

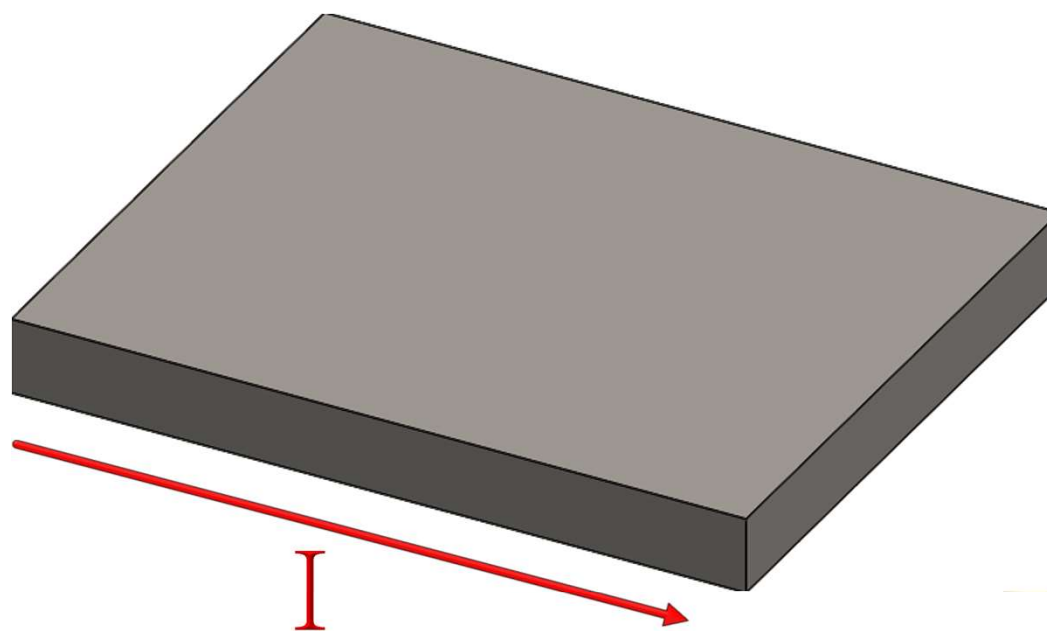
# Introduction to Three Dimensional (3D) Hall Effect Sensors

