**INNOLUX DISPLAY CORPORATION**

**MT170EN01 V.A LCD MODULE SPECIFICATION**

( ) Preliminary Specification  
(●) Final Specification

<table>
<thead>
<tr>
<th>Customer</th>
<th>Checked &amp; Approved by</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pagani · 3/1/06</td>
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<tr>
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<tr>
<td>MKT</td>
<td>QRA</td>
<td>PD</td>
</tr>
<tr>
<td>2/14</td>
<td>3/9/06</td>
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Date: 2006-3-10

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<table>
<thead>
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<th>Revise Date</th>
<th>Page</th>
<th>Content</th>
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<tr>
<td>01</td>
<td>2005-12-26</td>
<td>1</td>
<td>First edition to all. Change spec. of weight and brightness(center) and response time</td>
</tr>
<tr>
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<td></td>
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<td>6</td>
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<tr>
<td></td>
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<tr>
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<td></td>
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<td></td>
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## 4 General specification

<table>
<thead>
<tr>
<th>NO.</th>
<th>Item</th>
<th>Specification</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Display resolution (pixel)</td>
<td>1280(H) X 1024(V), SXGA resolution</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Active area (mm)</td>
<td>337.9(H) X 270.3(V)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Screen size (inch)</td>
<td>17 inches diagonal</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Pixel pitch (mm)</td>
<td>0.264(H) X 0.264(V)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Color configuration</td>
<td>R, G, B vertical stripe</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Overall dimension (mm)</td>
<td>358.5(W)x296.5(H)x17.5 (D) Max</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Weight (g)</td>
<td>2200 max</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Surface treatment</td>
<td>Anti-glare, Haze = 25%, Hard coating (3H)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Input color signal</td>
<td>8 bit LVDS</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Color saturation</td>
<td>72% NTSC</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Display colors</td>
<td>16.2M colors (6 bit with FRC)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Optimum viewing direction</td>
<td>6 o’clock</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Backlight</td>
<td>4 CCFL, top &amp; bottom edge side</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>TCO’ 03 and RoHS</td>
<td>TCO’ 03 and RoHS compliance</td>
<td></td>
</tr>
</tbody>
</table>
B. Electrical specifications

1. Pin assignment

**Connector**: JAE FI-X30SSL-HF or equivalent

<table>
<thead>
<tr>
<th>Pin No</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RxO0-</td>
<td>LVDS Differential data input Channel 0(-)</td>
</tr>
<tr>
<td>2</td>
<td>RxO0+</td>
<td>LVDS Differential data input Channel 0(+)</td>
</tr>
<tr>
<td>3</td>
<td>RxO1-</td>
<td>LVDS Differential data input Channel 1(-)</td>
</tr>
<tr>
<td>4</td>
<td>RxO1+</td>
<td>LVDS Differential data input Channel 1(+)</td>
</tr>
<tr>
<td>5</td>
<td>RxO2-</td>
<td>LVDS Differential data input Channel 2(-)</td>
</tr>
<tr>
<td>6</td>
<td>RxO2+</td>
<td>LVDS Differential data input Channel 2(+)</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>8</td>
<td>RxOC-</td>
<td>LVDS Differential Clock input (-)</td>
</tr>
<tr>
<td>9</td>
<td>RxOC+</td>
<td>LVDS Differential Clock input (+)</td>
</tr>
<tr>
<td>10</td>
<td>RxO3-</td>
<td>LVDS Differential data input Channel 3(-)</td>
</tr>
<tr>
<td>11</td>
<td>RxO3+</td>
<td>LVDS Differential data input Channel 3(+)</td>
</tr>
<tr>
<td>12</td>
<td>RxE0-</td>
<td>LVDS Differential data input Channel 0(-)</td>
</tr>
<tr>
<td>13</td>
<td>RxE0+</td>
<td>LVDS Differential data input Channel 0(+)</td>
</tr>
<tr>
<td>14</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>15</td>
<td>RxE1-</td>
<td>LVDS Differential data input Channel 1(-)</td>
</tr>
<tr>
<td>16</td>
<td>RxE1+</td>
<td>LVDS Differential data input Channel 1(+)</td>
</tr>
<tr>
<td>17</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>18</td>
<td>RxE2-</td>
<td>LVDS Differential data input Channel 2(-)</td>
</tr>
<tr>
<td>19</td>
<td>RxE2+</td>
<td>LVDS Differential data input Channel 2(+)</td>
</tr>
<tr>
<td>20</td>
<td>RxEC-</td>
<td>LVDS Differential Clock input (-)</td>
</tr>
<tr>
<td>21</td>
<td>RxEC+</td>
<td>LVDS Differential Clock input (+)</td>
</tr>
<tr>
<td>22</td>
<td>RxE3-</td>
<td>LVDS Differential data input Channel 3(-)</td>
</tr>
<tr>
<td>23</td>
<td>RxE3+</td>
<td>LVDS Differential data input Channel 3(+)</td>
</tr>
<tr>
<td>24</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>25</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>26</td>
<td>GND</td>
<td>Ground or Open</td>
</tr>
<tr>
<td>27</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>28</td>
<td>VCC</td>
<td>Power supply (+5.0V)</td>
</tr>
<tr>
<td>29</td>
<td>VCC</td>
<td>Power supply (+5.0V)</td>
</tr>
<tr>
<td>30</td>
<td>VCC</td>
<td>Power supply (+5.0V)</td>
</tr>
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</table>
Rear view of LCM
2. Absolute maximum ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Values</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power voltage</td>
<td>$V_{cc}$</td>
<td>-0.3</td>
<td>7.0</td>
<td>V At 25°C</td>
</tr>
<tr>
<td>Input signal voltage</td>
<td>$V_{IH}$</td>
<td>-0.3</td>
<td>3.6</td>
<td>V At 25°C</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>$T_{op}$</td>
<td>0</td>
<td>50</td>
<td>°C Note 1</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>$T_{ST}$</td>
<td>-25</td>
<td>60</td>
<td>°C Note 2</td>
</tr>
<tr>
<td>CCFL Current</td>
<td>ICFL</td>
<td>2</td>
<td>8</td>
<td>[mA] rms</td>
</tr>
</tbody>
</table>

