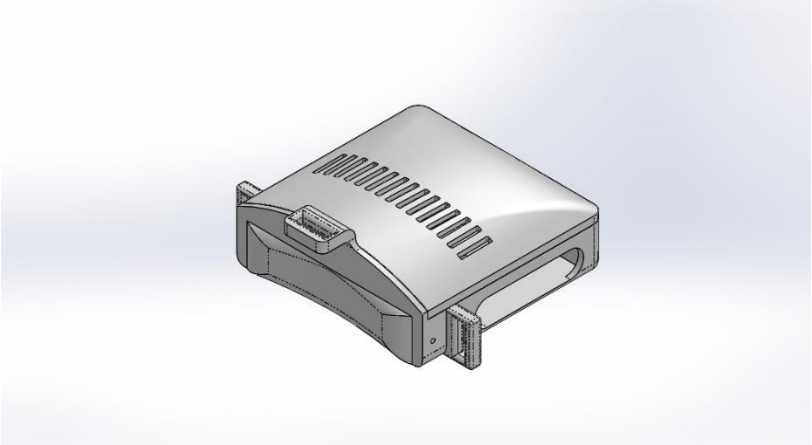


Simulation of Assembly V5

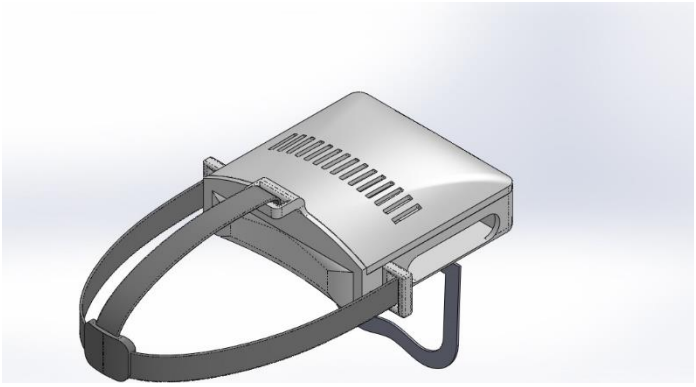
Date: Thursday, March 29, 2018
Designer: Solidworks
Study name: Thermal 1
Analysis type: Thermal(Steady state)

Table of Contents

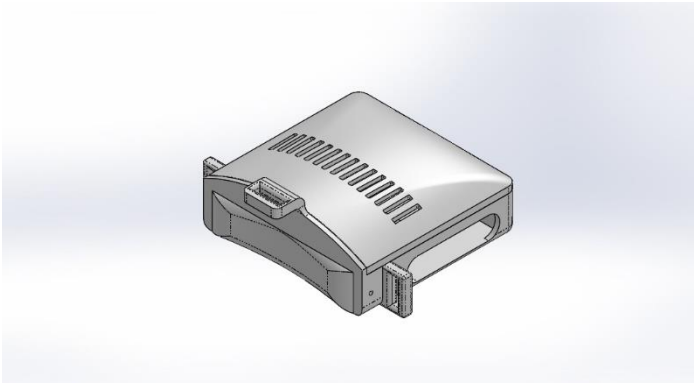
Description

Thermal Analysis

Assumptions

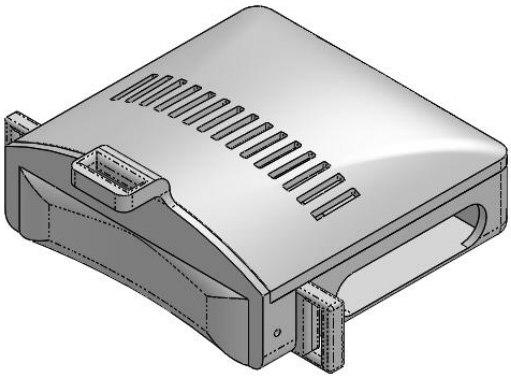


Original Model



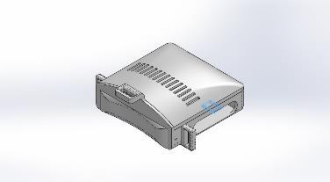
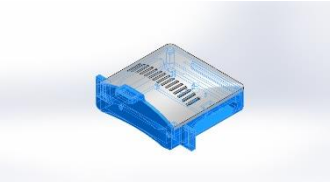
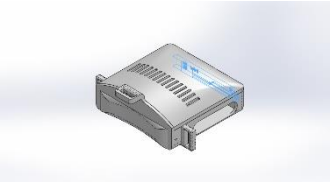
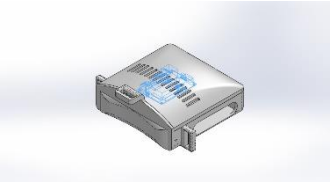
Model Analyzed

