



## ASI-T-240DA2AN/AY Rev 2

ITEM	Standard value	UNIT
LCD Type	TFT Transmissive	---
Driver element	a-Si TFT Active matrix	
Number of Dots	240*(RGB)*320	Dots
Pixel Arrangement	RGB Vertical Stripe	
Pixel Pitch (W*H)	0.153*0.153	mm
Active Area	36.72(H)*48.96(V)	mm
Glass Area (W*H)	39.72*55.96	mm
Viewing Direction	ALL FREE	
Control IC	ILI9341V	
Module Size(W*H*T)	42.72*59.46*2.35	mm
Approx. Weight	TBD	g
Back Light	4 White LED	
Touch Panel Type	----	
Touch Panel Active Area	----	mm
Touch Panel View Area	----	mm





## Contents

1. Introduction.....	4
1.1 Scope of application .....	4
1.2 Structure:.....	4
1.3 TFT features:.....	4
1.4 Applications:.....	4
2. General specification .....	5
3. Mechanical drawing.....	6
4. ABSOLUTE MAXIMUM RATINGS .....	7
5. ELECTRICAL CHARACTERISTICS .....	7
6. OPTICAL CHARACTERISTICS .....	8
7.MCU Interface Pin Function .....	10
8. AC Characteristics .....	10
8.1 8080-series MPU Parallel Interface Characteristics:18/16/9/8-Bit BUS	11
8.2 SERIAL Interface Characteristics (3/4LINE) .....	12
8.3 RGB Interface Characteristics : .....	13
9.LCM Quality Criteria .....	13
9.1 VISUAL & FUNCTION INSPECTION STANDARD.....	14
9.1.1 Inspection conditions.....	14
9.1.2 Definition .....	14
9.1.3 Sampling Plan.....	14
9.1.4 Criteria (Visual).....	15
9.2 Handling Precautions.....	18
9.3 Operation instructions.....	18
9.4 Storage instructions: .....	19
Remarks for Initialization Code     :	19



## 1. Introduction

### 1.1 Scope of application

This specification applies to the 2.4 inch TFT transmissive dot matrix LCD module.

LCD specification: Dots 240xRGBx320. As to basic specification of the driver IC, refer to the IC (ILI9341V) specification and datasheet.

### 1.2 Structure:

Double display structure:

TFT Module + FPC

FULL 262k Color 2.4 inch TFT LCD size for LCD;

One bare chip with gold bump (COG) TECH;

8080 MCU interface/serial interface/RGB interface

### 1.3 TFT features:

Structure: TFT PANNEL+IC+FPC;

Transmissive Type LCD

240 dot-source and 320 dot-gate outputs;

262k Color can be selected by software;

White LED back light;

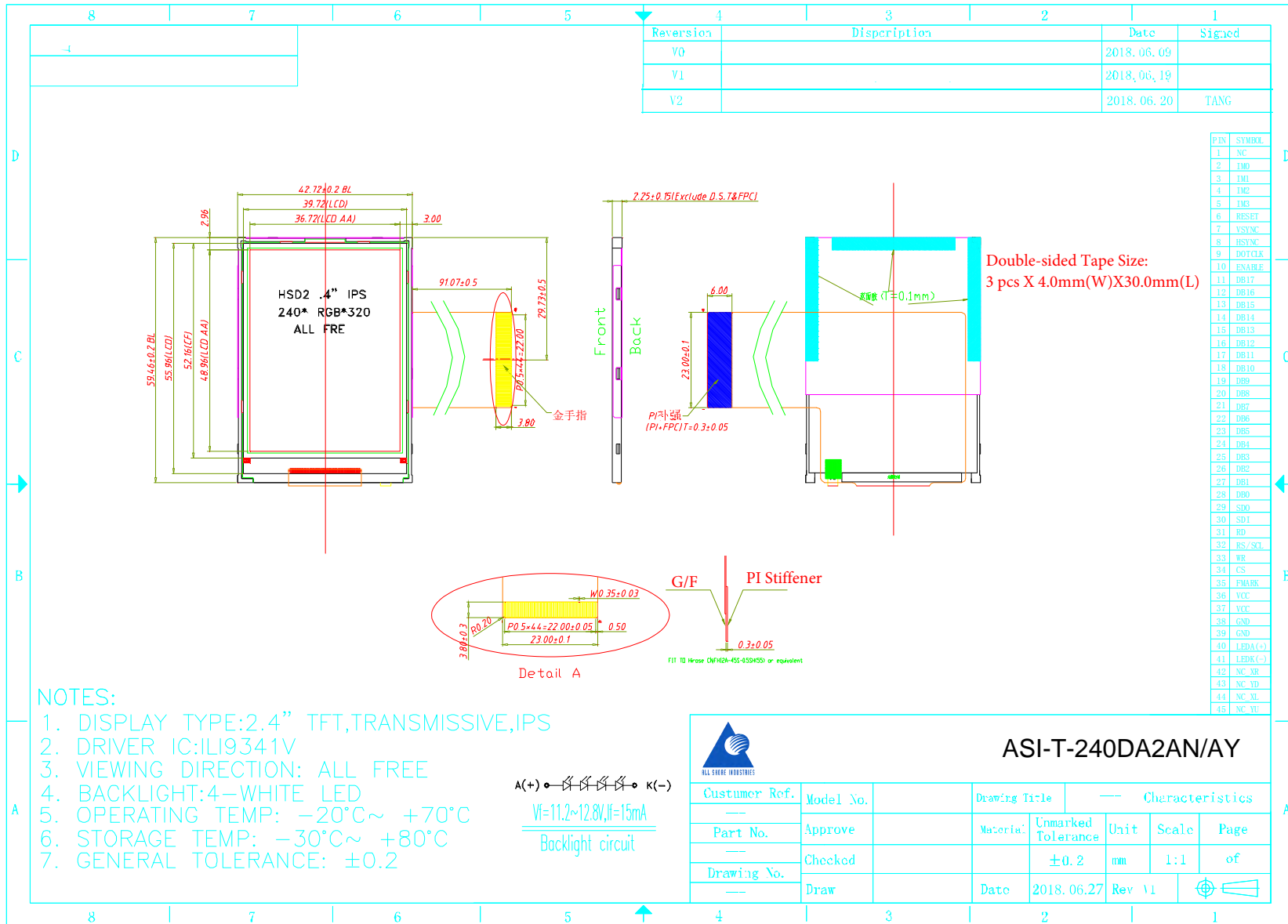
### 1.4 Applications:



## 2. General specification

ITEM	Standard value	UNIT
LCD Type	TFT Transmissive	---
Driver element	a-Si TFT Active matrix	
Number of Dots	240*(RGB)*320	Dots
Pixel Arrangement	RGB Vertical Stripe	
Pixel Pitch (W*H)	0.153*0.153	mm
Active Area	36.72(H)*48.96(V)	mm
Glass Area (W*H)	39.72*55.96	mm
Viewing Direction	ALL FREE	
Control IC	ILI9341V	
Module Size(W*H*T)	42.72*59.46*2.35	mm
Approx. Weight	TBD	g
Back Light	4 White LED	
Touch Panel Type	-----	
Touch Panel Active Area	-----	mm
Touch Panel View Area	-----	mm

### 3. Mechanical drawing



ASI-T-240DA2AN/AY



#### 4. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Supply voltage for logic	$V_{DD}$	-0.3	4.6	V
Input voltage for logic	$V_{IN}$	-0.5	$V_{DD} + 0.3$	V
Supply current (One LED)	$I_{LED}$	60	80	mA
Operating temperature	$T_{OP}$	-20	+70	°C
Storage temperature	$T_{ST}$	-30	+80	°C

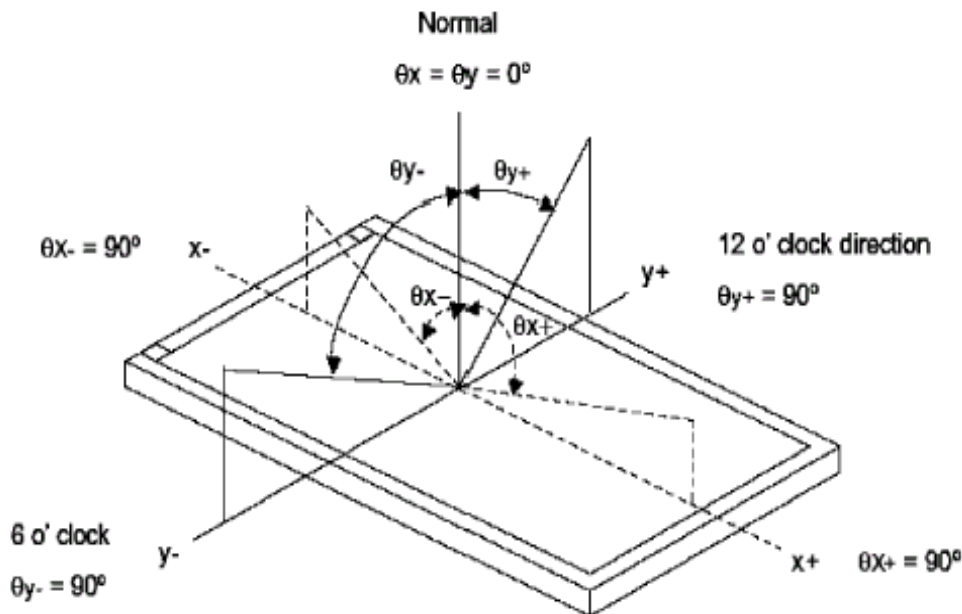
#### 5. ELECTRICAL CHARACTERISTICS

Item	Symbol	Min	Typ	Max	Unit	Applicable terminal
Supply voltage for logic	$V_{CC}$	2.5	2.8	3.3	V	$V_{DD}$
Input voltage	$V_{IL}$	-	-	$0.2 V_{CC}$	V	
	$V_{IH}$	$0.8 V_{CC}$	-	$V_{CC}$	V	
Input leakage current	$I_{LKG}$				$\mu A$	
LED Forward voltage	$V_f$	11.2	12	12.8	V	--
Input backlight current	$I_{LED}$	-	15	-	mA	
Operating life time	-	50,000	-	-	Hrs	25°C $I_{LED} \leq 15$ mA

