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# LCD MODULE SPECIFICATION

**P/N:** 8.0

**Model Name:**

**Version:**

**Date:** 2022/03/18

**Material code:**

**For Customer's Acceptance**

Approved by	Comment

DESIGN	CHECK	REVIEW



## 1 📄 VERSION HISTORY

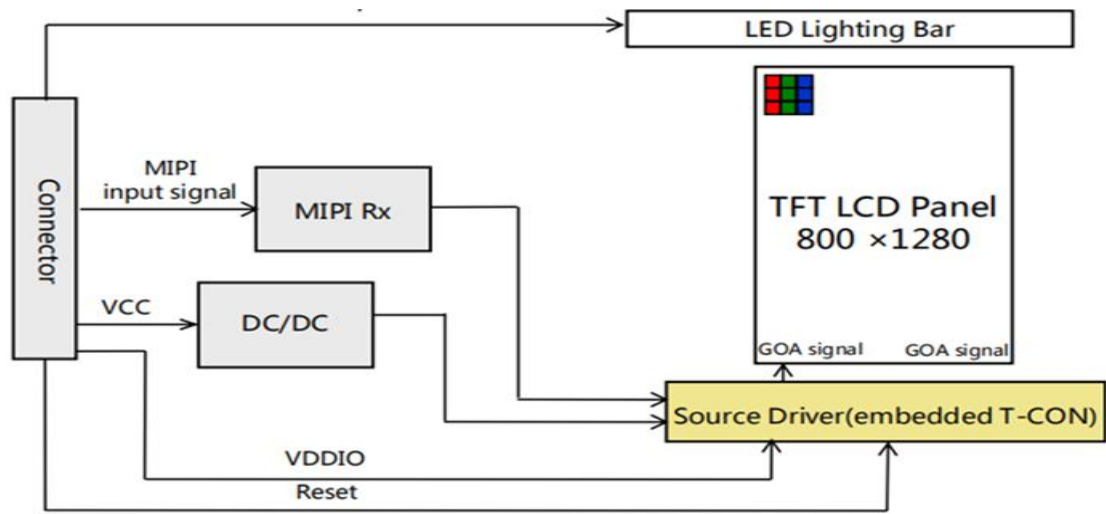
[illegible]

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## 2 📄 GENERAL INFORMATION

Item	Contents	Unit
LCD Size	8.0	inch
Driver element	a-Si TFT active matrix	--
Viewing direction	Normally Black	--
TP+LCM	123.46(W)*201.26(H)*3.93(T)mm	
Module size	114.6(W)*184.1(H)*2.45(T)mm	mm
Panel Active Area	107.64(W)*172.224(H)	mm
Pixel Pitch	0.13455(W)X0. 13455 (H)	mm
Number of Dots	800*RGB*1280	pixel
Colors	16.7M	--
Surface Treatment	TBD	
Interface	MIPI (4 Lane)	--
Brightness	380cd/m <sup>2</sup> (typ)	--
NTSC	60%(typ)	--

### 3 BLOCK DIAGRAM



## 4 OPERATION SPECIFICATIONS

### 4.1 ABSOLUTE MAXIMUM RATINGS

Item		Symbol	Values			Unit	Remark
			Min	Typ	Max		
Power Supply Voltage		VDD-3V3	3	3.3	3.6	V	
		IOVCC-1V8	1.7	1.8	3.6	V	
		VSP		-		V	
		VSN		-		V	
Ripple Voltage		VRP			300	MV	
LEDPWMOUT	High Level	VOH	0.8VDD	\	VDD	V	VDD=3.0-3.6V
	Low Level	VOL	0		0.2VDD	V	
Frame frequency		fFrame		60		HZ	

Input Signal Voltage	V <sub>I</sub>	-0.3	VDD3V3	V
Backlight forward current	I <sub>LED</sub>	0	25	mA(For each LED)
Operating temperature	TOP	0	50	°C
Storage temperature	TST	-20	60	°C
Humidity	RH	-	90%(Max50°C)	RH

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.

