ILLUMINANT 北極光企業有限公司

PRODUCT SPECIFICATION FOR TFT LCM

CUSTOMER:	
MODEL NO:	I3505-6HMT3224A
ACCEPTED BY:	

APPROVED BY:	CHECKED BY:	ORGANIZED BY:
LCM產品部 2008.11.01 隆茂生	LCM產品部 2008.11.01 贺秋芳	LCM產品部 2008.11.01 贺秋芳

■Approval for Specifications Only

□Approval for Specifications and Sample

Note: 1. Version of Specifications : 1

2. Others: Rohs Compliment

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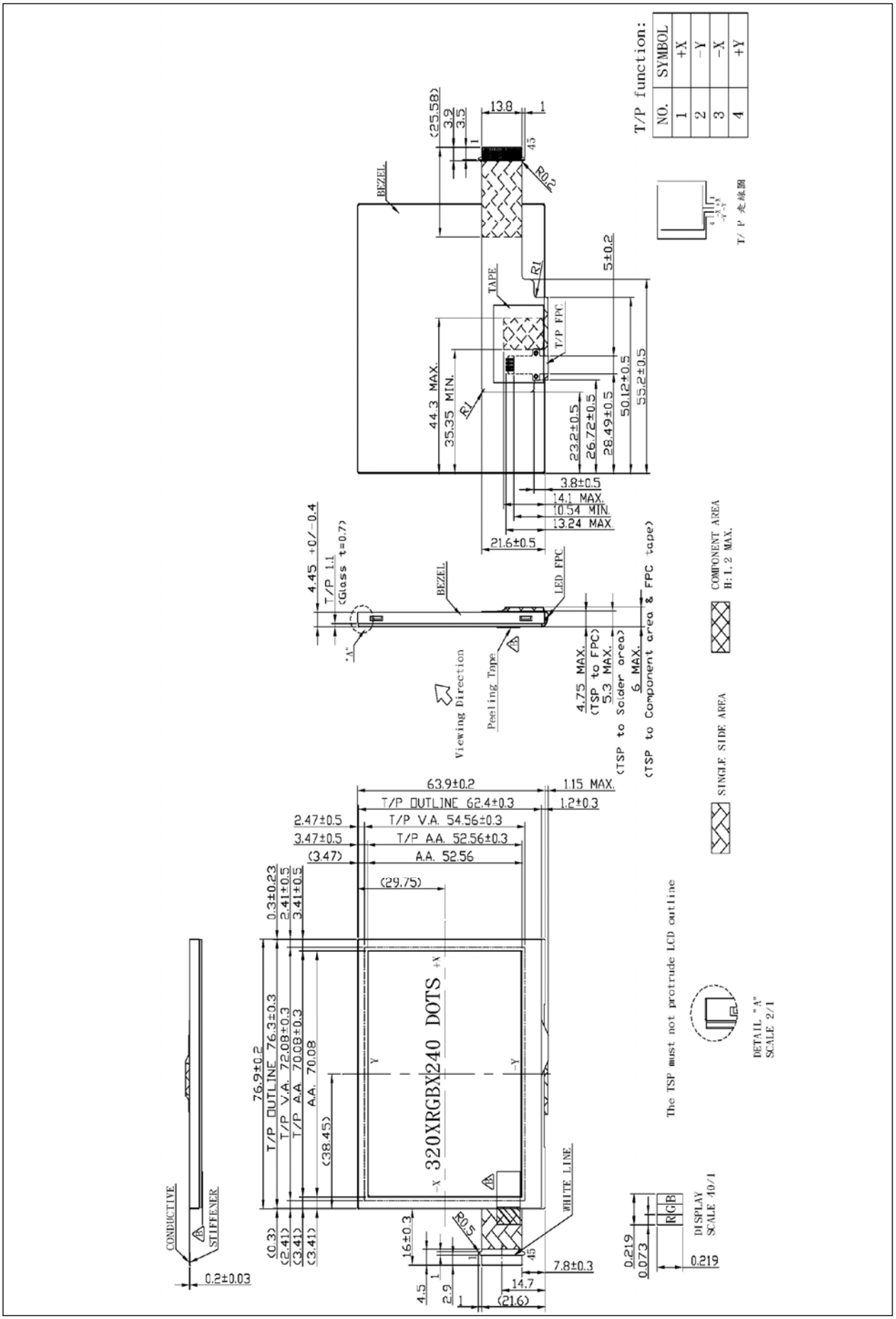
Version	Date	Contents
1	08/11/01	Initial Release

