晶采光電科技股份有限公司
AMPIRE CO., LTD.

SPECIFICATIONS FOR LCD MODULE

CUSTOMER	
CUSTOMER PART NO.	
AMPIRE PART NO.	AM-1280800N3TZQW-00H
APPROVED BY	
DATE	

☐Approved For Specifications
☐**Approved For Specifications & Sample**

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APPROVED BY	CHECKED BY	ORGANIZED BY

RECORD OF REVISION

Revision Date	Page	Contents	Editor
2014/10/03	--	New Release	Simon

1.0 General Descriptions

1.1 Introduction

The LCM is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, a backlight system, column driver and row driver circuit. This TFT LCD has a 10.1-inch diagonally measured active display area with WXGA resolution (1280 horizontal by 800 vertical pixels array).

1.2 Features

- 10.1" TFT LCD Panel
- LED Backlight System
- Supported WXGA 1280x800 pixels resolution
- Compatible with RoHS Standard

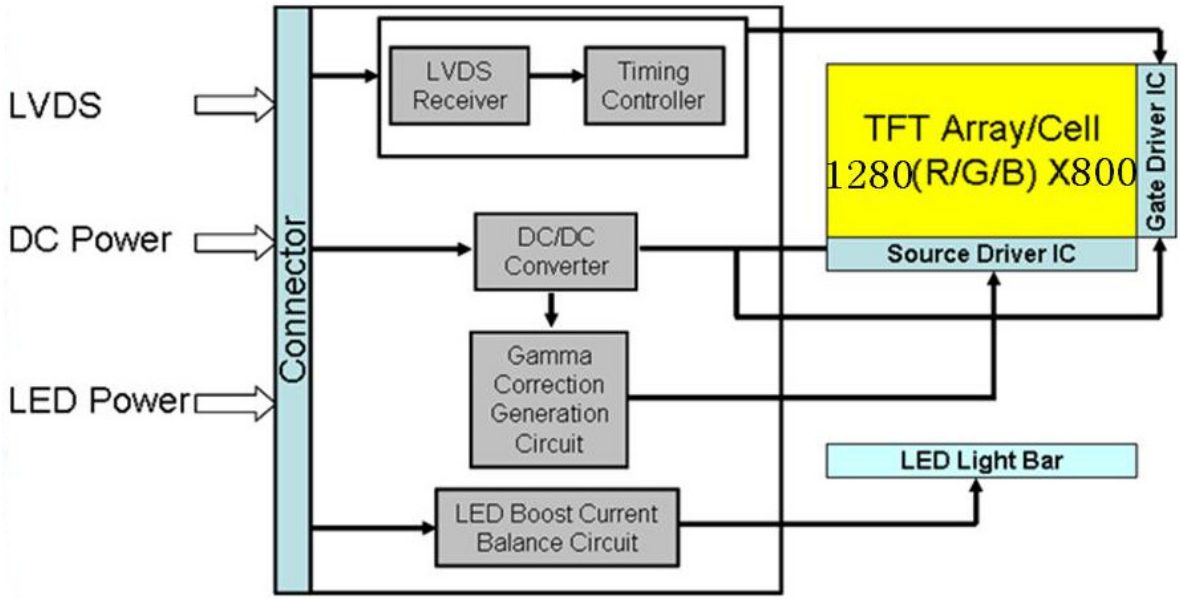
1.3 Product Summary

Items		Specifications	Unit
Screen Diagonal		10.1	Inch
Active Area		216.96(H) x 135.6(V)	mm
Pixel Format		1280(RGB) x800	-
Pixel Pitch		0.1695(H)×0.1695 (V)	mm
Pixel Arrangement		R.G.B. Vertical Stripe	-
Display Mode		Normally Black	-
White Luminance		350(Typ)	cd /m2
Contrast Ratio		800 : 1 (Typ)	-
Response Time		25	msec
Input Voltage		3.3	V
Weight		190 (Max)	g
Outline Dimensions	W/O PCB	229.46(H) x 149.1(V) x3.9(D) (Max)	mm
	W/ PCB	229.46(H) x 149.1(V) x5.7(D) (Max)	mm
Electrical Interface (Logic)		LVDS	-
Support Color		16.7M	-
Surface Treatment		Glare, Hard-Coating (3H)	-

1.4 Functional Block Diagram

Shows the functional block diagram of the LCD module.

Figure 1 Block Diagram



2.0 Absolute Maximum Ratings

Table 1 Electrical Absolute Ratings

Item	Symbol	Min	Max	Unit	Conditons
Logic Supply Voltage	V_{DD}	-0.3	7	V	TA=25℃
Supply VLED Voltage	VLED	-0.3	24	V	TA=25℃

Table 2 Reliability Absolute Ratings

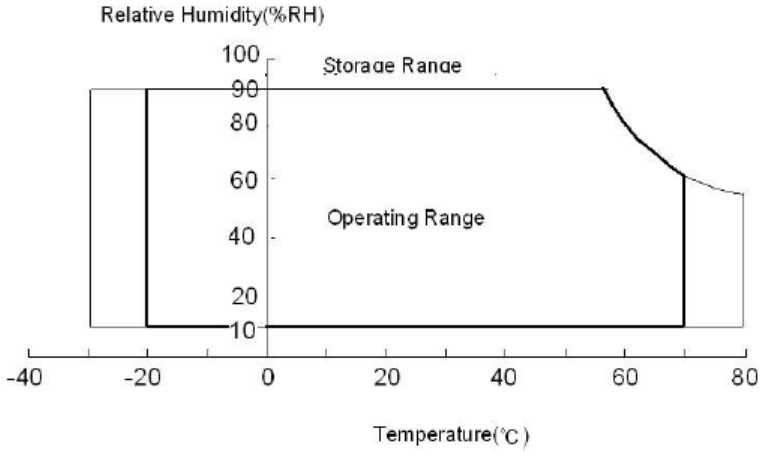
Item	Symbol	Min	Max	Unit	Conditons
Operating Temperature	TOP	-20	70	℃	Note
Operating Humidity	HOP	--	90	%RH	Note
Operating Temperature	TST	-30	80	℃	Note
Storage Humidity	HST	--	90	%RH	Note

Note: (1) Maximum Wet-Bulb temperature should be 39 degree C and no condensation.

