



# Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

( ) Preliminary Specifications

( V ) Final Specifications

|            |                      |
|------------|----------------------|
| Module     | 7 Inch Color TFT-LCD |
| Model Name | G070VAN01.1          |

|                                                                                                                                                                                          |                                                                 |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                                                        |             |      |       |       |            |          |             |      |       |       |           |          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|------|-------|-------|-----------------------|------|-------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------|-------|-------|------------|----------|-------------|------|-------|-------|-----------|----------|
| <table><tr><td>Customer</td><td>Date</td></tr><tr><td><hr/></td><td><hr/></td></tr><tr><td>Checked &amp; Approved by</td><td>Date</td></tr><tr><td><hr/></td><td><hr/></td></tr></table> | Customer                                                        | Date | <hr/> | <hr/> | Checked & Approved by | Date | <hr/> | <hr/> | <table><tr><td>Approved by</td><td>Date</td></tr><tr><td><hr/></td><td><hr/></td></tr><tr><td>Grace Hung</td><td>2020/8/4</td></tr><tr><td>Prepared by</td><td>Date</td></tr><tr><td><hr/></td><td><hr/></td></tr><tr><td>Ivan Chao</td><td>2020/8/4</td></tr></table> | Approved by | Date | <hr/> | <hr/> | Grace Hung | 2020/8/4 | Prepared by | Date | <hr/> | <hr/> | Ivan Chao | 2020/8/4 |
| Customer                                                                                                                                                                                 | Date                                                            |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                                                        |             |      |       |       |            |          |             |      |       |       |           |          |
| <hr/>                                                                                                                                                                                    | <hr/>                                                           |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                                                        |             |      |       |       |            |          |             |      |       |       |           |          |
| Checked & Approved by                                                                                                                                                                    | Date                                                            |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                                                        |             |      |       |       |            |          |             |      |       |       |           |          |
| <hr/>                                                                                                                                                                                    | <hr/>                                                           |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                                                        |             |      |       |       |            |          |             |      |       |       |           |          |
| Approved by                                                                                                                                                                              | Date                                                            |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                                                        |             |      |       |       |            |          |             |      |       |       |           |          |
| <hr/>                                                                                                                                                                                    | <hr/>                                                           |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                                                        |             |      |       |       |            |          |             |      |       |       |           |          |
| Grace Hung                                                                                                                                                                               | 2020/8/4                                                        |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                                                        |             |      |       |       |            |          |             |      |       |       |           |          |
| Prepared by                                                                                                                                                                              | Date                                                            |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                                                        |             |      |       |       |            |          |             |      |       |       |           |          |
| <hr/>                                                                                                                                                                                    | <hr/>                                                           |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                                                        |             |      |       |       |            |          |             |      |       |       |           |          |
| Ivan Chao                                                                                                                                                                                | 2020/8/4                                                        |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                                                        |             |      |       |       |            |          |             |      |       |       |           |          |
| Customer's sign back page                                                                                                                                                                | General Display Business Division /<br>AU Optronics corporation |      |       |       |                       |      |       |       |                                                                                                                                                                                                                                                                        |             |      |       |       |            |          |             |      |       |       |           |          |



# Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

## Contents

|                                                                |           |
|----------------------------------------------------------------|-----------|
| <b>1. Operating Precautions .....</b>                          | <b>4</b>  |
| <b>2. General Description .....</b>                            | <b>5</b>  |
| 2.1 Display Characteristics.....                               | 5         |
| 2.2 Optical Characteristics .....                              | 6         |
| <b>3. Functional Block Diagram .....</b>                       | <b>9</b>  |
| <b>4. Absolute Maximum Ratings .....</b>                       | <b>10</b> |
| 4.1 Absolute Ratings of TFT LCD Module.....                    | 10        |
| 4.2 Absolute Ratings of Environment.....                       | 10        |
| <b>5. Electrical Characteristics .....</b>                     | <b>10</b> |
| 5.1 TFT LCD Module .....                                       | 10        |
| 5.2 Backlight Unit .....                                       | 13        |
| <b>6. Signal Characteristic .....</b>                          | <b>14</b> |
| 6.1 Pixel Format Image.....                                    | 14        |
| 6.2 Signal Description .....                                   | 15        |
| 6.3 The Input Data Format.....                                 | 16        |
| 6.4 Interface Timing .....                                     | 18        |
| 6.5 Power ON/OFF Sequence .....                                | 19        |
| <b>7. Reliability Test Criteria .....</b>                      | <b>21</b> |
| <b>8. Mechanical Characteristics.....</b>                      | <b>22</b> |
| 8.1 LCM Outline Dimension .....                                | 22        |
| <b>9. Label and Packaging .....</b>                            | <b>23</b> |
| 9.1 Shipping Label (on the rear side of TFT-LCD display) ..... | 23        |
| <b>10 Safety .....</b>                                         | <b>24</b> |
| 10.1 Sharp Edge Requirements.....                              | 24        |
| 10.2 Materials .....                                           | 24        |
| 10.3 Capacitors.....                                           | 24        |
| 10.4 National Test Lab Requirement.....                        | 24        |



