# INNOLUX DISPLAY CORPORATION

## MT190AW02 V.W LCD MODULE SPECIFICATION

( ) Preliminary Specification

(●)Final Specification

| Approved by | Checked by | Prepared by |
|---|---|---|
| 10/9 '09 | Oct 9, 2009<br>10/12 '09 | 10/12 '09 |


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## Record of Revision

| Version | Revise Date | Page | Content |
|---|---|---|---|
| 1.0 | 2009/4/16 | All | First edition to all Spec. |
| 2.0 | 2009/5/8 | 15 | Update Min. Brightness from 220nits to 200nits. |
| 3.0 | 2009/06/22 | 6 | FFC Cancellation |
| | | 6 | Update LED Light Bar：annul view of LED Light Bar |
| | | 22 | Update ME front view |
| | | 23 | Update ME back view |
| 4.0 | 2009/10/08 | 9 | Revised Permissive Power Input Ripple Max Value from 0.15V to 0.2V |
| | | 14 | Add LED Life Time Min. Value:25000 (Hrs) |
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## A. General specification

| NO. | Item | Specification | Remark |
|---|---|---|---|
| 1 | Display resolution (pixel) | 1440(H) X 900(V), WXGA+ resolution | |
| 2 | Active area (mm) | 408.24(H) X 255.15(V) | |
| 3 | Screen size (inch) | 19 inches diagonal | |
| 4 | Pixel pitch (mm) | 0.2835(H) X 0.2835 (V) | |
| 5 | Color configuration | R, G, B vertical stripe | |
| 6 | Overall dimension (mm) | 428 (W) X 278 (H) X 16 (D) (Typ.) | |
| 7 | Weight (g) | 2200 | (Max) |
| 8 | Surface treatment | Anti-Glare, Haze=25%, Hard coating (3H) | Note 1 |
| 9 | Input color signal | 8 bit LVDS | |
| 10 | Display colors | 16.7M (6 bit with Hi-FRC) | |
| 11 | Color saturation | 68% NTSC | |
| 12 | Optimum viewing direction | 6 o'clock | |
| 13 | Backlight | Side-light bar (White LED) | |
| 14 | RoHS&HF | RoHS & HF compliance | |
| 15 | TCO'03 | TCO'03 compliance | Note 2 |

Note 1: Glare Option available

Note 2：Only Anti-Glare model can meet TCO'03 compliance

## B. Electrical specifications

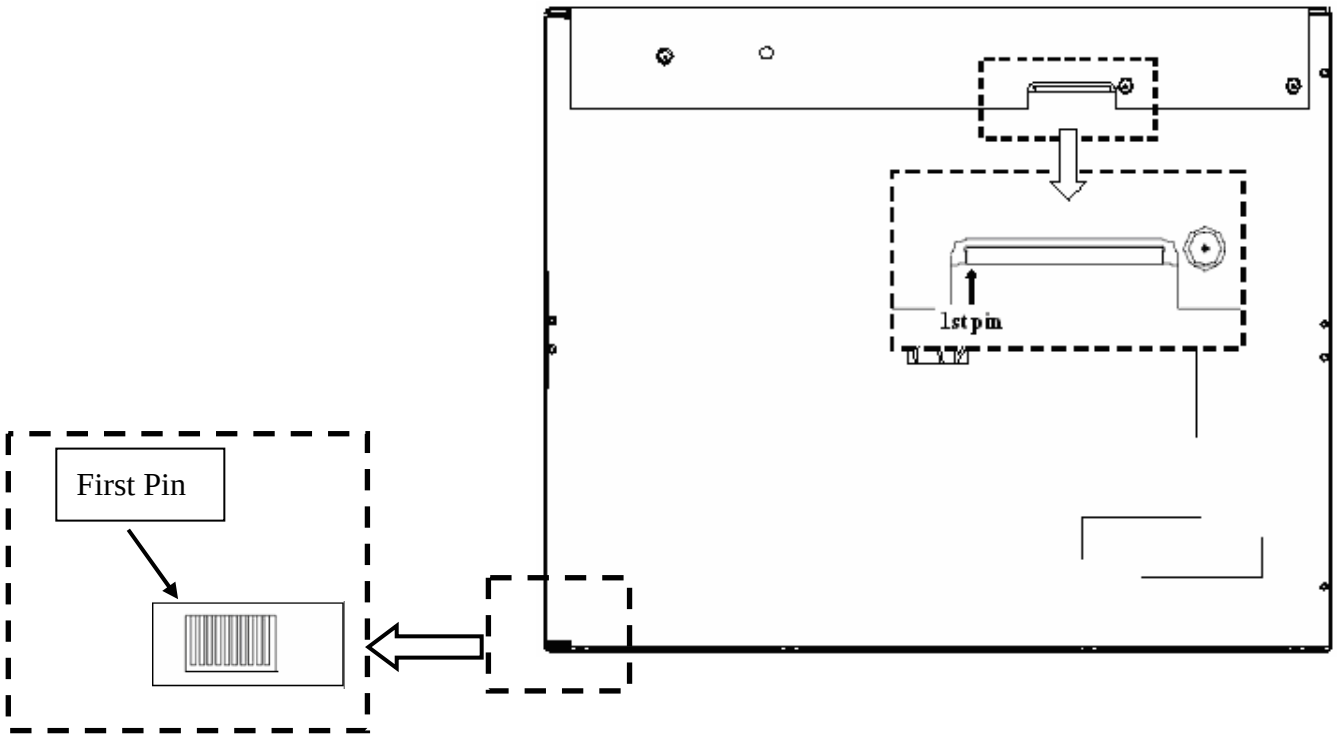
1. Pin assignment

**Connector**

1.1TFT LCD Module

FOXCONN GS23302-0311S-7F or mechanical interface equivalent connector.

| Pin No | Symbol | Description |
|---|---|---|
| Frame | VSS | Ground |
| 1 | RXinO0- | -LVDS differential data input, Chan 0-Odd |
| 2 | RXinO0+ | +LVDS differential data input, Chan 0-Odd |
| 3 | RXinO1- | -LVDS differential data input, Chan 1-Odd |
| 4 | RXinO1+ | +LVDS differential data input, Chan 1-Odd |
| 5 | RXinO2- | -LVDS differential data input, Chan 2-Odd |
| 6 | RXinO2+ | +LVDS differential data input, Chan 2-Odd |
| 7 | VSS | Ground |
| 8 | RXOC- | -LVDS differential Clock input (Odd) |
| 9 | RXOC+ | +LVDS differential Clock input (Odd) |
| 10 | RXinO3- | -LVDS differential data input, Chan 3-Odd |
| 11 | RXinO3+ | +LVDS differential data input, Chan 3-Odd |
| 12 | RXinE0- | -LVDS differential data input, Chan 0-Even |
| 13 | RXinE0+ | +LVDS differential data input, Chan 0-Even |
| 14 | VSS | Ground |
| 15 | RXinE1- | -LVDS differential data input, Chan 1-Even |
| 16 | RXinE1+ | +LVDS differential data input, Chan 1-Even |
| 17 | VSS | Ground |
| 18 | RXinE2- | -LVDS differential data input, Chan 2-Even |
| 19 | RXinE2+ | +LVDS differential data input, Chan 2-Even |
| 20 | RXEC- | -LVDS differential Clock input (Even) |
| 21 | RXEC+ | +LVDS differential Clock input (Even) |
| 22 | RXinE3- | -LVDS differential data input, Chan 3-Even |
| 23 | RXinE3+ | +LVDS differential data input, Chan 3-Even |
| 24 | VSS | Ground |
| 25 | NC | No Connection |
| 26 | NC | No Connection |
| 27 | NC | No Connection |
| 28 | VCC | +5.0V power supply |
| 29 | VCC | +5.0V power supply |
| 30 | VCC | +5.0V power supply |
| Frame | VSS | Ground |




