

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

In-house Manufacturing

Optical Bonding

Cover glass

System solutions

OEM Solutions

Custom Display

Production
Custom designs
Installation

Mechanical design



SPECIFICATION
FOR
LCM+CTP Module

MODULE No:	ET070WV07-KT
CUSTOMER:	

YOURITECH	INITIAL	DATE
WPREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

Shenzhen Youritech Technology Co.,Limited

Revision History

[illegible]

Part. No	ET070WV07-KT	REV	V1.0	Page 2 of 37
----------	--------------	-----	------	--------------

Shenzhen Youritech Technology Co.,Limited

Contents

1. Basic Specifications	5
1.1 TFT Features	5
1.2 CTP Features	5
1.3 Mechanical Information	6
2. Block Diagram	6
3. Outline dimension	7
4. Input terminal Pin Assignment	8
4.1 TFT PIN Define	8
4.2 CTP PIN Define	9
5. LCD Optical Characteristics	10
5.1 Optical specification	10
6. Electrical Characteristics	13
6.1 Absolute Maximum Rating	13
6.2 DC Electrical Characteristics	13
6.3 LED Backlight Characteristics	14
7. AC Characteristic	16
7.1 TTL mode	16
7.2 TTL_HVDE (with HV or DE) with TCON mode timing diagram	16
7.3 TIMING CHARACTERISTIC	18
7.3.1 HV Mode Data Input Format for IC as source driver with timing controller	18
7.3.2 DE Mode Data Input Format for IC as source driver with timing controller	20
8. CTP Specification	21
8.1 Electrical Characteristics	21
8.1.1 Absolute Maximum Rating	21
8.1.2 DC Electrical Characteristics (Ta=25℃)	21
8.1.3 AC Characteristics	22
8.2 I2C Timing	22
9. LCD Module Out-Going Quality Level	27
9.1 VISUAL & FUNCTION INSPECTION STANDARD	27
9.1.1 Inspection conditions	27
9.1.2 Definition	27
9.1.3 Sampling Plan	28
9.1.4 Criteria (Visual)	29
10. Reliability Test Result	35
11. Cautions and Handling Precautions	36
11.1 Handling and Operating the Module	36

Part. No	ET070WV07-KT	REV	V1.0	Page 3 of 37
----------	--------------	-----	------	--------------

Shenzhen Youritech Technology Co.,Limited

11.2 Storage and Transportation.....	36
12. Packing.....	37

Shenzhen Youritech Technology Co.,Limited

1.Basic Specifications

* Description

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This module is composed of a Transmissive type TFT-LCD Panel, driver circuit, capacitance touch panel, back-light unit. The resolution of a 7.0 " TFT-LCD contains 800X480 pixels, and can display up to 16.7M colors.

1.1 TFT Features

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	152.40(H)*91.44(V) (7.0 inch)	mm	
Driver element	TFT active matrix	-	
Display colors	65K/262K/16.7M	colors	
Number of pixels	800(RGB)*480	dots	
Pixel arrangement	RGB vertical stripe	-	
Pixel pitch	0.1905(H)*0.1905(V)	mm	
Viewing angle	Free	o'clock	
Controller IC	RM533C0+RM577C1	-	
Display mode	Transmissive /Normally Black	-	
LCM Interface	16/18/24bit RGB	-	
Operating temperature	-30~+85	°C	
Storage temperature	-40~+90	°C	
Module bonding technology	Use Tape bonding between LCM and CTP	-	

1.2 CTP Features

General Information Items	Specification	Unit	Note
	Main Panel		
Resolution	800(H)*480(V)	-	
Structure	G+G	-	
Controller IC	GT9271	-	
Interface	I2C	-	
Slave Address	0x5D(7bit) or 0x14(7bit)	-	Note1
Touch mode	Ten points and Gestures	-	-
Logic level	3.3	V	

Note1: For specific configuration method, please refer to section 8.2

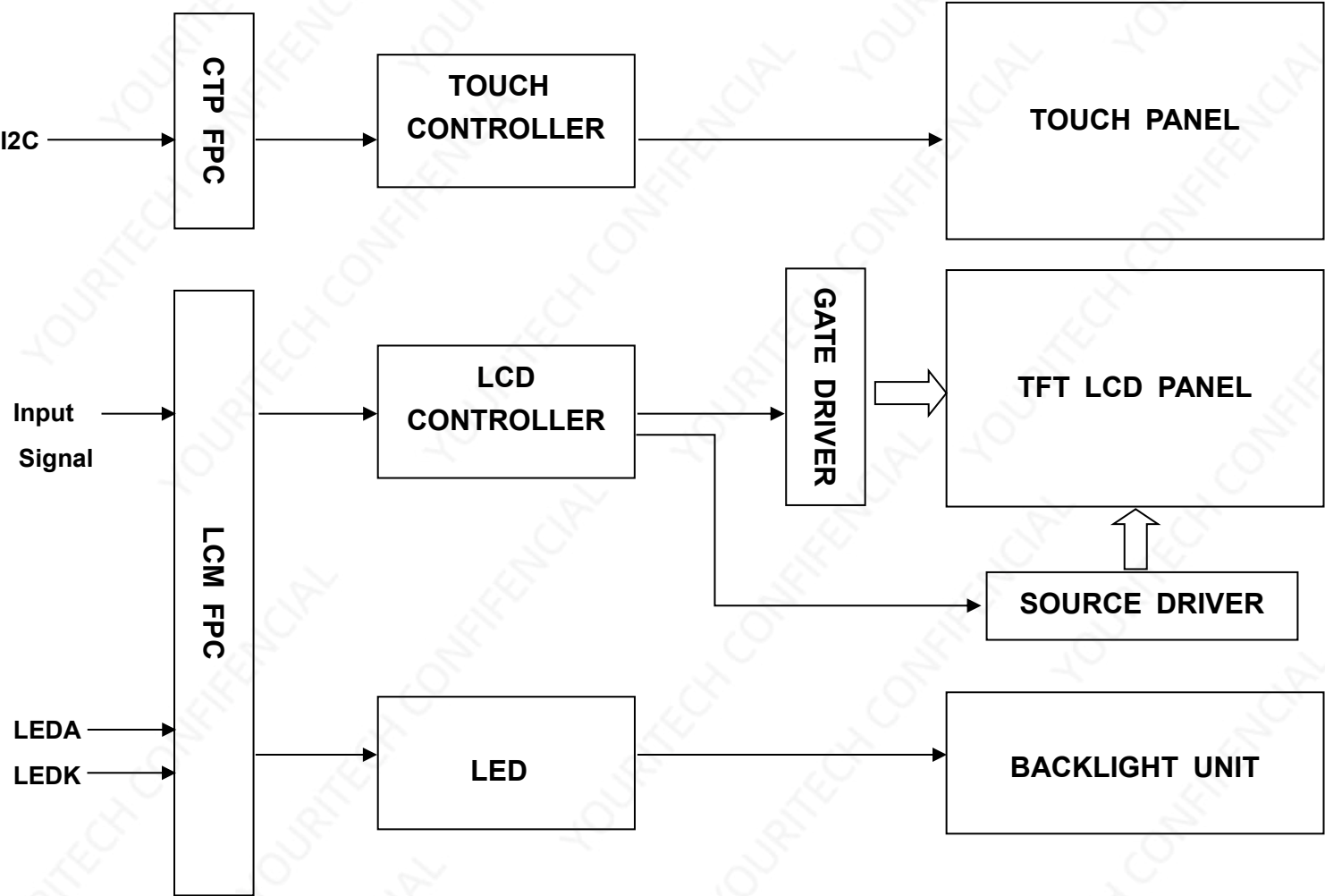
Part. No	ET070WV07-KT	REV	V1.0	Page 5 of 37
----------	--------------	-----	------	--------------

Shenzhen Youritech Technology Co.,Limited

1.3 Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	165.40	-	mm	
	Vertical(V)	-	104.59	-	mm	
	Depth(D)	-	7.73	-	mm	
Weight		-	195	-	g	

2. Block Diagram



3. Outline dimension



Shenzhen Youritech Technology Co.,Limited

4. Input terminal Pin Assignment

4.1 TFT PIN Define

NO.	SYMBOL	DISCRIPTION	I/O
1	VLED-	LED Cathode	P
2	VLED+	LED Anode	P
3	GND	Ground	P
4	VDD	Power supply for digital circuits	P
5-12	R0-R7	Red data input	I
13-20	G0-G7	Green data input	I
21-28	B0-B7	Blue data input	I
29	GND	Ground	P
30	PCLK	Dot clock signal for RGB interface operation.	I
31	DISP	Standby mode, Normally pulled high. STBYB = "1", power on STBYB = "0", power off.	I
32	HSYNC	Horizontal Sync input for TTL mode. Negative polarity	I
33	VSYNC	Vertical Sync input for TTL mode. Negative polarity	I
34	DE	Data Input Enable.	I
35	NC	--	--
36	GND	Ground	P
37	XR(NC)	--	--
38	YD(NC)	--	--
39	XL(NC)	--	--
40	YU(NC)	--	--

Shenzhen Youritech Technology Co.,Limited

4.2 CTP PIN Define

NO.	SYMBOL	DISCRIPTION	I/O
1	GND	Ground	P
2	NC	No Connection	
3	VDD	Supply voltage	P
4	SCL	I2C clock input	I
5	SDA	I2C data input and output	I
6	INT	External interrupt to the host	I
7	RST	External Reset, Low is active	I
8	GND	Ground	P

Shenzhen Youritech Technology Co.,Limited

5. LCD Optical Characteristics

5.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	$\Theta=0$ Normal viewing angle	600	1000	--		(1)(2)
Response time	Rising	T_R+T_F		--	25	30	msec	(1)(3)
	Falling							
Color Gamut		S(%)		55	60	--	%	C-light
Color Filter Chromaticity	White	W_X		0.2774	0.3174	0.3574		(1)(4) CA-310
		W_Y		0.2994	0.3394	0.3794		
	Red	R_X		0.6071	0.6271	0.6471		
		R_Y		0.3251	0.3451	0.3651		
	Green	G_X		0.2896	0.3096	0.3296		
		G_Y		0.5375	0.5575	0.5775		
	Blue	B_X		0.1328	0.1528	0.1728		
		B_Y		0.0544	0.0744	0.0944		
Viewing angle	Hor.	Θ_L	CR>10	--	80	--		(1)(4)
		Θ_R		--	80	--		
	Ver.	Θ_U		--	80	--		
		Θ_D		--	80	--		
		Option View Direction		Free				

*The data comes from the LCD specification.

