Capacitive Touch Switch Panel
Design Guide

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1. Basic Structure

*Panel Thickness (Reference only): 1.9 mm, 3.0 mm MAX. (Soda-lime Glass: 11.8mm)

2. Environmental Conditions

   Operating Temperature: -40 to +85 °C
   Strage Temperature: -40 to +85 °C
   Strage Humidity: 20 to 80 % RH (non-condensing)
   Vibration (non-operating): 10-55-10Hz, all amplitude 1mm, 30 minutes, X-Y-Z
   Shock (non-operating): 392m/s² (40G), 9ms X-Y-Z, 3 times each direction

3. Recommended Controller

<table>
<thead>
<tr>
<th>Controller</th>
<th>Maker</th>
</tr>
</thead>
<tbody>
<tr>
<td>R8C/3xT Series</td>
<td>Renesas Electronics Corp.</td>
</tr>
<tr>
<td>CY8C CapSense Series</td>
<td>Cypress Solutions Corp.</td>
</tr>
</tbody>
</table>

4. Aluminium Conductive Layer Resistance

   Aluminium line resistance: 18 Ω TYP (for line length 200 mm, width 0.3 mm, thickness 1 μm)

5. FPC Connector

   Lead pitch: 0.5 mm
   FPC length: 30 mm (Distance from edge of panel glass.)
   FPC coated thickness: 0.1 mm
   FPC lead tip thickness: 0.3 mm

Recommended connector: FH12A-20S-0.5SH(55) / HIROSE ELECTRIC CO., LTD
6. Panel Unit Dimensions
The panel unit price depends on panel numbers per sheet. Each panel unit is cut from a Basic Work Sheet as shown below.

- e.g.
  100 x 65 mm unit size
  = 10 units / sheet

- Multiple size panels on one work sheet are not possible.
7. Basic Work Sheet

Size: 350 × 260 mm
Usable size: 330 × 240 mm
Thickness: 1.8 mm (STD) or 2.3 mm or 2.8 mm

Base Work Sheet Size (350 × 260 mm)
8. Colour Variation

<table>
<thead>
<tr>
<th>Mask and Frame</th>
<th>Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Transparent (Back light suitable)</td>
</tr>
<tr>
<td>Mirror</td>
<td>○ (Photo 1)</td>
</tr>
<tr>
<td>Black</td>
<td>○ (Photo 2)</td>
</tr>
<tr>
<td>Mirror and Black combination</td>
<td>○ (Photo 3)</td>
</tr>
</tbody>
</table>

9. Number of Switches

| Number of FPC | Maximum number of Switches | Remarks                                                                 |
|---------------|-----------------------------|-------------------------------------------------------------------------|---|
| 1             | 19                          | Practical maximum number of switches also depends on panel unit size.     |---|
| 2             | 39                          |                                                                         |---|
10. Pattern Rules

10.1. Recommended Conditions

Switch pad size (area) : 10 × 10 mm minimum, larger than 15 × 15 mm is recommended.
(The switch pad can be any shape)

Gap between switch pads : 5.0 mm MIN
Gap between switch pad and line : 2.0 mm MIN

Line width : 0.2 ~ 0.3 mm

10.2. Pattern Design

Any pattern design may be used within the switch pad area.
(However, using a large proportion for transparent area may impede switch function.)

Example: "Itron" LED backlight transparent pattern on switch pad.

Island pattern may impede switch function.

Recommended pattern design

- Line Width: 20 μm MIN
10.3. Other Conditions

The surrounding unusable space size varies with the number of switches.
※Tentative values, for reference only.

<table>
<thead>
<tr>
<th>Number of switches / Usable space</th>
<th>~ 5</th>
<th>6 ~ 10</th>
<th>11 ~ 15</th>
<th>16 ~ 19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unusable space width [Unit: mm]</td>
<td>6.0 MIN</td>
<td>9.0 MIN</td>
<td>12.0 MIN</td>
<td>15.0 MIN</td>
</tr>
</tbody>
</table>

FPC position is flexible (consult us).

11. Other Options

11.1. Illumination Pattern

- Glass diffusion material for backlight can be used if necessary. (Diffusion Layer)
Cautions
Handling

- Glass edges and corners may be sharp. If shock is applied, the edges and corners can break easily, which can cause injury due to broken glass fragments. Wear gloves, etc, and exercise appropriate caution.

- Ensure correct front and back orientation of the panel.

- Do not pull on the FPC, or lift the panel with the FPC, as this may damage the FPC connection point.

- Use gloves or fingerstalls etc, to avoid causing fingerprints or stains on the panel.

Operation

- Touch panel only with finger or touch-panel stylis (normal polyester type), and not with any other objects. In particular, avoid touching with hard-tipped objects such as ball-point pens, which could cause malfunction or damage.

Product assembly

- Ensure product case or housing does not apply excessive stress or cause warping to the panel.

- FPC connection is fragile, so avoid pulling, or stress that could cause kinking, etc.

- The panel is a glass product, so particular caution with regards to vibration and shock is necessary. Ensure mounting is firm and cannot become loose.

- To avoid incorrect operation, ensure there are no burrs on the edge of the product case or housing. Also, ensure that the edge of the product case or housing is clear of the switch area.

- If FPC connection point or tip becomes wet due to condensation etc, faults due to migration short-circuit may occur.
## Revision Note

<table>
<thead>
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<th>Revision No.</th>
<th>Date</th>
<th>Note</th>
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<tbody>
<tr>
<td>-00</td>
<td>Jan. 16, 2013</td>
<td>Initial issue</td>
</tr>
<tr>
<td>-01</td>
<td>Feb. 04, 2014</td>
<td>Clarification</td>
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