HITACHI

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For Messrs : STD Date : Aug.25.'94

CUSTOMER'S ACCEPTANCE SPECIFICATIONS

LMG7380QHFC 481580

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Accepted by: _____ Proposed by: W. J. HWANG

3. MECHANICAL DATA

(1)	PART NAME	LMG7380QHFC
(2)	MODULE SIZE	160.0 (w)mm× 68.0 (H)mm× 11.0 (D)mm max.
(3)	DOT SIZE	0.44 (w)mm× 0.44 (H)mm
(4)	DOT PITCH	0.47 (w)mm× 0.47 (H)mm
(5)	NUMBER OF DOTS	256 (W) × 64 (H)DOTS
(6)	DUTY	1/64
(7)	LCD	FILM TYPE BLACK/WHITE (POSITIVE/NEGATIVE TYPE) THE UPPER POLARIZER IS ANTI-GLARE TYPE.(HARDNESS.3H) THE BOTTOM POLARIZER IS TRANSMISSIVE TYPE.
(8)	VIEWING DIRECTION	6 O'CLOCK
(9)	BACK LIGHT	COLD CATHODE FLUORESCENT LAMP
(10)	CONTROLLER	T6963C

5.1 ELECTRICAL CHARACTERISTICS OF LCM

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
POWER SUPPLY VOLTAGE FOR LOGIC	VDD-VSS	-	4.75	5.0	5.25	V
LC DRIVER CIRCUIT POWER SUPPLY VOLTAGE	VEE-VSS	-	-15.5	-15.0	-14.5	V
INPUT VOLTAGE	VI	H LEVEL	0.8VDD	-	VDD	V
		L LEVEL	0	-	0.2VDD	V
POWER SUPPLY CURRENT FOR LOGIC NOTE 1	IDD	VDD-VSS=5.0V	-	11.7	14.0	mA
POWER SUPPLY CURRENT FOR LCD RIVING NOTE 1	IEE	VDD-VSS=5.0V	-	2.5	4.0	mA
RECOMMENDED	VDD-V0	Ta= 0℃, ϕ=10°	-	(16.9)	-	V
LC DRIVING VOLTAGE		Ta=25℃, ϕ=10°	-	(15.8)	-	V
NOTE 2		Ta=40℃, ϕ=10°	-	(15.4)	-	V
FRAME FREQUENCY NOTE 2	fFRAME	-	-	75	-	Hz

NOTE 1 fFRAME=75Hz, VDD-V0 = (15.8) V, Ta=25℃

NOTE 2 RECOMMENDED LC DRIVING VOLTAGE FLUCTUATE ABOUT ±1.0V BY EACH MODULE.
TEST PATTERN IS ALL " 0" .

NOTE 3 NEED TO MAKE SURE OF FLICKERING AND RIPPLING OF DISPLAY WHEN SETTING THE FRAME FREQUENCY IN YOUR SET.

6. OPTICAL CHARACTERISTICS

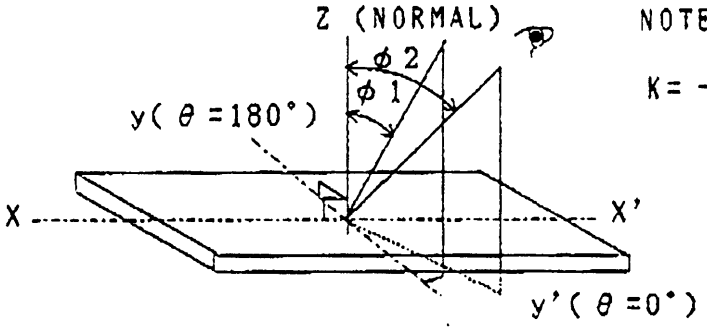
6.1 OPTICAL CHARACTERISTICS

Ta=25℃ (BACKLIGHT ON)

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	$\phi 2-\phi 1$	K ≧ 2.0	30	40	-	deg	1.2
CONTRAST RATIO	K	$\phi=10°$ $\theta=0°$	-	20	-	-	3
RESPONES TIME (RISE)	tr	$\phi=10°$ $\theta=0°$	-	(160)	-	ms	4
RESPONES TIME (FALL)	tf	$\phi=10°$ $\theta=0°$	-	(110)	-	ms	4

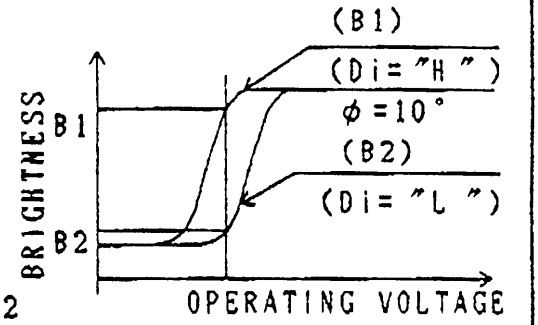
(MEASURE CONDITION BY HITACHI)

