MDT0660AIH-LVDS	1440 x 240	LVDS Interface	TFT Module

Specification

Version: 1	Date: 01/06/2018

Revision

1	30/05/2018	First issue

Display Features		
Display Size	6.60"	
Resolution	1440 x 240	
Orientation	Landscape	
Appearance	RGB	
Logic Voltage	3.3V	
Interface	LVDS	
Brightness	1000 cd/m^2	
Touchscreen	---	
Module Size	178.40 x 40.00 x 3.35mm	
Operating Temperature	-30°C ~ +85°C	
Pinout	40 way FFC	Box Quantity
Pitch	0.5mm	---

RoHS compliant

* - For full design functionality, please use this specification in conjunction with the SSD1305Z specification.(Provided Separately)

Display Accessories	
Part Number	Description
MPBV6	40 Way FFC to cable and wires. Driven by any driver board that can be wired to a 1mm pitch SHDR-40V-S-B receptacle.
MCIB14/16	HDMI-to-LVDS interface board, with voltage generation.

Optional Variants	
Appearances	Voltage

* 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, back-light unit. The resolution of a 6.6 " TFT-LCD contains 1440x240 pixels, and can display up to 16.7M colors.
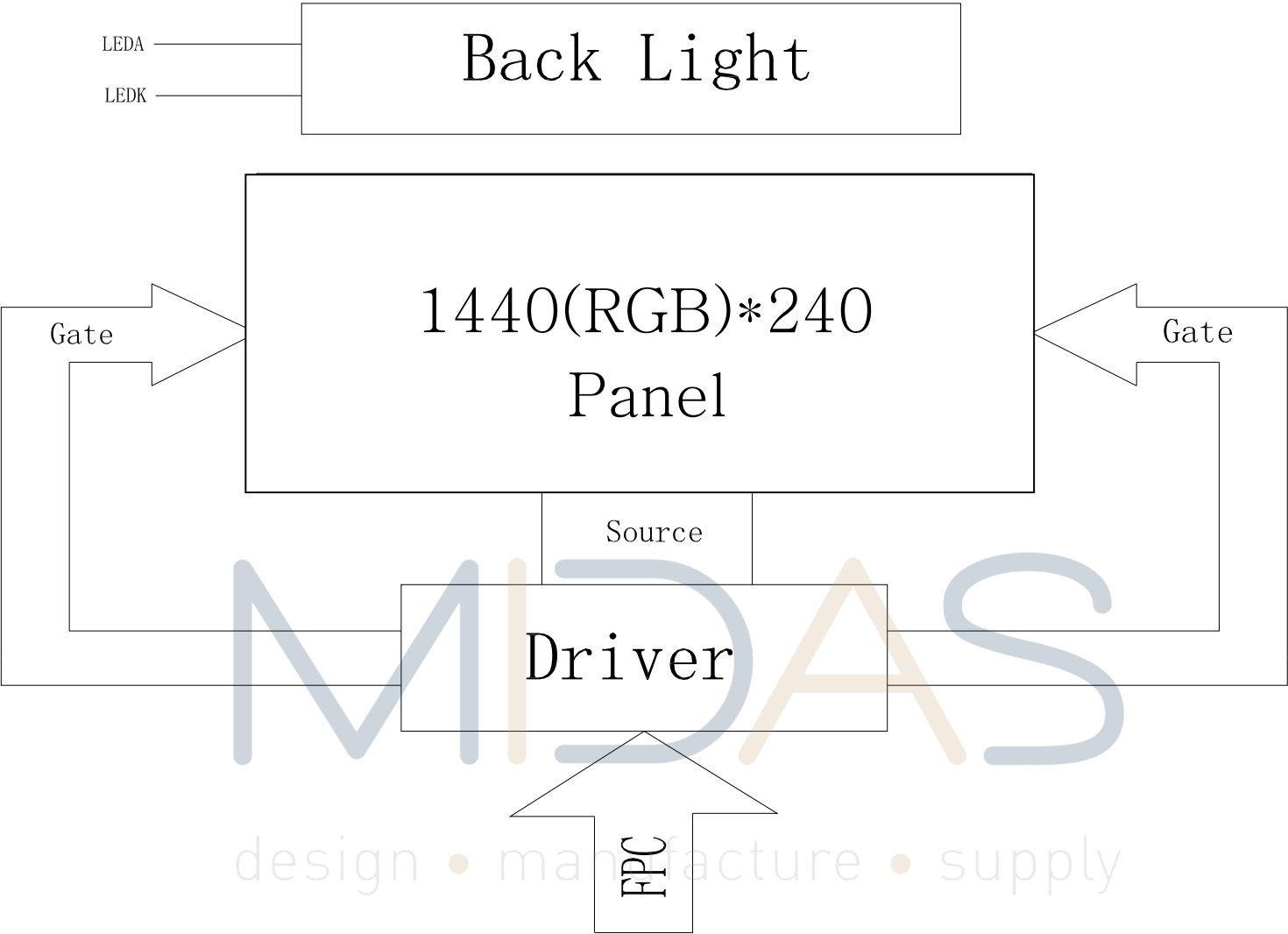
* Features

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	164.16(H)*27.36(V) (6.6 inch)	mm	
Driver element	TFT active matrix	-	
Display colors	262K/16.7M	colors	
Number of pixels	1440(RGB)*240	dots	
Pixel arrangement	RGB vertical stripe	-	
Pixel pitch	0.114(H)*0.114(V)	mm	
Viewing angle	Free	o'clock	
Controller IC	2*HX8249+HX8678	-	
LCM Interface	6/8Bit LVDS	-	
Display mode	Transmissive /Normally Black	-	
Operating temperature	-30～+85	℃	
Storage temperature	-40～+90	℃	

* Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	178.4	-	mm	
	Vertical(V)	-	40	-	mm	
	Depth(D)	-	3.35	-	mm	
Weight		-	TBD	-	g	

