Winstar Display Co., LTD
華凌光電股份有限公司
WEB: http://www.winstar.com.tw *E-mail: winstar@winstar.com.tw*

SPECIFICATION

CUSTOMER : _____

MODULE NO.: WF101BTYAPLNN0#

APPROVED BY: **(FOR CUSTOMER USE ONLY)**	**PCB VERSION:** **DATA:**

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			杨强
ISSUED DATE: 2016/01/21			

TFT Display Inspection Specification: http://www.winstar.com.tw/service.php

MODLE NO：

RECORDS OF REVISION	**DOC. FIRST ISSUE**

VERSION	DATE	REVISED PAGE NO.	**SUMMARY**
0	2015/10/01		First issue
A	2016/01/21		Modify Static electricity test

Contents

1.Module Classification Information

W	F	101	B	T	Y	A	P	L	N	N	0	#
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬

①	Brand：WINSTAR DISPLAY CORPORATION		
②	Display Type：F→TFT Type, J→Custom TFT		
③	Display Size：10.1” TFT		
④	Model serials no.		
⑤	Backlight Type：	F→CCFL, White S→LED, High Light White	T→LED, White
⑥	LCD Polarize Type/ Temperature range/ Gray Scale Inversion Direction	C→Transmissive, N. T, 6:00 ; I→Transmissive, W. T, 6:00 F→Transmissive, N.T,12:00 ; L→Transmissive, W.T,12:00 N→Transmissive, Super W.T, 6:00 Q→Transmissive, Super W.T, 12:00 X→Transmissive, W.T, VA TFT V→Transmissive, Super W.T, VA TFT R→Transmissive, Super W.T, O-TFT Z→Transmissive, W.T, O-TFT A→Transmissive, N.T, IPS TFT Y→Transmissive, W.T, IPS TFT	
⑦	A：TFT LCD B：TFT+FR+CONTROL BOARD C：TFT+FR+A/D BOARD D：TFT+FR+A/D BOARD+CONTROL BOARD E：TFT+FR+POWER BOARD F：TFT+CONTROL BOARD	G：TFT+FR H：TFT+D/V BOARD I：TFT+FR+D/V BOARD J：TFT+POWER BD	
⑧	Resolution:		
	A: 128160	B:320234	C:320240	D:480234	E:480272	F: 640480	G: 800480
	H:1024600	I:320480	J:240320	K:800600	L:240400	M :1024768	P :1280800
	S:480128	T:800320					
⑨	D: Digital L：LVDS						
⑩	Interface： N：without control board A：8Bit B：16Bit						
⑪	TS：N：Without TS T：resistive touch panel C：capacitive touch panel (G-F-F) G：capacitive touch panel(G-G)						
⑫	Version						
⑬	Special Code	#:Fit in with ROHS directive regulations					

2.Summary

This technical specification applies to 10.1’ color TFT-LCD panel. The 10.1’ color TFT-LCD panel is designed for camcorder, digital camera application and other electronic products which require high quality flat panel displays. This module follows RoHS.

3.General Specifications

Item	Dimension	Unit
Screen Diagonal	10.1	inch
Number of Pixels	1280 x 800	dots
Module dimension	229.46 x 149.1 x 4.56	mm
Active area	216.96 (H) x 135.6(V)	mm
Pixel pitch	0.1695 × 0.1695	mm
Display Mode	Normally Black	
Pixel Arrangement	R.G.B. Vertical Stripe	
Backlight Type	LED,Normally White	
Electrical Interface (Logic)	LVDS	
With /Without TP	Without TP	
Surface	Glare , Hard -Coating	

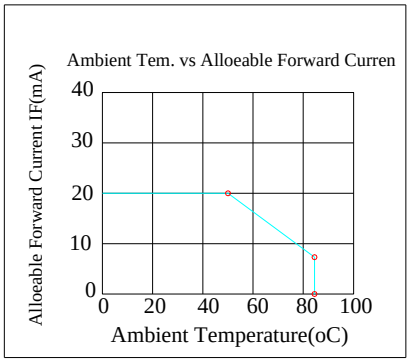
*Color tone slight changed by temperature and driving voltage.

4.Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	-20	—	+70	℃
Storage Temperature	TST	-30	—	+80	℃

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

1. Temp. ≦60℃, 90% RH MAX. Temp.＞60℃, Absolute humidity shall be less than 90% RH at 60℃



5.Electrical Characteristics

5.1. Power Consumption

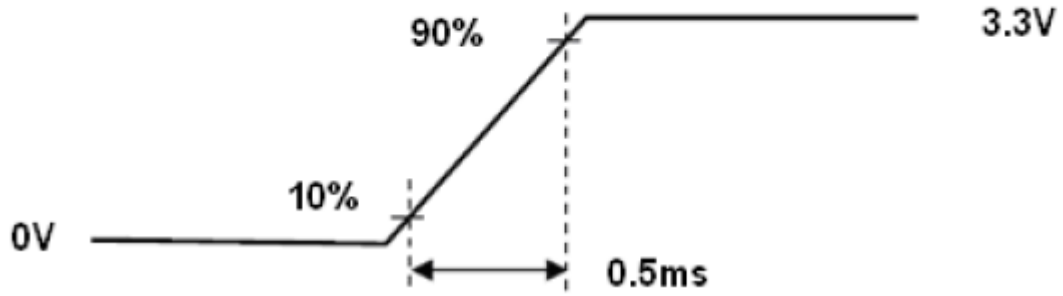
Input power voltage specifications are as follows.

