



# URS PRODUCTS AND TESTING PRIVATE LIMITED

A-29, Sector-5, Noida-201301  
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E info@urs-labs.com W www.urs-labs.com  
CIN NO U21014UP1987PTC008956



## SUMMARY OF TEST REPORT

TEST REPORT NO: SC24SPI00462\_1

DATE: 11/06/2024

(Total Number of Pages in Test Report: 43)

### TEST FORMAT AS PER IS 14286: 2010

1. Name of the Manufacturer: Icon Solar En Power Technologies Private Limited

2. Product: Crystalline silicon terrestrial photovoltaic (PV) modules (Si wafer based).

3. Model Tested: ISEN620N-TOP

Series Model:

**156 Half cut cell family with system voltage 1500V**

ISEN615N-TOP, ISEN610N-TOP, ISEN605N-TOP, ISEN600N-TOP

**144 Half cut cell family with system voltage 1500V**

ISEN590N-TOP, ISEN585N-TOP, ISEN580N-TOP, ISEN575N-TOP, ISEN570N-TOP, ISEN565N-TOP, ISEN560N-TOP

**132 Half cut cell family with system voltage 1500V**

ISEN540N-TOP, ISEN535N-TOP, ISEN530N-TOP, ISEN525N-TOP, ISEN520N-TOP

**120 Half cut cell family with system voltage 1500V**

ISEN500N-TOP, ISEN495N-TOP, ISEN490N-TOP, ISEN485N-TOP, ISEN480N-TOP, ISEN475N-TOP, ISEN470N-TOP, ISEN465N-TOP, ISEN460N-TOP

**108 Half cut cell family with system voltage 1500V**

ISEN440N-TOP, ISEN435N-TOP, ISEN430N-TOP, ISEN425N-TOP, ISEN420N-TOP

4. Model differences provided (if applicable): Yes

5. Model differences verified as per MNRE Guidelines for series approval: Yes

6. Test Results:

SL. NO.	TEST REQUIREMENT	CLAUSE	VERDICT
1	Marking	4.0	P
2	Visual Inspection	10.1	P
3	Maximum Power Determination	10.2	P
4	Insulation Test	10.3	P
5	Measurement of Temperature Coefficients.	10.4	P
6	Measurement of NOCT	10.5	P
7	Performance at STC and NOCT	10.6	P
8	Performance at low irradiance.	10.7	P
9	Outdoor exposure test	10.8	P
10	Hot-spot endurance test	10.9	P



ULR- TC646824100003977F  
Group-Miscellaneous product

Discipline-Electronics Testing



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11	UV preconditioning	10.10	P
12	Thermal cycling test	10.11	P
13	Humidity freeze test	10.12	P
14	Damp heat test	10.13	P
15	Robustness of termination test	10.14	P
16	Wet leakage current test	10.15	P
17	Mechanical load test	10.16	P
18	Hail test	10.17	P
19	Bypass diode thermal test	10.18	P

### General Information:

1. The conformity certificates of components/parts wherever applicable are verified to ensure complete testing of products under test and details regarding harmonized IEC standards (where IS standards are not available) are also provided in the list of components/parts (description of module construction) wherever applicable.

### CONCLUSION:

1. Sample meets all relevant requirements of IS 14286: 2010
2. Sample fails to meet the following test requirements:

I, hereby undertake that the verdict stated in the test reports for all the test matches with the test results. The sample meets/~~does not meets~~ all relevant requirements stated above of IS 14286: 2010.

Date: 11/06/2024



(Signature of Authorized person with Stamp)



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TC-6468

Test Report No: SC24SPI00462\_1  
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<b>TEST REPORT</b> <b>IS 14286:2010</b> <b>Crystalline Silicon Terrestrial Photovoltaic(PV) Modules</b> <b>-Design Qualification and Type Approval</b>	
Report Reference No.....:	SC24SPI00462_1
Date of issue.....:	11/06/2024
Total number of pages.....:	43
Testing Laboratory.....:	URS PRODUCTS AND TESTING PRIVATE LIMITED
Address.....:	A-29, Sector 5, Noida-201301, India
Applicant's name.....:	<b>Icon Solar En Power Technologies Private Limited</b>
Address.....:	PH. NO.09, GRAM DIGHARI MANDIR HASAUD, TEH ARANG CHHATTISGARH RAIPUR 492001
Test specification.....:	
Standard.....:	IS 14286: 2010
Test procedure.....:	Compliance report
Non-standard test method.....:	N/A
Test Report Form No. ....:	IS 14286_V1.0
Test Report Form Originator.....:	Bureau of Indian Standards
Master TRF.....:	Dated: 19.02.2018
Test item description.....:	Crystalline Silicon Terrestrial Photovoltaic (PV) Modules (Si Wafer Based)
Trade Mark.....:	
Manufacturer.....:	<b>Icon Solar En Power Technologies Private Limited</b>
Factory.....:	PH. NO.09, GRAM DIGHARI MANDIR HASAUD, TEH ARANG CHHATTISGARH RAIPUR 492001
Model/Type reference.....:	<b>Model Tested:</b> ISEN620N-TOP <b>Series Model:</b> <b>156 Half cut cell family with system voltage 1500V</b> ISEN615N-TOP, ISEN610N-TOP, ISEN605N-TOP, ISEN600N-TOP <b>144 Half cut cell family with system voltage 1500V</b> ISEN590N-TOP, ISEN585N-TOP, ISEN580N-TOP, ISEN575N-TOP, ISEN570N-TOP, ISEN565N-TOP, ISEN560N-TOP <b>132 Half cut cell family with system voltage 1500V</b> ISEN540N-TOP, ISEN535N-TOP, ISEN530N-TOP, ISEN525N-TOP, ISEN520N-TOP <b>120 Half cut cell family with system voltage 1500V</b> ISEN500N-TOP, ISEN495N-TOP, ISEN490N-TOP, ISEN485N-TOP, ISEN480N-TOP, ISEN475N-TOP, ISEN470N-TOP, ISEN465N-TOP, ISEN460N-TOP <b>108 Half cut cell family with system voltage 1500V</b> ISEN440N-TOP, ISEN435N-TOP, ISEN430N-TOP, ISEN425N-TOP, ISEN420N-TOP
Ratings.....:	See copy of Marking label and General product information.






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Testing procedure and testing location:		
<input checked="" type="checkbox"/> <b>Testing Laboratory:</b>		
Testing location/ address.....:	URS PRODUCTS AND TESTING PRIVATE LIMITED A-29, Sector 5, Noida-201301, India	
Tested by (name + signature) .....	Abhishek Bhashker (Asst. Manager)	
Approved by (name + signature).: 	NILESH BALASAHEB ASWAR (Lab Manager)	
Issued by (name + signature) .... :	Paras Singh (General Manager Technical)	





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Summary of testing:	
<b>Tests performed (name of test and test clause):</b>	<b>Testing location:</b> URS PRODUCTS AND TESTING PRIVATE LIMITED A-29, Sector 5, Noida-201301, India
10.1 Visual Inspection	
10.2 Maximum Power Determination	
10.3 Insulation Test	
10.4 Measurement of Temperature Coefficients.	
10.5 Measurement of NOCT	
10.6 Performance at STC and NOCT	
10.7 Performance at low irradiance.	
10.8 Outdoor exposure test	
10.9 Hot-spot endurance test	
10.10 UV preconditioning	
10.11 Thermal cycling test	
10.12 Humidity freeze test	
10.13 Damp heat test	
10.14 Robustness of termination test	
10.15 Wet leakage current test	
10.16 Mechanical load test	
10.17 Hail test	
10.18 Bypass diode thermal test	





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### Copy of Marking Plate

(Model Tested: ISEN620N-TOP)

 EN-ICON ADVANCED TECH SOLAR ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD. Factory Address- PH No.09, Gram- Dighari, Mandir Hasaud, Teh Arang, Raipur 492001, Chhattisgarh, India Tel: +91 771-4065755 <small>ELECTRICAL PARAMETER MEASURED AT 57°C</small>	Model No : ISEN620N-TOP Pmax (W) : 620 Wp ± 2% Voc (V) : 55.65 V Vmp (V) : 46.75 V Isc (A) : 14.06 A Imax (A) : 13.27 A	Dimension (L x W x H) : 2464 x 1134 x 35 mm System Voltage : 1500 V Series Fuse Rating : 30 A Application Class : CLASS A Safety Class : CLASS II Fire Safety Class : CLASS C	 <b>WARNING</b> ELECTRICAL HAZARD <small>www.ikon620n-urs.com</small>
	<small>ELECTRICAL PARAMETER MEASURED AT 57°C</small>		

### Marking inside the laminate

### Polarity marking on Junction Box

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN620N-TOP  
 NOMINAL WATTAGE : 620Wp ± 2% MADE IN INDIA



ICON620T1003181007

### Polarity marking on Connectors



The marking plate above represents all models covered by this report. See "General product information" for electrical ratings for all models.





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### (Series Model: ISEN615N-TOP)



 <b>Icon Solar-En Power Technologies Private Limited</b> Factory Address- PH No. 09, Gram-Dighari, Mandir Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India Tel: +91 771-4065755	Model No : ISEN615N-TOP Pmax (W) : 615 Wp ±2% Voc (V) : 55.50 V Vm (V) : 46.48 V Isc (A) : 14.02 A Imax (A) : 13.24 A	Dimension (L x W x H) : 2464 x 1134 x 35mm System Voltage : 1500 V Series Fuse Rating : 30 A Application Class : CLASS A Safety Class : CLASS II Fire safety Class : CLASS C	 <b>WARNING</b> ELECTRICAL HAZARD
	ELECTRICAL PARAMETER MEASURED AT STC		

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN615N-TOP  
 NOMINAL WATTAGE: 615 Wp ± 2% MADE IN INDIA

ICON615T1003181001




### (Series Model: ISEN610N-TOP)



 <b>Icon Solar-En Power Technologies Private Limited</b> Factory Address- PH No. 09, Gram-Dighari, Mandir Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India Tel: +91 771-4065755	Model No : ISEN610N-TOP Pmax (W) : 610 Wp ±2% Voc (V) : 55.35 V Vm (V) : 46.20 V Isc (A) : 13.99 A Imax (A) : 13.21 A	Dimension (L x W x H) : 2464 x 1134 x 35mm System Voltage : 1500 V Series Fuse Rating : 30 A Application Class : CLASS A Safety Class : CLASS II Fire safety Class : CLASS C	 <b>WARNING</b> ELECTRICAL HAZARD
	ELECTRICAL PARAMETER MEASURED AT STC		

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN610N-TOP  
 NOMINAL WATTAGE: 610 Wp ± 2% MADE IN INDIA

ICON610T1003181001




### (Series Model: ISEN605N-TOP)

 <b>Icon Solar-En Power Technologies Private Limited</b> Factory Address- PH No. 09, Gram-Dighari, Mandir Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India Tel: +91 771-4065755	Model No : ISEN605N-TOP Pmax (W) : 605 Wp ±2% Voc (V) : 55.22 V Vm (V) : 45.92 V Isc (A) : 13.95 A Imax (A) : 13.18 A	Dimension (L x W x H) : 2464 x 1134 x 35mm System Voltage : 1500 V Series Fuse Rating : 30 A Application Class : CLASS A Safety Class : CLASS II Fire safety Class : CLASS C	 <b>WARNING</b> ELECTRICAL HAZARD
	ELECTRICAL PARAMETER MEASURED AT STC		

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN605N-TOP  
 NOMINAL WATTAGE: 605 Wp ± 2% MADE IN INDIA

ICON605T1003181001






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### (Series Model: ISEN600N-TOP)



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Factory Address- PH No. 09, Gram-Dighari, Mandir  
Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
Tel: +91 771-4065755

Model No : ISEN600N-TOP  
Pmax (W) : 600 Wp ±2%  
Voc (V) : 55.01V  
Vm (V) : 45.66 V  
Isc (A) : 13.91 A  
Imax (A) : 13.15 A

Dimension (L x W x H) : 2464 x 1134 x 35mm  
System Voltage : 1500 V  
Series Fuse Rating : 30 A  
Application Class : CLASS A  
Safety Class : CLASS II  
Fire safety Class : CLASS C



