

Analysis of a Solar Cell

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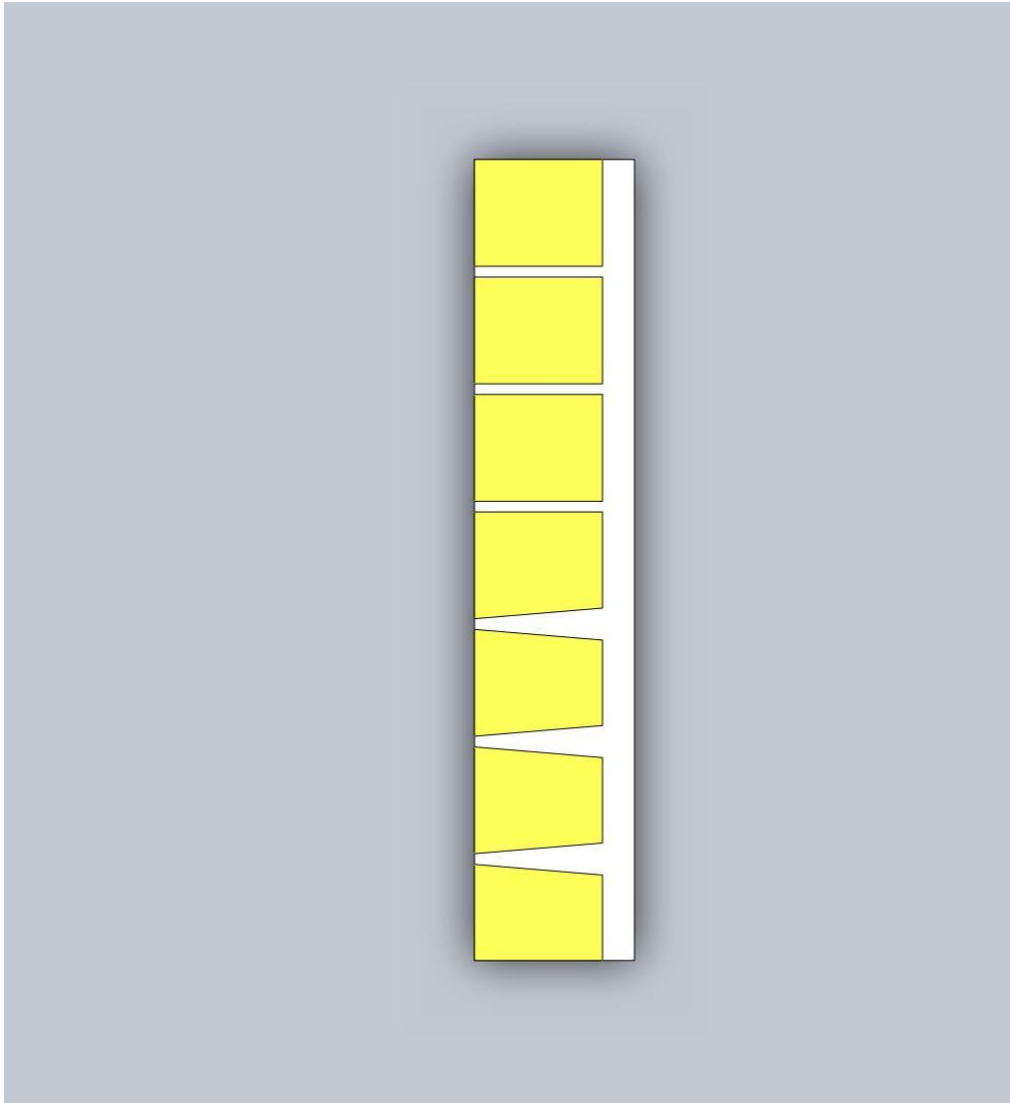
1. Introduction

A solar panel cell is analysed using the electric conduction solver module of EMS. The cell is composed of two aluminium electrodes, covering a silicon cell. A resistance set can be determined using the EMS boundary conditions settings.

