

INDUSTRIAL STRENGTH... Start Your Application From YOURITECH

Integration support

Obsolescence Management

PCAP

Embedded Systems

Human Machine Interface

Touch Solutions

Software

Quality Management

Open Frame Monitors

LCD Controller

Research & Development

Firmware

EMC tests

on-site service

Optical Bonding

In-house Manufacturing

Cover glass

System solutions

OEM Solutions

Custom Display

Production Custom designs Installation

Mechanical design



To :

Date :

TFT LCD

ET035WT01-GM

ACCEPTED BY :

C01

APPROVED BY	CHECKED BY	PREPARED BY



REVISION STATUS

[illegible]

CONTENTS

NO.	Items	Page
1.0	Overview	1
2.0	Absolute Maximum Ratings	2
3.0	ELECTRICAL CHARACTERISTICS	3
4.0	INTERFACE CONNECTION	5
5.0	SIGNAL TIMING SPECIFICATION	6
6.0	Mechanical Characteristics	7
7.0	POWER ON/OFF SEQUENCE	8
8.0	OPTICAL SPECIFICATION	11
9.0	Reliability test item	12
10.0	WARRANTY	13
11.0	Product Inspection Criteria	14



1.OVERVIEW

ET035WT01-GM is a 3.5-inch LCD Cell with thin film transistors as active elements and contains 640 X 480 pixels. Each pixel is divided into red, green and blue dot, which are arranged in vertical stripe. The cell is normally black mode, and can be applied to the transmission type display

1.1 General TFT specifications

ITEM	SPECIFICATION			
Panel Size	3.5" inch			
Number of Pixels	640(H) x 480(V)			
Display Area (mm)	70.08(H) × 52.56 (V)			
Pixel Pitch (mm)	0.1095(W)x 0.1095(H)			
Color Pixel Arrangement	RGB Vertical stripe			
Display Mode	Normally Black			
Number of Colors	16.7M(8bits)			
Brightness(cd/m ²)	500nits(typ)			
Response Time (ms)	25ms(typ)			
Viewing Direction	Free			
Contrast ratio	800:1			
Interface connection	mipi			
Module Size(mm)		Min.	Typ.	Max
	Horizontal (H)	74.3	74.5	74.7
	Vertical (V)	62.2	62.4	62.6
	Depth (D)	2.0	2.15	2.4
Module Weight (g)	TBD			
Backlight Unit	LED			



2 Electrical Characteristics

2.1 Absolute maximum ratings

Item	Symbol	Min.	Max.	Unit	Remark
Digital Supply Voltage	IOVCC	-0.3	+1.8	V	
Operating Ambient Temperature	T _{OP}	-30	+80	° C	
Operating Ambient Humidity	H _{OP}	60	90	% (RH)	
Storage Temperature	T _{STG}	-20	+70	° C	
Storage Humidity	H _{STG}	60	90	% (RH)	

2.2. Electrical absolute ratings

Item	Symbol	Min.	TYP.	Max.	Unit	Remark
Power voltage	IOVCC	1.65	1.8	3.3	V	
	LED_VCCS	-	-	-	V	
Analog Operating voltage	V _{sp}	5.0	5.5	6.0	V	
Analog Operating voltage	V _{sn}	-6.0	-5.5	-5.0	V	

2.3 Backlight

Item	Symbol	Min.	TYP.	Max.	Unit	Remark
Current for LED backlight	LED1- /LED2-	-	25	-	mA	
Voltage for LED Backlight	LED+	-	20	-	V	
LED Lifetime	-	30000	-	-	Hr	



3 Power on/off Sequence

Power source IOVCC, VCI can be applied and powered down in any order. IOVCC, VCI can be powered down in any order. During power off, if LCD is in the Sleep Out mode, IOVCC, VCI must be powered down minimum 120 msec after NRESET has been released. During power off, if LCD is in the Sleep In mode, IOVCC, VCI can be powered down minimum 0msec after NRESET has been released. NCS can be applied at any timing or can be permanently grounded. NRESET has priority over NCS

