DEVICE SPECIFICATION FOR

TFT - LCD module
MODEL No. LQ197V3DZ82
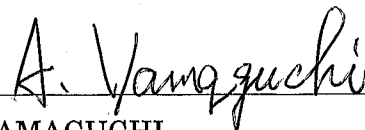
CUSTOMER'S APPROVAL

PRESENTED

DATE

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SHARP CORPORATION

RECORDS OF REVISION

MODEL No : LQ197V3DZ82

SPEC No : LD-17825

DATE	Rev	No.		PAGE	SUMMARY	NOTE
2005.09.06				-	-	1st Issue

1. Application

This specification sheets applies to the color 19.7" VGA TFT-LCD module LQ197V3DZ82.

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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, back light system and etc. Graphics and texts can be displayed on a 640× RGB× 480 dots panel with about 16 million colors by supplying date signal of 24 bit(8 bit x RGB), 2 kind of timing signal, +5V of DC supply voltages and supply voltage for back light.

3. Mechanical Specifications

Parameter	Specifications	Unit
Display size	50 (Diagonal)	cm
	19.7 (Diagonal)	inch
Active area	401.28 (H) x 298.8 (V)	mm
Pixel Format	640 (H) × 480 (V) (1pixel = R + G + B dot)	pixel
Pixel pitch	0.627 (H) × 0.6225 (V)	mm
Pixel configuration	B, G, R vertical stripe	
Display mode	Normally black	
Unit Outline Dimensions＊1	462.6(W) ×338.5(H) × 36.5(D)	mm
Mass	1960± 150	g
Surface treatment	Anti Glare, low reflection coating Hard Coating :2H Haze :23 +/- 5 %	

(＊1)Outline dimensions are shown in Fig.1

4. Input Terminals

4-1. Control circuit driving

CN1   Using connector   : 50FLZX-RSM1-A-GB-TB (IST)

Pin No.	Symbol	Function	Remarks
1	GND		
2	CK	Clock signal(sampling each data)	
3	GND		
4	GND		
5	GND		
6	DE	Data enable signal (Signal to settle the display position)	
7	GND		
8	R0	Red data signal (LSB)	
9	R1	Red data signal	
10	R2	Red data signal	
11	R3	Red data signal	
12	GND		
13	R4	Red data signal	
14	R5	Red data signal	
15	R6	Red data signal	
16	R7	Red data signal (MSB)	
17	GND		
18	G0	Green data signal (LSB)	
19	G1	Green data signal	
20	G2	Green data signal	
21	G3	Green data signal	
22	GND		
23	G4	Green data signal	
24	G5	Green data signal	
25	G6	Green data signal	
26	G7	Green data signal (MSB)	
27	GND		
28	B0	Blue data signal (LSB)	
29	B1	Blue data signal	
30	B2	Blue data signal	
31	B3	Blue data signal	
32	GND		
33	B4	Blue data signal	
34	B5	Blue data signal	
35	B6	Blue data signal	
36	B7	Blue data signal (MSB)	
37	GND		
38	GND		
39	GND		
40	GND		
41	GND		
42	GND		
43	GND		
44	VDD	+5V Power Supply	
45	VDD	+5V Power Supply	
46	VDD	+5V Power Supply	
47	VDD	+5V Power Supply	
48	L/R	Reverse terminal of Right and Left	【Note 1】
49	U/D	Reverse terminal of Up and Down	【Note 1】
50	GND		

Shield case contacts GND(Ground) of LCD module.　Recommended dimensions of FPC/FFC are shown in Fig.2.
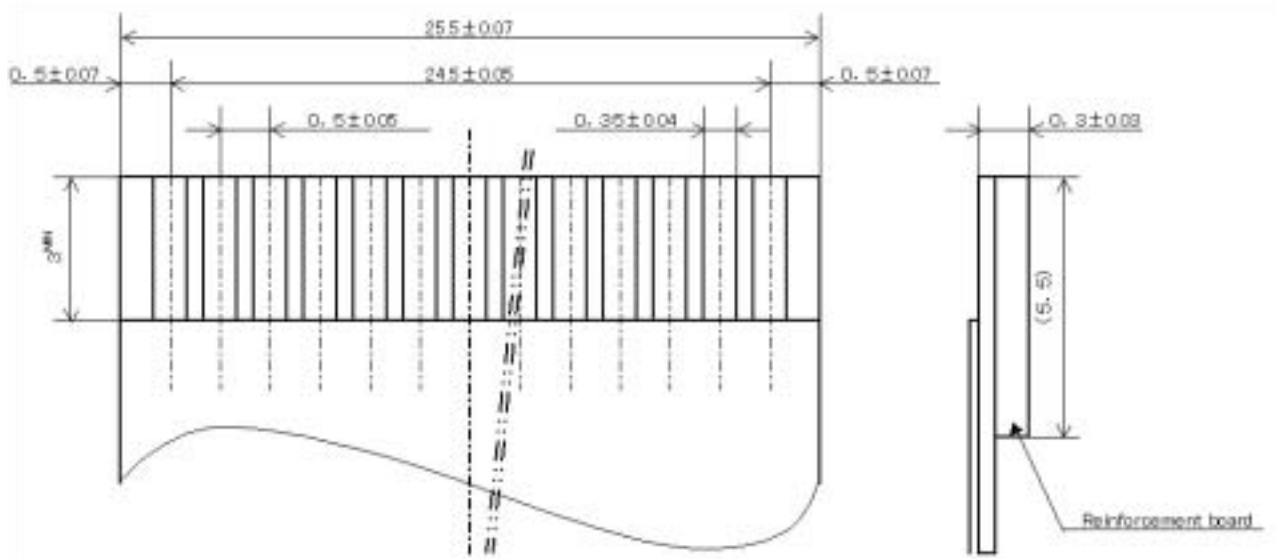
4-2. FPC/FFC

Fig.2 Recommended FPC/FFC dimensional diagram

【Note】 Use FFC/FPC which contact point is gold-plated.

