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	TFT LIQUID CRYSTAL DISPLAY GROUP SHARP CORPORATION	APPLICABLE GROUP TFT LIQUID CRYSTAL DISPLAY GROUP
	SPECIFICATION	

DEVICE SPECIFICATION FOR

TFT-LCD Module

MODEL No.

LQ133X1LH92

☐ CUSTOMER'S APPROVAL

DATE _____

BY _____

PRESENTED

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RECORDS OF REVISION

LQ133X1LH92

SPEC No.	DATE	REVISED No.	PAGE	SUMMARY	NOTE
LD-13718	Sep.3.2001	-	-		1st Issue

The device listed in these technical literature sheets was designed and manufactured for use in OA equipment.

In case of using the device for applications such as control and safety equipment for transportation(aircraft, trains, automobiles, etc.), rescue and security equipment and various safety related equipment which require higher reliability and safety, take into consideration that appropriate measures such as fail-safe functions and redundant system design should be taken.

Do not use the device for equipment that requires an extreme level of reliability, such as aerospace applications, telecommunication equipment(trunk lines), nuclear power control equipment and medical or other equipment for life support.

SHARP assumes no responsibility for any damage resulting from the use of the device which does not comply with the instructions and the precautions specified in these technical literature sheets.

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

1. Application

This specification applies to a color TFT-LCD module, LQ133X1LH92.

2. Overview

This module is a color active matrix LCD module incorporating amorphous silicon TFT (Thin Film Transistor). It is composed of a color TFT-LCD panel, driver ICs, control circuit and power supply circuit and a backlight unit. Graphics and texts can be displayed on a 1024×3×768 dots panel with 262,144 colors by using LVDS (Low Voltage Differential Signaling) to interface and supplying +3.3V DC supply voltage for TFT-LCD panel driving and supply voltage for backlight.

The TFT-LCD panel used for this module has very high aperture ratio. A low-reflection and higher-color-saturation type color filter is also used for this panel. Therefore, high-brightness and high-contrast image, which is suitable for the multimedia use, can be obtained by using this module.

Optimum viewing direction is 6 o'clock.

Backlight-driving DC/AC inverter is not built in this module.

[Features]

1) High aperture panel ; high-brightness or low power consumption.
2) Brilliant and high contrast image.
3) Small footprint and thin shape.
4) Light weight.

3. Mechanical Specifications

Parameter	Specifications	Unit
Display size	34 (13.3") Diagonal	cm
Active area	270.3 (H)×202.8 (V)	mm
Pixel format	1024 (H)×768 (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 (typ.)*1	284.0(W)×216.5 (H)×6.0max(D)	mm
Mass	465±20	g
Surface treatment	Anti-glare and hard-coating 2H	

*1.Note : excluding backlight cables.

Outline dimensions is shown in Fig.1

4. Input Terminals

4-1. TFT-LCD panel driving

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

Using connector : FI-SEB20P-HF10(JAE)

Corresponding connector : FI-SE20M,or FI-S20S (JAE)

Pin No.	Symbol	Function	Remark
1	Vcc	+3.3V power supply	
2	Vcc	+3.3V power supply	
3	GND		
4	GND		
5	RXIN0-	Receiver signal (-)	LVDS
6	RXIN0+	Receiver signal (+)	LVDS
7	GND		
8	RXIN1-	Receiver signal (-)	LVDS
9	RXIN1+	Receiver signal (+)	LVDS
10	GND		
11	RXIN2-	Receiver signal (-)	LVDS
12	RXIN2+	Receiver signal (+)	LVDS
13	GND		
14	RXCLKIN-	Clock signal (-)	LVDS
15	RXCLKIN+	Clock signal (+)	LVDS
16	GND		
17	Vedid	DDC+3.3V power supply	
18	NC	Reserved	
19	CLKedid	DDC Clock	
20	DATAedid	DDC Data	

