PREPARED BY: DATE	SHARP	SPEC No. LC99X10
		FILE No.
APPROVED BY: DATE	DUTY LIQUID CRYSTAL DISPLAY GROUP SHARP CORPORATION	ISSUE OCT.20.1999
		PAGE 27 Pages
		APPLICABLE DIVISION ENGINEERING DEPARTMENT I DUTY LCD DEVELOPMENT CENTER DUTY LIQUID CRYSTAL DISPLAY GROUP

SPECIFICATION

DEVICE SPECIFICATION for

Passive Matrix LCD Module

Model No.

LM057QB1T04

☐CUSTOMER'S APPROVAL

DATE _____

BY _____

PRESENTED
BY _____

M.ISE
DEPARTMENT GENERAL MANAGER
ENGINEERING DEPARTMENT I
DUTY LCD DEVELOPMENT CENTER
DUTY LIQUID CRYSTAL DISPLAY GROUP
SHARP CORPORATION

RECORDS OF REVISION

DOC.First issue	OCT.20.1999
Model No.	LM057QB1T04
Spec. No.	LC99X10

DATE	REF.PAGE PARAGRAPH DRAWING No.	REVISED NO.	SUMMARY	CHECK AND APPROVAL

[Precautions]

1) Industrial (Mechanical) design of the product in which this LCD module will be incorporated must be made so that the viewing angle characteristics of the LCD may be optimized.
This module's viewing angle is illustrated in Fig.1.

θ y MIN. < viewing angle < θ y MAX.

(For the specific values of θ y MIN., and θ y MAX., refer to the Table9 .)

Please consider the optimum viewing conditions according to the purpose when installing the module.

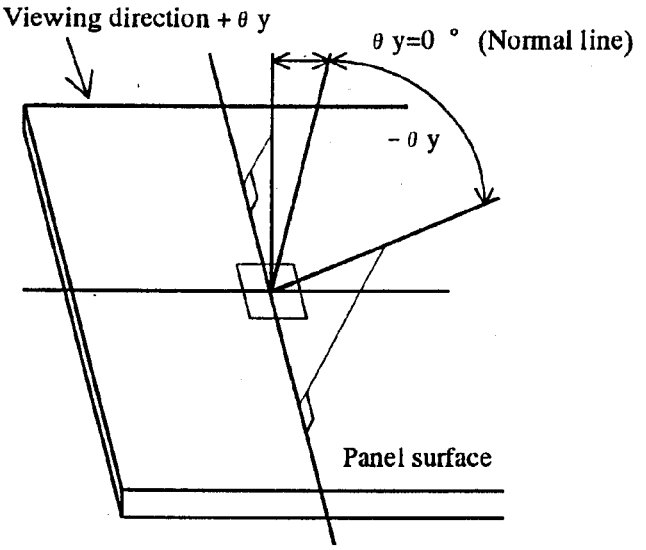


Fig.1 Definition of viewing angle

2) This module should be installed using mounting holes of metal bezel.
When installing the module, pay attention and handle carefully not to allow any undue stress such as twist or bend.

3) Since the front polarizer is easily damaged. Please pay attention not to scratch on its face.
It is recommended to use a transparent acrylic resin board or other type of protective panel on the surface of the LCD module to protect the polarizer, LCD panel, etc..

4) If the surface of the LCD panel is required to be cleaned, wipe it swiftly with cotton or other soft cloth. If it is not still clear completely, blow on and wipe it.

5) Water droplets, etc. must be wiped off immediately since they may cause color changes, staining, etc., if it remained for a long time.

6) Since LCD is made of glass substrate, dropping the module or banging it against hard objects maycause cracking or fragmentation.

7) Since CMOS LSIs are equipped in this module, following countermeasures must be taken to avoid electrostatics charge.

1. Operator

Electrostatic shielding clothes shall be had because it is feared that the static electricity is electrified to human body in case that operator have a insulating garment.

2. Equipment

There is a possibility that the static electricity is charged to equipment which have a function of peeling or mechanism of friction(EX: Conveyer, soldering iron, working table), so the countermeasure (electrostatic earth:$1\times10^{8}\Omega$) should be made.

3. Floor

Floor is a important part to leak static electricity which is generated from human body or equipment. There is a possibility that the static electricity is charged to them without leakage in case of insulating floor, so the countermeasure(electrostatic earth:$1\times10^{8}\Omega$) should be made.

4. Humidity

Humidity of working room may lower electrostatics generating material's resistance and have something to prevent electrifying. So, humidity should be kept over 50% because humidity less than 50 % may increase material's electrostatic earth resistance and it become easy to electrify.

5. Transportation/storage

The measure should be made for storage materials because there is a possibility that the static electricity, which electrify to human body or storage materials like container by friction or peeling, cause the dielectric charge.

6. Others

The laminator is attached on the surface of LCD module to prevent from scratches, fouling and dust. It should be peeled off unhurriedly with using static eliminator.

And also, static eliminator should be installed to prevent LCD module from electrifying at assembling line.

8) Don't use any materials which emit gas from epoxy resin(amines' hardener) and silicon adhesive agent (dealcohol or deoxym) to prevent change polarizer color owing to gas.

9) Since leakage current, which may be caused by routing of CCFT cables, etc., may affect the brightness of display, the inverter has to be designed taking the leakage current into consideration. Thorough evaluation of the LCD module/inverter built into its host equipment shall be conducted, therefore, to ensure the specified brightness.

10) Avoid to expose the module to the direct sun-light, strong ultraviolet light, etc. for a long time.

11) If stored at temperatures under specified storage temperature, the LC may freeze and be deteriorated. If storage temperature exceed the specified rating, the molecular orientation of the LC may change to that of a liquid, and they may not revert to their original state. Therefore, the module should be always stored at normal room temperature.

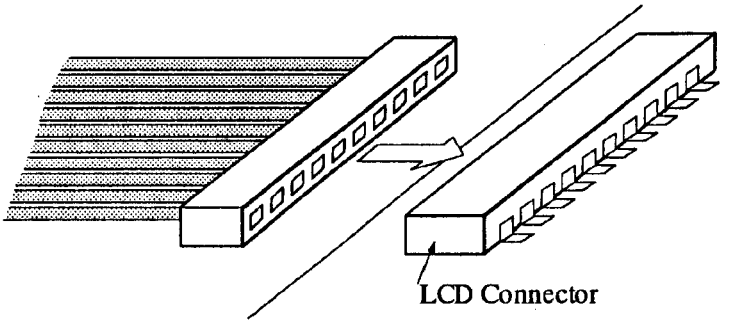
12) Disassembling the LCD module can cause permanent damage and should be strictly avoided.

13) Procedure insert mating connector

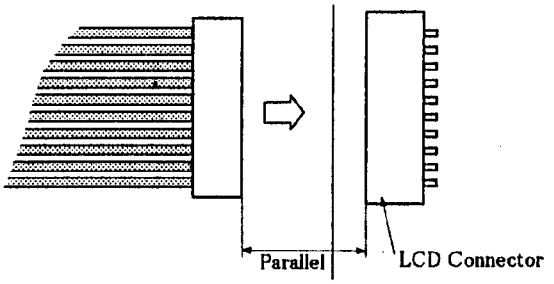
When the mating connector is inserted, it should be parallel to the used connector of LCD module and it should be inserted on horizontal firm base. When the mating connector is attempted to be fixed to LCD connector, it should be inserted properly in order not to create a gap as shown "A".

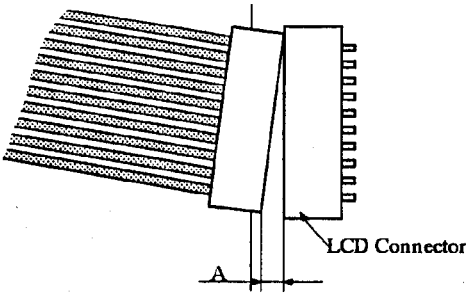
Please insert the connector as both edge is placed to the connect position of LCD connector.

1)Method of correct insert



2)Method of wrong insert





14) This specification describes display quality in case of no gray scale. Since display quality can be affected by gray scale methods, display quality shall be carefully evaluated for the usability of LCD module in case gray scale is displayed on the LCD module.

15) The module should be driven according to the specified ratings to avoid permanent damage.
DC voltage drive leads to rapid deterioration of LC, so ensure that the drive is alternating waveform by continuous application of the signal M. Especially the power ON/OFF sequence shown on Page 25 should be kept to avoid latch-up of drive LSI and application of DC voltage to LCD panel

16) It is a characteristic of LCD to maintain the displaying pattern when the pattern is applied for a long time.(Image retention) To prevent image retention, please do not apply the fixed pattern for along time by pre-installing such programs at your side.