Contact resistance may increase due to bimetallic corrosion if contact point of FFC/FPC is not gold-plated.
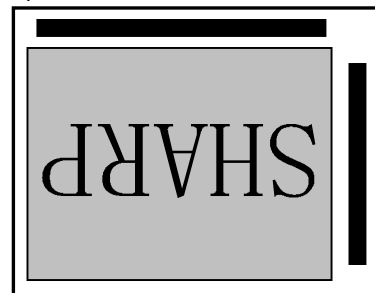
【Note 1】

R/L : L
U/D : L

R/L : H
U/D : L
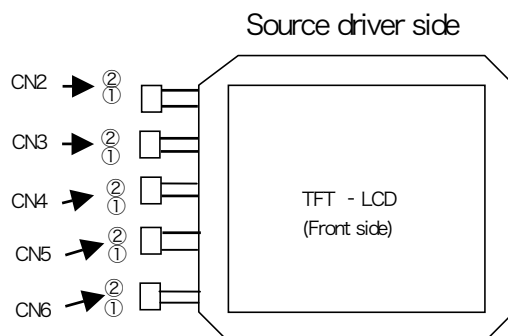
R/L : L
U/D : H

R/L : H
U/D : H

4-3. Back light driving

CN 2,3,4,5,6

The module-side connector :BHCR-02VS-5 (JST)

The user-side connector : SM02B-BHCS-1, SM02B-BHCS-2 , SM02B-BHCW-1 , SM02B-BHCW-2 (JST)

Pin no.	symbol	Function	Cable color	
1	V1	Power supply for lamp1	White	【Note1】
2	V2	Power supply for lamp2	Pink	【Note1】

【Note1】Please input the voltage of the opposite phase to V1 and V2.

Source driver side

5. Pixel arrangement and viewing angle

Pixel arrangement and viewing angle are as follows.
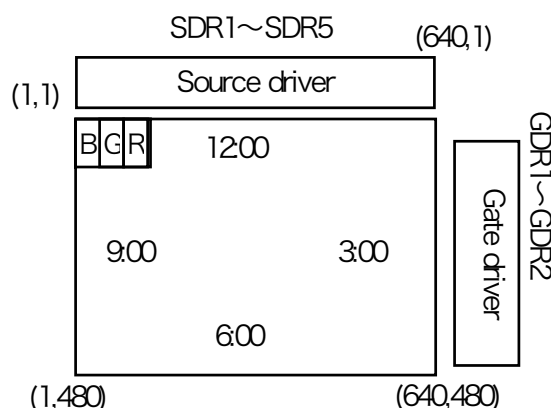
6. Absolute Maximum Ratings

Parameter	Symbol	Condition	Ratings	Unit	Remark
Input voltage (for Control PWB)	V_{IC}	Ta=25 ℃	-0.3~+3.6	V	【Note 1】
5V supply voltage (for Control PWB)	Vcc	Ta=25 ℃	0~+6	V	
Lamp Incoming voltage	V1	-	0~3000	Vrms	
	V2	-	0~3000	Vrms	
	△|V1-V2|	-	0~3000	Vrms	
Operation temperature (panel temperature)	T_{op}	-	0~+50	℃	【Note 2,3】
Storage temperature	T_{stg}	-	-25~+60	℃	【Note 2】

【Note 1】 CK, R0~R7, G0~G7, B0~B7, DE, R/L, U/D

【Note 2】Humidity 95%RH Max.(Ta≦40 ℃)

　　　　　Maximum wet-bulb temperature at 39 ℃ or less.(Ta>40 ℃)　No condensation.

【Note 3】Since it becomes as a cause of phenomena, such as contrast unevenness, please make the temperature distribution within a field of a panel uniform.

7. Electrical Characteristics

7-1. Control circuit driving
Ta=25 degree

Parameter		Symbol	Min.	Typ.	Max.	Uniit	Remark
+5V supply voltage	Supply voltage	Vcc	+4.5	+5.0	+5.5	V	【Note 1】
	Current dissipation	Icc	-	340	500	mA	【Note 2】
Permissive input ripple voltage		V_{RP}	-	-	100	mV_{P-P}	Vcc=+5.0V
Input Low voltage		V_{IL}	GND	-	0.9	V	【Note 3】
Input High voltage		V_{IH}	3.0	-	3.6	V	
Input leak current (Low)		I_{OL1}	-	-	1.0	μ A	V_I =0V 【Note 3】
Input leak current (High)		I_{OH1}	-	-	1.0	μ A	V_I =Vcc 【Note 3】

