These parts have corresponded with the RoHS directive.

MODEL No. LQ057V3DG02

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ENGINEERING DEPARTMENT
MOBILE LIQUID CRYSTAL DISPLAY DIVISION III
MOBILE LIQUID CRYSTAL DISPLAY GROUP
SHARP CORPORATION
## RECORDS OF REVISION

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<td>DEC. 10, 2007</td>
<td>–</td>
<td>1st Issue</td>
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1 Applicable TFT-LCD module
This specification applies to the color TFT-LCD module, LQ057V3DG02.

2 Overview
This module is a color active matrix transmissive LCD module incorporating amorphous silicon TFT (Thin Film Transistor).
It is composed of a color TFT-LCD panel, driver ICs, control circuits and power supply circuitry and a backlight unit. Graphics and texts can be displayed on a 640 x RGB x 480 dots panel with 262,144 colors by feeding 18 bit data signal (6bit/each of R,G,B), 4(four) timing signals, +3.3V DC power supply for TFT-LCD and AC power supply for backlight.

- Fine images with stripe aligned 307,200 pixels on 5.7 inch diagonal screen
- Color display capability of 262,144 colors with 18 bit data signal(6 bits for each RGB)
- Adapting a wide viewing angle technology [best viewing angle: 12 o’clock direction]
  (6 o’clock direction is also available by the function to flip the screen horizontally or vertically)
- High contrast, thanks to active matrix drive system
- AG(Anti Glare) polarizing filter
- Light and slim compact module achieved by COG assemble technology
- Natural coloring reproducibility by employing normally-white-mode, which has good nature in coloring
- Image inversion both horizontally and vertically
- LED drive circuit is built in this module to provide PWM Dimmer function.

3 Mechanical Specifications

<table>
<thead>
<tr>
<th>items</th>
<th>specifications</th>
<th>unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display size (Diagonal)</td>
<td>14.4 (5.7&quot;)</td>
<td>cm</td>
</tr>
<tr>
<td>Active display area</td>
<td>115.2 (H) x 86.4 (V)</td>
<td>mm</td>
</tr>
<tr>
<td>Pixel format</td>
<td>640(H) x RGB x 480(V)</td>
<td>dot</td>
</tr>
<tr>
<td></td>
<td>(1 pixel=R+G+B dots)</td>
<td>-</td>
</tr>
<tr>
<td>Pixel pitch</td>
<td>0.18[H] x 0.18[V]</td>
<td>mm</td>
</tr>
<tr>
<td>Pixel configuration</td>
<td>R,G,B vertical stripe</td>
<td>-</td>
</tr>
<tr>
<td>LCD mode</td>
<td>Normally white</td>
<td>-</td>
</tr>
<tr>
<td>Dimension *</td>
<td>144 (W) x 104.6 (H) x 12.3(D)</td>
<td>mm</td>
</tr>
<tr>
<td>Mass</td>
<td>TBD (max)</td>
<td>g</td>
</tr>
</tbody>
</table>

* Protrusion such as backlight harness and positioning boss are not included.
Fig.1 shows dimensions of the module.
## Input Signal Assignment

### 4.1 TFT-LCD Panel driving section

Employed connector: IMSA-9637S-33Y902 (IRISO ELECTRONICS CO., LTD.)

