

**To:**

**Date:**

TFT LCD: OBMB101XP07-B0
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ACCEPTED BY:
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APPROVED BY	CHECKED BY	PREPARED BY



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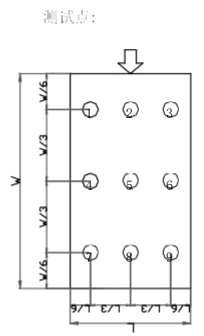
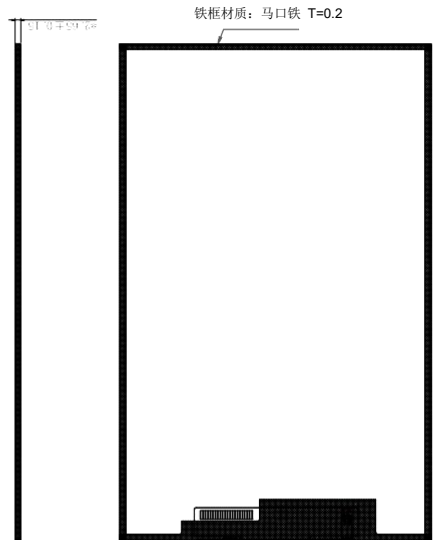
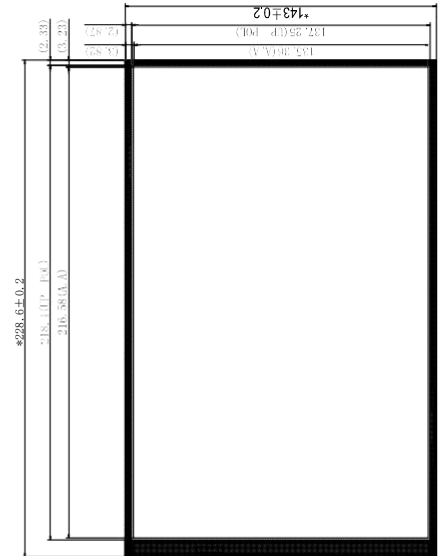
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## 1. GENERAL INFORMATION

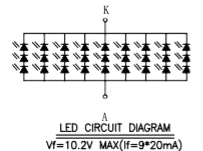
Item	Contents	Unit
LCD Size	10.1	inch
Driver element	a-Si TFT active matrix	--
Viewing direction	Normally Black	--
Module size	143(W)*228.6(H)*2.65(T)mm	mm
Panel Active Area	135.36(W)*216.576(H)	mm
Pixel Pitch	0.1692(W)X0.1692(H)	mm
Number of Dots	800*RGB*1280	pixel
Colors	16.7M	--
Surface Treatment	AG	
Interface	MIPI (4 Lane)	--
Brightness	250cd/m <sup>2</sup> (typ)	--
NTSC	60%(typ)	--

1	2	3	4	5	6	7	8	
客户确认	结构确认	项目确认			REV.	DESCRIPTION	REVISER	DATE
签名								



测试点:  
测试9点,测试距离:50±5mm,测试角度:1°±2.5°  
均匀性:最小/最大亮度\*100%,测试仪器DM-7A

- Notes:
- Unit: mm
  - Do not scale drawing
  - All radii without dimension R0.2mm, not specified tolerance is: ±0.2
  - "Δ" For important dimension; "□" For CPM dimension
  - "n" Modification rev. number, Draft angle 1.0°
  - 满足可靠性试验
  - 同一片白光色度坐标x/y要求:最大值与最小值相差不超过0.02.
  - 亮度、色度数据以研发DM-7为准, (9点测试)
  - Rolls must be complied. (Use Lead-free process)
  - 平整度控制到0.5MAX



