ILLUMINANT 北極光企業有限公司

PRODUCT SPECIFICATION FOR LCM

CUSTOMER:	
MODEL NO:	IG-B240601-6YFLYA
ACCEPTED BY:	

APPROVED BY:	CHECKED BY:	ORGANIZED BY:
北极光 2008.01.19 贺秋芳	北极光 2008.01.19 隆茂生	北极光 2008.01.19 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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Version	Date	Contents
1	08/01/19	Initial Release

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-B240601-6YFLYA

4. FEATURES :

(1) Display Type	: 240x64 Dots
(2) LCD Type	: STN Yellow-Green, Transflective, Negative
(3) Driving Method	: 1/240 Duty, 1/9 Bias
(4) Driver IC	: T6963C
(5) Viewing Direction	: 6 O'clock
(6) Interface	: 4BIT or 8BIT

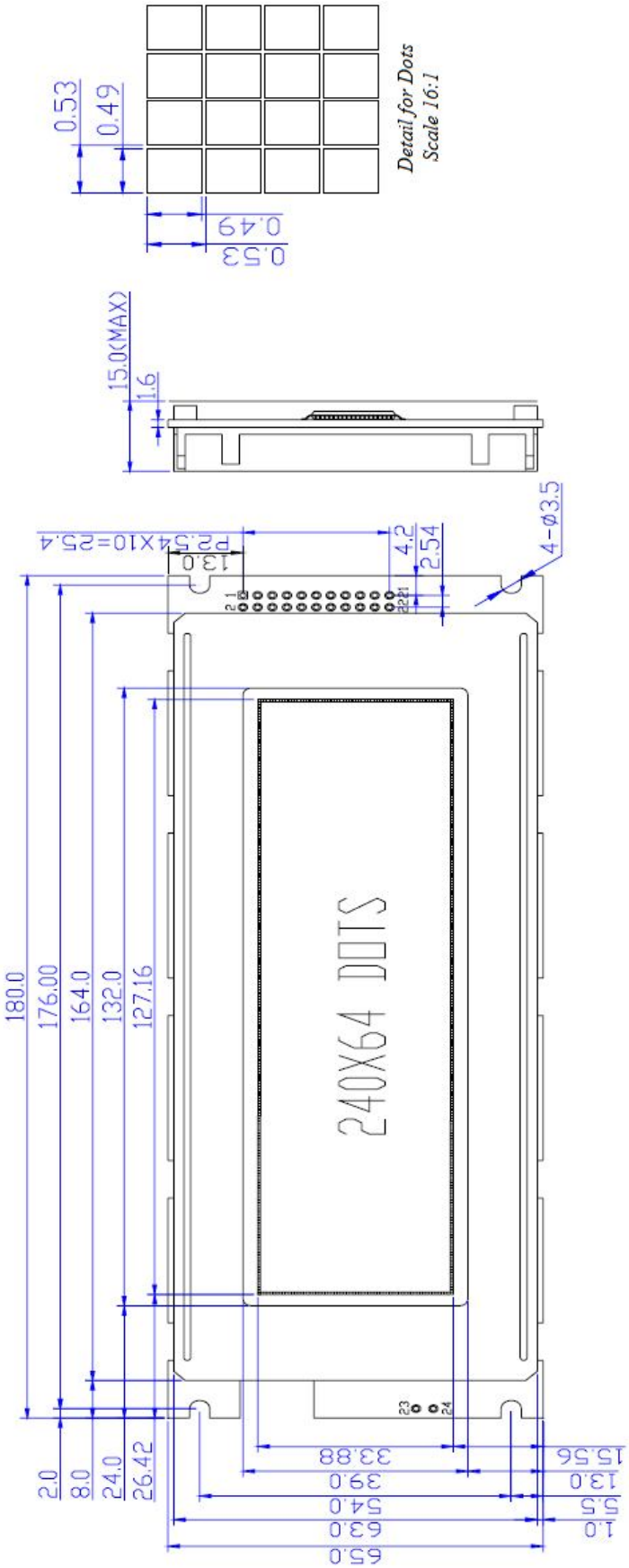
5. MECHANICAL SPECIFICATIONS :

ITEM	SPECIFICATIONS	UNIT
MODULE SIZE	180.00(W)X65.00 (H)X15.00MAX(D)	mm
VIEWING AREA	132.00(W)X39.00(H)	mm
ACTIVE AREA	127.16(W)X33.88(H)	mm
BACKLIGHT	YELLOW-GREEN LED	--
ASSY.TYPE	COB	--
WEIGHT	TBD	--

