

Part number: FL-070X0ETADAH-KIT

Description: 7" wide TFT 1024x600 500CD LVDS

Revision Number: 0_3

Prepared By: David

Prepared Date: 2017-May-03

Approved By: Ricky

Approved Date: 2017-May-03

Distributed by:



0. Record of Revision

Version and Date	Page	Old Description	New Description	Remark															
0_1 2016 July 06	All	1.First Edition Specification 2.Consigned Product: <table><tr><th>Products</th><th>FutureLabs</th><th>Customer</th></tr><tr><td>LCD</td><td>V</td><td></td></tr><tr><td>Touch/Glass</td><td></td><td></td></tr><tr><td>DSA</td><td></td><td></td></tr><tr><td>OCR Bonding</td><td></td><td></td></tr></table>	Products	FutureLabs	Customer	LCD	V		Touch/Glass			DSA			OCR Bonding				
Products	FutureLabs	Customer																	
LCD	V																		
Touch/Glass																			
DSA																			
OCR Bonding																			
0_2		Update A-Dim,																	
03	9,10	Add Current Consumption																	

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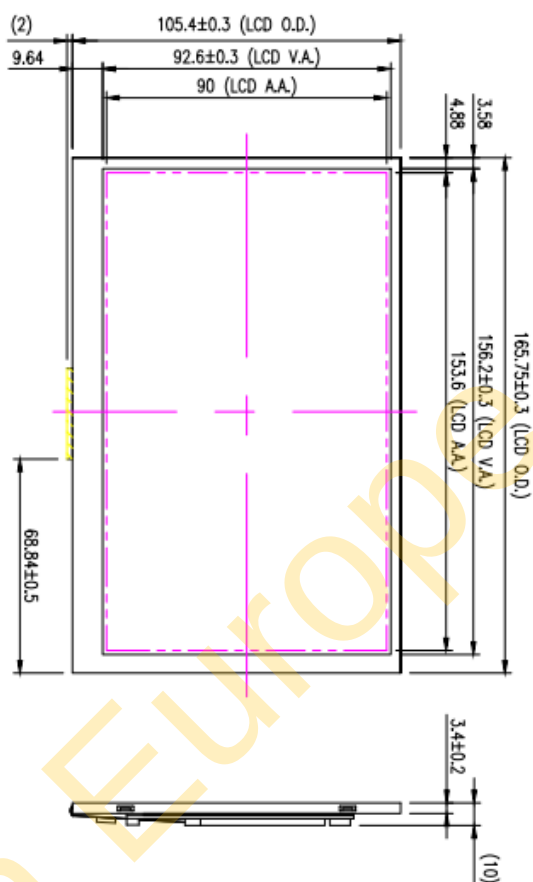
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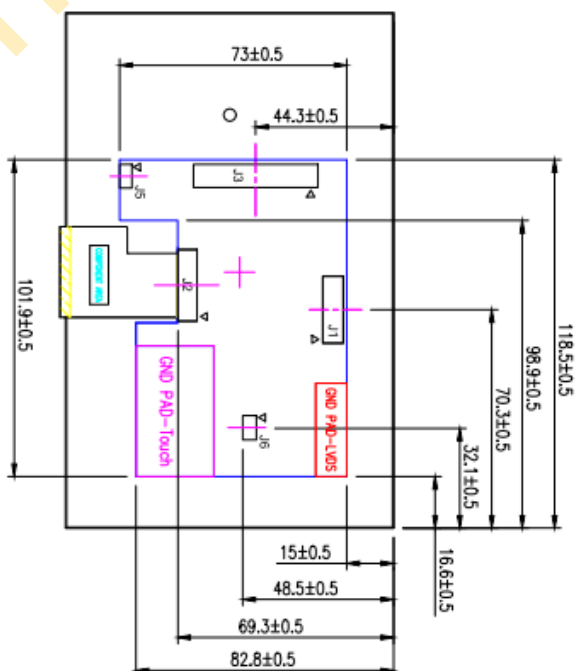
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A) TFT LCD Drawing and P/N

Front View



Back View



J1 & J3 Pin Define

Pin No.	Symbol	Pin No.	Symbol	Pin No.	Symbol
Pin 1	VCC3	Pin 11	RX1+	Pin 21	GND
Pin 2	VCC3	Pin 12	GND	Pin 22	LR
Pin 3	A-Dim	Pin 13	RX2-	Pin 23	UD
Pin 4	D-Dim	Pin 14	RX2+	Pin 24	LED_VCC
Pin 5	BK_EN	Pin 15	GND	Pin 25	LED_VCC
Pin 6	SEL6/8	Pin 16	RXC-	Pin 26	NC
Pin 7	RXD-	Pin 17	RXC+	Pin 27	NC
Pin 8	RXD+	Pin 18	GND	Pin 28	NC
Pin 9	GND	Pin 19	RX3-	Pin 29	NC
Pin 10	RX1-	Pin 20	RX3+	Pin 30	NC

