



SPECIFICATION FOR TFT LCD MODULE

CUSTOMER : _____

CUSTOMER MODULE : _____

HL MODEL : HG032XG003

☐ Preliminary Specification

☒ Final Specification

Customer Confirmation column:

Approved by : _____ Dept. : _____ Data : _____

Please return one of the copies of the specification with your signature to us within two weeks after you receive this document. If it is not returned, we will assume that you agree to the entire contents of this specification document.

Designed by	Checked by	Approved by



1. Features

Display Mode	Transmissive type
	3.17" Active matrix TFT-LCD
Display Format	Graphic 1024*(RGB)*768t-matrix
Driver IC	JD9168
Display color	16.7M colors
Interface	MIPI DSI 4 LINE interface
Viewing Direction	ALL

2. Mechanical Specification

Item	Specifications	Unit	Remarks
Dimensional Outline	69.41(W)*57.19(H)*1.99	mm	FPC not include
Resolution	1024(W)*(RGB) * 768(H)pixels	dots	
LCD Active Area	64.51(W)*48.38(H)	mm	
Pixel Size	0.0629 (W)* 0.0629(H)	mm	
Weight	T.B.D	g	

3.Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
Power Supply	TP_VDD	2.8	3.3	3.3	V	
	IOVCC	2.5	3.3	3.3	V	
	AVDD	4.5	5.5	6	V	
	AVEE	-6	-5.5	-4.5	V	
Current for LCD	liovcc	-	-		mA	
Operating temperature	TOPR	-20	-	70	℃	
Storage temperature	TSTR	-30	-	80	℃	

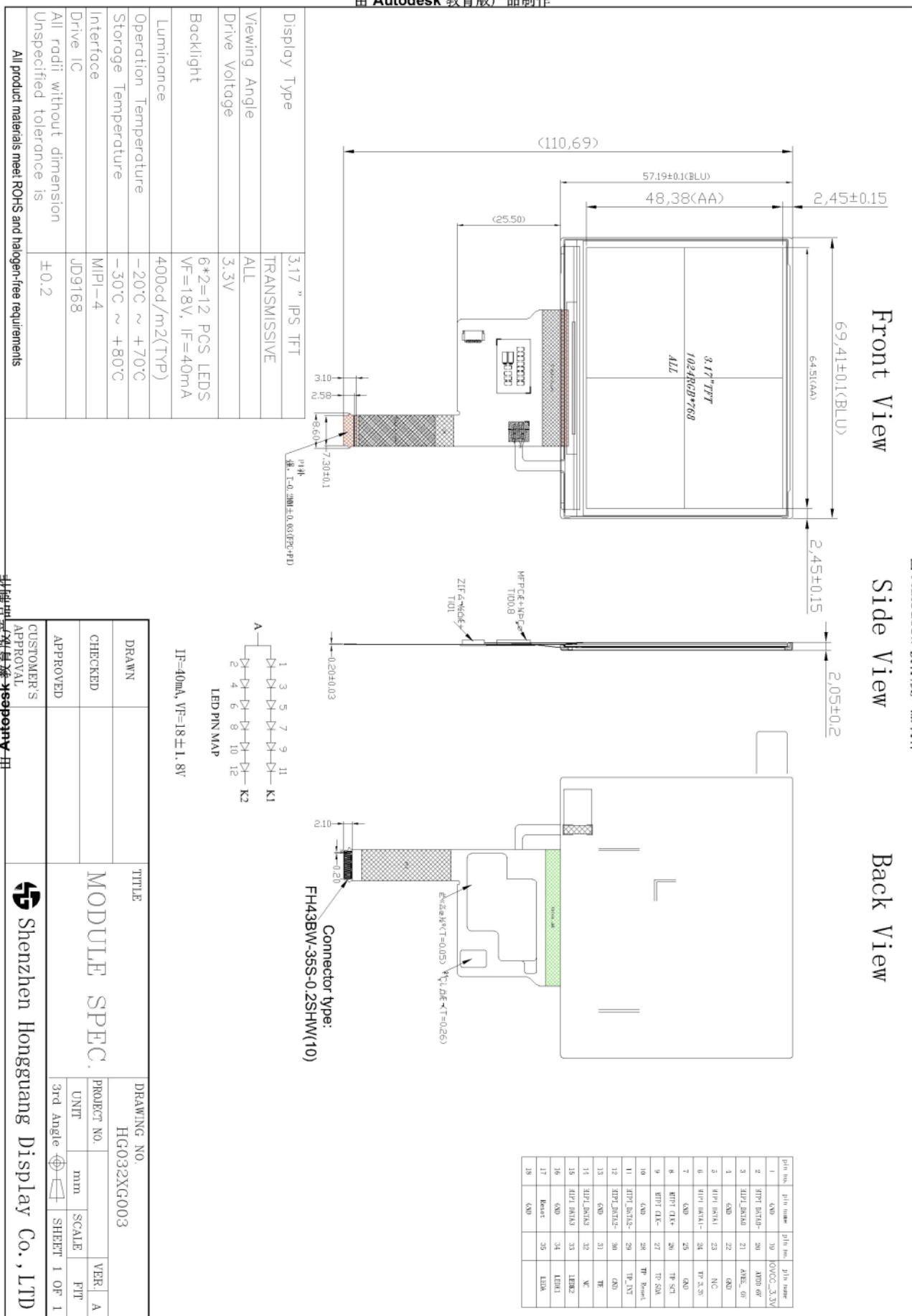


4. Revision history

[illegible]