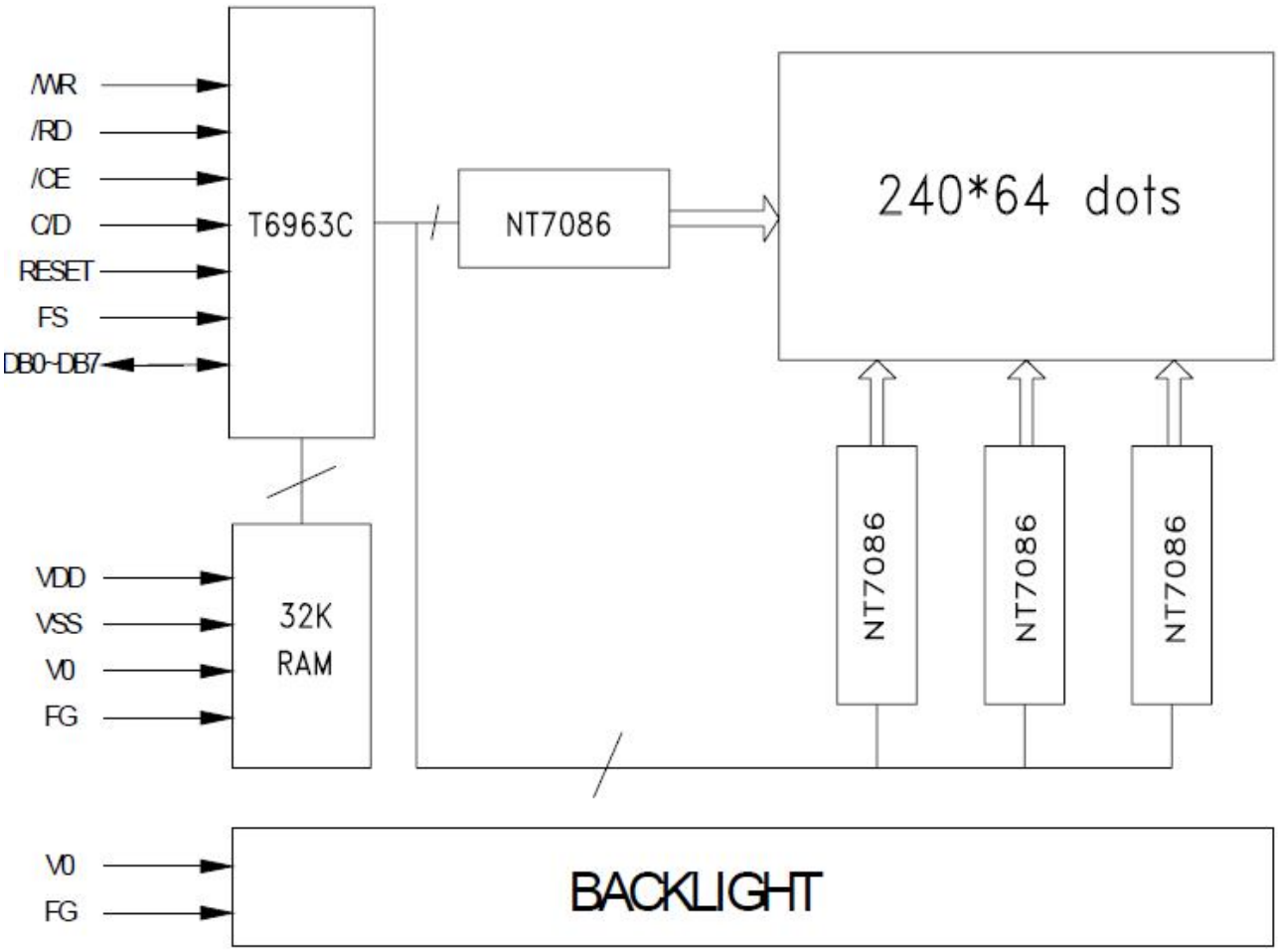
NOTES :

LCM should be grounded during handling LCM.

6. OUTLINE DIMENSIONS :



7. BLOCK DIAGRAM & APPLICATION CIRCUIT :



8. ABSOLUTE MAXIMUM RATINGS :

CHARACTERISTICS	SYMBOL	CONDITION	STANDARD VAULE			UNIT
			MIN	TYP	MAX	
Power Supply For Logic	V_{DD}	Ta=25℃	0	-	7.0	V
Power Supply For Driving	V_{LCD}	Ta=25℃	-		+18.0	
Input Voltage	V_{IN}	Ta=25℃	-0.3	-	VDD+0.3	V
Module Operating Temperature	T_{OPR}	---	-20	-	+70	℃
Module Storage Temperature	T_{STG}	---	-30	-	+80	℃
Storage Humidity	H_D	Ta<40℃	-		90	%RH

9. ELECTRICAL CHARACTERISTICS :

CHARACTERISTIC		SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage (Logic)		VDD-VSS	4.5	5.0	5.5	V
Supply Voltage (LCD)		VSS-VEE	-	12.8	-	V
Input Signal Voltage	“H” Level	VIN	VDD-2.2	-	VDD	V
	“L” Level	VIL	0	-	0.8	V
Supply Current (Logic)		IDD	-	24	-	mA
Supply Current (LCD)		IEE	-	2.0	-	mA
Backlight Voltage (BL)		Yellow-Green	-	4.2	-	V
Backlight Current (BL)		Yellow-Green	-	-	-	mA

10.INSTRUCTION CODE :