Table Power Voltage

Item		Symbol	Min.	Typ.	Max.	Units	Note
LCD Drive Voltage (Logic)		VDD	(3.0)	(3.3)	(3.6)	V	(2),(4)
VDD Current	White Pattern	IDD	-	(0.27)	-	A	(3),(4)
VDD Power Consumption	White Pattern	PDD	-	-	(1.0)	W	
LED Power Consumption		PLED	-	-	(2.5)	W	
Rush Current		Irush	-	-	(1.5)	A	(1),(4),(5)
Allowable Logic/LCD Drive Ripple Voltage		VDDrp	-	-	(300)	mV	(4)

Note (1) Measure Condition

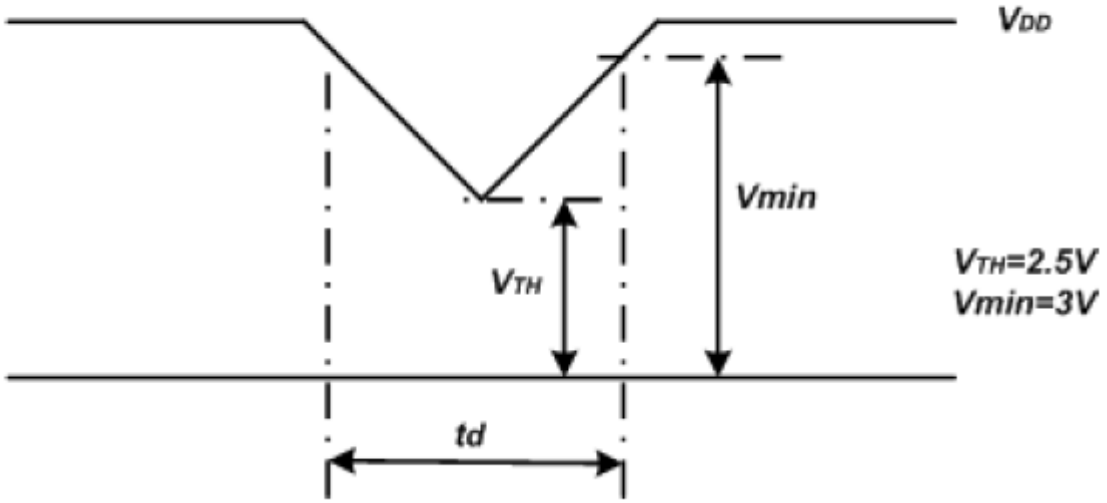
Figure VDD Rising time



Note (2) VDD Power Dip Condition

If VTH<VDD≤Vmin，then td≤10ms；when the voltage return to normal our panel must revive automatically.

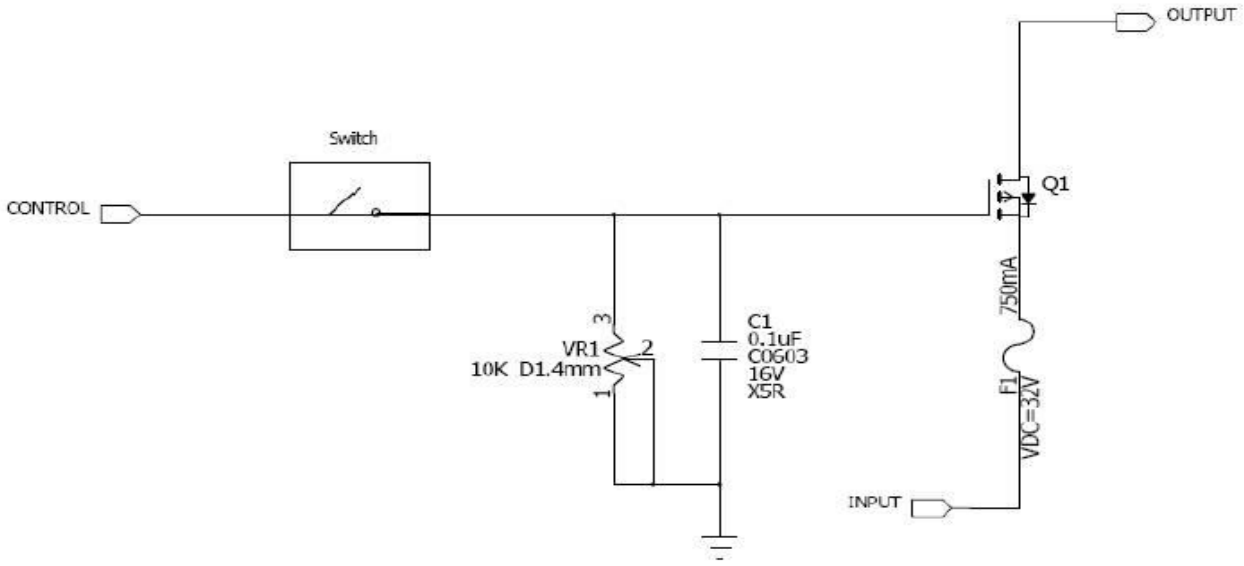
Figure VDD Power Dip



Note (3) Frame Rate=60Hz, VDD=3.3V,DC Current.

Note (4) Operating temperature 25℃, humidity 55%RH.

Note (5) The reference measurement circuit of rush current.



5.2. Backlight Characteristics

Item	Symbol		Min.	Typ.	Max.	Units	Note
LED Input Voltage	V_LED		6	12	21	V	(2)
LED Power Consumption	P_LED		-	-	2.5	W	(2)
LED Forward Voltage	VF		2.9	-	3.2	V	(2)
LED Forward Current	IF		-	20	-	mA	
PWM Signal Voltage	VPWM_EN	High	3.0	-	3.6	V	
		Low	0	-	0.4		
LED Enable Voltage	VLED_EN	High	3.0	-	3.6	V	
		Low	0	-	0.4		
Input PWM Frequency	FPWM		1	-	2	KHz	DDIM≥1%(2)
			2	-	5		DDIM≥2.5%(2)
			5	-	10		DDIM≥5%(2)
			10	-	20		DDIM≥10%(2)
LED Life Time	LT		15,000	-	-	Hours	(1)(2)

Note (1): The LED life time define as the estimated time to 50% degradation of initial luminous.
Note (2): Operating temperature 25℃, humidity 55%.

