


| | | | |
|-------------------------------------|------------|------------------|------------|
| MDT1010GIH-HDMI | 1280 x 800 | HDMI Interface | TFT Module |
| (MCT101HDMI-A) Specification | | | |
| Version: 1 | | Date: 22/06/2019 | |
| Revision | | | |
| 1 | 21/06/2019 | First issue | |

| Display Features | |  |
|-----------------------|---------------------------|---|
| Display Size | 10.10" | |
| Resolution | 1280 x 800 | |
| Orientation | Landscape | |
| Appearance | RGB | |
| Logic Voltage | 5V | |
| Interface | HDMI | |
| Brightness | 1100 cd/m ² | |
| Touchscreen | --- | |
| Module Size | 230.56 x 155.01 x 25.60mm | |
| Operating Temperature | -20°C ~ +70°C | |
| Pinout | 40 Way Connector | Box Quantity |
| Pitch | --- | Weight / Display |

* - For full design functionality, please use this specification in conjunction with the TFP401 specification. (Provided Separately)

| Display Accessories | |
|---------------------|-----------------------------|
| Part Number | Description |
| MCIB-HDMI/HDMI | Male To Male HDMI Connector |

| Optional Variants | |
|---|---------|
| Appearances | Voltage |
| Capacitive Touch Panel Resistive Touch Panel | |



Summary

TFT 10.1" is a IPS transmissive type color active matrix TFT liquid crystal display . In-Plane Switching (IPS) was one of the first refinements to produce significant gains in the light-transmissive characteristics of TFT panels. It is a technology that addresses the two main issues of a standard twisted nematic (TN) TFT display: colour and viewing angle.

General Specifications

- Screen Diagonal: 10.1 inch
- Number of Pixels: 1280 x 3(RGB) x 800 dots
- Module dimension: 230.56 x 155.01 x 25.6 mm
- Active area: 216.96 (H) x 135.6(V) mm
- Pixel pitch: 0.1695 × 0.1695 mm
- Display Mode: Normally Black
- Pixel Arrangement: R.G.B. Vertical Stripe
- Backlight Type: LED, Normally White
- Aspect Ratio: 16:9
- Electrical Interface (Logic): HDMI
- With /Without TP: Without TP
- Surface: Anti-Glare

*Color tone slight changed by temperature and driving voltage.



Interface

. CON6

| Pin No. | Symbol | Function | Remark |
|---------|--------|---|--------|
| 1 | 3.3V | TFT Module Power limit can only output 3.3V,100mA | Note1 |
| 2 | 5V | Raspberry Pi:Power 5V | |
| 3 | GPIO02 | Raspberry Pi:GPIO02 | |
| 4 | 5V | Raspberry Pi:Power 5V | |
| 5 | GPIO03 | Raspberry Pi:GPIO03 | |
| 6 | GND | Raspberry Pi:GND | |
| 7 | GPIO04 | Raspberry Pi:GPIO04 | |
| 8 | GPIO14 | Raspberry Pi:GPIO14 | |
| 9 | GND | Raspberry Pi:GND | |
| 10 | GPIO15 | Raspberry Pi:GPIO15 | |
| 11 | GPIO17 | Raspberry Pi:GPIO17 | |
| 12 | GPIO18 | Raspberry Pi:GPIO18 (Backlight Enable) | |
| 13 | GPIO27 | Raspberry Pi:GPIO27 | |
| 14 | GND | Raspberry Pi:GND | |
| 15 | GPIO22 | Raspberry Pi:GPIO22 | |
| 16 | GPIO23 | Raspberry Pi:GPIO23 | |
| 17 | 3.3V | TFT Module Power limit can only output 3.3V,100mA | Note1 |
| 18 | GPIO24 | Raspberry Pi:GPIO24 | |
| 19 | GPIO10 | Raspberry Pi:GPIO10 | |
| 20 | GND | Raspberry Pi:GND | |
| 21 | GPIO09 | Raspberry Pi:GPIO09 | |
| 22 | GPIO25 | Raspberry Pi:GPIO25 | |
| 23 | GPIO11 | Raspberry Pi:GPIO11 | |
| 24 | GPIO08 | Raspberry Pi:GPIO08 | |
| 25 | GND | Raspberry Pi:GND | |
| 26 | GPIO07 | Raspberry Pi:GPIO07 | |
| 27 | ID_SD | Raspberry Pi:ID_SD | |
| 28 | ID_SC | Raspberry Pi:ID_SC | |
| 29 | GPIO05 | Raspberry Pi:GPIO05 | |
| 30 | GND | Raspberry Pi:GND | |
| 31 | GPIO06 | Raspberry Pi:GPIO06 | |
| 32 | GPIO12 | Raspberry Pi:GPIO12 | |



