HITACHI

KAOHSIUNG HITACHI ELECTRONICS CO., LTD.

FOR MESSRS:_____ DATE: Oct. 15th 2008

CUSTOMER'S ACCEPTANCE SPECIFICATIONS

TX13D03VM1CAA

Contents

ACCEPTED BY:_____ PROPOSED BY: Dan Cheng

2. RECORD OF REVISION

DATE	SHEET No.	SUMMARY

3. GENERAL DATA

3.1 DISPLAY FEATURES

This module is a 5" VGA of 4:3 format of amorphous silicon TFT. The pixel format is vertical stripe and sub pixels are arranged as R(red), G(green), B(blue) sequentially .This display is RoHs compliant , and COG (chip on glass) technology and LED backlight are applied on this display.

Part Name	TX13D03VM1CAA
Module Dimensions	119.4(W)mm x 89.1(H)mm x 8.8(D)mm typ
LCD Active Area	100.8(W)mm x 75.6(H)mm
Dot Pitch	0.0525(W)mm x 3(R,G,B)(W) x 0.1575(H)mm
Resolution	640x3(R,G,B))(W)x480(H) dots
Color Pixel Arrangement	R, G, B Vertical stripe
LCD Type	Transmissive Color TFT; Normally White
Display Type	Active Matrix
Number of Colors	262k Colors (R,G,B 6bit digital each)
Backlight	Light Emitting Diode (LED)
Weight	110 g (typ.)
Interface	40pin C-MOS
Power Supply Voltage	3.3V for LCD driving 12 V for B / L driving
LED Driving Circuit	Built in
Power Consumption	0.33 W for LCD ; 3.0 W for B/L
Viewing Direction	6 O'clock (The direction without image inversion and least brightness change)

4. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	Remarks
Supply Voltage for LCD	VDD	-0.3	4.0	V	-
Input Voltage of Logic	VI	-0.3	VDD+0.3	V	Note 1
Supply Voltage for B/L	V_{LED}	0	15	V	-
Operating Temperature	Top	-20	70	°C	Note 2
Storage Temperature	Tst	-30	80	°C	Note 2

Note 1: The rating is defined for the signal voltages of the interface such as DTMG, DCLK and RGB data bus.

Note 2:The maximum rating is defined as above based on the temperature on the panel surface ,which might be different from ambient temperature after assembling the panel into the application. Moreover, some temperature-related phenomenon as below needed to be noticed:

- Background color,contrast and response time would be different in temperature other than 25°C.
- Operating under high temperature will shorten LED life time.

5. ELECTRICAL CHARACTERISTICS

5.1 LCD CHARACTERISTICS

$T_a = 25\ ^{\circ}C,\ VSS = 0V$

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks
Power Supply Voltage	VDD	-	3.0	3.3	3.6	V	-
Input Voltage of Logic	VI	"H" level	0.7VDD	-	VDD	V	Note 1
		"L" level	VSS	-	0.3VDD		
Power Supply Current	IDD	VDD-VSS=3.3V	-	100	-	mA	Note 2
Vsync Frequency	fV	-	50.0	60.0	70.0	Hz	-
Hsync Frequency	fH	-	26.3	31.5	36.8	KHz	
DCLK Frequency	fCLK	-	21	25.2	29.4	MHz	

Note 1: The rating is defined for the signal voltages of the interface such as DTMG,DCLK and RGB data bus.

Note 2: An all black check pattern is used when measuring IDD. fV=60 Hz.

5.2 BACKLIGHT CHARACTERISTICS

$T_a = 25\ ^{\circ}C$

Item	Symbol	Condition		Min.	Typ.	Max.	Unit	Remarks
B/L Input Voltage	V_{LED}	-		11.7	12.0	12.3	V	-
B/L Input Current	I_{LED}	-		-	250	-	mA	-
Brightness Control (100%→ 0 %)	DIM	Analog		0	-	3.3	-	-
		Digital (PWM)	$V_{PWM}H$	-	3.3	3.6	V	-
			$V_{PWM}L$	0	-	0.2	V	Note 1
			f_{PWM}	1	-	10	KHz	
			t_{PWM}	(10)	-	-	μs	
LED Lifetime	-	V_{LED}=12.0 V		-	70K	-	hrs	Note 2

Note 1: PWM function

- By changing the duty ratio of High/Low of PWM pulse to control Brightness.
- Don't make the PWM terminal in a Floating state, and connect to GND when waiting.
- Please input PWM signal after V_{LED}(12V) is supplied.
- Please turn off V_{LED}(12V) after PWM signal is stopped.

Note 2: The estimated lifetime is specified as the time to reduce 50% brightness by applying at 25°C.

6. OPTICAL CHARACTERISTICS

The optical characteristics are measured based on the conditions as below:

- Supplying the signals and voltages defined in the section of electrical characteristics.
- The backlight unit needs to be turned on for 30 minutes.
- The ambient temperature is 25°C.
- In the dark room around 500~1000 lx, the equipment has been set for the measurements as shown in Fig 6.1.