6.Interface Timing

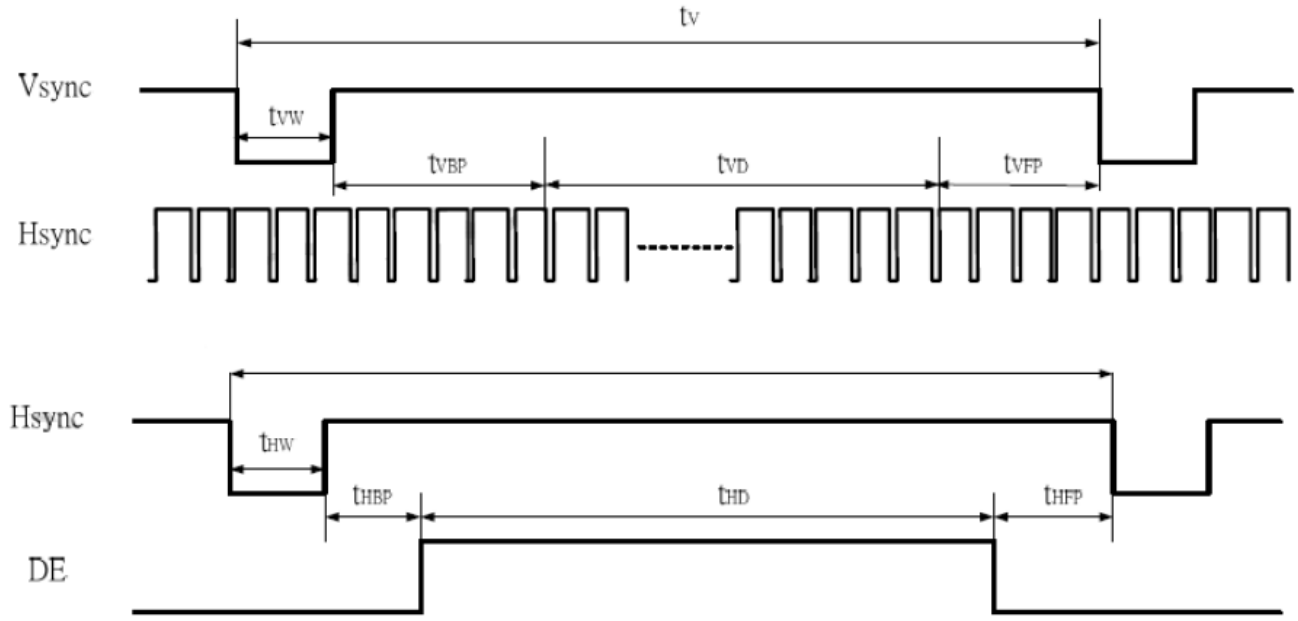
6.1. Timing Characteristics

Table Interface Timings

Parameter	Symbol	Unit	Min.	Typ.	Max.
Frame Rate	--	Hz	-	60	-
Frame Period	tV	line	(815)	(823)	(1023)
Vertical Display Time	tVD	line		800	
Vertical Blanking Time	tVW+tVBP+tVFP	line	(15)	(23)	(33)
1 Line Scanning Time	tH	clock	(1410)	(1440)	(1470)
Horizontal Display Time	tHD	clock		1280	
Horizontal Blanking Time	tHW+tHBP+tHFP	clock	(60)	(160)	(190)
Clock Rate	1/TC	MHz	(68.9)	(71.1)	(73.4)

6.2. Timing Diagram of Interface Signal (DE mode)

Figure Timing Characteristics



6.3. Power ON/OFF Sequence

Power on/off sequence is as follows. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.

