

MDT070004	1024 X 600	LVDS Interface	TFT Module
Specification			
Version: 1		Date: 23/04/2020	
Revision			
1	21/04/2020	First issue	

Display Features			
Display Size	7"		
Resolution	1024 X 600		
Orientation	Landscape		
Appearance	RGB		
Logic Voltage	3.3V		
Interface	LVDS		
Brightness	650 cd/m ²		
Touchscreen	---		
Module Size	164.80 x 99.80 x 5.50 mm		
Operating Temperature	-20°C ~ +70°C	Created By	Checked By
Pinout	50 way FFC	CL	---
Pitch	0.5 mm	Box Quantity	Weight / Display
		---	---

* - For full design functionality, please use this specification in conjunction with the HX8282A14 +HA8696A display driver specification.(Provided Separately)

Display Accessories	
Part Number	Description
MBID-50FP	50 way FFC/FPC 0.5mm to 50 way JST 1mm crimp header
MCIB14/16	HDMI-to-LVDS interface board, with voltage generation.
MDIB-CC1	Interconnect board for standard pitch pinouts to fine pitch wires. Providing pinouts for 2.54 pinout. 1.27, 1, 0.845, 0.8, 0.7, 0.65, 0.62, 0.6, 0.5 & 0.3 pads.

Optional Variants	
Appearances	Voltage



1. General Specification

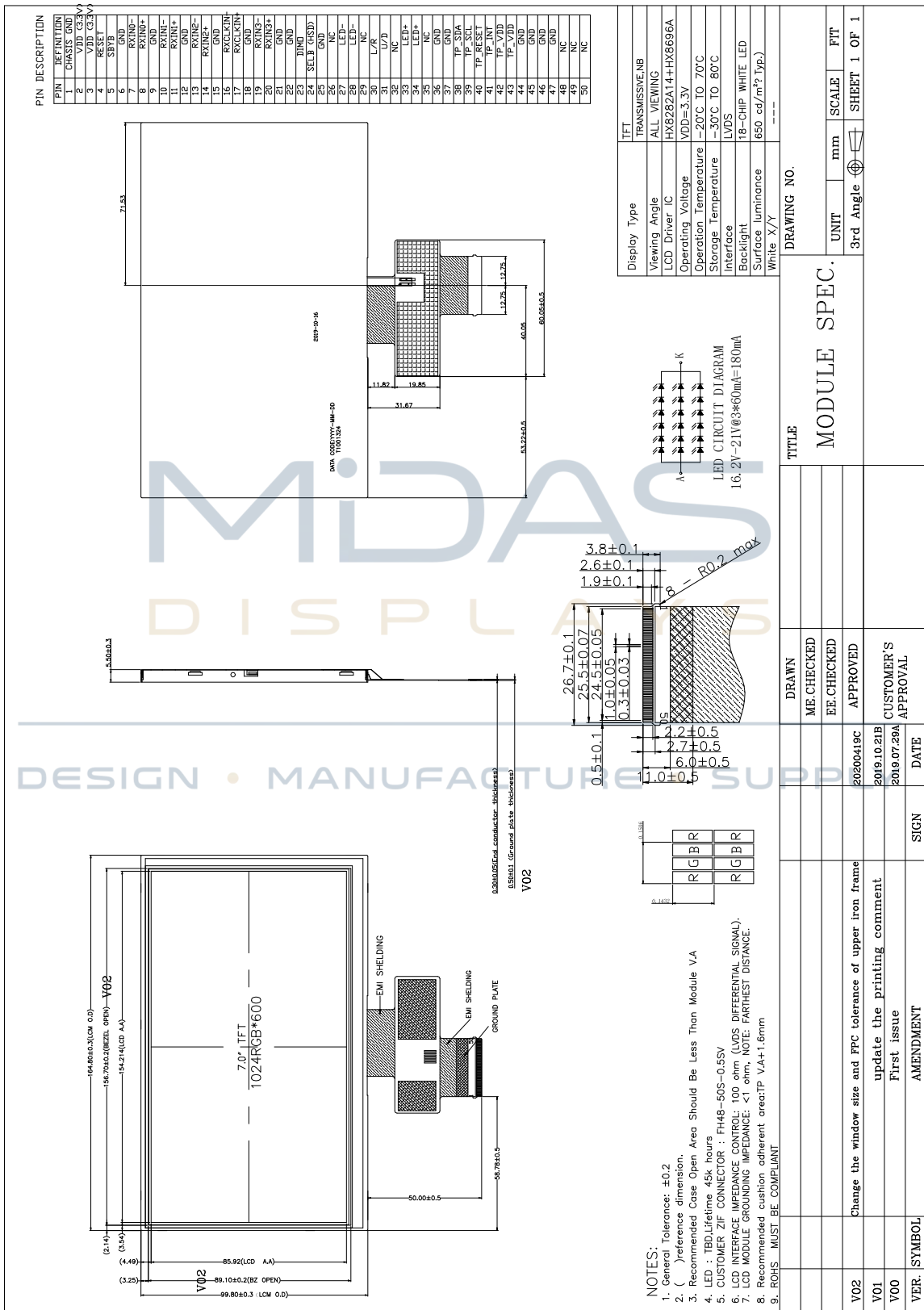
Item	Contents	Unit
LCD type	TFT/Normally black	
Module size (W*H*T)	164.80*99.80*5.5	mm
Active size (W*H)	154.214*85.92	mm
Pixel pitch (W*H)	0.1506*0.1432	mm
Number of dots	1024*600	
Driver IC	HX8282A14+HA8696A	
Interface type	4-lane LVDS	
Top polarizer type	Anti-Glare	
Recommend viewing direction	ALL	O'clock
Gary scale inversion direction	N/A	O'clock
Backlight type	18-Dies white LED	
Touch panel type	Without	

