

## Product Specification

PART NUMBER # REV: FLD-101HMLG2PC004#01

DESCRIPTION: TFT 10.1" w, 1280(H)\*800(V), LVDS, 262K/16.7M Color,  
IPS 700CD with Rocktouch Pcap USB-I2C With External Adhesive

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

PREPARED BY	REVIEWED BY
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## Revision History

Version	Date	Page	Description	Note
V1.0	2024/06/11		1st initial	

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## Table of Content

Product Specification .....	1
<b>1. GENERAL DESCRIPTION .....</b>	<b>4</b>
1.1 Description .....	4
1.2 Product Summary .....	4
<b>2. ABSOLUTE MAXIMUM RATING .....</b>	<b>5</b>
2.1 Electrical Absolute Rating .....	5
2.2 Environment Absolute Rating .....	5
<b>3. ELECTRICAL CHARACTERISTICS .....</b>	<b>6</b>
3.1 TFT LCD Module .....	6
3.2 Backlight Characteristics .....	6
3.3 LVDS Signal Timing Diagram of Interface Signal .....	7
3.3.1 AC Electrical characteristics .....	7
3.3.2 DC Electrical characteristics .....	9
<b>4. Signal Characteristic .....</b>	<b>10</b>
4.1 Timing Chart .....	10
4.2 Gate Output Timing Table .....	10
4.3 The Input Data Format .....	12
4.3.1 6bit LVDS input (JEIDA Format) .....	12
4.3.2 8bit LVDS input (JEIDA Format) .....	12
4.3.3 8bit LVDS input (VESA Format-Default) .....	13
4.4 Power Sequence .....	14
<b>5. INTERFACE PIN DESCRIPTION .....</b>	<b>15</b>
5.1 LCM Connector PIN Assignment .....	15
5.2 Pixel Format .....	16
<b>6. BLOCK DIAGRAM .....</b>	<b>17</b>
<b>7. OPTICAL CHARACTERISTIC .....</b>	<b>18</b>
<b>8. Touch Screen specification .....</b>	<b>21</b>
8.1 Environmental Specification .....	21
8.2 Mechanical Specification .....	21
8.3 USB-I2C Type Controller .....	21
<b>9. DIMENSION AND DRAWING .....</b>	<b>22</b>
<b>10. PRECAUTION AND PRODUCT HANDLING .....</b>	<b>23</b>

# 1. GENERAL DESCRIPTION

## 1.1 Description

10.1 inch is a Color Active Matrix Liquid Crystal Display Module composed of a TFT LCD panel and LED backlight system. The screen format is intended to support the 1280 x 800 screen and 16.7 M colors.

## 1.2 Product Summary

The following items are summary on the table under Ta=25 °C condition:

No.	Item	Specification	Unit
1	Display Size	10.1" w	Inch
2	Pixel Number	1280 (H) x 3(RGB)x 800 (V)	Pixels
3	Outline Dimension	250.6(H)×171.6(V)×13.15(D)	mm
4	Active Area	216.96 (H) x 135.60 (V)	mm
5	Pixel Pitch	0.1695(H) x 0.1695(V)	mm
6	Display Colors	262K/16.7M colors (6/8bit RGB)	
7	Pixel Arrangement	RGB vertical stripe	-
8	Display Mode	Normally Black	-
9	Electrical Interface	LVDS	-
10	Surface Treatment	Anti-Glare	-
11	Brightness	700 (Typ.)	cd/m <sup>2</sup>
12	Contrast Ratio	1000 (Typ.)	-

## 2. ABSOLUTE MAXIMUM RATING

### 2.1 Electrical Absolute Rating

Item	Symbol	Values			Unit	Note
		Min	Typ	Max		
Power Supply Voltage	VDD	-0.3	-	4.0	V	GND=0

### 2.2 Environment Absolute Rating

Item	Symbol	Values			Unit	Note
		Min	Typ	Max		
Operating Temperature	Top	-30	-	+80	°C	
Storage Temperature	Tstg	-30	-	+80	°C	

Note (1) In the standard conditions, there is no function failure issue occurred. All the cosmetic specification is judged before test.

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### 3. ELECTRICAL CHARACTERISTICS

#### 3.1 TFT LCD Module

Item	Symbol	Values			Unit	Note
		Min	Typ	Max		
Power supply voltage	VDD	3.0	3.3	3.6	V	GND=0
Input logic high voltage	VIH	0.7VDD	-	VDD	mA	
Input logic low voltage	VIL	GND	-	0.3VDD	V	

#### 3.2 Backlight Characteristics

The backlight system is an edge-lighting type with 40 LED.

Item		Symbol	Min.	Typ.	Max.	Unit	Note
Power for Analog circuit		VLED	9.0	12.0	15.0	V	
Backlight Current		ILED_A	-	500	-	mA	
ENABLE & PWM Threshold Voltage		Logic-Hight	1.6	3.3	5.0	V	
		Logic-Low	0	-	0.8	V	
Backlight	PWM	Duty Cycle	1	-	100	%	
Driving	Frequency	Dimming	100	-	8K	HZ	
Operating LED life time		Hr	50,000	-	-	Hours	(1)(2)

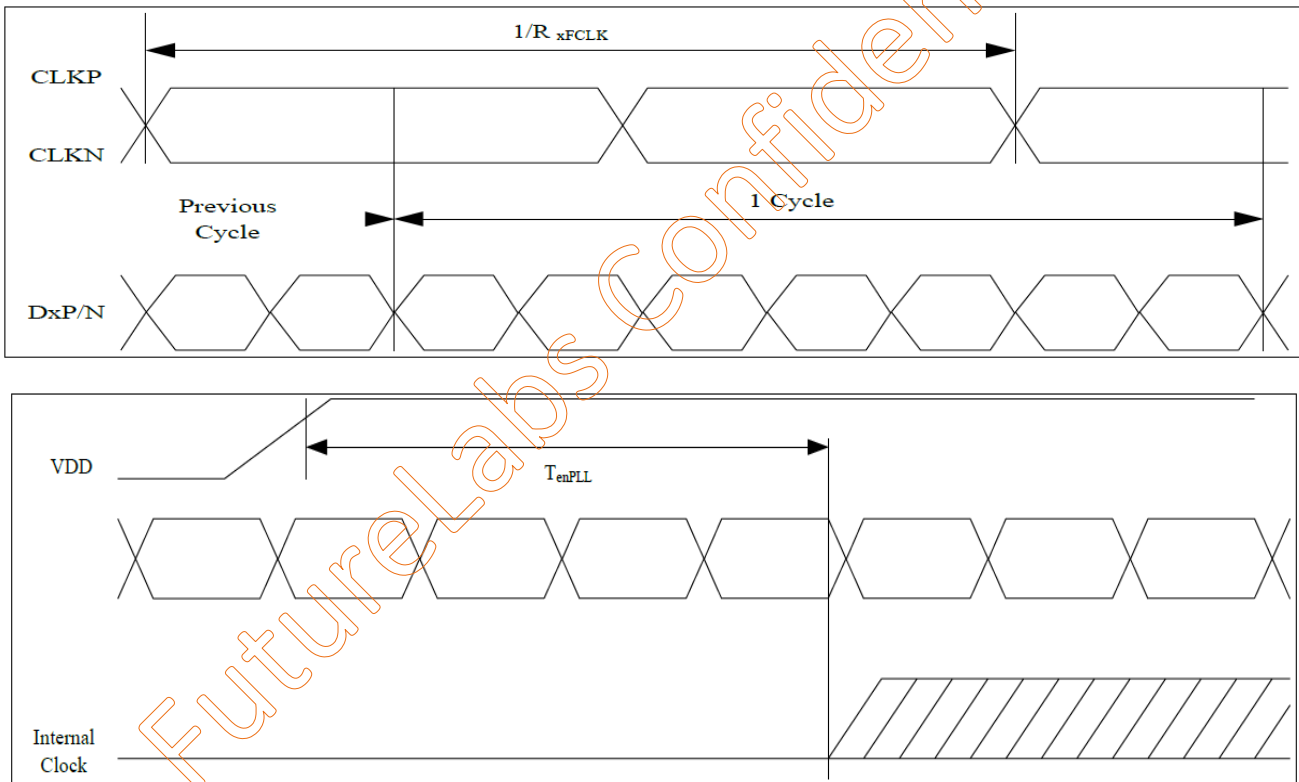
Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition:  $T_a=25\pm 3^\circ\text{C}$ , typical IL value indicated in the above table until the brightness becomes less than 50%.

