

Product Specification

PART NUMBER # REV: FLD-070DMLK1PCFA3#00

DESCRIPTION: TFT 7" W 800x480 8bit LVDS 1000CD integrated with

Rocktouch Pcap Black USB – I2C

() Preliminary Specification

(V) Approved Specification

Customer Name:	
Signature:	Date:

PREPARED BY	REVIEWED BY
<i>Sarah</i>	<i>David</i>

Revision History

Version	Date	Page	Description	Note
V1.0	2021/10/19		First Edition	

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1. GENERAL DESCRIPTION

1.1 Description

7" w 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 800x480 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	800 (H) x 3(RGB)x 480 (V)	Pixels	
3	Outline Dimension	189.8(H)x129.7(H)x12.9(D)	mm	
4	Active Area	152.4 (H) x 91.44 (V)	mm	
5	Pixel Pitch	0.1905(H) x0.1905(V)	mm	
6	Display Colors	16.7M colors		
7	Pixel Arrangement	RGB vertical stripe	--	
8	Display Mode	Normally Black	--	
9	NTSC	75 (Typ.)	%	
10	Electrical Interface	LVDS	--	
11	Surface Treatment	None	--	
12	Brightness	1000 (Typ.)	cd/m2	
13	Contrast Ratio	1000 (Typ.)	--	
14	Power	Logic System	0.55(Max.)	W
	Consumption	B/L System	3.808(Max.)	W

2. ABSOLUTE MAXIMUM RATING

2.1 Electrical Absolute Rating

Item	Symbol	Values			Unit	Note
		Min	Typ	Max		
Power supply voltage	V _{CC}	-0.3	-	4.5	V	GND=0
	V _{GH}	-0.3	-	V _{GL} +35.0	V	GND=0
	V _{GL}	-15	-	0.3	V	GND=0
	A _{VDD}	-0.3	-	14.5	V	AGND=0
	V _{COM}	4.0	-	6.0	V	
Logic Signal Input Level	V _I	-0.3	-	4.5	V	

(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.

(2) T_a = 25±2°C

2.2 Environment Absolute Rating

Item	Symbol	Values			Unit	Note
		Min.	Typ.	Max.		
Operating Temperature	T _{op}	-30		+85	°C	
Storage Temperature	T _{stg}	-40		+95	°C	

3. ELECTRICAL CHARACTERISTICS

3.1 TFT LCD Module

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Supply Voltage	Vcc	3.0	3.3	3.6	V	
	VGH	-	19	-	V	
	VGL	-	-10	-	V	
	AVDD	-	12.4	-	V	
VCOM	VCOM	-	5.5	-	V	
Input signal voltage	ViH	0.7* Vcc	-	Vcc	V	Note(1)
	Vil	0	-	0.3*V cc	V	
Current of power supply	Ivcc	-	15	-	mA	Vcc=3.3V,white pattern
	IaVDD	-	20	-	mA	AVDD=12.5,white pattern
	IvGH	-	0.25	-	mA	VGH=19V,white pattern
	IvGL	-	0.50	-	mA	VGL=10V,white pattern

Note (1): HSYNC, VSYNC, DE, Digital Date

Note (2): Be sure to apply the power voltage as the power sequence spec.

Note (3): GND=AGND=0V

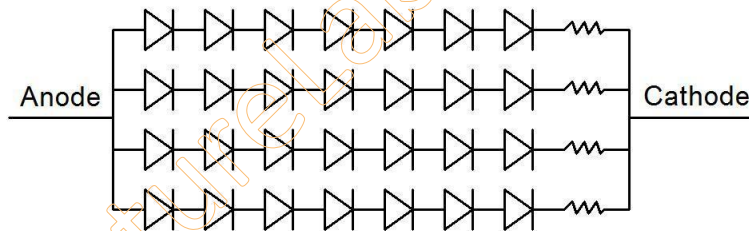
3.2 Back Light Unit

Item	Symbol	Min.	Typ.	Max.	Unit	Note
LED current	IL	-	160	-	mA	Ta=25°C
LED Voltage	V _F	-	-	23.8	Volt	Ta=25°C
Operating LED life time	Hr	30000	-	-	Hour	Ta=25°C Note(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°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 Ta=25°C and IL=160mA. The LED lifetime could be decreased if operating IL is larger than 280mA. The constant current driving method is suggested.