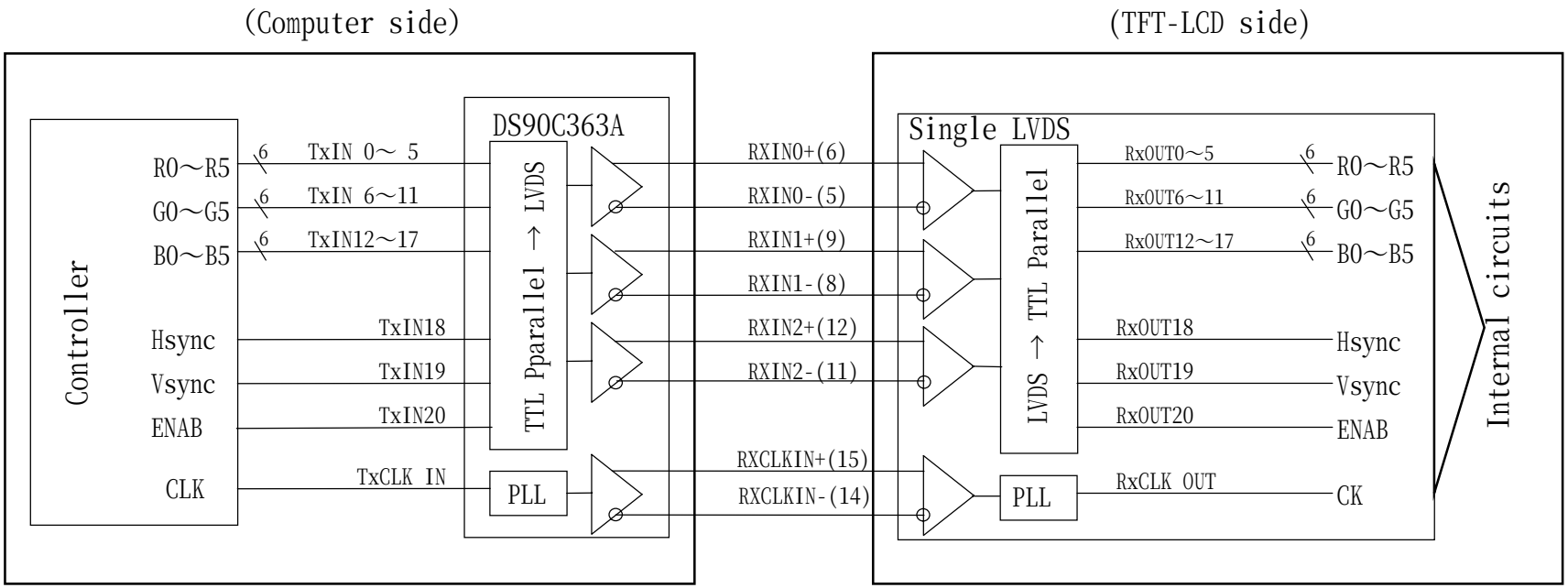
【Note 1】Relation between LVDS signals and actual data shows below section (4-2).

【Note 2】The shielding case is connected with signal GND

4-2 Interface block diagram

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

Corresponding Transmitter：DS90C363,DS90C383,DS90C363A,DS90C383A(National semiconductor),THC63LVDF63A,THC63LVDM63A(THine)



4-3. Backlight driving

CN2 : BHSR-02VS-1(JST)

Mating connector : SM02B-BHSS-1-TB(JST)

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

5. Absolute Maximum Ratings

Parameter	Symbol	Condition	Ratings	Unit	Remark
Input voltage	V_I	Ta=25℃	−0.3 ～ Vcc+0.3	V	【Note1】
+3.3V supply voltage	Vcc	Ta=25℃	0 ～ ＋ 4	V	
Storage temperature	Tstg	—	−25 ～ +60	℃	【Note2】
Operating temperature (Ambient)	Topa	—	0 ～ +50	℃	

【Note1】LVDS signals

【Note2】Humidity：95%RH Max. at Ta≦40℃.

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

No condensation.

6. Electrical Characteristics

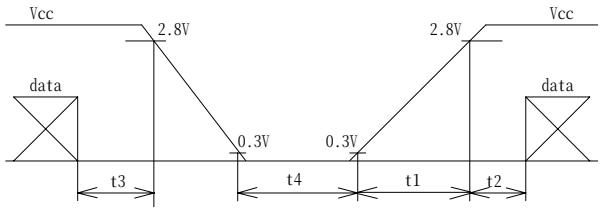
6-1.TFT-LCD panel driving Ta＝25℃

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Vcc	Supply voltage	Vcc	+3.0	+3.3	+3.6	V	【Note2】
	Current dissipation	Icc	—	330	540	mA	【Note3】
Permissive input ripple voltage		V_{RP}	—	—	100	mV p-p	Vcc=+3.3V
Differential input threshold voltage	High	V_{TH}	—	—	+100	mV	V_{CM}=+1.2V 【Note1】
	Low	V_{TL}	–100	—	—	mV	
Input current (High)		I_{OH}	—	—	±10	μA	V_I=2.4V Vcc=3.6V
Input current (Low)		I_{OL}	—	—	±10	μA	V_I=0V Vcc=3.6V
Terminal resistor		R_T	—	100	—	Ω	Differential input

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

【Note2】

On-off conditions for supply voltage



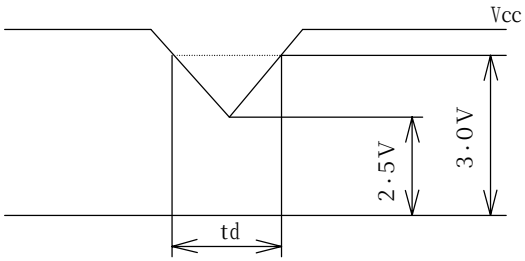
0＜t1≦10 ms

0＜t2≦100 ms

0＜t3≦1 s

t4＞200ms

Vcc-dip conditions

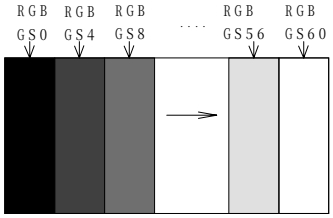


1) 2.5 V≦Vcc＜3.0 V
   td≦10 ms
2) Vcc＜2.5 V

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

【Note3】 Typical current situation : 16-gray-bar pattern.