Note 1: The relative humidity must not exceed 90% non-condensing at temperatures of 40°C or less. At temperatures greater than 40°C, the wet bulb temperature must not exceed 39°C.

Note 2: The unit should not be exposed to corrosive chemicals.
3. Electrical characteristics
   a. Typical operating conditions

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>Vcc</td>
<td>4.5</td>
<td>5.0</td>
<td>5.5</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Permissive Power Input Ripple</td>
<td>VRF</td>
<td>0.15</td>
<td>-</td>
<td>-</td>
<td>V</td>
<td>Note 1</td>
</tr>
<tr>
<td>Input Current</td>
<td>Icc</td>
<td>-</td>
<td>0.65</td>
<td>0.85</td>
<td>A</td>
<td>Note 2</td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Zm</td>
<td>90</td>
<td>100</td>
<td>110</td>
<td>ohm</td>
<td></td>
</tr>
<tr>
<td>Rush Current</td>
<td>IRush</td>
<td>-</td>
<td>2.0</td>
<td>3.0</td>
<td>A</td>
<td>Note 3</td>
</tr>
</tbody>
</table>

Logic Input Voltage

LVDS: IN+, IN-

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Mode Voltage</td>
<td>VCM</td>
<td>1.125</td>
<td>1.25</td>
<td>1.375</td>
<td>V</td>
</tr>
<tr>
<td>Differential Input Voltage</td>
<td>VID</td>
<td>250</td>
<td>350</td>
<td>450</td>
<td>mV</td>
</tr>
<tr>
<td>Threshold Voltage (High)</td>
<td>VTH</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>mV</td>
</tr>
<tr>
<td>Threshold Voltage (Low)</td>
<td>VTL</td>
<td>-100</td>
<td></td>
<td></td>
<td>mV</td>
</tr>
</tbody>
</table>

Note 1: Power input ripple should not exceed min. value.

Note 2: The specified current is under the Vcc =5V, 25 °C, fV=60Hz (frame frequency) condition whereas mosaic pattern (black & white [8*6] ) is displayed.