TI Precision Labs – Magnetic Sensors

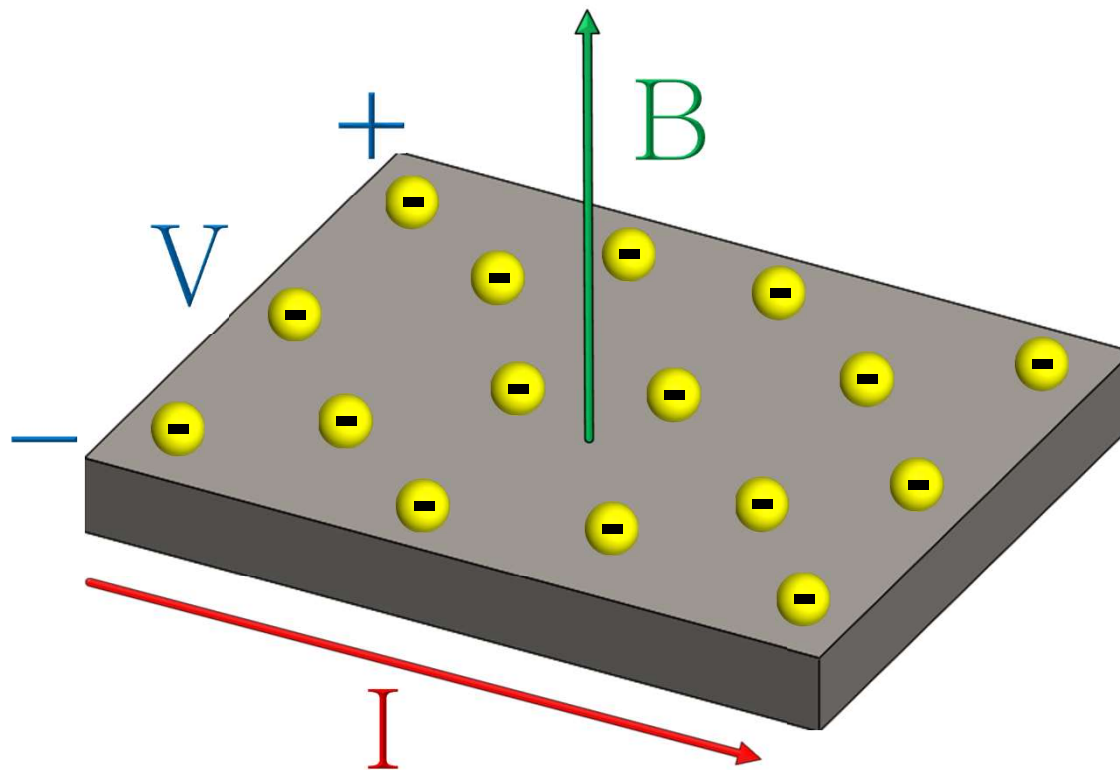
Presented and Prepared by Scott Bryson



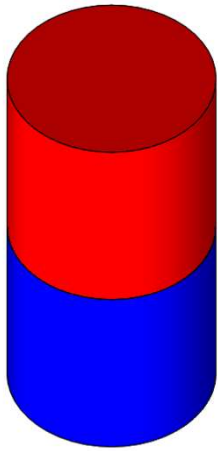
# Hall Effect Sensors



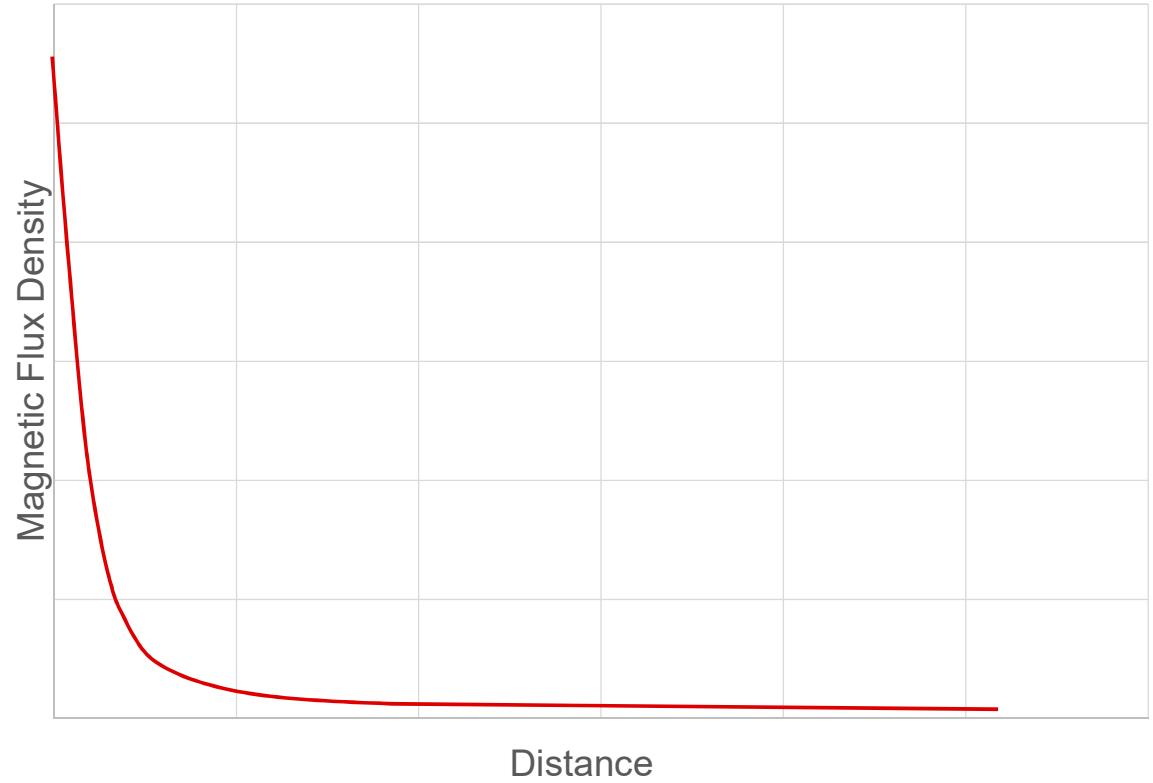