## Record of Revision

## Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

| Version                       | Date<br>(yyyy/m/d)                                                                 | Page                         | Old description                  | New Description                                                                      |                                |                                                                     |                                                    |                                |                                                |                              |                                 |                                |                                                                     |                                                    |                   |                                                |
|-------------------------------|------------------------------------------------------------------------------------|------------------------------|----------------------------------|--------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------|----------------------------------------------------|--------------------------------|------------------------------------------------|------------------------------|---------------------------------|--------------------------------|---------------------------------------------------------------------|----------------------------------------------------|-------------------|------------------------------------------------|
| 0.1                           | Jun. 18,<br>2019                                                                   | All                          | First draft specification        |                                                                                      |                                |                                                                     |                                                    |                                |                                                |                              |                                 |                                |                                                                     |                                                    |                   |                                                |
| 1.0                           | Mar. 06,<br>2020                                                                   | 5, 13                        | Modify Model name to G070VAN01.1 |                                                                                      |                                |                                                                     |                                                    |                                |                                                |                              |                                 |                                |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    | 5                            | Power Consumption <sub>ⓘ</sub>   |                                                                                      |                                | [Watt] <sub>ⓘ</sub>                                                 | 2.96W Max. <sub>ⓘ</sub>                            | Power Consumption <sub>ⓘ</sub> |                                                |                              | [Watt] <sub>ⓘ</sub>             | 1.4W Max. <sub>ⓘ</sub>         |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    | 6                            | Item <sub>ⓘ</sub>                | Unit <sub>ⓘ</sub>                                                                    | Conditions <sub>ⓘ</sub>        | Min. <sub>ⓘ</sub>                                                   | Typ. <sub>ⓘ</sub>                                  | Max. <sub>ⓘ</sub>              | Item <sub>ⓘ</sub>                              | Unit <sub>ⓘ</sub>            | Conditions <sub>ⓘ</sub>         | Min. <sub>ⓘ</sub>              | Typ. <sub>ⓘ</sub>                                                   | Max. <sub>ⓘ</sub>                                  |                   |                                                |
|                               |                                                                                    | White Luminance <sub>ⓘ</sub> |                                  |                                                                                      | cd/m <sup>2</sup> <sub>ⓘ</sub> | L <sub>w</sub> =25mA(center point) <sub>ⓘ</sub>                     |                                                    | 200 <sub>ⓘ</sub>               | White Luminance <sub>ⓘ</sub>                   |                              |                                 | cd/m <sup>2</sup> <sub>ⓘ</sub> | L <sub>w</sub> =32mA(center point) <sub>ⓘ</sub>                     |                                                    | 200 <sub>ⓘ</sub>  |                                                |
|                               |                                                                                    | 13                           | Symbol <sub>ⓘ</sub>              | Parameter <sub>ⓘ</sub>                                                               | Min. <sub>ⓘ</sub>              | Typ. <sub>ⓘ</sub>                                                   | Max. <sub>ⓘ</sub>                                  | Unit <sub>ⓘ</sub>              | Remark <sub>ⓘ</sub>                            | Symbol <sub>ⓘ</sub>          | Parameter <sub>ⓘ</sub>          | Min. <sub>ⓘ</sub>              | Typ. <sub>ⓘ</sub>                                                   | Max. <sub>ⓘ</sub>                                  | Unit <sub>ⓘ</sub> | Remark <sub>ⓘ</sub>                            |
|                               |                                                                                    |                              | I <sub>LE</sub> <sub>ⓘ</sub>     | LED Supply Current <sub>ⓘ</sub>                                                      |                                | 92 <sub>ⓘ</sub>                                                     |                                                    | mA <sub>ⓘ</sub>                | Ta = 25°C, <sub>ⓘ</sub><br>Note 2 <sub>ⓘ</sub> | I <sub>LE</sub> <sub>ⓘ</sub> | LED Supply Current <sub>ⓘ</sub> |                                | 32 <sub>ⓘ</sub>                                                     |                                                    | mA <sub>ⓘ</sub>   | Ta = 25°C, <sub>ⓘ</sub><br>Note 2 <sub>ⓘ</sub> |
| V <sub>LE</sub> <sub>ⓘ</sub>  | LED Supply Voltage <sub>ⓘ</sub>                                                    |                              |                                  | 22.4 <sub>ⓘ</sub>                                                                    | 25.2 <sub>ⓘ</sub>              | [V] <sub>ⓘ</sub>                                                    | Ta = 25°C, <sub>ⓘ</sub><br>Note 2/3 <sub>ⓘ</sub>   | V <sub>LE</sub> <sub>ⓘ</sub>   | LED Supply Voltage <sub>ⓘ</sub>                |                              | 21 <sub>ⓘ</sub>                 | 23.1 <sub>ⓘ</sub>              | [V] <sub>ⓘ</sub>                                                    | Ta = 25°C, <sub>ⓘ</sub><br>Note 2/3 <sub>ⓘ</sub>   |                   |                                                |
| P <sub>LED</sub> <sub>ⓘ</sub> | LED Power Consumption <sub>ⓘ</sub>                                                 |                              |                                  | 2.06 <sub>ⓘ</sub>                                                                    |                                | [Watt] <sub>ⓘ</sub>                                                 | Ta = 25°C, <sub>ⓘ</sub><br>Note 3/4/5 <sub>ⓘ</sub> | P <sub>LED</sub> <sub>ⓘ</sub>  | LED Power Consumption <sub>ⓘ</sub>             |                              | 0.672 <sub>ⓘ</sub>              |                                | [Watt] <sub>ⓘ</sub>                                                 | Ta = 25°C, <sub>ⓘ</sub><br>Note 3/4/5 <sub>ⓘ</sub> |                   |                                                |
| L <sub>L</sub> <sub>ⓘ</sub>   | LED Life Time <sub>ⓘ</sub>                                                         | 50000 <sub>ⓘ</sub>           | 70000 <sub>ⓘ</sub>               |                                                                                      | Hrs <sub>ⓘ</sub>               | Ta = 25°C, <sub>ⓘ</sub><br>Note 6, <sub>ⓘ</sub> Note 7 <sub>ⓘ</sub> | L <sub>L</sub> <sub>ⓘ</sub>                        | LED Life Time <sub>ⓘ</sub>     | 30,000 <sub>ⓘ</sub>                            | 50,000 <sub>ⓘ</sub>          |                                 | Hrs <sub>ⓘ</sub>               | Ta = 25°C, <sub>ⓘ</sub><br>Note 6, <sub>ⓘ</sub> Note 7 <sub>ⓘ</sub> |                                                    |                   |                                                |
| 22                            | Modify X0 drawing: add label position                                              |                              |                                  |                                                                                      |                                |                                                                     |                                                    |                                |                                                |                              |                                 |                                |                                                                     |                                                    |                   |                                                |
| 23                            |  |                              |                                  |  |                                |                                                                     |                                                    |                                |                                                |                              |                                 |                                |                                                                     |                                                    |                   |                                                |
| 1.1                           | Aug. 4,<br>2020                                                                    | 6                            | Red x <sub>ⓘ</sub>               | TBD <sub>ⓘ</sub>                                                                     | TBD <sub>ⓘ</sub>               | TBD <sub>ⓘ</sub>                                                    | Red x <sub>ⓘ</sub>                                 | 0.600 <sub>ⓘ</sub>             | 0.650 <sub>ⓘ</sub>                             | 0.700 <sub>ⓘ</sub>           |                                 |                                |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    |                              | Red y <sub>ⓘ</sub>               | TBD <sub>ⓘ</sub>                                                                     | TBD <sub>ⓘ</sub>               | TBD <sub>ⓘ</sub>                                                    | Red y <sub>ⓘ</sub>                                 | 0.285 <sub>ⓘ</sub>             | 0.335 <sub>ⓘ</sub>                             | 0.385 <sub>ⓘ</sub>           |                                 |                                |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    |                              | Green x <sub>ⓘ</sub>             | TBD <sub>ⓘ</sub>                                                                     | TBD <sub>ⓘ</sub>               | TBD <sub>ⓘ</sub>                                                    | Green x <sub>ⓘ</sub>                               | 0.256 <sub>ⓘ</sub>             | 0.306 <sub>ⓘ</sub>                             | 0.356 <sub>ⓘ</sub>           |                                 |                                |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    |                              | Green y <sub>ⓘ</sub>             | TBD <sub>ⓘ</sub>                                                                     | TBD <sub>ⓘ</sub>               | TBD <sub>ⓘ</sub>                                                    | Green y <sub>ⓘ</sub>                               | 0.563 <sub>ⓘ</sub>             | 0.613 <sub>ⓘ</sub>                             | 0.663 <sub>ⓘ</sub>           |                                 |                                |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    |                              | Blue x <sub>ⓘ</sub>              | TBD <sub>ⓘ</sub>                                                                     | TBD <sub>ⓘ</sub>               | TBD <sub>ⓘ</sub>                                                    | Blue x <sub>ⓘ</sub>                                | 0.101 <sub>ⓘ</sub>             | 0.151 <sub>ⓘ</sub>                             | 0.201 <sub>ⓘ</sub>           |                                 |                                |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    |                              | Blue y <sub>ⓘ</sub>              | TBD <sub>ⓘ</sub>                                                                     | TBD <sub>ⓘ</sub>               | TBD <sub>ⓘ</sub>                                                    | Blue y <sub>ⓘ</sub>                                | 0.006 <sub>ⓘ</sub>             | 0.056 <sub>ⓘ</sub>                             | 0.106 <sub>ⓘ</sub>           |                                 |                                |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    |                              |                                  |                                                                                      |                                |                                                                     |                                                    |                                |                                                |                              |                                 |                                |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    |                              |                                  |                                                                                      |                                |                                                                     |                                                    |                                |                                                |                              |                                 |                                |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    |                              |                                  |                                                                                      |                                |                                                                     |                                                    |                                |                                                |                              |                                 |                                |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    |                              |                                  |                                                                                      |                                |                                                                     |                                                    |                                |                                                |                              |                                 |                                |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    |                              |                                  |                                                                                      |                                |                                                                     |                                                    |                                |                                                |                              |                                 |                                |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    |                              |                                  |                                                                                      |                                |                                                                     |                                                    |                                |                                                |                              |                                 |                                |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    |                              |                                  |                                                                                      |                                |                                                                     |                                                    |                                |                                                |                              |                                 |                                |                                                                     |                                                    |                   |                                                |
|                               |                                                                                    |                              |                                  |                                                                                      |                                |                                                                     |                                                    |                                |                                                |                              |                                 |                                |                                                                     |                                                    |                   |                                                |



# Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

## 1. Operating Precautions

- 1) Since front polarizer is easily damaged, please be cautious and not to scratch it.
- 2) Be sure to turn off power supply when inserting or disconnecting from input connector.
- 3) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
- 4) When the panel surface is soiled, wipe it with absorbent cotton or soft cloth.
- 5) Since the panel is made of glass, it may be broken or cracked if dropped or bumped on hard surface.
- 6) To avoid ESD (Electro Static Discharge) damage, be sure to ground yourself before handling TFT-LCD Module.
- 7) Do not open nor modify the module assembly.
- 8) Do not press the reflector sheet at the back of the module to any direction.
- 9) In case if a module has to be put back into the packing container slot after it was taken out from the container, do not press the center of the LED light bar edge. Instead, press at the far ends of the LED light bar edge softly. Otherwise the TFT Module may be damaged.
- 10) At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.
- 11) TFT-LCD Module is not allowed to be twisted & bent even force is added on module in a very short time. Please design your display product well to avoid external force applying to module by end-user directly.
- 12) Small amount of materials having no flammability grade is used in the LCD module. The LCD module should be supplied by power complied with requirements of Limited Power Source (IEC60950 or UL1950), or be applied exemption.
- 13) Severe temperature condition may result in different luminance, response time and lamp ignition voltage.
- 14) Continuous operating TFT-LCD display under low temperature environment may accelerate lamp exhaustion and reduce luminance dramatically.
- 15) The data on this specification sheet is applicable when LCD module is placed in landscape position.
- 16) Continuous displaying fixed pattern may induce image sticking. It's recommended to use screen saver or shuffle content periodically if fixed pattern is displayed on the screen.



# Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

## 2. General Description

G070VAN01.1 is an a-Si & transmissive type thin film transistor liquid crystal display (TFT-LCD) with AHVA (Advanced Hyper View Angle) technology. This model is composed of a TFT-LCD, a driver, an FPCA (flexible printed circuit assembly), and a backlight unit.

