

MDT068601	480 X 1280	MIPI Interface	TFT Module
Specification			
Version: 1		Date: 27/10/2019	
Revision			
1	25/10/2019	First issue	

Display Features		 RoHS compliant	
Display Size	6.86		
Resolution	480 X 1280		
Orientation	Landscape		
Appearance	RGB		
Logic Voltage	3.3V		
Interface	MIPI		
Brightness	600 cd/m ²		
Touchscreen	---		
Module Size	66.70 x 181.00 x 4.70 mm		
Operating Temperature	-20°C ~ +70°C	Created By	Checked By
Pinout	40 way connector	CL	TSB
Pitch	0.50 mm	Box Quantity	Weight / Display
		---	---

* - For full design functionality, please use this specification in conjunction with the HX8394F display driver specification.(Provided Separately)

Display Accessories	
Part Number	Description
MBID-40FP	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.
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



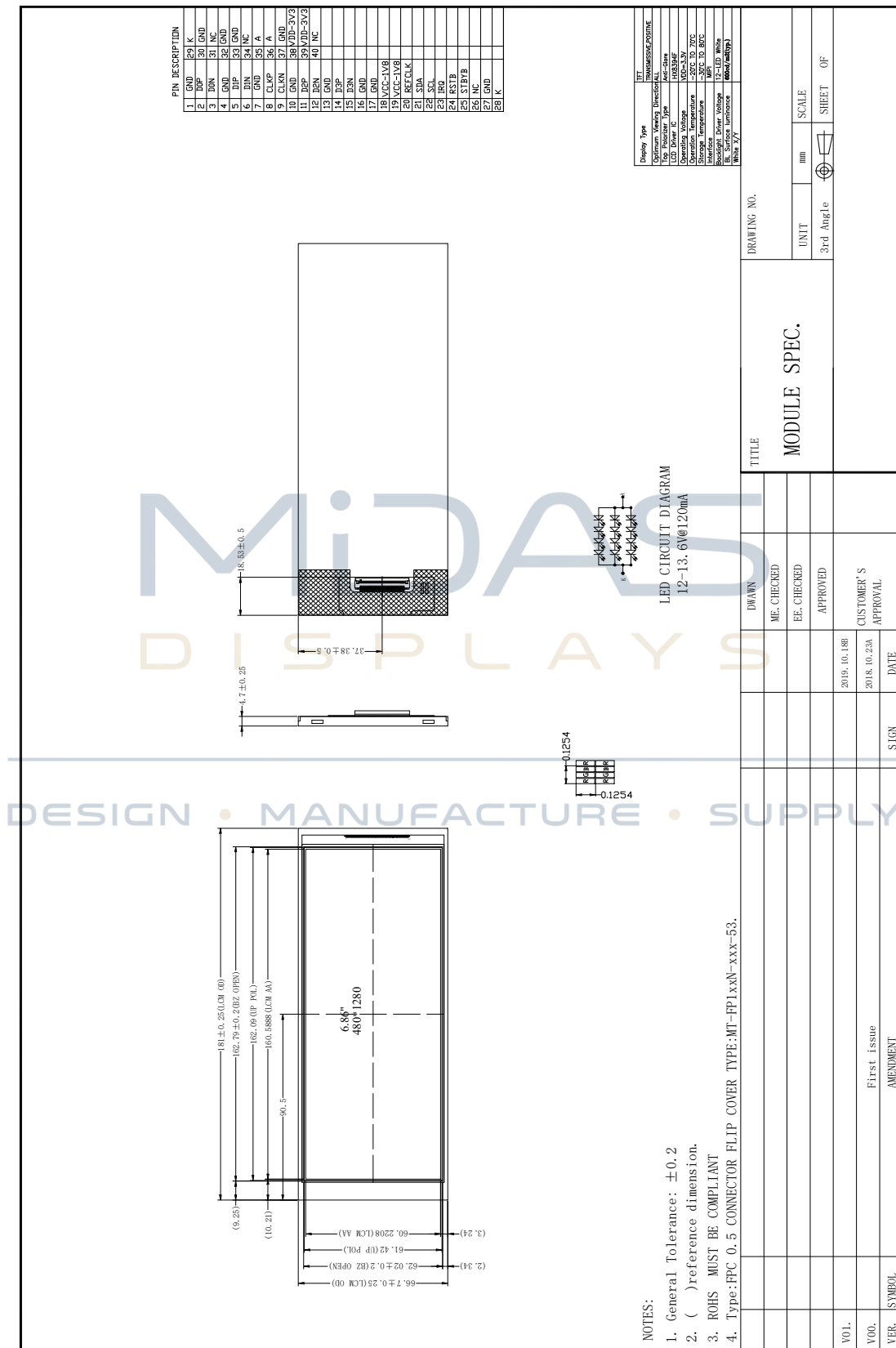
1. General Specification

Item	Contents	Unit
LCD type	TFT/TRANSMISSIVE	
Module size (W*H*T)	66.70*181.00*4.7	mm
Active size (W*H)	60.2208*160.5888	mm
Pixel pitch (W*H)	0.1254*0.1254	mm
Number of dots	480*1280	
Driver IC	HX8394F	
Interface type	MIPI	
Top polarizer type	Anti-Glare	
Recommend viewing direction	ALL	O'clock
Gary scale inversion direction	-	O'clock
Colors	16.7M	
Backlight type	12-Dies white LED	
Touch panel type	Without	

