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Production Custom designs Installation

Mechanical design



MODEL NO : ET033FW01-O**MODEL VERSION:** 01**SPEC VERSION :** 1.0**ISSUED DATE:** 2018-12-05

- ☒ Preliminary Specification
☐ Final Product Specification

Customer : _____

Approved by	Notes

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[illegible]

1 General Specifications

Feature		Spec
Display Spec.	Size	3.3 inch
	Resolution	480(RGB)*854
	Pixel Configuration	RGB Vertical Stripe
	Pixel pitch(mm)	0.108(H)*0.108(V)
	Display Mode	AMOLED
	Viewing Direction	Free angle
Mechanical Characteristics	LCM (W x H x D) (mm)	68x121 x 2.74(Typ)
	LCD Active Area(mm)	41.24(H)*73.02(V)
	With /Without TSP	Without CTP
	LCD Driver IC	TL2796
	Weight (g)	TBD
Electrical Characteristics	LCD Interface	RGB
	Color Depth	16.7M

Note 1: Viewing direction for best image quality is different from TFT definition. There is a 180 degree shift.

Note 2: Requirements on Environmental Protection: Q/S0002

Note 3: LCM weight tolerance: $\pm 5\%$

2 Input/Output Terminals

2.1 LCM Interface

No.	I/O	Symbol	Function
1	Power	GND	Ground Terminal
2	Power	GND	Ground Terminal
3	Power	ELVSS	Power for LTPS
4	Power	ELVSS	Power for LTPS
5	-	NC	-
6	Power	ELVDD	Power for LTPS
7	Power	ELVDD	Power for LTPS
8	-	NC	-
9	Logic I/O Power	VDDI(IOVCC)	Data I/O power supply
10	Analog Power	VCI	Internal power for RAM
11	O	ELON	DC DC IC Enable
12	I	CSB	Chip select signal input (Low Active)
13	-	SCL	Serial data transfer clock input pin
14	I	SDI	Serial data input pin
15	I	SDO	Serial data output pin
16	I	ENABLE	Data enable signal pin for RGB I/F
17	I	VSYNC	Vertical sync signal of the RGB I/F
18	I	HSYNC	Horizontal sync signal of the RGB I/F
19	Power	GND	Ground Terminal
20	I	DOTCLK	Dot clock signal of the RGB I/F
21	Power	GND	Ground Terminal
22	I/O	D23	Unidirectional Data Bus
23	I/O	D22	Unidirectional Data Bus
24	I/O	D21	Unidirectional Data Bus
25	I/O	D20	Unidirectional Data Bus
26	I/O	D19	Unidirectional Data Bus
27	I/O	D18	Unidirectional Data Bus
28	I/O	D17	Unidirectional Data Bus
29	I/O	D16	Unidirectional Data Bus
30	I/O	D15	Unidirectional Data Bus
31	I/O	D14	Unidirectional Data Bus
32	I/O	D13	Unidirectional Data Bus
33	I/O	D12	Unidirectional Data Bus
34	I/O	D11	Unidirectional Data Bus
35	I/O	D10	Unidirectional Data Bus
36	I/O	D9	Unidirectional Data Bus
37	I/O	D8	Unidirectional Data Bus
38	I/O	D7	Unidirectional Data Bus
39	I/O	D6	Unidirectional Data Bus
40	I/O	D5	Unidirectional Data Bus
41	I/O	D4	Unidirectional Data Bus
42	I/O	D3	Unidirectional Data Bus
43	I/O	D2	Unidirectional Data Bus
44	I/O	D1	Unidirectional Data Bus
45	I/O	D0	Unidirectional Data Bus
46	I/O	GND	Ground Terminal
47	I	RESETB	Reset Signal (0: reset, 1: normal operation)
48	-	MTP_VPP2	Connection to VCI when it is not EEPROM write program mode.
49	-	MTP_VPP1	Connection to GND when it is not EEPROM write program mode.
50	-	GND	Ground Terminal
51	-	GND	Ground Terminal

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3 Absolute Maximum Ratings

GND=0V

Item	Symbol	MIN	MAX	Unit	Remark
Power Voltage	VDD	-0.3	5	V	Note1
Operating Temperature	Top	-40	70	°C	
Storage Temperature	Tst	-40	85	°C	

Table 3 Absolute Maximum Ratings

Note 1: Temperature and relative humidity range are shown in the figure below.

4 Electrical Characteristics

4.1 Driving TFT LCD Panel

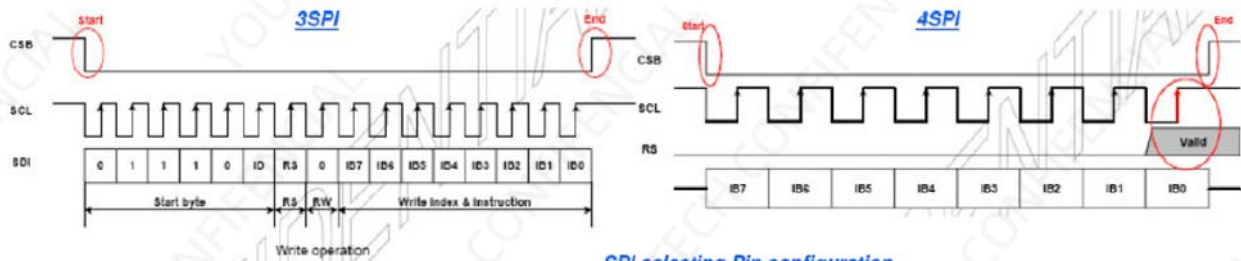
- Test Conditions : IOVCC=2.8V, VCI=2.8V, Vbat=3.8V, VSS=0V, Tamb=25 °C
at Full white(250nit) unless otherwise specified.