## 6. OPTICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE	
			MIN.	TYP.	MAX			
Brightness	B	Viewing normal angle	220	--	--	Cd/m <sup>2</sup>	All left side data are based on HSD LCD reference only	
Contrast Ratio	CR		640	800	--	--		
Response Time	Tr+Tf		--	35	46	ms		
CIE Color coordinate	Red		X <sub>R</sub>	-	0.647	-		
			Y <sub>R</sub>	-	0.317	-		
	Green		X <sub>G</sub>	-	0.275	-		
			Y <sub>G</sub>	-	0.582	-		
	Blue		X <sub>B</sub>	-	0.140	-		
			Y <sub>B</sub>	-	0.088	-		
White	X <sub>w</sub>		-	0.310	-			
	Y <sub>w</sub>	-	0.336	-				
Viewing Angle	Hor.	$\theta_{x+}$	--	80	--	Deg.		
		$\theta_{x-}$	--	80	--			
	Ver.	$\theta_{y+}$	--	80	--			
		$\theta_{y-}$	--	80	--			
Uniformity	Un		--	90	--	%		

**Note 1 : Definition of Viewing Angle  $\theta_x$  and  $\theta_y$  :**

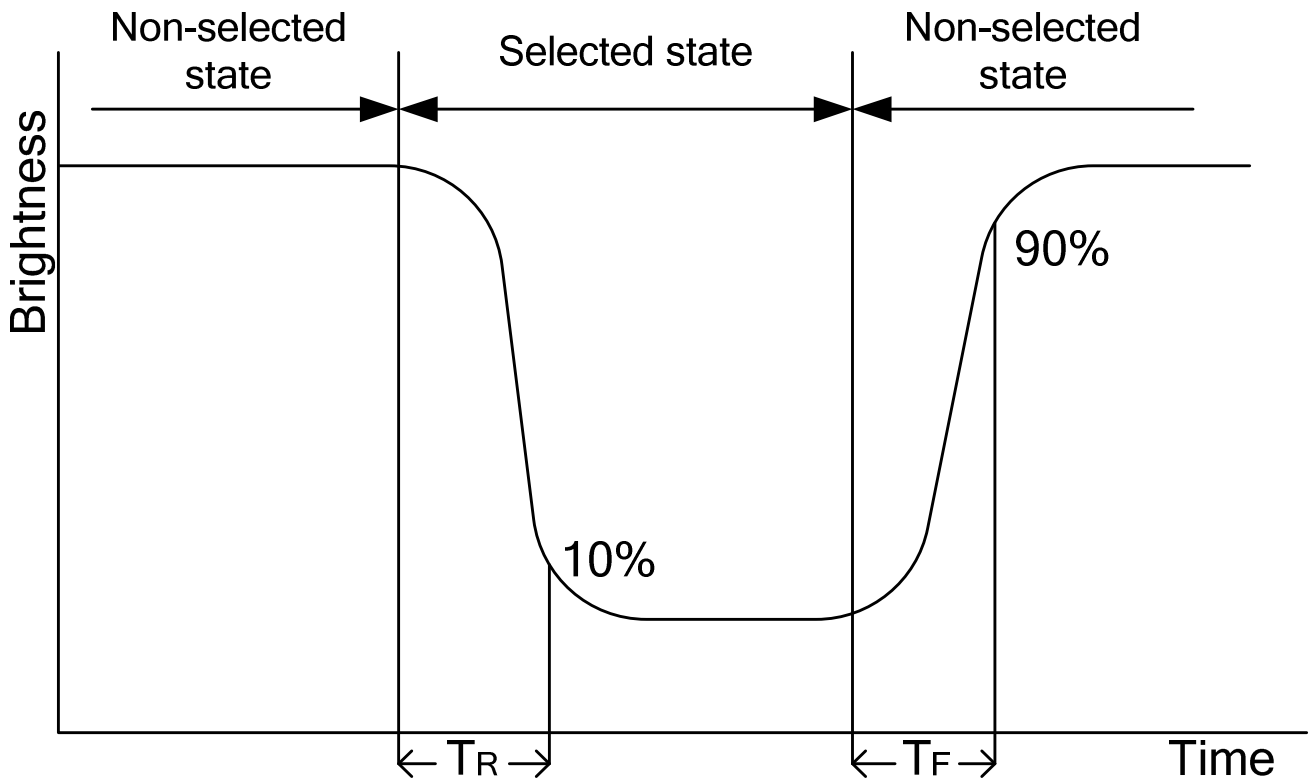




Note 2: Definition of contrast ratio CR:

$$CR = \frac{\text{Brightness of non-selected dots (white)}}{\text{Brightness of selected dots (black)}}$$

Note 3: Definition of response time ( $T_R$ ,  $T_F$ )



## 7. Interface Pin Function

NO.	SYMBOL	Description
1	NC	Don' t use
2-5	IM0-IM3	Interface setting pin.
6	RESET	This signal will reset the device.
7	VSYNC	Frame sync. signal of the RGB interface
8	HSYNC	Line sync. signal of the RGB interface
9	DOTCLK	Dot clock signal of the RGB interface
10	ENABLE	Data enable signal of the RGB interface
11-28	DB17-DB0	The 18bit data bus
29	SDO	SPI interface output signal.
30	SDI	The data line of the SPI
31	RD	The read enable signal of the 8080 timing
32	RS/SCL	The command or data select pin /SPI interface clock signal.
33	WR	The write enable signal of the 8080 timing
34	CS	Chip communication enable signal.
35	FMARK	The frame output signal.
36, 37	VCC	Power Supply(+2.8V~3.3V)
38, 39	GND	Ground
40	LEDA	Backlight+
41	LEDK	Backlight-
42-45	NC	Don' t use
Please refer the datasheet of the ILI9341V for the interface setting.(IM0-IM3)		

