CONTENTS

1. Table of date-revision

Date	Item	Revision point
AUG.,27.1990	PAGE 5/16	CORRECT THE SYMBOL OF SOURCE CURRENT ISS→IDD

2. Scope

This specification is applied to the liquid crystal display module LSSDB3011A operated with 1/64 duty.

3. Display contents

240 dots (W) × 64 dots (H)
Display mode : Reflective Positive type
Background color : gray(STN)

4. Mechanical characteristics

Item	Specification	Unit
Out line dimension	180 (W) × 75 (H) × 12(D)	mm
Viewing area	154 (W) × 48 (H)	mm
Weight	(about 120)	g

Note : (D) shows maximum length

5. Block diagram

Reference to attached circuit diagram

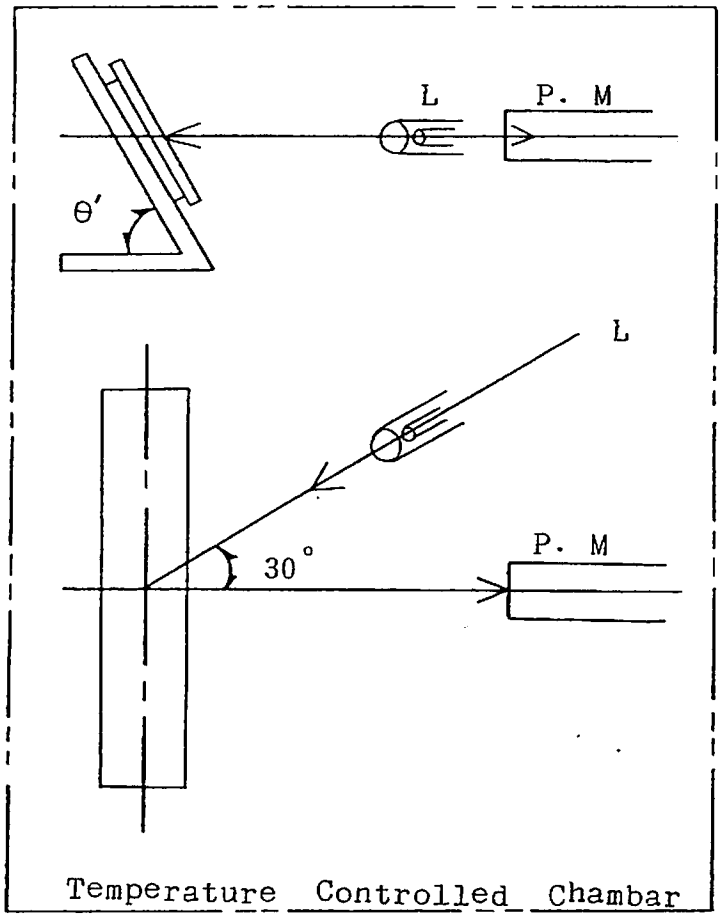
6. Electro-optical characteristics

6-1. Electro-optical characteristics

No.	Item	Symbol	Unit	Temp.(℃)	Std. value Min.	Typ.	Max.	Note
1.	Operating voltage	Vop	V	25	11.8	12.4	13.0	
				0	13.0	13.5	14.2	
2.	Response rise time	tr	msec	0			800	Note 1
			msec	25		120	200	
	Response fall time	tf	msec	0			1500	
			msec	25		250	350	
3.	Frame frequency	fF	Hz			70	120	Note 1
4.	Recommendable viewing angle	θ。	degree			90		Note 2
5.	Viewing angle							K≧2
	front-rear direction	θ	degree		30			Note 2
	right-left direction	ψ	degree				±50	Note 2
6.	Contrast	K		25	3.0	4.0		Note 3

6 – 2 Measuring instruments for electro-optical characteristics

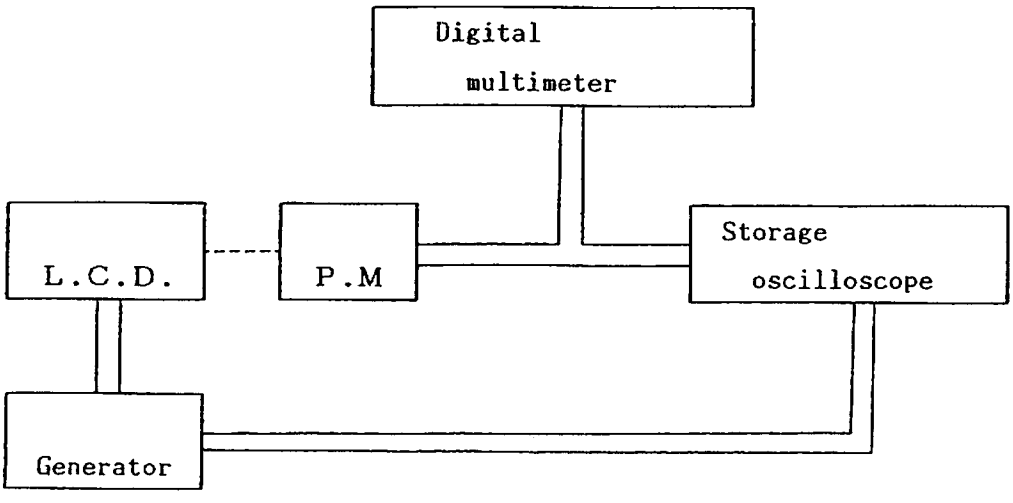
Photometer Type ; canon LC – 3S



L:Light source (Halogen lamp)

