ABOV SEMICONDUCTOR

Application Note

Capacitive Touch Design Guide

Version 1.02

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1 Introduction

This document describes contents that can be referred to when designing a hardware with capacitive touch sensor.

1. Basic principle of capacitive touch sensor.
2. Circuit Layout

2 Basic principle of capacitive touch sensor

1. 'Untouched' capacitance is composed of parasitic (Cp), electrode (Ce), and ground return capacitance (Cg).
2. 'Touched' capacitance increases the capacitance value by Ct than 'untouched' capacitance.
3. Parasitic capacitance (Cp) occur when two conductors with different voltage are close together. In circuits, unwanted capacitance exists inside parts, between parts, between lines, between parts and lines.
4. The sensitivity of the touch sensor depends on the capacitance the combination of Cp, Ce and Cg. The smaller this capacitance, the better the sensitivity. This is because 1 out of 10 feels 10 times bigger than 1 out of 100.
5. Therefore, it should be designed considering the location of parts and the length of the line.

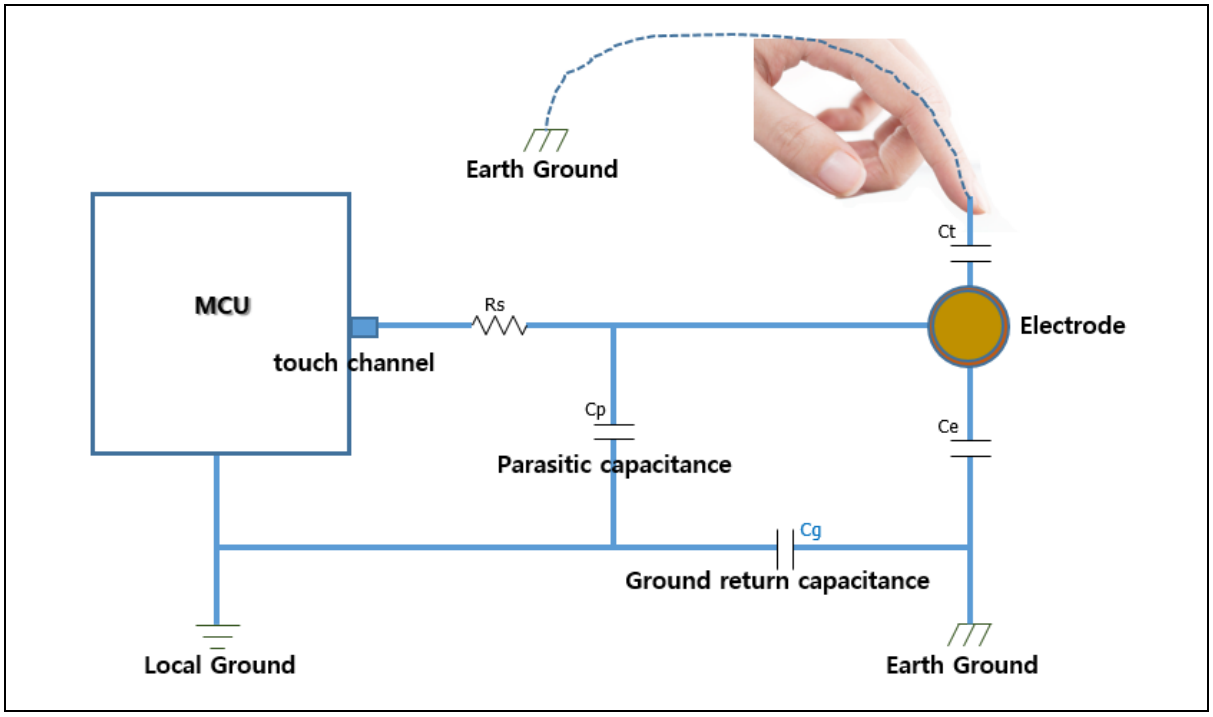

Figure 1. Equivalent Circuit

3 Circuit Layout

3.1 Component Placement

: ①, ②, ③ Place them close to the IC.

