

**DISPLAY Elektronik GmbH**

# DATA SHEET

**LCD MODULE**

**DEM 1024600P3 VMH-PW-N  
(C-TOUCH)**

*Product Specification*

*Version:1*

**19.10.2023**



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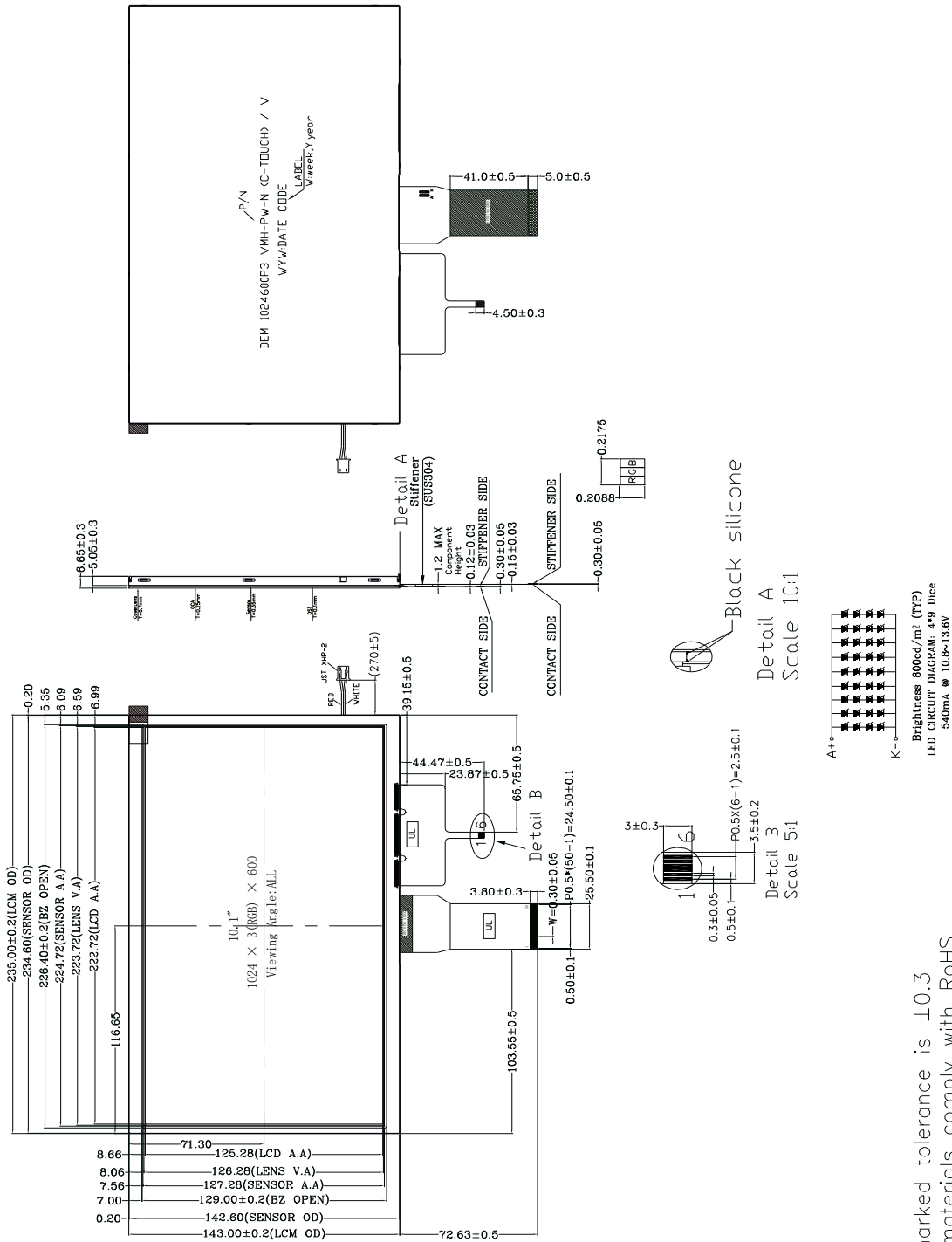
**1. GENERAL SPECIFICATIONS**

<b>ITEM</b>	<b>STANDARD VALUE</b>	<b>UNIT</b>
LCD SIZE	10.1 TFT	inch
LCD TYPE	TFT/IPS/ NORMALLY BLACK/TRANSMISSIVE	
MODULE SIZE	235.00 x 143.00 x 6.65	mm
ACTIVE AREA	222.72 x 125.28	mm
PIXEL PITCH (W*H)	0.2175 x 0.2088	
NUMBER OF PIXELS	1024 x 600	
DRIVER IC	EK73215 + EK79001H	
INTERFACE TYPE	LVDS	
RECOMMEND VIEWING DIRECTION	ALL	O'clock
GRAY SCALE INVERSION DIRECTION	-	O'clock
COLORS	16.7 M	
BACKLIGHT TYPE	36-DIES WHITE LED	
TOUCH PANEL TYPE	CTP	