Measuring Condition

Measuring surrounding : dark room

Ambient temperature : $25\pm 2^\circ\text{C}$

15min. warm-up time.

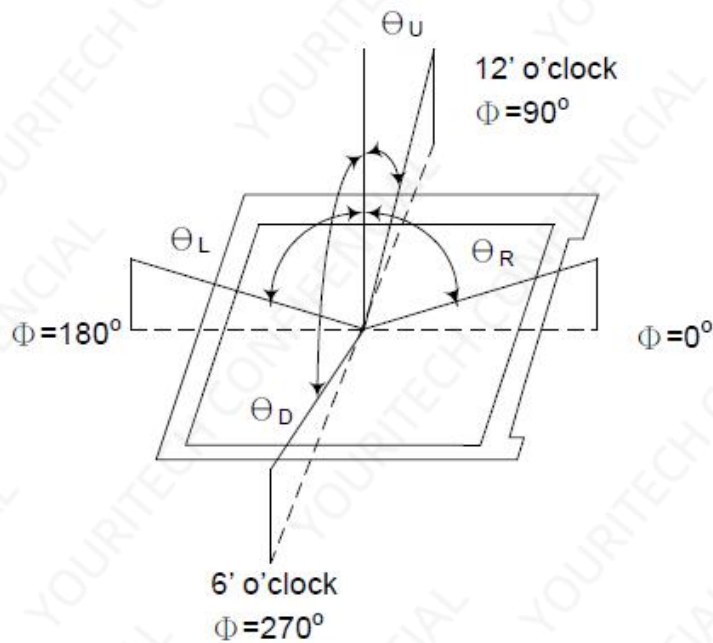
Measuring Equipment

FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

Part. No	ET070WV07-KT	REV	V1.0	Page 10 of 37
----------	--------------	-----	------	---------------

Shenzhen Youritech Technology Co.,Limited

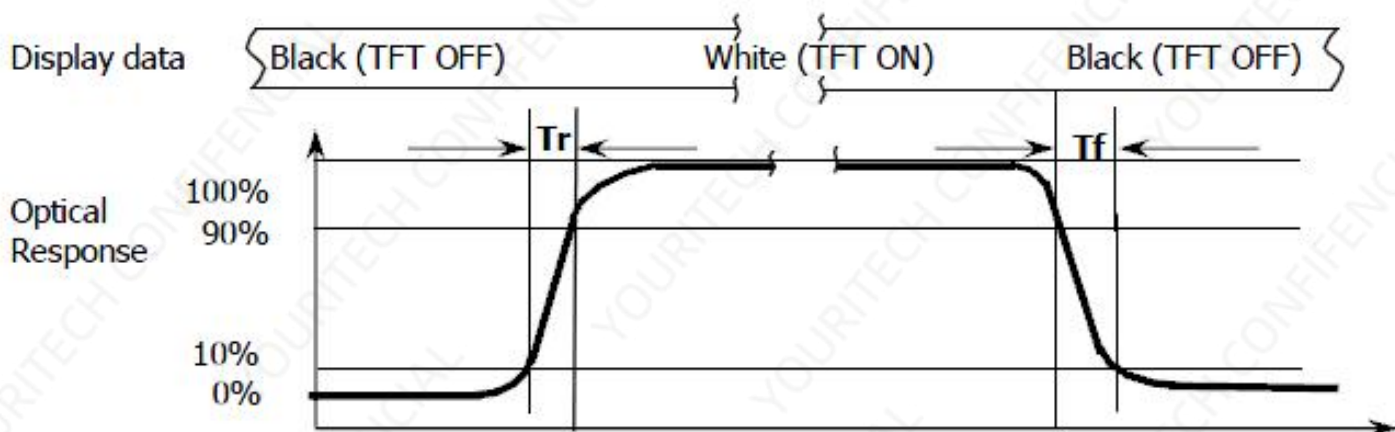
Note (1): Definition of Viewing Angle :



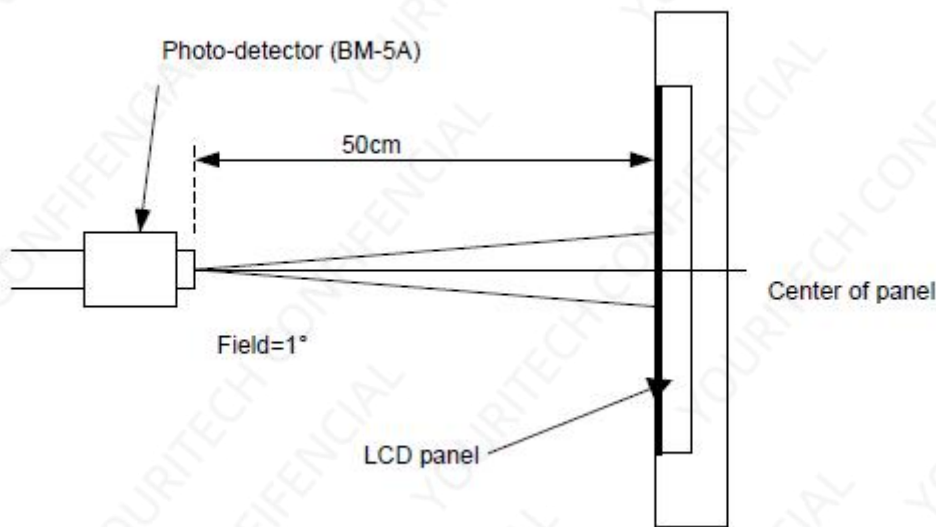
Note (2): Definition of Contrast Ratio(CR) :measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3): Response Time



Note (4): Definition of optical measurement setup



Shenzhen Youritech Technology Co.,Limited

6. Electrical Characteristics

6.1 Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit	Note
Digital Supply Voltage	VDD	-0.3	7.7	V	Note1
Operating temperature	T _{OP}	-30	+85	°C	
Storage temperature	T _{ST}	-40	+90	°C	

NOTE1: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

6.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VDD	2.7	3.3	3.6	V	
Normal mode Current	IDD	--	75	150	mA	
Level input voltage	V _{IH}	0.7*VDD	--	VDD	V	
	V _{IL}	GND	--	0.3* VDD	V	
Level output voltage	V _{OH}	VDD-0.4	--	--	V	
	V _{OL}	GND	--	GND+0.4	V	

Shenzhen Youritech Technology Co.,Limited

6.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 24 chips LED

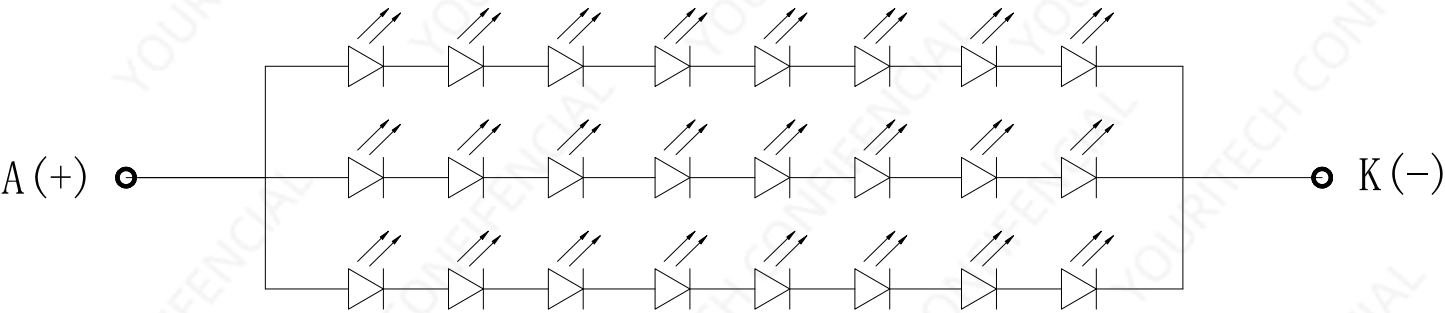
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	--	180	--	mA	
Forward Voltage	V_F	--	25.6	--	V	
LCM Luminance	LV	1000	1150	--	cd/m2	Note3
LED life time	Hr	--	50000	--	Hour	Note1,2
Uniformity	Avg	80	--	--	%	Note3

Note1: LED life time (Hr) can be defined as the time in which it continues to operate under the condition:

$T_a=25\pm3\text{ }^{\circ}\text{C}$, typical IL value indicated in the above table until the brightness becomes less than 50%.

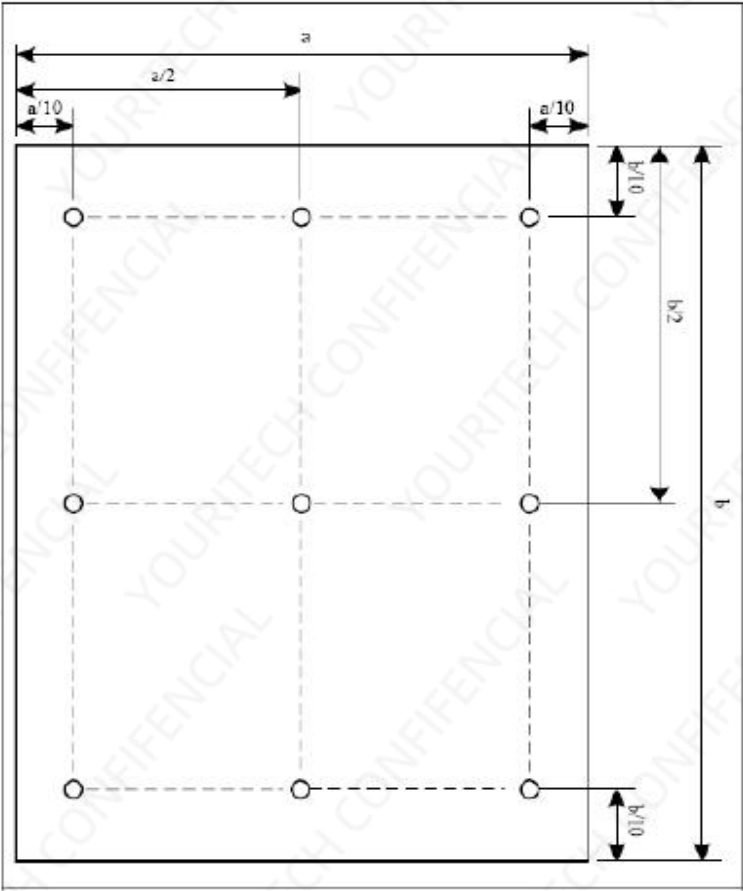
Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at

$T_a=25^{\circ}\text{C}$ and $I_L=180\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 180mA. The constant current driving method is suggested.



