SPECIFICATION
FOR
LCD Module

TNS-G480272RGDSW-2W

MODULE	
CUSTOMER:	

TZD	**INITIAL**	**DATE**
PREPARED BY		
APPROVED BY	刘若峰	

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REVISION STATUS

Version	Revise Date	Page	Content	Modified by
		-		

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1.General Description

*DESCRIPTION

TNS-G480272RGDSW-2W 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 4.3" TFT-LCD contains 480×272 pixels, and can display up to 16.7M colors.

*** Features**

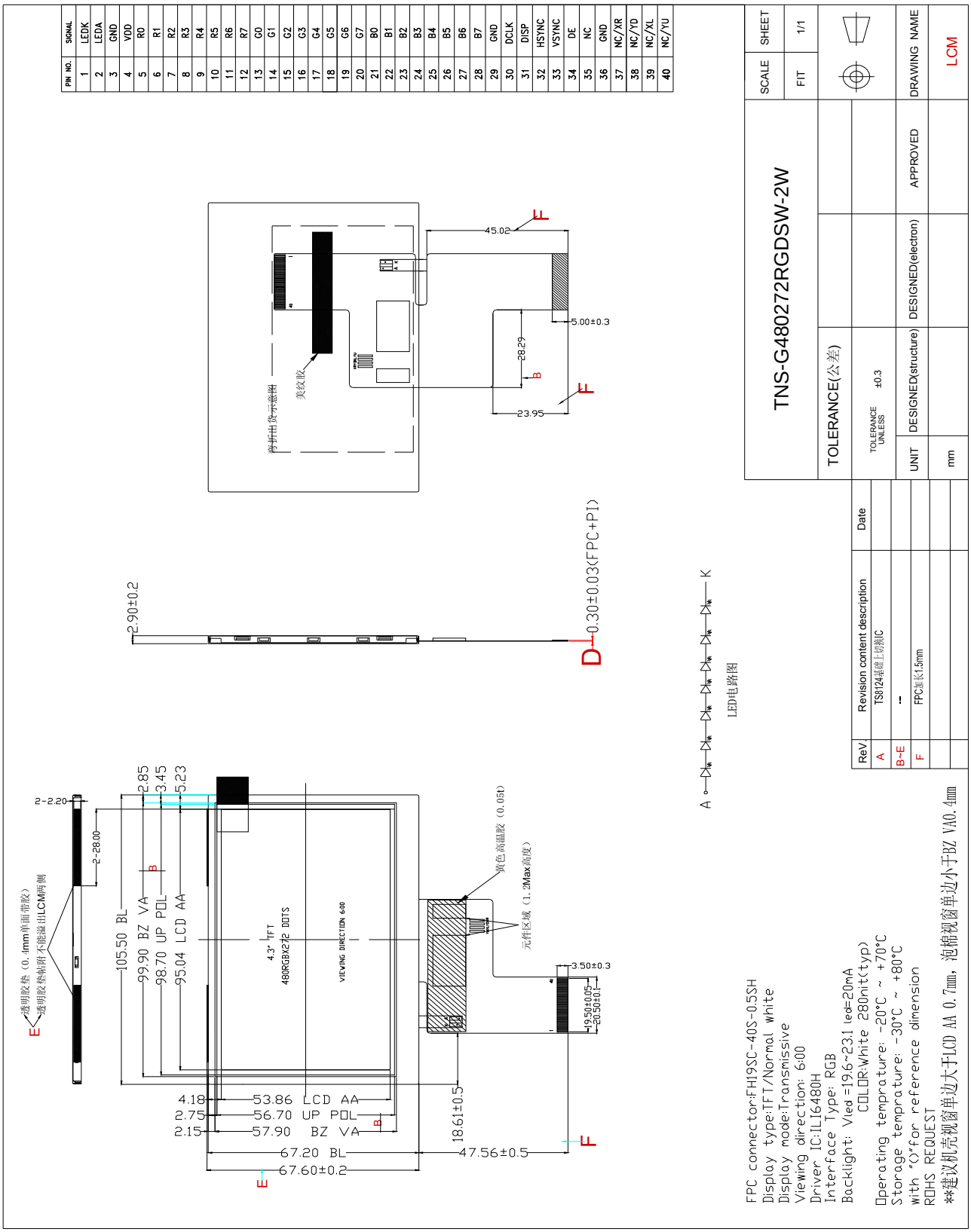
-Low Input Voltage: VCC: 2.7~3.6V
-Display Colors of TFT LCD: 16.7M colors
-RGB Interface: 24 bit
-Internal Power Supply Circuit.