【Note 1】

1) Input voltage sequences

$0 < t1 \leqq 10ms, 0 < t2 \leqq 10ms$

$0 < t3 \leqq 1s, \quad t4 \geqq 1s$
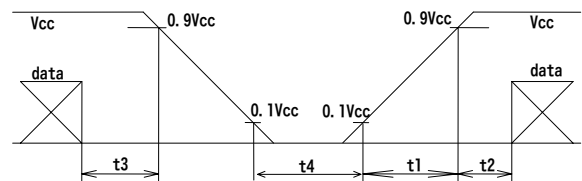
2) Dip conditions for supply voltage
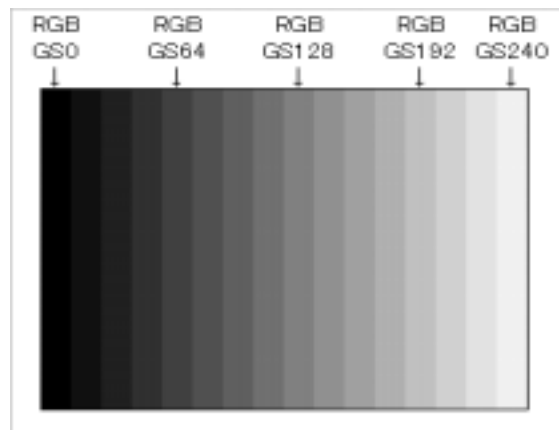
a) $2.7V \leqq Vcc < 4.5V$

$td \leqq 10ms$

b) $Vcc < 2.7V$

Condition of Dip conditions for supply voltage is based on input voltage sequence.
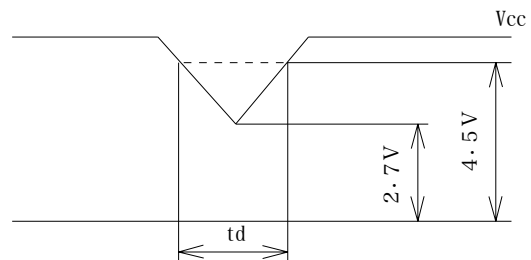
【Note 2】Typical current situation : 16 gray-bar pattern(Vcc=+5.0V)

The explanation of RGB gray scale see section 8.

【Note 3】CK,R0~R7,G0~G7,B0~B7,DE, L/R, U/D

7-2. Timing characteristics of Control circuit input signals

Timing diagrams of input signal are shown in Fig.3

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
CK(Clock)	Frequency	1/Tc	20.0	25.17	30.0	MHz	【Note 1】
	High time	Tch	10	-	-	ns	
	Low time	Tc1	10	-	-	ns	
Data	Set up time	Tds	5	-	-	ns	
	Hold time	Tdh	10	-	-	ns	
DE(Data Enable) signal	Set up time	Tes	7	-	Tc-15	ns	
	Horizontal period	TH	790	800	1620	Clock	
	Horizontal period (High)	THd	640	640	640	Clock	
	Vertical period	TV	517	525	1000	Line	【Note 2】
	Vertical period (High)	TVd	480	480	480	Line	

【Note 1】 In case of lower frequency, the deterioration of display quality, flicker, and etc, may occur.

【Note 2】 Be sure to input V0 data during Vertical blanking period.

【Note 3】 It is recommend making sure that length of vertical period is an integral multiple of horizontal length of period. Otherwise, the screen may not display properly.

7-3.Back Light unit driving

The back light unit is an directly under type with five CCFT (Cold Cathode Fluorescent Tube).

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

The value mentioned below is applicable to each individual CCFT .

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Lamp current range	I_L	3.0	6.0	7.0	mArms	
Lamp voltage	V_L	1238	1375	1512	Vrms	【Note5】 Ta=25℃,IL=6mA,58kHz
Lamp power consumption	P_L	－	8.3	－	W	【Note1】 Ta=25℃,IL=6mA, 58kHz
Lamp frequency	F_L	30	58	80	KHz	【Note2】
Kick-off voltage	Vs	－	－	2500	Vrms	Ta=0℃ 58kHz 【Note3,5】
Lamp life time	L_L	50000	－	－	hour	【Note4】

【Note1】 Referential data per one CCFT by calculation (IL × VL) .
The data doesn't include loss at inverter .

【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.

【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 voltage above this value should be applied to the lamp for more than 1 second to startup. Otherwise the lamp may not be turned on .

【Note4】Lamp life time is defined as the time when either ① or ② occurs in the continuous operation under the condition of Ta=25℃ and IL=6.0mArms .

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

② Kick-off voltage at Ta=0℃ exceeds maximum value, 2160Vrms .

Definition is based upon when the longer edge of the LCD module is placed horizontally (in landscape position)The length of LCD module's life time may vary if the module is placed vertically (in a portrait position), due to the lopsided mercury in the CCFT lamps.

【Note5】In antiphase drive, the voltage of one side would be the half of the value mentioned above table.