### 4.2 Typical Operation Conditions

Parameter	Symbol	Values			Unit
		Min	Typ	Max	
Power Voltage	VDD-3V3	3.0	3.3	3.6	V
Input Current	I <sub>VDD3V3</sub>	-	70	120	mA
Power Consumption	P <sub>LCD</sub>	-	-	-	W
	P <sub>BL</sub>	-	-	-	W

Note :1.Frame Rate=60Hz,VDDIN=3.3V,DC Current; Operating at 25°C at white pattern.

## 5 📄 BACKLIGHT CHARACTERISTICS

Item	Symbol	Min	Typ	Max	Unit	Condition
Forward voltage	V <sub>f</sub>	-	25.6	27	V	If=67.5mA
Luminance	LV	330	380	-	cd/m <sup>2</sup>	
Number of LED	-	24			Piece	-
Connection mode	p	8 Series and 3 parallel			-	-

### LED CIRCUIT DIAGRAM:



$I_f = 67.5\text{mA}$  (22.5mA/LED)       $V_f = 23.0\text{V} \sim 27.0\text{V}$   
 (恒定电流测试)

Approved By Customer		1	2	3	4	5	6
注：标注		请重点确认		REV	DATE	REVISE	DESCRIPTIONS
				△	2022-2-24	HZG	First issue



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## 7 🚩 Interface Signal

Pin No.	Symbol	Description
1	TP-VDD	Power SUPPLY
2	ID4	ID4
3	TP-RESET	TP Global reset signal
4	INT	I2C Interrupt Signal
5	ID3	ID3
6	SDA	I2C Data Signal
7	SCL	I2C Clock Signal
8	ID2	ID2
9	ID1	ID1
10	TE	Serves TE (Tearing Effect) pin on MPU interface
11	LCD-RESET	Global reset signal
12	GND	Ground
13	IOVCC-1V8	Power SUPPLY 1.8V
14	NC	OPEN
15	LEDK	Cathode
16	LEDK	Cathode
17	LEDK	Cathode
18	NC	OPEN
19	LEDA	Anode

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<b>20</b>	LEDA	Anode
<b>21</b>	LCD-VDD-3V3	Power SUPPLY 3.3V
<b>22</b>	NC	OPEN
<b>23</b>	NC	OPEN
<b>24</b>	NC	OPEN
<b>25</b>	GND	Ground
<b>26</b>	D2P	MIPI Differential Data Input
<b>27</b>	D2N	MIPI Differential Data Input
<b>28</b>	GND	Ground
<b>29</b>	D3P	MIPI Differential Data Input
<b>30</b>	D3N	MIPI Differential Data Input
<b>31</b>	GND	Ground
<b>32</b>	CLKP	MIPI Differential Clock Input
<b>33</b>	CLKN	MIPI Differential Clock Input
<b>34</b>	GND	Ground
<b>35</b>	D1N	MIPI Differential Data Input
<b>36</b>	D1P	MIPI Differential Data Input
<b>37</b>	GND	Ground
<b>38</b>	D0N	MIPI Differential Data Input
<b>39</b>	D0P	MIPI Differential Data Input
<b>40</b>	GND	Ground

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TP PIN		
1	SCL	I2C Clock Signal
2	SDA	I2C Data Signal
3	INT	I2C Interrupt Signal
4	RESET	Reset Signal
5	GND	Ground
6	VDD	Power Supply(2.8V)