NOTE1. DEFINITION OF θ AND ϕ

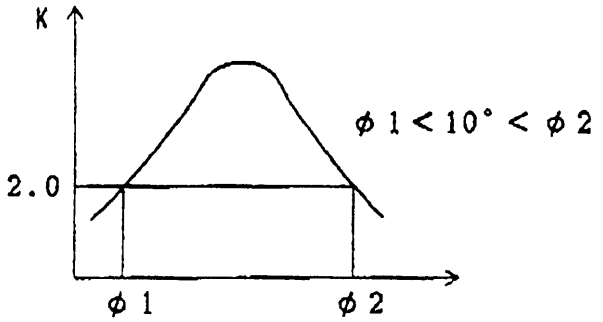


NOTE3. DEFINITION OF CONTRAST " K "

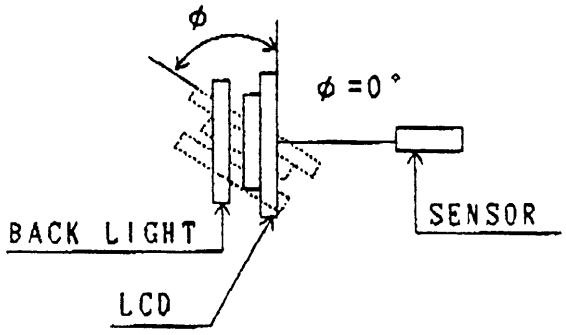
$$K = \frac{\text{BRIGHTNESS ON SELECTED DOT (B1)}}{\text{BRIGHTNESS ON NON-SELECTED DOT (B2)}}$$



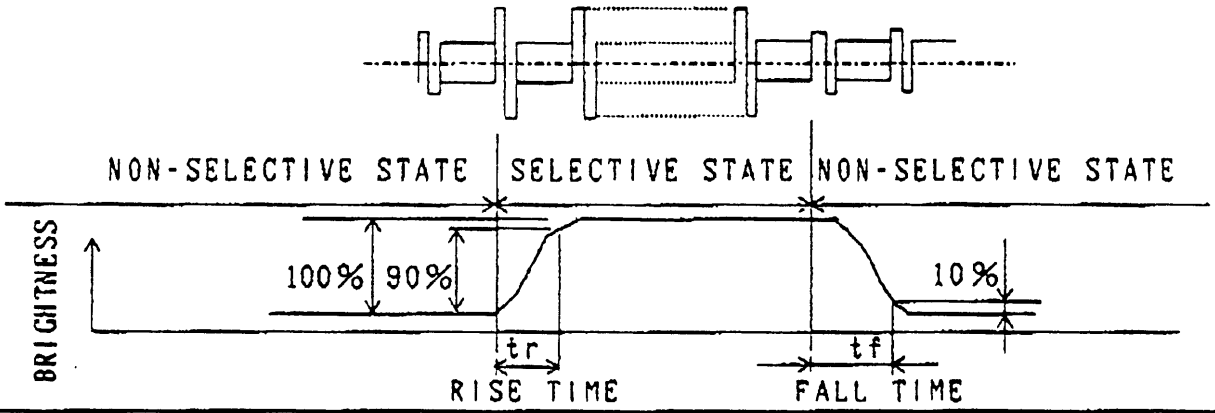
NOTE2. DEFINITION OF VIEWING ANGLE $\phi 1$ AND $\phi 2$



