
**SPECIFICATION
FOR
LCD Module
TS8050WV002-T**

MODULE:	TS8050WV002-T
CUSTOMER:	

TZD	INITIAL	DATE
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CUSTOMER	INITIAL	DATE
APPROVED BY		

REVISION STATUS

Version	Revise Date	Page	Content	Modified by
V1.0	2019.5.31	-	First Issued.	XIAO

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1. General Description

* DESCRIPTION

TS8050WV002-T is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 5.0" TFT-LCD contains 800X480 pixels, and can display up to 16.7M colors.

* Features

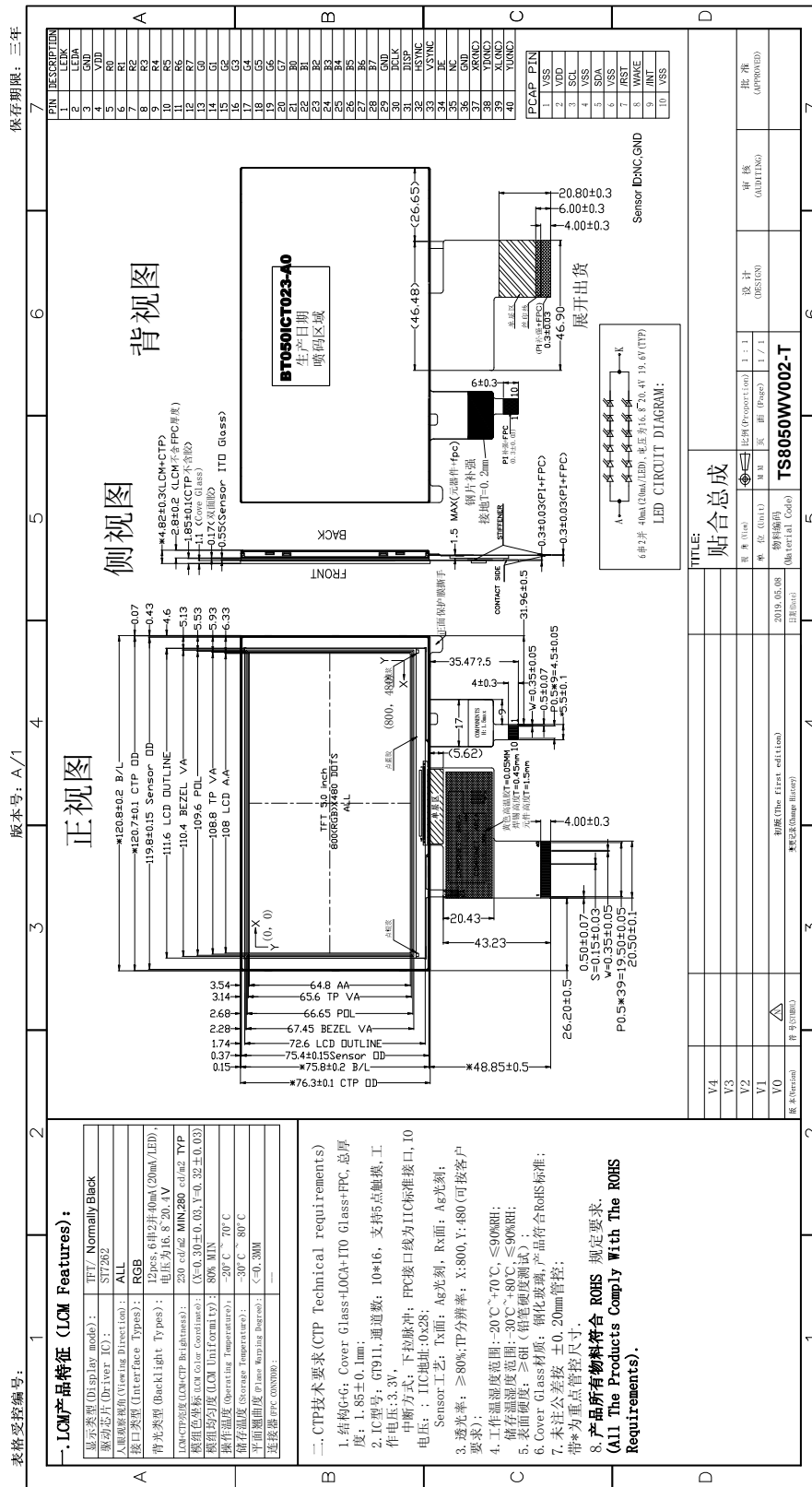
- Low Input Voltage: IOVCC: 1.65~3.3V;VCC: 2.5~3.3V
- Display Colors of TFT LCD: 16.7M colors
- Interface: RGB
- Internal Power Supply Circuit.

