SPEC No. LD－19306A

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DEVICE SPECIFICATION FOR

TFT-LCD Module

MODEL No.

LQ0DZA0097

**170M1LA12

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If any problem occurs in relation to the description of this specification, it shall be resolved through discussion with spirit of cooperation.

Contact and consult with a SHARP sales representative for any questions about this device.

Table of contents

1. Application

This specification applies to a color TFT-LCD module, LQ0DZA0097.

2. Overview

This module is a color active matrix LCD module incorporating amorphous silicon TFT (Thin Film Transistor). It is composed of a color TFT-LCD panel, driver ICs, control circuit and power supply circuit and a backlight unit. Graphics and texts can be displayed on a 1920×3×1200 dots panel with 262,144 colors by using LVDS (Low Voltage Differential Signaling) to interface and supplying +3.3V DC supply voltage for TFT-LCD panel driving and supply voltage for backlight.

Optimum viewing direction is 6 o'clock.

Backlight-driving DC/AC inverter is built in this module.

3. Mechanical Specifications

Parameter	Specifications	Unit
Display size	43(17.0") Diagonal	cm
Active area	365.76 (H)×228.60 (V)	mm
Pixel format	1920 (H)×1200 (V)	pixel
	(1 pixel = R+G+B dots)	
Aspect ratio	16 : 10	
Pixel pitch	0.1905 (H)×0.1905 (V)	mm
Pixel configuration	R,G,B vertical stripe	
Display mode	Normally white	
Surface treatment	Glare and hard-coating 2H Low reflection	

Parameter		Min.	Typ.	Max.	Unit
Unit outline dimensions [Note 1]	Width	381.7	382.2	382.7	mm
	Height	244.0	244.5	245.0	mm
	Depth	—	—	7.0	mm
Mass [Note 2]		—	730	750	g

[Note 1] excluding inverter unit, backlight cables and the mounting tab.

[Note 2] including inverter unit.

Outline dimensions is shown in Fig.1

4. Input Terminals

4-1. TFT-LCD panel driving

CN1 (LVDS signals and +3.3V DC power supply)

Pin No.	Symbol	Function	Remark
1	GND		
2	V_{CC}	+3.3V power supply	
3	V_{CC}	+3.3V power supply	
4	NC	Reserved	
5	NC	Reserved	
6	NC	Reserved	
7	NC	Reserved	
8	R1IN0-	Receiver signal of A side pixel (-)	[Note 1]
9	R1IN0+	Receiver signal of A side pixel (+)	[Note 1]
10	GND		
11	R1IN1-	Receiver signal of A side pixel (-)	[Note 1]
12	R1IN1+	Receiver signal of A side pixel (+)	[Note 1]
13	GND		
14	R1IN2-	Receiver signal of A side pixel (-)	[Note 1]
15	R1IN2+	Receiver signal of A side pixel (+)	[Note 1]
16	GND		
17	CK1 IN-	Clock signal of A side pixel (-)	[Note 1]
18	CK1 IN+	Clock signal of A side pixel (+)	[Note 1]
19	GND		
20	R2IN0-	Receiver signal of B side pixel (-)	[Note 1]
21	R2IN0+	Receiver signal of B side pixel (+)	[Note 1]
22	GND		
23	R2IN1-	Receiver signal of B side pixel (-)	[Note 1]
24	R2IN1+	Receiver signal of B side pixel (+)	[Note 1]
25	GND		
26	R2IN2-	Receiver signal of B side pixel (-)	[Note 1]
27	R2IN2+	Receiver signal of B side pixel (+)	[Note 1]
28	GND		
29	CK2 IN-	Clock signal of B side pixel (-)	[Note 1]
30	CK2 IN+	Clock signal of B side pixel (+)	[Note 1]

[Note 1] Relation between LVDS signals and actual data is shown in following section (4-2)(7-2).

[Note 2] The shielding case is connected with signal GND.

Using connector : FI-XB30SL-HF10 (JAE) or equivalent.

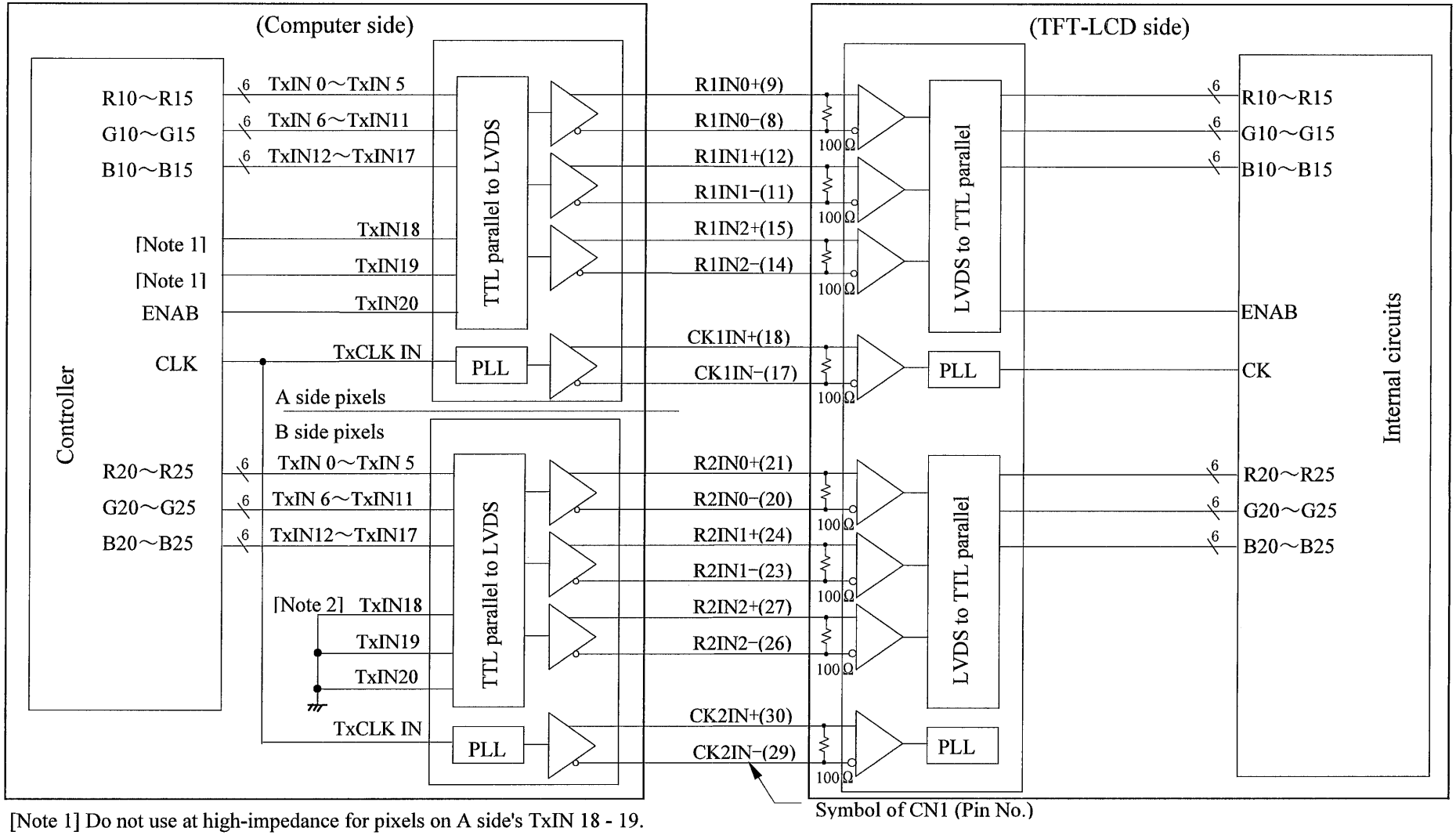
Corresponding connector : FI-X30M,FI-X30ML or FI-X30H (JAE)