B/L Circuit

Note (3) Luminance Uniformity of these 9 points is defined as below:



$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$

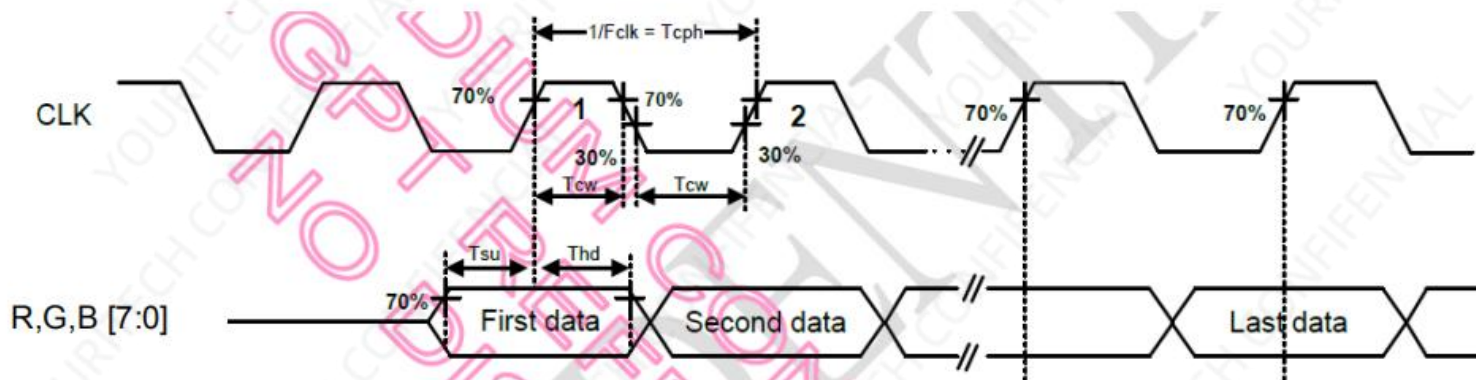
$$\text{Luminance} = \frac{\text{Total Luminance of 9 points}}{9}$$

Shenzhen Youritech Technology Co., Limited

7. AC Characteristic

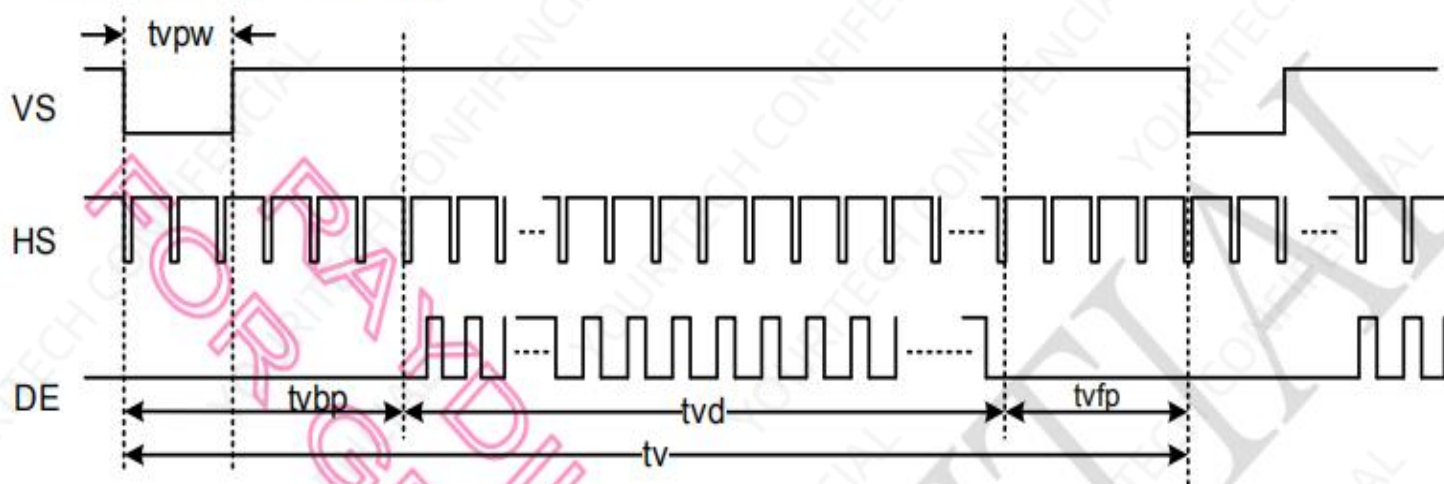
7.1 TTL mode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK frequency	Fclk	-	16	55	MHz	
CLK pulse width	Tcw	40%	-	60%	Tcph	
Data set-up time	Tsu	6	-	-	ns	D00 ~ D27
						to CLK
Data hold time	Thd	6	-	-	ns	D00 ~ D27
						to CLK



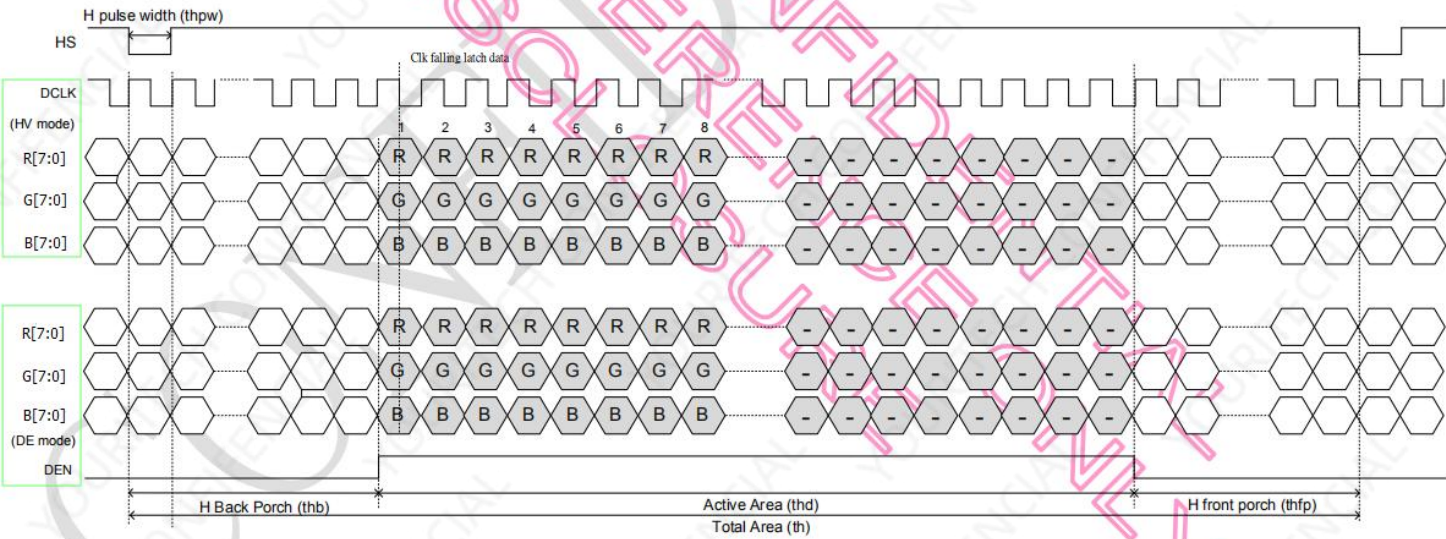
7.2 TTL_HVDE (with HV or DE) with TCON mode timing diagram

◆ Vertical input timing

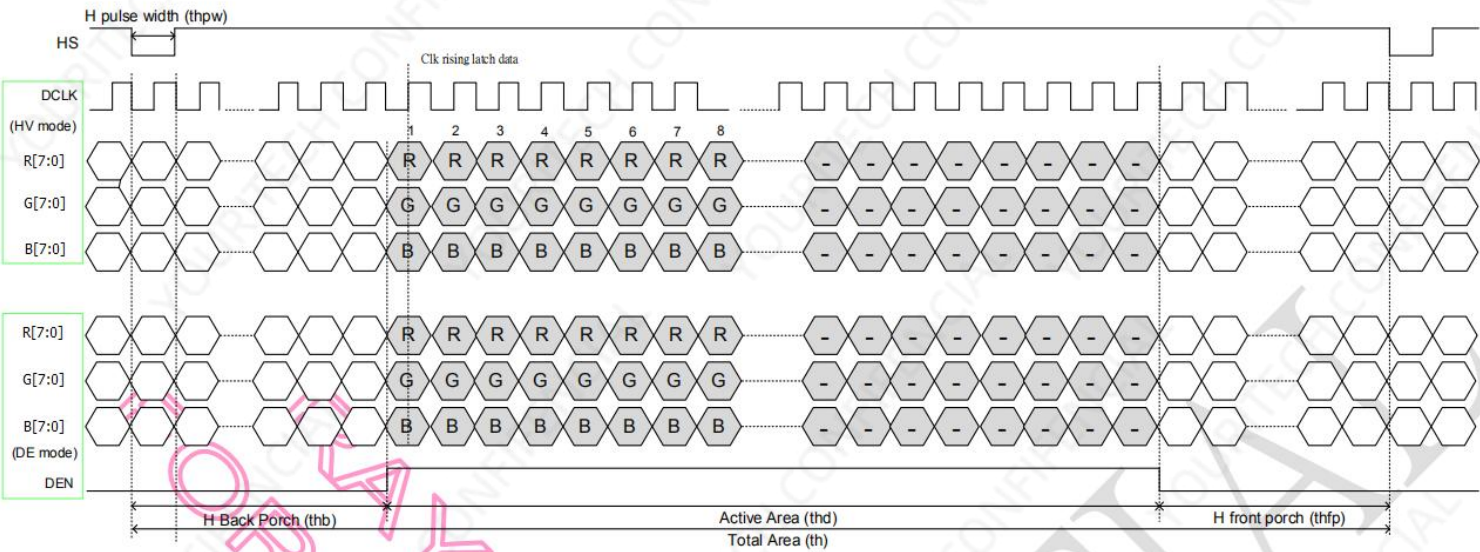


◆ Horizontal input timing

when CLKPOL = HI:



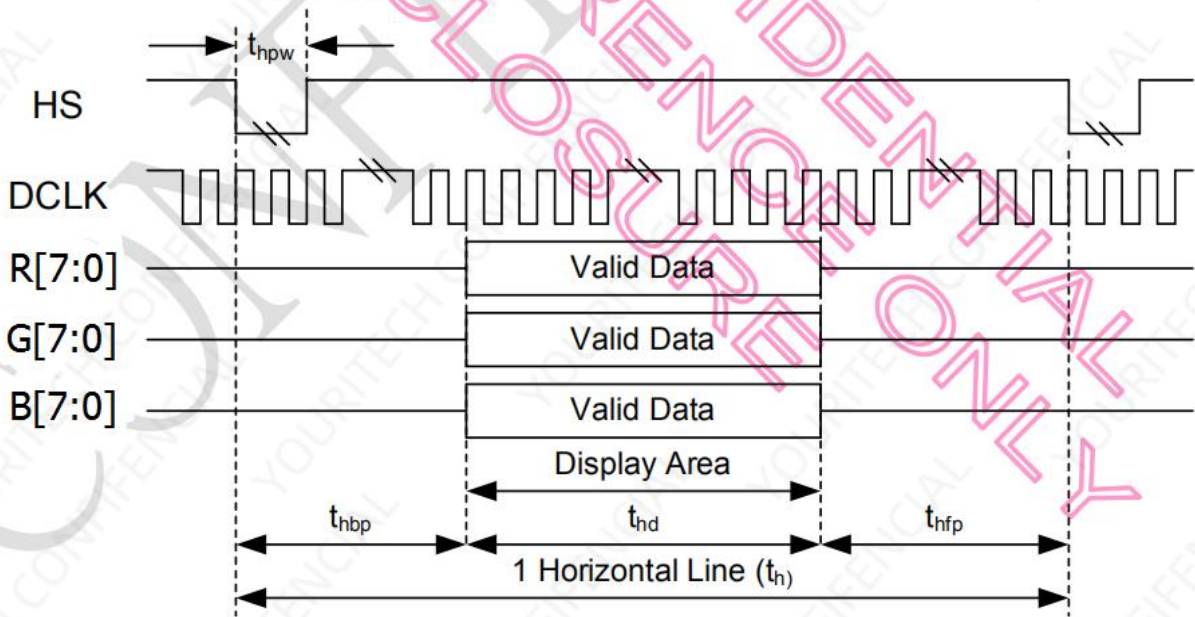
when CLKPOL = LO:



7.3 TIMING CHARACTERISTIC

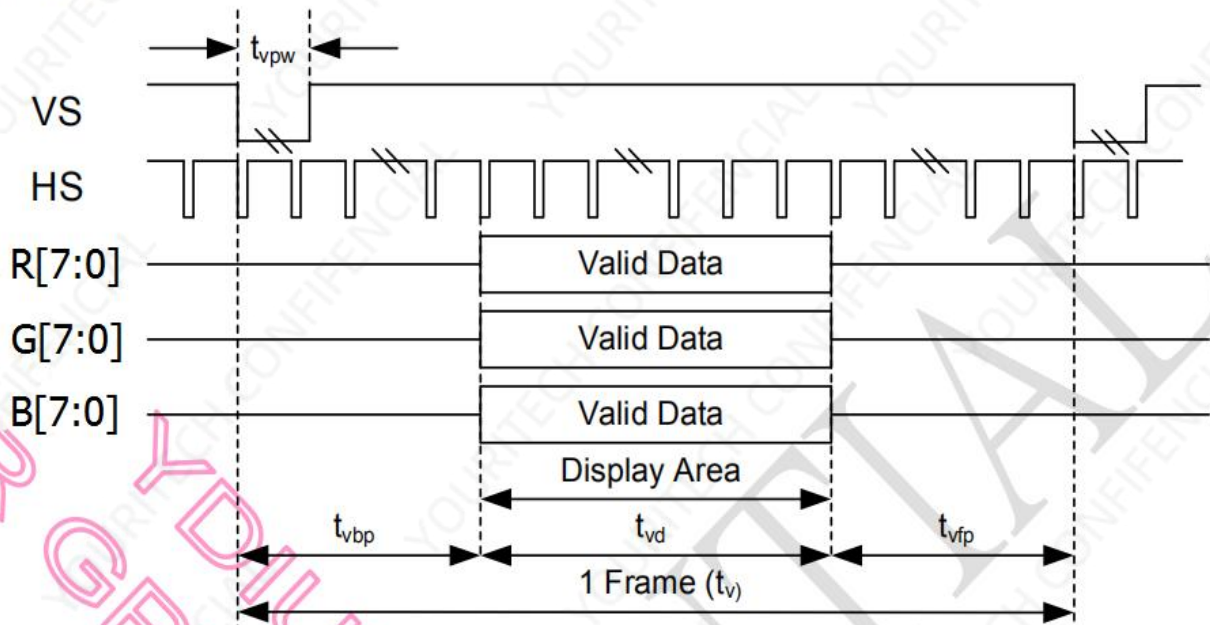
7.3.1 HV Mode Data Input Format for IC as source driver with timing controller

◆ Horizontal



Horizontal input timing at Sync mode

◆ Vertical



Vertical input timing at Sync mode

Shenzhen Youritech Technology Co.,Limited

Parameter	Symbol	800×RGB×480 (RES[3:0]=0x6h)		
		Min.	Typ.	Max.
DCLK Frequency	F_{DCLK}	25.2	27.2	30.5
Horizontal valid data	t_{hd}	800		
Hsync Pulse Width	t_{hpw}	1	2	100
Hsync back porch	t_{hbp}	5	16	101
Hsync front porch	t_{hfp}	19	44	115
1 Horizontal Line	t_h	856	860	920
Vertical valid data	t_{vd}	480		
Vsync Pulse Width	t_{vpw}	1	2	66
Vsync back porch	t_{vbp}	5	5	67
Vsync front porch	t_{vfp}	5	43	67
1 Vertical field	t_v	490	528	552

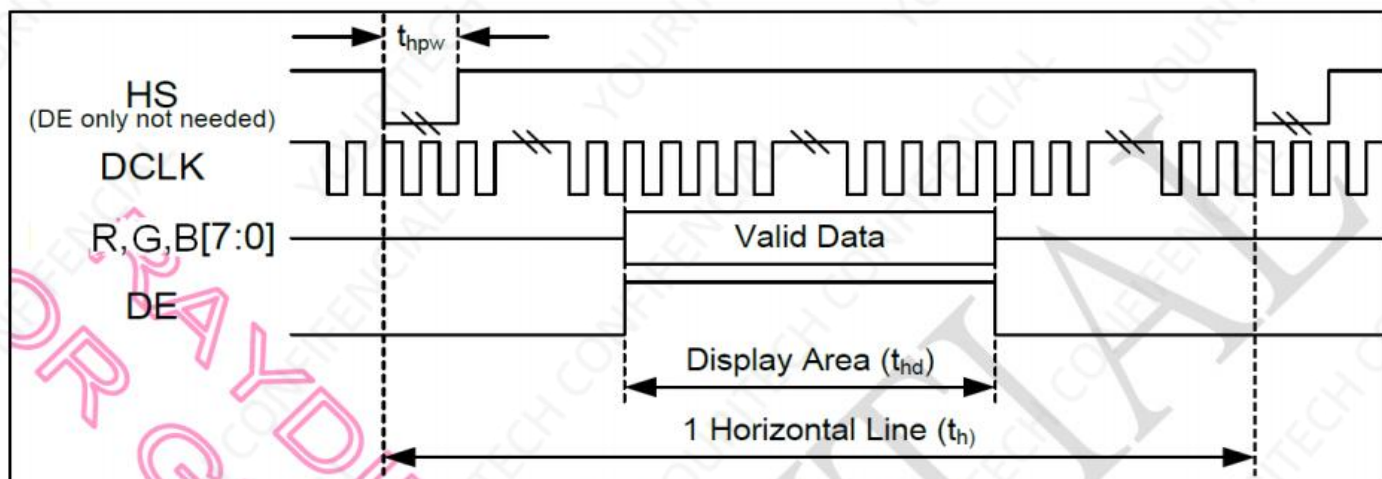
Note: (1) t_{hd} is same to H_{active} , and t_{vd} is same to V_{active} in chapter 5.1.

(2) DCLK frequency min/max value is base on frame rate 60 Hz.