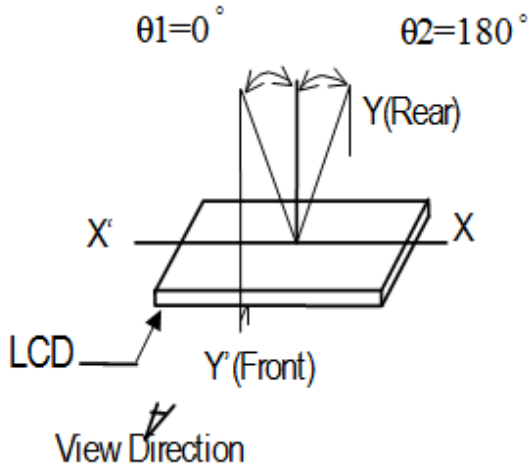
COMMAND	CODE	D1	D2	FUCTION
REGISTERS	00100001	X Address	Y Address	Set Cursor Pointer
	00100010	Data	00H	Set Offset Register
SETTING	00100100	Low Address	High Address	Set Address Pointer
	01000000	Low Address	High Address	Set Text Home Address
SET CONTROL	01000001	Columns	00H	Set Text Area
WORD	01000010	Low Address	High Address	Set Graphic Home Address
	01000011	Columns	00H	Set Graphic Area
	1000x000	-	-	OR Mode
	1000x001	-	-	EXOR Mode
MODE SET	1000x011	-	-	AND Mode
	1000x100	-	-	Text Attribute Mode
	10000xxx	-	-	Internal CG ROM Mode
	10001xxx	-	-	External CG RAM Mode
	10010000	-	-	Display Off
	1001xx11	-	-	Cursor On, Blink Off
DISPLAY	1001xx11	-	-	Cursor On, Blink On
MODE	100101xx	-	-	Text On, Graphic Off
	100110xx	-	-	Text Off, Graphic On
	100111xx	-	-	Text On, Graphic On
	10100000	-	-	1-Line Cursor
	10100001	-	-	2-Line Cursor
	10100010	-	-	3-Line Cursor
CURSOR	10100011	-	-	4-Line Cursor
PATTERN	10100100	-	-	5-Line Cursor
ELECT	10100101	-	-	6-Line Cursor
	10100110	-	-	7-Line Cursor
	10100111	-	-	8-Line Cursor
DATA AUTO	10110000	-	-	Set Data Auto Write
	10110001	-	-	Set Data Auto Read
READ/WRITE	10110010	-	-	Auto Reset
	11000000	-	-	Data Write and Increment
	11000001	-	-	Data Read and Increment
DATA	11000010	-	-	Data Write and Decrement
READ/WRITE	11000011	-	-	Data Read and Decrement
	11000100	-	-	Data Write and Non Variable
	11000101	-	-	Data Read and Non Variable
SCREEN PEEK	11100000	-	-	Screen Peek
SCREEN COPY	11101000	-	-	Screen Copy
	11110xxx	-	-	Bit Reset
	11111xxx	-	-	Bit Set
	1111x000	-	-	Bit0 (LSB)
	1111x001	-	-	Bit1
BIT SET/RESET	1111x010	-	-	Bit2
	1111x011	-	-	Bit3
	1111x100	-	-	Bit4
	1111x101	-	-	Bit5
	1111x110	-	-	Bit6
	1111x111	-	-	Bit7 (MSB)

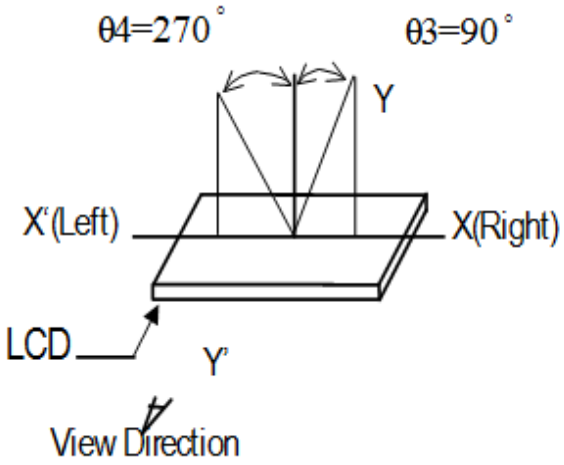
11.OPTICAL CHARACTERISTICS :

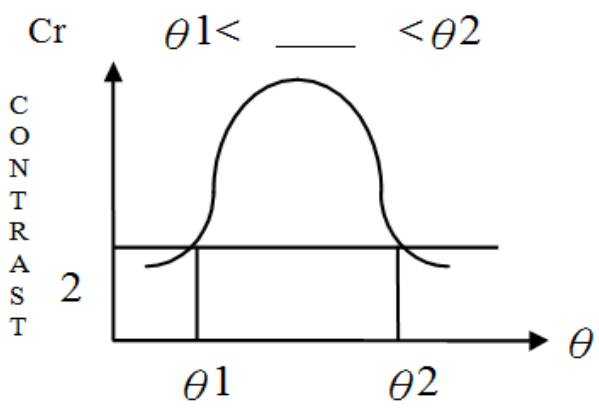
Ta=25℃

ITEM		SYMBOL	CONDITIONS		STANDARD VALUE MIN	STANDARD VALUE TYP	STANDARD VALUE MAX	UNIT
Viewing Angle		Θx	Cr>3	Θy=0	-20	-------	20	deg
		Θy		Θx=0	-25	-------	25	deg
Contrast Ratio		Cr	Θx=0° Θy=15°		3			
Response Time	Turn on	Ton	Θx=0°				200	ms
	Turn off	Toff	Θy=0°				360	ms