(Sharp is not responsible to its product quality, if the user applies a connector not corresponding to the above model.)

4-2 Interface block diagram

Using receiver : Dual LVDS interface contained in a control IC

Corresponding Transmitter : THC63LVDM63A (THINE) or equivalent



[Note 1] Do not use at high-impedance for pixels on A side's TxIN 18 - 19.
[Note 2] Please connect B side pixels, TxIN 18 - 19 to GND.

4-3. Backlight driving

CN2 : (Inverter signals and Inverter Power Supply)

Using connector : LVC-D20SFYG(HONDA TSUSHIN KOGYO CO.,LTD.)

Corresponding connector : LVC-D20LPMSG (HONDA TSUSHIN KOGYO CO.,LTD)

Pin no.	Symbol	Function	Remark
1	V_{INV}	Inverter power supply voltage	
2	V_{INV}	Inverter power supply voltage	
3	V_{INV}	Inverter power supply voltage	
4	N.C.	This is electrically opened	
5	GND		
6	N.C.	This is electrically opened	
7	V_{5VALW}	+5V power supply voltage	
8	GND		
9	SMB_DAT	Brightness control serial data signal	
10	SMB_CLK	Brightness control serial clock signal	
11	GND		
12	FPBACK	Backlight on/off signal	
13	GND		
14	LAMP STAT	Lamp status output signal (High:Backligt ON / Low: Backlight OFF)	
15	N.C.	This is electrically opened	
16	N.C.	This is electrically opened	
17	N.C.	This is electrically opened	
18	N.C.	This is electrically opened	
19	N.C.	This is electrically opened	
20	N.C.	This is electrically opened	

5. Absolute Maximum Ratings

Parameter	Symbol	Condition	Ratings		Unit	Remark
			Min.	Max.		
Input voltage	V_I	Ta=+25℃	-0.3	Vcc+0.3	V	[Note 1]
+3.3V supply voltage	Vcc	Ta=+25℃	0	+4.0	V	
Inverter power supply voltage	V_{INV}	Ta=+25℃	0	+24	V	
+5V power supply voltage	V_{5VALW}	Ta=+25℃	-0.3	+6.0	V	
Inverter control signal voltage	V_{SMB}	Ta=+25℃	-0.3	+6.0	V	[Note 2]
	V_{FBK}	Ta=+25℃	-0.3	+6.0	V	[Note 3]
Storage temperature	Tstg	—	-25	+60	℃	[Note 4]
Operating temperature (Ambient)	Topa	—	0	+50	℃	

[Note 1] LVDS signals , BIST

[Note 2] SMB signals

[Note 3] FPBACK signals

[Note 4] Humidity : 95%RH Max. at Ta≦+40℃.

Maximum wet-bulb temperature at +39℃ or less at Ta>+40℃.

No condensation.

6. Electrical Characteristics

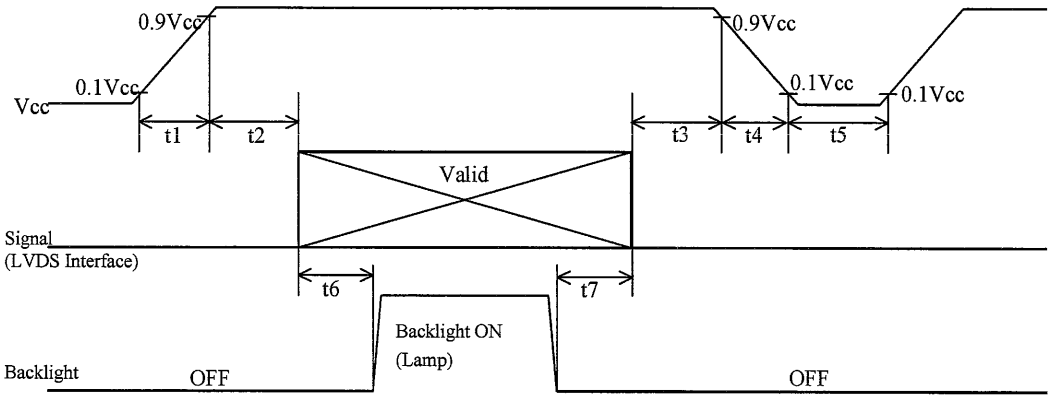
6-1.TFT-LCD panel driving

Ta=+25℃

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Supply voltage		Vcc	+3.0	+3.3	+3.6	V	[Note 2]
Current dissipation		Icc	—	580	920	mA	[Note 3]
Permissive input ripple voltage		V_{RP}	—	—	100	mV_{P-P}	Vcc = +3.3V
Input voltage range		V_I	0		2.4	V	LVDS signals
Differential input threshold voltage	High	V_{TH}	—	—	+100	mV	V_{CM} = +1.2V
	Low	V_{TL}	-100	—	—	mV	[Note 1]
Input current 1	High	I_{OH1}	—	—	±10	μA	V_I = +2.4V Vcc = +3.6V
	Low	I_{OL1}	—	—	±10	μA	V_I = 0V Vcc = 3.6V
Terminal resistor		R_T	—	100	—	Ω	Differential input
Input voltage	High	V_{IH}	2.5	-	-	V	BIST
	Low	V_{IL}	-	-	0.7	V	
Input current	High(V_{IH}=Vcc)	I_{OH2}	-	-	200	μA	
	Low(V_{IL}=0V)	I_{OL2}	-10.0	-	-	μA	

[Note 1] V_{CM} : Common mode voltage of LVDS driver.

[Note 2] On-off conditions for supply voltage



Symbol	Min.	Max.	Unit	Remark
t1	0	10	ms	
t2	0	1	S	
t3	0	1	S	
t4	0	400	ms	
t5	200	—	ms	
t6	180	—	ms	*1
t7	5	—	ms	*1

*1 : As for the power sequence for backlight, it is recommended to apply above mentioned input timing. If the backlight is lit on and off at a timing other than shown above, displaying image may get disturbed. This is due to variation of output signal from timing generator when LVDS signal is changed from on to off or vice versa, but has no harm to the module itself.