$T_a = 25\ ^{\circ}C, f_v = 60\,Hz, VDD = 3.3V$

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks
Brightness (center)		B	$\phi=0^{\circ}, \theta=0^{\circ}$	-	600	-	cd/m^2	Note 1
Brightness uniformity		-	V_{LED}=12V,DIM=0V	70	-	-	%	Note 2
Contrast Ratio		CR	(DutyCycle 0%)	250	500	-	-	Note 3
Response time		RISE(Ton)	$\phi=0^{\circ}, \theta=0$	-	20	-	ms	Note 4
		FALL(Toff)		-	10	-		
NTSC Ratio		-	$\phi=0^{\circ}, \theta=0$	-	50	-	%	-
Viewing Angle		θ=X	$\phi=0^{\circ}$,CR≧5	-	70	-	Degree	Note 5
		θ=X'	$\phi=180^{\circ}$,CR≧5	-	70	-		
		θ=Y	$\phi=90^{\circ}$,CR≧5	-	70	-		
		θ=Y'	$\phi=270^{\circ}$,CR≧5	-	70	-		
Color chromaticity	Red	X	$\phi=0^{\circ}, \theta=0$	(0.54)	(0.59)	(0.64)	-	Note 6
		Y		(0.30)	(0.35)	(0.40)		
	Green	X		(0.30)	(0.35)	(0.40)		
		Y		(0.51)	(0.56)	(0.61)		
	Blue	X		(0.10)	(0.15)	(0.20)		
		Y		(0.07)	(0.12)	(0.17)		
	White	X		(0.27)	(0.32)	(0.37)		
		Y		(0.28)	(0.33)	(0.38)		

Note 1: The brightness is measured from 9 point of the panel, P1~P9 in Fig. 6.2, for the average value.

Note 2: The brightness uniformity is calculated by the equation as below:

$$\text{Brightness uniformity} = \frac{\text{Min. Brightness}}{\text{Max. Brightness}} \text{ X100\%}$$

, which is based on the brightness values of the 9 points measured by BM-5 as shown in Fig. 6.2.

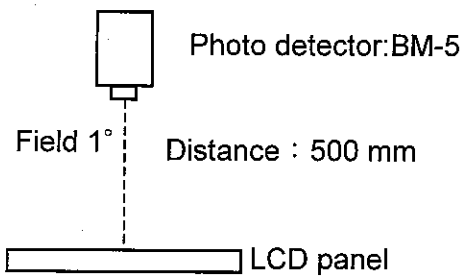


Fig. 6.1

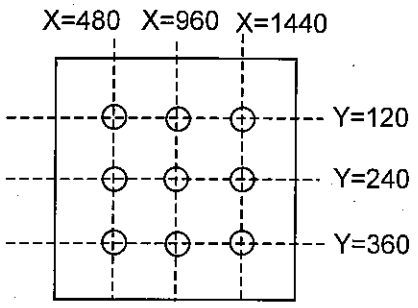


Fig. 6.2

Note 3: The Contrast ratio is measured from the center point of the panel, P5, and defined as the following equation:

$$CR = \frac{\text{Brightness of White}}{\text{Brightness of Black}} X100\%$$

Note 4: The definition of response time is shown in Fig. 6.3. The rising time is the period from 90% brightness to 10% brightness when the data is from white to black. Oppositely, Falling time is the period from 10% brightness rising to 90% brightness.

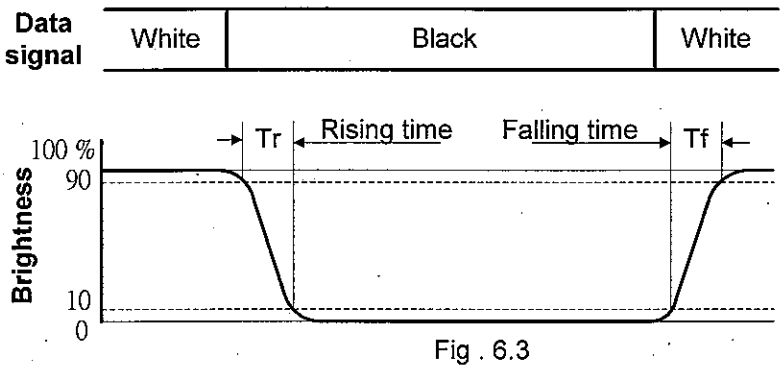


Fig . 6.3

Note 5: The definition of viewing angle is shown in Fig. 6.4. Angle ϕ is used to represent viewing directions, for instance, $\phi = 270°$ means 6 o'clock, and $\phi = 0°$ means 3 o'clock. Moreover, angle θ is used to represent viewing angles from axis Z toward plane XY.

The viewing direction of this display is 12 o'clock, which means that a photograph with gray scale would not be reversed in color and the brightness change would be less from this direction. However, the best contrast peak would be located at 6 o'clock.