2. Model View

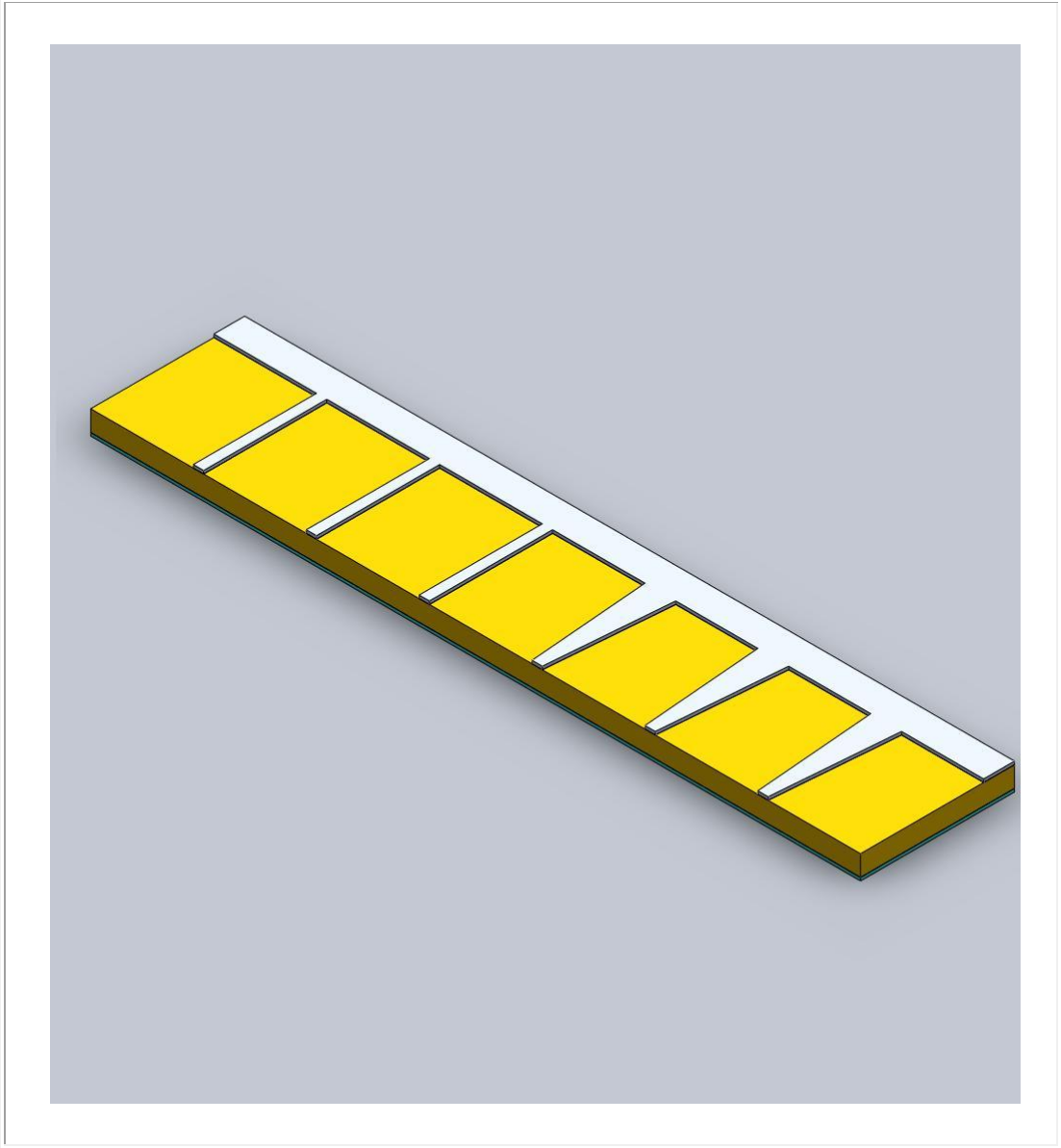
Solar_Cell_Top View

JPEG



Solar_Cell_Isometric View

JPEG



Solar_Cell_Current View (Mesh)

JPEG



3. Materials

Note: R.P. stands for Relative Permittivity

Nbr .	Part Name	Material Name	Permittivity Type
1	Back_Electrode-1-Body 1 (Extrude2)	Aluminium	Isotropic
2	Front_Electrode-1-Body 1 (Extrude1)	Aluminium	Isotropic

3	Silicon_Cell-1-Body 1 (Split Line1)	Silicon (Si)	Isotropic
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4. Load & Restraint Information

Nbr.	Name	Voltage(V)	Selected Faces	Selected Components
1	Fixed Voltage - 1	6.000e-001	0	0Front_Electrode-1
2	Fixed Voltage - 2	0.000e+000	0	0Back_Electrode-1

