



**SPECIFICATION
FOR
LCM Module
KD050WVFPA018**

MODULE:	KD050WVFPA018
CUSTOMER:	

REV	DESCRIPTION	DATE
1.0	FIRST ISSUE	2017.06.17

STARTEK	INITIAL	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

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常备库存
Stock For Sale

长期供货
Long Time supply

支持小量
NO MOQ

品种齐全
In Full Range



Revision History

[illegible]

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* 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 model is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 5.0'TFT-LCD contains 800X480 pixels, and can display up to 65K/262K/16.7M colors.

* Features

-Low Input Voltage: 3.3V(TYP)

-Display Colors of TFT LCD: 65K/262K/16.7M colors

Interface: 16/18/24Bit RGB Interface

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	108.0(H) *64.80(V) (5.0inch)	mm	-
Driver element	TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	800(RGB)*480	dots	-
TFT Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.135(H) x 0.135 (V)	mm	-
Viewing angle	ALL	o'clock	-
TFT Controller IC	HX8678C/HX8249A	-	-
Display mode	Transmissive/Normally Black	-	-
Operating temperature	-30~+85	°C	-
Storage temperature	-40~+90	°C	-

* Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		124.90		mm	-
	Vertical(V)		78.10		mm	-
	Depth(D)		2.95		mm	-
Weight			TBD		g	-

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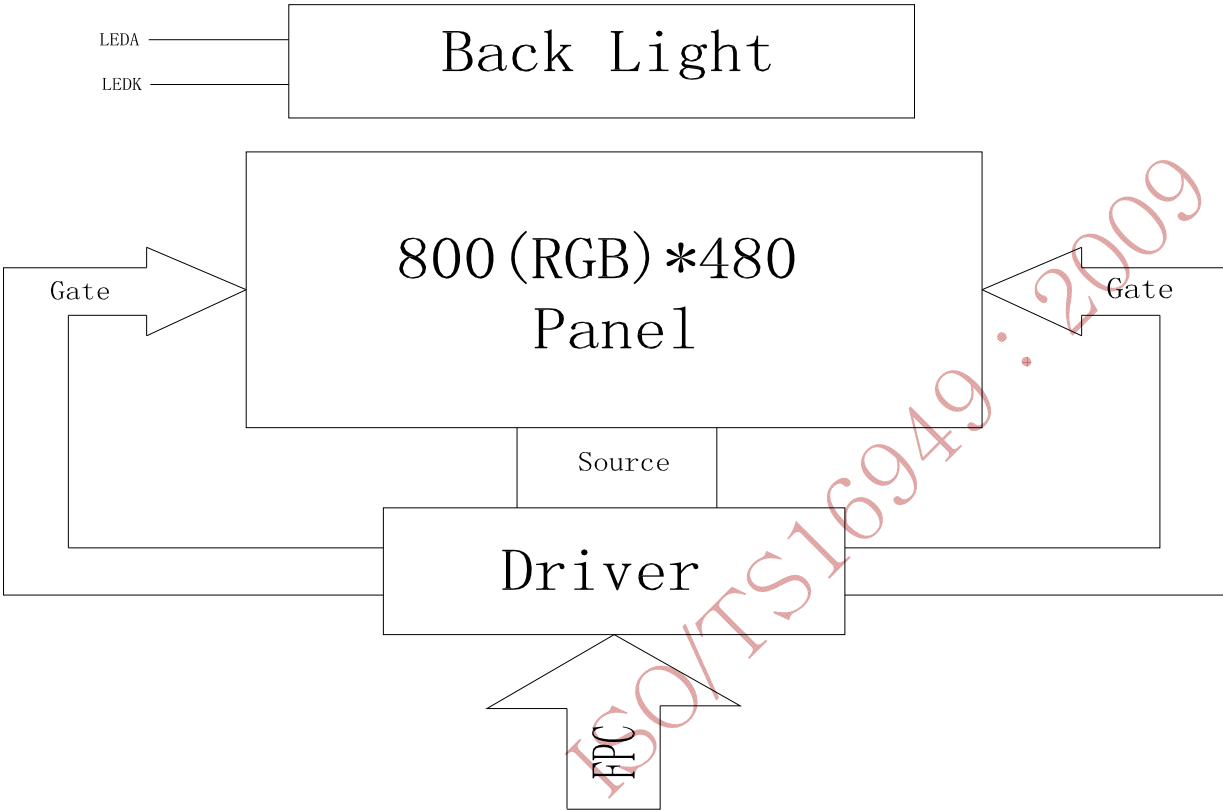
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1. Block Diagram



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3. Input terminal Pin Assignment

