

# Compare simulations

TI Precision Labs – TI Magnetic Sense Simulator

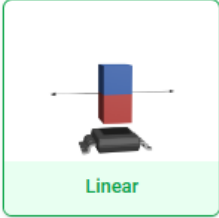
Presented and prepared by Alicia Rosenberger

# Create first simulation

TI Magnetic Sense Simulator (TIMSS) Alicia

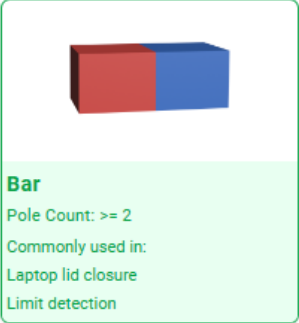
1 Function & Magnet 2 Select Sensor 3 Preview Window

1. Function Selected




Linear

2. Magnet Shape Selected



**Bar**  
Pole Count:  $\geq 2$   
Commonly used in:  
Laptop lid closure  
Limit detection

3. Sensor Selected



**TMAG5273**  
Quantity

Back Create ext

# Configure first simulation – magnet settings

The image shows a software interface for configuring magnet settings. It is divided into several sections:

- Magnet Specifications:** Shows Magnet Shape set to Bar and Magnet Shape set to Bar. A value of 2 is entered in a field.
- Magnet Geometry:** Shows Magnet Length - X dim (2 mm), Magnet Width - Y dim (2 mm), and Magnet Height - Z dim (4 mm). These three fields are highlighted with a red box.
- Magnet Motion:** Shows Origin Position and Final Position settings. The Origin Position section includes:
  - Position: X Axis (-7 mm), Y Axis (0 mm), Z Axis (6 mm)
  - Angle: X Axis (0 Deg), Y Axis (90 Deg), Z Axis (0 Deg)The Final Position section includes:
  - Position: X Axis (7 mm), Y Axis (0 mm), Z Axis (6 mm)These two sections are highlighted with a red box.

Additional visible settings include Sintered Nec, N42, Average Rema, 20, and Coercivity 11.5.

# Configure first simulation – sensor settings

The screenshot shows the TI Magnetic Sense Simulator (TIMSS) interface. The top bar displays the application name and the user 'Alicia'. The main workspace shows a 3D view of a magnet (two colored blocks) and a sensor (a small device). The 'Sensor' configuration panel is open, showing the following settings:

- Sensor Select:** Sensor 1 : TMAG5273
- Sensor Specifications:** (Expanded)
- Sensor Position:**
  - Position Properties:**
    - Position:** X Axis: 0 mm, Y Axis: 0.4 mm, Z Axis: -5 mm
    - Angle:** X Axis: 0 Deg, Y Axis: 0 Deg, Z Axis: 0 Deg

A red box highlights the 'Simulate' button at the bottom of the 3D view.

The screenshot shows the TI Magnetic Sense Simulator (TIMSS) interface in the 'Output' view. The top bar displays the application name and the user 'Alicia'. The main workspace shows a 3D view of the magnet and sensor. The 'Output' panel is open, showing the following results:

- Sensor Select:** Sensor 1 : TMAG5273
- Magnet Field Density vs Distance:** A line graph showing Magnetic Flux Density (mT) vs Magnet Displacement (mm). The graph displays four data series: Bx (red), By (green), Bz (blue), and Magnitude (orange).
- Device Output 1:** A line graph showing Output Signal (Code) vs Magnet Displacement (mm). The graph displays three data series: X Output (red), Y Output (green), and Z Output (blue).

A 'Play' button and a frame counter (0 to 14) are visible at the bottom of the 3D view. A vertical 'Input Parameters' sidebar is on the right.

# Save first simulation

The screenshot shows the TI Magnetic Sense Simulator (TIMSS) interface. The top bar includes the title 'TI Magnetic Sense Simulator (TIMSS)', a user profile 'Alicia', and a 'Save' button highlighted with a red box. The main workspace is divided into several panels: '3D Animation' on the left showing a 3D model of a magnet and sensor; 'Magnet Field Density vs Distance' in the top right, a line graph with four series (Bx, By, Bz, Magnitude); and 'Device Output 1' in the bottom right, a line graph with three series (X Output, Y Output, Z Output). A 'Play' button is visible at the bottom left of the 3D animation panel.

This screenshot shows the same TI Magnetic Sense Simulator (TIMSS) interface as the first image, but with an 'Edit Design Name' dialog box open in the center. The dialog box has a title 'Edit Design Name' and a text input field containing 'First Simulation'. Below the input field are two buttons: 'CANCEL' and 'OK', with the 'OK' button highlighted in a red box. The background interface is dimmed.

# Create second simulation

The screenshot shows the TI Magnetic Sense Simulator (TIMSS) interface. The top bar displays the application name and the user 'Alicia'. The main area is divided into 'Edit Design' and 'Output' tabs. The 'Output' tab is active, showing a 3D Animation of a magnet and a sensor, and two line graphs: 'Magnet Field Density vs Distance' and 'Device Output 1'. A dropdown menu is open over the 'Save as...' option, listing options: 'Export Input Parameters to JSON', 'Export Report to CSV', 'Export Report to PDF', and 'Import Input Parameters from JSON'. The 'Save as...' option is highlighted with a red box.

