

LQ170E1LG41

TFT-LCD Module

Spec. Issue Date: April 5, 2006

No: LD-18455

No.	LD – 18455
DATE	April 05, 2006

TECHNICAL LITERATURE
FOR
TFT - LCD module

These parts have corresponded with the RoHS directive.

MODEL No. **(LQ170E1LG41)**

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**Engineering department
Mobile LCD design center
MOBILE LIQUID CRYSTAL DISPLY GROUP
SHARP CORPORATION**

RECORDS OF REVISION

(LQ170E1LG41)

[illegible]

Application

This technical literature applies to the color 17.0 SXGA TFT-LCD module (LQ170E1LG41).

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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, power supply circuit and a back light unit. Graphics and texts can be displayed on a 1280 × RGB × 1024 dots panel with about 16 million colors (6bit + 2bitFRC) by using LVDS (Low Voltage Differential Signaling) and supplying +5.0V DC supply voltages for TFT-LCD panel driving and supply voltage for backlight.

3. Mechanical Specifications

Parameter	Specifications	Unit
Display size	43 (Diagonal)	cm
	17.0 (Diagonal)	Inch
Active area	337.9 (H) × 270.3 (V)	mm
Pixel format	1280 (H) × 1024 (V)	Pixel
	(1 pixel = R+G+B dots)	
Pixel pitch	0.264 (H) × 0.264 (V)	mm
Pixel configuration	R, G, B vertical stripe	
Display mode	Normally white	
Unit outline dimensions *1	358.5(W) × 296.5(H) × 17.5(D)	mm
Mass	2200 (max)	g
Surface treatment	Anti-glare and hard-coating	

*1.Note: excluding back light cables, cover and pet sheet.

The thickness of module (D) doesn't contain the projection.

PSWG Standard. Outline dimensions are shown in page19-20.

4. Input Terminals

4-1. TFT-LCD panel driving

CN1 (Interface signals and +5.0V DC power supply)

Using connectors : FI-X30SSL-HF (Japan Aviation Electronics Ind, Ltd)

Corresponding connectors : FI-X30C *, FI-X30H *, FI-X30M * (Japan Aviation Electronics Ind, Ltd)

Corresponding LVDS Transmitter : THC63LVDM83R(Thine) or compatible

Pin No.	Symbol	Function	Remark
1	RAin0-	Negative (-) LVDS CH0 differential data input (A port)	LVDS
2	RAin0+	Positive (+) LVDS CH0 differential data input (A port)	LVDS
3	RAin1-	Negative (-) LVDS CH1 differential data input (A port)	LVDS
4	RAin1+	Positive (+) LVDS CH1 differential data input (A port)	LVDS
5	RAin2-	Negative (-) LVDS CH2 differential data input (A port)	LVDS
6	RAin2+	Positive (+) LVDS CH2 differential data input (A port)	LVDS
7	GND	GND	
8	CKAin-	Negative (-) LVDS differential clock input (A port)	LVDS
9	CKAin+	Positive (+) LVDS differential clock input (A port)	LVDS
10	RAin3-	Negative (-) LVDS CH3 differential data input (A port)	LVDS
11	RAin3+	Positive (+) LVDS CH3 differential data input (A port)	LVDS
12	RBin0-	Negative (-) LVDS CH0 differential data input (B port)	LVDS
13	RBin0+	Positive (+) LVDS CH0 differential data input (B port)	LVDS
14	GND	GND	
15	RBin1-	Negative (-) LVDS CH1 differential data input (B port)	LVDS
16	RBin1+	Positive (+) LVDS CH1 differential data input (B port)	LVDS
17	GND	GND	
18	RBin2-	Negative (-) LVDS CH2 differential data input (B port)	LVDS
19	RBin2+	Positive (+) LVDS CH2 differential data input (B port)	LVDS
20	CKBin-	Negative (-) LVDS differential clock input (B port)	LVDS
21	CKBin+	Positive (+) LVDS differential clock input (B port)	LVDS
22	RBin3-	Negative (-) LVDS CH3 differential data input (B port)	LVDS
23	RBin3+	Positive (+) LVDS CH3 differential data input (B port)	LVDS
24	GND	GND	
25	GND	GND	
26	TxSEL	LVDS input format alternate OPEN: A MODE System GND: B MODE Detailedly see “4-2 Data Mapping”	
27	GND	GND	
28	VCC	+5V power supply	
29	VCC	+5V power supply	
30	VCC	+5V power supply	