Figure Power Sequence

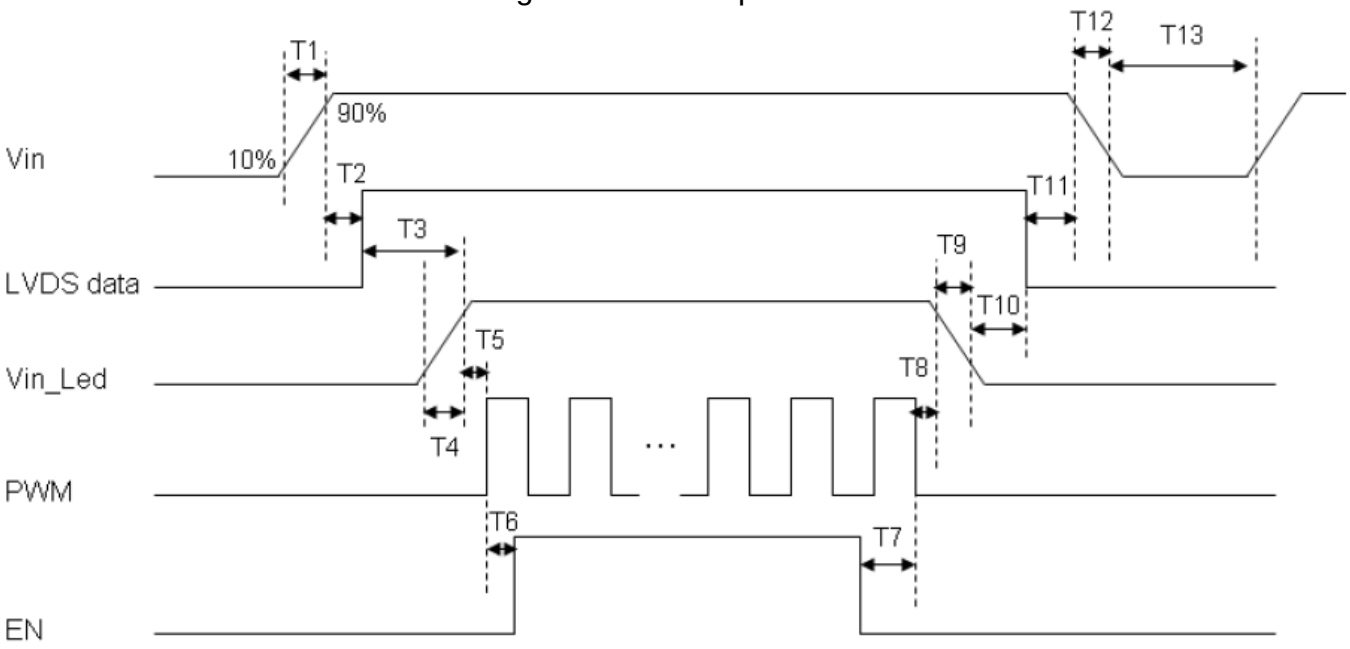


Table Power Sequencing Requirements

Parameter	Symbol	Unit	Min	Typ.	Max
VIN Rise Time	T1	ms	0.5	--	10
VIN Good to Signal Valid	T2	ms	30	--	90
Signal Valid to Backlight On	T3	ms	200	--	--
Backlight Power On Time	T4	ms	0.5	--	--
Backlight VDD Good to System PWM On	T5	ms	10	--	--
System PWM ON to Backlight Enable ON	T6	ms	10	--	--
Backlight Enable Off to System PWM Off	T7	ms	0	--	--
System PWM Off to B/L Power Disable	T8	ms	10	--	--
Backlight Power Off Time	T9	ms	0.5	10	30
Backlight Off to Signal Disable	T10	ms	200	--	--
Signal Disable to Power Down	T11	ms	0	--	50
VIN Fall Time	T12	ms	0.5	10	30
Power Off	T13	ms	500	--	--

7.Optical Characteristics

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time		Tr	θ =0° 、 Φ=0°	-	25	50	.ms	Note 3
		Tf						
Contrast ratio		CR	At optimized viewing angle	600	800	-	-	Note 4
Color Chromaticity	White	Wx	θ =0° 、 Φ=0	0.283	0.313	0.343	-	Note 2,5
		Wy		0.293	0.329	0.359	-	
Viewing angle (Gray Scale Inversion Direction)	Hor.	ΘR	CR≧10	75	85	-	Deg.	Note 1
		ΘL		75	85	-		
	Ver.	ΦT		75	85	-		
		ΦB		75	85	-		
Brightness		-	-	300	350	-	cd/m^2	Center of display

Ta=25±2℃

Note 1: Definition of viewing angle range

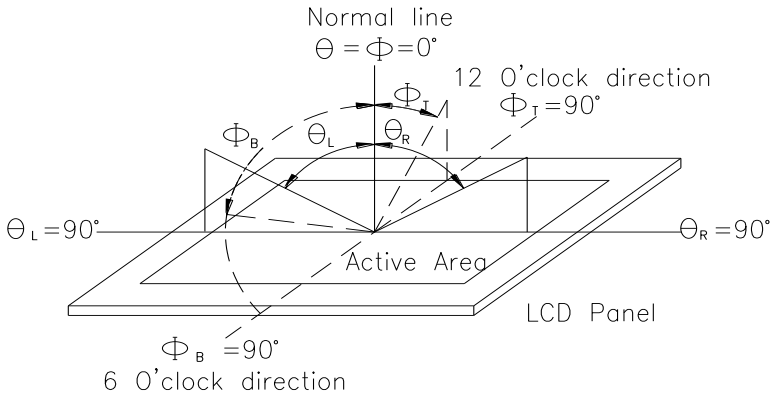


Fig. 7.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7 or BM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

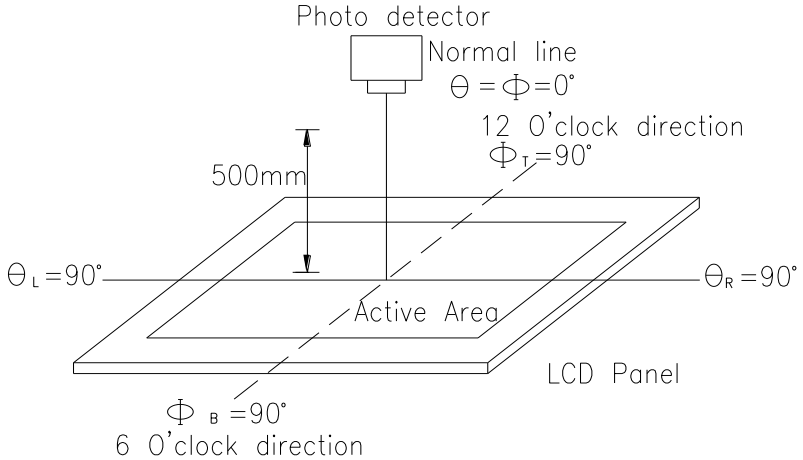
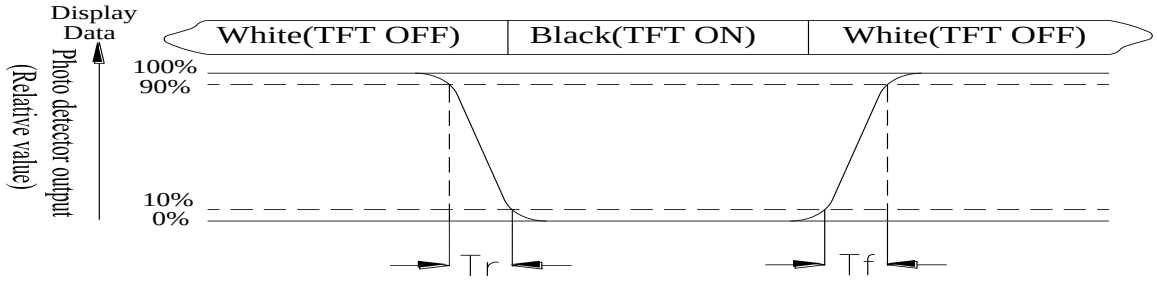


Fig. 7.2. Optical measurement system setup

Note 3: Definition of Response time:

The response time is defined as the LCD optical switching time interval between “White” state and

“Black” state. Rise time, Tr, is the time between photo detector output intensity changed from 90%to 10%. And fall time, Tf, is the time between photo detector output intensity changed from 10%to 90%