《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.
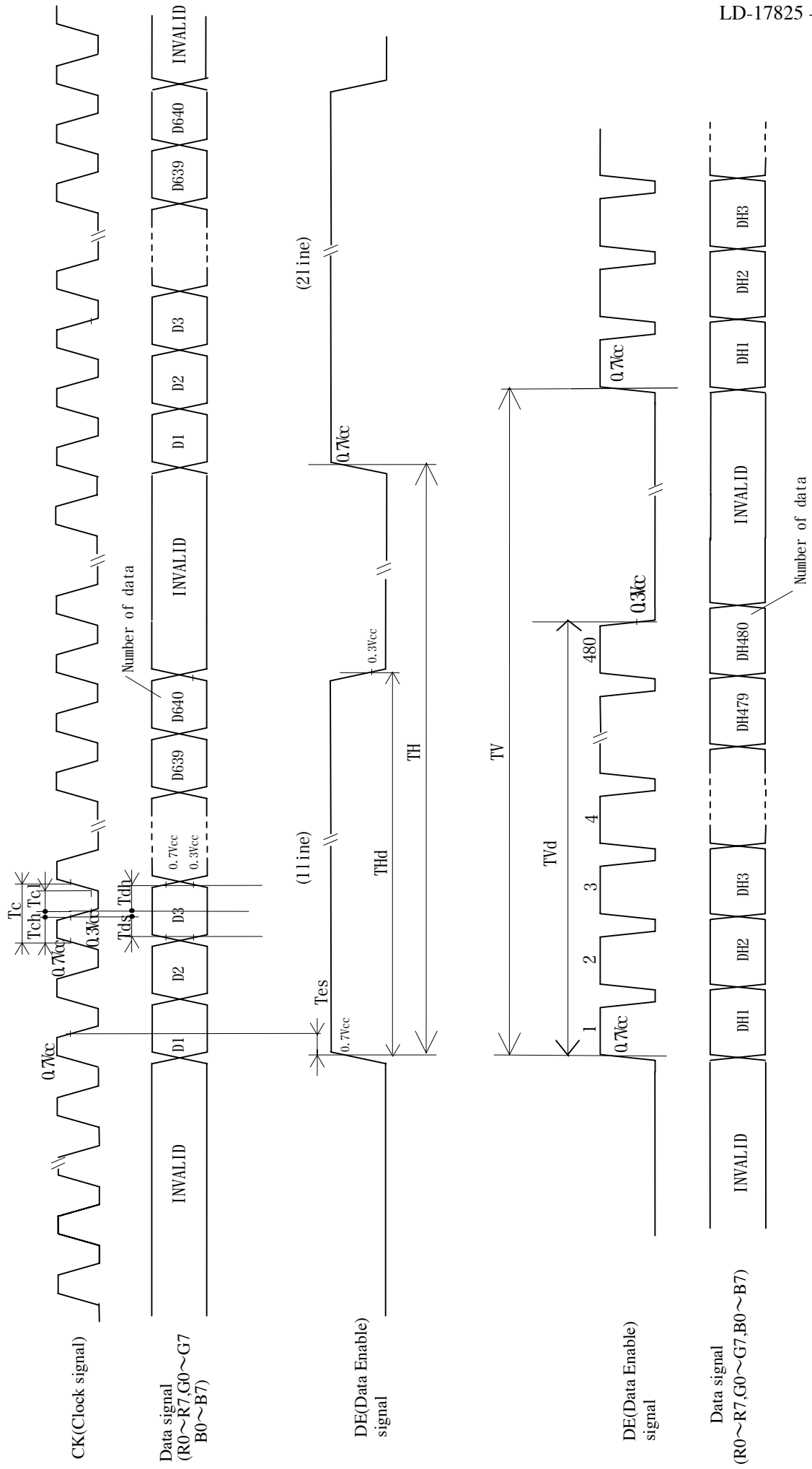
Fig3. Timing diagrams of input signals

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

Color & 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
																		Data signal							
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
	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
	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	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,

Each basic color can be displayed in 253 gray scales with 8 bit data signals. According to the combination of total 18 bit data signals, the 16-million-color display can be achieved on the screen. (X: don't care)

9. Optical characteristics

Ta=25[°C], Vcc=+5[V], I_L=6.0[mA]

Ta=25[°C], Vcc=+5[V], I_L=6.0[mA]

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range	Horizontal	$\theta 21$, $\theta 22$	CR≧10	80	85	-	Deg.	【Note1,2】 Fig 10
	Vertical	$\theta 11$ $\theta 12$		80	85	-	Deg.	
Contrast ratio		CRn	Best Viewing Angle	500	600	-		【Note2】 Fig 11
Response time		τ r+τ d	θ =0°C	-	20	30	ms	【Note3】 Fig 11
Chromaticity of white		X		0.242	0.272	0.302	-	【Note 4,7】
		Y		0.248	0.278	0.308	-	
Chromaticity of Red		X		0.610	0.640	0.670	-	
		Y		0.307	0.337	0.367	-	
Chromaticity of Green		X		0.240	0.270	0.300	-	
		Y		0.576	0.606	0.636	-	
Chromaticity of Blue		X		0.114	0.144	0.174	-	
		Y		0.040	0.070	0.100	-	
Luminance of white		YL1		360	450	-	cd/m²	
Luminance uniformity		δ W		-	-	1.25	-	【Note 6,7】

＊The measurement shall be executed 30 minutes after lighting at rating.