1. Block Diagram

LEDA ———————

LEDK ———————

Back Light

Gate →

1440(RGB)*240
Panel

← Gate

Source

Driver

↑ FPC

Outline dimension

NOTES:
1. DISPLAY TYPE: 6.6", TFT-LCD, 65/262K/16.7M COLORS
2. DISPLAY MODE: NORMALLY BLACK/IPS
3. VIEWING DIRECTION: ALL
4. LCM DRIVER IC: 2*HX8249+HX8678 (COG)
5. LCM Interface: LVDS
6. Touch Mode: NA
6. Touch Driver IC: NA
6. Touch Interface: NA
6. Touch and LCM Bonding technology: NA
7. VDD/VCI: 3.3V (REF IC D.S)
7. OPERATING TEMP: -30~+85 ℃
7. STORAGE TEMP: -40~+90 ℃
8. BACK LIGHT: LED WHITE, 16 Dual Chip LED(25.6V/80mA)
9. Luminance:800(MIN/60mA),900cd/m2(TYP/60mA)
9. Luminance:900(MIN/80mA),1000cd/m2(TYP/80mA)
10. RoHS COMPLIANT.

B/L Circuit

Component Area

Components & Driver
(Acrylate Tape on surface)

6.6" TFT
IPS

Diagram of TFT FPC bending
TFT FPC bending mode shipment

Down Bezel
Housing
Up Bezel
LCD
Up polaroid

TFT FPC
Housing Down Bezel
LCD
Up Bezel

No.	Pin Name
1	STBYB
2	RESET
3	VDD
4	VDD
5	SELB
6	GND
7	RXIN0-
8	RXIN0+
9	GND
10	RXIN1-
11	RXIN1+
12	GND
13	RXIN2-
14	RXIN2+
15	RXCLKIN-
16	RXCLKIN+
17	GND
18	RXIN3-
19	RXIN3+
20	GND
21	RXIN4-
22	RXIN4+
23	GND
24	NC
25	NC
26	NC
27	NC
28	NC
29	GND
30	RL
31	TB
32	ATRENB
33	CSB
34	SCL
35	SDA
36	VDDO-OTP
37	LED+
38	LED-
39	LED+
40	LED-

DRAWING NAME: MDT0660AIH-LVDS
PARTS NO.: MDT0660AIH-LVDS
Unit: mm
Page: 1/1

Drawn
Checked
Approve

TOLERANCE(公差)
TOLERANCE UNLESS: X.X±0.3
OTHERWISE SPECIFIED: X.XX±0.2
Scale 1:1

ReV	Revision content description	Date
A	FIRST	2018.04.28

Input terminal Pin Assignment

NO.	SYMBOL	DISCRIPTION	I/O
1	STBYB	Enale IC	Note 1
2	Reset	Reset IC	Note 2
3	VDD	Digital power-3.3v	P
4	VDD	Digital power-3.3v	P
5	SELB	6bit/8bit mode select	Note 3
6	GND	Ground	P
7	GND	Ground	P
8	RXINO-	Negative LVDS differential data input	I
9	RXINO+	Positive LVDS differential data input	I
10	GND	Ground	P
11	RXIN1-	Negative LVDS differential data input	I
12	RXIN1+	Positive LVDS differential data input	I
13	GND	Ground	P
14	RXCLKIN-	Negative LVDS differential data input	I
15	RXCLKIN+	Positive LVDS differential data input	I
16	GND	Ground	P
17	RXIN2-	Negative LVDS differential data input	I
18	RXIN2+	Positive LVDS differential data input	I
19	GND	Ground	P
20	RXIN3-	Negative LVDS differential data input	I
21	RXIN3+	Positive LVDS differential data input	I
22	GND	Ground	P
23	NC	No connected	
24	NC	No connected	
25	NC	No connected	

26	NC	No connected	
27	NC	No connected	
28	NC	No connected	
29	GND	Ground	P
30	RL	Horizontal shift direction	Note 4
31	TB	Vertical shift direction	Note 4
32	ATREN	ATREN should be kept H.	I
33	CSB	No connected	-
34	SCL	No connected	-
35	SDA	No connected	-
36	VDD-OTP	7.5V for OTP program (No connected)	P
37	LED-	LED Cathode	P
38	LED-	LED Cathode	P
39	LED+	LED Anode	P
40	LED+	LED Anode	P

Note.1

STBYB=H(3.3V),normal operarion.

STBYB=L(GND),timing controller,source driver will rurn off,all opout are High-Z.

Note.2

Suggest to connection with an RC reset circuit for stability,Normally pull high.

(47KΩ+0.1uF or extirnal MCU control)

Note.3

If LVDS iput data is 8 bit,SELB must be set to hight.

Note.4

Scan control Input		Scanning direcrion
RL	TB	
VDD	VDD	Up to Down,Left to Right
GND	VDD	Up to Down,Right to left
VDD	GND	Down to Up,Left to Right
GND	GND	Down to Up,Right to left.