## 8. AC Characteristics

### 8.1 Serial Interface

#### 7.4.2 Serial Interface Characteristics (3-line serial):

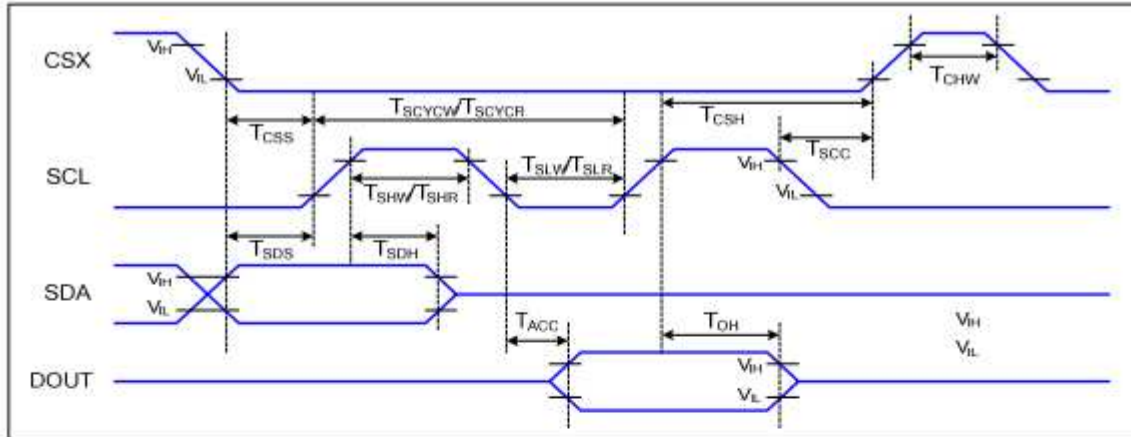


Figure 4 3-line serial Interface Timing Characteristics

V<sub>DD1</sub>=1.65 to 3.3V, V<sub>DD2</sub>=2.4 to 3.3V, A<sub>GND</sub>=D<sub>GND</sub>=0V, T<sub>a</sub>=-30 to 70 °C

Signal	Symbol	Parameter	Min	Max	Unit	Description
CSX	T <sub>CSS</sub>	Chip select setup time (write)	15		ns	
	T <sub>CSH</sub>	Chip select hold time (write)	15		ns	
	T <sub>CSS</sub>	Chip select setup time (read)	60		ns	
	T <sub>SCC</sub>	Chip select hold time (read)	65		ns	
	T <sub>CHW</sub>	Chip select "H" pulse width	40		ns	
SCL	T <sub>SCYCW</sub>	Serial clock cycle (Write)	66		ns	
	T <sub>SHW</sub>	SCL "H" pulse width (Write)	15		ns	
	T <sub>SLW</sub>	SCL "L" pulse width (Write)	15		ns	
	T <sub>SCYCR</sub>	Serial clock cycle (Read)	150		ns	
	T <sub>SHR</sub>	SCL "H" pulse width (Read)	60		ns	
	T <sub>SLR</sub>	SCL "L" pulse width (Read)	60		ns	
SDA (DIN)	T <sub>SDS</sub>	Data setup time	10		ns	
	T <sub>SDH</sub>	Data hold time	10		ns	
DOUT	T <sub>ACC</sub>	Access time	10	50	ns	For maximum CL=30pF
	T <sub>OH</sub>	Output disable time	15	50	ns	For minimum CL=8pF