### 2.1 Display Characteristics

The following items are characteristics summary on the table under 25 °C condition:

| Items                     | Unit    | Specifications             |
|---------------------------|---------|----------------------------|
| Screen Diagonal           | [inch]  | 7.0                        |
| Active Area               | [mm]    | 152.4(H)×91.44(V)          |
| Resolution                |         | 800 (H)×480 RGB(V)         |
| Pixel Pitch               | [mm]    | 0.1905(H)×0.0635×RGB(V)    |
| Pixel Arrangement         |         | R. G. B. Horizontal Stripe |
| Display Mode              |         | Normally Black             |
| Nominal Input Voltage VDD | [Volt]  | 3.3 (typ.)                 |
| Power Consumption         | [Watt]  | 1.4W Max.                  |
| Weight                    | [Grams] | 160+/-10%                  |
| Physical Size             | [mm]    | 166.6(H) × 107(V) × 7(T)   |
| Electrical Interface      |         | LVDS                       |
| Surface Treatment         |         | Anti-Glare,                |
| Support Color             |         | 16.7M Colors (24 bits)     |
| Temperature Range         |         |                            |
| Operating                 | [°C]    | -20 ~ +70                  |
| Storage (Non-Operating)   | [°C]    | -30 ~ +80                  |
| RoHS Compliance           |         | Yes                        |





## Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

### 2.2 Optical Characteristics

The optical characteristics are measured under stable conditions at 25 °C (Room Temperature):

| Item                                              | Unit              | Conditions                           |         | Min.  | Typ.  | Max.  | Note |
|---------------------------------------------------|-------------------|--------------------------------------|---------|-------|-------|-------|------|
| White Luminance                                   | cd/m <sup>2</sup> | I <sub>LED</sub> =32mA(center point) |         |       | 200   |       | 1    |
| Uniformity                                        | %                 | 9 points                             |         |       | 70    |       | 2,3  |
| Contrast Ratio                                    | --                |                                      |         | 1000  | 1300  |       | 4    |
| Response Time                                     | msec              | Rising                               |         |       |       | 11    | 5    |
|                                                   |                   | Falling                              |         |       |       | 19    |      |
|                                                   |                   | Rising + Falling                     |         |       |       | 20    |      |
| Viewing Angle                                     | degree            | Horizontal<br>CR >= 5                | (Right) | 80    | 85    |       | 6    |
|                                                   |                   |                                      | (Left)  | 80    | 85    |       |      |
|                                                   |                   | Vertical<br>CR >= 5                  | (Upper) | 80    | 85    |       |      |
|                                                   |                   |                                      | (Lower) | 80    | 85    |       |      |
| Color / Chromaticity<br>Coordinates<br>(CIE 1931) | --                | Red x                                |         | 0.600 | 0.650 | 0.700 |      |
|                                                   |                   | Red y                                |         | 0.285 | 0.335 | 0.385 |      |
|                                                   |                   | Green x                              |         | 0.256 | 0.306 | 0.356 |      |
|                                                   |                   | Green y                              |         | 0.563 | 0.613 | 0.663 |      |
|                                                   |                   | Blue x                               |         | 0.101 | 0.151 | 0.201 |      |
|                                                   |                   | Blue y                               |         | 0.006 | 0.056 | 0.106 |      |
|                                                   |                   | White x                              |         | 0.263 | 0.313 | 0.363 |      |
|                                                   |                   | White y                              |         | 0.279 | 0.329 | 0.379 |      |
| Color Gamut                                       | %                 |                                      |         |       | 60    |       |      |

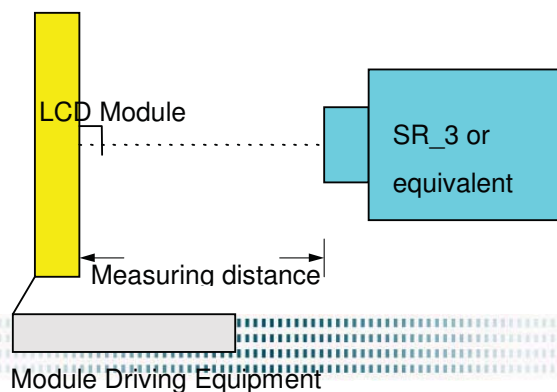
Note 1: Measurement method

Equipment Pattern Generator, Power Supply, Digital Voltmeter, Luminance meter (SR\_3 or equivalent)

Aperture 1° with 50cm viewing distance

Test Point Center

Environment < 1 lux



G070VAN01.1 rev. 1.1

6/24

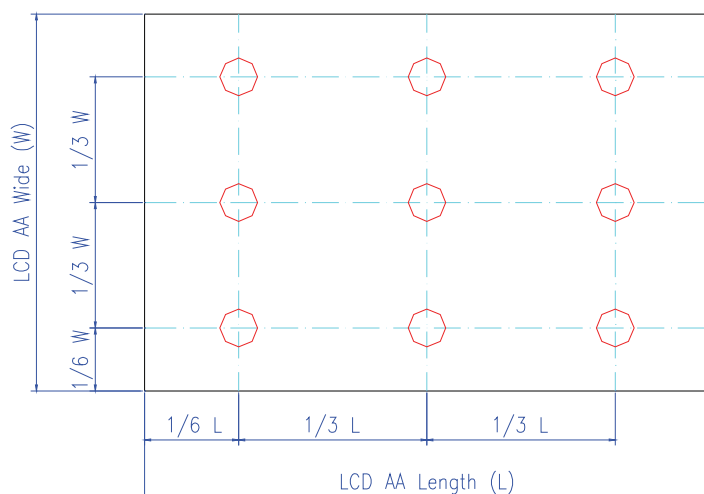


# Product Specification

AU OPTRONICS CORPORATION

G070VAN01.1

Note 2: Definition of 9 points position



Note 3: The luminance uniformity of 9 points is defined by dividing the minimum luminance values by the maximum test point luminance

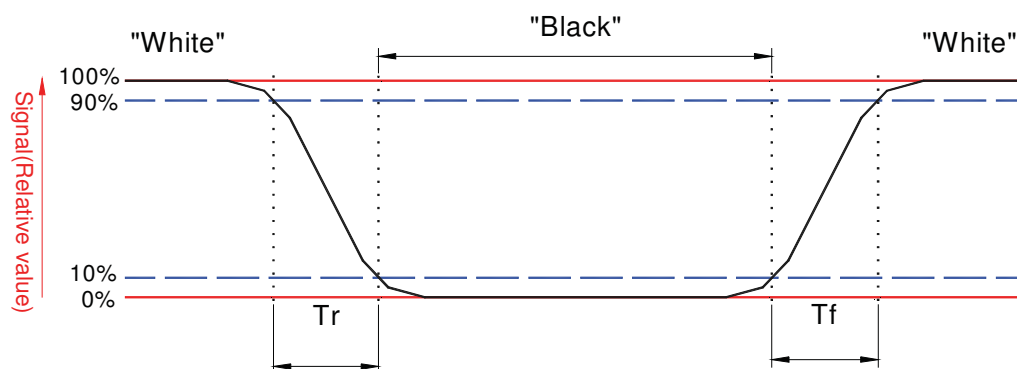
$$\delta_{w9} = \frac{\text{Minimum Brightness of nine points}}{\text{Maximum Brightness of nine points}}$$

Note 4: Definition of contrast ratio (CR):

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "White" state}}{\text{Brightness on the "Black" state}}$$

Note 5: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from "White" to "Black" (falling time) and from "Black" to "White" (rising time), respectively. The response time interval is between 10% and 90% of amplitudes. Please refer to the figure as below.



