

## PRODUCT SPECIFICATION

PART NUMBER # REV: QP-070WSVGAMLLC03#00

DESCRIPTION: TFT 7"wide 1024\*600 IPS

LVDS 600CD with Rocktouch Black Pcap USB-I2C 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>
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### Revision History

Spec Version	Date	Page	Description	Note
V1.0	2022/9/28		1 <sup>st</sup> initial	
V1.1	2022/10/25	P6/P14/P18	Modified optical characteristic & update ME Drawing	
V1.2	2022/12/06		Update ME spec	
V1.3	2022/12/29	P14/P18	Modified optical characteristic & update ME Drawing	

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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)	175.89 x 112.96 x 5.7 (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	LVDS 6/8 bit	
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
Supply Voltage	VDD	-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
Supply Voltage	VDD	2.3	3.3	3.6	V
	AVDD	-	9.6	-	V
	VGH	-	18	-	V
	VGL	-	-6	-	V
	VCOMH	-	3.3	-	V
	VCOML	-	3.1	-	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

Note 1: Typical VCOM is only a reference value. It must be optimized according to each LCM. Please use VR.

##### 3.2.2 Backlight Unit

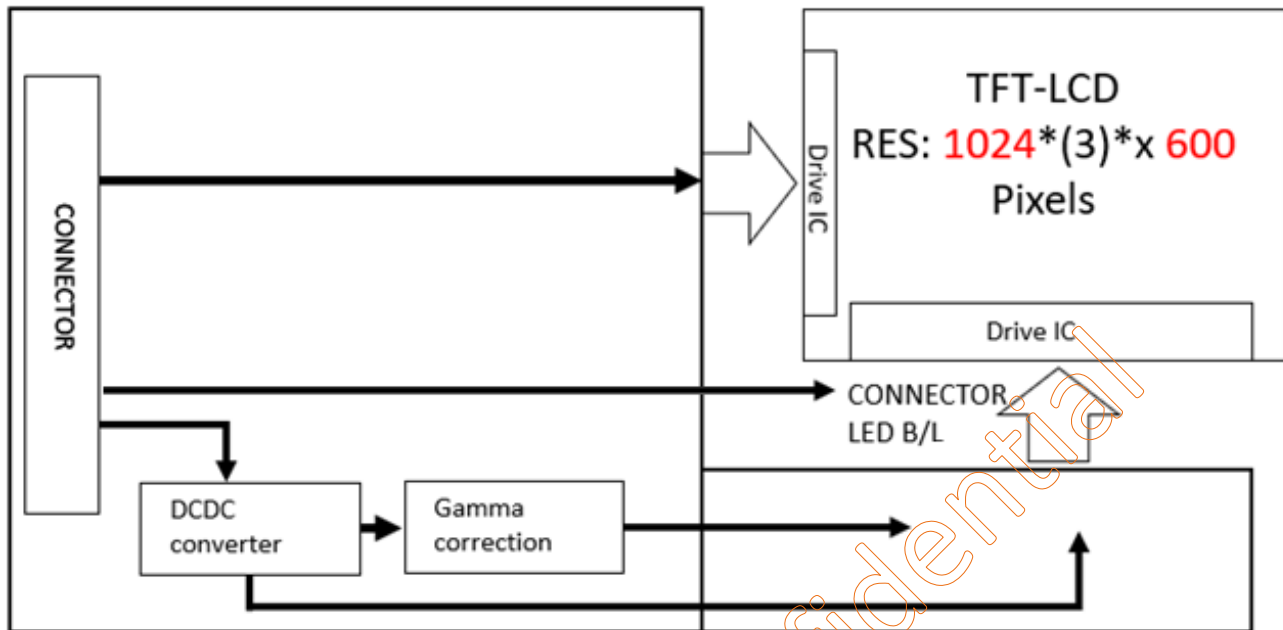
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V <sub>F</sub>	Ta=25 °C, I <sub>F</sub> =20mA/LED	8.4	9.6	10.2	V
Forward Current	I <sub>F</sub>	Ta=25 °C, V <sub>F</sub> =3.2V/LED	-	200	-	mA
Power dissipation	P <sub>D</sub>	-	-	1920	-	mW
Uniformity	Avg	-	-	80	-	%
LED working life(25 °C)	-	-	-	40,000	-	Hrs
Drive method	Constant current					
LED Configuration	30 White LEDs ( 3 LEDs in one string and 10 groups in parallel)					

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

The environmental conducted under ambient air flow, at Ta=25±2 °C,60%RH±5%.