[Note] Do not keep the interface signal high-impedance or unusual signal when power is on.

Vcc-dip conditions

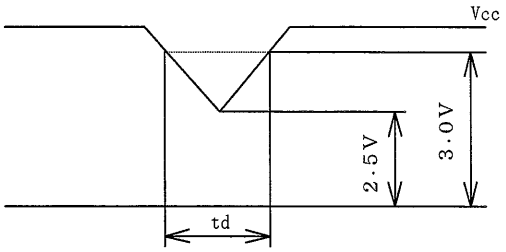
1) 2.5 V≦Vcc＜3.0 V

td≦10 ms

Under above condition, the display image should return to an appropriate figure after Vcc voltage recovers.

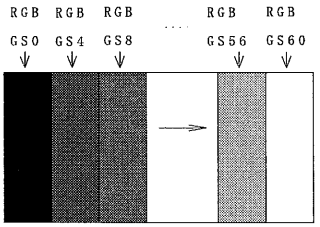
2) Vcc＜2.5 V

Vcc-dip conditions should also follow the On-off conditions for supply voltage



[Note 3] Typical current situation : 16-gray-bar pattern.

Vcc=+3.3V

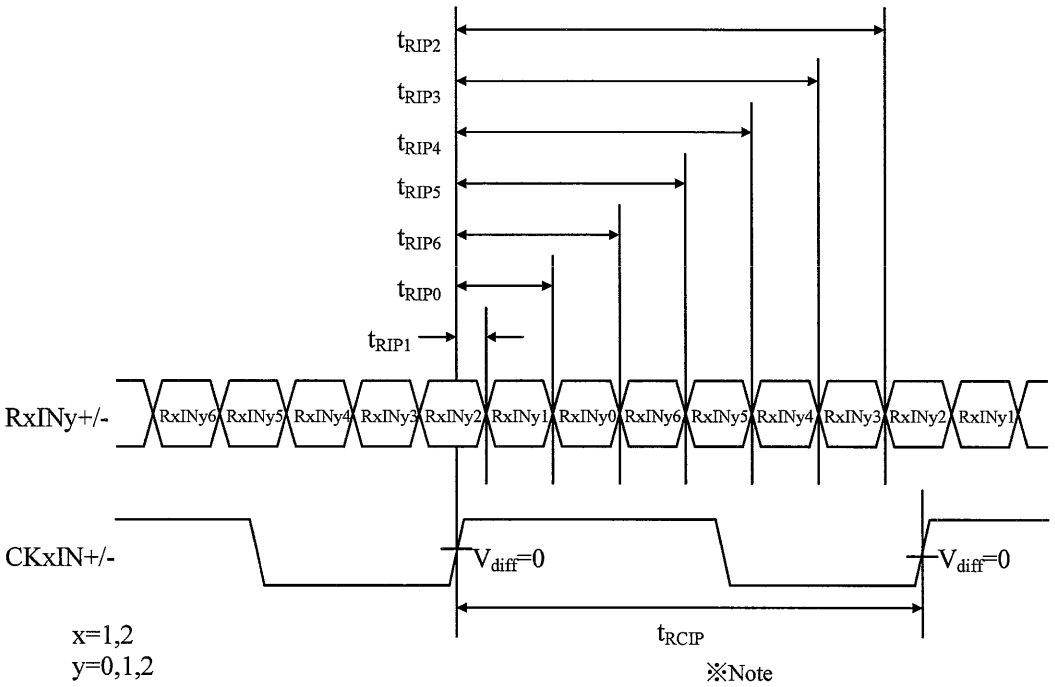


6-2. LVDS Input Specification

6.2.1.Switching Characteristics Vcc=+3.0V～+3.6V, Ta=0℃～+50℃

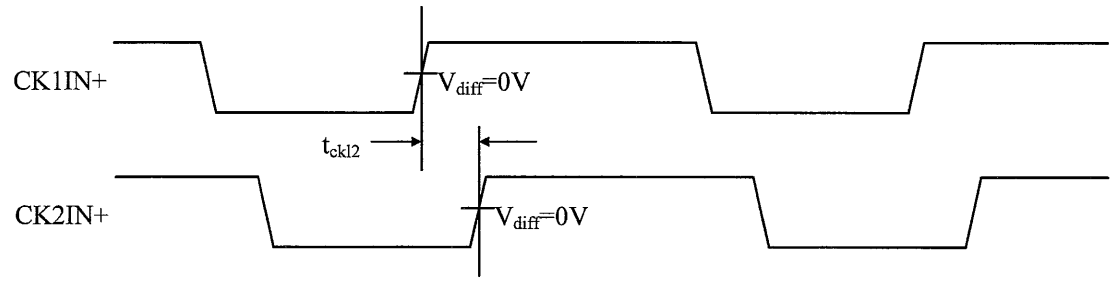
Parameter	Symbol	Min	Typ.	Max.	Unit
Input Data Position 0 (tRCIP=13.1ns)	t_{RIP1}	-0.25	0.0	+0.25	ns
Input Data Position 1 (tRCIP=13.1ns)	t_{RIP0}	t_{RCIP}/7-0.25	t_{RCIP}/7	t_{RCIP}/7+0.25	ns
Input Data Position 2 (tRCIP=13.1ns)	t_{RIP6}	2 t_{RCIP}/7-0.25	2 t_{RCIP}/7	2 t_{RCIP}/7+0.25	ns
Input Data Position 3 (tRCIP=13.1ns)	t_{RIP5}	3 t_{RCIP}/7-0.25	3 t_{RCIP}/7	3 t_{RCIP}/7+0.25	ns
Input Data Position 4 (tRCIP=13.1ns)	t_{RIP4}	4 t_{RCIP}/7-0.25	4 t_{RCIP}/7	4 t_{RCIP}/7+0.25	ns
Input Data Position 5 (tRCIP=13.1ns)	t_{RIP3}	5 t_{RCIP}/7-0.25	5 t_{RCIP}/7	5 t_{RCIP}/7+0.25	ns
Input Data Position 6 (tRCIP=13.1ns)	t_{RIP2}	6 t_{RCIP}/7-0.25	6 t_{RCIP}/7	6 t_{RCIP}/7+0.25	ns
Phase Lock Loop Set	t_{RPLL}			10	ms
Input Clock Period	t_{RCIP}	12.1	13.1	20	ns
Skew Time between CK1IN and CK2IN	t_{CK12}	-2.0	0.0	+2.0	ns