WARNING  
ELECTRICAL HAZARD

ELECTRICAL PARAMETER MEASURED AT STC

www.iconsolar-en.com

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
YEAR OF MAKE : 2024 MODEL : ISEN600N-TOP  
NOMINAL WATTAGE: 600 Wp ± 2% MADE IN INDIA

ICON600T1003181001



### (Series Model: ISEN590N-TOP)



Icon Solar-En Power Technologies Private Limited  
Factory Address- PH No. 09, Gram-Dighari, Mandir  
Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
Tel: +91 771-4065755

Model No : ISEN590N-TOP  
Pmax (W) : 590 Wp ±2%  
Voc (V) : 51.88 V  
Vm (V) : 44.05 V  
Isc (A) : 14.18 A  
Imax (A) : 13.40 A

Dimension (L x W x H) : 2278 x 1134 x 35mm  
System Voltage : 1500 V  
Series Fuse Rating : 30 A  
Application Class : CLASS A  
Safety Class : CLASS II  
Fire safety Class : CLASS C



WARNING  
ELECTRICAL HAZARD

ELECTRICAL PARAMETER MEASURED AT STC

www.iconsolar-en.com

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
YEAR OF MAKE : 2024 MODEL : ISEN590N-TOP  
NOMINAL WATTAGE: 590 Wp ± 2% MADE IN INDIA

ICON590T1003181001



### (Series Model: ISEN585N-TOP)



Icon Solar-En Power Technologies Private Limited  
Factory Address- PH No. 09, Gram-Dighari, Mandir  
Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
Tel: +91 771-4065755

Model No : ISEN585N-TOP  
Pmax (W) : 585 Wp ±2%  
Voc (V) : 51.74 V  
Vm (V) : 43.80 V  
Isc (A) : 14.14 A  
Imax (A) : 13.37 A

Dimension (L x W x H) : 2278 x 1134 x 35mm  
System Voltage : 1500 V  
Series Fuse Rating : 30 A  
Application Class : CLASS A  
Safety Class : CLASS II  
Fire safety Class : CLASS C



WARNING  
ELECTRICAL HAZARD

ELECTRICAL PARAMETER MEASURED AT STC

www.iconsolar-en.com

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
YEAR OF MAKE : 2024 MODEL : ISEN585N-TOP  
NOMINAL WATTAGE: 585 Wp ± 2% MADE IN INDIA

ICON585T1003181001







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### (Series Model: ISEN580N-TOP)

 <b>Icon Solar-En Power Technologies Private Limited</b> Factory Address- PH No. 09, Gram-Dighari, Mandir Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India Tel: +91 771-4065755	Model No : ISEN580N-TOP Pmax (W) : 580 Wp ±2% Voc (V) : 51.60 V Vm (V) : 43.56 V Isc (A) : 14.10 A Imax (A) : 13.33 A	Dimension (L x W x H) : 2278 x 1134 x 35mm System Voltage : 1500 V Series Fuse Rating : 30 A Application Class : CLASS A Safety Class : CLASS II Fire safety Class : CLASS C	 <b>WARNING</b> ELECTRICAL HAZARD
	ELECTRICAL PARAMETER MEASURED AT STC		

[www.iconsolar-en.com](http://www.iconsolar-en.com)

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN580N-TOP  
 NOMINAL WATTAGE: 580 Wp ± 2% MADE IN INDIA

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### (Series Model: ISEN575N-TOP)

 <b>Icon Solar-En Power Technologies Private Limited</b> Factory Address- PH No. 09, Gram-Dighari, Mandir Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India Tel: +91 771-4065755	Model No : ISEN575N-TOP Pmax (W) : 575 Wp ±2% Voc (V) : 51.46 V Vm (V) : 43.43 V Isc (A) : 14.06 A Imax (A) : 13.29 A	Dimension (L x W x H) : 2278 x 1134 x 35mm System Voltage : 1500 V Series Fuse Rating : 30 A Application Class : CLASS A Safety Class : CLASS II Fire safety Class : CLASS C	 <b>WARNING</b> ELECTRICAL HAZARD
	ELECTRICAL PARAMETER MEASURED AT STC		

[www.iconsolar-en.com](http://www.iconsolar-en.com)

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN575N-TOP  
 NOMINAL WATTAGE: 575 Wp ± 2% MADE IN INDIA

ICON575T1003181001

### (Series Model: ISEN570N-TOP)

 <b>Icon Solar-En Power Technologies Private Limited</b> Factory Address- PH No. 09, Gram-Dighari, Mandir Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India Tel: +91 771-4065755	Model No : ISEN570N-TOP Pmax (W) : 570 Wp ±2% Voc (V) : 51.32 V Vm (V) : 43.07 V Isc (A) : 14.02 A Imax (A) : 13.25 A	Dimension (L x W x H) : 2278 x 1134 x 35mm System Voltage : 1500 V Series Fuse Rating : 30 A Application Class : CLASS A Safety Class : CLASS II Fire safety Class : CLASS C	 <b>WARNING</b> ELECTRICAL HAZARD
	ELECTRICAL PARAMETER MEASURED AT STC		

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ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN570N-TOP  
 NOMINAL WATTAGE: 570 Wp ± 2% MADE IN INDIA

ICON570T1003181001





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### (Series Model: ISEN565N-TOP)



Icon Solar-En Power Technologies Private Limited  
 Factory Address- PH No. 09, Gram-Dighari, Mandir  
 Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
 Tel: +91 771-4065755

Model No : ISEN565N-TOP  
 Pmax (W) : 565 Wp ±2%  
 Voc (V) : 51.19 V  
 Vm (V) : 42.82 V  
 Isc (A) : 13.99 A  
 Imax (A) : 13.21 A

Dimension (L x W x H) : 2278 x 1134 x 35mm  
 System Voltage : 1500 V  
 Series Fuse Rating : 30 A  
 Application Class : CLASS A  
 Safety Class : CLASS II  
 Fire safety Class : CLASS C



**WARNING**  
 ELECTRICAL HAZARD

ELECTRICAL PARAMETER MEASURED AT STC

[www.iconsolar-en.com](http://www.iconsolar-en.com)

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN565N-TOP  
 NOMINAL WATTAGE: 565 Wp ± 2% MADE IN INDIA

ICON565T1003181001



### (Series Model: ISEN560N-TOP)



Icon Solar-En Power Technologies Private Limited  
 Factory Address- PH No. 09, Gram-Dighari, Mandir  
 Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
 Tel: +91 771-4065755

Model No : ISEN560N-TOP  
 Pmax (W) : 560 Wp ±2%  
 Voc (V) : 51.04 V  
 Vm (V) : 42.60 V  
 Isc (A) : 13.95 A  
 Imax (A) : 13.15 A

Dimension (L x W x H) : 2278 x 1134 x 35mm  
 System Voltage : 1500 V  
 Series Fuse Rating : 30 A  
 Application Class : CLASS A  
 Safety Class : CLASS II  
 Fire safety Class : CLASS C



**WARNING**  
 ELECTRICAL HAZARD

ELECTRICAL PARAMETER MEASURED AT STC

[www.iconsolar-en.com](http://www.iconsolar-en.com)

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN560N-TOP  
 NOMINAL WATTAGE: 560 Wp ± 2% MADE IN INDIA

ICON560T1003181001



### (Series Model: ISEN540N-TOP)



Icon Solar-En Power Technologies Private Limited  
 Factory Address- PH No. 09, Gram-Dighari, Mandir  
 Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
 Tel: +91 771-4065755

Model No : ISEN540N-TOP  
 Pmax (W) : 540 Wp ±2%  
 Voc (V) : 49.96 V  
 Vm (V) : 40.02 V  
 Isc (A) : 14.36 A  
 Imax (A) : 13.50 A

Dimension (L x W x H) : 2094 x 1134 x 35mm  
 System Voltage : 1500 V  
 Series Fuse Rating : 30 A  
 Application Class : CLASS A  
 Safety Class : CLASS II  
 Fire safety Class : CLASS C



**WARNING**  
 ELECTRICAL HAZARD

ELECTRICAL PARAMETER MEASURED AT STC

[www.iconsolar-en.com](http://www.iconsolar-en.com)

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN540N-TOP  
 NOMINAL WATTAGE: 540 Wp ± 2% MADE IN INDIA

ICON540T1003181001





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### (Series Model: ISEN535N-TOP)



 <b>EN-ICON</b> Harvesting the sun <b>Icon Solar-En Power Technologies Private Limited</b> Factory Address- PH No. 09, Gram-Dighari, Mandir Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India Tel: +91 771-4065755	Model No : ISEN535N-TOP Pmax (W) : 535 Wp ±2% Voc (V) : 49.80 V Vm (V) : 39.88 V Isc (A) : 14.32 A Imax (A) : 13.42 A	Dimension (L x W x H) : 2094 x 1134 x 35mm System Voltage : 1500 V Series Fuse Rating : 30 A Application Class : CLASS A Safety Class : CLASS II Fire safety Class : CLASS C	 <b>WARNING</b> ELECTRICAL HAZARD
	ELECTRICAL PARAMETER MEASURED AT STC		

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
YEAR OF MAKE : 2024 MODEL : ISEN535N-TOP  
NOMINAL WATTAGE: 535 Wp ± 2% MADE IN INDIA

ICON535T1003181001



### (Series Model: ISEN530N-TOP)



 <b>EN-ICON</b> Harvesting the sun <b>Icon Solar-En Power Technologies Private Limited</b> Factory Address- PH No. 09, Gram-Dighari, Mandir Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India Tel: +91 771-4065755	Model No : ISEN530N-TOP Pmax (W) : 530 Wp ±2% Voc (V) : 46.63 V Vm (V) : 39.64 V Isc (A) : 14.27 A Imax (A) : 13.38 A	Dimension (L x W x H) : 2094 x 1134 x 35mm System Voltage : 1500 V Series Fuse Rating : 30 A Application Class : CLASS A Safety Class : CLASS II Fire safety Class : CLASS C	 <b>WARNING</b> ELECTRICAL HAZARD
	ELECTRICAL PARAMETER MEASURED AT STC		

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
YEAR OF MAKE : 2024 MODEL : ISEN530N-TOP  
NOMINAL WATTAGE: 530 Wp ± 2% MADE IN INDIA

ICON530T1003181001



### (Series Model: ISEN525N-TOP)

 <b>EN-ICON</b> Harvesting the sun <b>Icon Solar-En Power Technologies Private Limited</b> Factory Address- PH No. 09, Gram-Dighari, Mandir Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India Tel: +91 771-4065755	Model No : ISEN525N-TOP Pmax (W) : 525 Wp ±2% Voc (V) : 46.47 V Vm (V) : 39.38 V Isc (A) : 14.23 A Imax (A) : 13.34 A	Dimension (L x W x H) : 2094 x 1134 x 35mm System Voltage : 1500 V Series Fuse Rating : 30 A Application Class : CLASS A Safety Class : CLASS II Fire safety Class : CLASS C	 <b>WARNING</b> ELECTRICAL HAZARD
	ELECTRICAL PARAMETER MEASURED AT STC		

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
YEAR OF MAKE : 2024 MODEL : ISEN525N-TOP  
NOMINAL WATTAGE: 525 Wp ± 2% MADE IN INDIA

ICON525T1003181001





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TC-6468

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### (Series Model: ISEN520N-TOP)



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 Factory Address- PH No. 09, Gram-Dighari, Mandir  
 Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
 Tel: +91 771-4065755

Model No : ISEN520N-TOP  
 Pmax (W) : 520 Wp  $\pm 2\%$   
 Voc (V) : 46.30 V  
 Vm (V) : 39.27 V  
 Isc (A) : 14.19 A  
 Imax (A) : 13.25 A

Dimension (L x W x H) : 2094 x 1134 x 35mm  
 System Voltage : 1500 V  
 Series Fuse Rating : 30 A  
 Application Class : CLASS A  
 Safety Class : CLASS II  
 Fire safety Class : CLASS C



**WARNING**  
 ELECTRICAL HAZARD

ELECTRICAL PARAMETER MEASURED AT STC

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ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN520N-TOP  
 NOMINAL WATTAGE: 520 Wp  $\pm 2\%$  MADE IN INDIA