NO.	SYMBOL	DISCRIPTION	I/O
1	LEDK	Cathode pin OF backlight	P
2	LEDA	Anode pin of backlight	P
3	GND	Ground.	P
4	VDD	Supply voltage(3.3V).	P
5	R0	Red data input.	I
6	R1	Red data input.	I
7	R2	Red data input.	I
8	R3	Red data input.	I
9	R4	Red data input.	I
10	R5	Red data input.	I
11	R6	Red data input.	I
12	R7	Red data input.	I
13	G0	Green data input.	I
14	G1	Green data input.	I
15	G2	Green data input.	I
16	G3	Green data input.	I
17	G4	Green data input.	I
18	G5	Green data input.	I
19	G6	Green data input.	I
20	G7	Green data input.	I
21	B0	Blue data input.	I
22	B1	Blue data input.	I
23	B2	Blue data input.	I
24	B3	Blue data input.	I
25	B4	Blue data input.	I

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26	B5	Blue data input.	I
27	B6	Blue data input.	I
28	B7	Blue data input.	I
29	GND	Ground.	P
30	PCLK	Clock signal. Latching data at the rising edge	I
31	DISP	Standby setting for testing, it should be connected to VDDIO in normal operation mode. If connected to GND, the IC is in standby mode.	I
32	HSYNC	Horizontal Sync input. Negative polarity.	I
33	VSYN	Vertical Sync input. Negative polarity.	I
34	DE	Data input Enable. Active High to enable the data input Bus under "DE Mode".	I
35	NC		
36	GND	Ground.	P
37	XR(NC)	Touch panel Right Glass Terminal	
38	YD(NC)	Touch panel Bottom Film Terminal	
39	XL(NC)	Touch panel LIFT Glass Terminal	
40	YU(NC)	Touch panel Top Film Terminal	

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4. LCD Optical Characteristics

4.1 Optical specification

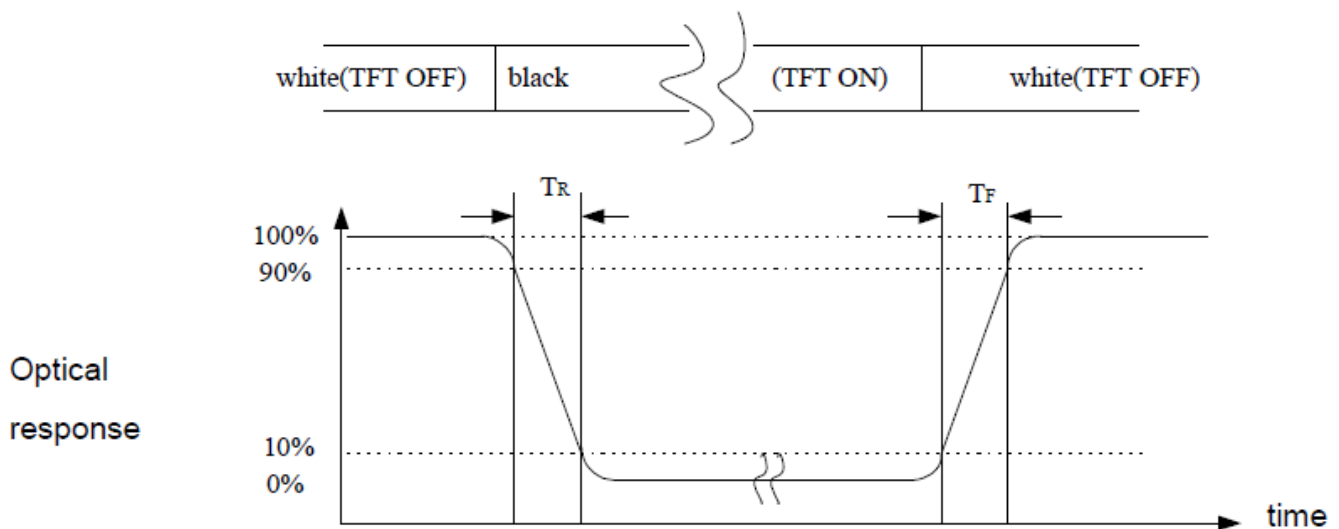
Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	$\Theta=0$	--	1000	--		2
Response time	Rising	T_{R+T_F}	Normal viewing angle	--	35	40	msec	3
	Falling			--				
Color gamut		S(%)		--	65.84	--	%	
Color Filter Chromaticity	White	W_X		0.275	0.325	0.365		
		W_Y		0.326	0.366	0.406		
	Red	R_X		0.579	0.619	0.659		
		R_Y		0.306	0.346	0.386		
	Green	G_X		0.286	0.326	0.366		
		G_Y		0.585	0.625	0.665		
	Blue	B_X		0.105	0.145	0.185		
		B_Y		0.045	0.085	0.125		
Viewing angle	Hor.	Θ_L	CR>10	--	85	--		
		Θ_R		--	85	--		
	Ver.	Θ_U		--	85	--		
		Θ_D		--	85	--		
Option View Direction		Free						



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) Definition of Response Time : Sum of T_R and T_F





5. Electrical Characteristics

5.1 Absolute Maximum Rating (Ta=25 VSS=0V)

Characteristics	Symbol	Min.	Max.	Unit
Digital Supply Voltage	VDD	-0.3	4.0	V
Operating temperature	T _{OP}	-30	+85	°C
Storage temperature	T _{ST}	-40	+90	°C

NOTE: 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.