Vcc=+3.3V



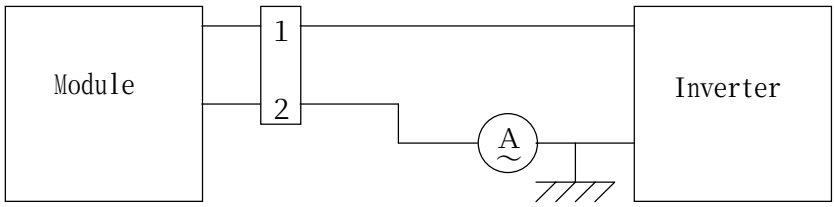
6-2. Backlight driving

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

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark	
Lamp current range	I_L	2.0	5.5	6.0	mArms	【Note1】	
Lamp voltage	V_L	—	640	—	Vrms		
Lamp power consumption	P_L	—	3.52	—	W	【Note2】	
Lamp frequency	F_L	42	60	70	kHz	【Note3】	
Kick-off voltage	Vs	—	—	1170	Vrms	Ta=25℃	
		—	—	1405	Vrms	Ta=0℃	【Note4】
Lamp life time	L_L	10000	—	—	hour	【Note5】	

【Note1】 Lamp current is measured with current meter for high frequency as shown below.



* 2 pin is V_{LOW}

【Note2】 Calculated Value for reference ($I_L \times V_L$)

【Note3】 Lamp frequency may produce interference with horizontal synchronous frequency, and this may cause beat on the display. Therefore lamp frequency shall be detached as much as possible from the horizontal synchronous frequency and from the harmonics of horizontal synchronous to avoid interference.

【Note4】 It is defined at 22pF for the ballast capacitor of a DC/AC inverter.
The voltage above this value should be applied to the lamp for more than 1 second to start-up. Otherwise the lamp may not be turned on.

【Note5】 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 I_L = 6.0mArms.

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

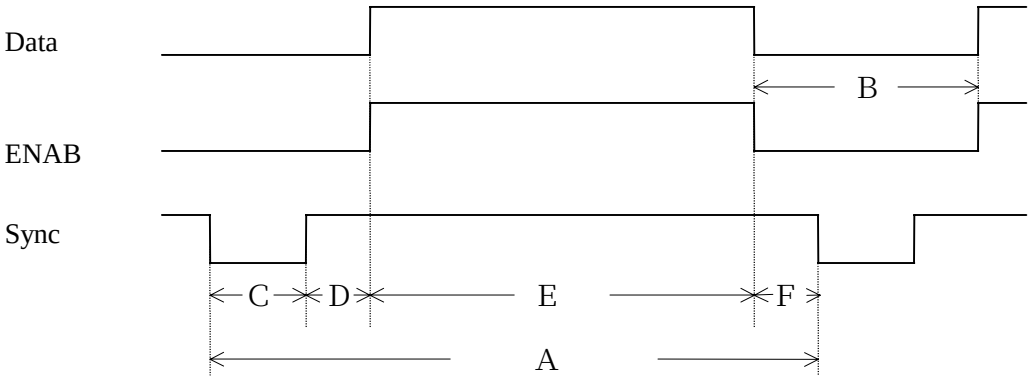
② Kick-off voltage at Ta = 0℃ exceeds maximum value, 1405V rms.

Note) The performance of the backlight, 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 backlight and the inverter (miss-lighting, flicker, etc.) never occur. When you confirm it, the module should be operated in the same condition as it is installed in your instrument.

7. Timing characteristics of input signals

7-1. Timing characteristics

(This is specified at digital outputs of LVDS driver.)



（Vertical）

Item（symbol）	Min.	Typ.	Max.	Unit	Remark
Vsync cycle (T_{VA})	—	16.667	—	ms	Negative
	803	806		line	
Blanking period(T_{VB})	35	38	—	line	
Sync pulse width (T_{VC})	4	6	—	line	
Back porch (T_{VD})	0	29		line	
Sync pulse width + Back porch (T_{VC}+T_{VD})	35	35	35	line	
Active display area (T_{VE})	768	768	768	line	
Front porch (T_{VF})	0	3	—	line	

(Horizontal)

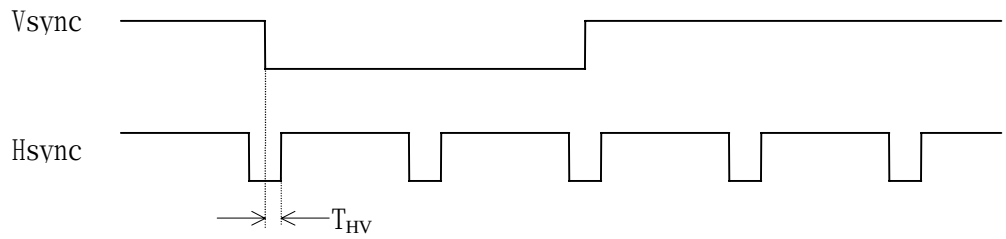
Item（symbol）	Min.	Typ.	Max.	Unit	Remark
Hsync cycle (T_{HA})	19.4	20.677	—	μs	Negative
	1260	1344	1408	clock	
Blanking period (T_{HB})	236	320	—	clock	
Sync pulse width (T_{HC})	8	136	—	clock	
Back porch (T_{HD})	0	160	312	clock	
Sync pulse width + Back porch (T_{HC} +T_{HD})	1500 - T_{HA}	296	T_{HA} - 1024	clock	
Active display area (T_{HE})	1024	1024	1024	clock	
Front porch (T_{HF})	0	24	—	clock	

（Clock）

Item	Min.	Typ.	Max.	Unit	Remark
Frequency	50.0	65.0	65.0	MHz	【Note1】

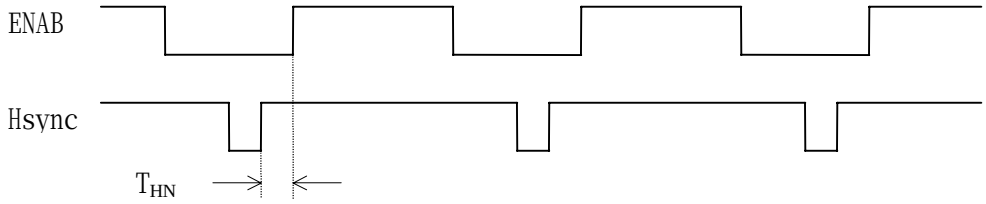
Note) In case of lower frequency, the deterioration of display quality, flicker etc., may be occurred.

