

**PRODUCT SPECIFICATION**  
**FOR LCD MODULE**

**Revision:** 0.0

**Model No:** AML-T20P78-01

**Module Type:** COG+FPC+B/L

**APPROVED SIGNATURE**

- Approved Product Specification only
- Approved Product Specification and Samples

<b><u>Prepared By</u></b>	<b><u>Checked By</u></b>	<b><u>Approved By</u></b>

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Shenzhen Amelin Electronic Technology Co. Ltd.

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## 1. General Description

AML-T20P78-01 is a transmissive type a-Si TFT-LCD (amorphous silicon thin film transistor liquid crystal display) module, which is composed of a TFT-LCD panel, a driver circuit and a backlight unit. The panel size is 2.0 inch and the resolution is 960\*240, the panel can display up to 262K colors.

## 2. Physical Features

Display Mode	TFT-LCD Module
	Active matrix TFT, Transmissive type
Display Format	Graphic 960×240 Dot-matrix
Input Data	Only support 6 bits Serial RGB interface
Viewing Direction	12 O'clock
Driver IC	ILI9342C

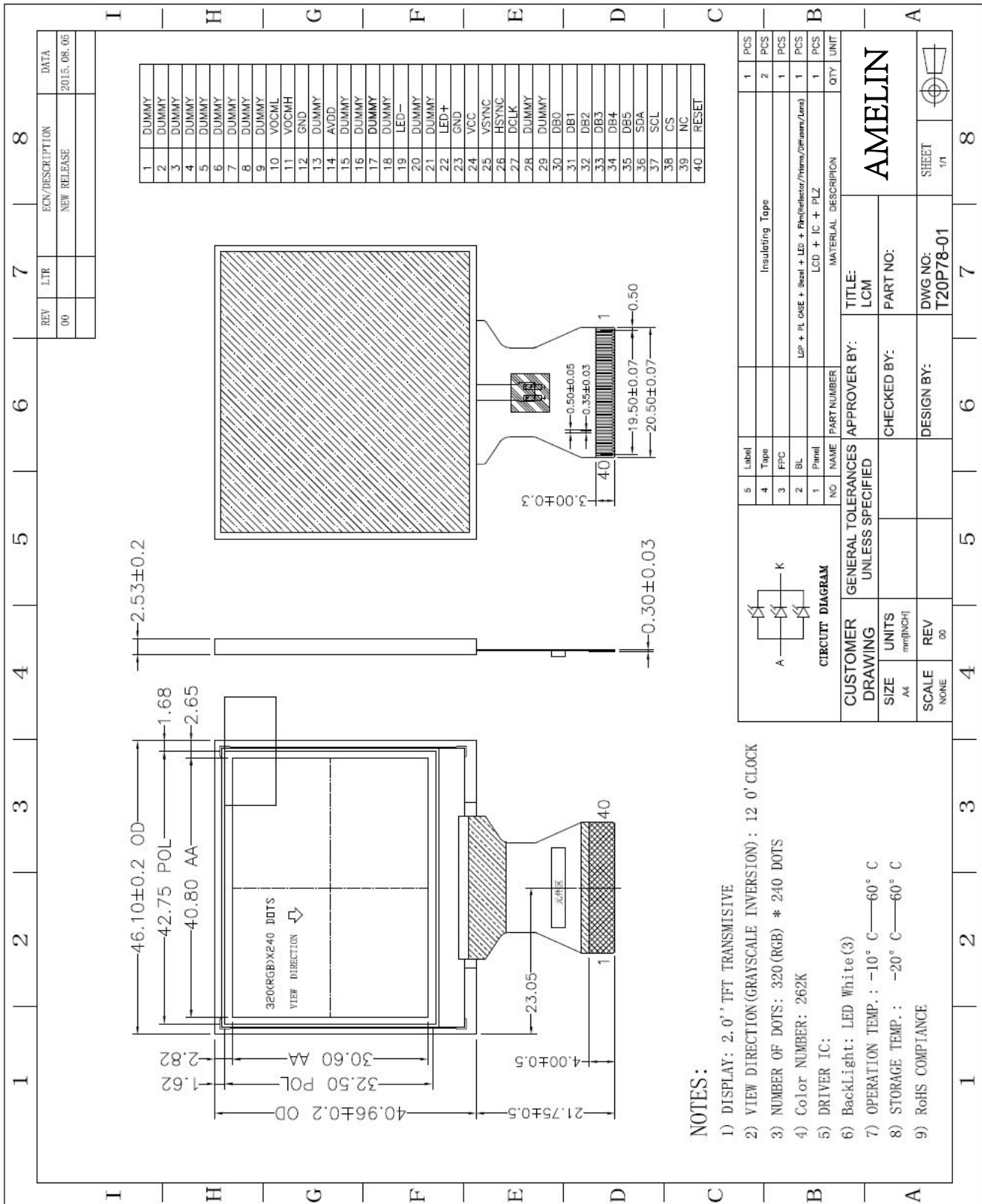
## 3. Mechanical Specification

Item	Contents	Unit
Module size (W×H×T)	46.10 × 40.96× 2.53	mm
Number of dots	960×240	---
Active area (W×H)	40.80×30.60	mm

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## 4. Outline Dimension



