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Custom Display

Production
Custom designs
Installation

Mechanical design



Project No. 项目编号	ET062WS01-T
Customer 客户名称	
Module No. 客户型号	
Product type 产品内容	Standard LCD Module TFT: 1024*RGBx600Dots 6.2”TFT

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. This LCD module should be designed for mobile phone use.

LCD specification: Dots 1024xRGBx600.

As to basic specification of the driver IC, refer to the IC (JD9168S) 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;

ALL O'CLOCK Type LCD

1024 dot-segment and 600 dot-common outputs;

16.7M Color can be selected by software;

White LED back light;

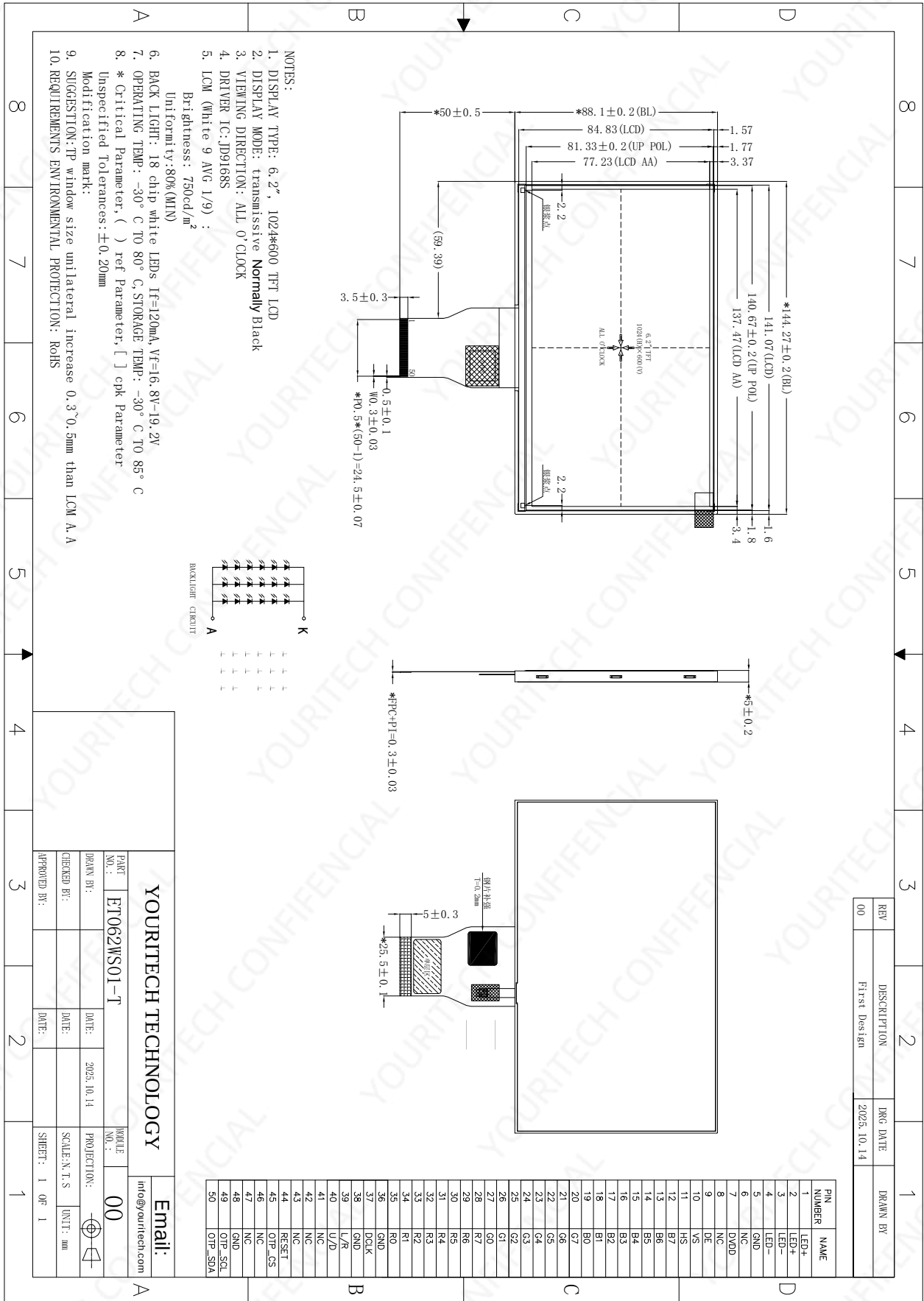
24bit RGB interface



2. LCM General specification

ITEM	Standard value	Unit
LCD Type	Normally Black	--
Drive element	TFT active matrix	--
Number of pixels	1024*3RGB(H)X600(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch (W*H)	0.13425(W)x 0.12872(H)	mm
Active area	137.47(W) x77.23(H)	mm
Viewing direction	ALL O'CLOCK	--
TFT Driver IC	JD9168S	--
TFT interface	24bit RGB Interface	--
Approx. Weight	TBD	g
LCM Size(W*H*T)	144.27(W) x88.1(H) x5.0(T)	mm
LCM+CTP Size(W*H*T)	-	mm
Touch structure	-	--
Touch Driver IC	-	--
Touch Interface	-	--





3. Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit
LCM Operating Temperature	T _{OPR}	-30	+80	°C
LCM Storage Temperature	T _{STG}	-30	+85	°C
TP Operating Temperature & Humidity (20% ~ 90%RH)	T _{OPR}	-30	+80	°C