**Terminal:** 0.5mm pitch, bottom contact, Au plating

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Symbol</th>
<th>Function</th>
<th>Polarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CK</td>
<td>Clock signal for sampling each data signal</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Hsync</td>
<td>Horizontal synchronous signal</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Vsync</td>
<td>Vertical synchronous signal</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>R0</td>
<td>RED data signal (LSB)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>R1</td>
<td>RED data signal</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>R2</td>
<td>RED data signal</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>R3</td>
<td>RED data signal</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>R4</td>
<td>RED data signal</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>R5</td>
<td>RED data signal (MSB)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>GND</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>G0</td>
<td>GREEN data signal (LSB)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>G1</td>
<td>GREEN data signal</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>G2</td>
<td>GREEN data signal</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>G3</td>
<td>GREEN data signal</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>G4</td>
<td>GREEN data signal</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>G5</td>
<td>GREEN data signal (MSB)</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>GND</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>B0</td>
<td>BLUE data signal (LSB)</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>B1</td>
<td>BLUE data signal</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>B2</td>
<td>BLUE data signal</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>B3</td>
<td>BLUE data signal</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>B4</td>
<td>BLUE data signal</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>B5</td>
<td>BLUE data signal (MSB)</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>TEST1</td>
<td>TEST1 (Please be sure to connect 26pin with ground)</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>ENAB</td>
<td>Data enable signal (signal to settle the horizontal display position)</td>
<td>[Note 1]</td>
</tr>
<tr>
<td>28</td>
<td>Vcc</td>
<td>+3.3V power supply (Supply same voltage to 28 and 29 pin)</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Vcc</td>
<td>+3.3V power supply</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>R/L</td>
<td>Selection signal for horizontal scanning direction (“L”: Normally, “H”: Right-and-Left reversal)</td>
<td>[Note 2]</td>
</tr>
<tr>
<td>31</td>
<td>U/D</td>
<td>Selection signal for vertical scanning direction (“H”: Normally, “L”: Up-and-Down reversal)</td>
<td>[Note 2]</td>
</tr>
<tr>
<td>32</td>
<td>TEST2</td>
<td>TEST2 (to be fixed to “High”)</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>TEST3</td>
<td>TEST3 (Please be sure to connect 33pin with ground)</td>
<td></td>
</tr>
</tbody>
</table>

The back shield case is internally grounded to GND of the module.

The front shield case is not certainly grounded to GND of the module.

**[Note 1]**

The horizontal display location is designated and controlled by rising timing of ENAB signal.

However if ENAB signal is fixed to “Low”, display location is designated by the default setting in the module.

(Don’t use the module by fixing ENAB to “High”) …..See: Chapter 7-2
4.2 LED drive circuit section

Employed connector: SM06B-SRSS-TB(LS) (SN)  (JST:0.5mm pitch)
Adapted connector: SHR-06V-S-B  · SHR-06V-S  (JST)

<table>
<thead>
<tr>
<th>Pin no.</th>
<th>Symbol</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>V_{LED}</td>
<td>LED drive circuit power supply (12V)</td>
</tr>
<tr>
<td>2</td>
<td>V_{LED}</td>
<td>LED drive circuit power supply (12V)</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>5</td>
<td>PWM</td>
<td>PWM Dimmer</td>
</tr>
<tr>
<td>6</td>
<td>LEDO</td>
<td>LED OPEN[ normal:High(5V), open error:Low ]</td>
</tr>
</tbody>
</table>

5 Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>Ratings</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>Vcc</td>
<td>Ta=25°C</td>
<td>0 ~ +4.6 Vcc</td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td>LED drive circuit supply voltage</td>
<td>Vcc</td>
<td>Ta=25°C</td>
<td>-0.3 ~ +35</td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td>Input signal voltage</td>
<td>V_i</td>
<td>Ta=25°C</td>
<td>-0.3 ~ + Vcc+0.3</td>
<td>V</td>
<td>[Note 1]</td>
</tr>
<tr>
<td>PWM Dimmer signal voltage</td>
<td>V_{PWM}</td>
<td>Ta=25°C</td>
<td>- 0.3 ~ +6</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>Tstg</td>
<td>-</td>
<td>TBD</td>
<td>°C</td>
<td>[Note 2]</td>
</tr>
<tr>
<td>Operating temperature (Panel surface)</td>
<td>Topp</td>
<td>-</td>
<td>TBD</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>

[Note 1] CK, R0 ~ R5, G0 ~ G5, B0 ~ B5, Hsync, Vsync, ENAB, R/L, U/D
[Note 2] Humidity: Less than 95%RH at Ta ≤ 40°C and
Maximum wet-bulb temperature must not exceed 39°C at Ta>40°C,
with no condensation.
6 Electrical characteristics

6.1 TFT-LCD Panel driving section

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>Unit</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>Vcc</td>
<td>+3.0</td>
<td>+3.3</td>
<td>+3.6</td>
<td>V</td>
<td>[Note1]</td>
</tr>
<tr>
<td>Current dissipation</td>
<td>Icc</td>
<td>-</td>
<td>(220)</td>
<td>-</td>
<td>mA</td>
<td>[Note2] VCC=3.3V</td>
</tr>
<tr>
<td>Allowed input ripple voltage</td>
<td>VRF</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>mV p-p</td>
<td>VCC=3.3V</td>
</tr>
<tr>
<td>Input voltage (“Low” state)</td>
<td>VIL</td>
<td>0</td>
<td>-</td>
<td>0.3Vcc</td>
<td>V</td>
<td>[Note3]</td>
</tr>
<tr>
<td>Input voltage (“High” state)</td>
<td>VIH</td>
<td>0.7Vcc</td>
<td>-</td>
<td>Vcc</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Input leakage current (low)</td>
<td></td>
<td>-</td>
<td>-</td>
<td>4.0</td>
<td>μA</td>
<td>$V_i=0V$[Note4]</td>
</tr>
<tr>
<td>Input leakage current (High)</td>
<td></td>
<td>-</td>
<td>-</td>
<td>4.0</td>
<td>μA</td>
<td>$V_i=3.3V$[Note5]</td>
</tr>
</tbody>
</table>