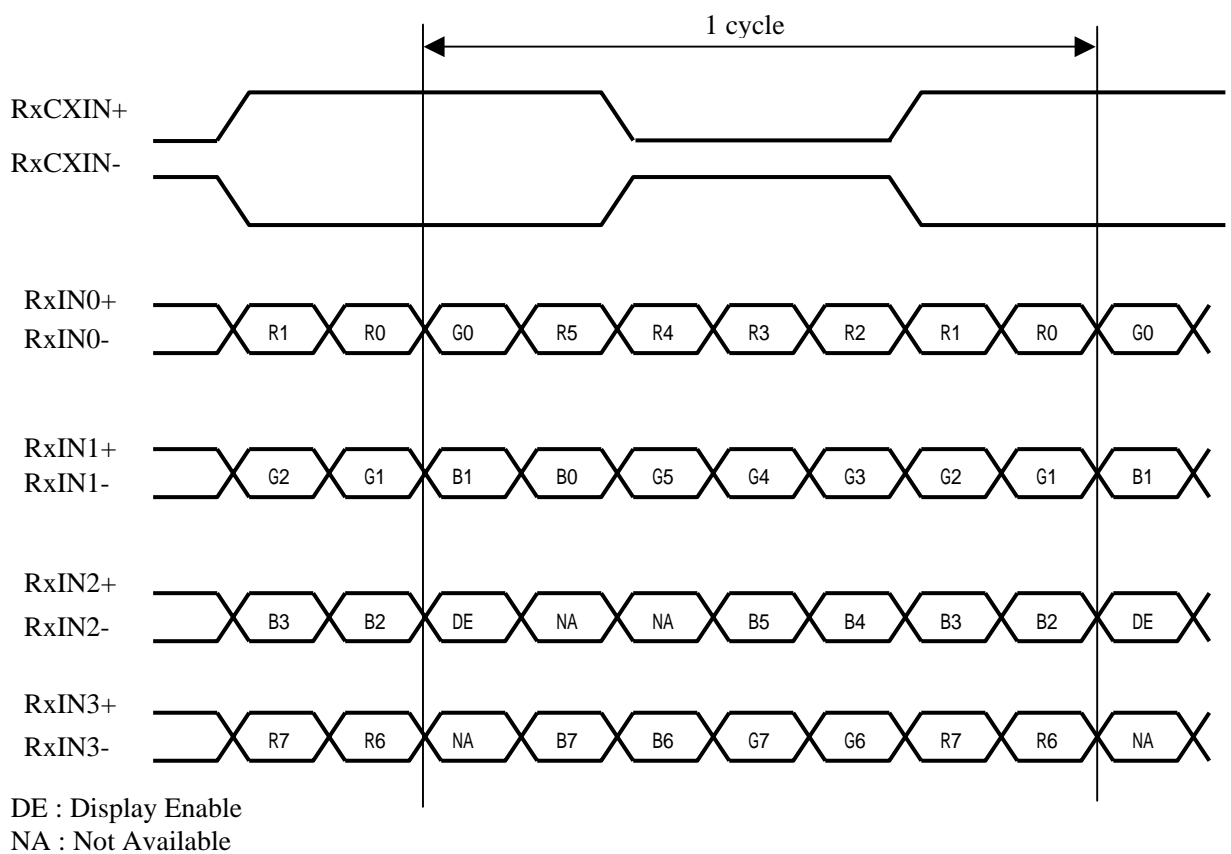
【Note1】 This module has dual pixel port to receive dual pixel data at the same time . A port receives first pixel data and B port receives second pixel data in dual pixel data.

4-2 Data Mapping

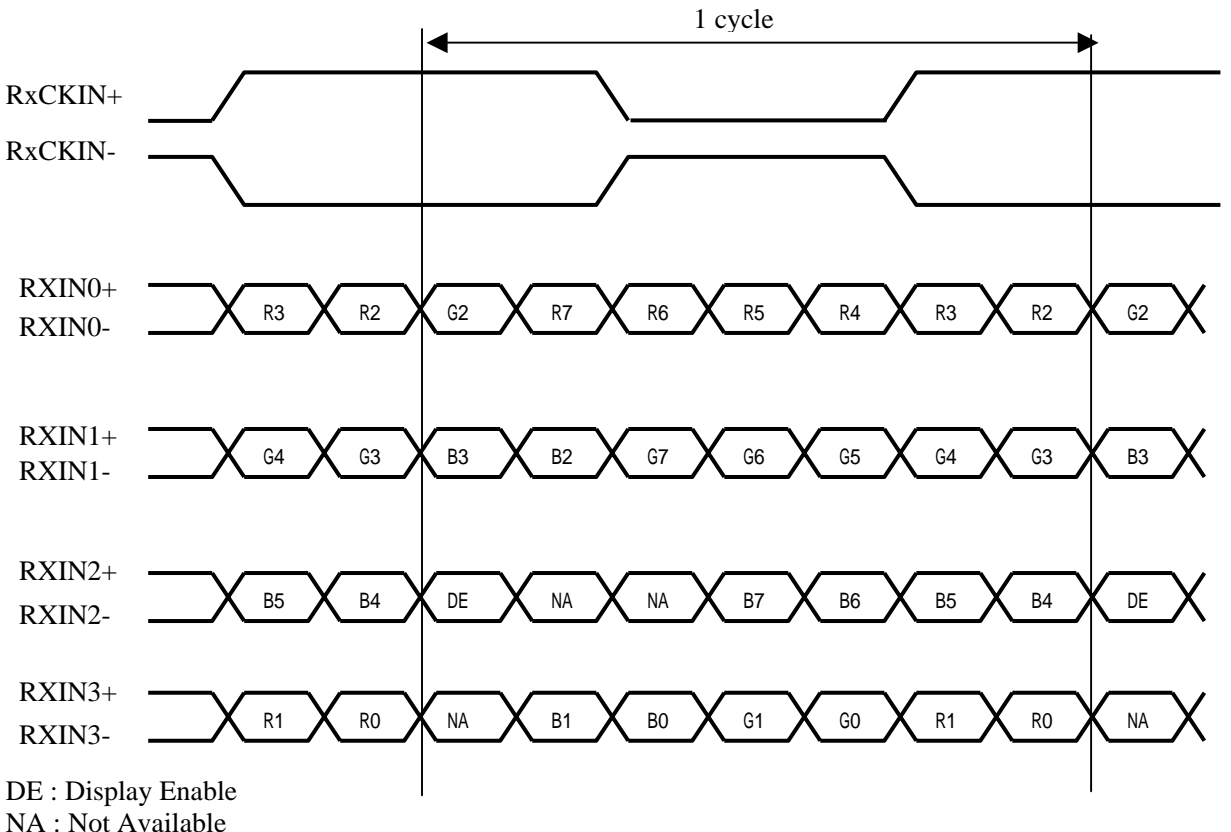
【note1】 pin assignment with LVDS_SET pin (Thine:THC63LVDM83R)

Transmitter		26pin TxSEL	
Pin No	Data	=OPEN A MODE	=SYSTEM GND B MODE
51	TA0	R0(LSB)	R2
52	TA1	R1	R3
54	TA2	R2	R4
55	TA3	R3	R5
56	TA4	R4	R6
3	TA5	R5	R7 (MSB)
4	TA6	G0(LSB)	G2
6	TB0	G1	G3
7	TB1	G2	G4
11	TB2	G3	G5
12	TB3	G4	G6
14	TB4	G5	G7 (MSB)
15	TB5	B0(LSB)	B2
19	TB6	B1	B3
20	TC0	B2	B4
22	TC1	B3	B5
23	TC2	B4	B6
24	TC3	B5	B7 (MSB)
27	TC4	(NA)	(NA)
28	TC5	(NA)	(NA)
30	TC6	DE	DE
50	TD0	R6	R0 (LSB)
2	TD1	R7(MSB)	R1
8	TD2	G6	G0 (LSB)
10	TD3	G7(MSB)	G1
16	TD4	B6	B0 (LSB)
18	TD5	B7(MSB)	B1
25	TD6	(NA)	(NA)
31	CLKIN	CLK	CLK

