REVISION :

DEVICE SPECIFICATION FOR

TFT-LCD Module

MODEL No.

LQ070Y3DG05

These parts are complied with the RoHS directive.

☐ CUSTOMER'S APPROVAL

BY _____

BY _____
J.Kawanishi

DEVELOPMENT DEPARTMENT I
DISPLAY DEVICE DIVISION II
DISPLAY DEVICE GROUP
SHARP CORPORATION

RECORDS OF REVISION

Model No. : LQ070Y3DG05

SPEC No.	DATE	REVISED No	PAGE	SUMMARY	NOTE
LD−25104A	2013/2/6			First edition	
SPEC No.	DATE	REVISED No	PAGE	SUMMARY	NOTE

NOTICE

This publication is the proprietary of SHARP and is copyrighted, with all rights reserved. Under the copyright laws, no part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical for any purpose, in whole or in part, without the express written permission of SHARP. Express written permission is also required before any use of this publication may be made by a third party.

The application circuit examples in this publication are provided to explain the representative applications of SHARP's devices and are not intended to guarantee any circuit design or permit any industrial property right or other rights to be executed. SHARP takes no responsibility for any problems related to any industrial property right or a third party resulting from the use of SHARP's devices, except for those resulting directly from device manufacturing processes.

SHARP reserves the right to make changes in the specifications, characteristics, data, materials, structures and other contents described herein at any time without notice in order to improve design or reliability. Contact SHARP in order to obtain the latest specification sheets before using any SHARP's device. Manufacturing locations are also subject to change without notice.

When using the products covered herein, please observe the conditions and the precautions written herein.
In no event shall the company be liable for any damages resulting from failure to strictly adhere to these conditions and precautions.

The devices in this publication are designed for general electronic equipment use.

The appropriate design measures should be taken to ensure reliability and safety when SHARP's devices are used for equipment such as:
・Transportation control and safety equipment(i.e.,aircraft, trains, automobiles, etc.)

・Traffic signals	・Gas leakage sensor breakers
・Alarm equipment	・Various safety devices etc.

SHARP's devices shall not be used for equipment that requires extremely high level of reliability, such as:

・Aerospace equipment	・Military and space applications
・Nuclear power control equipment	・Medical equipment for life support

Contact a SHARP representative, in advance, when intending to use SHARP's devices for any "specific" applications other than those recommended by SHARP.

The device in the production is based on RoHS instructions 95/02.
And RoHS instructions materials and chlorinated paraffin are not included intentionally.

The ozone-depleting substances is not used.

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

Contact and consult with a SHARP representative in advance, if there are any questions about the contents of this publication.

<div align="center">- Contents -</div>

1. Applicable TFT-LCD module

This specification applies to the color TFT-LCD module LQ070Y3DG05.

2. Overview

This module is a color active matrix LCD module incorporating amorphous silicon TFT(Thin Film Transistor).
It is composed of a color TFT-LCD panel, driver ICs, control circuit, power supply circuit and a White-LED
Backlight unit. Graphics and texts can be displayed on a 800×RGB×480dots panel with about 16.77million
colors by 24bit [8bit × RGB] data signals, timing signals and supplying +3.3V DC supply voltages for
TFT-LCD panel driving and DC supply voltage for backlight.

The maximum viewing angle is in the 6o'clock direction.
The 12o'clock direction is difficult to reverse the grayscale.

3. Mechanical Specifications

Items	Specifications	Unit
Display size	17.8（7inch）Diagonal	cm
Active area	153.60（H）×86.64（V）	mm
Pixel format	800（H）×480（V） （1 pixel＝R＋G＋B dot）	pixel
Dimension aspect ratio	16 ：9	
Pixel pitch	0.192（H）×0.1805（V）	mm
Pixel configuration	R,G,B vertical stripe	
Display mode	Normally white	
Unit outline dimensions	165.0（W）×104.0（H）×7.4(D)	mm
Mass(MAX)	193.9	g
Surface treatment	Anti-glare and hard-coating 3H	

4. Input Signal Assignment

4-1. CN1

Using connector: 089H50-000000-G2-R (Starconn) （50pin FFC Type）

Pin	Symbol	Function	Remark
1	GND	Ground	
2	GND	Ground	
3	VDD	LCD power supply	
4	VDD	LCD power supply	
5	U/D	Vertical scanning direction control signal	【Note4-3】
6	L/R	Horizontal scanning direction control signal	【Note4-3】
7	GND	Ground	
8	R0	RED Data signal (LSB)	【Note4-1】
9	R1	RED Data signal	【Note4-1】
10	R2	RED Data signal	
11	R3	RED Data signal	
12	GND	Ground	
13	R4	RED data signal	
14	R5	RED data signal	
15	GND	Ground	
16	R6	RED data signal	
17	R7	RED Data signal (MSB)	
18	GND	Ground	
19	G0	GREEN data signal(LSB)	【Note4-1】
20	G1	GREEN data signal	【Note4-1】
21	G2	GREEN data signal	
22	G3	GREEN data signal	
23	GND	Ground	
24	G4	GREEN data signal	
25	G5	GREEN data signal	
26	GND	Ground	
27	G6	GREEN data signal	
28	G7	GREEN data signal(MSB)	
29	GND	Ground	
30	B0	BLUE data signal(LSB)	【Note4-1】
31	B1	BLUE data signal	【Note4-1】
32	B2	BLUE data signal	
33	B3	BLUE data signal	
34	GND	Ground	
35	B4	BLUE data signal	
36	B5	BLUE data signal	
37	GND	BLUE data signal	
38	B6	BLUE data signal	
39	B7	BLUE data signal(MSB)	
40	GND	Ground	
41	DCLK	Clock signal for sampling each datum	【Note4-2】
42	GND	Ground	
43	DE	Data Enable signal	【Note4-4】
44	TEST	Please fix "Low".	
45	GND	Ground	
46	GND	Ground	
47	LED_PWM	PWM signal for backlight dimming	High Enable
48	LED_EN	ON/OFF control signal for backlight	High Enable
49	VLED	LED power supply for backlight	
50	VLED	LED power supply for backlight	

【Note4-1】

When input 18 bits RGB data, this terminals must be "Low" level.
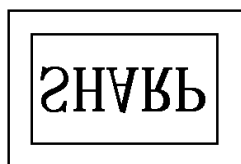
【Note4-2】
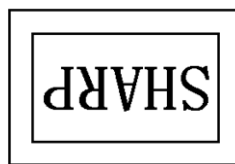
Data shall be latch at falling edgh of DCLK.