[Note1] Vcc turn-on/off conditions

1s < $t_0$

Vcc-dip conditions

1) At 2.7V $\leq$ Vcc $< 3.0V$

$t_d \leq 10ms$

2) At Vcc $< 2.7V$

Vcc dip conditions should also follow
the Vcc turn-on/off conditions

[Note2] Current dissipation (Typ.): When Black pattern is displayed.
[Note3] CK, R0–R5, G0–G5, B0–B5, Hsync, Vsync, ENAB, R/L, U/D
[Note4] R0–R5, G0–G5, B0–B5, Hsync, Vsync and ENAB
[Note5] R/L, U/D
6-2 Vcc turn-on/off conditions

Every Signal is CMOS Input, Hi-Z is prohibited when VCC is on level.
Please avoid the input of the signal voltage more than Supply voltage (VCC).

<table>
<thead>
<tr>
<th></th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>t1</td>
<td>0</td>
<td>-</td>
<td>10</td>
<td>ms</td>
</tr>
<tr>
<td>t2</td>
<td>0</td>
<td>-</td>
<td>50</td>
<td>ms</td>
</tr>
<tr>
<td>t3</td>
<td>0</td>
<td>-</td>
<td>100</td>
<td>ms</td>
</tr>
</tbody>
</table>

6-3 LED drive circuit section

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>Unit</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage</td>
<td>V_{LED}</td>
<td>11.2</td>
<td>12.0</td>
<td>12.6</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Current dissipation</td>
<td>I_{LED}</td>
<td>-</td>
<td>(300)</td>
<td>-</td>
<td>mA</td>
<td>V_{LED} = 12.0V</td>
</tr>
<tr>
<td>Dimmer signal Low voltage</td>
<td>V_{PWM,L}</td>
<td>-</td>
<td>-</td>
<td>0.2</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Dimmer signal High voltage</td>
<td>V_{PWM,H}</td>
<td>1.4</td>
<td>5.0</td>
<td>(12)</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Dimmer frequency</td>
<td>f_{PWM}</td>
<td>-</td>
<td>120</td>
<td>-</td>
<td>Hz</td>
<td></td>
</tr>
<tr>
<td>PWM Pulse width</td>
<td>T_{PWM_H}</td>
<td>(10)</td>
<td>-</td>
<td>-</td>
<td>μs</td>
<td>High period</td>
</tr>
<tr>
<td>LED OPEN voltage (normal)</td>
<td>V_{LEDO,H}</td>
<td>(4.5)</td>
<td>5.0</td>
<td>(5.5 )</td>
<td>V</td>
<td>@I_{LEDO,H} = 1μA</td>
</tr>
<tr>
<td>LED OPEN voltage (error)</td>
<td>V_{LEDO,L}</td>
<td>0</td>
<td>-</td>
<td>(0.3 )</td>
<td>V</td>
<td>@I_{LEDO,L} = 50μA</td>
</tr>
</tbody>
</table>

PWM Dimmer function

- PWM Dimmer function can be available by input PWM pulse into a PWM terminal and changing the duty ratio of Hi/Lo.
  ( PWM = High : ON , PWM = Low : OFF )
- Please do not make the PWM terminal in a floating state (no input state).
  Please be connected to the GND at the waiting time.
- Please input PWM signal after V_{LED}(12V) is supplied.
- Please turn off V_{LED}(12V) after PWM signal is stopped.
Timing Characteristics of Input Signals

Timing diagrams of input signal are shown in Fig.2.

