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PREPARED BY: DATE	SHARP MOBILE LCD GROUP I SHARP CORPORATION	SPEC No. MB1-1 C098-026 FILE No.
APPROVED BY: DATE		ISSUE Aug,19,2009 PAGE 30 Pages APPLICABLE DIVISION ■Mobile LCD Group I

SPECIFICATION

DEVICE SPECIFICATION
for TFT LCD Module Model No.

LS035Y8DX02A

□CUSTOMER'S APPROVAL

DATE

BY

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RECORDS OF REVISION			DOC.FIRST ISSUE Aug.19.2009
DATE	REF.PAGE PARAGRAPH DRAWING No.	REVISED No.	SUMMARY
Aug.19.2009		V0.1	First draft

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[For handling and system design]

(1) Do not scratch the surface of the polarizer film as it is easily damaged.

(2) If the cleaning of the surface of the LCD panel is necessary, wipe it swiftly with cotton or other soft cloth. Do not use organic solvent as it damages polarizer.

(3) Water droplets on polarizer must be wiped off immediately as they may cause color changes, or other defects if remained for a long time.

(4) Since this LCD panel is made of glass, dropping the module or banging it against hard objects may cause cracks or fragmentation.

(5) Certain materials such as epoxy resin (amine's hardener) or silicone adhesive agent (de-alcohol or de-oxym) emits gas to which polarizer reacts (color change). Check carefully that gas from materials used in system housing or packaging do not hart polarizer.

(6) Liquid crystal material will freeze below specified storage temperature range and it will not get back to normal quality even after temperature comes back within specified temperature range. Liquid crystal material will become isotropic above specified temperature range and may not get back to normal quality. Keep the LCD module always within specified temperature range.

(7) Do not expose LCD module to the direct sunlight or to strong ultraviolet light for long time.

(8) If the LCD driver IC (COG) is exposed to light, normal operation may be impeded. It is necessary to design so that the light is shut off when the LCD module is mounted.

(9) Do not disassemble the LCD module as it may cause permanent damage.

(10) As this LCD module contains components sensitive to electrostatic discharge, be sure to follow the instructions in below.

① Operators
Operators must wear anti-static wears to prevent electrostatic charge up to and discharge from human body.

② Equipment and containers
Process equipment such as conveyer, soldering iron, working bench and containers may possibly generate electrostatic charge up and discharge. Equipment must be grounded through 100Mohms resistance. Use ion blower.

③ Floor
Floor is an important part to leak static electricity which is generated from human body or equipment.
There is a possibility that the static electricity is charged to them without leakage in case of insulating floor, so the
countermeasure(electrostatic earth:$1\times10^{8}\Omega$) should be made.

④Humidity
Proper humidity of working room may reduce the risk of electrostatic charge up and discharge. Humidity should be kept over 50% all the time.

⑤Transportation/storage
Storage materials must be anti-static to prevent causing electrostatic discharge.

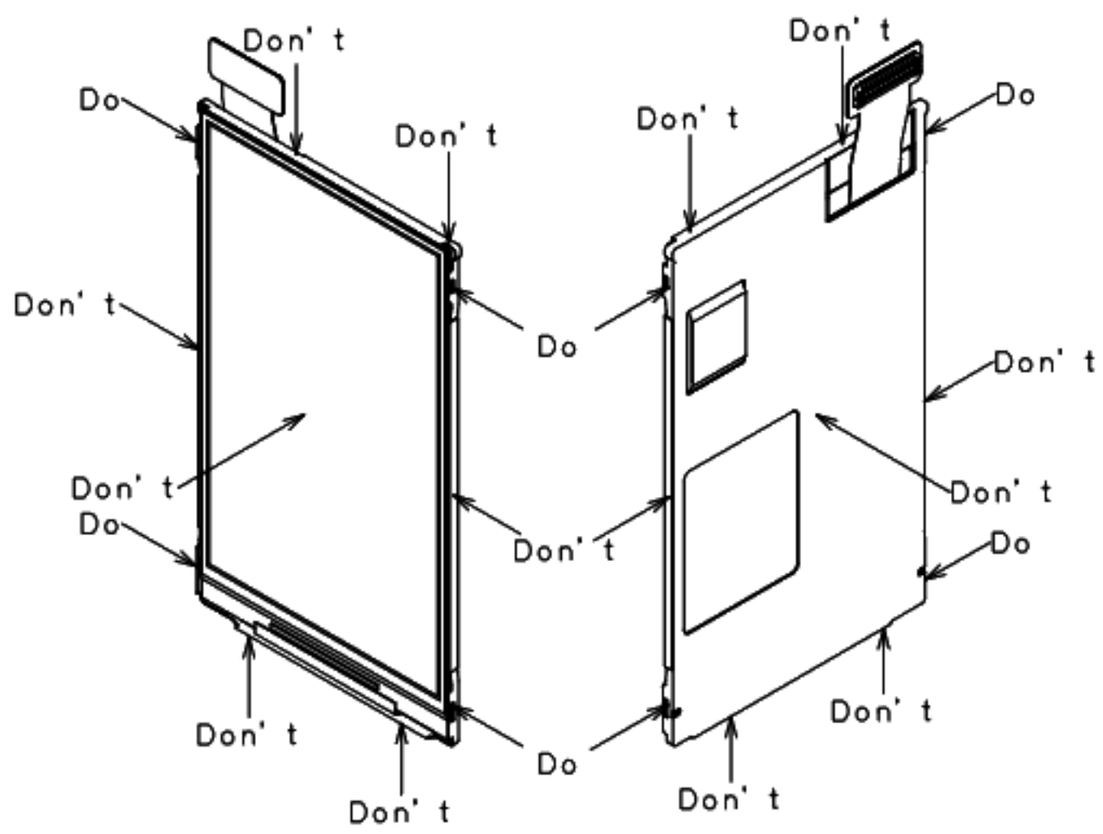
⑥Others
Protective film is attached on the surface of LCD panel to prevent scratches or other damages. When removing this protective film, remove it slowly under proper anti-ESD control such as ion blower.

(11) Hold LCD very carefully when placing LCD module into the system housing. Do not apply excessive stress or pressure to LCD module. Do not to use chloroprene rubber as it may affect on the reliability of the electrical interconnection.

(12) Do not hold or touch LCD panel to flex interconnection area as it may be damaged.

(13) As the binding material between LCD panel and flex connector mentioned in 12) contains an organic material, any type of organic solvents are not allowed to be used. Direct contact by fingers is also prohibited.

(14) When carrying the LCD module, place it on the tray to protect from mechanical damage. It is recommended to use the conductive trays to protect the CMOS components from electrostatic discharge. When holding the module, hold the Plastic Frame of LCD module so that the panel, COG and other electric parts are not damaged.



(15) Do not touch the COG's patterning area. Otherwise the circuit may be damaged.

(16) Do not touch LSI chips as it may cause a trouble in the inner lead connection.

(17) Place a protective cover on the LCD module to protect the glass panel from mechanical damages.

(18) LCD panel is susceptible to mechanical stress and even the slightest stress will cause a color change in background. So make sure the LCD panel is placed on flat plane without any continuous twisting, bending or pushing stress.

(19) Protective film is placed onto the surface of LCD panel when it is shipped from factory. Make sure to peel it off before assembling the LCD module into the system. Be very careful not to damage LCD module by electrostatic discharge when peeling off this protective film. Ion blower and ground strap are recommended.

(20) Make sure the mechanical design of the system in which the LCD module will be assembled matches specified viewing angle of this LCD module.

(21) This LCD module does not contain nor use any ODS (1,1,1-Trichloroethane, CCL4) in all materials used, in all production processes.

[For operating LCD module]

(1) Do not operate or store the LCD module under outside of specified environmental conditions.
(2) At the shipment, adjust the contrast of each LCD module with electric volume. LCD contrast may vary from panel to panel depending on variation of LCD power voltage from system.
(3) As opt-electrical characteristics of LCD will be changed, dependent on the temperature, the confirmation of display quality and characteristics has to be done after temperature is set at 25 °C and it becomes stable.

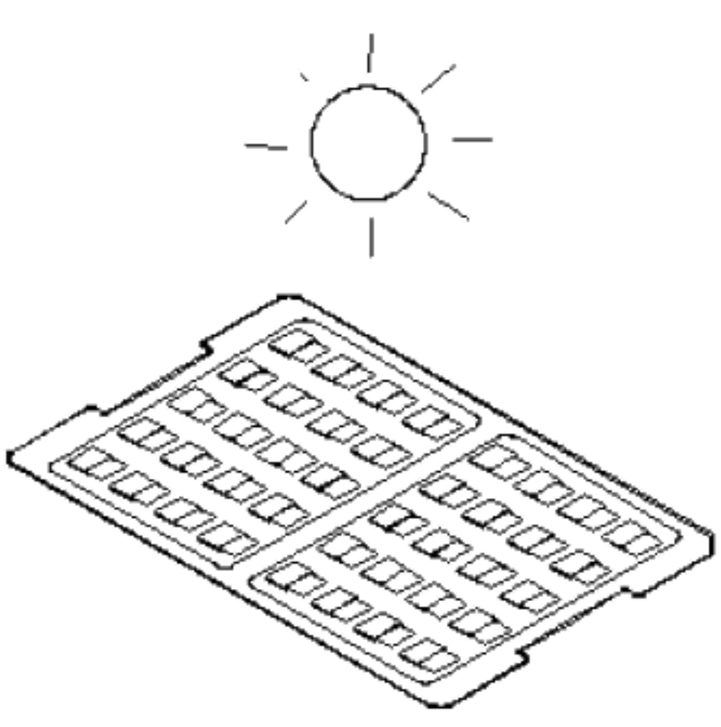
[Precautions for Storage]

(1) Do not expose the LCD module to direct sunlight or strong ultraviolet light for long periods. Store in a dark place.
(2) The liquid crystal material will solidify if stored below the rated storage temperature and will become an isotropic liquid if stored above the rated storage temperature, and may not retain its original properties. Only store the module at normal temperature and humidity (25±5°C,60±10%RH) in order to avoid exposing the front polarizer to chronic humidity.
(3) Keeping Method

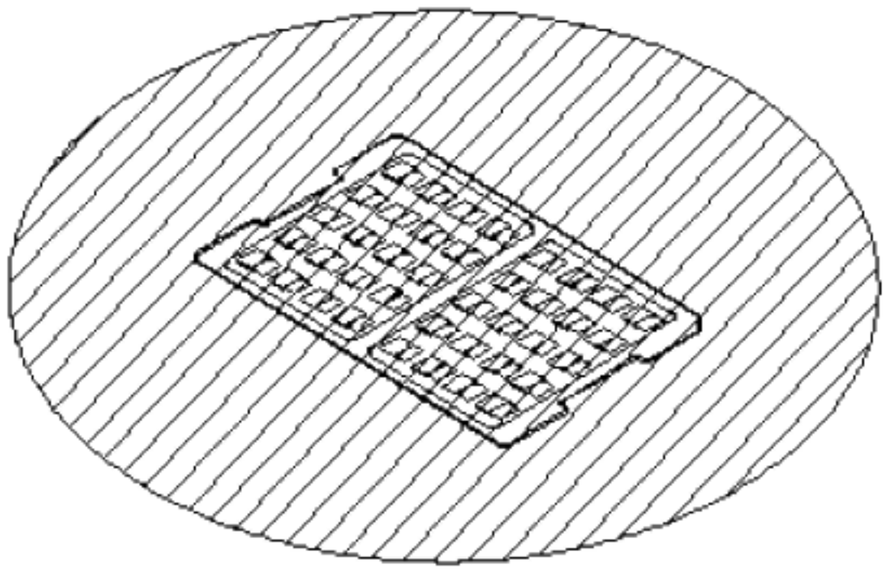
a. Don't keeping under the direct sunlight.

b. Keeping in the tray under the dark place.

DON'T



DO



(1) Do not operate or store the LCD module under outside of specified environmental conditions.
(2) Be sure to prevent light striking the chip surface.

[Other Notice]

(1) Do not operate or store the LCD module under outside of specified environmental conditions.

(2) As electrical impedance of power supply lines (VCC-GND) are low when LCD module is working, place the de-coupling capacitor near by LCD module as close as possible.

