V4 10N STATIC LOAD

Study Report

Analyzed File	V4 v9
Version	Autodesk Fusion 360 (2.0.3803)
Creation Date	2018-03-19, 18:57:20
Author	

⊟ Simulation Model 1:1

⊟ Study 2 - (10N) Static Stress

⊟ Study Properties

Study Type	Static Stress
Last Modification Date	2018-03-19, 18:33:23

⊟ Settings

⊟ General

Contact Tolerance	0.1 mm
Remove Rigid Body Modes	No

⊟ Mesh

Average Element Size (% of model size)	
Solids	10
Scale Mesh Size Per Part	No
Average Element Size (absolute value)	-
Element Order	Parabolic
Create Curved Mesh Elements	No
Max. Turn Angle on Curves (Deg.)	60
Max. Adjacent Mesh Size Ratio	1.5
Max. Aspect Ratio	10
Minimum Element Size (% of average size)	20

⊟ Adaptive Mesh Refinement

Number of Refinement Steps	0
Results Convergence Tolerance (%)	20
Portion of Elements to Refine (%)	10
Results for Baseline Accuracy	Von Mises Stress

⊟ Materials

Component	Material	Safety Factor
Headset V4 v1:1	PLA (3D Printed)	Yield Strength
Screen V4 v1:1	SOLIDWORKS Materials|Silicon|67	Yield Strength
Odroid XU4 v1:1	SolidWorks Materials|Silicon|67	Yield Strength

⊟ PLA (3D Printed)

Density	3.75E-07 kg / mm^3
Young's Modulus	3400 MPa
Poisson's Ratio	0.38
Yield Strength	13 MPa
Ultimate Tensile Strength	15 MPa
Thermal Conductivity	1.6E-04 W / (mm C)
Thermal Expansion Coefficient	8.57E-05 / C
Specific Heat	1500 J / (kg C)

⊟ SolidWorks Materials|Silicon|67

Density	2.33E-06 kg / mm^3
Young's Modulus	112400 MPa
Poisson's Ratio	0.28
Yield Strength	120 MPa
Ultimate Tensile Strength	0 MPa
Thermal Conductivity	0.124 W / (mm C)
Thermal Expansion Coefficient	0 / C
Specific Heat	0 J / (kg C)

⊟ SOLIDWORKS Materials|Silicon|67

Density	2.33E-06 kg / mm^3

Young's Modulus	112400 MPa
Poisson's Ratio	0.28
Yield Strength	120 MPa
Ultimate Tensile Strength	0 MPa
Thermal Conductivity	0.124 W / (mm C)
Thermal Expansion Coefficient	0 / C
Specific Heat	0 J / (kg C)

Contacts

Bonded

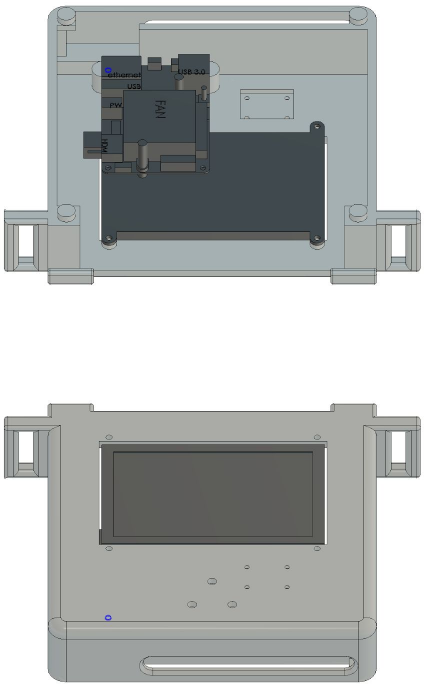
Name
[S] Bonded1 [Screen V4 v1:1||Odroid XU4 v1:1]

Connectors

Bolt Connector1

Type	Bolt Connector
Bolt Subtype	Threaded Hole
Bolt Diameter	3.2 mm
Head Washer	No
Usable Thread Length	5 mm
Pre-load type	Axial
Material	Steel
Elastic Modulus	210000 MPa
Poisson's Ratio	0.3
Thermal Expansion Coefficient	1.2E-05 / C