1.2 Recommend Connector for Backlight Unit

This connector is mounted on the monitor system board for LED light-bar FFC mating.

| | |
|---|---|
| Connector Name/Designation | Match Connector |
| Manufacturer | Entery INDUSTRIAL CO.,LTD |
| Mating type part number | 7080-Q10N-00R |

1.3 LED Light Bar

| Pin No | Symbol | Description |
|---|---|---|
| 1 | NC | No Connection |
| 2 | IRLED3 | LED current sense for string3 |
| 3 | IRLED1 | LED current sense for string1 |
| 4 | VLED | LED power supply |
| 5 | VLED | LED power supply |
| 6 | VLED | LED power supply |
| 7 | VLED | LED power supply |
| 8 | IRLED5 | LED current sense for string5 |
| 9 | IRLED4 | LED current sense for string4 |
| 10 | IRLED2 | LED current sense for string2 |

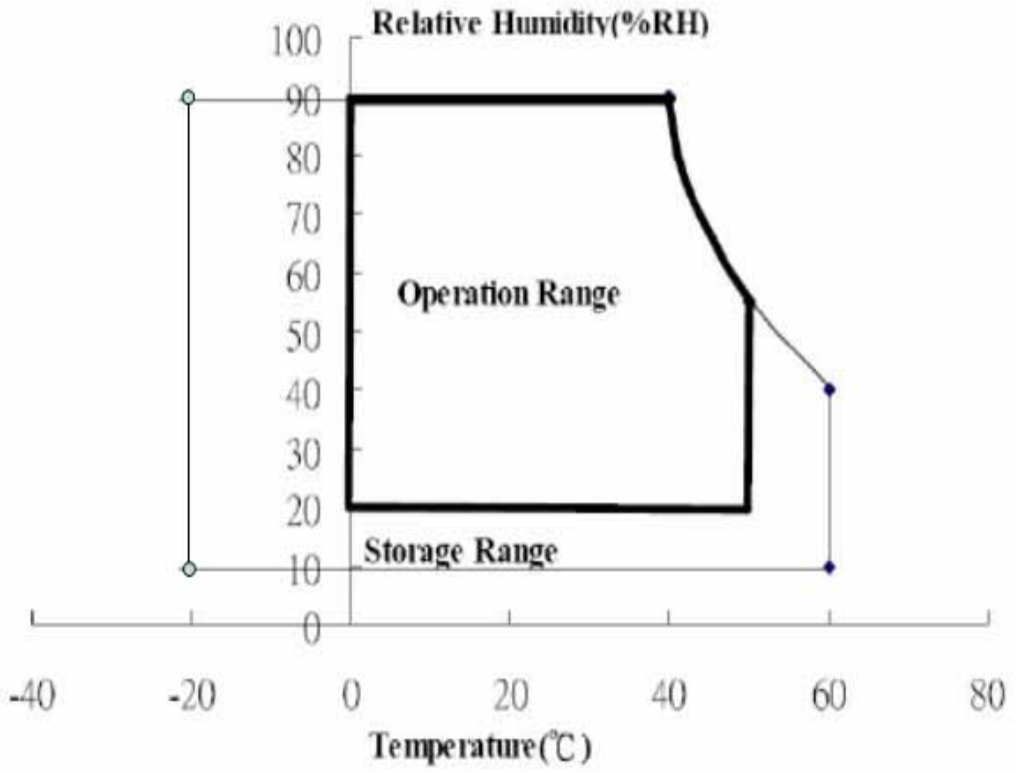
2. Absolute maximum ratings

Ta=25±2℃

| Parameter | Symbol | Values | | | Unit | Note |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Power voltage | Vcc | -0.3 | - | 6.0 | V | At25ºC |
| Input signal voltage | $V_{LH}$ | -0.3 | - | 4.3 | V | At25ºC |
| Storage temperature | TST | -20 | - | 60 | °C | (1) |
| Operating Ambient temperature | Top | 0 | - | 50 | °C | (2) |

Note 1: The unit should not be exposed to corrosive chemicals.

Note 2: The relative humidity must not exceed 90% non-condensing at temperatures of 40°C or less. At temperatures greater than 40°C, the wet bulb temperature must not exceed 39°C.



3. Electrical characteristics

a. Typical operating conditions

| Item | | | Symbol | Min. | Typ. | Max. | Unit | Remar |
|---|---|---|---|---|---|---|---|---|
| Input Voltage | | | $V_{cc}$ | 4.5 | 5 | 5.5 | V | |
| Permissive Power Input Ripple | | | $V_{RF}$ | - | - | 0.2 | V | |
| Input Current | | Black | $I_{cc}$ | - | 700 | 1000 | mA | Note 1 |
| | | White | $I_{cc}$ | - | 500 | 700 | | Note 2 |
| | | Mosaic | $I_{cc}$ | - | 700 | 1000 | | Note 3 |
| Rush Current | | | $I_{Rush}$ | - | 1.6 | 3 | A | Note 4 |
| Logic Input Voltage LVDS: IN+, IN- | Common Mode Voltage | | VCM | - | 1.2 | - | V | |
| | Differential Input Voltage | | VID | 100 | - | 600 | mV | |
| | Threshold Voltage (High) | | VTH | - | - | 100 | mV | Note 5 |
| | Threshold Voltage (Low) | | VTL | -100 | - | - | mV | Note 5 |

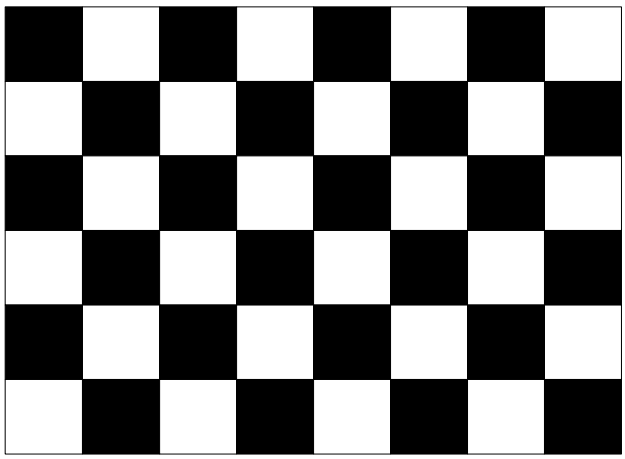
Note 1 : The specified current is under the Vcc =5V, 25 °C, fv=60Hz (frame frequency) condition whereas black pattern is displayed.

Note 2 : The specified current is under the Vcc =5V, 25 °C, fv=60Hz (frame frequency) condition whereas white pattern is displayed.

