

# SHARP

# LQ150X1DW11

TFT-LCD Module

(Model Number: LQ150X1DW11)

## Specifications

Spec No.: LD-13813

Dated: June 12, 2002

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PREPARED BY : \_\_\_\_\_  
DATE \_\_\_\_\_

APPROVED BY : \_\_\_\_\_  
DATE \_\_\_\_\_

# SHARP

TFT Liquid Crystal Display  
Group  
SHARP CORPORATION

## SPECIFICATION

SPEC No. LD-13813

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APPLICABLE GROUP

TFT Liquid Crystal Display  
Group


DEVICE SPECIFICATION FOR  
**TFT-LCD Module**  
MODEL No.  
**LQ150X1DW11**

CUSTOMER'S APPROVAL

DATE \_\_\_\_\_

BY \_\_\_\_\_

PRESENTED



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SHARP CORPORATION



**1. Application**

This specification applies to the color 15.0 XGA TFT-LCD module LQ150X1DW11.

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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 1024×3×768 dots panel with about 16 million colors by supplying 48 bit data signals(8bit×2pixel×RGB) , two display enable signals, two dot clock signals, +5V DC supply voltages for TFT-LCD panel driving and supply voltage for back light.

It is a wide viewing-angle-module (Vertical viewing angle:170° Horizontal viewing angle:170° ,CR≥10).

## 3. Mechanical Specifications

Parameter	Specifications	Unit
Display size	38.0 (Diagonal)	cm
	15.0 (Diagonal)	Inch
Active area	304.1 (H)×228.1 (V)	mm
Pixel format	1024 (H)×768 (V)	Pixel
	(1 pixel=R+G+B dots)	
Pixel pitch	0.297 (H)×0.297 (V)	mm
Pixel configuration	R,G,B vertical stripe	
Display mode	Normally black	
Unit outline dimensions 【Note1】	340 (W)×264 (H)×21.1 (D)	mm
Mass	1850 ± 50	g
Surface treatment	Anti-glare (Haze value = 23)	

【Note1】 excluding back light cables.

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 (Interface signals and +5VDC power supply)

Using connectors : FX10B-100P/10-SV (Hirose Electric Co., Ltd.)

Corresponding connectors : FX10A(B)-100S/10-SV (Hirose Electric Co., Ltd.)

Pin No.	Symbol	Function	Pin No.	Function	Function
1	VCC	+5V power supply	2	VCC	+5V power supply
3	VCC	+5V power supply	4	VCC	+5V power supply
5	VCC	+5V power supply	6	VCC	+5V power supply
7	GND	Fixed GND	8	GND	GND
9	-	RESERVE	10	-	RESERVE
-	GND	GND	-	GND	Fixed GND
11	GND	GND	12	GND	GND
13	RB7	Bport red data (MSB)	14	RA7	Aport red data (MSB)
15	RB6	Bport red data	16	RA6	Aport red data
17	GND	GND	18	GND	GND
19	RB5	Bport red data	20	RA5	port red data
21	RB4	Bport red data	22	RA4	Aport red data
23	GND	GND	24	GND	GND
25	RB3	Bport red data	26	RA3	Aport red data
27	RB2	Bport red data	28	RA2	Aport red data
29	GND	GND	30	GND	GND
-	GND	Fixed GND	-	GND	Fixed GND
31	GND	GND	32	GND	GND
33	RB1	Bport red data	34	RA1	Aport red data
35	RB0	Bport red data (LSB)	36	RA0	Aport red data (LSB)
37	GND	GND	38	GND	GND
39	GB7	Bport green data (MSB)	40	GA7	Aport green data (MSB)
41	GB6	Bport green data	42	GA6	Aport green data
43	GND	GND	44	GND	GND
45	GB5	Bport green data	46	GA5	Aport green data
47	GB4	Bport green data	48	GA4	Aport green data
49	GND	GND	50	GND	GND
-	GND	Fixed GND	-	GND	Fixed GND
51	GND	GND	52	GND	GND
53	GB3	Bport green data	54	GA3	Aport green data
55	GB2	Bport green data	56	GA2	Aport green data
57	GND	GND	58	GND	GND
59	GB1	Bport green data	60	GA1	Aport green data
61	GB0	Bport green data (LSB)	62	GA0	Aport green data (LSB)
63	GND	GND	64	GND	GND
65	CLKB	Bport clock	66	CLK	Aport clock
67	GND	GND	68	GND	GND
69	DEB	Bport data enable	70	DEA	Aport data enable
-	GND	Fixed GND	-	GND	Fixed GND
71	GND	GND	72	GND	GND
73	BB7	Bport blue data (MSB)	74	BA7	Aport blue data (MSB)
75	BB6	Bport blue data	76	BA6	Aport blue data
77	GND	GND	78	GND	GND
79	BB5	Bport blue data	80	BA5	Aport blue data
81	BB4	Bport blue data	82	BA4	Aport blue data
83	GND	GND	84	GND	GND
85	BB3	Bport blue data	86	BA3	Aport blue data
87	BB2	Bport blue data	88	BA2	Aport blue data
89	GND	GND	90	GND	GND
-	GND	Fixed GND	-	GND	Fixed GND
91	BB1	Bport blue data	92	BA1	Aport blue data
93	BB0	Bport blue data (LSB)	94	BA0	Aport blue data (LSB)
95	GND	GND	96	GND	GND
97	GND	GND	98	GND	GND
99	GND	GND	100	GND	GND