Note(3) LED Light Bar Circuit



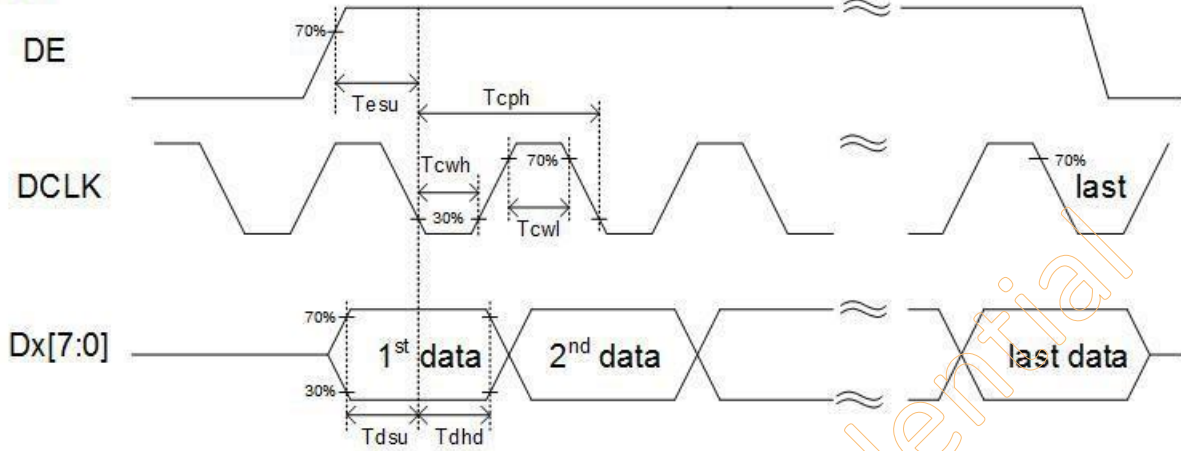
4. Timing Chart

4.1 Timing Table

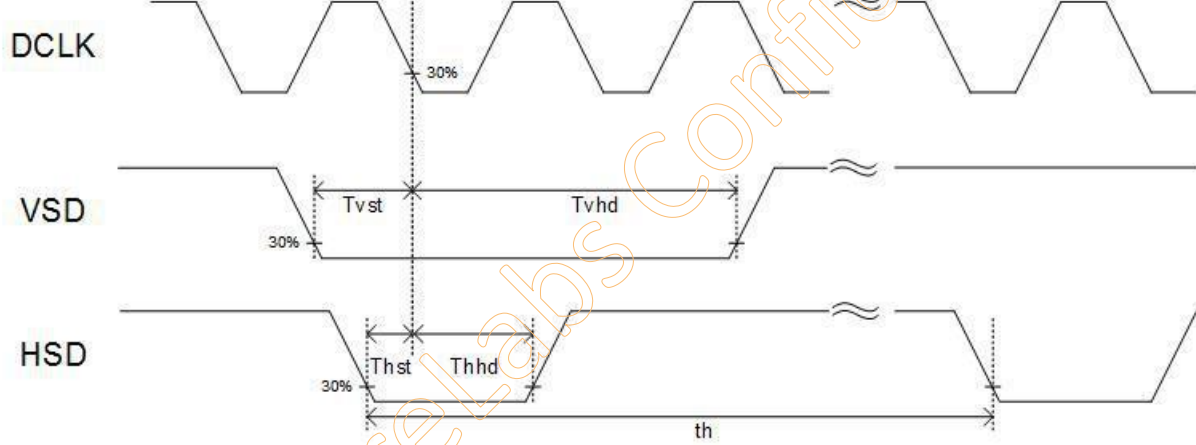
Item	Symbol	Min.	Type	Max.	Unit.	Remark
DCLK cycle time	Tcph	20		220	ns	
DCLK pulse duty	Tcwh	35	50	65	%	
VSD setup time	Tvst	8			ns	
VSD hold time	Tvhd	8			ns	
HSD setup time	Thst	8			ns	
HSD hold time	Thhd	8			ns	
Data setup time	Tdsu	8			ns	
Data hold time	Tdhd	8			ns	
DE setup time	Tesu	8			ns	
DE hold time	Tehd	8			ns	
DCLK frequency	fclk	28	30	32	MHz	
Horizontal display area	thd	800			Tcph	
HSD period time	th	899	902	915	Tcph	
HSD pulse width	thpw	5	10	15	Tcph	
HSD back porch	thb	32			Tcph	
HSD front porch	thfp	52	60	68	Tcph	
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	tvb	5			th	
VSD front porch	tvfp	55	60	65	th	