<MODE A>



<MODE B>

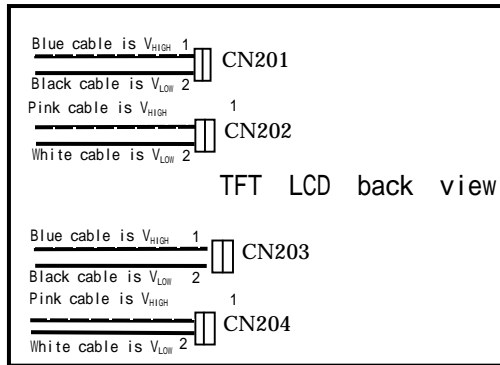


CN 201, 202,203,204

The module-side connector : BHSR-02VS-1 (JST)

The user-side connector : SM02B-BHSS-1-TB (JST)

Pin no.	symbol	I/O	Function
1	V_{HIGH}	I	Power supply for lamp (High voltage side)
2	V_{LOW}	I	Power supply for lamp (Low voltage side)



5. Absolute Maximum Ratings

Parameter	Symbol	Condition	Ratings	Unit	Remark
Supply voltage	V_{CC}	$T_a=25$	0 ~ +6.0	V	
Lamp kick-off voltage	V_S	$T_a=25$	MAX.2200	Vrms	
Storage temperature	T_{STG}	-	- 20 ~ + 60		【Note1】
Operating temperature (Ambient)	T_{OPA}	-	0 ~ + 50(panel surface)		

【Note1】 Humidity : 95%RH Max. (T_a 40)Maximum wet-bulb temperature at 39 or less. ($T_a>40$)

No condensation.

6. Electrical Characteristics

6-1. TFT-LCD panel driving

Ta = 25

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Vcc	Supply voltage	Vcc	+4.5	+5.0	+5.5	V	【Note2】
	Current dissipation	Icc	-	510	900	mA	【Note3】
Permissive input ripple voltage		V _{RF}	-	-	100	mVp-p	Vcc=+5.0V
Differential input threshold voltage	High	V _{TH}	-	-	+100	mV	V _{CM} =+1.2V 【Note1】
	Low	V _{TL}	-100	-	-	mV	
Input voltage width for LVDS redeiver		V _i	0		2.4	V	
Terminal resistor		R _T	-	100	-		Differential input
Input voltage for TxSEL signal	Low	VFL	-	-	1.0	V	【Note4】
	High	VFH	Please keep open				

【Note1】 V_{CM} : Common mode voltage of LVDS driver.

【Note2】

1) On-off sequences of Vcc and data

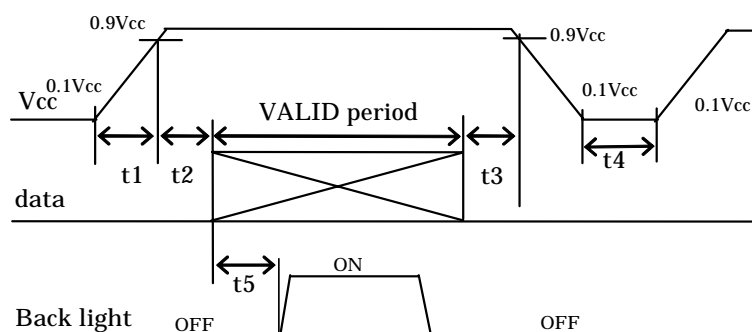
$$0.5 < t_1 \quad 10\text{ms}$$

$$10 < t_2 \quad 35\text{ms}$$

$$0 < t_3 \quad 50\text{ms}$$

$$1000\text{ms} \quad t_4$$

$$200\text{ms} \quad t_5$$



Display signals and (D0+/-, D1+/-, D2+/-, D3+/-, and CK+/-) and function signal (LVDS set) must be "0" voltage, exclusive the VALID period (see above sequence diagram). If these signals are higher than 0.3V, the internal circuit is damaged.

If some of display and function signals (TxSEL) of this product are cut while this product is working, even if the signal input to it once again, it might not work normally. If customer stops the display and function signals (TxSEL), they should be cut VDD.

The backlight power supply voltage should be inputted within the valid period of display and function signals, in order to avoid unstable data display.

In order to prevent unstable data displaying, suggest that, during display and function signal's valid period, backlight power voltage should be input under the custom's condition as possible.

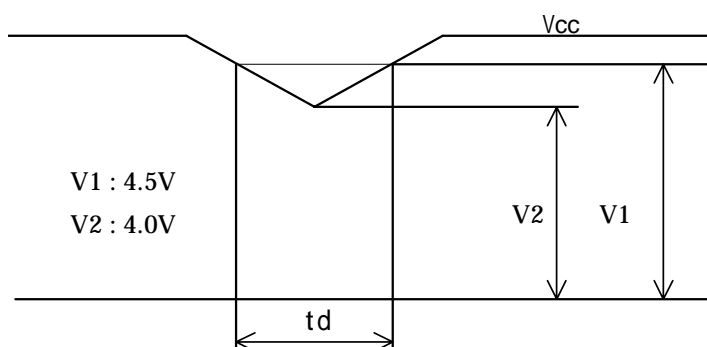
2) Dip conditions for supply voltage

$$1) \quad V_2 \quad V_{cc} < V_1$$

$$t_d \quad 20\text{ms}$$

$$2) \quad V_{cc} < V_2$$

Vcc-dip conditions should also follow the on-off conditions.



【Note3】 Typical current situation : Checkered flag pattern(EIAJ-2522)

V_{CC}=+5.0V, CK=67.5MHz

Horizontal period =12.5 us

Maximum current situation: 2H1V dot inverse pattern

【Note4】 TxSEL is inside pull-up signal(pull-up resistor:about 50K)

6-2. Backlight

The back light system is an edge-lighting type with 4CCFTs (Cold Cathode Fluorescent Tube).