【Note4-3】

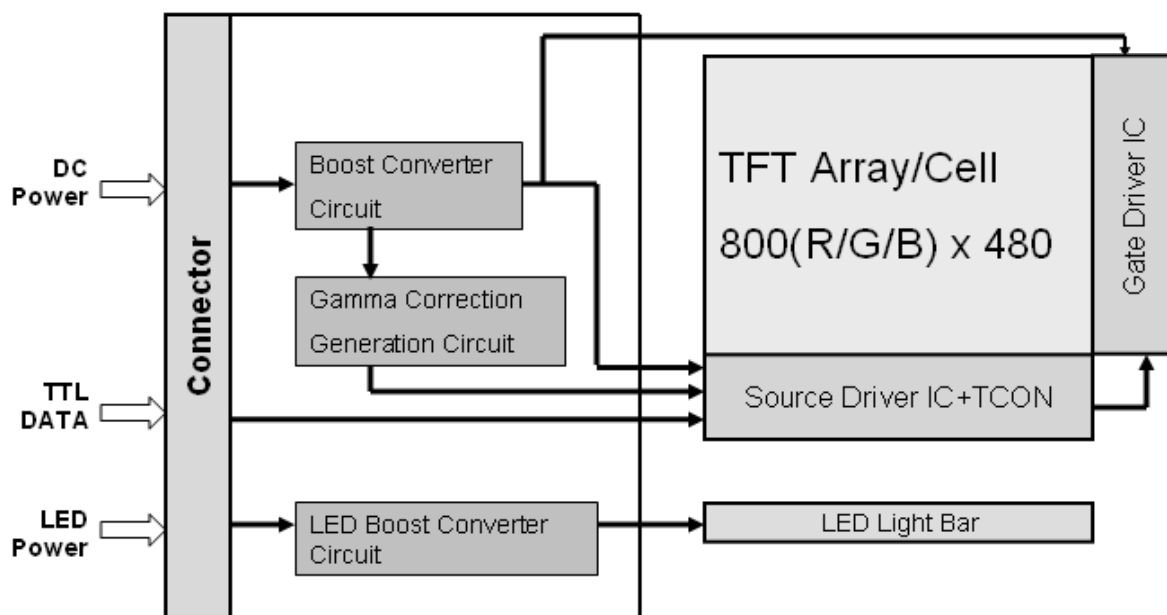R/L＝High、U/D＝Low

R/L＝Low、U/D＝Low

R/L＝High、U/D＝High

R/L＝Low、U/D＝High

【Note4-4】

Hsync/Vsync need not be input so that this model may drive only by the Data Enable signal.

4-2. Interface block diagram

5. Absolute Maximum Ratings

Parameter	Symbol	Condition	Ratings Min	Ratings Max	Unit	Remark
Supply voltage	V_{DD}	Ta=25℃	−0.3	4.0	V	【Note5-3】
	V_{LED}	Ta=25℃	−0.3	22.0	V	【Note5-3】
Input voltage	V_{I1}	Ta=25℃	−0.3	4.0	V	【Note5-3】 【Note5-4】
	V_{I2}	Ta=25℃	−0.3	6.0	V	【Note5-3】 【Note5-5】
Storage temperature	T_{STG}	—	−30	80	℃	【Note5-1】 【Note5-2】 【Note5-6】
Operating temperature	T_{OPA}	—	−20	70	℃	

【Note5-1】

Humidity：90%RH Max.(Ta≦40℃) Note static electricity.

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

【Note5-2】

The operating temperature guarantees only operation of the circuit. For contrast, response time and other factors related to display quality, judgment is done using the ambient temperature Ta=+25℃.

There is a possibility of causing deterioration in the irregularity and others of the screen and the display fineness though the liquid crystal module doesn't arrive at destruction when using it at 65～70℃.

There is a possibility of causing the fineness deterioration by the prolonged use in the (high temperature) humidity environment (60% or more).

【Note5-3】

Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.

【Note5-4】 R0～R7, G0～G7, B0～B7, DCLK, DE, U/D, L/R,
Do not use over V_{DD}+0.3V.

【Note5-5】 LED_PWM, LED_EN, Do not use over V_{DD}+0.3V.

【Note5-6】

Permanent damage may occur to the LCD module if beyond this specification.

Functional operation and LCD storage should be restricted to the conditions described under normal temperature (LCD outside).

6. Electrical Characteristics

6-1. TFT-LCD panel driving   Ta=+25℃

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
LCD supply voltage	V_{DD}		3.0	3.3	3.6	V	【Note6-2】
LCD current dissipation	I_{DD}	V_{DD}=3.3V	—	100	150	mA	Black pattern 60Hz
LCD power consumption	P_{DD}		—	—	0.5	W	
LCD rush current	I_{rush}		—	—	1.0	A	【Note6-3】
Permissive input ripple voltage	V_{RP}		—	—	100	mV_{P-P}	Vcc=3.3V
Input voltage (High)	V_{IH}		$0.7V_{DD}$	—	V_{DD}	V	【Note6-1】
Input voltage (Low)	V_{IL}		0	–	$0.3V_{DD}$	V	【Note6-1】
Input leak current(High)	I_{OH}		—	—	400	μA	V_I=+2.4V 【Note6-4】
Input leak current(Low)	I_{OL}		-10	—	+10	μA	V_I=0V 【Note6-4】

【Note6-1】 R0～R7, G0～G7, B0～B7, DE, DCLK, L/R, U/D

【Note6-2】 Vcc turn-on/off conditions
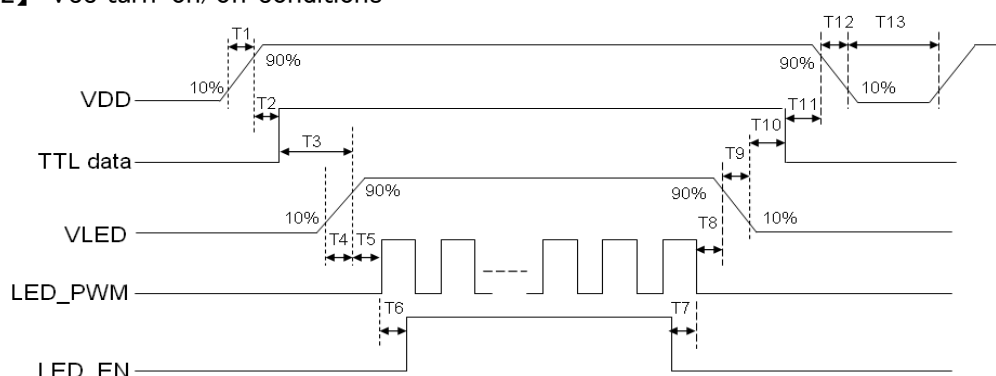
Symbol	Min.	Typ.	Max.	Unit
T1	0.5	–	10	ms
T2	30	–	90	ms
T3	200	–	–	ms
T4	0.5	–	–	ms
T5	10	–	–	ms
T6	10	–	–	ms
T7	0	–	–	ms