Optical characteristic measurement is performed in a darkroom or the state equivalent to this using the measuring method of the following figure.
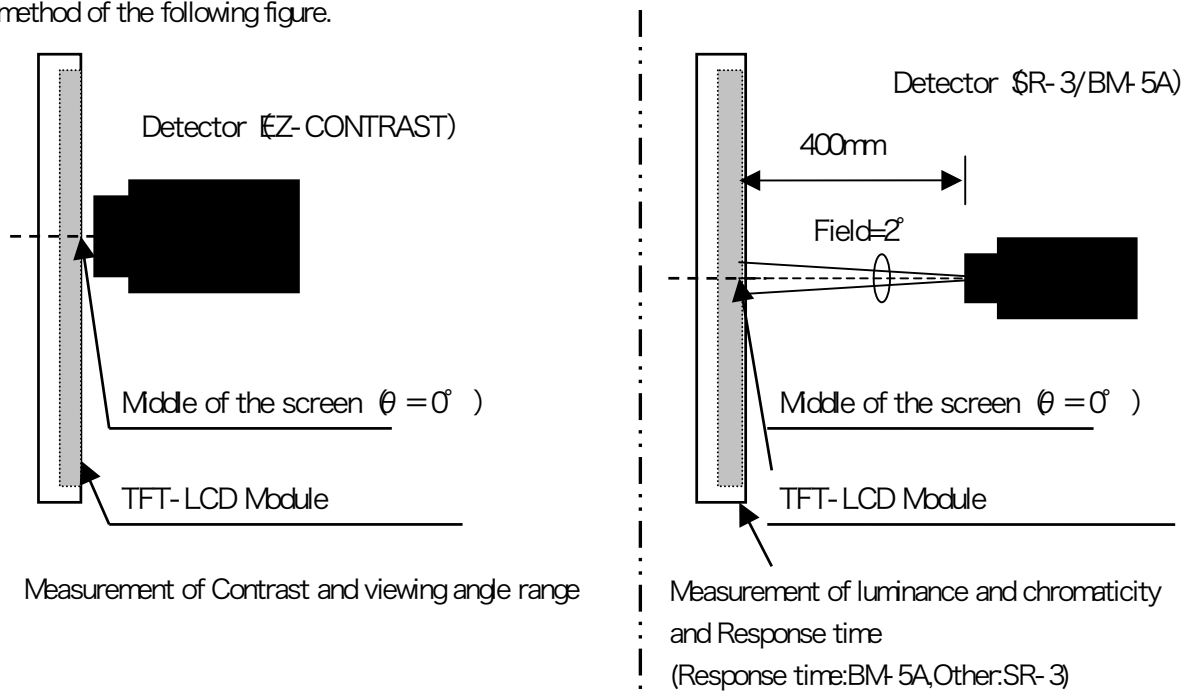

Measurement of Contrast and viewing angle range

Detector (EZ-CONTRAST)

Middle of the screen $\theta = 0°$)

TFT-LCD Module

Detector (SR-3/BM-5A)

400mm

Field=2°

Middle of the screen $\theta = 0°$)

TFT-LCD Module

Measurement of luminance and chromaticity and Response time
(Response time:BM-5A,Other:SR-3)

Fig.4 Optical characteristics measurement method

【Note 1】Definitions of viewing angle range : Fig.12

Normal line

$\theta 22$ $\theta 11$ $\theta 21$

$\theta 12$

Fig.12

6 o' clock direction
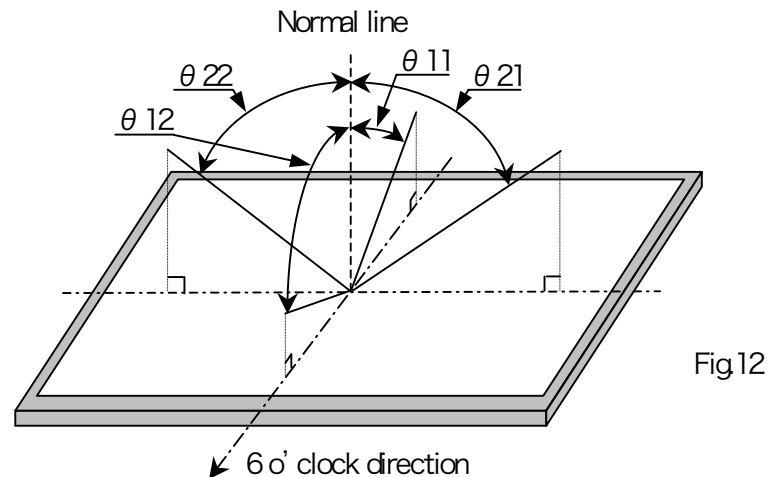
【Note 2】Definition of contrast ratio :

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 3】Definition of response time

The response time is defined as the following figure.13 and shall be measured by switching the input signal for "black" and "white".

White   black   white

100%
90%

Photodetector Output

10%
0%

τd τr

time
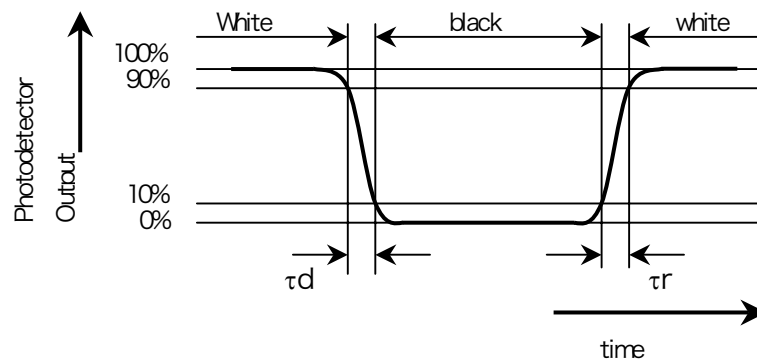
【Note 4】This shall be measured at center of the screen.