(2) When you apply the LCD module for OA system. Please make sure to keep the temperature of

LCD module is less than 70℃

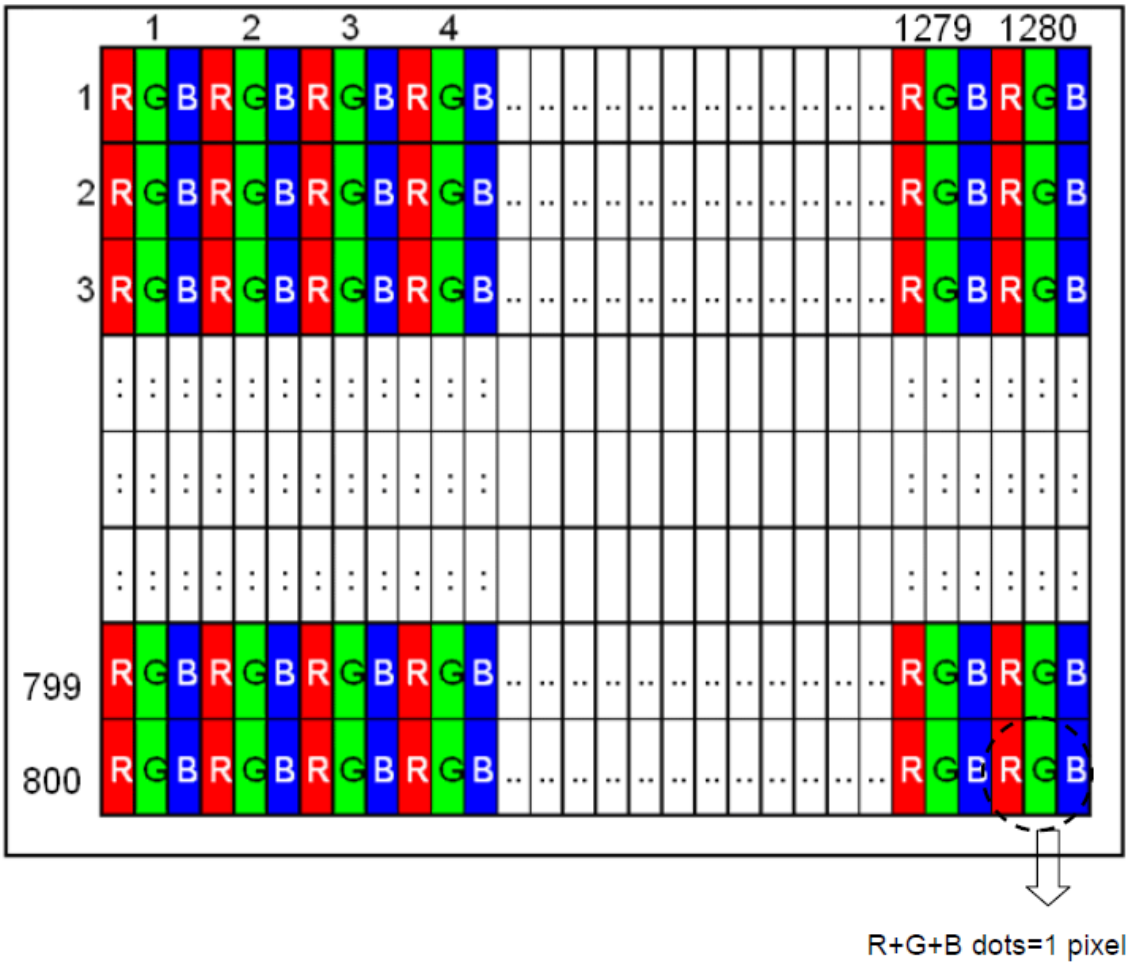
(3) Storage /Operating temperature



3.0 Pixel Format Image

Figure 2 shows the relationship of the input signals and LCD pixel format image.

Figure 2 Pixel Format



4.0 Optical Characteristics

The optical characteristics are measured under stable conditions as following notes

