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Project No. 项目编号	LCDT18351601
Customer 客户名称	
Module No. 客户型号	
Product type 产品内容	Standard LCD Module TFT: 128*RGBx160Dots 1.77" TFT LCD With touch panle

客户确认Customer Approval	
项目负责人Project Manager	
品质主管Director of Quality	
采购工程师Purchasing Engineer	



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1. Introduction

1.1 Scope of application

This specification applies to the LCD module that is supplied by LCDGO Technology CO., LTD.

LCD specification: Dots 128xRGBx160.

As to basic specification of the driver IC, refer to the IC (ILITEK:ILI9163V) specification and data book.

All material & processing of the LCD module should be Lead Free.

1.2 TFT features:

Structure: TFT PANNEL+IC +FPC+BL;

12 O'clock Type LCD

128dot-segment and 160 dot-common outputs;

65K Color can be selected by software;

White LED back light;

4-wire SPI interface;

1.3 Applications:



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2. LCM General specification

ITEM	Standard value	Unit
LCD Type	Normally White	--
Drive element	TFT active matrix	--
Number of pixels	128*3RGB(H)X160(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch (W*H)	0.073(W) × 0.219(H)	mm
Active area	28.032(W) × 35.04(H)	mm
Viewing direction	12 O'CLOCK	-
TFT Driver IC	ST7735S	
TFT interface	4-wire SPI	-
Module Size(W*H*T)	34.70(W) ×46.70(H) ×2.25(D)	mm
Approx. Weight	TBD	g
Touch structure		
Touch Driver IC		-
Touch Interface		

3. Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit
LCM Operating Temperature	T _{OPR}	-20	+70	°C
LCM Storage Temperature	T _{STG}	-30	+80	°C
TP Operating Temperature & Humidity(20% ~ 90%RH)	T _{OPR}			°C
TP SStorage Temperature & Humidity(20% ~ 90%RH)	T _{STG}			°C
Humidity	RH	-	90	%

4. Electrical Characteristics

4.1 TFT DC Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage for I/O	VDDIO	1.65	1.8	3.6	V
Supply Voltage for(DC/DC)	VDD	2.5	2.8	3.6	V
Supply Voltage for(DC/DC)	AVDD				V
Supply Voltage for(DC/DC)	AVEE				V
Current Consumption	I _{DD}	-	TBD	-	mA
	I _{DD-SLEEP}		TBD		uA

4.2 Back-Light Unit Characeristics

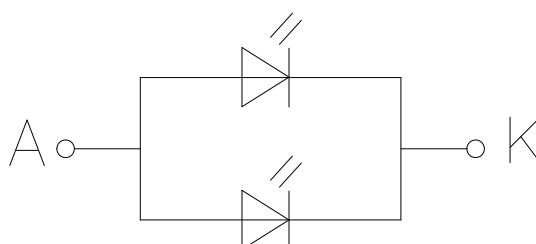
The back-light system is an edge-lighting type with white 2 LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V _F	2.85	--	3.3	V	-
Forward current	I _F	--	40	-	mA	-
Luminance(With LCD)	L _v		TBD	--	cd/m ²	-
LED life time	N/A	----	50,000	--	Hr	Note 1

Note:

- (1) The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_L=20mA/LED. The LED life time could be decreased if operating I_L is larger than 25mA/LED.

Backlight circuit diagram shown in below:



5. Timing Characteristics

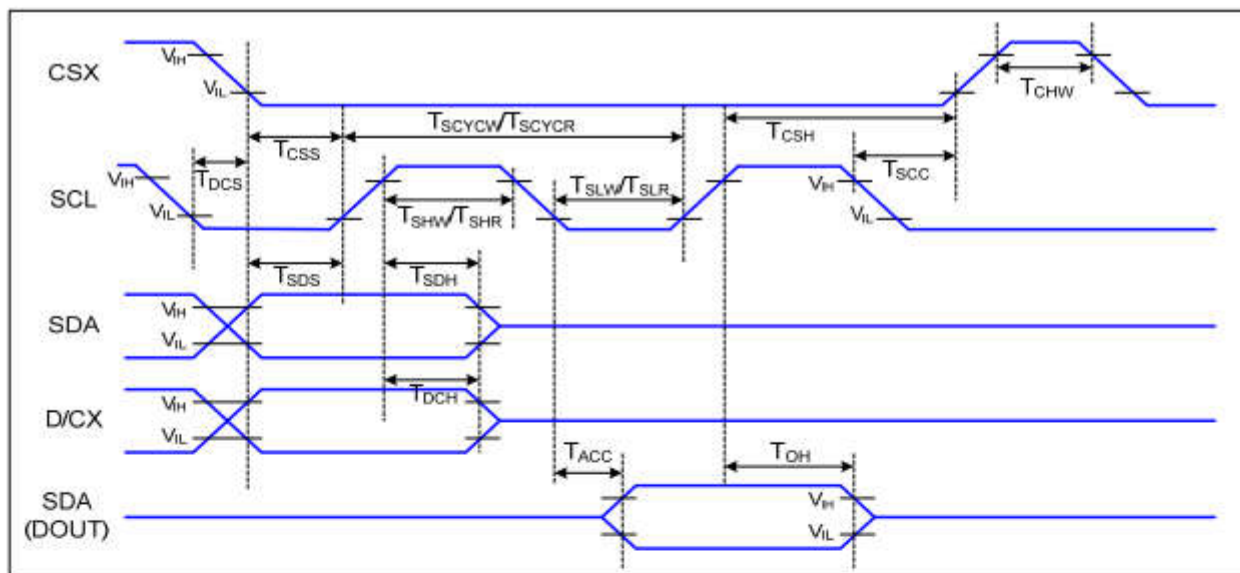


Figure 7 4-line Serial Interface Timing

T_a=25 °C, V_{DDI}=1.65~3.7V, V_{DD}=2.3~4.8V

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	TCSS	Chip Select Setup Time (Write)	TBD		ns	
	TCSH	Chip Select Hold Time (Write)	TBD		ns	
	TCSS	Chip Select Setup Time (Read)	TBD		ns	
	TSCC	Chip Select Hold Time (Read)	TBD		ns	
	TCHW	Chip Select "H" Pulse Width	TBD		ns	
SCL	TSCYCW	Serial Clock Cycle (Write)	TBD		ns	-Write Command & Data Ram
	TSHW	SCL "H" Pulse Width (Write)	TBD		ns	
	TSLW	SCL "L" Pulse Width (Write)	TBD		ns	
	TSCYCR	Serial Clock Cycle (Read)	TBD		ns	-Read Command & Data Ram
	TSHR	SCL "H" Pulse Width (Read)	TBD		ns	
	TSLR	SCL "L" Pulse Width (Read)	TBD		ns	
D/CX	TDCS	D/CX Setup Time	TBD		ns	
	TDCH	D/CX Hold Time	TBD		ns	
SDA (DIN) (DOUT)	TSDS	Data Setup Time	TBD		ns	For Maximum CL=30pF For Minimum CL=8pF
	TSDH	Data Hold Time	TBD		ns	
	TACC	Access Time	TBD	TBD	ns	
	TOH	Output Disable Time	TBD	TBD	ns	

Table 7 4-line Serial Interface Characteristics

6.Optical Characteristics

Items		Symbol	Condition	Specifications			Unit
				Min.	Typ.	Max.	
Contrast Ratio		CR		-	300	-	-
Response Time		T _R + T _F		-	30	-	ms
				-	-	-	ms
Chromaticity	Red	X _R			/		-
		Y _R			/		-
	Green	X _G			/		-
		Y _G			/		-
	Blue	X _B			/		-
		Y _B		/		-	
	White	X _W	0.28	0.31	0.34	-	
		Y _W	0.29	0.32	0.35	-	
Viewing angle	Hor.	φ1(3 o'clock)	Center CR≥10	-	45	-	deg.
		φ2(9 o'clock)		-	20	-	
	Ver.	θ2(12 o'clock)		-	45	-	
		θ1(6 o'clock)		-	45	-	
Uniformity					--		%

All left side data are based on LCDGO product reference only

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Note 1: Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