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## 5. Absolute Maximum Ratings

Item	Symbol	Min	Max	Unit
Supply voltage(Logic)	VCC	-0.3	3.6	V
Operating temperature	TOPR	-10	60	°C
Storage temperature	TSTR	-20	60	°C

## 6. Electrical Characteristics

Item	Symbol	Rating			Unit	Remark	
		Min	Typ	Max			
Power Voltage	VCC	2.5	3.3	3.6	V	---	
Input Voltage	L level	VIL	GND	---	0.2*VCC	V	---
	H level	VIH	0.8*VCC	---	VCC	V	
LCD Drive Power current	ILCD	---	10	---	mA	---	

## 7. Module Function Description

### 7-1. Pin Description

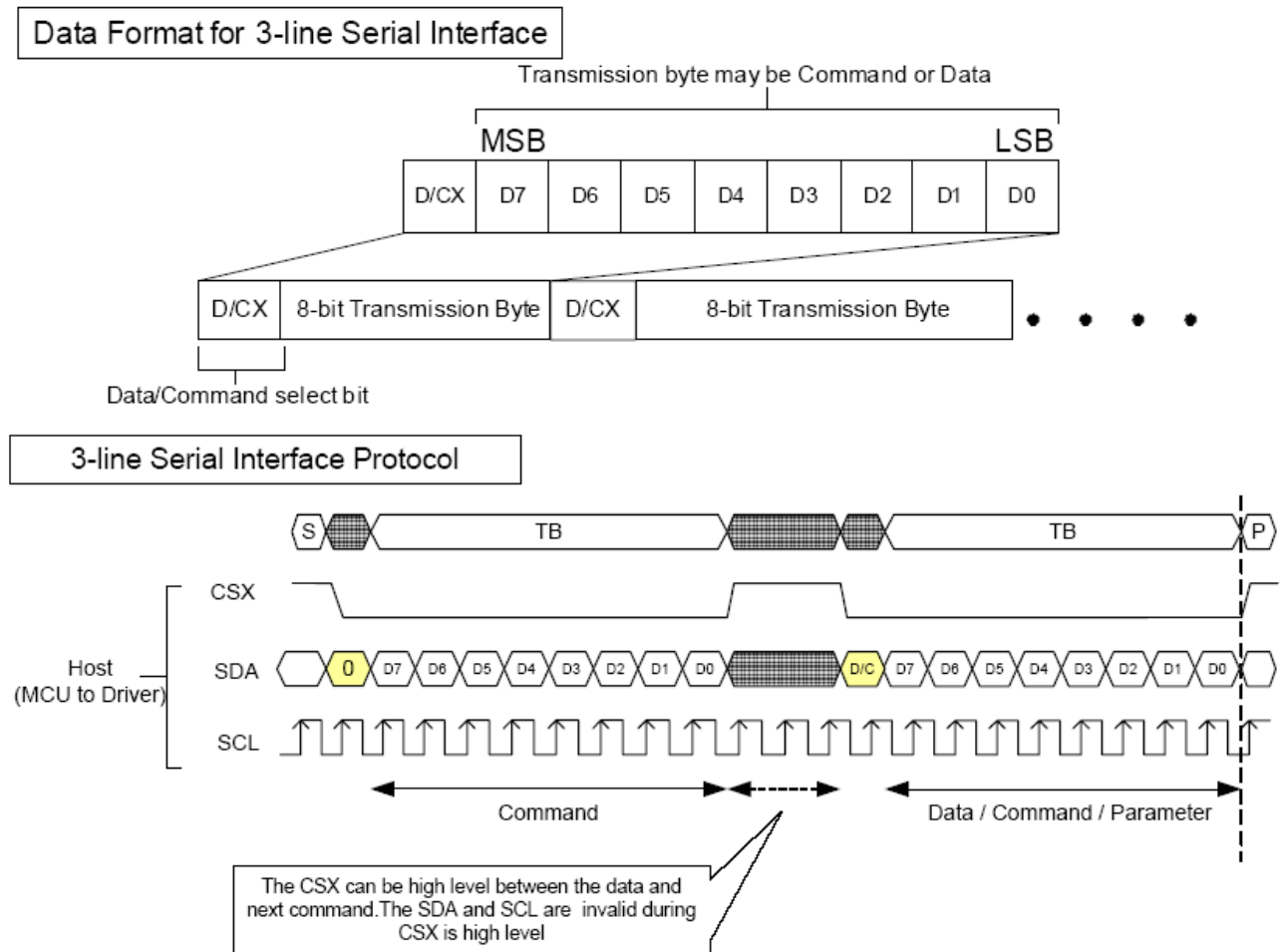
PIN NO.	Symbol	Description
1~9	Dummy	Dummy
10	VCOML	Capacitor for VCOM low
11	VCOMH	Capacitor for VCOM high
12	GND	Ground
13	Dummy	Dummy
14	VCC	Power supply for interface logic circuit
15~18	Dummy	Dummy
19	LED-	BL negative pin
20~21	Dummy	Dummy
22	LED+	BL positive pin
23	GND	Ground
24	VCC	Power supply for interface logic circuit
25	VSYNC	Frame synchronizing signal for RGB interface operation
26	HSYNC	Line synchronizing signal for RGB interface operation
27	DCLK	Dot clock signal for RGB interface operation
28~29	Dummy	Dummy
30~35	DB0~DB5	6 bits Data bus input
36	SDA	Serial command data input
37	SCL	Serial command clock input
38	CS	Serial communication chip select
39	Dummy	Dummy
40	RESET	System reset pin