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	95.04(H) *53.86(V) (4.3 inch)	mm	-
Driver element	a-Si TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	480(RGB) *272	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.198(H) *0.198(V)	mm	-
Viewing angle	6	o'clock	-
Drive IC	ILI6480H	-	-
Display mode	Transmissive/ Normally White	-	-
Operating temperature	-20～+70	℃	-
Storage temperature	-30～+80	℃	-

Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	105.5	-	mm	-
	Vertical(V)	-	67.2	-	mm	-
	Depth(D)	-	2.9	-	mm	-
Weight		-	TBD	-	g	-

2. Mechanical Specification



3. PIN DESCRIPTION

PIN No.	SYMBOL	LEVEL	DESCRIPTION
1	LEDK	L	Back light-
2	LEDA	H	Back light+
3	GND	H	power ground
4	VDD	H	power supply(2.7-3.6V)
5-12	R0-R7	H/L	Red data bus
13-20	G0-G7	H/L	Green data bus
21-28	B0-B7	H/L	Blue data bus
29	GND	L	power ground
30	DCLK	H/L	Pixel clock signal pin
31	DISP	H/L	connected to VDDIO in normal operation mode. connected to GND, the IC is in standby mode.
32	HSYNC	H/L	Horizontal sync.
33	VSYNC	H/L	Vertical sync.
34	DE	H/L	Data enable signal
35	NC		Not connection
36	GND	L	power ground
37	XR	H/L	Touch Panel Pin
38	YD	H/L	Touch Panel Pin
39	XL	H/L	Touch Panel Pin
40	YU	H/L	Touch Panel Pin

4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
	VDD	0.3	--	3.6	V	

4.2 DC ELECTRICAL CHARACTERISTICS

4.2.1 OPERATING CONDITIONS

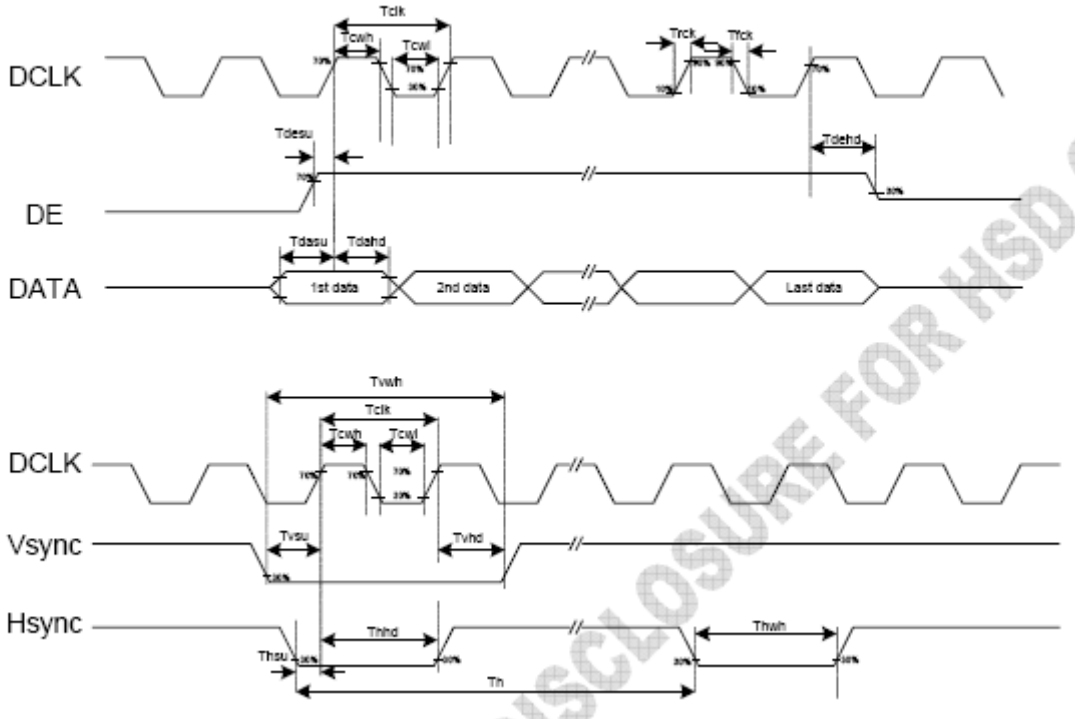
Typical Operating Conditions (Ta=25℃)

