HITACHI

FOR MESSRS : _____ DATE : Nov.19,2003

CUSTOMER'S ACCEPTANCE SPECIFICATIONS

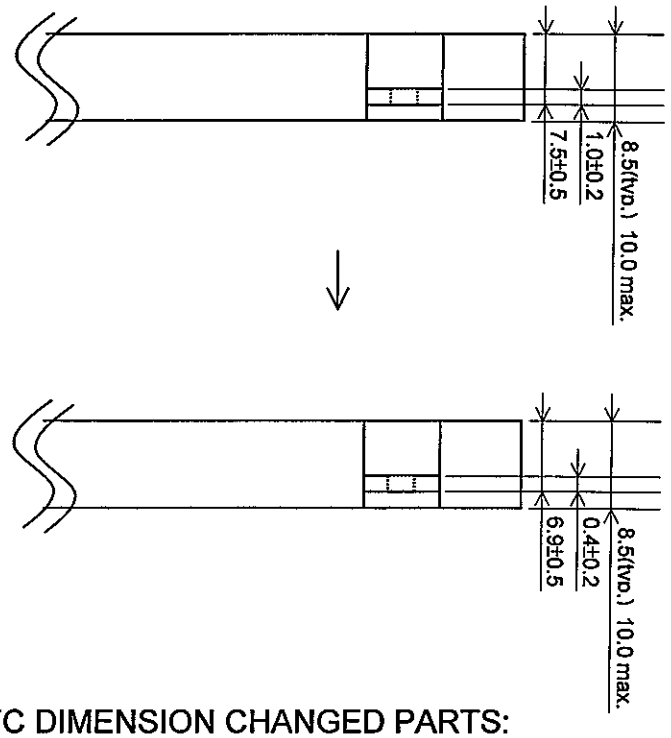
SX14Q001

CONTENTS

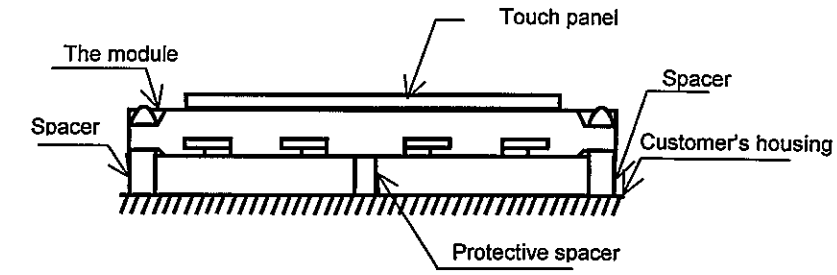
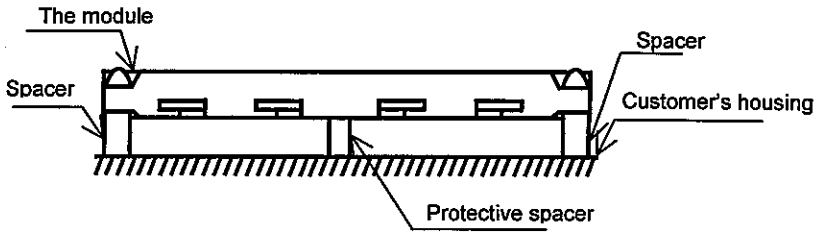
*When product will be discontinued, customer will be informed by HITACHI with twelve months prior announcement.

ACCEPTED BY; _____ PROPOSED BY; Jimmy J. HO

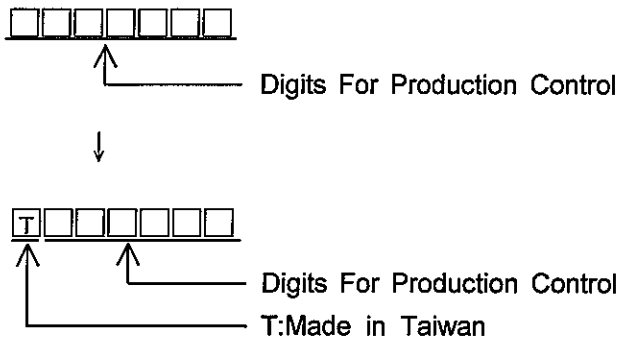
RECORD OF REVISION

DATE	SHEET No.	SUMMARY
May11.'01	7B64PS2703-SX14Q001-2 PAGE 3-1/1	CHANGED: (8) Backlight (50kh life (at 25℃) and replaceable) is canceled (11) power supply voltage 3.3V only → 3.3V
	7B64PS2704-SX14Q001-2 PAGE 4-2/2	CHANGED: 4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS Ambient temperature: Operating min. 5℃ → 0℃ max. 40℃ → 50℃
	7B63PS2709-SX14Q001-2 PAGE 9-1/1	CHANGED: 9.1 DIMENSION OUTLINE (1)  (2) FFC DIMENSION CHANGED PARTS: DETAIL A parts 0.85±0.2 → 0.65±0.15 1.25±0.1 → 1.0±0.05 0.8±0.1 → 0.7±0.1 21.25±0.3 → 17.0±0.1
	7B64PS2708-SX14Q001-2 PAGE 8-2/6	8.2 TIMING CHARACTERICS Ta=5℃ ~ 40℃ → Ta=0℃ ~ 50℃
	7B64PS2708-SX14Q001-2 PAGE 8-6/6	8.6 INTERNAL PIN CONNECTION CN1: FPC PITCH 1.25mm 16PINS ↓ CN1: FFC PITCH 1.0mm 16PINS

RECORD OF REVISION

DATE	SHEET No.	SUMMARY
May11.'01	7B64PS2711-SX4Q001-2 PAGE 11-1/3	CHANGED: 11.1 MOUNTING PRECAUTION  **Example of mounting**  **Example of mounting** 11.1 MOUNTING PRECAUTION "(3) For the module to be used.....shift with its own weight." Is canceled.
Sep.07.'01	7B64PS2703-SX14Q001-3 PAGE 3-1/1	3. GENERAL DATA Add (12)
	7B63PS2709-SX14Q001-3 PAGE 9-1/1	Update all page. FFC CONTACT SIDE : BOTTOM → TOP
Feb.21.'02	7B64PS2703-SX4Q001-4 PAGE 3-1/1	3. GENERAL DATA CHANGED : (2) Module size : 10.0max. (D)mm → 8.5(D)mm ADDED (8) Backlight : Life time : 50K HRS at 25℃ ADDED (12) Wide operating temperature 0 ~ 60℃
	7B64PS2704-SX4Q001-4 PAGE 4-1/1	4.3 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS Ambient temperature : OPERATING : MAX. 50℃ →MAX. 60℃

RECORD OF REVISION

DATE	SHEET No.	SUMMARY
Feb.21.'02	7B64PS2705-SX4Q001-4 PAGE 5-2/2	5.2 ELECTRICAL CHARACTERISTICS OF BACKLIGHT Lamp Voltage VL : (325) → (381) Frequency fL : (T.B.D) → (75)
	7B64PS2706-SX4Q001-4 PAGE 6-1/3	6.1 OPTICAL CHARACTERISTICS OF LCD Contrast ratio : MIN. : - → 25 Color tone : Red : X 0.54 → 0.52 Y 0.33 → 0.30 Green : Y 0.51 → 0.54
	7B64PS2708-SX4Q001-4 PAGE 8-2/6	8.2 TIMING CHARACTERITICS Ta : 50℃ → 60℃
	7B63PS2709-SX4Q001-4 PAGE 9-1/1	9. OUTLINE DIMENSIONS Deleted : Right Side Viewing LCM DEPTH DIMENSION : (8.5typ) → 8.5±0.3 10.0max. Add (Note 1)
Nov.19,'03	7B64PS2703-SX4Q001-5 PAGE 3-1/1	3. GENERAL DATA Revise (2) Module Size thickness : 8.5(D)mm→ 8.9(D)mm
	7B63PS2709-SX4Q001-5 PAGE 9-1/1	9. OUTLINE DIMENSIONS Revise Module Size thickness : 8.5±0.3 → 8.9±0.3
	7B64PS2712-SX4Q001-5 PAGE 12-1/2	12. LOT MARK Revise : 

3.GENERAL DATA

(1)	Part Name	SX14Q001
(2)	Module Size	167.0(W)mm x 109.0(H)mm x 8.9(D)mm
(3)	Dot Pitch	0.12(W)mm x 0.36(H)mm
(4)	Number of Dots	320 x 3(R,G,B)(W) x 240(H) dots
(5)	Duty	1/240
(6)	LCD	Color Transmissive type (negative type)
(7)	Viewing Direction	6 O'clock
(8)	Backlight	Cold Cathode Fluorescent Lamp (CFL) x 1 Life time : 50Kh at 25℃
(9)	Power Consumption(Total)	(1.9W) Except inverter
(10)	Brightness	150 cd/m^2 (typ.)
(11)	Power Supply Voltage	3.3V
(12)	Wide Operating temperature	0 ~ 60℃

4. ABSOLUTE MAXIMUM RATINGS

4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS(LCM) VSS=0V:Standard

ITEM	SYMBOL	MIN.	MAX.	UNIT	COMMENT
Power Supply for Logic	VDD-VSS	0	6.0	V	
Contrast Adjustment Voltage	VCON-VSS	0	VDD	V	
Input Voltage	Vi	-0.3	VDD+0.3	V	(Note 1)
Input Current	Ii	0	1	A	
Static Electricity	-	-	-	-	(Note 2)

Note 1 : $\overline{DOFF}$,FLM,CL1,CL2,D0~D7.

