DEVICE SPECIFICATION FOR

TFT - LCD module

MODEL No. LQ092B5DW01

PART No.   8 928 554 017

CUSTOMER'S APPROVAL

DATE _____

BY _____

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RECORDS OF REVISION

ＭＯＤＥＬ　Ｎｏ：LQ092B5DW01

SPEC No.	Date	NO.	PAGE	SUMMARY	NOTE
LCY-08041	2008. 4. 28		-	-	1st Issue
LCY-08041A	2008. 9. 24	A	19	Drawing change	2nd Issue
				LCM-06019H → LCM-06019J	
				Deletion of the 8th line of LED LPC	
				Change of the hole size of rear case	
LCY-08041B	2008.12.01	B	12	Add and revise the optical characteristics	3rd Issue
				- Viewing angle range	
				- White Luminance uniformity	
				- Gamma value	
				- Chromaticity (off-state)	
LCY-08041C	2009.02.09	C	12	Revise the optical characteristics	4th Issue
				- White Luminance	
				(Y)min.750cd/m^2 => 810 cd/m^2,	
				typ.1000 cd/m^2 => 1055 cd/m^2	

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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	
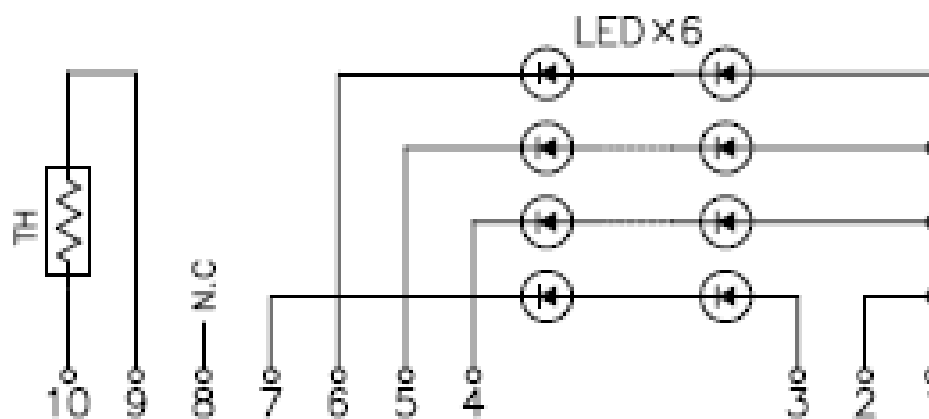
【Note 4-1】
　　　Number of White LED
　　　　　Parallel：3 chains
　　　　　Series：6 pcs

　　　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	℃	【Note 5-3,4】
Operating temperature (panel surface)	Topr1	-30	85	℃	【Note 5-3,4,5】
Operating temperature (ambient temperature)	Topr2	-30	70	℃	【Note 5-6】

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

【Note 5-2】 LED ambient temperature：25℃

【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℃. 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 Ta=＋25℃.

【Note 5-6】 In the case that ambient temperature is exceeded 58℃, 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	Vcc	+3.0	+3.3	+3.6	V	【Note 6-1】
	Current dissipation	Icc	-	400	450	mA	【Note 6-2】
Permissive input ripple		VRF	-	-	200	mVpp	
Input Low voltage		VIL	0	-	$0.3 \times Vcc$	V	【Note 6-3】
Input High voltage		VIH	$0.7 \times Vcc$	-	Vcc	V	
Low level Input current 1		IIL1	-	-	1.0	μA	【Note 6-4】
High level Input current 1		IIH1	-	-	1.0		
Low level Input current 2		IIL2	-	-	3.0	μA	【Note 6-5】
High level Input current 2		IIH2	-	66	180		
Low level Input current 3		IIL3	-	66	180	μA	【Note 6-6】
High level Input current 3		IIH3	-	-	3.0		

