

UP KIT Solution Specification

- ◇ PRELIMINARY SPECIFICATION
- ◆ APPROVED SPECIFICATION

Part Number: KIT-150GML20PUSA1B

Description: 15" KIT SOLUTION WITH TFT LCD (300CD with LVDS interface, 1024x768 format) assemble Pcap (3mm Black USB) DRIVEN BY CONVERTER BOARD AND CABLES

Prepared by: Joy

Approved by	
Date	

Revision History

Version	Date	Page	Description	Note
V0.1	2018/03/16		First Edition	
V0.2	2018/07/20	P4, P8	Update color, update power consumption	

Confidential



Table of Content

TFT Product Specification	1
A. LCD specification.....	4
1. GENERAL DESCRIPTION	4
1.1 Description.....	4
1.2 Product Summary	4
2. ABSOLUTE MAXIMUM RATING.....	5
2.1 Electrical Absolute Rating	5
3. ELECTRICAL CHARACTERISTICS.....	6
3.1 LCM.....	6
3.2 Backlight Unit	8
4. SIGNAL CHARACTERISTICS	10
4.1 Interface Timing.....	10
4.1.1 Timing Characteristics:	10
4.1.2 Power ON/OFF Sequence	13
4.2 Pixel Format Image	14
5. INTERFACE PIN DESCRIPTION	15
5.1 LCM Connector PIN Assignment.....	15
5.2 Backlight and LED Driver Connector PIN Assignment.....	17
6. BLOCK DIAGRAM.....	18
7. OPTICAL CHARACTERISTIC	19
B. Touch Screen specification	22
1. Enviromental Specification	22
2. Mechanical Specification.....	22
3. USB Type Controller	22
C. DIMENSION AND DRAWING.....	23
D. PRECAUTION AND PRODUCT HANDLING.....	25

A. LCD specification

1. GENERAL DESCRIPTION

1.1 Description

15" is a Color Active Matrix Liquid Crystal Display Module composed of a TFT LCD panel and LED backlight system. The module Screen format is intended to support the XGA, 1024 x768 screen and 262K/16.2M 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	15	Inch
2	Pixel Number	1024 (H) x RGB x 768 (V)	Pixels
3	Outline Dimension	326.5 (H) × 253.5 (V) × 9.1 (D)	mm
4	Active Area	304.1 (H) × 228.1 (V)	mm
5	Display Colors	262K/16.2M	--
6	Pixel Arrangement	RGB vertical stripe	--
7	Display Mode	MVA / Normally Black / Transmissive	--
8	Electrical Interface	LVD5	--
9	Surface Treatment	Anti-Glare, 3H hard coating	--
10	Brightness	300 (Typ.)	cd/m2
11	Contrast Ratio	2000 (Typ.)	--
12	Total Power Consumption (Typ)	8.6	-W



2. ABSOLUTE MAXIMUM RATING

2.1 Electrical Absolute Rating

Item	Symbol	Values		Unit	Note
		Min	Max.		
Power supply voltage	VCC	-0.3	4	V	
Converter Voltage	Vi	-0.3	18	V	
Enable Voltage	EN	--	5.5	V	
Backlight Adjust	Dimming	--	5.5	V	

Note Permanent damage to the device may occur if max. values are exceeded. Function operation should be restricted to the conditions described under normal operating conditions.

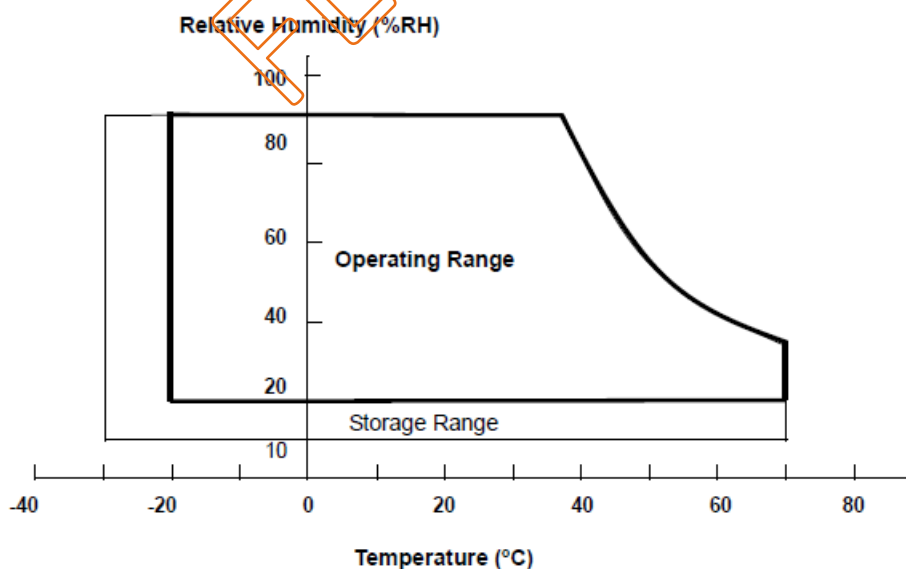
2.2 Environment Absolute Rating

Item	Symbol	Values			Unit	Note
		Min	Typ	Max.		
Operating Temperature	Top	-20		70	°C	Ta=25°C
Storage Temperature	Tstg	-30		70	°C	

Note (1) Temperature and relative humidity range is shown in the figure below.

Note (2) 90%RH Max. (Ta<40°C)

Note (3) Wet-bulb temperature should be 39°C Max.