White : 255 Gray
Black : 0Gray

mosaic pattern (black & white [8*6] )
Note 3: test condition:

1. $V_{cc} = 5\, \text{V}$, $V_{cc}$ rising time = $470\, \mu\text{s} \pm 10\%$

2. Pattern: Mosaic pattern

(3) Test circuit

*Diagram of test circuit showing components such as M1, M2, fuse, R1, R2, R3, C1, C2, C3, and control signal with VIN+ and VIN- connections.*

Note 4: LVDS signal definition

\[
\begin{align*}
\text{VID} &= \text{VIN}_+ - \text{VIN}_- , \\
\triangle \text{VCM} &= | \text{VCM}_+ - \text{VCM}_- | , \\
\triangle \text{VID} &= | \text{VID}_+ - \text{VID}_- | , \\
\text{VID}_+ &= | \text{VIH}_+ - \text{VIL}_- | , \\
\text{VID}_- &= | \text{VIL}_+ - \text{VIH}_- | , \\
\text{VCM} &= (\text{VIN}_+ + \text{VIN}_-)/2, \\
\text{VCM}_+ &= (\text{VIH}_+ + \text{VIL}_+)/2, \\
\text{VCM}_- &= (\text{VIL}_+ + \text{VIH}_-)/2,
\end{align*}
\]

VII$\_+$ = Positive differential DATA & CLK Input
VII$\_-$ = Negative differential DATA & CLK Input

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Note 5: Power on sequence for LCD $V_{cc}$

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Unit</th>
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</thead>
<tbody>
<tr>
<td>T1</td>
<td>0.1</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 ms</td>
</tr>
<tr>
<td>T2</td>
<td>0</td>
<td>10 ms</td>
</tr>
<tr>
<td>T3</td>
<td>200</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>T4</td>
<td>100</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>T5</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 ms</td>
</tr>
<tr>
<td>T6</td>
<td>0.1</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>T7</td>
<td>1000</td>
<td>--</td>
</tr>
</tbody>
</table>

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b. Display color v.s. input data signals

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color; the higher the binary input, the brighter the color. The table below provides a reference for color versus data input.

<table>
<thead>
<tr>
<th>Color</th>
<th>Input color data</th>
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<tbody>
<tr>
<td></td>
<td>Red</td>
</tr>
<tr>
<td></td>
<td>MSB/LSB</td>
</tr>
<tr>
<td>R7-R6</td>
<td>R5-R4</td>
</tr>
<tr>
<td>Black</td>
<td>0</td>
</tr>
<tr>
<td>Red(255)</td>
<td>1</td>
</tr>
<tr>
<td>Green(255)</td>
<td>0</td>
</tr>
<tr>
<td>Blue(255)</td>
<td>0</td>
</tr>
<tr>
<td>Magenta</td>
<td>1</td>
</tr>
<tr>
<td>Yellow</td>
<td>1</td>
</tr>
<tr>
<td>White</td>
<td>1</td>
</tr>
</tbody>
</table>

Red(000) dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
Red(001) | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
Red(002) | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
Red(253) | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
Red(254) | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
Red(255) bright | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

Green(000) dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
Green(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
Green(002) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
Red(000) dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
Green(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
Green(253) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
Green(254) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
Green(255) bright | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |

Blue(000) dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
Blue(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
Blue(002) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
Red(253) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
Blue(254) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
Blue(255) bright | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
c. Input signal timing

Support Input Timing Table

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dclk</td>
<td>period</td>
<td>14.71</td>
<td>18.52</td>
<td>22.22</td>
<td>nS</td>
</tr>
<tr>
<td></td>
<td>frequency</td>
<td>45</td>
<td>54</td>
<td>68</td>
<td>MHz</td>
</tr>
<tr>
<td>TV_TOTAL</td>
<td>V total line number</td>
<td>1044</td>
<td>1066</td>
<td>1300</td>
<td>T_H_TOTAL</td>
</tr>
<tr>
<td>TV_DATA</td>
<td>Data duration</td>
<td>--</td>
<td>1024</td>
<td>--</td>
<td>T_H_TOTAL</td>
</tr>
<tr>
<td>TVB</td>
<td>V-blank</td>
<td>20</td>
<td>42</td>
<td>--</td>
<td>T_H_TOTAL</td>
</tr>
<tr>
<td>f_V</td>
<td>frequency</td>
<td>50</td>
<td>60</td>
<td>75</td>
<td>Hz</td>
</tr>
<tr>
<td>TH_TOTAL</td>
<td>H total pixel number</td>
<td>710</td>
<td>844</td>
<td>980</td>
<td>DClk</td>
</tr>
<tr>
<td>TH_DATA</td>
<td>Data duration</td>
<td>--</td>
<td>640</td>
<td>--</td>
<td>DClk</td>
</tr>
<tr>
<td>THB</td>
<td>H-blank</td>
<td>70</td>
<td>204</td>
<td>--</td>
<td>DClk</td>
</tr>
</tbody>
</table>