| | | | |
|----|--------|---------------------|--|
| 33 | GPIO13 | Raspberry Pi:GPIO13 | |
| 34 | GND | Raspberry Pi:GND | |
| 35 | GPIO19 | Raspberry Pi:GPIO19 | |
| 36 | GPIO16 | Raspberry Pi:GPIO16 | |
| 37 | GPIO26 | Raspberry Pi:GPIO26 | |
| 38 | GPIO20 | Raspberry Pi:GPIO20 | |
| 39 | GND | Raspberry Pi:GND | |
| 40 | GPIO21 | Raspberry Pi:GPIO21 | |

Note1: The 3.3V supply current is limited; please pay special attention to use



CON5

| Pin No. | Symbol | Function | Remark |
|---------|--------|--|--------|
| 1 | NC | No connection | |
| 2 | 5V | Raspberry Pi:Power 5V | |
| 3 | GPIO02 | Raspberry Pi:GPIO02 | |
| 4 | 5V | Raspberry Pi:Power 5V | |
| 5 | GPIO03 | Raspberry Pi:GPIO03 | |
| 6 | GND | Raspberry Pi:GND | |
| 7 | GPIO04 | Raspberry Pi:GPIO04 | |
| 8 | GPIO14 | Raspberry Pi:GPIO14 | |
| 9 | GND | Raspberry Pi:GND | |
| 10 | GPIO15 | Raspberry Pi:GPIO15 | |
| 11 | GPIO17 | Raspberry Pi:GPIO17 | |
| 12 | GPIO18 | Raspberry Pi:GPIO18 (Backlight Enable) | |
| 13 | GPIO27 | Raspberry Pi:GPIO27 | |
| 14 | GND | Raspberry Pi:GND | |
| 15 | GPIO22 | Raspberry Pi:GPIO22 | |
| 16 | GPIO23 | Raspberry Pi:GPIO23 | |
| 17 | NC | No connection | |
| 18 | GPIO24 | Raspberry Pi:GPIO24 | |
| 19 | GPIO10 | Raspberry Pi:GPIO10 | |
| 20 | GND | Raspberry Pi:GND | |
| 21 | GPIO09 | Raspberry Pi:GPIO09 | |
| 22 | GPIO25 | Raspberry Pi:GPIO25 | |
| 23 | GPIO11 | Raspberry Pi:GPIO11 | |
| 24 | GPIO08 | Raspberry Pi:GPIO08 | |
| 25 | GND | Raspberry Pi:GND | |
| 26 | GPIO07 | Raspberry Pi:GPIO07 | |
| 27 | ID_SD | Raspberry Pi:ID_SD | |
| 28 | ID_SC | Raspberry Pi:ID_SC | |
| 29 | GPIO05 | Raspberry Pi:GPIO05 | |
| 30 | GND | Raspberry Pi:GND | |
| 31 | GPIO06 | Raspberry Pi:GPIO06 | |
| 32 | GPIO12 | Raspberry Pi:GPIO12 | |
| 33 | GPIO13 | Raspberry Pi:GPIO13 | |



| | | | |
|----|--------|---------------------|--|
| 34 | GND | Raspberry Pi:GND | |
| 35 | GPIO19 | Raspberry Pi:GPIO19 | |
| 36 | GPIO16 | Raspberry Pi:GPIO16 | |
| 37 | GPIO26 | Raspberry Pi:GPIO26 | |
| 38 | GPIO20 | Raspberry Pi:GPIO20 | |
| 39 | GND | Raspberry Pi:GND | |
| 40 | GPIO21 | Raspberry Pi:GPIO21 | |