5. Outline Dimension

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6. TFT Pin Descriptions

The electronics interface connector is FH43BW-35S-0.2SHW (10) .

Pin No.	Signal	Discription
1	GND	Ground.
2	MIPI_D0P	MIPI DATA
3	MIPI_D0N	MIPI DATA
4	GND	Ground.
5	MIPI_D1P	MIPI DATA
6	MIPI_D1N	MIPI DATA
7	GND	Ground.
8	MIPI_CLKP	MIPI CLOCK
9	MIPI_CLK-	MIPI CLOCK
10	GND	Ground.
11	MIPI_D2P	MIPI DATA
12	MIPI_D2N	MIPI DATA
13	GND	Ground.
14	MIPI_D3P	MIPI DATA
15	MIPI_D3N	MIPI DATA
16	GND	Ground.
17	RESET	LCD Reset pin
18	GND	Ground.
19	IOVCC	power supply for the I/O circuit
20	AVDD	Input positive power
21	AVEE	Input negative power
22	GND	Ground.
23	NC	NC
24	TP_VDD	Touch panel-I2C serial clock pin
25	GND	Ground.
26	TP_SCL	I2C clock input for TP
27	TP_SDA	I2C data input and output for TP
28	TP_RES	Touch panel-DC voltage supply
29	TP_INT	Ground.



30	GND	Ground.
31	TE	Tearing effect Signal
32	NC	NC
33	LEDK2	Backlight negtive
34	LEDK1	Backlight negtive
35	LED A	Backlight positive

7. Backlight Driving Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED backlight	V_L	--	18	--	V	Note 1
Current for LED backlight	I_L	--	40	--	mA	
LED life time	-	30,000	--	-	Hr	Note 2

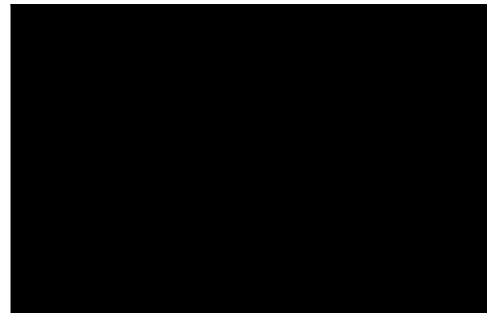
Note 1: The LED Supply Voltage is defined by the number of LED at $T_a=25^{\circ}\text{C}$ and $I_L=40\text{mA}$.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at $T_a=25^{\circ}\text{C}$ and $I_L=40\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 40 mA.

Note 3: Typ.specification:Gray-level test pattern; Max.specification:Black-level test pattern.



(a) Gray-level test pattern

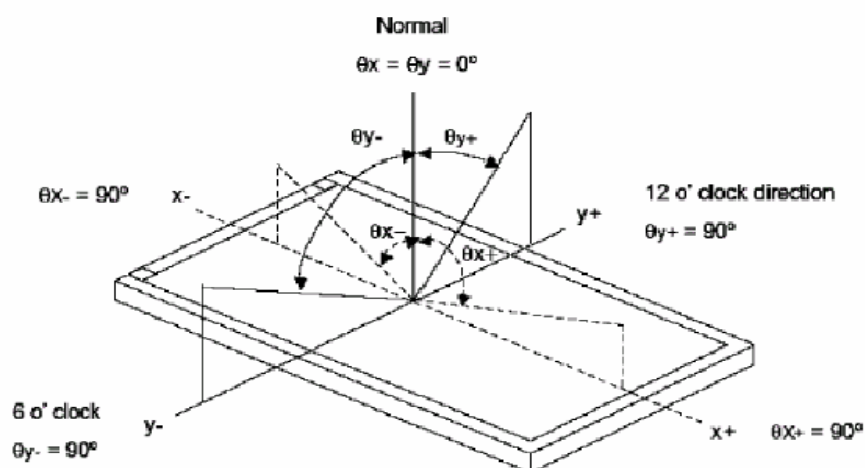


(b) Black-level test pattern

8. Optical Characteristics

ITEM	SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
			MIN.	TYP.	MAX		
Brightness	B	Viewing normal angle		400	—	Cd/m ²	
Contrast Ratio	CR			1200	—	—	
Response Time	Tr+Tf		—	25	40	ms	
Chromaticity Coordinate (Transmissive)	Red	X	0.6725	0.6759	0.6827		
		Y	0.2810	0.2842	0.2873		
	Green	X	0.3344	0.3366	0.3399		
		Y	0.5680	0.5740	0.5790		
	Blue	X	0.1249	0.1272	0.1296		
		Y	0.0457	0.0477	0.0535		
	White	X	0.3119	0.3144	0.3189		
		Y	0.3188	0.3263	0.3323		
Viewing Angle	Hor.	θ_{x+}	80	85	—	Deg.	
		θ_{x-}	80	85	—		
	Ver.	θ_{y+}	80	85	—		
		θ_{y-}	80	85			