**TOUCH PANEL:**

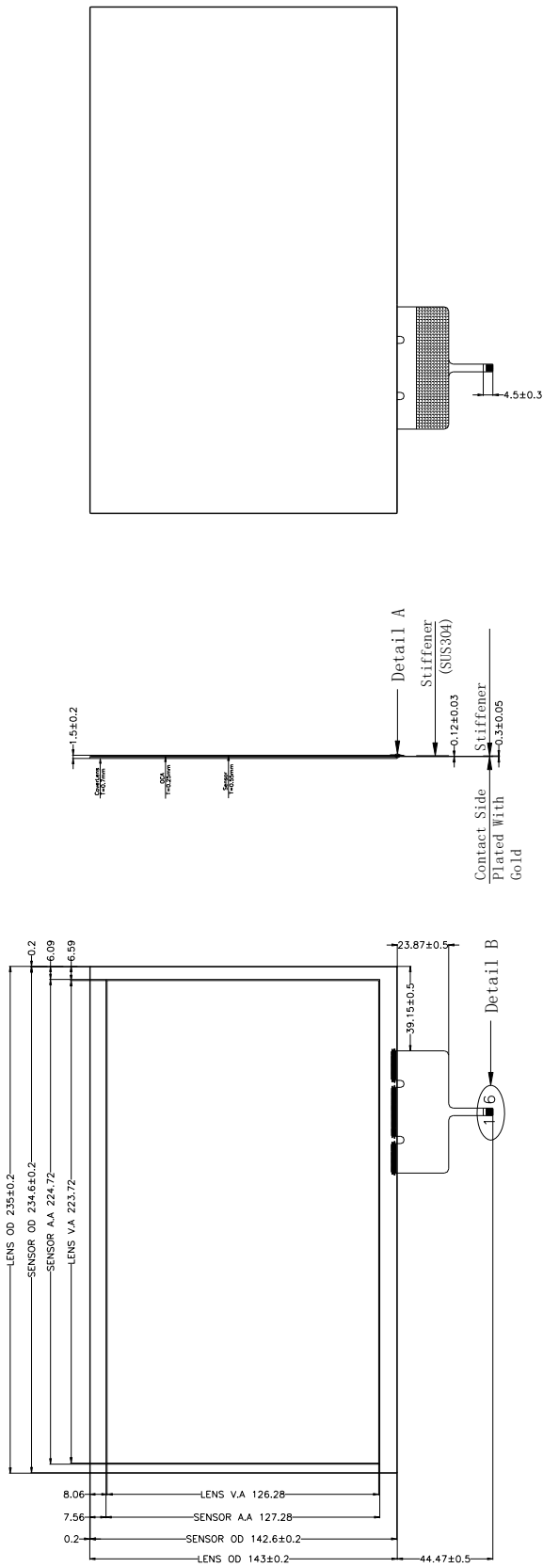
<b>Item</b>	<b>Contents</b>
Type	Capacitive Multi-touch
Module size(Without FPC)	235.00mm x 143.00mm x 1.50(T)mm
View area	223.72mm x 126.26mm
Interface	I2C
Driver IC	GT9110
Operation Voltage	2.8V~3.3V
ITO Glass thickness	0.55mm
Operation humidity	20~90%RH
Storage humidity	20~90%RH
Resolution	1024*600
Input force	≅ 10g
Input method	Finger or exclusive pen
Transparency	≅ 80%
Surface hardness	>6H
Hitting life	>35,000,000 times
Insulation	20M ohm or over(Dc 25V)

2. EXTERNAL DIMENSIONS



1. Unmarked tolerance is ±0.3
2. All materials comply with RoHS

TOUCH PANEL:

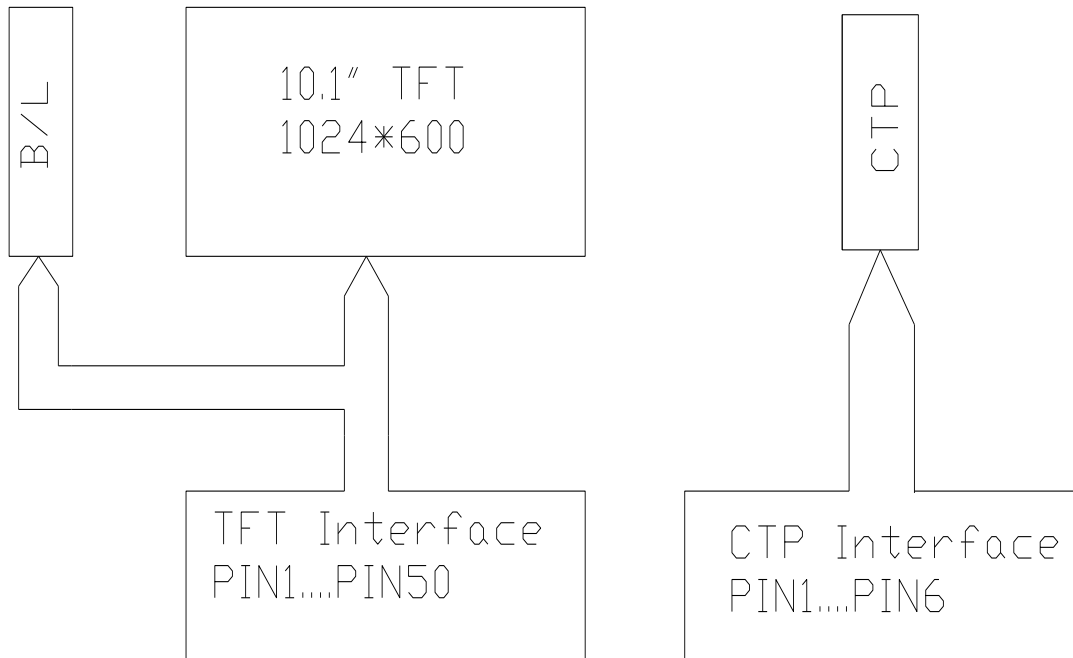


Black silicone  
Detail A  
Scale 10:1

Detail B  
Scale 5:1

- Remarks:
1. Unmarked tolerance is  $\pm 0.3$ ,  
Unmarked radius is R0.5;
  2. All materials comply with Rohs;
  3.  ...:critical dimension.

**3. BLOCK DIAGRAM**





## 4. PIN ASSIGNMENT

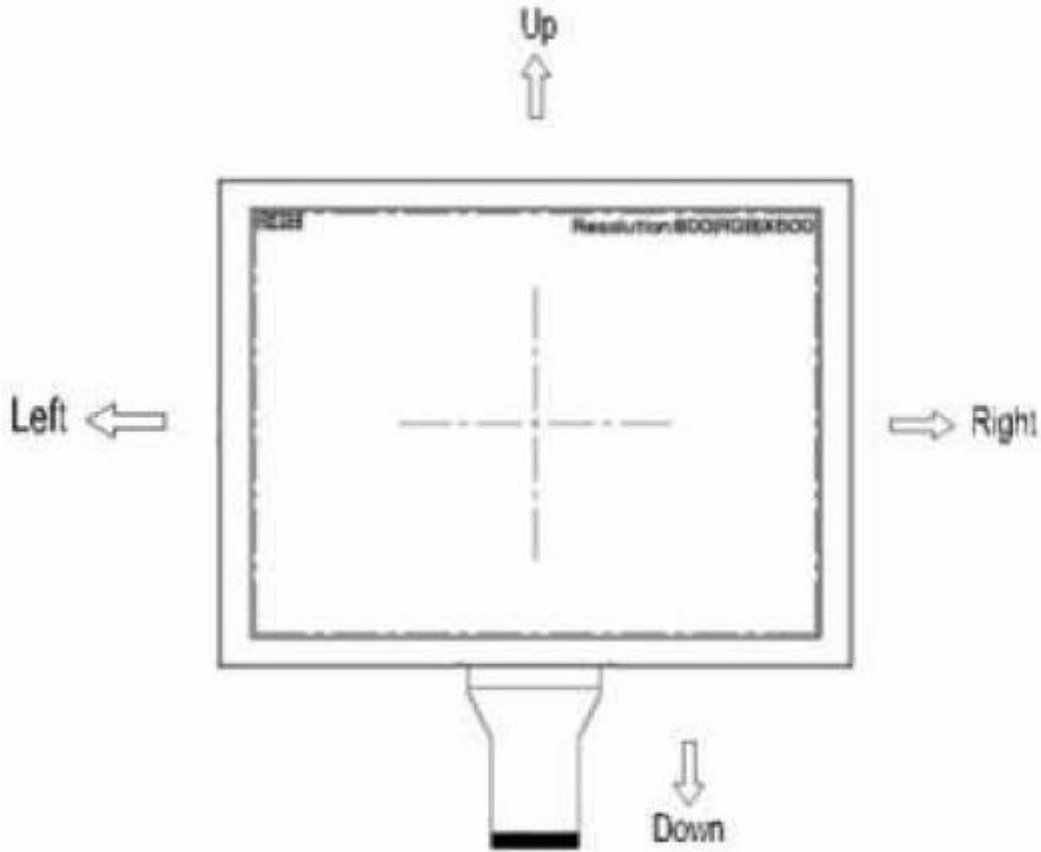
PIN NO.	SYMBOL	DESCRIPTION
1	NC	Not connection
2	NC	Not connection
3	NC	Not connection
4	NC	Not connection
5	NC	Not connection
6	VCOM	Common Voltage
7	VDD	Power supply
8	VDD	Power supply
9	NC	Not connection
10	RESET	Reset pin
11	STBYB	Standby mode, normally pulled high. STBYB = "1", normal operation STBYB = "0", timing controller, source driver will turn off, all output are High-Z
12	GND	Power ground
13	RXIN0-	Data lane0 input
14	RXIN0+	Data lane0 input
15	GND	Power ground
16	RXIN1-	Data lane1 input
17	RXIN1+	Data lane1 input
18	GND	Power ground
19	RXIN2-	Data lane2 input
20	RXIN2+	Data lane2 input
21	GND	Power ground
22	RXCLKIN-	CLK input
23	RXCLKIN+	CLK input
24	GND	Power ground
25	RXIN3-	Data lane3 input
26	RXIN3+	Data lane3 input
27	GND	Power ground
28	NC	Not connection
29	NC	Not connection
30	GND	Power ground
31	NC	Not connection
32	NC	Not connection