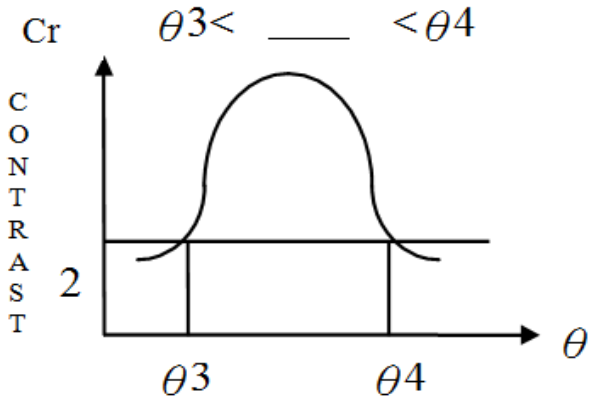
11-1 DEFINITION OF VIEWING ANGLE







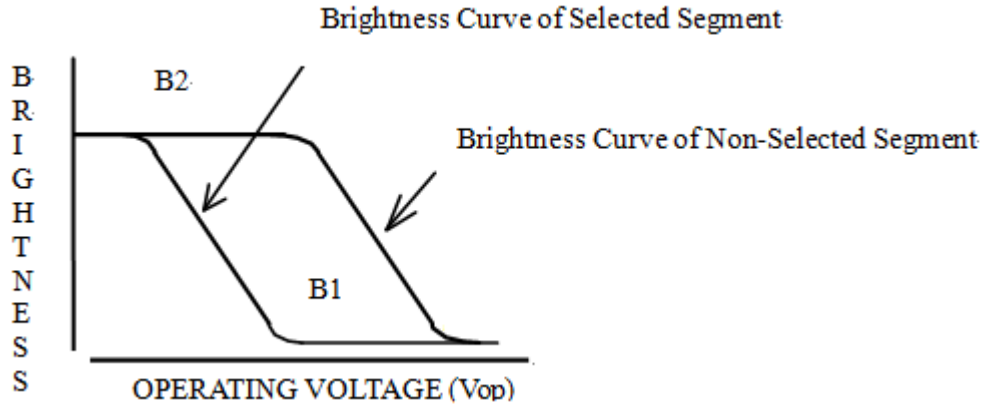
Front-Rear Viewing Angle



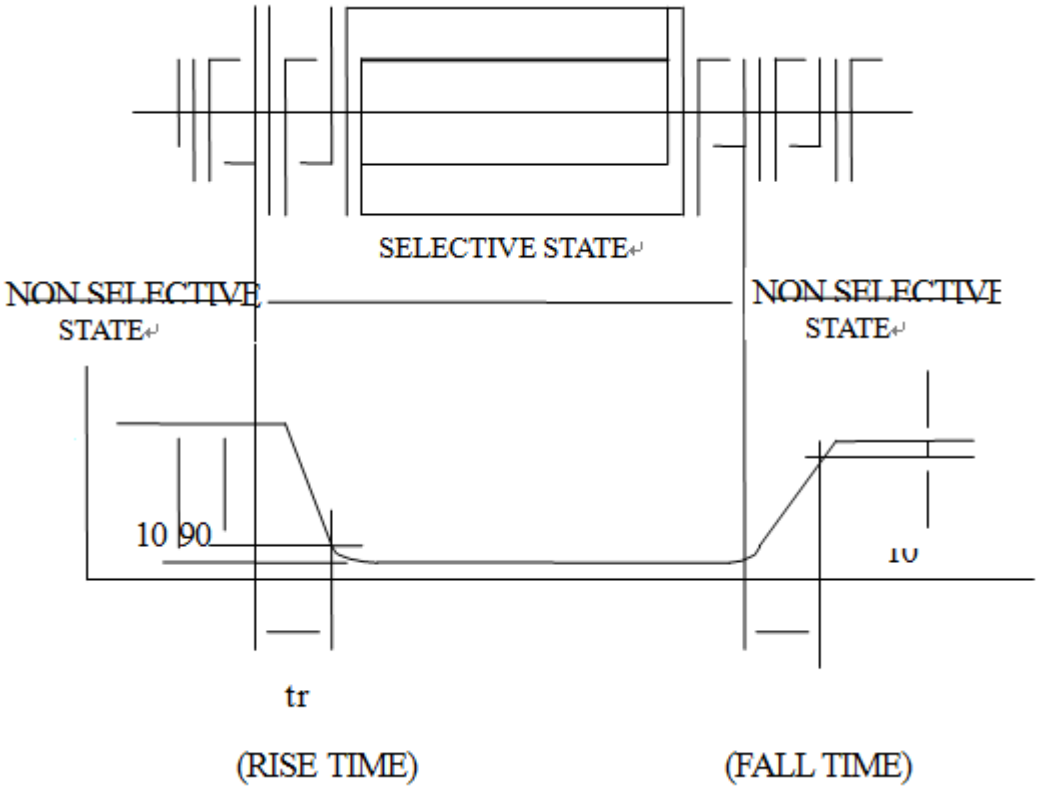