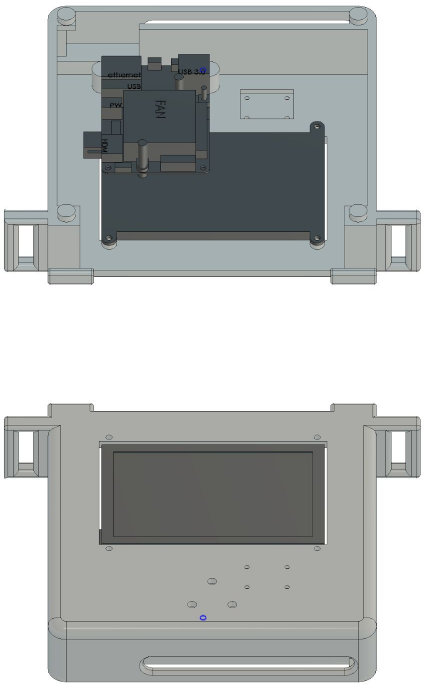
Selected Entities



⊟ Bolt Connector2

Type	Bolt Connector
Bolt Subtype	Threaded Hole
Bolt Diameter	3.2 mm
Head Washer	No
Usable Thread Length	5 mm
Pre-load type	Axial
Material	Steel
Elastic Modulus	210000 MPa
Poisson's Ratio	0.3
Thermal Expansion Coefficient	1.2E-05 / C

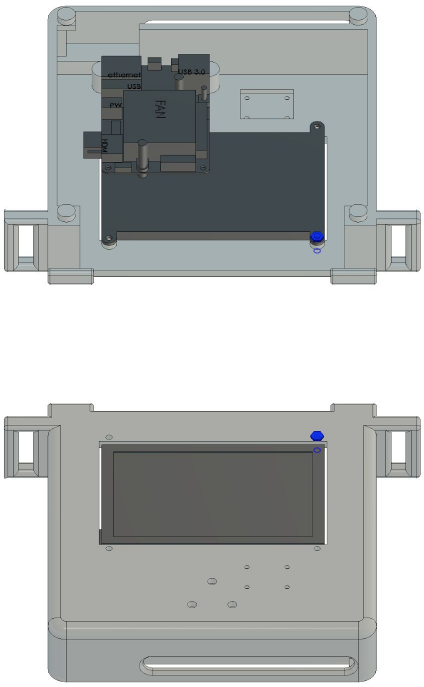
⊟ Selected Entities



⊟ Bolt Connector3

Type	Bolt Connector
Bolt Subtype	With Nut
Bolt Diameter	3.5 mm
Head Washer	No
Nut Washer	No
Pre-load type	Axial
Material	PLA (3D Printed)
Elastic Modulus	3400 MPa
Poisson's Ratio	0.38
Thermal Expansion Coefficient	8.57E-05 / C

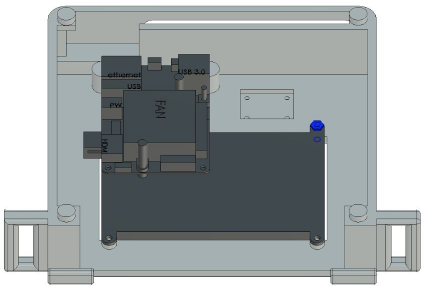
⊟ Selected Entities

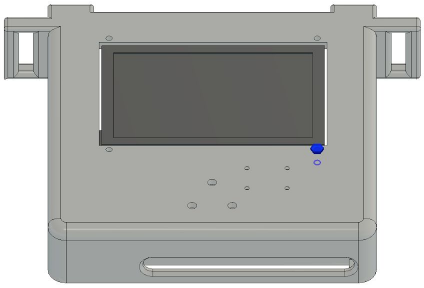


⊟ Bolt Connector4

Type	Bolt Connector
Bolt Subtype	With Nut
Bolt Diameter	3.5 mm
Head Washer	No
Nut Washer	No
Pre-load type	Axial
Material	PLA (3D Printed)
Elastic Modulus	3400 MPa
Poisson's Ratio	0.38
Thermal Expansion Coefficient	8.57E-05 / C