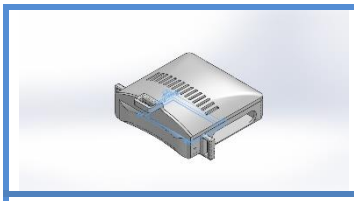
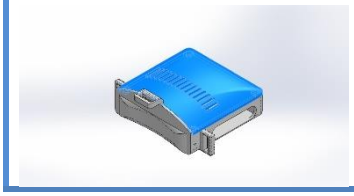
Model Information



Model name: Assembly V5
Current Configuration: Default

Solid Bodies

Document Name and Reference	Treated As	Volumetric Properties	Document Path/Date Modified
Cut-Extrude2 	Solid Body	**Mass:0.00495064 kg Volume:2.12474e-006 m^3 Density:2330 kg/m^3 Weight:0.0485163 N**	**C:\Users\Amir Shawwa\Desktop\W18\MECH 490\MECH 490\ARHeadset\CADS\ARV3\Adafruit BNO055 motion sensor v2.SLDPRT** Mar 17 00:06:37 2018
Fillet42 	Solid Body	**Mass:0.0930418 kg Volume:0.000297734 m^3 Density:312.5 kg/m^3 Weight:0.91181 N**	**C:\Users\Amir Shawwa\Desktop\W18\MECH 490\MECH 490\ARHeadset\CADS\ARV5\Headset V5.SLDPRT** Mar 20 19:58:34 2018
Cut-Extrude11 	Solid Body	**Mass:0.049033 kg Volume:2.10442e-005 m^3 Density:2330 kg/m^3 Weight:0.480524 N**	**C:\Users\Amir Shawwa\Desktop\W18\MECH 490\MECH 490\ARHeadset\CADS\ARV3\Intel real sense camera R200.SLDPRT** Mar 18 04:01:41 2018
Cut-Extrude7 	Solid Body	**Mass:0.110083 kg Volume:4.72461e-005 m^3 Density:2330 kg/m^3 Weight:1.07882 N**	**C:\Users\Amir Shawwa\Desktop\W18\MECH 490\MECH 490\ARHeadset\CADS\ARV3\Odroid XU4.SLDPRT** Mar 17 00:09:37 2018
Boss-Extrude7	Solid Body	**Mass:0.183091 kg Volume:7.85796e-005 m^3 Density:2330 kg/m^3 Weight:1.79429 N**	**C:\Users\Amir Shawwa\Desktop\W18\MECH 490\MECH 490\ARHeadset\CADS\ARV4\Screen V4.SLDPRT** Mar 17 00:05:53 2018

			
Cut-Extrude3 	Solid Body	**Mass:0.0413043 kg Volume:0.000132173 m^3 Density:312.501 kg/m^3 Weight:0.404782 N**	**C:\Users\Amir Shawwa\Desktop\W18\MECH 490\MECH 490\ARHeadset\CADS\AR V5\Top Cover V5.SLDPRT** Mar 20 00:49:03 2018

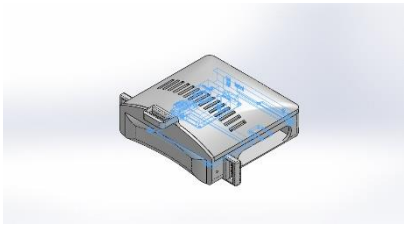
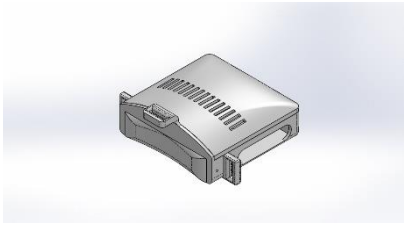
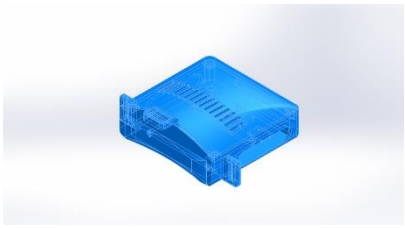
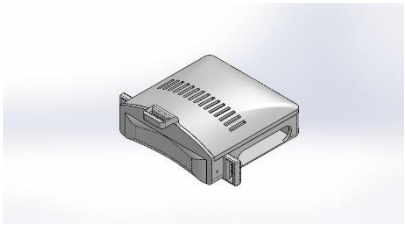
Study Properties