17) This phenomena (image retention) is not deterioration of LCD. If it happens, you can remove it by

applying different patterns.

18) CCFT backlight should be kept OFF during VDD is "L" level.

WARNING

Don't use any materials which emit following gas from epoxy resin (amines' hardener) and silicone adhesive agent (dealcohol or deoxym) to prevent change polarizer color owing to gas.

<Contents> Page

1. Application

This data sheet is to introduce the specification of LM057QB1T04, Passive matrix type monochrome LCD module.

2. Construction and Outline

Construction: Touch panel and 320 × 240 dots monochrome display module consisting of an LCD panel, PWB (printed wiring board) with electric components mounted onto, TCP (tape carrier package) to connect the LCD panel and PWB electrically, and plastic chassis with CCFT backlight and bezel to fix them mechanically. Signal ground (VSS) is connected with the metal bezel.

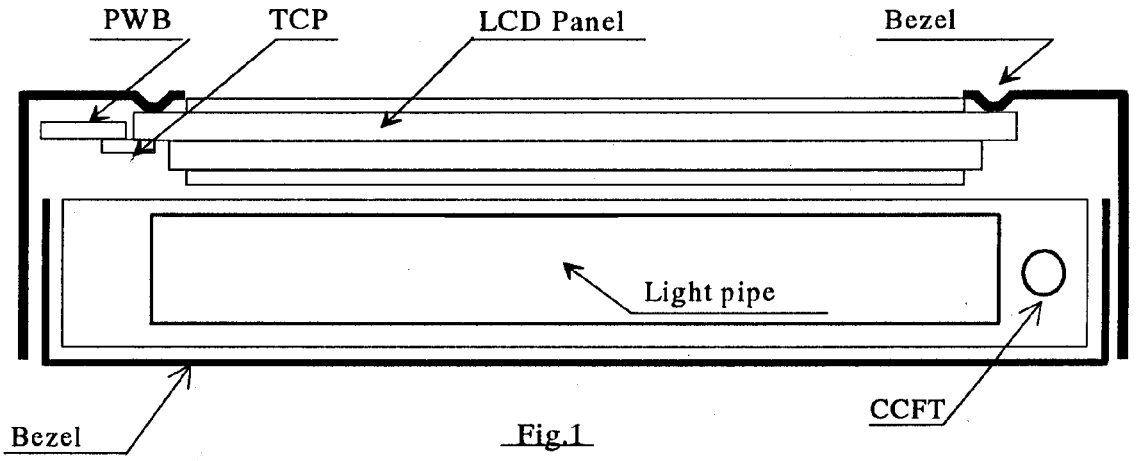


Fig.1

Outline :See Fig. 14

Connection :See Fig. 14 and Table 6

3. Mechanical Specification

Table1

Parameter	Specifications	Unit
Outline dimensions	154.6±0.5(W)×114.8±0.5(H)×8.3±0.5(D)	mm
Viewing area	118.2(W)×89.4(H) ***1**	mm
Active area	115.19(W)×86.39(H)	mm
Display format	320(W)×240(H)	mm
Dot size	0.35(W)×0.35(H)	-
Dot spacing	0.01	mm
***2** Base color	Normally black ***3**	-
Weight	Approx. 200	g

***1 Sealing Area will be visible in the outside of viewing area.**
Please design your product, such as cabinet open area, to hide the outside of viewing area.

*2 Due to the characteristics of the LC material, the colors vary with environmental temperature.

*3 Negative-type display
Display data "H" : ON → transmission
Display data "L" : OFF → light isolation

4. Absolute Maximum Ratings

4-1. Electrical absolute maximum ratings

Table 2

Parameter	Symbol	MIN.	MAX.	Unit	Remark
Supply voltage(Logic)	V_{DD}-V_{SS}	0	6.0	V	Ta=25 ℃
Input voltage	V_{IN}	-0.3	V_{DD}	V	Ta=25 ℃
Supply voltage (LCD)	V_{EE}-V_{SS}	0	32	V	Ta=25 ℃

4-2. Environment Conditions

Ambient temperature ,Humidity conditions

Table 3

Item	Topr		Tstg		Remark
	MIN.	MAX.	MIN.	MAX.	
Ambient temperature	0 ℃	+50 ℃	-25 ℃	+60 ℃	Note 4)
Humidity	Note 1)		Note 1)		No condensation
Vibration	Note 2)		Note 2)		3 directions(X/Y/Z)
Shock	Note 3)		Note 3)		6 directions(±X±Y±Z)

Note 1) Ta≦40 ℃.....95 % RH Max.

Ta＞40 ℃.....Absolute humidity shall be less than Ta=40 ℃ /95 % RH.

Note 2)

Table 4

Frequency	10 Hz～57 Hz	57 Hz～500 Hz
Vibration level	-	9.8 m/s^2
Vibration width	0.075 mm	-
Interval	10 Hz～500 Hz～10 Hz/11.0 min	

2 hours for each direction of X/Y/Z (6 hours as total)

Note 3) Acceleration : 490 m/s^2

Pulse width : 11 ms

3 times for each directions of ±X/±Y/±Z

Note 4) As opto-electrical characteristics of LCD will be changed, dependent on the temperature, the confirmation of display quality and characteristics has to be done after temperature is set at 25 ℃ and it becomes stable.

5. Electrical Specifications

5-1. Electrical characteristics

Table 5-1 Ta=25 ℃ VDD= 3.3 V±5 %

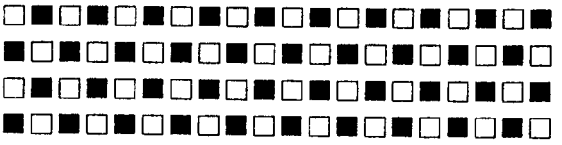
Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Supply voltage (Logic)	V_{DD}-V_{SS}	Ta = 0～50 ℃ (Note 1)		3.135	3.3	3.465	V
Contrast adjust voltage (Note 4)	V_{EE}-V_{SS}	Ta=0 ℃		-	27.2	28.6	V
		Ta=25 ℃		-	25.0	-	V
		Ta=50 ℃		21.9	23.1	-	V
Input signal voltage	V_{IN}	"H" level	Ta = 0～50 ℃	0.8 V_{DD}	-	V_{DD}	V
		"L" level		0	-	0.2 V_{DD}	V
Supply current	I_{DD}	Ta =25 ℃ Note 2)		-	0.9	1.35	mA
	I_{EE}			-	5.1	7.65	mA
Power consumption	Pd	Ta =25 ℃ Note 3)		-	130.5	223.5	mW

Note 1) Frame frequency = 75 Hz.

Note 2) Frame Frequency = 75 Hz , V_{EE} - Vss = 25.0 V, VDD = 3.3 V

Display pattern = checker flag pattern

Display Pattern



Note 3) Except Lamp power consumption. (*See Page 23)

Table 5-2 Ta=25 ℃ VDD= 5.0 V±5 %

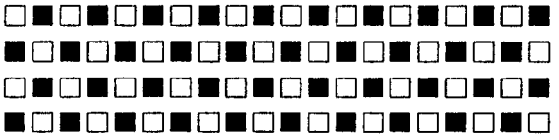
Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Supply voltage (Logic)	V_{DD}-V_{SS}	Ta = 0~50 ℃ (Note 1)		4.75	5.0	5.25	V
Contrast adjust voltage (Note 4)	V_{EE}-V_{SS}	Ta=0 ℃		-	27.2	28.6	V
		Ta=25 ℃		-	25.0	-	V
		Ta=50 ℃		21.9	23.1	-	V
Input signal voltage	V_{IN}	"H" level	Ta = 0~ 50 ℃	0.8 V_{DD}	-	V_{DD}	V
		"L" level		0	-	0.2V_{DD}	V
Supply current	I_{DD}	Ta =25 ℃ Note 2)		-	2.0	3.0	mA
	I_{EE}			-	5.5	8.25	mA
Power consumption	Pd	Ta =25 ℃ Note 3)		-	147.5	252	mW

Note 1) Frame frequency = 75 Hz.