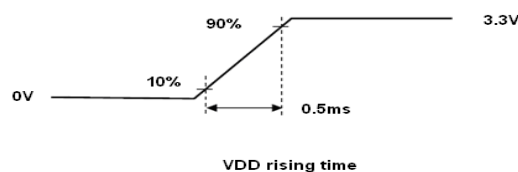| Symbol	Min.	Typ.	Max.	Unit
T8	10	–	–	ms
T9	–	10	30	ms
T10	200	–	–	ms
T11	0	–	50	ms
T12	–	10	30	ms
T13	500	–	–	ms

*TTL_DATA: R0～R7、G0～G7、B0～B7、DE、DCLK、L/R、U/D

・The relation between the data input and the backlight lighting will recommend the above-mentioned input sequence. When the backlight is turned on before the panel operates, there is a possibility of abnormally displaying. The liquid crystal module is not damaged.

・Please advise a power supply ON period that an input signal is not set to High-Z or it does not input an unusual signal.
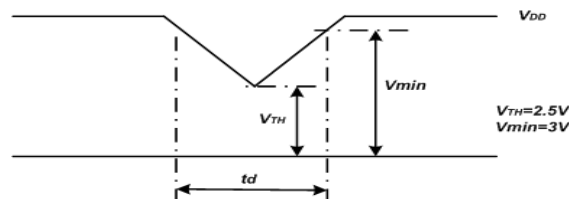
【Note6-3】
　LCD rush current measurement condition

VDD rising time

【Note6-4】
　V$_{DD}$ power dip condition

　　1) Vth< V$_{DD}$ <=Vmin
　　　td<=10ms

　　2) V$_{DD}$ < Vth

　　V$_{DD}$-dip conditions should also follow the on-off conditions for supply voltage.

6-2. Backlight driving Section

Ta＝+25℃

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark	
LED supply voltage	V$_L$	4.5	12.0	16.0	V		
LED power consumption	W$_L$	−	−	2.1	W	【Note6-2】	
Permissive input ripple voltage	V$_{RP\_BL}$	0	0	100	mV$_{P-P}$	V$_{DD}$=+12.0V	
LED rush current	I$_{Lrush}$	−	−	2.0	A	V$_{DD}$=+12.0V 【Note6-10】	
Input voltage (High)	V$_{LIH}$	2.5	3.3	5.5	V	【Note6-5】	
Input voltage (Low)	V$_{LIL}$	0	0	0.5	V	【Note6-5】	
Input leakage current (High)	I$_{LIH}$	—	—	800	μA	V$_{LI}$=2.5V V$_L$=12.0V	【Note6-6】
		—	—	+10	μA		【Note6-7】
Input leakage current (Low)	I$_{LIL}$	−10	—	+10	μA	V$_{LI}$=0V、V$_L$=12.0V 【Note6-5】	
PWM frequency	F$_{PWM}$	100	−	1,000	Hz	F$_{PWM}$≧1%	【Note6-12】
		100	−	5,000	Hz	F$_{PWM}$≧1%	
LED life time	L	20,000		0	h	【reference】 【Note6-9】 【Note6-11】	

【Note6-5】 LED_PWM、LED_EN

【Note6-6】 LED_PWM

【Note6-7】 LED_EN

【Note6-8】PWM Signal
　　　　　Low: LED OFF, High: LED ON
　　　　　F_{PWM} ＝ 1/t15
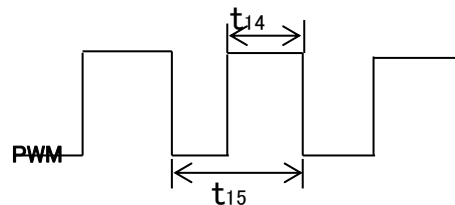　　　　　Duty 1% (at F_{PWM} <=1000Hz)　　: Min. Luminance
　　　　　Duty 100%　　　　　　　　　　　　: Max. Luminance

　　　　　Luminance changes in proportion to the duty ratio.

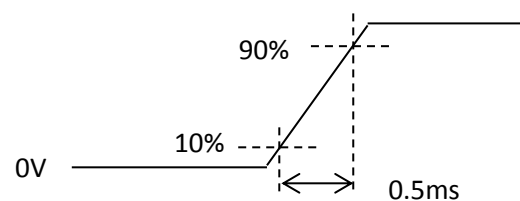　　　　　・Please advise PWM terminal is not set to High-Z.

　　　　　・When the frequency slows, the display fineness might decrease.

【Note6-9】
　　　　　Luminance becomes 50% of an initial value. (Ta＝25℃, PWM=100%)

【Note6-10】
　　　　　LED rush current measure condition

【Note6-11】

　　　　　The LED used in this LCD module is very sensitive to temperature change. If it operates for extremely
　　　　　long time under high temperature, it is possible rapidly to shorten the life time of LED.
　　　　　In case of such a condition, consult with us.

【Note6-12】

　　　　　When PWM signal is set "Low" more than 10ms, please turn off BL_EN.
　　　　　If PWM signal is input without reset of BL_EN ,Soft start function of LED driving circuit is invalid
　　　　　and inrush current may occur.

BL-EN　　　　　　　　　　　　　　Turn off　　　　BL-EN

PWM　　　　　　　　　over 10ms　　　　　　　PWM　　　　　　over 10ms

OK　　　　　　　　　　　　　　　　　　　　　　　NG
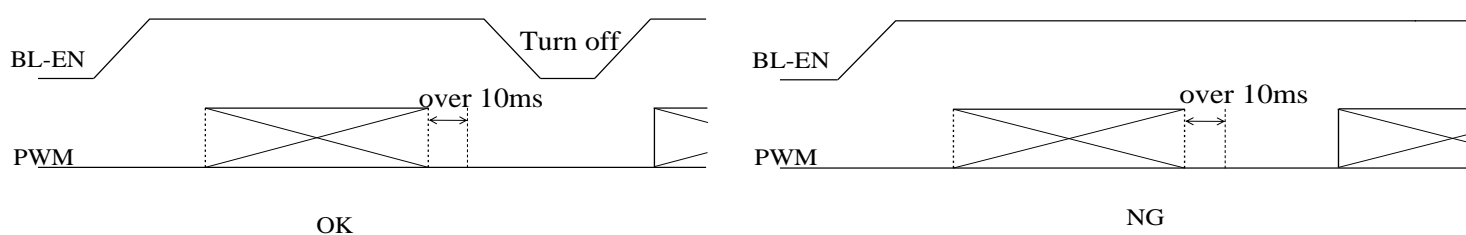
7. Timing Characteristics of Input Signals