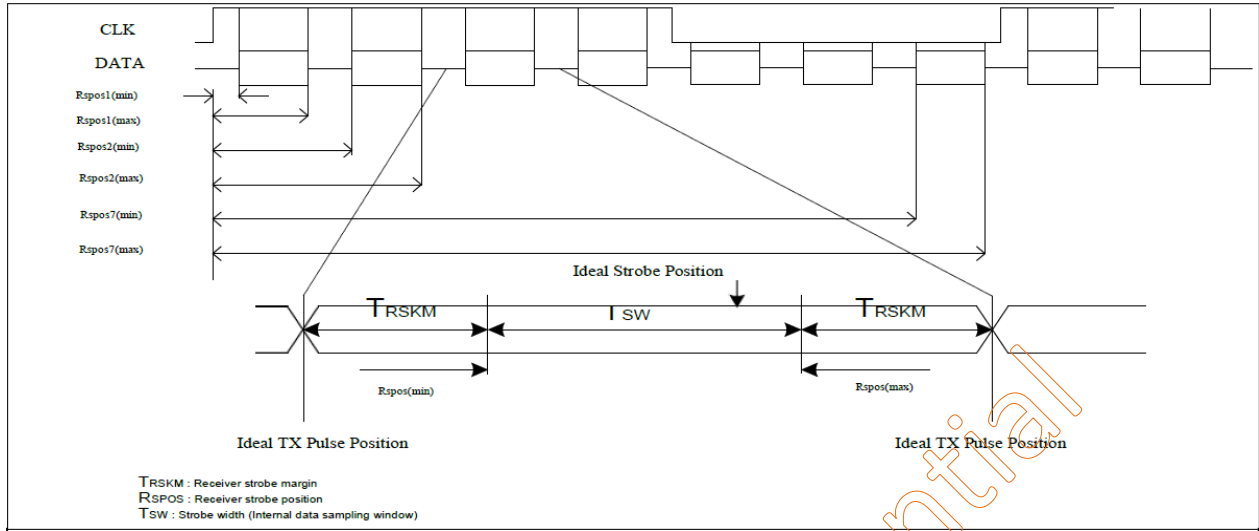
Note (2) The "LED life time" is defined as the module brightness decrease to 50% original brightness at  $T_a=25^\circ\text{C}$ . The LED lifetime could be decreased if operating IL is larger. The constant current driving method is suggested.

### 3.3 LVDS Signal Timing Diagram of Interface Signal

#### 3.3.1 AC Electrical characteristics

Parameter	Symbol	Values			Unit	Note
		Min	Typ	Max		
Clock frequency	RxFCLK	30	-	TBD	MHz	Refer to input timing table for each display resolution
Input data skew margin	TRSKM	500	-	-	ps	VID  = 200mV RxVCM = 1.2V RxFCLK = 81MHz
Clock high time	TLVCH	-	$4/(7 * RxFCLK)$	-	ns	
Clock low time	TLVCL	-	$3/(7 * RxFCLK)$	-	ns	
PLL wake-up time	TenPLL	-	-	150	us	





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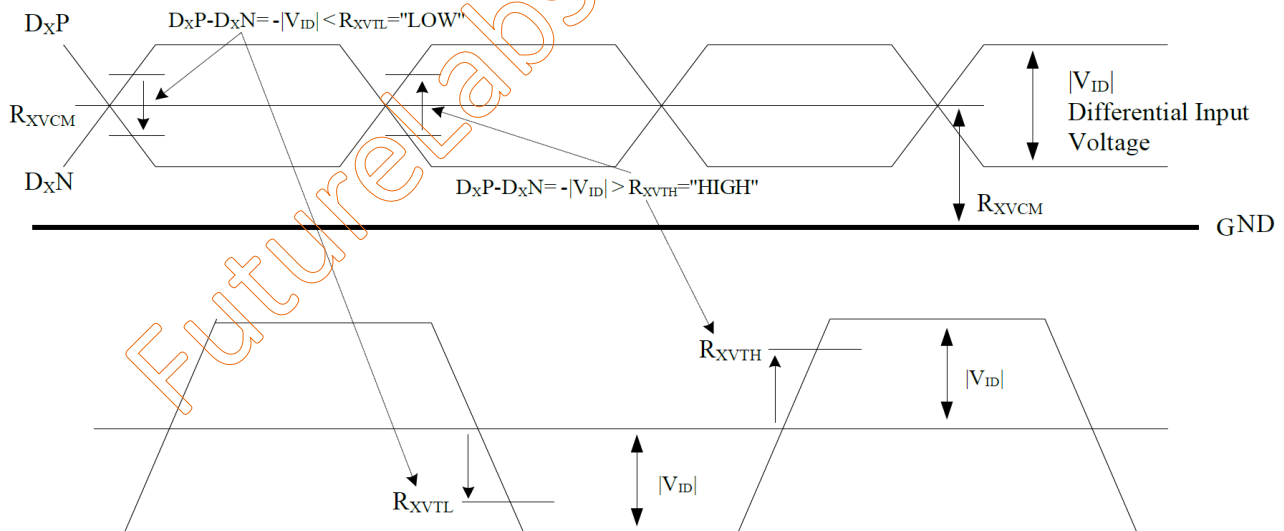


### 3.3.2 DC Electrical characteristics

(VDD=VDDIO=VDDIF=2.3 to 3.6V, VSS=VSSA=VSS\_IF=0V, TA=-20 to +85°C)