G070VAN01.1 rev. 1.1

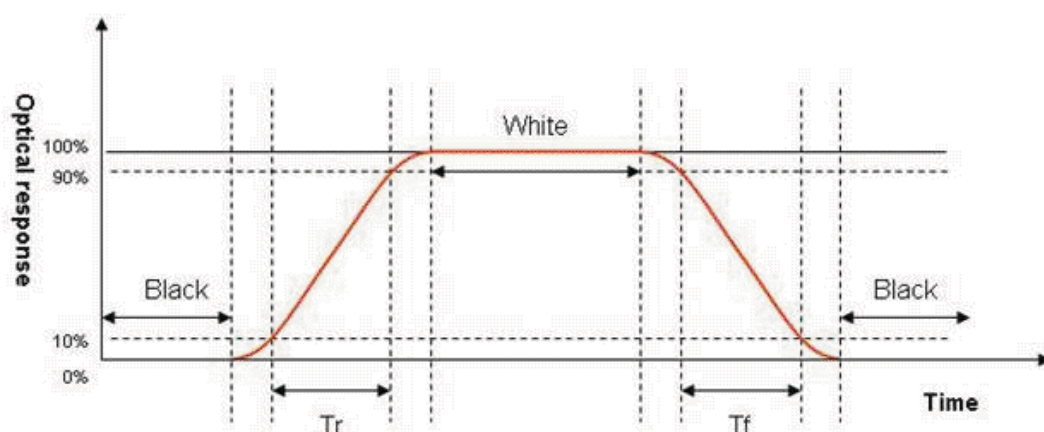
7/24



# Product Specification

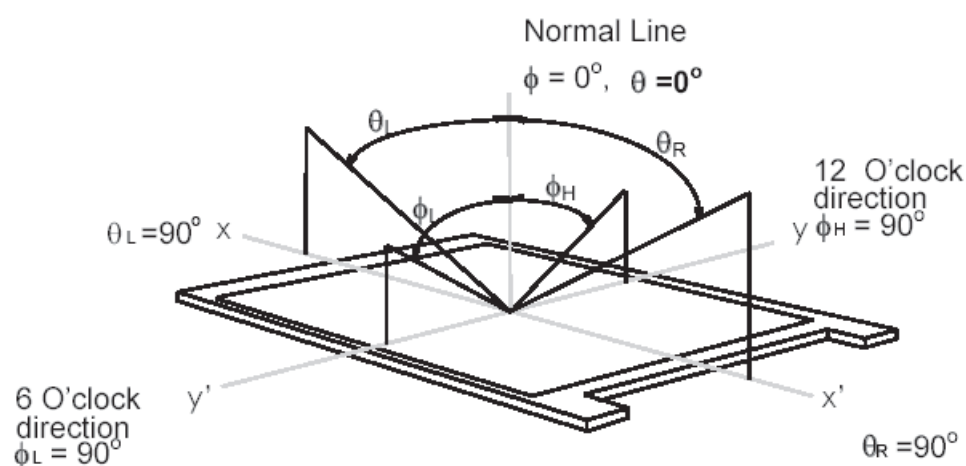
AU OPTRONICS CORPORATION

G070VAN01.1



Note 6: Definition of viewing angle

Viewing angle is the measurement of contrast ratio  $\geq 5$ , at the screen center, over a  $180^\circ$  horizontal and  $180^\circ$  vertical range (off-normal viewing angles). The  $180^\circ$  viewing angle range is broken down as below:  $90^\circ$  ( $\theta$ ) horizontal left and right, and  $90^\circ$  ( $\Phi$ ) vertical high (up) and low (down). The measurement direction is typically perpendicular to the display surface with the screen rotated to its center to develop the desired measurement viewing angle.







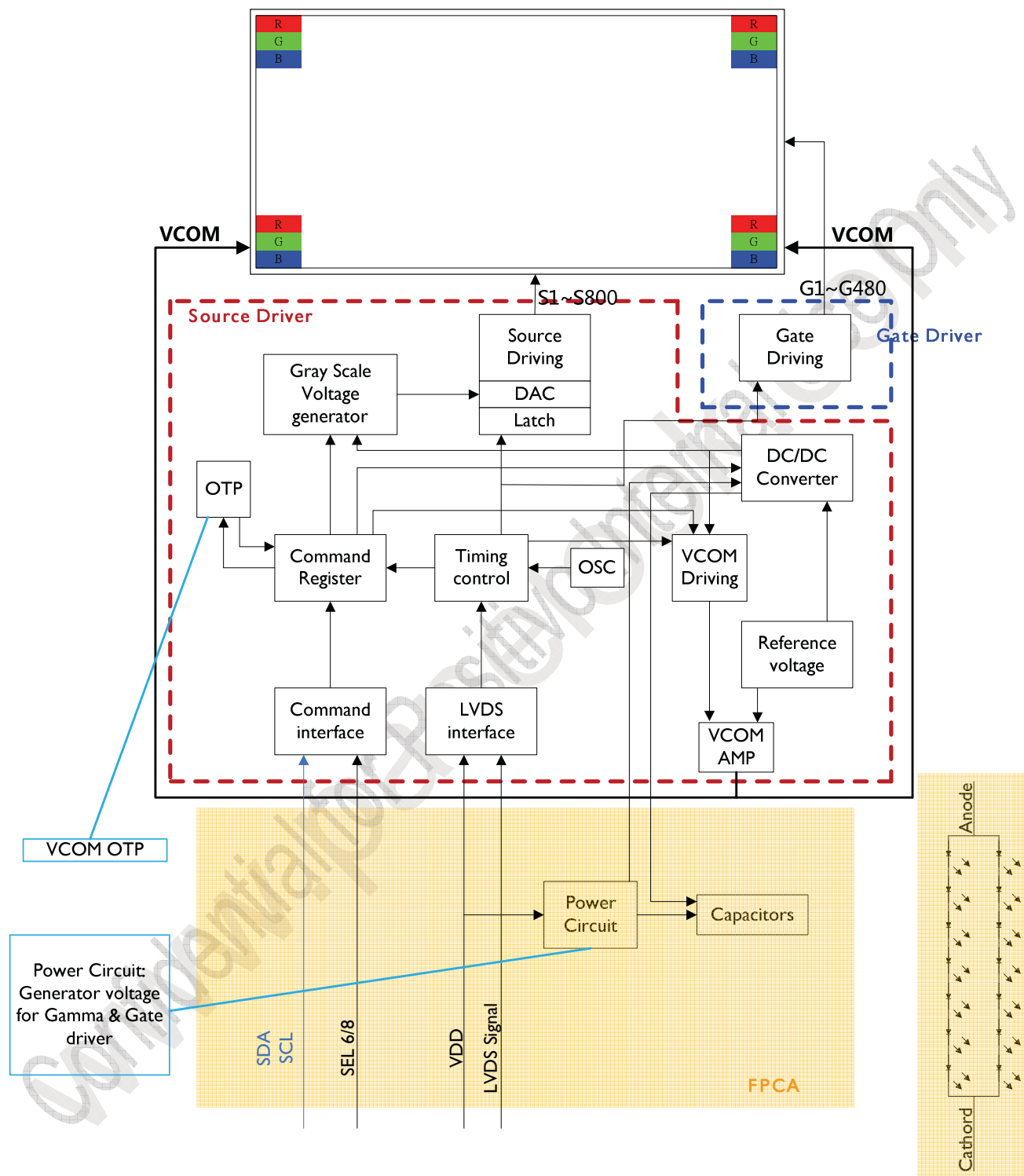
# Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

## 3. Functional Block Diagram

The following diagram shows the functional block of the 7 inch color TFT/LCD module:



G070VAN01.1 rev. 1.1

9/24



## Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

### 4. Absolute Maximum Ratings

#### 4.1 Absolute Ratings of TFT LCD Module

| Item                    | Symbol | Min  | Max     | Unit   |
|-------------------------|--------|------|---------|--------|
| Logic/LCD drive Voltage | Vin    | -0.3 | VDD+0.3 | [Volt] |

#### 4.2 Absolute Ratings of Environment

| Item                | Symbol | Min | Max | Unit  |
|---------------------|--------|-----|-----|-------|
| Operating           | TOP    | -20 | 70  | [°C]  |
| Operation Humidity  | HOP    | 5   | 90  | [%RH] |
| Storage Temperature | TST    | -30 | 80  | [°C]  |
| Storage Humidity    | HST    | 5   | 90  | [%RH] |

Note: Maximum Wet-Bulb should be 39 °C and no condensation.

### 5. Electrical Characteristics

#### 5.1 TFT LCD Module

##### 5.1.1 Power Specification

Input power specifications are shown as follows;

| Symbol             | Parameter               | Min | Typ | Max | Units  | Remark    |
|--------------------|-------------------------|-----|-----|-----|--------|-----------|
| VDD                | Logic/LCD Drive Voltage | 3.0 | 3.3 | 3.6 | [Volt] | Note1     |
| IVDD               | Panel Current           | -   | 140 | 200 | [mA]   | Note1,2,3 |
| IVDD Inrush        | Inrush Current          | -   | -   | 550 | [mA]   | Note 2    |
| Digital input      | Leakage current         | -   | -   | 50  | [uA]   | Note 2    |
| Differential input |                         | -   | -   | 100 | [uA]   | Note 2    |
| IVDD               |                         | -   | -   | 300 | [uA]   | Note 2    |

All conditions should be set typical value.

The panel can operate normally in the recommended operating condition.

Note1:Test pattern is the following picture & typ. By VDD=3.3V & max by VDD=3.6V

G070VAN01.1 rev. 1.1

10/24



## Product Specification

G070VAN01.1

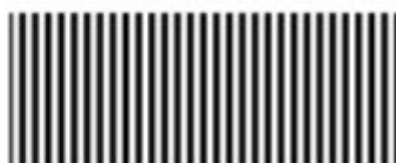
AU OPTRONICS CORPORATION

Note2: Operating temperature from -20°C to 70°C

Note3: panel loading of color bar pattern is close to typ spec., VBW pattern is close to max spec.