7.1 Timing Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>Unit</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clock</td>
<td>(1/T_c)</td>
<td>24.3</td>
<td>25.2</td>
<td>26.54</td>
<td>MHz</td>
<td></td>
</tr>
<tr>
<td>“High” time</td>
<td>(T_{ch})</td>
<td>10</td>
<td></td>
<td></td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>“Low” time</td>
<td>(T_{cl})</td>
<td>10</td>
<td></td>
<td></td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Data</td>
<td>Setup time</td>
<td>Tds</td>
<td>5</td>
<td></td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hold time</td>
<td>Tdh</td>
<td>5</td>
<td></td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Hsync</td>
<td>Period</td>
<td>TH</td>
<td>31.75</td>
<td></td>
<td>(\mu)s</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>780</td>
<td>800</td>
<td>820</td>
<td>\pm 20(\mu)s</td>
</tr>
<tr>
<td>Vsync</td>
<td>Period</td>
<td>TV</td>
<td>520</td>
<td>525</td>
<td>530</td>
<td>line 60Hz</td>
</tr>
<tr>
<td></td>
<td>Pulse width</td>
<td>TVp</td>
<td>2</td>
<td></td>
<td>519</td>
<td>line</td>
</tr>
<tr>
<td>Horizontal display period</td>
<td>THd</td>
<td>640</td>
<td></td>
<td></td>
<td>clock</td>
<td></td>
</tr>
<tr>
<td>Phase difference between Hsync and clock</td>
<td>THc</td>
<td>5</td>
<td></td>
<td>Tc-10</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Phase difference between Hsync and Vsync</td>
<td>TVh</td>
<td>0</td>
<td></td>
<td>50</td>
<td>clock</td>
<td></td>
</tr>
<tr>
<td>Vertical back porch</td>
<td>TVs</td>
<td>34(fixed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical front porch</td>
<td>TVf</td>
<td>6</td>
<td>16</td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td>Vertical display period</td>
<td>TVd</td>
<td>480</td>
<td></td>
<td></td>
<td>line</td>
<td></td>
</tr>
</tbody>
</table>

Note) In case of lower frequency, the deterioration of display quality, flicker etc., may occur.

★TVf = TV – TVs(34) – TVd(480)

7.2 Display Position in horizontal direction

Display position in horizontal direction is designated by rising timing of ENAB signal.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>Unit</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENAB signal</td>
<td>Setup time</td>
<td>Tes</td>
<td>5</td>
<td></td>
<td>Tc-10</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td>Pulse width</td>
<td>Tep</td>
<td>–</td>
<td>640</td>
<td>–</td>
<td>\pm 10(\mu)s</td>
</tr>
<tr>
<td></td>
<td>Phase difference between Hsync and ENAB signal</td>
<td>THc</td>
<td>44</td>
<td></td>
<td>104</td>
<td>clock</td>
</tr>
</tbody>
</table>

When ENAB is fixed to “Low”, the horizontal display will start from the clock C104 (clock) as shown in Fig.2.

7.3 Display position in vertical direction

Display start position in vertical direction TVs is fixed to the 34th line.

8 Input Signals, Basic Display Colors and Gray Scale of Each Color.

Display position of input data

![Diagram of display position]

UP

B G R

SHARP
Each basic color can be displayed in 64 gray scales from 6 bit data signals. According to the combination of total 18 bit data signals, the 262,144-color display can be achieved on the screen.
The optical specifications are measured 30 minutes after turning on and in a dark room or equivalent condition, according to the method shown in Fig.9-1, 2 below.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewing angle Range</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horizontal</td>
<td>021,022</td>
<td>CR≥5</td>
<td>-</td>
<td>(80)</td>
<td>-</td>
<td>° (Deg.)</td>
<td>[Note9-1,4]</td>
</tr>
<tr>
<td>Vertical</td>
<td>011</td>
<td></td>
<td>-</td>
<td>(80)</td>
<td>-</td>
<td>° (Deg.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>012</td>
<td></td>
<td>-</td>
<td>(70)</td>
<td>-</td>
<td>° (Deg.)</td>
<td></td>
</tr>
<tr>
<td>Contrast ratio</td>
<td>CR max</td>
<td>Best viewing angle</td>
<td>(200)</td>
<td>(600)</td>
<td>-</td>
<td>-</td>
<td>[Note9-2]</td>
</tr>
<tr>
<td>Response time</td>
<td>Rise</td>
<td>θ = 0°</td>
<td>-</td>
<td>(8)</td>
<td>(20)</td>
<td>ms</td>
<td>[Note9-3]</td>
</tr>
<tr>
<td></td>
<td>Fall</td>
<td>θ = 0°</td>
<td>-</td>
<td>(21)</td>
<td>(40)</td>
<td>ms</td>
<td></td>
</tr>
<tr>
<td>Chromaticity of white</td>
<td>x</td>
<td>θ = 0°</td>
<td>-</td>
<td>(0.313)</td>
<td>-</td>
<td>-</td>
<td>[Note9-4]</td>
</tr>
<tr>
<td></td>
<td>y</td>
<td>θ = 0°</td>
<td>-</td>
<td>(0.329)</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Luminance</td>
<td>Y</td>
<td></td>
<td>-</td>
<td>(400)</td>
<td>-</td>
<td>cd/m²</td>
<td></td>
</tr>
</tbody>
</table>

The optical specifications are measured 30 minutes after turning on and in a dark room or equivalent condition, according to the method shown in Fig.9-1, 2 below.

