

DISPLAY Elektronik GmbH

DATA SHEET

TFT MODULE

DEM 480272L TMH-PW-N

Product Specification

Version: 1

22.06.2016

CONTENTS

1. GENERAL SPECIFICATIONS.....2

2. EXTERNAL DIMENSIONS3

3. BLOCK DIAGRAM4

4. PIN ASSIGNMENT5

5. OPTICAL CHARACTERISTICS6

6. ABSOLUTE MAXIMUM RATINGS.....9

7. ELECTRICAL CHARACTERISTICS.....9

8. RELIABILITY TEST12

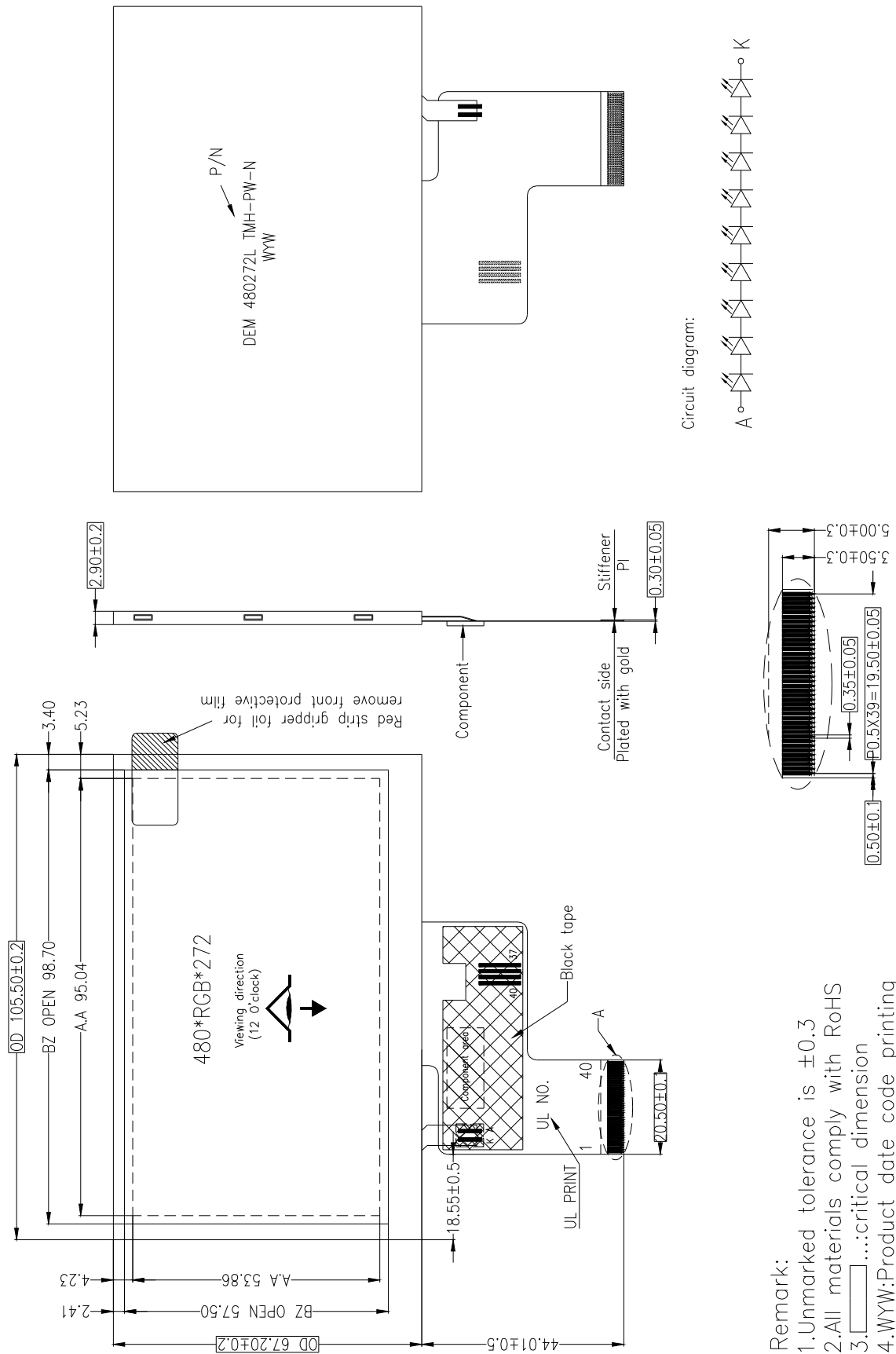
9. LCD MODULES HANDLING PRECAUTIONS.....13

10. OTHERS13

1. GENERAL SPECIFICATIONS

| Item | Contents | Unit |
|--------------------------------|---------------------|-------------|
| LCD TYPE | TFT/TRANSMISSIVE | |
| MODULE SIZE (W*H*T) | 105.50×67.20×2.90 | mm |
| ACTIVE SIZE (W*H) | 95.04*53.86 | mm |
| PIXEL PITCH (W*H) | 0.198*0.198 | mm |
| NUMBER OF DOTS | 480×RGB×272 | |
| DIVER IC | ILI6480BQ | |
| INTERFACE TYPE | 24-BIT/18-BIT — RGB | |
| TOP POLARIZER TYPE | ANTI-GLARE | |
| RECOMMEND VIEWING DIRECTION | 12:00 | O'CLOCK |
| GRAY SCALE INVERSION DIRECTION | 6:00 | O'CLOCK |
| COLORS | 16.7 Million | |
| BACKLIGHT TYPE | 9-DIES WHITE LED | |
| TOUCH PANEL TYPE | WITHOUT | |
| APPROX.WEIGHT | 45 | g |