Color bar pattern



VBW pattern

Confidential for Positive Internal Use Only



# Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

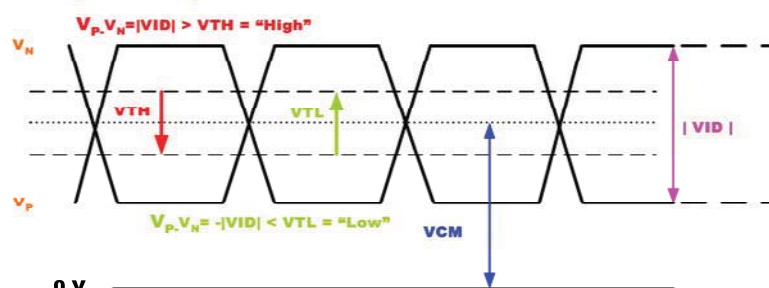
## 5.1.2 LVDS DC Signal Electrical Characteristics

| Symbol           | Item                                   | Min. | Typ. | Max. | Unit | Remark                                     |
|------------------|----------------------------------------|------|------|------|------|--------------------------------------------|
| V <sub>TH</sub>  | Differential Input High Threshold      | 100  | -    | -    | [mV] | V <sub>CM</sub> =1.2V                      |
| V <sub>TL</sub>  | Differential Input Low Threshold       | -    | -    | -100 | [mV] | V <sub>CM</sub> =1.2V                      |
| V <sub>ID</sub>  | Input Differential Voltage             | 200  | -    | 600  | [mV] |                                            |
| V <sub>ICM</sub> | Differential Input Common Mode Voltage | 1.0  | 1.2  | 1.4  | [V]  | V <sub>TH</sub> /V <sub>TL</sub> =+/-100mV |

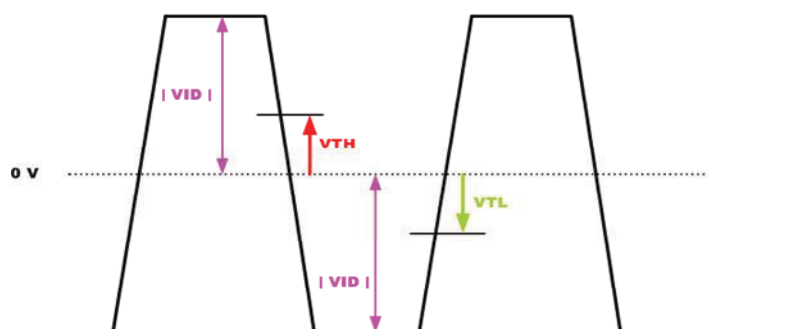
Input signals shall be low or Hi-Z state when VDD is off.

Note: LVDS Signal Waveform.

### Single-end Signal



### Differential Signal





## Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

### 5.2 Backlight Unit

#### 5.2.1 Parameter guideline for LED (For reference only, subjective to change)

Following characteristics are measured under a stable condition using an inverter at 25°C (Room Temperature):

#### Backlight driving conditions

| Symbol    | Parameter             | Min.   | Typ.   | Max. | Unit   | Remark                       |
|-----------|-----------------------|--------|--------|------|--------|------------------------------|
| $I_L$     | LED Supply Current    | -      | 32     |      | [mA]   | Ta = 25°C,<br>Note 2         |
| $V_L$     | LED Supply Voltage    | -      | 21     | 23.1 | [Volt] | Ta = 25°C<br>Note 2/3        |
| $P_{LED}$ | LED Power Consumption |        | 0.672  |      | [Watt] | Ta = 25°C<br>Note 3/4/5      |
| $L_L$     | LED Life Time         | 30,000 | 50,000 |      | Hrs    | Ta = 25°C,<br>Note 6, Note 7 |

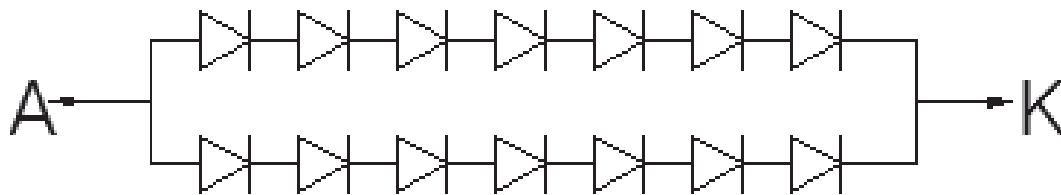
Note 1: Ta means ambient temperature of TFT-LCD module.

Note 2:  $I_L$ ,  $V_L$  are defined for 2strings of LED

Note 3: LED backlight is 14 LEDs (2strings, 7pcs for each string)

Note 4: The LED supply power is for 2strings of LED

Note 5: The voltage capacity of LED driver IC must be over max. of LED Voltage.



Note 6: Definition of life time: Brightness becomes to 50% of its original value.

Note 7: If G070VAN01.1 module is driven by high current or at high ambient temperature & humidity condition. The operating life will be reduce.





## Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

## 6. Signal Characteristic

## 6.1 Pixel Format Image

Following figure shows the relationship between input signal and LCD pixel format.

|                           | 1 <sup>st</sup><br>Pixel | 2 <sup>nd</sup><br>Pixel |  | 799 <sup>th</sup><br>Pixel | 800 <sup>th</sup><br>Pixel |
|---------------------------|--------------------------|--------------------------|--|----------------------------|----------------------------|
| 1 <sup>st</sup><br>Line   | R                        | R                        |  | R                          | R                          |
|                           | G                        | G                        |  | G                          | G                          |
|                           | B                        | B                        |  | B                          | B                          |
| 2 <sup>nd</sup><br>Line   | R                        | R                        |  | R                          | R                          |
|                           | G                        | G                        |  | G                          | G                          |
|                           | B                        | B                        |  | B                          | B                          |
|                           |                          |                          |  |                            |                            |
|                           |                          |                          |  |                            |                            |
|                           |                          |                          |  |                            |                            |
|                           |                          |                          |  |                            |                            |
|                           |                          |                          |  |                            |                            |
|                           |                          |                          |  |                            |                            |
| 479 <sup>th</sup><br>Line | R                        | R                        |  | R                          | R                          |
|                           | G                        | G                        |  | G                          | G                          |
|                           | B                        | B                        |  | B                          | B                          |
| 480 <sup>th</sup><br>Line | R                        | R                        |  | R                          | R                          |
|                           | G                        | G                        |  | G                          | G                          |
|                           | B                        | B                        |  | B                          | B                          |



# Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

## 6.2 Signal Description

The module uses a LVDS receiver embedded in AUO's ASIC. LVDS is a differential signal technology for LCD interface and a high-speed data transfer device.

### 6.2.1 TFT LCD Module: LVDS Connector

| Connector Name / Designation | Signal Connector                              |
|------------------------------|-----------------------------------------------|
| Manufacturer                 | 慶良電子股份有限公司<br>(CHIEF LAND ElectronicCo.,Ltd.) |
| Connector Model Number       | 093G30-00001A-M4                              |

| Pin no | Symbol | Function                               | Remark |
|--------|--------|----------------------------------------|--------|
| 1      | NC     | NOT CONNECT                            | Note 1 |
| 2      | LED+   | LED ANODE                              |        |
| 3      | LED+   | LED ANODE                              |        |
| 4      | NC     | NOT CONNECT                            |        |
| 5      | NC     | NOT CONNECT                            |        |
| 6      | NC     | NOT CONNECT                            |        |
| 7      | LED-   | LED KATHODE                            |        |
| 8      | LED-   | LED KATHODE                            |        |
| 9      | VDD    | Power supply +3.3V                     |        |
| 10     | VDD    | Power supply +3.3V                     |        |
| 11     | GND    | Ground                                 |        |
| 12     | GND    | Ground                                 |        |
| 13     | RXIN0N | Negative LVDS differential input       |        |
| 14     | RXIN0P | Positive LVDS differential input       |        |
| 15     | GND    | Ground                                 |        |
| 16     | RXIN1N | Negative LVDS differential input       |        |
| 17     | RXIN1P | Positive LVDS differential input       |        |
| 18     | GND    | Ground                                 |        |
| 19     | RXIN2N | Negative LVDS differential input       |        |
| 20     | RXIN2P | Positive LVDS differential input       |        |
| 21     | GND    | Ground                                 |        |
| 22     | RXCLKN | Negative LVDS differential clock input |        |
| 23     | RXCLKP | Positive LVDS differential clock input |        |
| 24     | GND    | Ground                                 |        |
| 25     | RXIN3N | Negative LVDS differential input       |        |
| 26     | RXIN3P | Positive LVDS differential input       |        |
| 27     | GND    | Ground                                 |        |



