

## Golden Module Test Report: Mitrex M240LS01F612 SN: MIT21A04123

**Report Number:** 21081-PR-E-005  
**Report Date:** 2022-03-30  
**Test Period:** 2022-01-24 to 2022-03-29  
**Project ID:** 21081 (CFV), PO-000476 (Customer PO)  
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### Project Summary

CFV Labs conducted performance at STC and temperature coefficient testing on one **M240LS01F612** module produced by **Mitrex**. An incoming inspection report, sample images and EL images were provided separately to the customer. Following outdoor stabilization in open circuit for >80kWh/m<sup>2</sup>, performance at STC and temperature coefficient measurements were performed.

### Preconditioning

Prior to the measurements the module received 89.8 kWh/m<sup>2</sup> of irradiation in open circuit.

### Performance at STC

*Estimated uncertainties (k=2) are: Isc ±1.6%, Voc ±0.75%, Imp ±2.1%, Vmp ±1.3%, Pmp ±2.2%*

Module ID	Serial Number	Isc (A)	Voc(V)	Imp (A)	Vmp (V)	Pmp (W)	FF (%)
21081-007	MIT21A04123	6.362	47.91	5.912	40.15	237.35	77.87

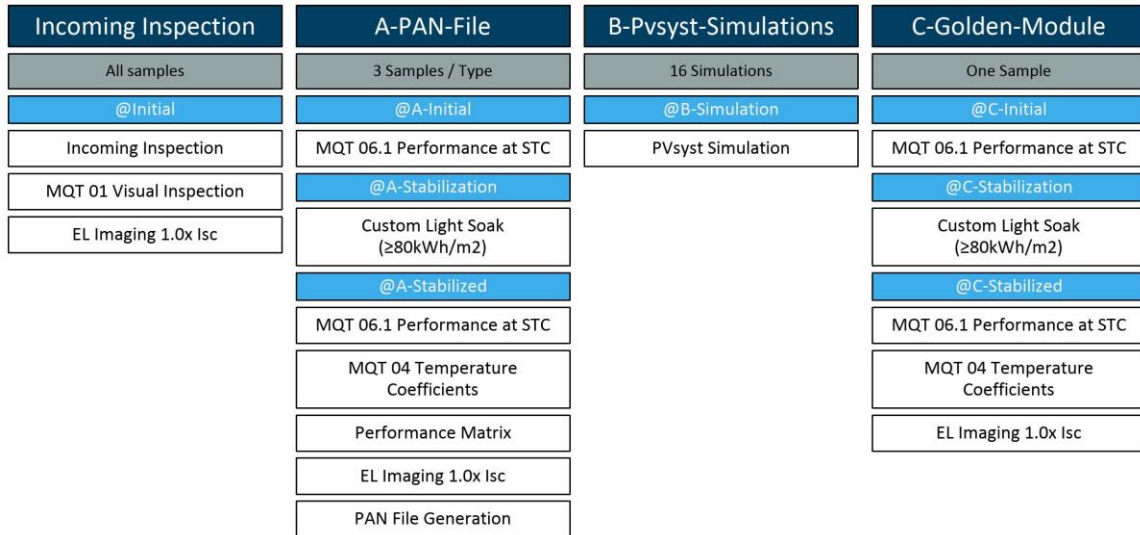
### Temperature Coefficients

*Estimated uncertainties (k=2) are: Relative: Isc ±10%, Voc ±5%, Imp N/A, Vmp ±5%, Pmp ±5%*

Module ID	α Isc (%/°C)	β Voc (%/°C)	α Imp (%/°C)	β Vmp (%/°C)	δ Pmp (%/°C)
21081-007	+0.0281	-0.2757	+0.0110	-0.3545	-0.3444

## Test Flow Assignment

The project test flow is provided in the diagram below:



A total of fourteen modules of several types were provided to CFV Labs for testing. The test flow assignment for each of the modules is provided in the table below. The modules were subjected to the tests legs in the order listed. ***This report contains only the golden module testing data for module 21081-007.***

Module ID	Test Leg(s)	Notes
21081-001	Incoming Inspection, A-PAN-File	Results in separate report
21081-002	Incoming Inspection, A-PAN-File	Results in separate report
21081-003	Incoming Inspection, A-PAN-File	Results in separate report
21081-004	Incoming Inspection	Spare
21081-005	Incoming Inspection, C-Golden-Module	Results in separate report
21081-006	Incoming Inspection	Spare
<b>21081-007</b>	<b>Incoming Inspection, A-PAN-File</b>	<b>Results in this report</b>
21081-008	Incoming Inspection, A-PAN-File	Results in separate report
21081-009	Incoming Inspection	Spare
21081-010	Incoming Inspection, A-PAN-File	Results in separate report
21081-011	Incoming Inspection	Spare
21081-012	Incoming Inspection, A-PAN-File	Results in separate report
21081-013	Incoming Inspection, A-PAN-File	Results in separate report
21081-014	Incoming Inspection, A-PAN-File	Results in separate report

## Results

### MQT 01 Visual Inspection

No major defects were observed during the visual inspection.