Note 3 : The specified current is under the Vcc =5V, 25 °C, fv=60Hz (frame frequency) condition whereas mosaic pattern(black & white [8*6] ) is displayed.

White : 255 Gray

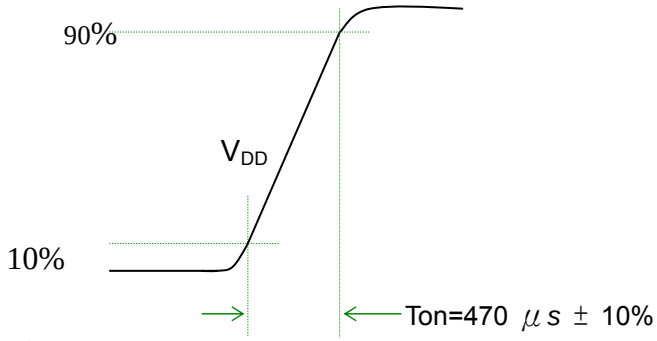
Black : 0 Gray



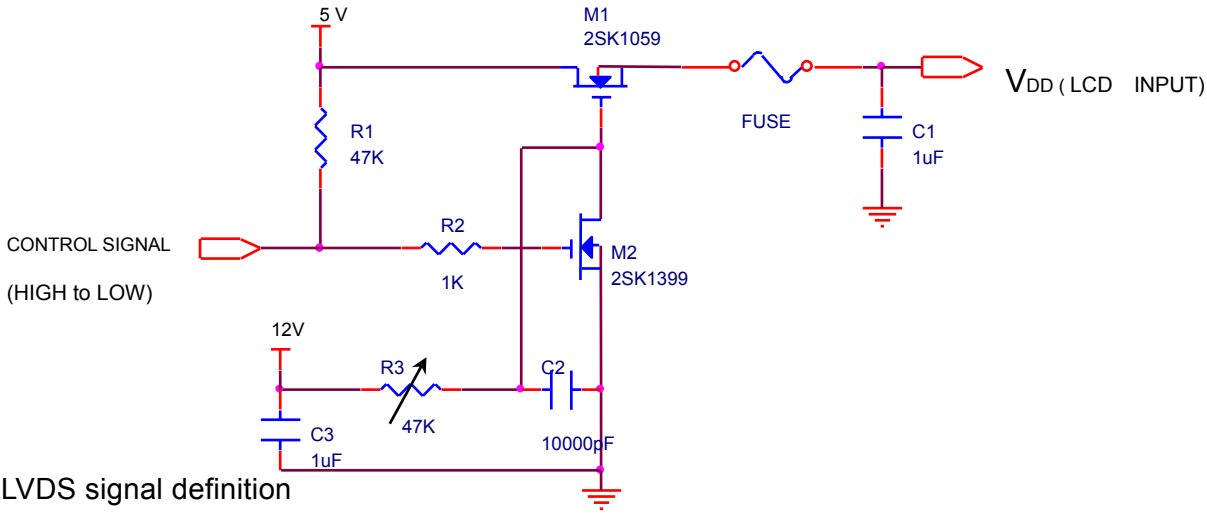
Note 4 : test condition :'