Parameter	Symbol	Values			Unit	Note
		Min	Typ	Max		
Differential input high threshold voltage	RXVTH	+0.1	0.2	0.3	V	RXVCM=1.2V
Differential input low threshold voltage	RXVTL	-0.3	-0.2	-0.1	V	
Input voltage range (singled-end)	RXVIN	0.7	-	1.7	V	
Differential input common mode voltage	RXVCM	1	1.2	1.4	V	VID =0.2
Differential input impedance	ZID	80	100	125	ohm	
Differential input voltage	VID	0.2	-	0.6	V	
Differential input leakage current	ILCLVDS	-10	-	+10	uA	
LVDS Digital Operating Current	IvDD	-	15	20	mA	FDCLK=80MHz, VDD=3.3V, Input pattern: 55h->Aah->55h->Aah
LVDS Digital Stand-by Current	IST	-	-	250	uA	Clock & all Functions are stopped

Single-end Signals



## 4. Signal Characteristic

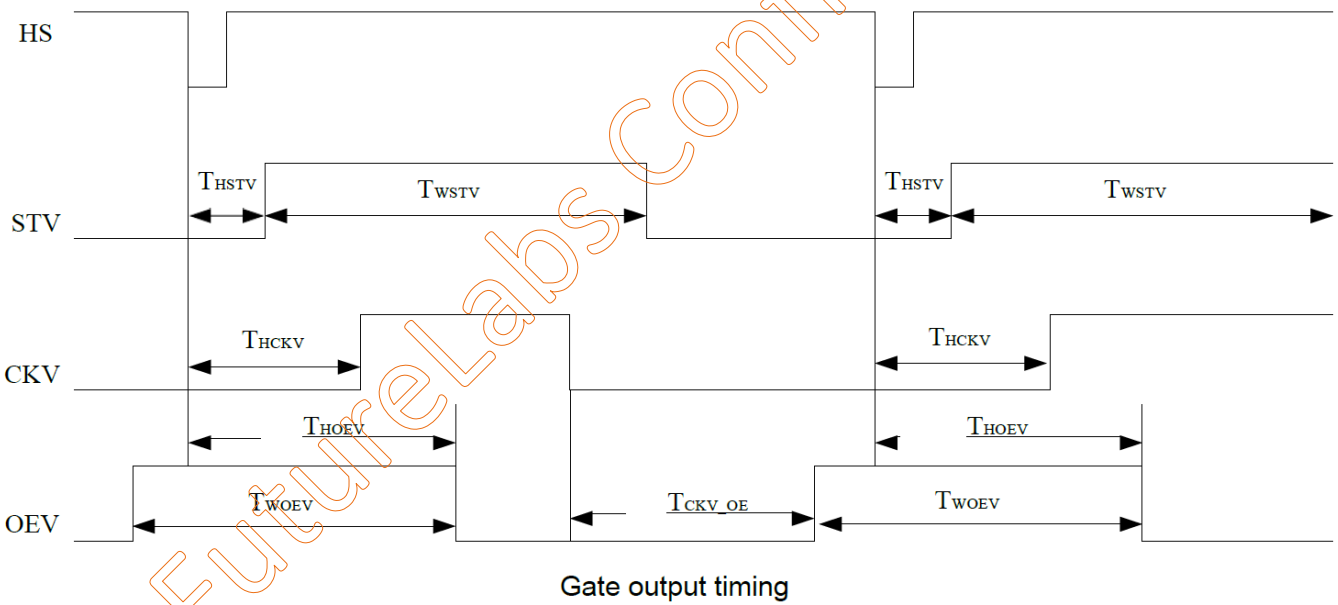
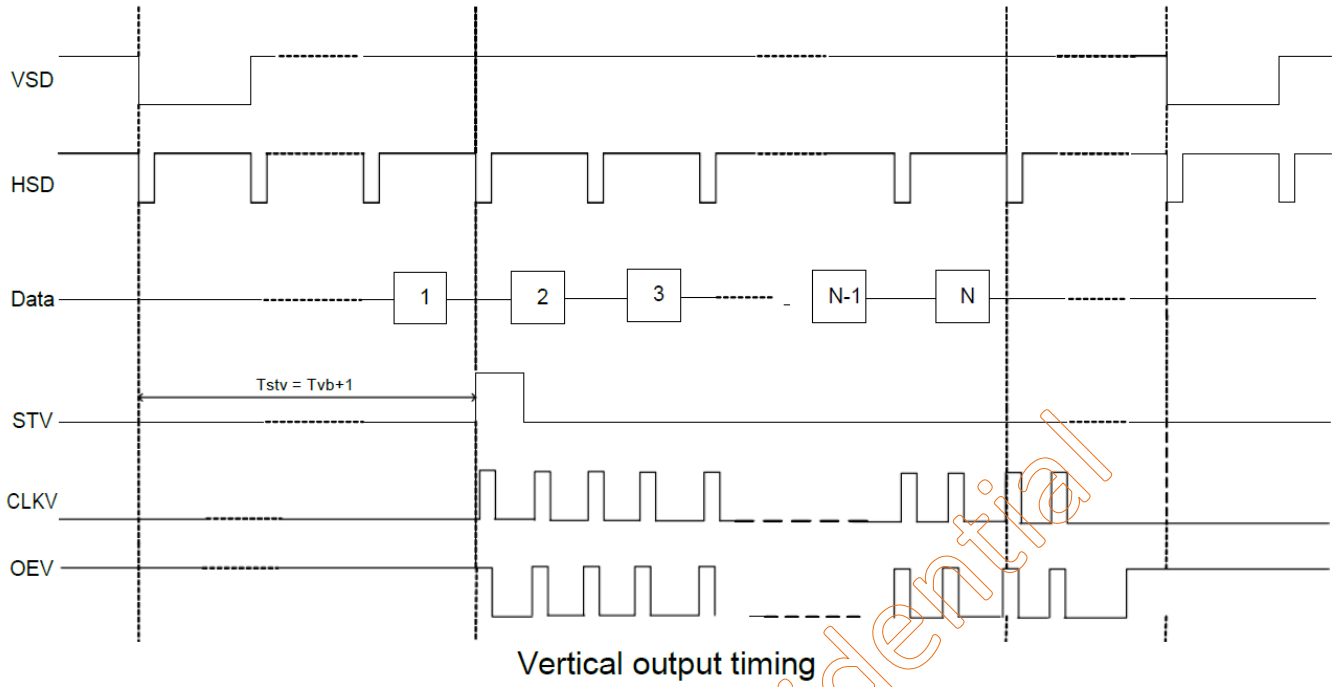
### 4.1 Timing Chart

Parameter		Symbol	Values			Unit	Note
			Min	Typ	Max		
DCLK frequency @Frame rate=60Hz (LVDS)		FDCLK	66.3	72.4	78.9	MHz	
HSYNC period time		TH	1380	1440	1500	DCLK	
Horizontal display area		THD	1280			DCLK	
HSYNC pulse width	Min.	THPW	2				
	Typ.		-				
	Max.		40				
HSYNC back porch(with pulse width)		THBP	88	88	88	DCLK	
HSYNC front porch		THFP	12	72	132	DCLK	
VSYNC period time		TV	824	838	872	H	
Vertical display area		TVD	800			H	
VSYNC pulse width	Min.	TVPW	2			H	
	Typ.		-				
	Max.		20				
VSYNC back porch(with pulse width)		TVBP	23	23	23	H	
VSYNC front porch		TVFP	1	15	49	H	

