

HITACHI

KAOHSIUNG HITACHI
ELECTRONICS CO.,LTD
P.O. BOX 26-27
2,13TH EAST ST. K.E.P.Z.
KAOHSIUNG TAIWAN R.O.C.
TEL:(07) 821-5811 (7 LINE)
FAX:(07) 821-5815

FOR MESSRS : TENOVIS

DATE: May.12.2009

CUSTOMER'S ACCEPTANCE SPECIFICATIONS **SR14Q001-R** **C O N T E N T S**

No.	ITEM	SHEET No.	PAGE
1	COVER	7B64PS 2701-SR14Q001-R-9	1-1/1
2	RECORD OF REVISION	7B64PS 2702-SR14Q001-R-9	2-1/4~4/4
3	GENERAL SPECIFICATIONS	7B64PS 2703-SR14Q001-R-9	3-1/1
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7	BLOCK DIAGRAM	7B64PS 2707-SR14Q001-R-9	7-1/1
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9	OUTLINE DIMENSIONS	7B63PS 2709-SR14Q001-R-9 7B64PS 2709-SR14Q001-R-9	9-1/2 9-2/2
10	APPEARANCE STANDARD	7B64PS 2710-SR14Q001-R-9	10-1/3~3/3
11	PRECAUTION IN DESIGN	7B64PS 2711-SR14Q001-R-9	11-1/3~3/3
12	DESIGNATION OF LOT MARK	7B64PS 2712-SR14Q001-R-9	12-1/1
13	PRECAUTION FOR USE	7B64PS 2713-SR14Q001-R-9	13-1/1

* WHEN PRODUCT WILL BE DISCONTINUED, CUSTOMER WILL BE INFORMED BY HITACHI WITH TWELVE MONTHS PRIOR ANNOUNCEMENT.

ACCEPTED BY: _____

PROPOSED BY: Dan Cheng

RECORD OF REVISION

DATE	SHEET No.	SUMMARY																				
JULY.06.'99	7B63PS 2709-SR14Q001-R-2 PAGE 9-1/2	CHANGE INTERFACE: CHANGE I/F FROM FFC (1.25mm PITCH, 14PIN) TO CONNECTOR (0.5mm PITCH, 15PIN)																				
	7B64PS 2709-SR14Q001-R-2 PAGE 9-2/2	CHANGE 9.3 INTERFACE PIN CONECTION FPC : PITCH 1.25mm 14PIN CN1 : PITCH 0.5mm 15PIN CONNECTOR (Molex : 52893-1590)																				
AUG.04.'99	7B63PS 2709-SR14Q001-R-3 PAGE 9-1/2	CHANGE CONNECTOR: Molex : 52893-1590 15PIN , 0.5mm PITCH ↓ Molex : 52893-2090 20PIN , 0.5mm PITCH																				
	7B64PS 2709-SR14Q001-R-3 PAGE 9-2/2	CHANGE 9.3 INTERFACE PIN CONECTION CN1 : PITCH 0.5mm 15PIN CONNECTOR (Molex : 52893-1590) ↓ PITCH 0.5mm 20PIN CONNECTOR (Molex : 52893-2090) ADD : PIN No.16~20 , SIGNAL=NC																				
MAR.03.'00	7B64PS 2704-SR14Q001-R-4 PAGE 4-1/1	CHANGE STATIC ELECTRICITY: <table border="1" style="margin: 5px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>SYMBOL</th> <th>MIN.</th> <th>MAX.</th> <th>UNIT</th> <th>COMMENT</th> </tr> </thead> <tbody> <tr> <td>-</td> <td>-</td> <td>100</td> <td>V</td> <td>NOTE2</td> </tr> </tbody> </table> ↓ <table border="1" style="margin: 5px auto; border-collapse: collapse; text-align: center;"> <tbody> <tr> <td>I/F ESD</td> <td>-</td> <td>100</td> <td>V</td> <td>NOTE2,3</td> </tr> <tr> <td>ESD</td> <td>-</td> <td>15</td> <td>KV</td> <td>NOTE2,4</td> </tr> </tbody> </table> ADDED NOTE3 . NOTE4	SYMBOL	MIN.	MAX.	UNIT	COMMENT	-	-	100	V	NOTE2	I/F ESD	-	100	V	NOTE2,3	ESD	-	15	KV	NOTE2,4
	SYMBOL	MIN.	MAX.	UNIT	COMMENT																	
	-	-	100	V	NOTE2																	
I/F ESD	-	100	V	NOTE2,3																		
ESD	-	15	KV	NOTE2,4																		
7B64PS 2706-SR14Q001-R-2 PAGE 6-1/1	CHANGE CONTRAST RATIO: (12) → 12																					
7B64PS 2709-SR14Q001-R-4 PAGE 9-2/2	CHANGE INTERFACE PIN CONNECTION: CN1 : PITCH 0.5mm 20PIN CONNECTOR (Molex : 52893-2090) ↓ CN1 : PITCH 0.5mm 15PIN CONNECTOR (Molex : 52893-1590) CN2 : OPTIONAL PITCH 1.0mm 15PIN CONNECTOR (Molex : 52271-1590) DELETE : PIN No.16~20 , SIGNAL=NC																					

RECORD OF REVISION

DATE	SHEET No.	SUMMARY																							
MAR.03.'00	7B64PS 2705-SR14Q001-R-4 PAGE 5-1/1	CHANGE VDD - V0 VOLTAGE: Ta= 0°C (24.0)V → Ta= 0°C 24.0V Ta=25°C (23.0)V → Ta=25°C 23.0V Ta=40°C (22.0)V → Ta=50°C 21.0V CHANGE 5.1 ELECTRICAL CHARACTERISTICS																							
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		NOTE 4 ADDED : THE TYP. FIGURE TEST PATTERN IS ALL"Q" THE MAX. FIGURE TEST PATTERN IS SINGEL PIXEL CHECKER PATTERN																							
OCT.20.'00	7B64PS 2703-SR14Q001-R-5 PAGE 3-1/1	CHANGE MODULE SIZE: 167.0(W)mm X 109.0(H)mm X 10.0(D)mm(max) ↓ 147.3(W)mm X 102.5(H)mm X 2.4(D)mm(max)																							
	7B64PS 2709-SR14Q001-R-5 PAGE 9-1/2	CHANGE DIMENSIONAL OUTLINE: WITH MODEL , WITHOUT FFC ↓ WITHOUT MODEL , WITH FFC(0.5mm pitch , 15pin)																							
	7B64PS 2709-SR14Q001-R-5 PAGE 9-2/2	DELETE 9.3 INTERNAL PIN CONNECTION: CN2:DELETE																							

