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DEVICE SPECIFICATION FOR  
**TFT - LCD module**  
 MODEL No. LQ092B5DW01

PART No. 8 928 554 017

CUSTOMER'S APPROVAL

DATE \_\_\_\_\_

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## 1. General

This TFT-LCD module is a color active matrix LCD (Liquid Crystal Display) module of transmissive type incorporating amorphous silicon TFT (Thin Film Transistor).

It is composed of a color TFT-LCD panel, driver ICs, control-PWB, FPC, frame, shielding front case, shielding back case and LED-backlight unit. (Driving circuit for LED-backlight is excluded.)

## 2. Features

- The 9.2 screen produces a high resolution image that is composed of 153,600 pixels elements in a stripe arrangement.
- Possible to indicate 262,144 colors by 18 bits (6 bits x RGB) data signal.
- Wide viewing angle technology without gray scales inversion.
- Reduced reflection as a result of low reflection black matrix and an antiglare (AG) polarizer being adopted.
- By COG method, realized a slim, lightweight, and compact module.
- Realized a high quality picture of the natural color appearance by adopting the ASV-Normally black Mode.
- Built-in LED backlight with the high performance of start-up in the low temperature.

## 3. Mechanical specifications

Table 1

Parameter	Specifications	Units	Remarks
Display format	153,600	pixels	
	960(W)×RGB×160(H)	dots	
Active area	230.4 (W) ×38.4 (H)	mm	
Screen size (Diagonal)	23.37[9.2 “]	cm	
Dot pitch	80.0 (W) ×240.0 (H)	μ m	
Pixel configuration	R,G,B Stripe configuration		
Outline dimension	248.0 (W)×52.83 (H)×14.0 (D)	mm	[Note 1-1]
Mass	225 ± 10	g	

[Note 1-1]

Excluding protrusions. Typical values are given.

For detailed measurements and tolerances, refer to Fig. 2, Outline Dimensions.

## 4. Input terminal

4-1) TFT-LCD panel driving part

Connector used: FH28-40S-0.5SH(05) (Hirose Electric Co., Ltd.)

Table 2

Pin No.	Symbol	Function	Remarks
1	GND	Ground	
2	DCLK	Clock signal for sampling each data signal	
3	GND	Ground	
4	R0	Red data signal (LSB)	
5	R1	Red data signal	
6	R2	Red data signal	
7	R3	Red data signal	
8	R4	Red data signal	
9	R5	Red data signal (MSB)	
10	GND	Ground	
11	G0	Green data signal (LSB)	
12	G1	Green data signal	
13	G2	Green data signal	
14	G3	Green data signal	
15	G4	Green data signal	
16	G5	Green data signal (MSB)	
17	GND	Ground	
18	B0	Blue data signal (LSB)	
19	B1	Blue data signal	
20	B2	Blue data signal	
21	B3	Blue data signal	
22	B4	Blue data signal	
23	B5	Blue data signal (MSB)	
24	GND	Ground	
25	Hsync	Horizontal Sync	【Note2-1】
26	DataEn ENAB	/ Data Enable	
27	Vsync	Vertical Sync	【Note2-1】
28	GND	Ground	
29	SCK	Clock signal for serial interface	【Note2-2】
30	SDI	Data signal for serial interface	【Note2-2】
31	WC	EEPROM write protect signal for serial interface	【Note2-2】
32	SCS	Chip select signal for serial interface	【Note2-2】
33	GND	Ground	
34	GND	Ground	
35	Reset	Reset of timing controller	
36	VCC	+3.3V Power Supply	
37	VCC	+3.3V Power Supply	
38	VCC	+3.3V Power Supply	
39	GND	Ground	
40	GND	Ground	

## 【Note 2-1】

Table 3

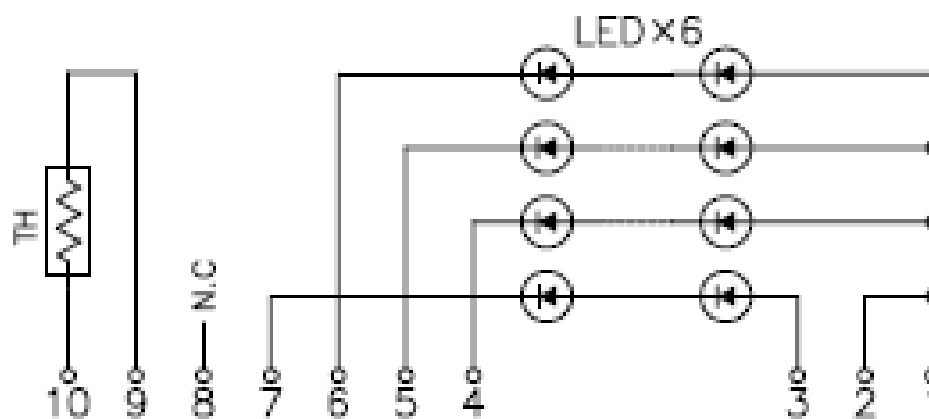
Hsync	Positive polarity
Vsync	Positive polarity

【Note 2-2】 Keep these terminals to “Hi” level

4-2) LED backlight driving part

Table 4

No.	Symbol	function	Remarks
1	Anode	White LED anode terminal	【Note4-1】
2	Anode	White LED anode terminal	【Note4-1】
3	Anode Red	Red LED anode terminal	【Note4-1】
4	Cathode1	LED cathode terminal 1	【Note4-1】
5	Cathode2	LED cathode terminal 2	【Note4-1】
6	Cathode3	LED cathode terminal 3	【Note4-1】
7	Cathode Red	Red LED cathode terminal	【Note4-1】
8	NC		
9	NTC	Thermal sensor for LED	【Note4-2】
10	GND	Ground	



【Note 4-1】

Number of White LED  
 Parallel : 3 chains  
 Series : 6 pcs

Number of Red LED  
 1 chain  
 Series : 6 pcs

【Note 4-2】

NTC : NSM3302J410J3 (OHIZUMI MFG. CO.,LTD.)

