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MODEL NO : ET070WQ02-T

MODEL VERSION: 01

SPEC VERSION : 1.0

ISSUED DATE: 2022-09-13

☐ 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

This LCD module should be designed for mobile phone use.

LCD specification: Dots 280xRGBx1424.

As to basic specification of the driver IC, refer to the IC (NV3052C) 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

280 dot-segment and 1424 dot-common outputs;

16.7M Color can be selected by software;

White LED back light;

24bit RGB interface

1.3 Applications:

2. LCM General specification

ITEM	Standard value	Unit
LCD Type	Normally Black	--
Drive element	TFT active matrix	--
Number of pixels	280*3RGB(H)X1424(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch (W*H)	0.120(W)x 0.120(H)	mm
Active area	33.60(H) ×170.88 (V)	mm
Viewing direction	ALL O'CLOCK	
TFT Driver IC	NV3052C	-
TFT interface	24bit RGB Interface	-
Approx. Weight	TBD	g
LCM Size(W*H*T)	38.20(W) x182.47(H) x3.50(T)	mm
Touch structure		
Touch Driver IC		
Touch Interface		

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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
Humidity	RH	10	90	%

4. Electrical Characteristics

4.1 TFT DC Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage for I/O	VDDIO	--	--	--	V
Supply Voltage for(DC/DC)	VDD	2.5	3.3	3.3	V
Current Consumption	I _{DD}	--	--	--	mA
	I _{DD-SLEEP}	--	--	--	uA

4.2 Back-Light Unit Characteristics

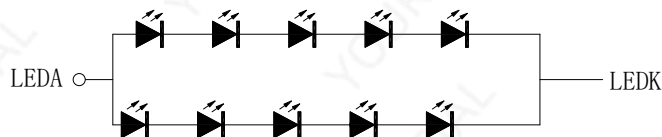
The back-light system is an edge-lighting type with 10 white LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V _F	14	--	16	V	-
Forward current	I _F	--	80	--	mA	-
Luminance(With LCD)	L _v	--	500	--	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=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. Module Function Description

Pin No.	Symbol	LCM Description	remarks
1	LEDA	POWER SUPPLY- FOR BACKLIGHT CATHODE	
2	LEDK	POWER SUPPLY+ FOR BACKLIGHT ANODE	
3	VCC 3.3V	Power Supply For LCD.	
4~5	GND	Power ground	
6	DE	Data enable signal in RGB I/F mode 1	
7	VS	Vertical sync. Signal in RGB I/F	
8	HS	Horizontal sync. Signal in RGB I/F	
9	CLK	Dot clock signal for RGB interface operation.	
10~17	B7~B0	8 bit data bus display blue data	
18~25	G7~G0	8 bit data bus display green data	
26~33	R7~R0	8 bit data bus display red data.	
34	RESET	Global reser pin	
35	CS	Chip selection signal.	
36	SCL	Serial clock signal.	
37	SDA	Serial data input/output pin.	
38	GND	Power ground	
39	VCC 3.3V	Power Supply For LCD.	
40	GND	Power ground	