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Power Supply	VCC	2.7	3.3	3.6	V	
Normal mode Current consumption	Icc	-	25	-	mA	V_{CC}=2.8V
TFT Gate ON Voltage	V_{GH}		15		V	
TFT Gate OFF Voltage	V_{GL}		-10	-16	V	

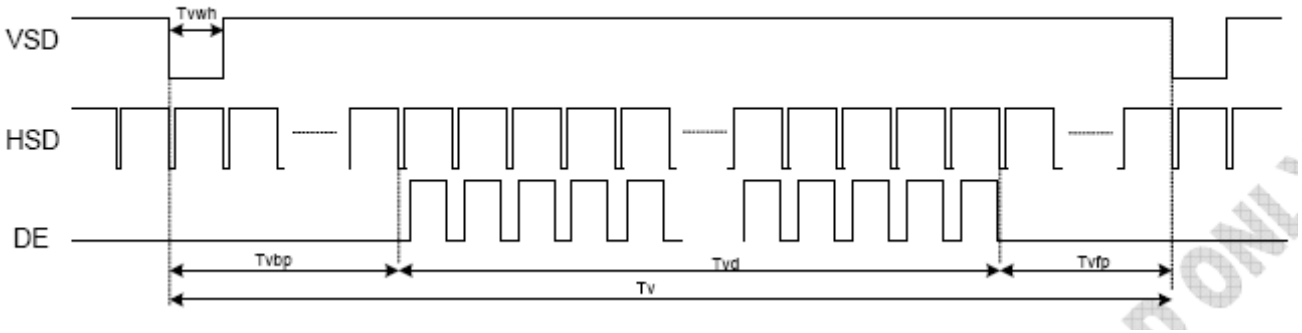
4.2.2 BACKLIGHT UNIT (GND=0V)

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Forward supply Voltage	V_f	--	20	--	V	
Forward supply Current	I_f	19.6	23.1	-	mA	
LCM Luminance	L_v	--	280	-	cd/m2	I_B=20mA
Uniformity	/	80			%	-