**5. Absolute maximum ratings**

Table 5

GND = 0 V

Parameter	Symbol	MIN	MAX	Unit	Note
Input voltage	VI	-0.3	VCC+0.3	V	【Note 5-1】
+3.3V power supply	VCC	-0.3	+4.6	V	
White LED forward current	IFw	-	150	mA	【Note 5-2】
Red LED forward current	IFr	-	50	mA	【Note 5-2】
Storage temperature	T stg	-40	90	°C	【Note 5-3,4】
Operating temperature (panel surface)	T opr1	-30	85	°C	【Note 5-3,4,5】
Operating temperature (ambient temperature)	T opr2	-30	70	°C	【Note 5-6】

【Note 5-1】 DCLK,R0~R5,G0~G5,B0~B5,Hsync,Vsync,DataEn

【Note 5-2】 LED ambient temperature : 25°C

【Note 5-3】 This rating applies to all area of panel surface and should not be exceeded.

【Note 5-4】 Maximum wet-bulb temperature is 57°C. Condensation of dew must be avoided as electrical current leaks will occur, causing a degradation of performance specifications.

【Note 5-5】 The operating temperature only guarantees operation of the circuit. For contrast, speed response, and other factors related to display quality, determine operating temperature using the formula  $T_a = +25^\circ\text{C}$ .

【Note 5-6】 In the case that ambient temperature is exceeded 58°C, LED current needs to be derated.

6. Electrical characteristics

6-1) TFT-LCD panel driving section

Table 6

GND=0V

Parameter	Symbol	MIN	TYP	MAX	Unit	Remarks	
+3.3V	Supply voltage	V <sub>CC</sub>	+3.0	+3.3	+3.6	V	【Note 6-1】
	Current dissipation	I <sub>CC</sub>	-	400	450	mA	【Note 6-2】
Permissive input ripple	V <sub>RF</sub>	-	-	200	mV <sub>pp</sub>		
Input Low voltage	V <sub>IL</sub>	0	-	0.3×V <sub>CC</sub>	V	【Note 6-3】	
Input High voltage	V <sub>IH</sub>	0.7×V <sub>CC</sub>	-	V <sub>CC</sub>	V		
Low level Input current 1	I <sub>IL1</sub>	-	-	1.0	μA	【Note 6-4】	
High level Input current 1	I <sub>IH1</sub>	-	-	1.0			
Low level Input current 2	I <sub>IL2</sub>	-	-	3.0	μA	【Note 6-5】	
High level Input current 2	I <sub>IH2</sub>	-	66	180			
Low level Input current 3	I <sub>IL3</sub>	-	66	180	μA	【Note 6-6】	
High level Input current 3	I <sub>IH3</sub>	-	-	3.0			

【Note 6-1】

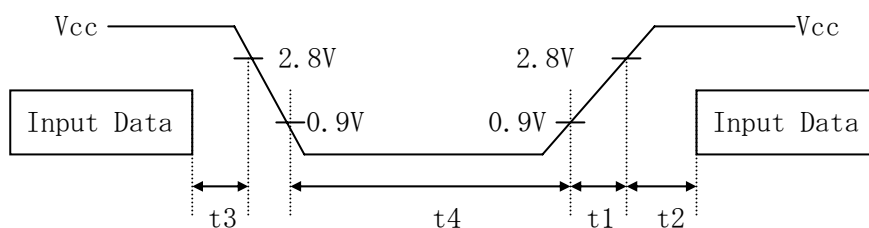
V<sub>CC</sub>-turn-on condition

0 ≤ t<sub>1</sub> ≤ 5ms

0 ≤ t<sub>2</sub> ≤ 5ms

0 ≤ t<sub>3</sub> ≤ 5ms

t<sub>4</sub> > 1s

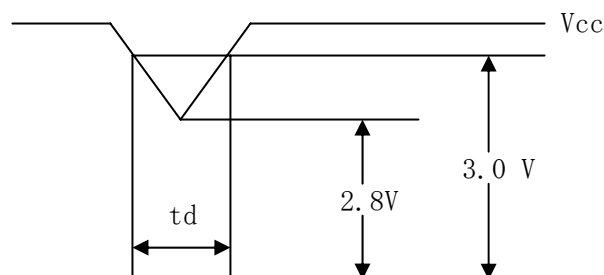


V<sub>CC</sub>-dip condition

1) in case 2.8V ≤ V<sub>CC</sub> ≤ 3.0, t<sub>d</sub> ≤ 10ms

2) in case V<sub>CC</sub> < 2.8V, V<sub>CC</sub>-dip conditions

Should also follow the V<sub>CC</sub>-turn-on conditions.



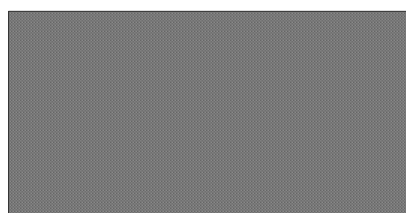
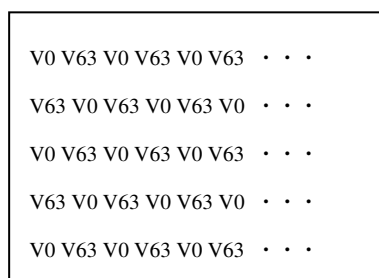


**【Note 6-2】**

Timing: Typical

Vcc : 3.3V

Situation: Black(V0) and White(V63) of 18 bits video is inverted at every 1H1V



<< situation >>

<Caution> The state data is current dissipation when the supply voltage is stabilized and is not Momentary current dissipation when the supply voltage is tuened-on.

