Product Specification

PART NUMBER # REV: FLD-050DMTM0PUFA1#00

DESCRIPTION: 5”w TFT 800(H)x480(V) TTL,
8 bit, 900CD Assembled with Pcap Black USB – I2C

( ) Preliminary Specification
(V) Approved Specification

Customer Name:	
Signature:	**Date:**

PREPARED BY	**REVIEWED BY**
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Revision History

Version	Date	Page	Description	Note
V1.0	2023/01/17		First Edition	

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1. GENERAL DESCRIPTION

1.1 Description

5 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 and 8 bit.

1.2 Product Summary

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

No.	Item	Specification	Unit
1	Display Size	5”w	Inch
2	Pixel Number	800 (H) x 3(RGB)x 480 (V)	Pixels
3	Outline Dimension	128.7(W) x 89.79(H) x 6.05 (D)	mm
4	Active Area	108 (W) x 64.8 (H)	mm
5	Pixel Pitch	0.135(W) x 0.135 (H)	mm
6	Display Colors	8bit	
7	Pixel Arrangement	RGB vertical stripe	-
8	Display Mode	Normally Black	-
9	Electrical Interface	TTL	-
10	Surface Treatment	Anti-Glare	-
11	Brightness	900 (Typ.)	cd/m2
12	Contrast Ratio	1000 (Typ.)	-
13	Power Consumption	LCD Module: 0.79W (Max.) Backlight System: 1.2 W (Max.)	W

2. ABSOLUTE MAXIMUM RATING

2.1 Electrical Absolute Rating

Item	Symbol	Values			Unit	Note
		Min	Typ	Max		
Power Supply Voltage	VDD	-0.3	-	5.0	V	GND=0
	VGH	0.3	-	40	V	GND=0
	VGL	-20	-	0.3	V	GND=0
	AVDD	0.5	-	15	V	AGND=0
	VCOM	0	-	6	V	
Logic Signal Input Level	VI	-0.3	-	VDD +0.3	V	

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) Permanent damage may occur to the LCD module if beyond this specification.
Function operation should be restricted to the conditions described under normal operating conditions.

Note (2) Ta=25±2°C

Note (3) In the standard conditions, there is no function failure issue occurred. All the cosmetic specification is judged before reliability test.

3. ELECTRICAL CHARACTERISTICS

3.1 TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	V_{DD}	3.0	3.3	3.6	V	
Input signal voltage	V_{IH}	0.7 V_{DD}	-	V_{DD}	V	Note(1)
	V_{IL}	GND	-	0.3V_{DD}	V	Note(1)
Current of power supply	I_{DD}	-	-	220	mA	V_{DD} =3.3V

Note(1) HSYNC, VSYNC, DE Digital Data

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

Note(3) GND=AGND=0V

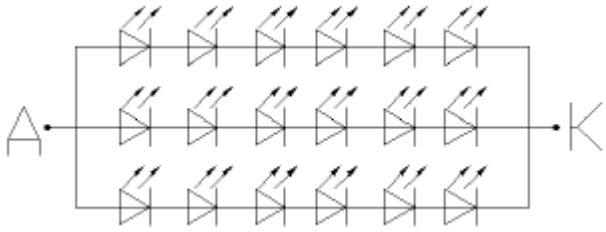
3.2 Backlight stics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
LED current	IL	-	60	-	mA	(2)
LED voltage	V_F	-	19.8	21.0	V	
Operating LED Lifetime	Hr	50.000	-	-	Hr	(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°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=40mA. The LED lifetime could be decreased if operating IL is larger than 40mA. The constant current driving method is suggested.

