Fast 3D model creation using FreeCAD

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www.wyolum.com

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WYOLUM EMERGENTS

https://wyolum.com

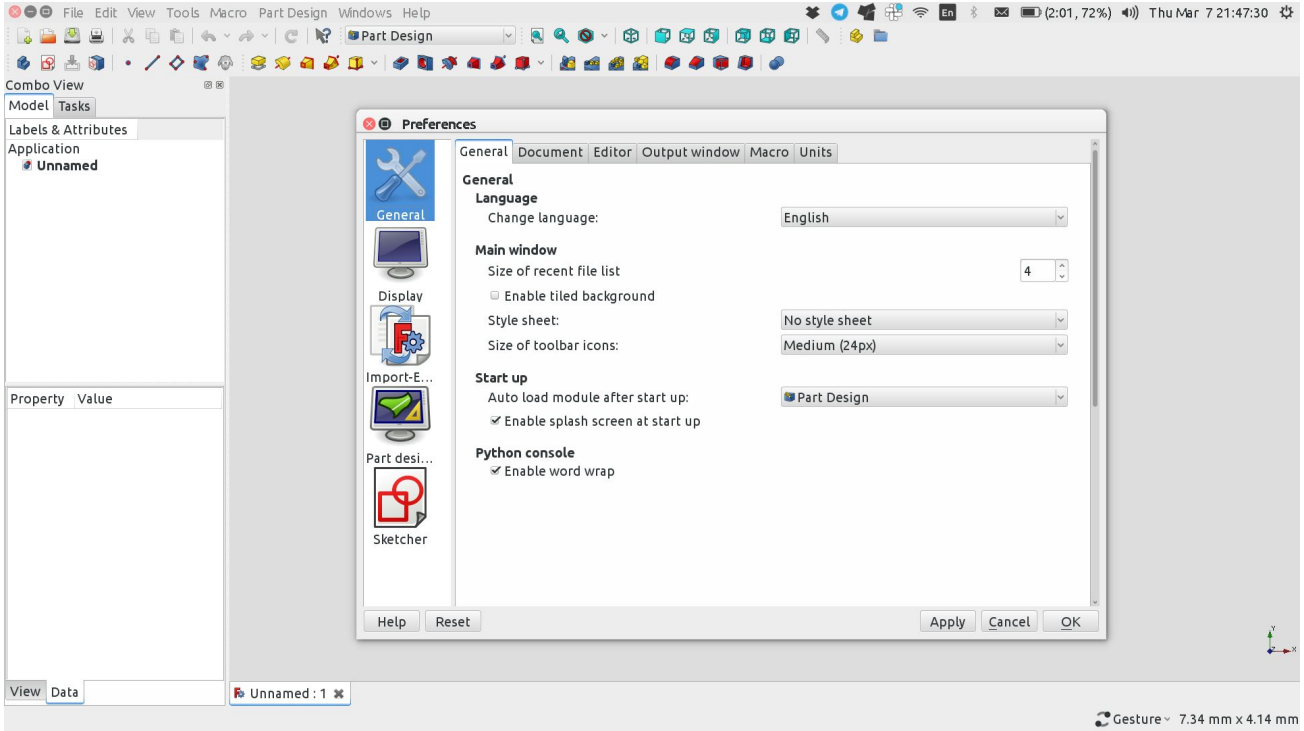
FreeCAD

https://www.freecadweb.org

- Open-source parametric 3D modeler
- Easily modify design by changing its parameters
- Sketch geometry constrained 2D shapes and use them as a base to build other objects.
- Multiplatform (Windows, Mac, Linux), highly customizable and extensible
- Reads and writes to many open file formats such as STEP, IGES, STL, SVG, DXF, OBJ, IFC, DAE
- Finite Element Analysis (FEA) tools, experimental CFD, BIM, Geodata, Path (CNC), robot simulation and more
- FreeCAD really is a Swiss Army knife of general-purpose engineering toolkits

Preferences / Views / Navigation

initial startup actions + add workbenches

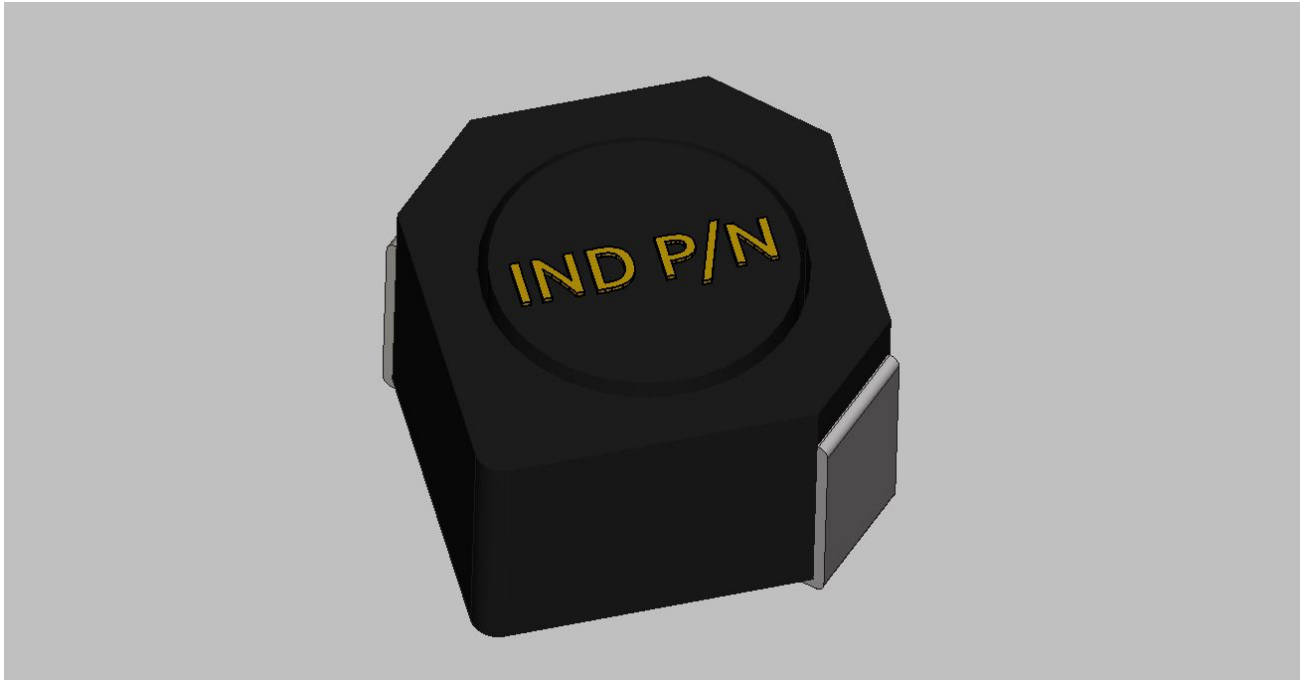


[CADquery]

[KiCad StepUp Tools]