TP SStorage Temperature & Humidity (20% ~ 90%RH)	T _{STG}	-30	+85	°C
Humidity	RH	--	90	%

4. Electrical Characteristics

4.1 TFT DC Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage for(DC/DC)	DVDD	2.8	3.3	3.3	V

4.2 Back-Light Unit Characeristics

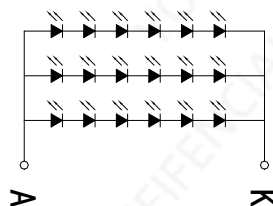
The back-light system is an edge-lighting type with 18 white LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V _F	16.8	--	19.2	V	--
Forward current	I _F	--	120	--	mA	--
Luminance(With LCD+CTP)	L _v	--	750	--	cd/m ²	--
LED life time	N/A	--	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=40mA/LED. The LED life time could be decreased if operating I_L is larger than 45mA/LED.

Backlight circuit diagram shown in below:



5. Module Function Description

Pin No.	Symbol	LCM Description	remarks
1	LED+	Power Supply For LED Backlight Anode Input.	
2	LED+	Power Supply For LED Backlight Anode Input.	
3	LED-	Power supply for backlight cathode input terminal.	
4	LED-	Power supply for backlight cathode input terminal.	
5	GND	Power ground	
6	NC	No Connection.	
7	DVDD	Power Supply For LCD.	
8	NC	No Connection.	
9	DEN	Data enable signal for RGB interface operation.	
10	VSD	Vertical sync. Signal in RGB I/F	
11	HSD	Horizontal sync. Signal in RGB I/F	
12	B7	Blue data	
13	B6	Blue data	
14	B5	Blue data	
15	B4	Blue data	
16	B3	Blue data	
17	B2	Blue data	
18	B1	Blue data	
19	B0	Blue data	
20	G7	Green data	
21	G6	Green data	
22	G5	Green data	
23	G4	Green data	
24	G3	Green data	
25	G2	Green data	
26	G1	Green data	