Customer Approval

Rev	Date	By	Check By	Check By	Check By	Check By	Check By	Check By	Check By
1	2023-03-01	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs
2	2023-03-01	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs
3	2023-03-01	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs
4	2023-03-01	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs
5	2023-03-01	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs
6	2023-03-01	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs
7	2023-03-01	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs
8	2023-03-01	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs
9	2023-03-01	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs
10	2023-03-01	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs	FutureLabs

- Note:
1. Tolerance: $\pm 0.3\text{mm}$
 2. Center brightness: 500 cd/m^2 (Typ.)
 3. The bending radius of FPC should be larger than 1.0mm .
 4. LCD Resolution : 1024x600
 5. J1 LVDS connector type for FFC cable : Starcon 089H30-000100-G2-C or equivalent
 6. J3 LVDS connector type for Cable : Starcon 093G30-0001A-M4 or equivalent

B) LCD Display Specifications

Texim Europe

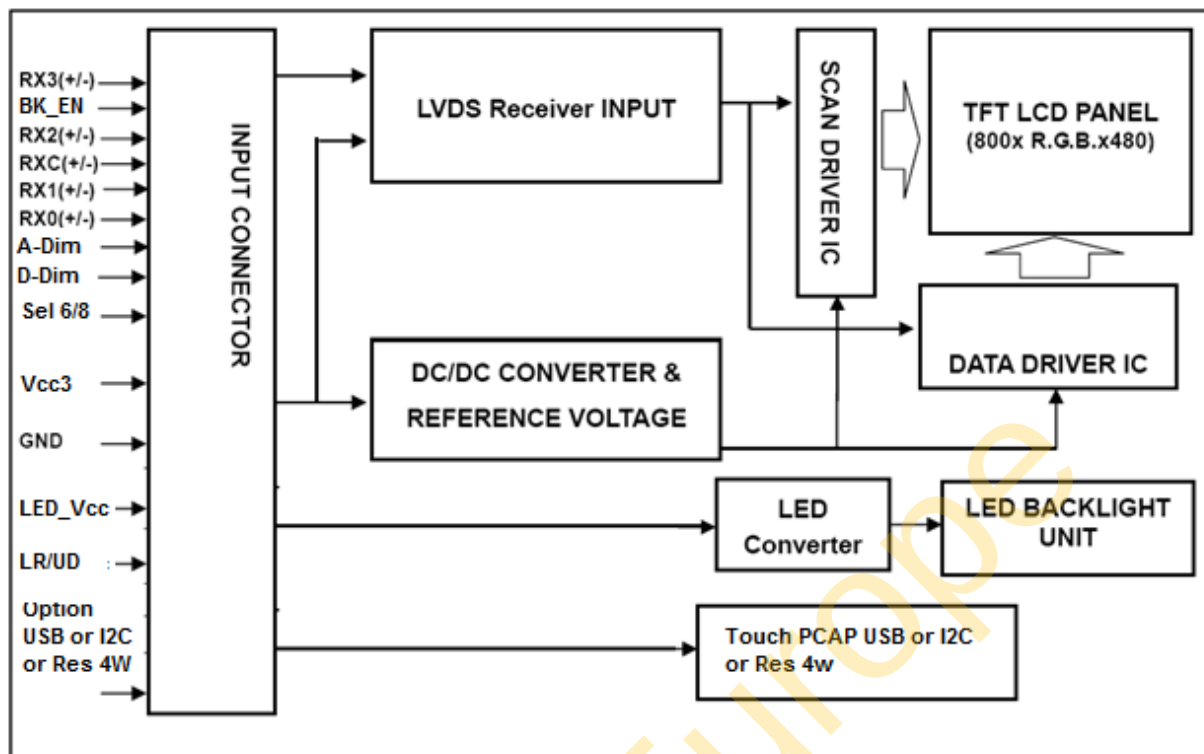
1. APPLICATION

Industrial, HMI, Pos, Marine

2. GENERAL SPECIFICATIONS

Parameter	Specifications	Unit
Screen Size	7 (diagonal)	inch
Display Format	1024(H) x (R,G,B) x 600(V)	dot
Active Area	153.6(W) × 90.0(H) mm	mm
Dot Pitch	0.05(W) × 0.15(H) mm	mm
Pixel Configuration	Stripe	
Outline Dimension	165.75(W) x 105.39(H) x 10 (D)	mm
Surface treatment	Anti-Glare	
Back-light	LED	
Interface	LVDS 18 / 24 bit	
Display mode	Normally white	
Weight	140	g
View Angle direction	6 o'clock (Reverse Scan Option)	
Our components and processes are compliant to RoHS standard		

