Product Specification

PART NUMBER # REV: FLC-070FMLG100001#00

DESCRIPTION: TFT 7”w, 1024(H)*600(V), LVDS, Full View 1000CD

( ) Preliminary Specification
(V) Approved Specification

Customer Name:	
Signature:	**Date:**

PREPARED BY	**REVIEWED BY**
Renee Huang	*David*

Revision History

Version	Date	Page	Description	Note
V1.0	2022/08/29		1st initial	

Table of Content

1. GENERAL DESCRIPTION

1.1 Description

7 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 10240 x 600 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	7”W	Inch
2	Pixel Number	1024 (H) x 3(RGB)x 600 (V)	Pixels
3	Outline Dimension	165(W) x 104(H) x 8.5 (D)Max PCB Zone 5.05(D)(Typ.)	mm
4	Active Area	154.21 (W) x 85.92 (H)	mm
5	Pixel Pitch	0.1506 (H) x 0.1432 (V)	mm
6	Display Colors	262K/16.7M	
7	Pixel Arrangement	RGB Vertical Stripe	- -
8	Display Mode	Normally Black	- -
9	Electrical Interface	LVDS 6/8 bit	- -
10	Surface Treatment	Anti-Glare	
11	Brightness	1000 (Typ.)	cd/m2
12	Contrast Ratio	800 (Typ.)	--

2. ABSOLUTE MAXIMUM RATING

2.1 Electrical Absolute Rating

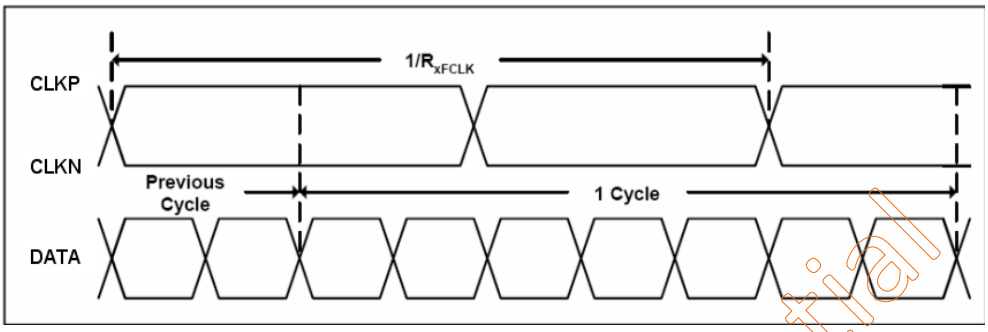
Item	Symbol	Values		Unit	Note
		Min	Max		
Power Supply Voltage	VDD	-0.3	4.0	V	