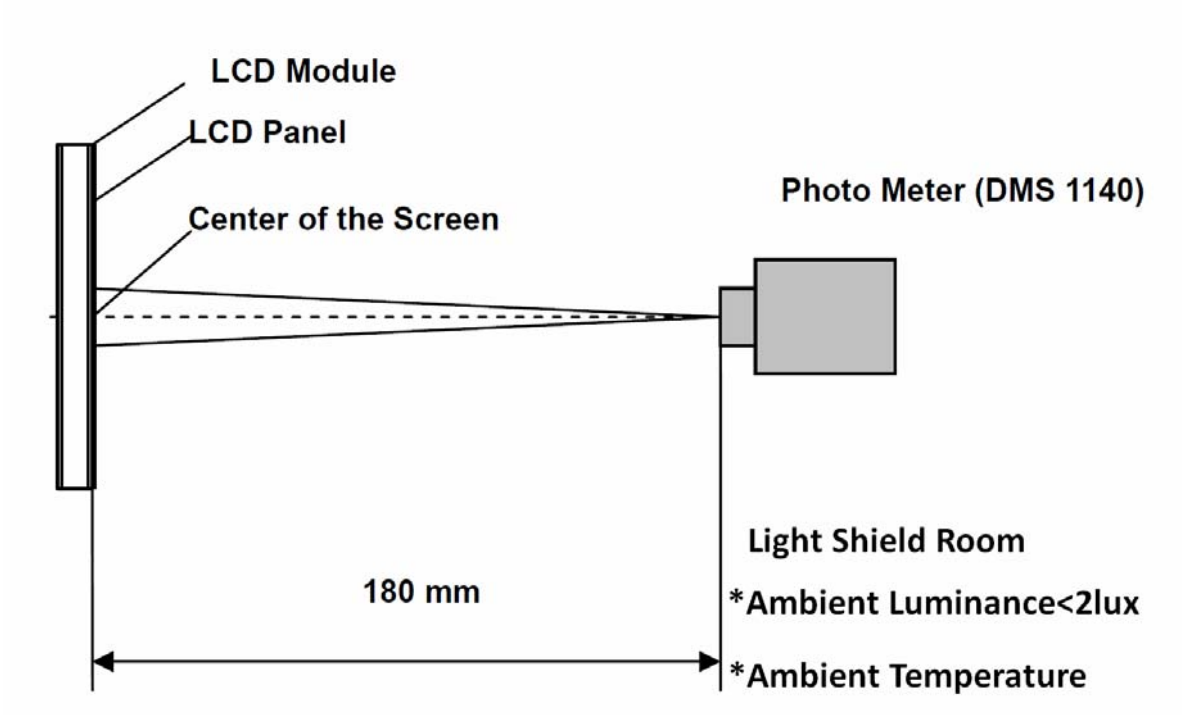
Table 2 Optical Characteristics

Item	Conditions		Min.	Typ.	Max.	Unit	Note
Viewing Angle （CR>10）	Horizontal	θ L	(75)	(85)	-	degree	(1),(2),(3)
		θ R	(75)	(85)	-		
	Vertical	θT	(75)	(85)	-		
		θ B	(75)	(85)	-		
Contrast Ratio	Center		(600)	(800)	-	-	(1),(2),(4)
Response Time	Rising		-	-	-	ms	(1),(2),(5)
	Falling		-	-	-	ms	
	Rising + Falling		-	25	-	ms	
Color Chromaticity (CIE1931)	NTSC		-	45	-	%	(1),(2)
	Red	x	Typ. -0.03	0.561	Typ. +0.03	-	(1),(2)
	Red	y		0.334		-	
	Green	x		0.341		-	
	Green	y		0.568		-	
	Blue	x		0.161		-	
	Blue	y		0.129		-	
	White	x	-	0.313	-	-	
	White	y	-	0.329	-	-	
White Luminance	Center		300	350	-	cd/m^2	(1),(2),(6)
Luminance Uniformity	9Points		70	75	-	%	(1),(2),(6)

Note (1) Measurement Setup:

The LCD module should be stabilized at given temperature(25 ℃) for 15 minutes to Avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 15 minutes in a windless room.

Figure 3 Measurement Setup



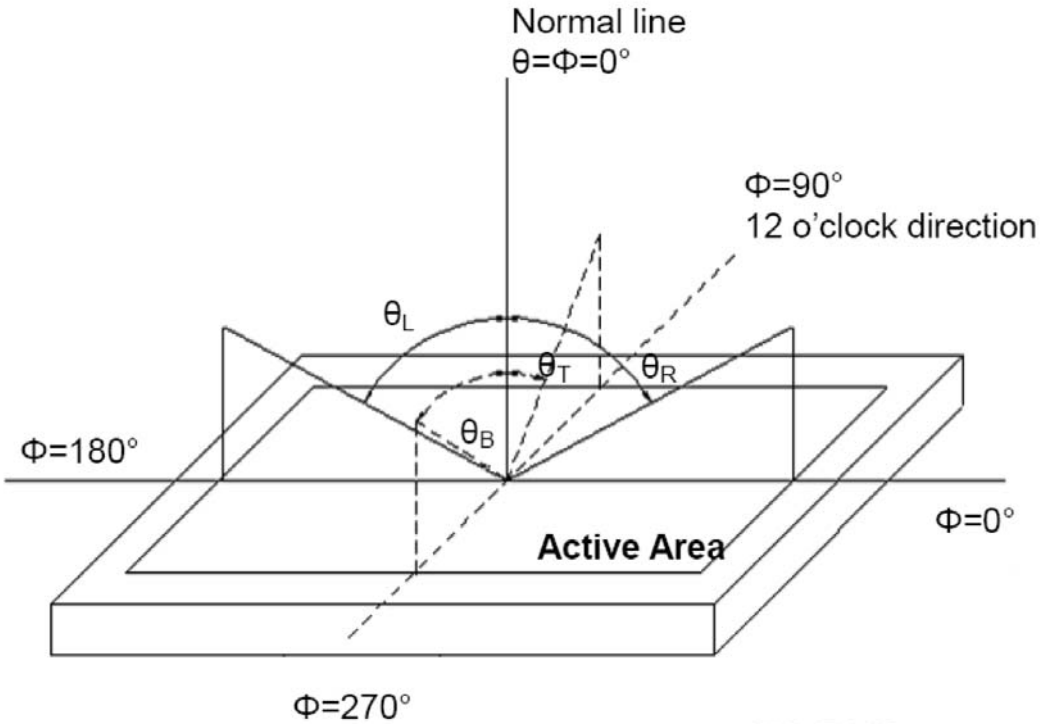
Note (2) The LED input parameter setting as:

VLED: 12V;

PWM_LED: Duty 100 %

Note (3) Definition of Viewing Angle

Figure 4 Definition of Viewing Angle



Note (4) Definition Of Contrast Ratio (CR)