### 4.2 Gate Output Timing Table

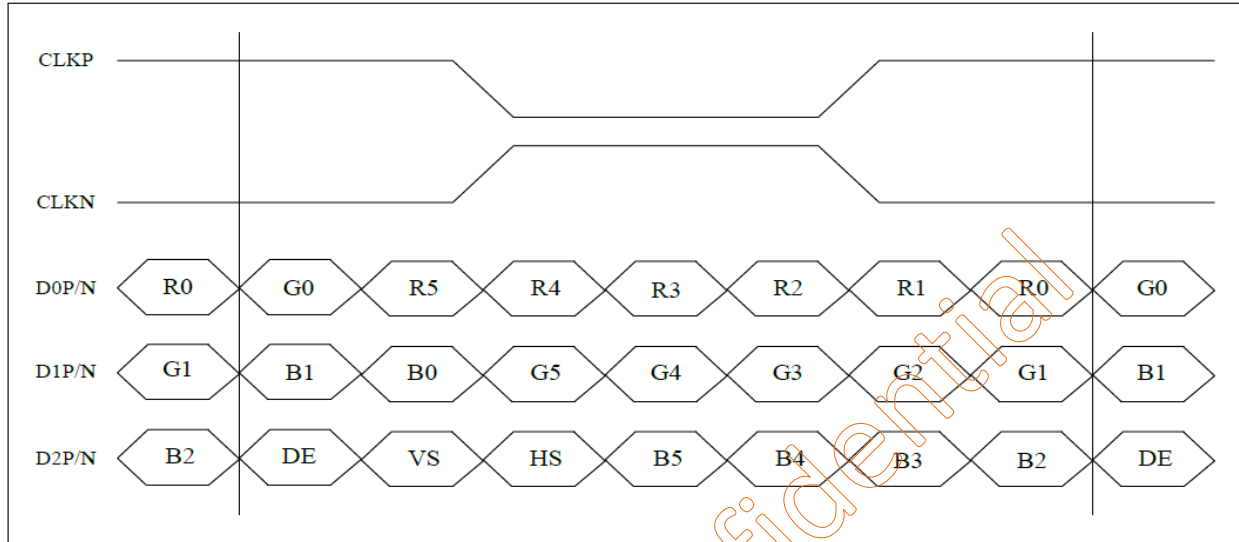
(VDD=2.3 to 3.6V, VSS=VSSA=VSS\_IF=0V, TA=-20 to +85°C)

Parameter	Symbol	Values			Unit	Note
		Min	Typ	Max		
STV Pulse Width	TWSTV	-	1	-	H	
Time from HSD to STV	THSTV	-	2	-	DCLK	
Time from HSD to CKV	THCKV	-	25	-	DCLK	
Time from HSD to OEV	THOEV	-	35	-	DCLK	
Time from CKV to OEV	TCKV_OE	-	168	-	DCLK	
OEV Pulse Width	TWOEV	-	188	-	DCLK	



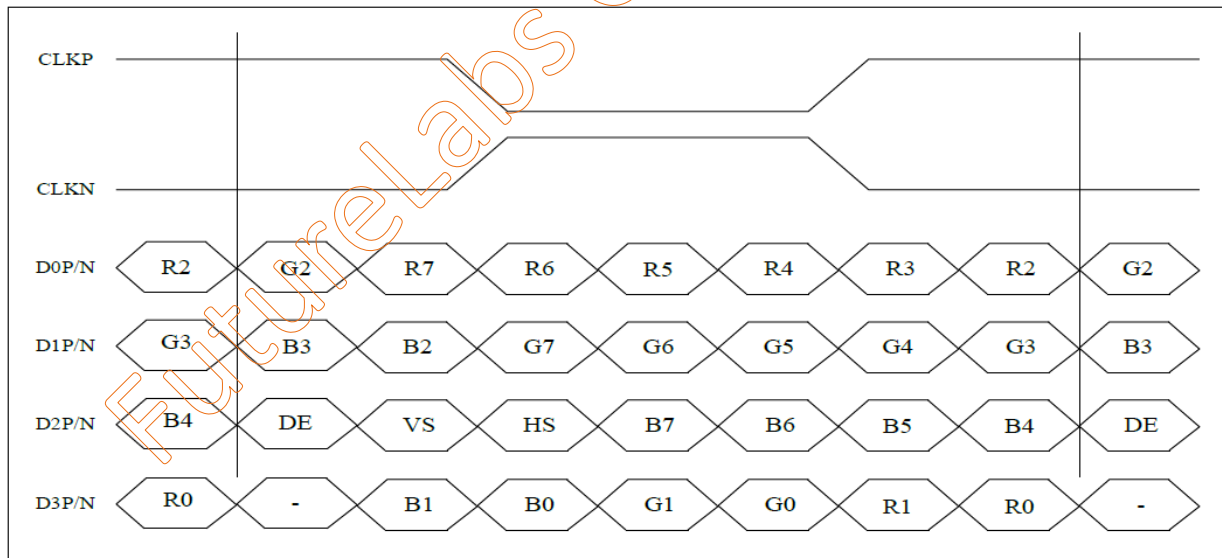
### 4.3 The Input Data Format

#### 4.3.1 6bit LVDS input (JEIDA Format)



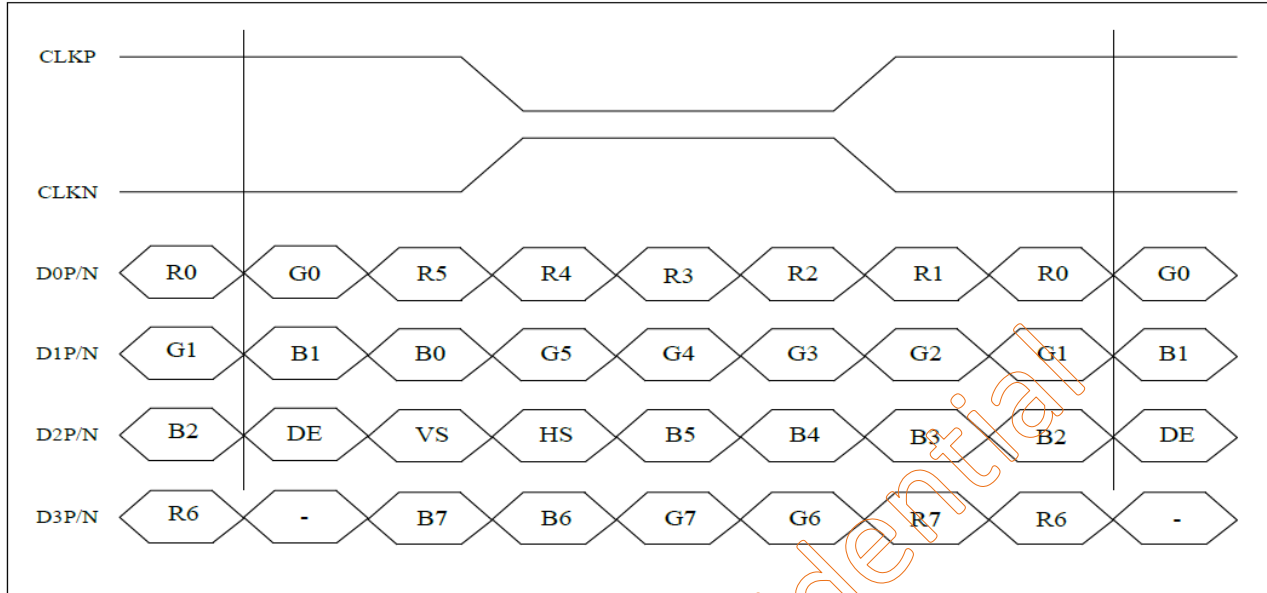
**6-bit LVDS input (LVBIT=L, LVFMT=Don't care)**