Note 2 : Make certains you are grounded when handling LCM.

4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

I T E M	OPERATING		STORAGE		COMMENT
	MIN.	MAX.	MIN.	MAX.	
Ambient temperature	0℃	60℃	-20℃	60℃	(Note 2,3,6)
Humidity	(Note 1)		(Note 1)		Without condensation
Vibration	-	2.45m/s^2	-	11.76m/s^2 (Note 5)	1 h max (Note 4)
Shock	-	29.4m/s^2	-	490m/s^2 (Note 5)	XYZ directions 11ms
Corrosive Gas	Not acceptable		Not acceptable		

Note 1 : Ta≦40℃ :85%RH max.
Ta>40℃ :Absolute humidity must be lower than the humidity of 85%RH at 40℃.

Note 2 : Ta at -20℃------< 48h , at 60℃------< 168h.

Note 3 : Background color changes slightly depending on ambient temperature. This phenomenon is reversible.

Note 4 : 5Hz～100 Hz(Except resonance frequency).

Note 5 : This module should be operated normally after finish the test.

Note 6 : The CFL life time will be reduced by operated at low temperature. Please make sure that the characteristics of the inverter meet the CFL specifications.
Also , the response time will be slower during operation at low temperature.

5. ELECTRICAL CHARACTERISTICS

5.1 ELECTRICAL CHARACTERISTICS OF LCD

I T E M	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Power Supply Voltage	VDD	VDD-VSS	3.15	3.3	3.45	V
Contrast Adjustment Voltage Range (Note 1)	VCON	-	0.8	-	2.8	V
Input Voltage for Logic Circuits (Note 2)	VI	"H" level	0.8VDD	-	VDD	V
		"L" level	0	-	0.2VDD	
Power Supply Current (Note 4)	IDD	VDD-VSS=3.3V	-	30	35	mA
Input Leak Current	Icon(Note5)	Vcon=0.8~2.8V	-	-	20	μA
	Iin(Note2)	Vin=VDDorVSS	-	-	±1.0	
Contrast Adjustment Voltage (Note 6)	VCON	Ta= 5℃, ϕ=0°	1.5	(2.0)	-	V
		Ta=25℃, ϕ=0°	-	(2.0)	-	
		Ta=40℃. ϕ=0°	-	(2.0)	2.5	
Frame Frequency (Note 7)	fFLM	-	60	70	80	Hz

Note 1 : In proportion as the VCON voltage decrease the brightness will increase.
Note 2 : $\overline{DOFF}$,FLM ,CL1 ,CL2 ,D0~D7.
Note 3 : fFLM=70Hz Ta=25℃,Display pattern : Checker pattern.
Note 4 : Rush Current of Power ON : 1A(PK) × 1ms + 0.15A(PK)×20ms
Note 5 : VCON
Note 6 :The Contrast Adjustment Voltage fluctuates about ±0.3V by each module. Temperature compensation circuit included in LCM. (only typ values)
Note 7 : Need to make sure of flickering and rippling of display when setting the Frame Frequency in your set.
Note 8 : Some points for attention while setting driving condition of appliance

(1) Frame Frequency
Please set the frame frequency as the typical value (central vale) which in CAS. According to the characteristic or response time of LC material, that setting the frame frequency near the mininum value or under the minimum value shown in CAS will cause a frame with moving phenomenon.

(2) Setting value Vcon
Vcon, adjusted to get the best contrast ratio of LCD module, is adjusted to be distributed within the tolerance ±0.3V of central value in CAS before LCD modules ship the factory.
The below items are recommended at customer side.

(i) When designing the appliance, please set the Vcon value as an adjustable value.

(ii) And the Vcon value must be able to be adjusted to match most suitable Vcon to get the best contrast ratio. A fixed Vcon value a little different from the most suitable Vcon value of LCD module and causes a misjudgment.

(ii) The Vcon adjustment(when D/A [Digital/Analog] converter is used) is recommended to be set as 50mV at most per step. That one step is more than 50mV may cause the input value to be not able match the most suitable value.
The characteristic of contrast ratio can not present absolutely.

5.2 ELECTRICAL CHARACTERISTICS OF BACKLIGHT

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Lamp Voltage	VL	-	(381)	-	Vrms	Ta=25℃ 5.5mA
Frequency	fL	-	(75)	-	kHz	
Lamp Current (1Lamp) (Note6)	IL	5.0	5.5	6.0	mA	Ta=25℃
Starting discharge Voltage	VS (Note 2)	(1000)	-	-	Vrms	Ta= 0℃

Note 1 : Please design your lamp driving circuit (inverter) according to the above specifications, and inform HITACHI of it.

Note 2 : Starting discharge voltage is increased when LCM is operating at low temperature. Please check the characteristics of your inverter before applying to your set.

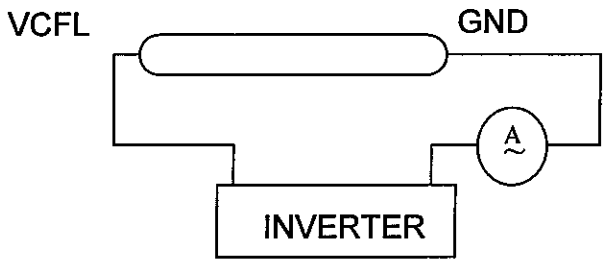
Note 3 : Average life time of CFL will be decreased when LCM is operating at low temperature.

Note 4 : Under lower driving frequency of an inverter, a certain backlight system (CFL & CFL reflection sheet) may generate a sound noise. Before designing the inverter, please consider the driving frequency and noise.

Note 5 : Absolute maximum ratings voltage of CFL cable for this module is as follows.

VCFL Side : 2kV
VSS Side : 300V
This inverter design shall not exceed the rated voltage.

Note 6 :



Note 7 : We recommend to equip protection circuit (to stop output) which works under abnormal operation to the inverter for CFL.

6. OPTICAL CHARACTERISTICS

6.1 OPTICAL CHARACTERISTICS OF LCD

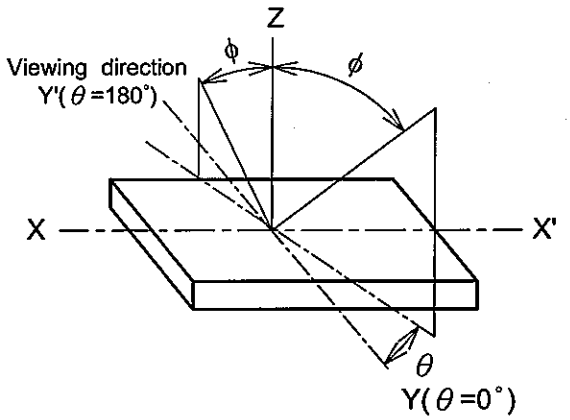
Ta=25℃(Backlight on)

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Viewing Area		$\phi 2$-$\phi 1$	θ=0°,K≧2.0	-	40	-	deg	1,2
Contrast Ratio		K	ϕ=0° θ=0°	25	40	-	-	3,5,6
Response Time (Rise)		tr	ϕ=0° θ=0°	-	250	-	ms	4
Response Time (Fall)		tf	ϕ=0° θ=0°	-	200	-	ms	4
Color Tone (Primary Color)	Red	x	ϕ=0° θ=0°	-	0.52	-	-	7
		y		-	0.30	-	-	
	Green	x		-	0.30	-	-	
		y		-	0.54	-	-	
	Blue	x		-	0.17	-	-	
		y		-	0.17	-	-	
	White	x		-	0.30	-	-	
		y		-	0.33	-	-	

(Measurement condition : HITACHI standard)

(Note 1~7) : See next page.

