PREPARED BY: DATE	SHARP	SPEC No. LCY-02145B
		FILE No.
APPROVED BY: DATE	MOBILE LIQUID CRYSTAL DISPLAY GROUP SHARP CORPORATION	ISSUE Jun.13. 2005
		PAGE 26 Pages
		APPLICABLE DIVISION MOBILE LCD CHINA DESIGN CENTER WUXI SHARP

SPECIFICATION

RoHS Compliance

DEVICE SPECIFICATION for

Passive Matrix Monochrome LCD Module

(640 × 480 dots)

Model No.

LM64P89N

☐CUSTOMER'S APPROVAL

DATE

BY

PRESENTED BY

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GENERAL MANAGER
MOBILE LCD CHINA DESIGN CENTER
WUXI SHARP

RECORDS OF REVISION

DOC. First issue	Feb. 15. 2005
Model No.	LM64P89N
Spec. No.	LCY-02145B

DATE	REVISED NO.	REF.PAGE PALAGRAPH DRAWING No.	SUMMARY	CHECK AND APPROVAL
April 16.2005	1	Page 9	Revised ambient temp: -20°C→-25°C,+45°C→+50°C	H. Watanabe
〃	〃	Page 19	Revised electronic parameters tCWL:200→65,tLWE:100→70 tSU:120→50 ,tH:120→40 tSSU:120→100,tSE:120→100	H. Watanabe
Jun.13.2005	2	Page 11	Interface:Solder plating → Tin plating 53261-1510 →53261-1571	K. Yamamoto
〃	〃	Page 25	Model name label description added LM64P89NA.R	K. Yamamoto
〃	〃	Page 26	1)Interface: Solder plating→Tin plating 2)PWB: Solder plating→ Gold plating ·Material on PWB: Soldering for mounting:Lead(Pb) solder→ Lead(Pb) free solder ·Lead: Solder plating→Tin plating 3)CCFT UNIT: Lead(Pb) solder & wire→ Lead(Pb) free solder & wire(UL style No.) 4)Model No. label : Suffix"R" 5) Screw : With hexavalent chromium→ hexavalent chromium free	K. Yamamoto

[General Precautions]

1) Water droplets must be wiped off immediately as those may cause color changes and/or stains if remained for a long time. (If the surface of the LCD panel is soiled, wipe it swiftly with cotton or other soft cloth. If it is not still clear completely, blow on and wipe it.)

2) Since the front polarizer is easily damaged, please pay attention not to scratch its face.

3) If the surface of the LCD cell needs to be cleaned, immediately wipe it with cotton or other soft cloth. If still not completely clear, blow on its and wipe.

4) Dropping the LCD module or hitting hard object with the LCD module may cause a cracking of LCD glass or others parts.

5) LCD module has viewing angle characteristics specified as in below. Take these into consideration when design customer's system. Set the LCD module in customer's system as the optimum viewing direction and viewing angle meet customer's purpose.

θ y min < viewing direction < θ y max

(For the specific values of θ y min, and θ y max, refer to the Table 8.)

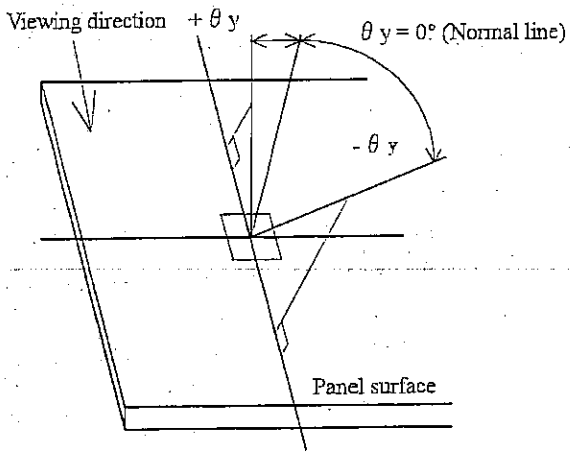


Fig.1 Definition of viewing angle

6) Do not use any materials , which may emit gas. Epoxy resin (amine's hardener) and silicone adhesive agents (dealcohol or deoxym) are known as materials, which may cause a color change of polarizer etc.

7) If the LCD module is stored below the specified temperature, liquid crystal may be frozen and be deteriorated. If the LCD module is stored above the specified temperature, the molecular orientation of the liquid crystal may change to a liquid state, and it may not revert to its original state.
Therefore, the LCD module should always be stored within specified temperature range.

8) Avoid exposing the LCD module to the direct sunlight or strong ultraviolet light for a long time.

9) Disassembling the LCD module may cause a permanent damage. It should be strictly avoided.

10) Keep following instructions to prevent electrostatic damages of CMOS LSIs , which are contained in the LCD module.

1.Operator

Electrostatic shielding clothes shall be worn to avoid electrostatic discharges from human body.

2.Equipment

There is a possibility that the static electricity is charged to equipment that has a function of peeling something or making friction (ex: conveyer, soldering iron, working table). These equipments should be grounded through approx. 1×10^{8} ohms resistance.

3. Floor

Floor is an 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: 1×10^{8} ohms) should be made.

4. Humidity

Proper level of humidity of working area may reduce the resistance of the material that generates electrostatics charges and also reduce the chance of charging up something. Keep the humidity over 50%.

5. Transportation and storage

Containers could also be easily charged up during transportation and storage. Make sure not to cause ESD (electrostatic discharges) during transportation and storage.

6. Others

The laminator (protective plastic film) is attached on the surface of LCD module to protect from scratches, stains and dust. Make sure to peel off the laminator slowly with using ion blower.

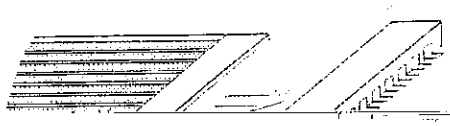
11) LCD module is susceptible to external mechanical force, and even a very light stress would cause color change. Therefore, make sure to mount LCD module to flat surface so that it will not be bent nor be twisted when installing the module in the customer system.

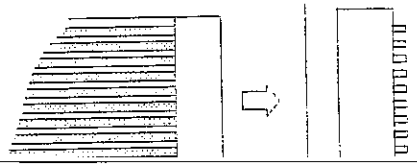
12) Handle LCD module carefully. Do not touch PWB area directly as it may damage the interconnections or electronic parts.

13) The interconnection mentioned in (12) above contains an organic material as a binder. Do not apply any materials, which contains an organic solvent to this area as it may result in malfunction.

14) 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 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.

i) Method of correct insert





[Precautions for Storage]

1) Do not expose the LCD module to direct sunlight or strong ultraviolet light for long periods. Store in a dark place.

2) Liquid crystal material will solidify if stored below the rated storage temperature. Liquid crystal will become an isotropic liquid if stored above the rated storage temperature and may not retain its original properties. Especially the humidity outside of specified range will also damage the polarizers.

[Precautions for Discarding Liquid Crystal Modules]

Liquid crystal panel: Dispose of as glass waste.

This LCD module does not contain any harmful materials.

The liquid crystal panel does not contain any dangerous or harmful materials.

[Precautions for Mechanical Design]

1) Be very careful both in system design and in its assembly not to apply an excessive stress to the LCD panel.
No bending stress or tensile forces are allowed.

2) LCD which consists of thin sheet will become the cause of a crack or a chip by mechanical stress such as vibration and a shock
Mechanical design shall be carefully evaluated to vibration and a shock by the customer based on customer's testing method.

3) Make sure not to damage electrical connection of the LCD module when testing it at customer's incoming or other inspection.
Use silicone material (rubber or foam) when holding the LCD module.

4) Earth the metallic case of the main system (contact of the unit and main system).

5) Insulate the Module and main system by attaching insulating washers made of bakelite or nylon, etc.

[Precautions for LCD Operation]

Be sure to perform a setup of LCD module within absolute rating given in the specifications.

