Customer: 
Model Name: EJ080NA-05B
Date: 2011/04/28
Version: 01

Preliminary Specification

For Customer’s Acceptance

<table>
<thead>
<tr>
<th>Approved by</th>
<th>Comment</th>
</tr>
</thead>
</table>

Approved by | Reviewed by | Prepared by |
-------------|-------------|-------------|
Hans Chen    | James Yu    | David Lee   |
2011/05/10   | 2011/05/09  | 2011/04/28  |
<table>
<thead>
<tr>
<th>Version</th>
<th>Revise Date</th>
<th>Page</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Spec.01</td>
<td>2011/04/09</td>
<td></td>
<td>Initial Release</td>
</tr>
</tbody>
</table>

Initial Release.
1. General Specifications
2. Pin Assignment
   2.1. TFT LCD Panel Driving Section
3. Operation Specifications
   3.1. Absolute Maximum Rating
      3.1.1. Typical Operation Conditions
      3.1.2. Current Consumption
      3.1.3. Backlight Driving Conditions
   3.2. Power Sequence
3.3. Timing Characteristics
   3.3.1. AC Electrical Characteristics
   3.3.2. Timing
   3.3.3. Timing Diagram
4. Optical Specifications
5. Reliability Test Items
6. General Precautions
   6.1. Safety
   6.2. Handling
   6.3. Static Electricity
   6.4. Storage
   6.5. Cleaning
7. Mechanical Drawing
8. Package Drawing
   8.1. Packaging Material Table
   8.2. Packaging Quantity
   8.3. Packaging Drawing
1. General Specifications

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Specification</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LCD size</td>
<td>8.0 inch (Diagonal)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Driver element</td>
<td>a-Si TFT active matrix</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Resolution</td>
<td>$800 \times 3(\text{RGB}) \times 600$</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Display mode</td>
<td>Normally White, Transmissive</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Dot pitch</td>
<td>$0.0675(W) \times 0.2025(H) \text{ mm}$</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Active area</td>
<td>$162.0(W) \times 121.5(H) \text{ mm}$</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Module size</td>
<td>$183.0(W) \times 141.0(H) \times 5.6(D) \text{ mm}$</td>
<td>Note 1</td>
</tr>
<tr>
<td>8</td>
<td>Surface treatment</td>
<td>Anti-Glare</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Color arrangement</td>
<td>RGB-stripe</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Interface</td>
<td>Digital</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Backlight power consumption</td>
<td>1.782W (Typ.)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Panel power consumption</td>
<td>0.356W (Typ.)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Weight</td>
<td>TBD</td>
<td></td>
</tr>
</tbody>
</table>

Note 1: Refer to Mechanical Drawing.
2. Pin Assignment

2.1. TFT LCD Panel Driving Section

1. FPC Connector is used for the module electronics interface. The recommended model is FH12A-50S-0.5SH manufactured by Hirose.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Symbol</th>
<th>I/O</th>
<th>Function</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LED +</td>
<td>P</td>
<td>LED Anode</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>LED +</td>
<td>P</td>
<td>LED Anode</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>LED -</td>
<td>P</td>
<td>LED Cathode</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>LED -</td>
<td>P</td>
<td>LED Cathode</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>P</td>
<td>Power ground</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>$V_{COM}$</td>
<td>I</td>
<td>Common voltage</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>$V_{CC}$</td>
<td>P</td>
<td>Power for Digital circuit</td>
<td>Note3</td>
</tr>
<tr>
<td>8</td>
<td>MODE</td>
<td>I</td>
<td>DE/SYNC mode select</td>
<td>Note3</td>
</tr>
<tr>
<td>9</td>
<td>DE</td>
<td>I</td>
<td>Data Input Enable</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>VS</td>
<td>I</td>
<td>Vertical Sync Input</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>HS</td>
<td>I</td>
<td>Horizontal Sync Input</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>B7</td>
<td>I</td>
<td>Blue data(MSB)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>B6</td>
<td>I</td>
<td>Blue data</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>B5</td>
<td>I</td>
<td>Blue data</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>B4</td>
<td>I</td>
<td>Blue data</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>B3</td>
<td>I</td>
<td>Blue data</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>B2</td>
<td>I</td>
<td>Blue data</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>B1</td>
<td>I</td>
<td>Blue data</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>B0</td>
<td>I</td>
<td>Blue data(LSB)</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>G7</td>
<td>I</td>
<td>Green data (MSB)</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>G6</td>
<td>I</td>
<td>Green data</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>G5</td>
<td>I</td>
<td>Green data</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>G4</td>
<td>I</td>
<td>Green data</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>G3</td>
<td>I</td>
<td>Green data</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>G2</td>
<td>I</td>
<td>Green data</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>G1</td>
<td>I</td>
<td>Green data</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>G0</td>
<td>I</td>
<td>Green data (LSB)</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>R7</td>
<td>I</td>
<td>Red data (MSB)</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>R6</td>
<td>I</td>
<td>Red data</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>R5</td>
<td>I</td>
<td>Red data</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>R4</td>
<td>I</td>
<td>Red data</td>
<td></td>
</tr>
</tbody>
</table>
### Table of Pin Assignments

