



Part number: FL-070X0ETADAH-KIT

Description: 7" wide TFT 1024x600 500CD LVDS

Revision Number: 0_1

Prepared By: David

Prepared Date: 2016-July-06

Approved By: Ricky

Approved Date: 2016-July-29

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 border="1"> <thead> <tr> <th>Products</th> <th>FutureLabs</th> <th>Customer</th> </tr> </thead> <tbody> <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> </tbody> </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																	

Texim Europe

Disclaimer

The information in this document is subject to change without notice. The manufacturer makes no representations or warranties regarding the contents of this manual and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose. Furthermore, the manufacturer reserves the right to revise this publication or make changes in the specifications of the product described within it at any time without notice and without obligation to notify any person of such revision.

Trademarks

FutureLabs is a registered trademark of FutureLabs Technology LTD.

Copyright

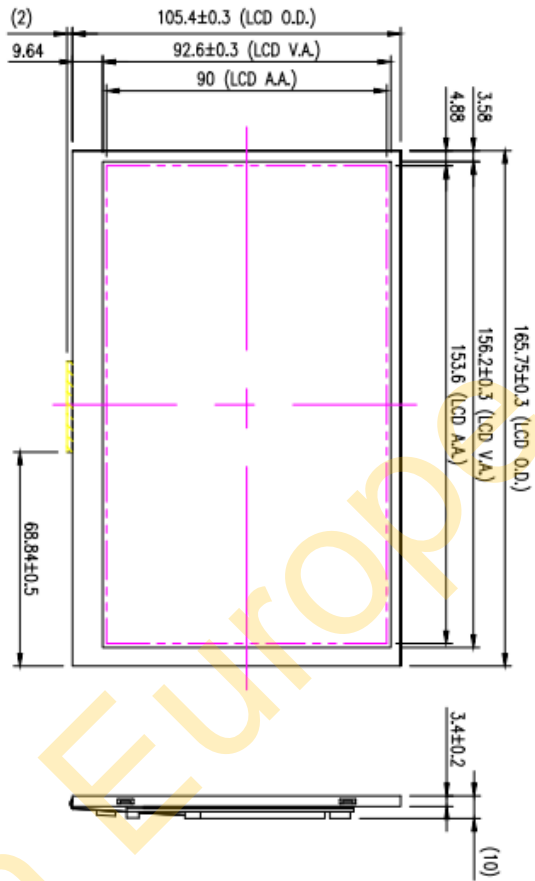
This publication, including all photographs, illustrations and software, is protected under international copyright laws, with all rights reserved. Neither this manual, nor any of the material contained herein, may be reproduced without the express written consent of FutureLabs Technology LTD.

Texim Europe

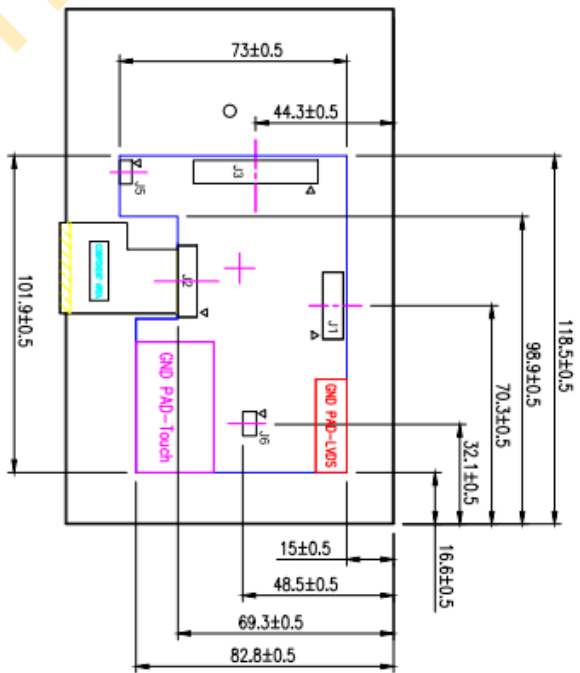
A) TFT LCD Drawing and P/N

Texim Europe

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	RX0+	Pin 18	GND	Pin 28	NC
Pin 9	GND	Pin 19	RX3-	Pin 29	NC
Pin 10	RX1-	Pin 20	RX3+	Pin 30	NC