Right-Left Viewing Angle

11-2 DEFINITION OF CONTRAST RATIO

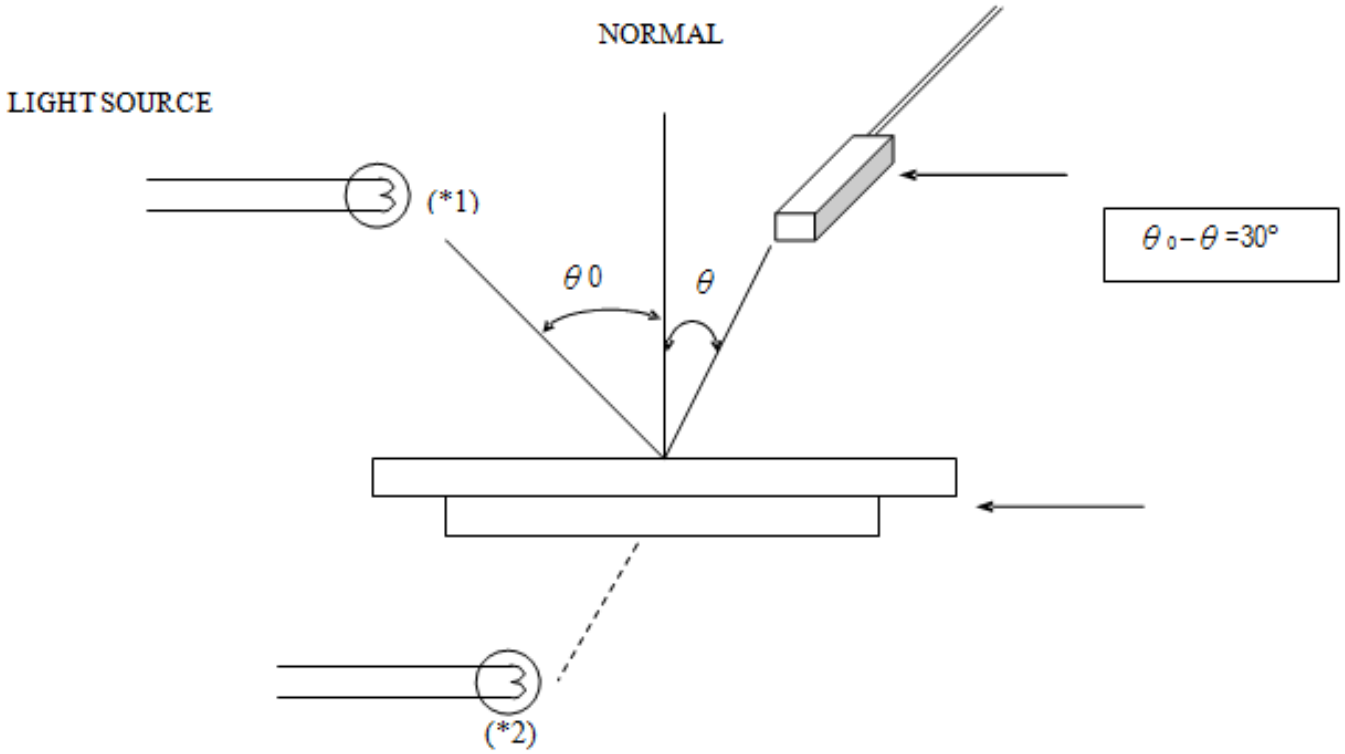
$$CR = \frac{\text{Brightness of Non-selected Segment (B2)}}{\text{Brightness of Selected Segment (B1)}}$$