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>R3</td>
<td>I Red data</td>
</tr>
<tr>
<td>33</td>
<td>R2</td>
<td>I Red data</td>
</tr>
<tr>
<td>34</td>
<td>R1</td>
<td>I Red data</td>
</tr>
<tr>
<td>35</td>
<td>R0</td>
<td>I Red data (LSB)</td>
</tr>
<tr>
<td>36</td>
<td>GND</td>
<td>P Power ground</td>
</tr>
<tr>
<td>37</td>
<td>DCLK</td>
<td>I Sample clock</td>
</tr>
<tr>
<td>38</td>
<td>GND</td>
<td>P Power ground</td>
</tr>
<tr>
<td>39</td>
<td>L/R</td>
<td>I Right/ left selection</td>
</tr>
<tr>
<td>40</td>
<td>U/D</td>
<td>I Up/down selection</td>
</tr>
<tr>
<td>41</td>
<td>$V_{GH}$</td>
<td>P Gate ON voltage</td>
</tr>
<tr>
<td>42</td>
<td>$V_{GL}$</td>
<td>P Gate OFF voltage</td>
</tr>
<tr>
<td>43</td>
<td>$AV_{DD}$</td>
<td>P Power for Analog circuit</td>
</tr>
<tr>
<td>44</td>
<td>RESET</td>
<td>I Global reset pin. Note1</td>
</tr>
<tr>
<td>45</td>
<td>NC</td>
<td>- No connection</td>
</tr>
<tr>
<td>46</td>
<td>$V_{COM}$</td>
<td>I Common voltage</td>
</tr>
<tr>
<td>47</td>
<td>DITHB</td>
<td>I Dithering function Note 4</td>
</tr>
<tr>
<td>48</td>
<td>GND</td>
<td>P Power ground</td>
</tr>
<tr>
<td>49</td>
<td>NC</td>
<td>- No connection</td>
</tr>
<tr>
<td>50</td>
<td>NC</td>
<td>- No connection</td>
</tr>
</tbody>
</table>

I: input, O: output, P: Power

**Note 1**: Global reset pin. Active Low to enter Reset State. Suggest to connecting with an RC reset circuit for stability. Normally pull high.

**Note 2**: Selection of scanning mode

<table>
<thead>
<tr>
<th>Setting of scan control input</th>
<th>Scanning direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>U/D</td>
<td>R/L</td>
</tr>
<tr>
<td>GND</td>
<td>$V_{CC}$</td>
</tr>
<tr>
<td>$V_{CC}$</td>
<td>GND</td>
</tr>
<tr>
<td>GND</td>
<td>$V_{CC}$</td>
</tr>
</tbody>
</table>

Up to down, left to right
Down to up, right to left
Up to down, right to left
Down to up, left to right

**Note 3**: DE/SYNC mode select, Normally pull high.
- H: DE mode.
- L: HS/VS mode.

**Note 4**: Dithering function enable control. Normally pull high.
- DITHB=“1”, Disable internal dithering function. For 18bit RGB interface, connect two LSB bits of all the R/G/B data buses to GND.
- DITHB=“0”, Enable internal dithering function, For TTL 24bit parallel RGB image data input.
Note 5: Definition of scanning direction.
Refer to the figure as below:
3. Operation Specifications