RECORD OF REVISION

DATE	SHEET No.	SUMMARY																
FEB.05.'01	7B64PS 2703-SR14Q001-R-6 PAGE 3-1/1	ADDED: (10) WEIGHT 57+/-2g																
	7B64PS 2705-SR14Q001-R-6 PAGE 5-1/1	CHANGED : 5.1 ELECTRICAL CHARACTERISTICS FRAME FREQUENCY , Min : 70Hz →60Hz																
	7B64PS 2709-SR14Q001-R-6 PAGE 9-1/2	CHANGED : 9.1 DIMENSIONAL OUTLINE OF LCM FFC LENGTH , 124+/-0.5mm →114+/-0.5mm																
	7B64PS 27010-SR14Q001-R-6 PAGE 10-2/3 ~10-3/3	CHANGED : 10.3 APPEARANCE SPECIFICATION CHANGED ALL APPEARANCE SPECIFICATION																
FEB.26.'01	7B64PS 2705-SR14Q001-R-7 PAGE 5-1/1	CHANGED : 5.1 ELECTRICAL CHARACTERISTICS IDD : min. = 2 mA , typ = 3.5mA IEE : min. = 1.5mA, typ = 3mA VDD-V0 : Ta= 0°C min. = 23V , max. = 25V Ta= 25°C min. = 22V , max. = 24V Ta= 50°C min. = 20V , max. = 22V																
	7B64PS 2704-SR14Q001-R-7 PAGE 4-1/1	CHANGED : 4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <tr> <td style="padding: 2px;">STATIC</td> <td style="padding: 2px;">I/F ESD</td> <td style="padding: 2px;">100V</td> </tr> <tr> <td style="padding: 2px;">ELECTRICITY</td> <td style="padding: 2px;">ESD</td> <td style="padding: 2px;">15KV</td> </tr> </table> <p style="text-align: center;">↓</p> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <tr> <td style="padding: 2px;">STATIC</td> <td style="padding: 2px;">PIN ESD</td> <td style="padding: 2px;">100V</td> </tr> <tr> <td style="padding: 2px;">ELECTRICITY</td> <td style="padding: 2px;">FFC ESD</td> <td style="padding: 2px;">15KV</td> </tr> <tr> <td style="padding: 2px;">NOTE6</td> <td style="padding: 2px;">LCD ESD</td> <td style="padding: 2px;">8KV</td> </tr> </table> ADDED : 4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS ADDED NOTE5 AND NOTE6	STATIC	I/F ESD	100V	ELECTRICITY	ESD	15KV	STATIC	PIN ESD	100V	ELECTRICITY	FFC ESD	15KV	NOTE6	LCD ESD	8KV	
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NOTE6	LCD ESD	8KV																
AUG.31.'01	7B64PS 2704-SR14Q001-R-8 PAGE 4-1/1	CHANGED: 4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS. <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <tr> <th rowspan="2" style="padding: 2px;">ITEM</th> <th colspan="2" style="padding: 2px;">STORAGE</th> </tr> <tr> <th style="padding: 2px;">MIN.</th> <th style="padding: 2px;">MAX.</th> </tr> <tr> <td style="padding: 2px;">AMBIENT TEMPERATURE</td> <td style="padding: 2px;">-20°C</td> <td style="padding: 2px;">60°C</td> </tr> </table> <p style="text-align: center;">↓</p> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <tr> <th rowspan="2" style="padding: 2px;">ITEM</th> <th colspan="2" style="padding: 2px;">STORAGE</th> </tr> <tr> <th style="padding: 2px;">MIN.</th> <th style="padding: 2px;">MAX.</th> </tr> <tr> <td style="padding: 2px;">AMBIENT TEMPERATURE</td> <td style="padding: 2px;">-25°C</td> <td style="padding: 2px;">55°C</td> </tr> </table>	ITEM	STORAGE		MIN.	MAX.	AMBIENT TEMPERATURE	-20°C	60°C	ITEM	STORAGE		MIN.	MAX.	AMBIENT TEMPERATURE	-25°C	55°C
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RECORD OF REVISION

DATE	SHEET No.	SUMMARY
AUG.31.'01	7B64PS 2709-SR14Q001-R-8 PAGE 9-1/2	CHANGE: 9.1 DIMENSIONAL OUTLINE OF LCM 114±0.5 → (114) ; 25±0.5 → (25) ; 30.5 → (30.5) ; 1.4 → (1.4) ; 1.8 → (1.8) ; 0.7 → (0.7) ; 0.4 → (0.3) ; max2.4 → 2.0±0.2 ; (4) → (6).
May.12,'09	7B64PS 2712-SR14Q001-R-9 PAGE 12-1/1	12. DESIGNATION OF LOT MARK Revised reversion from REV. – to REV.B

3. GENERAL SPECIFICATIONS

(1) PART NAME	SR14Q001-R
(2) MODULE SIZE	147.3(W)mm × 102.5(H)mm × 2.4 (D)mm (max.)
(3) EFFECTIVE DISPLAY AREA	120mm min. × 89mm min.
(4) DOT SIZE	0.345(W)mm × 0.345(H)mm
(5) DOT PITCH	0.360(W)mm × 0.360(H)mm
(6) DOT NUMBER	320 (W) × 240 (H)
(7) DUTY RATIO	1/240
(8) LCD TYPE	FSTN BLACK/WHITE TYPE (POSITIVE TYPE) THE UPPER POLARIZER IS GLARE TYPE. THE BUTTOM POLARIZER IS REFLECTIVE TYPE .
(9) VIEWING DIRECTION	6 O'CLOCK
(10) WEIGHT	57+/-2g

4. ABSOLUTE MAXIMUM RATINGS

4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS.

VSS=0V:STANDARD

ITEM	SYMBOL	MIN.	MAX.	UNIT	COMMENT
POWER SUPPLY FOR LOGIC	VDD-VSS	-0.3	7.0	V	
POWER SUPPLY FOR LC DRIVE	VDD-V0	0	27.5	V	
INPUT VOLTAGE	Vi	-0.3	VDD+0.3	V	NOTE 1
INPUT CURRENT	Ii	0	1	A	
STATIC ELECTRICITY NOTE 6	PIN ESD	-	100	V	NOTE 2,3
	FFC ESD	-	15	KV	NOTE 2,4
	LCD ESD	-	8	KV	NOTE 2,5

NOTE1. DISP.OFF,FRAME,LOAD,CP,D0~D3.

NOTE2. MAKE CERTAINS YOU ARE GROUNDED WHEN HANDLING LCM.

NOTE3 CONTACT DISCHARGE TO I/F CONNECTOR PINS.

NOTE4 CONTACT DISCHARGE TO FFC.

NOTE5 CONNECT DISCHARGE TO GLASS SURFACE.

NOTE6 25°C , 50~60%RH , 200PF, 250 OHM.

4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS.

I T E M	OPERATING		STORAGE		COMMENT
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	0°C	50°C NOTE 5	-25°C	55°C	NOTE 2,3
HUMIDITY	NOTE 1		NOTE 1		WITHOUT CONDENSATION
VIBRATION	-	2.45m/s ² (0.25G)	-	11.76m/s ² (1.2G) NOTE 5	NOTE 4
SHOCK	-	29.4m/s ² (3G)	-	490.0m/s ² (50G) NOTE 5	XYZ DIRECTIONS
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE 1 Ta<=40°C:85%RH max.

Ta>40°C:ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 85%RH AT 40°C.

NOTE 2 Ta AT -0°C < 48HRS,AT 60°C < 168HRS.

NOTE 3 BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE.THE PHENOMENON IS REVERSIBLE.
HIGHER LCD DRIVING VOLTAGE IS NEEDED WHILE OPERATING AT 0°C.

NOTE 4 5Hz~100Hz(EXCEPT RESONANCE FREQUENCY AND X , Y , Z EACH DIRECTION WITHIN 1 HOUR)

NOTE 5 THIS MODULE SHOULD BE OPERATED NORMALLY AFTER FINISH THE TEST.

5. ELECTRICAL CHARACTERISTICS

5.1 ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
POWER SUPPLY VOLTAGE FOR LOGIC	VDD-VSS	-	3.3×0.9	3.3	3.3×1.1	V
POWER SUPPLY VOLTAGE FOR LC DRIVING	VEE-VSS	-	-23.1	-22.0	-20.9	V
INPUT VOLTAGE NOTE 1	VI	L LEVEL	0.8VDD	-	VDD	V
		H LEVEL	0	-	0.2VDD	V
POWER SUPPLY CURRENT FOR LOGIC NOTE 4	IDD	VDD-VSS=3.3V VDD-V0=23.0V	2.0	3.5	8.0	mA
POWER SUPPLY CURRENT FOR LC DRIVING NOTE 4	IEE	VDD-VSS=3.3V VDD-V0=23.0V	1.5	3	7.0	mA
RECOMMENDED LC DRIVING VOLTAGE NOTE 3	VDD-V0	Ta= 0°C , φ=0°	23.0	24.0	25.0	V
		Ta=25°C , φ=0°	22.0	23.0	24.0	V
		Ta=50°C , φ=0°	20.0	21.0	22.0	V
FRAME FREQUENCY	fFRAME	-	60	75	140	Hz

NOTE 1 $\overline{\text{DISP.OFF}}$, fFRAME , LOAD , CP , D0~D3.