Note 2) Frame Frequency = 75 Hz , V_{EE} - Vss = 25.0 V, VDD = 5.0 V

Display pattern = checker flag pattern

Display Pattern



Note 3) Except Lamp power consumption. (*See Page 23)

5-2. Interface signals

<LCD>(CN1)

Table 6

Pin No.	Symbol	Description	Level
1	YD	scan start-up signal	"H"
2	LP	input latch signal	"H" -> "L"
3	XCK	data input clock signal	"H" -> "L"
4	DISP	display control signal	"H" display on , "L" display off
5	VDD	power supply for logic	
6	VSS	Ground potential	-
7	VEE	power supply for LCD	-
8	NC	No Connect	-
9	NC		
10	NC		
11	NC		
12	D3	Display data signal	"H"(ON), "L"(OFF)
13	D2		
14	D1		
15	D0		

<INVERTER>(CN2) Table 7

Pin No	Symbol	Description	Level
1	VL1(HV)	High voltage line(from Inverter)	for backlight
2	NC	-	
3	VL2(GND)	Ground line(from Inverter)	

Used connector

(CN1): 53261-1510 (MOLEX)

(CN2): BHR-03VS-1 (JST)

Correspondence connector :

(CN1): 51021-1500 (MOLEX)

(CN2): SM02-(8.0)B-BHS-1 (JST)

Note) Except above connector shall be out of guaranty.

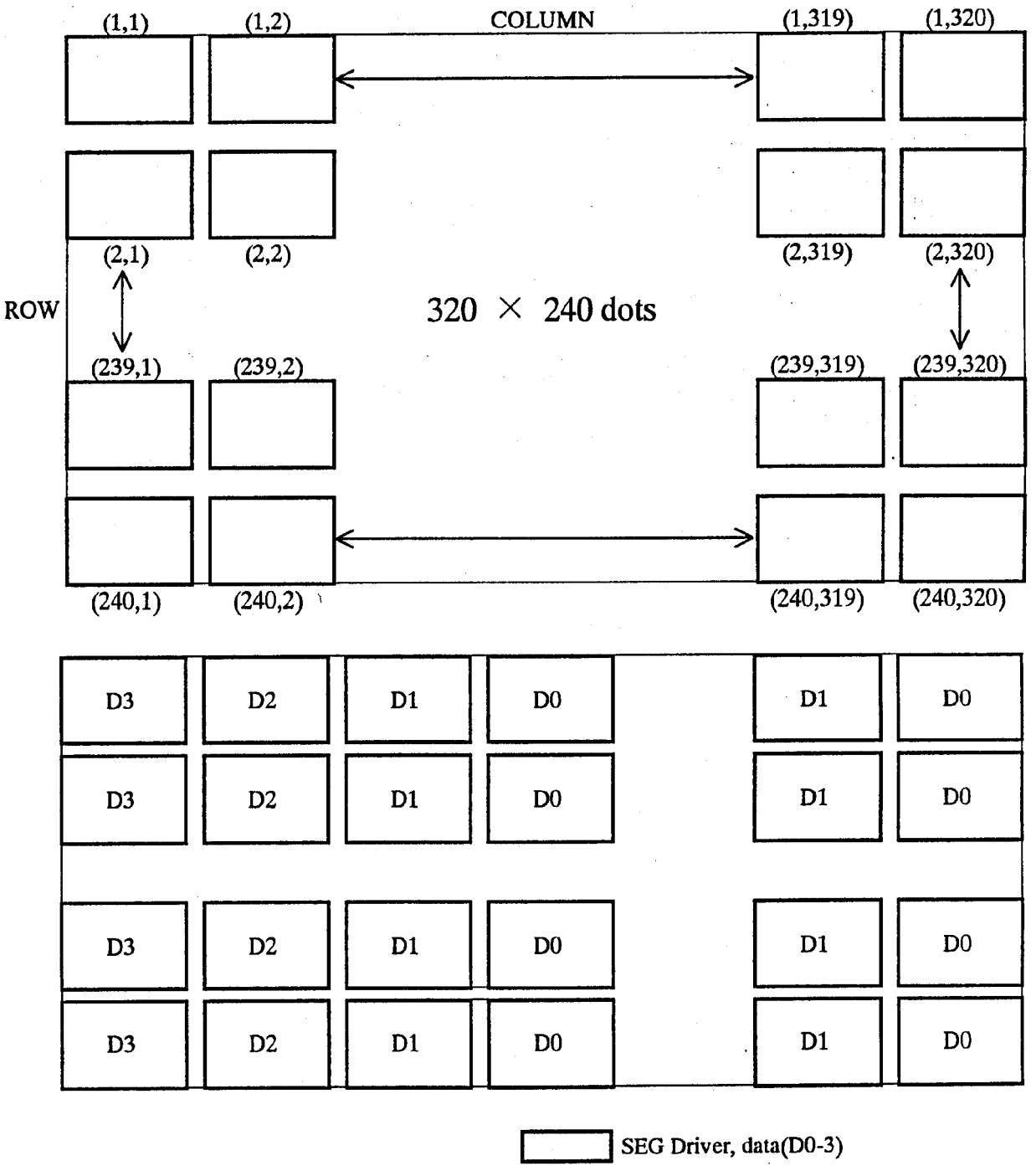
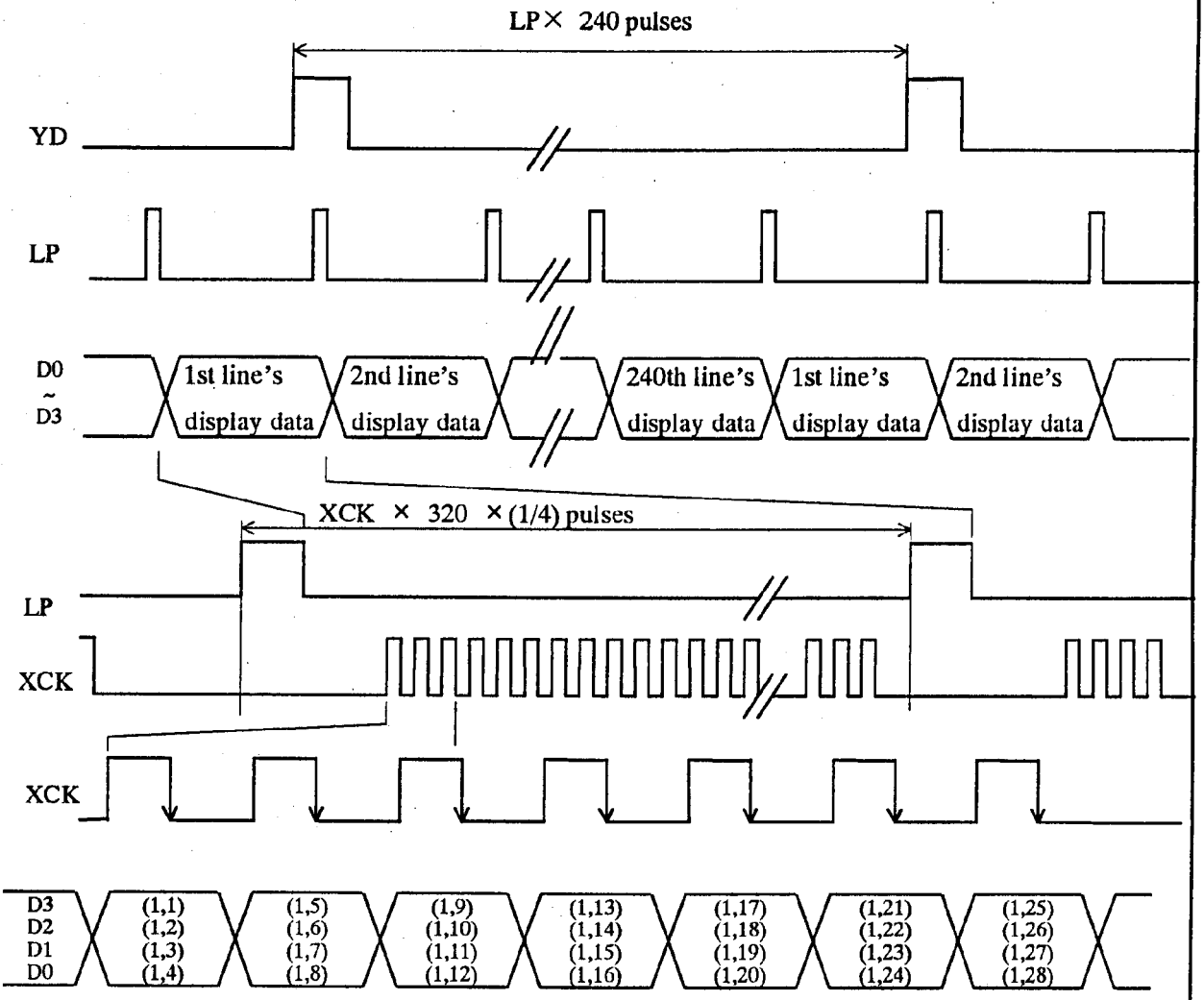


Fig.2 Dot chart of display area



*Electrical and optical characteristics are specified by above condition.