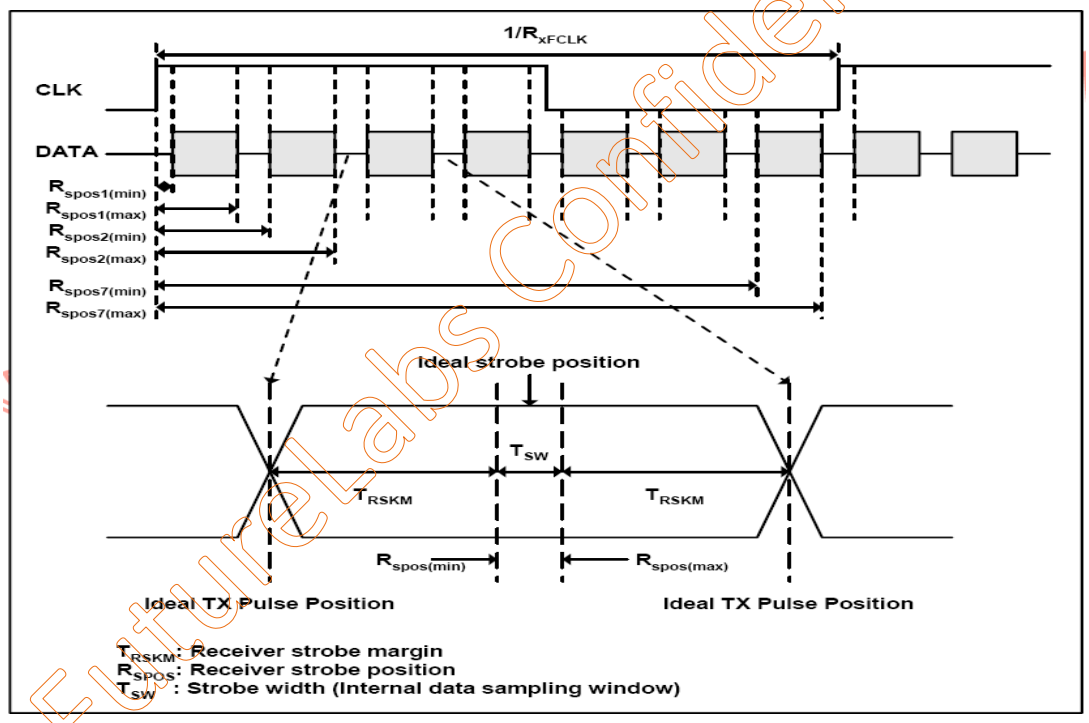
2.3 Environment Absolute Rating

Item	Symbol	Values			Unit	Note
		Min	Typ	Max.		
Operating Temperature	Top	-20	-	+70	°C	
Storage Temperature	Tstg	-30	-	+80	°C	

Note: (1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions

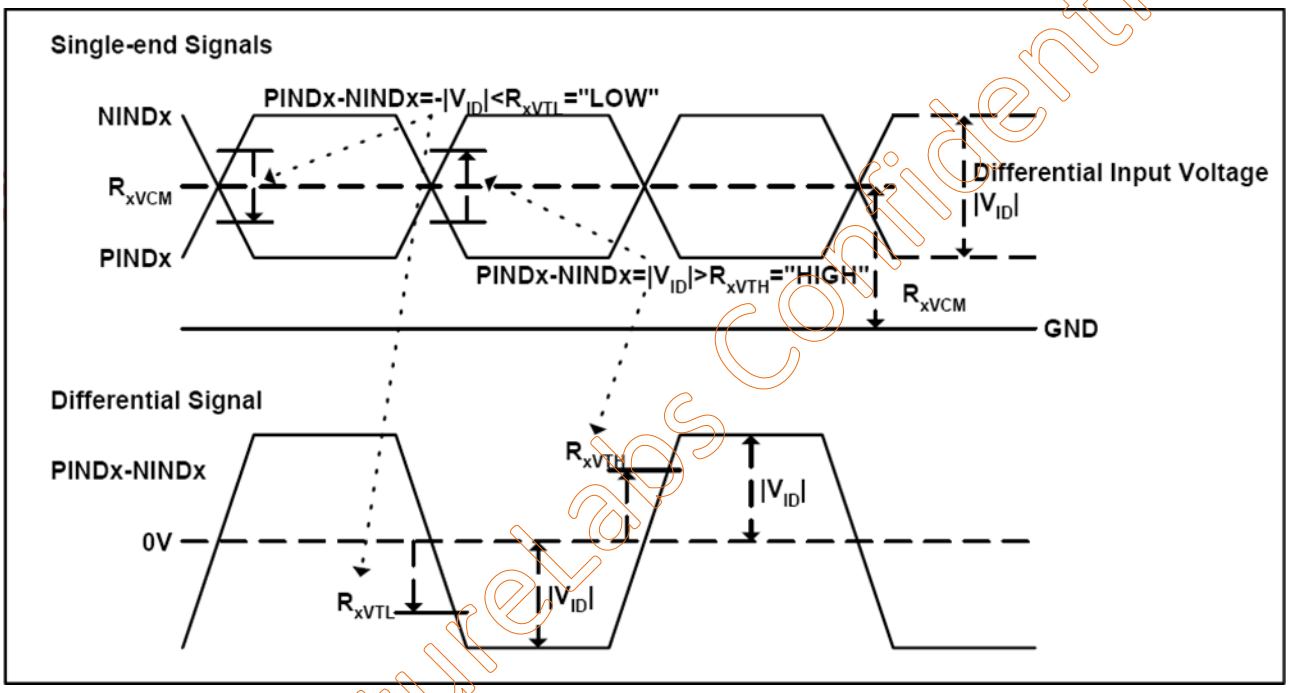
3.1 Input Clock and Data Timing Diagram





3.2 DC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Differential input high Threshold voltage	R_{XVTH}	-	-	+0.1	V	R_{XVCM}=1.2V
Differential input low Threshold voltage	R_{XVTL}	-0.1	-	-	V	
Input voltage range (singled-end)	R_{XVIN}	0	-	2.4	V	
Differential input common mode voltage	R_{XVCM}	$\|V_{ID}\|/2$	-	$2.4-\|V_{ID}\|/2$	V	
Differential voltage	$\|V_{ID}\|$	0.2	-	0.6	V	
Differential input leakage current	RV_{Xliz}	-10	-	+10	uA	