3.1. Absolute Maximum Rating

(GND=AV_{SS}=0V, Note 1)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Values</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min.</td>
<td>Max.</td>
<td></td>
</tr>
<tr>
<td>Power voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V_{CC}</td>
<td>V_{CC}</td>
<td>-0.3</td>
<td>5.0</td>
<td>V</td>
</tr>
<tr>
<td>AV_{DD}</td>
<td>AV_{DD}</td>
<td>-0.5</td>
<td>13.5</td>
<td>V</td>
</tr>
<tr>
<td>V_{GH}</td>
<td>V_{GH}</td>
<td>13.0</td>
<td>19.0</td>
<td>V</td>
</tr>
<tr>
<td>V_{GL}</td>
<td>V_{GL}</td>
<td>-12.0</td>
<td>-2.0</td>
<td>V</td>
</tr>
<tr>
<td>V_{GH}-V_{GL}</td>
<td>V_{GH}-V_{GL}</td>
<td>-</td>
<td>31.0</td>
<td>V</td>
</tr>
<tr>
<td>Operation Temperature</td>
<td>T_{OP}</td>
<td>-20</td>
<td>70</td>
<td>℃</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>T_{ST}</td>
<td>-30</td>
<td>80</td>
<td>℃</td>
</tr>
<tr>
<td>LED Reverse Voltage</td>
<td>V_{R}</td>
<td>-</td>
<td>1.2</td>
<td>V each LED</td>
</tr>
<tr>
<td>LED Forward Current</td>
<td>I_{F}</td>
<td>-</td>
<td>25</td>
<td>mA each LED</td>
</tr>
</tbody>
</table>

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

Note 2: V_{R} Conditions: Zener Diode 20mA
3.1.1. Typical Operation Conditions

(GND=AV<sub>SS</sub>=0V, Note 1)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Values</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min.</td>
<td>Typ.</td>
<td>Max.</td>
</tr>
<tr>
<td>Power voltage</td>
<td>V&lt;sub&gt;CC&lt;/sub&gt;</td>
<td>3.0</td>
<td>3.3</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>AV&lt;sub&gt;DD&lt;/sub&gt;</td>
<td>10.2</td>
<td>10.4</td>
<td>10.6</td>
</tr>
<tr>
<td></td>
<td>V&lt;sub&gt;GH&lt;/sub&gt;</td>
<td>15.3</td>
<td>16.0</td>
<td>16.7</td>
</tr>
<tr>
<td></td>
<td>V&lt;sub&gt;GL&lt;/sub&gt;</td>
<td>-7.7</td>
<td>-7.0</td>
<td>-6.3</td>
</tr>
<tr>
<td>Input signal voltage</td>
<td>V&lt;sub&gt;COM&lt;/sub&gt;</td>
<td>2.8</td>
<td>(3.8)</td>
<td>4.8</td>
</tr>
<tr>
<td>Input logic high voltage</td>
<td>V&lt;sub&gt;IH&lt;/sub&gt;</td>
<td>0.7V&lt;sub&gt;CC&lt;/sub&gt;</td>
<td>-</td>
<td>V&lt;sub&gt;CC&lt;/sub&gt;</td>
</tr>
<tr>
<td>Input logic low voltage</td>
<td>V&lt;sub&gt;IL&lt;/sub&gt;</td>
<td>0</td>
<td>-</td>
<td>0.3V&lt;sub&gt;CC&lt;/sub&gt;</td>
</tr>
</tbody>
</table>

Note 1: Be sure to apply V<sub>CC</sub> and V<sub>GL</sub> to the LCD first, and then apply V<sub>GH</sub>.
Note 2: V<sub>CC</sub> setting should match the signals output voltage (refer to Note 3) of customer’s system board.
Note 3: DCLK, HS, VS, RSTB, UPDN, STLR, MODE, DITHB.
Note 4: Typical V<sub>COM</sub> is only a reference value, it must be optimized according to each LCM. Be sure to use VR;
### 3.1.2. Current Consumption

(GND=AV\textsubscript{SS}=0V)