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	108(H) *64.8(V) (5.0 inch)	mm	-
Driver element	a-Si TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	800(RGB) *480	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.135(H) *0.135(V)	mm	-
Viewing angle	All(IPS)	o'clock	-
Drive IC	ST7262	-	-
Display mode	Normally black	-	-
Operating temperature	-20~+70	°C	-
Storage temperature	-30~+80	°C	-

Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	120.8	-	mm	±0.2
	Vertical(V)	-	76.3	-	mm	±0.2
	Depth(D)	-	4.82	-	mm	±0.3
Weight		-	TBD	-	g	-

2. MECHANICAL SPECIFICATION



3. Pin Description

Pin NO.	Symbol	Level	Remark
1	LEDK	L	Backlight Cathode
2	LEDA	H	Backlight Anode
3	GND	L	Ground
4	VDD	H	A supply voltage to the digital circuit(2.6-3.3V)
5-12	R0-R7	H/L	Red Data
13-20	G0-G7	H/L	Green Data
21-28	B0-B7	H/L	Blue Data
29	GND	L	Ground
30	DCLK	H/L	Clock signal
31	DISP	H/L	Display control / standby mode selection. DISP = "Low" : Standby; (Default) DISP = "High" : Normal display
32	HSYNC	H/L	Horizontal sync signal
33	VSYSN	H/L	Vertical sync signal
34	DE	H/L	Data input enable.
35	NC		Not Connect
36	GND	L	Ground
37	XR		TOUCH PANNEL XR
38	YD		TOUCH PANNEL YD
39	XL		TOUCH PANNEL XL
40	YU		TOUCH PANNEL YU

CTP

NO.	Symbol	remark
1	VSS	Ground
2	VDD	Power supply
3	SCL(3.3V)	Serial data input pin
4	VSS	Ground
5	SDA(3.3V)	Serial data input pin
6	VSS	Ground
7	RST	Hardware reset pin
8	WAKE	WAKE PIN
9	INT(3.3V)	Interrupt pin
10	VSS	Ground

4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min	Max.		
Supply Voltage for Logic circuit	IOVCC	1.65	3.3	V	
Supply Voltage for analog circuit	Vcc	-0.3	3.6	V	

4.2 DC ELECTRICAL CHARACTERISTICS

4.2.1 OPERATING CONDITIONS

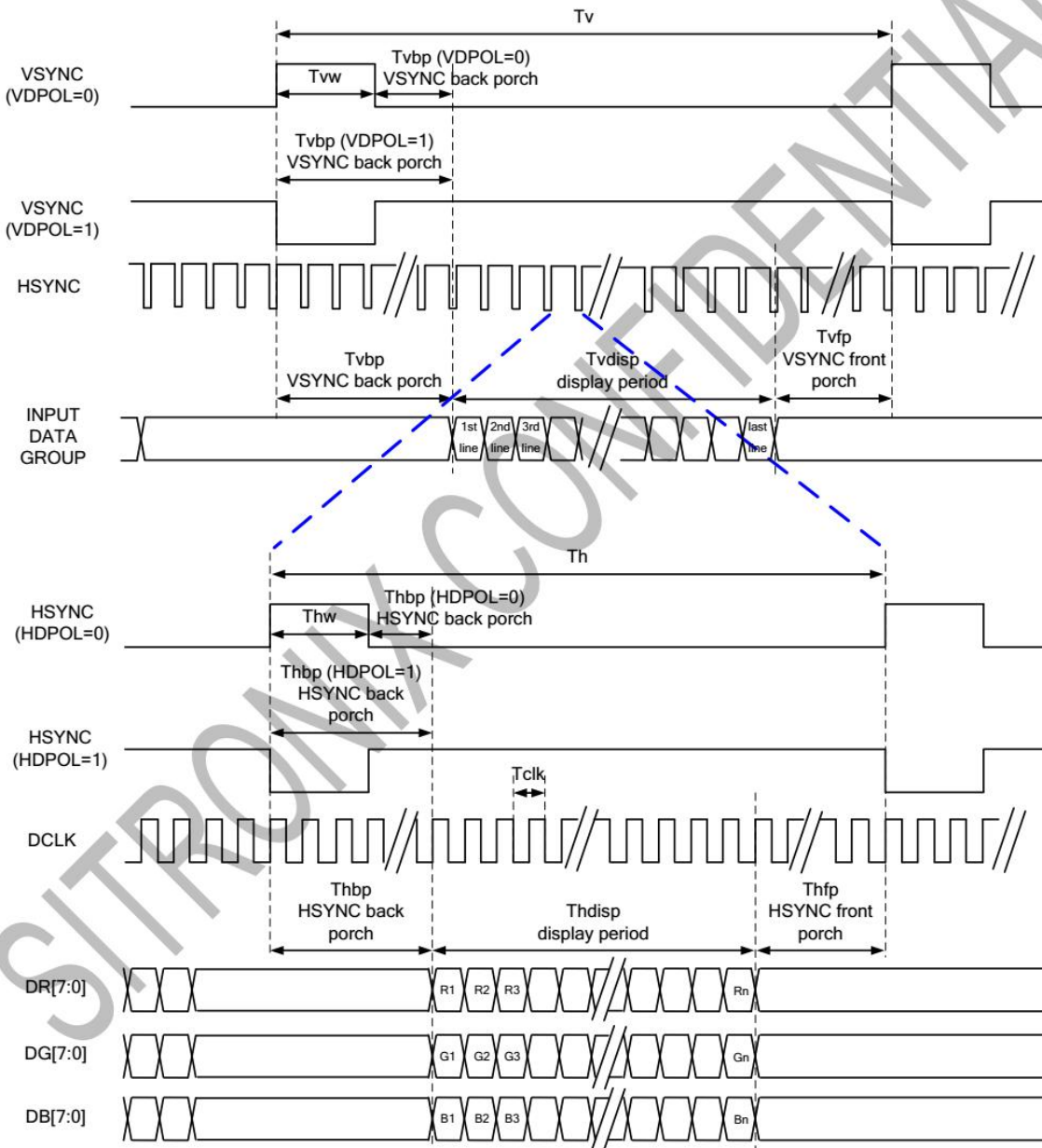
Typical Operating Conditions (Ta=25°C)