RL=H

TB=H
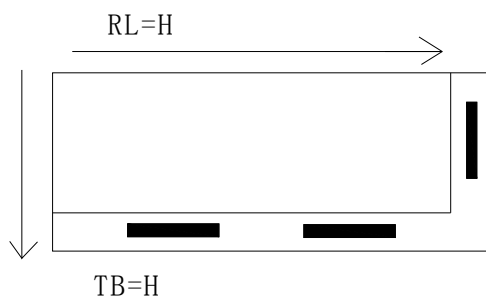
LCD Optical Characteristics

1. Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	$\Theta=0$	600	800	--		
Response time	Rising	T_R+T_F	Normal viewing angle	--	25	--	msec	
	Falling							
Uniformity		S(%)		--	(60)	--	%	
Color Filter Chromacicity	White	W_X		0.271	0.311	0.351		
		W_Y		0.293	0.333	0.373		
	Red	R_X		0.552	0.592	0.632		
		R_Y		0.287	0.327	0.367		
	Green	G_X		0.319	0.359	0.399		
		G_Y		0.553	0.593	0.633		
	Blue	B_X		0.108	0.148	0.188		
		B_Y		0.061	0.101	0.141		
Viewing angle	Hor.	ΘL	CR>10	--	80	--		
		ΘR		--	80	--		
	Ver.	ΘU		--	80	--		
		ΘD		--	80	--		
Option View Direction		Free						

Electrical Characteristics

1. Absolute Maximum Rating

Characteristics	Symbol	Min.	Max.	Unit	Note
Digital Supply Voltage	VDD	-0.3	4.0	V	Note1
Operating temperature	T_{OP}	-30	+85	℃	
Storage temperature	T_{ST}	-40	+90	℃	

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.

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	--	mA	
Level input voltage	V_{IH}	0.7*VDD	--	VDD+0.3	V	
	V_{IL}	GND-0.3	--	0.3*VDD	V	
Level output voltage	V_{OH}	VDD-0.4	--	--	V	
	V_{OL}	GND	--	GND+0.4	V	

3. LED Backlight Characteristics

The back-light system is edge-lighting type with 32 chips LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	60	80	--	mA	
Forward Voltage	V_F	--	25.6	--	V	
LCM Luminance (I_F =60mA)	LV	800	900	--	cd/m2	Note3
LCM Luminance (I_F =80mA)	LV	900	1000	--	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:
Ta=25±3 ℃, 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
Ta=25℃ and IL=80mA. The LED lifetime could be decreased if operating IL is larger than 80mA. The
constant current driving method is suggested.
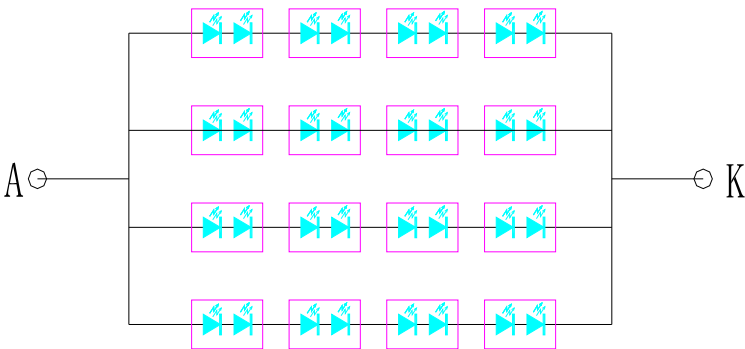
B/L Circuit

Note (3)   Luminance Uniformity of these 9 points is defined as below:
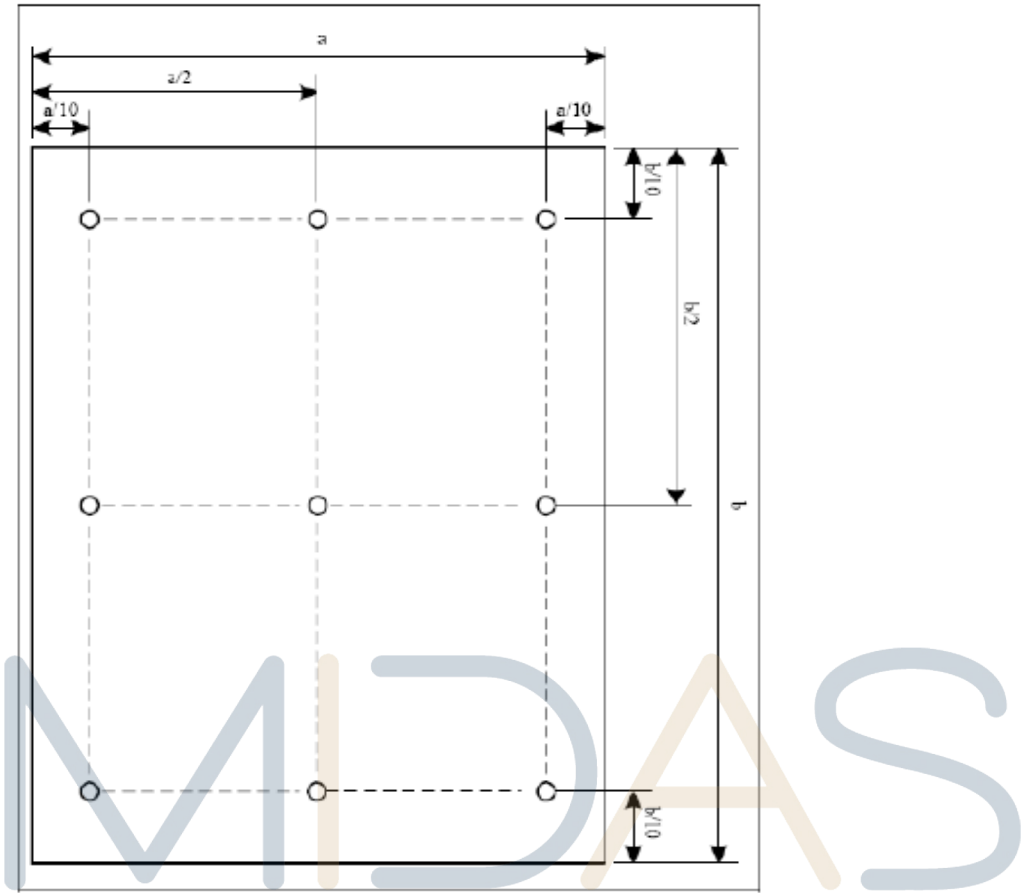
$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$

