ILLUMINANT 北極光企業有限公司

PRODUCT SPECIFICATION

CUSTOMER:	
MODEL NO:	**IG-B120601-6BTLWB**
ACCEPTED BY:	

APPROVED BY:	CHECKED BY:	PREPARED BY:
北极光 2009.04.16 Zhang	北极光 2009.04.16 He	北极光 2009.04.16 Han

Note 1. Version of Specifications : 1.1

2. Others : ROHS Compliant

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RECORD OF REVISION

Version	Date	Contents
1.0	2009/04/16	New Release

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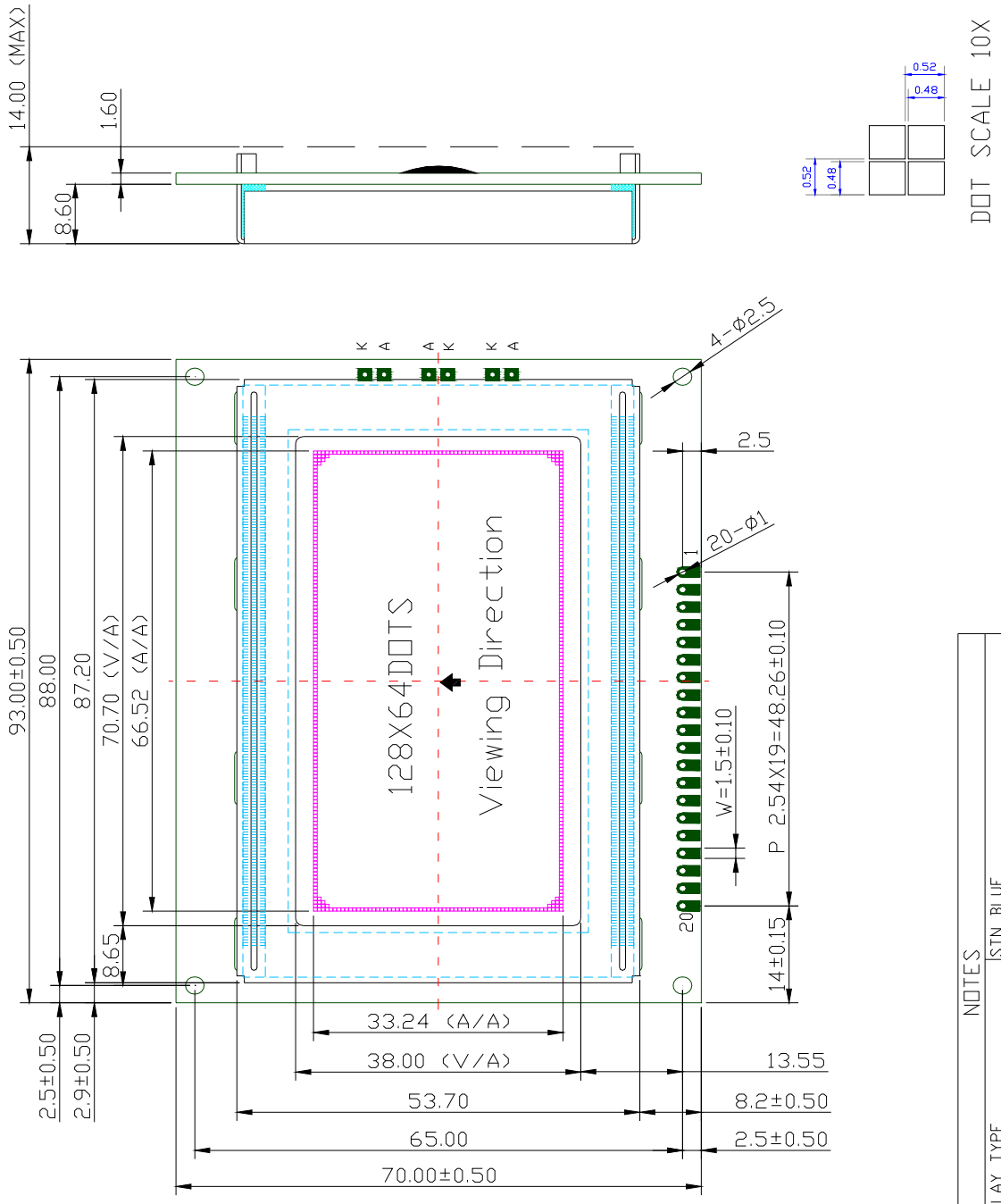
1. Mechanical Specification:

Item	Standard Value	Unit
LCD Type	STN/Blue mode/Transmissive/Negative	
Number of Dots	128*64	
Module Dimension	93.00(W)*70.00(H)*14.00(Max)	mm
View Area	70.70(W)*38.00(H)	mm
Active Area	66.52(W)*33.24(H)	mm
Duty	1/64	
Bias	1/9	
Viewing Direction	6H	-
Driver	KS0108B*2+KS0107B*1 or compatible	-
Backlight Type	White LED	
Touch Panel	Without	

PIN NO.	DESCRIPTION
1	VSS
2	VDD
3	VLCD
4	RS
5	R/W
6	E
7	D0
8	D1
9	D2
10	D3
11	D4
12	D5
13	D6
14	D7
15	CS1
16	CS2
17	RSTB
18	VEE
19	A
20	K



NOTES		
1	DISPLAY TYPE	STN BLUE
2	VIEWING DIRECTION	6H
3	POLARIZER MODE	TRANSMISSIVE / NEGATIVE
4	LOGIC VOLTAGE	5.0V
5	DRIVE METHOD	1/64DUTY 1/9BIAS
6	DRIVE METHOD	KS0107B, KS0108B(X2)
7	BACKLIGHT	LED(WHITE)
8	OPERATING TEMP.	-20°C ~ 70°C
9	STORAGE TEMP.	-30°C ~ 80°C

ILLUMINANT	1	NEW DRAWING	2009-04-19		
	REV.	CONTENT	DATE		
DRAWING NO.	IG-B120601-6BTLWB	DRAWN	LINDY	DATE	2009-04-19
UNIT:mm	PAGE: 1/1 VER: B SCALE: 1/1	CHECKED		DATE	
GENERAL TOLERANCE ±0.3		APPROVED		DATE	

2. Interface:

Pin No.	Function Description	Symbol
1	Ground	VSS
2	Supply Voltage for Logical Circuit (+5V)	VDD
3	LCD Driver Voltage	VLCD
4	Select Registers 0 : Instruction Register (for write) Busy Flag & Address Counter (for read) 1 : Data Register (for write and read)	RS
5	Select Read or Write (in parallel mode) 0 : Write 1 : Read	R/W
6	Enable Signal Write Mode (R/W=L) data of DB<0:7> is latched at the falling edge of E. Read Mode (R/W=H) DB<0:7> appears the reading data while E is at high level.	E
7	Data Bus	DB0
8	Data Bus	DB1
9	Data Bus	DB2
10	Data Bus	DB3
11	Data Bus	DB4
12	Data Bus	DB5
13	Data Bus	DB6
14	Data Bus	DB7
15	Chip Selection	CS1
16	Chip Selection	CS2
17	Reset Signal	RSTB
18	LCD Driver Voltage	VEE
19	Backlight “+”	A
20	Backlight “-“	K

3. Absolute Maximum Ratings:

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage (Logic)	**V_{DD}**	**-0.3**	**5.0**	**+5.5**	**V**
Supply Voltage(LCD)	**V_{EE}**	**V_{DD}-0.3**			
Input Voltage	**V_{IN}**	**-0.3**		**V_{DD}+0.3**	**V**
Operating Temperature	**T_{OP}**	**-20**	**-**	**+70**	**℃**
Storage Temperature	**T_{ST}**	**-30**	**-**	**+80**	**℃**