(3) Reset signal must be sent after power on to initialize LSI. LSI does not function properly until initialize it by reset signal.

(4) Generally, at power on, in order not to apply DC charge directly to LCD panel, supply logic voltage first and initialize LSI logic function including polarity alternation. Then supply voltage for LCD bias. At power off, in order not to apply DC charge directly to LCD panel, execute Power OFF sequence and Discharge command.

(5) Don't touch to FPC surface, exposed IC chip, electric parts and other parts, to any electric, metallic materials.

(6) No bromide specific fire-retardant material is used in this module.

(7) Do not display still picture on the display over 2 hours as this will damage the liquid crystal.

(8) The connector used in this LCD module is the one Sharp have not ever used.
Therefore, please note that the quality of this connector concerned is out of Sharp's guarantee.

[Precautions for Discarding Liquid Crystal Modules]

COG: After removing the LSI from the liquid crystal panel, dispose of it in a similar way to circuit boards from electronic devices.
LCD panel: Dispose of as glass waste. This LCD module contains no harmful substances. The liquid crystal panel contains no dangerous or harmful substances. The liquid crystal panel only contains an extremely small amount of liquid crystal (approx.100mg) and therefore it will not leak even if the panel should break.
-Its median lethal dose (LD50) is greater than 2,000 mg/kg and a mutagenetic (Aims test: negative) material is employed.
FPC: Dispose of as similar way to circuit board from electric device.

1. Application

This data sheet is to introduce the specification of LS035Y8DX02A active matrix 16,777,215color LCD module.
Main color LCD module is controlled by Driver IC (R63302).
If any problem occurs concerning the items not stated in this specification, it must be solved sincerely by both parties after deliberation.
As to basic specification of driver IC refer to the IC specification and handbook.

2. Construction and Outline

Construction: LCD panel, Driver (COG), FPC with electric components,
7 White LED lump, prism sheet, diffuser, light guide and reflector, plastic frame and metal frame to fix them mechanically.
Outline: See page 32
Connection: Board to board connector (Panasonic AXT550124 50 pins, 0.4mm pitch)
There shall be no scratches, stains, chips, distortions and other external drawbacks that may affect the display function.

Rejection criteria shall be noted in Inspection Standard.

In order to realize thin module structure, double-sided adhesive tapes are used to fix LCD panels. As these tapes do
not guarantee to permanently fix the panels, LCD panel may rise from the module when shipped from factory. So please make sure to design the system to hold the edges of LCD panel by the soft material such as sponge when LCD module is assembled into the cabinet.

3. Mechanical Specification

Table 1

Parameter		Specifications	Unit
Outline dimensions (typ)		51.16 (W) × 86.45 (H) × 2.0 (D)	mm
Main LCD Panel	Active area	45.36 (W) × 75.6 (H)	mm
	Viewing area	46.36 (W) × 76.6 (H)	mm
	Display format	480×RGB(W)×800(H)	-
	Dot pitch	0.0315 (W) ×0.0945 (H)	mm
	Base color *1	Normally Black	-
Mass		Approx 16.6	g

*1 Due to the characteristics of the LC material, the colors vary with environmental temperature.

4. Absolute Maximum Ratings

(4-1) Electrical absolute maximum ratings

Table 2

Ta=25 ℃

Parameter	Symbol	Min	Max	Unit	Remark
Supply voltage	VDDIO-GND	-0.3	4.6	V	*1
	VCC-GND	-0.3	4.6	V	*1
Input Voltage	V_{IN}	-0.3	VDDIO+0.3	V	*2

*1: VCC>=VDDIO

*2: Input terminal of logic system.

Voltage value is based on GND = 0V.

Environment Conditions

Table 3

Item	Top		Tstg		Remark
	MIN.	MAX.	MIN.	MAX.	
Ambient temperature	-20 °C	+70°C	-30 °C	+80°C	Note 2)
Humidity	Note 1)		Note 1)		No condensation

Note1) Ta ≤ 40 °C.....95 % RH Max

Note2) Ta > 40 °C.....Absolute humidity shall be less than Ta=40 °C /95 % RH.

As opt-electrical characteristics of LCD will be changed, dependent on the temperature, the confirmation of display quality and characteristics has to be done after temperature is set at 25 °C and it becomes stable.

Be sure not to exceed the rated voltage, otherwise a malfunction may occur.

5. Electrical Specifications

(5-1) Electrical characteristics

Table 4 Ta=25 °C, GND=0V, DCLK=26MHz

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Applicable Pin
Supply voltage	VDDIO-VSS	Ta=-20～70 °C	1.70	1.80	2.95	V	(note 1)
Supply voltage	VCC-VSS	Ta=-20～70 °C	2.75	2.80	2.95	V	
"H" level input voltage	V_{IH1}	Ta=-20～70 °C	0.8 VDDIO	-	-	V	(note 2)
"L" level input voltage	V_{IL1}		-	-	0.2 VDDIO	V	
"H" level output voltage	V_{OH1}	Ta=-20～70 °C	0.8 VDDIO	-	-	V	(note 3)
"L" level output voltage	V_{OL1}	I_{OH1}=-1 mA , I_{OL1} = 1 mA	-	-	0.2 VDDIO	V	
Current consumption	IDD+ICC	Ta=25 °C	-	20.5	-	mA	(note 4)

(note 1) The condition VDDIO ≤ VCC must be met

(note 2) Input mode of R0~R7, G0~G7, B0~B7, VSYNC, HSYNC, DCLK, DE, RESET, SDI, SCL, CS

(note 3) Output mode of SDO, LEDPWM.

(note 4) Following Conditions

Ta=25°C, frame frequency=60Hz (DCLK=26MHz)

Display Pattern: All ON (white) Pattern.

*All ON (white) Pattern

(5-2) LED back light

(1) At main panel the back light uses 7pcs edge light type white LED.

Table 5

Parameter	Conditions	Symbol	Min.	Typ.	Max.	Unit	Remark
Forward current	Ta=25 °C	I_{LED}	-	20 *1	-	mA	LEDA-LEDC

LED lamp: NSSW206T (NICHIA)

([Luminous Intensity rank]: W600~W675 [Color rank]: sbj2/sbk2)

*1 per one piece of LED

*Please consider Allowable Forward Current on used temperature

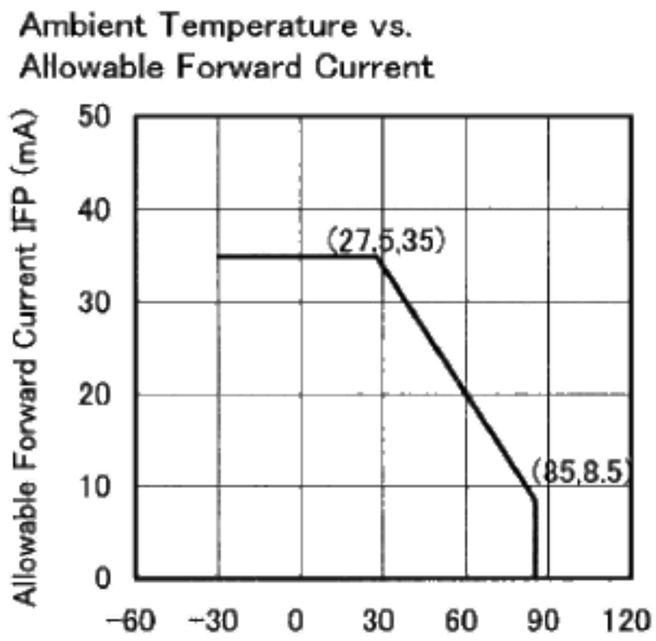
(refer to Ambient Temperature vs. Allowable Forward Current curve)

Table 6

Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Absolute Maximum Rating	Unit
Forward Current	IF	35	mA
Pulse Forward Current	IFP	100	mA
Reverse Voltage	VR	5	V
Power Dissipation	PD	119	mW
Operating Temperature	Topr	-30 ~ + 85	°C
Storage Temperature	Tstg	-40 ~ +100	°C
Soldering Temperature	Tsld	Reflow Soldering : 260°C for 10sec. Hand Soldering : 350°C for 3sec.	

IFP Conditions : Pulse Width ≤ 10msec. and Duty ≤ 1/10



*1 per one piece of

Table 7

Initial Electrical/Optical Characteristics (Ta=25°C)

Item		Symbol	Condition	Typ.	Max.	Unit
Forward Voltage		VF	IF=20[mA]	(3.1)	3.4	V
Reverse Current		IR	VR= 5[V]	-	50	μA
Luminous Flux		φv	IF=20[mA]	(6.6)	-	lm
Luminous Intensity		Iv	IF=20[mA]	(2.4)	-	cd
Chromaticity Coordinate*	x	-	IF=20[mA]	0.300	-	-
	y	-	IF=20[mA]	0.295	-	-

* Please refer to CIE 1931 chromaticity diagram.

*1 per one piece of

Table 8

Ranking (Ta=25°C)

Item		Symbol	Condition	Min.	Max.	Unit
Luminous Flux	Rank W700	φv	IF=20[mA]	7.00	7.25	lm
	Rank W675			6.75	7.00	
	Rank W650			6.50	6.75	
	Rank W625			6.25	6.50	
	Rank W600			6.00	6.25	

* Luminous Flux Measurement allowance is ± 7%.

Table 9

Color Ranks (IF=20mA,Ta=25°C)

	Rank Sbj2			
x	0.296	0.291	0.299	0.304
y	0.276	0.287	0.301	0.290

	Rank Sbk2			
x	0.304	0.299	0.307	0.312
y	0.290	0.301	0.315	0.304

* Color Coordinates Measurement allowance is ± 0.005.

* Basically, a shipment shall consist of the LEDs of a combination of the above ranks. The percentage of each rank in the shipment shall be determined by Nichia.

(5-3) Interface signals

Table 10

Pin No	Symbol	Description	I/O	Remarks
1	GND	GND level pin	-	
2	VCC	Power supply for analog and logic	-	
3	VCC	Power supply for analog and logic	-	
4	VDDIO	Power supply for I/O	-	
5	GND	GND level pin	-	
6	B0	Data signal in RGB I/F (BLUE)	I	
7	B1	Data signal in RGB I/F (BLUE)	I	
8	B2	Data signal in RGB I/F (BLUE)	I	
9	B3	Data signal in RGB I/F (BLUE)	I	
10	B4	Data signal in RGB I/F (BLUE)	I	
11	B5	Data signal in RGB I/F (BLUE)	I	
12	B6	Data signal in RGB I/F (BLUE)	I	
13	B7	Data signal in RGB I/F (BLUE)	I	
14	GND	GND level pin	-	
15	G0	Data signal in RGB I/F (GREEN)	I	
16	G1	Data signal in RGB I/F (GREEN)	I	
17	G2	Data signal in RGB I/F (GREEN)	I	
18	G3	Data signal in RGB I/F (GREEN)	I	
19	G4	Data signal in RGB I/F (GREEN)	I	
20	G5	Data signal in RGB I/F (GREEN)	I	
21	G6	Data signal in RGB I/F (GREEN)	I	
22	G7	Data signal in RGB I/F (GREEN)	I	
23	GND	GND level pin	-	
24	LEDPWM	Control signal for LED backlight	O	PWM signal's width is selected from 256 values
25	GND	GND level pin	-	
26	GND	GND level pin	-	
27	LEDC	LED cathode	-	
28	GND	GND level pin	-	
29	LEDA	LED Anode	-	
30	GND	GND level pin	-	
31	MAKER ID	MARKER_ID pin = "GND"	-	
32	DE	Data enable signal in RGB	I	
33	HSYNC	Line synchronous signal in RGB I/F	I	
34	VSYNC	Frame synchronous signal in RGB I/F	I	
35	DCLK	Dot clock signal in RGB I/F	I	
36	CS	Chip Select pin in Serial I/F	I	Low(GND) enable
37	SCL	Serial clock signal in Serial I/F	I	
38	SDI	Serial data input signal in Serial I/F	I	
39	SDO	Serial data output signal in Serial I/F	O	
40	RESET	Reset enable pin	I	Low(GND) enable
41	GND	GND level pin	-	
42	R0	Data signal in RGB I/F (RED)	I	
43	R1	Data signal in RGB I/F (RED)	I	
44	R2	Data signal in RGB I/F (RED)	I	
45	R3	Data signal in RGB I/F (RED)	I	
46	R4	Data signal in RGB I/F (RED)	I	
47	R5	Data signal in RGB I/F (RED)	I	
48	R6	Data signal in RGB I/F (RED)	I	
49	R7	Data signal in RGB I/F (RED)	I	
50	GND	GND level pin	-	