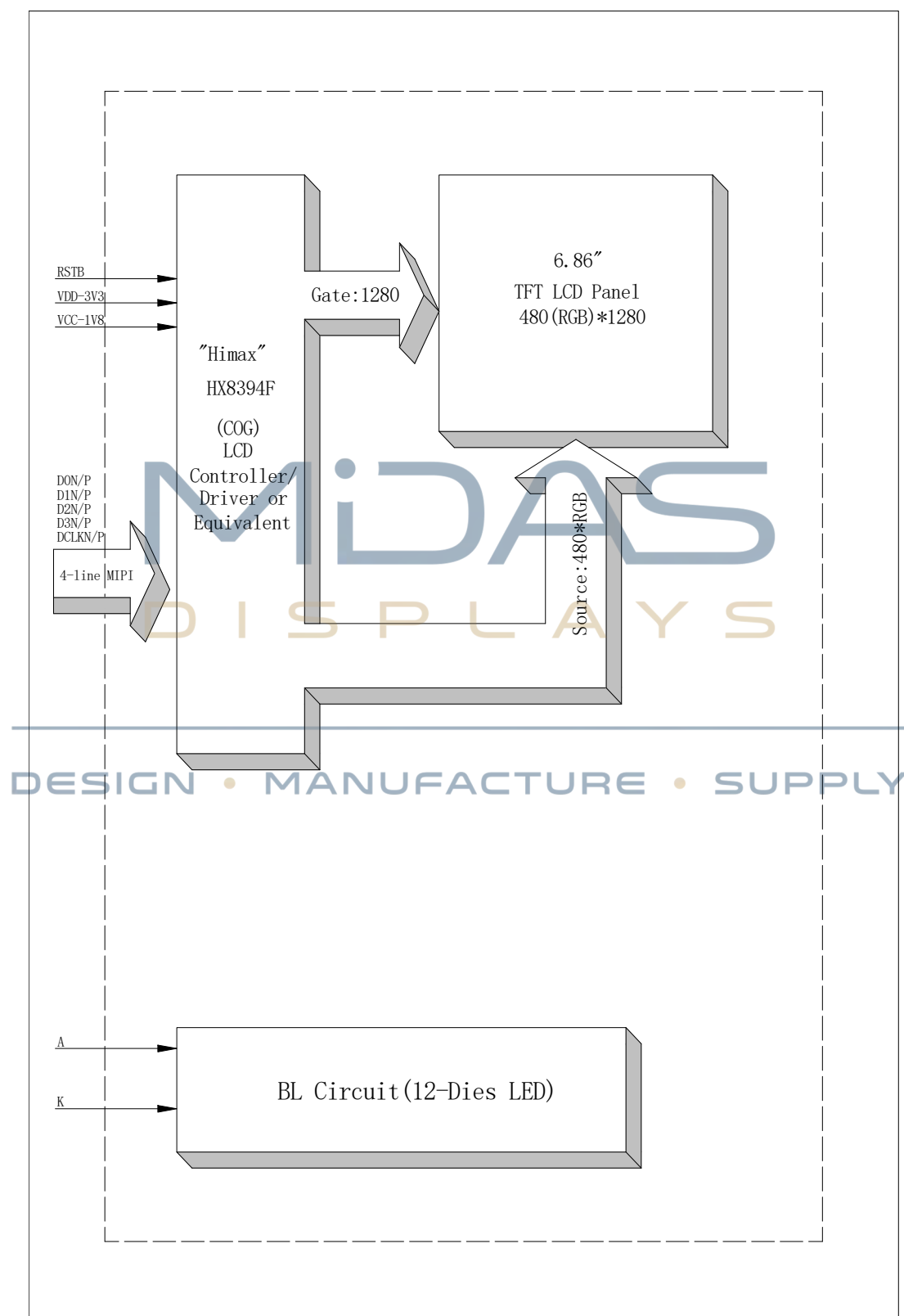
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2. Mechanical Drawing