The screenshot shows the TI Magnetic Sense Simulator (TIMSS) interface. The top bar displays the application name and the user 'Alicia'. The main area is divided into 'Edit Design' and 'Output' tabs. The 'Output' tab is active, showing a 3D Animation of a magnet and a sensor, and two line graphs: 'Magnet Field Density vs Distance' and 'Device Output 1'. An 'Edit Design Name' dialog box is open, with the 'Design Name' field containing 'Second Simulation'. The 'OK' button is highlighted with a red box.

# Edit second simulation

TI Magnetic Sense Simulator (TIMSS) Alicia

Second Simulation \* Function Linear Save

**Edit Design** Output

Design Parametric Sweep Compare Design

**Magnet** Sensor Sim Settings

- Magnet Specifications
- Magnet Geometry
- Magnet Motion

Origin Position

Position

X Axis	Y Axis	Z Axis
-7 mm	6 mm	1 mm

Angle

X Axis	Y Axis	Z Axis
90 Deg	90 Deg	0 Deg

Final Position

Position

X Axis	Y Axis	Z Axis
7 mm	6 mm	1 mm

**Simulate**

TI Magnetic Sense Simulator (TIMSS) Alicia

Second Simulation \* Function Linear Save

**Edit Design** **Output**

Design Parametric Sweep Compare Design

Sensor Select Sensor 1: TMAG5273

**3D Animation**

**Magnet Field Density vs Distance**

Magnetic Flux Density (mT)

Magnet Displacement (mm)

Legend: Bx, By, Bz, Magnitude

**Device Output 1**

Output Signal (Code)

Magnet Displacement (mm)

Legend: X Output, Y Output, Z Output

Play 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 Frame #

\*This tool was designed using the MagPyLib API in Python. More information regarding this open source library and its methods can be found at the following publication source: <https://authors.elsevier.com/td/article/S2352711020300170>

Input Parameters

# Compare design

The screenshot displays the TI Magnetic Sense Simulator (TIMSS) interface. The left sidebar contains navigation options: Design, Parametric Sweep, and Compare Design (highlighted with a red box). The main area is split into a 3D Animation view on the left and a configuration panel on the right. The configuration panel is titled 'Second Simulation' and includes sections for 'Magnet Specifications', 'Magnet Geometry', and 'Magnet Motion'. The 'Magnet Specifications' section is expanded, showing parameters like Magnet Shape (Bar), Poles (2), Magnet Material (Sintered Neodymium Iron Boron), and Material Grade (N42). Below this, there are fields for Remanence (1310 mT at 20°C) and Temperature Coefficient (-0.12 %/°C). The right side of the interface features a 'Simulate' button and a 'Compare Design' button (highlighted with a red box). A red-bordered error message box is overlaid on the bottom left, stating: 'Failed to open file for comparison. The design file for comparison must have the same function as the current design.' Below the error message, there is a 'Simulate' button (highlighted with a red box).

TI Magnetic Sense Simulator (TIMSS)

Second Simulation \* / Second Simulation

Edit Design / Output / Input files / Output

3D Animation

Design / Design / Magnet / Sensor / Sim Settings

Parametric Sweep / Parametric Sweep

Compare Design / Compare Design

Play

0 1 2 3 4 5 6 7 8 9 10 11

\*This tool was designed using the MapPyLib API in Python. More information regarding this open source methods can be found at the following publication: <https://authors.elsevier.com/td/article/S2332711020300170>

Failed to open file for comparison  
The design file for comparison must have the same function as the current design.

Simulate

Simulate

# Compare design – results

Graph for Comparison Magneti

Bx By Bz Magnitude

Second Simulation

Input files Output

Current Design File Second Simulation Sensor Select **Sensor 1 : TMAG...**  
Sensor 1 : TMAG5273

Design file for comparison First Simulation Sensor Select **Sensor 1 : TMAG5...**  
Sensor 1 : TMAG5273

3D Animation

Overlay Export Graph

Graph for Comparison Magneti

Bx By Bz Magnitude

Graph for Comparison Magnetic Field vs Distance Graph

Overlay Export Graph

# Learn more

- TI Magnetic Sense Simulator Product Folder  
<https://www.ti.com/TIMSS>
- TI Magnetic Sense Simulator User's Guide  
<https://www.ti.com/lit/ug/slyu067/slyu067.pdf>
- TI Magnetic Sense Simulator App Brief  
<https://www.ti.com/lit/ab/slya083/slya083.pdf>
- Magnetic Sensors Product Page  
<https://www.ti.com/sensors/magnetic-sensors/overview.html>
- Position Sensing Demo Video Series  
<https://www.ti.com/video/series/position-sensing-demos.html>
- TI Precision Labs: Magnetic Sensor Training Videos  
<https://www.ti.com/video/series/precision-labs/ti-precision-labs-magnetic-sensors.html>
- Sensors E2E Forum  
<https://e2e.ti.com/support/sensors-group/sensors/f/sensors-forum>
- TI Magnetic Sensor Portfolio  
<https://www.ti.com/magneticsensors>

To start your simulation now, visit:  
[www.ti.com/timss/](http://www.ti.com/timss/)