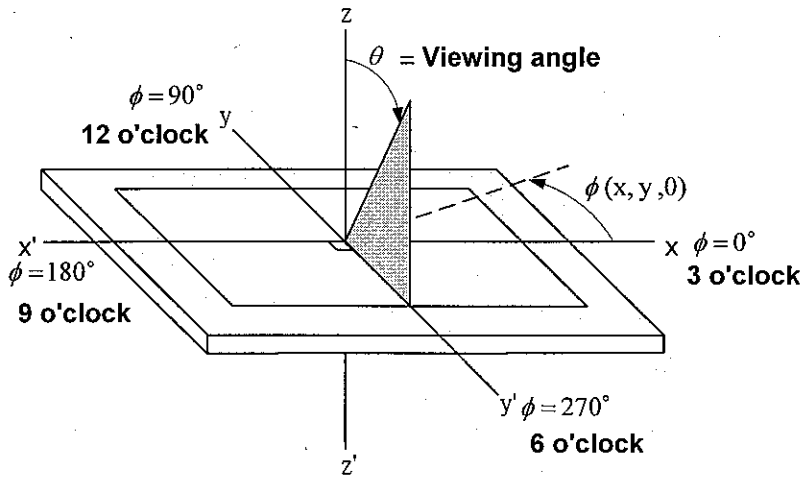
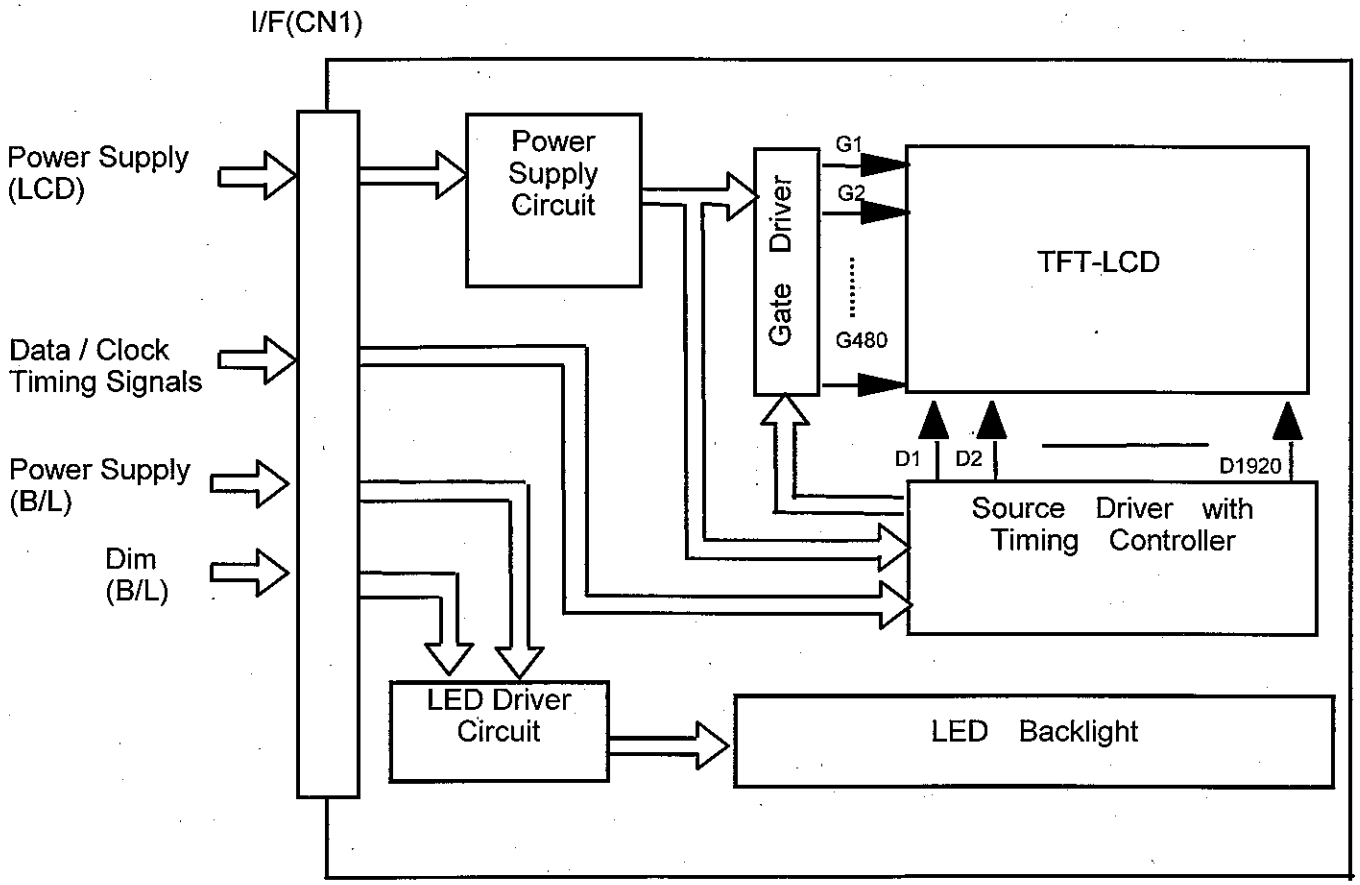


Fig. 6.4

Note 6: The color chromaticity is measured from the center point of the panel, P5, as shown in Fig. 6.2.

7 BLOCK DIAGRAM



8. RELIABILITY TESTS

Test Item	Condition	
High Temperature	1) Operating 2) 70°C	240 hrs
Low Temperature	1) Operating 2) -20°C	240 hrs
High Temperature	1) Storage 2) 70°C	240 hrs
Low Temperature	1) Storage 2) -20°C	240 hrs
Heat Cycle	1) Operating 2) –20°C ~70°C 3) 3hrs~1hr~3hrs	240 hrs
Thermal Shock	1) Non-Operating 2) -35°C ↔ 85°C 3) 0.5 hr ↔ 0.5 hr	240 hrs
High Temperature & Humidity	1) Operating 2) 40°C & 85%RH 3) Without condensation 4) Note 3	240 hrs
Vibration	1) Non-Operating 2) 20~200 Hz 3) 2G 4) X, Y, and Z directions	1 hr for each direction
Mechanical Shock	1) Non-Operating 2) 10 ms 3) 50G 4) ±X, ± Y and ±Z directions	Once for each direction
ESD	1) Operating 2) Tip: 200 pF, 250 Ω 3) Air discharge for glass: ± 8KV 4) Contact discharge for metal frame: ± 8KV 5) Contact discharge for LCD interface: ± 100V	1) Glass: 9 points 2) Metal frame: 8 points 3) Connector: all pins

Note 1: Display functionalities are inspected under the conditions defined in the specification after the reliability tests.

Note 2: The display is not guaranteed for use in corrosive gas environments.

Note 3: Under the condition of high temperature & humidity, if the temperature is higher than 40℃, the humidity needs to be reduced as Fig. 7.1 shown.