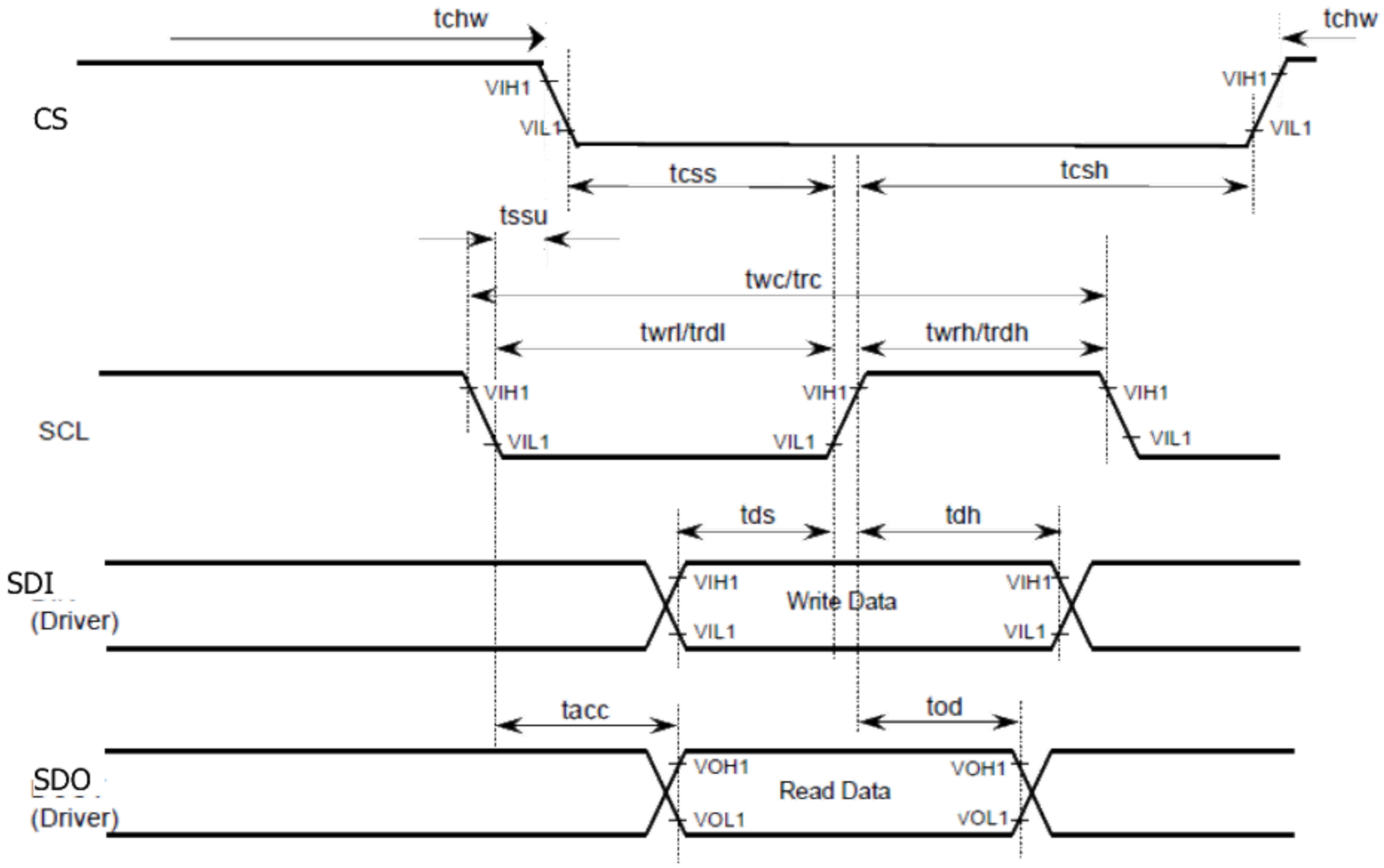
Corresponded connector : Board to board Connector (Panasonic AXT550124)
Signals connect to LCD module. Symbols correspond able to Circuit diagram in Page 30.

(5-4) Host Interface Timing Diagrams for **serial interface**

Table 11

Condition : GND=0, VDDIO=1.7~2.95V, Ta = 25°C

Item	Symbol		Unit	Test Condition	Min.	Max.
Chip Select Set Up Time	CS	tcss	ns		40	-
Chip Select Hold Time		tcsh	ns		40	-
Chip Select High Pulse Width		tchw	ns		100	
Write Cycle Time	SCL (Write)	twc	ns		100	-
SCL"High"Width(Write)		twrh	ns		40	-
SCL"Low"Width(Write)		twrl	ns		40	-
SCL Set Up Time		tssu	ns		10	
Read Cycle Time	SCL (Read)	trc	ns		300	-
SCL"High"Width (Read)		trdh	ns		120	-
SCL"Low"Width(Read)		trdl	ns		120	-
Data Set Up Time	SDI	tds	ns		30	-
Data Hold Time		tdh	ns		30	-
Access Time	SDO	tacc	ns	CL Max.30pF Min.8pF	-	110
Output Disable Time		tod	ns		10	-
Rising/Falling Time	-	tr/tf	ns		-	15



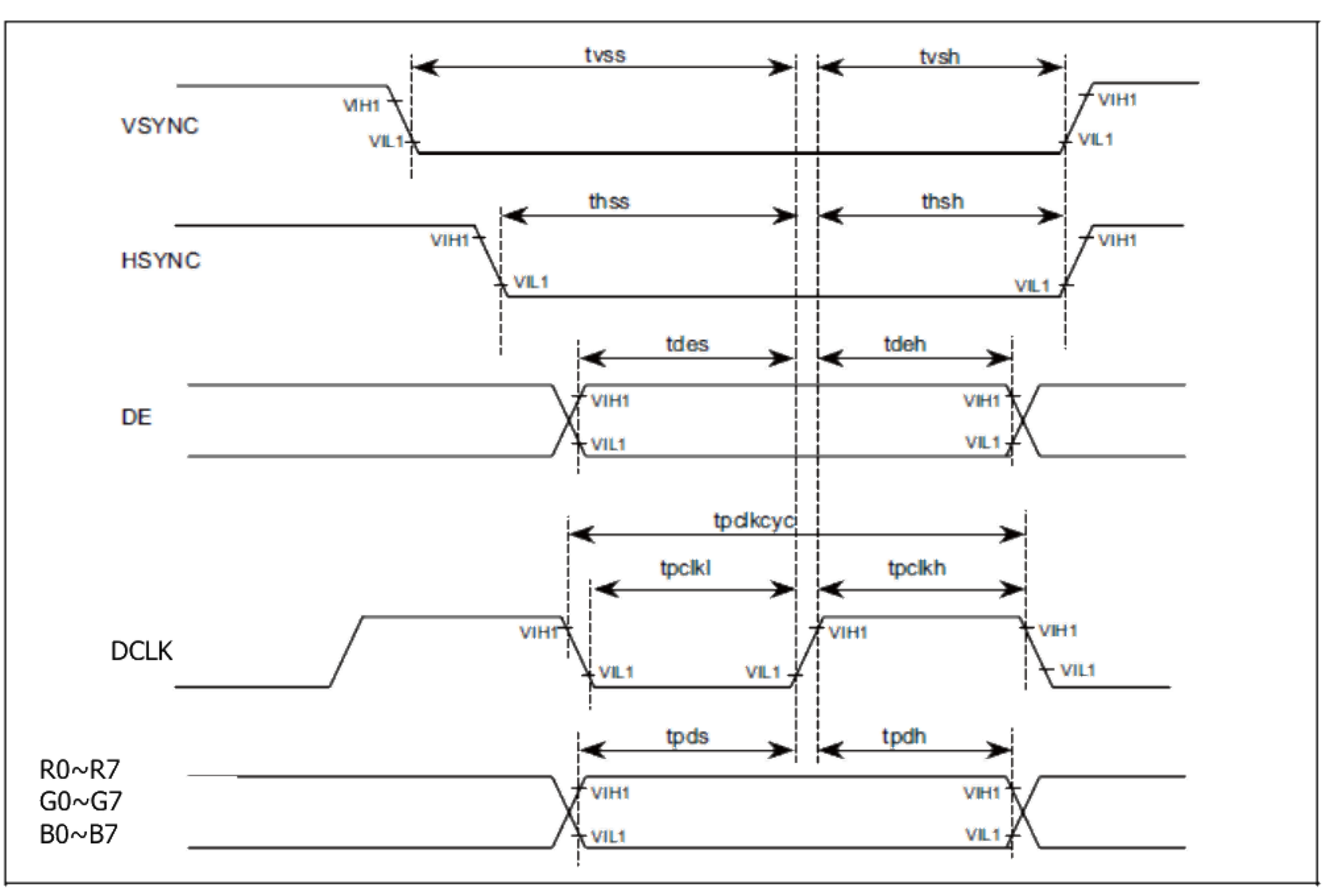
(5-5) Host Interface Timing Diagrams for **RGB interface**

Table 12

Condition : GND=0, VDDIO=1.7～2.95V, Ta = 25℃

Item	Symbol		Unit	Test Condition	Min.	Max.
VSYNC setup time	VSYNC	tyss	ns		10	-
VSYNC hold time		tvsh	ns		15	-
HSYNC setup time	HSYNC	thss	ns		10	-
HSYNC hold time		thsh	ns		15	-
DE setup time	DE	tdes	ns		10	-
DE hold time		tdeh	ns		15	-
Pixel clock cycle time	DCLK	tpclkcyc	ns		31	-
Pixel clock “Low” period		tpclkl	ns		10	-
Pixel clock “High” period		tpclkh	ns		10	-
Data setup time	*1	tds	ns		10	-
Data hold time		tdh	ns		10	-
Rise / Fall time	-	tr/tf	ns		-	5