3. Block Diagram



4. Interface Pin Function

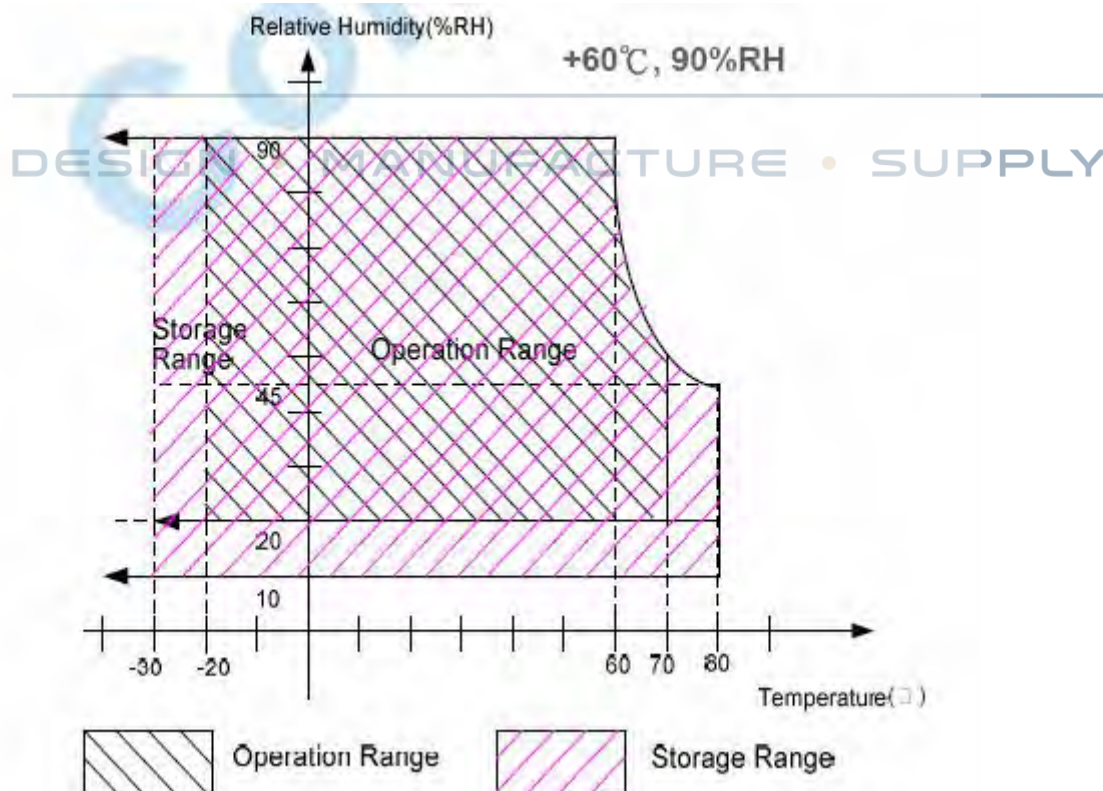
NO.	SYMBOL	Description
1	GND	Ground
2	D0P	MIPI data positive signal(D0+)
3	D0N	MIPI data negative signal(D0-)
4	GND	Ground
5	D1P	MIPI data positive signal(D1+)
6	D1N	MIPI data negative signal(D1-)
7	GND	Ground
8	CLKP	MIPI data positive signal(CLK+)
9	CLKN	MIPI data negative signal(CLK-)
10	GND	Ground
11	D2P	MIPI data positive signal(D2+)
12	D2N	MIPI data negative signal(D2-)
13	GND	Ground
14	D3P	MIPI data positive signal(D3+)
15	D3N	MIPI data negative signal(D3-)
16	GND	Ground
17	GND	Ground
18	VCC-1V8	Power supply for logic(1.8V)
19	VCC-1V8	Power supply for logic(1.8V)
20	REFCLK	No connection
21	SDA	No connection
22	SCL	No connection
23	IRQ	No connection
24	RSTB	Chip reset pin, low active.
25	STBYB	No connection
26	NC	No connection
27	GND	Ground
28	K	Cathode of backlight
29	K	Cathode of backlight
30	GND	No connection
31	NC	No connection
32	GND	Ground
33	GND	Ground
34	NC	No connection
35	A	Anode of backlight
36	A	Anode of backlight
37	GND	No connection
38	VDD-3V3	Power supply for analog(3.3V)
39	VDD-3V3	Power supply for analog(3.3V)
40	NC	No connection

5. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply voltage for analog	VDD	-0.3	3.6	V
Supply voltage for logic	VCC	-0.3	3.6	V
Supply current (One LED)	I _{LED}		60	mA
Operating temperature	T _{OP}	-20	+70	°C
Storage temperature	T _{ST}	-30	+80	°C

Note1 : 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.