【Note 5】Temperature of panel surface shall be 40 degree.

【Note 6】Definition of white uniformity ;

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

$$\delta W = \frac{\text{maximum Luminance of five points(brightness)}}{\text{minimum Luminace of five points(brightness)}}$$

160   320   480   pixel

A   D   120

C   240

B   E   360

pixel
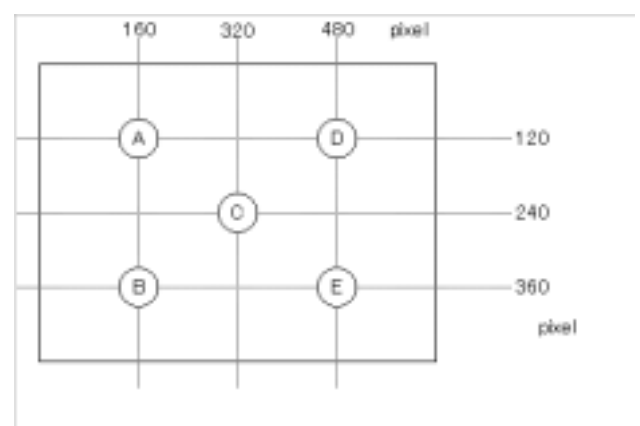
【Note7】The setting value of a use inverter

a)Lamp current: 6mArms

b)Frequency: 58kHz

10. Display Quantity

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

11. Handling Precautions of the module

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

b) This product is using the parts(CCFT etc) which generate the high voltage. Therefore, during operating, please don't touch these parts.

c) Be sure to fix the module in the same plane so that the module can be installed without any extra stress such as warp or twist.

d) Since the front polarizer is easily damaged, pay attention to treat it.

e) Since long contact with water may cause discoloration or spots, wipe off water drop immediately.

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

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

h) Since CMOS LSI is used in this module, take care of static electricity and consider wearing the earth personnel when handling.

i) Ground attachment to the LCD module should be considered, so that influences from EMI and outer noise is minimized.

j) The module has some printed circuit boards (PCBs) and cable harness on the back side, take care to keep them form any stress or pressure when handling or installing the module; otherwise some of electronic parts on the PCBs and cable harness may be damaged.

k) Observe all other precautionary requirements in handling components.

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.

n) Blow off dust with N_2 blower for which static electricity preventive measure has been taken. Ionized air gun is recommended.

12. Packing form

a) Piling number of cartons: 3(maximum)

b) Packing quantity in one carton : 10

c) Carton size : 706mm(W) × 532mm(D) × 421mm(H)

d) Total mass of one carton filled with full modules : 22Kg

13. 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 temperature must be less than 60°C)
5	Low temperature operation test	Ta = 0°C 240H

6	Vibration test
	(non- operating)
		Waveform : Sine wave
		Frequency : 10～57Hz/Vibration width (one side) : 0.075mm
		           : 57～500Hz/Gravity : 9.8m/s^2
		Sweep time : 11minutes
		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, sine wave Direction : ±X, ±Y, ±Z, once for each direction.
8	Thermal shock test (non- operating)	Ta=-25°C～60°C ; 5 cycles Test period : 10 hours (1 hour for each temperature)

9	ESD test	Contact discharge method : C=150pF,R=330Ω
		   (non- operating) Pass +/- 15kV
		   (operating) Pass +/- 8kV
		Air discharge method : C=150pF,R=330Ω
		   (non- operating) Pass +/- 20kV
		   (operating) Pass +/- 10kV

【Result evaluation criteria】

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

14. Others

     1) Lot No. Label

SHARP
LQ197V3DZ82   — Model No.

Bar Code
(Lot No.)

59 00000001 ←   Lot No

MADE IN JAPAN

How to express Lot No.

Production country indication
Japanese products : "MADE IN JAPAN"
Chinese products : "MADE IN CHINA"
Malaysian products : "MADE IN MALAYSIA"

A production year (the last figures of the Christian Era)

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

Serial No.

SHARP management No.

＊Lot Number is printed on Barcode.

＊Label color is white, and Characters are black.

2) Packing Label

社内品番：（４Ｓ）LQ197V3DZ82

| Bar code（①） |

ＬｏｔＮＯ． ：（１Ｔ）２００５．※．※※

| Bar code（②） |

Ｑｕａｎｔｉｔｙ：（Ｑ） １０ｐｃｓ

| Bar code（③） |

ユーザ品番 ：

| ＊＊＊＊＊ |

シャープ物流用ラベルです。

① Model No. (LQ197V3DZ82)

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) Turn off the inverter circuit for back light before turning off the power source for the controller.

7) Rust is out of considerations.

8) Regulation on usage of destructible chemical substances for the Ozone layer

Regulated substances :CFCS、Quadru Carbon Chloride、1,1,1-Tri chloro-ethylene (MethylChloroform)

   a) above mentioned substances are not used in the product, and/or assembled unit and parts of this product

   b) above mentioned substances are not used in the process of manufacturing the product and/or assembled unit and parts of this product.

9) Marking of using material information

It is displaying the material of the optical parts with the label in the module back.

