

Touch sensor simulation with QuickField



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https://quickfield.com/seminar/seminar_touch_sensors.htm



Touch sensors





Touch sensor simulation with QuickField



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QuickField Analysis Options

	Magnetostatics					
Magnetic analysis suite	AC Magnetics					
	Transient Magnetic					
Electric analysis suite	Electrostatics (2D,3D) and DC Conduction (2D,3D)					
	AC Conduction					
	Transient Electric field					
	Steady-State Heat transfer (2D,3D)					
Thermostructural analysis suite	Transient Heat transfer					
	Stress analysis					



MultiPhysics (2D)



Stresses & Deformations

https://quickfield.com/coupling.htm



QuickField API



https://quickfield.com/programming.htm



QuickField Difference



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Touch sensor capacitance



Problem specification:

Relative permittivity ϵ of dielectric is 4.7

Task:

Determine capacitance as a function of a distance between touch sensor and the conducting stylus.

https://quickfield.com/advanced/touch_sensor_capacitance.htm

Touch sensor capacitance

https://quickfield.com/advanced/touch_sensor_capacitance.htm

Capacitive touch sensor

Problem specification:

Relative permittivity ε of media: dielectric board 4.7 coating 4 *Tx* voltage +1V, *Rx* voltage 0V

<u>Task:</u>

Calculate capacitance with finger and without finger

https://quickfield.com/advanced/capacitive_touch_sensor.htm

Capacitive touch sensor

https://quickfield.com/advanced/capacitive_touch_sensor.htm

Touch sensor matrix

Problem specification:

Relative permittivity ϵ of media: dielectric board 4.3 dielectric film 2 glass 5 *Rx* voltage +1V, *Tx* voltage -1V

<u>Task:</u>

Calculate mutual capacitance between *T*x and *R*x electrodes

https://quickfield.com/advanced/touch_sensor_matrix.htm

Touch sensor matrix

https://quickfield.com/advanced/touch_sensor_matrix.htm

Touchless sensor

Problem specification:

Relative permittivity of dielectric $\varepsilon = 4.7$ *Tx* voltage +1V, *Rx* - floating, finger is grounded.

<u>Task:</u>

Calculate *Rx* electrodes potential for various finger positions..

https://quickfield.com/advanced/touchless_sensor.htm

Touchless sensor

Geometric Quantities				
Faces No.	1			
Area, m²	0.00425			
Physical Quantities				
Electric charge, C	4.2194e-13			
Average surface potential, V	0.91835			

Voltage U, V													
0.9100	0.9115	0.9130	0.9145	0.9160	0.9175	0.9190	0.9205	0.9220	0.9235	0.9250			

https://quickfield.com/advanced/touchless_sensor.htm

Inductive touch button

Problem specification:

Metal electrical conductivity 37 MS/m; Coil current I = 0.1 mA, frequency f = 8 MHz, Finger force F = 2 N; Metal foil thickness 0.25 mm, Young's modulus E = 70 GPa, Poisson's ratio v = 0.33.

<u>Task:</u>

Calculate the change in inductance value.

https://quickfield.com/advanced/inductive_touch_button.htm

Inductive touch button

https://quickfield.com/advanced/inductive_touch_button.htm

Touchscreen thickness is 0.1 mm

https://quickfield.com/advanced/touchscreen.htm

Touchscreen sensor

https://quickfield.com/advanced/touchscreen.htm

This recording is over

More recordings and simulation examples at www.quickfield.com

Your feedback is welcome: support@quickfield.com