Fig. 3 Data input timing chart

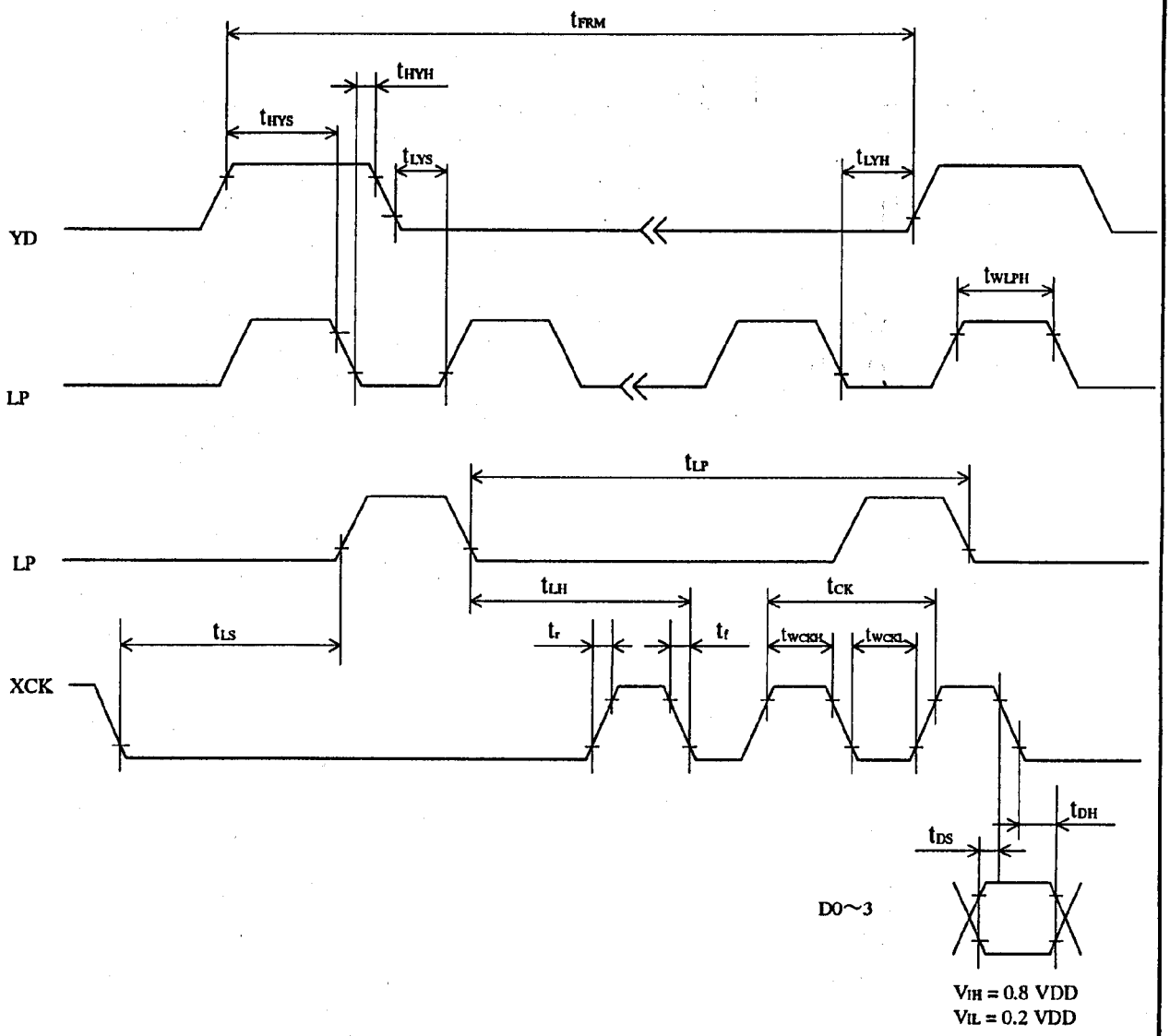


Fig.4 Interface timing chart

5-3. Interface timing ratings

Table8

Ta=25 ℃,VDD=3.0～5.5 V

Item	Symbol	Rating			Unit
		MIN.	TYP.	MAX.	
Frame cycle *2	t_{FRM}	12.5		14.3	ms
XCK signal clock cycle	t_{CK}	200			ns
"H" level clock width	t_{WCKH}	100			ns
"L" level clock width	t_{WCKL}	100			ns
LP signal clock cycle	t_{LP}			70	μs
LP signal "H" level pulse width	t_{WLPH}	200			ns
Data set up time	t_{DS}	80			ns
hold time	t_{DH}	80			ns
YD signal "H" level set up time	t_{HYS}	100			ns
"H" level hold time	t_{HYH}	100			ns
"L" level set up time	t_{LYS}	100			ns
"L" level hold time	t_{LYH}	100			ns
LP ↑ allowance time from XCK ↓	t_{LS}	200			ns
XCK ↑ allowance time from LP ↓	t_{LH}	200			ns
Input signal rise/fall time *1	t_r,t_f			50	ns

*1 When LCD module is operated by high speed of XCK(Shift clock), (t_{CK} - t_{WCKH} -t_{WCKL}) /2 is maximum.

*2 Owing to the characteristics of LCD module, "shadowing" will become more eminent as frame frequency goes up, while flicker will be reduced.

Since judgment of display quality is subjective and display quality such as "shadowing" is pattern dependent, it is recommended that decision of frame frequency, to which power consumption of the LCD module is proportional, be made based on your own through testing on the LCD module with every possible patterns displayed on it.

It is recommended that frequency range is 70 Hz～ 80 Hz

*3 The intervals of one LP fall and the next must be always the same, and LPs must be input ontinuously. The interval must be 70 μs MAX.

6. Module Driving Method

6-1. Circuit configuration

Fig. 10 shows the block diagram of the module's circuitry.

6-2. Display face configuration

The display consists of 320 ×240 dots as shown in Fig.2.

The interface is single panel with double drive to be driven at 1/240 duty ratio.

6-3. Input data and control signal

The LCD driver is 80 bits LSI, consisting of shift registers, latch circuits and LCD driver circuits. Input data for each row (320) will be sequentially transferred in the form of 4 bit parallel data through shift registers from top left of the display together with clock signal (XCK).

When input of one row (320) is completed, the data will be latched in the form of parallel data corresponding to the signal electrodes by the falling edge of latch signal (LP) then, the corresponding drive signals will be transmitted to the 320 lines of column electrodes of the LCD panel by the LCD drive circuits.

At this time, scan start-up signal (YD) has been transferred from the scan signal driver to the 1st row of scan electrodes, and the contents of the data signals are displayed on the 1st row of the display face according to the combinations of voltages applied to the scan and signal electrodes of the LCD. While the data of 1st row are being displayed, the data of 2nd row are entered. When data for 320 dots have been transferred, they will be latched by the falling edge of LP, switching the display to the 2nd row.

Such data input will be repeated up to the 240th row of each display segment, from upper row to lower rows, to complete one frame of display by time sharing method.

Then data input proceeds to the next display frame.

YD generates scan signal to drive horizontal electrodes.

Since DC voltage, if applied to LCD panel, causes chemical reaction in LC materials, causing deterioration of the materials, drive wave-form shall be inverted at every display frame to prevent the generation of such DC voltage. Control signal M plays such a role.

Because of the characteristics of the CMOS driver LSI, the power consumption of the display module goes up with the clock frequency of XCK.

To minimize data transfer speed of XCK clock the LSI has the system of transferring 4 bit parallel data through the 4 lines of shift registers.
Thanks to this system the power consumption of the display module is minimized.

In this circuit configuration, 4 bit display data shall input to data input pins of D0-3.

Furthermore, the display module has bus line system for data input to minimize the power consumption with data input terminals of each driver LSI being activated only when relevant data input is fed.

Data input for column electrodes and chip select of driver LSI are made as follows:
The driver LSI at the left end of the display face is first selected, and the adjacent driver LSI right next side is selected when data of 80 dot (20 XCK) is fed. This process is sequentially continued until data is fed to the driver LSI at the right end of the display face. This process is followed simultaneously both at the top and bottom column drivers LSI's.

Thus data input will be made through 4 bit bus line sequentially from the left end of the display face.

Since this display module contains no refresh RAM, it requires the above data and timing pulse inputs even for static display.

The timing chart of input signals are shown in Fig.4 and Table8 .