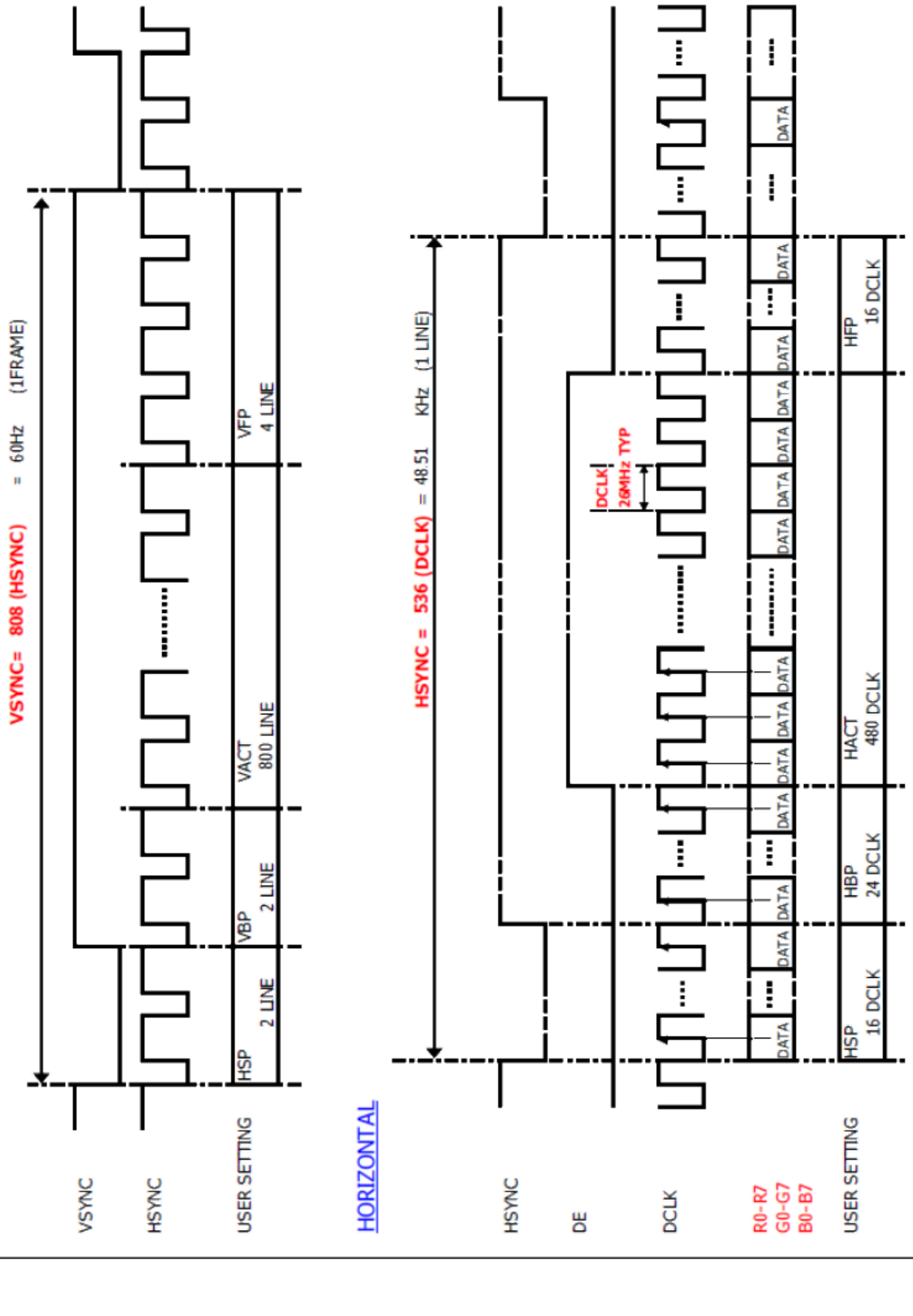
*1 : R0~R7/G0~G7/B0~B7/DE



(5-6) Picture data input timing Diagrams for **RGB interface**

Table 13

Item	Symbol	unit	MIN	TYP	MAX
Input dot clock	DCLK	MHz	24.70	26.00	27.30
Horizontal sync period	HSYNC	DCLK	-	536	-
Horizontal sync pulse width	HSP	DCLK	-	16	-
Horizontal back porch	HBP	DCLK	-	24	-
Horizontal front porch	HFP	DCLK	-	16	-
Horizontal active	HACT	DCLK	-	480	-
Vertical sync period	VSYNC	HSYNC	-	808	-
Vertical sync pulse width	VSP	HSYNC	-	2	-
Vertical back porch	VBP	HSYNC	-	2	-
Vertical front porch	VFP	HSYNC	-	4	-
Vertical active	VACT	HSYNC	-	800	-



(5-7) Schematic of LCD module system

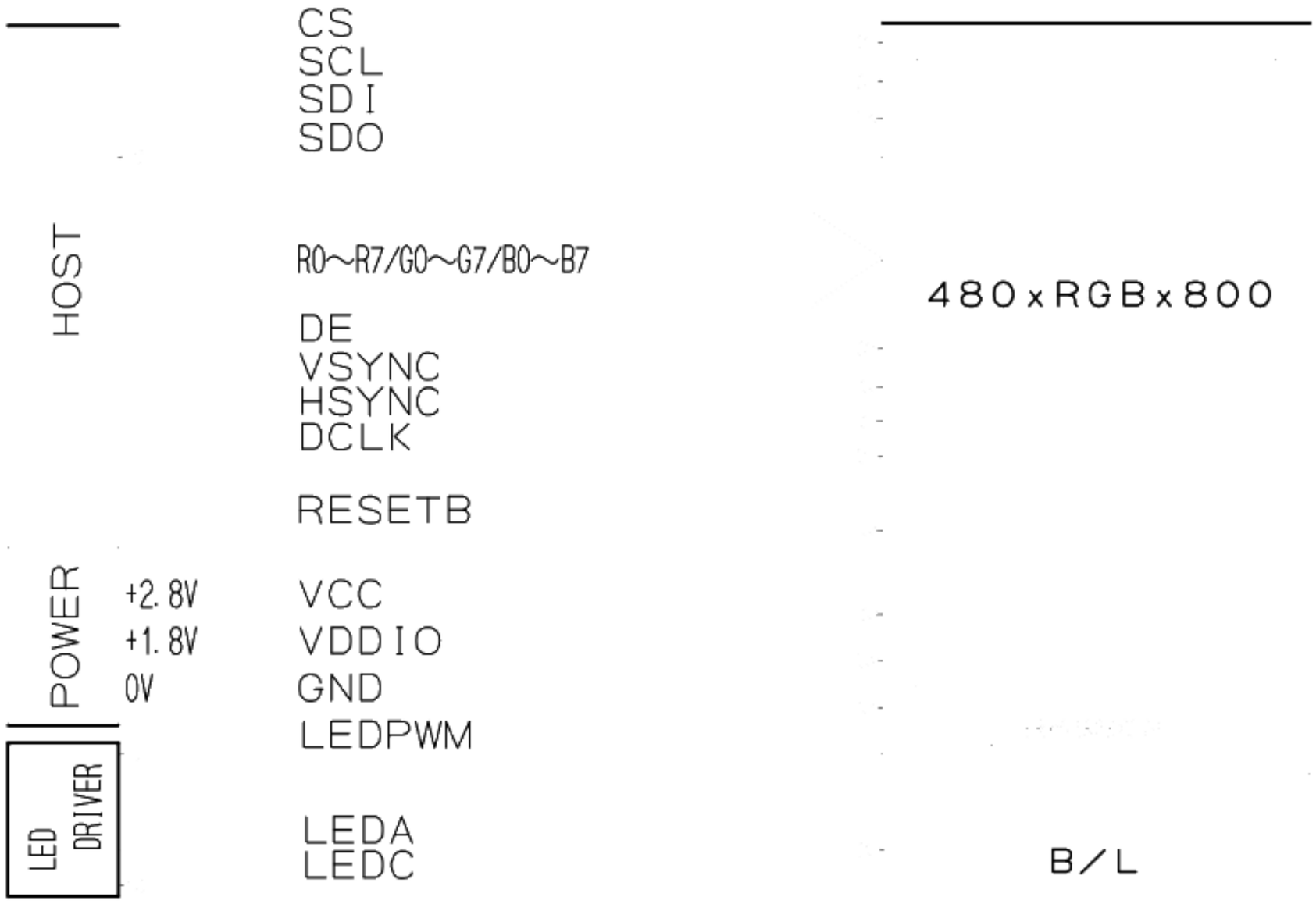


Fig.1 Schematic of LCD module system

6. Optical Characteristics

Table 14 VDDIO=1.8 V, VCC=2.8V, ILED=20mA/pcs, Ta = 25℃,
DCLK=26MHz

Optical Characteristics								
Parameter		symbol	condition	MIN	TYP	MAX	unit	Remark
Transmissive mode								
Brightness		Br	θ=0°	350	500	-	cd/㎡	Note1,2
Contrast ratio		T-Co	θ=0°	400	500	-	-	Note1,3
Viewing Angle		θ11	Co > 5	70	80	-	deg	Note1
		θ12		70	80	-		
		θ21		70	80	-		
		θ22		70	80	-		
Response Time	Rise	τr1	θ=0°	-	11	22	ms	Note1,4
	Decay	τd1		-	24	48	ms	
White chromaticity		x	θ=0°	0.24	0.29	0.34	-	Note.1,3
		y		0.26	0.31	0.36	-	
Red chromaticity		x	θ=0°	0.55	0.60	0.65	-	
		y		0.30	0.35	0.40	-	
Green chromaticity		x	θ=0°	0.25	0.30	0.35	-	
		y		0.49	0.54	0.59	-	
Blue chromaticity		x	θ=0°	0.10	0.15	0.20	-	
		y		0.04	0.09	0.14	-	
Uniformity		-	θ=0°	80	-	-	%	Note.1, 5
NTSC ratio		-	θ=0°	40	50	-	%	Note.1
Color Temperature		-	θ=0°	6000	7800	10000	K	Note.1
Flicker ratio		-	θ=0°	-	-	10(*1)	%	Note.1
Reflective mode								
Reflectance		Re	θ=0°	-	1.5	-	-	Note.1, 6
Contrast ratio		R-Co	θ=0°	-	10	-	-	Note.1, 6

*1: Measuring condition

- Measuring systems: YOKOGAWA 3298_01 + 3298_11
- Temperature = 25℃(±3℃), Frame Frequency = 60Hz (+/-5%),
  LED back-light: ON, Environment brightness < 150 lx, Sampling Frequency = 30Hz
- Measuring pattern : Horizontal stripe pattern <black (V0) / gray(V127) / black (V0) /gray (V127)…>
- Measured sample : New sample before a long term aging.
- Flicker ratio is very sensitive to measuring condition.

Note 1) Definition of range of visual angle

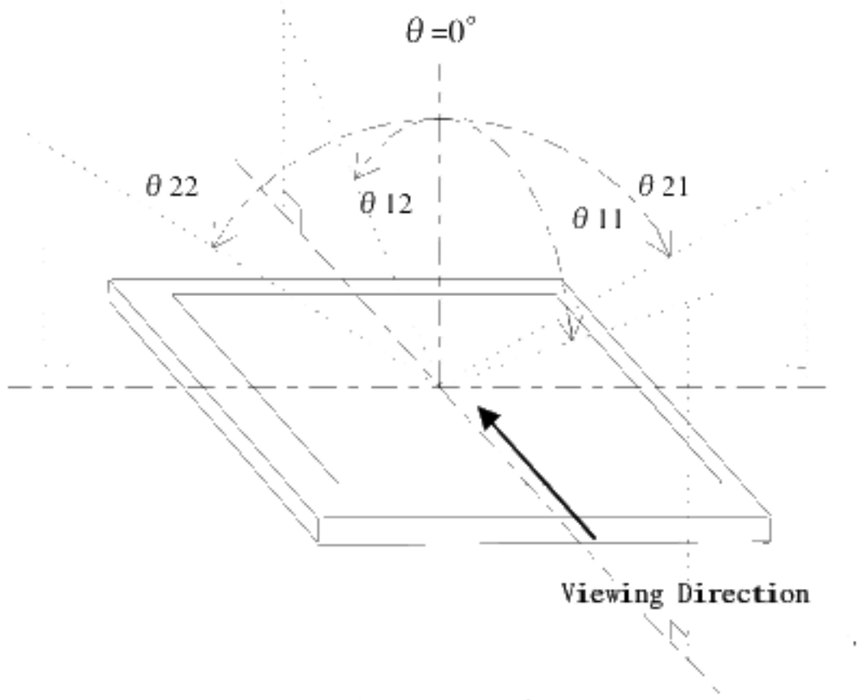


Fig .2 Definition of viewing angle

Note 2) Brightness is measured as shown in Fig.3, and is defined as the brightness of all pixels "White" at the center of display area on optimum contrast.