## 8.2 RGB Interface Characteristics

### 7.4.4 RGB Interface Characteristics:

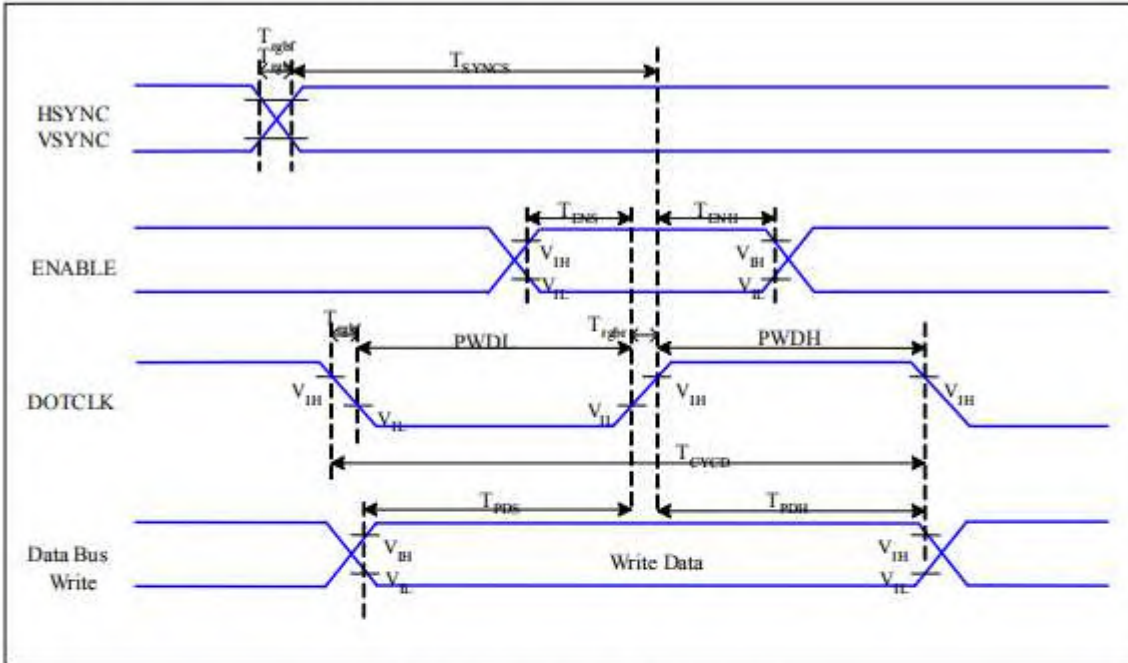
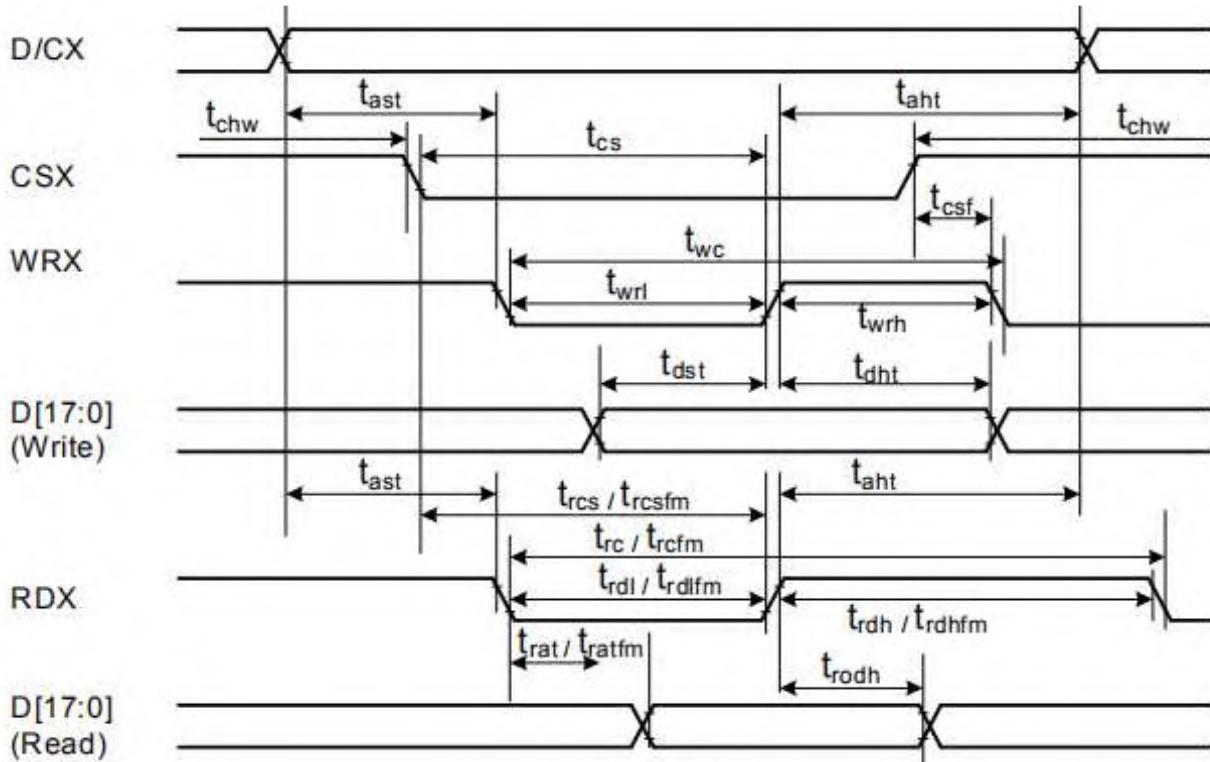


Figure 6 RGB Interface Timing Characteristics

$V_{DD1}=1.65$  to  $3.3V$ ,  $V_{DD}=2.4$  to  $3.3V$ ,  $AGND=DGND=0V$ ,  $T_a=30-70^{\circ}C$

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
HSYNC, VSYNC	$T_{\text{SYNC}}$	VSYNC, HSYNC Setup Time	30	-	ns	
ENABLE	$T_{\text{ENS}}$	Enable Setup Time	25	-	ns	
	$T_{\text{ENH}}$	Enable Hold Time	25	-	ns	
DOTCLK	PWDH	DOTCLK High-level Pulse Width	60	-	ns	
	PWDL	DOTCLK Low-level Pulse Width	60	-	ns	
	$T_{\text{CYCD}}$	DOTCLK Cycle Time	120	-	ns	
	$T_{\text{rghr}}$ , $T_{\text{rghf}}$	DOTCLK Rise/Fall time	-	20	ns	
DB	$T_{\text{PDS}}$	PD Data Setup Time	50	-	ns	
	$T_{\text{PDH}}$	PD Data Hold Time	50	-	ns	