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

## 4. BLOCK DIAGRAM



## 5. PIN CONNECTIONS

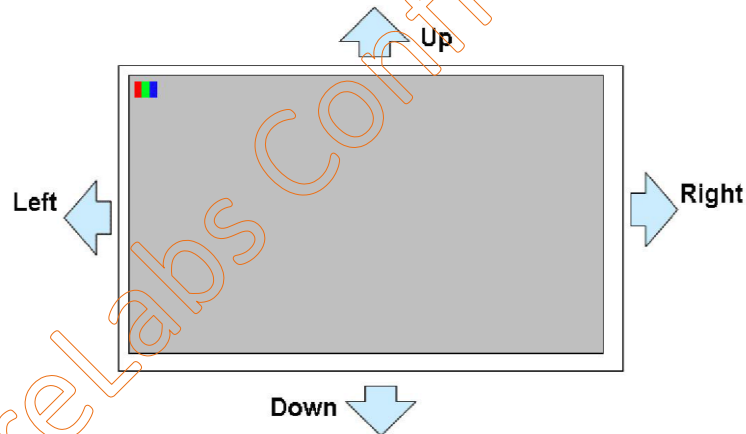
No.	Symbol	Function	Remark
1	VCOM	Common Voltage.	
2	VDD	Power Supply	
3	VDD	Power Supply	
4	NC	No connection.	
5	RESET	Global reset pin.	
6	STBYB	Standby mode, Normally pulled high. STBYB="1", normal operation STBYB="0", timing controller, source driver will turn off	
7	GND	Ground.	
8	RXIN0-	-LVDS differential data input.	
9	RXIN0+	+LVDS differential data input.	
10	GND	Ground.	
11	RXIN1-	-LVDS differential data input.	
12	RXIN1+	+LVDS differential data input.	
13	GND	Ground.	
14	RXIN2-	-LVDS differential data input.	
15	RXIN2+	+LVDS differential data input.	
16	GND	Ground.	
17	RXCLKIN-	-LVDS differential clock input.	
18	RXCLKIN+	+LVDS differential clock input.	
19	GND	Ground.	
20	RXIN3-	-LVDS differential data input.	
21	RXIN3+	+LVDS differential data input.	
22	GND	Ground.	
23	NC	No connection.	
24	NC	No connection.	
25	GND	Ground.	
26	NC	No connection.	
27	DIMO	Backlight CABC controller signal output	
28	SELB	L: 8bit LVDS interface H: 6bit LVDS interface	
29	AVDD	Power for Analog Circuit.	
30	GND	Ground.	
31	LED-	LED Cathode	



32	LED-	LED Cathode	
33	L/R	Horizontal inversion	Note 1
34	U/D	Vertical inversion	Note 1
35	VGL	Gate OFF Voltage.	
36	NC	No Connection	
37	NC	No Connection	
38	VGH	Gate ON Voltage.	
39	LED+	LED Anode	
40	LED+	LED Anode	

Note1:

UPDN	SHLR	Data Shifting
DVDD	GND	Left→Right, Up→Down (default)
GND	GND	Right→Left, Up→Down
DVDD	DVDD	Left→Right, Down→Up
GND	DVDD	Right→Left, Down→Up