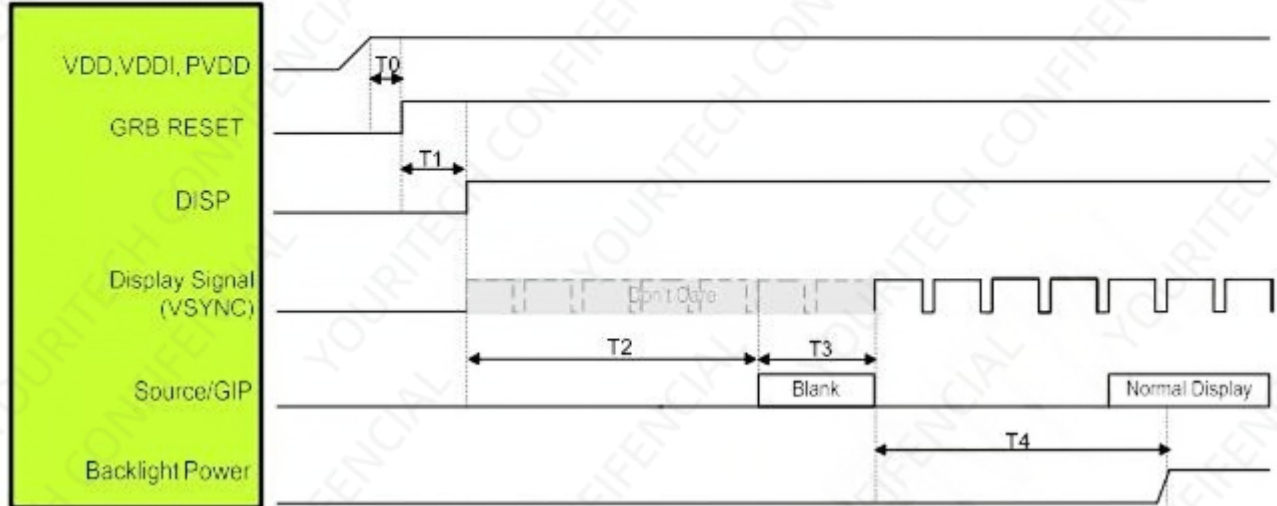
27	G0	Green data	
28	R7	Red data	
29	R6	Red data	
30	R5	Red data	
31	R4	Red data	
32	R3	Red data	
33	R2	Red data	
34	R1	Red data	
35	R0	Red data	
36	GND	Power ground	
37	DCLK	Dot clock signal for RGB interface operation.	
38	GND	Power ground	
39	L/R	Source Right or Left sequence control. Normally pull high.	
40	U/D	Gate Up or Down scan control. Normally pull low.	
41	NC	No Connection.	
42	NC	No Connection.	
43	NC	No Connection.	
44	RESET	Reset Signal input pin.	
45	OTP_CS	OTP Pin (NC)	
46	NC	No Connection.	
47	NC	No Connection.	
48	GND	Power ground	
49	OTP_SCL	OTP Pin (NC)	
50	OTP_SDA	OTP Pin (NC)	



6. Timing Characteristics

Power On Sequence

Power Mode



Symbol	Description	Time	Unit
T0	System power stability to GRB RESET signal	≥1	ms
T1	GRB RESET= "High" to DISP="High"	≥10	ms
T2	DISP="High" to Source/GIP scan blank	85	ms
T3	IC scan blanking signal	≥33	ms
T4	Display signal input to Backlight power on (base on Display Signal Frame Rate 60Hz)	≥100	ms

Note: 1. When DISP pull "H" or "L", IC will execute the internal power on or power off procedures. Please be careful about the timing of

DISP and do not interrupt it during power on or power off procedure, otherwise unexpected errors will occur.

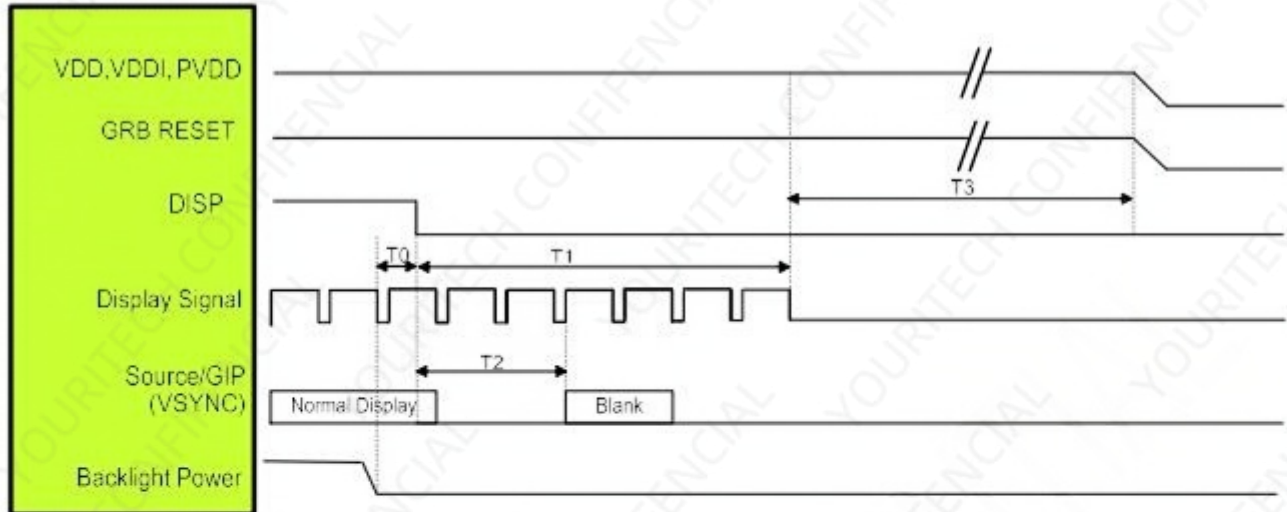
2. RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0].