### 8.3 8080-MCU Interface Characteristics



Signal	Symbol	Parameter	min	max	Unit	Description
DCX	tast	Address setup time	0	-	ns	
	taht	Address hold time (Write/Read)	0	-	ns	
CSX	tchw	CSX "H" pulse width	0	-	ns	
	tcs	Chip Select setup time (Write)	15	-	ns	
	trcs	Chip Select setup time (Read ID)	45	-	ns	
	trcsfm	Chip Select setup time (Read FM)	355	-	ns	
	tcsf	Chip Select Wait time (Write/Read)	10	-	ns	
WRX	twc	Write cycle	66	-	ns	
	twrh	Write Control pulse H duration	15	-	ns	
	twrl	Write Control pulse L duration	15	-	ns	
RDX (FM)	trcfm	Read Cycle (FM)	450	-	ns	
	trdhfm	Read Control H duration (FM)	90	-	ns	
	trdlfm	Read Control L duration (FM)	355	-	ns	
RDX (ID)	trc	Read cycle (ID)	160	-	ns	
	trdh	Read Control pulse H duration	90	-	ns	
	trdl	Read Control pulse L duration	45	-	ns	
D[17:0], D[17:10]&D[8:1], D[17:10], D[17:9]	tdst	Write data setup time	10	-	ns	For maximum CL=30pF For minimum CL=8pF
	tdht	Write data hold time	10	-	ns	
	trat	Read access time	-	40	ns	
	tratfm	Read access time	-	340	ns	
	trod	Read output disable time	20	80	ns	

Note:  $T_a = -30$  to  $70$  °C,  $V_{DDI}=1.65V$  to  $3.3V$ ,  $V_{CI}=2.5V$  to  $3.3V$ ,  $V_{SS}=0V$ .

## 9.LCM Quality Criteria

### 9.1 VISUAL & FUNCTION INSPECTION STANDARD

#### 9.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

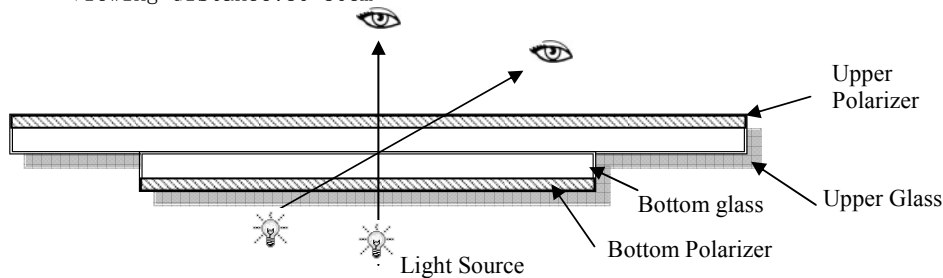
Temperature :  $25 \pm 5^{\circ}\text{C}$

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

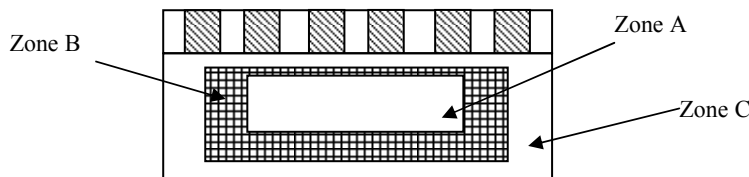
Viewing Angle : Normal viewing Angle.

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 .)

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.

#### 9.1.3 Sampling Plan

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

AQL:

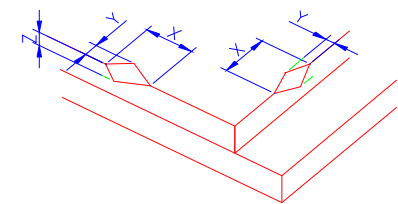
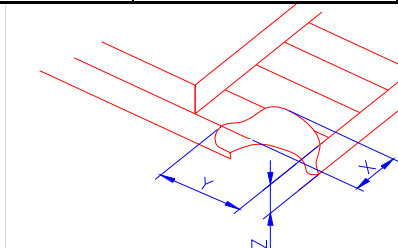
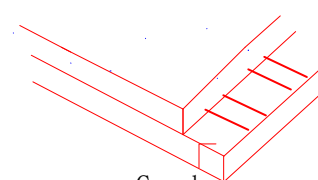
Major defect	Minor defect
0.65	1.5

LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module

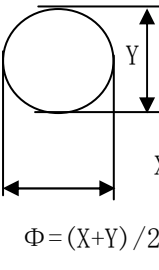
No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	

4	Color tone	Color unevenness, refer to limited sample	Minor
5	Soldering appearance	Good soldering , Peeling off is not allowed.	
6	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

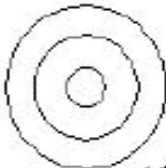


9.1.4 Criteria (Visual)

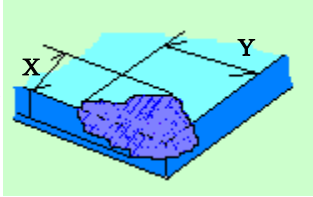
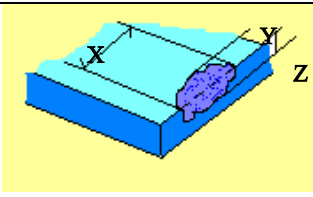
Number	Items	Criteria (mm)						
1.0 LCD Crack/Broken	(1) The edge of LCD broken  NOTE: X: Length Y: Width Z: Height L: Length of ITO, T: Height of LCD	 <table border="1" data-bbox="845 873 1388 1030"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>≤3.0mm</td> <td>&lt;Inner border line of the seal</td> <td>≤T</td> </tr> </tbody> </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 border="1" data-bbox="909 1321 1324 1400"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>≤3.0mm</td> <td>≤L</td> <td>≤T</td> </tr> </tbody> </table>	X	Y	Z	≤3.0mm	≤L	≤T		
X	Y	Z						
≤3.0mm	≤L	≤T						
(3) LCD crack   <p>Crack Not allowed</p>								