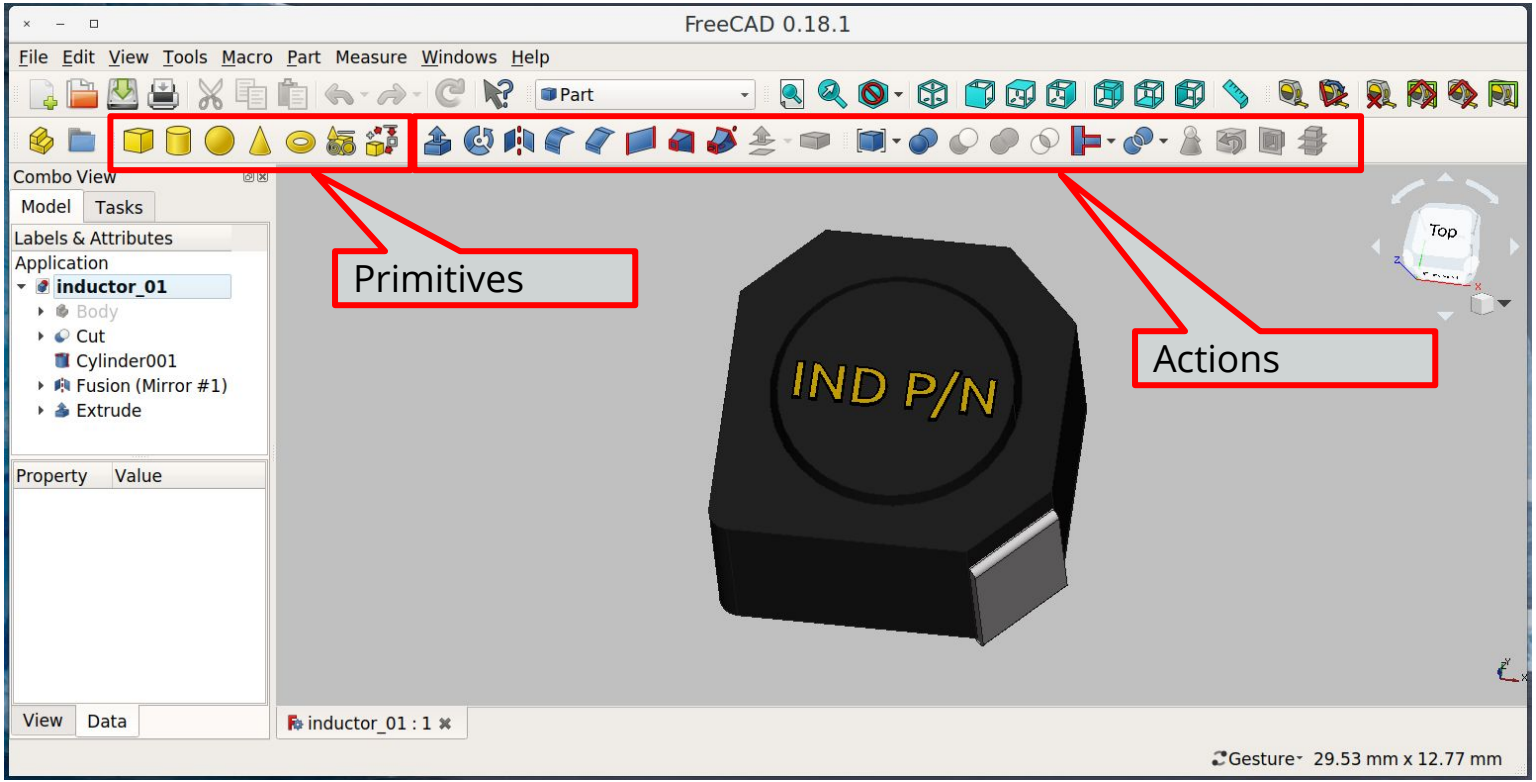
PART workbench

Using primitives



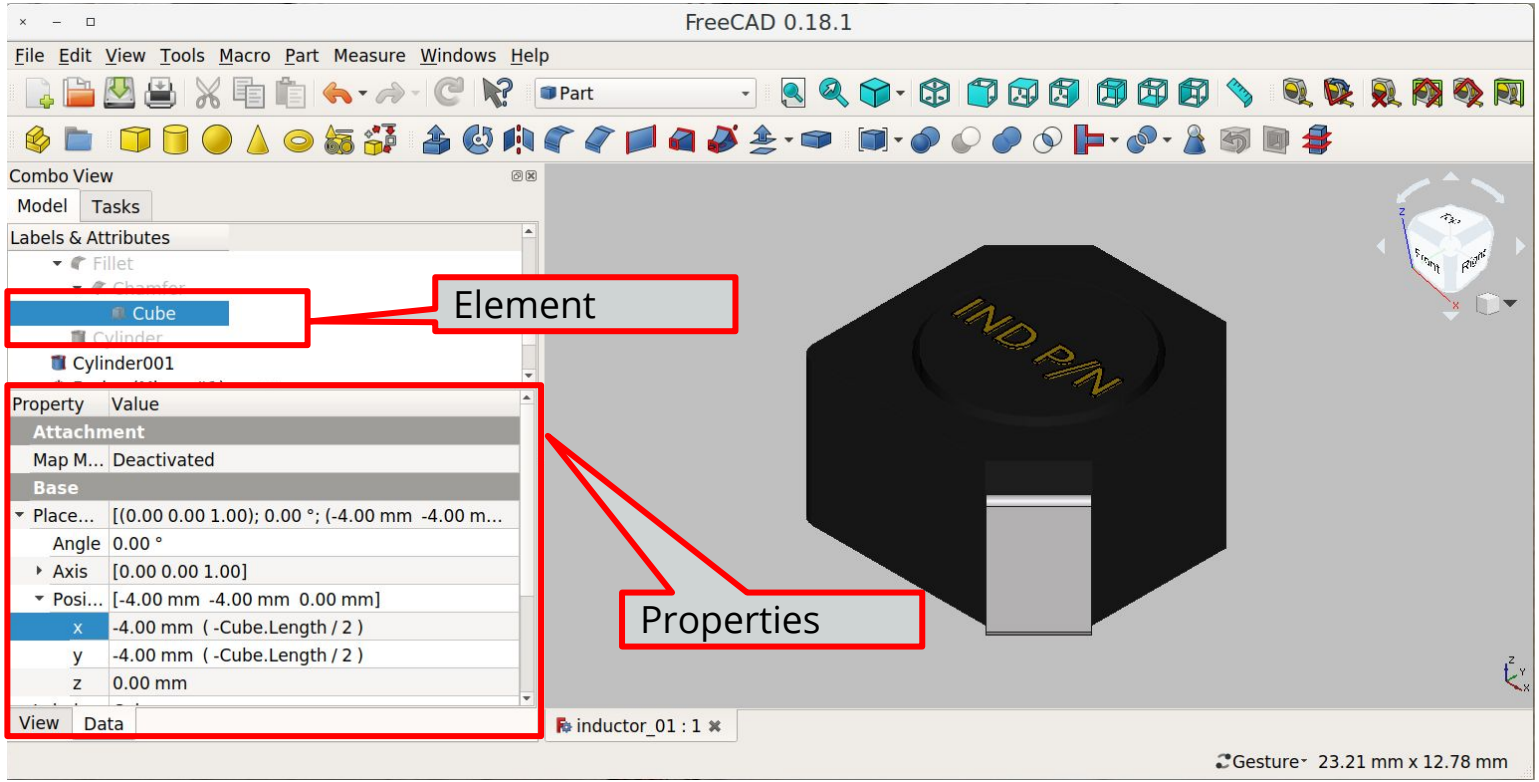
PART workbench

Using primitives



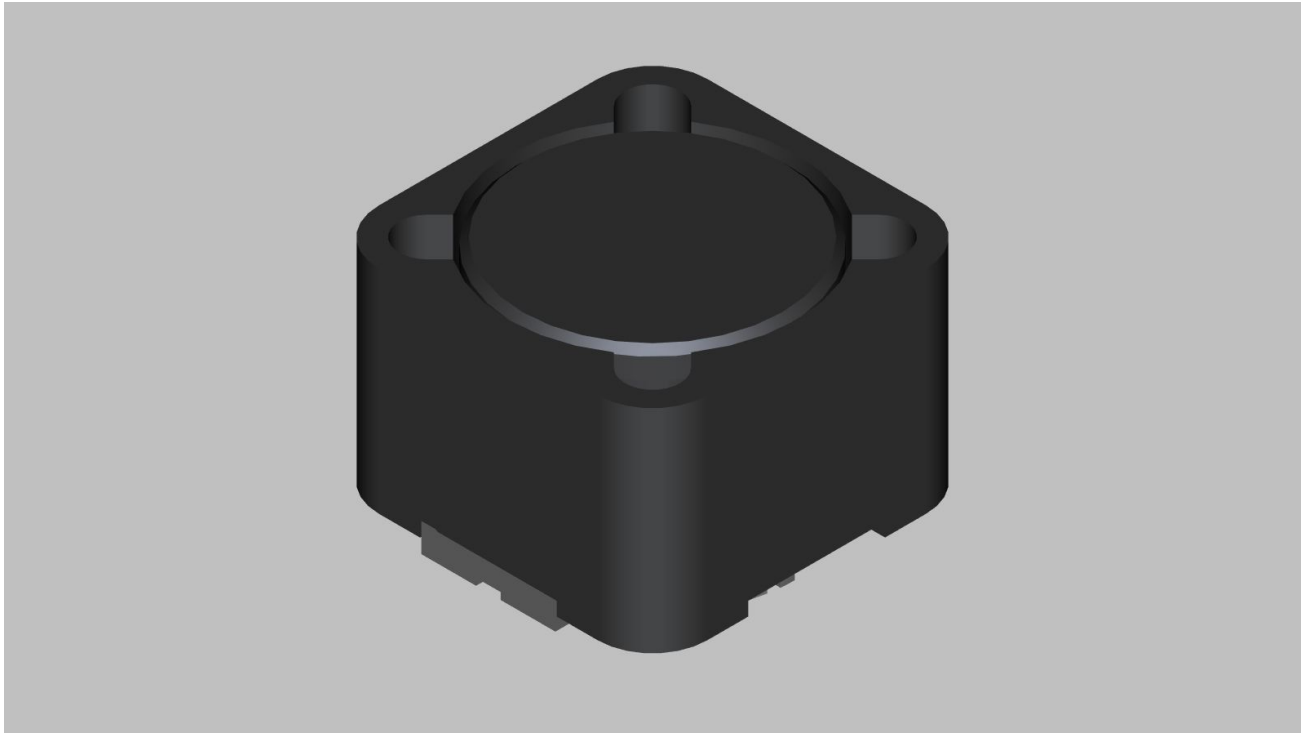
PART workbench