P.M:Photo sensor of photomultiplier

6 – 3 Block diagram of system



7. Electrical characteristics

7－1 Maximum rating

Item	Symbol	Min.	Max.	Unit
Source voltage for logic	VDD－VSS	－0.3	6	V
Source voltage for LCD	VDD－VEE	0	16	V
Input voltage	Vi	－0.3	VDD+0.3	V
Operating temperature	Ta	0	50	℃
Storage temperature	Tstg	－20	70	℃

7－2 Electrical characteristics

Condition : VDD = 5.0V ± 5%　　Ta = 25 ℃

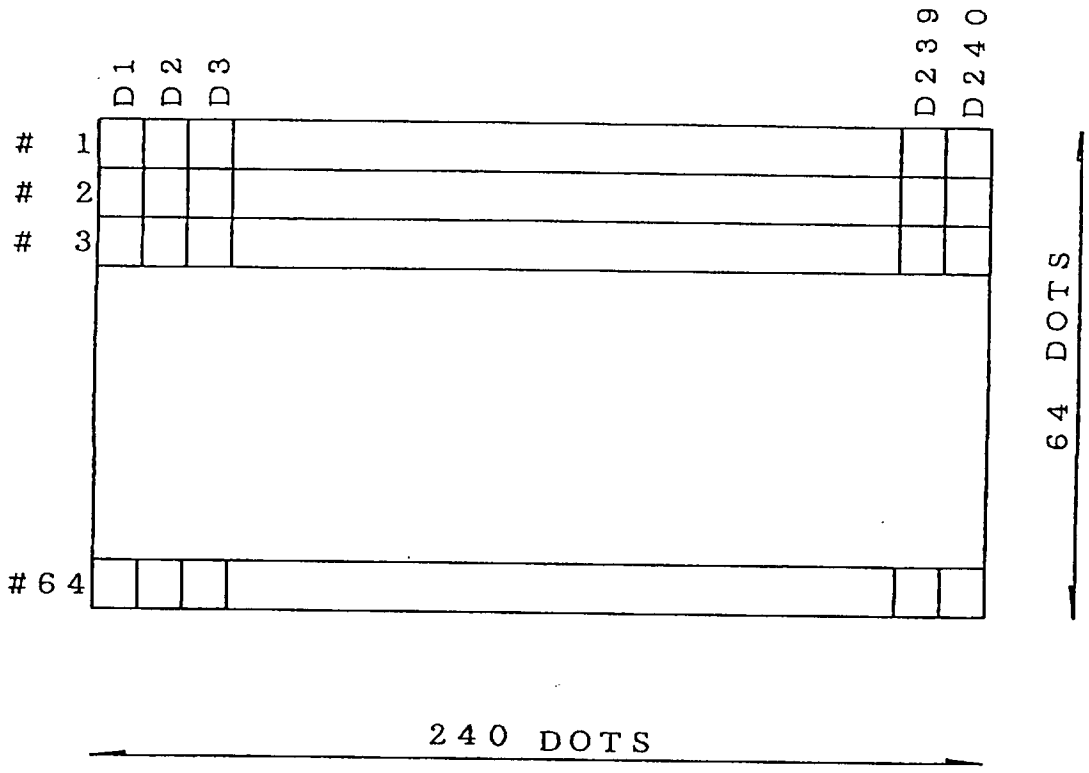
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Input high level voltage	VIH	－	0.8VDD	－	VDD	V
Input low level voltage	VIL	－	0	－	0.2VDD	V
Output high level voltage	VOH	－	VDD-0.4	－	－	V
Output low level voltage	VOL	－	－	－	0.4	V
⚠ IDD Source current	~~ISS~~	VDD=5.0	－	3.6	6.5	mA
	IEE	VDD-VEE=12.4V	－	1.4	2.8	mA