**【Note 6-3】** DCLK,R0~R5,G0~G5,B0~B5,Hsync,Vsync,DataEn

**【Note 6-4】** DCLK,R0~R5,G0~G5,B0~B5

**【Note 6-5】** DataEn

**【Note 6-6】** Hsync,Vsync

6-2) Backlight driving section

Table 7-1 (for White LED)

Parameter	Symbol	M I N	T Y P	M A X	Unit	Remarks
Forward voltage	Vf+25	—	18.5	21.6	V	Ta=25°C,IF=100mA
Forward voltage	Vf-30	—	—	23.1	V	Ta=-30°C,IF=100mA
Forward current	IF	—	100	—	mA	Per terminal
Power consumption	Wf	—	5.54	—	W	<b>【Note7-1】</b>

Table 7-2 (for Red LED)

Parameter	Symbol	M I N	T Y P	M A X	Unit	Remarks
Forward voltage	Vf+25	—	12.0	14.5	V	Ta=25°C,IF=33mA
Forward voltage	Vf-30	—	—	15.7	V	Ta=-30°C,IF=33mA
Forward current	IF	—	33	—	mA	
Power consumption	Wf	—	0.4	—	W	<b>【Note7-1】</b>

**【Note 7-1】** Reference, Wf = VF x IF x parallel qty.

## 6-3) Timing characteristics

Timing diagrams of input signal are shown in Fig.1

Table 8

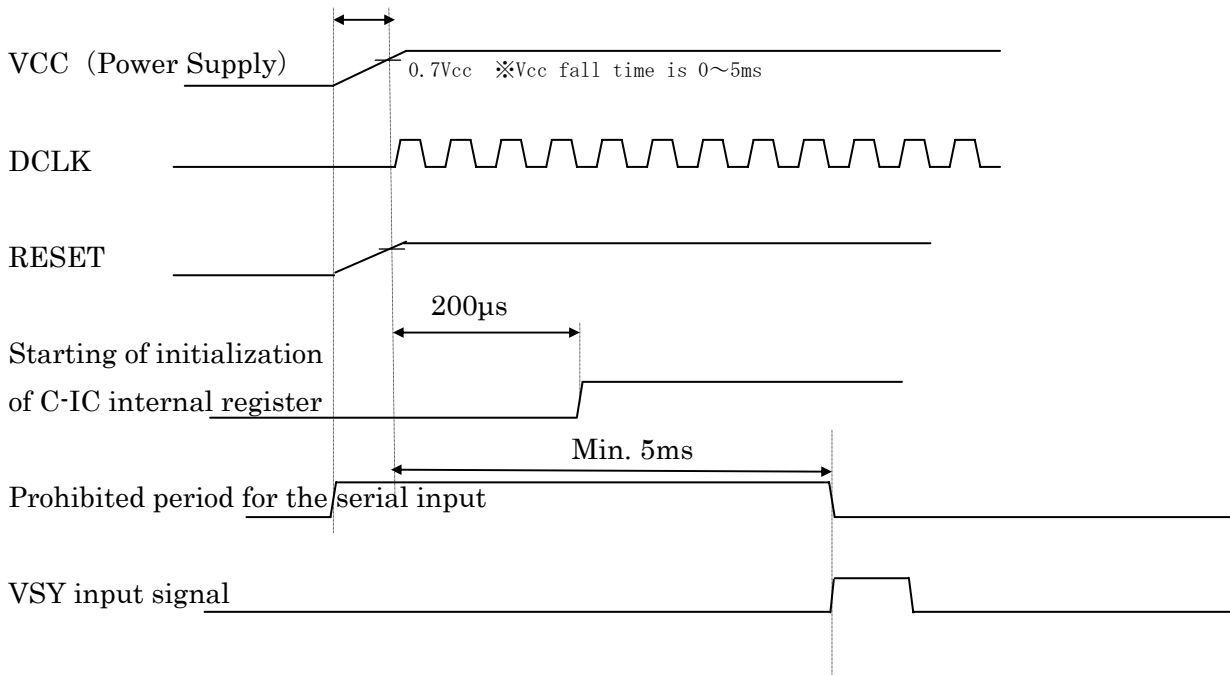
Parameter		Symbol	MIN	TYP	MAX	Unit	Note
Clock [DCLK]	Frequency	1/Tc	15.9	18	19.8	MHz	Frequency : 1/(THa/THb)
	Hi_time	Tch	12	-	-	ns	
	Lo_Time	Tcl	13	-	-	ns	
Data [I*0-5]	Setup time	Tds	5			ns	
	Hold time	Tdh	5			ns	
Horizontal Sync.signal [HSY]	Cycle	THa	(62.33)	67.48	(69.18)	$\mu$ s	
		THb	(1200)	1214	(1230)	ck	
	Pulse width	THp	5	8	THb-5	ck	
Vertical sync. Signal [VSY]	Cycle	TV	(245)	247	270	line	
	Pulse width	TVp	2	10	TV-2	line	
	Frequency		59	60.03	61	Hz	
Horizontal display period		THd	-	960	-	ck	
HSY_DCLK phase difference		THc	A-8	A	A+8	ns	※A=Tch (1/2DCLK)
HSY_VSY phase difference		TVh	-10	0	10	ck	
Vertical display invalid line		TVs	6	40	50	line	40 line (default)
Vertical display period		TVd	-	160	-	Line	
Enable Signal [HENAB]	Setup time	Tes	5	-	-	ns	
	Hold time	Teh	5	-	-	ns	
	Pulse width	Tep	5	960	960	ck	
Horizontal display starting position		THE	160	173	244	ck	<b>【Note8-1】</b>

**【Note8-1】**

Note for setting the Horizontal display starting position (The : phase difference between HSY falling HENAB rising)