CONTENTS

1. Mechanical Specification:

Item	Standard Value	Unit
Display Size	3.5	inch
Module Dimension	76.90(W)*63.90(H)*4.45(D)	mm
Active Area	70.08(W)*52.56(H)	mm
Number of Dots	320RGB*240Dots	Dot
Pixel Arrangement	RGB Strip Type	-
Pixel Pitch	0.219(W)mm*0.219(H)mm	mm
LCD Type	Normal White / Transmissive / Positive	-
Viewing Direction	6H	-
Driver	ILI9322B	-
Interface	RGB Data Bus, 24Bit Parallel Data	
Approx. Weight	-	g
Various Color Display	16.7M	K
Backlight Color	White	
Chip Connection	LED*6	



2. Absolute Maximum Ratings:

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply Voltage	V_{CI}	-0.3		+4.6	V	Note2
Power Supply Voltage	V_{DD}	-0.3		+4.6	V	Note2
Operating Temperature	T_{OP}	-20	-	+70	℃	-
Storage Temperature	T_{STG}	-40	-	+85	℃	-
Humidity				90	%RH	Note1

*NOTE1: TA≦40℃ without dewing

NOTE2: All of voltage listed above are with respective to GND=VSS=0V. Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above.

3. Electrical Characteristics:

(GND=AVSS=0V)

Item		Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply		VCI	3.2	3.3	3.4	V	
		VDD	3.2	3.3	3.4		IOVCC
Driver Input Signal Voltage	H	V_{IH}	0.7*VDD	-	VDD	V	
	L	V_{IL}	GND	-	0.3*VDD	V	
Driver Output Signal Voltage	H	V_{OH}	0.8*VDD	-	VDD	V	
	L	V_{OL}	GND	-	0.2*VDD	V	

4. Interface:

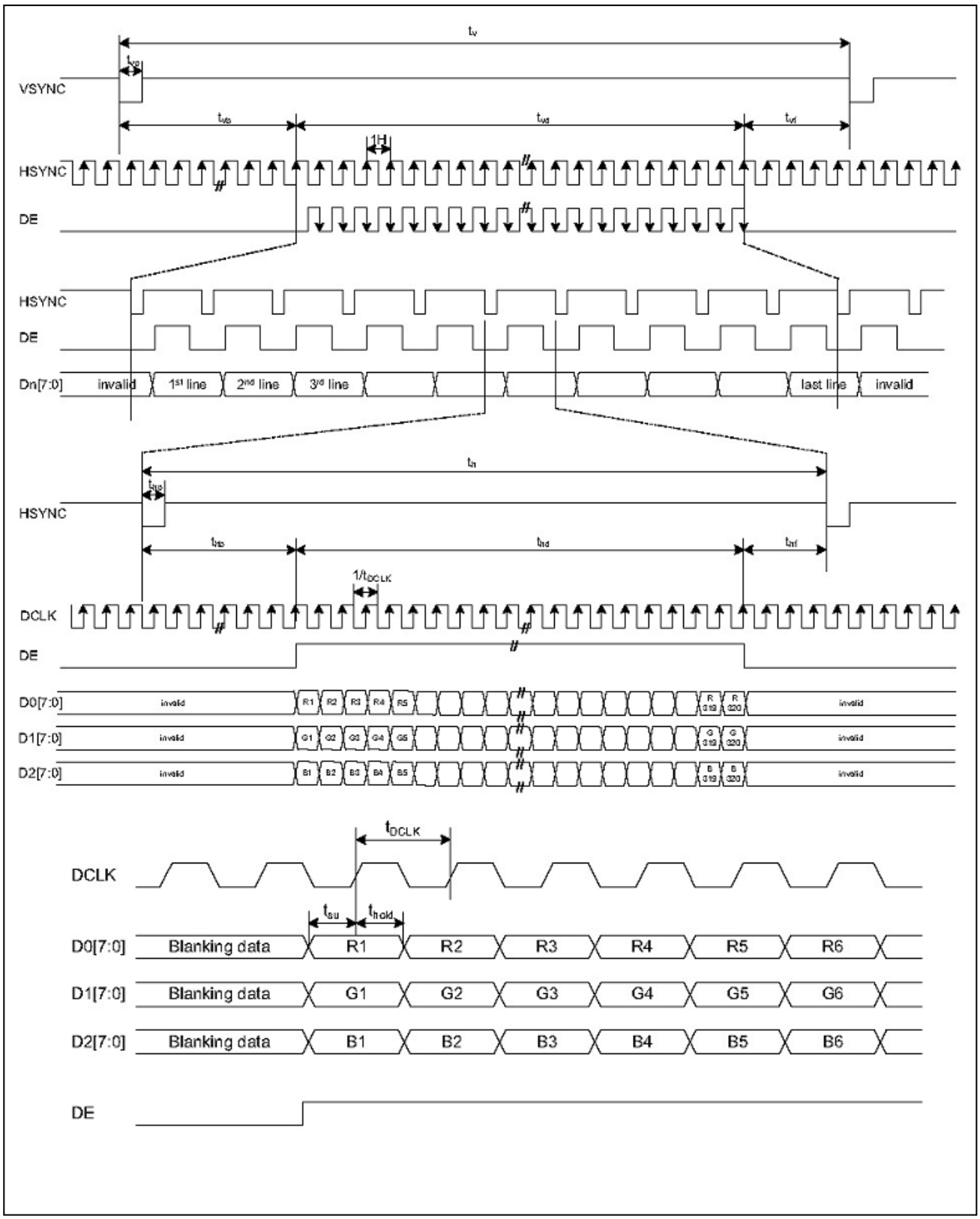
No.	Symbol	I/O	Function
1	LED-	P	Backlight Power(-)
2	LED-	P	Backlight Power(-)
3	LED+	P	Backlight Power(+)
4	LED+	P	Backlight Power(+)
5	GND	P	Ground
6	X1(R)	I/O	Touch Panel X_Right
7	Y1(B)	I/O	Touch Panel Y_Bottom
8	X2(L)	I/O	Touch Panel X_Left
9	Y2(T)	I/O	Touch Panel Y_Top
10	GND	P	Ground
11	VCI	P	Main Power
12	VCI	P	Main Power
13	VDD	P	I/O Power
14	RESET	I	Reset
15	CS	I	Chip Select Signal
16	SCL	I	SPL Clock Signal
17	SDI	I	SPL Data Input Pin
18	D0(B0)	I	Blue Data Bit 0
19	D1(B1)	I	Blue Data Bit 1
20	D2(B2)	I	Blue Data Bit 2
21	D3(B3)	I	Blue Data Bit 3
22	D4(B4)	I	Blue Data Bit 4
23	D5(B5)	I	Blue Data Bit 5
24	D6(B6)	I	Blue Data Bit 6
25	D7(B7)	I	Blue Data Bit 7
26	D8(G0)	I	Green Data Bit 0
27	D9(G1)	I	Green Data Bit 1
28	D10(G2)	I	Green Data Bit 2
29	D11(G3)	I	Green Data Bit 3