⊟ Selected Entities

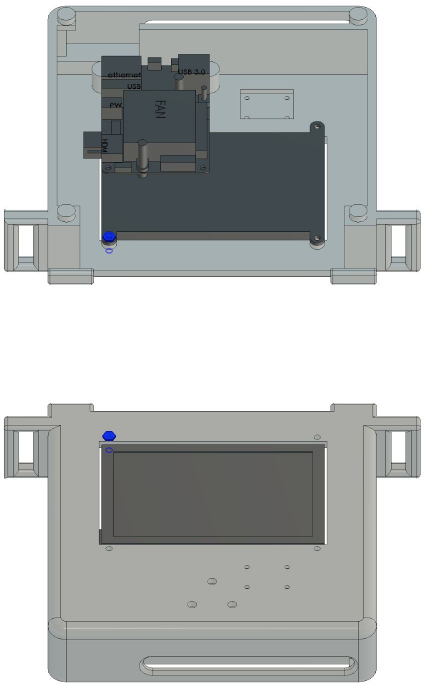




Bolt Connector5

Type	Bolt Connector
Bolt Subtype	With Nut
Bolt Diameter	3.5 mm
Head Washer	No
Nut Washer	No
Pre-load type	Axial
Material	PLA (3D Printed)
Elastic Modulus	3400 MPa
Poisson's Ratio	0.38
Thermal Expansion Coefficient	8.57E-05 / C

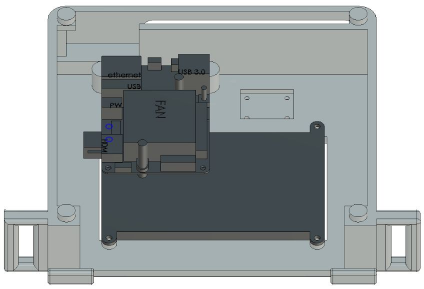
Selected Entities

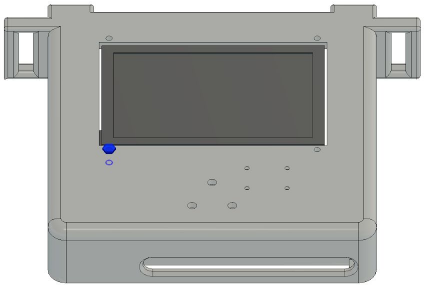


Bolt Connector6

Type	Bolt Connector
Bolt Subtype	With Nut
Bolt Diameter	3.5 mm
Head Washer	No
Nut Washer	No
Pre-load type	Axial
Material	PLA (3D Printed)
Elastic Modulus	3400 MPa
Poisson's Ratio	0.38
Thermal Expansion Coefficient	8.57E-05 / C