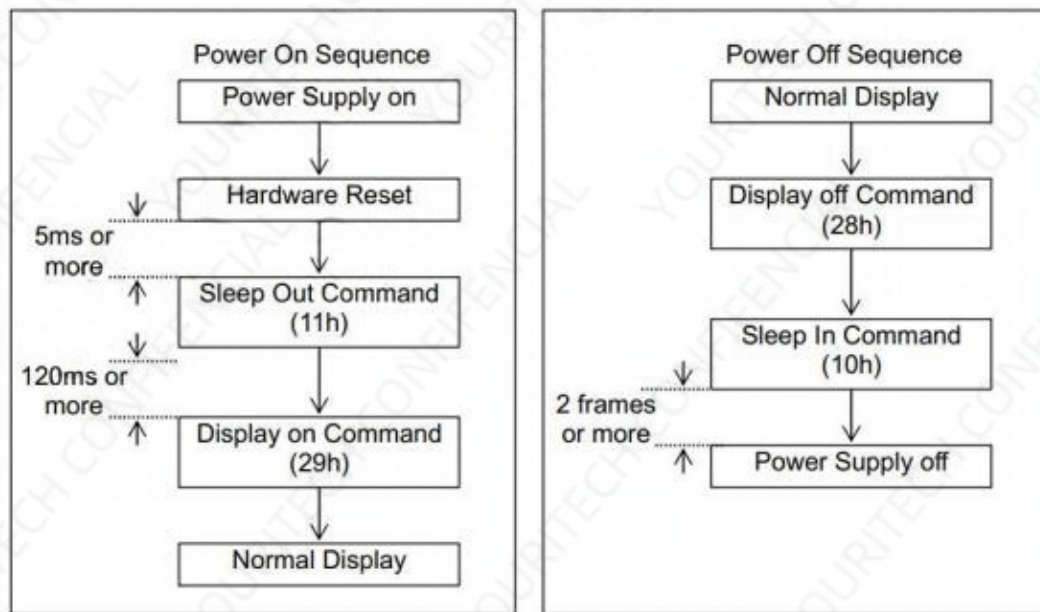


Figure 3.1: The power supply ON/OFF setting for Display ON/OFF and Sleep In/out

3.2 Case 1: RESX line is held high or unstable by host at power on

If RESX line is held high or unstable by the host during power on, then a Hardware Reset must be applied after both VDD1, VDD2 and VDD3 have been applied- otherwise correct functionality is not guaranteed. There is no timing restriction upon this hardware reset.



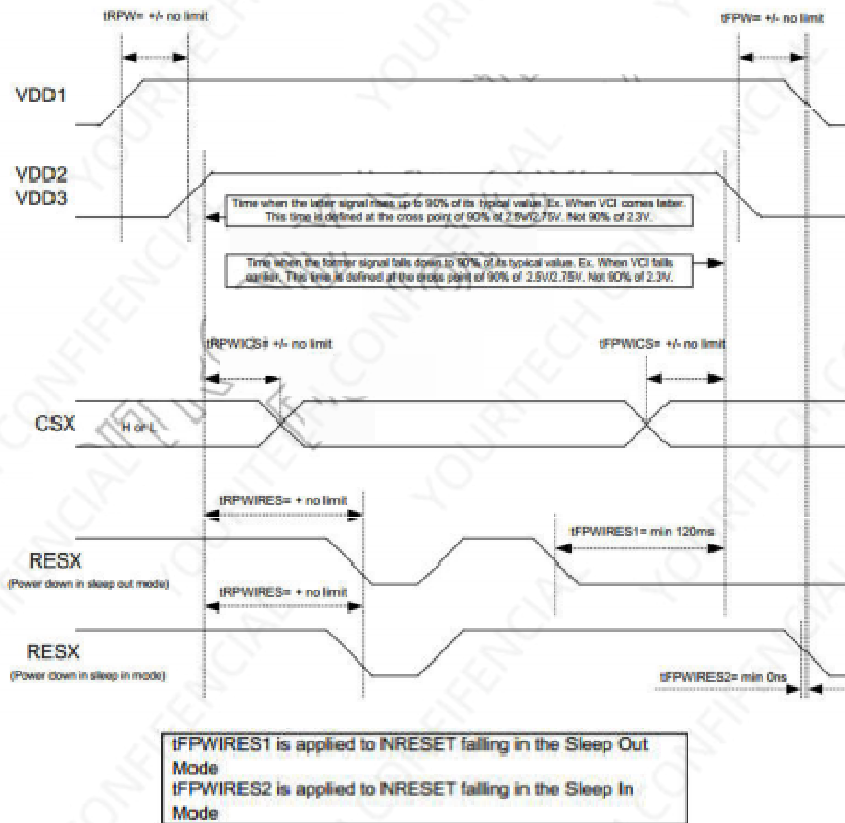
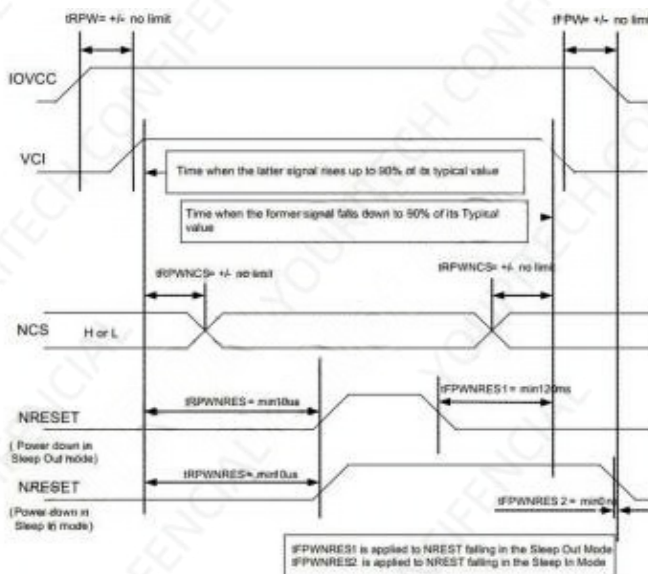


Figure 3.2: Case 1: RESX line is held high or unstable by host at power on

3.3 Case 2: RESX line is held low by host at power on

If RESX line is held low (and stable) by the host during power on, then the RESX must be held low for minimum 10μ sec after both VDD1, VDD2 and VDD3 have been applied.