Note :
1.Ta=25℃
2.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

4. Electrical Characteristics:

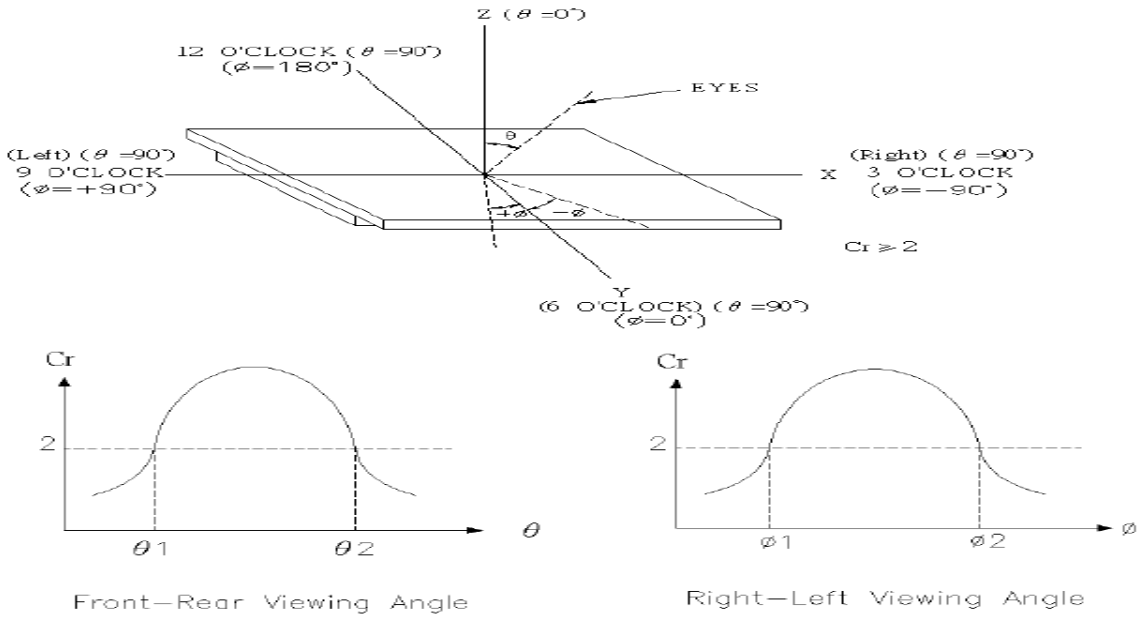
Characteristic		Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage (Logic)		V_{DD}-V_{SS}	Ta= +25℃	-0.3	5.0	+5.5	V
Supply Voltage (LCD)		V_{DD}-V_0		V_{DD}-0.3	11.1	V_{DD}+15	
Input Voltage	High	V_{IH}		2.0		V_{DD}	
	Low	V_{IL}		V_{SS}	--	0.8	
Output Voltage	High	V_{OH}		2.4	--	--	V
	Low	V_{OL}		--	--	0.4	
Supply Current (Logic)		I_{DD}	V_{DD}=5.0V	--	20	30	mA
Backlight Voltage		V_{BL}	White LED		3.0		V
Backlight Current		I_{BL}			45		mA
Backlight Life Time			Ta= +25℃, V_{BL}=3.0V		100,000		Hr

5. Optical Characteristics:

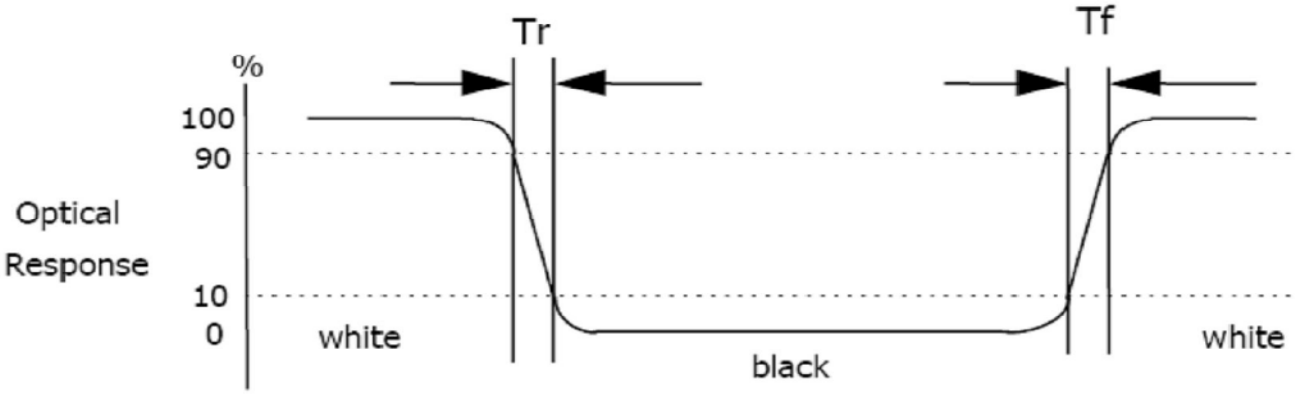
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle	Top	ΦH	CR≥10	-	15	-	Degree	Note.1
	Bottom	ΦL		-	30	-		
	Left	ΘL		-	30	-		
	Right	ΘR		-	30	-		
Response Time (Tr+Tf)			Θ=0	-	500	650	ms	Note.2
Uniformity		△B	If=60 mA			75	%	Note.0
Contrast Ratio		CR	At optimized viewing angle		4	-	-	Note.3

Note. 0 : △B=B(min)/B(max)

Note. 1 : Definition of Viewing Angle : Refer to figure as below:



Note. 2 : Definition of Response Time : TR and TF. The figure below is the output signal of the photo detector.