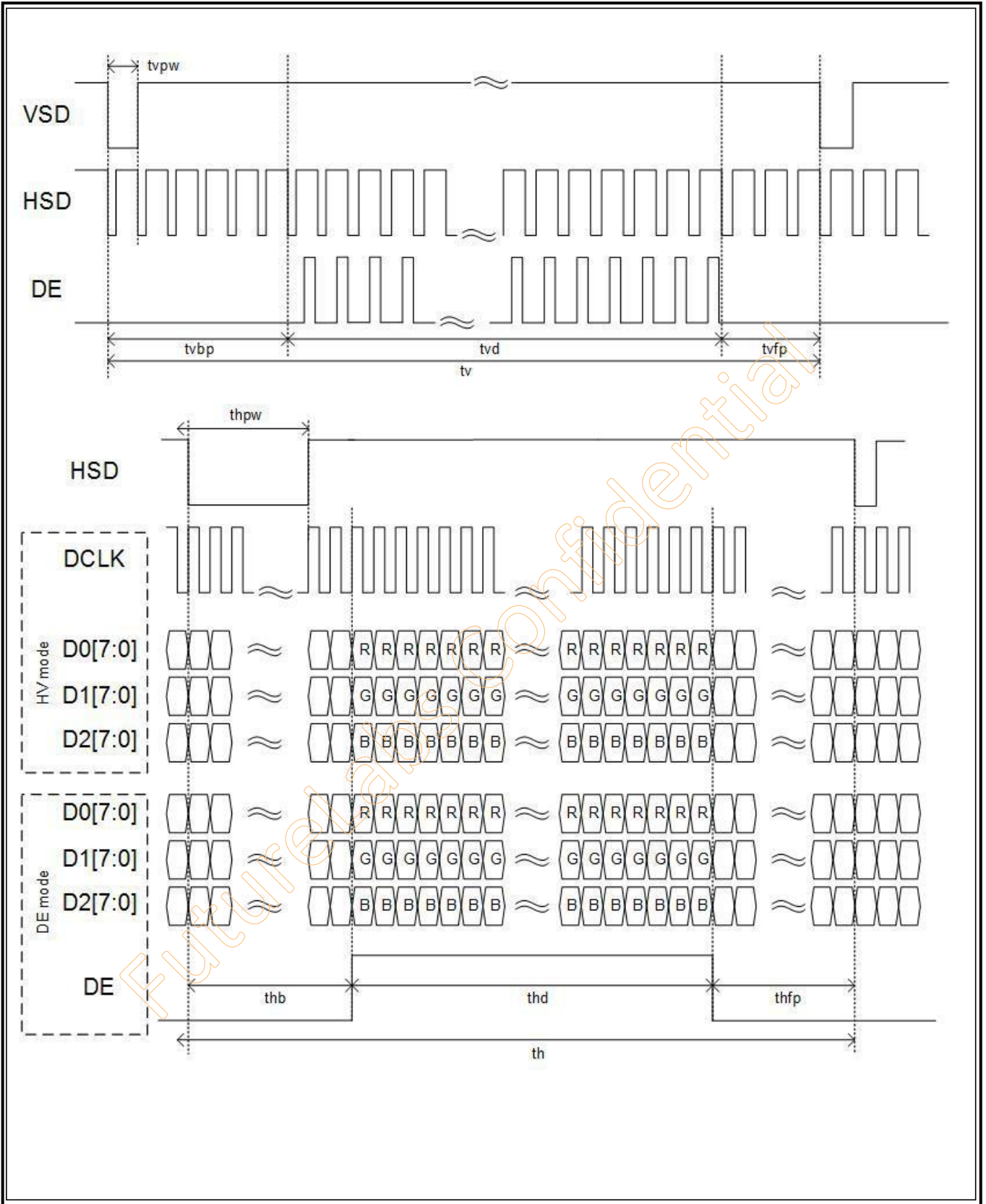
4.2 Timing Diagram of Interface Signal

DE mode

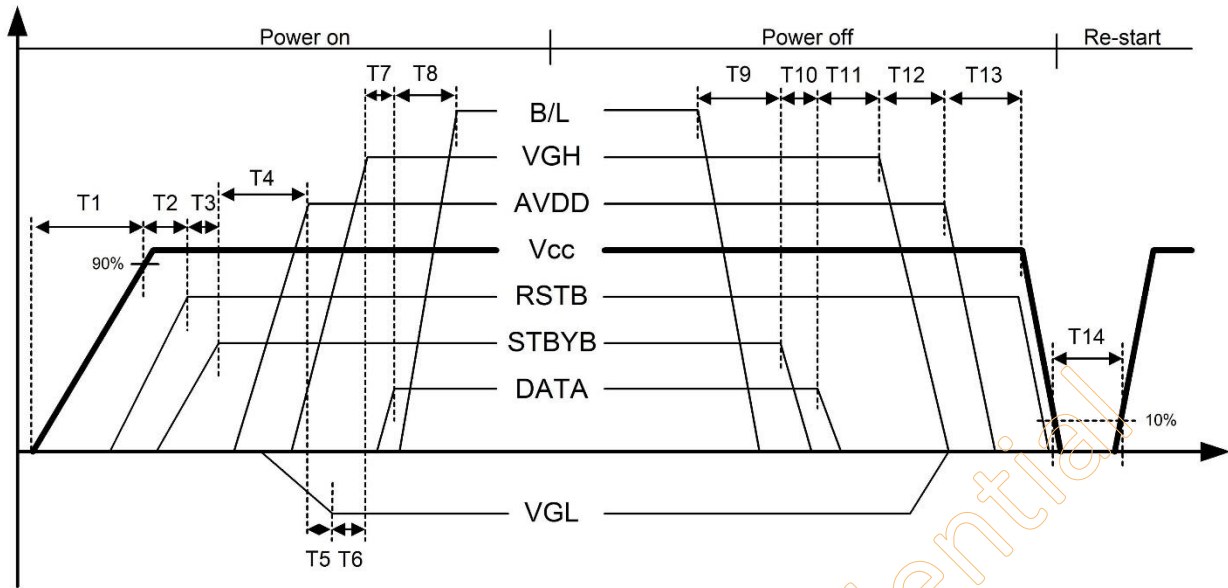


HV mode





4.3 Power 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

The Data are included in the R0~R7, G0~G7, B0~B7, HSD, VSD, DCLK, DE, MODE, SHLR, and UPDN.

5. INTERFACE PIN DESCRIPTION

5.1 LCM Connector PIN Assignment

The electronics interface connector : 093G30-00001A-M4 or Equivalent.