Note 4: Definition of contrast ratio:
The contrast ratio is defined as the following expression.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: White Vi = V_{i50} ± 1.5V
Black Vi = V_{i50} ± 2.0V
“±” means that the analog input signal swings in phase with VCOM signal.
“±” means that the analog input signal swings out of phase with VCOM signal.
The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 6: Definition of color chromaticity (CIE 1931)
Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

8.Interface

Interface Connector
Table Signal Connector Type

Item	Description
Manufacturer / Type	Starconn / 300E40-0010RA-G3
Mating Receptacle / Type (Reference)	TBD or Compatible

8.1. TFT LCD MODULE

Pin #	Signal Name	Description	Remarks
1	NC	No Connection	-
2	VDD	Power Supply	-
3	VDD	Power Supply	-
4	VDD_EDID	VDD_EDID	-
5	SCL_EDID	SCL_EDID	-
6	SDA_EDID	SDA_EDID	-
7	NC	No Connection	-
8	LV0N	-LVDS Differential Data Input	-
9	LV0P	+LVDS Differential Data Input	
10	GND	Ground	-
11	LV1N	-LVDS Differential Data Input	-
12	LV1P	+LVDS Differential Data Input	
13	GND	Ground	-
14	LV2N	-LVDS Differential Data Input	-
15	LV2P	+LVDS Differential Data Input	
16	GND	Ground	-
17	LVCLKN	-LVDS Differential Clock Input	-
18	LVCLKN	+LVDS Differential Clock Input	
19	GND	Ground	-
20	LV3N	-LVDS Differential Data Input	-
21	LV3P	+LVDS Differential Data Input	
22	GND	Ground	-
23	LED_GND	Ground for LED Driving	-
24	LED_GND	Ground for LED Driving	-
25	LED_GND	Ground for LED Driving	-
26	NC	No Connection	-
27	LED_PWM	PWM Input Signal for LED Driver	-
28	LED_EN	LED Enable Pin	-
29	NC	Reserved For CABC	
30	NC	No Connection	-
31	LED_VCC	Power Supply for LED Driver	-

32	LED_VCC	Power Supply for LED Driver	-
33	LED_VCC	Power Supply for LED Driver	-
34	NC	No Connection	-
35	BIST	BIST pin	-
36	NC	No Connection	-
37	NC	No Connection	-
38	NC	No Connection	-
39	NC	No Connection	-
40	NC	No Connection	-

Note: All input signals shall be low or Hi- resistance state when VDD is off.

8.2. LVDS Receiver

Signal Electrical Characteristics For LVDS Receiver

Table LVDS Receiver Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High	Vth	-	-	+100	mV	VCM=+1.2V
Differential Input Low	Vtl	-100	-	-	mV	VCM=+1.2V
Magnitude Differential Input	|VID|	200	-	400	mV	-
Common Mode Voltage	VCM	0.3+(VID/2)	-	VDD-1.2-(VID/2)	V	-
Common Mode Voltage	ΔVCM	-	-	50	mV	VCM=+1.2V

Note (1) Input signals shall be low or Hi-Z state when VDD is off.
(2) All electrical characteristics for LVDS signal are defined and shall be measured at the interface connector of LCD.