Study name	Thermal 1
Analysis type	Thermal(Steady state)
Mesh type	Solid Mesh
Solver type	FFEPlus
Solution type	Steady state
Contact resistance defined?	No
Result folder	SOLIDWORKS document (C:\Users\Amir Shawwa\Desktop\W18\MECH 490\MECH 490\ARHeadset\CADS\AR V5\FEA)

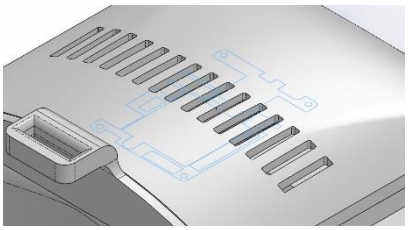
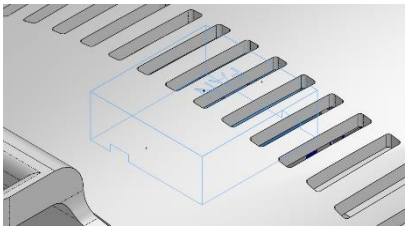
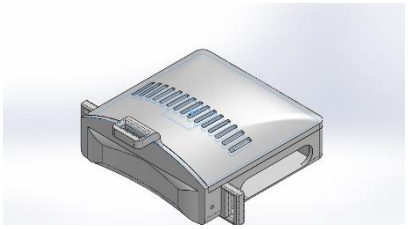
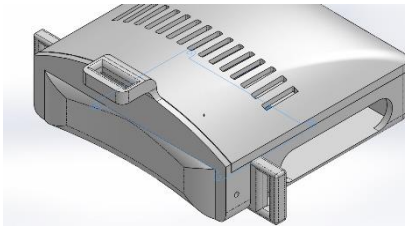
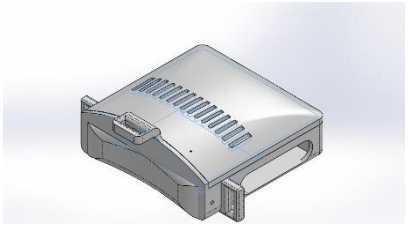
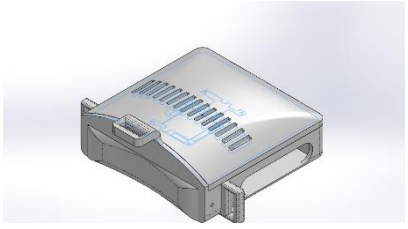
Units

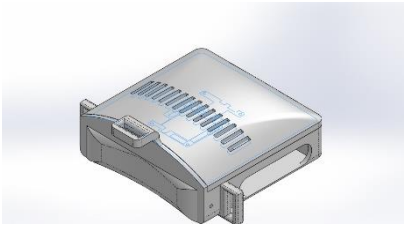
Unit system:	SI (MKS)
Length/Displacement	mm
Temperature	Kelvin
Angular velocity	Rad/sec
Pressure/Stress	N/m^2

Material Properties

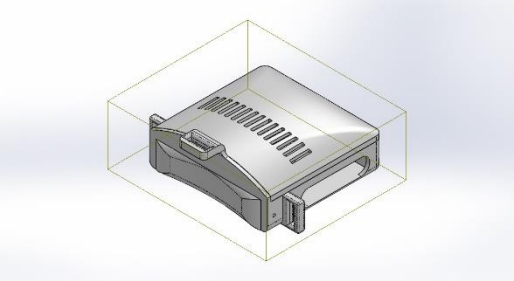
Model Reference	Properties	Components
	**Name:** Silicon **Model type:** Linear Elastic Isotropic **Default failure criterion:** Unknown **Thermal conductivity:** 124 W/(m.K) **Mass density:** 2330 kg/m^3	SolidBody 1(Cut-Extrude2)(Adafruit BNO055 motion sensor v2-1), SolidBody 1(Cut-Extrude11)(Intel real sense camera R200-1), SolidBody 1(Cut-Extrude7)(Odroid XU4-1), SolidBody 1(Boss-Extrude7)(Screen V4-1)
Curve Data:N/A		
	**Name:** Acrylic (Medium-high impact) **Model type:** Linear Elastic Isotropic **Default failure criterion:** Unknown **Thermal conductivity:** 0.21 W/(m.K) **Specific heat:** 1500 J/(kg.K) **Mass density:** 1200 kg/m^3	SolidBody 1(Fillet42)(Headset V5-1), SolidBody 1(Cut-Extrude3)(Top Cover V5-2)
Curve Data:N/A		
	**Name:** PLA (3D Printed) **Model type:** Linear Elastic Isotropic **Default failure criterion:** Unknown **Thermal conductivity:** 0.13 W/(m.K) **Specific heat:** 1800 J/(kg.K) **Mass density:** 312.5 kg/m^3	<Material_ComponentList1/>
Curve Data:N/A		
	**Name:** ABS **Model type:** Linear Elastic Isotropic **Default failure criterion:** Unknown **Thermal conductivity:** 0.2256 W/(m.K) **Specific heat:** 1386 J/(kg.K) **Mass density:** 1020 kg/m^3	<Material_ComponentList1/>
Curve Data:N/A		