4-2. Back light driving

CN 2, 4 (High voltage side)

The module-side connector : BHR-03(6.0)VS-1 (JST)

The user-side connector : SM03(6.0)B-BHS-1 (JST)

Pin no.	symbol	I/O	Function
1	V <sub>HIGH</sub>	I	Power supply for lamp 1 (High voltage side)
2	V <sub>HIGH</sub>	I	Power supply for lamp 2 (High voltage side)
3	V <sub>HIGH</sub>	I	Power supply for lamp 3 (High voltage side)

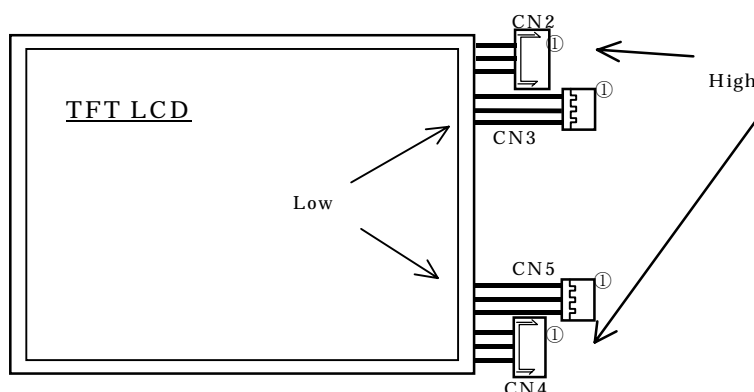
CN 3,5(Low voltage side)

The module-side connector : BHR-03VS-1 (JST)

The user-side connector : SM03(4.0)B-BHS-1 (JST)

Pin no.	symbol	I/O	Function
1	V <sub>LOW</sub>	I	Power supply for lamp 1 (Low voltage side)
2	V <sub>LOW</sub>	I	Power supply for lamp 2 (Low voltage side)
3	V <sub>LOW</sub>	I	Power supply for lamp 3 (Low voltage side)

The pair of CN2 and CN3 is for the same CCFT lamps. The pair of CN4 and CN5 is in the same way.



5. Absolute Maximum Ratings

Parameter	Symbol	Condition	Ratings	Unit	Remark
Storage temperature	T <sub>stg</sub>	—	-25 ~ +60	°C	【Note1】
Operating temperature (Ambient)	T <sub>opa</sub>	—	0 ~ +50	°C	
Input voltage	V <sub>I</sub>	T <sub>a</sub> =25°C	-0.3 ~ +3.6	V	【Note2】
supply voltage	V <sub>cc</sub>	T <sub>a</sub> =25°C	0 ~ + 6	V	

【Note1】 Humidity : 95%RH Max. ( T<sub>a</sub> ≤ 40°C )

Maximum wet-bulb temperature at 39°C or less. ( T<sub>a</sub> > 40°C )

No condensation.

【Note2】 CLKA, CLKB, RA0~RA7, GA0~GA7, BA0~BA7, RB0~RB7, GB0~GB7, BB0~BB7, DEA, DEB

**6. Electrical Characteristics**

6-1. TFT-LCD panel driving

Ta = 25°C

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply voltage	Vdd	4.5	5.0	5.5	V	【Note1】
Current dissipation	Idd	—	400	650	mA	【Note2】
Permissive input ripple voltage	V <sub>RF</sub>	—	—	100	mVp-p	
Input voltage (Low)	V <sub>IL</sub>	GND	—	0.6	V	【Note3】
Input voltage (High)	V <sub>IH</sub>	2.6	3.3	3.5	V	【Note3】
Input current (Low)	I <sub>IL</sub>	—	—	10	μA	V <sub>I</sub> =GND 【Note3】
Input current (High)	I <sub>IH</sub>	—	—	10	μA	V <sub>I</sub> =V <sub>cc</sub> 【Note3】

**【Note1】**

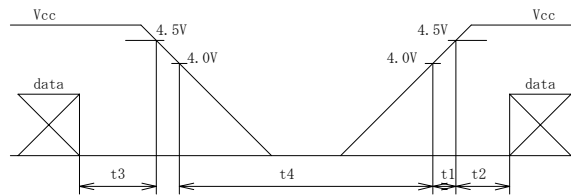
On-off sequences of Input voltage

$0 < t1 \leq 100\text{ms}$

$0 < t2 \leq 100\text{ms}$

$0 \leq t3 \leq 1\text{s}$

$t4 \geq 1\text{s}$



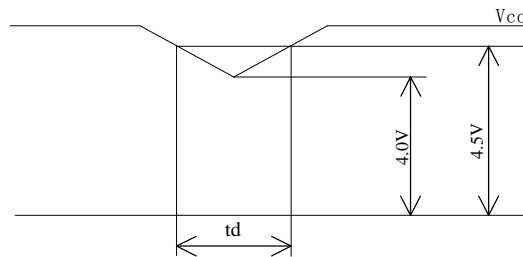
Dip conditions for supply voltage

1)  $4.0\text{V} \leq V_{cc} < 4.5\text{V}$

$t_d \leq 10\text{ms}$

2)  $V_{cc} < 4.0\text{V}$

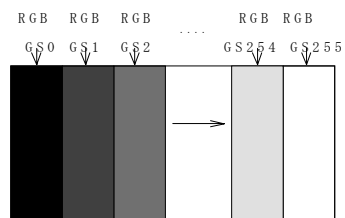
The LCD module shuts down.



