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Custom Display

Production Custom designs Installation

Mechanical design



Project No. 项目编号	ET035CIR01
Customer 客户名称	
Module No. 客户型号	
Product type 产品内容	Standard LCD Module TFT: 800*RGBx640Dots 3.54”TFT LCD

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	

PREPARED BY	CHECKED BY	APPROVED BY

1. Introduction

1.1 Scope of application

This specification applies to the LCD module that is supplied by YOURITECH TECHNOLOGY CO.,LTD

LCD specification: Dots 800xRGBx640.

As to basic specification of the driver IC, refer to the IC:FL5893 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;

IPS Type LCD

800dot-segment and640 dot-common outputs;

16.7M Color can be selected by software;

White LED back light;

24 bit RGB interface

2. LCM General specification

ITEM	Standard value	Unit
LCD Type	Normally black	--
Drive element	TFT active matrix	--
Number of pixels	800*3RGB(H)X640(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch (H*V)	0.0375(H) x0.1125(V)	mm
Active area	90.00(H) x 72.00(V)	mm
Viewing direction	ALL O'CLOCK	--
TFT Driver IC	FL5893	--
TFT interface	24 bit RGB Interface	--
Approx. Weight	TBD	g
LCM Size(W*H*T)	97.60W) x 83.79(H) x4.04(T)	mm
Touch structure	--	--
Touch Driver IC	--	--
Touch Interface	--	--

[illegible]

3.Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit
LCM Operating Temperature	T _{OPR}	-30	+85	°C
LCM Storage Temperature	T _{STG}	-40	+90	°C
Humidity	RH	--	90	%

4.Electrical Characteristics

4.1 TFT DC Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage for(DC/DC)	VDD	3.0	3.3	3.6	V

4.2Back-Light Unit Characeristics

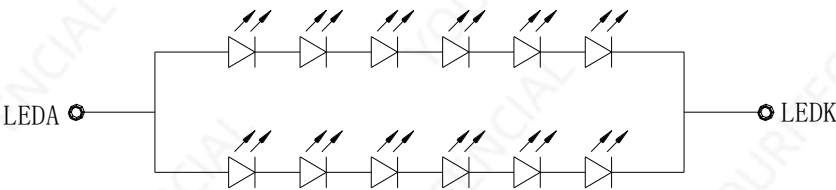
The back-light system is an edge-lighting type with white 12 LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V _F	16.8	--	20.4	V	--
Forward current	I _F	--	80	--	mA	--
Luminance(With LCD)	L _v	--	1000	--	cd/m ²	--
LED life time	N/A	20000	30,000	--	Hr	Note 1

Note:

- (1) The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_L=60mA/LED. The LED life time could be decreased if operating I_L is larger than 90mA/LED.