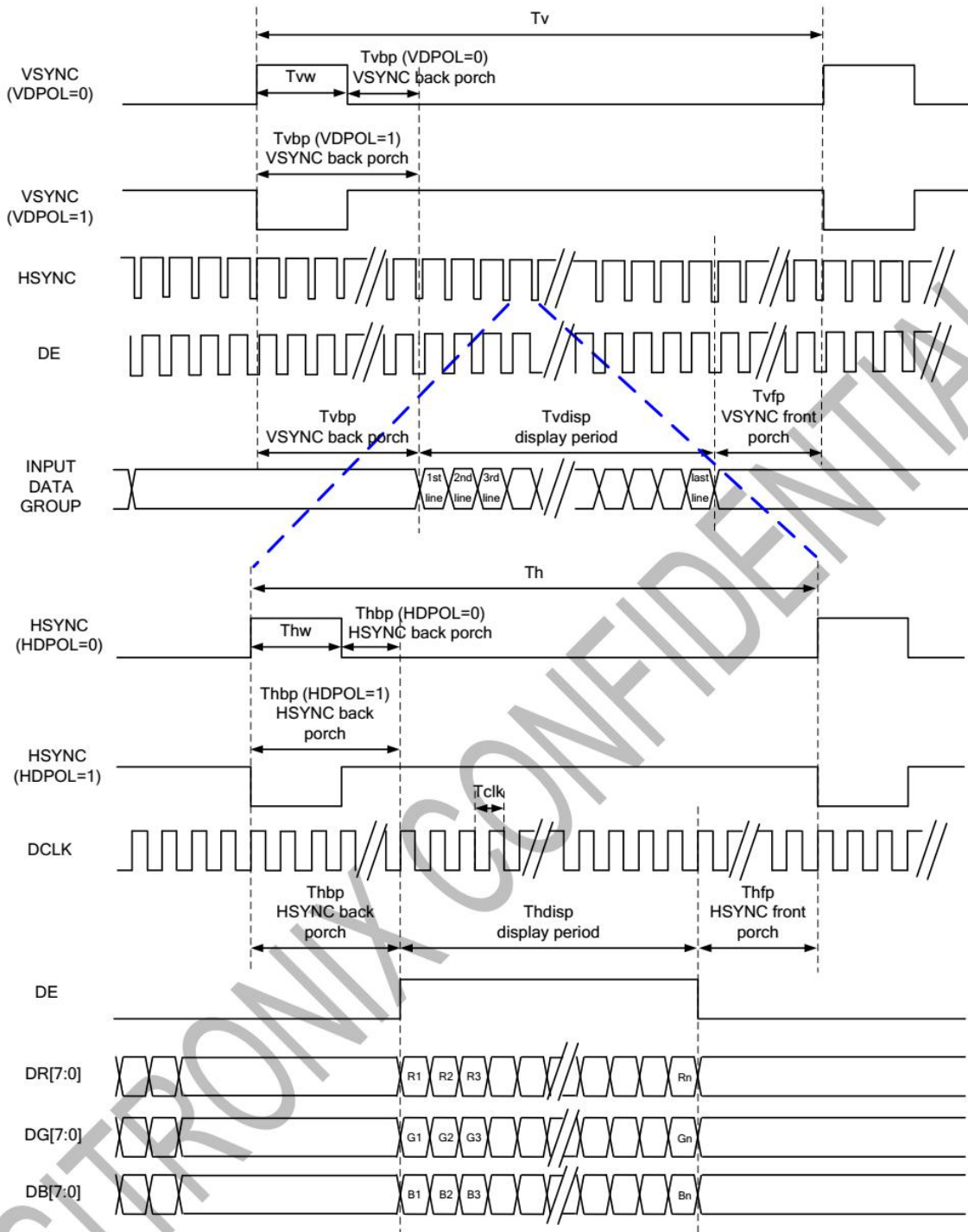
Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Power Supply	Vcc	2.5	2.8	3.3	V	
Power Supply	IOVCC	1.65	1.8	2.0	V	
Normal mode Current consumption	Icc	-	35	-	mA	VCC=2.8V
TFT Gate ON Voltage	VGH	-	15	-	V	
TFT Gate OFF Voltage	VGL	-	-10	-	V	