Note (3) LED Light Bar Circuit



4. Signal Characteristic

4.1 Timing Chart of Interface Signal

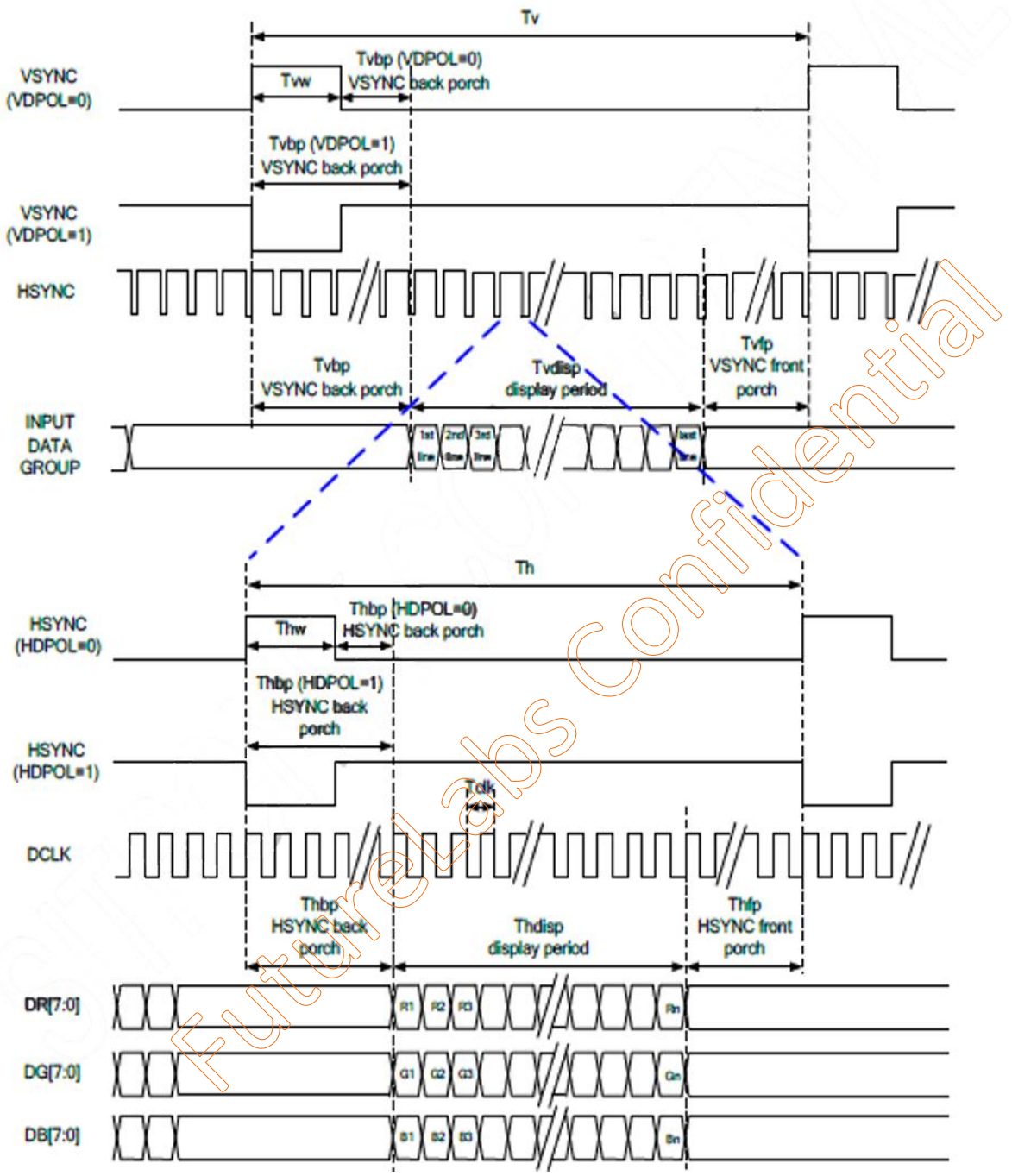
Parallel 24-bit RGB input Timing (PVDD=VDD=VDDI=3.3V AGND=0V, TA=25°C

Parallel 24-bit RGB interface Timing Table							
Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	23	25	27	MHz	
HSYNC	Period Time	Th	808	818	896	DCLK	
	Display Period	Thdisp		800		DCLK	
	Back Porch	Thbp	4	8	48	DCLK	
	Front Porch	Thfp	4	8	48	DCLK	
	Pulse Width	Thw	2	4	8	DCLK	
VSYNC	Period Time	Tv	488	496	504	HSYNC	
	Display Period	Tvdisp		480		HSYNC	
	Back Porch	Tvbp	4	8	12	HSYNC	
	Front Porch	Tvfp	4	8	12	HSYNC	
	Pulse Width	Tvw	2	4	8	HSYNC	