8. Interface

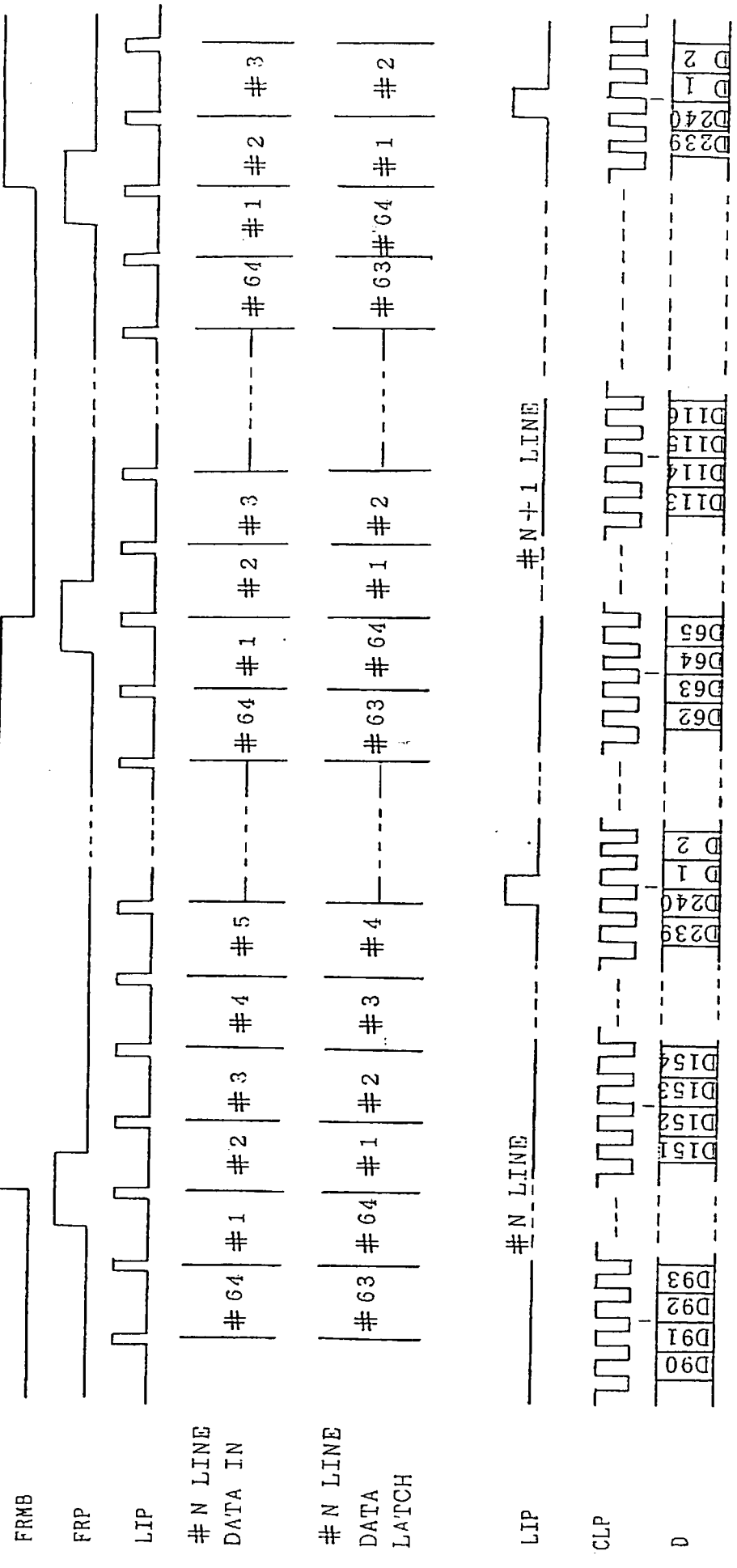
8 – 1 Interface Pin connection

Pin No.	Symbol	Function
1	VEE	Power supply for LCD driver
2	CLP	Shift clock of display
3	D	Input data
4	LIP	Latch pulse of display data and shift clock for common driver
5	FRMB	Switch signal to convert LCD drive wavetorm into AC.
6	FRP	Frame pulse for common driver
7	VDD	Power supply for logic circuit
8	VSS	Power supply (GND)

