

**DISPLAY Elektronik GmbH**

# **DATA SHEET**

## **LCD MODULE**

### **DEM 800480K3 TMH-PW-N (C-TOUCH)**

*Product Specification*

*Version:2*

**20.10.2020**

# GENERAL SPECIFICATION

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MODULE NO. :

DEM 800480K3 TMH-PW-N  
(C-TOUCH)

CUSTOMER

| VERSION NO. | CHANGE DESCRIPTION  | DATE       |
|-------------|---------------------|------------|
| 0           | ORIGINAL VERSION    | 03.06.2020 |
| 1           | CHANGE THE DRAWINGS | 19.06.2020 |
| 2           | CHANGE THE DRAWINGS | 20.10.2020 |
|             |                     |            |
|             |                     |            |
|             |                     |            |
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|             |                     |            |
|             |                     |            |

PREPARED BY: YK

DATE: 20.10.2020

APPROVEDBY: MHI

DATE: 20.10.2020

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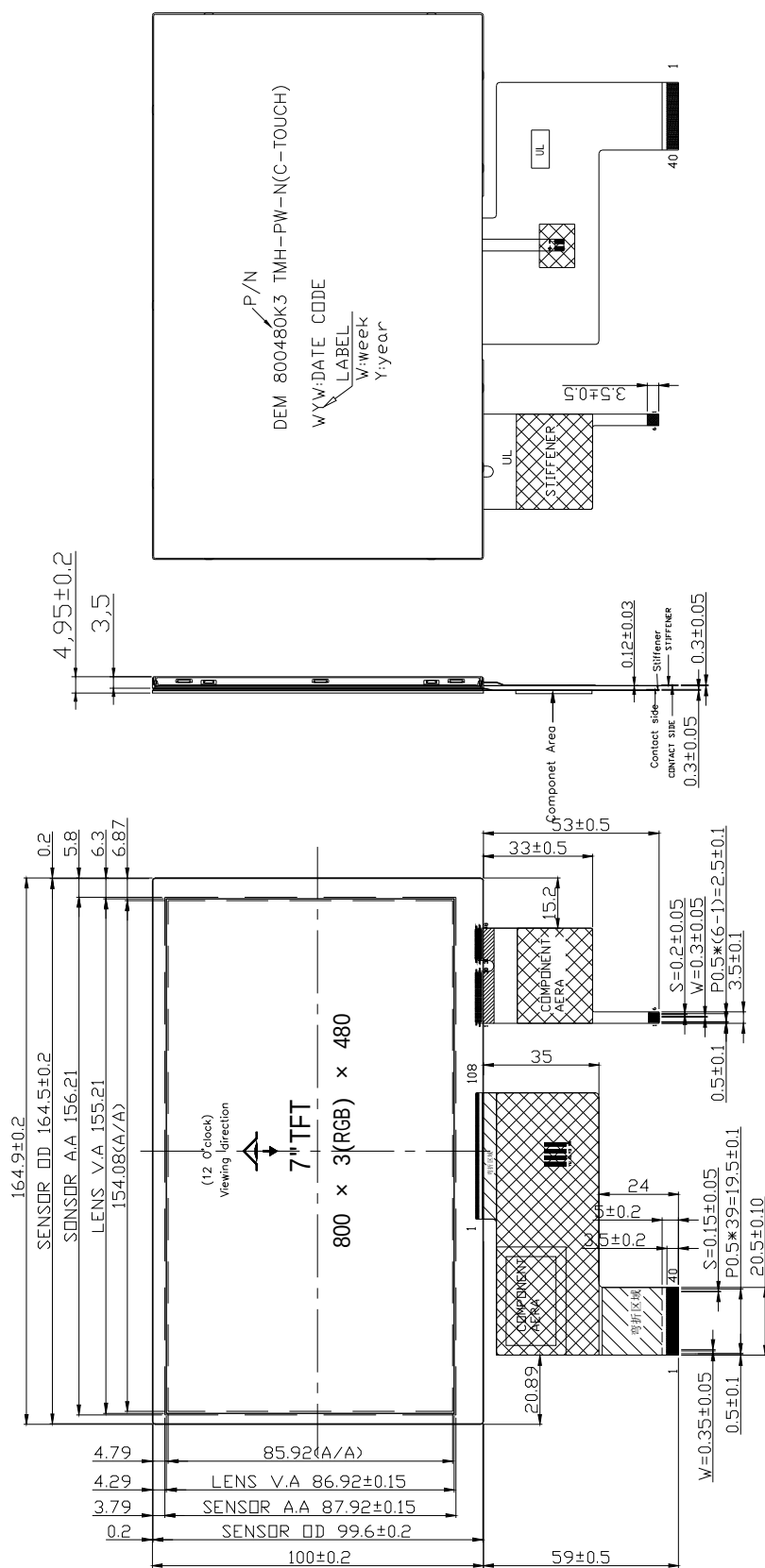
**1. GENERAL SPECIFICATIONS**