30	D12(G4)	I	Green Data Bit 4
31	D13(G5)	I	Green Data Bit 5
32	D14(G6)	I	Green Data Bit 6
33	D15(G7)	I	Green Data Bit 7
34	D16(R0)	I	Red Data Bit 0
35	D17(R1)	I	Red Data Bit 1
36	D18(R2)	I	Red Data Bit 2
37	D19(R3)	I	Red Data Bit 3
38	D20(R4)	I	Red Data Bit 4
39	D21(R5)	I	Red Data Bit 5
40	D22(R6)	I	Red Data Bit 6
41	D23(R7)	I	Red Data Bit 7
42	HSYNC	I	Horizontal Sync Input
43	VSYNC	I	Vertical Sync Input
44	DOTCLK	I	Dot Data Clock
45	ID	O	Distinguish LCM Maker

* The output of 45th pin ID is VCI level. Use ID pin to distinguish LCM maker.

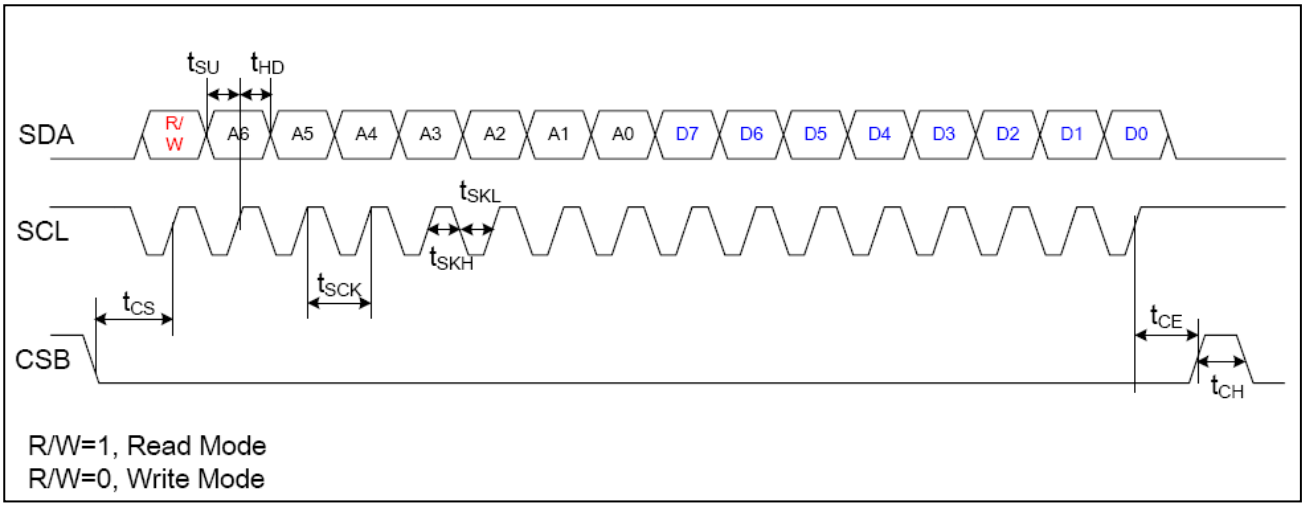
5. Timing Characteristics:

1) 24bit Parallel RGB Interface



Parameter	Symbol	Min.	Typ.	Max.	Unit.	Note
DCLK Frequency	$1/t_{DCLK}$	-	6.4	11	MHz	
Horizontal Period	t_h	-	408	-	t_{DCLK}	
Horizontal Display Period	t_{hd}	320	320	320	t_{DCLK}	
Horizontal Back Porch	t_{hb}	-	38	-	t_{DCLK}	
Horizontal Front Porch	t_{hf}	-	50	-	t_{DCLK}	
Horizontal Pulse Width	t_{hp}	1	1	-	t_{DCLK}	
Vertical Period	t_v	-	262	-	t_h	
Vertical Display Period	t_{vd}	240	240	240	t_h	
Vertical Back Porch	t_{vb}	2	18	-	t_h	
Vertical Front Porch	t_{vf}	2	4	-	t_h	
Vertical Pulse Width	t_{vp}	1	1	-	t_h	
Data setup time	t_{su}	12	-	-	ns	
Data hold time	t_{hold}	12	-	-	ns	

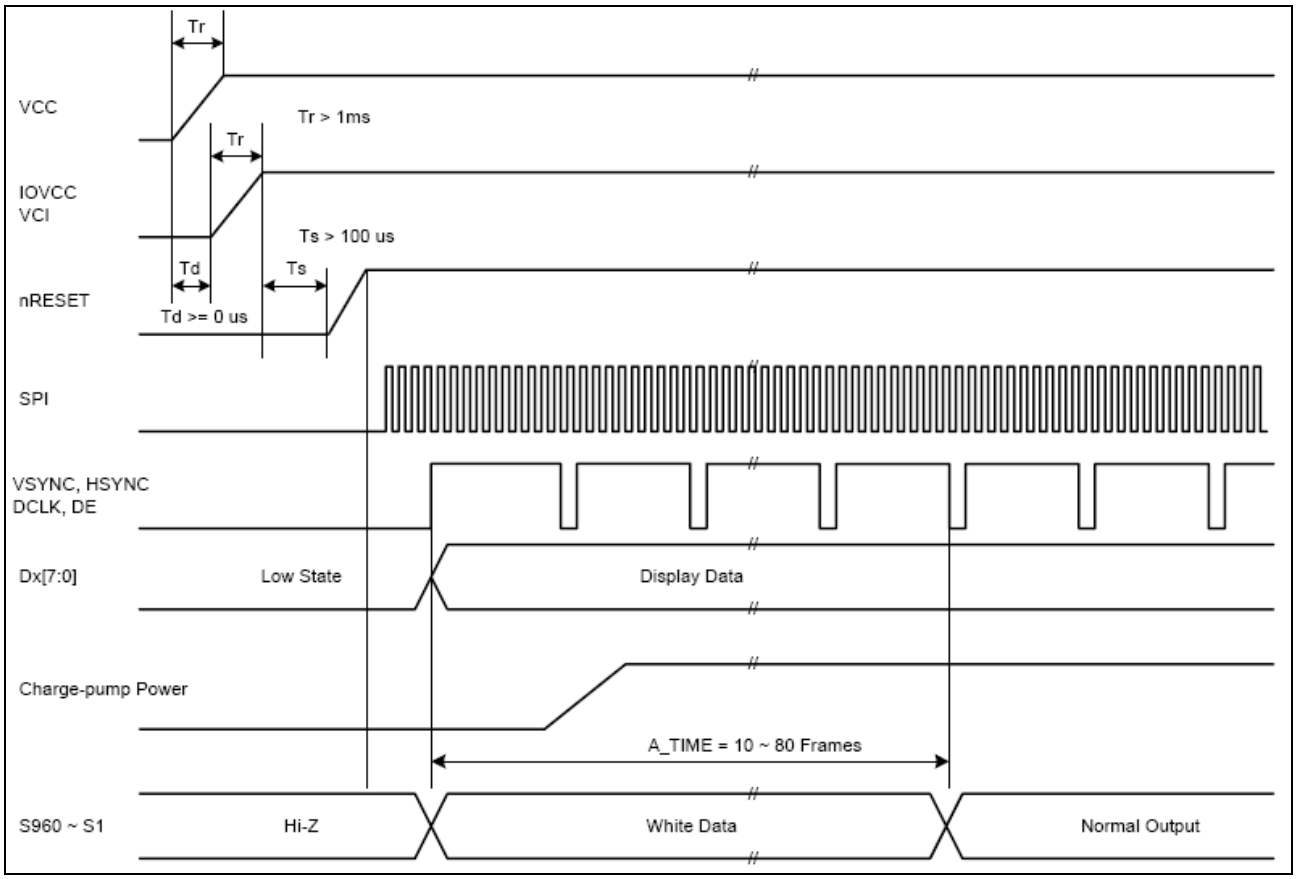
2) Serial Peripheral Interface (SPI)