Pin No.	Symbol	Function	Remark
1	VCC LCD	Power Supply Voltage (+3.3V)	
2	VCC LCD	Power Supply Voltage (+3.3V)	
3	NC	No Connection	
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-	LVDS differential Clock Input	
12	RXCLK+	LVDS differential Clock Input	
13	RX3-	LVDS Differential Data Input	
14	RX3+	LVDS Differential Data Input	
15	GND	Ground	
16	V rotation	Reverse Scan Up/Down (Note)	
17	H rotation	Reverse Scan Left/Right (Note)	
18	NC	No Connection	
19	NC	No Connection	
20	NC	No Connection	
21	NC	No Connection	

Pin No.	Symbol	Function	Remark
22	GND	Ground	
23	NC	No Connection	
24	NC	No Connection	
25	NC	No Connection	
26	NC	No Connection	
27	BLK VCC	LED power supply (12V)	
28	BLK VCC	LED power supply (12V)	
29	ENABLE	Backlight Enable	
30	PWM	PWM mode	

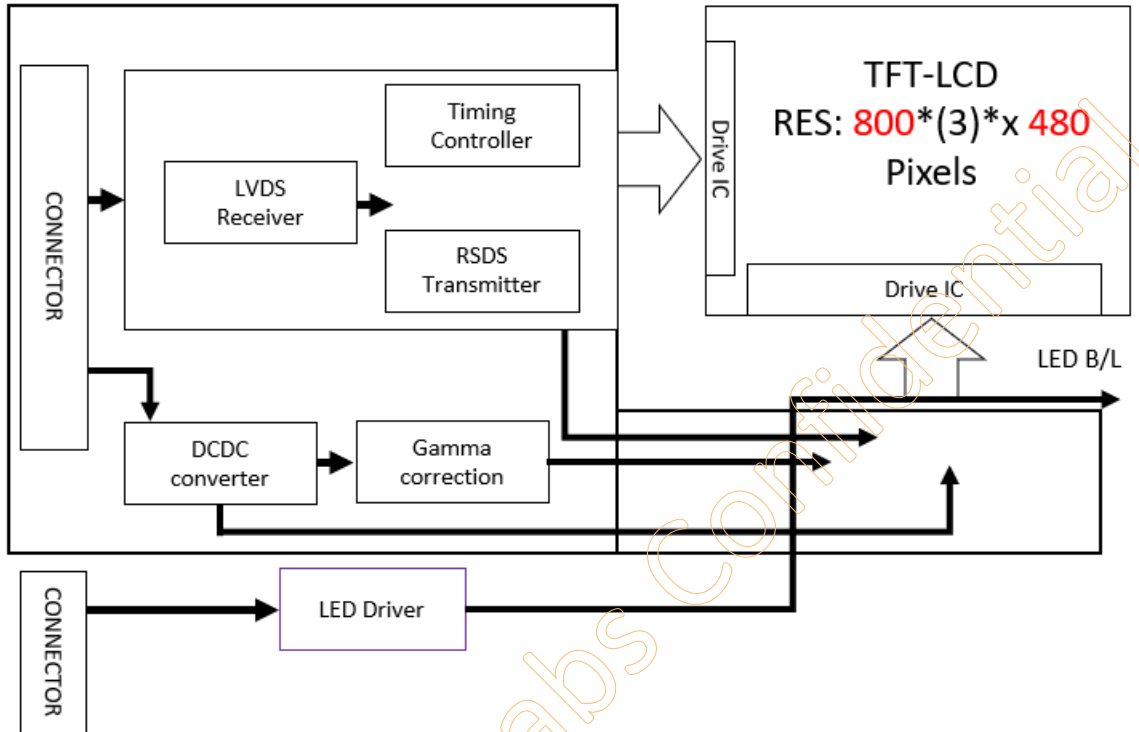
Note 1 :SHLR and UPDN control function

SHLR	UPDN	Data shifting
H	H	Left→Right, Up→Down
L	H	Right→Left, Up→Down
L	L	Right→Left, Down→Up
H	L	Left→Right, Down→Up



