

## PRODUCT SPECIFICATION

PART NUMBER # REV: QP-070WSVGAMLLC04#00

DESCRIPTION: TFT 7"wide 1024\*600 IPS

LVDS 600CD DSA with Rocktouch Pcap 3mm Black with Ext DSA

- ( ) Preliminary Specification
- ( V ) Approved Specification

<b>Customer Name:</b>	
<b>Signature:</b>	<b>Date:</b>

<b>QiteX FutureLabs Advanced Display Product Line</b>	
<b>PREPARED BY</b>	<b>REVIEWED BY</b>
<i>Renee Huang</i>	<i>David</i>

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### Revision History

Spec Version	Date	Page	Description	Note
V1.0	2022/12/20		1 <sup>st</sup> initial	

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# 1. Precautions and Warranty

## 1.1 Precaution

- 1.1.1 Do not apply rough force such as bending or twisting to the module during assembly.
- 1.1.2 To assemble or install module into user's system can be only in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.
- 1.1.3 Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.
- 1.1.4 It's not permitted to have pressure or impulse on the module because the LCD panel and Backlight will be damaged.
- 1.1.5 Always follow the correct power sequence when LCD module is connecting and operating. This can prevent damage to the CMOS LSI chips during latch-up.
- 1.1.6 Do not pull the I/F connector in or out while the module is operating.
- 1.1.7 Do not disassemble the module, or insert anything into the Backlight unit
- 1.1.8 It is dangerous that moisture come into or contacted the LCD module, because moisture may damage LCD module when it is operating.
- 1.1.9 High temperature or humidity may reduce the performance of module. Please store LCD module
- 1.1.10 within the specified storage conditions.
- 1.1.11 The response time will become slowly below lower temperature.
- 1.1.12 Do not keep same pattern in a long period of time. It may cause image sticking on LCD.
- 1.1.13 Display may change color with different temperature.
- 1.1.14 The Module should be kept into anti-static bag or other containers resistant to static for storage.
- 1.1.15 If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.
- 1.1.16 After the module's end of life, it is not harmful in case of normal operation and storage.

## 1.2 Warranty

- 1.2.1 Our warranty liability is limited to repair and/or replacement. We will not be responsible for any consequential loss.
- 1.2.2 If possible, we suggest customer to use up all modules in six months. If the module storage time over twelve months, we suggest that recheck it before the module be used.

## 2. GENERAL DESCRIPTION

The specification is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This product is composed of a TFT-LCD panel, driver ICs and a backlight unit.

### 2.1 General Specifications

Features	Details	Unit
Display Size(Diagonal)	7"W	
Display Mode	Transmissive /Normally black	
Resolution	1024 RGB x 600	Pixels
View Direction	FULL View	Best Image
Module Outline (H x V x D)	193 x 136 x 7.45 193 x 136 x 13.31 (Max.) (Note1)	mm
Active Area	154.21(H) x 85.92(V)	mm
Pixel Size	0.1506 x 0.1432	mm
Pixel Arrangement	RGB Vertical stripe	
Display Colors	262K/16.7 M	
Interface	6/8 bit LVDS Interface	
With or Without Touch Panel	With	-

Note1: Inclusive hooks, posts, FFC/FPC tail etc.

### 3. Absolute Maximum Ratings

#### 3.1 Absolute Ratings of Environment

V<sub>SS</sub>=0V, Ta=25°C

Item	Symbol	Min.	Max.	Unit
Digital Supply Voltage	VCC LCD	-0.5	5.0	V
Storage temperature	T <sub>STG</sub>	-30	+80	°C
Operating temperature	T <sub>OP</sub>	-20	+70	°C

Note 1: If Ta below 50°C, the maximal humidity is 90%RH, if Ta over 50°C, absolute humidity should be less than 60%RH.

Note 2: The response time will be extremely slow when the operating temperature is around -10°C, and the back ground will become darker at high temperature operating.

#### 3.2 Electrical Absolute Ratings

##### 3.2.1 TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit
Digital Supply Voltage	VCC-LCD	2.3	3.3	3.6	V
Differential input high threshold voltage	RxVTH	-	-	0.1	V
Differential input low threshold voltage	RxVTL	-0.1	-	-	V
Input voltage range (singled-end)	RxVIN	0	-	2.4	V
Differential input common mode voltage	RxVCM	VID /2	-	2.4 -  VID /2	V
Differential input voltage	VID	0.2	-	0.6	V
Current Consumption All white	ICC	-	90	-	mA

##### 3.2.2 Backlight Unit

Item	Symbol	Min.	Typ.	Max.	Unit
BLU Supply Voltage	BLK VCC	-	5	7.5	V
BLU Consumption Current	BLK ICC	-	450	-	mA
Logic Low Threshold (EN,PWM)	V <sub>IL</sub>	-	-	0.8	V
Logic High Threshold (EN,PWM)	V <sub>IH</sub>	1.9	-	-	V
PWM Duty Cycle	-	0.1	-	100	%
PWM Dimming Frequency	f <sub>DIM</sub>	100	-	30K	Hz
Pull Down Resistor (Both EN and PWM pins)	R <sub>PD</sub>	-	800	-	kΩ
LED working life(25°C)			40,000	-	Hrs

Note1 : Led life time defined as follows: The final brightness is at 50% of original brightness.