HDMI

| Pin No. | Symbol | I/O | Function | Remark |
|---------|--------|-----|---------------------------------|--------|
| 1 | Rx2+ | I | +LVDS Differential Data Input | |
| 2 | GND | P | Ground | |
| 3 | Rx2- | I | -LVDS Differential Data Input | |
| 4 | Rx1+ | I | +LVDS Differential Data Input | |
| 5 | GND | P | Ground | |
| 6 | Rx1- | I | -LVDS Differential Data Input | |
| 7 | Rx0+ | I | +LVDS Differential Data Input | |
| 8 | GND | P | Ground | |
| 9 | Rx0- | I | -LVDS Differential Data Input | |
| 10 | RxC+ | I | +LVDS Differential Clock Input | |
| 11 | GND | P | Ground | |
| 12 | RxC- | I | -LVDS Differential Clock Input | |
| 13-14 | NC | - | No connection | |
| 15 | SCL | I/O | DDC(Data Display Channel) Clock | |
| 16 | SDA | I/O | DDC(Data Display Channel) Data | |
| 17 | GND | P | Ground | |
| 18 | 5V | P | Power Supply | |
| 19 | Detect | I/O | Hot plug detect | |

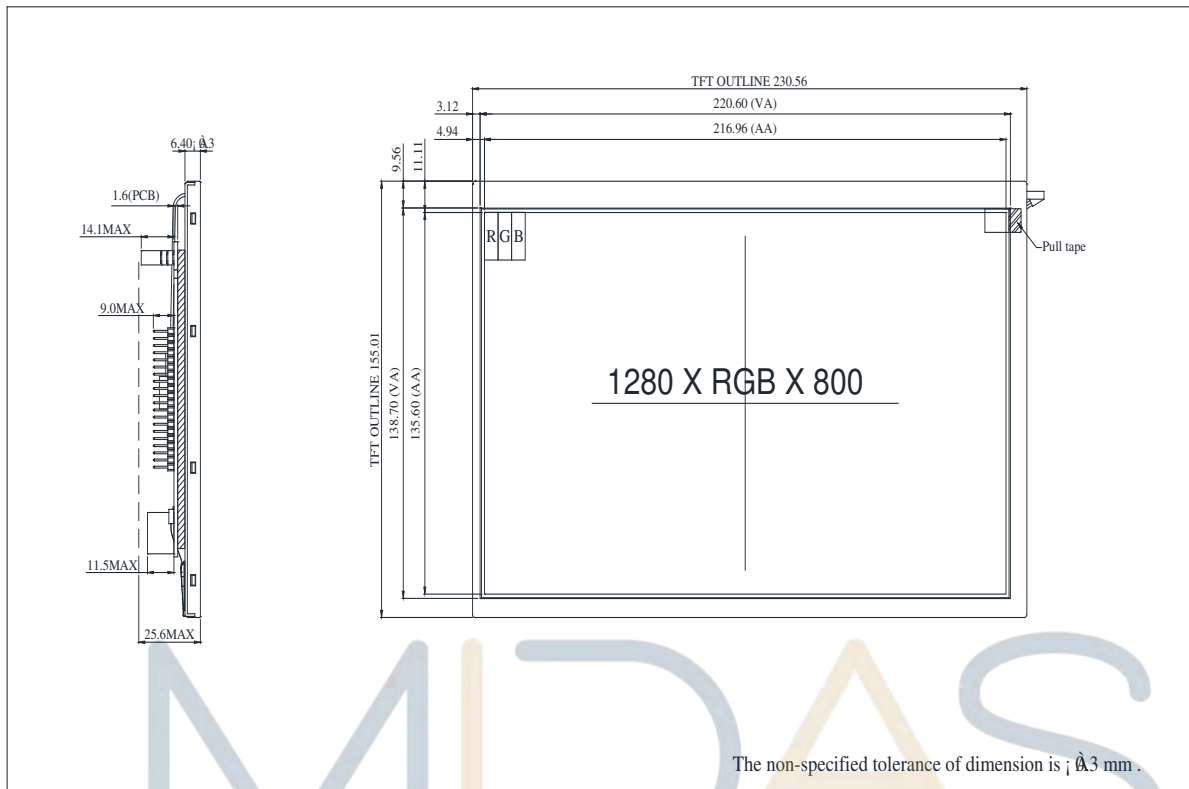
I: input, O: output, P: Power

POWER-JACK

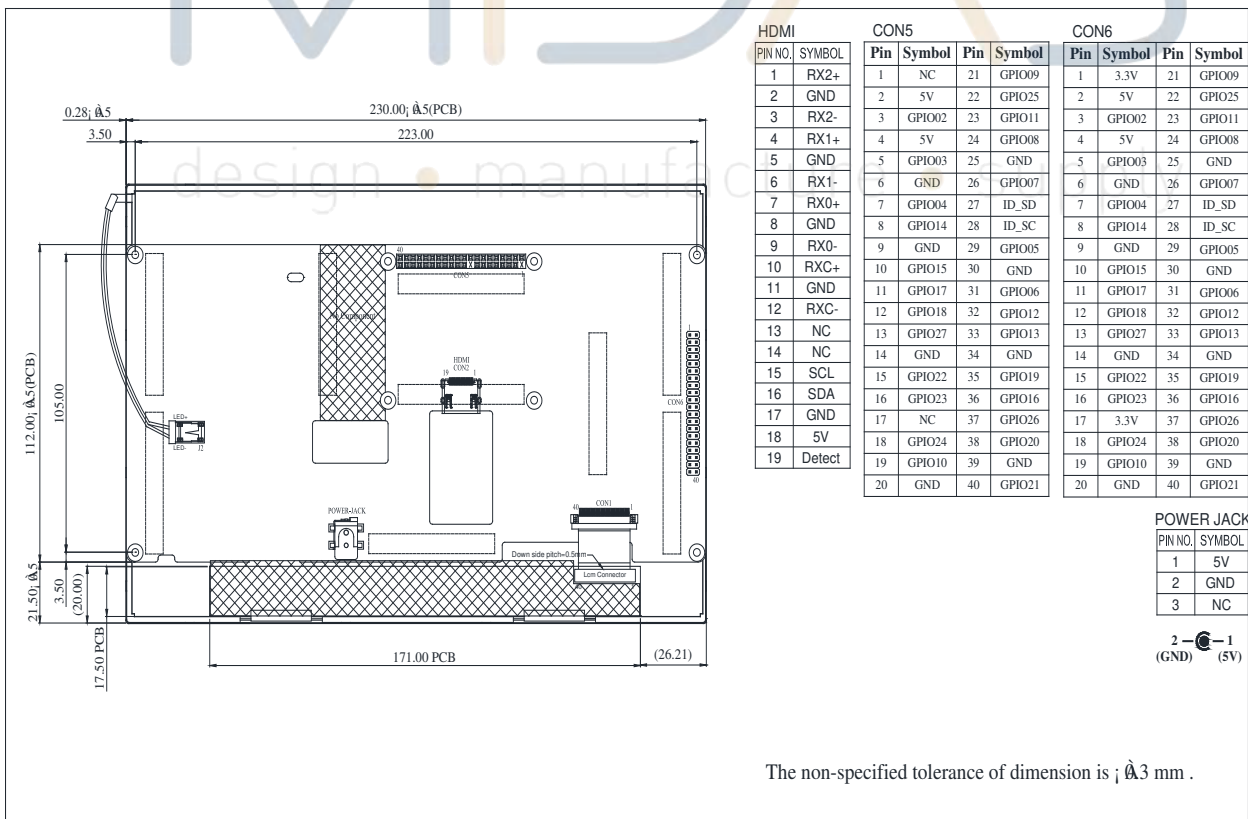
| Pin No. | Symbol | I/O | Function | Remark |
|---------|--------|-----|-------------------|--------|
| 1 | 5V | P | Power Supply (5V) | |
| 2 | GND | P | Ground | |
| 3 | NC | - | No connection | |



Contour Drawing



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



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

Absolute Maximum Ratings

| Item | Symbol | Min | Typ | Max | Unit |
|-----------------------|--------|-----|-----|-----|------|
| Operating Temperature | TOP | -20 | — | +70 | °C |
| Storage Temperature | TST | -20 | — | +70 | °C |

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

1. Temp. $\leq 60^{\circ}\text{C}$, 90% RH MAX. Temp. $> 60^{\circ}\text{C}$, Absolute humidity shall be less than 90% RH at 60°C

Electrical Characteristics

1. Operating conditions:

| Item | Symbol | Condition | Min | Typ | Max | Unit | Remark |
|------------------------|--------|-----------|-------|-----|-----|------|--------|
| Supply Voltage For LCM | VDD | — | 4.9 | 5 | 5.1 | V | — |
| Supply Current For LCM | IDD | — | — | 1.9 | 2.7 | A | Note 1 |
| LED life time | — | — | 50000 | — | — | Hr | Note 3 |

Note 1 : This value is test for VDD =5.0V , Ta=25°C only

Note 2 : Display with Raspberry pi the driver power is over USB , first make sure you have a 3A power supply, with a good quality USB cable, a thin wire power cable is no good. Make sure its 24AWG or smaller, shorter USB cables are better too.