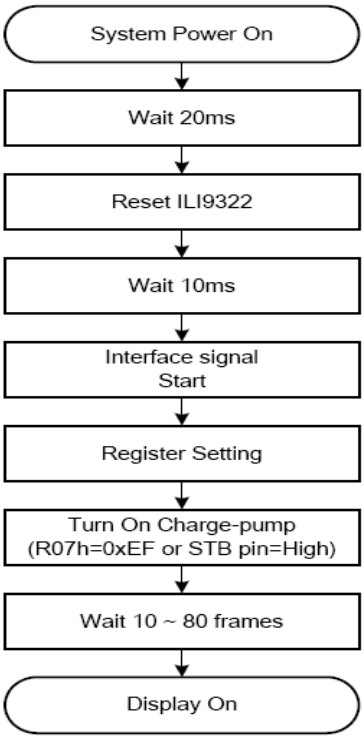


SPI Timing Specification

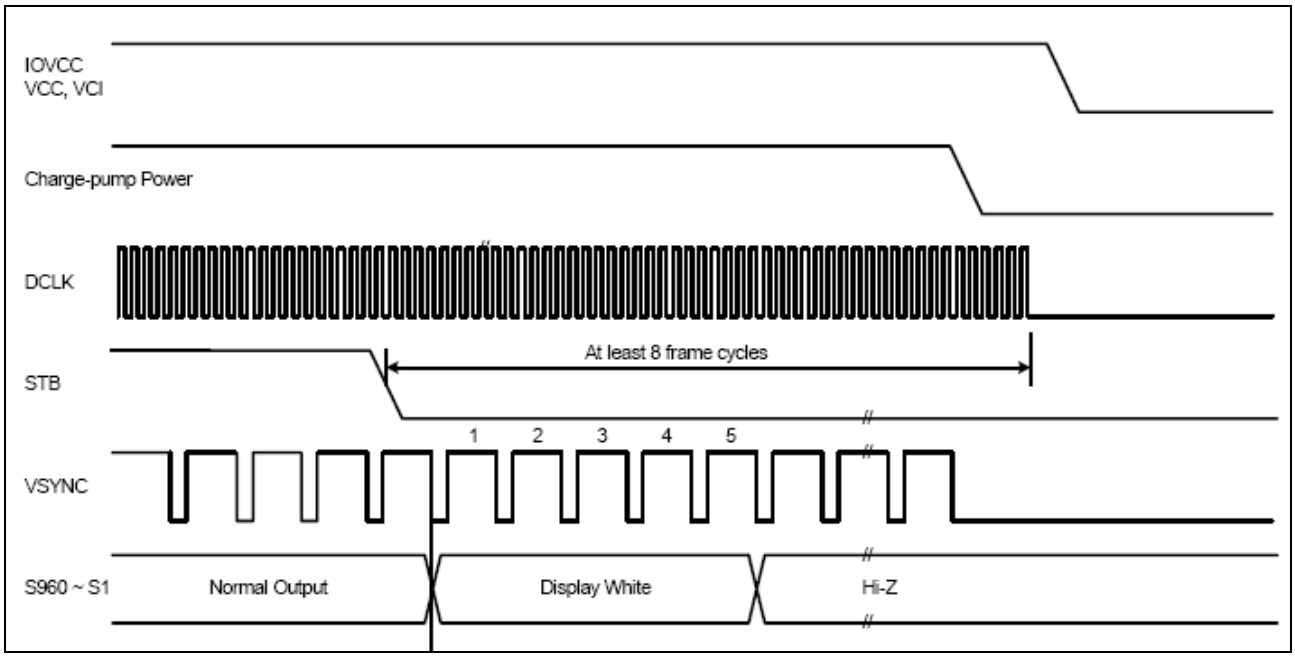
Items	Symbol	Min.	Typ.	Max.	Unit	Note
CSB to SCL Setup time	T_{CS}	50	-	-	ns	
CSB to SCL Hold time	T_{CE}	50	-	-	ns	
SCL Period	T_{SCK}	50	-	-	ns	
SCL High Period	T_{SKH}	25	-	-	ns	
SCL Low Period	T_{SKL}	25	-	-	ns	
Data Setup Time	T_{SU}	15	-	-	ns	
Data Hold Time	T_{HD}	15	-	-	ns	
CSB High Pulse Period	T_{CH}	50	-	-	ns	