#### 4.3.2 8bit LVDS input (JEIDA Format)



**8-bit LVDS input (LVBIT=H, LVFMT=L)**

### 4.3.3 8bit LVDS input (VESA Format-Default)

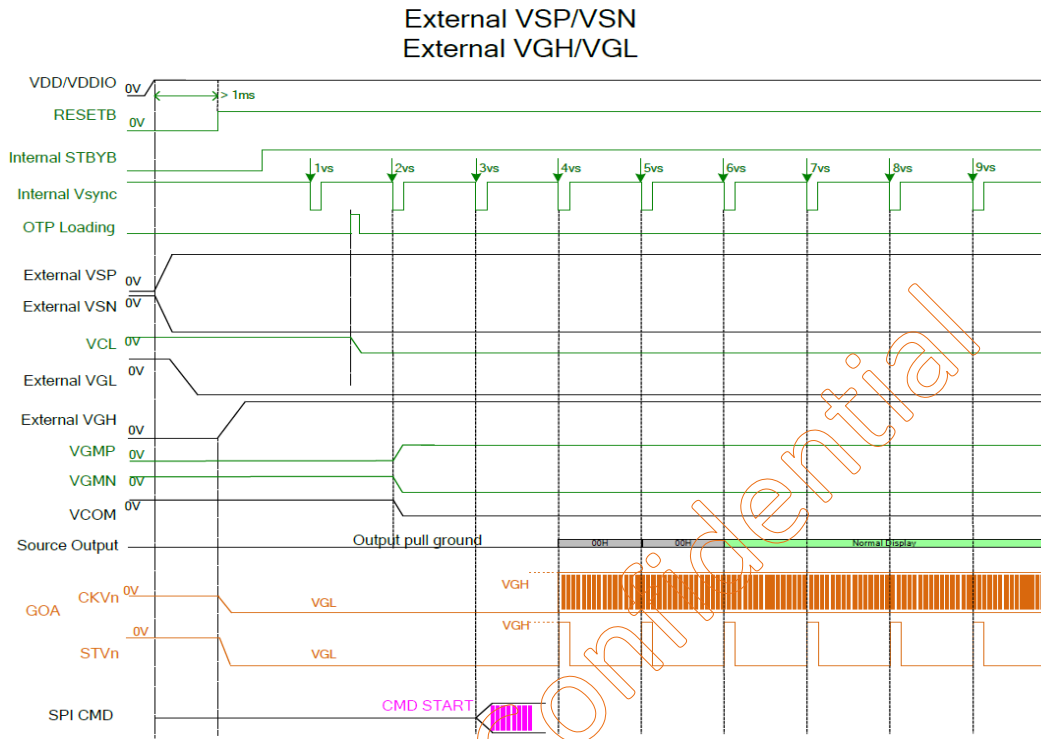


**8-bit LVDS input(LVBIT=H, LVFMT=H)**

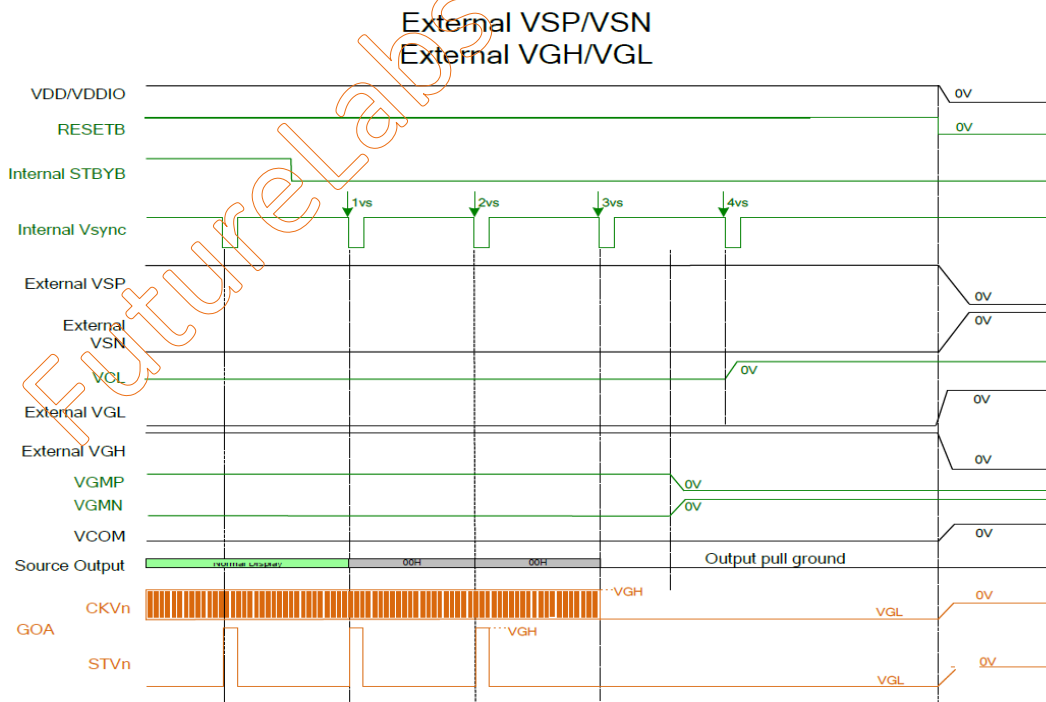
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## 4.4 Power Sequence

