

STANDARD OPERATING PROCEDURE FOR
LED SOLAR SIMULATOR (LSH-7320)

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Safety measures-

- 1) Do not look directly onto the light source.
- 2) Do not bring or place any liquid esp. water near the system. Please take all necessary precautions needed when working with electrical equipments.

LED Solar Simulator LSH-7320-

The LED solar simulator is a class ABA type solar simulator which provides a variable output from 0.1 sun to 1.1 sun over a 2"x 2" illumination area at a working distance of 12" (305mm). The design drives multiple LED's spaced over a spectrum of 400nm to 1100nm. The lifetime of the LEDs is over 10,000 hours. The LEDs come to a stable operating power within 5 minutes of warm up.

Salient features and specifications-

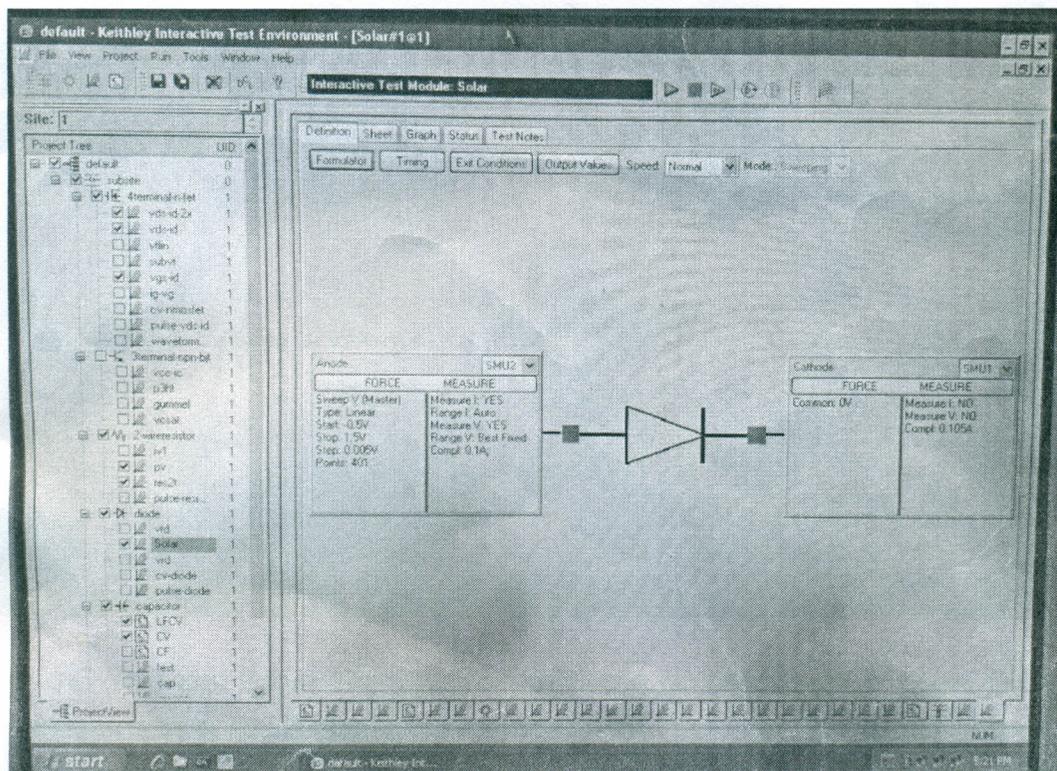
Type	Class ABA type AM 1.5G
Illumination Area	2 inches x 2 inches (51mm x 51mm)
Total Power output	110mW/cm sq.
Variable output control	0.1 sun to 1.1 sun
Wavelength Range	400nm - 1100nm
Working plane adjustment	12 inches; 305 mm
Height adjustment	7.5 inches to 17.75 inches (190mm to 450mm)
Operating temp. Range	10°C to 40°C
Humidity	< 85%, relative, non-condensing
Power requirements	100-240 VAC, 2.8A max , 47-63 Hz