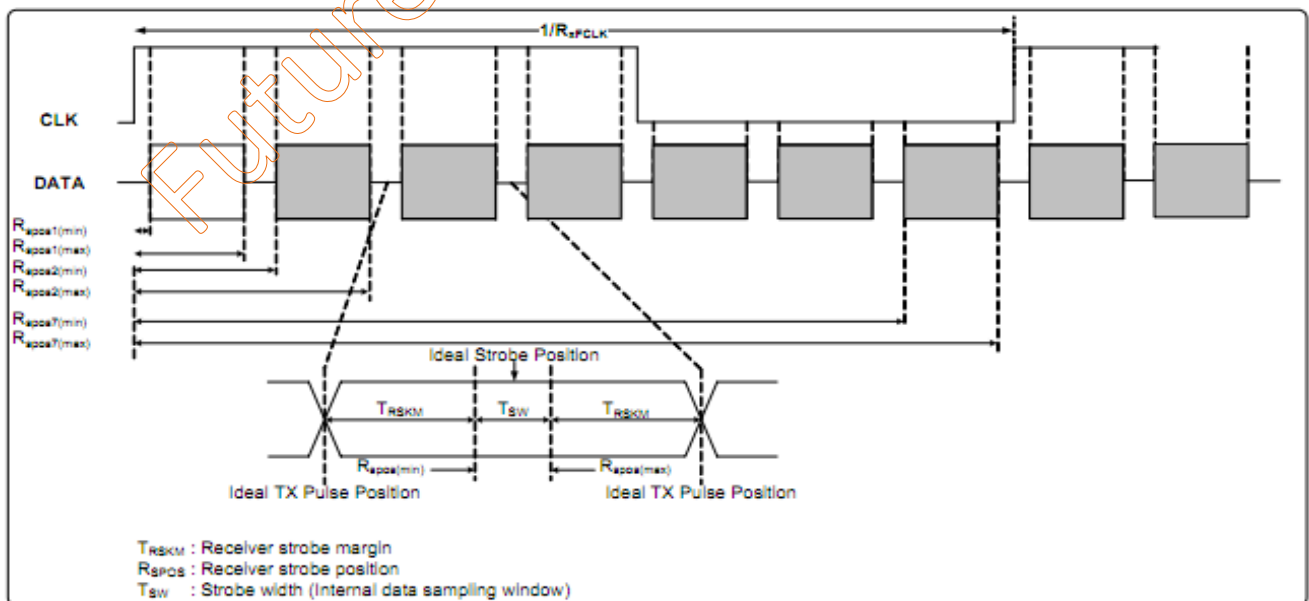
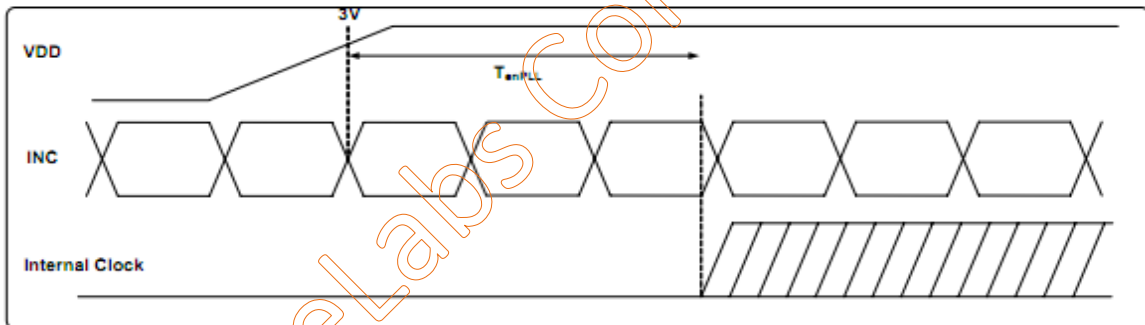
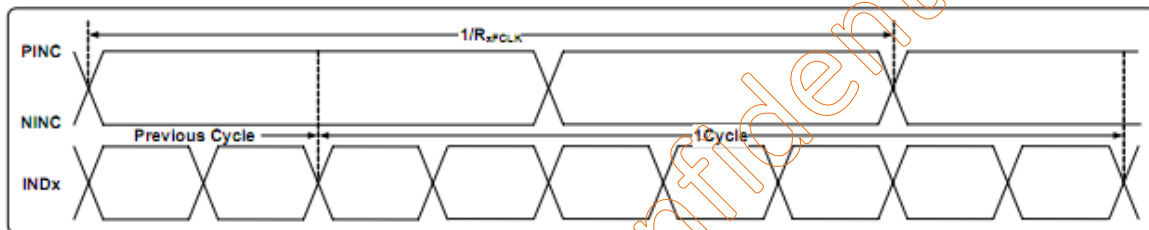