Note. 3 : Definition of Contrast Ratio (CR) , Ratio of gray max (G max) & gray min (G min) , Contrast ratio (CR) = (G max) / (G min) , (G max) = luminance with all pixel white , (G min) = luminance with all pixel black

6. Timing Characteristics :

6.1 Clock Timing

Characteristic	Symbol	Min.	Typ.	Max.	Unit
CLK1,CLK2 Cycle Time	t_{CY}	2.5	-	20	s
CLK1 'LOW' Level Width	t_{WL1}	625	-	-	ns
CLK2 'LOW' Level Width	t_{WL2}	625	-	-	
CLK1 'HIGH' Level Width	t_{WH1}	1875	-	-	
CLK2 'HIGH' Level Width	t_{WH2}	1875	-	-	
CLK1-CLK2 Phase Difference	t_{D12}	625	-	-	
CLK2-CLK1 Phase Difference	t_{D21}	625	-	-	
CLK1, CLK2 Rise Time	t_R	-	-	150	
CLK1, CLK2 Fall Time	t_F	-	-	150	

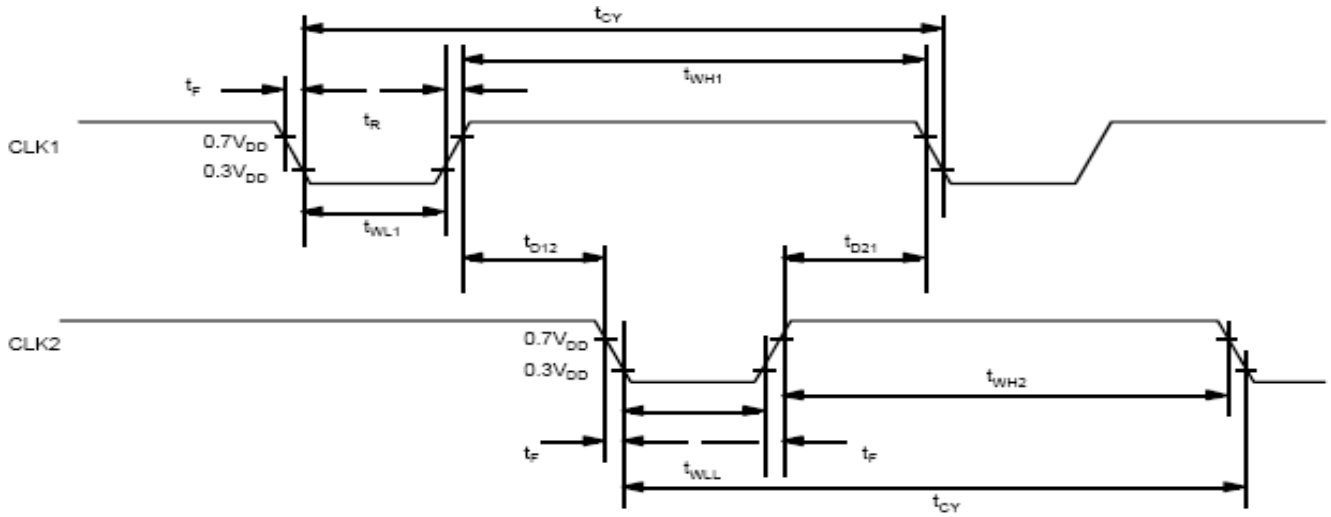


Fig 1. External clock waveform

6.2 Display Control Timing

Characteristic	Symbol	Min.	Typ.	Max.	Unit
FRM Delay Time	t_{DF}	-2	-	+2	us
M Delay Time	t_{DM}	-2	-	+2	us
CL "LOW Level Width	t_{WL}	35	-	-	us
CL "HIGH' Level Width	t_{WH}	35	-	-	us

