

TFT-Display Datenblatt

Modell OT024AQUDDT-00

Kurzdaten

Hersteller	ONation
Diagonale	2,4" / 6,1 cm
Format	3:4
Auflösung	240 x 320
Backlight	LED / 150 cd/m ²
Interface	RGB
Touchscreen	ja
Temperatur	-20... +70°C (Betrieb)



Vertrieb durch:

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ONATION CORPORATION

CUSTOMER' S APPROVAL SPECIFICATIONS

MODEL: OT024AQUDDT-00
(Complied with RoHS)

CUSTOMER: _____

Version:P0.1

C O N T E N T S

ISSUE:JAN.10.2011

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CUSTOMER	tsc		
APPROVAL	APPROVAL	CHECKER	PREPARE
	<i>ch lee</i>	<i>ch lee</i>	<i>lan</i>

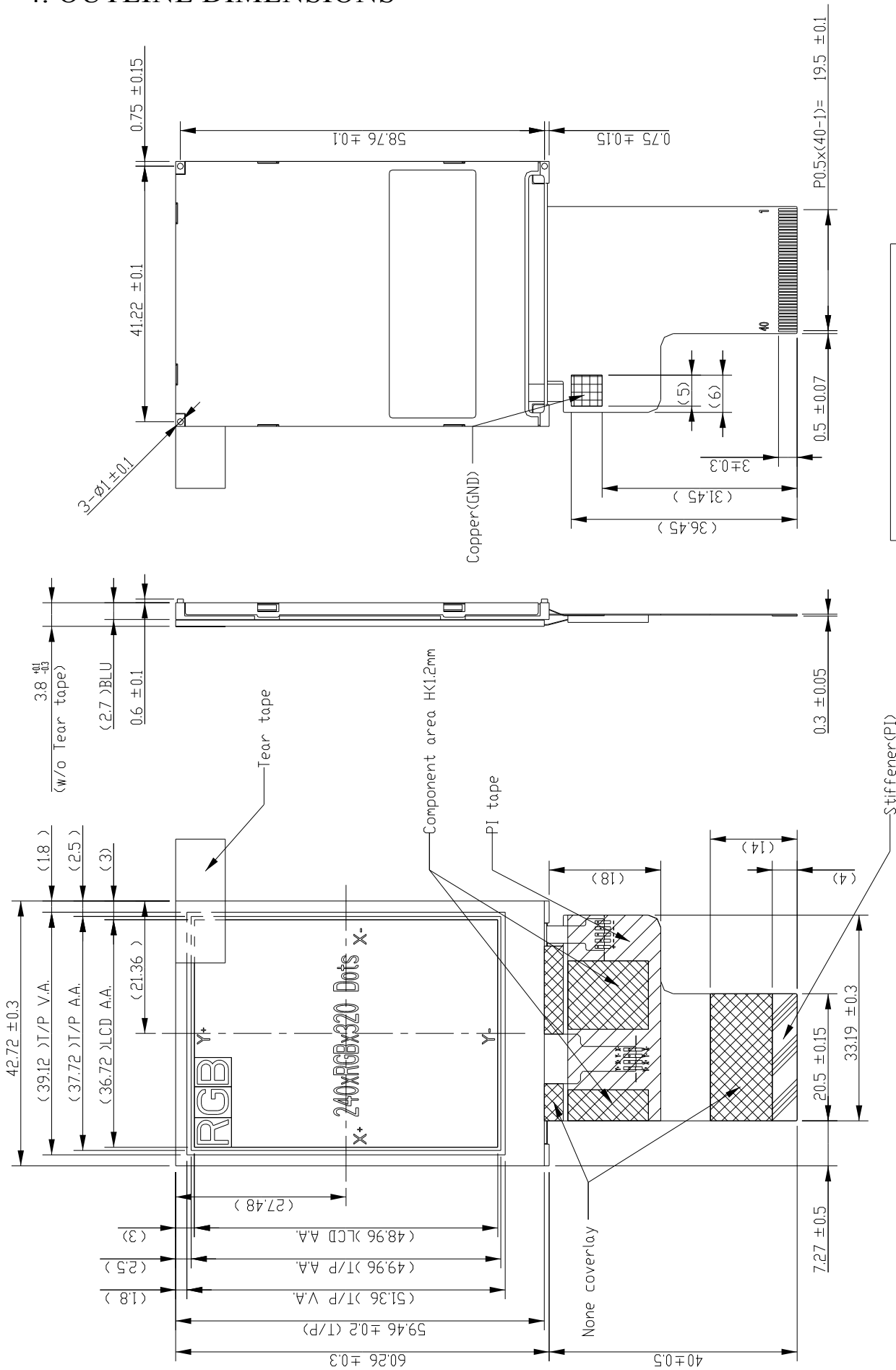
2.RECORD OF REVISION

Rev	DATE	PAGE	SUMMARY
0.1	2011.01.10	ALL	Preliminary specification was first issued