## 6. Signal Characteristics

### 6.1 LVDS mode AC electrical characteristics

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Clock Frequency	R <sub>XFLK</sub>	26.2		71	MHz
Input data skew margin	T <sub>RSKM</sub>	500			pS
Clock high time	T <sub>LVCH</sub>	-	4/(7* R <sub>XFLK</sub> )	-	ns
Clock low time	T <sub>LVCL</sub>	-	3/(7* R <sub>XFLK</sub> )	-	ns
PLL wake-up time	T <sub>emPLL</sub>	-	-	150	us

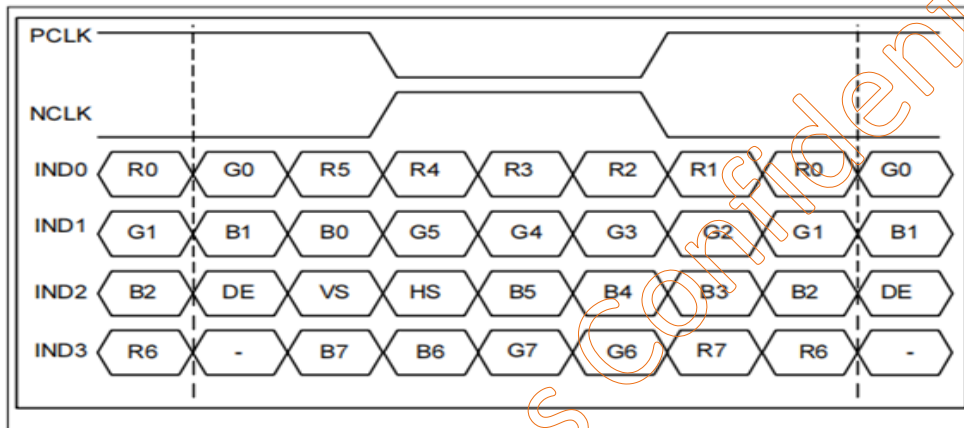
Condition: |VID|=400mV; RxVCM=1.2V R<sub>XFLK</sub> = 71MHz



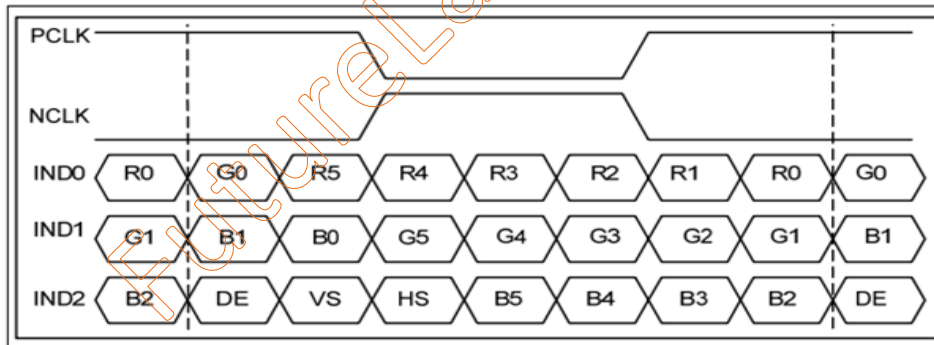
Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Modulation Frequency	SSC <sub>MF</sub>	23	-	93	KHZ
Modulation Rate	SSC <sub>MR</sub>	-	-	+/- 3	%

