SHARP

TECHNICAL   LITERATURE

FOR

TFT - LCD   module

These parts have corresponded with the RoHS directive.

MODEL No. LQ121S1LG62

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Engineering   department Ⅰ
Mobile LCD division Ⅲ
MOBILE LIQUID CRYSTAL DISPLY GROUP
SHARP   CORPORATION

RECORDS OF REVISION

LQ121S1LG62

SPEC No.	DATE	REVISED No.	PAGE	SUMMARY	NOTE
LD-20X54A	Dec. 9. 2008	–	–	–	1 st Issue

LQ121S1LG62

1.   Application

   This technical literature applies to color 12.1SVGA TFT-LCD module, LQ121S1LG62

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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 backlight unit.
   Graphics and texts can be displayed on a 800 X 3 X 600 dots panel with 262,144 colors by using LVDS
   (Low Voltage Differential Signaling) system for interface and supplying +3.3Vor+5.0V DC supply voltage for
   TFT-LCD panel driving.
   This module is super-high brightness (450cd/m^2) and high contrast (600:1).
   This module is the type of wide viewingangle the viewing angle is 6 o'clock direction.
   LED Backlight-driving DC/DC converter is not built in this module.

3. Mechanical Specifications

Parameter	Specifications	Unit
Display size	31 (12.1") Diagonal	cm
Active area	246.0 (H) X 184.5 (V)	mm
Pixel format	800 (H) X 600 (V)	pixel
	(1 pixel=R+G+B dots)	
Number of colors (Number of gray scale level)	262, 144 colors （64 gray scales per color）	
Pixel pitch	0.3075 (H) X 0.3075 (V)	mm
Pixel configuration	R,G,B vertical stripe	
Display mode	Normally white	
Unit outline dimensions *1	276.0(W)×209.0(H)×Max.11.0 (D) *Outline dimensions is shown in Fig.1	mm
Mass	Max. 750	g
Surface treatment	Anti-glare and hard-coating 3H	

*1.Note: <u>Excluding back light cables　(The backlight cable is not attached to the LCD unit.)</u>

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

　　　　　Outline dimensions are shown in Fig.1.

4. Input Terminals

4-1. TFT-LCD panel driving

CN1 (LVDS signals , +3.3V / +5.0V DC power supply and Contorol signal)

Corresponding connector:FI-SE20ME (JAE) or FI-S20S (JAE)

Pin No.	Symbol	Function	Remark
1	V_{CC}	+3.3V / +5.0V power supply	
2	V_{CC}	+3.3V / +5.0V power supply	
3	GND		
4	GND		
5	RXIN0-	Differential data input, CH0 (negative)	LVDS signal
6	RXIN0+	Differential data input, CH0 (positive)	LVDS signal
7	GND		
8	RXIN1-	Differential data input, CH1 (negative)	LVDS signal
9	RXIN1+	Differential data input, CH1 (positive)	LVDS signal
10	GND		
11	RXIN2-	Differential data input, CH2 (negative)	LVDS signal
12	RXIN2+	Differential data input, CH2 (positive)	LVDS signal
13	GND		
14	RXCLK IN-	Differential clock input (negative)	LVDS signal
15	RXCLK IN+	Differential clock input (positive)	LVDS signal
16	GND		
17	R/L	Horizontal display mode select signal	[Note1]
18	U/D	Vertical display mode select signal	[Note2]
19	GND		
20	GND		

[Note]   To obtain the proper relation between LVDS signals and actual digital data signals, the digital signals should be inputted into the transmitter as described in the nextsection, 4-2.

[Note]   The shielding case is connected with signal GND.
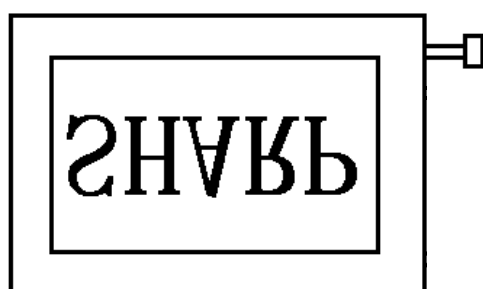
[Note 1],[Note 2]