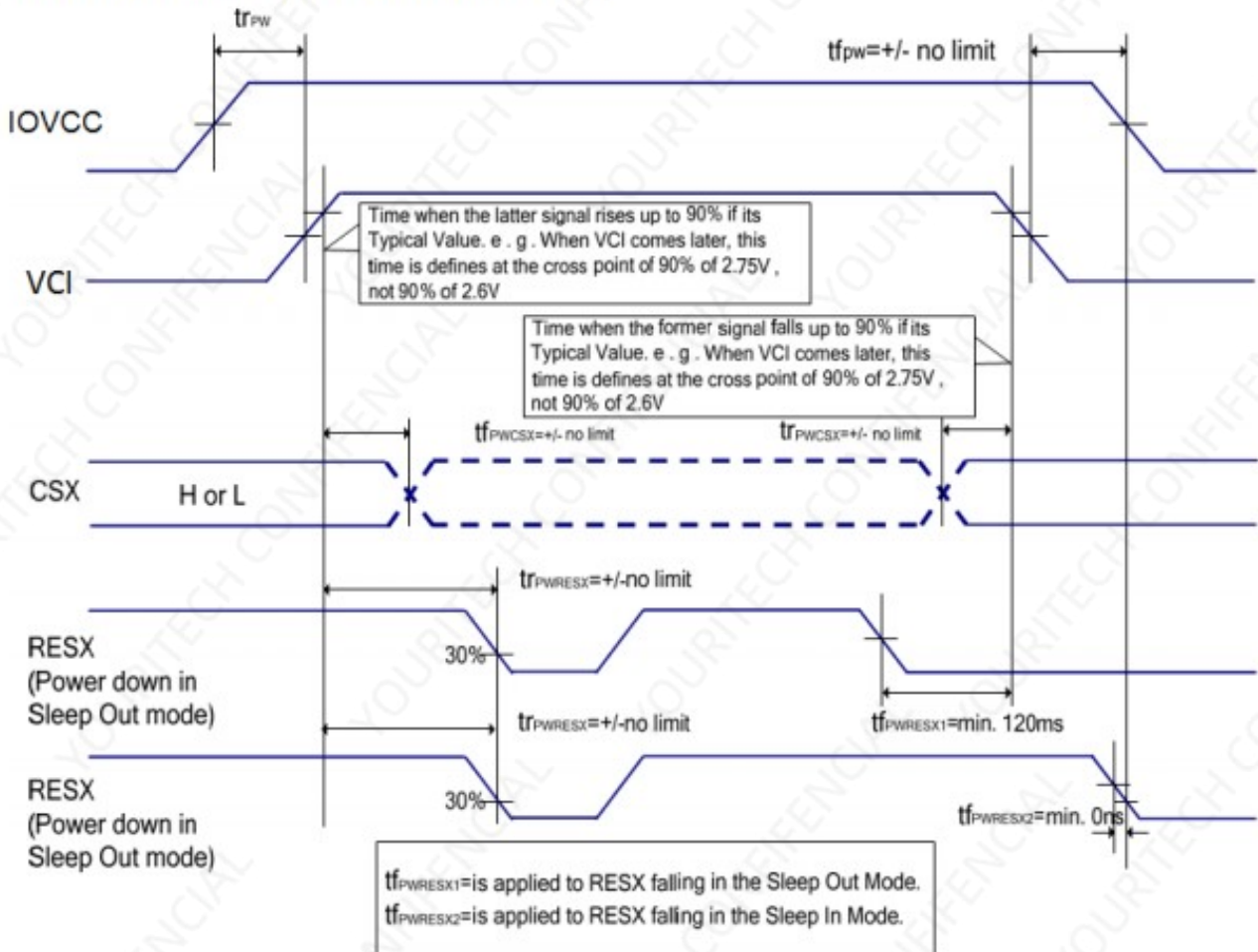
CTP PIN Description:

Pin No.	Symbol	CTP Functional	Notes
1	CTP_RST 2.8V	Touch panel reset	
2	CTP_INT 2.8V	Touch panel interrupt output	
3	GND	Power ground	
4	CTP_SDA 2.8V	Touch panel I2C data	
5	CTP_SCL 2.8V	Touch panel I2C clock	
6	CTP_VCC 2.8V	Touch panel Power supply 2.8~3.3V	