Selected Entities





Mesh

Type	Nodes	Elements
Solids	55454	30478

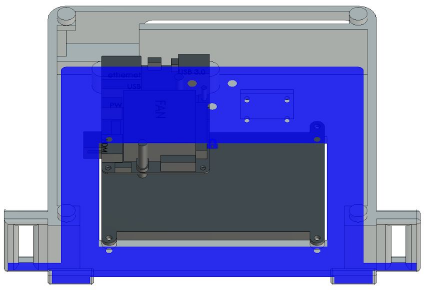
Load Case1

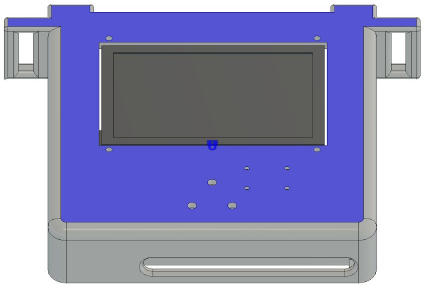
Constraints

Fixed1

Type	Fixed
Ux	Yes
Uy	Yes
Uz	Yes

Selected Entities



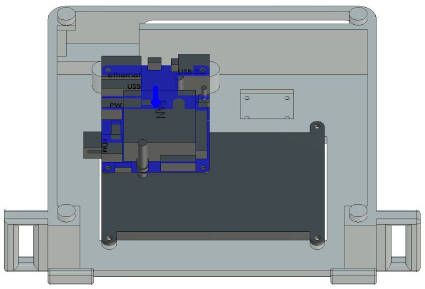


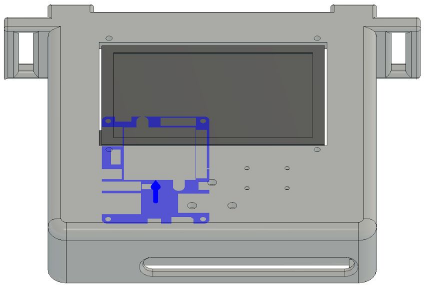
Loads

Force1

Type	Force
Magnitude	10 N
X Value	0 N
Y Value	-10 N
Z Value	1.304E-32 N
Force Per Entity	No

Selected Entities





Results

Result Summary

Name	Minimum	Maximum
Safety Factor		
Per Body	4.315	15
Stress		
Von Mises	0 MPa	27.81 MPa
1st Principal	-9.856 MPa	28.38 MPa
3rd Principal	-35.55 MPa	5.081 MPa
Normal XX	-27.15 MPa	27.79 MPa
Normal YY	-26.95 MPa	19.65 MPa
Normal ZZ	-10.06 MPa	9.676 MPa
Shear XY	-11.08 MPa	11.4 MPa
Shear YZ	-1.925 MPa	2.488 MPa

Shear ZX	-4.938 MPa	3.435 MPa
Displacement		
Total	0 mm	0.1893 mm
X	-7.169E-04 mm	0.06236 mm
Y	-0.1853 mm	0.001608 mm
Z	-0.02021 mm	7.265E-04 mm
Reaction Force		
Total	0 N	0.5583 N
X	-0.08619 N	0.1448 N
Y	-0.05704 N	0.5554 N
Z	-0.09342 N	0.1565 N
Strain		
Equivalent	0	3.399E-04
1st Principal	-6.015E-08	3.361E-04
3rd Principal	-3.922E-04	0
Normal XX	-2.361E-04	2.391E-04
Normal YY	-1.672E-04	1.31E-04
Normal ZZ	-5.906E-05	7.347E-05
Shear XY	-2.523E-04	2.597E-04
Shear YZ	-4.385E-05	5.666E-05
Shear ZX	-1.125E-04	7.823E-05
Contact Pressure		
Total	0 MPa	6.97 MPa
X	-5.659 MPa	2.711 MPa
Y	-5.397 MPa	4.999 MPa
Z	-1.913 MPa	1.925 MPa

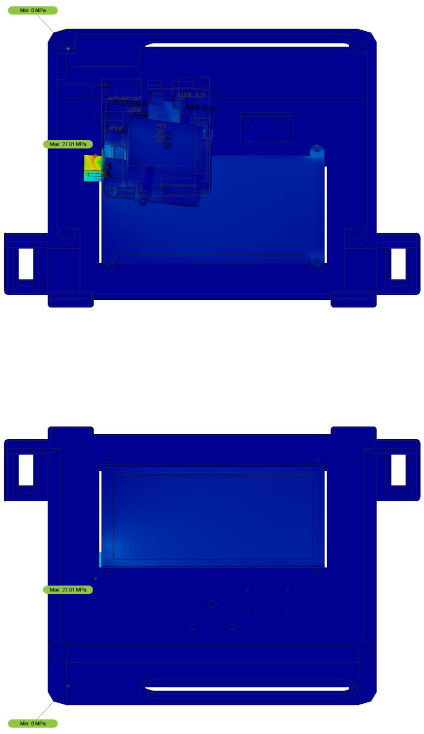
⊟ Reaction Forces

Constraint Name	**Reaction Force**		**Reaction Moment**	
	Magnitude	**Component (X,Y,Z)**	**Magnitude**	**Component (X,Y,Z)**
Fixed1	10.01 N	4.058E-09 N	388.7 N mm	231.7 N mm
		10.01 N		5.658E-07 N mm
		6.323E-09 N		-312 N mm

