S H A R P

TFT LIQUID CRYSTAL DISPLAY GROUP
SHARP CORPORATION

S P E C I F I C A T I O N

DEVICE SPECIFICATION FOR

T F T — L C D m o d u l e

MODEL No. L Q 0 5 8 T 5 D R Q 1

☐ CUSTOMER'S APPROVAL

DATA _____ _____

BY _____

PRESENTED

BY *S. Yasuda*

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TFT LIQUID CRYSTAL DISPLAY GROUP

SHARP CORPORATION

RECORDS OF REVISION

SPEC No.	DATE	REVISED No.	PAGE	SUMMARY	NOTE
YCL-99116	Jul.26.1999				1st. Issue
YCL-99116A	Dce.23.1999	A－1	1 6	Alminum tape pasting (addition)	2nd. Issue
	Dce.23.1999	A－2	1 8	Digit number of serial No. (Change)	
	Dce.23.1999	A－3	3,12,16	CONNECTOR (Change)	
YCL-99116	Jul.26.1999				1st. Issue
YCL-99116A	Dce.23.1999	A－1	1 6	Alminum tape pasting (addition)	2nd. Issue

NOTICE

(1) Application

This specification literature applies to color TFT-LCD module ,LQ058T5DRQ1

(2) Summary and Features

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-PWB, FPC, frame,
front shielding case, back-light unit.

Graphics and texts can be displayed on a 640×3×350 dots panel with 262,144 colors by supplying.
DC/AC inverter isn't composed.

The 5.8 screen produces a high resolution image that is composed of 224,000 pixel elements in
a stripe   arrangement.

Wide viewing angle technology is employed.   (The most suitable viewing angle is
in the 12 o'clock direction.)

By adopting an active matrix drive, a picture with high contrast is realized.

Through the use of TN-normally white mode, an image with highly natural color image is realized.

It is used the Low-reflection (LR) and an antiglare (AG) surface polarization plate.

An inverted video display in the vertical and horizontal directions is possible.

(3) Mechanical specifications

table 3-1

Parameter	Specifications	Units	Remarks
Display format	224,000	pixels	
	640(W)×RGB×350(H)	dots	
Active area	128.6 (W) ×70.35 (H)	mm	
Screen size (Diagonal)	14.7 [5.8"]	cm	
Dot pitch	0.067 (W) ×0.201 (H)	mm	
Pixel configuration	R.G,B Stripe configuration		
Outline dimension	147×89×12.3	mm	【Note3-1】
Mass	175±10	g	
Surface treatment	AG+LR		

【Note 3-1】

Typical values are given.   For detailed measurements and tolerances, please refer to Fig. 1.

(4)Input terminal

4-1)TFT-LCD panel driving part

Used connector: 32FLZ　RSM—R—TB (J.S.T.　MFG　CO.,LTD)

Table 4-1

CN1

Pin No.	Symbol	Description	Remarks
1	G N D	Ground	
2	C L K	Clock signal for sampling each data signal	
3	H sync	Horizontal synchronous signal	【Note4-1】
4	V sync	Vertical synchronous signal	【Note4-1】
5	G N D	Ground	
6	R 0	RED data signal(LSB)	
7	R 1	RED data signal	
8	R 2	RED data signal	
9	R 3	RED data signal	
1 0	R 4	RED data signal	
1 1	R 5	RED data signal(MSB)	
1 2	G N D	Ground	
1 3	G 0	GREEN data signal(LSB)	
1 4	G 1	GREEN data signal	
1 5	G 2	GREEN data signal	
1 6	G 3	GREEN data signal	
1 7	G 4	GREEN data signal	
1 8	G 5	GREEN data signal(MSB)	
1 9	G N D	Ground	
2 0	B 0	BLUE data signal(LSB)	
2 1	B 1	BLUE data signal	
2 2	B 2	BLUE data signal	
2 3	B 3	BLUE data signal	
2 4	B 4	BLUE data signal	
2 5	B 5	BLUE data signal(MSB)	
2 6	G N D	Ground	
2 7	E N A B	Signal to settle the horizontal display position	【Note4-2】
2 8	V C C	Power supply voltage	
2 9	V C C	Power supply voltage	
3 0	I N V	Selection for horizontal and vertical scanning direction	【Note4-3】
3 1	T 0	Thermistor 0	
3 2	T 1	Thermistor 1	

【Note 4-1】

Hsync	Negative
Vsync	Negative

【Note 4-2】

The horizontal display start timing is settled in accordance with a rising timing of ENAB signal. In case ENAB is fixed "Low", the horizontal start timing is determined as described in Fig3.

(Don't keep ENAB "High" during operation.)

【Note 4-3】

INV = "High" : Regular video

INV = "Low" : Horizontally and Vertically inverted video

4-2) Back-light fluorescent tube driving part

Used connector:BHR-02(8. 0)VS-1N(JST Co. ,Ltd)

Fit connctor:SM02(8.0)B-BHS-1N(JST Co. ,Ltd)

Table 4-2

No.	Symbol	i /o	Function	Color of FL cable
1	VL1	I	Input terminal	RED
2	VL2	I	Input terminal	BLACK

Used thermistor :203GT—1(Ishizuka electoronics Corporation)=20.0k Ω ± 3 %

(5)Absolute maximum ratings

Table 5-1 $GND=0V$

Parameter	Symbol	MIN	MAX	Unit	Note
Input voltage	V_I	-0.3	VCC+0.3	V	[Note 5-1] Ta=25℃
+3.3V power supply	VCC	0	5	V	Ta=25℃
Storage temperature	Tstg	-40	+95	℃	[Note 5-2]
Operating temperature (panel surface)	Topr1	-30	+85	℃	[Note 5-2]
Operating temperature (Ambient temperature)	Topr2	-30	+60	℃	[Note 5-2]

[Note 5-1]   CK,R0~R5,G0~G5,B0~B5,Hsync,Vsync,ENAB,HVR

[Note 5-2]   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 section

Table 6-1 $GND=0V,$ Ta=25℃

Parameter		Symbol	MIN	TYP	MAX	Unit	Remarks
+3.3V	Supply voltage	Vcc	+3.0	+3.3	+3.6	V	[Note 6-1]
	Current dissipation	Icc	—	300	340	mA	[Note 6-2,3]
Permissive input ripple		V_{RF}	—	—	100	mVpp	
Input Low voltage		V_{IL}	—	—	0.3VCC	V	[Note 6-4]
Input High voltage		V_{IH}	0.7VCC	—	—	V	
Input current (Low)		I_{IL}	—	—	10	μA	$V_I=0V$ [Note 6-5]
Input current (High)		I_{IH}	—	—	10	μA	$V_I=VCC$ [Note 6-5]
Input current (Low)		I_{IL}	6.0	—	150	μA	$V_I=0V$ [Note 6-6]
Input current (High)		I_{IH}	—	—	2.0	μA	$V_I=VCC$ [Note 6-6]