| ITEM                           | STANDARD VALUE                      | UNIT    |
|--------------------------------|-------------------------------------|---------|
| LCD TYPE                       | TFT/TN/ NORMALLY WHITE/TRANSMISSIVE |         |
| MODULE SIZE                    | 164.90 x 100.00 x 4.95              | mm      |
| ACTIVE AREA                    | 154.08 x 85.92                      | mm      |
| PIXEL PITCH                    | 0.0642 x 0.1790                     |         |
| NUMBER OF PIXELS               | 800 x 480                           |         |
| DRIVER IC                      | HX8664B + HX8264E                   |         |
| INTERFACE TYPE                 | RGB                                 |         |
| RECOMMEND VIEWING DIRECTION    | 12                                  | O'CLOCK |
| GRAY SCALE INVERSION DIRECTION | 6                                   | O'CLOCK |
| COLORS                         | 16.7 MILLION                        |         |
| BACKLIGHT TYPE                 | 27-DIES WHITE LED                   |         |
| TOUCH PANEL TYPE               | CTP                                 |         |

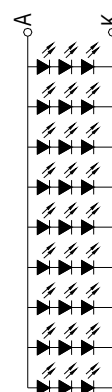
**Touch Panel:**

| Item                  | Contents                     |
|-----------------------|------------------------------|
| Type                  | Capacitive Multi-touch       |
| Module Size           | 164.90mm x 100.00mm x 1.45mm |
| View Area             | 155.21mm x 86.92mm           |
| Driver IC             | FT5426                       |
| Interface             | I2C                          |
| Operation Voltage     | 2.6V~3.6V                    |
| ITO Glass Thickness   | 0.4mm                        |
| Operation Humidity    | 20~90%RH                     |
| Storage Humidity      | 20~90%RH                     |
| Resolution            | 800 x 480                    |
| Input Force           | ≤10g                         |
| Temperature Operation | -20°C to +70°C               |
| Temperature Storage   | -30°C °C to +80°C            |
| Input Method          | Finger or exclusive pen      |
| Transparency          | ≥88%                         |
| Surface Hardness      | >6H                          |
| Hitting Life          | >35,000,000 times            |
| Insulation            | 20M ohm or over(Dc 25V)      |
| ESD(Human Body Model) | 2,000 V                      |

## 2. EXTERNAL DIMENSIONS



### 3.Circuit Diagram (LED 3\*9=27 SMD) Color: WHITE



180mA @ 9V(TYP)

Brightness 400cd/m2(TYP)

Remark:

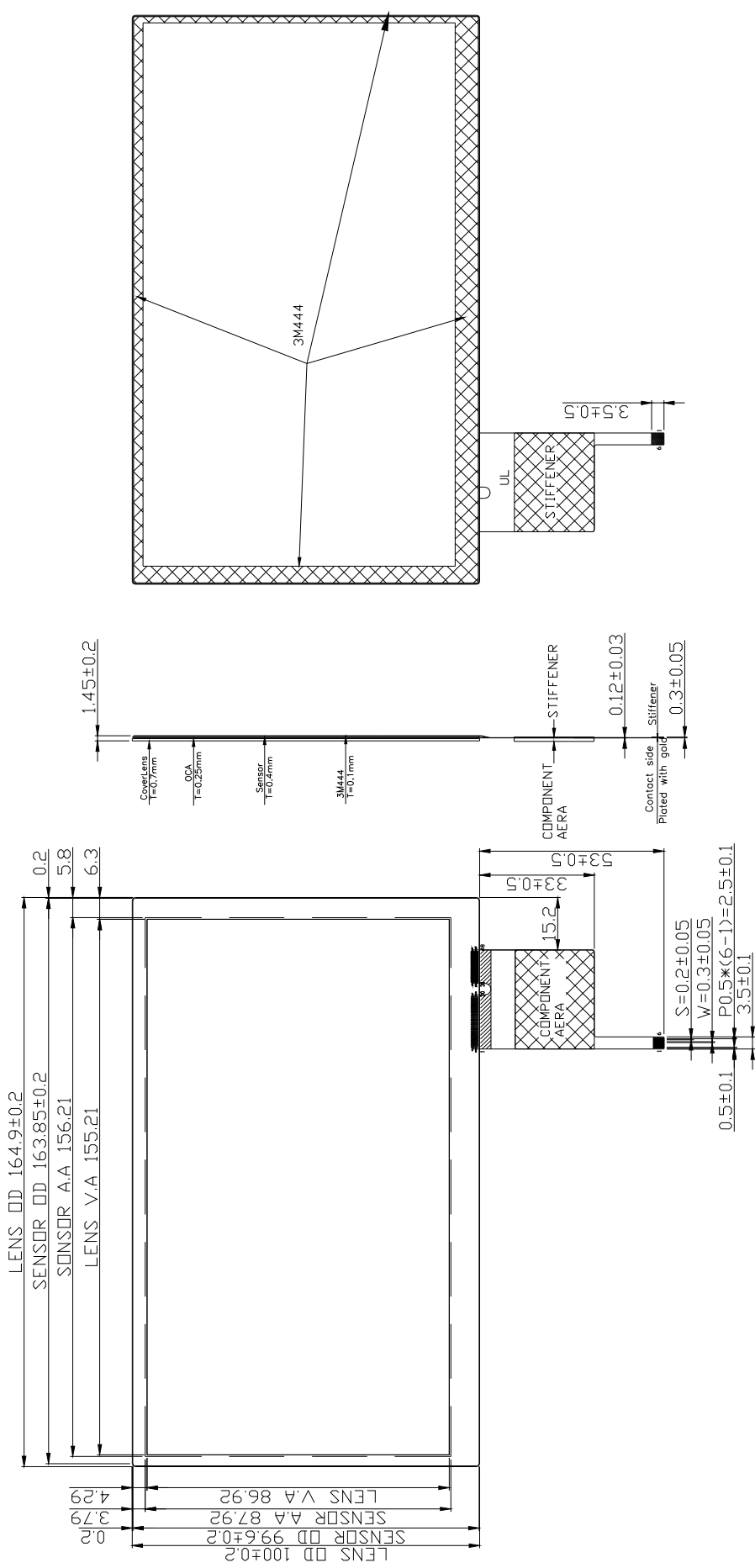
Remark:

1. Unmarked tolerance is  $\pm 0.3$

2.All materials comply with RoHS

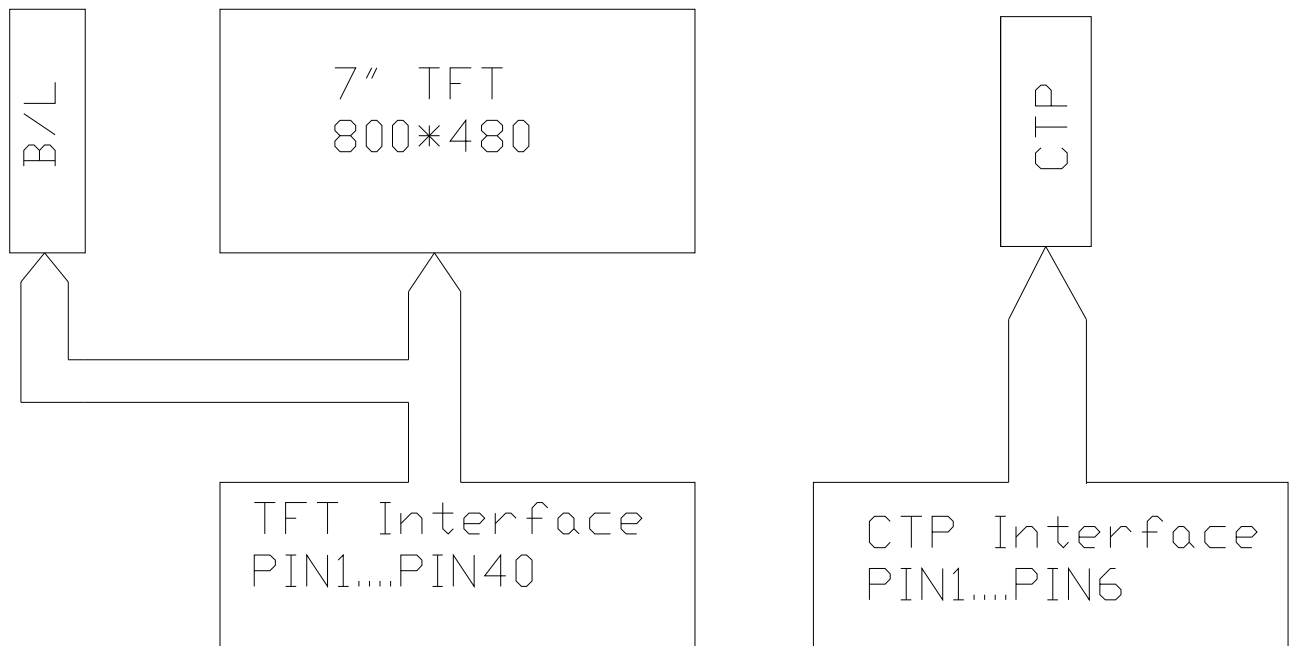
3. ...:critical dimension.