【Note 6-1】
  Vcc-turn-on condition
   $0 \leqq t1 \leqq 5ms$
   $0 \leqq t2 \leqq 5ms$
   $0 \leqq t3 \leqq 5ms$
     $t4 > 1s$
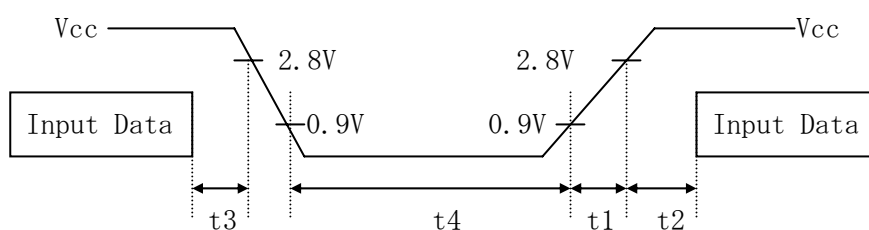
Vcc-dip condition
  1)   in case $2.8V \leqq Vcc \leqq 3.0, td \leqq 10ms$
  2)   in case $Vcc < 2.8V$, Vcc-dip conditions
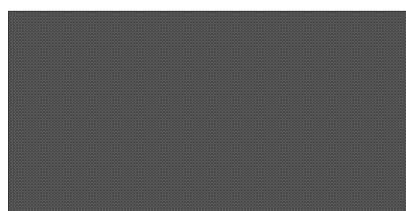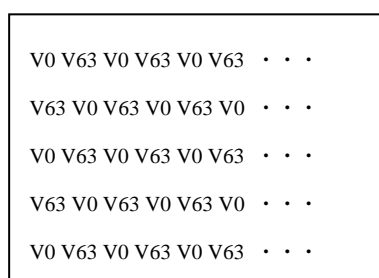   Should also follow the Vcc-turn-on conditions.
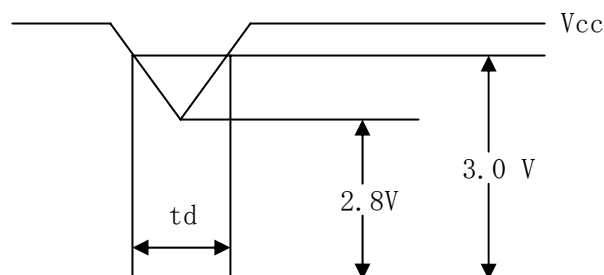
【Note 6-2】
    Timing: Typical
    Vcc   : 3.3V
    Situation: Black(V0) and White(V63) of 18 bits video is inverted at every 1H1V
                                  .

```
V0 V63 V0 V63 V0 V63  ・・・
V63 V0 V63 V0 V63 V0  ・・・
V0 V63 V0 V63 V0 V63  ・・・
V63 V0 V63 V0 V63 V0  ・・・
V0 V63 V0 V63 V0 V63  ・・・
```

<< 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	MIN	TYP	MAX	Unit	Remarks
Forward voltage	Vf+25	－	18.5	21.6	V	Ta=25℃,IF＝100mA
Forward voltage	Vf-30	－	－	23.1	V	Ta=-30℃,IF=100mA
Forward current	IF	－	100	－	mA	Per terminal
Power consumption	Wf	－	5.54	－	W	【Note7-1】

    Table 7-2 (for Red LED)

Parameter	Symbol	MIN	TYP	MAX	Unit	Remarks
Forward voltage	Vf+25	－	12.0	14.5	V	Ta=25℃,IF＝33mA
Forward voltage	Vf-30	－	－	15.7	V	Ta=-30℃,IF=33mA
Forward current	IF	－	33	－	mA	
Power consumption	Wf	－	0.4	－	W	【Note7-1】

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

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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]	Freqency	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)	μs	
		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	
	Freqency		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	【Note8-1】