Figure Voltage Definitions

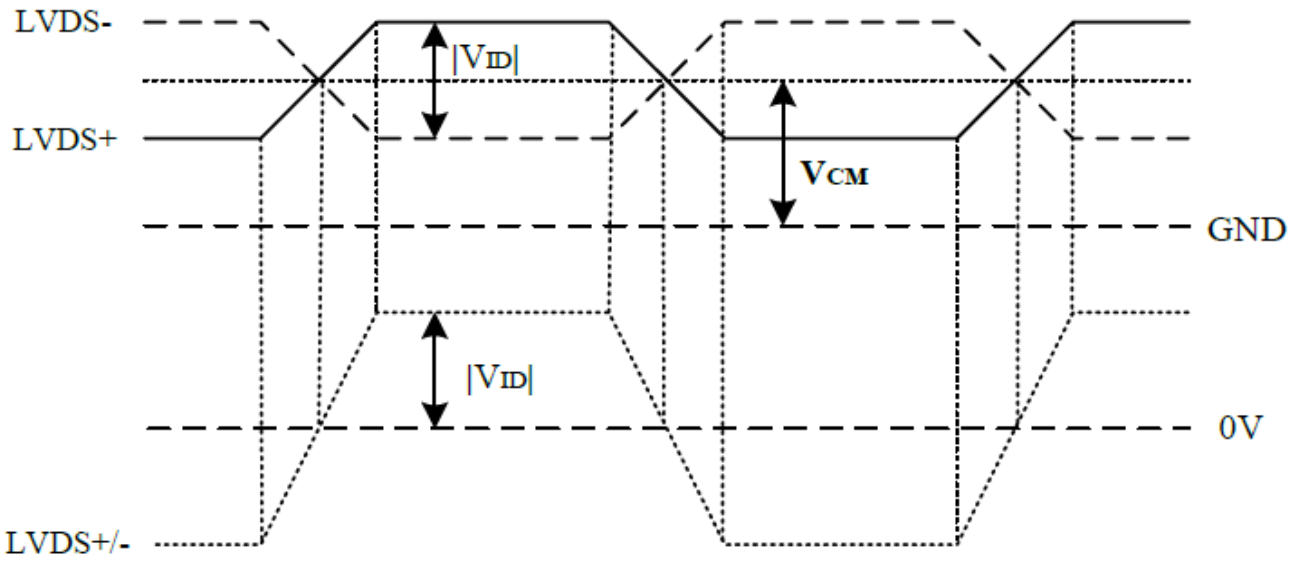
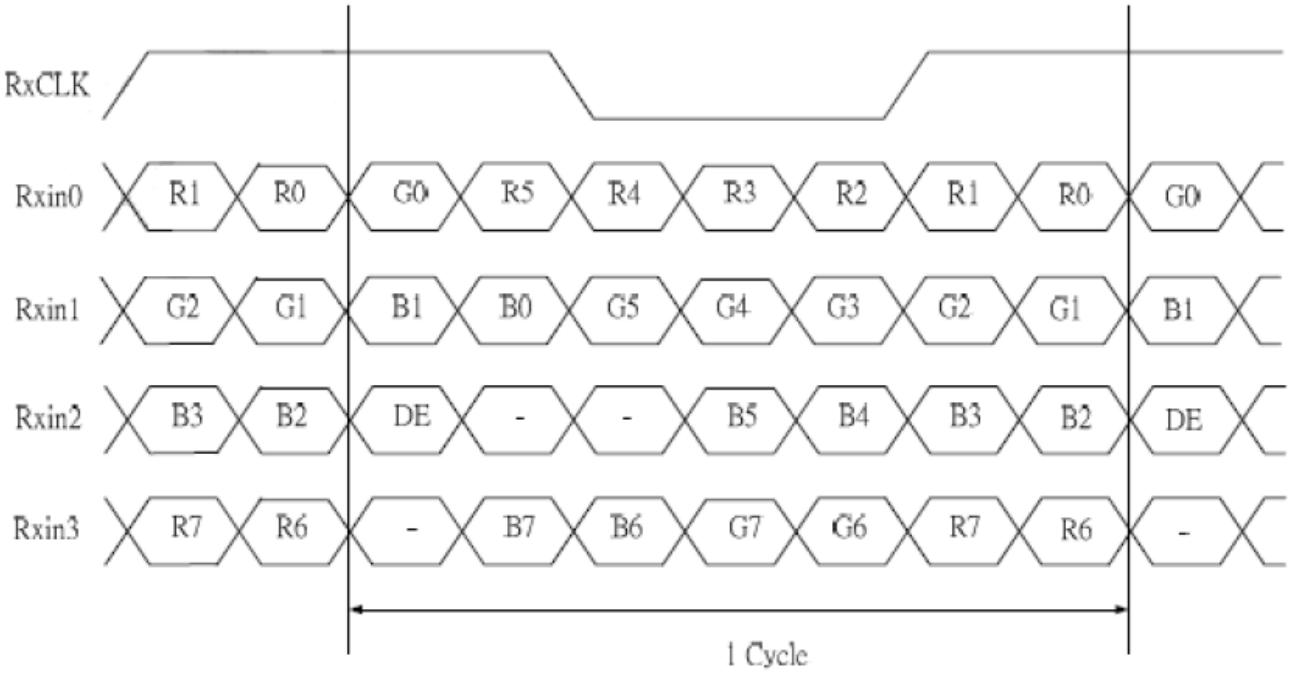
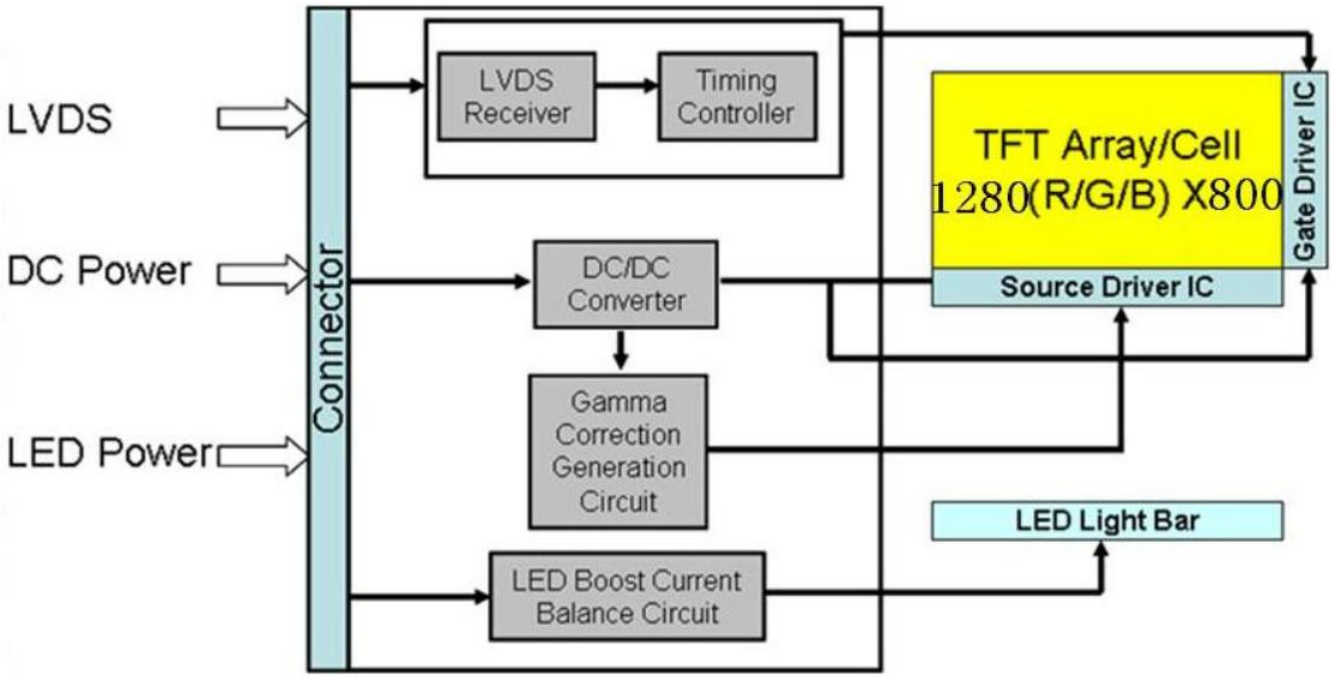


Figure LVDS Data Mapping

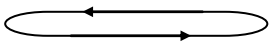

RxCLK
Rxin0
R1
R0
G0
R5
R4
R3
R2
R1
R0
G0
Rxin1
G2
G1
B1
B0
G5
G4
G3
G2
G1
B1
Rxin2
B3
B2
DE
-
-
B5
B4
B3
B2
DE
Rxin3
R7
R6
-
B7
B6
G7
G6
R7
R6
-
1 Cycle