3. LVDS interface Display signal: DCLK P/N; RX[3:0] P/N.



Power Off Sequence

Power Mode



Symbol	Description	Time	Unit
T0	Backlight Power off to DISP="Low"	≥1	ms
T1	DISP="Low" to IC internal voltage discharge complete	≥100	ms
T2	DISP="Low" to Source/GIP scan blank (base on Display Signal Frame Rate 60Hz)	≤50	ms
T3	IC internal voltage discharge is completed to VDD/VDDI/PVDD off	≥0	ms

Note: 1. When DISP pull "H" or "L", IC will execute the internal power on or power off procedures. Please be careful about the timing of DISP and do not interrupt it during power on or power off procedure, otherwise unexpected errors will occur.

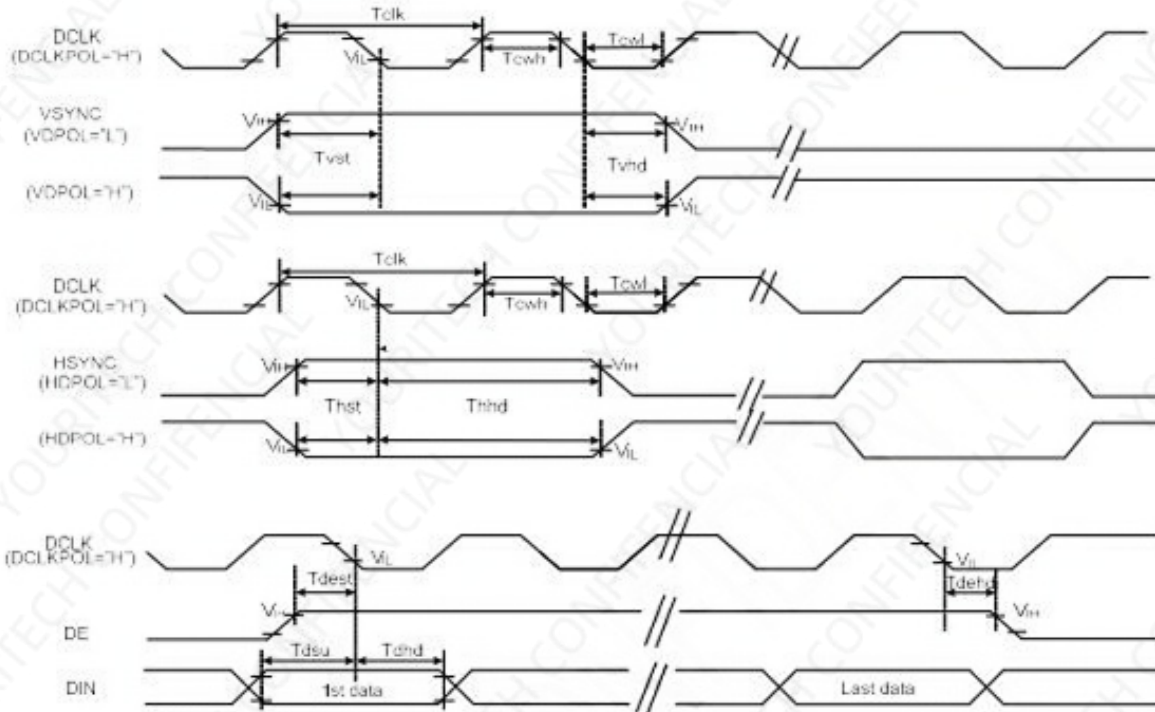
2. RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0].

