Product Specification

PART NUMBER # REV: FLC-070DMLG200002#00

DESCRIPTION: TFT 7"W, 800(H)*480(V) IPS LVDS, 500CD

( )   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	2022/05/10		1st initial	
V2.0	2022/05/11		Modify Outline dimension	
V2.1	2022/05/16		Modify Spec.	
V2.2	2022/12/09	P6 P14	1. modify backlight spec 2. add chromaticity data	

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 800 x 480 screen.

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	800 (H) x 3(RGB)x 480 (V)	Pixels
3	Outline Dimension	165(W) x 104(H) x 5.2(D) 165(W) x 104(H) x 9 max. (D)	mm
4	Active Area	152.4 (W) x 91.44 (H)	mm
5	Pixel Pitch	0.1905 (H) x 0.1905 (V)	mm
6	Display Colors	16.7M	
7	Pixel Arrangement	RGB Vertical Stripe	- -
8	Display Mode	Normally Black	- -
9	Electrical Interface	LVDS	- -
10	Surface Treatment	Anti-Glare	
11	Brightness	500 (Typ.)	cd/m2
12	Contrast Ratio	1000 (Typ.)	--
13	Power Consumption	TFT module: 5.22	W

2. ABSOLUTE MAXIMUM RATING

2.1 Electrical Absolute Rating

Item	Symbol	Values		Unit	Note
		Min	Max		
Power Supply Voltage	VCC	-0.3	4.5	V	GND=0

2.2 Environment Absolute Rating

Item	Symbol	Values			Unit	Note
		Min	Typ	Max.		
Operating Temperature	Topa	-30	-	+85	°C	
Storage Temperature	Tstg	-30	-	+85	°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.

Note 2: Ta =25±2 °C

Note 3: Test Condition: LED current

3. ELECTRICAL CHARACTERISTICS

3.1 TFT LCD Module

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power supply voltage	VCC	3.0	3.3	3.6	V	GND=0
Power Current	I_{VCC}	-	150	200	mA	
Input signal voltage	Vih	0.7Vcc	-	Vcc	V	
	V_{IL}	GND	-	0.3Vcc	V	

3.2 Backlight Characteristics

Parameter guideline for LED driving is under stable conditions at 25℃　(Room Temperature):

Item	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Backlight Forward Voltage	VLED	9.0	12.0	15.0	V	
Backlight Current	IL	-	180	300	mA	
PWM Signal Voltage_High	VPWM	1.6	-	-	V	
PWM Signal Voltage_Low		0	-	0.8	V	
PWM Duty Cycle		1	-	100	%	Note
PWM Frequency Dimming	DIM	100	-	8K	Hz	
BL Enable High Threshold	V_{BL_ENH}	1.6	-	-	V	
BL Enable Low Threshold	V_{BL_ENL}	0	-	0.8	V	
LED Life Time	Hr	50,000	-	-	Hrs	

Note 1: Be sure to apply the power voltage as the power sequence spec.

Note 2: DGND=AGND=0V.

Note 3: Below 1% PWM brightness is at 0

3.3 DC Electrical Characteristics

(LVDS mode : VDD=2.7V to 3.6V, AVDD=8V to 13.5V, AVSS=GND=0V, TA=-40 to +95℃)