Note2: 90%RH Max(Max wet temp. is 60°C)
Maximum wet-bulb temperature is at 60°C or less. And No condensation (no drops of dew)



6. Electrical Characteristics

6.1 Input Power

Item	Symbol	Min	Typ.	Max	Unit	Applicable terminal
Supply Voltage for Analog	VDD	2.5	3.3	3.6	V	
Supply Voltage for Logic	VCC	1.65	1.8	3.3	V	
Input Voltage	V _{IL}	GND	-	0.3VCC	V	
	V _{IH}	0.7VCC	-	VCC		
Input leakage Current	I _{LKG}	-1		1	μA	

6.2 Backlight Driving Conditions

Item	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED Backlight	V _F	12	12.8	13.6	V	I _L =120mA
Current for LED Backlight	I _L		120		mA	
Power Consumption	P		1.536		W	
LED Life Time		30,000			Hr	Note

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

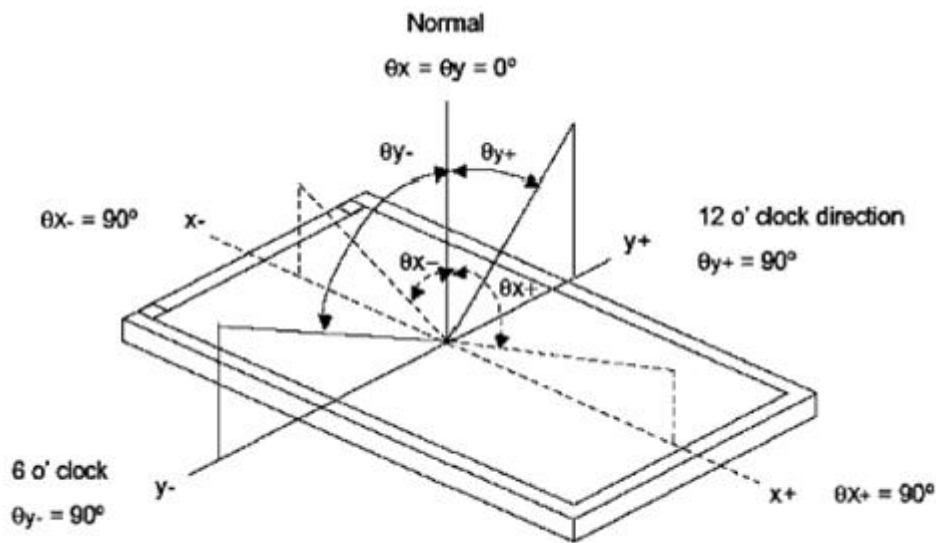


7. Optical Characteristics

ITEM		SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
				MIN	TYP.	MAX		
Luminance		L	$I_L = 120\text{mA}$	480	600	840	Cd/m^2	
Contrast Ratio		CR	$\theta = 0^\circ$	1000	1500			
Response Time		T_{ON}	25°C		25	35	ms	
		T_{OFF}						
CIE Color Coordinate	Red	X_R	Viewing normal angle	0.5978	0.6378	0.6778		
		Y_R		0.3019	0.3419	0.3819		
	Green	X_G		0.2533	0.2933	0.3333		
		Y_G		0.5526	0.5926	0.6326		
	Blue	X_B		0.1003	0.1403	0.1803		
		Y_B		0.0444	0.0844	0.1244		
	White	X_W		0.2330	0.2730	0.3130		
		Y_W		0.2519	0.2919	0.3319		
Viewing Angle	Hor.	θ_{X+}	$CR \geq 10$	70	80		Degree	
		θ_{X-}		70	80			
	Ver.	θ_{Y+}		70	80			
		θ_{Y-}		70	80			
Uniformity	Un			80			%	



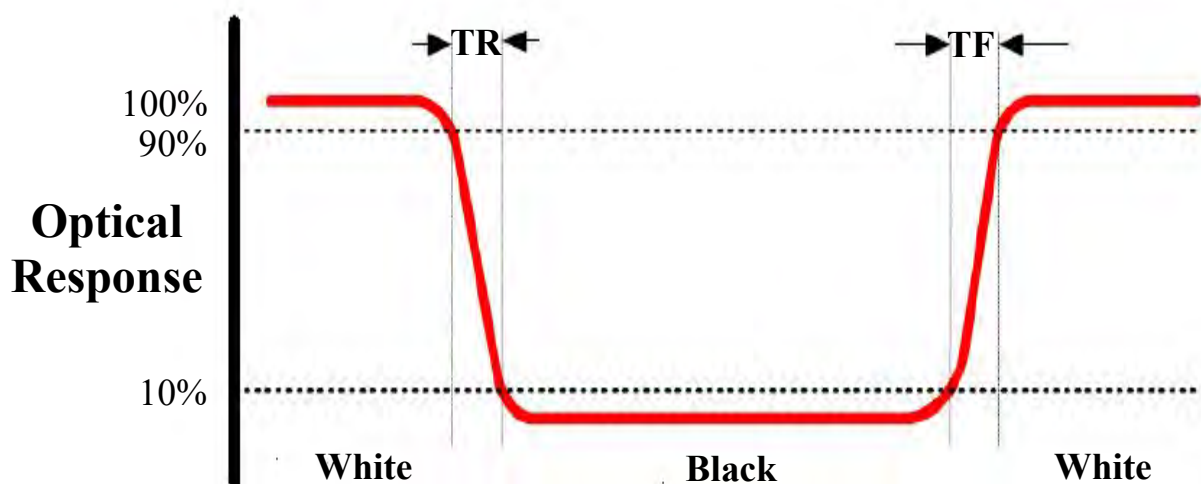
Note 1: Definition of Viewing Angle θ_x and θ_y :