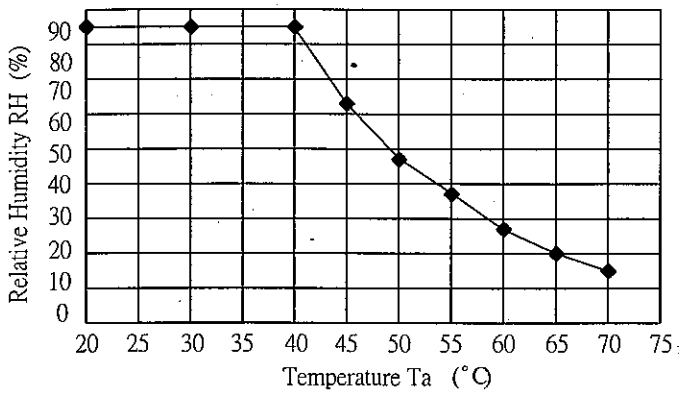


Fig. 7.1

9 LCD INTERFACE

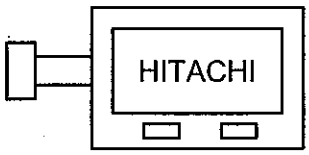
9.1 INTERNAL PIN CONNECTION

CN1 JAE: FA5B040HF1R3000 (Suitable FPC : t0.3±0.03mm, 0.5±0.03mm pitch)

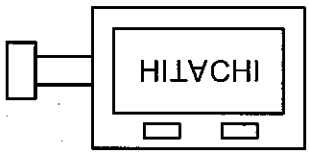
PIN No.	SIGNAL	FUNCTION
1	VDD	Power Supply for Logic
2	VDD	
3	U/D	Vertical Display mode Control (Note 1)
4	L/R	Horizontal Display mode Control (Note 1)
5	Vsync	Vertical Sync Pulse
6	DTMG	Timing Signal for Data
7	VSS	GND
8	DCLK	Dot Clock
9	VSS	GND
10	Hsync	Horizontal Sync Pulse
11	VSS	GND
12	B5	Blue Data
13	B4	
14	B3	
15	VSS	GND
16	B2	Blue Data
17	B1	
18	B0	
19	VSS	GND
20	G5	Green Data
21	G4	
22	G3	
23	VSS	GND
24	G2	Green Data
25	G1	
26	G0	
27	VSS	GND
28	R5	Red Data
29	R4	
30	R3	
31	VSS	GND
32	R2	Red Data
33	R1	
34	R0	
35	MODE	Sync Mode Control (Note 2)
36	DIM	Brightness Control
37	V_{LED}	Power Supply for B/L
38	V_{LED}	
39	V_{LED}	
40	V_{LED}	

Note 1 : Vertical Display Inode and Horizontal Display mode control.

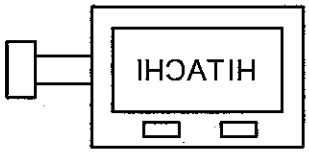
U/D : H , L/R : H



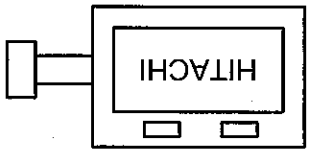
U/D : L , L/R : H



U/D : H , L/R : L



U/D : L , L/R : L



Note 2 : Sync mode control

H : DTMG only , no need Hsync and Vsync.

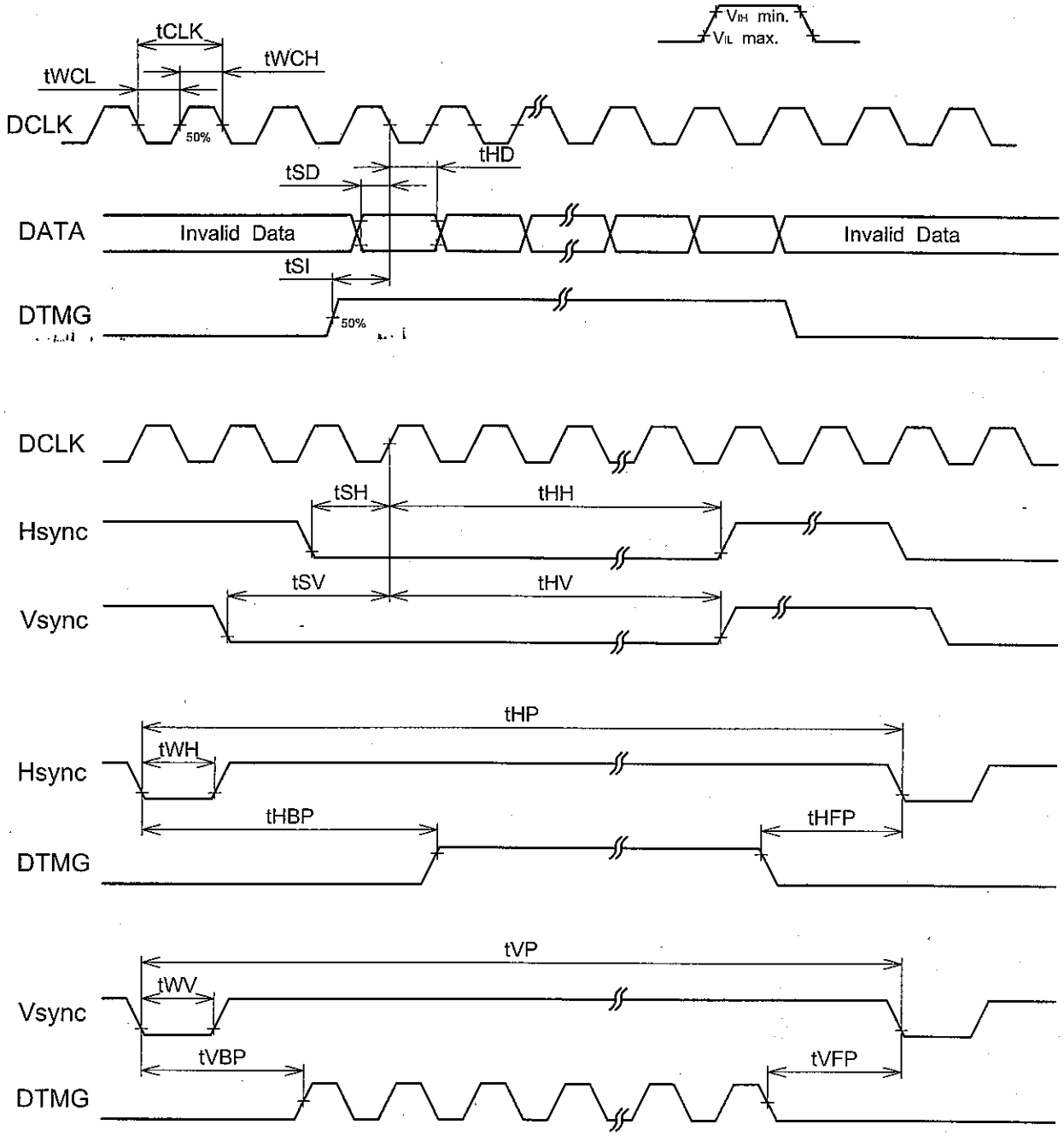
L : Hsync and Vsync only , no need DTMG.