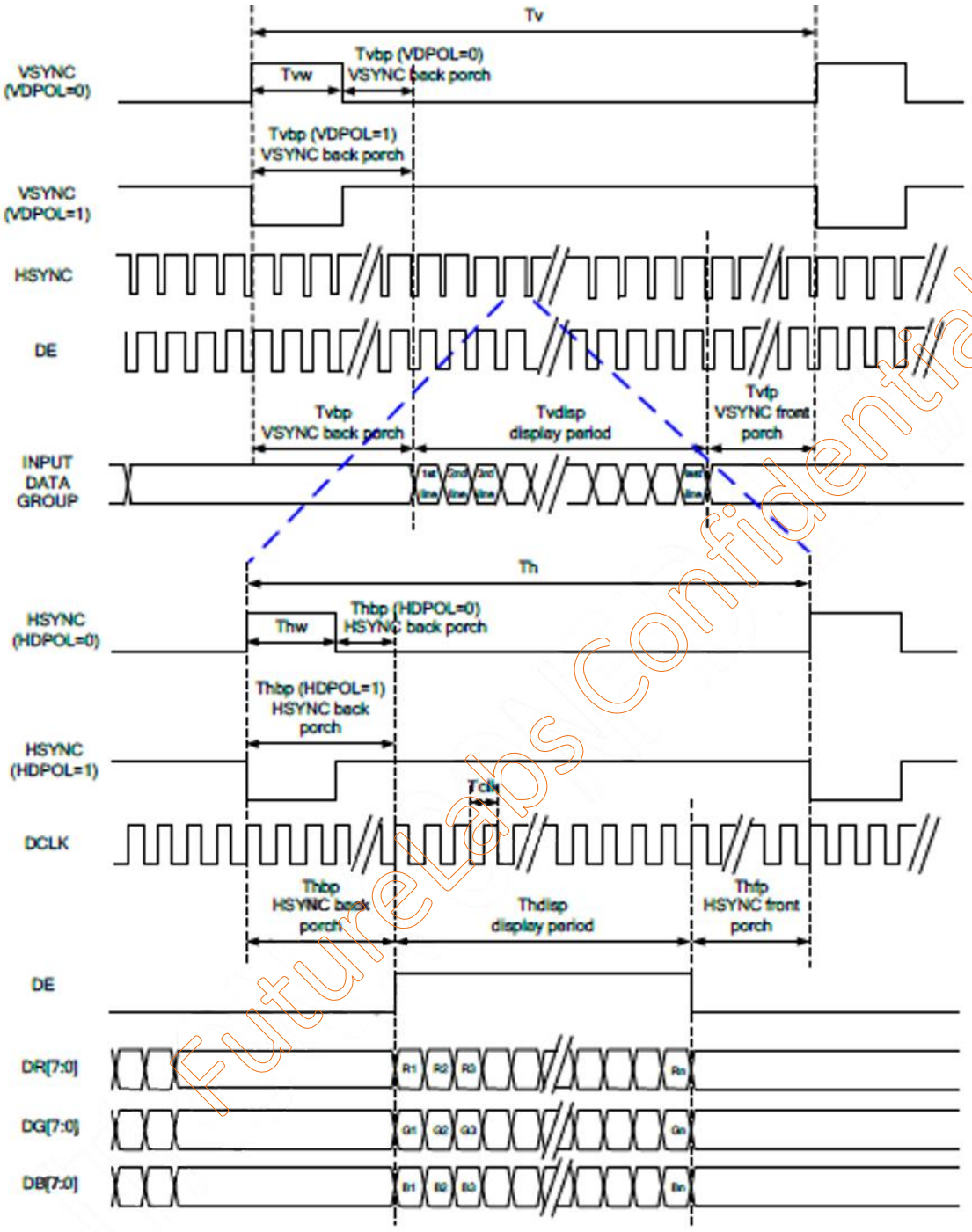
4.2 RGB Interface

RGB Mode Selection Table	DCLK	HSYNC	VSYNC	DE
SYNC DE Mode	Input	Input	Input	Input
SYNC Mode	Input	Input	Input	GND
DE Mode	Input	GND	GND	Input

