 2024-08-02 E13: 2024-07-29		—
Test Voltage applied [V] :			IR – 2025, Dielectric - 10800		—
Size of module [m²] :			a 2.80, 2.58		—
Sample #	Required	Measured	Dielectric breakdown		Result
	MΩ	MΩ	Yes (description)	No	
C04	15.50	5830	-	No	P
C05	15.50	7800	-	No	P
C06	15.50	6440	-	No	P
C07	15.50	7000	-	No	P
C08	15.50	6500	-	No	P
C09	15.50	6000	-	No	P
C10	a 14.28	7320	-	No	P
C13	a 14.28	5760	-	No	P
C18	15.50	5500	-	No	P

IEC 61215-2					
Clause	Requirement + Test		Result - Remark		Verdict
C19	15.50	5000	-	No	P
C20	15.50	8600	-	No	P
C21	15.50	6120	-	No	P
C28	^a 14.28	6000	-	No	P
E04	15.50	9400	-	No	P
E05	15.50	10000	-	No	P
E06	15.50	7390	-	No	P
E07	15.50	5600	-	No	P
E08	15.50	7700	-	No	P
E09	15.50	7540	-	No	P
E10	15.50	8930	-	No	P
E18	15.50	7560	-	No	P
E19	15.50	6750	-	No	P
E20	15.50	7850	-	No	P
E21	15.50	7850	-	No	P
E13	^a 14.28	6560	-	No	P
E28	^a 14.28	7000	-	No	P
Supplementary information: Size of module [m²]:					
^a 2.469x1.134 m = 2.80 m², 2.278x1.134 m = 2.58 m²					

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
TABLE 23.10: MQT 15 fin: Final Wet leakage current test			P
Test Date [YYYY-MM-DD]	C04, C05, E04, E05: 2024-08-02 C08, C09, E08, E09: 2024-07-16 C06, C07, E07: 2024-06-18 E06: 2024-06-21 C18, C19, E18, E19: 2024-08-13 C20, C21, E20, E21: 2024-08-07 C13: 2024-05-22 C28, E28: 2024-08-02 E13: 2024-07-29		—
Test Voltage applied [V]	2025		—
Solution temperature [°C]	2024-08-02: 23.2 2024-07-16: 23.0 2024-06-18: 23.4 2024-06-21: 23.0 2024-08-13: 23.1 2024-08-07: 23.2 2024-05-22: 23.4 2024-07-31: 23.4 2024-07-29: 23.1		—
Size of module [m ²]	^a 2.80, 2.58		—
Solution resistivity [Ω cm]	2024-08-02: 2000 2024-07-16: 2040 2024-06-18: 1990 2024-06-21: 2050 2024-08-13: 2000 2024-08-07: 2020 2024-05-22: 2010 2024-07-31: 2090 2024-07-29: 1990		—
Sample #	Measured [MΩ]	Limit [MΩ]	Result
C04	1340	15.50	P
C05	1500	15.50	P
C06	1420	15.50	P
C07	1670	15.50	P
C08	1450	15.50	P
C09	1550	15.50	P
C10	1500	^a 14.28	P

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict
C13	1650	^a 14.28	P
C18	1400	15.50	P
C19	1350	15.50	P
C20	1500	15.50	P
C21	1790	15.50	P
C28	1230	^a 14.28	P
E04	14301	15.50	P
E05	990	15.50	P
E06	1600	15.50	P
E07	1900	15.50	P
E08	1760	15.50	P
E09	2000	15.50	P
E10	2550	15.50	P
E18	1800	15.50	P
E19	2000	15.50	P
E20	2300	15.50	P
E21	1650	15.50	P
E13	1550	^a 14.28	P
E28	1830	^a 14.28	P
Supplementary information: Size of module [m ²]: ^a 2.469x1.134 m = 2.80 m ² , 2.278x1.134 m = 2.58 m ²			

IEC 61215-2

Annex 1: Critical components information

5.3.2 Internal wiring		
Cell connector		
Manufacturer:	Type:	Material:
Xi'an Telison New Materials Co.,Ltd. (TELISON)	60Sn40Pb	Copper, solder plated
Geba Cables and Wires India Pvt Ltd	60Sn40Pb	Copper, solder plated
TaiCang JuRen PV Material Co.,Ltd	60Sn40Pb	Copper, solder plated
neocab-pv A B INDUSTRIES	60Sn40Pb	Copper, solder plated
VALEO PRODUCTS LLP	60Sn40Pb	Copper, solder plated
Shanghai SunBy Solar Technology Co.,Ltd	60Sn40Pb	Copper, solder plated
Ulbrich of Austria GmbH	60Sn40Pb	Copper, solder plated
VIDYA WIRES pvt. Ltd.	60Sn40Pb	Copper, solder plated
BEST WIRE pvt. Ltd	60Sn40Pb	Copper, solder plated
Wuxi Sveck Technology Co.,Ltd	60Sn40Pb	Copper, solder plated
SUMATI ELECTRONICS pvt. Ltd.	60Sn40Pb	Copper, solder plated
Thickness [μm]:	Dimension [mm]:	Coatings:
200	0.2x0.5 mm	Coating Sn60/Pb40
Supplementary Information: Number of parallel cell connectors: 210mm Family: 12, 182mm Family: 10, 166mm Family: 9		
String connector		
Manufacturer:	Type:	Material
Xi'an Telison New Materials Co.,Ltd. (TELISON)	60Sn40Pb	Copper, solder plated
Geba Cables and Wires India Pvt Ltd	60Sn40Pb	Copper, solder plated
TaiCang JuRen PV Material Co.,Ltd	60Sn40Pb	Copper, solder plated
neocab-pv A B INDUSTRIES	60Sn40Pb	Copper, solder plated
VALEO PRODUCTS LLP	60Sn40Pb	Copper, solder plated
Shanghai SunBy Solar Technology Co.,Ltd	60Sn40Pb	Copper, solder plated
Ulbrich of Austria GmbH	60Sn40Pb	Copper, solder plated
VIDYA WIRES pvt. Ltd.	60Sn40Pb	Copper, solder plated

IEC 61215-2

BEST WIRE pvt. Ltd	60Sn40Pb	Copper, solder plated
Wuxi Sveck Technology Co.,Ltd	60Sn40Pb	Copper, solder plated
SUMATI ELECTRONICS pvt. Ltd.	60Sn40Pb	Copper, solder plated
Thickness [μm]:	Dimension [mm]:	Coatings:
400	0.40x 5.00	60Sn40Pb
Supplementary Information: Provided for connection between cell strings and junction box		
5.3.3 External wiring and cables		
Cables		
Manufacturer:	Type:	Material:
Zhonghuan Sunter PV Technology Co Ltd	62930 IEC 131,	PV Wire
Diameter [mm ²]:	Length [mm]:	Max. Temperature:
1x4mm ²	Various	90 °C
Certified: ☒ Yes / ☐ No	Standards:	Others:
Certifier and Cert. No. TÜV Rheinland certified, No. R-50436635 0001	☒ IEC 62930 ☐ EN 50618	
Supplementary Information: with PV-ZH011C-5 Junction Box		
Manufacturer:	Type:	Material:
Dhash PV Technologies Private Limited	62930 IEC 131	PV Wire
Diameter [mm ²]:	Length [mm]:	Max. Temperature:
1x4mm ²	Various	90 °C
Certified: ☒ Yes / ☐ No	Standards:	Others:
Certifier and Cert. No. TÜV Rheinland certified, No. R-50520444 0001	☒ IEC 62930 ☐ EN 50618	
Supplementary Information: with DSJB12c Junction Box		
5.3.4 Connectors		
Manufacturer:	Type:	Class:
Zhonghuan Sunter Pv Technology Co Ltd	PV-ZH202B	Class II
Max. Voltage:	Max. Current:	Max. Temperature:
1500 VDC	40 A max	120 °C
IP-rating:	Locked:	
IP 68	☐ Yes / ☒ No	
Certified: ☒ Yes / ☐ No	Standards:	Others:
Certifier and Cert. No. TUV SUD certificate No. B 082630 0021	☒ IEC 62852	
Supplementary Information: with PV-ZH011C-5 Junction Box		
Manufacturer:	Type:	Class:
Dhash PV Technologies Private Limited	DS01	Class II
Max. Voltage:	Max. Current:	Max. Temperature:
1500 VDC	35 A max	120 °C
IP-rating:	Locked:	
IP 68	☐ Yes / ☒ No	

IEC 61215-2		
Certified: ☒ Yes / ☐ No	Standards:	Others:
Certifier and Cert. No. TUV Rheinland certificate No. 60152493	☒ IEC 62852	
Supplementary Information: with DSJB12C junction box		
5.3.5 Junction boxes		
Manufacturer:	Type:	Class:
Zhonghuan Sunter Pv Technology Co Ltd	PV-ZH011C-5, 1500 VDC	II
IP-rating:	Dimensions (l x w x h) [mm ²]:	Weight [g]:
IP 68	Left box: 66.5 x 23.90 x 17.10 Middle box: 52.70 x 23.90 x 17.10 Right box: 66.5 x 23.90 x 17.10	N/A
Max. Voltage:	Max. Current:	Max. Temperature:
1500	30	85°C
Electrical Termination cell side:	Electrical Termination cell side:	Number of Bypass Diodes
Soldered ☒	Soldered ☒	03
Crimped ☐	Crimped ☐	
Welded ☐	Welded ☐	
Screwed ☐	Screwed ☐	
Screwless ☐	Screwless ☐	
Potted:	Certified: ☒ Yes / ☐ No	Standards:
☒ Yes / ☐ No	Certifier and Cert. No. TUV SUD: B0826300026 Rev. 02	☒ IEC 62790
Manufacturer:	Type:	Class:
Dhash PV Technologies Private Limited (DHASH)	DSJB12C, 1500 VDC	II
IP-rating:	Dimensions (l x w x h) [mm ²]:	Weight [g]:
IP 68	Left box: 66.5 x 23.90 x 17.10 Middle box: 52.70 x 23.90 x 17.10 Right box: 66.5 x 23.90 x 17.10	N/A
Max. Voltage:	Max. Current:	Max. Temperature:
1500V	30	85°C
Electrical Termination cell side:	Electrical Termination cell side:	Number of Bypass Diodes
Soldered ☒	Soldered ☒	03
Crimped ☐	Crimped ☐	
Welded ☐	Welded ☐	
Screwed ☐	Screwed ☐	
Screwless ☐	Screwless ☐	
Potted:	Certified: ☒ Yes / ☐ No	Standards:
☒ Yes / ☐ No	Certifier and Cert. No. TUV Rheinland: R 50535496 001	☒ IEC 62790
Supplementary Information: N/A		

IEC 61215-2

5.3.6 Frontsheets and backsheets		
Frontsheet		
Used as: ☐ Basic Insulation ☒ Reinforced Insulation		
Total Dimensions (width x length) [mm]: (210mm Family) 132 cells module: 2407 x 1303 x 35 120 cells module: 2194 x 1303 x 35 108 cells module: 1981 x 1303 x 35 96 cells module: 1768 x 1303 x 35 (182mm Family) 156 cells module: 2469x1134x35 144 cells module: 2278x1134x35 132 cells module: 2099x1134x35 120 cells module: 1914x1134x35 108 cells module: 1731x1134x35 (166mm Family) 156 cells module: 2261x1038x35 144 cells module: 2092x1038x35 132 cells module: 1923x1038x35 120 cells module: 1754x1038x35		
Material:	Manufacturer:	Type:
Glass	Guangxi Xinyi Photovoltaic Industry Co., Ltd. (XINYI)	Low iron AR coated semi-tempered glass
Glass	Wujiang CSG Glass Co., Ltd.	Low iron AR coated semi-tempered glass
Glass	Flat Glass Group Co., Ltd.	Low iron AR coated semi-tempered glass
Glass	BOROSIL RENEWABLES LTD	Low iron AR coated semi-tempered glass
Glass	Shannxi Topray Solar Co., Ltd	Low iron AR coated semi-tempered glass
Glass	Vishakha Glass Pvt Ltd	Low iron AR coated semi-tempered glass
Thickness [mm]:	Heat strength.: ☐ Yes / ☐ No	Coating: ☒ Yes / ☐ No
3.2	☒ Tempered ☐ Heat strengthened ☐ Annealed	Description
Structured: ☐ Yes / ☒ No	Certified: ☐ Yes / ☒ No	Standards:
Description	Certifier and Cert. No.	
Supplementary Information: N/A		
Single layer: ☐	Used as: ☐ Basic Insulation ☐ Reinforced Insulation	
Material:	Manufacturer:	Type:
Thickness [mm]	Thermal Index:	Material Group:
	☐ RTE °C ☐ TI °C ☐ RTI °C	☐ I ☐ II ☐ III
Colour:	Certified ☐ Yes / ☐ No	Standards:
	Certifier and Cert. No.	
Supplementary Information:		
Multi-layer ☐	Used as: ☐ Basic Insulation ☐ Reinforced Insulation	
Material:	Manufacturer:	Type:

IEC 61215-2		
Total Thickness [mm]:	No of layers:	
Layer No. 1 (air side)	Used as: ☐ Basic Insulation ☐ Reinforced Insulation	
Material:	Manufacturer:	Type:
Thickness [mm]	Thermal Index:	Material Group:
	☐ RTE °C ☐ TI °C ☐ RTI °C	☐ I ☐ II ☐ III
Colour:	Certified ☐ Yes / ☐ No	Standards:
	Certifier and Cert. No.	
Layer No. 2	Used as: ☐ Basic Insulation ☐ Reinforced Insulation	
Material:	Manufacturer:	Type:
Thickness [mm]	Thermal Index:	Material Group:
	☐ RTE °C ☐ TI °C ☐ RTI °C	☐ I ☐ II ☐ III
Colour:	Certified ☐ Yes / ☐ No	Standards:
	Certifier and Cert. No.	
Layer No. 3	Used as: ☐ Basic Insulation ☐ Reinforced Insulation	
Material:	Manufacturer:	Type:
Thickness [mm]	Thermal Index:	Material Group:
	☐ RTE °C ☐ TI °C ☐ RTI °C	☐ I ☐ II ☐ III
Colour:	Certified ☐ Yes / ☐ No	Standards:
	Certifier and Cert. No.	
Layer No. n (Encapsulation side)	Used as: ☐ Basic Insulation ☐ Reinforced Insulation	
Material:	Manufacturer:	Type:
Thickness [mm]	Thermal Index:	Material Group:
	☐ RTE °C ☐ TI °C ☐ RTI °C	☐ I ☐ II ☐ III
Colour:	Certified ☐ Yes / ☐ No	Standards:
	Certifier and Cert. No.	
Supplementary Information:		
Backsheet		
Used as: ☐ Basic Insulation ☒ Reinforced Insulation		
Material:	Manufacturer:	Type:
Glass		
Thickness [mm]:	Heat strength.: ☐ Yes / ☐ No	Coating: ☐ Yes / ☐ No
	☐ Tempered ☐ Heat strengthened ☐ Annealed	Description

IEC 61215-2		
Structured: ☐ Yes / ☐ No	Certified: ☐ Yes / ☐ No	Standards:
Description	Certifier and Cert. No.	
Supplementary Information:		
Single layer: ☐	Used as: ☐ Basic Insulation ☐ Reinforced Insulation	
Material:	Manufacturer:	Type:
Thickness [mm]	Thermal Index:	Material Group:
	☐ RTE °C	☐ I
	☐ TI °C	☐ II
	☐ RTI °C	☐ III
Colour:	Certified ☐ Yes / ☐ No	Standards:
	Certifier and Cert. No.	
Supplementary Information:		
Multi-layer ☒	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PVDF/PET/ Fluorine resin coating	Cybrid Technologies Inc.	Cynagard 465A(R)
Total Thickness [mm]:	No of layers:	
0.32	3	
Layer No. 1 (air side)	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PVDF	Cybrid Technologies Inc/Hangzhou Foremost Material Technology Co., Ltd.	HSMx-T/Solvan PV1010 20TG,
Thickness [mm]	Thermal Index:	Material Group:
0.020	☐ RTE °C	☐ I
	☐ TI °C	☐ II
	☒ RTI 120 °C	☐ III
		☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
TP	Certifier and Cert. No. TUV Rheinland R 50475642	2 PfG 1793/11.17
Layer No. 2	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
Polyester	Cybrid Technologies Inc.	SW-T,
Thickness [mm]	Thermal Index:	Material Group:
0.010	☐ RTE °C	☐ I
	☒ TI 120 °C	☐ II
	☐ RTI °C	☐ III
		☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
N/A	Certifier and Cert. No. TUV Rheinland R 50475642	2 PfG 1793/11.17
Layer No. 3	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PET	Jiangsu Yuxing Film Technology Co., Ltd.	CY25HT
Thickness [mm]	Thermal Index:	Material Group:
0.288	☐ RTE °C	☐ I
	☒ TI 120 °C	☐ II

IEC 61215-2		
	☐ RTI °C	☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
N/A	Certifier and Cert. No. TUV Rheinland R 50475642	2 PfG 1793/11.17
Layer No. 4(PV side)	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
Fluorine skin film	Cybrid Technologies Inc.	Cybrid-C
Thickness [mm]	Thermal Index:	Material Group:
0.004	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
TP	Certifier and Cert. No. TUV Rheinland R 50475642	IEC TS 62788-2: 2017/ 2 PfG 1793/11.17
Supplementary Information: For PIX MBHTB/ PIX MBHDTB series		
Multi-layer ☒	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PVDF/PET/ Fluorine resin coating	Cybrid Technologies Inc.	Cynagard 205A(R)
Total Thickness [mm]:	No of layers:	
0.22	3	
Layer No. 1 (air side)	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PVDF	Hangzhou Foremost Material Technology Co., Ltd.	SOLVAN PV1010
Thickness [mm]	Thermal Index:	Material Group:
0.020	☐ RTE °C ☐ TI °C ☒ RTI 120 °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
White/Black	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17
Layer No. 2	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PET	Sichuan Dongfang Insulating Material Co., Ltd.	DS10
Thickness [mm]	Thermal Index:	Material Group:
0.288	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
N/A	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17
Layer No. 3	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
Fluorine resin coating	Cybrid Technologies Inc.	Cybrid-C
Thickness [mm]	Thermal Index:	Material Group:

IEC 61215-2		
0.004	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
White/Black	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17
Supplementary Information: White- For PIX MPH/MPHD series, Black - For PIX MPH/MPHD series		
Backsheet		
Used as: ☐ Basic Insulation ☒ Reinforced Insulation		
Material:	Manufacturer:	Type:
Glass		
Thickness [mm]:	Heat strength.: ☐ Yes / ☐ No	Coating: ☐ Yes / ☐ No
	☐ Tempered ☐ Heat strengthened ☐ Annealed	Description
Structured: ☐ Yes / ☐ No	Certified: ☐ Yes / ☐ No	Standards:
Description	Certifier and Cert. No.	
Supplementary Information:		
Single layer: ☐	Used as: ☐ Basic Insulation ☐ Reinforced Insulation	
Material:	Manufacturer:	Type:
Thickness [mm]	Thermal Index:	Material Group:
	☐ RTE °C ☐ TI °C ☐ RTI °C	☐ I ☐ II ☐ III
Colour:	Certified ☐ Yes / ☐ No	Standards:
	Certifier and Cert. No.	
Supplementary Information:		
Multi-layer ☒	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
Polyvinylidene Fluoride (PVDF)/Polyethylene Terephthalate film (PET)/Polyethylene (PE)	COVEME SPA	dyMat Clr KL 50/285
Total Thickness [mm]:	No of layers:	
0.375	3	
Layer No. 1 (air side)	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PVDF	Hangzhou Foremost Material Technology Co., Ltd.	SOLVAN PV1010
Thickness [mm]	Thermal Index:	Material Group:
0.018	☐ RTE °C ☐ TI °C ☒ RTI 120 °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
Transparent	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17