### A: Power on Sequence



### B: Power off Sequence



## 5. INTERFACE PIN DESCRIPTION

### 5.1 LCM Connector PIN Assignment

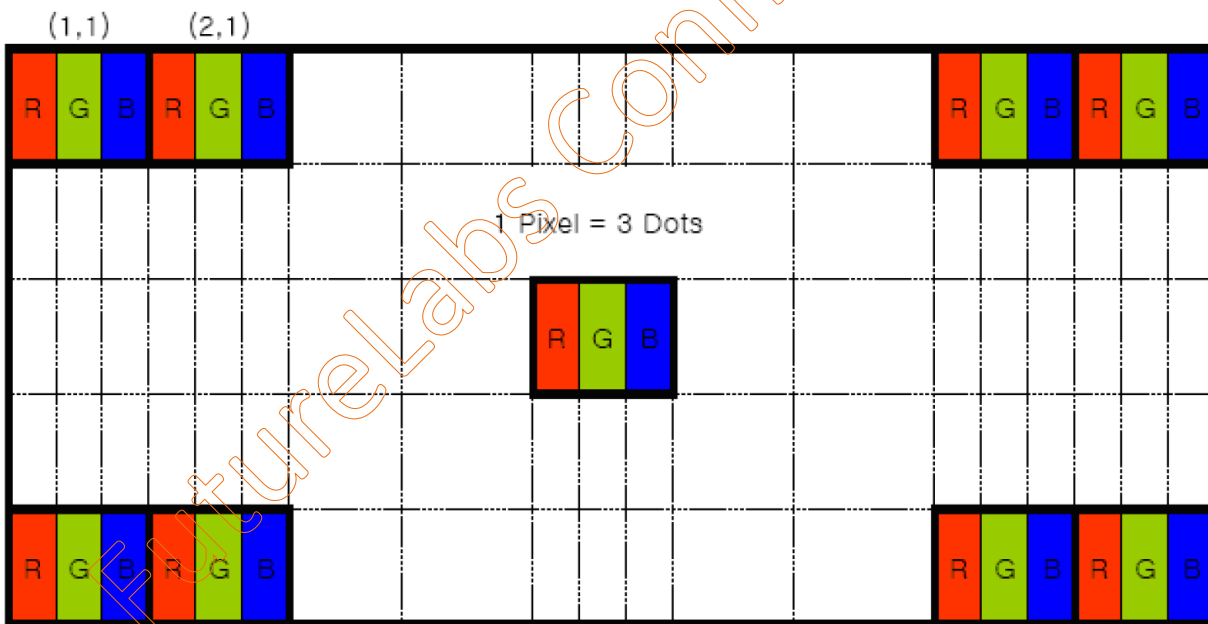
A 40PIN connector is used for the module electronics interface the recommended model is STM MSAK24025P40B or equivalent.

Pin No.	Symbol	I/O	Description
1	NC	-	No connection
2	VDD	P	Power supply
3	VDD	P	Power supply
4	NC	-	No Connection
5	NC	-	No Connection
6	SEL 6/8bit	I	6/8 Bit input select, pull High or NC:8bit, Low:6Bit
7	NC	-	No connection
8	Rxin0N	I	-LVDS differential data
9	Rxin0P	I	+LVDS differential data
10	GND	P	Ground
11	Rxin1N	I	-LVDS differential data
12	Rxin1P	I	+LVDS differential data
13	GND	P	Ground
14	Rxin2N	I	-LVDS differential data
15	Rxin2P	I	+LVDS differential data
16	GND	P	Ground
17	RXCLKN	I	- LVDS differential clock input
18	RXCLKP	I	+ LVDS differential clock input
19	GND	P	Ground
20	Rxin3N	I	-LVDS differential data
21	Rxin3P	I	+LVDS differential data
22	GND	P	Ground
23	NC	-	No connection
24	NC	-	No connection
25	GND	P	Power Ground
26	NC	-	No connection
27	NC	-	No connection
28	GND	P	Power Ground
29	NC	-	No connection
30	NC	-	No connection

Pin No.	Symbol	I/O	Description
31	LED_GND	P	Ground for LED Driver
32	LED_GND	P	Ground for LED Driver
33	LED_GND	P	Ground for LED Driver
34	NC	-	No connection
35	PWM	I	PWM signal for LED Driver Control Backlight Brightness
36	BL_EN	I	LED Driver enable Pin
37	NC	-	No connection
38	LED_VCC	P	Power Supply for LED Driver
39	LED_VCC	P	Power Supply for LED Driver
40	LED_VCC	P	Power Supply for LED Driver

I: input O: output ,P: power

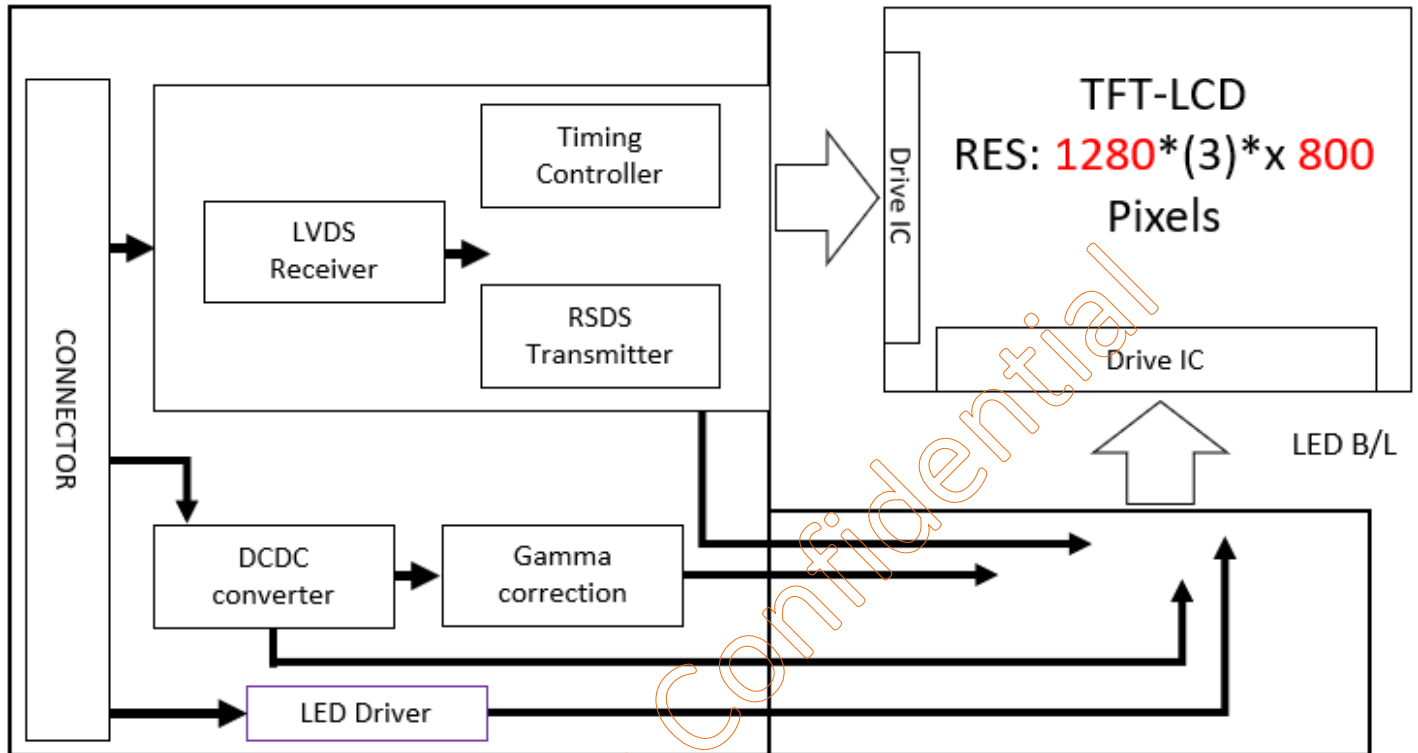
## 5.2 Pixel Format





## 6. BLOCK DIAGRAM

The following diagram shows the functional block of the TFT module:



## 7. OPTICAL CHARACTERISTIC

The optical characteristics are measured under stable conditions at room temperature 25 °C.