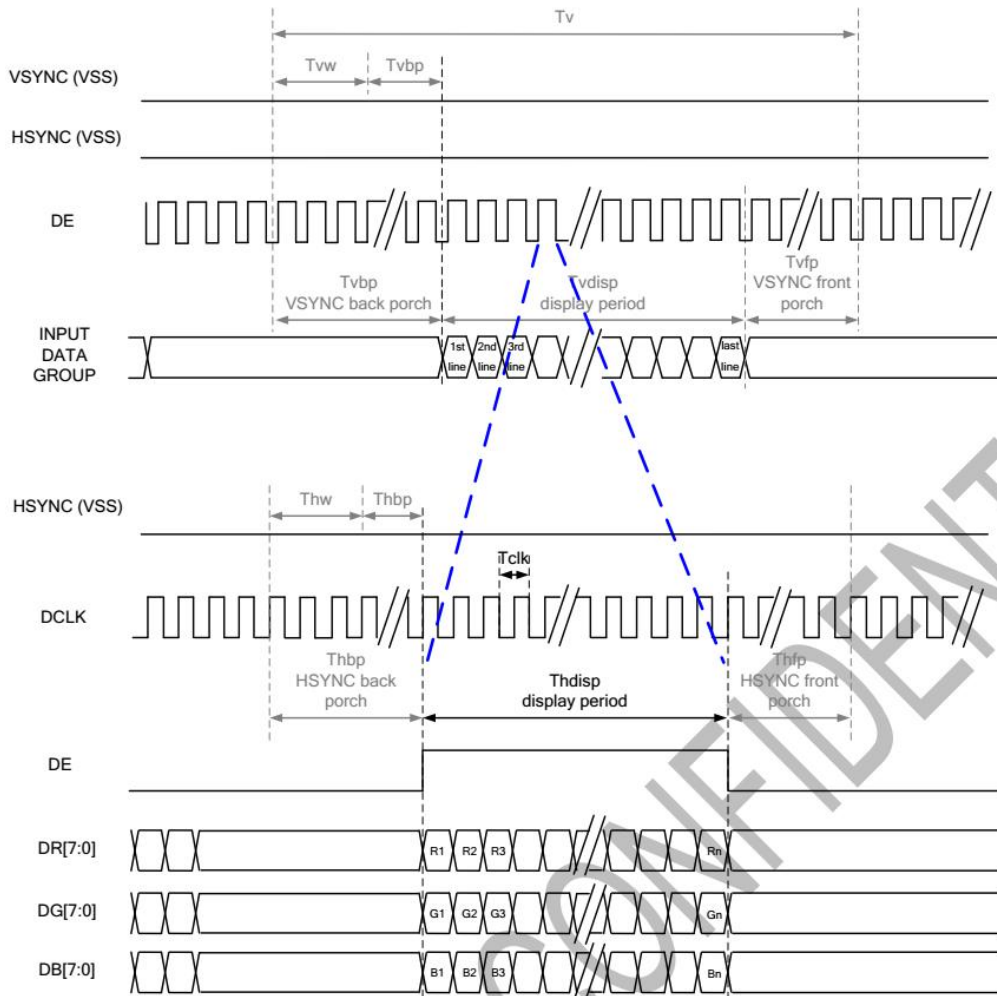
4.2.2 BACKLIGHT UNIT (GND=0V)

