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PCAP

Mechanical design

Production Custom designs Installation



MODEL NO : ET090WS01-T

MODEL VERSION: 01

SPEC VERSION : 1.0

ISSUED DATE: 2022-12-13

☐ Preliminary Specification

☒ Final Product Specification

Customer : _____

Approved by	Notes

Youri Confirmation

Prepared by	Reviewed by	Approved by
John	Johnny	Wang

1. Introduction

1.1 Scope of application

LCD specification: Dots 1024xRGBx600.

As to basic specification of the driver IC, refer to the IC (Orise:TBD) 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;

LVDS interface

1.3 Applications:

Motorcycle dashboard

Electric Animation Dashboard

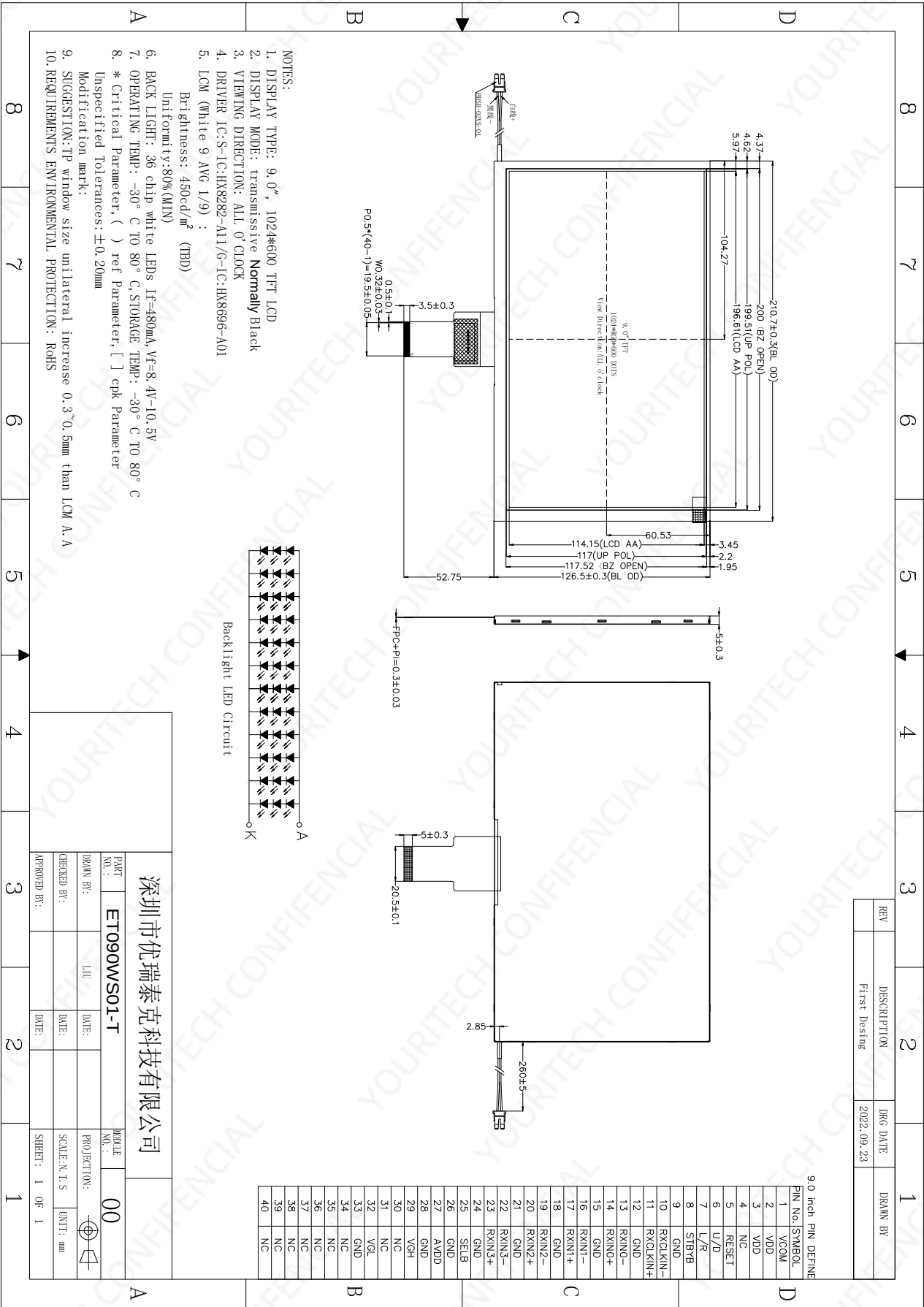
Medical display

Engineering vehicle display

Outdoor highlight equipment

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)	0.192(W)x 0.19025(H)	mm
Active area	196.61 (H) × 114.15 (V)	mm
Viewing direction	ALL O'CLOCK	
TFT Driver IC	TBD	-
TFT interface	LVDS Interface	-
Approx. Weight	TBD	g
LCM Size(W*H*T)	210.70(W) x126.50(H) x5.0(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	+80	°C
Humidity	RH	10	90	%

4.Electrical Characteristics

4.1 TFT DC Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
TFT OperationFrame rate	Hz	--	60	--	Hz	
Supply Voltage for(DC/DC)	VDD	2.3	3.3	3.6	V	
TFT Gate ON Voltage	VGH	--	18	--	V	
TFT Gate OFF Voltage	VGL	--	-8	--	V	
TFT Common Voltage	Vcom	4.0	4.4	4.6	V	
AVDD	Avdd	9.6	10.2	13.5	V	

4.2 Back-Light Unit Characeristics

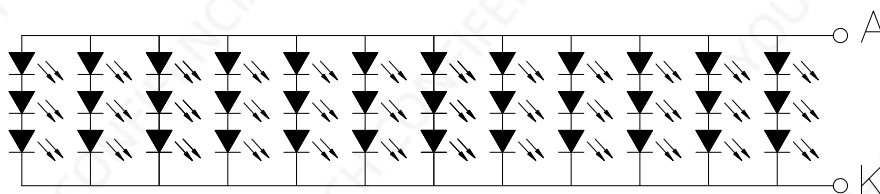
The back-light system is an edge-lighting type with 36 white LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V _F	8.4	--	10.5	V	-