Note 1 : Definition of Viewing Angle

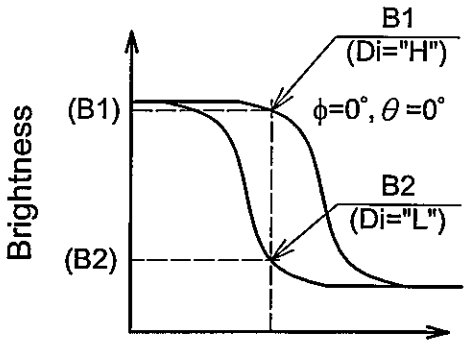


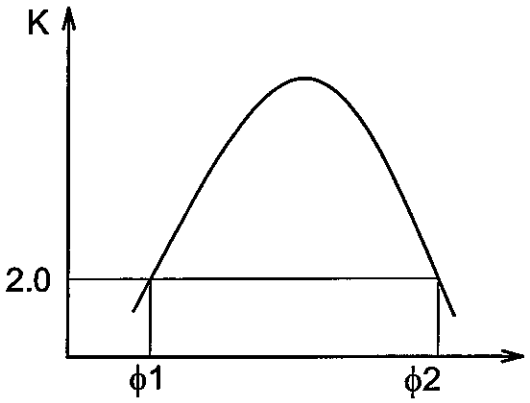
Note 2 : Definition of viewing angle

$\phi 1 < 0^\circ < \phi 2$

Note 3 : Definition of contrast "K"

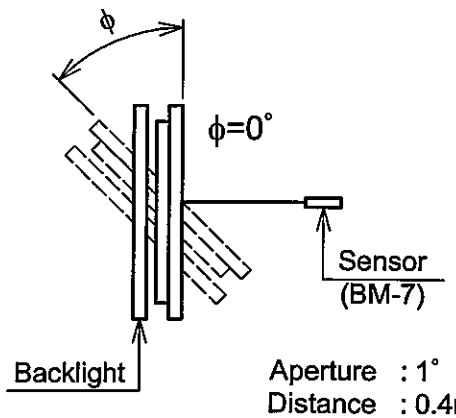
$$K = \frac{\text{Brightness on selected area (B1)}}{\text{Brightness on non-selected area (B2)}}$$





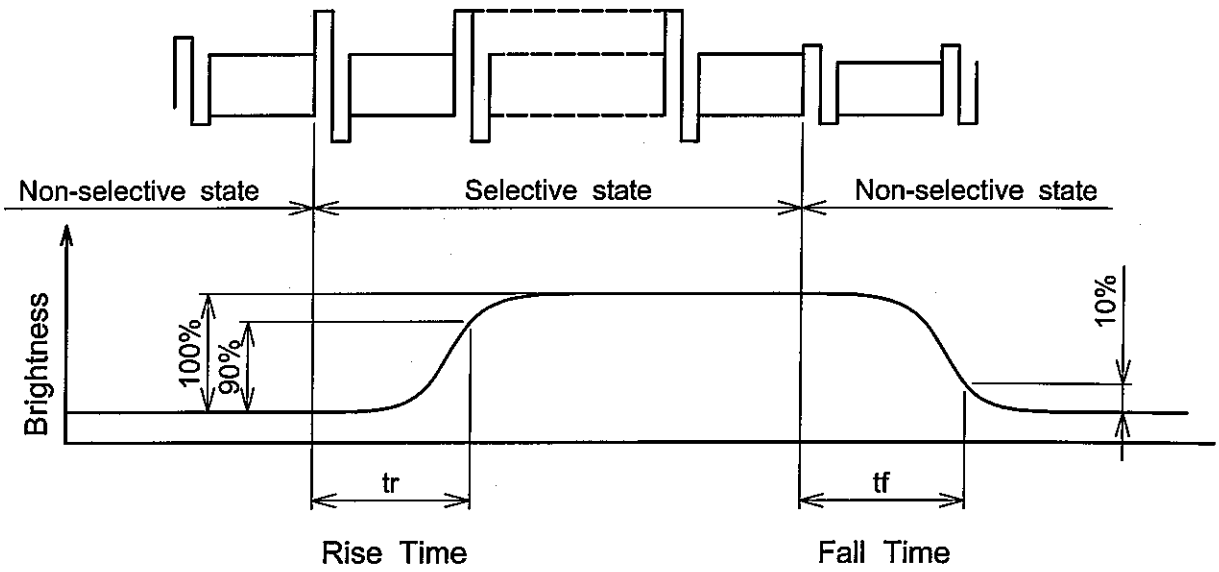
Viewing Angle

Contrast ratio K vs viewing angle ϕ



Aperture : 1°
Distance : 0.4m

Note 4 : Definition of optical response time



Rise Time

Fall Time

Note 5 : HITACHI will not do 100% inspection for minimum value. Minimum value is for reference.

Note 6 : HITACHI will do sampling inspection for minimum value.

Note 7 : The LCD driving voltage should be adjusted at the voltage where the peak contrast is obtained.

6.2 OPTICAL CHARACTERISTICS OF BACKLIGHT

ITEM	MIN.	TYP.	MAX.	UNIT	NOTE
Brightness	-	150	-	cd/m^2	IL=5.5mA (Note1),(Note2)
Rise Time	-	(5)	-	Minute	IL=5.5mA,Brightness 80%
Brightness Uniformity	-	-	±30	%	Undermentioned (Note 1,3)

(Measurement condition : HITACHI standard)

CFL : INITIAL , Ta=25℃

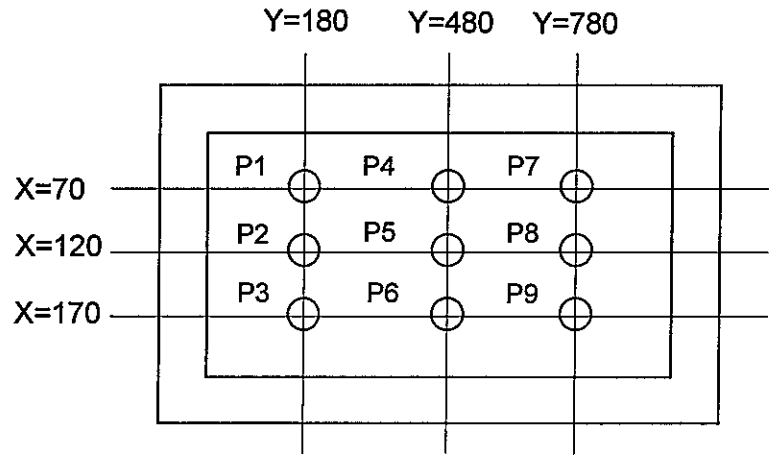
Display data should be all "ON"

The LCD driving voltage should be adjusted so as to obtain maximum contrast, when display pattern is all "Q".

Note 1 : Measurement after 10 minutes from CFL operating.
Average value of 9 points (Note 3)

Note 2 : Brightness control : 100%.