【Note8-1】
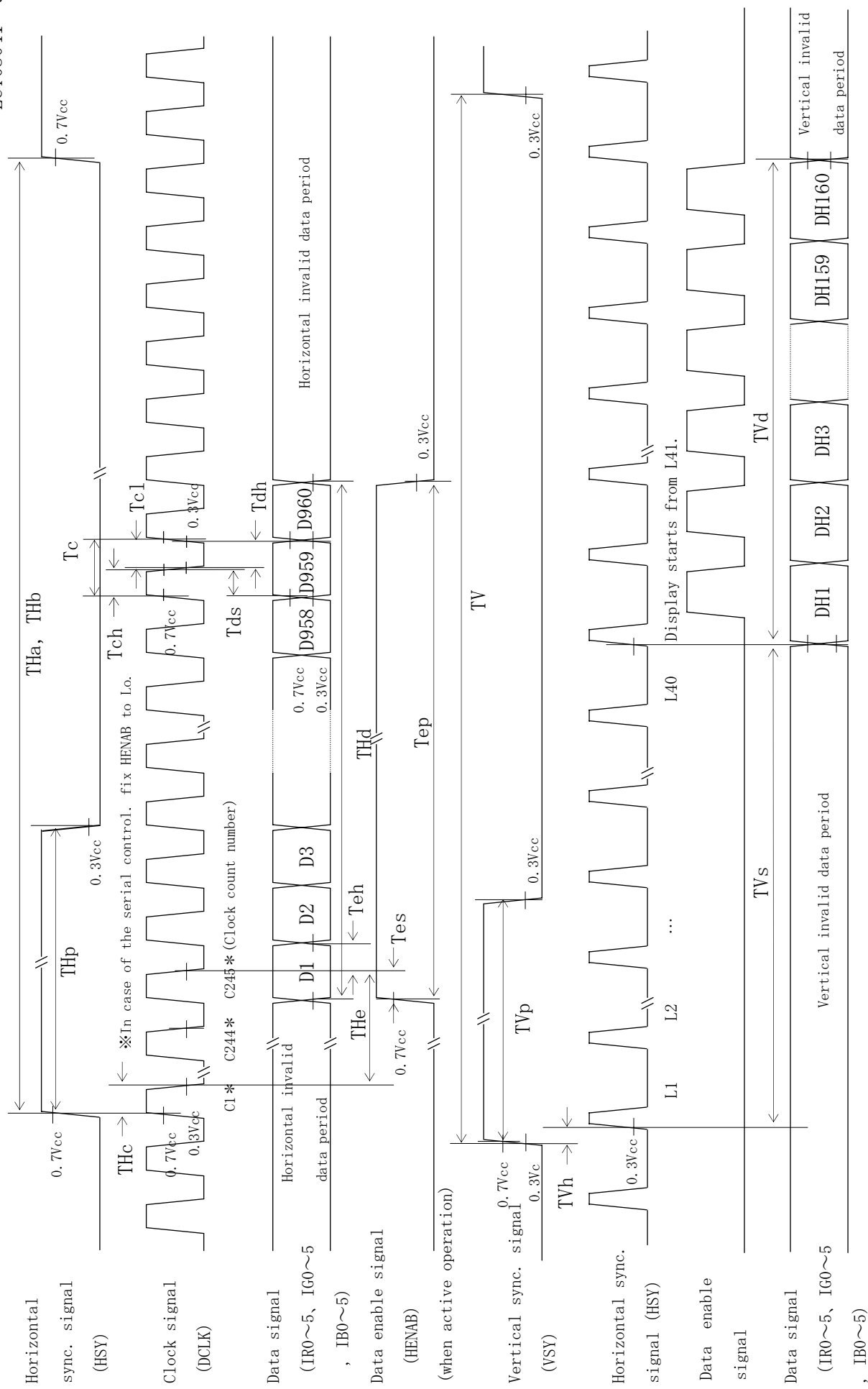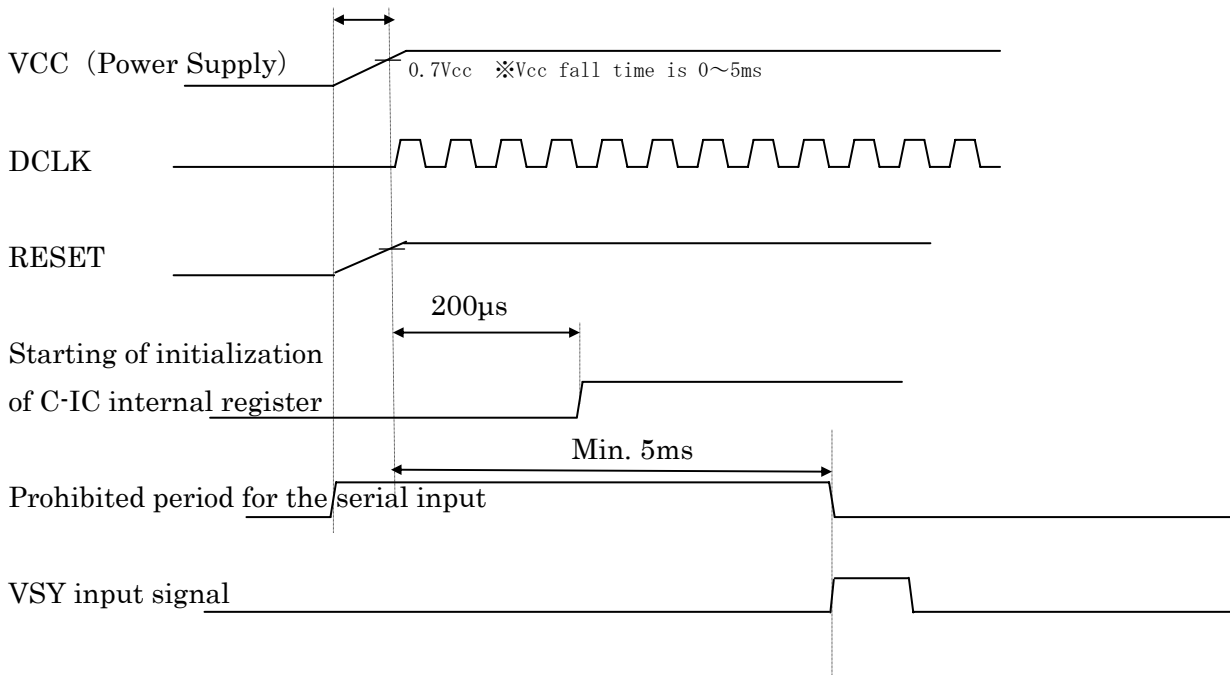　　Note for setting the Horizontal display starting position (The：phase difference between HSY falling HENAB rising)

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Horizontal sync. signal (HSY)

Clock signal (DCLK)

Data signal (IR0〜5, IG0〜5, IB0〜5)

Data enable signal (HENAB)

(when active operation)

Vertical sync. signal (VSY)

Horizontal sync. signal (HSY)

Data enable signal

Data signal (IR0〜5, IG0〜5, IB0〜5)

0.7Vcc

THa, THb

THp

THc

0.7Vcc
0.3Vcc

0.3Vcc

※In case of the serial control. fix HENAB to Lo.