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Values</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min.</td>
<td>Typ.</td>
<td>Max.</td>
</tr>
<tr>
<td>Current for Driver</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(I_{GH})</td>
<td>-</td>
<td>0.2</td>
<td>0.5</td>
<td>mA</td>
</tr>
<tr>
<td>(I_{GL})</td>
<td>-</td>
<td>0.2</td>
<td>1.0</td>
<td>mA</td>
</tr>
<tr>
<td>(I_{CC})</td>
<td>-</td>
<td>5.5</td>
<td>10.0</td>
<td>mA</td>
</tr>
<tr>
<td>(I_{AVDD})</td>
<td>-</td>
<td>32.0</td>
<td>50.0</td>
<td>mA</td>
</tr>
</tbody>
</table>

### 3.1.3. Backlight Driving Conditions

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Values</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage for LED backlight</td>
<td>(V_L)</td>
<td>9.3</td>
<td>9.9</td>
<td>10.5</td>
</tr>
<tr>
<td>Current for LED backlight</td>
<td>(I_L)</td>
<td>162</td>
<td>180</td>
<td>198</td>
</tr>
<tr>
<td>LED life time</td>
<td>-</td>
<td>20,000</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C and \(I_L = 180\) mA.

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and \(I_L = 180\) mA. The LED lifetime could be decreased if operating \(I_L\) is larger than 180 mA.
3.2. Power Sequence

3.2.1. Power on:

3.2.2. Power off:

Note: Data include R0~R5, B0~B5, GO~G5, STLR, UPDN, DCLK, HS, VS, DE.

B/L→Data→VGH→AVDD→VGL→VCC
### 3.3. Timing Characteristics

#### 3.3.1. AC Electrical Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Values</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS setup time</td>
<td>$T_{\text{hst}}$</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HS hold time</td>
<td>$T_{\text{hhd}}$</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VS setup time</td>
<td>$T_{\text{vst}}$</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VS hold time</td>
<td>$T_{\text{vhd}}$</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Data setup time</td>
<td>$T_{\text{dsu}}$</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Data hole time</td>
<td>$T_{\text{dhd}}$</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DE setup time</td>
<td>$T_{\text{esu}}$</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DE hole time</td>
<td>$T_{\text{ehd}}$</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VDD Power On Slew rate</td>
<td>$T_{\text{POR}}$</td>
<td>-</td>
<td>-</td>
<td>20 ms</td>
</tr>
<tr>
<td>RSTB pulse width</td>
<td>$T_{\text{Rst}}$</td>
<td>10</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CLKIN cycle time</td>
<td>$T_{\text{coh}}$</td>
<td>20</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CLKIN pulse duty</td>
<td>$T_{\text{cwh}}$</td>
<td>40</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>Output stable time</td>
<td>$T_{\text{sst}}$</td>
<td>-</td>
<td>-</td>
<td>6</td>
</tr>
</tbody>
</table>
### 3.3.2. Timing

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Values</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min.</td>
<td>Typ.</td>
<td>Max.</td>
</tr>
<tr>
<td><strong>Horizontal Display Area</strong></td>
<td>thd</td>
<td>-</td>
<td>800</td>
<td>-</td>
</tr>
<tr>
<td><strong>DCLK Frequency</strong></td>
<td>fclk</td>
<td>-</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td><strong>One Horizontal Line</strong></td>
<td>th</td>
<td>862</td>
<td>1056</td>
<td>1200</td>
</tr>
<tr>
<td><strong>HS pulse width</strong></td>
<td>thpw</td>
<td>1</td>
<td>-</td>
<td>40</td>
</tr>
<tr>
<td><strong>HS Back Porch(Blanking)</strong></td>
<td>thb</td>
<td>46</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td><strong>HS Front Porch</strong></td>
<td>thfp</td>
<td>16</td>
<td>210</td>
<td>354</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Values</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min.</td>
<td>Typ.</td>
<td>Max.</td>
</tr>
<tr>
<td><strong>Vertical Display Area</strong></td>
<td>tvd</td>
<td>-</td>
<td>600</td>
<td>-</td>
</tr>
<tr>
<td><strong>VS period time</strong></td>
<td>tv</td>
<td>624</td>
<td>635</td>
<td>700</td>
</tr>
<tr>
<td><strong>VS pulse width</strong></td>
<td>tvpw</td>
<td>1</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td><strong>VS Back Porch(Blanking)</strong></td>
<td>tvb</td>
<td>23</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td><strong>VS Front Porch</strong></td>
<td>tvfp</td>
<td>1</td>
<td>12</td>
<td>77</td>
</tr>
</tbody>
</table>
3.3.3. Timing Diagram