8 – 2 Relation between the input data and each DOT



8 – 3 Timing chart

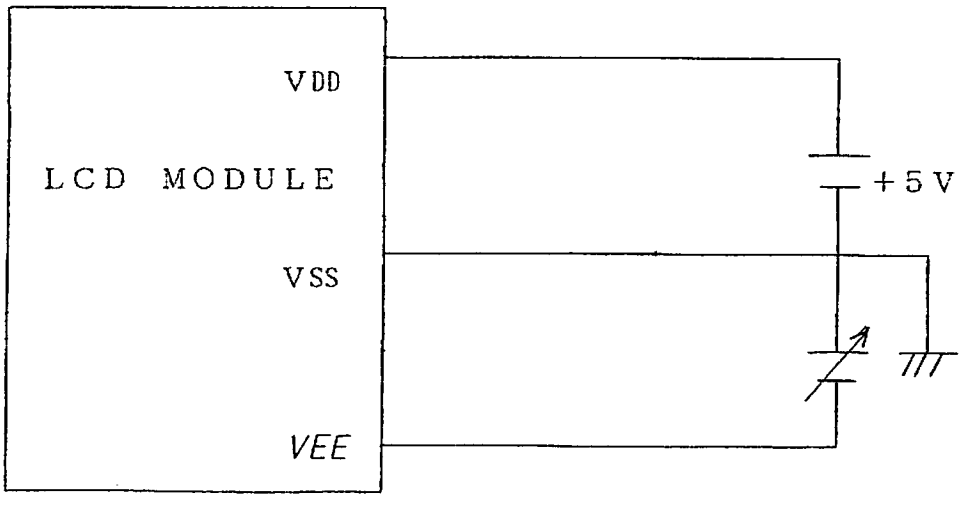


8－4 Switching characteristics

(VDD=5V±10%, Ta=－20～85℃, CL=15pE)

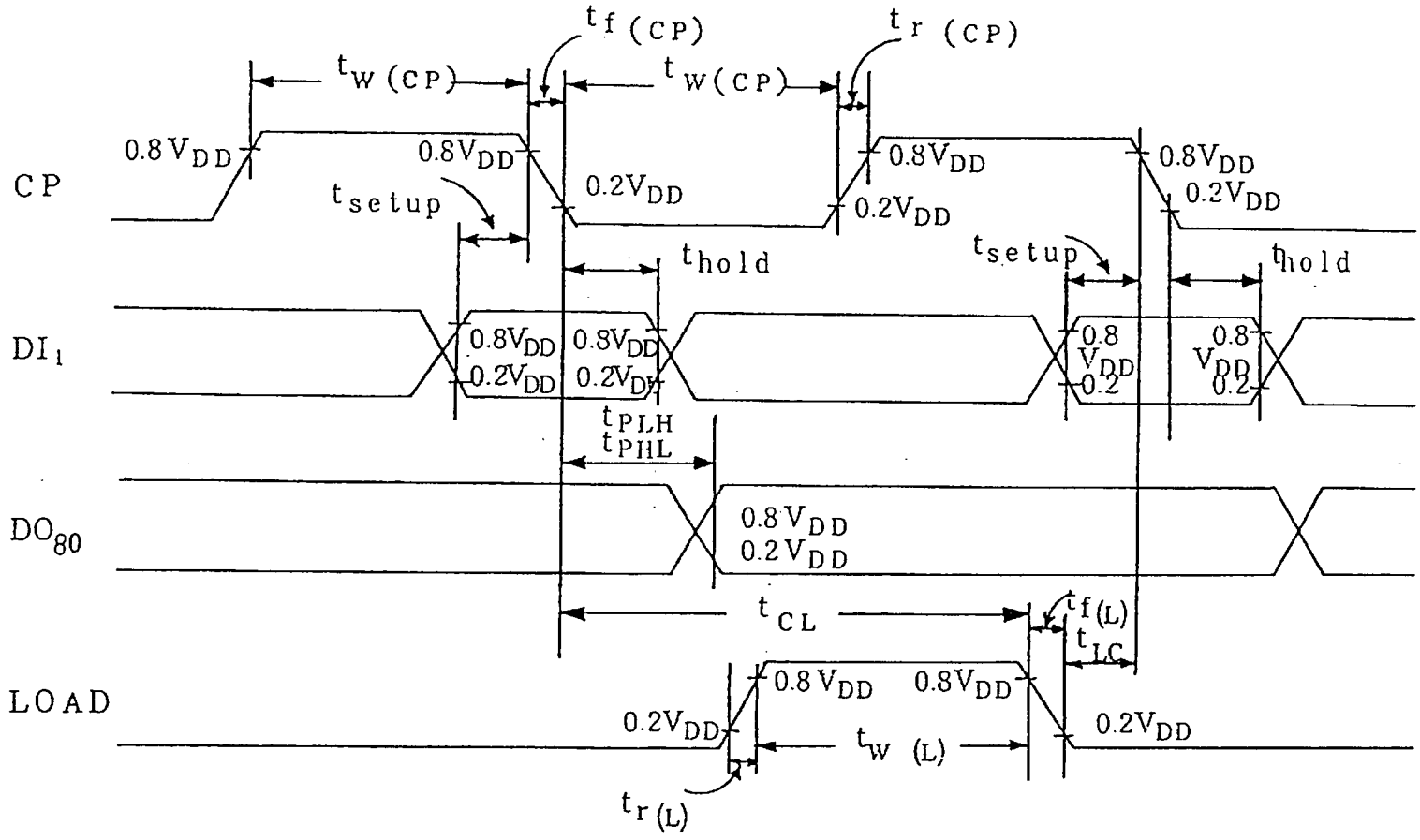
ITIM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT.
H, L DELAY TIME	t PLH t PHL	－	－	－	250	ns
CLOCK PULSE FREQUENCY	f CP	DUTY=50%	－	－	3.3	MHz
CLP PULSE WIDTH	t W(CP)	－	125	－	－	ns
LOAD PULSE WIDTH	t W(L)	－	125	－	－	ns
SET UP TIME DI CP	t setup	－	100	－	－	ns
CP LIP	t CL	－	250	－	－	ns
LOAD CP	t LC	－	0	－	－	ns
ホールド DI CP	t hold	－	100	－	－	ns
CP RISE AND FALL TIME	t r(CP) t f(CP)	－	－	－	50	ns
LOAD RISE AND FALL TIME	t r(L) t f(L)	－	－	－	1	ns