C1 * C244 * C245 * (Clock count number)

Horizontal invalid data period

THe

0.7Vcc
0.3Vcc

Tes

Teh

THe

D1 D2 D3

Tc

Tcl

0.3Vcc

Tch

0.7Vcc

Tds

Tdh

D958 D959 D960

0.7Vcc
0.3Vcc

THd

Tep

0.3Vcc

Horizontal invalid data period

TV

TVp

0.3Vcc

TVs

L1 L2 ... L40

Display starts from L41.

TVd

0.7Vcc
0.3Vc

TVh

0.3Vcc

Vertical invalid data period

DH1 DH2 DH3 DH159 DH160

Vertical invalid data period

Fig.1 Input timing chart (HENAB : active)

6-4) Power On Sequence

VCC（Power Supply）
0.7Vcc ※Vcc fall time is 0〜5ms

DCLK

RESET

200μs

Starting of initialization
of C-IC internal register

Min. 5ms

Prohibited period for the serial input

VSY input signal

    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

D1,DH1	D2,DH1	D3,DH1		D960,DH1
D1,DH2	D2,DH2			
D1,DH3				
		R G B		
D1,DH160				D960,DH160
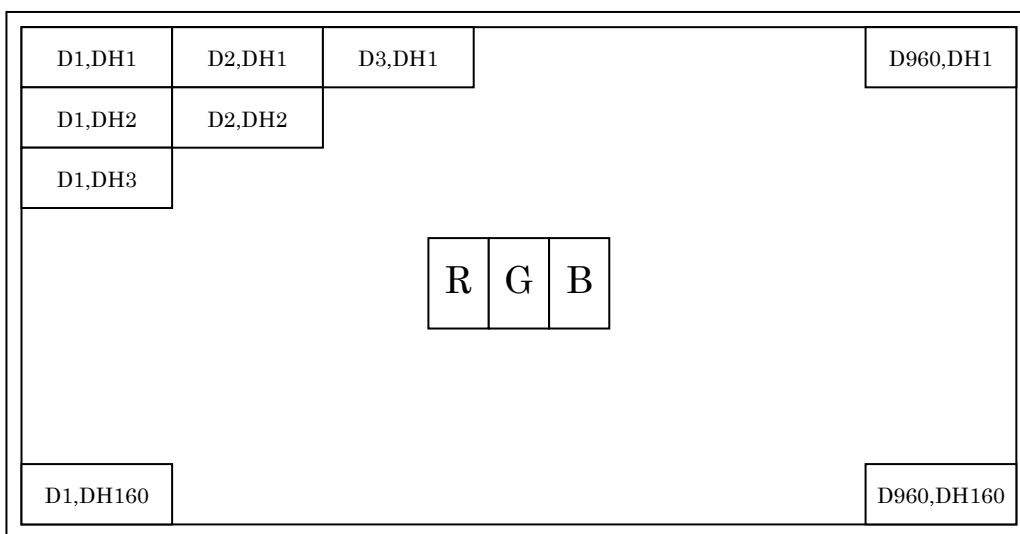
Display position of input data (H,V)

7. 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
	Bleu	GS63	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

Data signal　　0 :Low level voltage　　1 :High level voltage

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℃, Vcc=+3.3V

Parameter			Symbol	Condition	Min	Typ	Max	Unit	Remarks
Viewing angle range			Δθ11 Δθ12	CR≧100	30	40	- -	°(degree)	【Note 9-1,2】
			Δθ21 Δθ22	CR≧100	35	45	-	°(degree)	
Contrast ratio			CRp	Perpendicular	700	1000	-		【Note 9-2】
Response time	+25℃	Rise	τr	Black=>White	-	12	20	ms	【Note 9-3】
				worst(L0→L8)	-	55	70	ms	
		Fall	τd	White=>Black	-	5	10	ms	
				worst(L16→L8)	-	25	30	ms	
	0℃	Rise	τr	Black=>White	-	15	20	ms	
				worst(L0→L8)	-	165	210	ms	
		Fall	τd	White=>Black	-	12	20	ms	
				worst(L16→L8)	-	60	80	ms	
	-20℃	Rise	τr	Black=>White	-	50	70	ms	
				worst(L0→L8)	-	540	750	ms	
		Fall	τd	White=>Black	-	45	70	ms	
				worst(L16→L8)	-	190	280	ms	
	-30℃	Rise	τr	Black=>White	-	110	150	ms	
				worst(L0→L8)	-	1280	1650	ms	
		Fall	τd	White=>Black	-	110	200	ms	
				worst(L16→L8)	-	460	650	ms	
White Luminance			Y	White: IF=100mA Red: IF=33mA	810	1055	-	cd/m²	【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】
			y		-	(0.288)	-		reference value
	off-state		x	off-state	-	(0.302)	-		【Note 9-8】
			y		-	(0.325)	-		reference value
LED life time	+25℃		-	Continuation	10,000	-	-	hour	【Note 9-5】
	−30℃		-	Intermittent	2,000	-		time	【Note 9-6】

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※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).