Note: DE is reference signal, DE means the display data valid.

d. Display Position

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### e. Backlight driving conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
<th>Remark</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp voltage</td>
<td>VL</td>
<td>610</td>
<td>700</td>
<td></td>
<td>Vrms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lamp operation current</td>
<td>IL</td>
<td>2</td>
<td>7</td>
<td>8</td>
<td>mArms</td>
<td>Note 1</td>
<td></td>
</tr>
<tr>
<td>Lamp starting voltage</td>
<td>VLstart</td>
<td>1500</td>
<td>7</td>
<td>8</td>
<td>Vrms</td>
<td></td>
<td>Note 2,3,4,5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1750</td>
<td></td>
<td></td>
<td></td>
<td>T = 25°C</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>F</td>
<td>40</td>
<td>50</td>
<td>80</td>
<td>KHZ</td>
<td>Note 5</td>
<td></td>
</tr>
<tr>
<td>Lamp life time</td>
<td></td>
<td>50000</td>
<td></td>
<td></td>
<td>Hr</td>
<td>Note 6</td>
<td></td>
</tr>
</tbody>
</table>

**Note 1:**

- The degrees of unbalance: less than 10%
- The ratio of wave height: less than $\sqrt{2}$ ±10%

The degrees of unbalance = $|I_p - I_p| / I_{rms} \times 100(\%)$

The ratio of wave height = $I_p$ (or $I_p$) / $I_{rms}$

Lamp should be completely turned on.

**Note 2:**

Test equipment: AS-114B, Output Capacitor = 18pF, f=57KHz

**Note 3:**

- The voltage shown above should be applied to the lamp for more than 1 second after startup.
- Otherwise, the lamp may not be turned on normally.

**Note 4:**

Inverter should provide more than min. value, and then lamp could be completely turned on.
Note 5:

Lamp frequency may produce interference with horizontal synchronous frequency and this may cause line flow on the display. Therefore lamp frequency shall be detached from the horizontal synchronous frequency and its harmonics as far as possible in order to avoid interference.

Note 6:

Lamp life definition:

The brightness of lamp becomes 50% of the initial brightness or not normal lighting.

Backlight connector: JST BHSR - 02VS-1

<table>
<thead>
<tr>
<th>Pin no.</th>
<th>Symbol</th>
<th>Function</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VIH</td>
<td>Lamp high voltage input</td>
<td>Cable color: Pink</td>
</tr>
<tr>
<td>2</td>
<td>VIL</td>
<td>Lamp low voltage input</td>
<td>Cable color: White</td>
</tr>
</tbody>
</table>
### C. Optical specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Condition</th>
<th>Specification</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response time</td>
<td>Tr</td>
<td>θ = 0°</td>
<td>Min. 2</td>
<td>Typ. 6</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td>Tf</td>
<td></td>
<td>Min. 6</td>
<td>Typ. 12</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td>Tr+Tf</td>
<td></td>
<td>Min. 8</td>
<td>Typ. 18</td>
<td>Max.</td>
</tr>
<tr>
<td>Contrast ratio</td>
<td>CR</td>
<td>θ = 0°</td>
<td>Min. 400</td>
<td>Typ. 500</td>
<td>Max.</td>
</tr>
<tr>
<td>Viewing angle</td>
<td>Top</td>
<td>CR ≥ 10</td>
<td>Min. 65</td>
<td>Typ. 75</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CR ≥ 5</td>
<td>Min. 75</td>
<td>Typ. 85</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td>Bottom</td>
<td>CR ≥ 10</td>
<td>Min. 50</td>
<td>Typ. 60</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CR ≥ 5</td>
<td>Min. 60</td>
<td>Typ. 70</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td>Left</td>
<td>CR ≥ 10</td>
<td>Min. 65</td>
<td>Typ. 75</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CR ≥ 5</td>
<td>Min. 75</td>
<td>Typ. 85</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td>Right</td>
<td>CR ≥ 10</td>
<td>Min. 65</td>
<td>Typ. 75</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CR ≥ 5</td>
<td>Min. 75</td>
<td>Typ. 85</td>
<td>Max.</td>
</tr>
<tr>
<td>Brightness (Center)</td>
<td>Y_L</td>
<td></td>
<td>Min. 200</td>
<td>Typ. 250</td>
<td>Max.</td>
</tr>
<tr>
<td>Color chromaticity (CIE)</td>
<td>Wx</td>
<td>θ = 0°</td>
<td>Min. -0.03</td>
<td>Typ. +0.03</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td>Wy</td>
<td></td>
<td>Min. 0.313</td>
<td>Typ. 0.329</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td>Rx</td>
<td></td>
<td>Min. 0.640</td>
<td>Typ. 0.640</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td>Ry</td>
<td></td>
<td>Min. 0.349</td>
<td>Typ. 0.349</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td>Gx</td>
<td></td>
<td>Min. 0.284</td>
<td>Typ. 0.284</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td>Gy</td>
<td></td>
<td>Min. 0.617</td>
<td>Typ. 0.617</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td>Bx</td>
<td></td>
<td>Min. 0.142</td>
<td>Typ. 0.142</td>
<td>Max.</td>
</tr>
<tr>
<td></td>
<td>By</td>
<td></td>
<td>Min. 0.067</td>
<td>Typ. 0.067</td>
<td>Max.</td>
</tr>
<tr>
<td>White uniformity (13)</td>
<td>δ_yy</td>
<td></td>
<td>Min. 0.75</td>
<td>Typ. 0.8</td>
<td>Max.</td>
</tr>
<tr>
<td>Cross talk</td>
<td>Ct</td>
<td></td>
<td>Min. 2%</td>
<td>Typ. 2%</td>
<td>Max.</td>
</tr>
</tbody>
</table>