Note 2: Definition of contrast ratio CR:

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

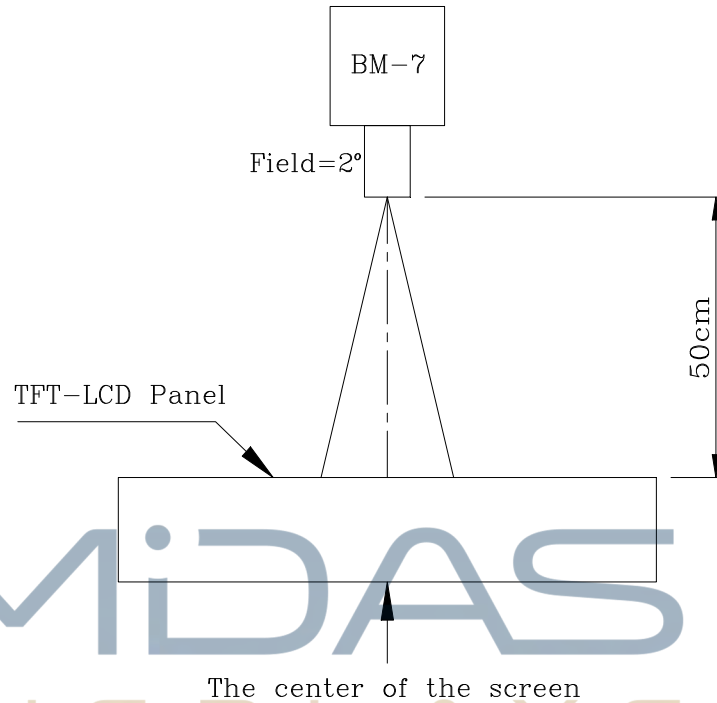
Note 3: Definition of Response Time (T_r, T_f)