Fig.9-1 Measuring setup for Viewing angle and Contrast ratio
(BM-5A is used for contrast.)

Fig.9-2 Measuring setup for Luminance, Chromaticity and Response time
(BM-7 is used for Luminance, SR-1 is for response)
[Note9-1] Definitions of viewing angle range:

The best viewing angle of this module is slightly leaned to 12 o’clock from normal line.
Where $\theta_{11} > \theta_{\text{max}}$, gray scale is reversed partially.
Where $\theta_{11} < \theta_{\text{max}}$, or in $\theta_{12}$ direction, gray scale isn’t reversed.

[Note9-2] Definition of contrast ratio:

The contrast ratio is defined as the following.

$$\text{Contrast Ratio (CR)} = \frac{\text{Central luminance(brightness) with all pixels white}}{\text{Central luminance(brightness) with all pixels black}}$$

[Note9-3] Definition of response time:

The response time is defined as the following figure and shall be measured by switching the input signal between "black" and "white" alternatively.

[Note9-4] This parameter should be measured at the center of the screen and 30 minutes after turn-on. The characteristics are measured when the driver circuit is not powered.
10 Display Qualities
Please refer to the Outgoing Inspection Standard.

11 Handling Instruction
11.1 Assembling the module
1) The TFT-LCD module is designed to be mounted on equipment using the mounting tabs in the four corners of the module at the rear side. On mounting the module, as the nominal diameter 3.0mm tapping screw (fastening torque is 0.25 through 0.30 N·m) is recommended, be sure to fix the module on the same plane, taking care not to wrap or twist the module. The depth of tapping screw embedded into LCD module must be less than 5mm.

The pressing module, (ex. touching switch etc.) causes disordered image. So taking care for pressure not to conduct directly to LCD module.

2) Please power off the module before you connect or disconnect input connector.

11.2 Precautions in mounting
1) Polarizer which is made of soft material and susceptible to flaw must be handled carefully.
2) Method of removing dust from polarizer.
   • Blow off dust with N2 blower for which static electricity preventive measure has been taken.
   • Since the polarizer is easily damaged, wiping should be avoided. If the panel has stain or finger grease, we recommend to use adhesive tape to softly remove them from the panel.
   Inevitable, wipe off by cleaning cloth for a lens with carefully, breathing on it.
3) When metal part of the TFT-LCD module (shielding lid and rear case) is soiled, wipe it with soft dry cloth. For stubborn dirties, wipe the part, breathing on it.
4) Wipe off water drop or finger grease immediately. Long contact with water may cause discoloration or spots.
5) TFT-LCD module uses glass which breaks or cracks easily if dropped or bumped on hard surface handle with care.
6) Since CMOS LSIs are incorporated in this module, take care of electrostatic and earth human body while handling.
11.3 Caution in product design

The notes and cautions below should be followed when product is designed with this module.

The module should be protected with cover to prevent salt content and/or water droplet.

Take enough shielding countermeasure not to interfere to peripheral electronic device.

11.4 Others

• The LCD has the nature that its performance is degradation by ultra-violet light. Don’t leave the LCD module in direct sunlight or strong ultra violet ray.

• If stored at the temperatures lower than the rated storage temperature, the LC may freeze and it may cause LCD panel damage. If storage temperature exceeds the specified rating, the molecular orientation of the LC may change to that of a liquid, and they may not revert to their original state. Store the module in normal room temperature.

• The inductive loss caused by routing of lamp lead wire, which is closed to conductive section, may require the kick-off voltage greater than specified kick-off voltage.

• The liquid crystal may leak out when the LCD is broken. If the liquid crystal drip into the eyes or mouth washes it out immediately.

• Avoid the Device to use and leave in the atmosphere described below:

  Condensation and/or the high concentration of corrosive gases.