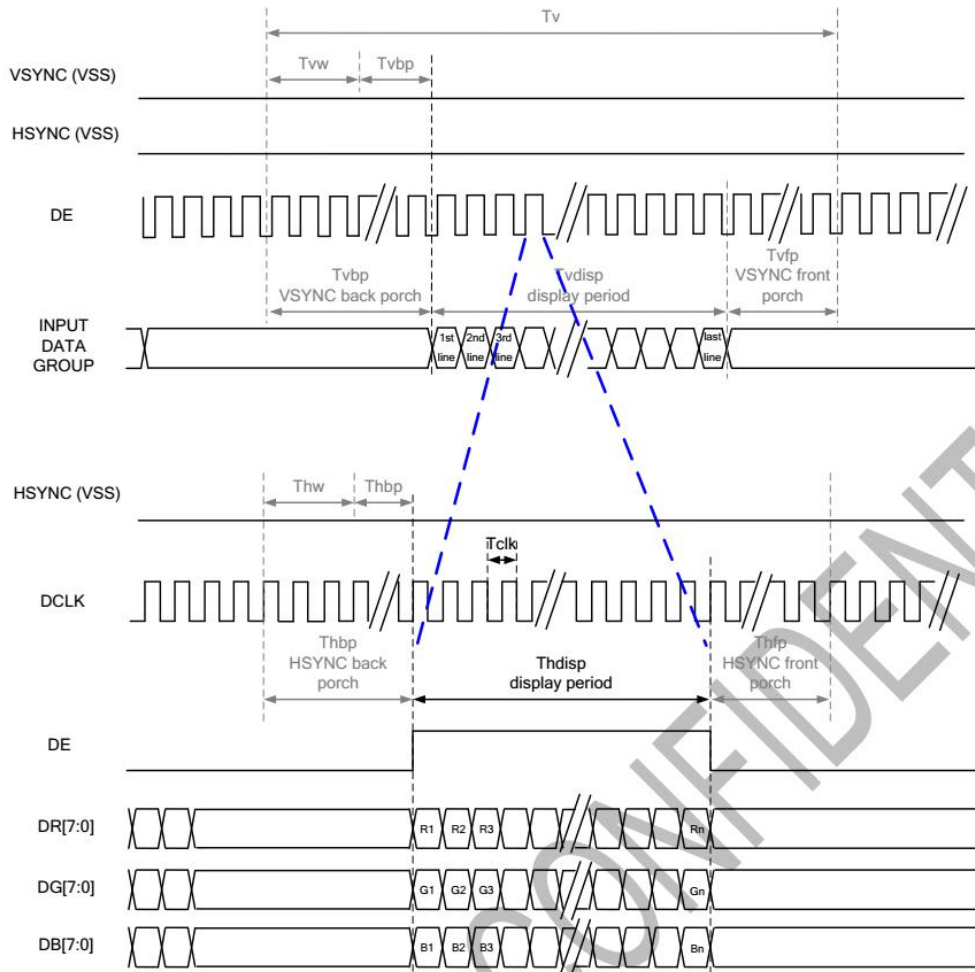
Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Forward supply Voltage	Vf	16.8	-	20.4	V	
Forward supply Current	If	-	40	-	mA	
LCM Luminance	Lv	230	280	-	cd/m2	I _B =40mA
Uniformity	/	80			%	-

4.3 Interface Characteristics







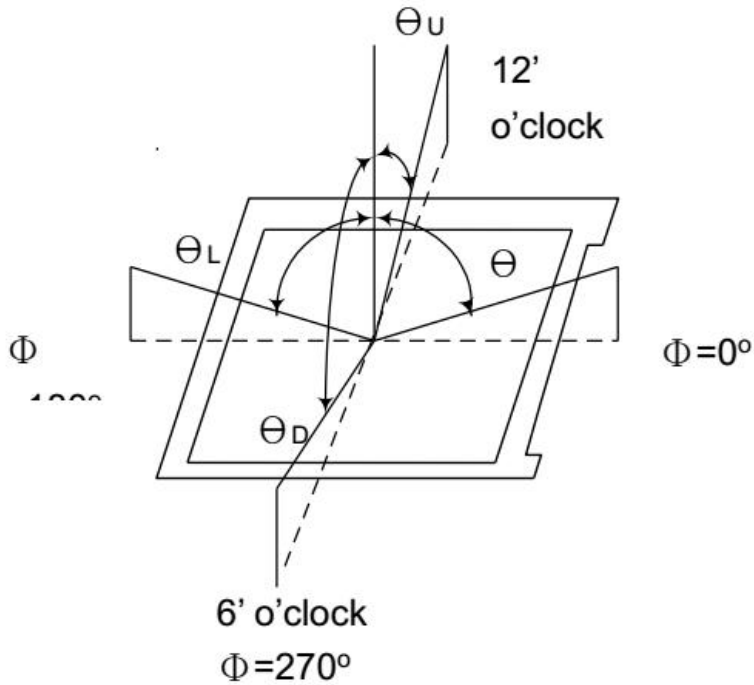


5. OPTICAL CHARACTERISTICS

(LCD optical characteristics)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Transmittance (with Polarizer)	T (%)	$\Theta=0$ Normal viewing angle	—	(4.8)	—	%	Measuring with normal polarizer , Reference Only Base on $V_{op}=5.1V$	
Transmittance (without Polarizer)	T (%)		—	(16.2)	—	%		
Contrast Ratio	CR		(800)	(1000)	—	—	(1)(2)	
Response Time	T_{R+T_F}		—	30	40	msec	(1)(3)	
Color Gamut	(%)		45	50	—	%	C-light	
Color Chromaticity (CIE1931)	White		W_x	—	(0.320)	—	—	(1)(4) CF glass C-light
			W_y	—	(0.345)	—	—	
	Red		R_x	—	(0.629)	—	—	
			R_y	—	(0.326)	—	—	
	Green		G_x	—	(0.337)	—	—	
		G_y	—	(0.546)	—	—		
	Blue	B_x	—	(0.136)	—	—		
		B_y	—	(0.143)	—	—		
Viewing Angle	Hor.	Θ_L	70	80	—	—	(1)(4) Measuring with normal polarizer , Reference Only	
		Θ_R	70	80	—			
	Ver.	Θ_U	70	80	—			
		Θ_D	70	80	—			
Optima View Direction			Free				(5)	