MIDAS
DISPLAYS

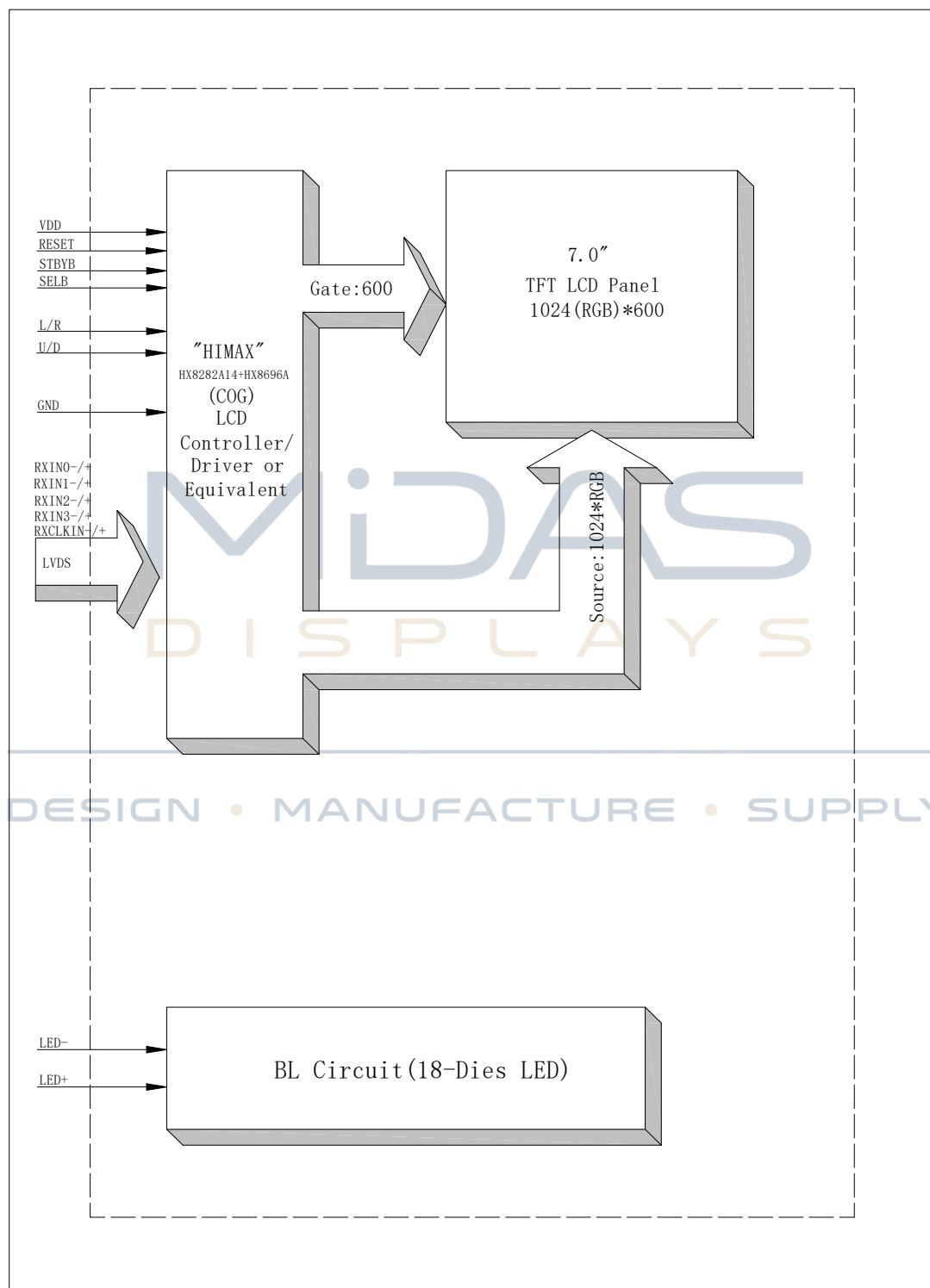
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2. Mechanical Drawing



3. Block Diagram

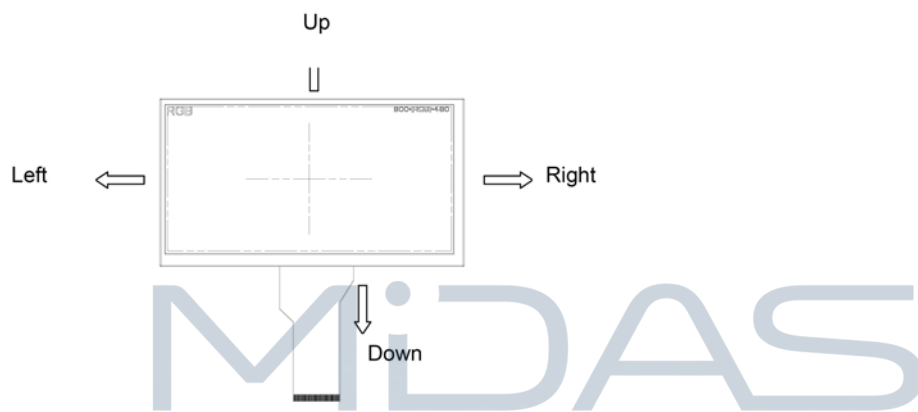


4. Interface Pin Function

Pin No.	Symbol	Description
1	CHASIS GND	Power ground
2	VDD	Digital power.
3	VDD	Digital power.
4	RESET	Global Reset Pin
5	SBYB	Standby mode control. Normally pull High. When SBY=H, all the functions are on. (Default pulls high) When SBY=L, TCON and source driver are off and all output are GND
6	GND	Power ground
7	RXIN0-	- LVDS differential data input
8	RXIN0+	+ LVDS differential data input
9	GND	Power ground
10	RXIN1-	- LVDS differential data input
11	RXIN1+	+ LVDS differential data input
12	GND	Power ground
13	RXIN2-	- LVDS differential data input
14	RXIN2+	+ LVDS differential data input
15	GND	Power ground
16	RXCLK IN-	-LVDS differential clock input
17	RXCLK IN+	+ LVDS differential clock input
18	GND	Power ground
19	RXIN3-	- LVDS differential data input
20	RXIN3+	+ LVDS differential data input
21	GND	Power ground
22	GND	Power ground
23	DIMO	No connection
24	SELB(HSD)	6bit/8bit mode select(Note)
25	GND	Power ground
26	NC	No connection
27	LED-	LED Cathode
28	LED-	LED Cathode
29	NC	No connection
30	L/R	Horizontal inversion(Note)
31	U/D	Vertical inversion(Note)
32	NC	No connection
33	LED+	LED Anode
34	LED+	LED Anode
35	NC	No connection
36	GND	Power ground



37	GND	Power ground
38	TP_SD A	No connection
39	TP_SCL	No connection
40	TP_RES ET	No connection
41	TP_INT	No connection
42~43	TP_VD D	No connection
44~47	GND	POWER GROUND
48~50	NC	No connection



Note:

SELB: If LVDS input data is 6 bits ,SELB must be set to High;

If LVDS input data is 8 bits ,SELB must be set to Low.

L/R: Source Driver internal shift register is controlled by this pin as shown below: Normally pull high.

L/R=H: SO1, SO2, SO3, . . . ,SO1536. (Default)

L/R=L: SO1536, SO1535, SO1534, . . . ,SO1.

U/D: Gate Driver Up/down scan setting. Normally pull low.

When U/D=H, reverse scan.

STV1 output vertical start pulse and UD pin output “H” to Gate driver

When U/D=L, normal scan. (Default)

STV2 output vertical start pulse and UD pin output “L” to Gate driver.

5. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage For Analog	AVDD	-0.5	14.85	V
Supply Voltage For Logic	VDD	-0.5	3.96	V
Power supply	VGH	-0.3	40	V
Power supply	VGL	-20	0.3	V
Power supply	VGH - VGL	-	40	V
Supply current (One LED)	I _{LED}		30	mA
Operating temperature	T _{OP}	-20	+70	°C
Storage temperature	T _{ST}	-30	+80	°C

Note: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

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6. Electrical Characteristics

6.1 Input Power

Item	Symbol	Min.	Typ.	Max.	Unit	Applicable terminal
Supply Voltage For Analog	AVDD	9.4	9.6	9.8	V	
Supply Voltage For Logic	VDD	3.0	3.3	3.6	V	
Power supply	VGH	16	18	20	V	
Power supply	VGL	-7	-6	-5	V	
Power supply	VCOM	3.0	3.6	4.2	V	
Input Voltage	V _{IL}	0	-	0.3VDD	V	
	V _{IH}	0.7 VDD	-	VDD		
Input leakage Current	I _{LKG}	-		-	μA	

6.2 Backlight Driving Conditions

Item	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED Backlight	V _F	16.2	19.2	21	V	I _L =180mA
Current for LED Backlight	I _L		180		mA	
Power Consumption	P		1.728		W	
LED Lifetime		30,000	50,000		Hr	Note

Note: Brightness to be decreased to 50% of the initial value at ambient temperature TA=25°C

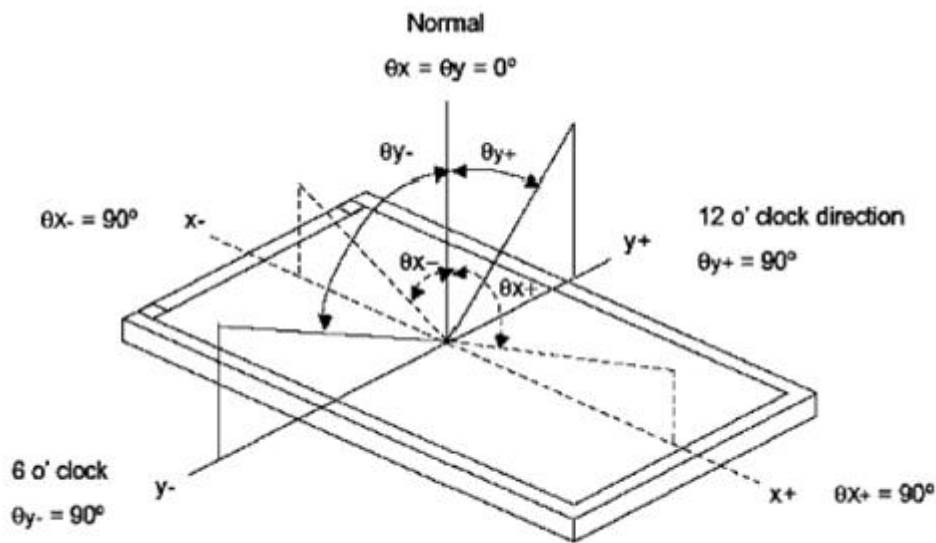


7. Optical Characteristics

ITEM		SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
				MIN.	TYP.	MAX.		
Luminance		L	$I_L = 180\text{mA}$	520	650	910	Cd/m^2	
Contrast Ratio		CR	$\theta = 0^\circ$		800			
Response Time		T_{ON}	25°C		30	40	ms	
		T_{OFF}						
CIE Color Coordinate	Red	X_R	Viewing normal angle					
		Y_R						
	Green	X_G						
		Y_G						
	Blue	X_B						
		Y_B						
	White	X_W		0.260	0.300	0.340		
		Y_W		0.290	0.330	0.370		
Viewing Angle	Hor.	θ_{X+}	$\text{CR} \geq 10$		85		Degree	
		θ_{X-}			85			
	Ver.	θ_{Y+}			85			
		θ_{Y-}			85			
Uniformity	Un			80			%	



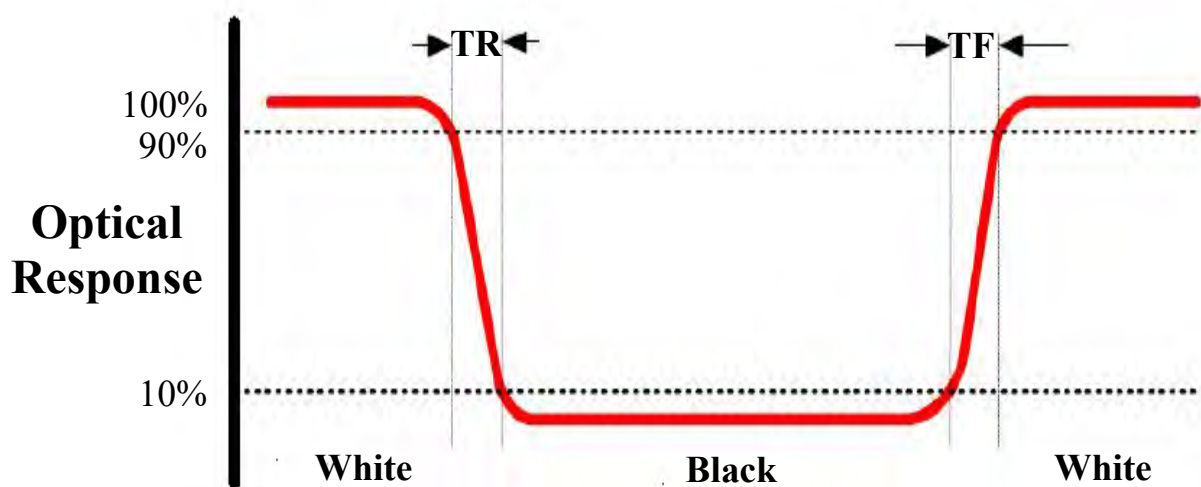
Note 1: Definition of Viewing Angle θ_x and θ_y :



Note 2: Definition of contrast ratio CR:

$$CR = \frac{\text{Luminance of white state}}{\text{Luminance of black state}}$$

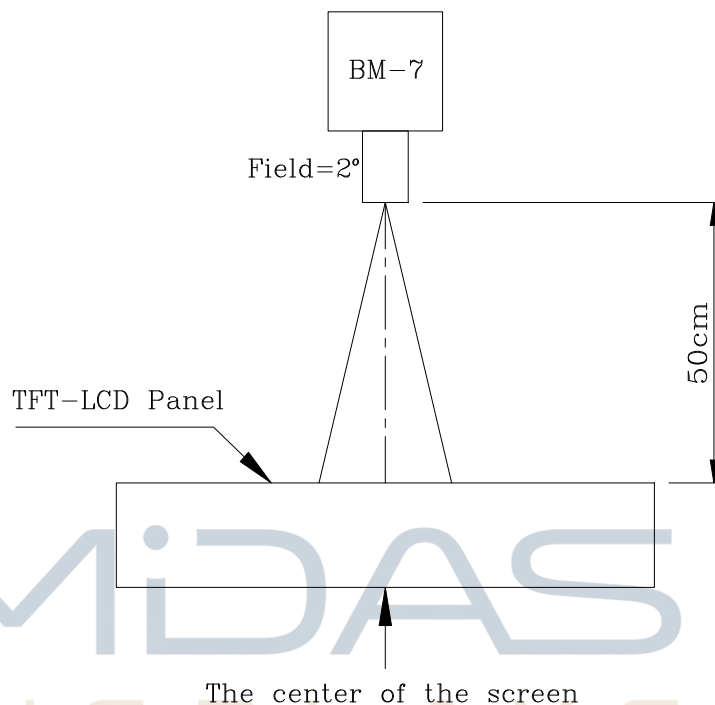
Note 3: Definition of Response Time (T_r, T_f)



