CHENG UEI PRECISION INDUSTRY CO., LTD.

PRODUCT SPECIFICATION

RoHS

5.0" TFT LCD MODULE
MODEL: FL500WVR00-A0T

< ◇> Preliminary Specification

< ◆> Engineering Specification

< ◇> Approval Specification

CUSTOMER'S APPROVAL	
CUSTOMER :	
SIGNATURE:	DATE:

APPROVED BY	PM REVIEWD	PREPARED By

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Revision Status

Version	Revise Date	Page	Content	Modified By
V1.0	03/18/2008		First Issued	Arlo & Roger
V2.0	04/10/2008	4、10、17	Modify LED Current	Arlo & Roger

Table of Contents

1. General Description

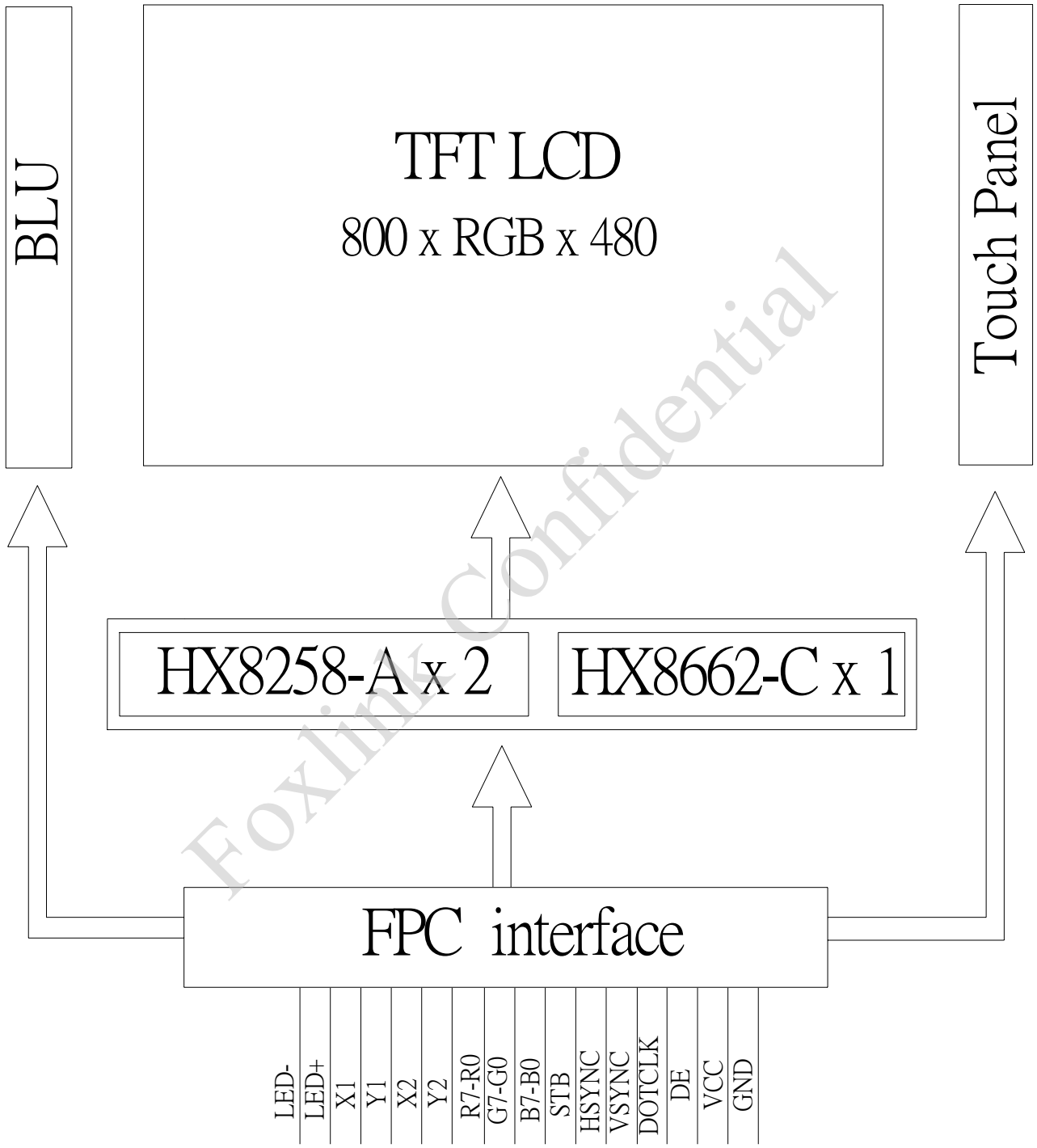
1.1 Description

The specifications is a transmissive type color active matrix liquid crystal display (LCD) which uses amorphous thin film transistor (TFT) as switching devices. This product is composed of a TFT LCD panel, driver ICs,FPC and a backlight unit. The following table described the features of FL500WVR00-A0T.

