

INDUSTRIAL STRENGTH... Start Your Application From YOURITECH

Integration support

Obsolescence Management

PCAP

Embedded Systems

Human Machine Interface

Touch Solutions

Software

Quality Management

Open Frame Monitors

LCD Controller

Research & Development

Firmware

EMC tests

on-site service

Optical Bonding

In-house Manufacturing

Cover glass

System solutions

OEM Solutions

Custom Display

Production Custom designs Installation

Mechanical design



Project No. 项目编号	ET068BA01-T
Customer 客户名称	
Module No. 客户型号	
Product type 产品内容	Standard LCD Module TFT: 480*RGBx1280Dots 6.86" 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. This LCD module should be designed for mobile phone use.

LCD specification: Dots 480xRGBx1280.

As to basic specification of the driver IC, refer to the IC (NV3051F-L) 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

480 dot-segment and 1280 dot-common outputs;

16.7M Color can be selected by software;

White LED back light;

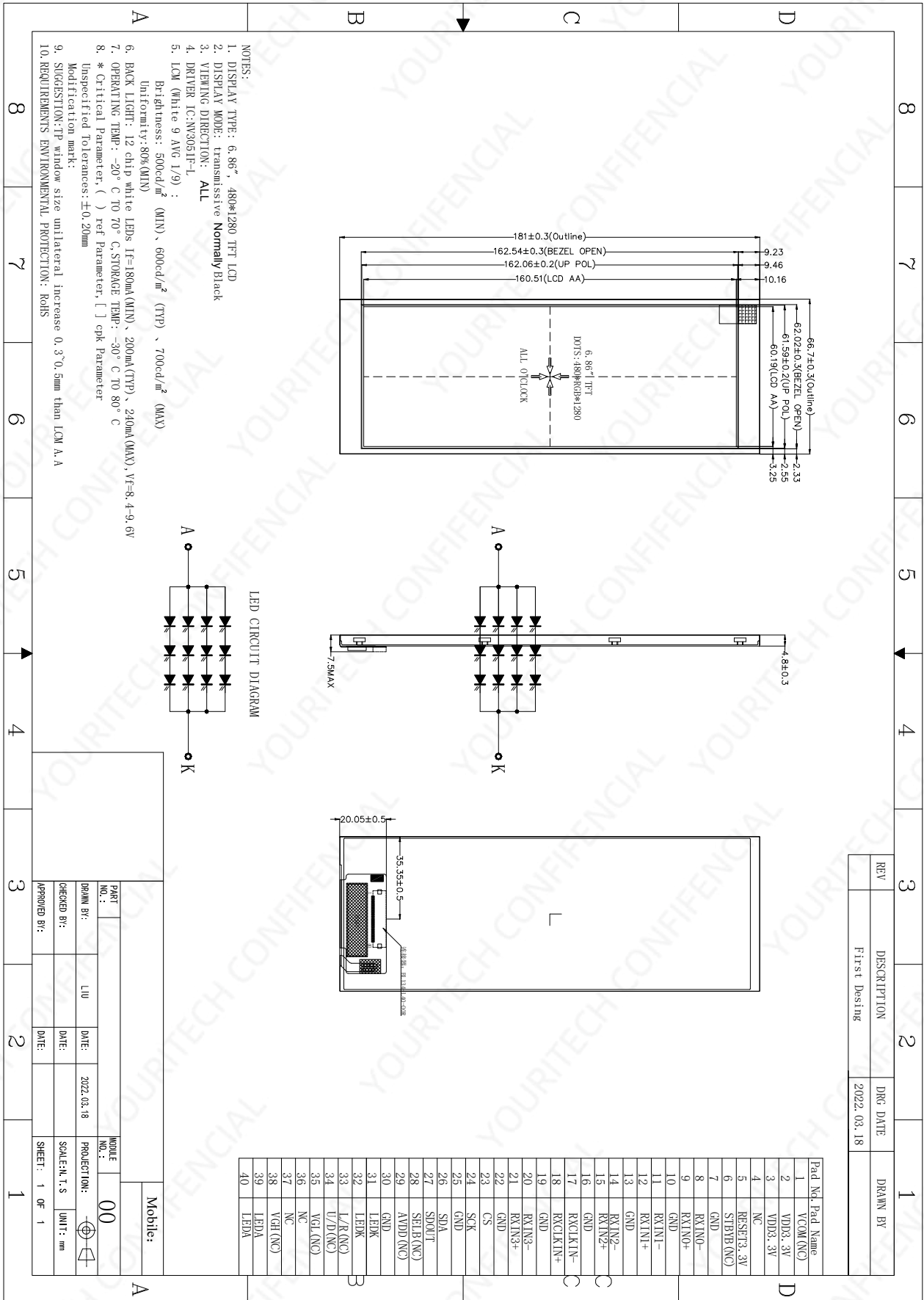
LVDS interface



2. LCM General specification