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

AC Characteristics

1. LVDS 6-bit vs. 8-bit mode
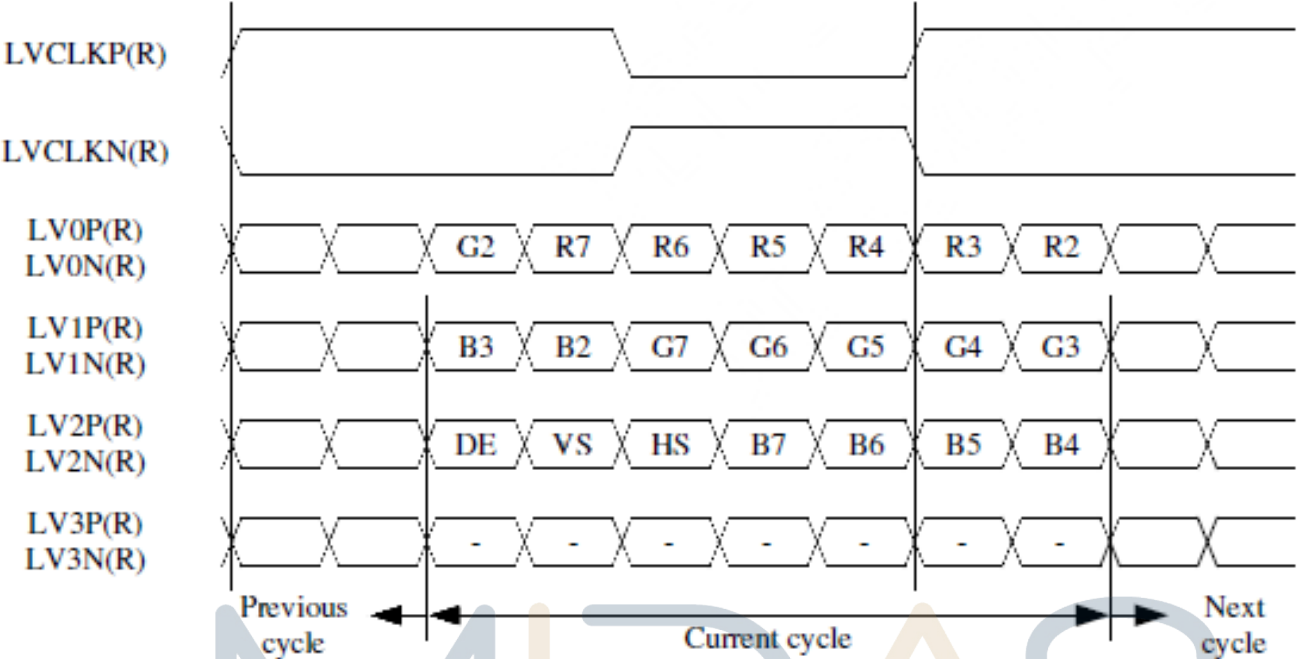
Figure 4.1: LVDS 6-bit
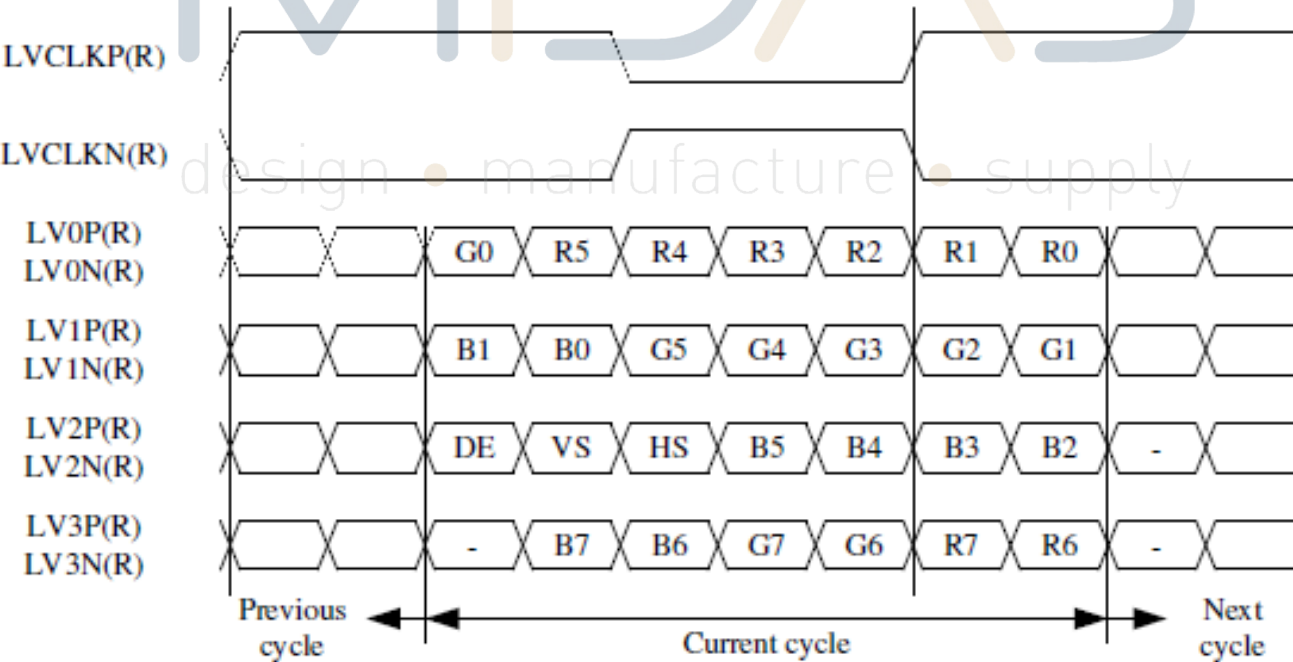
Figure 4.2: LVDS 8-bit (VESA format)
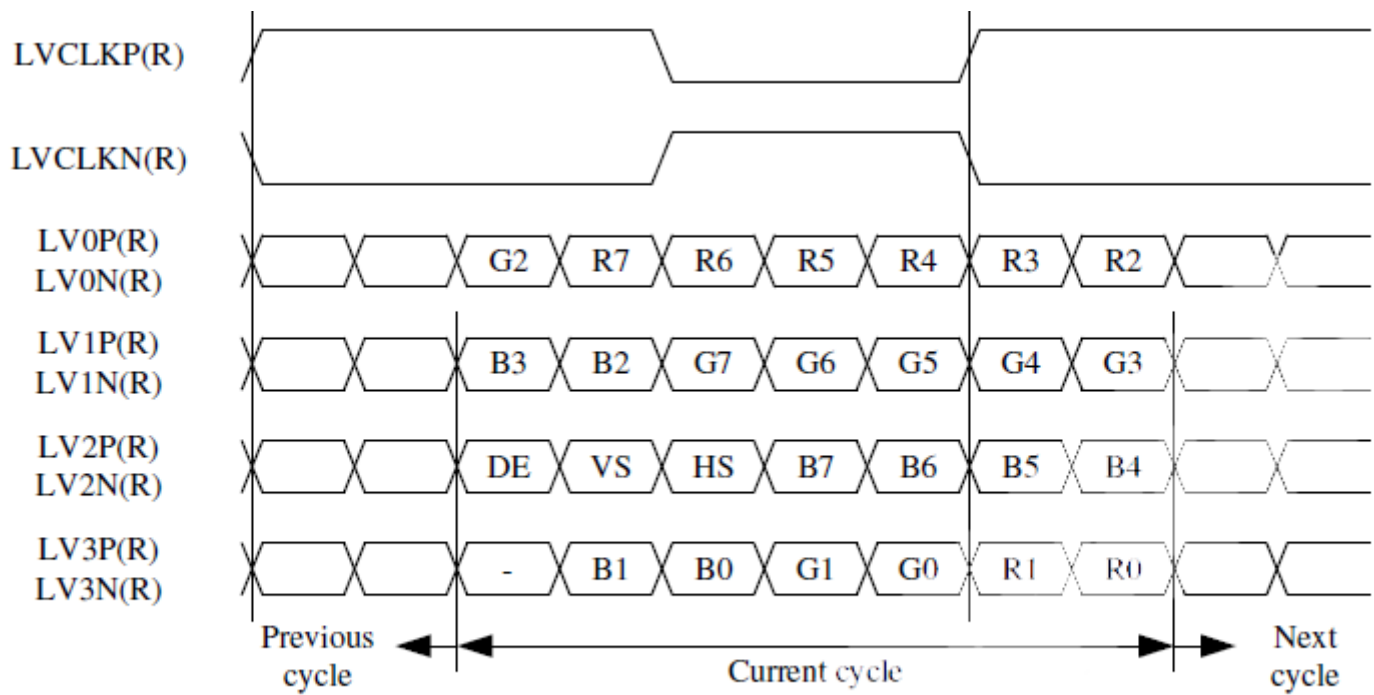
Figure 4.3: LVDS 8-bit (JEIDA format)