4.3 RGB TIMING CHARACTERISTICS

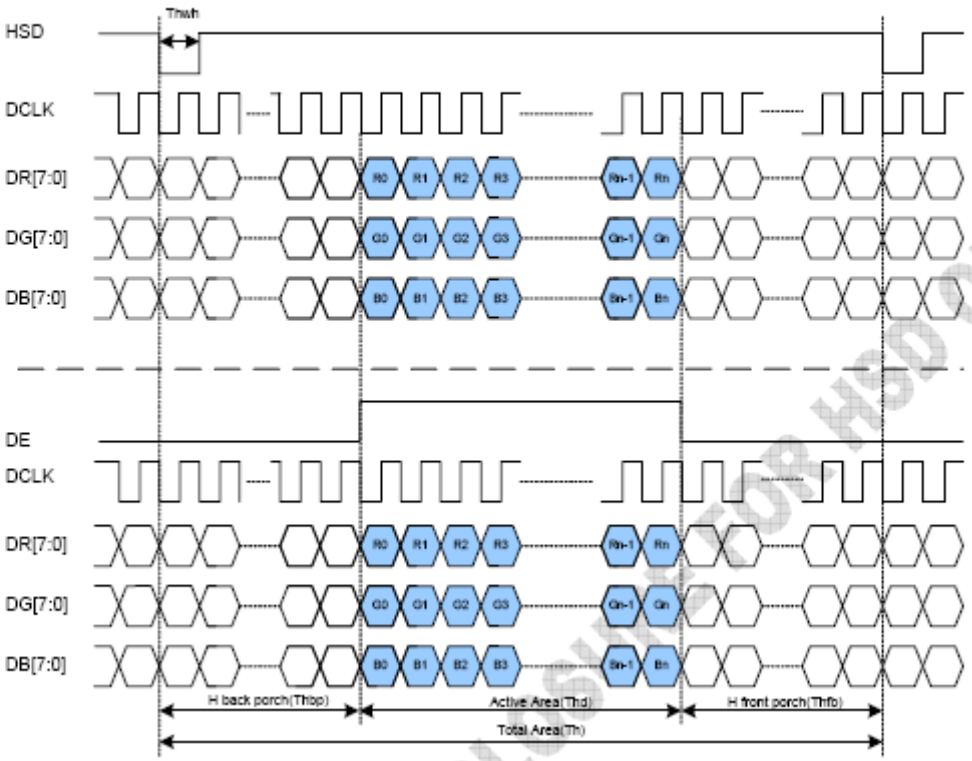


Vertical input timing



Parallel RGB Mode Data format

(HV Mode)



(DE Mode)

Parallel RGB input timign 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	93	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

5. OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Threshold voltage		Vsat		—	2.4	—		(1)
		Vth		—	1.4	—		(1)
Transmittance (Without PZ)		T		—	19.1	—	%	
Contrast		CR	Θ=0 Normal viewing angle	480	600	—		(2)(3)
Response time	Rising	T_R		—	3	6	msec	(2)(4)
	Falling	T_F		—	7	14		
Color gamut		S		—	50	—	%	C light
Color chromaticity (CIE1931)	White	W_x		0.292	0.307	0.322		(2)(5) CF Glass C light
		W_y		0.333	0.348	0.363		
	Red	Rx		0.616	0.631	0.646		
		Ry		0.327	0.342	0.357		
	Green	Gx		0.306	0.321	0.336		
		Gy		0.538	0.553	0.568		
	Blue	Bx		0.134	0.149	0.164		
		By		0.168	0.183	0.198		
Viewing angle (With EWV PZ)	Hor.	Θ_L	CR>10	65	75	—		
		Θ_R		65	75	—		
	Ver.	Θ_U		50	60	—		
		Θ_D		60	70	—		
Optima View Direction		6 O' clock						(6)

Measuring Condition

- Measuring surrounding: dark room
- Ambient temperature: 25±2°C
- 15min. warm-up time.

Measuring Equipment

- FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.
- Measuring spot size: 20 ~ 21 mm

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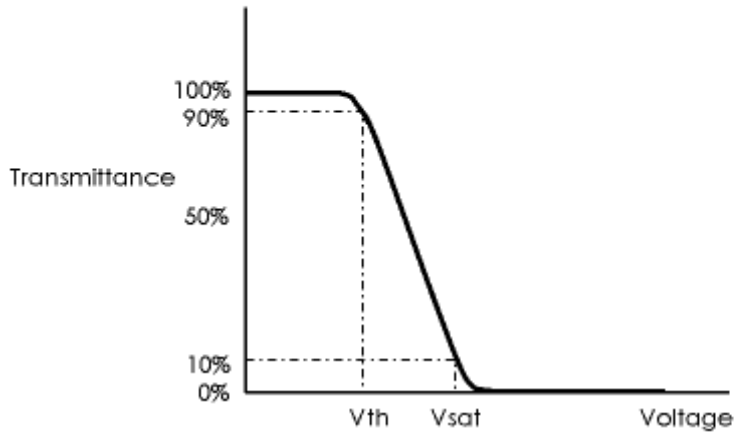
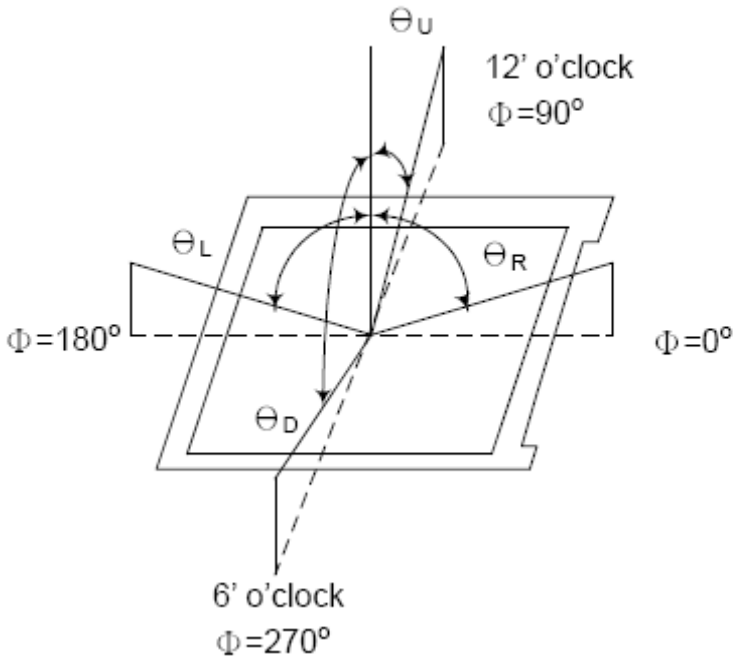
Note (1) Definition of Vth and Vsat (at 20℃)