IEC 61215-2		
Layer No. 2	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PU	COVEME Engineered Films Zhangjiagang Co., Ltd.	Coveme dyMat adhesive
Thickness [mm]	Thermal Index:	Material Group:
0.009	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
N/A	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17
Layer No. 3	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PET	Jaingsu Yuxing Film Zhangjiagang Co., Ltd.	CY25HT
Thickness [mm]	Thermal Index:	Material Group:
0.285	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
TP	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17
Layer No. 4	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PU	COVEME Engineered Films Zhangjiagang Co., Ltd.	Coveme dyMat adhesive
Thickness [mm]	Thermal Index:	Material Group:
0.009	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
N/A	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17
Layer No. 5(PV side)	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PE	COVEME Engineered Films Zhangjiagang Co., Ltd.	PE
Thickness [mm]	Thermal Index:	Material Group:
0.050	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
TP	Certifier and Cert. No. TUV Rheinland R 50475642	IEC TS 62788-2: 2017/ 2 PfG 1793/11.17
Supplementary Information: For PIX MBHTB series		
Multi-layer ☒	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:

IEC 61215-2		
Polyvinylidene Fluoride (PVDF)/Polyethylene Terephthalate film (PET)/Polyethylene (PE)	COVEME SPA	dyMat KL 50/285
Total Thickness [mm]:	No of layers:	
0.375	3	
Layer No. 1 (air side)	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PVDF	Hangzhou Foremost Material Technology Co., Ltd.	SOLVAN PV1010
Thickness [mm]	Thermal Index:	Material Group:
0.018	☐ RTE °C ☐ TI °C ☒ RTI 120 °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
White	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17
Layer No. 2	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PU	COVEME Engineered Films Zhangjiagang Co., Ltd.	Coveme dyMat adhesive
Thickness [mm]	Thermal Index:	Material Group:
0.009	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
N/A	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17
Layer No. 3	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PET	Jaingsu Yuxing Film Zhangjiagang Co., Ltd.	CY25HT
Thickness [mm]	Thermal Index:	Material Group:
0.285	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
TP	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17
Layer No. 4	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PU	COVEME Engineered Films Zhangjiagang Co., Ltd.	Coveme dyMat adhesive
Thickness [mm]	Thermal Index:	Material Group:
0.009	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A

IEC 61215-2		
Colour:	Certified ☒ Yes / ☐ No	Standards:
N/A	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17
Layer No. 5(PV side)	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PE	COVEME Engineered Films Zhangjiagang Co., Ltd.	PE
Thickness [mm]	Thermal Index:	Material Group:
0.050	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
White	Certifier and Cert. No. TUV Rheinland R 50475642	IEC TS 62788-2: 2017/ 2 PfG 1793/11.17
Supplementary Information: For PIX MPH series		
Multi-layer ☒	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
Polyvinylidene Fluoride (PVDF)/Polyethylene Terephthalate film (PET)/Polyethylene (PE)	COVEME SPA	dyMat BK KL 50/285 BK
Total Thickness [mm]:	No of layers:	
0.375	3	
Layer No. 1 (air side)	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PVDF	Hangzhou Foremost Material Technology Co., Ltd.	SOLVAN PV1010
Thickness [mm]	Thermal Index:	Material Group:
0.018	☐ RTE °C ☐ TI °C ☒ RTI 120 °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
Black	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17
Layer No. 2	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PU	COVEME Engineered Films Zhangjiagang Co., Ltd.	Coveme dyMat adhesive
Thickness [mm]	Thermal Index:	Material Group:
0.009	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
N/A	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17
Layer No. 3	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PET	Jaingsu Yuxing Film	CY25HT

IEC 61215-2		
	Zhangjiagang Co., Ltd.	
Thickness [mm]	Thermal Index:	Material Group:
0.285	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
TP	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17
Layer No. 4	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PU	COVEME Engineered Films Zhangjiagang Co., Ltd.	Coveme dyMat adhesive
Thickness [mm]	Thermal Index:	Material Group:
0.009	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
N/A	Certifier and Cert. No. TUV Rheinland R 50411794	2 PfG 1793/11.17
Layer No. 5(PV side)	Used as: ☐ Basic Insulation ☒ Reinforced Insulation	
Material:	Manufacturer:	Type:
PE	COVEME Engineered Films Zhangjiagang Co., Ltd.	PE
Thickness [mm]	Thermal Index:	Material Group:
0.050	☐ RTE °C ☒ TI 120 °C ☐ RTI °C	☐ I ☐ II ☐ III ☒ N/A
Colour:	Certified ☒ Yes / ☐ No	Standards:
Black	Certifier and Cert. No. TUV Rheinland R 50475642	IEC TS 62788-2: 2017/ 2 PfG 1793/11.17
Supplementary Information: For PIX MPH series		
5.3.7 Insulation barriers / Edge sealant		
Used as: ☐ Functional ☐ Basic Insulation ☐ Reinforced Insulation		
Total Dimensions (width x length) [mm]:		
Material:	Manufacturer:	Type:
N/A	N/A	N/A
Thickness [mm]	Thermal Index:	Material Group:
N/A	☐ RTE °C ☐ TI °C ☐ RTI °C	☐ I ☐ II ☐ III
Colour:	Certified ☐ Yes / ☐ No	Standards:
N/A	Certifier and Cert. No.	
Supplementary Information: N/A		
5.3.9 Encapsulants		
Used as: ☐ Basic Insulation ☐ Reinforced Insulation ☒ N/A		
Total Dimensions (width x length) [mm]:		
Material: (Frontsheet side)	Manufacturer:	Type:
Ethylene Vinyl Acetate (EVA)	PIXON GREEN ENERGY	PIX Fast Cure

IEC 61215-2

Ethylene Vinyl Acetate (EVA)	PRIVATE LIMITED Hangzhou First APPLIED Material Co.,Ltd	F406PS
Thickness [mm] 0.55±0.10	Thermal Index: ☐ RTE °C ☐ TI °C ☒ RTI 50 °C	Material Group: ☐ I ☐ II ☐ III
Colour: NC	Certified ☒ Yes / ☐ No Certifier and Cert. No. UL LLC, E526148	Standards: UL 746 series
NC	Certifier and Cert. No. UL LLC, E526148	UL 746 series
Material: (Backsheet side) Ethylene Vinyl Acetate (EVA)	Manufacturer: PIXON GREEN ENERGY PRIVATE LIMITED	Type: PIX Fast Cure
Ethylene Vinyl Acetate (EVA)	Hangzhou First APPLIED Material Co.,Ltd	F806PS
Thickness [mm] 0.55±0.10	Thermal Index: ☐ RTE °C ☐ TI °C ☒ RTI 50 °C	Material Group: ☐ I ☐ II ☐ III
Colour: NC	Certified ☐ Yes / ☐ No Certifier and Cert. No. UL LLC, E526148	Standards: UL 746 series
NC	Certifier and Cert. No. UL LLC, E526148	UL 746 series
Supplementary Information: N/A		

5.5.2.3 Polymeric materials used as electrical insulation

Location: Junction box potting		
Application ☐ External part ☒ Support of live parts ☐ Mechanical functions		
Used as: ☐ Functional ☐ Basic Insulation ☒ Reinforced Insulation		
Material: Silicon RTV	Manufacturer: Tonsan Adhesive Inc	Type: 1521
Flammability class: V-0		
Thickness [mm] > 3.0	Thermal Index: ☐ RTE °C ☐ TI °C ☒ RTI 105 °C	Material Group: ☒ I ☐ II ☐ III
Colour: White/Black	Certified ☒ Yes / ☐ No Certifier and Cert. No. UL LLC, E253998	Standards: UL 746 series
Supplementary Information: N/A		
Location: Junction box potting		
Application ☐ External part ☒ Support of live parts ☐ Mechanical functions		
Used as: ☐ Functional ☐ Basic Insulation ☒ Reinforced Insulation		
Material: Silicon RTV	Manufacturer: Adarsha Specialty Chemicals Pvt Ltd	Type: ADSIL JB 597
Flammability class: V-0		
Thickness [mm]	Thermal Index:	Material Group:

IEC 61215-2

> 3.0	☐ RTE °C ☐ TI °C ☒ RTI 105 °C	☒ I ☐ II ☐ III
Colour:	Certified ☒ Yes / ☐ No	Standards:
White/Black	Certifier and Cert. No. UL LLC, E529923	UL 746 series
Supplementary Information: N/A		

5.3.10 Bypass Diodes

Manufacturer:	Type:	Type:
Zhejiang Zhonghuan Sunter PV technology private Limited	40SQ045	
SMC Diode Solutions		DS5045T
Nominal current of diode I _F (A)	40	50
R _{THJ-C} (K/W) / R _{THJ-L} (K/W)	1.5 (case)	1.5 (case)
Max. T _J (°C)	200	200
Max. V _F at I _F (V)	0.55 (T _J = 25°C)	0.52 (T _J = 25°C)
Supplementary Information: N/A		

5.4.2 / 5.4.4 Screws

Application	Kind of screw:	Dimensions (diameter/length)	Material
N/A	N/A	N/A	N/A
Supplementary Information: N/A			

5.4.3 Rivets

Application	Dimensions (diameter/length)	Material:
N/A	N/A	N/A
Supplementary Information: N/A		

5.4.6 Adhesives

For Junction Boxes		
Manufacturer:	Type:	
Tonsan Adhesive Inc	1527	
Manufactured by: Adarsha Specialty Chemicals Pvt Ltd	Adsil PV 555	
Additional function as: ☐ Basic Insulation ☐ Reinforced Insulation ☐ N/A		
Thickness [mm]	Thermal Index:	Material Group:
N/A	☐ RTE °C ☐ TI °C ☒ RTI 105 °C	☐ I ☐ II ☐ III
Supplementary Information: N/A		
For Frames / Backrails		
Additional function as: ☐ Basic Insulation ☐ Reinforced Insulation ☒ N/A		
Manufacturer:	Type:	
Tonsan Adhesive Inc	1527	
Manufactured by: Adarsha Specialty Chemicals Pvt Ltd	Adsil PV 555	
Additional function as: ☐ Basic Insulation ☐ Reinforced Insulation ☒ N/A		
Thickness [mm]	Thermal Index:	Material Group:

IEC 61215-2

N/A	☐ RTE	°C	☐ I
	☐ TI	°C	☐ II
	☒ RTI	105 °C	☐ III

Supplementary Information:

5.5.3 Metallic Materials

Frame / Corner joint / Backrail:

Manufacturer:	Type:	Dimension
JIANGSU YUEJIA METALLIC TECHNOLOGY CO., LTD	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
Akcome Metals Technology(Nantong) Co., Ltd	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
Jiangsu Akcome Science & Technology Co.,Ltd.	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
Jiangsu Sulv New Material Technology Co., Ltd.	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
Jiangyin Haihong New Energy Technology Co., Ltd.	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
MUM GROUP CO., LTD -- Tianqu Aluminium	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
Jiangyin Yuanshuo Metal Technology Co.,Ltd	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
Jiangyin Tinze New Energy Technology Co., Ltd	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
Vinitech Metal Pvt. Ltd.	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
Jiangyin Tianmu Green Energy Technology Co.,Ltd	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
Jiangyin Optimal Metal Technology Co., Ltd	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
Jiangyin Yuanshuo Metal Technology Co Ltd	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
M/s. Jiangyin Enor New Material Tec	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
Dharmik Metal	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
wuxi growell technology co. ltd.	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT
Vishakha Renewables Pvt. Ltd	6063T6	35mm x 33mm - LONG, 35mm x 18mm - SHORT

Supplementary Information: Frame rails are crimped to the corner piece on the inner side of the frame. Frame for one PV module is made of two end rails, two side rails and 4 corner pieces.

Others: N/A

Manufacturer:	Type:	Dimension
N/A	N/A	N/A

Supplementary Information: N/A

Cell		
Kind of cell	Manufacturer:	Type:
☒ cSi ☐ CdTe ☐ aSi ☐ CiGs	Tongwei Solar (Meishan) Co.,Ltd.	M210CBPERCBP MONO PERC BIFACIAL
Thickness [μm]:	Dimension [mm]:	Number of busbars:
180±20	210mm x 105mm±0. 25mm	12

IEC 61215-2

Kind of cell	Manufacturer:	Type:
■ cSi □ CdTe □ aSi □ CiGs	Tongwei Solar Co., Ltd	Tongwei Solar M182ABPERCBP
Thickness [μm]:	Dimension [mm]:	Number of busbars:
175±17.5	91mm x 182mm±0.5mm	10
Kind of cell	Manufacturer:	Type:
■ cSi □ CdTe □ aSi □ CiGs	Jupiter International Limited	182x182 MM-10BB, MONO PERC, Model: 182
Thickness [μm]:	Dimension [mm]:	Number of busbars:
175±17.5	91mm x 182mm±0.5mm	10
Kind of cell	Manufacturer:	Type:
■ cSi □ CdTe □ aSi □ CiGs	Tongwei Solar (Chengdu)Co.,Ltd	TONGWEI SOLAR MONO- CRYSTALLINE M1669BPERCBP SE SOLAR CELL
Thickness [μm]:	Dimension [mm]:	Number of busbars:
190±30	83mm x 166mm±0.3mm	9
Kind of cell	Manufacturer:	Type:
■ cSi □ CdTe □ aSi □ CiGs	Zhejiang Aiko Solar Energy Technology Co., Ltd. (AIKOSOLAR)	MC182-10BB-144F Bifacial PERC Solar cell
Thickness [μm]:	Dimension [mm]:	Number of busbars:
185±18.5	91mm x 182mm±0.5mm	10
Kind of cell	Manufacturer:	Type:
■ cSi □ CdTe □ aSi □ CiGs	Jiangsu Longheng new energy Co., Ltd (Solar Space)	182 Monocrystalline, Bifacial PERC Solar Cell
Thickness [μm]:	Dimension [mm]:	Number of busbars:
175±17.5	91mm x 182mm±0.5mm	10
Supplementary Information: Refer material combinations in General product information section		

Cell fixing Tape						
No.	Material	Manufacturer	Type		Ratings	
1	Anti-UV PET Tape UV-1	3M India Limited	3M		Thickness: 0.05 mm	
2	PET	Shanghai Yanger technologies	PET film 0.058		Thickness: 0.05 mm	

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

Annex 2: Test table for verifying other alternative stabilization procedure

Step 1: Alternative stabilization									N/A
Test Date (YYYY-MM-DD) start/end:									—
Test method description:									—
	Sample	Sample	Sample						—
Power before alternative stabilization (W)									—
Power after alternative stabilization (W)									—
Supplementary information:									
Step 2: Light exposure									N/A
☐ Solar simulator ☐ Natural sunlight									
Sample		Test Date (YYYY-MM-DD) start/end.....:							
Test cycle	Light source	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)	
Initial	—	—	—	—	—		—	—	
1							—	—	
2									
Supplementary information: N/A									
Sample		Test Date (YYYY-MM-DD) start/end.....:							
Test cycle	Light source	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)	
Initial	—	—	—	—	—		—	—	
1							—	—	
2									
Supplementary information: N/A									
Sample		Test Date (YYYY-MM-DD) start/end.....:							
Test cycle	Light source	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)	
Initial	—	—	—	—	—		—	—	
1							—	—	
2									
Supplementary information: N/A									

IEC 61215-2				
Clause	Requirement + Test	Result - Remark		Verdict
Step 3: Stabilization determination				N/A
	Sample	Sample	Sample	Result
Stable power $P_{\max 1}$ after alternative stabilization (W)				
Stable power $P_{\max 2}$ after light exposure (W)				
Power change $P_{\max 2}$ to $P_{\max 1}$ (%)				
Allowed power change $P_{\max 2}$ to $P_{\max 1}$ (%)				
Is alternative stabilization method valid? (Yes/No)				
Supplementary information: N/A				

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

Annex 3: Lower and higher output power modules

TABLE A.4.1 Performance at STC before initial stabilization (Front side)							N/A
Test Date [YYYY-MM-DD].....:							—
Test method.....:				☐ Solar simulator ☐ Natural sunlight			—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
Low 1							N/A
Low 2							N/A
High 1							N/A
High 2							N/A
Supplementary information: The limit value is calculated through considering the tolerance of rated label values and lab measurement uncertainty.							

TABLE A.4.2 Performance at STC before initial stabilization (Back side)							N/A
Test Date [YYYY-MM-DD].....:							—
Test method.....:				☐ Solar simulator ☐ Natural sunlight			—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
Low 1							N/A
Low 2							N/A
High 1							N/A
High 2							N/A
Supplementary information: The limit value is calculated through considering the tolerance of rated label values and lab measurement uncertainty.							

TABLE A.4.3 Performance at BNPI before initial stabilization							N/A
Test Date [YYYY-MM-DD].....:							—
Test method.....:				☐ Solar simulator ☐ Natural sunlight			—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
Low 1							N/A
Low 2							N/A
High 1							N/A
High 2							N/A
Supplementary information: The limit value is calculated through considering the tolerance of rated label values and lab measurement uncertainty.							

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE A.4.4: MQT 19.1 ini: Initial Stabilization procedure							N/A
Light exposure method				☐ Solar simulator	☐ Natural sunlight		
Stabilization criterion x per IEC 61215-1-x :							—
Sample #	Low 1	Test Date (YYYY-MM-DD) start/end					
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—		—	—
1							
2							
3							
4						—	—
Sample #	Low 2	Test Date (YYYY-MM-DD) start/end					
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—		—	—
1							
2							
3							
4						—	—
Sample #	High 1	Test Date (YYYY-MM-DD) start/end					
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—		—	—
1							
2							
3							
4						—	—
Sample #	High 2	Test Date (YYYY-MM-DD) start/end					
Test cycle	Integrated irradiation (kWh/m ²)	Irradiance (W/m ²)	Module temperature (°C)	Resistive load	P _{max} (W) at the end of cycle	(P _{max} – P _{min}) / P _{average} (%)	Stable (Yes/No)
Initial	—	—	—	—		—	—
1							

IEC 61215-2							
Clause	Requirement + Test				Result - Remark		Verdict
2							
3							
4						—	—
Supplementary information: N/A							
☐ Other stabilization procedures							
Sample #	Test Date (YYYY-MM-DD) start/end						
Low 1							
Low 2							
High 1							
High 2							
Test method description: N/A							
Supplementary information: N/A							

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE A.4.7: MQT 6.1 Performance at STC after initial stabilization (Front side)							N/A
Test Date [YYYY-MM-DD]..... :							—
			Lower end power class		Higher end power class		—
$P_{\max}(\text{lab})$ (W) :			$\leq$ _____	$\geq$ _____	$\geq$ _____.		—
$\bar{P}_{\max}(\text{lab})$ (W) :			$\geq$ _____.		$\geq$ _____.		—
$P_{\max4}(\text{la})$ (W) :							
$V_{\text{oc}}(\text{lab})$ (V) :			$\leq$ _____.		$\leq$ _____.		—
$I_{\text{sc}}(\text{lab})$ (A) :			$\leq$ _____.		$\leq$ _____.		—
Test method..... :			☐ Solar simulator ☐ Natural sunlight				—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	$P_{\max}$ [W]	FF [%]	Result
Low 1							N/A
Low 2							N/A
High 1							N/A
High 2							N/A
Supplementary information: The limit value is calculated through considering the tolerance of rated label values and lab measurement uncertainty.							

TABLE A.4.8: MQT 6.1 Performance at STC after initial stabilization (Back side)							N/A
Test Date [YYYY-MM-DD]..... :							—
		Lower end power class		Higher end power class			—
$P_{\max}(\text{lab})$ (W) :		$\leq$ _____	$\geq$ _____	$\geq$ _____			—
$\bar{P}_{\max}(\text{lab})$ (W) :		$\geq$ _____		$\geq$ _____			—
$V_{\text{oc}}(\text{lab})$ (V) :		$\leq$ _____		$\leq$ _____			—
$I_{\text{sc}}(\text{lab})$ (A) :		$\leq$ _____		$\leq$ _____			—
Test method.....:		☐ Solar simulator ☐ Natural sunlight					—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	P_{max} [W]	FF [%]	Result
Low 1							N/A
Low 2							N/A
High 1							N/A
High 2							N/A
Supplementary information: The limit value is calculated through considering the tolerance of rated label values and lab measurement uncertainty.							