3.3 Backlight Unit

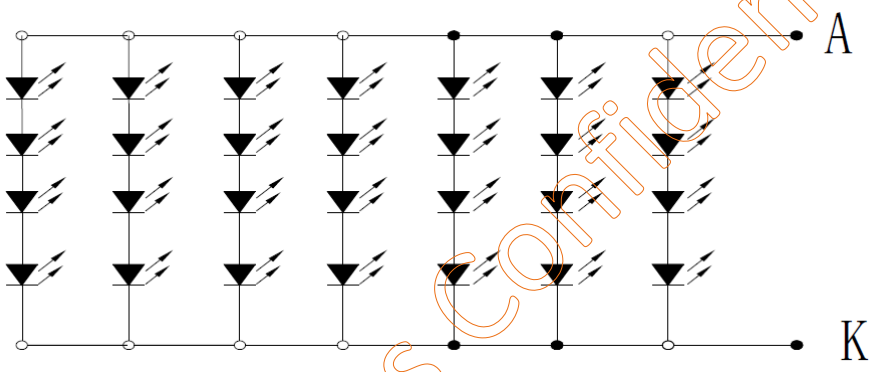
The backlight system is an edge-lighting type with 28 LED.

The characteristics of LED are shown in the following tables.

Parameter	Symbol	Min.	Type	Max.	Unit.	Note
LED current	IL	-	420	500	mA	(2)
LED Voltage	VL	-	12	13.6	V	
Power Consumption	PBL		5040	6800	mW	
Operating LED life time	Hr	50,000	-	-	Hour	(1)(2)

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25±3 ℃, 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 Ta=25℃ and IL=420mA. The LED lifetime could be decreased if operating IL is larger than 420mA. The constant current driving method is suggested.