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	Logic	IOVCC	-	1.65	1.8	V
		VCI	-	2.5	2.9	
	Power	VBat	-	2.5	3.8	
		ELVDD		4.554	4.6	
		ELVSS		-4.998	-4.9	
Input Voltage	"H" level	VIH	-	0.8*IOVCC	-	V
	"L" level	VIL	-	-0.2	-	

5 Timing Chart

5.1 RGB Interface

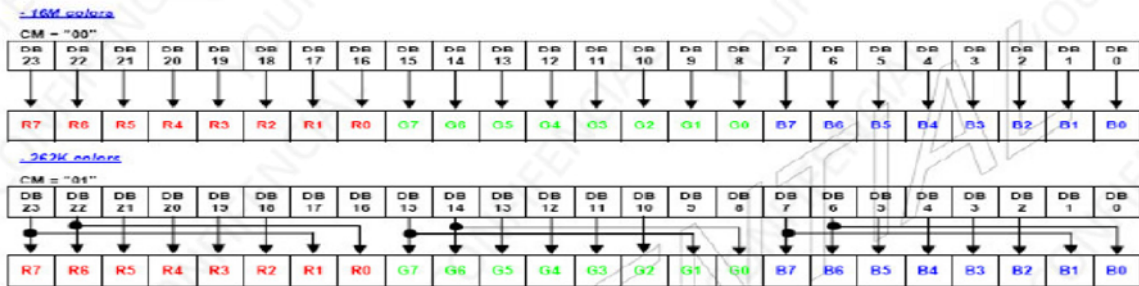
Instruction format



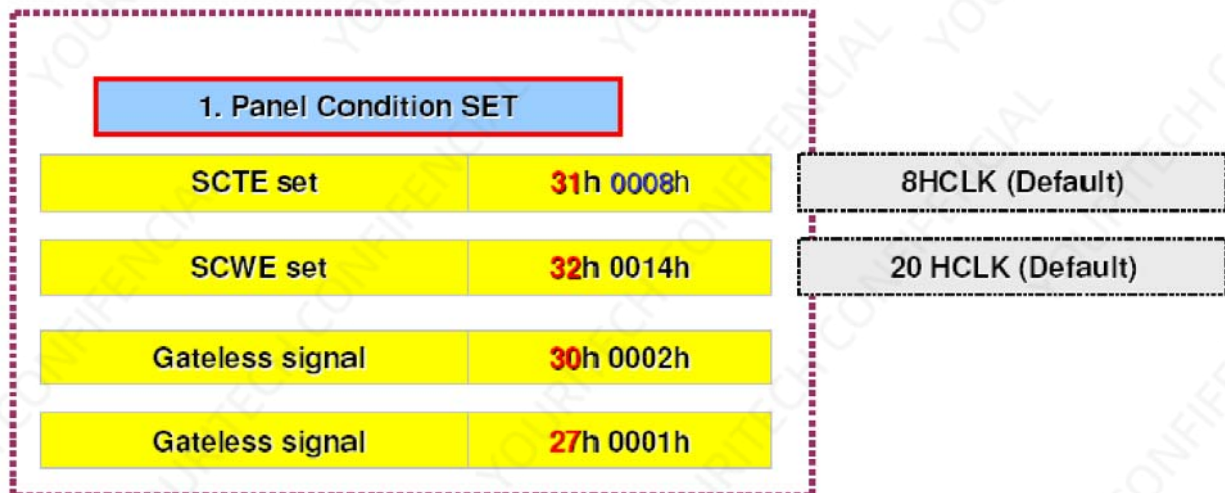
SPI selecting Pin configuration

IM1	IM0/ID	SPI mode
GND	I/D	3-Pin Serial Peripheral Interface
IOVCC	GND	4-Pin Serial Peripheral Interface