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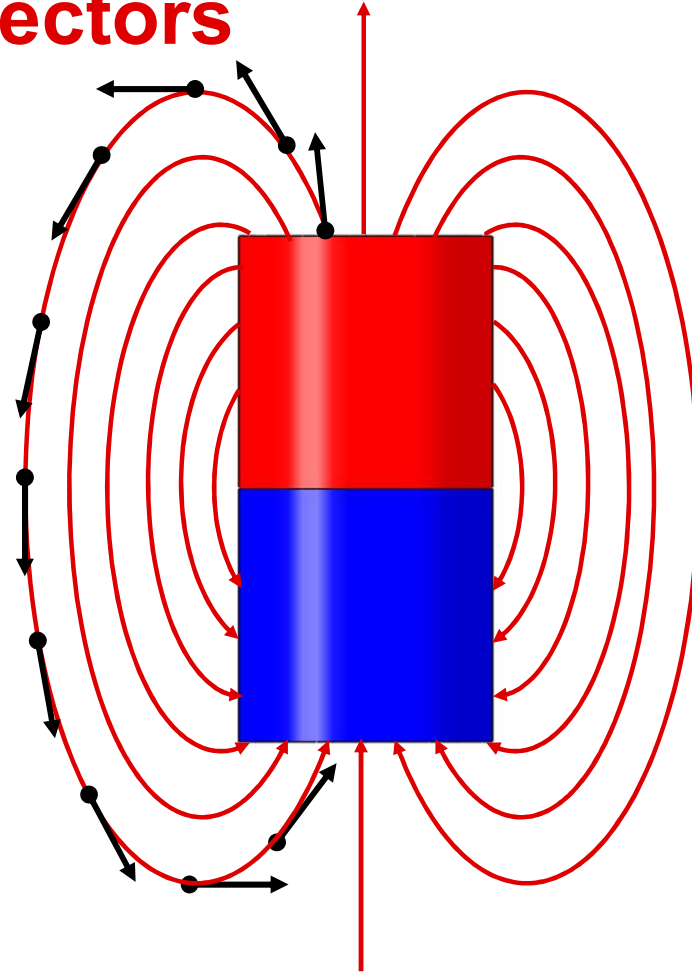
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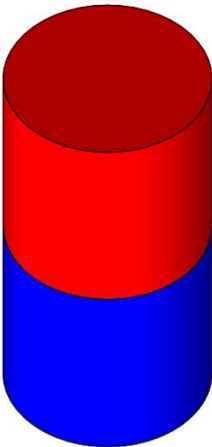
Magnetic Flux Density vs. Distance from Sensor