MATERIAL INFORMATION
LENS FILM :> PET, AK-X<
DIFFUSER SHEET:> PMMA-X PET<
DIFFUSER BOARD:> SMMA, PS<

10) Cold cathode fluorescent lamp in LCD panel contains a small amount of mercury,

Please follow local ordinances or regulations for

It displays it on the back of the module as follows.

・COLD CATHODE FLUORESCENT LAMP IN LCD PANEL
 CONTAINS A SMALL AMOUNT OF MERCURY.PLEASE FOLLOW
 LOCAL ORDINANCES OR REGULATIONS FOR DISPOSAL.
・当該液晶ディスプレイパネルは蛍光管が組込まれていますので、地方
 自治体の条例、または、規則に従って廃棄してください。

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

15. 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.

BEZEL/DISPLAY POSITION

ACTIVE AREA

BEZEL OPENING AREA
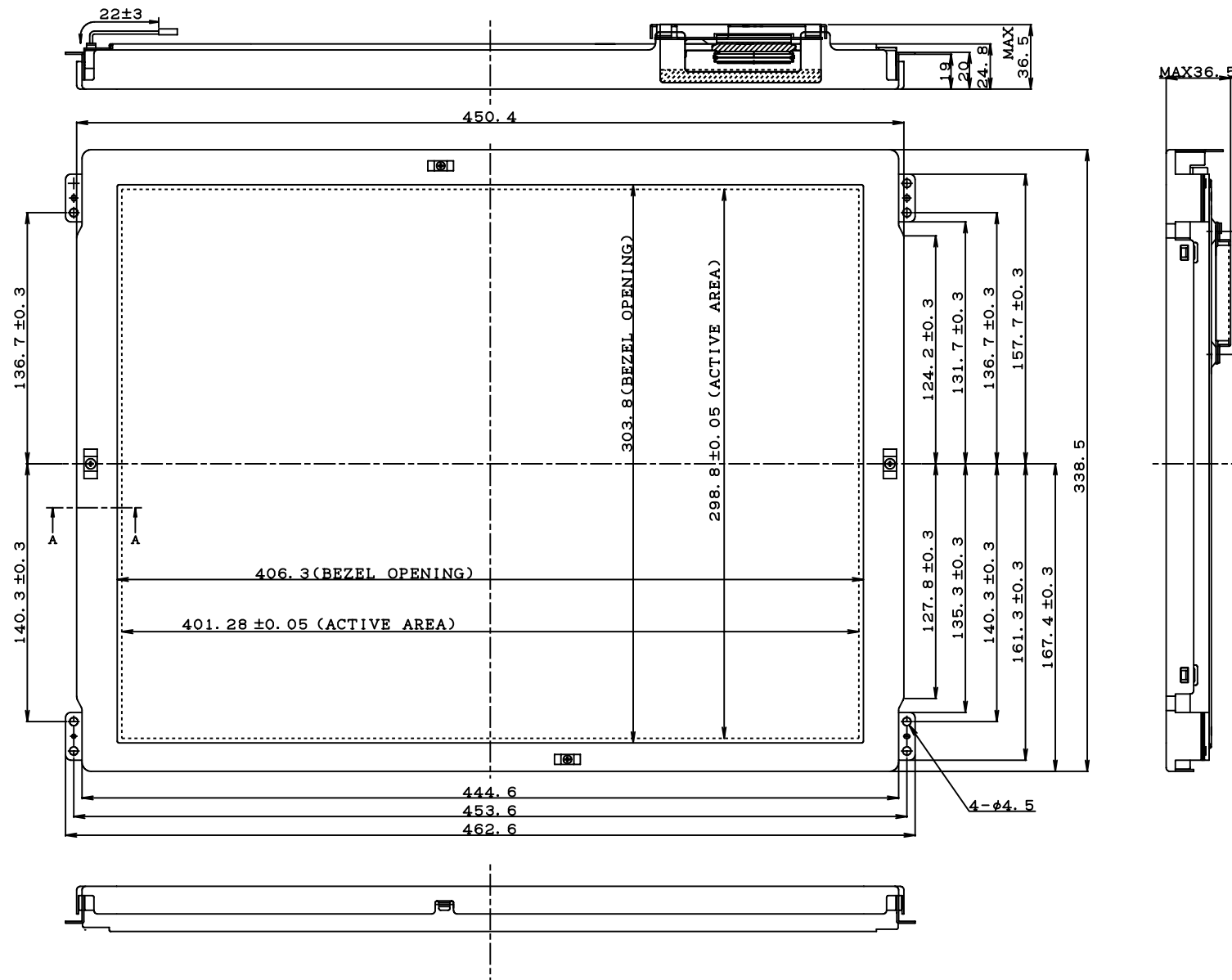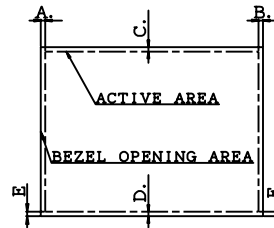
1) TOLERANCE X-DIRECTION A:2.5±0.8
2) TOLERANCE X-DIRECTION B:2.5±0.8
3) TOLERANCE Y-DIRECTION C:2.5±0.8
4) TOLERANCE Y-DIRECTION D:2.5±0.8
5) OBLIQUITY OF DISPLAY AREA |E-F|<0.8