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

The value mentioned below is at the case of one CCFT.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Lamp current range	I_L	3.5	7.5	9.0	mArms	【Note1】 at $L=300\text{cd/m}^2(\text{typ})$
Lamp voltage	V_L	-	580	700	Vrms	$I_L=7.5\text{mArms}$ $T_a=25$ 60kHz
Lamp frequency	F_L	40	48	55	kHz	【Note2】
Kick-off voltage	V_s	-	-	1700	Vrms	$T_a=0$ 【Note3,4】
Lamp life time	T_L	50,000	-	-	hour	【Note5】

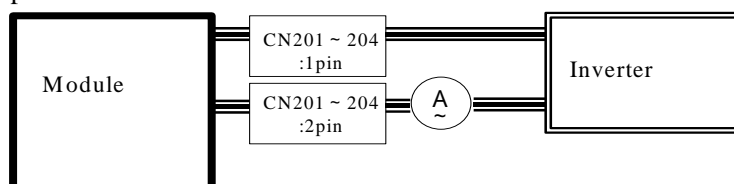
【Note1】 A lamp can be light in the range of lamp current shown above.

Maximum rating for current is measured by high frequency current measurement equipment connected to V_{Low} at circuit showed below.

(Note : To keep enough kick-off voltage and necessary steady voltage for CCFT.)

Lamp frequency : 40 ~ 55kHz

Ambient temperature : 0 ~ 50



【Note2】 Lamp frequency of inverter may produce interference with horizontal synchronous frequency, and this may cause horizontal beat on the display. Therefore, adjust lamp frequency, and keep inverter as far as from module or use electronic shielding between inverter and module to avoid interference.

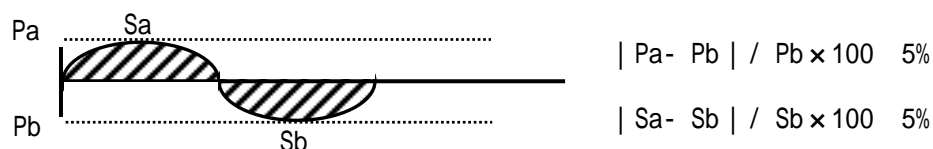
Recommended value of " F_L " is as following.

$$"F_L" = 1/4 \times 1/TH \times (2n-1) \quad n:\text{Numerical number (1,2,3,.....)}$$

【Note3】 The kick-off voltage may rise up in the user set, please decide the open output voltage by checking not to occur lighting failure under operating state.

The open output voltage should be applied to the lamp for more than 1 second to startup. Otherwise the lamp may not be turned on.

【Note4】 The asymmetric ration of working waveform for lamps (Lamp voltage peak ration, Lamp current peak ration and waveform space ration) should be less than 5%(see the following figure).If the waveform is asymmetric, DC(Direct current) element applies into the lamp. In this case, a lamp lifetime may be shortened because a distribution of a lamp enclosure substance toward one side between low voltage terminal (cold terminal) and high voltage terminal (Hot terminal).



Pa: Supply voltage /current peak for positive, Pb: Supply voltage /current peak for negative

Sa: Waveform space for positive part, Sb: Waveform space for negative part

【Note5】 Lamp life time is defined as the time when Brightness becomes 50% of the original value in the continuous operation under the condition of $T_a=25$ and $I_L = 7.5\text{mA}_{\text{rms}}/\text{lamp}$

《Note》

The performance of the backlight, for example lifetime or brightness, is much influenced by the characteristics of the DC-AC inverter for the lamp. When you design or order the inverter, please make sure that a poor lighting caused by the mismatch of the backlight and the inverter (miss-lighting, flicker, etc.) never occurs. When you confirm it, the module should be operated in the same condition as it is installed in your instrument.

Use the lamp inverter power source incorporating such safeguard as over voltage / over current protective circuit or lamp voltage waveform detection circuit, which should have individual control of each lamp.

In case one circuit without such individual control is connected to more than two lamps, excessive current may flow into one lamp when the other one is not in operation.