**Note 1:** Ambient temperature = 25°C.

**Note 2:** To be measured in dark room after backlight warm up 30 minutes.

**Note 3:** To be measured with a viewing cone of 2° by Topcon luminance meter BM-5A.

**Note 4:** Definition of response time:
The output signals of BM-7 are measured when the input signals are changed from “Black” to “White” (falling time) and from “White” to “Black” (rising time), respectively. The response time interval between the 10% and 90% of amplitudes. Refer to figure as below.

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[http://www.BDTIC.com/INNOLUX](http://www.BDTIC.com/INNOLUX)
Note 5. Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

Contrast ratio (CR) = \( \frac{\text{Brightness on the "white" state}}{\text{Brightness on the "black" state}} \)

Note 6: Driving conditions for CCFL: \( I_L = 7.0 \, mA \), 50 KHz Frequency.

Note 7: Definition of viewing angle

Note 8: Definition white uniformity:

Luminance are measured at the following thirteen points (1~13).

\[ \delta_W = \frac{\text{Minimum Brightness of thirteen points}}{\text{Maximum Brightness of thirteen points}} \]
Note 9:

Unit: percentage of dimension of display area

\[ \frac{L_A - L_A'}{L_A} \times 100\% \leq 2\% \text{ max., } L_A \text{ and } L_A' \text{ are brightness at location A and A'} \]

\[ \frac{L_B - L_B'}{L_B} \times 100\% \leq 2\% \text{ max., } L_B \text{ and } L_B' \text{ are brightness at location B and B'} \]

Note 10: Optical characteristic measurement setup

![Optical characteristic measurement setup diagram]

Field=2\(^o\) 50cm

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## D. Reliability test items