AC Timing Diagrams LVDS Inputs

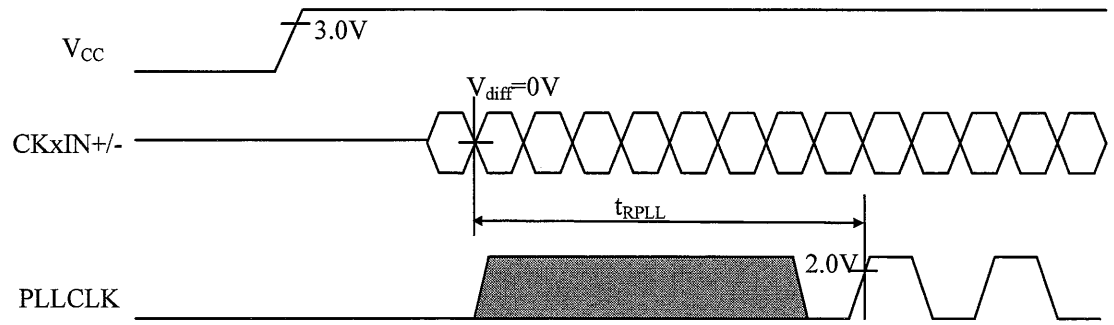


※Note
Vdiff=(RxINy+)-(RxINy-), (CKxIN+)-(CKxIN-)

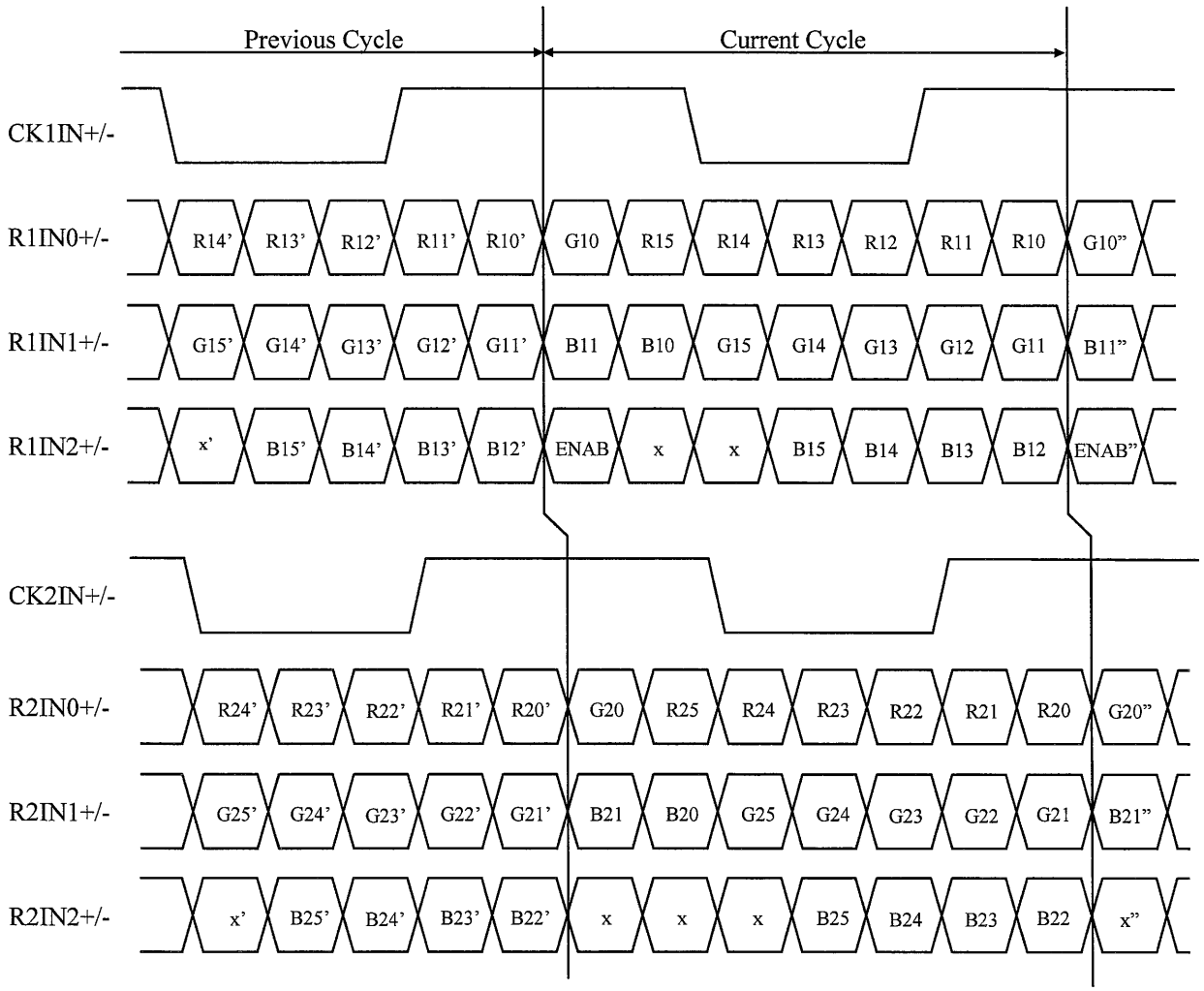
AC Timing Diagrams LVDS Input CLK Skew



LVDS Phase Lock Loop Set



6.2.2.LVDS Data Input Timing



6-3. Backlight driving

6.3.1.Backlight lifetime

The backlight system is an edge-lighting type with single CCFT (Cold Cathode Fluorescent Tube).

The lifetime of the lamp are shown in the following table.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Lamp life time	L_L	12,000	—	—	Hour	[Note]

[Note] Lamp life time is defined as the time when ① occurs in the continuous operation under the condition of Ta = 25℃ and SMB_DAT=00_{HEX}

① Brightness becomes 50 % of the original value under standard condition.

6.3.2. Inverter unit driving Ta=+25℃

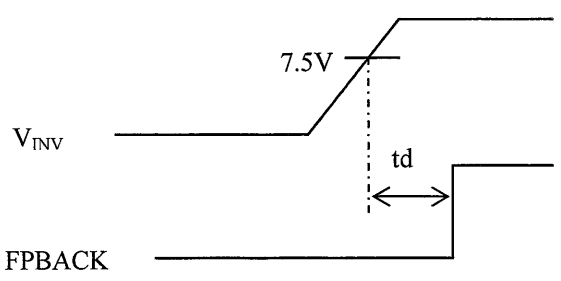
Parameter		Symbol	Condition	Min.	Typ	Max	Unit	Remark
Inverter supply voltage		V_{INV}	—	7.5	—	21	V	
Inverter current dissipation		I_{INV}	V_{INV}=7.5V V_{5VALW}=5.0V	80	—	880	mA	[Note]
			V_{INV}=21V V_{5VALW}=5.0V	40	—	380	mA	
Brightness control IC supply voltage		V_{5VALW}	—	4.5	5.0	5.5	V	
Brightness control IC current dissipation		I_{5VALW}	V_{5VALW} = 4.5～5.5V SMB_DAT=00_{HEX}	—	3	—	mA	
SMB_ DAT SMB_ CLK	Input voltage Low	V_{SH}	V_{5VALW} = 4.5～5.5V	0	—	0.3× V_{5VALW}	V	
	Input voltage High	V_{SL}	V_{5VALW} = 4.5～5.5V	0.7× V_{5VALW}	—	V_{5VALW}	V	
FPBACK	Input voltage Low	V_{FL}	V_{5VALW} =5.5V	0	—	0.6	V	
	Input voltage High	V_{FH}	V_{5VALW} =5.5V	3.0	—	5.5	V	
LAMP STAT	Output voltage Low	V_{OL}	V_{5VALW} =5.5V	0		0.6	V	
	Output voltage High	V_{OH}	V_{5VALW} =5.5V	3.0		5.5	V	