R/L = High, U/D = Low   R/L = Low, U/D = Low

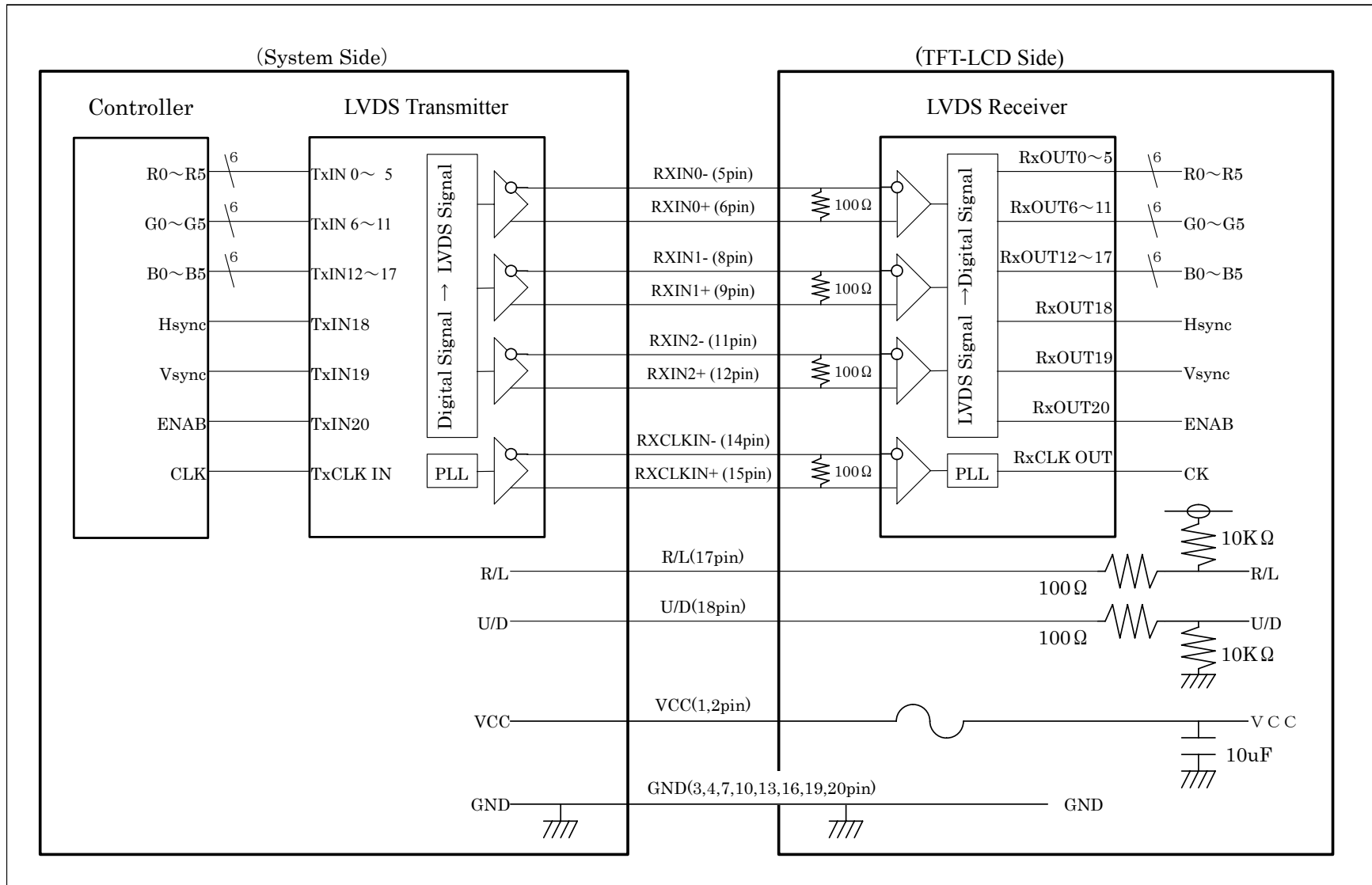R/L = High, U/D = High   R/L = Low, U/D = High
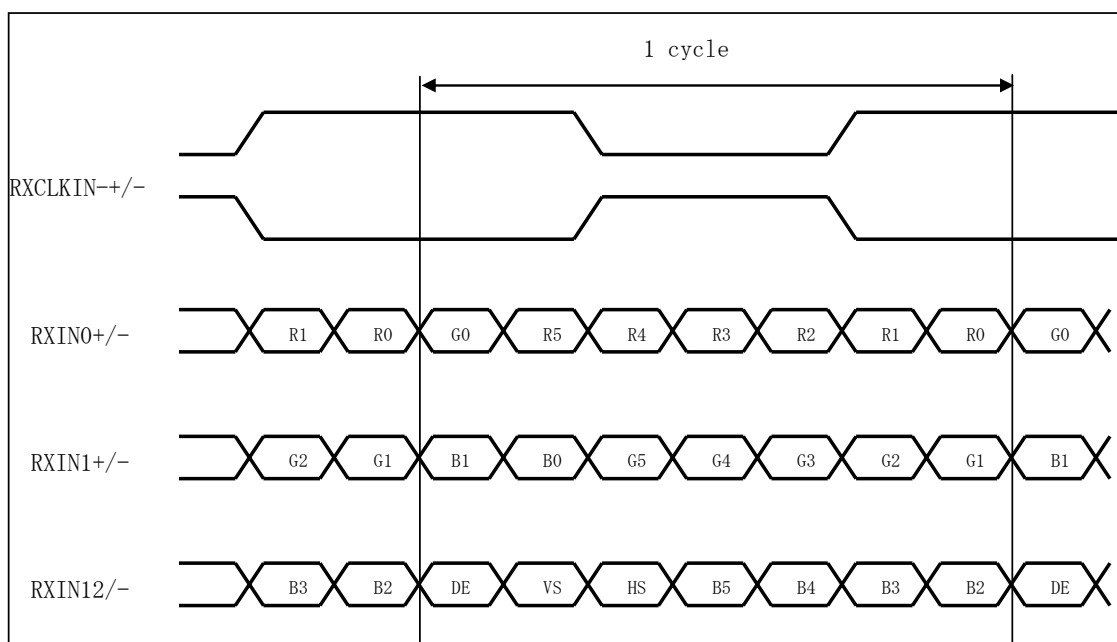
4-2　LVDS Interface block diagram

Using receiver：Single LVDS interface, which equals THC63LVDF64A(THine),contained in a control IC

Corresponding Transmitter：DS90C363, DS90C363A, DS90C383, DS90C383A（National semiconductor），

THC63LVDF63A,THC63LVDM63A(THine), SN75LVDS84(Ti)

（System Side）　　　　　　　　　　　　　　　　　　　　　　（TFT-LCD Side）

Controller　　　　　　LVDS Transmitter　　　　　　　　　　LVDS Receiver

Controller	LVDS Transmitter		LVDS Receiver	
R0～R5	TxIN 0～5	RXIN0- (5pin)	RxOUT0～5	R0～R5
G0～G5	TxIN 6～11	RXIN0+ (6pin)　100Ω	RxOUT6～11	G0～G5
B0～B5	TxIN12～17	RXIN1- (8pin)	RxOUT12～17	B0～B5
		RXIN1+ (9pin)　100Ω		
Hsync	TxIN18	RXIN2- (11pin)	RxOUT18	Hsync
Vsync	TxIN19	RXIN2+ (12pin)　100Ω	RxOUT19	Vsync
ENAB	TxIN20		RxOUT20	ENAB
CLK	TxCLK IN　PLL	RXCLKIN- (14pin)	RxCLK OUT	CK
		RXCLKIN+ (15pin)　100Ω	PLL	

Digital Signal → LVDS Signal

LVDS Signal →Digital Signal

R/L	R/L(17pin)	100Ω	10KΩ R/L
U/D	U/D(18pin)	100Ω	U/D 10KΩ
VCC	VCC(1,2pin)		VCC 10uF
GND	GND(3,4,7,10,13,16,19,20pin)		GND

LD20X54A-4

[Note]   Data Mapping

4-3. Backlight driving

CN2   Used connector : 50156806   (Molex)
　　　　Corresponding connector : 5013300600   (Molex)

Pin no.	symbol	function
1	+ch3	Power supply for LED (Ch3 High voltage side)
2	+ch2	Power supply for LED (Ch2 High voltage side)
3	+ch1	Power supply for LED (Ch1 High voltage side)
4	- ch1	Power supply for LED (Ch1 Low voltage side)
5	- ch2	Power supply for LED (Ch2 Low voltage side)
6	- ch3	Power supply for LED (Ch3 Low voltage side)