## 8 SIGNAL TIMING CHARACTERISTICS

### 8.1 Power On/Off Sequence

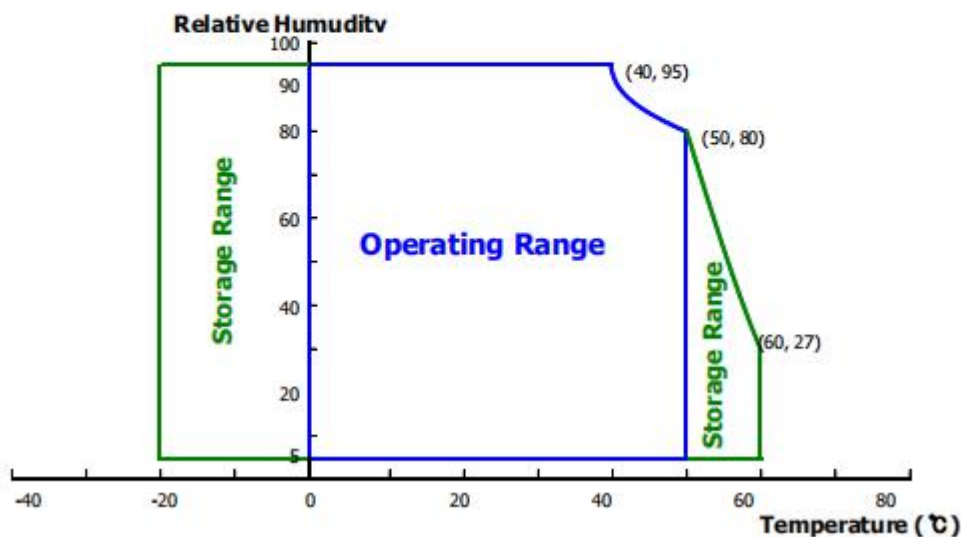
### 2.0 ABSOLUTE MAXIMUM RATINGS

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table 2.

< Table 2. Absolute Maximum Ratings>

Parameter	Symbol	Min.	Max.	Unit	Remarks
Power Supply Voltage	VDD	-0.3	5.0	V	Note 1
Operating Temperature	TOP	-20	+60	°C	Note 2
Storage Temperature	TST	-20	+60	°C	

- Notes : 1. Permanent damage to the device may occur if maximum values are exceeded functional operation should be restricted to the condition described under normal operating conditions.
2. Temperature and relative humidity range are shown in the figure below.  
95 % RH Max. ( 40 OC  $\geq$  Ta)  
Maximum wet - bulb temperature at 39 OC or less. (Ta > 40 OC) No condensation.



## 8.2 Video input timing for Multi-Drop type

Parameter	Symbol	Values			Unit	Notes
		Min	Typ	Max		
Power Supply Input Voltage	VDD	3.0	3.3	3.6	Vdc	
Logic Power Supply Input Voltage	VLOG	1.7	1.8	1.9	Vdc	
Power Supply Ripple Voltage	VRP		300		mV	
Power Supply Current	IDD	-	50	126	mA	1
Power Consumption	PDD		0.20	0.45	Watt	
Logic Power Supply Current	ILOG	16	18	20	mA	
Logic Power Consumption	PLOG		33		mW	
Rush current	IRUSH	-	1		A	2

Notes : 1. The supply voltage is measured and specified at the interface connector of LCM.

The current draw and power consumption specified is for VDD=3.3V, Frame rate  $f_v=60\text{Hz}$  and Clock frequency = 68.4MHz. Test pattern of power supply current is : typ@White, max@R/G/B

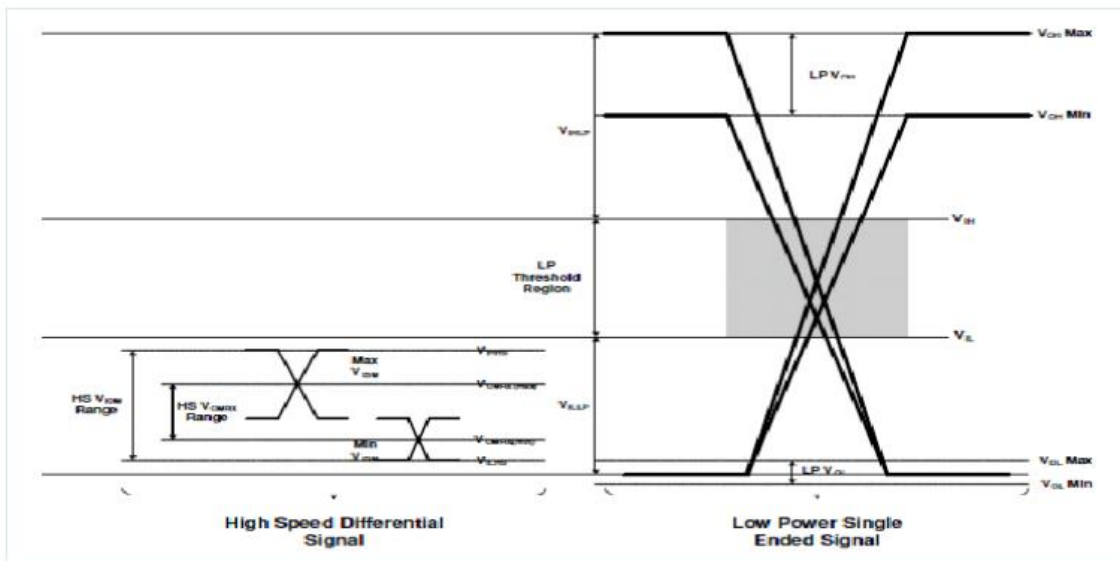
2. The duration of rush current is about 2ms and rising time of Power input is 1ms(min)