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### (Series Model: ISEN500N-TOP)



Icon Solar-En Power Technologies Private Limited  
 Factory Address- PH No. 09, Gram-Dighari, Mandir  
 Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
 Tel: +91 771-4065755

Model No : ISEN500N-TOP  
 Pmax (W) : 500 Wp  $\pm 2\%$   
 Voc (V) : 43.37 V  
 Vm (V) : 36.42 V  
 Isc (A) : 14.46 A  
 Imax (A) : 13.73 A

Dimension (L x W x H) : 1908 x 1134 x 35mm  
 System Voltage : 1500 V  
 Series Fuse Rating : 30 A  
 Application Class : CLASS A  
 Safety Class : CLASS II  
 Fire safety Class : CLASS C



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 ELECTRICAL HAZARD

ELECTRICAL PARAMETER MEASURED AT STC

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ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN500N-TOP  
 NOMINAL WATTAGE: 500 Wp  $\pm 2\%$  MADE IN INDIA

ICON500T1003181001



### (Series Model: ISEN495N-TOP)



Icon Solar-En Power Technologies Private Limited  
 Factory Address- PH No. 09, Gram-Dighari, Mandir  
 Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
 Tel: +91 771-4065755

Model No : ISEN495N-TOP  
 Pmax (W) : 495 Wp  $\pm 2\%$   
 Voc (V) : 43.21 V  
 Vm (V) : 36.22 V  
 Isc (A) : 14.40 A  
 Imax (A) : 13.67 A

Dimension (L x W x H) : 1908 x 1134 x 35mm  
 System Voltage : 1500 V  
 Series Fuse Rating : 30 A  
 Application Class : CLASS A  
 Safety Class : CLASS II  
 Fire safety Class : CLASS C



**WARNING**  
 ELECTRICAL HAZARD

ELECTRICAL PARAMETER MEASURED AT STC

[www.iconsolar-en.com](http://www.iconsolar-en.com)

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN495N-TOP  
 NOMINAL WATTAGE: 495 Wp  $\pm 2\%$  MADE IN INDIA

ICON495T1003181001





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### (Series Model: ISEN490N-TOP)



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 Factory Address- PH No. 09, Gram-Dighari, Mandir  
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ELECTRICAL PARAMETER MEASURED AT STC

Model No : ISEN490N-TOP	Dimension (L x W x H) : 1908 x 1134 x 35mm
Pmax (W) : 490 Wp ±2%	System Voltage : 1500 V
Voc (V) : 43.05 V	Series Fuse Rating : 30 A
Vm (V) : 36.01 V	Application Class : CLASS A
Isc (A) : 14.34 A	Safety Class : CLASS II
Imax (A) : 13.61 A	Fire safety Class : CLASS C

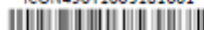


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ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN490N-TOP  
 NOMINAL WATTAGE: 490 Wp ± 2% MADE IN INDIA

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### (Series Model: ISEN485N-TOP)



Icon Solar-En Power Technologies Private Limited  
 Factory Address- PH No. 09, Gram-Dighari, Mandir  
 Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
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ELECTRICAL PARAMETER MEASURED AT STC

Model No : ISEN485N-TOP	Dimension (L x W x H) : 1908 x 1134 x 35mm
Pmax (W) : 485 Wp ±2%	System Voltage : 1500 V
Voc (V) : 42.89 V	Series Fuse Rating : 30 A
Vm (V) : 35.80 V	Application Class : CLASS A
Isc (A) : 14.28 A	Safety Class : CLASS II
Imax (A) : 13.55 A	Fire safety Class : CLASS C



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ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN485N-TOP  
 NOMINAL WATTAGE: 485 Wp ± 2% MADE IN INDIA

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### (Series Model: ISEN480N-TOP)



Icon Solar-En Power Technologies Private Limited  
 Factory Address- PH No. 09, Gram-Dighari, Mandir  
 Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
 Tel: +91 771-4065755

ELECTRICAL PARAMETER MEASURED AT STC

Model No : ISEN480N-TOP	Dimension (L x W x H) : 1908 x 1134 x 35mm
Pmax (W) : 480 Wp ±2%	System Voltage : 1500 V
Voc (V) : 42.73 V	Series Fuse Rating : 30 A
Vm (V) : 35.59 V	Application Class : CLASS A
Isc (A) : 14.22 A	Safety Class : CLASS II
Imax (A) : 13.49 A	Fire safety Class : CLASS C



WARNING  
ELECTRICAL HAZARD

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ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN480N-TOP  
 NOMINAL WATTAGE: 480 Wp ± 2% MADE IN INDIA

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### (Series Model: ISEN475N-TOP)



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Factory Address- PH No. 09, Gram-Dighari, Mandir  
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Model No : ISEN475N-TOP  
Pmax (W) : 475 Wp ±2%  
Voc (V) : 42.56 V  
Vm (V) : 35.37 V  
Isc (A) : 14.16 A  
Imax (A) : 13.43 A  
Dimension (L x W x H) : 1908 x 1134 x 35mm  
System Voltage : 1500 V  
Series Fuse Rating : 30 A  
Application Class : CLASS A  
Safety Class : CLASS II  
Fire safety Class : CLASS C



WARNING  
ELECTRICAL HAZARD

ELECTRICAL PARAMETER MEASURED AT STC

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ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
YEAR OF MAKE : 2024 MODEL : ISEN475N-TOP  
NOMINAL WATTAGE: 475 Wp ± 2% MADE IN INDIA

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### (Series Model: ISEN470N-TOP)



Icon Solar-En Power Technologies Private Limited  
Factory Address- PH No. 09, Gram-Dighari, Mandir  
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Model No : ISEN470N-TOP  
Pmax (W) : 470 Wp ±2%  
Voc (V) : 42.40 V  
Vm (V) : 35.16 V  
Isc (A) : 14.11 A  
Imax (A) : 13.37 A  
Dimension (L x W x H) : 1908 x 1134 x 35mm  
System Voltage : 1500 V  
Series Fuse Rating : 30 A  
Application Class : CLASS A  
Safety Class : CLASS II  
Fire safety Class : CLASS C



WARNING  
ELECTRICAL HAZARD

ELECTRICAL PARAMETER MEASURED AT STC

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ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
YEAR OF MAKE : 2024 MODEL : ISEN470N-TOP  
NOMINAL WATTAGE: 470 Wp ± 2% MADE IN INDIA

ICON470T1003181001



### (Series Model: ISEN465N-TOP)



Icon Solar-En Power Technologies Private Limited  
Factory Address- PH No. 09, Gram-Dighari, Mandir  
Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
Tel: +91 771-4065755

Model No : ISEN465N-TOP  
Pmax (W) : 465 Wp ±2%  
Voc (V) : 42.24 V  
Vm (V) : 34.94 V  
Isc (A) : 14.05 A  
Imax (A) : 13.31 A  
Dimension (L x W x H) : 1908 x 1134 x 35mm  
System Voltage : 1500 V  
Series Fuse Rating : 30 A  
Application Class : CLASS A  
Safety Class : CLASS II  
Fire safety Class : CLASS C



WARNING  
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ELECTRICAL PARAMETER MEASURED AT STC

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ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
YEAR OF MAKE : 2024 MODEL : ISEN465N-TOP  
NOMINAL WATTAGE: 465 Wp ± 2% MADE IN INDIA

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### (Series Model: ISEN460N-TOP)



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 Factory Address- PH No. 09, Gram-Dighari, Mandir  
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ELECTRICAL PARAMETER MEASURED AT STC

Model No : ISEN460N-TOP	Dimension (L x W x H) : 1908 x 1134 x 35mm
Pmax (W) : 460 Wp ±2%	System Voltage : 1500 V
Voc (V) : 42.07 V	Series Fuse Rating : 30 A
Vm (V) : 34.72 V	Application Class : CLASS A
Isc (A) : 13.99 A	Safety Class : CLASS II
Imax (A) : 13.25 A	Fire safety Class : CLASS C



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ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN460N-TOP  
 NOMINAL WATTAGE: 460 Wp ± 2% MADE IN INDIA

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### (Series Model: ISEN440N-TOP)



Icon Solar-En Power Technologies Private Limited  
 Factory Address- PH No. 09, Gram-Dighari, Mandir  
 Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
 Tel: +91 771-4065755

ELECTRICAL PARAMETER MEASURED AT STC

Model No : ISEN440N-TOP	Dimension (L x W x H) : 1722 x 1134 x 35mm
Pmax (W) : 440 Wp ±2%	System Voltage : 1500 V
Voc (V) : 38.63 V	Series Fuse Rating : 30 A
Vm (V) : 32.98 V	Application Class : CLASS A
Isc (A) : 14.30 A	Safety Class : CLASS II
Imax (A) : 13.35 A	Fire safety Class : CLASS C



WARNING  
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ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN440N-TOP  
 NOMINAL WATTAGE: 440 Wp ± 2% MADE IN INDIA

ICON440T1003181001

### (Series Model: ISEN435N-TOP)



Icon Solar-En Power Technologies Private Limited  
 Factory Address- PH No. 09, Gram-Dighari, Mandir  
 Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
 Tel: +91 771-4065755

ELECTRICAL PARAMETER MEASURED AT STC

Model No : ISEN435N-TOP	Dimension (L x W x H) : 1722 x 1134 x 35mm
Pmax (W) : 435 Wp ±2%	System Voltage : 1500 V
Voc (V) : 38.50 V	Series Fuse Rating : 30 A
Vm (V) : 32.76 V	Application Class : CLASS A
Isc (A) : 14.22 A	Safety Class : CLASS II
Imax (A) : 13.30 A	Fire safety Class : CLASS C



WARNING  
ELECTRICAL HAZARD

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ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
 YEAR OF MAKE : 2024 MODEL : ISEN435N-TOP  
 NOMINAL WATTAGE: 435 Wp ± 2% MADE IN INDIA

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### (Series Model: ISEN430N-TOP)



Icon Solar-En Power Technologies Private Limited  
Factory Address- PH No. 09, Gram-Dighari, Mandir  
Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
Tel: +91 771-4065755

Model No : ISEN430N-TOP  
Pmax (W) : 430 Wp ±2%  
Voc (V) : 38.42 V  
Vm (V) : 32.49 V  
Isc (A) : 14.13 A  
Imax (A) : 13.25 A

Dimension (L x W x H) : 1722 x 1134 x 35mm  
System Voltage : 1500 V  
Series Fuse Rating : 30 A  
Application Class : CLASS A  
Safety Class : CLASS II  
Fire safety Class : CLASS C



**WARNING**  
ELECTRICAL HAZARD

ELECTRICAL PARAMETER MEASURED AT STC

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ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
YEAR OF MAKE : 2024 MODEL : ISEN430N-TOP  
NOMINAL WATTAGE: 430 Wp ± 2% MADE IN INDIA

ICON430T1003181001



### (Series Model: ISEN425N-TOP)



Icon Solar-En Power Technologies Private Limited  
Factory Address- PH No. 09, Gram-Dighari, Mandir  
Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
Tel: +91 771-4065755

Model No : ISEN425N-TOP  
Pmax (W) : 425Wp ±2%  
Voc (V) : 38.29 V  
Vm (V) : 32.23 V  
Isc (A) : 14.05 A  
Imax (A) : 13.20 A

Dimension (L x W x H) : 1722 x 1134 x 35mm  
System Voltage : 1500 V  
Series Fuse Rating : 30 A  
Application Class : CLASS A  
Safety Class : CLASS II  
Fire safety Class : CLASS C



**WARNING**  
ELECTRICAL HAZARD

ELECTRICAL PARAMETER MEASURED AT STC

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ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
YEAR OF MAKE : 2024 MODEL : ISEN425N-TOP  
NOMINAL WATTAGE: 425 Wp ± 2% MADE IN INDIA

ICON425T1003181001



### (Series Model: ISEN420N-TOP)



Icon Solar-En Power Technologies Private Limited  
Factory Address- PH No. 09, Gram-Dighari, Mandir  
Hasaud, Teh - Arang, Raipur 492001, Chhattisgarh, India  
Tel: +91 771-4065755