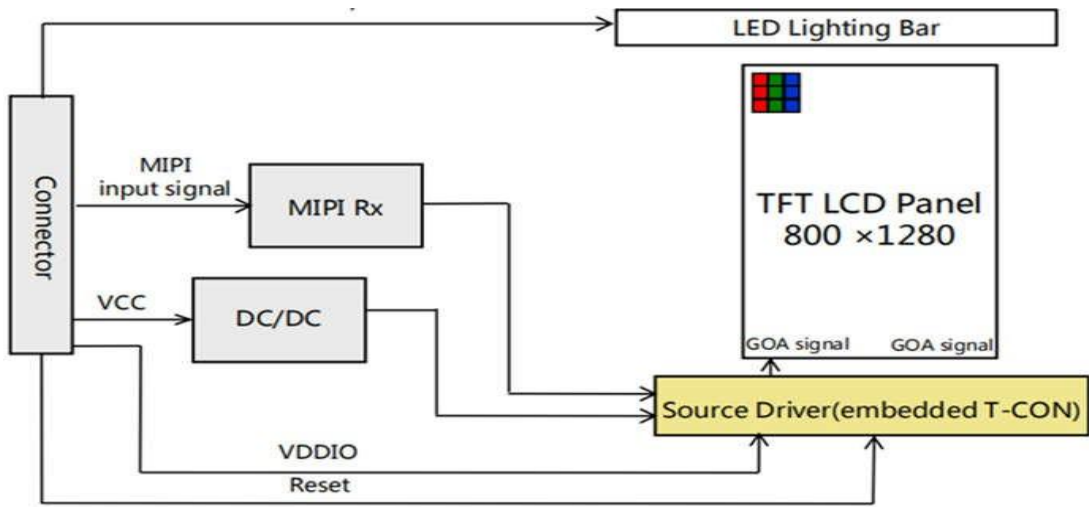
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Condition
Forward Voltage	Vf			10.5	v	
Luminance(9-Points average)	Lv				cd/m²	
Uniformity	Avg	75			%	
Colour Coordinate (Center Point)	X	0.25	0.28	0.31		
	Y	0.26	0.28	0.32		
Luminance(9-Points average)	Lv		280		cd/m²	
Uniformity	Avg	75			%	
Colour Coordinate (Center Point)	X	0.27		0.33		
	Y	0.28		0.36		
Operating Temperature	Topp	0		+50	°C	
Storage Temperature	Tstg	-20		+60	°C	

If=20mA\*9=180mA  
(恒定电流)  
测量仪器: BM-7  
测试高度500mm  
Ta=25° C

Design by:	横组成品图	数量	比例	第三视角
(设计)	版本	A	1	1:1
Check by:	单位	mm	页数	第 1 张 共 1 张
(审查)				
Approval By:				
(承认)				

Customer's Code:  
(客户料号)

Don't scale this drawing (请勿缩放此图纸)



## 3 OPERATION SPECIFICATIONS

### 3.1 ABSOLUTE MAXIMUM RATINGS

Item		Symbol	Values			Unit	Remark
			Min	Typ	Max		
Power Supply Voltage		VDD	3.0	3.3	3.6	V	
		VDDIO	-	-	-	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		frame		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.