Photo detector （SR-3）

400　　±

Field=1°

Center of the screen(θ=0°)

TFT-LCD module
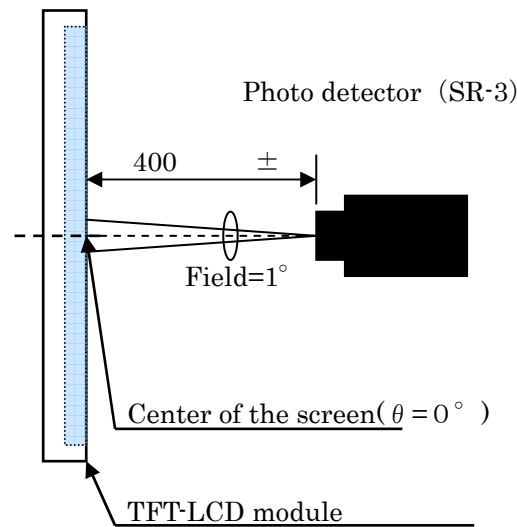
Fig.(ⅰ)　Measuring method of optical characteristics

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

Normal line

θ22

θ11　　　　θ12

θ21

6 o'clock direction
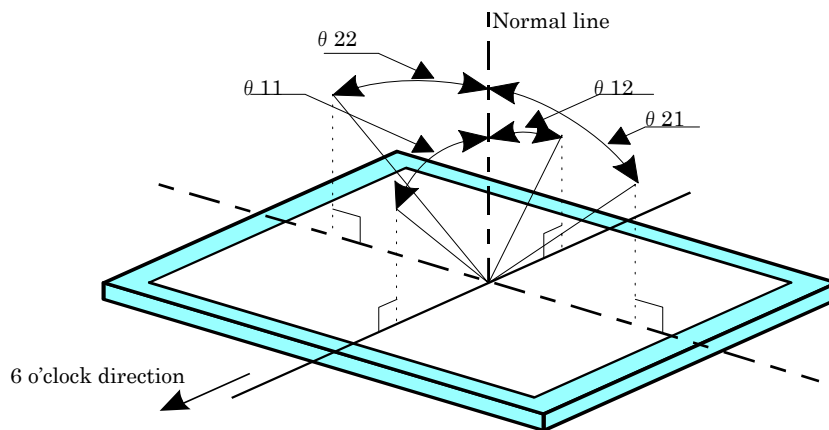
Fig.(ii) Definition for viewing angle

【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".
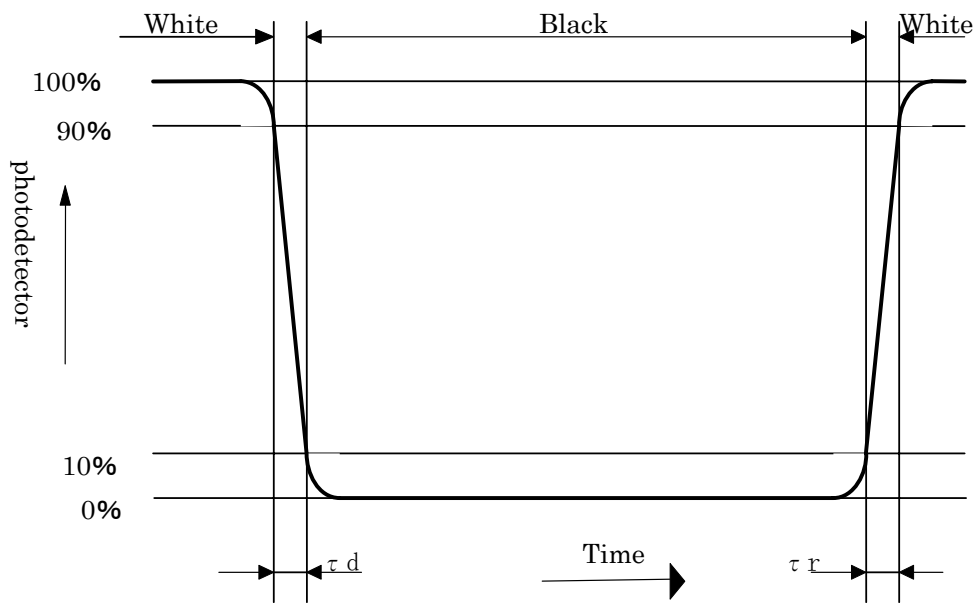
Fig.(iii)

【Note 9-4】 Measured on the center area of the panel at a viewing cone 1° 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 If(White)=100mA, If(Red)=33mA.

