



- ( ) Preliminary Specifications
- ( V ) Final Specifications

|                   |                         |
|-------------------|-------------------------|
| <b>Module</b>     | 12.1 Inch Color TFT-LCD |
| <b>Model Name</b> | G121EAN01.0             |

| Customer                         | Date  |
|----------------------------------|-------|
| <b>Checked &amp; Approved by</b> |       |
| _____                            | _____ |

| Approved by   | Date       |
|---|------------|
| Grace Hung  | 2017/05/02 |
| <b>Prepared by</b>  |            |
| Kevin Tseng   | 2017/05/02 |
| General Display Business Division /<br>AU Optronics corporation |            |

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|-------------------------|--|---|--|-------------|--------|-------------------------|-----------|-------------------------|-------|---------------|-------|---------|-----------------|----------------|-------|-----------|---------------|--------------|------------------------|--------|---------|-------------------------|-------------------|-------------------|--------|-------|--------|---------------------|-------------------------|------|--------------------|--------|--|--------------------|--|--------|-------------|-------------|-------------------------|--------|-----------------|------|-------------------|-----------------|-------|------|-----------------|--------|--------------|------------------------|------|-----|-------------------|-------------------|------|-----------------------------|-----------------------|------------|---------------------|---------|--------|--------|-----------|-----|--------------------|--------|-----|--------------------|---------------------|----|----|----|------|-----------|----|---------------------|------|-------|-------|--------|-----------------------|------|-----------------------|------|------|------|--------|-----------------------|---------------|--|--------|---------|--|-----|-----------------------|--|--------|-----------|-----|-----|-----|------|--------|------|---------------|----|----|----|--------|--|------|---------------|------|------|------|-----|-------------------------|------|-------------------|-----|-----|-----|--------|-------------------------|-----|------------|-------|-----|---|--------|--|--------|---|-----|--------|--|------|-------------------|-----|-----|-----|------|--|------|--------------------|---|-----|-----|---|----------------------|------|-----------------------|------------|---|-----|--------|--|-----------|---|-----|--------|--|----|---------------------|----|----|----|------|-----------|----|---------------------|------|-------|-------|--------|-----------------------|------|-----------------------|------|------|------|--------|-----------------------|---------------|--|--------|---------|--|-----|-----------------------|
| 0.0 2016/02/05          | All  | First Edition   |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 0.1 2016/03/10          | 10   |   |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
|                         | 11   | <table border="1"> <thead> <tr> <th>Item</th> <th>Symbol</th> <th>Min</th> <th>Max</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>Logic/LCD Drive Voltage</td> <td>VDD</td> <td>-0.3</td> <td>+3.8</td> <td>[Volt]</td> </tr> <tr> <td>Contolr Signals</td> <td>SEL68, REVERSE</td> <td>-0.3</td> <td>VDD</td> <td>[Volt]</td> </tr> <tr> <td>LVDS Signals</td> <td>CLKIN -/+, RIN0 ~ 3-/+</td> <td>-0.3</td> <td>VDD</td> <td>[Volt]</td> </tr> <tr> <td>LED Input Voltage</td> <td>VCC</td> <td>-0.3</td> <td>+13</td> <td>[Volt]</td> </tr> <tr> <td>LED Control Signals</td> <td>EN, PWM</td> <td>-0.3</td> <td>+6</td> <td>[Volt]</td> </tr> </tbody> </table> | Item   | Symbol      | Min    | Max                     | Unit      | Logic/LCD Drive Voltage | VDD   | -0.3          | +3.8  | [Volt]  | Contolr Signals | SEL68, REVERSE | -0.3  | VDD       | [Volt]        | LVDS Signals | CLKIN -/+, RIN0 ~ 3-/+ | -0.3   | VDD     | [Volt]                  | LED Input Voltage | VCC               | -0.3   | +13   | [Volt] | LED Control Signals | EN, PWM                 | -0.3 | +6                 | [Volt] | <table border="1"> <thead> <tr> <th>Item</th> <th>Symbol</th> <th>Min</th> <th>Max</th> <th>Unit</th> </tr> </thead> <tbody> <tr> <td>Logic/LCD Drive Voltage</td> <td>VDD</td> <td>-0.3</td> <td>+3.8</td> <td>[Volt]</td> </tr> <tr> <td>Contolr Signals</td> <td>SEL68</td> <td>-0.3</td> <td>VDD</td> <td>[Volt]</td> </tr> <tr> <td>LVDS Signals</td> <td>CLKIN -/+, RIN0 ~ 3-/+</td> <td>-0.3</td> <td>0.6</td> <td>[Volt]</td> </tr> <tr> <td>LED Input Voltage</td> <td>VLED</td> <td>-0.3</td> <td>15</td> <td>[Volt]</td> </tr> <tr> <td>LED Control Signals</td> <td>EN, PWM</td> <td>-0.3</td> <td>+6</td> <td>[Volt]</td> </tr> </tbody> </table> | Item               | Symbol   | Min    | Max         | Unit        | Logic/LCD Drive Voltage | VDD    | -0.3            | +3.8 | [Volt]            | Contolr Signals | SEL68 | -0.3 | VDD             | [Volt] | LVDS Signals | CLKIN -/+, RIN0 ~ 3-/+ | -0.3 | 0.6 | [Volt]            | LED Input Voltage | VLED | -0.3                        | 15                    | [Volt]     | LED Control Signals | EN, PWM | -0.3   | +6     | [Volt]    |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
|                         | Item   | Symbol  | Min  | Max         | Unit   |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
|                         | Logic/LCD Drive Voltage  | VDD   | -0.3   | +3.8        | [Volt] |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
|                         | Contolr Signals  | SEL68, REVERSE  | -0.3   | VDD         | [Volt] |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| LVDS Signals            | CLKIN -/+, RIN0 ~ 3-/+   | -0.3  | VDD  | [Volt]      |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| LED Input Voltage       | VCC  | -0.3  | +13  | [Volt]      |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| LED Control Signals     | EN, PWM  | -0.3  | +6   | [Volt]      |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Item                    | Symbol   | Min   | Max  | Unit        |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Logic/LCD Drive Voltage | VDD  | -0.3  | +3.8   | [Volt]      |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Contolr Signals         | SEL68  | -0.3  | VDD  | [Volt]      |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| LVDS Signals            | CLKIN -/+, RIN0 ~ 3-/+   | -0.3  | 0.6  | [Volt]      |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| LED Input Voltage       | VLED   | -0.3  | 15   | [Volt]      |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| LED Control Signals     | EN, PWM  | -0.3  | +6   | [Volt]      |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 14                      | <table border="1"> <thead> <tr> <th>Symbol</th> <th>Parameter</th> <th>Min</th> <th>Typ</th> <th>Max</th> <th>Unit</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>VCC</td> <td>Input Voltage</td> <td>10.8</td> <td>12</td> <td>12.6</td> <td>[Volt]</td> <td></td> </tr> <tr> <td>Ivcc</td> <td>Input Current</td> <td>0.33</td> <td>0.4</td> <td>0.4</td> <td>[A]</td> <td>VCC=12V &amp; 100% PWM Duty</td> </tr> <tr> <td>Pvcc</td> <td>Power Consumption</td> <td>3.96</td> <td>4.8</td> <td>4.8</td> <td>[Watt]</td> <td>VCC=12V &amp; 100% PWM Duty</td> </tr> <tr> <td rowspan="2">Ven</td> <td rowspan="2">EN Control</td> <td>BL On</td> <td>3</td> <td>5.5</td> <td>[Volt]</td> <td></td> </tr> <tr> <td>BL Off</td> <td>0</td> <td>0.5</td> <td>[Volt]</td> <td></td> </tr> <tr> <td>Fvwm</td> <td>Dimming Frequency</td> <td>200</td> <td>200</td> <td>200</td> <td>[Hz]</td> <td></td> </tr> <tr> <td>Dvwm</td> <td>Dimming Duty Cycle</td> <td>5</td> <td>100</td> <td>100</td> <td>%</td> <td></td> </tr> <tr> <td rowspan="2">Vvwm</td> <td rowspan="2">Dimming Control Level</td> <td>High Level</td> <td>3</td> <td>5.5</td> <td>[Volt]</td> <td></td> </tr> <tr> <td>Low Level</td> <td>0</td> <td>0.5</td> <td>[Volt]</td> <td></td> </tr> <tr> <td>If</td> <td>LED Forward Current</td> <td>50</td> <td>50</td> <td>50</td> <td>[mA]</td> <td>Ta = 25°C</td> </tr> <tr> <td>Vf</td> <td>LED Forward Voltage</td> <td>24.4</td> <td>31.24</td> <td>31.24</td> <td>[Volt]</td> <td>If = 45 mA, Ta = 25°C</td> </tr> <tr> <td>Pled</td> <td>LED Power Consumption</td> <td>4.88</td> <td>6.25</td> <td>6.25</td> <td>[Watt]</td> <td>If = 45 mA, Ta = 25°C</td> </tr> <tr> <td>LED life time</td> <td></td> <td>70,000</td> <td>100,000</td> <td></td> <td>Hrs</td> <td>If = 45 mA, Ta = 25°C</td> </tr> </tbody> </table> | Symbol  | Parameter  | Min         | Typ    | Max                     | Unit      | Remark                  | VCC   | Input Voltage | 10.8  | 12      | 12.6            | [Volt]         |       | Ivcc      | Input Current | 0.33         | 0.4                    | 0.4    | [A]     | VCC=12V & 100% PWM Duty | Pvcc              | Power Consumption | 3.96   | 4.8   | 4.8    | [Watt]              | VCC=12V & 100% PWM Duty | Ven  | EN Control         | BL On  | 3  | 5.5                | [Volt]   |        | BL Off      | 0           | 0.5                     | [Volt] |                 | Fvwm | Dimming Frequency | 200             | 200   | 200  | [Hz]            |        | Dvwm         | Dimming Duty Cycle     | 5    | 100 | 100               | %                 |      | Vvwm                        | Dimming Control Level | High Level | 3                   | 5.5     | [Volt] |        | Low Level | 0   | 0.5                | [Volt] |     | If                 | LED Forward Current | 50 | 50 | 50 | [mA] | Ta = 25°C | Vf | LED Forward Voltage | 24.4 | 31.24 | 31.24 | [Volt] | If = 45 mA, Ta = 25°C | Pled | LED Power Consumption | 4.88 | 6.25 | 6.25 | [Watt] | If = 45 mA, Ta = 25°C | LED life time |  | 70,000 | 100,000 |  | Hrs | If = 45 mA, Ta = 25°C | <table border="1"> <thead> <tr> <th>Symbol</th> <th>Parameter</th> <th>Min</th> <th>Typ</th> <th>Max</th> <th>Unit</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>VLED</td> <td>Input Voltage</td> <td>10</td> <td>12</td> <td>15</td> <td>[Volt]</td> <td></td> </tr> <tr> <td>Ivcc</td> <td>Input Current</td> <td>0.51</td> <td>0.65</td> <td>0.65</td> <td>[A]</td> <td>VCC=12V &amp; 100% PWM Duty</td> </tr> <tr> <td>Pvcc</td> <td>Power Consumption</td> <td>6.1</td> <td>6.5</td> <td>6.5</td> <td>[Watt]</td> <td>VCC=12V &amp; 100% PWM Duty</td> </tr> <tr> <td rowspan="2">Ven</td> <td rowspan="2">EN Control</td> <td>BL On</td> <td>2.5</td> <td>4</td> <td>[Volt]</td> <td></td> </tr> <tr> <td>BL Off</td> <td>0</td> <td>0.5</td> <td>[Volt]</td> <td></td> </tr> <tr> <td>Fvwm</td> <td>Dimming Frequency</td> <td>200</td> <td>200</td> <td>200</td> <td>[Hz]</td> <td></td> </tr> <tr> <td>Dvwm</td> <td>Dimming Duty Cycle</td> <td>1</td> <td>100</td> <td>100</td> <td>%</td> <td>1~6% with non-linear</td> </tr> <tr> <td rowspan="2">Vvwm</td> <td rowspan="2">Dimming Control Level</td> <td>High Level</td> <td>3</td> <td>5.5</td> <td>[Volt]</td> <td></td> </tr> <tr> <td>Low Level</td> <td>0</td> <td>0.5</td> <td>[Volt]</td> <td></td> </tr> <tr> <td>If</td> <td>LED Forward Current</td> <td>50</td> <td>50</td> <td>50</td> <td>[mA]</td> <td>Ta = 25°C</td> </tr> <tr> <td>Vf</td> <td>LED Forward Voltage</td> <td>24.4</td> <td>31.24</td> <td>31.24</td> <td>[Volt]</td> <td>If = 50 mA, Ta = 25°C</td> </tr> <tr> <td>Pled</td> <td>LED Power Consumption</td> <td>4.88</td> <td>6.25</td> <td>6.25</td> <td>[Watt]</td> <td>If = 50 mA, Ta = 25°C</td> </tr> <tr> <td>LED life time</td> <td></td> <td>70,000</td> <td>100,000</td> <td></td> <td>Hrs</td> <td>If = 50 mA, Ta = 25°C</td> </tr> </tbody> </table> | Symbol | Parameter | Min | Typ | Max | Unit | Remark | VLED | Input Voltage | 10 | 12 | 15 | [Volt] |  | Ivcc | Input Current | 0.51 | 0.65 | 0.65 | [A] | VCC=12V & 100% PWM Duty | Pvcc | Power Consumption | 6.1 | 6.5 | 6.5 | [Watt] | VCC=12V & 100% PWM Duty | Ven | EN Control | BL On | 2.5 | 4 | [Volt] |  | BL Off | 0 | 0.5 | [Volt] |  | Fvwm | Dimming Frequency | 200 | 200 | 200 | [Hz] |  | Dvwm | Dimming Duty Cycle | 1 | 100 | 100 | % | 1~6% with non-linear | Vvwm | Dimming Control Level | High Level | 3 | 5.5 | [Volt] |  | Low Level | 0 | 0.5 | [Volt] |  | If | LED Forward Current | 50 | 50 | 50 | [mA] | Ta = 25°C | Vf | LED Forward Voltage | 24.4 | 31.24 | 31.24 | [Volt] | If = 50 mA, Ta = 25°C | Pled | LED Power Consumption | 4.88 | 6.25 | 6.25 | [Watt] | If = 50 mA, Ta = 25°C | LED life time |  | 70,000 | 100,000 |  | Hrs | If = 50 mA, Ta = 25°C |
| Symbol                  | Parameter  | Min   | Typ  | Max         | Unit   | Remark                  |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| VCC                     | Input Voltage  | 10.8  | 12   | 12.6        | [Volt] |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Ivcc                    | Input Current  | 0.33  | 0.4  | 0.4         | [A]    | VCC=12V & 100% PWM Duty |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Pvcc                    | Power Consumption  | 3.96  | 4.8  | 4.8         | [Watt] | VCC=12V & 100% PWM Duty |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Ven                     | EN Control   | BL On   | 3  | 5.5         | [Volt] |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