Model No : ISEN420N-TOP  
Pmax (W) : 420 Wp ±2%  
Voc (V) : 38.16 V  
Vm (V) : 31.96 V  
Isc (A) : 13.98 A  
Imax (A) : 13.15 A

Dimension (L x W x H) : 1722 x 1134 x 35mm  
System Voltage : 1500 V  
Series Fuse Rating : 30 A  
Application Class : CLASS A  
Safety Class : CLASS II  
Fire safety Class : CLASS C



**WARNING**  
ELECTRICAL HAZARD

ELECTRICAL PARAMETER MEASURED AT STC

[www.iconsolar-en.com](http://www.iconsolar-en.com)

ICON SOLAR-EN POWER TECHNOLOGIES PVT. LTD.  
YEAR OF MAKE : 2024 MODEL : ISEN420N-TOP  
NOMINAL WATTAGE: 420 Wp ± 2% MADE IN INDIA

ICON420T1003181001







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GENERAL INFORMATION	
<b>Test item particulars:</b>	
Accessories and detachable parts included in the evaluation.....:	N/A
Options included.....:	N/A
<u>Abbreviations used in the report:</u>	
HF–Humidity Freeze	TC–Temperature Cycling
DH–Damp Heat	Vmp–Maximum power voltage
Imp–Maximum power current	Voc–Open circuit voltage
Isc-Short circuit current	FF–Fill Factor
Pmp –Maximum power	$\alpha$ –Current temperature coefficient
NOCT–Nominal Operating Cell Temperature	$\beta$ –Voltage temperature coefficient
STC –Standard Test Conditions	$\delta$ –power temperature coefficient
<u>Possible test case verdicts:</u>	
-test case does not apply to the test object.....:	N/A (Not Applicable)
-test object does meet the requirement.....:	Pass (P)
-test object does not meet the requirement.....:	Fail (F)

General remarks:  
 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 testing laboratory.  
 "(See Enclosure #)" refers to additional information appended to the report.  
 "(See appended table)" refers to a table appended to the report.  
 Throughout this report a point is used as the decimal separator.





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### General Product Information:

PV module type reference.....: ISEN620N-TOP

#### Product Electrical Ratings at STC

Nominal maximum power (Pmax).....: 620W

Nominal open circuit voltage at (Voc).....: 55.65V

Nominal short circuit current at (Isc).....: 14.06A

Nominal maximum power voltage (Vpm).....: 46.75V

Nominal maximum power current (Ipm).....: 13.27A

### Product Safety Ratings

Maximum system voltage.....: 1500V

Maximum over-current protection rating.....: 30A

Safety application class.....: Class A

Safety class in accordance with IS 61140.....: Class II

Fire safety class.....: Class C

Recommended maximum series/parallel module configurations.....:  
156 half cut cells family: 26 no.  
144 half cut cells family: 27 no.  
132 half cut cells family: 29 no.  
120 half cut cells family: 32 no.  
108 half cut cells family: 36 no.





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<b>Description of module construction:</b> (Manufactories and part numbers, unless otherwise specified)	
Sample.....:	Random sampling
Module	
Front cover	AR coating tempered glass, Thickness: 3.20mm, Manufactured by BOROSIL RENEWABLES LIMITED
Rear cover	PRESERV 1-300 TF, Thickness: 360µm, Manufactured by RENEWSYS INDIA PVT. LTD. Partial discharge: Project no.: 4789424469 tested by UL INDIA PVT LTD
Encapsulation material	CONCERVE 360, Thickness: 0.45-0.65±5% Manufactured by RENEWSYS INDIA PVT. LTD.
Frame	Alloy 6063 T6, 35mm*35mm Manufactured by: ALOM EXTRUSION LTD.
Dimensions (l x w x h) mm	2464mm*1134mm*35mm (for 156 half cut cells family) 2278mm*1134mm*35mm (for 144 half cut cells family) 2094mm*1134mm*35mm (for 132 half cut cells family) 1908mm*1134mm*35mm (for 120 half cut cells family) 1722mm*1134mm*35mm (for 108 half cut cells family)
Module area [m <sup>2</sup> ]	2.794 m <sup>2</sup> for 156 half cut cells family) 2.583 m <sup>2</sup> (for 144 half cut cells family) 2.375 m <sup>2</sup> (for 132 half cut cells family) 2.164 m <sup>2</sup> (for 120 half cut cells family) 1.953 m <sup>2</sup> (for 108 half cut cells family)
Minimum distance between current carrying parts and module edge [mm]	13.87mm
<b>Cell</b>	
Cell (include type)	182M-10D11, N-type TOPCon Manufactured by JIETAI NEW ENERGY TECHNOLOGY CO., LTD.
Cells (lxw) [mm]	91mmX182mm±0.5mm
Cell thickness [µm]	130µm±13µm
Cell area [cm <sup>2</sup> ]	165.62
Number of cells	156 half cut cells family 144 half cut cells family 132 half cut cells family 120 half cut cells family 108 half cut cells family
<b>Components and other</b>	
Cells per bypass diode	52 (for 156 half cut cells family) 48 (for 144 half cut cells family) 44 (for 132 half cut cells family) 40 (for 120 half cut cells family) 36 (for 108 half cut cells family)
Type of bypass diode	Type: MK6045; VRRM: 45V, IF(AV) : 60A, RθJC : 1.2, Tj : +200°C Manufactured by: Genx PV India Private Limited
No. of bypass diode	3





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Cell connector	Sn60/Pb40, 0.32mm, GEBA CABLES & WIRES INDIA PRIVATE LIMITED
String connector	Sn60/Pb40, 6x0.4(mm) & 4x0.4(mm), GEBA CABLES & WIRES INDIA PRIVATE LIMITED
Junction box	GXSB-01, Rated Voltage: 1500 V d.c., -40 to +85°C, IP 68, Manufactured by: GENX PV INDIA PRIVATE LIMITED. Certificate number B 115777 0002 Rev.-00 Tested by TUV SUD PRODUCT SERVICE GMBH
Cable	BIRLA UNISTAR 1Cx4.0 mm <sup>2</sup> , Rated voltage: 1.8kv DC, Manufactured by: VINDHYA TELELINK LTD. Tested as per IS 17293: 2020 with CM/L no.: 8200162706
Connectors	GXCO1, Rated Voltage: 1500V DC, Rated Current: 40A, -40 to +85°C, IP68, Manufactured by: GENX PV INDIA PRIVATE LIMITED. Certificate No. B 115777 0001 Rev. 00 Tested by TUV SUD PRODUCT SERVICE GMBH.
Adhesive for frame	Fasto SM30, RTV Silicone adhesive, Manufactured by: FASTO ADVANCE MATERIALS INDIA PVT. LTD.
Adhesives (junction box)	
Potting material (junction box)	
Others	Fluxing agent: 952-S, Manufactured by: KESTER

<b>A1.5</b>	<b>MODULE DESIGN - MINIMUM DISTANCES</b>	
	Between cells (mm).....:	1.4mm
	Between cell and edge of laminate (mm).....:	13.5mm
	Between any current carrying part and edge of laminate (mm)....:	14mm

<b>A1.6</b>	<b>MODULE DESIGN - ELECTRICAL CONFIGURATION</b>	
	Total number of cells.....:	156 half cut cells family 144 half cut cells family 132 half cut cells family 120 half cut cells family 108 half cut cells family
	Serial-parallel connection of cells.....:	Series parallel connection
	Cells per bypass diode.....:	52 (for 156 half cut cells family) 48 (for 144 half cut cells family) 44 (for 132 half cut cells family) 40 (for 120 half cut cells family) 36 (for 108 half cut cells family)
	No. of bypass diodes.....:	3

**Note:** Bill of material are same for all series family models.





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Similarities & difference between representative model and series/family models:									
Sr. No	Series/Family Model	Electrical Specifications						Model difference	Model similarities
		Maximum System Voltage, (Vdc)	Open Circuit Voltage @STC/Voc (Vdc)	Rated Voltage @ STC/ Vmp (V dc)	Short Circuit Current @ STC/Isc (A)	Rated Current @ STC/Imp (A)	Rated Maximum Power at STC, (Watts)		
1.	ISEN620N-TOP (Representative Model)	1500	55.65	46.75	14.06	13.27	620	<ul style="list-style-type: none"> <li>• Pmp</li> <li>• Voc</li> <li>• Isc</li> <li>• Vmp</li> <li>• Imp</li> </ul> <ul style="list-style-type: none"> <li>• Maximum System Voltage</li> <li>• Cell technology</li> <li>• Encapsulation</li> <li>• Superstrate</li> <li>• Module size</li> <li>• Backsheet/substrate</li> <li>• Frame and/or mounting structure</li> <li>• Junction box/electrical termination</li> <li>• Cell interconnect materials or technique</li> <li>• Electrical circuit of an identical package</li> <li>• Power output (by 10%) in the identical package including size and using the identical cell process.</li> <li>• Bypass diode</li> </ul>	
Series Models:									
2.	ISEN615N-TOP	1500	55.50	46.48	14.02	13.24	615		
3.	ISEN610N-TOP	1500	55.35	46.20	13.99	13.21	610		
4.	ISEN605N-TOP	1500	55.22	45.92	13.95	13.18	605		
5.	ISEN600N-TOP	1500	55.01	45.66	13.91	13.15	600		
6.	ISEN590N-TOP	1500	51.88	44.05	14.18	13.40	590		
7.	ISEN585N-TOP	1500	51.74	43.80	14.14	13.37	585		
8.	ISEN580N-TOP	1500	51.60	43.56	14.10	13.33	580		
9.	ISEN575N-TOP	1500	51.46	43.43	14.06	13.29	575		
10.	ISEN570N-TOP	1500	51.32	43.07	14.02	13.25	570		
11.	ISEN565N-TOP	1500	51.19	42.82	13.99	13.21	565		
12.	ISEN560N-TOP	1500	51.04	42.60	13.95	13.15	560		
13.	ISEN540N-TOP	1500	49.96	40.02	14.36	13.50	540		
14.	ISEN535N-TOP	1500	49.80	39.88	14.32	13.42	535		
15.	ISEN530N-TOP	1500	46.63	39.64	14.27	13.38	530		
16.	ISEN525N-TOP	1500	46.47	39.38	14.23	13.34	525		
17.	ISEN520N-TOP	1500	46.30	39.27	14.19	13.25	520		
18.	ISEN500N-TOP	1500	43.37	36.42	14.46	13.73	500		
19.	ISEN495N-TOP	1500	43.21	36.22	14.40	13.67	495		
20.	ISEN490N-TOP	1500	43.05	36.01	14.34	13.61	490		
21.	ISEN485N-TOP	1500	42.89	35.80	14.28	13.55	485		
22.	ISEN480N-TOP	1500	42.73	35.59	14.22	13.49	480		
23.	ISEN475N-TOP	1500	42.56	35.37	14.16	13.43	475		
24.	ISEN470N-TOP	1500	42.40	35.16	14.11	13.37	470		
25.	ISEN465N-TOP	1500	42.24	34.94	14.05	13.31	465		
26.	ISEN460N-TOP	1500	42.07	34.72	13.99	13.25	460		
27.	ISEN440N-TOP	1500	38.63	32.98	14.30	13.35	440		
28.	ISEN435N-TOP	1500	38.50	32.76	14.22	13.30	435		
29.	ISEN430N-TOP	1500	38.42	32.49	14.13	13.25	430		
30.	ISEN425N-TOP	1500	38.29	32.23	14.05	13.20	425		
31.	ISEN420N-TOP	1500	38.16	31.96	13.98	13.15	420		





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Testing Procedure
<input checked="" type="checkbox"/> New module type
<input type="checkbox"/> Modifications (if yes, please choose the applicable modification according to the Retesting Guideline)
<input type="checkbox"/> Change in cell technology
<input type="checkbox"/> Modification to encapsulation system
<input type="checkbox"/> Modification to superstrate
<input type="checkbox"/> Increase in module size
<input type="checkbox"/> Modification to back sheet/ substrate
<input type="checkbox"/> Modification to frame and/ or mounting structure
<input type="checkbox"/> Modification to junction box/ electrical termination
<input type="checkbox"/> Change in cell interconnect materials or technique
<input type="checkbox"/> Change in electrical circuit of an identical package
<input type="checkbox"/> Higher or lower power output (by 10%) in the identical package including size and using the identical cell process
<input type="checkbox"/> Qualification of a frameless module after the design has received certification as a framed module
<input type="checkbox"/> Change in bypass diode or number of diodes