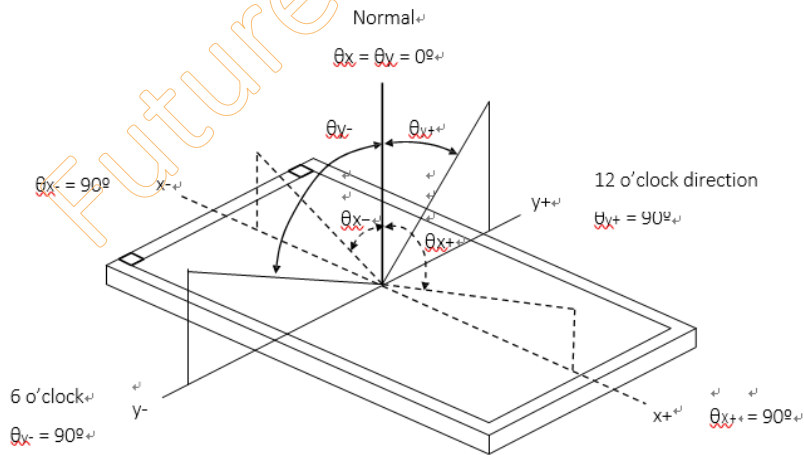
6. BLOCK DIAGRAM

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



7. OPTICAL CHARACTERISTIC

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR		700	1000		-	
Response Time		TR+TF		-	30	40	ms	
Center Luminance of White		LC	$\theta_x=0^\circ, \theta_y=0^\circ$	750	1000	-	cd/m ²	
Brightness uniformity			Viewing angle at normal direction	70	80	-	%	
Chromaticity	Red	Rx	Viewing angle at normal direction	Typ. -0.04	0.31	Typ. +0.04	-	
		Ry			0.33		-	
	Green	Gx			0.650		-	
		Gy			0.334		-	
	Blue	Bx			0.292		-	
		By			0.611		-	
	White	Wx			0.147		-	
		Wy			0.061		-	
Viewing Angle	Horizontal	θ_{x+}	CR=10	80	85	-	Deg.	
		θ_{x-}		80	85	-		
	Vertical	θ_{y+}		80	85	-		
		θ_{y-}		80	85	-		

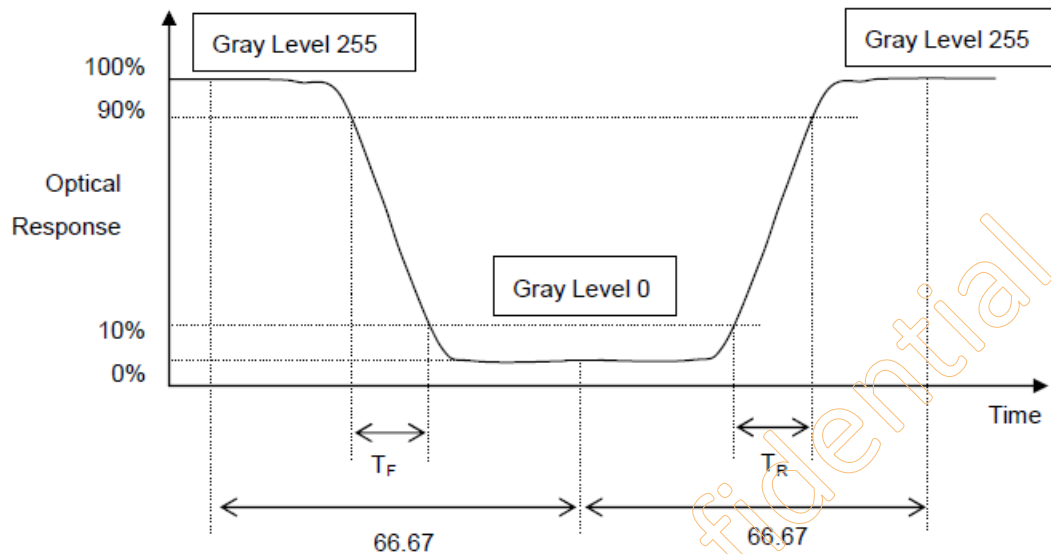


Note 2: Definition of Contrast Ratio (CR)