Number	Items	Criteria (mm)																											
2.0	Spot defect  $\Phi = (X+Y)/2$	① light dot (LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain)																											
		<table border="1"> <thead> <tr> <th rowspan="2">Zone Size (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.10</math></td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.10 &lt; \Phi \leq 0.15</math></td> <td colspan="3">3 ( distance <math>\geq 10\text{mm}</math>)</td> </tr> <tr> <td><math>0.15 &lt; \Phi \leq 0.2</math></td> <td colspan="3">1</td> </tr> <tr> <td><math>0.2 &lt; \Phi</math></td> <td colspan="3">0</td> </tr> </tbody> </table>	Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.10$	Ignore			$0.10 < \Phi \leq 0.15$	3 ( distance $\geq 10\text{mm}$ )			$0.15 < \Phi \leq 0.2$	1			$0.2 < \Phi$	0						
		Zone Size (mm)		Acceptable Qty																									
			A	B	C																								
		$\Phi \leq 0.10$	Ignore																										
		$0.10 < \Phi \leq 0.15$	3 ( distance $\geq 10\text{mm}$ )																										
		$0.15 < \Phi \leq 0.2$	1																										
		$0.2 < \Phi$	0																										
		② Dim spot (LCD/TP/Polarizer dim dot, light leakage, dark spot)																											
		<table border="1"> <thead> <tr> <th rowspan="2">Zone Size (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.1</math></td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.1 &lt; \Phi \leq 0.2</math></td> <td colspan="3">2 ( distance <math>\geq 10\text{mm}</math>)</td> </tr> <tr> <td><math>0.2 &lt; \Phi \leq 0.3</math></td> <td colspan="3">1</td> </tr> <tr> <td><math>\Phi &gt; 0.3</math></td> <td colspan="3">0</td> </tr> </tbody> </table>	Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.1$	Ignore			$0.1 < \Phi \leq 0.2$	2 ( distance $\geq 10\text{mm}$ )			$0.2 < \Phi \leq 0.3$	1			$\Phi > 0.3$	0						
		Zone Size (mm)		Acceptable Qty																									
			A	B	C																								
		$\Phi \leq 0.1$	Ignore																										
		$0.1 < \Phi \leq 0.2$	2 ( distance $\geq 10\text{mm}$ )																										
		$0.2 < \Phi \leq 0.3$	1																										
$\Phi > 0.3$	0																												
③ Polarizer accidented spot																													
<table border="1"> <thead> <tr> <th rowspan="2">Zone Size (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.2</math></td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.2 &lt; \Phi \leq 0.5</math></td> <td colspan="3">2 ( distance <math>\geq 10\text{mm}</math>)</td> </tr> <tr> <td><math>\Phi &gt; 0.5</math></td> <td colspan="3">0</td> </tr> </tbody> </table>	Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.2$	Ignore			$0.2 < \Phi \leq 0.5$	2 ( distance $\geq 10\text{mm}$ )			$\Phi > 0.5$	0												
Zone Size (mm)		Acceptable Qty																											
	A	B	C																										
$\Phi \leq 0.2$	Ignore																												
$0.2 < \Phi \leq 0.5$	2 ( distance $\geq 10\text{mm}$ )																												
$\Phi > 0.5$	0																												
Line defect (LCD/TP /Polarizer black/white line, scratch, stain)	<table border="1"> <thead> <tr> <th rowspan="2">Width(mm)</th> <th rowspan="2">Length(mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.03</math></td> <td>Ignore</td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.03 &lt; W \leq 0.05</math></td> <td><math>L \leq 3.0</math></td> <td colspan="3"><math>N \leq 2</math></td> </tr> <tr> <td><math>0.05 &lt; W \leq 0.08</math></td> <td><math>L \leq 2.0</math></td> <td colspan="3"><math>N \leq 2</math></td> </tr> <tr> <td><math>0.08 &lt; W</math></td> <td colspan="4">Define as spot defect</td> </tr> </tbody> </table>	Width(mm)	Length(mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.03$	Ignore	Ignore			$0.03 < W \leq 0.05$	$L \leq 3.0$	$N \leq 2$			$0.05 < W \leq 0.08$	$L \leq 2.0$	$N \leq 2$			$0.08 < W$	Define as spot defect			
Width(mm)	Length(mm)			Acceptable Qty																									
		A	B	C																									
$\Phi \leq 0.03$	Ignore	Ignore																											
$0.03 < W \leq 0.05$	$L \leq 3.0$	$N \leq 2$																											
$0.05 < W \leq 0.08$	$L \leq 2.0$	$N \leq 2$																											
$0.08 < W$	Define as spot defect																												