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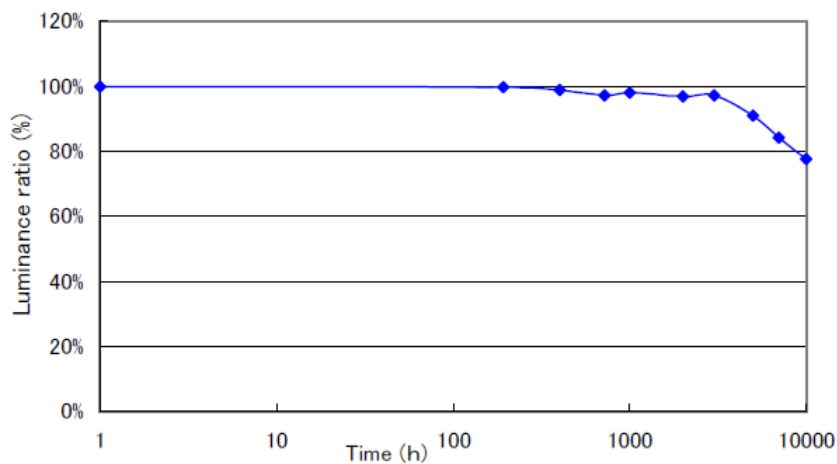
【Note 9-6】 The intermittent cycles is defined as a time when brightness is not become under 50%
of the original value under the condition of following cycle.

Ambient temperature:-30℃

HIGH(White：If = 100mA

Red：If = 33mA)

OFF

5min 5min 5min 5min
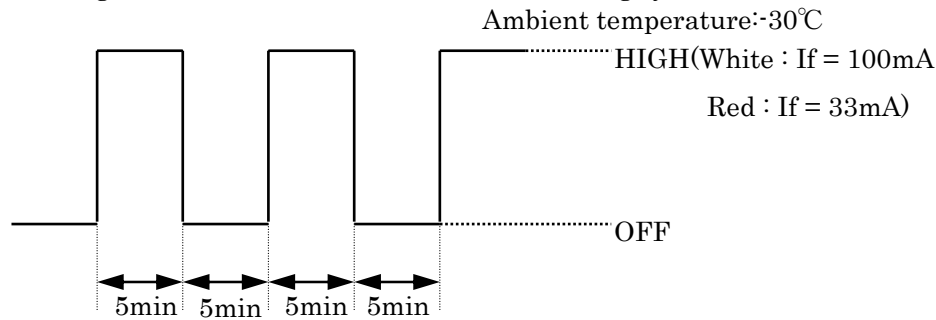
【Note 9-7】 Measuring point is defined as follows.
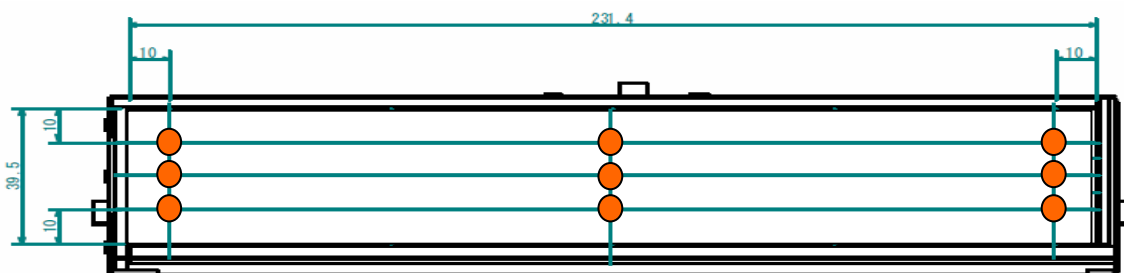
【Note 9-8】 Measuring instrument：Minolta CM-2002
Measuring condition：SCE mode, 2°, D65 light source

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

10-2) Mounting of module
①On 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.
②Please power off the module when you connect the input/output connector.

10-3) Precautions in mounting
①Polarizer 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.
②Precautions 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 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 protection sheet near discharging blower
　　so as to protect polarizer against flaw.
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.