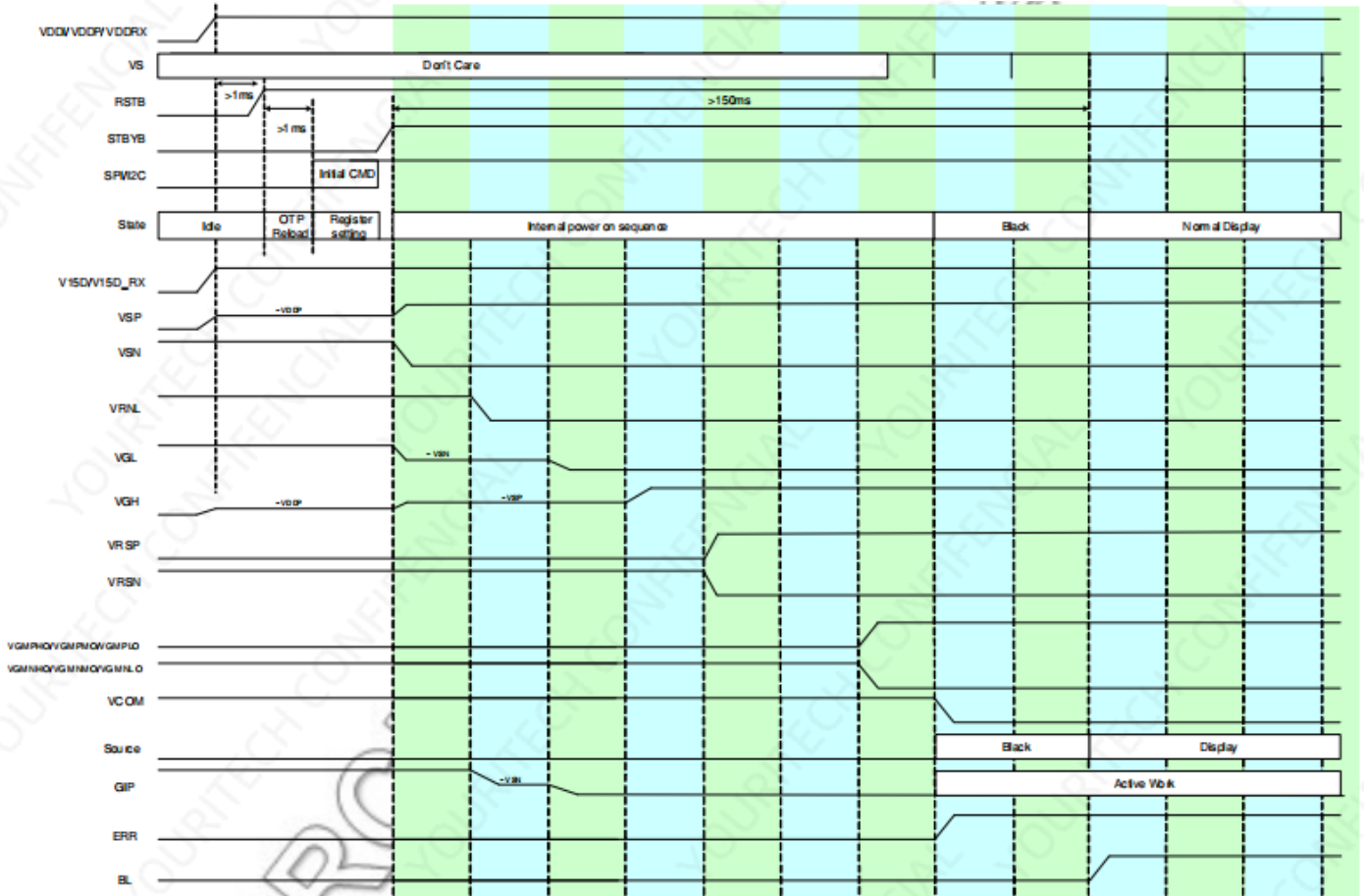
Backlight circuit diagram shown in below:



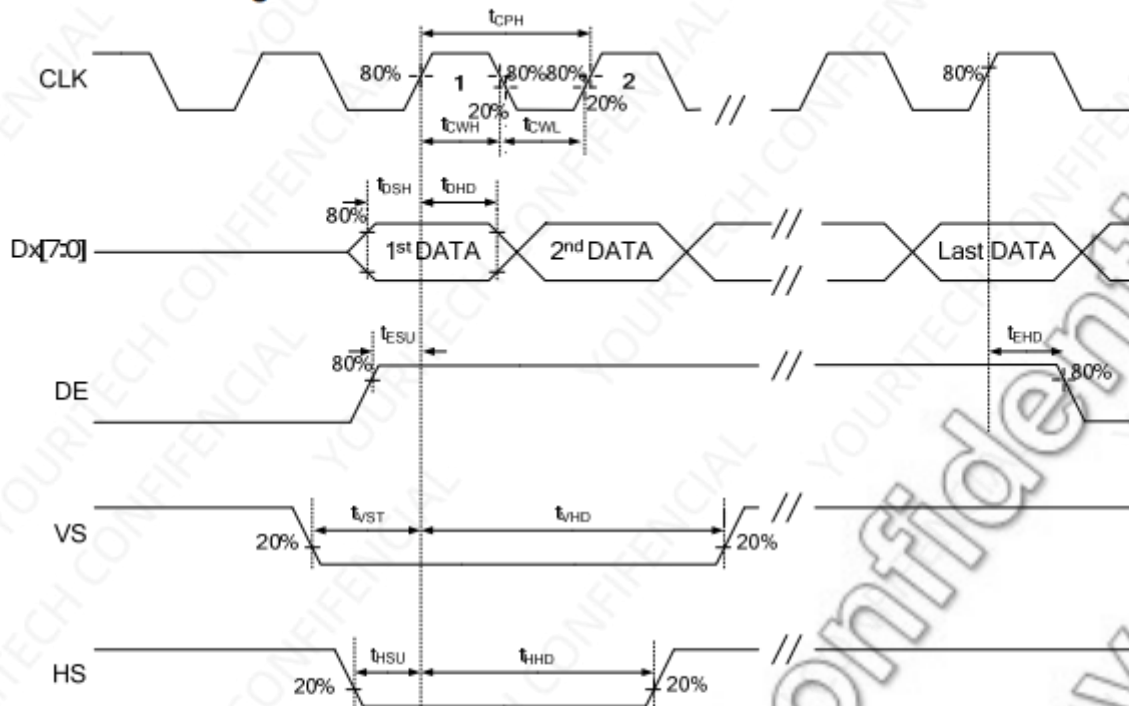
5. Module Function Description

Pin No.	Symbol	LCM Functional	Notes
1	LEDK	Power supply for backlight cathode input terminal.	
2	LEDA	Power supply for backlight anode input terminal.	
3	GND	Power Ground	
4	VCC	Power Supply For LCD	
5	R0	Red data	
6	R1	Red data	
7	R2	Red data	
8	R3	Red data	
9	R4	Red data	
10	R5	Red data	
11	R6	Red data	
12	R7	Red data	
13	G0	Green data	
14	G1	Green data	
15	G2	Green data	
16	G3	Green data	
17	G4	Green data	
18	G5	Green data	
19	G6	Green data	
20	G7	Green data	
21	B0	Blue data	
22	B1	Blue data	
23	B2	Blue data	
24	B3	Blue data	
25	B4	Blue data	
26	B5	Blue data	
27	B6	Blue data	
28	B7	Blue data	
29	GND	Power Ground	
30	PCLK	Dot clock signal for RGB interface operation.	
31	NC	No Connection.	
32	HS	Line synchronous signal for RGB interface operation.	
33	VS	Frame synchronous signal for RGB interface operation.	
34	DE	Data enable signal for RGB interface operation.	
35	NC	No Connection.	
36	GND	Power Ground	
37	RST	Reset Signal input pin.	
38	SDA	Serial data input/output pin.	
39	SCL	Serial clock signal pin.	
40	CS	Chip selection signal pin.	

6. Timing Characteristics



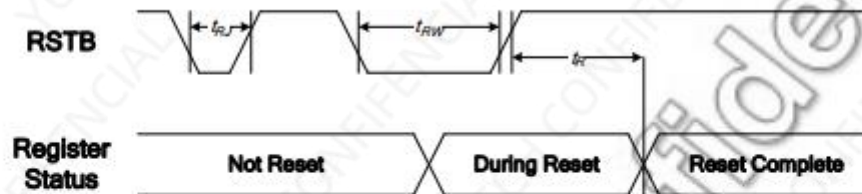
CMOS AC Timing



VSSI = VSSRX = VSSP = 0V, VDDI = VDDP = VDDR = 3.0 ~ 3.3V, Ta Temperature

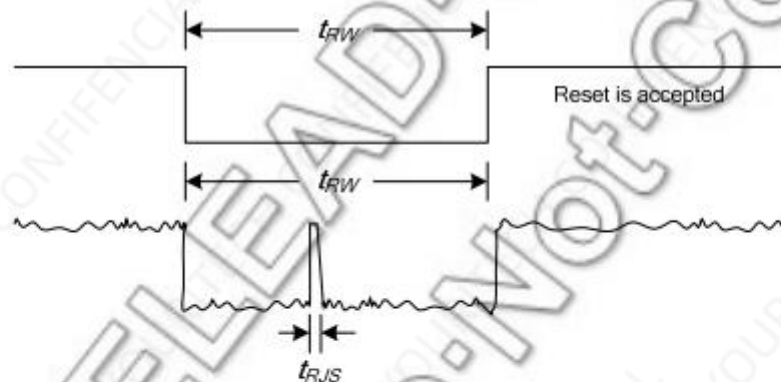
Item	Signal	Symbol	Condition	Rating		Unit
				Min.	Max.	
CLK cycle time	CLK	t_{CPH}		25	200	ns
CLK pulse high duty		t_{CWH}		40	60	%
CLK pulse low duty		t_{CWL}		40	60	
VS setup time	VS	t_{VST}		4	-	ns
VS hold time		t_{VHD}		2	-	
HS setup time	HS	t_{HST}		4	-	
HS hold time		t_{HHD}		2	-	
Data setup time	Dx[7:0]	t_{DSH}		4	-	
Date hold time		t_{DHD}		2	-	
DE setup time	DE	t_{ESU}		4	-	
DE hold time		t_{EHD}		2	-	

Hardware Reset Timing



VSSI = VSSRX = VSSP = 0V, VDDI = VDDP = VDDR_X = 3.0 ~ 3.3V, T_a Temperature

Item	Signal	Symbol	Condition	Rating		Unit
				Min.	Max.	
Reset time	RSTB	t _R		—	5	us
Reset "L" pulse width		t _{RW}		15	—	
Reset rejection		t _{RJ}		—	5	ns
Reset rejection (for noise spike)		t _{RJS}		—	10	



Note:

- For OTP related operation, it takes 50ms at least for OTP Registers to load OTP contents. Do not use any OTP related command during this period.
- When the system issues a RSTB low pulse, the reset procedure of IC will start if the low pulse is longer than t_{RW} specified above. If the low pulse is less than t_{RJ} specified above, the reset procedure of IC will not start. If the low pulse is longer than t_{RJ} and less than t_{RW}, the reset procedure of IC is not guaranteed.