5.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VDD	3.0	2.8/3.3	3.6	V	
Normal mode Current consumption	IDD	--	65	--	mA	
Level input voltage	V _{IH}	0.7V _{DDIO}		VDDIO	V	
	V _{IL}	GND		0.3V _{DDIO}	V	
Level output voltage	V _{OH}	0.8VDDIO		VDDIO	V	
	V _{OL}	GND		0.2VDDIO	V	

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5.3 LED Backlight Characteristics

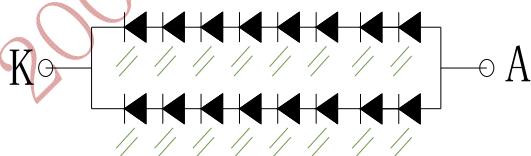
The back-light system is edge-lighting type with 16 chips White LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	30	40	--	mA	
Forward Voltage	V_F	--	25.6	--	V	
LCM Luminance	L_v	600	660	--	cd/m ²	Note3
LED life time	Hr	50000	--	--	Hour	Note1,2
Uniformity	AVg	80	--	--	%	Note3

Note (1) 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 $I_L=40\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 40mA. The constant current driving method is suggested.



Backlight LED Circuit

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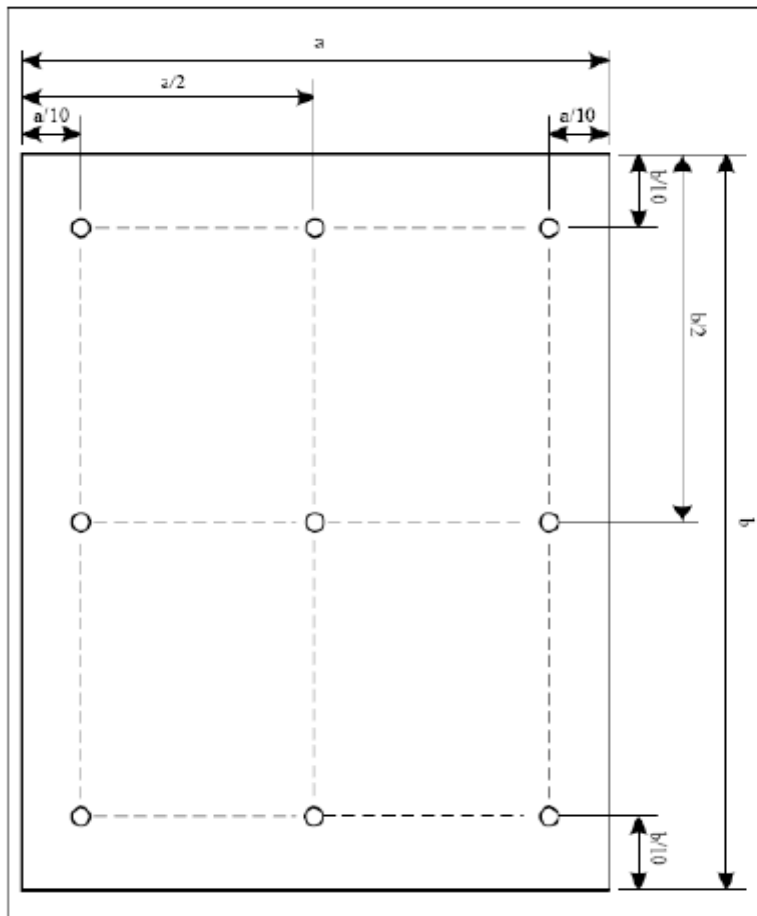
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NOTE 3: Luminance Uniformity of these 9 points is defined as below:



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

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

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6. AC Characteristic

6.1 Input signal timing

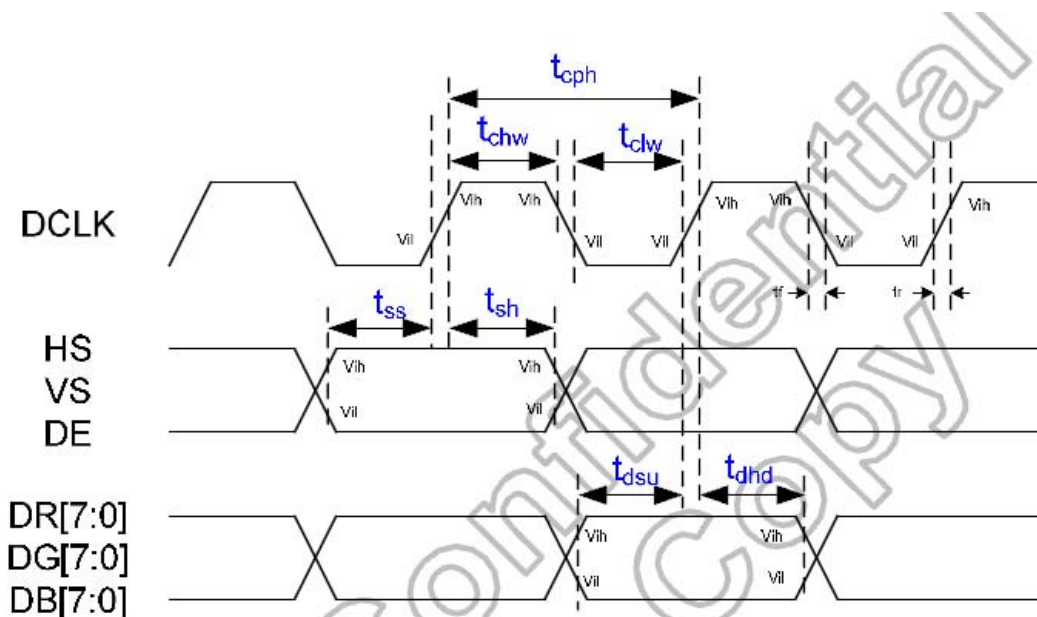


Figure 7.1: TTL input timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK period	T_{cph}	16.8	-	-	ns
DCLK clock high width	T_{chw}	6	-	-	ns
DCLK clock low width	T_{clw}	6	-	-	ns
VS setup time	T_{ss}	5	-	-	ns
VS hold time	T_{sh}	5	-	-	ns
HS setup time	T_{ss}	5	-	-	ns
HS hold time	T_{sh}	5	-	-	ns
DE setup time	T_{ss}	5	-	-	ns
DE hold time	T_{sh}	5	-	-	ns
Data setup time	T_{dsu}	5	-	-	ns
Data hold time	T_{dhd}	5	-	-	ns
Input signal rising time	T_r	-	-	10	ns
Input signal falling time	T_f	-	-	10	ns