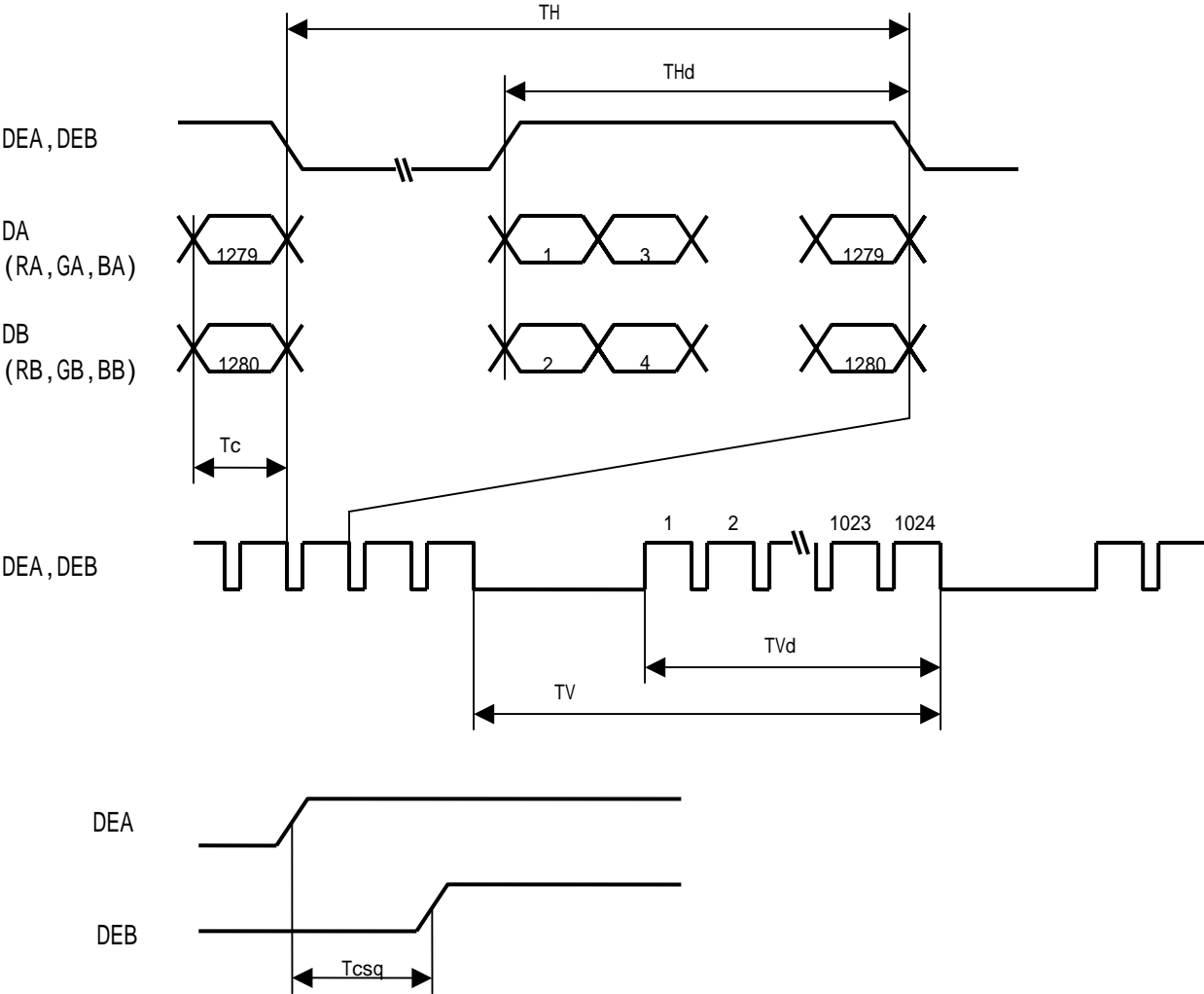
Under the environment of 10lx or less, miss-lighting or lighting delay may occur.

7. Timing characteristics of input signals

7-1. Timing characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Clock	Frequency	1/Tc	40	54	68	MHz	
Horizontal signals	Cycle	TH	672	844	1024	clock	
			12.5	15.63	20.46	μs	
	Horizontal period (High)	THd	640	640	640	clock	
Vertical signals	Cycle	TV	1032	1066	1536	line	
			13.0	16.6	18.2	ms	
	Vertical period (High)	TVd	1024	1024	1024	line	

【Note】 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

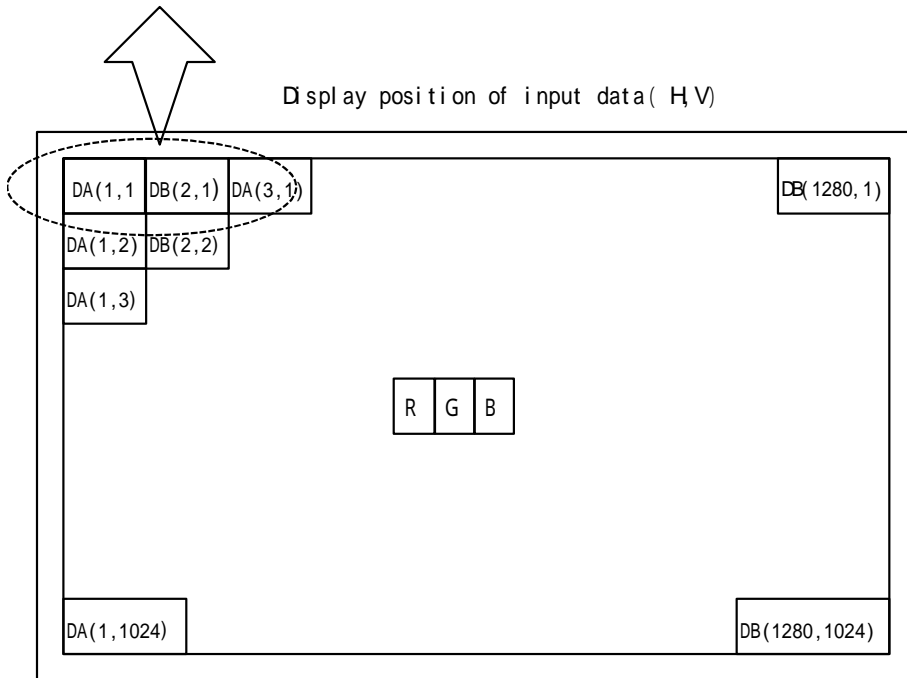
RA	GA	BA	RB	GB	BB
DA(1,1)			DB(2,1)		

Two pixels-data are sampled at the same time.

* DA: RA0 ~ RA7, GA0 ~ GA7, BA0 ~ BA7

* DB: RB0 ~ RB7, GB0 ~ GB7, BB0 ~ BB7

Display position of input data (H, V)



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

		Data signal																											
	Colors & Gray scale	Gray Scale	R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B1	B2	B3	B4	B5	B6	B7			
Basic Color	Black	-	0	0	0	0	0	0	0	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	0	0	0	0	X	X	1	1	1	1	1	1	1		
	Green	-	0	0	0	0	0	0	0	0	X	X	1	1	1	1	1	1	0	0	0	0	0	0	0	0			
	Cyan	-	0	0	0	0	0	0	0	0	X	X	1	1	1	1	1	1	X	X	1	1	1	1	1	1			
	Red	-	X	X	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Magenta	-	X	X	1	1	1	1	1	1	0	0	0	0	0	0	0	0	X	X	1	1	1	1	1	1			
	Yellow	-	X	X	1	1	1	1	1	1	X	X	1	1	1	1	1	1	0	0	0	0	0	0	0	0			
	White	-	X	X	1	1	1	1	1	1	X	X	1	1	1	1	1	1	X	X	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	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	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	0	0	0	0	0	0			
	⬆	⬇	⬇								⬇								⬇										
	⬇	⬇	⬇								⬇								⬇										
	Brighter	GS250	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	⬇	GS251	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Red	GS252	X	X	1	1	1	1	1	1	0	0	0	0	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	0	0	0	0	0	0			
	⬆	GS1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	Darker	GS2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0				
	⬆	⬇	⬇								⬇								⬇										
	⬇	⬇	⬇								⬇								⬇										
	Brighter	GS250	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0			
	⬇	GS251	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0			
	Green	GS252	0	0	0	0	0	0	0	0	X	X	1	1	1	1	1	1	0	0	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	0	0	0	0	0	0			
	⬆	GS1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0			
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0			
	⬆	⬇	⬇								⬇								⬇										
	⬇	⬇	⬇								⬇								⬇										
	Brighter	GS250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1			
	⬇	GS251	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1			
	Blue	GS252	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	1	1	1	1	1	1			

0 : Low level voltage, 1 : High level voltage. X :Don't care.