Touch Panel:



Remarks:  
1.Unmarked tolerance is ±0.3,  
Unmarked radius is R0.5;  
2.All materials comply with Rohs;  
3.□ ...critical dimension.

**3. BLOCK DIAGRAM**





**4. PIN ASSIGNMENT**

| PIN NO. | SYMBOL | DESCRIPTION                                                                                                                                                |
|---------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | K      | LED Cathode                                                                                                                                                |
| 2       | A      | LED Anode                                                                                                                                                  |
| 3       | GND    | Power ground                                                                                                                                               |
| 4       | VDD    | Power supply                                                                                                                                               |
| 5       | R0     | Red data                                                                                                                                                   |
| 6       | R1     | Red data                                                                                                                                                   |
| 7       | R2     | Red data                                                                                                                                                   |
| 8       | R3     | Red data                                                                                                                                                   |
| 9       | R4     | Red data                                                                                                                                                   |
| 10      | R5     | Red data                                                                                                                                                   |
| 11      | R6     | Red data                                                                                                                                                   |
| 12      | R7     | Red data                                                                                                                                                   |
| 13      | G0     | Power ground                                                                                                                                               |
| 14      | G1     | Green data                                                                                                                                                 |
| 15      | G2     | Green data                                                                                                                                                 |
| 16      | G3     | Green data                                                                                                                                                 |
| 17      | G4     | Green data                                                                                                                                                 |
| 18      | G5     | Green data                                                                                                                                                 |
| 19      | G6     | Green data                                                                                                                                                 |
| 20      | G7     | Green data                                                                                                                                                 |
| 21      | B0     | Blue data                                                                                                                                                  |
| 22      | B1     | Blue data                                                                                                                                                  |
| 23      | B2     | Blue data                                                                                                                                                  |
| 24      | B3     | Blue data                                                                                                                                                  |
| 25      | B4     | Blue data                                                                                                                                                  |
| 26      | B5     | Blue data                                                                                                                                                  |
| 27      | B6     | Blue data                                                                                                                                                  |
| 28      | B7     | Blue data                                                                                                                                                  |
| 29      | GND    | Power ground                                                                                                                                               |
| 30      | CLK    | Clock signal                                                                                                                                               |
| 31      | STBYB  | Standby mode, normally pulled high.<br>STBYB = "1", normal operation<br>STBYB = "0", timing controller, source driver will turn off, all output are High-Z |

|    |     |                                           |
|----|-----|-------------------------------------------|
| 32 | HS  | Horizontal sync signal; negative polarity |
| 33 | VS  | Vertical sync signal; negative polarity   |
| 34 | DEN | Data input enable                         |
| 35 | NC  | Not connection                            |
| 36 | GND | Power ground                              |
| 37 | NC  | Not connection                            |
| 38 | NC  | Not connection                            |
| 39 | NC  | Not connection                            |
| 40 | NC  | Not connection                            |