**【Note2】** Typical current situation : 256-bar pattern

V<sub>cc</sub>=+5.0V, f<sub>ck</sub>=32.5MHz, 25°C

The explanation of each RGB scale is described below section 8.



**【Note3】** CLKA, CLKB, RA0~RA7, GA0~GA7, BA0~BA7, RB0~RB7, GB0~GB7, BB0~BB7,DEA, DEB

## 6-2. Back light driving

The back light system is an edge-lighting type with six CCFTs (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.

CCFT Model Name : KTBE264MSTF-314KB176-Z (Stanley Electric Co.,Ltd)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Lamp current range	$I_L$	4.0	6.0	7.0	mArms	【Note1】
Lamp voltage	$V_L$	—	680	—	Vrms	$T_a=25^{\circ}\text{C}$
Lamp power consumption	$P_L$	—	4.08	—	W	【Note2】
Lamp frequency	$F_L$	35	60	70	KHz	【Note3】
Kick-off voltage	$V_s$	—	—	1250	Vrms	$T_a=25^{\circ}\text{C}$ 【Note4】
		—	—	1600	Vrms	$T_a=0^{\circ}\text{C}$ 【Note4】
Lamp life time	$T_L$	50,000	—	—	hour	【Note5】

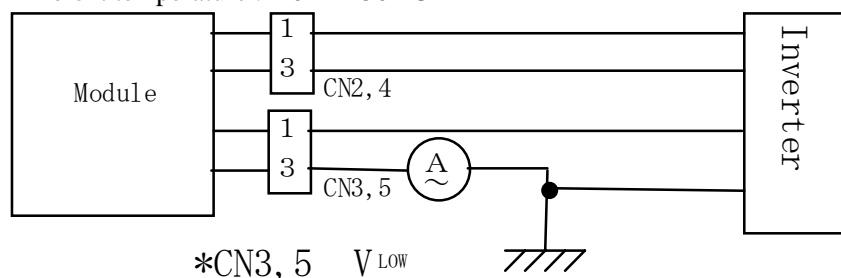
【Note1】 A lamp can be light in the range of lamp current shown above.

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 : 35 ~ 70 kHz

Ambient temperature : 0 ~ 50 °C



【Note2】 Referential data per one CCFT by calculation ( $I_L \times V_L$ ).

The data doesn't include loss at inverter .

【Note3】 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.

【Note4】 Kick-off voltage value is described as the index in the state of lamp only.

The kick-off voltage is estimated to be risen up as approx. +200V in the state of module only, and the further rise up can be seen according to the assembling status of user cabinet. Please set the kick-off voltage of inverter to avoid the lighting failures in the state of operation. Please design the inverter so that its open output voltage can be connected for more than 1 second to startup. Otherwise, the lamp may not be turned on. But, please set as 100ms when the ambient luminance around the lamp is more than 1lux.

【Note5】 Lamp life time is defined as the time when either ① or ② occurs in the continuous operation under the condition of  $T_a=25^{\circ}\text{C}$  and  $I_L=6.0 \pm 0.5\text{mArms}$  .

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

② Kick-off voltage at  $T_a=0^{\circ}\text{C}$  exceeds maximum value, 1600Vrms .

【Note6】 Synchronize frequency and phase of two CCFT in the same connector.

Otherwise it may exceed rated voltage of connector.

《Note》

The performance of the back light, for example life time 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 back light 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 overvoltage / overcurrent 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.

## 7. Timing characteristics of input signals

### 7-1-1. Timing characteristics

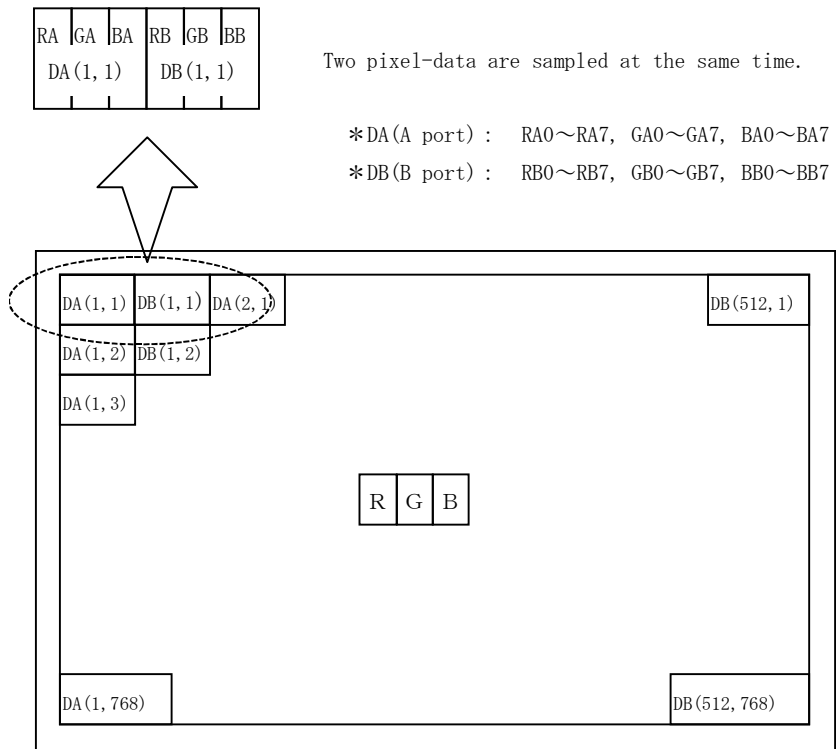
	Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Clock	Frequency	1/Tc	25	32.5	40	MHz	【Note1】
	High period	Tch	9	—	—	ns	
	Low period	Tcl	9	—	—	ns	
	Skew	Tcsq	-4	0	4	ns	
Data	Setup period	Tds	5	—	—	ns	
	Hold period	Tdh	5	—	—	ns	
Data enable signal	Setup period	Tes	5	—	Tc-10	ns	
	Hold period	Teh	5	—	—	ns	
	Horizontal period	TH	528	672	860	clock	
			16.6	20.7	—	μs	
	Horizontal period (High)	THd	512	512	512	clock	
	Vertical period	TV	773	806	990	line	【Note2】
	Vertical period (High)	TVd	768	768	768	line	

