

Force Sensing Resistors

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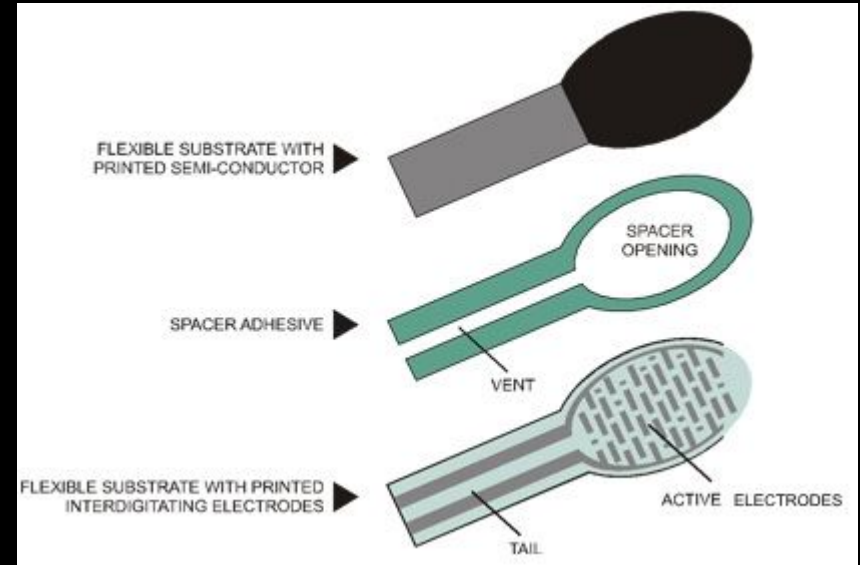
What is FSR &
why should you
care about it?

Presentation



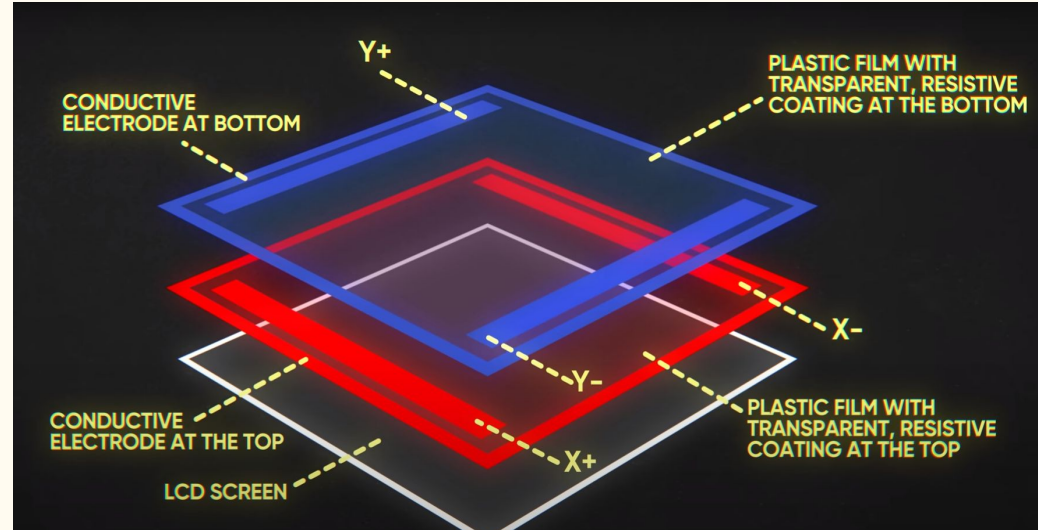
What is FSR?

Is a kind of resistor which relies on a semi-conductive material or link present in between two thin substrate which have the capability to measure force of the tiniest magnitude



How are FSRs made?

Force sensing resistors consist of a semi-conductive material – or, semi-conductive ink – contained between two thin substrates. As shown in figure, there are two different types of force sensing resistor technologies – Shunt Mode, and Thru Mode.