Thermal Loads

Load name	Load Image	Load Details
Temperature-1		**Entities:** 1 face(s) **Temperature:** 50 Celsius
Convection-1		**Entities:** 5 face(s) **Convection Coefficient:** 100 W/(m^2.K) **Time variation:** Off **Temperature variation:** Off **Bulk Ambient Temperature:** 298.15 Kelvin **Time variation:** Off
Radiation-1		**Entities:** 2 face(s) **Radiation Type:** Surface to surface **Open system:** On **Ambient Temperature:** 25 Celsius **Emissivity:** 0.95
Temperature-3		**Entities:** 1 face(s) **Temperature:** 35 Celsius
Radiation-2		**Entities:** 2 face(s) **Radiation Type:** Surface to surface **Open system:** On **Ambient Temperature:** 25 Celsius **Emissivity:** 0.95
Radiation-3		**Entities:** 2 face(s) **Radiation Type:** Surface to ambient **Ambient Temperature:** 25 Celsius **Emissivity:** 0.95 **View Factor:** 0.5

Radiation-4		**Entities:** 2 face(s) **Radiation Type:** Surface to ambient **Ambient Temperature:** 25 Celsius **Emissivity:** 0.95 **View Factor:** 0.5

Contact Information

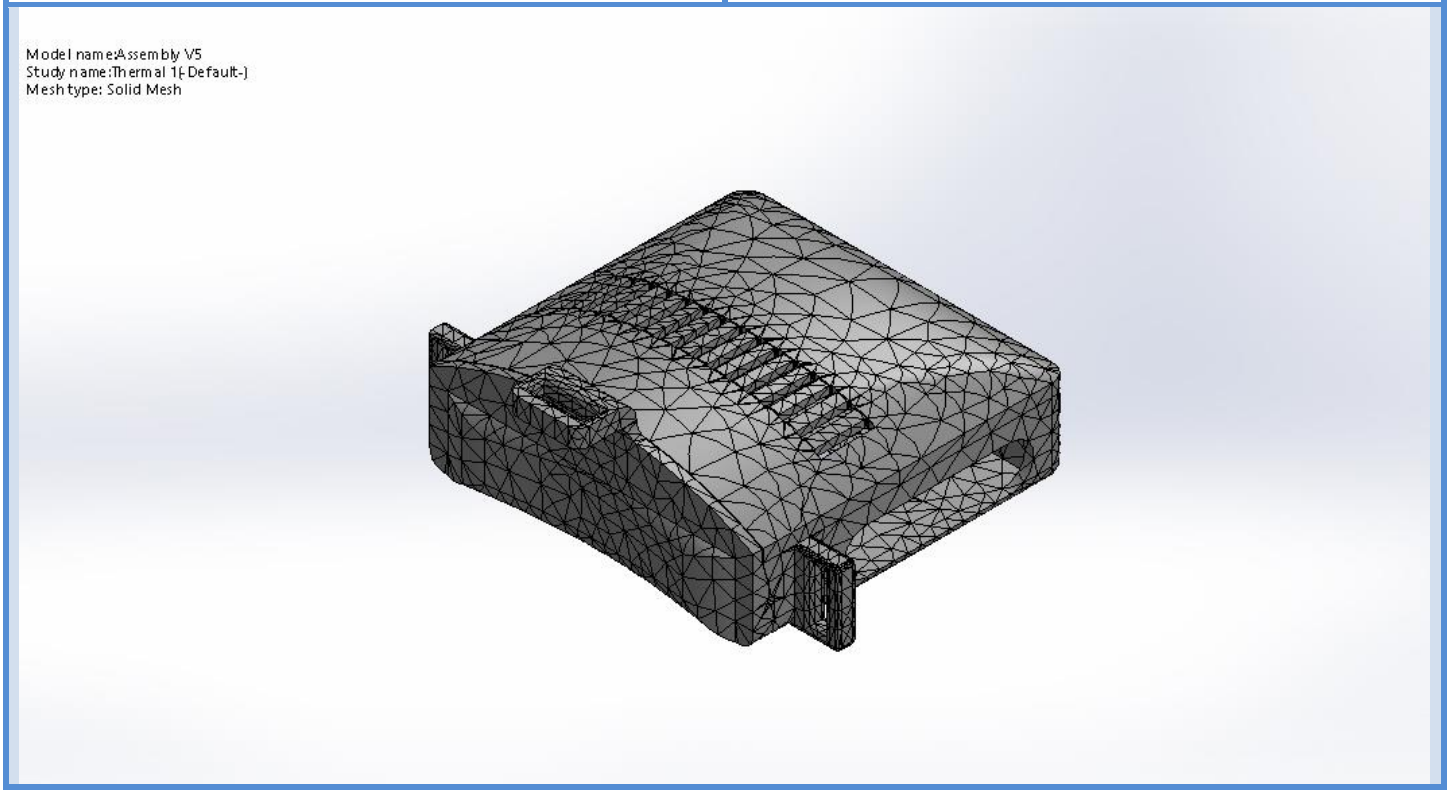
Contact	Contact Image	Contact Properties
Global Contact		**Type:** Bonded **Components:** 1 component(s) **Options:** Compatible mesh