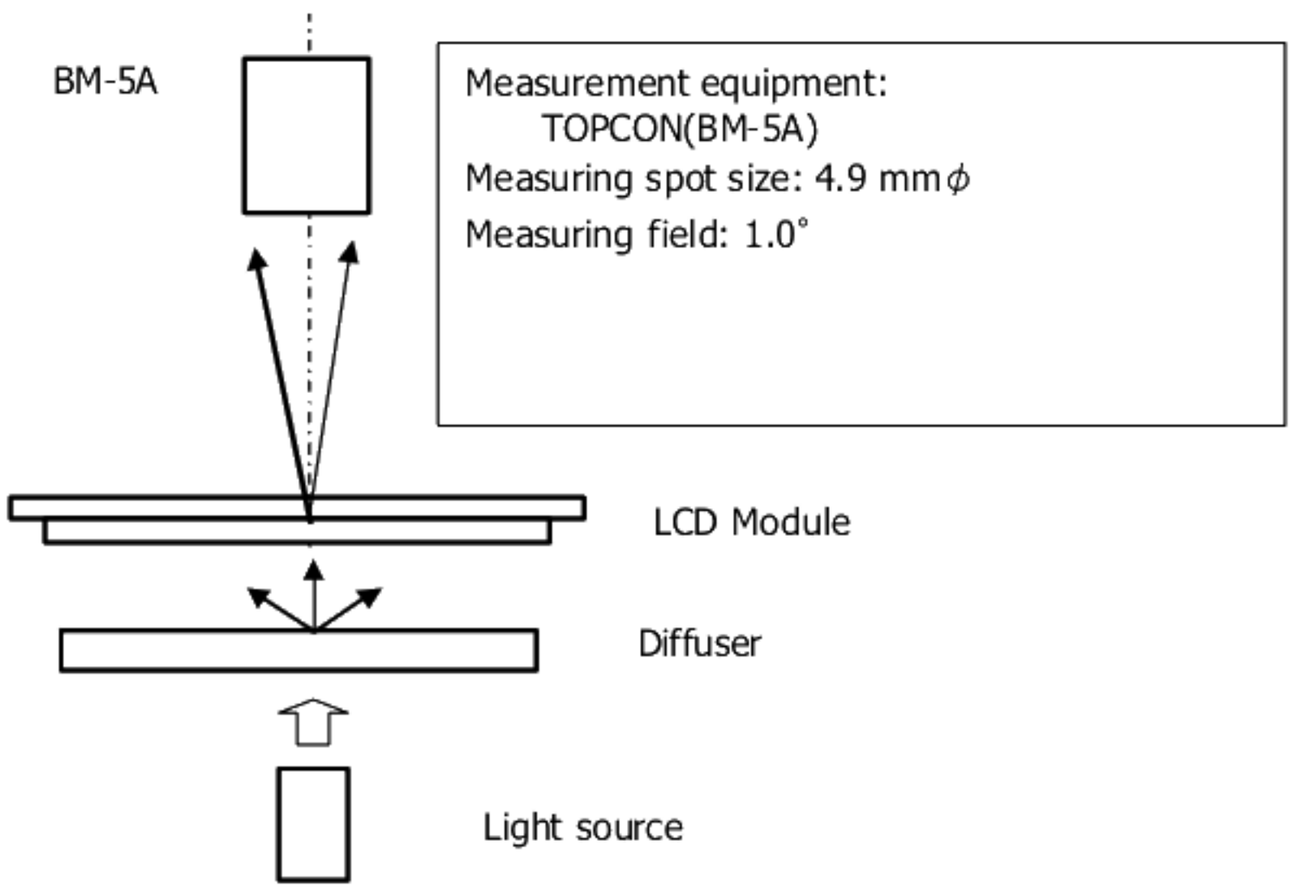


Fig. 3 Optical characteristics Test Method (Brightness)

Note 3) Contrast ratio is defined as follows:

$$\text{Transmissive mode Contrast} = \frac{\text{Brightness of all white pattern}}{\text{Brightness of standard black plate}}$$

Note 4) Response time is defined as follows:

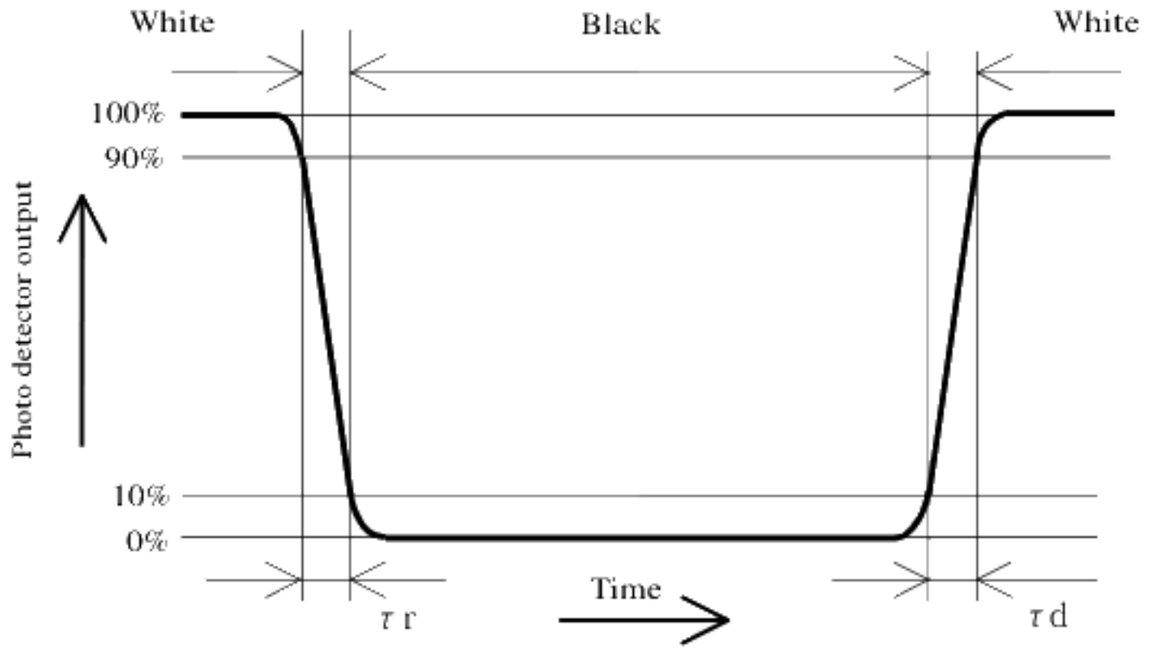


Fig. 4 Response time

Note 5) Uniformity is defined as follows:

$$\text{Uniformity} = \frac{\text{Minimum Luminance(brightness) in 9 points}}{\text{Maximum Luminance(brightness) in 9 points}}$$

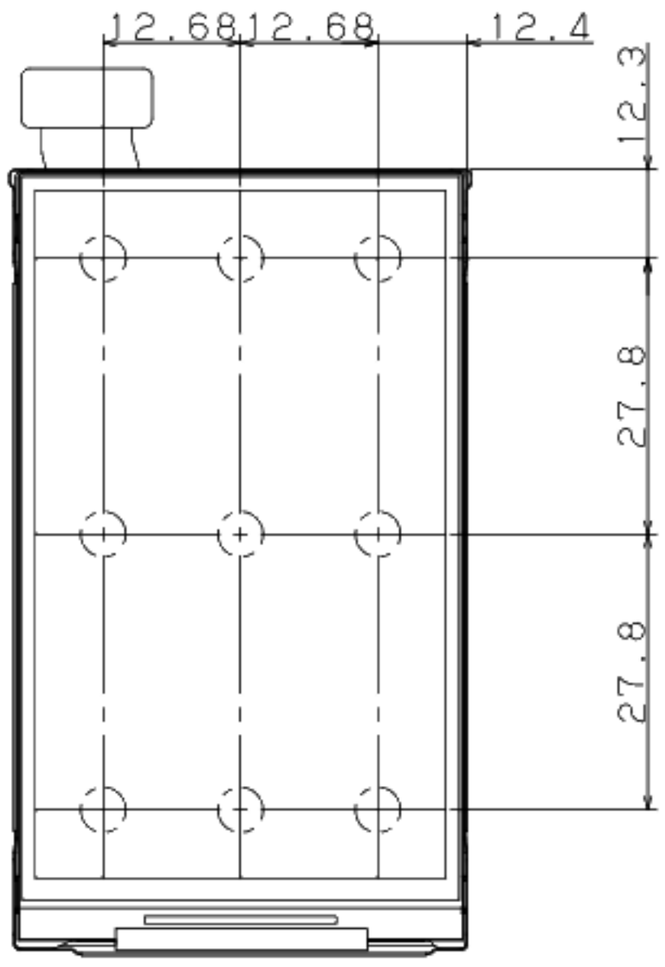


Fig. 5 Measuring Point

Note 6) Reflectance is defined as follows:
Measurement equipment: MINOLTA CM2002

$$\text{Reflectance} = \frac{\text{Reflectance of all white pattern}}{\text{Reflectance of standard white plate}}$$

$$\text{Reflective mode contrast} = \frac{\text{Reflectance of all white pattern}}{\text{Reflectance of all black pattern}}$$

7. Reliability

Table. 15

No.	Test	Condition	Judgment criteria
1	Temperature Cycling	-30℃ → 80℃ → -30℃ … 60min (3min) 60min (3min) 60min 10cycle	Per table in below
2	High Temp. Storage	Ta=80℃ 96h	Per table in below
3	Low Temp. Storage	Ta=-30℃ 96h	Per table in below
4	Humidity Operation	Ta=60℃ 90%RH 96h	Per table in below (polarizer discoloration is excluded)
5	High Temp. Operation	Ta=70℃ 96h	Per table in below
6	Low Temp. Operation	Ta=-20℃ 96h	Per table in below
7	ESD	Discharge resistance: 0 Ω Discharge capacitor: 200 pF Discharge voltage: ±200 V Max Discharge 1 time to each input line ※ "GND" of display module is connected GND of test system ground.	Per table in below

INSPECTION	CRITERION(after test)
Appearance	No Crack on the FPC, on the LCD Panel
Alignment of LCD Panel	No Bubbles in the LCD Panel No other Defects of Alignment in Active area
Electrical current	Within device specifications
Function / Display	No Broken Circuit, No Short Circuit or No Black line No Other Defects of Display

8. Packaging specifications

(8-1) Details of packaging

1) Packaging materials: Table.16
2) Packaging style : Fig. 10, 11

(8-2) Reliability

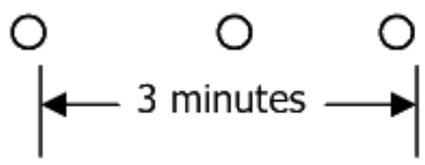
1) Vibration test

Table.16

Item	Test			
Frequency	5 Hz to 50 Hz (3 minutes cycle)			
Direction	Up-Down, Left-Right, Front-Back (3 directions)			
Period	Up-Down	Left-Right	Front-Back	Total
	60min	15min	15min	90min

The frequency should start at 5 Hz and vary continuously.

Total amplitude	20mm	0.2mm	20mm	0.2mm	
Frequency	5 Hz	50 Hz	5 Hz	50 Hz	(For 9.8m/s^2)



2) Drop test

Drop height: 750mm
Number of drop: 10 times (Drop sequence: 1 corner, 3 edges, 6 faces)

(8-3) Packaging quantities

240 modules per master carton

(8-4) Packaging weight

About 9kg

(8-5) Packaging outline dimensions

365 mm×530 mm×235 mm (H)

(Packaging materials) Table.17

	Parts name	Materials
1	Master carton	Corrugate card board
2	Inside sleeve	Corrugate card board
3	Outside sleeve	Corrugate card board
4	Tray for packaging	Polystyrene with anti-static treatment + anti-static polystyrene
5	Protective bag	Polyethylene with anti-static treatment
6	OPP tape	Polypropylene
7	Bar code label	Anti-static polyethylene