9.Block Diagram



10.Reliability

Content of Reliability Test (Wide temperature, -20℃~70℃)

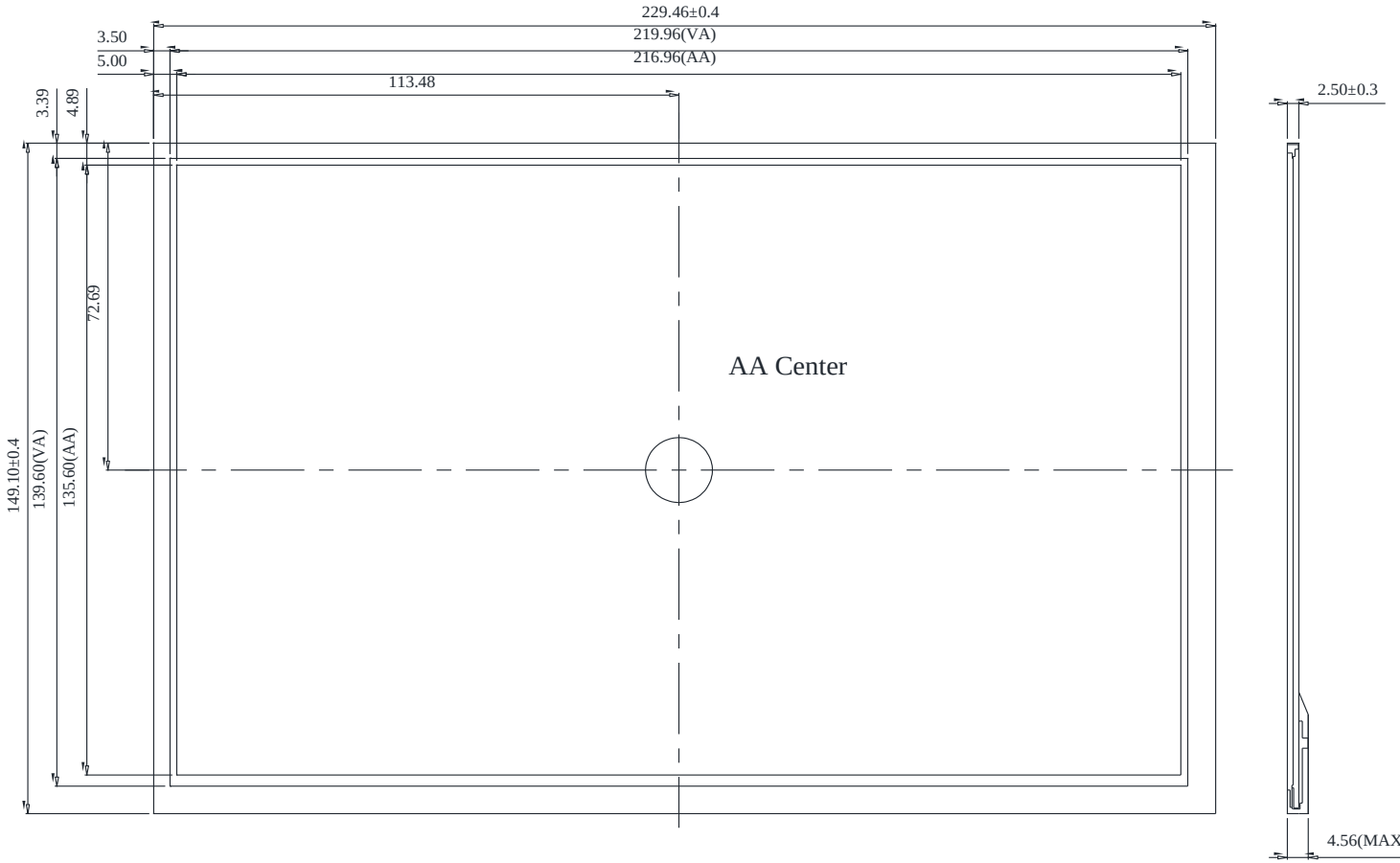
Environmental Test			
Test Item	**Content of Test**	**Test Condition**	**Note**
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80℃ 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30℃ 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70℃ 200hrs	——
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20℃ 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60℃,90%RH max	60℃,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation -20℃ 25℃ 70℃  30min 5min 30min 1 cycle	-20℃/70℃ 10 cycles	——
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 15mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=±600V(contact), ±800v(air), RS=330Ω CS=150pF 10 times	——

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

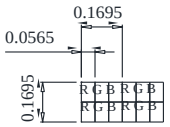
Note3: The packing have to including into the vibration testing.