## 8.3 MIPI Interface Characteristic

### 8.3.1 MIPI Input Signal SPEC

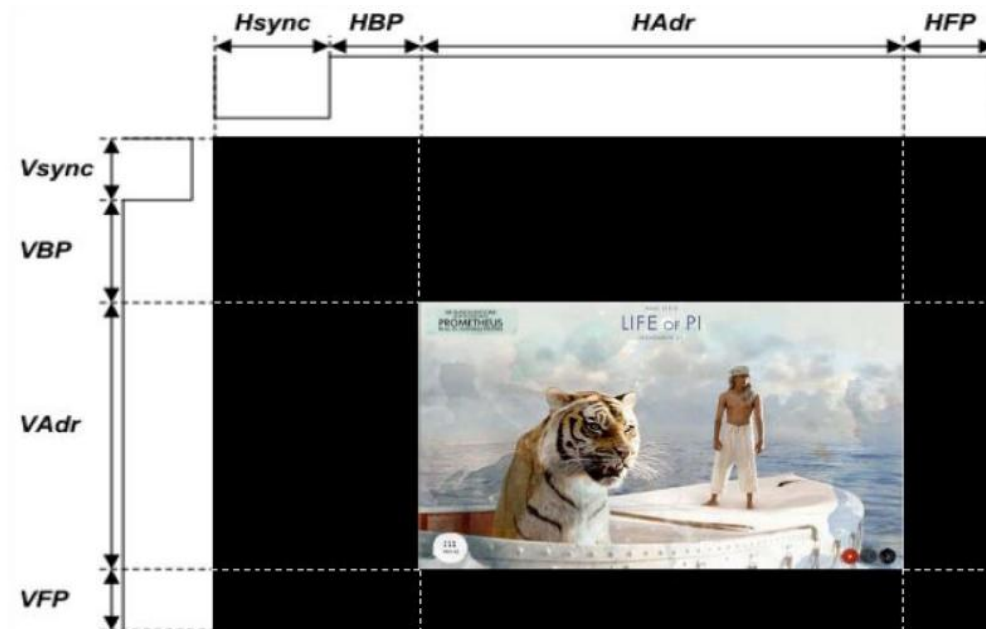
< Table 5 MIPI Input Signal Spec >

Parameter	Symbol	Min	Typ	Max	Unit	Condition
MIPI digital operation current	$I_{VCCIF}$	16	18	20	mA	-
MIPI digital stand-by current	$I_{VCCIFST}$	-	200	-	uA	-
<b>MIPI Characteristics for High Speed Receiver</b>						
Single-ended input low voltage	$V_{ILHS}$	-40	-	-		
Single-ended input high voltage	$V_{IHHS}$	-	-	460	mV	
Common-mode voltage	$V_{CMRXDC}$	155	-	330	mV	
Differential input impedance	$Z_{ID}$	80	100	125	$\Omega$	
HS transmit differential voltage( $V_{OD}=V_{DP}-V_{DN}$ )	$ V_{OD} $	140	200	250	mV	
<b>MIPI Characteristics for Low Power Receiver</b>						
Pad signal voltage range	$V_I$	-50	-	1350	mV	
Ground shift	$V_{GNDSH}$	-50	-	50	mV	
Output low level	$V_{OL}$	-50	-	50	mV	
Output high level	$V_{OH}$	1.1	1.2	1.3	V	



## Signal Timing Spec

Item	Symbol	Min	Typ	Max	Unit
Pixel CLK	Tpixclk	–	68	–	MHZ
MIPI CLK	Frequency	–	–	–	MHZ
Horizonntal Active Display Term	Hadr	–	800	–	tpclk
	HBP	–	20	–	tpclk
	HFP	–	40	–	tpclk
	HS	–	20	–	tpclk
Vertical Active Display Term	Vadr	–	1280	–	Line
	VBP	–	12	–	Line
	VFP	–	30	--	Line
	VS	–	4	–	Line