Procedure for placing the sample-

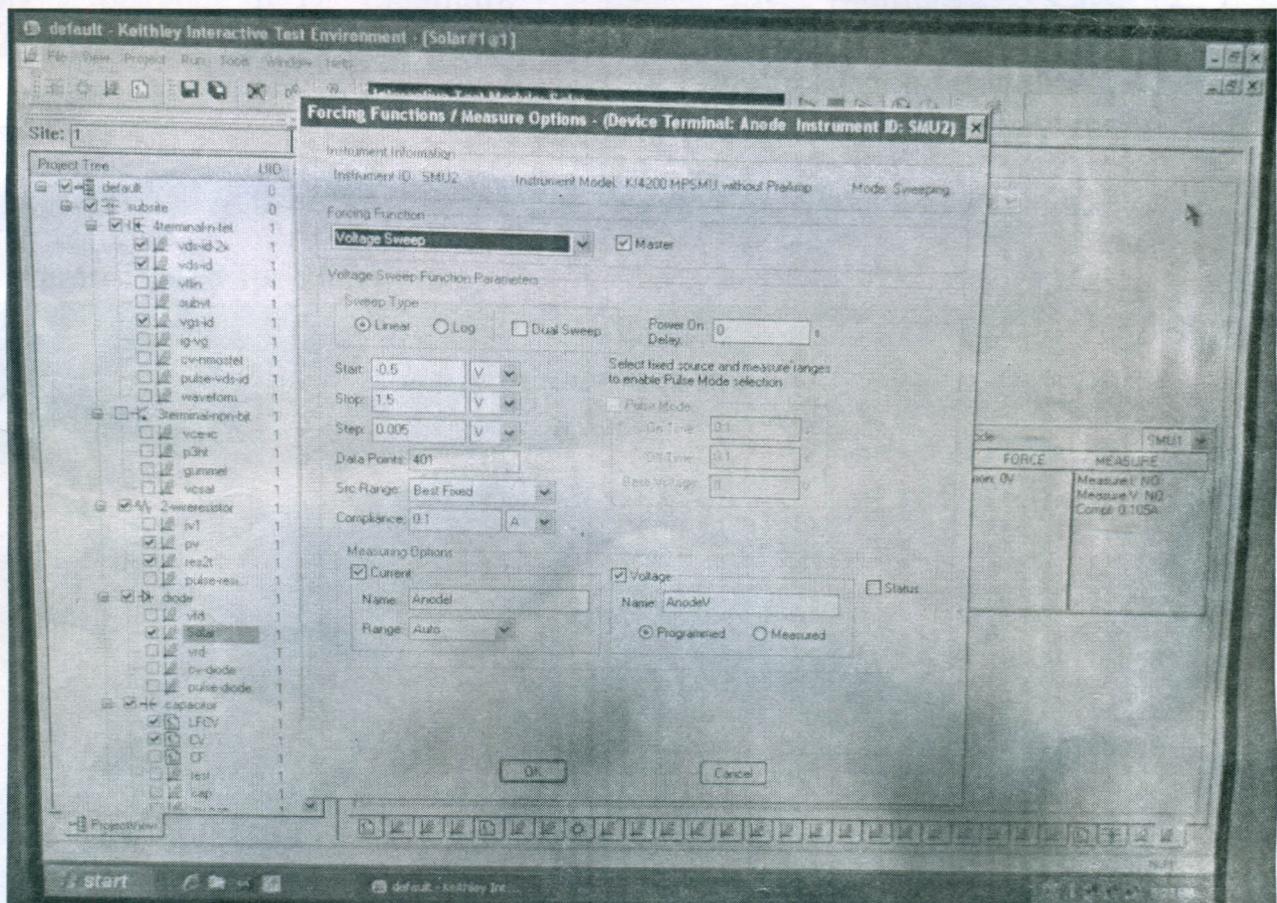
- 1) Place the device on the Pixel selector box(For HOD group) and connect the pixel selector with the BNC cable. The BNC cable has two banana pins at the end which are connected to two BNC's (Port F and G) by a connector.

Procedure for Switching on the Keithley Software-

- 1) Switch ON the SM (Switch Matrix), SMU (Source Measuring Unit) and main power of LED solar simulator from the extension board placed below the table. The Keithley measurement system and the SM will start.
- 2) After the Windows is loaded, Start the KITE(Keithley Interactive Test Environment) software.
- 3) The following window will appear.