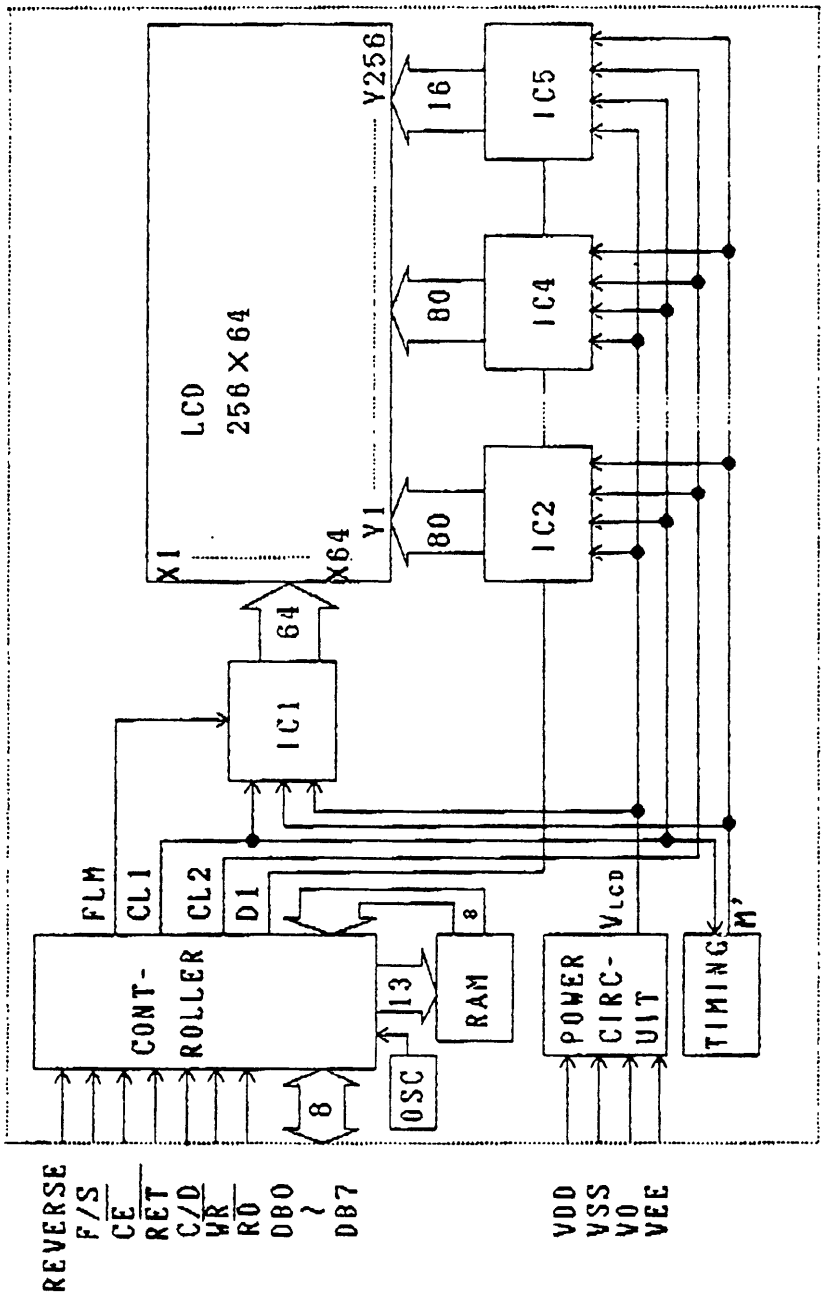
CONTRAST RATIO K VS VIEWING ANGLE ϕ



NOTE4. DEFINITION OF OPTICAL RESPONSE



7. BLOCK DIAGRAM



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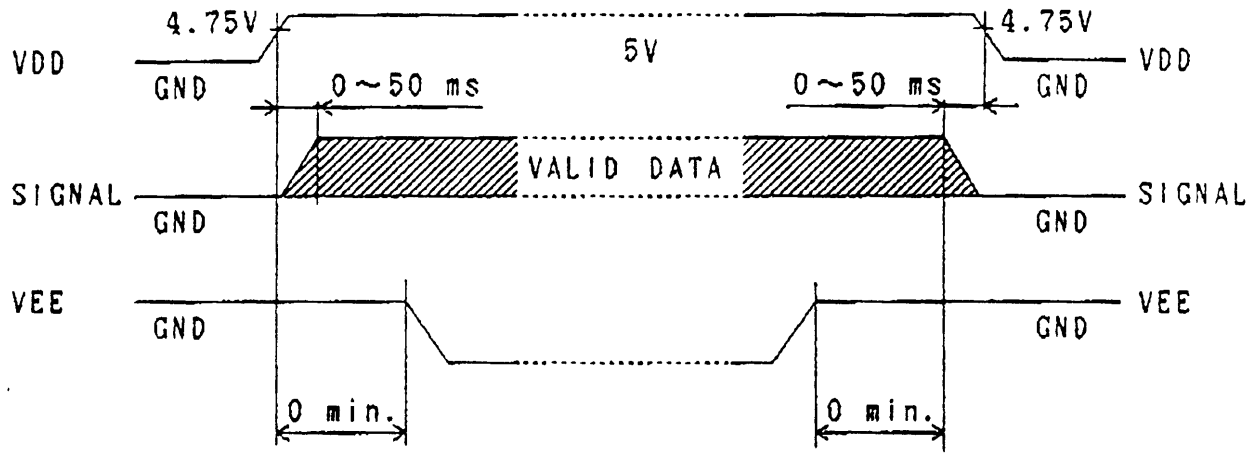
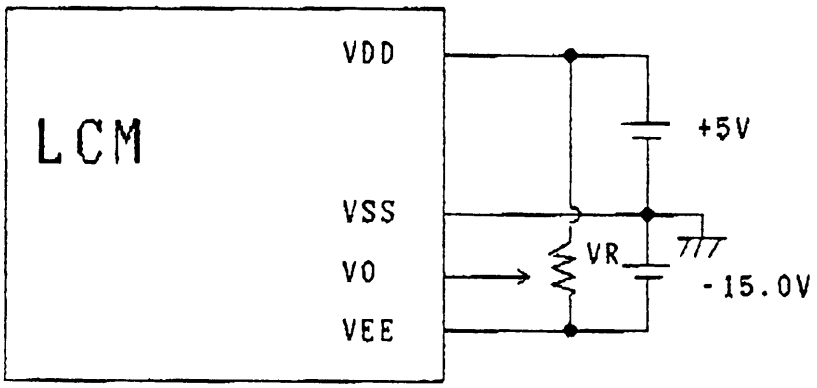
8.2 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL



POWER ON POWER OFF

THE MISSING PIXELS MAY OCCUR WHEN THE LCM IS DRIVEN BEYOND ABOVE POWER INTERFACE TIMING SEQUENCE.

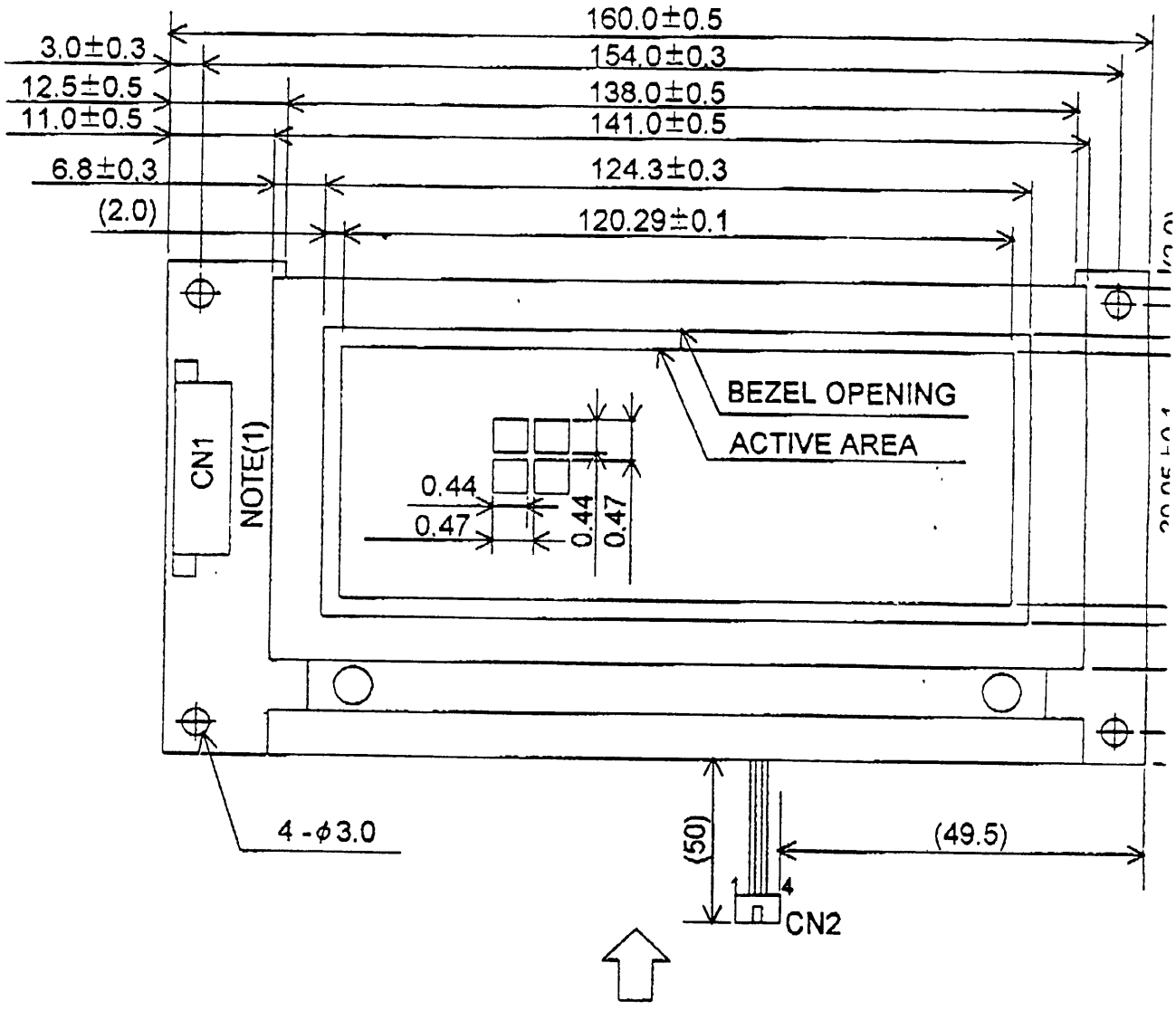
8 .3 POWER SUPPLY FOR LCM (EXAMPLE)