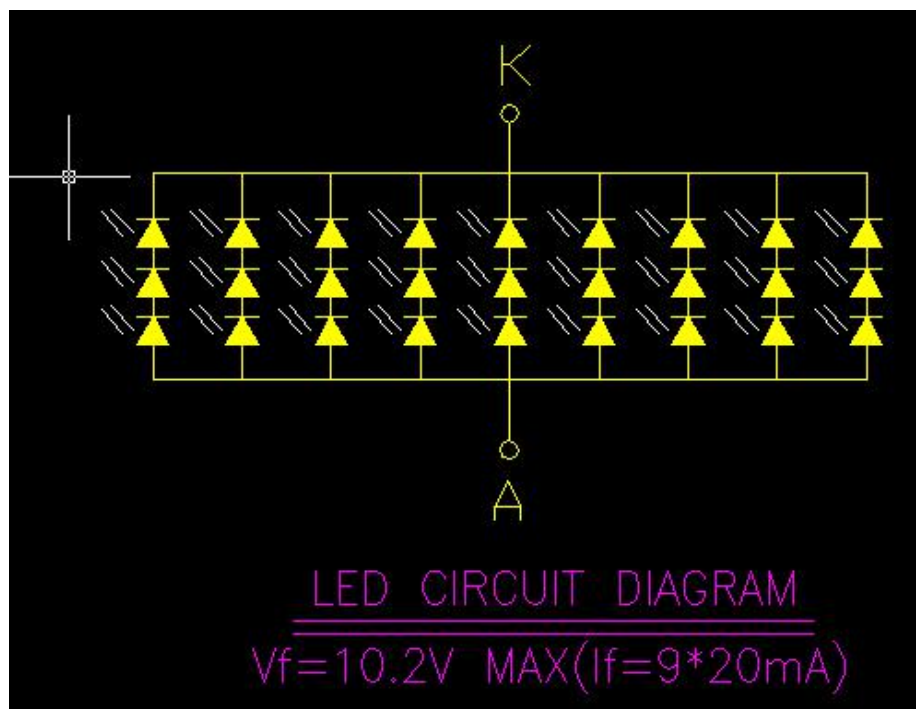
### 4.2 Typical Operation Conditions

Parameter	Symbol	Values			Unit
		Min	Typ	Max	
Power Voltage	VDD3V3	-	3.3	-	V
Input Current	I <sub>VDD3V3</sub>	-	-	-	mA
Power Consumption	P <sub>LCD</sub>	-	-	-	W
	P <sub>BL</sub>	-	2.0	-	W

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

## 5 BACKLIGHT CHARACTERISTICS

Item	Symbol	Min	Typ	Max	Unit	Condition
Forward voltage	Vf	8.1	9.0	10.5	V	If=180mA
Luminance	LV	220	250	-	cd/m <sup>2</sup>	
Number of LED	-	27			Piece	-
Connection mode	p	Series and parallel			-	-





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## 7 Interface Signal

Pin No.	Symbol	Description
1	NC	PPEN
2	VDDIN	Power SUPPLY 3.3V
3	VDDIN	Power SUPPLY 3.3V
4	GND	Ground
5	RESET	Global reset signal (HIGH=VDDIN)
6	LCD-ID	LCD-ID/NC
7	GND	Ground
8	MIPI_TDN0	MIPI data input
9	MIPI_TDP0	MIPI data input
10	GND	Ground
11	MIPI_TDN1	MIPI data input
12	MIPI_TDP1	MIPI data input
13	GND	Ground
14	MPI_TCN	MIPI clock input
15	MPI_TCP	MIPI clock input
16	GND	Ground
17	MIPI_TDN2	MIPI data input
18	MIPI_TDP2	MIPI data input
19	GND	Ground

<b>20</b>	MIPI_TDN3	MIPI data input
<b>21</b>	MIPI_TDP3	MIPI data input
<b>22</b>	GND	Ground
<b>23</b>	NC	OPEN
<b>24</b>	NC	OPEN
<b>25</b>	GND	Ground
<b>26</b>	NC	OPEN
<b>27</b>	PWMO	PWMO/NC
<b>28</b>	NC	OPEN
<b>29</b>	NC	OPEN
<b>30</b>	GND	Ground
<b>31</b>	LEDK	LED Cathode
<b>32</b>	LEDK	LED Cathode
<b>33</b>	NC	OPEN
<b>34</b>	NC	OPEN
<b>35</b>	NC	OPEN
<b>36</b>	NC	OPEN
<b>37</b>	NC	OPEN
<b>38</b>	NC	OPEN
<b>39</b>	LEDA	LED Anode
<b>40</b>	LEDN	LED Anode