5. Study Properties

Mesh Information

Nbr.Of Nodes	Nbr.Of Elements	Element Size (m)	Tolerance (m)
260521	1402754	0.000100	0.000005

Solver information

Solver Type	Nbr. Current Increments	Compute inductance
Direct Solver	---	---

6. Results Table

Dissipated power Results

Dissipated Power (W)

1.109281e-007

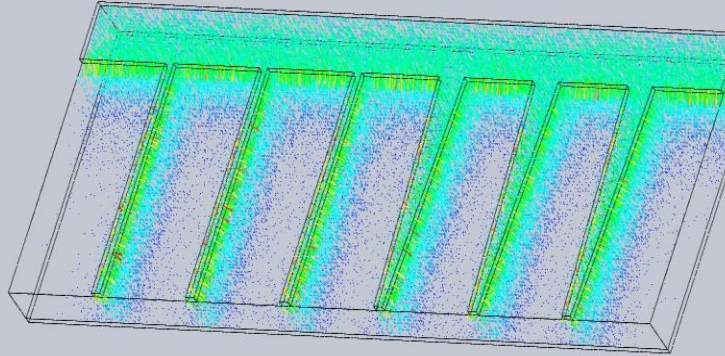
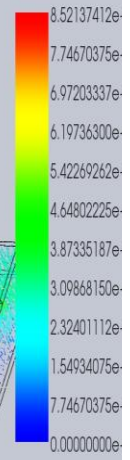
7. Electric Field Results

Electric Field - 1

JPEG

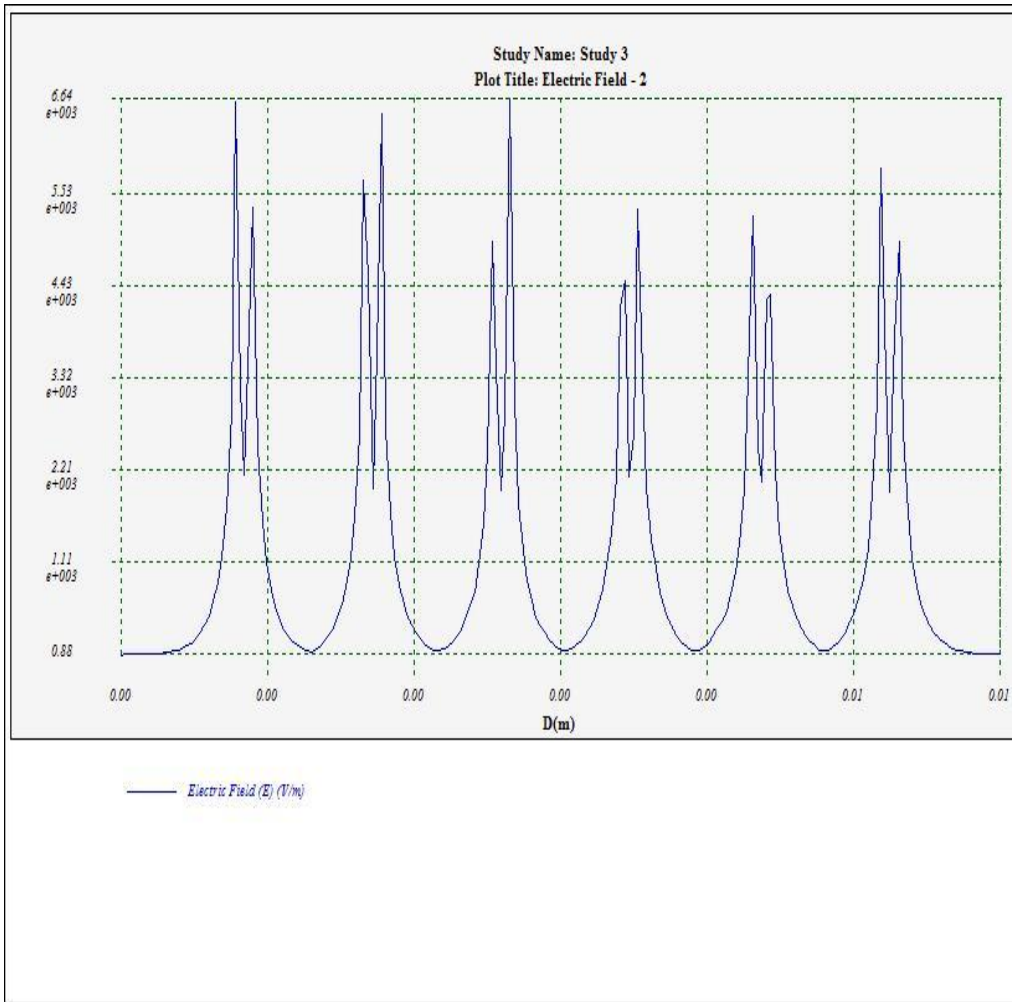
Model Name: Solar_Cell
Study Name: Study 3
Plot Name: Electric Field - 1 (Resultant)