11-3 DEFINITION OF RESPONSE TIME



11-4 DEFINITION OF RESPONSE TIME

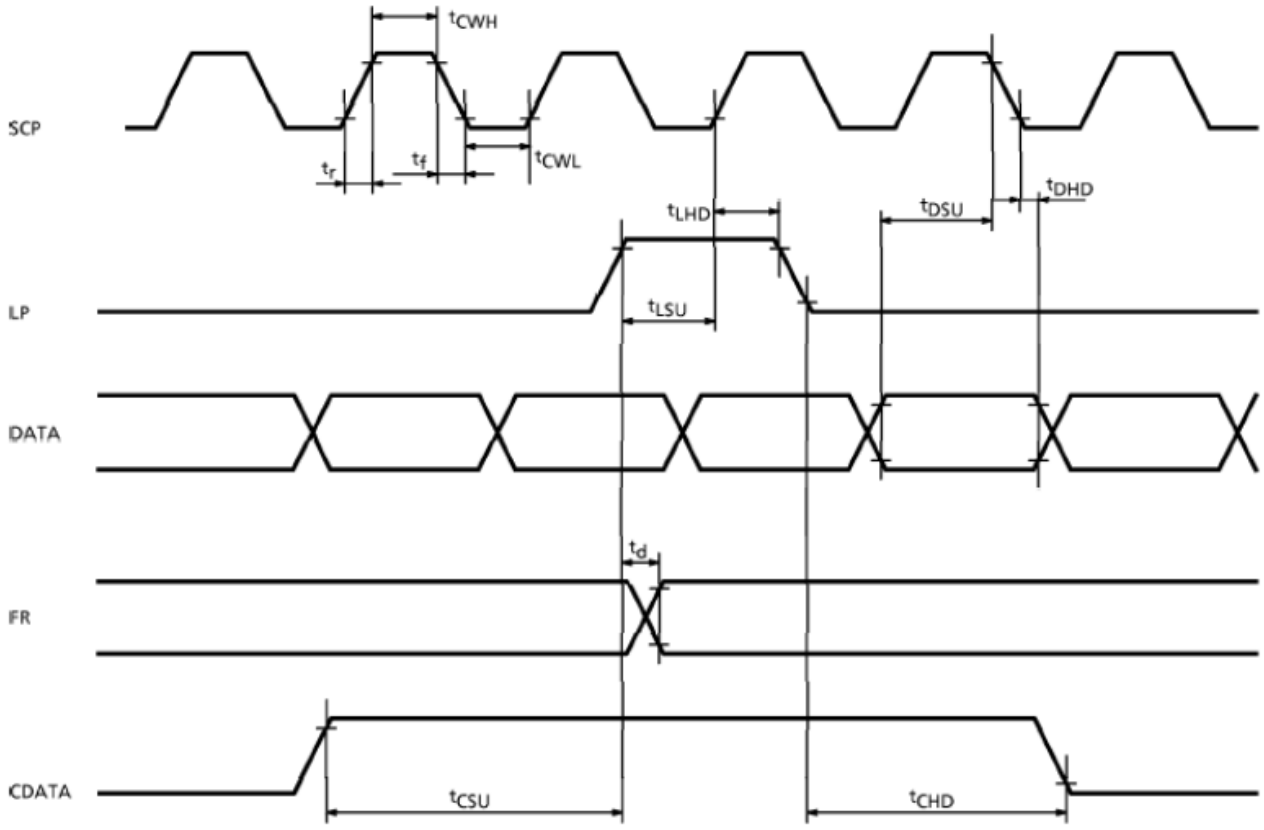


*1. Light source position for measuring the reflective type of LCD panel.

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

12. AC CHARACTERISTICS :

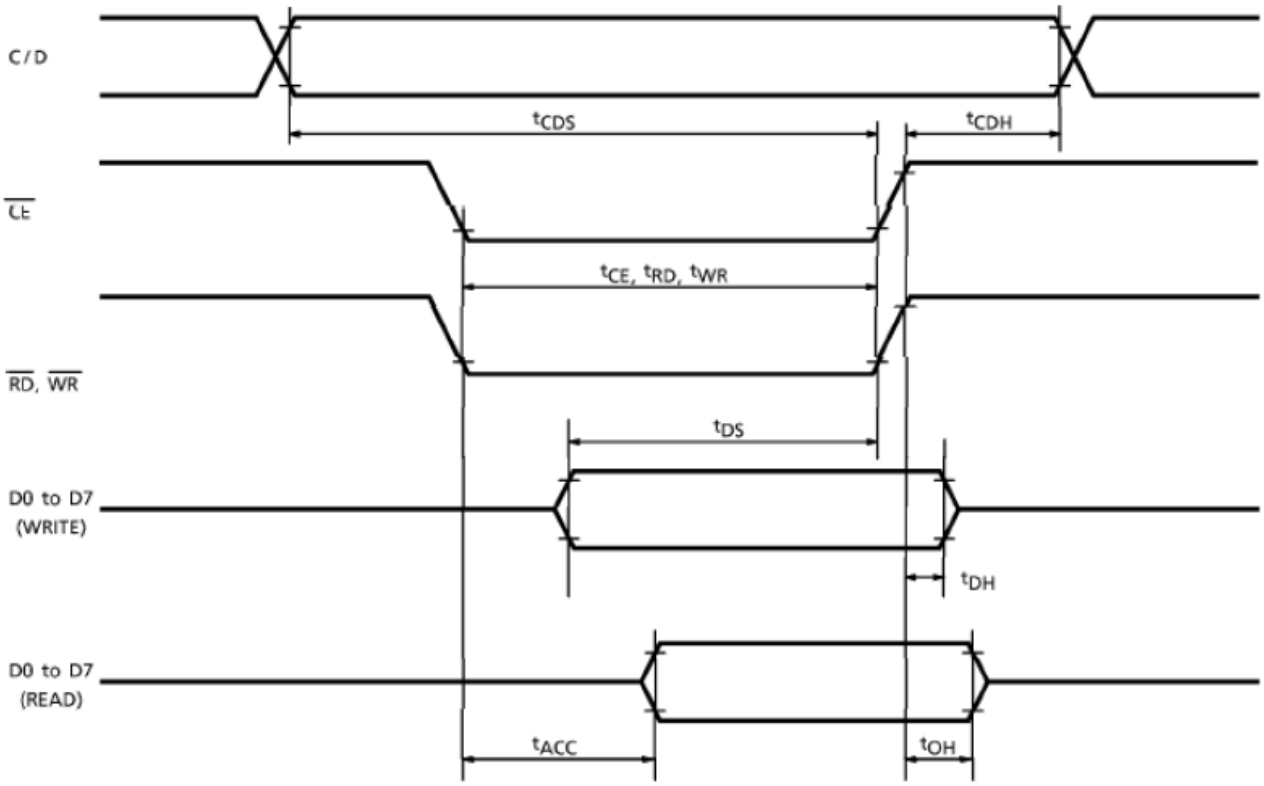
12-1 Switching Characteristics



Test Conditions (Unless otherwise noted, V_{DD}=5.0V±10%, V_{SS}=0V, Ta=-20 to 70℃)

ITEM	SYMBOL	TEST CONDITION	MIN	MAX	UNIT
Operating Frequency	f_{scp}	Ta=-10~70℃	-	2.75	MHz
SCP Pulse Width	t_{CWH}, t_{CWL}	-	150	-	ns
SCP Rise/Fall Time	t_r, t_f	-	-	30	ns
LP Set-up Time	t_{LSU}	-	150	290	ns
LP Hold Time	t_{LHD}	-	5	40	ns
Data Set-up Time	t_{DSU}	-	170	-	ns
Data Hold Time	t_{DHD}	-	80	-	ns
FR Delay Time	t_d	-	0	90	ns
CDATA Set-up Time	t_{CSU}	-	450	850	ns
CDATA Hold Time	t_{CHD}	-	450	950	ns