Note: Unless otherwise specified timings herein show cross point at 50% of signal/power level

Figure 3.3: Case 2: RESX line is held low by host at power on



4. INTERFACE CONNECTION

4.1 CN1 (Input Signal)

Pin No.	SYMBOL	FUNCTION	Note
1	LEDA	LED power (Anode)	
2	LEDK	Cathode 1	
3	LEDK	Cathode 1	
4	VCI	Power supply: +3.3V	
5	IOVCC	Power supply: +1.8V	
6	RESET	Global reset pin, active low	
7	NC	No connection	
8	NC	No connection	
9	GND	Ground	
10	D0P	+MIPI-DSI Data differential signal input pins	
11	D0N	- MIPI-DSI Data differential signal input pins	
12	GND	Ground	
13	D1P	+MIPI-DSI Data differential signal input pins	
14	D1N	- MIPI-DSI Data differential signal input pins	
15	GND	Ground	
16	CKP+	+MIPI-DSI Clock differential signal input pins	
17	CKP-	-MIPI-DSI Clock differential signal input pins	
18	GND	Ground	
19	D2P	+MIPI-DSI Data differential signal input pins	
20	D2N	- MIPI-DSI Data differential signal input pins	
21	GND	Ground	
22	D3P	+MIPI-DSI Data differential signal input pins	
23	D3N	- MIPI-DSI Data differential signal input pins	
24	GND	Ground	
25	NC	No connection	
26	NC	No connection	
27	NC	No connection	
28	NC	No connection	
29	NC	No connection	
30	GND	Ground	



5. SIGNAL TIMING SPECIFICATION

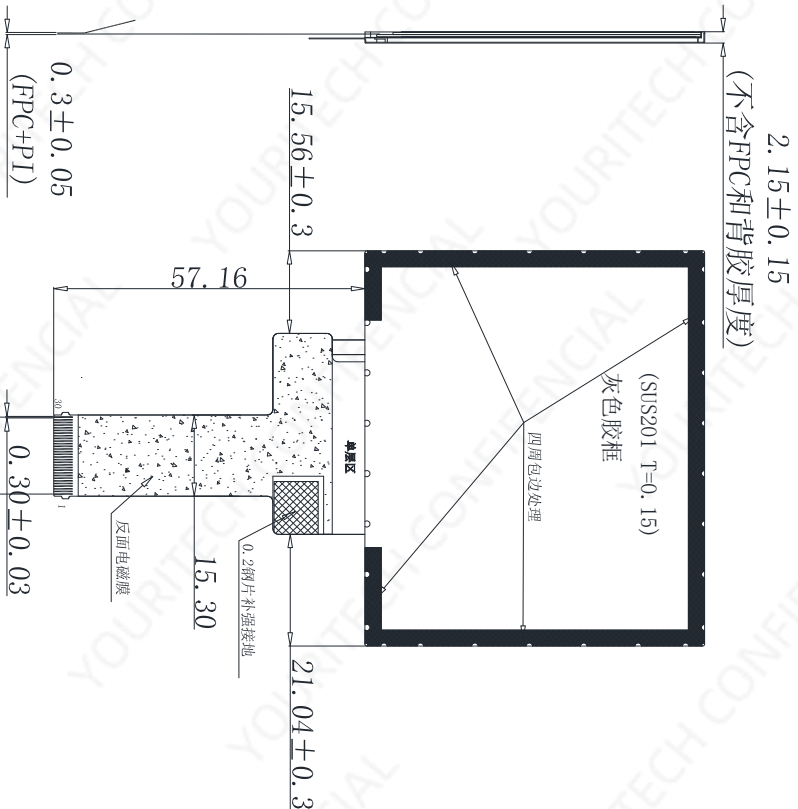
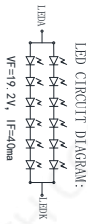
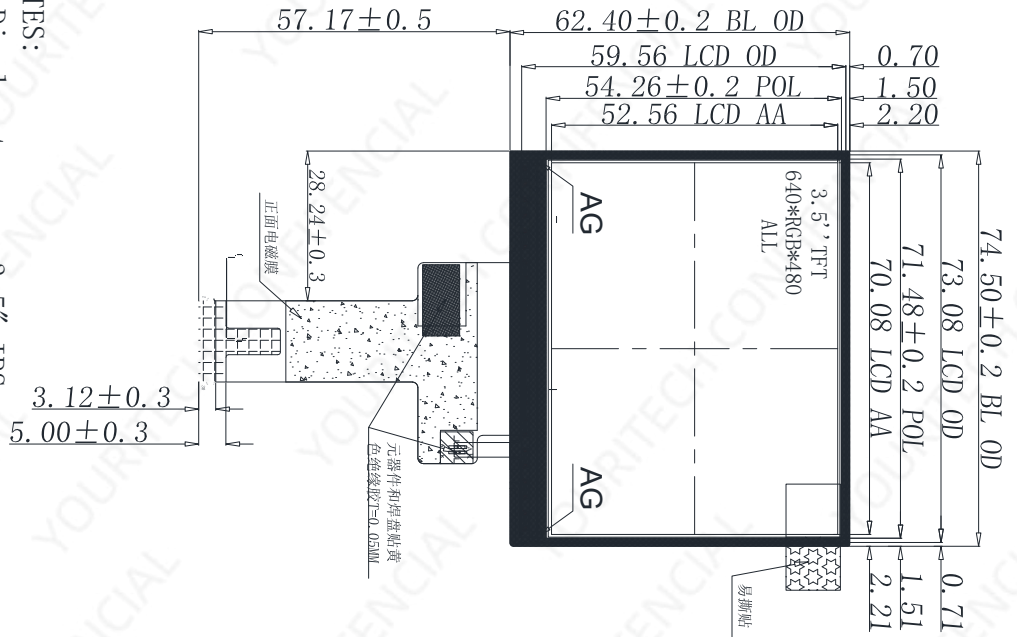
5.1 Data Timing Specification

