

PREPARED BY : DATE	SHARP DISPLAY DEVICE BUSINESS GROUP SHARP CORPORATION SPECIFICATION	FILE No. LD-25104A
APPROVED BY : DATE		FILE No.
		ISSUE : 06-Feb-13
		PAGE : 29pages
		APPLICABLE GROUP DISPLAY DEVICE BUSINESS GROUP

REVISION :

DEVICE SPECIFICATION FOR

TFT-LCD Module

MODEL No.

LQ070Y3DG05

These parts are complied with the RoHS directive.

CUSTOMER'S APPROVAL

BY _____

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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.

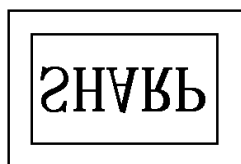
【Note4-3】



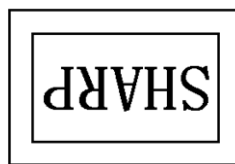
R/L=High、U/D=Low



R/L=Low、U/D=Low



R/L=High、U/D=High

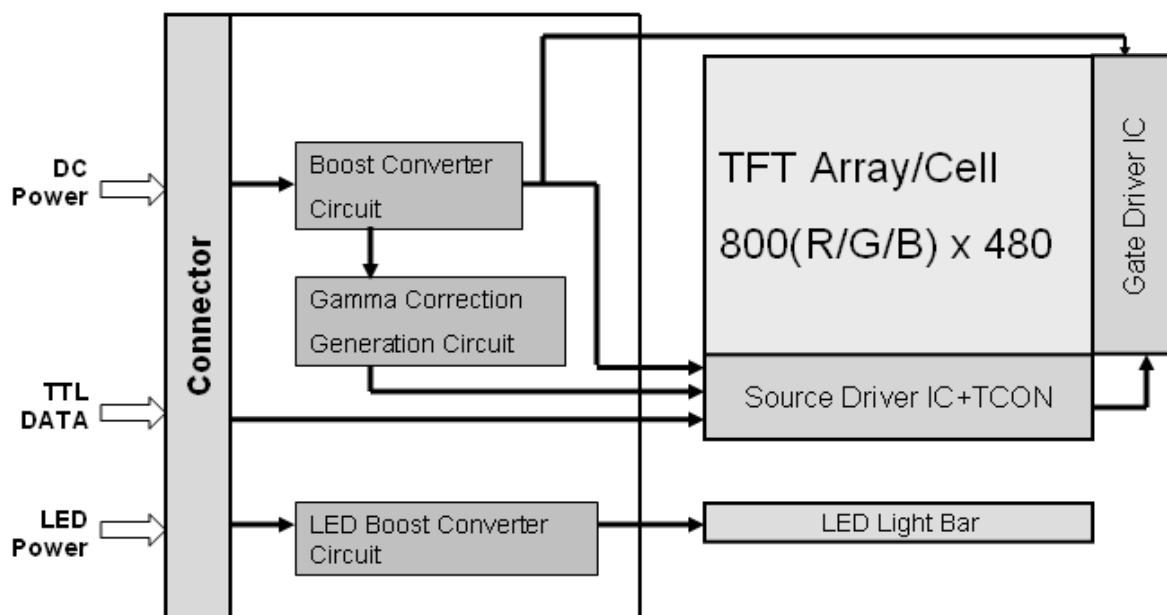


R/L=Low、U/D=High

【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		Unit	Remark
			Min	Max		
Supply voltage	V _{DD}	T _a =25°C	-0.3	4.0	V	【Note5-3】
	V _{LED}	T _a =25°C	-0.3	22.0	V	【Note5-3】
Input voltage	V _{I1}	T _a =25°C	-0.3	4.0	V	【Note5-3】 【Note5-4】
	V _{I2}	T _a =25°C	-0.3	6.0	V	【Note5-3】 【Note5-5】
Storage temperature	T _{STG}	—	-30	80	°C	【Note5-1】 【Note5-2】
Operating temperature	T _{OPA}	—	-20	70	°C	【Note5-6】

【Note5-1】

Humidity: 90%RH Max.(T_a≤40°C) Note static electricity.