33	SELB	In LVDS interface connected HSD to FPC for Pin Setting SELB="L":8 bit SELB="H":6 bit
34	AVDD	Power for Analog Circuit
35	GND	Power ground
36	NC	Not connection
37	NC	Not connection
38	L/R	Source Right or Left sequence control. Normally pull high. L/R = "L", shift left: last data = S1←S2←S3.....←S1200 = first data. L/R = "H", shift right: first data = S1→S2→S3.....→S1200 = last data
39	U/D	Gate Up or Down scan control. Normally pull low. UPDN = "L", STV2 output vertical start pulse and UD pin output logical "0" to Gate driver.(Default) UPDN = "H", STV1 output vertical start pulse and UD pin output logical "1" to Gate driver.
40	VGL	Gate OFF Voltage
41	NC	Not connection
42	NC	Not connection
43	VGH	Gate ON Voltage
44	NC	Not connection
45	NC	Not connection
46	NC	Not connection
47	NC	Not connection
48	NC	Not connection
49	NC	Not connection
50	NC	Not connection

**SELECTION OF SCANNING MODE**

SETTING OF SCAN CONTROL INPUT		SCANNING DIRECTION
U/D	L/R	
GND	DVDD	UP TO DOWN, RIGHT TO LEFT
DVDD	GND	DOWN TO UP, LEFT TO RIGHT
GND	GND	UP TO DOWN, LEFT TO RIGHT
DVDD	DVDD	DOWN TO UP, RIGHT TO LEFT

DEFINITION OF SCANNING DIRECTION REFER TO THE FIGURE AS BELOW:



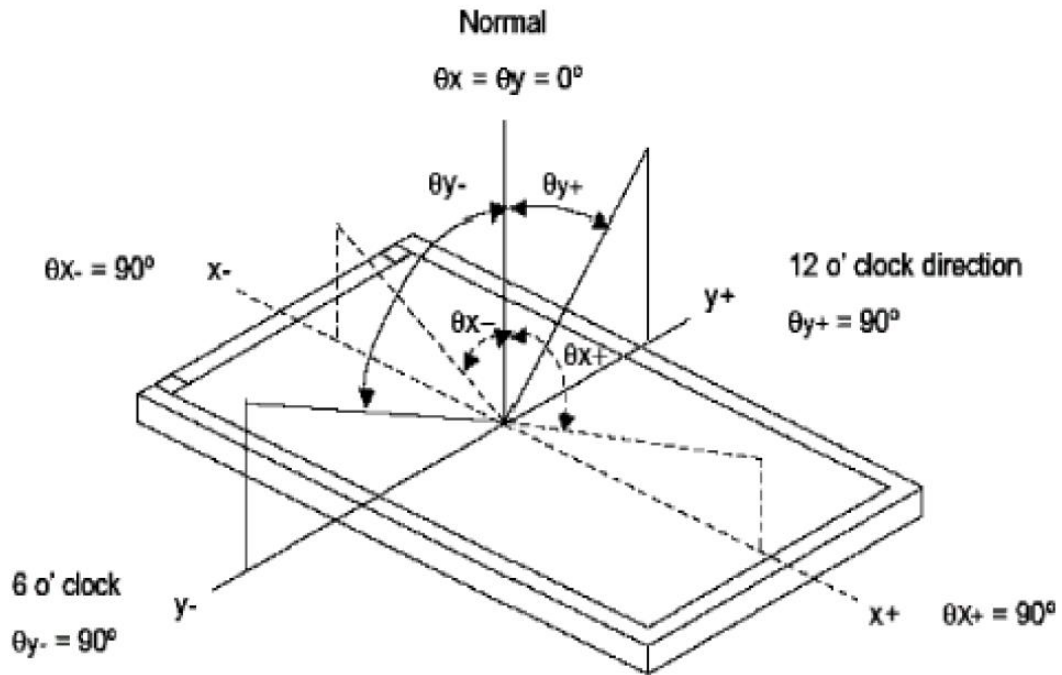
**TOUCH PANEL:**

Pin No.	Symbol	Description
1	INT	External Interrupt
2	RST	Global reset input, low active
3	SDA	I2C Serial data input/output
4	SCL	I2C Serial clock input/output
5	VDD	Positive power supply
6	GND	Negative supply