Using primitives



PART DESIGN workbench

Sketches, Constraints, Extrude, Revolve, Pocket



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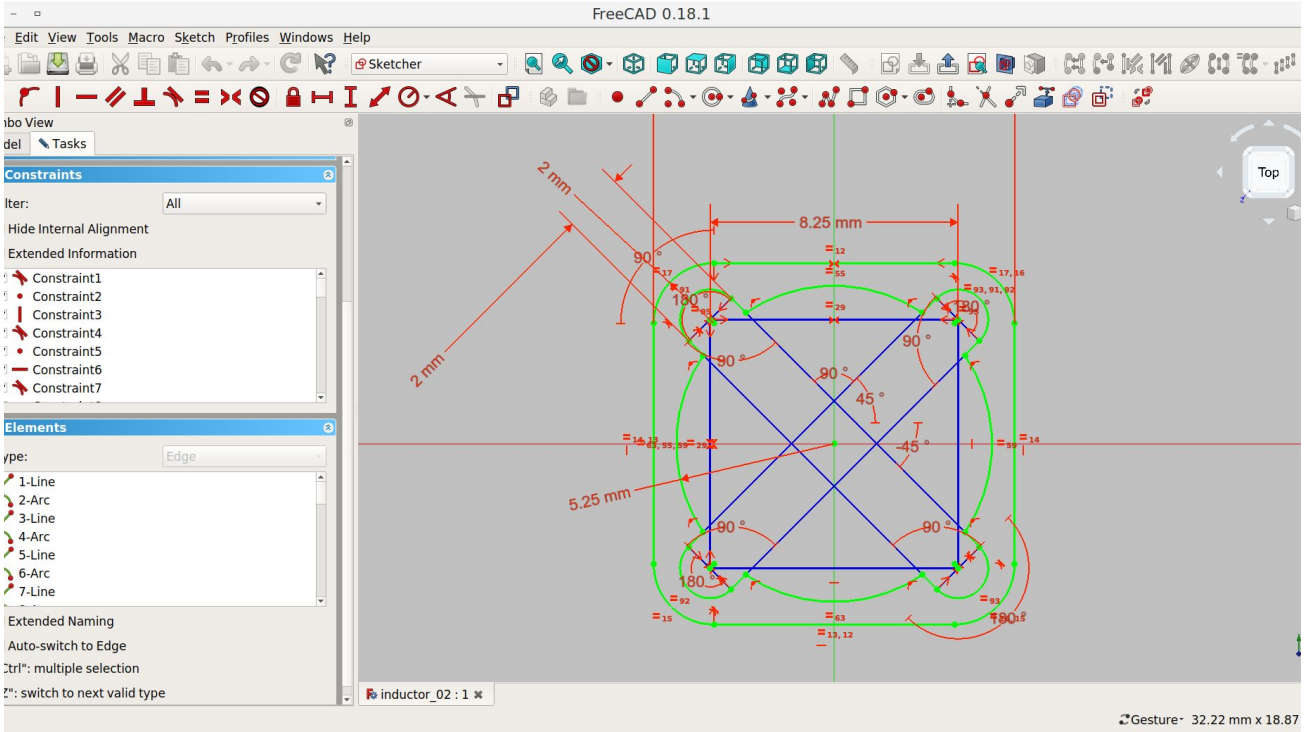
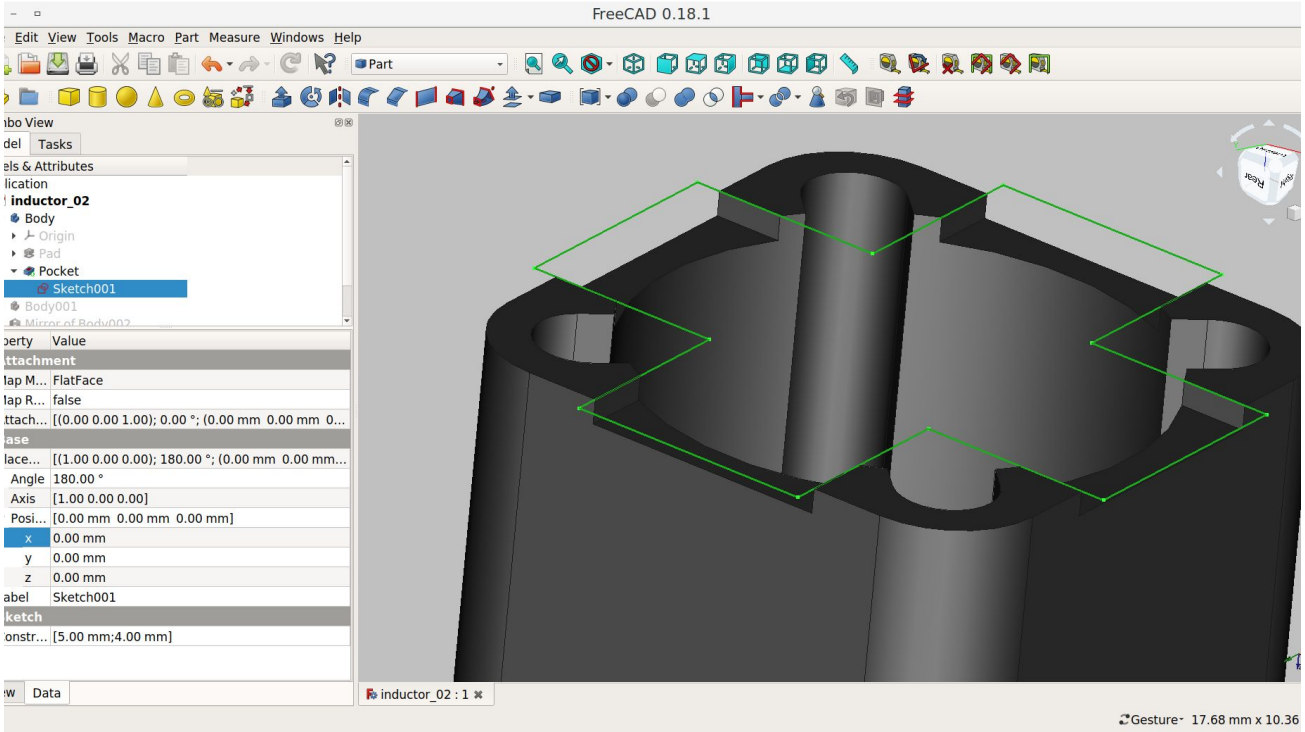