【Note1】 Two pixel-data are sampled at the same time.

【Note2】 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

Graphics and texts can be displayed on a 1024 × 3 × 768 dots panel with 16M colors by supplying 48 bit data signal (8bit/color [256 gray scales] × 3 × 2 pixels).



Display position of input data (H,V)

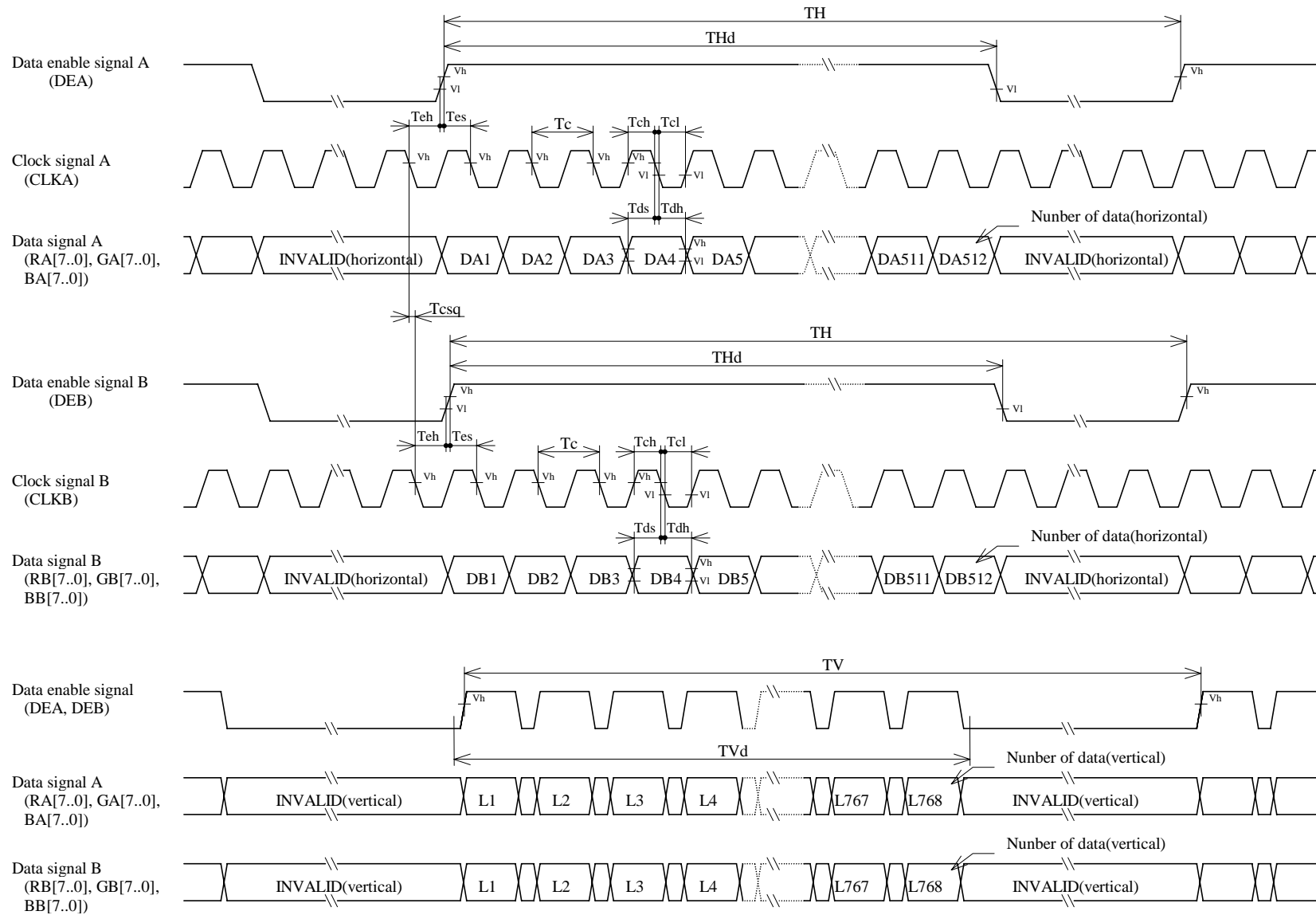


Fig.2 Input Signal Waveforms

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

	Colors & Gray scale	Gray Scale	Data signal																											
			RA0 RA1 RA2 RA3 RA4 RA5 RA6 RA7	GA0 GA1 GA2 GA3 GA4 GA5 GA6 GA7	BA0 BA1 BA2 BA3 BA4 BA5 BA6 BA7																									
			RB0 RB1 RB2 RB3 RB4 RB5 RB6 RB7	GB0 GB1 GB2 GB3 GB4 GB5 GB6 GB7	BB0 BB1 BB2 BB3 BB4 BB5 BB6 BB7																									
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 0 0 0 0 0 0 0																								
	Blue	—	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1																								
	Green	—	0 0 0 0 0 0 0 0	1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																								
	Cyan	—	0 0 0 0 0 0 0 0	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1																								
	Red	—	1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																								
	Magenta	—	1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1																								
	Yellow	—	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0	0 0 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 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 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	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	0 0 0 0 0 0 0 0																								
	↑	↓																												
	↓	↓																												
	Brighter	GS253	1 0 1 1 1 1 1 1	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																								
	↓	GS254	0 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																								
	Red	GS255	1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0	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	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	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 0	0 0 0 0 0 0 0 0																								
	↑	↓																												
	↓	↓																												