7-1. Timing characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
Clock	Frequency	$1/T_C$	28.0	30.0	40.0	MHz	
	High time	T_{CH}	10	–	–	ns	
	Low time	T_{CL}	10	–	–	ns	
	Duty ratio	T_{CH}/T_C	40	50	60	%	
Data	Setup time	T_{DS}	8	–	–	ns	
	Hold time	T_{DH}	8	–	–	ns	
ENAB signal	Horizontal period	T_H	908	928	1080	clock	
	Horizontal display period	T_{HD}	800	800	800	clock	
	Vertical period	T_V	517	525	704	line	【Note7-1】
	Vertical display period	T_{VD}	480	480	480	line	
	Setup time	T_{ES}	8	–	–	ns	
	Hold time	T_{EH}	8	–	–	ns	

【Note7-1】

In case of using the long vertical period, the deterioration of display quality, flicker etc. may occur.
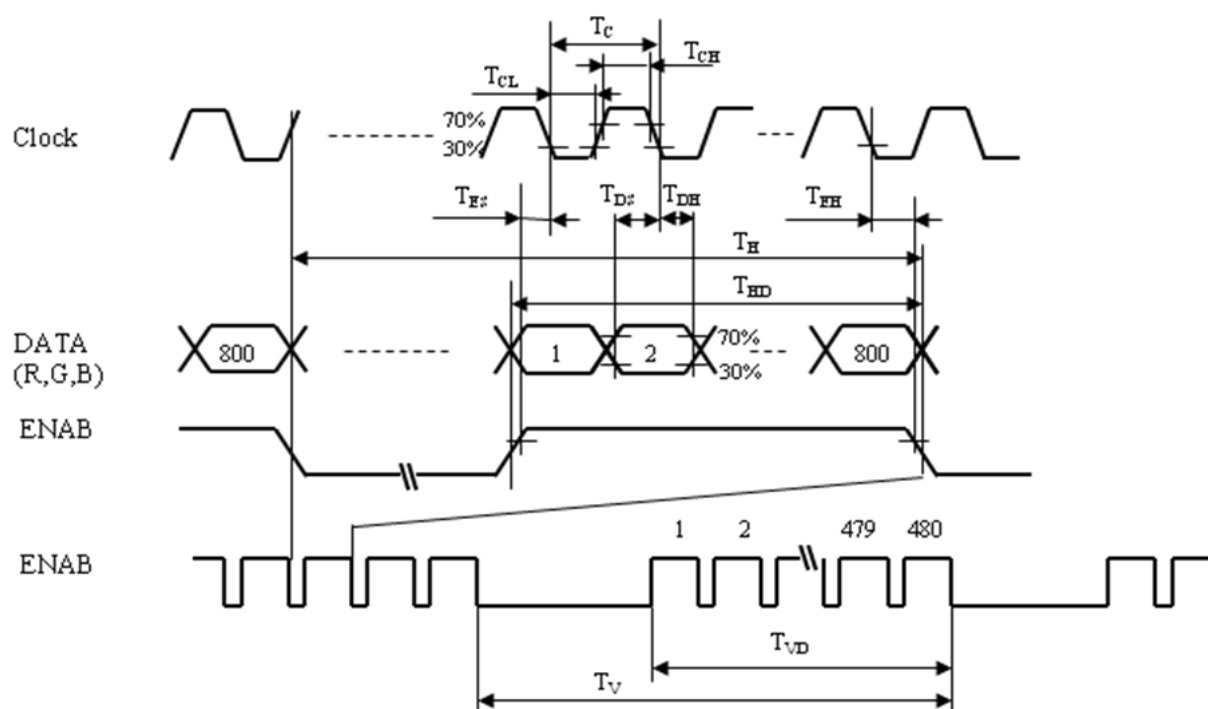
7-2. Input Data Signals and Display Position on the screen

R	G	B	R	G	B
(1, 1)			(2, 1)		

↑ UP

Display position of input data(H,V)

D(1,1) D(2,1) D(3,1)　　　　　　　　D(800 ,1)

D(1,2) D(2,2)

D(1,3)

R	G	B

D(1, 480)　　　　　　　　D(800 , 480)
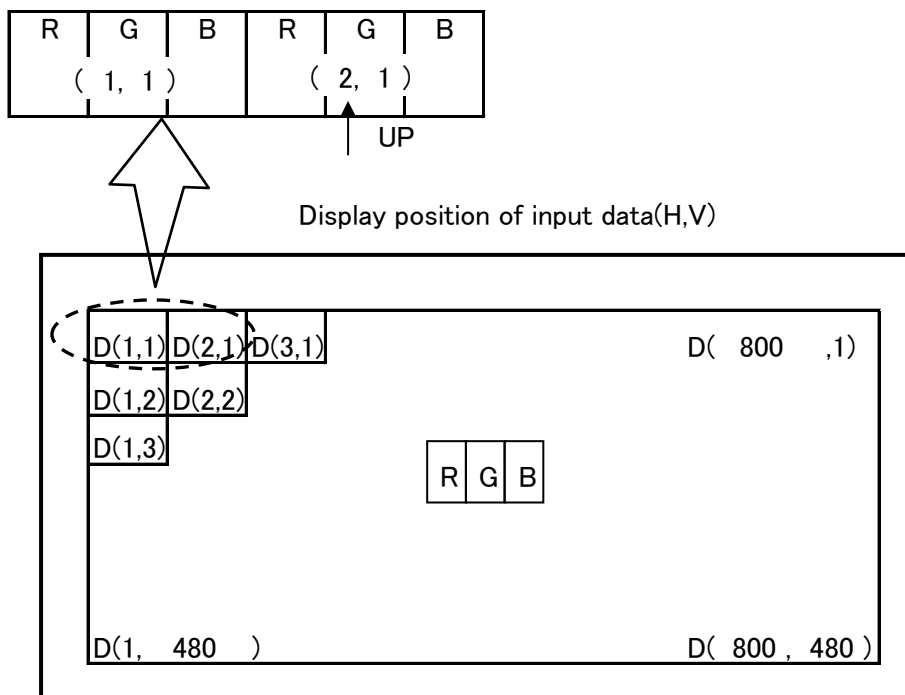
8.
Input Signals, Basic Display Colors and Gray Scale of Each Color

	Colors & Gray scale		R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B1	B2	B3	B4	B5	B6	B7
Basic Color	Black	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	—	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	—	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Cyan	—	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	—	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	—	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	—	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	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	1	1	1	1	1	1
Gray Scale of Red	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	↑	GS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	↑	↓				↓								↓								↓				
	↓	↓				↓								↓								↓				
	Brighter	GS253	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	↓	GS254	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	GS255	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	↑	GS1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	↑	↓				↓								↓								↓				
	↓	↓				↓								↓								↓				
	Brighter	GS253	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	↓	GS254	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Green	GS255	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale of Blue	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	↑	GS1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	↑	↓				↓								↓								↓				
	↓	↓				↓								↓								↓				
	Brighter	GS253	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1
	↓	GS254	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
	Blue	GS255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

0 : Low level voltage   1 : High level voltage

Each basic color can be displayed in 256 gray scales from 8 bit data signals. According to the combination of total 24 bit data signals, the 16,777,216-color display can be achieved on the screen.