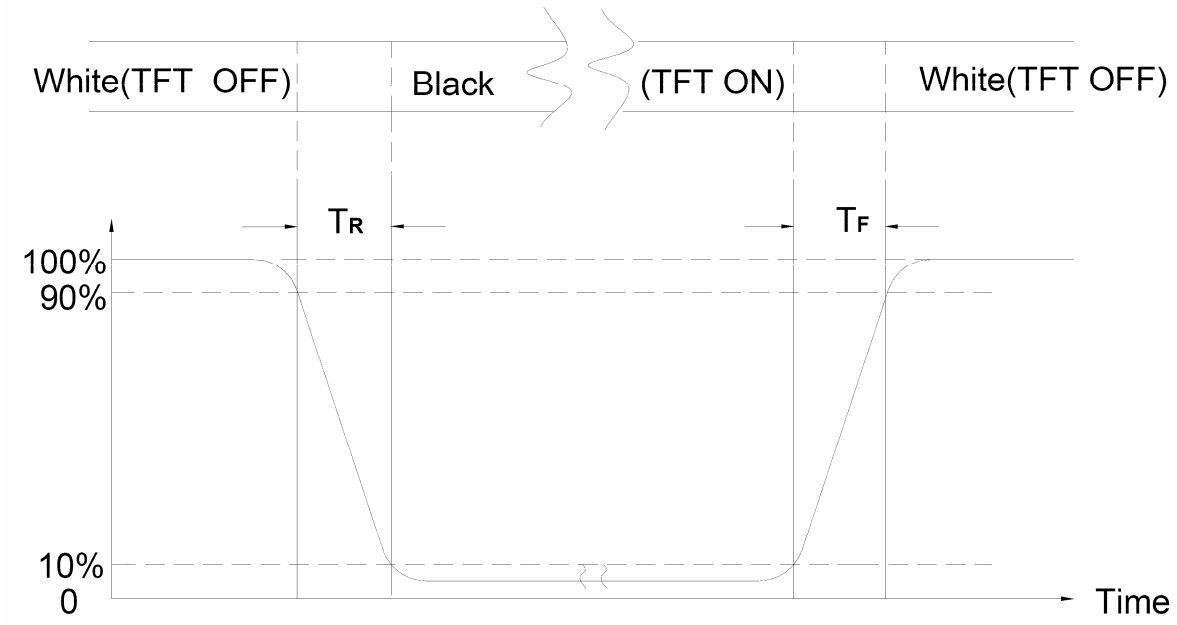
The contrast ratio can be calculated by the following expression

Contrast Ratio (CR) = L255 / L0

L255: Luminance of gray level 255, L0: Luminance of gray level 0

Note (5) Definition Of Response Time (TR, TF)

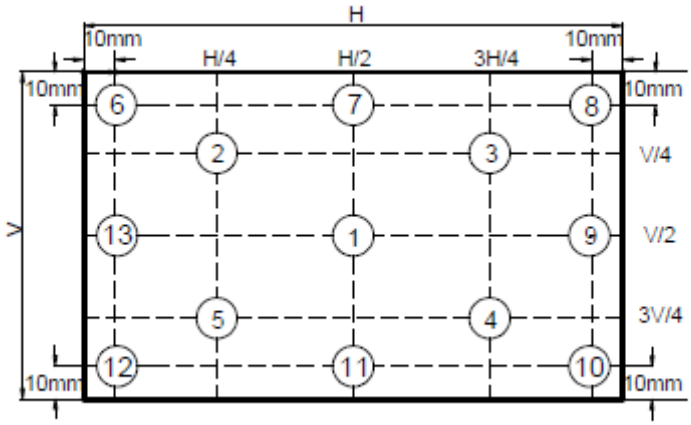
Figure 5 Definition of Response Time



Note (6) Definition Of Brightness Luminance

$$\text{Luminance uniformity} = \frac{\text{Min}(L1,L6,L7,L8,L9,L10,L12,L14)}{\text{Max}(L1,L6,L7,L8,L9,L10,L12,L14)} \times 100\%$$

Figure 6 Measurement Locations



5.0 Backlight Characteristics

5.1 Parameter Guideline Of LED Backlight

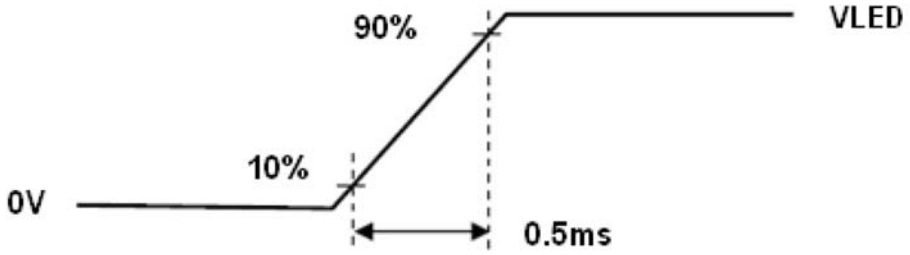
Table 3 Parameter Guideline for LED Backlight

Symbol	Parameter		Min.	Typ.	Max.	Units	Condition
VLED	LED Input		(6)	(12)	(21)	[V]	Ta=25℃ Note B
PLED	LED Power Consumption		-	-	(2.5)	W	Ta=25℃ Note B
VLED_PWM	PWM Signal Voltage	High	3.0	--	3.6	V	Ta=25℃
		Low	0	--	0.4	V	
F_{PWM}	PWM dimming Frequency		1000	-	2000	Hz	Ddim≥1%
			2000	-	20000	Hz	Ddim≥5%
VLED_EN	LED Enable Voltage	High	3.0	--	3.6	V	-
		Low	0	--	0.4	V	
LT	LED Life Time		15,000	-	-	Hours	Ta=25℃ Note A

Note A: The LED life time define as the estimated time to
50% degradation of initial luminous.

Note B: A higher LED power supply voltage will result in better power efficiency.
Keep the VLED between 12V and 12.6V is strongly recommended.

Figure 7 LED Rush Current Measure Condition



VLED rising time

6.0 Electrical Characteristics

6.1 TFT LCD Module Interface Connector

Table 4 Connector Name / Designation

Item	Description
Manufacturer / Part Number	Starconn / 300E40-0010RA-G3
Mating Model Number	TBD or compatible

Table 5 Signal Pin Assignment

Pin #	Singnal Name	Description	Remarks
1	NC	Not Connect	-
2	VDD	Power Supply, 3.3V (typical)	-
3	VDD	Power Supply, 3.3V (typical)	
4	VDD_EDID	Power Supply for EDID I2C Flash IC	
5	SCL_EDID	I2C Serial Clock for EDID I2C Flash IC	
6	SDA_EDID	I2C Serial Data for EDID I2C Flash IC	
7	NC	Not Connect	
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 data input	
18	LVCLKP	+LVDS differential data 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	Not Connect	
27	LED_PWM	PWM Input signal for LED driver	
28	LED_EN	LED Enable Pin	
29	CABC_EN	Content Adaptive Brightness Control Function Enable	Enable: Hi Disable:Lo
30	NC	Not Connect	
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	Not Connect	
35	BIST	BIST pin	
36-40	NC	Not Connect	