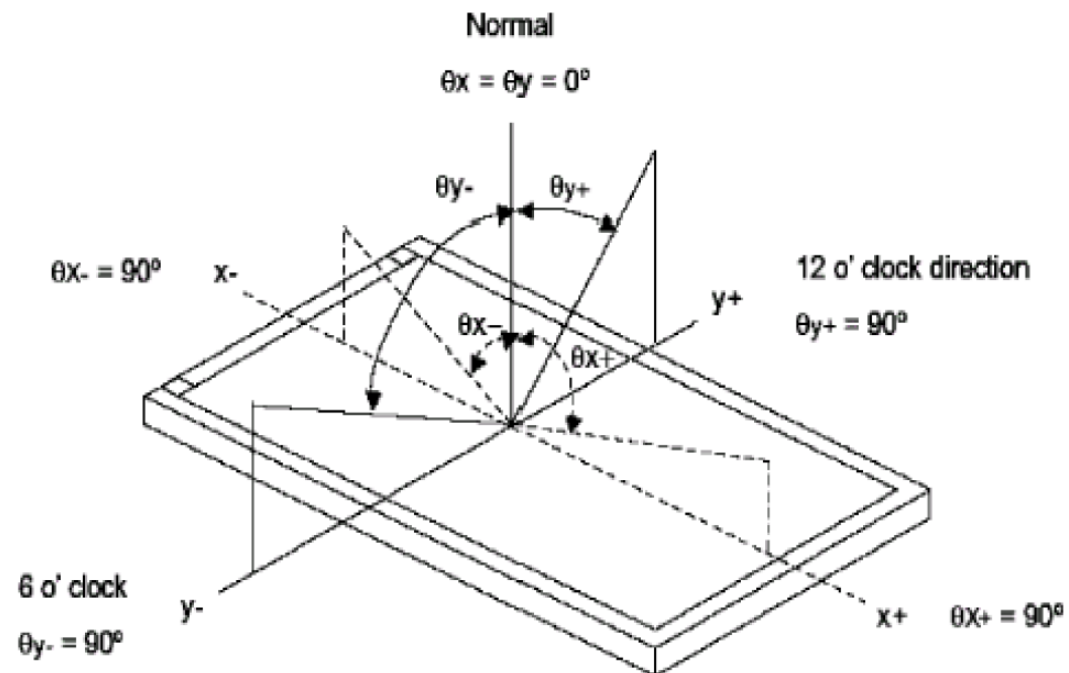
**Touch Panel:**

| Pin No. | Symbol  | Description                   |
|---------|---------|-------------------------------|
| 1       | VCC     | Positive power supply(3.3V)   |
| 2       | GND     | Negative supply               |
| 3       | I2C_SCL | I2C Serial clock input/output |
| 4       | I2C_SDA | I2C Serial data input/output  |
| 5       | INT     | External Interrupt            |
| 6       | RST     | External Reset, Low is active |

**5. OPTICAL CHARACTERISTICS**

| ITEM                        |         | SYMBOL         | CONDITIONS              | SPECIFICATIONS |       |       | UNIT              | NOTE |
|-----------------------------|---------|----------------|-------------------------|----------------|-------|-------|-------------------|------|
|                             |         |                |                         | MIN            | TYP.  | MAX   |                   |      |
| Luminance                   |         | L              |                         | 320            | 400   | -     | Cd/m <sup>2</sup> |      |
| Contrast Ratio              |         | CR             | $\theta = 0^\circ$      | 400            | 500   |       |                   |      |
| Response Time               | Rising  | T <sub>R</sub> | 25°C                    |                | 10    | 20    | ms                |      |
|                             | Falling | T <sub>F</sub> |                         |                | 15    | 30    |                   |      |
| CIE<br>COLOUR<br>COORDINATE | RED     | XR             | VIEWING<br>NORMAL ANGLE |                |       |       |                   |      |
|                             |         | YR             |                         |                |       |       |                   |      |
|                             | GREEN   | XG             |                         |                |       |       |                   |      |
|                             |         | YG             |                         |                |       |       |                   |      |
|                             | BLUE    | XB             |                         |                |       |       |                   |      |
|                             |         | YB             |                         |                |       |       |                   |      |
|                             | WHITE   | XW             |                         | 0.278          | 0.308 | 0.338 |                   |      |
|                             |         | YW             |                         | 0.297          | 0.327 | 0.357 |                   |      |
| VIEWING<br>ANGLE            | Hor.    | $\theta_{x+}$  | CR $\geq$ 10            | 60             | 70    |       | Degree            |      |
|                             |         | $\theta_{x-}$  |                         | 60             | 70    |       |                   |      |
|                             | Ver.    | $\theta_{y+}$  |                         | 40             | 50    |       |                   |      |
|                             |         | $\theta_{y-}$  |                         | 60             | 70    |       |                   |      |