- Note:
1. Tolerance: ±0.3mm
 2. Center brightness: 500 cd/m² (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

Customer Approval	Part Number	FL-070X0ETADAH-KIT
Design	Drawn	Checked
Checked	Approved	Released
Released	Released	Released

B) LCD Display Specifications

Texim Europe

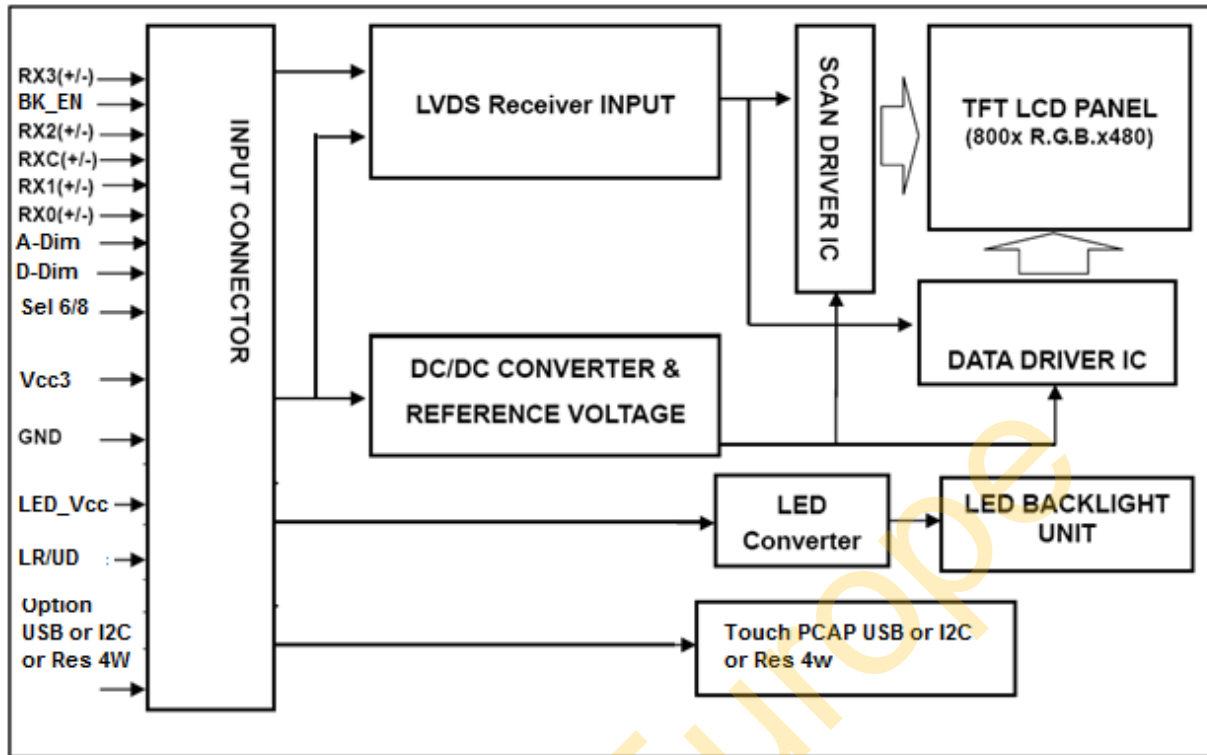
1. APPLICATION

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) x 90.0(H) mm	mm
Dot Pitch	0.05(W) x 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