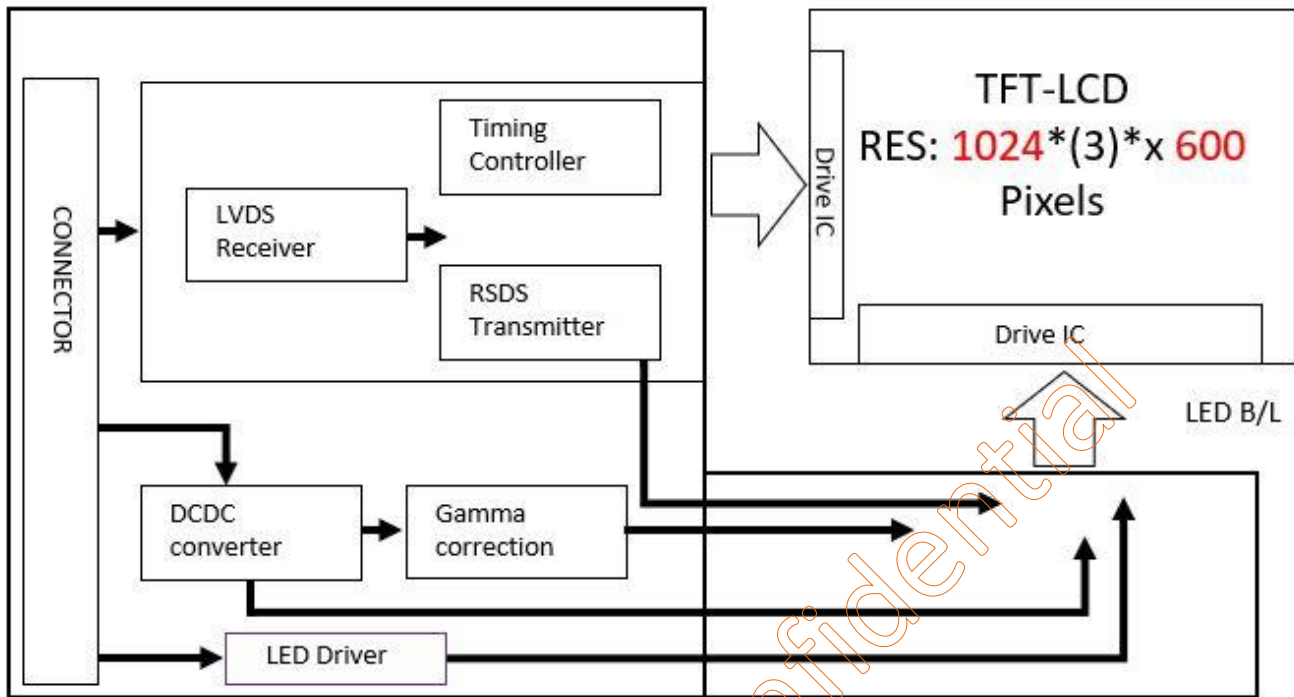
The environmental conducted under ambient air flow, at  $T_a=25\pm 2$  °C, 60%RH $\pm$ 5%.

Typical operating life time is estimated data, led power dissipation is evaluated by led supplier.

PWM Diming Frequency (Hz)	Dimming Duty	
	Min(%)	Max(%)
100< FDIM < 200	0.1	100
200< FDIM < 500	0.4	100
500< FDIM < 1K	0.8	100
1K< FDIM < 2K	1.5	100
2K< FDIM < 5K	4	100
5K< FDIM < 10K	8	100
10K< FDIM < 30K	12	100

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## 4. BLOCK DIAGRAM





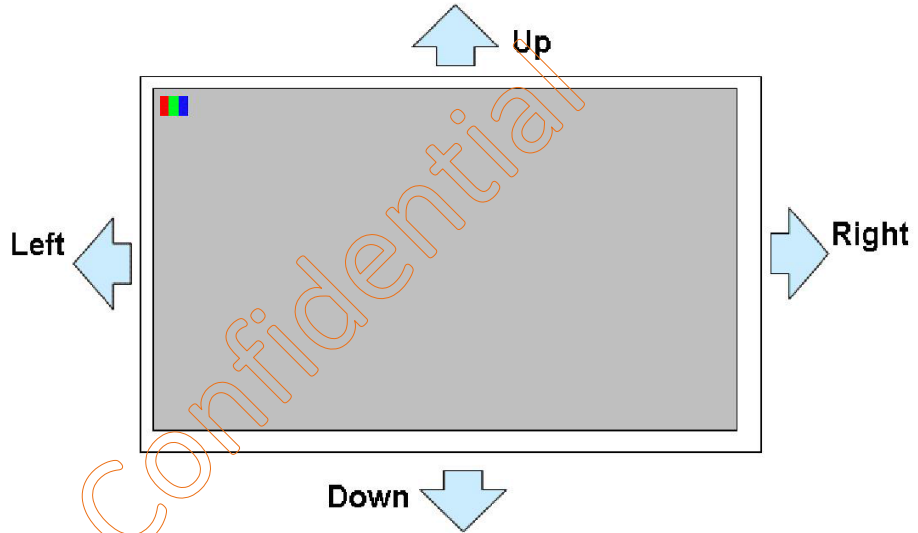
## 5. PIN CONNECTIONS

Connector: Starconn 093G30-B0001A-M4 or Equivalent.