3.MECHANICAL SPECIFICATIONS

No.	Item	Specification
(1)	Number Of Dots (Dots)	240 X RGB X 320
(2)	Module Size(mm)	42.72(H) X 60.26(V) X 3.8(D)
(3)	Active Area(mm)	36.72(H) X 48.96(V)
(4)	Pixel Pitch(mm)	0.153(H) X 0.153(V)
(5)	LCD Model	Normally White TN
(6)	LED Backlight Color	White
(7)	Viewing Direction	12 o'clock
(8)	Color Configuration	R.G.B Vertical Stripe
(9)	Driving Method	COG TYPE
(10)	Driver IC	HX8347D
(11)	Module Weight(g)	(17.5)

4. OUTLINE DIMENSIONS



General tolerance	
.X:	± 0.2 X°:
.XX:	± 0.1 X°:
.XXX:	± 0.05 XX°:

- Note:
- 1.RoHS compliance
 - 2.<-,->Reference Dim
 - 3.FPC Connector:FH19SC-40S-0.5SH(HRS)
 - 4.T/P V.A.:No electrode pattern,No adhesive area

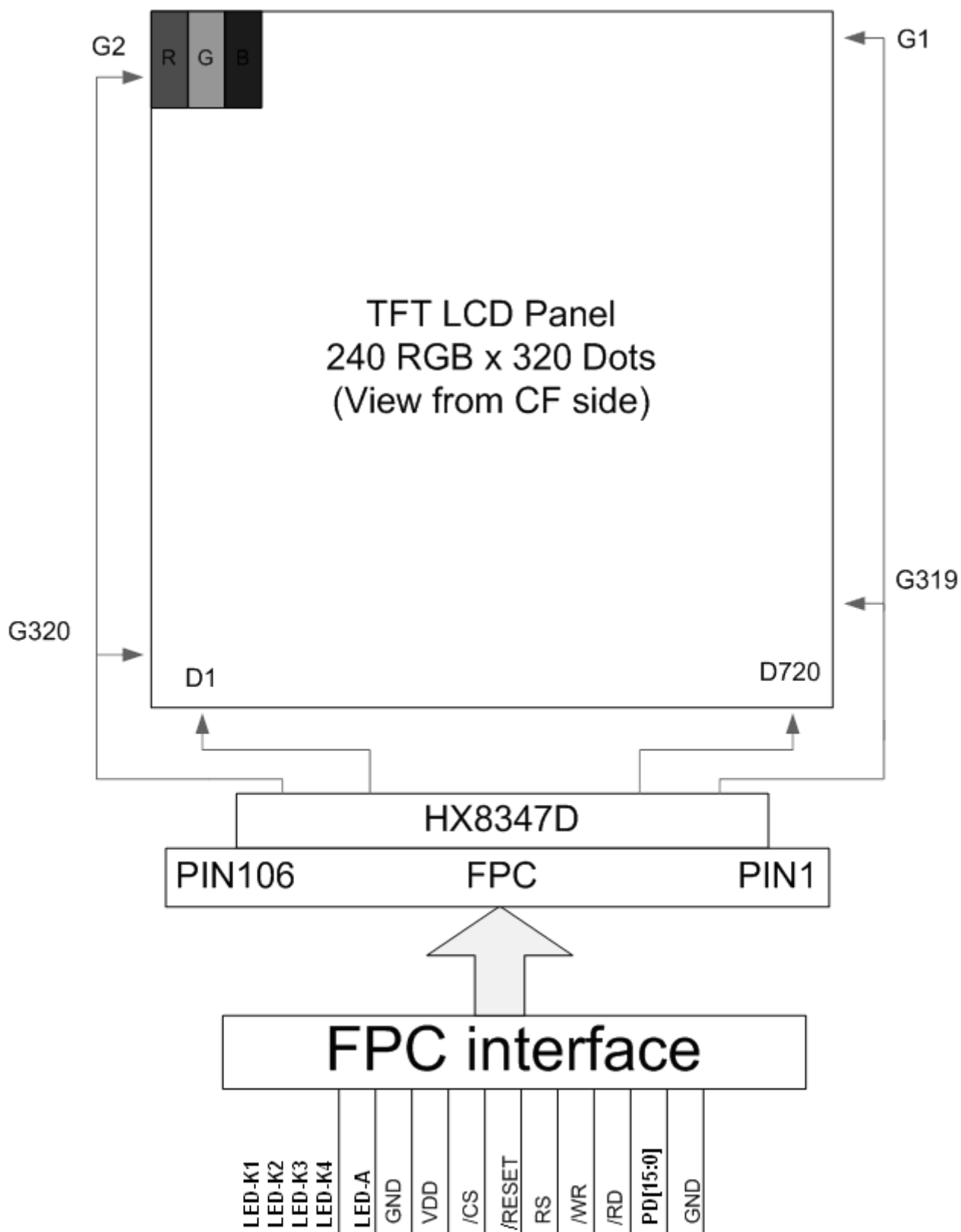
5. INTERFACE PIN CONNECTION

LCM PANEL DRIVING SECTION(Connector: HIROSE FH19SC-40S-0.5SH or Equivalent)

No.	Symbol	I/O	Function
1	GND	P	Ground
2	DOTCLK	I	Clock input
3	GND	P	Ground
4	ENABLE	I	Data enable signal
5	VSYNC	I	Vertical synchronous signal
6	HSYNC	I	Horizontal synchronous signal
7	/RESET	I	Hardware reset
8	PD1	I/O	Blue signal data bus(LSB)
9	PD2	I/O	Blue signal data bus
10	PD3	I/O	Blue signal data bus
11	PD4	I/O	Blue signal data bus
12	PD5	I/O	Blue signal data bus(MSB)
13	PD6	I/O	Green signal data bus(LSB)
14	PD7	I/O	Green signal data bus
15	PD8	I/O	Green signal data bus
16	PD9	I/O	Green signal data bus
17	PD10	I/O	Green signal data bus
18	PD11	I/O	Green signal data bus(MSB)
19	PD13	I/O	Red signal data bus(LSB)
20	PD14	I/O	Red signal data bus
21	PD15	I/O	Red signal data bus
22	PD16	I/O	Red signal data bus
23	PD17	I/O	Red signal data bus(MSB)
24	VDD	P	Digital power supply voltage
25	VCI	P	Analog power supply voltage