⊟ Stress

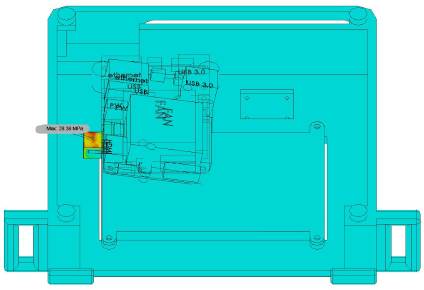
⊟ Von Mises

[MPa] 0  27.81



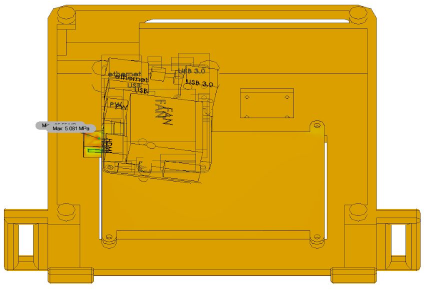
⊟ 1st Principal

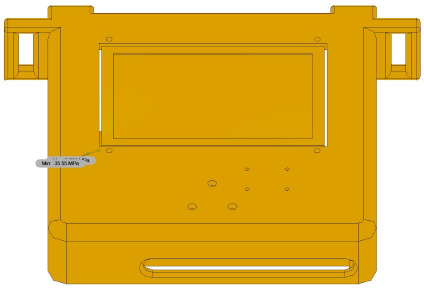
[MPa] -9.86  28.38



⊟ **3rd Principal**

[MPa] -35.55 5.08

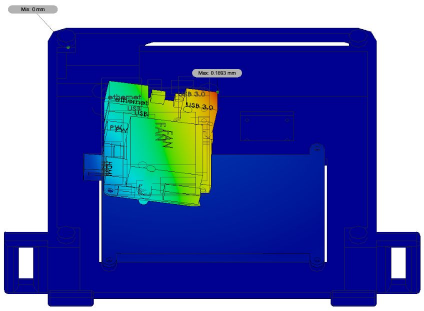




⊟ Displacement

⊟ Total

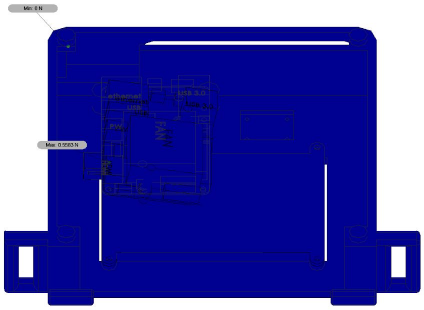
[mm] 0 0.1893



⊟ Reaction Force

Total

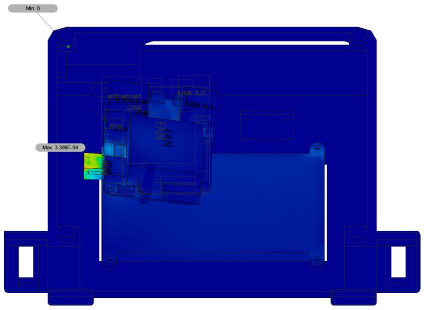
[N] 0  0.5583



Strain

Equivalent

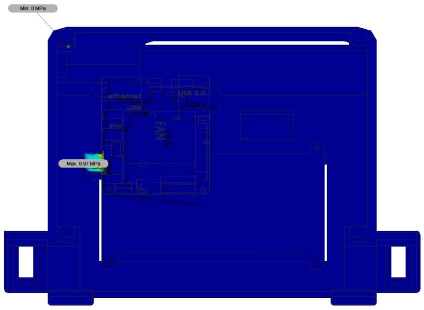
0  3.399E-04

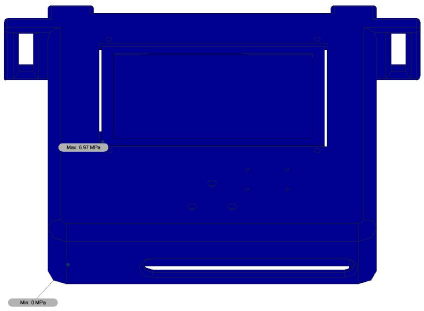


⊟ Contact Pressure

⊟ Total

[MPa] 0 6.97




Max: 0.07 MPa
Min: 0 MPa