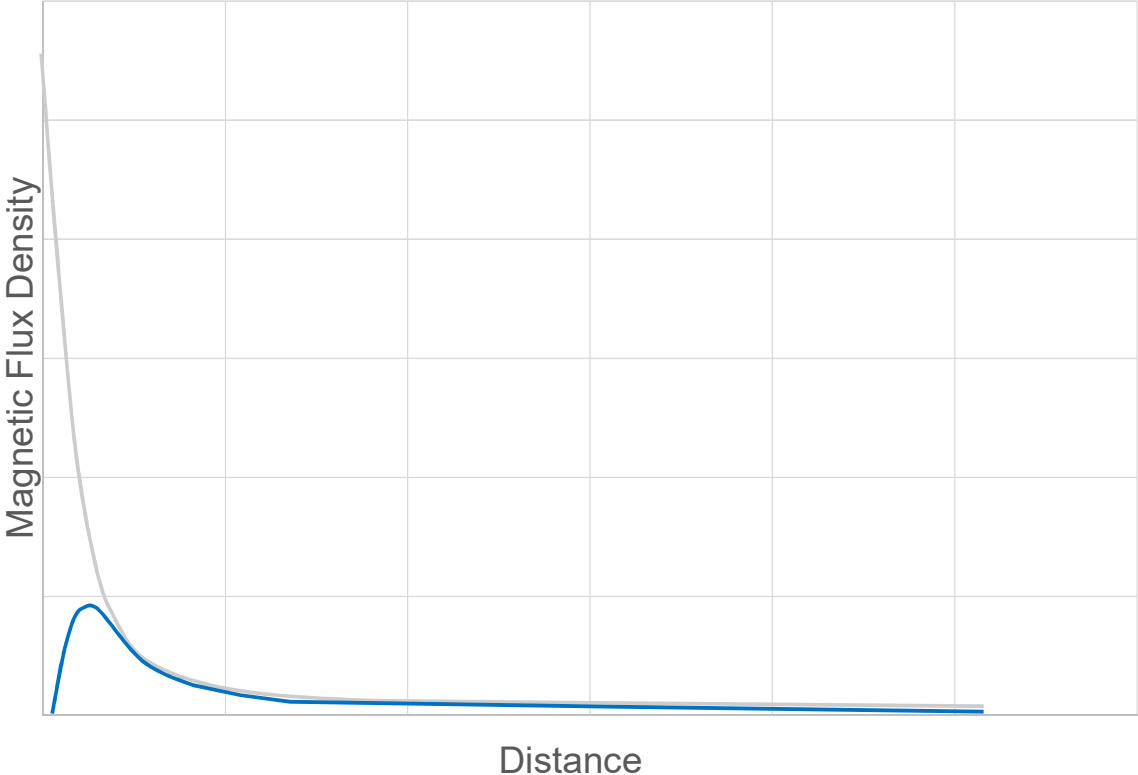
# Magnetic field vectors



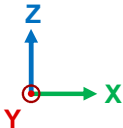
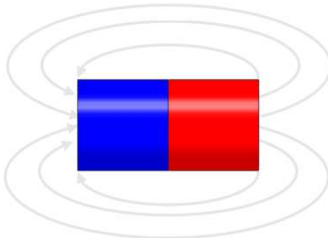
# Limitations of One Dimensional Sensors