3. ELECTRICAL CHARACTERISTICS

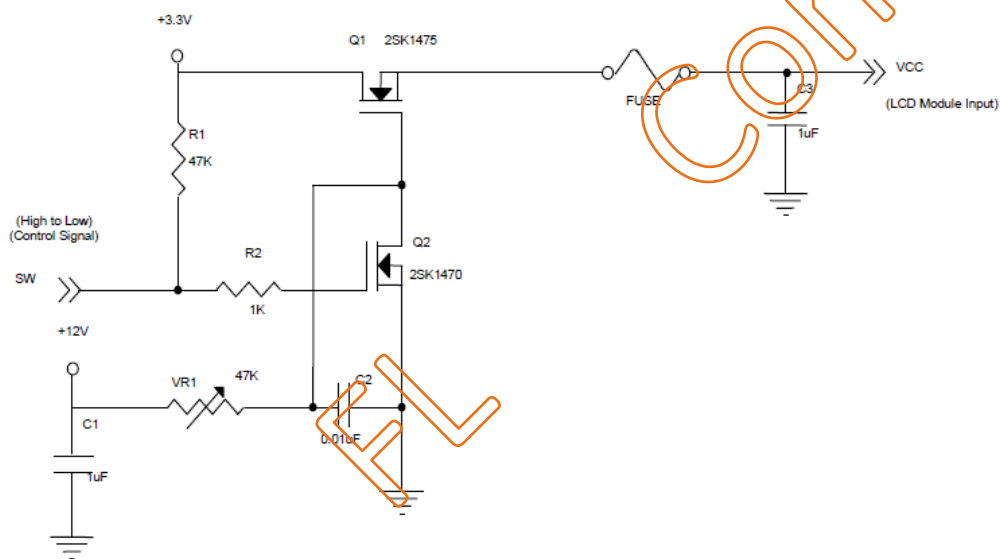
3.1 LCM

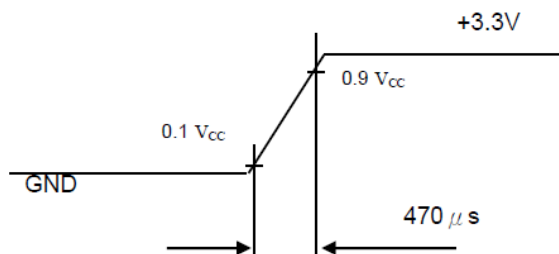
Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Supply Voltage	V _{CC}	3.0	3.3	3.6	V	
Ripple Voltage	V _{RP}	--	--	100	mVp-p	
Rush Current	I _{RUSH}	-	-	2.0	A	(2)
Power Supply Current	White	--	800	960	mA	(3)
	Black	--	670	800	mA	
LVDS differential input voltage	VID	200	-	600	mV	-
LVDS common input voltage	VIC	1.0	1.2	1.4	V	-
Differential Input Voltage for LVDS Receiver Threshold H level	"H" Level	--	--	100	mV	
Differential Input Voltage for LVDS Receiver Threshold L level	"L" Level	-100	--	--	mV	
Terminating Resistor	R _T		100		Ohm	

Note (1) The assembly should be always operated within above ranges.

T_a = 25 ± 2 °C

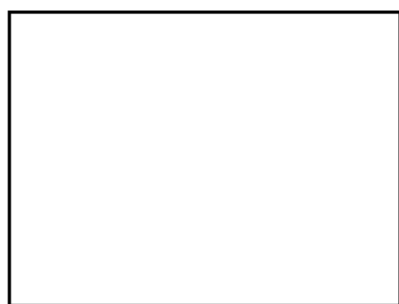
Note (2) Measurement Conditions:





Note (3) The specified power supply current is under the conditions at VDD=3.3V, T_a=25 ± 2 °C, DC current and f_v=60Hz, whereas a power dissipation check pattern below is displayed.

a. White Pattern



Active Area

b. Black Pattern



Active Area

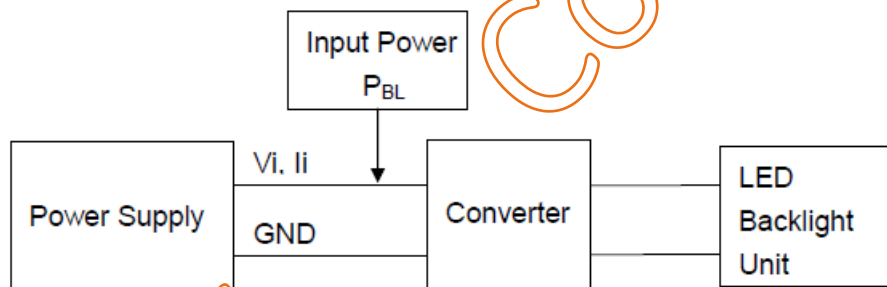


3.2 Backlight Unit

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

Symbol	Parameter		Min.	Typ.	Max.	Unit	Note
Vi	Converter Power Supply Voltage		10.8	12.0	13.2	V	
Ii	Converter Power Supply Current		0.23	0.4	0.45	A	@Vi=12V (Duty 100%)
PBL	BLU Power consumption		--	4.8	5.4	W	@Vi=12V (Duty 100%)
--	EN Control Level	Backlight on	2.0	3.3	5.0	V	
		Backlight off	0	--	0.8	V	
--	PWM Dimming Control Level	PWM High Level	2.0	3.3	5.0	V	
		PWM Low Level	0	--	0.15	V	
--	PWM Dimming Control Duty Ratio		1	--	100	%	@200Hz
fPWM	PWM Dimming Control Frequency		190	200	20K	Hz	(2)
LL	LED life Time (Typical)		50,000	70,000	--	Hrs	(3)

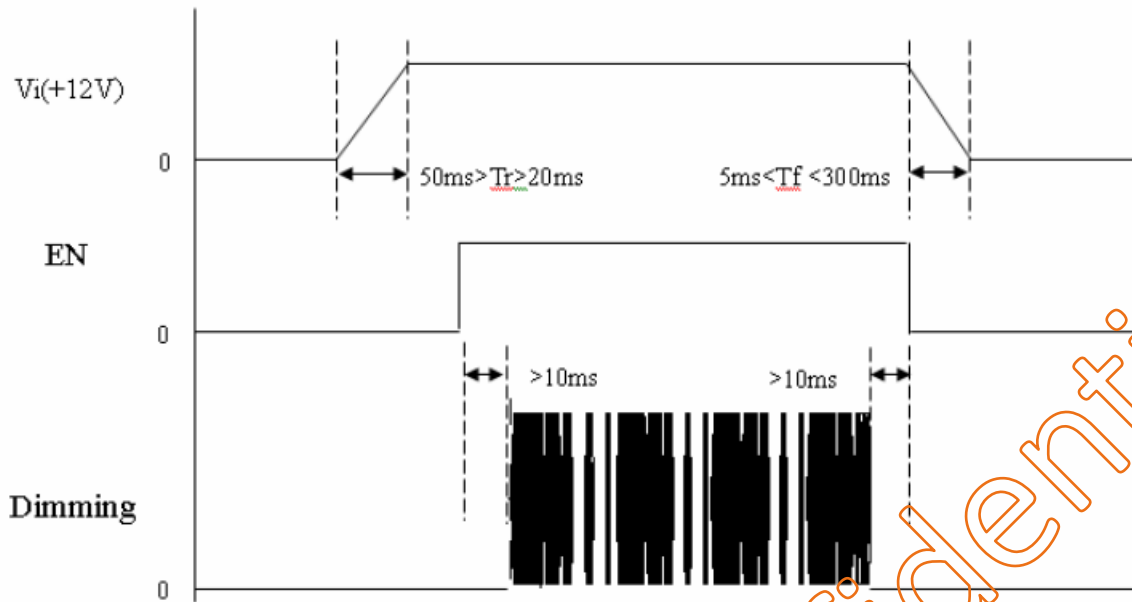
Note (1) LED current is measured by utilizing a high frequency current meter as shown below:



Note (2) At 20k Hz PWM control frequency, duty ratio range is restricted from 20% to 100%.

Note (3) The life time of LED is estimated data and defined as the time when it continues to operate under the conditions at $T_a = 25 \pm 2$ °C and Duty 100% until the brightness becomes $\leq 50\%$ of its original value. Operating LED under high temperature environment will reduce life time and lead to color shift.