Parameter	Symbol	Panel Resoition			
		640*480			
		Min.	Typ.	Max.	Unit
DCLK frequency	Fdclk	-	31	-	MHz
Horizontal Display Area	Thd	640			DCLK
Hsync pulse width	t _{hpw}	-	120	-	DCLK
Hsync back porch	t _{hbp}	-	120	-	DCLK
Hsync front porch	t _{hfp}	-	120	-	DCLK
Vertical Display Area	tvd	480			T _H
Vsync pulse width	t _{hpw}	-	4	-	T _H
Vsync back porch	t _{hbp}	-	16	-	T _H
Vsync front porch	t _{hfp}	-	12	-	T _H



6. MECHANICAL DIMENSIONC

- NOTES:
- 1、Display type: 3.5"-IPS
 - 2、Viewing direction: ALL
 - 3、Drive IC: ST77031
 - 4、Backlight color: 12 LED WHITE
 - 5、Operation temperature: -20~70° C
 - 6、Storage temperature: -30~80° C
 - 7、LCM Operating Voltage: Vdd=2.8V
 - 8、Vamds: 模块可视区域, 建议外壳可视区域比Vamds单边小0.3以上



FPC弯折示意图 展开出货

TFT PIN	PIN	SYMBOL
1	LED+	
2-3	LED-	
4	VCC	
5	IOVCC	
6	RESET	
7	NC	
8	PWM(NC)	
9	GND	
10	DOP	
11	DON	
12	GND	
13	D1P	
14	D1N	
15	GND	
16	CLKP	
17	CLKN	
18	GND	
19	D2P	
20	D2N	
21	GND	
22	D3P	
23	D3N	
24	GND	
25	NC	
26	NC	
27	NC	
28	NC	
29	NC	
30	GND	

REV	DESCRIPTION:	DATA
C00	首次设计	
C01	背光新开模, 修改胶框	2025. 05. 28

YOURITECH TECHNOLOGY			
TECHTRON MODEL	ET035WT01-GM	DATE	2024. 11. 09
SCALE	1 : 1	UNIT	mm
		APPROVED	
		CHECKED	
PROJECTION:		DESIGNED	



7. OPTICAL SPECIFICATION

7.1 Overview

The test of Optical specifications shall be measured in a dark room (ambient luminance $\leq 1\text{lux}$ and temperature = $25\pm 2^\circ\text{C}$) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0° . The center of the measuring spot on the Display surface shall stay fixed. The backlight should be operating for 30 minutes prior to measurement.

7.2 Optical Specifications

$T_a = 25^\circ\text{C}$, $V_{CC}=3.3\text{V}$

ITEM	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	NOTE
Contrast Ratio	CR	$\theta = 0^\circ$	600	800			1.2.3
Luminance(CEN)	Lw	Point-5	-	500		cd/m^2	1.3
Luminance Uniformity	ΔL		78	80		%	1.3
Response Time (White - Black)	$T_r + T_f$	$\theta = 0^\circ$	-	25	50	ms	1.3.5
NTSC	-	Point-5	45	50	-	%	1.4
Viewing Angle	Vertical	Upper(θ)	75	85	-	Deg	1.4
		Down(θ)	75	85	-	Deg	1.4
	Horizontal	Left(θ)	75	85	-	Deg	1.4
		Right (θ)	75	85	-	Deg	1.4
Color Coordinate	White	W_x	-	-	-	-	1.3
		W_y	-	-	-		
	Red	R_x	-	-	-		
		R_y	-	-	-		
	Green	G_x	-	-	-		
		G_y	-	-	-		
	Blue	B_x	-	-	-		
		B_y	-	-	-		

Note 1: Measuring Conditions:

The optical characteristics are determined after the unit has been 'ON' and stable at the maximum brightness, in a dark environment at an ambient temperature at $25^\circ\text{C} \pm 2^\circ\text{C}$.