1.2 Features:

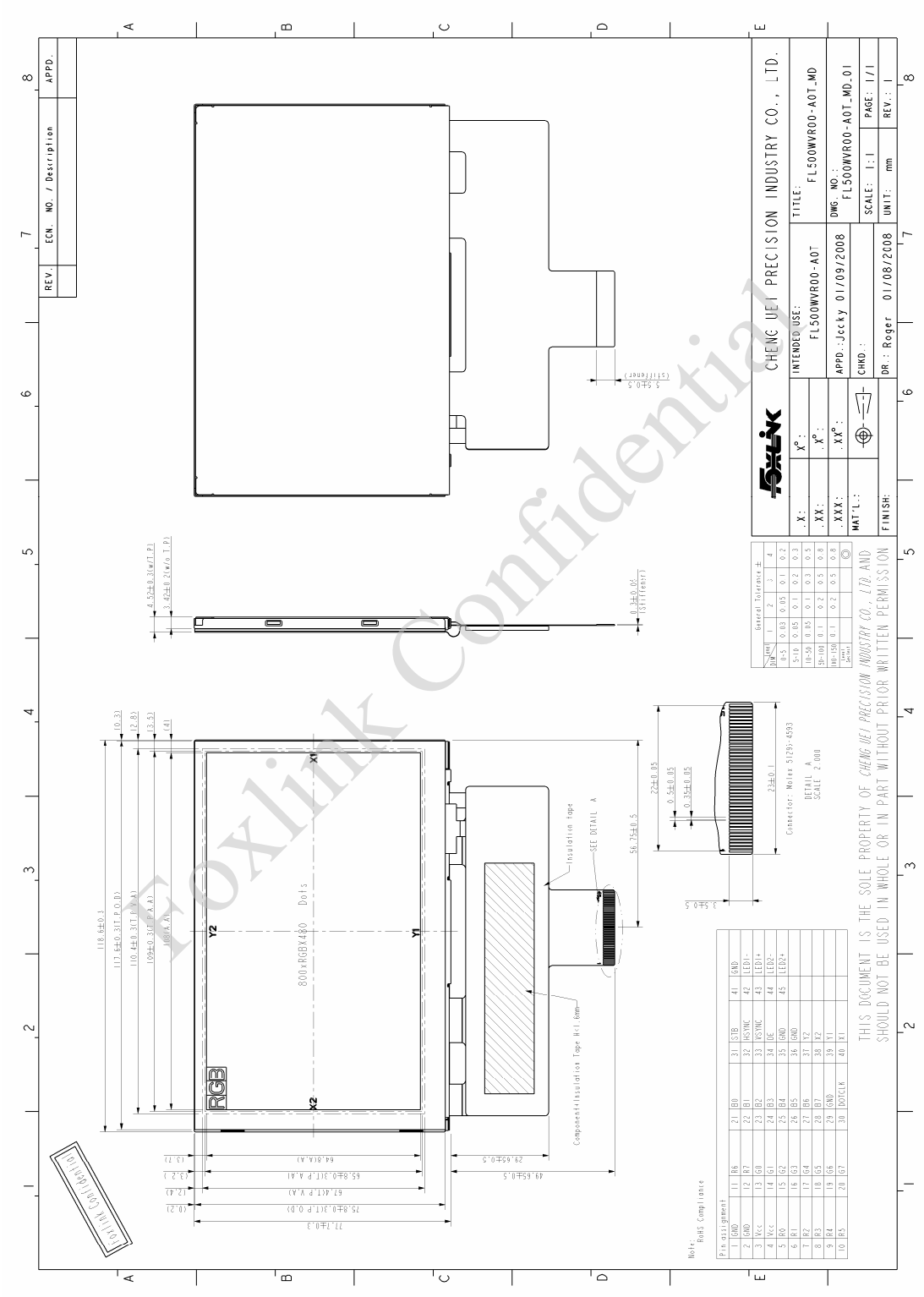
No.	Item	Specification	Unit
1	Panel Size	5.0” Diagonal	inch
2	Number of Pixels	800(H)×RGB×480(V)	Pixels
3	Active Area	108(H)×64.8(V)	mm
4	Pixel Pitch	0.135(H) x0.135 (V)	mm
5	Outline Dimension	118.6(H) x 77.7(V) x 4.52(D)	mm
6	Number of Colors	16.7M Colors	-
7	Pixel Arrangement	RGB Vertical Stripe	-
8	Display Mode	Normally White TN / Transmissive	-
9	Brightness (LED I_f=40mA)	280 (Typ.) 250(Min.)	cd/m^2
10	Contrast Ratio	250 :1 (Typ.)	-
11	Chromaticity (White, x / y)	0.330 / 0.370 (Typ.)	
12	Response time (Tr+Tf)	50 (Typ.)	ms
13	Viewing Direction	6 o’clock	-
14	Input Interface	RGB interface	-
15	Viewing Angle (U/D/L/R)	50/55/60/60	degree
16	Backlight unit	LED * 14	-
17	Surface Treatment	Hard Coating (3H)	-
18	Driver IC	Source: HX8258A (2ea) Gate: HX8662C (1ea)	
19	Weight	(85)	g