9. Optical specification

Ta=+25°C, Vcc=+3.3V

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range	Horizontal	θ3,θ9	CR>10	60	70	–	Deg.	【Note9-1】 【Note9-2】 【Note9-4】
	Vertical	θ6		60	70	–	Deg.	
		θ12		40	50	–	Deg.	
Contrast ratio		CR	optimized angle	400	500	–		【Note9-2】 【Note9-4】
Response Time(White Black)		τr+τd		–	16	–	ms	【Note9-3】 【Note9-4】
Chromaticity of White		Wx	θ=0°	0.260	0.310	0.360		【Note9-4】
		Wy		0.280	0.330	0.380		
Luminance of white		Y_{L1}		280	350	–	cd/m^2	【Note9-4】
White Uniformity				–	–	1.43		【Note9-5】

※

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

The optical characteristics shall be measured in a dark room or equivalent state with the method shown in Fig.2 below.
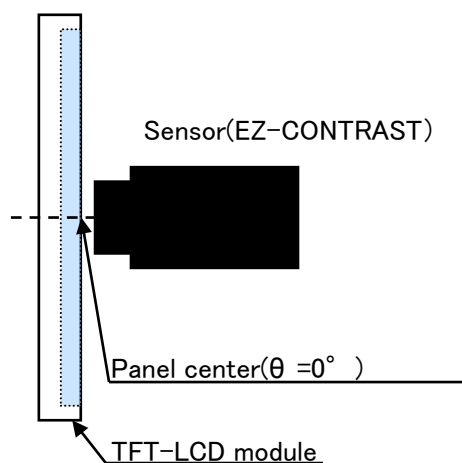

Sensor(EZ-CONTRAST)

Panel center(θ=0°)

TFT-LCD module

Fig2-1 Measuring setup for Viewing angle

Sensor
Response time(BM-5A/BM-7)
Contrast(SR-3)
Luminance(SR-3)
Chromaticity(SR-3)
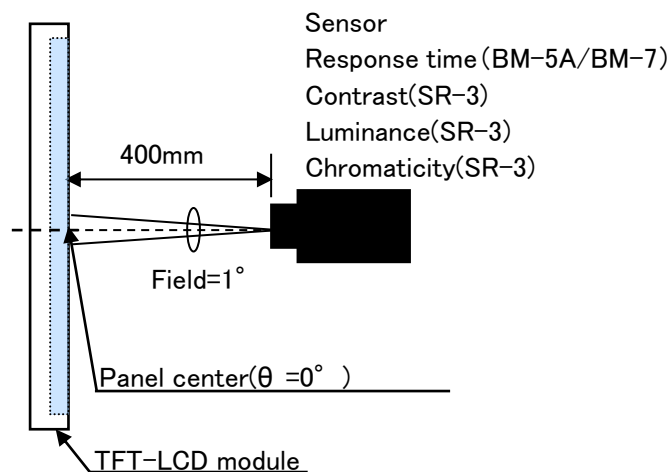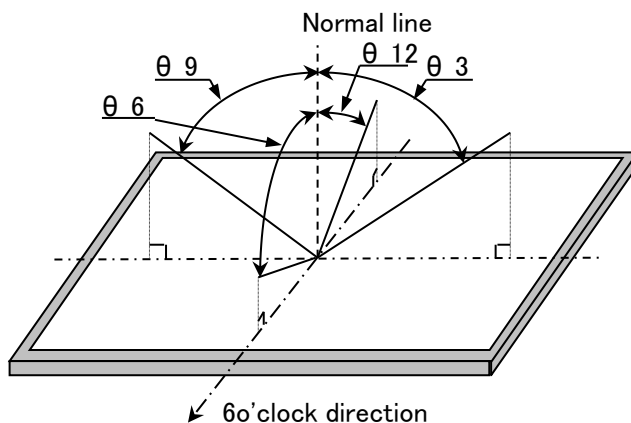
400mm

Field=1°

Panel center(θ=0°)

TFT-LCD module

Fig2-2 Measuring setup for Luminance, Chromaticity and Response

Fig.2 Optical characteristics measurement method

【Note9-1】 Definitions of viewing angle range

Normal line

θ9 θ12 θ3

θ6

6o'clock direction

【Note9-2】 Definition of contrast ratio

The contrast ratio is defined as the following.

$$\text{Contrast Ratio(CR)} = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

【Note9-3】 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".
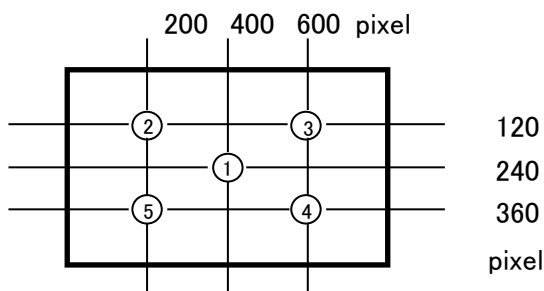
Photo detector Output (Relative Value)

White   Black   White

100%
90%

10%
0%

T_d T_r

Time
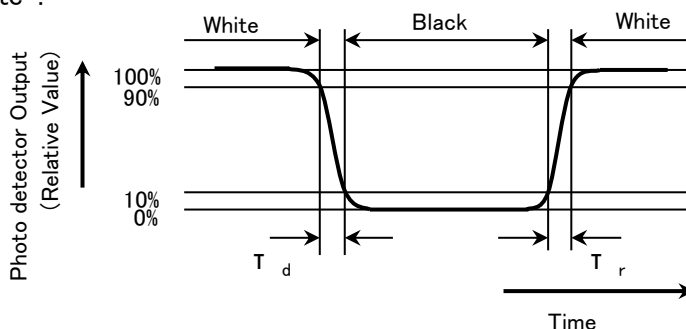
【Note9-4】
This shall be measured at center of the screen.

【Note9-5】 Definition of white uniformity

White uniformity is defined as the following with five measurements.(①〜⑤)

$$\delta w = \frac{①〜⑤ \text{ Maximum luminance of 5 points}}{①〜⑤ \text{ Minimum luminance of 5 points}}$$

200 400 600 pixel

②   ③   120
①   240
⑤   ④   360
pixel

10. Display Qualities

Please refer to the Outgoing Inspection Standard.