6.2 Parallel RGB at Sync mode(when R9=0 Ω)

• Horizontal

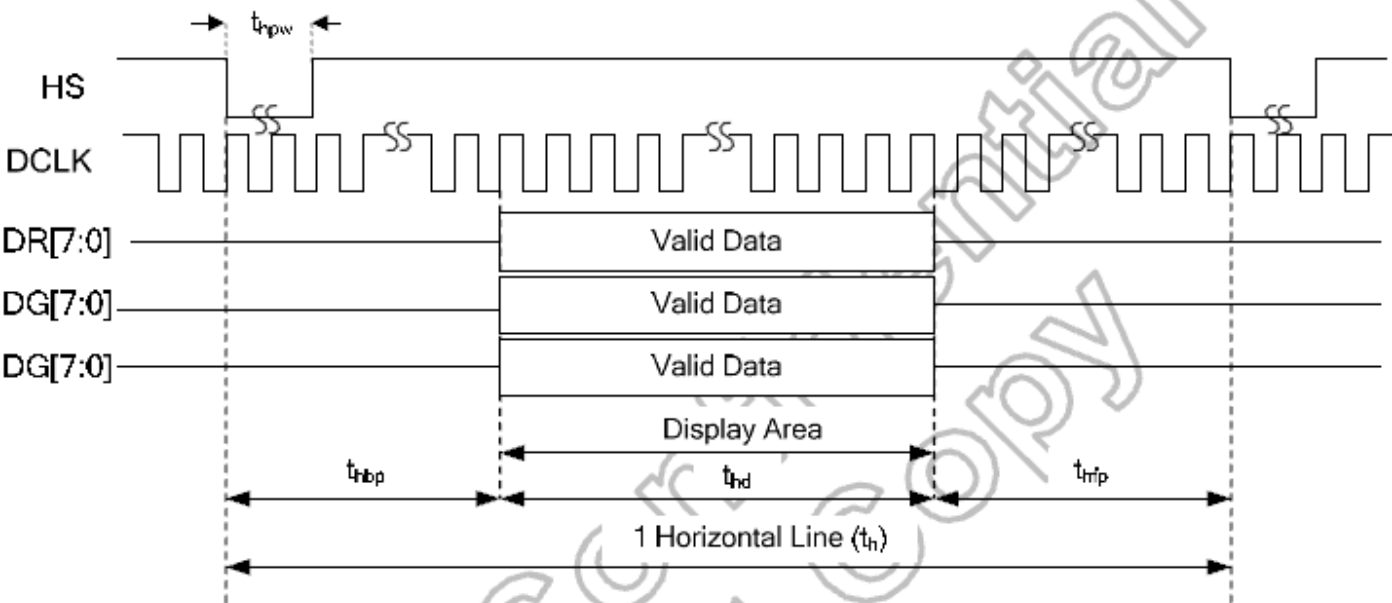
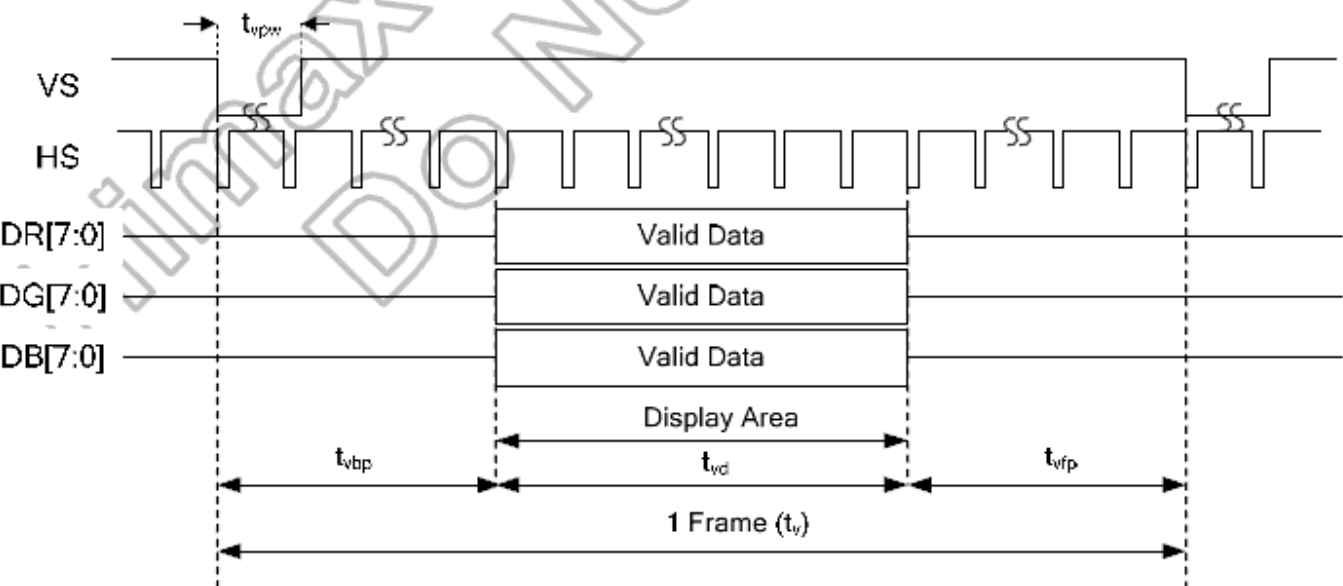


Figure 7.7: Horizontal input timing at Sync mode

• Vertical





Parameter	Symbol	Panel resolution									Unit
		800xRGBx480 (RS[3:0]=6h)			800xRGBx1280 (RS[3:0]=7h)			960xRGBx160 (RS[3:0]=8h)			
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
DCLK frequency	F _{DCLK}	25.2	27.2	30.5	66.3	69.4	77.7	10.4	11.8	14.8	MHz
Horizontal valid data	t _{hd}	800			800			960			DCLK
Hsync pulse width	t _{hpw}	1	2	100	1	2	100	1	2	124	DCLK
Hsync back porch	t _{hbp}	5	16	101	5	16	101	5	16	125	DCLK
Hsync front porch	t _{hfp}	19	44	115	19	44	115	19	44	139	DCLK
1 horizontal line	t _h	856	860	920	856	860	920	1016	1020	1104	DCLK
Vertical valid data	t _{vd}	480			1280			160			H
Vsync pulse width	t _{vpw}	1	2	66	1	2	122	1	2	58	H
Vsync back porch	t _{vbp}	5	5	67	5	5	123	5	5	59	H
Vsync front porch	t _{vfp}	5	43	67	5	59	123	5	27	59	H
1 vertical field	t _v	490	528	552	1290	1344	1408	170	192	224	H

ISO9001 : 2008 ISO/TS16949

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6.3 Parallel RGB at DE mode(when R10=0Ω default)