Maximum wet-bulb temperature at 39°C or less. (T_a>40°C) 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 T_a=+25°C.

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°C.

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).

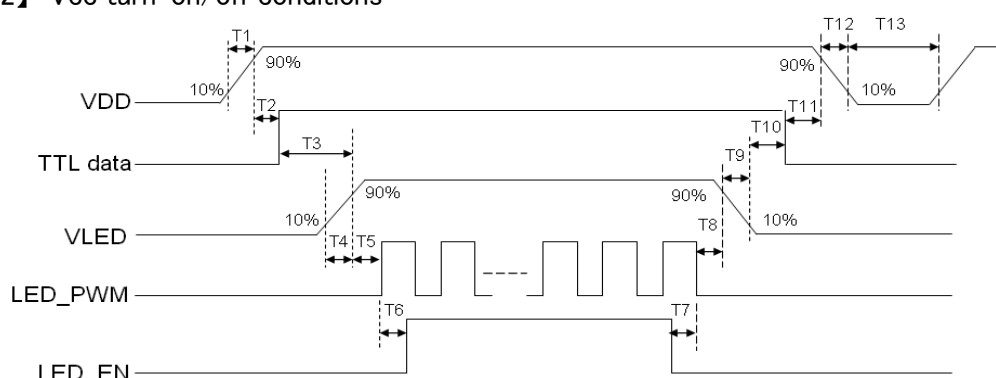
6. Electrical Characteristics

6-1. TFT-LCD panel driving

Ta=+25°C

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}	V _{CC} =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】 V_{CC} 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

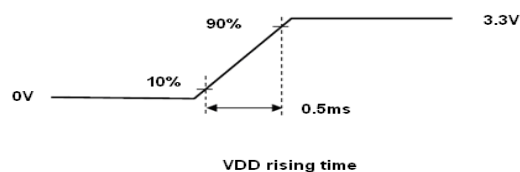
*TTL_DATA: R0~R7, G0~G7, B0~B7, DE, DCLK, L/R, U/D

• 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



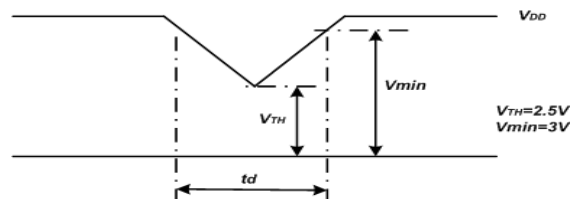
【Note6-4】

 V_{DD} power dip condition

1) $V_{th} < V_{DD} \leq V_{min}$

$t_d \leq 10ms$

2) $V_{DD} < V_{th}$

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

6-2. Backlight driving Section

 $T_a = +25^\circ C$

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	mVP-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	$V_{LI}=2.5V$ 【Note6-6】
		-	-	+10	μA	$V_L=12.0V$ 【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	$F_{PWM} \geq 1\%$ 【Note6-12】
		100	-	5,000	Hz	$F_{PWM} \leq 1\%$
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

$$F_{\text{PWM}} = 1/t_{15}$$

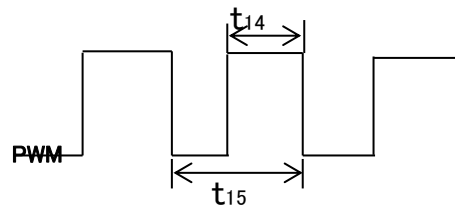
Duty 1% (at $F_{\text{PWM}} \leq 1000\text{Hz}$) : Min. Luminance

Duty 100% : Max. Luminance

Luminance changes in proportion to the duty ratio.

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

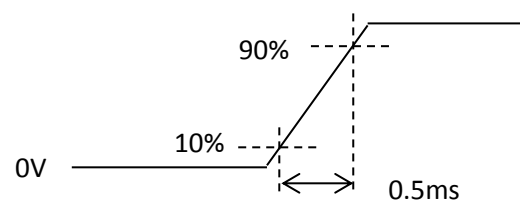
·When the frequency slows, the display fineness might decrease.