IEC 61215-2			
Clause	Requirement + Test	Result - Remark	Verdict

TABLE A.4.9: MQT 6.1 Performance at BNPI after initial stabilization							N/A
Test Date [YYYY-MM-DD]..... :							—
				Lower end power class		Higher end power class	—
$P_{\max}(\text{lab})$ (W)				$\leq$ _____,	$\geq$ _____	$\geq$ _____,	—
$\bar{P}_{\max}(\text{lab})$ (W)				$\geq$ _____,		$\geq$ _____,	—
$V_{\text{oc}}(\text{lab})$ (V)				$\leq$ _____,		$\leq$ _____,	—
$I_{\text{sc}}(\text{lab})$ (A)				$\leq$ _____,		$\leq$ _____,	—
Test method..... :				☐ Solar simulator ☐ Natural sunlight			—
Sample #	I_{sc} [A]	V_{oc} [V]	I_{mp} [A]	V_{mp} [V]	$P_{\max}$ [W]	FF [%]	Result
Low 1							N/A
Low 2							N/A
High 1							N/A
High 2							N/A
Supplementary information: The limit value is calculated through considering the tolerance of rated label values and lab measurement uncertainty.							

IEC 61215-2**Annex 4: List of measurement equipment**

A completed list of used test equipment shall be provided in the Test Reports when a Manufacturer Testing Laboratory according to CTF stage 1 or CTF stage 2 procedure has been used.

Note: This page may be removed when CTF stage 1 or CTF stage 2 are not used. See also clause 4.8 in OD 2020 for more details.

Clause	Measurement / testing	Testing / measuring equipment / material used, (Equipment ID)	Range used	Last Calibration date	Calibration due date
N/A	N/A	N/A	N/A	N/A	N/A

IEC 61215-2**Statement of Measurement Uncertainty**

The Test Report shall include a statement concerning the uncertainty of the measurement systems used for the tests conducted when it is required by the standard, client or other authorities.

In such cases, the table below is to be used for reporting the Uncertainty in Measurement.

This page may be removed from the final Test Report when not required. See also clause 4.8 in OD 2020 for more details.

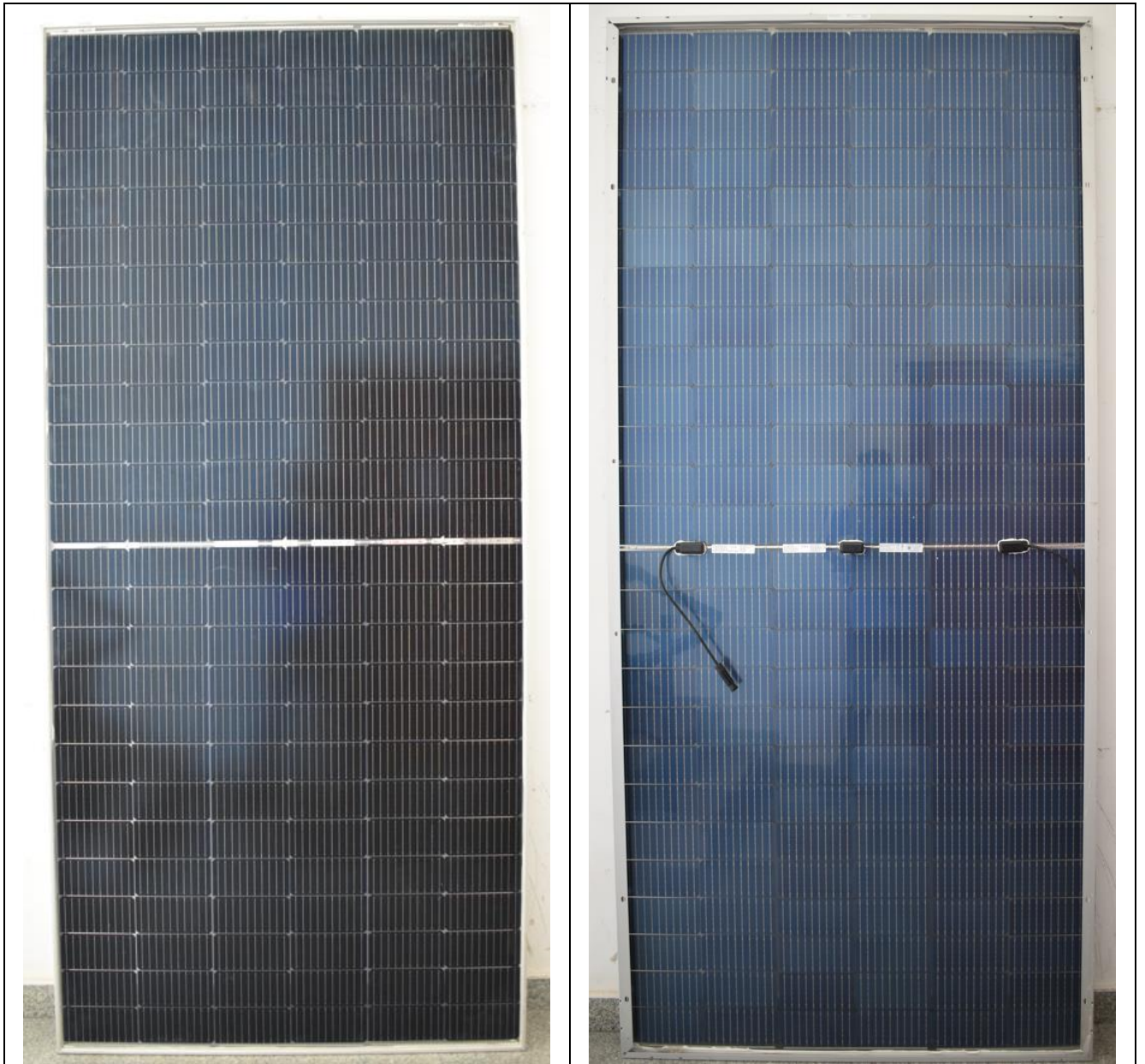
Clause #	Parameter/ Measurement / test method	Requirement % or k	Calculated U of M*
N/A	N/A	N/A	N/A

*Note: Calculations leading to the reported value are on file with the NCB

Annex 5:

Type	Supplement Id	Description
Photographs	1-01	Front & Rear View of test module (Model: PIX MBHTB 156 575)
Photographs	1-02	Front View of Junction box & Connector
Documents	2-01	Installation manual
Datasheets	3-01	Cell

1-01 Front & Rear View of module



1-02 Front View of Junction box & Connector



2-01 installation manual



SOLAR MODULES
SOLAR ROOFTOP
EPC SOLUTIONS



INDEX

	01	Introduction
	02	Disclaimer of Liability
	03	Laws & Regulations
		General Information & Safety
		• Module Identification
		• PV Module Unloading, Storage and Unpacking
	04	• Operation Safety
		• Installation Safety
		• Fire Safety
		• Electrical Performance Safety
		Environmental Considerations
	05	5.1 Climate Conditions
		5.2 Stability of Structure
		5.3 Site Selection
		5.4 Tilt angle Selection
		Mounting Installation
		6.1 Important Instructions for Mounting
	06	6.2 mounting
		Methods Bolt
		Type
		6.3 PV Module Grounding
		6.4 Electrical Wiring
		6.5 Cables & Connectors
		6.6 Bypass Diodes
	07	Electrical and Mechanical Parameters
	08	Electrical Configuration
		8.1 Fuse Rating
		8.2 Selection of Inverter and compatibility
	09	PV Module Maintenance and care
		9.1 Visual Inspection
		9.2 Cleaning
		9.3 Inspection of Connector and Cable
	10	Warning
	11	Contact Details
	12	Annexure

Solar is the new Green!





1. INTRODUCTION

Thank you for choosing **Pixon Green Energy Private Limited (PGEPL)** Solar PV modules.

This manual contains information regarding handling, storage, installation, operation, maintenance and safety in dealing with the PGEPL photovoltaic modules. Before installation or using the PGEPL PV modules, it is must to read this manual and understand The instructions carefully.

2. DISCLAIMER OF LIABILITY

This Installation Manual is applicable for Pixon Green Energy Private Limited (PGEPL) PV Modules.

- This manual is for authorized & trained users only. PGEPL is not responsible for any type of mishandling or failure to follow instruction manual. Any type of Loss, Damage, Hazard, Injury or Expense because of improper installation, handling, usage and maintenance is not in scope of PGEPL.
- PGEPL assumes no responsibility for the infringement of intellectual property rights or other rights of third parties that may result from use of the module. No license is granted in this regard, either in expression or implicitly, or under any patent rights.
- Information contained in this Instruction Manual is based on PGEPL information and expertise. This manual and specification can be changed by the company without giving any prior notice or information.

3. LAWS & REGULATIONS

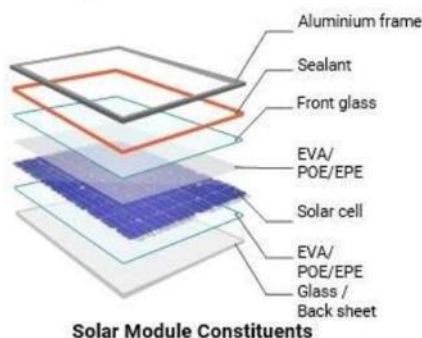
Mechanical and electrical installation of PV modules shall follow proper regulations such as electric law, building law and electrical-connection requirements. These regulations vary with different installation sites, such as building roof, ground mounted installation, vehicle-mounted application and the place of locality based on city and country. Requirements may also vary with DC or AC System and different installation system voltage. Please contact local authorities for specific clauses in terms of laws and regulations

4. GENERAL INFORMATION & SAFETY

• Module Identifications:

Each module is pasted with labels providing information below:

- **Name Plate:** It describes Product Type, Standard Rated Power, Rated Current, Rated Voltage, Open Circuit Voltage, Short Circuit current under testing conditions, Certification Indicator, Maximum System Voltage etc.
 - **Current Level Label:** It describes modules according to their optimal working current.
- Serial No: Each module has a unique serial number which is solidified inside the module permanently and it can be seen from front top of the module. Each serial number is put in before laminating of the module. In addition, you can find the same serial number on the module name plate



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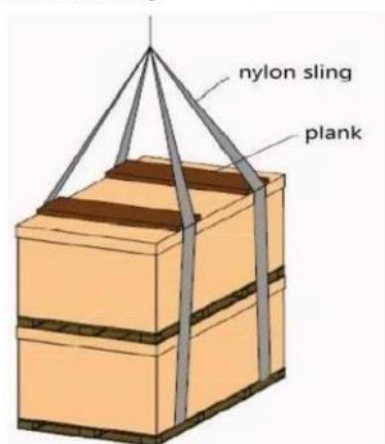
- **PV module unloading, storage and unpacking:**

Modules are fragile electronics which need immense care even while they lay in storage. The unpacking of the modules also needs substantial care and concern. Follow the PV module storage and unpacking instructions as listed below:

- **Module Unloading:**

1. In order to minimize the impact of sling on the safety of goods in the process of hoisting, the module without frame should be supported during loading and unloading. For example wooden stick, boards or other fixture of the same width as the outer packing case should be used on the upper part of the box to reduce the pressure of the contact position on the box.
2. Upon arrival of the modules, please check the packaging box is in good condition, and check whether the module type and quantity on the outer packaging are consistent with the delivery order, if anything is wrong, please contact Pixon Solar logistics and sales staff immediately.

Crane unloading



Note: Without Plank Crane unloading not allowed

When crane is used to unload the modules, please choose and use specialized tooling according to the weight and size of the module. Please adjust the position of the sling to keep the modules steady. To ensure the safety of the module, wooden sticks, boards or other fixtures of the same width as the outer packing cases should be used on the upper part of the box to prevent the sling from squeezing the pallet and damaging the modules. When placing the modules, do not lower the packing box too quickly and put it on a flat ground. For vertically landscape packages, do not lift up more than TWO pallets of modules at once; for vertically portrait packages, do not lift up more than ONE pallet of modules at once. Do not unload modules under the weather conditions of wind more than 6 class (in Beaufort scale), heavy rain or heavy snow.

Forklift unloading

1. Please choose a suitable forklift according to weight.
2. The fork should go into the pallet at least 3/4 of the pallet depth during unloading.
3. Drive slowly and do not allow forks to hit the cartons or pallets.
4. It is recommended to operate the forklift from the Aluminium frame side of the module and not touch the glass side. If the operation must be carried out on the glass side, please place buffer protection material in advance to prevent the inside modules being damaged due to the external force.
5. It is recommended to extend the height or width of the forklift backrest so that the force is distributed on the modules' aluminium frame.

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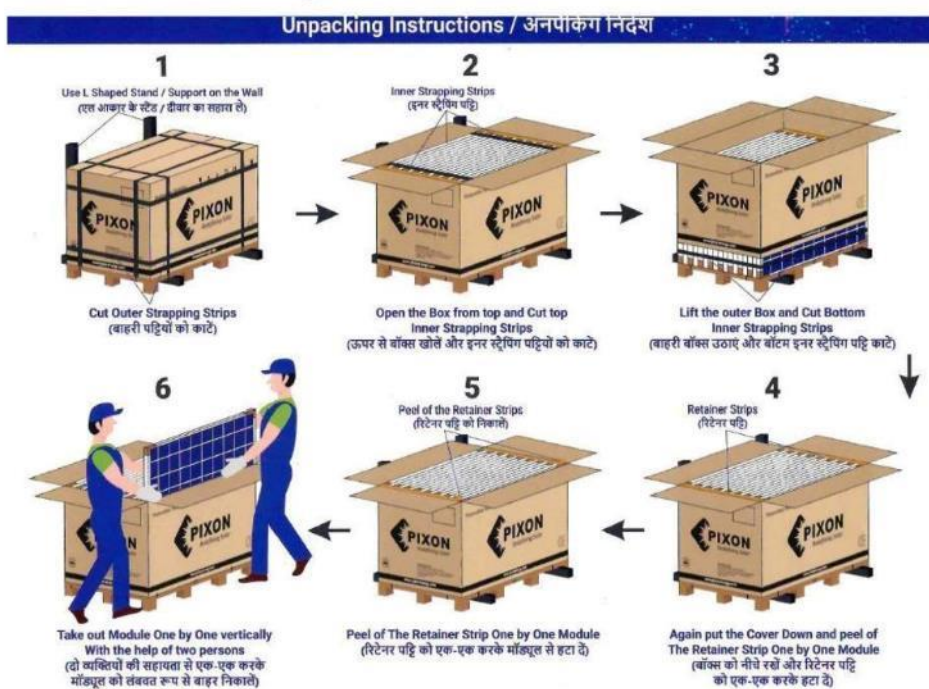
• **Storage Location Guidelines:**

1. Don't Store Pallets on Uneven surface
2. Don't remove the original package and keep the wrapping film and carton box in a good condition, if the modules require long-distance transport or long-term storage.
3. In rainy weather, please fully cover the modules and pallets with a rain protection and take moisture-proof
4. Measures on pallets and cartons to prevent collapse and moisture ingress.



1. Don't allow unauthorized persons to access the module storage area.
2. Don't leave modules unsupported or unsecured.
3. Don't stack modules on the project site

• **Module unboxing method:**



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✓ DO'					
1. Check your order specification.	2. Store in dry ventilated place.	3. Handle a module by 2 persons Only (from edges).	4. Wear safety gloves to avoid injury.	5. Open PGEPL packing carton following the unpacking manual instructions.	6. Storage area should have well-established fire-system.
✗ DONT'					
			1. Lift module by junction box or cables. 2. Remove name-plate of module or its parts. The warranty would go void in such case. 6. Keep or use flammable objects near module storage.		
1. Stack more than 2 high.	2. Damage packaging.	3. Drop or stack 1 module on another.			

• Operation safety:

Solar module is a high voltage producing electronic. Thus, it is important to be familiar with the general PV operation safety rules to minimize your risk of injury due to accidental electric shock or other physical harm.

✓ DO'		✗ DONT'	
1. Handle panels objects using fork-lift truck surface,	2. Be careful in placing	1. Put heavy modules on a or drop anything	2. Paint module surface or apply glue.
		3. Drill frame of modules. It can reduce Frame loading capacity.	4. Damage, grad or scratch the back film of modules. It can lead to frame corrosion.

• Installation safety:

Solar module is a high voltage producing electronic. On direct exposure to sunlight, it can produce electricity whether it is loaded or not. Thus, there is no main switch to put off this electricity and one should handle modules with care.

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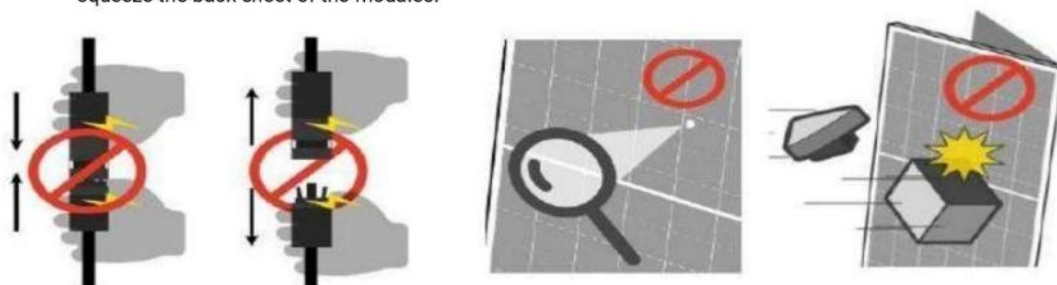
✓ DO'S

 1. Wear safety clothing	 2. Must use insulated that fit	 3. Carry installation	 4. Modules should	 5. Only a qualified/certified	 6. Follow "top-to-bottom" or
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✗ DONT'S

 1. Touch junction box or cable connector ends With bare hands.	 2. Install or handle any PV modules in unfavourable weather conditions like rains, snow, storms Or even a windy day.	 3. Install modules where flammable gases are present.	 4. Let artificial sunlight focus on PV modules.	 5. Use sharp objects to wipe glass or rear Cover.	 6. Use different specification modules in Same array system.
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1. Always wear protective head gear, insulating gloves and safety shoes (with rubber soles) and other protective measures during installation.
2. When installing or maintaining the photovoltaic system, please do not wear metal rings, watches and other metal products, so as not to cause electric shock danger and damage the modules.
3. Keep the PV module packed in the carton until installation. Once the modules are removed from the packing box, they should be installed and connected to the bus box in time. If they are not installed immediately, protective measures (such as adding rubber joint cover, etc.) should be taken on the connection head.
4. Do not touch the PV module unnecessarily during installation. The glass surface and the frame may be hot. There is a risk of burns and electric shock.
5. Do not work in rain, snow or windy conditions.
6. Due to the risk of electrical shock, do not perform any work if the terminals of the PV module are wet to Avoid Shock Hazard)
7. Use insulated tools and do not use wet tools During Installation & Commissioning.
8. When installing PV modules, do not drop any objects over PV module to prevent from micro crack and Damage.
9. Make sure flammable gasses are not generated or present near the installation site.
10. Insert module connectors fully and correctly. An audible "click" sound should be heard. This sounds confirms the connectors are fully seated. Check all connections (MC4 connectors should be connected properly. An audible "click" sound should be heard. This sounds confirms the connectors are connected properly.
11. Connect the male and female connectors correctly, check the wiring condition, all wires shall not be separated from the modules, and secure the wires with cable ties so that the wires do not scratch or squeeze the back sheet of the modules.