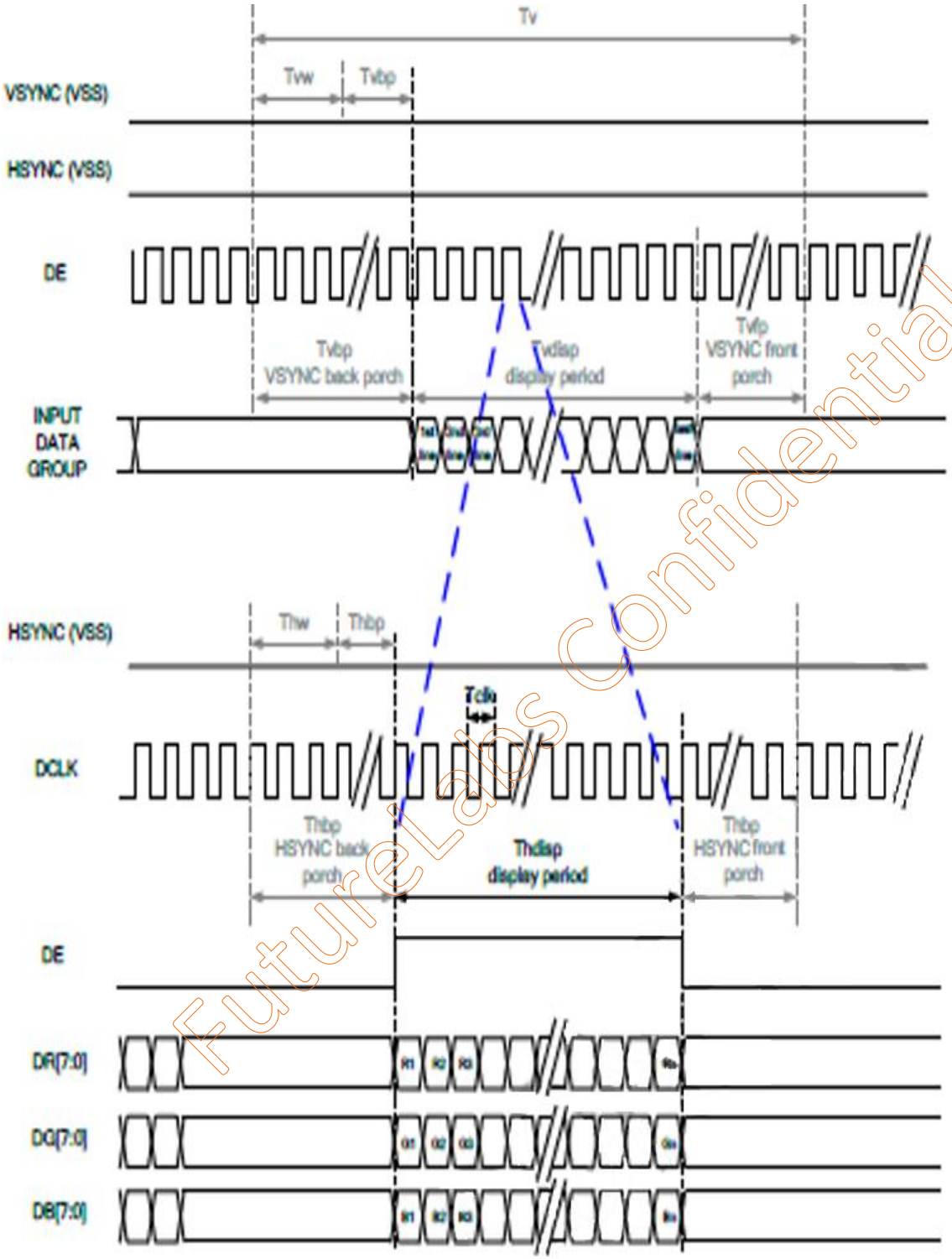
4.3 SYNC Mode



4.4 SYNC DE Mode

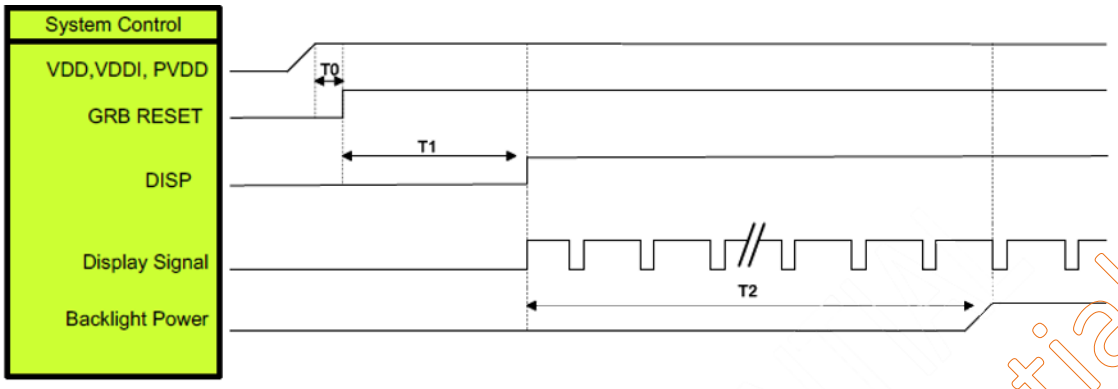


4.5 DE Mode



4.6 Power Sequence

1. Power On

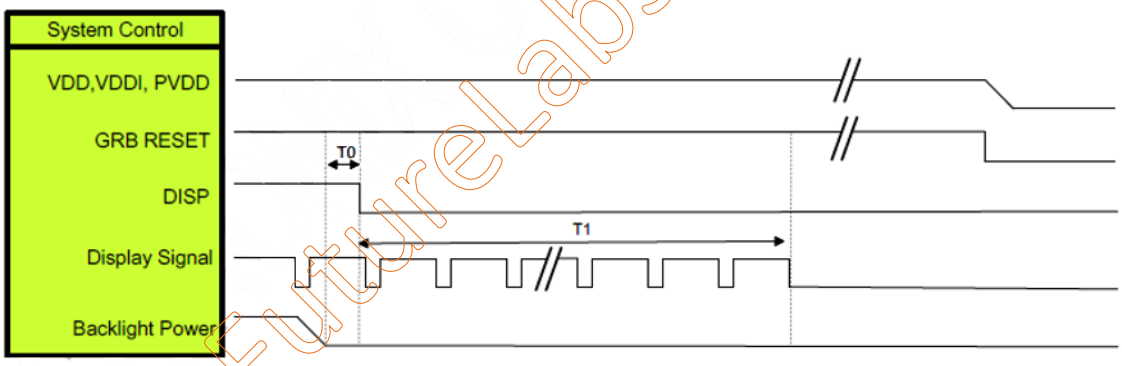


Symbol	Description	Min. Time	Unit
T0	System power stability to GRB RESET signal	0	ms
T1	GRB RESET = “High” to DISP = “High”	10	ms
T2	Display Signal output to Backlight Power on	250	ms

Note: RGB interface Display signal: DCLK, VSYNC, HSYNC, DE, DR[7:0], DG[7:0],DB[7.0]

Note: LVDS interface Display signal: DCLK P/N, RX[3:0]P/N

2. Power off



Symbol	Description	Min. Time	Unit
T0	Backlight Power off to Disp = Low	5	ms
T1	DISP= Low to IC intimal voltage discharge complete	100	ms

Note: RGB interface Display signal: DCLK, VSYNC, HSYNC, DE, DR[7:0], DG[7:0],DB[7.0]

Note: LVDS interface Display signal: DCLK P/N, RX[3:0]P/N

5. INTERFACE PIN DESCRIPTION