ITEM	Standard value	Unit
LCD Type	Normally Black	--
Drive element	TFT active matrix	--
Number of pixels	480*3RGB(H)X1280(V)	Dots
Pixel arrangement	RGB stripe	--
Pixel Pitch (W*H)	0.1254(W)x 0.1254(H)	mm
Active area	60.19(H) × 160.51 (V)	mm
Viewing direction	ALL O'CLOCK	
TFT Driver IC	NV3051F-L	-
TFT interface	LVDS Interface	-
Approx. Weight	TBD	g
LCM Size(W*H*T)	66.70(W) x181.00(H) x4.80(T)	mm
Touch structure	--	
Touch Driver IC	--	-
Touch Interface	--	





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	Note
TFT OperationFrame rate	Hz	--	60	--	Hz	
Supply Voltage for(DC/DC)	VDD	2.5	3.3	3.6	V	

4.2 Back-Light Unit Characeristics

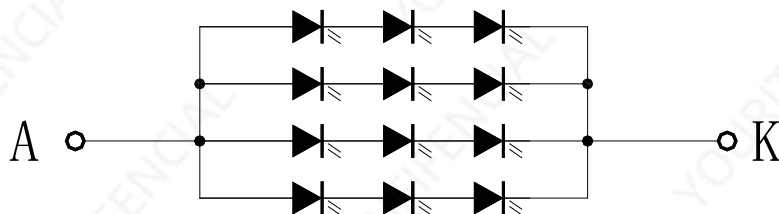
The back-light system is an edge-lighting type with 12 white LEDs. The characteristics of the back-light are shown in the following tables.

Characteristics	Symbol	Min.	Type	Max.	Unit	Notes
Forward Voltage	V _F	8.4	--	9.6	V	-
Forward current	I _F	180	200	240	mA	-
Luminance(With LCD)	L _v	500	600	700	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

LCM PIN Description:

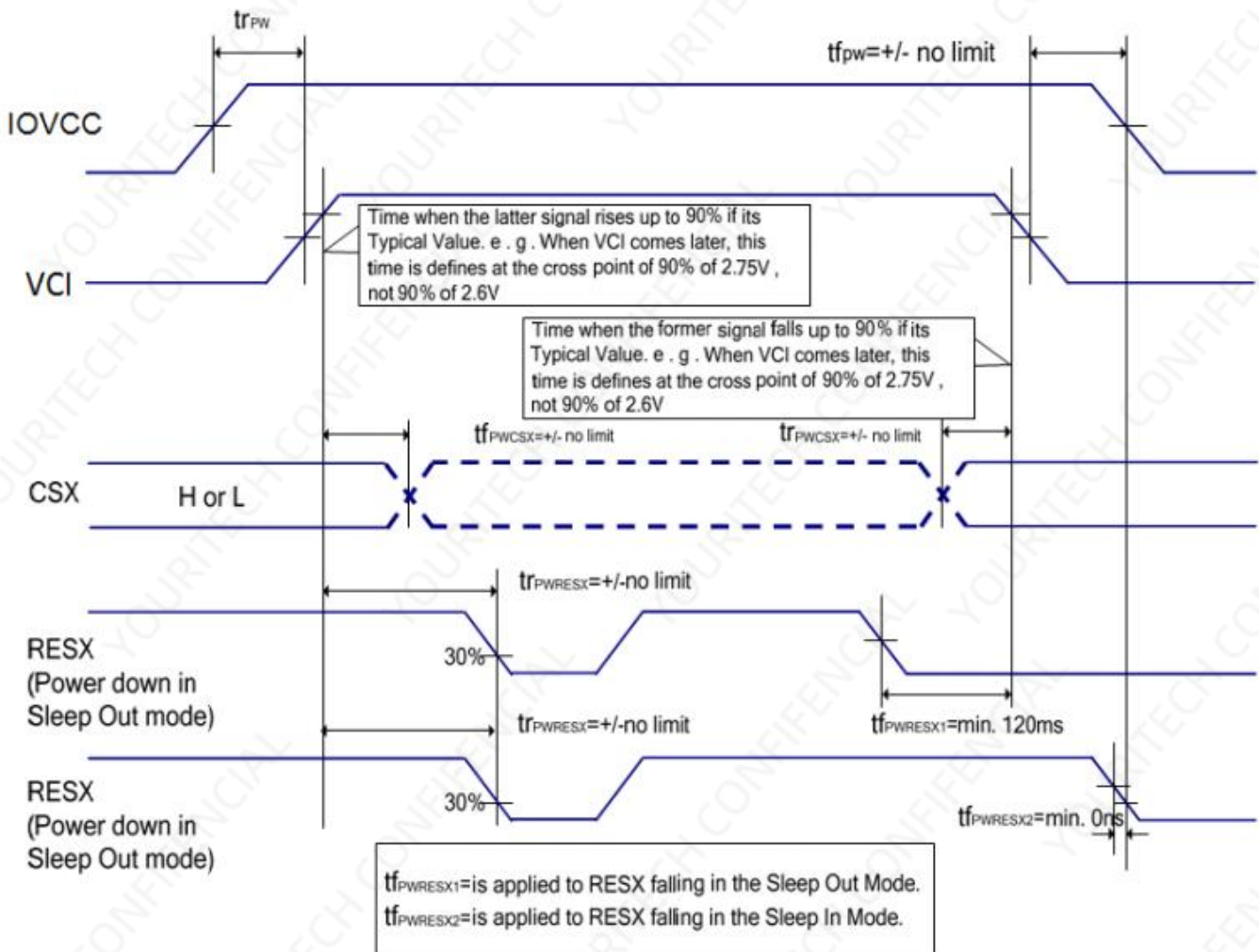
Pin No.	Symbol	Description
1	VCOM/NC	NC
2	VDD 3.3V	Power Voltage for digital circuit.
3	VDD 3.3V	Power Voltage for digital circuit.
4	NC	NC
5	RESET 3.3V	RESET PIN
6	STBYB/NC	NC
7	GND	Ground
8	RXIN0-	Negative LVDS Differential Data Input
9	RXIN0+	Positive LVDS Differential Data Input
10	GND	Ground
11	RXIN1-	Negative LVDS Differential Data Input
12	RXIN1+	Positive LVDS Differential Data Input
13	GND	Ground
14	RXIN2-	Negative LVDS Differential Data Input
15	RXIN2+	Positive LVDS Differential Data Input
16	GND	Ground
17	RXCLKIN-	Negative LVDS Differential Clock Input
18	RXCLKIN+	Positive LVDS Differential Clock Input
19	GND	Ground
20	RXIN3-	Negative LVDS Differential Data Input
21	RXIN3+	Positive LVDS Differential Data Input
22	GND	Ground
23	CS(NC)	NC
24	SCL(NC)	NC
25	GND	Ground
26	SDA(NC)	NC
27	SDO(NC)	NC
28	SELB(NC)	NC
29	AVDD(NC)	NC
30	GND	Ground
31-32	LED-	LED Cathode
33	L/R(NC)	NC
34	U/D(NC)	NC
35	VGL(NC)	NC
36	NC	NC
37	NC	NC
38	VGH(NC)	NC
39-40	LED+	LED Anode



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.