No.	Symbol	Function
1	VCC LCD(3.3V)	Power Supply
2	VCC LCD(3.3V)	Power Supply
3	SEL 6/8	“L”: 8bit LVDS interface “H”:6bit LVDS interface
4	RX0-	LVDS differential data input
5	RX0+	LVDS differential data input
6	RX1-	LVDS differential data input
7	RX1+	LVDS differential data input
8	RX2-	LVDS differential data input
9	RX2+	LVDS differential data input
10	GND	Ground
11	RXCLK-	CLOCK differential clock input
12	RXCLK+	CLOCK differential clock input
13	RX3-	LVDS differential data input
14	RX3+	LVDS differential data input
15	GND	Ground
16	U/D	Horizontal inversion (Note1)
17	L/R	Vertical inversion (Note1)
18	NC	No connection
19	NC	No connection
20	NC	No connection
21	NC	No connection
22	GND	Ground
23	NC	No connection
24	NC	No connection
25	NC	No connection
26	NC	No connection
27	BLK VCC(5V)	Power for LED backlight
28	BLK VCC(5V)	Power for LED backlight
29	ENABLE	BL Enable
30	PWM	Dimming Control Input

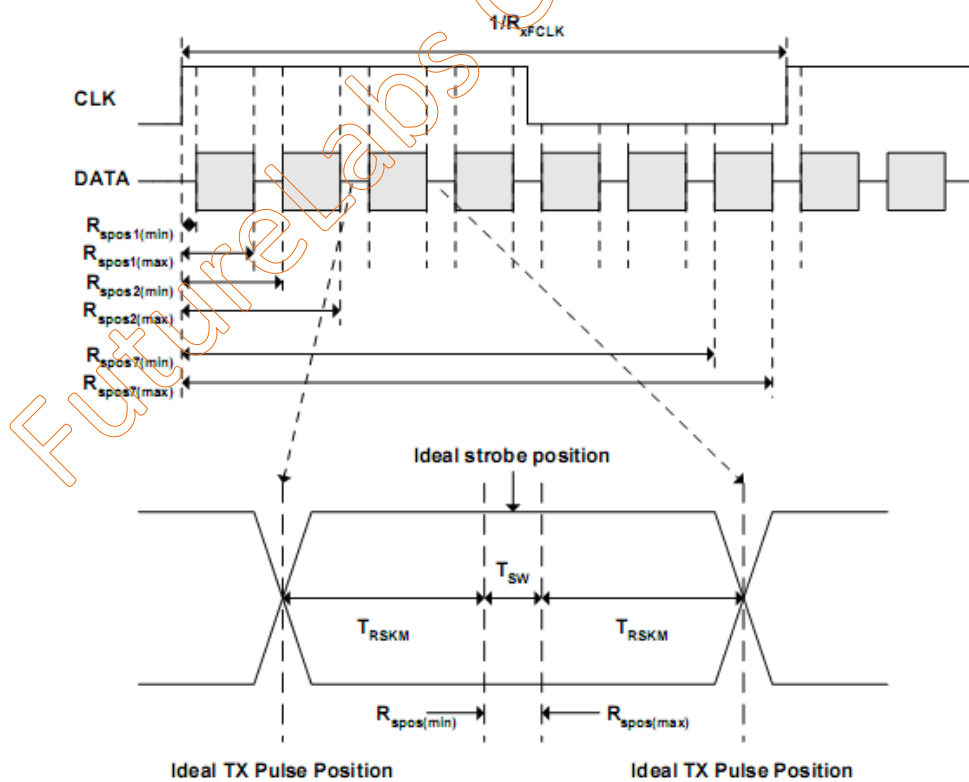
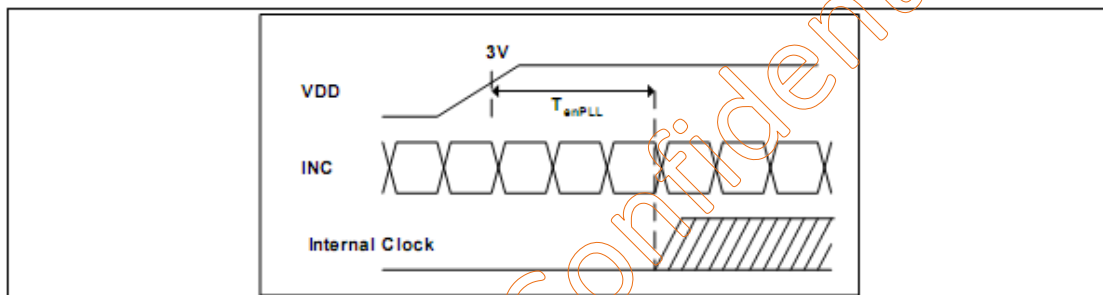
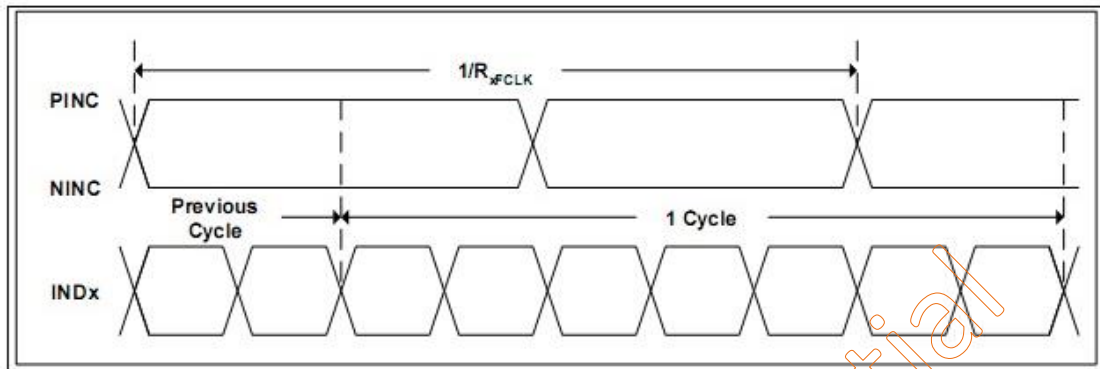
Note1: U/D R/L Function Description