The DTMG and Hsync-Vsync mode timing is determined as described in 8.2.

9.2 TIMING CHART

Vsync,Hsync,DTMG,control pin
R0~R5,G0~G5,B0~B5

*Data is latched negative edge trigger of DCLK



Note 1 : DTMG is definition of the above timing for Hsync and Vsync.
Note 2 : DTMG should be set to low level when it is not input valid data.

9.3 INTERFACE TIMING

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARKS
DCLK	Cycle time	t_{CLK}	34.48	39.71	-	ns	
	Low level Width	t_{WCL}	17.24	-	-		
	High level Width	t_{WCH}	17.24	-	-		
	Duty	D	0.45	0.5	0.55	-	D= t_{CLKL}/ t_{CLK}
Data	Set up time	t_{SD}	12	-	-	ns	for DCLK
	Hold time	t_{HD}	12	-	-		

Note : Vsync Cycle should be set to odd.

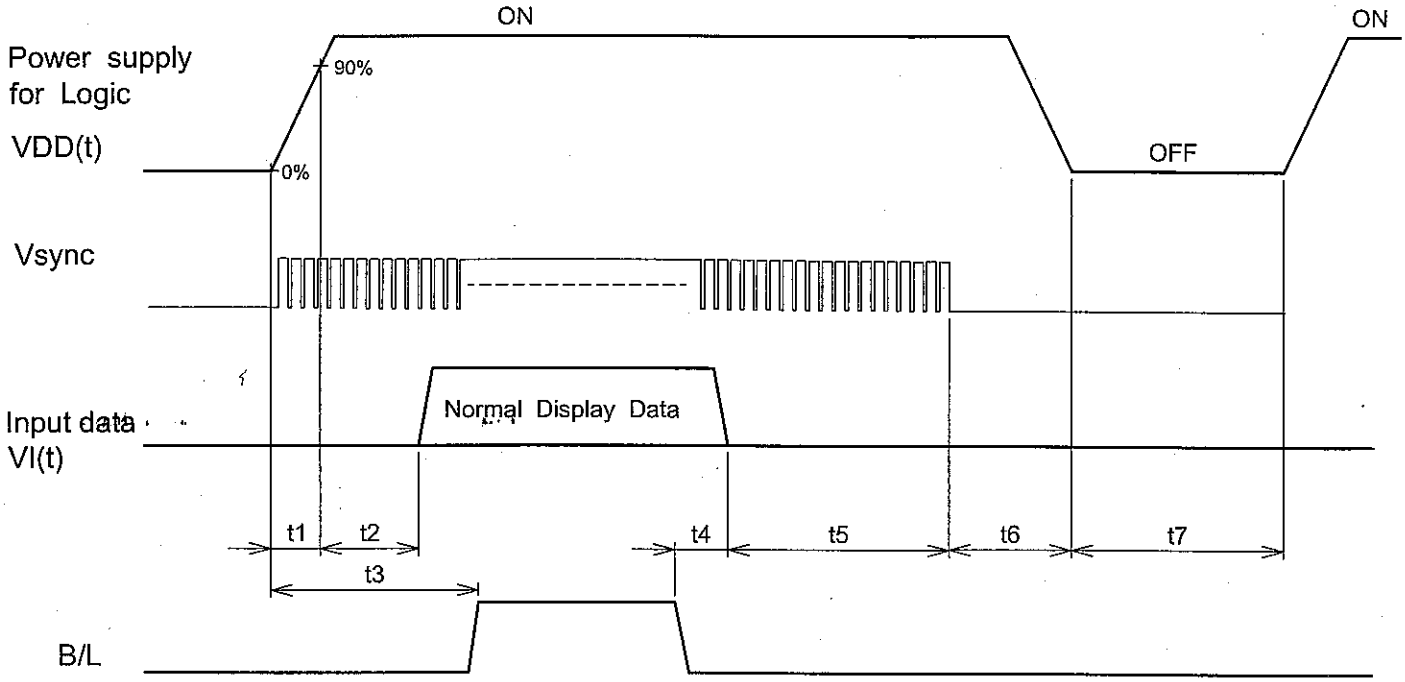
Hsync-Vsync Mode

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARKS
Hsync	Set up time	t_{SH}	12	-	-	ns	for DCLK
	Hold time	t_{HH}	12	-	-		
	Cycle time	t_{HP}	792	800	1039	tCLK	
	Valid width	t_{WH}	6	96	138		
	Horizontal back porch	t_{HBP}	144	144	144		
Vsync	Set up time	t_{SV}	12	-	-	ns	for DCLK
	Hold time	t_{HV}	12	-	-		
	Cycle time	t_{VP}	496	525	747	tHP	
	Valid width	t_{WV}	2	2	10		
	Vertical back porch	t_{VBP}	12	12	12		