2. Functional Block Diagram



3. Mechanical Specification

3.1 Mechanical Dimension



Pin assignment									
1	GND	11	R6	21	B0	31	STB	41	GND
2	GND	12	R7	22	B1	32	HSYNC	42	LED1-
3	Vcc	13	G0	23	B2	33	VSYNC	43	LED1+
4	Vcc	14	G1	24	B3	34	DE	44	LED2-
5	R0	15	G2	25	B4	35	GND	45	LED2+
6	R1	16	G3	26	B5	36	GND		
7	R2	17	G4	27	B6	37	Y2		
8	R3	18	G5	28	B7	38	X2		
9	R4	19	G6	29	GND	39	Y1		
10	R5	20	G7	30	DOTCLK	40	X1		

Note: RoHS Compliance

4. Pin Description

4.1 Interface Pin Description

No.	Symbol	I/O	Function	Remark
1	GND	P	Power Ground	
2	GND	P	Power Ground	
3	VCC	P	Power Supply	
4	VCC	P	Power Supply	
5	R0	I	Red signal data bus(LSB)	
6	R1	I	Red signal data bus	
7	R2	I	Red signal data bus	
8	R3	I	Red signal data bus	
9	R4	I	Red signal data bus	
10	R5	I	Red signal data bus	
11	R6	I	Red signal data bus	
12	R7	I	Red signal data bus(MSB)	
13	G0	I	Green signal data bus(LSB)	
14	G1	I	Green signal data bus	
15	G2	I	Green signal data bus	
16	G3	I	Green signal data bus	
17	G4	I	Green signal data bus	
18	G5	I	Green signal data bus	
19	G6	I	Green signal data bus	
20	G7	I	Green signal data bus(MSB)	
21	B0	I	Blue signal data bus(LSB)	
22	B1	I	Blue signal data bus	
23	B2	I	Blue signal data bus	
24	B3	I	Blue signal data bus	
25	B4	I	Blue signal data bus	
26	B5	I	Blue signal data bus	
27	B6	I	Blue signal data bus	
28	B7	I	Blue signal data bus(MSB)	
29	GND	P	Power Ground	
30	DOTCLK	I	Clock Signal; Latch Data at the Rising Edge	
31	STB	I	Standby mode control (Low active,Default pull high)	
32	HSYNC	I	Horizontal Synchronous Signal	
33	VSYNC	I	Vertical Synchronous Signal	
34	DE	I	Data Enable	
35	GND	P	Power Ground	
36	GND	P	Power Ground	
37	Y2	I	Y_Up	
38	X2	I	X_Left	
39	Y1	I	Y_Bottom	
40	X1	I	X_Right	
41	GND	P	Power Ground	

42	LED1-	P	LED_Cathode	
43	LED1+	P	LED_Anode	
44	LED2-	P	LED_Cathode	
45	LED2+	P	LED_Anode	

5. Electrical Characteristics

5.1 Absolute Maximum Ratings

5.1.1 Electronic Absolute Maximum Ratings

Item	Symbol	Values		Unit	Remark
		Min	Max.		
Power Supply Voltages	VCC	-0.3	+7	V	
	V_{GH}-V_{GL}	-0.3	+45	V	
Input signal voltage	V_{IN}	-0.5	VCC+0.5	V	
LED Reverse Voltage	V_r	-	5	V	ONE LED
LED Forward Current	I_F	-	30	mA	ONE LED
LED Power Dissipation	P_d	-	105	mW	ONE LED
Storage Temperature	T_{ST}	-30	80	℃	
Operating Temperature (Ambient Temperture)	T_{opa}	-20	70	℃	

5.2 DC Electrical Characteristics

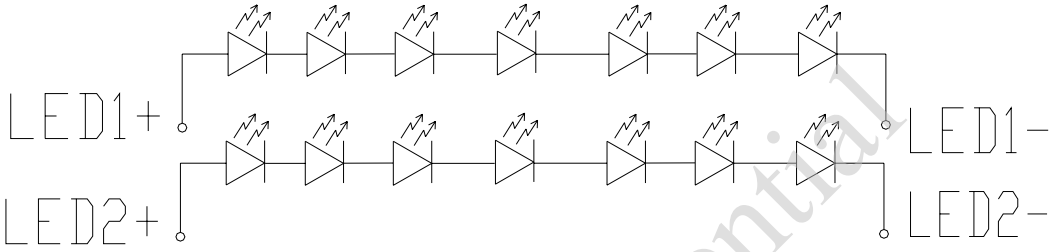
5.2.1 LCD DC Characteristics

Typical Operating Conditions (Ta=25℃)