Note 1 : Definition of Viewing Angle θ_x and θ_y :

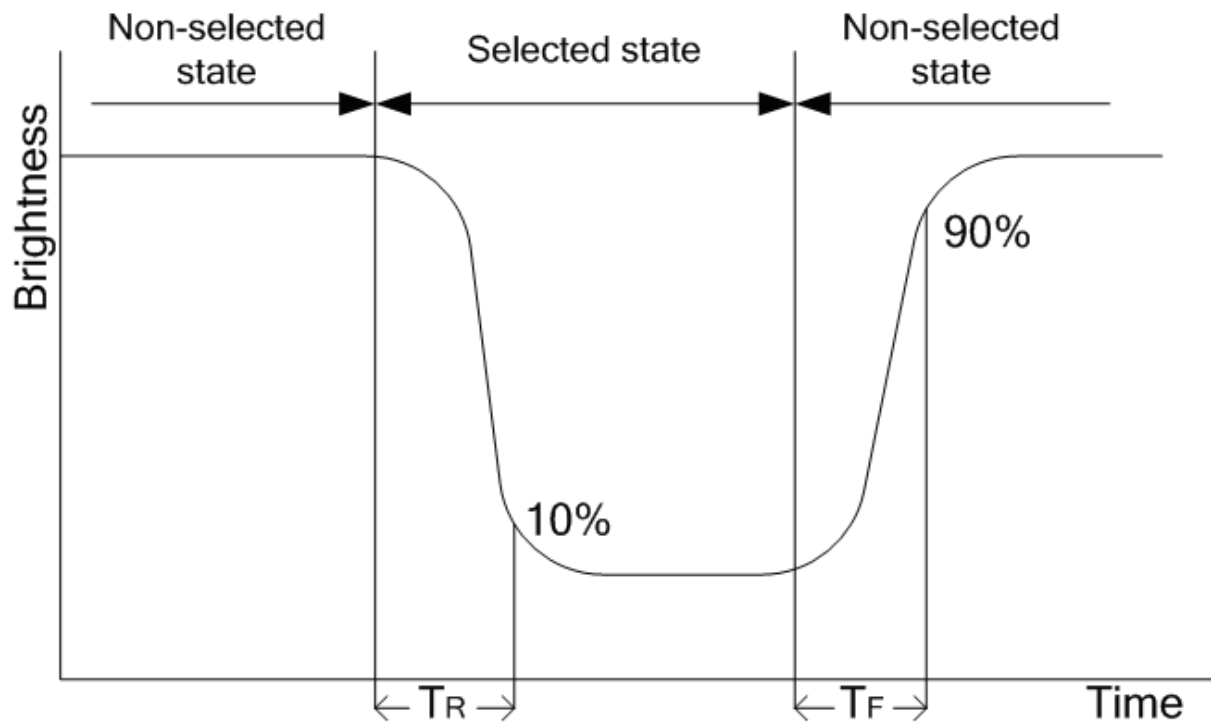


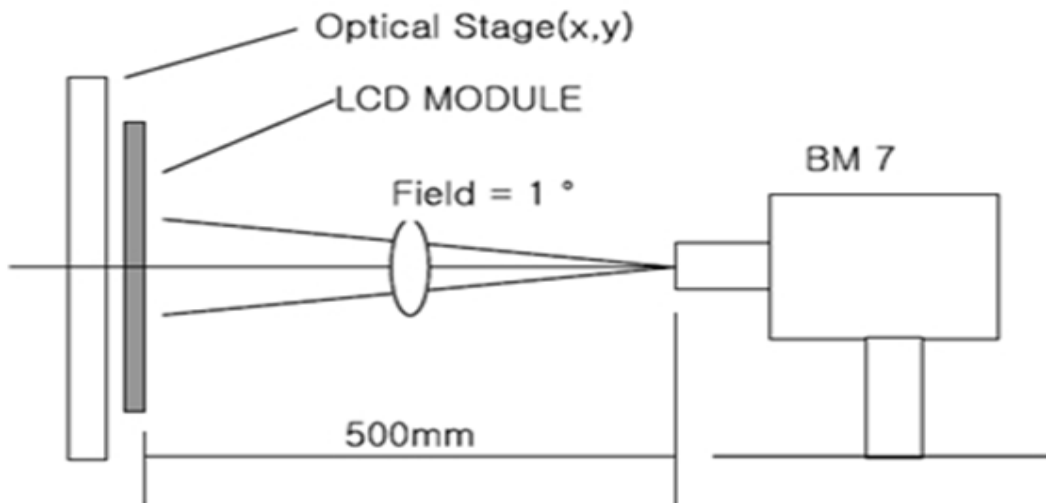
2: Definition of contrast ratio CR:



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

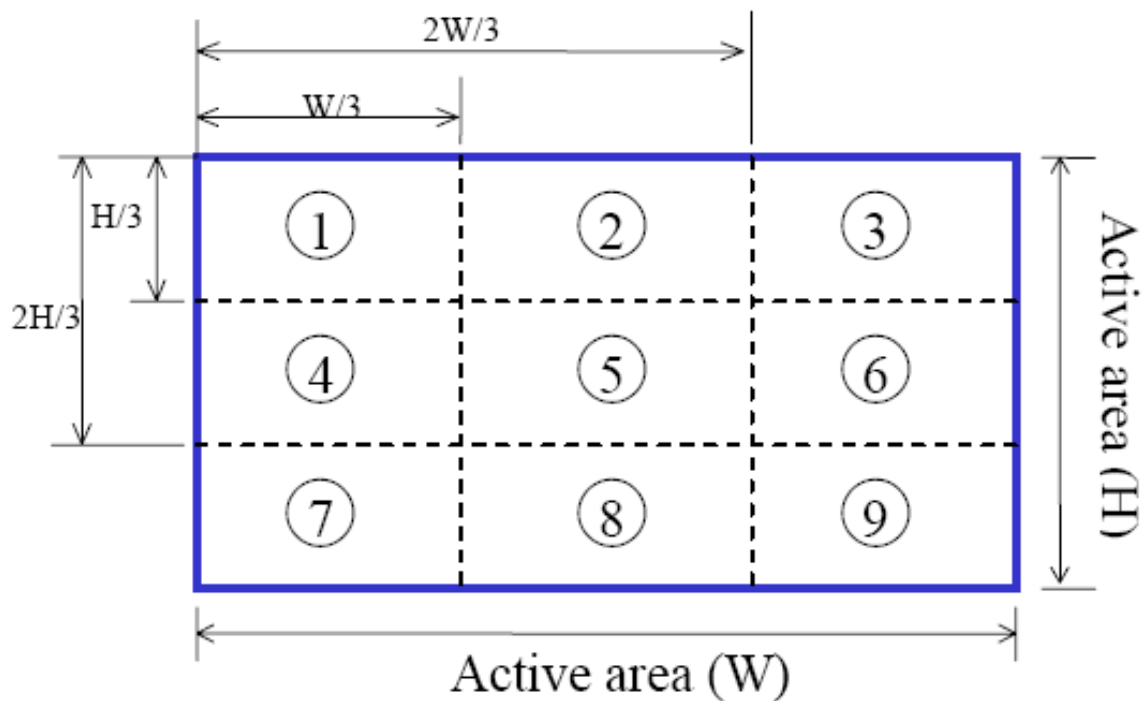
Note 3: Definition of response time (T_R , T_F)





<Transmissive Mode>

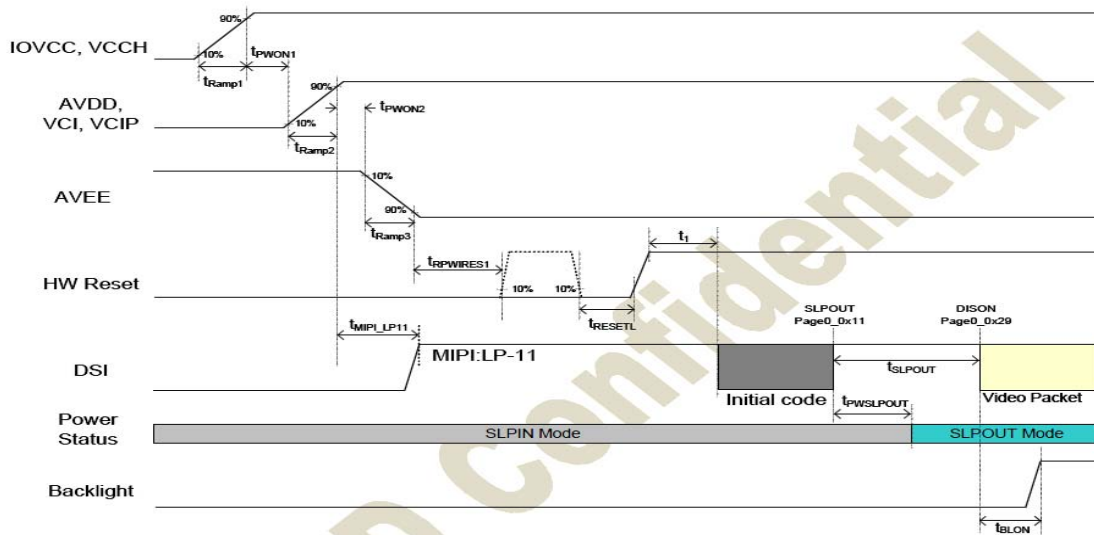
Optical Characteristic Measurement Equipment and method