8－5 Example of the power-supply circuit of the LCD module



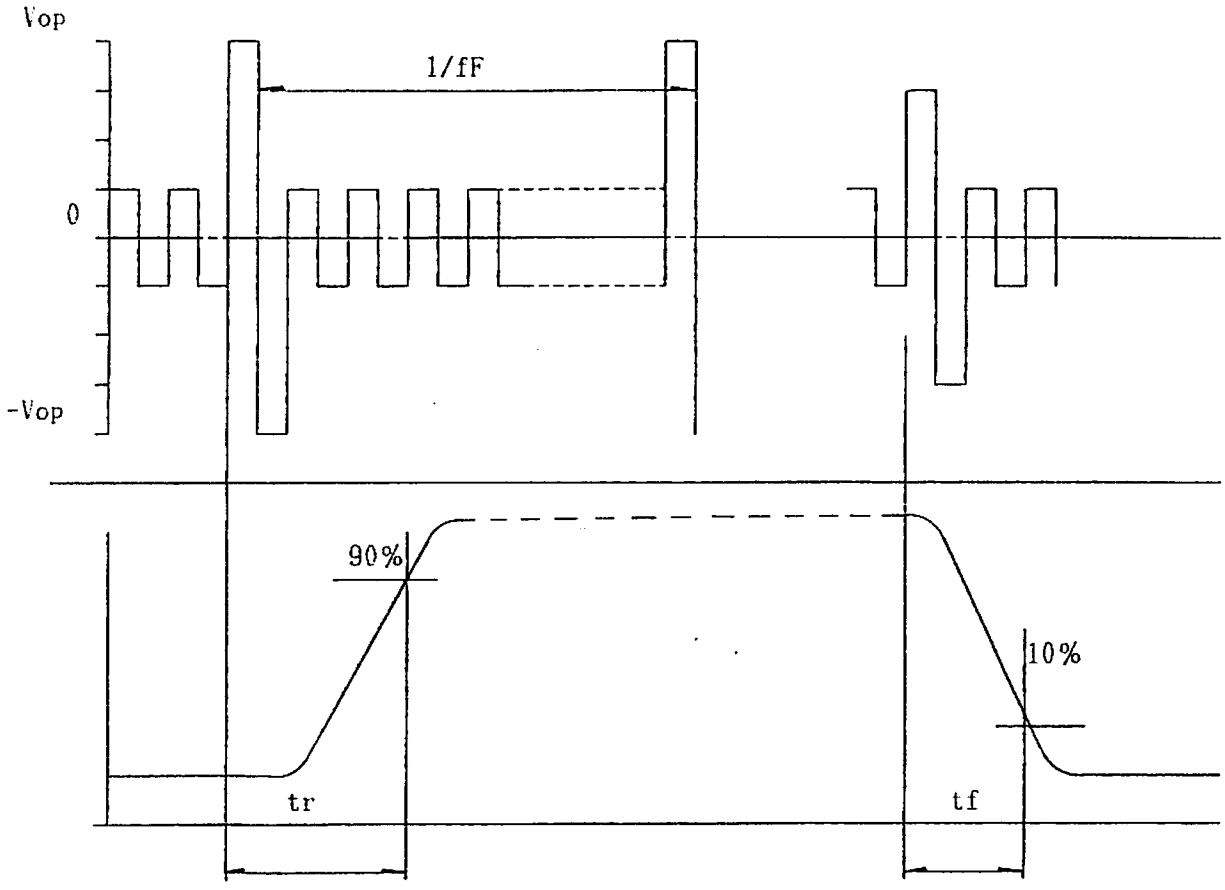
VR : Typ. 10KΩ～20KΩ

Switching characteristics



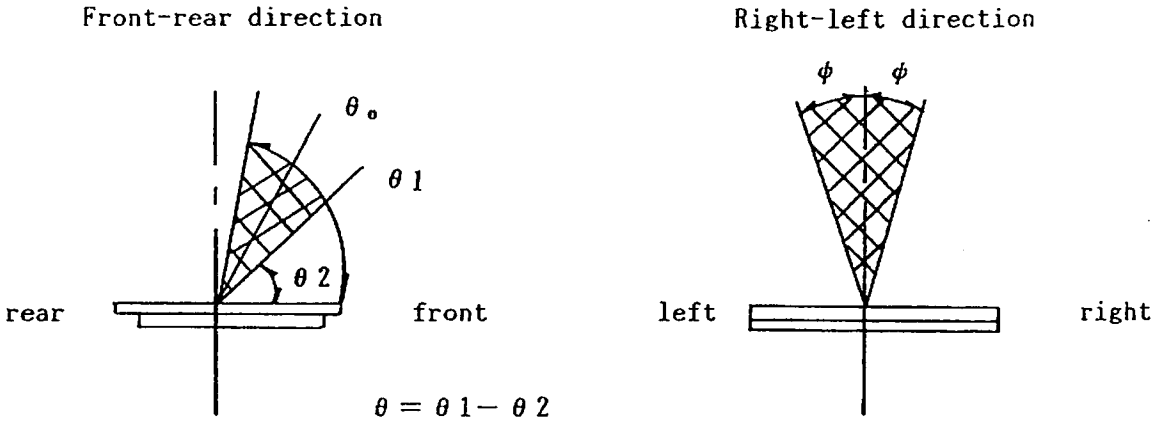
Note 1. Definition of response time and measuring condition.

Response time is measured at the point whose response is the slowest of all segments under the following condition.



Condition	a) Temperature		0℃, 25℃
	b) Frame frequency	fF	70Hz
	c) Viewing angle		90°
	d) Operating voltage	Vop	12.4V(25℃),13.5V(0℃)

Note 2. Definition of viewing angle



Note 3. Definition of contrast ratio

Contrast ratio is defined under the following condition.

$$\frac{\text{reflectance value of non-selected condition}}{\text{reflectance value of selected condition}}$$

a)	Temperature		25℃
b)	Frame frequency	fF	70Hz
c)	Viewing angle	θ_o	90°
d)	Operating voltage	Vop	12.4V

9. Reliability

9－1 High temperature operation

Normal performance : After leaving them in on－state under normal humidity (less than 30% R.H) at 50℃ for 120 hours.

9－2 Low temperature operation

Normal performance : After leaving them in on－state under normal humidity (less than 60% R.H) at 0℃ for 120 hours.
Pay attention to keep dewdrops from the module during this test.

9－3 High temperature storage

Normal performance : After leaving them in off－state under normal humidity (less than 30% R.H) at 70℃ for 120 hours.

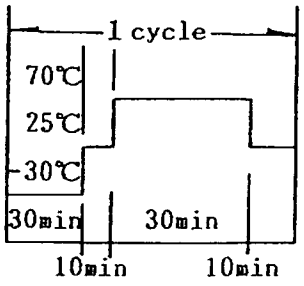
9－4 Low temperature storage

Normal performance : After leaving them in off－state under normal humidity (less than 60% R.H) at -25℃ for 120 hours.

9－5 High temperature and high humidity storage

Normal performance : After leaving them under the condition of 95% R.H and 40℃ for 120 hours.
Pay attention to keep dewdrops from the module during this test.

9－6 Heat cycle test



Normal performance : After ten cycle

9 − 7 Vibration