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1. Do not touch the junction box and the end of the interconnected cables (connectors) with bare hands during installation or under sunlight, irrespective of the PV module are connected to or disconnected from the system.
2. All MC4/H4 disconnection should be done with MC4 Spanner Wrench Tool Only.
3. The junction box must be protected from direct sunlight and water. The connector must meet the IP68 standard after being connected. However, it is not recommended to use the connector under water for a long time.
4. Do not expose to artificially concentrate sunlight on the PV module.
5. Do not expose the PV module to excessive loads on the surface of the PV module or twist the frame.
6. Do not hit or put excessive load on the glass or back sheet, this may break the cells or cause micro cracks.
7. During the installation or operation, don't use sharp tools to wipe the back sheet and glass. Scratches can appear on the module.
8. Do not drill holes in the frame. It may cause corrosion on the frame.
9. When installing modules on roof mounted structures, please try to follow the "from top to bottom" and/or "from left to right" principle, and don't step on the module. This will damage the module and would be dangerous for personal safety.
10. Modules will have thermal expansion and cold contraction effect. When installing, the interval between two adjacent conventional modules is recommended > 10mm. If there are special requirements subject to PGEPL approvals.
11. If glass breaks due to any reason, it is advised to keep away from human contact. At ambient wet condition any human contact with the broken glass surface may lead to electrical shocks. Once module glass breaks it has to be scrapped or disposed after removing it from string after string is disconnected from the load
12. It is recommended to cover the front side of the solar panel (and also the backside in case of bifacial modules) with an opaque cover during installation and handling of the solar panels.

• Fire safety:

The solar system is subject to fire hazards due to electricity and loose circuits. PV modules may continue to produce a dangerous voltage, even if they have been disconnected from the inverter, have been partly or entirely destroyed, or the system wiring has been compromised or destroyed. Consider following aspects to ensure the fire safety precautions.

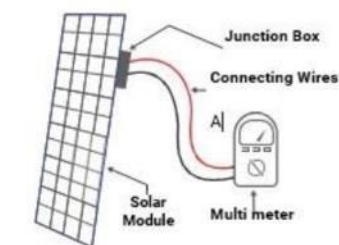


NOTE

1. PGEPL PV Modules (for modules under UL spec) have a Type 4 fire resistance rating in accordance with UL 61730 certification
2. The fire rating of provided PV module is valid only when mounted in manner

• Electrical Performance Safety:

As discussed earlier, PV Modules can produce DC current under illumination and do not have a switch. Thus, it is mandatory to handle it with substantial care considering the electrical safety and precautions listed further:



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✓ DO'			✗ DONT'		
1. Use installation insulated tools.	2. Wear rubber gloves And other safety Accessories.	3. Keep module surface covered by cloth, hard-Board or light-proof material when not in use.	1. Bring metal in contact with module's Connection wires.	2. Break down electrical connections in loaded conditions. It can lead to Electric arc or shock.	3. Deal with modules or its connectors when they are wet.

5. Environmental Considerations:

• Climate Conditions:

All the PGEPL Solar modules qualify Application Class A and are tested for following:

IS 14286, IS/IEC 61730 - 1 & 2 Design / Type & Safety	IEC 62759 - 1 Transportation Test	UL 61730 - 1 & 2, 1730 Standard for Safety	IEC 60904 - 1 & 7 Calibration	IEC 62716 Ammonia Test
IEC EE CB SCHEME 61215, 61730 - 1 & 2 (2016) Design for safety Test	IEC 61701 Salt Mist Test	IEC 61853 - 1 Power Rating Standard	IEC 60068 - 2 -68 Sand & Dust Test	IEC 62804 PID

• Operation Range:

Ambient temperature	-40°C to +50°C.
Operating temperature	-40°C to +85°C.
Storage temperature:	-20°C to +50°C.
Humidity	≤85%
Design Load	Front: +3600Pa and Rear : 1600 Pa
Safety	>1.5
Mechanical Load Pressure	5400Pa (112.8lb/ft2) from front and 2400 from the rear (50.12lb/ ft2).

• Stability Of Structure :

- Structure matching the mounting hole-pitch of different types of modules is used to survive the load required and fatigue of the outdoor application. The structure should be coated to survive in external environment till lifecycle of PV module of 30 Years. Please consult the PGEPL technical support department for more information on the use of modules in special climates, such as an altitude greater than 2000 m.
- NOTE: The mechanical load bearing capacity depends upon the installer's mounting methods and failure to follow the instructions in this manual may result in variations to withstand snow and wind loads. The system installer should ensure that the installation methods used meet these requirements as well as any local codes and regulations pertaining to their locality and country.

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• **Site Selection:**

1. PV modules should be installed in a place where no shading occurs throughout the year. Front and rear shading can be minimized by ensuring that the distance between an obstruction and the solar array is more than three times the height of the obstruction.
2. Solar modules have a Type 4 fire resistance rating in accordance with UL 61730 certification. The fire rating of the module is valid only when mounted in the manner specified in the mechanical mounting instructions in this manual. Rooftop installations should be placed over fire resistant roof coverings only. Roof constructions and installations may affect the fire safety of a building, and improper installation may create hazards in the event of a fire.
3. To maintain the fire Type 4 minimum slope of 5 inch/feet is necessary when mounting on a roof in order to ensure the Type 4 fire rating of the modules.
4. To gain better output from rear side from Bifacial modules prefer Albedo table while installing PV modules

Surface type	Typical Value	Surface type	Typical Value	Surface type	Typical Value
Fresh asphalt	0.03 - 0.04	Bare Soil	0.17	Snow	0.4-0.9
Sand	0.15 - 0.18	Green Grass	0.20-0.25	Fresh snow	0.8-0.9
Agriculture Crop	0.18 - 0.25	Desert Sand	0.30-0.40	Ocean Ice	0.5-0.7

5. PV modules place of installation plays key role in Electric Power generation and performance. Consider the following site selection and Other parameters:

✓ DO'S

1. Install at a place with no shading Throughout the

2. Distance between a shading-object and solar array should be 3 times > than height of shading-Object.

3. Module facing should be: South in Northern Hemisphere & North in Southern Hemisphere

4. Prefer portrait PV-modules layout for minimal dirt-shading.

5. Maintain sufficient row-to-row gaps to avoid Module shading each other.

6. Slope of 1:2.4 is must to maintain fire class rating.

✗ DONT'S

1. Use mounting-methods that block Drainage holes.

2. Install with PV module immersed Under water.

3. Install PV module on moving objects like vehicle or vessel. Different modules are used for Different applications.

NOTE:

- PGEPL solar module is fire rated with Type C.

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- **Tilt angle Selection:**

1. PV modules placed at an angle, that faces the sun directly for 365 days, increases the output power performance.
2. The tilt angle is measured between the PV module's surfaces with the horizontal ground (Figure 1).
3. For standalone systems with batteries or grid-connected installation with permanent structure, the tilt angle of the PV modules should be selected based on seasonal load and sunlight.
4. Recommended Tilt Angle for a fixed system is as shown in the world map.



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Optimal roof pitch angle depending on installation position



Optimal angle for fixed solar panels depending on installation position.

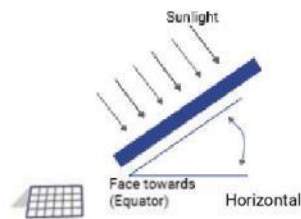
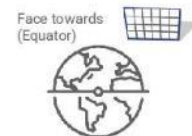


Figure 1

Module facing should be: South in Northern Hemisphere & North in Southern Hemisphere for optimum energy production

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6. MOUNTING INSTALLATION

- **Important Instruction for mounting.**
- Thermal expansion of support structures should not cause any PV module breakage. This would not be part of PGEPL Warranty.
- Ground mounted modules should be at a height enough to prevent the lowest edge of module to be covered in snow for long time in places experiencing heavy snowfall.
- Clearing of snow, dust, dirt and other foreign particles from mounting structure & PV module is must for long-term reliability of PV setup.
- The module is considered to be in compliance with UL 61730 only when the module is mounted in the manner specified by the mounting instructions.
- Any module without a frame (laminated) shall not be considered to comply with the requirements of UL 61730 unless the module is mounted with hardware that has been tested and evaluated with the module under this standard or by a field Inspector certifying that the installed module complies with the requirements of UL 61730.
- Shadow on the solar module is only acceptable if the irradiation is lesser than 200 W/m².

✓
DO'S

1. Mounting system can withstand 2400 Pa of wind-load and 5400 Pa of snow-load.

2. Minimum clearance between module frame and roof surface should be 200 mm.

3. Minimum distance between each PV module should be 10.5 mm.

4. Module facing should be: South in Northern Hemisphere & North in Southern Hemisphere. Power reduces significantly with modules facing east or west.

5. Angle of all modules connected in series should be same. Different angles can lead to current fluctuations and loss in power output.

✗
DONT'S

1. Avoid wiring loop formations.

2. Disconnect or cut module cables when connected with load.

3. Drainage holes blockage while installation.

6. Distance between a shading-object and solar array should be 3 times > than height of shading-object.

7. Install modules at recommended tilt angles as listed in above chapter of tilt angle showing the world map.

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- **Mounting Methods :**

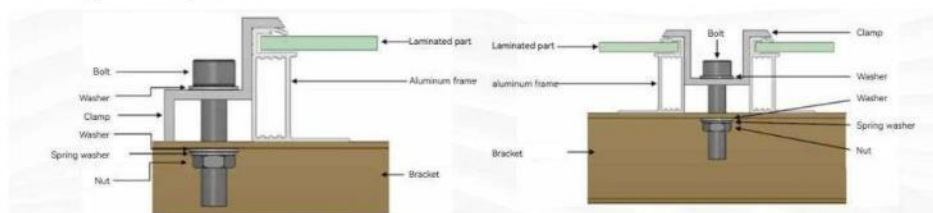
Clamps Mounting

The module can be mounted by a dedicated clamp, as shown in Figure.

Under no circumstances should the clamp touch the glass or deform the frame. The interface of the clamp to the front of the frame must be smooth and flat to prevent frame or other components from being damaged. Make sure that there are no shadows caused by clamps. The drain holes of module cannot be blocked by clamps.

For framed PV module, it is recommended that the length of the clamp be at least 50mm, the clamp must maintain an overlap of 10-12 mm with the frame of the module (For Clamp installation with an overlap of less than 10mm, technicians need to be consulted for assessment).

The applied value of torque should refer to mechanical design standard and the bolt type customer is using, for example: M8: 14-18 N·m.



MOUNTING METHOD: CLAMPING

The mechanical load test with these mounting methods were performed according to IEC 61215. Clamping methods will vary and are dependent on the mounting structures. Please follow the mounting guide lines recommended by the mounting system supplier. Each module must be securely fastened at a minimum of 6 points on two opposite sides. The clamps should be positioned symmetrically. The clamps should be positioned according to the authorized position ranges defined in the above drawings. Install and tighten the module clamps to the mounting rails using the torque stated by the mounting hardware manufacturer. The system designer and the installer are responsible for load calculations and for proper design of support structure.

For bifacial modules, the mounting rails shall be designed to limit as much as possible the shade on module rear side cells. Warranty may be void in the cases

Where improper clamps (For example, the clamp height does not match with the frame height) or unsuitable installation methods are found. When installing inter-modules or end-type clamps, please take the following measures into account:

Do not bend the module frame.

Do not touch or cast shadows on the front glass. Do not damage the surface of the frame (to the exception of the clamps with bonding pins).

Ensure the clamps overlap the module frame For configurations where the mounting rails run parallel to the frame, precautions should be taken to ensure the bottom flange of the module frame overlaps the rail as well clamps of modules with aluminum frame

Ensure the clamp thickness is at least 3 mm (0.12 in).

Clamp material should be anodized aluminum alloy or stainless steel.

Clamp positions are of crucial importance for the reliability of the installation. The clamp center lines must only be positioned within the ranges indicated in the tables below, depending on the configuration and load.

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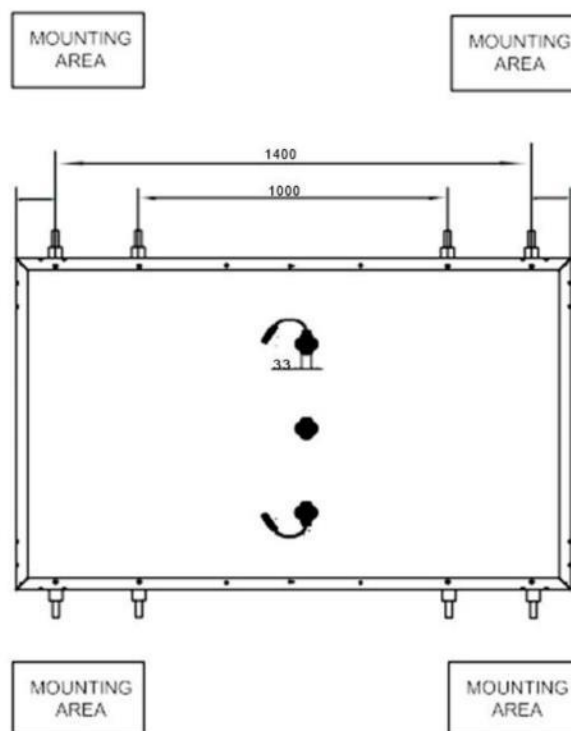
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Clamp description:

Type end clamp: AW 6063 T6 (Aluminum alloy 6063)
Type of mid clamp: No mid clamp was used
Width of clamp: 55 mm
Depth of clamp: "15 mm (over module frame)"
Height of clamp: "35 mm (designed for 35mm module frame)"
Clamp min thickness: 4 mm

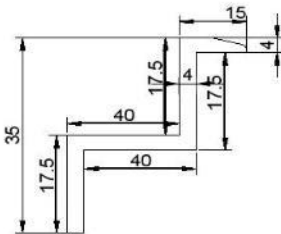
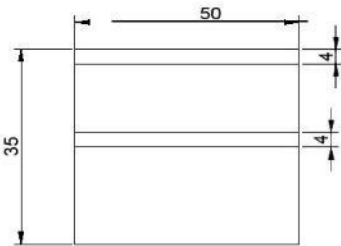
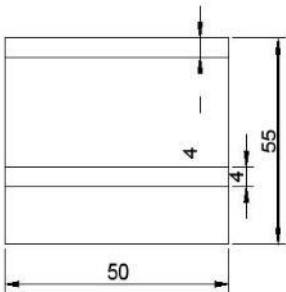
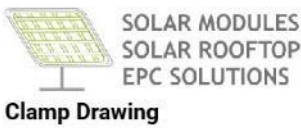


Short Side Clamping



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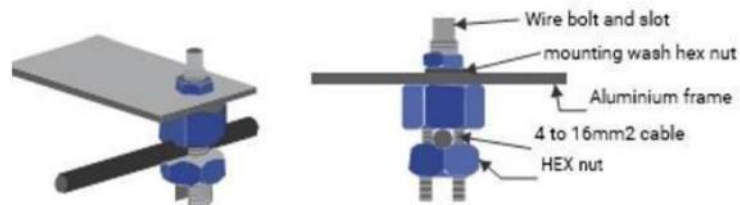
- **PV Module Grounding:**

1. The module frame should be grounded to prevent any shock hazards due to failure of insulation from the internal circuitry or lightning induced voltages.
2. The aluminum frame of the modules is anodized to generate a corrosion resistant layer on the frame which, however, is non-conductive in nature and cannot provide grounding to the module. So, separate grounding holes are provided in the module (marked with the earthing symbol).



Figure 10: Grounding hole of the PV module

3. The grounding method of the frame of arrays shall comply with the NEC NFPA 70, issue date 2017, article 250. In Canada, installation should be done in accordance with CSA C22.1, Safety Standard for Electrical Installations, Canadian Electrical Code, Part 1, and other applicable local standards.
4. The aluminum frame should not come in direct contact with any copper wire, so special grounding device should be used (such as Tyco grounding bolt #2058729-1, UL listed KDER E69905) as shown in Figure 12 below.
5. The Tyco grounding bolt comprises of wire bolt & slot, Hex washer nut (with star washer) and Hex nut. The Hex washer nut shall be 8.73 mm thick, made of stainless steel. The grounding device should fully conduct between frame, structure and earthing wire. Tightening torque shall be 16-20 Nm.



Grounding mechanism of the PV module, using Tyco grounding bolt

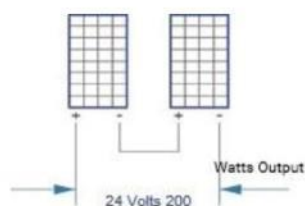
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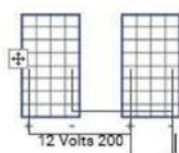


• **Electrical Wiring:**

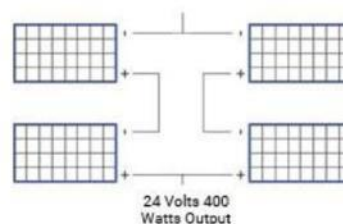
1. All wiring should be performed by well-trained installers as per the local codes and regulations. It is recommended to connect only n number of modules in series such that the system voltage should not exceed the rated value at any time of the year. The engineer should choose the appropriate design based on the Inverter MPPT ratings and operating voltage conditions and the environmental conditions considering the lowest temperature at the site.
2. The wiring are done in following three ways:



Series Wiring Connection
Meant to increase voltage



Parallel Wiring Connection
Meant to increase current



Series - Parallel Wiring Connection
Balance voltage & current

1. System voltage should not exceed the rated value.
2. Reverse polarity may lead to permanent product damage which can't be repaired or replaced.
3. PGEPL recommends a maximum of 2 strings to be connected in parallel with appropriate string fuse for circuit protection.
4. It is recommended to multiply the current and voltage ratings of the panel by suitable safety factor (1.25 for weather related enhancement x 1.25 for equipment derating = 1.56) to calculate the electrical ratings of balance of system components. In case of bifacial modules, the backside power gain should also be factored in.

For maximum system voltage, below formula can be used:

$$\text{System voltage} = X * Voc * [1 + ((T_{voc} \%) * (25 - T_{min}))]$$

where -

X: No: modules which are connected in series

Tvoc - Thermal coefficient of open circuit voltage for the module in %

Voc - Open circuit voltage of each module (Refer to the Data Sheet)

Tmin - Minimum ambient temperature of the location of the plant

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Cable and Connectors:

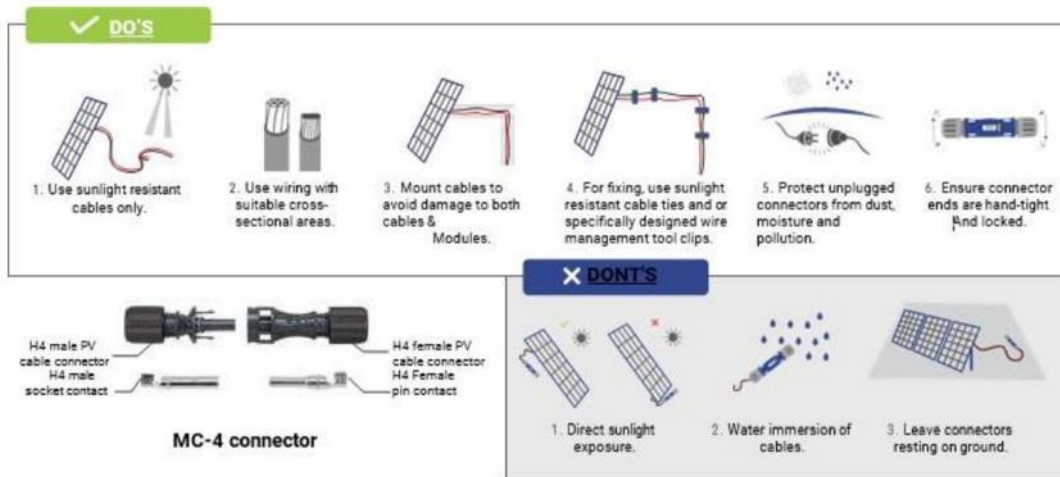
PGEPL PV modules are provided with two stranded, sunlight resistant output cables that are terminated with PV Connectors ready for most installations.

PV Connector Manufactured by	Male Connector Model No.	Female Connector Model No.	Mating Connector
Dhash PV Technologies Private Limited	DS-01	DS-01	Same manufacturer and model of connector
Zhejiang Zhonghuan Sunter PV technology private Limited	PV-ZH011C-5	PV-ZH011C-5	Same manufacturer and model of connector

The minimum wire size should be 12 AWG. The temperature range of the cables is -40°C to +90°C. (Figure 2):



The cables come pre-fitted with PV connectors provided in PGEPL PV modules.