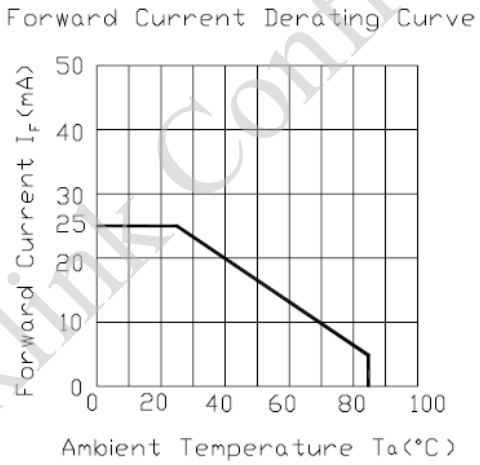
Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
Operating voltage	VCC	2.7	3.3	3.6	V	
Input high voltage	V_{IH}	0.8VCC	-	VCC	V	
Input low voltage	V_{IL}	0	-	0.2VCC	V	
Output high voltage	V_{OH}	VCC-0.3	-	VCC	V	
Output low voltage	V_{OL}	0	-	0.3	V	
Current Consumption	$I_{CC\text{-}Black}$	-	(140)	(210)	mA	
Power Consumption	P_{LCD}	-	(462)	(693)	mW	

5.2.2 Backlight Unit

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
LED Voltage	V_{LED}	-	24.5	-	V	LED*14
LED Current	I_{LED}	-	40	-	mA	LED*14
Power Consumption	P_{LED}	-	980	-	mW	LED*14



5.2.3 LED Forward Current



5.3 AC Electrical Characteristics

SYNC mode

PARAMETER	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
CLK frequency	F_{CPH}	-	33.26	-	MHz	
CLK period	T_{CPH}	-	30.06	-	ns	
CLK pulse duty	T_{CWH}	40	50	60	%	
HS period	T_H	-	1056	-	T_{CPH}	
HS pulse width	T_{WH}	1	128	-	T_{CPH}	
HS-first horizontal data time	T_{HS}	STHD[7:0]+88(i)			T_{CPH}	
HS Active Time	T_{HA}	-	800	-	T_{CPH}	
VS period	T_V	-	525	-	T_H	
VS pulse width	T_{WV}	1	2	-	T_H	
VS-DEN time	T_{VS}	STVD[6:0]+8			T_H	
VS Active Time	T_{VA}	-	480	-	T_H	

(i) $T_{HS}+T_{HA}<T_H$

DE mode

PARAMETER	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
CLK frequency	F_{CPH}	-	33.26	-	MHz	
CLK period	T_{CPH}	-	30.06	-	ns	
CLK pulse duty	T_{CWH}	40	50	60	%	
DE period	$T_{DEH}+T_{DEL}$	1000	1056	1200	T_{CPH}	
DE pulse width	T_{DH}	-	800	-	T_{CPH}	
DE frame blanking	T_{HS}	10	45	110	$T_{DEH}+T_{DEL}$	
DE frame width	T_{EP}	-	480	-	$T_{DEH}+T_{DEL}$	