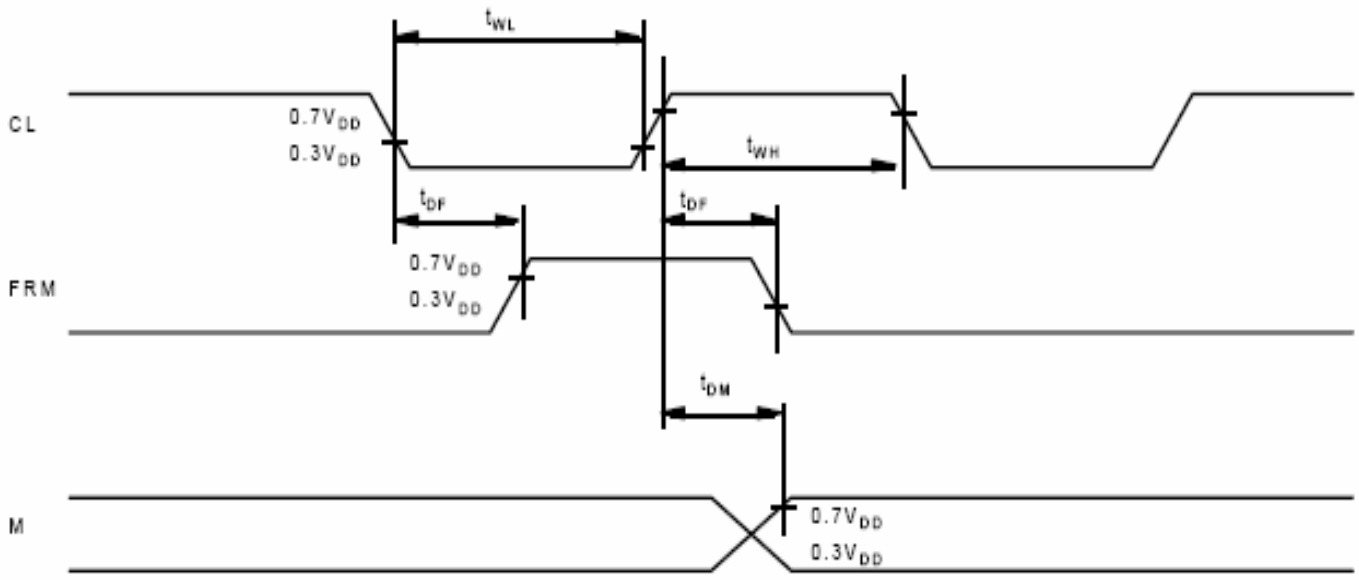


Fig 2. Display control signal waveform

6.3 MPU Interface

Characteristic	Symbol	Min.	Typ.	Max.	Unit
E Cycle	t_C	1000	-	-	ns
E High Level Width	t_{WH}	450	-	-	ns
E Low Level Width	t_{WL}	450	-	-	ns
E Rise Time	t_R	-	-	25	ns
E Fall Time	t_F	-	-	25	ns
Address Set-Up Time	t_{ASU}	140	-	-	ns
Address Hold Time	t_{AH}	10	-	-	ns
Data Set-Up Time	t_{SU}	200	-	-	ns
Data Delay Time	t_D	-	-	320	ns
Data Hold Time (Write)	t_{DHW}	10	-	-	ns
Data Hold Time (Read)	t_{DHR}	20	-	-	ns