Condition: LVDS clock=71MHz center spread

## 6.2 Data Input Format



8-bit LVDS input

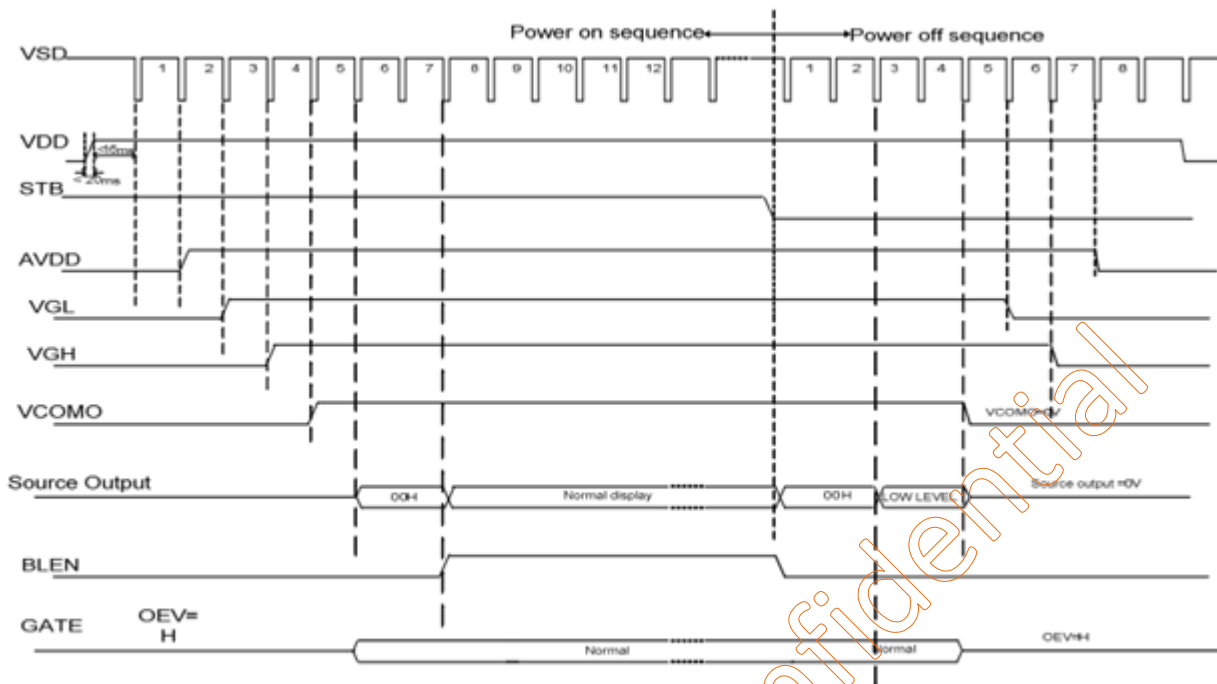


6-bit LVDS input

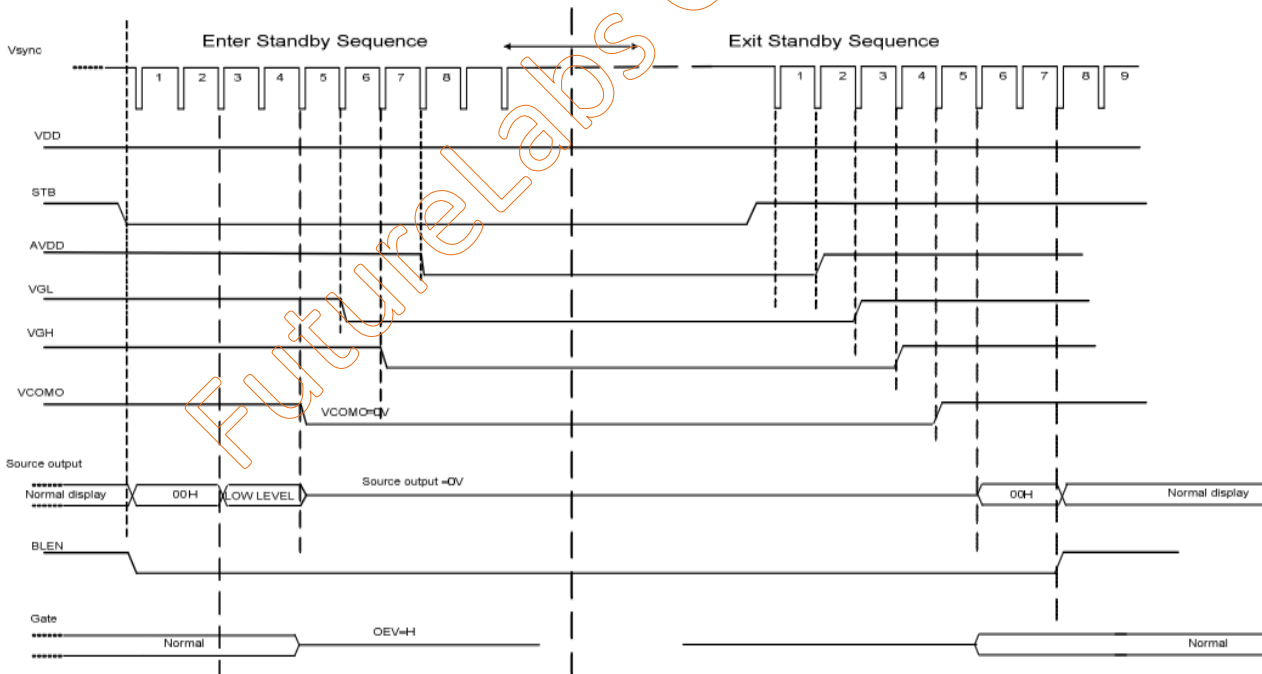
DE mode					
Parameter	Symbol	Value			Unit
		Min	Typ	Max	
DCLK frequency @Frame rate=60hz	fclk	40.8	51.2	67.2	Mhz
Horizontal display area	thd	1024			DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+thfp	90	320	376	DCLK
Vertical Display Area	tvd	600			H
VSYNC period time	tv	610	635	800	H
VSYNC blanking	tvb+tvfp	10	35	200	H