2. LVDS input timing

LVDS input timing is described as below.
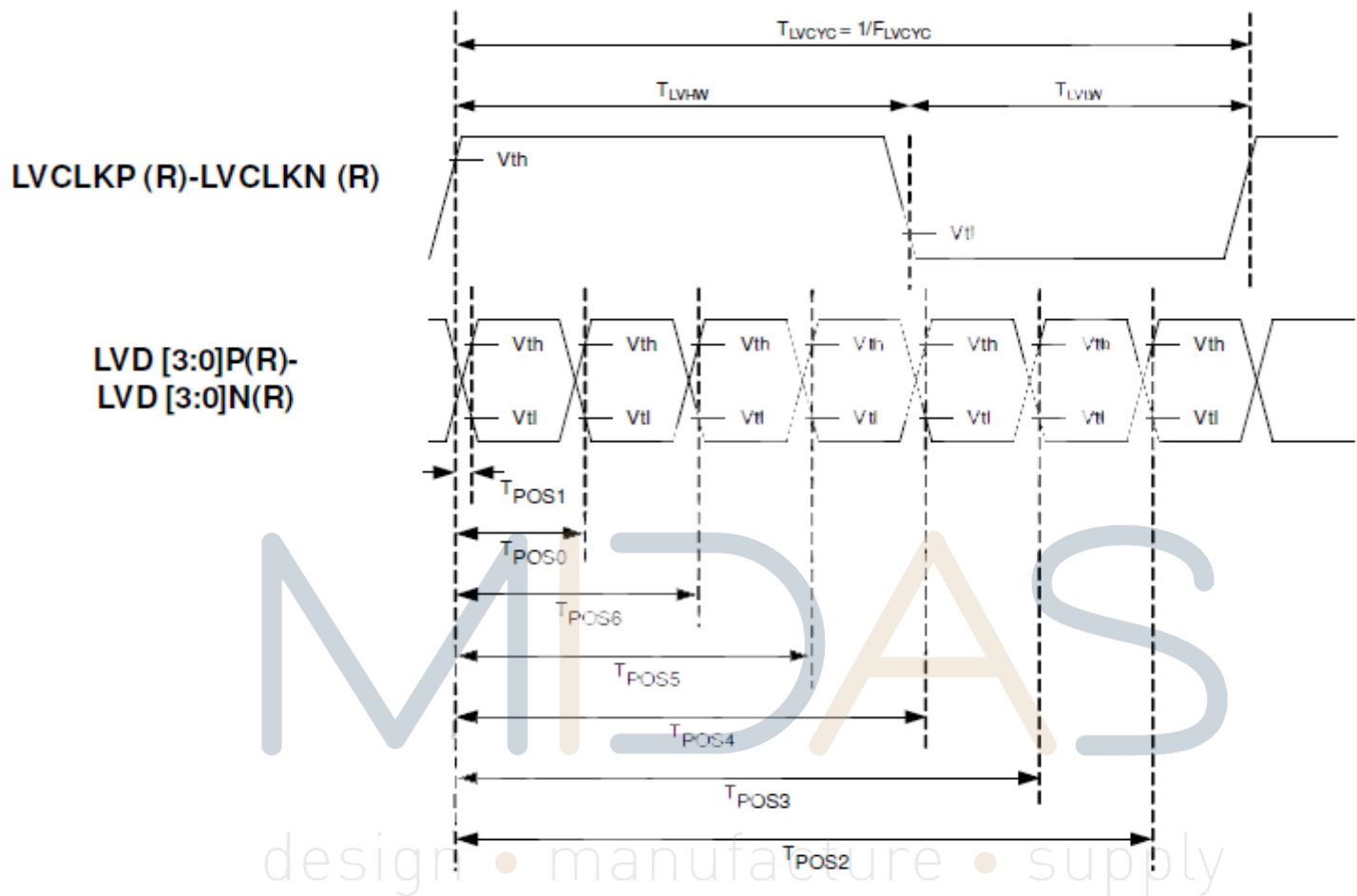
Figure 7.2: LVDS input timing
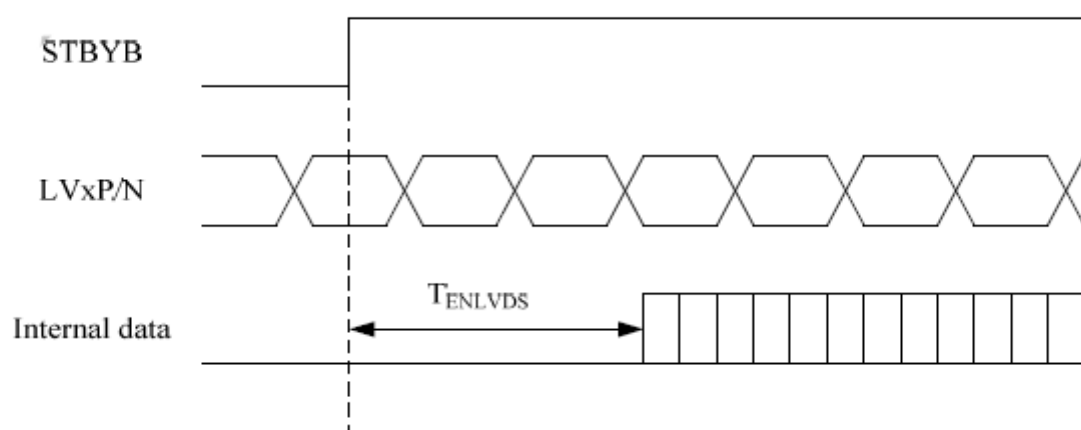
Figure 7.3: LVDS wake up time