LED : 28 =4*7 LED Circuit

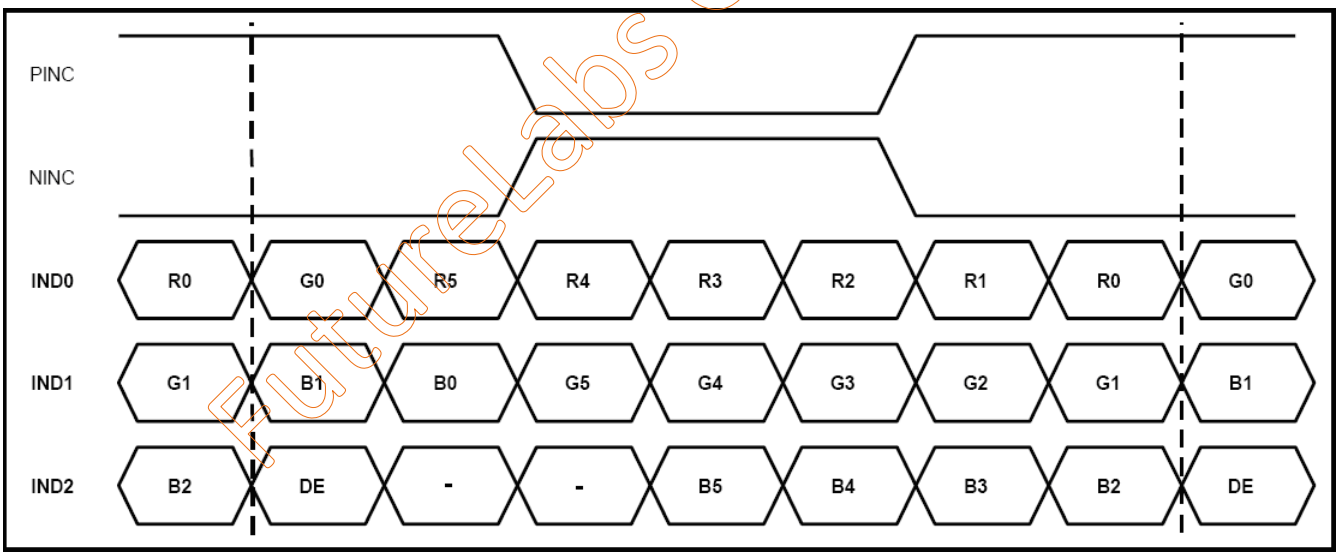
4.Timing Chart

4.1 Timing Table

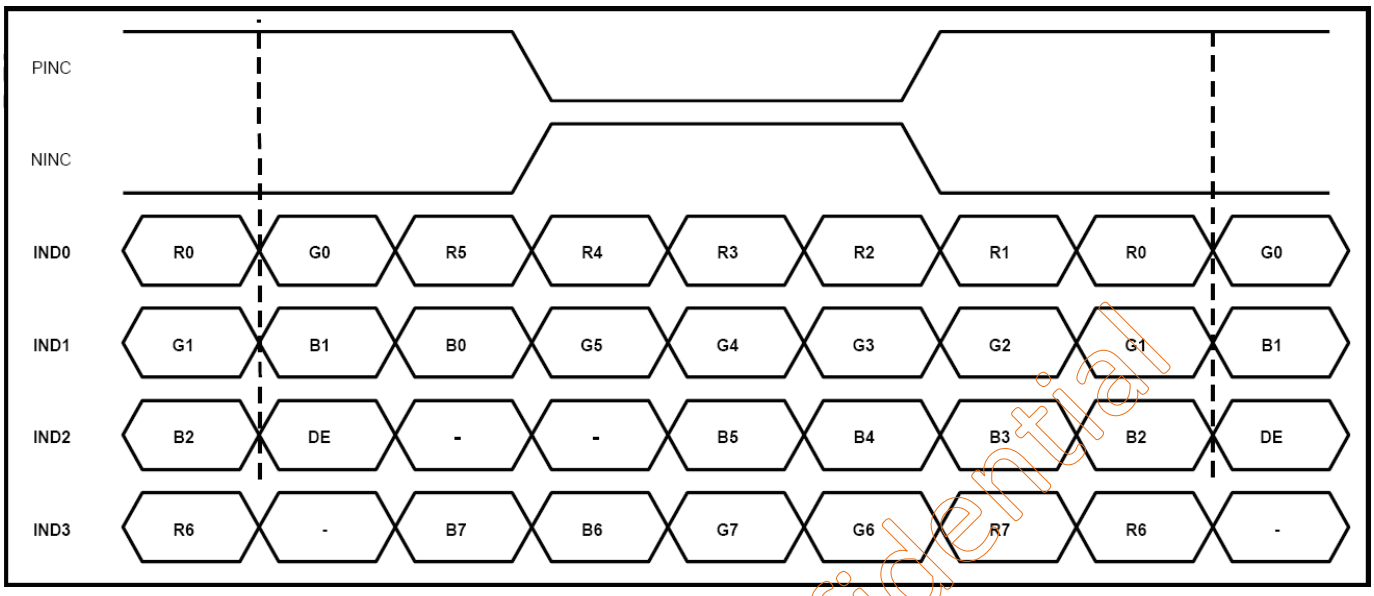
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	fclk	40.8	51.2	67.2	MHz	Frame rate=60Hz
Horizontal display area	thd		1024			
HS period time	th	1114	1344	1400	DCLK	
HS Blanking	thb	90	320	376	DCLK	
Vertical display area	tvd		600			
VS period time	tv	610	635	800	H	
VS Blanking	thb	10	35	200	H	

4.2 LVDS INPUT DATA FORMAT

6 bits LVDS input



8 bits LVDS input



Note: Support DE timing mode only, SYNC mode not supported.

5. INTERFACE PIN DESCRIPTION

5.1 LCM Connector PIN Assignment

FPC Down Connector is : MSAKT2407P30HA(信盛精工) or F1-X30SSLA-HF (JAE) or compatible 30pin, pitch = 1.0mm)

Pin No.	Symbol	IO	Functions	Remark
1	VCC(3.3V)	P	Power Voltage for digital circuit;3.3V	
2	VCC(3.3V)	P	Power Voltage for digital circuit;3.3V	
3	SEL6/8	I	LVDS signal 6bit/8bit select	
4	RX0-	I	- LVDS differential data input	
5	RX0+	I	+ LVDS differential data input	
6	RX1-	I	- LVDS differential data input	
7	RX1+	I	+ LVDS differential data input	
8	RX2-	I	- LVDS differential data input	
9	RX2+	I	+ LVDS differential data input	
10	GND	P	Ground	
11	RXCK-	I	- LVDS differential clock input	
12	RXCK+	I	+ LVDS differential clock input	
13	RX3-	I	- LVDS differential data input	
14	RX3+	I	+ LVDS differential data input	
15	GND	P	Ground	
16	L/R	I	Horizontal scan control signal; H or NC: Left to Right; L:Right to Left;	
17	U/D	I	Vertical scan control signal; H or NC: Up to Down; L: Down to Up	
18	NC	---	No connection	
19	NC	---	No connection	
20	NC	---	No connection	
21	NC	---	No connection	
22	GND	P	Ground	