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

6.2 LVDS Receiver

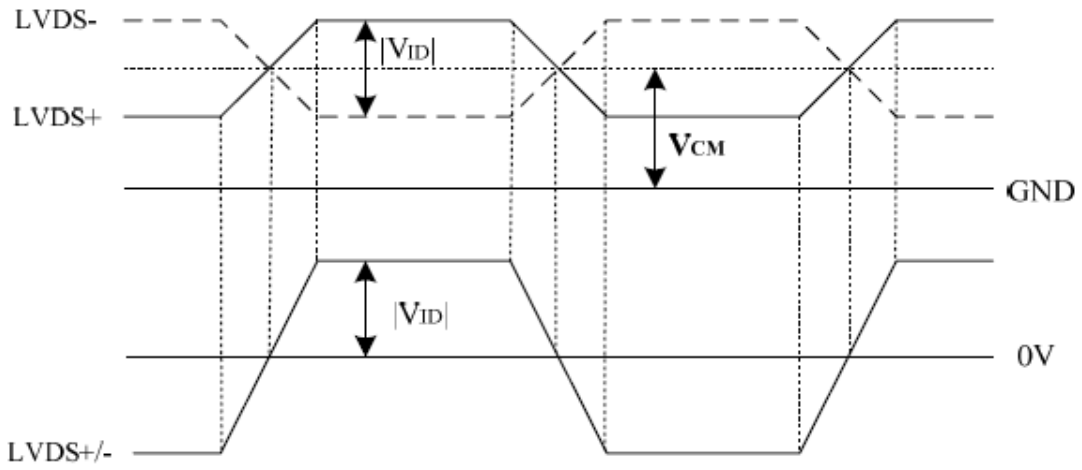
6.2.1 Signal Electrical Characteristics For LVDS Receiver

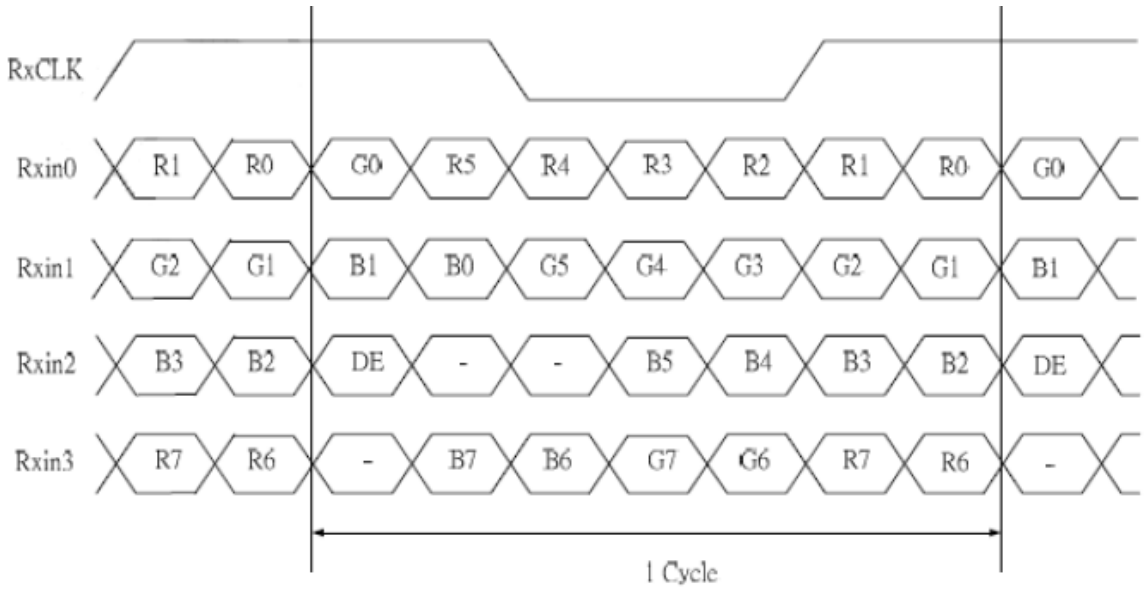
Table 7 LVDS Receiver Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High	Vth	-	-	+100	mV	V_{CM}=+1.2V
Differential Input Low	Vtl	-100	-	-	mV	V_{CM}=+1.2V
Magnitude Differential Input	$\|V_{ID}\|$	200	-	400	mV	-
Common Mode Voltage	V_{CM}	0.3+(VID/2)	-	VDD-1.2-(VID/2)	V	-
Common Mode Voltage	ΔV_{CM}	-	-	50	mV	V_{CM}=+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.