Scan Control Input		Scanning Direction
UPDN	SHLR	
GND	VCC	Left→Right, Up→Down(default)
GND	GND	Right→Left, Up→Down
VCC	VCC	Left→Right, Down→Up
VCC	GND	Right→Left,, Down→Up



## 6. AC Characteristics

### 6.1 Timing



$T_{RSKM}$ : Receiver strobe margin  
 $R_{spos}$ : Receiver strobe position  
 $T_{SW}$ : Strobe width (Internal data sampling window)

## 6.2 LVDS mode

Parameter	Symbol	Min	Typ	Max	Unit	Condition
Clock Frequency	RxFCLK	26.2	45	71	MHz	
Input Data Skew Margin	TRSKM	500			pS	IVIDI = 400Mv RxVCM = 1.2V RxFCLK = 71MHz
Clock High Time	TLVCH		$4/(7 \cdot RxFCLK)$		ns	
Clock Low Time	TLVCL		$3/(7 \cdot RxFCLK)$		ns	
PLL Wake-up Time	TenPLL			150	uS	

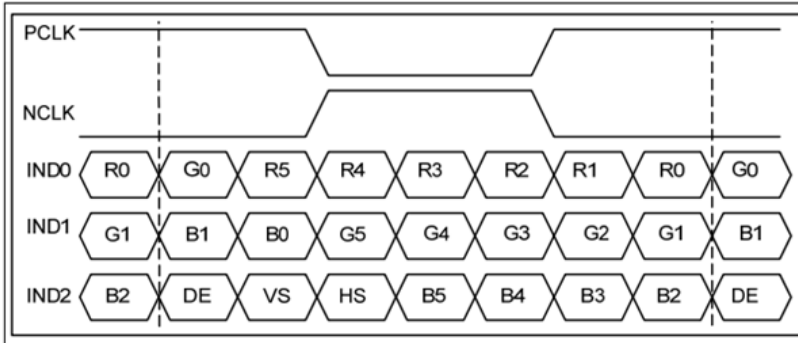
Parameter	Symbol	Min	Typ	Max	Unit	Condition
DCLK Frequency	Fclk	-	65	71	MHz	VDD=2.3~3.6V
DCLK Cycle Time	Tclk	14.1	15.4		ns	
DCLK Pulse Duty	Tcwh	40	50	60	%	Tclk
Time From HDS to Source Output	Thso	-	64	-	DCLK	
Time From HDS to LD	Thld	-	64	-	DCLK	
Time From HDS to STV	Thstv	-	2	-	DCLK	
Time From HDS to CKV	Thckv	-	20	-	DCLK	
Time From HDS to OEV	Thoev	-	4	-	DCLK	
LD Pulse Width	Twld	-	10	-	DCLK	
CKV Pulse Width	Twckv	-	66	-	DCLK	
OEV Pulse Width	Twoev	-	74	-	DCLK	