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Differential Input high Threshold voltage	RxvTH	-	-	0.2	V	RXVCM=1.2V
Differential Input Low Threshold voltage	RxvTL	-0.2	-	-	V	
Input voltage range(signaled-end)	RxVN	0.3	-	VDD-1.2	V	-
Differential Input common Mode voltage	RxvcM	0.8	1.2	VDD-1.2-|VID|/2	V	-
Differential Input voltage	|VID|	0.2	-	1	V	RXVCM=1.2V
Differential Input Leakage Current	RVxliz	-10	-	+10	uA	-
LVDS Digital Operating Current	IddIvds	-	TBD	TBD	mA	Fclk=61MHz,VDD=3.3V
LVDS Digital Stand-by Current	IstIvdds	-	TBD	TBD	uA	Clock & all functions are stopped
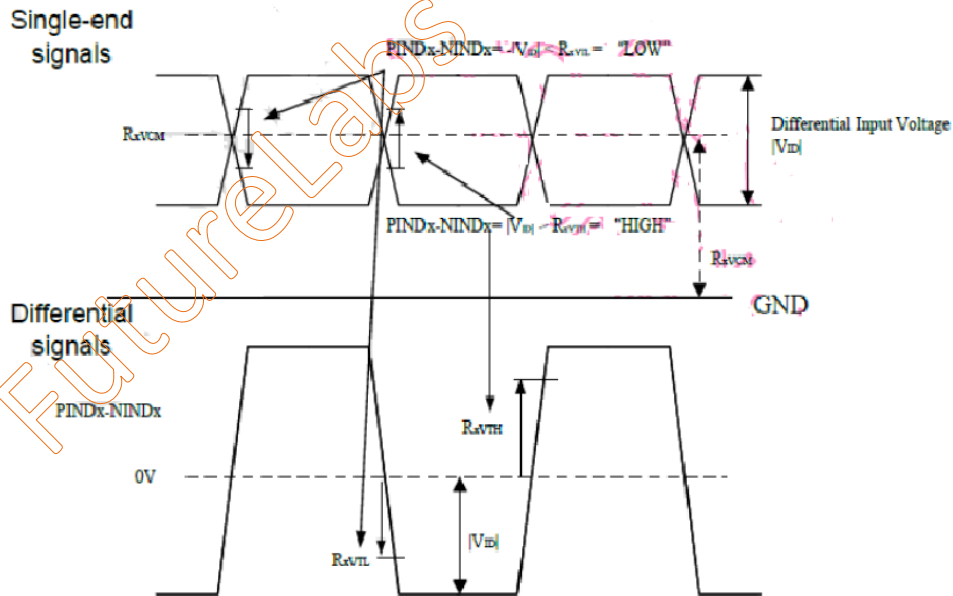
4.Timing Chart

4.1 Timing Table

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
DCLK cycle time	Tcph	20		220	ns	
DCLK pulse duty	Tcwh	35	50	65	%	
VSD setup time	Tvst	8			ns	
VSD hold time	Tvhd	8			ns	
HSD setup time	Thst	8			ns	
HSD hold time	Thhd	8			ns	
Data setup time	Tdst	8			ns	
Data hold time	T	8			ns	
DE setup time	Test	8			ns	
DE hold time	Tehd	8			ns	
DCLK frequency	fclk	28	30	32	MHz	
Horizontal display area	thd		800		Tcph	
1 Horizontal Line	th	889	902	915	Tcph	
HSD pulse width	thpw	5	10	15	Tcph	
HSD Back Porch (Blanking)	thb		32		Tcph	
HSD Front Porch	thfp	52	60	68	Tcph	
Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Vertical display area	tvd		480		th	
VSD period time	tv	546	555	564	th	
VSD pulse width	tvpw	6	10	14	th	
VSD Back Porch (Blanking)	tvb		5		th	
VSD Front Porch	tvfp	55	60	65	th	