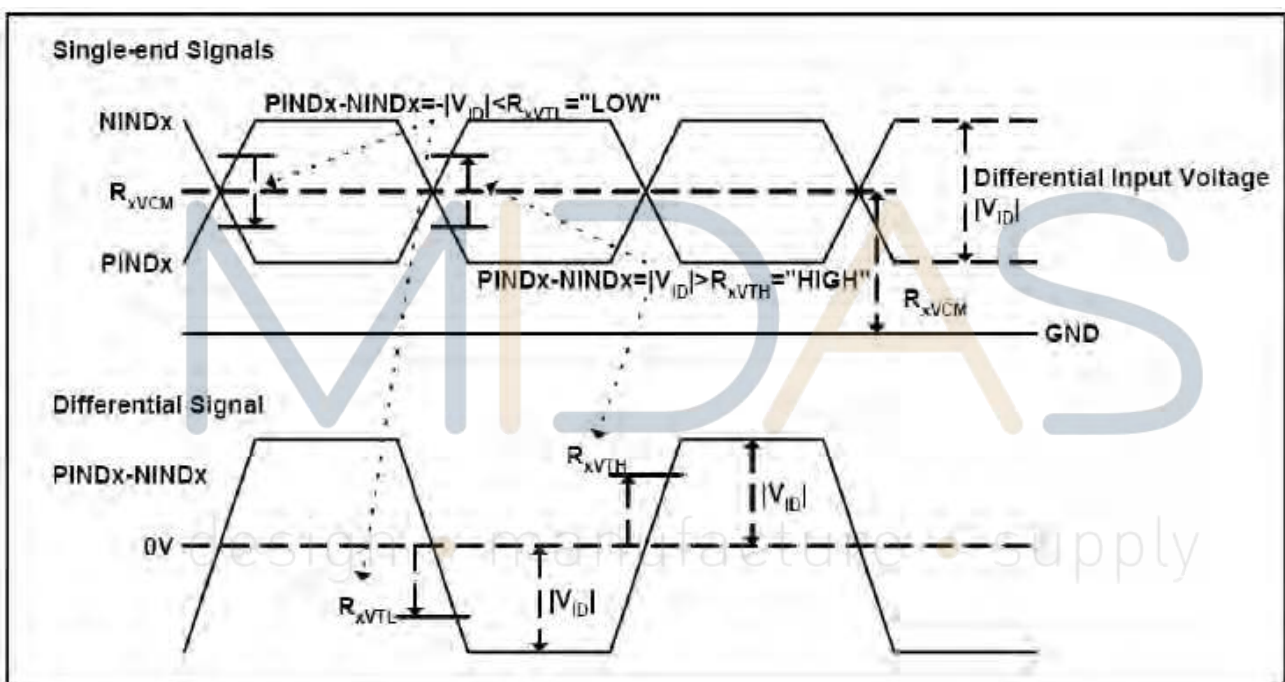
Note 3: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and IL =480mA. The LED lifetime could be decreased if operating IL is lager than 480mA.