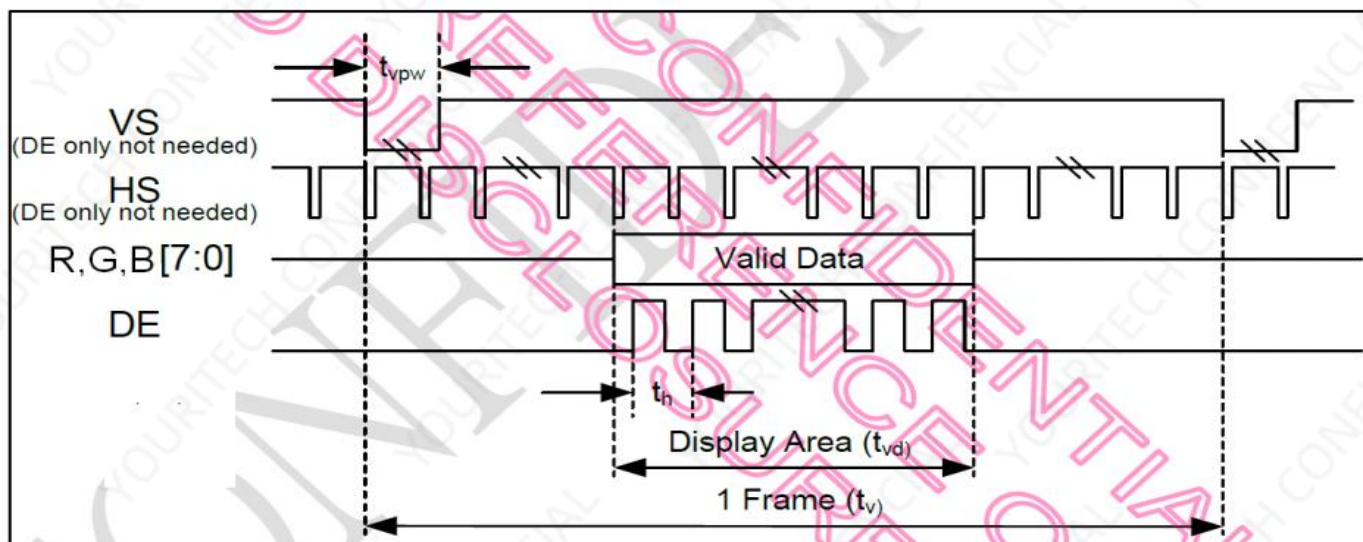
(3) If thermal function is enabled Minimum Vsync front porch + Vsync back porch should be greater than 6lines + 300us

Shenzhen Youritech Technology Co.,Limited

7.3.2 DE Mode Data Input Format for IC as source driver with timing controller



Horizontal input timing at DE only mode



Vertical input timing at DE only mode

Parameter	Symbol	800×RGB×480		
		Min.	Typ.	Max.
DCLK Frequency	F_{DCLK}	25.2	27.2	30.5
Horizontal valid data	t_{hd}	800		
1 Horizontal Line	t_h	856	860	920
Vertical valid data	t_{vd}	480		
1 Vertical field	t_v	490	528	552

Input timing table for DE mode

Shenzhen Youritech Technology Co.,Limited

8. CTP Specification

8.1 Electrical Characteristics

8.1.1 Absolute Maximum Rating

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	VDD	2.66	3.47	V	
Operating temperature	T _{OP}	-30	+85	°C	
Storage temperature	T _{ST}	-40	+90	°C	

8.1.2 DC Electrical Characteristics (Ta=25°C)

(Ambient temperature:25°C, VDD=2.8V, VDDIO=1.8V or VDDIO=VDD)

Item	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage/VDD	2.66	3.3	3.47	V	
Normal mode operating current	--	13	--	mA	
Green mode operating current	--	4.5	--	mA	
Sleep mode operating current	70	--	120	uA	
Digital Input low voltage/VIL	-0.3	--	0.25*VDD	V	
Digital Input high voltage/VIH	0.75*VDD	--	VDD+0.3	V	
Digital Output low voltage/VOL	--	--	0.15*VDD	V	
Digital Output high voltage/VOH	0.85*VDD	--	--	V	

Shenzhen Youritech Technology Co.,Limited

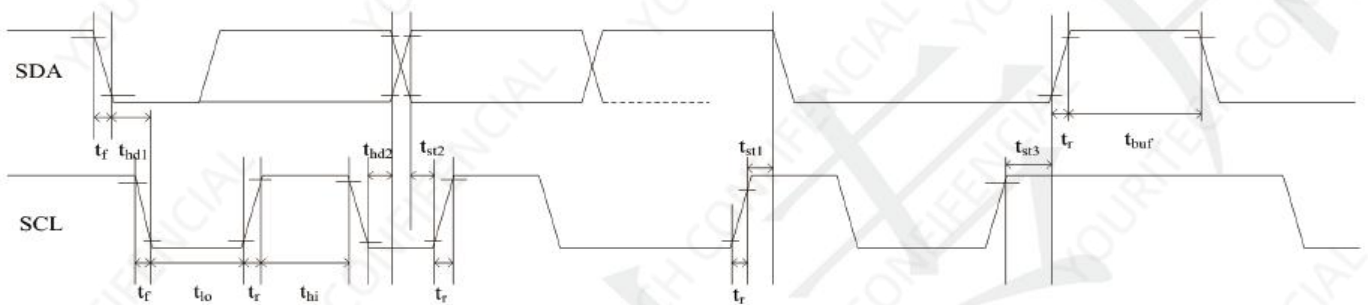
8.1.3 AC Characteristics

(Ambient temperature:25°C, VDD=2.8V, VDDIO=1.8V)

Parameter	Min	Typ	Max	Unit	Note
OSC oscillation frequency	59	60	61	MHZ	
I/O output rise time,low to high	-	14	-	ns	
I/O output rfall time,high to low	-	14	-	ns	

8.2 I2C Timing

GT9271 provides a standard I2C interface for SCL and SDA to communicate with the host. GT9271 always serves as slave device in the system with all communication being initialized by the host. It is strongly recommended that transmission rate be kept at or below 400Kbps. The I2C timing is shown below:



Shenzhen Youritech Technology Co.,Limited

Test condition 1: 1.8V host interface voltage, 400Kbps transmission rate, 2K pull-up resistor

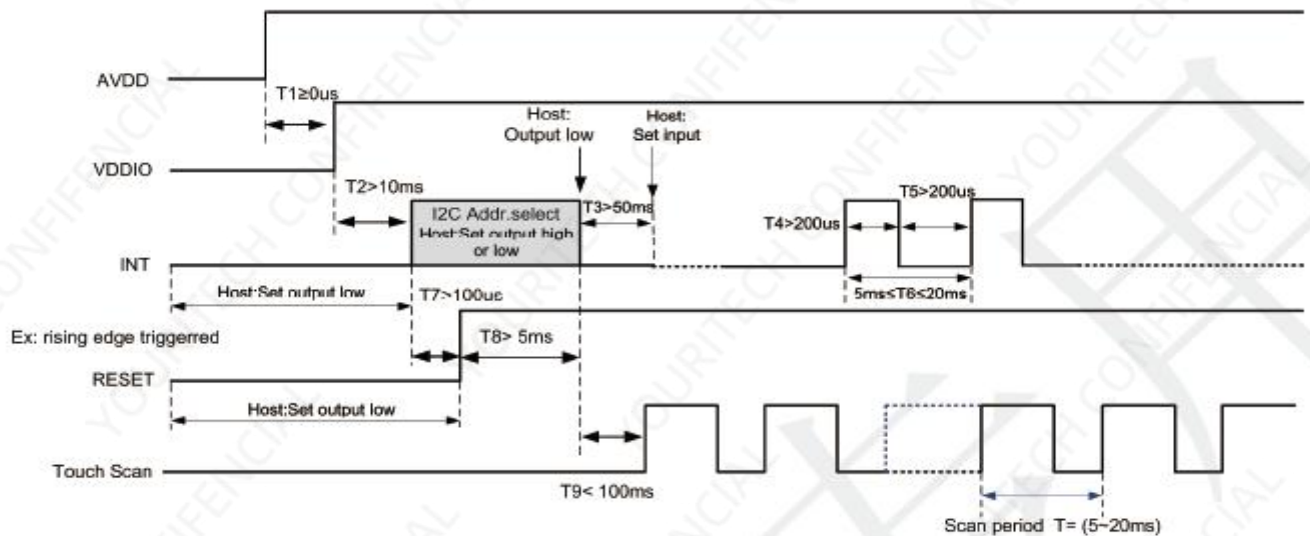
Parameter	Symbol	Min.	Max.	Unit
SCL low period	t_{lo}	1.3	-	us
SCL high period	t_{hi}	0.6	-	us
SCL setup time for Start condition	t_{st1}	0.6	-	us
SCL setup time for Stop condition	t_{st3}	0.6	-	us
SCL hold time for Start condition	t_{hd1}	0.6	-	us
SDA setup time	t_{st2}	0.1	-	us
SDA hold time	t_{hd2}	0	-	us

Test condition 2: 3.3V host interface voltage, 400Kbps transmission rate, 2K pull-up resistor

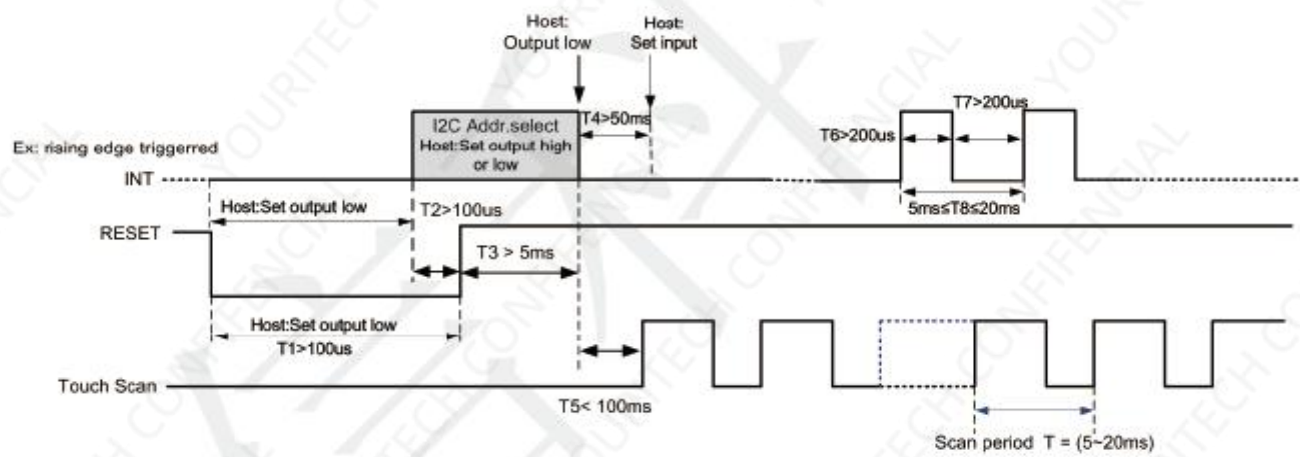
Parameter	Symbol	Min.	Max.	Unit
SCL low period	t_{lo}	1.3	-	us
SCL high period	t_{hi}	0.6	-	us
SCL setup time for Start condition	t_{st1}	0.6	-	us
SCL setup time for Stop condition	t_{st3}	0.6	-	us
SCL hold time for Start condition	t_{hd1}	0.6	-	us
SDA setup time	t_{st2}	0.1	-	us
SDA hold time	t_{hd2}	0	-	us

GT9271 supports two I2C slave addresses: 0xBA/0xBB and 0x28/0x29. The host can select the address by changing the status of Reset and INT pins during the power-on initialization phase. See the diagram below for configuration methods and timings:

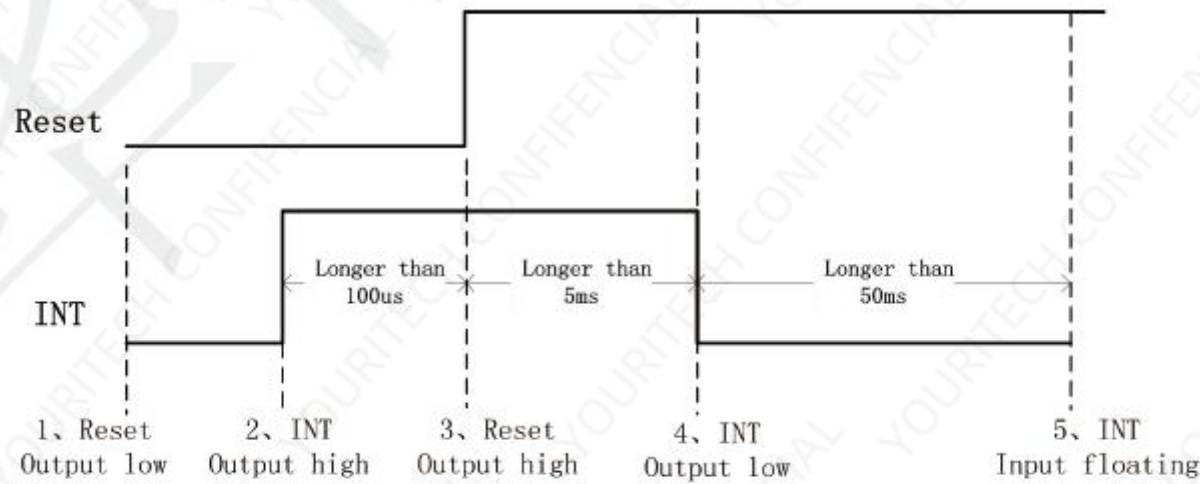
Power-on Timing:



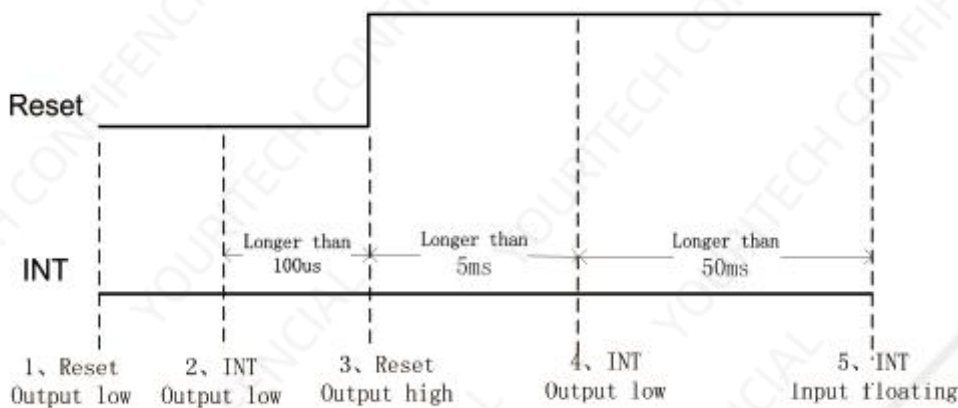
Timing for host resetting GT9271:



Timing for setting slave address to 0x28/0x29:



Timing for setting slave address to 0xBA/0xBB:



a) Data Transmission

(For example: slave address is 0xBA/0xBB)

Communication is always initiated by the host. Valid Start condition is signaled by pulling SDA line from high to low when SCL line is high. Data flow or address is transmitted after the Start condition.

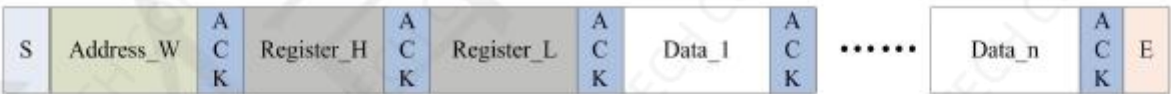
All slave devices connected to I²C bus should detect the 8-bit address issued after Start condition and send the correct ACK. After receiving matching address, GT9271 acknowledges by configuring SDA line as output port and pulling SDA line low during the ninth SCL cycle. When receiving unmatched address, namely, not 0XBA or 0XBB, GT9271 will stay in an idle state.

For data bytes on SDA, each of 9 serial bits will be sent on nine SCL cycles. Each data byte consists of 8 valid data bits and one ACK or NACK bit sent by the recipient. The data transmission is valid when SCL line is high.

When communication is completed, the host will issue the Stop condition which implies the transition of SDA line from low to high when SCL line is high.

b) Writing Data to GT9271

(For example: slave address is 0xBA/0xBB)



Timing for Write Operation

The diagram above displays the timing sequence of the host writing data onto GT9271. First, the host issues a Start condition. Then, the host sends 0XBA (address bits and R/W bit; R/W bit as 0 indicates Write operation) to the slave device.

After receiving ACK, the host sends the 16-bit register address (where writing starts) and the 8-bit data bytes (to be written onto the register).

The location of the register address pointer will automatically add 1 after every Write Operation. Therefore, when the host needs to perform Write Operations on a group of registers of continuous addresses, it is able to write continuously. The Write Operation is terminated when the host issues the Stop condition.

c) Reading Data from GT9271
(For example: slave address is 0xBA/0xBB)



Timing for Read Operation

The diagram above is the timing sequence of the host reading data from GT9271. First, the host issues a Start condition and sends 0xBA (address bits and R/W bit; R/W bit as 0 indicates Write operation) to the slave device.

After receiving ACK, the host sends the 16-bit register address (where reading starts) to the slave device. Then the host sets register addresses which need to be read.

Also after receiving ACK, the host issues the Start condition once again and sends 0xBB (Read Operation). After receiving ACK, the host starts to read data.

GT9271 also supports continuous Read Operation and, by default, reads data continuously. Whenever receiving a byte of data, the host sends an ACK signal indicating successful reception. After receiving the last byte of data, the host sends a NACK signal followed by a STOP condition which terminates communication.

9. LCD Module Out-Going Quality Level

9.1 VISUAL & FUNCTION INSPECTION STANDARD

9.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

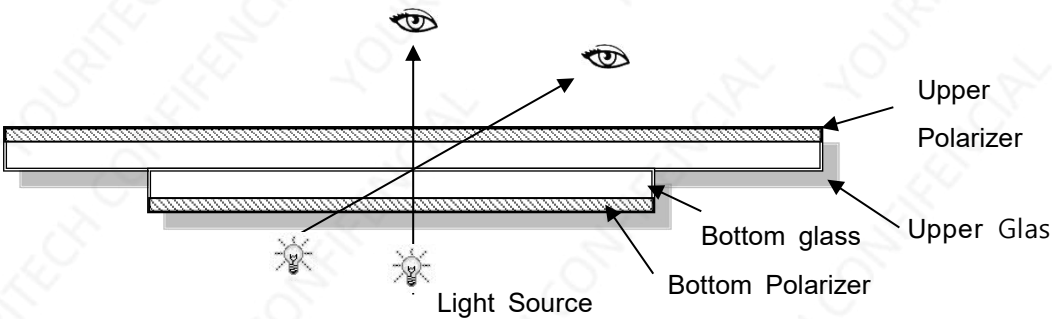
Temperature : $25\pm5^{\circ}\text{C}$

Humidity : $65\%\pm 10\%\text{RH}$

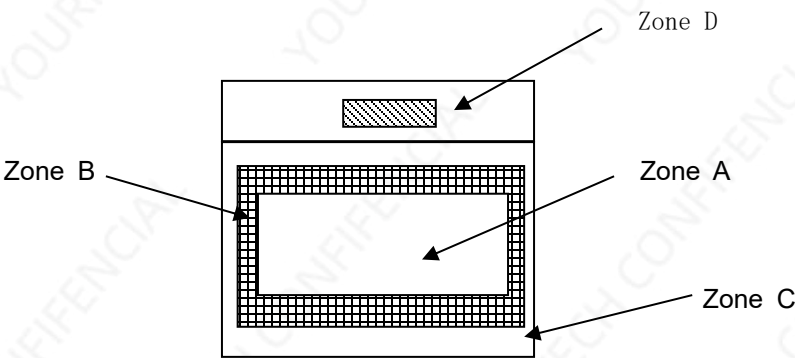
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



9.1.2 Definition



Zone A : Effective Viewing Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)

Zone D : IC Bonding Area

Note:As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function or appearance after assembly by customer

Shenzhen Youritech Technology Co.,Limited

9.1.3 Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class II

AQL:

Major defect	Minor defect
0.65	1.5

LCD: Liquid Crystal Display , LCM: Liquid Crystal Module, CTP: Capacitive Touch Panel

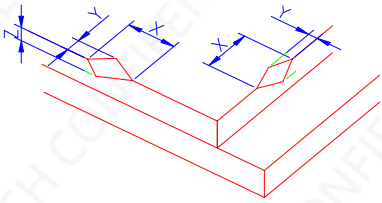
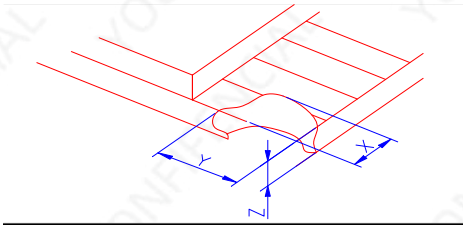
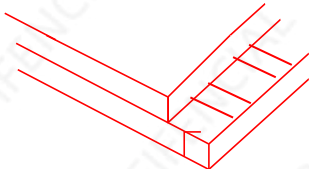
No	Items to be inspected	Criteria	Classification of defect s
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. etc	Major
2	Missing	Missing components and etc	
3	Outline dimension	Overall outline dimension beyond the drawi ng is not allowed,deformation and etc	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Spot/Line defect	Light dot,Dim spot,(Note1) Polarizer Air Bubble, Polarizer accidented spot and etc	
6	Soldering appearance	Good soldering , Peeling off is not allowed and etc	
7	LCD/Polarizer/CTP	Black/White spot/line, scratch, crack, etc.	

Note1: a) Light dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.

b) Dim dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture.