Electric Field
(V/m)



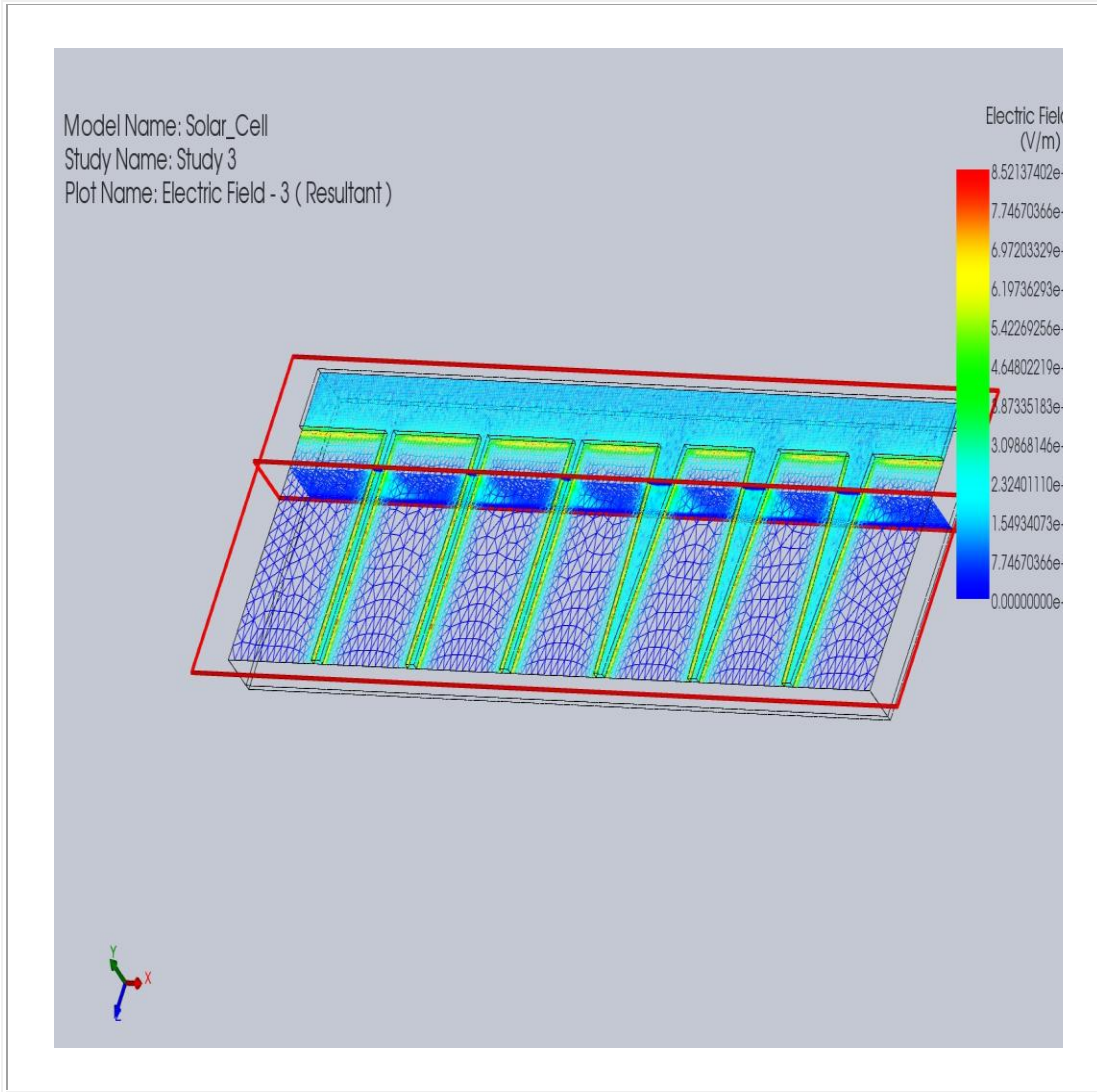
Electric Field - 2

JPEG



Electric Field - 3