Forward current	I _F	--	480	--	mA	-
Luminance(With LCD)	L _v	--	450	--	cd/m ²	-
LED life time	N/A	--	20,000	--	Hr	Note 1

Note:

- (1) The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_L=30mA/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

LCM PIN Description:

Pin No.	Symbol	LCM Description	remarks
1	VCOM	Common Voltage	
2~3	VDD	Power for Digital Circuit 3.3V	
4	NC	No connection	
5	RESET	Global reset pin	
6	U/D	Gate Up or Down scan control. Normally pull low.	
7	L/R	Source Right or Left sequence control. Normally pull high.	
8	STBYB	Standby mode: STBYB = "H", normal operation (default) STBYB = "L", timing controller, source driver will turn off, all output are High-Z.	
9	GND	Ground	
10	NIND	-LVDS CLOCK differential signal input	
11	PIND	+LVDS CLOCK differential signal input	
12	GND	Ground	
13	NIND0	-LVDS differential data input	
14	PIND0	+LVDS differential data input	
15	GND	Ground	
16	NIND1	-LVDS differential data input	
17	PIND1	+LVDS differential data input	
18	GND	Ground	
19	NIND2	-LVDS differential data input	
20	PIND2	+LVDS differential data input	
21	GND	Ground	
22	NIND3	-LVDS differential data input	
23	PIND3	+LVDS differential data input	
24	GND	Ground	
25	SELB	6bit/8bit mode select	Note1
26	GND	Ground	
27	AVDD	Power for Analog Circuit	

28	GND	Ground	
29	VGH	Gate ON Voltage	
30-31	NC	No connection	
32	VGL	Gate OFF Voltage	
33	GND	Ground	
34-40	NC	No connection	

Note1:

If LVDS input data is 6 bits, SELB must be set to High;

If LVDS input data is 8 bits, SELB must be set to Low.

Note2: When L/R="0", set right to left scan direction.

When L/R="1", set left to right scan direction.