Each basic color can be displayed in 253 gray scales from 8 bit data signals. According to the combination of total 24 bit data signals, the 16-million-color display can be achieved on the screen.

9. Optical Characteristics

Ta=25 , Vcc =+5.0V

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range	Vertical	11	CR 10	30	45	-	Deg.	【Note1,4】
		12		50	65	-	Deg.	
	Horizontal	21, 22		50	65	-	Deg.	
Contrast ratio		C R	=0 °	400	500	-		【Note2,4】
Response Time		d + r		-	8	-	ms	【Note3,4】
Chromaticity of White		x		0.283	0.313	0.343		【Note4】
		y		0.299	0.329	0.359		
Chromaticity of Red		x		0.62	0.65	0.68		
		y		0.31	0.34	0.37		
Chromaticity of Green		x		0.27	0.30	0.33		
		y		0.59	0.62	0.65		
Chromaticity of Blue		x		0.11	0.14	0.17		
		y		0.04	0.07	0.10		
Luminance of white		YL		220	300	-	cd/m ²	IL=7.5mA rms fL=64kHz 【Note4】
White Uniformity		w		-	1.2	1.3	-	【Note5】

The measurement shall be executed 20 minutes after lighting at rating.

The optical characteristics shall be measured in a dark room or equivalent state with the method shown in Fig.2 below.

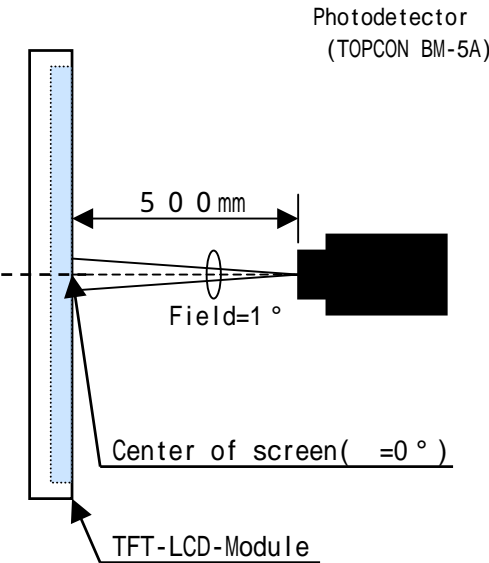
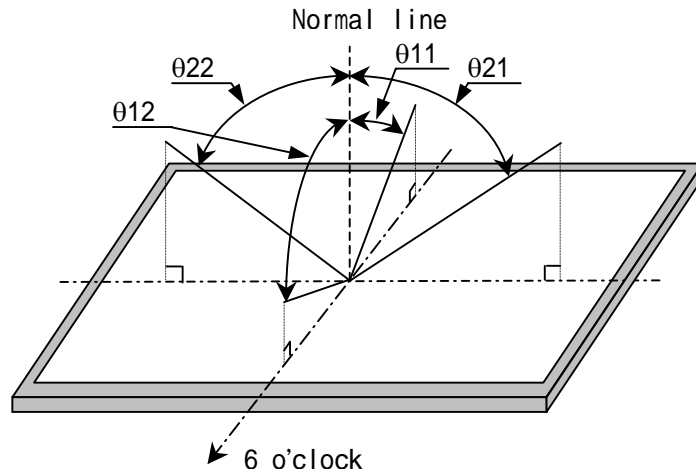


Fig2 Optical characteristics measurement method

【Note1】 Definitions of viewing angle range:



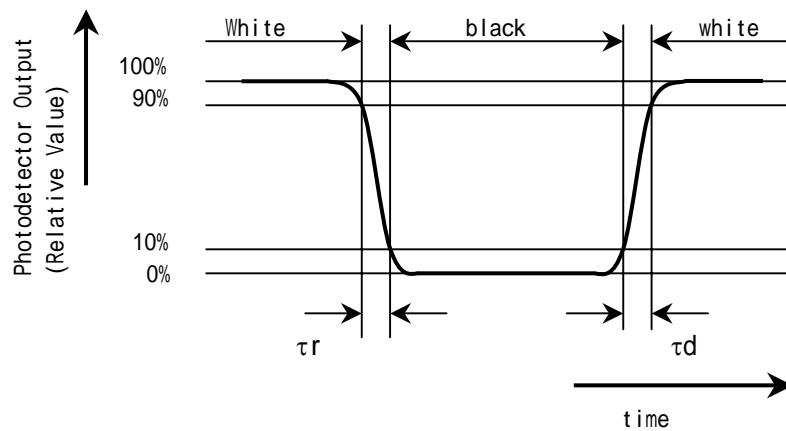
【Note2】 Definition of contrast ratio:

The contrast ratio is defined as the following.

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

【Note3】 Definition of response time:

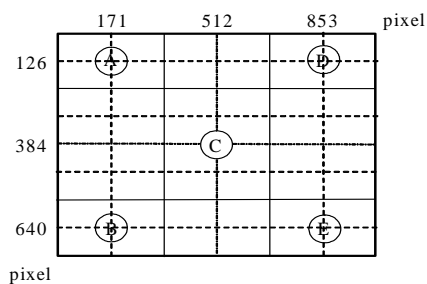
The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".



【Note4】 This shall be measured at center of the screen.