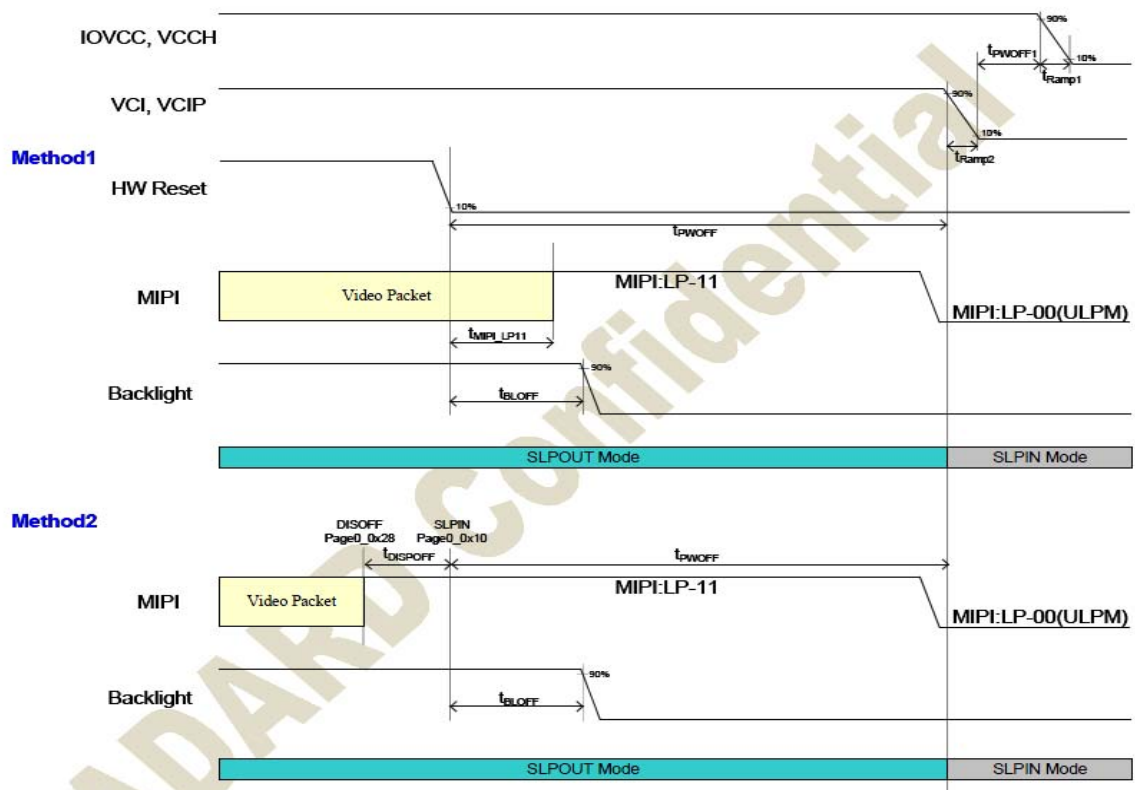
Main Measuring point

9. DSI Power On/Off Timing

9.1 Power On Timing f External Power IC



9.1 Power Off Timing of External Power IC



10. SIGNAL TIMING SPECIFICATION

10.1 The 3.17 VV032X0M-NJ0-2GP0 is operated by the DE only.

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	-	51	-	MHz
Horizontal display area	thd	1024			pixel
HSYNC	th	20			pixel
HSYNC blanking	thbp+ thfp	-	40	-	pixel
Vertical display area	Tvd	768			pixel
VSYNC	th	2			line
VSYNC blanking	tvbp+ tvfp	6	14	-	line
Frequency	fV	-	60	-	Hz

11. Signal Timing Waveforms Of Interface Signal

Note: Please refer to JD9168 data sheet for more details.