3. BLOCK DIAGRAM



4 ABSOLUTE MAXIMUM RATINGS

GND=0V

Parameter	Symbol	MIN.	MAX.	Unit	Remark
Operating temperature	Top	-20	70	°C	Module surface*
Storage temperature	Tst	-20	70	°C	-
Humidity	Operation	20%~90% relative humidity			Ta≤38°C
	Non Operation	5%~90% relative humidity			Ta≤38°C

5. ELECTRICAL CHARACTERISTICS

5.1 Operating Conditions

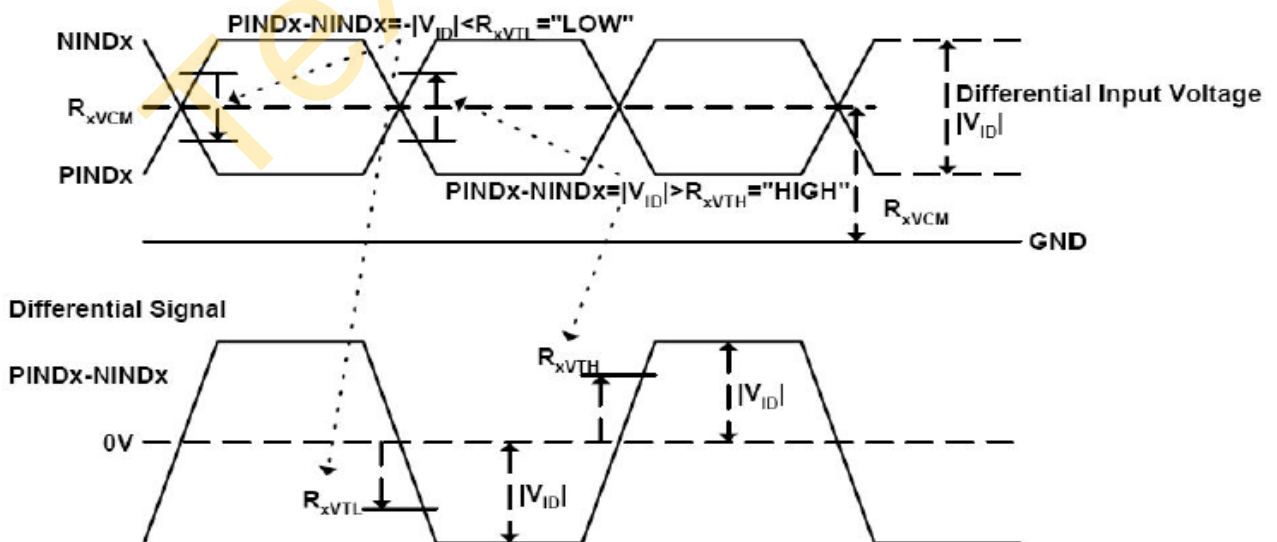
GND=0V, f_H=38.1KHz, f_V=60Hz, f_{CLK}=50.2MHz, T_a=25°C

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Power Supply voltage	V _{CC3}	3.0	3.3	3.6	V	
Power Consumption	I _{CC3}	---	125	---	mA	V _{CC3} = 3,3V
Differential Input High Threshold	R _{xVTH}	-	-	100	[mV]	R _{xVCM} =1.2V Note 2
Differential input Low Threshold	R _{xVTL}	-100	-	-	[mV]	
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	R _{VxIIZ}	-10		+10	uA	
"H" level logical input voltage	V _{IH}	0.7 V _{CC3}	--	V _{CC3}	V	Note1
"L" level logical input voltage	V _{IL}	-0,1	0	0.2	V	

Note 1: LVDS, Reset.

Note 2: LVDS Signal Waveform.