- **Clock and Data input waveform**

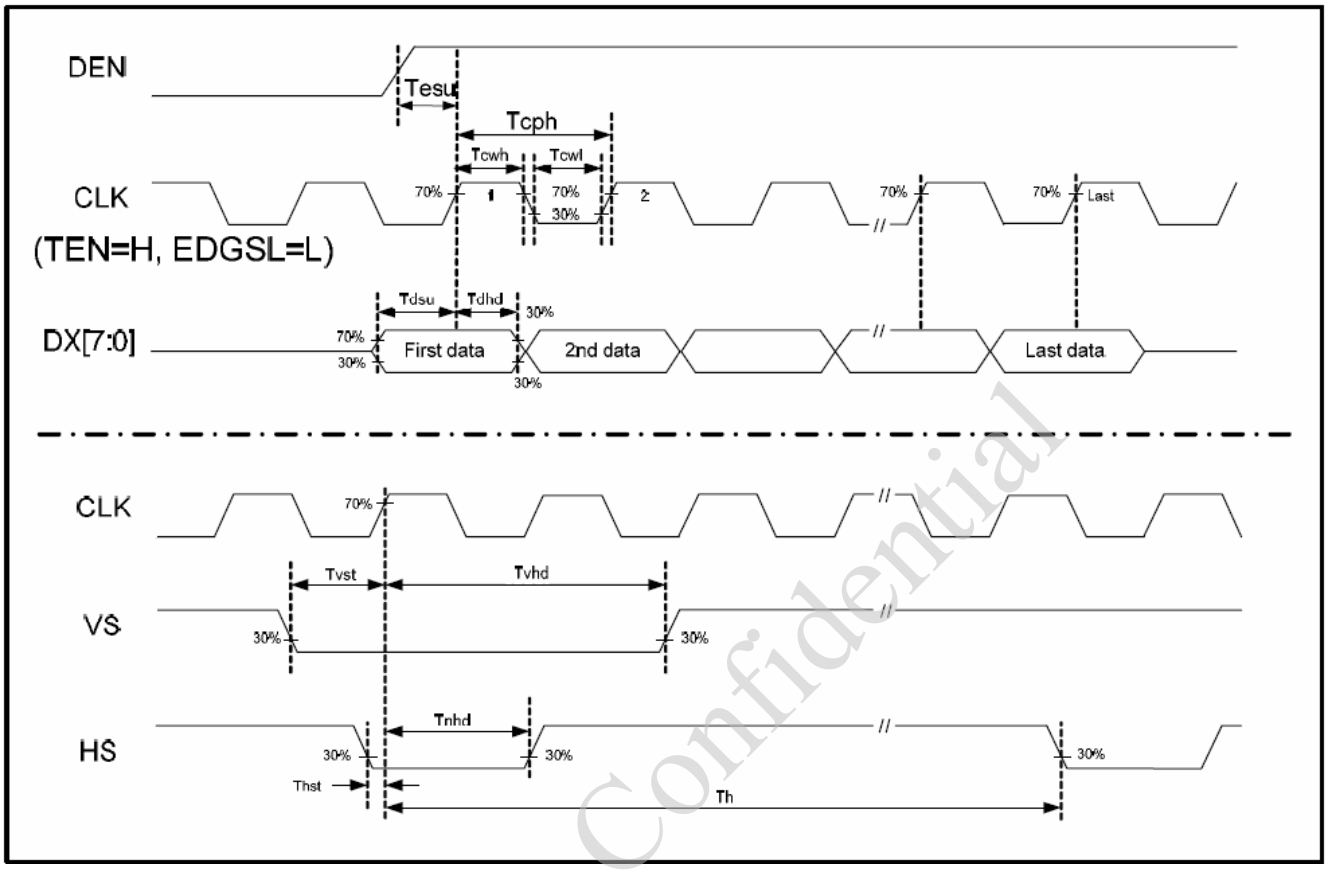


Figure 5.1 Clock and Data input waveform

- **Data input format**

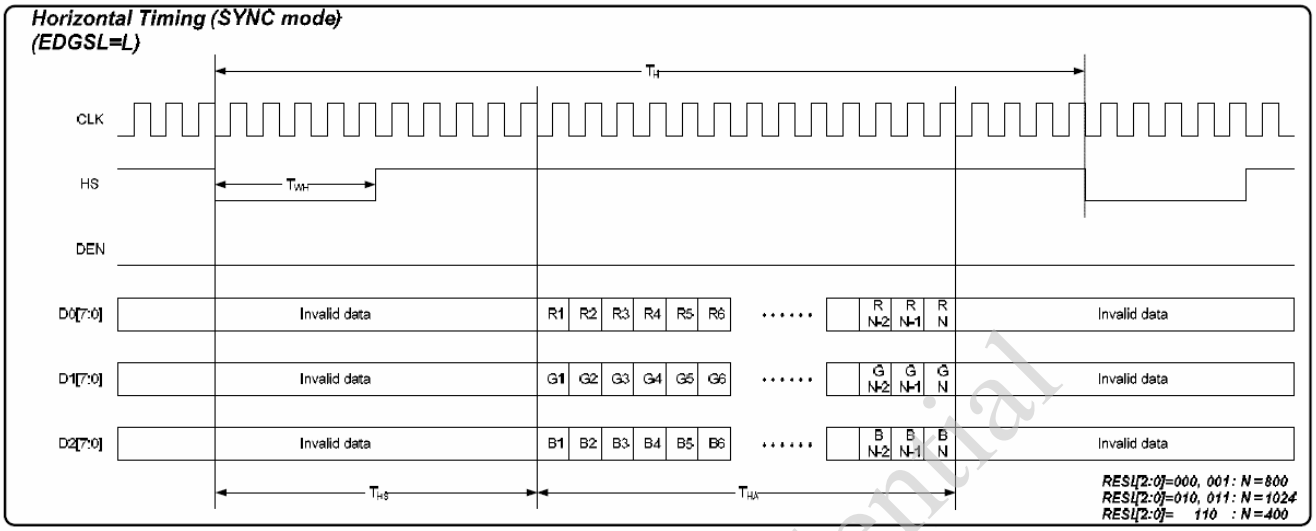


Figure 5.2 SYNC mode Horizontal Data format

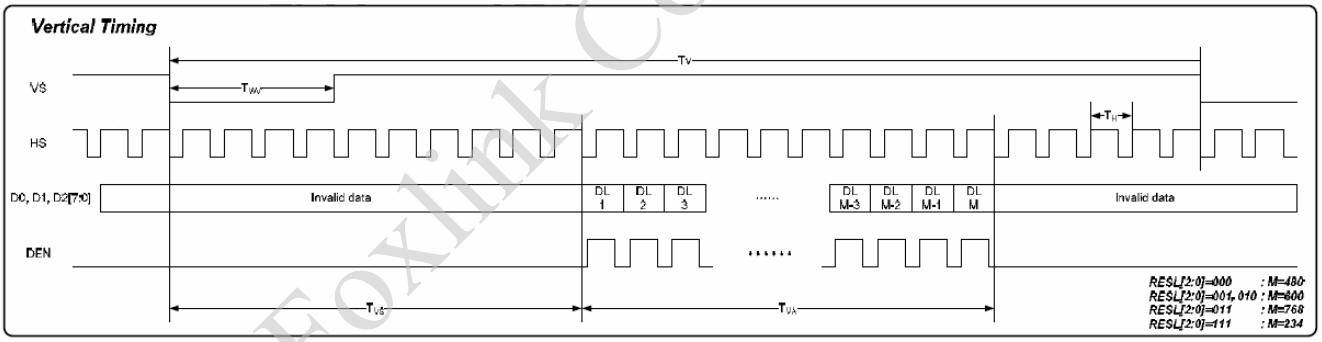


Figure 5.3 SYNC mode Vertical Data format

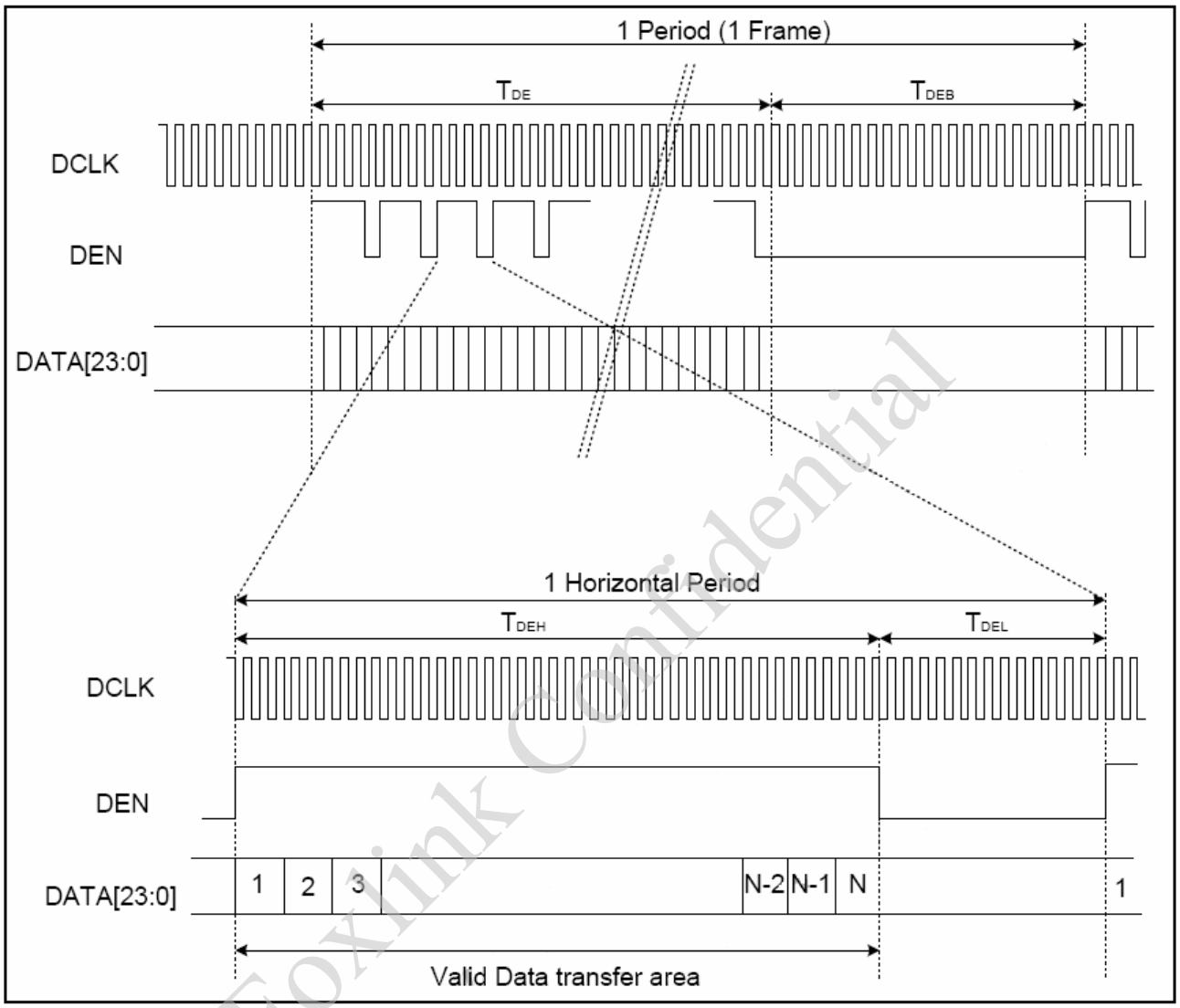


Figure 5.4 DE Mode Data Format

6. Touch Screen Panel Specifications

6.1 Electronic characteristics

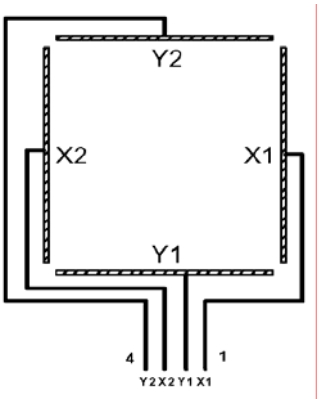
Item		Min.	Typ.	Max.	Unit	Note
Linearity		-	-	1.5	%	
Circuit Resistance	X-axis	200	-	900	Ω	
	Y-axis	200	-	900	Ω	
Insulation Resistance		20	-	-	MΩ	
Operating Voltage		-	-	5	V	
Chattering		-	-	10	ms	
Transmittance		80	-	-	%	

6.2 Mechanical & Reliability Characteristics

Item	Min.	Typ.	Max.	Unit	Note