3) Power ON Sequence

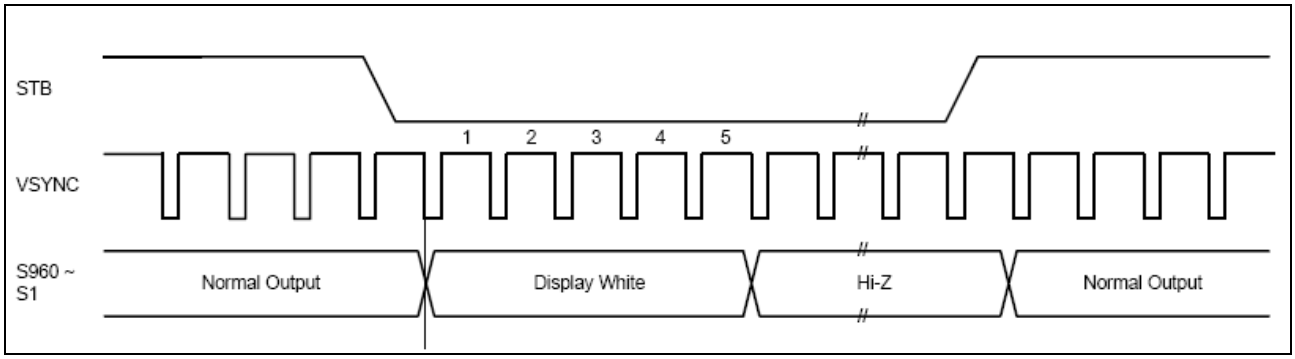


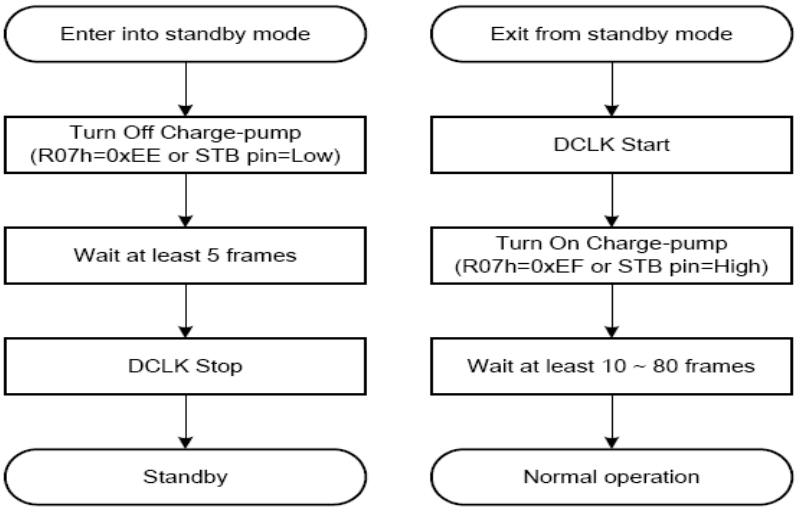


4) Power OFF Sequence



5) Stand by Sequence





6. Electro-Optical Characteristics:

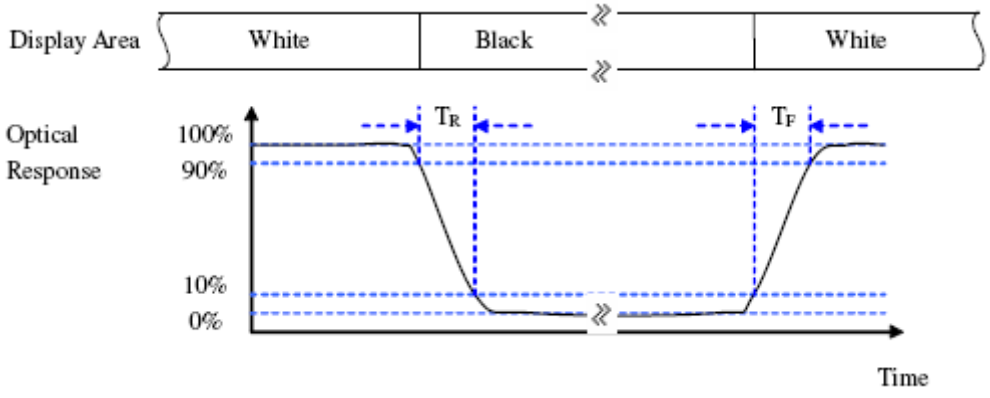
(Ta=25±2℃)