**5. OPTICAL CHARACTERISTICS**

ITEM	SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
			MIN	TYP.	MAX		
Luminance	L	$I_L=540\text{mA}$		800		Cd/m <sup>2</sup>	
Contrast ratio	CR	$\theta = 0^\circ$		800			
Response time	T <sub>ON</sub>	25°C		30	40	ms	
	T <sub>OFF</sub>						
CIE COLOUR COORDINATE	RED	RX	VIEWING NORMAL ANGLE	TYP. - 0.03	0.605	TYP. + 0.03	
		RY			0.336		
	GREEN	GX			0.297		
		GY			0.552		
	BLUE	BX			0.139		
		BY			0.132		
	WHITE	WX			0.307		
		WY			0.338		
VIEWING ANGLE	Hor.	$\theta_{x+}$	CR ≥ 10		85	Degree	
		$\theta_{x-}$			85		
	Ver.	$\theta_{y+}$			85		
		$\theta_{y-}$			85		

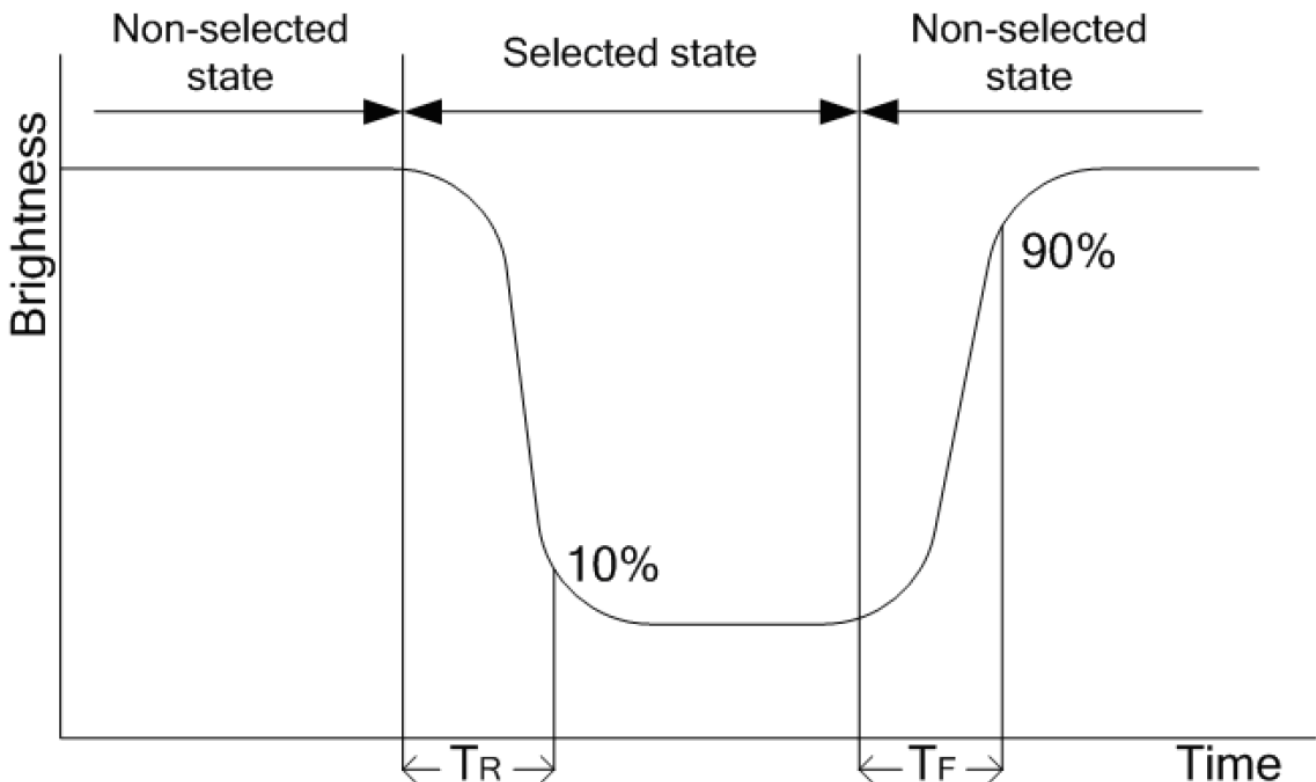
Note 1 : Definition of Viewing Angle  $\theta_x$  and  $\theta_y$  :



Note 2: Definition of contrast ratio CR:

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

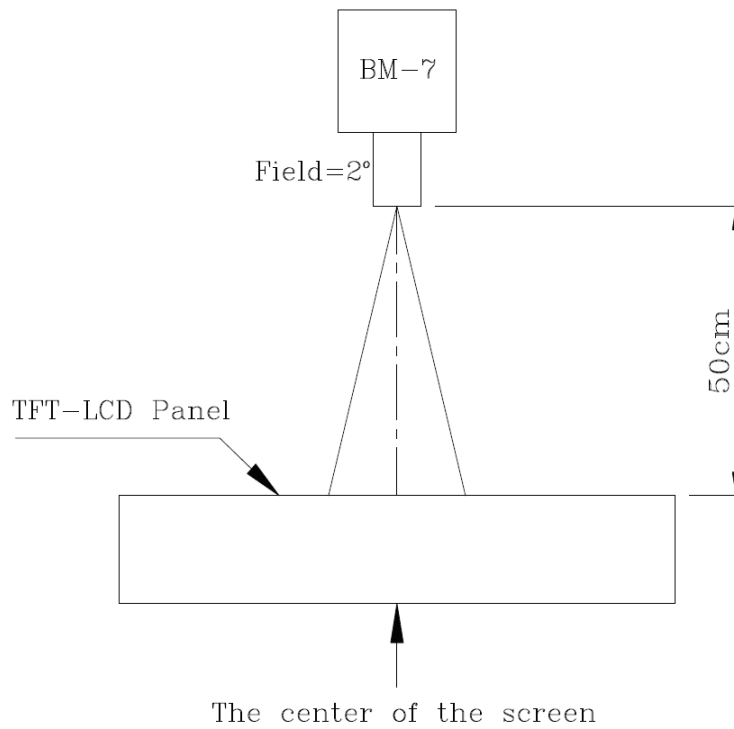
Note 3: Definition of response time ( $T_R$ ,  $T_F$ )



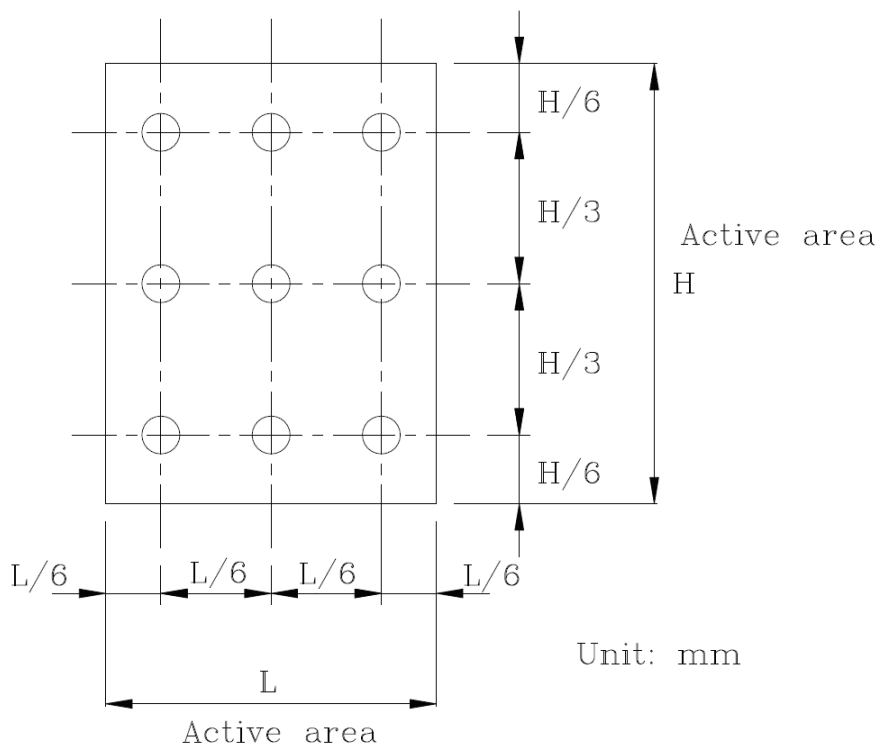
**Note 4: Definition of Luminance**

**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	-0.5	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	10.8	12.2	13.6	V	
Supply Current	IL		540		mA	
Power consumption	P		6.58		W	
LED lifetime		30,000			H <sub>r</sub>	