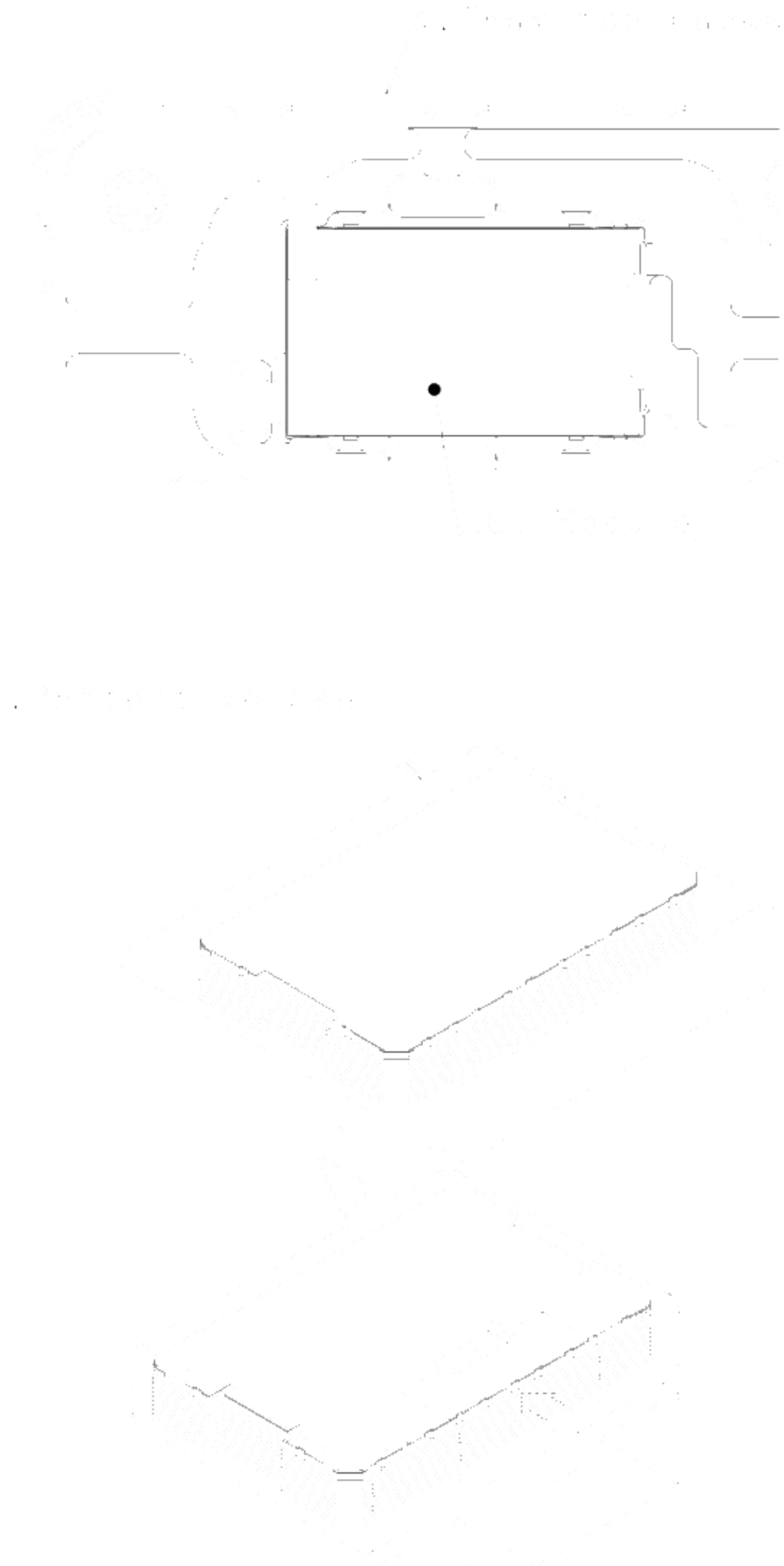


Fig.6 Packaging style (Tray for packaging)

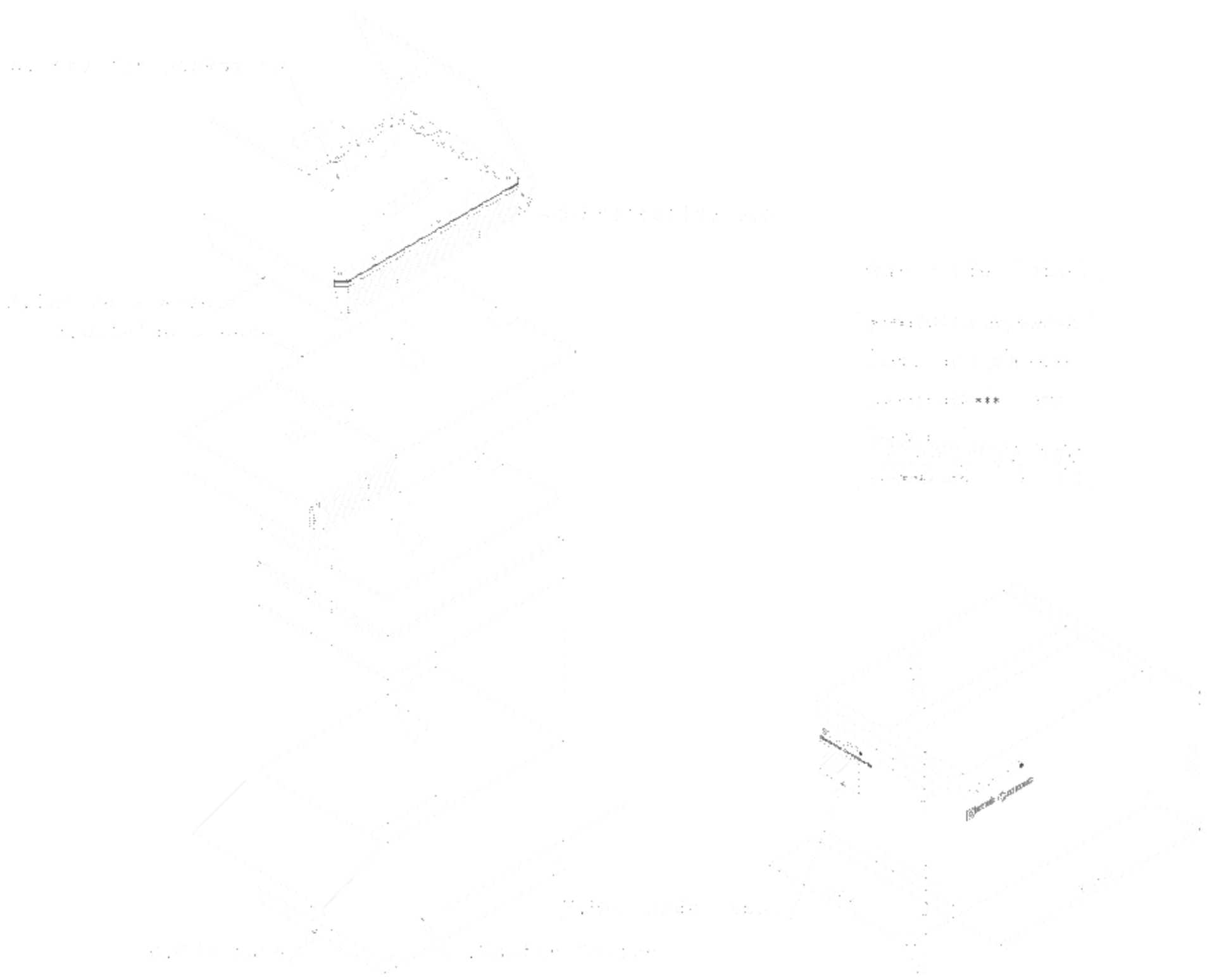


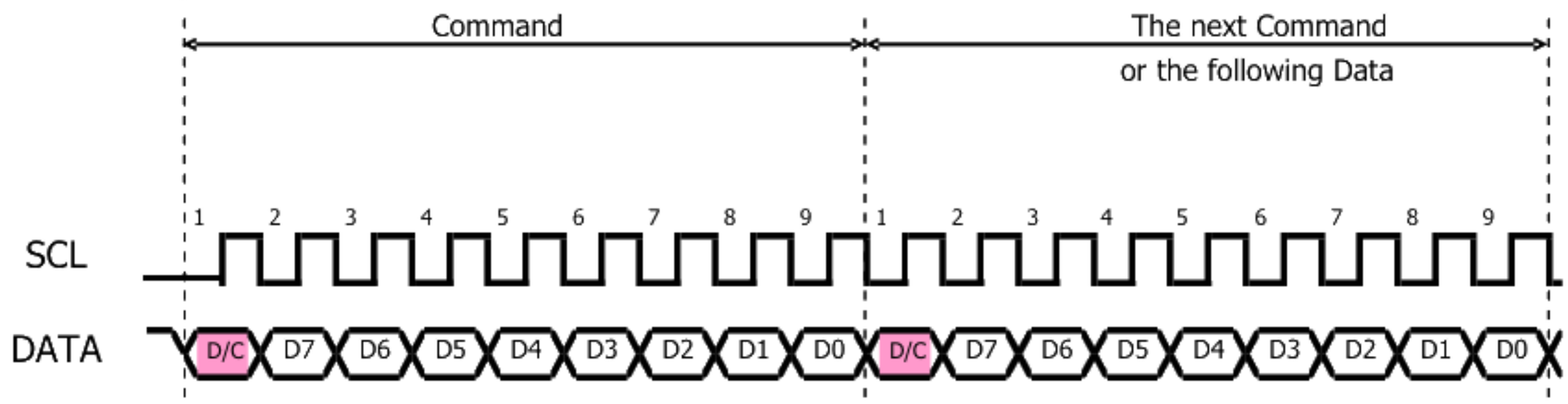
Fig. 7 Packaging style (Master carton for packaging)

9. Initial Sequence

*Condition

LCD DRIVER	R63302 (RENESA SP)
INTERFACE	Register data : serial I/F
	Picture data : RGB I/F (24bit colors)
DOT CLOCK(DCLK)	26MHz
POWER SUPPLY	VDDIO=1.8V / VCC=2.8V

*Serial data input data format



1) POWER ON Sequence

ITEM	D/C	Command or Data	HEX	REMARK
VCC ON				
WAIT min 0ms				
VDDIO ON				
VSYNC="H"/HSYNC="H"/DE="H"/DCLK="H or L"/R0-7,G0-7,B0-7="H or L"				
HW RESET=L				
WAIT min 1 ms				
HW RESET=H				
WAIT min 5 ms				
Picture Write (VSYNC/HSYNC/DE/DCLK/R0-7/G0-7/B0-7 start)				
Display ON	L	Command	29h	
Sleep OUT	L	Command	11h	
WAIT min 120ms				
Address Mode Setting	L	Command	36h	
	H	Data	00h	
Pixel Format Setting	L	Command	3Ah	
	H	Data	70h	
Command Access Enable	L	Command	B0h	
	H	Data	00h	
BLC Setting	L	Command	B8h	
	H	Data	**h	00h : BLC OFF 01h : BLC ON
LED PWM ON/OFF , Brightness Setting	L	Command	B9h	
	H	Data	01h	
	H	Data	FFh	
Command Access Disable	L	Command	B0h	
	H	Data	03h	

2) POWER OFF Sequence order change

ITEM	D/C	Command or Data	HEX	REMARK
Sleep IN	L	Command	10h	
WAIT min 120ms				
Display OFF	L	Command	28h	
VSYNC="H"/HSYNC="H"/DE="H"/DCLK="H or L"/R0-7,G0-7,B0-7="H or L"				
VDDIO OFF				
WAIT min 0ms				
VCC OFF				

3) SLEEP MODE ON Sequence order change

ITEM	D/C	Command or Data	HEX	REMARK
Sleep IN	L	Command	10h	
WAIT 120ms				
Display OFF	L	Command	28h	
VSYNC="H"/HSYNC="H"/DE="H"/DCLK="H or L"/R0-7,G0-7,B0-7="H or L"				

4) SLEEP MODE OFF Sequence order change

ITEM	D/C	Command or Data	HEX	REMARK
Picture Write (VSYNC/HSYNC/DE/DCLK/R0-7/G0-7/B0-7 start)				
Display ON	L	Command	29h	
Sleep OUT	L	Command	11h	
WAIT min 120ms				

10. Parts List

Table

PARTS CODE	SPECIFICATION	SIZE	VENDOR
LCD	480XRGBx800	3.47"	SHARP
Polarizer	-	-	NITTO
Driver LSI	R63302 -Polishing-	-	RENESAS SP
Back Light	-	-	OMRON
FPC	2layer	-	NIPPON MEKTRON
Connector	AXT550124	-	PANASONIC
LED1~7	NSSW206T	-	NICHIA
C1	1uF/6.3V	1005	TAIYO/MURATA/KYOCERA
C2	1uF/6.3V	1005	TAIYO/MURATA/KYOCERA
C3	1uF/6.3V	1005	TAIYO/MURATA/KYOCERA
C4	1uF/6.3V	1005	TAIYO/MURATA/KYOCERA
C5	1uF/6.3V	1005	TAIYO/MURATA/KYOCERA
C6	1uF/6.3V	1005	TAIYO/MURATA/KYOCERA
C7	1uF/6.3V	1005	TAIYO/MURATA/KYOCERA
C8	2.2uF/6.3V	1005	TAIYO/MURATA/KYOCERA
C9	1uF/10V	1005	TAIYO/MURATA/KYOCERA
C10	1uF/10V	1005	TAIYO/MURATA/KYOCERA
C11	1uF/10V	1005	TAIYO/MURATA/KYOCERA
C12	1uF/10V	1005	TAIYO/MURATA/KYOCERA
C13	1uF/16V	1608	TAIYO/MURATA/KYOCERA
C14	1uF/16V	1608	TAIYO/MURATA/KYOCERA
C15	2.2uF/10V	1608	TAIYO/MURATA/KYOCERA
C16	0.22uF/16V	1005	TAIYO/MURATA/KYOCERA
C17	0.22uF/10V	1005	TAIYO/MURATA/KYOCERA
C18	0.1uF/35V	1005	TAIYO/MURATA/KYOCERA
D1	DSF05S30CTB	1208	TOSHIBA
D2	HSD226-NKRF-E	1406	RENESAS
D3	HSD226-NKRF-E	1406	RENESAS
L1	LQH2MCN100M52L	2016	MURATA
L2	0 ohm	1005	ROHM/TAIYO SHA/KAMAYA