【Note 6-1】
On-off conditions for supply voltege
$0 < t1 \leqq 10ms$
$0 < t2 \leqq 10ms$
$0 < t3 \leqq 1s$
$t4 \geqq 1s$
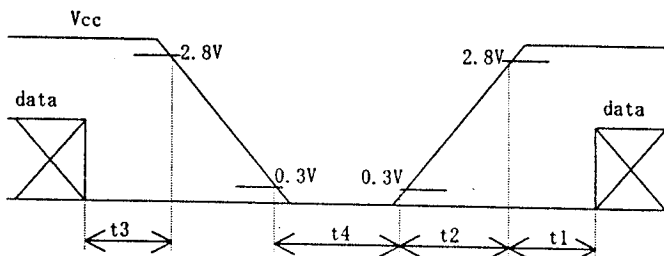
Vcc-dip conditions

1) $2.8V \leqq Vcc < 3.0V$
    $td \leqq 10ms$
2) $Vcc < 2.8V$
    Vcc-dip conditions should also follow the
    on-off conditions.
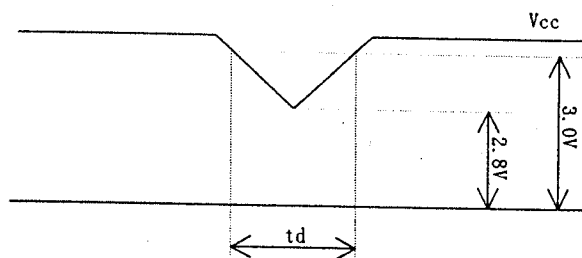
【Note 6-2】
Typical current situation: Black (GS0) pattern
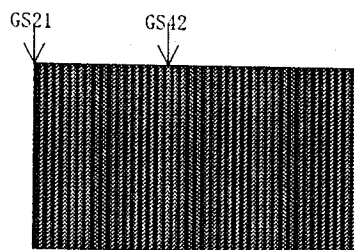   Timing: Typical
                        VCC= 3.3 V

Black(GS0)

【Note 6-3】 Maximum current situation: Vertical stripe
pattern alternating 21 gray scale (GS21) with Black (GS0)
every 1 dot.
Timing; Typical
VCC= +3.3 V

GS21   GS42

【Note 6-4】 CK,R0~R5,G0~G5,B0~B5,Hsync,Vsync,ENAB,HVR
【Note 6-5】 CK,R0~R5,G0~G5,B0~B5,Hsync,Vsync,ENAB
【Note 6-6】 HVR

6-2)Backlight driving section
    The backlight system is an edge-lighting type with single CCFT (Cold Cathode Fluorescent Tube).
The characteristics of Lamp are shown in the following table.
    Table 6-2

Parameter	Symbol	M I N	T Y P	M A X	Unit	Remarks
lamp voltage	V L 7	740	840	940	Vrms	I L =5.5mArms
lamp current	I L	5.0	5.5	6.0	mArms	ordinary state
	I L B	—	—	9.0	mArms	PWM dimming state 【Note 6-7】
lamp frequency	f L	30	—	60	kHz	
kick-off voltage	V S	—	—	2350	Vrms	Ta=+25℃
		—	—	2400 ·	Vrms	Ta=-30℃

    Inverter : HIU-359A-W2[Harison electric co.,ltd] (Output capasitor:18pF,frequency:49kHz)

【Note 6-7】 available area
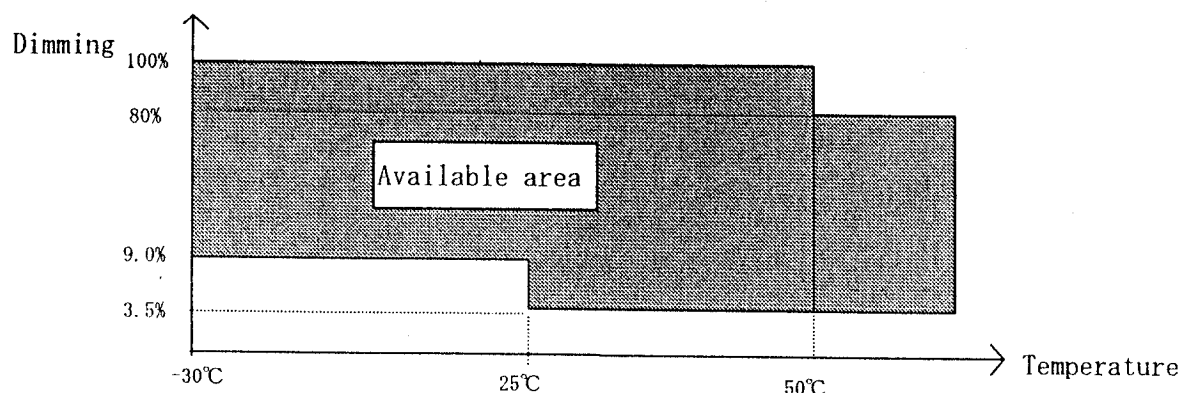
7)Timing Characteristics of input signals

Timing diagrams of input signal are shown in Fig.3

7-1) Timing characteristics

Table 7-1

Parameter		Symbol	MIN	TYP	MAX	Unit	Remarks
Clock	Frequency	1/Tc	—	25.18	27.6	MHz	
	High time	Tch	5	—	—	ns	
	Low time	Tcl	10	—	—	ns	
	Duty ratio	Th/t	40	50	60	%	
Data	Setup time	Tds	5	—	—	ns	
	Hold time	Tdh	10	—	—	ns	
Horizontal sync. signal	Cycle	TH	30	31.78	—	μ s	
			770	800	900	clock	
	Pulse width	THp	2	96	200	clock	
Vertical sync. signal	Cycle	TV	515	525	560	line	
	Pulse width	TVp	2	96	200	line	
Horizontal display period		THd	640	640	640	clock	
Hsync-Clock phase difference		THc	10	—	Tc-10	ns	
Hsync-Vsync phase difference		TVh	1	—	Tc-THp	clock	
Vertical display start position		TVs	103	103	103	Line	
Vertical data period		TVd	350	350	350	Line	

