

Case Design for Optimal Fingerprint Scanning and Optimal Auto-On™ Finger Detection

Applicable Models: SDU03x, SDU04x, SDOPP03x, SDOPP04, FDU04

The following application notes are highly recommended when designing your case to embed a SecuGen fingerprint module.

- Avoid recessed fingerprint platen
- Avoid interference with the touch chip sensor

Avoid recessed fingerprint platen

Make the glass contact surface (platen) of the fingerprint sensor **flush with the case** (Fig. 1) as much as possible and **not recessed** (Fig. 2) by making the case opening around the platen tapered.

This helps the finger contact the sensor with a larger contact area. A larger contact area is desirable because it ensures that a larger part of the fingerprint is scanned, which improves matching accuracy and lowers false rejection rates.

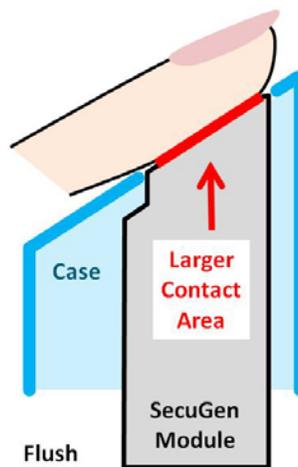


Fig. 1 Recommended.

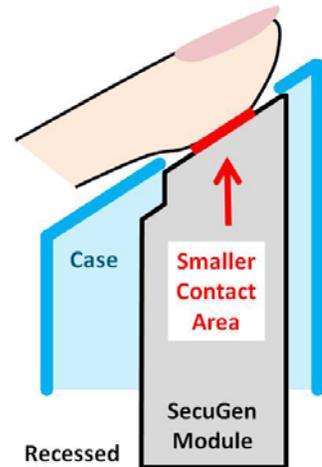


Fig. 2 Not recommended.

Avoid interference with the touch chip sensor

The housing should be designed to prevent interference from the external environment near the **critical touch chip sensing areas** (Fig. 3). These are the critical areas of the fingerprint module: the upper sides and upper rear of the module near the prism. The fingerprint module is designed with an Auto-On™ function in which a **touch chip sensor** detects the presence of a finger placed on the platen.

Due to the touch chip characteristics – its ability to detect anything with conductive or dielectric properties, SecuGen modules with Auto-On require special consideration when embedding into your devices.

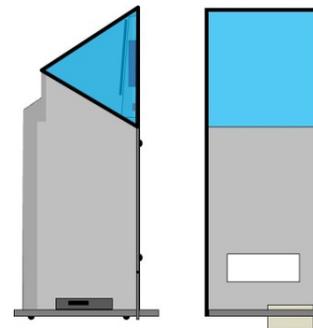


Fig. 3 Touch chip sensing areas in blue.

The main factors that can interfere with the touch chip sensor are:

- **Material used for mounting the module** – Do not use metal as a mounting bracket around the touch chip sensing area. The touch chip sensor is influenced by metal. If the touch chip sensing area of the module is located near metal, it may not work properly. If the mounting bracket is made of conductive material, it should be loose around the touch chip sensing area so that it does not interfere with the touch chip sensor.
- **Wiring around or near the touch chip sensor areas** – Do not place wires around the touch chip sensing area
- **RF cards and wireless devices near the module** – Do not place the fingerprint module near RF card or wireless devices
- **User behavior** – See User guidelines below for best results

How the touch chip sensor works

The touch chip sensor is located on the back of the fingerprint module and directly behind the glass prism (Fig. 4). The touch chip sensor is initialized when the main power is turned on. The touch chip sensor continually measures the input capacitance every second and compares it with a programmed default threshold value (i.e. a reference capacitance).

If the capacitance is higher than the threshold, the sensor will send the Auto-On™ signal to turn on the LED. If a finger is placed on the platen, the touch chip sensor will detect an increase in input capacitance; if it is higher than the threshold value, then the fingerprint will be captured.

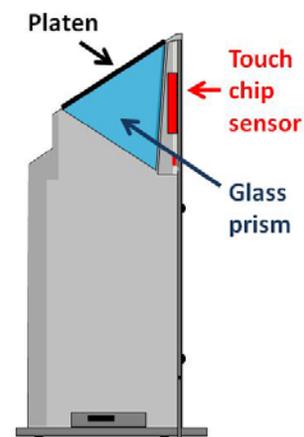


Fig. 4 Side view of SecuGen module.

Due to the fact that the touch chip sensor re-calibrates its threshold value every second, occasionally the threshold value could change due a variety of factors in the external environment. Such interfere with the touch chip sensor could cause it to temporarily not detect the presence of a finger on the platen.

User guidelines for Auto-On™

In addition to the physical environment, user behavior can sometimes interfere with the touch chip sensor. For example, if a user places his or her finger on the platen too lightly or slowly, this could cause the input capacitance to be lower than the threshold value, making the touch sensor re-calibrate and increase its threshold value. As a result, the touch sensor would not detect the finger.

For best results when scanning a fingerprint, the following is recommended.

1. Make sure the finger covers at least the middle of the platen (Fig. 5).
2. Place the finger firmly on the platen but not too slowly or too lightly. This could cause the touch chip sensor to recalibrate to a higher threshold value and not detect the finger.
3. Do not wrap fingers around the touch chip sensor areas. Do not grasp the back of the module near the touch chip sensor area.

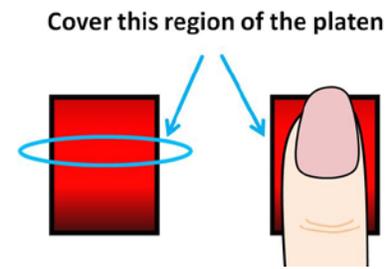


Fig. 5 The touch chip sensor is located below the glass prism, approximately near the middle of the platen. Place finger to cover the central region of the platen.

Troubleshooting:

If your finger is not detected when placed on the platen, remove your finger, wait for 5 seconds, and then try again. Wait 5 seconds to allow the touch chip sensor to reset the threshold value to default.