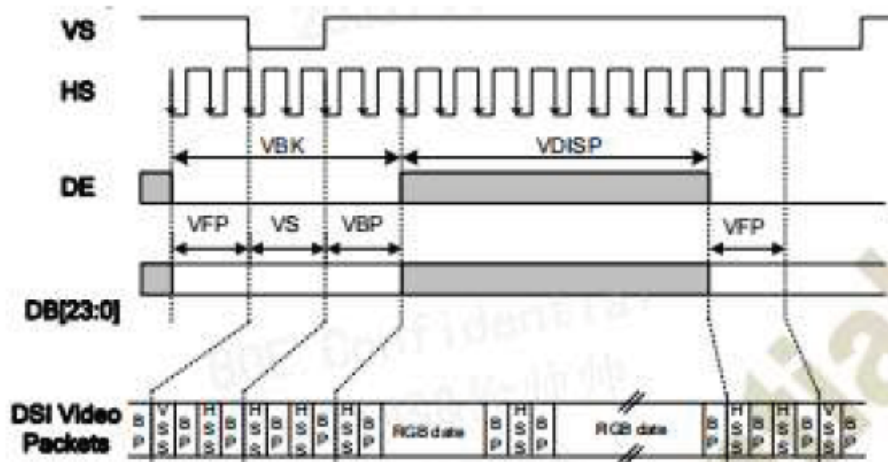


Figure 11.12: Vertical Timings for DPI I/F

Resolution=800x480 ($T_A=25^\circ\text{C}$, IOVCC=3.3V, VCI=3.3V)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Vertical low pulse width	VS	-	2	-	Note ⁽¹⁾	Line
Vertical front porch	VFP	-	2	-	-	Line
Vertical back porch	VBP	-	2	-	Note ⁽¹⁾	Line
Vertical blanking period	VBK	VS+VBP+VFP	6	-	-	Line
Vertical active area	-	VDISP	-	480	-	Line
Vertical Refresh rate	VRR	-	-	60	-	Hz

Note:

1. The VS and VBP pulse width are related to GIP start pulse and GIP clock pulse timing. The GIP start pulse and GIP clock pulse must be set at corresponding position for LCD normal display.

Resolution=1024x600 ($T_A=25^\circ\text{C}$, IOVCC=3.3V, VCI=3.3V)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Vertical low pulse width	VS	-	2	-	Note ⁽¹⁾	Line
Vertical front porch	VFP	-	2	-	-	Line
Vertical back porch	VBP	-	2	-	Note ⁽¹⁾	Line
Vertical blanking period	VBL	VS+VBP+VFP	6	-	-	Line
Vertical active area	-	VDISP	-	600	-	Line
Vertical Refresh rate	VRR	-	-	60	-	Hz

Note:

1. The VS and VBP pulse width are related to GIP start pulse and GIP clock pulse timing. The GIP start pulse and GIP clock pulse must be set at corresponding position for LCD normal display.

Table 11.16: Vertical Timings for DSI Video I/F

12. Reliability

Item NO.	Item	Test Conditions	Remark
1	High temperature Operation	+70℃ 96Hours	Note 2, Note 4
2	Low temperature Operation	-20℃ 96Hours	Note 1, Note 4
3	High Temperature Storage	+80℃ 96Hours	Note 1, Note 4
4	Low temperature Storage	-30℃ 96Hours	Note 1, Note 4
5	Operate at High Temp and Humidity	+60℃ 90%RH 96Hours	Note 4
6	Thermal Shock	-20℃ (30min)→25℃ (5min)→70℃ (30min)→25℃ (5min) Cycle:10	Note 4
7	ESD Test	±8KV ,R=330 Ω ,C=150pF,Air ±4KV ,R=330 Ω ,C=150pF,Contact 10 times	
8	Packing vibration test	Frequency:10HZ~55HZ~10HZ Amplitude:1.5mm X,Y,Zdirection for total 2 hours (6 hours for total)	

Note 1: Ta is the ambient temperature of samples.

Note 2: Ts is the temperature of panel's surface.

Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

13. Inspection standards

1. AQL (Acceptable Quality Level)

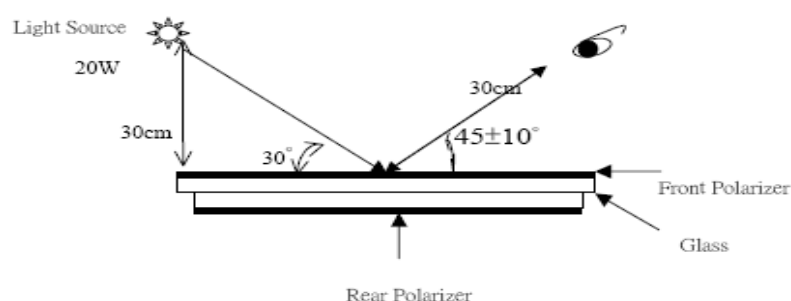
AQL of major and minor defect.

	MAJOR DEFECT	MINOR DEFECT
AQL	0.65	1.0

2. Basic conditions for inspection

The LCM face to us, in normal environment, the lux is 1000 ± 200 . (Darkroom's lux: 100 ± 50), About an angle of incidence 30, a distance of 30 cm with an angle of 45 degree to check the products without uncovering the film!