5.1 LCM Connector PIN Assignment

TFT LCD Module CN2 (Input signal): FPC Down Connector (FH19SC-40S-0.5SH(HIROSE), 40pin pitch=0.5mm

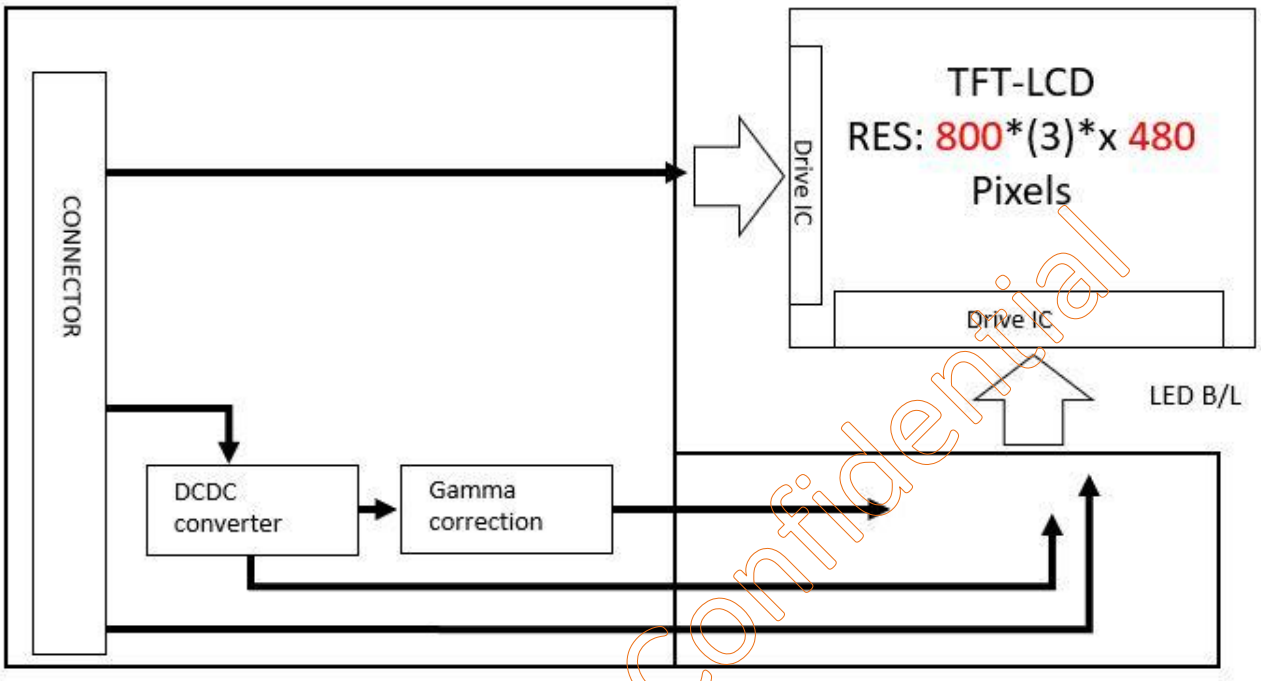
Pin No.	Symbol	I/O	Description
1	VLED-	P	Power for LED backlight cathode
2	VLED+	P	Power for LED backlight anode
3	GND	P	Power Ground
4	VDD	P	Power Voltage
5	R0	I	Data Input (LSB)
6	R1	I	Data Input
7	R2	I	Data Input
8	R3	I	Data Input
9	R4	I	Data Input
10	R5	I	Data Input
11	R6	I	Data Input
12	R7	I	Data Input (MSB)
13	G0	I	Data Input (LSB)
14	G1	I	Data Input
15	G2	I	Data Input
16	G3	I	Data Input
17	G4	I	Data Input
18	G5	I	Data Input
19	G6	I	Data Input
20	G7	I	Data Input (MSB)
21	B0	I	Data Input (LSB)
22	B1	I	Data Input
23	B2	I	Data Input
24	B3	I	Data Input
25	B4	I	Data Input
26	B5	I	Data Input
27	B6	I	Data Input
28	B7	I	Data Input (MSB)
29	DGND	I	Digital Ground
30	DCLK	I	Pixel Clock