4.2 LVDS INPUT DATA FORMAT
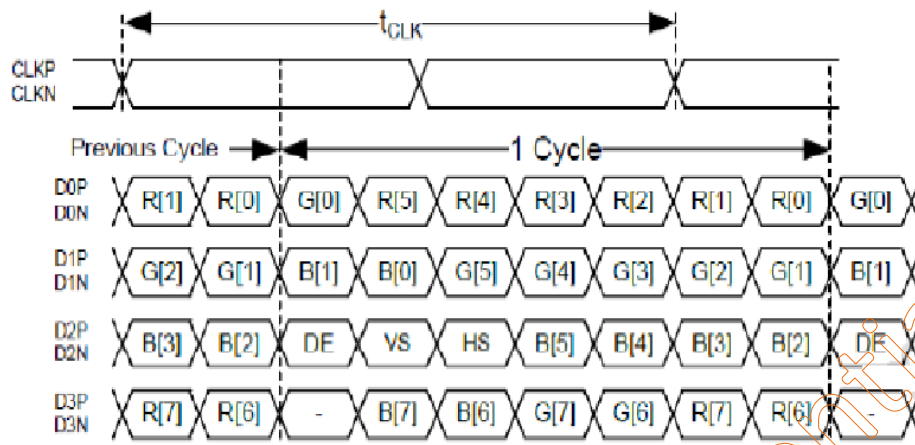
8-bit LVDS VESA input

4.3 Power On/Off Sequence
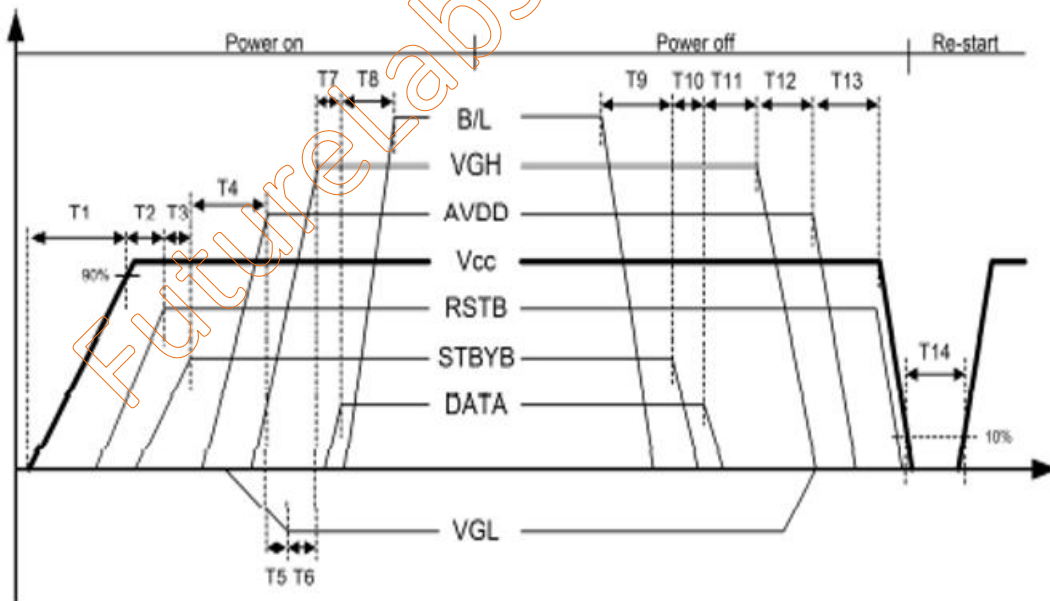
Item	Min.	Typ.	Max.	Unit
T1	--	--	20	ms
T2	1	--	--	ms
T3	1	--	--	ms
T4	50	--	--	ms
T5	32	--	--	ms
T6	16	--	--	ms
T7	16	--	--	ms
T8	32	--	--	ms
T9	32	--	--	ms
T10	32	--	--	ms
T11	50	--	--	ms
T12	16	--	--	ms
T13	32	--	--	ms
T14	1000	--	--	ms

5. INTERFACE PIN DESCRIPTION

5.1 LCM Connector PIN Assignment

The electronics interface connector is F1-X30SSLA-HF(JAE) 30pin,pitch=1.0mm or equivalent.

| Pin No	Symbol	IO	Function	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	NC	--	No Connection	
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	RXCLK-	I	-LVDS differential clock input	
12	RXCLK+	I	+LVDS differential clock input	
13	RX3-	I	-LVDS differential data input	
14	RX3+	I	+LVDS differential data input	
15	GND	P	Ground	
16	V/H	I	Horizontal scan control signal ; H:Left to Right, Up to Down; L: Right to Left, Down to Up	
17	NC	--	No connection	
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	

Note : I : Signal Input ; O : Signal Output ; P : Power Supply

6. BLOCK DIAGRAM

The following diagram shows the functional block of the TFT module:
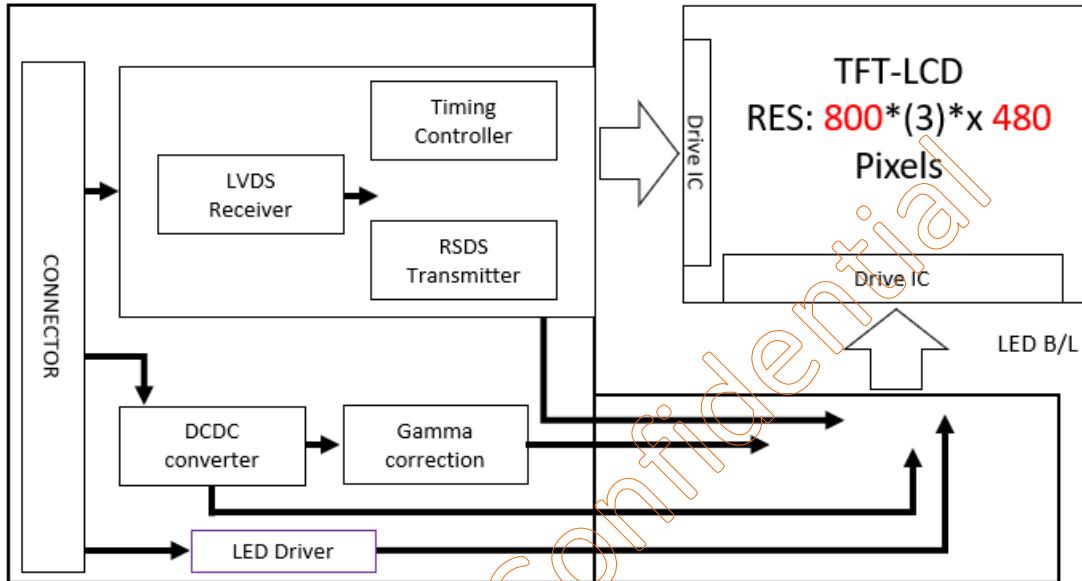
7. OPTICAL CHARACTERISTIC