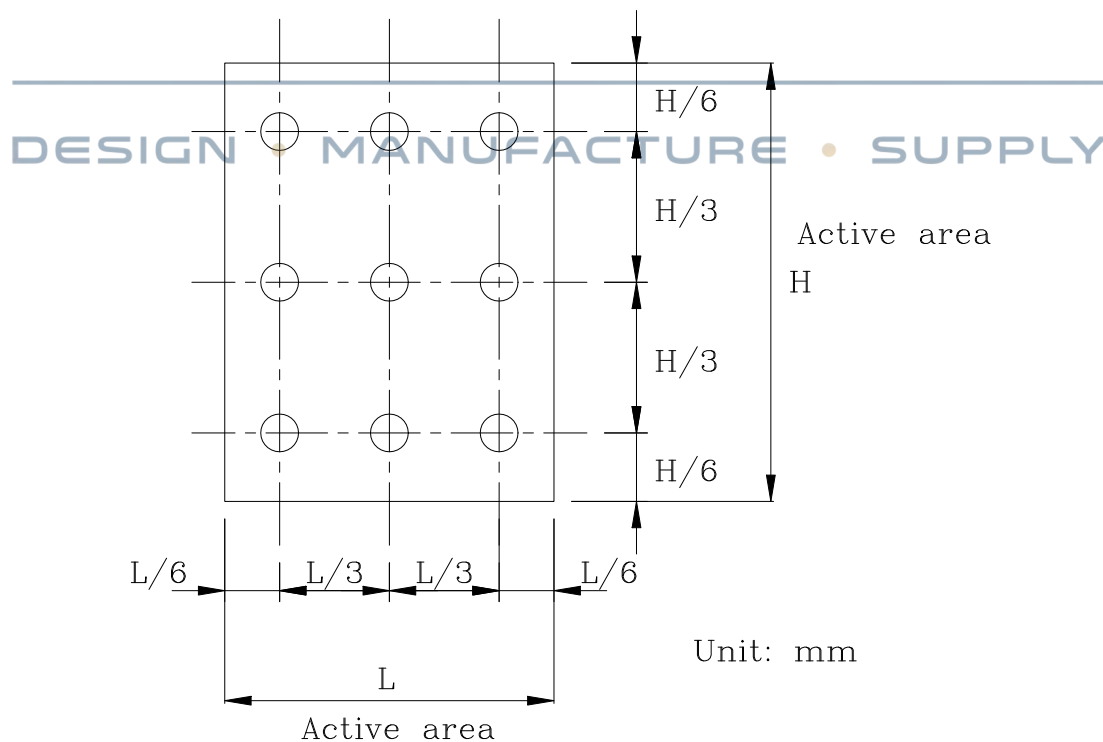
Note 4: Definition of Luminance

①The Brightness Test Equipment Setup

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



②The Brightness Test Point Setup



8. Initialization Code

8.1 4-Line MIPI(480x1280)

```
//Set_porch
#define LCD_VBPD      (15)
#define LCD_VFPD      (2)
#define LCD_VSPW      (10)
#define LCD_HBPD      (120)
#define LCD_HFPD      (120)
#define LCD_HSPW      (3)

//Set_EXTC
PacketHeader[39 04 00 XX]
Payload[B9 FF 83 94]
Checksum [XX XX]

//Set_MY_MX_RGB
PacketHeader[15 36 01]

//Set_power
PacketHeader[39 0B 00 XX]
Payload[B1 48 0C 6C 09 32 24 71 51 2F 43]
Checksum [XX XX]

//Set_MIPI
PacketHeader[39 07 00 XX]
Payload[BA 63 03 68 6B B2 C0]
Checksum [XX XX]

//Set_display
PacketHeader[39 07 00 XX]
Payload[B2 40 A0 64 0E 0A 2F]
Checksum [XX XX]

//Set_cycles
PacketHeader[39 16 00 XX]
Payload[B4 1C 78 1C 78 1C 78 01 0C 86 55 00 3F 1C 78 1C 78 1C 78 01 0C 86]
Checksum [XX XX]

//Set_GIP_0
PacketHeader[39 22 00 XX]
Payload[D3 00 00 00 00 64 07 08 08 32 10 07 00 07 32 10 03 00 03 00 32 10 08 00 35 33 09 09
37 0D 07 37 0E 40]
Checksum [XX XX]
Delay 5ms
```


PacketHeader[15 C6 ED]

//Sleep_out

PacketHeader[05 11 00]

Delay 120ms

//Display_on

PacketHeader[05 29 00]

Delay 10ms

9. Standard Specification for Reliability

9.1 Standard Specification for Reliability of LCD Module

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ta = +70°C, 240 hours	IEC60068-21:2007 GB2423.2-2008
2	Low Temperature Operation	Ta = -20°C, 240 hours	IEC60068-2-1:2007 GB/2423.1-2008
3	High Temperature Storage	Ta = +80°C, 240 hours	IEC60068-21:2007 GB/2423.2-2008
4	Low Temperature Storage	Ta = -30°C, 240 hours	IEC60068-21:2007 GB/2423.1-2008
5	Storage at High Temperature and Humidity	Ta = +60°C, 90% RH max,240hours	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	20°C 30 min~+60°C30 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°C~35°C, 30%~60%.86Kpa~106Kpa)	IEC61000-42:2001 GB/T17626.2-2006
8	Package Drop Test	Height:80cm, 1corner,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	In section 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±5°C), normal humidity (50±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

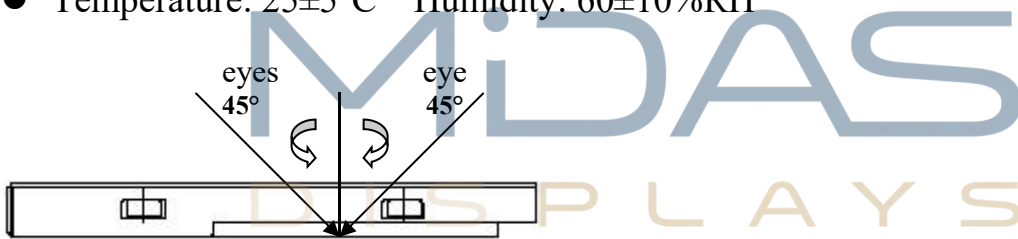
Both parties should negotiate together when the following problems happen.

