ILLUMINANT北極光企業有限公司

PRODUCT SPECIFICATION FOR TFT LCM

CUSTOMER:	
MODEL NO:	IG-B120601-6YFLYB
ACCEPTED BY:	

APPROVED BY:	CHECKED BY:	ORGANIZED BY:
北极光 2009.05.11 贺秋芳	北极光 2009.05.11. 隆茂生	北极光 2009.05.11. 隆茂生

☐ Approval for Specifications Only
■ Approval for Specifications and Sample

Note: 1. Version of Specifications : 1
2. Others: Rohs Compliment

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RECORDS OF REVISION

DATE	REVISED NO.	REVISED DESCRIPTIONS	PREPARED	CHECKED	APPROVED
2009.05.11	01	FIRST ISSUE			
2009.05.12	02	LED VOLTAGE CHANGED FROM 2.1V TO 5.0V			
2009.06.12	03	LED VOLTAGE CHANGED FROM 5.0V TO 4.3V			

3. GENERAL SPECIFICATIONS :

3-1 SCOPE :
This specification covers the delivery requirements for the liquid crystal display delivered by ILLUMINANT to Customer.

3-2 PRODUCTS :
Liquid Crystal Display Module (LCM)

3-3 MODULE NAME
IG-B120601-6YFLYB

4. FEATURES :

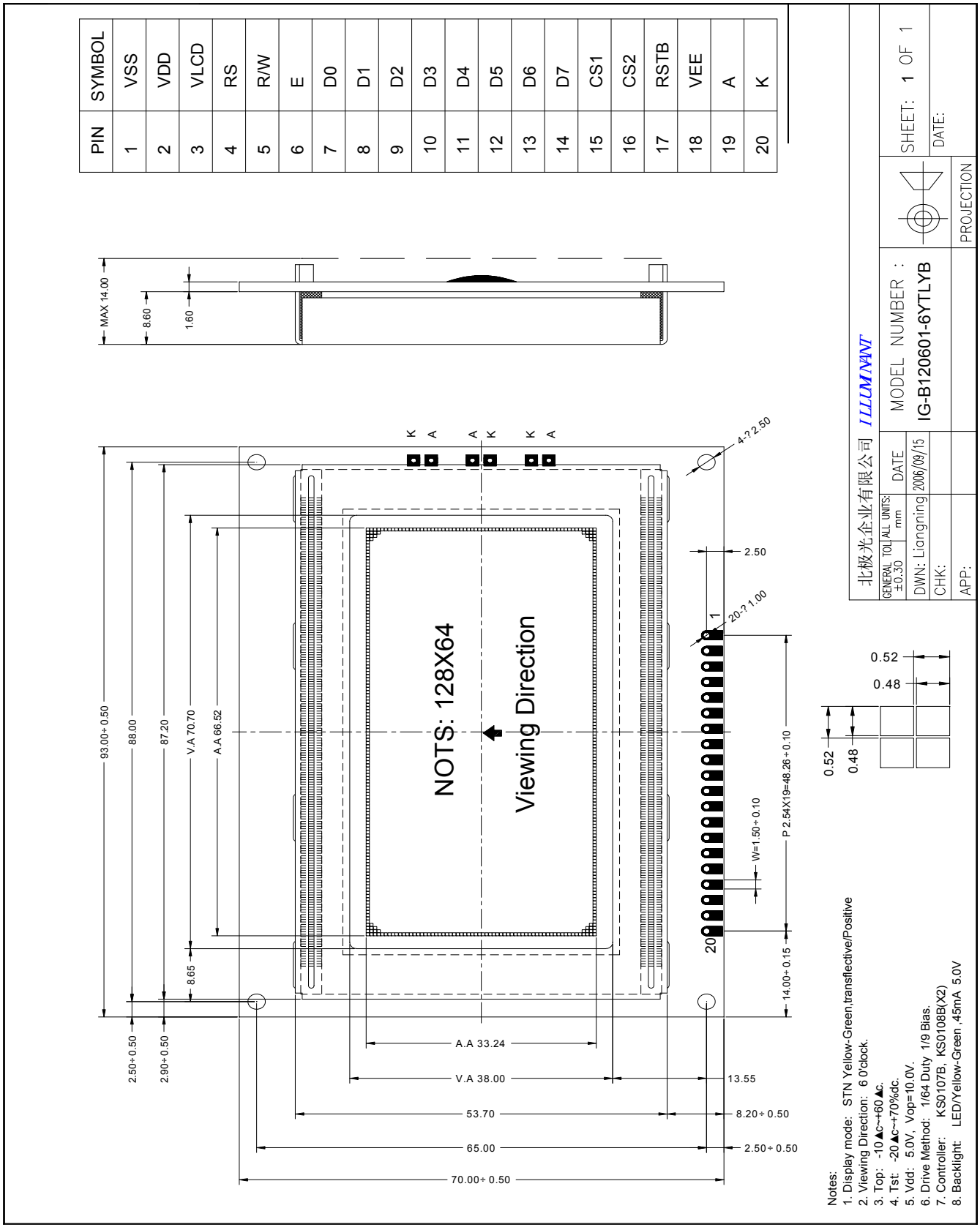
(1) Display Type : STN Yellow-Green, 6 O'clock, Transflective/Positive
(2) Driving Method : 1/64 duty, 1/9 bias
(3) Built-in Controller : KS0108B(X2), KS0107B
(4) LED Backlight : LED/Yellow-Green, 4.3V
(5) VDD : 5.0V VOP : 10V