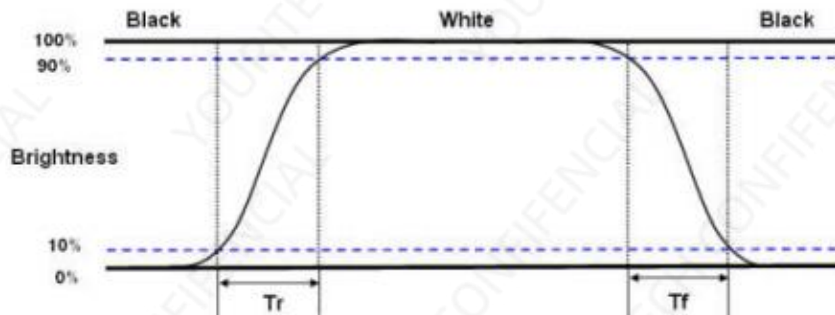
Note 2: Definition of response time:

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time is the time between photodetector output intensity



changed from 10% to 90%.

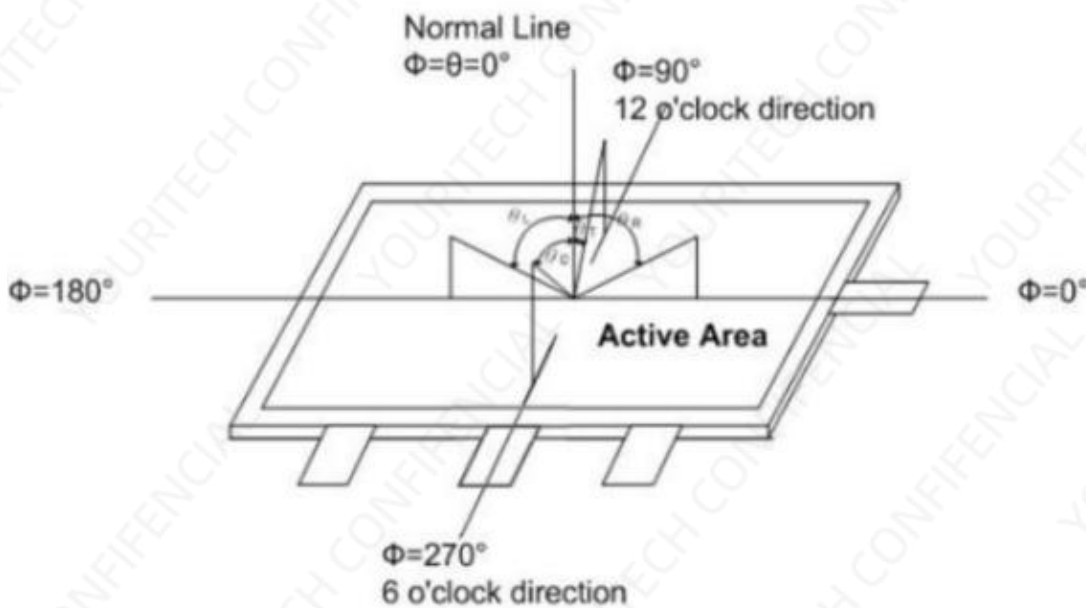
90% to 10%.



Note 2: Definition of contrast ratio:

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

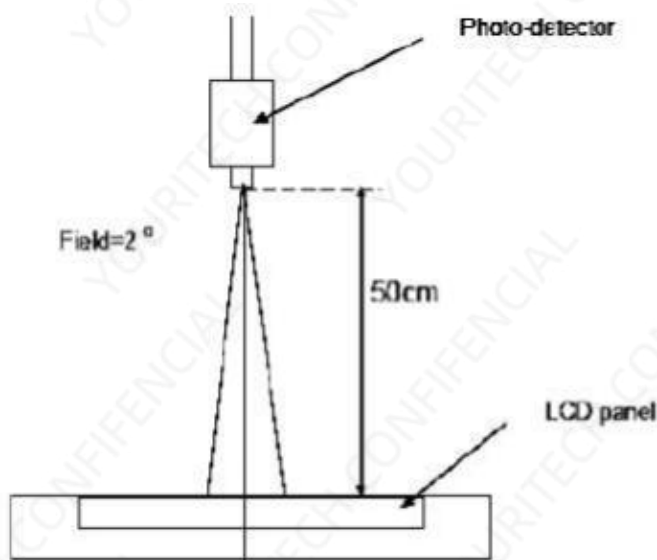
Note 3: Definition of viewing angle



Note 4: Optical characteristic measurement setup.

The LCD module should be stabilized at given temperature for 10 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 10 minutes in a windless room.