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:

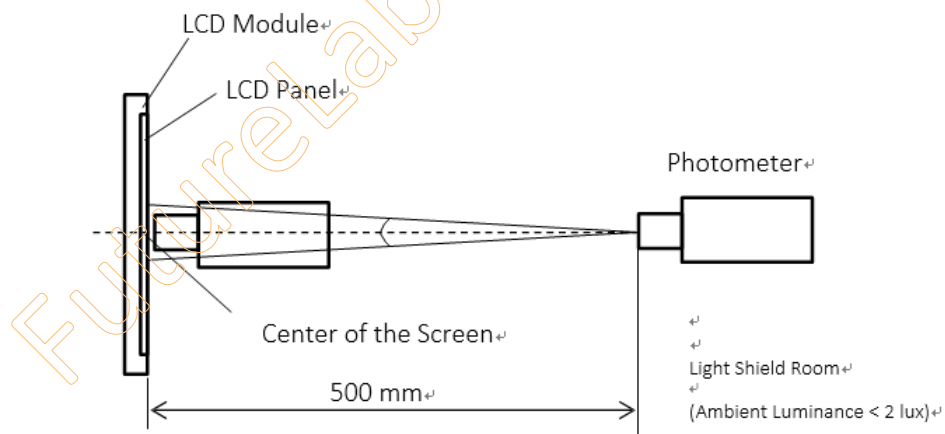
The response time is set initially by defining the “Rising Time (T_R)” and the “Falling Time (T_F)” respectively. Please refer the figure to the followings:



Note 4: Definition of Brightness (L)

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

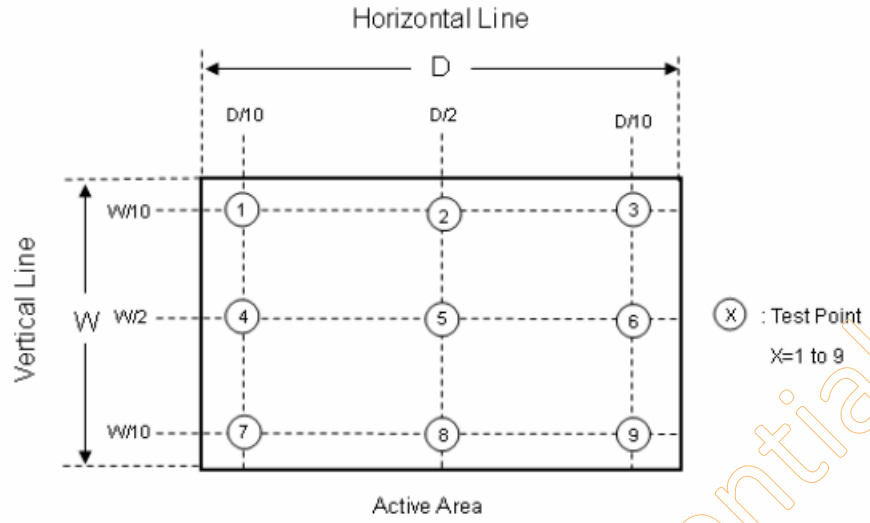
Note 5: The method of optical measurement:



Note 6: Definition of White Variation (δW):

Measure the luminance of gray level 255 at 5 points

$$\delta W = \text{Maximum} [L(1), L(2), L(3), L(4) \sim L(9)] / \text{Minimum} [L(1), L(2), L(3), L(4) \sim L(9)]$$



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8. Touch Screen specification