**【Note6-9】**

Luminance becomes 50% of an initial value. ($T_a = 25^\circ\text{C}$, PWM=100%)

【Note6-10】

LED rush current measure condition

**【Note6-11】**

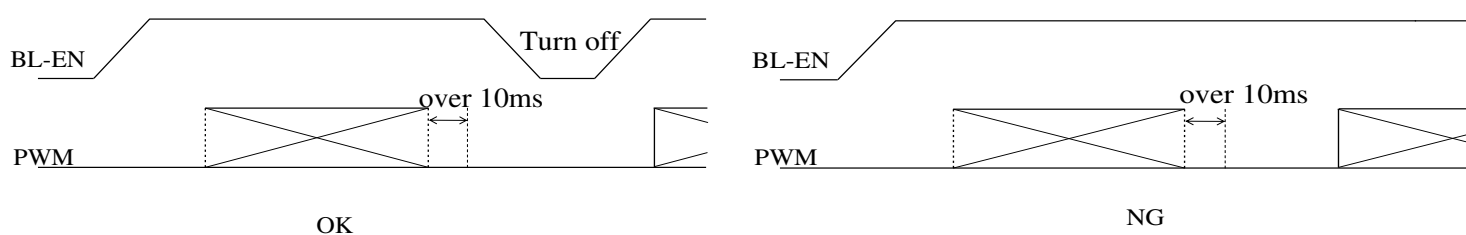
The LED used in this LCD module is very sensitive to temperature change. If it operates for extremely long time under high temperature, it is possible rapidly to shorten the life time of LED.

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.



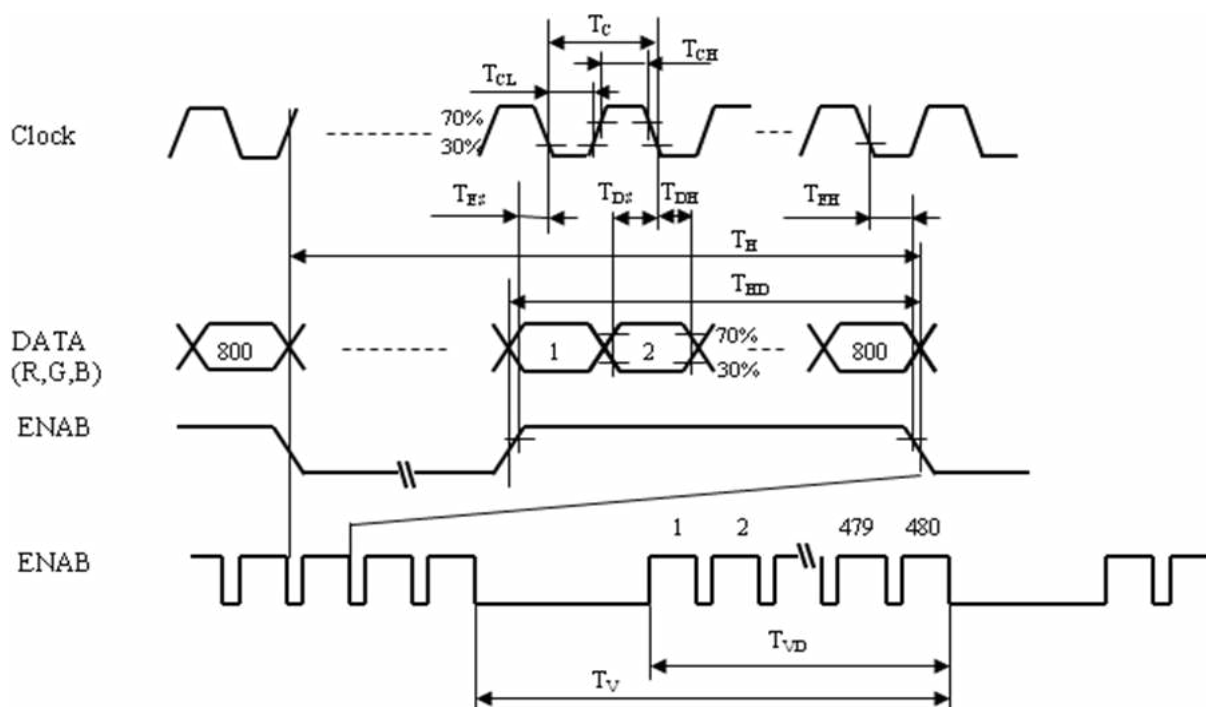
7. Timing Characteristics of Input Signals