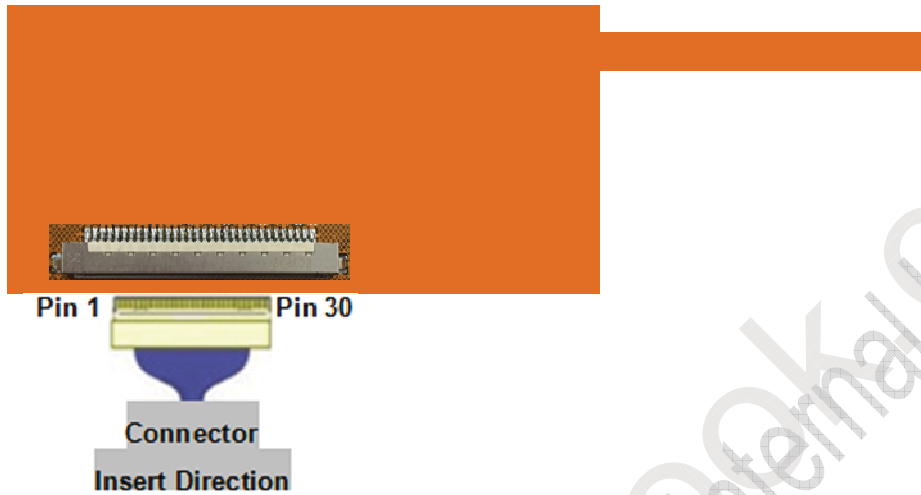
# Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

|    |         |                                                       |        |
|----|---------|-------------------------------------------------------|--------|
| 28 | SEL 6/8 | Low or NC → 6bit input mode<br>High → 8bit input mode |        |
| 29 | NC      | NOT CONNECT                                           | Note 1 |
| 30 | NC      | NOT CONNECT                                           | Note 1 |

Note 1: AUO internal engineering use

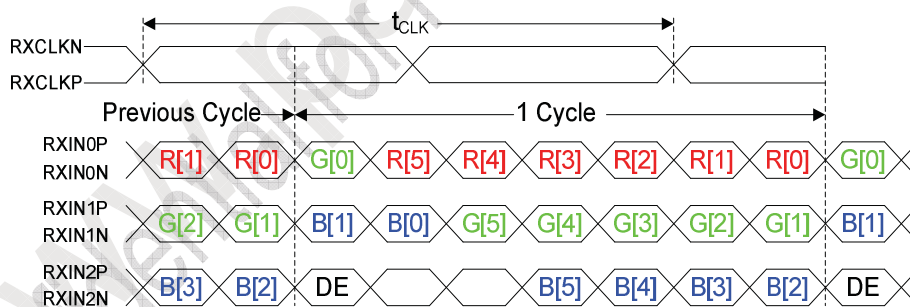


Note1: 30pin start from left side of connector.

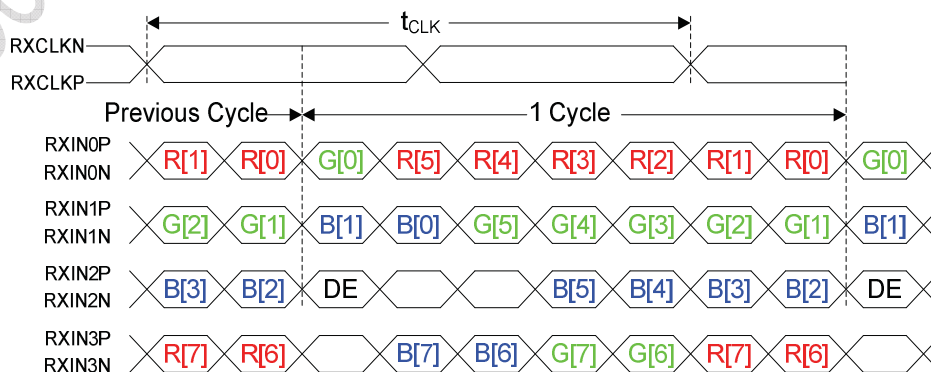
Note2: Input signals shall be low or High-impedance state when VDD is off.

## 6.3 The Input Data Format

SEL68 = "Low" or "NC" for 6 bits LVDS Input



SEL68 = "High" for 8 bits LVDS Input(VESA Format)





# Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

| Signal Name      | Description        | Remark                                                                  |
|------------------|--------------------|-------------------------------------------------------------------------|
| R7               | Red Data 7         | Red-pixel Data                                                          |
| R6               | Red Data 6         |                                                                         |
| R5               | Red Data 5         | For 8Bits LVDS input<br>MSB: R7 ; LSB: R0                               |
| R4               | Red Data 4         |                                                                         |
| R3               | Red Data 3         | For 6Bits LVDS input<br>MSB: R5 ; LSB: R0                               |
| R2               | Red Data 2         |                                                                         |
| R1               | Red Data 1         |                                                                         |
| R0               | Red Data 0         |                                                                         |
| G7               | Green Data 7       | Green-pixel Data                                                        |
| G6               | Green Data 6       |                                                                         |
| G5               | Green Data 5       | For 8Bits LVDS input<br>MSB: G7 ; LSB: G0                               |
| G4               | Green Data 4       |                                                                         |
| G3               | Green Data 3       | For 6Bits LVDS input<br>MSB: G5 ; LSB: G0                               |
| G2               | Green Data 2       |                                                                         |
| G1               | Green Data 1       |                                                                         |
| G0               | Green Data 0       |                                                                         |
| B7               | Blue Data 7        | Blue-pixel Data                                                         |
| B6               | Blue Data 6        |                                                                         |
| B5               | Blue Data 5        | For 8Bits LVDS input<br>MSB: B7 ; LSB: B0                               |
| B4               | Blue Data 4        |                                                                         |
| B3               | Blue Data 3        | For 6Bits LVDS input<br>MSB: B5 ; LSB: B0                               |
| B2               | Blue Data 2        |                                                                         |
| B1               | Blue Data 1        |                                                                         |
| B0               | Blue Data 0        |                                                                         |
| RXCLKN<br>RXCLKP | LVDS Data Clock    |                                                                         |
| DE               | Data Enable Signal | When the signal is high, the pixel data shall be valid to be displayed. |

Note: Output signals from any system shall be low or Hi-Z state when VDD is off.



# Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

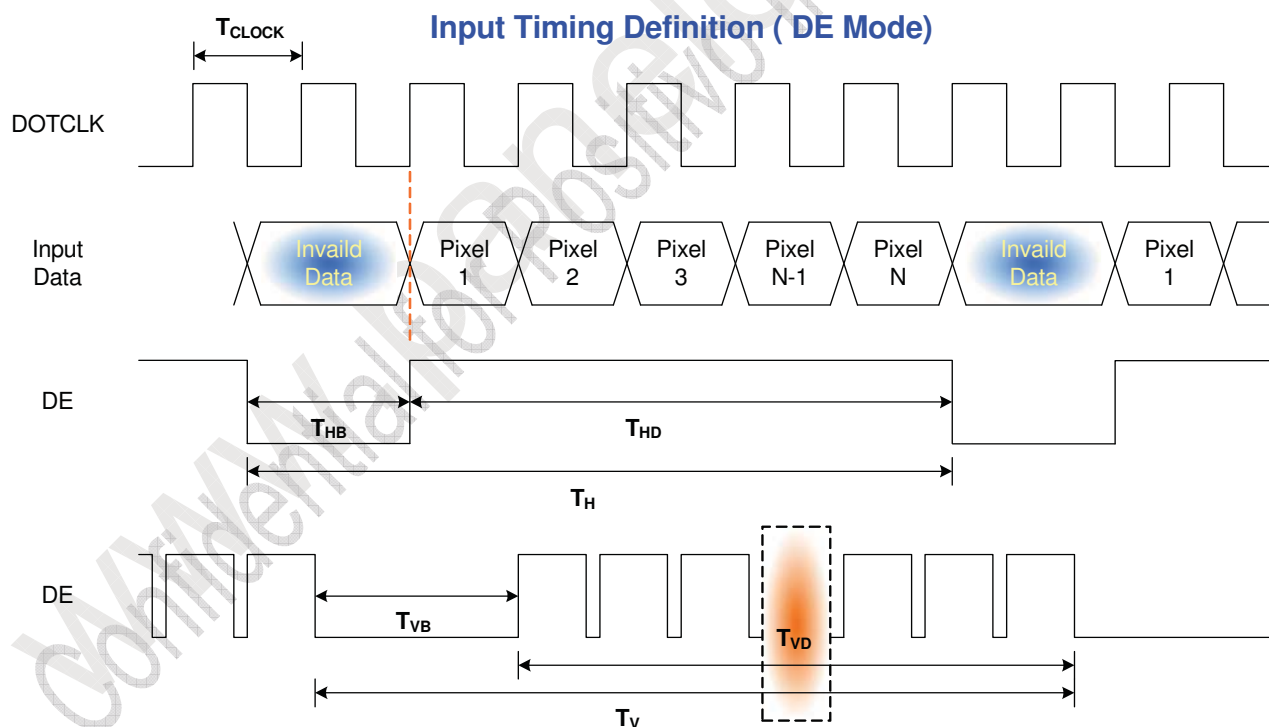
## 6.4 Interface Timing

### 6.4.1 Timing Characteristics

| Signal                |          | Symbol                | Min. | Typ. | Max. | Unit               |
|-----------------------|----------|-----------------------|------|------|------|--------------------|
| Clock Frequency       |          | 1/ T <sub>Clock</sub> | 33.2 | 37   | 45   | MHz                |
| Vertical<br>Section   | Period   | T <sub>V</sub>        | 525  | 525  | 580  | T <sub>Line</sub>  |
|                       | Active   | T <sub>VD</sub>       | 480  |      |      |                    |
|                       | Blanking | T <sub>VB</sub>       | 45   | 45   | 100  |                    |
| Horizontal<br>Section | Period   | T <sub>H</sub>        | 1054 | 1175 | 1395 | T <sub>Clock</sub> |
|                       | Active   | T <sub>HD</sub>       | 800  |      |      |                    |
|                       | Blanking | T <sub>HB</sub>       | 254  | 375  | 595  |                    |
| Frame Rate            |          | F                     | 60   |      |      | Hz                 |

Note : DE mode.

### 6.4.2 Input Timing Diagram







## Product Specification

G070VAN01.1

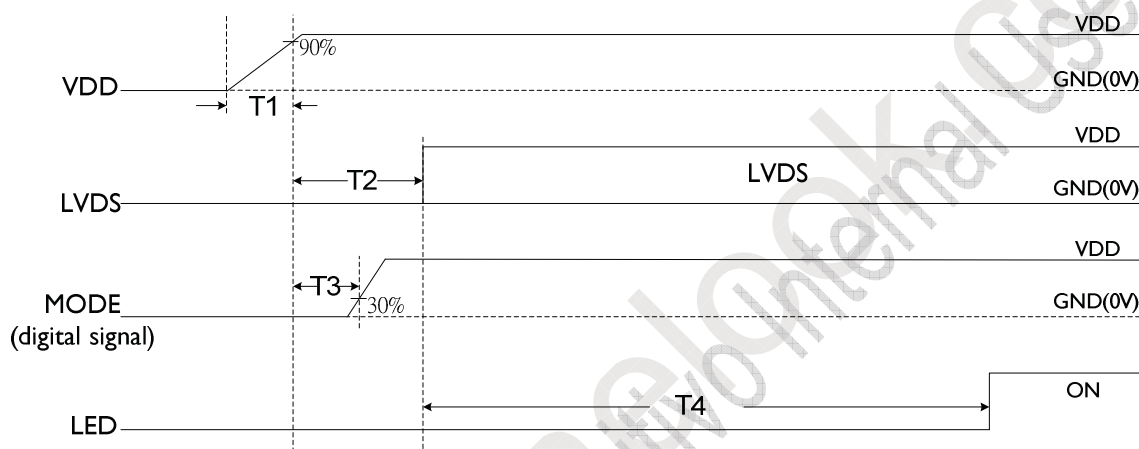
AU OPTRONICS CORPORATION

## 6.5 Power ON/OFF Sequence

VDD power and lamp on/off sequence is as below. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.

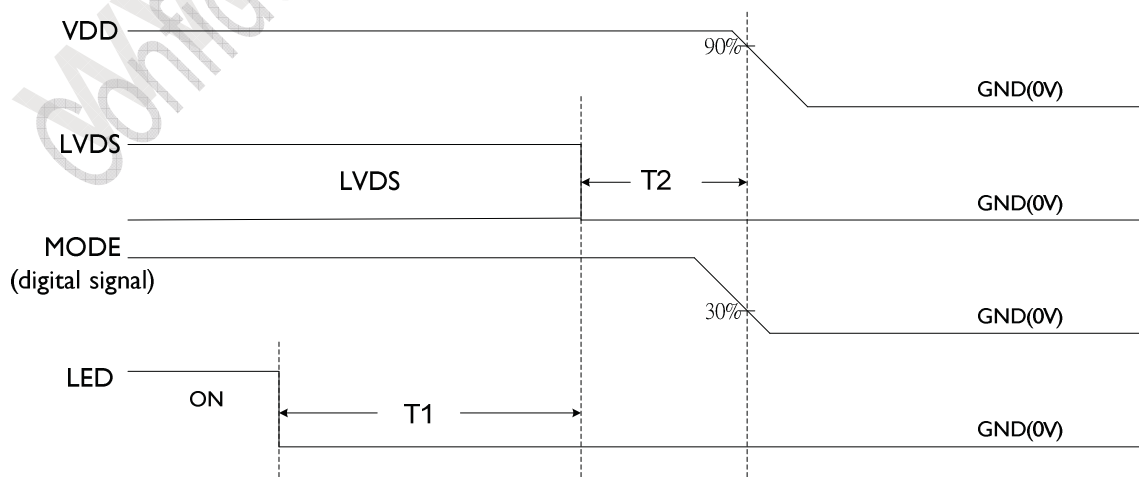
## Panel Power on sequence:

| Parameter | Value |      |      | Unit |
|-----------|-------|------|------|------|
|           | Min.  | Typ. | Max. |      |
| T1        | 1     | -    | -    | ms   |
| T2        | 7     | -    | -    | ms   |
| T3        | 0     | -    | -    | ms   |
| T4        | 300   | -    | -    | ms   |



## Panel Power off sequence:

| Parameter | Value |      |      | Unit |
|-----------|-------|------|------|------|
|           | Min.  | Typ. | Max. |      |
| T1        | 350   | -    | -    | ms   |
| T2        | 0     | -    | -    | ms   |





# Product Specification

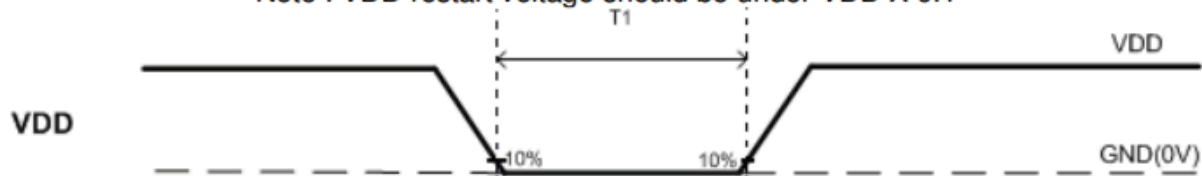
G070VAN01.1

AU OPTRONICS CORPORATION

## VDD ON/OFF:

| Parameter | Value |      |      | Unit |
|-----------|-------|------|------|------|
|           | Min.  | Typ. | Max. |      |
| T1        | 700   | --   | -    | ms   |

Note : VDD restart voltage should be under VDD X 0.1



The above on/off sequence should be applied to avoid abnormal function in the display. Please make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector.



# Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

## 7. Reliability Test Criteria

| Items                          | Required Condition                                                       | Note   |
|--------------------------------|--------------------------------------------------------------------------|--------|
| Temperature Humidity Bias      | 60 °C /90%,240Hr                                                         |        |
| High Temperature Operation     | 70 °C, 240Hr (center point of panel surface)                             |        |
| Low Temperature Operation      | -20 °C, 240Hr                                                            |        |
| Hot Storage                    | 80 °C, 240 hours                                                         |        |
| Cold Storage                   | -30 °C, 240 hours                                                        |        |
| Thermal Shock Test             | -30 °C ~ 70 °C /50 cycles 1Hrs/cycle                                     |        |
| Shock Test (Non-Operating)     | 50G,20ms,Half-sine wave,(+X,+Y,+Z)                                       |        |
| Vibration Test (Non-Operating) | Frequency: 10~55 Hz<br>Stoke: 1.5mm<br>Sweep: 10~55~10 Hz                |        |
| ESD                            | Contact : ± 8KV/ operation, Class B<br>Air : ± 15KV / operation, Class B | Note 1 |
| Drop (with carton)             | Height: 61cm<br>1 corner, 3 edges, 6 surfaces                            |        |

Note1: According to EN61000-4-2 , ESD class B: Some performance degradation allowed. No data lost  
. Self-recoverable. No hardware failures.