NOTE 2 RECOMMENDED LC DRIVING VOLTAGE FLUCTUATE ABOUT +/-1.0V BY EACH MODULE.

NOTE 3 NEED TO MAKE SURE OF FLICKERING AND RIPPLING OF DISPLAY WHEN SETTING THE FRAME FREQUENCY IN YOUR SET.
TEST PATTERN IS ALL "Q".

NOTE 4 fFLM=75HZ

VDD-V0=23.0V, Ta=25°C.

THE TYP. FIGURE TEST PATTERN IS ALL "Q"

THE MAX. FIGURE TEST PATTERN IS SINGEL PIXEL CHECKER PATTERN.

6. OPTICAL CHARACTERISTICS

6.1 OPTICAL CHARACTERISTICS

Ta=25°C

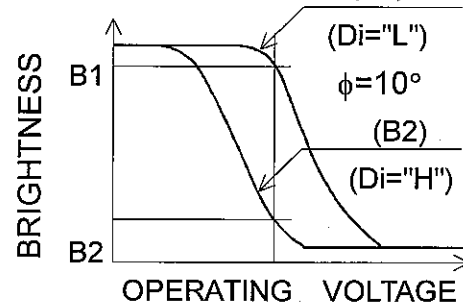
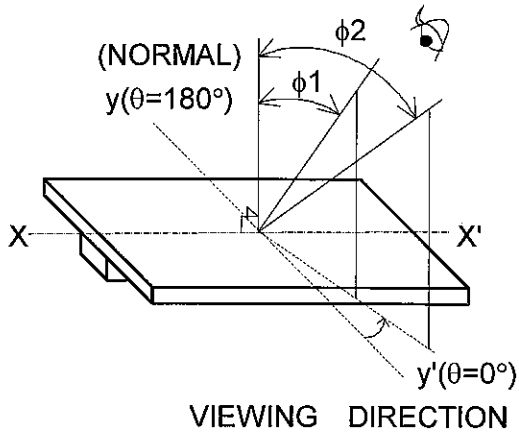
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	$\phi 2-\phi 1$	$K \geq 2.0$	-	40	-	deg	1,2
CONTRAST RATIO	K	$\phi = 0^\circ \theta = 0^\circ$	-	12	-	-	3
RESPONSE TIME (RISE)	tr	$\phi = 0^\circ \theta = 0^\circ$	-	120	-	ms	4
RESPONSE TIME (FALL)	tf	$\phi = 0^\circ \theta = 0^\circ$	-	150	-	ms	4

(MEASURE CONDITION BY HITACHI)

NOTE 1. DEFINITION OF θ AND ϕ

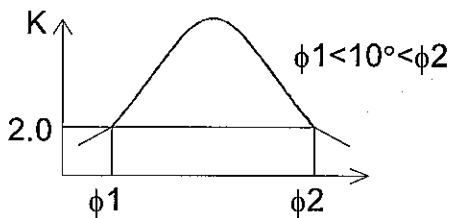
NOTE 3. DEFINITION OF CONTRAST "K"