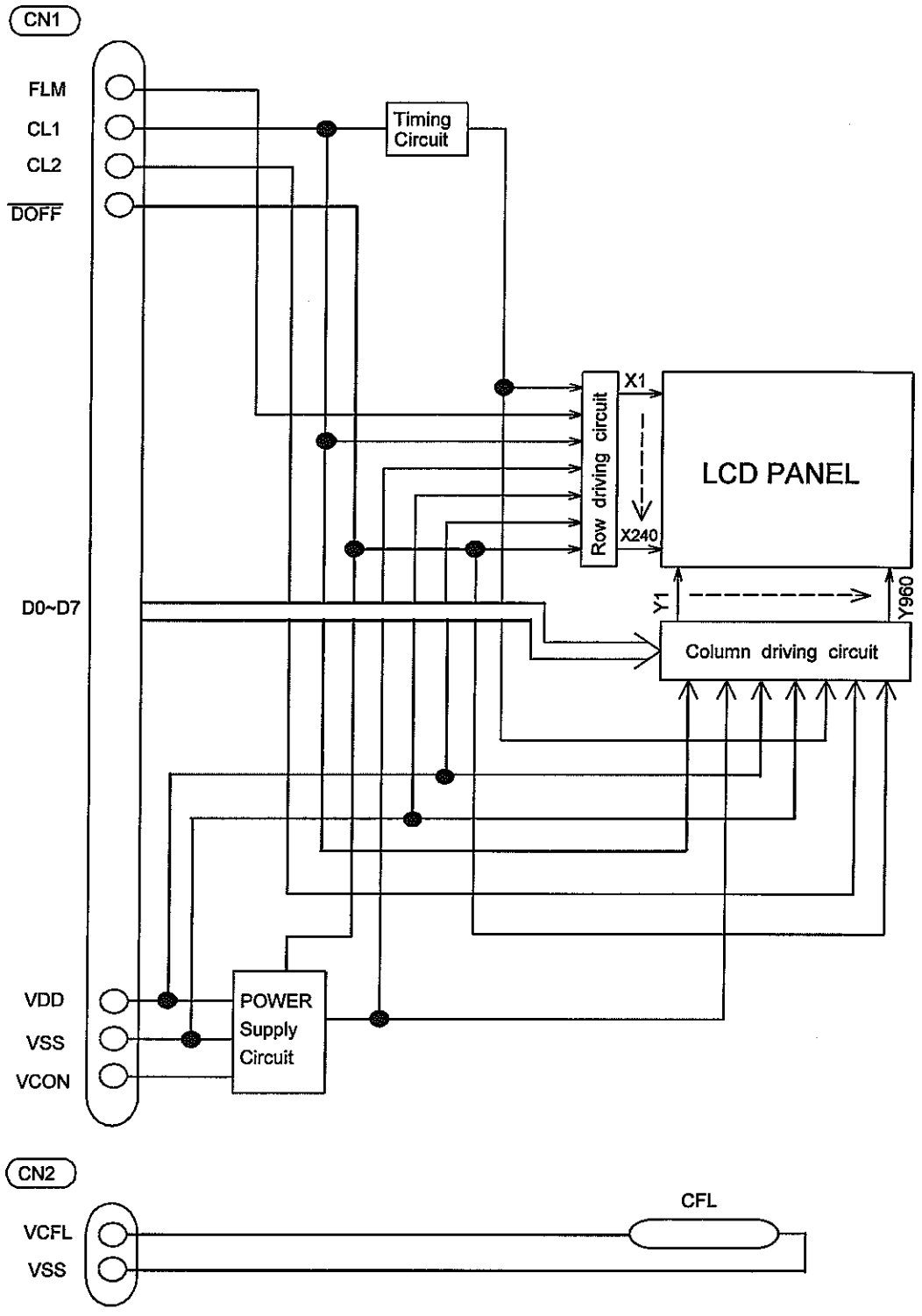
Note 3 : Measurement of the following 9 places on the display.



Note 4 : Definition of the brightness tolerance.

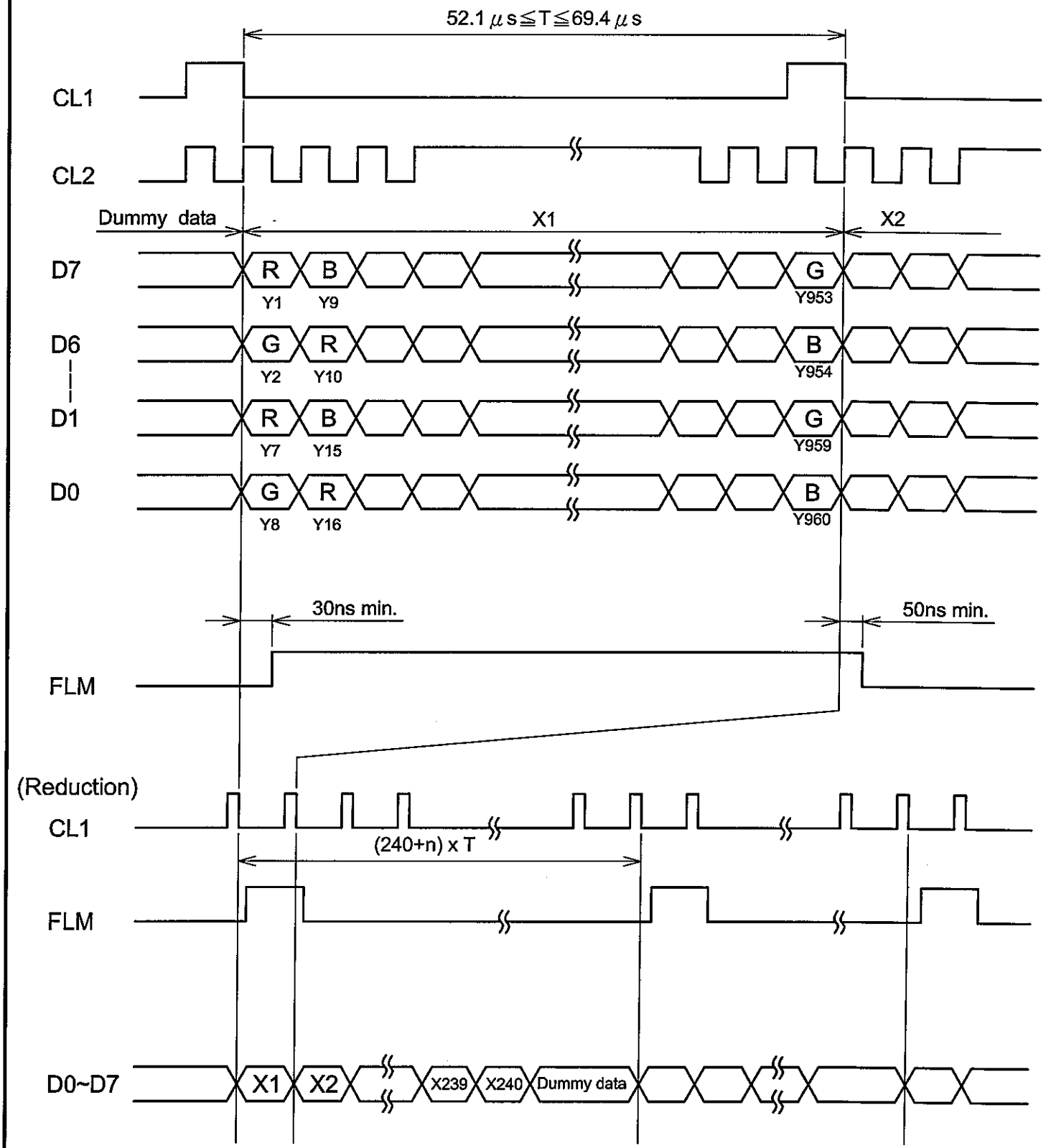
$$\left(\frac{\text{Max. brightness or min. brightness - Average brightness}}{\text{Average brightness}}\right)\times 100$$