Note2:

- Water condensation is not allowed for each test items.
- Each test is done by new TFT-LCD module. Don't use the same TFT-LCD module repeatedly for reliability test.
- The reliability test is performed only to examine the TFT-LCD module capability.
- To inspect TFT-LCD module after reliability test, please store it at room temperature and room humidity for 24 hours at least in advance.

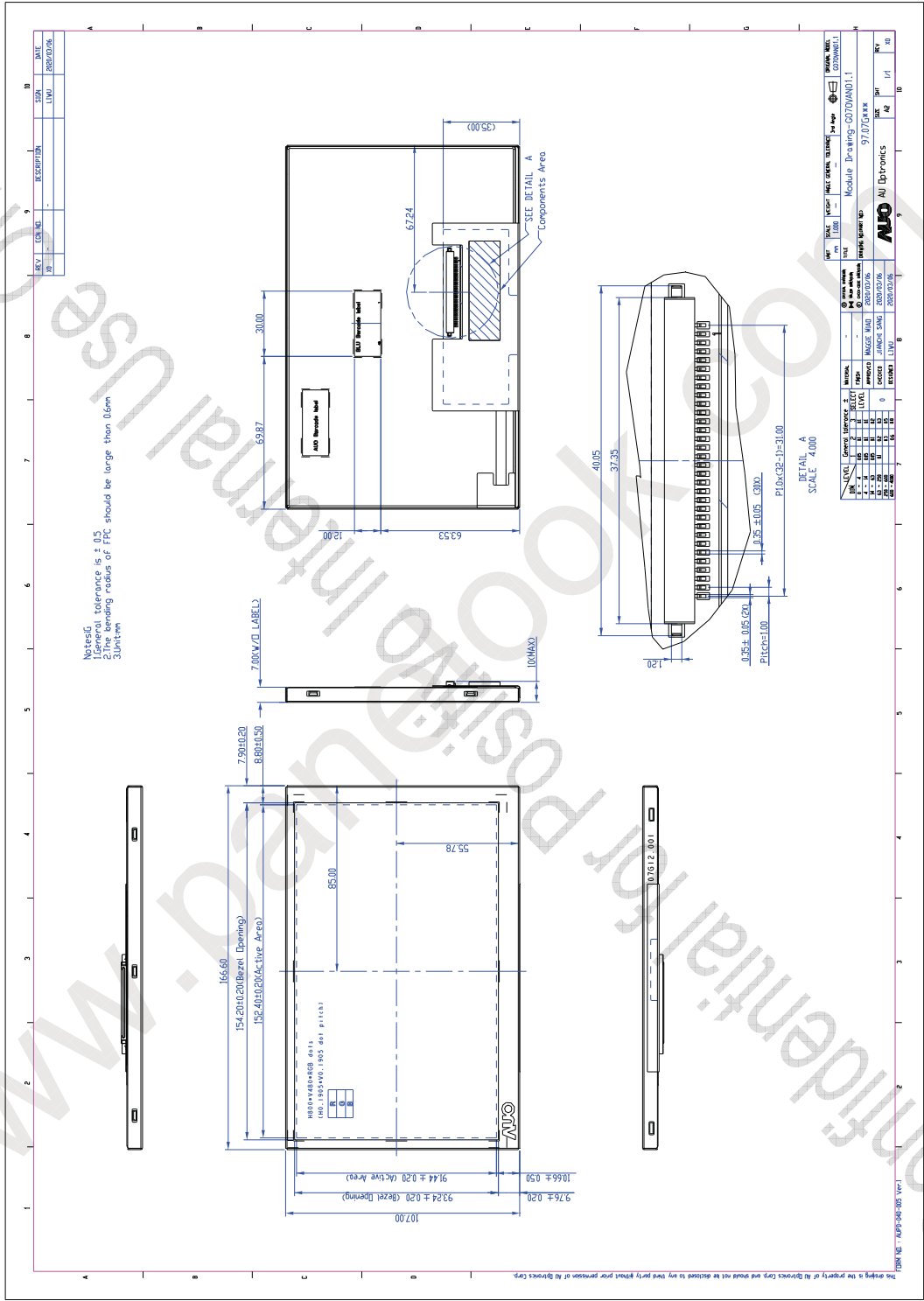
Product Specification

AU OPTONICS CORPORATION

G070VAN01.1

8. Mechanical Characteristics

8.1 LCM Outline Dimension





## Product Specification

G070VAN01.1

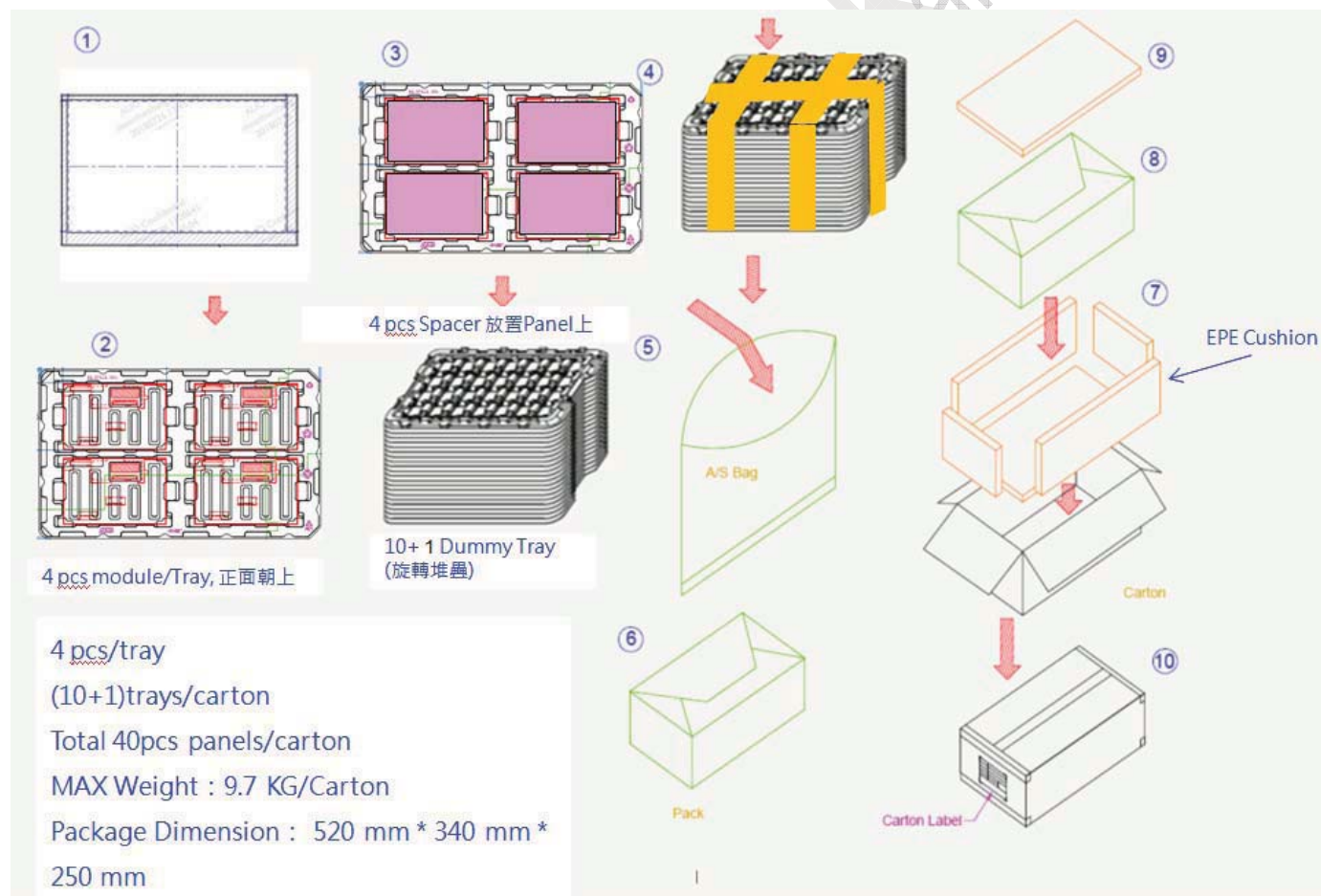
AU OPTRONICS CORPORATION

### 9. Label and Packaging

#### 9.1 Shipping Label (on the rear side of TFT-LCD display)



#### 9.1 Carton Package







## Product Specification

G070VAN01.1

AU OPTRONICS CORPORATION

### 10 Safety

#### 10.1 Sharp Edge Requirements

There will be no sharp edges or comers on the display assembly that could cause injury.

#### 10.2 Materials

##### 10.2.1 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 AUO toxicologist.

##### 10.2.2 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.

#### 10.3 Capacitors

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

#### 10.4 National Test Lab Requirement

The display module will satisfy all requirements for compliance to:

UL 60950-1 second edition

U.S.A. Information Technology Equipment