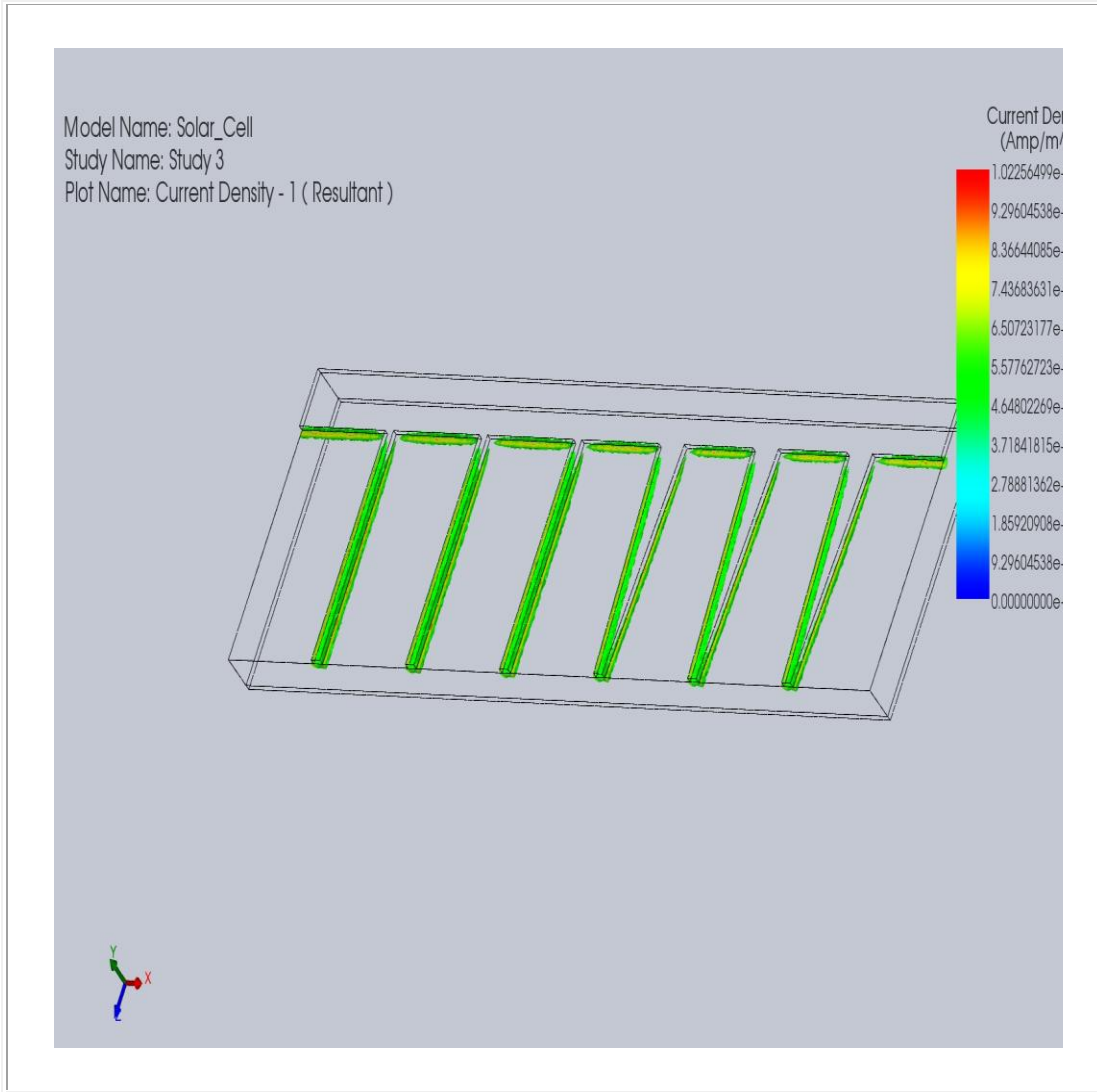
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8. Current Density Results