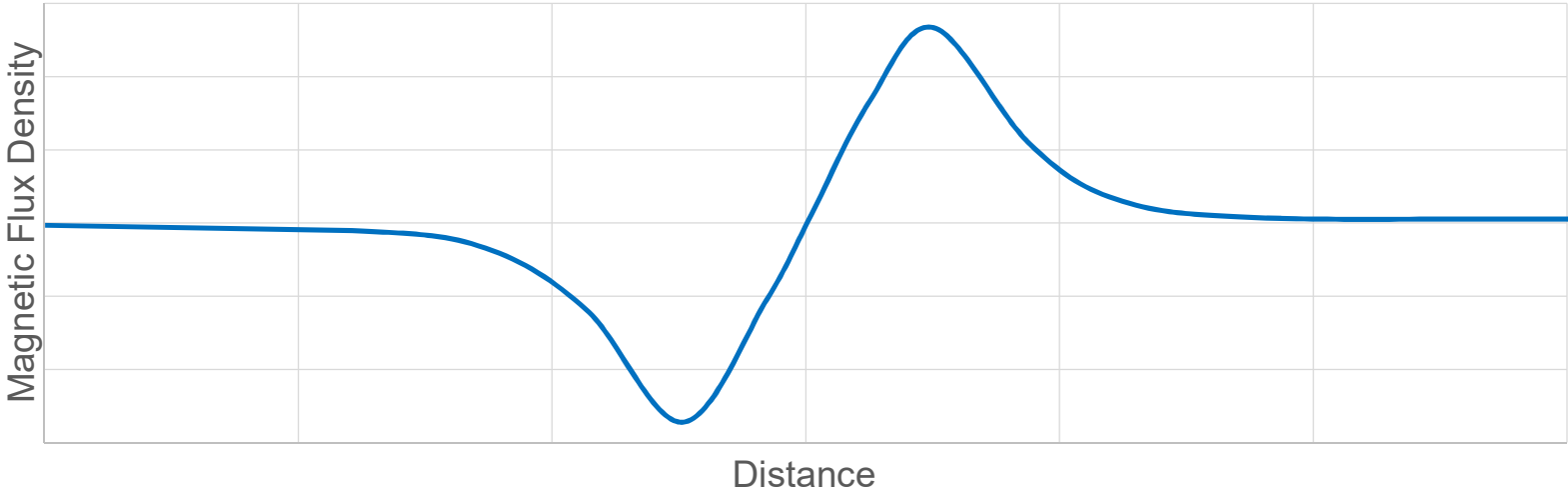
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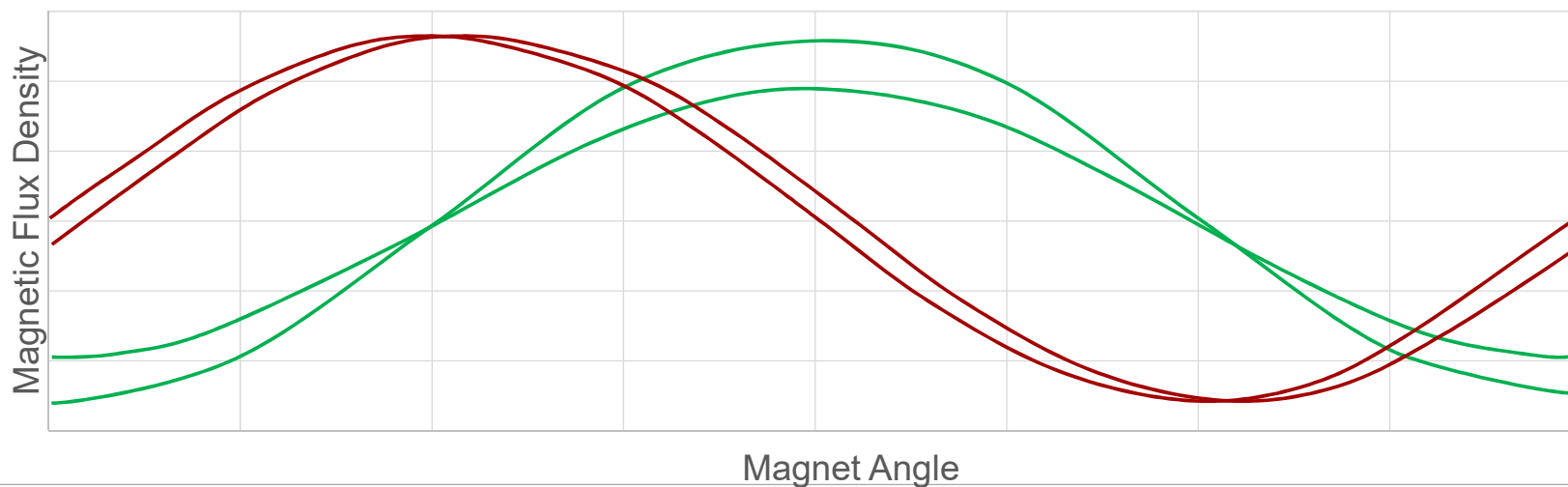
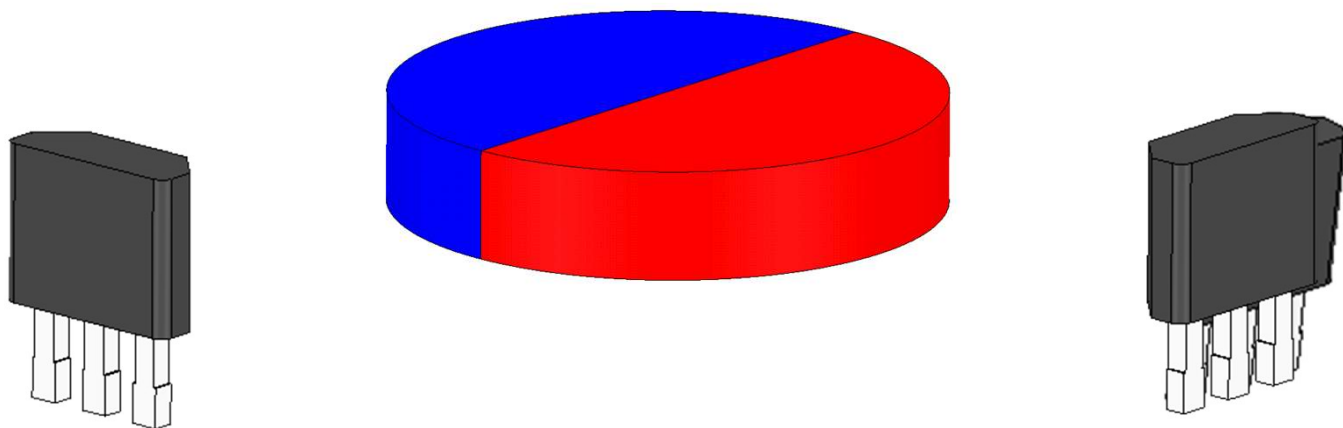
# Limitations of One Dimensional Sensors