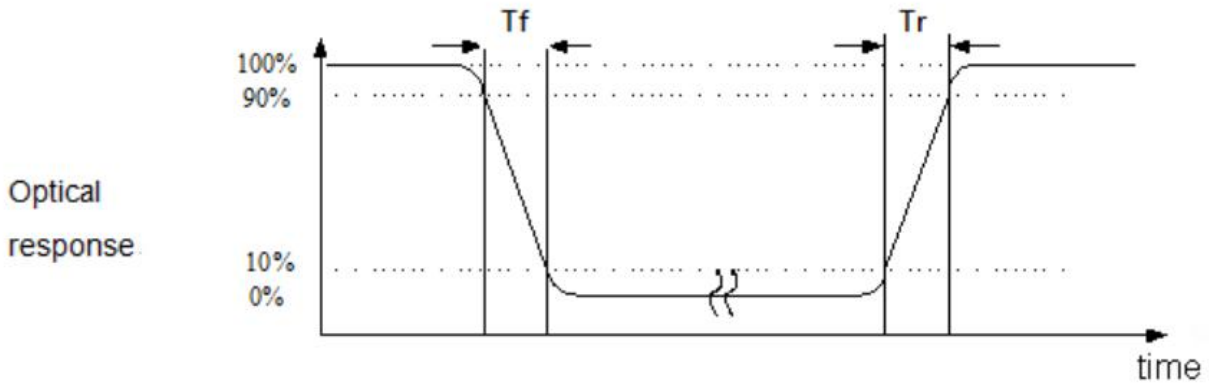
Note (1) Definition of Viewing Angle:



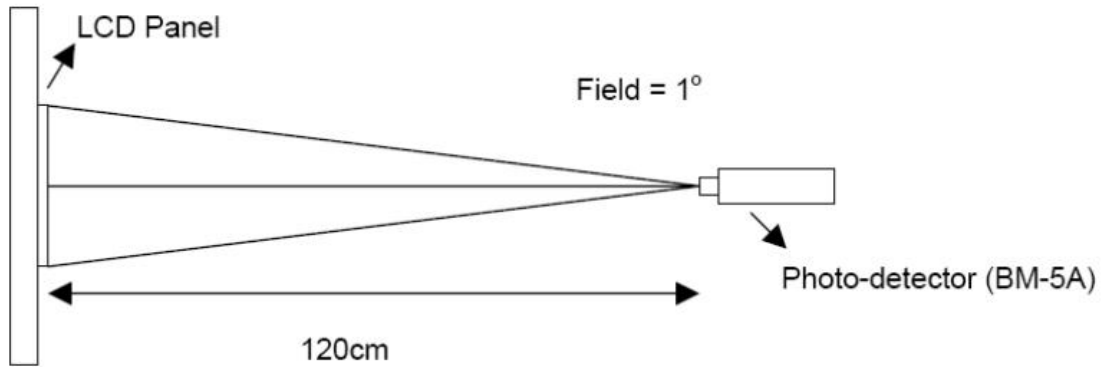
Note (2) Definition of Contrast Ratio (CR) :
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

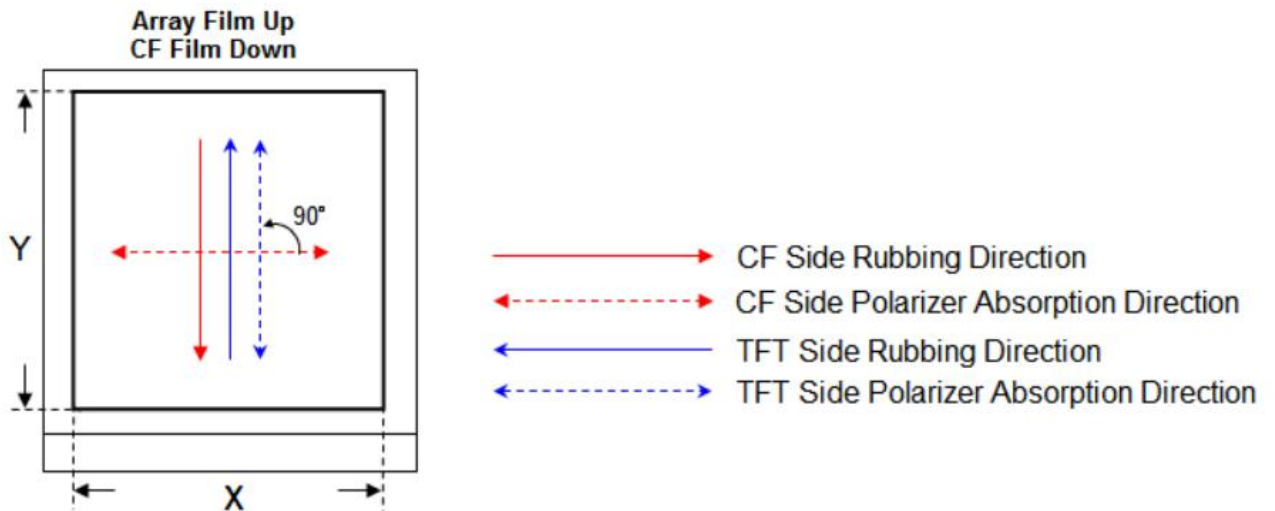
Note (3) Definition of Response Time : Sum of T_R and T_F