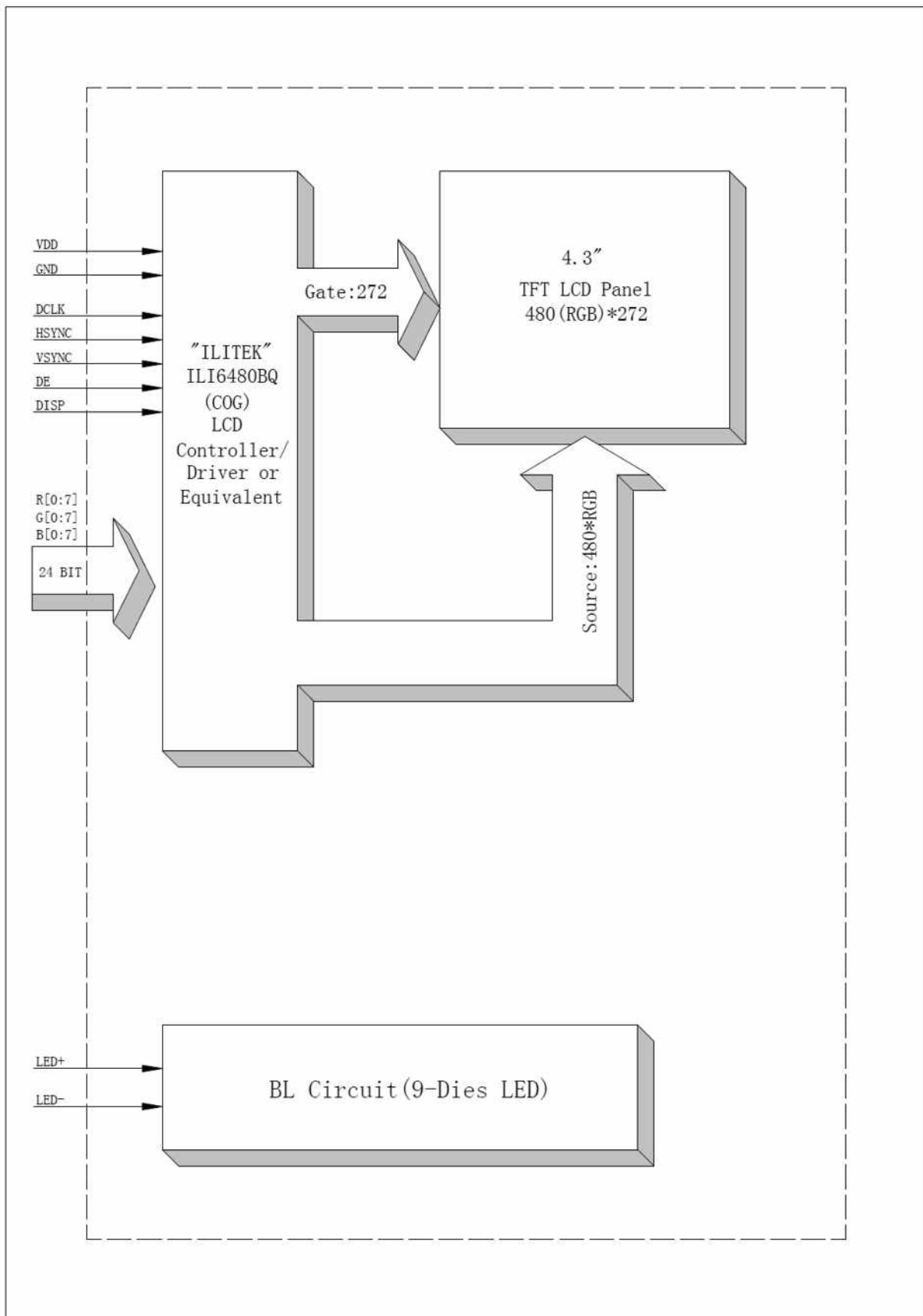
2. EXTERNAL DIMENSIONS



Remark:
 1. Unmarked tolerance is ± 0.3
 2. All materials comply with RoHS
 3. ...:critical dimension
 4. WW:Product date code printing
 Format: Y:year ,WW:week

Detail A
Scale 2:1

3. BLOCK DIAGRAM



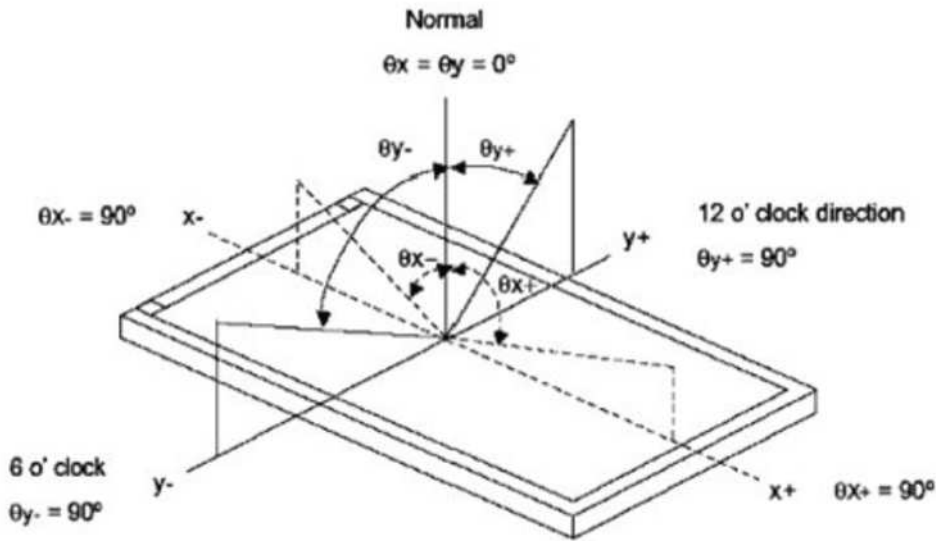
4. PIN ASSIGNMENT

| Pin No. | Symbol | Description |
|----------------|---------------|-----------------------------------------------------------------------------------------------------------------|
| 1 | LED- | Cathode of LED backlight |
| 2 | LED+ | Anode of LED backlight |
| 3 | GND | Power ground |
| 4 | VDD | Power supply |
| 5~12 | R0~R7 | 8-bit digital Red data input, |
| 13~20 | G0~G7 | 8-bit digital Green data input, |
| 21~28 | B0~B7 | 8-bit digital Blue data input, |
| 29 | GND | Power ground |
| 30 | DCLK | Clock signal; latching data at the falling edge |
| 31 | DISP | Display control / standby mode selection. DISP – “Low” : Standby; DISP – “High” : Normal display(Default) |
| 32 | HSYNC | Horizontal sync signal; negative polarity |
| 33 | VSNC | Vertical sync signal; negative polarity |
| 34 | DE | Data input enable. Active High to enable the data input. |
| 35 | NC | No connection. |
| 36 | GND | Power ground |
| 37 | NC | No connection. |
| 38 | NC | No connection. |
| 39 | NC | No connection. |
| 40 | NC | No connection. |