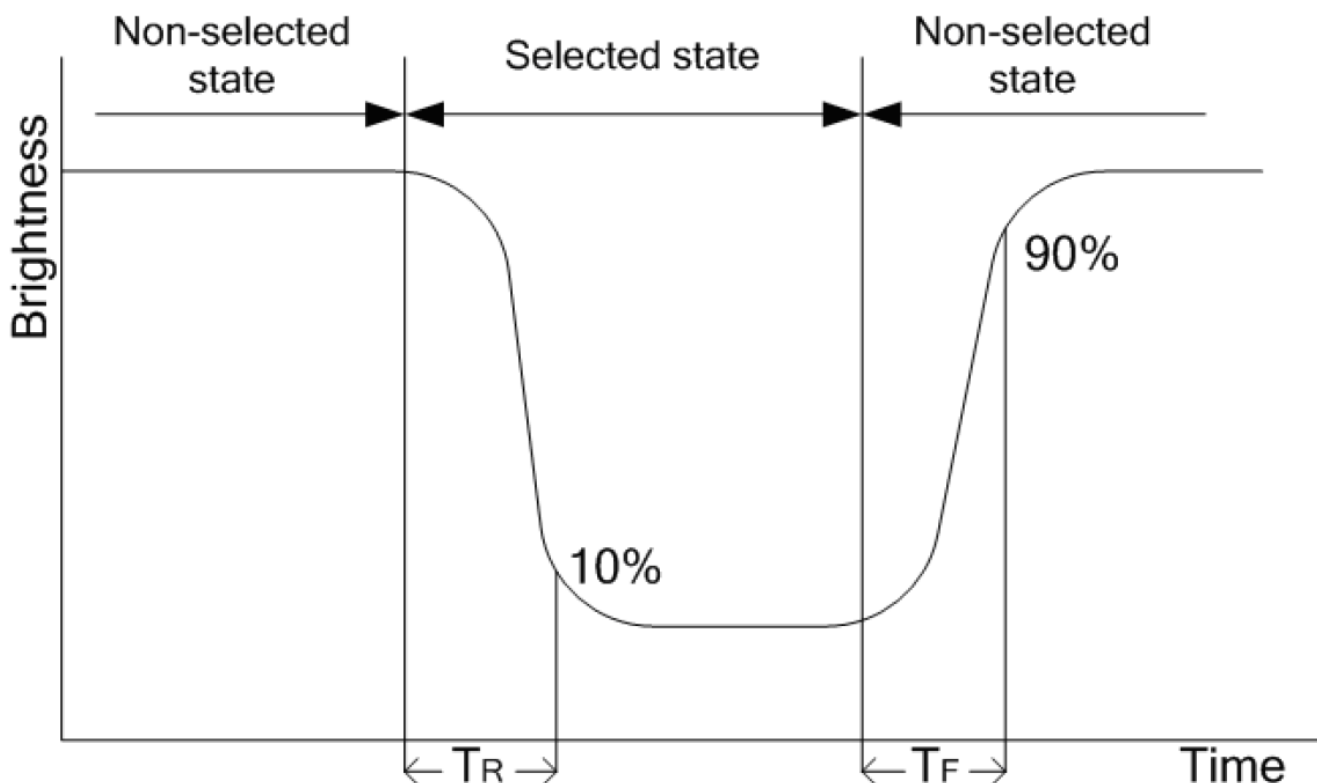
**Note 1 : Definition of Viewing Angle  $\theta_x$  and  $\theta_y$  :**



**Note 2: Definition of contrast ratio CR:**

$$CR = \frac{\text{Brightness of non-selected dots (white)}}{\text{Brightness of selected dots (black)}}$$

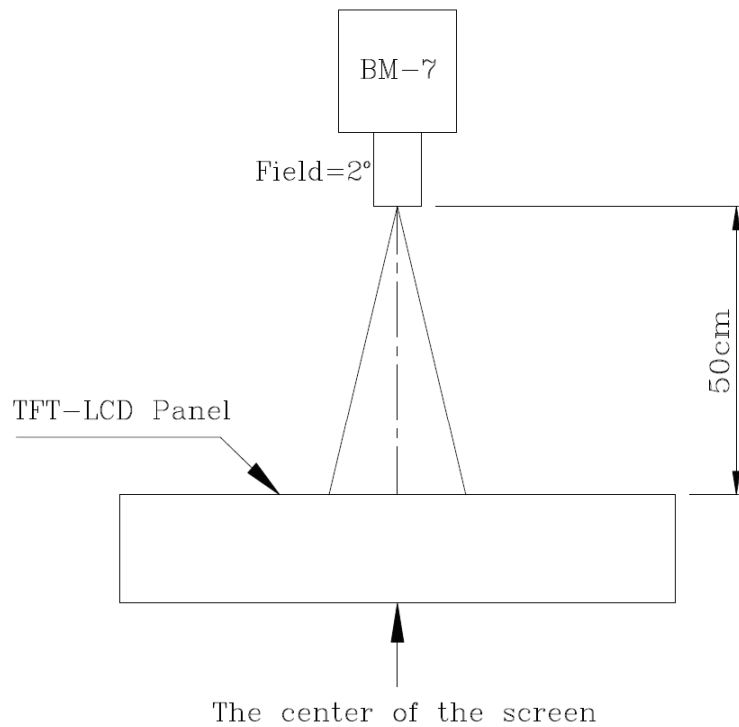
**Note 3: Definition of response time ( $T_R$ ,  $T_F$ )**