23	NC	---	No connection	
24	NC	---	No connection	
25	NC	---	No connection	
26	NC	---	No connection	
27	VLED+	P	Backlight Driver Power Supply 12V	
28	VLED+	P	Backlight Driver Power Supply 12V	
29	ENABLE	I	Backlight Driver Enable signal	
30	PWM	I	Backlight Brightness Control signal	

Note1：If LVDS input data is 6 bits ,SELB must be set to High;

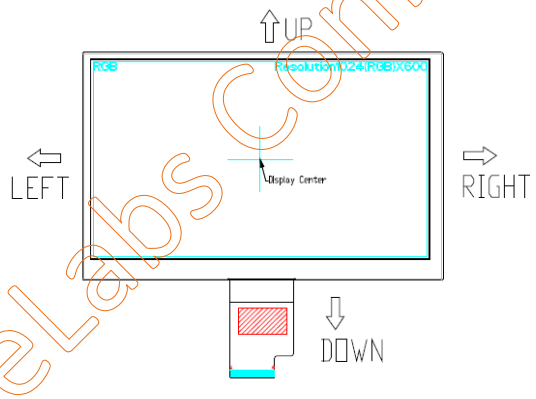
If LVDS input data is 8 bits, SELB must be set to Low.

Note2：When L/R="0", set right to left scan direction.

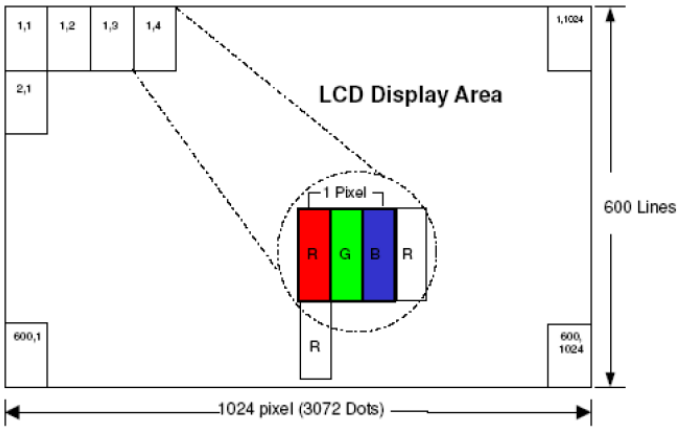
When L/R="1", set left to right scan direction.

When U/D="0", set top to bottom scan direction.

When U/D="1", set bottom to top scan direction.

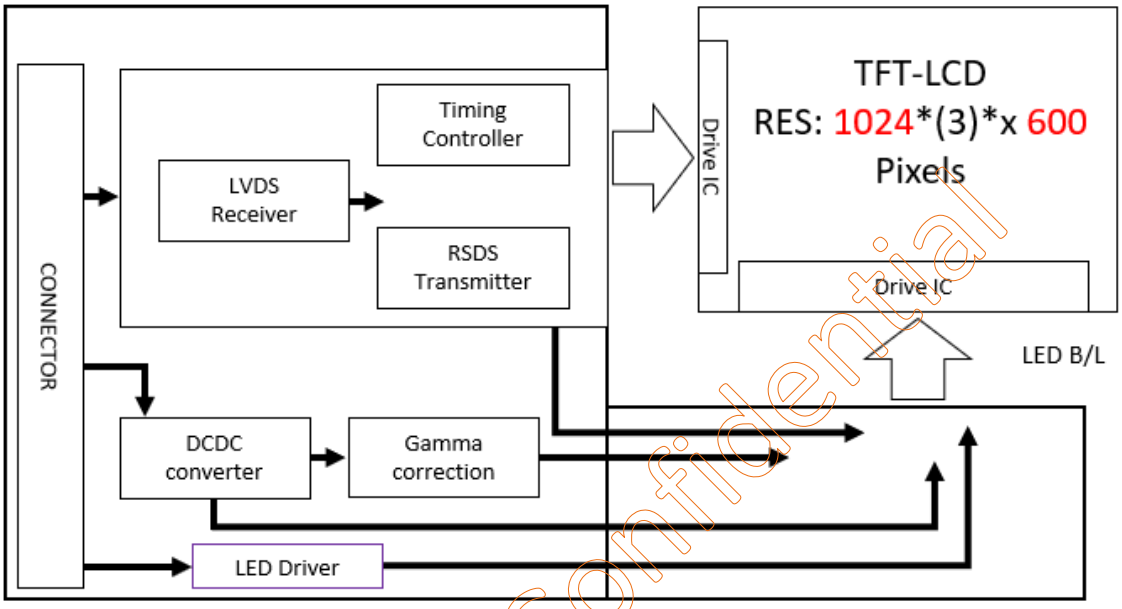


5.2 Pixel Fomat



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.