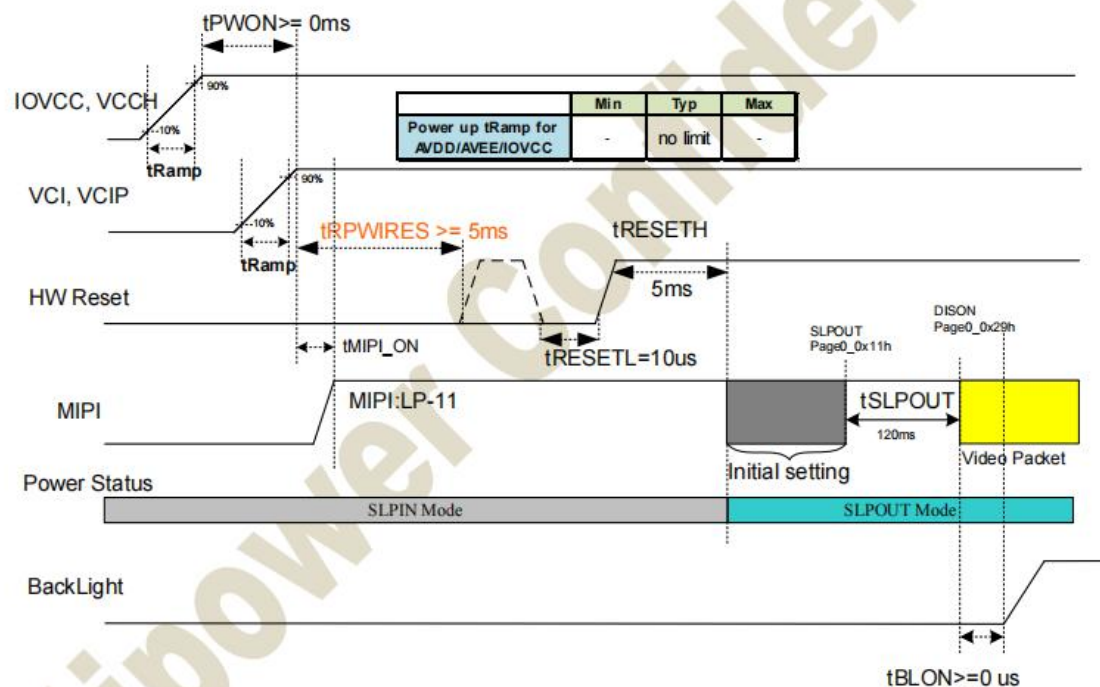


## 8.3.2 Power Sequence

BOOSTM[1:0]=10 / 11 (Internal DC/DC power mode : PFM, Charge Pump, JD5001)

VCCD=IOVCC=VCCH=1.65V ~ 3.6V, VCI=VCIP=2.5V ~ 4.8V.

Power on:



Symbol	Min	Typ	Max	Unit	Remark
tRamp	-	no limit	-	us	
tPWON	0	-	-	ms	
tON1	0	-	-	ms	
tMIPI-ON	0	-	tRPWIRES	ms	
tRPWIRES	5	-	-	ms	
tRESETL	10	-	-	us	
tRESETH	5	-	-	ms	
tSLPOUT	120	-	-	ms	
tBLON	0	-	-	ms	