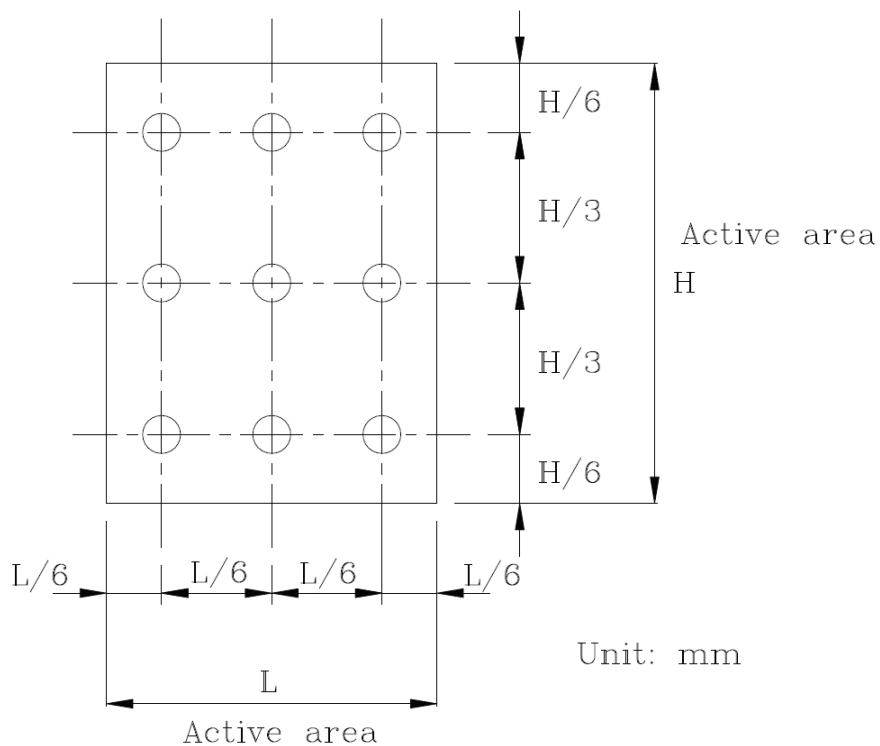
**Note 4: Definition of Luminance**

**①The Brightness Test Equipment Setup**

Field=2° (As measuring “black” image, field=2° is the best testing condition)



**②The Brightness Test Point Setup**



**6. ABSOLUTE MAXIMUM RATINGS**

| PARAMETER             | SYMBOL | MIN  | MAX | UNIT |
|-----------------------|--------|------|-----|------|
| Power Supply Voltage  | VDD    | -0.3 | 5.0 | V    |
| Operating Temperature | Top    | -20  | +70 | °C   |
| Storage Temperature   | Tst    | -30  | +80 | °C   |

**7. ELECTRICAL CHARACTERISTICS****7.1 BLACKLIGHT DRIVING CONDITIONS**

| ITEM              | SYMBOL | SPECIFICATIONS |        |     | UNIT           | REMARK |
|-------------------|--------|----------------|--------|-----|----------------|--------|
|                   |        | MIN            | TYP.   | MAX |                |        |
| Supply Voltage    | Vf     |                | 9      |     | V              |        |
| Supply Current    | IL     |                | 180    |     | mA             |        |
| Power Consumption | P      |                | 1.62   |     | W              |        |
| LED Lifetime      |        |                | 50,000 |     | H <sub>r</sub> |        |

**7.2 ELECTRICAL CHARACTERISTICS**

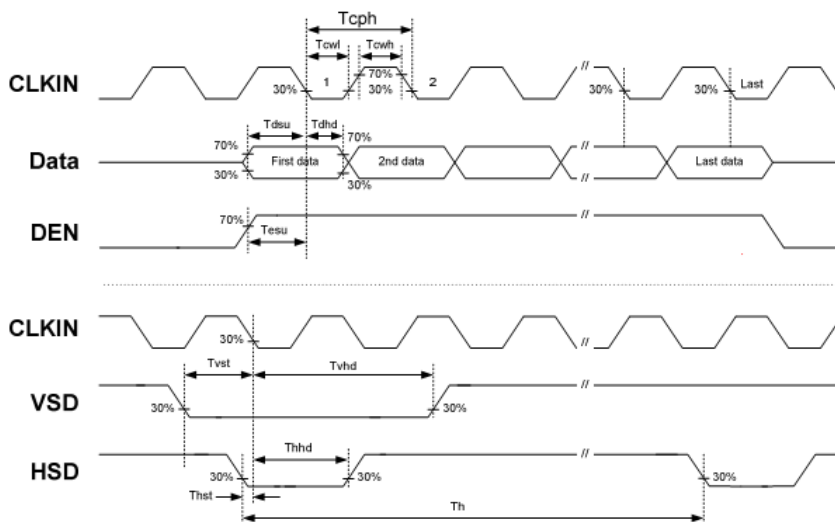
| ITEM          | SYMBOL | MIN    | TYP. | MAX    | UNIT |
|---------------|--------|--------|------|--------|------|
| Power Supply  | VDD    | 3.0    | 3.3  | 3.6    | V    |
| Input Voltage | Vil    | GND    | -    | 0.3VDD | V    |
|               | Vih    | 0.7VDD | -    | VDD    | V    |