• Horizontal

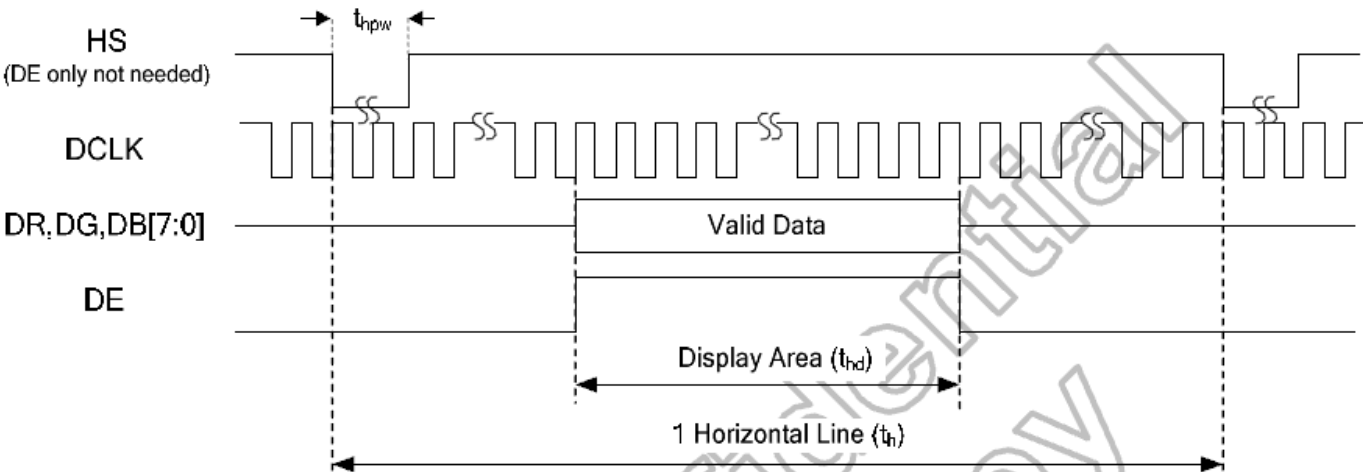
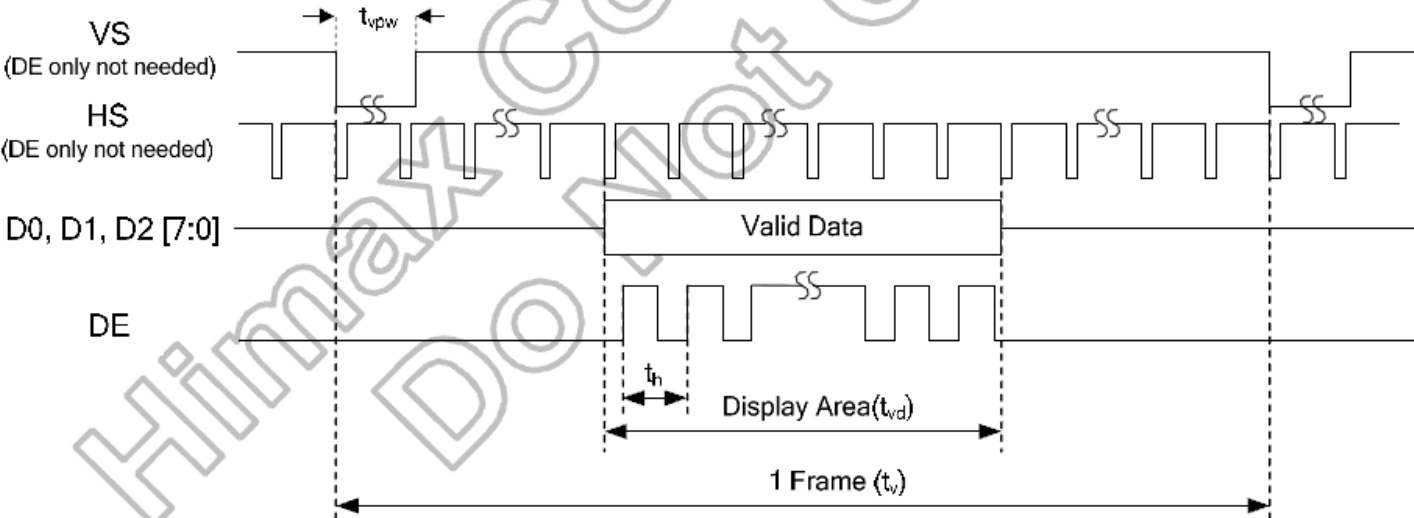


Figure 7.9: Horizontal input timing at DE only mode

• Vertical





Parameter	Symbol	Panel Resolution									Unit
		800xRGBx480 (RS[3:0]=6h)			800xRGBx1280 (RS[3:0]=7h)			960xRGBx160 (RS[3:0]=8h)			
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
DCLK frequency	F _{DCLK}	25.2	27.2	30.5	66.3	69.4	77.7	10.4	11.8	14.8	MHz
Horizontal valid data	t _{hd}	800			800			960			
1 horizontal line	t _h	856	860	920	856	860	920	1016	1020	1104	DCLK
Vertical valid data	t _{vd}	480			1280			160			
1 vertical field	t _v	490	528	552	1290	1344	1536	170	192	224	H

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7. LCD Module Out-Going Quality Level