11. FPC art work

(11-1) Layer 1

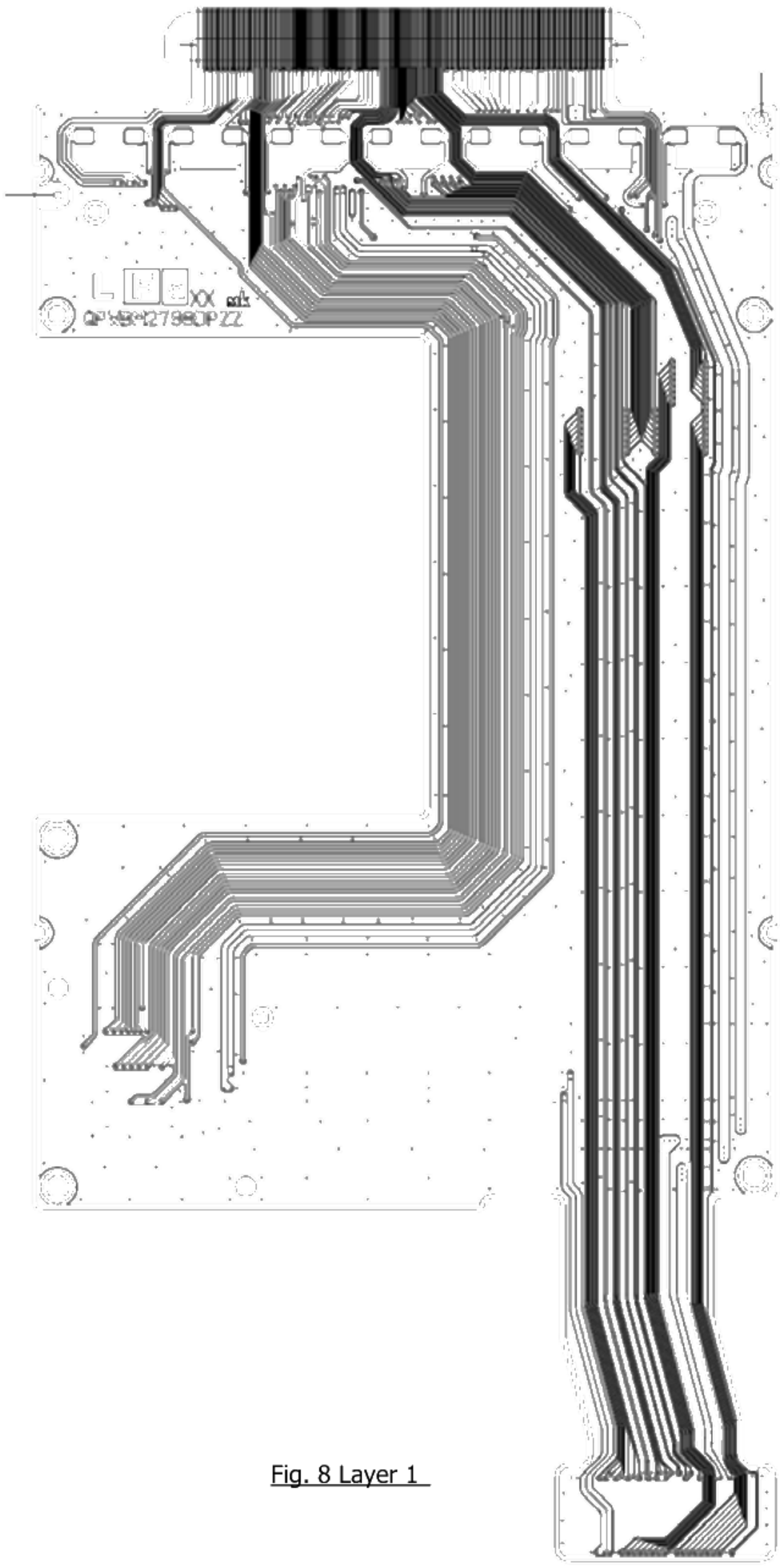


Fig. 8 Layer 1

(11-2) Layer 2

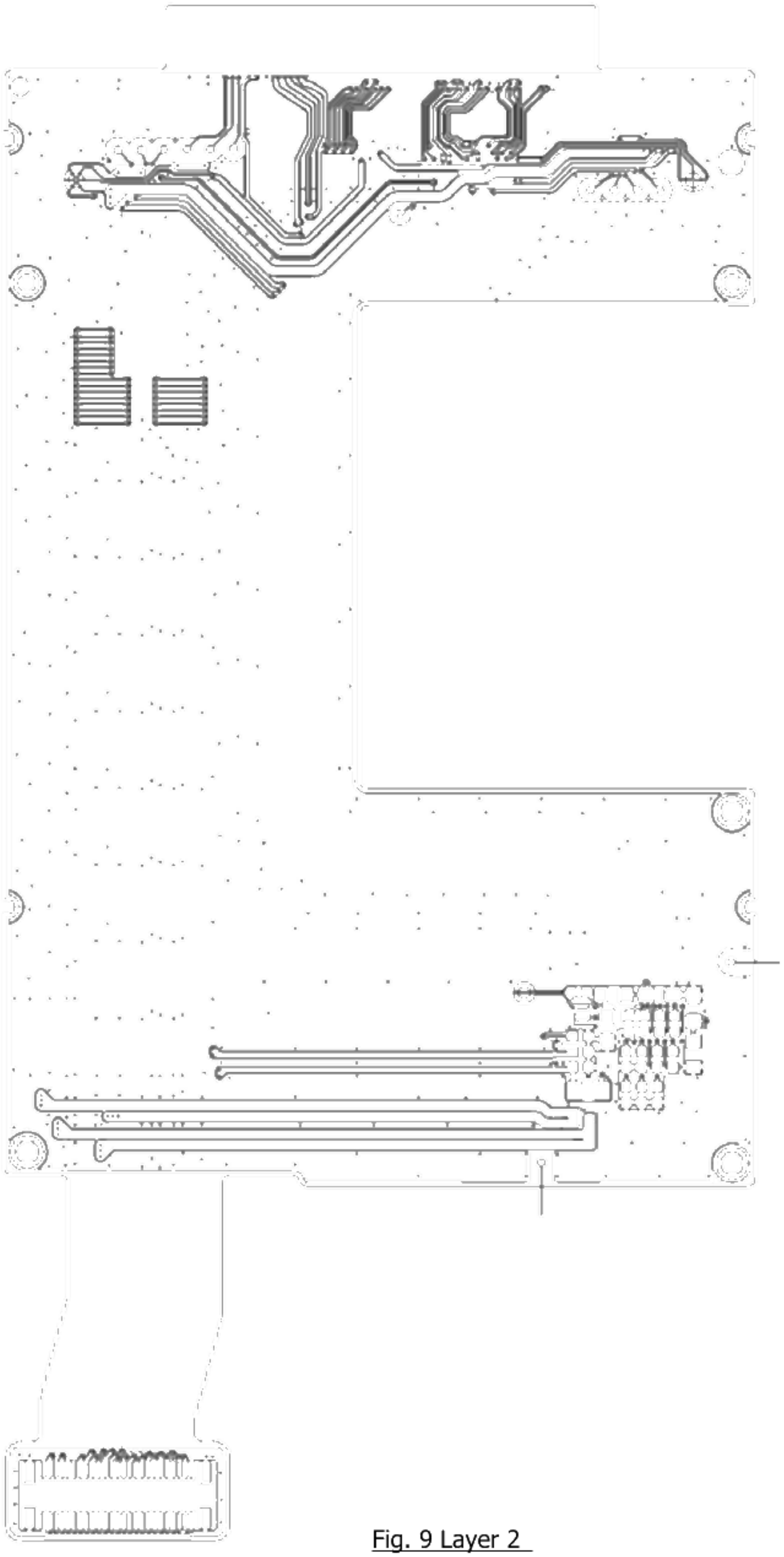


Fig. 9 Layer 2

(11-3) Part layout of layer 1

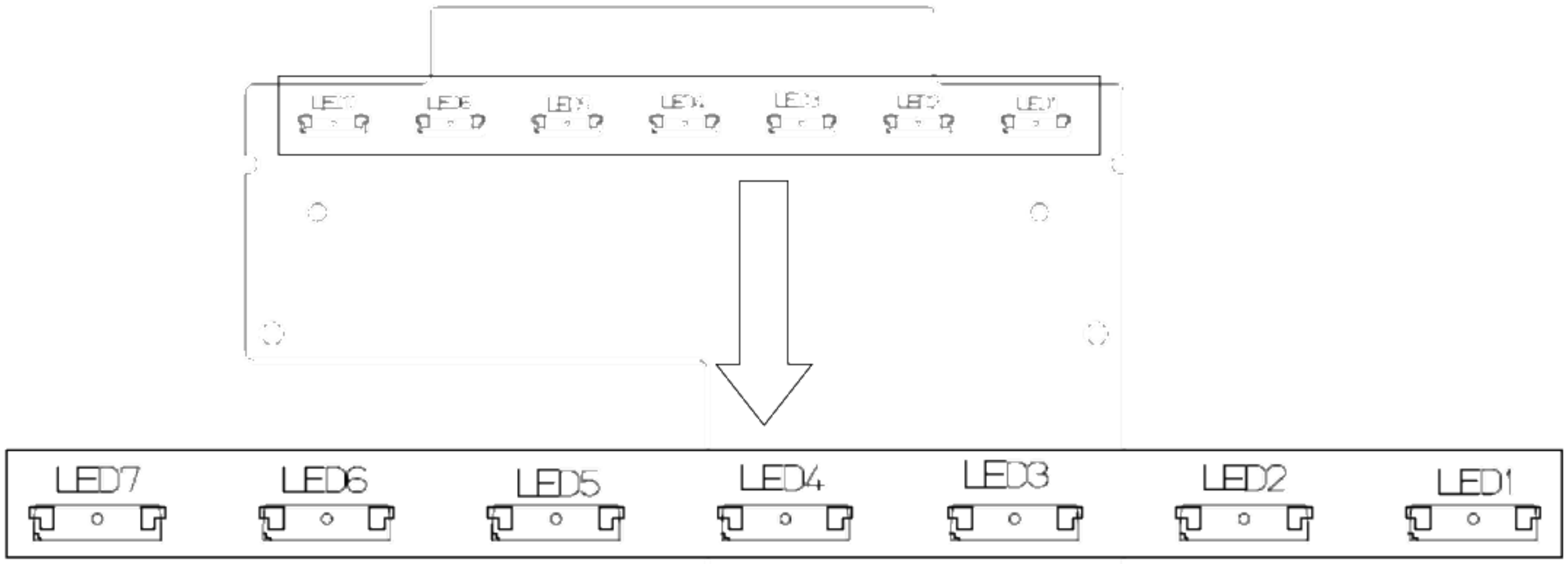


Fig. 10 Part layout of layer

(11-4) Part layout of layer 2

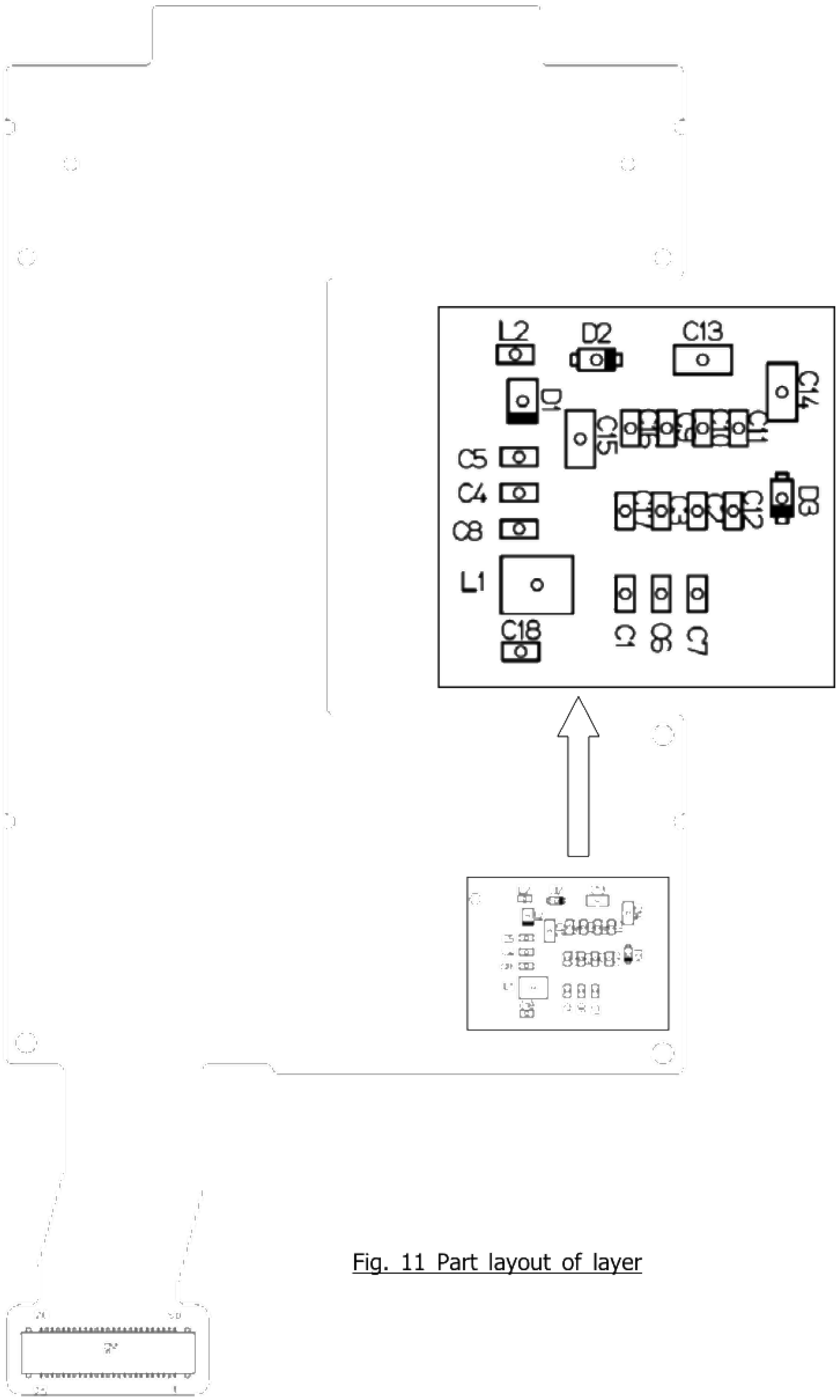


Fig. 11 Part layout of layer

12. Circuit diagram

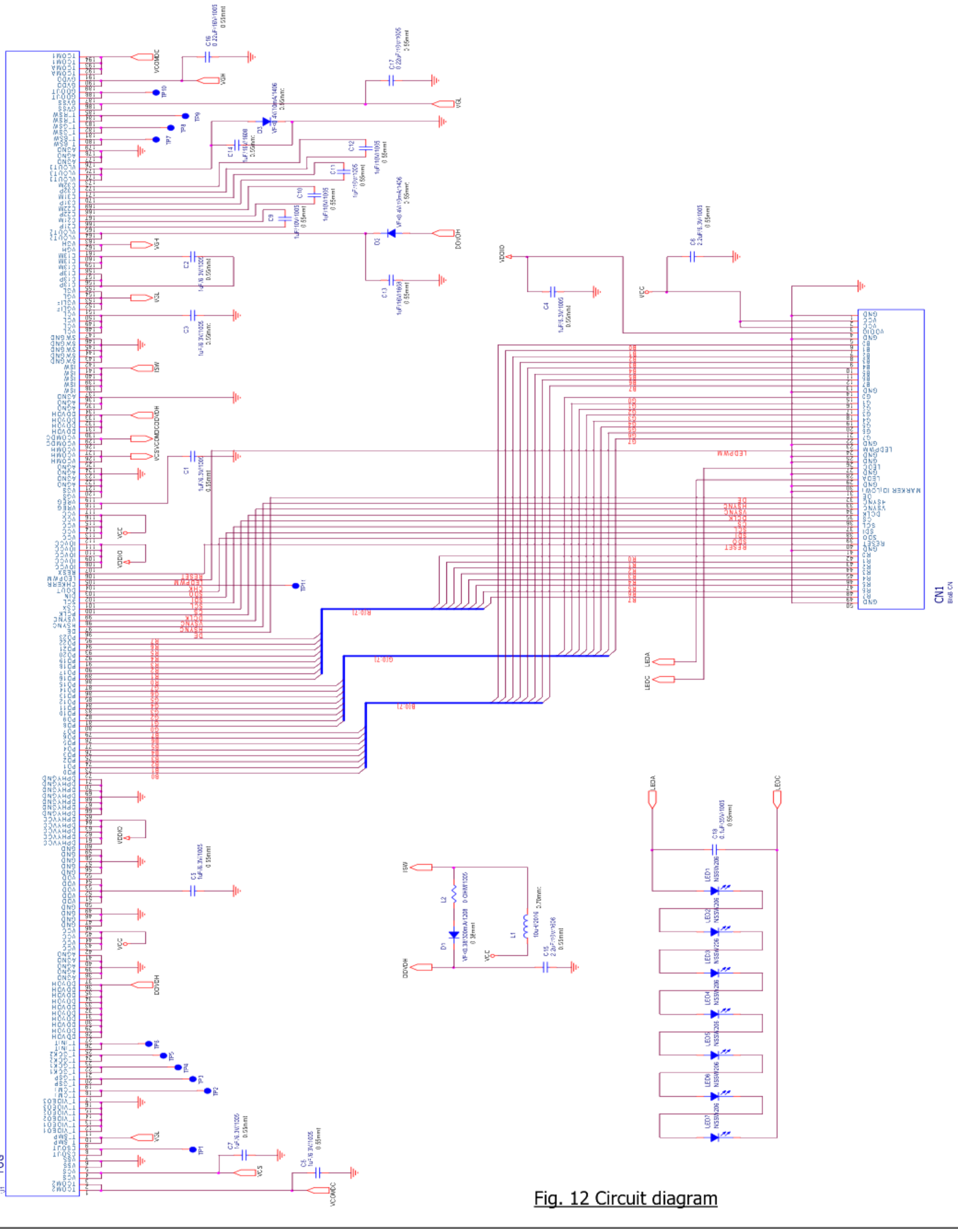


Fig. 12 Circuit diagram

13. Serial Number Label identification

Numbering is specified as follows.

⑦

LS035Y8DX02A

9 01 Z 000001 A Q

① ② ③ ④ ⑤ ⑥

① product year (lower 1 digits)

9: 2009

0: 2010

② product week

01 ～ 52 or 53

③ Line number

A ～ Z, 0 ～ 9

④ serial number

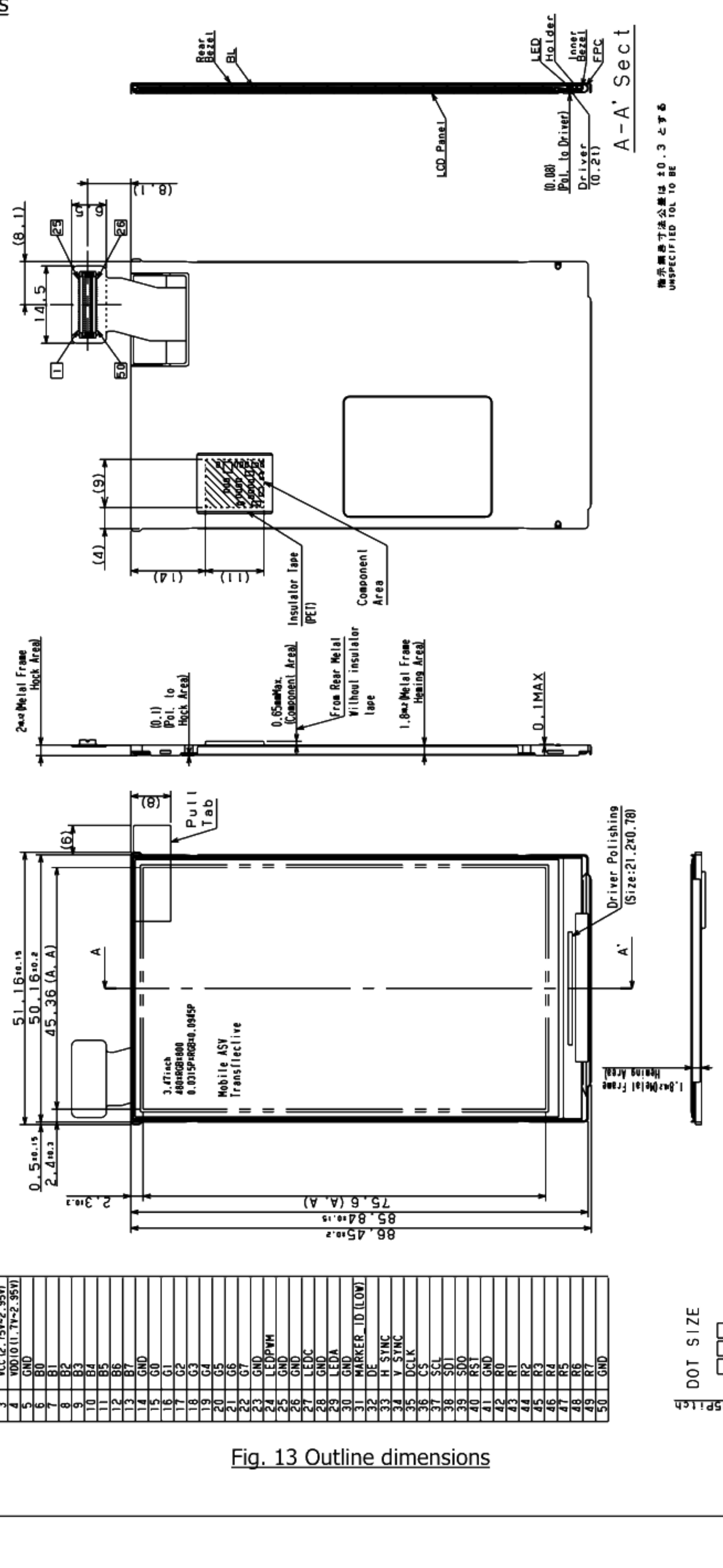