Note (2) Definition of Viewing Angle:



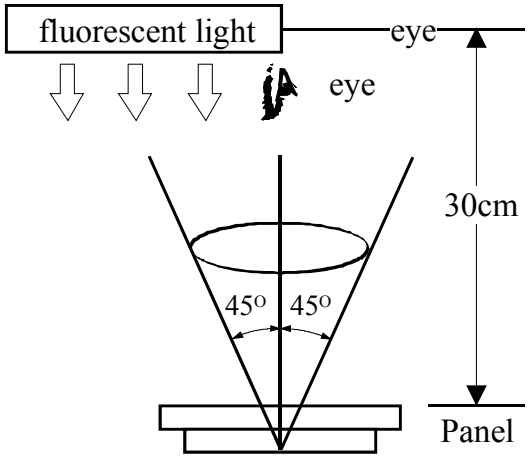
Note (3) Definition of Contrast Ratio (CR):
measured at the center point of panel

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

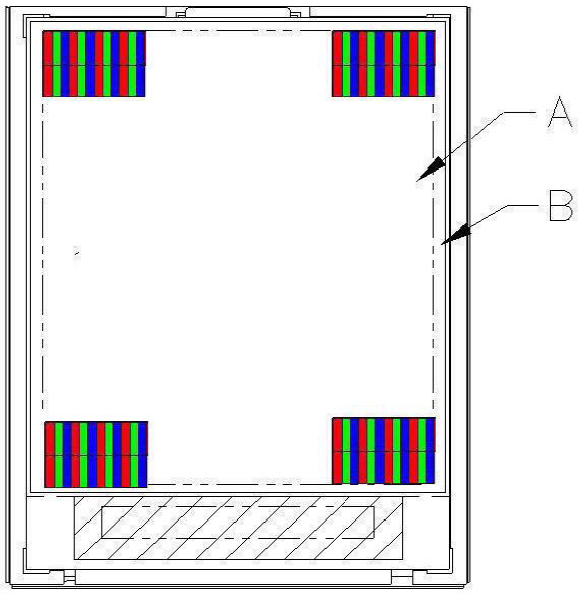
6. QUALITY SPECIFICATIONS

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±5°C, 50±20%RH maximum.

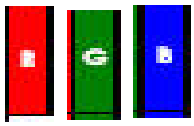
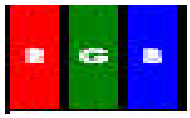


6.2 DEFINITION OF AREA

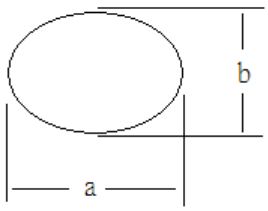


A Area : Viewing area.
B Area : Out of viewing.(outside viewing area)

6.3 INSPECTION SPECIFICATION

NO	Item	Acceptable specification	Judgment Criterion
1	Electrical Testing	**1-1 sub pixel classification** ● Sub Pixel: Number of sub pixel doesn't exceed one dot.  Sub Pixel (Dot) a> Dark dot ----one Allowed b> Bright dot ---- one Allowed	N≦1
		● Pixel : Three dots link together doesn't exceed ones  Pixel	N≦0
		1-2 Leakage to light ● Leakage to light be not allowed.	N=0
		1-3 Picture to shake ● Picture had shake, twinkle and noise etc. instable of defect that be not allowed.	N=0
		1-4 Function ● No display or No function. ● Source Line, Gate Line. ● Contrast Ratio ● Current consumption exceeds product specifications. ● Display malfunction.	N=0
2	Mechanical Dimension	2-1 Mechanical Dimension exceeds product specifications. 2-2 Out of frame and boss of plastic changed shape that be not allowed.	N=0