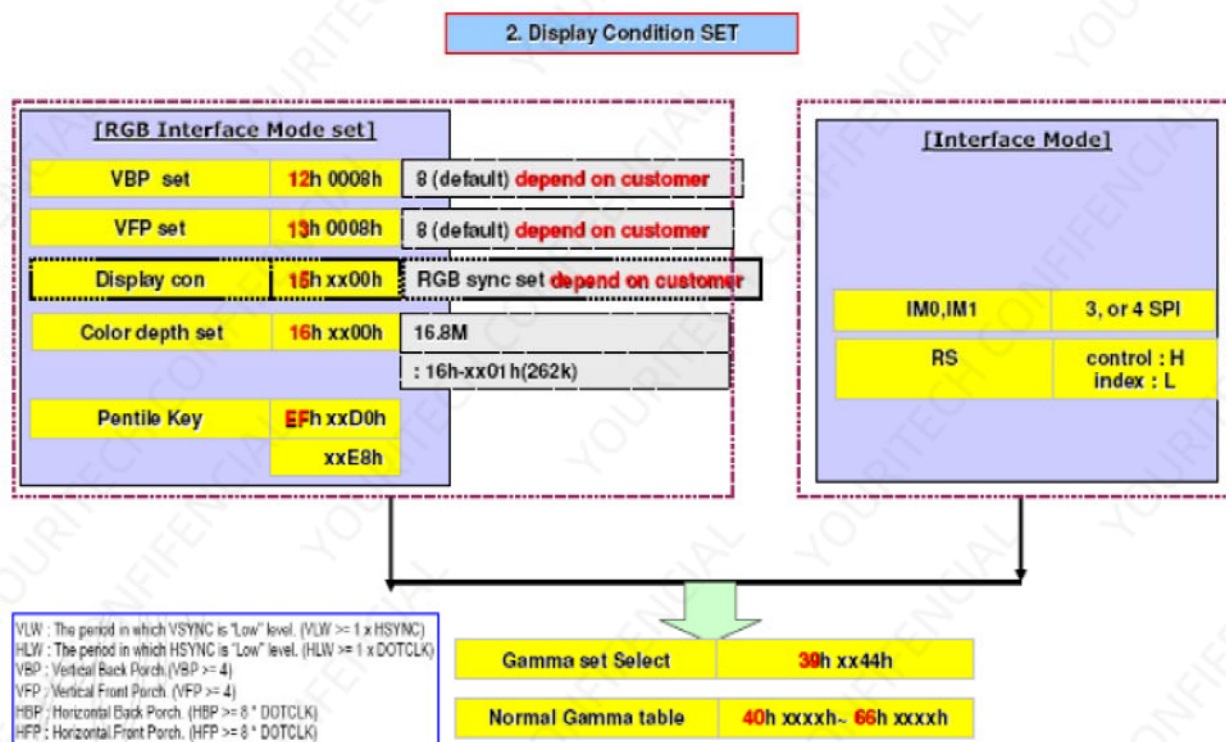
image data format



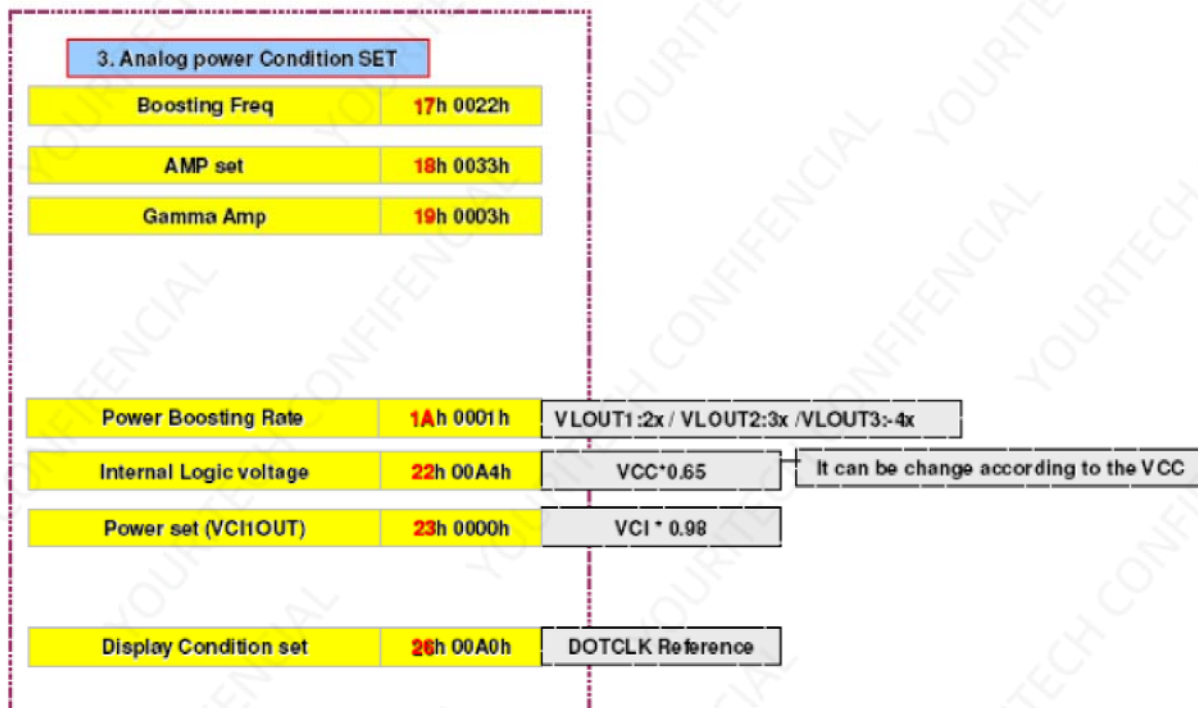
5.2 Panel Condition Set(LTPS)