Normal performance : After leaving them under the following conditions.

Frequency	:	10～55 Hz
Maximun acceleration	:	5 G
1 cycle time	:	1 minute
Time	:	X.Y.Z. each direction for 15 minutes

9 − 8 Drop inpact test

Normal performance : After dropping them through 0.70 meter to strike a 30−㎜ lauan board in packing.

9 − 9 Life time

Expected life is more than 50,000 hours under normal operating condition.

10. Handling precaution

10-1 LCD surface

(1) Note that polarizers are so soft that it can be easily damaged. Do not press polarizer surface with hard object.

(2) When LCD surface becomes dirty, wipe softly with absorbent cotton soaked in benzine .
Do not use acetone and something like that kind solvent, or you will damage the polarizer surface.

10-2 Installment

(1) LSIs on the P.W.B. are easily damaged by static electricity.
Body should be connected to the G.N.D. through high resistance about 1MΩ to discharge it in order to protect them from damage caused by static electricity.

(2) Refrain from strong pressure or bending force when you install it to the case.

(3) Place a proper protective cover over the LCD surface in order to protect polarizer surface from scratch or strain.

10-3 Operation

(1) Contrast ratio of the LCD panel changes under operating condition such as viewing angle, operating temperature etc.
Please adjust operating voltage Vop within suggested range in this specification.

(2) When dewdrops are on the LCD module after some kind of test, dry it sufficiently before operating.

10－4 Storage

(1) Refrain from keeping it under the condition of high temperature and high humidity.

10－5 Packing

Attention is to be paid so that the products are not damaged during transportation.

10－6 Indication of manufacturing No.

(1) Manufacturing No. is to be written on the P.C. board the side on which LSIs are mounted.

(2) Manufacturing No. has eight digit as fllows.