Note (4) Definition of optical measurement setup



Note (5) Rubbing Direction & Polarizer Absorption Direction

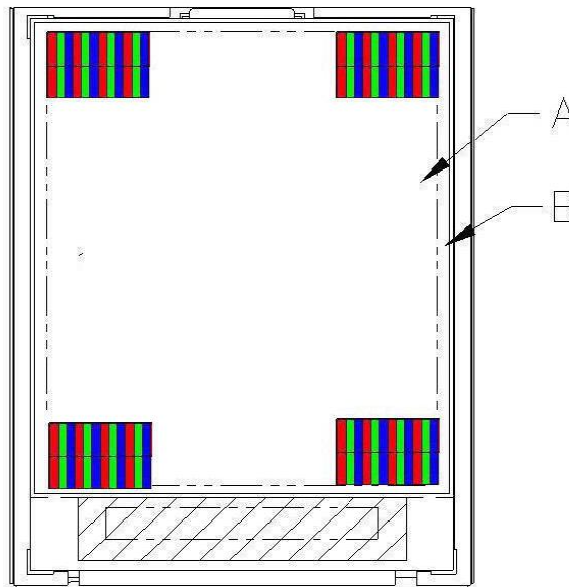


6. QUALITY SPECIFICATIONS

6.1 INSPECTION CONDITION

- (1) Inspect under 300~500Lux fluorescent light, leaving 30~35cm between panels and eyes, and between panels and lights.
- (2) Inspection condition is $23\pm 5^{\circ}\text{C}$, $50\pm 20\%\text{RH}$ maximum.



6.2 DEFINITION OF AREA

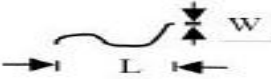
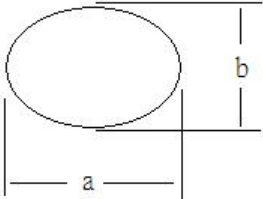


A Area : Viewing area.

B Area : Out of viewing.(outside viewing area)

6.3 INSPECTION SPECIFICATION

NO	Item	Acceptable specification	Judgment Criterion
1	Electrical Testing	<p>1-1 sub pixel classification</p> <ul style="list-style-type: none"> ● Sub Pixel: Number of sub pixel doesn't exceed one dot. <div style="text-align: center;">  <p>Sub Pixel (Dot)</p> </div> <p>a > Dark dot ----one Allowed b > Bright dot ---- one Allowed</p> <ul style="list-style-type: none"> ● Pixel : Three dots link together doesn't exceed ones <div style="text-align: center;">  <p>Pixel</p> </div> <p>1-2 Leakage to light</p> <ul style="list-style-type: none"> ● Leakage to light be not allowed. <p>1-3 Picture to shake</p> <ul style="list-style-type: none"> ● Picture had shake, twinkle and noise etc. instable of defect that be not allowed. <p>1-4 Function</p> <ul style="list-style-type: none"> ● No display or No function. ● Source Line, Gate Line. ● Contrast Ratio ● Current consumption exceeds product specifications. ● Display malfunction. 	<p>N ≦ 2</p> <p>N ≦ 0</p> <p>N=0</p> <p>N=0</p> <p>N=0</p>
2	Mechanical Dimension	<p>2-1 Mechanical Dimension exceeds product specifications.</p> <p>2-2 Out of frame and boss of plastic changed shape that be not allowed.</p>	N=0