- 4) Now, select the "Solar" option in the Project Tree panel by double clicking it.
- 5) You can change the SMU according to your device structure. For P-i-N select SMU2 at the Anode position and for N-i-P structure select SMU 1 at the Anode position. The cathode will change automatically.
- 6) Click on "Force Measure" option to change the Voltage Sweep Function Parameters according to your need. Mainly the Start, Stop and the Step voltages are changed.

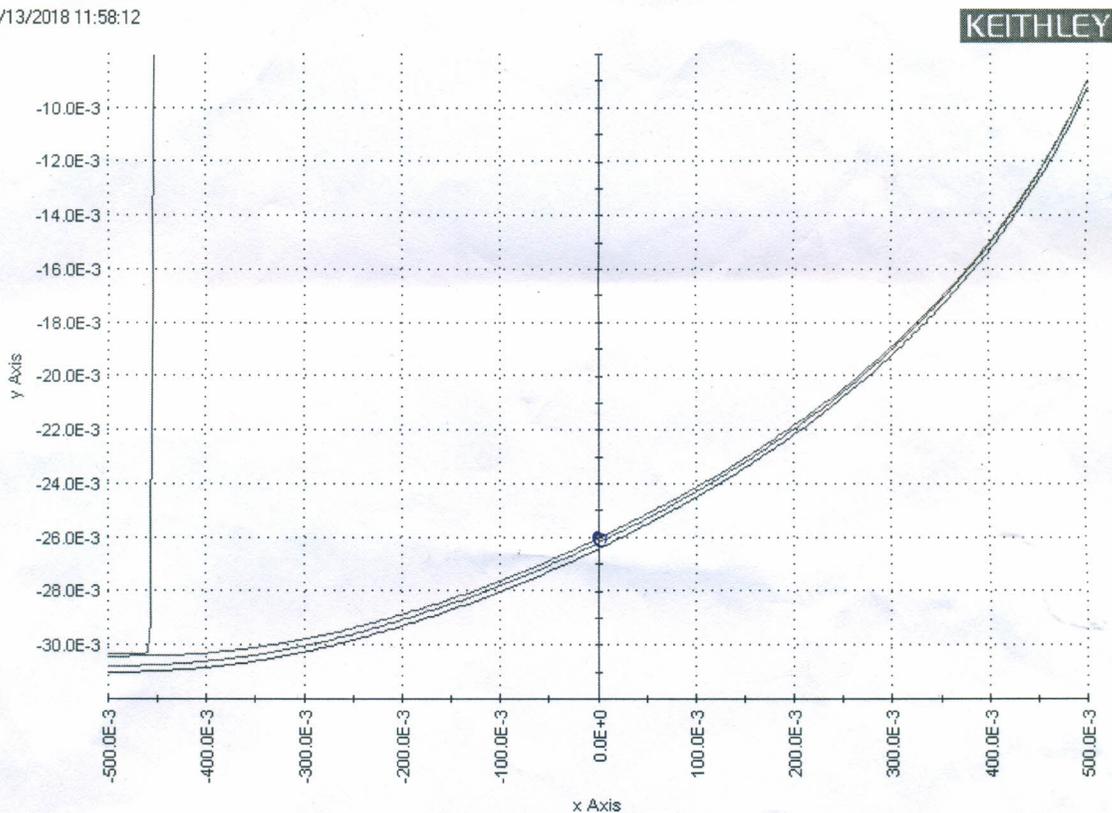


- 7) Cover the pixel selector with either the black cloth and measure dark IV for all the pixels.

8) Switch ON the LED solar simulator by switching ON the button on the simulator box and keep it in 1 sun. Wait for 5 minutes in order for the LED's to get stabilized.

9) Calibrate the simulator by checking current in the detector which should be equivalent to 26.2 mA. The graph for IV characteristics at 1 sun is attached below.

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10) Measure lighted IV for all the pixels of your device. Go to the Graph panel and click on the Green start button to run the measurement.

11) You can Save the data in the .csv or the excel format by going to 'Sheet' window < Save As.

- 12) Finally after the measurement is done switch OFF the simulator and close the KITE software. Switch OFF the button of switch matrix and then shutdown the SMU after taking the data.