31	DISP	I	Display on/off
32	HSYNC	I	Horizontal sync Signal
33	VSYNC	I	Vertical sync Signal
34	DE	I	Data Enable
35	NC	-	No Connect
36	GND	P	Power Ground
37	NC	-	No Connect
38	NC	-	No Connect
39	NC	-	No Connect
40	NC	-	No Connect

I : input O : output P : power

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.

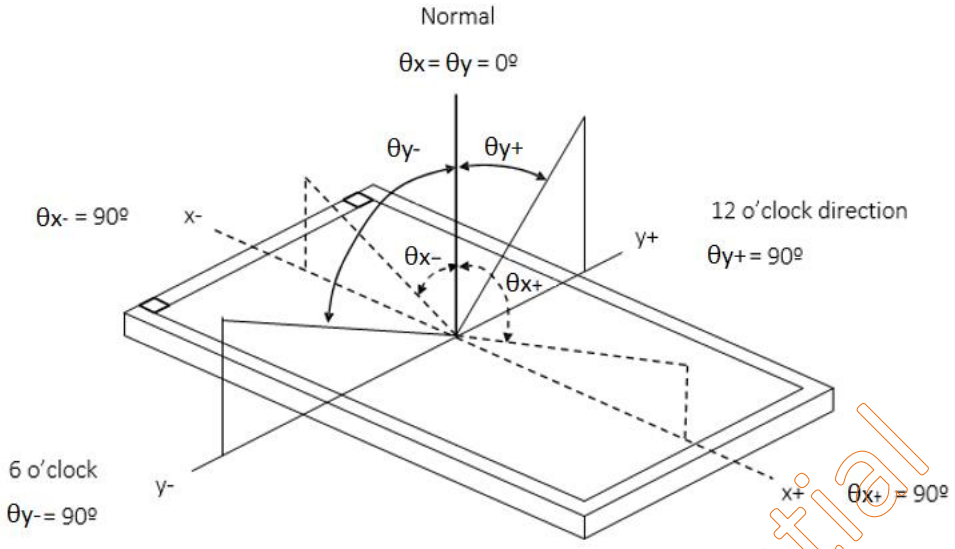
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	θ_X=0°	800	1000	-	-	(2)(5)
Response Time (Rising)		T_R	25°C	-	30	40	ms	(3)
		T_F						
Center Luminance of White		L_C	θ_X=0°, θ_Y =0° Viewing angle at normal direction	800	900	-	cd/m2	(4)(5)
Brightness uniformity		B_{UNI}		70			%	(5)(6)
Chromaticity	Red	Rx		Typ. -0.05	TBD	Typ. +0.05	-	(1)(5)
		Ry			TBD		-	
	Green	Gx			TBD		-	
		Gy			TBD		-	
	Blue	Bx			TBD		-	
		By			TBD		-	
	White	Wx			0.32		-	
		Wy			0.34		-	
Viewing Angle	Horizontal	θ_X+	CR≥10	-	85	-	Deg.	(1)(5)
		θ_X-		-	85	-		
	Vertical	θ_Y+		-	85	-		
		θ_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