DTMG Mode

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARKS
DTMG	Set up time	t_{SI}	12	-	-	ns	for DCLK
	Hold time	t_{HD}	12	-	-		
	Horizontal back porch	t_{HBP}	115	160	255	tCLK	
	Horizontal front porch	t_{HFP}	0	0	0		
	Cycle time	t_{HP}	755	800	895		
	Vertical back porch	t_{VBP}	6	45	255	tHP	
	Vertical front porch	t_{VFP}	0	0	0		
	Cycle time	t_{VP}	486	525	735		

9.4 POWER ON/OFF SEQUENCE



POWER ON

$t_1 \leqq 1ms$
Vsync x 4 $< t_2 \leqq$ Vsync x 8
Vsync x 8 $\leqq t_3$

POWER OFF

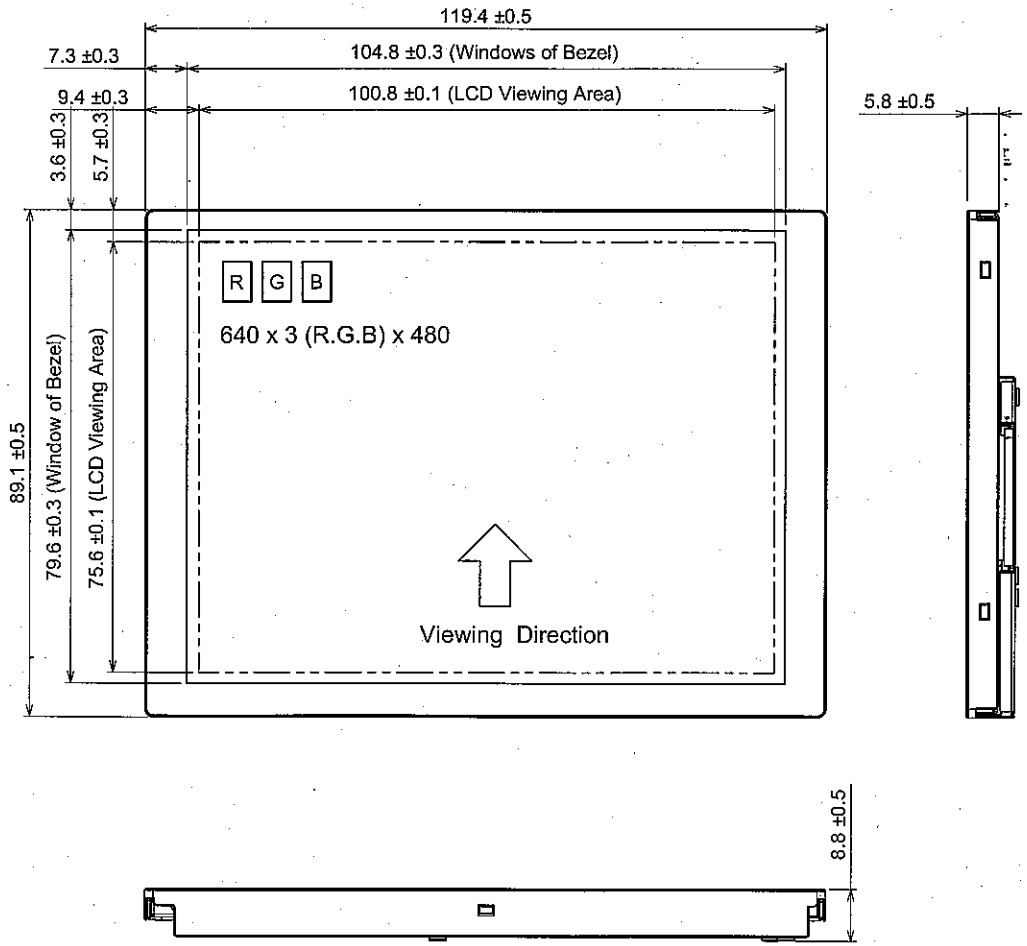
5ms $\leqq t_4$
Vsync x 4 $\leqq t_5$
10ms $\leqq t_6 \leqq$ 50 ms
400ms $\leqq t_7$

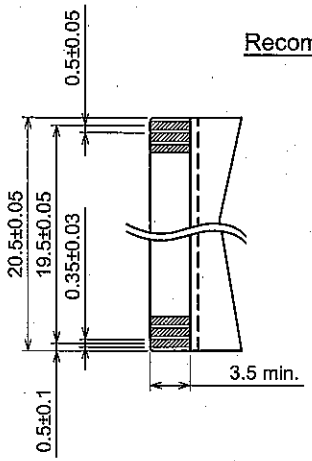
Note 1 : 0V$\leqq$VI(t)$\leqq$VDD(t)DTMG is definition of the above timing for Hsync and Vsync. Input data must be set to low for power on / off even t1+t2 and t5+t6.
Note 2 : Input data should not be set high impedance when power on.