5. OPTICAL CHARACTERISTICS

| ITEM | SYMBOL | CONDITIONS | SPECIFICATIONS | | | UNIT | NOTE | |
|----------------------------|------------------|--------------------|-------------------------|------|------|-------------------|--------|--|
| | | | MIN | TYP. | MAX | | | |
| Luminance | L | $I_L - 20mA$ | 500 | 550 | 600 | Cd/m ² | | |
| Contrast Ratio | CR | $\theta = 0^\circ$ | 400 | 500 | | | | |
| Response Time | T _{ON} | 25°C | | 10 | 20 | ms | | |
| | T _{OFF} | | | 15 | 30 | | | |
| CIE Color Coordinate | Red | X _R | | | | | | |
| | | Y _R | | | | | | |
| | Green | X _G | Viewing normal angle | | | | | |
| | | Y _G | | | | | | |
| | Blue | X _B | | | | | | |
| | | Y _B | | | | | | |
| | White | X _W | | 0.27 | 0.31 | 0.35 | | |
| | | Y _W | | 0.31 | 0.35 | 0.39 | | |
| Viewing Angle | Hor. | θ_{X+} | | 60 | 70 | | Degree | |
| | | θ_{X-} | | 60 | 70 | | | |
| | Ver. | θ_{Y+} | 40 | 50 | | | | |
| | | θ_{Y-} | 60 | 70 | | | | |
| Uniformity | Un | | 80 | | | % | | |

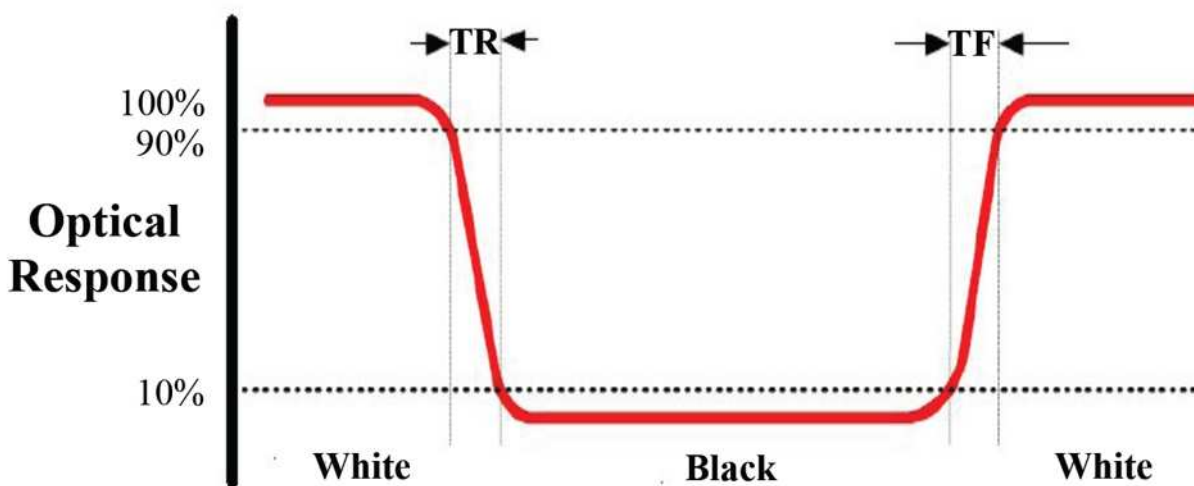
Note 1: Definition of Viewing Angle θ_x and θ_y :



Note 2: Definition of contrast ratio CR:

$$CR = \frac{\text{Luminance of white state}}{\text{Luminance of black state}}$$

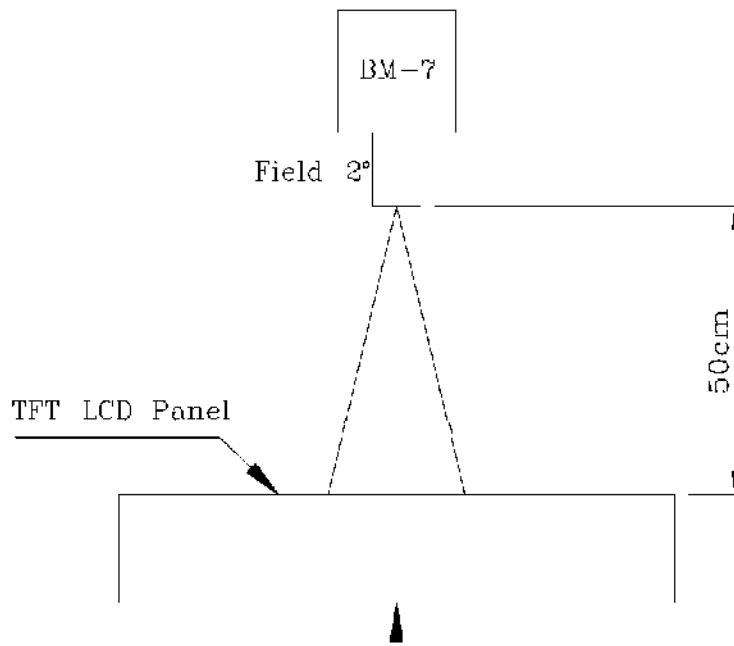
Note 3: Definition of Response Time(T_r, T_f)



Note 4: Definition of Luminance

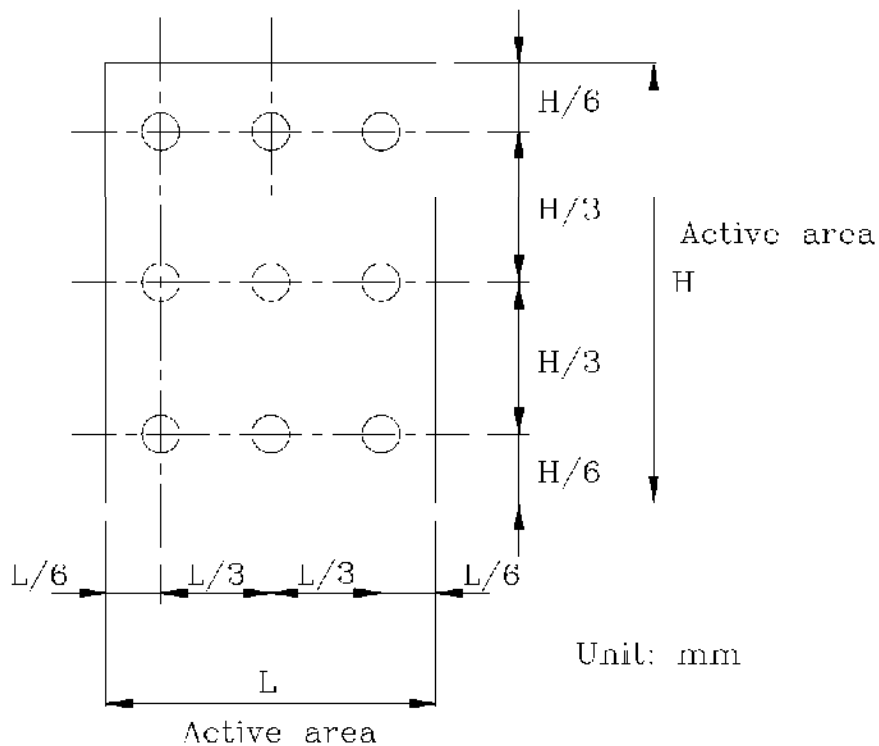
① The Brightness Test Equipment Setup

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



The center of the screen

② The Brightness Test Point Setup



6. ABSOLUTE MAXIMUM RATINGS

| Parameter | Symbol | Min | Max | Unit |
|---------------------------|------------------|------|-----|------|
| Supply voltage for analog | VDD | -0.3 | 4.5 | V |
| Supply voltage for logic | VDD | -0.3 | 4.5 | V |
| Supply current (One LED) | I _{LED} | | 30 | mA |
| Operating temperature | T _{OP} | -20 | -70 | °C |
| Storage temperature | T _{ST} | -30 | -80 | °C |

Note : The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

7. ELECTRICAL CHARACTERISTICS

7.1 INPUT POWER

| Item | Symbol | Min | Typ. | Max | Unit | Applicable terminal |
|---------------------------|------------------------------------|----------------|--------|---------------|------|---------------------|
| Supply Voltage for Analog | VDD | 3.0 | 3.3 | 3.6 | V | |
| Supply Voltage for Logic | VDD | 3.0 | 3.3 | 3.6 | V | |
| Input Voltage | V _{IL} V _{IH} | GND 0.7 VCC | - - | 0.3VCC VCC | V | |
| Input leakage Current | I _{IRK} | -1 | | 1 | μA | |