Single-end Signals



6. BACKLIGHT UNIT

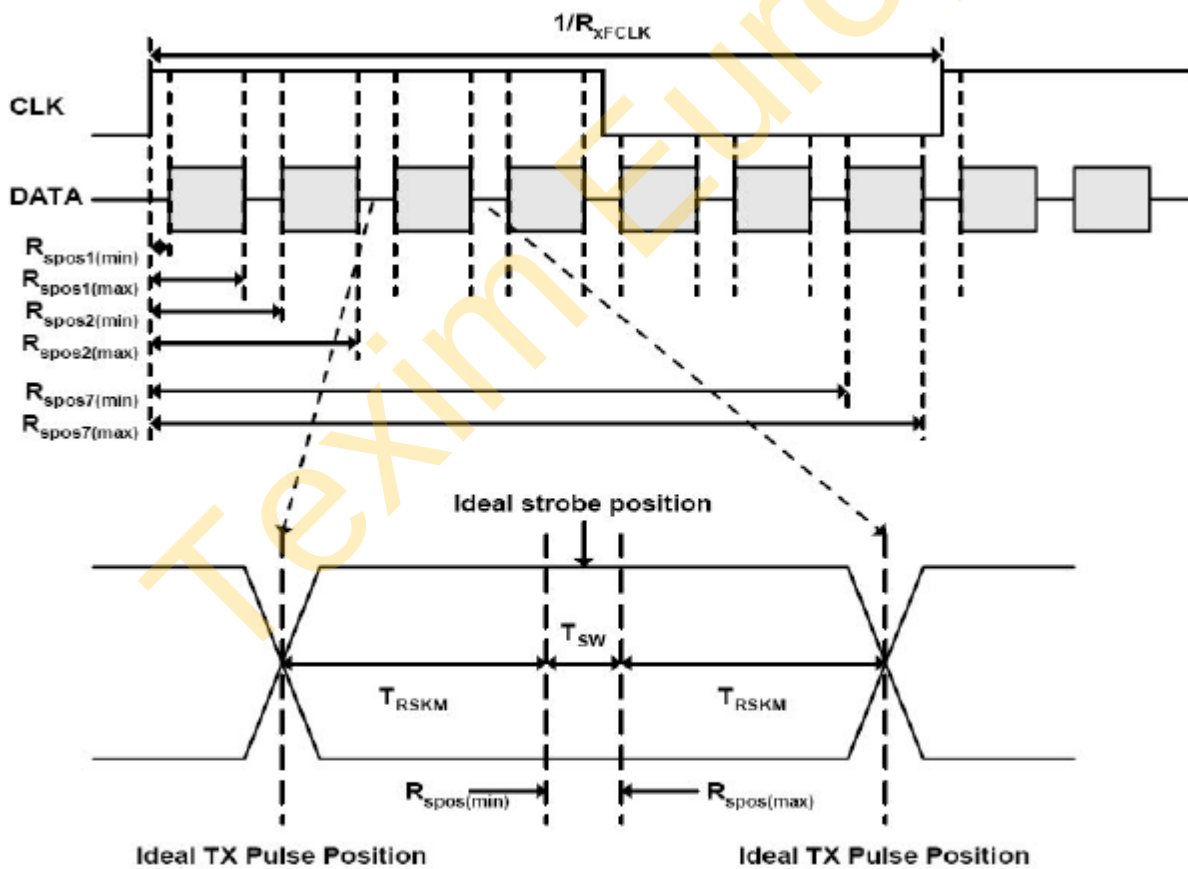
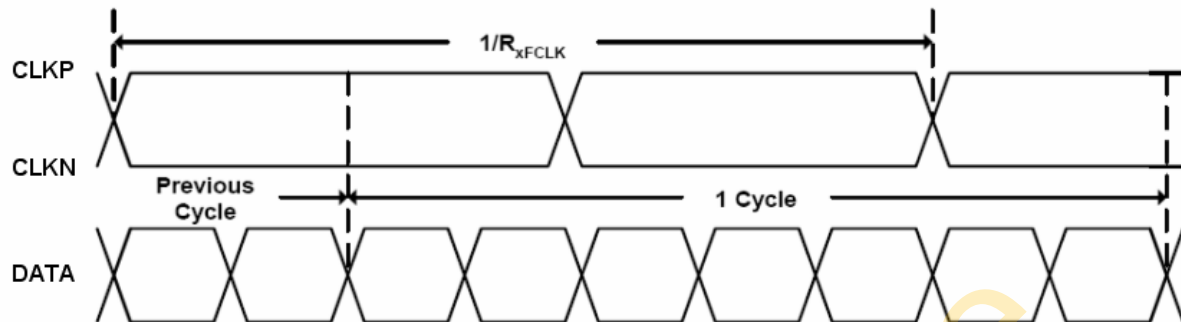
Item	Symbol	Min	Typ	Max	Unit	Note
LED Converter Voltage	Vi(LED_VCC)	4.7	5	12	V	
LED driver current Consumption	Ii(LED_ICC)	---	450		mA	Vi(LED_VCC) = 5V
LED driver current Consumption	Ii(LED_ICC)		200		mA	Vi(LED_VCC) = 12V
Enable Voltage	EN (BK_EN)	2,5	3.3	5	V	Enable
Disable Voltage	EN (BK_EN)	-	0	0.2	V	Disable
Backlight ADJ	A-Dim	0	-	5	V	Max Bright = 0V
	D-Dim	-	3.3	5	V	
Adjust PWM Control Level	PWM High	0.7VCC	3.3	VCC	V	
	PWM Low	0	0	0.2	V	
Adjust PWM Control Ratio		20	-	100	%	
Adjust PWM Control Freq	fPWM	200	1K	-	Hz	
LED life time		--	20,000	--	Hr	Note1