|                         |  | BL Off  | 0  | 0.5         | [Volt] |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Fvwm                    | Dimming Frequency  | 200   | 200  | 200         | [Hz]   |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Dvwm                    | Dimming Duty Cycle   | 5   | 100  | 100         | %      |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Vvwm                    | Dimming Control Level  | High Level  | 3  | 5.5         | [Volt] |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
|                         |  | Low Level   | 0  | 0.5         | [Volt] |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| If                      | LED Forward Current  | 50  | 50   | 50          | [mA]   | Ta = 25°C               |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Vf                      | LED Forward Voltage  | 24.4  | 31.24  | 31.24       | [Volt] | If = 45 mA, Ta = 25°C   |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Pled                    | LED Power Consumption  | 4.88  | 6.25   | 6.25        | [Watt] | If = 45 mA, Ta = 25°C   |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| LED life time           |  | 70,000  | 100,000  |             | Hrs    | If = 45 mA, Ta = 25°C   |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Symbol                  | Parameter  | Min   | Typ  | Max         | Unit   | Remark                  |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| VLED                    | Input Voltage  | 10  | 12   | 15          | [Volt] |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Ivcc                    | Input Current  | 0.51  | 0.65   | 0.65        | [A]    | VCC=12V & 100% PWM Duty |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Pvcc                    | Power Consumption  | 6.1   | 6.5  | 6.5         | [Watt] | VCC=12V & 100% PWM Duty |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Ven                     | EN Control   | BL On   | 2.5  | 4           | [Volt] |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
|                         |  | BL Off  | 0  | 0.5         | [Volt] |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Fvwm                    | Dimming Frequency  | 200   | 200  | 200         | [Hz]   |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Dvwm                    | Dimming Duty Cycle   | 1   | 100  | 100         | %      | 1~6% with non-linear    |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Vvwm                    | Dimming Control Level  | High Level  | 3  | 5.5         | [Volt] |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
|                         |  | Low Level   | 0  | 0.5         | [Volt] |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| If                      | LED Forward Current  | 50  | 50   | 50          | [mA]   | Ta = 25°C               |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Vf                      | LED Forward Voltage  | 24.4  | 31.24  | 31.24       | [Volt] | If = 50 mA, Ta = 25°C   |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Pled                    | LED Power Consumption  | 4.88  | 6.25   | 6.25        | [Watt] | If = 50 mA, Ta = 25°C   |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| LED life time           |  | 70,000  | 100,000  |             | Hrs    | If = 50 mA, Ta = 25°C   |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 14                      | Note 3: If, Vf are defined for one channel LED. There are three LED channel in back light unit.  | Note 3: If, Vf are defined for one channel LED. There are four LED channel in back light unit.  |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 16                      | <table border="1"> <thead> <tr> <th>Pin NO</th> <th>Signal Name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12V</td> <td>LED Power</td> </tr> <tr> <td>2</td> <td>12V</td> <td>LED Power</td> </tr> <tr> <td>3</td> <td>12V</td> <td>LED Power</td> </tr> <tr> <td>4</td> <td>12V</td> <td>LED Power</td> </tr> <tr> <td>5</td> <td>ENLED</td> <td>Enable Pin</td> </tr> <tr> <td>6</td> <td>Dimming</td> <td>Backlight Adjust</td> </tr> <tr> <td>7</td> <td>GND</td> <td>Ground</td> </tr> <tr> <td>8</td> <td>GND</td> <td>Ground</td> </tr> <tr> <td>9</td> <td>VCC</td> <td>Power supply +3.3V</td> </tr> <tr> <td>10</td> <td>VCC</td> <td>Power supply +3.3V</td> </tr> </tbody> </table>  | Pin NO  | Signal Name  | Description | 1      | 12V                     | LED Power | 2                       | 12V   | LED Power     | 3     | 12V     | LED Power       | 4              | 12V   | LED Power | 5             | ENLED        | Enable Pin             | 6      | Dimming | Backlight Adjust        | 7                 | GND               | Ground | 8     | GND    | Ground              | 9                       | VCC  | Power supply +3.3V | 10     | VCC  | Power supply +3.3V | <table border="1"> <thead> <tr> <th>Pin NO</th> <th>Signal Name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>VLED</td> <td>LED Power Input</td> </tr> <tr> <td>2</td> <td>VLED</td> <td>LED Power Input</td> </tr> <tr> <td>3</td> <td>VLED</td> <td>LED Power Input</td> </tr> <tr> <td>4</td> <td>VLED</td> <td>LED Power Input</td> </tr> <tr> <td>5</td> <td>EN</td> <td>LED Driver Enable</td> </tr> <tr> <td>6</td> <td>PWM</td> <td>LED Driver Backlight Adjust</td> </tr> <tr> <td>7</td> <td>GND</td> <td>Ground</td> </tr> <tr> <td>8</td> <td>GND</td> <td>Ground</td> </tr> <tr> <td>9</td> <td>VDD</td> <td>Power supply +3.3V</td> </tr> <tr> <td>10</td> <td>VDD</td> <td>Power supply +3.3V</td> </tr> </tbody> </table> | Pin NO | Signal Name | Description | 1                       | VLED   | LED Power Input | 2    | VLED              | LED Power Input | 3     | VLED | LED Power Input | 4      | VLED         | LED Power Input        | 5    | EN  | LED Driver Enable | 6                 | PWM  | LED Driver Backlight Adjust | 7                     | GND        | Ground              | 8       | GND    | Ground | 9         | VDD | Power supply +3.3V | 10     | VDD | Power supply +3.3V |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Pin NO                  | Signal Name  | Description   |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 1                       | 12V  | LED Power   |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 2                       | 12V  | LED Power   |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 3                       | 12V  | LED Power   |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 4                       | 12V  | LED Power   |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 5                       | ENLED  | Enable Pin  |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 6                       | Dimming  | Backlight Adjust  |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 7                       | GND  | Ground  |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 8                       | GND  | Ground  |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 9                       | VCC  | Power supply +3.3V  |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 10                      | VCC  | Power supply +3.3V  |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Pin NO                  | Signal Name  | Description   |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 1                       | VLED   | LED Power Input   |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 2                       | VLED   | LED Power Input   |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 3                       | VLED   | LED Power Input   |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 4                       | VLED   | LED Power Input   |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 5                       | EN   | LED Driver Enable   |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 6                       | PWM  | LED Driver Backlight Adjust   |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 7                       | GND  | Ground  |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 8                       | GND  | Ground  |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 9                       | VDD  | Power supply +3.3V  |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 10                      | VDD  | Power supply +3.3V  |  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 0.2 2016/4/8            | 7  | Color Gamut=70%   | Color Gamut=72%  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 0.3 2016/11/15          | 23   | 9.2 Carton Package  | Update Catron Package information  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 0.4 2016/11/15          | 21<br>22   | Front View Drawing<br>Rear View Drawing   | Front View : Add dimension data<br>Rear View : Add Pin1 Location   |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 0.4 2016/11/15          | 6  | Typical Power Consumption = 7.8   | Typical Power Consumption = 7.65   |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 0.4 2016/11/15          | 7  | Color / Chromaticity:<br>R/G/B Color: TBD   | <table border="1"> <tbody> <tr> <td>Red x</td> <td>0.581</td> <td>0.631</td> <td>0.681</td> </tr> <tr> <td>Red y</td> <td>0.279</td> <td>0.329</td> <td>0.379</td> </tr> <tr> <td>Green x</td> <td>0.249</td> <td>0.299</td> <td>0.349</td> </tr> <tr> <td>Green y</td> <td>0.569</td> <td>0.619</td> <td>0.669</td> </tr> <tr> <td>Blue x</td> <td>0.105</td> <td>0.155</td> <td>0.205</td> </tr> <tr> <td>Blue y</td> <td>0.004</td> <td>0.054</td> <td>0.104</td> </tr> </tbody> </table> | Red x       | 0.581  | 0.631                   | 0.681     | Red y                   | 0.279 | 0.329         | 0.379 | Green x | 0.249           | 0.299          | 0.349 | Green y   | 0.569         | 0.619        | 0.669                  | Blue x | 0.105   | 0.155                   | 0.205             | Blue y            | 0.004  | 0.054 | 0.104  |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Red x                   | 0.581  | 0.631   | 0.681  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Red y                   | 0.279  | 0.329   | 0.379  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Green x                 | 0.249  | 0.299   | 0.349  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Green y                 | 0.569  | 0.619   | 0.669  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Blue x                  | 0.105  | 0.155   | 0.205  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| Blue y                  | 0.004  | 0.054   | 0.104  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 0.4 2016/11/15          | 8  | active area: 246mm (H)x184.5mm (V)  | active area: 261.12mm (H) x 163.2mm (V)  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 0.4 2016/11/15          | 12   | I <sub>VDD</sub> ; P <sub>VDD</sub> = TBD   | I <sub>VDD</sub> = 458 ; P <sub>VDD</sub> = 1.65 (Max.)  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |
| 0.4 2016/11/15          | 14   | I <sub>VCC</sub> =0.51 ; P <sub>VCC</sub> =6.1  | I <sub>VCC</sub> =0.5 ; P <sub>VCC</sub> =6  |             |        |                         |           |                         |       |               |       |         |                 |                |       |           |               |              |                        |        |         |                         |                   |                   |        |       |        |                     |                         |      |                    |        |  |                    |  |        |             |             |                         |        |                 |      |                   |                 |       |      |                 |        |              |                        |      |     |                   |                   |      |                             |                       |            |                     |         |        |        |           |     |                    |        |     |                    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |  |        |           |     |     |     |      |        |      |               |    |    |    |        |  |      |               |      |      |      |     |                         |      |                   |     |     |     |        |                         |     |            |       |     |   |        |  |        |   |     |        |  |      |                   |     |     |     |      |  |      |                    |   |     |     |   |                      |      |                       |            |   |     |        |  |           |   |     |        |  |    |                     |    |    |    |      |           |    |                     |      |       |       |        |                       |      |                       |      |      |      |        |                       |               |  |        |         |  |     |                       |