Activation force	-	-	80	g	Note.1
Pen Writing Durability	100,000	-	-	characters	Note.2
Pitting Durability	1,000,000	-	-	touches	Note.3
Surface hardness	3	-	-	H	

Note.1：Operation foece with R8.0mm silicone finger.
Note.2：Writing with R0.8mm plastic stylus pen; writing force 150g in active area.
(Each direction inside Active area 3 mm) Speed is 60mm/sec.
Note.3： With the silicon Rubbre R8mm on the same point of the touch panel with 250g force, frequency 240 times/min.

6.3 Touch Screen Panel



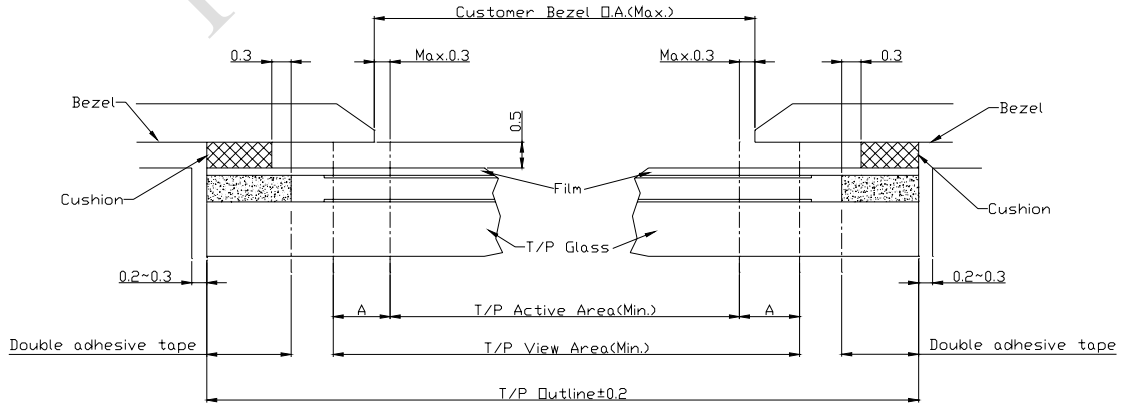
X : Upper electrode
Y : Lower electrode

6.4 Touch Screen Panel pin define

Pin No.	Symbol	I/O	Function
1	X1	Right	Right electrode – differential analog
2	Y1	Bottom	Bottom electrode – differential analog
3	X2	Left	Left electrode – differential analog