LVDS AC characteristic

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Clock Frequency	RxFCLK	-	30	-	TBD	MHz
Input data skew margin	TRSKM	$ VID = 200\text{mV}$ $RxVCM = 1.2\text{V}$ $RxFCLK = 81\text{MHz}$	500	-	-	ps
Clock High Time	TLVCH	-	-	$4/(7 \cdot RxFCLK)$	-	ns
Clock Low Time	TLVCL	-	-	$3/(7 \cdot RxFCLK)$	-	ns
PLL wake-up-time	TenPLL	-	-	-	150	us

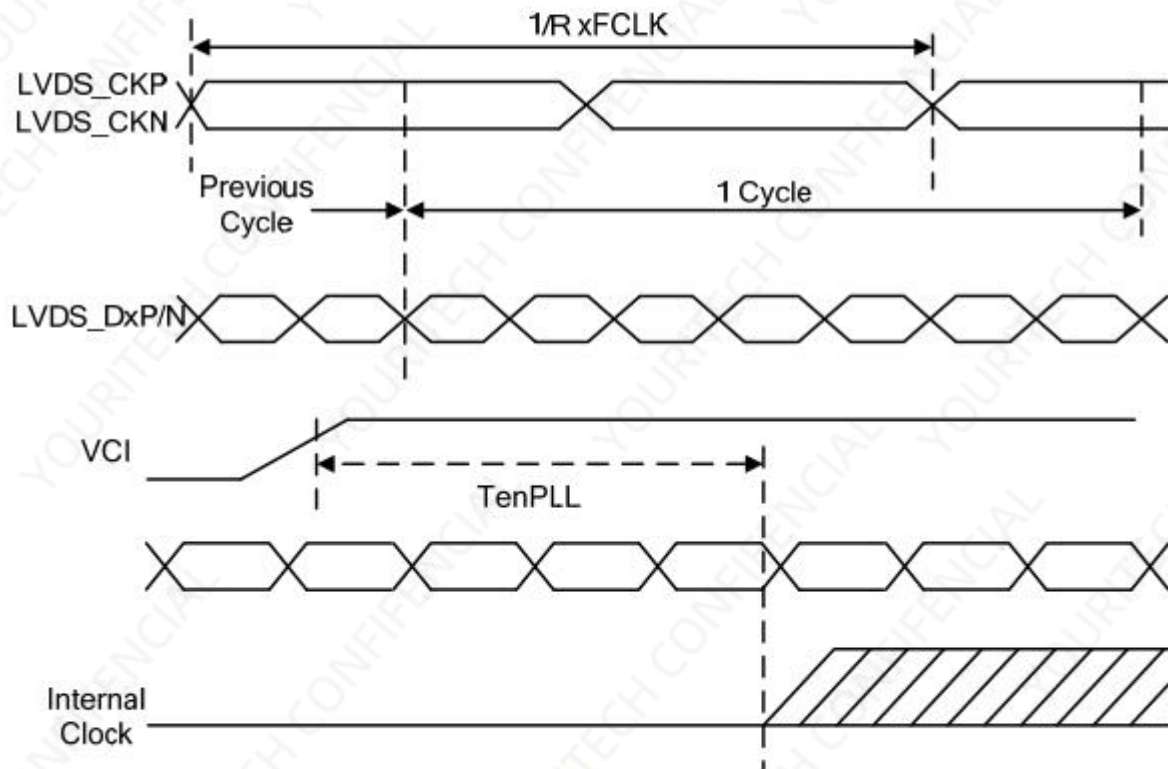
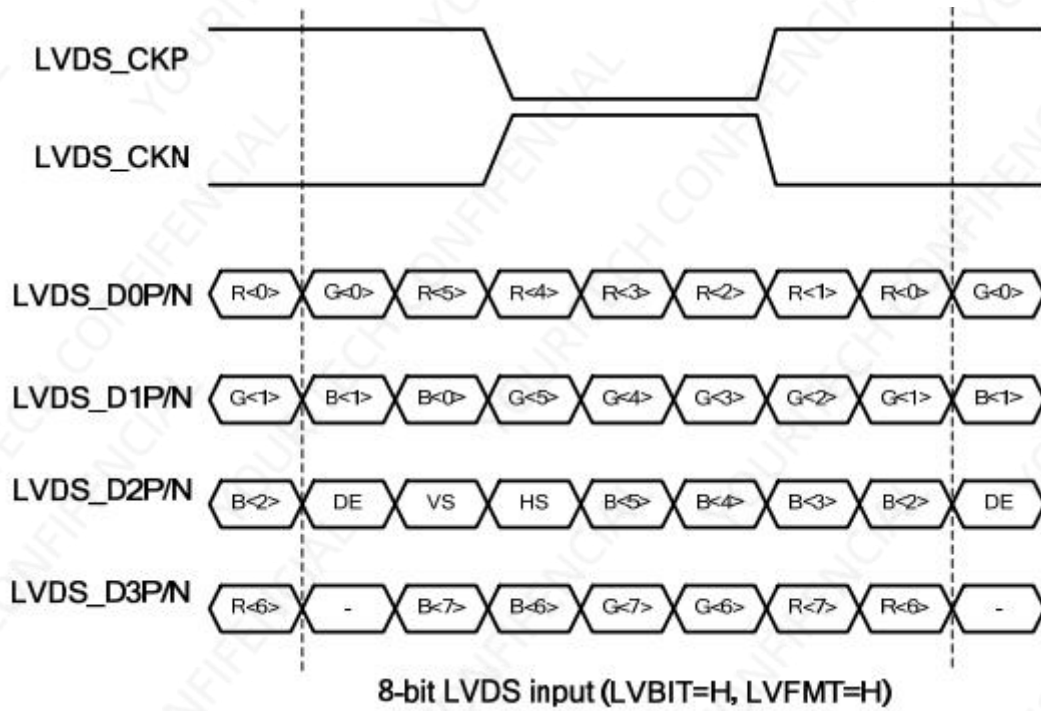