LVDS Signal Timing Characteristics

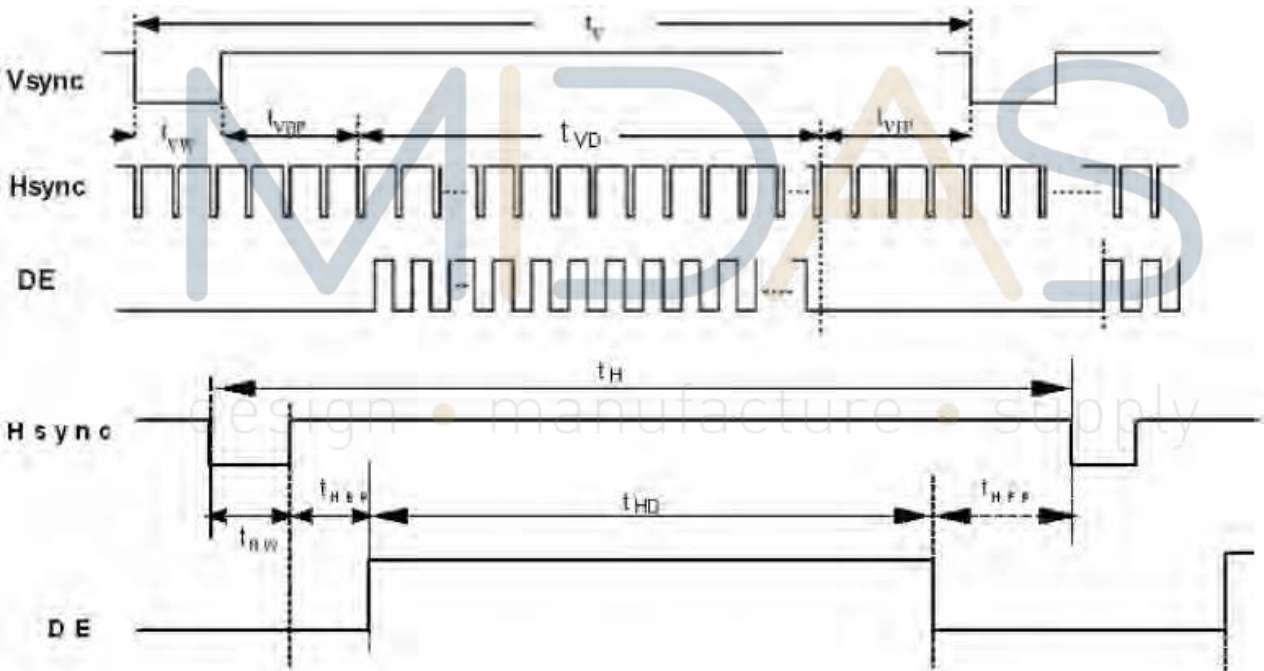
AC Electrical Characteristics

| Parameter | Symbol | Values | | | Unit | Remark |
|--|--------|--------|------|------|------|-------------|
| | | Min. | Typ. | MAX. | | |
| LVDS Differential input high Threshold voltage | RxVTH | - | - | +100 | mV | RXVCM=1.2 V |
| LVDS Differential input low Threshold voltage | RxVTL | -100 | - | - | mV | |
| LVDS Differential input common mode voltage | RxVCM | 0.7 | - | 1.6 | V | |
| LVDS Differential voltage | VID | 200 | - | 600 | mV | |