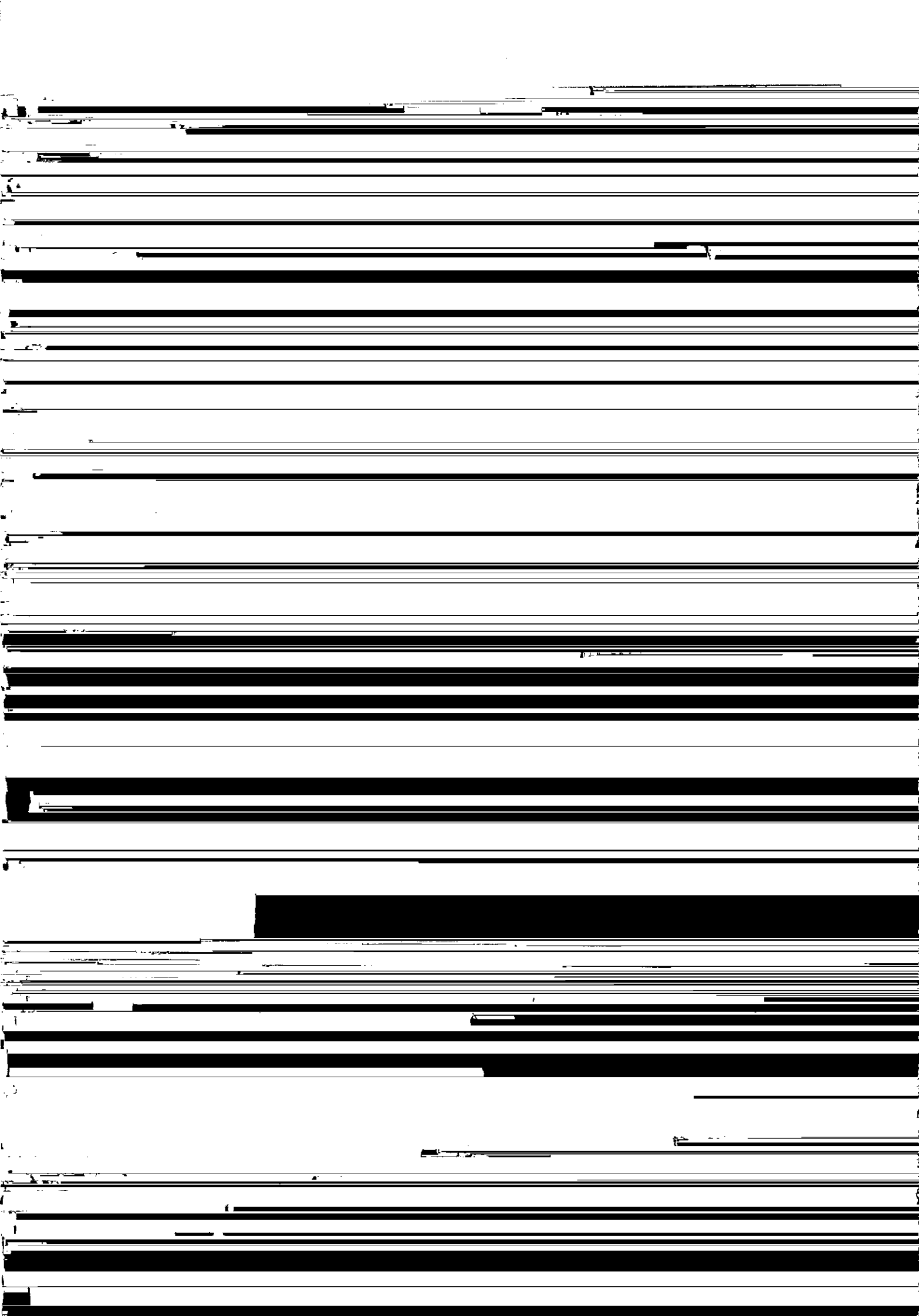
It cannot guarantee about the failure by use with value other than specification regulation.

Please use this LCD module after sufficient evaluation and a check by the customer's production.

1) Applying DC voltage to LCD panel will cause a rapid degradation of liquid crystal.
So, drive the LCD panel with an alternating pulse (M signal) continuously.
Keep power ON/OFF sequence specified in page 24 to prevent a latched-up of driver LSI and a DC charge to the LCD panel.

2) This specification specifies the characteristics of LM64P89N (640 × 480 dots) in no gray scale mode.
Display quality in gray scale mode is not specified in this specification as it may vary depending on the method of gray scaling.
Be carefully evaluated display quality by customer's production, because the quality is depending upon the gray scaling method of controller.
Operating condition given in the specifications are the absolute ratings with consideration to power consumption value and display quality.
In order to have influence on the LCD module characteristics, it cannot guarantee about the failure by use with value other than the specification regulation.
If customer would like to change the operating condition, need to contact the contents of change to Sharp Corporation.

<Contents>



3. Mechanical Specification

Table 1

Parameter	Specifications	Unit
Outline dimensions	268(W) × 190(H) × 7 max(D)	mm
Active area	211.17(W) × 158.37(H)	mm
Display format	640(W) × 480(H)	-
Dot size	0.3(W) × 0.3(H)	mm
Dot spacing	0.03	mm
Base color *1	Normally black *2	-
Weight	450(typ.)	g

*1 Due to the characteristics of the LC material, display color varies with temperature.

*2 Negative-type display

Display data "H" : ON → White

Display data "L" : OFF → Black

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	V_{DD}	V	Ta=25 ℃
Supply voltage (LCD)	V_{DD}-V_{EE}	0	30	V	Ta=25 ℃

4-2. Environment conditions

Table 3

Item	Tstg		Topr		Remark
	MIN.	MAX.	MIN.	MAX.	
/1\ Ambient temperature	-25 °C	+60 °C	0 °C	+50 °C	Note 2)
Humidity	Note 1)				No condensation

Note 1) Ta≦40 °C: 95 % RH Max.

Ta>40 °C: Absolute humidity shall be less than Ta=40 °C / 95 % RH.

Note 2) As opt-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 °C and it becomes stable.

4-3. Vibration test

Table 4 (Ta=25℃ Non-operation)

Frequency	10 Hz~57 Hz	57 Hz~500 Hz
Vibration level	-	9.8 m/s²
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)

4-4. Shock test (Ta=25℃ Non-operation)

Acceleration: 490 m/s²

Pulse width: 11 ms

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

Note 3)

Note 3) Since this module does not have enough mounting mechanism, it is impossible to conduct vibration and shock test at SHARP side. Therefore, assemble it to your cabinet and then these test shall be conducted to be satisfied the necessary condition in according with 4-3 and 4-4 condition (Non-operating).

5. Electrical Specifications

5-1. Electrical characteristics

Table 5

Ta=25 °C V_{DD}=5V±5%

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (Logic)	V_{DD}-V_{SS}	(Note 1,2)	4.75	5.0	5.25	V
Supply voltage(LCD drive)	V_{DD}-V_{EE}	(Note 3,4,5)	20.1	23.9	28.2	V
Input signal voltage	V_{IN}	"H"level	0.8 V_{DD}	-	V_{DD}	V
		"L" level	0	-	0.2 V_{DD}	V
Input leakage current	I_{IL}	"H"level	-	-	250	μA
		"L" level	-250	-	-	μA
Supply current(Logic)	I_{DD}	(Note 6)	-	24	36	mA
Supply current(LCD drive)	I_{EE}		-	17	26	mA
Power consumption	Pd	(Note 6)	-	450	680	mW

Note 1) V_{DD} to be applied according to the specifications shall be regulated and sudden fluctuation of V_{DD}, even if the fluctuation is within the specifications, shall be strictly avoided.

Note 2) Vss is ground potentinal.
Frame frequency = 120 Hz.

Note 3) The viewing angle θ at which the optimum contrast is obtained by adjusting V_{EE} -V_{SS}.
Refer to Fig.9 for the definition of θ.

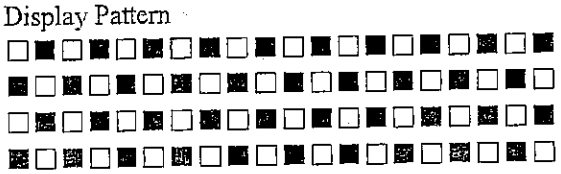
Note 4) Max. and Min. values are specified as the Max. and Min. voltage within the condition of operational temperature range (0~45 °C).
Typ. Values are specified as the typical voltage at 25 °C.

Note 5) V_{EE} is minus potential.

Note 6) Display high frequency.

V_{DD}=5V, V_{DD}-V_{EE}=23.9V, Frame frequency =85Hz,
Display pattern = checker flag pattern

Display Pattern



Note 7) Except Lamp power consumption.

5-2. Interface signals

<LCD>

Table 6

Pin No	Symbol	Description	Level
1	S	Scan start-up signal	"H"
2	CP1	Input data latch signal	"H" → "L"
3	CP2	Ground potential	-
4	DISP	Display control signal	"H"(ON), "L"(OFF)
5	V_{DD}	Power supply for logic and LCD(+)	-
6	V_{SS}	Ground potential	-
7	V_{EE}	Power supply for LCD(-)	
8	DU0	Display data signal	"H"(ON), "L"(OFF)
9	DU1		
10	DU2		
11	DU3		
12	DL0	Display data signal	"H"(ON), "L"(OFF)
13	DL1		
14	DL2		
15	DL3		

<CCFT>

Table 7

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

Note) Pin No. and its location are shown in Fig.16.