Module group assignment:		
Sample #	Sample Group ID	Sample No. & Serial number
ISEN620N-TOP		Full Testing
	A	1 & ICON620T1003181004
	B	2 & ICON620T1003181006
	C1	3 & ICON620T1003181007
	C2	4 & ICON620T1003181009
	D1	5 & ICON620T1003181010
	D2	6 & ICON620T1003181014
	E1	7 & ICON620T1003181015
	E2	8 & ICON620T1003181016





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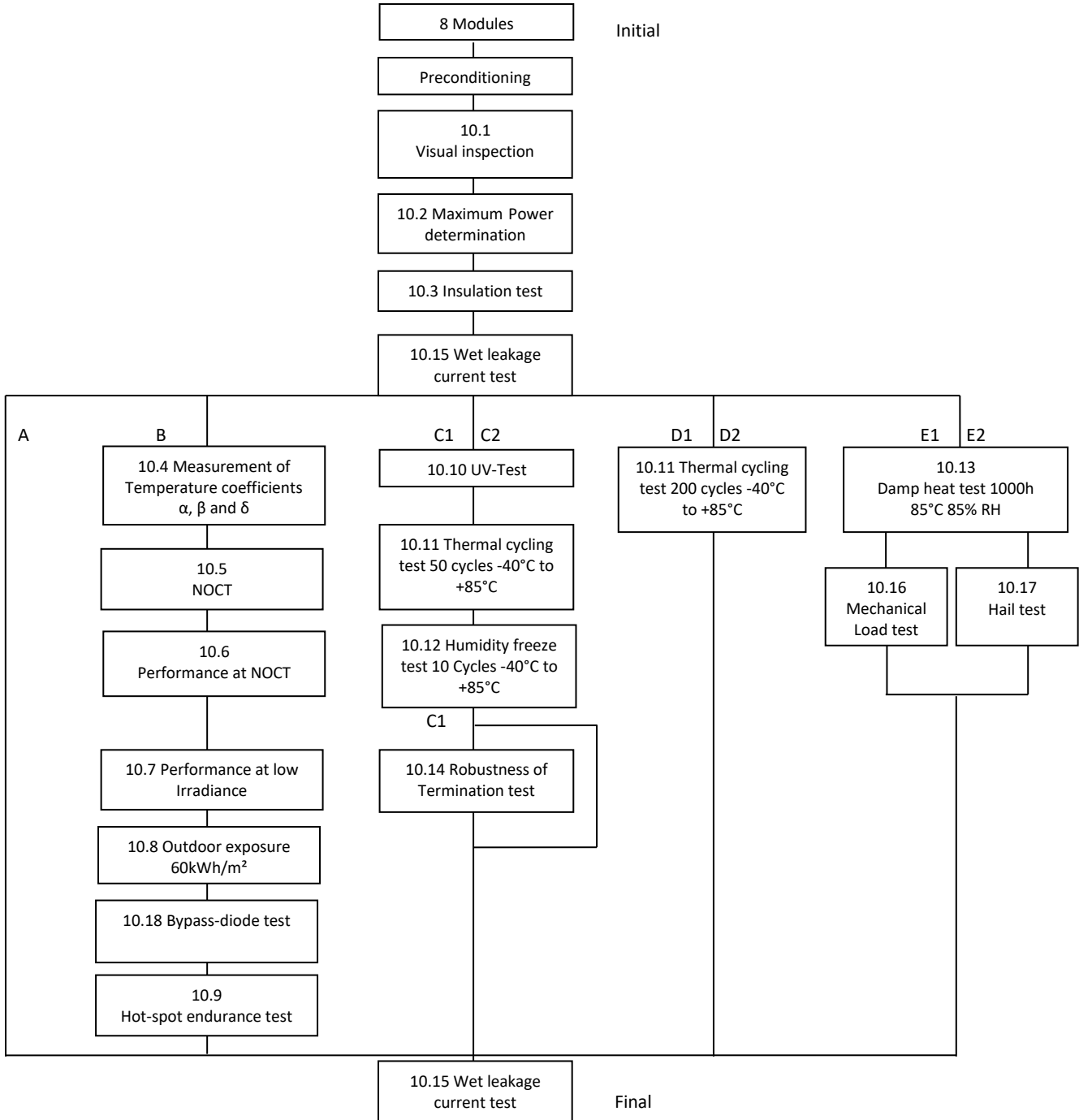


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10 TEST PROCEDURES (if it is not a full test, strikethrough non-performed test)  
Note: Deviations from test sequence are possible but must be documented.

### TEST PROCEDURES






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Clause	Requirement + Test	Result-Remark	Verdict
4	MARKING		P
	Name, monogram or symbol of manufacturer.....:	Icon Solar En Power Technologies Private Limited 	P
	Type or model number.....:	ISEN620N-TOP	P
	Serial number.....:	Marked	P
	Polarity of terminals or leads.....:	Marked	P
	Maximum system voltage.....:	1500V	P
	The date and place of manufacture.....:	Traceable through the serial number Marked	P
	Initial examination	All Modules	-
10	Preconditioning.....:	5.0 kWh/m <sup>2</sup>	P
10.1	Visual inspection.....:	See table 10.1 Int	P
10.2	Maximum power determination.....:	See table 10.2 Int	P
10.3	Insulation test.....:	See table 10.3 Int	P
10.15	Wet leakage current test	See table 10.15 Int	P
Group A	Control Module	Sample Group ID A	-
Group B	1 Module	Sample Group ID B	-
10.4	Measurement of temperature coefficients	See table 10.4 B	P
10.5	Measurement of Nominal Operating Cell Temperature [NOCT, °C].....:	See table 10.5 B	P
10.6	Performance at STC and NOCT.....:	See table 10.6 B	P
10.7	Performance at low irradiance.....:	See table 10.7 B	P
10.8	Outdoor exposure test	See table 10.8 B	P
10.18	Bypass diode thermal test	See table 10.18 B	P
	Maximum allowed junction temperature.....:	200°C	P
	Measured junction temperature.....:	See table 10.18 B	P
10.9	Hot spot endurance test.....:	See table 10.9 B	P
Group C	2Modules	Sample Group ID C1, C2	P
10.10	UV test.....:	15 kWh/m <sup>2</sup>	P
	Final measurements	See table 10.10 C	P
10.11	Thermal cycling test (50cycles).....:	50	P
	Final measurements	See appended table 10.11 C	P
10.12	Humidity freeze (10cycles).....:	10	P
	Final measurements	See table 10.12 C	P
Group C1	1 Module	Sample Group ID C1	P
10.14	Robustness of terminations test.....:	Type A	P
	Final measurements	See table 10.14 C1	P







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Clause	Requirement + Test	Result-Remark	Verdict
Group D	2 Modules	Sample Group ID D1, D2	P
10.11	Thermal cycling test (200 cycles).....:	200	P
	Final measurements	See table 10.11 D	P
Group E	2 Modules	Sample Group ID E1, E2	P
10.13	Damp heat test.....:	1000h	P
	Final measurements	See table 10.13 E	P
Group E1	1 Module	Sample Group ID E1	P
10.16	Mechanical load test.....:	2400Pa & 5400Pa	P
10.16.4	-No open-circuits or ground faults detected		P
	Final measurements	See table 10.16 E1	P
Group E2	1 Module	Sample Group ID E2	P
10.17	Hail test	25 mm	P
	Number of points impacted.....:	11	P
	Final measurements	See table 10.17 E2	P
	Final measurement	All modules	P
10.15	Wet leakage current test	See table 10.15 F	P





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Clause	Requirement + Test	Result-Remark	Verdict
<b>10.1 Initial</b>	<b>TABLE: Visual inspection (Initial)</b>		P
Test Date [MM/DD/YYYY].....:	04/03/2024		-
Sample #	Nature and position of initial findings – comments or attach photos		-
1	No visual defect		P
2	No visual defect		P
3	No visual defect		P
4	No visual defect		P
5	No visual defect		P
6	No visual defect		P
7	No visual defect		P
8	No visual defect		P
Supplementary information: Nil			

<b>10.2 Initial</b>	<b>TABLE: Maximum power determination (Initial)</b>						P
Test Date [MM/DD/YYYY].....:	04/05/2024						-
Module temperature [°C].....:	25						-
Irradiance [W/m²].....:	1000						-
Sample#	Voc[V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF[%]	
1	55.64	46.76	14.06	13.28	620.97	79.38	
2	55.63	46.75	14.05	13.28	620.84	79.43	
3	55.63	46.77	14.07	13.27	620.64	79.29	
4	55.64	46.77	14.04	13.26	620.17	79.39	
5	55.63	46.74	14.03	13.27	620.24	79.47	
6	55.65	46.72	14.08	13.29	620.91	79.24	
7	55.68	46.79	14.05	13.26	620.44	79.31	
8	55.67	46.78	14.05	13.27	620.77	79.37	
Supplementary information: Nil							

<b>10.3 Initial</b>	<b>Table: Insulation test (initial)</b>			P
Test Date [MM/DD/YYYY].....:	04/05/2024			-
Test Voltage applied [V].....:	4000V for 1min & 1500V for 2min			-
Sample#	Measured	Required	Dielectric break down Yes(description)/No	Result
	GΩ	MΩ		
1	13.45	14.32	No	P
2	13.82	14.32	No	P
3	13.22	14.32	No	P
4	14.04	14.32	No	P
5	13.73	14.32	No	P
6	13.39	14.32	No	P
7	13.54	14.32	No	P
8	13.17	14.32	No	P
Supplementary information: Area of module 2.794[m²].				





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Clause	Requirement + Test	Result-Remark	Verdict
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10.15 Initial		TABLE: Wet leakage current test (Initial)		P
Test Date [MM/DD/YYYY].....:		04/06/2024		-
Test Voltage applied [V].....:		1500V		-
Solution resistivity [ $\Omega$ cm].....:		<3500 at 22 $\pm$ 3°C	2498	-
Solution temperature [°C].....:		23.0		-
Sample#	Measured[G $\Omega$ ]	Limit[M $\Omega$ ]		Result
1	5.13	14.32		P
2	5.58	14.32		P
3	6.02	14.32		P
4	5.35	14.32		P
5	5.17	14.32		P
6	5.59	14.32		P
7	5.10	14.32		P
8	5.24	14.32		P

Supplementary information: Area of module 2.794[m<sup>2</sup>].