(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
(T_{HN})	0	—	312	clock	

7-2 Display position

Item	Standards	Beginning	Ending	Unit	Remark
Horizontal	rising edge of ENAB	0	1024	clock	
	falling edge of Hsync	296	1320	clock	【Note1】
Vertical	falling edge of Vsync	35	803	clock	

【Note1】 ENAB signal must be fixed to low.

［Note］

(Horizontal display direction)

When ENAB is fixed low, 296 clock are counted from Hsync negative edge and data from after are available . If you need other timing, please use ENAB signal.

(Vertical display direction)

35 lines are counted from Vsync negative edge and data from next line are available.

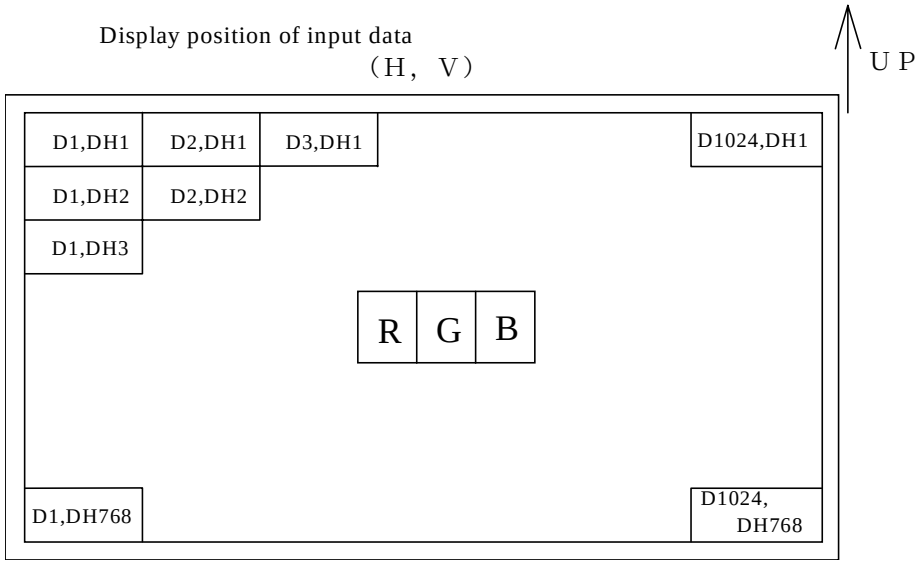
(Note of ENAB signal)

ENAB could not be used for the purpose of the vertical display start timing.

Caution

Image will not be displayed on the right position otherwise.

7-3. Input Data Signals and Display Position on the screen



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

	Colors & Gray scale	Data signal																	
		Gray Scale	R0	R1	R2	R3	R4	R5	G0	G1	G2	G3	G4	G5	B0	B1	B2	B3	B4	B5
Basic Color	Black	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	—	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Green	—	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Cyan	—	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Red	—	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	—	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	—	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	White	—	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale of Red	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	↓				↓						↓						↓		
	⇩	↓				↓						↓						↓		
	Brighter	GS61	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	⇩	GS62	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red	GS63	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	⇧	↓				↓						↓						↓		
	⇩	↓				↓						↓						↓		
	Brighter	GS61	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0
	⇩	GS62	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0
	Green	GS63	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Gray Scale of Blue	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	⇧	↓				↓						↓						↓		
	⇩	↓				↓						↓						↓		
	Brighter	GS61	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
	⇩	GS62	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	Blue	GS63	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

0 : Low level voltage, 1 : High level voltage

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

9. EDID data structure

This is the EDID(Extended Display Identification Data) data formats to support displays as defined in the VESA Plug & Display .