26	GND	P	Ground
27	Y+	I	Touch panel signal (YU)
28	X-	I	Touch panel signal (XR)
29	Y-	I	Touch panel signal (YD)
30	X+	I	Touch panel signal (XL)
31	GND	P	Ground
32	WR/SCL	I	Clock pin for serial pin
33	SDI	I	Data input pin for serial mode
34	/CS	I	Chip select
35	GND	P	Ground
36	LED-K1	P	Cathode for LED
37	LED-K2	P	Cathode for LED
38	LED-K3	P	Cathode for LED
39	LED-K4	P	Cathode for LED
40	LED-A	P	Anode for LED

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6. BLOCK DIAGRAM



7. ABSOLUTE MAXIMUM RATINGS

7.1 ELECTRICAL ABSOLUTE MAXIMUM RATING

ITEM	SYMBOL	Values		UNIT	Remark
		MIN.	MAX.		
Power Supply Voltages	VDD	-0.3	+4.6	V	
	VCI	-0.3	+4.6	V	

7.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		Remark
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-20	70	-30	80	Note 1,2,3
Humidity		90	-	90	Note 4

Note 1 : The response time will become lower when operated at low temperature.

Note 2 : Background color changes slightly depending on ambient temperature.

Note 3 : Operation $T_a=70^{\circ}\text{C}$ & $-20^{\circ}\text{C} \leq 240\text{Hrs}$.

Note 4 : Operation $T_a=60^{\circ}\text{C}$ & $H=90\% \leq 240\text{Hrs}$.

8. ELECTRICAL CHARACTERISTICS

8.1 LCM ELECTRICAL CHARACTERISTICS

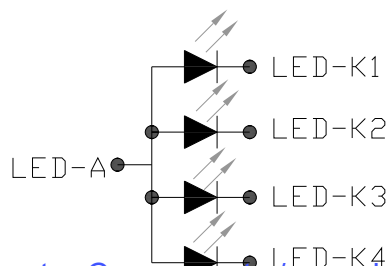
$T_a=25^{\circ}\text{C}$

Item	Symbol	Values			Unit
		Min.	Typ.	Max.	
Power voltage	VDD	1.65	2.8	3.3	V
	VCI	2.5	2.8	3.3	V
Current Consumption**	I_{DD}	-	(4.66)	-	mA
Input high voltage	V_{IH}	$0.8 \cdot V_{DD}$	-	VDD	V
Input low voltage	V_{IL}	GND	-	$0.2 \cdot V_{DD}$	V
Output high voltage	V_{OH}	$0.8 \cdot V_{DD}$	-	VDD	V
Output low voltage	V_{OL}	0	-	$0.2 \cdot V_{DD}$	V