	Brighter	GS253	0 0 0 0 0 0 0 0	1 0 1 1 1 1 1 1	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																								
	↓	GS254	0 0 0 0 0 0 0 0	0 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0																								
	Green	GS255	0 0 0 0 0 0 0 0	1 1 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 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	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	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	0 1 0 0 0 0 0 0																								
	↑	↓																												
	↓	↓																												
	Brighter	GS253	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	1 0 1 1 1 1 1 1	1 0 1 1 1 1 1 1																								
	↓	GS254	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 1 1 1 1 1 1 1	0 1 1 1 1 1 1 1																								
	Blue	GS255	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1																								

0 : Low level voltage,            1 : High level voltage.

Each basic color can be displayed in 256 gray scales from 8 bit data signals. According to the combination of total 48 bit data signals, the 16-million-color display can be achieved on the screen.

**9. Optical Characteristics**

Ta=25°C, Vcc =+5V

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark		
Viewing angle range	Vertical	$\theta 11$	$CR \geq 10$	70	85	—	Deg.			
		$\theta 12$		70	85	—	Deg.			
	Horizontal	$\theta 21, \theta 22$		70	85	—	Deg.			
Contrast ratio		C R	$\theta = 0^\circ$	—	350	—	—	【Note2,4】		
Response Time	Rise	$\tau r$	$\theta = 0^\circ$	—	5	25	m s	【Note3,4】		
	Decay	$\tau d$		—	20	50	m s			
Chromaticity of White		Wx	$\theta = 0^\circ$	0.283	0.313	0.343	—	【Note4】		
		Wy		0.299	0.329	0.359	—			
Chromaticity of Red		Rx		0.607	0.637	0.667	—			
		Ry		0.309	0.339	0.369	—			
Chromaticity of Green		Gx		0.245	0.275	0.305	—			
		Gy		0.575	0.605	0.635	—			
Chromaticity of Blue		Bx		0.115	0.145	0.175	—			
		By		0.057	0.087	0.117	—			
Luminance of white		YL			240	300	—		cd/m <sup>2</sup>	IL=6.0mA rms FL=60kHz 【Note4】
White Uniformity		$\delta w$			—	—	1.25		—	【Note5】

※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.3 below.

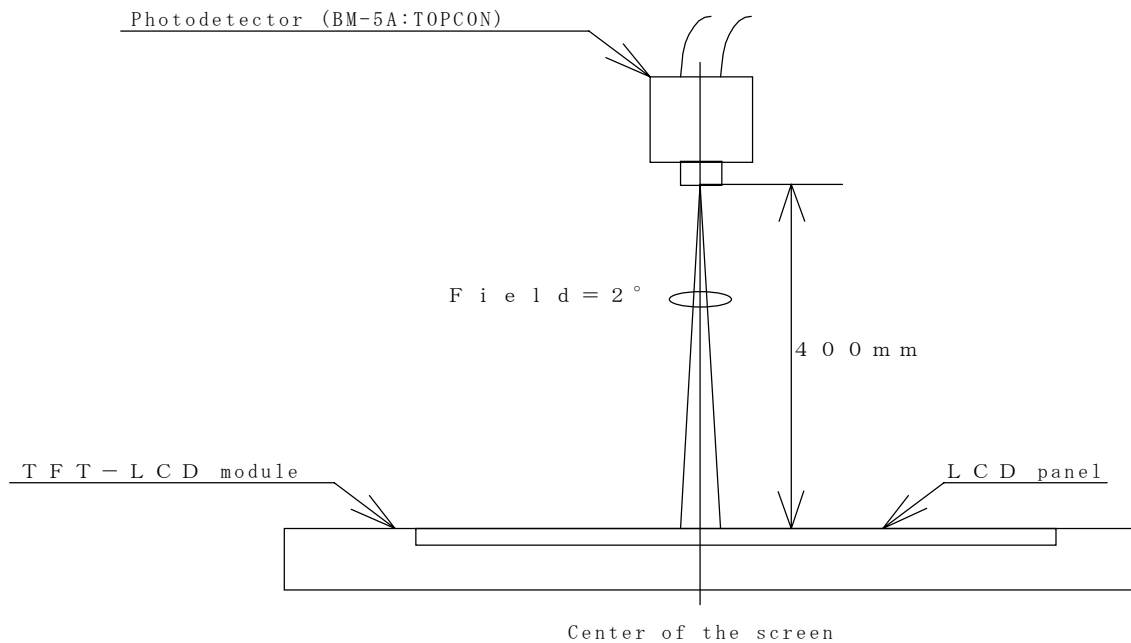
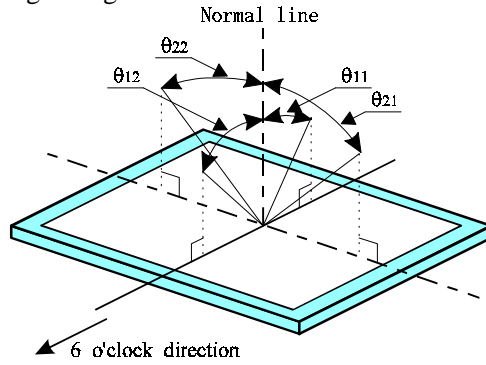