Byte (decimal)	Byte (hex)	Field Name and Comments	Value (hex)	Value (binary)
0	00	Header	00	00000000
1	01	Header	FF	11111111
2	02	Header	FF	11111111
3	03	Header	FF	11111111
4	04	Header	FF	11111111
5	05	Header	FF	11111111
6	06	Header	FF	11111111
7	07	Header	00	00000000
8	08	EISA manufacture code = SHP	4D	01001101
9	09	EISA manufacture code (Compressed ASCII)	10	00010000
10	0A	Product code (LQ133X1LH92 : ”5004”)	8C	10001100
11	0B	Product code (hex,LSB first)	13	00010011
12	0C	LCD module Serial No (fixed “0”)	00	00000000
13	0D	LCD module Serial No (fixed “0”)	00	00000000
14	0E	LCD module Serial No (fixed “0”)	00	00000000
15	0F	LCD module Serial No (fixed “0”)	00	00000000
16	10	Week of manufacture (fixed “0”)	00	00000000
17	11	Year of manufacture - 1990 (ex 2000 – 1990 = 10) (fixed “0”)	00	00000000
18	12	EDID structure version # = 1	01	00000001
19	13	EDID revision # = 3	03	00000011
20	14	Video i/p definition = Digital i/p	80	10000000
21	15	Max H image size(cm) = 27cm	1B	00011011
22	16	Max V image size(cm) = 20cm	14	00010100
23	17	Display gamma (2.2×100) – 100 = 120	78	01111000
24	18	Feature support(stanby,suspend,RGB color/Prefer Time)	CA	11001010
25	19	Red/Green Low bit(RxRy/GxGy)	03	00000011
26	1A	Blue/White Low bit(BxBy/WxWy)	50	01010000
27	1B	Red X(Rx) (written value “ ”)	94	10010100
28	1C	Red Y(Ry) (written value “ ”)	53	01010011
29	1D	Green X(Gx) (written value “ ”)	4D	01001101
30	1E	Green Y(Gy) (written value “ ”)	8B	10001011
31	1F	Blue X(Bx) (written value “ ”)	26	00100110
32	20	Blue Y(By) (written value “ ”)	20	00100000
33	21	White X(Wx) (written value “ ”)	50	01010000
34	22	White Y(Wy) (written value “ ”)	54	01010100
35	23	Established timings 1 (800×600@60Hz)	00	00000000
36	24	Established timings 2 (1024×768@60Hz)	08	00001000
37	25	Established timings 3(Manufacture’s reserved timing)	00	00000000
38	26	Standard timing ID1 (Horizontal active pixels)	61	01100001
39	27	Standard timing ID1 (Aspect ratio 4:3) (Refresh Rate 60Hz-60=0)	40	01000000

40	28	Standard timing ID2	01	00000001
41	29	Standard timing ID2	01	00000001
42	2A	Standard timing ID3	01	00000001
43	2B	Standard timing ID3	01	00000001
44	2C	Standard timing ID4	01	00000001
45	2D	Standard timing ID4	01	00000001
46	2E	Standard timing ID5	01	00000001
47	2F	Standard timing ID5	01	00000001
48	30	Standard timing ID6	01	00000001
49	31	Standard timing ID6	01	00000001
50	32	Standard timing ID7	01	00000001
51	33	Standard timing ID7	01	00000001
52	34	Standard timing ID8	01	00000001
53	35	Standard timing ID8	01	00000001
54	36	Detailed timing descriptor#1 fck/10000	64	01100100
55	37	#1 fck	19	00011001
56	38	#1 Horizontal active	00	00000000
57	39	#1 Horizontal blanking	40	01000000
58	3A	#1 Horizontal active/Horizontal blanking	41	01000001
59	3B	#1 Vertical active	00	00000000
60	3C	#1 Vertical blanking	26	00100110
61	3D	#1 Vertical active/Vertical blanking	30	00110000
62	3E	#1 Horizontal sync , offset	0C	00001100
63	3F	#1 Horizontal sync , width	88	10001000
64	40	#1 Vertical sync,offset / Vertical sync,width	36	00110110
65	41	#1 Horizontal sync offset/width/Vertical sync offset/width	00	00000000
66	42	#1 Horizontal image size	30	00110000
67	43	#1 Vertical image size	E4	11100100
68	44	#1 Horizontal image size / Vertical image size	10	00010000
69	45	Horizontal boader	00	00000000
70	46	Vertical boader	00	00000000
71	47	Flags(Non-interlaced/Horizontal polarity/Vertical polarity)	18	00011000
72	48	Detailed timing descriptor #2	00	00000000
73	49	Flag	00	00000000
74	4A	Reserved	00	00000000
75	4B	Dummy Descriptor	10	00010000
76	4C	Flag	00	00000000
77	4D	1st dummy	00	00000000
78	4E	2nd dummy	00	00000000
79	4F	3rd dummy	00	00000000
80	50	4th dummy	00	00000000
81	51	5th dummy	00	00000000
82	52	6th dummy	00	00000000
83	53	7th dummy	00	00000000

84	54	8th dummy	00	00000000
85	55	9th dummy	00	00000000
86	56	10th dummy	00	00000000
87	57	11th dummy	00	00000000
88	58	New line character #2 indicates end	0A	00001010
89	59	Padding with “blank” character	20	00100000
90	5A	Detailed timing descriptor #3	00	00000000
91	5B	Flag	00	00000000
92	5C	Reserved	00	00000000
93	5D	Dummy Descriptor	10	00010000
94	5E	Flag	00	00000000
95	5F	1st Dummy	00	00000000
96	60	2nd Dummy	00	00000000
97	61	3rd Dummy	00	00000000
98	62	4th Dummy	00	00000000
99	63	5th Dummy	00	00000000
100	64	6th Dummy	00	00000000
101	65	7th Dummy	00	00000000
102	66	8th Dummy	00	00000000
103	67	9th Dummy	00	00000000
104	68	10th Dummy	00	00000000
105	69	11th Dummy	00	00000000
106	6A	New line character #3 indicates end	0A	00001010
107	6B	Padding with “blank” character	20	00100000
108	6C	Detailed timing descriptor #4	00	00000000
109	6D	Flag	00	00000000
110	6E	Reserved	00	00000000
111	6F	Dummy descriptor	10	00010000
112	70	Flag	00	00000000
113	71	1st Dummy	00	00000000
114	72	2nd Dummy	00	00000000
115	73	3rd Dummy	00	00000000
116	74	4th Dummy	00	00000000
117	75	5th Dummy	00	00000000
118	76	6th Dummy	00	00000000
119	77	7th Dummy	00	00000000
120	78	8th Dummy	00	00000000
121	79	9th Dummy	00	00000000
122	7A	10th Dummy	00	00000000
123	7B	11th Dummy	00	00000000
124	7C	New line character #4 indicates end	0A	00001010
125	7D	Padding with “blank” character	20	00100000
126	7E	Extension flag	00	00000000
127	7F	Checksum	5A	01011010