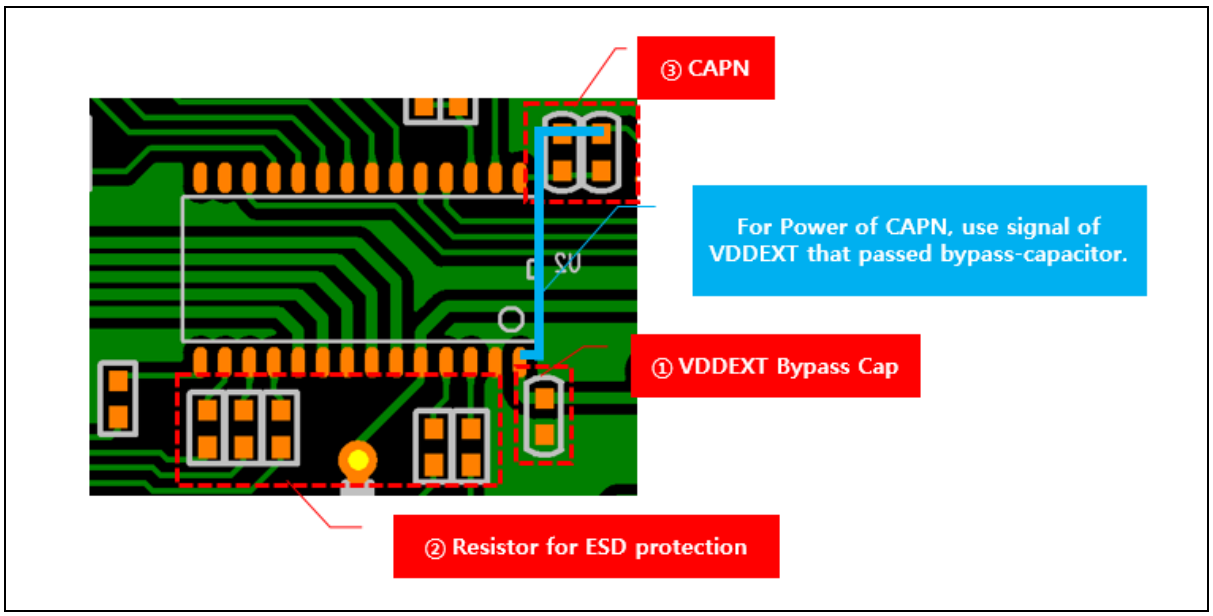

Figure 2. Clearance between touch PAD & GND

3.2 Routing Tips

1. Do not cross the I2C lines

   : If it unavoidable, vertical crossing is recommended.

2. Do not cross the LED control lines.

   : If it unavoidable, vertical crossing is recommended.

3. If the touch pattern goes parallel to the communication line, insert a ground pattern between the two.

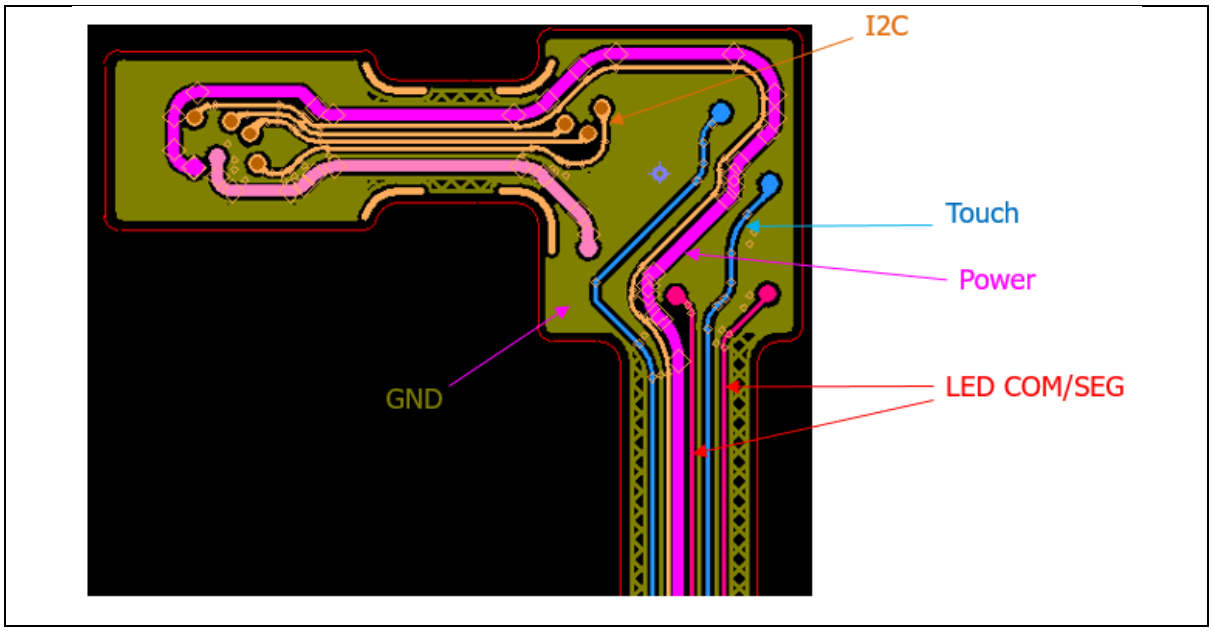

Figure 3. Clearance between touch PAD & GND

3.3 Clearance between touch PAD & GND

: 0.3mm ~ 1.0mm (0.4mm Recommended)