7. BLOCK DIAGRAM



8. INTERFACE TIMING CHART

8.1 TIMING CHART

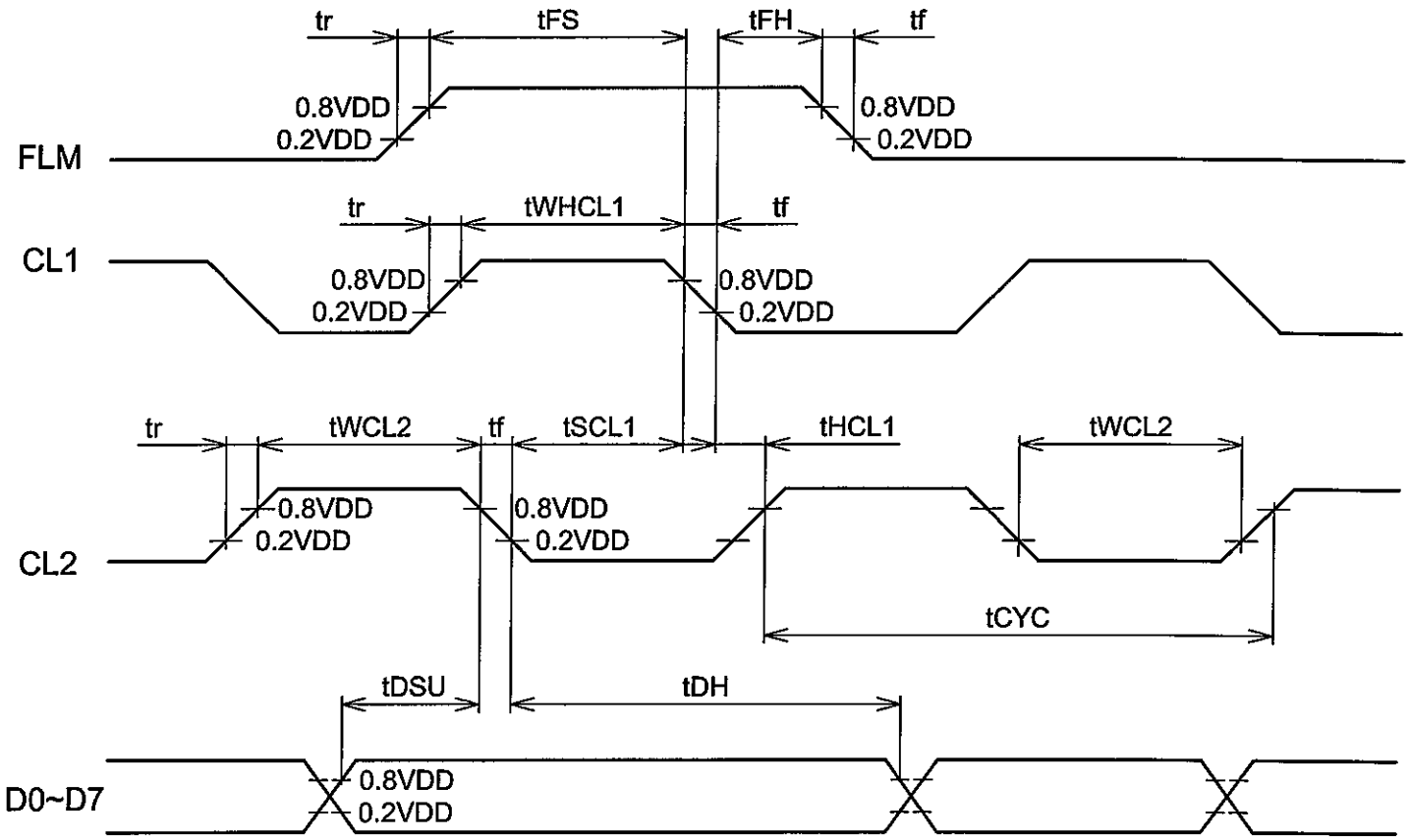


Note 1 : HITACHI recommends the duty ratio is 1/240 (n=0).
Due to the variation of customers and HITACHI testing equipment , changing the duty ratio (n=1,2,.....) may obtain optimum perfomance.

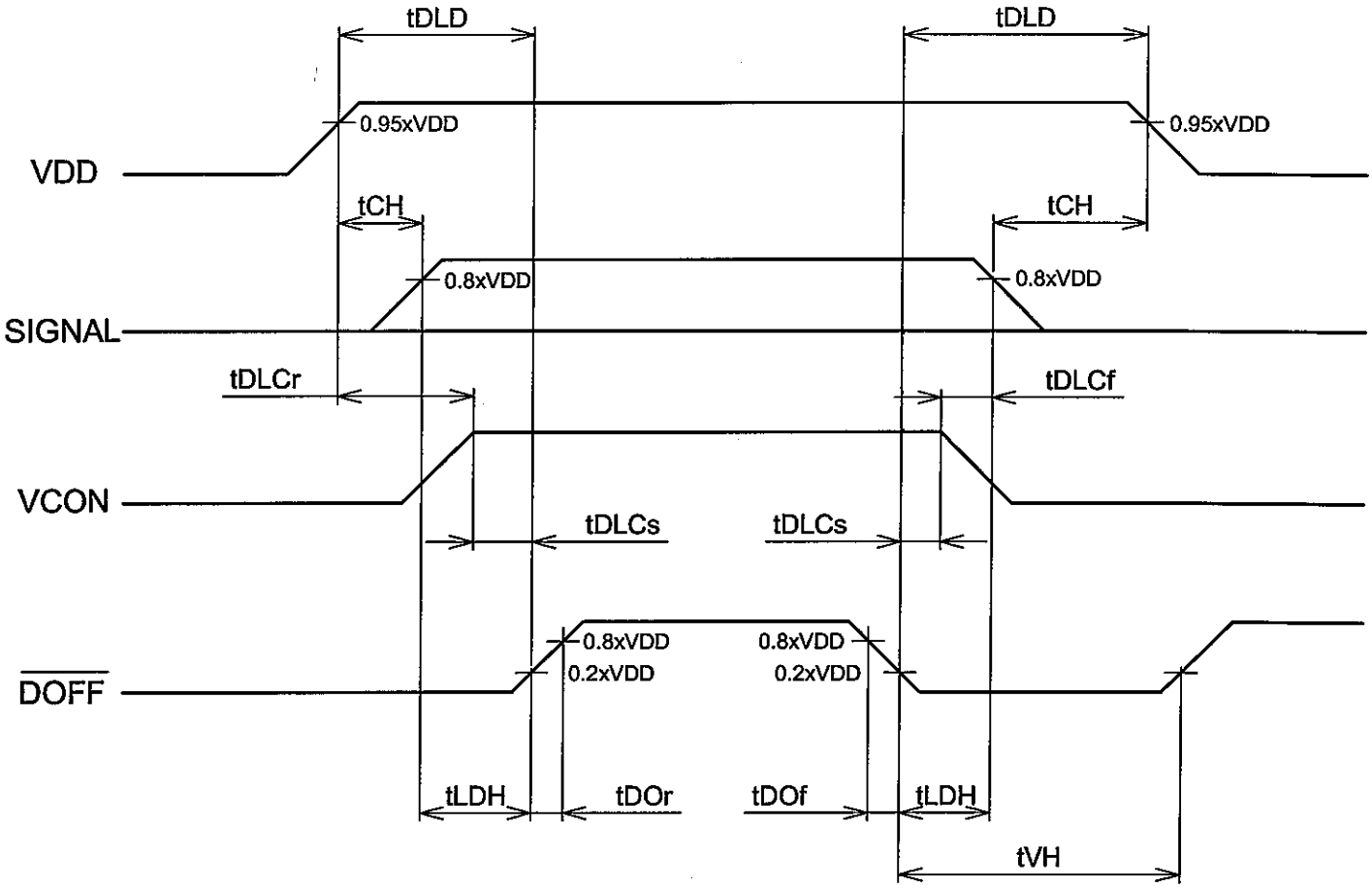
8.2 TIMING CHARACTERISTICS

VDD=3.3±0.15V , VSS=0V , VCON=0.8~2.8V , Ta=0℃~+60℃

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
CL1 Pulse width "H"	tWHCL1	100	—	—	ns
CL2 cycle time	tCYC	60	—	—	ns
CL2 Pulse width	tWCL2	30	—	—	ns
CL1 set up time	tSCL1	40	—	—	ns
CL1 hold time	tHCL1	80	—	—	ns
Clock rise fall time	tr , tf	—	—	30	ns
Data set up time	tDSU	20	—	—	ns
Data hold time	tDH	20	—	—	ns
"FLM" set up time	tFS	100	—	—	ns
"FLM hold time	tFH	50	—	—	ns



8.3 POWER ON/OFF SEQUENCE



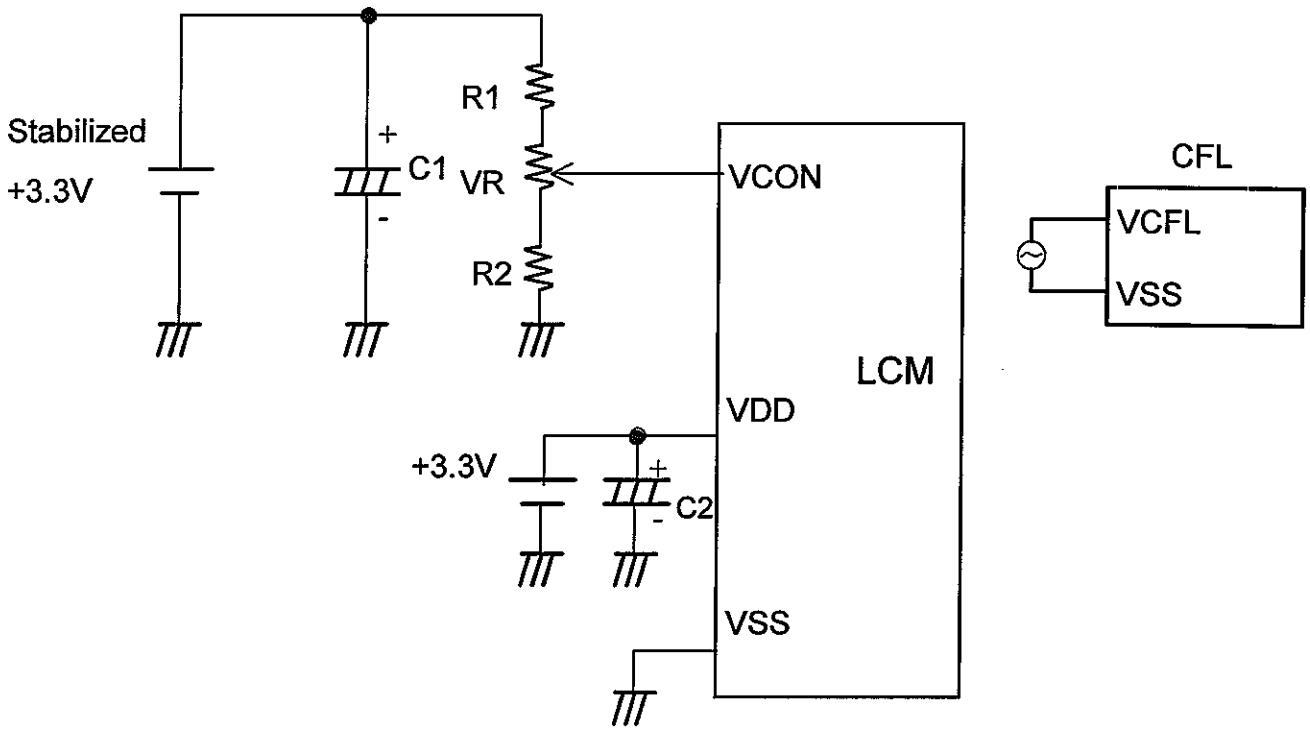
SYMBOL	MIN.	MAX.	UNIT	COMMENT
tDLD	200	—	ms	(Note 1) (Note 2)
tCH	0	—	ms	
tLDH	20	—	ms	
tDOr	—	100	ns	
tDOf	—	100	ns	
tDLCr	20	—	ms	
tDLCf	0	—	ms	
tDLCs	20	—	ms	
tVH	200	—	ms	