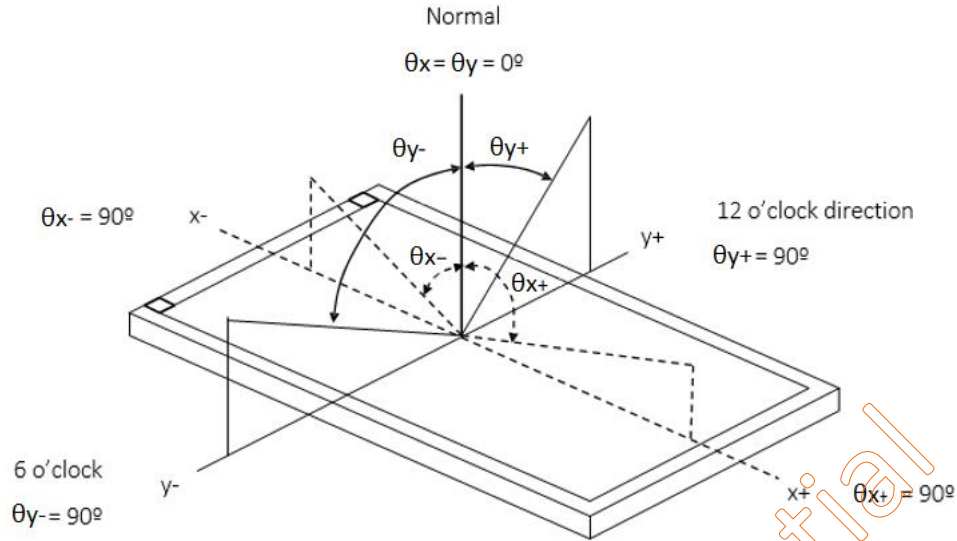
Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Contrast Ratio	CR	$\theta_x=0^\circ$	800	1000	-	-	(2)(5)	
Response Time	TR+ TF	25°C	-	25	35	ms	(3)	
Center Luminance of White	LC	$\theta_x=0^\circ, \theta_y=0^\circ$ Viewing angle at normal direction	600	700	-	cd/m2	(4)(5)	
Brightness uniformity			75			%	(5)(6)	
Chromaticity	Red		Rx	Typ. -0.03	0.635	Typ. +0.03	-	(1)(5)
			Ry		0.308		-	
	Green		Gx		0.330		-	
			Gy		0.615		-	
	Blue		Bx		0.158		-	
			By		0.121		-	
	White		Wx		0.315		-	
			Wy		0.336		-	
Viewing Angle	Horizontal	$\theta_{x+}$	80	85	-	Deg.	(1)(5)	
		$\theta_{x-}$	80	85	-			
	Vertical	$\theta_{y+}$	80	85	-			
		$\theta_{y-}$	80	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

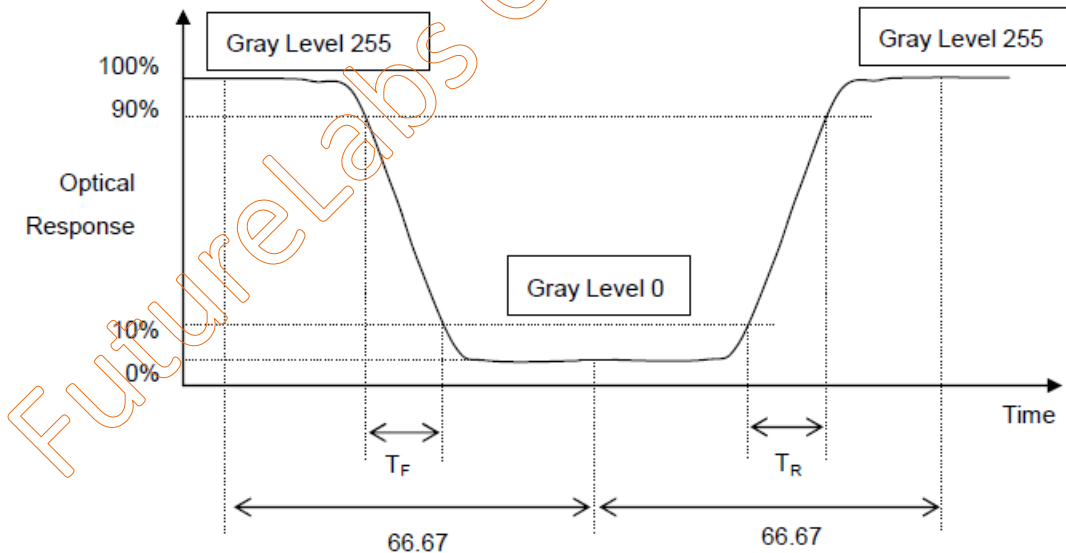


Note 2: Definition of Contrast Ratio (CR)

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:

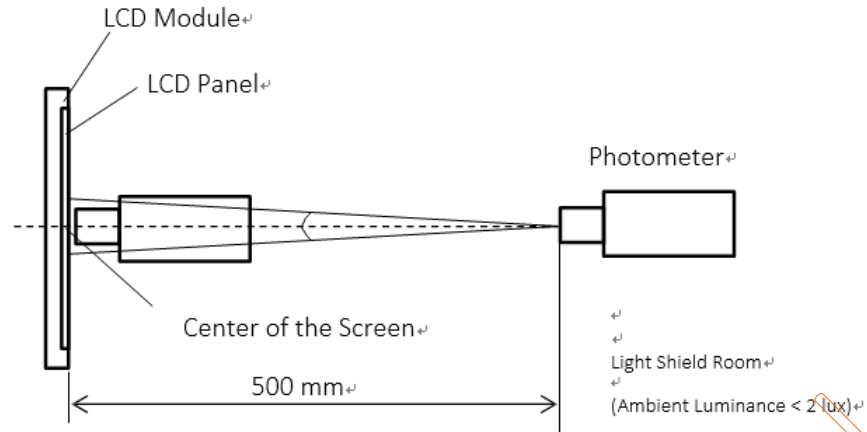
The response time is set initially by defining the “Rising Time (TR)” and the “Falling Time (TF)” respectively. Please refer the figure to the followings:



Note 4: Definition of Brightness (L)