6-4) Power On Sequence



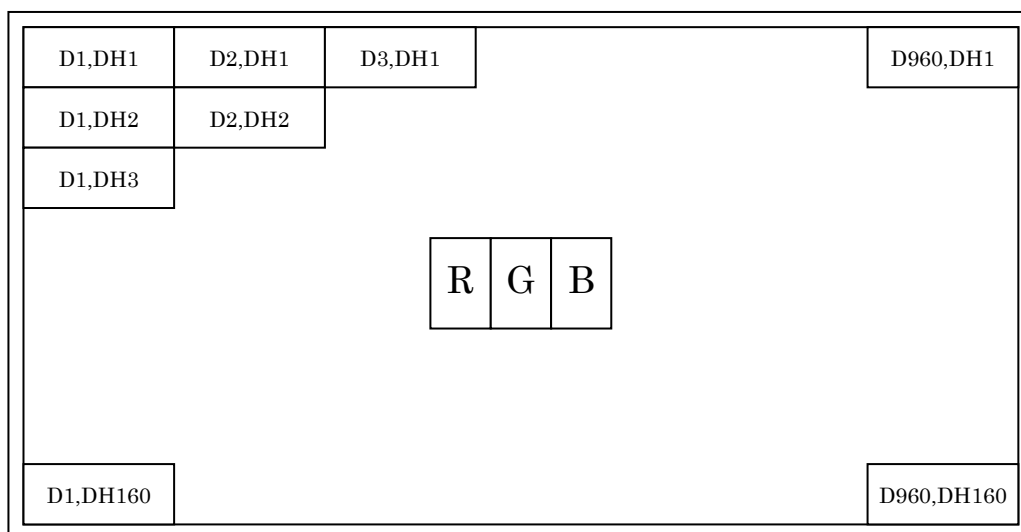
Do not input the serial signal from outside for about of 5ms, as the signal to drive DAC is made after the releasing timing of the FREST reset signal after the power on of 3.3V.

When power ON, make the sequence of “3.3V power on → input of the input signal” as shown in the above.

When power OFF, make the reversed sequence of the power ON, i.e. release of the input signal →3.3V power OFF.

6-5) Input Data Signals and Display Position on the screen

↑  
U P



Display position of input data (H,V)

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

	Colors & Gray scale	Data signal														0 :Low level voltage					1 :High level voltage				
		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					
	Bleu	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.

## 8. Optical characteristics

Table 9

Ta=25°C, Vcc=+3.3V

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Remarks		
Viewing angle range	$\Delta \theta 11$ $\Delta \theta 12$	CR $\geq$ 100	30	40	-	°(degree)	【Note 9-1,2】		
	$\Delta \theta 21$ $\Delta \theta 22$	CR $\geq$ 100	35	45	-	°(degree)			
Contrast ratio	CRp	Perpendicular	700	1000	-		【Note 9-2】		
Response time	+25°C	Rise	$\tau_r$	Black=>White	-	12	20	ms	【Note 9-3】
				worst(L0→L8)	-	55	70	ms	
		Fall	$\tau_d$	White=>Black	-	5	10	ms	
				worst(L16→L8)	-	25	30	ms	
	0°C	Rise	$\tau_r$	Black=>White	-	15	20	ms	
				worst(L0→L8)	-	165	210	ms	
		Fall	$\tau_d$	White=>Black	-	12	20	ms	
				worst(L16→L8)	-	60	80	ms	
	-20°C	Rise	$\tau_r$	Black=>White	-	50	70	ms	
				worst(L0→L8)	-	540	750	ms	
		Fall	$\tau_d$	White=>Black	-	45	70	ms	
				worst(L16→L8)	-	190	280	ms	
-30°C	Rise	$\tau_r$	Black=>White	-	110	150	ms		
			worst(L0→L8)	-	1280	1650	ms		
	Fall	$\tau_d$	White=>Black	-	110	200	ms		
			worst(L16→L8)	-	460	650	ms		
White Luminance	Y	White: IF=100mA Red: IF=33mA	810	1055	-	cd/m <sup>2</sup>	【Note 9-4】		
White Luminance uniformity	-	9 point Lmax / Lmin White: IF=100mA Red: IF=33mA	-	1.35	1.45		【Note 9-7】		
Gamma value	-	Perpendicular at L31	1.76	2.2	2.64		【Note 9-4】		
Chromaticity	White	x	White: IF=100mA Red: IF=33mA	0.272	0.322	0.377	【Note 9-4】		
		y		0.274	0.324	0.374			
	Red	x		0.595	0.645	0.695			
		y		0.266	0.316	0.366			
	Green	x		0.311	0.361	0.411			
		y		0.502	0.552	0.602			
	Blue	x		0.106	0.156	0.206			
		y		0.094	0.144	0.194			
	Black	x		-	(0.285)	-		【Note 9-4】 reference value	
		y		-	(0.288)	-			
off-state	x	off-state	-	(0.302)	-	【Note 9-8】			
	y		-	(0.325)	-	reference value			
LED life time	+25°C	-	Continuation	10,000	-	-	hour	【Note 9-5】	
	-30°C	-	Intermittent	2,000	-	-	time	【Note 9-6】	

※Measure after 30 minutes of power on. The optical measurement of the characteristic is to be done in the condition which is equal to the darkroom or use the measuring method described in the following Fig.( i ).