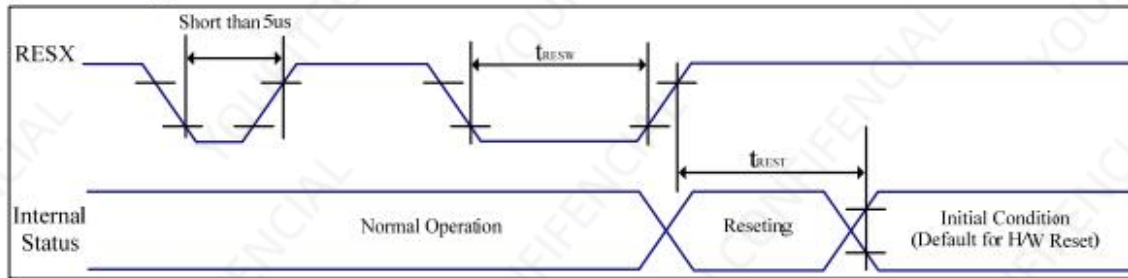
Figure LVDS figure

Parameter	Symbol	Min.	Typ.	Max.	Units	Condition
Modulation Frequency	SSCMF	23	-	93	KHz	
Modulation Rate	SSCMR	-	-	+3	%	





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

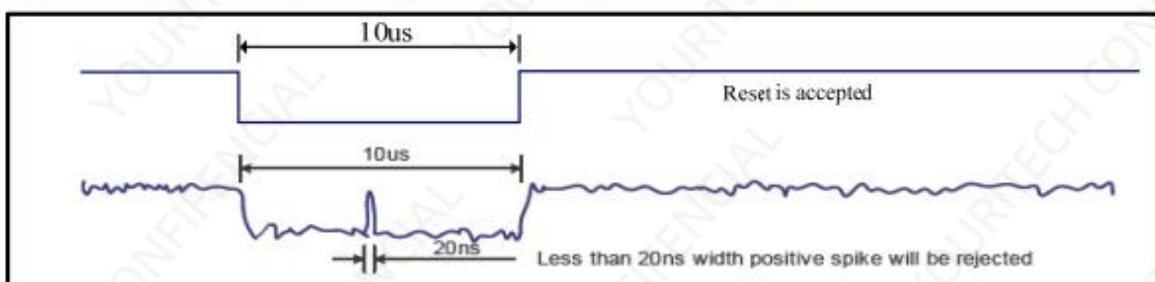
Note 1: Due to an electrostatic discharge on RESX line, spike does not cause irregular system reset according to the table below.

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.