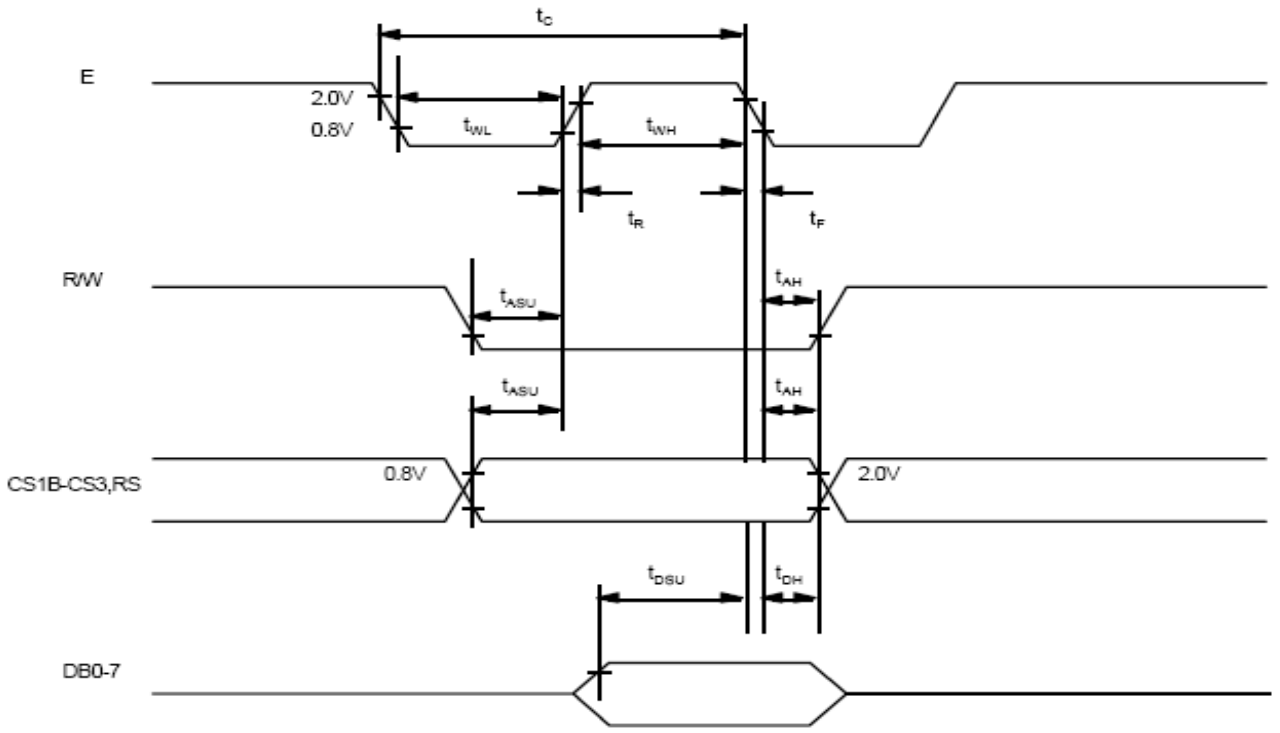


Fig 3. MPU write timing

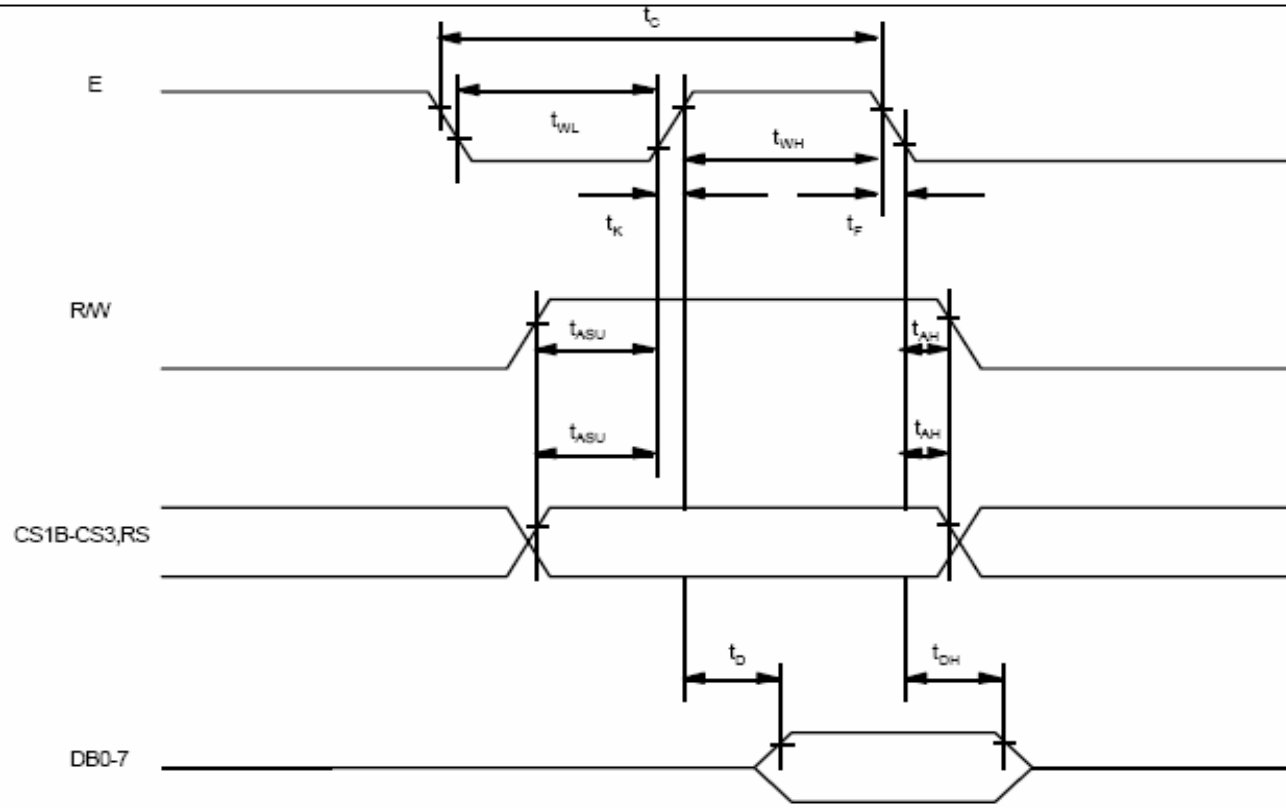


Fig 3. MPU write timing

7. Reliability:

7.1 MTTF

The LCD module shall be designed to meet a minimum MTTF value of 50,000 hours with normal condition. (25°C in the room without sunlight; not include lifetime of backlight and Touch Panel).

7.2 Test Condition

No.	Item	Condition	Criterion
1	High Temperature Operating	+70°C 240hrs	。No defect of operational function in room temperature are allowable(23±5°C). 。Leakage current should be below double of initial value.
2	Low Temperature Operating	-20°C 240hrs	
3	High Temperature Non-Operating	+80°C 240hrs	
4	Low Temperature Non-Operating	-30°C 240hrs	
5	High Temperature / Humidity Non-Operating	60°C ; 90%RH ; 240hrs	
6	Temperature Shock Operating	-20°C ⟷ 70°C (30min) (5min) (30min) 50 Cycles	
7	Electro-Static Discharge	HBM : ±2kv	

Note 1: Test after 24 hours in room temperature(23±5°C).