5. Absolute Maximum Ratings

Parameter	Symbol	Condition	Pin name	Ratings	Unit	Remark
+3.3V / +5.0V supply voltage	Vcc	Ta=25 ℃	Vcc	0 to + 6.0	V	
Input voltage	VI1	Ta=25℃	RXINi-/+(i= 0,1,2)	-0.3 to Vcc+0.3	V	Vcc<3.0V
			RXCLK IN-/+	-0.3 to 3.3V	V	3.0V≦Vcc
	VI2	Ta=25℃	R/L , U/D	-0.3 to Vcc+0.3	V	
Storage temperature	Tstg	-	-	-30 to +80	℃	[Note3]
Operating temperature	Topa	Panel surface	-	-30 to +80	℃	[Note4]

[Note3] Humidity: 95%RH Max. at Ta=<40℃.
　　　　　Maximum wet-bulb temperature at 39℃ or less at Ta>40 ℃. No condensation.
[Note4] There is a possibility of causing deterioration in the irregularity and others of the screen and the display fineness when preserving or using it from 65 to 80℃

6.Recommended operation condition

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply voltage	Vcc	＋3.0	+3.3/+5.0	＋5.5	V	[Note5]
LVDS Signals	V_L	0		2.4	V	[Note6]
Input voltage	VI	0		Vcc	V	[Note7]
Surface temperature	Topa	-30		+80	℃	[Note8], [Note9]

[Note5]On-off conditions for supply voltage

$0 < t1 \leqq 15ms$

$0 < t2 \leqq 10ms$

$0 < t3 \leqq 100ms$

$0 < t4 \leqq 1s$

$200ms < t5$

Vcc-dip conditions

1) $2.5V \leqq Vcc$

$td \leqq 10ms$

2) $Vcc < 2.5V$

Vcc-dip conditions should also follow the On-off

conditions for supply voltage

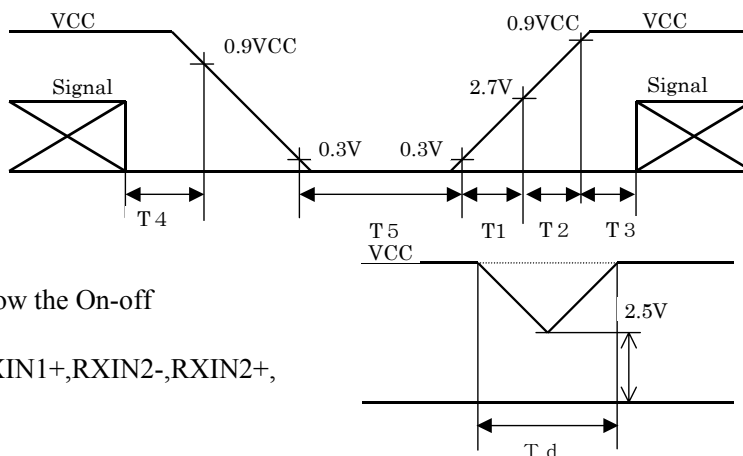[Note6]　RXIN0-, RXIN0+,RXIN1-,RXIN1+,RXIN2-,RXIN2+,

RXCLK IN-,RXCLK IN+

[Note7] R/L, U/D

[Note8] Humidity: 95%RH Max. at Ta=<40ºC.

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

No condensation.

[Note9] Maximum value : Panel surface temperature

7. Electrical Characteristics

7-1.TFT-LCD panel driving　　　　　　　　　　　　　　　　　　　　Ta=25 ºC

| Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Current dissipation	Vcc=+3.3V	Icc	-	380	480	mA	[Note10]
	Vcc=+5.0V	Icc	-	230	280	mA	
Permissive input ripple voltage		VRP	-	-	100	mVp-p	
Input voltage range	LVDS signal	VL	0	-	2.4	V	[Note11]
Differential input threshold voltage	High	VTH	-	-	VCM+100	mV	V_{CM}=1.2V
	Low	VTL	VCM–100	-	-	mV	[Note12]
Input impedance (Differential input)		RT	-	100	-	Ω	[Note11]
Input voltage	Low	VIL	-	-	0.8	V	[Note13]
	High	VIH	2.1	-	-		[Note14]
Input current1	Low(VI=0V)	IOL1	-800	-	-		[Note13]
	High(VI=Vcc)	IOH1	-10.0	-	10.0		
Input current2	Low(VI=0V)	IOL2	-10.0	-	10.0	uA	[Note14]
	High(VI=Vcc)	IOH2	-	-	800	uA	

[Note10] Typical current situation : 16-gray-bar pattern.

Vcc=+3.3V / +5.0V

[Note11] LVDS signals

[Note12] V_{CM} : Common mode voltage of LVDS driver.

[Note13] R/L

[Note14] U/D
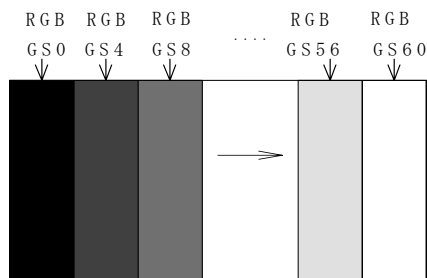
7-2. Backlight

The backlight system is an edge-lighting type with white-LED.

The characteristics of LED are shown in the following table.

(It is usually required to measure under the following condition.

condition:IL=60mA／ Constant current drive,Ta=25℃±2℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED voltage	V_L	―	(22.1)	(25.6)	V	Value for one channel
LED current range	I_L	―	(60)	(65)	mA	Value for one channel
Number of circuit channel		―	3	―		[Note15]
Lamp power consumption	W_L	―	(4.0)	―	W	[Note16]
Life time（LCD module）	L_L	―	(70,000) .	―	Hour	[Note17、18]

[Note15] The LED backlight is composed of 3 channels which 7 LED is connected in series.

[Note16] Calculated value for reference ($I_L \times V_L \times 3$ channel)

[Note17]①Lighting condition:

・The state of the LCD module installation: Landscape position and standing position

・Atmosphere temperature: 25℃

・Lighting current: 60mA (Constant current drive／Continuous turning on)

②Definition of Life time:

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

[Note18]In the method of the parallel connection of the input of each channel and the drive, an excessive current

flows to the channel side where the voltage is low, and, as a result, there is a possibility of causing the LED

longevity decrease.

It is preferable to do the fixed current drive only for each channel to each channel.