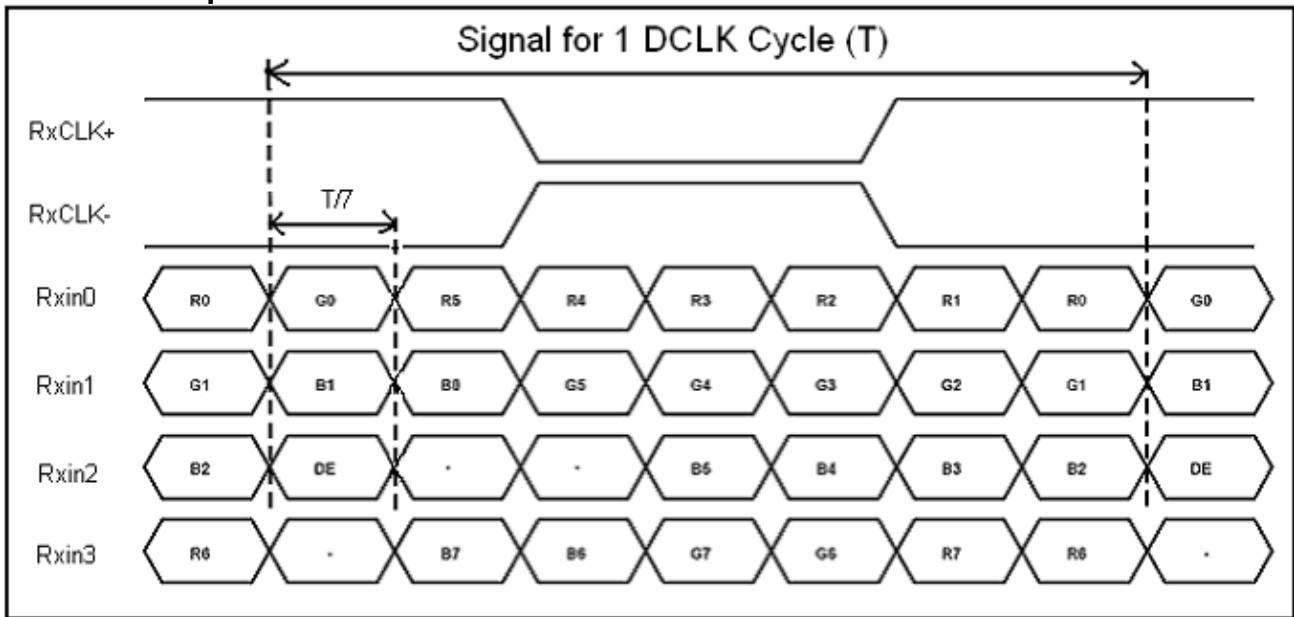


Timing Table

| Parameter | Symbol | Value | | | Unit | Remark |
|-----------------------------------|--|-------|------|------|------|------------------|
| | | Min. | Typ. | Max. | | |
| Clock Frequency | 1/Tc | 68.9 | 71.1 | 73.4 | Mhz | Frame rate =60Hz |
| Horizontal display area | thd | 1280 | | | Tc | |
| HS period time | th | 1410 | 1440 | 1470 | Tc | |
| HS Width +Back Porch +Front Porch | t _{HW} + t _{HBP} +t _{HFP} | 60 | 160 | 190 | Tc | |
| Vertical display area | tvd | 800 | | | tH | |
| VS period time | tv | 815 | 823 | 833 | tH | |
| VS Width +Back Porch +Front Porch | t _{VW} + t _{VBP} +t _{VFP} | 15 | 23 | 33 | tH | |



LVDS Data Input Format



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Optical Characteristics

| Item | Symbol | Condition. | Min | Typ. | Max. | Unit | Remark | |
|--------------------|--------|-----------------------------------|------------|------|------|-------------------|-------------------|----------|
| Response time | Tr | $\theta=0^\circ$ 、 $\Phi=0^\circ$ | - | 10 | 20 | .ms | Note 3 | |
| | Tf | | - | 15 | 30 | | | |
| Contrast ratio | CR | At optimized viewing angle | 600 | 800 | - | - | Note 4 | |
| Color Chromaticity | White | $\theta=0^\circ$ 、 $\Phi=0$ | Wx | 0.26 | 0.31 | 0.36 | - | Note 2,5 |
| | | | Wy | 0.28 | 0.33 | 0.38 | - | |
| Viewing angle | Hor. | $CR \geq 10$ | Θ_R | 75 | 85 | - | Deg. | Note 1 |
| | | | Θ_L | 75 | 85 | - | | |
| | Ver. | | Φ_T | 75 | 85 | - | | |
| | | | Φ_B | 75 | 85 | - | | |
| Brightness | - | - | 1000 | 1100 | - | cd/m ² | Center of display | |
| Uniformity | (U) | - | 70 | - | - | % | Note5 | |

Ta=25±2°C

Note 1: Definition of viewing angle range

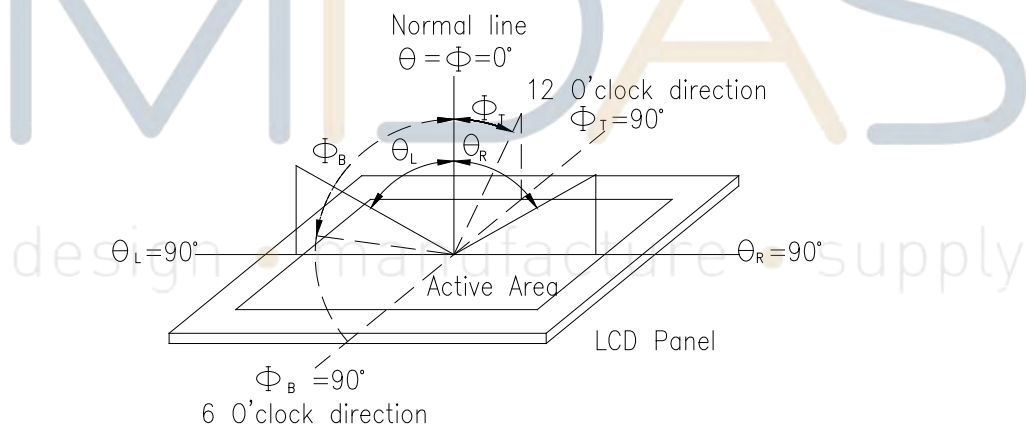


Fig. 9.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7 or BM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