7.Optical Characteristics

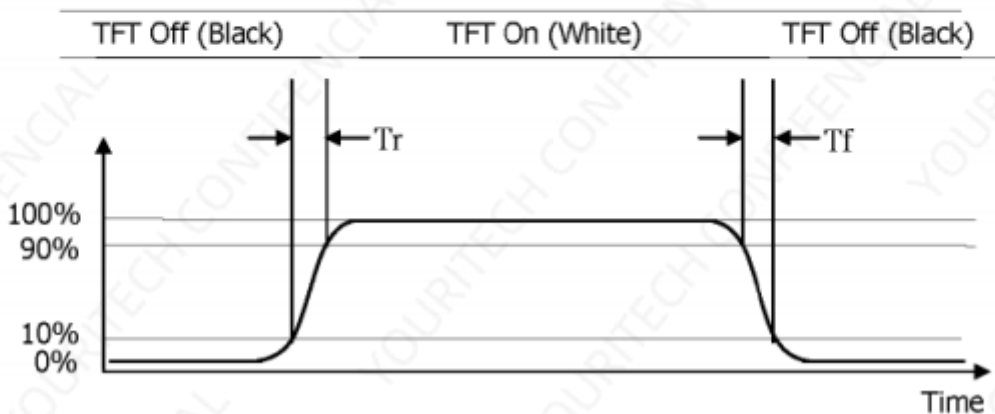
Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	-	85	-	Deg.	Note 1
		Θ_9		-	85	-	Deg.	
	Vertical	Θ_{12}		-	85	-	Deg.	
		Θ_6		-	85	-	Deg.	
Luminance Contrast ratio		CR	$\Theta = 0^\circ$ (Center) Normal Viewing Angle	1000	-	-		Note 2
Transmittance (pol)		T(%)		-	3.5	-	%	Base on YAG light Note 3
White Chromaticity		x_w		Typ-0.03	0.307	Typ+0.03		Base on C light, This value is sim ulated and t he final spe c is determi ned by cust omer backli ght measur ements Note 5
		y_w			0.334			
Reproduction of color	Red	x_R			0.653			
		y_R			0.317			
	Green	x_G			0.295			
		y_G			0.594			
	Blue	x_B			0.137			
		y_B			0.098			
Flicker		-		-	-	20%		灰黑画面
ColorGamut(NTSC)		-		65%	70%	-		
Response Time (Rising + Falling)		T_{RT}	Ta= 25° C $\Theta = 0^\circ$	-	25	-	ms	Note 6

Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface.
2. Contrast measurements shall be made at viewing angle of $\theta = 0^\circ$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (See FIGURE 1 shown in Appendix)
Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. Center Luminance of white is defined as the LCD surface. Luminance shall be measured with all pixels in the view field set first to white. This measurement shall be taken at the locations shown in FIGURE 4 for a total of the measurements per display.
4. The White luminance uniformity on LCD surface is then expressed as :
 $\Delta Y = (\text{Minimum Luminance of 9points} / \text{Maximum Luminance of 9points}) * 100$
5. The color chromaticity coordinates specified in Table 3. shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.
6. The electro-optical response time measurements shall be made as FIGURE 5 shown in Appendix by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is T_d , and 90% to 10% is T_r .



8. Reliability Test Item

No.	Test Item	Test Condition	Notes
1	High Temp. Storage	+90℃ / 240H	1. Functional test isOK. Missing Segment,short, unclear segment non-display,display abnormally and liquid crystal leakare un-allowed. 2. No low temperature bubbles,end seal loose andfall, frame rainbow.
2	Low Temp. Storage	-40℃ / 240H	
3	High Tempe. Operating	+85℃ / 240H	
4	Low Tempe. Operating	-30℃ / 240H	
5	High Temperature /Humidity storage	60℃ x 90%RH / 240H	
6	Thermal and cold shock	Static state, -30℃（30min）~85℃ （30min）, 10 cycles	

9. Packing Method----TBD

- END -