7. Optical Characteristics

Following spec are based upon the electrical measuring conditions, on which the contrast of perpendicular direction($\theta x = \theta y = 0°$) will be MAX..

Table9 Ta = 25 ℃, V_{DD}= 3.3 V, V_{EE}-Vss = Vmax

Parameter		Symbol	Condition		MIN.	TYP.	MAX.	Unit	Remark
Viewing angle range		θx	Co>4.0	$\theta y = 0°$	-25	-	25		Note 1)
		θy		$\theta x = 0°$	-10	-	20		
Contrast ratio		Co	$\theta x = \theta y = 0°$		-	18	-	-	Note2)
Response time	Rise	τr	$\theta x = \theta y = 0°$		-	190	250	ms	Note3)
	Decay	τd	$\theta x = \theta y = 0°$		-	150	200	ms	

Note 1) The viewing angle range is defined as shown Fig.5.

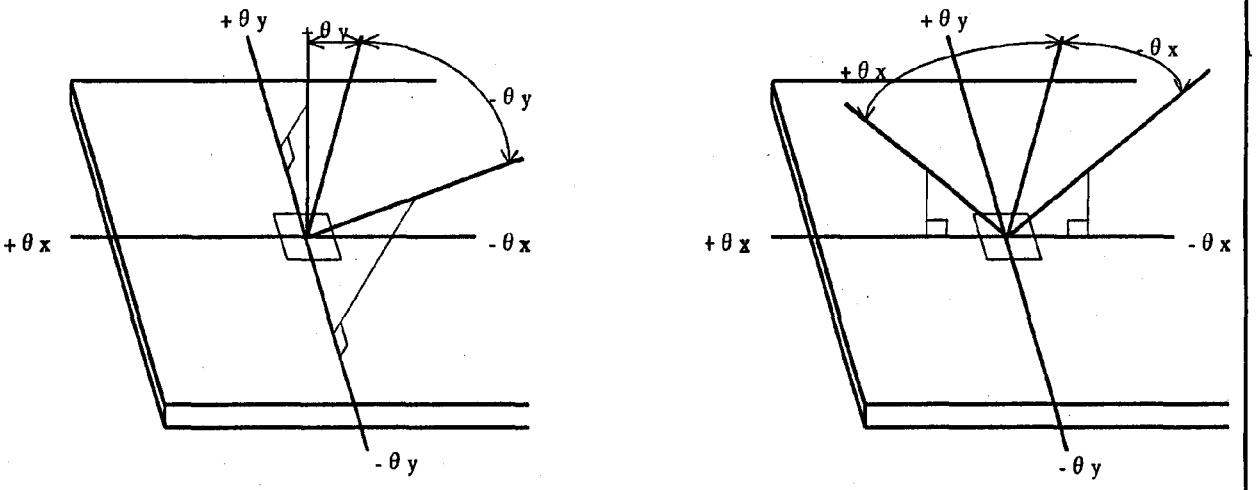


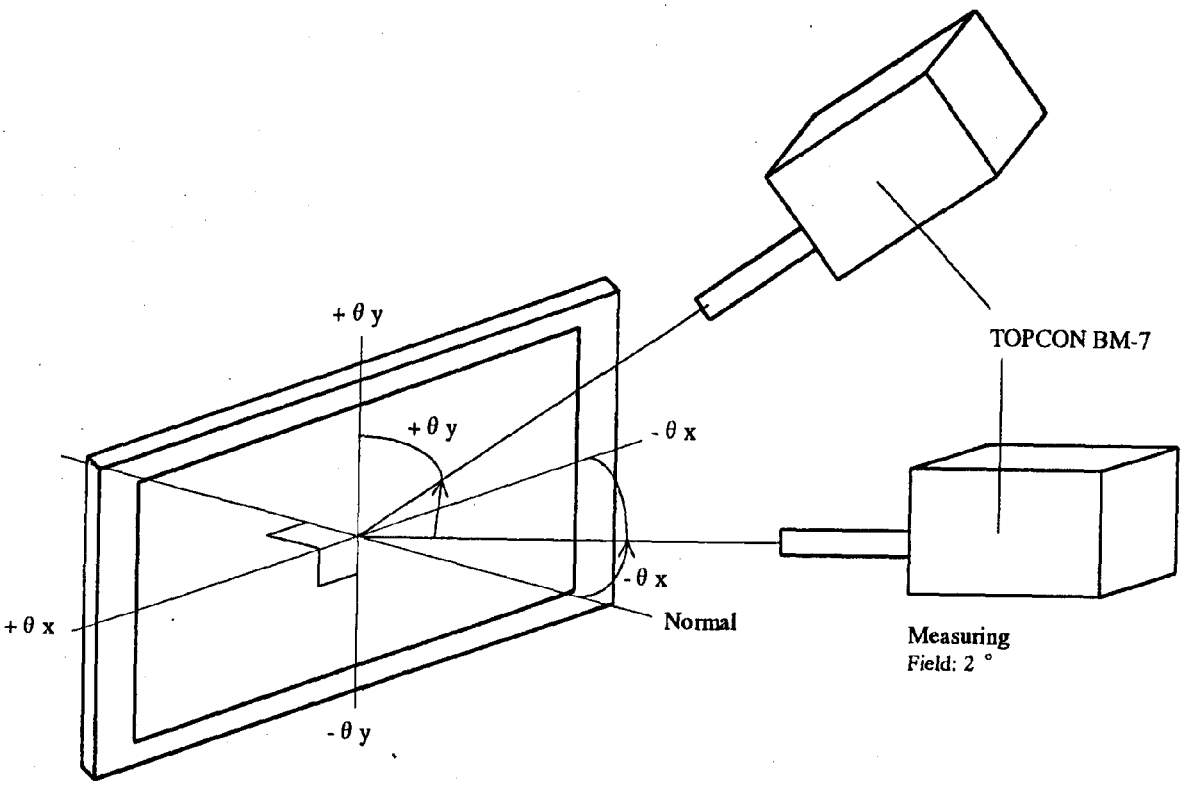
Fig.5 Definition of Viewing Angle

Note 2) Contrast ratio is defined as follows:

$$Co = \frac{\text{Luminance(brightness) all pixes "White" at Vmax}}{\text{Luminance(brightness) all pixes "dark" at Vmax}}$$

Vmax is defined in Fig.7.

Note 3) The response characteristics of photo-detector output are measured as shown in Fig.9, assuming that input signals are applied so as to select and deselect the dot to be measured, in the optical characteristics test method shown in Fig. 8.



Measuring Spot Size : ϕ 10 mm

θ x : Angle from "normal" to viewing surface rotated about the horizontal axis.

θ y : Angle from "normal" to viewing surface rotated about the vertical axis.