7-1. Timing characteristics

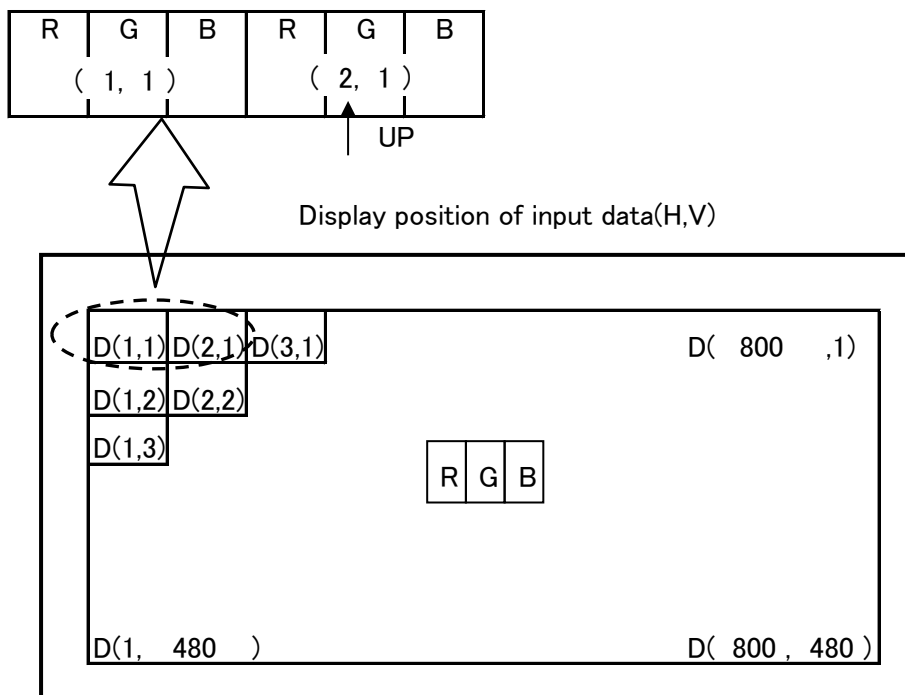
	Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Clock	Frequency	$1/T_C$	28.0	30.0	40.0	MHz	
	High time	T_{CH}	10	-	-	ns	
	Low time	T_{CL}	10	-	-	ns	
	Duty ratio	T_{CH}/T_C	40	50	60	%	
Data	Setup time	T_{DS}	8	-	-	ns	
	Hold time	T_{DH}	8	-	-	ns	
ENAB signal	Horizontal period	T_H	908	928	1080	clock	
	Horizontal 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



8.

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

	Colors & Gray scale	Data signal																							
		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
	Blue	—	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	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Cyan	—	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	—	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	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
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	
	↑	GS1	1	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	
	↑	↓	↓							↓							↓								
	↓	↓	↓							↓							↓								
	Brighter	GS253	1	0	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	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	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	
	↑	GS1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Darker	GS2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	↑	↓	↓							↓							↓								
	↓	↓	↓							↓							↓								
	Brighter	GS253	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	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Green	GS255	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	
	↑	GS1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
	↑	↓	↓							↓							↓								
	↓	↓	↓							↓							↓								
	Brighter	GS253	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	1	1	1	1	1	1	1
Blue	GS255	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

$T_a=+25^{\circ}\text{C}$, $V_{cc}=+3.3\text{V}$

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range	Horizontal	θ_{3, θ_9}	CR>10	60	70	-	Deg.	【Note9-1】 【Note9-2】 【Note9-4】
	Vertical	θ_6		60	70	-	Deg.	
		θ_{12}		40	50	-	Deg.	
Contrast ratio		CR	optimized angle	400	500	-		【Note9-2】 【Note9-4】
Response Time(White Black)		$T_r + T_d$	$\theta = 0^{\circ}$	-	16	-	ms	【Note9-3】 【Note9-4】
Chromaticity of White		W_x		0.260	0.310	0.360		【Note9-4】
		W_y		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.