Magnetic Flux Density vs. Magnet travel

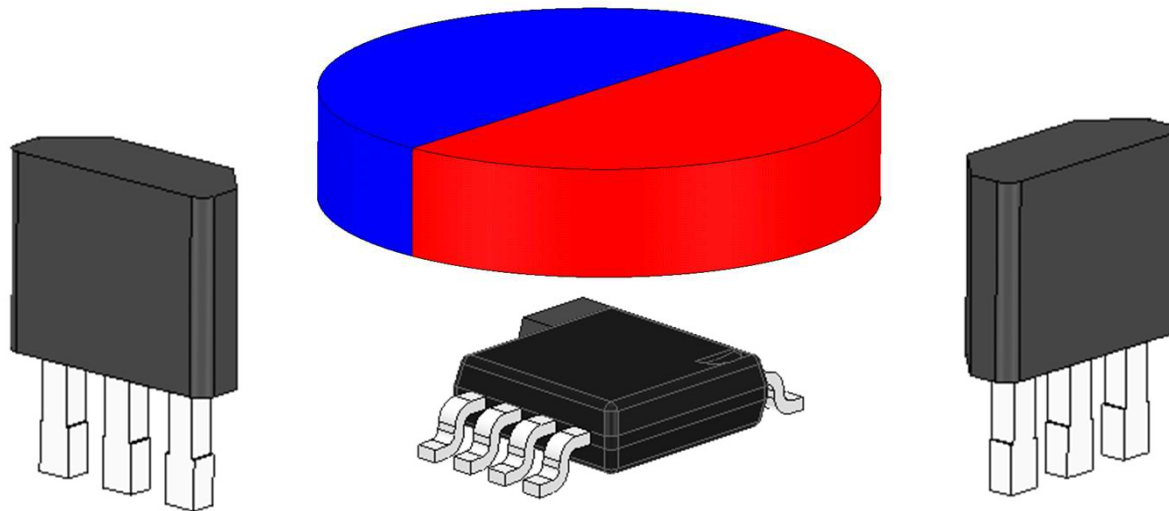


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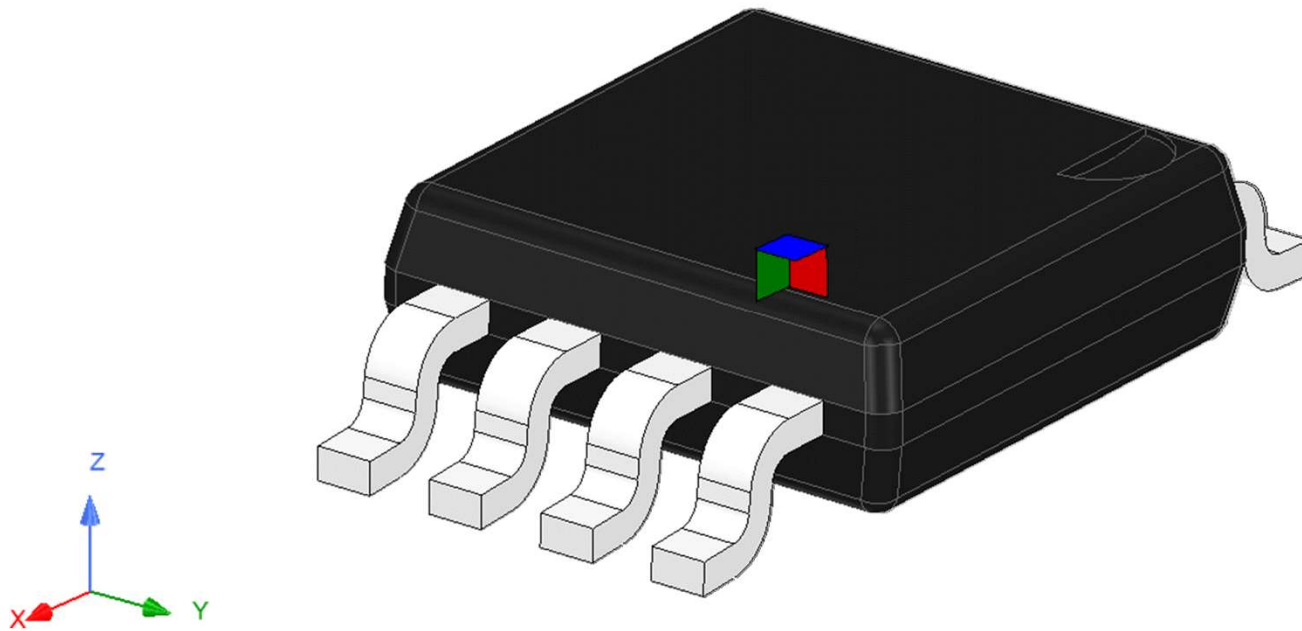