(Connectors)

<LCD> Used connector : 53261-~~1510~~ 1571 (Molex)

Mating connector : 51021-1500 (Molex)

2

<CCFT> Used connector : M63M83-04(MITSUMI)

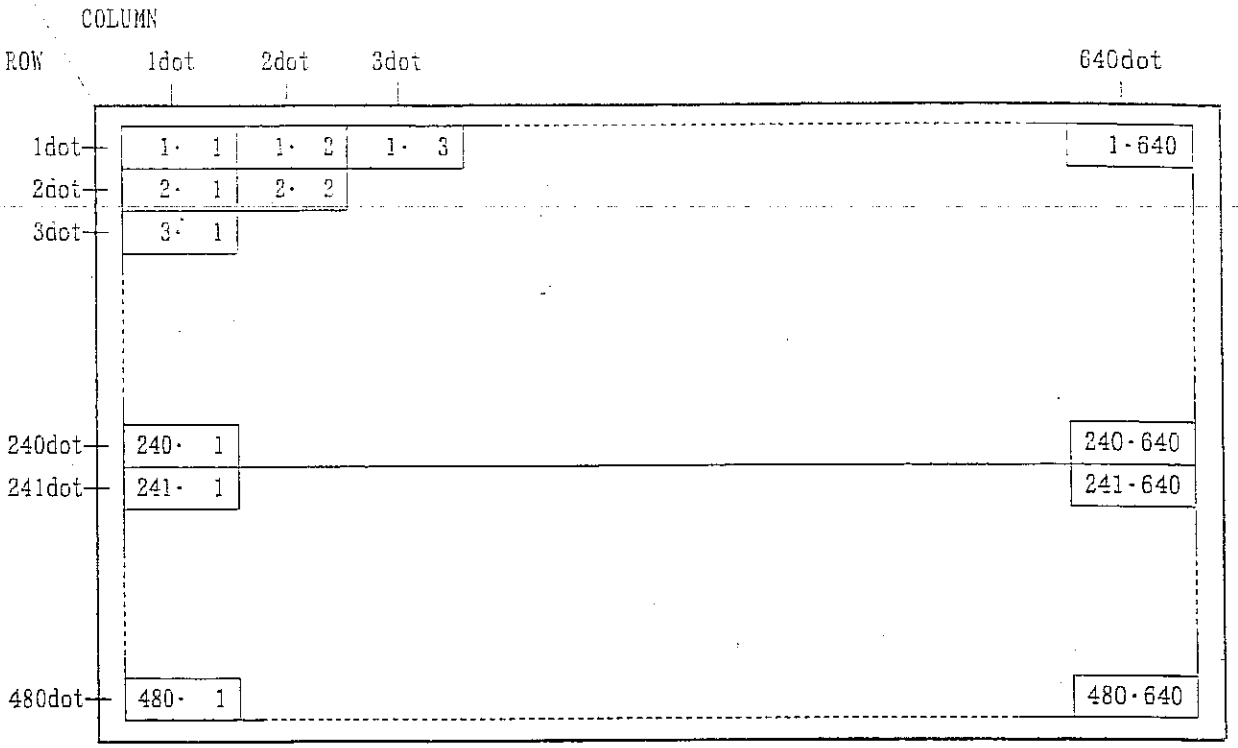
Mating connector : M60-04-30-114P(MITSUMI)

M60-04-30-134P(MITSUMI)

M61M73-04(MITSUMI)

Note) Except above connector shall be out of guaranty.

5-3 Interface timing ratings



Note) 1-2 means 1st row 2nd column dot.