Power sequence and control signal timing are shown in the following figure

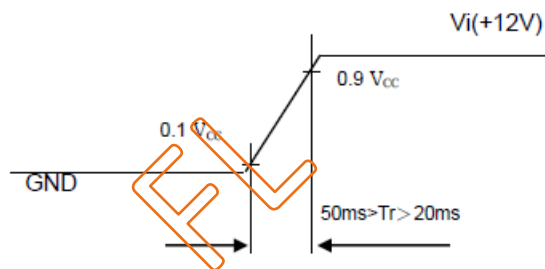


Note : While system is turned ON or OFF, the power sequences must follow as below descriptions

Turn ON sequence: $V_i(+12V) \rightarrow EN \rightarrow \text{Dimming}$

Turn OFF sequence: $\text{Dimming} \rightarrow EN \rightarrow V_i(+12V)$

Note (4)



4. SIGNAL CHARACTERISTICS

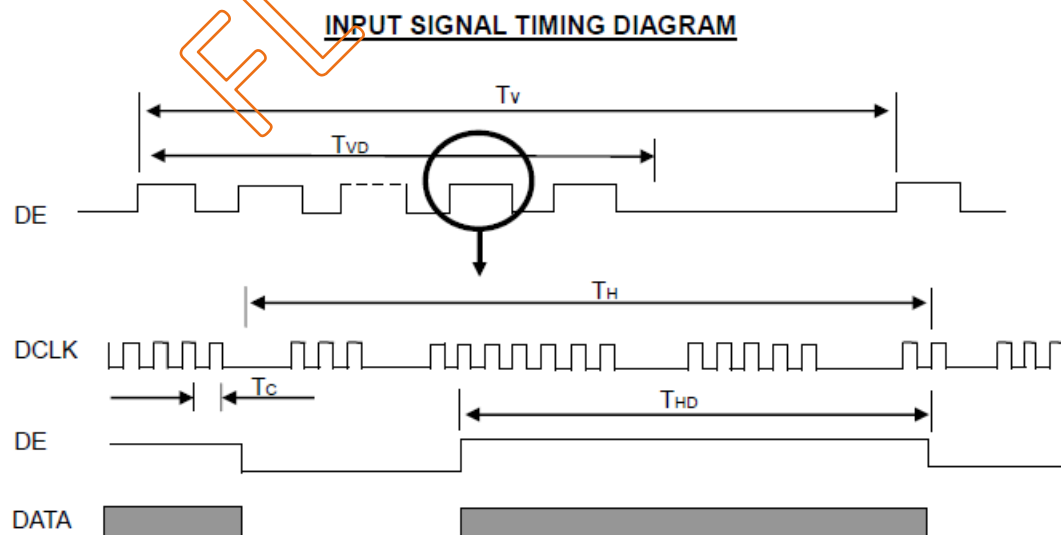
4.1 Interface Timing

4.1.1 Timing Characteristics:

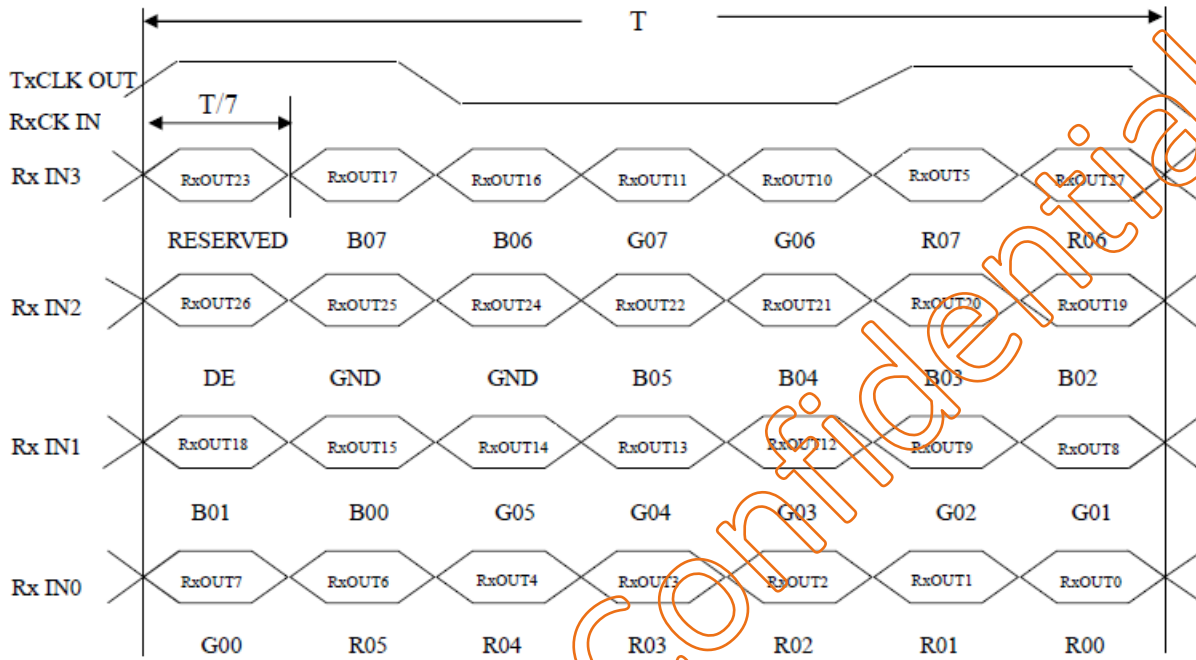
Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Clock	Frequency	F _c	53.35	65	80	MHZ	
	Period	T _c	12.5	15.38	18.75	ns	
	Input cycle to cycle jitter	Trd	--	--	200	ns	(a)
	Input Clock to data skew	TLVCCS	-0.02*T _c	--	0.02*T _c	ps	(b)
	Spread spectrum modulation range	F _{clk_in_mod}	--	--	1.02*F _c	MHz	(c)
	Spread spectrum modulation frequency	F _{SSM}	--	--	200	KHz	
Vertical Display Term	Frame Rate	Fr	55	60	70	Hz	
	Total	T _v	780	806	840	Th	T _v =T _{vd} +T _{vb}
	Display	T _{vd}	768	768	768	Th	-
	Blank	T _{vb}	T _v -T _{vd}	38	T _v -T _{vd}	Th	-
Horizontal Display Term	Total	T _h	1240	1344	1360	Tc	T _h =T _{hd} +T _{hb}
	Display	T _{hd}	1024	1024	1024	Tc	-
	Blank	T _{hb}	T _h -T _{hd}	320	T _h -T _{hd}	Tc	-

Note (1) Since this assembly is operated in DE only mode, Hsync and Vsync input signals should be set to low logic level or ground. Otherwise, this assembly would operate abnormally.

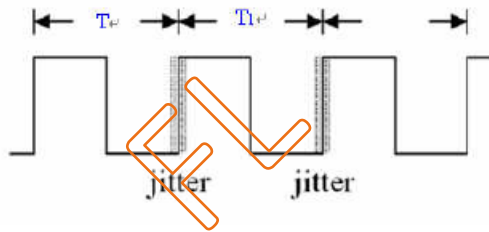
Note(2) The T_v(T_{vd}+T_{vb}) must be integer, otherwise, the module would operate abnormally.