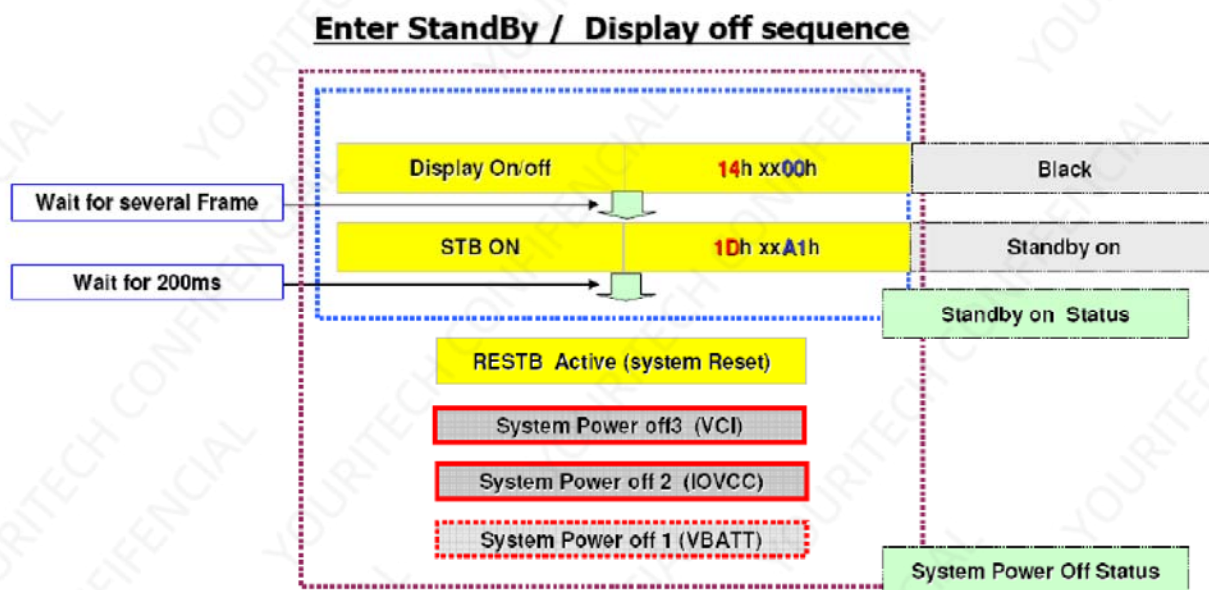
5.4 Display Condition Set



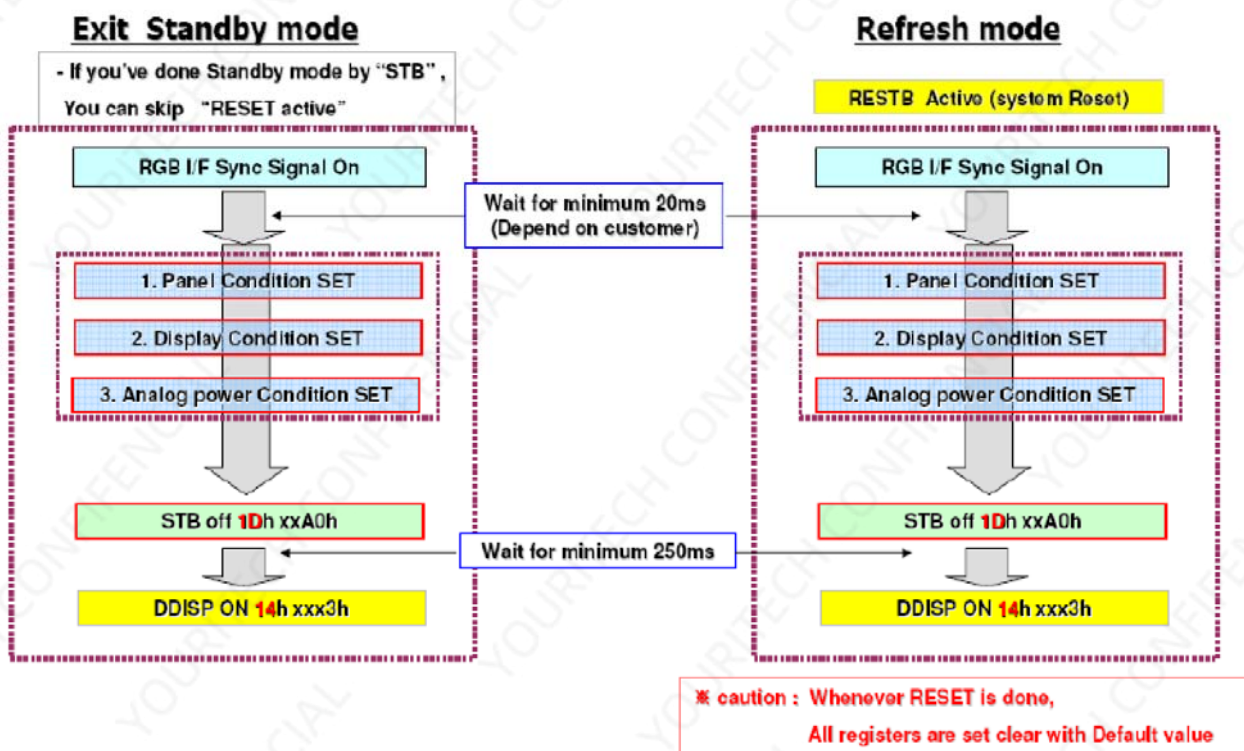
5.5 Analog Power Condition Set



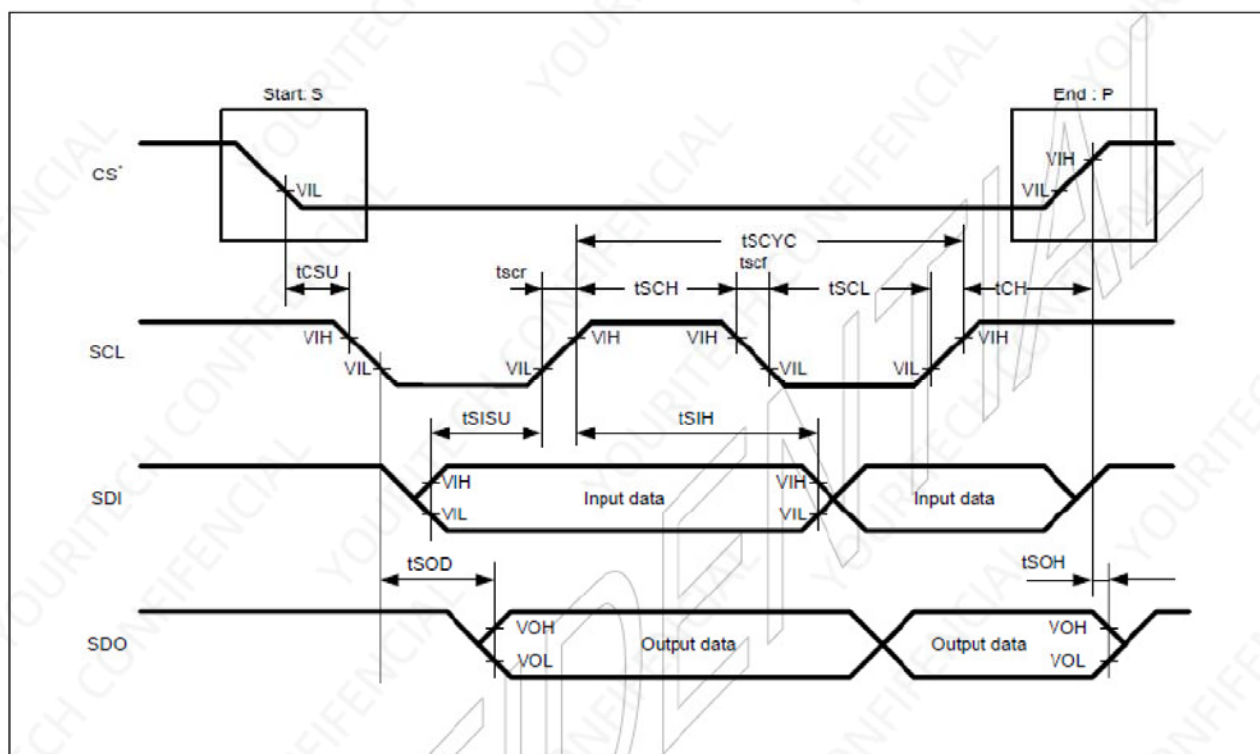
5.6 Power OFF sequence(display off sequence)



5.7 Exit Standby mode



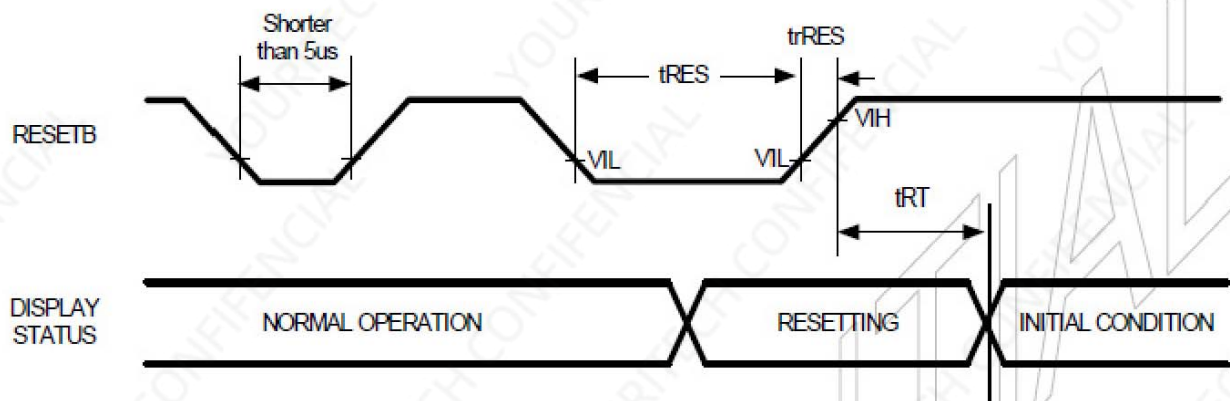
5.8 AC Characteristics



IOVCC=1.65 to 3.3V, VCC= 2.4 to 3.3V operation

Item	Symbol	Min.	Typ.	Max.	Unit
Write (received)	tSCYC	100	-	-	ns
Read (transmitted)	tSCYC	350	-	-	ns
Write (received)	tSCH	40	-	-	ns
Read (transmitted)	tSCH	150	-	-	ns
Write (received)	tSCL	40	-	-	ns
Read (transmitted)	tSCL	150	-	-	ns
Serial clock rise/fall time	tSCr, tSCf	-	-	20	ns
Chip select set up time	tCSU	20	-	-	ns
Chip select hold time	tCH	60	-	-	ns
Serial input data set up time	tSISU	30	-	-	ns
Serial input data hold time	tSIH	30	-	-	ns
Serial output data delay time	tSOD	-	-	130	ns
Serial output data hold time	tSOH	5	-	-	ns