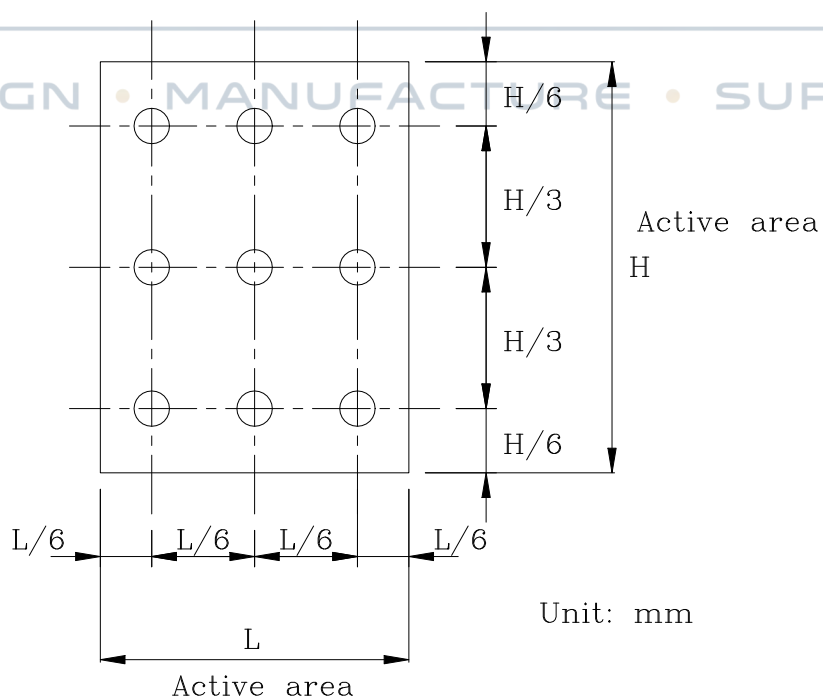
Note 4: Definition of Luminance

①The Brightness Test Equipment Setup

Field= 2° (As measuring “black” image, field= 2° is the best testing condition)



②The Brightness Test Point Setup



8. Timing Characteristics

8.1 LVDS Timing Diagram

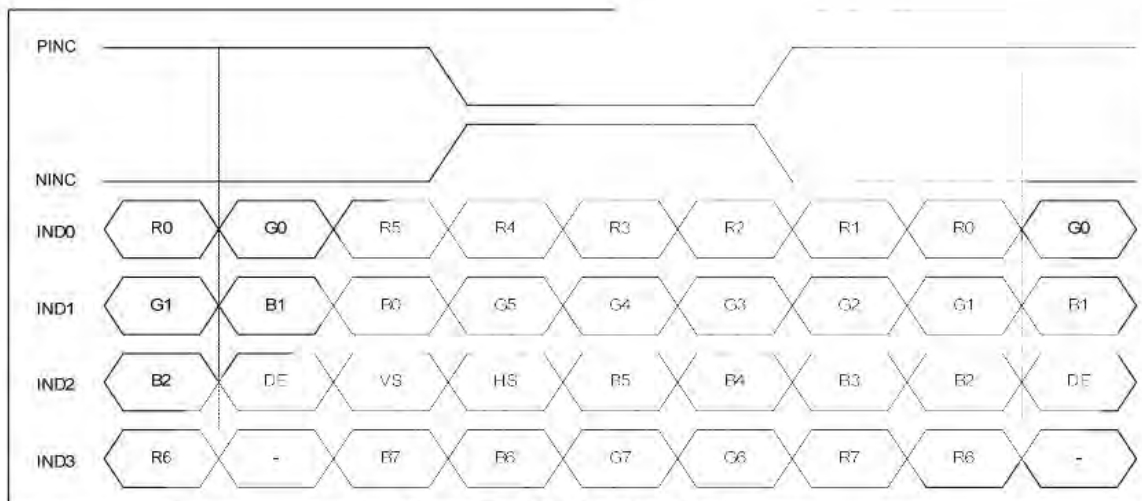


Figure 10.5: 8-bit LVDS Input

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{XFCLK}	20	-	71	MHz	-
Input data skew margin	T_{RSKM}	500	-	-	pS	$ V_{ID} =400mV$ $R_{XVCM}=1.2V$ $R_{XFCLK}=71MHz$
Clock high time	T_{LVCH}	-	$4/(7 \times R_{XFCLK})$	-	ns	-
Clock low time	T_{LVCL}	-	$3/(7 \times R_{XFCLK})$	-	ns	-
PLL wake-up time	T_{emPLL}	-	-	150	μs	-

Table 10.2: LVDS mode AC electrical characteristics

8.2 Parallel RGB input timing table

Resolution : 1024x600

- DE mode

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	40.8	51.2	67.2	MHz
Horizontal Display Area	thd	1024			DCLK
HSD Period	th	1114	1344	1400	DCLK
HSD Blanking	thb+ thfp	90	320	376	DCLK
Vertical Display Area	tvd	600			T _H
VSD Period	tv	610	635	800	T _H
VSD Blanking	tvbp+ tvfp	10	35	200	T _H

Table 10.4: DE mode (1024x600)

- HV mode

Horizontal timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	44.9	51.2	63	MHz
Horizontal Display Area	thd	1024			DCLK
HSD Period	th	1200	1344	1400	DCLK
HSD Pulse Width	thpw	1	-	140	DCLK
HSD Back Porch	thbp	160			DCLK
HSD Front Porch	thfp	16	160	216	DCLK