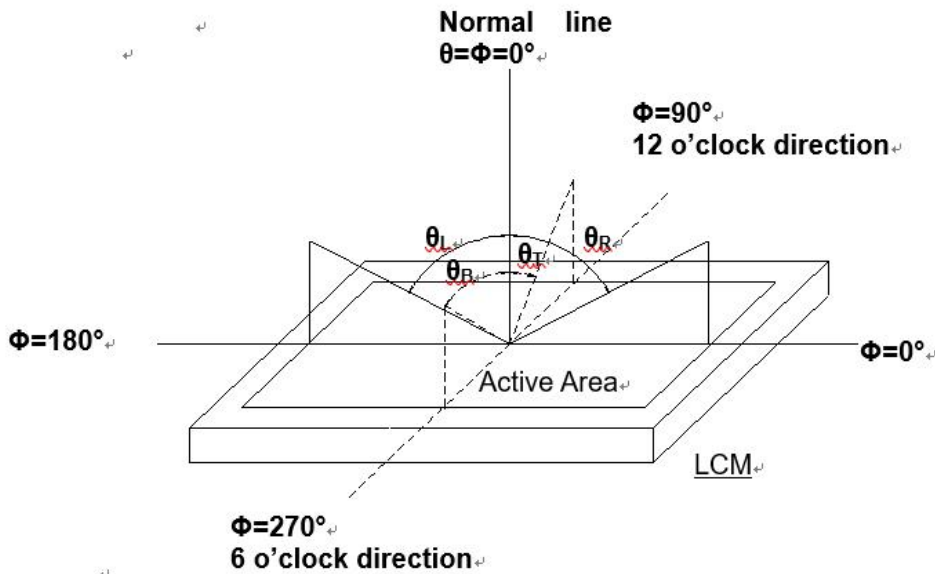


## 9 🚦 ELECTRO-OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
Response time		Tr+Tf	$\theta=0^\circ$ Ta=25°C	-	30	35	ms	Note 2 Note 3
Contrast ratio		Cr		900	1200	-	-	Note 2 Note 4
Luminance uniformity		$\delta$ WHITE		75	-	-	%	Note 2 Note 6
Surface Luminance		LV		330	380	--	cd/m <sup>2</sup>	Note 2
Color temperature		Tcp		-	TBD	-	K	
Viewing angle range		$\theta$	=90°	80	85	-	deg	Note1
			=270°	80	85	-	deg	
			=0°	80	85	-	deg	
			=180°	80	85	-	deg	
CIE(x,y) chromaticity	Red	x	$\theta=0^\circ$ Ta=25°C		TBD			Note 2 Note 5
		y			TBD			
	Green	x			TBD			
		y			TBD			
	Blue	x			TBD			
		y			TBD			
	White	x		0.26	-	0.36		
		y		0.26	-	0.36		

Note 1: Definition of viewing angle range

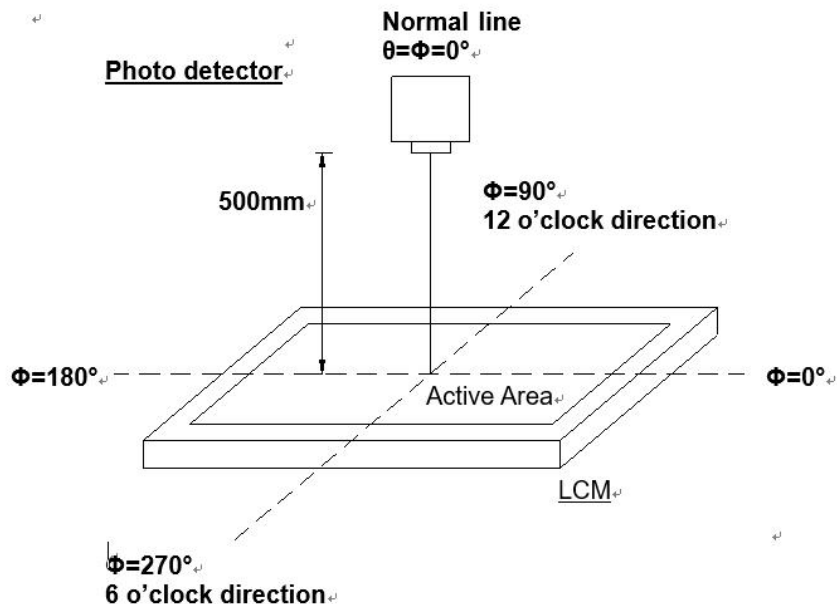
Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface



**Definition of viewing angle**

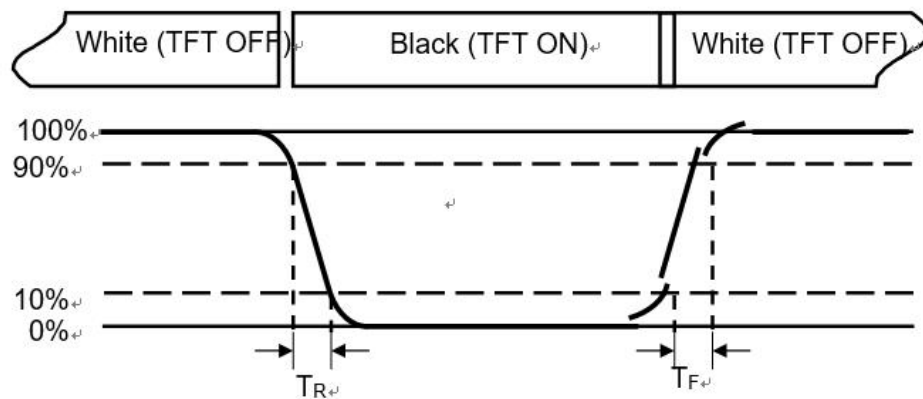
Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Viewing angle is measured by ELDIM-EZ contrast/Height :1.2mm ,Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/ Field of view:  $1^\circ$  /Height: 500mm.)



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%.



**Definition of response time**

Note 4: Definition of contrast ratio

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

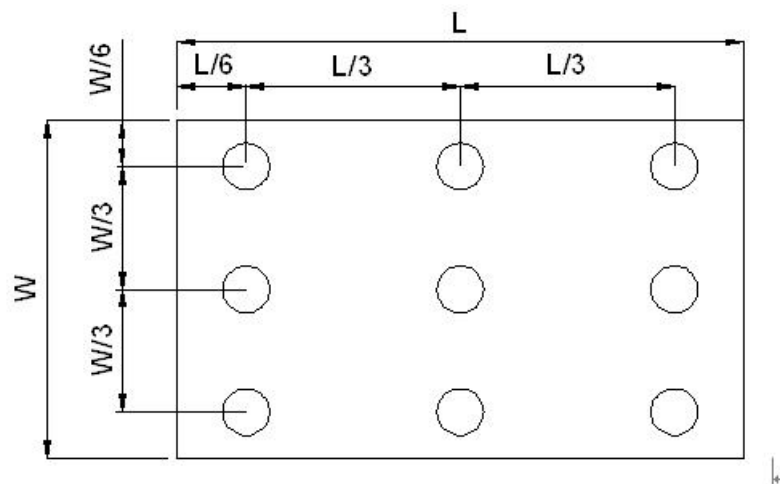
Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity ("White" state)

Active area is divided into 9 measuring areas. Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{min}}{B_{max}}$$



**Definition of measuring points**

$B_{max}$ : The measured maximum luminance of all measurement position.

$B_{min}$ : The measured minimum luminance of all measurement position.

## 10 🚩 RELIABILITY TEST

Reliability test conditions ( Polarizer characteristics null )

No.	Test Items	Test Condition	Remarks
1	High Temperature Storage	T = 60℃ for 96hr	Module (Without Contamination)
2	Low Temperature Storage	T = -20℃ for 96hr	
3	High Temperature Operating	T = 50℃ for 96hr	
4	Low Temperature Operating	T = 0℃ for 96hr (But no condensation of dew)	
5	High Temp. and High Humidity Operating	T = 50℃ /90% for 96hr (But no condensation dew)	
6	Thermal Shock	-10±2℃~25~60±2℃×10cycles (30min.) (5min.) (30min.)	
7	Packing Shock	1corner, 3edge, 6face / 76cmDrop	Packing
8	Packing Vibration	Random 1.06Grms XYZ 30min for each direction	
9	Electrostatic Discharge	Contact: ±4KV Air: ±8KV 150PF/330Ω,5Points/panel,5times	Class B.Note1

※ 1) No.1~ No.6 : No guarantee for panel, only for module with the above test conditions.

※2) No.7~ No.8 : Refer to 7-1) Packing Ass'y on page 14.

### Note1

Class	Performance
A	All functions perform as designed during and after exposure to interference
B	Temporary degradation or less of performance which is self-recoverable
C	Degradation or less of performance which requires operator intervention or system reset to recover
D	Degradation or less of function which is not recoverable

### Result Evaluation Criteria

TFT- LCD Panel should be at room temperature for 2 hours when the display quality test is over.

There should be no particular change which might affect the practical display function and the display quality test should be conducted under normal operating condition.