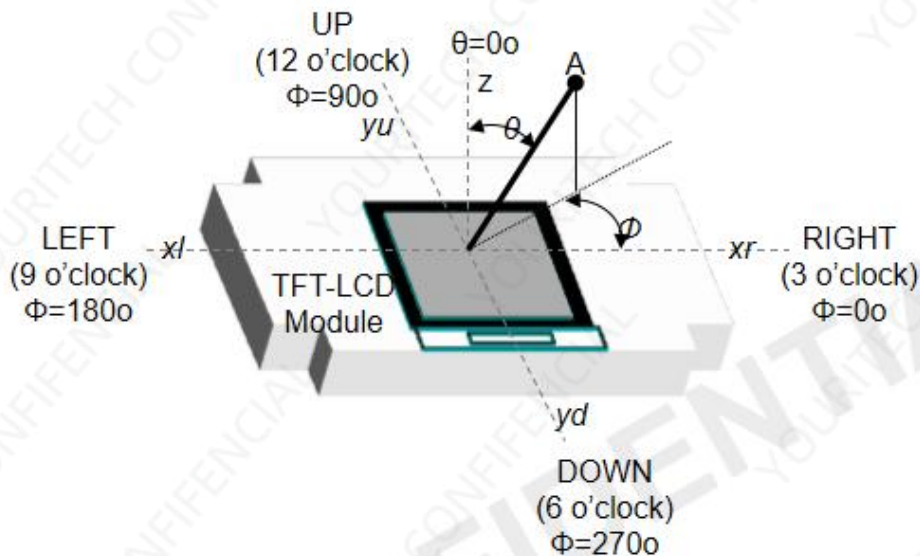


7. Optical Characteristics

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle Range	Horizontal	Θ_3	CR > 10	75	85	-	Deg.	Note 4.1
		Θ_9		75	85	-	Deg.	
	Vertical	Θ_{12}		75	85	-	Deg.	
		Θ_6		75	85	-	Deg.	
Contrast Ratio		CR	$\Theta = 0^\circ$	1000	1500	-		APF
Cell Transmittance		Tr		3.74	4.4	-	%	Note 4.2/4.3
Reproduction of color		Rx	$\Theta = 0^\circ$	0.627	0.656	0.687		With BLU @C Light Note 4.4
		Ry		0.288	0.318	0.338		
		Gx		0.225	0.255	0.385		
		Gy		0.546	0.576	0.606		
		Bx		0.107	0.137	0.168		
		By		0.068	0.098	0.128		
		Wx		0.263	0.293	0.323		
		Wy		0.292	0.322	0.352		
Color Gamut			$\Theta = 0^\circ$	65	70	-	%	
Response Time		Tr	$T_a = 25^\circ \text{C}$ $\Theta = 0^\circ$	-	16	21	ms	Note 4.5
		Tf		-	14	19	ms	
		Tgray		-	30	40	ms	

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 7. 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.

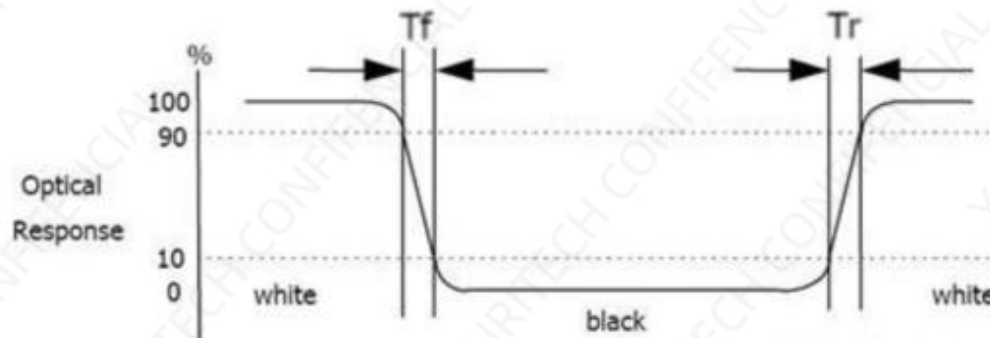
$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

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 8. Response Time Testing>



8. Reliability Test Item

No.	Test Item	Test Condition	Notes
1	High Temp. Storage	+80°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	+70°C / 96H	
4	Low Temp. Operating	-20°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), 10 cycles	

9. Packing Method----TBD

- END -