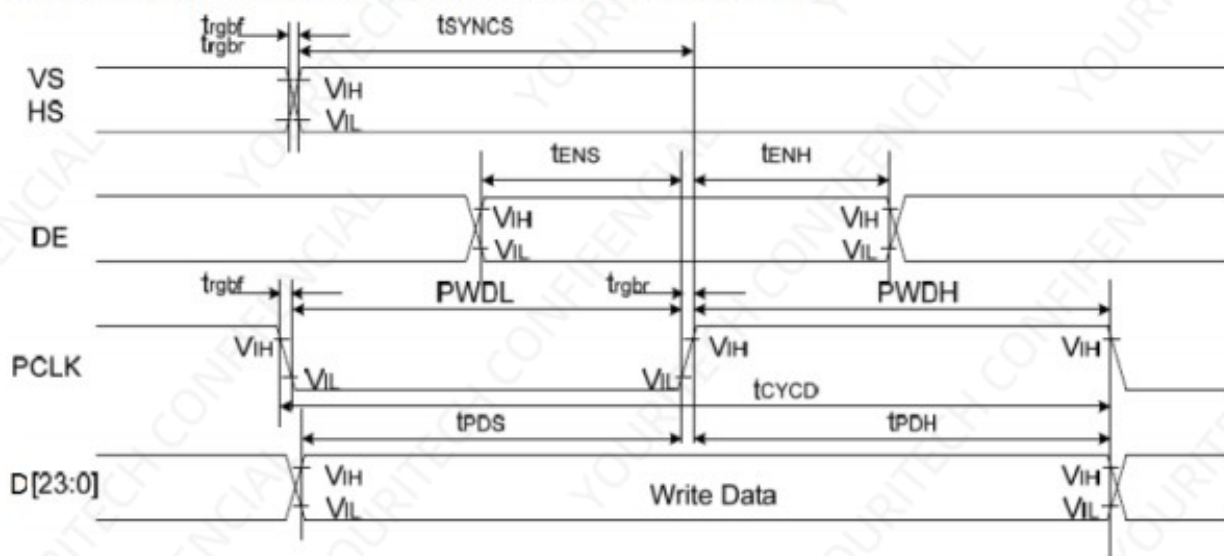
6. Timing Characteristics

Case 1 – RESX line is held high or unstable by host at power on

If RESX line is held High or unstable by the host during Power On, then a Hardware Reset must be applied after both VCI and IOVCC have been applied – otherwise correct functionality is not guaranteed. There is no timing restriction upon this hardware reset.



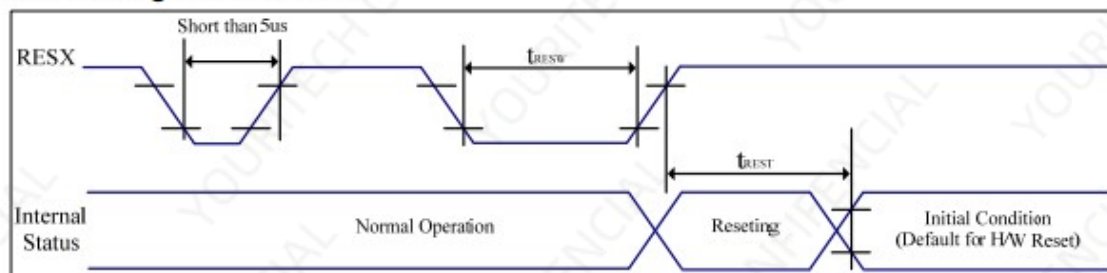
Parallel 24/18/16-bit RGB Interface Timing Characteristics



Signal	Symbol	Parameter	min	max	Unit	Description
VS/HS	t_{SYNCS}	VS/HS setup time	5	-	ns	24/18/16-bit bus RGB interface mode
	t_{SYNCH}	VS/HS hold time	5	-	ns	
DE	t_{ENS}	DE setup time	5	-	ns	
	t_{ENH}	DE hold time	5	-	ns	
D[23:0]	t_{POS}	Data setup time	5	-	ns	
	t_{PDH}	Data hold time	5	-	ns	
PCLK	$PWDH$	PCLK high-level period	13	-	ns	
	$PWDL$	PCLK low-level period	13	-	ns	
	t_{CYCD}	PCLK cycle time	28	-	ns	
	t_{grbr}, t_{grbf}	PCLK, HS, VS rise/fall time	-	15	ns	

Note 1: IOVCC=1.65 to 3.6V, VCI=2.5 to 6V, VSSA=VSS=0V, Ta=-30 to 70°C

Reset timing characteristics



VSS=0V, IOVCC=1.65V to 3.6V, VCI=2.5V to 6.0V, Ta = -30°C to 70°C

Symbol	Parameter	Related Pins	MIN	TYP	MAX	Note	Unit
t_{RESW}	*1) Reset low pulse width	RESX	10	-	-	-	us
t_{REST}	*2) Reset complete time	-	-	-	5	When reset applied during Sleep in mode	ms
		-	-	-	120	When reset applied during Sleep out mode	ms

Table: Reset input timing

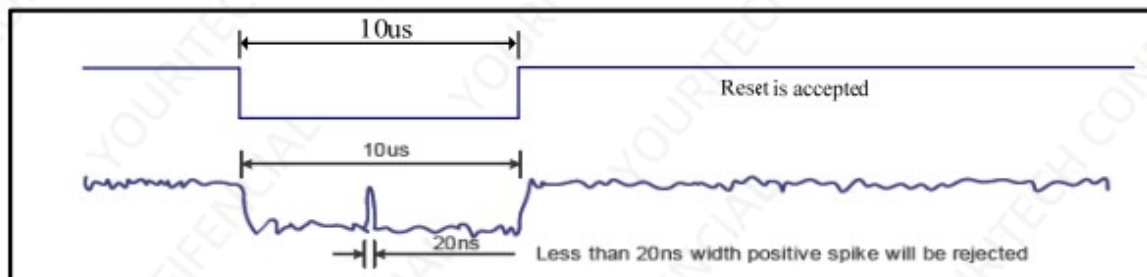
Note 1: Due to an electrostatic discharge on RESX line, spike does not cause irregular system reset according to the table below.