Note 1 : Please keep the specified sequence because wrong sequence may cause permanent damage to the LCD panel.

Note 2 : HITACHI recommends you to use $\overline{\text{DOFF}}$ function.
Display quality may deteriorate if you don't use $\overline{\text{DOFF}}$ function.

8.4 POWER SUPPLY FOR LCM

Example



8.5 INPUT DATA ALLOCATION TABLE

Data Signal	D7	D6	D5	D4	D3	D2	D1	D0	D7	D6	D5	D4	----------	D4	D3	D2	D1	D0
X \ Y	1	2	3	4	5	6	7	8	9	10	11	12	----------	956	957	958	959	960
1	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
2	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
3	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
4	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
5	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
138	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
139	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
140	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
141	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
142	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
143	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
144	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
145	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
238	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
239	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B
240	R	G	B	R	G	B	R	G	B	R	G	B	----------	G	B	R	G	B

R : RED
G : GREEN
B : BLUE

8.6 INTERNAL PIN CONNECTION

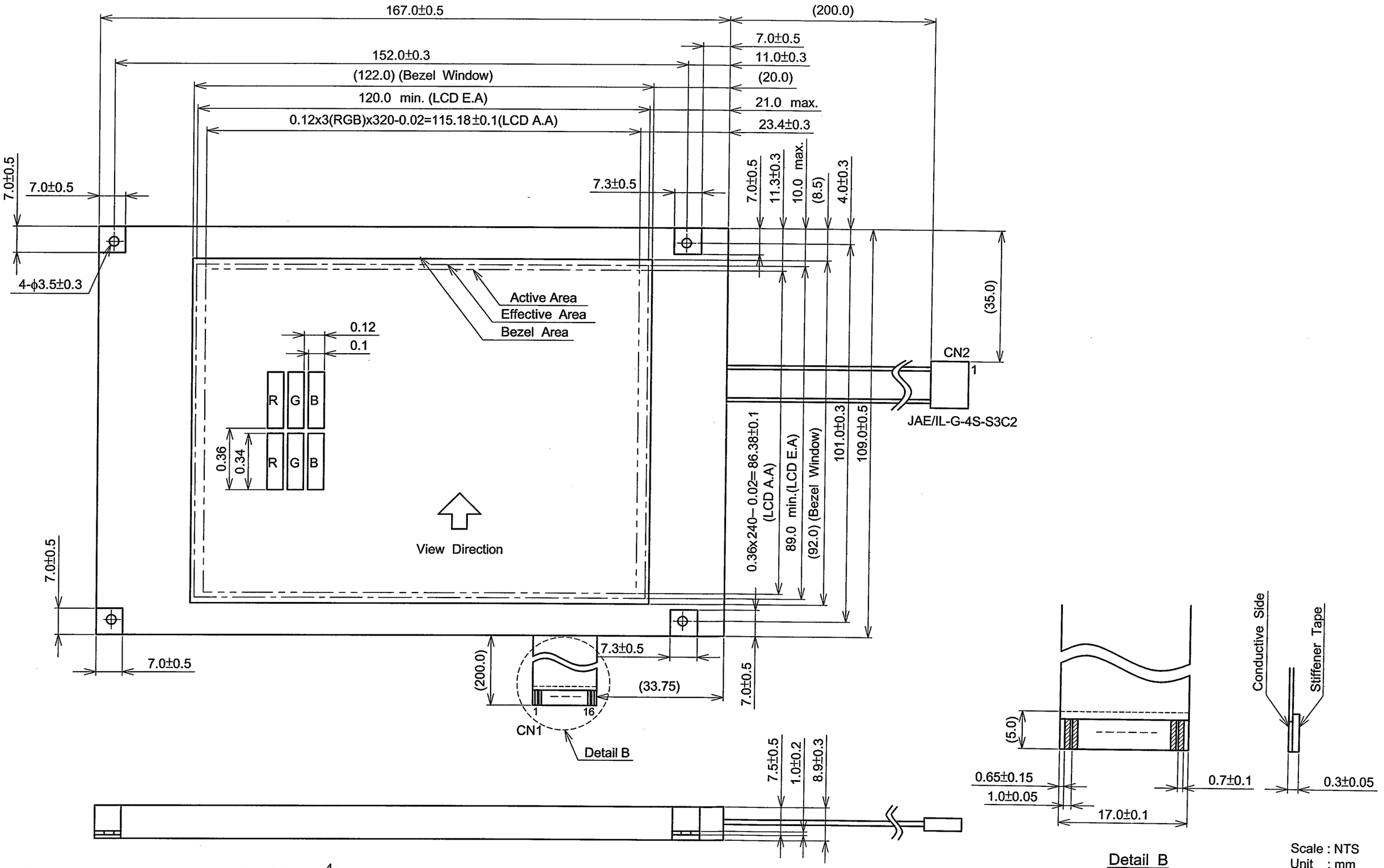
CN1 FFC : Pitch 1.0mm 16pins

PIN No.	SIGNAL	LEVEL	FUNCTION
1	FLM	H	First Line Marker
2	CL1	H→L	Data Latch
3	CL2	H→L	Data Shift
4	$\overline{\text{DOFF}}$	H/L	H : ON , L : OFF
5	VDD	—	Power Supply for Logic
6	VSS	—	GND
7	VCON	—	Contrast Adjust
8	D0	H/L	Display Data
9	D1		
10	D2		
11	D3		
12	D4		
13	D5		
14	D6		
15	D7		
16	VSS	—	GND

CN2 : JAE / IL - G - 4S - S3C2

PIN No.	SIGNAL	LEVEL	FUNCTION
1	H.V.	—	Power Supply for CFL
2	N.C	—	—
3	N.C	—	—
4	L.V.	—	GND for CFL

9.OUTLINE DIMENSIONS



Note 1 : Measurement when adding 9.8 x 10^4Pa at the measuring point.

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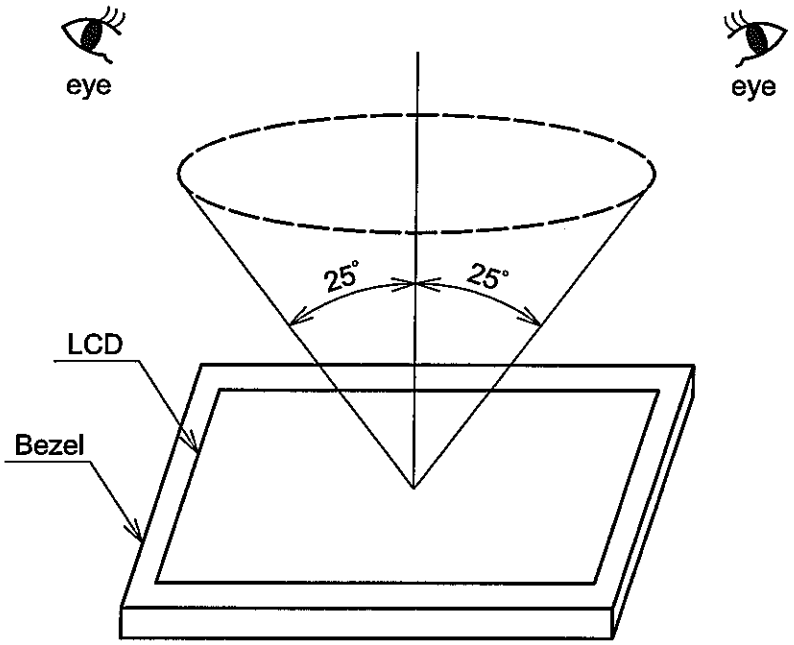
10. APPEARANCE STANDARD

10.1 APPEARANCE INSPECTION CONDITION

Visual inspecton should be done under the following condition.