Single-ended:
LVD [3:0]P,
LVD [3:0]N

Vcm+0.5*Vth
Vcm-0.5*Vtl

Vcm

Vcm-0.5*Vth
Vcm+0.5*Vtl

T_{EX} T_{EYEW} T_{EX}
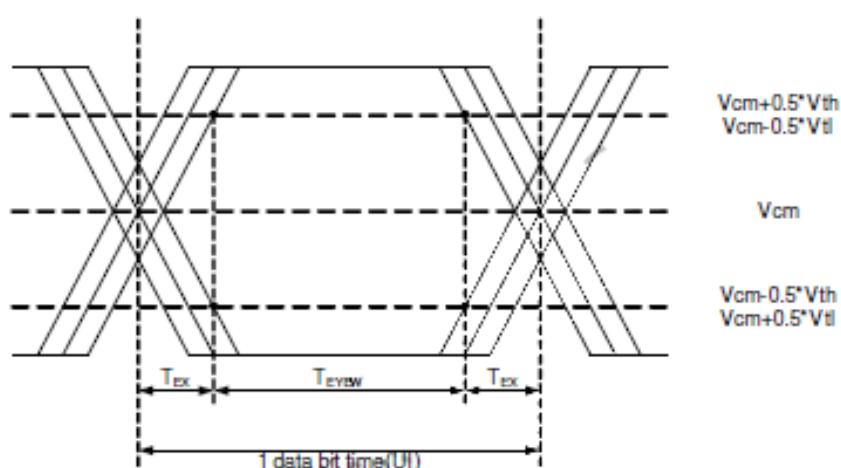
1 data bit time(UI)

Differential:
LVD [3:0]P-LVD [3:0]N

Vth

0

Vtl

T_{EX} T_{EYEW} T_{EX}
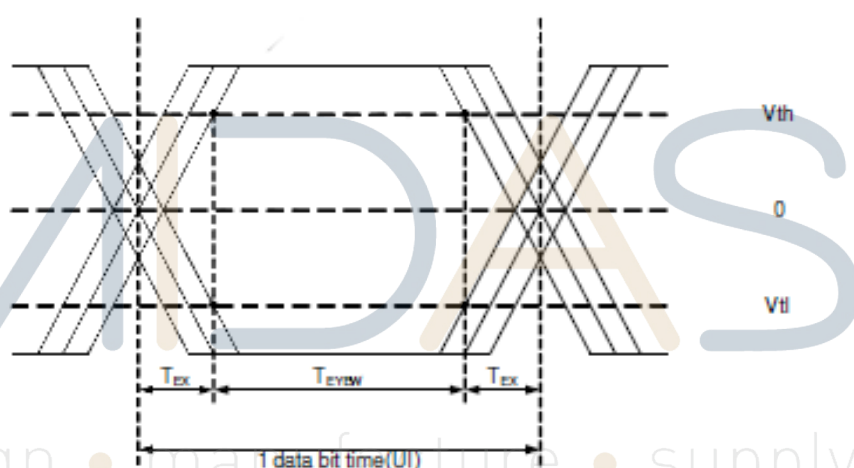
1 data bit time(UI)