|     |          |    |  |   |
|-----|----------|----|--|---|
| 1.0 | 2017/5/2 | 14 | V <sub>F</sub> = 31.24 (Max)                         | V <sub>F</sub> = 27.2 (Max)   |
| 1.0 | 2017/5/2 | 14 | PLED=6.25(Max)                                       | PLED=5.44(Max)  |
| 1.0 | 2017/5/2 | 11 | 4.1 Control Signals : SEL68, REVERSE                 | 4.1 Control Signals : SEL68   |
| 1.0 | 2017/5/2 | 12 | 5.1.1 I <sub>VDD</sub> LCD Input Current : 458 (Max) | 5.1.1 I <sub>VDD</sub> LCD Input Current : 500 (Max)                |
| 1.0 | 2017/5/2 | 12 | VIH , Remark : SEL68 and REVERSE                     | VIH , Remark : SEL68  |
| 1.0 | 2017/5/2 | 12 | VIL , Remark : SEL68 and REVERSE                     | VIL , Remark : SEL68  |
| 1.0 | 2017/5/2 | 17 | 6.3.1 SEL 68<br>Note 3: RSV stands for "Reserved".   | Delete: Note3: RSV stands for "Reserved".<br>Delete: Raw table: RSV |
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## 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 without flammability grade are used in the TFT-LCD module. The TFT-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.

## 2. General Description

This specification applies to the Color Active Matrix Liquid Crystal Display G121EAN01.0 composed of a TFT-LCD display, a driver and power supply circuit, and a LED backlight system.

The screen format is intended to support WXGA (1280(H) x 800(V)) screen and 16.7M (8-bits) or 262k colors (6-bits). LED driving board for backlight unit is included in G121EAN01.0.

G121EAN01.0 designed with wide viewing angle; wide temperature and long life LED backlight is well suited for industrial applications. G121EAN01.0 is a RoHS product.

### 2.1 Display Characteristics

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

| Items                     | Unit    | Specifications                       |
|---------------------------|---------|--------------------------------------|
| Screen Diagonal           | [inch]  | 12.1                                 |
| Active Area               | [mm]    | 261.12(H) x 163.2(V)                 |
| Pixels H x V              |         | 1280 x 3(RGB) x 800                  |
| Pixel Pitch               | [mm]    | 0.204 x 0.204                        |
| Pixel Arrangement         |         | R.G.B. Vertical Stripe               |
| Display Mode              |         | Normally Black                       |
| Nominal Input Voltage VDD | [Volt]  | 3.3 (typ.)                           |
| Typical Power Consumption | [Watt]  | 7.65                                 |
| Weight                    | [Grams] | 480 (max.)                           |
| Physical Size             | [mm]    | 278.0(H) x 184.0(V) x 9.29(D) (Typ.) |
| Electrical Interface      |         | 1 channel LVDS                       |
| Surface Treatment         |         | Anti-glare, Hardness 3H              |
| Support Color             |         | 16.7M / 262K colors                  |
| Temperature Range         |         |                                      |
| Operating                 | [°C]    | -30 to +85                           |
| Storage (Non-Operating)   | [°C]    | -30 to +85                           |
| RoHS Compliance           |         | RoHS Compliance                      |

## 2.2 Optical Characteristics

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

| Item  | Unit                 | Conditions                                      | Min.  | Typ.  | Max.  | Remark    |
|---|----------------------|---|-------|-------|-------|-----------|
| White Luminance                             | [cd/m <sup>2</sup> ] | I <sub>F</sub> = 50mA/1 LED Line (center point) | 400   | 500   | -     | Note 1    |
| Uniformity                                  | %                    | 5 Points  | 75    | -     | -     | Note 2, 3 |
| Contrast Ratio                              |                      |   | 800   | 1000  | -     | Note 4    |
| Response Time                               | [msec]               | Rising  | -     | -     | -     | Note 5    |
|   | [msec]               | Falling   | -     | -     | -     |           |
|   | [msec]               | Raising + Falling                               | -     | 25    | -     |           |
| Viewing Angle                               | [degree]             | Horizontal (Right)<br>CR = 10 (Left)            | 80    | 89    | -     | Note 6    |
|   | [degree]             |   | 80    | 89    | -     |           |
|   | [degree]             | Vertical (Upper)<br>CR = 10 (Lower)             | 80    | 89    | -     |           |
|   | [degree]             |   | 80    | 89    | -     |           |
| Color / Chromaticity Coordinates (CIE 1931) |                      | Red x   | 0.581 | 0.631 | 0.681 |           |
|   |                      | Red y   | 0.279 | 0.329 | 0.379 |           |
|   |                      | Green x   | 0.249 | 0.299 | 0.349 |           |
|   |                      | Green y   | 0.569 | 0.619 | 0.669 |           |
|   |                      | Blue x  | 0.105 | 0.155 | 0.205 |           |
|   |                      | Blue y  | 0.004 | 0.054 | 0.104 |           |
|   |                      | White x   | 0.263 | 0.313 | 0.363 |           |
|   |                      | White y   | 0.279 | 0.329 | 0.379 |           |
| Color Gamut                                 | %                    |   |       | 72    | -     |           |