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

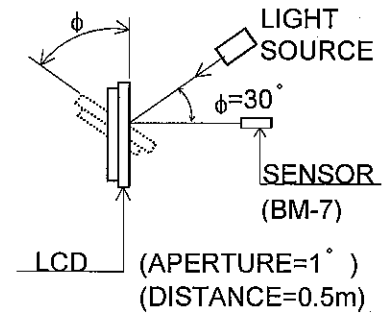


NOTE 2. DEFINITION OF VIEWING ANGLE

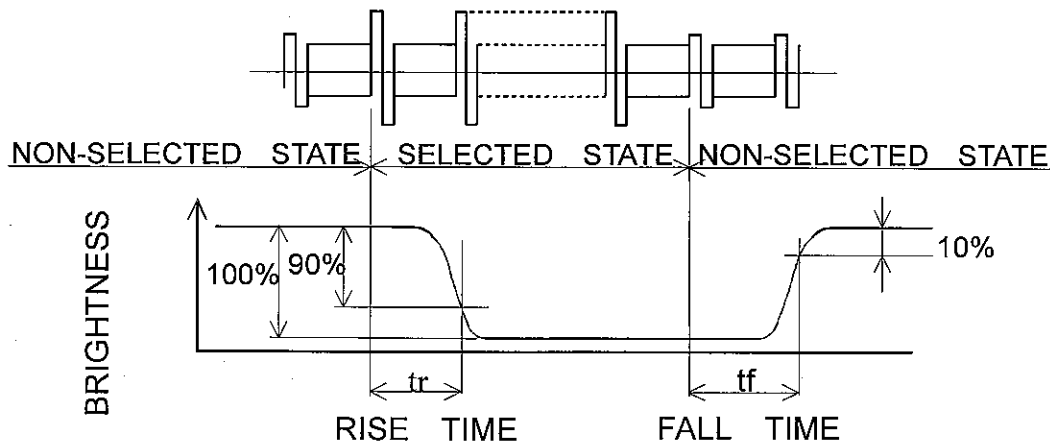
$\phi 1$ AND $\phi 2$



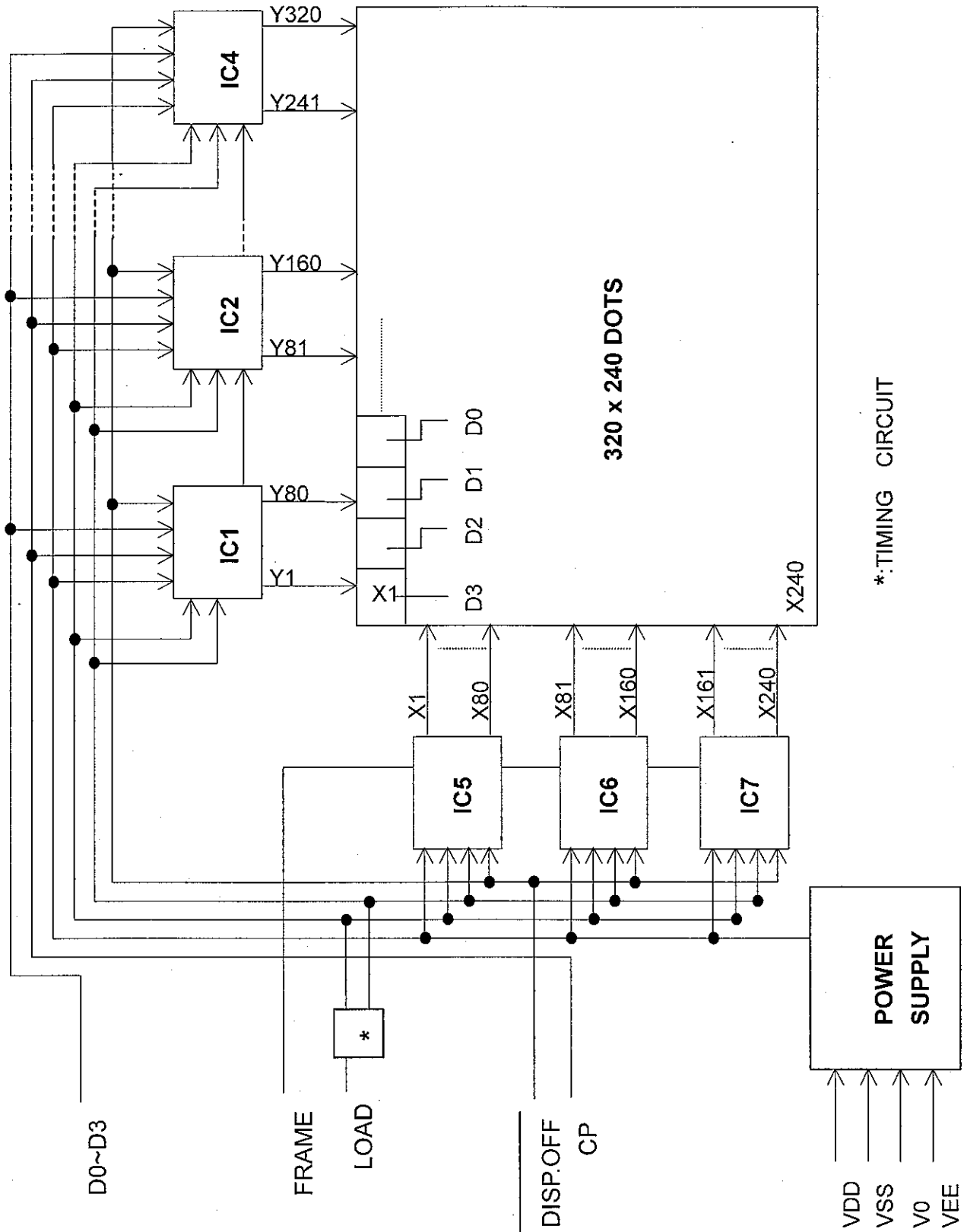
CONTRAST RATIO K VS VIEWING ANGLE ϕ



NOTE 4. DEFINITION OF OPTICAL RESPONSE TIME

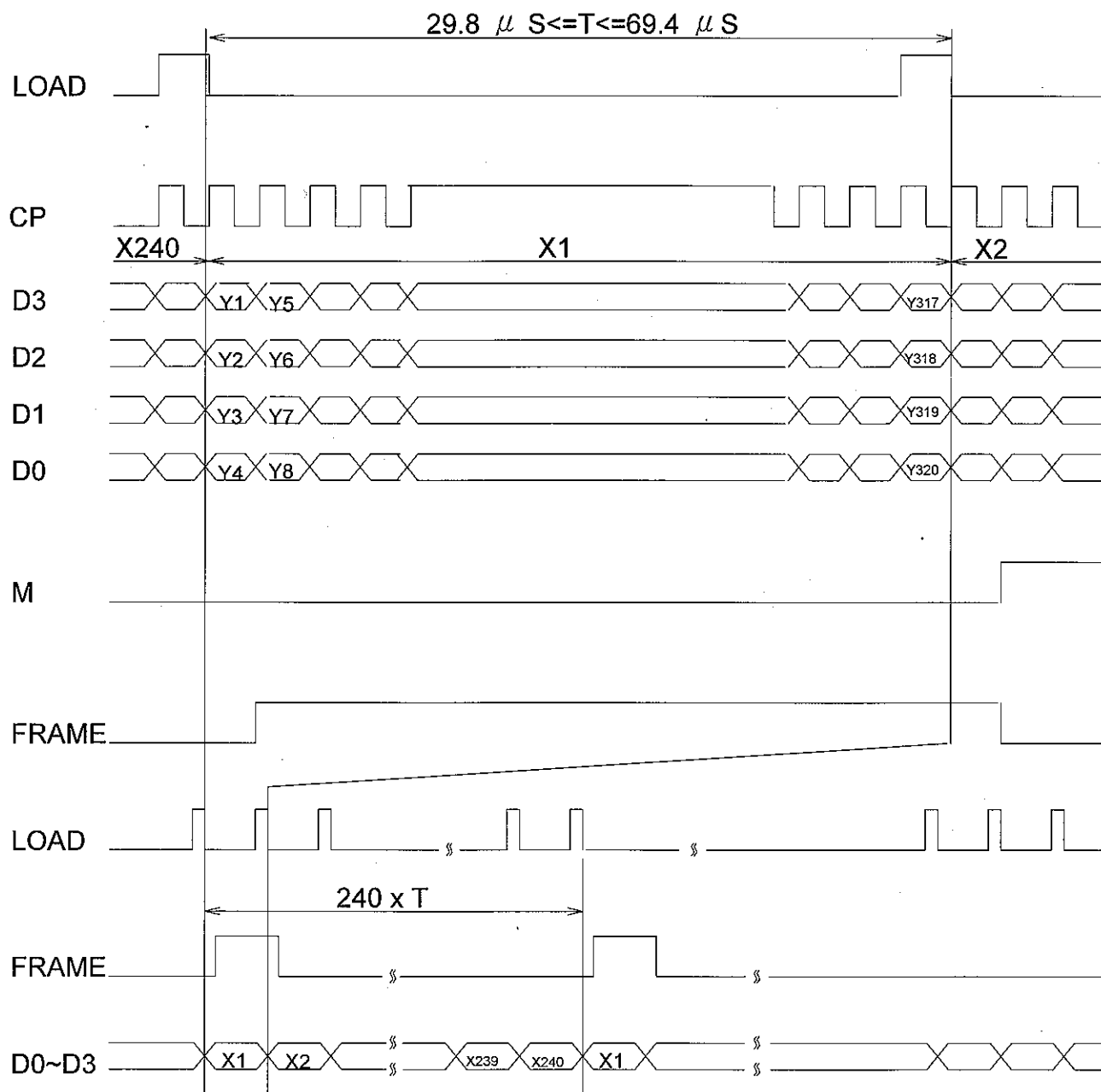


7. BLOCK DIAGRAM



8. INTERFACE TIMING CHART

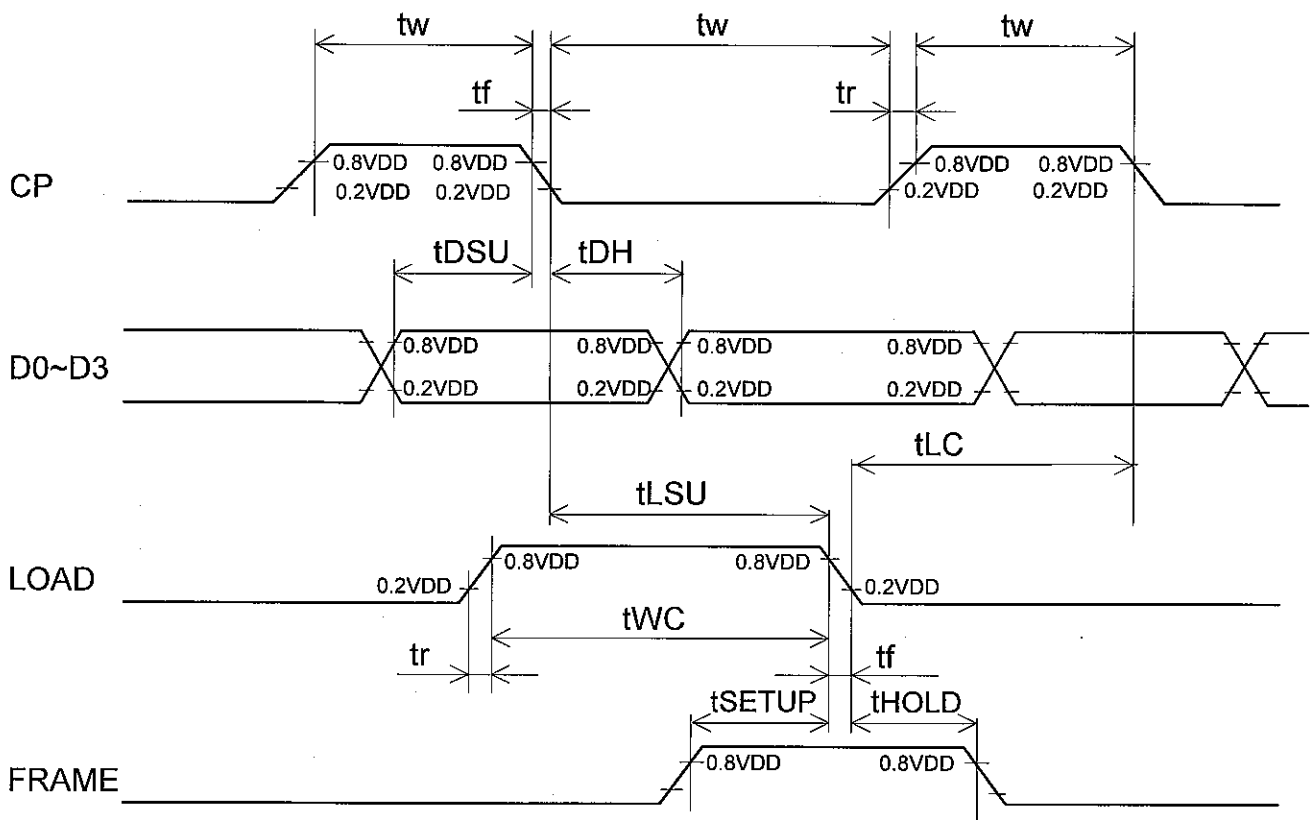
8.1 INTERFACE TIMING CHART



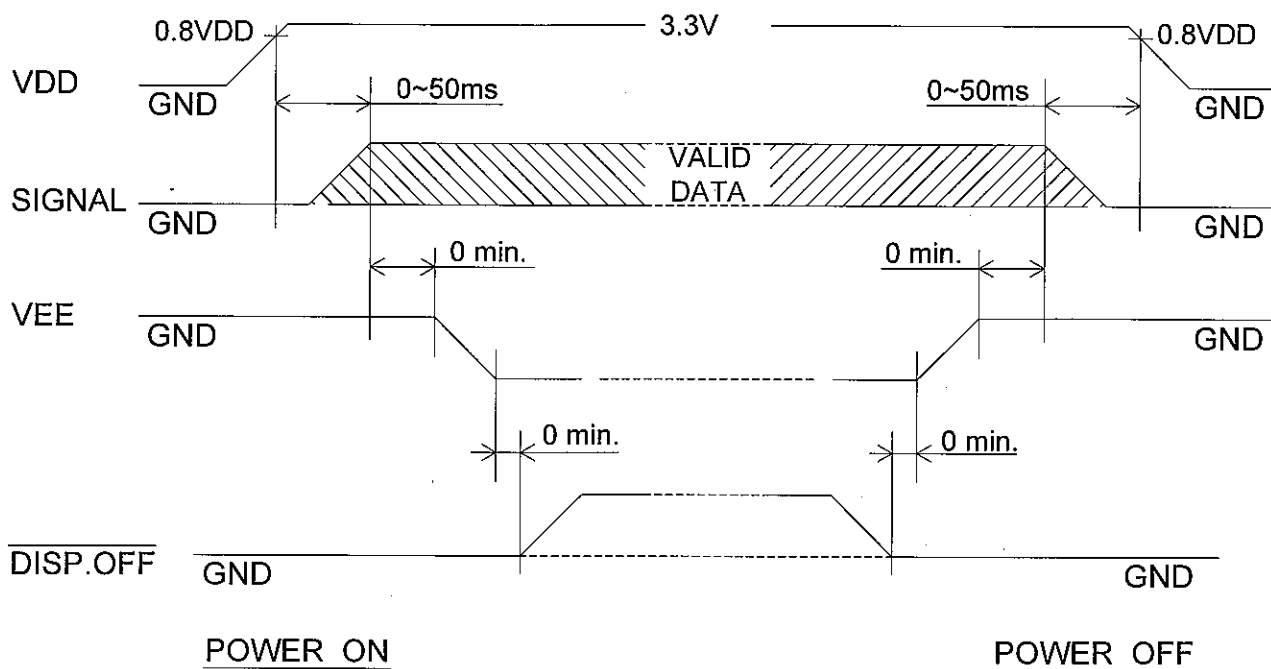
8.2 TIMING CHARACTERISTICS

$0^{\circ}\text{C} \leq T_a \leq 50^{\circ}\text{C}$, $V_{DD} = 3.3\text{V} \pm 10\%$