(1) $V_{DD}$ = 5 V, $V_{DD}$ rising time = 470 μs ± 10%

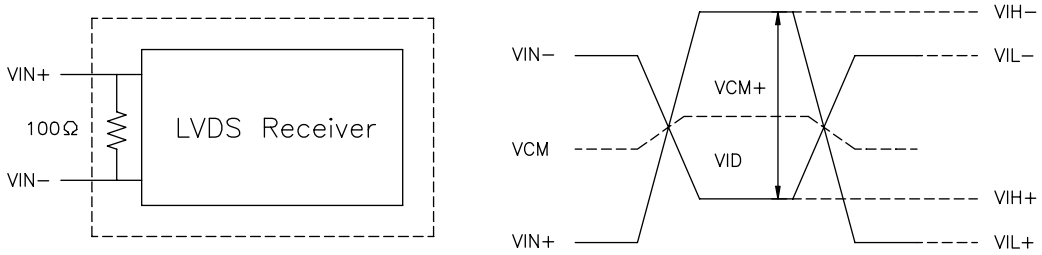
(2) Pattern: Mosaic pattern




(3) Test circuit




Note 5: LVDS signal definition




$VIN_+$ = Positive differential DATA & CLK Input

VIN- = Negative differential DATA & CLK Input

VID = $VIN_+$ – VIN- ,

ΔVCM = | $VCM_+$–VCM- | ,

ΔVID = | $VID_+$–VID- | ,

VID+ = | $VIH_+$–VIH- | ,

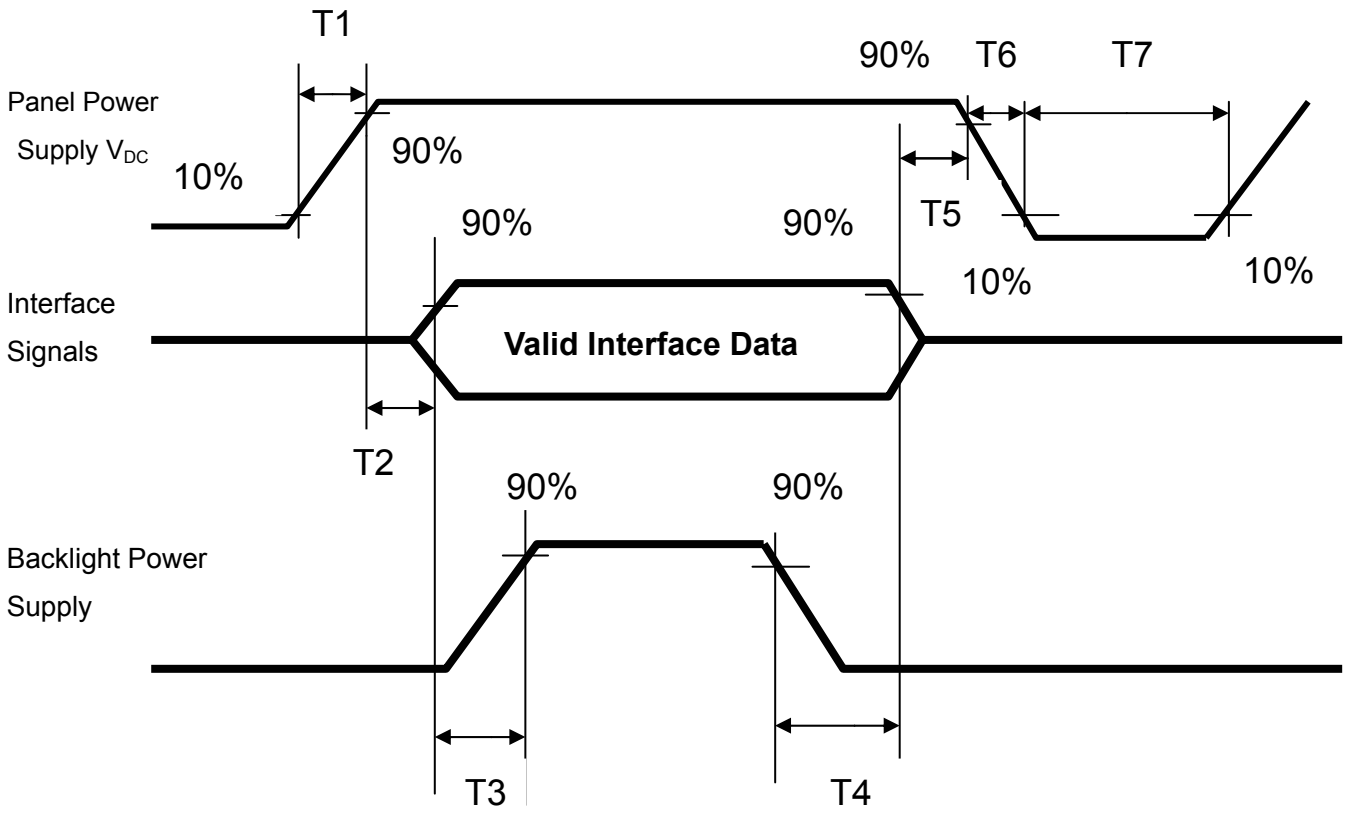
VID- = | $VIL_+$–VIL- | ,

VCM = ($VIN_+$ +VIN-)/2,

VCM+ = ($VIH_+$ +VIH-)/2,

VCM- = ($VIL_+$ +VIL-)/2,

Note 6 : Power on sequence for LCD $V_{DD}$




| Parameter | Value | | | Unit |
|---|---|---|---|---|
| | Min | Typ | Max | ms |
| T1 | 0.1 | - | 10 | ms |
| T2 | 0 | 30 | 50 | ms |
| T3 | 200 | 250 | - | ms |
| T4 | 100 | 250 | - | ms |
| T5 | 0 | 20 | 50 | ms |
| T6 | 0.1 | - | 10 | ms |
| T7 | 1000 | - | - | ms |

b. Display color vs. input data signals

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

| Color | | Input color data | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Red | | | | | | | | Green | | | | | | | | Blue | | | | | | | |
| | | MSB | | | | | | | LSB | MSB | | | | | | | LSB | MSB | | | | | | | LSB |
| | | R7 | R6 | R5 | R4 | R3 | R2 | R1 | R0 | G7 | G6 | G5 | G4 | G3 | G2 | G1 | G0 | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 |
| Basic colors | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(255) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(255) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue(255) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Cyan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Magenta | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Yellow | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | White | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Red | Red(000) dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(002) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Red(253) | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(254) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(255) bright | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Green | Green(000)dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(002) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Green(253) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(254) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(255)bright | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Blue | Blue(000) dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue(001) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Blue(002) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Blue(253) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| | Blue(254) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| | Blue(255) bright | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

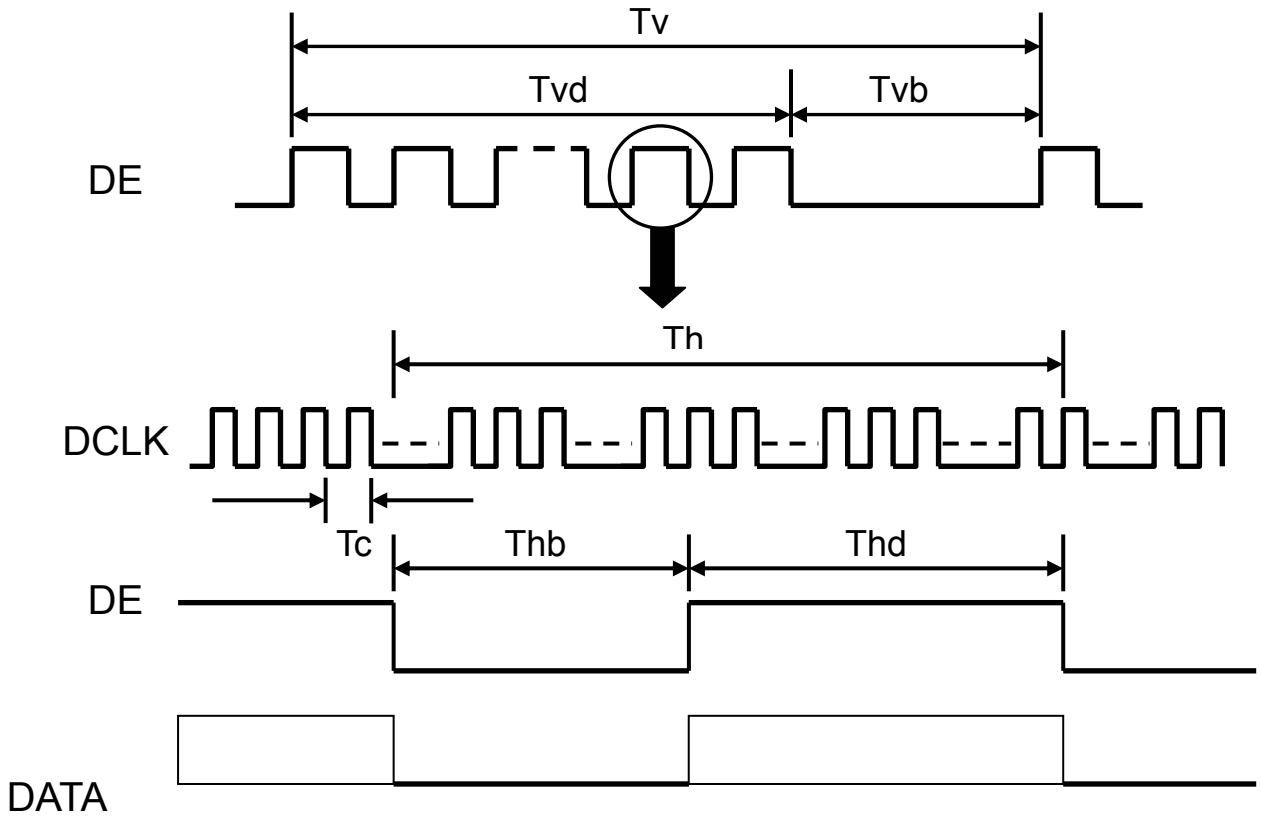
c. Input signal timing

Support Input Timing Table

| | Item | Description | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Clock | Dclk | period | 17.24 | 22.5 | 27 | nS |
| | | frequency | 37 | 44.4 | 58 | MHz |
| Vertical | $T_{V\_TOTAL}$ | V total line number | 905 | 926 | 942 | $T_{H\_TOTAL}$ |
| | $T_{V\_DATA}$ | Data duration | — | 900 | — | $T_{H\_TOTAL}$ |
| | $T_{VB}$ | V-blank | 5 | 26 | — | $T_{H\_TOTAL}$ |
| | $f_V$ | frequency | 50 | 60 | 75 | Hz |
| Horizontal | $T_{H\_TOTAL}$ | H total pixel number | 752 | 800 | 968 | DClk |
| | $T_{H\_DATA}$ | Data duration | — | 720 | — | DClk |
| | $T_{HB}$ | H-blank | 32 | 80 | — | DClk |

Note: Because this module is operated by DE only mode, Hsync and Vsync input signals should be set to low Logic level or ground. Otherwise, this module would operate abnormally.