5.9 Reset Timing Characteristics



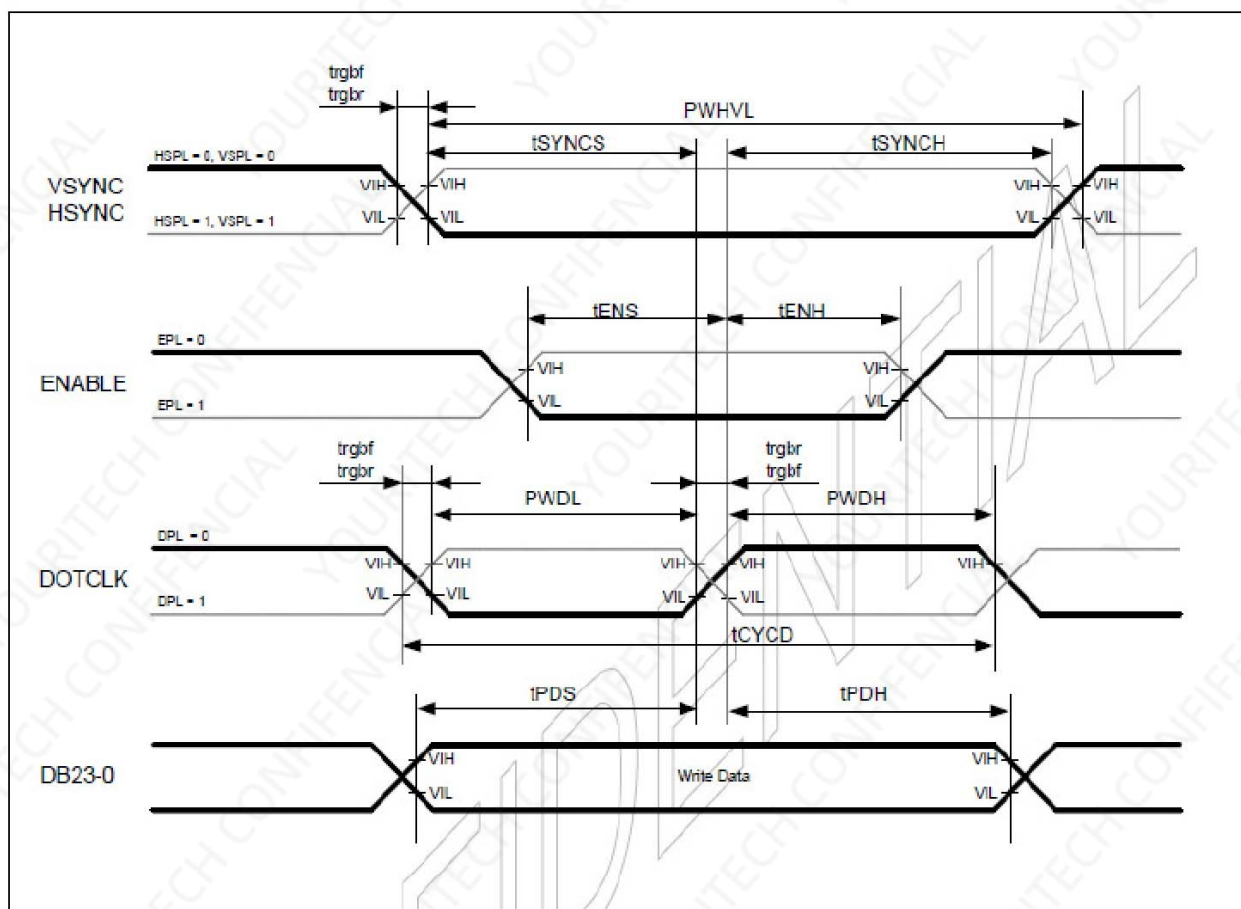
IOVCC=1.65 to 3.3V, VCC= 2.4 to 3.3V operation

Item	Symbol	Unit	Min.	Typ.	Max.
Reset low-level width	tRES	us	10	-	-
Reset rise time	trRES	us	-	-	2
Reset cancel	tRT	ms			1

Reset description

RESETB Pulse	Action
Shorter than 5us	Reset rejected
Longer than 10us	Reset
Between 5 ~ 10us	Reset starts

5.10 RGB Interface Timing Characteristics



RGB interface(16/18/24-bit), IOVCC=1.65 to 3.3V, VCC= 2.4 to 3.3V operation

Item	Symbol	Min.	Typ.	Max.	Unit
VSYNCS / HSYNCS "Low" level pulse width	PWHVL	1	-	-	DOTCLK
VSYNCS / HSYNCS set up time	tSYNCS	10	-	-	ns
VSYNCS / HSYNCS hold time	tSYNCH	10	-	-	ns
ENABLE set up time	tENS	10	-	-	ns
ENABLE hold time	tENH	10	-	-	ns
DOTCLK "Low" level pulse width	PWDL	10	-	-	ns
DOTCLK "High" level pulse width	PWDH	10	-	-	ns
DOTCLK cycle time	tCYCD	30	-	-	ns
Data set up time	tPDS	7	-	-	ns
Data hold time	tPDH	7	-	-	ns
DOTCLK, VSYSNC, HSYNCS rising, falling time	trgbr, trgbf	-	-	15	ns

Note 1) Above AC characteristics condition is in case of VCCL >= 1.8V irrespective of VCC.