[Note] : Brightness control from minimum to maximum

6.3.3. Power ON/OFF sequence

7.5V≦V_{INV}≦21 V

10 ms ≦td

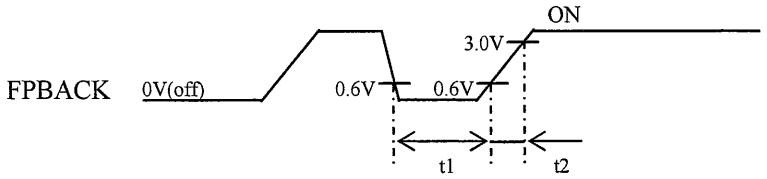


6.3.4. FPBACK ON sequence

Backlight power on/off is possible with FPBACK.

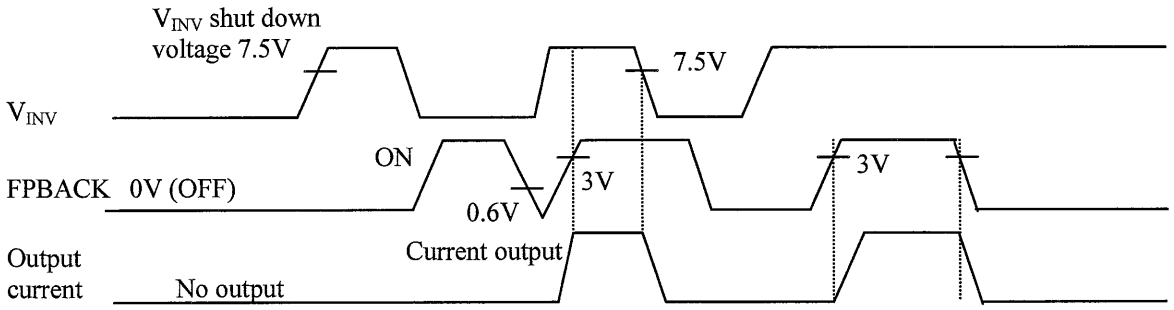
50 m s ≦ t1

t2 ≦ 20 ms



6.3.5. The Condition of Shut Down

Please refer to the figure below for the conditions that will cause the inverter shut down.
If the V_{INV} voltage is higher than 7.5V but there is no enable signal, then the inverter will shut down.
If the V_{INV} voltage is down less than 7.5V,it will cause the inverter shut down.
The enable signal has to be reset to get the inverter started again.

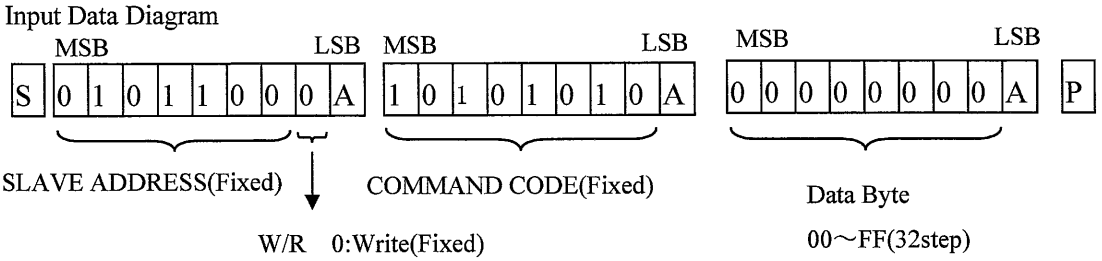


6.3.6. Brightness Control

When Brightness control signal is inputted from SMB_DAT and SMB_CLK , brightness control can work by the PWM circuit operation of inverter inside.

Brightness Data	Brightness	Notes
00_{HEX}	Maximum Brightness	Set on power-up
$08 \sim F0_{HEX}$	↓	32STEP
FF_{HEX}	Minimum Brightness	

Input Data Diagram

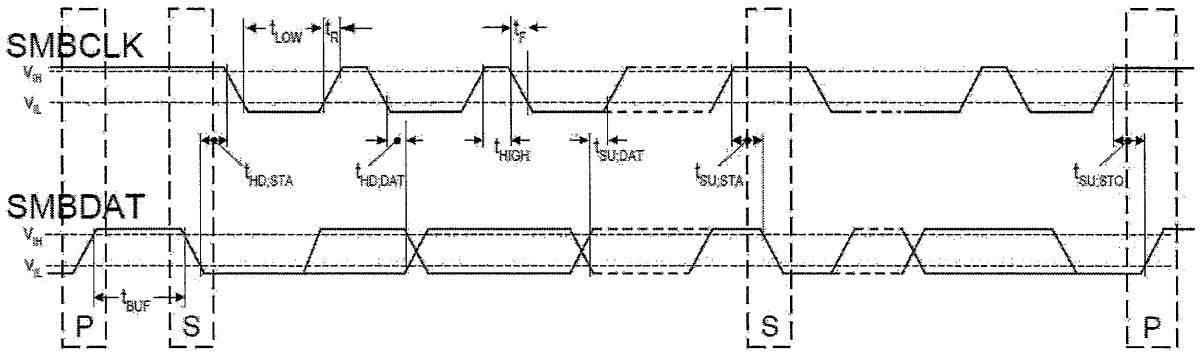


S: Start Condition

P: Stop Condition

A: Acknowledge

6.3.7 AC Characteristics（SMB_DAT,SMB_CLK）



5VALW=4.5～5.5V,Ta=-10～60℃

Parameter	Symbol	Min.	Typ.	Max.	Unit.	Remark
SMB_CLK frequency	f_{SMB}	10	—	100	k Hz	
Bus Free Time Between STOP and START Condition	t_{BUF}	4.7	—	—	μ s	
Hold Time after (Repeated) START Condition	$t_{HD:STA}$	4.0	—	—	μ s	
Repeated Start Condition setup time	$t_{SU:STA}$	4.7	—	—	μ s	
STOP Condition setup time	$t_{SU:STO}$	4.0	—	—	μ s	
Data hold time	$t_{HD:DAT}$	300	—	—	ns	
Data setup time	$t_{SU:DAT}$	250	—	—	ns	
Detect clock low timeout	$t_{TIMEOUT}$	25	—	35	ms	
Clock low period	t_{LOW}	4.7	—	—	μ s	
Clock high period	t_{HIGH}	4.0	—	50	μ s	
Cumulative clock low extend time (slave device)	$t_{LOW:SEXT}$	—	—	25	ms	
Cumulative clock low extend time (master device)	$t_{LOW:MEXT}$	—	—	10	ms	
Clock/Data Fall Time	t_F	—	—	300	ns	
Clock/Data Rise Time	t_R	—	—	1000	ns	
Time in which a device must be operational after power-on reset	t_{POR}	—	—	500	ms	