Note 2: The sampling above is individually for each reliability testing condition.

Note 3: The color fading of polarizing filter should not care.

Note 4: All of the reliability testing chamber above, is using D.I. water.(Min value:1.0 MΩ-cm)

Note 5: 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.

8. Inspection Criteria:

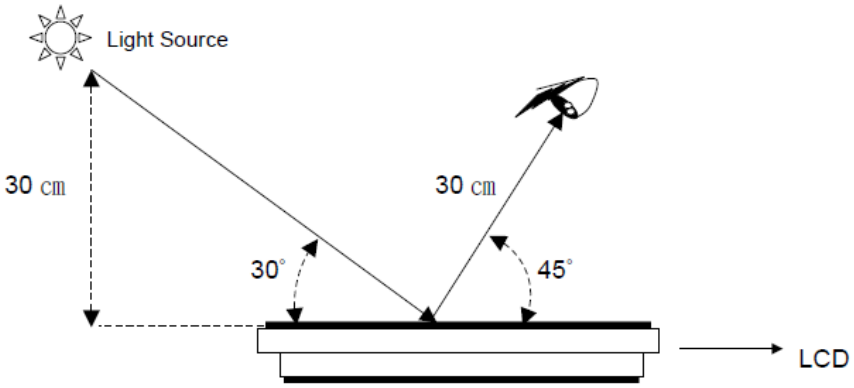
8.1 Inspection Conditions

8.1.1 Environmental conditions
The environmental conditions for inspection shall be as follows
Room temperature: 23±5°C, Humidity: 50±20%RH
8.1.2 The external visual inspection
With 1000±200 lux fluorescent lamp as the light source, the inspection was in the distance of 30cm or more from the LCD to the inspector's eyes .

8.2 Light Method

8.2.1 Inspection is implemented over 30cm vertical distance and 30° incidence under 1000±200 lux. (As showed below)

8.2.2 Viewing direction for inspection over 30㎝ far and is 45° against from LCD (As showed below)



8.3 Classification of Defects

8.3.1 Major defect
A major defect refers to a defect that may substantially degrade usability for product applications.

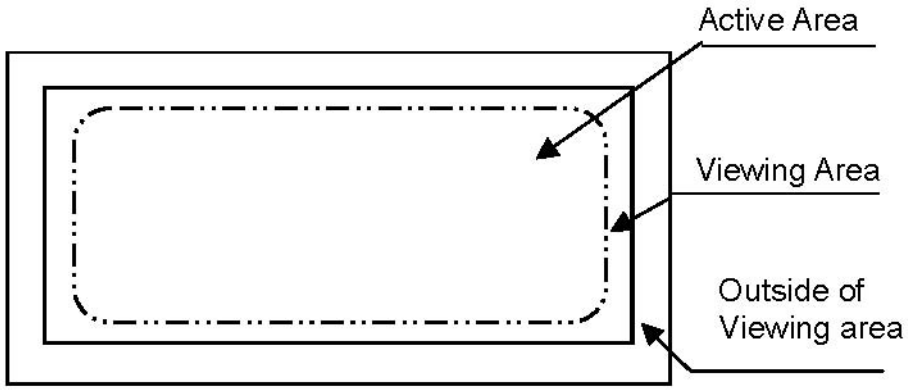
8.3.2 Minor defect
A minor defect refers to a defect which is not considered to be able substantially degrade the product application or a defect that deviates from existing standards almost unrelated to the effective use of the product or its operation.
Notes: If the LCD/LCM's cosmetic and display performance do not specify in "inspection criterion", it should be based on these delivered samples.

8.4 Sampling & Acceptable Quality Level

Inspection Item	Major Defect	Minor Defect
Cosmetic	1.0%	1.5%
Electrical Test	0.4%	0.65%

8.5 Definition of Inspection Area

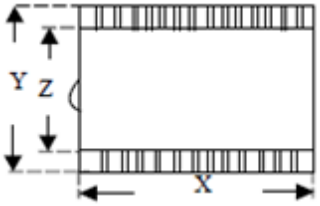
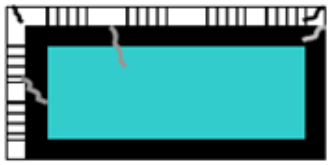
V.A: Viewing Area
A.A: Active Area



8.6 Items and Criteria

8.6.1 Visual inspection criterion in cosmetic

(1) Glass Defect

Glass Defect			
No	Defect	Criteria	Remark
1	Dimension (Minor)	By engineering diagram	
2	Cracks (Major)	Extensive crack	