## 7-2. Timing Characteristics

### 7-2-1 SPI Timing

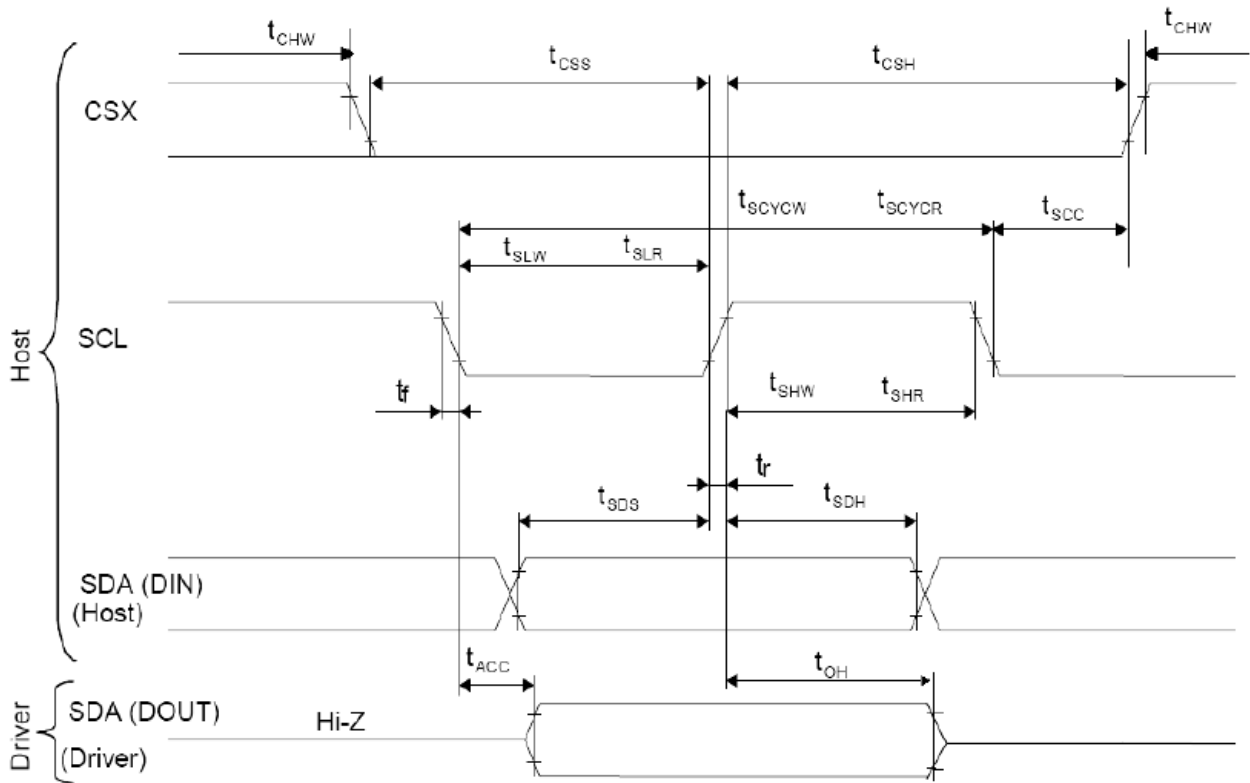
The write mode of the interface means that host writes commands or data to ILI9342. The 3-lines serial data packet contains a data/command select bit (D/CX) and a transmission byte. If the D/CX bit is "low", the transmission byte is interpreted as a command byte. If the D/CX bit is "high", the transmission byte is stored as the display data RAM (Memory write command), or command register as parameter.