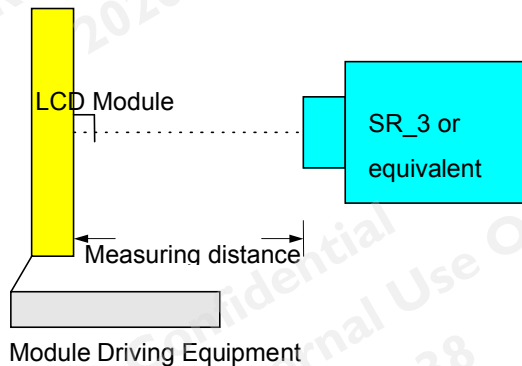
Note 1: Measurement method

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

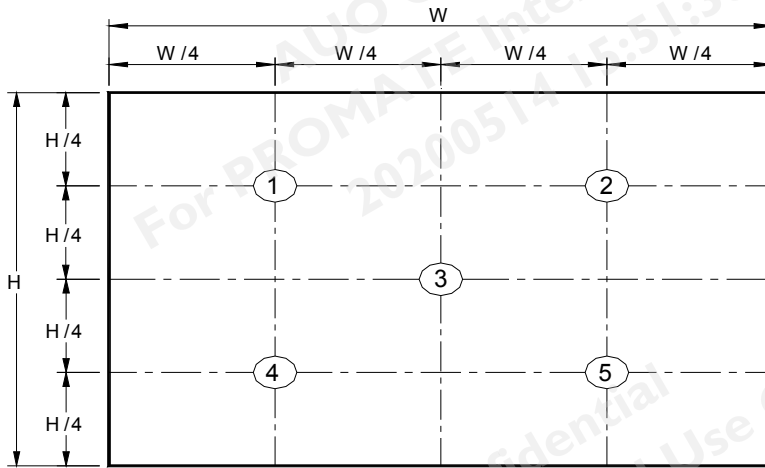
Aperture 1° with 50cm viewing distance

Test Point Center

Environment < 1 lux



Note 2: Definition of 5 points position (Display active area: 261.12mm (H) x 163.2mm (V))



Note 3: The luminance uniformity of 5 points is defined by dividing the minimum luminance values by the maximum test point luminance

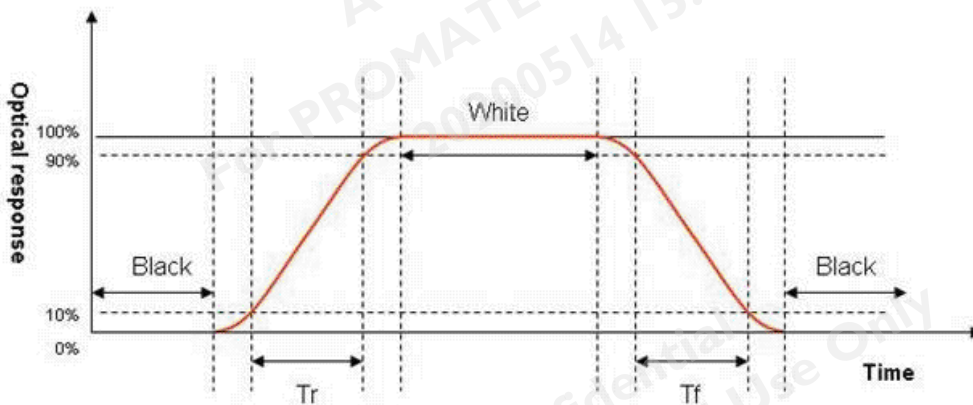
$$\delta_{w9} = \frac{\text{Minimum Brightness of five points}}{\text{Maximum Brightness of five points}}$$

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:

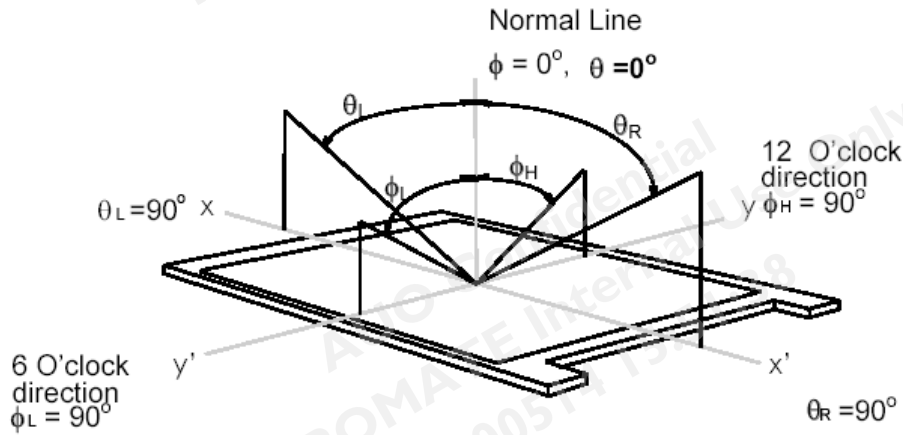
The output signals of photo detector are measured when the input signals are changed from "White" to "Black" (falling time) and from "Black" to "White" (rising time), respectively. The response time interval is between 10% and 90% of amplitudes. Please refer to the figure as below.





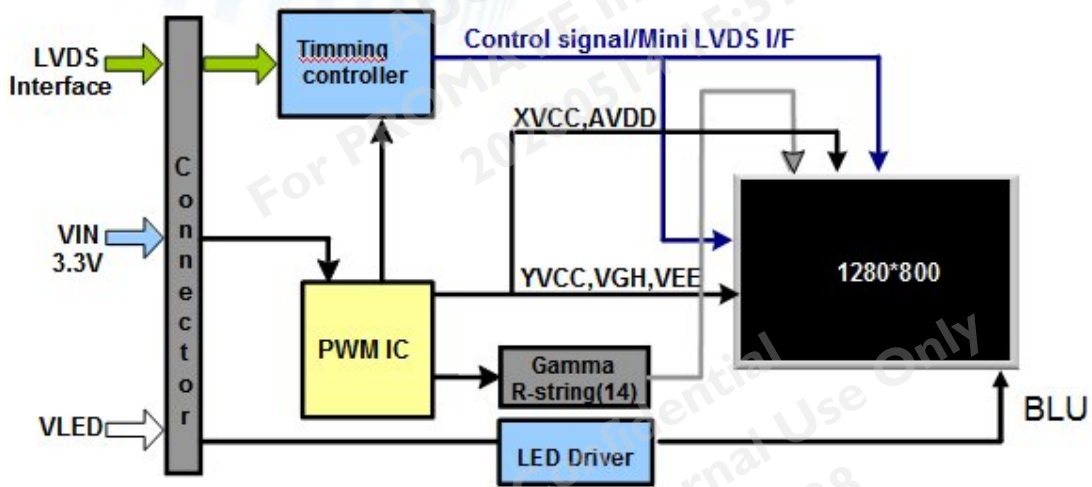
Note 6: Definition of viewing angle

Viewing angle is the measurement of contrast ratio  $\geq 10$ , at the screen center, over a 180° horizontal and 180° vertical range (off-normal viewing angles). The 180° viewing angle range is broken down as below: 90° ( $\theta$ ) horizontal left and right, and 90° ( $\Phi$ ) 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.



### 3. Functional Block Diagram

The following diagram shows the functional block of the 12.1 inch color TFT/LCD module:



AUO Confidential  
 For PROMATE Internal Use Only  
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## 4. Absolute Maximum Ratings

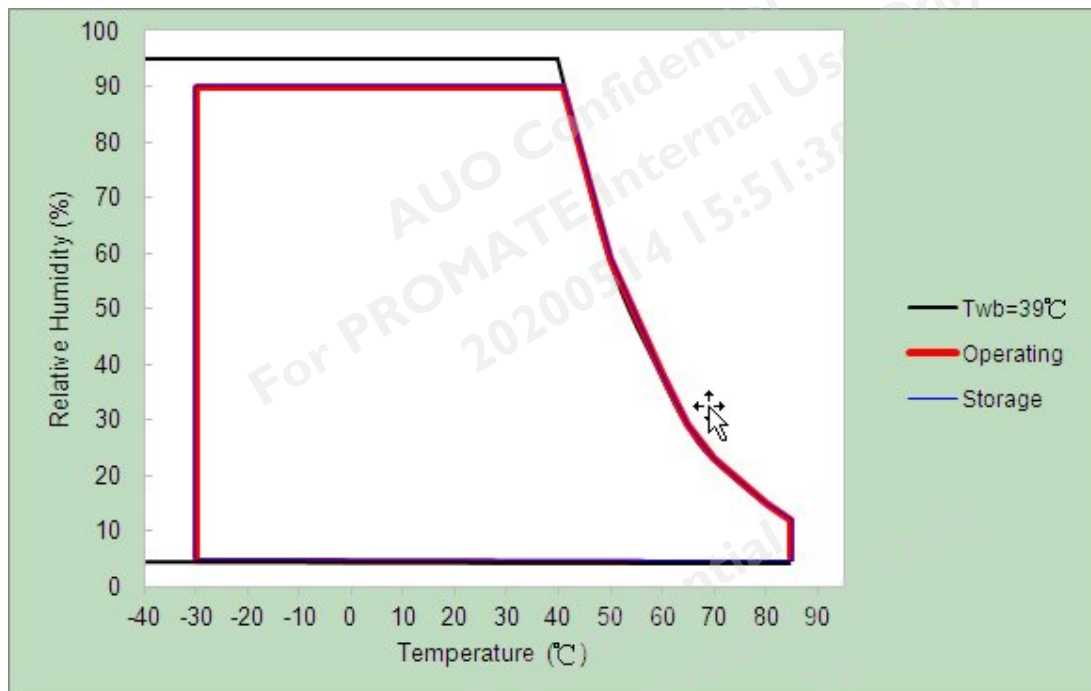
### 4.1 Absolute Ratings of TFT LCD Module

| Item                    | Symbol                 | Min  | Max  | Unit   |
|-------------------------|------------------------|------|------|--------|
| Logic/LCD Drive Voltage | VDD                    | -0.3 | +3.8 | [Volt] |
| Control Signals         | SEL68                  | -0.3 | VDD  | [Volt] |
| LVDS Signals            | CLKIN -/+, RIN0 ~ 3-/+ | -0.3 | 0.6  | [Volt] |
| LED Input Voltage       | VLED                   | -0.3 | 15   | [Volt] |
| LED Control Signals     | EN, PWM                | -0.3 | +6   | [Volt] |