【Note5】 Definition of white uniformity:

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



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

10. 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.
Blow away dust on the polarizer with antistatic N₂ blow. It is undesirable to wipe off because a polarizer is sensitive.
It is recommended to peel off softly using the adhesive tape when soil or finger oil is stuck to the polarizer. When unavoidable, wipe off carefully with a cloth for wiping lenses.
- d) Since long contact with water may cause discoloration or spots, wipe off water drop immediately.
- 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 take the human earth into consideration when handling.
- h) Since there is a circuit board in the module back, stress is not added at the time of a design assembly. Please make it like. If stress is added, there is a possibility that circuit parts may be damaged.
- i) Protection film is attached to the module surface to prevent it from being scratched .
Peel the film off slowly , just before the use, with strict attention to electrostatic charges.
display quality.
- j) The polarizer surface on the panel is treated with Anti-Glare for low reflection. In case of attaching protective board over the LCD, be careful about the optical interface fringe etc. which degrades display quality.
- k) Do not expose the LCD panel to direct sunlight. Lightproof shade etc. should be attached when LCD panel is used under such environment.
- l) Blow off 'dust' on the polarizer by using an ionized nitrogen.
- m) Make sure the four mounting holes of the module are grounded sufficiently. Take electro-magnetic interference (EMI) into consideration.
- n) The module has some printed circuit boards (PCBs) on the back side. Take care to keep them from any stress or pressure when handling or installing the module; otherwise some of electronic parts on the PCBs may be damaged.
- o) 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 fail.
- p) Observe all other precautionary requirements in handling components.
- q) When some pressure is added onto the module from rear side constantly, it causes display non-uniformity issue, functional defect, etc. So, please avoid such design.
- r) 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.
- s) Cold cathode fluorescent lamp in LCD panel contains a small amount of mercury, please follow local ordinances or regulations for disposal.
- t) Be careful of a back light lead not to pull by force at the time of the wiring to an inverter, or line processing.

- u) The torque for mounting screws must never exceed 0.34N-m. Higher torque values might result in distortion of the bezel.
- v) Be sure to confirm it in the same condition as it is installed in your instrument.
- w) Liquid crystal contained in the panel may leak if the LCD is broken. Rinse it as soon as possible if it gets inside your eye or mouth by mistake.
- x) Notice: Never dismantle the module, because it will cause failure.
- y) Be careful when using it for long time with fixed pattern display as it may cause afterimage.
- z) 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.
- aa) If a minute particle enters in the module and adheres to an optical material, it may cause display non-uniformity issue, etc. Therefore, fine-pitch filters have to be installed to cooling and inhalation hole if you intend to install a fan.

11. Packing form

- a) Production country : CHINA
- b) Piling number of cartons : T.B.D
- c) Packing quantity in one carton : T.B.D
- d) Carton size : T.B.D
- e) Total mass of one carton filled with full modules : T.B.D
- f) Packing form is shown : T.B.D

12 . Reliability test items

T.B.D

13 . Others

- 1) Lot No. and indication Bar Code Label:

T.B.D

- 2) Packing Label

T.B.D

- 3) 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.
- 4) Disassembling the module can cause permanent damage and should be strictly avoided.
- 5) Please be careful since image retention may occur when a fixed pattern is displayed for a long time.
- 6) The chemical compound which causes the destruction of ozone layer is not being used.
- 7) Warning of mercury and material information of LPG (Light Pipe Guide) are stamped on the back of the module.

MATERIAL INFORMATION

>PLASTIC LIGHT GUIDE:PMMA<

- 8) Cold cathode fluorescent lamp in LCD PANEL contains a small amount of mercury, Please follow local ordinances or regulations for disposal.

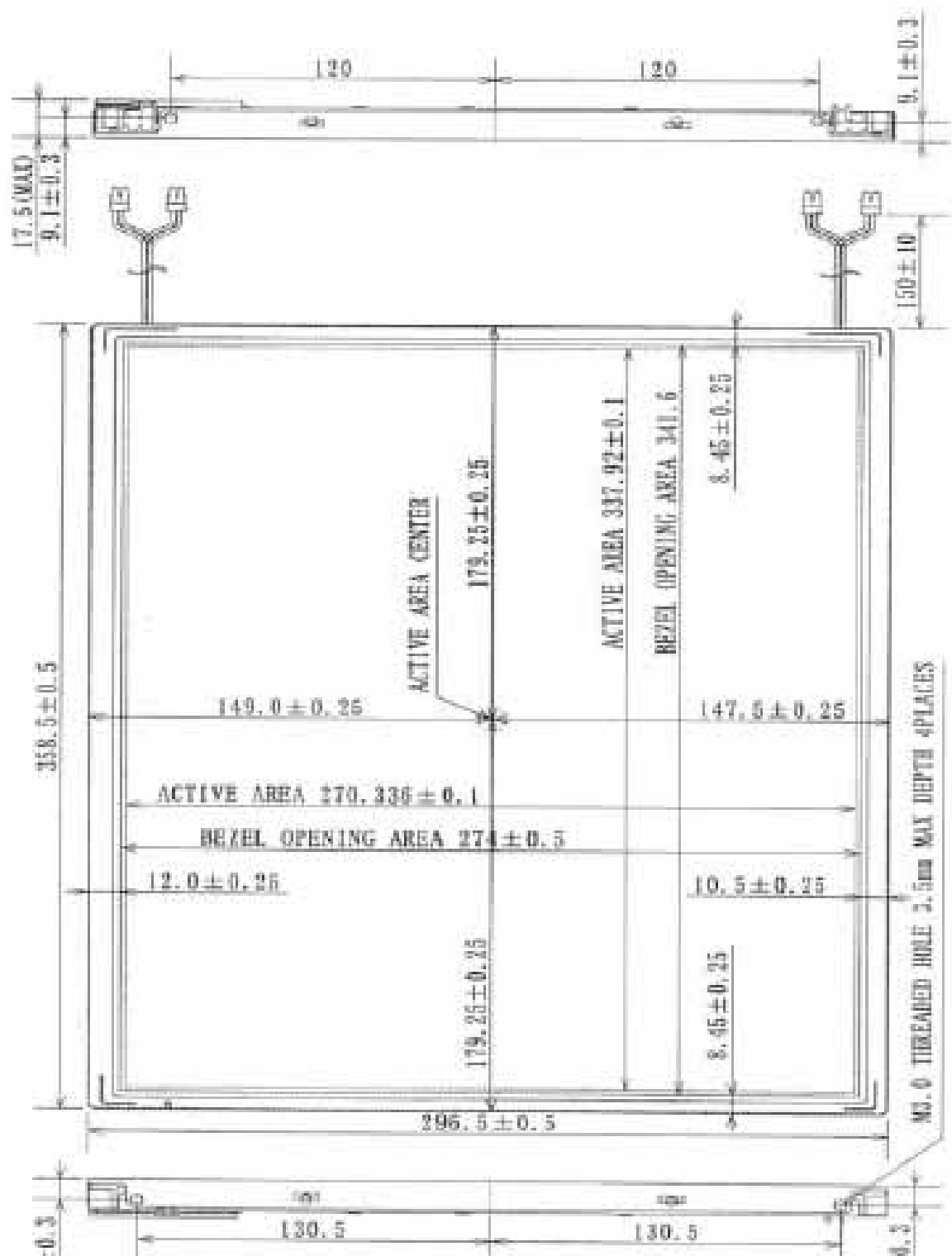
- 9) If any problem occurs in relation to the description of this technical literature, it shall be resolved through discussion with spirit of cooperation.