VR: 10～20K Ω

VDD-VO: LCD DRIVING VOLTAGE

9.1 DIMENSIONAL OUTLINE



UNIT: mm

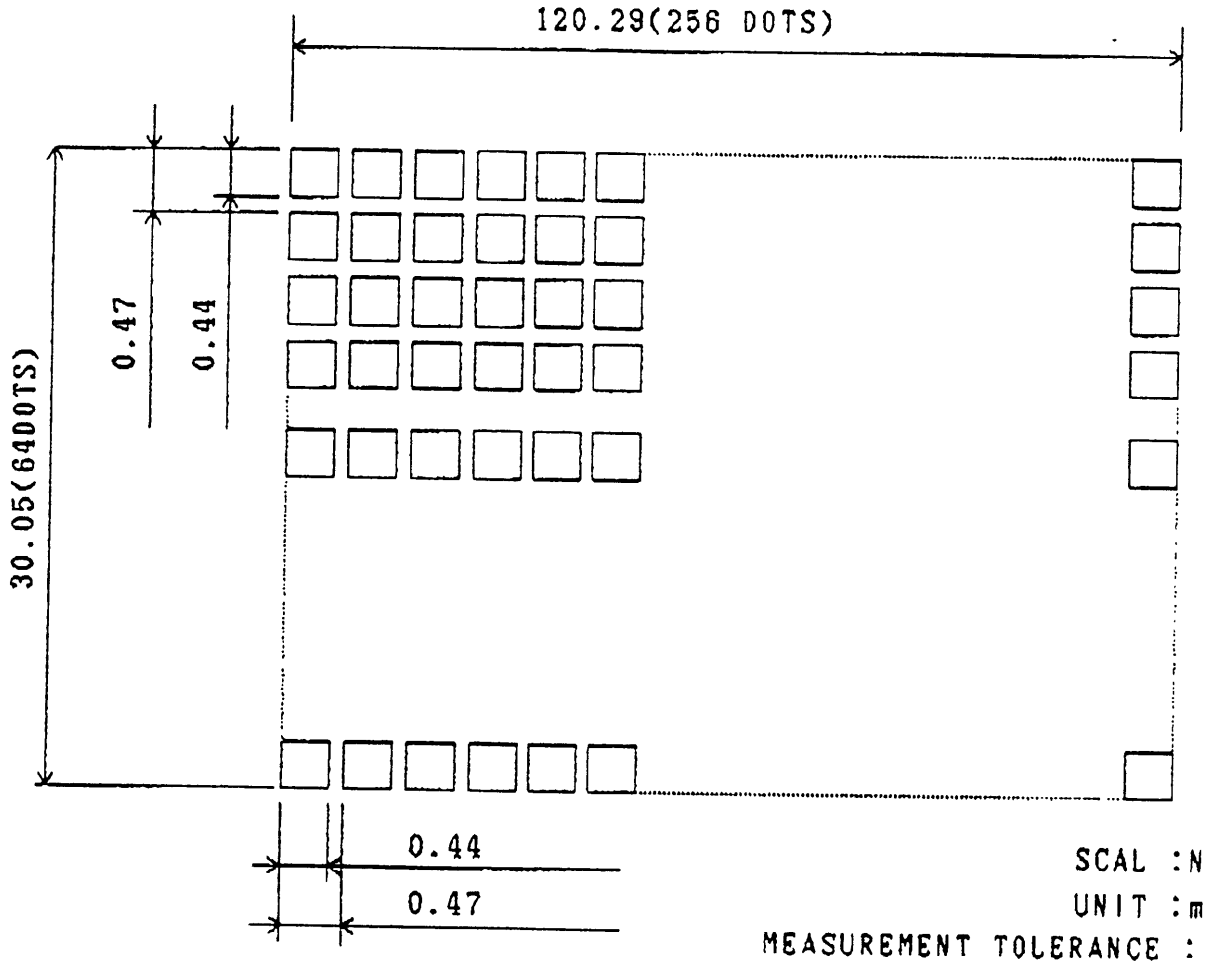
SCALE: NTS

CC
CF

AP

NOTE(1): CC
TY

9. 2 DISPLAY PATTERN



SCAL :NTS
UNIT :mm
MEASUREMENT TOLERANCE : ±0.1

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10. APPEARANCE STANDARD

10. 1 APPEARANCE INSPECTION CONDITION

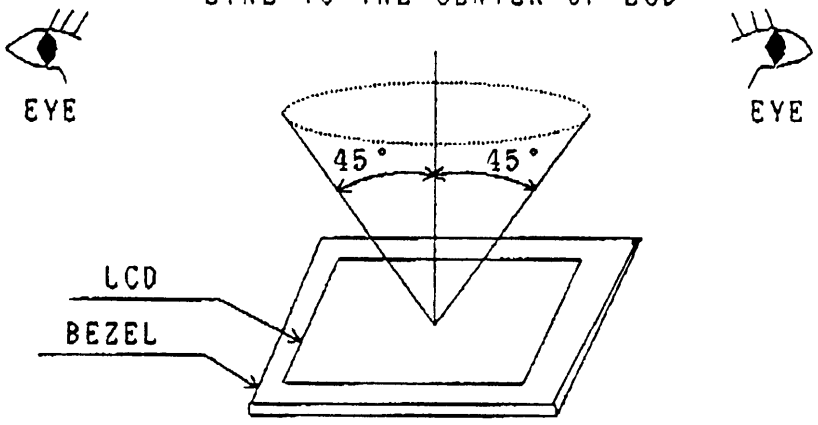
VISUAL INSPECTION SHOULD BE DONE UNDER THE FOLLOWING CONDITION.

(1) IN THE DARK ROOM