## 8 SIGNAL TIMING CHARACTERISTICS

### 8.1 Power On/Off Sequence

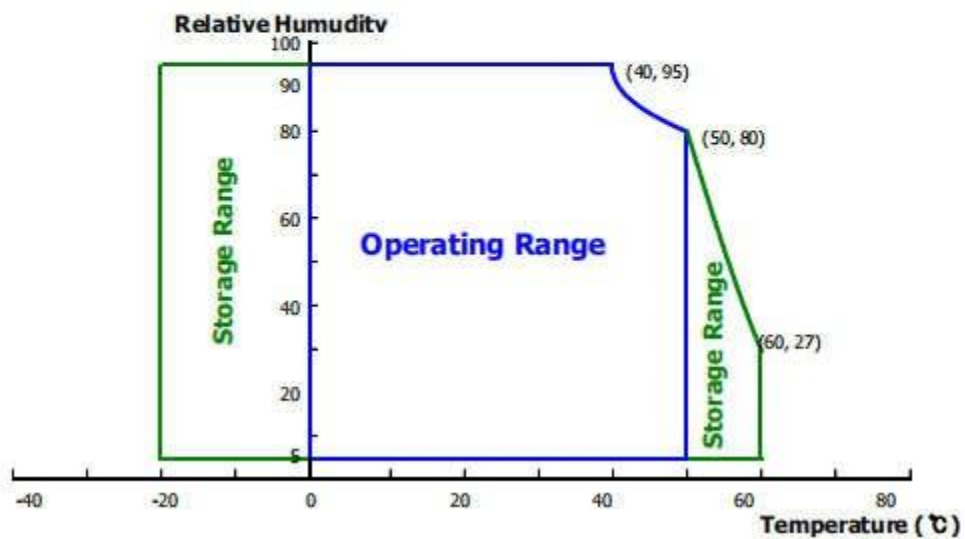
#### 2.0 ABSOLUTE MAXIMUM RATINGS

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 ≥ 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

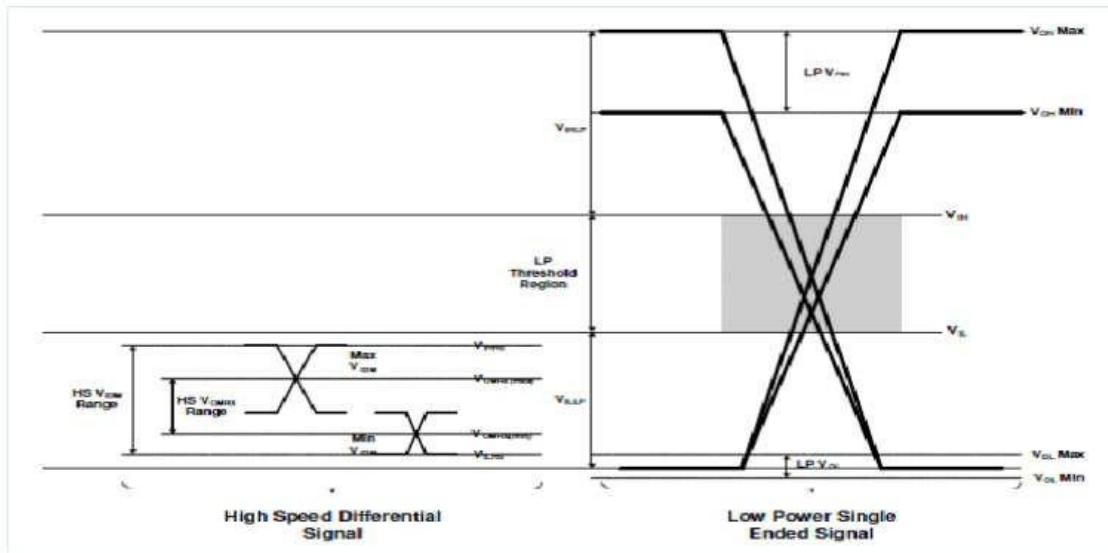
2. The duration of rush current is about 2ms and rising time of Power input is 1ms(min)