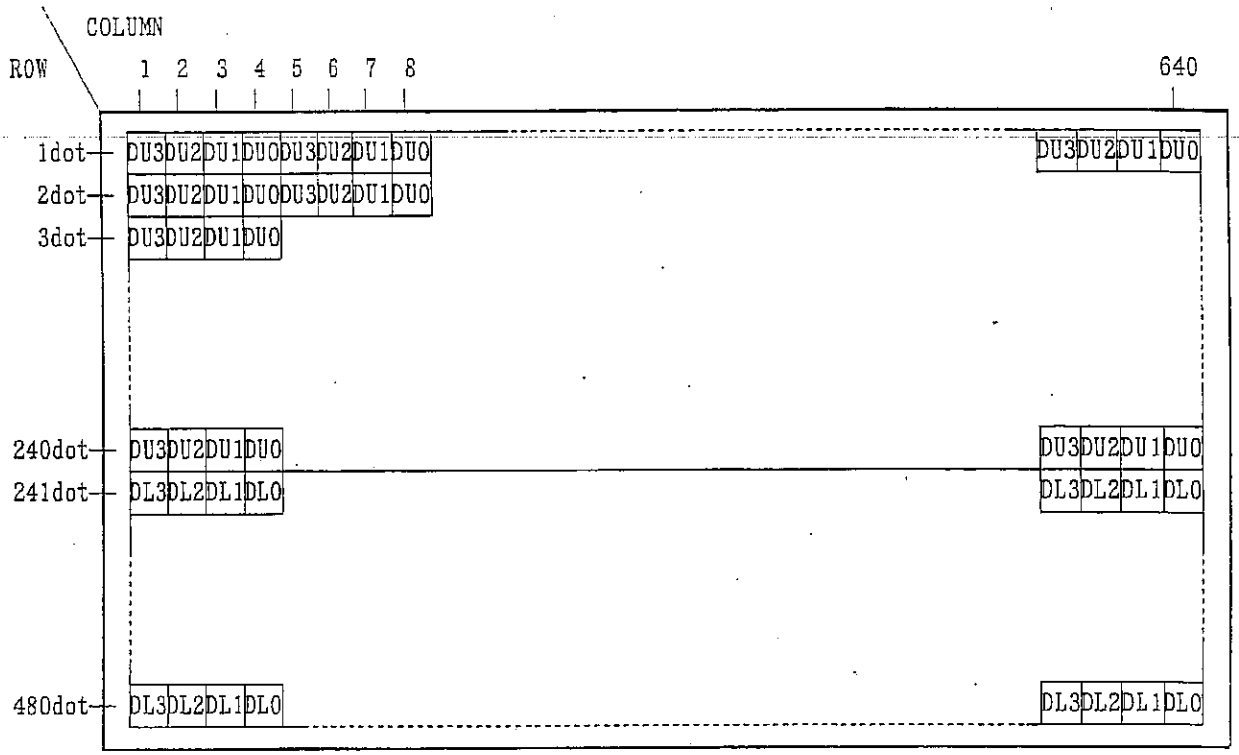


Fig.5 Dot chart of display area

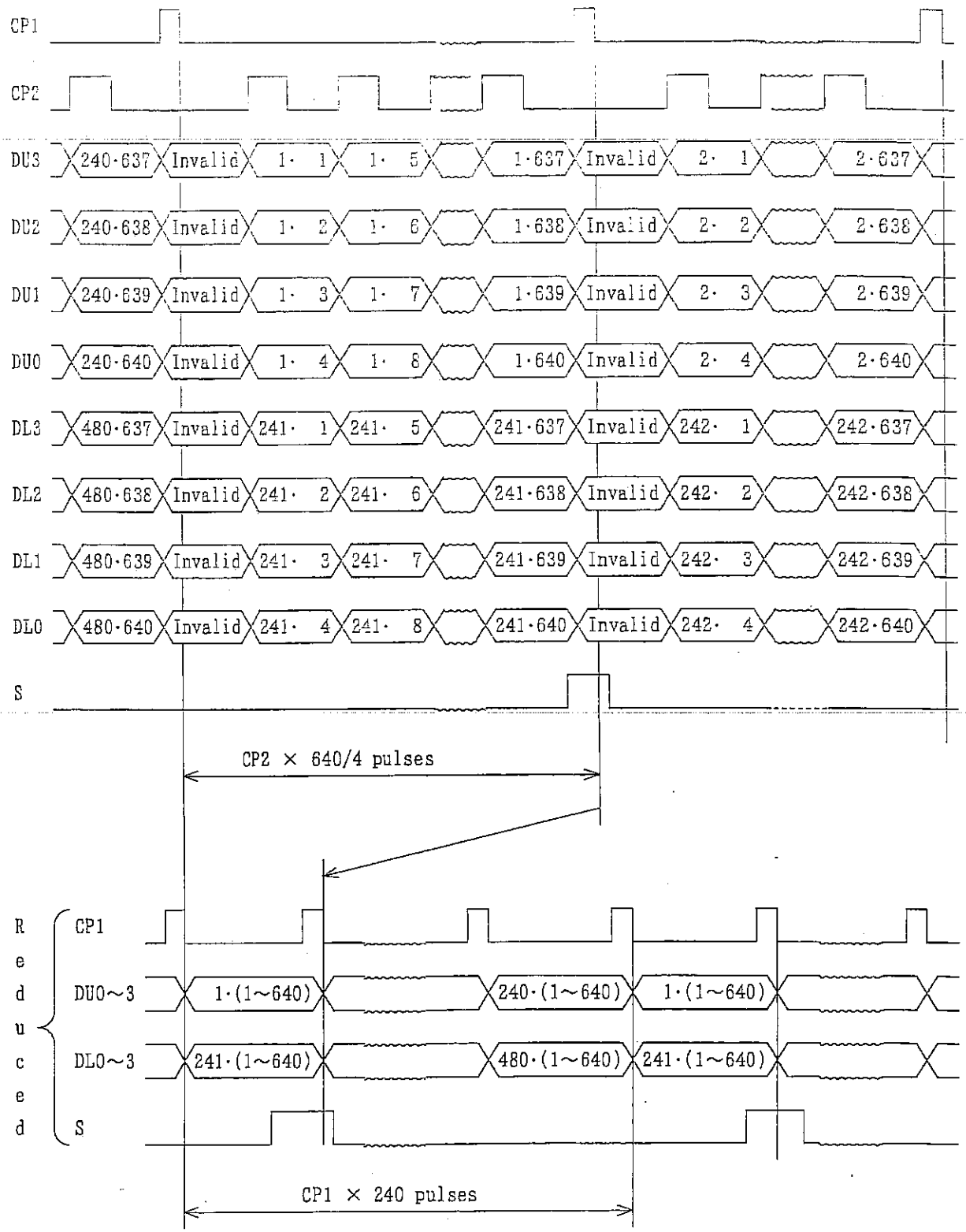
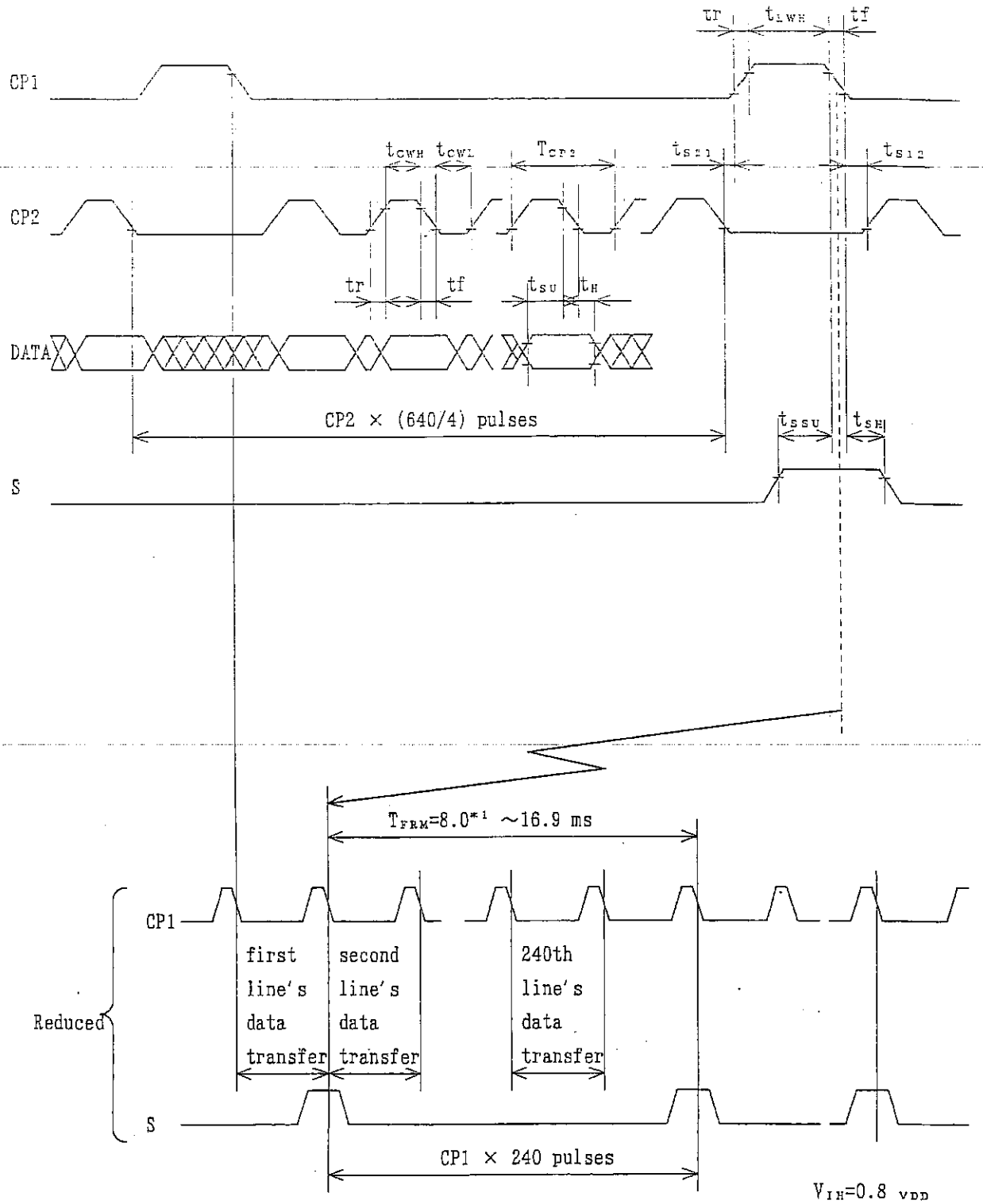


Fig.6 Data input timing



＊1 See table 7

Fig.7 Interface timing chart

Table7 Interface timing ratings

Ta=25 °C, VDD=5.0±0.5 %

Item	Symbol	Rating			Unit
		MIN.	TYP.	MAX.	
Frame cycle *2	T_{FRM}	8.0		16.9	ms
CP2 clock cycle	T_{CP2}	152			ns
"H" level clock width	t_{CWH}	65			ns
"L" level clock width	t_{CWL}	65			ns
"H" level latch clock width	t_{LWH}	70			ns
Data set up time	t_{SU}	50			ns
Data hold time	t_H	40			ns
S set up time	t_{SSU}	100			ns
S hold time	t_{SH}	100			ns
CP2 ↑ clock allowance time from CP1 ↓	t_{S21}	0			ns
CP1 ↑ clock allowance time from CP2 ↓	t_{S12}	0			ns
Clock rise / fall time *1	t_r,t_f			t_{rf}*2	ns

*1 LCD module functions at the minimum frame cycle of 8 ms (Maximum frame frequency of 125 Hz). Owing to the characteristics of LCD module, "shadowing" will become more eminent as frame frequency goes up, while flicker will be reduced.

According to our experiments, frame cycle of 11.7 ms Min. or frame frequency of 85 Hz Max. will demonstrate optimum display quality in terms of flicker and "shadowing".
But 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 testing on the LCD module with every possible patterns displayed on it.

*2 : $t_{rf} = 50$ in case $T_{CT} = (T_{CP2} - t_{CWH} - t_{CWL}) / 2 \geqq 50$

$t_{rf} = T_{CT}$ in case $T_{CT} = (T_{CP2} - t_{CWH} - t_{CWL}) / 2 < 50$

*3 The intervals of one CP1 fall and the next must be always the same, and CP1s must be input continuously.

6. Module Driving Method

6-1. Circuit configuration

Fig.8 shows the block diagram of the module's circuitry.

6-2. Display face configuration

The display face electrically consists of two (upper and lower) display segments so that the unit may offer higher contrast by reducing drive duty ratio.

Each display segment (640 × 480 dots) is 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.

Display data which are externally divided into data for each row (640 dots) will be sequentially transferred in the form of 4- bit parallel data through shift registers by Clock Signal CP2 from the left top of the display face.

When input of one row (640 dots) is completed, the data will be latched in the form of parallel data for 640 lines of signal electrodes by latch signal (CP1) then, the corresponding drive signals will be transmitted to the 640 lines of column electrodes of the LCD panel by the LCD drive circuits.

At this time, scan start-up signal (S) 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 rows of upper and lower half of the display face according to the combinations of voltages applied to the scan and signal electrodes of the LCD.