- 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

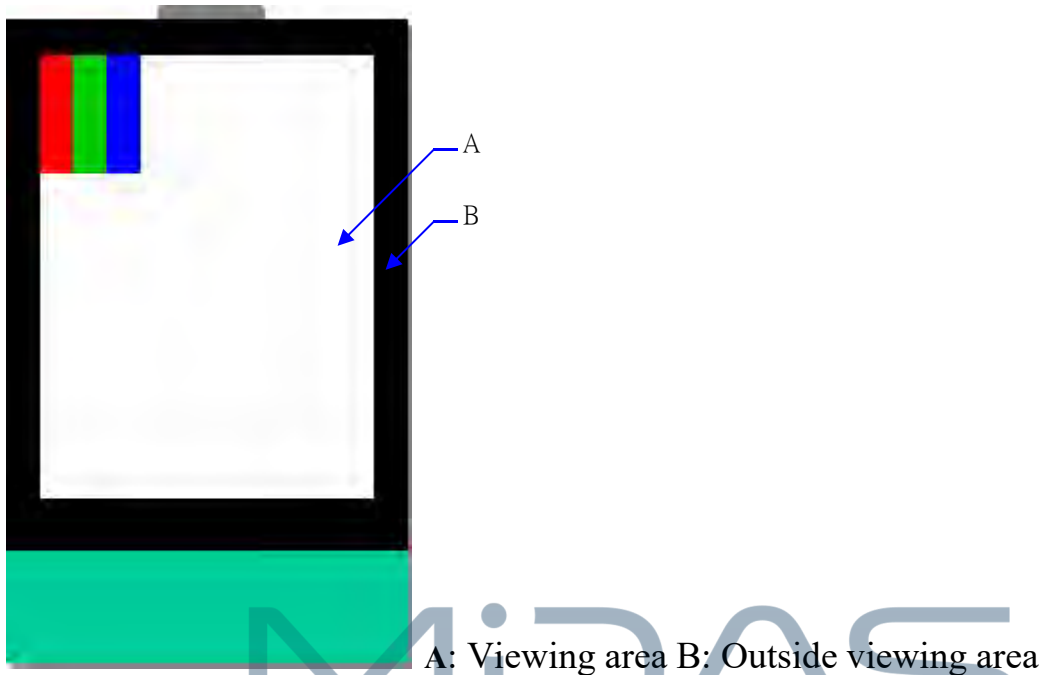
10.5.1 Manner of appearance test

- The test must be under 20W × 2 or 40W fluorescent light, and the distance of view must be at 30 ± 5 cm.
- When test the model of transmissive product must add the reflective plate.
- The test direction is base on around 45° of vertical line.
- Temperature: $25 \pm 5^\circ\text{C}$ Humidity: $60 \pm 10\%\text{RH}$



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- Definition of area:

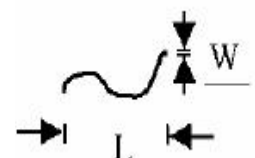


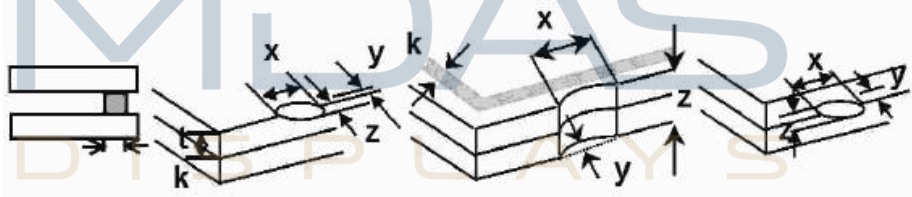
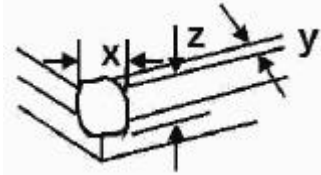
10.5.2 Basic principle

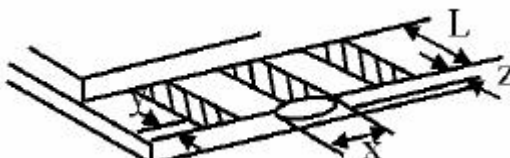
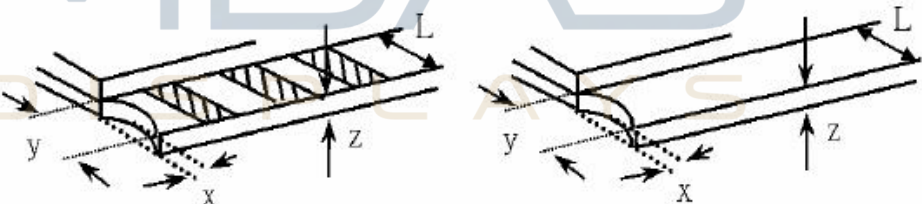
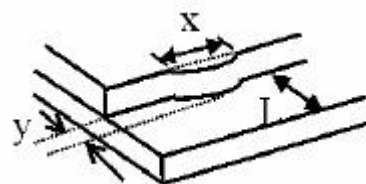
- When the standard can not be described, AQL will be applied.
- The sample of the lowest acceptable quality level must be negotiated by both supplier and customer when any dispute happened.
- New item must be added on time when it is necessary.