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Brightness		L	-	240	310	--	cd/m^2	With T/P
Response Time		T_R+T_F	θ=0	--	25	--	ms	Note2
Contrast Ratio		CR	At the center of A.A.	250	300			Note3
Color Chromaticity	White	W_X	θ=0	0.27	0.31	0.37	-	Note4
		W_Y		0.26	0.30	0.34		
Viewing Angle	Horizontal	3”	CR≧10	55	75	-	Degree	Note5
		9”		55	75	-		
	Vertical	12”		40	55	-		
		6”		55	75	-		

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

* Note 1 : Test equipment setup
After stabilizing and leaving the panel along at a given temperature for 30mins, the measurement should be executed. Measurement should be executed in a stable, windless and dark room. Optical specifications are measured by Topcon BM-7(fast) with a viewing angle of 2° at a distance of 50 cm and normal direction.

* Note 2 : Definition of Response Time : T_R and T_F
The figure below is the output signal of the photo detector.



* Note 3 : Definition of Contrast Ratio

$$\text{Contrast Ratio (CR)} = \frac{\text{Brightness measured when LCD is at “white state”}}{\text{Brightness measured when LCD is at “black state”}}$$

White Vi=$V_{i50\%}$ -/+1.5V

Black Vi=$V_{i50\%}$ ± 2.0V

“±”means that the analog input signal swings in phase with VCOM signal.

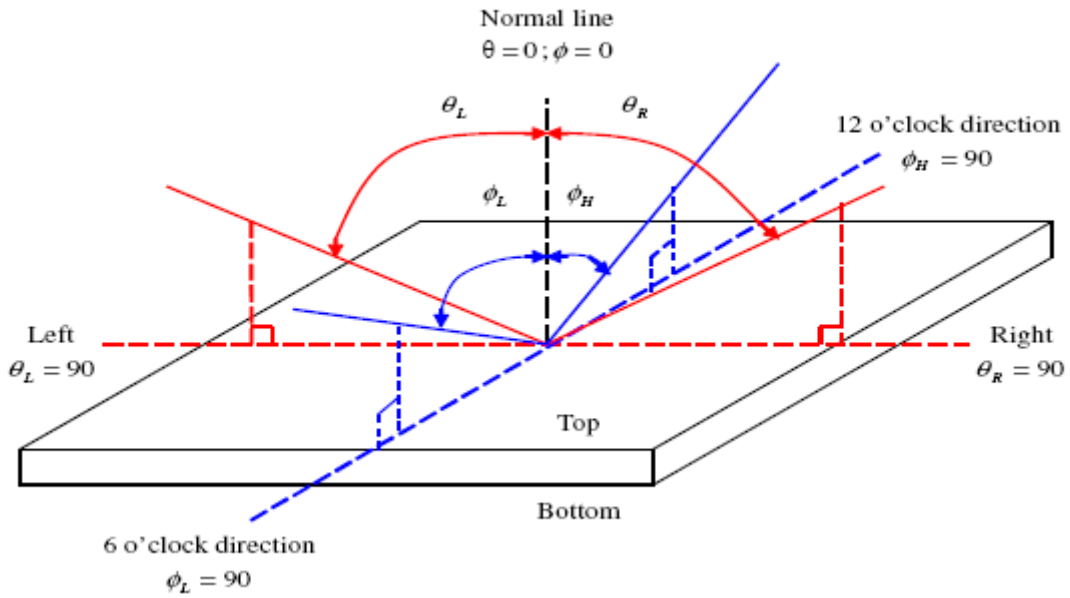
“-/+” means that the analog input signal swings out of phase with VCOM signal.

$V_{i50\%}$: The analog input voltage when transmission is 50%.

The 100% transmission is defined as the transmission of LCD panel when all the input terminal of module are electrically opened.

* Note 4 : Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

* Note 5 : Definition of Viewing Angle



7. Backlight:

7.1 Standard Lamp Styles (Edge Lighting Type):

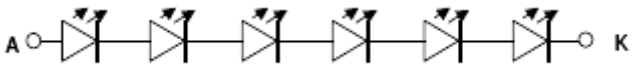
The LED chips are distributed over the edge light area of the illumination unit, which gives the less power consumption:

7.2 The Main Advantages of the LED Backlight are as Following:

The brightness of the backlight can simply be adjusted by a resistor or a potentiometer.