0	0 1	— — — — —
1990	01～12	serial No.
(Year)	(Month)	

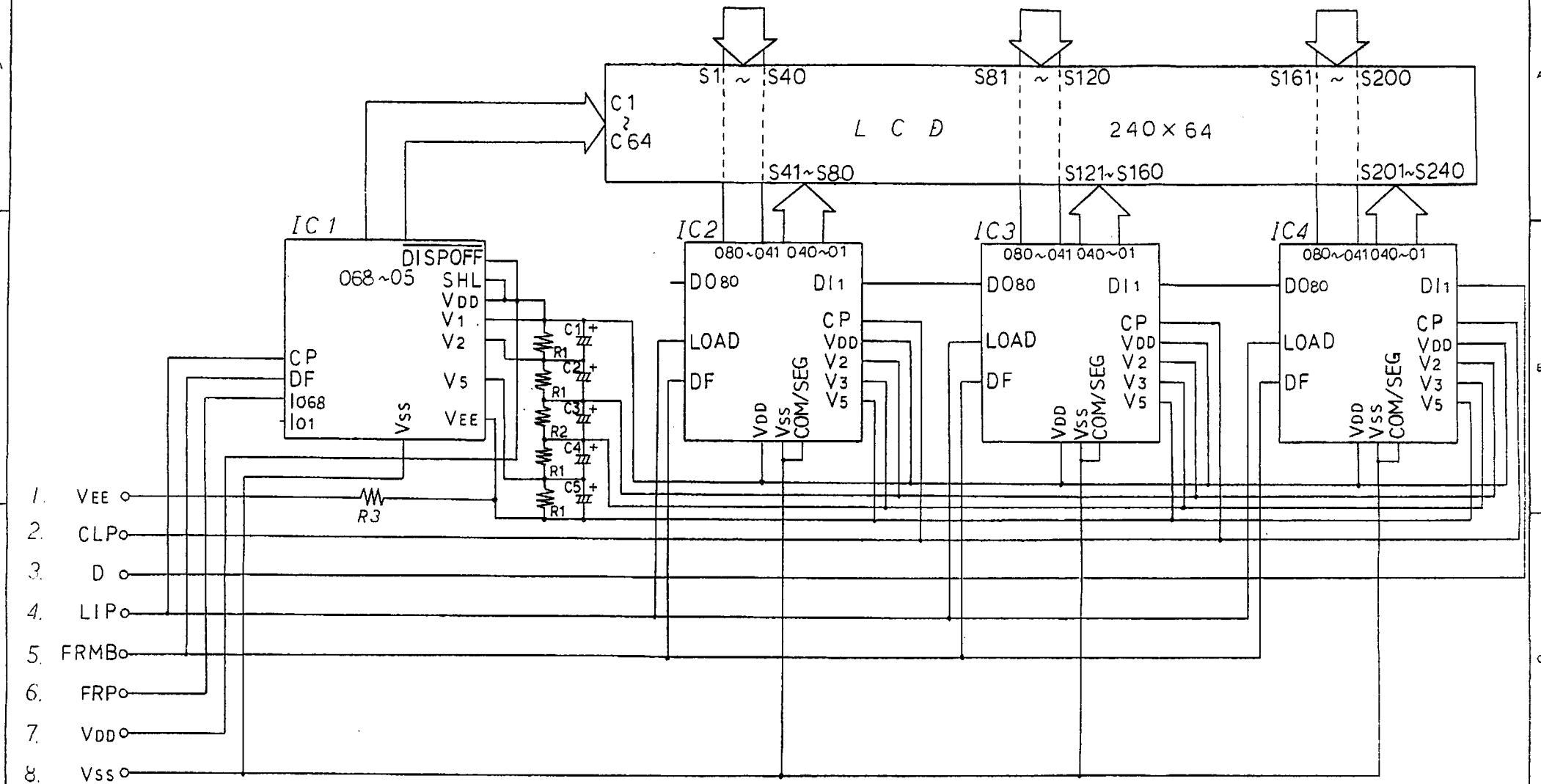
11. Whether or not being Strategic Product with regard to COCOM

This product is not Strategic Product subject to COCOM regulation.