### SSC tolerance of LVDS receiver

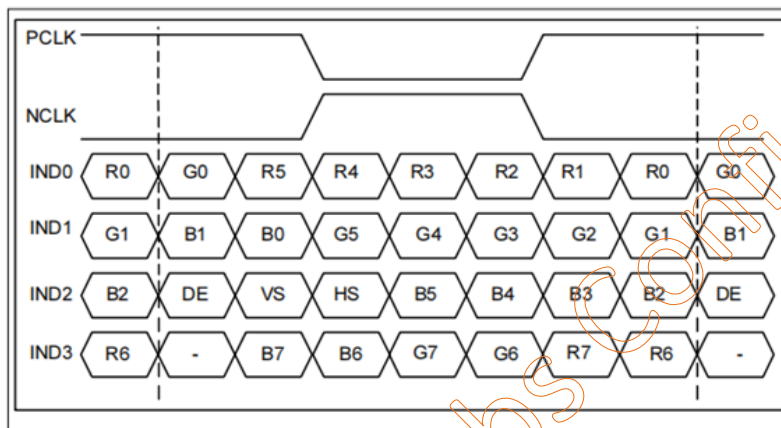
Parameter	Symbol	Min	Typ	Max	Unit	Condition
Modulation Frequency	SSCMF	23	-	93	KHz	
Modulation Rate	SSCMR			+/- 3	%	LVDS clock = 71MHz Center spread