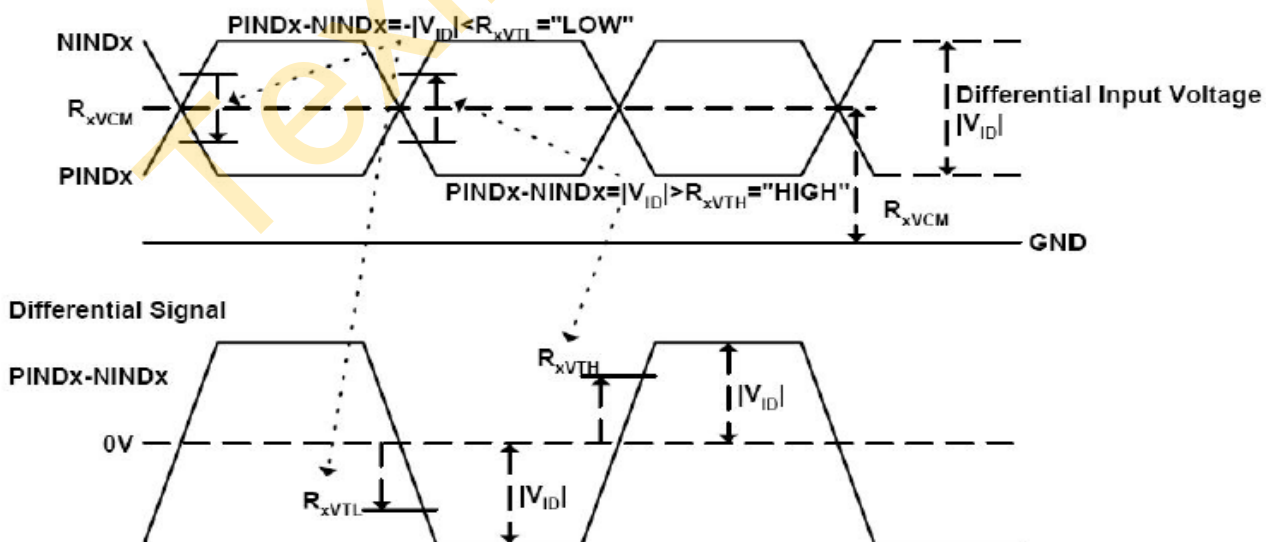
GND=0V, fH=38.1KHz, fV=60Hz, fCLK=50.2MHz, Ta=25°C

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Power Supply voltage	Vcc3	3.0	3.3	3.6	V	
Differential Input High Threshold	R _{xVTH}	-	-	100	[mV]	R _{xVCM} =1.2V
Differential input Low Threshold	R _{xVTL}	-100	-	-	[mV]	Note 2
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 _{Vxliz}	-10		+10	uA	
“H” level logical input voltage	V _{IH}	0.7 Vcc3	--	Vcc3	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	V _{i(LED_VCC)}	4.7	5	12	V	
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	f _{PWM}	200	1K	-	Hz	
LED life time		--	20,000	--	Hr	Note1