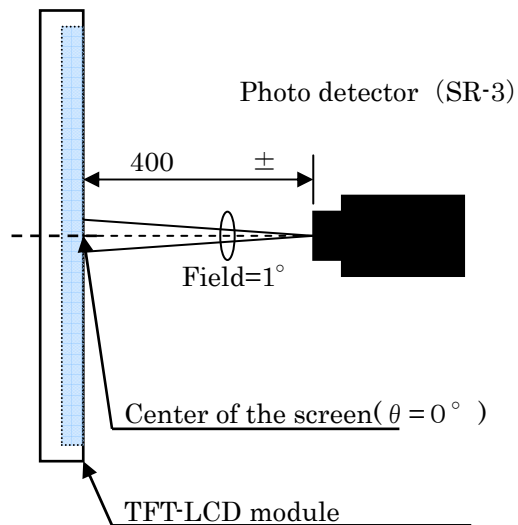


Fig.( i ) Measuring method of optical characteristics

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

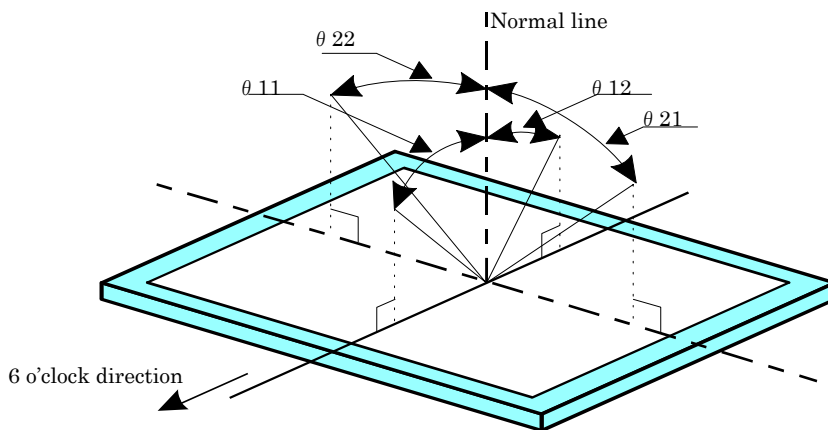


Fig.(ii) Definition for viewing angle

【Note 9-2】 Contrast ratio is defined as follows:

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

Measured by SR-3.

【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".

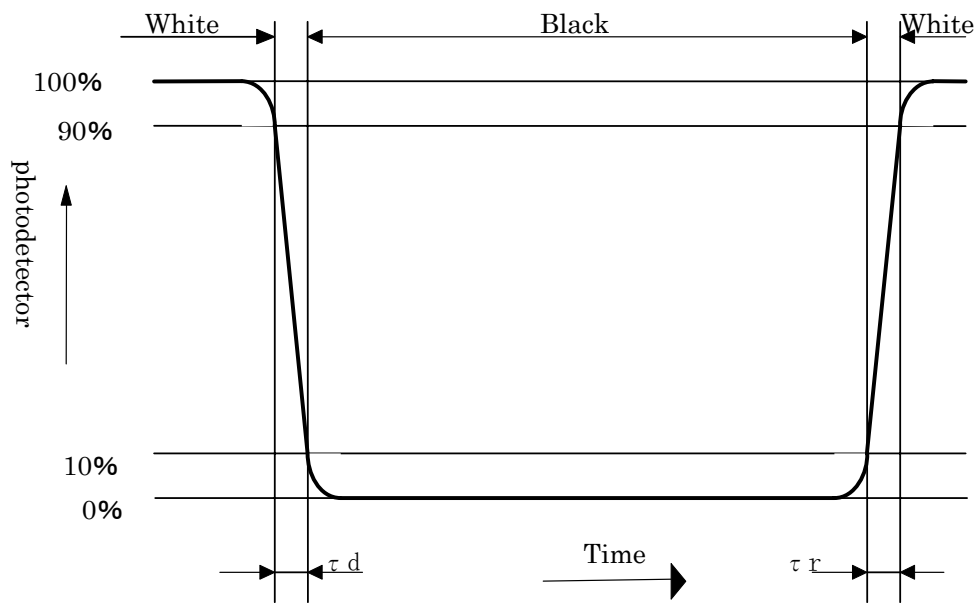
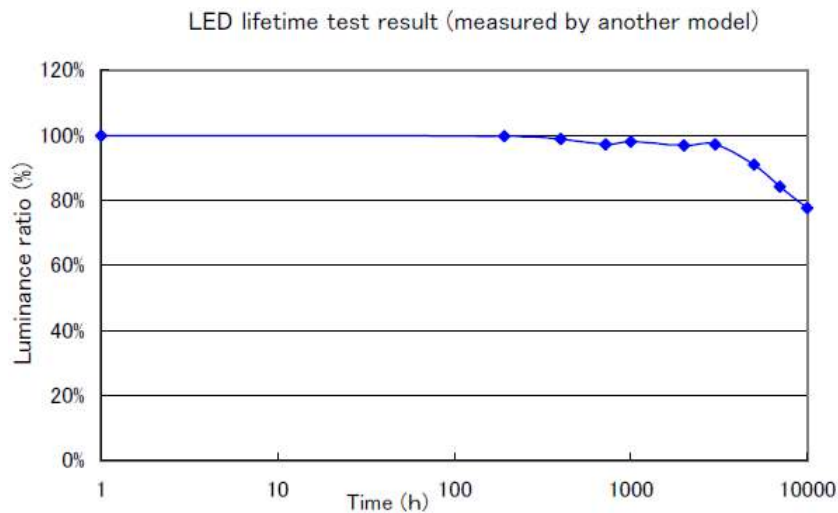


Fig.(iii)

【Note 9-4】 Measured on the center area of the panel at a viewing cone  $1^\circ$  by TOPCON luminance meter SR-3.(After 30 minutes operation)

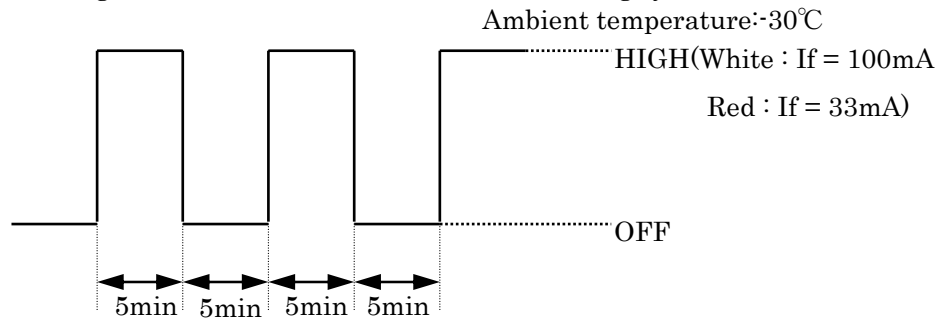
【Note 9-5】 Backlight life time is defined as the time when the brightness of the panel not to become less than 50% of the original value in the continuous operation under the condition of LED forward current  $I_f(\text{White})=100\text{mA}$ ,  $I_f(\text{Red})=33\text{mA}$ .