7.0 Interface Timings

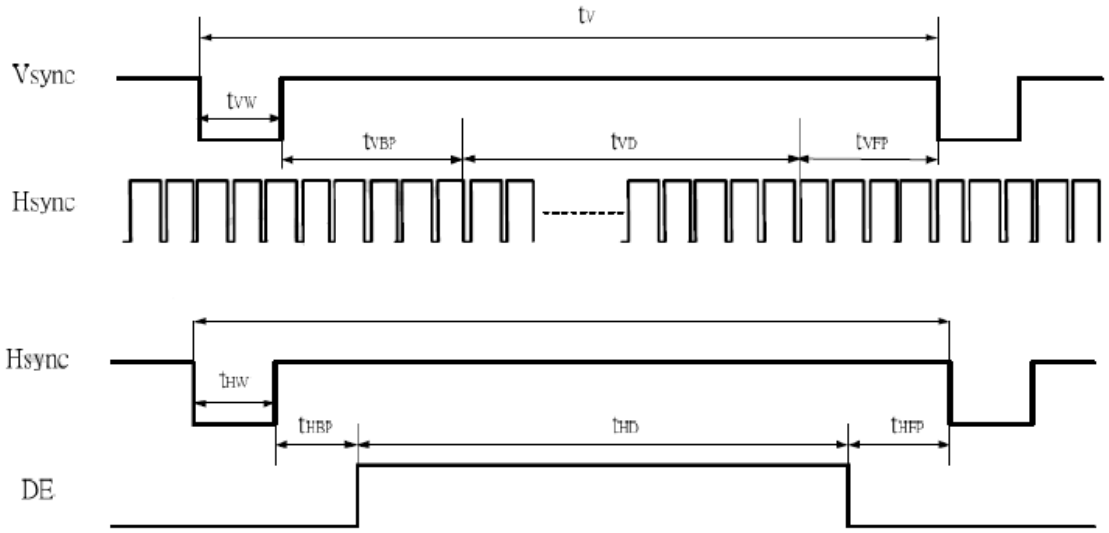
7.1 Timing Characteristics

Interface Timings

Parameter	Symbol	Unit	Min.	Typ.	Max.
Frame Rate	--	Hz	-	60	-
Frame Period	t_V	line	(815)	(823)	(1023)
Vertical Display Time	t_{VD}	line		800	
Vertical Blanking Time	$t_{VW}+t_{VBP}+t_{VFP}$	line	(15)	(23)	(33)
1 Line Scanning Time	t_H	clock	(1410)	(1440)	(1470)
Horizontal Display Time	t_{HD}	clock		1280	
Horizontal Blanking Time	$t_{HW}+t_{HBP}+t_{HFP}$	clock	(60)	(160)	(190)
Clock Rate	$1/T_C$	MHz	(68.9)	(71.1)	(73.4)

7.2 Timing Diagram of Interface Signal (DE mode)

Figure 8 Timing Characteristics



8.0 Power Consumption

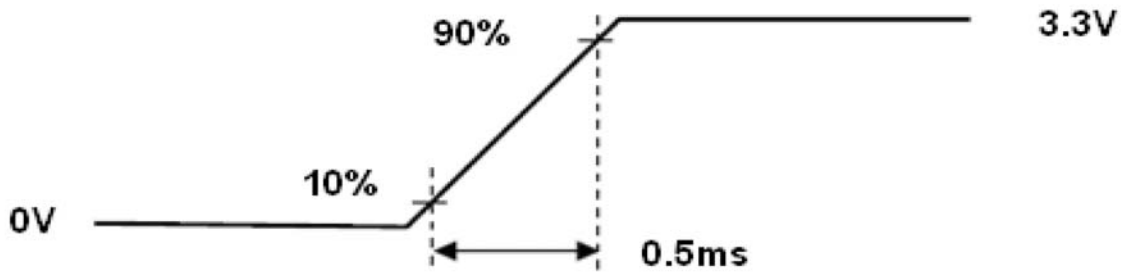
Input power specifications are as follows.

Table 8 Power Consumption

Item		Symbol	Min	Typ	Max	Unit	Note
LCD Drive Voltage		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	(3),(4)
LED Power Consumption		PLED			2.5	W	(3),(4)
Rush Current		Irush			1.5	A	(1),(4),(5)
Allowable Logic/LCD Drive Ripple Voltage		VDDrp			300	mV	(4)

Note 1.Measure Condition

Figure 9 VDD rising time

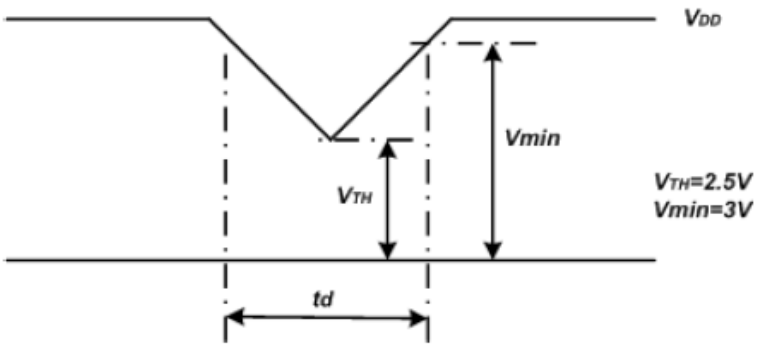


VDD rising time

Note 2.VDD Power Dip Condition

If VTH<VDDRVmin , then tdR10ms; when the voltage return to normal our panel must revive automatically.

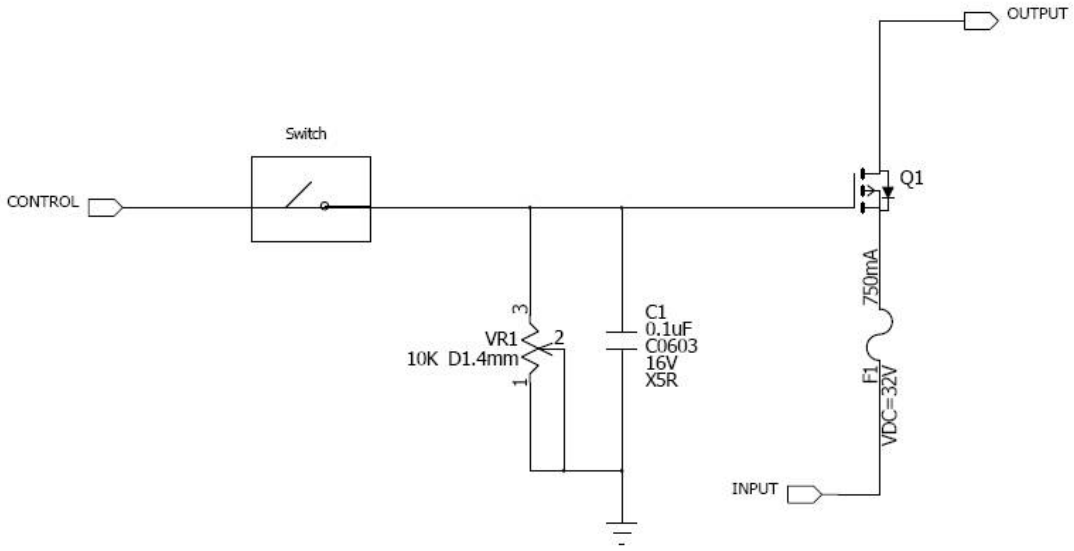
Figure 12 VDD Power Dip



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.