12-2 Switching Characteristics_Bus Timing

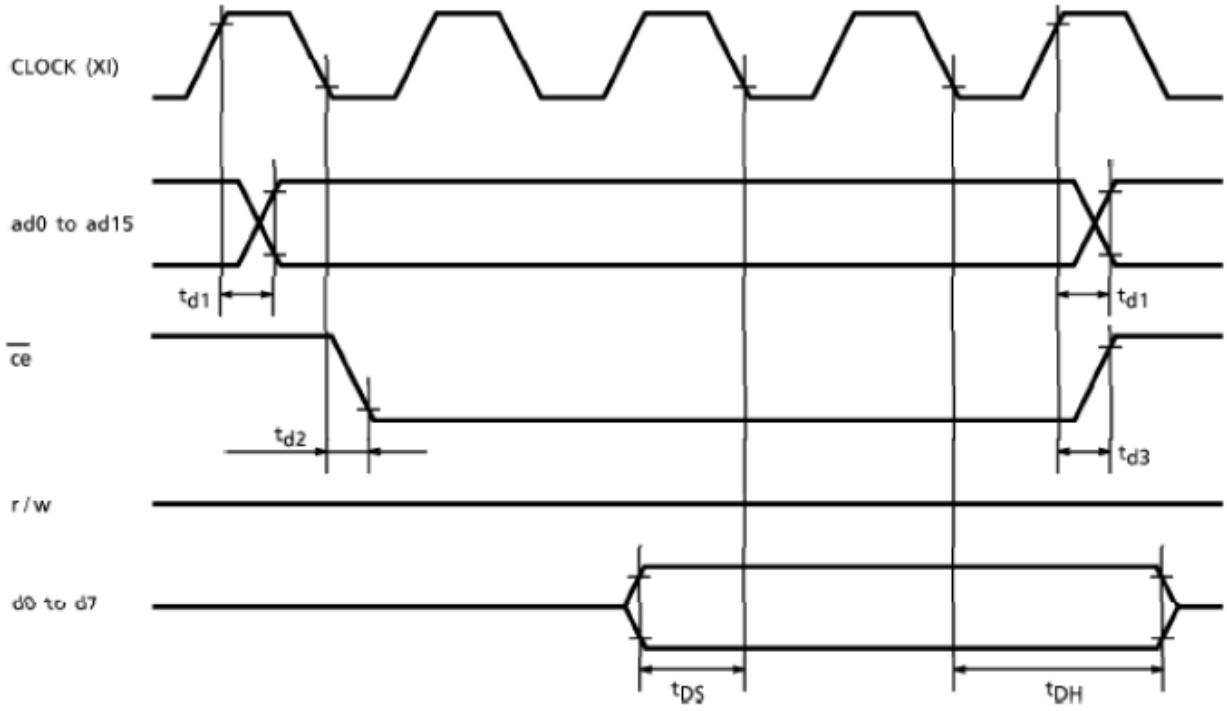


Test Conditions (Unless otherwise noted, V_{DD}=5.0V±10%, V_{SS}=0V, Ta=-20 to 70℃)

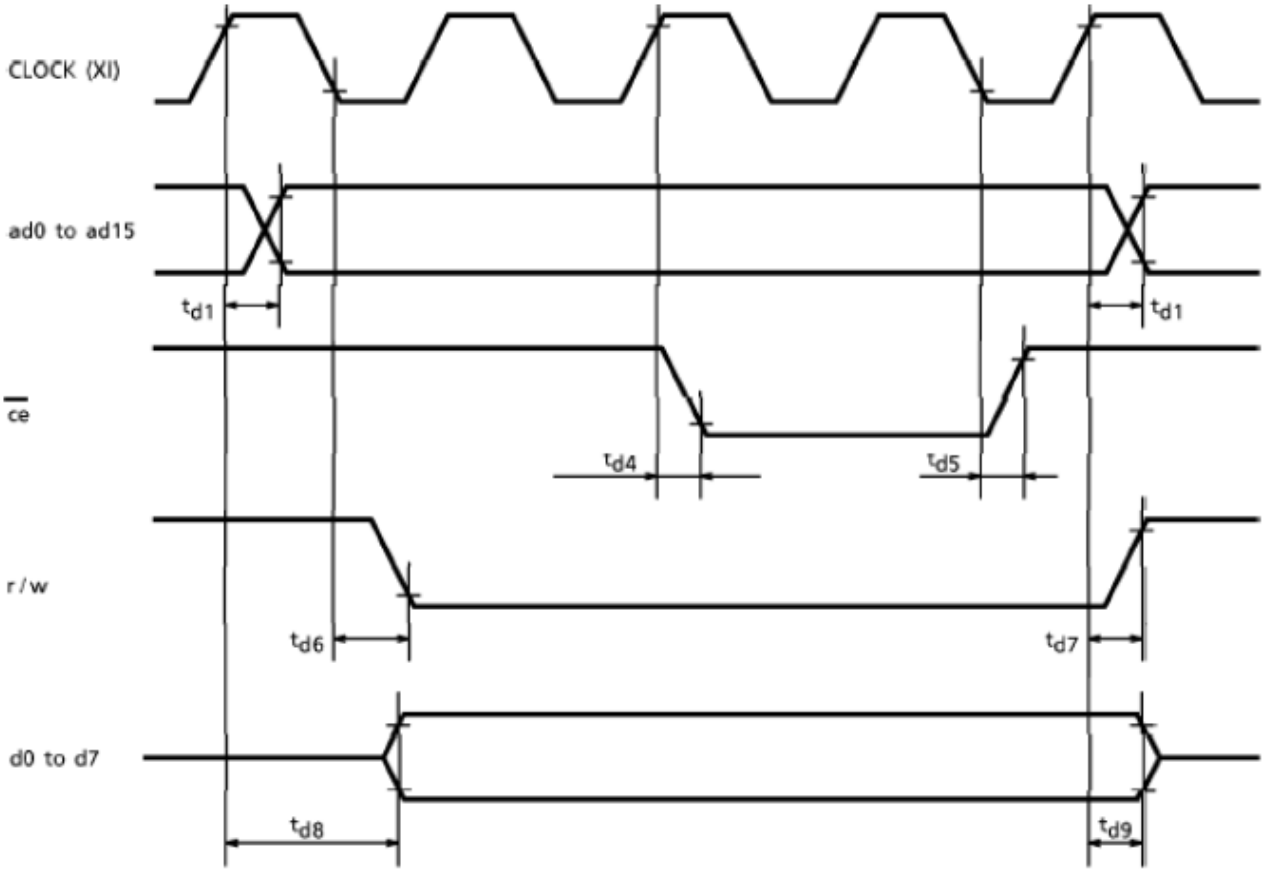
ITEM	SYMBOL	TEST CONDITION	MIN	MAX	UNIT
C/D Set-up Time	t_{CDS}	-	100	-	ns
C/D Hold Time	t_{CDH}	-	10	-	ns
CE,RD,WR Pulse Width	t_{CE},t_{RD},t_{WR}	-	80	-	ns
Data Set-up Time	t_{DS}	-	80	-	ns
Data Hold Time	t_{DH}	-	40	-	ns
Access Time	t_{ACC}	-	-	150	ns
Output Hold Time	t_{OH}	-	10	50	ns