7.1 VISUAL & FUNCTION INSPECTION STANDARD

7.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

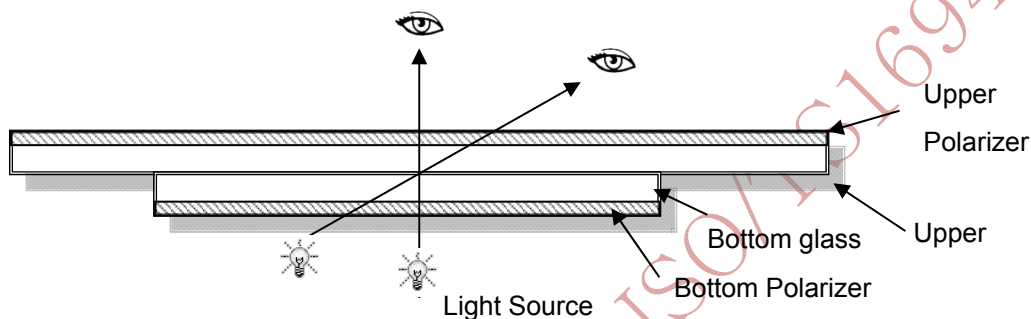
Temperature : $25 \pm 5^\circ\text{C}$

Humidity : 65%±10%RH

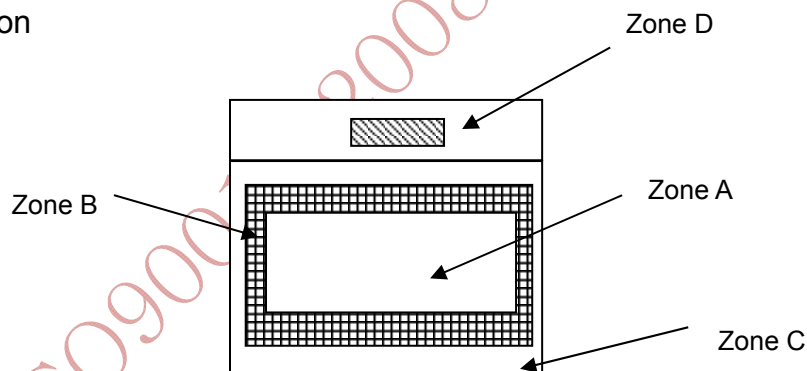
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



7.1.2 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

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7.1.3 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 , TP: Touch Panel , LCM: Liquid Crystal Module

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

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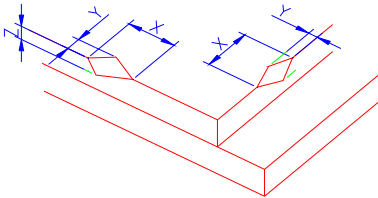
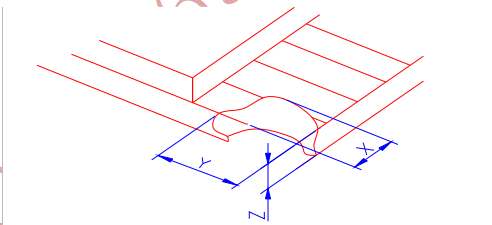
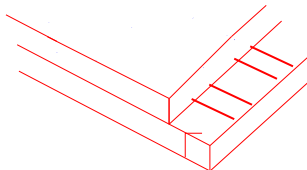
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7.1.4 Criteria (Visual)

Number	Items	Criteria(mm)						
1.0 LCD Crack/Broken NOTE: X: Length Y: Width Z: Height L: Length of ITO, 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							

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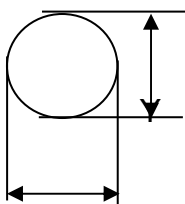
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2.0

Spot defect



X

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

① light dot (LCD/TP/Polarizer black/white spot, light dot, pinhole, dent, stain)

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.10$	Ignore		
$0.10 < \Phi \leq 0.25$	3(distance $\geq 10\text{mm}$)		
$0.25 < \Phi \leq 0.3$	2		
$\Phi > 0.35$	0		

② Dim spot (LCD/TP/Polarizer dim dot, light leakage, dark spot)

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.1$	Ignore		
$0.10 < \Phi \leq 0.25$	3(distance $\geq 10\text{mm}$)		
$0.25 < \Phi \leq 0.3$	2		
$\Phi > 0.35$	0		

③ Polarizer accidented spot

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.2$	Ignore		
$0.3 < \Phi \leq 0.5$	2(distance $\geq 10\text{mm}$)		
$\Phi > 0.5$	0		

④ Pixel bad points (light dot, Dim dot, color dot)

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.1$	Ignore		
$0.15 < \Phi \leq 0.25$	2(distance $\geq 10\text{mm}$)		
$\Phi > 0.3$	0		