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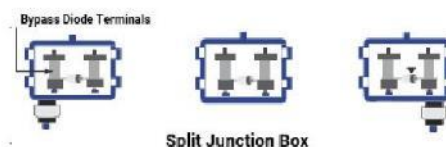


The PGEPL modules are equipped with connectors that comply with the standard for connectors for use in photovoltaic system - UL 6703 or IEC 62852. The PV wiring connectors used for mating, from Different manufactures, should include following:

- Means to identify each distinct PV connector manufacturer's product - such as a picture or illustration, unique physical features, markings, company logos etc.
- Allowable mating connector manufacturer and model number(s) listed for each distinct cable connector manufacturer's product(s), as well as contact information and/or website of the PV connector manufacturer

1) Bypass Diodes:

- 1) PGEPL Solar Module Junction box contains Bypass Diode which is in parallel connection with the PV cell strands.
- 2) In case the diode goes out of order, the complete Junction box has to be replaced.
- 3) NOTE: Diodes are used to bypass the shaded area And can minimize both heating and array current reduction.



07. ELECTRICAL & MECHANICAL PARAMETERS

1. All electrical data shall be shown as relative to standard test conditions (STC) (1 000 W/m², 25°C, AM 1,5 according to IEC 60904-3) on the front side, and Bifaciality coefficients at STC according to IEC 60904-1-2 for Bifacial models . Refer ANNEXURE 1.
2. In outside environment, it is possible that under certain conditions, the solar panels will produce higher voltage or current, depending on the temperature and incident irradiance levels. The temperature coefficients are as follows:
3. Under normal conditions, a photovoltaic module is likely to experience conditions that produce higher current and/or voltage than reported at standard test conditions. Accordingly, the values of I_{sc} and V_{oc} marked on this PV module should be multiplied by a factor of 1,25 when determining component voltage ratings, conductor current ratings, and size of controls (e.g. inverter) connected to the PV output."
4. The module is considered to be in compliance with this standard only when the module is either mounted in the manner specified by the mounting instructions, or when the mounting means has been evaluated with this PV module to UL 2703. A module with exposed conductive parts is considered to be in compliance with this standard only when it is either electrically grounded in accordance with the manufacturer's instructions and the requirements of the National Electrical Code, ANSI/NFPA 70 (2014-2017), or when the bonding means has been evaluated with this PV module to UL 2703."
5. For bifacial modules, designation of which side(s) of the module have been tested for front side exposures. Unless tested as a front side, the back side is restricted for use with indirect or limited direct sunlight (less than 300 W/m²). If both sides of a module are intended for use with prolonged exposure to direct sunlight (> 300 W/m²), each side must meet requirements for front side
6. "A photovoltaic module is likely to experience conditions that produce higher current and/or voltage than reported at standard test conditions. Factors to consider include module temperature and front side irradiance (and, for bifacial modules, ground or roof albedo, row spacing, and installation height). Accordingly, the values

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Of VOC and ISC (or for bifacial modules, ISC aBSI) marked on this PV module should be multiplied by a factor of 1,25 when determining voltage and current ratings for components connected to the PV output."

7. "The safety factor of 1,25 given for the minimum voltage rating of the components in the example statement above may be modified during the design of a system according to the minimum temperature of the location of the installation and the temperature coefficient for VOC. The safety factor of 1,25 given for conductor current ratings values for ISC (or for bifacial modules, ISC aBSI) may be adjusted based on the maximum values of irradiance incident on the front side of the module (and the rear side for bifacial modules). To this purpose, a full simulation for the specific location and module orientation (and for bifacial modules, ground albedo, row spacing and installation height) is required. Further guidance for the choice of a safety factor other than 1,25 is given in the National Electrical Code

Refer to section 690-8 of the NEC for an additional multiplying factor of 125 percent (80 percent derating) which may be applicable. For the Safety Standard for Electrical Installations, please refer to national building codes and safety requirements.

08. ELECTRICAL CONFIGURATION

It is recommended that all the Solar Module, Module array and the DC combiner box should be handled by only trained person. PGEPL is not responsible for any causality or hazards on the site.

The brief of electrical configuration is:

- 1) The PV module laminates are inserted into anodized aluminium frame. IP67 rating terminal box made of plastic material which is resistant to high temperature contains connection terminals and bypass diodes. In aluminium frames there is number of holes to attach the modules with structure in field.
- 2) The products can be used in grid connected Utility & standalone system in houses, rooftop, PV stations, communication stations, petrol, ocean, meteorological, traffic and solar building etc.
- 3) The maximum power of all PGEPL Mono and Poly Crystalline Silicon modules is in range of 250 WP to 665 WP with tolerance of $\pm 3\%$.
- 4) The EPC / Customer is advised to not mismatch any modules & strings with different currents and different voltages which can lead to adverse effects of performance generation of the entire PV Power Plant.
- 5) A solar array generates DC electricity when sunlight falls on the modules and the inverter is in active mode. Once the minimum voltage and current requirements are met, this is converted into AC power accordingly.



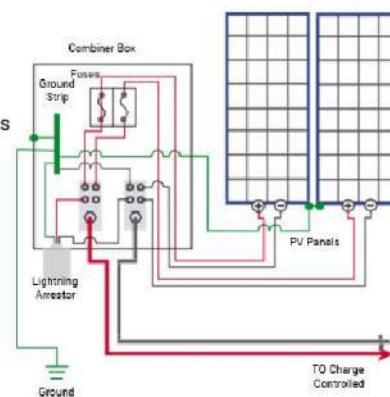
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2) Fuse Rating:

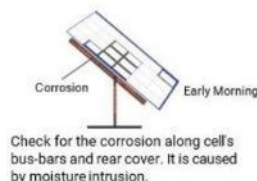
1. All PGEPL modules fuse rating is 30A, applicable for 1500V system. (For MBB Fuse rating is 30A).
2. This fuse rating value also corresponds to the maximum Reverse current that a module can withstand (when one string is shaded then the other parallel Strings of modules will be loaded by the shaded string and current will flow) and therefore impacts the number of strings in parallel.
3. When fuses are fitted they should be rated for the Maximum DC voltage and connected in each, Non-grounded pole of the array (i.e. if the system is not grounded then fuses should be connected in both the positive and negative poles).
4. While we use a 30A fuse in regular power plant, the Bifacial module produces excess current. It is thus necessary to refer to the datasheet and design the fuse rating accordingly taking the onsite conditions into consideration



9. PV MODULE MAINTENANCE AND CARE

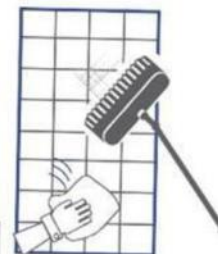
It is recommended to do yearly or half-yearly plant maintenance-check and cleaning by trained professionals.

3) Visual Inspection:



4) Cleaning:

1. PV Module Cleaning should be done only by properly trained personnel who understand the risks of using water to electrical components.
2. Cleaning can be performed by Wet Cleaning, Soft Cleaning, Compressed Air cleaning, Rotating Brush, Dry Brush cleaning. Cleaning should be performed in a way that no stress on PV modules is caused which may lead to cracks on solar cells.
3. Usage of soft module cleaning kit is recommended. Soft cloth and slight detergent can be used as an alternate solution.
4. Climbing of personnel on the PV modules is strictly prohibited as it can cause irreversible damage to the solar cells of the PV modules.
5. Water used for cleaning should be of same temperature as of module, as the temperature difference can create thermal shocks by which PV module can be damaged and will not be a part of the Warranty.
6. The water should be regularly checked for TDS. It is immediately recommended to install RO at the site if the TDS of the water is deviating



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- From appropriate standards and acceptable limit of less than 500mg/l.
7. Avoid cleaning by sharp edge objects which can damage the material of back sheet and can cause a cut and impact the performance of the PV module and the plant.
 8. The PV Modules are advised to be cleaned regularly ensuring dust/dirt free and devoid of any bird droppings. Failing to clean the same can cause damage to the power output of the PV system.
 9. The rare surface of the module does not require cleaning unless any objects or dirt is stuck on the back sheet. In bifacial modules with transparent Backsheet, it is preferable to clean the Backsheet gently with cotton cloth or with compressed air (at pressure less than 2.4 kPa). Water should not be sprinkled on the backside of the modules to avoid water ingress inside the junction box.

Method A: Compressed Water

1. Requirement for water quality:
2. PH: 5 ~7;
3. Chloride and Salinity : 0 - 3,000 mg/L
4. Turbidity : 0-30 NTU
5. Conductivity : 1500~3000 $\mu\text{S}/\text{cm}$
6. Total dissolved solids (TDS) : ≤ 1000 mg/L
7. Water hardness (calcium and magnesium ions) : 0-40 mg/L
8. Non-alkaline water must be used; demineralized water shall be used when conditions are available
9. The maximum water pressure recommended is 4 MPa (40 bar)

Method B: Compressed Air

1. We recommends using this method to clean the soft dirt (like dust) on modules. This technique can be applied as long as the method is efficient enough to clean the modules considering the on-site conditions.

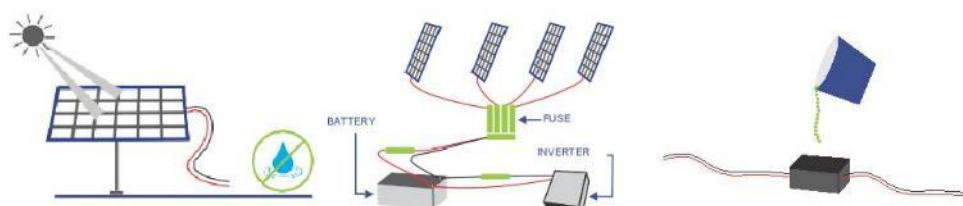
Method C: Wet Cleaning

1. If excessive soiling is present on the module surface, a non-conductive brush, sponge, or other mild agitating method may be used with caution.
2. Please make sure that any brushes or agitating tools are constructed with non-conductive materials to minimize risk of electric shock and that they are not abrasive to the glass or the aluminium frame.
3. If grease is present, an environmentally friendly cleaning agent may be used with caution.

Method D: Robot Cleaning

1. If a cleaning robot is used, the cleaning material shall be such as to ensure no scratch or damage is done to the glass surface & aluminium frame during the cleaning. The weight of the robot shall not exceed 30 kg. If the cleaning robot is improperly used, the resulting module damage power attenuation is not covered by PGEPL.

5) Inspection of connectrs and cabel:



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SOLAR MODULES SOLAR ROOFTOP EPC SOLUTIONS

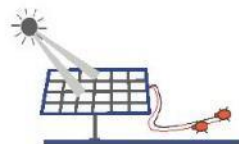
Ensure all cable assemblies are tightly fitted and no part of the cable is immersed or exposed to water logging.

Check for all the strings fuses of each non-earthed pole are working properly and in operation.

Check the sealing gels of the junction box for any damage..



Check that all connections are tight and corrosion-free.



Check for all wiring for possible rodent damage, weathering and electrical leakage to ground.

NOTE:
The dual glass modules of the non-metallic frame should not be earthed

6) Product recycle and end of Life:

Product should be recycled in useful renewable method after the end of its life cycle. Please contact PGEPL at the end of the product life cycle for recycling procedure. Do not discard the e-waste in bins.



10. WARNING

While performing any type of electrical maintenance, all the system should be isolated / shutdown and maintenance should be performed by well trained professionals only. Any failure to follow instructions may result in lethal electric shocks, burns, injuries, other electrical hazards, fire hazards and some time may lead death also. PGEPL is not responsible for any type of accident occurring in Power plant while using the PGEPL panels.

11. CONTACT DETAILS

PV modules do not contain any serviceable parts. If customer has any doubts that installation is not working properly, please contact your installer / EPC / O&M. Immediately and please leave a note to the PGEPL Customer Service Team.

1. Contact PGEPL sales and service team at +91 72290 35962
2. Email customer feedback at crm@pixonenergy.in
3. Reach to us at:
 1. **Factory:** Rajkot - Jamnagar Highway, PO: Depaliya, TA: Padadhari, Rajkot - 360110. Gujarat, India.
 2. **Office:** 2nd Floor, Star Avenue, Nr. Moti Tanki Chowk, Gymkhana Road, Rajkot - 360001. Gujarat, India.

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12. ANNEXURE

Product Electrical Ratings:				
Monofacial Module:				
Module type	PIX MPH 132 660/ PIX MPHB 132 660	PIX MPH 132 655/ PIX MPHB 132 655	PIX MPH 132 650/ PIX MPHB 132 650	PIX MPH 132 645/ PIX MPHB 132 645
P_{max} [W] /Tolerance	660/±3%	655/±3%	650/±3%	645/±3%
Voc [V] /Tolerance	46.3/±5%	46.20/±5%	46.10/±5%	46.00/±5%
Isc [A] /Tolerance	18.17/±5%	18.10/±5%	18.02/±5%	17.93/±5%
Vmp [V]	37.8	37.7	37.6	37.5
Imp [A]	17.47	17.38	17.29	17.20
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
Module type	PIX MPH 132 640/ PIX MPHB 132 640	PIX MPH 132 635/ PIX MPHB 132 635	PIX MPH 132 630/ PIX MPHB 132 630	PIX MPH 132 625/ PIX MPHB 132 625
P_{max} [W] /Tolerance	640/±3%	635/±3%	630/±3%	625/±3%
Voc [V] /Tolerance	45.90/±5%	45.80/±5%	45.70/±5%	45.60/±5%
Isc [A] /Tolerance	17.85/±5%	17.76/±5%	17.65/±5%	17.55/±5%
Vmp [V]	37.4	37.3	37.2	37.1
Imp [A]	17.12	17.03	16.94	16.85
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
Module type	PIX MPH 120 600/ PIX MPHB 120 600	PIX MPH 120 595/ PIX MPHB 120 595	PIX MPH 120 590/ PIX MPHB 120 590	PIX MPH 120 585/ PIX MPHB 120 585
P_{max} [W] /Tolerance	600/±3%	595/±3%	590/±3%	585/±3%
Voc [V] /Tolerance	41.85/±5%	41.85/±5%	41.45/±5%	41.25/±5%
Isc [A] /Tolerance	18.31/±5%	18.27/±5%	18.22/±5%	18.18/±5%
Vmp [V]	34.65	34.45	34.25	34.05
Imp [A]	17.32	17.28	17.23	17.19
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
Module type	PIX MPH 120 580/ PIX MPHB 120 580	PIX MPH 120 575/ PIX MPHB 120 575	PIX MPH 120 570/ PIX MPHB 120 570	
P_{max} [W] /Tolerance	580/±3%	575/±3%	570/±3%	
Voc [V] /Tolerance	41.05/±5%	40.95/±5%	40.91/±5%	
Isc [A] /Tolerance	18.13	18.07	18.00	
Vmp [V]	33.85	33.65	33.55	
Imp [A]	17.14	17.08	16.99	
Maximum system voltage [V]	1500	1500	1500	
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	
Module type	PIX MPH 108 540/ PIX MPHB 108 540	PIX MPH 108 535/ PIX MPHB 108 535	PIX MPH 108 530/ PIX MPHB 108 530	PIX MPH 108 525/ PIX MPHB 108 525
P_{max} [W] /Tolerance	540 /±3%	535/±3%	530 /±3%	525 /±3%
Voc [V] /Tolerance	36.88/±5%	36.77/±5%	36.65/±5%	36.58/±5%
Isc [A] /Tolerance	18.52/±5%	18.37/±5%	18.26/±5%	18.16/±5%
Vmp [V]	31.07	30.82	30.7	30.62
Imp [A]	17.39	17.37	17.28	17.15
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
Module type	PIX MPH 108 520/ PIX MPHB 108 520	PIX MPH 108 515/ PIX MPHB 108 515	PIX MPH 108 510/ PIX MPHB 108 510	
P_{max} [W] /Tolerance	520 /±3%	515 /±3%	510 /±3%	
Voc [V] /Tolerance	36.48/±5%	36.38/±5%	36.27/±5%	
Isc [A] /Tolerance	18.08/±5%	17.95/±5%	17.85/±5%	
Vmp [V]	30.53	30.42	30.33	
Imp [A]	17.04	16.94	16.83	
Maximum system	1500	1500	1500	

voltage [V]				
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	
Module type	PIX MPH 96 480/ PIX MPHB 96 480	PIX MPH 96 475/ PIX MPHB 96 475	PIX MPH 96 470/ PIX MPHB 96 470	PIX MPH 96 465/ PIX MPHB 96 465
P_{max} [W] /Tolerance	480/±3%	475/±3%	470/±3%	465/±3%
Voc [V] /Tolerance	33.68/±5%	33.59/±5%	33.46/±5%	33.35/±5%
Isc [A] /Tolerance	18.31/±5%	18.21/±5%	18.13/±5%	18.05/±5%
Vmp [V]	28.47	28.34	28.25	28.17
Imp [A]	16.87	16.76	16.65	16.52
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
Module type	PIX MPH 96 460/ PIX MPHB 96 460	PIX MPH 96 455/ PIX MPHB 96 455	PIX MPH 96 450/ PIX MPHB 96 450	
Voc [V] /Tolerance	460/±3%	455/±3%	450/±3%	
Vmp [V]	33.24/±5%	33.15/±5%	33.03/±5%	
Imp [A]	17.94/±5%	17.81/±5%	17.69/±5%	
Isc [A] /Tolerance	28.05	27.91	27.78	
P_{max} [W] /Tolerance	16.41	16.32	16.21	
Maximum system voltage [V]	1500	1500	1500	
Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	
Module type	PIX MPH 156 595 / PIX MPHB 156 595 / PIX MPHBD 156 595 / PIX MPHD 156 595	PIX MPH 156 590 / PIX MPHB 156 590 / PIX MPHBD 156 590 / PIX MPHD 156 590	PIX MPH 156 585 / PIX MPHB 156 585 / PIX MPHBD 156 585 / PIX MPHD 156 585	PIX MPH 156 580 / PIX MPHB 156 580 / PIX MPHBD 156 580 / PIX MPHD 156 580
P_{max} [W] /Tolerance	595/±3%	655/±3%	585/±3%	580/±3%
Voc [V] /Tolerance	54.23/±5%	54.14/±5%	54.02/±5%	53.92/±5%
Isc [A] /Tolerance	13.95/±5%	13.95/±5%	13.85/±5%	13.76/±5%
Vmp [V]	46.13	45.97	45.87	45.76
Imp [A]	12.9	12.84	12.76	12.68
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 156 575 / PIX MPHB 156 575 / PIX MPHBD 156 575 / PIX MPHD 156 575	PIX MPH 156 570 / PIX MPHB 156 570 / PIX MPHBD 156 570 / PIX MPHD 156 570	PIX MPH 156 565 / PIX MPHB 156 565 / PIX MPHBD 156 565 / PIX MPHD 156 565	PIX MPH 156 560 / PIX MPHB 156 560 / PIX MPHBD 156 560 / PIX MPHD 156 560
P_{max} [W] /Tolerance	575/±3%	570/±3%	565/±3%	560/±3%
Voc [V] /Tolerance	53.82/±5%	53.72/±5%	53.63/±5%	53.51/±5%
Isc [A] /Tolerance	13.65/±5%	13.58/±5%	13.45/±5%	13.34/±5%
Vmp [V]	45.65	45.57	45.46	45.36
Imp [A]	12.6	12.51	12.43	12.35
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30