5. MECHANICAL SPECIFICATIONS :

ITEM	SPECIFICATIONS	UNIT
MODULE SIZE	93.00(W)X70.00(H)X14.00MAX(D)	mm
VIEWING AREA	70.70(W)X38.00(H)	mm
ACTIVE AREA	66.52(W)X33.24(H)	mm
DOT SIZE	0.48(W)X0.48(H)	mm
DOT PITCH	0.52(W)X0.52(H)	mm
BACKLIGHT	Yellow-Green	--
ASSY.TYPE	COB	--
WEIGHT	TBD	--

NOTES :
LCM should be grounded during handling LCM.

6. OUTLINE DIMENSIONS :



7. ABSOLUTE MAXIMUM RATINGS :

CHARACTERISTICS	SYMBOL	STANDARD VAULE			UNIT
		MIN	TYP	MAX	
Power Supply Voltage(1)	VDD	-0.3	5.0	+7.0	V
Power Supply Voltage(2)	LCD	--	10	--	V
Operating Temperature	TOPR	-10	--	+60	℃
Storage Temperature	TSTG	-20	--	+70	℃
Input Voltage	VIN	-0.3	--	VDD+0.3	V

8. ELECTRICAL CHARACTERISTICS (VDD=2.7~5.5V)

S6B0107 :

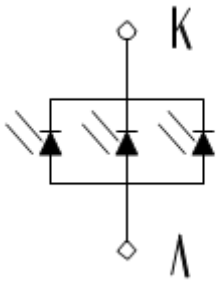
CHARACTERISTIC		SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	NOTE
Input	High	V_{IH}	--	0.7VDD	--	VDD	V	(1)
Voltage	Low	V_{IL}		VSS	--	0.3VDD		
Output	High	V_{OH}	I_{OH}=-0.4mA	VDD-0.4	--	--	V	(2)
Voltage	Low	V_{OL}	I_{OL}=0.4mA	--	--	0.4		
Input Leakage Current		I_{LKG}	$V_{IN}=V_{DD}-V_{SS}$	-1.0	--	1.0	μA	(1)
OSC Frequency		f_{OSC}	Rf=47kΩ±2% Cf=20pf±5%	315	450	585	kHz	
On Resistance (VDIV-CI)		R_{ON}	VDD-VEE=17V Load current=±150mA	--	--	1.5	KΩ	
Operating Current		I_{DD1}	Master mode 1/128 duty	--	--	1.0	mA	(3)
		I_{DD2}	Slave model 1/128 duty	--	--	200	mA	(4)
Supply Current		I_{EE}	Master mode 1/128 duty	--	--	100		(5)
Operating		f_{op1}	Master mode External clock	50	--	600	kHz	
Frequency		f_{op2}	Slave mode	0.5	--	1500		

S6B0108 :

CHARACTERISTIC	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	NOTE
Input High Voltage	V_{IH1}	--	$0.7V_{DD}$	--	V_{DD}	V	(1)
	V_{IH2}	--	2.0	--	V_{DD}	V	(2)
Input Low Voltage	V_{IL1}	--	0	--	$0.3V_{DD}$	V	(1)
	V_{IL2}	--	0	--	0.8	V	(2)
Output High Voltage	V_{OH}	I_{OH}=-200μA	2.4	--	--	V	(3)
Output Low Voltage	V_{OL}	I_{OL}=1.6㎃	--	--	0.4	V	(3)
Input Leakage Current	I_{LKG}	$V_{IN}=V_{SS}$-V_{DD}	-1.0	--	1.0	μA	(4)
Three-state(off) Input Current	I_{TSL}	$V_{IN}=V_{SS}$-V_{DD}	-5.0	--	5.0	μA	(5)
Driver Input Leakage Current	I_{DIL}	$V_{IN}=V_{EE}$-V_{DD}	-2.0	--	2.0	μA	(6)
Operating Current	I_{DD1}	During Display	--	--	100	μA	(7)
	I_{DD2}	During Access Access Cycle =1㎒	--	--	500	μA	(7)
On Resistance	R_{ON}	V_{DD}-V_{EE}=15V I_{LOAD}=±0.1㎃	--	--	7.5	kΩ	(8)