14. Carton storage condition

T.B.D

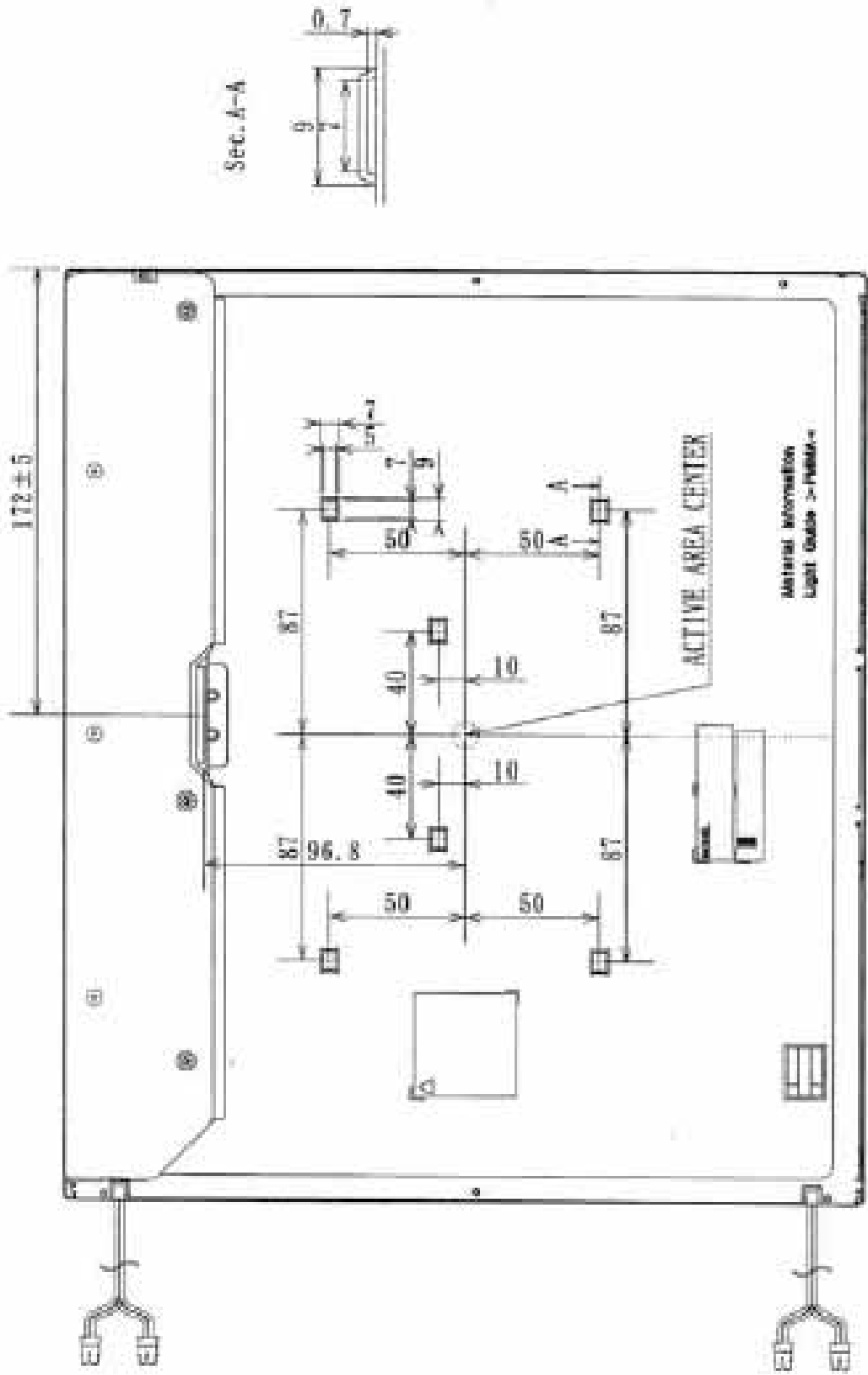
15. Outline dimensions

1) FRONT side



NOTE: NOT MARKED TOLERANCES IN THE FIGURE ARE ± 0.5 mm.

2) Rear side



NOTE: NOT MARKED TOLERANCES IN THE FIGURE ARE $\pm 0.5mm$

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Suggested applications (if any) are for standard use; See Important Restrictions for limitations on special applications. See Limited Warranty for SHARP's product warranty. The Limited Warranty is in lieu, and exclusive of, all other warranties, express or implied. ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR USE AND FITNESS FOR A PARTICULAR PURPOSE, ARE SPECIFICALLY EXCLUDED. In no event will SHARP be liable, or in any way responsible, for any incidental or consequential economic or property damage.

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