Module type	PIX MPH 144 545 / PIX MPHB 144 545 / PIX MPHBD 144 545 / PIX MPHD 144 545	PIX MPH 144 540 / PIX MPHB 144 540 / PIX MPHBD 144 540 / PIX MPHD 144 540	PIX MPH 144 535 / PIX MPHB 144 535 / PIX MPHBD 144 535 / PIX MPHD 144 535	PIX MPH 144 530 / PIX MPHB 144 530 / PIX MPHBD 144 530 / PIX MPHD 144 530
Voc [V] /Tolerance	545/±3%	540/±3%	535/±3%	530/±3%
Vmp [V]	49.65/±5%	49.50/±5%	49.35/±5%	49.20/±5%
Imp [Adc]	13.92/±5%	13.85/±5%	13.78/±5%	13.71/±5%
Isc [Adc] /Tolerance	41.80	41.65	41.50	41.35
Pmax [W] /Tolerance	13.04	12.97	12.90	12.82
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 144 525 / PIX MPHB 144 525 / PIX MPHBD 144 525 / PIX MPHD 144 525	PIX MPH 144 520 / PIX MPHB 156 520 / PIX MPHBD 144 520 / PIX MPHD 144 520	PIX MPH 144 515 / PIX MPHB 144 515 / PIX MPHBD 144 515 / PIX MPHD 144 515	PIX MPH 144 510 / PIX MPHB 144 510 / PIX MPHBD 144 510 / PIX MPHD 144 510
Voc [V] /Tolerance	525/±3%	520/±3%	515/±3%	510/±3%
Vmp [V]	49.05/±5%	48.85/±5%	48.62/±5%	48.47/±5%
Imp [Adc]	13.65/±5%	13.61/±5%	13.55/±5%	13.45/±5%
Isc [Adc] /Tolerance	41.20	41.05	40.91	40.86
Pmax [W] /Tolerance	12.75	12.67	12.59	12.49
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 132 500 / PIX MPHB 132 500 / PIX MPHBD 132 500 / PIX MPHD 132 500	PIX MPH 156 495 / PIX MPHB 132 495 / PIX MPHBD 132 495 / PIX MPHD 156 495	PIX MPH 132 490 / PIX MPHB 132 490 / PIX MPHBD 132 490 / PIX MPHD 132 490	PIX MPH 132 485 / PIX MPHB 132 485 / PIX MPHBD 132 485 / PIX MPHD 132 485
Voc [V] /Tolerance	500/±3%	495/±3%	490/±3%	485/±3%
Vmp [V]	46.46/±5%	46.37/±5%	46.26/±5%	46.15/±5%
Imp [Adc]	13.49/±5%	13.36/±5%	13.27/±5%	13.19/±5%
Isc [Adc] /Tolerance	38.89	38.76	38.53	38.43
Pmax [W] /Tolerance	12.86	12.78	12.72	12.63
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 132 480 / PIX MPHB 132 480 / PIX MPHBD 132 480 / PIX MPHD 132 480	PIX MPH 132 475 / PIX MPHB 132 475 / PIX MPHBD 132 475 / PIX MPHD 132 475	PIX MPH 132 470 / PIX MPHB 132 470 / PIX MPHBD 132 470 / PIX MPHD 132 470	
Voc [V] /Tolerance	480/±3%	475/±3%	470/±3%	
Vmp [V]	46.06/±5%	45.96/±5%	45.87/±5%	

Imp [A _{dc}]	13.1/±5%	12.99/±5%	12.88/±5%	
Isc [A _{dc}]/Tolerance	38.32	38.22	38.12	
P _{max} [W]/Tolerance	12.53	12.43	12.33	
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 120 455 / PIX MPHB 120 455 / PIX MPHBD 120 455 / PIX MPHD 120 455	PIX MPH 120 450 / PIX MPHB 120 450 / PIX MPHBD 120 450 / PIX MPHD 120 450	PIX MPH 120 445 / PIX MPHB 120 445 / PIX MPHBD 120 445 / PIX MPHD 120 445	PIX MPH 120 440 / PIX MPHB 120 440 / PIX MPHBD 120 440 / PIX MPHD 120 440
V _{oc} [V]/Tolerance	455/±3%	450/±3%	445/±3%	440/±3%
V _{mp} [V]	41.62/±5%	41.52/±5%	41.43/±5%	41.31/±5%
Imp [A _{dc}]	13.97/±5%	13.89/±5%	13.79/±5%	13.68/±5%
Isc [A _{dc}]/Tolerance	36.52	36.42	36.29	36.18
P _{max} [W]/Tolerance	12.46	12.36	12.27	12.17
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 120 435 / PIX MPHB 120 435 / PIX MPHBD 120 435 / PIX MPHD 120 435	PIX MPH 120 430 / PIX MPHB 120 430 / PIX MPHBD 120 430 / PIX MPHD 120 430	PIX MPH 120 425 / PIX MPHB 120 425 / PIX MPHBD 120 425 / PIX MPHD 120 425	PIX MPH 120 420 / PIX MPHB 120 420 / PIX MPHBD 120 420 / PIX MPHD 120 420
V _{oc} [V]/Tolerance	435/±3%	430/±3%	425/±3%	420/±3%
V _{mp} [V]	41.22/±5%	41.11/±5%	40.98/±5%	40.87/±5%
Imp [A _{dc}]	13.57/±5%	13.47/±5%	13.38/±5%	13.27/±5%
Isc [A _{dc}]/Tolerance	36.05	35.98	35.81	35.69
P _{max} [W]/Tolerance	12.07	11.96	11.87	11.77
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 108 410 / PIX MPHB 108 410 / PIX MPHBD 108 410 / PIX MPHD 108 410	PIX MPH 108 405 / PIX MPHB 108 405 / PIX MPHBD 108 405 / PIX MPHD 108 405	PIX MPH 108 400 / PIX MPHB 108 400 / PIX MPHBD 108 400 / PIX MPHD 108 400	PIX MPH 108 395 / PIX MPHB 108 395 / PIX MPHBD 108 395 / PIX MPHD 108 395
V _{oc} [V]/Tolerance	410 /±3%	405 /±3%	400 /±3%	395 /±3%
V _{mp} [V]	37.34/±5%	37.14/±5%	36.94/±5%	36.75/±5%
Imp [A _{dc}]	13.76/±5%	13.65/±5%	13.58/±5%	13.47/±5%
Isc [A _{dc}]/Tolerance	31.22	31.02	30.82	30.65
P _{max} [W]/Tolerance	13.14	13.06	12.99	12.89
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 108 390 / PIX MPHB 108 390 / PIX MPHBD 108 390 / PIX MPHD 108 390	PIX MPH 108 385 / PIX MPHB 108 385 / PIX MPHBD 108 385 / PIX MPHD 108 385	PIX MPH 108 380 / PIX MPHB 108 380 / PIX MPHBD 108 380 / PIX MPHD 108 380	PIX MPH 108 375 / PIX MPHB 108 375 / PIX MPHBD 108 375 / PIX MPHD 108 375

	MPHD 108 390	MPHD 108 385	MPHD 108 380	/ PIX MPHD 108 375
Voc [V] /Tolerance	390 /±3%	385 /±3%	380 /±3%	375 /±3%
Vmp [V]	36.65/±5%	36.54/±5%	36.45/±5%	36.34/±5%
Imp [Adc]	13.38/±5%	13.33/±5%	13.17/±5%	13.07/±5%
Isc [Adc] /Tolerance	30.55	30.42	30.25	30.13
Pmax [W] /Tolerance	12.78	12.67	12.55	12.46
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 156 490 / PIX MPHB 156 490	PIX MPH 156 485 / PIX MPHB 156 485	PIX MPH 156 480 / PIX MPHB 156 480	PIX MPH 156 475 / PIX MPHB 156 475
Pmax [W] /Tolerance	490/±3%	485/±3%	480/±3%	475/±3%
Voc [V] /Tolerance	53.72/±5%	53.63/±5%	53.52/±5%	53.41/±5%
Isc [Adc] /Tolerance	11.78/±5%	11.67/±5%	11.56/±5%	11.48/±5%
Vmp [V]	45.94	45.85	45.78	45.69
Imp [Adc]	10.67	10.58	10.49	10.4
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 156 470 / PIX MPHB 156 470	PIX MPH 156 465 / PIX MPHB 156 465	PIX MPH 156 460 / PIX MPHB 156 460	
Pmax [W] /Tolerance	470/±3%	465/±3%	460/±3%	
Voc [V] /Tolerance	53.29/±5%	53.23/±5%	53.16/±5%	
Isc [Adc] /Tolerance	11.39/±5%	11.28/±5%	11.18/±5%	
Vmp [V]	45.6	45.5	45.41	
Imp [Adc]	10.31	10.22	10.13	
Maximum system voltage [V]	1500	1500	1500	
Maximum Over-Current Protection Rating [A]	30	30	30	
Module type	PIX MPH 144 450 / PIX MPHB 144 450	PIX MPH 144 445 / PIX MPHB 144 445	PIX MPH 144 440 / PIX MPHB 144 440	PIX MPH 144 435 / PIX MPHB 144 435
Pmax [W] /Tolerance	450 /±3%	445/±3%	440 /±3%	435 /±3%
Voc [V] /Tolerance	49.3/±5%	49.1/±5%	48.9/±5%	48.7/±5%
Isc [Adc] /Tolerance	11.6/±5%	11.53/±5%	11.46/±5%	11.39/±5%
Vmp [V]	41.48	41.28	41.09	40.89
Imp [Adc]	10.85	10.78	10.71	10.64
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 144 430 / PIX MPHB 144 430	PIX MPH 144 425 / PIX MPHB 144 425	PIX MPH 144 420 / PIX MPHB 144 420	-
Pmax [W] /Tolerance	430/±3%	425/±3%	420/±3%	
Voc [V] /Tolerance	48.5/±5%	48.3/±5%	48.1/±5%	
Isc [Adc] /Tolerance	11.31/±5%	11.22/±5%	11.15/±5%	
Vmp [V]	40.61	40.44	40.32	
Imp [Adc]	10.59	10.51	10.42	

Maximum system voltage [V]	1500	1500	1500	
Maximum Over-Current Protection Rating [A]	30	30	30	
Module type	PIX MPH 132 410 / PIX MPHB 144 410	PIX MPH 132 405 / PIX MPHB 144 405	PIX MPH 132 400 / PIX MPHB 144 400	PIX MPH 132 395 / PIX MPHB 144 395
Pmax [W]/Tolerance	410/±3%	405/±3%	400/±3%	395/±3%
Voc [V]/Tolerance	45.42/±5%	45.3/±5%	45.18/±5%	45.09/±5%
Isc [Adc]/Tolerance	11.62/±5%	11.53/±5%	11.43/±5%	11.35/±5%
Vmp [V]	38.76	38.65	38.58	38.47
Imp [Adc]	10.58	10.49	10.37	10.29
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 132 390 / PIX MPHB 144 390	PIX MPH 132 385 / PIX MPHB 144 385	PIX MPH 132 380 / PIX MPHB 144 380	
Pmax [W]/Tolerance	390 /±3%	385/±3%	380 /±3%	
Voc [V]/Tolerance	44.58/±5%	44.47/±5%	44.38/±5%	
Isc [Adc]/Tolerance	11.24/±5%	11.12/±5%	11.01/±5%	
Vmp [V]	38.37	38.25	38.01	
Imp [Adc]	10.17	10.07	10.01	
Maximum system voltage [V]	1500	1500	1500	
Maximum Over-Current Protection Rating [A]	30	30	30	
Module type	PIX MPH 120 375 / PIX MPHB 144 375	PIX MPH 120 370 / PIX MPHB 144 370	PIX MPH 120 365 / PIX MPHB 144 365	PIX MPH 120 360 / PIX MPHB 144 360
Pmax [W]/Tolerance	375/±3%	370/±3%	365 /±3%	360 /±3%
Voc [V]/Tolerance	41.4/±5%	41.3/±5%	41.2/±5%	41.1/±5%
Isc [Adc]/Tolerance	11.75/±5%	11.67/±5%	11.48/±5%	11.37/±5%
Vmp [V]	35.54	35.22	35.13	35.02
Imp [Adc]	10.62	10.51	10.39	10.28
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30
Module type	PIX MPH 120 355 / PIX MPHB 144 355	PIX MPH 120 350 / PIX MPHB 144 350	PIX MPH 120 345 / PIX MPHB 144 345	PIX MPH 120 340 / PIX MPHB 144 340
Pmax [W]/Tolerance	355 /±3%	350 /±3%	345 /±3%	340 /±3%
Voc [V]/Tolerance	41/±5%	40.9/±5%	40.8/±5%	40.7/±5%
Isc [Adc]/Tolerance	11.25/±5%	11.12/±5%	11.03/±5%	10.89/±5%
Vmp [V]	34.95	34.8	34.68	34.52
Imp [Adc]	10.17	10.06	9.95	9.86
Maximum system voltage [V]	1500	1500	1500	1500
Maximum Over-Current Protection Rating [A]	30	30	30	30

Bifacial Module :

	Module type	PIX MBHTB 132 660	PIX MBHTB 132 655	PIX MBHTB 132 650	PIX MBHTB 132 645
STC condition	P_{max} [W] /Tolerance	660/±3%	655/±3%	650/±3%	645/±3%
	V_{oc} [V] /Tolerance	46.3/±5%	46.20/±5%	46.10/±5%	46.00/±5%
	I_{sc} [A] /Tolerance	18.17/±5%	18.10/±5%	18.02/±5%	17.93/±5%
	V_{mp} [V]	37.8	37.7	37.6	37.5
	I_{mp} [A]	17.47	17.38	17.29	17.20
BNPI condition	P_{max} [W] /Tolerance	725/±3%	720/±3%	715/±3%	710/±3%
	V_{oc} [V] /Tolerance	46.30/±5%	46.20/±5%	46.10/±5%	46.00/±5%
	I_{sc} [A] /Tolerance	20.02/±5%	19.95/±5%	19.88/±5%	19.79/±5%
Bifaciality coefficient	ϕP_{max}	75±10%	75±10%	75±10%	75±10%
	ϕV_{oc}	100±10%	100±10%	100±10%	100±10%
	ϕI_{sc}	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 132 640	PIX MBHTB 132 635	PIX MBHTB 132 630	PIX MBHTB 132 625
STC condition	P_{max} [W] /Tolerance	640/±3%	635/±3%	630/±3%	625/±3%
	V_{oc} [V] /Tolerance	45.90/±5%	45.80/±5%	45.70/±5%	45.60/±5%
	I_{sc} [A] /Tolerance	17.85/±5%	17.76/±5%	17.65/±5%	17.55/±5%
	V_{mp} [V]	37.4	37.3	37.2	37.1
	I_{mp} [A]	17.12	17.03	16.94	16.85
BNPI condition	P_{max} [W] /Tolerance	705/±3%	700/±3%	695/±3%	690/±3%
	V_{oc} [V] /Tolerance	45.90/±5%	45.80/±5%	45.70/±5%	45.60/±5%
	I_{sc} [A] /Tolerance	19.69/±5%	19.58/±5%	19.47/±5%	19.38/±5%
Bifaciality coefficient	ϕP_{max}	75±10%	75±10%	75±10%	75±10%
	ϕV_{oc}	100±10%	100±10%	100±10%	100±10%
	ϕI_{sc}	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 120 600	PIX MBHTB 120 595	PIX MBHTB 120 590	PIX MBHTB 120 585
STC condition	P_{max} [W] /Tolerance	600/±3%	595/±3%	590/±3%	585/±3%
	V_{oc} [V] /Tolerance	41.85/±5%	41.65/±5%	41.45/±5%	41.25/±5%
	I_{sc} [A] /Tolerance	18.31/±5%	18.27/±5%	18.22/±5%	18.18/±5%
	V_{mp} [V]	34.65	34.45	34.25	34.05
	I_{mp} [A]	17.32	17.28	17.23	17.19
BNPI condition	P_{max} [W] /Tolerance	660/±3%	655/±3%	650/±3%	645/±3%
	V_{oc} [V] /Tolerance	41.85/±5%	41.65/±5%	41.45/±5%	41.25/±5%
	I_{sc} [A] /Tolerance	20.06/±5%	20.02/±5%	19.97/±5%	19.91/±5%
Bifaciality coefficient	ϕP_{max}	75±10%	75±10%	75±10%	75±10%
	ϕV_{oc}	100±10%	100±10%	100±10%	100±10%
	ϕI_{sc}	75±10%	75±10%	75±10%	75±10%

	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 120 580	PIX MBHTB 120 575	PIX MBHTB 120 570	
STC condition	Pmax [W] /Tolerance	580/±3%	575/±3%	570/±3%	
	Voc [V] /Tolerance	41.05/±5%	40.95/±5%	40.91/±5%	
	Isc [A] /Tolerance	18.13	18.07	18.00	
	Vmp [V]	33.85	33.65	33.55	
	Imp [A]	17.14	17.08	16.99	
BNPI condition	Pmax [W] /Tolerance	640/±3%	630/±3%	625/±3%	
	Voc [V] /Tolerance	41.05/±5%	40.95/±5%	40.91/±5%	
	Isc [A] /Tolerance	19.87/±5%	19.72/±5%	19.59/±5%	
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	
	φVoc	100±10%	100±10%	100±10%	
	φIsc	75±10%	75±10%	75±10%	
	Maximum system voltage [V]	1500	1500	1500	
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	
	Module type	PIX MBHTB 108 540	PIX MBHTB 108 535	PIX MBHTB 108 530	PIX MBHTB 108 525
STC condition	Pmax [W] /Tolerance	540 /±3%	535/±3%	530 /±3%	525 /±3%
	Voc [V] /Tolerance	36.88/±5%	36.77/±5%	36.65/±5%	36.58/±5%
	Isc [A] /Tolerance	18.52/±5%	18.37/±5%	18.26/±5%	18.16/±5%
	Vmp [V]	31.07	30.82	30.7	30.62
	Imp [A]	17.39	17.37	17.28	17.15
BNPI condition	Pmax [W] /Tolerance	595/±3%	590/±3%	585/±3%	580/±3%
	Voc [V] /Tolerance	36.88/±5%	36.77/±5%	36.65/±5%	36.58/±5%
	Isc [A] /Tolerance	20.19/±5%	20.08/±5%	19.96/±5%	19.87/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 108 520	PIX MBHTB 108 515	PIX MBHTB 108 510	
STC condition	Pmax [W] /Tolerance	520 /±3%	515 /±3%	510 /±3%	
	Voc [V] /Tolerance	36.48/±5%	36.38/±5%	36.27/±5%	
	Isc [A] /Tolerance	18.06/±5%	17.95/±5%	17.85/±5%	
	Vmp [V]	30.53	30.42	30.33	
	Imp [A]	17.04	16.94	16.83	
BNPI condition	Pmax [W] /Tolerance	570/±3%	565/±3%	560/±3%	
	Voc [V] /Tolerance	36.48/±5%	36.38/±5%	36.27/±5%	
	Isc [A] /Tolerance	19.69/±5%	19.62/±5%	19.59/±5%	
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	
	φVoc	100±10%	100±10%	100±10%	
	φIsc	75±10%	75±10%	75±10%	
	Maximum system voltage [V]	1500	1500	1500	
	Maximum Over-	30 A	30 A	30 A	

	Current Protection Rating [A]				
	Module type	PIX MBHTB 96 480	PIX MBHTB 96 475	PIX MBHTB 96 470	PIX MBHTB 96 465
STC condition	Pmax [W] /Tolerance	480/±3%	475/±3%	470/±3%	465/±3%
	Voc [V] /Tolerance	33.68/±5%	33.59/±5%	33.46/±5%	33.35/±5%
	Isc [A] /Tolerance	18.31/±5%	18.21/±5%	18.13/±5%	18.05/±5%
	Vmp [V]	28.47	28.34	28.25	28.17
	Imp [A]	16.87	16.76	16.65	16.52
BNPI condition	Pmax [W] /Tolerance	530/±3%	520/±3%	515/±3%	510/±3%
	Voc [V] /Tolerance	33.68/±5%	33.59/±5%	33.46/±5%	33.35/±5%
	Isc [A] /Tolerance	19.78/±5%	19.39/±5%	19.21/±5%	19.03/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 96 460	PIX MBHTB 96 455	PIX MBHTB 96 450	
STC condition	Pmax [W] /Tolerance	460/±3%	455/±3%	450/±3%	
	Voc [V] /Tolerance	33.24/±5%	33.15/±5%	33.03/±5%	
	Isc [A] /Tolerance	17.94/±5%	17.81/±5%	17.69/±5%	
	Vmp [V]	28.05	27.91	27.78	
	Imp [A]	16.41	16.32	16.21	
BNPI condition	Pmax [W] /Tolerance	505/±3%	500/±3%	495/±3%	
	Voc [V] /Tolerance	33.24/±5%	33.15/±5%	33.03/±5%	
	Isc [A] /Tolerance	18.95/±5%	18.87/±5%	18.79/±5%	
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	
	φVoc	100±10%	100±10%	100±10%	
	φIsc	75±10%	75±10%	75±10%	
	Maximum system voltage [V]	1500	1500	1500	
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	
	Module type	PIX MBHTB 156 595 / PIX MBHDTB 156 595	PIX MBHTB 156 590 / PIX MBHDTB 156 590	PIX MBHTB 156 585 / PIX MBHDTB 156 585	PIX MBHTB 156 580 / PIX MBHDTB 156 580
STC condition	Pmax [W] /Tolerance	593/±5%	590/±3%	585/±3%	580/±3%
	Voc [V] /Tolerance	54.23/±5%	54.14/±5%	54.02/±5%	53.92/±5%
	Isc [A] /Tolerance	13.95/±5%	13.95/±5%	13.85/±5%	13.76/±5%
	Vmp [V]	46.13	45.97	45.87	45.76
	Imp [A]	12.9	12.84	12.76	12.68
BNPI condition	Pmax [W] /Tolerance	655/±3%	650/±3%	645/±3%	640/±3%
	Voc [V] /Tolerance	54.23/±5%	54.14/±5%	54.02/±5%	53.92/±5%
	Isc [A] /Tolerance	15.48/±5%	15.39/±5%	15.28/±5%	15.19/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A