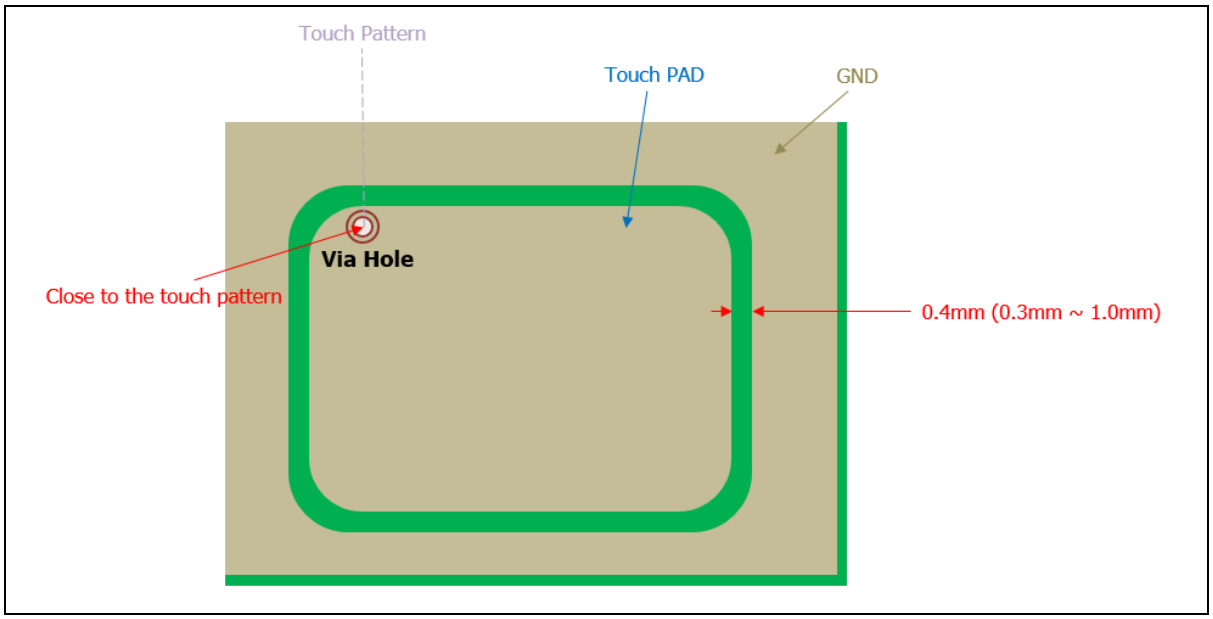

Figure 4. Clearance between touch PAD & GND

3.4 Clearance between Touch Pattern & GND

: PCB(FR4) - 0.15mm (min)

: FPCB – 0.08mm (min)