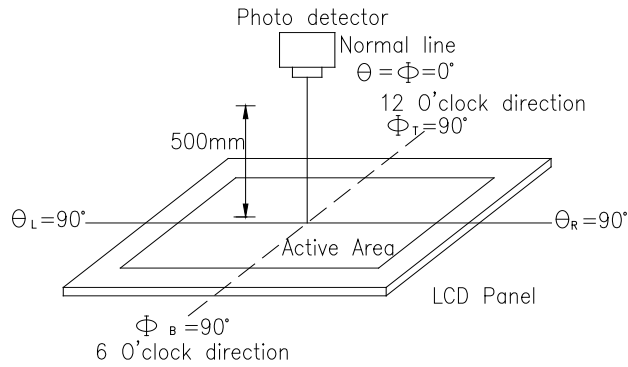
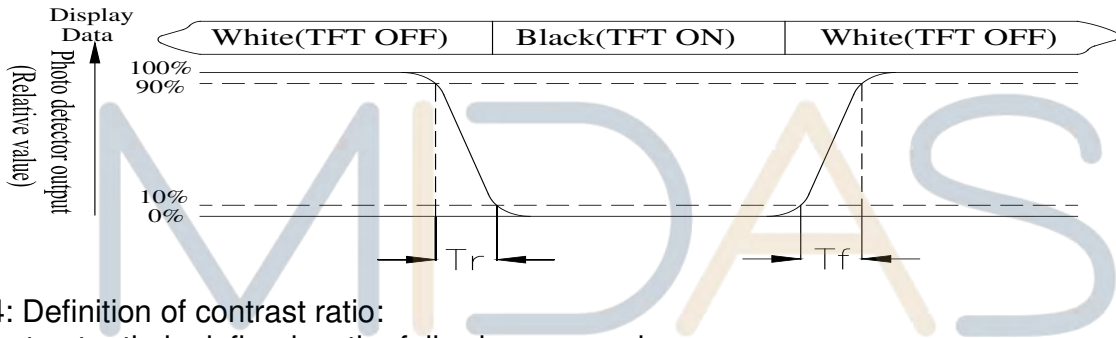


Fig. 9.2. Optical measurement system setup

Note 3: Definition of Response time:

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time, T_r , is the time between photo detector output intensity changed from 90% to 10%. And fall time, T_f , is the time between photo detector output intensity changed from 10% to 90%



Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

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



Note 5: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (reference the picture in below). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = $L_{min}/L_{max} \times 100\%$

L = Active area length

W = Active area width

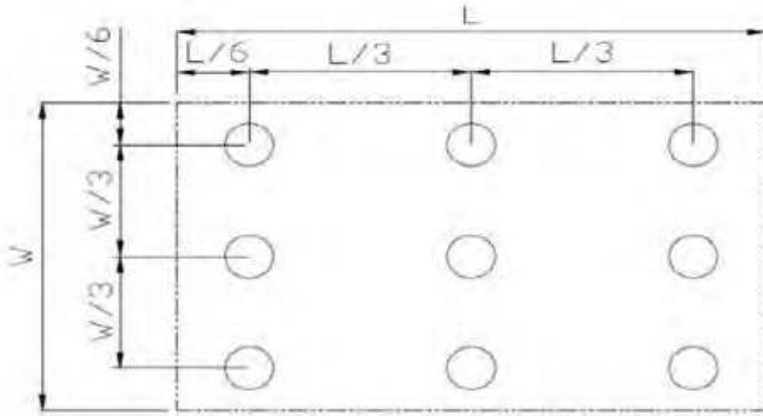


Fig 9.3. Definition of uniformity

Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

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Reliability

Content of Reliability Test (Wide temperature, -20°C~70°C)

| Environmental Test | | | |
|--------------------------------------|---|---|------|
| Test Item | Content of Test | Test Condition | Note |
| High Temperature storage | Endurance test applying the high storage temperature for a long time. | 70°C 200hrs | 2 |
| Low Temperature storage | Endurance test applying the low storage temperature for a long time. | -20°C 200hrs | 1,2 |
| High Temperature Operation | Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time. | 70°C 200hrs | — |
| Low Temperature Operation | Endurance test applying the electric stress under low temperature for a long time. | -20°C 200hrs | 1 |
| High Temperature/ Humidity Operation | The module should be allowed to stand at 60°C,90%RH max | 60°C,90%RH 96hrs | 1,2 |
| Thermal shock resistance | The sample should be allowed stand the following 10 cycles of operation <div style="text-align: center;"> <p>-20°C 25°C 70°C</p> <p>30min 5min 30min</p> <p>1 cycle</p> </div> | -20°C/70°C 10 cycles | — |
| Vibration test | Endurance test applying the vibration during transportation and using. | Total fixed amplitude : 1.5mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes | 3 |
| Static electricity test | Endurance test applying the electric stress to the terminal. | VS=±600V(contact) , ±800v(air), RS=330Ω CS=150pF 10 times | — |

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.