Mesh information

Mesh type	Solid Mesh
Mesher Used:	Curvature-based mesh
Jacobian points	4 Points
Maximum element size	32.7399 mm
Minimum element size	6.54799 mm
Mesh Quality	High
Remesh failed parts with incompatible mesh	Off

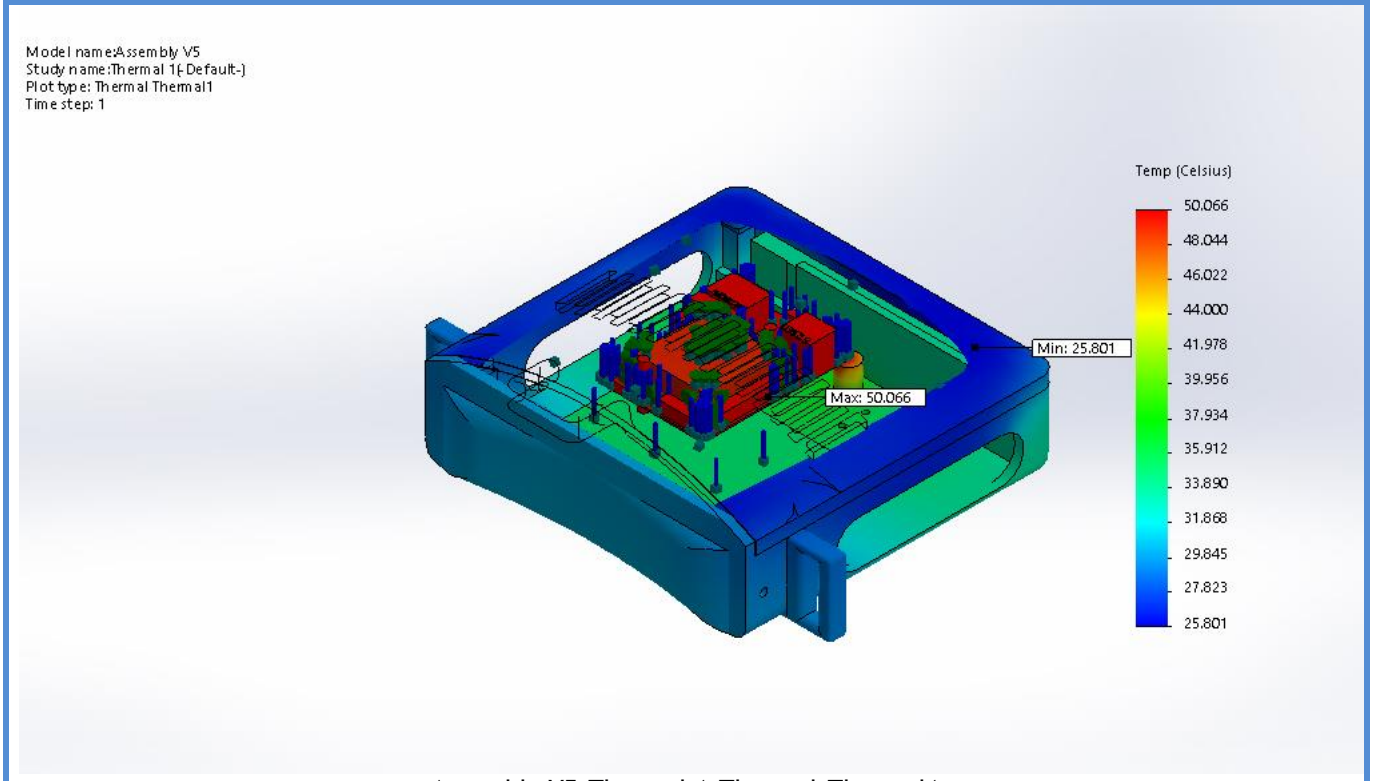
Mesh information - Details

Total Nodes	39572
Total Elements	20741
Maximum Aspect Ratio	122.17
% of elements with Aspect Ratio < 3	51.4
% of elements with Aspect Ratio > 10	5.29
% of distorted elements(Jacobian)	0
Time to complete mesh(hh;mm;ss):	00:00:07
Computer name:	LENOVO-PC



Study Results

Name	Type	Min	Max
Thermal1	TEMP: Temperature	25.8012 Celsius Node: 34039	50.0664 Celsius Node: 21463