Fig.6 Optical Characteristics Test Method I

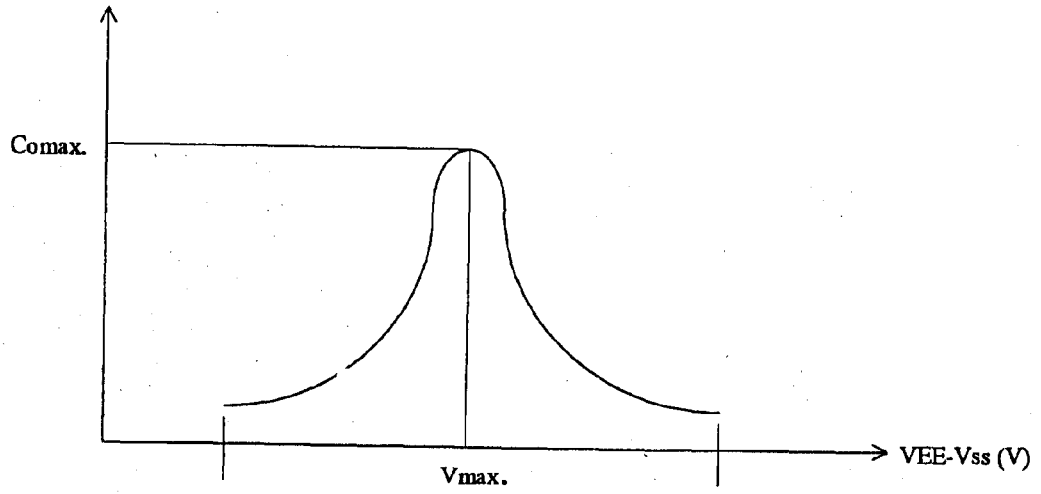
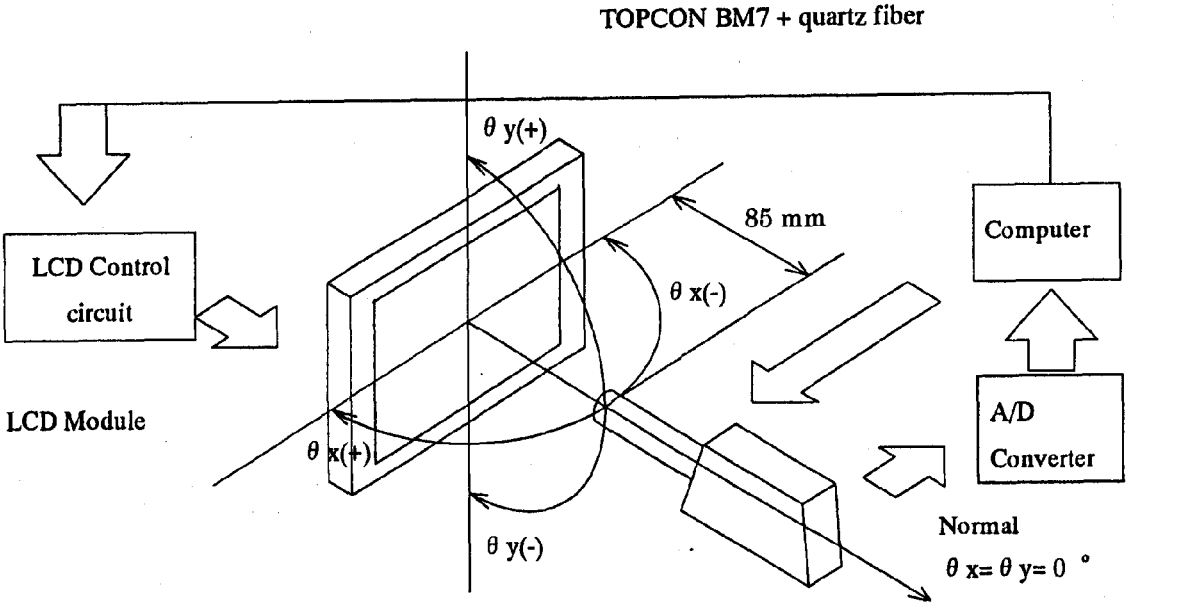


Fig.7 Definition of Vmax

(Response Measurement)

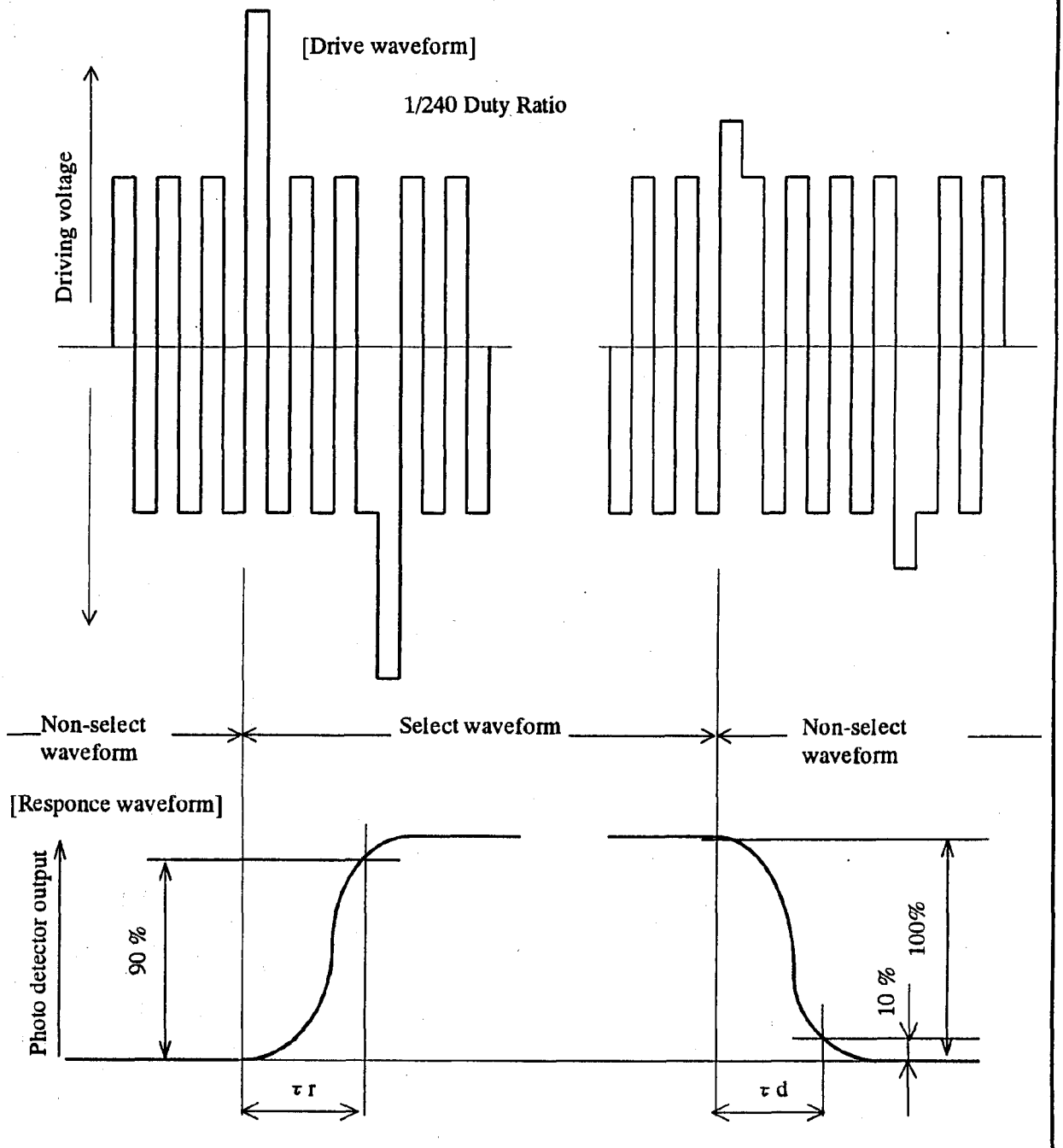
Ta = 25 ℃

In dark room



(Measuring spot size : ϕ 10 mm, Measuring Field : 2 °)