9.5 RELATIONSHIP BETWEEN DISPLAYED COLOR AND INPUT DATA

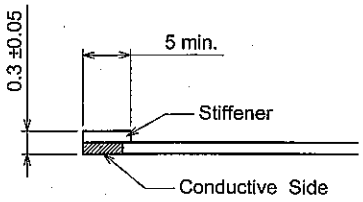
	COLOR & Gray Scale	Data Signal																	
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red (0)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green (0)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue (0)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red (62)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red (61)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red (1)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red (0)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Green	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green (62)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Green (61)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green (1)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	Green (0)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Blue	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue (62)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue (61)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue (1)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue (0)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

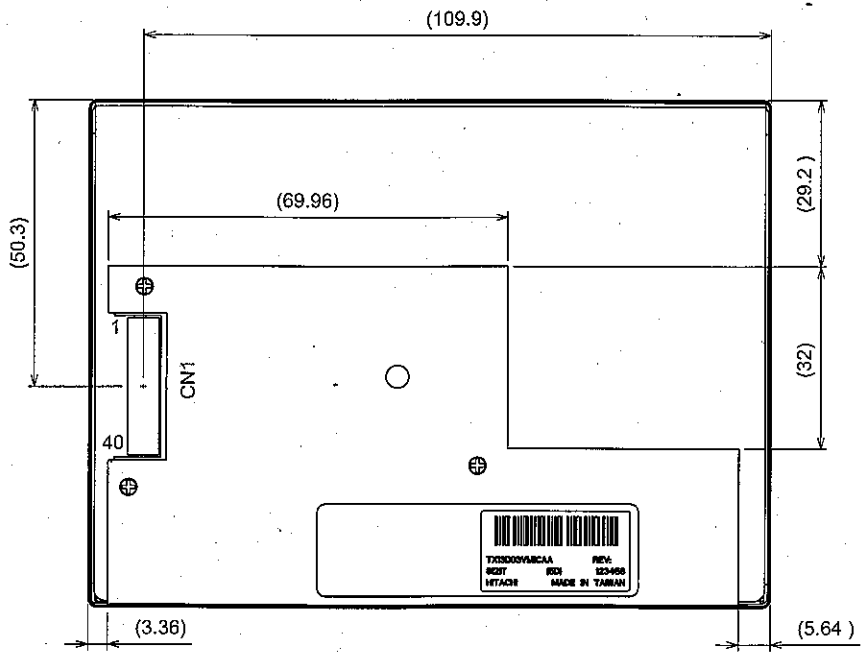
10. OUTLINE DIMENSIONS





Recommended design rule for CN1 FPC





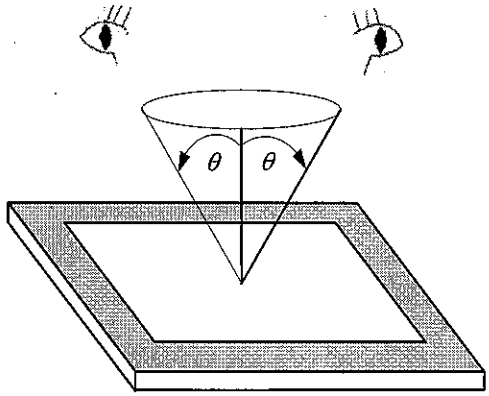
Scale : NTS
Unit : mm

KAOHSIUNG HITACHI ELECTRONICS CO.,LTD.	SHEET NO.	7B63PS 27010-TX13D03VM1CAA-1	PAGE	10-1/1

11. APPEARANCE STANDARD

The appearance inspection is performed in a dark room around 2000 lx based on the conditions as below:

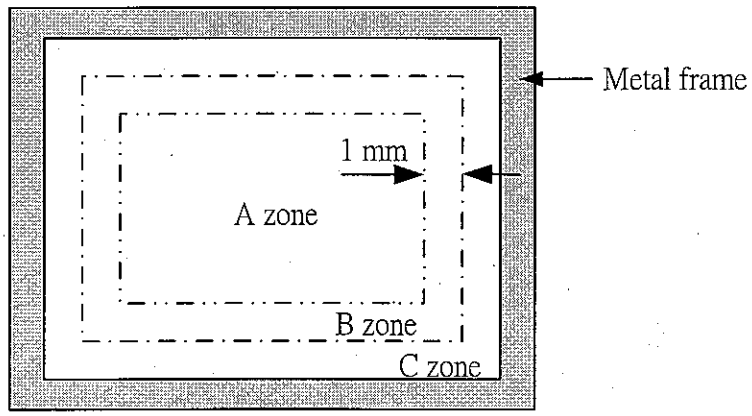
- The distance between inspector's eyes and display is 30 cm.
- The viewing zone is defined with angle θ shown as below. The inspection should be performed within 45° when display is shut down. The inspection should be performed within 25° when display is power on.



11.1 THE DEFINITION OF LCD ZONE

LCD panel is divided into 3 areas as shown as below for appearance specification in next section. A zone is the LCD active area (dot area); B zone is the area, which extended 1 mm out from LCD active area; C zone is the area between B zone and metal frame.

In terms of housing design, B zone is the recommended window area customers' housing should be located in.



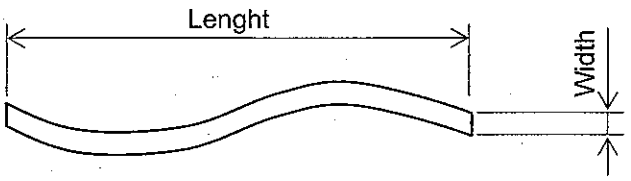
11.2 LCD APPEARANCE SPECIFICATION

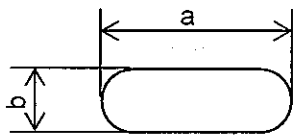
The specification as below is defined as the amount of unexpected phenomenon or material in different zones of LCD panel. The definitions of length, width and average diameter using in the table are shown in Fig. 10.3 and Fig. 10.4.