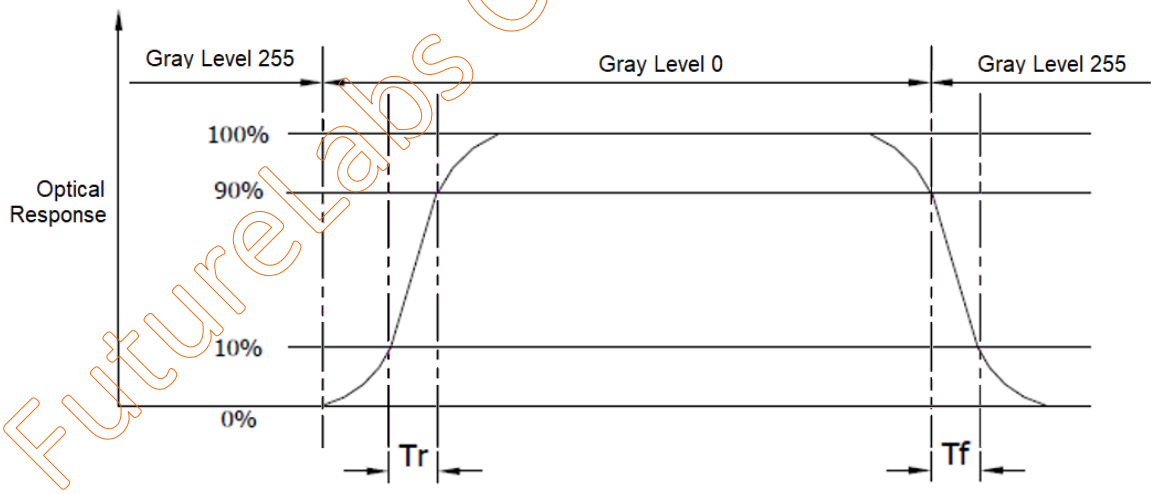


Note 2: Definition of Contrast Ratio (CR)

Measure the viewing angle of 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:

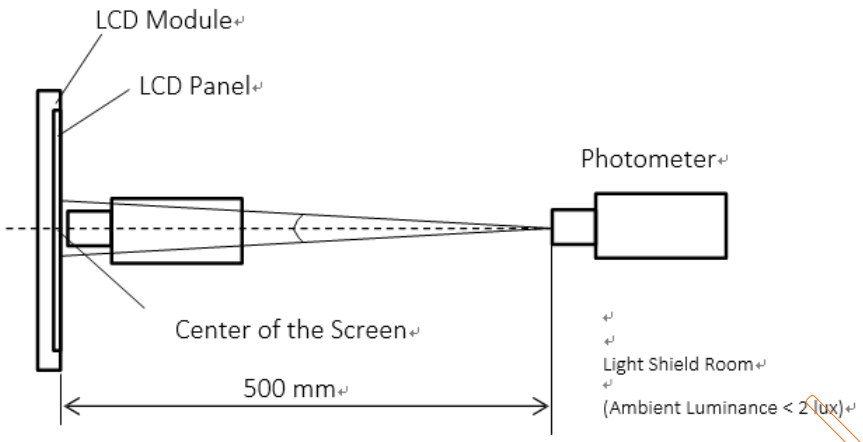
The response time is set initially by defining the "Rising Time (TR)" and the "Falling Time (TF)" respectively. Please refer the figure to the followings:



Note 4: Definition of Brightness (L)

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

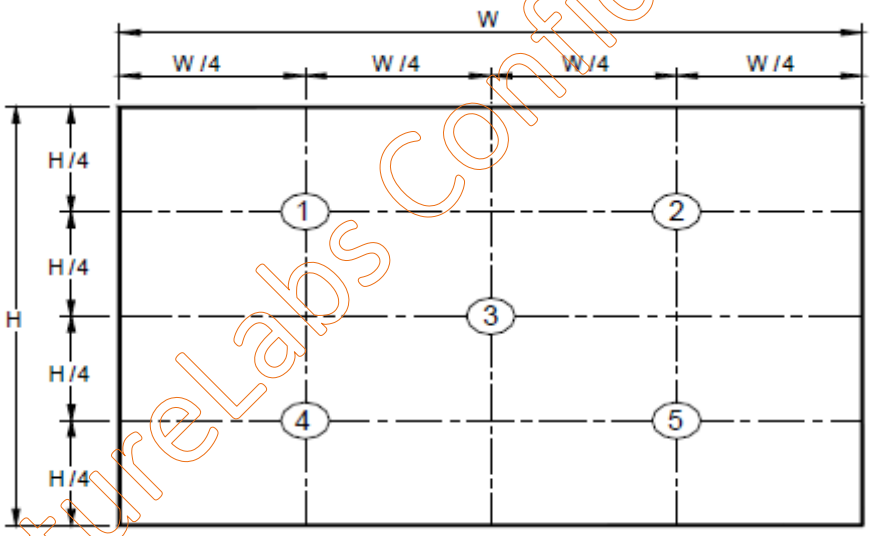
Note 5: The method of optical measurement:



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. Touch Screen specification

8.1 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

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

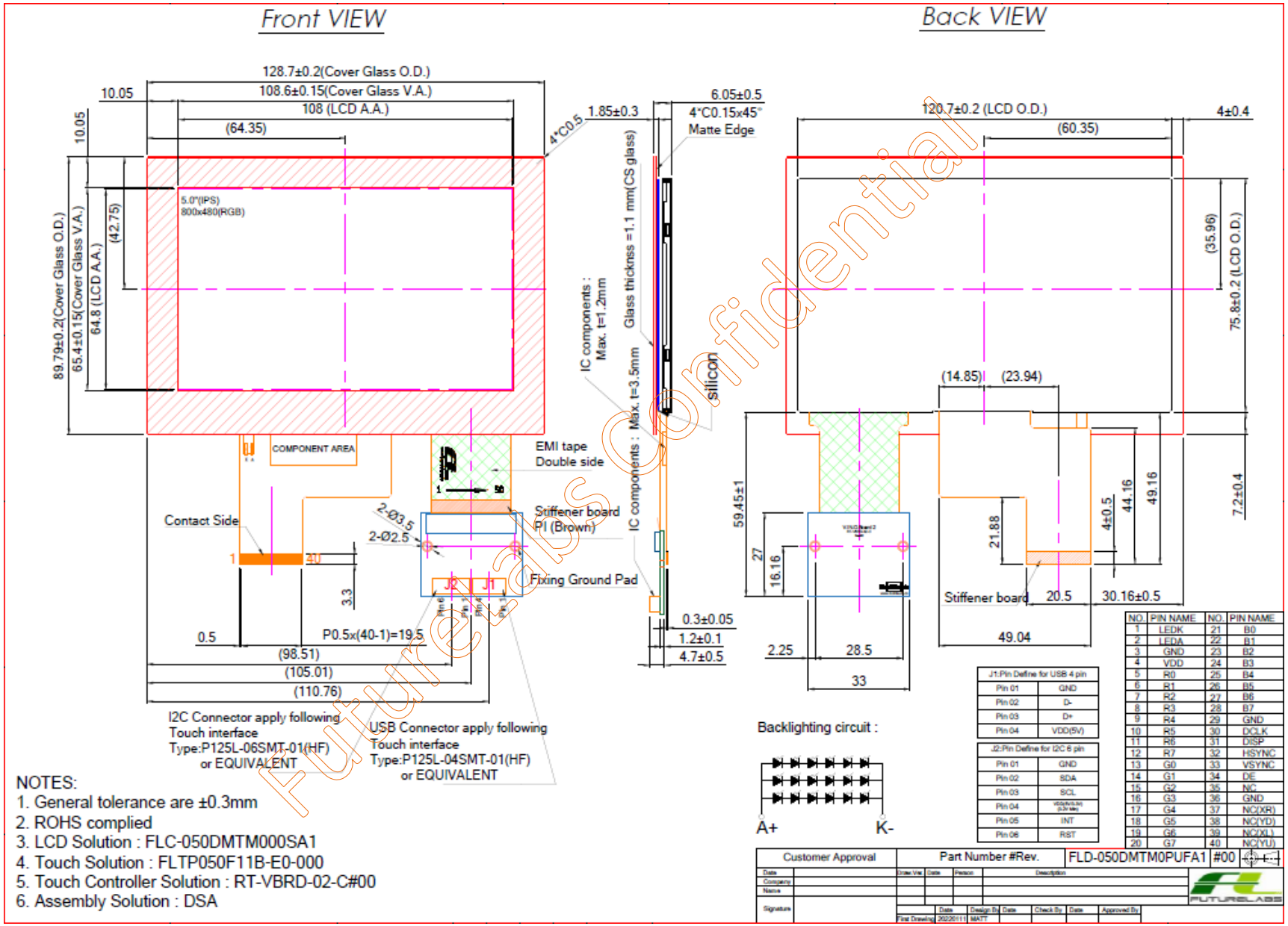
8.3 USB Type Controller

Parameters	Features
Circuit Board Dimension	Refer to drawings
Channels of Panel	Based on Sensor Design
Input Voltage	USB: 5VTyp. 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	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 < 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°C ± 5°C and the humidity is below 60% RH.