### 4.2 Absolute Ratings of Environment

| Item                  | Symbol | Min | Max | Unit  |
|-----------------------|--------|-----|-----|-------|
| Operating Temperature | TOP    | -30 | +85 | [°C]  |
| Operation Humidity    | HOP    | 5   | 90  | [%RH] |
| Storage Temperature   | TST    | -30 | +85 | [°C]  |
| Storage Humidity      | HST    | 5   | 90  | [%RH] |

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



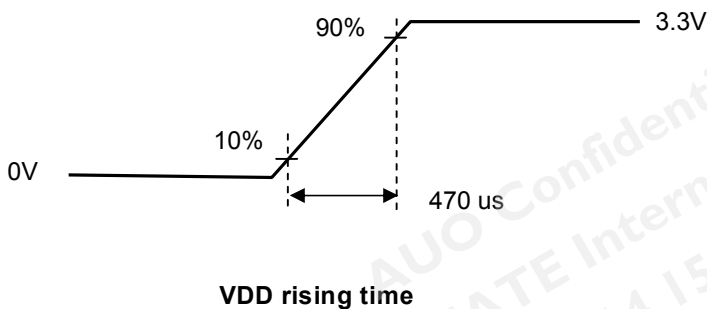
## 5. Electrical Characteristics

### 5.1 TFT LCD Module

#### 5.1.1 LCD Electrical Specification

| Symbol                | Parameter                                |            | Min      | Typ | Max      | Units       | Remark   |
|-----------------------|--|------------|----------|-----|----------|-------------|--|
| VDD                   | Logic/LCD Input Voltage                  |            | 3.0      | 3.3 | 3.6      | [Volt]      |  |
| I <sub>VDD</sub>      | LCD Input Current                        |            | -        | -   | 500      | [mA]        | VDD=3.3V at 60 HZ, all Black Pattern   |
| P <sub>VDD</sub>      | LCD Power consumption                    |            | -        | -   | 1.65     | [Watt]      | VDD=3.3V at 60 HZ, all Black Pattern   |
| I <sub>rush LCD</sub> | LCD Inrush Current                       |            | -        | -   | 1.5      | [A]         | VDD=3.3V at 60 HZ, all Black Pattern<br>Note 1 VDD rising time $\geq 470\mu s$ |
| VDD <sub>rp</sub>     | Allowable Logic/LCD Drive Ripple Voltage |            | -        | -   | 100      | [mV]<br>p-p | VDD=3.3V at 60 HZ, all Black Pattern   |
| VIH                   | Control Signals Voltage                  | High Level | 0.7* VDD | -   | VDD      | [Volt]      | SEL68  |
| VIL                   |  | Low Level  | 0        | -   | 0.3* VDD | [Volt]      | SEL68  |

Note 1: Measurement condition:



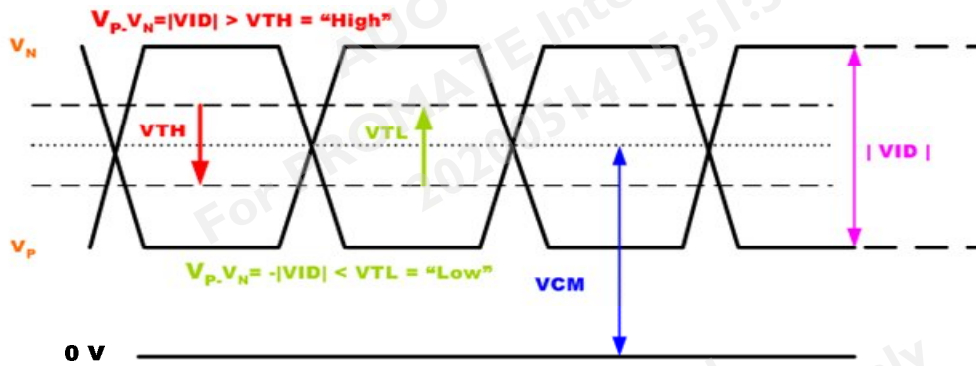
### 5.1.2 LVDS Electrical Characteristics

| Symbol | Parameter                              | Min. | Typ. | Max. | Unit | Remark          |
|--------|--|------|------|------|------|-----------------|
| VTH    | Differential Input High Threshold      | -    | -    | 100  | [mV] | VCM=1.2V        |
| VTL    | Differential Input Low Threshold       | -100 | -    | -    | [mV] | VCM=1.2V        |
| VID    | Input Differential Voltage             | 100  | 400  | 600  | [mV] |                 |
| VICM   | Differential Input Common Mode Voltage | 1.1  | -    | 1.45 | [V]  | VTH/VTL=+-100mV |

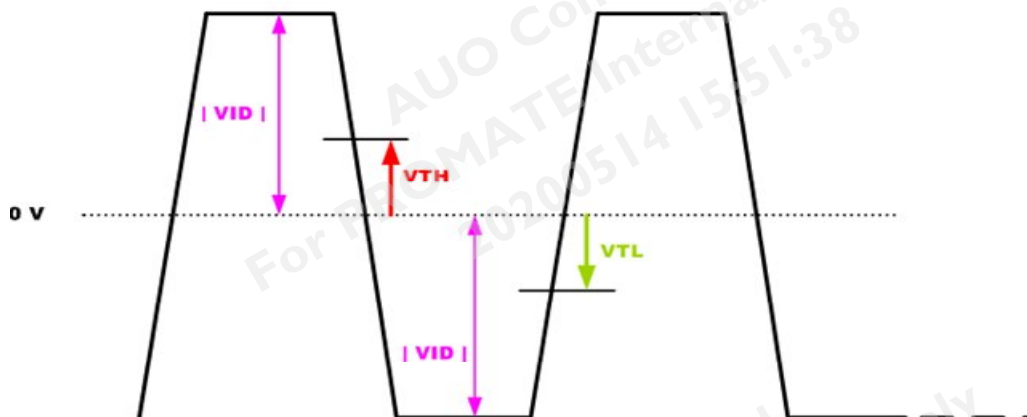
Input signals shall be low or Hi-Z state when VDD is off.

Note: LVDS Signal Waveform.

#### Single-end Signal



#### Differential Signal



## 5.2 Backlight Unit

### 5.2.1 Parameter guideline for LED

Following characteristics are measured under stable condition at 25°C. (Room Temperature):

| Symbol                 | Parameter             |            | Min.   | Typ.    | Max. | Unit   | Remark                            |
|------------------------|-----------------------|------------|--------|---------|------|--------|-----------------------------------|
| <b>VLED</b>            | Input Voltage         |            | 10     | 12      | 15   | [Volt] |                                   |
| <b>I<sub>VCC</sub></b> | Input Current         |            | -      | 0.5     |      | [A]    | VCC=12V & 100% PWM Duty           |
| <b>P<sub>VCC</sub></b> | Power Consumption     |            | -      | 6       |      | [Watt] | VCC=12V & 100% PWM Duty           |
| <b>V<sub>EN</sub></b>  | EN Control            | BL On      | 2.5    | -       | 4    | [Volt] |                                   |
|                        | Level                 | BL Off     | 0      | -       | 0.5  | [Volt] |                                   |
| <b>F<sub>PWM</sub></b> | Dimming Frequency     |            | 200    | -       | 20K  | [Hz]   |                                   |
| <b>D<sub>PWM</sub></b> | Dimming Duty Cycle    |            | 1      | -       | 100  | %      | 1~5% with non-linear              |
| <b>V<sub>PWM</sub></b> | Dimming               | High Level | 3      | -       | 5.5  | [Volt] |                                   |
|                        | Control Level         | Low Level  | 0      | -       | 0.5  | [Volt] |                                   |
| <b>I<sub>F</sub></b>   | LED Forward Current   |            | -      | 50      |      | [mA]   | Ta = 25°C                         |
| <b>V<sub>F</sub></b>   | LED Forward Voltage   |            | -      | 24.4    | 27.2 | [Volt] | I <sub>F</sub> = 50 mA, Ta = 25°C |
| <b>P<sub>LED</sub></b> | LED Power Consumption |            | -      | 4.88    | 5.44 | [Watt] |                                   |
| <b>LED life time</b>   |                       |            | 70,000 | 100,000 | -    | Hrs    | I <sub>F</sub> = 50 mA, Ta = 25°C |

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

Note 2: VCC, I<sub>VCC</sub>, P<sub>VCC</sub> are defined for LED backlight.(100% duty of PWM dimming)

Note 3: I<sub>F</sub>, V<sub>F</sub> are defined for one channel LED. There are four LED channel in back light unit.