8.1 Environmental Specification

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

8.2 Mechanical Specification

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

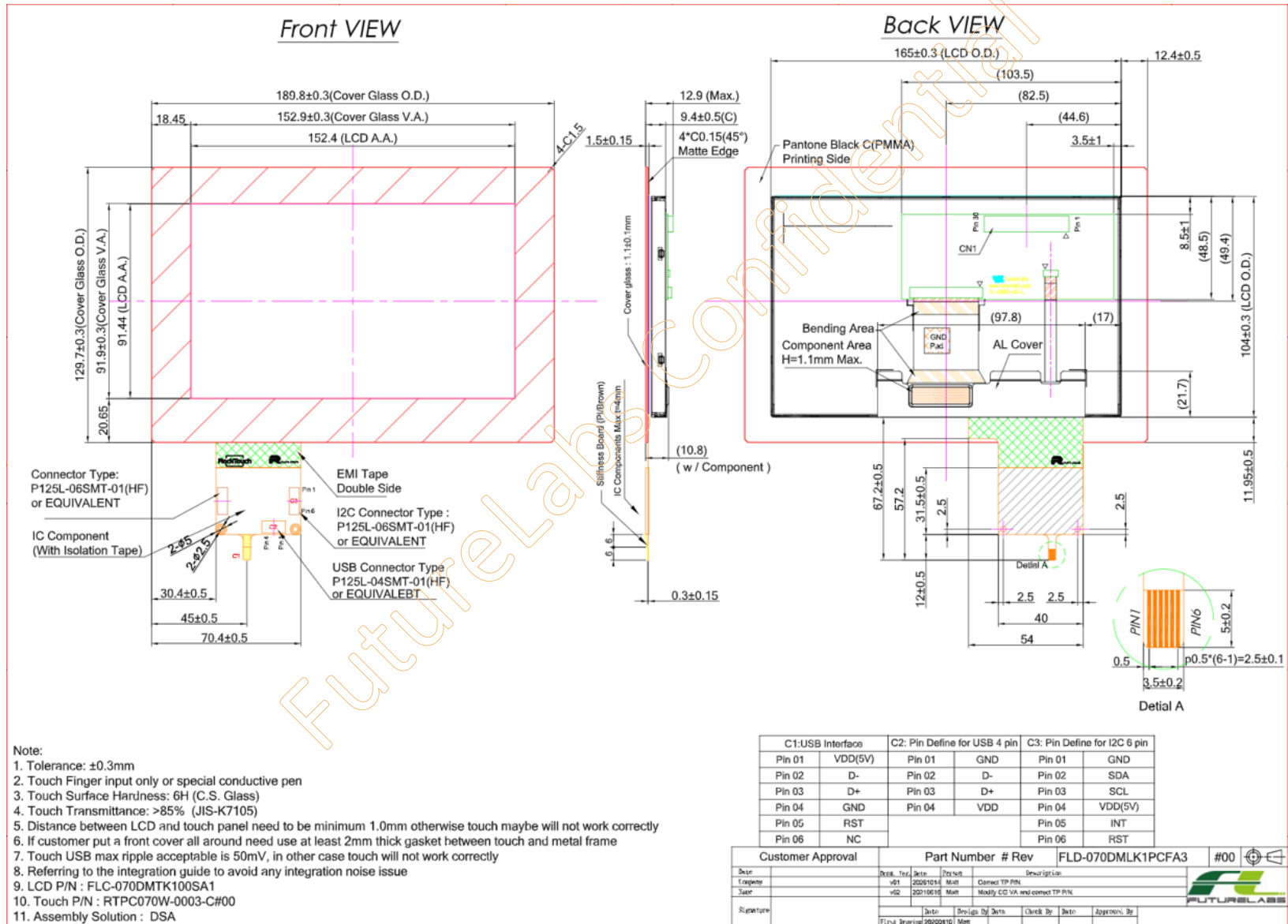
8.3 Type Controller USB – I2C

Parameters	Features
Circuit Board Dimension	Refer to drawings
Channels of Panel	Based on Sensor Design
Input Voltage	5V for USB – 5V/3,3V(Min 3,2V) for I2C
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: <100mA
	Idle Mode : <20mA
	Sleep Mode :<1mA
	(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 another 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.