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
CLOCK FREQUENCY	f _{CP}	-	-	4.0	MHz
CLOCK PULSE WIDTH	t _W	63	-	-	ns
CLOCK RISE FALL TIME	t _r , t _f	-	-	20	ns
DATA SET UP TIME	t _{DSU}	50	-	-	ns
DATA HOLD TIME	t _{DH}	50	-	-	ns
LOAD SET UP TIME	t _{LSU}	80	-	-	ns
LOAD CLOCK TIME	t _{LC}	80	-	-	ns
"FRAME" SET UP TIME	t _{SETUP}	100	-	-	ns
"FRAME" HOLD TIME	t _{HOLD}	100	-	-	ns
"LOAD" PULSE WIDTH	t _{WC}	125	-	-	ns

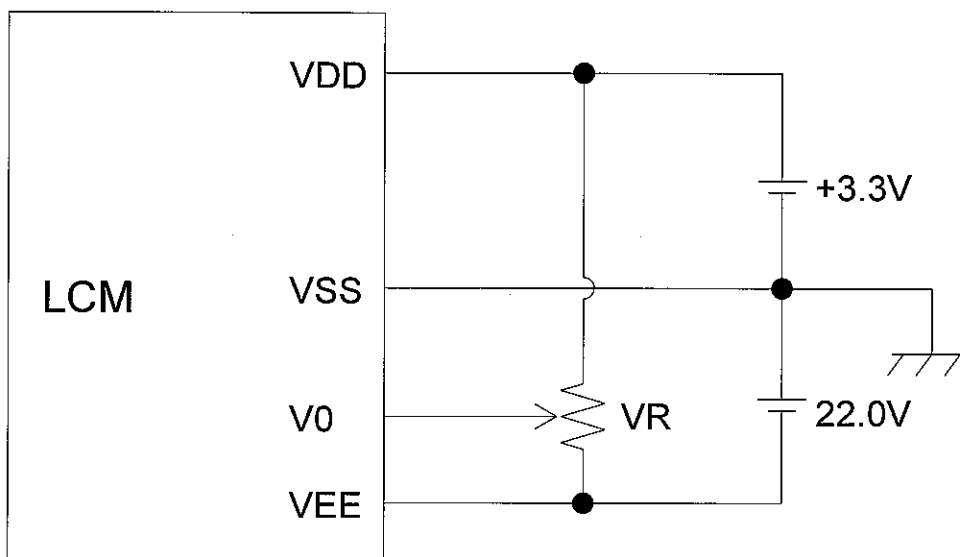


8.3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL



THE MISSING PIXELS MAY OCCUR WHEN THE LCM IS SRIVEN EXCEPT ABOVE POWER INTERFACE TIMING SEQUENCE.