Any instruction can be sent in any order to ILI9342 and the MSB is transmitted first. The serial interface is initialized when CSX is high status. In this state, SCL clock pulse and SDA data are no effect. A falling edge on CSX enables the serial interface and indicates the start of data transmission. See the detailed data format for 3-/4-line serial interface.



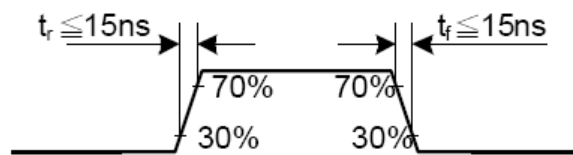
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Signal	Symbol	Parameter	min	max	Unit	Description
SCL	$t_{scycw}$	Serial Clock Cycle (Write)	66	-	ns	
	$t_{shw}$	SCL "H" Pulse Width (Write)	33	-	ns	
	$t_{slw}$	SCL "L" Pulse Width (Write)	33	-	ns	
	$t_{scydr}$	Serial Clock Cycle (Read)	150	-	ns	
	$t_{sshr}$	SCL "H" Pulse Width (Read)	75	-	ns	
	$t_{slr}$	SCL "L" Pulse Width (Read)	75	-	ns	
SDA (Input)	$t_{sds}$	Data setup time (Write)	10	-	ns	
	$t_{sdh}$	Data hold time (Write)	10	-	ns	
SDA (Output)	$t_{acc}$	Access time (Read)	30	50	ns	For maximum CL=30pF For minimum CL=8pF
	$t_{oh}$	Output disable time (Read)	90	95	ns	For maximum CL=30pF For minimum CL=8pF
CSX	$t_{chw}$	CSX "H" Pulse Width	40	-	ns	
	$t_{css}$	SCL-CSX (Write Time)	15	-	ns	
	$t_{csh}$		15	-	ns	
	$t_{css}$	CSX-SCL (ReadTime)	75	-	ns	
	$t_{csh}$		75	-	ns	

Note:  $T_a = -40$  to  $85$  °C,  $IOVCC=1.65V$  to  $3.3V$ ,  $VCI=2.5V$  to  $3.6V$ ,  $AGND=DGND=0V$