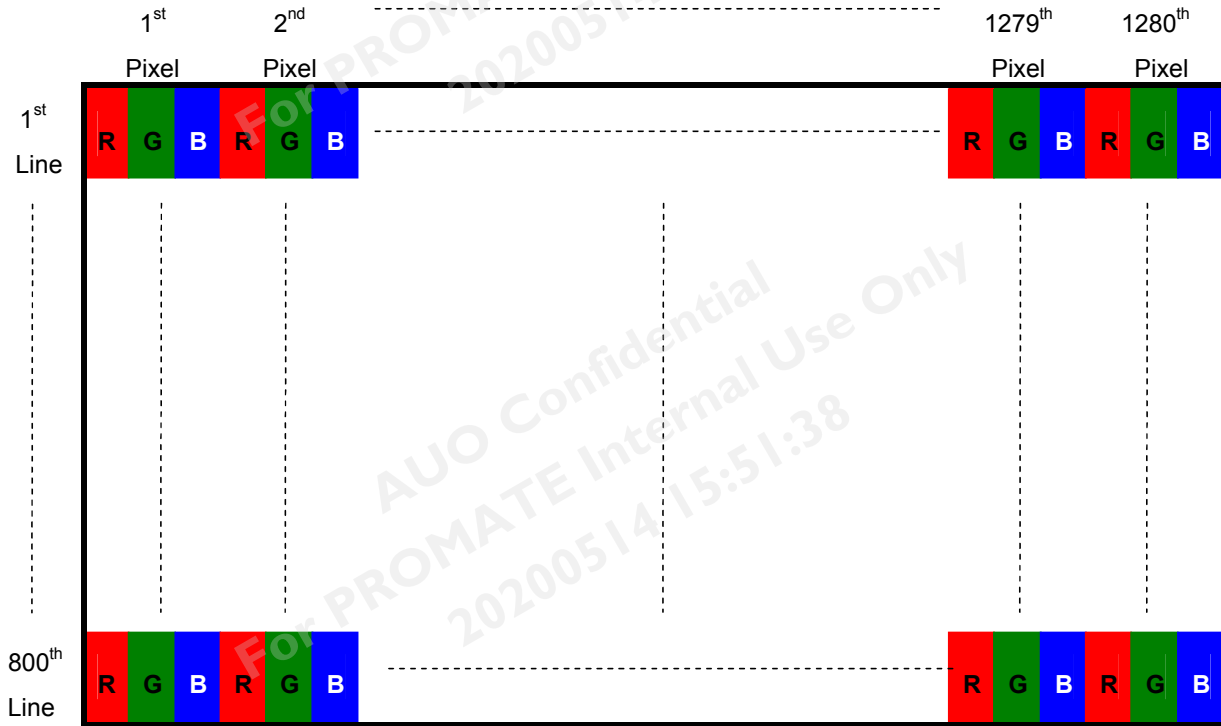
Note 4: If G121EAN01.0 module is driven by high current or at high ambient temperature & humidity condition. The operating life will be reduced.

Note 5: Operating life means brightness goes down to 50% initial brightness. Minimum operating life time is estimated data.

## 6. Signal Characteristics

### 6.1 Pixel Format Image

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



## 6.2 Signal Description

The module using a LVDS receiver embaded 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

|                                     |                         |
|-------------------------------------|-------------------------|
| <b>Connector Name / Designation</b> | <b>Signal Connector</b> |
| Manufacturer                        | Starconn                |
| Connector Model Number              | 093G30-B0001A-1         |

### 6.2.2 Input Signal Description

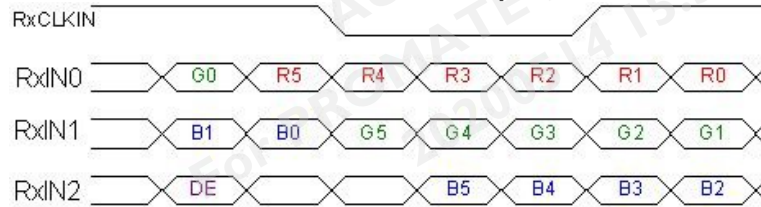
| Pin NO | Signal Name | Description   |
|--------|-------------|---|
| 1      | VLED        | LED Power Input   |
| 2      | VLED        | LED Power Input   |
| 3      | VLED        | LED Power Input   |
| 4      | VLED        | LED Power Input   |
| 5      | EN          | LED Driver Enable                                       |
| 6      | PWM         | LED Driver Backlight Adjust                             |
| 7      | GND         | Ground  |
| 8      | GND         | Ground  |
| 9      | VDD         | Power supply:+3.3V                                      |
| 10     | VDD         | Power supply:+3.3V                                      |
| 11     | GND         | Ground  |
| 12     | GND         | Ground  |
| 13     | RXin0N      | -LVDS differential data (0N)                            |
| 14     | RXin0P      | +LVDS differential data (0P)                            |
| 15     | GND         | Ground  |
| 16     | RXin1N      | -LVDS differential data (1N)                            |
| 17     | RXin1P      | +LVDS differential data (1P)                            |
| 18     | GND         | Ground  |
| 19     | RXin2N      | -LVDS differential data (2N)                            |
| 20     | RXin2P      | +LVDS differential data (2P)                            |
| 21     | GND         | Ground  |
| 22     | LVDS_RX_N   | -LVDS differential clock input                          |
| 23     | LVDS_RX_P   | +LVDS differential clock input                          |
| 24     | GND         | Ground  |
| 25     | RXin3N      | -LVDS differential data (3N)                            |
| 26     | RXin3P      | +LVDS differential data (3P)                            |
| 27     | GND         | Ground  |
| 28     | SEL 6/8     | Low or NC-->6 bit input mode<br>High-->8 bit input mode |
| 29     | GND         | Ground  |
| 30     | GND         | Ground  |



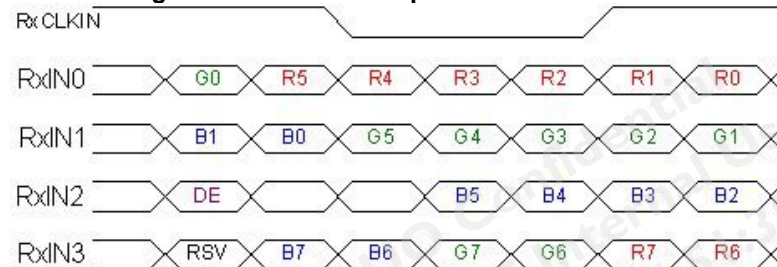
## 6.3 The Input Data Format

### 6.3.1 SEL68

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



**SEL68 = "High" for 8 bits LVDS Input**



Note 1: Please follow PSWG.

Note 2: R/G/B data 7:MSB, R/G/B data 0:LSB

| Signal Name | Description        | Remark  |   |
|-------------|--------------------|---|---|
| R7          | Red Data 7         | Red-pixel Data<br><br>For 8Bits LVDS input<br>MSB: R7 ; LSB: R0 |   |
| R6          | Red Data 6         |   |   |
| R5          | Red Data 5         |   |   |
| R4          | Red Data 4         |   |   |
| R3          | Red Data 3         |   |   |
| R2          | Red Data 2         |   |   |
| R1          | Red Data 1         | For 6Bits LVDS input<br>MSB: R5 ; LSB: R0                       |   |
| R0          | Red Data 0         |   |   |
| G7          | Green Data 7       |   | Green-pixel Data<br><br>For 8Bits LVDS input<br>MSB: G7 ; LSB: G0       |
| G6          | Green Data 6       |   |   |
| G5          | Green Data 5       |   |   |
| G4          | Green Data 4       |   |   |
| G3          | Green Data 3       |   |   |
| G2          | Green Data 2       |   |   |
| G1          | Green Data 1       | For 6Bits LVDS input<br>MSB: G5 ; LSB: G0                       |   |
| G0          | Green Data 0       |   |   |
| B7          | Blue Data 7        |   | Blue-pixel Data<br><br>For 8Bits LVDS input<br>MSB: B7 ; LSB: B0        |
| B6          | Blue Data 6        |   |   |
| B5          | Blue Data 5        |   |   |
| B4          | Blue Data 4        |   |   |
| B3          | Blue Data 3        |   |   |
| B2          | Blue Data 2        |   |   |
| B1          | Blue Data 1        | For 6Bits LVDS input<br>MSB: B5 ; LSB: B0                       |   |
| B0          | Blue Data 0        |   |   |
| RxCLKIN     | LVDS Data Clock    |   | The typical frequency is 40MHz.   |
| DE          | Data Enable Signal |   | When the signal is high, the pixel data shall be valid to be displayed. |

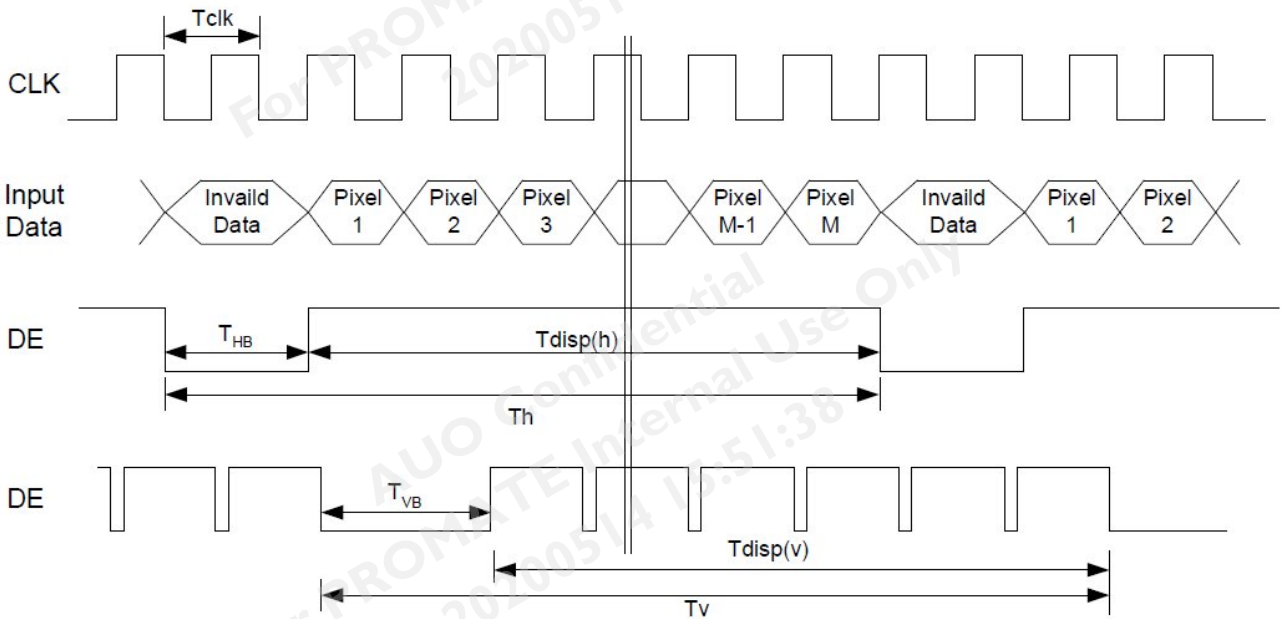
Note: Output signals from any system shall be low or Hi-Z state when VDD is off.