<Reference data>

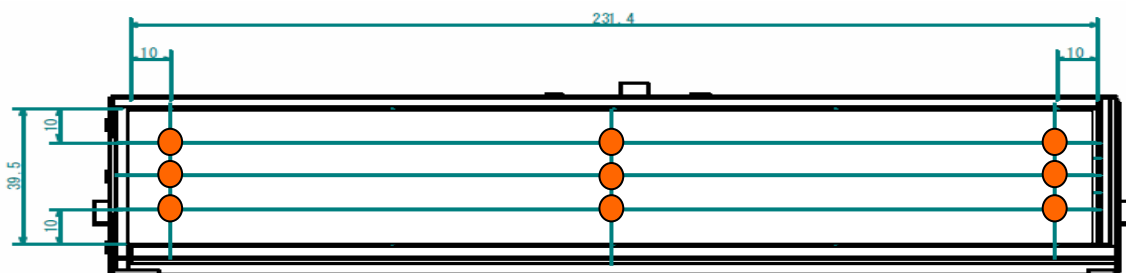




【Note 9-6】 The intermittent cycles is defined as a time when brightness is not become under 50% of the original value under the condition of following cycle.



【Note 9-7】 Measuring point is defined as follows.



【Note 9-8】 Measuring instrument : Minolta CM-2002

Measuring condition : SCE mode, 2° , D65 light source

## 9. Display quality

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

## 10. Handling instructions

### 10-1) Handling of LED-FPC

- ① Please bend FPC only in the direction of an inner side.
- ② Please do not hang a LCD module or do not apply excessive power for FPC.

### 10-2) Mounting of module

- ① On mounting the module, 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.
- ② Please power off the module when you connect the input/output connector.

### 10-3) Precautions in mounting

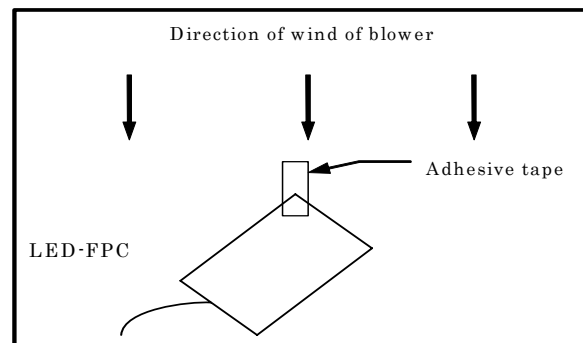
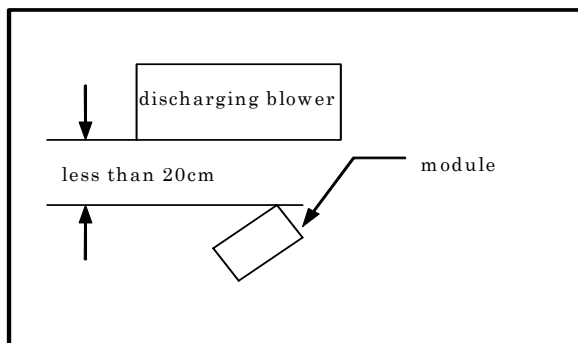
- ① Polarizer which is made of soft material and susceptible to flaw must be handled carefully.  
Protection sheet is applied on the surface to protect it against scratches and dirties. It is recommended to remove the protection sheet immediately before the use by taking care of static electricity.
- ② Precautions in removing the protection sheet
  - A) Working environment  
When the protection sheet is removed, 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 from dust and with an adhesive mat on the doorway
- c) Advisable humidity: 50%~70%      Advisable temperature: 15°C~27°C
- 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 protection sheet near discharging blower so as to protect polarizer against flow.
- c) Remove the protection sheet, pulling adhesive tape slowly to your side taking 5 or more second.
- d) After removing the protection sheet, pass the module to the next work process preventing 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, to use adhesive tape is recommended to remove them softly from the panel.

- ③ 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.
- ④ TFT-LCD module uses glass which breaks or cracks easily if dropped or bumped on hard surface. Handle with care.
- ⑤ Since CMOS LSI is used in this module, take care of static electricity and earth your body when handling.

10-4) Caution of product design

The LCD module shall be protected against water or salt-water by the waterproof cover. Take measures against the interferential radiation from module, not to interfere surrounding appliances.

10-5) Others

- ① Do not expose the module to direct sunlight or intensive ultraviolet rays for several hours or more; liquid crystal is deteriorated by ultraviolet rays.
- ② Store the module at a temperature near the room temperature. If lower than the rated storage temperature, liquid crystal solidifies, causing the panel to be damaged. If higher than the rated storage temperature, liquid crystal turns into isotropic liquid and may not recover.
- ③ If LCD panel breaks, there may be a possibility that the liquid crystal leaks out 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.
- ④ Observe all other precautionary requirements in handling general electronic components.
- ⑤ Be careful since image retention may occur when a fixed pattern is displayed for a long time.

**11. Packing form** (See Fig.3)

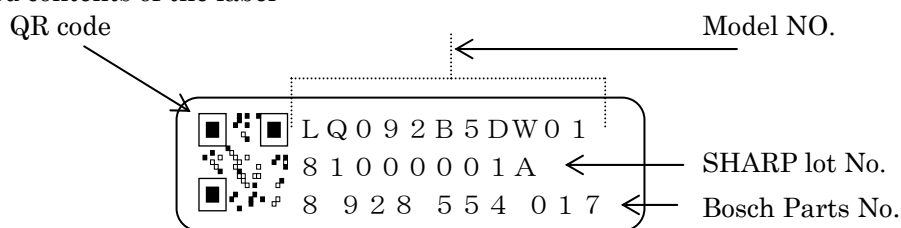
- a) Piling number of cartons : MAX 10
- b) Package quantity in one carton 30 pcs
- c) Carton size: 573×373×203 mm
- d) Total mass of one carton filled with full modules: 8.1 kg
- e) Conditions for storage.