9. LED BACKLIGHT:

9-1 POWER SUPPLY FOR LED BACKLIGHT

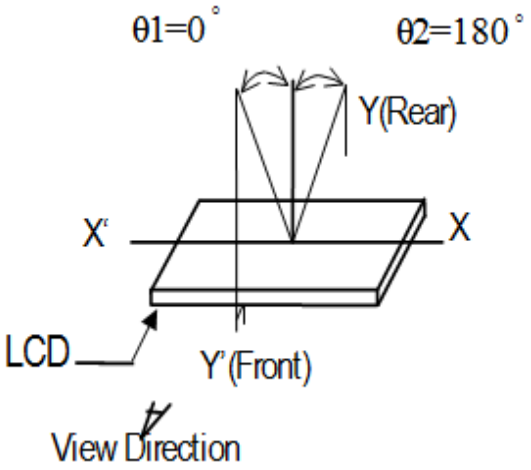


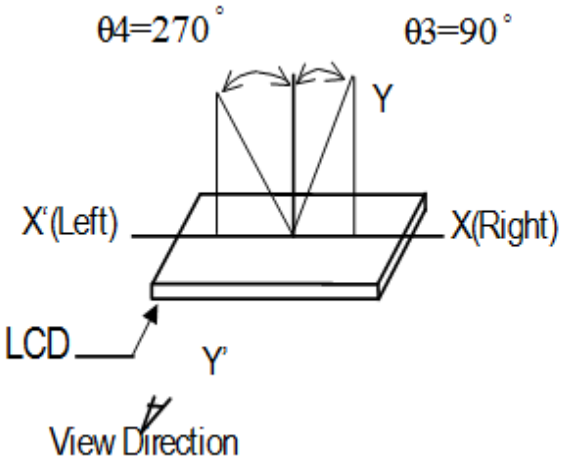
9-2 ELECTRICAL-OPTICAL CHARACTERISTICS
(Ta=25℃, Unless specified, the ambient temperature Ta=25℃)

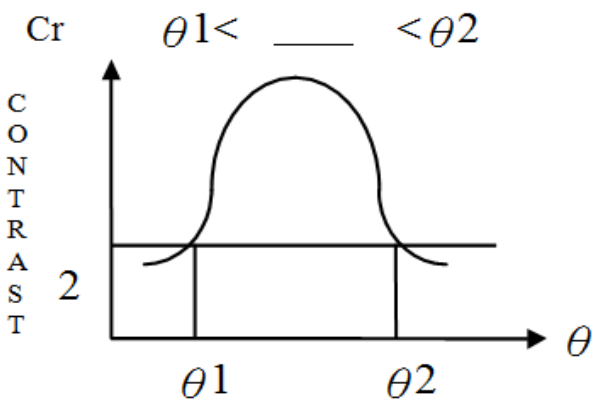
ITEM	SYMBOL	CONDITIONS	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
Forward Voltage	Vf	If=45mA	-	4.3	-	V
Reverse Current	Ir	Vr=5.0V	-	45	-	μA
Spectral Line Half Width	△λ	If=45mA T=25℃	-	-	-	nm
Peak Wavelength	λp		-	-	-	nm
Luminance	Lv	If=45mA	-	-	-	Cd/m^2
Uniformity	△	MIN/MAX=100%	-	-	75%	%