**Test pattern:Black

8.2 BACKLIGHT UNITS

Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
LED Voltage	V_L	-	(3.2)	-	V	
LED Current	I_f	-	60	-	mA	



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9.OPTICAL CHARACTERISTICS

Ta=25°C

Item	Symbol	Conditions	Specifications				REMARK
			Min.	Typ.	Max.	Unit	
Contrast Ratio	CR	At optimized Viewing angle	-	250	-	-	Note (1)
Response Time (Tr+Tf)		T=0	-	30	-	ms	Note (2)
Brightness		Center	-	150	-	cd/m2	
Uniformity			-	80	-	%	Note (5)
Color Chromaticity	Red	XR	(0.51)	(0.64)	(0.71)	-	Note (4)
		YR	(0.28)	(0.33)	(0.38)		
	Green	XG	(0.26)	(0.31)	(0.36)	-	
		YG	(0.57)	(0.62)	(0.67)		
	Blue	XB	(0.09)	(0.14)	(0.19)	-	
		YB	(0.06)	(0.06)	(0.11)		
	White	XW	(0.23)	(0.28)	(0.33)	-	
		YW	(0.25)	(0.30)	(0.35)		
Viewing Angle		θY+		50		Deg.	Note (3)
		θY-		30			
		θX-		60			
		θX+		60			

*Note (1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L63 / L0$$

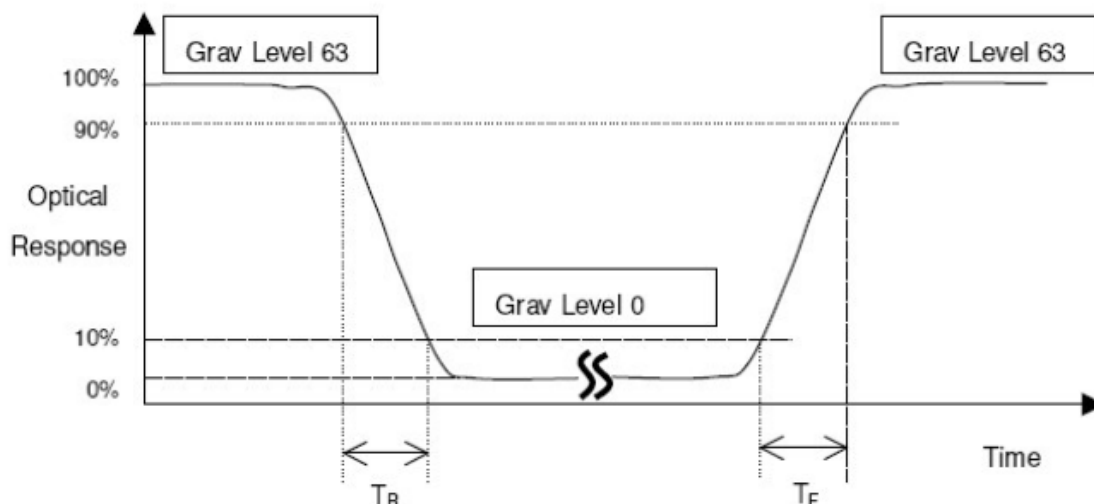
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

$$CR = CR (5)$$

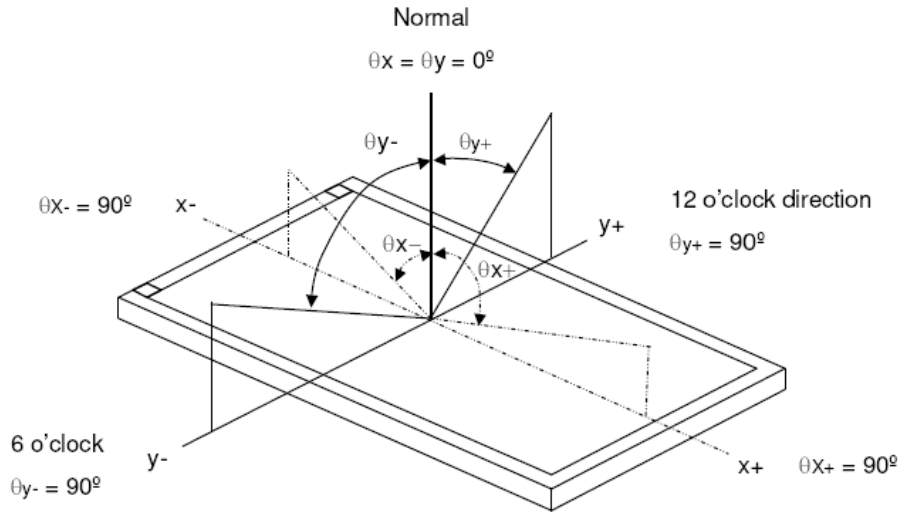
CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