Fig.3 Optical characteristics measurement method

【Note1】 Definitions of viewing angle range:



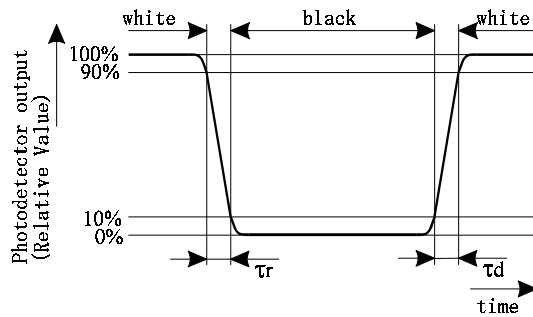
【Note2】 Definition of contrast ratio:

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:

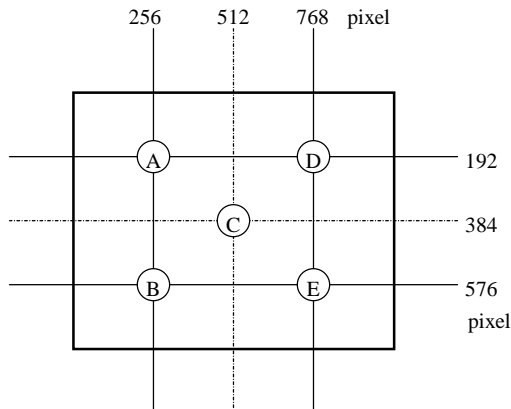
The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".



【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).



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

**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 polarize is easily damaged, pay attention not to scratch it.
- 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) Make sure the four mounting holes of the module are grounded sufficiently. Take electro-magnetic interference (EMI) into consideration.
- i) 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.
- j) Observe all other precautionary requirements in handling components.
- k) 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.
- l) 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.
- m) 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.

**11. Packing form**

- a) Piling number of cartons : maximum 6 cartons
- b) Packing quantity in one carton : 5 module
- c) Carton size : 473mm(W)×443mm(D)×258(H)
- d) Total mass of one carton filled with full modules : Max.11300g
- e) Packing form : Packing form is shown in Fig.4

**12. Reliability test items**

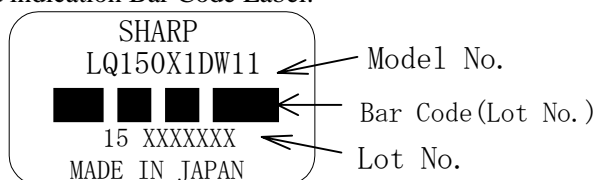
No.	Test item	Conditions
1	High temperature storage test	Ta = 60°C      240h
2	Low temperature storage test	Ta = -25°C      240h
3	High temperature & high humidity operation test	Ta = 40°C ; 95%RH      240h (No condensation)
4	High temperature operation test	Ta = 50°C      240h (The panel temp. must be less than 60°C)
5	Low temperature operation test	Ta = 0°C      240H
6	Vibration test (non- operating)	Frequency : 10~57Hz/Vibration width (one side) : 0.075mm : 58~500Hz/Gravity : 9.8m/s <sup>2</sup> 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 <sup>2</sup> Pulse width : 11ms, sine wave Direction : ±X, ±Y, ±Z, once for each direction.

**【Result Evaluation Criteria】**

Under the display quality test conditions with normal operation state, these shall be no change which may affect practical display function.

**13. Others**

1) Lot No. and indication Bar Code Label:



How to express Lot No.

A production year (the last figures of the Christian

Serial No.

A production month (1~9, X, Y, Z)

2) Packing Label

社内品番 : (4 S) <b>LQ150X1DW11</b>	
バーコード (①)	
Lot NO.	: (1 T) 2001.05.15
バーコード (②)	
Quantity : (Q)	5 pcs
バーコード (③)	
ユーザ品番	:
シャープ物流用ラベルです。	

① Model No. (LQ150X1DW11)

② Lot No. (Date)

③ Quantity

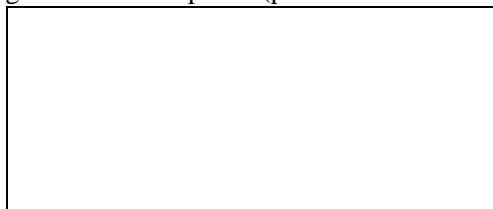
3) Adjusting volume have been set optimally before shipment, so do not change any adjusted value.

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 labeled on the back of the module.