10. OPTICAL CHARACTERISTICS :

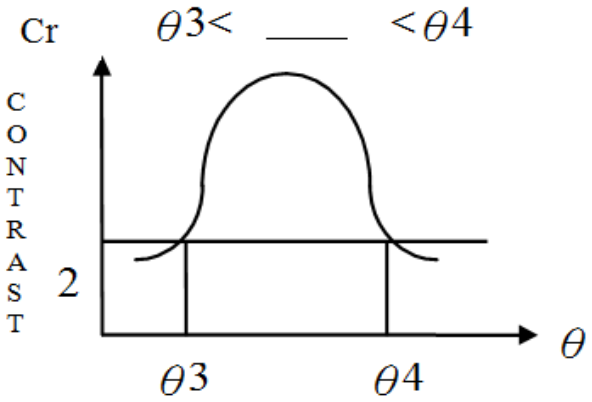
10-1 DEFINITION OF VIEWING ANGLE







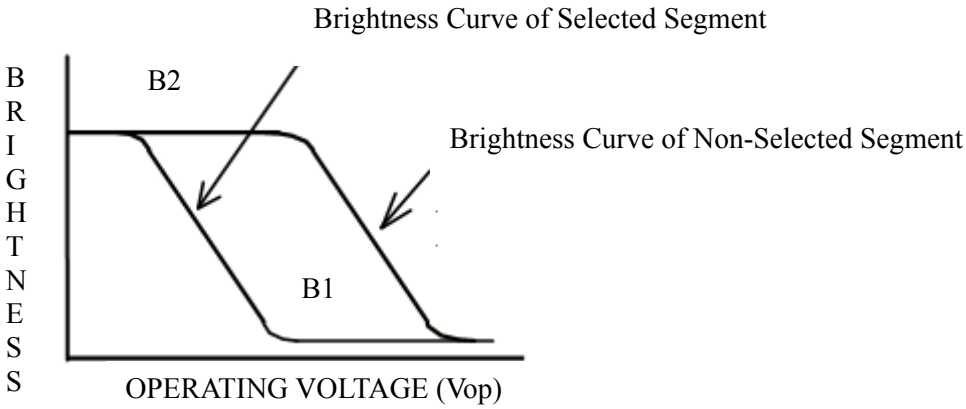
Front-Rear Viewing Angle



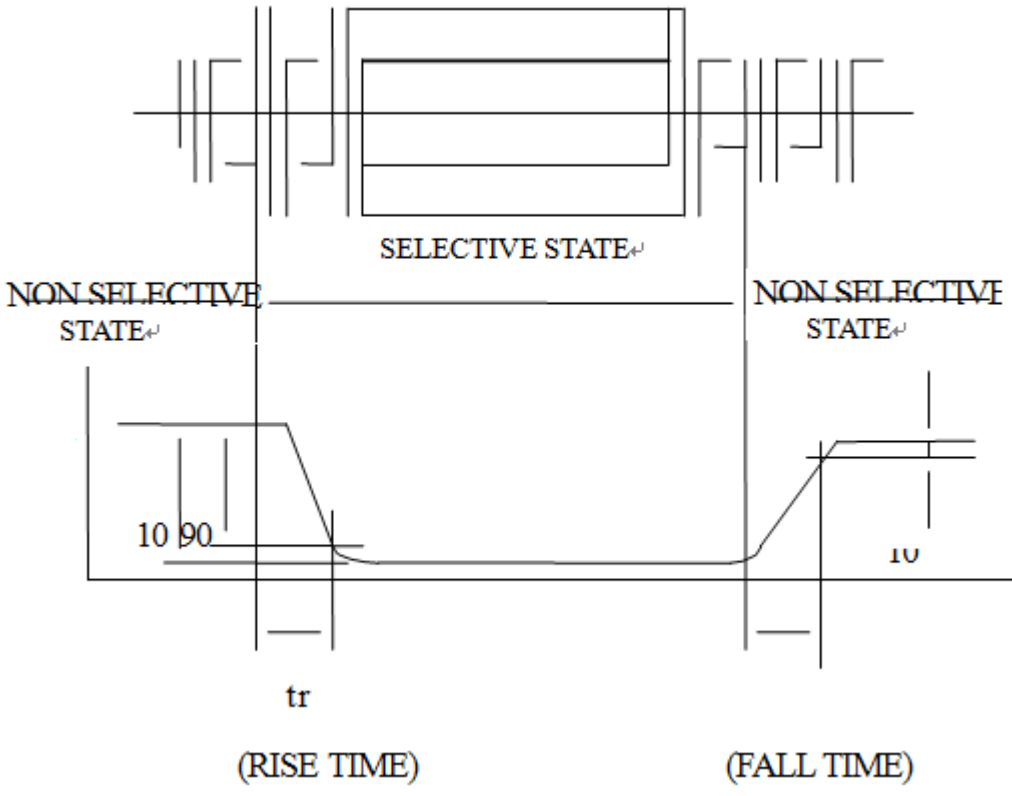
Right-Left Viewing Angle

10-2 DEFINITION OF CONTRAST RATIO

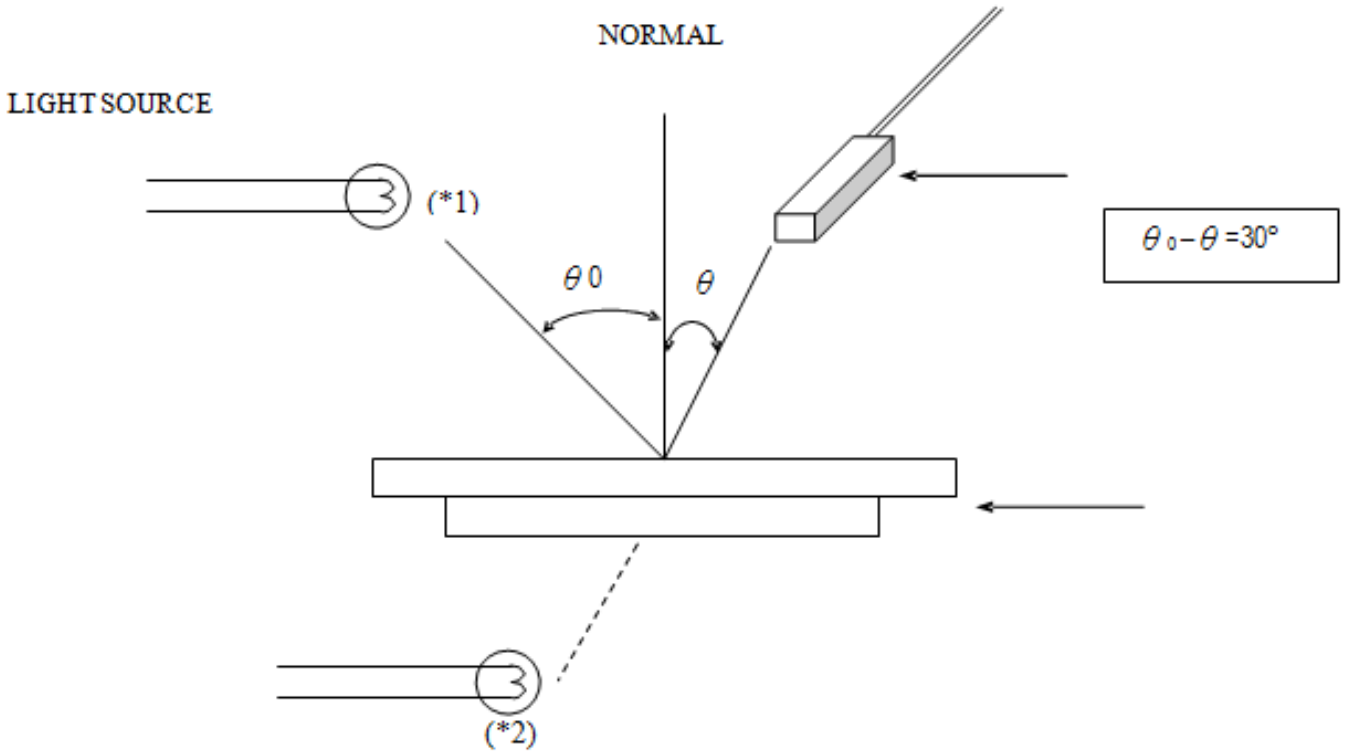
$$CR = \frac{\text{Brightness of Non-selected Segment (B2)}}{\text{Brightness of Selected Segment (B1)}}$$



10-3 DEFINITION OF RESPONSE TIME



10-4 DEFINITION OF RESPONSE TIME



*1. Light source position for measuring the reflective type of LCD panel.
*2. Light source position for measuring the transflective / transmissive types of LCD panel.

11. TIMING CHARACTERISTICS (V_{DD}=5.0V)

11-1 CLOCK TIMING

CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT
CLK1,CLK2 Cycle Time	t_{CY}	2.5	-	20	μS
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	