*Note (2) Definition of Response Time (TR, TF):



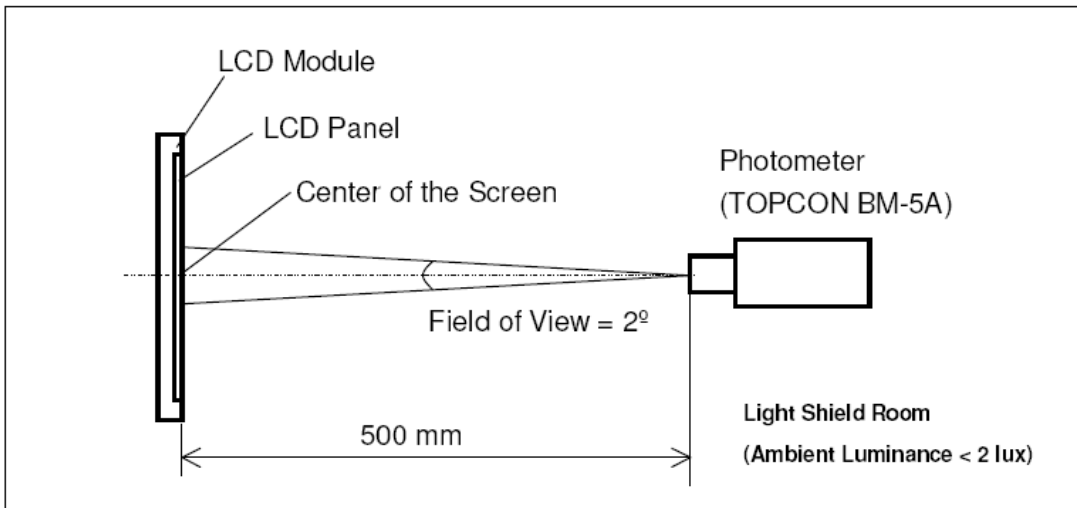
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*Note(3) Definition of Viewing Angle

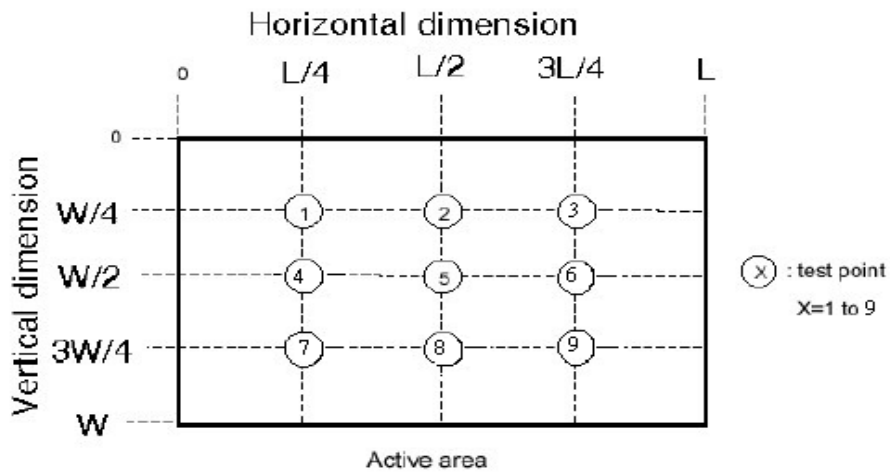


*Note (4) Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



*Note(5)