Figure 3.1 Input Clock and Data Timing Diagram

Figure 3.2 Horizontal input timing diagram.
## 4. Optical Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Symbol</th>
<th>Condition</th>
<th>Values</th>
<th>Unit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewing angle (CR ≥ 10)</td>
<td></td>
<td>θₗ</td>
<td>60 70 -</td>
<td></td>
<td>degree</td>
</tr>
<tr>
<td></td>
<td></td>
<td>θᵣ</td>
<td>60 70 -</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>θₜ</td>
<td>40 50 -</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>θᵦ</td>
<td>60 70 -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time</td>
<td></td>
<td>Tₚ₀</td>
<td>- 10 20</td>
<td>msec</td>
<td>Note 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tₚᵣ</td>
<td>- 15 30</td>
<td>msec</td>
<td>Note 3</td>
</tr>
<tr>
<td>Contrast ratio</td>
<td></td>
<td>CR</td>
<td>400 500</td>
<td></td>
<td>Note 4</td>
</tr>
<tr>
<td>Color chromaticity</td>
<td></td>
<td>Wₓ</td>
<td>0.26 0.31 0.36</td>
<td></td>
<td>Note 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wᵧ</td>
<td>0.28 0.33 0.38</td>
<td></td>
<td>Note 5</td>
</tr>
<tr>
<td>Luminance</td>
<td></td>
<td>L</td>
<td>200 250</td>
<td>cd/m²</td>
<td>Note 6</td>
</tr>
<tr>
<td>Luminance uniformity</td>
<td></td>
<td>Yᵤ</td>
<td>70 75 -</td>
<td>%</td>
<td>Note 7</td>
</tr>
</tbody>
</table>

Test Conditions:
1. $V_{CC}=3.3V$, $I_L=180mA$ (Backlight current), the ambient temperature is 25°C.
2. The test systems refer to Note 2.
Note 1: Definition of viewing angle range

![Diagram of viewing angle range]

Note 2: Definition of optical measurement system.
The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1°/Height: 500mm.)

![Diagram of optical measurement system setup]
Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time ($T_{ON}$) is the time between photo detector output intensity changed from 90% to 10%. And fall time ($T_{OFF}$) is the time between photo detector output intensity changed from 10% to 90%.

![Diagram of response time]

Note 4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of luminance:

Measured at the center area of the panel when LCD panel is driven at “white” state. The LED driving condition is $I_L=180\text{mA}$. 
Note 7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer to Fig. 4-4). Every measuring point is placed at the center of each measuring area.

\[
\text{Luminance Uniformity (Yu)} = \frac{B_{\text{min}}}{B_{\text{max}}}
\]

\[
L \quad \text{Active area length} \quad W \quad \text{Active area width}
\]