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## 7. Power On/Off Sequence



Power On/Off timing chart



Enter and Exit Standby Mode timing chart

## 8. OPTICAL CHARACTERISTIC

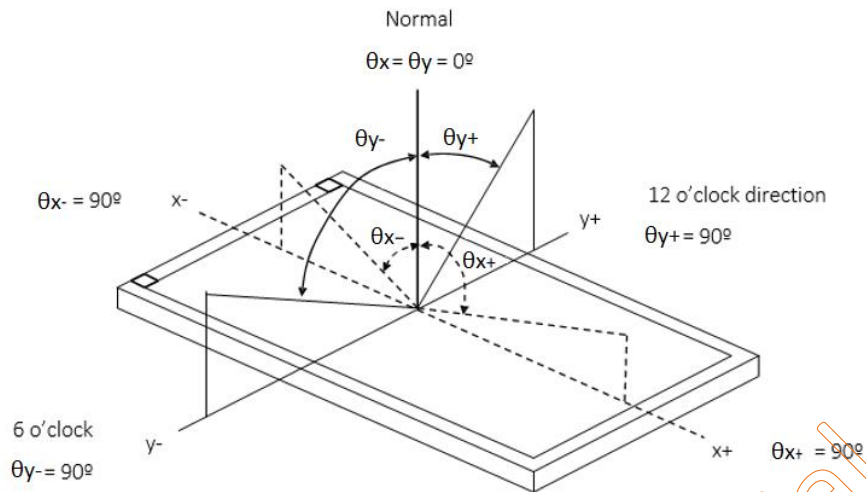
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR			800		-	(2), (5)
Response Time		TR+TF		-	30	40	ms	(3)
Luminance on TFT		Lc		440	600	-	cd/m <sup>2</sup>	(4), (5)
NTSC Ratio (Gamut)					50	-	%	
Chromaticity	Red	Rx		$\theta_x=0^\circ, \theta_y=0^\circ$ Viewing angle at normal direction	0.528	0.578	0.628	-
		Ry	0.313		0.363	0.413	-	
	Green	Gx	0.268		0.318	0.368	-	
		Gy	0.530		0.580	0.63	-	
	Blue	Bx	0.088		0.138	0.188	-	
		By	0.057		0.107	0.157	-	
	White	Wx	0.236		0.286	0.336	-	
		Wy	0.290		0.340	0.39	-	
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.