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

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	$\theta_X=0°$	700	1000	-	-	(2)(5)
Response Time		T_R+T_F	25°C	-	30	40	ms	(3)
Center Luminance of White		L_C		400	500	-	cd/m2	(4)(5)
White Variation		δW		-	75	-	%	(6)
Chromaticity	Red	Rx	$\theta_X=0°, \theta_Y=0°$ Viewing angle at normal direction	0.615	0.655	0.695	-	(1) (5)
		Ry		0.278	0.318	0.358	-	
	Green	Gx		0.221	0.261	0.301	-	
		Gy		0.536	0.576	0.616	-	
	Blue	Bx		0.1	0.14	0.18	-	
		By		0.042	0.082	0.122	-	
	White	Wx		0.256	0.296	0.336	-	
		Wy		0.293	0.333	0.373	-	
Viewing Angle	Horizontal	$\theta_{X}+$	CR=10	-	80	-	Deg.	(1)(5)
		$\theta_{X}-$		-	80	-		
	Vertical	$\theta_{Y}+$		-	80	-		
		$\theta_{Y}-$		-	80	-		

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.
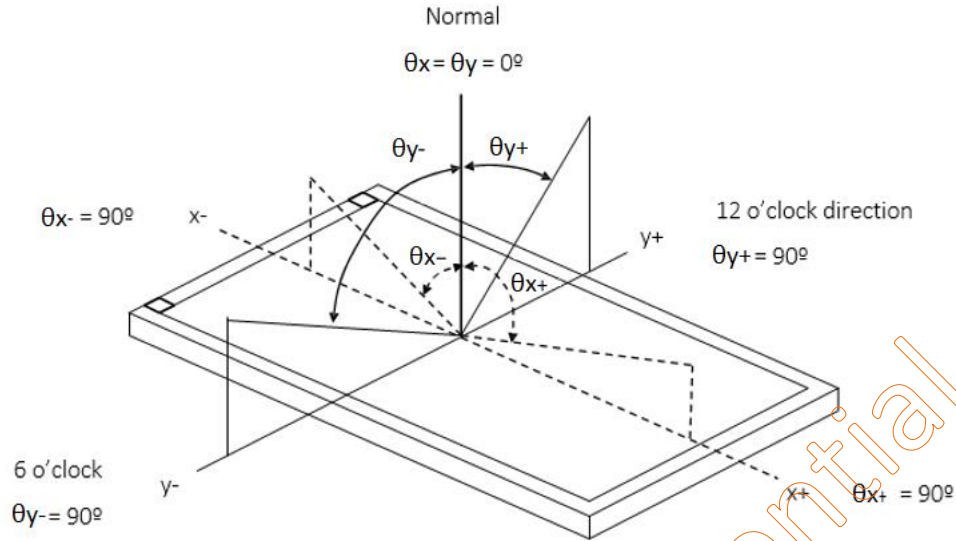
Note 2: Definition of Contrast Ratio (CR)

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
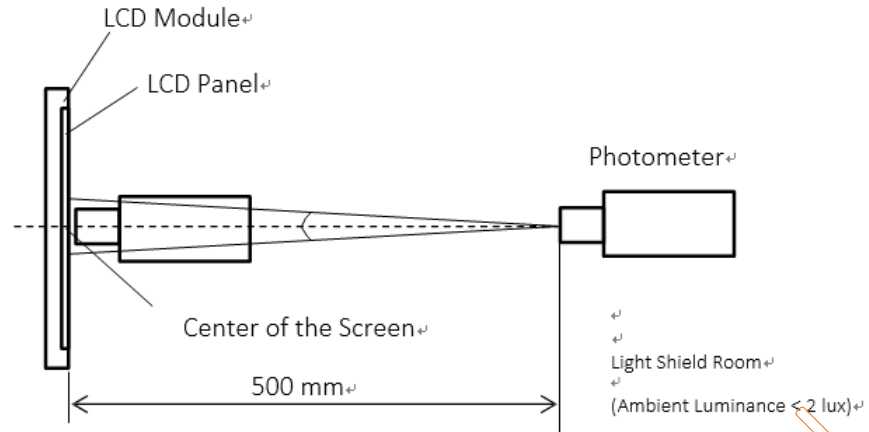
Note 3: Definition of Response Time:

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:
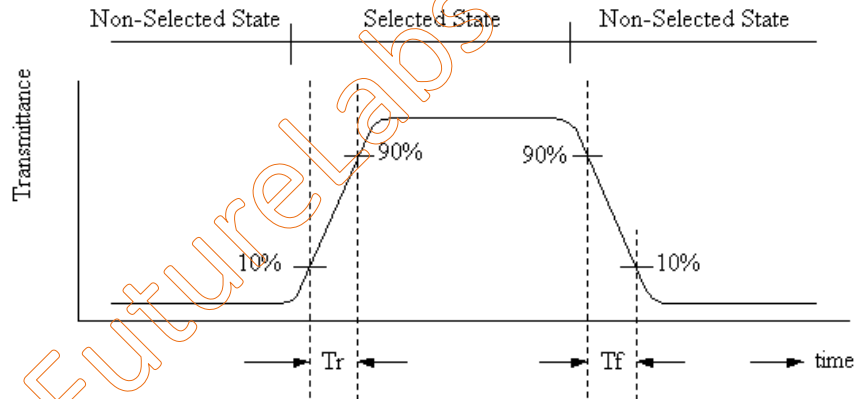
Note 4: Definition of Brightness (L)

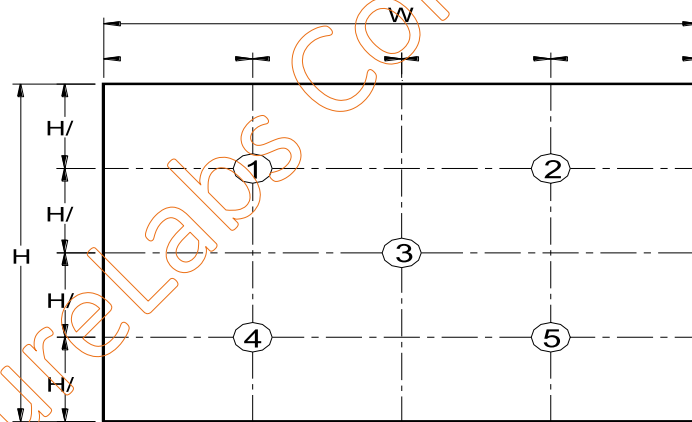Measure the center area of the panel and the viewing angle of the θx=θy =0°

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

8. Reliability Test
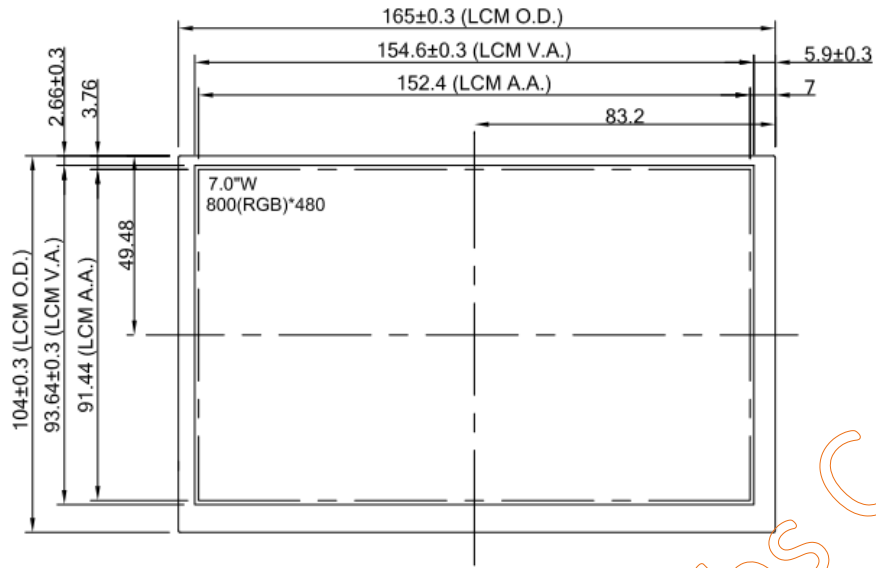
Test item	Condition	
High Temperature	1) Operating 2) 85°C	240 hrs
Low Temperature	1) Operating 2) -30°C	240 hrs
High Temperature	1)Storage 2)85°C	240 hrs
Low Temperature	1)Storage 2)-30°C	240 hrs
High Temperature and High Humidity (Operation)	1)+60°C 2)90%RH	240 hrs
Shock Test (Non Operating)	1) Acceleration 100G 2) Wave Time: 6 ms 3) X, Y, and Z directions 3 times for each direction	
Vibration (Non Operating)	1) 5~200Hz 2) Acceleration 0.015G Λ2/HZ 3) X, Y, and Z directions	2hr for each direction