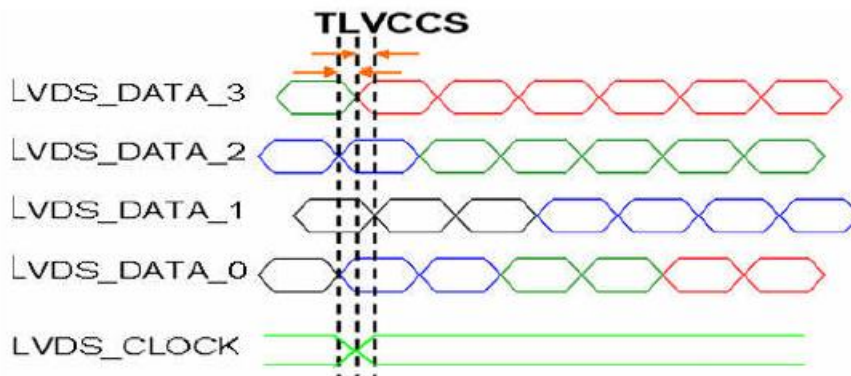
TIMING DIAGRAM of LVDS



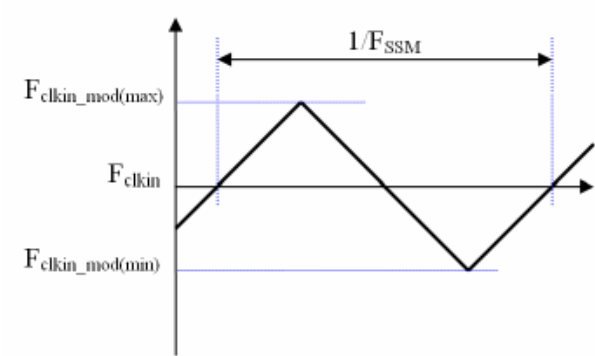
Note (a) The input clock cycle-to-cycle jitter is defined as below figures. $Trcl = T_1 - T_1$



Note (b) Input Clock to data skew is defined as below figures.



Note (c) The SSCG (Spread spectrum clock generator) is defined as below figures.

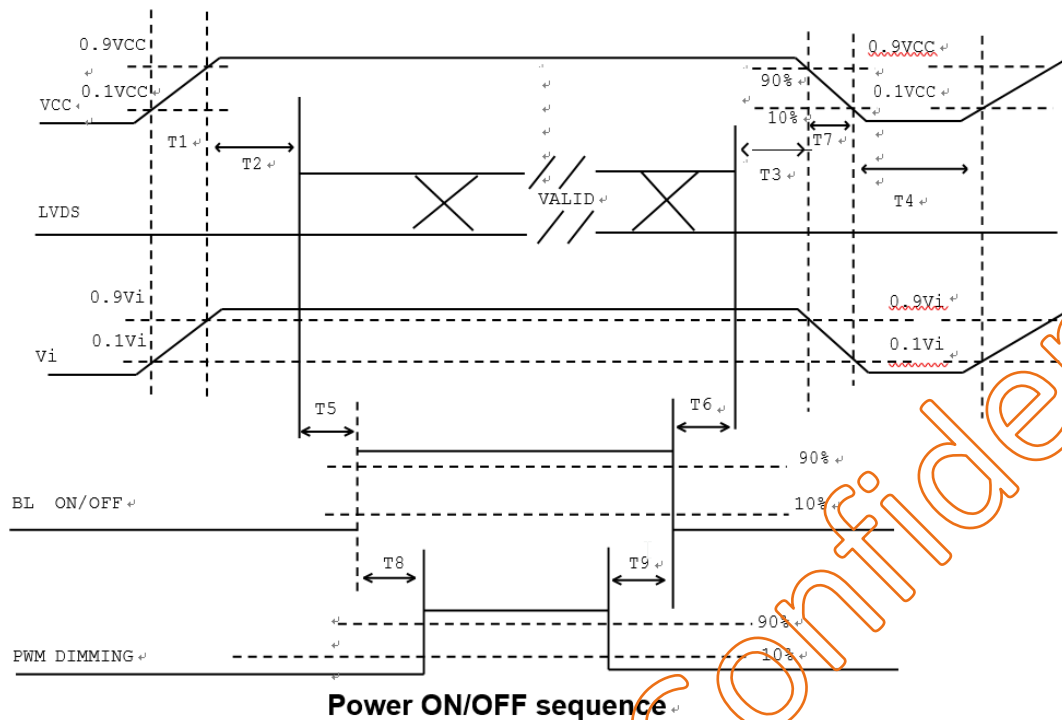


Confidential



4.1.2 Power ON/OFF Sequence

To prevent a latch-up or DC operation of LCD assembly, the power on/off sequence should be as the diagram below.



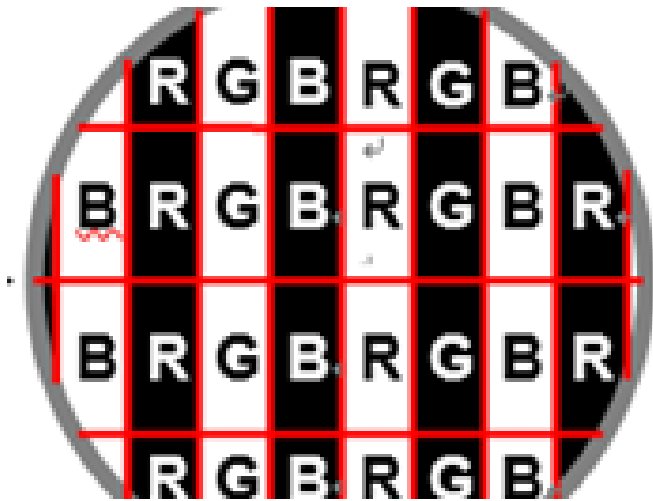
Note (1) Please avoid floating state of interface signal at invalid period.

Note (2) When the interface signal is invalid, be sure to pull down the power supply of LCD VCC to 0V.

Note (3) The Backlight converter power must be turned on after the power supply for the logic and the interface signal is valid. The Backlight converter power must be turned off before the power supply for the logic and the interface signal is invalid.