## 8. TIMING CHARACTERISTICS

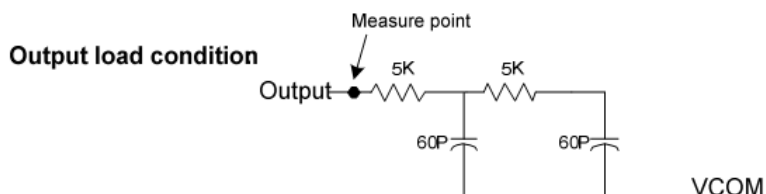
### 8.1 PARALLEL RGB MODE TIMING DIAGRAM

#### Timing Diagram

#### Input Clock and Data Timing Diagram



#### Source Output



| Parameter        | Symbol | Min. | Typ. | Max. | Unit  | Conditions       |
|------------------|--------|------|------|------|-------|------------------|
| CLKIN Frequency  | Fclk   | -    | 33.3 | 50   | MHz   | VDD = 3.0V ~3.6V |
| CLKIN Cycle Time | Tclk   | 20   | 30   | -    | ns    |                  |
| CLKIN Pulse Duty | Tcwh   | 40   | 50   | 60   | %     | Tclk=Tcwh+cwl    |
|                  | Tcwl   | 40   | 50   | 60   | %     |                  |
| VSD to STV       | Tstv   | -    | 24   | -    | H     | HV mode          |
| DEN to STV       | Tstv   | -    | 4    | -    | CLKIN | DE mode          |
| STV pulse width  | Twstv  | -    | 0.5  | -    | H     |                  |
| STV to CKV       | Tckv   | -    | 18   | -    | CLKIN |                  |
| STV to OEV       | Toev   | -    | 2    | -    | CLKIN |                  |
| CKV Pulse Width  | Twckv  | -    | 66   | -    | CLKIN |                  |
| OEV Pulse Width  | Twoev  | -    | 50   | -    | CLKIN |                  |

**9. RELIABILITY TEST**

| NO. | TEST ITEM                                    | CONDITIONS                                  |       |
|-----|----------------------------------------------|---------------------------------------------|-------|
| 1   | HIGH TEMPERATURE STORAGE                     | TA=80°C                                     | 240Hr |
| 2   | LOW TEMPERATURE STORAGE                      | TA=-30°C                                    | 240Hr |
| 3   | HIGH TEMPERATURE OPERATION                   | TA=70°C                                     | 240Hr |
| 4   | LOW TEMPERATURE OPERATION                    | TA=-20°C                                    | 240Hr |
| 5   | HIGH TEMPERATURE AND HIGH HUMIDITY OPERATION | +60°C, 90%RH                                | 240Hr |
| 6   | THERMAL SHOCK                                | -30°C → +80°C, 0.5Hr; 100CYCLES; 1H/ CYCLES |       |



**10. LCD MODULES HANDLING PRECAUTIONS**

- n** The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- n** If the display panel is damaged and the liquid crystal substance inside it leaks out, do not get any in your mouth. If the substance come into contact with your skin or clothes promptly wash it off using soap and water.
- n** Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- n** The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.
- n** To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
  - Be sure to ground the body when handling the LCD module.
  - Tools required for assembly, such as soldering irons, must be properly grounded.
  - To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
  - The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.
- n** Storage precautions

When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps. Keep the modules in bags designed to prevent static electricity charging under low temperature / normal humidity conditions (avoid high temperature / high humidity and low temperatures below 0°C). Whenever possible, the LCD modules should be stored in the same conditions in which they were shipped from our company.

**11. OTHERS**

- n** Liquid crystals solidify at low temperature (below the storage temperature range) leading to defective orientation of liquid crystal or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subjected to a strong shock at a low temperature.
- n** If the LCD modules have been operating for a long time showing the same display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. Abnormal operating status can be resumed to be normal condition by suspending use for some time. It should be noted that this phenomena does not adversely affect performance reliability.
- n** To minimize the performance degradation of the LCD modules resulting from caused by static electricity, etc. exercise care to avoid holding the following sections when handling the modules:
  - Exposed area of the printed circuit board
  - Terminal electrode sections.