Note 5: Definition of color chromaticity (CIE1931)

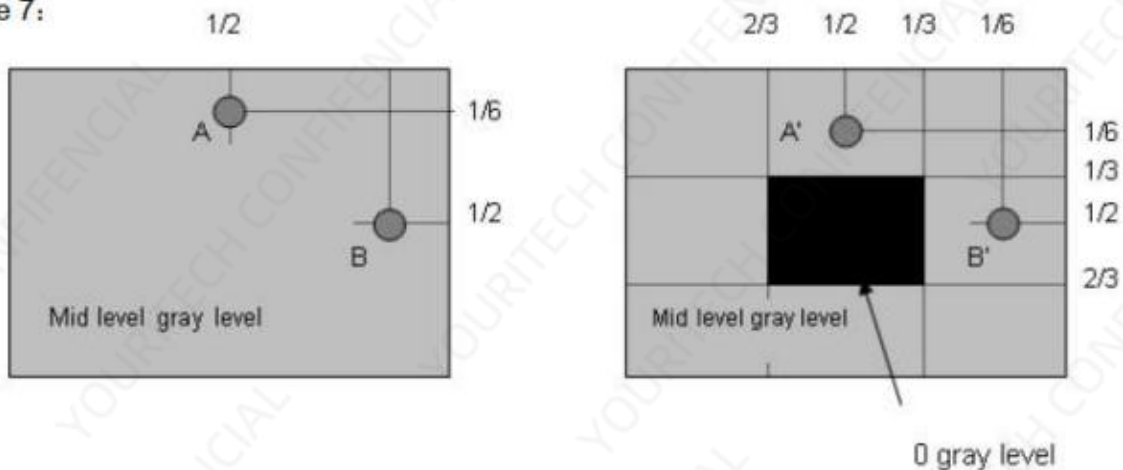
Color coordinates measured at center point of LCD.

Note 6: Measuring Conditions:

The optical characteristics are determined after the unit has been 'ON' and stable at the maximum brightness, in a dark environment at an ambient temperature at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$. The electrical conditions

include $V_{cc} = 3.3\text{ V}$, $f_v = 60\text{ Hz}$. Recommended measuring equipments for luminance and color is BM5A Colorimeter with a viewing cone of 2° or similar. The measuring distance should be about 30-50 cm from the LCD surface at normal unless otherwise specified. The (virtual) measuring spot should be 5mm in diameter. The CIE 1931 Standards shall be used. Viewing angle measurements should be done by the CS2000 EZ Color system or similar.

Note 7:



Unit: percentage of dimension of display area

$|L_A - L_{A'}| / L_A \times 100\% = 2\% \text{ max.}$, L_A and $L_{A'}$ are brightness at location A and A'

$|L_B - L_{B'}| / L_B \times 100\% = 2\% \text{ max.}$, L_B and $L_{B'}$ are brightness at location B and B'



8. RELIABILITY TEST ITEM

9.1 TEMPERATURE AND HUMIDITY

TEST ITEMS	CONDITIONS	NOTE
High Temperature Operation	80℃ ; 240hrs	Note1
High Temperature Storage	80℃ ; 240hrs	Note
High Temperature High Humidity Operation	65℃ ; 90%RH ; 240hrs (No condensation)	Note
Low Temperature Operation	-20℃ ; 240hrs	Note
Low Temperature Storage	-30℃ ; 240hrs	Note
Thermal Shock	-30℃(0.5hr)~80℃(0.5hr); 100Cycles	Non-Operating
Image Sticking	25℃ ; 4hrs	Note
MTBF	30000 Hrs	

Note1: Criteria: Normal display image with no function defect and no line defect. Mura defect Judged by 5% ND filter

Note2: All tests above are practiced at module type.

Note3: All the cosmetic specification is judged before the reliability stress. Only a single item of these tests

shall be executed on a single panel , no more one test item shall be executed on a single panel.

Note4: Evaluation should be tested after storage at room temperature for more than two hours.



9. OPTICAL SPECIFICATION

9.1 Overview

The test of Optical specifications shall be measured in a dark room (ambient luminance 1 lux and temperature = 25±2℃) with the equipment of Luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. The center of the measuring spot on the Display surface shall stay fixed.

The backlight should be operating for 30 minutes prior to measurement.

9.2 Optical Specifications

ITEM	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	NOTE
Contrast Ratio	CR	Point-5	1000:1	1300:1			1.2.3
Luminance(CEN)	Lw	Point-5	800	1000		cd/m ²	1.3
Luminance Uniformity	L		70	80		%	1.3
Response Time (White - Black)	Tr +Tf	Point-5	-	-	35	ms	1.3.5
NTSC	-	Point-5	-	70	-	%	1.4
Viewing Angle	Vertical	Upper(θ)	-	85	-	Deg	1.4
		Down(θ)	-	85	-	Deg	1.4
	Horizontal	Left(θ)	-	85	-	Deg	1.4
		Right (θ)	-	85	-	Deg	1.4
Color Coordinate	White	Wx	0.254	0.284	0.314	-	1.3
		Wy	0.288	0.318	0.348		
	Red	Rx	0.591	0.621	0.651		
		Ry	0.304	0.334	0.364		
	Green	Gx	0.274	0.304	0.334		
		Gy	0.595	0.625	0.655		
	Blue	Bx	0.115	0.145	0.175		
		By	0.017	0.047	0.077		

Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing 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.

2. Contrast measurements shall be made at viewing angle of $\theta = 0^\circ$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (See FIGURE 1 shown in Appendix) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Center trans of white is defined as the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 4 for a total of the measurements per display.