Parameter	Value			Units
	Min	Ty	Max	
T1	0.5	-	10	ms
T2	0	-	50	ms
T3	0	-	50	ms
T4	500	-	-	ms
T5	200	-	-	ms
T6	200	-	-	ms
T7	5	-	300	ms
T8	10	-	-	ms
T9	10	-	-	ms
T10	20	-	50	ms

4.2 Pixel Format Image



Confidential



5. INTERFACE PIN DESCRIPTION

5.1 LCM Connector PIN Assignment

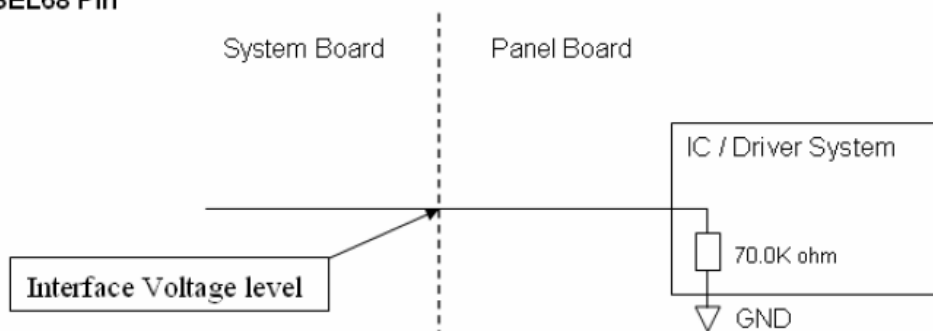
	Symbol	Description	Note
1	VCC	Power supply: +3.3V	-
2	VCC	Power supply: +3.3V	-
3	NC	No Connection	-
4	LR/UD	Reverser Scan Control H or NC= Normal Mode L= Horizontal/Vertical Reverse Scan	-
5	RX0-	LVDS Differential Data Input (Negative)	-
6	RX0+	LVDS Differential Data Input (Positive)	-
7	GND	Ground	-
8	RX1-	LVDS Differential Data Input (Negative)	-
9	RX1+	LVDS Differential Data Input (Positive)	-
10	NC	No Connection	-
11	RX2-	LVDS Differential Data Input (Negative)	-
12	RX2+	LVDS Differential Data Input (Positive)	-
13	GND	Ground	-
14	RXCLK-	LVDS Differential Clock (Negative)	-
15	RXCLK+	LVDS Differential Clock (Positive)	-
16	GND	Ground	-
17	RX3-	LVDS Differential Data Input (Negative)	-
18	RX3+	LVDS Differential Data Input (Positive)	-
19	NC	No Connection	-
20	SEL68	LVDS 6/8 bit select function control, High-> 6bit input mode Low or NC-> 8bit input mode	(3)

Note (1) Connector Part No.: Cvilux CID520D1HR0-NH or equivalent.

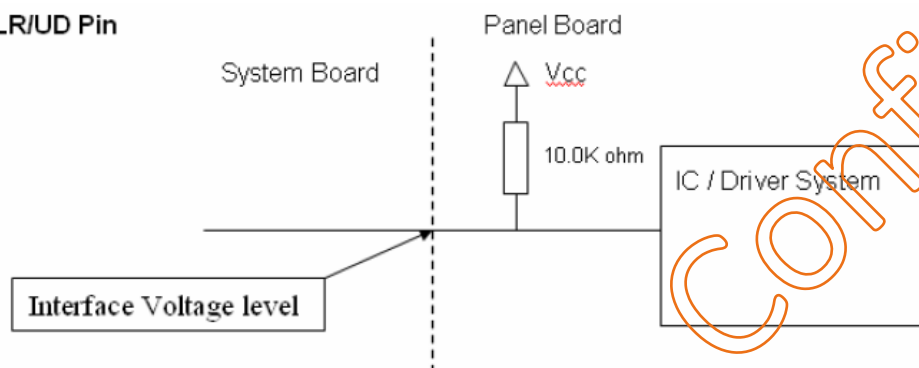
Note (2) User's connector Part No.: Hirose DF14-20S-1.25C or equivalent.

Note (3) "Low" stands for 0V. "High" stands for 3.3V. "NC" stands for "No Connection"

SEL68 Pin



LR/UD Pin

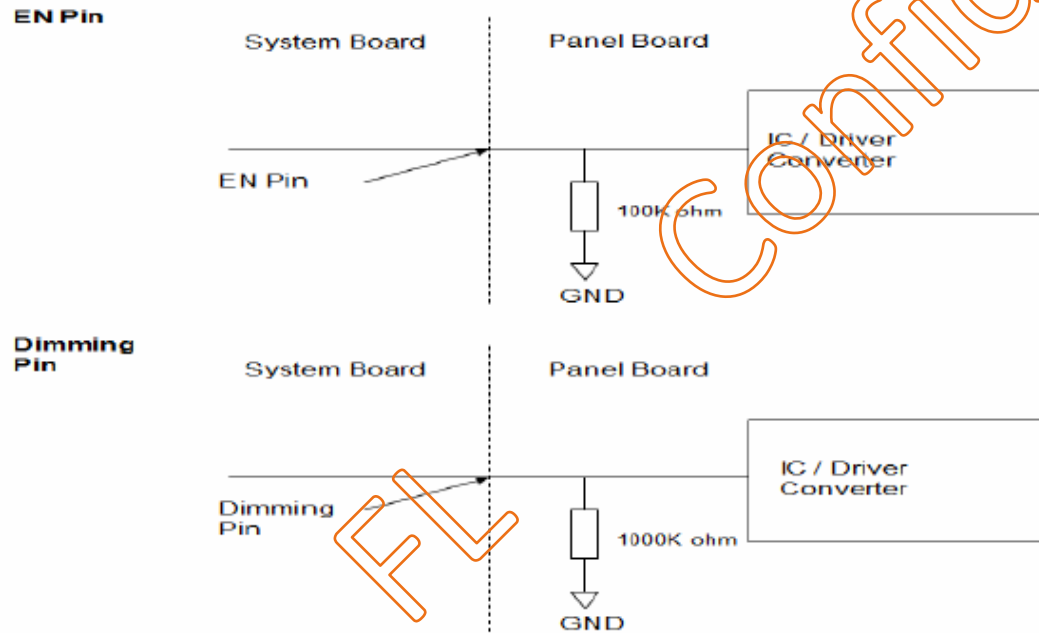


5.2 Backlight and LED Driver Connector PIN Assignment

Pin No	Symbol	Description	Remark
1	Vi	Converter input voltage	12V
2	VGND	Converter ground	Ground
3	EN	Enable pin	3.3V
4	Dimming	Backlight Adjust	PWM Dimming (Hi: 3.3V _{DC} , Lo: 0V _{DC})
5	NC	Not Connect	