10.4 B		TABLE: Measurement of temperature coefficients		P
Test Date [MM/DD/YYYY].....:		04/10/2024		-
Ambient air temperature [°C].....:		25		-
Irradiance [W/m <sup>2</sup> ].....:		1000		-
Module temperature [°C] high/low.....:		65 /25		-
Sample#	Parameter	Calculated Value		
2	Short circuit current $\alpha$ [%/°C].....:	0.0480		-
	Open circuit voltage $\beta$ [%/°C].....:	-0.2562		-
	Peak power $\delta$ [%/°C].....:	-0.3047		-

Supplementary information: Nil

10.5 B		TABLE: Measurement of Nominal Operating Cell Temperature [NOCT, °C]			P
Test Date [MM/DD/YYYY].....:		04/15/2024	04/16/2024	04/17/2024	-
Wind velocity [m/s] high/low.....:		1.03/0.68	1.07/0.72	1.01/0.69	-
Ambient temperature [°C] high/low.....:		34.81/30.20	34.85/30.95	34.55/30.07	-
Irradiance [W/m <sup>2</sup> ] high/low.....:		913.1/542.2	907.3/577.4	939.3/518.5	-
Module temperature [°C] high/low.....:		49.13/30.89	49.41/31.17	50.12/31.45	-
Wind velocity [m/s] (average).....:		0.81	0.87	0.78	-
Ambient temperature [°C] (average).....:		32.24	32.11	31.90	-
NOCT correction factor [°C].....:		1	1	1	-
Calculated NOCT [°C].....:		46.23	46.05	46.14	-

Sample#	Average NOCT[°C]
2	46.14

Supplementary information: Nil





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<b>10.6 B</b>	<b>TABLE: Performance at STC and NOCT</b>		P			
Sample No.....:	2					
Test Date [MM/DD/YYYY].....:	04/19/2024		-			
Wind velocity [m/s] high/low.....:	N/A		-			
Test method.....:	[X] Indoor [ ] Outdoor		-			
Ambient air temperature [°C].....:	25		-			
Irradiance [W/m <sup>2</sup> ] High/Low.....:	1000		-			
Module temperature [°C] high/low.....:	25°C for STC / 46.14°C for NOCT		-			
Condition	Voc [V]	Vmp [V]	Isc [A]	Imp [A]	Pmp [W]	FF[%]
STC	55.65	46.77	14.07	13.27	620.64	79.26
NOCT	51.94	42.85	13.16	12.45	533.48	78.05
Supplementary information: Nil						

<b>10.7 B</b>	<b>TABLE: Performance at low irradiance</b>		P			
Test Date [MM/DD/YYYY].....:	04/21/2024		-			
Ambient air temperature [°C].....:	N/A		-			
Irradiance [W/m <sup>2</sup> ].....:	200		-			
Module temperature [°C].....:	25		-			
Test method.....:	[X] Data corrected to a 25°C cell temperature and 200W/m <sup>2</sup> irradiance [ ] Directly measured		-			
Sample#	Voc[V]	Vmp[V]	Isc[A]	Imp[A]	Pmp [W]	FF[%]
2	43.28	37.68	3.74	3.32	125.10	77.28
Supplementary information: Nil						

<b>10.8 B</b>	<b>TABLE: Outdoor exposure test</b>		P
Sample No.....:	2		-
Test Date [MM/DD/YYYY] start/end.....:	04/29/2024 to 05/06/2024		
Total irradiation dosage [kWh/m <sup>2</sup> ].....:	60		-
Supplementary information: Nil			

<b>(10.1 Visual inspection after outdoor exposure test)</b>		P
Test Date [MM/DD/YYYY].....:	05/06/2024	-
Sample#	Nature and position of initial findings – comments or attach photos	-
2	No visual defect	P
Supplementary information: Nil		





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Clause	Requirement + Test	Result-Remark	Verdict
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<b>(10.2 Maximum power determination after outdoor exposure test)</b>							P
Test Date [MM/DD/YYYY].....:		05/06/2024				-	
Module temperature [°C].....:		25				-	
Irradiance [W/m <sup>2</sup> ].....:		1000				-	
Sample#	Voc[V]	Vmp[V]	Isc[A]	Imp[A]	Pmp [W]	FF[%]	
2	55.62	46.68	14.05	13.24	618.04	79.09	
1(control)	55.61	46.77	14.05	13.27	620.64	79.43	
Pmp degradation after this test [%] ≤ 5%.....:			-0.42 for Sample 2				
<b>(10.3 Insulation test after outdoor exposure test)</b>							P
Test Date [MM/DD/YYYY].....:		05/06/2024				-	
Test Voltage applied [V].....:		4000V for 1min & 1500V for 2min				-	
Sample#	Measured	Required	Dielectric breakdown		Result		
	GΩ	MΩ	Yes(description)	No			
2	12.75	14.32	No	-	P		
Supplementary information: Area of module 2.794[m <sup>2</sup> ], Minimum requirement according to the standard is 40MΩm <sup>2</sup>							

<b>10.18B</b>	<b>TABLE: Bypass diode thermal test</b>			P
Sample No.....:	2			-
Test Date [MM/DD/YYYY] start/end.....:	05/07/2024			-
Module temperature [°C].....:	75±5			-
Number of diodes in junction box.....:	3			-
Diode manufacturer.....:	Genx PV India Private Limited			-
Diode type designation.....:	MK6045			-
Max. permissible junction temperature T <sub>jmax</sub> [°C] (according to diode datasheet).....:	200			-
	Diode1	Diode2	Diode3	Result
Current flow applied [A].....:	14.06	14.06	14.06	-
Max. diode surface temperature [°C] a or b:	146.0	145.8	145.7	-
Voltage drop [V].....:	0.38	0.34	0.35	-
Power dissipation [W].....:	5.34	4.78	4.92	-
Thermal resistance junction to leads (RTHJL)/to case (RTHJC) [K/W] (according to datasheet).....:	1.2	1.2	1.2	-
Calculated max. junction temperature T <sub>jcalc</sub> [°C] a or b..... :	152.41	151.54	151.61	-
T <sub>jcalc</sub> < T <sub>jmax</sub> (test passed)? Yes/No.....:	Yes	Yes	Yes	-
Current flow (1.25 * Isc) [A].....:	17.58	17.58	17.58	-
Max. diode surface temperature [°C] a or b :	156.05	155.76	155.83	-
Remarks: After completion of the test, diode is still functional. (a: measured at diode case or ambient near diode case, b: measured at diode leads)				





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<b>(10.1 Visual inspection after bypass diode thermal test)</b>			P
Test Date [MM/DD/YYYY].....:	05/07/2024		-
Sample#	Nature and position of initial findings – comments or attach photos		-
2	No visual defect		P

Supplementary information: Nil

<b>(10.2 Maximum power determination after bypass diode thermal test)</b>			P
Test Date [MM/DD/YYYY].....:	05/07/2024		-
Module temperature [°C].....:	25		-
Irradiance [W/m <sup>2</sup> ].....:	1000		-

Sample#	Voc[V]	Vmp[V]	Isc[A]	Imp[A]	Pmp [W]	FF[%]
2	55.58	46.61	14.04	13.20	615.25	78.84
1 (control)	55.60	46.75	14.05	13.27	620.37	79.41
Pmp degradation after this test [%] ≤5%.....:			-0.45 for Sample 2			-

Supplementary information: Nil

<b>(10.3 Insulation test after bypass diode thermal test)</b>			P		
Test Date [MM/DD/YYYY].....:	05/07/2024		-		
Test Voltage applied [V].....:	4000V for 1min & 1500V for 2min		-		
Sample#	Measured	Required	Dielectric breakdown		Result
	GΩ	MΩ	Yes(description)	No	
2	11.97	14.32	No	-	P

Supplementary information: Area of module 2.794[m<sup>2</sup>], Minimum requirement according to the standard is 40MΩm<sup>2</sup>

<b>10.9 B</b>	<b>TABLE: Hot-spot endurance test</b>	P
Sample No. ....:	2	-
Test Date [MM/DD/YYYY] start/end.....:	05/20/2024	-
Cell interconnection circuit.....:	[ ] S [X] SP [ ] SPS	-
Module temperature at thermal equilibrium [°C].....:	52.4	-
Determination of worst case cell		-
Maximum measured cell temperature in 5hours [°C]:	78.9	-
Shading rate [%].....:	100	-

Supplementary information: Nil

<b>(10.1 Visual inspection after hot-spot endurance test)</b>			P
Test Date [MM/DD/YYYY].....:	05/21/2024		-
Sample#	Nature and position of initial findings		-
2	No visual defect		P

Supplementary information: Nil





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<b>(10.2 Maximum power determination after hot-spot endurance test)</b>							P
Test Date [MM/DD/YYYY].....:		05/21/2024					-
Module temperature [°C].....:		25					-
Irradiance [W/m <sup>2</sup> ].....:		1000					-
Sample#	Voc[V]	Vmp[V]	Isc[A]	Imp[A]	Pmp [W]	FF[%]	
2	55.45	46.49	14.01	13.15	611.34	78.69	
1(control)	55.58	46.75	14.03	13.27	620.37	79.56	
Pmp degradation after this test [%] ≤5%.....:		-0.64 for Sample 2					-
Supplementary information: Nil							

<b>(10.3 Insulation test after hot-spot endurance test)</b>							P
Test Date [MM/DD/YYYY].....:		05/21/2024					-
Test Voltage applied [V].....:		4000V for 1min & 1500V for 2min					-
Sample#	Measured	Required	Dielectric breakdown		Result		
	GΩ	MΩ	Yes(description)	No			
2	11.12	14.32	No	-	P		
Supplementary information: Area of module 2.794[m <sup>2</sup> ], Minimum requirement according to the standard is 40MΩm <sup>2</sup>							

<b>10.10C</b>	<b>TABLE: UV preconditioning test</b>					P	
Test Date [MM/DD/YYYY] start/end.....:		04/10/2024 to 04/18/2024					-
Module temperature [°C].....:		60 ± 5					-
Total UV Irradiation 280-400nm [kWh/m <sup>2</sup> ].....:		15.0					-
Irradiation 280-320nm [kWh/m <sup>2</sup> ].....:		5.0					-
Sample#	Open circuits (Yes/No)						
3	No open circuit found					P	
4	No open circuit found					P	
Supplementary information: Nil							

<b>(10.1 Visual inspection after UV preconditioning test)</b>							P
Test Date [MM/DD/YYYY].....:		04/18/2024					-
Sample#	Nature and position of initial findings						
3	No visual defect					P	
4	No visual defect					P	
Supplementary information: Nil							

<b>(10.2 Maximum power determination after UV preconditioning test)</b>							P
Test Date [MM/DD/YYYY].....:		04/18/2024					-
Module temperature [°C].....:		25					-
Irradiance [W/m <sup>2</sup> ].....:		1000					-
Sample#	Voc[V]	Vmp[V]	Isc[A]	Imp[A]	Pmp [W]	FF[%]	
3	55.35	46.59	14.04	13.18	614.06	79.02	
4	55.34	46.56	14.03	13.17	613.20	78.98	
1 (Control)	55.56	46.75	14.02	13.26	619.91	79.58	
Pmp degradation after this test [%] ≤5%.....:		-1.06 & -1.12 for Sample 3 & 4 respectively					-
Supplementary information: Nil							





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<b>(10.3 Insulation test after UV preconditioning test)</b>					P
Test Date [MM/DD/YYYY].....:		04/18/2024			-
Test Voltage applied [V].....:		4000V for 1min & 1500V for 2min			-
Sample#	Measured	Required	Dielectric breakdown		Result
	GΩ	MΩ	Yes(description)	No	
3	12.38	14.32	No	-	P
4	13.24	14.32	No	-	P
Supplementary information: Area of module 2.794[m <sup>2</sup> ], Minimum requirement according to the standard is 40MΩm <sup>2</sup>					

<b>10.11C</b>		<b>TABLE: Thermal cycling 50 test</b>			P
Test Date [MM/DD/YYYY] start/end.....:		04/19/2024 to 05/03/2024			-
Total cycles (50).....:		50			-
Sample#	Open circuits (Yes/No)				-
3	No open circuit found				P
4	No open circuit found				P
Supplementary information: Nil					

<b>(10.1 Visual inspection after thermal cycling 50 test)</b>					P
Test Date [MM/DD/YYYY].....:		05/03/2024			-
Sample#	Nature and position of initial findings				-
3	No visual defect				P
4	No visual defect				P
Supplementary information: Nil					

<b>(10.2 Maximum power determination after thermal cycling 50 test)</b>							P
Test Date [MM/DD/YYYY].....:		05/03/2024					-
Module temperature [°C].....:		25					-
Irradiance [W/m <sup>2</sup> ].....:		1000					-
Sample#	Voc[V]	Vmp[V]	Isc[A]	Imp[A]	Pmp [W]	FF[%]	
3	55.25	46.35	14.01	13.11	607.65	78.50	
4	55.21	46.31	14.01	13.08	605.73	78.31	
1 (Control)	55.54	46.74	14.01	13.27	620.24	79.71	
Pmp degradation after this test [%] ≤5%.....:		-1.04 & -1.22 for Sample 3 & 4 respectively					-
Supplementary information: Nil							