8. Timing characteristics of input signals

8-1. Timing characteristics

(These are specified at the digital inputs/outputs of LVDS transmitter/receiver.)
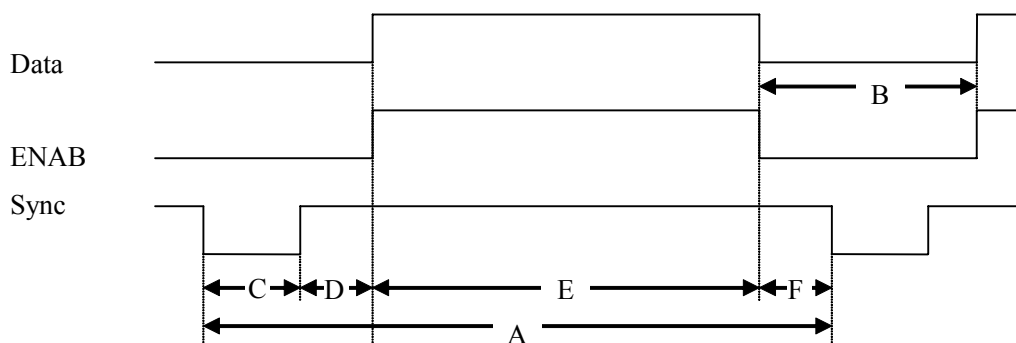
(Vertical timing)

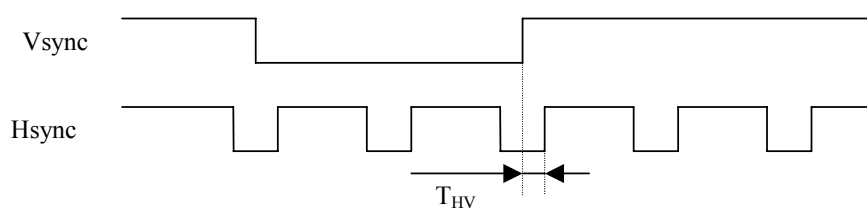| Item(symbol)	Min.	Typ.	Max.	Unit	備考
Vsync cycle (T_{VA})	-	17.6	-	ms	Negative
	628	666	798	line	
Blanking period(T_{VB})	28	66	-	line	
Vsync pulse width (T_{VC})	2	4	6	line	
Back porch (T_{VD})	23	23	23	line	
Vsync pulse width+Back porch ($T_{VC}+T_{VD}$)	25	27	29	line	
Active display area (T_{VE})	600	600	600	line	
Front porch (T_{VF})	3	39	-	line	

(Horizontal timing)

Item(symbol)	Min.	Typ.	Max.	Unit	Remark
Hsync cycle (T_{HA})	20.8	26.4	39.9	us	Negative
	832	1056	1395	clock	
Blanking period (T_{HB})	40	256	-	clock	
Hsync pulse width (T_{HC})	2	128	200	clock	
Back porch (T_{HD})	928-T_{HA}	88	T_{HA}-752	clock	
Active display area (T_{HE})	800	800	800	clock	
Front porch (T_{HF})	0	40	-	clock	

(Clock signal)

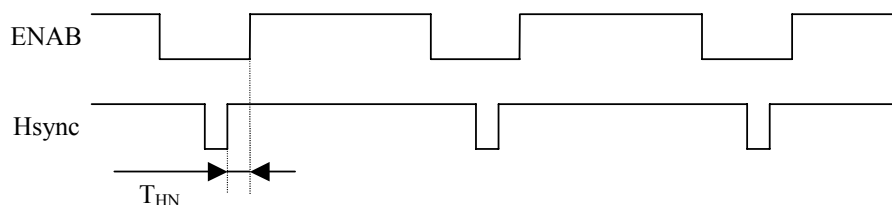| Item	Min.	Typ.	Max.	Unit	Remark
Frequency	35	40	42	MHz	[Note19]

[Note19] In case of lower frequency, the deterioration of display quality, flicker etc., may be occurred.

(Hsync-Vsync Phase difference)

Item(symbol)	Min.	Typ.	Max.	Unit	Remark
Hsync-Vsync Phase difference (T_{HV})	1	-	T_{HA}-T_{HC}	clock	

(Hsync-ENAB Phase difference)

Item	Min.	Typ.	Max.	Unit	Remark
Hsync-ENAB Phase difference (T_{HN})	0	-	T_{HA}-T_{HC} -800	clock	

8-2   Display position

Item	Standards	Beginning	Ending	Unit	Remark
Horizontal	rising edge of ENAB	0	800	clock	
	rising edge of Hsync	88	888	clock	[Note20]
Vertical	rising edge of Vsync	23	623	line	

[Note20]   In case that ENAB signal is fixed to low level. Do not keep ENAB signal high during operation.

8-3. Input Data Signals and Display Position on the screen

Display position of input data

(H , V)

D1,DH1	D2,DH1	D3,DH1		D800,DH1
D1,DH2	D2,DH2			
D1,DH3				

R | G | B

| D1,DH600 | | | | D800, DH600 |

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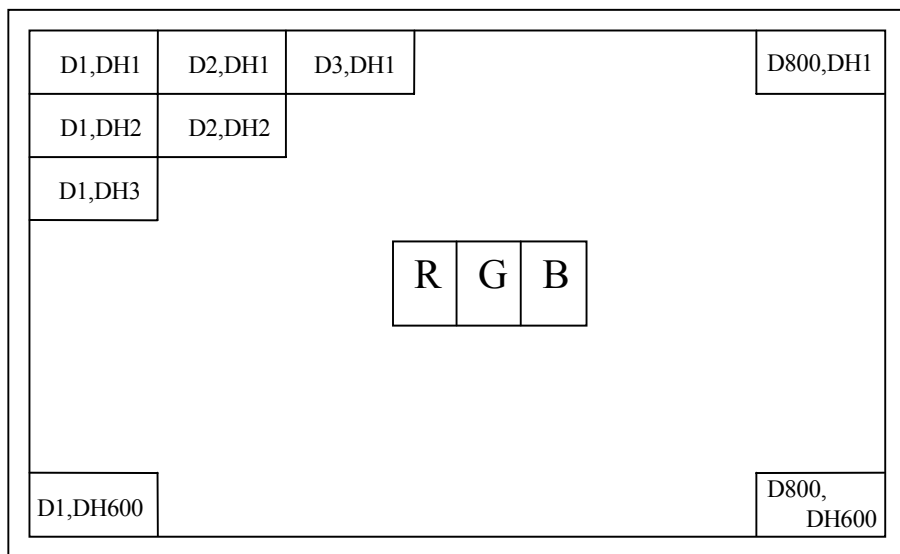
9. Input Signals, Basic Display Colors and Gray Scale of Each Color

Colors & Gray scale		Gray Scale	R0	R1	R2	R3	R4	R5	G0	G1	G2	G3	G4	G5	B0	B1	B2	B3	B4	B5
					Data signal															
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.