Shenzhen Youritech Technology Co.,Limited

9.1.4 Criteria (Visual)

Number	Items	Criteria(mm)						
1.0 LCD Crack/Broken NOTE: X: Length Y: Width Z: Height L: Length of IT O, T: Height of LCD	(1) The edge of LCD broken	 <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤3.0mm</td><td><Inner border line of the seal</td><td>≤T</td></tr></table>	X	Y	Z	≤3.0mm	<Inner border line of the seal	≤T
X	Y	Z						
≤3.0mm	<Inner border line of the seal	≤T						
	(2)LCD corner broken	 <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤3.0mm</td><td>≤L</td><td>≤T</td></tr></table>	X	Y	Z	≤3.0mm	≤L	≤T
X	Y	Z						
≤3.0mm	≤L	≤T						
	(3) LCD crack	 Crack Not allowed						

Shenzhen Youritech Technology Co.,Limited

2.0

$$\Phi = (X + Y) / 2$$

Spot defect

① light dot (black/white spot , pinhole, stain, etc.)

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.15$	Ignore	Ignore	
$0.15 < \Phi \leq 0.25$	3(distance $\geq 10\text{mm}$)		
$0.25 < \Phi \leq 0.4$	2(distance $\geq 10\text{mm}$)		
$\Phi > 0.4$	0		

② Dim spot (light leakage、dent、dark spot, etc)

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.15$	Ignore	Ignore	
$0.15 < \Phi \leq 0.25$	3(distance $\geq 10\text{mm}$)		
$0.25 < \Phi \leq 0.4$	2(distance $\geq 10\text{mm}$)		
$\Phi > 0.4$	0		

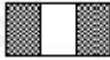
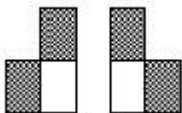
③ Polarizer accidented spot

Zone Size (mm)	Acceptable Qty			
	A	B	C	
$\Phi \leq 0.2$	Ignore		Ignore	
$0.2 < \Phi \leq 0.5$	2(distance $\geq 10\text{mm}$)			
$\Phi > 0.5$	0			

④Polarizer Bubble

Zone Size (mm)	Acceptable Qty			
	A	B	C	
$\Phi \leq 0.2$	Ignore		Ignore	
$0.2 < \Phi \leq 0.4$	2(distance $\geq 10\text{mm}$)			
$\Phi > 0.4$	0			

Shenzhen Youritech Technology Co.,Limited

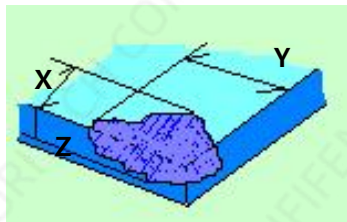
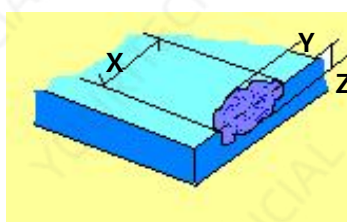
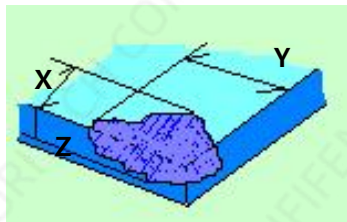
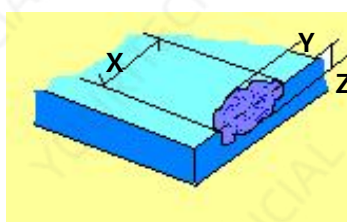
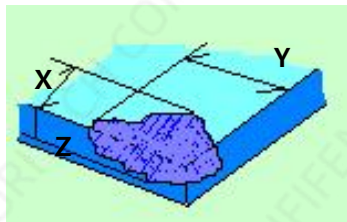
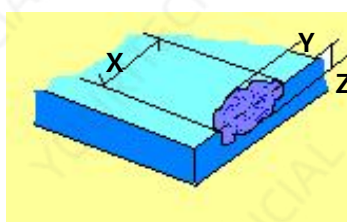
3.0	LCD Pixel defect	Pixel bad points <table> <tr> <th>Item</th><th>Zone A</th><th>Acceptable Qt</th></tr> <tr> <td rowspan="3">Bright dot</td><td>Random</td><td>$N \leq 2$</td></tr> <tr> <td>2 dots adjacent</td><td>$N \leq 0$</td></tr> <tr> <td>3 dots adjacent</td><td>$N \leq 0$</td></tr> <tr> <td rowspan="3">Dark dot</td><td>Random</td><td>$N \leq 3$</td></tr> <tr> <td>2 dots adjacent</td><td>$N \leq 0$</td></tr> <tr> <td>3 dots adjacent</td><td>$N \leq 0$</td></tr> <tr> <td>Distance</td><td> 1. Minimum Distance Between Bright dots. 2. Minimum Distance Between dark dots 3. Minimum Distance Between dark and bright dot. </td><td>5mm</td></tr> <tr> <td colspan="2">Total bright and dark dot</td><td>$N \leq 4$</td></tr> </table> Note: A) Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern. B) Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture. C) 2 dot adjacent = 1 pair = 2 dots Picture:   2 dot adjacent 2 dot adjacent (vertical)   2 dot adjacent 2 dot adjacent (slant)	Item	Zone A	Acceptable Qt	Bright dot	Random	$N \leq 2$	2 dots adjacent	$N \leq 0$	3 dots adjacent	$N \leq 0$	Dark dot	Random	$N \leq 3$	2 dots adjacent	$N \leq 0$	3 dots adjacent	$N \leq 0$	Distance	1. Minimum Distance Between Bright dots. 2. Minimum Distance Between dark dots 3. Minimum Distance Between dark and bright dot.	5mm	Total bright and dark dot		$N \leq 4$
Item	Zone A	Acceptable Qt																							
Bright dot	Random	$N \leq 2$																							
	2 dots adjacent	$N \leq 0$																							
	3 dots adjacent	$N \leq 0$																							
Dark dot	Random	$N \leq 3$																							
	2 dots adjacent	$N \leq 0$																							
	3 dots adjacent	$N \leq 0$																							
Distance	1. Minimum Distance Between Bright dots. 2. Minimum Distance Between dark dots 3. Minimum Distance Between dark and bright dot.	5mm																							
Total bright and dark dot		$N \leq 4$																							

Shenzhen Youritech Technology Co., Limited

4.0	Line defect (LCD /Polarizer backlight black/white line, scratch, stain)																											
																												
	W: width, L : length																											
	N : Count																											
		<table><tr><th rowspan="2">Width(mm)</th><th rowspan="2">Length(m m)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>$\Phi \leq 0.05$</td><td>Ignore</td><td colspan="2">Ignore</td><td rowspan="3">Ignore</td></tr><tr><td>$0.05 < W \leq 0.06$</td><td>$L \leq 5.0$</td><td colspan="2">$N \leq 3$</td></tr><tr><td>$0.06 < W \leq 0.08$</td><td>$L \leq 4.0$</td><td colspan="2">$N \leq 2$</td></tr><tr><td>$W > 0.08$</td><td colspan="4">Define as spot defect</td></tr></table>	Width(mm)	Length(m m)	Acceptable Qty			A	B	C	$\Phi \leq 0.05$	Ignore	Ignore		Ignore	$0.05 < W \leq 0.06$	$L \leq 5.0$	$N \leq 3$		$0.06 < W \leq 0.08$	$L \leq 4.0$	$N \leq 2$		$W > 0.08$	Define as spot defect			
Width(mm)	Length(m m)	Acceptable Qty																										
		A	B	C																								
$\Phi \leq 0.05$	Ignore	Ignore		Ignore																								
$0.05 < W \leq 0.06$	$L \leq 5.0$	$N \leq 3$																										
$0.06 < W \leq 0.08$	$L \leq 4.0$	$N \leq 2$																										
$W > 0.08$	Define as spot defect																											
5.0	Electronic Components SMT.	Not allow missing parts, solderless connection, cold solder joint, mismatch, The positive and negative polarity opposite																										
6.0	Display color& Brightness.	1. Color: Measuring the color coordinates, The measurement standard according to the datasheet or samples. 2. Brightness: Measuring the brightness of White screen, The measurement standard according to the datasheet or Samples.																										
7.0	LCD Mura/Waving/Hot spot	Not visible through 5% ND filter in 50% gray or judge by limit sample if necessary.																										

8.0	CTP Related	CTP Cover sensor acc identified black/white spot	Size Φ (mm)		Acceptable Qty			
					A	B	C	
			$\Phi \leq 0.15$	Ignore		Ignore		
			$0.15 < \Phi \leq 0.25$	4 (distance $\geq 10\text{mm}$)				
			$0.25 < \Phi \leq 0.35$	3 (distance $\geq 10\text{mm}$)				
			$\Phi > 0.35$	0				
		CTP Cover scratch	Width(mm)		Ignore (mm)	Acceptable Qty		
						A	B	C
			$\Phi \leq 0.05$	Ignore	Ignore			
			$0.05 < W \leq 0.06$	$L \leq 4.0$	$N \leq 3$			
$0.06 < W \leq 0.08$	$L \leq 3.0$		$N \leq 2$					
$0.08 < W$	Define as spot defect							