(2) WITH CFL PANEL LIGHTED WITH PRESCRIBED INVERTER CIRCUIT.

(3) WITH EYES 25cm DISTANCE FROM LCM

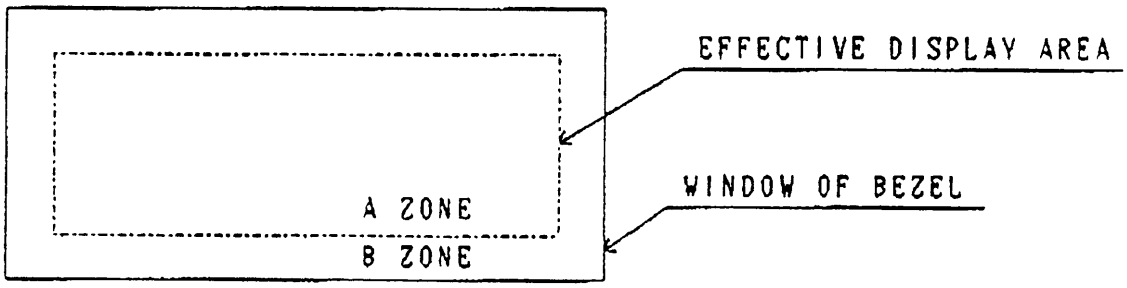
(4) VIEWING ANGLE WITHIN 45 DEGREES FROM THE VERTICAL LINE TO THE CENTER OF LCD



10. 2 DEFINITION OF EACH ZONE

A ZONE: WITHIN THE EFFECTIVE DISPLAY AREA SPECIFIED AT PAGE 9-1/3 OF THIS DOCUMENT.

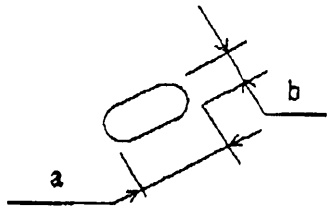
B ZONE: AREA BETWEEN THE WINDOW OF BEZEI LINE AND THE EFFECTIVE DISPLAY AREA LINE SPECIFIED AT PAGE 9-1/3 OF THIS DOCUMENT.