Hypothesis



How does FSR
work and how
will it affect your
experience

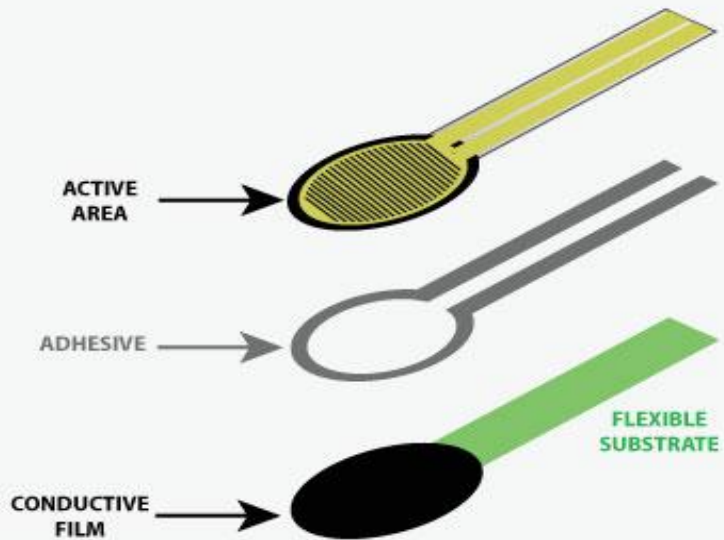
How do FSRs work

FSR (Force Sensing Resistor), Most engineers have learned that the formula for force is an object's mass multiplied by its acceleration (or, $F=M*A$), or, applied pressure multiplied by the contact area ($F=P*Area$). There are several engineering units to represent "F" in these equations, such as Newtons (N), pound-force (lbf), and others.

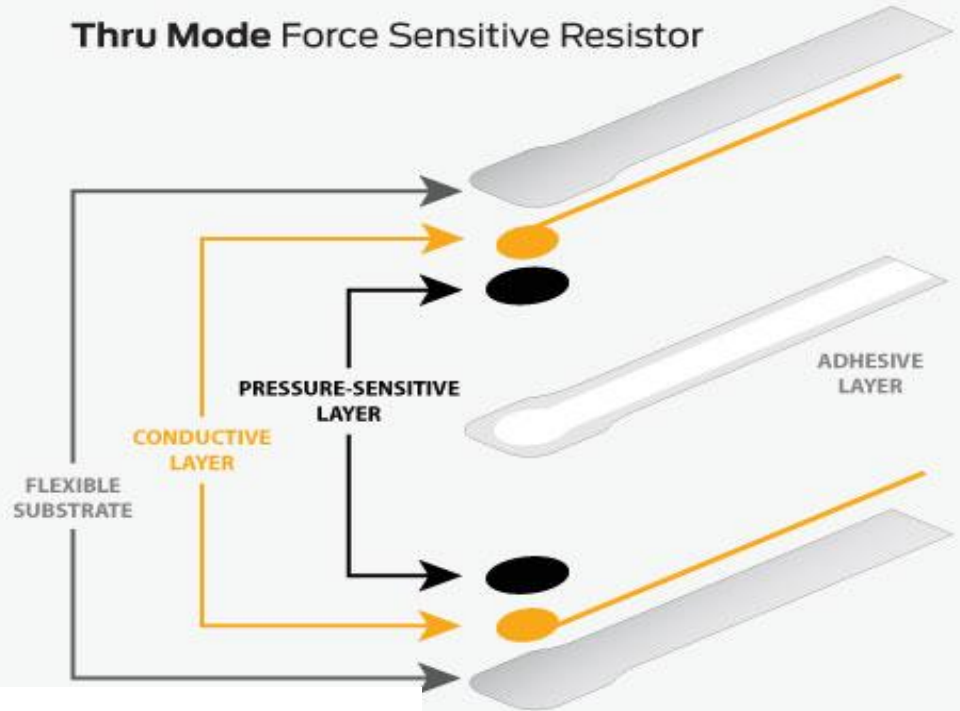
On their own, force sensing resistors are not pre-calibrated to correlate a force reading to a known engineering unit. However, the force measurement output captured by a force sensing resistor can be correlated to the applied force through a calibration procedure.

Force sensing resistors are a piezoresistive sensing technology. This means they are passive elements that function as a variable resistor in an electrical circuit. As shown in Figure, when unloaded, the sensor has a high resistance (on the order of Megaohms ($M\Omega$)) that drops as force is applied (usually on the order of Kiloohms ($K\Omega$)). When you consider the inverse of resistance (conductance), the conductance response as a function of force is linear within the sensor's designated force range.

Shunt Mode Force Sensitive Resistor



Thru Mode Force Sensitive Resistor



Working principal

How will FSR technology change our computing experience?

1. Measuring a relative change in force.
 2. Measuring pressure sensitivity
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1. Measuring rate of change in force.
 2. Contacting and/or touch.
 3. Force thresholds to trigger an action of any sort.