⑤ Polarizer Bubble

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.2$	Ignore		
$0.3 < \Phi \leq 0.4$	3(distance $\geq 10\text{mm}$)		
$0.4 < \Phi \leq 0.5$	2		
$\Phi > 0.5$	0		

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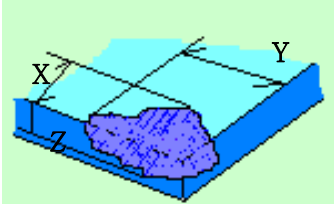
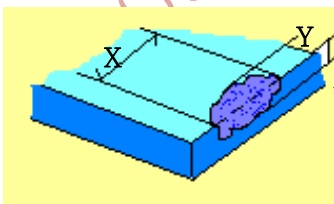
3.0	Line defect (LCD/TP /Polarizer backlight black/white line, scratch, stain)	Width(mm)	Length(m m)	Acceptable Qty		
				A	B	C
		$\Phi \leq 0.05$	Ignore	Ignore		Ignore
		$0.05 < W \leq 0.06$	$L \leq 3.0$	$N \leq 2$		
		$0.07 < W \leq 0.08$	$L \leq 2.0$	$N \leq 1$		
	$0.08 < W$	Define as spot defect				
4.0	Electronic Comp onents SMT	Not allow missing parts , solderless connection , cold solder joint , mis match , The positive and negative polarity opposite				
5.0	Display color& B rightness	1. Color : Measuring the color coordinates, The measurement standar d according to the datasheet or samples. 2. Brightness : Measuring the brightness of White screen, The measu rement standard according to the datasheet or Samples.				

6.0	RTP Related	TP film • bubble/ accidented spot					
			Size Φ (mm)	Acceptable Qty			
				A	B	C	
			$\Phi \leq 0.1$	Ignore			Ignore
			$0.1 < \Phi \leq 0.2$	3 (distance $\geq 10\text{mm}$)			
			$0.25 < \Phi \leq 0.3$	2			
$\Phi > 0.35$	0						



TP film scratch	Width(mm)	Length(mm)	Acceptable Qty		
			A	B	C
	$\Phi \leq 0.05$	Ignore	Ignore		
	$0.05 < W \leq 0.06$	$L \leq 3.0$	$N \leq 2$		
	$0.07 < W \leq 0.08$	$L \leq 2.0$	$N \leq 1$		
	$0.08 < W$	Define as spot defect			
Assembly deflection	beyond the edge of backlight $\leq 0.2\text{mm}$				
Bulge (undulation included)	The ITO film plumped below 0.40mm, it's ok. 				
Newton Ring	Newton Ring area $> 1/3$ TP area NG Newton Ring area $\leq 1/3$ TP area OK				



		TP corner broken X : length Y : width Z : height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>X≤3mm</td><td>Y≤3mm</td><td>Z<COVER thickness</td></tr></table> * *Circuitry broken is not allowed.	X	Y	Z	X≤3mm	Y≤3mm	Z<COVER thickness	
X	Y	Z								
X≤3mm	Y≤3mm	Z<COVER thickness								
		TP edge broken X : length Y : width Z : height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>X≤4mm</td><td>Y≤2mm</td><td>Z<COVER thickness</td></tr></table> * Circuitry broken is not allowed.	X	Y	Z	X≤4mm	Y≤2mm	Z<COVER thickness	
X	Y	Z								
X≤4mm	Y≤2mm	Z<COVER thickness								

Criteria (functional items)

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	TP no function	Not allowed



8. Reliability Test Result

8.1 Condition

Item	Condition	Sample Size	Test Result	Note
Low Temperature Operating Life test	-30℃, 96HR	3ea	pass	-
Thermal Humidity Operating Life test	85℃90%RH, 96HR	3ea	pass	-
Temperature Cycle ON/OFF test	-30℃ ↔ 85℃, ON/OFF, 20CYC	3ea	pass	(1)
High Temperature Storage test	90℃, 96HR	3ea	pass	-
Low Temperature Storage test	-40℃, 96HR	3ea	pass	-
ESD test	150pF, 330Ω, ±6KV(Contact)/± 8KV(Air), 5 points/panel, 10 times/point	3ea	pass	
Thermal Shock Resistance	The sample should be allowed to stand the following 5 cycles of operation: TSTL for 30 minutes -> normal temperature for 5 minutes -> TSTH for 30 minutes -> normal temperature for 5 minutes, as one cycle, then taking it out and drying it at normal temperature, and allowing it stand for 24 hours	3ea	pass	
Box Drop Test	1 Corner 3 Edges 6 faces, 66cm(MEDIUM BOX)	1box	pass	-

Note (1) ON Time over 10 seconds, OFF Time under 10 seconds

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常备库存
Stock For Sale

长期供货
Long Time supply

支持小量
NO MOQ

品种齐全
In Full Range



9. Cautions and Handling Precautions

9.1 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

9.2 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.

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10. Packing

---TBD-----

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