Shenzhen Youritech Technology Co., Limited

		<table><tr><td rowspan="5">CTP Cover Pinhole/ Lack of ink</td><td><table><tr><th>Zone Size (mm)</th><th>Acceptable Qty</th></tr><tr><td>$\Phi \leq 0.2$</td><td>C</td></tr><tr><td>$0.2 < \Phi \leq 0.3$</td><td>Ignore</td></tr><tr><td>$0.3 < \Phi \leq 0.4$</td><td>4(distance $\geq 10\text{mm}$)</td></tr><tr><td>$\Phi > 0.4$</td><td>2(distance $\geq 10\text{mm}$)</td></tr></table></td></tr><tr><td rowspan="5">CTP Bonding bubble/ accident spot</td><td><table><tr><th>Size $\Phi(\text{mm})$</th><th colspan="2">Acceptable Qty</th></tr><tr><td></td><th>A</th><th>B</th></tr><tr><td>$\Phi \leq 0.1$</td><td colspan="2">Ignore</td></tr><tr><td>$0.1 < \Phi \leq 0.2$</td><td colspan="2">3(distance $\geq 10\text{mm}$)</td></tr><tr><td>$0.2 < \Phi \leq 0.3$</td><td colspan="2">2(distance $\geq 10\text{mm}$)</td></tr><tr><td>$\Phi > 0.3$</td><td colspan="2">0</td></tr></table></td></tr><tr><td>Assembly deflection</td><td colspan="2">beyond the edge of backlight $\leq 0.2\text{mm}$</td></tr><tr><td rowspan="2">CTP cover broken X : length Y : width Z : height</td><td><table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$X \leq 0.5\text{mm}$</td><td>$Y \leq 0.5\text{mm}$</td><td>$Z < \text{cover thickness}$</td></tr></table> * Circuitry broken is not allowed. </td><td></td></tr><tr><td rowspan="2">CTP cover broken X : length Y : width Z : height</td><td><table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$X \leq 0.3\text{mm}$</td><td>$Y \leq 0.3\text{mm}$</td><td>$Z < \text{cover thickness}$</td></tr></table> * Circuitry broken is not allowed. </td><td></td></tr></table>	CTP Cover Pinhole/ Lack of ink	<table><tr><th>Zone Size (mm)</th><th>Acceptable Qty</th></tr><tr><td>$\Phi \leq 0.2$</td><td>C</td></tr><tr><td>$0.2 < \Phi \leq 0.3$</td><td>Ignore</td></tr><tr><td>$0.3 < \Phi \leq 0.4$</td><td>4(distance $\geq 10\text{mm}$)</td></tr><tr><td>$\Phi > 0.4$</td><td>2(distance $\geq 10\text{mm}$)</td></tr></table>	Zone Size (mm)	Acceptable Qty	$\Phi \leq 0.2$	C	$0.2 < \Phi \leq 0.3$	Ignore	$0.3 < \Phi \leq 0.4$	4(distance $\geq 10\text{mm}$)	$\Phi > 0.4$	2(distance $\geq 10\text{mm}$)	CTP Bonding bubble/ accident spot	<table><tr><th>Size $\Phi(\text{mm})$</th><th colspan="2">Acceptable Qty</th></tr><tr><td></td><th>A</th><th>B</th></tr><tr><td>$\Phi \leq 0.1$</td><td colspan="2">Ignore</td></tr><tr><td>$0.1 < \Phi \leq 0.2$</td><td colspan="2">3(distance $\geq 10\text{mm}$)</td></tr><tr><td>$0.2 < \Phi \leq 0.3$</td><td colspan="2">2(distance $\geq 10\text{mm}$)</td></tr><tr><td>$\Phi > 0.3$</td><td colspan="2">0</td></tr></table>	Size $\Phi(\text{mm})$	Acceptable Qty			A	B	$\Phi \leq 0.1$	Ignore		$0.1 < \Phi \leq 0.2$	3(distance $\geq 10\text{mm}$)		$0.2 < \Phi \leq 0.3$	2(distance $\geq 10\text{mm}$)		$\Phi > 0.3$	0		Assembly deflection	beyond the edge of backlight $\leq 0.2\text{mm}$		CTP cover broken X : length Y : width Z : height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$X \leq 0.5\text{mm}$</td><td>$Y \leq 0.5\text{mm}$</td><td>$Z < \text{cover thickness}$</td></tr></table> * Circuitry broken is not allowed.	X	Y	Z	$X \leq 0.5\text{mm}$	$Y \leq 0.5\text{mm}$	$Z < \text{cover thickness}$		CTP cover broken X : length Y : width Z : height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$X \leq 0.3\text{mm}$</td><td>$Y \leq 0.3\text{mm}$</td><td>$Z < \text{cover thickness}$</td></tr></table> * Circuitry broken is not allowed.	X	Y	Z	$X \leq 0.3\text{mm}$	$Y \leq 0.3\text{mm}$	$Z < \text{cover thickness}$	
CTP Cover Pinhole/ Lack of ink	<table><tr><th>Zone Size (mm)</th><th>Acceptable Qty</th></tr><tr><td>$\Phi \leq 0.2$</td><td>C</td></tr><tr><td>$0.2 < \Phi \leq 0.3$</td><td>Ignore</td></tr><tr><td>$0.3 < \Phi \leq 0.4$</td><td>4(distance $\geq 10\text{mm}$)</td></tr><tr><td>$\Phi > 0.4$</td><td>2(distance $\geq 10\text{mm}$)</td></tr></table>	Zone Size (mm)		Acceptable Qty	$\Phi \leq 0.2$	C	$0.2 < \Phi \leq 0.3$	Ignore	$0.3 < \Phi \leq 0.4$	4(distance $\geq 10\text{mm}$)	$\Phi > 0.4$	2(distance $\geq 10\text{mm}$)																																											
	Zone Size (mm)	Acceptable Qty																																																					
	$\Phi \leq 0.2$	C																																																					
	$0.2 < \Phi \leq 0.3$	Ignore																																																					
	$0.3 < \Phi \leq 0.4$	4(distance $\geq 10\text{mm}$)																																																					
$\Phi > 0.4$	2(distance $\geq 10\text{mm}$)																																																						
CTP Bonding bubble/ accident spot	<table><tr><th>Size $\Phi(\text{mm})$</th><th colspan="2">Acceptable Qty</th></tr><tr><td></td><th>A</th><th>B</th></tr><tr><td>$\Phi \leq 0.1$</td><td colspan="2">Ignore</td></tr><tr><td>$0.1 < \Phi \leq 0.2$</td><td colspan="2">3(distance $\geq 10\text{mm}$)</td></tr><tr><td>$0.2 < \Phi \leq 0.3$</td><td colspan="2">2(distance $\geq 10\text{mm}$)</td></tr><tr><td>$\Phi > 0.3$</td><td colspan="2">0</td></tr></table>	Size $\Phi(\text{mm})$	Acceptable Qty			A	B	$\Phi \leq 0.1$	Ignore		$0.1 < \Phi \leq 0.2$	3(distance $\geq 10\text{mm}$)		$0.2 < \Phi \leq 0.3$	2(distance $\geq 10\text{mm}$)		$\Phi > 0.3$	0																																					
	Size $\Phi(\text{mm})$	Acceptable Qty																																																					
		A	B																																																				
	$\Phi \leq 0.1$	Ignore																																																					
	$0.1 < \Phi \leq 0.2$	3(distance $\geq 10\text{mm}$)																																																					
$0.2 < \Phi \leq 0.3$	2(distance $\geq 10\text{mm}$)																																																						
$\Phi > 0.3$	0																																																						
Assembly deflection	beyond the edge of backlight $\leq 0.2\text{mm}$																																																						
CTP cover broken X : length Y : width Z : height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$X \leq 0.5\text{mm}$</td><td>$Y \leq 0.5\text{mm}$</td><td>$Z < \text{cover thickness}$</td></tr></table> * Circuitry broken is not allowed.	X	Y	Z	$X \leq 0.5\text{mm}$	$Y \leq 0.5\text{mm}$	$Z < \text{cover thickness}$																																																
	X	Y	Z																																																				
$X \leq 0.5\text{mm}$	$Y \leq 0.5\text{mm}$	$Z < \text{cover thickness}$																																																					
CTP cover broken X : length Y : width Z : height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$X \leq 0.3\text{mm}$</td><td>$Y \leq 0.3\text{mm}$</td><td>$Z < \text{cover thickness}$</td></tr></table> * Circuitry broken is not allowed.	X	Y	Z	$X \leq 0.3\text{mm}$	$Y \leq 0.3\text{mm}$	$Z < \text{cover thickness}$																																																
	X	Y	Z																																																				
$X \leq 0.3\text{mm}$	$Y \leq 0.3\text{mm}$	$Z < \text{cover thickness}$																																																					

Criteria (functional items)

Part. No	ET070WV07-KT	REV	V1.0	Page 33 of 37
----------	--------------	-----	------	---------------

Shenzhen Youritech Technology Co.,Limited

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	CTP no function	Not allowed

Shenzhen Youritech Technology Co.,Limited

10. Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	85°C,96H	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the LCD; 2.Non-display; 3.Missing segments/line; 4.Glass crack; 5.Current IDD is twice higher than initial value.
Low Temperature Operating	-30°C, 96HR	
High Temperature Storage	90°C, 96HR	
Low Temperature Storage	-40°C, 96HR	
High Temperature & High Humidity Operating	+60°C, 90% RH ,96 hours.	
Thermal Shock (Non-operation)	-10°C,30 min ↔ 60°C,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±8KV, 5times; Contact:±6KV, 5 times; (Environment: 15°C~35°C, 30%~60%).	
Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package condition).	
Box Drop Test	1 Corner 3 Edges 6 faces,80cm(MEDIUM BOX)	

Remark:

- 1.The test samples should be applied to only one test item.
- 2.Sample size for each test item is 5~10pcs.
- 3.For Damp Proof Test, Pure water(Resistance > 10MΩ) should be used.
- 4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.
- 5.Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.
6. The color fading mura of polarizing filter should not care.

Part. No	ET070WV07-KT	REV	V1.0	Page 35 of 37
----------	--------------	-----	------	---------------

Shenzhen Youritech Technology Co., Limited

11. Cautions and Handling Precautions

11.1 Handling and Operating the Module

(1) When the module is assembled, it should be attached to the system firmly.

Do not warp or twist the module during assembly work.

(2) Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.

(3) Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.

(4) Do not allow drops of water or chemicals to remain on the display surface.

If you have the droplets for a long time, staining and discoloration may occur.

(5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

(6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.

Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.

(8) Protect the module from static; it may cause damage to the CMOS ICs.

(9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(10) Do not disassemble the module.

(11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.

(12) Pins of I/F connector shall not be touched directly with bare hands.

(13) Do not connect, disconnect the module in the "Power ON" condition.

(14) Power supply should always be turned on/off by the item 6.1 Power On Sequence & 6.2 Power Off Sequence

11.2 Storage and Transportation.

(1) Do not leave the panel in high temperature, and high humidity for a long time.

It is highly recommended to store the module with temperature from 0 to 35 °C and relative humidity of less than 70%

(2) Do not store the TFT-LCD module in direct sunlight.

(3) The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.

(4) It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module.

In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.

(5) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.

Part. No	ET070WV07-KT	REV	V1.0	Page 36 of 37
----------	--------------	-----	------	---------------

12. Packing