Fig. 8 Optical Characteristics Test Method Ⅱ



τ r : Rise time

τ d : Decay time

Fig.9 Definition of Response time

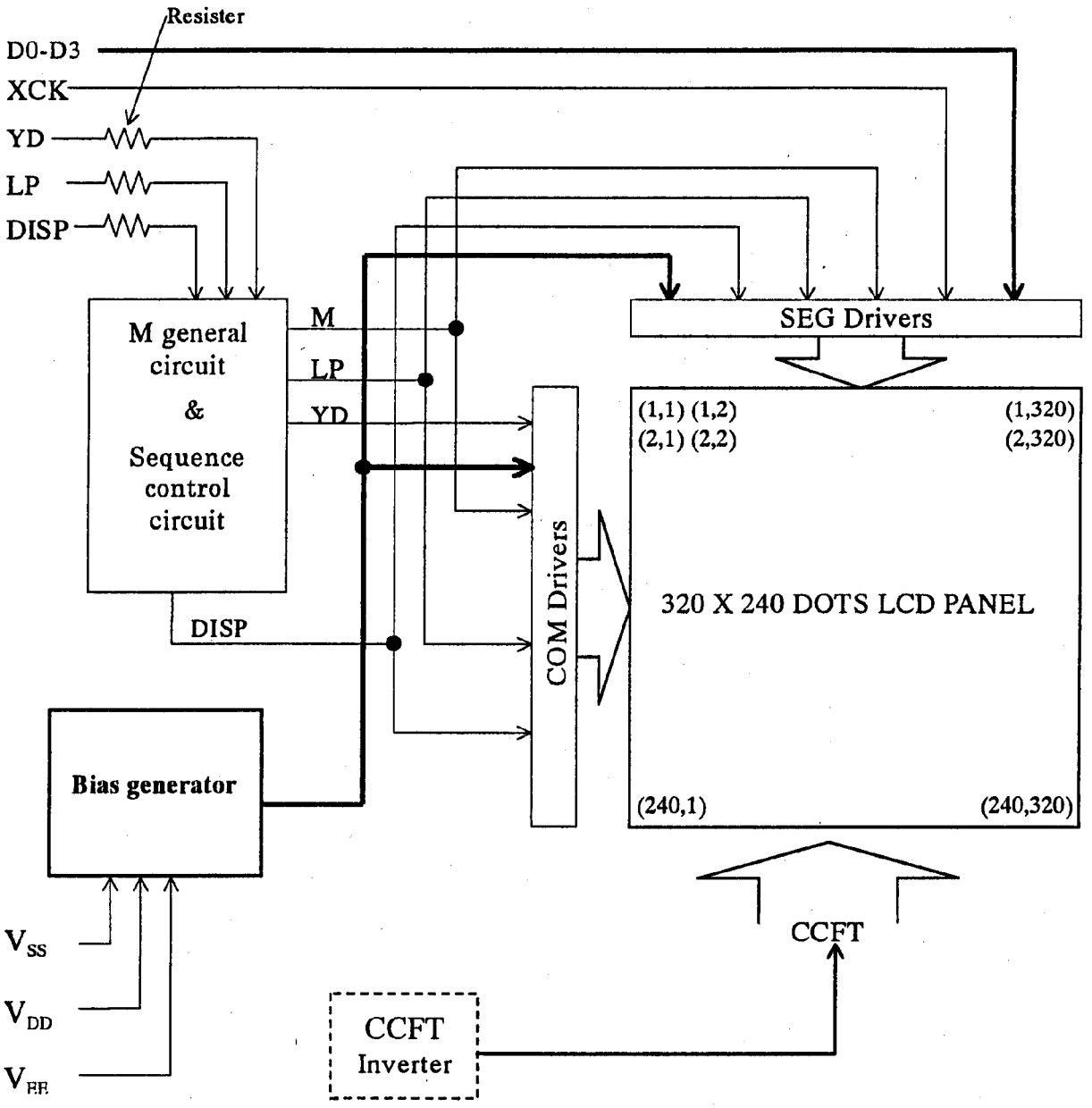


Fig. 10 Circuit block diagram

8. Characteristics of Backlight

8-1 Rating(Note)

Parameter	MIN.	TYP.	MAX.	Unit
Brightness	180	200	-	cd/m^2

The values above is defined as the average brightness inside the viewing area.

8-2 Measurement circuit

CXA-0612(TDK) at IL = 4.0 mArms

8-3 Measurement equipment

BM-7 (TOPCON Corporation)

8-4 Measurement conditions

8-4-1. Measurement circuit voltage : DC = 9.5 V, at primary side

8-4-2. LCD: All digits WHITE, VDD= 3.3 V, VEE-VSS = Vmax,

D0-3="H"(White) Frame Frequency 75 Hz

8-4-3. Ambient temperature : 25 ℃

Measurement shall be executed 30 minutes after turning on.

8-5 Used lamp :

HMBVK2JB45H134(HARISON ELECTRIC CO., LTD)

Used cable : UL3587, AWG26

(NISSEI ELECTRIC CO.,LTD or SUMITOMO ELECTRIC INDUSTRIES LTD.)

8-5-1. Rating (1pc)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Remark
Lamp current	I_L	3.0	4.0	5.0	mArms	*1
Lamp voltage	V_L	-	395	-	Vrms	-
Lamp power consumption	P_L	-	1.58	-	W	*2
Lamp frequency	F_L	40	-	80	kHz	-
Kick-off voltage	V_S	-	-	560	Vrms	Ta=25 ℃
		-	-	683	Vrms	Ta= 0 ℃
Lamp life time	L_L	15 000	25 000	-	h	*4

Within no conductor closed. (CCFT only)

*1 It is recommended that IL be not more than 4.0 mArms so that heat radiation of CCFT backlight may least affect the display quality.

*2 Power consumption excluded inverter loss.

*3 The circuit voltage(VS) of the inverter should be designed to have some margin, because VS may be increased due to the leak current in case of the LCD module.

*4 Average life time of CCFT will be decreased when LCD is operating at lower temperature

8-5-2. Operating life

The operating life tome is 25 000 hours or more at 4.0 mA MAX., at 25±1℃.
(Operating life with CXA-0612 or equivalent.)

The inverter should meet the following conditions to keep the specified life time of used lamp;

-Since, symmetric waveform without spike in positive and negative

-Output frequency range:40 kHz- 80 kHz

Make sure the operating conditions by executing the burn-in enough time.

The operating life time is defined as having ended when any of the following conditions occur;

25±1 ℃

-When the voltage required for initial discharge has reached 110 % of the initials value.

-When the illuminence quantity of light has decreased to 50 % of the initials value.

(Note) Rating are defined as the average brightness inside the viewing area specified in Fig.11.

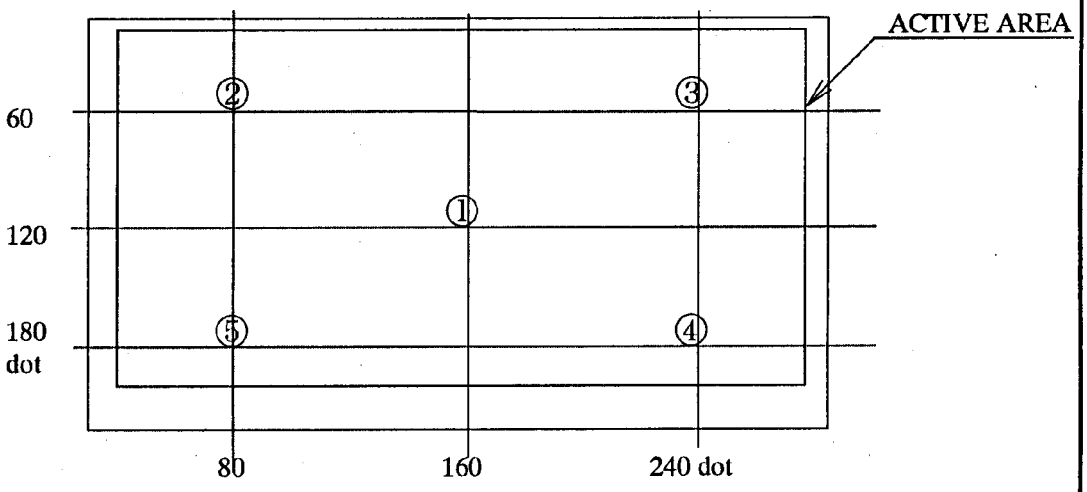
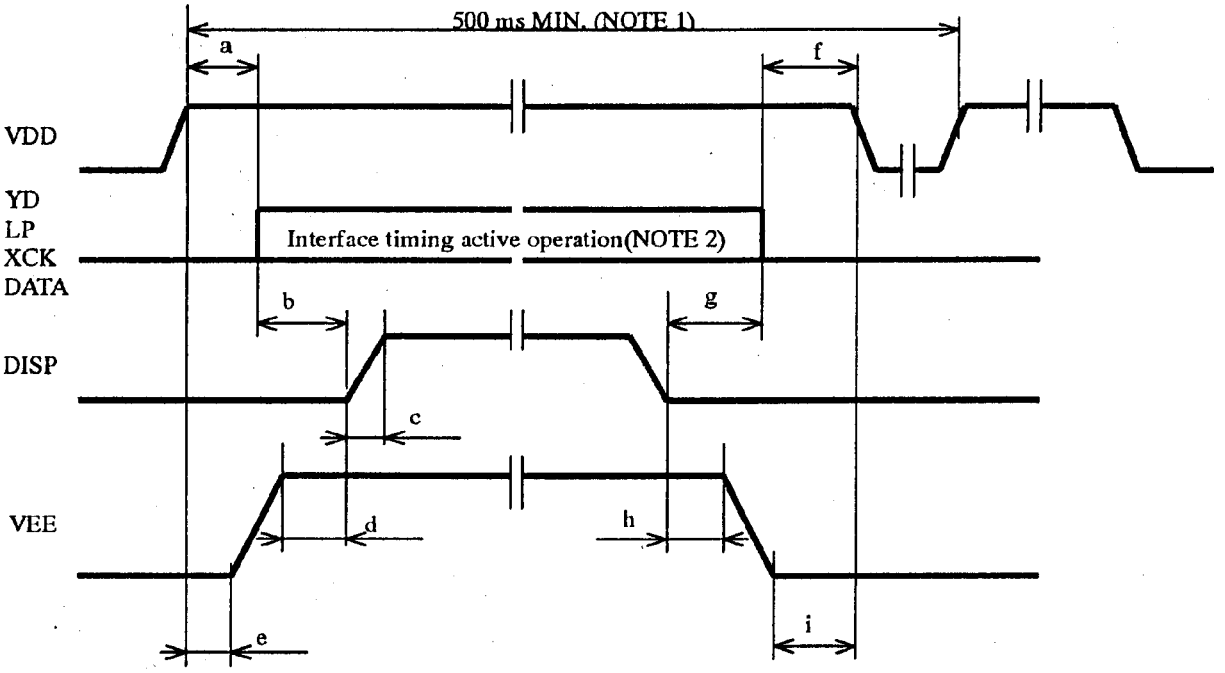


Fig.11 Measuring points (1-5)

9. Supply voltage sequence condition

The power ON/OFF sequence shown on Fig.12 shall be followed to avoid latch-up of drive LSIs and application of DC voltage to LCD panel.