	Module type	PIX MBHTB 156 575 / PIX MBHDTB 156 575	PIX MBHTB 156 570 / PIX MBHDTB 156 570	PIX MBHTB 156 565 / PIX MBHDTB 156 565	PIX MBHTB 156 560 / PIX MBHDTB 156 560
STC condition	Pmax [W] /Tolerance	575/±3%	570/±3%	565/±3%	560/±3%
	Voc [V] /Tolerance	53.82/±5%	53.72/±5%	53.63/±5%	53.51/±5%
	Isc [A] /Tolerance	13.65/±5%	13.56/±5%	13.45/±5%	13.34/±5%
	Vmp [V]	45.65	45.57	45.46	45.36
	Imp [A]	12.6	12.51	12.43	12.35
BNPI condition	Pmax [W] /Tolerance	630/±3%	625/±3%	620/±3%	615/±3%
	Voc [V] /Tolerance	53.82/±5%	53.72/±5%	53.63/±5%	53.51/±5%
	Isc [A] /Tolerance	15.08/±5%	14.97/±5%	14.88/±5%	14.81/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 144 545 / PIX MBHDTB 144 545	PIX MBHTB 144 540 / PIX MBHDTB 144 540	PIX MBHTB 144 535 / PIX MBHDTB 144 535	PIX MBHTB 144 530 / PIX MBHDTB 144 530
STC condition	Pmax [W] /Tolerance	545/±3%	540/±3%	535/±3%	530/±3%
	Voc [V] /Tolerance	49.65/±5%	49.50/±5%	49.35/±5%	49.20/±5%
	Isc [A] /Tolerance	13.92/±5%	13.85/±5%	13.78/±5%	13.71/±5%
	Vmp [V]	41.80	41.65	41.50	41.35
	Imp [A]	13.04	12.97	12.90	12.82
BNPI condition	Pmax [W] /Tolerance	600/±3%	595/±3%	590/±3%	585/±3%
	Voc [V] /Tolerance	49.65/±5%	49.50/±5%	49.35/±5%	49.20/±5%
	Isc [A] /Tolerance	15.31/±5%	15.21/±5%	15.15/±5%	15.06/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 144 525/ PIX MBHDTB 144 525	PIX MBHTB 144 520 / PIX MBHDTB 144 520	PIX MBHTB 144 515 / PIX MBHDTB 144 515	PIX MBHTB 144 510 / PIX MBHDTB 144 510
STC condition	Pmax [W] /Tolerance	525/±3%	520/±3%	515/±3%	510/±3%
	Voc [V] /Tolerance	49.05/±5%	48.85/±5%	48.62/±5%	48.47/±5%
	Isc [A] /Tolerance	13.65/±5%	13.61/±5%	13.55/±5%	13.45/±5%
	Vmp [V]	41.20	41.05	40.91	40.86
	Imp [A]	12.75	12.67	12.59	12.49
BNPI condition	Pmax [W] /Tolerance	580/±3%	570/±3%	565/±3%	560/±3%
	Voc [V] /Tolerance	49.05/±5%	48.85/±5%	48.62/±5%	48.47/±5%
	Isc [A] /Tolerance	14.96/±5%	14.86/±5%	14.76/±5%	14.66/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 132 500 / PIX MBHDTB 132	PIX MBHTB 132 495 / PIX MBHDTB 132	PIX MBHTB 132 490 / PIX MBHDTB 132 490	PIX MBHTB 132 485 / PIX

		500	495		MBHDTB 132 485
STC condition	Pmax [W] /Tolerance	500/±3%	495/±3%	490/±3%	485/±3%
	Voc [V] /Tolerance	46.46/±5%	46.37/±5%	46.26/±5%	46.15/±5%
	Isc [A] /Tolerance	13.49/±5%	13.36/±5%	13.27/±5%	13.19/±5%
	Vmp [V]	38.89	38.76	38.53	38.43
	Imp [A]	12.86	12.78	12.72	12.63
BNPI condition	Pmax [W] /Tolerance	550/±3%	545/±3%	540/±3%	535/±3%
	Voc [V] /Tolerance	46.46/±5%	46.37/±5%	46.26/±5%	46.15/±5%
	Isc [A] /Tolerance	15.1/±5%	15.01/±5%	14.92/±5%	14.83/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 132 480 / PIX MBHDTB 132 480	PIX MBHTB 132 475 / PIX MBHDTB 132 475	PIX MBHTB 132 470 / PIX MBHDTB 132 470	-
STC condition	Pmax [W] /Tolerance	480/±3%	475/±3%	470/±3%	
	Voc [V] /Tolerance	46.06/±5%	45.96/±5%	45.87/±5%	
	Isc [A] /Tolerance	13.1/±5%	12.99/±5%	12.88/±5%	
	Vmp [V]	38.32	38.22	38.12	
	Imp [A]	12.53	12.43	12.33	
BNPI condition	Pmax [W] /Tolerance	530/±3%	520/±3%	515/±3%	
	Voc [V] /Tolerance	46.06/±5%	45.96/±5%	45.87/±5%	
	Isc [A] /Tolerance	14.7/±5%	14.57/±5%	14.45/±5%	
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	
	φVoc	100±10%	100±10%	100±10%	
	φIsc	75±10%	75±10%	75±10%	
	Maximum system voltage [V]	1500	1500	1500	
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	
	Module type	PIX MBHTB 120 455 / PIX MBHDTB 120 455	PIX MBHTB 120 450 / PIX MBHDTB 120 450	PIX MBHTB 120 445 / PIX MBHDTB 120 445	PIX MBHTB 120 440 / PIX MBHDTB 120 440
STC condition	Pmax [W] /Tolerance	455/±3%	450/±3%	445/±3%	440/±3%
	Voc [V] /Tolerance	41.62/±5%	41.52/±5%	41.43/±5%	41.31/±5%
	Isc [A] /Tolerance	13.97/±5%	13.89/±5%	13.79/±5%	13.68/±5%
	Vmp [V]	36.52	36.42	36.29	36.18
	Imp [A]	12.46	12.36	12.27	12.17
BNPI condition	Pmax [W] /Tolerance	500/±3%	495/±3%	490/±3%	485/±3%
	Voc [V] /Tolerance	41.62/±5%	41.52/±5%	41.43/±5%	41.31/±5%
	Isc [A] /Tolerance	15.38/±5%	15.26/±5%	15.14/±5%	15.02/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 120 435 / PIX MBHDTB 120 435	PIX MBHTB 120 430 / PIX MBHDTB 120 430	PIX MBHTB 120 425 / PIX MBHDTB 120 425	PIX MBHTB 120 420 / PIX MBHDTB 120 420
STC condition	Pmax [W] /Tolerance	435/±3%	430/±3%	425/±3%	420/±3%
	Voc [V] /Tolerance	41.22/±5%	41.11/±5%	40.98/±5%	40.87/±5%

	Isc [Ade] /Tolerance	13.57/±5%	13.47/±5%	13.38/±5%	13.27/±5%
	Vmp [V]	36.05	35.98	35.81	35.69
	Imp [Ade]	12.07	11.96	11.87	11.77
BNPI condition	Pmax [W] /Tolerance	480/±3%	475/±3%	470/±3%	465/±3%
	Voc [V] /Tolerance	41.22/±5%	41.11/±5%	40.98/±5%	40.87/±5%
	Isc [Ade] /Tolerance	14.9/±5%	14.78/±5%	14.66/±5%	14.54/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 108 410 / PIX MBHDTB 108 410	PIX MBHTB 108 405 / PIX MBHDTB 108 405	PIX MBHTB 108 400 / PIX MBHDTB 108 400	PIX MBHTB 108 395 / PIX MBHDTB 108 395
STC condition	Pmax [W] /Tolerance	410 /±3%	405 /±3%	400 /±3%	395 /±3%
	Voc [V] /Tolerance	37.34/±5%	37.14/±5%	36.94/±5%	36.75/±5%
	Isc [Ade] /Tolerance	13.76/±5%	13.65/±5%	13.58/±5%	13.47/±5%
	Vmp [V]	31.22	31.02	30.82	30.65
	Imp [Ade]	13.14	13.06	12.99	12.89
BNPI condition	Pmax [W] /Tolerance	450/±3%	445/±3%	440/±3%	435/±3%
	Voc [V] /Tolerance	37.34/±5%	37.14/±5%	36.94/±5%	36.75/±5%
	Isc [Ade] /Tolerance	15.35/±5%	15.23/±5%	15.11/±5%	14.99/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 108 390 / PIX MBHDTB 108 390	PIX MBHTB 120 385 / PIX MBHDTB 108 385	PIX MBHTB 120 380 / PIX MBHDTB 108 380	PIX MBHTB 120 375 / PIX MBHDTB 108 375
STC condition	Pmax [W] /Tolerance	390 /±3%	385 /±3%	380 /±3%	375 /±3%
	Voc [V] /Tolerance	36.65/±5%	36.54/±5%	36.45/±5%	36.34/±5%
	Isc [Ade] /Tolerance	13.38/±5%	13.33/±5%	13.17/±5%	13.07/±5%
	Vmp [V]	30.55	30.42	30.25	30.13
	Imp [Ade]	12.78	12.67	12.55	12.46
BNPI condition	Pmax [W] /Tolerance	430/±3%	425/±3%	420/±3%	455/±3%
	Voc [V] /Tolerance	36.65/±5%	36.54/±5%	36.45/±5%	36.34/±5%
	Isc [Ade] /Tolerance	14.87/±5%	14.76/±5%	14.64/±5%	14.53/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 156 490	PIX MBHTB 156 485	PIX MBHTB 156 480	PIX MBHTB 156 475
STC condition	Pmax [W] /Tolerance	490/±3%	485/±3%	480/±3%	475/±3%
	Voc [V] /Tolerance	53.72/±5%	53.63/±5%	53.52/±5%	53.41/±5%
	Isc [Ade] /Tolerance	11.78/±5%	11.67/±5%	11.56/±5%	11.48/±5%
	Vmp [V]	45.94	45.85	45.78	45.69
	Imp [Ade]	10.67	10.58	10.49	10.4
BNPI	Pmax [W] /Tolerance	540/±3%	535/±3%	530/±3%	520/±3%

condition	Voc [V] /Tolerance	53.72/±5%	53.63/±5%	53.52/±5%	53.41/±5%
	Isc [A] /Tolerance	12.78/±5%	12.66/±5%	12.55/±5%	12.44/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 156 470	PIX MBHTB 156 465	PIX MBHTB 156 460	
STC condition	Pmax [W] /Tolerance	470/±3%	465/±3%	460/±3%	
	Voc [V] /Tolerance	53.29/±5%	53.23/±5%	53.16/±5%	
	Isc [A] /Tolerance	11.39/±5%	11.28/±5%	11.18/±5%	
	Vmp [V]	45.6	45.5	45.41	
	Imp [A]	10.31	10.22	10.13	
BNPI condition	Pmax [W] /Tolerance	515/±3%	510/±3%	505/±3%	
	Voc [V] /Tolerance	53.29/±5%	53.23/±5%	53.16/±5%	
	Isc [A] /Tolerance	12.39/±5%	12.21/±5%	12.12/±5%	
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	
	φVoc	100±10%	100±10%	100±10%	
	φIsc	75±10%	75±10%	75±10%	
	Maximum system voltage [V]	1500	1500	1500	
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	
	Module type	PIX MBHTB 144 450	PIX MBHTB 144 445	PIX MBHTB 144 440	PIX MBHTB 144 435
STC condition	Pmax [W] /Tolerance	450 /±3%	445/±3%	440 /±3%	435 /±3%
	Voc [V] /Tolerance	49.3/±5%	49.1/±5%	48.9/±5%	48.7/±5%
	Isc [A] /Tolerance	11.6/±5%	11.53/±5%	11.46/±5%	11.39/±5%
	Vmp [V]	41.48	41.28	41.09	40.89
	Imp [A]	10.85	10.78	10.71	10.64
BNPI condition	Pmax [W] /Tolerance	495/±3%	490/±3%	485/±3%	480/±3%
	Voc [V] /Tolerance	49.3/±5%	49.1/±5%	48.9/±5%	48.7/±5%
	Isc [A] /Tolerance	12.73/±5%	12.63/±5%	12.54/±5%	12.47/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 144 430	PIX MBHTB 144 425	PIX MBHTB 144 420	
STC condition	Pmax [W] /Tolerance	430/±3%	425/±3%	420/±3%	
	Voc [V] /Tolerance	48.5/±5%	48.3/±5%	48.1/±5%	
	Isc [A] /Tolerance	11.31/±5%	11.22/±5%	11.15/±5%	
	Vmp [V]	40.61	40.44	40.32	
	Imp [A]	10.59	10.51	10.42	
BNPI condition	Pmax [W] /Tolerance	475/±3%	465/±3%	460/±3%	
	Voc [V] /Tolerance	48.5/±5%	48.3/±5%	48.1/±5%	
	Isc [A] /Tolerance	12.41/±5%	12.25/±5%	12.14/±5%	
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	
	φVoc	100±10%	100±10%	100±10%	
	φIsc	75±10%	75±10%	75±10%	
	Maximum system voltage [V]	1500	1500	1500	
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	

	Module type	PIX MBHTB 132 410	PIX MBHTB 132 405	PIX MBHTB 132 400	PIX MBHTB 132 395
STC condition	Pmax [W] /Tolerance	410/±3%	405/±3%	400/±3%	395/±3%
	Voc [V] /Tolerance	45.42/±5%	45.3/±5%	45.18/±5%	45.09/±5%
	Isc [A] /Tolerance	11.62/±5%	11.53/±5%	11.43/±5%	11.35/±5%
	Vmp [V]	38.76	38.65	38.58	38.47
	Imp [A]	10.58	10.49	10.37	10.29
BNPI condition	Pmax [W] /Tolerance	450/±3%	445/±3%	440/±3%	435/±3%
	Voc [V] /Tolerance	45.42/±5%	45.3/±5%	45.18/±5%	45.09/±5%
	Isc [A] /Tolerance	12.68/±5%	12.58/±5%	12.48/±5%	12.37/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 132 390	PIX MBHTB 132 385	PIX MBHTB 132 380	
STC condition	Pmax [W] /Tolerance	390 /±3%	385/±3%	380 /±3%	
	Voc [V] /Tolerance	44.58/±5%	44.47/±5%	44.38/±5%	
	Isc [A] /Tolerance	11.24/±5%	11.12/±5%	11.01/±5%	
	Vmp [V]	38.37	38.25	38.01	
	Imp [A]	10.17	10.07	10.01	
BNPI condition	Pmax [W] /Tolerance	430/±5%	425/±5%	420/±5%	
	Voc [V] /Tolerance	44.58/±5%	44.47/±5%	44.38/±5%	
	Isc [A] /Tolerance	12.33/±5%	12.23/±5%	12.0/±5%	
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	
	φVoc	100±10%	100±10%	100±10%	
	φIsc	75±10%	75±10%	75±10%	
	Maximum system voltage [V]	1500	1500	1500	
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	
	Module type	PIX MBHTB 120 375	PIX MBHTB 120 370	PIX MBHTB 120 365	PIX MBHTB 120 360
STC condition	Pmax [W] /Tolerance	375/±3%	370/±3%	365 /±3%	360 /±3%
	Voc [V] /Tolerance	41.4/±5%	41.3/±5%	41.2/±5%	41.1/±5%
	Isc [A] /Tolerance	11.75/±5%	11.67/±5%	11.48/±5%	11.37/±5%
	Vmp [V]	35.54	35.22	35.13	35.02
	Imp [A]	10.62	10.51	10.39	10.28
BNPI condition	Pmax [W] /Tolerance	410/±3%	405/±3%	400/±3%	395/±3%
	Voc [V] /Tolerance	41.4/±5%	41.3/±5%	41.2/±5%	41.1/±5%
	Isc [A] /Tolerance	12.55/±5%	12.43/±5%	12.31/±5%	12.17/±5%
Bifaciality coefficient	φPmax	75±10%	75±10%	75±10%	75±10%
	φVoc	100±10%	100±10%	100±10%	100±10%
	φIsc	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A
	Module type	PIX MBHTB 120 355	PIX MBHTB 120 350	PIX MBHTB 120 345	PIX MBHTB 120 340
STC condition	Pmax [W] /Tolerance	355 /±3%	350 /±3%	345 /±3%	340 /±3%
	Voc [V] /Tolerance	41/±5%	40.9/±5%	40.8/±5%	40.7/±5%
	Isc [A] /Tolerance	11.25/±5%	11.12/±5%	11.03/±5%	10.89/±5%
	Vmp [V]	34.95	34.8	34.68	34.52
	Imp [A]	10.17	10.06	9.95	9.86
BNPI condition	Pmax [W] /Tolerance	390/±3%	385/±3%	380/±3%	375/±3%

	Voc [V] /Tolerance	41/±5%	40.9/±5%	40.8/±5%	40.7/±5%
	Isc [A] /Tolerance	12.05/±5%	11.93/±5%	11.81/±5%	11.71/±5%
Bifaciality coefficient	ϕP_{max}	75±10%	75±10%	75±10%	75±10%
	ϕV_{oc}	100±10%	100±10%	100±10%	100±10%
	ϕI_{sc}	75±10%	75±10%	75±10%	75±10%
	Maximum system voltage [V]	1500	1500	1500	1500
	Maximum Over-Current Protection Rating [A]	30 A	30 A	30 A	30 A

Module technology	Temperature Coefficient	NOCT
Mono- facial /Bifacial Module	$\alpha = 0.04\%/^{\circ}\text{C}$	$45 \pm 2^{\circ}\text{C}$
	$\beta = -0.24\%/^{\circ}\text{C}$	
	$\gamma = -0.31\%/^{\circ}\text{C}$	

Note: - * Please refer latest Module datasheet for more details.