11. Handling Instructions

【Handling Precautions】

a)

　　Treat LCD module in dustless surroundings. Metal foreign material stuck to the circuit is possible to cause a short.

b)

　　Be sure to turn off the power supply when insertion extraction the cable.

c)

　　Be careful not to give any physical stress onto the circuit and/or the connector of LCD module
　　when you pull/plug a cable. Physical stress will cause a break or worse connection.

d)

　　Do not touch or scratch the polarizer with items harder than the surface rating or permanent damage can result.

e)

　　Use N2-blower such as an ionized nitrogen has anti-electrostatic when you blow dusts on Polarizer.

f)

　　Since a long contact with water may cause discoloration or spots, wipe it with absorbent cotton or other soft
　　cloth immediately.

g)

　　This module contains CMOS LSI. Please use appropriate anti-static protection methods for all contact with
　　the LCD panel and its electrical circuits.

h)

　　Be careful with the edge parts of the module which is made of metal.

i)

　　Since the LCD panel is made of glass, it may break or crack if dropped or bumped on hard surface.
　　Always handle with care.

j)

　　When the panel is broken, do not touch the glass. Although the panel is difficult to be scattered, touching the
　　broken part may hurt your hands.

k)

　　Liquid crystal contained in the panel may leak if the LCD is broken. If LC material should accidently come in
　　contact with the mouth or eyes rinse with water as soon as possible, following the instructions of the
　　appropriate MSDS.

l)

    Do not touch the circuit and the pattern of the board. If you touch it, the circuit may be broken.

m)

    Do not expose to strong ultraviolet rays such as direct sunlight for a long time.

n)

    Follow the regulations when LCD module is scrapped. The government you stay may have some regulations about it.

o)

    Protection 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. Blow off 'dust' on the polarizer by using an ionized nitrogen.

p)

    After peeling laminate film off, please do not attached to the front polarizer. If you attach again and store it long time, surface of the front polarizer changes in quality and it may cause display non-uniformity issue.

【Set-Design Precautions】

a)

    Disassembly of the LCD panel in any way voids the warranty and may permanently damage the LCD panel.

b)

    Be sure to design the cabinet so that the module can be installed without any extra stress such as warp or twist.

c)

    Consider grounding the bezel to reduce EMI, ESD and minimize electronic noise into the LCD panel.

d)

    When mounting the LCD panel, use all the provided mounting holes and maintain uniformity and coplanarity
so as not to bend, bow or twist the LCD panel at any time.
If stress is added, there is a possibility that circuit parts may be damaged.

e)

    It causes an irregular display and the defective indication, etc., when always put constant pressure
on the back of the module. Please do not make the structure to press the back of the module.

f)

    In case of attaching a cover glass or touch panel to the front surface, use appropriate measures to avoid degrading optical performance.

g)

To prevent loss of uniformity and prevent the introduction of contamination to the optical path of the LCD panel, please use fine-pitch filters in the air flow of forced ventilation.

h)

Please design part arrangement to consider the heat dissipation not to change the local temperature for module.

i)

Be sure to follow the absolute maximum rating in the specification. The design should consider the surrounding temperature, the fluctuating input signal, and tolerance of the electronic parts. Exceeding values is possible to cause worse characteristic such as burn and/or broken of the parts on LCD module.

j)

Be sure to use LCD module within the recommended operating conditions. Operating module out of the recommended range is not guaranteed even if it is in the absolute maximum rating.

k)

Follow the power, signal, and supply voltage sequence which the specification indicates, regarding on-off input signal after power on of LCD module.

l)

According to the using application, power circuit protection is recommended at module failure.

m)

Take enough shielding countermeasure not to interfere to peripheral electronic device by unnecessary radiation from the module.

o)

This product is not water-proof and dust-proof structure.

【Operation Precautions】

a)

Avoid prolonged exposure to strong UV light as the panel may be permanently damaged. Apply sufficient protection to block UV radiation in strong UV environments.

b)

When handling LCD modules and assembling them into cabinets, please avoid long-term storage in the environment of oxidization or deoxidization gas. The use of materials such as reagent, solvent, adhesive, resin, etc. which generate these gasses, may cause corrosion and discoloration of the modules.
Do not use the LCD module under such environment.

c)

To prevent reduction in optical quality and abnormal display, avoid exposure and contamination of the LCD panel from epoxy resin (mine system curing agent) that comes out from the material and the packaging material used for the set side, the silicon adhesive (dealcoholization system and oxime system), and the tray blowing agents (azo-compound), etc. Please confirm LCD panel compatibility with materials employed in your manufacturing and shipping processes.

d)

Do not use polychloroprene (CR) with LCD module. It will generate chlorine gas, which will damage the reliability of the connection part on LCD panel.

e)

Do not drive the LCD panel for a prolonged time with a fixed pattern or image retention may result.
(Please use a screen saver etc., in order to avoid an afterimage.)

f)

If stored at the temperatures lower than the rated storage temperature, the LC may freeze and it may cause LCD panel damage. And If stored at the temperatures higher than the rated storage temperature, the LC will lose its characteristics, and it cannot recover. Please keep it at near room temperature.

g)

Nature of dew consideration prevention is necessary when LCD is used for long time under high-temperature and high-humidity.

12. Packing form

12-1. Packing form figure

Packing form is shown in Fig 3.

12-2 Carton storage conditions

a) Piling number of cartons : MAX. 6cartons

b) Package quantity in one carton : 80pcs

c) Carton size(Typ.) : 550mm(W)×366mm(D)×260mm(H)

d) Total mass (One carton filled with 80 modules) : 18kg

d) Carton store environment :

① Temperature　　0〜40℃

② Relative humidity　90%以下

Please refer below as average value of the environmental conditions.

Summer time　　　Temperature: 20〜35℃ Humidity: 85% and below
Winter time　　　 Temperature: 5〜15℃   Humidity: 85% and below

Please maintain within 240 hours of accumulated length of storage time, with conditions of 40 degrees Celsius and room humidity of 90%.

③ Direct sunlight

Please keep the product in a dark room or cover the product to protect from direct sunlight.

④ Atmospheric condition

Please refrain from keeping the product with possible corrosive gas or volatile flux.

⑤ Prevention of dew

Do not place directly on the floor, and please store the product carton either on a wooden pallet or a stand to avoid dew condensation. In order to obtain moderate ventilation in the pallet's bottom surfaces, arrange correctly in the fixed direction.

Please place the product cartons away from the storage wall.