10. Optical Characteristics

Ta=25°C, Vcc=+3.3V / +5.0V

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range	Horizontal	$\theta 21$, $\theta 22$	CR>10	60	70	-	Deg.	[Note21]
	Vertical	$\theta 11$		35	50	-	Deg.	[Note24]
		$\theta 12$		55	60	-	Deg.	
Contrast ratio		CRn	$\theta =0°$	300	-	-	-	[Note22]
		CRo	Optimum viewing angle	-	600	-	-	[Note24]
Response time	Rise	τ r	$\theta =0°$	-	10	-	ms	[Note23]
	Decay	τ d		-	25	-	ms	[Note24]
Chromaticity of white		x		T.B.D.	T.B.D.	T.B.D.	-	[Note24]
		y		T.B.D.	T.B.D.	T.B.D.	-	
Chromaticity of red		x		T.B.D.	T.B.D.	T.B.D.	-	
		y		T.B.D.	T.B.D.	T.B.D.	-	
Chromaticity of green		x		T.B.D.	T.B.D.	T.B.D.	-	
		y		T.B.D.	T.B.D.	T.B.D.	-	
Chromaticity of blue		x		T.B.D.	T.B.D.	T.B.D.	-	
		y		T.B.D.	T.B.D.	T.B.D.	-	
Luminance of white		Y_{L1}		（300）	（450）	-	cd/m²	IL=60mA
White Uniformity		δW		-	-	1.35	-	[Note25]

[Note]
　The measurement shall be executed 30 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
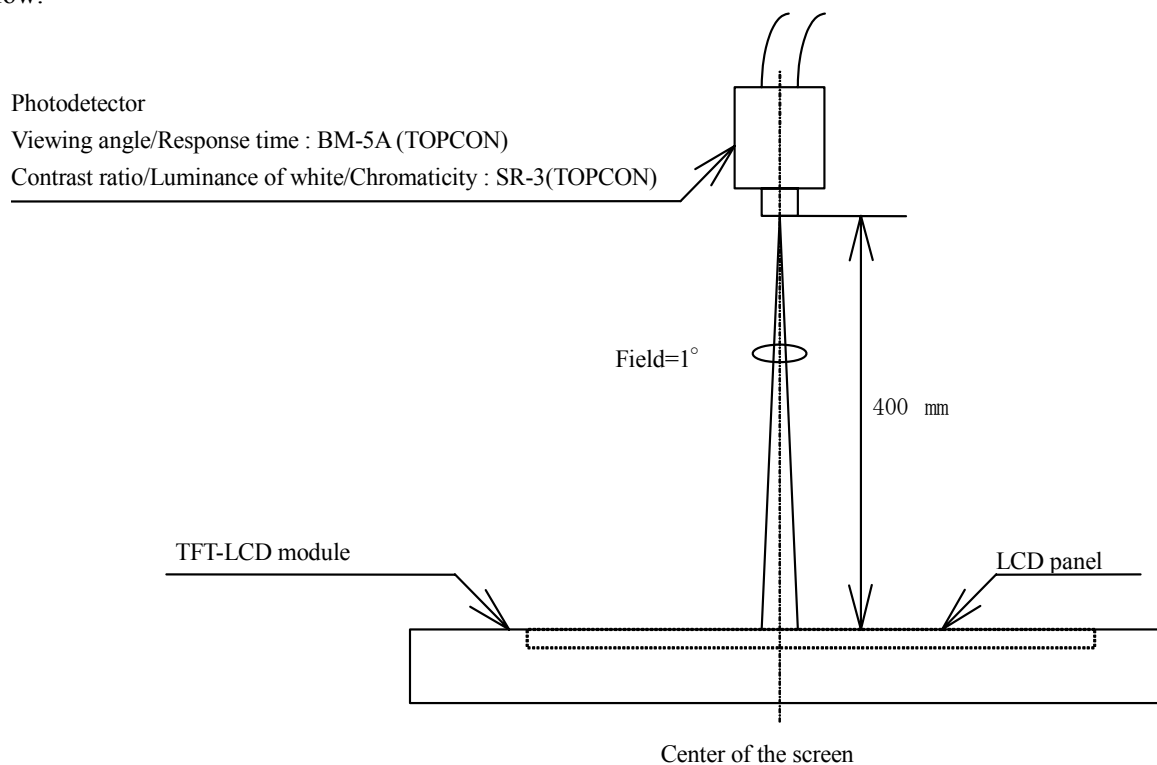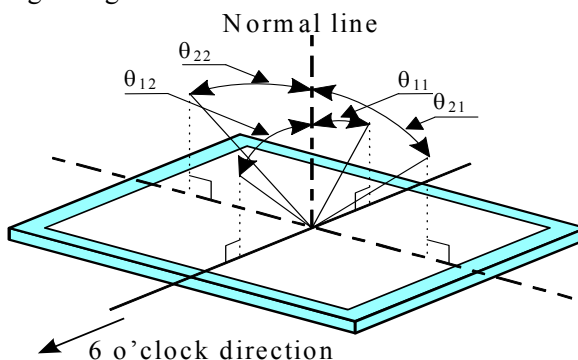　below.

Photodetector
Viewing angle/Response time : BM-5A (TOPCON)
Contrast ratio/Luminance of white/Chromaticity : SR-3(TOPCON)

Field=1°

400 mm

TFT-LCD module

LCD panel

Center of the screen

Fig.2 Optical characteristics measurement method

[Note21]Definitions of viewing angle range:

Normal line

θ_{22} θ_{12} θ_{11} θ_{21}

6 o'clock direction

[Note22]Definition of contrast ratio:

The contrast ratio is defined as the following.

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

[Note23]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" .

white | black | white

100%
90%

Photodetector output
(relative Value)

10%
0%

τr τd

time
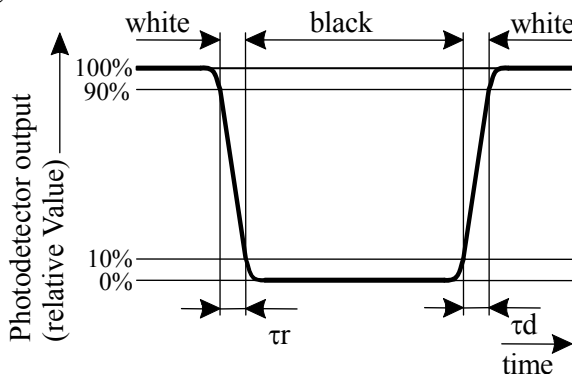
[Note24]This shall be measured at center of the screen.

