

SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

19EET304/ IOT FOR ELECTRICAL SCIENCES

III YEAR VI SEM

UNIT 4 – ACTIVATION DEVICES

TOPIC 8 – Touch control

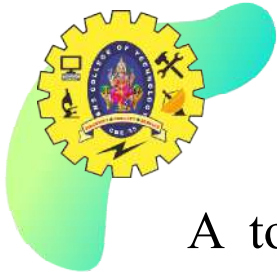




What is a Touch Sensor?

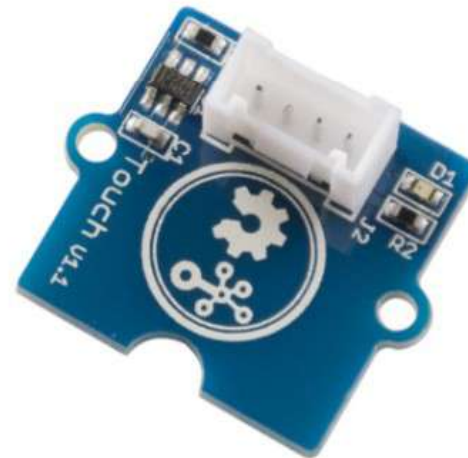
Touch Sensors are the electronic sensors that can detect touch. They operate as a switch when touched. These sensors are used in lamps, touch screens of the mobile, etc... Touch sensors offer an intuitive user interface.





What is a Touch Sensor?

A touch sensor is an electronic sensor used in detecting and recording physical touch. Also known as tactile sensors, it's a small, simple, low-cost sensor made to replace old mechanical switches .





Touch Sensor

Touch sensors are also known as Tactile sensors. These are simple to design, low cost and are produced in large scale.

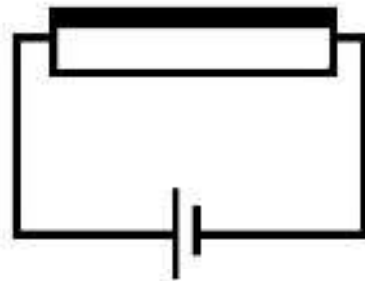
With the advance in technology, these sensors are rapidly replacing the mechanical switches. Based on their functions there are two types of touch sensors- Capacitive sensor and Resistive sensor

Capacitive sensors work by measuring capacitance and are seen in portable devices. These are durable, robust and attractive with low cost. Resistive sensors don't depend on any electrical properties for operation. These sensors work by measuring the pressure applied to their surface.

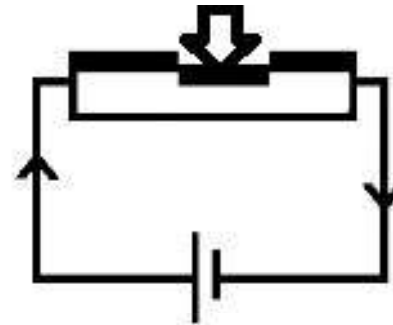




Touch Sensor Working Principle



No Contact- No
Flow of Current



Contact- Flow of
Current

A touch sensor works like a switch, where when there's contact, touch, or pressure on the surface of a touch sensor, it opens up an electrical circuit and allows currents to flow through it.





ASSESSMENT - 1

Identify the names of sensors

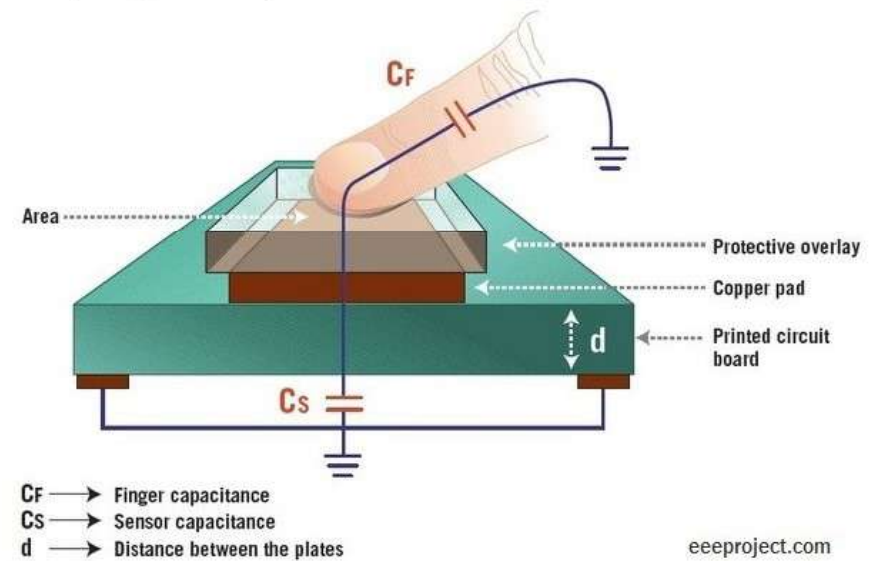




Types of Touch Sensors

1. Capacitive Touch Sensor
2. Resistive Touch Sensor

The principles of capacitive touch sensing.

