


# WINSTAR Display Co.,Ltd.
# 華凌光電股份有限公司

Represented by:

first FC components
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# SPECIFICATION

**CUSTOMER :** _____

**MODULE NO.: WG12864A-TMI-V#N**

| APPROVED BY:<br>( FOR CUSTOMER USE ONLY ) | PCB VERSION: DATA: |
|---|---|

| SALES BY | APPROVED BY | CHECKED BY | PREPARED BY |
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| VERSION | DATE | REVISED PAGE NO. | SUMMARY |
|---|---|---|---|
| E | 2017/02/15 | | Modify Backlight Information |

# General Specification

| Item | Dimension | Unit |
|---|---|---|
| Number of dots | 128 x 64 | — |
| Module dimension | 93.0 x 70.0 x 13.6 (MAX) | mm |
| View area | 72.0 x 40.0 | mm |
| Active area | 66.52 x 33.24 | mm |
| Dot size | 0.48 x 0.48 | mm |
| Dot pitch | 0.52 x 0.52 | mm |
| LCD type | STN Negative, Blue Transmissive<br>(In LCD production, It will occur slightly color difference. We can only guarantee the same color in the same batch.) | |
| Duty | 1/64 | |
| View direction | 6 o'clock | |
| Backlight Type | LED, White | |
| IC | NT7107, NT7108 | |

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# Absolute Maximum Ratings

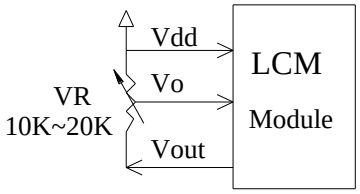
| Item | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Operating Temperature | $T_{OP}$ | -20 | — | +70 | ℃ |
| Storage Temperature | $T_{ST}$ | -30 | — | +80 | ℃ |
| Supply Voltage For Logic | $V_{DD}$-$V_{SS}$ | -0.3 | — | 7.0 | V |
| Driver Supply Voltage | $V_{LCD}$ | $V_{EE}$-0.3 | — | $V_{DD}$+0.3 | V |

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# Electrical Characteristics

| ITEM | SYMBOL | CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Supply Voltage For Logic | $V_{DD}$-$V_{SS}$ | — | 4.5 | 5.0 | 5.5 | V |
| Supply Voltage For LCD<br>*Note | $V_{DD}$-$V_O$ | Ta=-20℃<br>Ta=25℃<br>Ta=70℃ | —<br>8.6<br>7.6 | —<br>8.9<br>— | 10.6<br>9.2<br>— | V<br>V<br>V |
| Input High Volt. | $V_{IH}$ | — | 0.7 $V_{DD}$ | — | $V_{DD}$ | V |
| Input Low Volt. | $V_{IL}$ | — | 0 | — | 0.8 | V |
| Output High Volt. | $V_{OH}$ | — | 2.4 | — | — | V |
| Output Low Volt. | $V_{OL}$ | — | — | — | 0.4 | V |
| Supply Current | $I_{DD}$ | $V_{DD}$=5.0V | — | 29.2 | — | mA |