Be careful of the inside of a warehouse to ventilate well and please consider installation of a ventilator.

Manage to rapid temperature change under natural environment.

⑥ Vibration

Please refrain from keeping the product in the place which always has vibration.

⑦ Storage period

Within above mentioned conditions, maximum storage period should be one year.
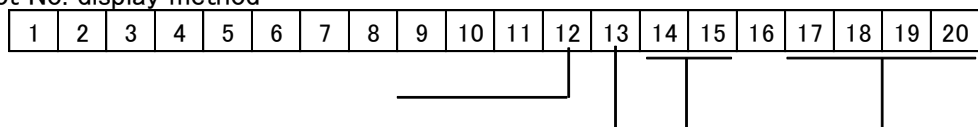
13. Marking of product name

13-1. Label indication

A) Module serial label

The label that displays SHARP logo・Model No.(LQ070Y3DG05)・Lot No. is stuck on the back of the module.

M070SWP1 R3 HW:1.1 FW:0.0 ZPSOEIS0701C51460083 ← Lot No.

LQ070Y3DG05 ← SHARP logo

SHARP

RoHS   S   ZB   MADE IN CHINA

Production year

Model No.   Production month   Production day   Serial No.

・Lot No. display method

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

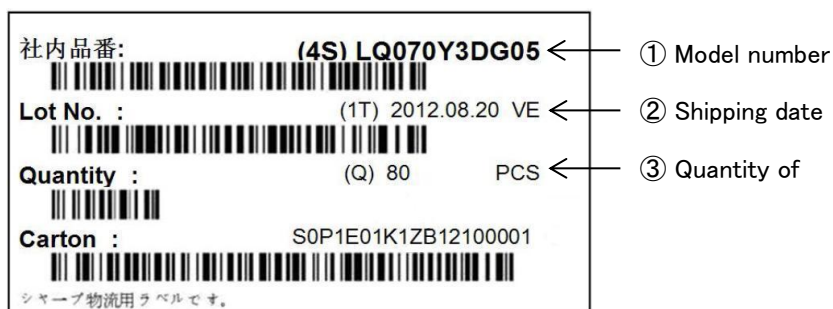12 digit: Product year (2010="A", 2011="B", 2012="C", 2013="D", 2014="E"…)

13 digit: Product month (Jan="1", Feb="2", Mar="3", …… Oct="A", Nov="B", Dec="C")

14、15 digits: Product day

17~20 digits: Serial No.

13-2. Packing box Label

The label that displays ①Model number(LQ070Y3DG05) ②Shipping date ③Quantity of module is stuck on the packing box. Moreover, the display of bar code also applies to this.

社内品番: **(4S) LQ070Y3DG05** ← ① Model number

Lot No. :   (1T) 2012.08.20 VE ← ② Shipping date

Quantity :   (Q) 80   PCS ← ③ Quantity of

Carton :   S0P1E01K1ZB12100001

シャープ物流用ラベルです。

※ R.C.(RoHS Compliance)

R. C.

A right picture is written to the packing box of module for the RoHS restriction.

　※ R.C.(RoHS Compliance)means these parts have corresponded with the RoHS directive.

　　This module corresponds from the first sample to RoHS Directive.

The figure below is written under the SHARP logo of the packing box about the production country.

MADE IN CHINA

14. Reliability Test Items

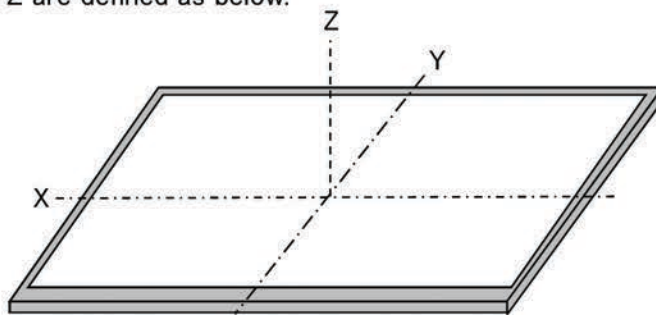| No.	Test item	Conditions	Remark
1	High temperature storage test	Ambient temperature 80 °C 240H	【Note1】
2	Low temperature storage test	Ambient temperature −30°C 240H	【Note1】
3	High temperature & high humidity operation test	Ambient temperature 40°C、Humidity 95% RH 240H (No condensation.)	【Note1】
4	High temperature operation test	Panel surface 70°C 240H	【Note1】
5	Low temperature operation test	Ambient temperature −20°C 240H	【Note1】
6	Vibration test (non-operating)	Sin wave Frequency ：10〜500Hz／. Acceleration：14.7m/s2 Test period：3H（X, Y, Z direction 1H）	【Note1】 【Note2】
	Shock test (non-operating)	Max. acceleration ：2352m/s2 Pulse width：2ms Half sine wave direction ：±X,±Y,±Z Test period：Once for each direction	【Note1】 【Note2】
7 8	Thermal shock test (non- operating)	−30°C[0.5h]〜80°C[0.5h]／50cycle	【Note1】

【Note1】 Result Evaluation Criteria

Under the display quality test conditions with normal operation state, these shall be no change