Figure 7.4: LVDS input eye diagram

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Clock frequency	FLVCYC	10	-	85	MHz
Clock period	TLVCYC	11.76	-	100	nsec
1 data bit time	UI	-	1/7	-	TLVCYC
Clock high time	LVHW	2.9	4	4.1	UI
Clock low time	LVLW	2.9	3	4.1	UI
Position 1	TPOS1	-0.2	0	0.2	UI
Position 0	TPOS0	0.8	1	1.2	UI
Position 6	TPOS6	1.8	2	2.2	UI
Position 5	TPOS5	2.8	3	3.2	UI
Position 4	TPOS4	3.8	4	4.2	UI
Position 3	TPOS3	4.8	5	5.2	UI
Position 2	TPOS2	5.8	6	6.2	UI
Input eye width	TEYEW	0.6	-	-	UI
Input eye border	TEX	-	-	0.2	UI
LVDS wake up time	TENLVDS	-	-	150	µs

Table 7.2: LVDS input timing parameters

3. Reset timing
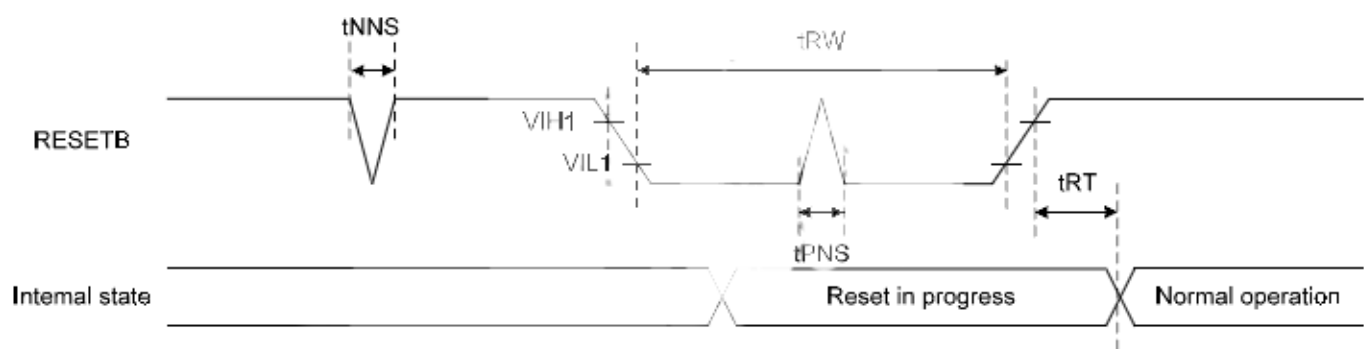
Figure 7.5: Reset timing

(VDD1=VDD2=2.7 to 3.6V, GND=0V, T_A=-40 to +95 °C)

Signal	Parameter	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
RESETB	Reset pulse width	tRW	10	-	-	μs
	Reset complete time	tRT	-	-	5	μs
	Positive spike noise width	tPNS	-	-	100	ns
	Negative spike noise width	tNNS	-	-	100	ns

Table 7.4: Reset timing parameters

LCD Module Out-Going Quality Level

1. VISUAL & FUNCTION INSPECTION STANDARD

1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

        Temperature : 25±5℃

        Humidity :   65%±10%RH

        Viewing Angle : Normal viewing Angle.

        Illumination: Single fluorescent lamp (300 to 700Lux)

        Viewing distance:30-50cm
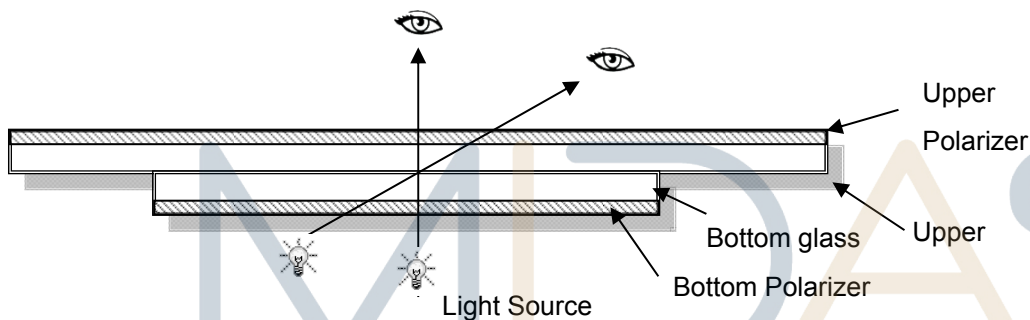
1.2 Definition
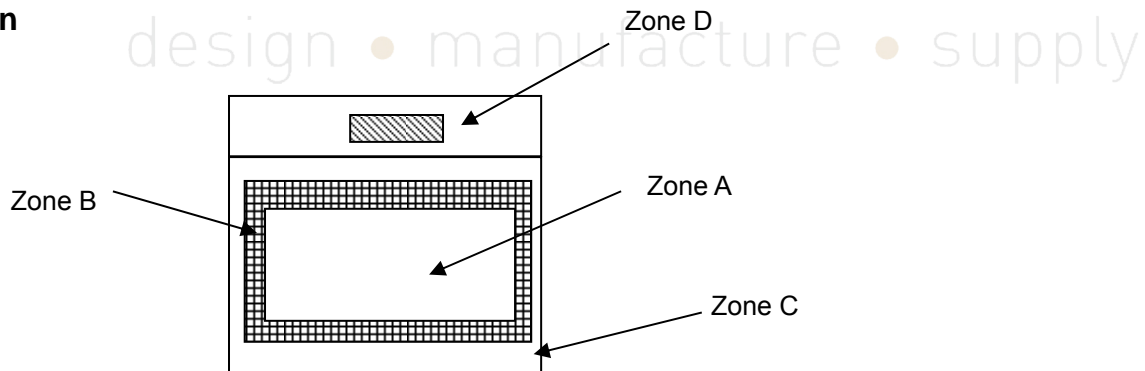
Zone A : Effective Viewing   Area(Character or Digit can be seen)