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10.6 Inspection Specification

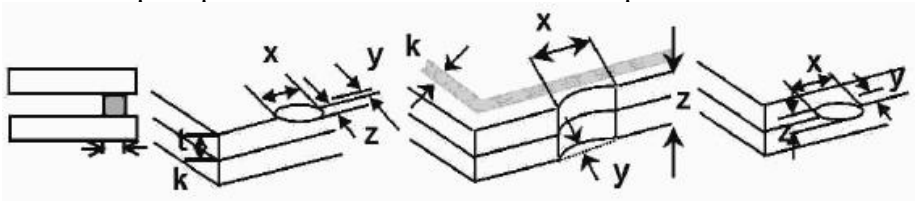
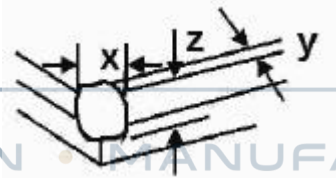
NO.	Item	Criterion	AQL														
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character, dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 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>2</td></tr><tr><td>$0.20 < \Phi \leq 0.25$</td><td>2</td></tr><tr><td>$0.25 < \Phi \leq 0.30$</td><td>1</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	$0.10 < \Phi \leq 0.20$	2	$0.20 < \Phi \leq 0.25$	2	$0.25 < \Phi \leq 0.30$	1	$0.30 < \Phi$	0	1.5		
		Size(mm)	Acceptable Q'ty														
$\Phi \leq 0.10$	Accept no dense																
$0.10 < \Phi \leq 0.20$	2																
$0.20 < \Phi \leq 0.25$	2																
$0.25 < \Phi \leq 0.30$	1																
$0.30 < \Phi$	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>$L \leq 3.0$</td><td>$0.02 < W \leq 0.05$</td><td rowspan="2">2</td></tr><tr><td>$L \leq 2.5$</td><td>$0.03 < W \leq 0.08$</td></tr><tr><td>---</td><td>$0.08 < W$</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	$L \leq 3.0$	$0.02 < W \leq 0.05$	2	$L \leq 2.5$	$0.03 < W \leq 0.08$	---	$0.08 < W$	Rejection	1.5
Length(mm)	Width(mm)	Acceptable Q'ty															
---	$W \leq 0.02$	Accept no dense															
$L \leq 3.0$	$0.02 < W \leq 0.05$	2															
$L \leq 2.5$	$0.03 < W \leq 0.08$																
---	$0.08 < W$	Rejection															

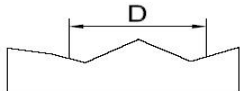
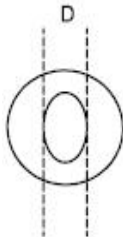
NO.	Item	Criterion			AQL
04	Polarizer bubbles	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction	Size Φ(mm)	Acceptable Q'ty	1.5
			Φ ≤ 0.20	Accept no dense	
			0.20< Φ ≤ 0.50	3	
			0.50< Φ ≤ 1.00	2	
			1.00< Φ	0	
			Total Q'ty	3	
05	Scratches	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 ≤ 1/2t	Not over viewing area	x ≤ 1/8a	
		1/2t< z ≤ 2t	Not exceed 1/3k	x ≤ 1/8a	
		⊙ 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 ≤ 1/2t	Not over viewing area	x ≤ 1/8a	
1/2t< z ≤ 2t	Not exceed 1/3k	x ≤ 1/8a			
⊙ 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>$x \leq 1/8a$</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>$x \leq 1/8a$</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>$X \leq a$</td></tr></table>	y: Chip width	x: Chip length	z: Chip thickness	$y \leq 0.5\text{mm}$	$x \leq 1/8a$	$0 < z \leq t$	y: Chip width	x: Chip length	z: Chip thickness	$y \leq L$	$x \leq 1/8a$	$0 < z \leq t$	y: width	x: length	$y \leq 1/3L$	$X \leq a$	1.5
		y: Chip width	x: Chip length	z: Chip thickness															
		$y \leq 0.5\text{mm}$	$x \leq 1/8a$	$0 < z \leq t$															
y: Chip width	x: Chip length	z: Chip thickness																	
$y \leq L$	$x \leq 1/8a$	$0 < z \leq t$																	
y: width	x: length																		
$y \leq 1/3L$	$X \leq a$																		

NO.	Item	Criterion	AQL
08	Cracked glass	The LCD with 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 light or color is wrong.	1.5 1.5 0.65
10	Bezel	Bezel must comply with product specifications.	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	12.1 FPC terminal damage $\leq$ 1/2 FPC terminal width and can not affect the function , we judge accept. 12.2 FPC alignment hole damage $\leq$ 1/2 alignment area and can not affect the function , we judge accept.	1.5 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.	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>$x \leq 1/8a$</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>$x \leq 1/8a$</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	$x \leq 1/8a$	z: Chip thickness	y: Chip width	x: Chip length	$z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$	1.5
z: Chip thickness	y: Chip width	x: Chip length													
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$z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$													

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.	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.