## 6.3 Data of LVDS Receiver

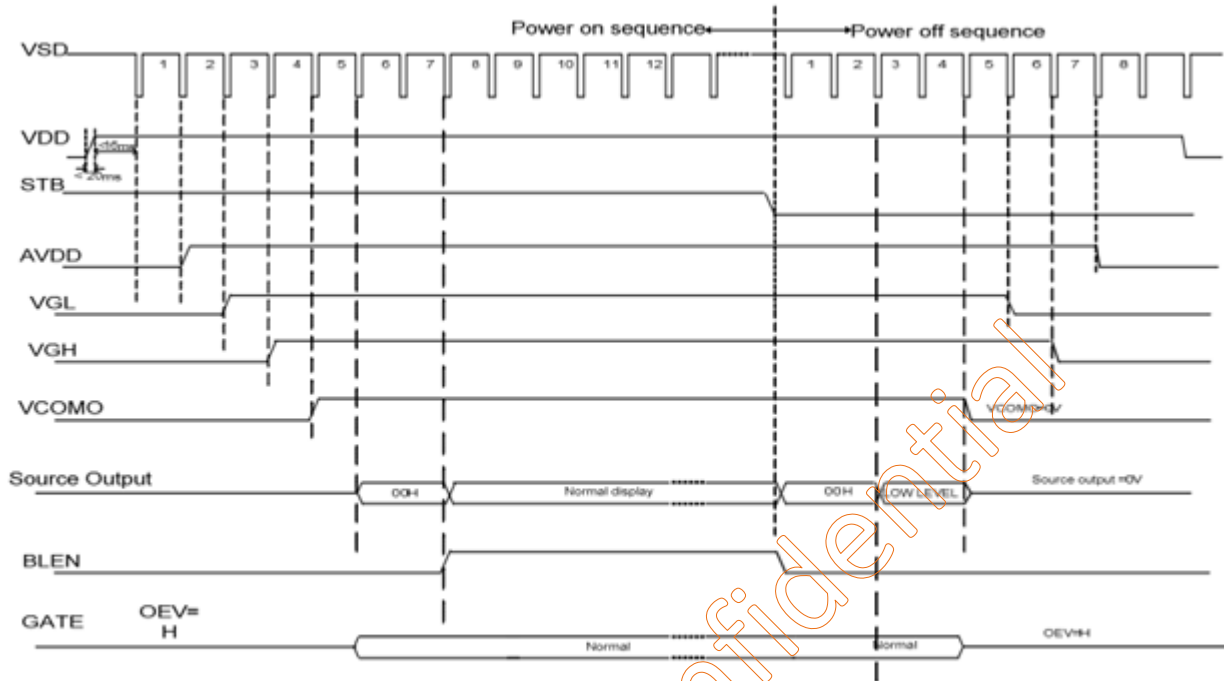
6-bit LVDS input



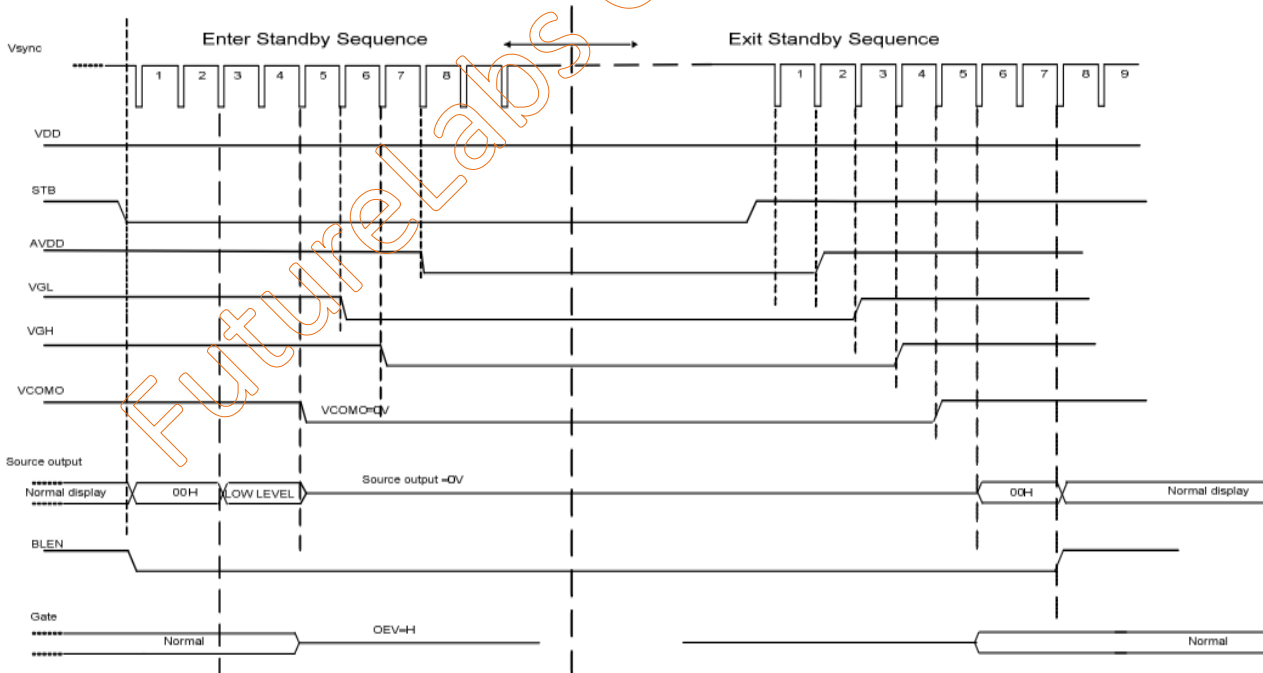
8-bit LVDS input



## 7. Power On/Off Sequence



Power On/Off timing chart



Enter and Exit Standby Mode timing chart

## 8. OPTICAL CHARACTERISTIC

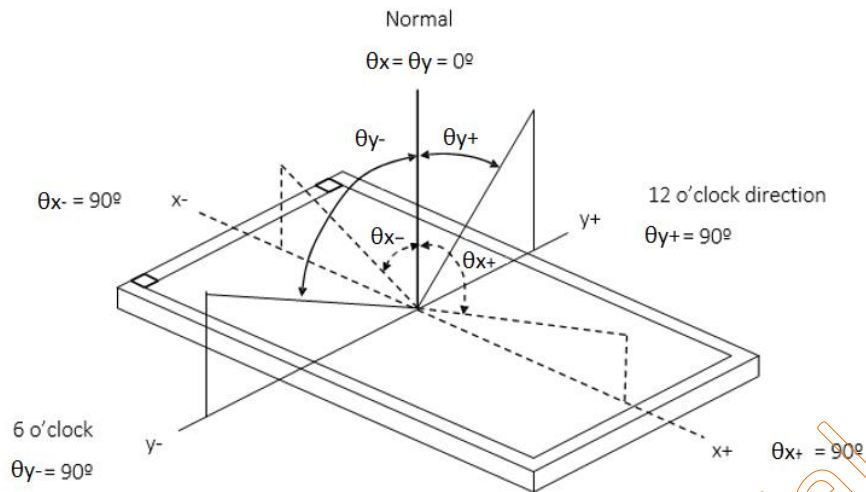
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	$\theta_x=0^\circ, \theta_y=0^\circ$ Viewing angle at normal direction		800		-	(2), (5)
Response Time		$T_R+T_F$		-	30	40	ms	(3)
Luminance on TFT		$L_c$		520	600	-	cd/m <sup>2</sup>	(4), (5)
NTSC Ratio (Gamut)					50	-	%	
Chromaticity	Red	R <sub>x</sub>		0.529	0.579	0.629	-	(1), (5)
		R <sub>y</sub>		0.305	0.355	0.405	-	
	Green	G <sub>x</sub>		0.244	0.294	0.344	-	
		G <sub>y</sub>		0.549	0.599	0.649	-	
	Blue	B <sub>x</sub>		0.096	0.146	0.196	-	
		B <sub>y</sub>		0.053	0.103	0.153	-	
	White	W <sub>x</sub>	0.225	0.275	0.325	-		
		W <sub>y</sub>	0.287	0.337	0.387	-		
Viewing Angle	Horizontal	$\theta_{x+}$	CR $\geq$ 10	-	85	-	Deg.	(1), (5)
		$\theta_{x-}$		-	85	-		
	Vertical	$\theta_{y+}$		-	85	-		
		$\theta_{y-}$		-	85	-		

The following optical specifications shall be measured in a darkroom or equivalent state (ambient luminance <2 lux, and at room temperature).

The room temperature is 25°C±2°C

Note 1: Definition of Viewing Angle

Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or the vertical clock direction with respect to the optical axis which is normal to the LCD surface.