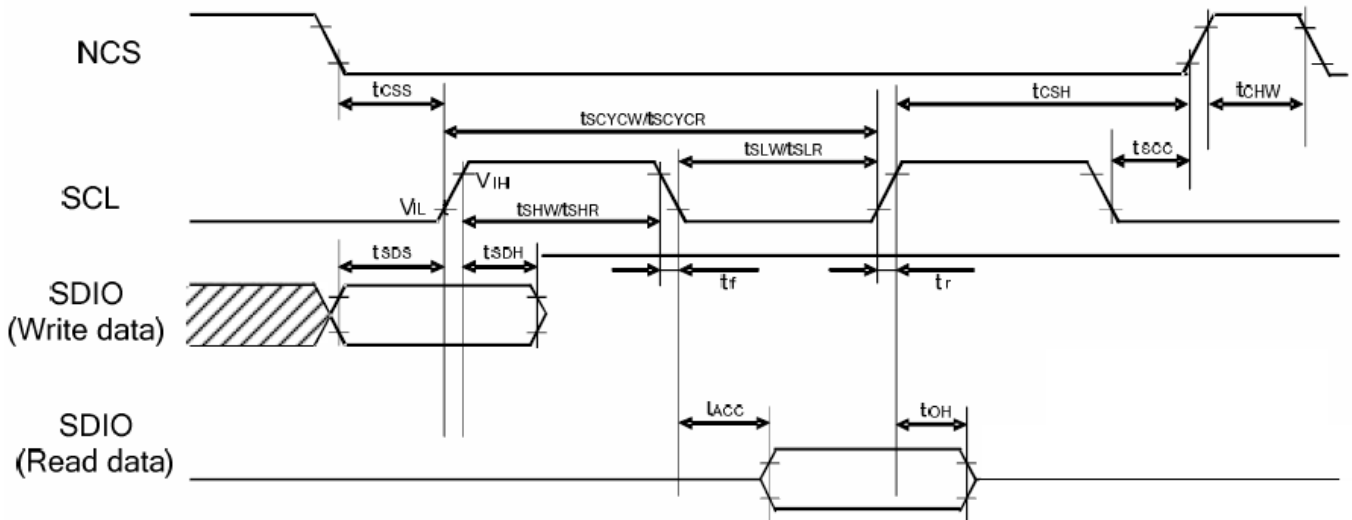
$$\left(1 - \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}} \right) \times 100\% > 80\%$$

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10. AC CHARACTERISTICS

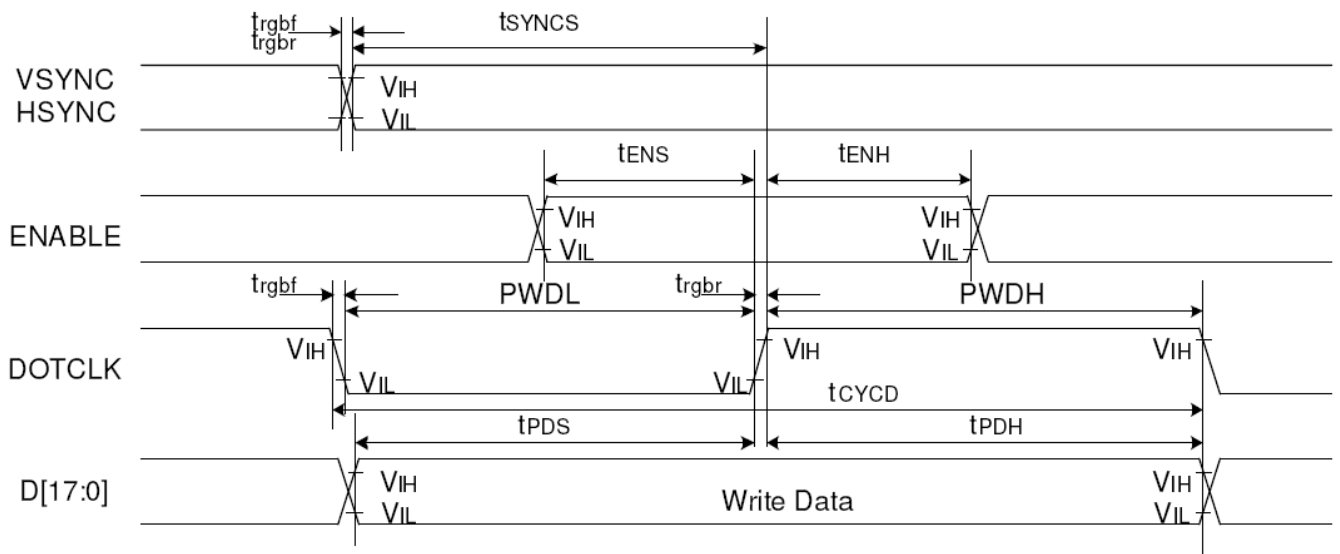
10.1 SERIAL DATA TRANSFER INTERFACE TIMING CHARACTERISTICS

Signal	Symbol	Parameter	min	max	Unit	Remarks
SCL	tscycw	Serial clock cycle (write)	20	-	ns	
	tshw	SCL "H" pulse width (write)	8	-	ns	
	tslw	SCL "L" pulse width (write)	8	-	ns	
	tscycr	Serial clock cycle (read)	150	-	ns	
	tshr	SCL "H" pulse width (read)	60	-	ns	
	tslr	SCL "L" pulse width (read)	60	-	ns	
SDIO	tsds	Data setup time (write)	10	-	ns	
	tsdh	Data hold time (write)	10	-	ns	
SDI/SDO	tacc	Access time (read)	10	50	ns	
	toh	Output disable time (read)	15	50	ns	
NCS	tchw	CSX "H" pulse width	40	-	ns	
	tcss	CSX-SCL time (write)	15	-	ns	
	tcsH		15	-	ns	