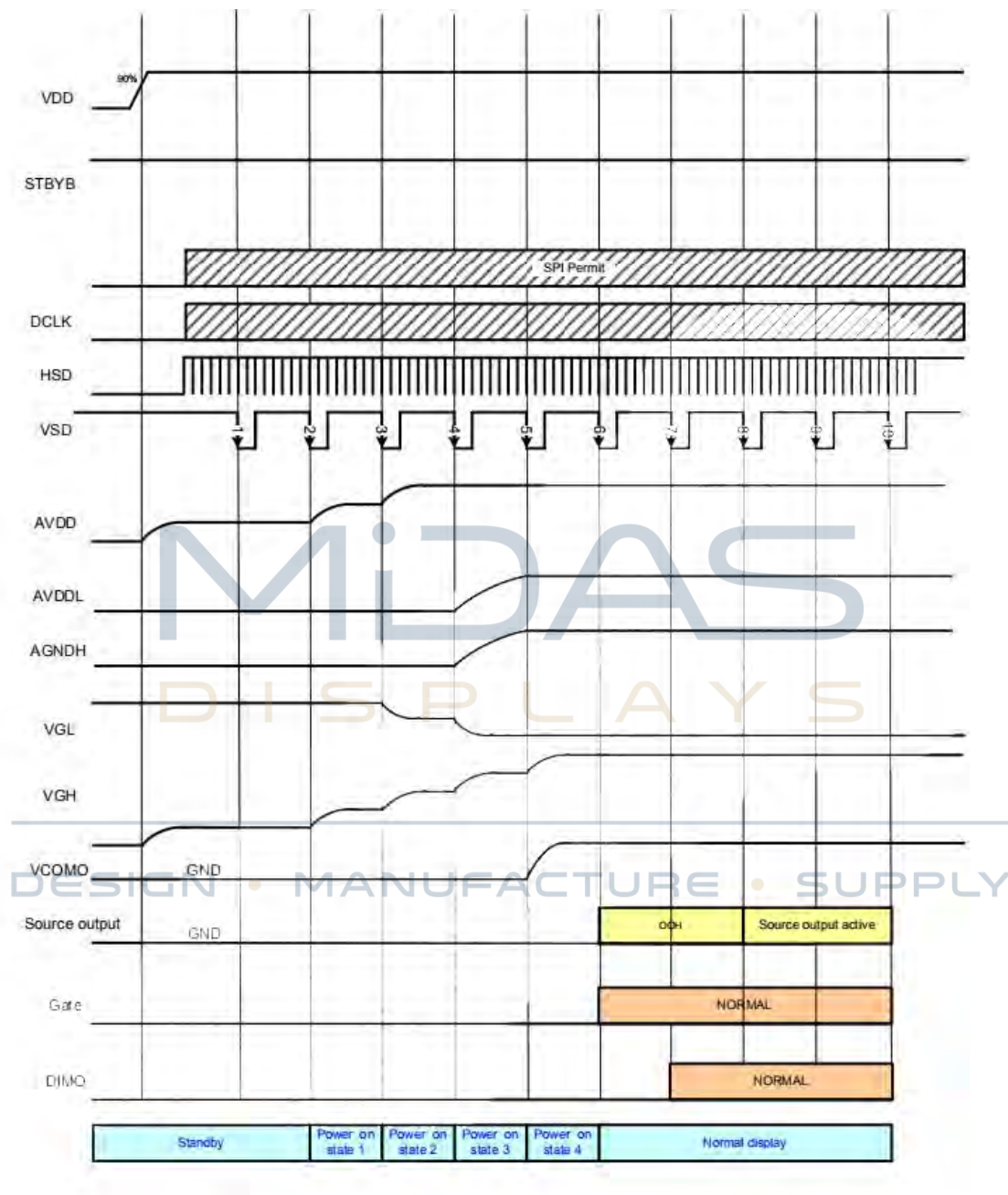
Table 10.5: HV mode horizontal timing (1024x600)

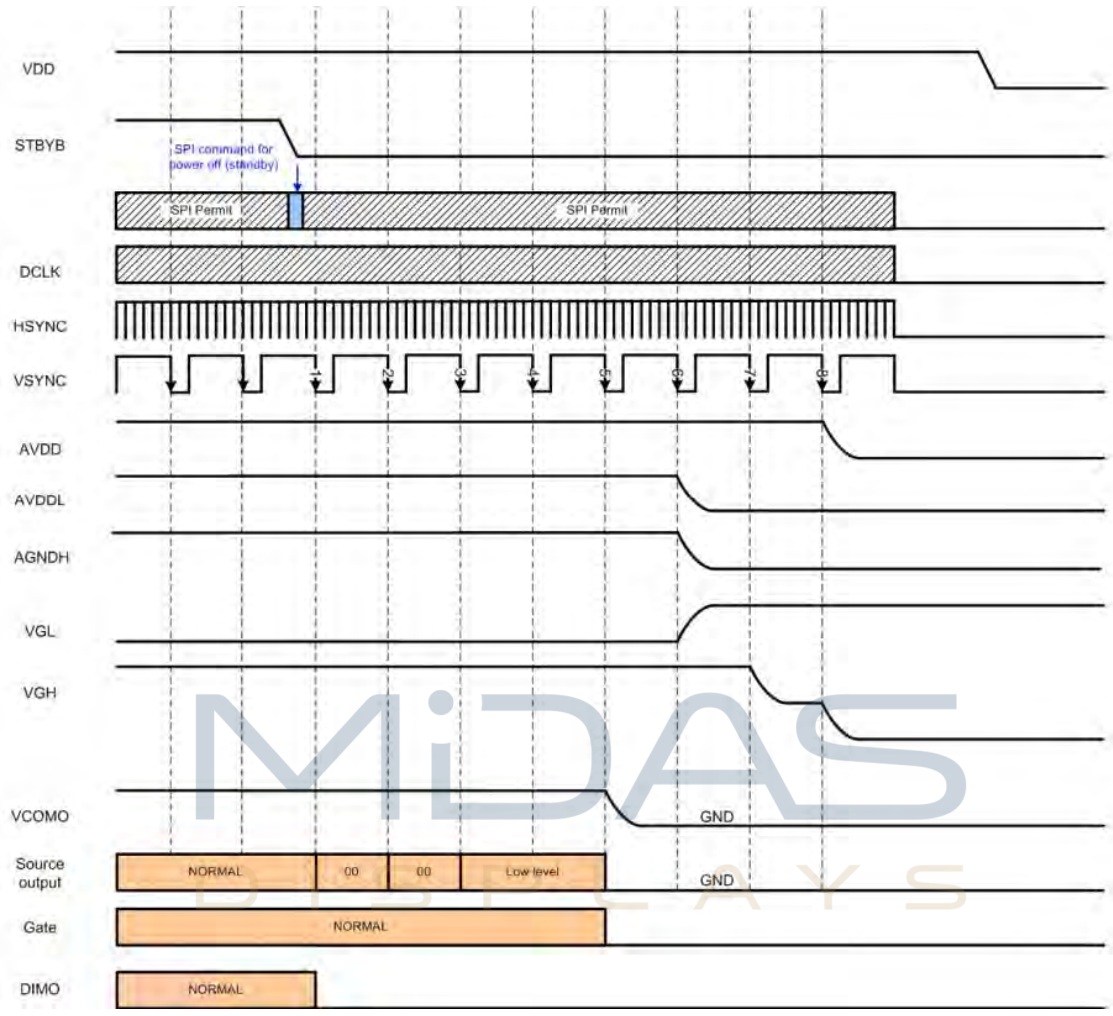
Vertical Timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd	600			T _H
VSD Period	tv	624	635	750	T _H
VSD Pulse Width	tvpw	1	-	20	T _H
VSD Back Porch	tvbp	23			T _H
VSD Front Porch	tvfp	1	12	127	T _H

Table 10.6: HV Mode Vertical Timing (1024x600)

8.3 Power on/off





Note: Low level=3FH, when NBW=L (Normally white)
 Low level=00H, when NBW=H (Normally black)

9. Standard Specification for Reliability

9.1 Standard Specification for Reliability of LCD Module

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts = +70℃, 240 hours	IEC60068-21:2007 GB2423.2-2008
2	Low Temperature Operation	Ta = -20℃, 240 hours	IEC60068-2-1:2007 GB/2423.1-2008
3	High Temperature Storage	Ta = +80℃, 240 hours	IEC60068-21:2007 GB/2423.2-2008
4	Low Temperature Storage	Ta = -30℃, 240 hours	IEC60068-21:2007 GB/2423.1-2008
5	Storage at High Temperature and Humidity	Ta = +60℃, 90% RH max,240hours	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-20℃ 30 min~+60℃ 30 min, Change time:5min, 20 Cycle	Start with cold temperature, End with high temperature, IEC60068-214:1984, GB/2423.22-2002
7	ESD	C=150pF,R=330Ω,5point/panel Air:±8Kv,5times; Contact:±4Kv,5times (Environment:15℃~35℃, 30%~60%.86Kpa~106Kpa)	IEC61000-42:2001 GB/T17626.2-2006
8	Package Drop Test	Height:80cm, 1 corner,3 edges,6 surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

9.2 Testing Conditions and Inspection Criteria

For the final test, the testing sample must be stored at room temperature for 24 hours. After the tests listed in Table 9.2, standard specifications for reliability will be executed in order to ensure stability.