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

7-2) Horizontal display position

①In case ENAB is active

The horizontal display position is determined by ENAB signal. The input data corresponding to the 5 edge from rising of ENAB signal is displayed at the left end of the active area. (shown in Fig.3)

Parameter		symbol	Min.	Typ.	Max.	Unit	Remark
Enable signal	Setup time	Tes	5	—	Tc−10	ns	
	Pulse width	Tep	2	640	640	clock	
Hsync-Enable signal phase Difference		THe	44	—	TH-644	clock	

②In case ENAB is "Low"

The display starts from the data of C108(clock) as shown in Fig.3.
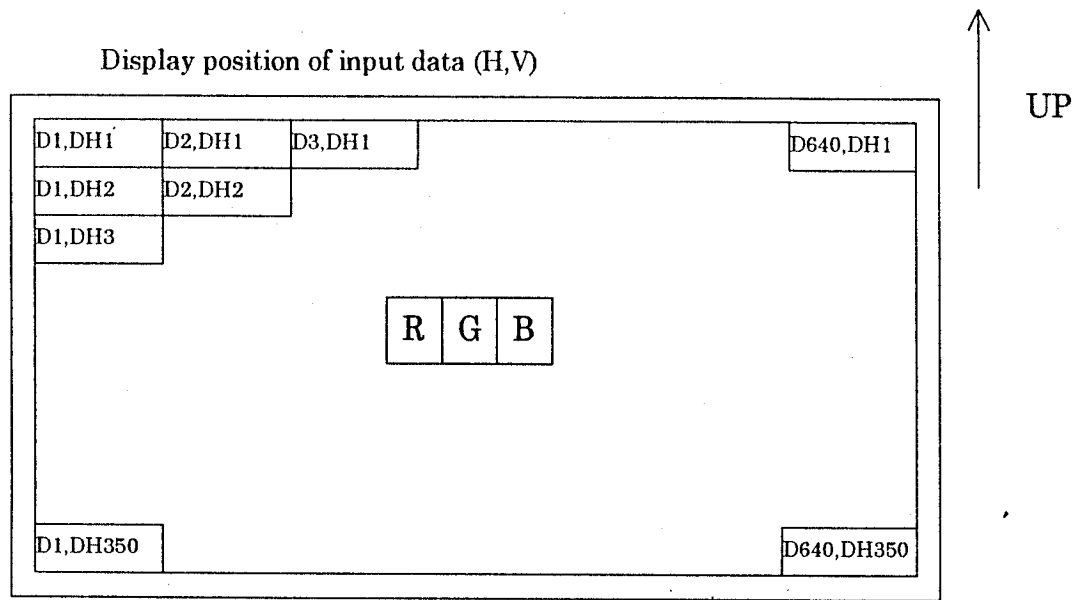
Be careful that the module does not work when ENAB is Hi fixed.

7-3) Vertical display position

ENAB signal has no relation to the vertical display position.

7-4) Input Data Signals and Display Position on the screen

Display position of input data (H,V)

D1,DH1	D2,DH1	D3,DH1		D640,DH1
D1,DH2	D2,DH2			
D1,DH3				

R | G | B

| D1,DH350 | | | | D640,DH350 |

↑

UP

(8) Input Signals, Basic Display Color 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
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 bleu	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)Optical characteristics

Table 9-1

Ta=25℃, VCC=+3.3V

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remarks
Viewing angle range		$\triangle \theta 11$	CR≧5	35	40	—	° (degree)	【Note 9-1,4】
		$\triangle \theta 12$		60	65	—	° (degree)	
		$\triangle \theta 2$		60	65	—	° (degree)	
Contrast ratio		CRmax	Optimal	100	—	—		【Note 9-2,4】
Response time	Rise	τr	$\theta = 0°$	—	30	60	ms	【Note 9-3,4】
	Fall	τd		—	50	100	ms	
Luminance		Y	IL=5.5mArms	270	360	—	cd/m²	【Note 9-5】
White chromaticity		x	IL=5.5mArms	0.263	0.313	0.363		
		y	IL=5.5mArms	0.279	0.329	0.379		
lamp life time	+25℃	-	continuation	10,000	—	—	hour	【Note 9-6】
	-30℃	-	intermission	2,000	—	—	time	【Note 9-7】

DC/AC inverter for external connection shown in following.

Inverter : HIU-359A-W2[Harison electric co.,ltd] (Output capasitor:18pF,frequency:49kHz)

※measuring after 30minutes
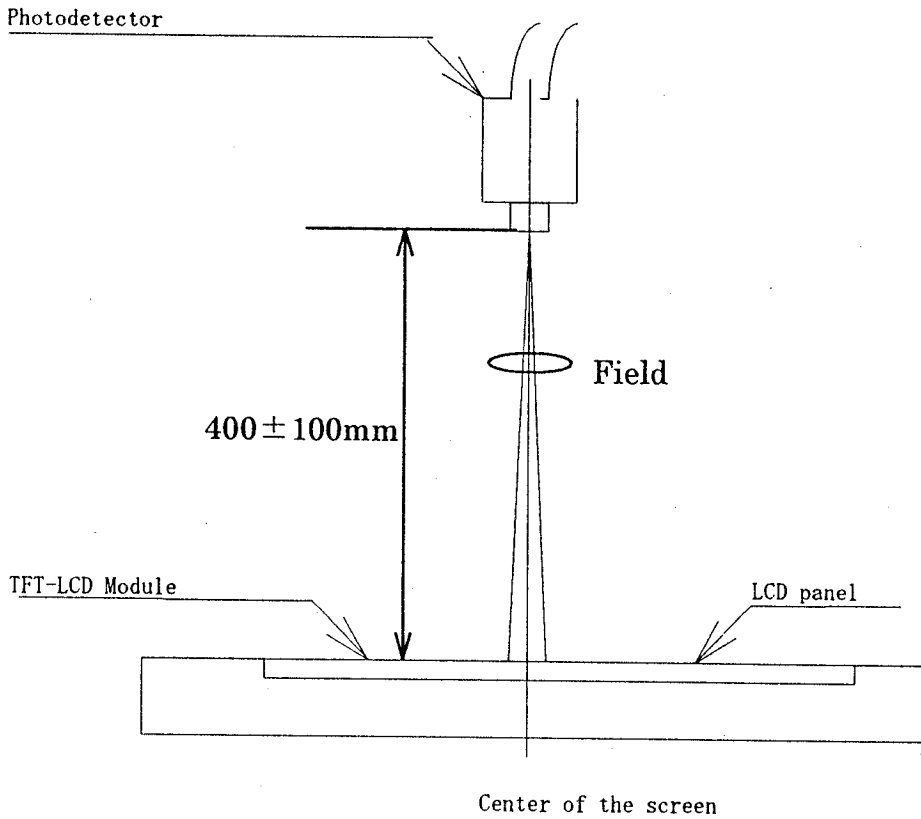
Fig.9-1 Optical characteristics measurement method