Current Density - 1

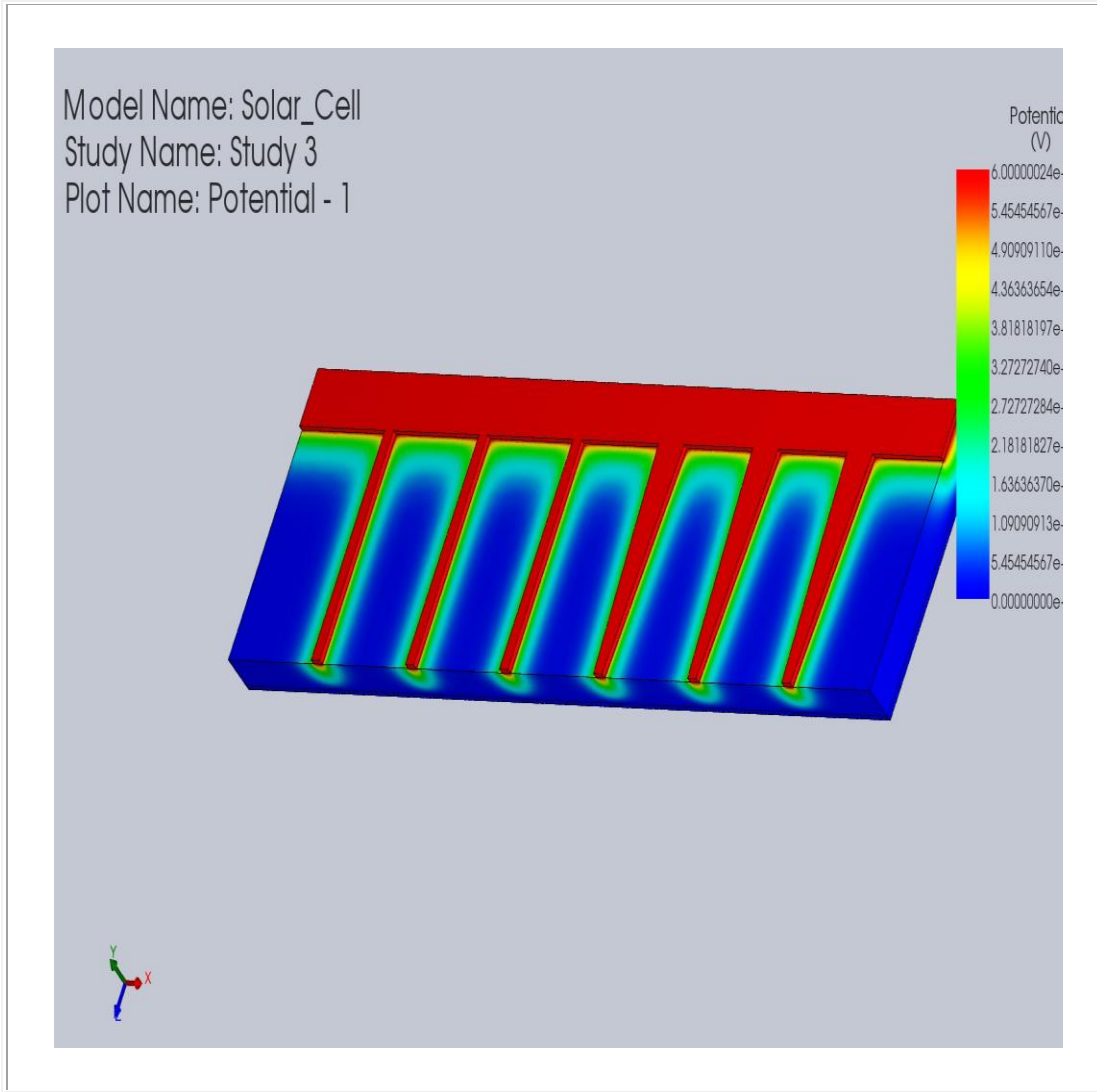
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9. Potential Results

Potential - 1

JPEG



10. Appendix

Material Name: Aluminium

Permittivity Type: Isotropic

Note: R.P. stands for Relative Permittivity

R.P.	Conductivity(Mho/m)	Polarization	Thermal Conductivity
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			(W/m.K)
1.000e+00 0	3.820e+007	NO	2.500e+002

Material Name: Silicon (Si)

Permittivity Type: Isotropic

Note: R.P. stands for Relative Permittivity

R.P.	Conductivity(Mho/m)	Polarization	Thermal Conductivity (W/m.K)
0.000e+00 0	1.200e-005	NO	1.120e+002