No.	Item	Test Model	Inspection Criteria
01	Current Consumption	Refer To Specification	The current consumption should conform to the product specification.
02	Contrast	Refer To Specification	After the tests have been executed, the contrast must be larger than half of its initial value prior to the tests.
03	Appearance	Visual inspection	Defect free.

9.3 MTBF

MTBF	Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature ($25\pm 5^{\circ}\text{C}$), normal humidity ($50\pm 10\%$ RH), and in area not exposed to direct sun light.
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10. Specification of Quality Assurance

This standard of Quality Assurance confirms to the quality of LCD module products supplied by Midas Displays.

10.1 Quality Test

Before delivering, the supplier should conduct the following tests to confirm the quality of products.

- Electrical-Optical Characteristics: According to the individual specification to test the product.
- Appearance Characteristics: According to the individual specification to test the product.
- Reliability Characteristics: According to the definition of reliability on the specification for testing products.

10.2 Delivery Test

Before delivering, the supplier should conduct the delivery test.

- Test method: According to MIL-STD105E. General Inspection Level II take a single Time.
- The defects classify of AQL as following:
Major defect: AQL = 0.65
Minor defect: AQL = 1.5
Total defects: AQL = 1.5

10.3 Non-conforming Analysis & Feedback

10.3.1 Non-conforming Analysis

- Purchaser should provide the data detail of non-conforming sample and the non-conforming.
- After receiving the data detail from purchaser, the analysis of non-conforming should be finished within two weeks.
- If the analysis can't be finished on time, supplier must notice purchaser 3 days in advance.



10.3.2 Disposition of non-conforming

- If any product defect be found during assembling, supplier must change the good for every defect after confirmation.
- Both supplier and customer should analyze the reason and discuss the disposition of non-conforming when the reason of nonconforming is not sure.

10.4 Agreement items

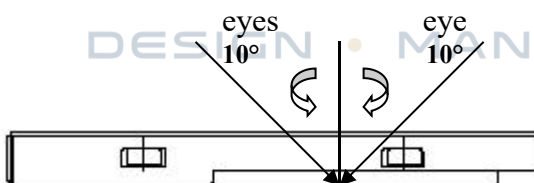
Both parties should negotiate together when the following problems happen.

- There is any problem of standard of quality assurance, and both sides should agree that it must be modified.
- There is any argument item which does not record in the standard of quality assurance.
- Any other special problem.

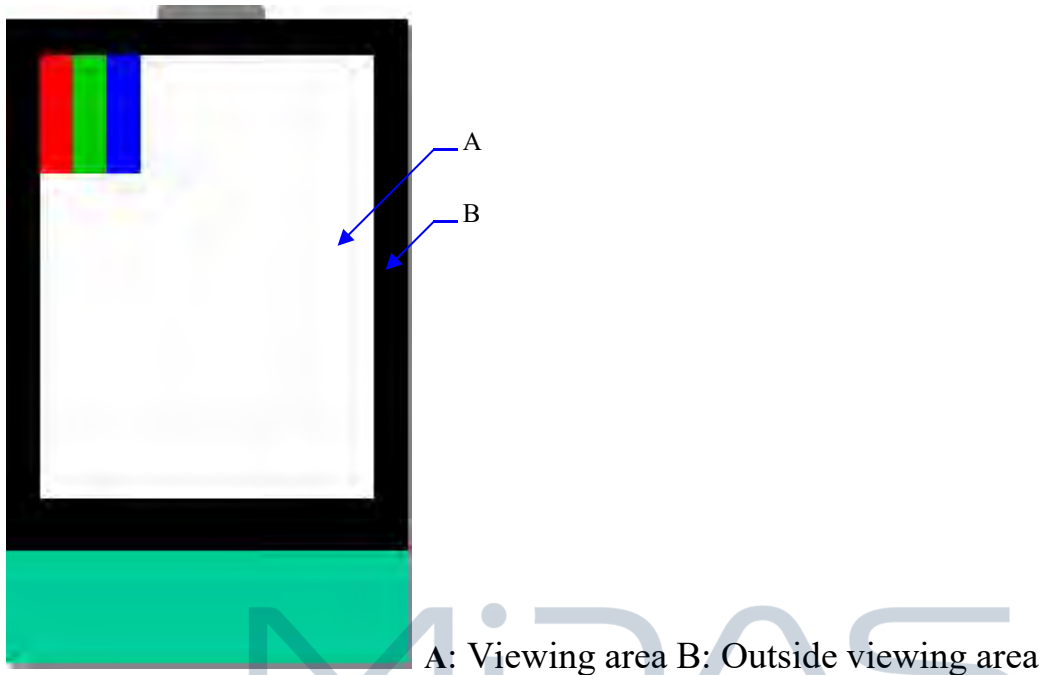
10.5 Standard of The Product Appearance Test

10.5.1 Manner of appearance test

- The test must be under 20W × 2 or 40W fluorescent light, and the distance of view must be at 30±5cm.
- When test the model of transmissive product must add the reflective plate.
- The test direction is base on around 10° of vertical line.
- Temperature: 25±5°C Humidity: 60±10%RH



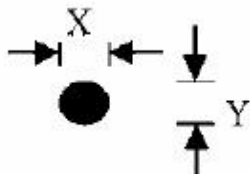
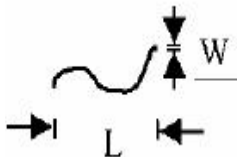
- Definition of area:

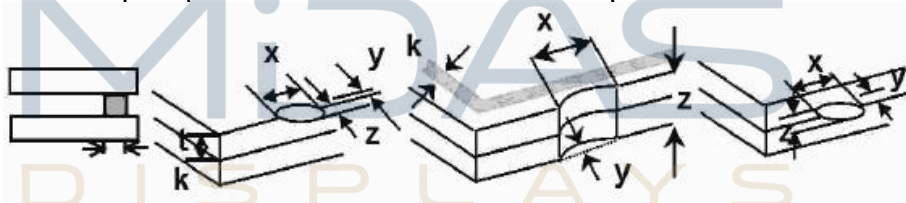
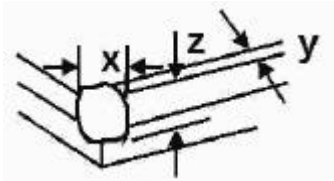