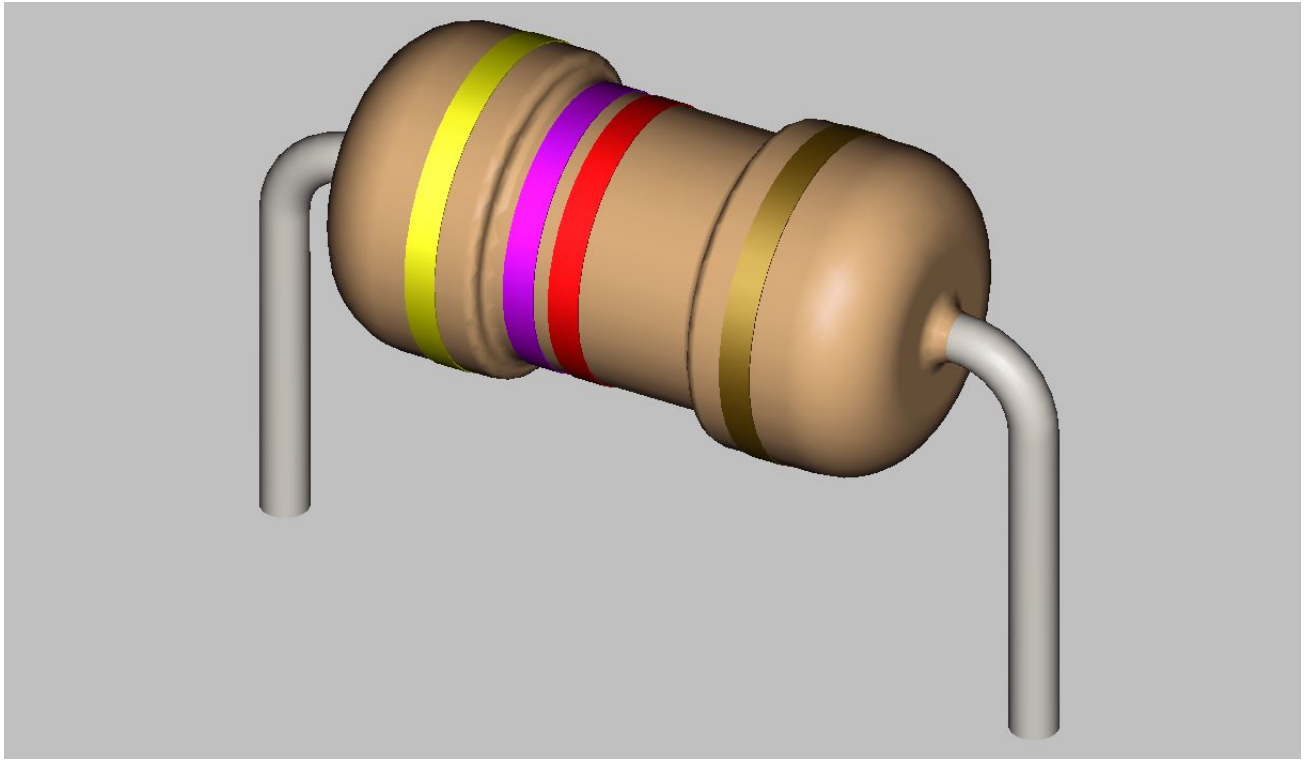
PART DESIGN workbench

Sketches, Constraints, Extrude, Revolve, Pocket



PART DESIGN workbench..

Revolve, Sweep, Mirror



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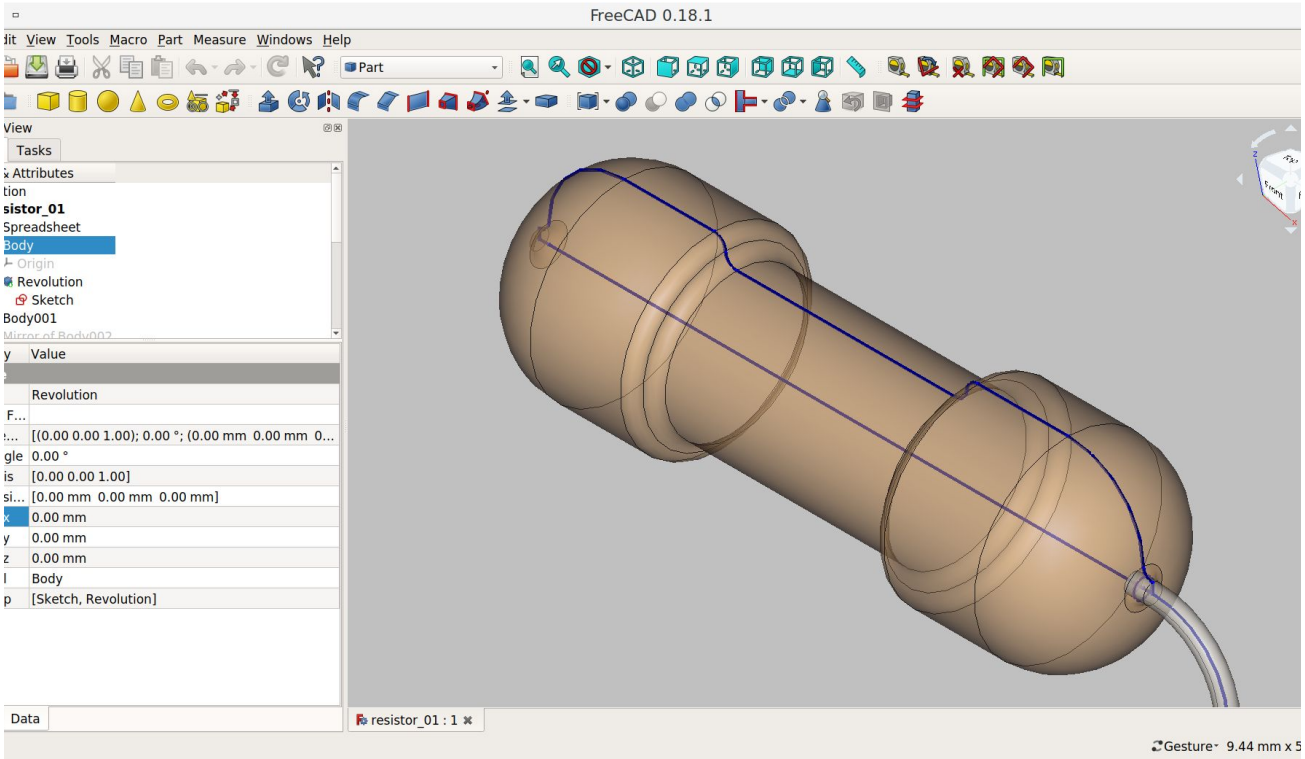
Revolve, Sweep, Mirror