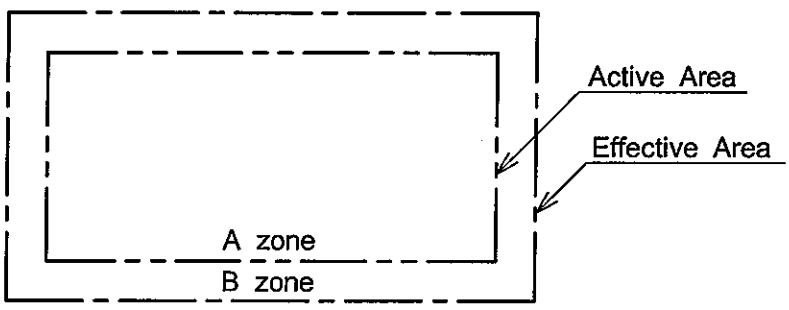
(1) The inspection should be done in a dark room.
(2) The CFL should be lighted with the prescribed inverter.
(3) The distance between eyes of an inspector and the LCD module is 25cm.
(4) The viewing zone is shown the figure.
Viewing angle $\leqq 25^{\circ}$.



10.2 DEFINITION OF ZONE

A zone : Within the active area line specified at page 9-1/1 of this document.

B zone : Area between the effective area line and the active area line specified at page 9-1/1 of this document.



10.3 APPEARANCE INSPECTION CONDITION

(1) LCD APPEARANCE

＊: If the problem related to this section occures about this item, the responsible persons of both party (Customer and HITACHI) will discuss the matter in detail.

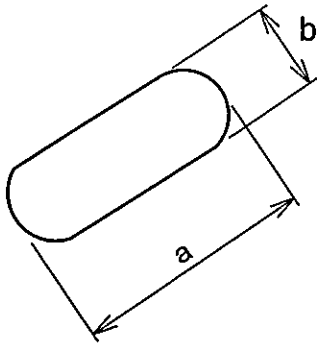
No.	ITEM	CRITERIA			A	B
LCD	Scratches	Distinguished one is not acceptable (to be judged by HITACHI SRANDARD)			＊	—
	Dent	Same as above			＊	—
	Wrinkles in Polarizer	Same as above			＊	—
	Bubbles	Average Diameter D (mm)	Maximum Number Acceptable		○	—
		D≦0.2	ignored			
		0.2＜D≦0.3	12			
		0.3＜D≦0.5	3			
		0.5＜D	none			
	Stains, Foreign Materials, Dark Spot	Filamentous (Line shape)			○	＊
		Length L(mm)	Width W(mm)	Maximum Number Acceptable		
		L≦2.0	W≦0.03	ignored		
		L≦3.0	0.03＜W≦0.05	6		
		L≦2.5	0.05＜W≦0.1	1		
		Round (Dot shape)			○	＊
		Average Diameter D(mm)	Maximum Number Acceptable	Minimum Space		
		D＜0.2	ignored	—		
		0.2≦D＜0.3	10	10 mm		
		0.3≦D＜0.4	5	30 mm		
		0.4≦D	none	—		
		The total number	Filamentous+Round=10			
		Those wiped out easily are acceptable				
	Color Tone	To be judged by HITACHI STANDARD			○	—
	Color Uniformity	Same as above			○	—

No.	ITEM	CRITERIA				A	B
LCD	Contrast Irregularity (Spot)	Average Diameter D(mm)	Contrast	Maximum Number Acceptable	Minimum Space	○	—
		D≦0.25	To be Judged by HITACHI	ignored	—		
		0.25<D≦0.35		10	20 mm		
		0.35<D≦0.5		4	20 mm		
		0.5<D≦0.7		3	50 mm		
		0.7<D		none	—		
	Contrast Irregularity (Line) (A pair of scratches)	Width W (mm)	Length L (mm)	Maximum Number Acceptable	Minimum Space	○	—
		W≦0.25	L≦1.2	2	20 mm		
		W≦0.2	L≦1.5	3	20 mm		
		W≦0.15	L≦2.0	3	20 mm		
		W≦0.1	L≦3.0	4	20 mm		
		The whole number		6			
		To be judged by HITACHI STANDARD				○	—

(2) CFL BACKLIGHT APPEARANCE

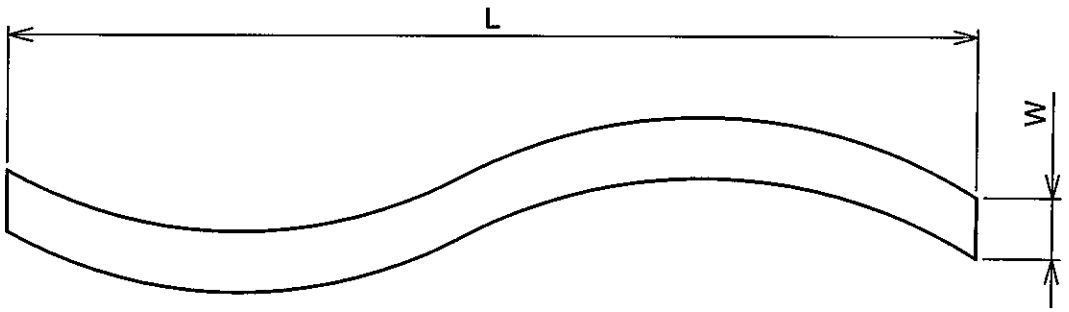
No.	ITEM	CRITERIA			A	B
CFL BACKLIGHT	Dark Spots White Spots Foreign Materials (Spot)	Average Diameter D(mm)	Maximum Number Acceptable		○	—
		D≦0.4	ignored			
		0.4<D	none			
	Foreign Materials (Line)	Width W (mm)	Length L (mm)	Maximum Number Acceptable	○	—
		W≦0.2	L≦2.5	1		
			2.5<L	none		
		0.2<W	—	none		
	Scratches	Width W (mm)	Length L (mm)	Maximum Number Acceptable	○	—
		W≦0.1	—	ignored		
		0.1<W≦0.2	L≦11.0	1		
			11.0<L	none		
		0.2<W	—	none		

Note 1 : Definition of average diameter (D)



$\frac{a+b}{2}$ = D.....Average Diameter

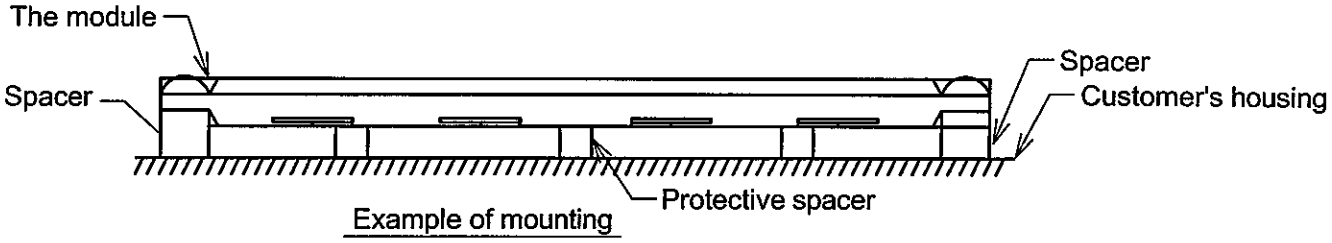
Note 2 : Definition of length (L) and width (W)