NO.	ITEM	CRITERIA				A	B
L C D	CONTRAST IRREGULARITY (SPOT)	AVERAGE DIAMETER D(mm)	CONTRAST	MAXIMUM NUMBER ACCEPTABLE	MINIMUM SPACE	○	-
		D ≦ 0.25	TO BE JUDGED BY HITACHI STANDARD	IGNORE	-		
		0.25 < D ≦ 0.35		10	20mm		
		0.35 < D ≦ 0.5		4	20mm		
		0.5 < D		NONE	-		
	CONTRAST IRREGULARITY (A PAIR OF SCRATCH)	WIDTH W(mm)	LENGTH L(mm)	MAXIMUM NUMBER ACCEPTABLE	MINIMUM SPACE	○	-
		W ≦ 0.25	L ≦ 1.2	2	20mm		
		W ≦ 0.2	L ≦ 1.5	3	20mm		
		W ≦ 0.15	L ≦ 2.0	3	20mm		
		W ≦ 0.1	L ≦ 3.0	4	20mm		
		THE WHOLE		6			
	RUBBING SCRATCH	TO BE JUDGED BY HITACHI STANDARD					

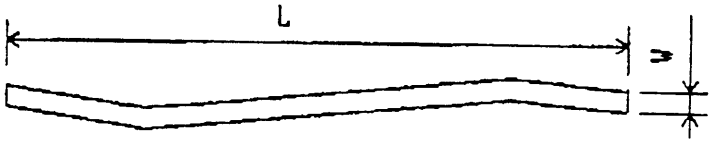
NOTE

(1) DEFINITION OF AVERAGE DIAMETER D

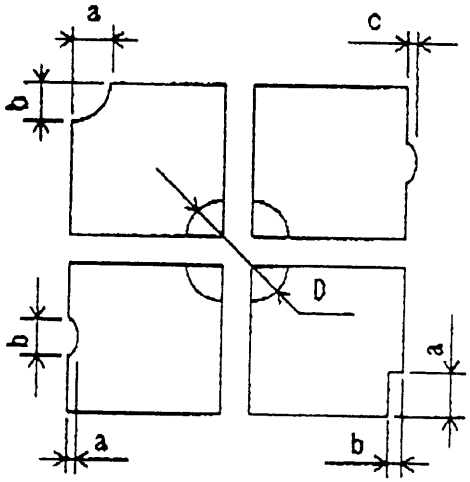


$$D = \frac{a+b}{2}$$

(2) DEFINITION OF LENGTH L AND WIDTH W



(3) DEFINITION OF PINHOLE



C : SALIENCE

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11.3 CAUTION AGAINST STATIC CHARGE

AS THIS MODULE IS PROVIDED WITH C-MOS LSI, THE CARE TO TAKE SUCH A PRECAUTION AS TO GROUNDING THE OPERATOR'S BODY IS REQUIRED WHEN HANDLING IT.

11 .4 POWER ON SEQUENCE

INPUT SIGNALS SHOULD NOT BE APPLIED TO LCD MODULE BEFORE POWER SUPPLY VOTAGE IS APPLIED AND REACHES TO SPECIFIED VOLTAGE (5±0.25V). IF ABOVE SEQUENCE IS NOT KEPT, C-MOS LSIS OF LCD MODULES MAY BE DAMAGED DUE TO LATCH UP PROBLEM.

11 .5 PACKAGING

(1) NO. LEAVING PRODUCTS IS PREFERABLE IN THE PLACE OF HIGH HUMIDITY FOR A LONG PERIOD OF TIME. FOR THEIR STORAGE IN THE PLACE WHERE TEMPERATURE IS 35℃ OR HIGHER, SPECIAL CARE TO PREVENT THEM FROM HIGH HUMIDITY IS REQUIRED. A COMBINATION OF HIGH TEMPERATURE AND HIGH HUMIDITY MAY CAUSE THEM POLARIZATION DEGRADATION AS WELL AS BUBBLE GENERATION AND POLARIZER PEEL-OFF. PLEASE KEEP THE TEMPERATURE AND HUMIDITY WITHIN THE SPECIFIED RANGE FOR USE AND STORING.

(2) SINCE UPPER POLARIZERS AND LOWER ALUMINUM PLATES TEND TO BE EASILY DAMAGED, THEY SHOULD BE HANDLED WITH FULL CARE SO AS NOT TO GET THEM TOUCHED, PUSHED OR RUBBED BY A PIECE OF GLASS. TWEEZERS AND ANYTHING ELSE WHICH ARE HARDER THAN A PENCIL LEAD 3H.

(3) AS THE ADHESIVES USED FOR ADHERING UPPER/LOWER POLARIZERS AND ALUMINUM PLATES ARE MADE OF ORGANIC SUBSTANCES WHICH WILL BE DETERIORATED BY A CHEMICAL REACTION WITH SUCH CHEMICALS AS ACETONE,TULUENE ETHANOLE AND ISOPROPYLALCOHOL. THE FOLLOWING SOLVENTS ARE RECOMMENDED FOR USE:

NORMAL HEXANE

PLEASE CONTACT US WHEN IT IS NECESSARY FOR YOU TO USE CHEMICALS OTHER THAN THE ABOVE.