## 6.4 TFT-LCD Interface Timing

### 6.4.1 Timing Characteristics

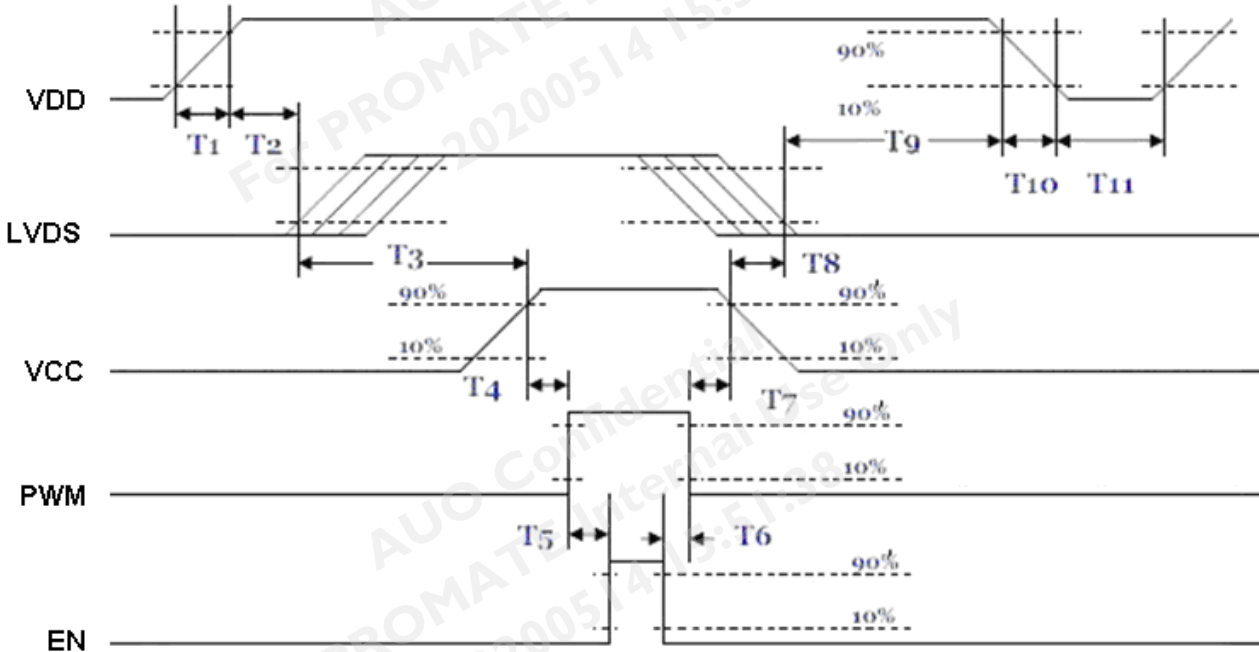
| Signal       | Parameter          | Symbol               | Min.     | Typ. | Max. | Unit |              |
|--------------|--------------------|----------------------|----------|------|------|------|--------------|
| Clock Timing | Clock frequency    | $1/T_{\text{Clock}}$ | 60       | 74.4 | 90   | MHz  |              |
| Vsync Timing | Vertical Section   | Period               | $T_V$    | 808  | 838  | 900  | Vsync Timing |
|              |                    | Active               | $T_{VD}$ | -    | 800  | -    |              |
|              |                    | Blanking             | $T_{VB}$ | 8    | 38   | 100  |              |
| Hsync Timing | Horizontal Section | Period               | $T_H$    | 1350 | 1480 | 1680 | Hsync Timing |
|              |                    | Active               | $T_{HD}$ | -    | 1280 | -    |              |
|              |                    | Blanking             | $T_{HB}$ | 70   | 200  | 400  |              |
| Frame Rate   |                    | F                    | 50       | 60   | 75   | Hz   |              |

### 6.4.2 Input Timing Diagram



### 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.



**Power ON/OFF sequence timing**

| Parameter | Value |      |      | Units |
|-----------|-------|------|------|-------|
|           | Min.  | Typ. | Max. |       |
| T1        | 0.5   | -    | 10   | [ms]  |
| T2        | 30    | 40   | 50   | [ms]  |
| T3        | 175   | -    | -    | [ms]  |
| T4        | 10    | -    | -    | [ms]  |
| T5        | 10    | -    | -    | [ms]  |
| T6        | 0     | -    | -    | [ms]  |
| T7        | 10    | -    | -    | [ms]  |
| T8        | 100   | -    | -    | [ms]  |
| T9        | 0     | 16   | 50   | [ms]  |
| T10       | -     | -    | 10   | [ms]  |
| T11       | 1000  | -    | -    | [ms]  |

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.

## 7. Reliability Test Criteria

| Items                          | Required Condition   | Note   |
|--------------------------------|--|--------|
| Temperature Humidity Bias      | 60 °C, 90%RH, 300 hours  |        |
| High Temperature Operation     | 85 °C, 300 hours   |        |
| Low Temperature Operation      | -30 °C, 300 hours  |        |
| Hot Storage                    | 85 °C, 300 hours   |        |
| Cold Storage                   | -30 °C, 300 hours  |        |
| Thermal Shock Test             | -20 °C / 30 min, 60 °C / 30 min, 100cycles, 40 °C minimum ramp rate  |        |
| Hot Start Test                 | 85 °C / 1Hr min. power on/off per 5 minutes, 5 times   |        |
| Cold Start Test                | -30 °C / 1Hr min. power on/off per 5 minutes, 5 times  |        |
| Shock Test (Non-Operating)     | 50G, 20ms, Half-sine wave, ( ±X, ±Y, ±Z)   |        |
| Vibration Test (Non-Operating) | 1.5G, (10~200Hz, Sine wave)<br>30 mins/axis, 3 direction (X, Y, Z)   |        |
| On/off test                    | On/10 sec, Off/10 sec, 30,000 cycles   |        |
| ESD                            | Contact = ± 8 kV, class B (R=330,C=150pF)<br>Air = ± 15 kV, class B (R=330,C=150pF)<br>1sec, 8 points, 25times/point | Note 1 |
| EMI                            | 30-230 MHz, limit 40 dBu V/m, 230-1000 MHz, limit 47 dBu V/m   |        |

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

Note2:

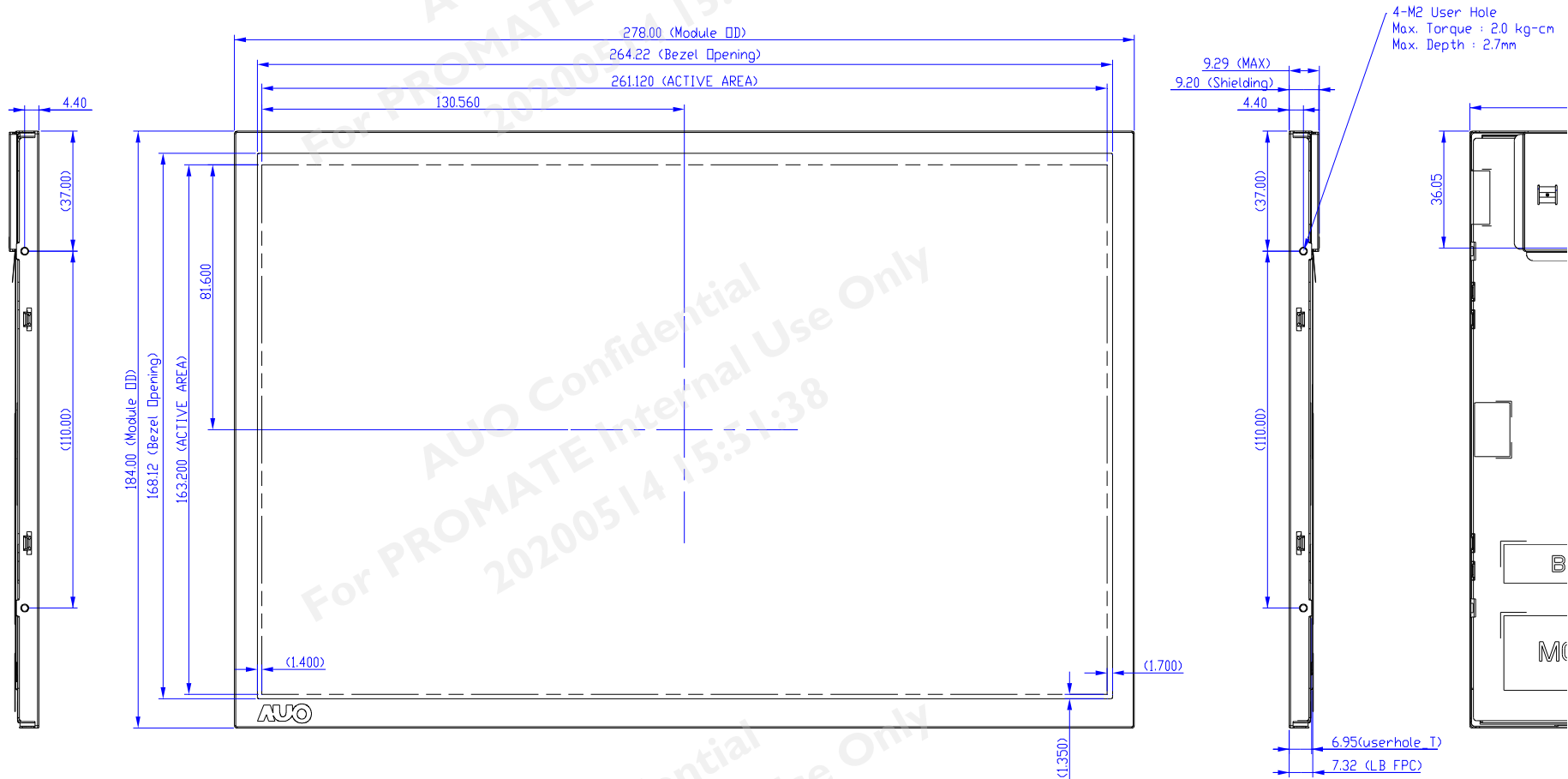
- Water condensation is not allowed for each test items.
- Each test is done by new TFT-LCD module. Don't use the same TFT-LCD module repeatedly for reliability test.
- The reliability test is performed only to examine the TFT-LCD module capability.
- To inspect TFT-LCD module after reliability test,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