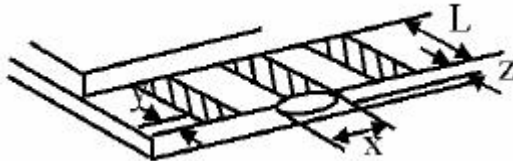
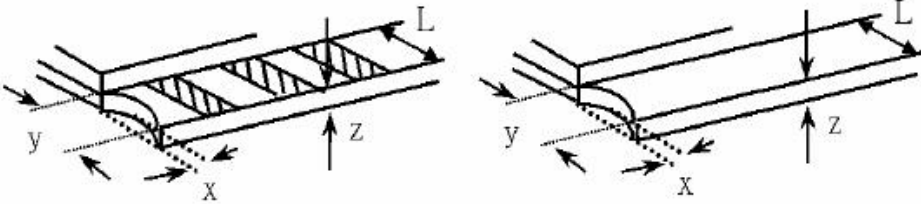
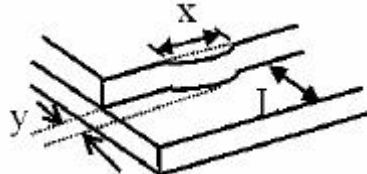
10.5.2 Basic principle

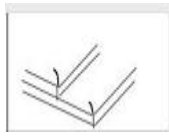
- When the standard can not be described, AQL will be applied.
- The sample of the lowest acceptable quality level must be negotiated by both supplier and customer when any dispute happened.
- New item must be added on time when it is necessary.

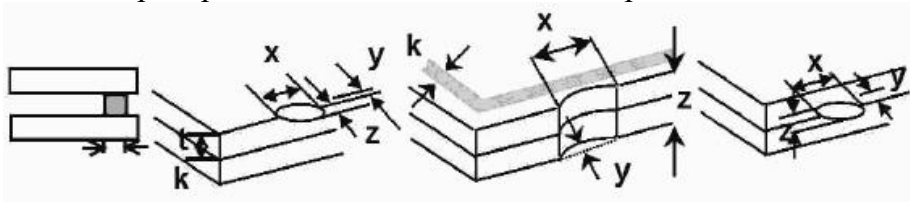
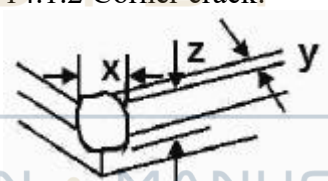
10.6 Inspection Specification

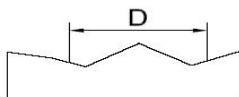
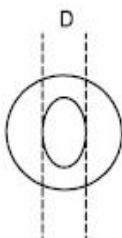
NO.	Item	Criterion	AQL												
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character, dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 1.7 Mixed product types. 1.8 Flicker	0.65												
02	Black or White spots or Bright spots or Color spots on LCD (Display only)	2.1 White and black or color spots on display $\leq 0.25\text{mm}$, no more than Five spots. 2.2 Densely spaced: No more than three spots within 3mm.	1.5												
03	LCD and Touch Panel black spots, white spots, contamination (non – display)	3.1 Round type: As following drawing $\Phi = (X+Y) / 2$  <table><thead><tr><th>Size(mm)</th><th>Acceptable Q'ty</th></tr></thead><tbody><tr><td>$\Phi \leq 0.10$</td><td>Accept no dense</td></tr><tr><td>$0.10 < \Phi \leq 0.20$</td><td>1</td></tr><tr><td>$0.20 < \Phi \leq 0.25$</td><td>1</td></tr><tr><td>$0.25 < \Phi \leq 0.30$</td><td>0</td></tr><tr><td>$0.30 < \Phi$</td><td>0</td></tr></tbody></table> * Densely spaced: No more than two spots within 3mm.	Size(mm)	Acceptable Q'ty	$\Phi \leq 0.10$	Accept no dense	$0.10 < \Phi \leq 0.20$	1	$0.20 < \Phi \leq 0.25$	1	$0.25 < \Phi \leq 0.30$	0	$0.30 < \Phi$	0	1.5
		Size(mm)	Acceptable Q'ty												
$\Phi \leq 0.10$	Accept no dense														
$0.10 < \Phi \leq 0.20$	1														
$0.20 < \Phi \leq 0.25$	1														
$0.25 < \Phi \leq 0.30$	0														
$0.30 < \Phi$	0														
		3.2 Line type: (As following drawing)  <table><thead><tr><th>Length(mm)</th><th>Width(mm)</th><th>Acceptable Q'ty</th></tr></thead><tbody><tr><td>---</td><td>$W \leq 0.02$</td><td>Accept no dense</td></tr><tr><td>$L < 2.5$</td><td>$W < 0.08$</td><td>1</td></tr><tr><td>---</td><td>$0.08 \leq W$</td><td>Rejection</td></tr></tbody></table> * Densely spaced: No more than two lines within 3mm.	Length(mm)	Width(mm)	Acceptable Q'ty	---	$W \leq 0.02$	Accept no dense	$L < 2.5$	$W < 0.08$	1	---	$0.08 \leq W$	Rejection	1.5
Length(mm)	Width(mm)	Acceptable Q'ty													
---	$W \leq 0.02$	Accept no dense													
$L < 2.5$	$W < 0.08$	1													
---	$0.08 \leq W$	Rejection													

NO.	Item	Criterion			AQL
04	Polarizer bubbles	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction	Size Φ (mm)	Acceptable Q'ty	1.5
			$\Phi \leq 0.30$	Accept no dense	
			$0.30 < \Phi \leq 0.50$	0	
			$0.50 < \Phi \leq 1.00$	0	
			$1.00 < \Phi$	0	
			Total Q'ty	0	
05	Scratches	Follow NO.3 -2 Line Type.			
06	Chipped glass	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length 6.1 General glass chip: 6.1.1 Chip on panel surface and crack between panels:			1.5
					
		z: Chip thickness	y: Chip width	x: Chip length	
		$Z \leq 1/2t$	Not over viewing area	$x \leq 2MM$	
		$1/2t < z \leq 2t$	Not exceed $1/3k$	$x \leq 2MM$	
		⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip			
		6.1.2 Corner crack:			
					
		z: Chip thickness	y: Chip width	x: Chip length	
		$Z \leq 1/2t$	Not over viewing area	$x \leq 2MM$	
		$1/2t < z \leq 2t$	Not exceed $1/3k$	$x \leq 2MM$	
⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip					