## INPUT SIGNAL TIMING DIAGRAM



d. Display Position

| | | | | | | |
|---|---|---|---|---|---|---|
| D(1, 1) | D(2, 1) | …… | D(720, 1) | …… | D(1439, 1) | D(1440, 1) |
| D(1, 2) | D(2, 2) | …… | D(720, 2) | …… | D(1439, 2) | D(1440, 2) |
| ⋮ | | …… | ⋮ | …… | ⋮ | ⋮ |
| D(1, 450) | D(2, 450) | …… | D(720, 450) | …… | D(1439, 450) | D(1440, 450) |
| ⋮ | | …… | ⋮ | …… | ⋮ | ⋮ |
| D(1, 899) | D(2, 899) | …… | D(720, 899) | …… | D(1439, 899) | D(1440, 899) |
| D(1, 900) | D(2, 900) | …… | D(720, 900) | …… | D(1439, 900) | D(1440, 900) |

e.Backlight Unit

| Parameter | Symbol | Value | | | Unit | Note |
|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | | |
| Light Bar Input Voltage | $V_{LED}$ | --- | --- | 40.8 | VDC | (Duty 100%) |
| Light Bar Input Current | $I_{LED}$ | --- | --- | 200 | mADC | (1),(2),(3) |
| Power Consumption | $P_{LED}$ | --- | --- | 8.16 | W | (4) |
| LED Life Time | LBL | 25000 | 30000 | --- | Hrs | (5) |

Note (1): There are one Light Bar, and the specified current is input LED chip 100% duty current.

Note (2): The sensing current of each string is 40mA.

Note (3): The light bar have five current sensing strings, so that the light bar input current is 200mA.

Note (4): PLED = ILED × VLED.

Note (5): The life time is determined as the time at which luminance of the LED becomes 50% of the initial brightness or not normal lighting at ILED=200mA on condition of continuous operating at 25±2°C.

## C. Optical specifications

| Item | Symbol | Condition | Specification | | | Unit | Remark |
|---|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | | |
| Response time | Tr | θ= 0° | - | 1.5 | 4 | ms | Note 2 |
| | Tf | | - | 3.5 | 6 | | |
| | Tr+Tf | | - | 5 | 10 | | |
| Contrast ratio | CR | θ= 0° | 700 | 1000 | - | | Note 1,3 |
| Viewing angle | Top | CR≧10 | 70 | 80 | - | deg. | Note 1,3,4 |
| | Bottom | CR≧10 | 70 | 80 | - | | |
| | Left | CR≧10 | 75 | 85 | - | | |
| | Right | CR≧10 | 75 | 85 | - | | |
| Brightness (Center) | $Y_L$ | | 200 | 250 | - | nits | Note 1 |
| Color chromaticity(CIE) | Wx | θ= 0° | -0.03 | 0.313 | +0.03 | | Note 1 |
| | Wy | | | 0.329 | | | |
| | Rx | | | 0.640 | | | |
| | Ry | | | 0.345 | | | |
| | Gx | | | 0.324 | | | |
| | Gy | | | 0.611 | | | |
| | Bx | | | 0.146 | | | |
| | By | | | 0.062 | | | |
| White uniformity (9) points) | $\delta_W$ | | 0.70 | 0.75 | - | | Note 1,5 |
| Cross talk | Ct | | - | - | 2% | | Note 6 |

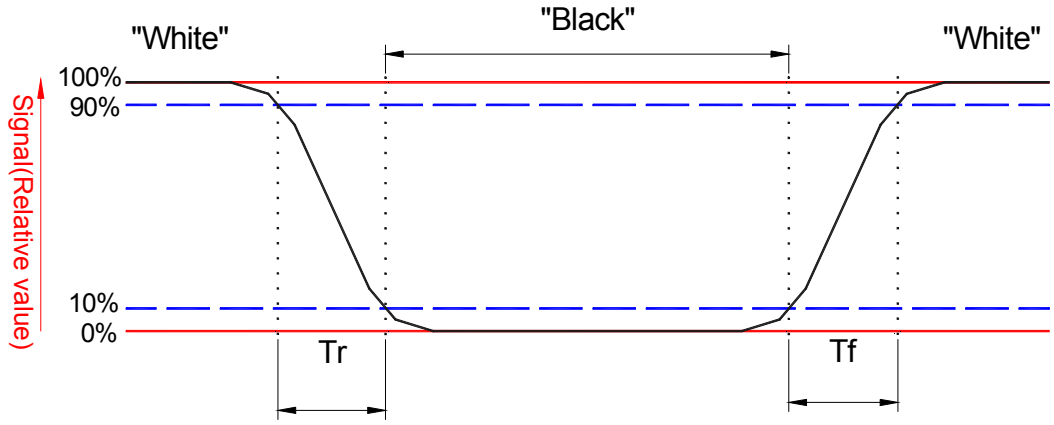
Note: 1. Ambient temperature = 25°C.

. 2.To be measured in dark room after backlight warm up 10 minutes.

Note 1: To be measured with a viewing cone of 2°by Topcon luminance meter BM-5A.

Note 2: Definition of response time:

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

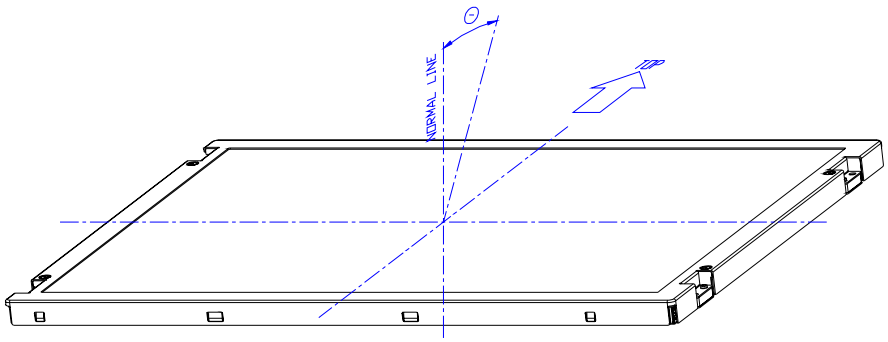



Note 3: Definition of contrast ratio:

Contrast ratio is calculated by the following formula.