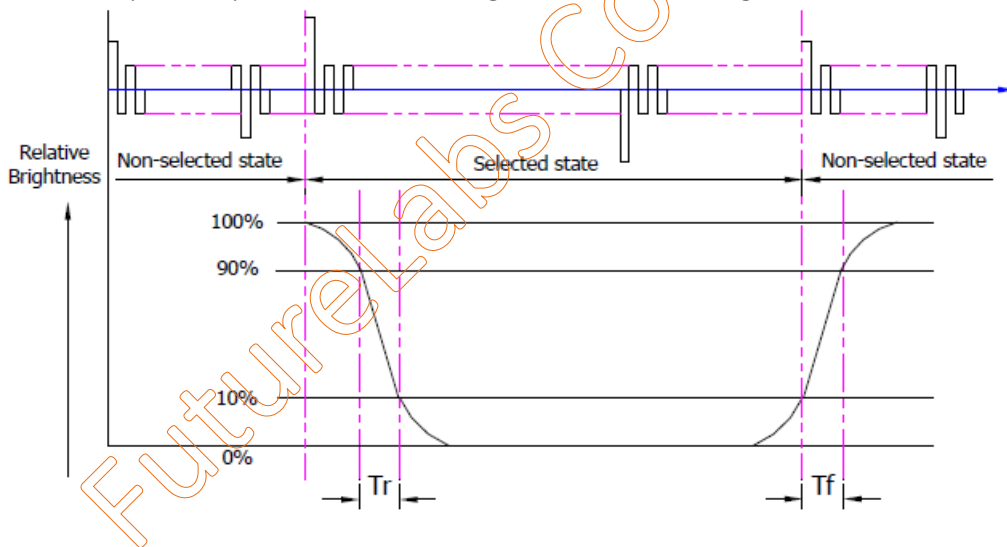


Note 2: Definition of Contrast Ratio (CR)

Measure the viewing angle of  $\Theta = 0$  and at the center of the LCD surface. Luminance with all pixels in white state divide by Luminance with all pixels in Black state

Note 3: Definition of Response Time:

The response time is set initially by defining the "Rising Time ( $T_R$ )" and the "Falling Time ( $T_F$ )" respectively. Please refer the figure to the followings:

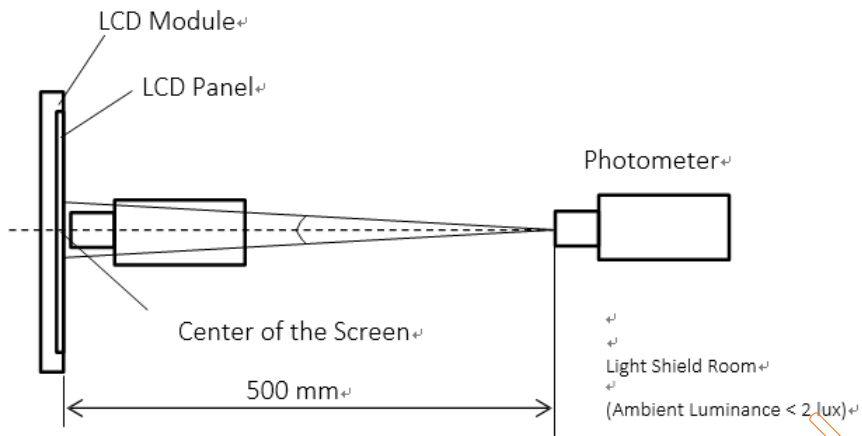


Note 4: Definition of Brightness (L)

Measure the center area of the panel and the viewing angle of the  $\theta_x = \theta_y = 0^\circ$

Note 5: The method of optical measurement:

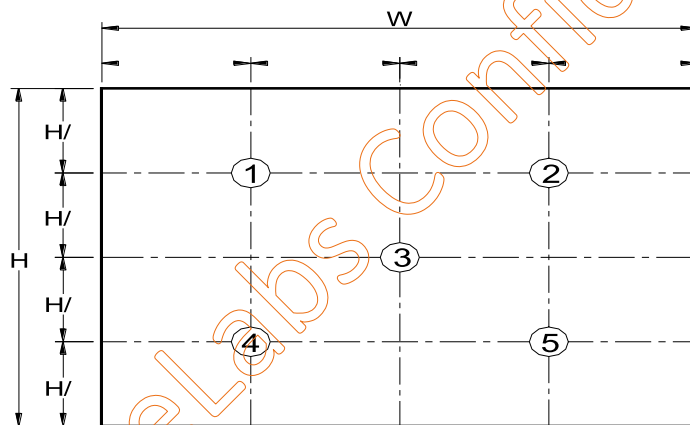




Note 6: Definition of White Variation ( $\delta W$ ):

Measure the luminance of gray level 255 at 5 points

$$\delta W = \text{Minimum} [L (1), L (2), L (3), L (4), L (5) ] / \text{Maximum} [L (1), L (2), L (3), L (4), L (5)] * 100\%$$



## 9. Touch Screen specification

### 9.1 Environmental Specification

Specification	Value
Operating Temperature	-20°C ~ 70°C
Storage Temperature	-30°C ~ 80°C
Operating Humidity	20% ~ 90%RH
Storage Humidity	10% ~ 90%RH

### 9.2 Mechanical Specification

Specification	Value
Operating Life (Finger input)	10 <sup>7</sup> times
Light Transmittance	>86% Min. (JIS K-7105) with glass
Surface hardness	6H
FPC Peeling Force	5N Max