【Note 9-1】 Viewing angle range is defined as follows.

definition for viewing angle
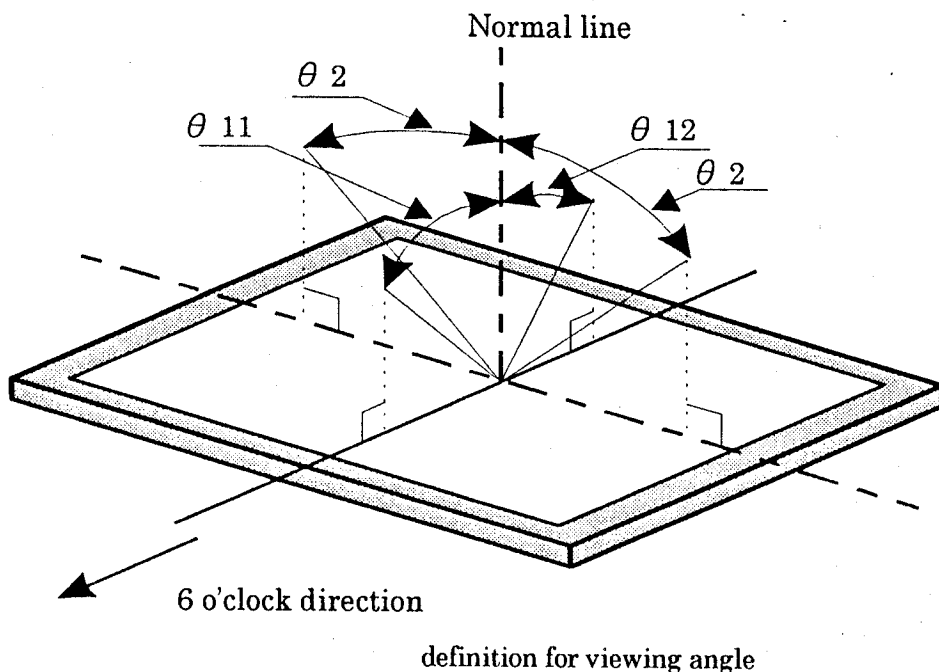
【Note 9-2】 Contrast ratio is defined as follows:

$$\text{Contrast ratio(CR)} = \frac{\text{Photo detector output with LCD being "white"}}{\text{Photo detector output with LCD being "black"}}$$

【Note 9-3】 Response time is obtained by measuring the transition time of photo detector output, when input signals are applied so as to make the area "black" to and from "white".
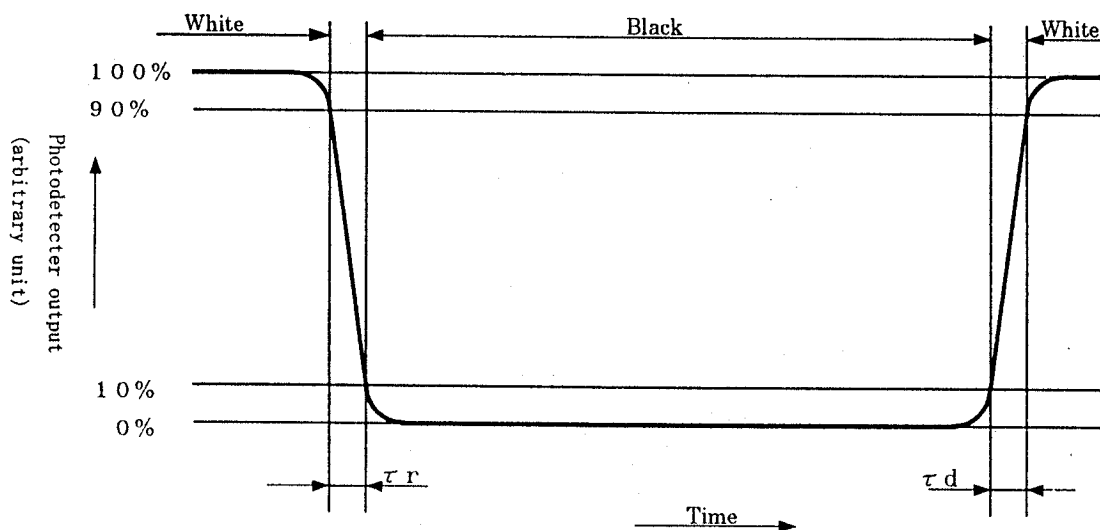
【Note 9-4】 Measured on the center area of the panel at a viewing cone 2° (= Filed) by
TOPCON luminance meter BM-5A or ELDIM luminance meter EZ Contrast.
(After 30 minutes operation)
DC/AC inverter driving frequency:(49 kHz)

【Note 9-5】 Measured on the center area of the panel at a viewing cone 1° (= Filed) by
TOPCON luminance meter BM-7.(After 30 minutes operation)
DC/AC inverter driving frequency:(49 kHz)

【Note 9-6】 Lamp life time is defined as the time when either or occurs in the continuous
operation under the condition of lamp current IL=5.5mArms
and PWM dimming 80%~5% (Ic=9.0mArms Ta=25℃)
Brightness not to become under 50% of the original value.

【Note 9-7】 The intermittent cycles is defined as a time when brightness not to become under 50%
of the original value under the condition of following cycle.

Ambient temperature:-30℃

HIGH(9mArms)

OFF

5min   5min   5min   5min
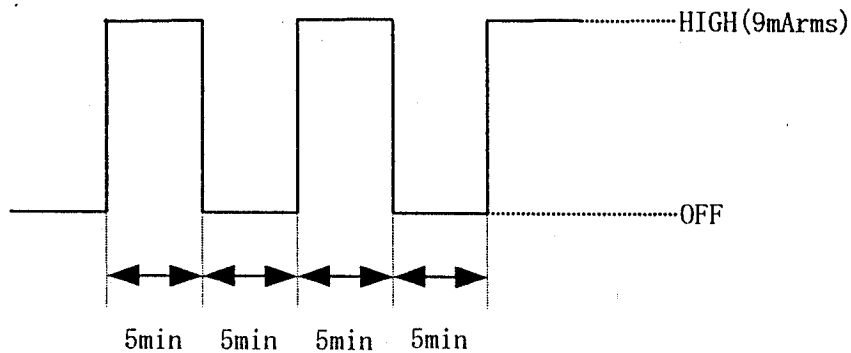
(10)Mechanical characteristics

10-1) External appearance

Do not exist extreme defects. (See Fig. 1)

10-2) Panel toughness

The panel shall not be broken ,when 19N is pressed on the center of the panel by a   smooth sphere having 15 mm diameter.