While the 1st rows of data are being displayed, the 2nd row of date are entered. When 640 dots of data have been transferred, they latched on the falling edge of CP1 clock, the display face proceeds to the 2nd rows of display.

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.

Scan start -up signal S generates scan signal to drive horizontal electrodes.

Since DC voltage, if applied to LCD panel, causes chemical reaction which will deteriorate LCD panel. 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 as the operating frequency CP2 increases.
Thus the driver LSI applies the system of tranferring 4-bits parallel data through the 4 lines of shift registers to reduce the data transfer speed CP2.
Thanks to the LSI, the power consumption of the display module will be minimized.

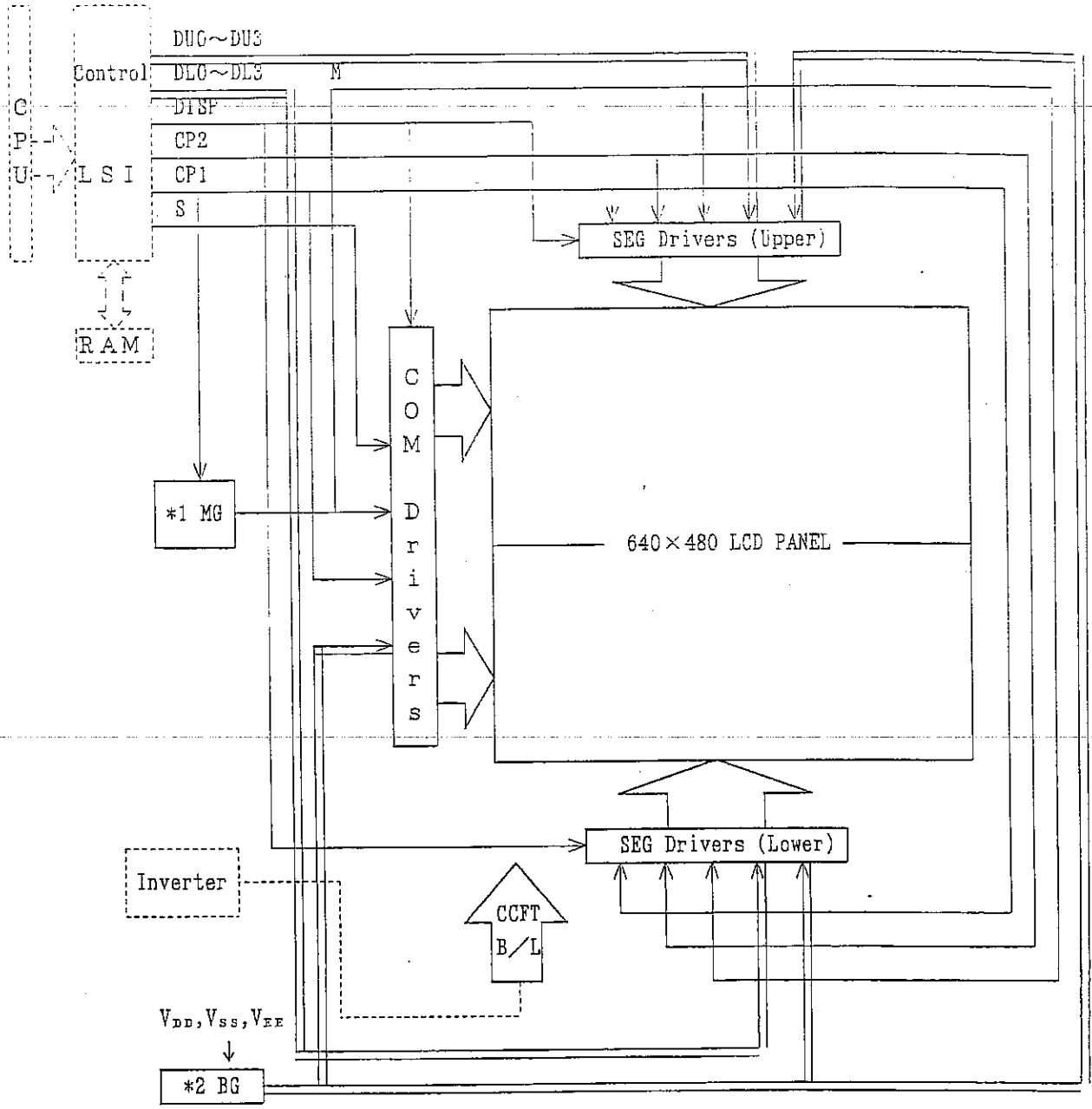
In this circuit configuration, 4-bit display data shall be therefore input to data input pins of DU0 -3 (upper display segment) and DL0-3(lower display segment).

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 of both the upper and the lower display segment 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 of the right next side is selected when data of 80 dots (20CP2) is fed.
This process is simultaneously followed at the column drivers LSI's of both the upper and the lower display segments.
Thus data input for both the upper and the lower display segments must be through 4-bit bus line sequentially from the left end of the display face.

Since this graphic 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.7 and Table 7.



*1 MG: M GENERATOR CIRCUIT

*2 BG: BIAS GENERATOR CIRCUIT

Fig.8 Circuit block diagram

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.

Table 8

Ta = 25 °C, V_{DD}= 5.0 V, V_{EE}-V_{SS} = Vmax

Parameter		Symbol	Condition			MIN.	TYP.	MAX.	Unit	Remark
Viewing angle range		θx	Co>4.0	$\theta y = 0°$	$\theta x \geqq 0°$	-20	-	-	deg	Note 1)
					$\theta x < 0°$	-	-	-25	deg	
		θy		$\theta x = 0°$	$\theta y \geqq 0°$	-20	-	-	deg	
					$\theta y < 0°$	-	-	-10	deg	
Contrast ratio		Co	$\theta x = \theta y = 0°$			10	18	-	-	Note2)
Response time	Rise	τr	$\theta x = \theta y = 0°$			-	200	300	ms	Note3)
	Decay	τd	$\theta x = \theta y = 0°$			-	150	250	ms	

Note 1) The viewing angle range is defined as shown Fig.9.