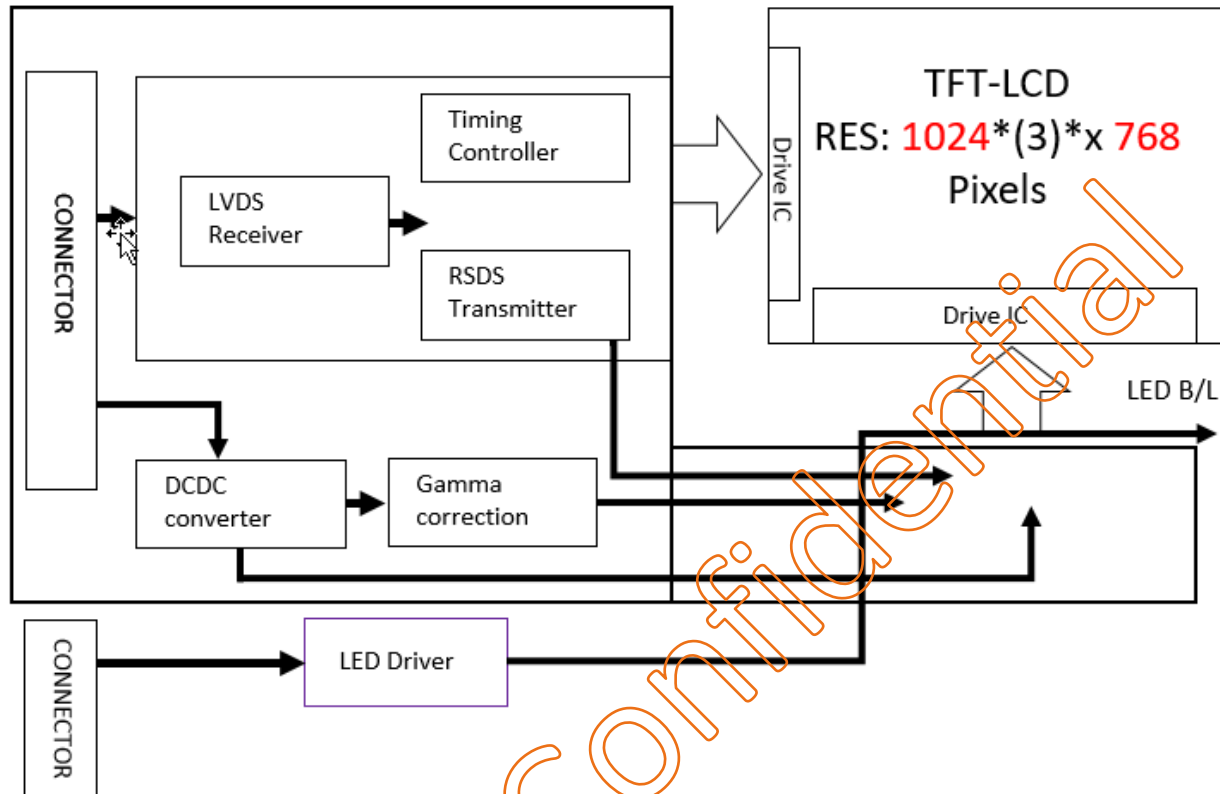
Note (1) Connector Part No.: CI4205M2HRP-NH(Cvilux) or equivalent.

Note (2) User's connector Part No.: Molex 51146-0500 or equivalent.



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.

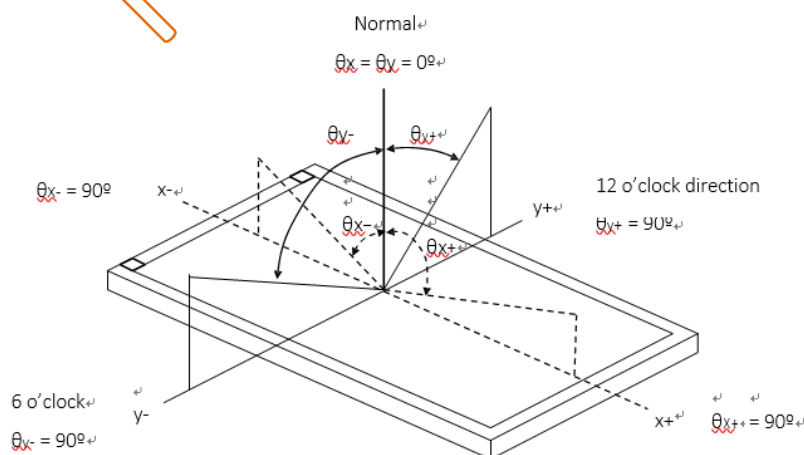
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	$\theta_x = 0^\circ, \theta_y = 0^\circ$ Viewing angle at normal direction	1300	2000	-	-	(2)(5)
Response Time		T_R		-	16	21	ms	(3)
		T_F		-	7	14	ms	
Center Luminance of White		L_C		240	300	-	cd/m ²	(4)(5)
White Variation		δW		-	1.25	1.33	-	(5)(6)
Chromaticity	Red	R_x		Typ. -0.05	0.647	Typ. +0.05	-	(1) (5)
		R_y			0.338		-	
	Green	G_x			0.321		-	
		G_y			0.606		-	
	Blue	B_x			0.157		-	
		B_y			0.039		-	
	White	W_x			0.313		-	
		W_y			0.329		-	
Viewing Angle	Horizontal	θ_{x+}	CR ≥ 10	80	88	-	Deg.	(1)(5)
		θ_{x-}		80	88	-		
	Vertical	θ_{y+}		80	88	-		
		θ_{y-}		80	88	-		

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 $\pm$ 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

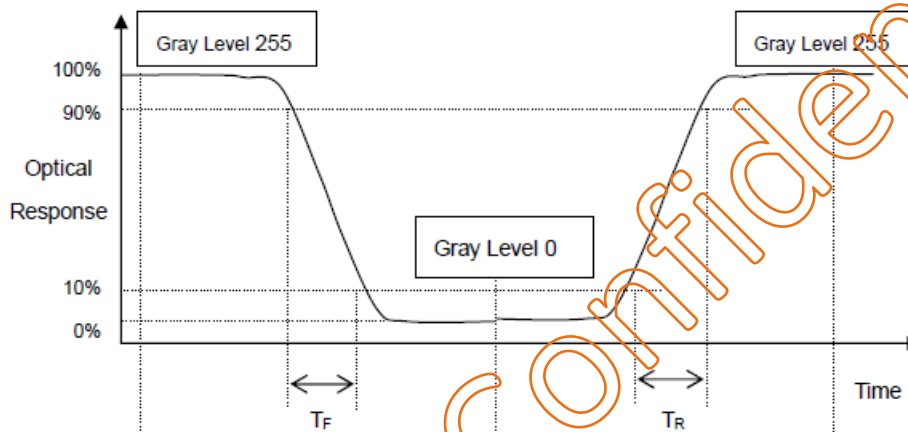


Note 2: Definition of Contrast Ratio (CR)

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:

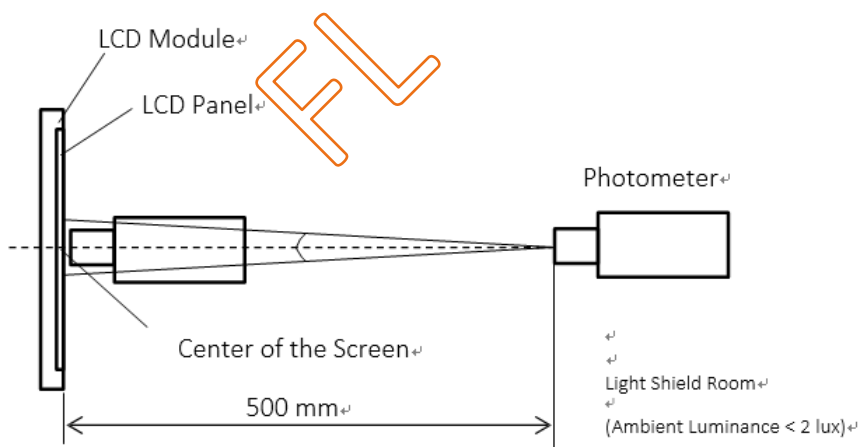
The response time is set initially by defining the "Rising Time (T_R)" and the "Falling Time (T_F)" respectively. The response time interval is between 10% and 90% of amplitudes, please refer the figure to the followings:



Note 4: Definition of Brightness (Lc)

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

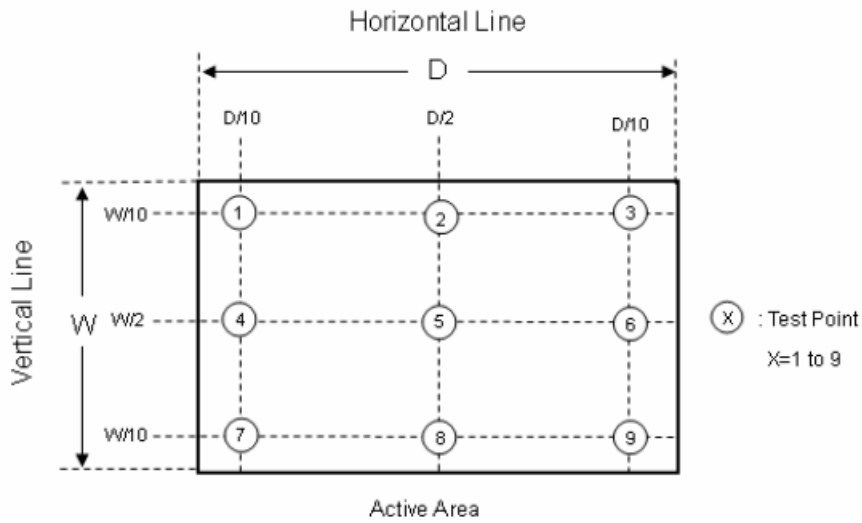
Note 5: The method of optical measurement:



Note 6: Definition of White Variation (δW):

Measure the luminance of gray level 255 at 9 points

$$\delta W = \text{Maximum} [L(1), L(2), L(3) \dots L(8), L(9)] / \text{Minimum} [L(1), L(2), L(3) \dots L(4), L(5)]$$



Confidential



B. Touch Screen specification

1. Enviromental Specification

Specification	Value	Remarks
Operating Temperature	-20°C ~ 70°C	
Storage Temperature	-40°C ~ 80°C	
Operating Humidity	20% ~ 90%RH	
Storage Humidity	10% ~ 90%RH	

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

3. USB Type Controller

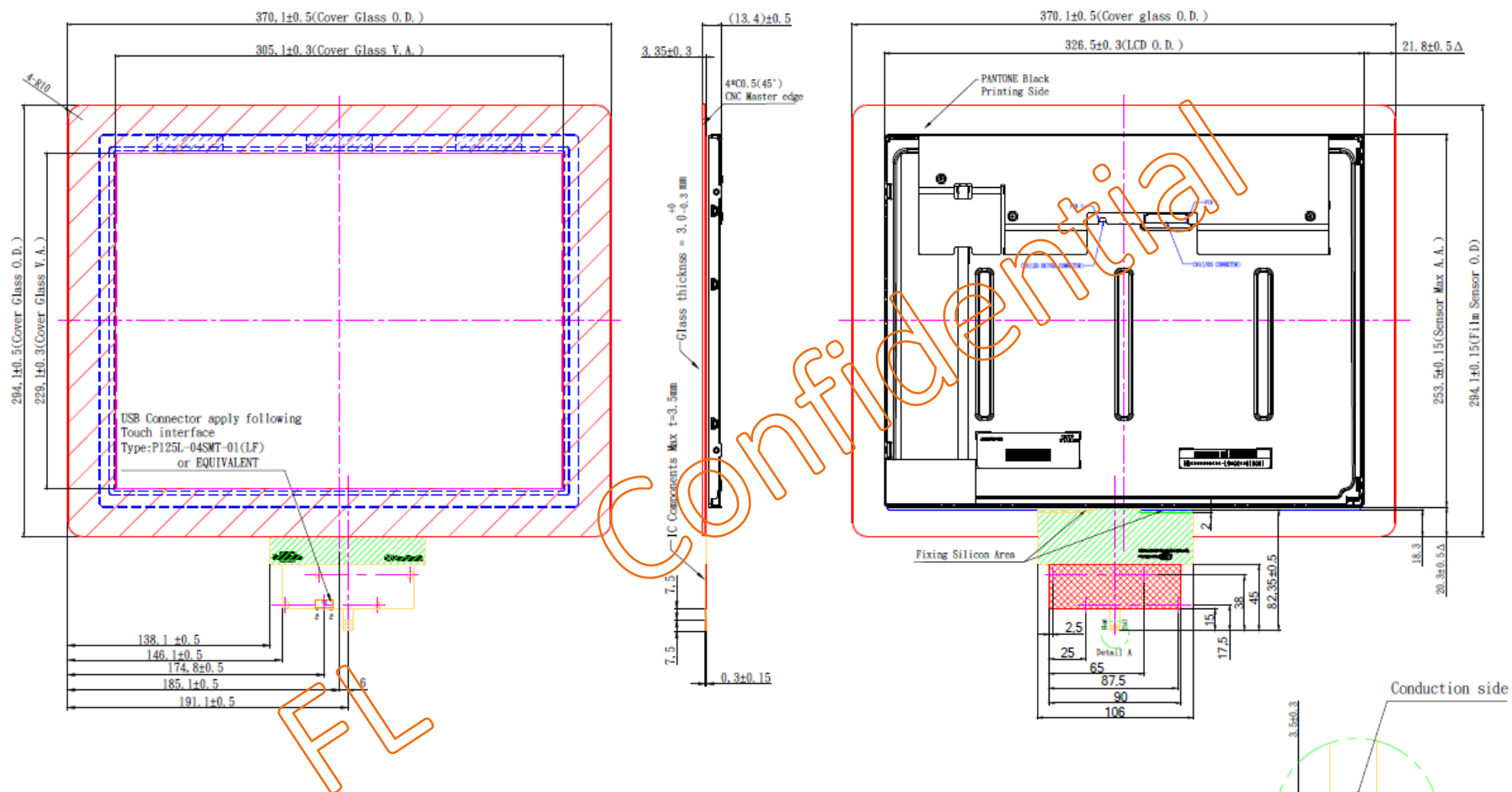
Parameters	Features
Circuit Board Dimension	Refer to drawings
Channels of Panel	Based on Sensor Design
Input Voltage	5V for USB
Linearity(Note 1)	Single Line drawing accuracy : Up to 1pt +/- 1mm offset /10mm
	Single Touch (point) accuracy : Up to 1pt +/- 1mm
Interface	USB: 2.0(Below) Full Speed
Resolution	4096×4096 resolution
Power consumption(mA)	Active Mode: <70mA
	Idle Mode : <55mA
	Sleep Mode :< 15mA
	(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 other parameters