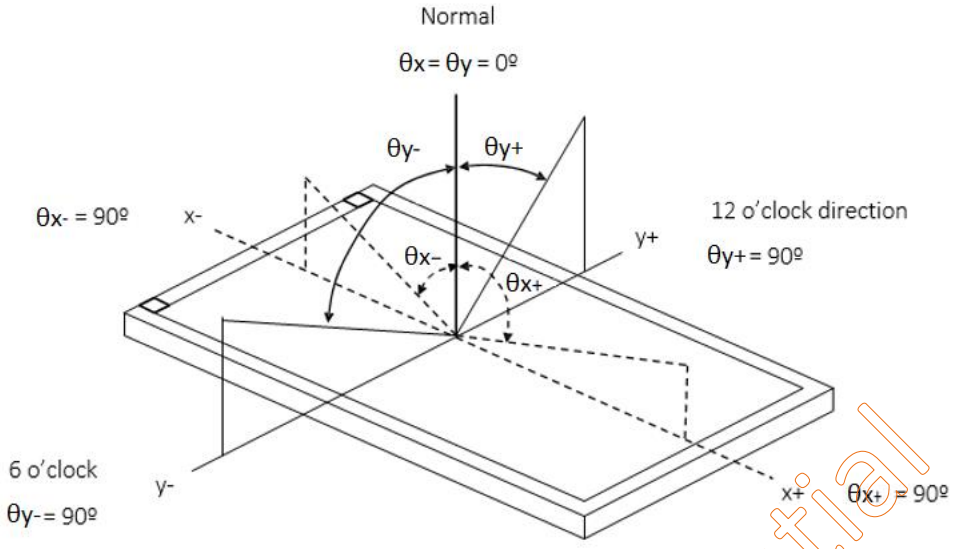
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	θ_X=0°	640	800	-	-	(2)(5)
Response Time		T_R	25°C	-	4	8	ms	(3)
		T_F			12	24		
Center Luminance of White		L_C	θ_X=0°, θ_Y =0° Viewing angle at normal direction	900	1000	-	cd/m2	(4)(5)
White Variation		δW		75	80	85	%	(6)
Chromaticity	Red	Rx		Typ. -0.05	0.591	Typ. +0.05	-	(1) (5)
		Ry			0.336		-	
	Green	Gx			0.342		-	
		Gy			0.593		-	
	Blue	Bx			0.144		-	
		By			0.082		-	
	White	Wx			0.284		-	
		Wy			0.299		-	
Viewing Angle	Horizontal	θ_{X+}	CR=10	75	80	85	Deg.	(1)(5)
		θ_{X-}		75	80	85		
	Vertical	θ_{Y+}		75	80	85		
		θ_{Y-}		75	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.