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

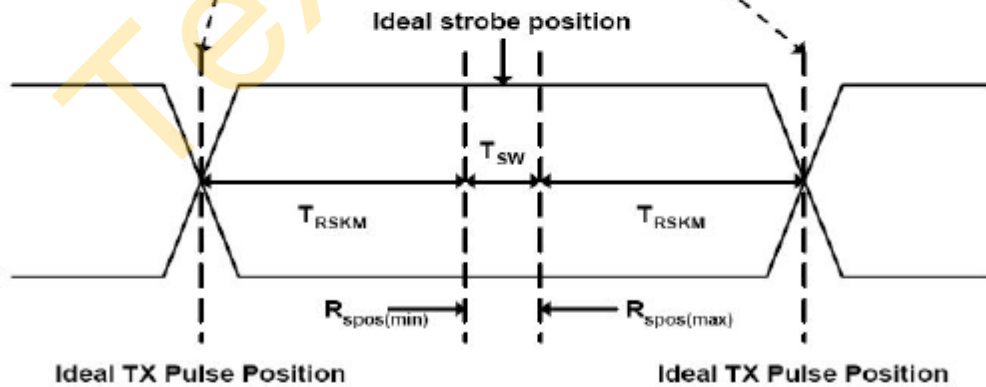
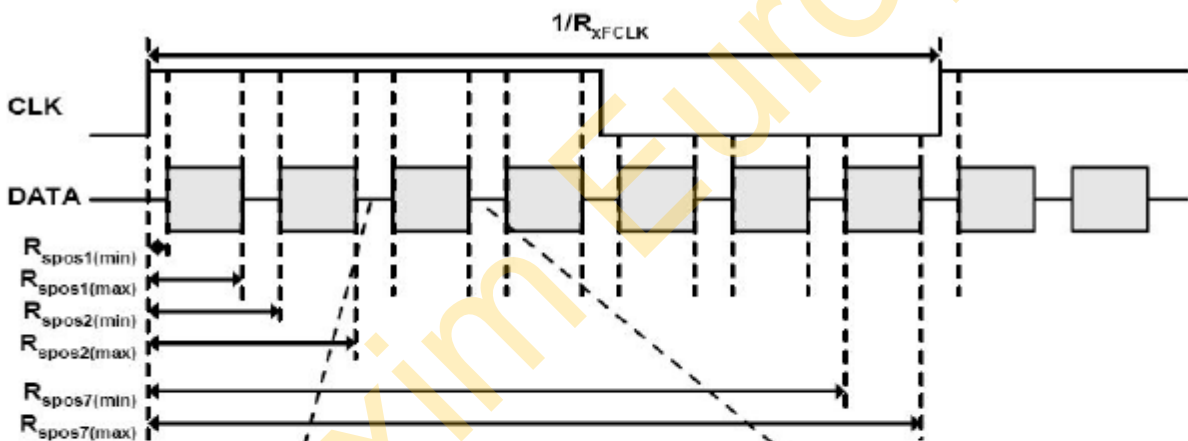
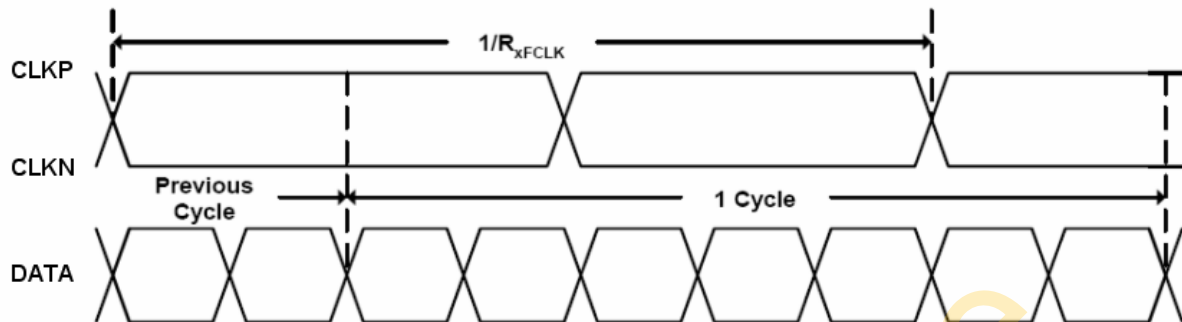
7. INPUT SIGNAL CHARACTERISTICS

7.1 AC Characteristics

7.1.1 AC Electrical Characteristics

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Clock Frequency	R _x FCLK	40.8	51.2	67.2	MHz	Frame rate =60Hz
Input data skew margin	T _{RSKM}	500	-	-	ps	
Clock high time	TLVCH	-	4/(7*R _x FCLK)	-	ns	
Clock low time	TLVCL	-	3/(7*R _x FCLK)	-	ns	
Horizontal display area	TDEH	-	1024		R _x FCLK	
HS period time	TDEH+TDEL	1114	1344	1400	R _x FCLK	
HS Blanking	TDEL	90	320	376	R _x FCLK	
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