Fig. 4-4 Definition of measuring points

- \(B_{\text{max}}\): The measured maximum luminance of all measurement position.
- \(B_{\text{min}}\): The measured minimum luminance of all measurement position.
5. Reliability Test Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Test Conditions</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Temperature Storage</td>
<td>Ta = 80°C, 240hrs</td>
<td>Note 1, Note 4</td>
</tr>
<tr>
<td>Low Temperature Storage</td>
<td>Ta = -30°C, 240hrs</td>
<td>Note 1, Note 4</td>
</tr>
<tr>
<td>High Temperature Operation</td>
<td>Ts = 70°C, 240hrs</td>
<td>Note 2, Note 4</td>
</tr>
<tr>
<td>Low Temperature Operation</td>
<td>Ta = -20°C, 240hrs</td>
<td>Note 1, Note 4</td>
</tr>
<tr>
<td>Operate at High Temperature and Humidity</td>
<td>+40°C, 90%RH, 240hrs</td>
<td>Note 4</td>
</tr>
<tr>
<td>Thermal Shock</td>
<td>-30°C/30 min ~ +80°C/30 min for a total 100 cycles, Start with cold temperature and end with high temperature.</td>
<td>Note 4</td>
</tr>
<tr>
<td>Vibration Test</td>
<td>Frequency range:10<del>55Hz Stroke:1.5mm Sweep:10Hz</del>55Hz~10Hz 2 hours for each direction of X, Y, Z. (6 hours for total)</td>
<td>Note 4</td>
</tr>
<tr>
<td>Mechanical Shock</td>
<td>100G 6ms,±X, ±Y, ±Z 3 times for each direction</td>
<td>Note 4</td>
</tr>
<tr>
<td>Package Vibration Test</td>
<td>Random Vibration : 0.015G*G/Hz from 5-200HZ, -6dB/Octave from 200-500HZ 2 hours for each direction of X, Y, Z. (6 hours for total)</td>
<td>Note 4</td>
</tr>
<tr>
<td>Package Drop Test</td>
<td>Height:60 cm 1 corner, 3 edges, 6 surfaces</td>
<td>Note 4</td>
</tr>
<tr>
<td>Electro Static Discharge</td>
<td>± 2KV, Human Body Mode, 100pF/1500Ω</td>
<td>Note 4</td>
</tr>
</tbody>
</table>

Note 1: Ta is the ambient temperature of samples.
Note 2: Ts is the temperature of panel's surface.
Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.
Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.
6. General Precautions

6.1. Safety

Liquid crystal is poisonous. Do not put it in your mouth. If liquid crystal touches your skin or clothes, wash it off immediately by using soap and water.

6.2. Handling

1. The LCD panel is plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.
2. The polarizer attached to the display is easily damaged. Please handle it carefully to avoid scratch or other damages.
3. To avoid contamination on the display surface, do not touch the module surface with bare hands.
4. Keep a space so that the LCD panels do not touch other components.
5. Put cover board such as acrylic board on the surface of LCD panel to protect panel from damages.
6. Transparent electrodes may be disconnected if you use the LCD panel under environmental conditions where the condensation of dew occurs.
7. Do not leave module in direct sunlight to avoid malfunction of the ICs.

6.3. Static Electricity

1. Be sure to ground module before turning on power or operating module.
2. Do not apply voltage which exceeds the absolute maximum rating value.

6.4. Storage

1. Store the module in a dark room where must keep at 25±10℃ and 65%RH or less.
2. Do not store the module in surroundings containing organic solvent or corrosive gas.
3. Store the module in an anti-electrostatic container or bag.

6.5. Cleaning

1. Do not wipe the polarizer with dry cloth. It might cause scratch.
2. Only use a soft sloth with IPA to wipe the polarizer, other chemicals might permanent damage to the polarizer.
7. Mechanical Drawing
8. Package Drawing

8.1 Packaging Material Table

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Model (Material)</th>
<th>Dimensions (mm)</th>
<th>Unit Weight (kg)</th>
<th>Quantity</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LCM Module</td>
<td>EJ080NA-05B</td>
<td>183.0 × 141.0 × 5.6</td>
<td>TBD</td>
<td>30pcs</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Partition</td>
<td>BC Corrugated paper</td>
<td>512 × 349 × 226</td>
<td>1.184</td>
<td>1set</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Corrugated Bar</td>
<td>B Corrugated paper</td>
<td>349 × 186 × 38</td>
<td>0.155</td>
<td>4pcs</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Dust-Proof Bag</td>
<td>PE</td>
<td>700 × 530</td>
<td>0.060</td>
<td>1pcs</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>A/S Bag</td>
<td>PE</td>
<td>220.0 × 200.0 × 0.2</td>
<td>0.003</td>
<td>30pcs</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Carton</td>
<td>Corrugated paper</td>
<td>530 × 355 × 255</td>
<td>1.100</td>
<td>1pcs</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Total weight</td>
<td>TBD±5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8.2 Packaging Quantity

Total LCM quantity in Carton: no. of Partition 2 Rows × quantity per Row 15 = 30
8.3 Packaging Drawing

Diagram showing the process of packaging with LCM, A/S Bag, Partition + Corrugated Bar*2, Dust-Proof Bag, Fasten Tape, and Corrugated Bar*2.