Note 1: "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25°C

7. INPUT SIGNAL CHARACTERISTICS

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Clock Frequency	RxFCLK	40.8	51.2	67.2	MHz	Frame rate =60Hz
Input data skew margin	TRSKM	500	-	-	ps	
Clock high time	TLVCH	-	$4/(7 \cdot RxFCLK)$	-	ns	
Clock low time	TLVCL	-	$3/(7 \cdot RxFCLK)$	-	ns	
Horizontal display area	TDEH	-	1024		RxFCLK	
HS period time	TDEH+TDEL	1114	1344	1400	RxFCLK	
HS Blanking	TDEL	90	320	376	RxFCLK	
Vertical display area	TDE	-	600	-	TDEH+TDEL	
VS period time	TDE+TDEB	610	635	800	TDEH+TDEL	
VS Blanking	TDEB	10	35	200	TDEH+TDEL	

7.1.2 Input Clock and Data Timing Diagram

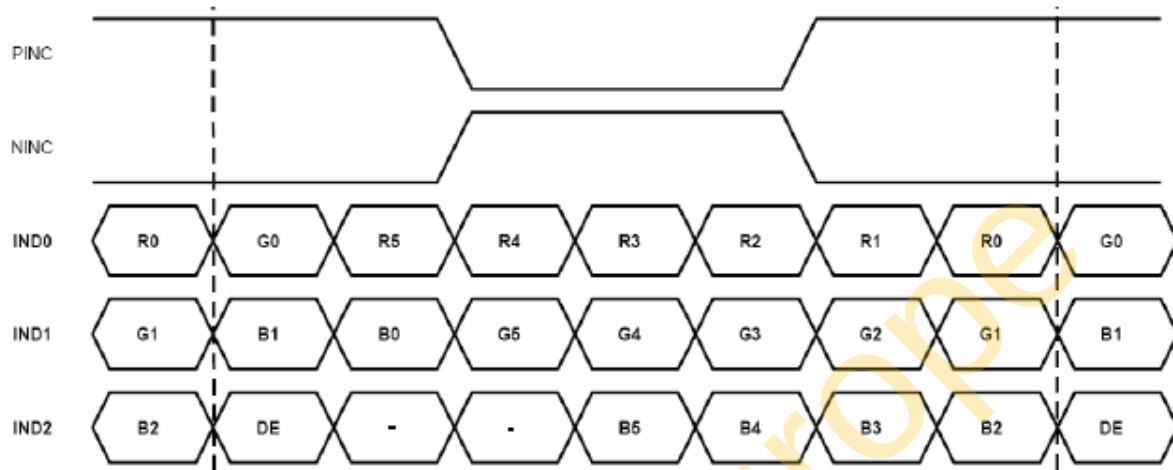


T_{RSKM} : Receiver strobe margin
 R_{SPOS} : Receiver strobe position
 T_{SW} : Strobe width (Internal data sampling window)

7.2 Timing Controller Timing Chart

7.2.1 Data Input format

6bit LVDS input



8bit LVDS input



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

8 PIN CONNECTIONS J1 (30 pin “FFC Type”) and J3 (30 pin “Cable Type”)

Pin NO.	SYMBOL	I/O	DESCRIPTION
1	VCC3	I	Power Supply Voltage (+3,3V)
2	VCC3	I	Power Supply Voltage (+3,3V)
3	A-Dim	I	Analog Dimming – 0V Max to 5V Min (Note 2)
4	D-Dim	I	Digital Dimming (PWM Model) – (3,3V – 5V PWM ON) (Note 2)
5	BK_EN	I	Backlight Enable (0V Disable – 3,3V to 5V Enable)
6	SEL6/8	I	Selection 6 / 8 bit Panel 6bit –connect to high (3.3V/5V) 8bit—connect to Low (0 V or NC)
7	RX0-	I	LVDS differential data input Pair 0
8	RX0+	I	
9	GND	I	Ground
10	RX1-	I	LVDS differential data input Pair 1
11	RX1+	I	
12	GND	I	Ground
13	RX2-	I	LVDS differential clock input Pair 2
14	RX2+	I	
15	GND	I	Ground
16	RXC-	I	LVDS differential clock input Pair
17	RXC+	I	
18	GND	I	Ground
19	RX3-	I	LVDS differential data input Pair 3
20	RX3+	I	
21	GND	I	Ground
22	LR	I	Reverse Scan Left/Right

			When L/R="0", set right to left scan direction. When L/R="1", set left to right scan direction.
23	UD	I	Reverse Scan UP/Down When U/D="0", set top to bottom scan direction. When U/D="1", set bottom to top scan direction.
24	LED_VCC	I	LED Power supply input (+5V to +12V)
25	LED_VCC	I	LED Power supply input (+5V to +12V)
26	NC	I	No connection (see Note 4 in case of USB or I2C touch or Res 4W)
27	NC	I	No connection (see Note 4 in case of USB or I2C touch or Res 4W)
28	NC	I	No connection (see Note 4 in case of USB or I2C touch or Res 4W)
29	NC	I	No connection (see Note 4 in case of USB or I2C touch or Res 4W)
30	NC	I	No connection (see Note 4 in case of USB or I2C touch or Res 4W)

Note 1 : The LCM support DE mode.