7. Timing characteristics of input signals

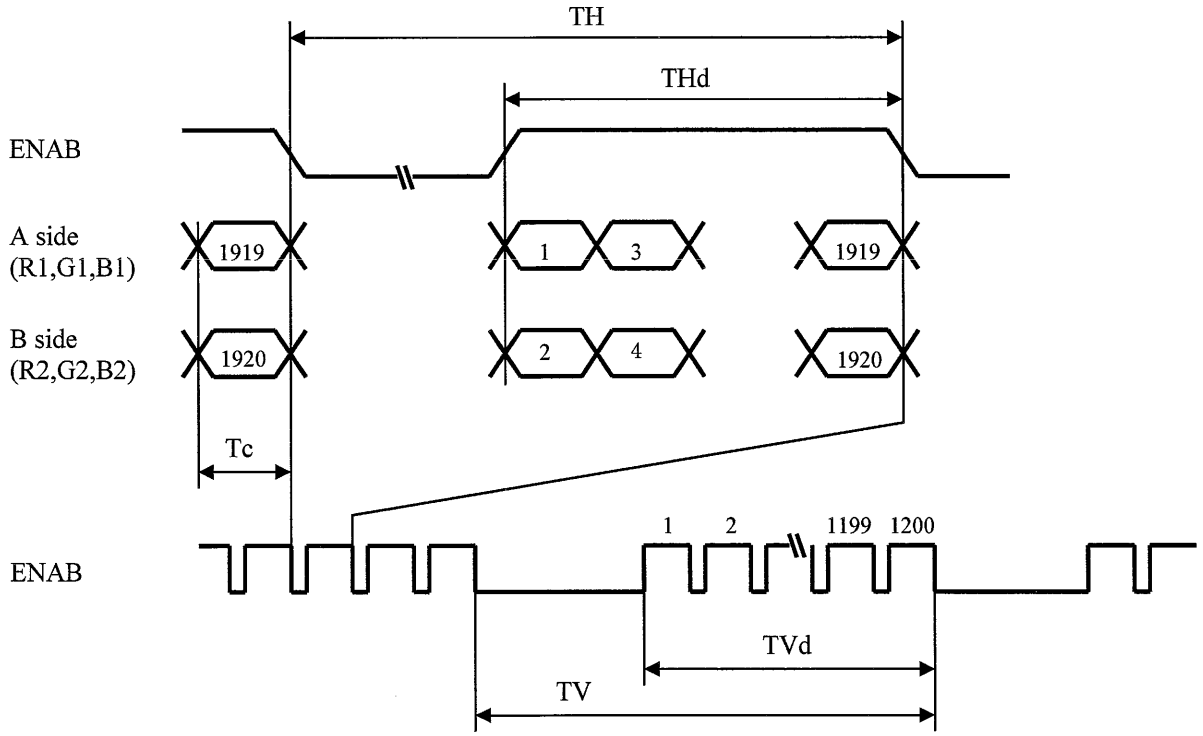
7-1. Timing characteristics

Vcc=+3.0V～+3.6V, Ta=0℃～+50℃

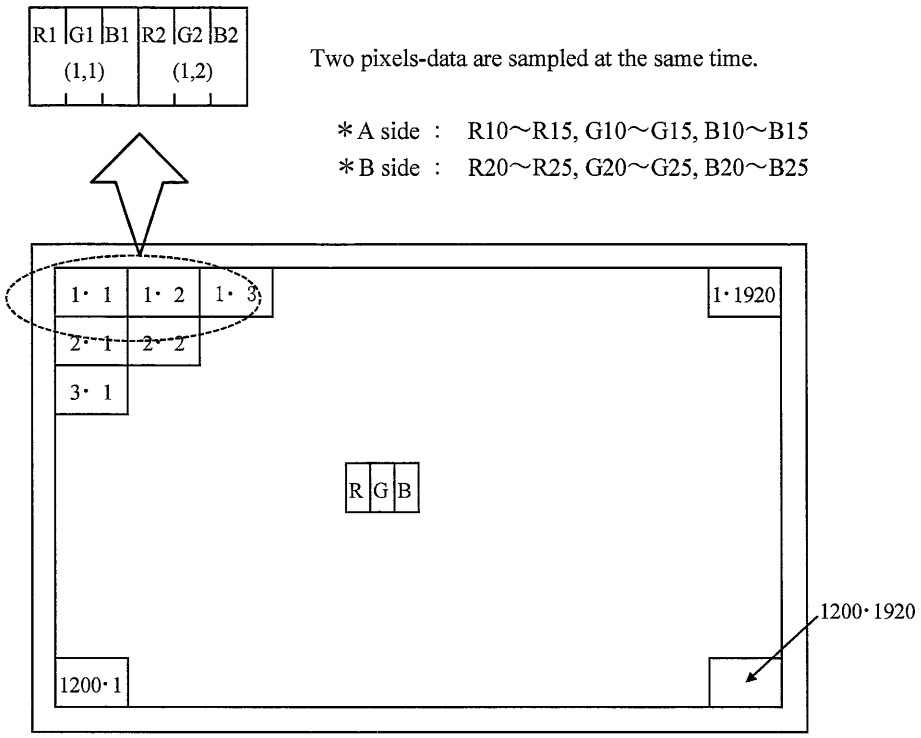
Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Clock	Frequency	1/Tc	50	75.875	82.5	MHz	[Note 1]
Data enable Signal	Horizontal period	TH	1000	1024	1106	clock	
			13.2	13.5	—	μs	
	Horizontal period (High)	THd	960	960	960	clock	
	Vertical period	TV	1202	1235	1280	Line	[Note 2]
			16.22	16.67	—	ms	
	Vertical period (High)	TVd	1200	1200	1200	line	

[Note 1] Two pixels-data are sampled at the same time.

[Note 2] In case of using the long vertical period, the deterioration of display quality, flicker, etc, may occur.