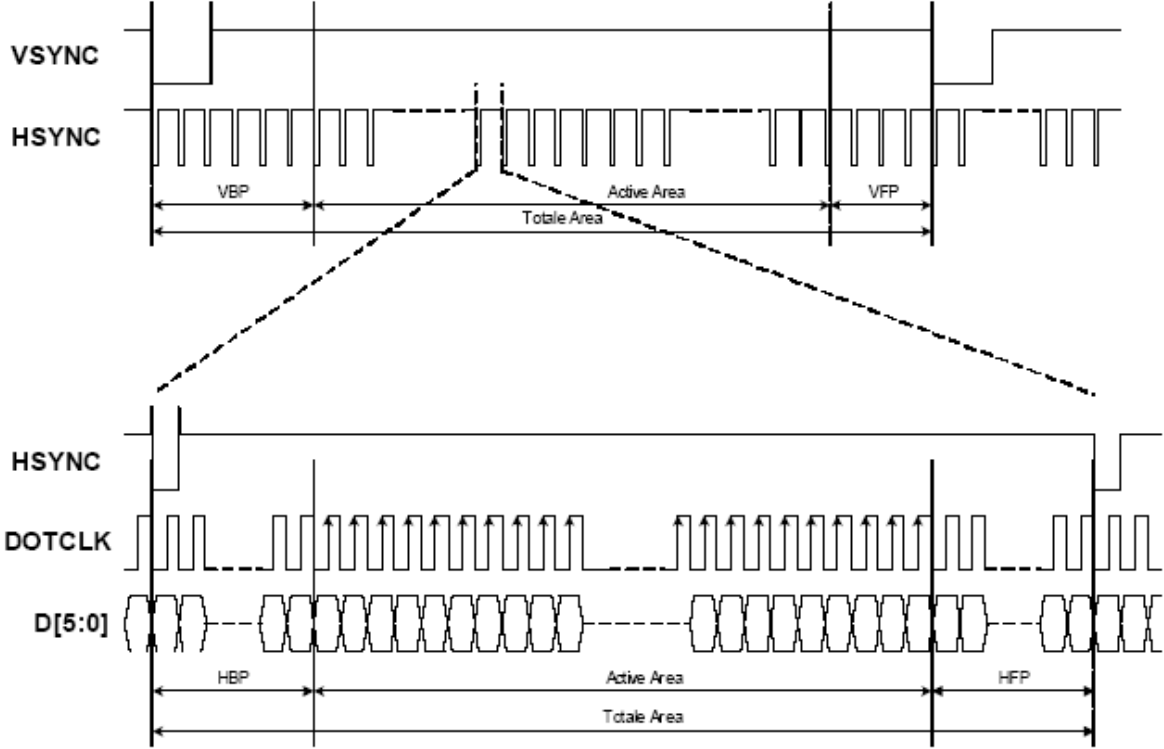


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## 7-2-2 6-bit RGB Timing

**SYNC Mode, RCM[1:0]="11"**



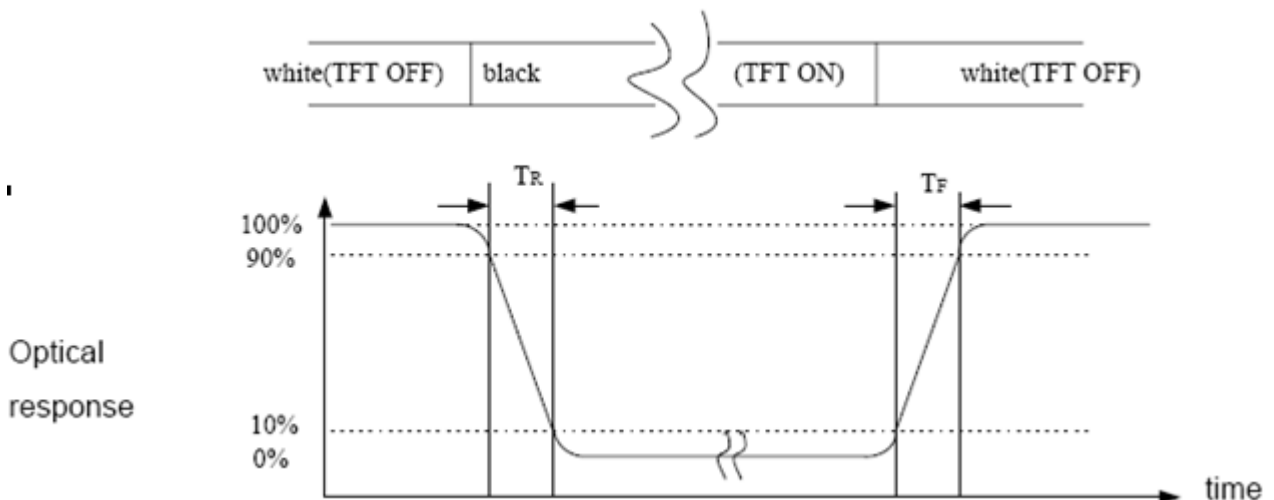
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## 8. Electro-Optical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	
Response time	Tr +Tf	$\theta_x = \theta_y = 0$	---	21	42	ms	Note 1	
Contrast Ratio	CR		---	400	---	---	Note 2	
Transmittance	T%		4.3	5.0	---	%		
Color chromaticity	W		Wx	0.293	0.313	0.333	---	Reference Only
			Wy	0.323	0.343	0.363		
	R		Rx	0.614	0.634	0.654		
			Ry	0.332	0.352	0.372		
	G		Gx	0.285	0.305	0.325		
			Gy	0.549	0.569	0.589		
B	Bx		0.113	0.133	0.153			
	By	0.105	0.125	0.145				
Viewing angle	$\theta_U$	CR $\geq$ 10	---	60	---	Deg.	Note 3	
	$\theta_D$		---	50	---			
	$\theta_L$		---	60	---			
	$\theta_R$		---	60	---			
NTSC			---	57.9	---	---		
Luminance ( $I_F = 60mA$ )	L		---	400	---	cd/m2	Note4	