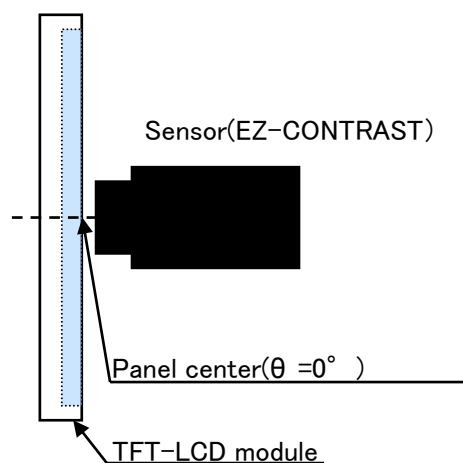


Fig2-1 Measuring setup for Viewing angle

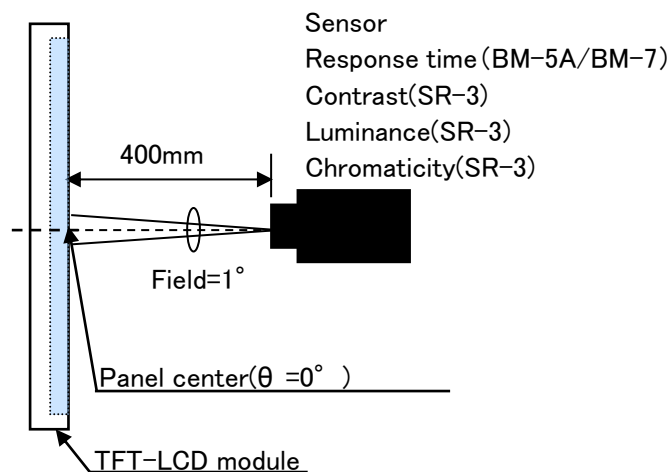
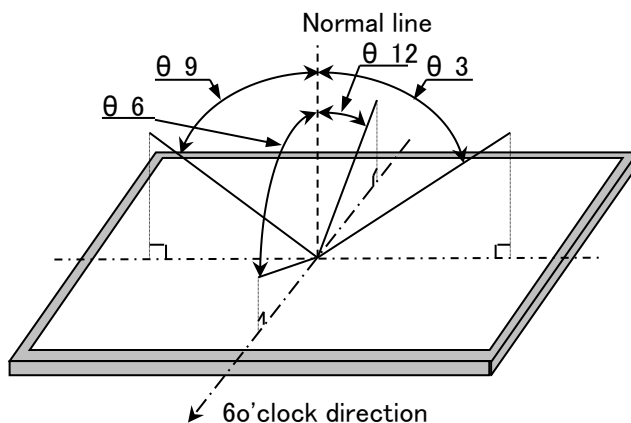


Fig2-2 Measuring setup for Luminance, Chromaticity and Response

Fig.2 Optical characteristics measurement method

【Note9-1】 Definitions of viewing angle range



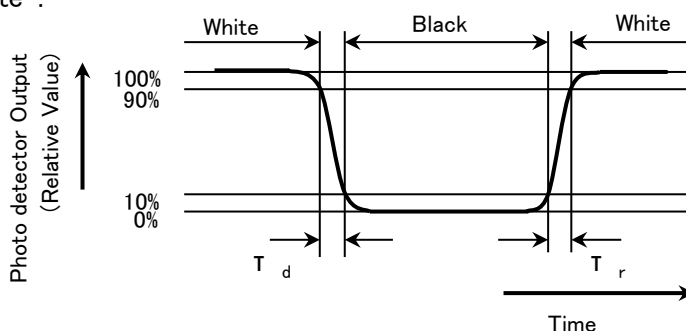
【Note9-2】 Definition of contrast ratio

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".