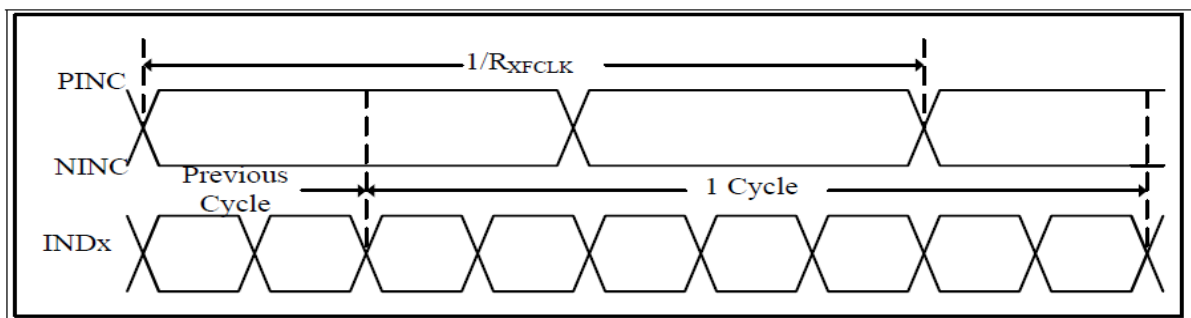
**7.2 ELECTRICAL CHARACTERISTICS**

ITEM	SYMBOL	MIN	TYP.	MAX	UNIT
Power Supply	VDD	3.0	3.3	3.6	V
	AVDD		9.6		V
	VGH		18		V
	VGL		-6		V
	VCOM	4.0		4.4	V
Input voltage	Vil	GND	-	0.3VDD	V
	Vih	0.7VDD	-	VDD	V

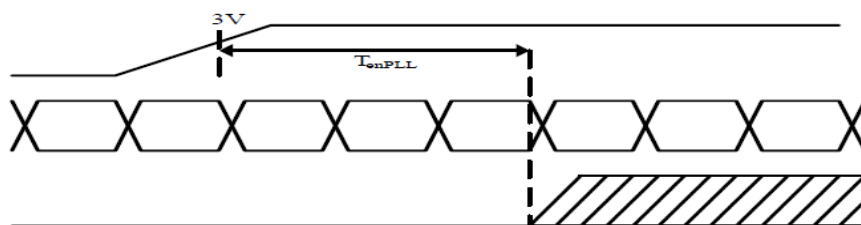
8.TIMING CHARACTERISTICS

8.1 LVDS mode

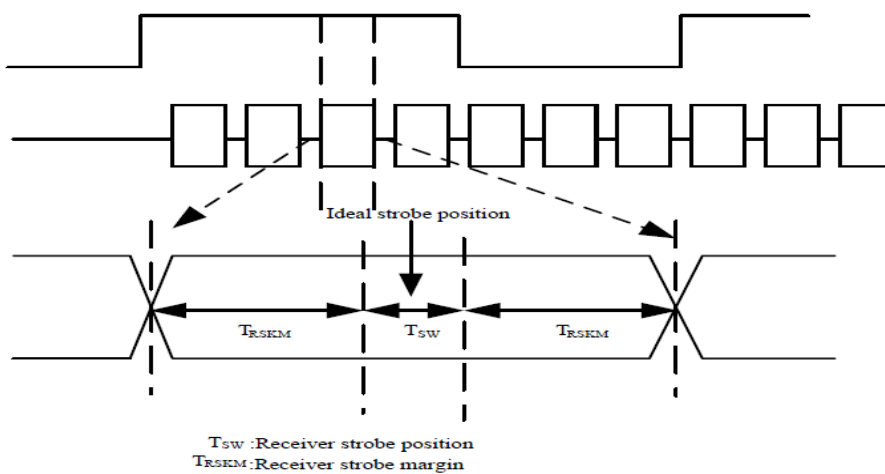
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Clock Frequency	RxFCLK		20	-	71	MHz
Input data skew margin	TRSKM	VID =400mV RxVCM=1.2V RxFCLK=71MHz	500			ps
Clock High Time	TLVCH			4/(7* RxFCLK)		ns
						ns
Clock Low Time	TLVCL			3/(7* RxFCLK)		ns
PLL wake-up-time	TenPLL				150	us



LVDS timing(1)