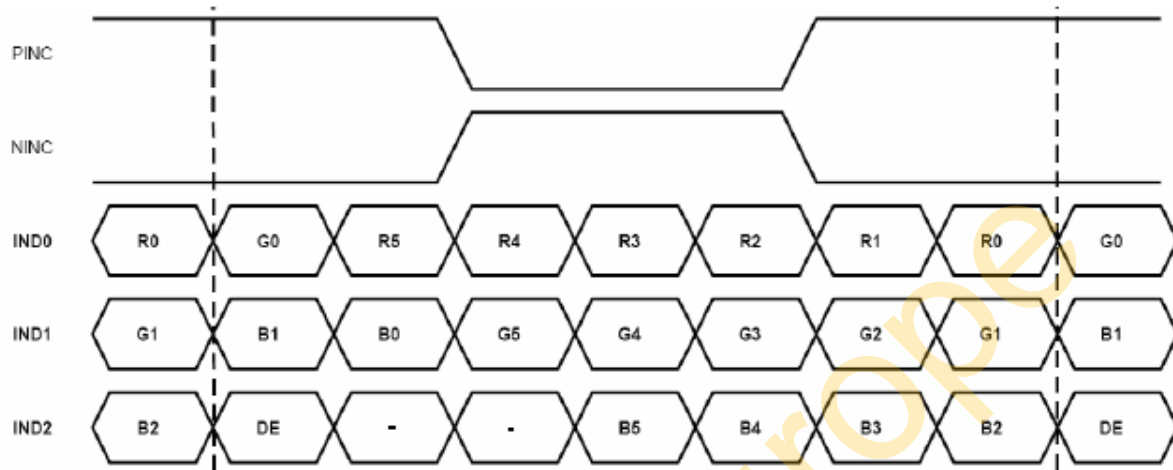


T_{RSKM} : Receiver strobe margin
 R_{SPOS} : Receiver strobe position
 T_{SW} : Strobe width (Internal data sampling window)