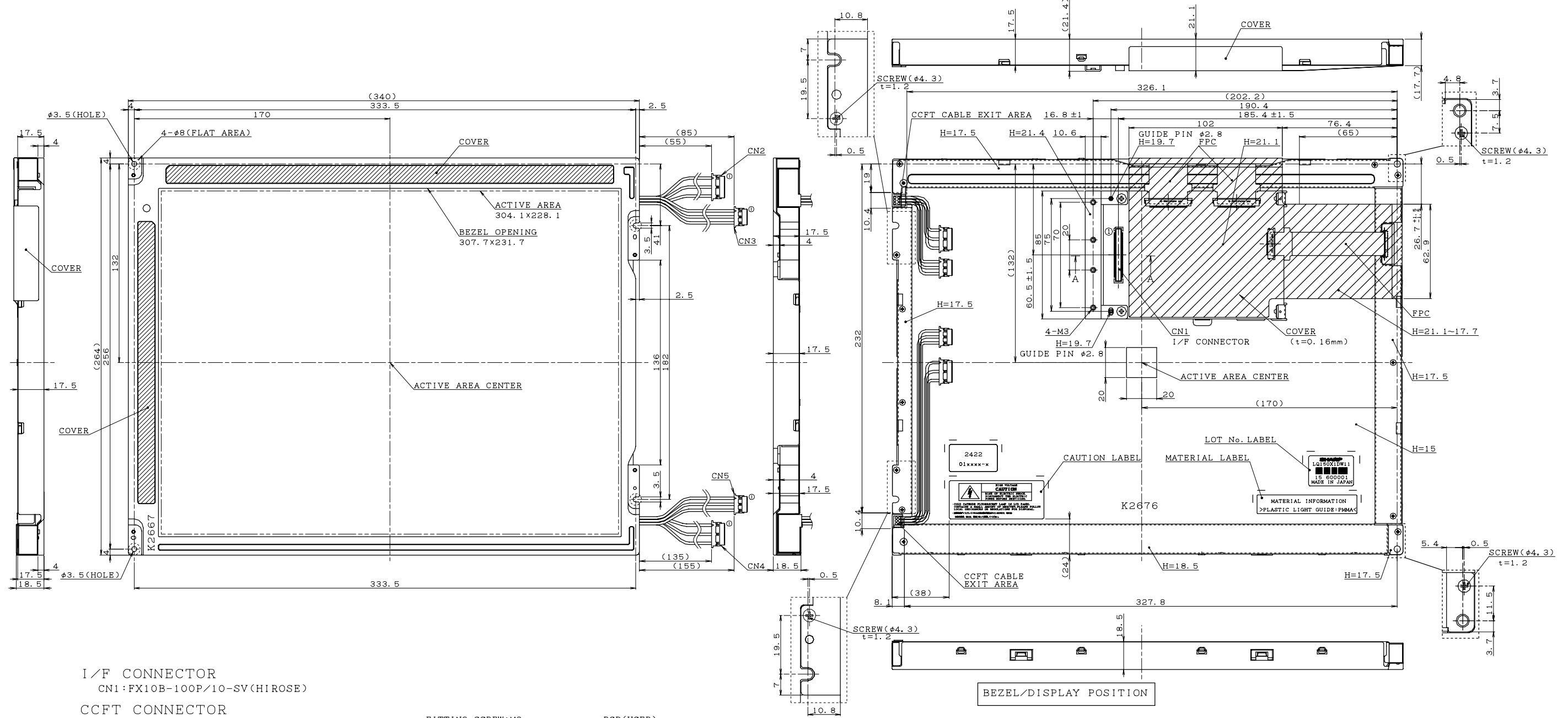
8) Cold cathode fluorescent lamp in LCD PANEL contains a small amount of mercury, Please follow local ordinances or regulations for disposal. (put on the back of the module. Size: 63×25.5mm )



9) When any question or issue occurs, it shall be solved by mutual discussion.

◎ Carton storage condition

- Temperature      0°C to 40°C
- Humidity          95%RH or less
- Reference condition : 20°C to 35°C , 85%RH or less (summer)  
: 5°C to 15°C , 85%RH or less (winter)  
• the total storage time (40°C,95%RH) : 240H or less
- Sunlight          Be sure to shelter a product from the direct sunlight.
- Atmosphere       Harmful gas, such as acid and alkali which bites electronic components and/or wires, must not be detected.
- Notes              Be sure to put cartons on palette or base, don't put it on floor, and store them with removing from wall  
Please take care of ventilation in storehouse and around cartons, and control changing temperature is within limits of natural environment
- Storage period    1 year



I/F CONNECTOR  
CN1: FX10B-100P/10-SV(HIROSE)

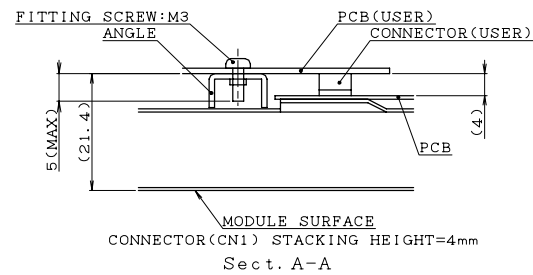
CCFT CONNECTOR  
CN2, 4: BHR-03(6.0)VS-1(JST)

1	High
2	High
3	High

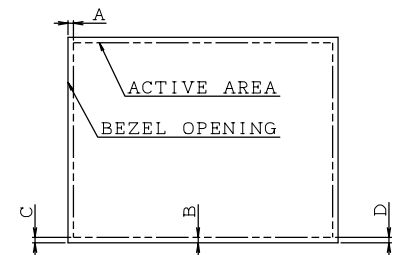
CCFT CONNECTOR  
CN3, 5: BHR-03VS-1(JST)

1	GND
2	GND
3	GND

- NOTES
- UNSPECIFIED TOLERANCE TO BE  $\pm 0.5$ .
  - WARP AND FLATING FOR PCB AND CHASSIS ARE EXCLUDED FROM THICKNESS AND DIMENSION OF THE UNIT.
  - ELECTRONIC PARTS ARE ARRANGED UNDER COVER. (HATCHING AREA) PLEASE DO NOT PRESS.