Environment

- ①Temperature : 0~40°C
- ②Humidity : 60%RH or less (at 40°C)  
No dew condensation at low temperature and high humidity.
- ③Atmosphere :Harmful gas, such as acid or alkali which corrodes 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.

**12. Indication of lot number**

- ①Attached location of the label : See Fig.8 (Outline Dimensions).
- ②Indicated contents of the label



contents of lot No. the 1st figure ·· production year (ex. 2008 : 8)  
 the 2nd figure ·· production month 1,2,3,·····,9,X,Y,Z  
 the 3rd~7th figure ·· serial No. 00001~  
 the 8th figure ·· revision marks A,B,C··

**13. Fab locations**

Panel production : SHARP (Mie factory) — Mie Tech  
 LCD assembly : K Tech (Mie)

14. Reliability test

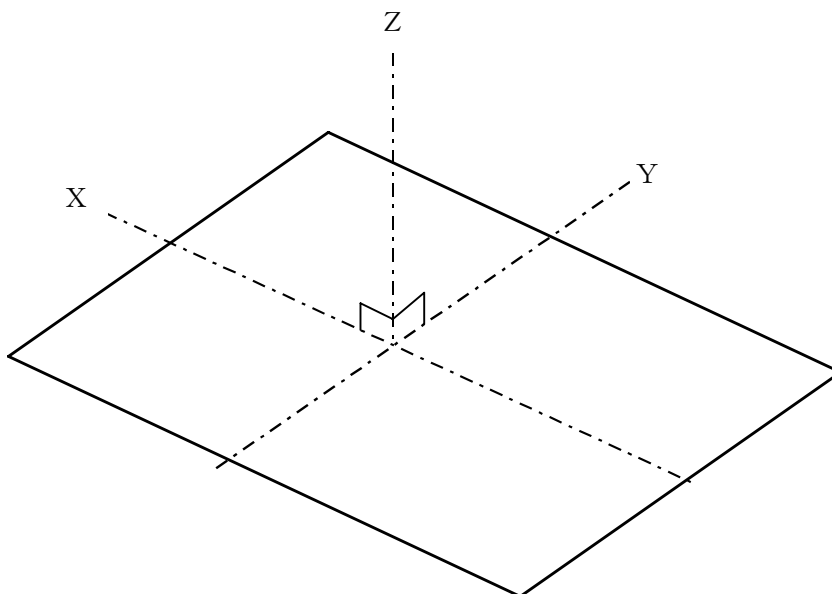
Table 10

No.	Test items	Test conditions
1	High temperature storage test	Ta=+85°C 240h
2	Low temperature storage test	Ta=-40°C 240h
3	High temperature And high humidity operating test	Tp=+60°C, 90%RH 240h
4	High temperature operating test	Tp=+85°C 240h
5	Low temperature operating test	Ta=-30°C 240h
6	Electro static discharge test	±200V, 200pF(0Ω) 1 times for each terminals
7	Shock test	980m/s <sup>2</sup> · 6ms, ±X, ±Y, ±Z 3times for each direction (JIS C0041,A-7 condition C)
8	Vibration test	Frequency range : 8~33.3Hz , Stroke : 1.3mm Frequency range : 33.3Hz~400Hz , Acceleration : 28.4 m/s <sup>2</sup> Cycle : 15 minutes X,Z 2 hours for each directions, 4 hours for Y direction (total 8 hours) (JIS D1601)
9	Heat shock test storage test	Ta=-30~+85°C , 200cycles (0.5h) (0.5h)