<table>
<thead>
<tr>
<th>Test Item</th>
<th>Test Condition</th>
<th>Judgement</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>High temperature storage</td>
<td>60°C, 40%RH, 240Hrs</td>
<td>Note 1</td>
<td>Note 2</td>
</tr>
<tr>
<td>Low temperature storage</td>
<td>-25°C, 240Hrs</td>
<td>Note 1</td>
<td>Note 2</td>
</tr>
<tr>
<td>High temperature &amp; high humidity</td>
<td>40°C, 90%RH, 240Hrs (No condensation)</td>
<td>Note 1</td>
<td>Note 2</td>
</tr>
<tr>
<td>operation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High temperature operation</td>
<td>50°C, 40%RH, 240Hrs</td>
<td>Note 1</td>
<td>Note 2</td>
</tr>
<tr>
<td>Low temperature operation</td>
<td>0°C, 240Hrs</td>
<td>Note 1</td>
<td>Note 2</td>
</tr>
<tr>
<td>Thermal Shock (non-operation)</td>
<td>-20°C~60°C 1Hr, 10mins, 1Hr, 100cycles</td>
<td>Note 1</td>
<td>Note 2</td>
</tr>
<tr>
<td>Electrostatic discharge (ESD)</td>
<td>150 pF, 330Ω, 10kV, 1 second, 9 position on the panel, 10 times each place</td>
<td>Note 1</td>
<td>Note 2</td>
</tr>
<tr>
<td>Vibration (non-operation)</td>
<td>Sweep: 1G, 10Hz ~ 500Hz ~ 10Hz/30min 1 Hr for each direction X, Y, Z (3 Hrs in total)</td>
<td>Note 1</td>
<td>Note 2</td>
</tr>
<tr>
<td>Mechanical shock (non-operation)</td>
<td>50G/11ms, ±X, ±Y, ±Z once for each direction</td>
<td>Note 1</td>
<td>Note 2</td>
</tr>
<tr>
<td>MTBF Demonstration</td>
<td>50,000 hours with confidence level 90%</td>
<td>Note 1</td>
<td>Note 3</td>
</tr>
</tbody>
</table>

**Note 1:**
- **Pass:** Normal display image with no obvious non-uniformity and no line defect. Partial transformation of the module parts should be ignored.
- **Fail:** No display image, obvious non-uniformity, or line defects.

**Note 2:**
Evaluation should be tested after storage at room temperature for one hour.

**Note 3:**
The MTBF calculation is based on the assumption that the failure rate distribution meets the Exponential Model.
E. Safety

(1) Sharp Edge Requirements
There will be no sharp edges or corners on the display assembly that could cause injury.

(2) Materials
a. Toxicity
There will be no carcinogenic materials used anywhere in the display module. If toxic materials are used, they will be reviewed and approved by the responsible InnoLux Toxicologist.

b. Flammability
All components including electrical components that do not meet the flammability grade UL94-V1 in the module will complete the flammability rating exception approval process. The printed circuit board will be made from material rated 94-V1 or better. The actual UL flammability rating will be printed on the printed circuit board.

C. Capacitors
If any polarized capacitors are used in the display assembly, provisions will be made to keep them from being inserted backwards.

F. Display quality
The display quality of the color TFT-LCD module should be in compliance with the Innolux’s Incoming inspection standard.

G. Handling precaution
The Handling of the TFT-LCD should be in compliance with the Innolux’s handling principle standard.
H. Label

(1) Module Label

(a) Model Number: MT170EN01
(b) Version: V.A
(c) Serial ID I: Z₁ Z₂ Z₃ Z₄ Z₅ Z₆ Z₇ Z₈ Z₉ Z₁₀ Z₁₁ Z₁₂

Serial ID includes the information as below:

1. Manufactured Date: Year: 0~9, for 2000~2009
3. Date: 1~9 & A~Z (exclude I, O, Q, U) for 1th~31th
4. Code of grade: 1, 3, 5, 7, E
5. Serial No: Module manufacture sequential no

(e) Serial ID II (INL internal use)
(2) Carton Label

INNOLUX DISPLAY

BOX ID:

Part No:

Model No. MT170EN01 V.A
AM1700005 AXX

Quantity: 10 PCS

MFG Date: 20XX/XX/XX  Made in XXX

QC:

120 mm

(a) Model Number: MT170EN01
(b) Version: V.4
(c) Packing quantity: 10 pcs
(d) Serial ID: Z1 Z2 Z3 Z4 Z5 Z6 Z7 Z8 Z9

Serial No
Code of grade
Year, Month, Date

INL internal use

(e) Customer Part No & Serial ID (For MNT internal use)

Serial ID includes the information as below:

(a) Manufactured Date: Year: 0~9, for 2000~2009
   Month: 1~9 & A~C for Jan.–Dec.
   Date: 1~9 & A~Z (exclude I, O, Q, U) for 1th~31th

(b) Code of grade: 1, 3, 5, 7, E

http://www.BDTIC.com/INNOLUX
(c) Serial No: Module packing sequential no

I. Packing form

Step A
Put LCM into A/S bag

Step B
Turn back A/S bag

Step C

Step D
Put LCM with A/S bag into carton

Step E
Carton - 10 pcs

Step F
J. ME Drawing

(1) Front view
(2) Back view
http://www.BDTIC.com/Innolux