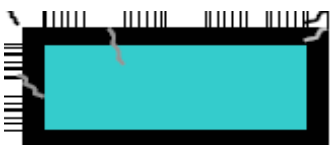
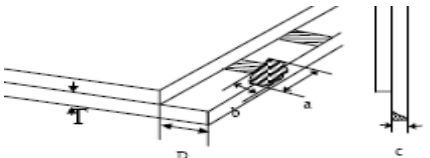
(As shown below)

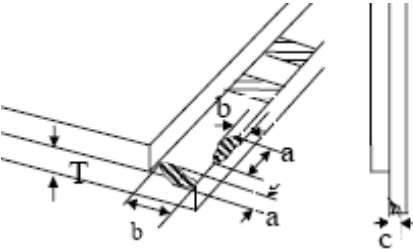
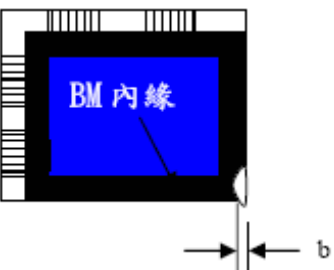


3. Inspection item and criteria

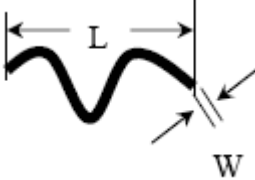
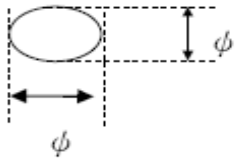
3.1 Visual inspection criterion in immobility

3.1.1 Glass defect

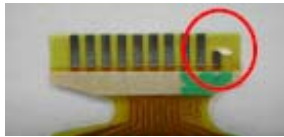
NO	Defect item	Criteria	Remark
1	Dimension Unconformity (Major defect)	By Engineering Drawing	
2	Cracks (Major defect)	1. Linear cracks panel 2. Nonlinear crack contrast by limited sample 【Reject】	
3	Glass extrude the conductive area (minor defect)	a: disregards and no influence assemblage. 1) $b \leq 1/3$ Pin width (non bonding area) 2) bonding area ≤ 0.5 mm 【Accept】	A: Length, b: Width
4	Pin-side, conductive area damaged (minor defect)	(a c: disregards) $b \leq 1/3$ of effective length for bonding electrode 【Accept】	a: length, b: Width, c: Thickness 

5	Pin-side,non-conductive area damaged (minor defect)	1)Damage area don't touch the ITO (Inclueing contraposition mark, except scribing mark) 【Accept】 2) $C < T$ $b \leq BM1/3$ of width 【Accept】 3) $c = T$ b not touch the seal glue 【Accept】 4) a disregards	a: Length, b: Width c: Thickness 
6	Non-pin-side damage (minor defect)	$c < T$ 1) b exceeds $1/3Bm$ 【Reject】 $c = T$ b not touch the seal glue 【Reject】	c: Thickness b: width of  damage

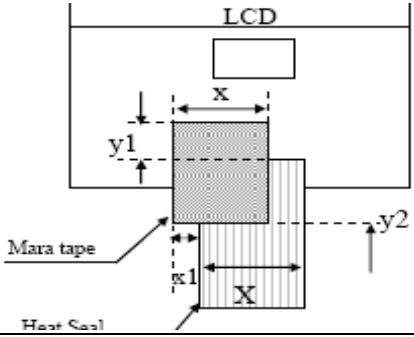
3.1.2LCD appearance defect(View area)

NO	Defect item	Criteria		Remark
1	Fiber、glass cratch、polarizer scratch/folded (minor defect)	Specification	Allowable	note1:L: Length, W: Width note2: disregard if out of AA 
		$W \leq 0.03\text{mm}$	disregard	
		$0.03\text{mm} < W \leq 0.05\text{mm};$ $L \leq 3.0\text{mm}$	2	
		$0.05\text{mm} < W \leq 0.1\text{mm};$ $L \leq 3.0\text{mm}$	1	
		$W > 0.1\text{mm}; L > 3.0\text{mm}$	0	
2	Polarizer bubble、concave and convex (minor defect)	$\phi \leq 0.2\text{mm}$	disregard	note1: $\phi = (L+W)/2$, L:Length, W :Width note2:disregard if out of AA
		$0.2\text{mm} < \phi \leq 0.3\text{mm}$	2	
		$0.3\text{mm} < \phi \leq 0.5\text{mm}$	1	
		$0.5\text{mm} < \phi$	0	
3	Black dots、dirty dots、impurities、eye winker (minor defect)	$\phi \leq 0.15\text{mm}$	disregard	note2:disregard if out of AA 
		$0.15\text{mm} < \phi \leq 0.25\text{mm}$	2	
		$0.25\text{mm} < \phi \leq 0.3\text{mm}$	1	
		$0.3\text{mm} < \phi$	0	
4	Polarizer prick (minor defect)	$\phi \leq 0.1\text{mm}$	disregard	note1: $\phi = (L+W)/2$, L=Length, W=Width note2:the distance between two dots>5mm
		$0.1\text{mm} < \phi \leq 0.25\text{mm}$	3	
		$\phi > 0.25\text{mm}$	0	