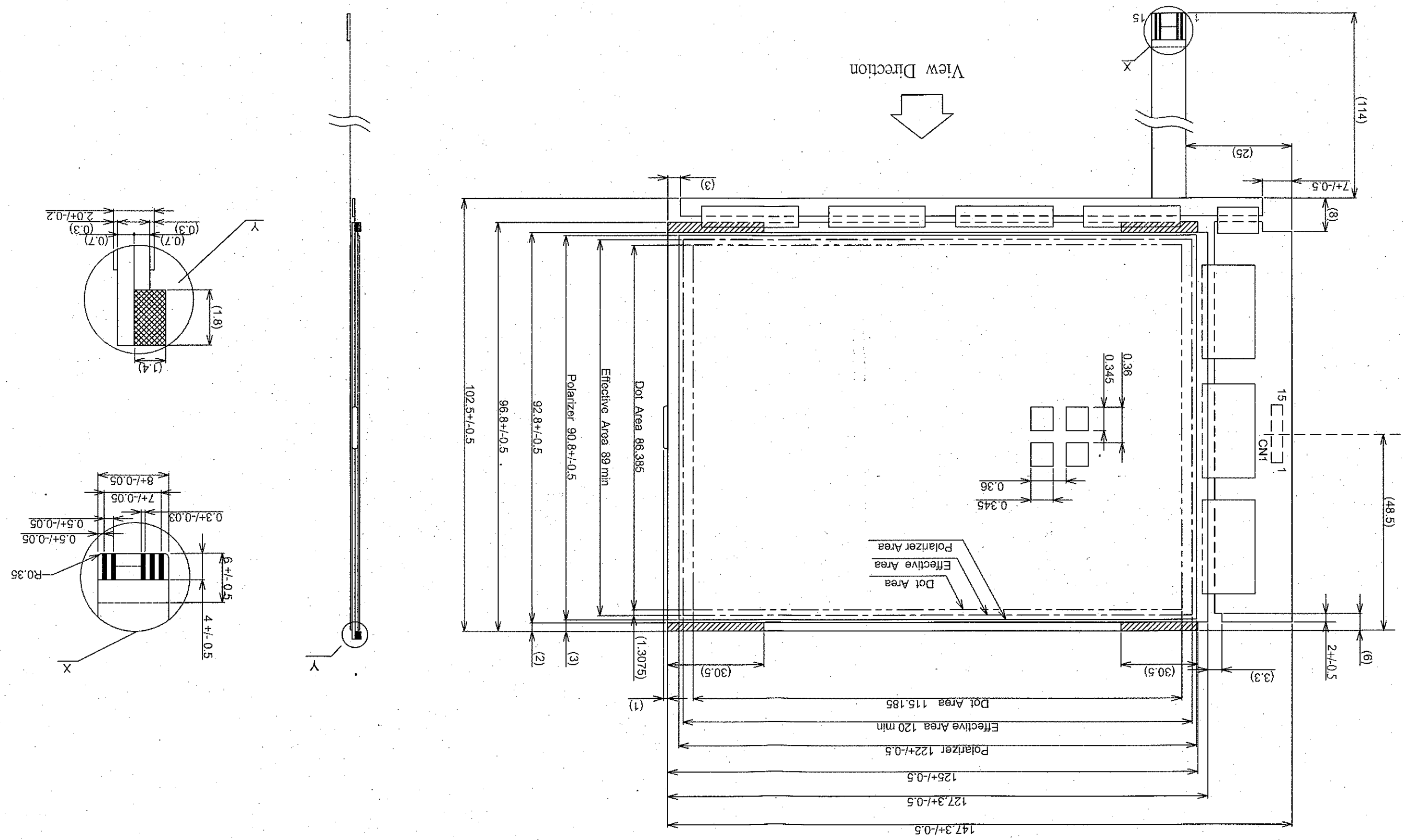
8.4 POWER SUPPLY FOR LCM



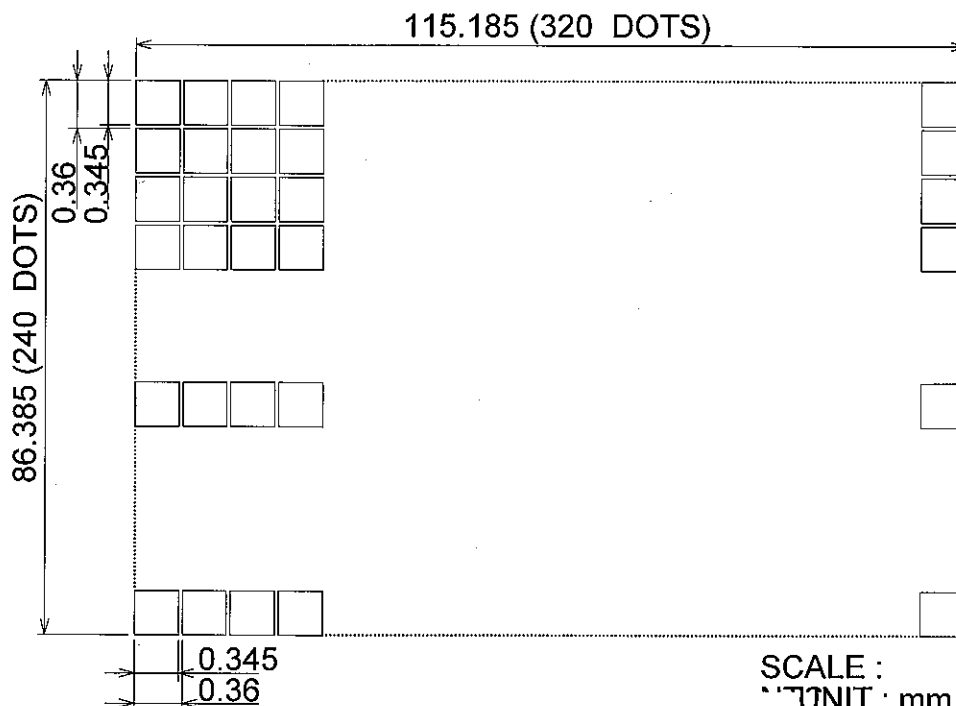
NOTE (1) VR : 10k Ω

NOTE (2) WE RECOMMEND TO ADD FUSE (1A) TO VDD LINE.

9. DIMENSIONAL OUTLINE OF LCM
9.1 DIMENSIONAL OUTLINE OF LCM



9.2 DISPLAY PATTERN



SCALE :
UNIT : mm
MEASUREMENT TOLERANCE : +/-0.1

9.3 INTERNAL PIN CONNECTION

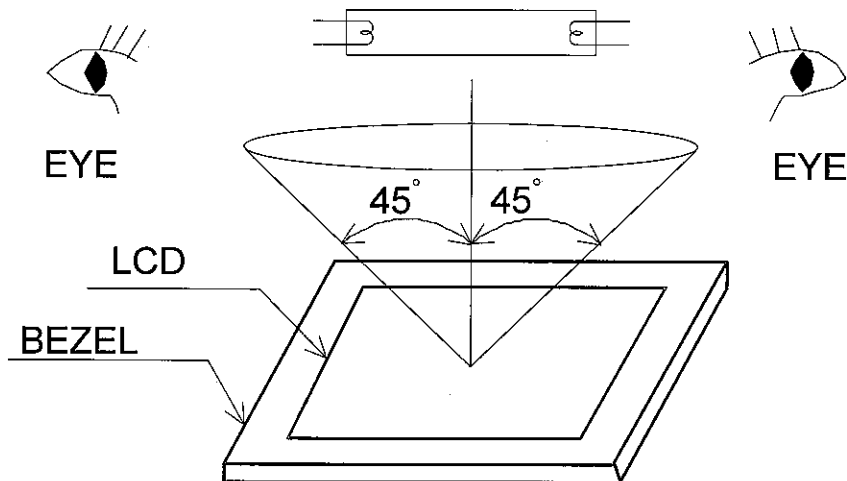
CN1 : PITCH 0.5mm 15 PINS CONNECTOR (Molex : 52893-1590)

INTERFACE		PIN No.	SIGNAL	LEVEL	FUNCTION
LCM	I/F1	1	D0	H/L	DISPLAY DATA
		2	D1		
		3	D2		
		4	D3		
		5	DISP.OFF	H/L	H:ON / L:OFF
		6	FRAME	H	FIRST LINE MARKER
		7	N.C	-	-
		8	LOAD	H→L	DATA LATCH
		9	CP	H→L	DATA SHIFT
		10	VDD	-	POWER SUPPLY FOR LOGIC
		11	VSS	-	GND
		12	VEE	-	POWER SUPPLY FOR LC
		13	V0	-	OPERATING VOLTAGE LC DRIVING
		14	VSS	-	GND
		15	NC	-	-

10. APPEARANCE STANDARD

10.1 APPEARANCE INSPECTION CONDITION (IN THE EFFECTIVE VIEWING AREA) VISUAL INSPECTION SHOULD BE UNDER THE FOLLOWING CONDITION.