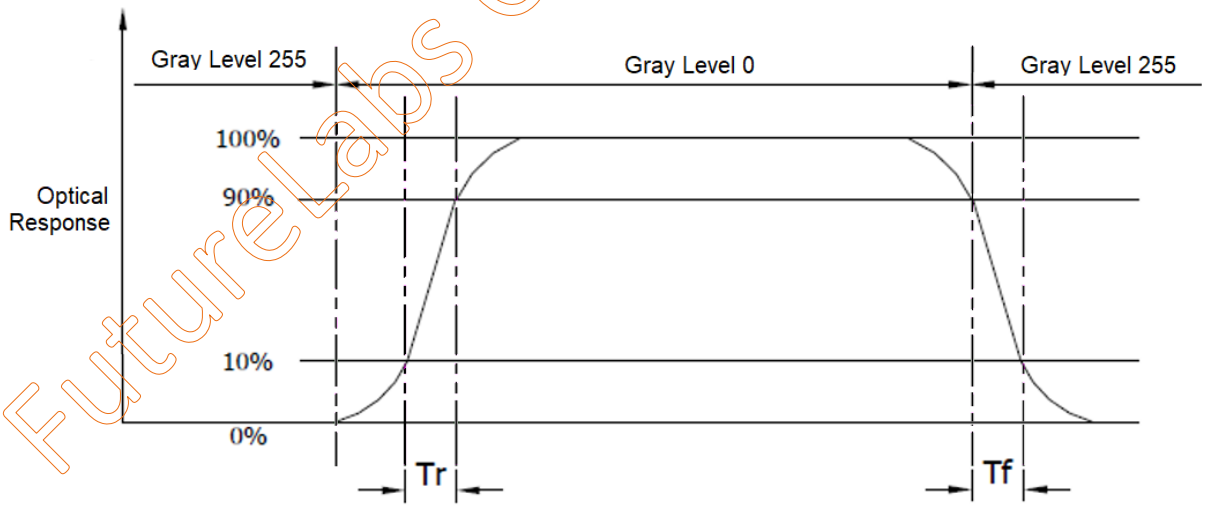


Note 2: Definition of Contrast Ratio (CR)

Measure the viewing angle of Θ= 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:

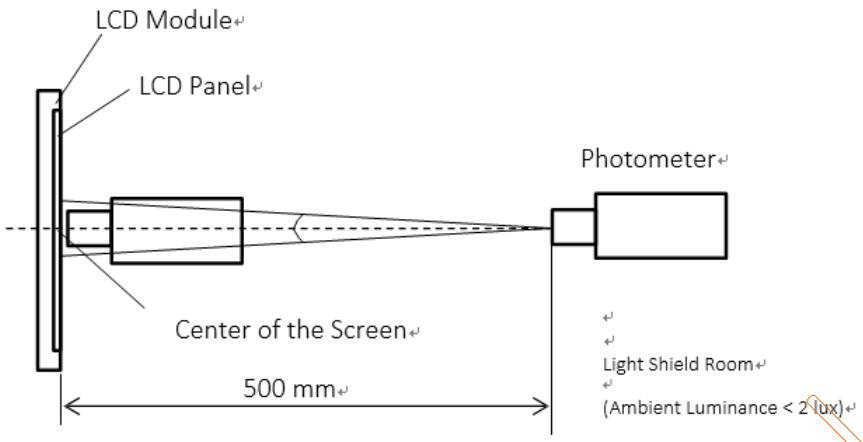
The response time is set initially by defining the "Rising Time (TR)" and the "Falling Time (TF)" respectively. Please refer the figure to the followings:



Note 4: Definition of Brightness (L)

Measure the center area of the panel and the viewing angle of the θx=θy =0°

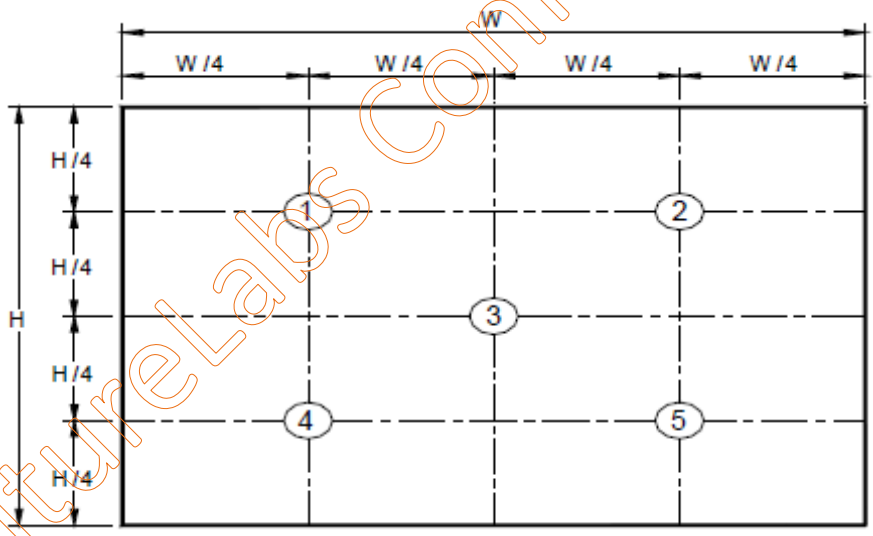
Note 5: The method of optical measurement:



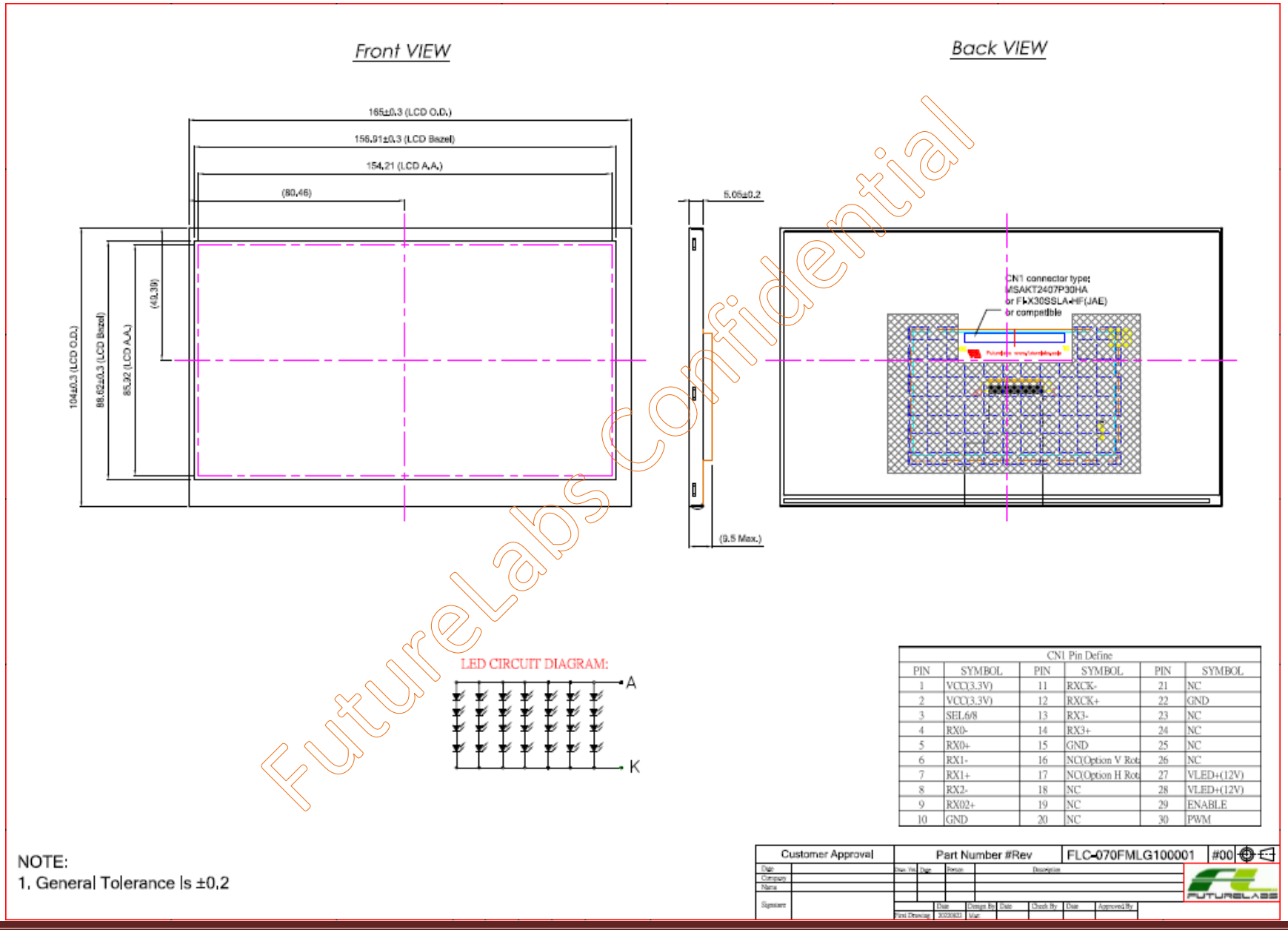
Note 6: Definition of White Variation (δW):

Measure the luminance of gray level 255 at 5 points

δW = (Maximum [L (1), L (2), L (3), L (4)~ L (5)] / Minimum [L (1), L (2), L (3), L (4)~ L (5)]) x 100%



8. DIMENSION AND DRAWING



CN1 Pin Define

PIN	SYMBOL	PIN	SYMBOL	PIN	SYMBOL
1	VCC(3.3V)	11	RXCIK-	21	NC
2	VCC(3.3V)	12	RXCIK+	22	GND
3	SEL6/8	13	RX3-	23	NC
4	RX0-	14	RX3+	24	NC
5	RX0+	15	GND	25	NC
6	RX1-	16	NC(Option V Rot	26	NC
7	RX1+	17	NC(Option H Rot	27	VLED+(12V)
8	RX2-	18	NC	28	VLED+(12V)
9	RX02+	19	NC	29	ENABLE
10	GND	20	NC	30	PWM

9. 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°C ± 5°C and the humidity is below 60% RH.