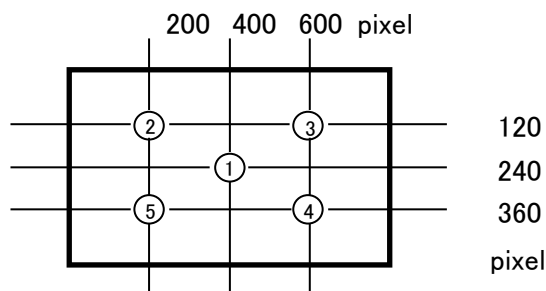
【Note9-4】

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)

$$\delta_w = \frac{\text{①~⑤ Maximum luminance of 5 points}}{\text{①~⑤ Minimum luminance of 5 points}}$$



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 accidentally 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°C
 - ② Relative humidity 90%以下

Please refer below as average value of the environmental conditions.

Summer time	Temperature: 20~35°C	Humidity: 85% and below
Winter time	Temperature: 5~15°C	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

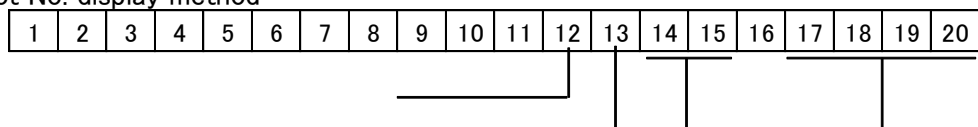
13-1. Label indication

A) Module serial label

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



Lot No. display method



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

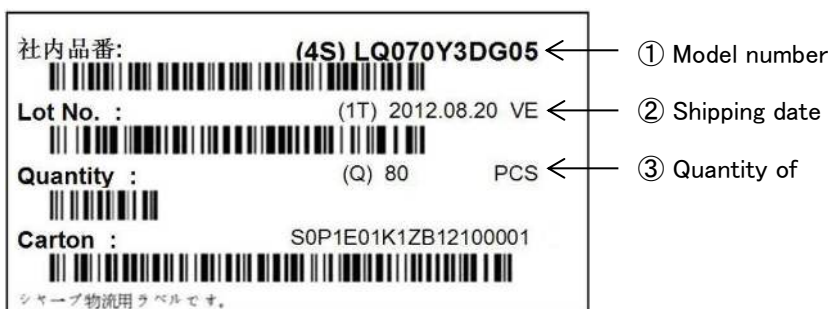
13 digit: Product month (Jan="1", Feb="2", Mar="3", Oct="A", Nov="B", Dec="C")

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.



※ 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/s ² Test period: 3H(X, Y, Z direction 1H)	【Note1】 【Note2】
	Shock test (non-operating)	Max. acceleration : 2352m/s ² Pulse width: 2ms Half sine wave direction : ±X, ±Y, ±Z Test period: Once for each direction	【Note1】 【Note2】
7	Thermal shock test (non-operating)	-30°C[0.5h]~80°C[0.5h]/50cycle	【Note1】
8			