NO.	Item	Criterion	AQL																
07	Glass crack	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length 7.2 Protrusion over terminal: 7.2.1 Chip on electrode pad:  <table> <tr> <td>y: Chip width</td> <td>x: Chip length</td> <td>z: Chip thickness</td> </tr> <tr> <td>$y \leq 0.5\text{mm}$</td> <td>$x \leq 2\text{MM}$</td> <td>$0 < z \leq t$</td> </tr> </table> 7.2.2 Non-conductive portion:  <table> <tr> <td>y: Chip width</td> <td>x: Chip length</td> <td>z: Chip thickness</td> </tr> <tr> <td>$y \leq L$</td> <td>$x \leq 2\text{MM}$</td> <td>$0 < z \leq t$</td> </tr> </table> ⊙ If there chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications. ⊙ If the product will be heat sealed by the customer, the alignment mark must not be damaged. 7.2.3 Substrate protuberance and internal crack  <table> <tr> <td>y: width</td> <td>x: length</td> </tr> <tr> <td>$y \leq 1/3L$</td> <td>$X \leq 2\text{MM}$</td> </tr> </table>	y: Chip width	x: Chip length	z: Chip thickness	$y \leq 0.5\text{mm}$	$x \leq 2\text{MM}$	$0 < z \leq t$	y: Chip width	x: Chip length	z: Chip thickness	$y \leq L$	$x \leq 2\text{MM}$	$0 < z \leq t$	y: width	x: length	$y \leq 1/3L$	$X \leq 2\text{MM}$	1.5
y: Chip width	x: Chip length	z: Chip thickness																	
$y \leq 0.5\text{mm}$	$x \leq 2\text{MM}$	$0 < z \leq t$																	
y: Chip width	x: Chip length	z: Chip thickness																	
$y \leq L$	$x \leq 2\text{MM}$	$0 < z \leq t$																	
y: width	x: length																		
$y \leq 1/3L$	$X \leq 2\text{MM}$																		

NO.	Item	Criterion	AQL
08	Cracked glass	The LCD with any extensive crack is not acceptable. 	1.5
09	Backlight elements	9.1 Illumination source flickers when lit. 9.2 Spots or scratches that appear when lit must be judged. Using LCD spot, lines and contamination standards. 9.3 Backlight doesn't illuminate or color is wrong.	1.5 1.5 0.65
10	Bezel	No scratches with $W > 0.1$ and $Length > 2.5mm$.	1.5
11	PCB、COB	11.1 COB seal may not have pinholes larger than 0.2mm or contamination. 11.2 COB seal surface may not have pinholes through to the IC. 11.3 The height of the COB should not exceed the height indicated in the assembly diagram. 11.4 There may not be more than 2mm of sealant outside the seal area on PCB. And there should be no more than three places. 11.5 Parts on PCB must be the same as on the production characteristic chart. There should be no wrong parts, missing parts or excess parts. 11.6 The jumper on the PCB should conform to the product characteristic chart.	1.5 1.5 1.5 1.5 0.65 0.65
12	FPC	FPC damage per IPC guidelines.(IPC-A-610) Nicks or damage along the edges of the flexible printed circuitry and cutouts, providing the penetration does not exceed 50% of the distance from the edge to the nearest conductor to 2.5mm[0.1in], Whichever is less.	1.5
13	Soldering	13.1 No cold solder joints, missing solder connections, oxidation or icicle. 13.2 No short circuits in components on PCB or FPC. 13.3 Soldering per IPC guidelines.(IPC-A-610)	1.5 0.65

NO.	Item	Criterion	AQL												
14	Touch Panel Chipped glass	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Touch Panel Total thickness a: LCD side length L: Electrode pad length 14.1 General glass chip: 14.1.1 Chip on panel surface and crack between panels:  <table><tr><td>z: Chip thickness</td><td>y: Chip width</td><td>x: Chip length</td></tr><tr><td>$Z \leq t$</td><td>$\leq 1/2 k$ and not over viewing area</td><td>$x \leq 2\text{MM}$</td></tr></table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip 14.1.2 Corner crack:  <table><tr><td>z: Chip thickness</td><td>y: Chip width</td><td>x: Chip length</td></tr><tr><td>$z \leq t$</td><td>$\leq 1/2 k$ and not over viewing area</td><td>$x \leq 2\text{MM}$</td></tr></table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip	z: Chip thickness	y: Chip width	x: Chip length	$Z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 2\text{MM}$	z: Chip thickness	y: Chip width	x: Chip length	$z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 2\text{MM}$	1.5
z: Chip thickness	y: Chip width	x: Chip length													
$Z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 2\text{MM}$													
z: Chip thickness	y: Chip width	x: Chip length													
$z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 2\text{MM}$													

NO.	Item	Criterion	AQL										
15	Touch Panel(Fish eye、dent and bubble on film)	<table> <tr> <th>SIZE(mm)</th> <th>Acceptable Q'ty</th> </tr> <tr> <td>$\Phi \leq 0.2$</td> <td>Accept no dense</td> </tr> <tr> <td>$0.2 < D \leq 0.4$</td> <td>5</td> </tr> <tr> <td>$0.4 < D \leq 0.5$</td> <td>2</td> </tr> <tr> <td>$0.5 < D$</td> <td>0</td> </tr> </table>  	SIZE(mm)	Acceptable Q'ty	$\Phi \leq 0.2$	Accept no dense	$0.2 < D \leq 0.4$	5	$0.4 < D \leq 0.5$	2	$0.5 < D$	0	1.5
SIZE(mm)	Acceptable Q'ty												
$\Phi \leq 0.2$	Accept no dense												
$0.2 < D \leq 0.4$	5												
$0.4 < D \leq 0.5$	2												
$0.5 < D$	0												
16	Touch Panel Newton ring	Newton ring dimension $\leq 1/2$ touch panel area and not affect font and line distortion($\leq 2.5\%$) , it is acceptable.	1.5										
17	Touch Panel Linearity	Less than 2.5% is acceptable.	1.5										
18	LCD Ripple	Touch the touch panel , can not see the LCD ripple. Pen: R 1.0mm silicon rubber. Operation Force: 80g	1.5										
19	General appearance	19.1 Pin type must match type in specification sheet. 19.2 LCD pin loose or missing pins. 19.3 Product packaging must the same as specified on packaging specification sheet. 19.4 Product dimension and structure must conform to product specification sheet. 19.5 Product packaging shall be by trays sized to protect tft and fpc cable. 19.6 Cable shall not be bent during transportation. 19.7 Top tray must be empty.	0.65 0.65 0.65 0.65										

11. Handling Precaution

11.1 Handling of LCM

- Avoid external shock.
- Don't apply excessive force on the surface.
- Liquid in LCD is hazardous substance, do not lick or swallow. When the liquid makes contact with your hand, skin, cloth, etc., wash it thoroughly and immediately.
- Don't operate it above the absolute maximum rating.
- Don't disassemble the LCM.
- The operators should wear protections whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, the copper leads on the PCB and the interface terminals with any parts of the human body.
- The modules should be kept in antistatic bags or other containers resistant to static for storage.
- The module is coated with a film to protect the display surface, be careful when peeling off this protective film since static electricity may be generated.

11.2 Storage

- Store it in an ambient temperature of $25\pm 10^{\circ}\text{C}$, and in a relative humidity of $50\pm 10\%\text{RH}$. Don't expose to sunlight or fluorescent light.
- Store it in a clean environment, free from dust, active gas, and solvent.
- Store it in anti-static electricity container.
- Store it without any physical load.

11.3 Soldering

- Use only soldering irons with proper grounding and no leakage.
- Iron: no higher than $280\pm 10^{\circ}\text{C}$ and less than 3 sec during hand soldering.
- Rewiring: no more than 2 times.