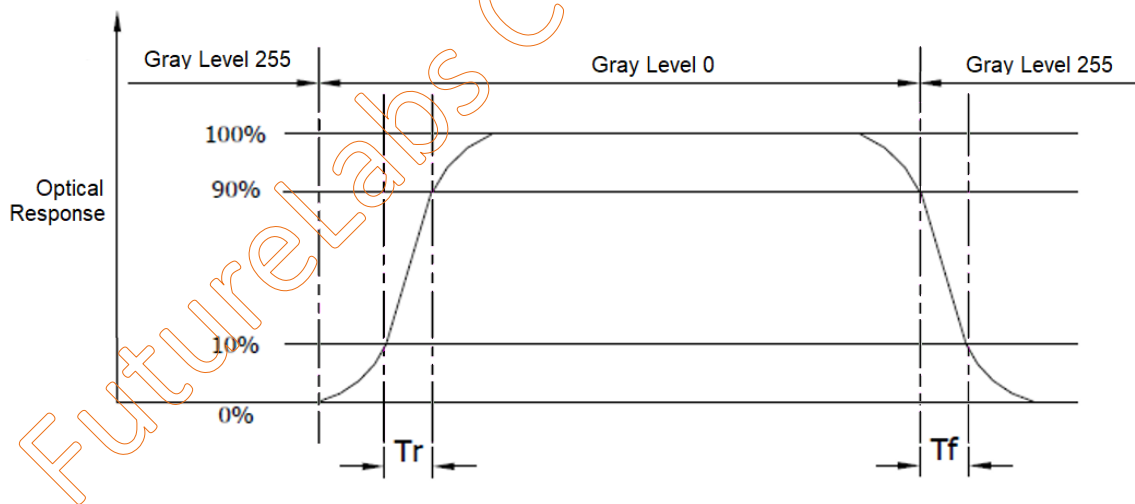


Note 2: Definition of Contrast Ratio (CR)

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:

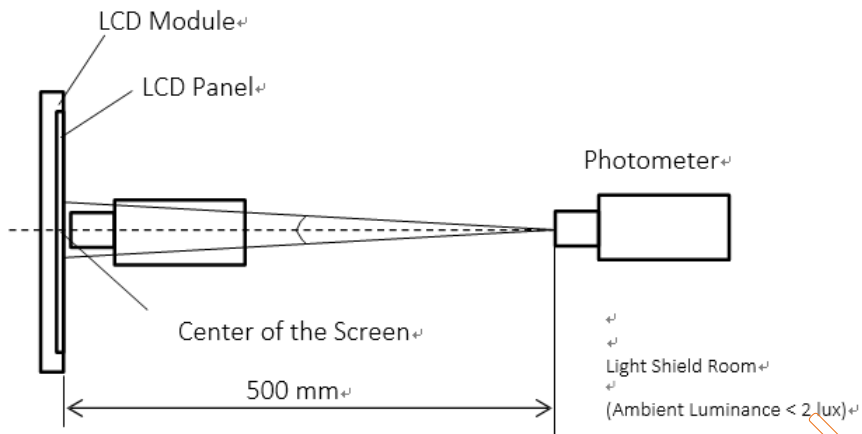
The response time is set initially by defining the "Rising Time ( $T_R$ )" and the "Falling Time ( $T_F$ )" respectively. Please refer the figure to the followings:



Note 4: Definition of Brightness (L)

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

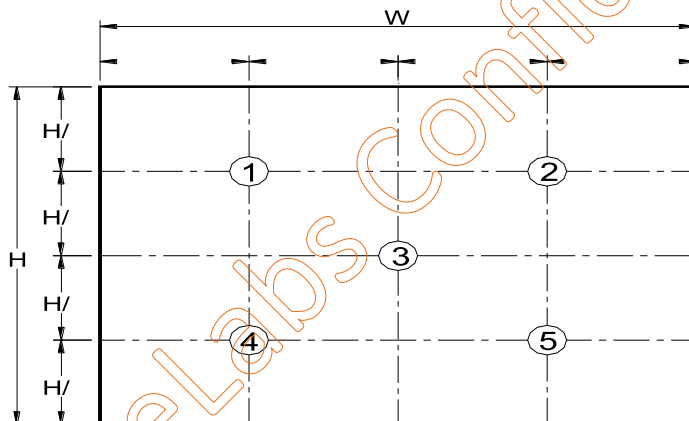
Note 5: The method of optical measurement:



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

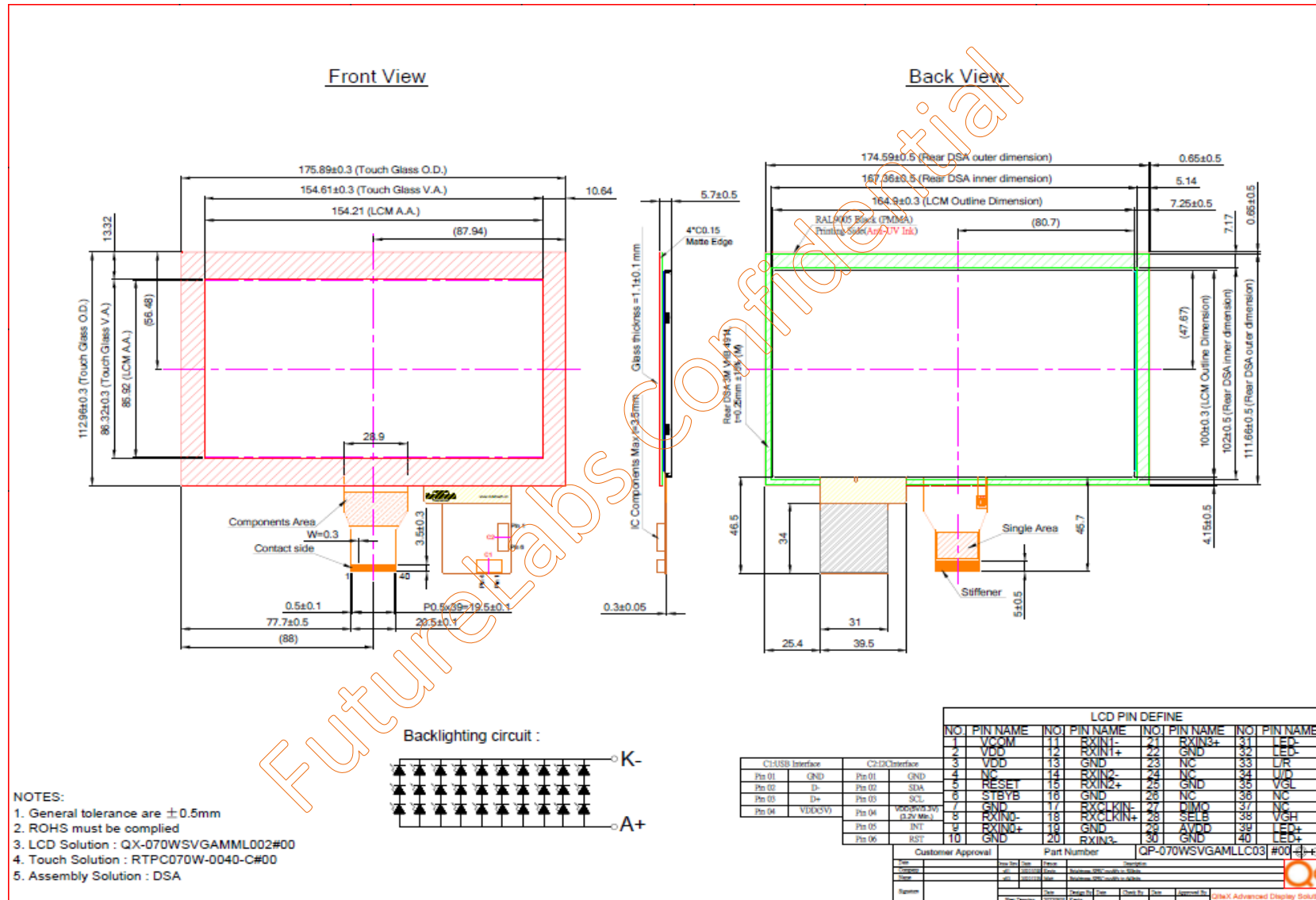
### 9.3 Combo Type Controller USB / I2C

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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