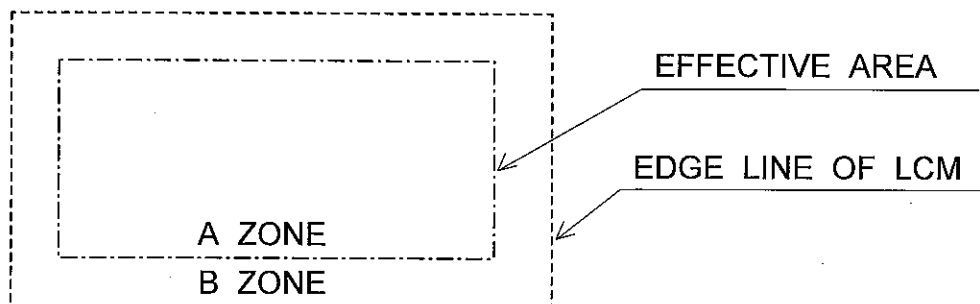
- (1) IN THE DARK ROOM. AND PUT ON THE SINGLE 20W FLUORESCENT LAMP TO LCD DISTANCE 25 TO 30CM.
- (2) WITH EYES 25CM DISTANCE FROM LCM.
- (3) VIEWING ANGLE WITHIN 45 DEGREES FROM THE VERTICAL LINE TO THE CENTER LCD.



10.2 DEFINITION OF EACH ZONE

A ZONE : WITHIN THE VIEWING AREA SPECIFIED AT PAGE 9-1/2 OF THIS DOCUMENT.

B ZONE : AREA BETWEEN THE EDGE LINE OF LCD GLASS AND THE VIEWING AREALINE SPECIFIED AT PAGE 9-1/2 OF THIS DOCUMENT.



10.3 APPEARENCE SPECIFICATION

10.3.1 TABLE OF DEFECTS , VIEWING AREA

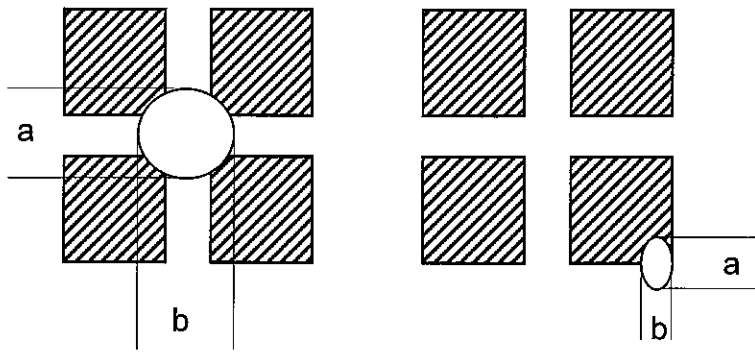
DEFECTS, VIEWING AREA	DEFECTS, SIZE (mm) DEFINITION : (NOTE1) $S = (a+b)/2$ (mm)		DEFECTS, max QUANTITY AREA: $\leq 50\text{cm}^2$ DISTANCE: 5cm
WHITE SPOTS	$s \leq 0.15$ ACCUMULATIONS		NOT COUNTED NOT ALLOWED
	$0.3 > s > 0.15$		5
	$s > 0.3$		NOT ALLOWED
BLACK SPOTS	$0.15 \leq s \leq 0.3$		5
	$s > 0.3$		NOT ALLOWED
FOREIGN MATERIALS INSIDE THE CELL, ON GLASS OR POLARIZING FILTER	LENGTH L(mm)	WIDTH W(mm)	
	$L \leq 2.0$	$W \leq 0.03$	NOT COUNTED
	$L \leq 3.0$	$0.03 < W \leq 0.05$	6
	-	$0.05 < W$	NOT ALLOWED
BUBBLES IN CELL (AIR INCLUSION)			NOT ALLOWED
BUBBLES BETWEEN GLASS AND POLARIZATION FILTER	$s > 0.3$		NOT ALLOWED
	$0.3 > s > 0.15$		5
COLOUR VARIATIONS			TOLERANCE WINDOW: NEED CUSTOMER APPROVAL
VISIBILITY OF ITO LAYER			TOLERANCE WINDOW: NEED CUSTOMER APPROVAL
OTHER VISIBLE DEFECTS LIKE : RAINBOWS, STRIPES, ETC.			NOT ALLOWED
SUM OF ALL DEFECTS/VIEWING AREA, WITHOUT ELECTRICAL DRIVING PINHOLES/DEFORMATION TEST: WITH ELECTRICAL DRIVING (NOTE 2)			Max. 5
	$s \leq 0.15$		NOT COUNTED
	$0.15 < s < 0.3$		Max. 5
	$s > 0.3$		NOT ALLOWED
SUM OF ALL DEFECTS/VIEWING AREA			Max. 5

10.3.2 TABLE OF DEFECTS , NON VIEWING AREA

DEFECTS, NON VIEWING AREA	DEFECT SIZE (NOTE1)	REQUIREMENTS
LEAKAGE		NOT ALLOWED
SEALING AREA	>50% REDUCTION OF SEALING FRAME WIDTH	NOT ALLOWED
FILLING HOLE CLOSURE, PENETRATION DEPTH OF END SEAL	>0.2mm	NOT ALLOWED
BUBBLES IN CELL (AIR INCLUSION)		NOT ALLOWED
BUBBLES BETWEEN GLASS AND POLARIZATION FILTER	$s: (a+b)/2 > 1\text{mm}$	NOT ALLOWED

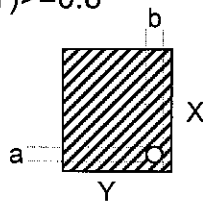
NOTE 1 : DEFINATION OF DEFECT SIZE

DEFECT SIZE $S=(a+b)/2$



NOTE 2 : AREA OF SEGMENT OR DOT $A \geq 80\%$

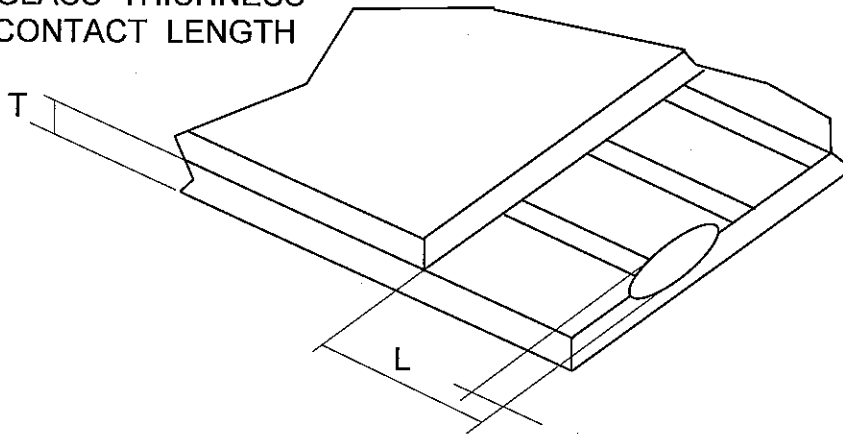
$(X \times Y - a \times b) / (X \times Y) \geq 0.8$



10.3.3 DEFECTS, CHIPPED GLASS

T = GLASS THICKNESS

L = CONTACT LENGTH



DEFECTS, CHIPPED GLASS	DEFECTS, SIZE	REQUIREMENTS
PROGRESSIVE CRACKS		NOT ALLOWED
SCRATCHES ON/IN CONTACT AREA		NOT ALLOWED
CRACKS ON CONTACT SURFACES	>25% OF CONTACT LENGTH	NOT ALLOWED
CRACKS BETWEEN CONTACT SURFACE	>40% OF CONTACT LENGTH	NOT ALLOWED
OTHER	>50% OF GLASS THICKNESS	NOT ALLOWED
SUM OF ALL ALLOWED DEFECTS, CHIPPED GLASS		Max.3 (INCL.1 CORNER CRACK/DEVICE)

11. PRECAUTION IN DESIGN

11.1 LC DRIVING VOLTAGE (VEE) AND VIEWING ANGLE RANGE.

SETTING VEE OUT OF THE RECOMMENDED CONDITION WILL BE A CAUSE FOR A CHANGE OF VIEWING ANGLE RANGE.

11.2 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.

11.3 POWER ON SEQUENCE

INPUT SIGNALS SHOULD NOT BE APPLIED TO LCD MODULE BEFORE POWER SUPPLY VOLTAGE IS APPLIED AND REACHES TO SPECIFIED VOLTAGE (3.3V \pm 10%).