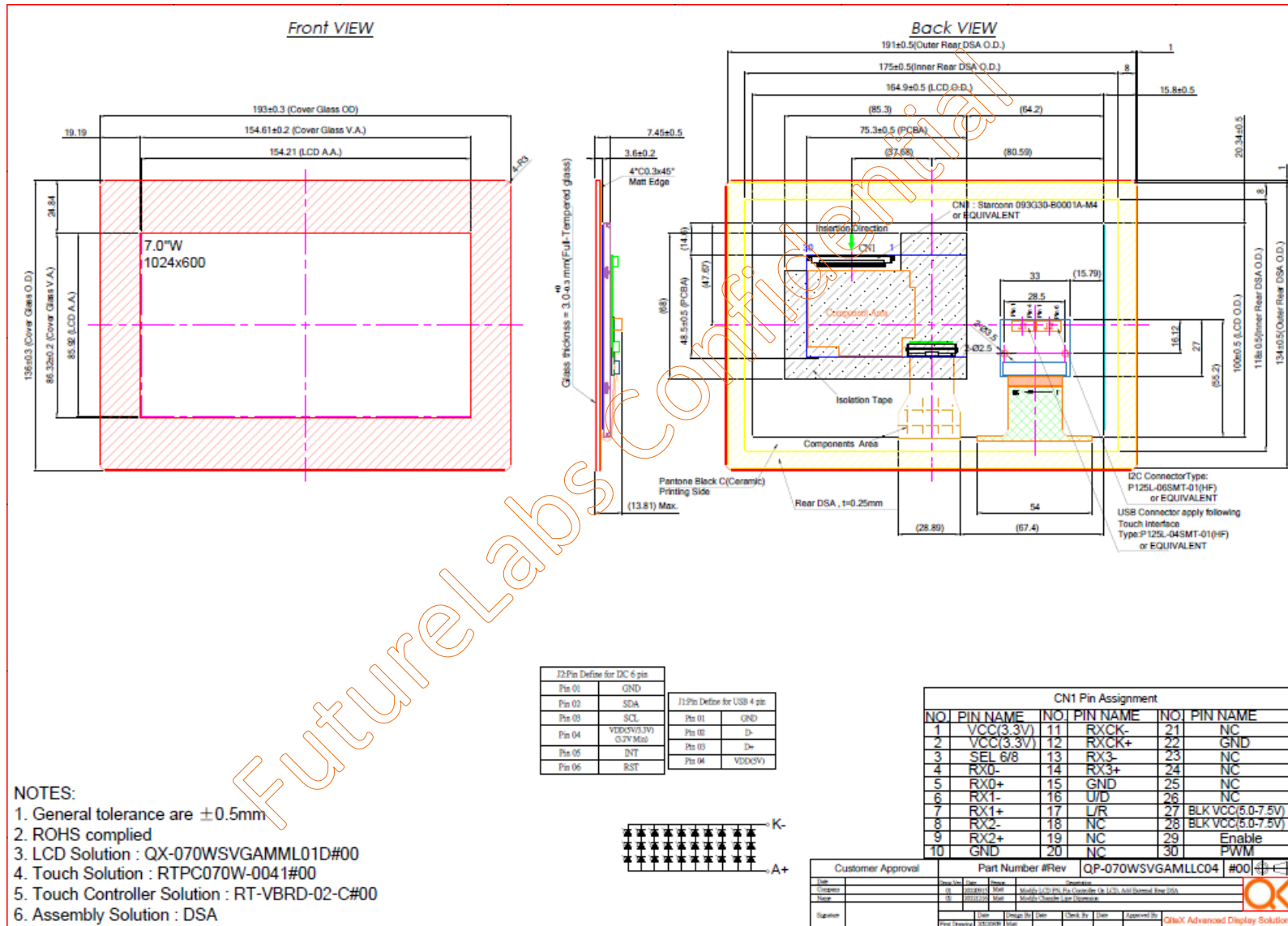
### 9.3 Combo Type Controller USB / I2C

Parameters	Features
Circuit Board Dimension	Refer to drawings
Channels of Panel	Based on Sensor Design
Input Voltage	USB: 5V Typ. I2C: 5V / 3.3V (3.2V Min )
Linearity(Note 1)	Single Line drawing accuracy : Up to 1pt +/- 1mm offset /10mm
	Single Touch (point) accuracy : Up to 1pt +/- 1mm
Interface	USB: 2.0 Full Speed I2C: 100K / 400K Hz
Resolution	16384×16384 resolution
Power consumption(mA)	Active Mode: <40mA
	Idle Mode : <30mA
	Sleep Mode :<10mA
	(Operation Mode :Active Mode only)
Report rate(points/sec) Note(2)	> 100 Hz
Response time	Average < 25 ms

Note (1): Depending by Sensor design and other parameters, Refer to Windows 8 Logo regulation if need to follow min spec.

Note (2): Report rate will vary by channel number, cover thickness, number of fingers and others parameter.

# 10. OUTLINE DRAWING



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