11.Contour Drawing

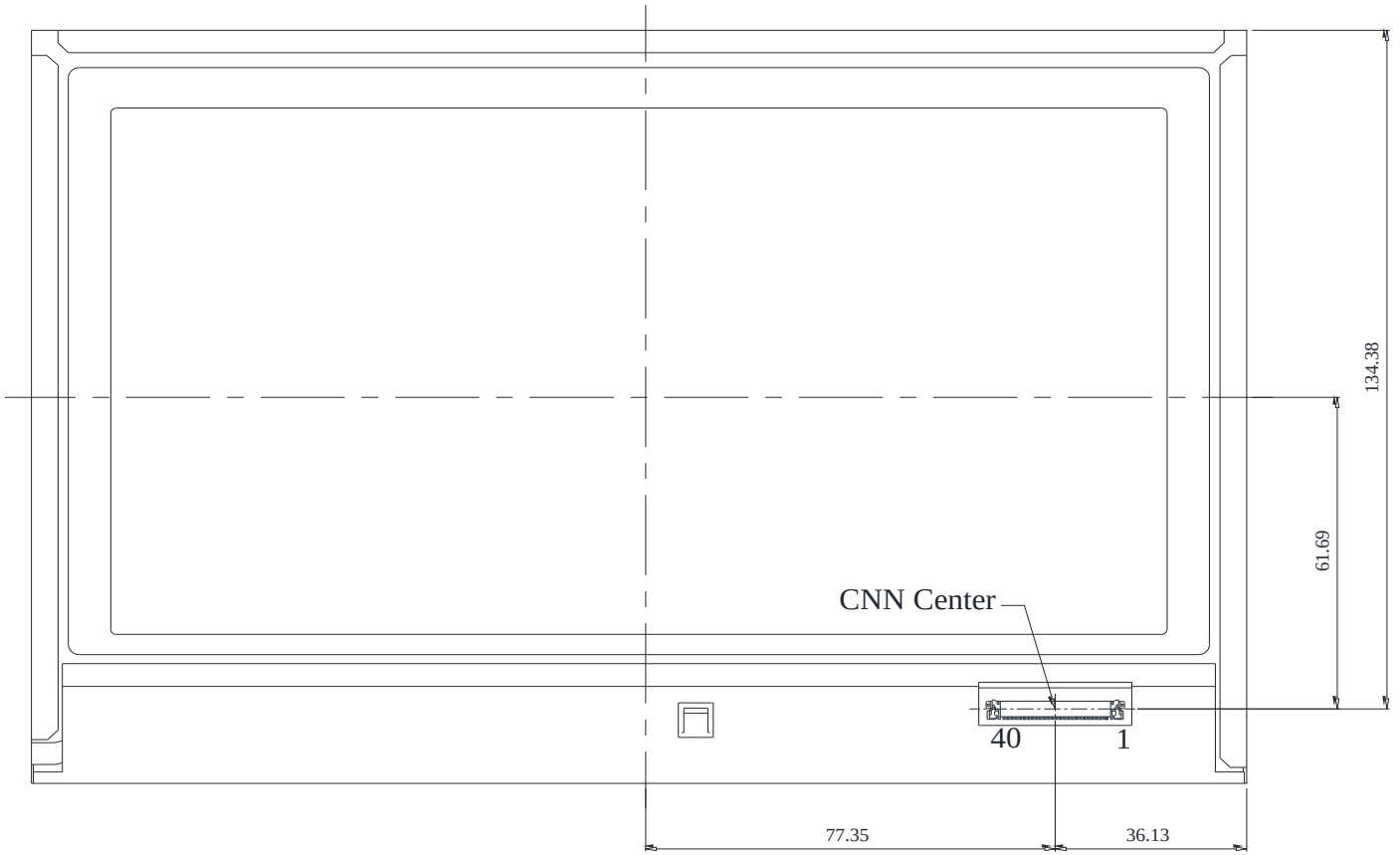


PIN NO.	SYMBOL	PIN NO.	SYMBOL
1	NC	21	LV3P
2	VDD	22	GND
3	VDD	23	LED_GND
4	VDD_EDID	24	LED_GND
5	SCL_EDID	25	LED_GND
6	SDA_EDID	26	NC
7	NC	27	LED_PWM
8	LV0N	28	LED_EN
9	LV0P	29	NC
10	GND	30	NC
11	LV1N	31	LED_VCC
12	LV1P	32	LED_VCC
13	GND	33	LED_VCC
14	LV2N	34	NC
15	LV2P	35	BIST
16	GND	36	NC
17	LVCLKN	37	NC
18	LVCLKN	38	NC
19	GND	39	NC
20	LV3N	40	NC

The non-specified tolerance of dimension is ±0.3mm.



SCALE 50/1



The non-specified tolerance of dimension is ±0.3mm.

winstar

LCM Sample Estimate Feedback Sheet

Module Number： _____

1、Panel Specification：

1. Panel Type： □ Pass □ NG ,_____
2. View Direction： □ Pass □ NG ,_____
3. Numbers of Dots： □ Pass □ NG ,_____
4. View Area： □ Pass □ NG ,_____
5. Active Area： □ Pass □ NG ,_____
6. Operating Temperature： □ Pass □ NG ,_____
7. Storage Temperature： □ Pass □ NG ,_____
8. Others：_____

2、Mechanical Specification：

1. PCB Size： □ Pass □ NG ,_____
2. Frame Size： □ Pass □ NG ,_____
3. Material of Frame： □ Pass □ NG ,_____
4. Connector Position： □ Pass □ NG ,_____
5. Fix Hole Position： □ Pass □ NG ,_____
6. Backlight Position： □ Pass □ NG ,_____
7. Thickness of PCB： □ Pass □ NG ,_____
8. Height of Frame to PCB： □ Pass □ NG ,_____
9. Height of Module： □ Pass □ NG ,_____
10. Others： □ Pass □ NG ,_____

3、Relative Hole Size：

1. Pitch of Connector： □ Pass □ NG ,_____
2. Hole size of Connector： □ Pass □ NG ,_____
3. Mounting Hole size： □ Pass □ NG ,_____
4. Mounting Hole Type： □ Pass □ NG ,_____
5. Others： □ Pass □ NG ,_____

4、Backlight Specification：

1. B/L Type： □ Pass □ NG ,_____
2. B/L Color： □ Pass □ NG ,_____
3. B/L Driving Voltage (Reference for LED Type)： □ Pass □ NG ,_____
4. B/L Driving Current： □ Pass □ NG ,_____
5. Brightness of B/L： □ Pass □ NG ,_____
6. B/L Solder Method： □ Pass □ NG ,_____
7. Others： □ Pass □ NG ,_____

>> **Go to page 2** <<

5、Electronic Characteristics of Module：

1. Input Voltage： □ Pass □ NG ,_____
2. Supply Current： □ Pass □ NG ,_____
3. Driving Voltage for LCD： □ Pass □ NG ,_____
4. Contrast for LCD： □ Pass □ NG ,_____
5. B/L Driving Method： □ Pass □ NG ,_____
6. Negative Voltage Output： □ Pass □ NG ,_____
7. Interface Function： □ Pass □ NG ,_____
8. LCD Uniformity： □ Pass □ NG ,_____
9. ESD test： □ Pass □ NG ,_____
10. Others： □ Pass □ NG ,_____

6、Summary：

Sales signature：_____

Customer Signature：_____ **Date**：____/____/____