Ta= Ambient temperature, Tp= Panel temperature

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

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



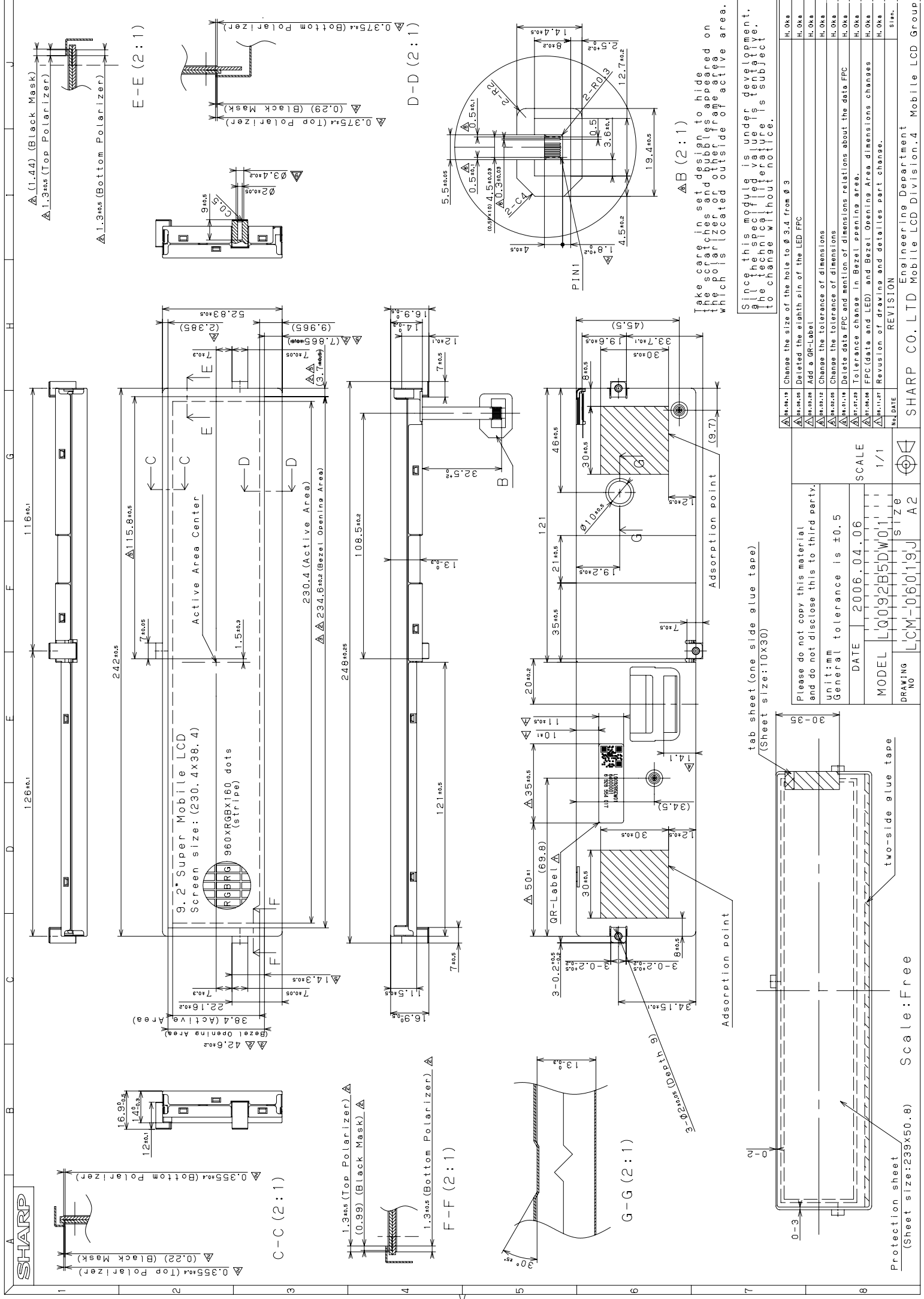


Fig.2 Outline dimensions

Take care in set design to hide the scratches and bubbles appeared on the polarizer or other frame area which is located outside of active area.

Since this module is under development, all the specified value is tentative. The technical literature is subject to change without notice.

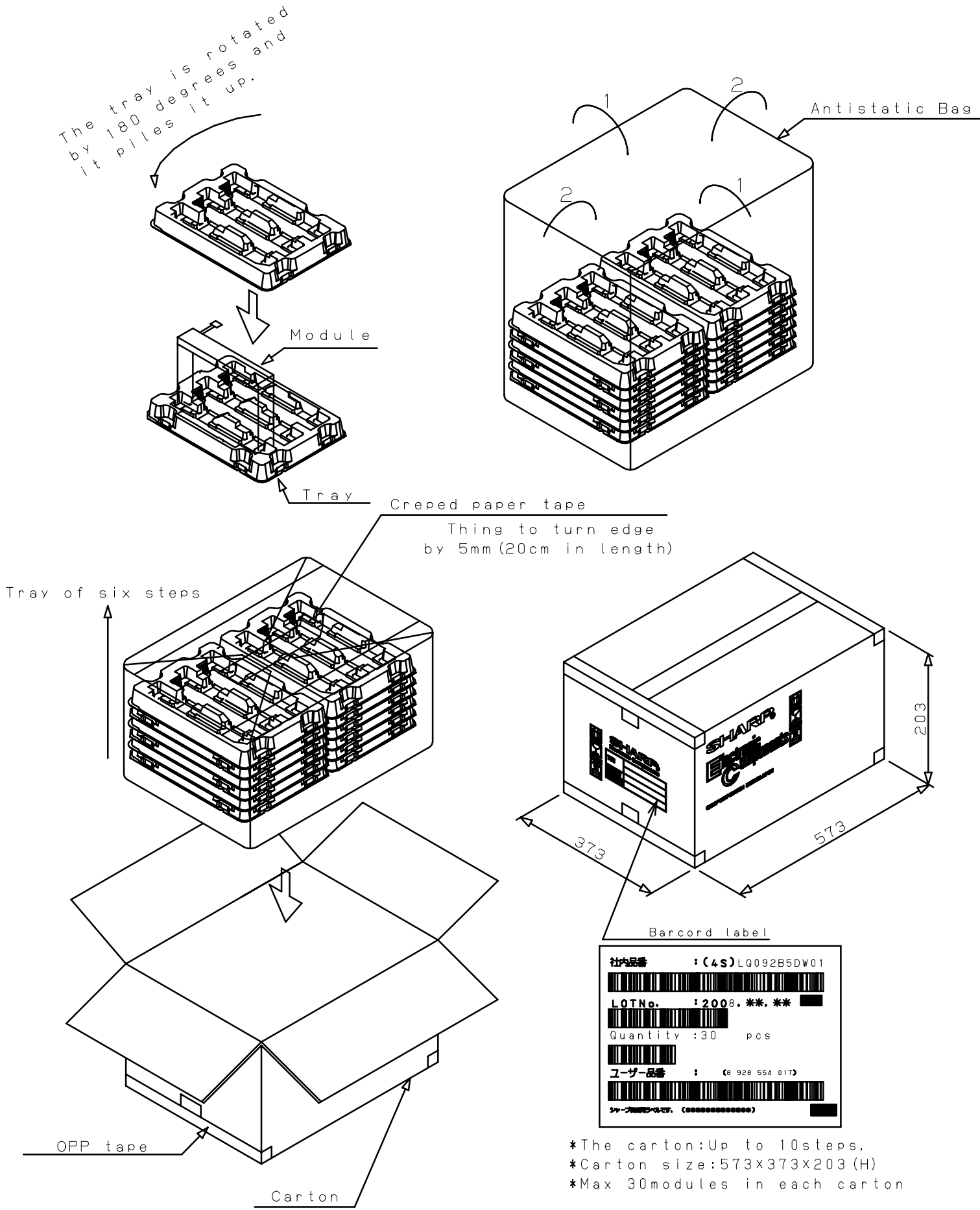


Fig.3 Packing form