UNSPECIFIED TOLERANCE TO BE ±0.6
UNIT:mm

BEZEL-PANEL GAP

CUSHION
BEZEL

CUSHION
BEZEL

PANEL

PANEL

<SECTION A-A>

THE GAP BETWEEN
BEZEL AND PANEL: G≦0.5

22±3

MAX
36.5

24.8

MAX36.5

450.4

303.8(BEZEL OPENING)

298.8±0.05 (ACTIVE AREA)

136.7±0.3

140.3±0.3

A

A

406.3(BEZEL OPENING)

401.28±0.05 (ACTIVE AREA)

124.2±0.3
131.7±0.3
136.7±0.3
157.7±0.3

338.5

127.8±0.3
135.3±0.3
140.3±0.3
161.3±0.3
167.4±0.3

444.6
453.6
462.6

4-φ4.5

MAX36.5

106.8

191.8

H=5.35

H=5.35

CN2

5-22±3

87.1

CN1

126

139

CN3

54.5

56.5

96

H=0

146.6

CN4

128

139

CN5

CN6

H=5.35

4-φ2.2
4-φ6.2

H=5.35

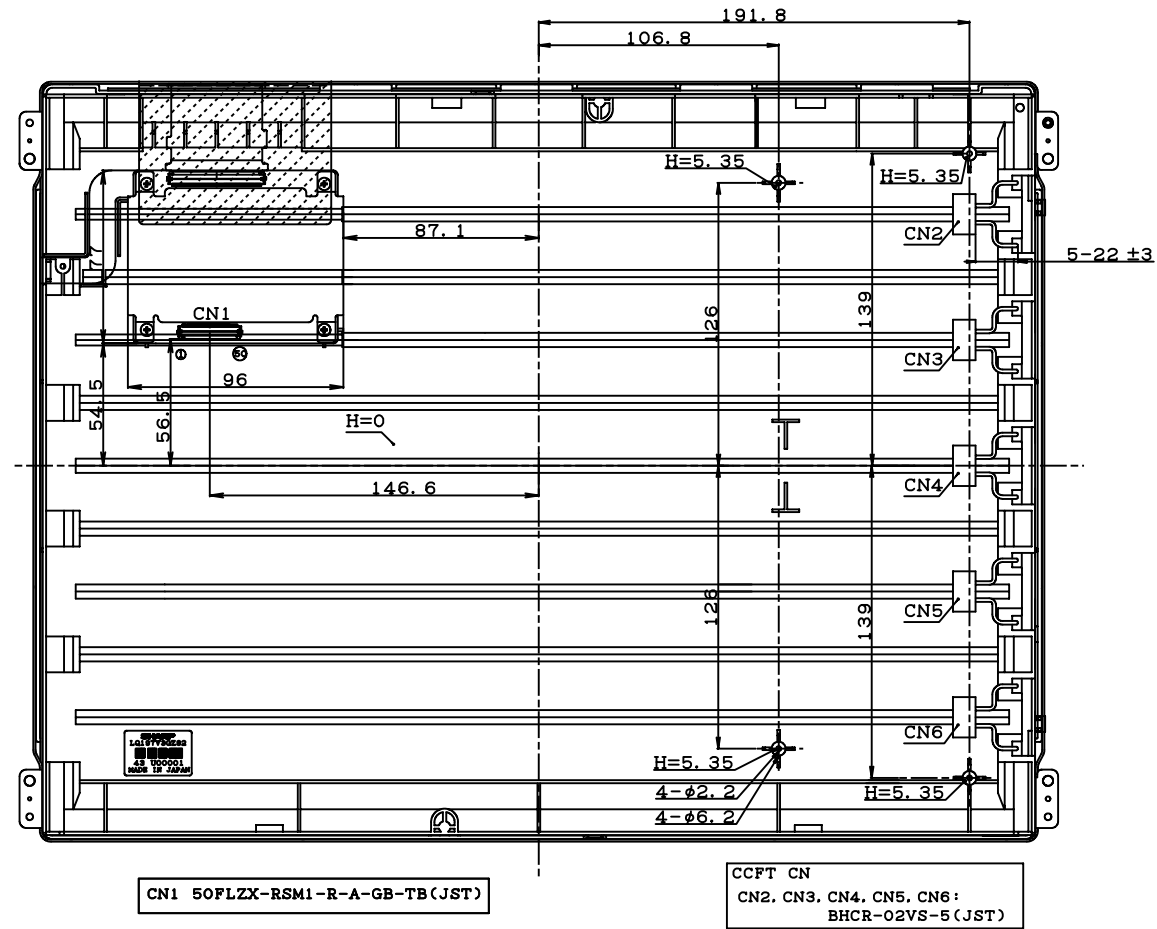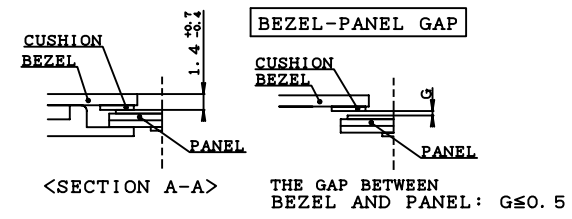CN1 50FLZX-RSM1-R-A-GB-TB(JST)

CCFT CN
CN2,CN3,CN4,CN5,CN6:
BHCR-02VS-5(JST)

Fig.1 LQ197V3DZ82 OUTLINE DIMENSIONS

Fig. 5 PACKING FORM