[Note25]Definition of white uniformity:

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

200   400   600 pixel

A   D   150

C   300

B   E   450
pixel
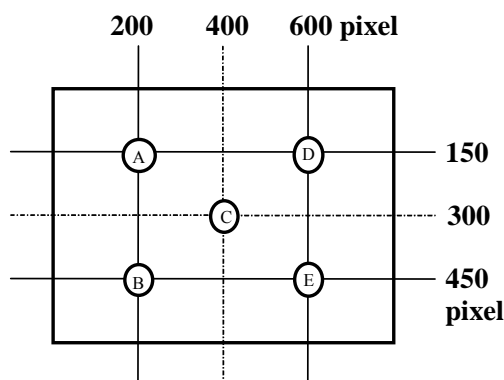
$$\delta w = \frac{\text{Maximum Luminance of five points (brightness)}}{\text{Minimum Luminance of five points (brightness)}}$$

11. Display Quality

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

12. 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 N_2 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) 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) 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.

Blow off 'dust' on the polarizer by using an ionized nitrogen.

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) Connect GND to 4 place of mounting holes to stabilize against EMI and external noise.

m) When handling LCD modules and assembling them into cabinets, please avoid that long-terms 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 modules.

Do not use the LCD module under such environment.

n) When install LCD modules in the cabinet, recommended torque value is "0.294±0.02N・m (3.0±0.2kgf・cm)".

Be sure to confirm it in the same condition as it is installed in your instrument.

o) 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.

p) Notice : Never dismantle the module , because it will cause failure.

Please do not peel off the Black tape pasted to the product. However, the panel protection film is excluded.

q)Be careful when using it for long time with fixed pattern display as it may cause   accidental image.

(Please use a screen saver etc., in order to avoid an afterimage.)

r) 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.

s) 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.

t) The LED used for this product is very sensitive to the temperature. Luminance decreases rapidly when it isused

for a long time under the environment of the high temperature. Please consult our company when it is used

under the environment like the above mentioned.

u)Please make the LED lighting power supply an independent fixed current drive composition in each channel.

When each channel of LED is driven parallel, the display fineness and longevity might be deteriorated.

v)Epoxy resin (amine series curing agent), silicone adhesive material (dealcoholization series and oxime series),

tray forming agent (azo compound) etc, in the cabinet or the packing materials may induce abnormal display

with polarizer film deterioration regardress of contact or noncontact to polarizer film.

Be sure to confirm the component of them.

13. Packing form

Product countries / Areas	CHINA
Piling number of cartons	6
Package quantity in one carton	10pcs
Carton size	388(L) x 334(W) x 263(H)
Total mass of one carton filled with full modules	10,000g
Packing form is shown	Fig3

14.Reliability test items

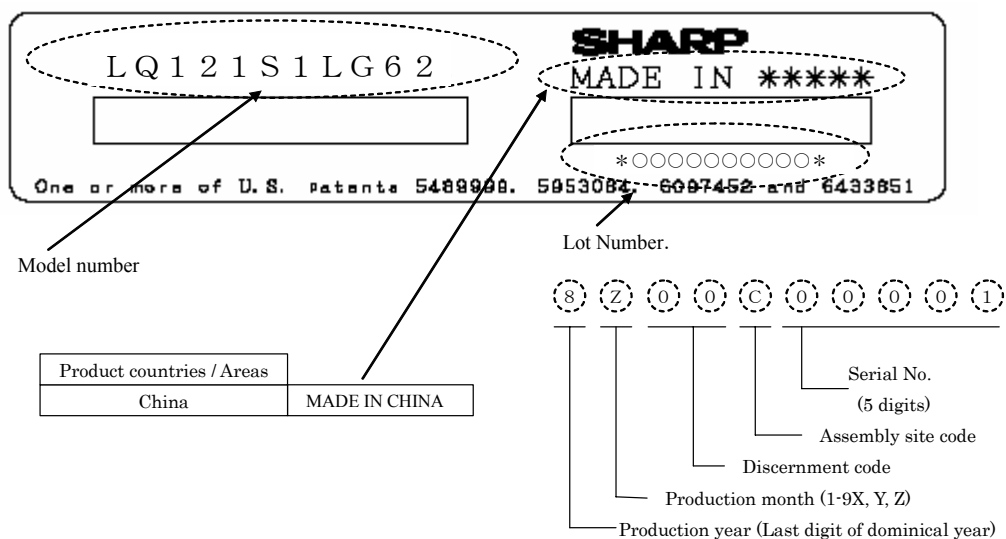| No.	Test item	Conditions	Remark
1	High temperature storage test	Ta=80℃ 240h	Panel surface
2	Low temperature storage test	Ta= -30℃ 240h	
3	High temperature & high humidity operation test	Ta=40℃ ；95%RH 240h (No condensation)	
4	High temperature operation test	Ta=80℃ 240h	Panel surface
5	Low temperature operation test	Ta= -30℃ 240h	
6	Vibration test (non- operating)	Frequency: 10～57Hz/Vibration width (one side):0.153mm : 57～500Hz/Gravity: 14.7 m/s^2 Sweep time : 11 minutes Test period : 3 hours (1 hour for each direction of X,Y,Z)	
7	Shock test (non- operating)	Max. gravity : 490m/s^2 Pulse width : 11ms, half sine wave Direction : ±X,±Y,±Z once for each direction.	
8	ESD test	Contact discharge (150pF 330Ω) non-operating = ±10kV, operating = ±8kV Atmospheric discharge (150pF 330Ω) non-operating = ±20kV, operating = ±15kV	
9	EMI	Measurement in 10m site Display position on the screen = "H" (full-screen), GND to 4 place = un-connect, Vcc / Vsignal = typ.	VCCI (Class B)