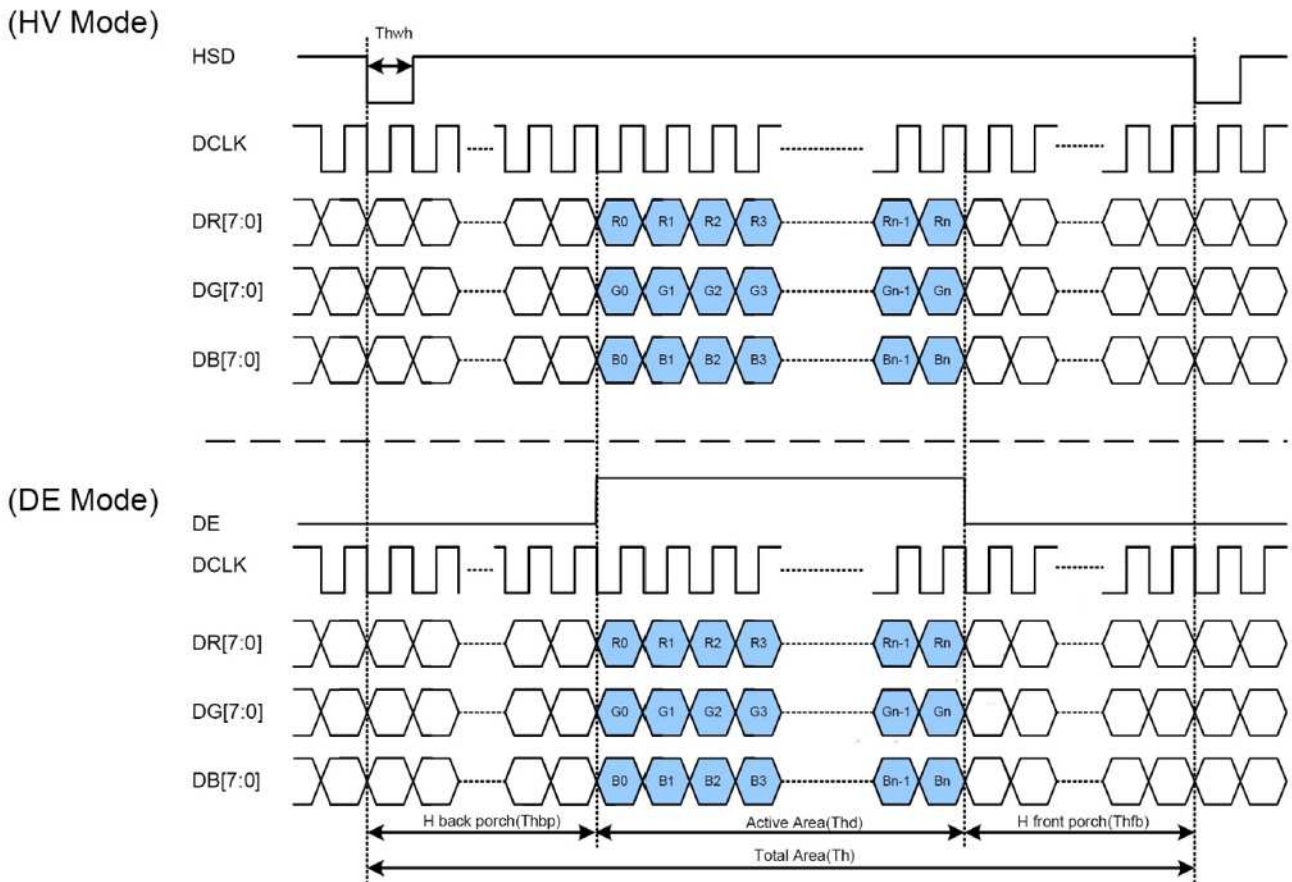
7.2 BLACKLIGHT DRIVING CONDITIONS

| Item | Symbol | Value | | | Unit | Remark |
|---------------------------|----------------|--------|-------|------|------|-----------------------|
| | | Min. | Typ. | Max. | | |
| Voltage for LED Backlight | V _F | 27 | 28.8 | 30.6 | V | I _L = 20mA |
| Current for LED Backlight | I _L | 15 | 20 | 25 | mA | |
| Power Consumption | P | | 0.576 | | W | |
| LED Life Time | | 50,000 | | | Hr | Note |