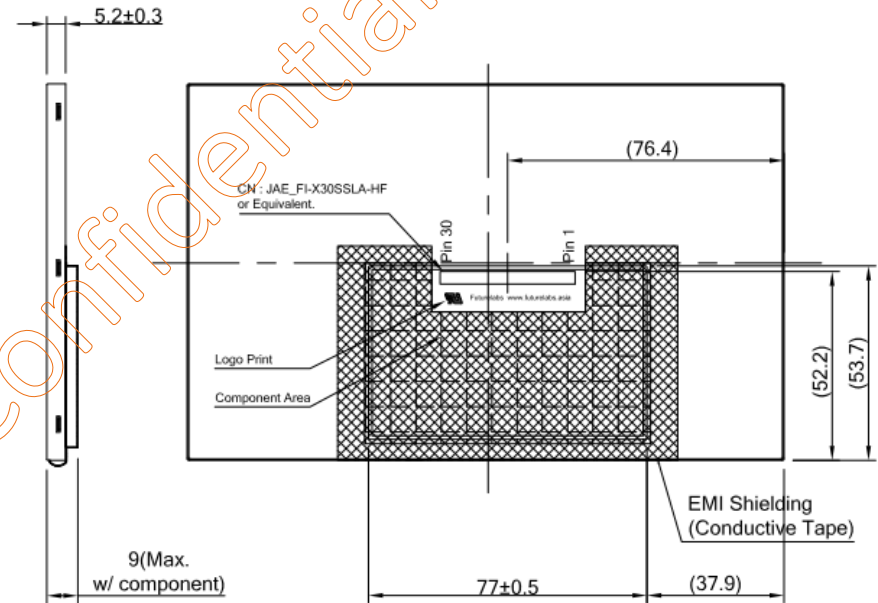Note 1: Inspection after 2～4 hours storage at room temperature, the sample shall be free from defects

Note 2: In the standard conditions, there is no function failure issue occurred. All the cosmetic specification is judged before test.

9. DIMENSION AND DRAWING

Front VIEW

- 165±0.3 (LCM O.D.)
- 154.6±0.3 (LCM V.A.)
- 152.4 (LCM A.A.)
- 83.2
- 5.9±0.3
- 7
- 2.66±0.3
- 3.76

7.0"W
800(RGB)*480

- 104±0.3 (LCM O.D.)
- 93.64±0.3 (LCM V.A.)
- 91.44 (LCM A.A.)
- 49.48

Back VIEW

- 5.2±0.3
- (76.4)
- (52.2)
- (53.7)
- 9(Max. w/ component)
- 77±0.5
- (37.9)

CN : JAE_FI-X30SSLA-HF or Equivalent.

Pin 30

Pin 1

Futurelabs www.futurelabs.asia

Logo Print

Component Area

EMI Shielding (Conductive Tape)

CN Pin Define

PIN	SYMBOL	PIN	SYMBOL	PIN	SYMBOL
1	VCC_3.3V.	11	RXCK-	21	NC
2	VCC_3.3V.	12	RXCK+	22	GND
3	NC	13	RX3-	23	NC
4	RX0-	14	RX3+	24	NC
5	RX0+	15	GND	25	NC
6	RX1-	16	V/H	26	NC
7	RX1+	17	NC	27	VLED+_12V.
8	RX2-	18	NC	28	VLED+_12V.
9	RX2+	19	NC	29	ENABLE
10	GND	20	NC	30	PWM

NOTE:
1. General Tolerance is ±0.3
2. Viewing Direction : Full View

Customer Approval		Part Number #Rev	FLC-070DMLG200002	#00
Date	Doc. Ver. Date	Person	Description	
Company	01 20220511 Kevin	Update Pin Define information		
Name				
Signature	Date	Design By Date	Check By Date	Approved By
	First Drawing	20220509 Kevin		

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