9.0 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 11 Power Sequence

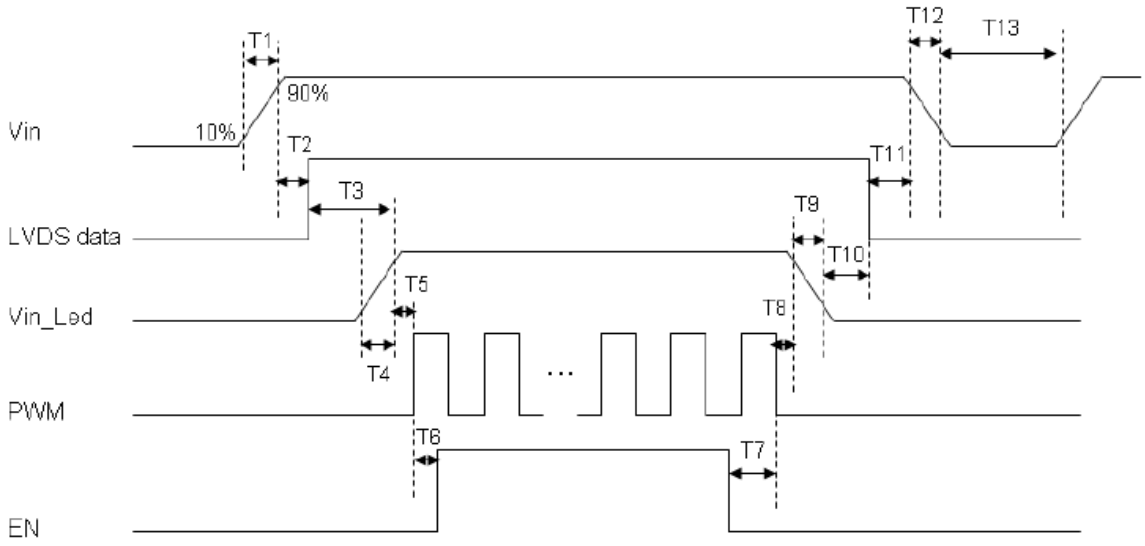


Table 9 Power Sequencing Requirements

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	--	10	30
Backlight Off to Signal Disable	T10	ms	200	--	--
Signal Disable to Power Down	T11	ms	0	--	50
VIN Fall Time	T12	ms	--	10	30
Power Off	T13	ms	500	--	--

10 USE PRECAUTIONS

10.1 Handling precautions

1) The polarizing plate may break easily so be careful when handling it. Do not touch, press or rub it with a hard-material tool like tweezers.
2) Do not touch the polarizing plate surface with bare hands so as not to make it dirty. If the surface or other related part of the polarizing plate is dirty, soak a soft cotton cloth or chamois leather in benzine and wipe off with it. Do not use chemical liquids such as acetone, toluene and isopropyl alcohol. Failure to do so may bring chemical reaction phenomena and deteriorations.
3) Remove any spit or water immediately. If it is left for hours, the suffered part may deform or decolorize.
4) If the LCD element breaks and any LC stuff leaks, do not suck or lick it. Also if LC stuff is stuck on your skin or clothing, wash thoroughly with soap and water immediately.

10.2 Installing precautions

1) The PCB has many ICs that may be damaged easily by static electricity. To prevent breaking by static electricity from the human body and clothing, earth the human body properly using the high resistance and discharge static electricity during the operation. In this case, however, the resistance value should be approx. 1MΩ and the resistance should be placed near the human body rather than the ground surface. When the indoor space is dry, static electricity may occur easily so be careful. We recommend the indoor space should be kept with humidity of 60% or more. When a soldering iron or other similar tool is used for assembly, be sure to earth it.
2) When installing the module and ICs, do not bend or twist them. Failure to do so may crack LC element and cause circuit failure.
3) To protect LC element, especially polarizing plate, use a transparent protective plate (e.g., acrylic plate, glass etc) for the product case.
4) Do not use an adhesive like a both-side adhesive tape to make LCD surface (polarizing plate) and product case stick together. Failure to do so may cause the polarizing plate to peel off.

10.3 Storage precautions

1) Avoid a high temperature and humidity area. Keep the temperature between 0°C and 35°C and also the humidity under 60%.
2) Choose the dark spaces where the product is not exposed to direct sunlight or fluorescent light.
3) Store the products as they are put in the boxes provided from us or in the same conditions as we recommend.

10.4 Operating precautions

1) Do not boost the applied drive voltage abnormally. Failure to do so may break ICs. When applying power voltage, check the electrical features beforehand and be careful. Always turn off the power to the LC module controller before removing or inserting the LC module input connector. If the input connector is removed or inserted while the power is turned on, the LC module internal circuit may break.
2) The display response may be late if the operating temperature is under the normal standard, and the display may be out of order if it is above the normal standard. But this is not a failure; this will be restored if it is within the normal standard.
3) The LCD contrast varies depending on the visual angle, ambient temperature, power voltage etc. Obtain the optimum contrast by adjusting the LC dive voltage.
4) When carrying out the test, do not take the module out of the low-temperature space suddenly. Failure to do so will cause the module condensing, leading to malfunctions.
5) Make certain that each signal noise level is within the standard (L level: 0.2Vdd or less and H level: 0.8Vdd or more) even if the module has functioned properly. If it is beyond the standard, the module may often malfunction. In addition, always connect the module when making noise level measurements.
6) The CMOS ICs are incorporated in the module and the pull-up and pull-down function is not adopted for the input so avoid putting the input signal open while the power is ON.