## 8.3 MIPI Interface Characteristic

### 8.3.1 MIPI Input Signal SPEC

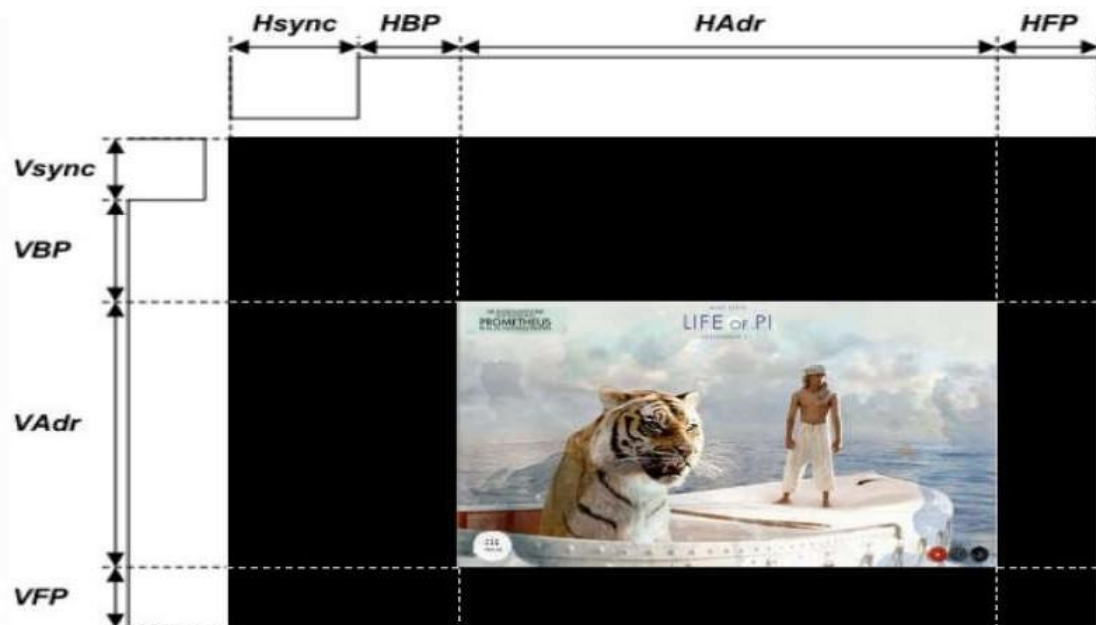
< Table 5 MIPI Input Signal Spec >

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

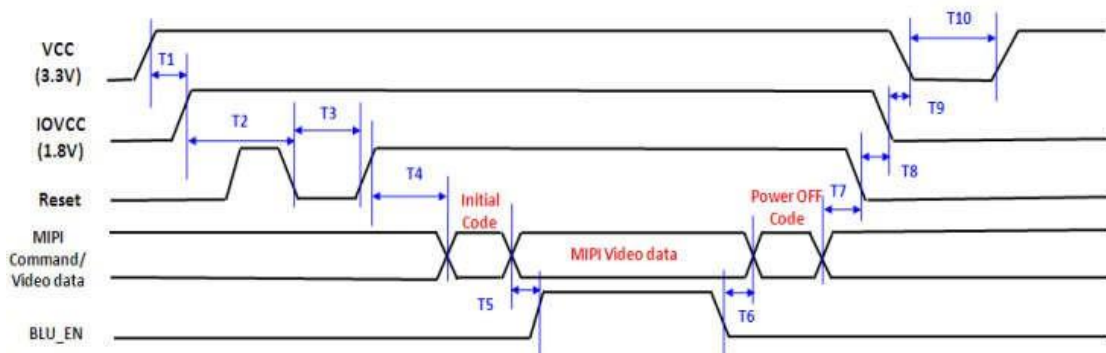
Item	Symbol	Min	Typ	Max	Unit
Pixel CLK	Tpixclk		68.43		MHz
MIPI CLK	Period	-	2.22	-	ns
	Frequency	-	450	-	MHz
Hsync	Period	--	16	-	$t_{pCLK}$
	Frequency	-	77.76	-	KHz
Vsync	Period	-	4	-	Line
	Frequency	-	60	-	Hz
Horizontal Active Display Term rgb vporch 8 4 4 rgb hporch 16 48 16	HAdr	-	800	-	$t_{pCLK}$
	HBP	-	48	-	$t_{pCLK}$
	HFP	-	16	-	$t_{pCLK}$
	Total	-	880	-	$t_{pCLK}$
Vertical Active Display Term	Vadr	-	1280	-	Line
	VBP	-	4	-	Line
	VFP	-	8	-	Line
	Total	-	1296	-	Line



## 8.3.2 Power Sequence

To prevent a latch-up or DC operation of the LCD FOG, the power on/off sequence shall be as shown in below

### Power on/off sequence



Power ON/OFF Timing			
Parameters	Value		Unit
	min.	max.	
T1	0.5	-	ms
T2	1	-	
T3	0.02	-	
T4	5	-	
T5	200	-	
T6	40	-	
T7	0	-	
T8	1	-	
T9	No Limit	-	
T10	500	-	