4. The White luminance uniformity on LCD surface is then expressed as : $\Delta Y = (\text{Minimum Luminance of 9points} / \text{Maximum Luminance of 9points}) * 100$

5. The color chromaticity coordinates specified in Table 4. shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurement condition is C- light source.

6. The electro-optical response time measurements shall be made as FIGURE 5 shown in Appendix by switching the "data" input signal ON and OFF. The times needed for the transmittance to change from 10% to 90% is Tr, and 90% to 10% is Tf.



10. WARRANTY

11.1 THE PERIOD IS WITHIN 12 MONTHS SINCE THE DATE OF SHIPPING OUT UNDER NORMAL USING AND STORAGE CONDITIONS.

11.2 THE WARRANTY WILL BE AVOIDED IN CASE OF DEFECT INDUCED BY CUSTOMER.



11. Product Inspection Criteria

11.1 INSPECTION CONDITIONS

11.1.1 AMBIENT CONDITIONS:

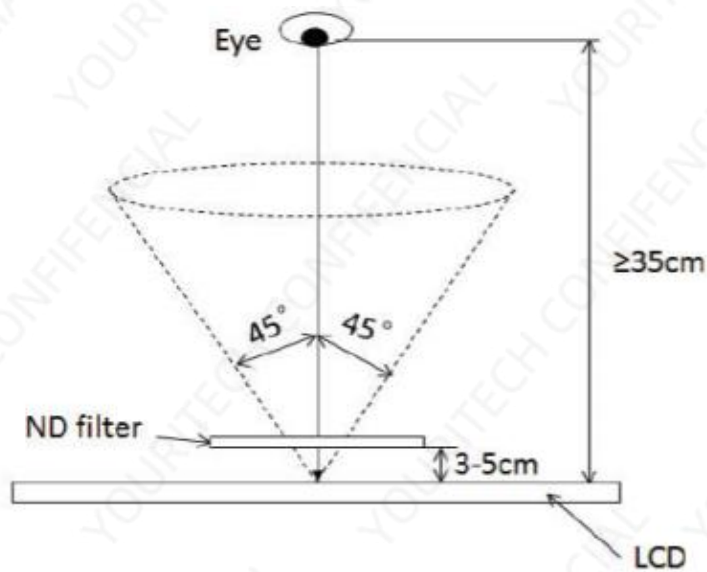
- A. TEMPERATURE: ROOM TEMPERATURE 25 ± 5 °C
- B. HUMIDITY: (60 ± 10) %RH
- C. ILLUMINATION(THE SURFACE OF LCD)
- BACKLIGHT-ON 100-300LUX
- BACKLIGHT-OFF 800-1200LUX

11.1.2 VIEWING DISTANCE

THE DISTANCE BETWEEN THE LCD AND THE INSPECTOR'S EYES SHALL BE 35CM OR MORE.

11.1.3 VIEWING ANGLE

U/D: $45^\circ/45^\circ$, L/R: $45^\circ/45^\circ$

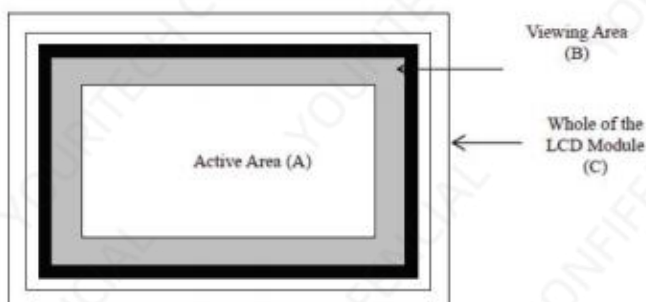


11.1.4 LIGHT-ON CONDITION

THE CURRENT OF THE BACKLIGHT SHOULD REFER TO THE RECOMMENDED TYPICAL VALUE IN THIS SPECIFICATION.



11.1.5 DEFINITION OF LCD ZONE (WITHOUT FRONT BEZEL)

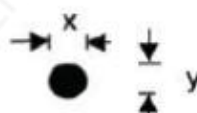
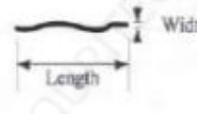


A-zone: The inside of the Active Area(as defined on the product drawing)

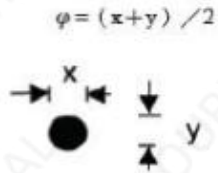
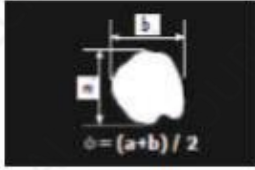
B-zone: The inside of the Viewing Area which is which is 1.5mm from each edge of A-zone.