<b>(10.3 Insulation test after thermal cycling 50 test)</b>					P
Test Date [MM/DD/YYYY].....:		05/03/2024			-
Test Voltage applied [V].....:		4000V for 1min & 1500V for 2min			-
Sample#	Measured	Required	Dielectric breakdown		Result
	GΩ	MΩ	Yes (description)	No	
3	11.49	14.32	No	-	P
4	12.07	14.32	No	-	P
Supplementary information: Area of module 2.794[m <sup>2</sup> ], Minimum requirement according to the standard is 40MΩm <sup>2</sup>					







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10.12C	TABLE: Humidity freeze 10 test	P
Test Date [MM/DD/YYYY] start/end.....:	05/06/2024 to 05/17/2024	-
Total cycles (10).....:	10	-
Sample#	Open circuits(Yes/No)	-
3	No open circuit found	P
4	No open circuit found	P
Supplementary information: Nil		

(10.1 Visual inspection after humidity freeze 10 test)	P
Test Date [MM/DD/YYYY].....:	05/17/2024
Sample#	Nature and position of initial findings
3	No visual defect
4	No visual defect
Supplementary information: Nil	

(10.2 Maximum power determination after humidity freeze 10 test)	P						
Test Date [MM/DD/YYYY].....:	05/17/2024						
Module temperature [°C].....:	25						
Irradiance [W/m²].....:	1000						
Sample#	Voc[V]	Vmp[V]	Isc[A]	Imp[A]	Pmp [W]	FF[%]	
3	55.08	46.17	13.95	13.01	600.67	78.18	
4	54.88	46.14	13.87	12.97	598.44	78.62	
1(Control)	55.51	46.74	14.01	13.26	619.77	79.69	
Pmp degradation after this test [%] ≤5%.....:							-1.15 & -1.20 for Sample 3 & 4 respectively

(10.3 Insulation test after humidity freeze 10 test)	P				
Test Date [MM/DD/YYYY].....:	05/17/2024				
Test Voltage applied [V].....:	4000V for 1min & 1500V for 2min				
Sample#	Measured	Required	Dielectric breakdown		Result
	GΩ	MΩ	Yes(description)	No	
3	10.30	14.32	No	-	P
4	11.23	14.32	No	-	P
Supplementary information: Area of module 2.794[m²], Minimum requirement according to the standard is 40MQm²					

10.14C1	TABLE: Robustness of terminations test	P
Test Date [MM/DD/YYYY] start/end....:	05/20/2024	-
Types of terminations	Type A	-
Applied force in all directions [N]..... :	40 for tensile test, 20 for bending test	-
Sample#	Open circuits(Yes/No)	-
4	No open circuit found	P
Supplementary information: Nil		

(10.1 Visual inspection after robustness of terminations test)	P
Test Date [MM/DD/YYYY].....:	05/20/2024
Sample#	Nature and position of initial findings
4	No visual defect
Supplementary information: Nil	





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<b>(10.2 Maximum power determination after robustness of terminations test)</b>							P
Test Date [MM/DD/YYYY].....:			05/20/2024				-
Module temperature [°C].....:			25				-
Irradiance [W/m <sup>2</sup> ].....:			1000				-
Sample#	Voc[V]	Vmp[V]	Isc[A]	Imp[A]	Pmp [W]	FF[%]	
4	54.85	46.11	13.86	12.96	597.59	78.61	
1 (Control)	55.52	46.73	14.02	13.26	619.64	79.61	
Pmp degradation after this test [%] ≤5%.....:			-0.14 for Sample 4				-
Supplementary information: Nil							

<b>(10.3 Insulation test after robustness of terminations test)</b>							P
Test Date [MM/DD/YYYY].....:			05/20/2024				-
Test Voltage applied [V].....:			4000V for 1min & 1500V for 2min				-
Sample#	Measured	Required	Dielectric breakdown				-
	GΩ	MΩ	Yes(description)	No			
4	10.87	14.32	No	-			P
Supplementary information: Area of module 2.794[m <sup>2</sup> ], Minimum requirement according to the standard is 40MΩm <sup>2</sup>							

<b>10.11D</b>		<b>TABLE: Thermal cycling 200 test</b>					P
Test Date [MM/DD/YYYY] start/end.....:			04/10/2024 to 05/25/2024				-
Total cycles (200).....:			200				-
Applied current [A].....:			13.27				-
Sample#	Open circuits(Yes/No)						
5	No open circuit found						P
6	No open circuit found						P
Supplementary information: Nil							

<b>(10.1 Visual inspection after thermal cycling 200 test)</b>							P
Test Date [MM/DD/YYYY].....:			05/25/2024				-
Sample#	Nature and position of initial findings						
5	No visual defect						P
6	No visual defect						P
Supplementary information: Nil							

<b>(10.2 Maximum power determination after thermal cycling 200 test)</b>							P
Test Date [MM/DD/YYYY].....:			05/25/2024				-
Module temperature [°C].....:			25				-
Irradiance [W/m <sup>2</sup> ].....:			1000				-
Sample#	Voc[V]	Vmp[V]	Isc[A]	Imp[A]	Pmp [W]	FF[%]	
5	55.18	46.30	14.02	13.07	605.14	78.22	
6	55.13	46.24	13.99	13.06	603.89	78.30	
1 (Control)	55.52	46.75	14.01	13.25	619.44	79.64	
Pmp degradation after this test [%] ≤5%.....:			-2.43 & -2.74 for Sample 5 & 6 respectively				-
Supplementary information: Nil							





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<b>(10.3 Insulation test after thermal cycling 200 test)</b>			P		
Test Date [MM/DD/YYYY].....:		05/25/2024	-		
Test Voltage applied [V].....:		4000V for 1min & 1500V for 2min	-		
Sample#	Measured	Required	Dielectric breakdown		Result
	GΩ	MΩ	Yes(description)	No	
5	12.25	14.32	No	-	P
6	12.07	14.32	No	-	P
Supplementary information: Area of module 2.794[m <sup>2</sup> ], Minimum requirement according to the standard is 40MΩm <sup>2</sup>					

<b>10.13E</b>	<b>TABLE: Damp heat 1000 test</b>		P
Test Date [MM/DD/YYYY] start/end:		04/10/2024 to 05/23/2024	-
Total hours (1000).....:		1000	-
Sample#	Open circuits(Yes/No)		-
7	No open circuit found		P
8	No open circuit found		P

Supplementary information: Nil			
<b>(10.1 Visual inspection after damp heat 1000 test)</b>			P
Test Date [MM/DD/YYYY].....:		05/23/2024	-
Sample#	Nature and position of initial findings		-
7	No visual defect		P
8	No visual defect		P

Supplementary information: Nil					
<b>(10.3 Insulation test after damp heat 1000 test)</b>			P		
Test Date [MM/DD/YYYY].....:		05/23/2024	-		
Test Voltage applied [V].....:		4000V for 1min & 1500V for 2min	-		
Sample#	Measured	Required	Dielectric breakdown		Result
	GΩ	MΩ	Yes(description)	No	
7	11.82	14.32	No	-	P
8	11.31	14.32	No	-	P
Supplementary information: Area of module 2.794[m <sup>2</sup> ], Minimum requirement according to the standard is 40MΩm <sup>2</sup>					

<b>(10.15 Wet leakage current test after damp heat 1000 test)</b>			P
Test Date [MM/DD/YYYY].....:		05/23/2024	-
Test Voltage applied [V].....:		1500V	-
Solution resistivity [Ωcm].....:		< 3500 Ω cm at 22 ± 3°C	2479
Solution temperature [°C].....:		22.9	-
Sample#	Measured[GΩ]	Limit[MΩ]	Result
7	4.17	14.32	P
8	4.62	14.32	P
Supplementary information: Area of module 2.794[m <sup>2</sup> ], Minimum requirement according to the standard is 40MΩm <sup>2</sup>			





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<b>(10.2 Maximum power determination after damp heat 1000 test)</b>						P
Test Date [MM/DD/YYYY].....:		05/23/2024				-
Module temperature [°C].....:		25				-
Irradiance [W/m²].....:		1000				-
Sample#	Voc[V]	Vmp[V]	Isc[A]	Imp[A]	Pmp [W]	FF[%]
7	55.20	46.35	14.03	13.12	608.11	78.52
8	55.25	46.39	14.04	13.13	609.10	78.52
1 (Control)	55.55	46.71	14.01	13.26	619.37	79.58
Pmp degradation after this test [%]≤5%.....:		-1.99 & -1.88 for Sample 7 & 8 respectively				-
Supplementary information: Nil						

<b>10.16E1</b>	<b>TABLE: Mechanical load test</b>		P
Sample#.....:	7		-
Test Date [MM/DD/YYYY].....:	06/04/2024		-
Mounting method.....:	As per manual	As per manual	-
Load applied to.....:	Front side	Back side	-
Mechanical load [Pa].....:	2400	2400	-
First cycle time (start/end).....:	10:10 to 11:10	11:30 to 12:30	-
Intermittent open-circuit (Yes/No).....:	No	No	-
Mechanical load [Pa].....:	2400	2400	-
Second cycle time (start/end).....:	12:40 to 1:40	2:20 to 3:20	-
Intermittent open-circuit (Yes/No).....:	No	No	-
Mechanical load [Pa].....:	5400	2400	-
Third cycle time (start/end).....:	3:35 to 4:35	4:50 to 5:50	-
Intermittent open-circuit (Yes/No).....:	No	No	-
Supplementary information: Nil			





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<b>(10.1 Visual inspection after mechanical load test)</b>			P
Test Date [MM/DD/YYYY].....:		06/04/2024	-
Sample#	Nature and position of initial findings		-
7	No visual defect		P

Supplementary information: Nil

<b>(10.2 Maximum power determination after mechanical load test)</b>			P			
Test Date [MM/DD/YYYY].....:		06/04/2024	-			
Module temperature [°C].....:		25	-			
Irradiance [W/m²].....:		1000	-			
Sample#	Voc[V]	Vmp[V]	Isc[A]	Imp[A]	Pmp [W]	FF[%]
7	55.13	46.25	14.01	13.09	605.41	78.38
1 (Control)	55.53	46.73	14.00	13.25	619.17	79.64
Pmp degradation after this test [%] ≤5%.....:		-0.44 for Sample 7				-

Supplementary information: Nil

<b>(10.3 Insulation test after mechanical load test)</b>			P		
Test Date [MM/DD/YYYY].....:		06/04/2024	-		
Test Voltage applied [V].....:		4000V for 1min & 1500V for 2min	-		
Sample#	Measured	Required	Dielectric breakdown		Result
	GΩ	MΩ	Yes(description)	No	
7	10.97	14.32	No	-	P

Supplementary information: Area of module 2.794[m²], Minimum requirement according to the standard is 40MΩm²

<b>10.17E2</b>	<b>TABLE: Hail impact test</b>	P
Test Date [MM/DD/YYYY].....:		06/04/2024
Ice ball size [mm].....:		25
Ice ball weight [g].....:		7.53
Ice ball velocity [m/s].....:		23.15
Number of impact locations.....:		11

Sample#	Open circuits (Yes/No)	-
8	No open circuit found	-

Supplementary information: Nil

<b>(10.1 Visual inspection after hail impact test)</b>			P
Test Date [MM/DD/YYYY].....:		06/04/2024	-
Sample#	Nature and position of initial findings		-
8	No visual defect		P

Supplementary information: Nil





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<b>(10.2 Maximum power determination after hail impact test)</b>			P			
Test Date [MM/DD/YYYY].....:		06/04/2024	-			
Module temperature [°C].....:		25	-			
Irradiance [W/m <sup>2</sup> ].....:		1000	-			
Sample#	Voc[V]	Vmp[V]	Isc[A]	Imp[A]	Pmp [W]	FF[%]
8	55.21	46.35	14.03	13.12	608.11	78.51
1 (Control)	55.54	46.70	14.00	13.25	618.78	79.58
Pmp degradation after this test [%] ≤5%.....:				-0.16 for Sample 8		-
Supplementary information: Nil						

<b>(10.3 Insulation test after hail impact test)</b>					P
Test Date [MM/DD/YYYY].....:		06/04/2024			-
Test Voltage applied [V].....:		4000V for 1min & 1500V for 2min			-
Sample#	Measured	Required	Dielectric breakdown		Result
	GΩ	MΩ	Yes(description)	No	
8	10.81	14.32	No	-	P
Supplementary information: Area of module 2.794[m <sup>2</sup> ], Minimum requirement according to the standard is 40MΩm <sup>2</sup>					