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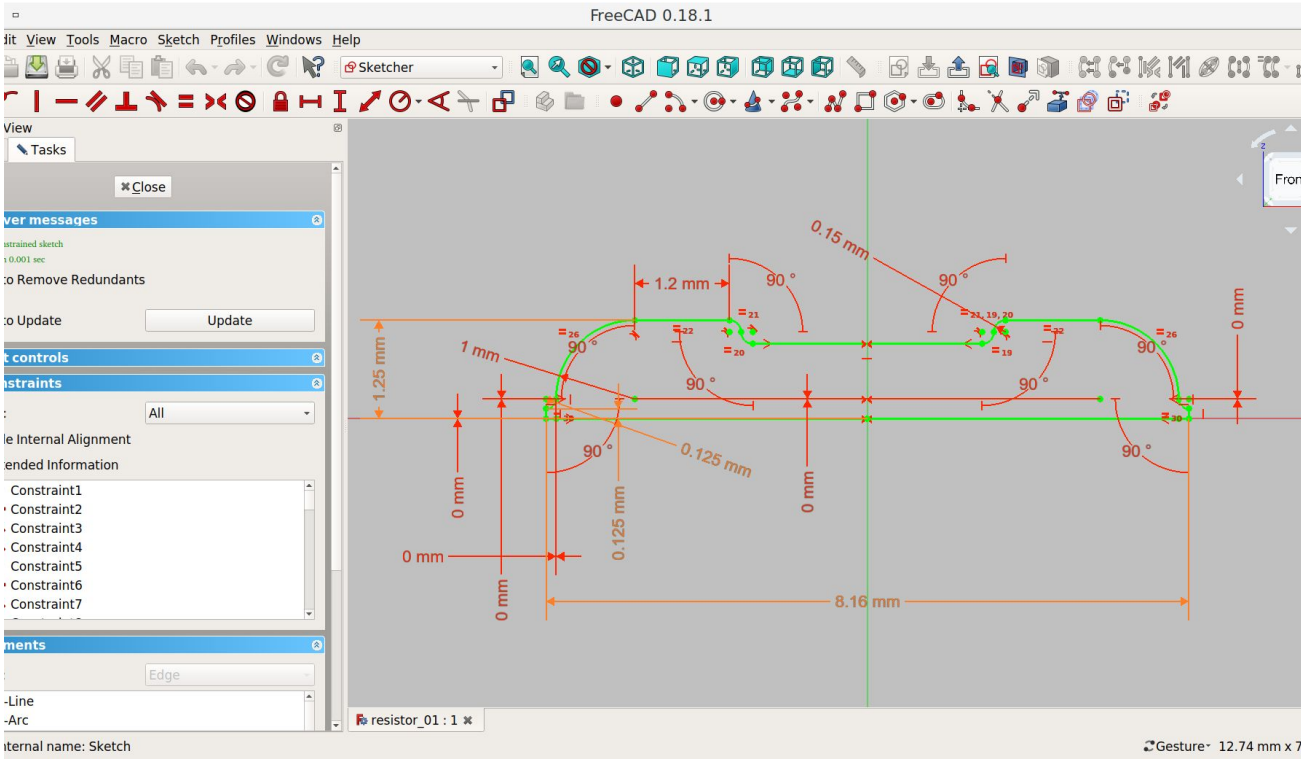
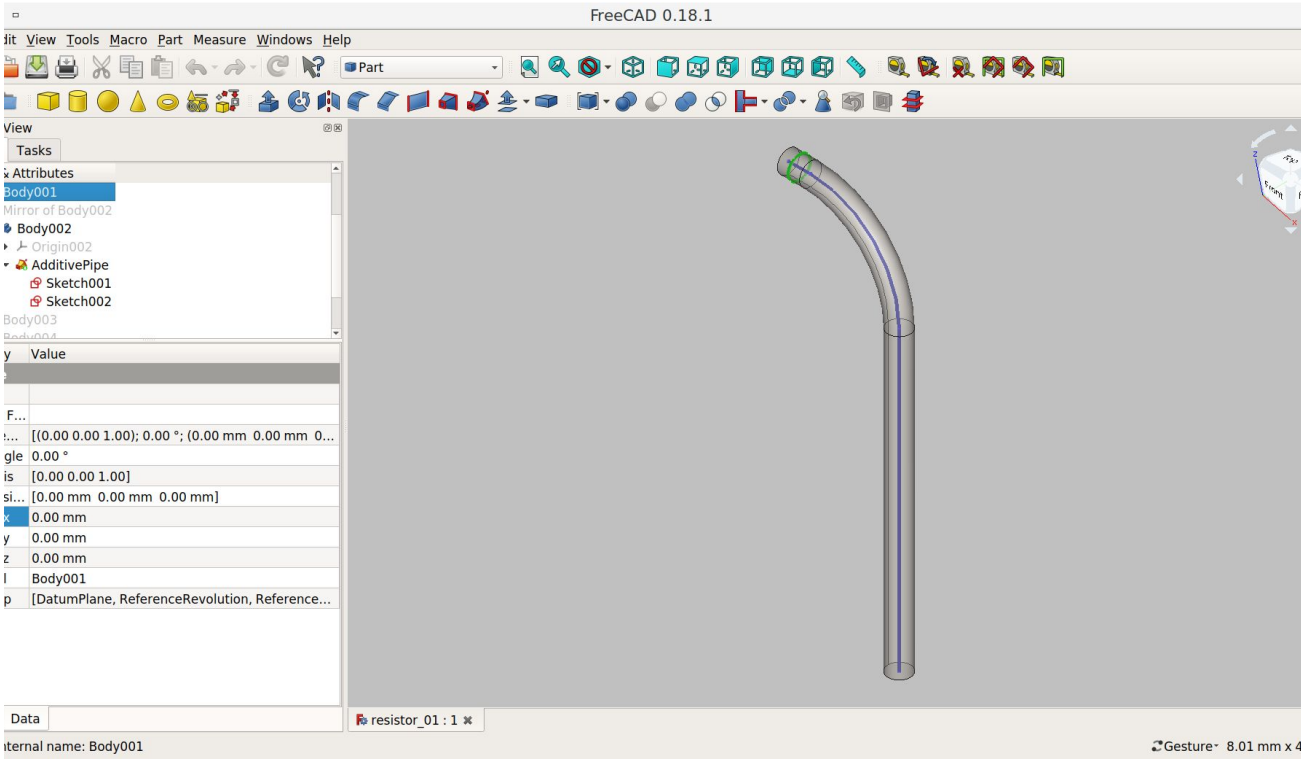
Revolve, Sweep, Mirror



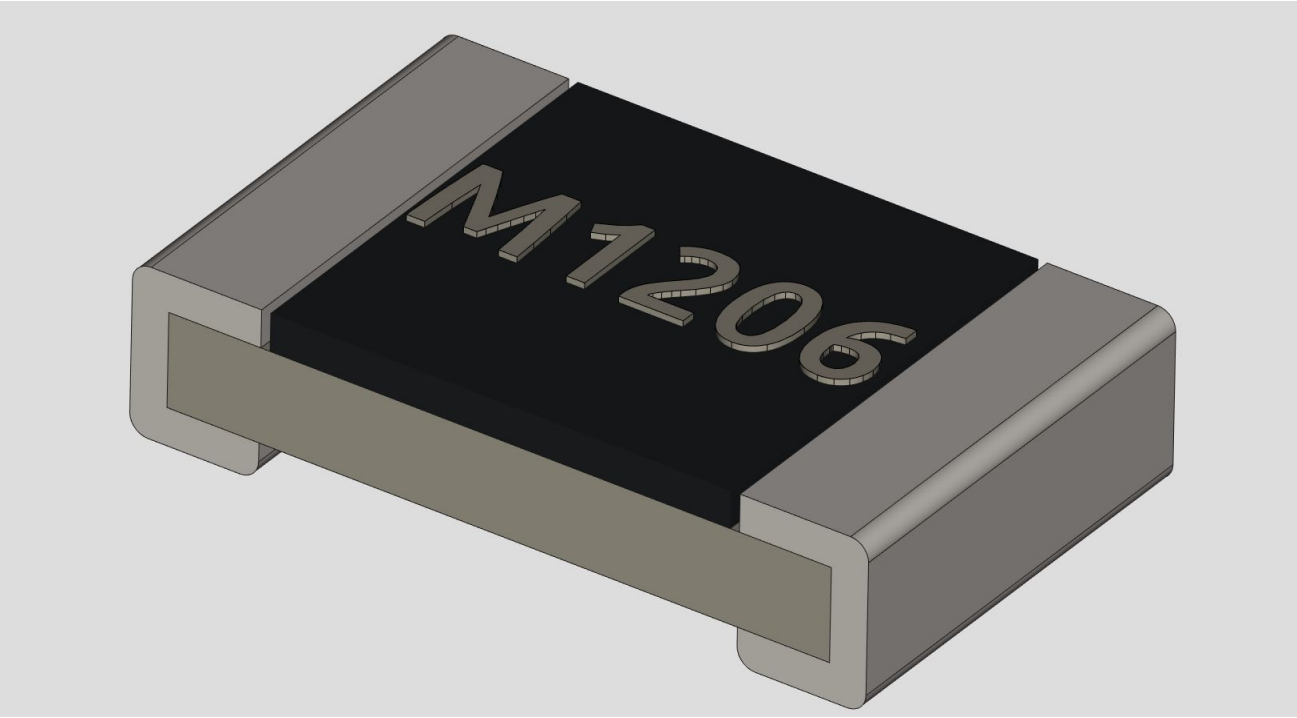
PART DESIGN workbench..