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

1.3 Sampling Plan

According to GB/T 2828.1-2003 ; , normal inspection, Class Ⅱ

AQL:
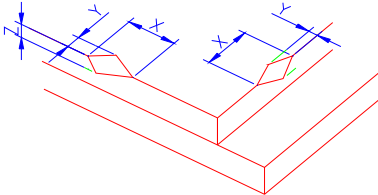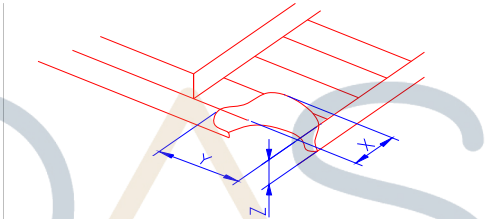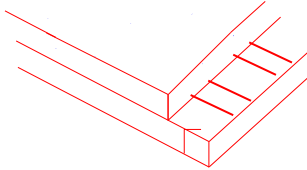
Major defect	Minor defect
0.65	1.5

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.	
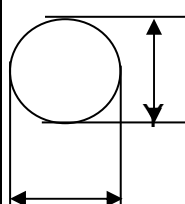
1.4 Criteria (Visual)

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			
		X	Y	Z
		≤3.0mm	<Inner border line of the seal	≤T
	(2)LCD corner broken			
		X	Y	Z
		≤3.0mm	≤L	≤T
	(3) LCD crack	Crack Not allowed		

| 2.0 | Spot defect

X

Φ=(X+Y)/2 | ① light dot（LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain） |

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

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.10	Ignore		Ignore
0.10<Φ≤0.25	4(distance≧10mm)		
0.25<Φ≤0.35	3		
Φ>0.4	0		

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

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.1	Ignore		Ignore
0.10<Φ≤0.25	4(distance≧10mm)		
0.25<Φ≤0.35	3		
Φ>0.4	0		

③ Polarizer accidented spot

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		Ignore
0.3<Φ≤0.5	3(distance≧10mm)		
Φ>0.5	1		

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

Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.15	Ignore		Ignore
0.2<Φ≤0.3	2(distance≧10mm)		
Φ>0.4	1		

⑤ Polarizer Bubble
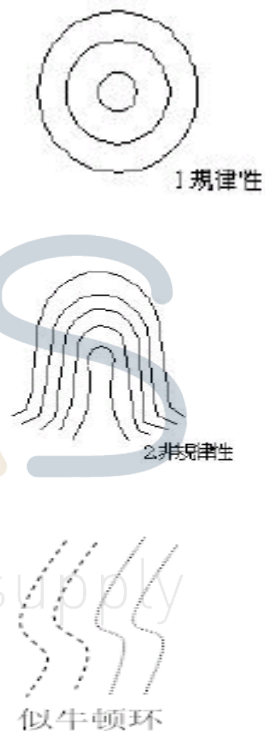
Zone / Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		Ignore
0.3<Φ≤0.4	4(distance≧10mm)		
0.4<Φ≤0.5	3		
Φ>0.5	1		
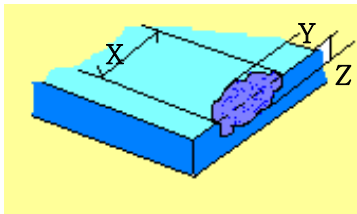
		Width(mm)	Length(mm)	Acceptable Qty		
				A	B	C
3.0	Line defect (LCD/TP /Polarizer backlight black/white line, scratch, stain)	Φ≤0.05	Ignore	Ignore		Ignore
		0.05<W≤0.06	L≤5.0	N≤3		
		0.07<W≤0.08	L≤4.0	N≤2		
		0.08<W	Define as spot defect			
4.0	Electronic Components SMT	Not allow missing parts，solderless connection，cold solder joint，mis match，The positive and negative polarity opposite				
5.0	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.				
6.0	LCD Mura	By 5% ND filter invisible.				

			TP film bubble/ accidented spot	Size Φ(mm)	Acceptable Qty		
					A	B	C
7.0	RTP Related			Φ≤0.1	Ignore		Ignore
				0.1<Φ≤0.25	4（distance≧10mm）		
				0.25<Φ≤0.35	3		
				Φ>0.4	1		

Width(mm)	Length(mm)	Acceptable Qty		
		A	B	C
Φ≤0.05	Ignore	Ignore		Ignore
0.05<W≤0.06	L≤5.0	N≤3		
0.07<W≤0.08	L≤4.0	N≤2		
0.08<W	Define as spot defect			

(TP film scratch)

		Assembly deflection	beyond the edge of backlight ≤0.2mm	
		Bulge (undulation included)	The ITO film plumped below 0.40mm, it's ok. <0.4mm	
		Newton Ring	Newton Ring area>1/3 TP area NG Newton Ring area≤1/3 TP area OK	
		TP corner broken X：length Y：width Z：height		

X	Y	Z
X≤3mm	Y≤3mm	Z<COVER thickness

*Circuitry broken is not allowed.

		TP edge broken X：length Y：width Z：height	X	Y	Z	
			X≤4mm	Y≤2mm	Z<COVER 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

Reliability Test Result

Item	Condition	Inspection after test
High Temperature Operating	85℃,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℃, 96HR	
High Temperature Storage	90℃, 96HR	
Low Temperature Storage	-40℃, 96HR	
High Temperature & High	+60℃, 90% RH ,96 hours.	
Thermal Shock (Non-operation)	-30℃,30 min ↔ +85℃,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±8KV, 5times; Contact:±6KV, 5 times; (Environment: 15℃~35℃, 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,80㎝(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.

Cautions and Handling Precautions

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

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 ℃ 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.