Note 2 : Pin3 and Pin4 can't be use simultaneously (Dimming can be used or Analog Mode or PWM Mode)

Note 3:

J3-LVDS connector type for Cable : Starcon 093G30-0001A-M4 or equivalent



J1--LVDS connector type for FFC cable : Starconn . 089H30-000100-G2-C.

ZIF FFC Pitch=0.5mm, H=2mm. Bottom Contact on Connector

Note 4

(Option 1) In case of RTPC070W-XXXXX-**U** (USB interface) connected

26	USB_VCC	I	Touch Panel USB VCC
27	D-	I	Touch Panel Data -
28	D+	I	Touch Panel Data +
29	NC	I	No Connection
30	GND1	I	Touch Panel Ground 1 (for USB)

(Option 2) In case of RTPC070W-XXXXX-**I** (I2C interface) connected

26	VDD	I	Touch Panel VDD (I2C)
27	SDA	I	Touch Panel SDA (I2C)
28	SCL	I	Touch Panel SCL (I2C)
29	INT	I	Touch Panel INT (I2C)
30	GND1	I	Touch Panel Ground 1 (for I2C)

(Option 3) In case of Touch screen Resistive 4 wire connected

26	Y2	I	Touch Panel Res 4 wire Y2 axis
27	X2	I	Touch Panel Res 4 wire X1 axis
28	Y1	I	Touch Panel Res 4 wire Y1 axis
29	X1	I	Touch Panel Res 4 wire X1 axis
30	NC	I	No Connection