7-2. Input Data Signals and Display Position on the screen



Display position of input data(V・H)

8. Input Signals, Basic Display Colors and Gray Scale of Each Color

	Colors & Gray scale	Gray Scale	Data signal																	
			R10	R11	R12	R13	R14	R15	G10	G11	G12	G13	G14	G15	B10	B11	B12	B13	B14	B15
			R20	R21	R22	R23	R24	R25	G20	G21	G22	G23	G24	G25	B20	B21	B22	B23	B24	B25
Basic Color	Black	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	—	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Green	—	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Cyan	—	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Red	—	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	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
Gray Scale of Red	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	↑	GS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	↑	↓				↓						↓						↓		
	↓	↓				↓						↓						↓		
	Brighter	GS61	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	↓	GS62	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red	GS63	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	↑	GS1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	↑	↓				↓						↓						↓		
	↓	↓				↓						↓						↓		
	Brighter	GS61	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0
	↓	GS62	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0
	Green	GS63	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Gray Scale of Blue	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	↑	GS1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	↑	↓				↓						↓						↓		
	↓	↓				↓						↓						↓		
	Brighter	GS61	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
	↓	GS62	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	Blue	GS63	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

0 : Low level voltage, 1 : High level voltage

Each basic color can be displayed in 64 gray scales from 6 bit data signals. According to the combination of total 18 bit data signals, the 262,144-color display can be achieved on the screen.

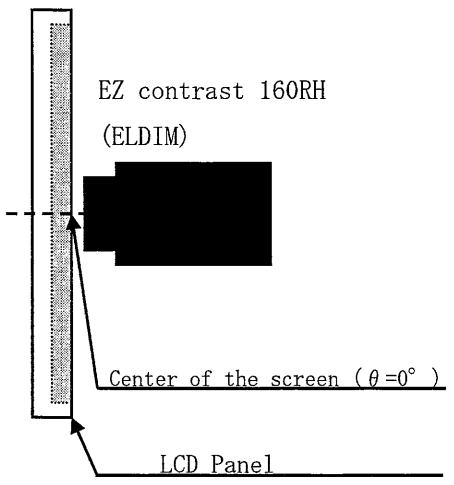
9. Optical Characteristics

Ta=+25℃, Vcc=+3.3V

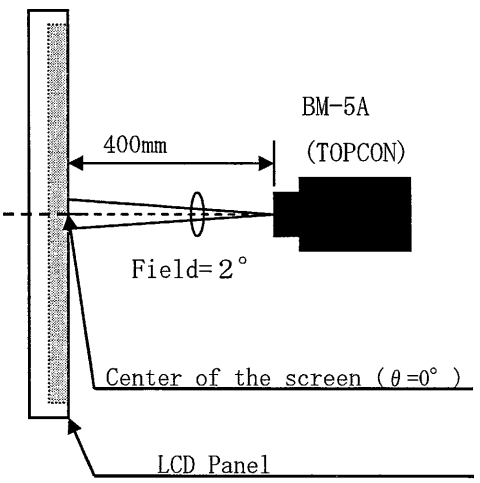
Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range	Horizontal	θ 21, θ 22	CR>10	60	70	—	Deg.	[Note 1,3,6]
	Vertical	θ 11		40	50	—	Deg.	
		θ 12		50	60	—	Deg.	
Contrast ratio		CRn	θ =0°	300	—	—		[Note 2,4,6]
		Cro	Optimum viewing angle	300	550	—		
Response time		τ r+ τ d	θ =0°	—	30	35	ms	[Note 2,4,6]
Chromaticity of white		x		0.263	0.313	0.363		[Note 2,6]
		y		0.279	0.329	0.379		
Chromaticity of red		x		0.543	0.593	0.643		
		y		0.275	0.325	0.375		
Chromaticity of green		x		0.265	0.315	0.365		
		y		0.499	0.549	0.599		
Chromaticity of blue		x		0.101	0.151	0.201		
		y		0.078	0.128	0.178		
Luminance of white		Y_{LI}		160	200	—	cd/m^2	[Note 2,7] Vin= 21V SDA＝00_{HEX}
White Uniformity		Δ w		—	0.1	0.25		[Note 2,8]

※ The measurement shall be executed 30 minutes after lighting at rating.
(typical condition : SDA=00_{HEX})
The optical characteristics shall be measured in a dark room or equivalent.

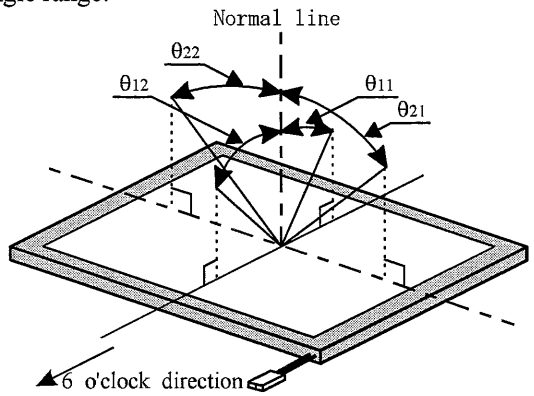
[Note 1] Measuring Viewing Angle Range



[Note 2] Other Measurements



[Note 3] Definitions of viewing angle range:



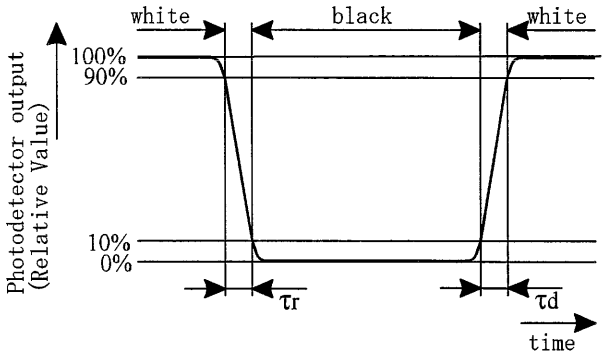
[Note 4] Definition of contrast ratio:

The contrast ratio is defined as the following.

$$\text{Contrast Ratio (CR)} = \frac{\text{Luminance (brightness) with all pixels white}}{\text{Luminance (brightness) with all pixels black}}$$

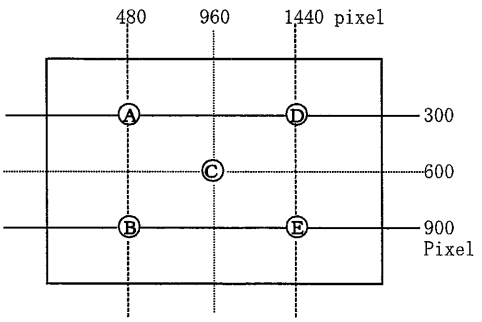
[Note 5] Definition of response time:

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white" .



[Note 6] This shall be measured at center of the screen.