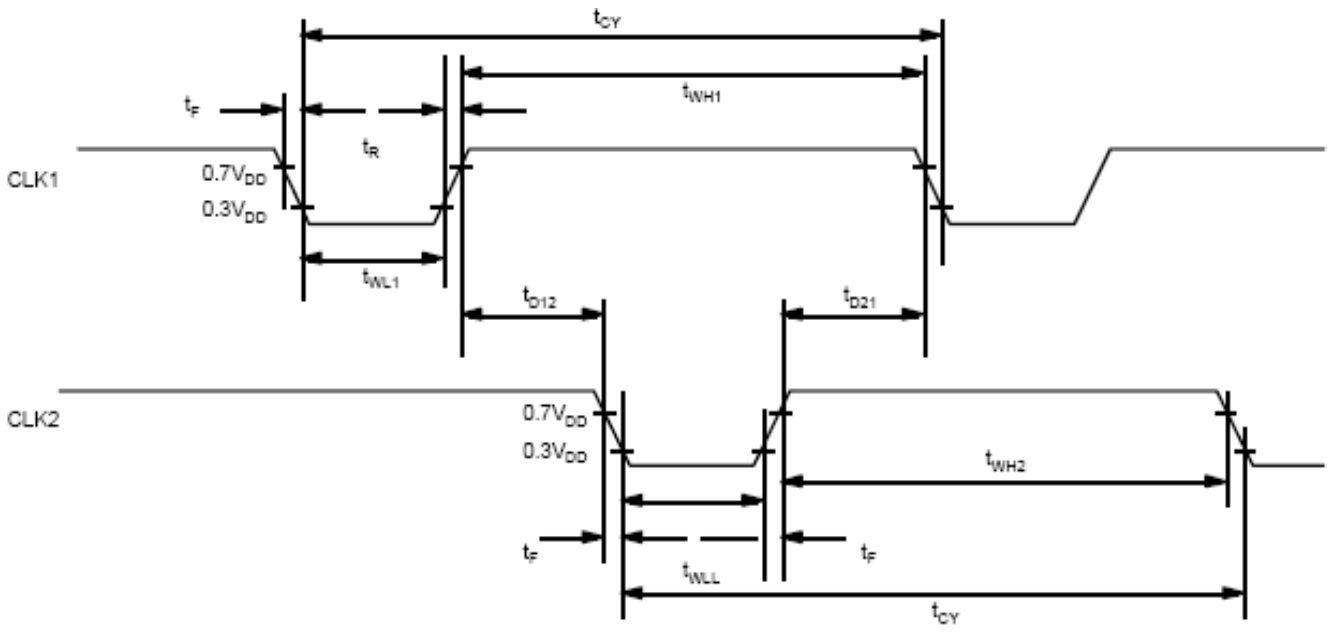


Fig 1. External clock waveform

11-2 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

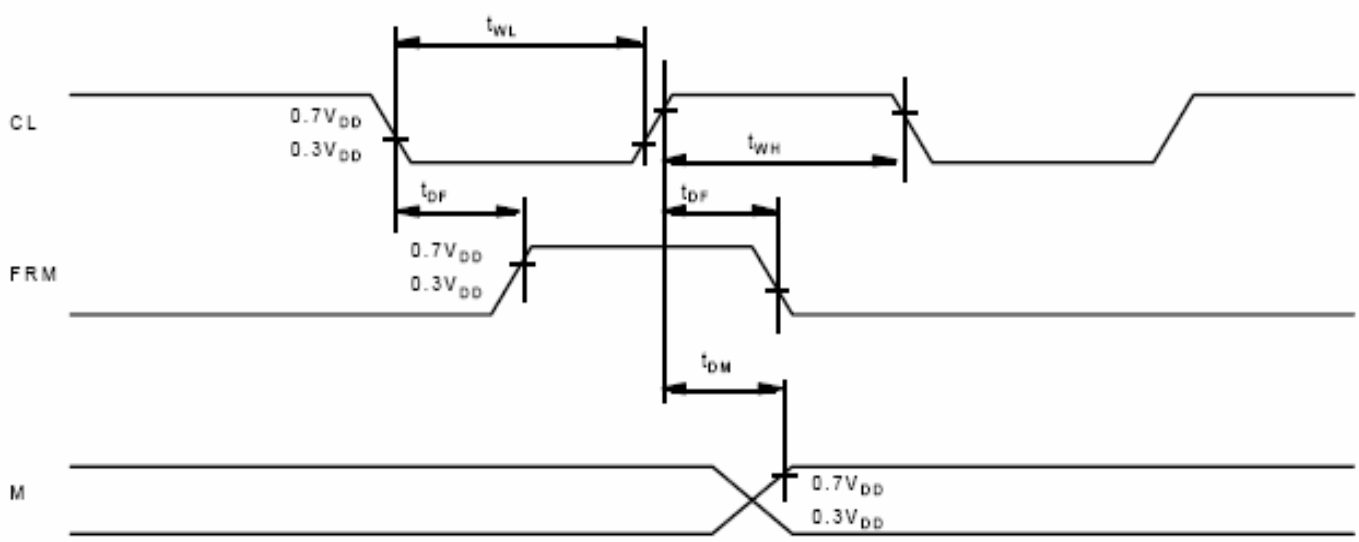


Fig 2. Display control signal waveform

11-3 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

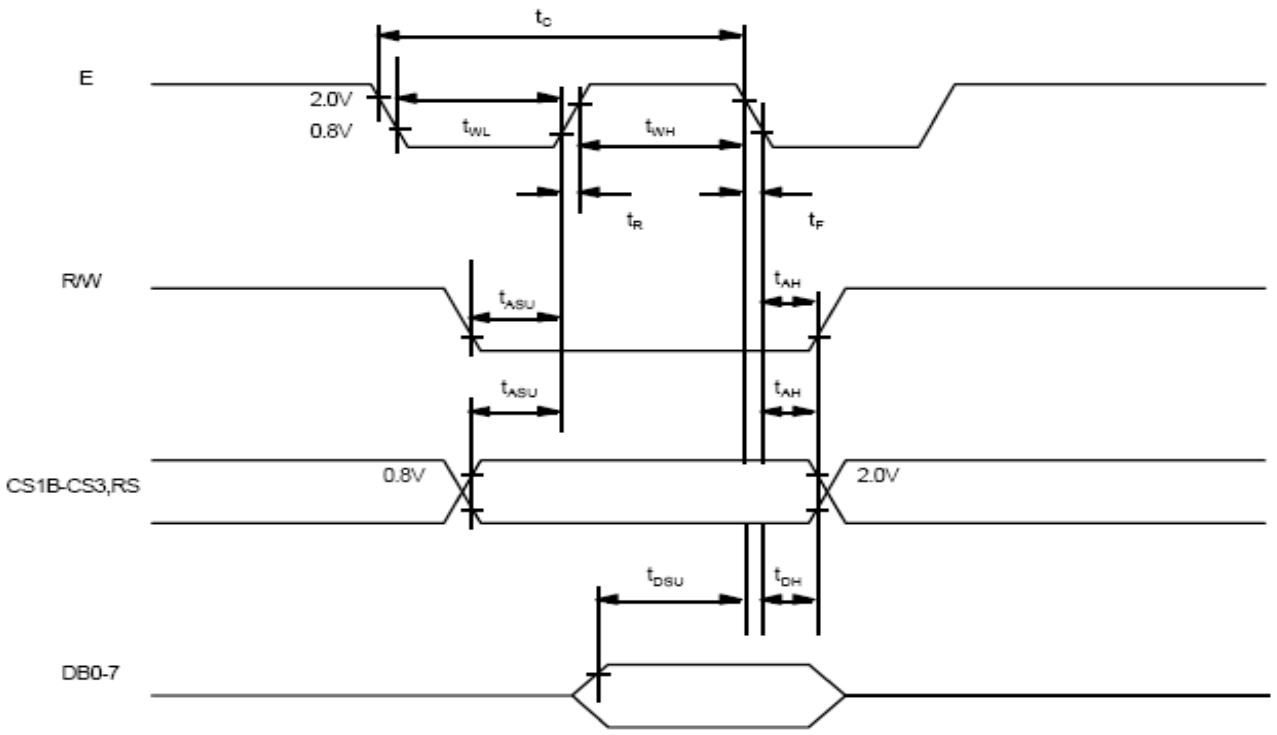


Fig 3. MPU write timing

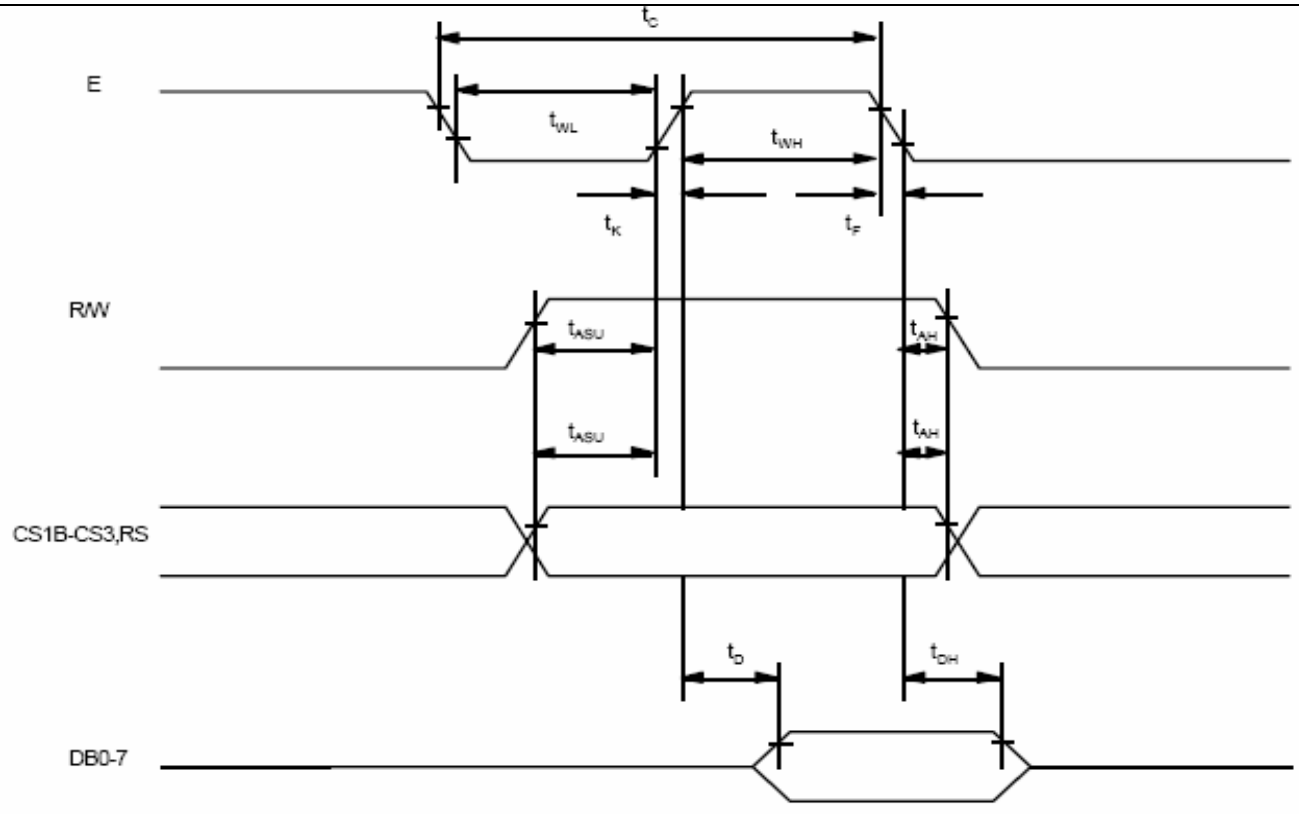


Fig 3. MPU write timing

12. PIN ASSIGNMENT

PIN NO.	FUNCTION DESCRIPTION	SYMBOL
1	Ground	VSS
2	Supply Voltage for Logical Circuit	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	RW
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

13. ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	CONDITIONS	CRITERION
Operating Temperature	TOPR	-10℃~+60℃	No defect in displaying and operational function
Storage Temperature	TSTG	-20℃~+70℃	No defect in displaying and operational function

14. RELIABILITY

ITEM	CONDITIONS	CRITERION
Operating Temperature	High Temperature +60℃ 96hrs	No defect in displaying and operational function
	Low Temperature -10℃ 96hrs	
Storage Temperature	High Temperature +70℃ 96hrs	No defect in displaying and operational function
	Low Temperature -20℃ 96hrs	
Humidity	40℃ 90%RH 96hrs	No defect in displaying and operational function