discharging blower

less than 20cm

module

Direction of wind of blower

LED-FPC

Adhesive tape
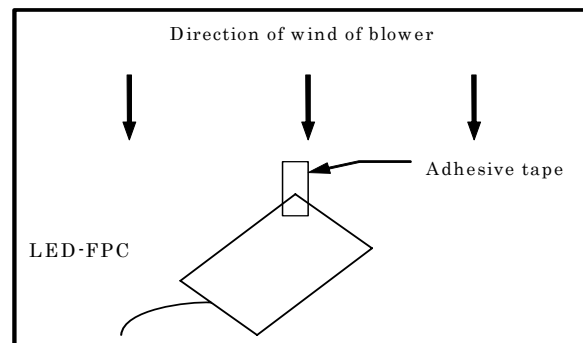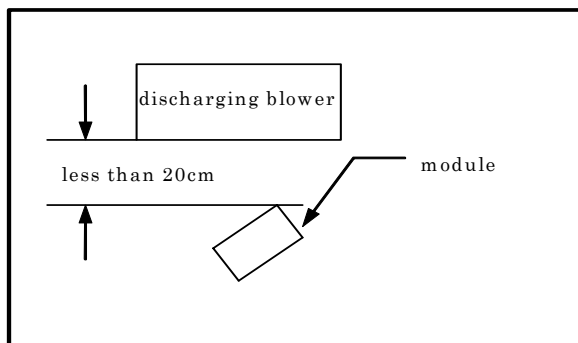
e) Method of removing dust from polarizer
・ Blow off dust with N2 blower for which static electricity preventive
　measure has been taken.
・ Since polarizer is vulnerable, wiping should be avoided.
　But when the panel has stain or grease, to use adhesive tape is recommended
　to remove them softly from the panel.

③When 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.
④TFT-LCD module uses glass which breaks or cracks easily if dropped or bumped on hard surface.
　Handle with care.
⑤Since 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
①Do not expose the module to direct sunlight or intensive ultraviolet rays for several hours or more;
　liquid crystal is deteriorated by ultraviolet rays.
②Store 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.
③If 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.
④Observe all other precautionary requirements in handling general electronic components.
⑤Be careful since image retention may occur when a fixed pattern is displayed for a long time.
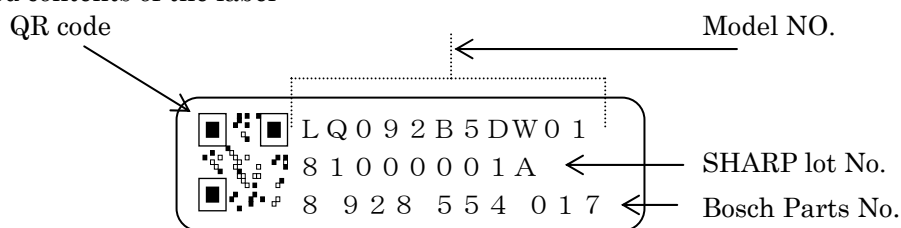
11. Packing form　(See Fg.3)

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℃
　　　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 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 asearth, etc.

12.Indication of lot number

　　①Attached location of the label　　　　：See Fig.8 (Outline Dimensions).
　　②Indicated contents of the label
　　　　QR code　　　　　　　　　　　　　　　　　　　　Model NO.

```
■▩■ L Q 0 9 2 B 5 D W 0 1
▩▩▩ 8 1 0 0 0 0 0 1 A        ←  SHARP lot No.
■▩▩ 8  9 2 8  5 5 4  0 1 7   ←  Bosch Parts No.
```