Revolve, Sweep, Mirror



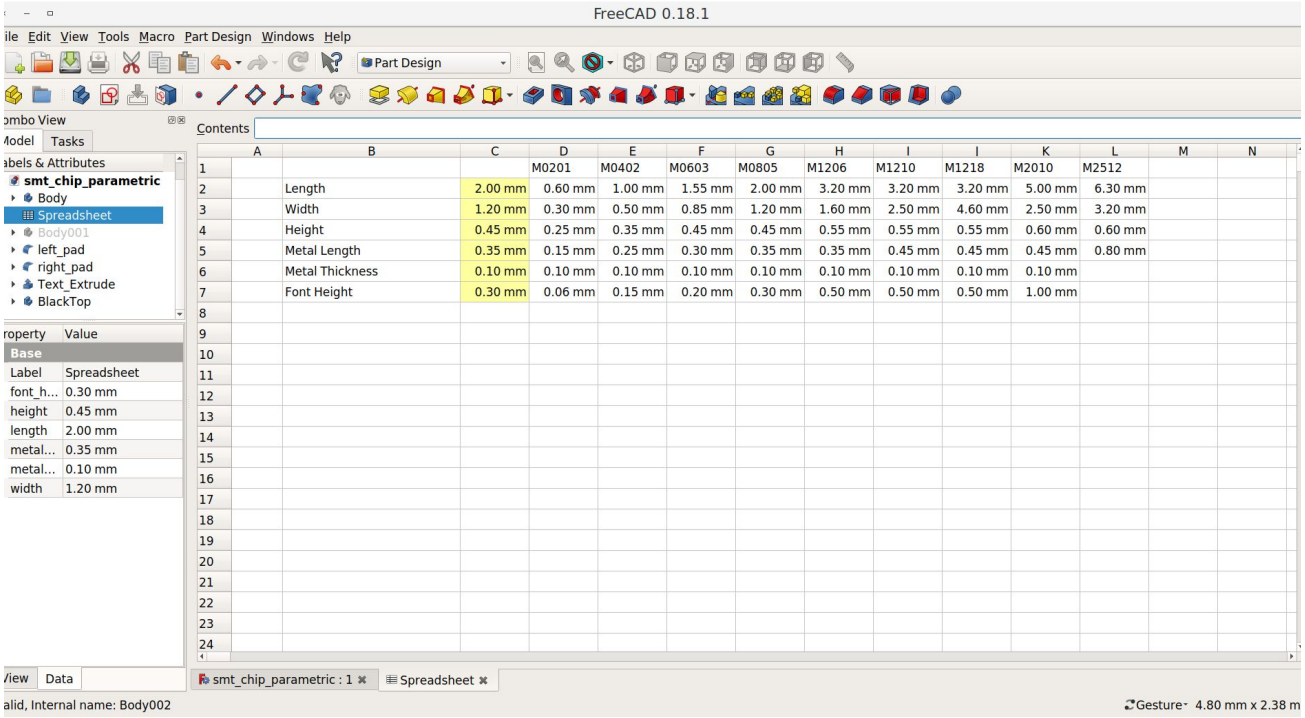
SPREADSHEET workbench

Parametric design



SPREADSHEET workbench

Parametric design



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1				M0201	M0402	M0603	M0805	M1206	M1210	M1218	M2010	M2512		
2		Length	2.00 mm	0.60 mm	1.00 mm	1.55 mm	2.00 mm	3.20 mm	3.20 mm	3.20 mm	5.00 mm	6.30 mm		
3		Width	1.20 mm	0.30 mm	0.50 mm	0.85 mm	1.20 mm	1.60 mm	2.50 mm	4.60 mm	2.50 mm	3.20 mm		
4		Height	0.45 mm	0.25 mm	0.35 mm	0.45 mm	0.45 mm	0.55 mm	0.55 mm	0.55 mm	0.60 mm	0.60 mm		
5		Metal Length	0.35 mm	0.15 mm	0.25 mm	0.30 mm	0.35 mm	0.35 mm	0.45 mm	0.45 mm	0.45 mm	0.80 mm		
6		Metal Thickness	0.10 mm	0.10 mm	0.10 mm	0.10 mm	0.10 mm	0.10 mm	0.10 mm	0.10 mm	0.10 mm			
7		Font Height	0.30 mm	0.06 mm	0.15 mm	0.20 mm	0.30 mm	0.50 mm	0.50 mm	0.50 mm	1.00 mm			
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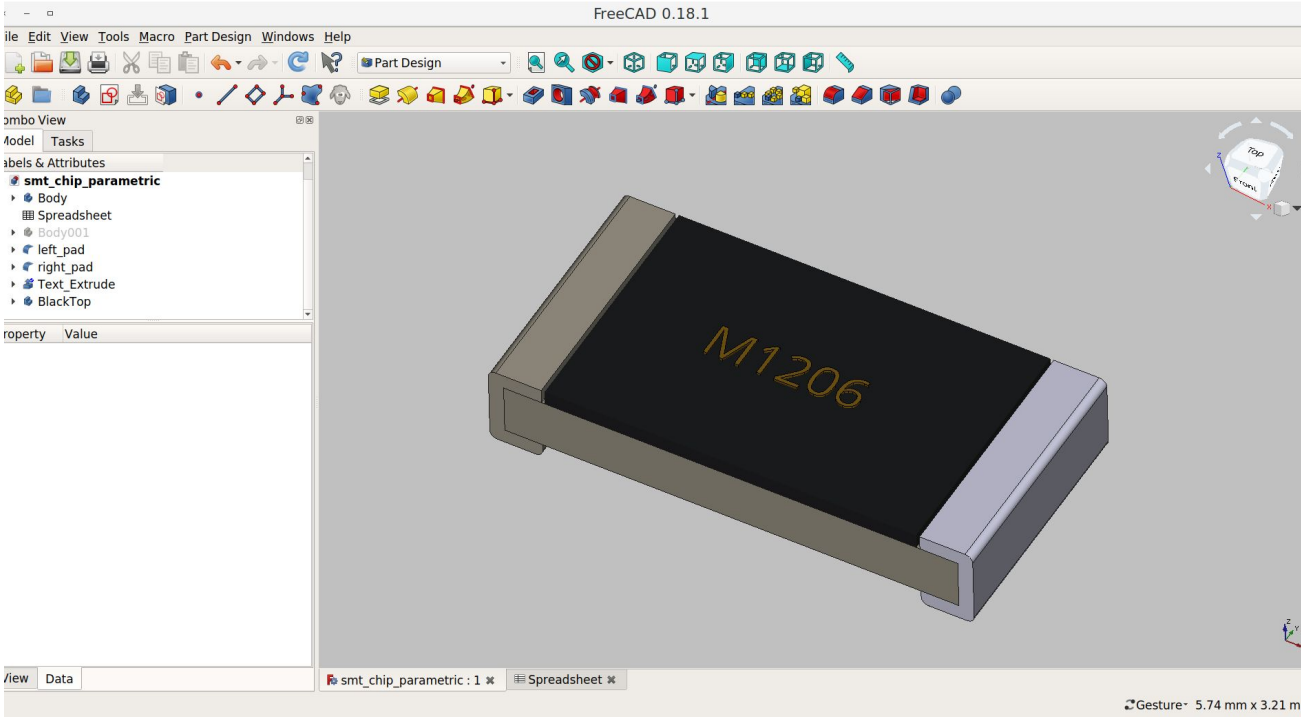
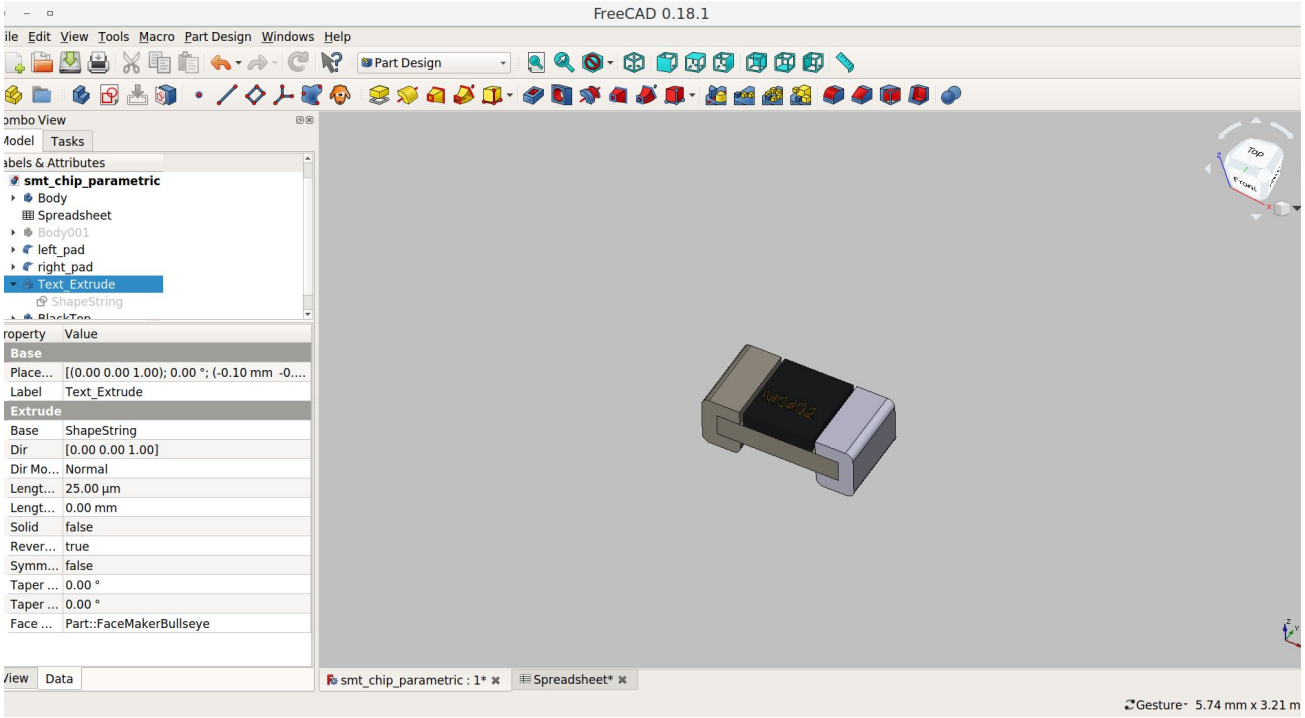
SPREADSHEET workbench