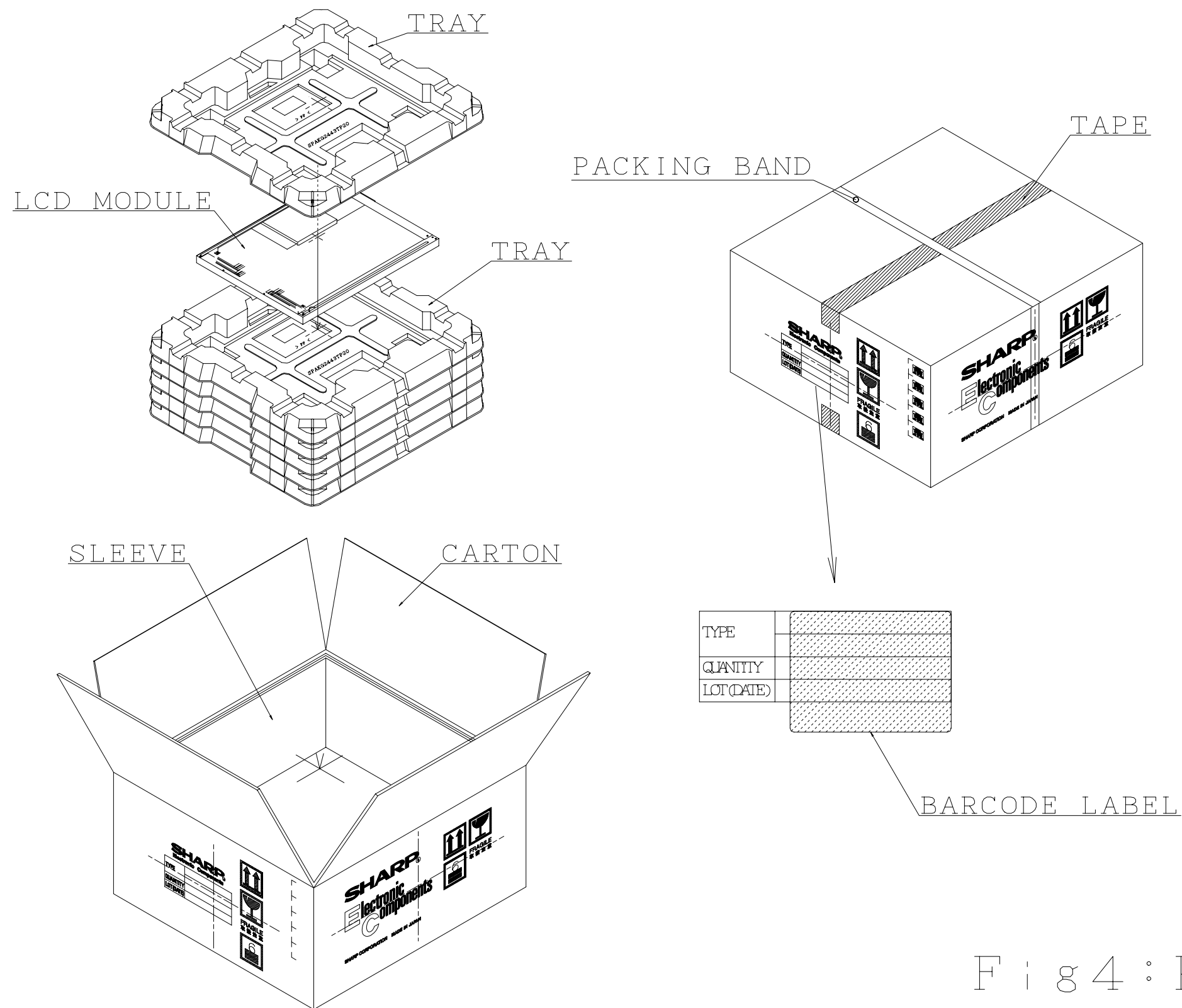


BEZEL/DISPLAY POSITION



- TOLERANCE X-DIRECTION A:  $1.8 \pm 0.8$
- TOLERANCE Y-DIRECTION B:  $1.8 \pm 0.8$
- OBLIQUITY OF DISPLAY AREA C-D:  $< 0.8$

Fig 1: 15" XGA OUTLINE DIMENSIONS (LQ150X1DW11)



社内品番: (4S)LQ150X1DW11	← ①
<input type="text"/>	
LotNO. : (1T)2001.08.02 1	← ②
<input type="text"/>	
Quantity: (Q) 5 pcs	← ③
<input type="text"/>	
ユーザー品番 :	← ④
<input type="text"/>	
シャープ物流用ラベルです。	← ⑤

- ① Model No.
- ② Lot No. (Date)
- ③ Quantity
- ④ User model No.
- ⑤ Sharp model No.

Fig 4 : PACKING FORM

**SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.**

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