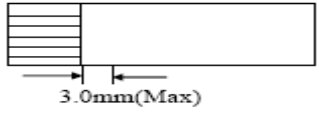
3.1.3FPC

NO	Defect item	Criteria		Remark
1	Copper screen peel (minor defect)	Copper screen peel 【Reject】		
2	No release tape or peel	No release tape or peel 【Reject】		
3	Dirty dot and impurity of FPC for customer using side (minor defect)	Specification	Allowable	Note1: Cannot have stride ITO impurities
		$\phi \leq 0.25\text{mm}$	2	
		$\phi > 0.25$	0	

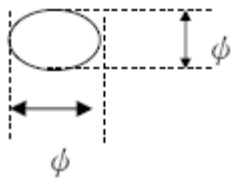
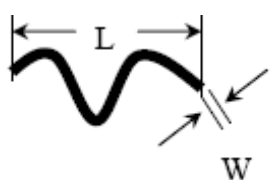
3.1.4 Black tape & Mara tape

NO	Defect item	Criteria	Remark
1	FPC or H/S black tape (minor defect)	1. shift spec: 1) glue to the polarize 【Reject】 2) IC bare 【Reject】 2. left-and-right spec: 1) exceed of FPC edge or H-S edge 【Reject】 2) IC bare 【Reject】	
2	No black tape (major defect)	No black tape 【Reject】	
3	Tape position mistake (minor defect)	Not by engineering drawing	
4	Mara tape defect (minor defect)	Peel before pulling the protecting film 【Reject】	

3.1.5 Silicon and Taffy glue

NO	Defect item	Criteria	Remark
1	Quantity of silicon (major defect)	Uncover the ITO and circuit area 【Reject】	note: compared by engineering
2	Taffy glue (major defect)	1. Uncover the reveal copper area 【Reject】 2. Cover layer 0.3mm(Min)~3.0mm(Max) 【Reject】	note: if customer has special requirement, refer to the technical document 
3	Depth of glue covering (major defect)	Depth of glue covering overtop front Polarizer 【Reject】	Except of the special requirement

3.2 Electrical criteria

NO	Defect item	Criteria	Remark	
1	No display (major defect)	No display 【Reject】		
2	Missing line (major defect)	Missing line 【Reject】		
3	Seg-com light and dark (major defect)	Seg-com light and dark 【Reject】	ND filter 2% test	
4	No display in immobility (major defect)	No display in immobility 【Reject】		
5	Flicker of Pattern (major defect)	Flicker of Pattern 【Reject】		
6	Mura (major defect)	ND filter 2%test		
7	Over current (major defect)	Over current 【Reject】		
8	Voltage out of specification (major defect)	Voltage out of specification 【Reject】		
9	Pattern blur, error code (major defect)	Pattern blur, error code 【Reject】		
10	Dark light, Flicker (major defect)	Dark light, Flicker 【Reject】		
11	Black/white dots 、 Dirty dots、 eye winker (major defect)	Specification	Allowable	Note1:disregard if out of AA 
		$\phi \leq 0.15\text{mm}$	disregard	
		$0.15\text{mm} < \phi \leq 0.25\text{mm}$	2	
		$0.25\text{mm} < \phi \leq 0.3\text{mm}$	1	
		$0.3\text{mm} < \phi$	0	
12	Fiber、glass crutch、Polarizer scratch/folded (major defect)	$W \leq 0.03\text{mm}$	disregard	Note1:L: Length, W: Width Note2: disregard if out of AA 
		$0.03\text{mm} < W \leq 0.05\text{mm}$ $L \leq 3.0\text{mm}$	2	
		$0.05\text{mm} < W \leq 0.1\text{mm}$ $L \leq 3.0\text{mm}$	1	
		$W > 0.1\text{mm}; L > 3.0\text{mm}$	0	



14.Precautions for using LCD modules.

14 .1 Safety

- (1)Do not swallow any liquid crystal ,even if there is no proof that liquid crystal is poisonous.
- (2)If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3)If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

14. 2Storage Conditions

- (4)Store the panel or module in a dark place where the temperature is $23\pm 5^{\circ}\text{C}$ and the humidity is below $45\pm 20\%\text{RH}$.
- (5)Store in anti-static electricity container.
- (6)Store in clean environment, free from dust, active gas, and solvent.
- (7)Do not place the module near organics solvents or corrosive gases.
- (8))Do not crush, shake, or jolt the module.

14. 3 Handling Precautions

- (9)Avoid static electricity, which can damage the CMOS LSI.
- (10)The polarizing plate of the display is very fragile, please handle it very carefully.
- (11)Do not give external shock.
- (12)Do not apply excessive force on the surface.
- (13)Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- (14)Do not use ketonic solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (15)Do not operate it above the absolute maximum rating.
- (16)Do not remove the panel or frame from the module.

14.4 Warranty

The period is within twelve months since the date of shipping out under normal using and storage conditions.