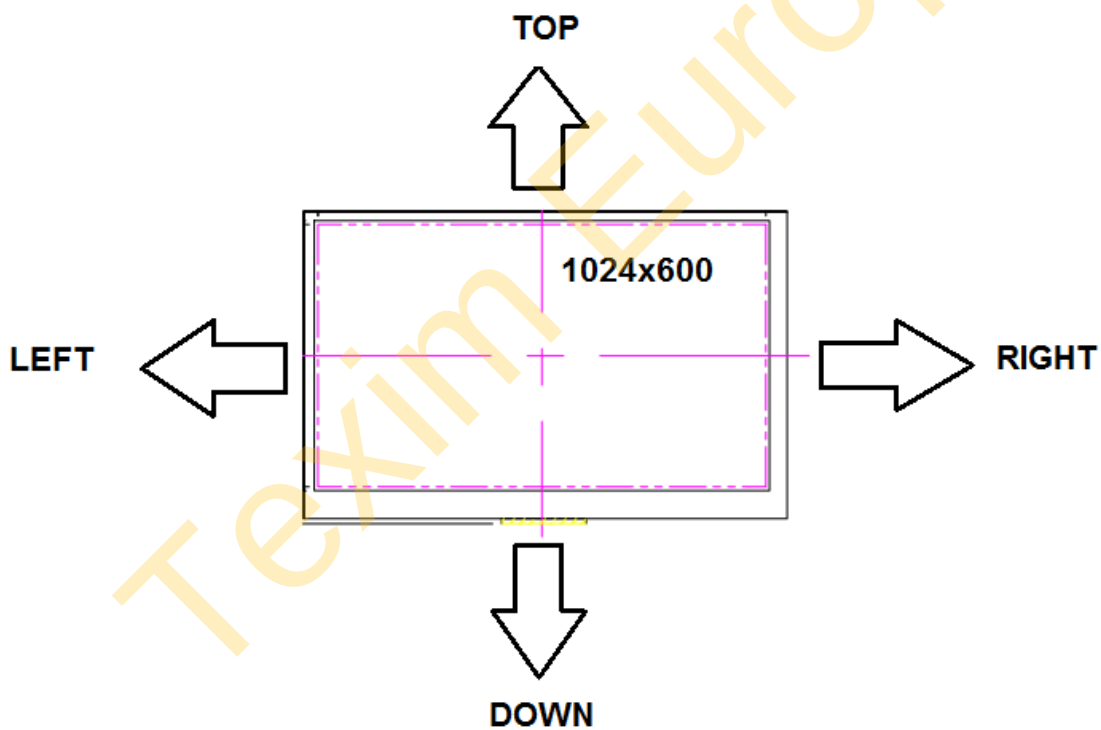
9. SCANNING DIRECTION

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

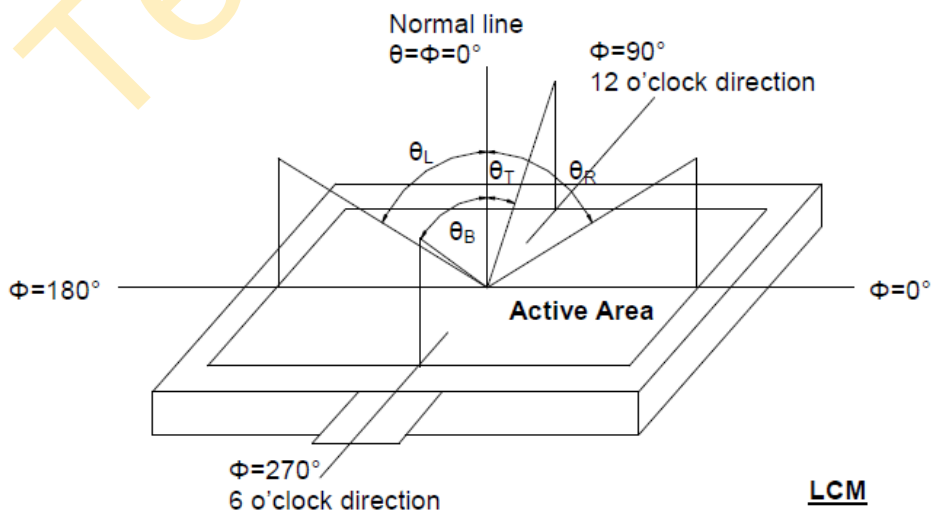


10. OPTICAL CHARACTERISTIC

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle		θ_L	Center $CR \geq 10$	65	75	--	deg	Note 1,2,3
		θ_R		65	75	--		
		θ_T		60	70	--		
		θ_B		65	75	--		
Contrast Ratio		CR	at optimized viewing angle	500	700	--		Note 2,3,4
Response time	Rise	T_r	Center	-	10	20	ms	Note 2,3,6
	Fall	T_f	$\theta_x = \theta_y = 0^\circ$	-	15	30	ms	
Uniformity		B-uni	$\theta_x = \theta_y = 0^\circ$	70	80	--	%	Note 2,3,5
Brightness		L	$\theta_x = \theta_y = 0^\circ$	400	500	--	cd/m ²	Note 2,3
Chromaticity		x_w	Center	0.249	0.299	0.349		Note 2,3,7
		y_w	$\theta_x = \theta_y = 0^\circ$	0.273	0.323	0.373		
Transmittance		T_r		3.15%	3.5%	-		

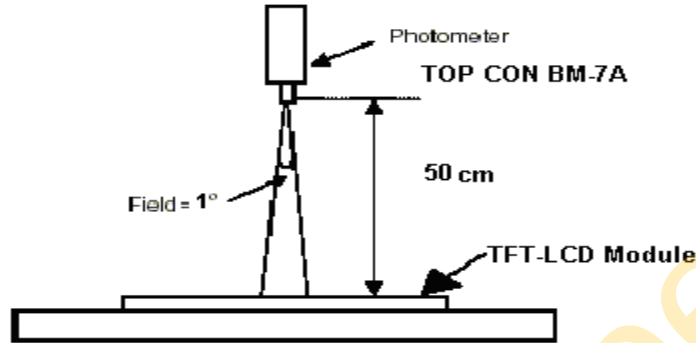
The following optical specifications shall be measured in a darkroom or equivalent state (ambient luminance ≤ 1 lux, and at room temperature). The operation temperature is $25^\circ\text{C} \pm 2^\circ\text{C}$ and LED Backlight Current $I_L = 180\text{mA}$. The measurement method is shown in Note1.

Note 1: Definition of viewing angle range



Note 2: All input terminals LCD panel must be ground while measuring the center area of the panel.

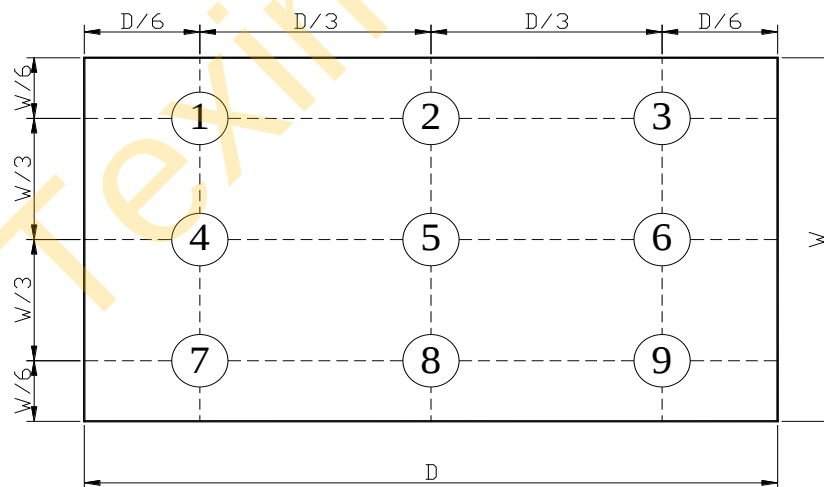
Note 3: Measured at the center area of the panel and at the viewing angle of the $\theta_x = \theta_y = 0^\circ$