Bifurcation of serial Number “PG230210000001”

PG – ‘Pixon Green’ 23 – ‘Year of Manufacturing’

02 – ‘Month of Manufacturing’ 10 – ‘Day of PO Generation date, 000001 – ‘Last digit of Serial number’

4-01 Cell Datasheet



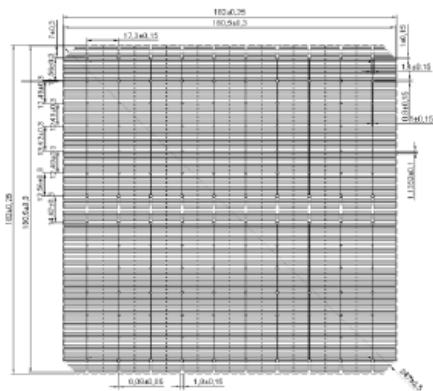
爱旭太阳能

单晶 182-247-10BB-160F-BBD17.3 双面 PERC 电池 (A-V6.2)

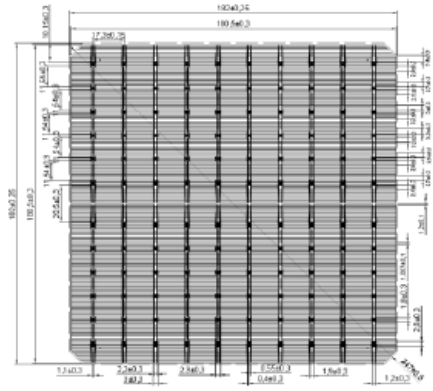
外观描述 Appearance Description		
产品型号	Product type	7M9E1018A-L1
尺寸	Dimension	182mm×182mm±0.25mm (φ247mm±0.5mm)
成品物料号	Cell product number	60002517/60002528
厚度(电池片)	Thickness (Cell)	170μm±17μm (掺 NB)
正面 (-)	Front Side (-)	二氧化硅+蓝色氮化硅复合减反膜 (PID Free) ; 半片设计; Silicon oxide + blue silicon nitride compound anti-reflection coating (PID Free) ; Half-cut design;
背面 (+)	Back Side (+)	钝化复合层 (氧化铝及氮化硅); Passivated layer (AlOx and SiNx) and Rear Contact (Al).

电池片外观 Cell Appearance

正面外观 Front Side Appearance



背面外观 Rear Side Appearance



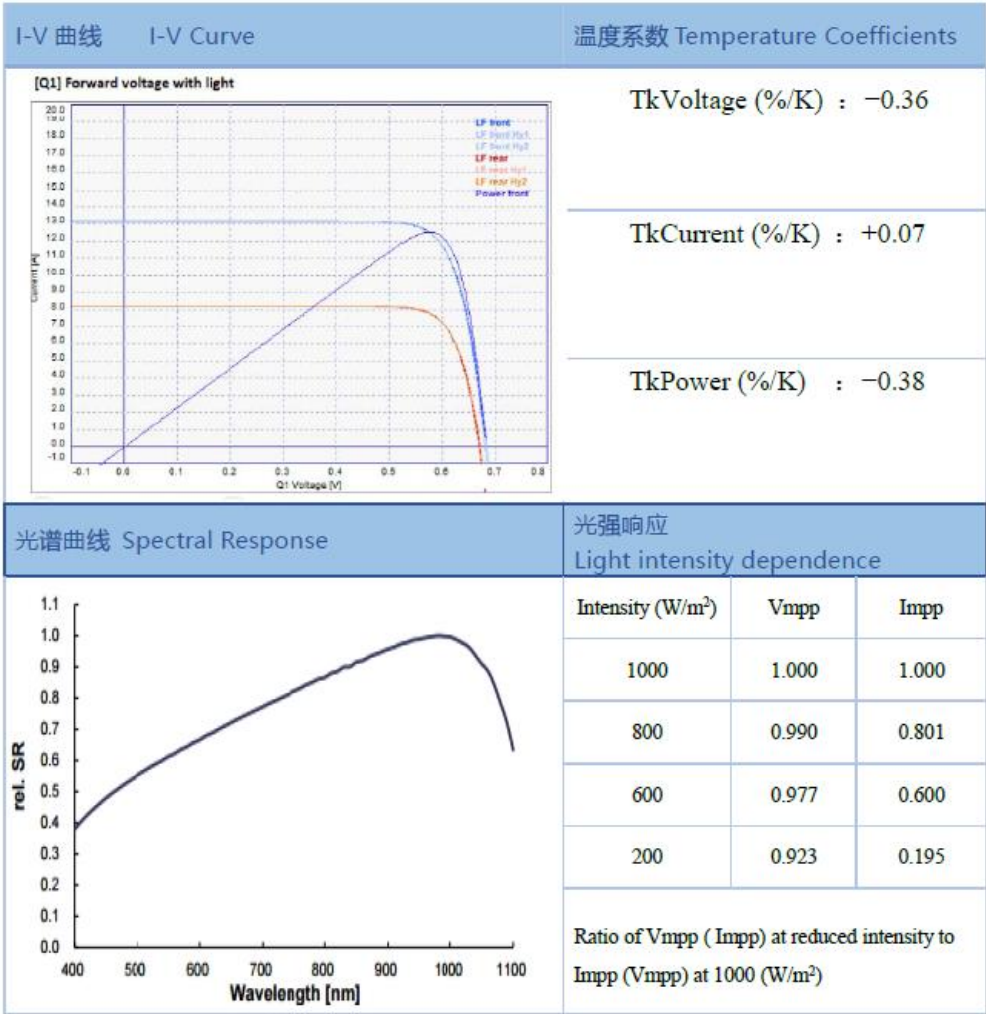
图形描述 Graphical Description		
参数项目 Item		规格 Spec
正面 Front Side	主栅数量	Number of busbars
	细栅线数量	Number of fingers
	正面主栅线宽度	Width of front busbar
	主栅线间距	Distance between busbars
背面 Back Side	主栅数量	Number of busbars
	背面主栅线宽度	width of rear busbar
	背铝栅线数量	Number of rear Al fingers
	电极分段数量	Number of Ag electrode sections



电性能参数 Electrical Characteristics

Eff (%)	Pmpp (W)	Ump(V)	Imp(A)	Voc(V)	Isc(A)	FF(%)
23.70-23.80	7.82	0.616	12.695	0.6972	13.471	83.26
23.60-23.70	7.79	0.614	12.687	0.6957	13.458	83.20
23.50-23.60	7.76	0.612	12.680	0.6943	13.445	83.13
23.40-23.50	7.73	0.610	12.672	0.6930	13.429	83.06
23.30-23.40	7.69	0.607	12.669	0.6908	13.412	83.00
23.20-23.30	7.66	0.605	12.661	0.6893	13.400	82.93
23.10-23.20	7.63	0.603	12.648	0.6875	13.394	82.86
23.00-23.10	7.59	0.601	12.629	0.6862	13.358	82.80
22.90-23.00	7.56	0.599	12.621	0.6850	13.341	82.73
22.80-22.90	7.53	0.597	12.613	0.6837	13.324	82.66
22.70-22.80	7.49	0.595	12.584	0.6830	13.300	82.48
22.60-22.70	7.46	0.593	12.581	0.6822	13.285	82.32
22.50-22.60	7.43	0.591	12.578	0.6812	13.278	82.11
22.40-22.50	7.40	0.589	12.564	0.6795	13.278	81.97
22.30-22.40	7.36	0.587	12.538	0.6781	13.269	81.81
22.20-22.30	7.33	0.585	12.537	0.6765	13.257	81.71
22.10-22.20	7.30	0.583	12.524	0.675	13.249	81.59
22.00-22.10	7.26	0.580	12.51	0.6738	13.240	81.40
21.90-22.00	7.23	0.579	12.495	0.6728	13.227	81.23
21.80-21.90	7.20	0.577	12.482	0.6715	13.214	81.09
21.70-21.80	7.16	0.575	12.459	0.6708	13.202	80.88
21.60-21.70	7.13	0.573	12.443	0.6691	13.199	80.73
21.50-21.60	7.10	0.571	12.439	0.6678	13.186	80.59
21.40-21.50	7.07	0.569	12.424	0.6668	13.177	80.46
21.30-21.40	7.03	0.567	12.403	0.6652	13.154	80.35
21.20-21.30	7.00	0.566	12.375	0.6644	13.126	80.24
21.10-21.20	6.97	0.564	12.36	0.663	13.114	80.12
21.00-21.10	6.93	0.562	12.325	0.6622	13.08	80.03

标准测试条件: 1000W/m², AM1.5, 25°C



注：以上技术参数受限于技术变更及测试，爱旭太阳能保留最终解释权。



182 Monocrystalline Bifacial PERC Solar Cell

S18210BB023



FEATURES

- Ultra-Efficient solar cells with an anisotropically etched surface
- Low pressure diffusion with good uniformity Silver
- front contact bars and aluminum local back surface file
- Silicon nitride anti-reflection coating

Physical Characteristics

Substrate material	P-type mono-crystalline silicon wafer-PERC
Cell thickness	175 μ m $\pm$ 17.5 μ m
Dimension	182mm*182mm $\pm$ 0.5mm
Diagonal	247mm $\pm$ 0.5mm
Front (-)	10*0.08mm $\pm$ 0.03mm bus bars (silver) 152 lines, Silicon oxide + blue silicon nitride compound anti-reflection coating(PID Free)
Back (+)	1.4 $\pm$ 0.3mm wide soldering pads (silver) , Aluminum oxide and Aluminum lines back-surface field, Laser design of vertical bus bars

Front silver pastes: DKEM Series , FUSION Series , Hereus

Series, isilver materials ;

Aluminum pastes: Rutech Series , T-SUN Series BP-1, mono;

Back silver pastes: Rutech Series, Gonda Series, SUNGROUP Series, HOYI Series

Efficiency	%	23.2	23.1	23.0	22.9	22.8	22.7	22.6	22.5	22.4	22.3	22.2
Voc	V	0.688	0.687	0.686	0.685	0.684	0.683	0.682	0.681	0.680	0.679	0.678
Isc	A	13.623	13.592	13.563	13.534	13.503	13.478	13.453	13.428	13.403	13.381	13.359
Vmpp	V	0.598	0.597	0.596	0.595	0.594	0.593	0.592	0.591	0.590	0.589	0.588
Imp	A	12.808	12.774	12.741	12.706	12.672	12.638	12.604	12.569	12.534	12.500	12.465
Pmpp	W	7.66	7.63	7.59	7.56	7.53	7.49	7.46	7.43	7.40	7.36	7.33

Specifications subjects to technical changes and test , Jiangsu Longheng new energy Co., Ltd reserves the right of final interpretation

TkPower	-(0.39±0.02) %/k
TkVoltage	-(0.33±0.03) %/k
TkCurrent	+(0.06±0.015) %/k

Jiangsu Longheng new energy Co., Ltd | Tel: 0527-80515955 |
Add: No.1299, Shanghai Road, Suqian City, Jiangsu Province, China

Annex 6: TEST RESULTS

TABLE 09: MQT 18: Bypass diode thermal test					P
Test Date [YYYY-MM-DD] start/end :	2024-07-26				—
Sample #	E13				—
Module temperature [°C] :	76.6				—
Number of diodes in junction box :	03				—
Diode manufacturer :	SUNTER				—
Diode type designation :	40SQ045				—
Max. permissible junction temperature, T_{Jmax} [°C] (according to diode datasheet) :	200				—
Detailed description of sample preparation procedure :	Sense wires was connected to each diode				—
Step 1, Determination of V_D versus T_J characteristic					—
	30 ± 2 °C	50 ± 2 °C	70 ± 2 °C	90 ± 2 °C	
Ambient temperature of the junction box :	31.0	51.3	70.5	90.4	
Pulsed current:	15	15	15	15	
Voltage drop, V_D [V] :	0.445	0.432	0.412	0.392	
Voltage drop, V_D [V] :	0.405	0.393	0.380	0.355	
Voltage drop, V_D [V] :	0.447	0.434	0.414	0.394	
V_D versus T_J characteristic :	$y = -1107.2x + 525.28$				
V_D versus T_J characteristic :	$y = -1183.9x + 513.75$				
V_D versus T_J characteristic :	$y = -1107.2x + 527.5$				
Max. permissible junction temperature T_{Jmax} [°C] (according to diode datasheet) :	200				—
Step 2, Bypass diode thermal test					—
	Diode 1	Diode 2	Diode 3	Result	
Current flow applied [A] :	15.0	15.0	15.0	—	
Max. diode surface temperature allowed T_{Jmax} [°C] :	200	200	200	—	
Voltage drop, V_D [V] after 1h :	0.3074	0.2729	0.3141	—	
Calculated max. junction temperature T_{Jcalc} [°C] :	131.8	135.0	132.7	P	
$T_{Jcalc} < T_{Jmax}$ (test passed)? yes/no :	YES	YES	YES	P	
Current flow (1.25 * I_{sc}) [A] :	18.75	18.75	18.75	—	
Bypass diode remain(s) functional (yes/no) :	Yes	Yes	Yes	P	
Remarks: See Table 10 for the test details of bypass diode functionality test. 3 Diodes are considered as representative number. These diodes have to be selected as worst case. In case that additional bypass diodes tests are performed the results shall be listed in an attachment. For bifacial modules, use the value of the short-circuit current at elevated irradiance BSI (equivalent to 1 000 W/m ² on the front side and 300 W/m ² on the back side). Extrapolate I_{sc-BSI} , these quantities are combined as follows: $I_{sc-BSI}=I_{sc-BNPI}+(I_{sc-BNPI}-I_{sc})(G_{BSI}-G_{BNPI})/(G_{BNPI}-1\ 000)$, $G_{BSI}=1\ 000+300\phi$, $G_{BNPI}=1\ 000+135\phi$, $\phi=\text{Min}(\phi/I_{sc}, \phi/P_{max})$					

Max. diode surface temperature allowed T_{jmax} [°C] :	200	200	200	P
Voltage drop, V_D [V] after 1h :	0.3138	0.3093	0.3220	P
Calculated max. junction temperature T_{jcalc} [°C] :	136.4	137.0	139.6	P
$T_{jcalc} < T_{jmax}$ (test passed)? yes/no :	YES	YES	YES	P
Current flow ($1.25 * I_{sc}$) [A] :	18.75	18.75	18.75	P
Bypass diode remain(s) functional (yes/no) :	Yes	Yes	Yes	P
Remarks: See Table 10 for the test details of bypass diode functionality test. 3 Diodes are considered as representative number. These diodes have to be selected as worst case. In case that additional bypass diodes tests are performed the results shall be listed in an attachment. For bifacial modules, use the value of the short-circuit current at elevated irradiance BSI (equivalent to 1 000 W/m² on the front side and 300 W/m² on the back side). Extrapolate I_{sc-BSI}, these quantities are combined as follows: $I_{sc-BSI} = I_{sc-BNPI} + (I_{sc-BNPI} - I_{sc})(G_{BSI} - G_{BNPI}) / (G_{BNPI} - 1\ 000)$, $G_{BSI} = 1\ 000 + 300\phi$, $G_{BNPI} = 1\ 000 + 135\phi$, $\phi = \text{Min}(\phi_{sc}, \phi P_{max})$				

TABLE 11: MQT 09 - Hot-spot endurance test		
Test Date [YYYY-MM-DD] start/end :	2024-07-31 / 2024-08-05	—
Sample #	E13	—
Procedure of technology :	☒ wafer-based technologies (WBT) MQT 09.1 ☐ monolithically integrated (MLI) thin film technologies MQT 09.2	—
Cell interconnection circuit :	☐ S ☒ SP ☐ PS	—
Type of light source :	☐ Pulse solar simulator ☒ Steady state solar simulator ☐ Natural sunlight	—
Module temperature at thermal equilibrium [°C] :	48.0	—

TABLE 11.1: MQT 09 - Hot-spot endurance test for WBT						
Selected hot-spot cells :	Low	Low	Low	High	Permanent	—
	1C	3V	4A	3B	N/A	
Shading rate [%] :	22	23	22	12	N/A	—
Max. measured cell temperature in each cell [°C]:	73.7	134.0	134.7	145.3	N/A	—
Test duration of each shading [h] :	1	1	1	1	N/A	—
Irradiance during shading [W/m²] :	1195	1195	1197	1195	N/A	—
Supplementary information: For bifacial modules, determination of the cell shading percent and the prolonged exposure are performed at the elevated irradiance BSI. If double-side illumination is used to produce BSI, both the back and the front of the cell are shaded in the same way. During cell selection, any cell that is permanently shaded by a module feature (such as the junction box) is added to the list of selected cells						

TABLE 13: MQT 20 - Cyclic (dynamic) mechanical Load test		P
Test Date [MM/DD/YYYY].....:	2024-05-22	—
Sample #	C05	—
Temperature of tested module(°C):	27.4	—
Maximum pressure (Pa) :	1000	—
Pressure tolerance(Pa) :	1000±100	—
Monitoring current (A) :	140mA	—
Rate per minute(cycles) :	6	—
Number of cycles	1000	—
Pressure provider (Air pressure or vacuum).....:	vacuum	—
Cell and alive part broken/ not	Not	P
Current continuous (continuous/ disconnection occurred)	continuous	P
Supplementary information: N/A		

TABLE 13: MQT 20 - Cyclic (dynamic) mechanical Load test		P
Test Date [MM/DD/YYYY].....:	2024-05-23	—
Sample #	E04	—
Temperature of tested module(°C):	27.4	—
Maximum pressure (Pa) :	1000	—
Pressure tolerance(Pa) :	1000±100	—
Monitoring current (A) :	140mA	—
Rate per minute(cycles) :	6	—
Number of cycles	1000	—
Pressure provider (Air pressure or vacuum).....:	vacuum	—
Cell and alive part broken/ not	Not	P
Current continuous (continuous/ disconnection occurred)	continuous	P
Supplementary information: N/A		

TABLE 13: MQT 20 - Cyclic (dynamic) mechanical Load test		P
Test Date [MM/DD/YYYY].....:	2024-05-23	—
Sample #	E05	—
Temperature of tested module(°C):	27.6	—
Maximum pressure (Pa) :	1000	—
Pressure tolerance(Pa) :	1000±100	—
Monitoring current (A) :	140mA	—
Rate per minute(cycles) :	6	—
Number of cycles	1000	—
Pressure provider (Air pressure or vacuum).....:	vacuum	—
Cell and alive part broken/ not	Not	P
Current continuous (continuous/ disconnection occurred)	continuous	P
Supplementary information: N/A		

TABLE 19: MQT 16 Static mechanical load test			P
Sample # :	E06		—
Design load(front side/ back side) :	3600/1600		—
Safety factors :	1.5		—
Test Date [YYYY-MM-DD]	2024-06-17		—
Mounting method :	Nut and bolt		—
Load applied to :	front side	back side	—
Mechanical load [Pa] :	5400	2400	—
First cycle time (start/end) :	08:45/09:45	09:50/10:50	—
Intermittent open-circuit (yes/no) :	No	No	P
Second cycle time (start/end):	11:00/12:00	12:05/13:05	—
Intermittent open-circuit (yes/no) :	No	No	P
Third cycle time (start/end) :	13:15/14:15	14:20/15:20	—
Intermittent open-circuit (yes/no) :	No	No	P
Supplementary information: may need to be performed with each mounting situation			

TABLE 19: MQT 16 Static mechanical load test			P
Sample # :	C28		—
Design load(front side/ back side) :	3600/1600		—
Safety factors :	1.5		—
Test Date [YYYY-MM-DD]	2024-08-01		—
Mounting method :	Nut and bolt		—
Load applied to :	front side	back side	—
Mechanical load [Pa] :	5400	2400	—
First cycle time (start/end) :	08:45/09:45	09:55/10:55	—
Intermittent open-circuit (yes/no) :	No	No	P
Second cycle time (start/end):	11:05/12:05	12:10/13:10	—
Intermittent open-circuit (yes/no) :	No	No	P
Third cycle time (start/end) :	13:20/14:20	14:30/15:30	—
Intermittent open-circuit (yes/no) :	No	No	P
Supplementary information: may need to be performed with each mounting situation			

TABLE 19: MQT 16 Static mechanical load test			P
Sample # :	E28		—
Design load(front side/ back side) :	3600/1600		—
Safety factors :	1.5		—
Test Date [YYYY-MM-DD]	2024-08-02		—
Mounting method :	Nut and bolt		—
Load applied to :	front side	back side	—
Mechanical load [Pa] :	5400	2400	—
First cycle time (start/end) :	09:00/10:00	10:05/11:05	—
Intermittent open-circuit (yes/no) :	No	No	P
Second cycle time (start/end):	11:10/12:10	12:15/13:15	—
Intermittent open-circuit (yes/no) :	No	No	P
Third cycle time (start/end) :	13:25/14:25	14:30/15:30	—
Intermittent open-circuit (yes/no) :	No	No	P
Supplementary information: may need to be performed with each mounting situation			