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

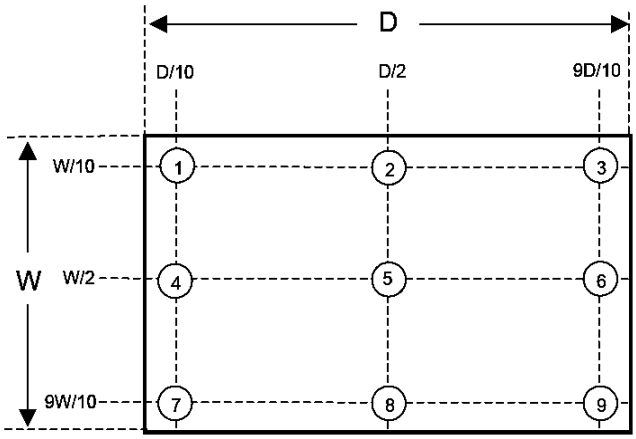
Note 4: Definition of viewing angle



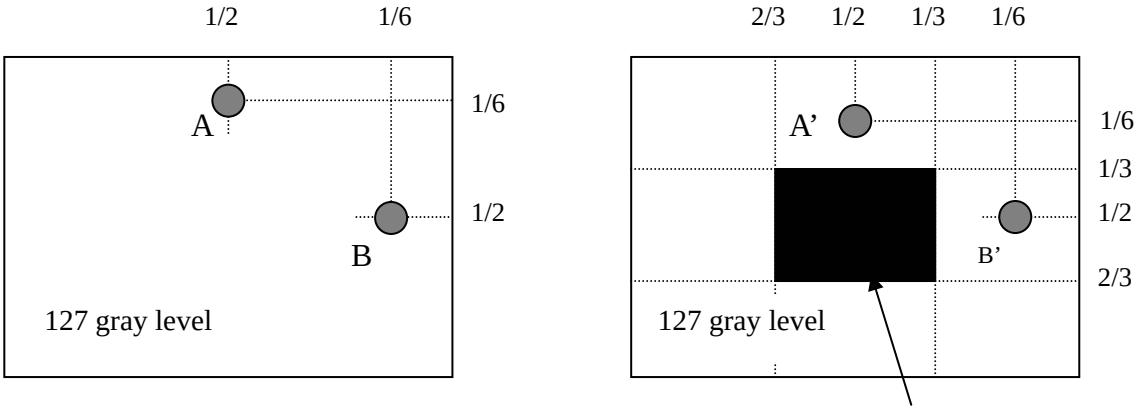

Note 5: Definition white uniformity:

Luminance are measured at the following nine points (P1~P9).

$$\delta_W = \frac{\text{Minimum Brightness of nine points (P1~P9).}}{\text{Maximum Brightness of nine points (P1~P9).}}$$



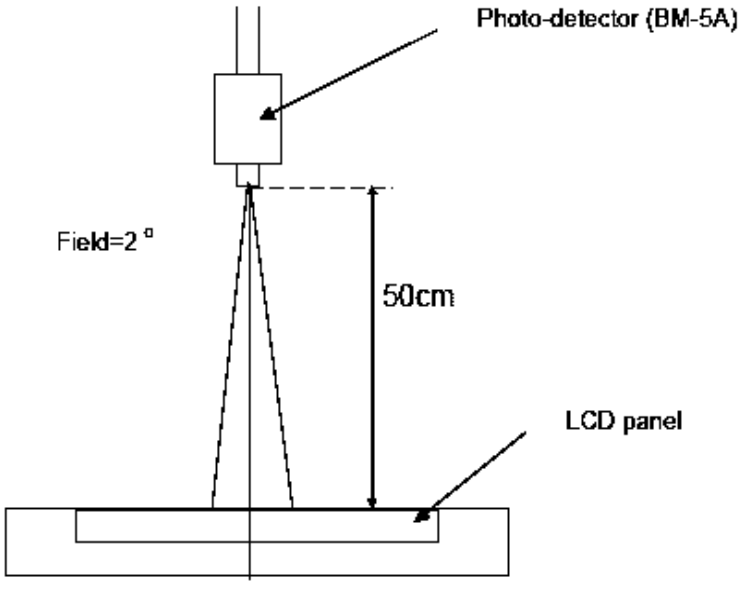

Note 6:




$I L_A-L_{A'} I / L_A \times 100\%= 2\%$ max., $L_A$ and $L_{A'}$ are brightness at location A and A'

$I L_B-L_{B'} I / L_B \times 100\%= 2\%$ max., $L_B$ and $L_{B'}$ are brightness at location B and B'

Note 10: Optical characteristic measurement setup.



## D. Reliability test items

| Test Item | Test Condition | Judgment | Remark |
|---|---|---|---|
| High temperature storage | 60°C, 240Hrs | Note 1 | Note 2 |
| Low temperature storage | -20°C, 240Hrs | Note 1 | Note 2 |
| High temperature & high humidity operation | 40°C, 90%RH, 240Hrs<br>(No condensation) | Note 1 | Note 2 |
| High temperature operation | 50°C, 240Hrs | Note 1 | Note 2 |
| Low temperature operation | 0°C, 240Hrs | Note 1 | Note 2 |
| Thermal Shock<br>(non-operation) | -20°C~60°C<br>1Hr, 1Hr, 100cycles | Note 1 | Note 2 |
| Electrostatic discharge (ESD) | Contact:+/-8kV, 150pF(330ohms), 16points<br>10 times/1 point, 1 time/1 sec<br>Air discharge:+/-15kV, 150pF(330ohms),<br>9 points, 10 times/1 point, 1 time/1 sec | Note 1 | Note 2 |
| Vibration<br>(non-operation) | Vibration level : 1.5G<br>Bandwidth : 10-300Hz<br>Waveform : sine wave,<br>sweep rate : 10min<br>30 min for each direction X, Y, Z<br>(1.5 Hrs in total) | Note 1 | Note 2 |
| Mechanical Shock<br>(non-operation) | Shock level : 50G, 11ms<br>Waveform : Half sine wave<br>Direction : ±X, ±Y, ±Z<br>One time each direction | Note 1 | Note 2 |
| MTBF Demonstration | 30,000 hours with confidence level 90% | Note 1 | Note 3 |

Note1: Pass: Normal display image with no obvious non-uniformity and no line defect.
Partial transformation of the module parts should be ignored.
Fail: No display image, obvious non-uniformity, or line defects.

Note2: Evaluation should be tested after storage at room temperature for two hours.

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

## E. Safety

**(1) Sharp Edge Requirements**

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

**(2) Materials**

**a. Toxicity**

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

**b. Flammability**

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

**c. Capacitors**

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

**F. Display quality**

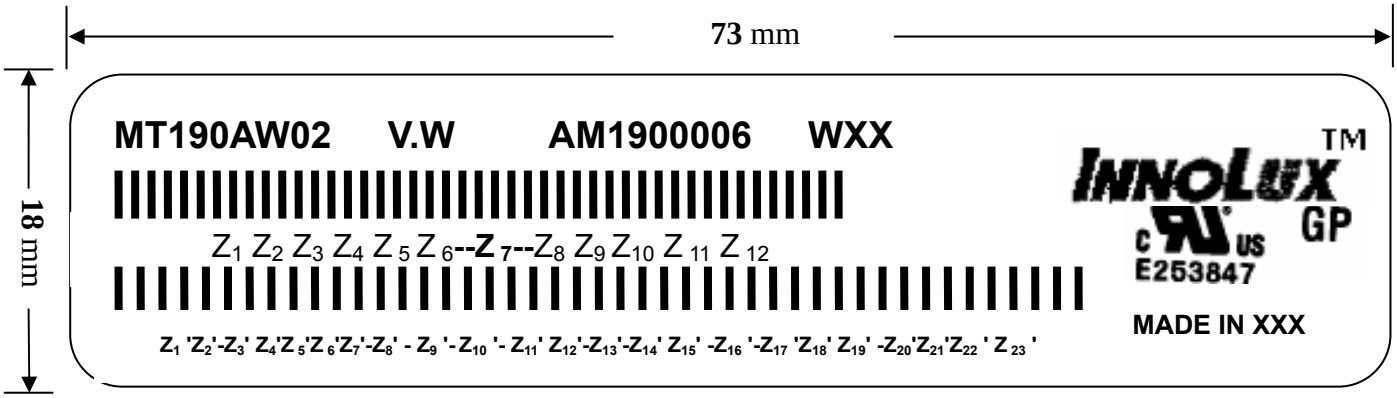
The display quality of the color TFT-LCD module should be in compliance with the Innolux's Incoming inspection standard.