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 10us	Reset
Between 5us and 10us	Reset starts (It depends on voltage and temperature condition.)

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), then return to default condition for H/W reset.

Note 3: During Reset Complete Time, ID1/ID2/ID3 and VCOM value in OTP will be latched to internal register. After a rising edge of RESX, there is a H/W reset complete time (t_{REST}) which lasted 5ms. The loading operation will be done every time during this reset.

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



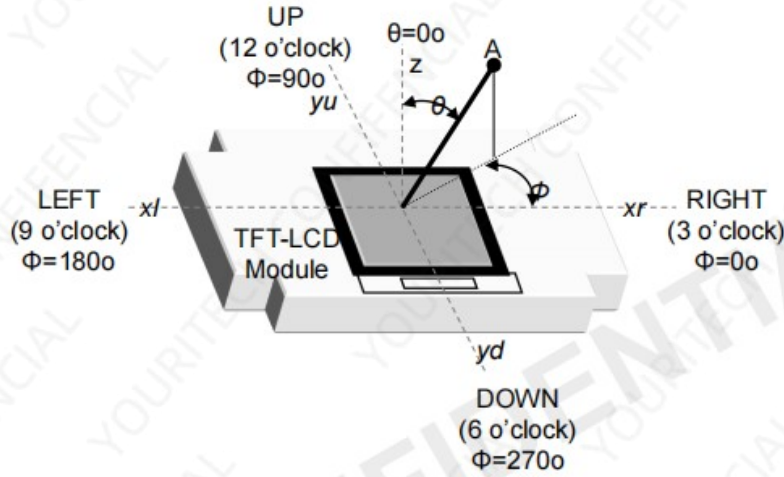
Note 5: It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120 msec.

7.Optical Characteristics

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	[Ta=25±2℃]
Viewing Angle Range	Horizontal	Θ ₃	CR > 10	80	85		Deg.	Note 4.1
		Θ ₉		80	85		Deg.	
	Vertical	Θ ₁₂		80	85		Deg.	
		Θ ₆		80	85		Deg.	
Contrast Ratio		CR	Θ = 0°	900:1	1200:1			Center, Perpendicular@25℃ BLU: silicate, with BEF Note 4.2
Cell Transmittance		Tr		3.6 (预估值, 待实物最终确定)	4.1 (预估值, 待实物最终确定)		%	Center, Perpendicular@25℃ BLU: silicate, with BEF Note 4.3
Reproduction of color		Wx	Θ = 0°	0.286	0.301	0.316		BOE产线管控only CF, With OC, @ "C" light, CIE 1931 Note 4.4
		Wy		0.314	0.329	0.344		
Color Gamut			Θ = 0°	60	65		%	only CF, Without OC, @ "C" light, CIE 1931
Response Time		Tr+Tf	Ta= 25℃ Θ = 0°			35	ms	Note 4.5

Note 4.1: 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 8).

<Figure 5. Viewing Angle Range Is Defined As Follows>



Note 4.2: 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. Luminance Contrast Ratio (CR) is defined mathematically.

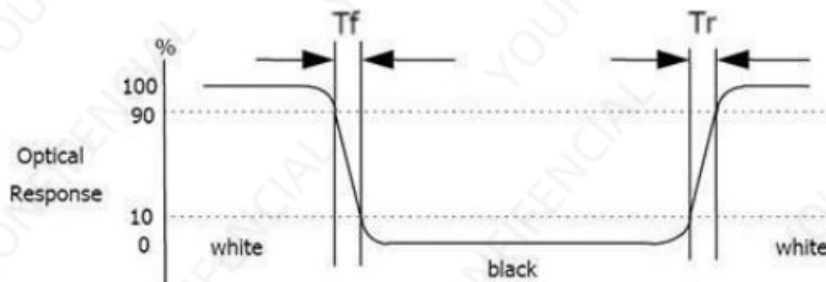
$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

Note 4.3: Transmittance is the Value with Polarizer.

Note 4.4: The color chromaticity coordinates specified in Table 16 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.

Note 4.5: The electro-optical response time measurements shall be made as Figure 9 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_f .

<Figure 6. Response Time Testing>



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	+70°C / 96H	
4	Low Tempe. Operating	-20°C / 96H	
5	High Temperature /Humidity storage	50°C x 90%RH /96H	
6	Thermal and cold shock	Static state, -20°C (30min) ~60°C (30min) , 50 cycles	

9. Packing Method----TBD

- END -