<table>
<tr><th>NO</th><th>Item</th><th>Acceptable specification</th><th>Judgment Criterion</th></tr>
<tr><td>3</td><td>Cosmetic Inspection</td><td>
3-1 Blemish: Line shapes of defect
<table>
<tr><th>Length</th><th>Width</th><th>Acceptable number</th><th>Mini. space</th></tr>
<tr><td>---</td><td>W≦0.03</td><td>Ignore</td><td rowspan="3">5 m m</td></tr>
<tr><td>L≦2.5</td><td>0.03<W≦0.05</td><td>3</td></tr>
<tr><td>L≦2.5</td><td>0.05<W≦0.1</td><td>2</td></tr>
<tr><td>--</td><td>W＞0.1</td><td>Not allowed</td><td>---</td></tr>
</table>
L: length(mm)
W: width(mm)


3-2 Blemish: dot shapes of defect.
<table>
<tr><th>Dimension</th><th>Acceptable number</th><th>Mini. Space</th></tr>
<tr><td>Φ≦0.10</td><td>Ignore</td><td>---</td></tr>
<tr><td>0.10＜Φ≦0.15</td><td>2</td><td rowspan="2">5 m m</td></tr>
<tr><td>0.15＜Φ≦0.25</td><td>1</td></tr>
<tr><td>Φ＞0.25</td><td>0</td><td>---</td></tr>
</table>
3-3 Polarizer Bubble
<table>
<tr><th>Dimension</th><th>Acceptable number</th><th>Mini. Space</th></tr>
<tr><td>Φ≦0.20</td><td>Ignore</td><td>---</td></tr>
<tr><td>0.20＜Φ≦0.30</td><td>2</td><td>15 m m</td></tr>
<tr><td>Φ＞0.30</td><td>0</td><td>---</td></tr>
</table>
Foreign Substances


Φ=(a+b)/2
</td><td></td></tr>
</table>

<table>
<tr><th>NO</th><th>Item</th><th>Acceptable specification</th><th>Judgment Criterion</th></tr>
<tr><td>3</td><td>Cosmetic Inspection</td><td>
3-4 Scratch
● Sensate scratch not allowed.
● Impassive scratch as below.
Unit:mm
<table>
<tr><th>Length</th><th>Width</th><th>Acceptable number</th><th>Mini. space</th></tr>
<tr><td>-----</td><td>W≦0.03</td><td>Ignore</td><td rowspan="3">5 m m</td></tr>
<tr><td>L≦2.5</td><td>0.03<W≦0.05</td><td>3</td></tr>
<tr><td>L≦2.5</td><td>0.05<W≦0.1</td><td>2</td></tr>
<tr><td>----</td><td>0.1＜W</td><td>Not allowed</td><td rowspan="2">---</td></tr>
<tr><td>L>2.5</td><td>----</td><td>Not allowed</td></tr>
</table>
</td><td></td></tr>
<tr><td>4</td><td>Package</td><td>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.</td><td>N=0</td></tr>
</table>

7. RELIABILITY

测试项目 test item	选项 Options	使用仪器 equipment	测试条件和要求 test condition
操作温度			高温+70℃ 96 小时
			低温-20℃ 96 小时
高温储存			高温+80℃ 96小时（置常温2H后测试）
低温储存			低温-30℃ 96 小时（置常温2H后测试）
恒温恒湿			60℃ 90%RH 96HRS
振　动			时间：每个方向振动三十分钟(X,Y,Z)频率：10 Hz～55Hz～10 Hz (1 min)振幅：1.5mm
冷热冲击			-20℃(30mins) 25℃(5mins)+70℃(30mins) 10 cycles
FPC弯折测试			LCM FPC 弯折区 180 度弯折 200 次
ESD			接触放电：±4kV 空气放电：±8kV
常温老化			常温通电老化 96H
FPC拉力测试			FPC 金手指长度×0.62 kg=拉力值（大于此值）为OK，反之视为：NG

8. HANDLING PRECAUTION

8.1 SAFETY

(1) Do not swallow any liquid crystal, even if there is no proof that liquid stal 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±5℃ and thehumidity is below 50±20%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 ketonics solvent & Aromatic solvent, use with a soft cloth soaked with acleaning 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

The period is within twelve months since the date of shipping out under normal using and storage conditions.