Caution: In spite of very soft toughness, if, in the long-term, add pressure on the   active area, it is possible to occur the functional damage.

10-3) Input/output connector performance

A)Input/output connectors for the operation of LCD module

(32 pin 【J.S.T. MFG CO.,LTD】:) 32FLZ   RSM－R－TB

1)Applicable FPC   refer the below figure

2)Terminal holding force :   More than 0.9N/pin

(Each terminal is pulled out at a rate of 25 ±3mm/min.)

3)Insertion/pulling :contact resistance is not twice larger than the durability initial value   after applicable FPC is inserted and pulled out 20 times
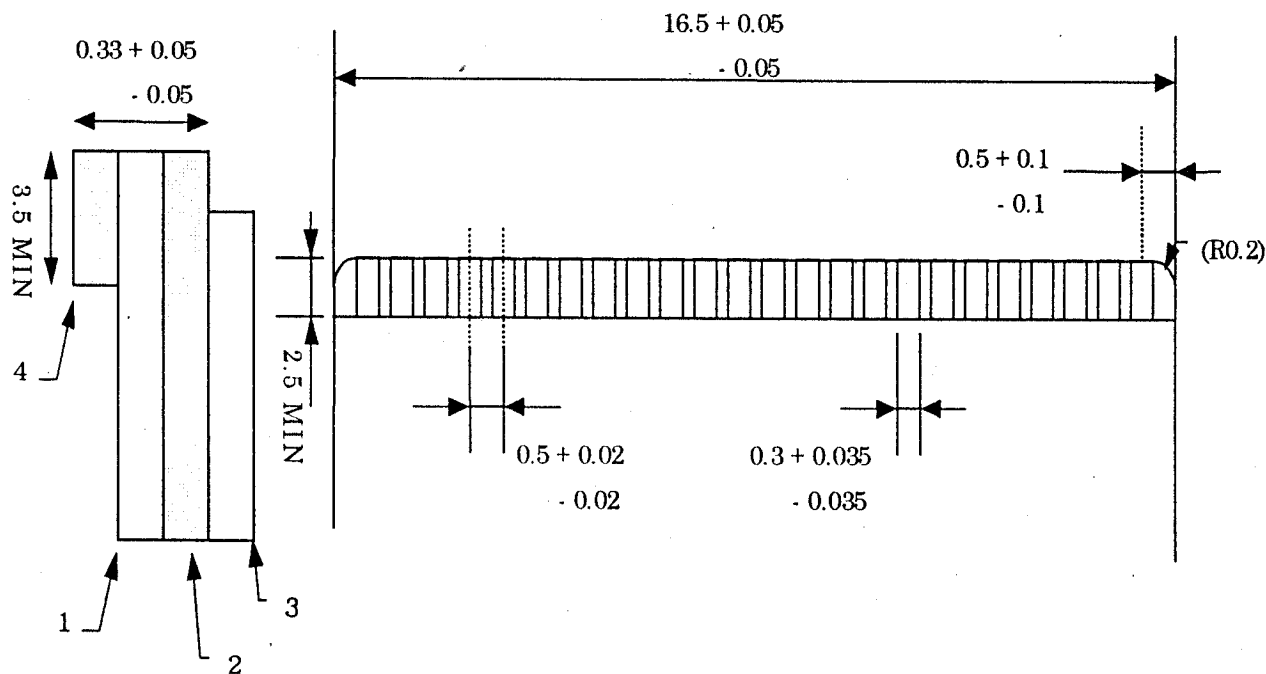
No.	Name	Materials
1	Base material	Polyimide or equivalent material(25 μ m thick)
2	Copper foil	Copper foil(35 μ m thick) Solder plated over 2 μ m
3	Cover lay	Polyimide or equivalent material
4	Reinforcing plate	Polyester polyimide or equivalent material(188 μ m thick)

FPC applied to input/output connector (0.5mm pitch)

B)I/O connector of backlight driving circuit 〔JST〕

Lump connector

Symbol	Used Connector	Corresponding connector
CNA,B	BHR-02(8.0)VS-1N	SM02(8.0)B-BHS-1N(assembled on PWB)
		SM02(8.0)B-BHS-TB(assembled on PWB)
		BHMR-03V (interconnecter)

(11) Display quality

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

(12) Handling instructions

12-1) Mounting of module

The TFT-LCD module is designed to be mounted on equipment using the mounting tabs in the four corners of the module at the rear side.

On mounting the module, as the M2.6 tapping screw fastening torque is 0.3 through 0.5N·m is recommended, be sure to fix the module on the same plane, taking care not to wrap or twist the module.

Don't reach the pressure of touch-switches of the set side to a module directly, because images may be disturbed.

Please power off the module when you connect the input/output connector.

Please connect the metallic shielding cases of the module and the ground pattern of the inverter circuit surely. If that connection is not perfect, there may be a possibility that the following problems happen.

a). The noise from the backlight unit will increase.

b). The output from inverter circuit will be unstable. Then, there may be a possibility that some problems happen.

c). In some cases, a part of module will heat.

12-2) Precautions in mounting

Polarizer which is made of soft material and susceptible to flaw must be handled carefully.

Protective film (Laminator) is applied on the surface to protect it against scratches and dirties. It is recommended to peel off the laminator immediately before the use, taking care of static electricity.

Precautions in peeling off the laminator

A) Working environment

When the laminator is peeled off, static electricity may cause dust to stick to the polarizer surface. To avoid this, the following working environment is desirable.

a) Floor: Conductive treatment of 1MΩ or more on the tile

(conductive mat or conductive paint on the tile)

b) Clean room free form dust and with an adhesive mat on the doorway

c) Advisable humidity:50%~70%   Advisable temperature:15℃~27℃

d) Workers shall wear conductive shoes, conductive work clothes, conductive gloves and an earth band.