### Preconditioning

The modules received 89.8 kWh/m<sup>2</sup> of irradiation in open circuit under natural sunlight.

### MQT 06.1 Performance at STC

Estimated Uncertainties (k=2) are:  $I_{sc} \pm 1.6\%$ ,  $V_{oc} \pm 0.75\%$ ,  $I_{mp} \pm 2.1\%$ ,  $V_{mp} \pm 1.3\%$ ,  $P_{mp} \pm 2.2\%$

Module ID	Reference	Isc (A)	Voc(V)	Imp (A)	Vmp (V)	Pmp (W)	FF (%)
21081-007	A-Initial	6.380	47.95	6.008	40.24	241.78	79.03
21081-007	A-Stabilized	6.362	47.91	5.912	40.15	237.35	77.87

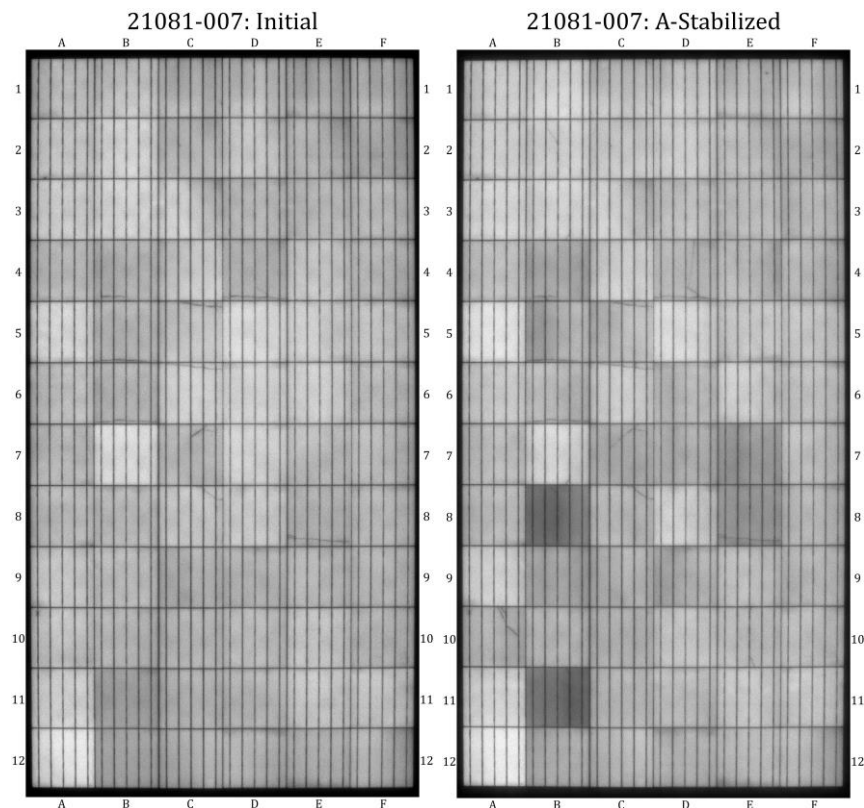
### Temperature Coefficients

Estimated uncertainties (k=2) are: Relative:  $I_{sc} \pm 10\%$ ,  $V_{oc} \pm 5\%$ ,  $I_{mp} N/A$ ,  $V_{mp} \pm 5\%$ ,  $P_{mp} \pm 5\%$

Module ID	$\alpha I_{sc}$ (%/°C)	$\beta V_{oc}$ (%/°C)	$\alpha I_{mp}$ (%/°C)	$\beta V_{mp}$ (%/°C)	$\delta P_{mp}$ (%/°C)
21081-007	+0.0281	-0.2757	0.0110	-0.3545	-0.3444

### Electroluminescence (EL) Imaging

EL images are provided below and separately to the customer in digital format.



## Sample Information

Sample images and an incoming inspection are provided separately to the customer in digital format.

### Sample Labeling:

Module ID	Manufacturer	Module Type	Serial Number
21081-007	Mitrex	M240LS01F612	MIT21A04123

### Construction Details:

Module Type	Length [m]	Width [m]	Thickness [mm]
M240LS01F612	2.030	1.067	23.5

### Nameplate Values:

No nameplates were attached to the modules. The module type is adopted to be a 240W class module based on communication with the customer and the measured STC power. No other nameplate data is available.

Module Type	Isc [A]	Voc [V]	Imp [A]	Vmp [V]	Pmp [W]	Max Sys Volt [V]	Fuse Rating [A]
M240LS01F612	-	-	-	-	240	-	-

### Sample Images:



## Procedures

The procedures for the testing in this report are summarized in the following table:

Test Name	Standard / Procedure	CFV Accreditation
Incoming Inspection	CFV	NA
Visual Inspection	IEC 61215-2:2016 MQT 01	ISO 17025
Electroluminescence Imaging	IEC TS 60904-13:2018	ISO 17025
Preconditioning	IEC 61215:2005, Clause 5	ISO 17025
Performance at STC	IEC 61215-2:2016 MQT 06.1	ISO 17025
Temperature Coefficients	IEC 61215-2:2016 MQT 04	ISO 17025

## Equipment and Calibration

Equipment and calibration information is available upon request.

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