【Note】A gap of panel shall not occur by vibration or the shock
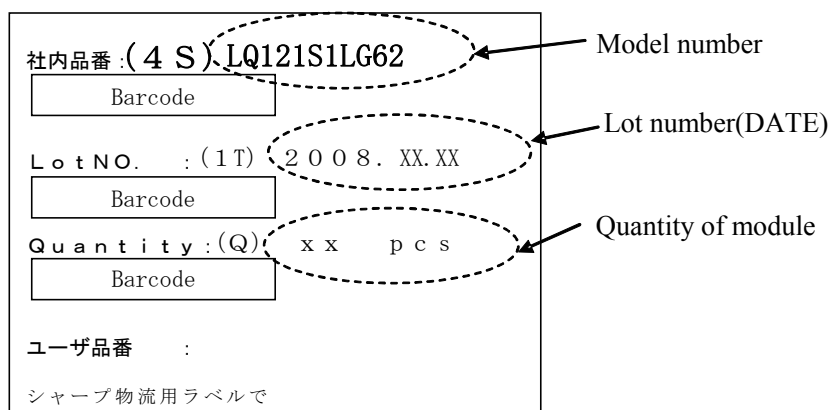
【Result Evaluation Criteria】

　　Under the display quality test conditions with normal operation state, these shall be no change

　　which may affect practical display function. (normal operation state：Temperature:15～35℃,

　　 Humidity:45～75％, Atmospheric pressure:86～106kpa)

15.Others
15-1 Lot number Label:

LQ121S1LG62

SHARP
MADE IN *****

○○○○○○○○○

One or more of U.S. patents 5489998. 5953082. 6097452 and 6433851

Model number

Lot Number.

Product countries / Areas	
China	MADE IN CHINA

⑧ Ⓩ ⓪ ⓪ Ⓒ ⓪ ⓪ ⓪ ⓪ ①

Serial No.
(5 digits)

Assembly site code

Discernment code

Production month (1-9X, Y, Z)

Production year (Last digit of dominical year)

15-2 Packing box Label:

社内品番 :（ 4 S) LQ121S1LG62

Barcode

L o t N O . :(1 T) 2 0 0 8 . XX. XX

Barcode

Q u a n t i t y :(Q) x x p c s

Barcode

ユーザ品番 :

シャープ物流用ラベルで

Model number

Lot number(DATE)

Quantity of module

R.C.

※R.C.（RoHs Compliance） means these parts have corresponded with the RoHs directive

15-3 If any problem occurs in relation to the description of this specification , it shall be resolved
through discussion with spirit of cooperation.

16. Storage conditions

<Environmental condition range of storage temperature and humidity>

Temperature   0 to 40 degrees Celsius

Relative humidity   95% and below

【Note】 Please refer below as a mean value of the environmental conditions.

Summer time   temperature   20 to 35 degrees Celsius

humidity   85% and below

Winter time   temperature   5 to 15 degrees Celsius

humidity   85% and below

Please maintain within 240 hours of accumulated length of storage time, with conditions of 40 degrees Celsius and room humidity of 95%.

Direct sun light   Please keep the product in a dark room or cover the product to protect from direct sun light.

Atmospheric condition   Please refrain from keeping the product with possible corrosive gas or volatile flux.
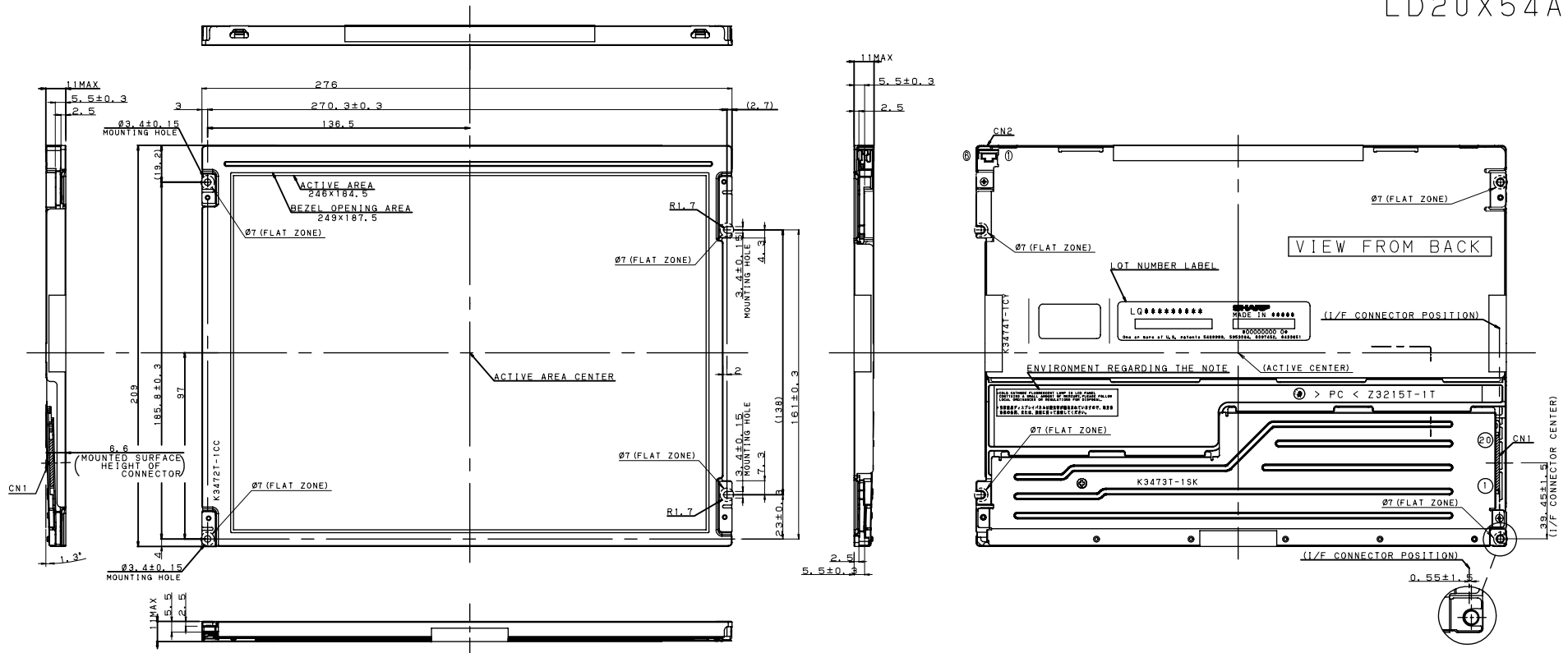
Prevention of dew   * Please store the product carton either on a wooden pallet or a stand / rack to prevent   dew. Do not place directly on the floor. In addition, to obtain moderate ventilation in between the pallet's top and bottom surfaces, pile the cartons up in a single direction and in order.

* Please place the product cartons away from the storage wall.

* Please maintain the storage area with an appropriate ventilation. It is recommendable   to furnish the storage area with equipments such as ventilation systems.