B) Working procedures

a) Direct the wind of discharging blower somewhat downward to ensure that module is blown sufficiently.   Keep the distance between module and discharging blower within 20 cm.

b) Attach adhesive tape to the laminator part near discharging blower so as to protect polarizer against flaw.

c) Peel off laminator, pulling adhesive tape slowly to your side taking 5 or more second.

d) On peeling off the laminator, pass the module to the next work process to prevent the module to get dust.
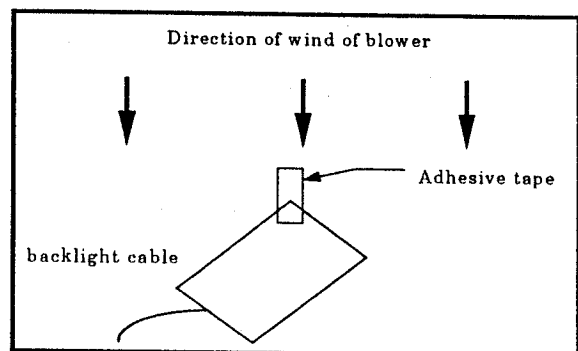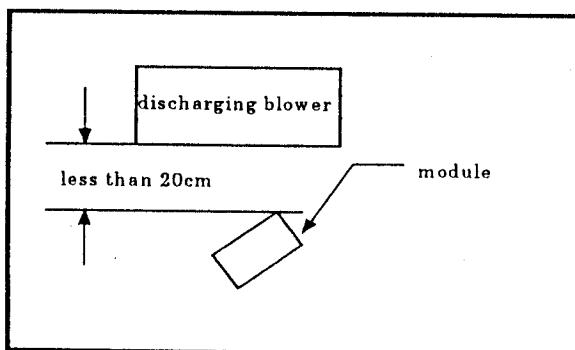
e) Method of removing dust from polarizer

· Blow off dust with N2 blower for which static electricity preventive measure has been taken.

· Since polarizer is vulnerable, wiping should be avoided.

But when the panel has stain or grease, we recommend to use adhesive tape to softly remove them from the panel.

When metal part of the TFT-LCD module (shielding lid and rear case) is soiled, wipe it with soft dry cloth. For stubborn dirties, wipe the part, breathing on it. Wipe off water drop or finger grease immediately.   Long contact with water may cause discoloration or spots. TFT-LCD module uses glass which breaks or cracks easily if dropped or bumped on hard surface. Handle with care. Since CMOS LSI is used in this module, take care of static electricity and earth your body when handling.

12-3) Precautions in adjusting module

Adjusting volumes on the rear face of the module have been set optimally before shipment. Therefore, do not change any adjusted values.   If adjusted values are changed, the specifications described here may not be satisfied.

12-4) Caution of product design

The LCD module shall be protected against water salt-water by the waterproof cover.

Please take measures to interferential radiation from module, to do not interfere surrounding appliances.

12-5) Others

Do not expose the module to direct sunlight or intensive ultraviolet rays for many hours; liquid crystal is deteriorated by ultraviolet rays. Store the module at a temperature near the room temperature. At lower than the rated storage temperature, liquid crystal solidifies, causing the panel to be damaged. At higher than the rated storage temperature, liquid crystal turns into isotropic liquid and may not recover. The voltage of beginning electric discharge may over the normal voltage because of leakage current from approach conductor by to draw lump read lead line around. If LCD panel breaks, there may be a possibility that the liquid crystal escapes from the panel. Since the liquid crystal is injurious, do not put it into the eyes or mouth. When liquid crystal sticks to hands, feet or clothes, wash it out immediately with soap. Observe all other precautionary requirements in handling general electronic components.

(13) Packing form

Piling number of cartons : MAX 10

Package quantity in one carton   20 pcs

Carton size: 476(W)×398(H)×155(D) mm

Total mass of one carton filled with full modules: 4.5 kg

Conditions for storage.

Environment

①Temperature : 0～40℃

②Humidity   : 60%RH or less (at 40℃)

No dew condensation at low temperature and high humidity.

③Atmosphere   :Harmful gas, such as acid or alkali which bites electronic components and/or wires, must not be detected.

④Period   : about 3 months

⑤Opening of the package : In order to prevent the LCD module from breakdown by electrostatic charges, please control the room humidity over 50%RH and open the package taking sufficient countermeasures against electrostatic charges, such as earth, etc.

(14) Others

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.

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

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

Indication of lot number

The lot number is shown on a label. Attached location is shown in Fig.1 (Outline Dimensions).

Indicated contents of the label

LQ058T5DRQ1   ○○○○○○○○
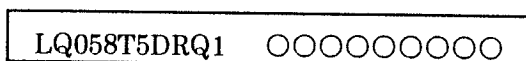
model No.   lot No.

contents of lot No.   the 1st figure ·· production year   (ex. 1996 : 6)

the 2nd figure ·· production month   1,2,3,······,9,X,Y,Z

the 3rd~8th figure ·· serial No.   000001~

the 9th figure ·· revision marks   A,B,C··

(15) Reliability Test Conditions for TFT-LCD Module

Table 15-1

Remark) Temperature condition is based on operating temperature conditions on (5)-Table 5-1.

No.	Test items	Test conditions
1	High temperature storage test	Ta= +95℃ 240h
2	Low-temperature storage test	Ta= -40℃ 240h
3	High temperature and high humidity operating test	Tp= +60℃ , 95%RH 240h
4	High temperature operating test	Tp= +85℃ 240h
5	Low temperature operating test	Tp= -30℃ 240h
6	Electro static discharge test	±200V ・ 200pF(0Ω) 1 time for each terminals
7	Shock test	980m/s² ・ 6ms, ±X ; ±Y ; ±Z 3 times for each direction (JIS C0041, A-7 Condition C)
8	Vibration test	Frequency range : 8~33.3Hz Stroke : 1.3mm Sweep : 33.3Hz~400Hz Acceleration : 28.4m/s² Cycle : 15 minutes X,Z 2 hours for each directions, 4 hours for Y direction (total 8 hours) 【caution】 (JIS D1601)
9	Heat shock test	Ta= (−30)℃~(+85)℃ / 200 cycles (0.5h) (0.5h)

【Note】 Ta= Ambient temperature, Tp= Panel temperature

【Check items】 In the standard condition, there shall be no practical problems that may affect the display function.