4	Y2	Top	Top electrode – differential analog

6.5 Design Guideline For Touch Panel

Bezel edge must be positioned in the area between the active area and view area.The bezel may press the touch screen and cause activation if the edge touches the active area. A gap of approximately 0.5mm is needed between the bezel and the top electrode. It may cause unexpected activation if the gap is too narrow. There is a tolerance of 0.2~0.3mm for the outside dimenation of the touch panel and tail. A gap must be made to absorb the tolerance in the case and connector. T/P C.A dimension is Up,Right 1.6mm,Left 3.5,Bottem 4.5mm.



Note
A=Pressing Prohibition Area

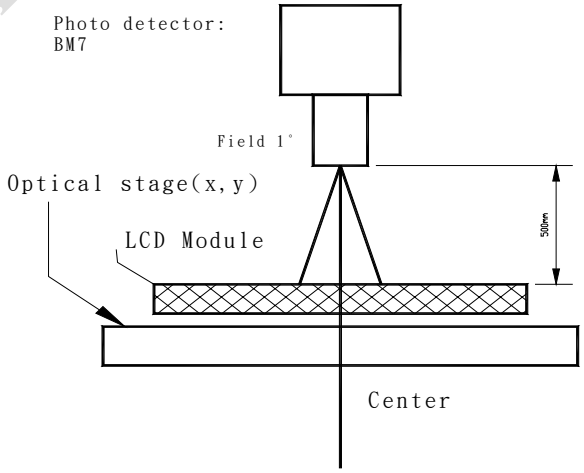
7. Optical Characteristics

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state with the methods shown in Note.1.