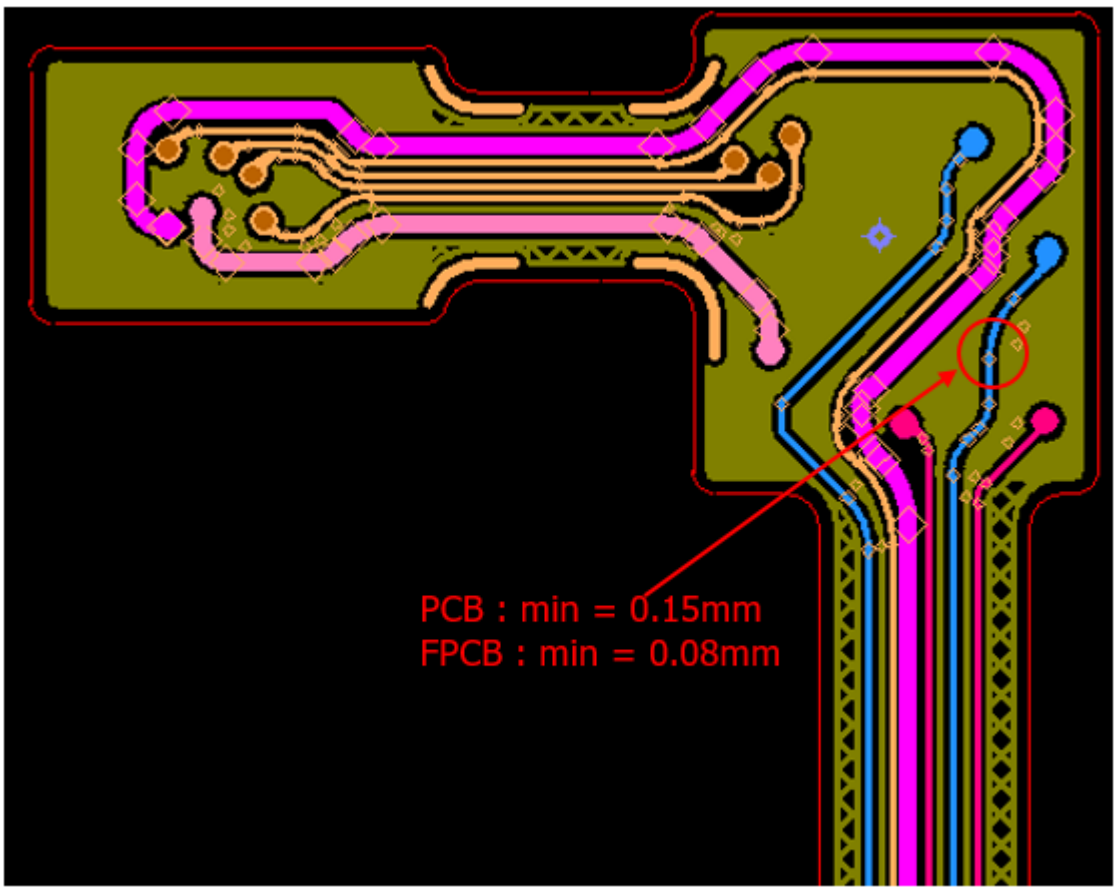

Figure 5. Clearance Touch Pattern & GND

3.5 Mesh Structure (GND Plane)

: Recommended for severe noise environments.

- Trace Width Max: 0.718mm
- Trace Pitch Max: 1.14mm

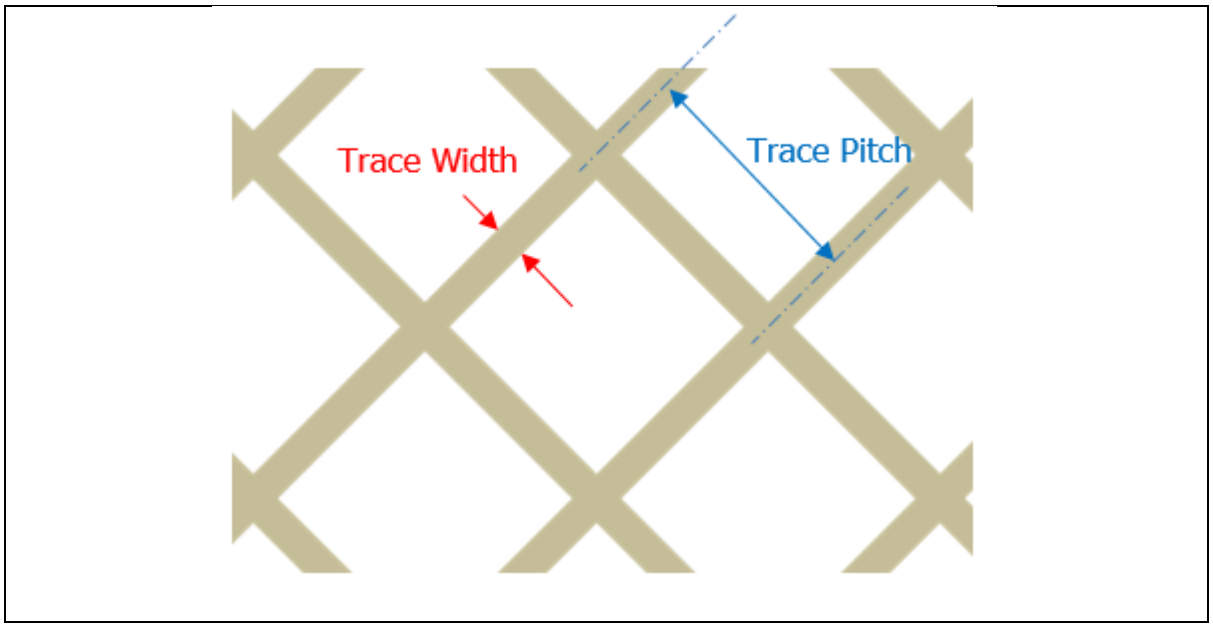

Figure 6. Mesh Structure

Revision history

Date	Revision	Description
20.04.10	1.00	Document created
22.11.01	1.01	Revised the font of this document
24.12.03	1.02	Updated the disclaimer.

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