Note(1) Definition of Response Time: Sum of  $T_R$  and  $T_F$



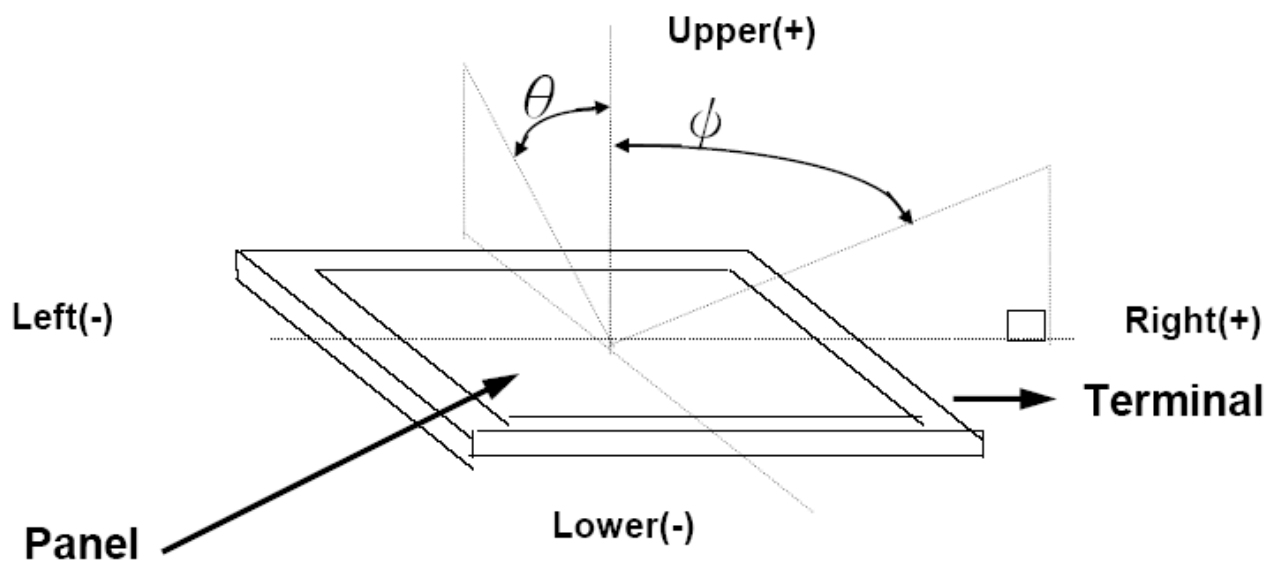
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Note (2) Definition of Contrast Ratio(CR):measured at the center point of panel

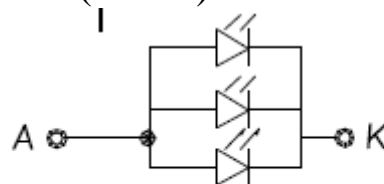
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3) Definition of Viewing Angle  $\theta$  and  $\phi$ :