10. Optical Characteristics

Ta=25℃, Vcc=+3.3V

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range	Horizontal	θ21, θ22	CR>10	45	—	—	Deg.	【Note1,4】
	Vertical	θ11		10	—	—	Deg.	
		θ12		30	—	—	Deg.	
Contrast ratio		CRn	θ=0°	150	—	—		【Note2,4】
		CRo	Optimum viewing angle	—	300	—		
Response time	Rise	τr	θ=0°	—	15		ms	【Note3,4】
	Decay	τd		—	30		ms	
Chromaticity of white		x		—	0.313	—		【Note4】
		y		—	0.329	—		
Luminance of white 【Note4】		Y_L		120	150	—	cd/m^2	I_L = 6.0mArms F_L=60kHz
White Uniformity		δ_W		—	—	1.45		【Note5】

※ The measurement shall be executed 30 minutes after lighting at rating. (condition : I_L =6.0mArms)

The optical characteristics shall be measured in a dark room or equivalent state with the method shown in Fig.3 below.

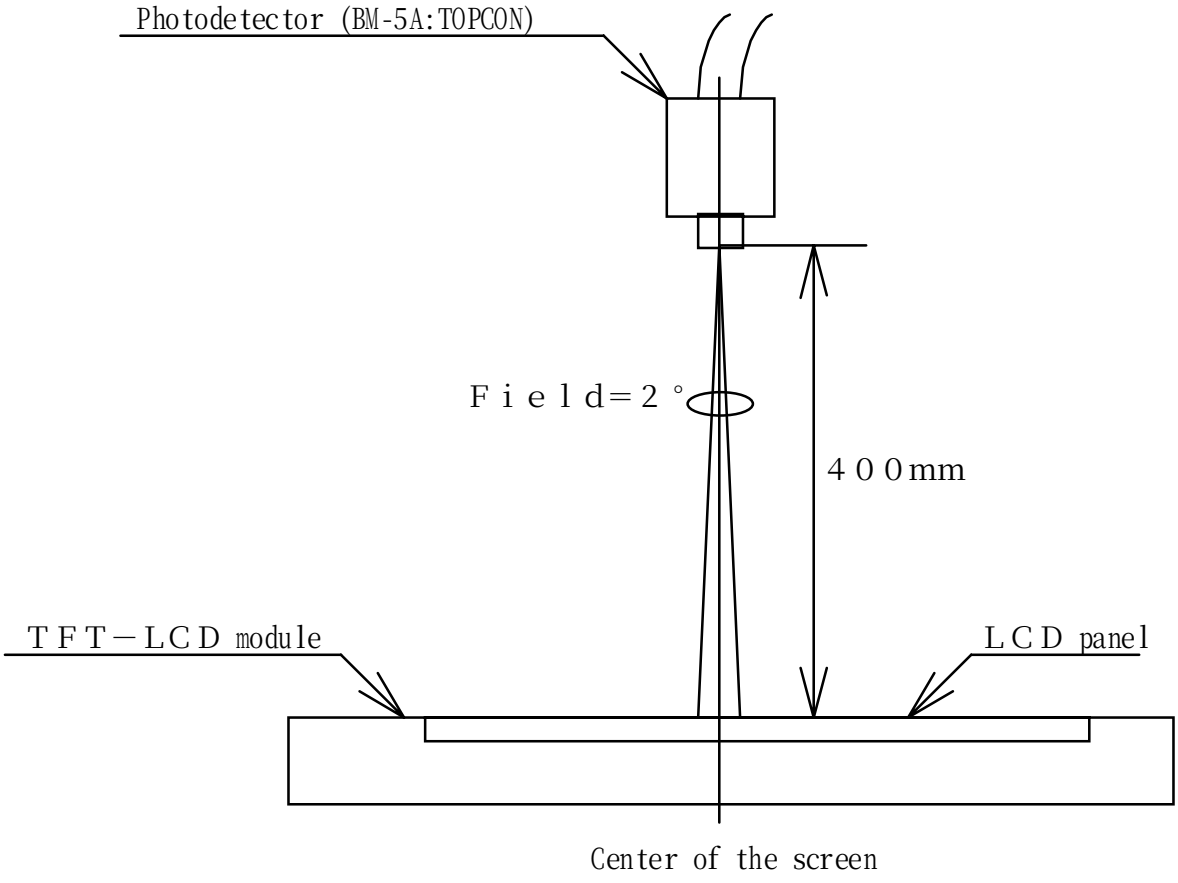
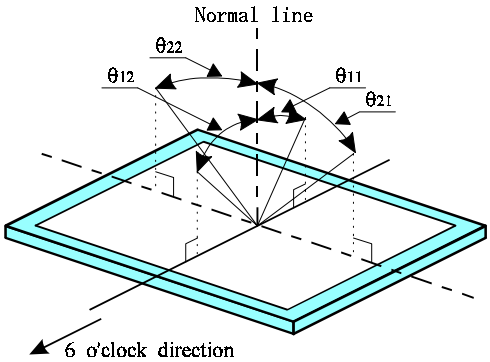