3.0	Polarizer Bubble	<table border="1"> <thead> <tr> <th rowspan="2">Zone Size (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.2</math></td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.2 &lt; \Phi \leq 0.4</math></td> <td colspan="3">2 (distance <math>\geq 10\text{mm}</math>)</td> </tr> <tr> <td><math>0.4 &lt; \Phi \leq 0.6</math></td> <td colspan="3">1</td> </tr> <tr> <td><math>0.6 &lt; \Phi</math></td> <td colspan="3">0</td> </tr> </tbody> </table>	Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.2$	Ignore			$0.2 < \Phi \leq 0.4$	2 (distance $\geq 10\text{mm}$ )			$0.4 < \Phi \leq 0.6$	1			$0.6 < \Phi$	0			Ignore	
		Zone Size (mm)		Acceptable Qty																							
			A	B	C																						
		$\Phi \leq 0.2$	Ignore																								
		$0.2 < \Phi \leq 0.4$	2 (distance $\geq 10\text{mm}$ )																								
$0.4 < \Phi \leq 0.6$	1																										
$0.6 < \Phi$	0																										
4.0	SMT	According to IPC-A-610C class II standard . Function defect and missing part are major defect , the others are minor defect.																									
5.0	TP Related	TP bubble/ accidented spot	<table border="1"> <thead> <tr> <th rowspan="2">Size <math>\Phi</math> (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.1</math></td> <td colspan="3">Ignore</td> </tr> <tr> <td><math>0.1 &lt; \Phi \leq 0.2</math></td> <td colspan="3">2</td> </tr> <tr> <td><math>0.2 &lt; \Phi \leq 0.3</math></td> <td colspan="3">1</td> </tr> <tr> <td><math>0.3 &lt; \Phi</math></td> <td colspan="3">0</td> </tr> </tbody> </table>	Size $\Phi$ (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.1$	Ignore			$0.1 < \Phi \leq 0.2$	2			$0.2 < \Phi \leq 0.3$	1			$0.3 < \Phi$	0			Ignore
		Size $\Phi$ (mm)	Acceptable Qty																								
			A	B	C																						
		$\Phi \leq 0.1$	Ignore																								
		$0.1 < \Phi \leq 0.2$	2																								
$0.2 < \Phi \leq 0.3$	1																										
$0.3 < \Phi$	0																										
Assembly deflection	beyond the edge of backlight $\leq 0.15\text{mm}$																										
Newton Ring	<p>Newton Ring area <math>&gt; 1/3</math> TP area NG</p> <p>Newton Ring area <math>\leq 1/3</math> TP area OK</p>	 <p>1 规律性</p>  <p>2 非规律性</p>  <p>似牛顿环</p>																									

	TP corner broken X: length Y: width Z: height	<table border="1"> <tr> <td>X</td> <td>Y</td> <td>Z</td> </tr> <tr> <td><math>X \leq 3.0\text{mm}</math></td> <td><math>Y \leq 3.0\text{mm}</math></td> <td><math>Z &lt; \text{LCD thickness}</math></td> </tr> </table>	X	Y	Z	$X \leq 3.0\text{mm}$	$Y \leq 3.0\text{mm}$	$Z < \text{LCD thickness}$	
		X	Y	Z					
$X \leq 3.0\text{mm}$	$Y \leq 3.0\text{mm}$	$Z < \text{LCD thickness}$							
* Circuitry broken is not allowed.									
	TP edge broken X: length Y: width Z: height	<table border="1"> <tr> <td>X</td> <td>Y</td> <td>Z</td> </tr> <tr> <td><math>X \leq 6.0\text{mm}</math></td> <td><math>Y \leq 2.0\text{mm}</math></td> <td><math>Z &lt; \text{LCD thickness}</math></td> </tr> </table>	X	Y	Z	$X \leq 6.0\text{mm}$	$Y \leq 2.0\text{mm}$	$Z < \text{LCD thickness}$	
		X	Y	Z					
$X \leq 6.0\text{mm}$	$Y \leq 2.0\text{mm}$	$Z < \text{LCD thickness}$							
* Circuitry broken is not allowed.									

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

## 9.2 Handling Precautions

- 9.2.1 Avoid static electricity damaging the LSI.
- 9.2.2 Do not remove the panel or frame from the module .
- 9.2.3 The polarizing plate of the display is very fragile . So, please handle it very carefully.
- 9.2.4 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of the plate.
- 9.2.5 The color tone of display and background of LCM has the possibility to be changed in the storage temperature range.
- 9.2.6 Pay attention to the working environment, as the element may be destroyed by static electricity.
  - Be sure to ground human body and electric appliance during work.
  - Avoid working in a dry environment to minimize the generations of static electricity.
  - Static electricity may be generated when the protective film is fast peeled off.
- 9.2.7 When soldering the terminal of LCM, make certain the AC power source of soldering iron does not leak.
- 10.4.8 If the display surface becomes contaminated ,breathe on the surface and gently wipe it with a soft-dry- clean cloth .If it is heavily contaminated ,moisten cloth with the following solvent(ex:Ethyl alcohol).Solvents other than those above-mentioned may damage the polarizer(Especially ,do not use them .ex: Warter / Ketone)

## 9.3 Operation instructions

- 9.3.1 It is recommended to drive the LCD within the specified voltage limits, try to adjust the operating voltage for the optimal contrast, the color and contrast of LCD panel will varies at different temperature.
- 9.3.2 Response time is greatly delayed at low operating temperature range. However, this does not mean the LCD will be out of the order, It will recover when it returns to the specified temperature range.
- 9.3.3 If the display area is pushed hard during operation, the display will become abnormal.



9.3.4 Do not operate the LCD at the environments over the specified conditions, this may cause damage on the LCD and shorten the lifetime.

#### 9.4 Storage instructions:

9.4.1 Store LCDs in a sealed polyethylene bag.

9.4.2 Store LCDs in a dark place, Do not expose to sunlight or fluorescent light. Keep the temperature between 0°C and 35°C.

9.4.3 Avoid the polarizer touch any other object, ( It is recommended to store them in the container in which they were shipped.)

#### Remarks:

**Initialization Code will be provided upon request .**