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

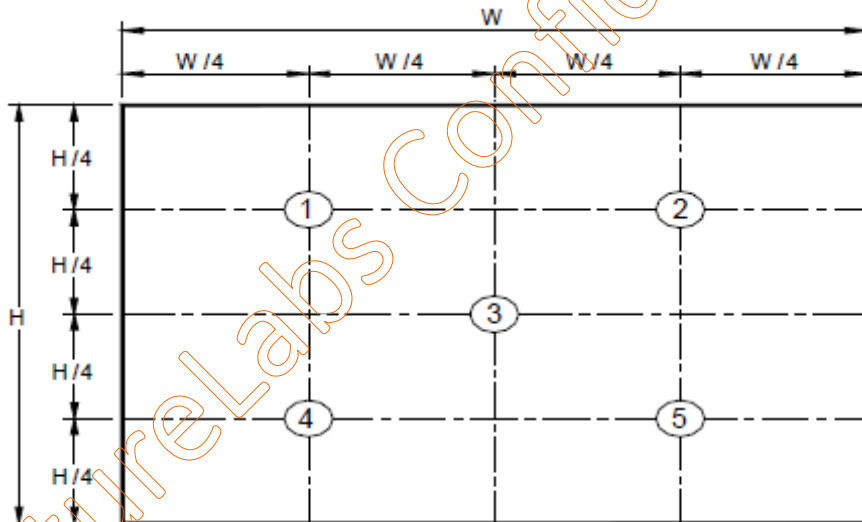
Note 5: The method of optical measurement:



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

Measure the luminance of gray level 255 at 5 points

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



## 8. Touch Screen specification

### 8.1 Environmental Specification

Specification	Value
Operating Temperature	-30°C ~ 80°C
Storage Temperature	-40°C ~ 80°C
Operating Humidity	20% ~ 90%RH
Storage Humidity	10% ~ 90%RH

### 8.2 Mechanical Specification

Specification	Value
Operating Life (Finger input)	10 <sup>7</sup> times
Light Transmittance	>85% Min. (JIS K-7105) with glass
Surface hardness	6H
FPC Peeling Force	5N Max

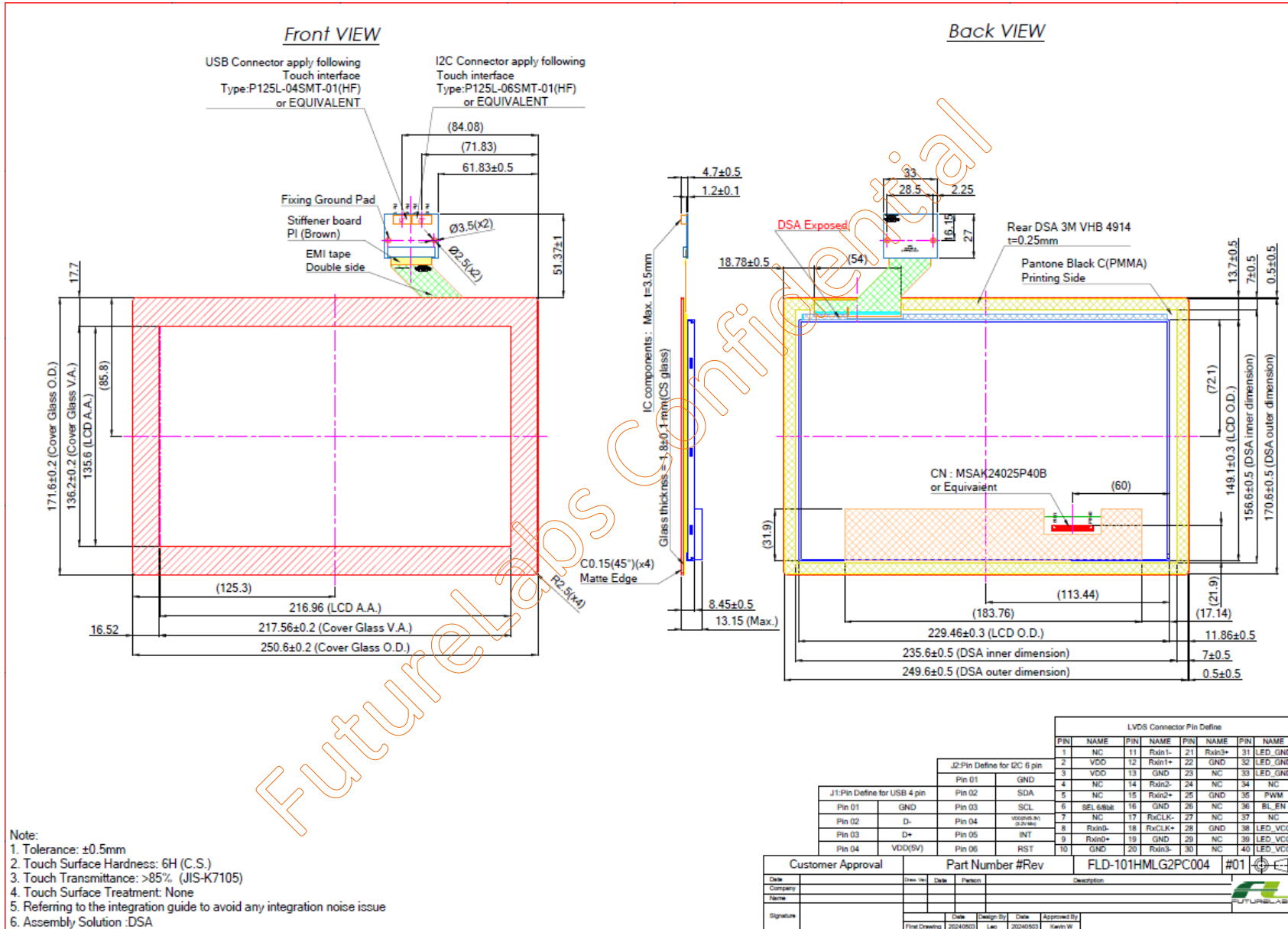
### 8.3 USB-I2C Type Controller

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(Below) Full Speed I2C: 100K/400KHz
Resolution	16384x16384 resolution
Power consumption(mA)	Active Mode: <108mA
	Idle Mode : <54mA
	Sleep Mode :<10mA
	(Operation Mode : Active Mode only)
Report rate(points/sec) Note(2)	>100 Hz
Response time	Average < 25ms

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 other parameter.

# 9. DIMENSION AND DRAWING



## 10. PRECAUTION AND PRODUCT HANDLING

- Do not apply the external force such as bending or twisting to the LCD panel and backlight during assembly.
- Do not insert and plug out the input connector while the LCD panel is operating.
- Do not take apart the panel or frame from LCD module assembly or insert anything into the backlight unit.
- Do not keep the same pattern in a long period of time, it may cause image sticking on LCD panel. Can use shuffle content periodically if fixed pattern is displayed on the screen.
- Do not touch the display area with bare hands, this will stain the display area.
- Pay attention to handle lead wire of backlight, that is not tugged in connect with LED driver.
- Do not change variable resistance settings in LCD panel, it may cause not satisfy of LCD characteristics specification.
- The surface of LCD panel's polarizer is very soft and easily scratched, please use a very soft dry cloth without chemicals for cleaning.
- To avoid the static electricity to damage the CMOS LSI, the operator should be grounded when in contact with the LCD panel, and also to all electrical equipment.
- Need to follow the correct power frequency when LCD panel is connecting and operating, this can avoid damage to CMOS LSI during latch-up.
- Need to store the LCD panel indoor without the exposure of sunlight where the temperature is  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  and the humidity is below 60% RH.