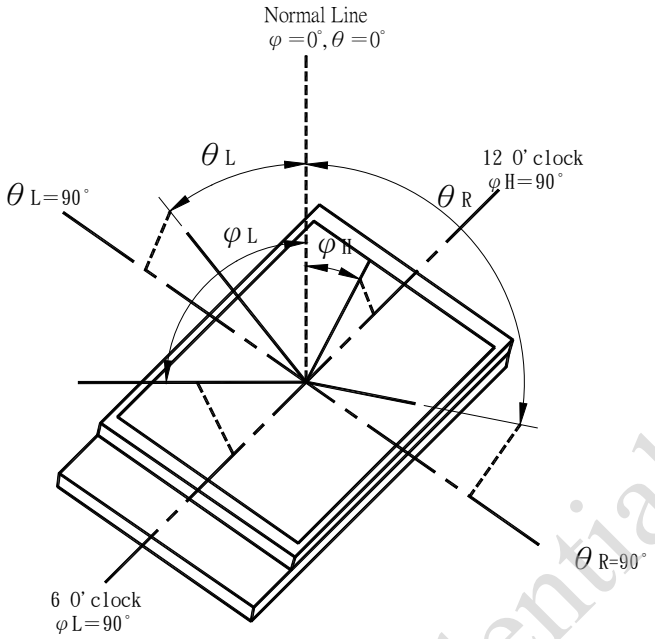
7.1 Main LCD Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle	Top	ΦH	CR≧10	-	50	-	degree	Note.2
	Bottom	ΦL		-	55	-		
	Left	ΘL		-	60	-		
	Right	ΘR		-	60	-		
Response time(Tr+Tf)			Θ=0	-	50	-	ms	Note.3
Brightness			Center	250	280	-	cd/m^2	
Contrast Ratio		CR	At optimized viewing angle	-	250	-	-	Note.4
Color Chromaticity	White	X_W	Viewing normal angle Φ,Θ=0	(0.28)	(0.33)	(0.38)	-	Note.5
		Y_W		(0.32)	(0.37)	(0.42)		
	Red	X_R		(0.56)	(0.61)	(0.66)	-	-
		Y_R		(0.32)	(0.37)	(0.42)		
	Green	X_G		(0.30)	(0.35)	(0.40)	-	-
		Y_G		(0.53)	(0.58)	(0.63)		
	Blue	X_B		(0.10)	(0.15)	(0.20)	-	-
		Y_B		(0.06)	(0.11)	(0.16)		

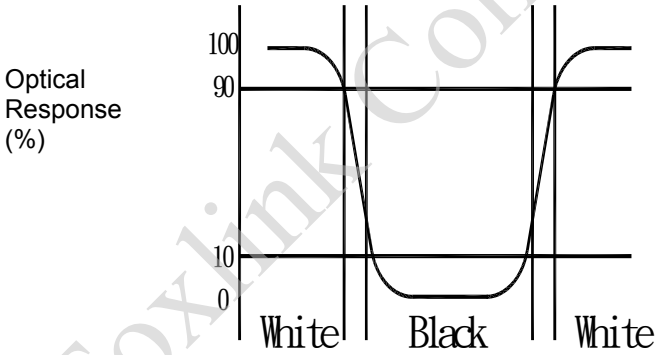
Note.1: After stabilizing and leaving the panel alone at a given temperature for 30 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7 with a viewing angle of 1° at a distance of 50cm and normal direction.



Note.2: Definition of Viewing Angle: Refer to figure as below:



Note.3: Definition of Response Time: TR and TF
The figure below is the output signal of the photo detector.



Note.4: Definition of Contrast Ratio (CR)

Ratio of gray max (G max)& gray min(G min)
Contrast ratio (CR) =(G max) / (G min)
(G max)=luminance with all pixel white
(G min)=luminance with all pixel black

Note.5: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

8. Reliability

9. Cosmetic Criteria of LCD Screen

10. Package

11. Precautions for Use

11.1 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.

11.2 Storage Conditions

(1) Store the panel or module in a dark place where the temperature is 23±5°C and the humidity 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.

11.3 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 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.

11.4 Warranty

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

12. LOT mark

Example: FL000QCC00-A0M 077310010010

Code	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Mark	F	L	0	0	0	Q	C	C	0	0	-	A	0	M

Code	15	16	17	18	19	20	21	22	23	24	25	26	27
Mark	speac	0	7	7	3	1	0	0	1	0	0	1	0

Code 1~14 ：Foxlink LCM Porduct number
Code 15 ：Space
Code16~17 ：Production day(year)
2007：07
2008：08
2009：09
Code18 ：Production day(month)

Month	1	2	3	4	5	6	7	8	9	10	11	12
Mark	1	2	3	4	5	6	7	8	9	A	B	C

Code19~20：Production day(day)
Code21~27：Production LOT number
Bar code label size：35 (W) x 9 (H) x 0.12 (T) mm