Note 4: Definition of Contrast Ratio (CR):

$$CR = \frac{\text{Luminance with all pixels in white state}}{\text{Luminance with all pixels in Black state}}$$

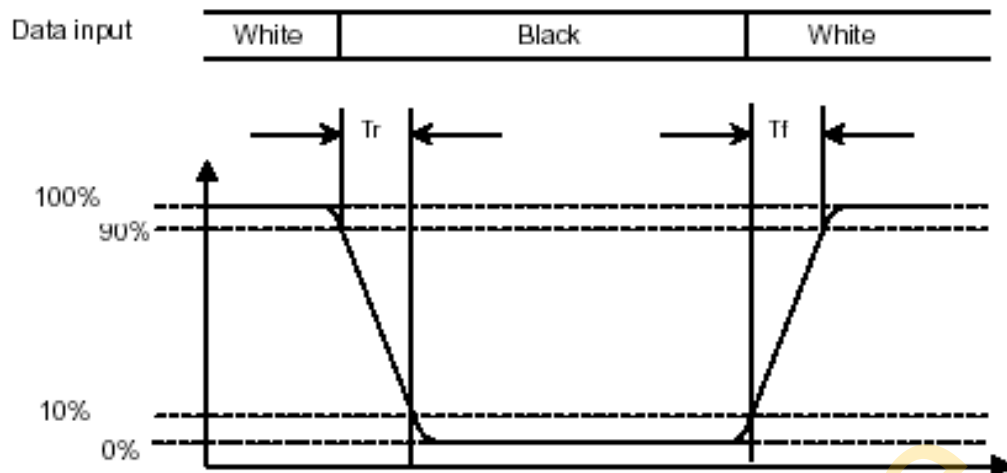
Note 5: Definition of Brightness Uniformity (B-uni):



$$B\text{-uni} = \frac{\text{Minimum luminance of 9 points}}{\text{Maximum luminance of 9 points}} \quad (\text{Note 5}).$$

Note 6: Definition of Response Time:

The Response Time is set initially by defining the “Rising Time (T_r)” and the “Falling Time (T_f)” respectively. T_r and T_f are defined as following figure.



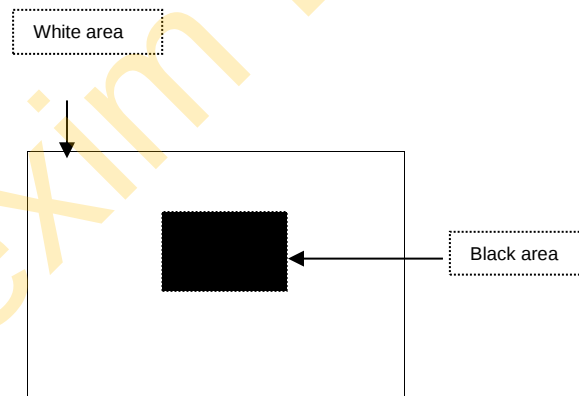
Note 7: Definition of Chromaticity:

The color coordinates (x_w, y_w) are obtained with all pixels in the viewing field at white states, respectively.

Note 8: Definition of Image sticking (tis):

Continuously display the test pattern shown in the figure below for 2 hours. Then display a completely white screen. The previous image shall not persist more than 2 sec at 25 °C

Image sticking pattern



11. QUALITY ASSURANCE

11.1 RA Test Condition

11.1.1 Temperature and Humidity(Ambient Temperature)

Temperature : $25 \pm 5^{\circ}\text{C}$

Humidity : $65 \pm 5\%$

11.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

11.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

11.1.4 Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

11.1.5 Test Method

Reliability Test Item & Level		Test Level	Remark
No.	Test Item		
1	High Temperature Storage Test	T=70°C,240hrs	IEC68-2-2
2	Low Temperature Storage Test	T=-20°C,240hrs	IEC68-2-1
3	High Temperature Operation Test	T=70°C,240hrs	IEC68-2-2
4	Low Temperature Operation Test	T=-20°C,240hrs	IEC68-2-1
5	High Temperature and High Humidity (No operation)	T=40°C,90%RH,240hrs	IEC68-2-3
6	Thermal Cycling Test (No operation)	-20°C → +25°C → +70°C, 100 Cycles 30 min 5 min 30 min	IEC68-2-14
7	Vibration Test (No operation)	Frequency :10 ~ 55 Hz Amplitude :1.5 mm Sweep time : 11 min Test Period: 6 Cycles for each direction of X, Y, Z	IEC68-2-6
8	Drop test	Height :60cm 1 conner,3edges,6surfaces	IEC68-2-32
9	Shock test	100G,6ms,Direction:±X±Y±Z Cycle:3times	IEC68-2-27
10	ESD TEST	State: operating Location: LCM/TP surface Condition:150pf 330Ω Contact +/- 8kV Air +/-15kV Criteria: Class C	IEC61000-4-2

12. PACKAGING: TBD

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