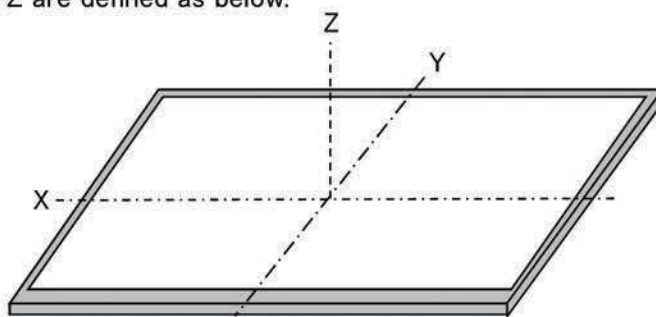
【Note1】 Result Evaluation Criteria

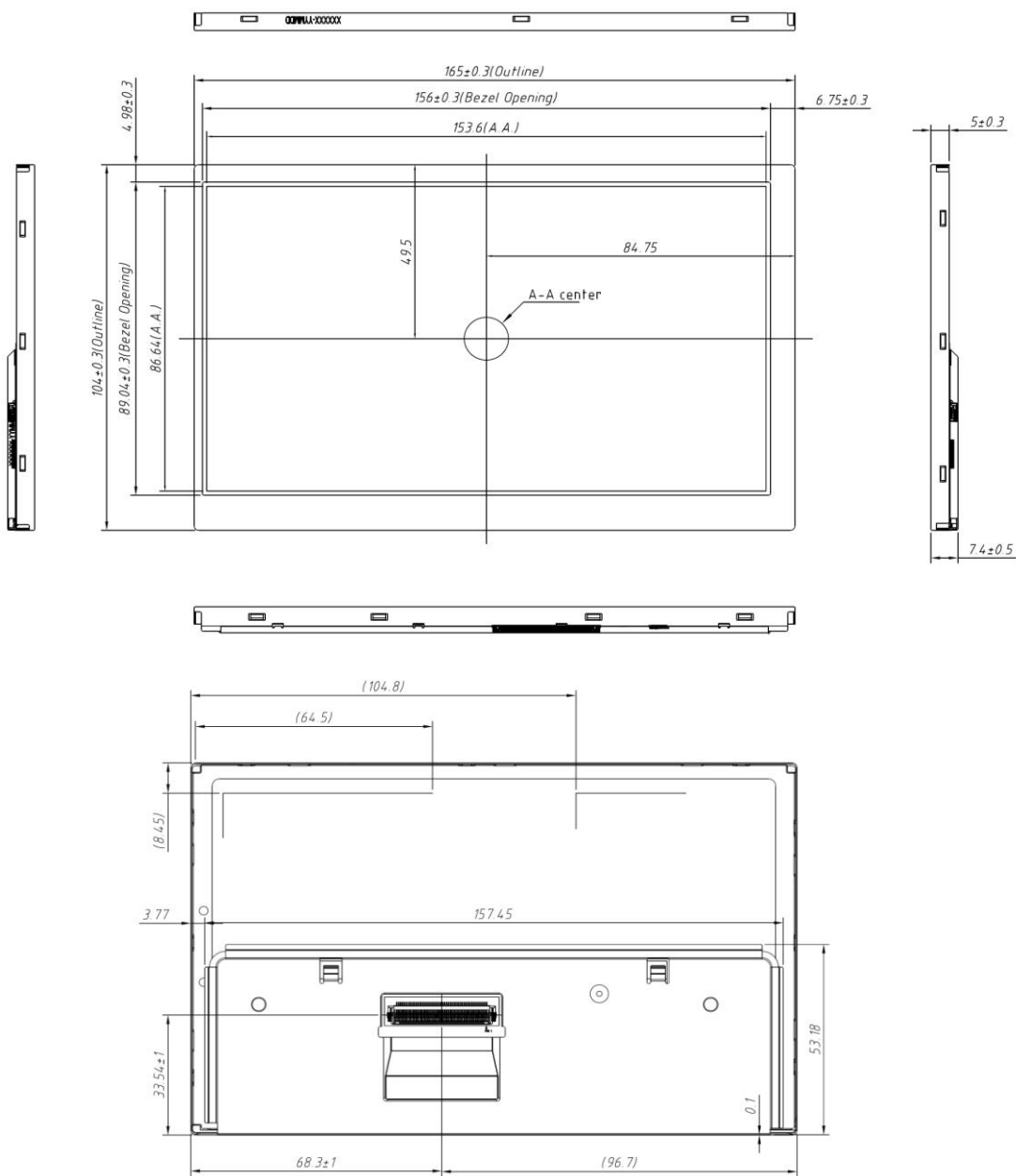
Under the display quality test conditions with normal operation state, these shall be no change which may affect practical display function.