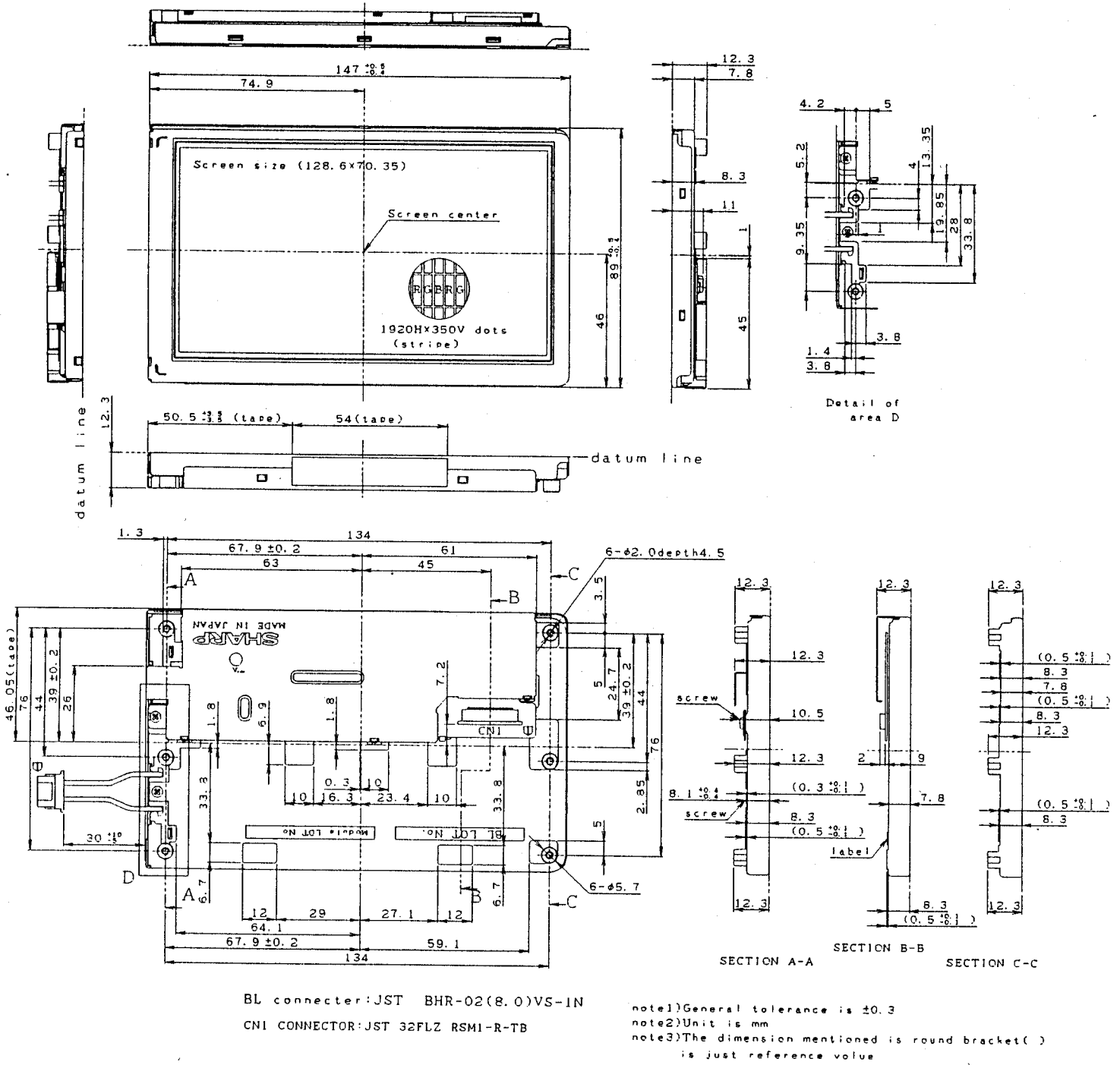【caution】 X,Y,Z directions are shown as follows:

BL connecter:JST BHR-02(8.0)VS-1N
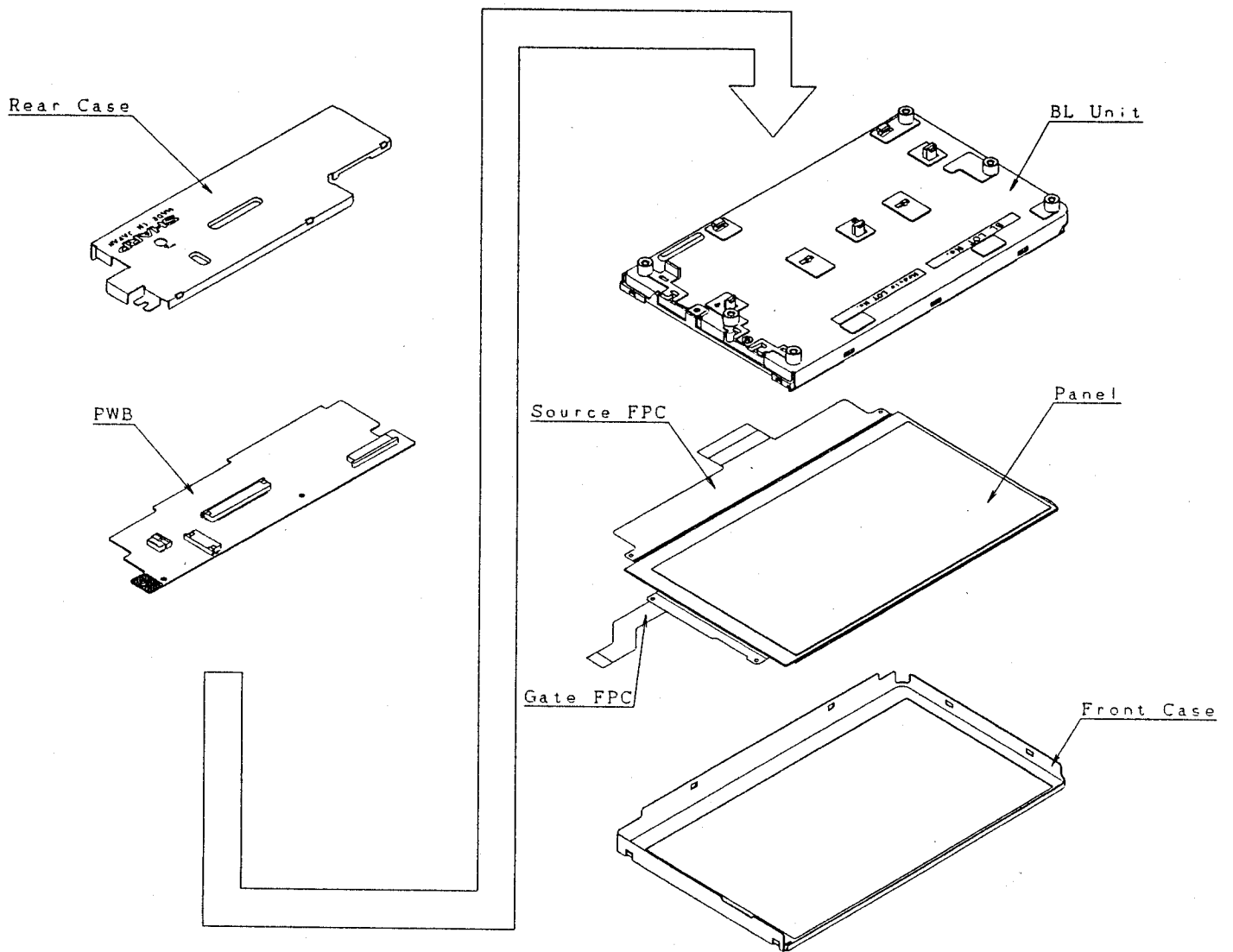
CN1 CONNECTOR:JST 32FLZ RSM1-R-TB