**G.Handling precaution**

The Handling of the TFT-LCD should be in compliance with the Innolux's handling principle standard.

## H. Label

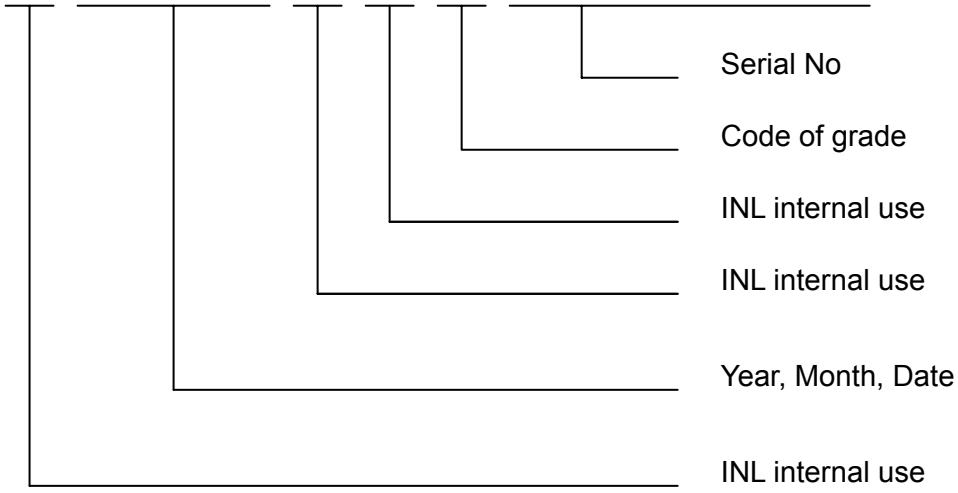
**(1) Module Label**




(a) Model Number: MT190AW02

(b) Version: V.W

(c) Serial ID I: $Z_1$ $Z_2$ $Z_3$ $Z_4$ $Z_5$ $Z_6$ $Z_7$ $Z_8$ $Z_9$ $Z_{10}$ $Z_{11}$ $Z_{12}$

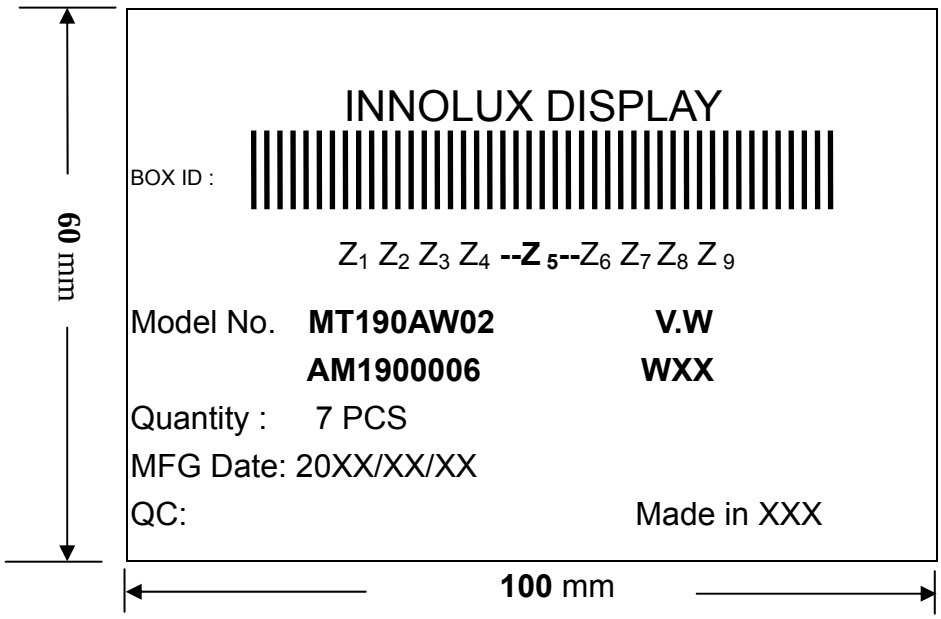



Serial ID includes the information as below:

1. Manufactured Date: Year: 0~9, for 2000~2009
2. Month: 1~9 & A~C for Jan.~Dec.
3. Date: 1~9 & A~Z (exclude I, O, Q, U) for 1st~31th
4. Code of grade: 1, 2, 3, 5, E
5. Serial No: Module manufacture sequence no

(d) Serial ID II (INL internal use)

**(2) Carton Label**

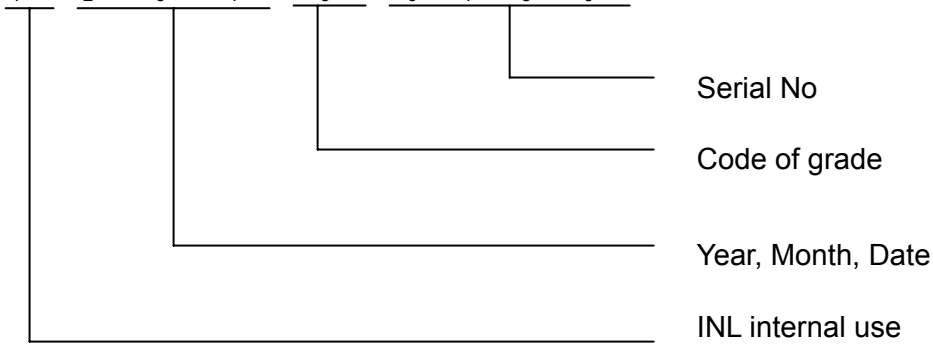



(a) Model Number: MT190AW02

(b) Version: V.W

(c) Packing quantity:7 pcs

(d) Serial ID: $Z_1$ $Z_2$ $Z_3$ $Z_4$ $Z_5$ $Z_6$ $Z_7$ $Z_8$ $Z_9$




Serial ID includes the information as below:

(a) Manufactured Date: Year: 0~9, for 2000~2009

Month: 1~9 & A~C for Jan.~Dec.