6 Optical Characteristics

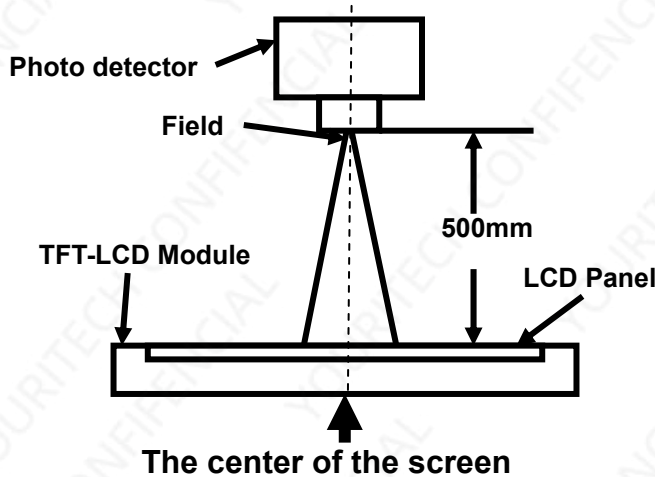
Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≥ 10	80	85	-	Degree	Note2,3
		θB		80	85	-		
		θL		80	85	-		
		θR		80	85	-		
Contrast Ratio		CR	θ=0°	2000	-	-		Note 3
Color Gamut		-	NTSC		105		%	
Life Time		-	H		3000		HR	
Response Time		T _{ON}	25℃	-	-	0.1	ms	Note 4
		T _{OFF}						
Chromaticity	White	x	Backlight is on	0.28	0.30	0.32		Note 1,5
		y		0.29	0.31	0.33		
	Red	x						Note 1,5
		y						
	Green	x						Note 1,5
		y						
	Blue	x						Note 1,5
		y						
Uniformity		U		80	85	--	%	Note 6
Luminance		L		200	250	-	cd/m ²	Note 7

Test Conditions:

1. $I_F = 20$ mA, and the ambient temperature is 25°C.
2. The test systems refer to Note 1 and Note 2.

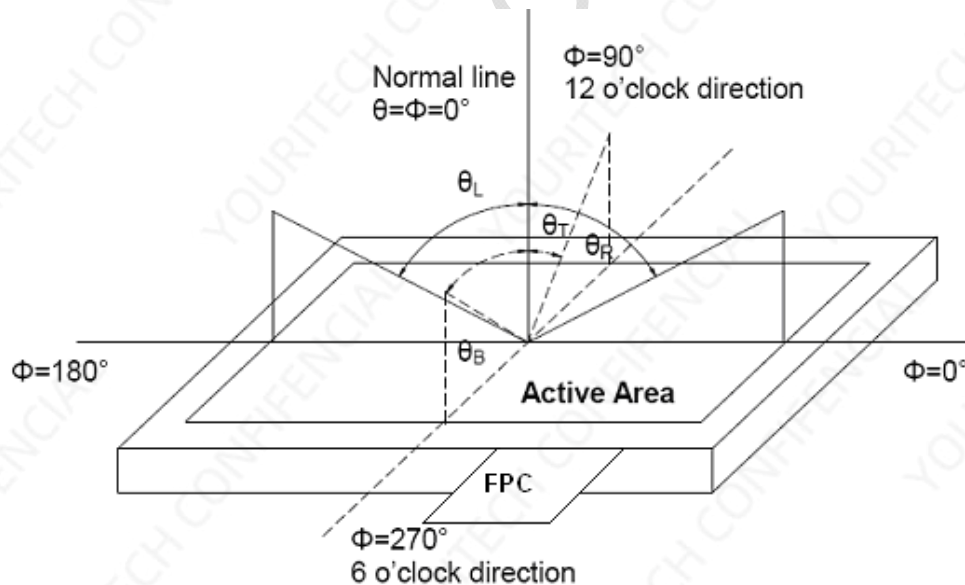
Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD.



Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

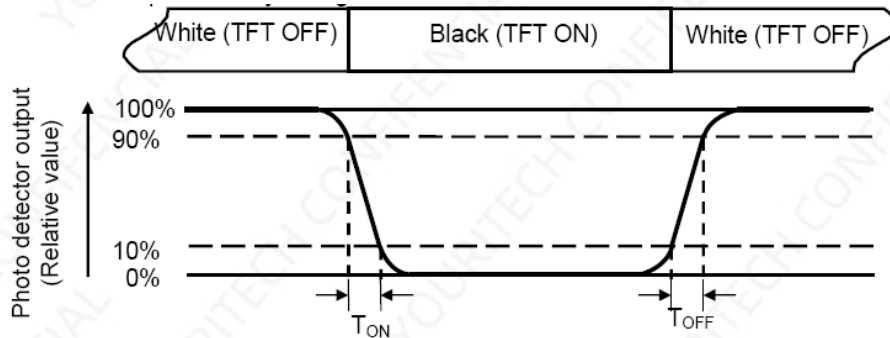
"White state ": The state is that the LCD should drive by V_{white} .

"Black state": The state is that the LCD should drive by V_{black} .

V_{white} : To be determined V_{black} : To be determined.

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931)

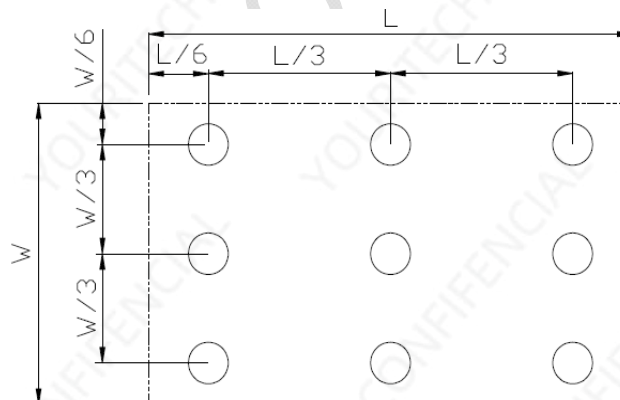
Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (U)} = L_{\min} / L_{\max}$$

L-----Active area length W----- Active area width



$L_{\max}$: The measured Maximum luminance of all measurement position.