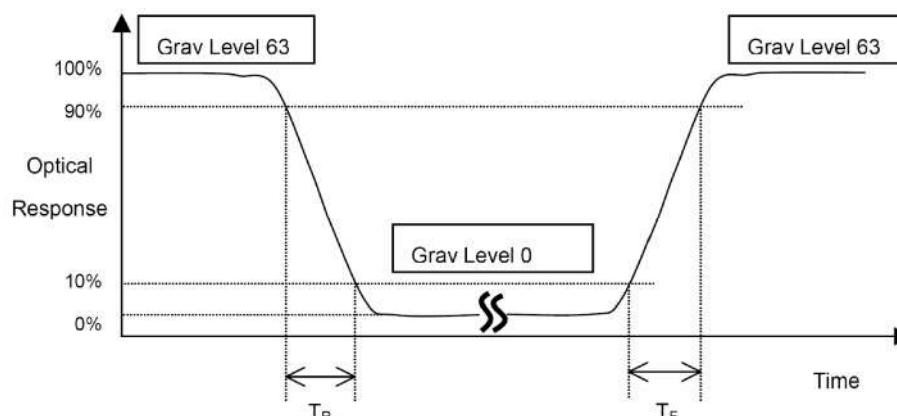
L63: Luminance of gray level 63

L0: Luminance of gray level 0

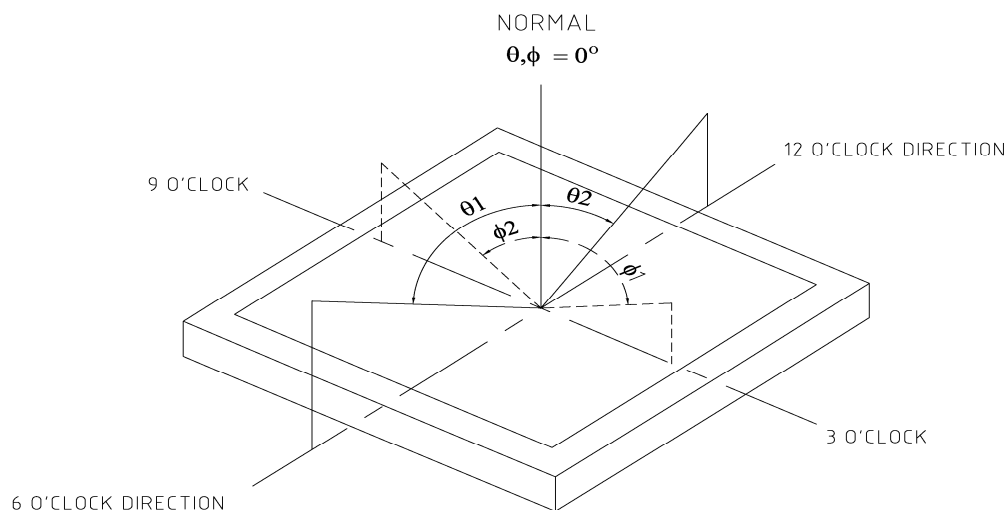
$$CR = CR(10)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note 5.

Note 2: Definition of Response Time (T_R , T_F):



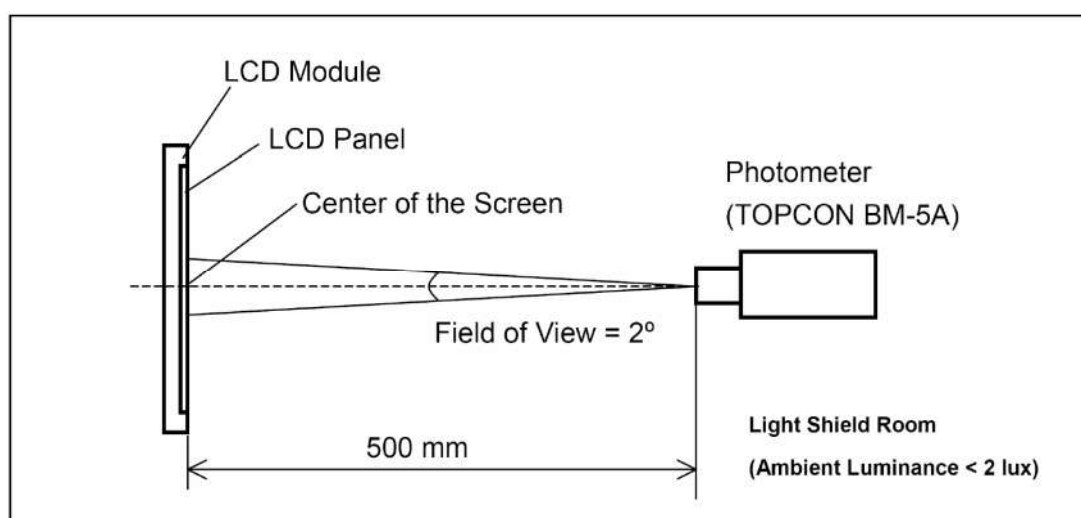
Note 3: Viewing Angle



The above “Viewing Angle” is the measuring position with Largest Contrast Ratio; not for good image quality. View Direction for good image quality is 6 O’clock. Module maker can increase the “Viewing Angle” by applying Wide View Film.

Note 4: Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



7. Reliability Test Item



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No.	Test Item	Test Condition	Check Time
1	High Temp Storage	Ta= 80℃	240 hrs
2	Low Temp Storage	Ta= -30℃	240 hrs
3	High Temp Operation	Ta= 70℃	240 hrs
4	Low Temp Operation	Ta= -20℃	240 hrs
5	High Temp & High Humidity Operation	Ta=60℃ H=90%RH	240 hrs

Note: (1) Ta : Ambient temperature

(2) All judgments of display are performed after temp of panel returns to room temperature

(3) Display function should be no change under normal operating condition.

(4) Under no condensation of dew

8. Packing Method----TBD

9. Module Function Description

Pin No.	Symbol	Functional	Notes
1	GND	Power Ground	
2	GND	Power Ground	
3	GND	Power Ground	
4	GND	Power Ground	
5	IOVCC	Power supply 1.65-3.6V	
6	Reset	Reset signal input terminal. Active at	
7	RS	Display data / Command selection pin	
8	SCK	used as SCL	
9	SDA	serial input/ output signal in SPI interface	
10	CS	Chip select signal input pin	
11	GND	Power Ground	
12	VDD	Power supply 2.5-3.6V	
13	LEDA	Anode of backlight3.0v-3.4v typical 3.2v	
14	LEDK	Cathode of backlight	
15	LEDK	Cathode of backlight	
16	GND	Power Ground	



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