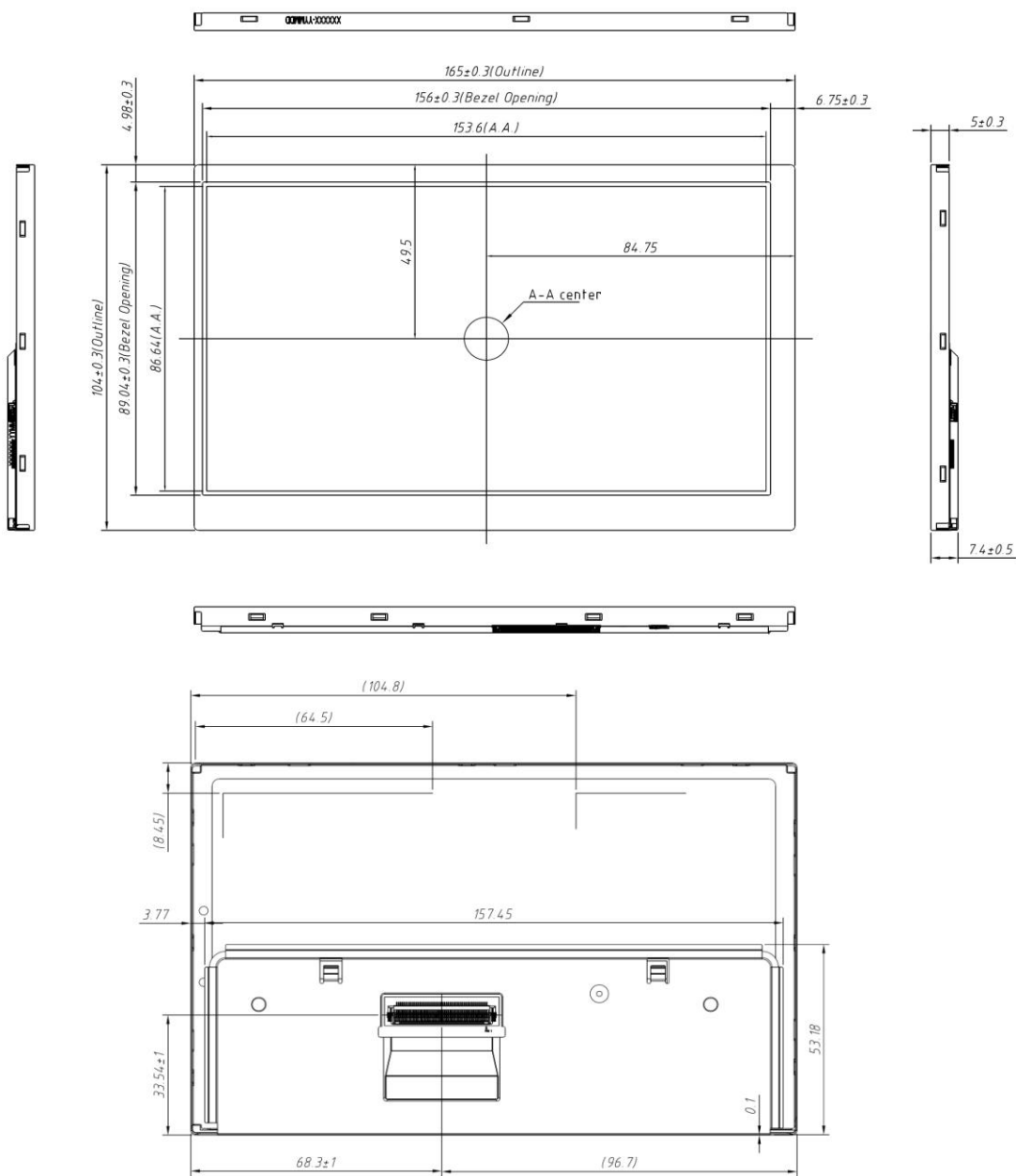which may affect practical display function.

(*)normal operation state：Temperature:15〜35°C,Humidity:45〜75%, Atmospheric pressure:86〜106kpa)

【Note2】

The directions of X, Y, Z are defined as below:

Fig.1. Outline Dimensions

Put the Module
in the bag

1pcs Module

Folding bag

80pcs PE bag
80pcs Module

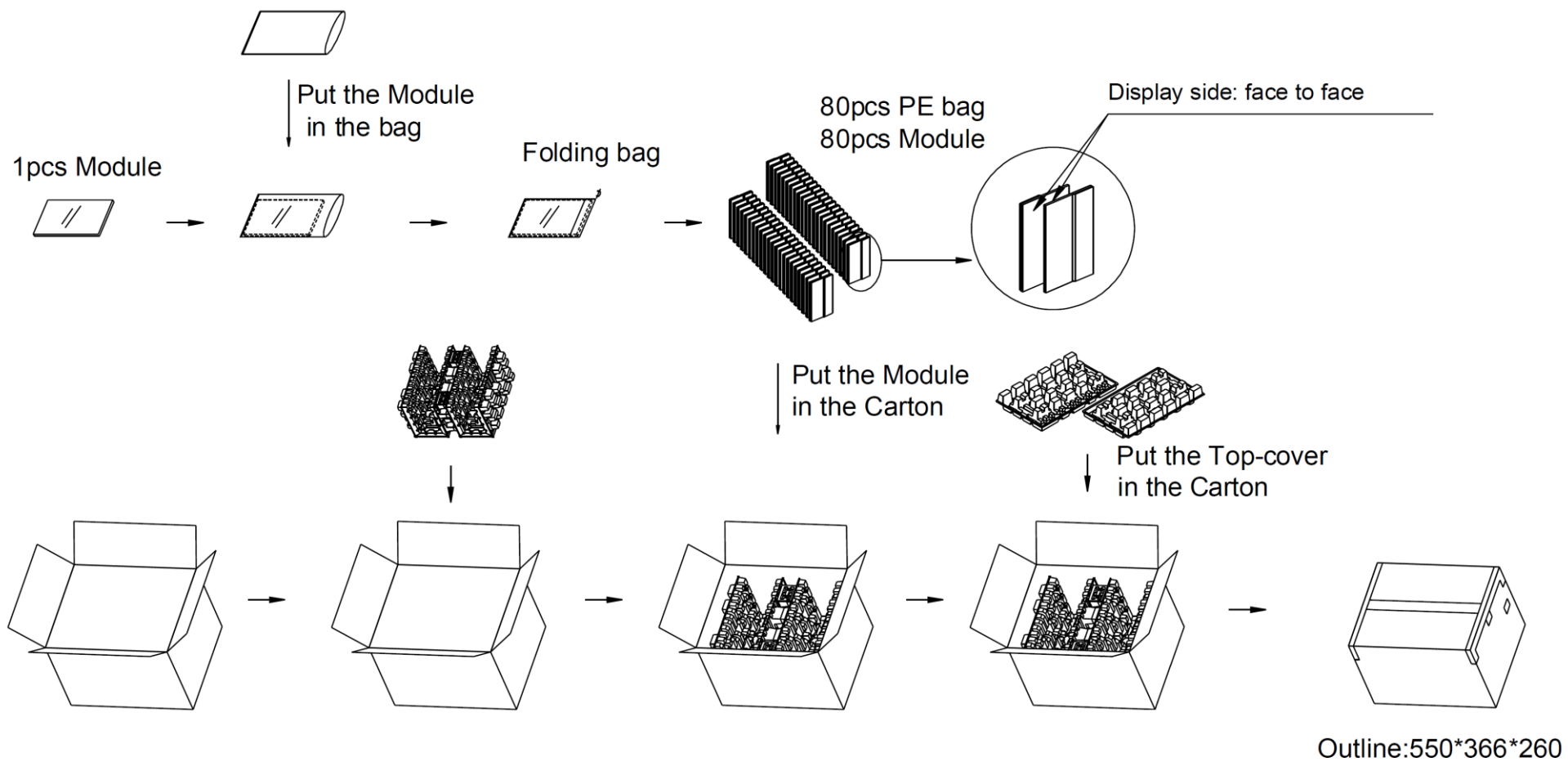Display side: face to face

Put the Module
in the Carton

Put the Top-cover
in the Carton

Outline:550*366*260

Fig.3. Packing form figure