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

　　Panal production：　SHARP (Mie factory)　－　Mie Tech
　　LCD assembly　　：　K Tech (Mie)
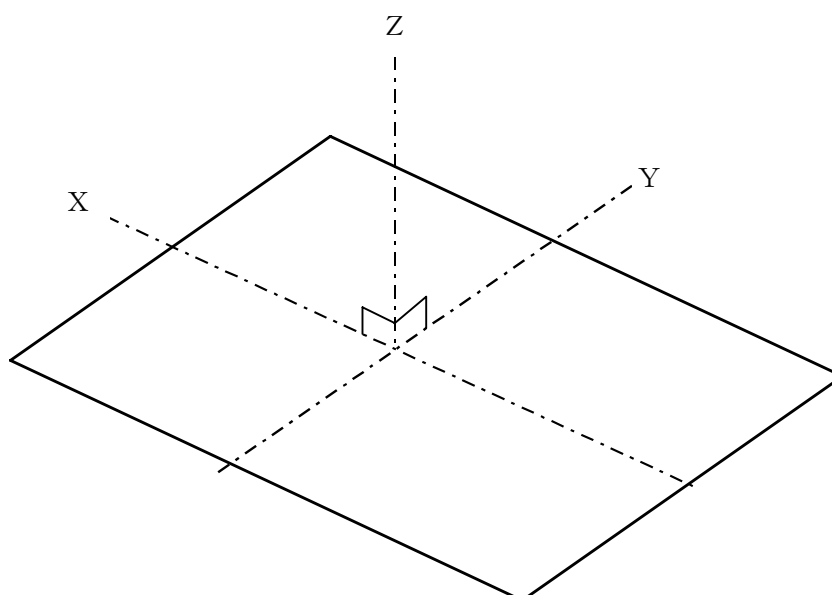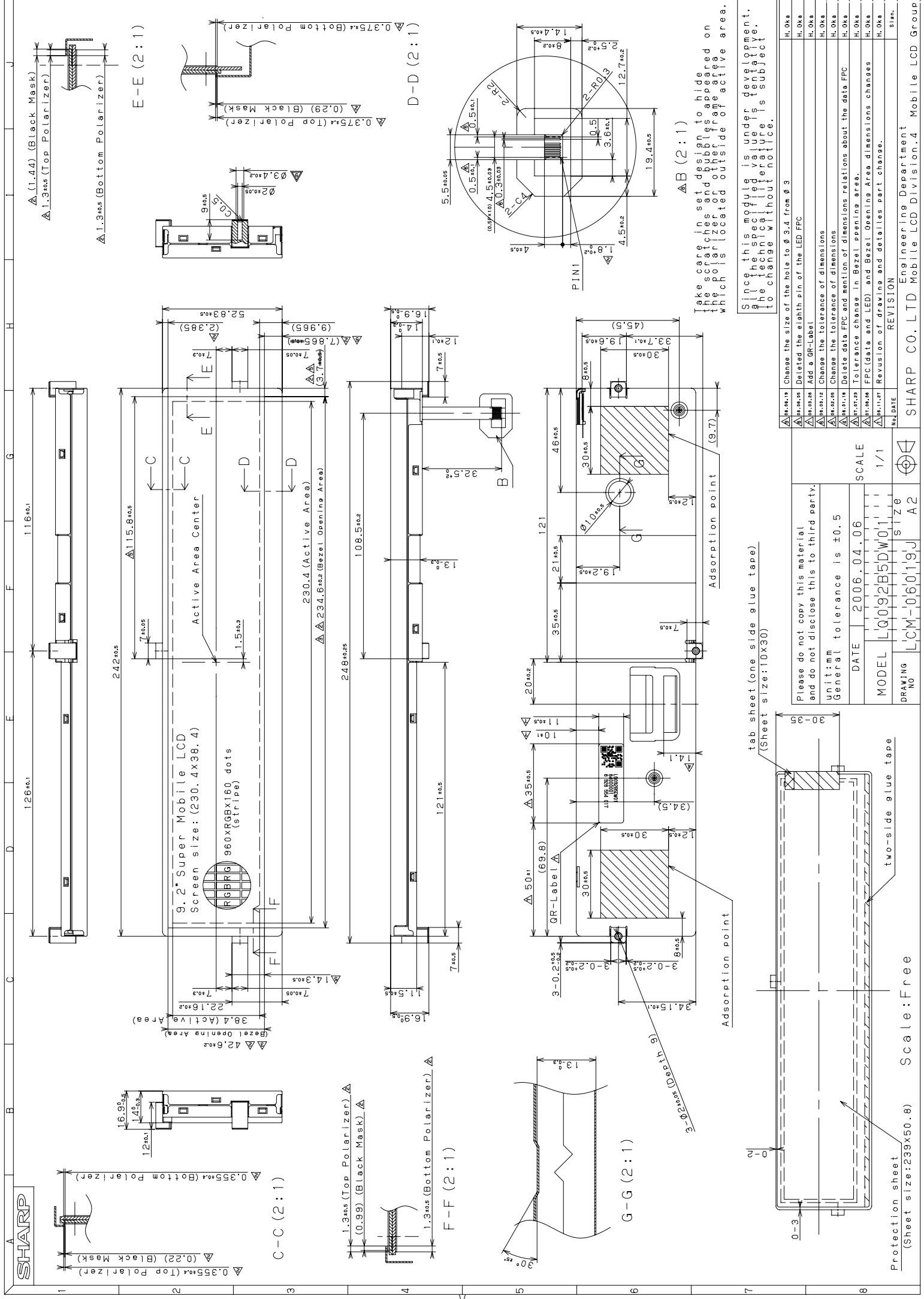
14. Reliability test

Table 10

No.	Test items	Test conditions
1	High temperature storage test	Ta=+85℃　　　　　　　240h
2	Low temperature storage test	Ta=-40℃　　　　　　　240h
3	High temperature And high humidity operating test	Tp=+60℃, 90%RH　　　240h
4	High temperature operating test	Tp=+85℃　　　　　　　240h
5	Low temperature operating test	Ta=-30℃　　　　　　　240h
6	Electro static discharge test	±200V, 200pF(0Ω)　　　1 times for each terminals
7	Shock test	980m/s^2・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^2 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℃ , 　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:

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Fig.2 Outline dimensions

LCY08041-20

The tray is rotated by 180 degrees and it piles it up.

Module

Tray

Antistatic Bag

Creped paper tape
Thing to turn edge by 5mm(20cm in length)

Tray of six steps

OPP tape

Carton

Barcord label

社内品番 :(4S)LQ092B5DW01

LOTNo. :2008.**.**

Quantity :30 pcs

ユーザー品番 : (8 928 554 017)

シャープ製造ラベルです。(***********)

203

573

373

*The carton:Up to 10steps.
*Carton size:573×373×203(H)
*Max 30modules in each carton

Fig.3 Packing form