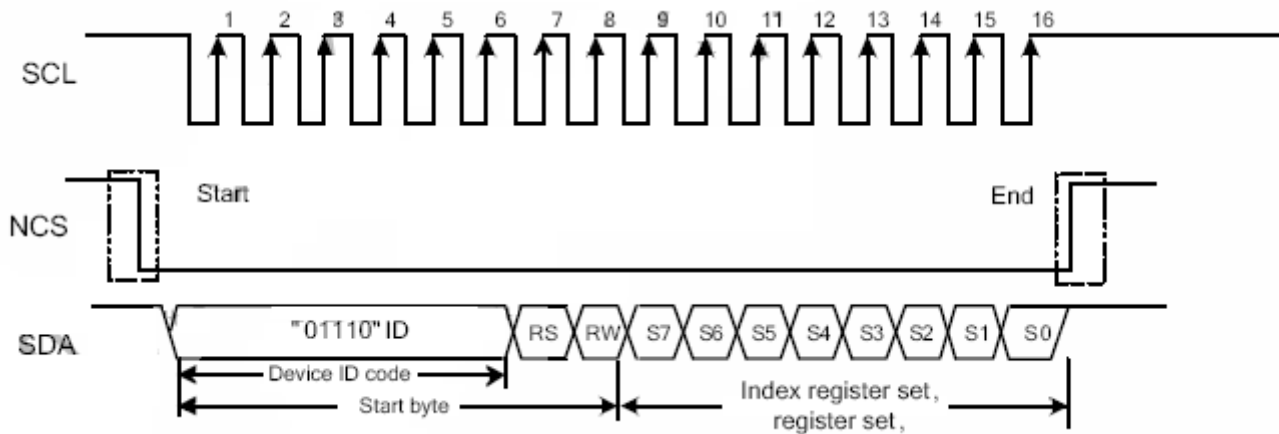


10.2 PARALLEL 18/16-bit RGB INTERFACE TIMING CHARACTERISTICS

Signal	Symbol	Condition	min	max	Unit	Remarks
Pixel low pulse width	T_{CLKLT}	-	15	-	ns	
Pixel high pulse width	T_{CLKHT}	-	15	-	ns	
Vertical Sync. set-up time	T_{VSST}	-	15	-	ns	
Vertical Sync. hold time	T_{VSSH}	-	15	-	ns	
Horizontal Sync. set-up time	T_{HSST}	-	15	-	ns	
Horizontal Sync. hold time	T_{HSSH}	-	15	-	ns	
Data enable set-up time	T_{DEST}	-	15	-	ns	
Data enable hold time	T_{DEHT}	-	15	-	ns	
Data set-up time	T_{DST}	-	15	-	ns	
Data hold time	T_{DHT}	-	15	-	ns	
Phase difference of sync signal falling edge	Thv	-	0	240	dotclk	



10.3 SERIAL INTERFACE(3-wire)



RS	R/W	Function
0	0	Set index register
1	0	Writes instruction or GRAM data
1	1	Reads command (not support GRAM read)

10.4 RGB INTERFACE

PARALLEL RGB INTERFACE SET TABLE

17H	D17	D16	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0	Bus width
50h	R4	R3	R2	R1	R0	x	G5	G4	G3	G2	G1	G0	B4	B3	B2	B1	B0	x	16-bit data

11.TOUCH SCREEN PANEL SPECIFICATION

11.1 ELECTRONIC CHARACTERISTIC

Item	Min.	Typ.	Max.	Unit	Note	
Linearity	-	-	1.5	%		
Circuit Resistance	X-axis	160	377	640	Ω	
	Y-axis	260	529	1040	Ω	
Insulation Resistance	20	-	-	M Ω		
Operating Voltage	-	-	5	V		
Chattering	-	-	10	ms		
Transmittance	80	-	-	%		

11.2 MECHANICAL & RELIABILITY CHARACTERISTIC

Item	Min.	Typ.	Max.	Unit	Note
Activation force	-	20	50	gf	Note1
Pen Writing Durability	100,000	-	-	characters	Note2
Pitting Durability	1,000,000	-	-	touches	Note3
Surface hardness	3	-	-	H	Note4

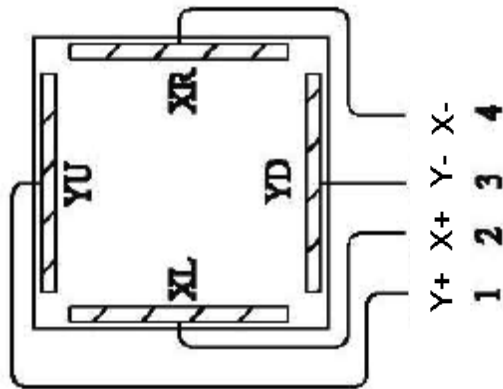
Note1 : Operation force with R0.8mm stylus pen.