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

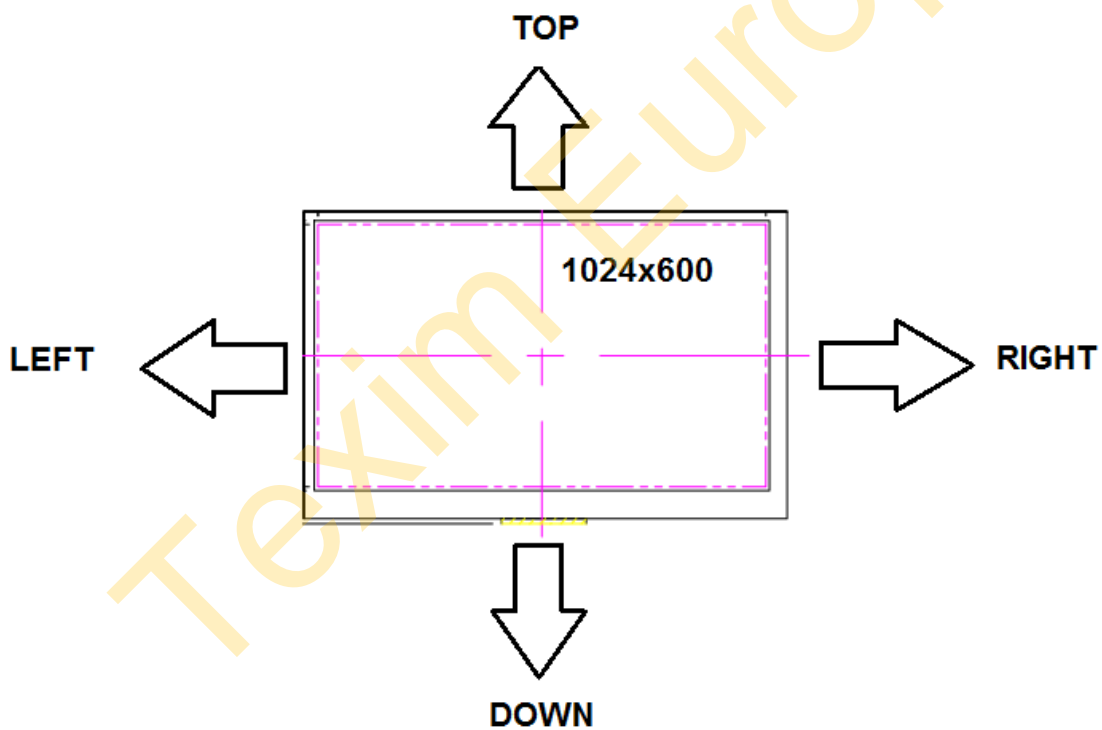
9. SCANNING DIRECTION

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

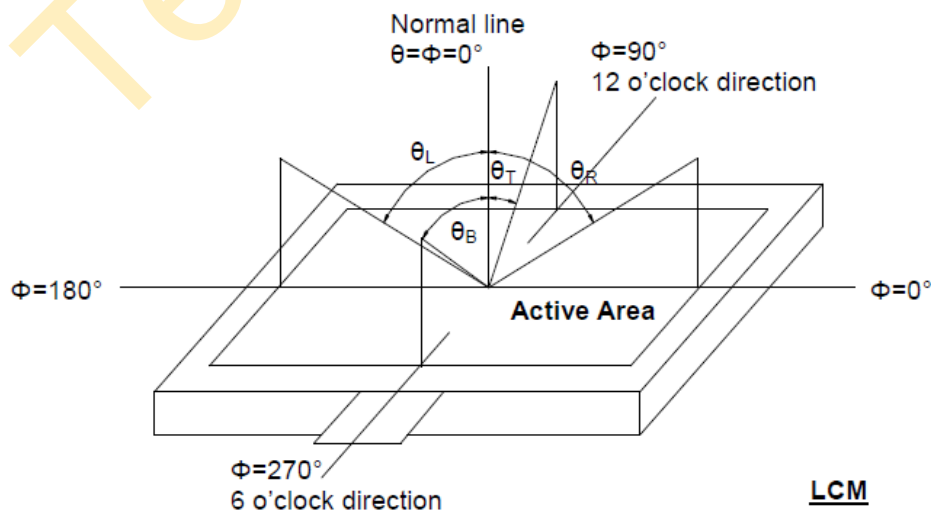


10. OPTICAL CHARACTERISTIC

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle		θ_L	Center	65	75	--	deg	Note 1,2,3
		θ_R		65	75	--		
		θ_T	$CR \geq 10$	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%	-		

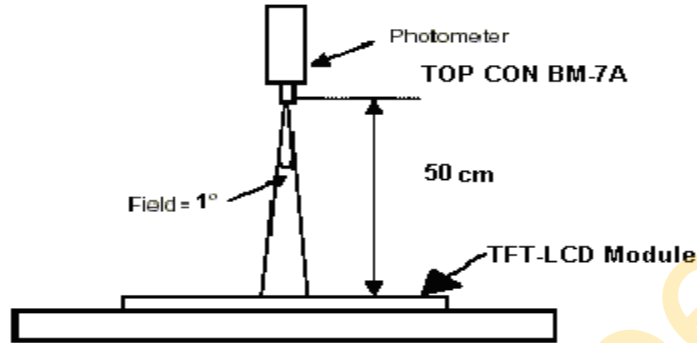
The following optical specifications shall be measured in a darkroom or equivalent state (ambient luminance ≤ 1 lux, and at room temperature). The operation temperature is $25^\circ\text{C} \pm 2^\circ\text{C}$ and LED Backlight Current $I_L = 180\text{mA}$. The measurement method is shown in Note1.

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.