Assembly V5-Thermal 1-Thermal-Thermal1

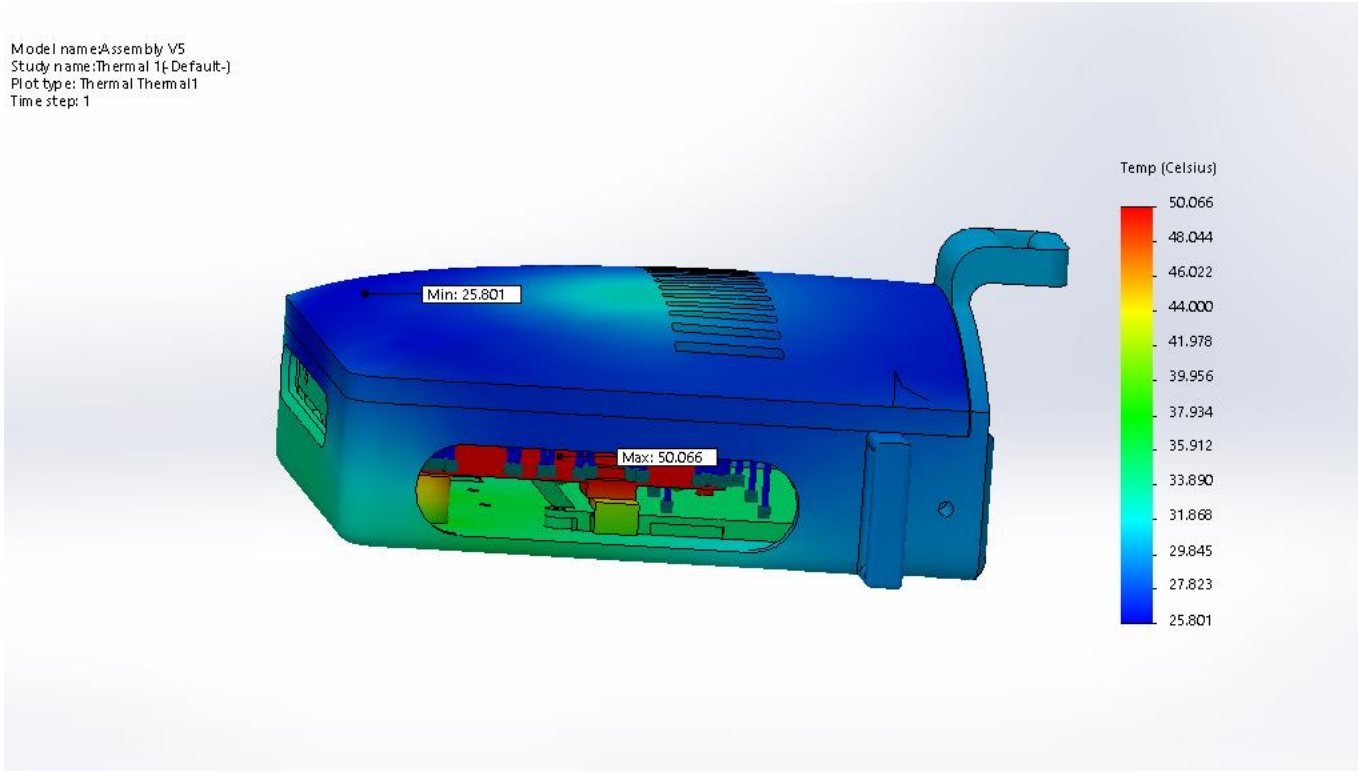