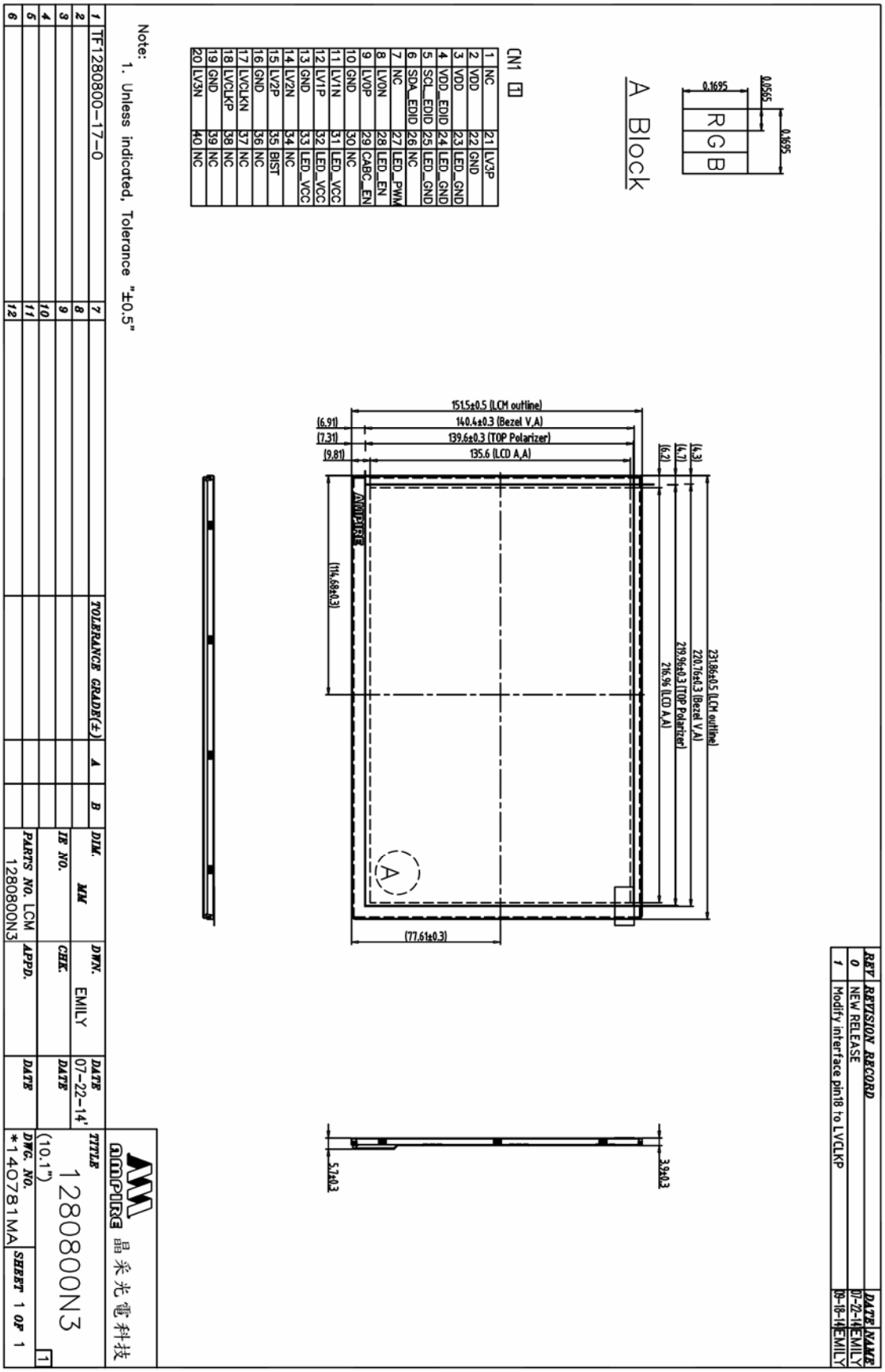
7) The characteristic of the semiconductor element changes when it is exposed to light emissions, therefore ICs on the LCD may malfunction if they receive light emissions. To prevent these malfunctions, design and assemble ICs so that they are shielded from light emissions.

8) Crosstalk occurs because of characteristics of the LCD. In general, crosstalk occurs when the regularized display is maintained. Also, crosstalk is affected by the LC drive voltage. Design the contents of the display, considering crosstalk.

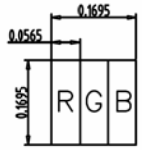
10. Other

1) Do not disassemble or take the LC module into pieces. The LC modules once disassembled or taken into pieces are not the guarantee articles.
2) The residual image may exist if the same display pattern is shown for hours. This residual image, however, disappears when another display pattern is shown or the drive is interrupted and left for a while. But this is not a problem on reliability.
3) AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products.

11. MECHANIC DRAWING



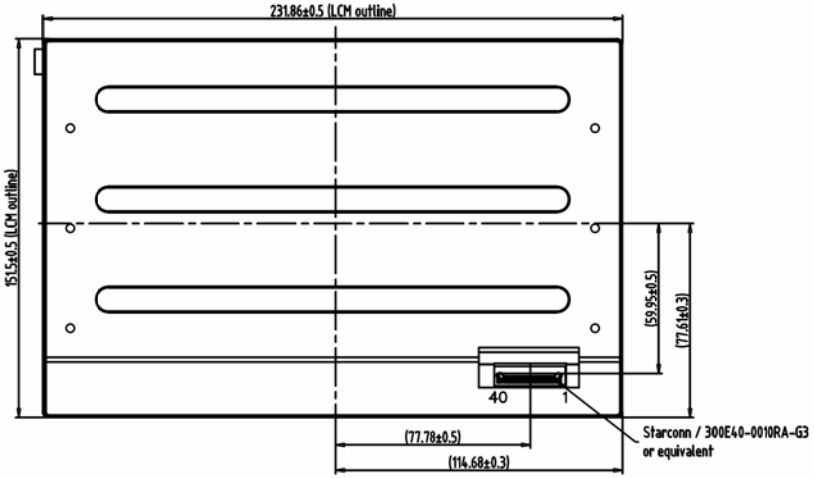
REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	07-22-14	EMILY
1	Modify interface pin18 to LVCLKP	09-18-14	EMILY



A Block

CN1 [1]

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	CABC_EN
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	LVCLKP	38	NC
19	GND	39	NC
20	LV3N	40	NC



Back view

Note:
1. Unless indicated, Tolerance "±0.5"

1	TF1280800-17-0	7		TOLERANCE GRADE(±)	A	B	DIM. MM	DWN. EMILY	DATE 07-22-14'	TITLE 1280800N3 (10.1") [1]
2		8					IE NO.	CHK.	DATE	
3		9								
4		10								
5		11					PARTS NO. LCM-1 1280800N3	APPD.	DATE	DWG. NO. *140782MA / SHEET 1 OF 1
6		12								

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