* Note: Please design the VOP adjustment circuit on customer's main board

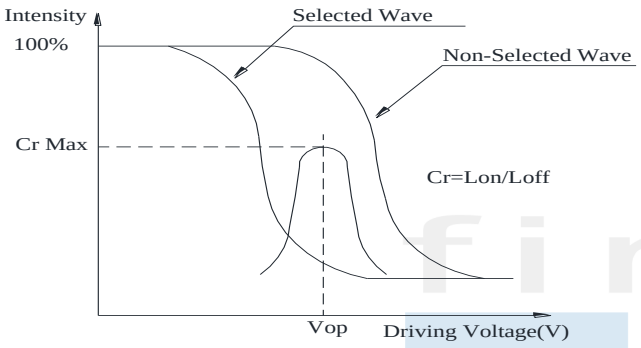


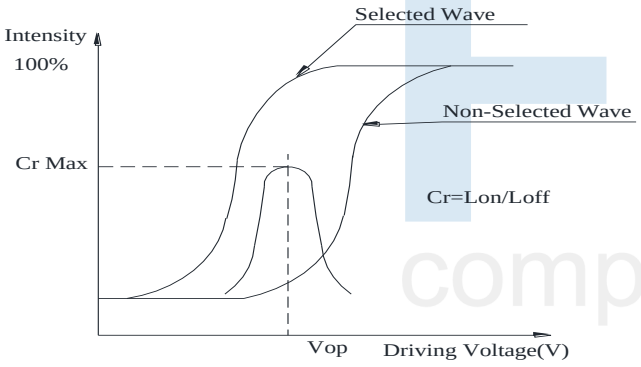

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# Optical Characteristics

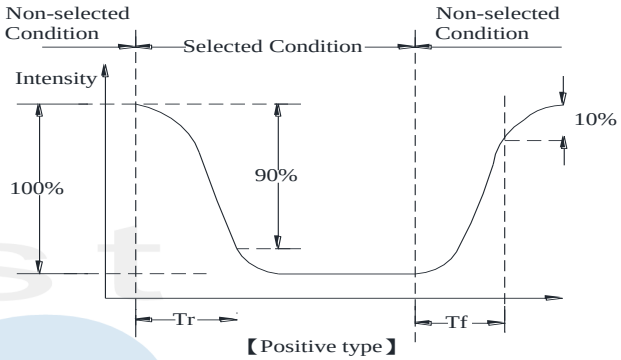
| Item | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| View Angle | θ | CR≧2 | 0 | — | 20 | ψ = 180° |
| | θ | CR≧2 | 0 | — | 40 | ψ = 0° |
| | θ | CR≧2 | 0 | — | 30 | ψ = 90° |
| | θ | CR≧2 | 0 | — | 30 | ψ = 270° |
| Contrast Ratio | CR | — | — | 3 | — | — |
| Response Time | T rise | — | — | 200 | 300 | ms |
| | T fall | — | — | 250 | 350 | ms |

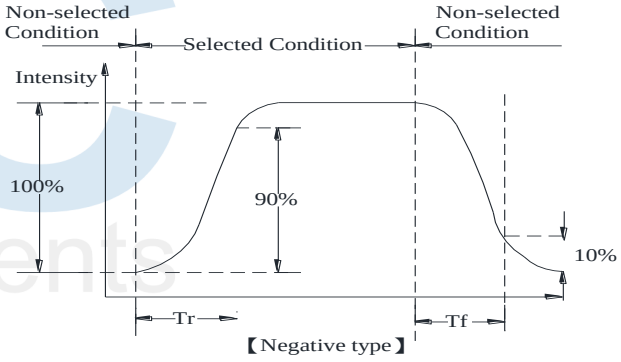
**Definition of Operation Voltage (Vop)**