C. DIMENSION AND DRAWING

LCM+Pcap

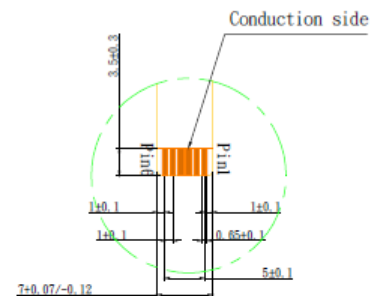


Note:

1. Tolerance: ± 0.5 mm
2. Touch finger input or special conductive pen
3. Touch Surface Hardness: 6H (Semi-Tempered Glass)
4. Touch Transmittance: $>85\%$ (JIS-K7105)
5. Touch Surface Treatment: None
6. Distance between LCD and touch panel need to be minimum 1.0mm otherwise touch maybe will not work correctly
7. If customer put a front cover all around need use at least 2mm thick gasket between touch and metal frame
8. USB max ripple acceptable is 50mV, in other case touch will not work correctly
9. Referring to the integration guide to avoid any integration noise issue
10. LCD model : FLC-150GML2000SA1
11. Touch model : RTPC150-H30BP1-U
12. Assembly Solution : DSA

C1:USB Interface	
Pin 01	GND
Pin 02	D-
Pin 03	D+
Pin 04	VDD
Pin 05	NC
Pin 06	RST

C2:Pin Define for USB 4 pin	
Pin 01	GND
Pin 02	D-
Pin 03	D+
Pin 04	VDD

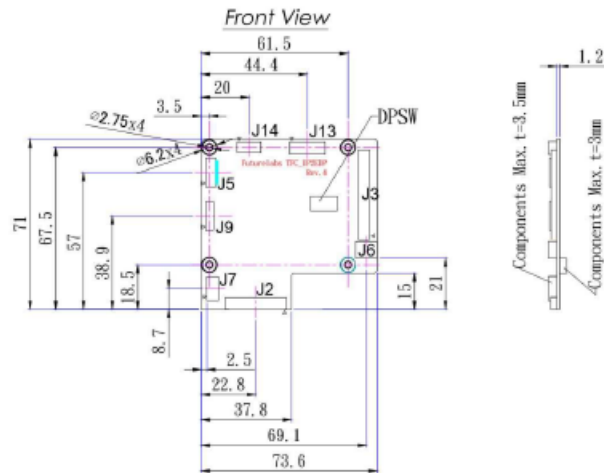


Detail A

Customer Approval		Part Number		FLD-150GML20PUSA1	
Date		Rev	Date	Person	Description
Company					
Signature		Date	Design By	Check By	Approved By

Converter board & Accessory

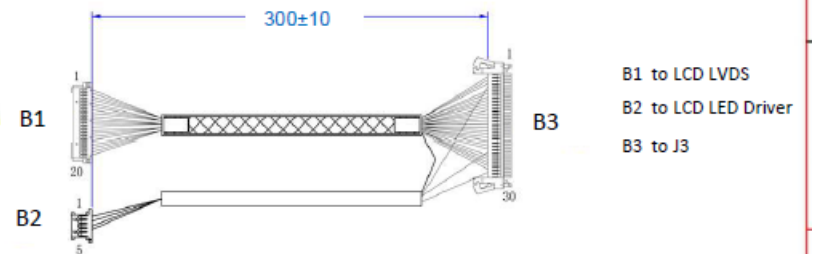
1. eDP Converter Board P/N : TFC_UP2EDP



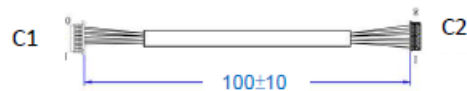
2. eDP to eDP Cable P/N : CBL-41-03-100-A



3. LVDS Cable P/N : CB-EDP2G150XGE

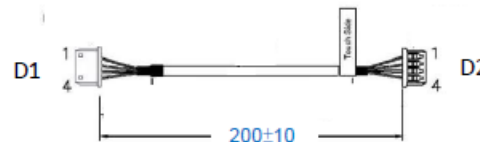


4. Internal USB Cable P/N : CB_UP2USB8



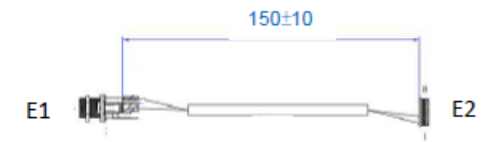
C1 To to UP USB
C2 To to J5

5. Touch USB Cable 4 to 4 pin P/N : CB-EDPB2USB4-200



D1 To J14
D2 To Touch Screen

6. External Backlight power P/N : CB-EDP2DCJACK



DC Power JACK 5.5 * 2.0
E1 To 12V power
E2 To J13

DPSW selection
for 15"



Connector table of eDP Converter Board

Connector Number	Function	Cable
J2	No use	No use
J3	LVDS from 10.1"W up to 21.5"W	CB-EDP2G150XGE
J5	8 pin UB to 10 Pin USB UP	CB_UP2USB8
J6	No use	No use
J7 & J14	USB interface for Touch 10.4 up to 21.5"W	CB-EDPB2USB4-200
J9	eDP to UP Board eDP-DSI	CBL-41-03-100-A
J13	Power Input for LCD backlight from 10.4"W up to 21.5"W	CB-EDP2DCJACK

Customer Approval		Part Number		KIT-150GML20PUSA1B	
Date	Rev	Date	Person	Description	
Company Name					
Signature		Date	Design By	Date	Check By
		Final Drawing			

D. PRECAUTION AND PRODUCT HANDLING

- Do not apply the external force such as bending or twisting to the module 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 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.
- 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.



Distributed by:



The Netherlands



Elektrostraat 17
NL-7483 PG Haaksbergen

T: +31 (0)53 573 33 33
F: +31 (0)53 573 33 30
E: nl@texim-europe.com

Belgium



Zuiderlaan 14 bus 10
B-1731 Zellik

T: +32 (0)2 462 01 00
F: +32 (0)2 462 01 25
E: belgium@texim-europe.com

UK & Ireland



St. Mary's House, Church Lane
Carlton Le Moorland
Lincoln LN5 9HS

T: +44 (0)1522 789 555
F: +44 (0)845 299 22 26
E: uk@texim-europe.com

Germany North



Bahnhofstrasse 92
D-25451 Quickborn

T: +49 (0)4106 627 07-0
F: +49 (0)4106 627 07-20
E: germany@texim-europe.com

Germany South



Martin-Kollar-Strasse 9
D-81829 München

T: +49 (0)89 436 086-0
F: +49 (0)89 436 086-19
E: germany@texim-europe.com

Austria



Warwitzstrasse 9
A-5020 Salzburg

T: +43 (0)662 216 026
F: +43 (0)662 216 026-66
E: austria@texim-europe.com

Nordic region



Sdr. Jagtvej 12
DK-2970 Hørsholm

T: +45 88 20 26 30
F: +45 88 20 26 39
E: nordic@texim-europe.com

Italy



Via Matteotti 43
IT-20864 Agrate Brianza (MB)

T: +39 (0)395 967 226
F: +39 (0)395 967 226
E: italy@texim-europe.com

General information



info@texim-europe.com
www.texim-europe.com