Item	Criteria				Applied zone
Scratches	Length (mm)	Width (mm)	Maximum number	Minimum space	A,B
	Ignored	W≦0.02	Ignored	-	
	L≦40	0.02<W≦0.04	10	-	
	L≦20	W≦0.04	10	-	
Dent	Distinguished one is acceptable (To be judged by HITACHI standard)				A
Wrinkles in polarizer	Same as above				A
Bubbles on polarizer	Average diameter (mm)		Maximum number		A
	D≦0.2		Ignored		
	0.2<D≦0.3		12		
	0.3<D≦0.5		3		
	0.5<D		none		
1) Stains 2) Foreign Materials 3) Dark Spot	Filamentous (Line shape)				A,B
	Length (mm)	Width (mm)	Maximum number		
	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)				A,B
	Average diameter (mm)	Maximum number	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 numver	Filamentous + Round=10			
	Those wiped out easily are acceptable				
Color Tone	To be judged by HITACHI STANDARD				A
Color Uniformity	Sane as above				A
Dot-Defect (Note 1)			Maximum number		A
	Sparkle mode	1 dot	4		
		2 dots (Note.(3)-(f))	1		
		Total	5		
	Black mode	1 dot	5		
		2 dots (Note.(3)-(f))	2		
		Total	5		
	Total		10		

(2) LED BACKLIGHT APPEARANCE

No.	Item	Criteria			Applied zone
LED	Dark Spots	Average diameter D(mm)		Maximum number	A
	White Spots	D≦0.4		ignored	
	Foreign Materials (Spot)	0.4＜D		none	
BACKLIGHT	Foreign Materials (Line)	Width W(mm)	Length L(mm)	Maximum number	A
		W≦0.2	L≦2.5	1	
			2.5＜L	None	
		0.2<W	-	none	
	Scratches	Width W(mm)	Length L(mm)	Maximum number	A
		W≦0.1	-	ignored	
		0.1＜W≦0.2	L≦11.0	1	
			11.0＜L	None	
		0.2＜W	-	none	

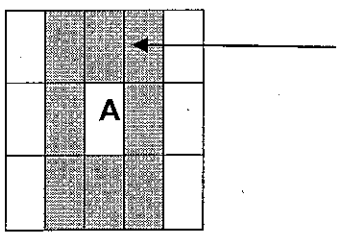




Average diameter = $\frac{a+b}{2}$

Note 1: The defi nitions of dot defect are as below:

- The defect area of the dot must be bigger than half of a dot.
- For bright dot-defect, showing black pattern, the dot's brightness must be over 30% brighter than others.
- For dark dot-defect, showing white pattern, the dot's brightness must be under 70% darker than others.
- The definition of 1-dot-defect is the defect-dot, which is isolated and no adjacent defect-dot.
- The definition of adjacent dot is shown as below.
- The Density of dot defect is defined in the area within diameter ϕ =20mm.



12. PRECAUTION IN DESIG

12.1 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.

12.2 HANDLING PRECAUTIONS

(1) As the adhesives used for adhering upper/lower polarizer's and frame are made of organic substances which will be deteriorated by a chemical reaction with such chemicals as acetone, toluene, ethanol and isopropyl alcohol. 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.

(2) 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.

(3) Immediately wipe off saliva or water drop attached on the display area because it may cause deformation or faded color.

(4) Foggy 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.

(5) Touching the display area or I/F pins with bare hands or contaminating 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 polarizer's.)

(6) 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.

(7) 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.

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

(9) 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.

12.3 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 4. 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.

12.4 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.

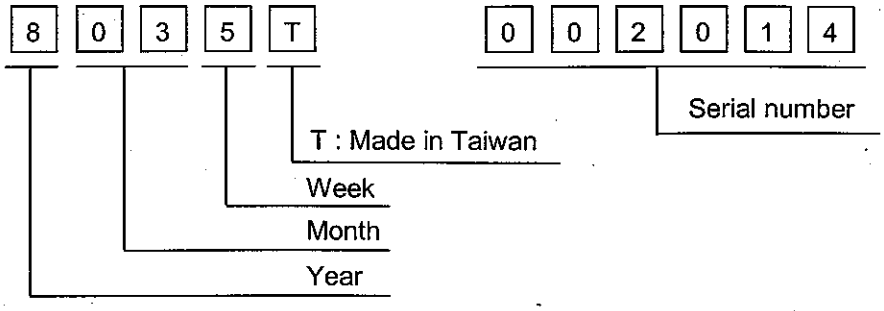
(2) 2Keep the temperature between 10℃ and 35℃ at normal humidity.

(3) Store the LCD modules in the container which is used for shipping from us.

(4) No articles shall be left on the surface over an extended period of time.

13. DESIGNATION OF LOT MARK

(1) The lot mark is shown as below. First 4 digits are used to represent production lot, T represented made in Taiwan, and the last 6 digits are the serial number.



(2) The tables as below are shown what the first 4 digits of lot mark are shorted for.

Year	Mark
2008	8
2009	9
2010	0
2011	1
2012	2

Month	Mark	Month	Mark
1	01	7	07
2	02	8	08
3	03	9	09
4	04	10	10
5	05	11	11
6	06	12	12

Week (Days)	Mark
1~7	1
8~14	2
15~21	3
22~28	4
29~31	5

(3) Except letters I and O, revision number will be shown on lot mark and following letters A to Z.

(4) The location of the lot mark is on the back of the display .