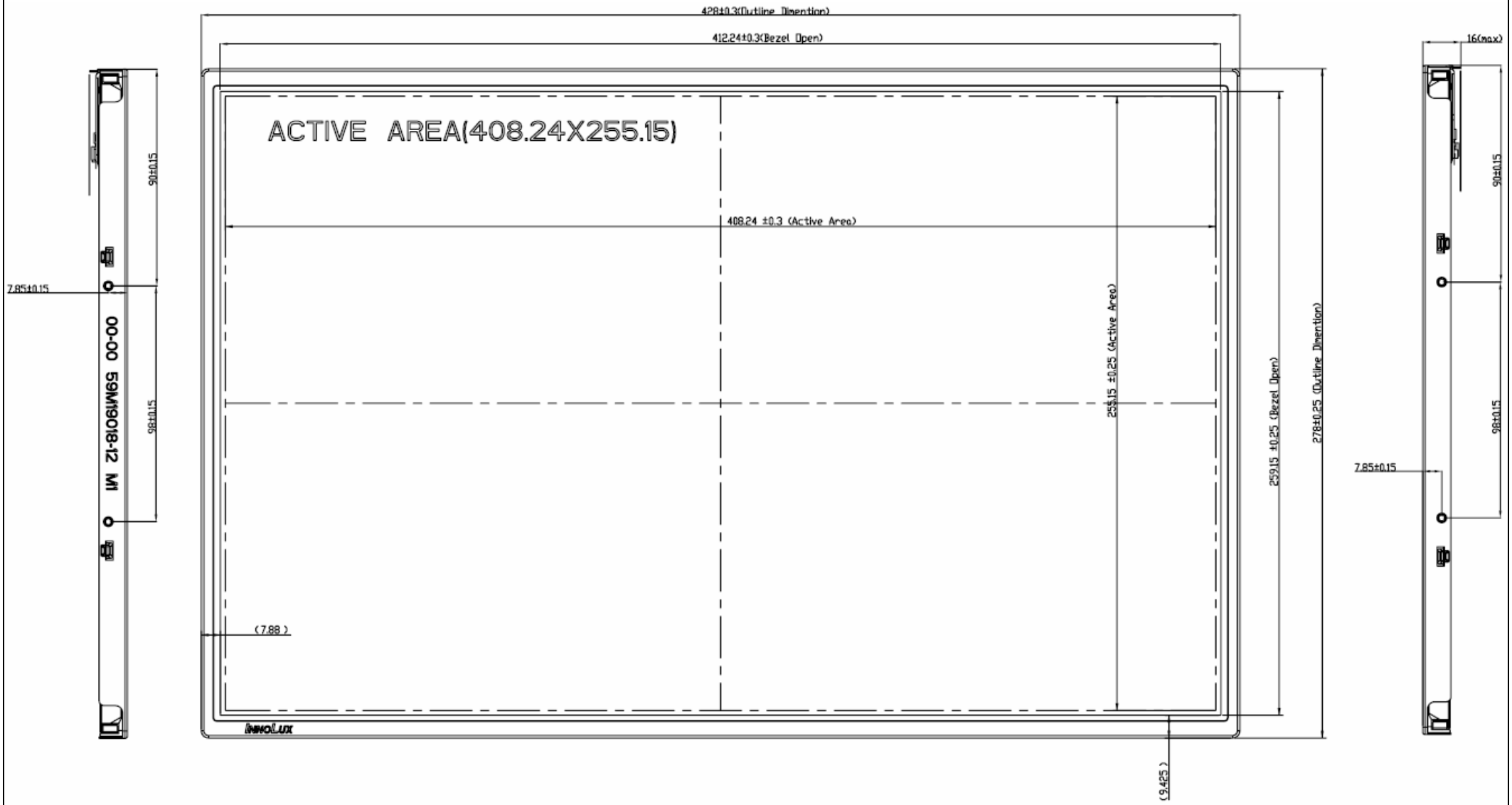
Date: 1~9 & A~Z (exclude I, O, Q, U) for 1st~31th

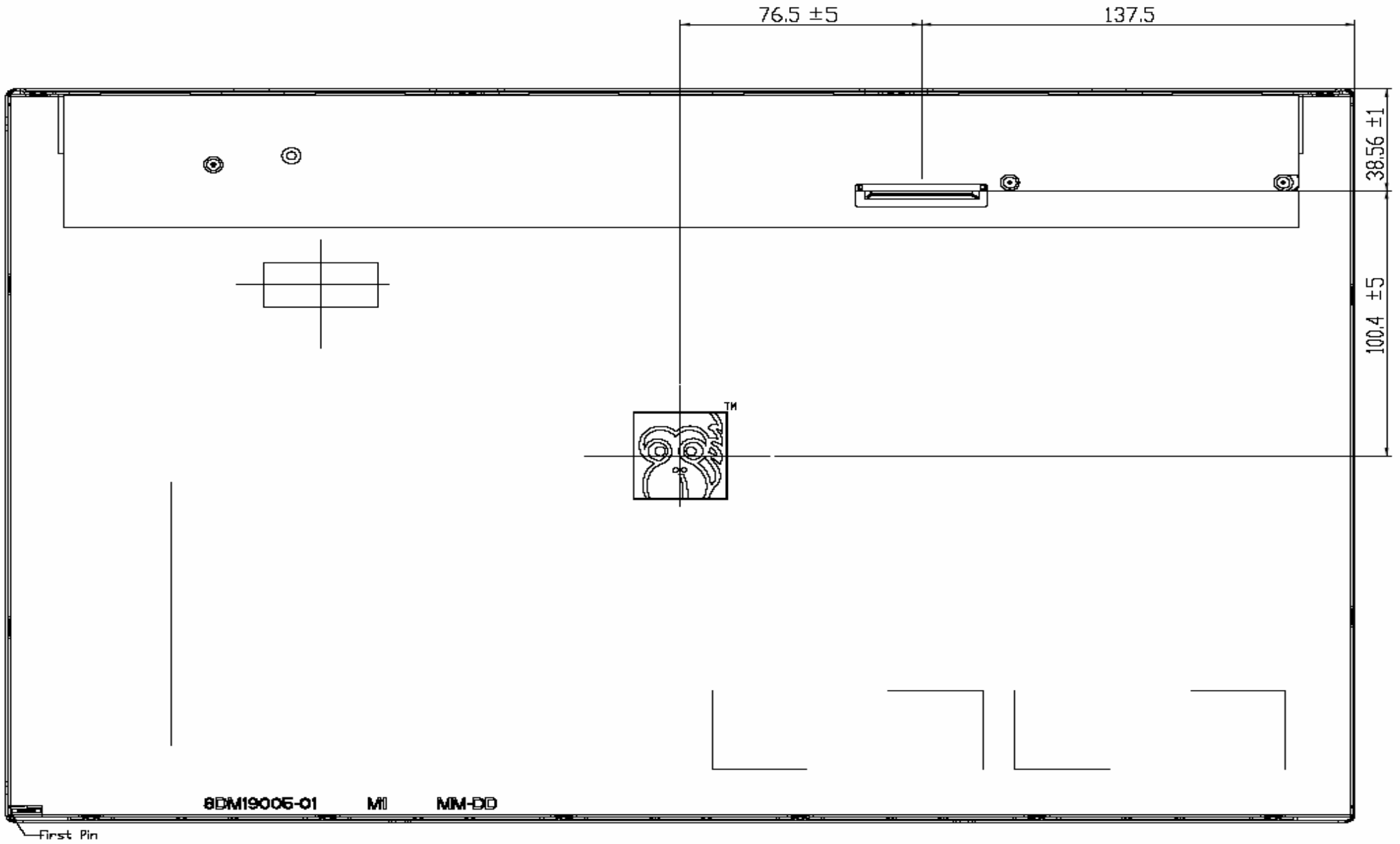
(b) Code of grade: 1,2, 3, 5, E

(c) Serial No: Module packing sequence no

## I. Mechanical drawing

## I. Mechanical drawing




76.5 ±5
137.5
38.56 ±1
100.4 ±5
TM
8DM19005-01 M1 MM-DD
First Pin