**Definition of Response Time ( Tr , Tf )**



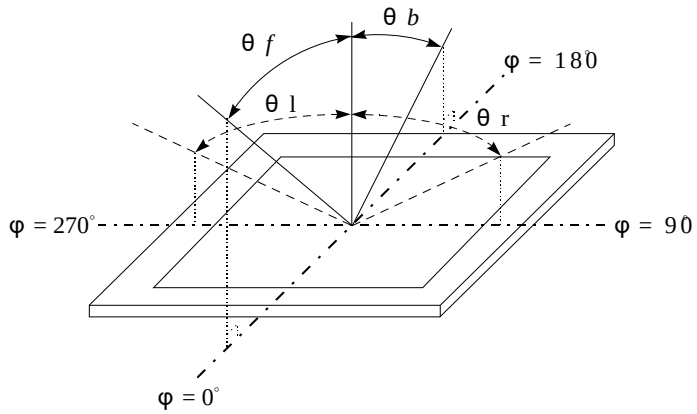




**Conditions :**

Operating Voltage : Vop　　Viewing Angle(θ ，φ ) : 0°， 0°

Frame Frequency : 64 HZ　　Driving Waveform : 1/N duty , 1/a bias

**Definition of viewing angle(CR≧2)**

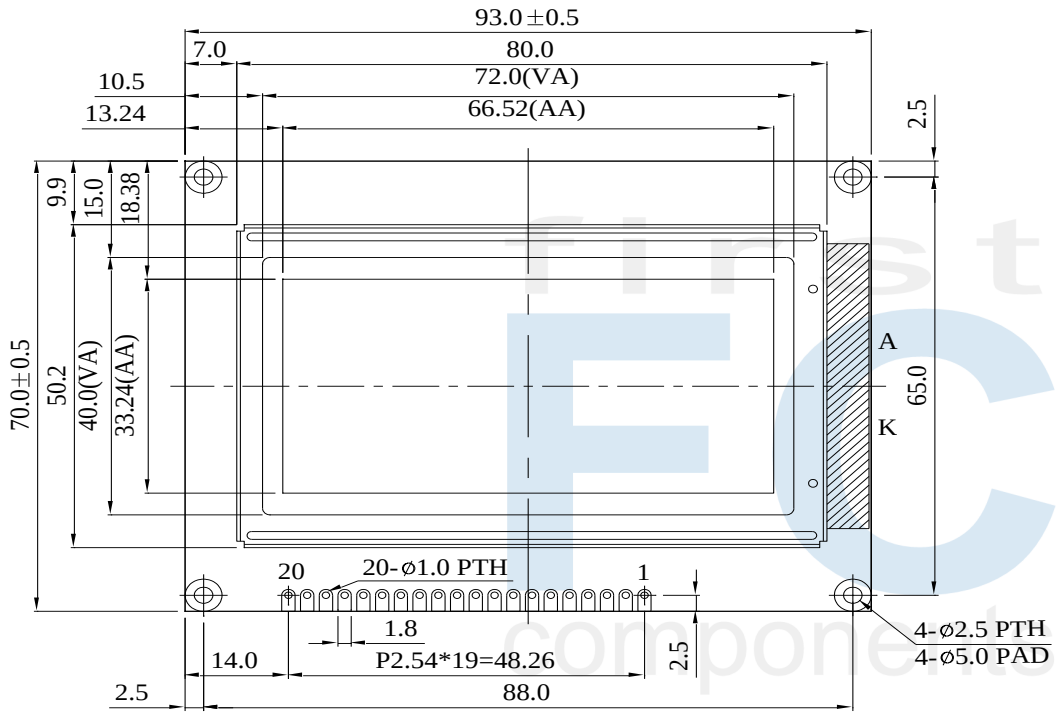


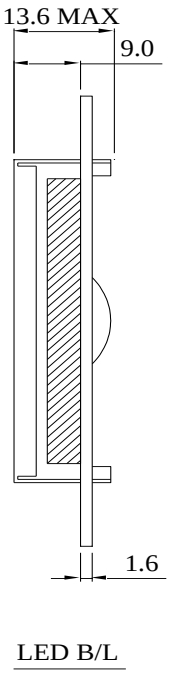
# Interface Pin Function

| Pin No. | Symbol | Level | Description |
|---|---|---|---|
| 1 | $V_{SS}$ | 0V | Ground |
| 2 | $V_{DD}$ | 5.0V | Supply voltage for logic |
| 3 | $V_o$ | (Variable) | Operating voltage for LCD |
| 4 | D/I | H/L | H: Data , L : Instruction |
| 5 | R/W | H/L | H: Read (MPU←Module) , L: Write (MPU→Module) |
| 6 | E | H | Enable signal |
| 7 | DB0 | H/L | Data bus line |
| 8 | DB1 | H/L | Data bus line |
| 9 | DB2 | H/L | Data bus line |
| 10 | DB3 | H/L | Data bus line |
| 11 | DB4 | H/L | Data bus line |
| 12 | DB5 | H/L | Data bus line |
| 13 | DB6 | H/L | Data bus line |
| 14 | DB7 | H/L | Data bus line |
| 15 | CS1 | H | Select Column 1~ Column 64 |
| 16 | CS2 | H | Select Column 65~ Column 128 |
| 17 | /RES | L | Reset signal |
| 18 | Vout | — | Negative Voltage output |
| 19 | A | — | Power Supply for LED backlight ( + ) |
| 20 | K | — | Power Supply for LED backlight ( - ) |

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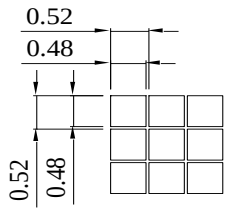
# Contour Drawing &Block Diagram




LED B/L

| PIN NO. | SYMBOL |
|---|---|
| 1 | Vss |
| 2 | Vdd |
| 3 | Vo |
| 4 | D/I |
| 5 | R/$\overline{W}$ |
| 6 | E |
| 7 | DB0 |
| 8 | DB1 |
| 9 | DB2 |
| 10 | DB3 |
| 11 | DB4 |
| 12 | DB5 |
| 13 | DB6 |
| 14 | DB7 |
| 15 | CS1 |
| 16 | CS2 |
| 17 | $\overline{RES}$ |
| 18 | Vout |
| 19 | A |
| 20 | K |




DOT SIZE

The non-specified tolerance of dimension is ±0.3mm.

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