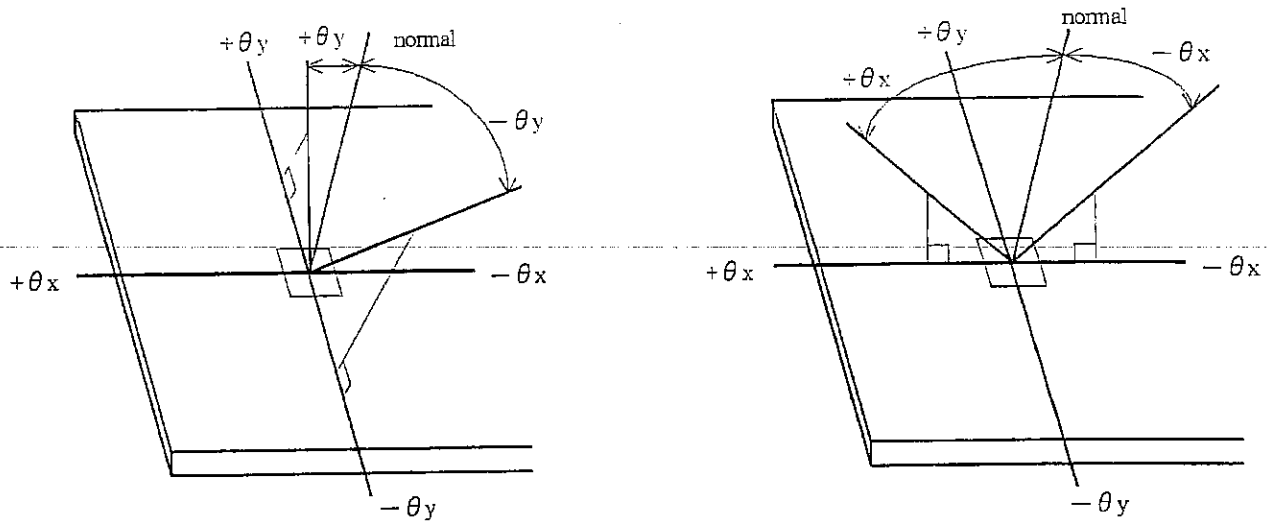


Fig.9 Definition of Viewing Angle

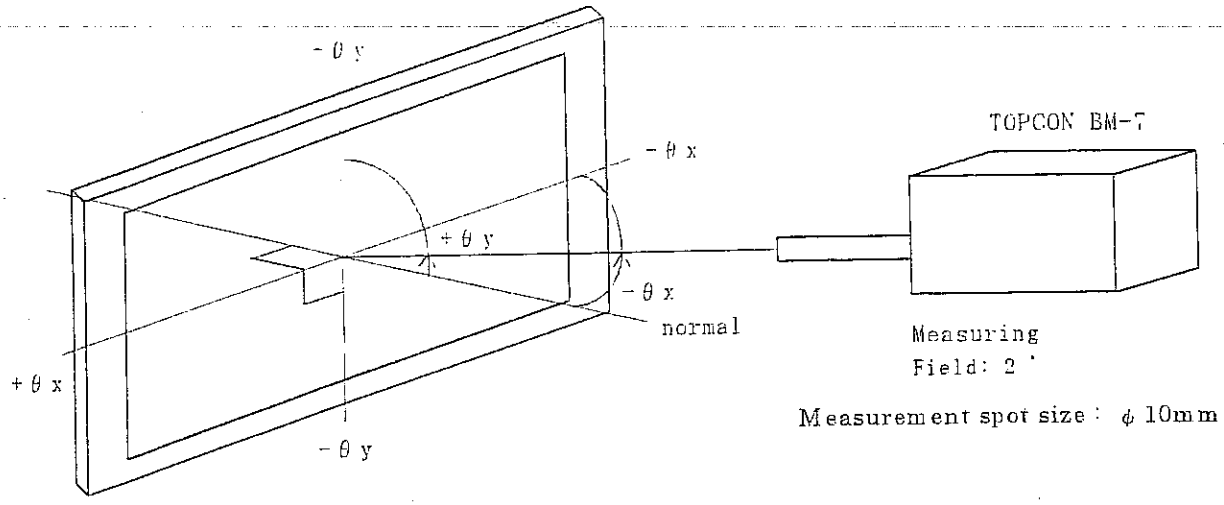
Note 2) Contrast ratio is defined as follows:

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

(Measured as shown in Fig.9 and Fig.10.)

Vmax is defined in Fig.11.

Note 3) The response time of photo-detector output are measured as shown in Fig.12, assuming that input signals are applied so as to select and deselect the dot to be measured, in the optical characteristics measuring method shown in Fig.13.



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.9 Optical characteristics measuring method I (transmissive mode)

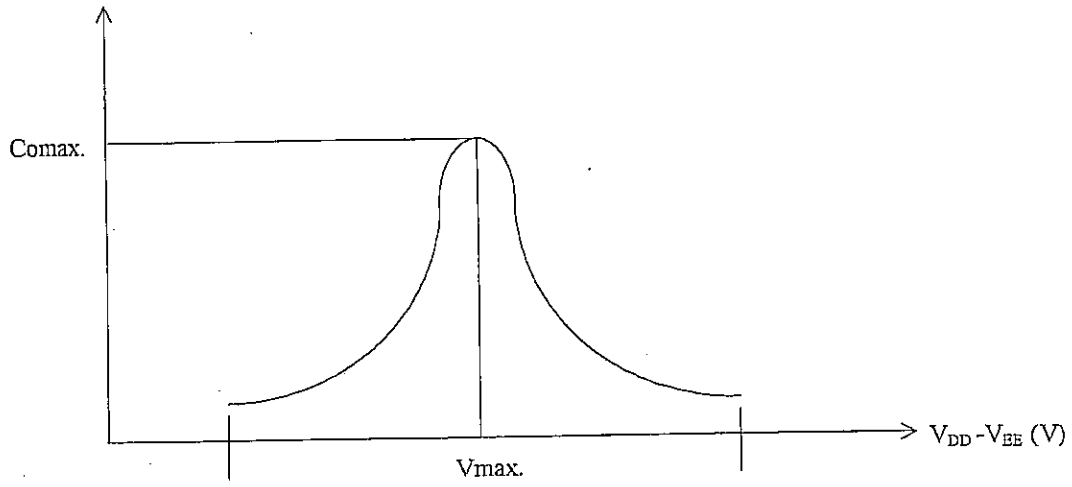


Fig.11 Definition of Vmax

(Response Measurement)

Ta = 25 °C

In dark room

TOPCON BM7 + quartz fiber

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

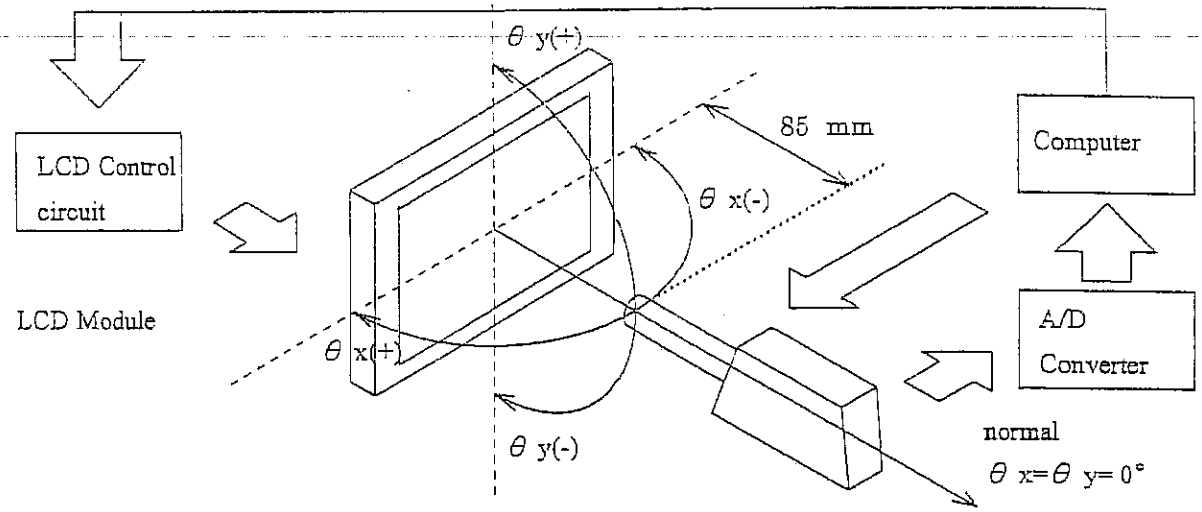
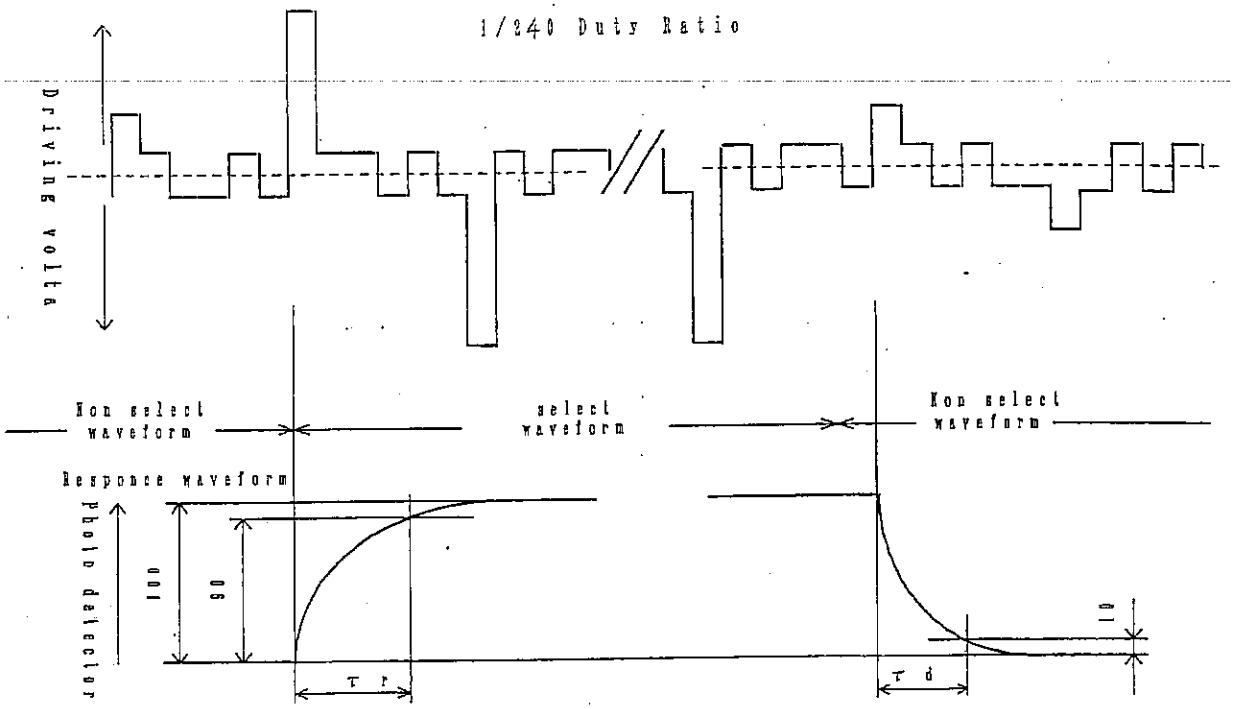


Fig.12 Optical Characteristics Test Method II



τ r : Rise time

τ d : Decay time

Fig.13 Definition of Response time

8.Characteristics of Backlight

The ratings are given on condition that the following conditions are satisfied.