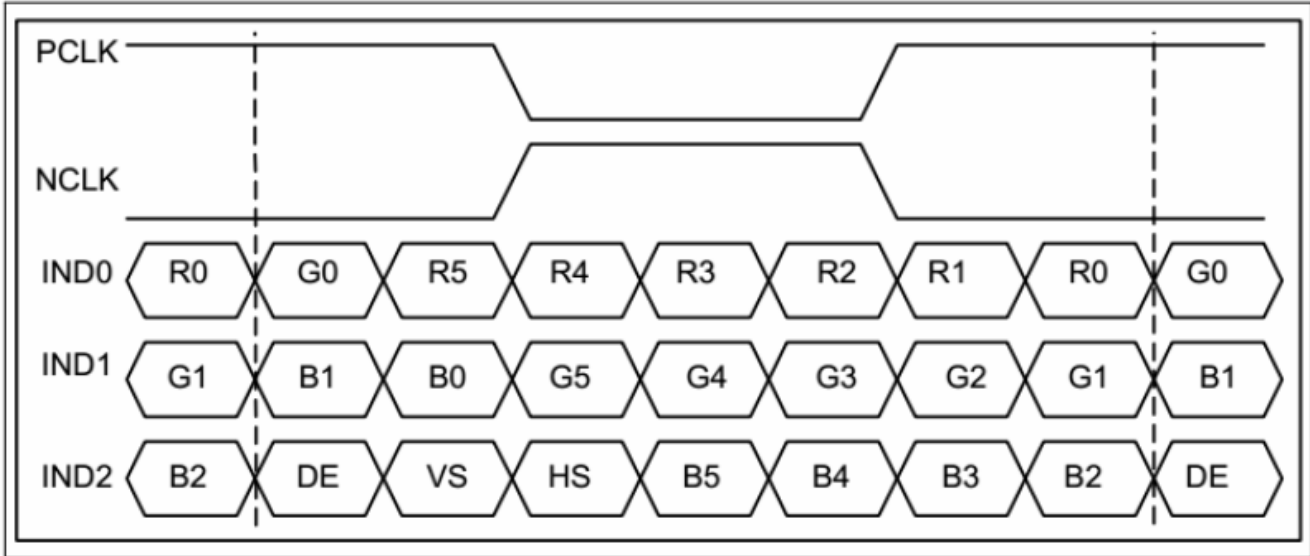
LVDS timing(2)



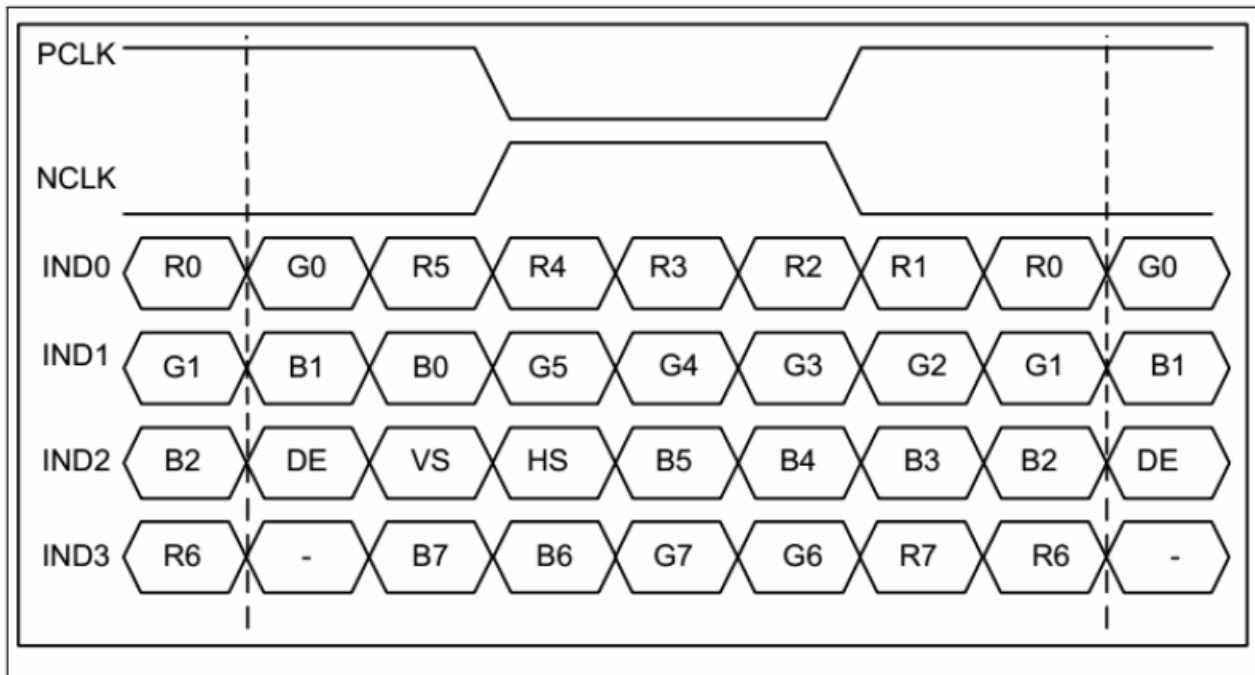
LVDS timing(3)



8.2 Date input format



6-bit LVDS Input Timing chart



8-bit LVDS Input Timing chart

**9. RELIABILITY TEST**

<b>NO.</b>	<b>TEST ITEM</b>	<b>CONDITIONS</b>	
1	HIGH TEMPERATURE STORAGE	TA=80°C	96H
2	LOW TEMPERATURE STORAGE	TA=-30°C	96H
3	HIGH TEMPERATURE OPERATION	TA=70°C	96H
4	LOW TEMPERATURE OPERATION	TA=-20°C	96H
5	HIGH TEMPERATURE AND HIGH HUMIDITY OPERATION	+60°C, 90%RH	96H
6	THERMAL SHOCK	-30°C → +80°C,	0.5H:5CYCLES

**10. 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.

**11. 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.