(4) LIGHTLY WIPE TO CLEAN THE DIRTY SURFACE WITH ABSORBENT COTTON WASTE OR OTHER SOFT MATERIAL LIKE CHAMOIS,SOAKED IN THE CHEMICALS RECOMMENDED WITHOUT SCRUBBING IT HARDLY.
TO PREVENT THE DISPLAY SURFACE FROM DAMAGE AND KEEP THE APPEARANCE IN GOOD STATE,IT IS SUFFICIENT ,IN GENERAL,TO WIPE IT WITH ABSORBENT COTTON.

(4) A SLIGHT DEW DEPOSITING ON TERMINALS IS A CAUSE FOR ELECTROCHEMICAL REACTION RESULTING IN TERMINAL OPEN CIRCUIT.USAGE UNDER THE RELATIVE CONDITION OF 40℃ 50%RH OR LESS IS REQUIRED

11.7 STORAGE

IN CASE OF STORING FOR A LONG PERIOD OF TIME (FOR INSTANCE,FOR YEARS) FOR THE PURPOSE OF REPLACEMENT USE,THE FOLLOWING WAYS ARE RECOMMENDED.

(1) STORAGE IN A PLOYETHYLENE BAG WITH THE OPENING SEALED SO AS NOT TO ENTER FRESH AIR OUTSIDE IN IT,AND WITH NO DESICCANT.

(2) PLACING IN A DARK PLACE WHERE NEITHER EXPOSURE TO DIRECT SUNLIGHT NOR LIGHT IS, KEEPING TEMPERATURE IN THE RANGE FROM 0 ℃ TO 35 ℃

(3) STORING WITH NO TOUCH ON POLARIZER SURFACE BY ANYTHING ELSE. (IT IS RECOMMENDED TO STORE THEM AS THEY HAVE BEEN CONTAINED IN THE INNER CONTAINER AT THE TIME OF DELIVERY FROM US.)

11 .8 SAFETY

(1) IT IS RECOMMENDABLE TO CRASH DAMAGED OR UNNECESSARY LCD'S INTO PIECES AND WASH OFF LIQUID CRYSTAL BY EITHER OF SOLVENTS SUCH AS ACETONE AND ETHANOL, WHICH SHOUD BE BURNED UP LATER.

(2) WHEN ANY LIQUID LEAKED OUT OF A DAMAGED GLASS CELL COMES IN CONTACT WITH YOUR HANDS, PLEASE WASH IT OFF WELL WITH SOAP AND WATER.

13. PRECAUTION FOR USE

(1) A LIMITED SAMPLE SHOULD BE PROVIDED BY THE BOTH PARTIES ON AN OCCASION WHEN THE BOTH PARTIES AGREED ITS NECESSITY. JUDGEMENT BY A LIMITED SAMPLE SHALL TAKE EFFECT AFTER THE LIMITED SAMPLE HAS BEEN ESTABLISHED AND CONFIRMED BY THE BOTH PARTIES.

(2) IN THE FOLLOWING OCCASIONS, THE HANDLING OF THE PROBLEM SHOULD BE DECIDED THROUGH DISCUSSION AND AGREEMENT BETWEEN RESPONSIBLE PERSONS OF THE BOTH PARTIES.
   (1) WHEN A QUESTION IS ARISEN IN THE SPECIFICATIONS.
   (2) WHEN A NEW PROBLEM IS ARISEN THAT IS NOT SPECIFIED IN THIS SPECIFICATIONS.
   (3) WHEN AN INSPECTION SPECIFICATION CHANGE OR OPERATING CONDITION CHANGE IN CUSTOMER IS REPORTED TO HITACHI, AND SOME PROBLEMS ARE ARISEN IN THIS SPECIFICATION DUE TO THE CHANGE.
   (4) WHEN A NEW PROBLEM IS ARISEN AT THE CUSTOMER'S OPERATING SET FOR SAMPLE EVALUATION IN THE CUSTOMER SIDE.

(3) REGARDING THE TREATMENT FOR MAINTENANCE AND REPAIRING, BOTH PARTIES WILL DISCUSS IT IN SIX MONTHS LATER AFTER LATEST DELIVERY OF THIS PRODUCT.

THE PRECAUTION THAT SHOULD BE OBSERVED WHEN HANDLING LCM HAS BEEN EXPLAIND ABOVE. IF ANY POINTS ARE UNCLEAR OR IF YOU HAVE ANY REQUESTS,PLEASE CONTACT WITH HITACHI.