1) Rating(NOTE)

Parameter	Min	Typ	Max	Unit
Brightness	60	75	—	cd/m²

2) Measurement circuit : LM000106(SHARP) (at IL=5 mArms)

3) Measurement equipment: BM-7 (TOPCON)

4) Measurement conditions

4-1 Measurement circuit voltage: DC=12 V at primary side

4-2 LCD: All digits WHITE, VDD=5 V,VDD-VEE=Vmax,DU0～DU3 (refer Fig.6) DL0～DL3="H"(WHITE)

4-3 Ambient temperature: 25 ℃

Measurement shall be executed 30 minutes after turning on.

5) Lamp

5-1 Ratings(1pc)

Parameter		Max. allowable value
Circuit voltage(VS)	1,000 Vrms MIN	1,500 Vrms
Discharging tube current(IL)	5 mArms TYP	6 mArms *
Power comsumption	2.1 W	—
Discharging tube voltage(VL)	500 Vrms TYP	—
Brightness(B)	32,500 cd/m² TYP	—

Within no conductor closed.

* It is recommended that IL be not more than 5 mArms so that heat radiation of CCFT backlight may least affect the display quality.

5-2 Operating life time

Parameter	Min.	Typ.	Max.	Unit	Conditions
operating life time	15,000	25,000	-	hours	IL= 5 mArms

(CCFT invecter LM000106 or equivalent)

The inverter should meet the following conditions;
-Sine,symmetric waveform without spike in positive and negative.

—The voltage at the secondary side is 1,000 Vrms or more.
-Illuminance frequency is from 25kHz to 45kHz.

The operating life time is defined as having ended when any of the following conditiones occur; (25±5 ℃)
-When the voltage required for initial discharge has reached 980 Vrms or when it has reached 10.8 V-DC when used an inverter.
-When the illuminence or quantity of light has decreased to 50 % of the initial value.

(NOTE) Rating are defined as the average brightness inside the viewing area specified in Fig.14.

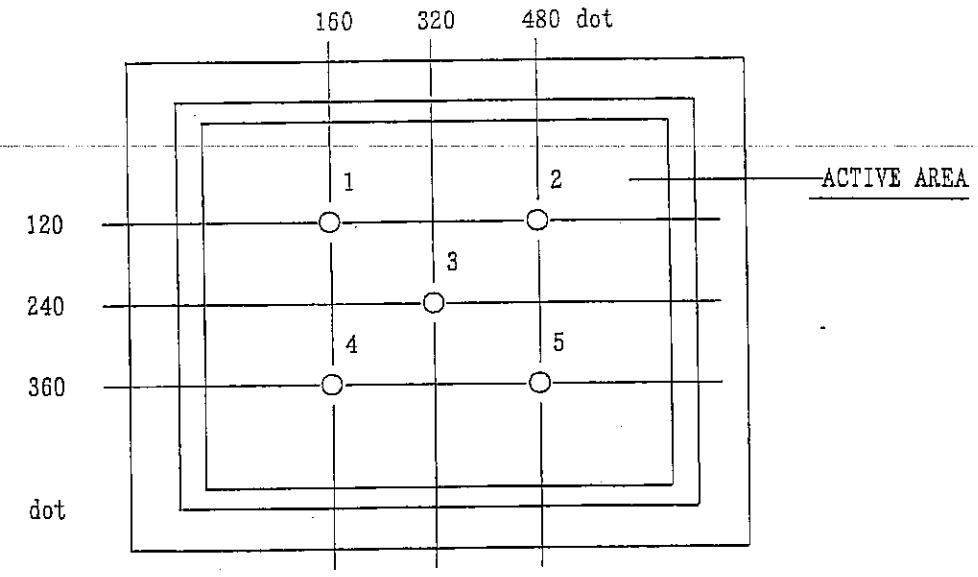
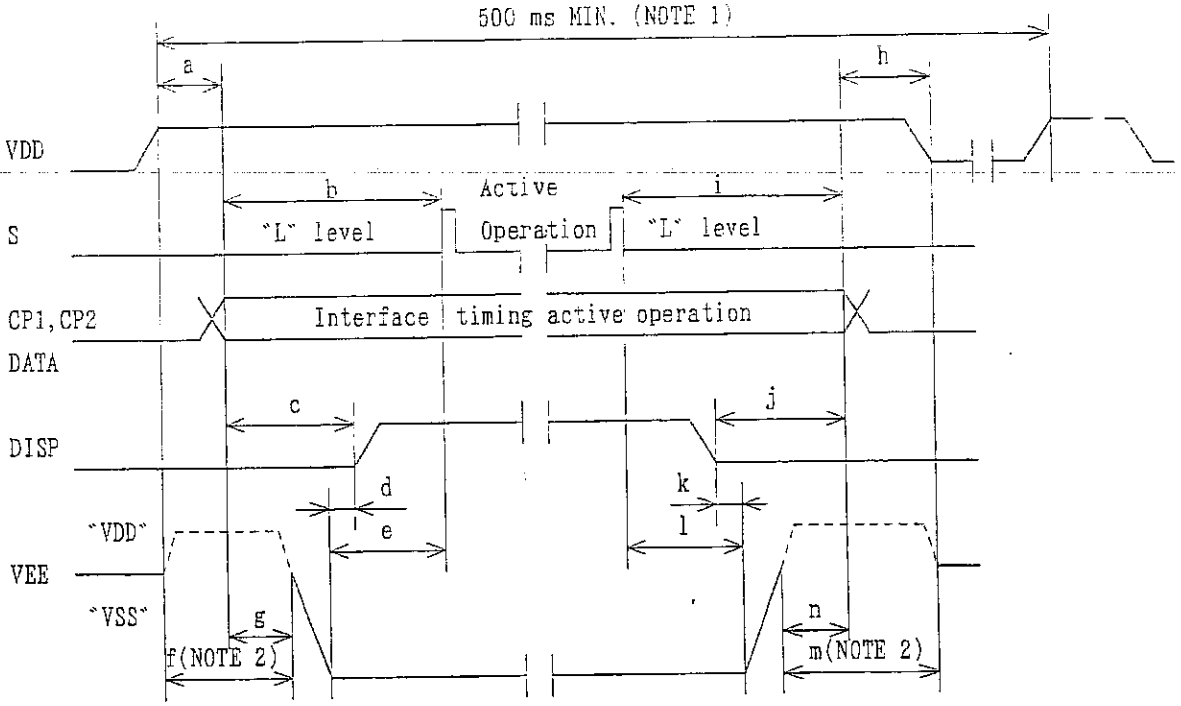


Fig.14 Measuring points(1~5)

9. Supply voltage sequence condition



POWER ON		
SYMBOL	With DISP control	Without DISP control
a	0 ms MIN.	0 ms MIN. 20 ms MAX.
b	0 ms MIN.	20 ms MIN.
c	20 ms MIN.	-
d	0 ms MIN.	-
e	-	0 ms MIN.
f	0 ms MIN.	(NOTE2)
g	-	0 ms MIN. 100 ms MAX.

POWER OFF		
SYMBOL	With DISP control	Without DISP control
h	0 ms MIN.	0 ms MIN. 20 ms MAX.
i	0 ms MIN.	20 ms MIN.
j	20 ms MIN.	-
k	0 ms MIN.	-
l	-	0 ms MIN.
m	0 ms MIN.	(NOTE2)
n	-	100 ms MIN.

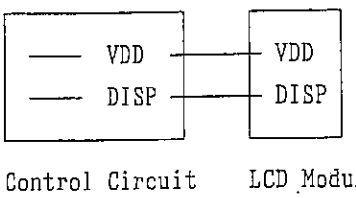
(NOTE 1) Power ON/OFF cycle time. All signals and power line shall be in accordance with above sequence in case of power ON/OFF.

(NOTE 2) VEE to be set at "VDD level" or "open". VEE should be in accordance with the dotted line when DISP(display control signal) is not used.