[Note 7] Average of five point.(A~E)



[Note 8] Definition of white uniformity:

White uniformity is defined as the following with five measurements (A~E).

$$\delta w = \frac{\text{Maximum Luminance of five points (brightness)} - \text{Minimum Luminance of five points (brightness)}}{\text{Maximum Luminance of five points (brightness)}}$$

10. Display Quality

The display quality of the color TFT-LCD module shall be in compliance with the Incoming Inspection Standard.

11. Handling Precautions

a) Be sure to turn off the power supply when inserting or disconnecting the cable.

b) Be sure to design the cabinet so that the module can be installed without any extra stress such as warp or twist.

c) Since the front polarizer is easily damaged, pay attention not to scratch it.

d) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.

e) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.

f) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface. Handle with care.

g) Since CMOS LSI is used in this module, take care of static electricity and injure the human earth when handling. Observe all other precautionary requirements in handling components.

h) This module has its circuitry PCBs on the rear side and should be handled carefully in order not to be stressed.

i) Please handle carefully not to charge excessive stress onto the back of the module. Excessive stress may cause unrepairable damage to the module.

j) Protect sheet is attached to the module surface to prevent it from being scratched. Peel the sheet off slowly just before the use with strict attention to electrostatic charges. Ionized air shall be blown over during the action. Blow off the 'dust' on the polarizer by using an ionized nitrogen gun, etc..

k) Do not expose the LCD module to a direct sunlight, for a long period of time to protect the module from the ultra violet ray.

l) Connect GND of mounting holes to stabilize against EMI and external noise.

m) There are high voltage portions on the backlight and very dangerous. Careless touch may lead to electrical shock. When exchange lamps or service, turn off the power without tail.

n) When handling LCD modules and assembling them into cabinets, please be noted that long-term storage in the environment of oxidization or deoxidization gas and the use of such materials as reagent, solvent, adhesive, resin, etc. which generate these gasses, may cause corrosion and discoloration of the LCD modules.

o) Cold cathode fluorescent lamp in LCD panel contains a small amount of mercury, please follow local ordinances or regulations for disposal.

p) Be sure not to apply tensile stress to the lamp lead cable.

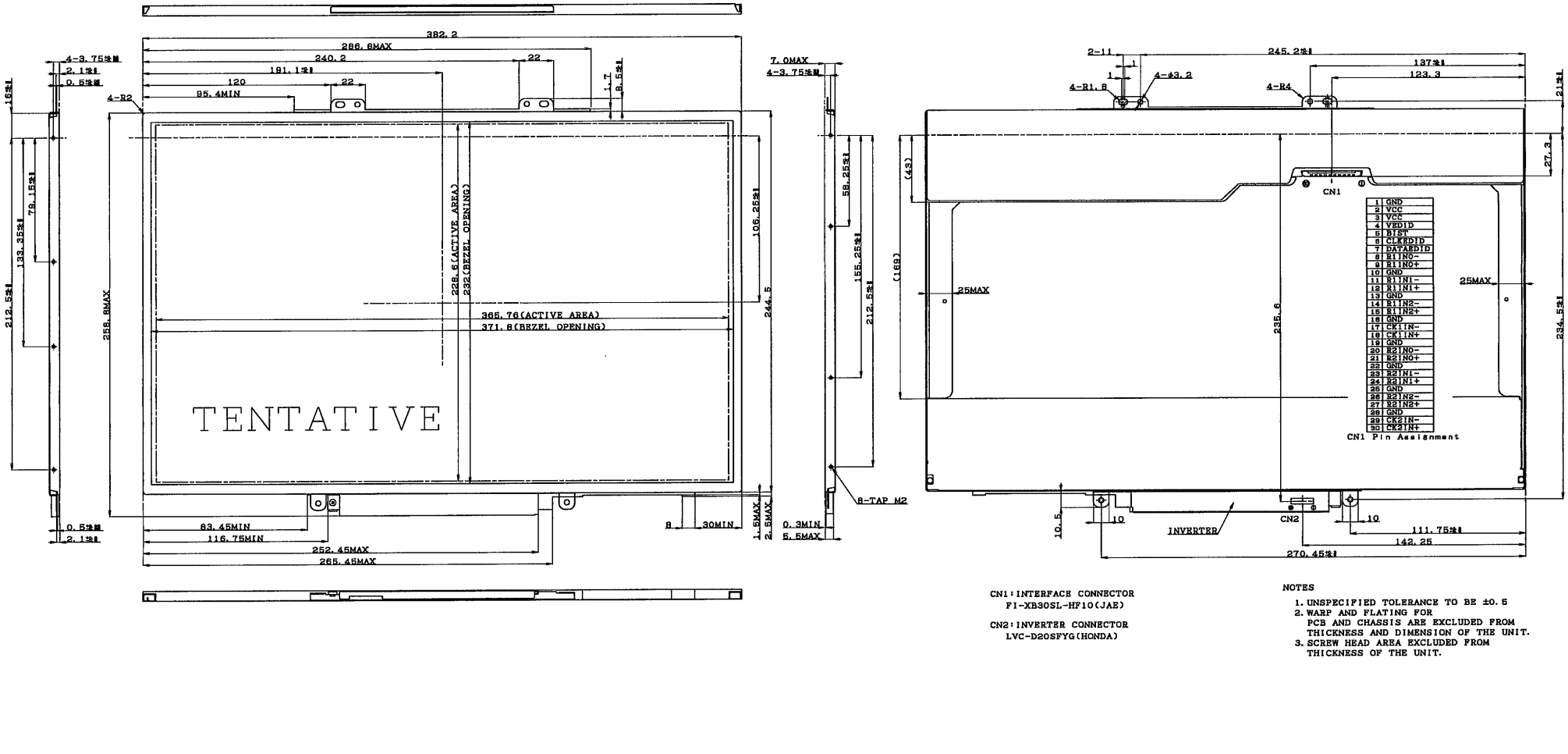
q) Adjusting volume have been set optimally before shipment, so do not change any adjusted value. If adjusted value is changed, the specification may not be satisfied.

r) Disassembling the module can cause permanent damage and should be strictly avoided.

s) Please be careful since image retention may occur when a fixed pattern is displayed for a long time.

12. Packing form

Piling number of cartons	Max.5
Package quantity in one carton	10 pcs
Carton size	463(W)×380(D)×318(H) mm
Total mass of one carton filled with full modules	9.4kg



CN1:INTERFACE CONNECTOR
FI-XB30SL-HF10(JAE)

CN2:INVERTER CONNECTOR
LVC-D20SFYG(HONDA)

NOTES

1. UNSPECIFIED TOLERANCE TO BE ±0.5
2. WARP AND FLATING FOR PCB AND CHASSIS ARE EXCLUDED FROM THICKNESS AND DIMENSION OF THE UNIT.
3. SCREW HEAD AREA EXCLUDED FROM THICKNESS OF THE UNIT.

D/N:2D-055-278-01e

Fig1. LQ170M1LA12 OUTLINE DIMENSIONS