Image-1

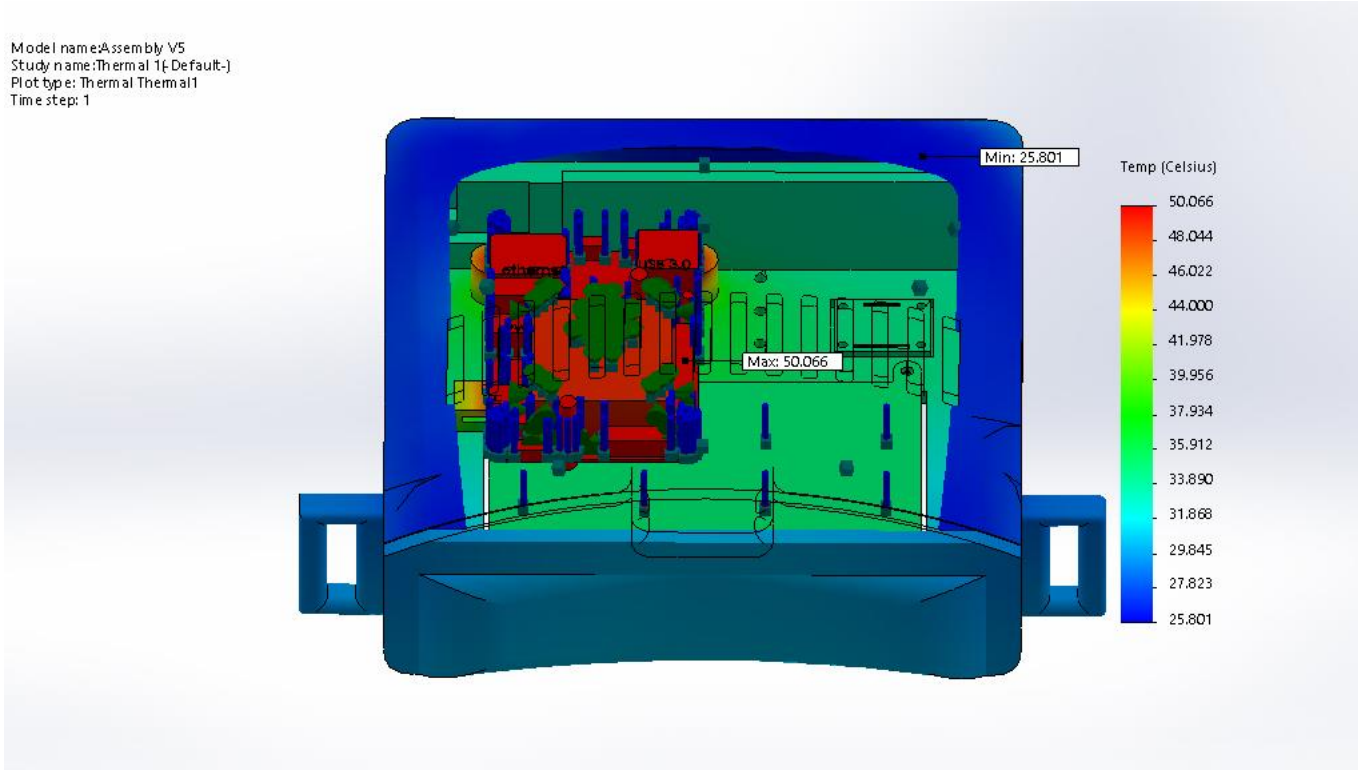


Image-2