(*)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:





o

Fig.1. Outline Dimensions

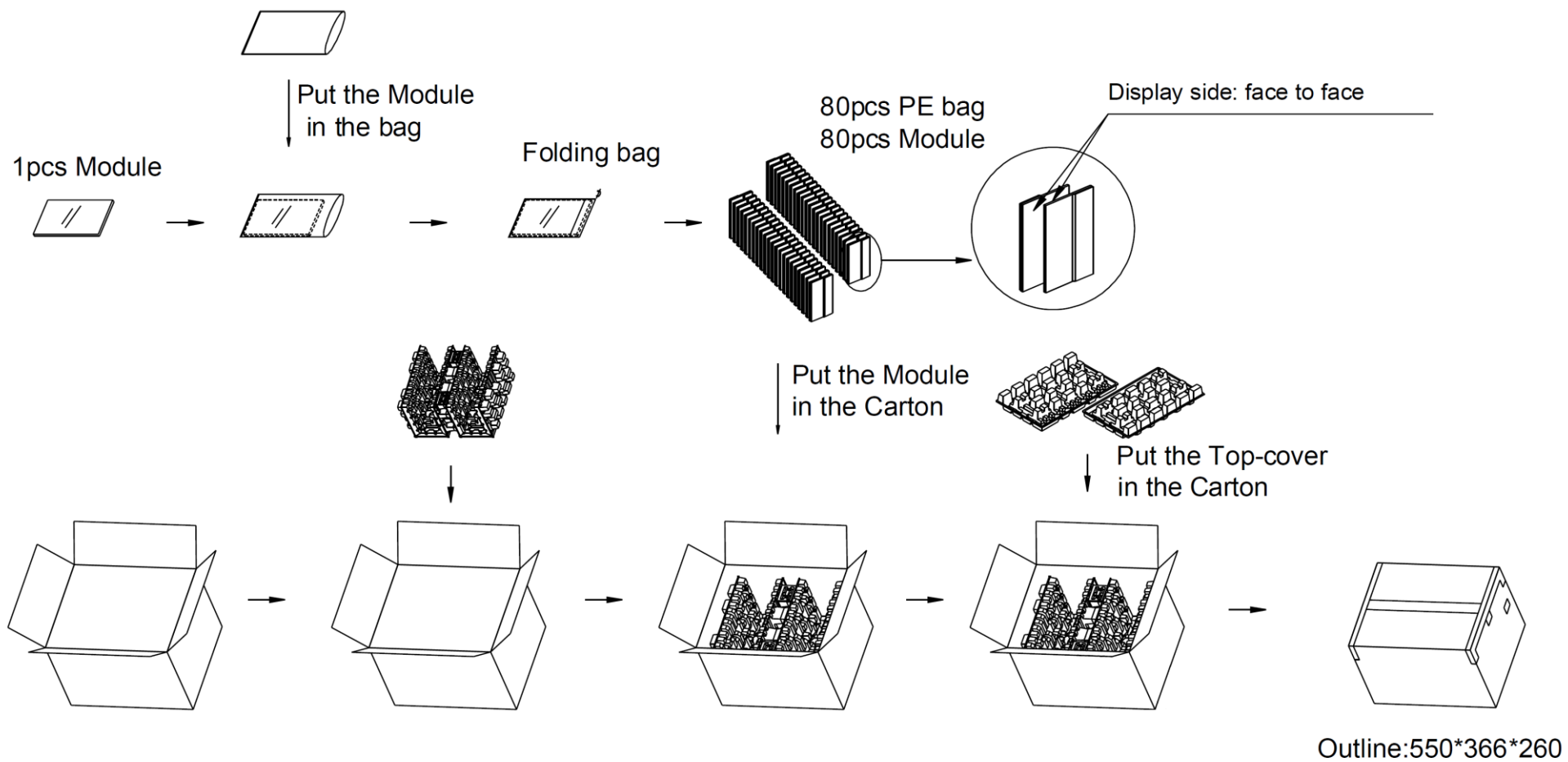


Fig.3. Packing form figure