NO	Item	Acceptable specification	Judgment Criterion																		
3	Cosmetic Inspection	<p>3-1 Blemish: Line shapes of defect</p> <table border="1" data-bbox="363 353 1313 707"> <thead> <tr> <th>Length</th> <th>Width</th> <th>Acceptable number</th> <th>Mini. space</th> </tr> </thead> <tbody> <tr> <td>---</td> <td>$W \leq 0.05$</td> <td>Ignore</td> <td rowspan="3">5 m m</td> </tr> <tr> <td>$L \leq 3.0$</td> <td>$0.05 < W \leq 0.08$</td> <td>4</td> </tr> <tr> <td>$L \leq 3.0$</td> <td>$0.08 < W \leq 0.15$</td> <td>3</td> </tr> <tr> <td>--</td> <td>$W > 0.15$</td> <td>Not allowed</td> <td>---</td> </tr> </tbody> </table> <p>L: length(mm) W: width(mm)</p> 	Length	Width	Acceptable number	Mini. space	---	$W \leq 0.05$	Ignore	5 m m	$L \leq 3.0$	$0.05 < W \leq 0.08$	4	$L \leq 3.0$	$0.08 < W \leq 0.15$	3	--	$W > 0.15$	Not allowed	---	
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		--	$W > 0.15$	Not allowed	---																
		<p>3-2 Blemish: dot shapes of defect.</p> <table border="1" data-bbox="435 965 1281 1200"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Mini. Space</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.15$</td> <td>Ignore</td> <td>---</td> </tr> <tr> <td>$0.15 < \Phi \leq 0.20$</td> <td>3</td> <td rowspan="2">5 m m</td> </tr> <tr> <td>$0.20 < \Phi \leq 0.30$</td> <td>2</td> </tr> <tr> <td>$\Phi > 0.30$</td> <td>0</td> <td>---</td> </tr> </tbody> </table>	Dimension	Acceptable number	Mini. Space	$\Phi \leq 0.15$	Ignore	---	$0.15 < \Phi \leq 0.20$	3	5 m m	$0.20 < \Phi \leq 0.30$	2	$\Phi > 0.30$	0	---					
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<p>3-3 Polarizer Bubble</p> <table border="1" data-bbox="435 1272 1281 1435"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Mini. Space</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.25$</td> <td>Ignore</td> <td>---</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.35$</td> <td>3</td> <td>15 m m</td> </tr> <tr> <td>$\Phi > 0.35$</td> <td>0</td> <td>---</td> </tr> </tbody> </table>	Dimension	Acceptable number	Mini. Space	$\Phi \leq 0.25$	Ignore	---	$0.25 < \Phi \leq 0.35$	3	15 m m	$\Phi > 0.35$	0	---									
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$\Phi > 0.35$	0	---																			
<p>Foreign Substances</p>  <p style="text-align: right;">$\Phi = (a+b)/2$</p>																					

NO	Item	Acceptable specification	Judgment Criterion			
3	Cosmetic Inspection	3-4 Scratch ● Sensate scratch not allowed. ● Impassive scratch as below. <div style="text-align: right; color: red;">Unit:mm</div>				
		Length		Width	Acceptable number	Mini. space
		-----		$W \leq 0.05$	Ignore	5 m m
		$L \leq 3.0$		$0.05 < W \leq 0.08$	4	
		$L \leq 3.0$		$0.08 < W \leq 0.15$	3	
		----		$0.15 < W$	Not allowed	---
		$L > 3.0$		----	Not allowed	
4	Package	4-1 Mixed product types 4-2 Shipping q'ty should be the same as "shipping notice form" q'ty. 4-3 Outer box can't broken.	N=0			
5	LCD Mura	LCD Mura according to ND 5% keep out to determine, if keep out distance at 30cm be seen by eyes is NG, otherwise will be ok if invisible.				

7. RELIABILITY

Test Item	Test Condition
High Temperature Operation	70°C for 96 hours
Low Temperature Operation	-20°C for 96 hours
High Temperature Storage	80°C for 96 hours
Low Temperature Storage	-30°C for 96 hours
High Temperature Operation Humidity Operation	60°C, 90%RH for 72 hours
Thermal Shock	-10°C (30min) ~+25°C (5min)~ +60°C (30min) for 10 cycles
Vibration Test (No Operation)	Frequency: 10~55Hz Amplitude:1.0mm Sweep Time: 11min Test Period: 6 Cycles for each direction of X, Y, Z
Static electricity test	Touch 4KV,air touch 8KV

8. HANDLING PRECAUTION

8.1 SAFETY

- (1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
- (2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

8.2 STORAGE CONDITIONS

- (1) Store the panel or module in a dark place where the temperature is $23\pm 5^{\circ}\text{C}$ and the humidity is below $50\pm 20\% \text{RH}$.
- (2) Store in anti-static electricity container.
- (3) Store in clean environment, free from dust, active gas, and solvent.
- (4) Do not place the module near organics solvents or corrosive gases.
- (5) Do not crush, shake, or jolt the module.

8.3 HANDLING PRECAUTIONS

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- (6) Do not use ketonic solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.

8.4 WARRANTY

- 1) The period is within twelve months since the date of shipping out under normal using and storage conditions.
- 2) According to Techstar TFT LCD quality standard, Techstar will rework or exchange for functional defect goods since within one year.