12-3 Switching Characteristics

12-3-1 External RAM Read Mode



12-3-2 External RAM Write Mode



Test Conditions (Unless otherwise noted, V_{DD}=5.0V±10%, V_{SS}=0V, Ta=-20 to 70℃)

ITEM	SYMBOL	TEST CONDITION	MIN	MAX	UNIT
Address Delay Time	t_{d1}	-	-	250	ns
CE Fall Delay Time(Read)	t_{d2}	-	-	180	ns
CE Rise Delay Time(Read)	t_{d3}	-	-	180	ns
Data Set-up Time	t_{DS}	-	0	-	ns
Data Hold Time	t_{DH}	-	30	-	ns
CE Fall Delay Time(Write)	t_{d4}	-	-	200	ns
CE Rise Delay Time(Write)	t_{d5}	-	-	200	ns
r/w Fall Delay Time	t_{d6}	-	-	180	ns
r/w Rise Delay Time	t_{d7}	-	-	180	ns
Data Stable Time	t_{d8}	-	-	450	ns
Data Hold Time	t_{d9}	-	-	200	ns

13. PIN ASSIGNMENT :

PIN NO.	SYMBOL	FUNCTION DESCRIPTION
1	FG	Module Frame Ground
2	VSS	Ground
3	VDD	Supply Voltage for Logic and LCD(+)
4	V0	Operating Voltage for LCD
5	/WR	Data Write into T6963C
6	/RD	Data Read F from T6963C
7	/CE	Chip Enable Signal
8	C/D	Command/Data Selection
9	NC	No Connection
10	Reset	Reset Signal
11	DB0	Data Bit 0
12	DB1	Data Bit 1
13	DB2	Data Bit 2
14	DB3	Data Bit 3
15	DB4	Data Bit 4
16	DB5	Data Bit 5
17	DB6	Data Bit 6
18	DB7	Data Bit 7
19	FS	Font Selection
20	VEE	DC-DC Output Voltage
21	LEDA	Backlight Power Supply (5.0V)
22	LEDK	Backlight Power Supply (0V)

14. RELIABILITY :

ITEM	CONTENT OF TEST	CONDITION
High Temperature Storage	Endurance test applying the high storage temperature for a long time.	80℃ 96hrs
Low Temperature Storage	Endurance test applying the low storage temperature for a long time	-30℃ 96hrs
High Temperature Operation	Endurance test applying the electric stress(voltage& current) and the thermal stress to the element for a long time	70℃ 96hrs
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time	-20℃ 96hrs
High Temperature Humidity Storage	Endurance test applying the high temperature and high humidity storage for a long time	40℃, 90RH 96hrs
Temperature Cycle	Endurance test applying the low and high temperature cycle. -20℃ -- 25℃ -- 70℃ -- 25℃ 30min 5min 30min 5min 1cycle	-20℃~70℃
Vibration Test (package state)	Endurance test applying the vibration during transportation	10 Hz~55 Hz~10 Hz 1.5mmP-P, 1.5g X.Y.-5mm
Shock Test (package state)	Endurance test applying the shock during transportation	Drop a product from a height of 79cm to a solid unbending and horizontal plane
Atmospheric Pressure Test	Endurance test applying the atmospheric pressure during transportation by air	40kPa 24hrs

*NOTE : TEST CONDITION

Supply Voltage for Logic System = 3V

Supply Voltage for LCD System = Operating Voltage at 25℃.

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.