IF ABOVE SEQUENCE IS NOT KEPT, C-MOS LSIS OF LCD MODULES MAY BE DAMAGED DUE TO LATCH UP PROBLEM.

11.4 PACKING

- (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°C 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 PELL-OFF. PLEASE KEEP THE TEMPERATURE AND HUMIDITY WITHIN THE SPECIFIED RANGE FOR USE AND STORAGE.
- (2) SINCE UPPER/BOTTOM POLARIZERS TEND TO BE EASILY DAMAGED, THEY SHOULD BE HANDLED FULL WITH CARE SO AS NOT GET THEM TOUCHED, PUSHED OR RUBBED.
- (3) AS THE ADHESIVES USED FOR ADHERING UPPER/BOTTOM POLARIZERS ARE MADE OF ORGANIC SUBSTANCES WHICH WILL BE DETERIORATED BY A CHEMICAL REACTION WITH SUCH CHEMICALS AS ACETONE, TULUENE, ETHANOLE AND ISOPROPYLALCOHOL. THE FPLLOWING SOLAVENTS ARE RECOMMENDED FOR USE:
NORMAL HEXANE
PLEASE CONTACT US WHEM IT IS NECESSARY FOR YOU TO USE CHEMICALS.
- (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.

- (5) IMMEDIATELY WIPE OFF SALIVA OR WATER DROP ATTACHED ON THE DISPLAY AREA BECAUSE ITS LONG PERIOD ADHERANCE MAY CAUSE DEFORMATION OR FADED COLOR ON THE SPOT.
- (6) FOGY DEW DEPOSITED ON THE SURFACE AND CONTACT TERMINALS DUE TO COLDNESS WILL BE CAUSED FOR POLARIZER DAMAGE, STAIN AND DIRT ON PRODUCT. WHEN NECESSARY TO TAKE OUT THE PRODUCTS FROM SOME PLACE AT LOW TEMPERATURE FOR TEST, ETC. IT IS REQUIRED FOR THEM TO BE WARMED UP IN A CONTAINER ONCE AT THE TEMPERATURE HIGHER THAN THAT OF ROOM.
- (7) TOUCHING THE DISPLAY AREA AND CONTANT TERMINALS WITH BARE HANDS AND CONTAMINATING THEM ARE PROHIBITED, BECAUSE THE STAIN ON THE DISPLAY AREA AND POOR INSULATION BETWEEN TERMINALS ARE OFTEN CAUSE BY BEING TOUCHED BY BARE HANDS. (THERE ARE SOME COSMETICS DETRIMENTAL TO POLARIZERS.)
- (8) IN GENERAL THE QUALITY OF GLASS IS FRAGILE SO THAT IT TENDS TO BE CRACKED OR CHIPPED IN HANDLING, SPECIALLY ON ITS PERIPHERY. BECAUSE BE CAREFUL NOT TO GIVE IT SHAPR SHOCK CAUSED BY DROPPING DOWN, ETC.

11.5 CAUTION FOR OPERATION

- (1) IT IS AN INDIPENSABLE CONDITION TO DRIVE LCD'S WITHIN THE SPECIFIED VOLTAGE LIMIT SINCE THE HIGHER VOLTAGE THAN THE LIMIT CAUSES THE SHORTER LCD LIFE. AN ELECTROCHEMICAL REACTION DUE TO DIRECT CURRENT CAUSES LCD'S UNDESIRABLE DETERIORATION, SO THAT THE USE OF DIRECT CURRENT DRIVER SHOULD BE AVOIDED.
- (2) RESPONSE TIME WILL BE EXTREMELY DELAYED AT LOWER TEMPERATURE THAN THE OPERATING TEMPERATURE RANGE AND ON THE OTHER HAND AT HIGHER TEMPERATURE LCD'S SHOW DARK BULL COLOR IN THEM. HOWEVER THOSE PHENOMENA DO NOT MEAN MALFUNCTION OR OUT OF ORDER WITH LCD'S WHICH WILL COME BACK IN THE SPECIFIED OPERATING TEMPERATURE RANGE.
- (3) IF THE DISPLAY IS AREA PUSHED HARD DURING OPERATION, SOME FONT WILL BE ABNORMALLY DISPLAY BUT IT RESUMES NORMAL CONDITION AFTER TURNING OFF ONCE.
- (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°C 50%RH OR LESS IS REQUIRED.

11.6 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 POLYETHYLENE 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 DEGREE C TO 35 DEGREE C.
- (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.)

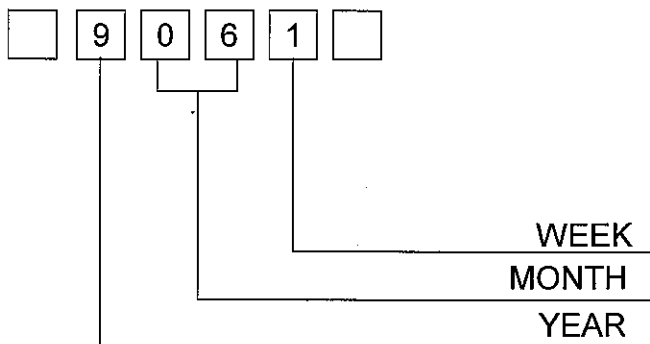
11.7 SAFTY

- (1) IT IS RECOMMENDABLE TO CRASH DAMAGE OR UNNECESSARY LCD'S INTO PIECES AND WASH OFF LIQUID CRYSTAL BY EITHER OF SOLVENTS SUCH AS ACETONE AND ETHANOL, WHICH SHOULD BE BURNED UP LATER.
- (2) WHEN ANY LIQUID LEAKED OUT OF A DAMAGE GLASS CELL COMES IN CONTACT WITH YOUR HANDS, PLEASE WASH IT OFF WELL WITH SOAP AND WATER.

12. DESIGNATION OF LOT MARK

LOT MARK

LOT MARK IS CONSISTED OF 4 DIGIT NUMBER.



YEAR	FIGURE IN LOT MARK
2009	9
2010	0
2011	1
2012	2
2013	3

NOTE 1. SOME PRODUCTS HAVE ALPHABET AT THE END OR THE FIRST.

MONTH	FIGURE IN LOT MARK	MONTH	FIGURE IN LOT MARK
JAN.	01	JULY.	07
FEB.	02	AUG.	08
MAR.	03	SEP.	09
APR.	04	OCT.	10
MAY.	05	NOV.	11
JUN.	06	DEC.	12

WEEK (DAY IN CALENDAR)	FIGURE IN LOT MARK
01~07	1
08~14	2
15~21	3
22~28	4
29~31	5

Rev No.	ITEM
—	Mcount IC:MN73099HED(Panasonic) Transistor:2SA1036K(ROHM) Connector:52893-1595(Molex)
B	Mcount IC:IT7001M(ITE) Transistor:2SA1576(ROHM) Connector:BL115-15RL-TAGF(SUNCAGEY)

LOCATION OF LOT MARK : ON THE BACK SIDE OF LCM

9061TB

T : MADE IN TAIWAN.
B : Rev. B

13. PRECIPITIN FOR USE

- (1) A LIMIT SAMPLE SHOULD BE PROVIDED BY THE BOTH PARTIES ON AN OCCASION WHEN THE BOTH PARTIES AGREED ITS NECESSITY. JUDGMENT BY A LIMIT SAMPLE SHALL TAKE EFFECT AFTER THE LIMIT SAMPLE HAS BEEN ESTABLISHED AND CONFIRMED BY THE BOTH PARTIES.
- (2) ON 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 WHICH IS NOT SPECIFIED IN THIS SPECIFICATIONS.
 - (3) WHEN AN INSPECTION SPECIFICATIONS CHANGE OR OPERATING CONDITION CHANGE IN CUSTOMER IS REPORTED TO HITACHI, AND SOME PROBLEM IS 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 SITE.

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