$L_{\min}$: The measured Minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.

7 Environmental / Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	70℃, 120Hours	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	-40℃, 120Hours	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	85℃, 120Hours	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	-40℃, 120Hours	IEC60068-2-1:2007 GB2423.1-2008
5	Storage at High Temperature and Humidity	60℃, 90%RH, 120Hours	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-20℃ ↔ 70℃, ON/OFF, 20CYC	Start with cold temperature, End with high temperature, IEC60068-2-14:1984,G B2423.22-2002
7	ESD	Voltage:±8KV R:330 ohm,C:150pF Air discharge,10 times	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration Test	10 => 55 =>10 => 55 => 10 Hz, within 1 minute;Amplitude:1.5mm. 15 minutes for each Direction (X,Y,Z)	IEC60068-2-6:1982 GB/T2423.10—1995
10	Package Drop Test	Packed, 66CM free fall 6 sides, 1 corner, 3edges	IEC60068-2-32:1990 GB/T2423.8—1995

Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

Note3: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Note 4: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

8. Outline Dimension

基本规格:		产品规格	
DISPLAY TYPE:	NORMALY BLACK	DISPLAY TYPE:	TRANSMISSIVE
RESOLUTION:		RESOLUTION:	
Driver IC:		Driver IC:	
Viewing Angle (U/D/L/R):	80/80/80/80 Typ	Viewing Angle (U/D/L/R):	80/80/80/80 Typ
LCM BRIGHTNESS:		LCM BRIGHTNESS:	
Contrast:		Contrast:	
Chromaticity (W TP):		Chromaticity (W TP):	
MTSC:		MTSC:	
Unit/Format:		Unit/Format:	
Tc:		Tc:	
GAMMA		GAMMA	
CROSS TALK:		CROSS TALK:	
BACKLIGHT:		BACKLIGHT:	
Interface:		Interface:	
OPERATING TEMP:	-40°C ~ 70°C	OPERATING TEMP:	-40°C ~ 70°C
STORAGE TEMP:	-40°C ~ 80°C	STORAGE TEMP:	-40°C ~ 80°C
电压:	VCI=3.3V Typ	电压:	VCI=3.3V Typ
平面度:		平面度:	
寄存器地址:		寄存器地址:	

VER.	SYMBOL	AMENDMENT	SIGN	DATE	DRAWN	ME. CHECKED	EE. CHECKED	APPROVED	TITLE	DRAWING NO.	UNIT	SCALE	SHEET	TOP	1
01	A	First Issue	SP	2018.06.19					MODULE SPEC.	ET033FW01-O	mm				
深圳市优瑞泰克科技有限公司															

47.02 BL OUTLINE

45.02 LCD OUTLINE

41.24 LCD AA

73.02 LCD AA

81.24 LCD OUTLINE

83.24 BL OUTLINE

3.3" (48RGP854)

VIEWING DIRECTION: ALL

33.5

1.3

31.5

连接器

???

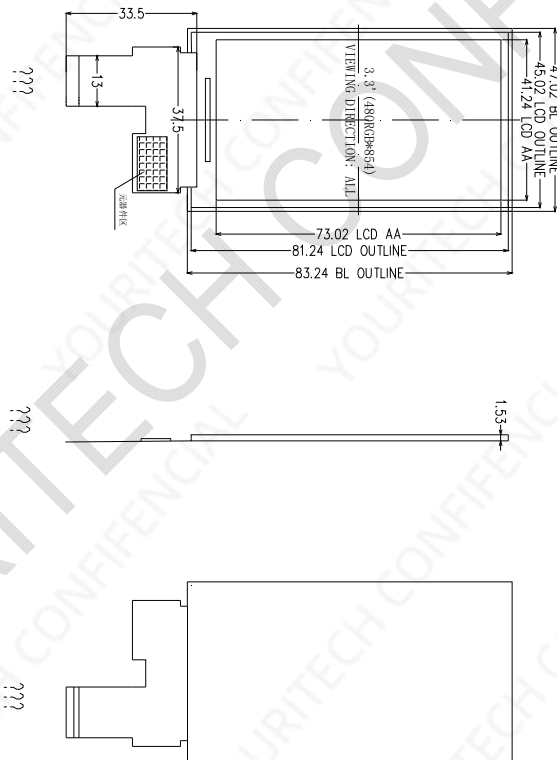
???

???

1.53

???

???



9 Packing Drawing

TBD

10 Precautions for Use of LCD Modules

a) Handling Precautions

- i. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- ii. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.
- iii. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- iv. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.
- v. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:
 - Isopropyl alcohol
 - Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
 - Ketone
 - Aromatic solvents
- vi. Do not attempt to disassemble the LCD Module.
 - vii. If the logic circuit power is off, do not apply the input signals.
 - viii. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

10.1.8.1 Be sure to ground the body when handling the LCD Modules.

10.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.

10.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

10.1.8.4 The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

b) Storage precautions

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i. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

ii. The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ~ 40℃ Relatively humidity: ≤80%

iii. The LCD modules should be stored in the room without acid, alkali and harmful gas.

c) Transportation Precautions

i. The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.