• The caution to other ordinal electronic component should be followed also.
# Reliability Test Items

<table>
<thead>
<tr>
<th>No.</th>
<th>Test parameter</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High temperature storage test</td>
<td>Leaves the module at $T_a = \text{TBD}^\circ \text{C}$ for 240h</td>
</tr>
<tr>
<td>2</td>
<td>Low temperature storage test</td>
<td>Leaves the module at $T_a = \text{TBD}^\circ \text{C}$ for 240h</td>
</tr>
<tr>
<td>3</td>
<td>High temperature &amp; high humidity operation test</td>
<td>Operates the module at $T_a = 40^\circ \text{C}$; 90~95%RH for 240h (No condensation)</td>
</tr>
<tr>
<td>4</td>
<td>High temperature operation test</td>
<td>Operates the module with $\text{TBD}^\circ \text{C}$ at panel surface for 240h</td>
</tr>
<tr>
<td>5</td>
<td>Low temperature operation test</td>
<td>Operates the module at $T_a = \text{TBD}^\circ \text{C}$ for 240h</td>
</tr>
<tr>
<td>6</td>
<td>Strength against ESD</td>
<td>$\pm200\text{V} \cdot 200\text{pF} [0\text{[0]}]$ one time for each terminal</td>
</tr>
</tbody>
</table>
| 7   | Shock test (non-operating) | Max. acceleration : 980m/s$^2$  
Pulse width : 6ms, half sine wave  
Direction : $\pm X, \pm Y, \pm Z$  

one time for each direction. |
| 8   | Vibration test (non-operating) | Frequency : 10~57Hz/Vibration width (one side):0.15mm  
: 57~500Hz/acceleration:19.6m/s$^2$  
Sweep time : 6 minutes  
Test period : 3 hours  
(1 hour for each direction of X,Y,Z) |
| 9   | Thermal shock test | $\text{TBD}^\circ \text{C} \sim \text{TBD}^\circ \text{C}$ /50 cycle  
[0.5h] [0.5h] |

[Result Evaluation Criteria]

Under the display quality test conditions with normal operation state, these shall be no change which may affect practical display function.

[Note] The directions of X, Y, Z are defined as below:

![Diagram of X, Y, Z directions](image)
13 Packing Form

13.1 Fig.3 shows packaging form. TBD

13.2 Carton stock conditions
   a) Maximum number of Carton being stuck: Max. TBD cartons
   b) Maximum number of product contained: TBD Unit
   c) Carton size: TBD mm(W)×TBD mm(H)×TBD mm(D)
   d) Total mass : TBD kg
   e) Carton stock environment:
      1) Temperature: 0 ~ 40°C
      2) Humidity: Up to 60%RH
      3) Ambiance: No gases bite into electronic components and wiring materials
      4) Period: Approximately 3month
      5) Unpacking: To prevent LCD module from damaging by ESD, unpack the module with effective measure after controlling humidity 50%RH or more.

14 Marking of product name

1. Serial No. indication
   Serial No. is indicated by labeling. The location is given in Fig.1 Outline dimension.
   Indicated contents: LQ057V3DG02 7X000001X
   Model name Serial No.

   Serial No. contents
   1st digit: last digit of produced year (ex. 2007 → “7”)
   2nd digit: Produced month 1, 2, 3 ~ 9, X, Y, Z
   3rd ~ 8th digit: Sequential number 000001 ~
   9th digit: Interoffice control code
   (There is it in the case of the blank.)

2. Don’t disassemble this module, it may cause malfunction.
3. Image retention may occur when the fixed image is display for long time.
4. Liquid crystal panel drive input FFC/FPC specification
   • Refer to the one that the size of FFC/FPC was recommended it of input connector.
     [IMSA-9637S-33Y902(IRISO ELECTRONICS CO.,LTD.), 33pin 0.5mm pitch]
   • The terminal of FFC/FPC of input connector recommend gold or gold plating specification.
     Because point of contact with its is gold plating specification.
1) Take care in set design to hide the scratches and bubbles appeared on the polarizer or other flame area which is located outside of active area.
2) CN1: I/O connector is MCPA-9627S-33782 (INEO ELECTRICS CO., LTD)
   CN2: connector is SMB5B-5R5S-TB (LF) (SMT Mfg. Co., Ltd)
3) The whole curvature is not inclined thickness direction.
4) Recommendetion screw is normal size 3mm tapping amount of invation 5mm.
5) General tolerance is ±0.5mm.