3. LVDS interface Display signal: DCLK P/N; RX[3:0] P/N.

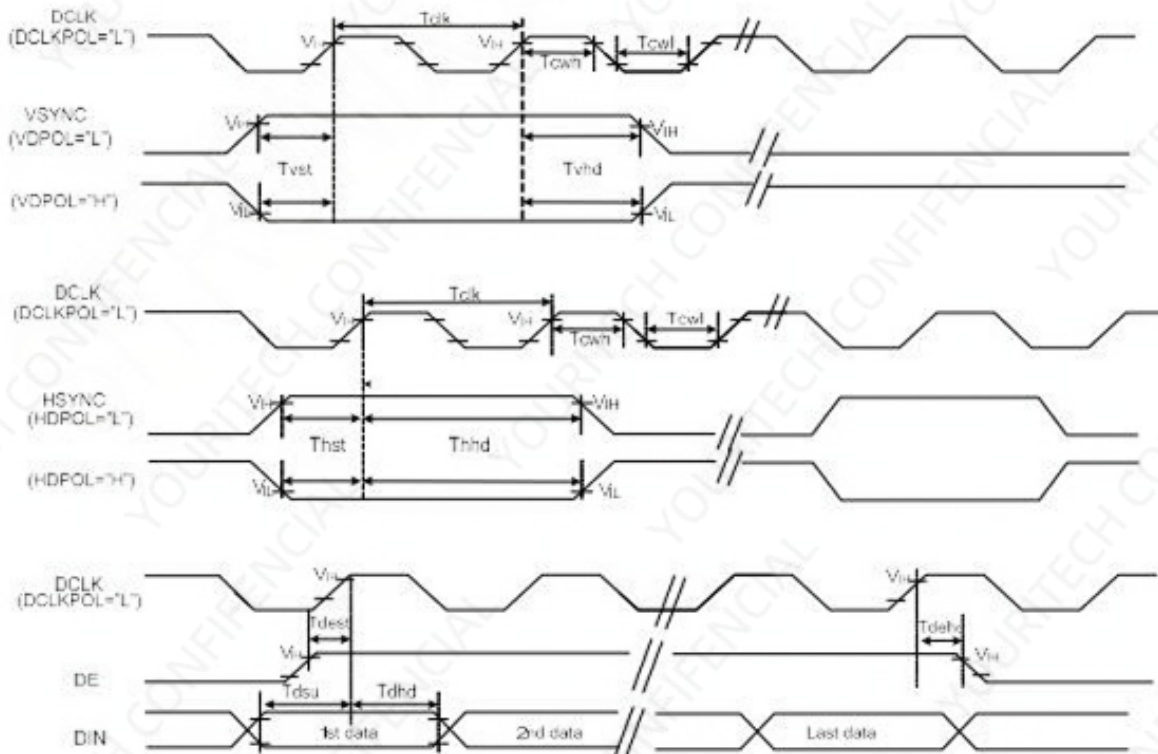


System Bus Timing for RGB Interface

DCLK Negative Polarity (DCLKPOL="H")



DCLK Positive Polarity (DCLKPOL="L")



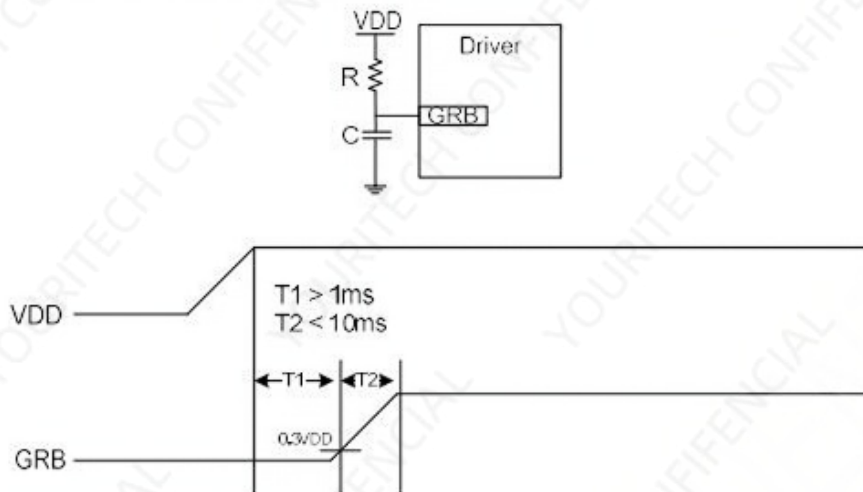
DC Electrical Characteristics (PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C, Bare Chip).