When U/D="0", set top to bottom scan direction.

When U/D="1", set bottom to top scan direction.

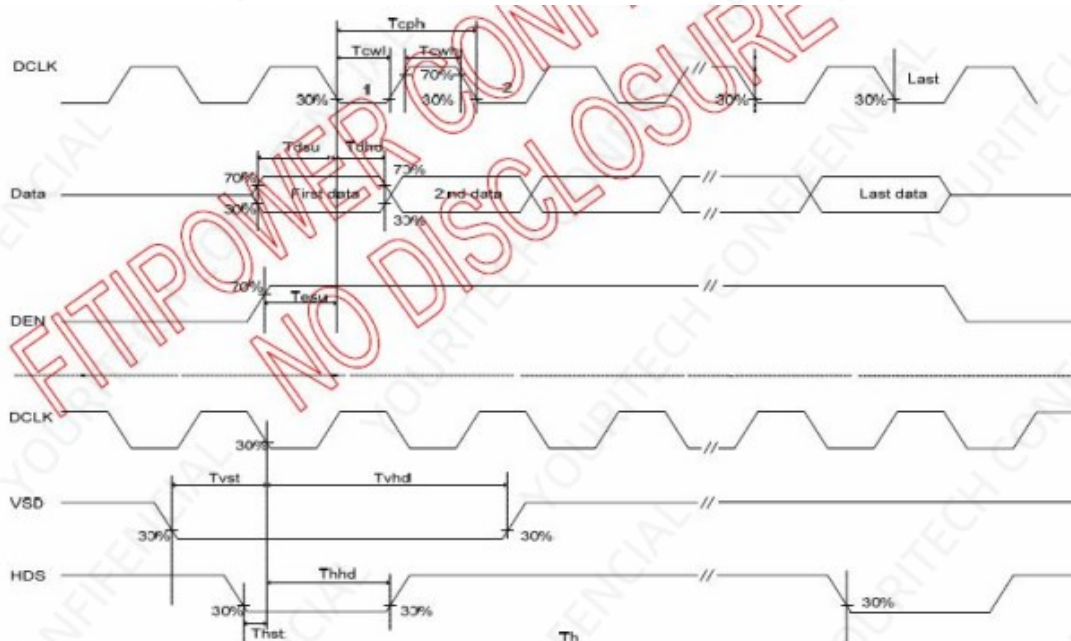
- DE mode

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	40.8	51.2	67.2	MHz
Horizontal Display Area	thd		1024		DCLK
HSD Period	th	1114	1344	1400	DCLK
HSD Blanking	thb+ thfp	90	320	376	DCLK
Vertical Display Area	tvd		600		T _H
VSD Period	tv	610	635	800	T _H
VSD Blanking	tvbp+ tvfp	10	35	200	T _H

- HV mode

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	44.9	51.2	63	MHz
Horizontal Display Area	thd	1024			DCLK
HSD Period	th	1200	1344	1400	DCLK
HSD Pulse Width	thpw	1	-	140	DCLK
HSD Back Porch	thbp	160			DCLK
HSD Front Porch	thfp	16	160	216	DCLK

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd		600		T _H
VSD Period	tv	624	635	750	T _H
VSD Pulse Width	tpw	1	-	20	T _H
VSD Back Porch	tvbp		23		T _H
VSD Front Porch	tvfp	1	12	127	T _H



Reset Input Timing:

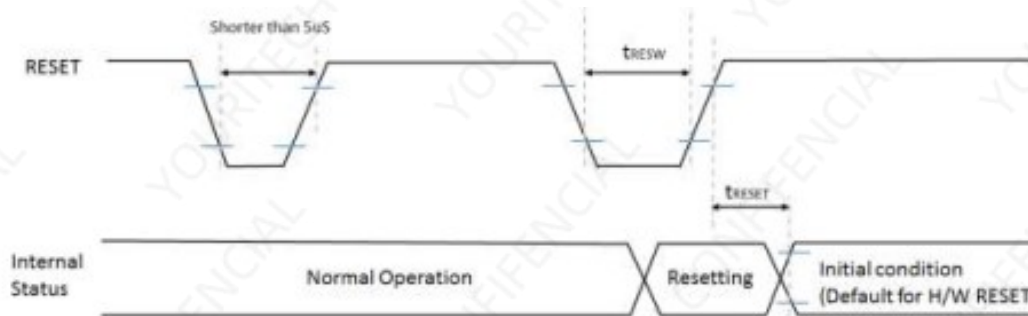


Figure 4-13 Reset Input Timing

Table 4-2 Reset Input Timing

Signal	Symbol	Parameter	Description	Specification			Unit	Notes
				MIN	TYP	MAX		
RESET	tRESW	Reset "L" pulse width		10			uS	1
	tRESET	Reset complete time	When reset applied during Sleep in mode			5	mS	2
			When reset applied during Sleep Out mode			120	mS	5

Note 1: Condition : Ta =25°C

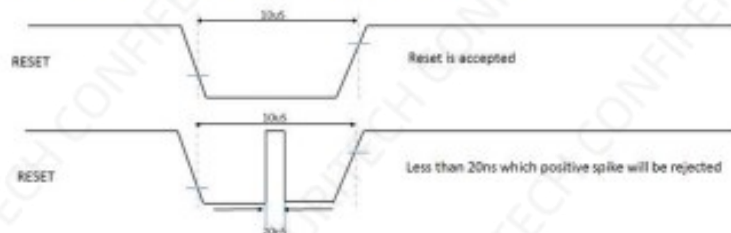
Note 2: Spike due to an electrostatic discharge on RESET line does not cause irregular system reset according to the table below.

RESET Pulse	Action
Less than 5us	Reset Rejected
More than 10uS	Reset
Between 5us and 10uS	Reset Start

Note 2: During the resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120ms, when Reset Starts in sleep out mode. The display remains the blank state in sleep in mode) and then return to Default condition for H/W RESET.

Note3: During Reset Complete Time, values in OTP memory will be latched to internal register during this period. This loading is done every time when there is H/W RESET complete time (tRESET) within 5ms after a rising edge of RESET.

Note 4: Spike Rejection also applies during a valid reset pulse as shown below:



Note 5: It is necessary to wait 5ms after releasing RESET when sending commands, and Sleep Out command can not be sent within 120ms.

7.Optical Characteristics

< Table 11. Optical Specifications>

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	-	85	-	Deg.	WV-Pol Note 1
		Θ_9		-	85	-	Deg.	
	Vertical	Θ_{12}		-	85	-	Deg.	
		Θ_6		-	85	-	Deg.	
Luminance Contrast ratio		CR	$\Theta = 0^\circ$	-	800	-		Note 2
Cell Transmittance		Tr		-	5.5	-	%	Base on C Light Note 3
White Chromaticity		x_w		TYP. - 0.03	0.302	TYP. + 0.03		Note 4 Base on C Light
		y_w			0.334			
Reproduction of color (C light)	Red	R_x			0.619			
		R_y			0.337			
	Green	G_x			0.279			
		G_y			0.538			
	Blue	B_x			0.141			
		B_y			0.134			
Color Gamut (C light)					-	50	-	%
Response Time (Rising + Falling)		T_{RT}	Ta= 25° C $\Theta = 0^\circ$	-	30	40	ms	Note 5

Note :

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 5).
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 5) Luminance Contrast Ratio (CR) is defined mathematically.

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

3. Transmittance is the Value with Polarizer.
4. The color chromaticity coordinates specified in Table 6 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Calculation is based on C light.
5. The electro-optical response time measurements shall be made as FIGURE 6 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is T_r , and 90% to 10% is T_d .

8. Reliability Test Item

No.	Test Item	Test Condition	Notes
1	High Temp. Storage	+80°C / 96H	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	-30°C / 96H	
3	High Tempe. Operating	+80°C / 96H	
4	Low Tempe. Operating	-30°C / 96H	
5	High Temperature /Humidity storage	60°C x 90%RH /96H	
6	Thermal and cold shock	Static state, -20°C (30min) ~70°C (30min) , 50 cycles	

9. Packing Method----TBD

- END -