note1)General tolerance is ±0.3
note2)Unit is mm
note3)The dimension mentioned is round bracket( )
       is just reference value

Fig.1 OUTLINE DIMENSIONS

Rear Case

BL Unit

PWB

Source FPC

Panel

Gate FPC

Front Case
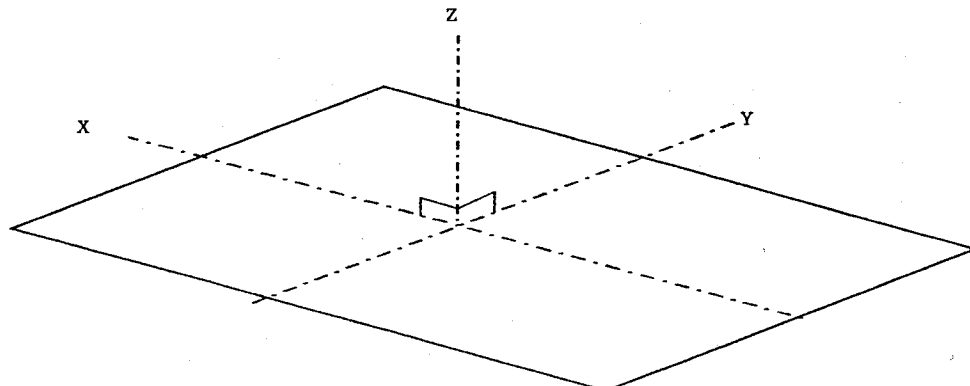
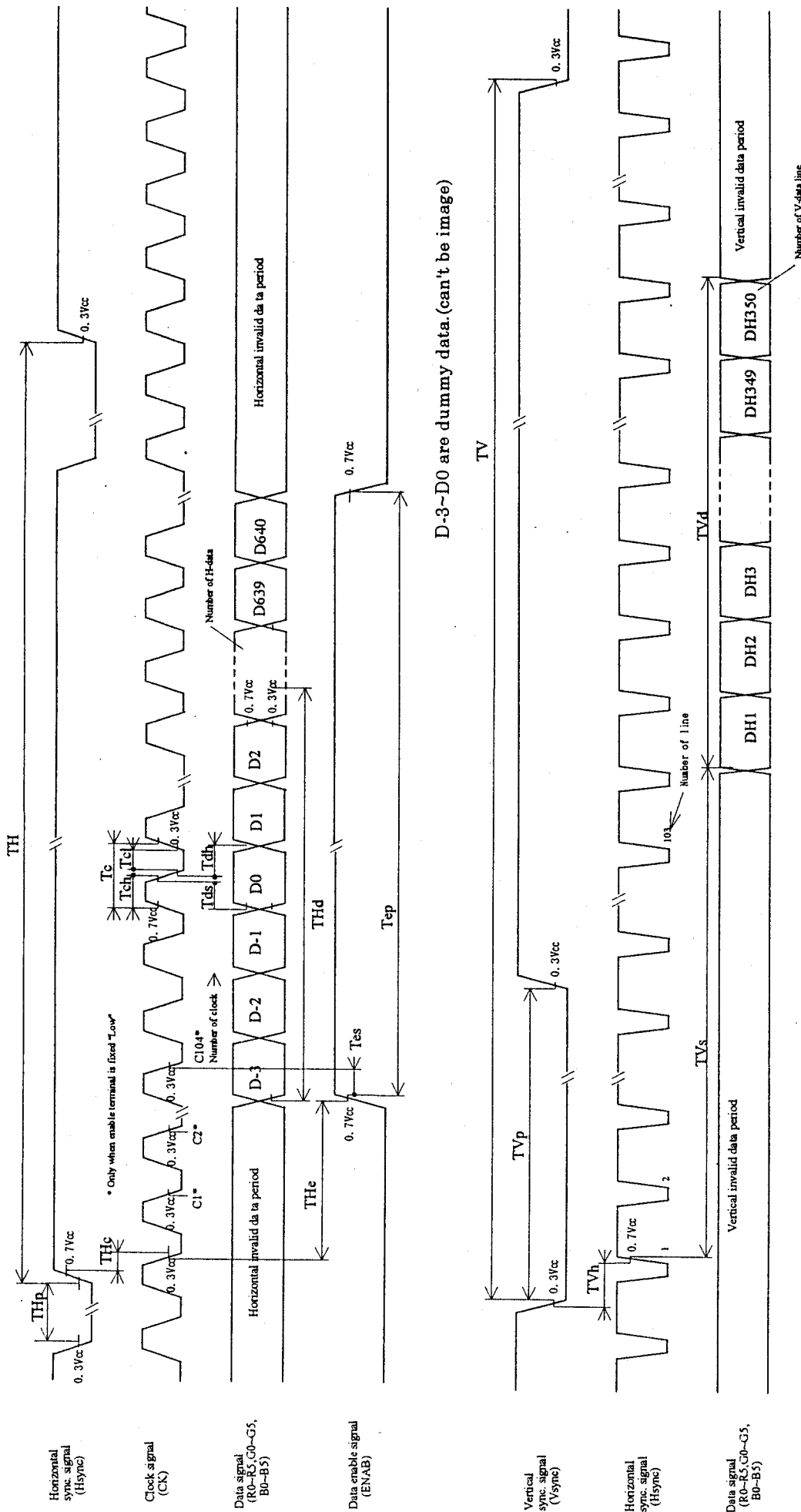Fig.2 CONSTRUCTION OF TFT-LCD MODULE

D-3~D0 are dummy data. (can't be image)

Fig .3   Input signal waveforms

Fig.4-1 Packing form

Fig.4-2　Packing form