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK Pulse Duty	T _{cw}	40	50	60	%	
VSYNC Setup Time	T _{vst}	10	-	-	ns	
VSYNC Hold Time	T _{vhd}	10	-	-	ns	
HSYNC Setup Time	T _{hst}	10	-	-	ns	
HSYNC Hold Time	T _{hhd}	10	-	-	ns	
Data Setup Time	T _{dsu}	10	-	-	ns	
Data Hold Time	T _{dhd}	10	-	-	ns	
DE Setup Time	T _{dest}	10	-	-	ns	
DE Hold Time	T _{dehd}	10	-	-	ns	

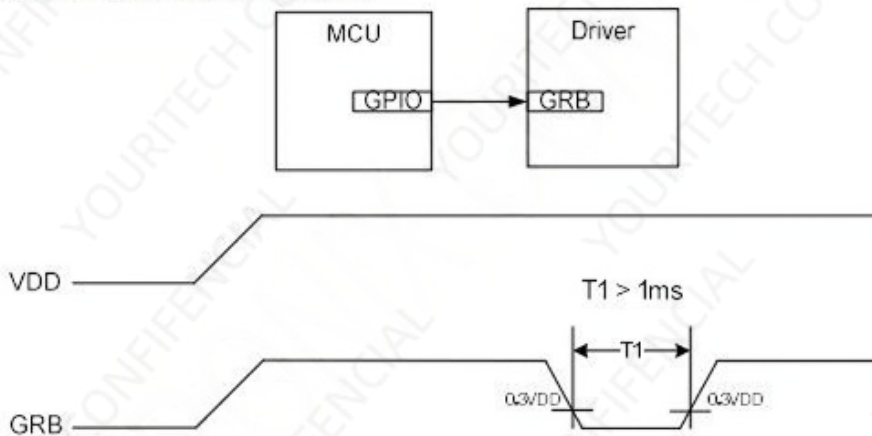
Reset timing

Setting GRB pin to "L" (hardware reset) can initialize internal function. Initialized by GRB pin is essential before operating. There are two suggestions for hardware reset connection.

(1) The GRB pin with external RC circuit.



(2) The GRB pin controlled by MCU.



7.Optical Characteristics

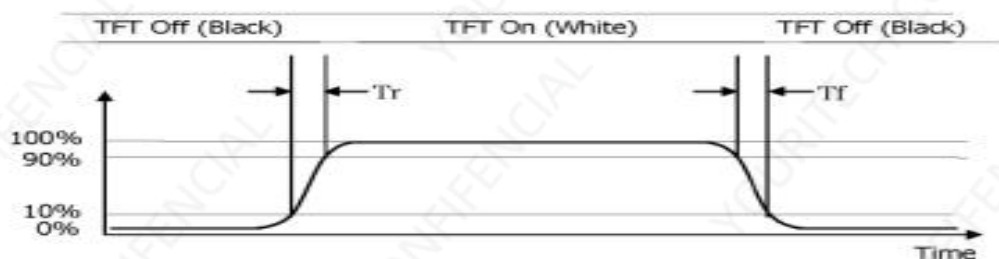
Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	68	80	-	Deg.	Note 1
		Θ_9		68	80	-	Deg.	
	Vertical	Θ_{12}		68	80	-	Deg.	
		Θ_6		68	80	-	Deg.	
Transmittance		Tr	$\Theta = 0^\circ$	3.74	4.4	-	%	W/O APF
Luminance Contrast ratio		CR	$\Theta = 0^\circ$	800	1000	-		Note 2
Color Gamut	NTSC	CIE1931	$\Theta = 0^\circ$	51	60	-	%	Note 5 @C Light
Reproduction of color	White	Wx	$\Theta = 0^\circ$	Typ -0.03	0.309	Typ +0.03		
		Wy			0.347			
Response Time		Tr+Td	Ta= 25° C $\Theta = 0^\circ$	-	30	35	ms	Note 6
Cross Talk		CT	$\Theta = 0^\circ$	-	-	2.0	%	

Notes : 1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles 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 (see FIGURE 1).

2. Contrast measurements shall be made at viewing angle of $\Theta = 0$ 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) Luminance Contrast Ratio (CR) is defined mathematically.

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

3. The color chromaticity coordinates specified in Table 5. 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.
4. The electro-optical response time measurements shall be made as FIGURE 2 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Td.



8. Reliability Test Item

No.	Test Item	Test Condition	Notes
1	High Temp. Storage	+85°C / 96H	1. Functional test is OK. Missing Segment, short, unclear segment non-display, display abnormally and liquid crystal leakage un-allowed. 2. No low temperature bubbles, end seal loose and fall, frame rainbow.
2	Low Temp. Storage	-30°C / 96H	
3	High Temp. Operating	+80°C / 96H	
4	Low Temp. Operating	-30°C / 96H	
5	High Temperature / Humidity storage	60°C x 90%RH / 96H	
6	Thermal and cold shock	Static state, -30°C (30min) ~80°C (30min), 10 cycles	