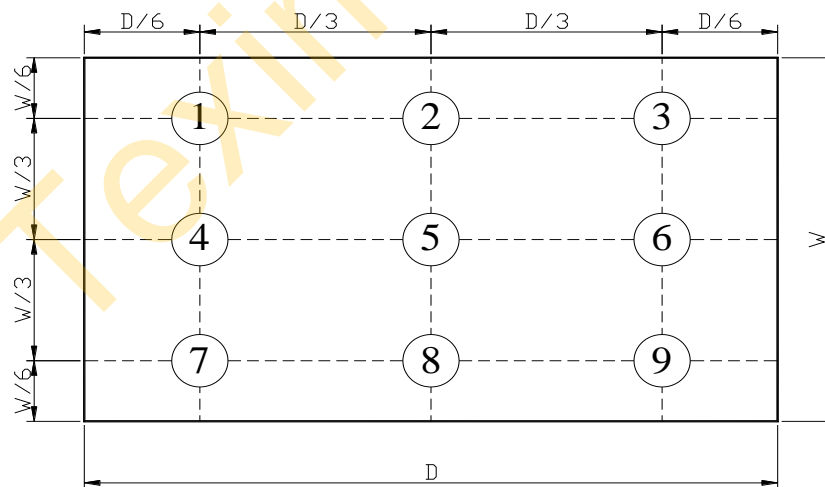
Note 3: Measured at the center area of the panel and at the viewing angle of the $\theta_x=\theta_y=0^\circ$



Note 4: Definition of Contrast Ratio (CR):

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

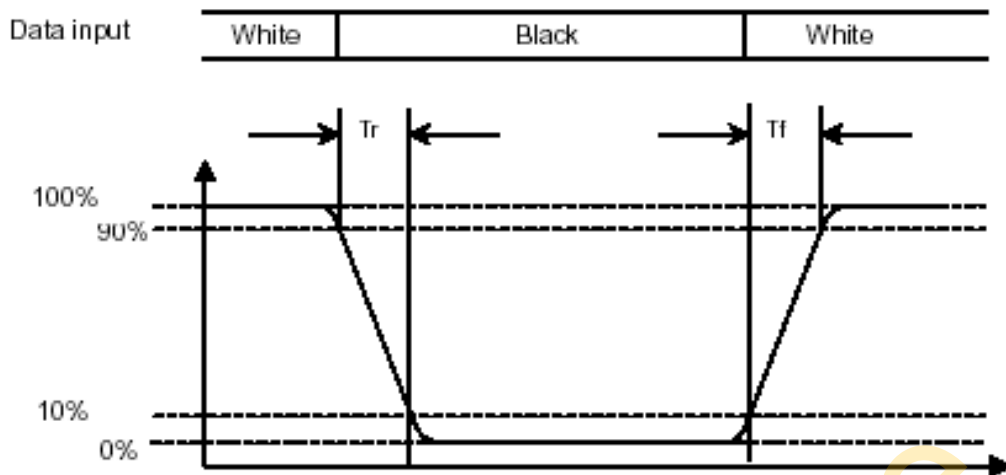
Note 5: Definition of Brightness Uniformity (B-uni):



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

Note 6: Definition of Response Time:

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



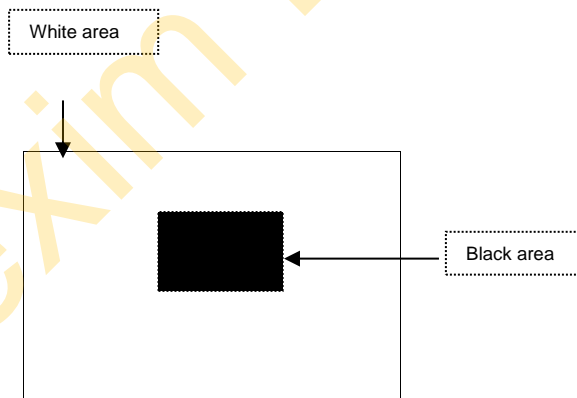
Note 7: Definition of Chromaticity:

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)	$-20^{\circ}\text{C} \rightarrow +25^{\circ}\text{C} \rightarrow +70^{\circ}\text{C}$, 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: $\pm X \pm Y \pm Z$ Cycle:3times	IEC68-2-27
10	ESD TEST	State: operating Location: LCM/TP surface Condition:150pf 330 Ω Contact +/- 8kV Air +/-15kV Criteria: Class C	IEC61000-4-2

12. PACKAGING: TBD

Texim Europe