Note: Brightness to be decreased to 50% of the initial value at ambient temperature TA=25°C

7.3 TIMING CHARACTERISTICS

7.3.1 PARALLEL RGB MODE TIMING DIAGRAM

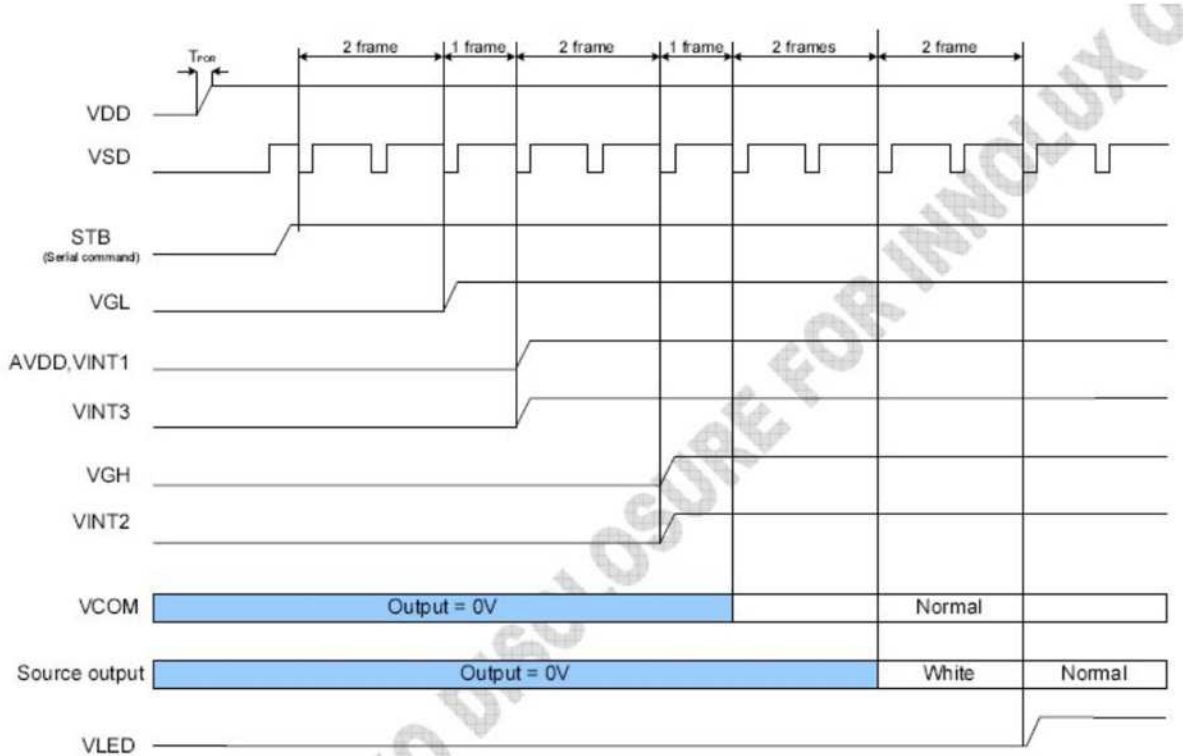


7.3.2 PARALLEL RGB TIMING TABLE

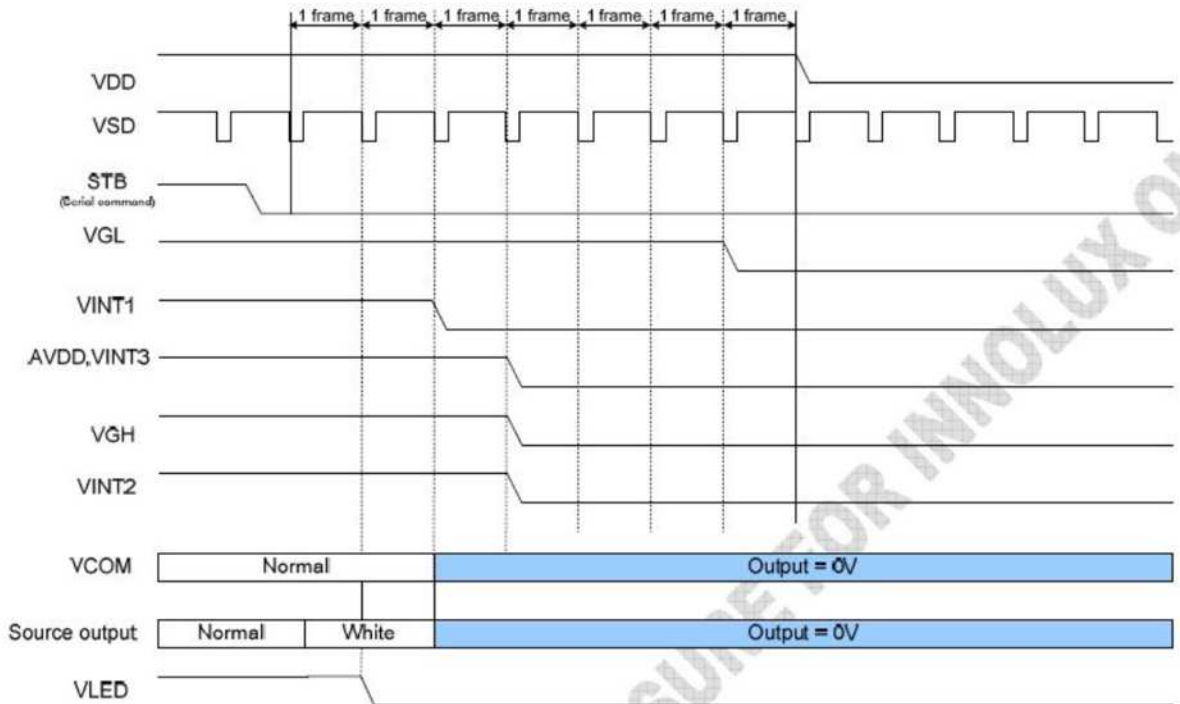
| Parameter | Symbol | Value | | | Unit |
|------------------|--------|-------|------|------|------|
| | | Min. | Typ. | Max. | |
| DCLK frequency | fclk | 5 | 9 | 12 | MHz |
| VSD period time | Tv | 277 | 288 | 400 | H |
| VSD display area | Tvd | 272 | | | H |
| VSD back porch | Tvb | 3 | 8 | 31 | H |
| VSD front porch | Tvfp | 2 | 8 | 97 | H |
| HSD period time | Th | 520 | 525 | 800 | DCLK |
| HSD display area | Thd | 480 | | | DCLK |
| HSD back porch | Thbp | 36 | 40 | 255 | DCLK |
| HSD front porch | Thfp | 4 | 5 | 65 | DCLK |

7.3.3 POWER ON/OFF SEQUENCE

Power on



Power off



8. RELIABILITY TEST

| No. | Item | Description |
|------------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01 | High temperature operation | The sample should be allowed to stand at 70°C for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours. |
| 02 | Low temperature operation | The sample should be allowed to stand at -20°C for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours. |
| 03 | High temperature storage | The sample should be allowed to stand at 80°C for 240 hours under no-load condition, and then returning it to normal temperature condition, and allowing it stand for 2 hours. |
| 04 | Low temperature storage | The sample should be allowed to stand at -30°C for 240 hours under no-load condition, then returning it to normal temperature condition, and allowing it stand for 2 hours. |
| 05 | Moisture storage | The sample should be allowed to stand at 60°C,90%RH MAX for 240 hours under no-load condition, then taking it out and drying it at normal temperature for 2 hours. |
| 06 | Operate at high temperature and humidity | 60°C,90%RH,240hr |
| 07 | Thermal shock storage | The sample should be allowed to stand the following 10 cycles : -30°C for 30 minutes → normal temperature for 5 minutes → 80°C for 30 minutes → normal temperature for 5 minutes, as one cycle. |
| 08 | Packing vibration | Frequency range : 10Hz ~ 55Hz Amplitude of vibration : 1.5mm Sweep time: 12 min X,Y,Z 2 hours for each direction. |
| 09 | Packing drop test | According to ASTM-D-5327. |
| 10 | Electrical Static | Air: ±4KV 150pF/330Ω 5 times |

9. LCD MODULES HANDLING PRECAUTIONS

- The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- 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.
- Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarize carefully.
- 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.
- 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.

10. OTHERS

- 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.
- 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.
- 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.