<b>10.2 F</b>	<b>TABLE: Maximum power determination (Final)</b>							P
Test Date [MM/DD/YYYY].....:		05/20/2024 to 06/04/2024					-	
Module temperature [°C].....:		25					-	
Irradiance [W/m <sup>2</sup> ].....:		1000					-	
Sample#	Voc[V]	Vmp[V]	Isc[A]	Imp[A]	Pmp [W]	FF[%]	Degradation [%]	Limit[%]
1	55.54	46.70	14.00	13.25	618.78	79.58	-	-8
2	55.45	46.49	14.01	13.15	611.34	78.69	-1.53	-8
3	55.08	46.17	13.95	13.01	600.67	78.18	-3.22	-8
4	54.85	46.11	13.86	12.96	597.59	78.61	-3.64	-8
5	55.18	46.30	14.02	13.07	605.14	78.22	-2.43	-8
6	55.13	46.24	13.99	13.06	603.89	78.30	-2.74	-8
7	55.13	46.25	14.01	13.09	605.41	78.38	-2.42	-8
8	55.21	46.35	14.03	13.12	608.11	78.51	-2.04	-8
Supplementary information: Nil								





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<b>10.15F</b>	<b>TABLE: Wet leakage current test (Final)</b>		P
Test Date [MM/DD/YYYY].....:	06/05/2024		-
Test Voltage applied [V].....:	1500V		-
Solution resistivity [ $\Omega$ cm].....:	< 3500 $\Omega$ cm at 22 $\pm$ 3°C	2507	-
Solution temperature [°C].....:	23.0		-
Sample#	Measured[G $\Omega$ ]	Limit[M $\Omega$ ]	Result
1	4.29	14.32	P
2	4.33	14.32	P
3	5.10	14.32	P
4	4.42	14.32	P
5	4.18	14.32	P
6	4.38	14.32	P
7	3.63	14.32	P
8	3.85	14.32	P
Supplementary information: Area of module 2.794[m <sup>2</sup> ], Minimum requirement according to the standard is 40M $\Omega$ m <sup>2</sup>			





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### List of Annexes

- Annex 1: List of measurement equipment
- Annex 2: Spectrum of the lamp used for the UV pre-screening test (Optional)
- Annex 3: Statement of the estimated uncertainty of the test results
- Annex 4: Enclosures (Photographs)
- Annex 5: Electrical rating of series models







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## Annex 1: List of measurement equipment

Description	Identification#	Application
Visual inspection test setup	URS/LAB/Lab/1323	Visual inspection test
Sun simulator	URS/LAB/Lab/841	Maximum power determination, Performance at STC, Performance at low irradiance, Measurement of temperature coefficient
IV Curve tracer	URS/LAB/Lab/1046	Performance at low irradiance, Hot spot endurance test, Bypass diode functionality test,
DC Power supply	URS/LAB/Lab/847	Insulation test, Wet leakage test
Hipot tester	URS/LAB/Lab/874	Insulation test, Wet leakage test
Thermal imager	URS/LAB/Lab/640	Hot spot endurance test
Bypass diode tester	URS/LAB/Lab/856	Bypass diode test
NMOT/NOCT	URS/LAB/Lab/846	NOCT test, Temperature test, Outdoor exposure test
UV chamber	URS/LAB/Lab/859	UV preconditioning
Damp heat chamber	URS/LAB/Lab/860	Damp heat test
Humidity freeze chamber	URS/LAB/Lab/861	Temperature cycling test
Damp heat chamber	URS/LAB/Lab/1381	Temperature cycling test, Bypass diode test
DC Power supply	URS/LAB/Lab/926	Temperature cycling test,
Temperature data logger	URS/LAB/Lab/925	Temperature cycling test, Bypass diode test
Continuity tester	URS/LAB/Lab/852	Continuity test
Robustness of termination	URS/LAB/Lab/842	Robustness of termination test
Wet leakage tester	URS/LAB/Lab/855	Wet leakage test
Glass Thermometer	URS/LAB/Lab/979	Wet leakage test
Mechanical load	URS/LAB/Lab/853	Mechanical load test
Hail tester	URS/LAB/Lab/849	Hail tester test
Vernier caliper	URS/LAB/Lab/898	For dimension
Measuring tape	URS/LAB/Lab/937.1	For dimension





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## Annex 2: Spectrum of the lamp used for the UV pre-screening test (Optional)

## Annex 3: Statement of the estimated uncertainty of the test results

For Pmp – Measurement uncertainty is  $\pm 2.4\%$   
For Isc – Measurement uncertainty is  $\pm 2.1\%$   
For Voc – Measurement uncertainty is  $\pm 1.8\%$





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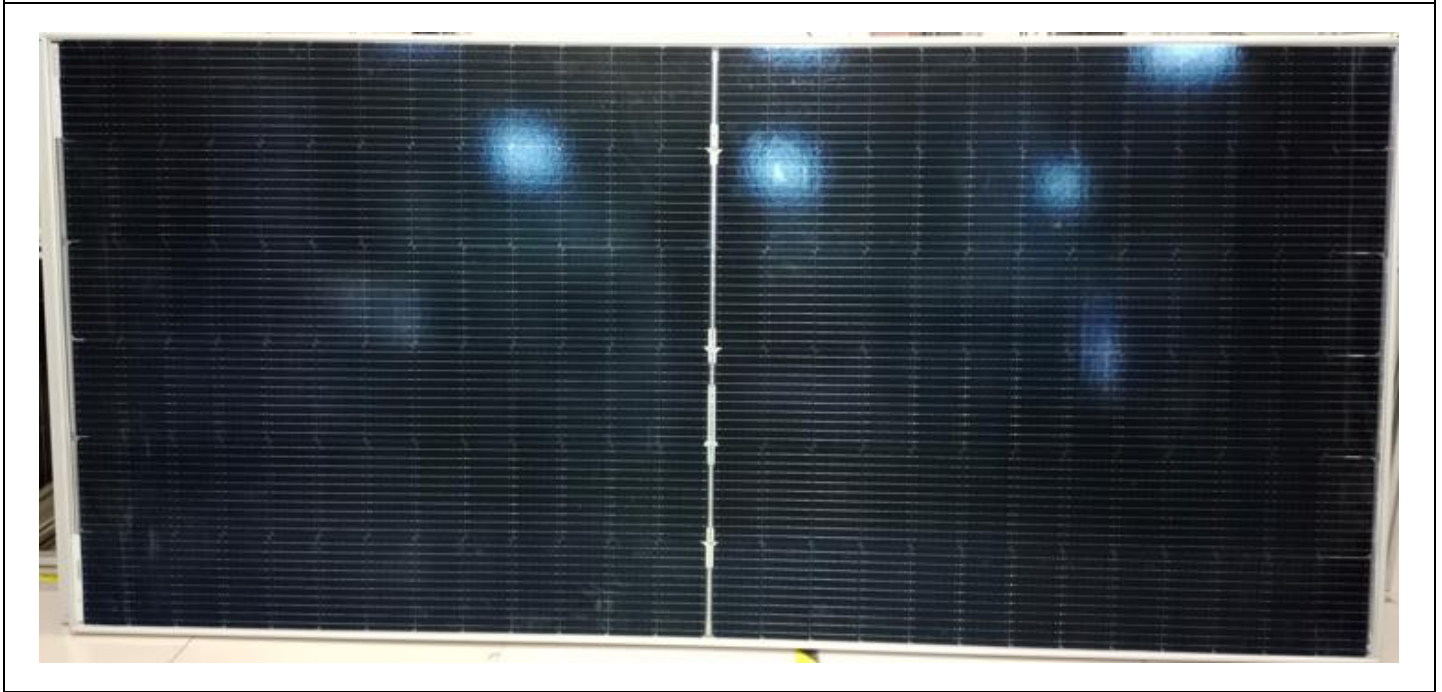
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## Annex 4: Enclosures (Photographs)



Rear view



Front view





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Junction Box closed view



Junction Box opened view



Negative Connector



Positive Connector





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## Annex 5: Electrical rating of series models

Model	System Voltage (V)	Electrical Rating					Fuse Rating (A)	Dimension			Total no. of cells (Half cut cells) (no.)	No of cells per by bypass diode (no.)
		Voc (V)	Vm (V)	Isc (A)	Im (A)	Pm (W)		L (mm)	W (mm)	H (mm)		
ISEN620N-TOP (Representative Model)	1500	55.65	46.75	14.06	13.27	620	30 A	2464	1134	35	156	52
ISEN615N-TOP	1500	55.50	46.48	14.02	13.24	615	30 A	2464	1134	35	156	52
ISEN610N-TOP	1500	55.35	46.20	13.99	13.21	610	30 A	2464	1134	35	156	52
ISEN605N-TOP	1500	55.22	45.92	13.95	13.18	605	30 A	2464	1134	35	156	52
ISEN600N-TOP	1500	55.01	45.66	13.91	13.15	600	30 A	2464	1134	35	156	52
ISEN590N-TOP	1500	51.88	44.05	14.18	13.40	590	30 A	2278	1134	35	144	48
ISEN585N-TOP	1500	51.74	43.80	14.14	13.37	585	30 A	2278	1134	35	144	48
ISEN580N-TOP	1500	51.60	43.56	14.10	13.33	580	30 A	2278	1134	35	144	48
ISEN575N-TOP	1500	51.46	43.43	14.06	13.29	575	30 A	2278	1134	35	144	48
ISEN570N-TOP	1500	51.32	43.07	14.02	13.25	570	30 A	2278	1134	35	144	48
ISEN565N-TOP	1500	51.19	42.82	13.99	13.21	565	30 A	2278	1134	35	144	48
ISEN560N-TOP	1500	51.04	42.60	13.95	13.15	560	30 A	2278	1134	35	144	48
ISEN540N-TOP	1500	49.96	40.02	14.36	13.50	540	30 A	2094	1134	35	132	44
ISEN535N-TOP	1500	49.80	39.88	14.32	13.42	535	30 A	2094	1134	35	132	44
ISEN530N-TOP	1500	46.63	39.64	14.27	13.38	530	30 A	2094	1134	35	132	44
ISEN525N-TOP	1500	46.47	39.38	14.23	13.34	525	30 A	2094	1134	35	132	44
ISEN520N-TOP	1500	46.30	39.27	14.19	13.25	520	30 A	2094	1134	35	132	44
ISEN500N-TOP	1500	43.37	36.42	14.46	13.73	500	30 A	1908	1134	35	120	40
ISEN495N-TOP	1500	43.21	36.22	14.40	13.67	495	30 A	1908	1134	35	120	40
ISEN490N-TOP	1500	43.05	36.01	14.34	13.61	490	30 A	1908	1134	35	120	40
ISEN485N-TOP	1500	42.89	35.80	14.28	13.55	485	30 A	1908	1134	35	120	40
ISEN480N-TOP	1500	42.73	35.59	14.22	13.49	480	30 A	1908	1134	35	120	40
ISEN475N-TOP	1500	42.56	35.37	14.16	13.43	475	30 A	1908	1134	35	120	40
ISEN470N-TOP	1500	42.40	35.16	14.11	13.37	470	30 A	1908	1134	35	120	40
ISEN465N-TOP	1500	42.24	34.94	14.05	13.31	465	30 A	1908	1134	35	120	40
ISEN460N-TOP	1500	42.07	34.72	13.99	13.25	460	30 A	1908	1134	35	120	40
ISEN440N-TOP	1500	38.63	32.98	14.30	13.35	440	30 A	1722	1134	35	108	36
ISEN435N-TOP	1500	38.50	32.76	14.22	13.30	435	30 A	1722	1134	35	108	36
ISEN430N-TOP	1500	38.42	32.49	14.13	13.25	430	30 A	1722	1134	35	108	36
ISEN425N-TOP	1500	38.29	32.23	14.05	13.20	425	30 A	1722	1134	35	108	36
ISEN420N-TOP	1500	38.16	31.96	13.98	13.15	420	30 A	1722	1134	35	108	36

.....End of the report.....