Note(4)

- Test Instrument:BM-7(Distance:500mm;Field=1°)
- Light Source: LED\*3(White)



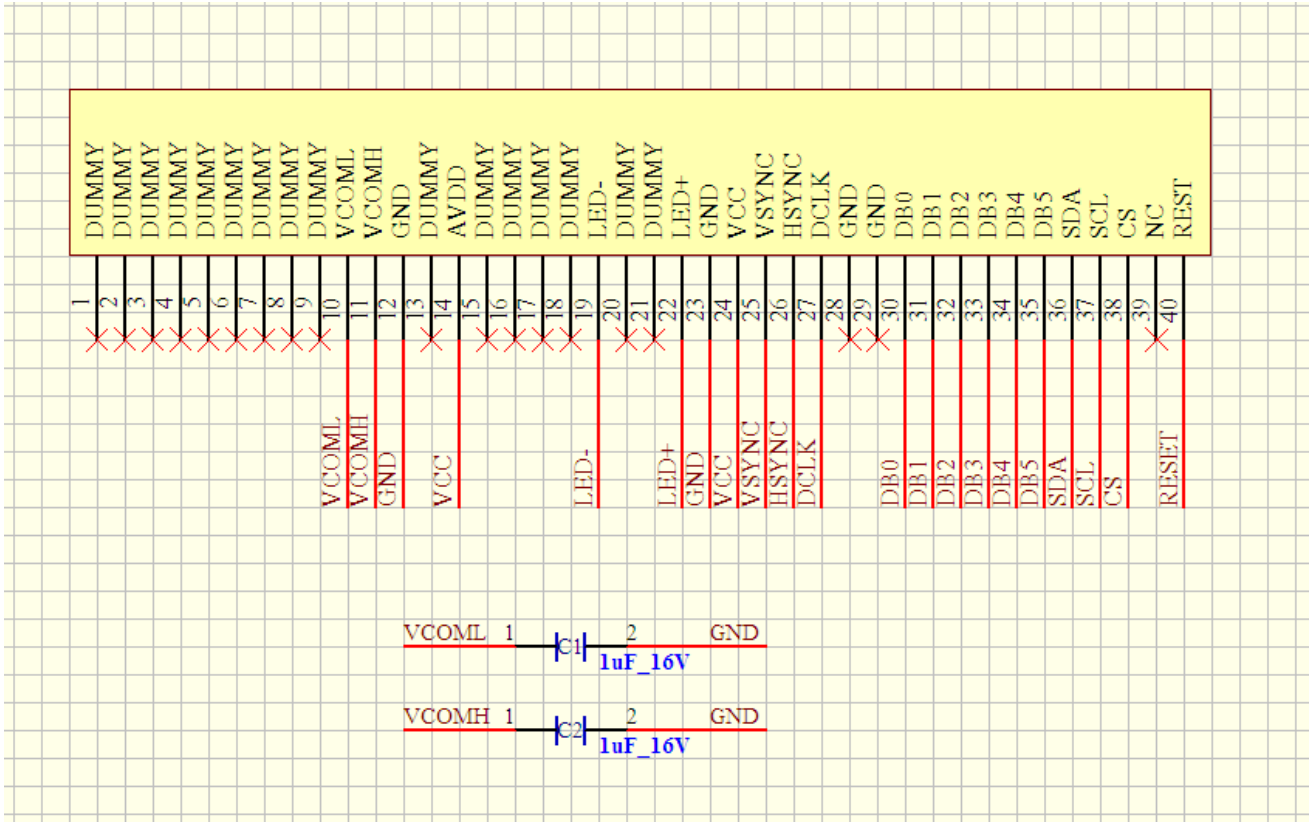
**CIRCUIT DIAGRAM**

- Conditions:  $I_F = 60mA$  ,  $V_{BL} = 3.2V$
- Uniformity=(Min. Brightness/ Max. Brightness)\*100%
- Uniformity  $\geq 80\%$

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## 9. Application Circuit



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## 10. Records Of Version

<b>Version</b>	<b>Revise Date</b>	<b>Page</b>	<b>Content</b>
0.0	2015-9-10	All	New released