Note2 : Tip R 0.8 mm stylus pen, Load 150 gf, Sliding speed 150 mm/sec, Sliding length 25 mm.

Note3 : Tip R8 mm Silicone rubber & Tip R0.8 mm stylus pen(Pom), Load 250 gf, Hitting speed 3 times/sec.

Note4 : 3H pressure 500 gf, 45deg.

11.3 TOUCH SCREEN PANEL



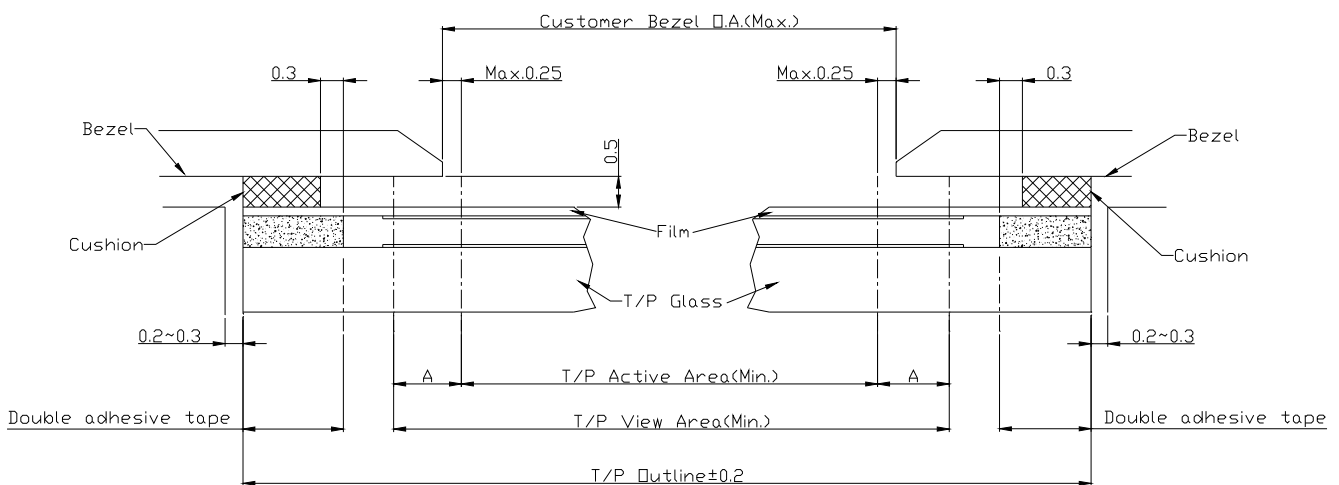
Circuit Diagram

11.4 TOUCH SCREEN PANEL PIN DEFINE

Pin No.	Symbol	I/O	Function
1	Y+	Top	Top electrode – differential analog
2	X+	Left	Left electrode – differential analog
3	Y-	Bottom	Bottom electrode – differential analog
4	X-	Right	Right electrode – differential analog

11.5 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 dimension of the touch panel and tail. A gap must be made to absorb the tolerance in the case and connector



Note
A=Pressing Prohibition Area

12. RELIABILITY TEST

Environmental Test				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	80°C	240HRS	
2	Low Temperature Storage	-30±3°C	240HRS	
3	High Temperature Operation	70°C	240HRS	
4	Low Temperature Operation	-20°C	240HRS	
5	Temperature Cycle	-30°C ←→ 80°C (30min) (30min)	50CYCLE	
6	High Temperature Humidity Operation	60°C 90%RH	240HRS	

NOTE (1): a. THE MODULE SHOULD WORK PROPERLY.

b. BEFORE AND AFTER FUNCTION TEST, THE DIFFERENCE OF CONSUMPTIVE CURRENT SHOULD BE WITHIN 10%

NOTE (2) : a. THE MODULE SHOULD WORK PROPERLY.

b. THE MODLUE WON'T BE DEFORMATIVE, COLOR CHANGEABLE OR BROKEN.

c. THE MODULES CAN'T BE APART.