7.3 Backlight Characteristic

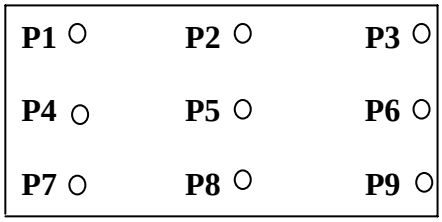
Item	Symbol	MIN.	TYP.	MAX.	Unit	Remark
LED Current	**IL**	**--**	**20**	**--**	**V**	
LED Voltage	**VL**	16.8	**--**	**21.0**	**mA**	



NOTE:

1.Backlight Only
2.Average Luminous Intensity of P1-P9
3.Uniformity = Min(P1~P9)/Max(P1~P9) * 100%>80%

7.4 Measured Method:



(Effective spatial Distribution)
Hole Diameter±1ø ; 1 to 9per Position Measured Luminous

8. Application Note:

1)Suggestion of SPI Code

Register No.	Setting Value	Description
01h	16h	Set the amplitude of Vcom alternating voltage be 1.14*VREG1OUT.
02h	36h	Set the VCOMH voltage from 0.91*VREG1OUT.
0Ch	22h	Set the operating frequency of the step-up circuit 1/ circuit 2.
0Bh	01h	Set line inversion. Set RGB I/F signal HSYNC+VSYNC mode.
10h	A7h	Set Neg_Gamma1, Pos_Gamma1
11h	57h	Set Neg_Gamma2, Pos_Gamma2
12h	73h	Set Neg_Gamma3, Pos_Gamma3
13h	72h	Set Neg_Gamma4, Pos_Gamma4
14h	73h	Set Neg_Gamma5, Pos_Gamma5
15h	55h	Set Neg_Gamma6, Pos_Gamma6
16h	17h	Set Neg_Gamma7, Pos_Gamma7
17h	62h	Set Neg_Gamma8, Pos_Gamma8

R/W	D7	D6	D5	D4	D3	D2	D1	D0
W	0	0	0	0	RGBIF[1]	RGBIF[0]	0	F/L

F/L	Function
0	Frame inversion.
1	Line Inversion. **(default)**

RGBIF[1:0]	Function
00	HSYNC+VSYNC Mode
01	HSYNC+VSYNC+DE Mode **(default)**
10	DE Only Mode
11	Setting disabled

9. Touch Panel Specifications:

1) Electronic Characteristics

Item		Min.	Typ.	Max.	Unit	Remark
Operating Voltage		--	5	7	V	DC
Resistance	X(Film)	200	--	900	Ω	
	Y(Glass)	200	--	900		
Linearity		--	--	1.5%	--	
Response Time		--	--	10	ms	
Insulation Resistance		20M	--	--	Ω	DC25V

2) Mech. & Reliability Characteristics

Item	Min.	Typ.	Max.	Unit	Remark
Activation Force	--	--	80	g	Note1
Surface Hardness	3	--	--	H	JIS-K5600
Durability-Surface Scratching	Write 100,000	--	--	Characters	Note 2
Durability-Surface Pitting	1,000,000	--	--	Touchs	Note 3

Note:

1. Stylus pen input : R 0.8mm poly acetal pen or finger.
2. By using Φ3.0mm/R0.8mm/POM pen with 2.45N (250g) loading under 70mm/sec moving speed, within the touch panel 35mm linear contact range for 100K times, one direction defined as one time, goods must fulfil.
3. By using Φ12mm/R8.0mm silicon rubber, under the loading of 250g to impact the surface of touch panel under the speed of 2~3time/second, after repeat knocking 100k times, goods must fulfil.

10. Reliability:

No.	Item	Condition	Criterion
1	High Temperature Operating	70℃ 160hrs	*No defect of operational function in room temperature are allowable(23±5℃)
2	Low Temperature Operating	-20℃ 160hrs	
3	High Temperature/ Humidity Non-Operating	60℃ 90%RH 160hrs	
4	Thermal Humidity Bias	60℃ 90%RH 160hrs	
5	High Temperature Non-Operating	85℃ 160hrs	
6	Low-Temperature Non-Operating	-40℃ 160hrs	
7	Temperature Shock Non-Operating	-30℃ ◄——► 85℃ (30min) (5min) (30min) 30cycle	
8	Electro-static Discharge	Contact:±4KV,150pF/330Ω Non-contact:±8KV, 150pF/330Ω	5time to LCD 4 corners of active area

Note 1: Test after 24 hours in room temperature(23±5°C).

Note 2: The sampling above is individually for each reliability testing condition.

Note 3: The color fading of polarizing filter should not care.

Note 4: All of the reliability testing chamber above, is using D.I. water.(Min value:1.0 MΩ-cm)

Note 5: In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.