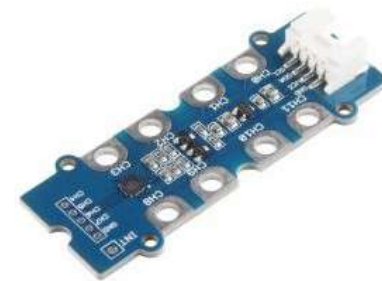


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Capacitive Touch Sensor

1. Commonly associated with MicroChip at42qt1010, a Capacitive touch sensor measures touch based on electrical disturbance from a change in capacitance.
2. It consists of an electrode film on top of the glass panel that's conductively coated with a printed circuit pattern around the outer viewing area.





capacitive touch sensor working



- 1.The user applies touch on the glass panel
- 2.The printed circuit panel around the outer viewing area of the glass panel creates an electrical charge across the surface
- 3.It results in a decrease in capacitance and allows the system to determine the touchpoint
- 4.Multiple touch points can be detected as well, allowing for touch pinch and spread





Capacitive touch sensor applications



1. Portable devices such as smartphones and tablets (iPhones, iPad, etc.)
2. Home applications such as touch lamps
3. Automotives
4. Industrial





Advantages of a capacitive touch sensor

1. Doesn't require pressure to be applied since it's built on the glass itself, hence making force insignificant to sensing requirements
2. Support for multi-touch
3. High responsiveness





Resistive touch sensor




1. Resistive touch sensor measures touch through responding to the pressure applied to their surface.
2. It consists of two conductive layers and a non-conductive separator. Unlike the capacitive touch sensors, it's not multi-touch compatible.





Resistive touch sensor Working

- 
- 1.The user applies pressure against the surface
 - 2.The outside conductive layer is then pressed against the inner layer, resulting in voltage changes
 - 3.The voltage changes are then compared to the starting voltage, allowing for the point at which the touch took place to be calculated

Resistive touch sensor Working



Applications:

- Musical instruments, touchpads, etc.
- Older music players, game consoles, etc.
- Office equipment

Advantages of a resistive touch sensor:

- Cost-effective and durable to be used in harsh environments
- Able to be used with stylus and gloves
- Less complex
- Low power consumption



Resistive touch sensor Working



Disadvantages of a resistive touch sensor:

The inability for multi-touch technology unlike the capacitive touch sensors

Dependent on pressure, require more pressure to be applied for sensing to take place





Capacitive vs Resistive touch sensor



| | Capacitive touch sensor | Resistive touch sensor |
|---|--|--|
| How it measures | Electrical disturbance from a change in capacitance | Amount of pressure applied to the surface |
| Multi touch | Multi touch capable | Not multi touch capable |
| Pressure Requirement | Does not require pressure to be applied | Require and relies on pressure to be applied |
| Compatibility with gloves/stylus | Doesn't work with gloves or stylus | Work with gloves or stylus |
| Applications | Portable devices; smart phones and tablets Home applications Automotives and industrial usages | Musical instruments, touchpads, etc. Older music players, game consoles Office equipment |



Applications



These sensors are highly used in mobile phones, iPods, automotive, small home appliances, etc...

These are also used for measuring pressure, distance, etc...

A drawback of these sensors is that they can give a false alarm.

Resistive touch sensors only work when sufficient pressure is applied.





ASSESSMENT – 2

Find the Process

| | |
|---|--|
|  <p>Consumer</p> |  <p>Industrial</p> |
|  <p>Computing</p> |  <p>Automotive</p> |

Smart key,
Control switches,
HVAC,
Car audio



References

- <https://www.elprocus.com/touch-sensor-working-and-its-applications/#:~:text=Touch%20sensors%20work%20similar%20to,with%20an%20insulator%20between%20them.>
- <https://www.watelectronics.com/what-is-touch-sensor-working-its-applications/>
- <https://www.seeedstudio.com/blog/2019/12/31/what-is-touch-sensor-and-how-to-use-it-with-arduino/>
- <https://eeepproject.com/touch-sensor/>





Thank You