Parametric design



SPREADSHEET workbench

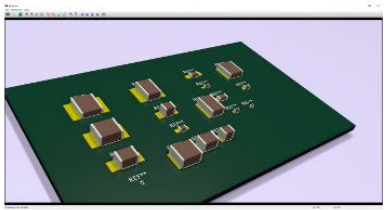
Parametric design



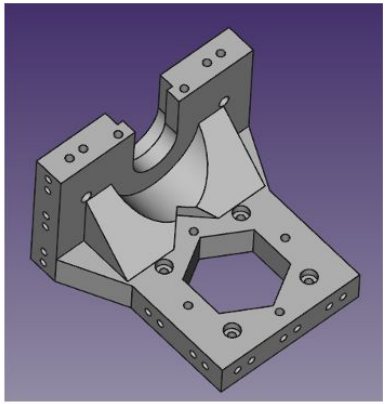
CADquery workbench

Programmatic parametric design

KiCad uses cadquery to build high quality models of electronic components. (https://github.com/KiCad/packages3D)



This Prusa i3 extruder support uses cadquery to build the model (https://github.com/adam-urbanczyk/cadquery-models):



https://github.com/dcowden/cadquery

LINKS

For reference

- Official KiCad 3D model libraries for rendering and MCAD integration
- KiCad 3d models using CADquery in FreeCAD by easyw
- A module-workbench combo that adds a CadQuery editor to FreeCAD
- FreeCAD - library of Parts
- Video - Getting started with CADquery scripting

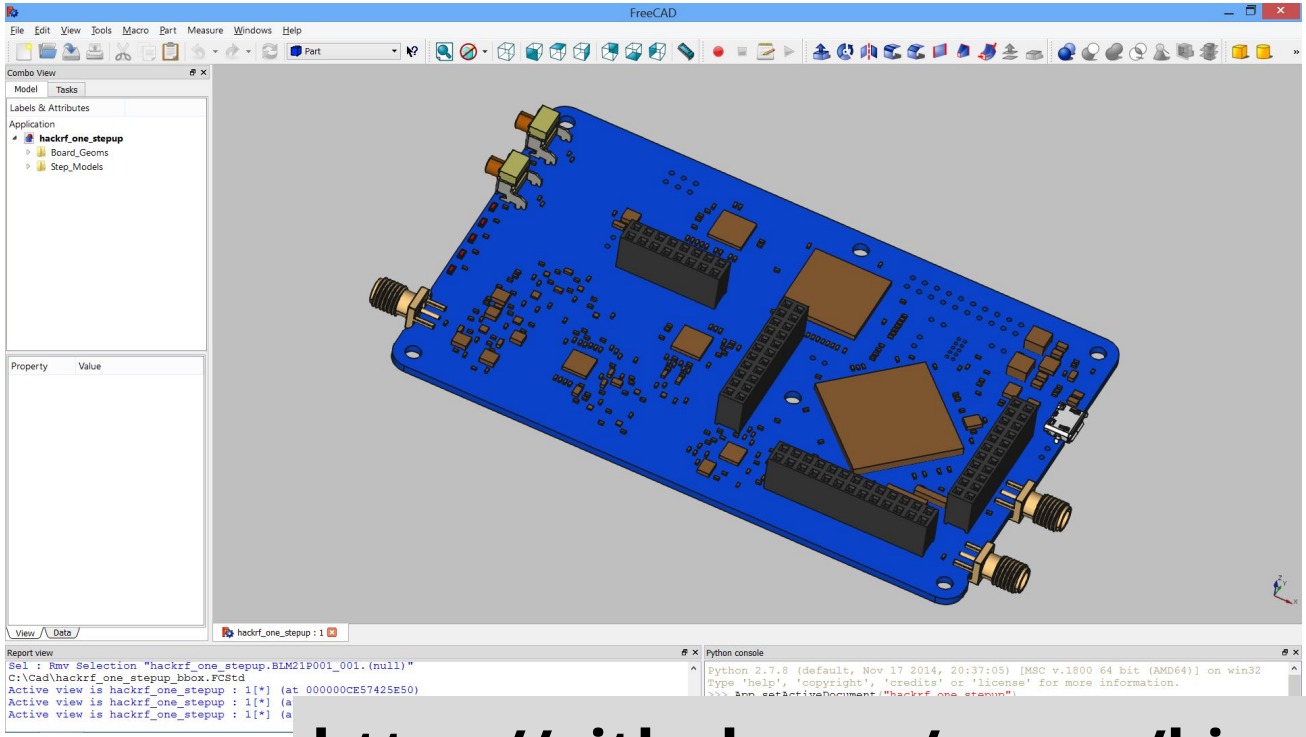
KiCad Best Practises

Ambient, Diffuse, Specular, Shininess

- Preferred method to create 3D models
- VRML Materials Docs
  - KiCad_3D-Viewer_component-materials-reference-list_MarioLuzeiro
  - KiCad_3D-Viewer_Illumination_model_and_materials-MarioLuzeiro