	POWER ON	
Symbol	Allowable value	
a	0 ms MIN.	1 s MAX.
b	20 ms MIN.	-
c	-	100 ns MAX.
d	0 ms MIN.	-
e	0 ms MIN.	-

	POWER OFF	
Symbol	Allowable value	
f	0 ms MIN.	1 s MAX.
g	20 ms MIN.	-
h	20 ms MIN.	-
i	0 ms MIN.	-

Fig.12 Supply voltage sequence condition

(NOTE 1) Power ON/OFF cycle time. All signals and power line shall be in accordance with above sequence in case of power ON/OFF.

(NOTE 2) The signals which comply with the interface timing in Fig. 3, Fig.4, and Table8 , must be input.

10. Applicable inspection standard

The LCD module shall meet the following inspection standard : S-U-012-01

11.Lot Number

Lot number is shown at the position mentioned in Fig.13 in accordance with the following numbering rule

(Example) 99 H 00001

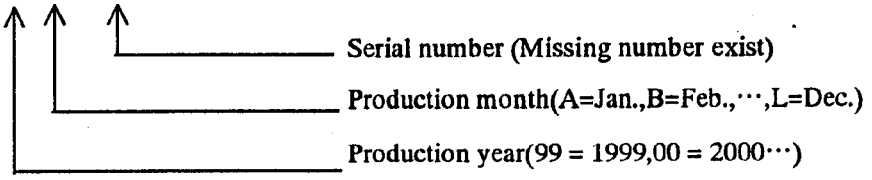


Fig. 13

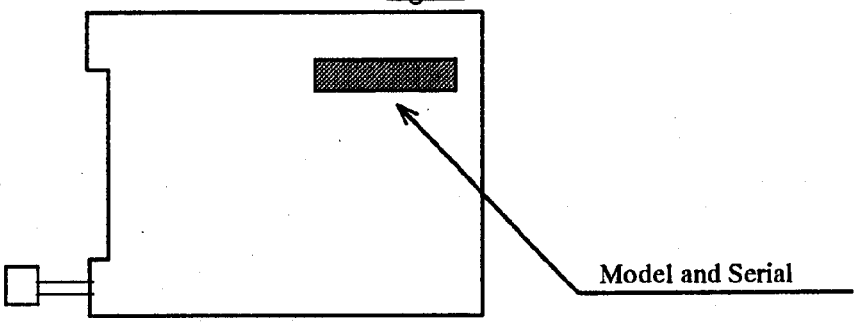
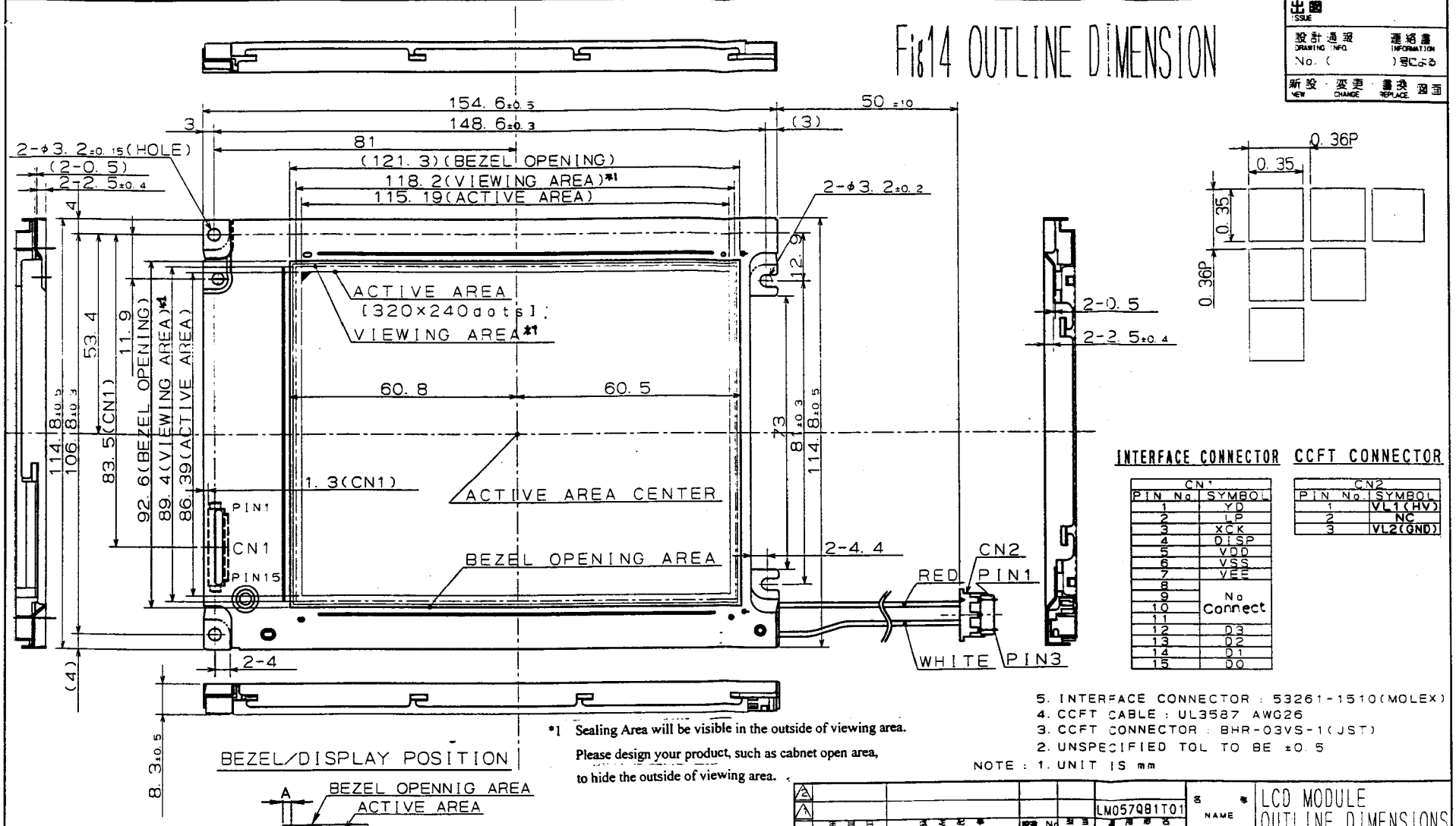


Fig14 OUTLINE DIMENSION



INTERFACE CONNECTOR

CN1

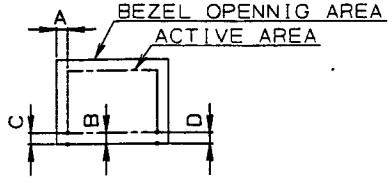
PIN No.	SYMBOL
1	YD
2	YP
3	XCK
4	DISP
5	VDD
6	VSS
7	VEE
8	
9	No Connect
10	
11	
12	D3
13	D2
14	D1
15	D0

CCFT CONNECTOR

CN2

PIN No.	SYMBOL
1	VL1(HV)
2	NC
3	VL2(GND)

BEZEL/DISPLAY POSITION



1) TOLERANCE X-DIRECTION A: 3.21±0.5
2) TOLERANCE Y-DIRECTION B: 3.11±0.5
3) OBLIQUITY OF DISPLAY AREA IC-DI<0.5

*1 Sealing Area will be visible in the outside of viewing area.
Please design your product, such as cabnet open area, to hide the outside of viewing area.

NOTE : 1. UNIT IS mm
2. UNSPECIFIED TOL TO BE ±0.5
3. CCFT CONNECTOR : BHR-03VS-1(JST)
4. CCFT CABLE : UL3587 AWG26
5. INTERFACE CONNECTOR : 53261-1510(MOLEX)

DESIGN	TRACE	CHECK	CHECK	APPROVE	MATERIAL	THICKNESS	FINISH

LM057QB1T01

SHARP CORPORATION
Engineering Department 1
Duty Panel Development Center
Duty LCD Group

NAME	LCD MODULE OUTLINE DIMENSIONS
ASSEMBLY	320×240 DOTS
PARTS CODE	
DATE	1999 6 4
DRAWING No.	
SCALE	1/1