(2) FPC

No	Defect	Criteria	Remark
1	Copper peeling (Minor)	Copper peeling [Reject]	

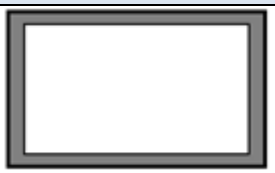
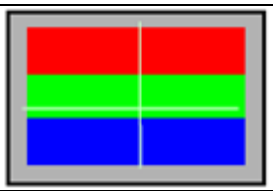
(3) Black Tape

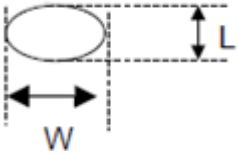
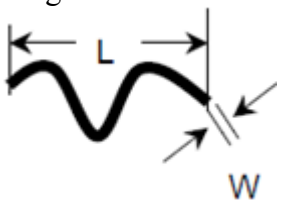
No	Defect	Criteria	Remark
1	Shift (Minor)	IC exposed [Reject]	
2	No black tape (Minor)	No black tape [Reject]	

(4) Silicon

No	Defect	Criteria	Remark
1	Amount of silicon (Minor)	ITO exposed [Reject]	

8.6.2 Visual inspection criterion in electrical display

No	Defect	Criteria		Remark
1	No display (Minor)	Not allowed		
2	Missing line (Minor)	Not allowed		
3	Darker or lighter line (Major)	Not allowed		
4	Weak line (Minor)	By limited sample		
5	Bright/Dark point (Minor)	Spec	Permissible Q'ty	1:1 sub-pixel:1R or 1G or 1B 2:Point defect area≥1/2 sub pixel
		Bright point	1	
		Dark point	2	
6	Round type	Spec	Permissible Q'ty	1.Φ=(L+W), L:Length,

	(Minor)	Φ ≤0.10mm	Disregard	W:Width 2. Disregard if out of A.A 
		0.10mm< Φ ≤0.20mm	3	
		0.20mm<Φ	0	
7	Line type (Minor)	Spec	Permissible Q'ty	1. L:Length, W:Width 2. Disregard if out of A/A 
		W≤0.03mm	Disregard	
		L≤3.0mm and 0.03mm<W≤0.05mm	2	
		L≤3.0mm and 0.05mm<W≤0.10mm	1	
		W>0.10mm or L> 3.0mm	0	
8	Mura (Minor)	By 5% ND filter invisible		

8.6.3 Others

1. Issues that are not defined in this document shall be discussed and agreed with both parties. (Customer and supplier)
2. Unless otherwise agreed upon in writing, the criteria shall be applied to both parties. (Customer and supplier)

9. Precautions for Use:

9.1 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.

9.2 Storage Conditions

(1) Store the panel or module in a dark place where the temperature is 23±5°C and the humidity is below 50±20%RH.
(2) Store in anti-static electricity container.
(3) Store in clean environment, free from dust, active gas, and solvent.
(4) Do not place the module near organics solvents or corrosive gases.
(5) Do not crush, shake, or jolt the module.
(6) Do not exposed to direct sun light of fluorescent lamps.

9.3 Installing LCD Module

Attend to the following items when installing the LCM.
(1) Cover the surface with a transparent protective plate or touch panel to protect the polarizer and LC cell.
(2) When assembling the LCM into other equipment, the spacer to the bit between the LCM and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements. The measurement tolerance should be ±0.1mm.

9.4 Precautions For Operation

(1) Viewing angle varies with the change of liquid crystal driving voltage (Vo). Adjust Vo to show the best contrast.
(2) Driving the LCD in the voltage above the limit will shorten its lifetime.
(3) Response time is greatly delayed at temperature below the operating temperature range. However, this does not mean the LCD will be out of the order. It will recover when it returns to the specified temperature range.
(4) When turning the power on, input each signal after the positive/negative voltage becomes stable.
(5) Do not apply water or any liquid on product which composed of T/P.

9.5 Handling Precautions

(1) Avoid static electricity which can damage the CMOS LSI; please wear the wrist strap when

handling.
(2) The polarizing plate of the display is very fragile. so, please handle it very carefully.
(3) Do not give external shock.
(4) Do not apply excessive force on the surface; it may cause display abnormal .
(5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
(6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
(7) Do not operate it above the absolute maximum rating.
(8) Do not remove the panel or frame from the module.
(9) Do not apply water or any liquid on product, which composed of T/P.

9.6 Warranty

(1) The period is within 12 months since the date of shipping out under normal using and storage conditions.
(2) The warranty will be avoided in case of defect induced by customer.