KiCad StepUp Tools workbench

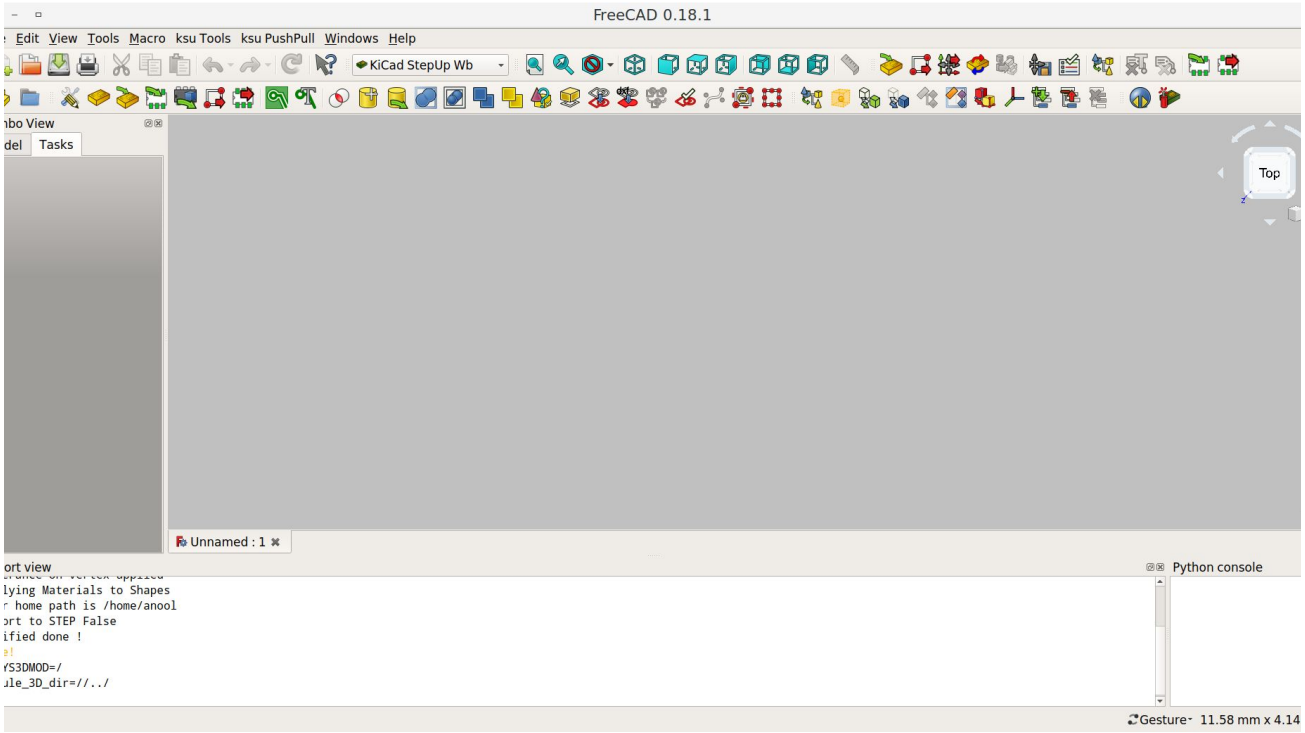
easyw / Maurice / maui

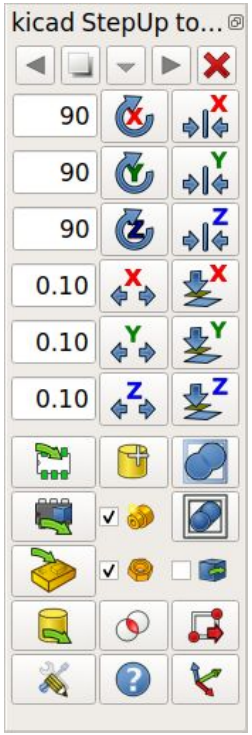


https://github.com/easyw/kicadStepUpMod

KiCad StepUp Tools workbench

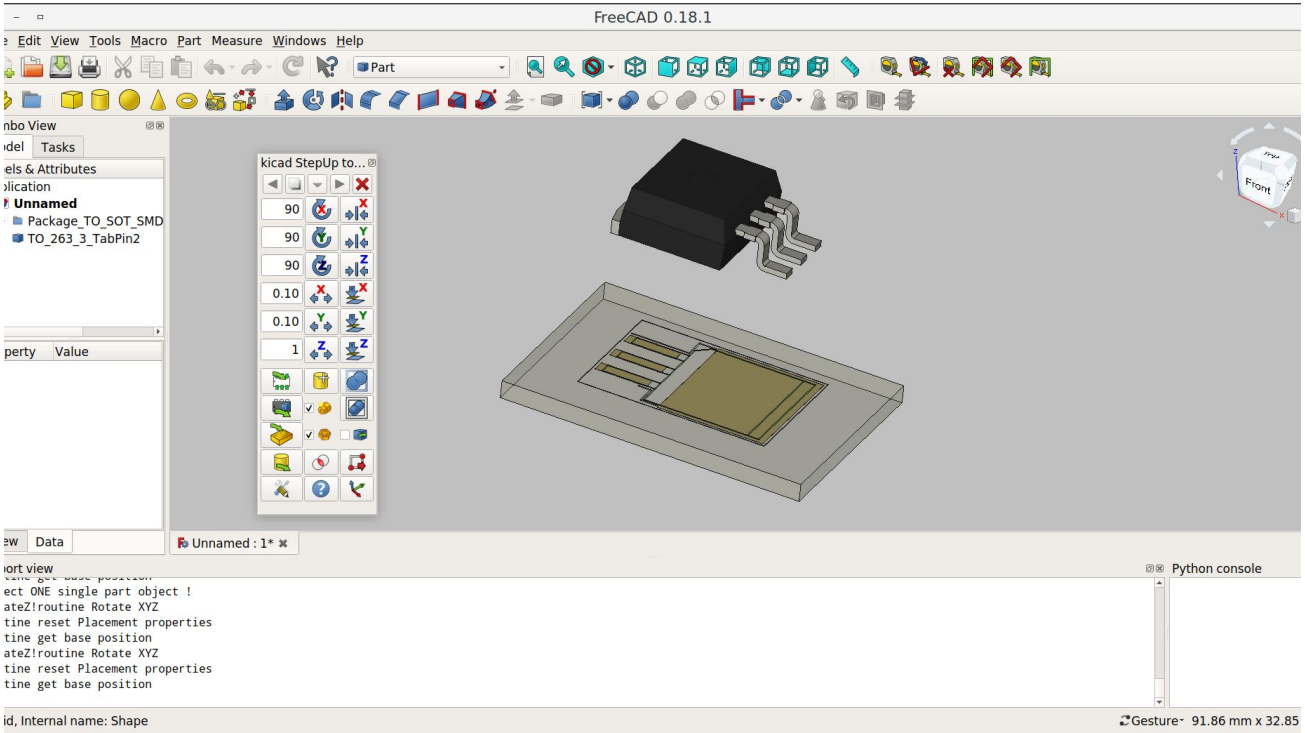
easyw / Maurice / maui

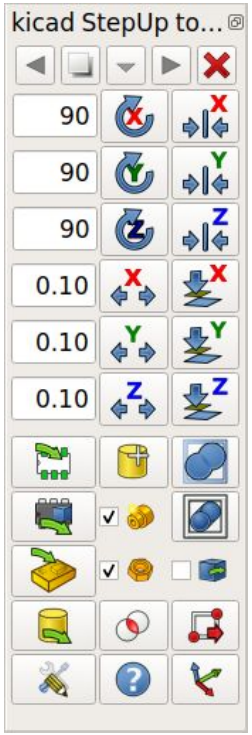




KiCad StepUp Tools workbench

easyw / Maurice / maui





KiCad StepUp Tools workbench

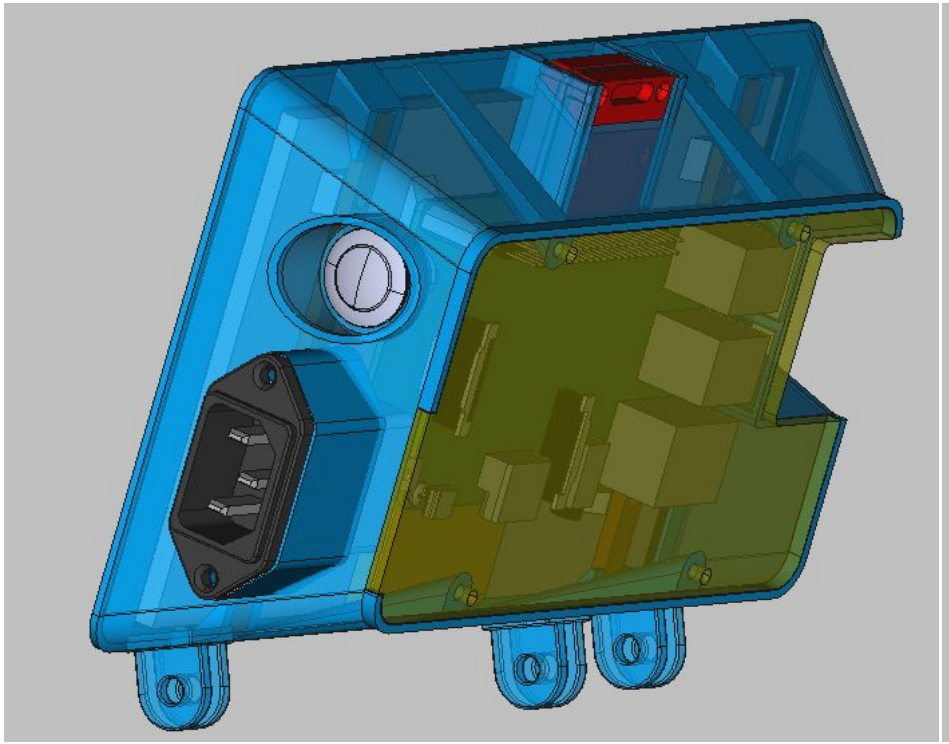
easyw / Maurice / maui

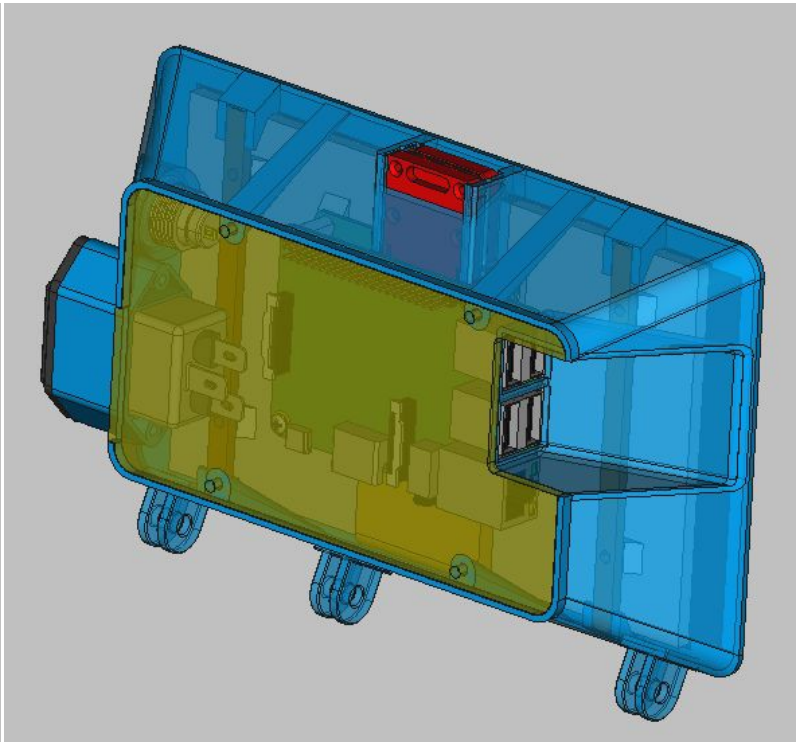
https://www.youtube.com/watch?v=6R6UEUScjgA

kicad StepUp: a Seamless ECAD MCAD Synchronization

Enclosure Design

Import STEP and VRML from KiCad





Thanks..

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Link to this Slide deck : http://bit.ly/anool_kicon

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