Fig.3 Optical characteristics measurement method

【Note1】Definitions of viewing angle range:



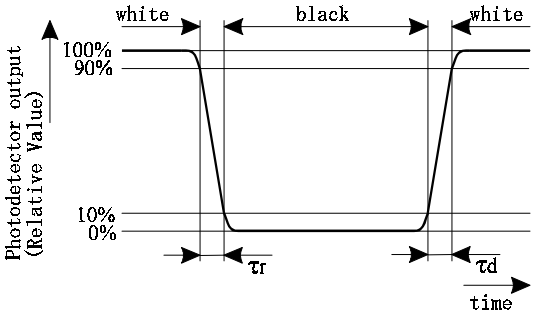
【Note2】Definition of contrast ratio:

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:

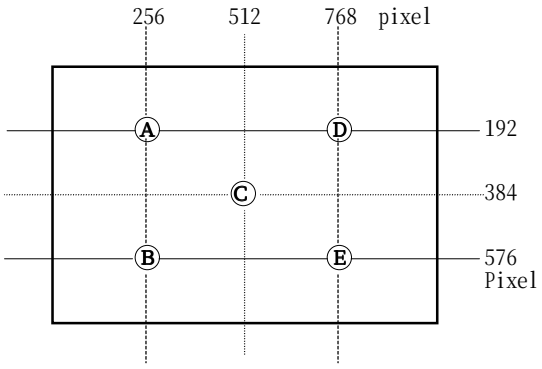
The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white" .



【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).



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

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.

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.

h) Observe all other precautionary requirements in handling components.

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

j) Laminated 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. Ionized air shall be blown over during the action. Blow off the 'dust' on the polarizer by using an ionized nitrogen gun, etc..

k) Duaring the module aging , don't put protection film on the module surface.

l) 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.

13. Packing form

a) Piling number of cartons : MAX.5

b) Package quantity in one carton : 10pcs

c) Carton size : 434 (W) × 340 (D) × 282 (H) mm

d) Total mass of one carton filled with full modules : 5950 g

Packing form is shown in Fig.2

14. 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^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 : 490 m/s^2 Pulse width : 11 ms, sine wave Direction : ±X,±Y,±Z once for each direction.

15. Others

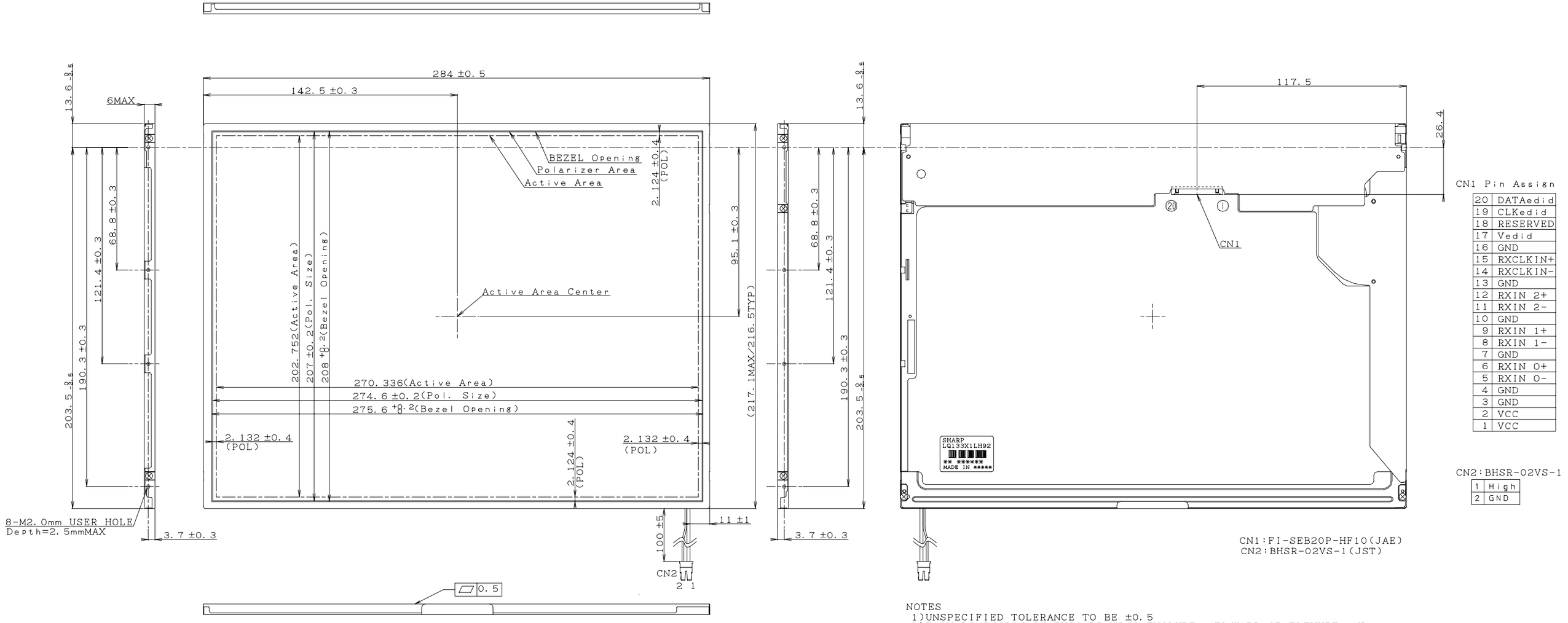
1) Lot No. Label:

2) 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.