C-zone: Whole of the LCD Module except the zone A and B. (Including FPC& Metal Frame & backside of the LCD Module)

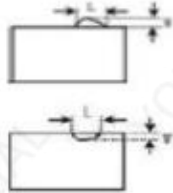
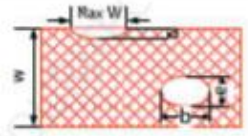
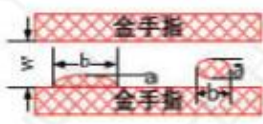
11.2 COSMETIC INSPECTION CRITERIA

Inspection Item	Inspection Standards	Acceptable Qty.	Applied Zone	Inspection Mode	Note
Dark spots (Including Optical bonding Dirty/Dust)	$\theta \leq 0.15$	Ignore	A	Backlight -on	$\varphi = (x+y) / 2$ 
	$0.15 < \theta \leq 0.35$	6			
	$0.35 < \theta$	None			
Bright spots	$\theta \leq 0.2$	Ignore	A	Backlight -on	$\varphi = (x+y) / 2$ 
	$0.2 < \theta \leq 0.35$	3			
	$0.35 < \theta$	None			
Serried spot	$\theta \leq 0.2$	N≤10 (in per 10mm ²)	A	Backlight -on	$\varphi = (x+y) / 2$ 
Bright pixel dot	1 sub-pixel, Visible through ND3%	None	A	Backlight -on	
Dark pixel dot	1 sub-pixel	3 (distance≥ 10mm)	A	Backlight -on	
Lints & Scratches	$W \leq 0.05$ and $L \leq 5.0$	Ignore	A	Backlight -on Backlight -off	
	$0.05 < W \leq 0.1$ and $L \leq 4.0$	5			
	$0.1 < W$ or $L > 4.0$	None			



Polarizer Dent/Bubble	$\theta \leq 0.15$	Ignore	A	Backlight -on Backlight -off	$\phi = (x+y) / 2$ 
	$0.15 < \theta \leq 0.35$	3			
	$0.35 < \theta$	None			
Mura	Visible through ND5% at full black pattern	None	A	Backlight -on	
Dirty\Dust	Those wiped out easily are acceptable	\	\	\	\
BM hole of Overlay	$\theta \leq 0.1$	Ignore	B	Backlight -off	
	$0.1 < \theta \leq 0.2$	4			
	$0.2 < \theta$	None			
CTP Surface Damage(dot) 正面爆点、崩点	$\theta \leq 0.15$	Ignore	A/B	Backlight -on Backlight -off	\
	$0.15 < \theta \leq 0.25$	8			
	$0.25 < \theta$	None			
CTP coner Damage背面CTP角破损	$X \leq 3, Y \leq 3, Z \leq T$	3	B/C	Backlight -off	
CTP edge Damage背面CTP边破损	$Y \leq 0.5, Z \leq T/2$	Ignore	B/C	Backlight -off	
	$X \leq 5, Y \leq 3, Z \leq T$	4			
CTP glass Crack CTP 玻璃裂纹	Not allowed	/	B/C	Backlight -off	
CTP Newton	Without core	Ignore	A/B	Backlight - on /off	
Circle	With core	According to Dark Spot	A/B	Backlight - on /off	
Scratch /bubble/stain on protecting film	/	Ignore	/	/	/
Dot in Logo&Icon 点缺陷	$\theta < 0.1\text{mm}$, not count; $0.1\text{mm} \leq \theta \leq 0.2\text{mm}$, only one dot in every logo or ICON 每一个图标、笔段允许数 $n \leq 1$ 。具体如下定义: 1) 每个字母只允许 $n \leq 1$; 2) 中间横线中允许 $n \leq 1$;				



	3) 单边大弧允许 $n \leq 3$, 但分别落在如下三个笔段中, 同一笔段只允许 $n \leq 1$;  备注: 单边大弧分为三个笔段计算点缺陷。				
Dot in IR or CAM	Accept in dark background, in other background $\theta \leq 0.2$ $N \leq 1$	1	B	Backlight -off	
Uneven color(lens AG/AR film, ICON)	According to Limited sample	\	\	\	\
Excessive glue /Lack glue of AG/AR film in Area B	$W \leq 0.2$	Ignore	B	Backlight -off	
	$0.2 \leq W \leq 0.3$ $L \leq 6$	Ignore			
	$W > 3$	None			
BM edge defect	$W \leq 0.1$	Ignore	B/C	Backlight -off	\
	$0.1 \leq W \leq 0.25$ $L \leq 1$	2 (Per side)			
	$W > 0.25$	None			
FPC Pin hole	$a \leq W/3, b \leq W$	Ignore	C	Backlight -off	
	$a > W/3, b > W$	None			
FPC copper residue	$a \leq W/3, b \leq W$	Ignore	C	Backlight -off	
	$a > W/3, b > W$	None			
FPC dent/crease	Print mark/dent	Ignore	C	Backlight -off	\
	Crease with acute angle	None			
EMI area defect	Spot $\leq 1.0 \times 1.0$	Acceptable with black oily pan repair	C	Backlight -off	\
	Scratch $W \leq 0.1$, $L \leq 1/2$ FPC width				
DST bubble	$\theta \leq 8$	Ignore	C	Backlight -off	\
	$8 \leq \theta < 10$	3(Per side)			
	$10 \leq \theta < 12$	1(Per side)			
	$12 < \theta$	None			

Notes1: Goworld shall handle with issue related to CTP, Tianma is excluded from CTP related responsibility

Notes2: 单个屏总的次要缺陷数不超过