* Please maintain the ambient temperature within the range of natural environmental fluctuation.

Storage period   Within above mentioned conditions, maximum storage period should be one year.

VIEW FROM BACK

LOT NUMBER LABEL

(I/F CONNECTOR POSITION)

ENVIRONMENT REGARDING THE NOTE   (ACTIVE CENTER)

> PC < Z3215T-1T

K3473T-1SK

ACTIVE AREA
246×184.5

BEZEL OPENING AREA
249×187.5

ACTIVE AREA CENTER

Ø7 (FLAT ZONE)

MOUNTING HOLE

Ø3.4±0.15

MOUNTED SURFACE HEIGHT OF CONNECTOR

INTERFACE CONNECTOR
PIN LAYOUT

pin	1	2	3	4	5	6
	VCC	VCC	GND	GND	RXIN0-	RXIN0+
7	8	9	10	11	12	13
GND	RXIN1-	RXIN1+	GND	RXIN2-	RXIN2+	GND
14	15	16	17	18	19	20
RCLKIN-	RCLKIN+	GND	R/L	U/D	GND	GND

CORRESPONDING CONNECTOR:FI-SE20M, FI-S20S

BEZEL/DISPLAY POSITION

A

ACTIVE AREA

BEZEL OPENING

C   B   D
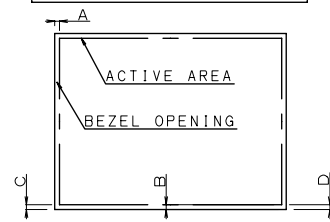
1) TOLERANCE X-DIRECTION A:1.5±0.8
2) TOLERANCE Y-DIRECTION B:1.5±0.8
3) OBLIQUITY OF DISPLAY AREA |C-D|<0.8

CN2:50156806(MOLEX)

①	+ch3	Power supply for LED (Ch3 High voltage side)
②	+ch2	Power supply for LED (Ch2 High voltage side)
③	+ch1	Power supply for LED (Ch1 High voltage side)
④	-ch1	Power supply for LED (Ch1 Low voltage side)
⑤	-ch2	Power supply for LED (Ch2 Low voltage side)
⑥	-ch3	Power supply for LED (Ch3 Low voltage side)

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. RECOMMENDED TIGHTEN TORQUE FOR MOUNTING
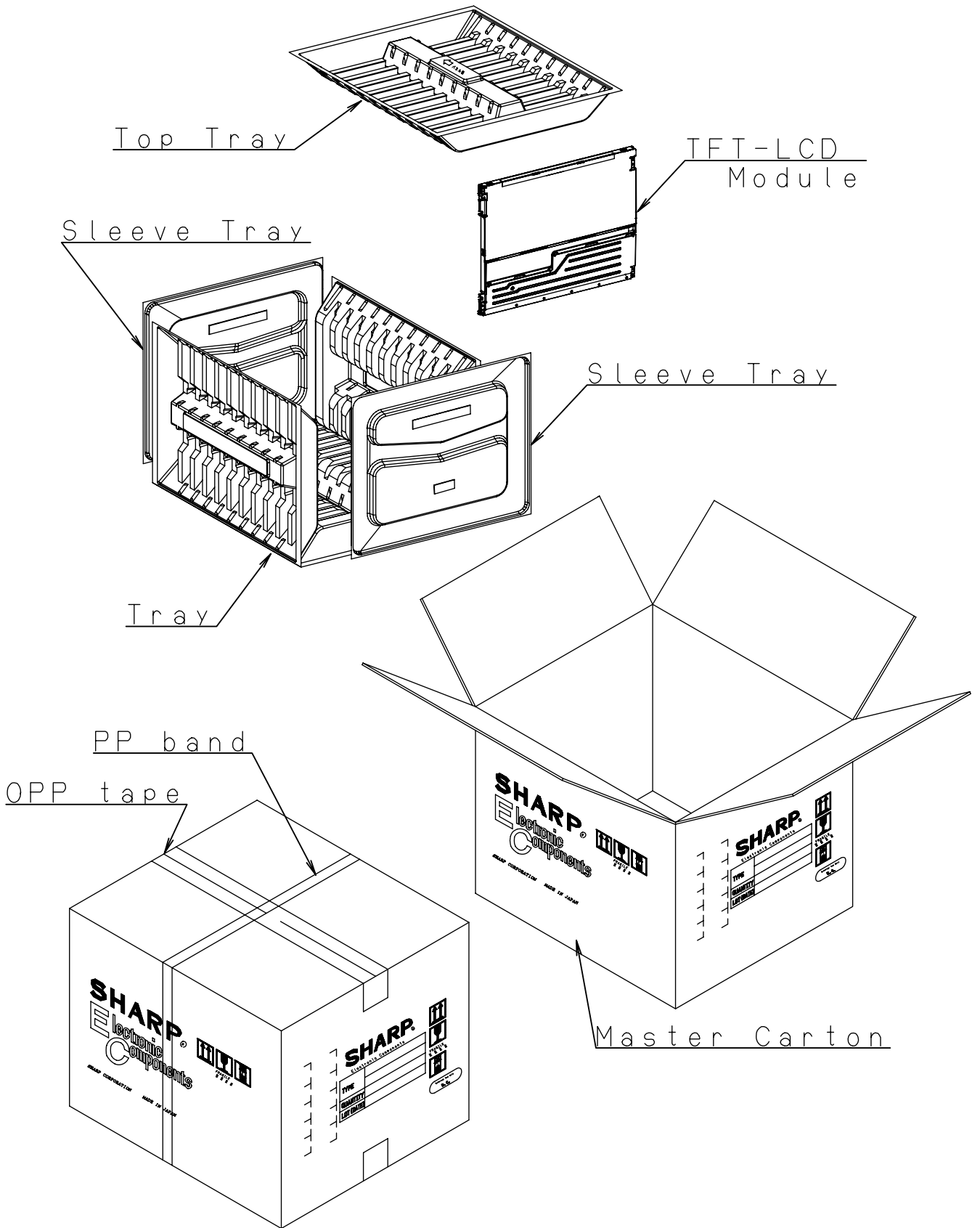   0.294±0.02N·m(3.0±0.2kgf·cm)

Fig1. OUTLINE DIMENSIONS
(LQ121S1LG62)

Top Tray

TFT-LCD
Module

Sleeve Tray

Sleeve Tray

Tray

PP band

OPP tape

Master Carton

Fig3.Packing Form