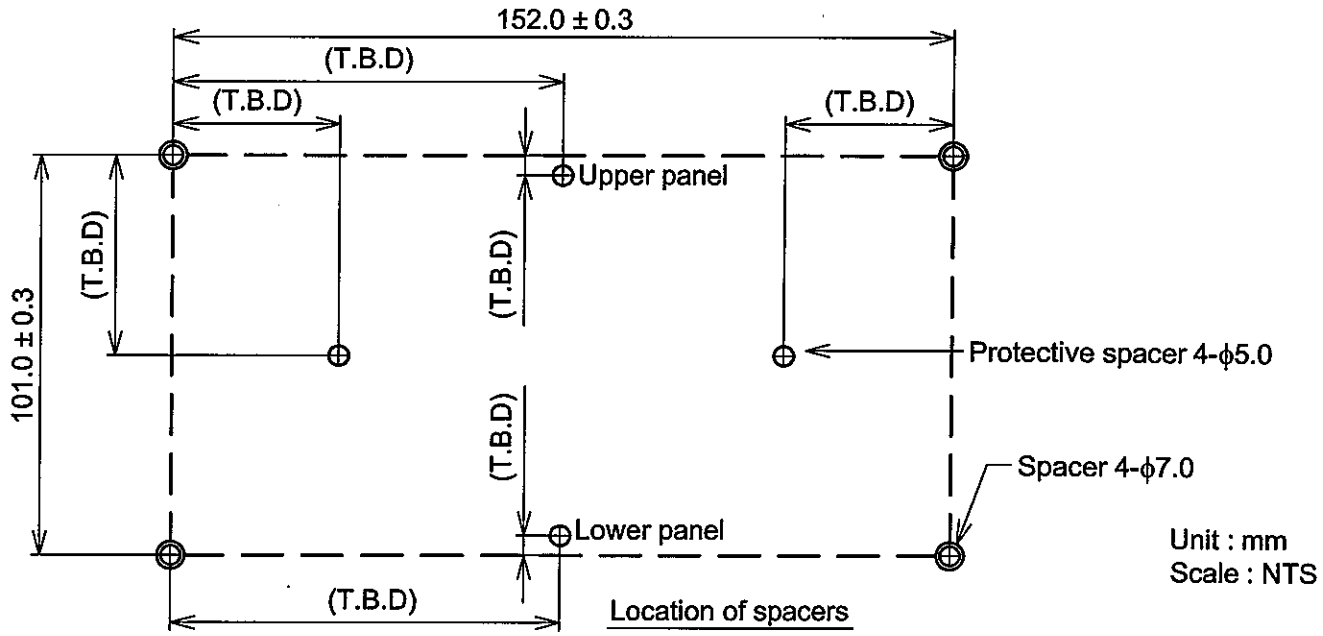
11. PRECAUTION IN DESIGN

11.1 MOUNTING PRECAUTION

Please mount the LCD module by using mounting holes provided. While mounting please pay attention to the followings.



Example of mounting



Location of spacers

(1) To prevent the module cove from being pressed, the distance between the module and the fitting plate, which means the length of the spacers, should be shorter than 1.0mm.

(2) The protective spacers are recommend in order to protect the module from shock.

11.2 PRECAUTIONS AGAINST ELECTROSTATIC DISCHARGE

As this module contains C-MOS LSIs, it is not strong against electrostatic discharge. Make certain that the operator's body is connected to the ground through a list band, etc. And don't touch I/F pins directly.

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 (3.3±0.15V). If the above sequence is not kept, C-MOS LSIs of LCD module may be damaged due to latch up phenomenon.

11.4 HANDLING PRECAUTIONS

(1) Since the polarizer on the top, and the aluminum plate on the bottom tend to be easily damaged, the should be with full care so as not to get them touched, pushed or rubbed by a piece on glass, tweezers and anything else which are hander a pencil lead 3H.

(2) As the adhesives used for adhering upper/lower polarizers and aluminum plate are made of organic substances which will be deteriorated by a chemical reaction with such chemicals as acetone, tuluene, ethanole and isopropylalcohol. The following are recommended for use :
normal hexane.

Please contact with us when it is necessary for you to use chemicals other than the above.

(3) Lightly wipe to clean the dirty surface with absorbent cotton or other soft material like chamois, soaked in the recommended chemicals without scrubbing it hardly. Always wipe the surface horizontally or vertically. Never give a wipe in a circle. 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) Immediately wipe off saliva or water drop attached on the display area because it may cause deformation or faded color.

(5) Fogy dew deposited on the surface may cause a damage, stain or dirt to the polarizer. When you need to take out the LCD module from some place at low temperature for test, etc. It is required to be warmed them up to temperature higher than room temperature before taking them out.

(6) Touching the display area or I/F pins with bare hands or contamilnating them are prohibited, because the stain on the display area and poor insulation between terminals are often caused by being touched with bare hands.
(Some cosmetics are detrimental to polarizers.)

(7) In general, the glass is fragile so that, especially on its periphery, tends to be cracked or chipped in handling. Please not give the LCD module sharp shocks by falling, etc.

(8) Maximum pressure to the surface must be less than 1.96×10^4 Pa. And if the pressure area is less than 1cm^2, maximum pressure must be less than 1.96N.

(9) Since the metal width is narrow on these locations (see page 9-1/1), please careful with handling.

(10) Top sheets shall be cleaned gently using a soft cloth such as those used for glasses. Hard wiping accumulated dust will leave scars on the surface even using a cloth.

11.5 OPERATION PRECAUTION

(1) Using a LCM module beyond its maximum ratings may result in its permanent destruction. LCM module's should usually be used under recommended operating conditions shown in chapter 5. Exceeding any of these conditions may adversely affect its reliability.

(2) Response time will be extremely delayed at lower temperature than the specified operating temperature range and on the other hand LCD's shows dark blue at higher temperature.
However those phenomena do not main defects of the LCD module. Those phenomena will disappear in the specified operating temperature range.

(3) If the display area is pushed hard during operation, some display patterns will be abnormally display.

(4) A slight dew depositing on terminals may cause electrochemical reaction which leads to terminal open circuit. Please operate the LCD module under the relative condition of 40℃ 85%RH.

(5) Since STN-LCD is sensitive for heat please consider the heat prodession from any heat sources like inverter , DC/DC converter , CPU and so on.

11.6 STORAGE

In case of storing LCD module for a long period of time (for instance, for years) for the purpose of replacement use, the following precautions necessary.

(1) Store the LCD modules in a dark place, do not expose them to sunlight or ultraviolet rays.
(2) Keep the temperature between 10℃ and 35℃ at normal humidity.
(3) Store the LCD modules in the container which is used for shipping from us.
(4) No articles shall be left on the surfacae over an extended period of time.
(5) 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.)

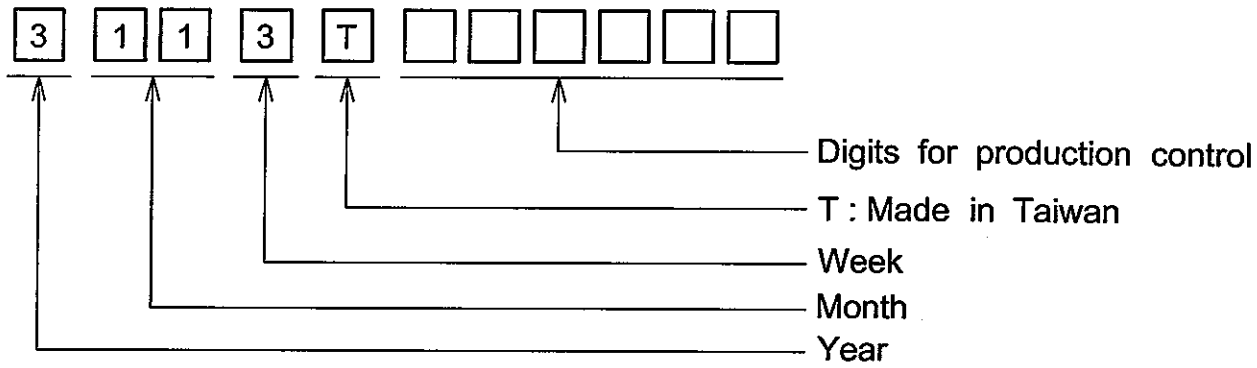
11.7 SAFETY

The LCD modules include Cold Cathode Fluorescent Lamp (CFL). CFL contains a small amount of mercury. Please follow local ordinances or regulations for disposal. Wear finger cots or gloves whenever handling or assembling a Touch Panel its glass edges are sharp.

12. DESIGNATION OF LOT MARK

12.1 LOT MARK

Lot mark is consisted of 4 digits for production lot and 6 digits for production control.



YEAR	FIGURE IN LOT MARK
2003	3
2004	4
2005	5
2006	6
2007	7

MONTH	FIGURE IN LOT MARK	MONTH	FIGURE IN LOT MARK
Jan.	01	Jul.	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
1~7	1
8~14	2
15~21	3
22~28	4
29~31	5

12.2 REVISION

REV No.	ITEM	LOT No.	PRODUCTION CONTROL No.
A			000001~

12.3 LOCATION OF LOT MARK

On the back side of LCM.

13. PRECAUTIPON FOR USE

(1) A limit sample should be provided by the both parities on an occasion when the both parties agree to its necessity.
Judgement 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 by customer is reported to HITACHI, and some problem is arisen in the specification due to the change.

4. When a new problem is arisen at the customer's operating set for sample evaluation.

(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 have been explained above.
If any points are unclear or if you have any requests , please contact HITACHI.