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## 8. Mechanical Characteristics

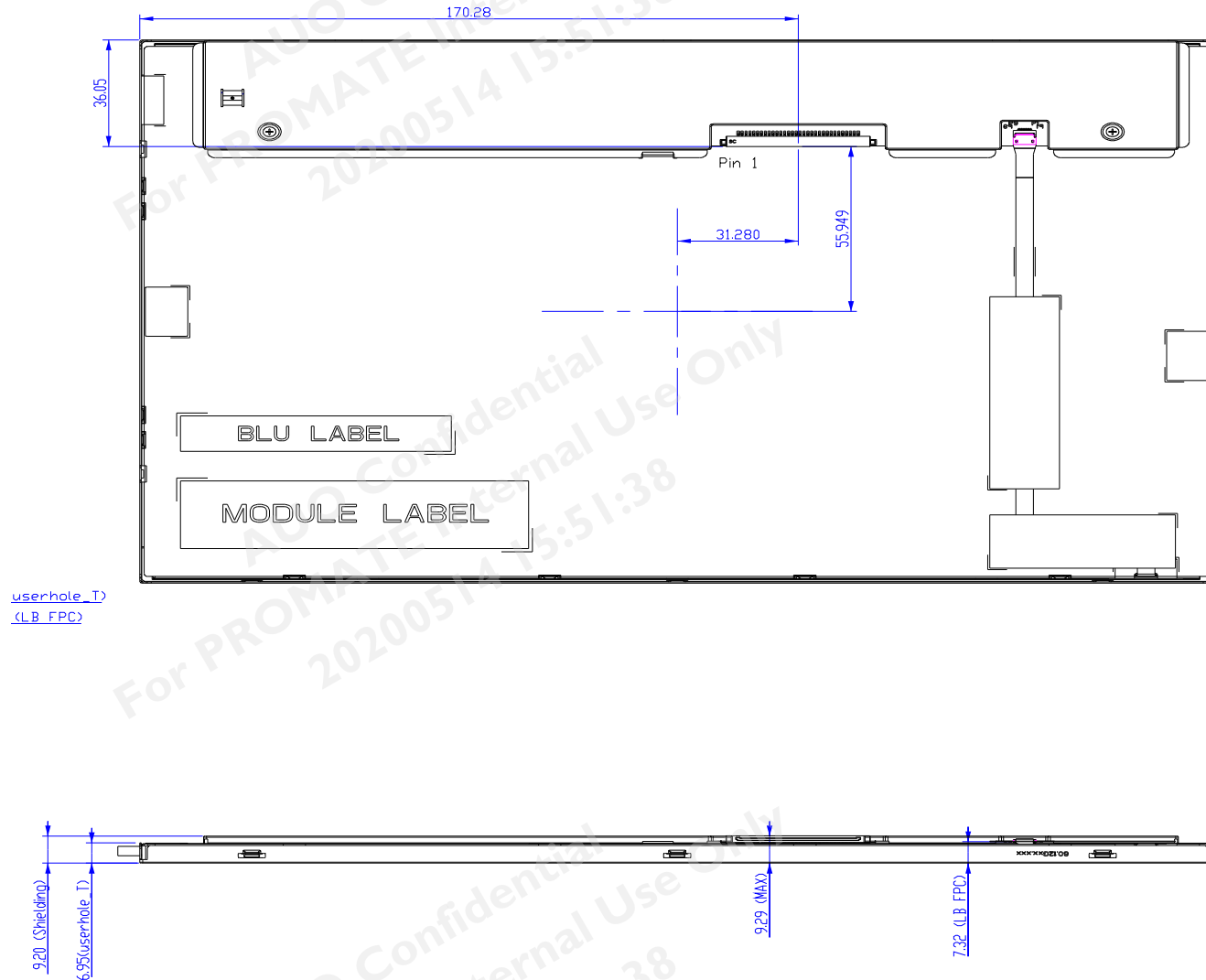
### 8.1 LCM Outline Dimension (Front View)





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## 8.2 LCM Outline Dimension (Rear View)

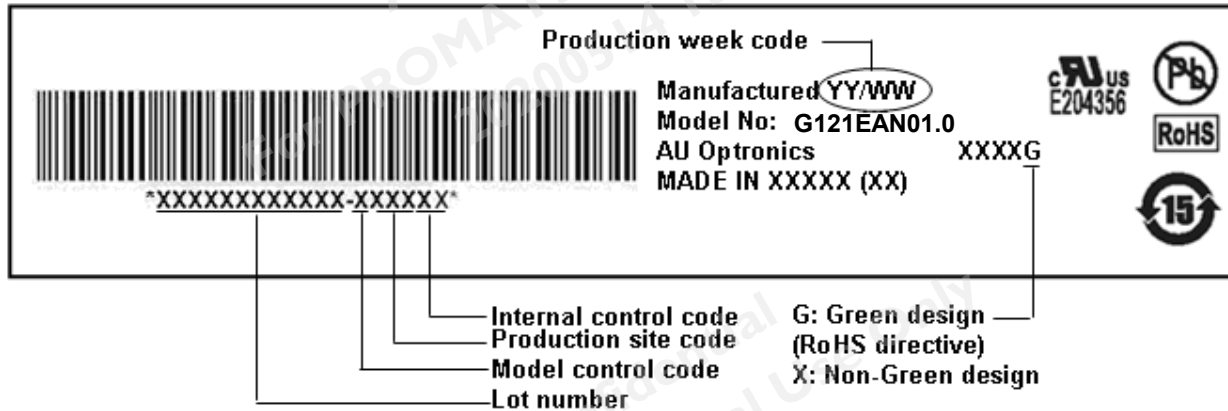


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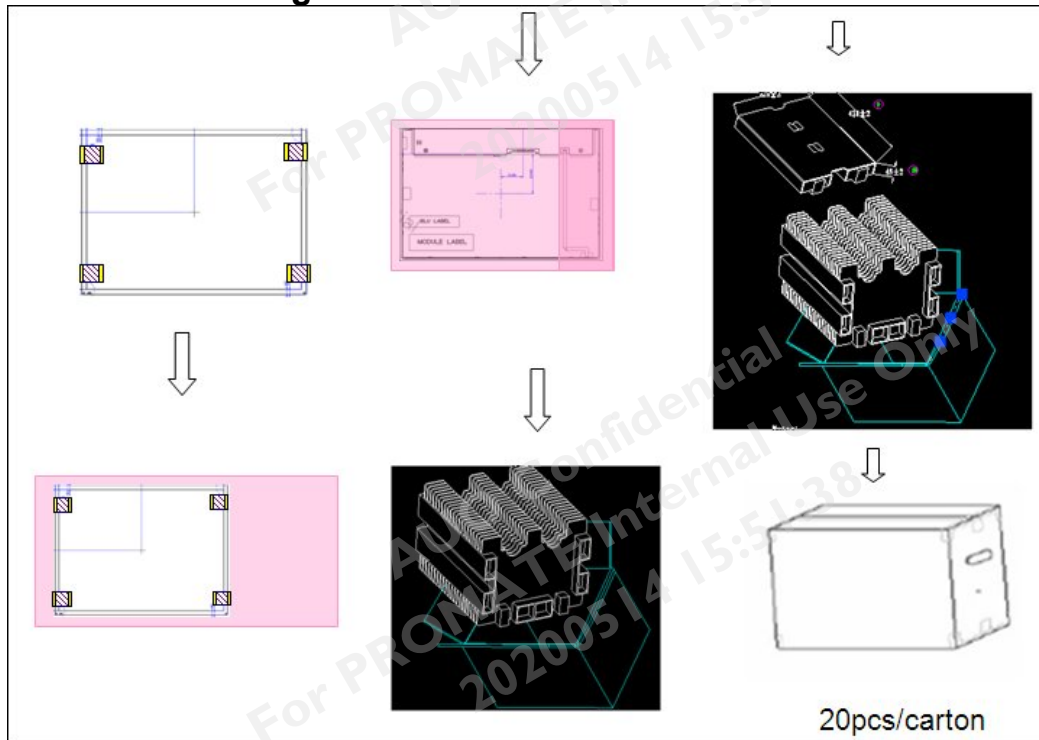
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## 9. Label and Packaging

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



### 9.2 Carton Package



Max capacity : 20 TFT-LCD module per carton

Max weight: 15.5 kg per carton

Outside dimension of carton: 450 (L)\* 375 (W)\* 320 (H)mm

Pallet size : 1,150 mm\* 910 mm\* 135mm

One Pallet : 4 Layers by boxes.

Module by air : (2 \*3) \*4 layers , one pallet put 24 boxes , total 480pcs module

Module by sea : One pallet (2 \*3) \*4 layers + One pallet (2 \*3) \*1 layers , total 600pcs module

Module by sea\_ HQ : One pallet (2 \*3) \*4 layers + One pallet (2 \*3) \*2 layers , Total 720pcs module

## 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 1950, First Edition

U.S.A. Information Technology Equipment