(NOTE 3) Connection of DISP (pin.No.4)

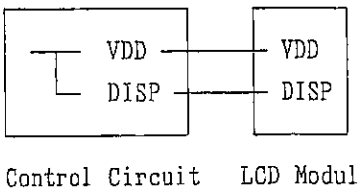
○With DISP control

Input DISP control signal shown on this page.



○Without DISP control

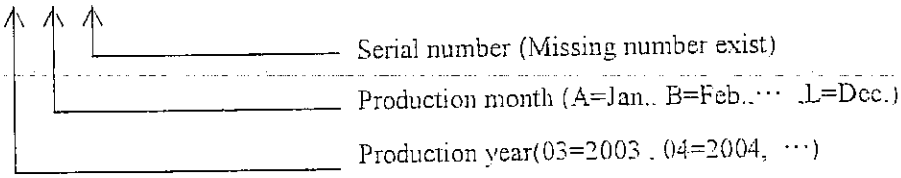
DISP to be connected with VDD.



10. Lot Number

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

(Example) 03 E 00001



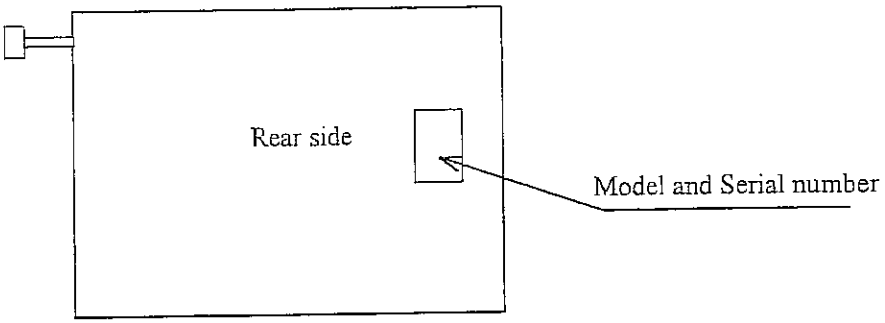


Fig.15

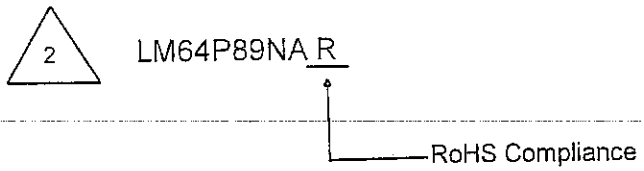
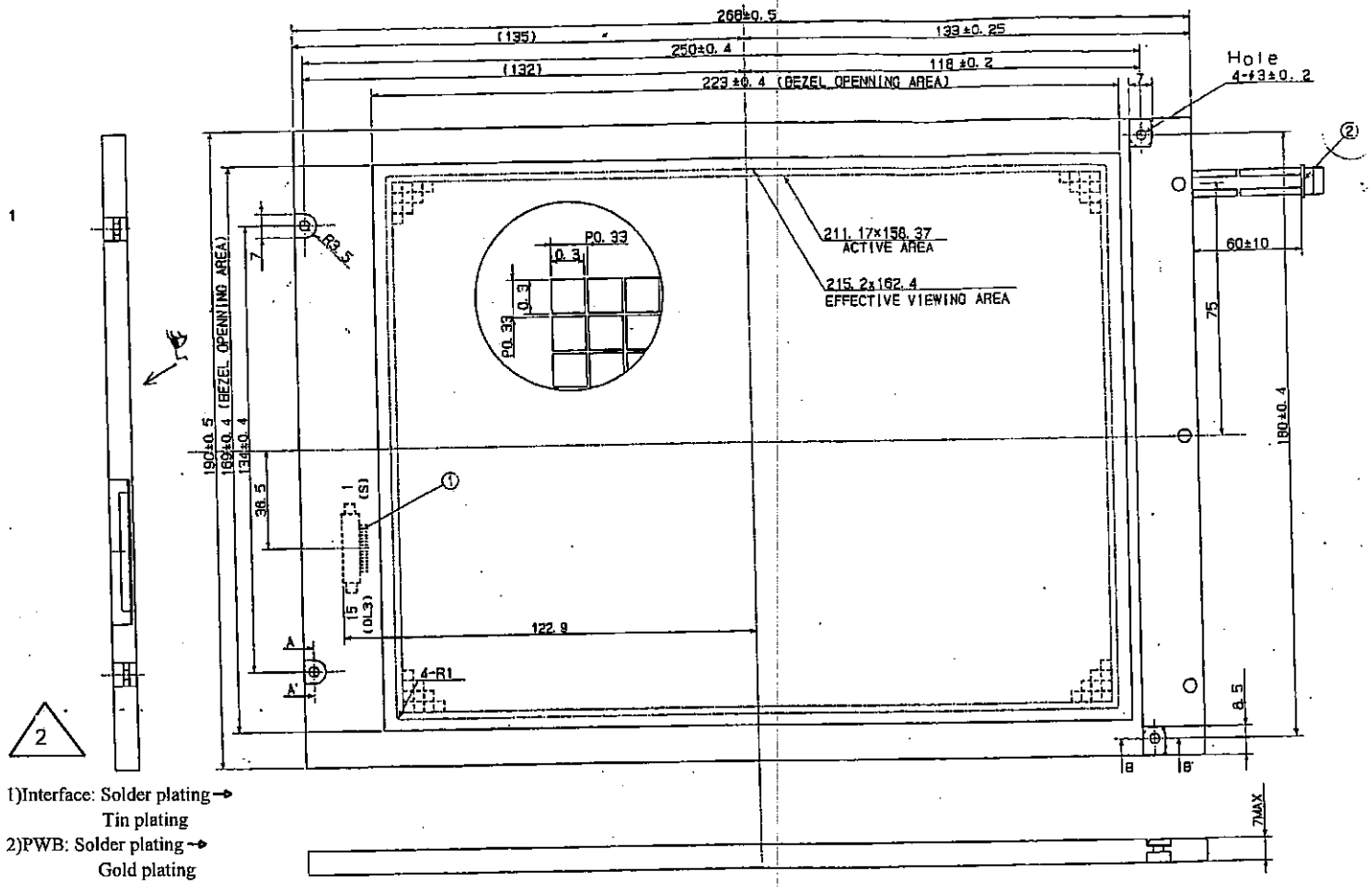
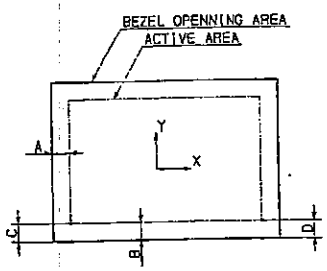


Fig.16



BEZEL/DISPLAY POSITION



1)TOL(TOLERANCE)X-direction A:5.9±0.6
2)TOL(TOLERANCE)Y-direction B:5.3±0.6
3)OBLIQUITY of DISPLAY AREA |C-D|<0.6

1 INTERFACE CONNECTOR(15pins)
~~SD-53261-1510~~ (MOLEX) △2 SD-53261-1571

2 CCFT CONNECTOR
M63MB3-04 (MITSUMI)

INTERFACE PIN LAYOUT

PIN#	1	2	3	4	5	6	7	8
Symbol	S	CP1	CP2	旧1*	VDD	VSS	VEE	DUO
PIN#	9	10	11	12	13	14	15	
Symbol	DU1	DU2	DU3	DL0	DL1	DL2	DL3	

△2

1)Interface: Solder plating → Tin plating
2)PWB: Solder plating → Gold plating
- Material on PWB: Soldering for mounting:Lead (Pb) solder → Lead(Pb) free solder
- Lead: Solder plating → Tin plating

3) CCFT UNIT: Lead(Pb) solder & wire → Lead(Pb) free solder & wire(UL style No.)
4) Model No. label : Suffix"R"
5)Screw:With hexavalent chromium → hexavalent chromium free

2005.6.6	RoHS Compliance	陳忠	LM64P89N
△2 2003.4.16	Revised ambient temp and electronic parameters RIVISE		

DATE	No.	PREPA	MODEL
MATERIAL	THICKNESS	FINISH	SCALE

DESIGN	DRAWN	CHECK	APPROVE
		M. KIKUCHI	

SHARP CORPORATION
シャープ(株) MB液晶(事本)
設計部門 設計C第1開発部

NAME	640X480Dots 0.33Pitch LCD UNIT OUTLINE DIMENSIONS
SYMBOL	
PARTS CODE	
DATE	2003・2・12
DRAWING No.	WSJ-03029

指示なき寸法公差は UNSPECIFIED TOL TO BE ±0.5 とする