12. Drawing

(1) LCD UNIT CIRCUIT DIAGRAM

(2) LCD UNIT



IC1	: MSM5298A OR MSM5298
IC2~IC4	: MSM5260
R1	: 1KΩ
R2	: 5.1KΩ
R3	: 150Ω
C1~C5	: 10μF

PART NO.	NAME	MATERIAL	SPEC	FINISH
—	—	—	—	—

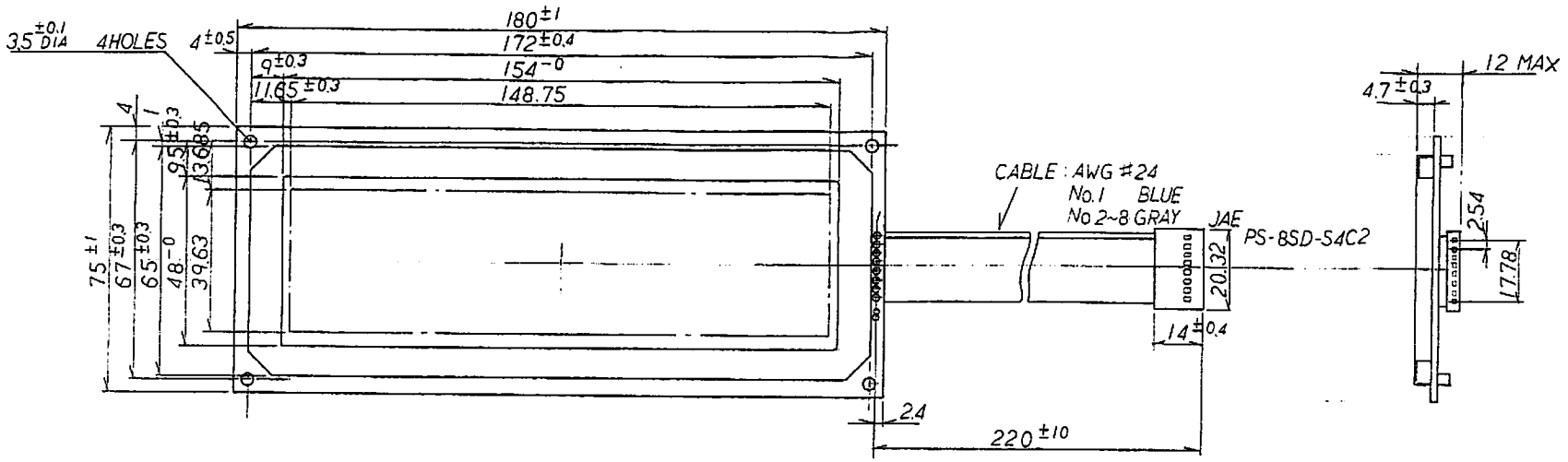
ALPS ELECTRIC CO., LTD.

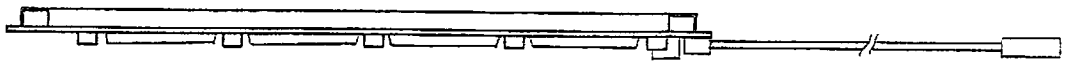
UNIT	SCALE	
mm	1/1	LSSDB3011A

APPD.	CHKD.	DSGD.	TITLE
Apr.18.90 T.Yamaguchi	18.APR.90 Y.Kato	18.Apr.90 N.Sato	CIRCUIT DIAGRAM

DOCUMENT NO.

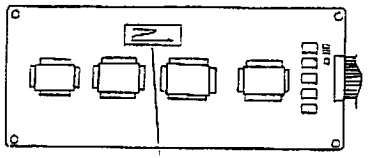
ZONE	SYMB.	DATE	APPD.	CHKD.	DSGD.



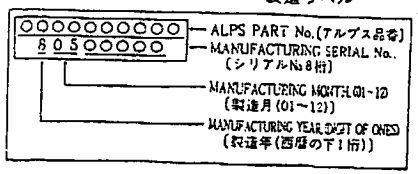


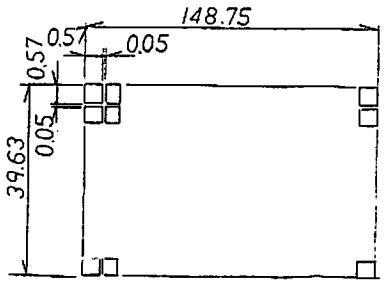
Manufacturing No. label position

製造ラベル貼り位置



Manufacturing No. label 製造ラベル





4．本製品は、反射ポジ表示である。
3．本製品は、S TN グレーモードである。(背景色：グレー)
2．表示文字の寸法公差は、±0.1 とする。
注記) 1．本製品は、仕様書 LSSDBS011A に基づく。

4. DISPLAY MODE IS REFLECTIVE AND POSITIVE TYPE.
3. DISPLAY MODE IS S TN GRAY TYPE.
2. THE TOLERANCE OF DISPLAY OUTLINE DIMENSIONS IS ±0.1mm.
NOTE) 1. REFER TO SPEC No. LSSDB30:1A FOR THE SPECIFICATION OF LCD.

PART NO.	NAME	MATERIAL	SPEC	FINISH

ALPS ELECTRIC CO., LTD.

UNIT mm | SCALE 1:1 | LSSDB3011A

APP'D Apr.27.'90 | CHKD Apr.27.'90 | DSGD Apr.27.'90 | TITLE L C D MODULE

DRAWING NO.

ZONE | SYMB. | DATE | APPD. | CHKD | DSGD