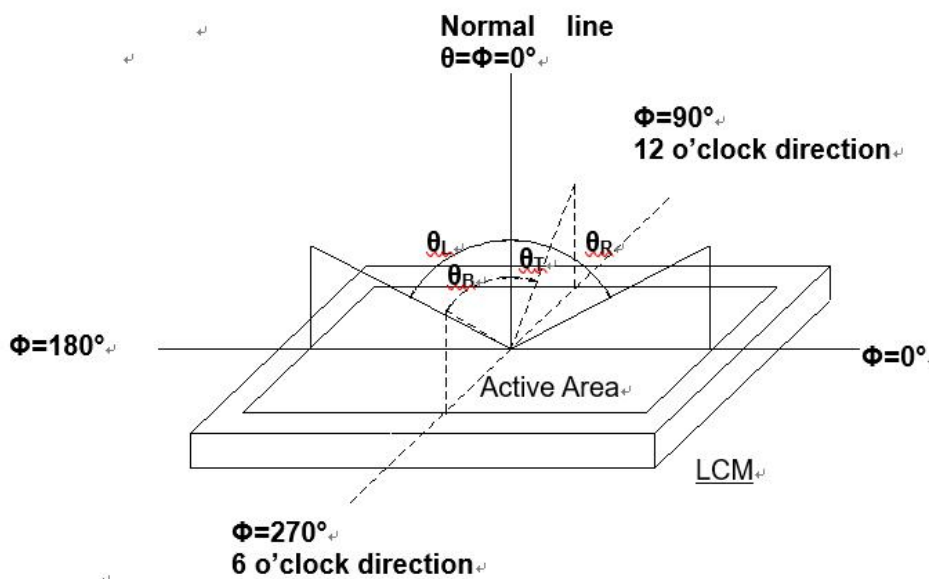
## 9 ELECTRO-OPTICAL CHARACTERISTICS

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		700:1	1000:1	-	-	Note 2 Note 4
Luminance uniformity	$\delta$ WHITE		75	80	-	%	Note 2 Note 6
Surface Luminance	LV		220	250	-	cd/m <sup>2</sup>	Note 2
Color temperature	Tcp		6000	8000		K	
Viewing angle range	$\theta$	$=90^\circ$	80	85	-	deg	Note1
		$=270^\circ$	80	85	-	deg	
		$=0^\circ$	80	85	-	deg	
		$=180^\circ$	80	85	-	deg	
CIE(x,y) chromatically	Red	x	-	-	-		Note 2 Note 5
		y	-	-	-		
	Green	x	-	-	-		
		y	-	-	-		
	Blue	x	-	-	-		
		y	-	-	-		
	White	x	0.270	0.310	0.330		
		y	0.280	0.340	0.360		



Note 1: Definition of viewing angle range

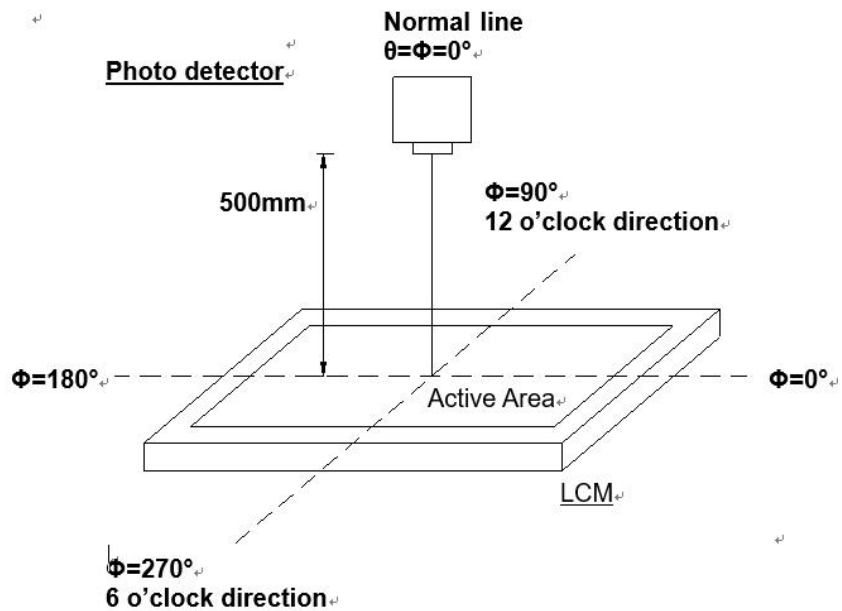
Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface



Definition of viewing angle

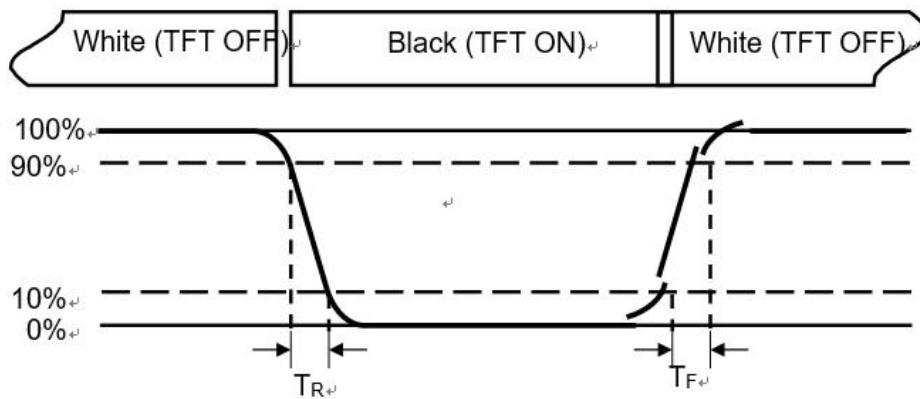
Note 2: Definition of optical measurement system.

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° /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**

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

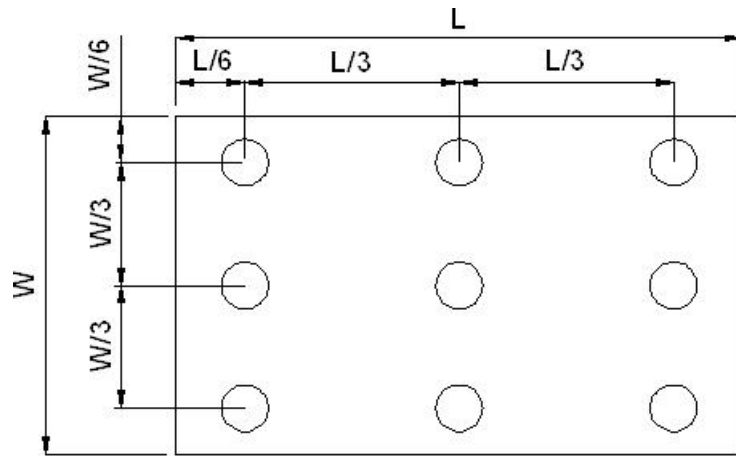
**Note 5: Definition of color chromatically (CIE1931)**

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°C for 96hr	Module (Without Contamination)
2	Low Temperature Storage	T = -20°C for 96hr	
3	High Temperature Operating	T = 50°C for 96hr	
4	Low Temperature Operating	T = 0°C for 96hr (But no condensation of dew)	
5	High Temp. and High Humidity Operating	T = 50°C /90% for 96hr (But no condensation dew)	
6	Thermal Shock	-10±2°C~25~60±2°C×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.

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

**Note1**

<b>Class</b>	Performance
<b>A</b>	All functions perform as designed during and after exposure to interference
<b>B</b>	Temporary degradation or less of performance which is self-recoverable
<b>C</b>	Degradation or less of performance which requires operator intervention or system reset to recover
<b>D</b>	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.

## 11 Quality level

**TBD**

## 12 Package Drawing

### LCM 产品（刀卡类）包装流程图

#### LCM Product(Card Type) Packing Flow Diagram

#### 1.0 包装材料清单请参考 LCM BOM;

Packing BOM: Please Reference the LCM BOM

#### 2.0 包装方法（Packing Procedure）