Vibration	*Operating time : thirty minutes exposure for each direction(X,Y,Z) * Sweep frequency : 10~55Hz(1min) * Amplitude : 1.5mm	No defect in displaying and operational function
Thermal Shock	-20℃(30mins) ⟷ +70℃(30mins) 10 cycles	No defect in displaying and operational function

*NOTE : TEST CONDITION
(1) TEMPERATURE AND HUMIDITY: IF NO SPECIFICATION, TEMP, SET AT 25±2℃, HUMIDITY SET AT 60±5%RH
(2) OPERATING STATE : SAMPLES SUBJECT TO THE TESTS SHALL BE IN OPERATING CONDITION

15. PRECAUTION FOR USE

The following precaution should be followed, since this module contains precise parts.

(1) Do not store module for an extended periods of time under the conditions of high temperature and high humidity.
(2) Avoid using or storing the module in areas that expose it to direct sunlight or ultraviolet rays.
(3) Use protective finger covers when handling the module to avoid scratching or staining the module.
(4) Care should be taken not to expose the module to static electricity, because the module contains C-MOS LSI's.
(5) The LSI is sensitive to light. The user's product should be designed so that LSI is not exposed to any light during operation.
(6) During installation, cover the display area with acrylic protection plates to protect the polarizer plate and LCD cells.
(7) Do not apply any excessive shocks to the module because the module contains sensitive LCD cells. Do not use a module, which has experienced strong mechanical shock.
(8) Care should be taken when the power supply turns on as following.
   (a) Do not apply any input signals before the supplying voltage is applied.
   (b) Do not turn off the power supply while any input signals are applied.

CAUTION

(1) Dangerous. Do not shock glass because glass can break.
(2) If module breaks, do not touch it directly.
(Glass could stick or cut skin)
(3) Do not swallow Liquid Crystal.
(In case of broken LCD panel, do not swallow liquid crystal even if there is no proof that liquid crystal is poisonous)
(4) If liquid crystal is exposed to skin, wash the area thoroughly with alcohol or soap.
(5) When disposing of the product, please observe industrial waste disposal laws in each country and district.
(6) In case of injury, give immediate treatment and consult with a doctor.
(7) This product is constructed precisely. Don't disassemble or modify.

※ Neglecting this mark can cause injury to humans and damage to materials.