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

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

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



CN1 Pin Assign

20	DATAedid
19	CLKedid
18	RESERVED
17	Vedid
16	GND
15	RXCLKIN+
14	RXCLKIN-
13	GND
12	RXIN 2+
11	RXIN 2-
10	GND
9	RXIN 1+
8	RXIN 1-
7	GND
6	RXIN 0+
5	RXIN 0-
4	GND
3	GND
2	VCC
1	VCC

CN2:BHSR-02VS-1

1	High
2	GND

CN1:FI-SEB20P-HF10(JAE)
CN2:BHSR-02VS-1(JST)

NOTES
1)UNSPECIFIED TOLERANCE TO BE ±0.5
2)EACH DIMENSION IN THIS DRAWING EXCLUDE ANY WARPAGE. FLEXURE AND TRANSFORMATION OF COVER. PCB. AND OTHER COMPONENTS OF MODULE.

Fig. 1 OUTLINE DIMENSIONS

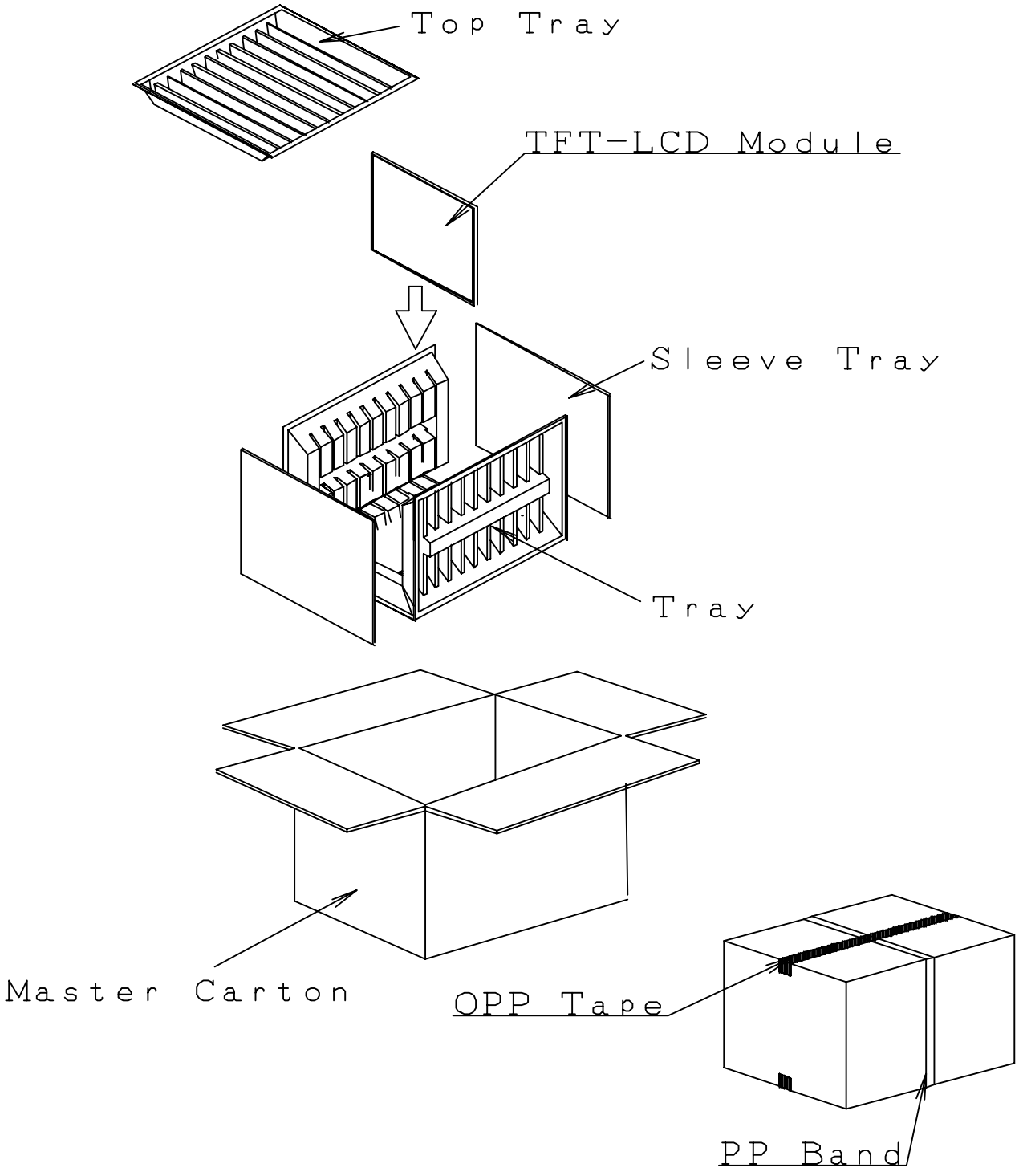


Fig.2 Packing form