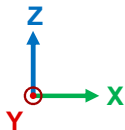
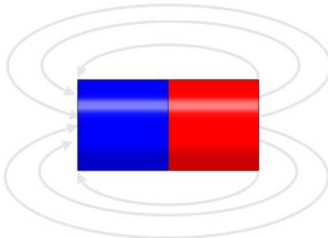
# Three Dimensional Sensors



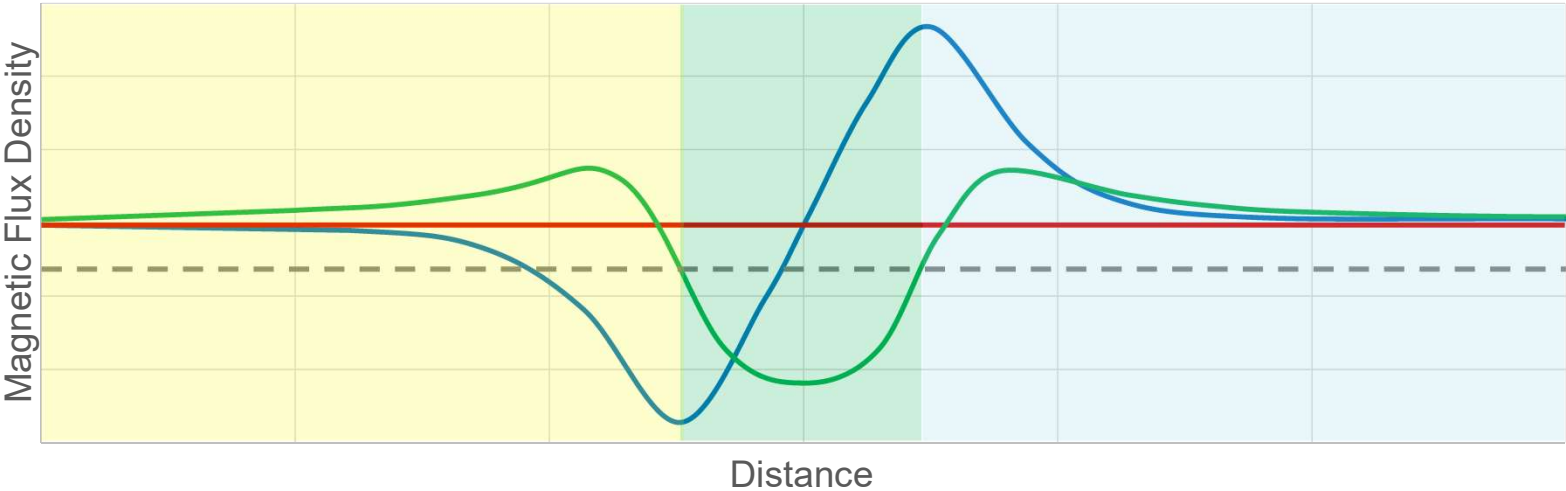
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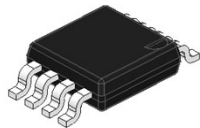
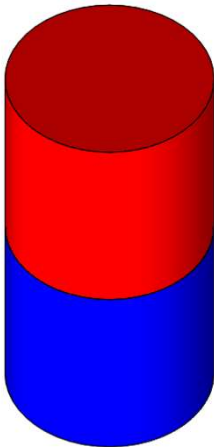
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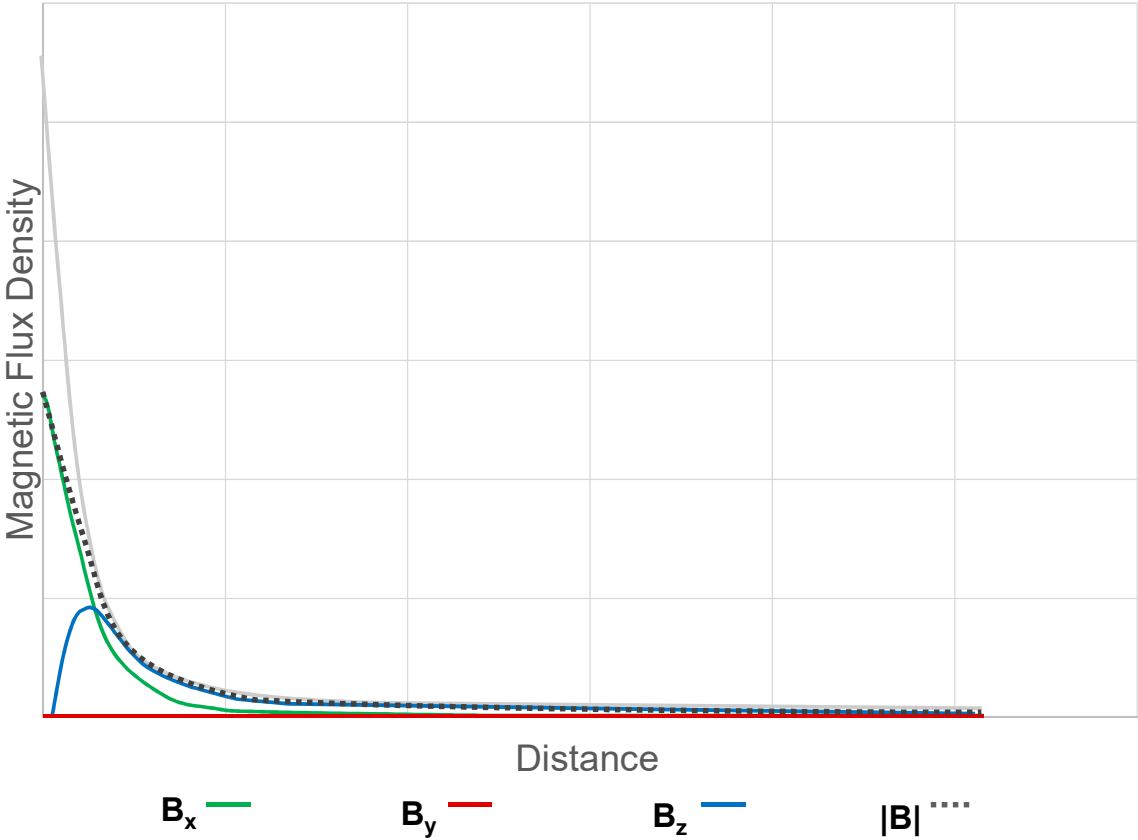
Magnetic Flux Density vs. Magnet travel



# Limitations of One Dimensional Sensors



Magnetic Flux Density vs. Distance from Sensor



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# Introduction to Three Dimensional (3D) Hall Effect Sensors

TI Precision Labs – Magnetic Sensors

Presented and Prepared by Scott Bryson



## 3D Hall Effect Sensors

- 1) A One dimensional Hall Effect Sensor can detect which field component
  - a) X – Component
  - b) Y – Component
  - c) Z – Component
  - d) All of the above, but only one at a time
  
- 2) What force causes an unequal charge distribution in the Hall Element
  - 1) Weak Force
  - 2) Centripetal Force
  - 3) Lorentz Force
  - 4) Normal Force

## 3D Hall Effect Sensors

- 3) Angle detection requires Hall Elements how many degrees out of phase?
- a) 45 degrees
  - b) 60 degrees
  - c) 90 degrees
  - d) 180 degrees
- 4) True or False: Magnetic Field lines are uniform and travel in a single direction
- a) True
  - b) False



## 3D Hall Effect Sensors

- 5) 3D Hall Effect Sensors were shown to help improve measurements for which magnet configurations?
- a) Lateral Transit
  - b) Arc Transit
  - c) Angular Rotation
  - d) Head On Approach

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