000001 ～ 999999, A00001 ～ Z99999

⑤ Version number

⑥ factory code

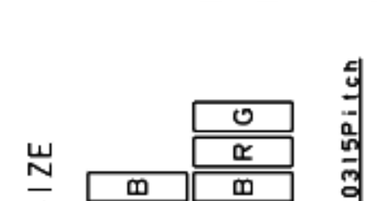
⑦ LCD Module code

14. Outline dimensions



Pin layout

No.	Symbol
1	GND
2	VCC (2.75V~2.95V)
3	VCC (2.75V~2.95V)
4	VDDIO (1.7V~2.95V)
5	GND
6	B0
7	B1
8	B2
9	B3
10	B4
11	B5
12	B6
13	B7
14	GND
15	G0
16	G1
17	G2
18	G3
19	G4
20	G5
21	G6
22	G7
23	GND
24	LEDPWM
25	GND
26	GND
27	LEDC
28	GND
29	LEDA
30	GND
31	MARKER_ID (LOW)
32	DE
33	H SYNC
34	V SYNC
35	DCLK
36	CS
37	SCL
38	SDI
39	SDO
40	RST
41	GND
42	R0
43	R1
44	R2
45	R3
46	R4
47	R5
48	R6
49	R7
50	GND



NOTE 1) Dimensions with bracket( ).
are now under study.
NOTE 2) LCD Module thickness does not
contain length reformable
to regular thickness by
pressing down.
NOTE 3) FPC I/F Connector: AXT550124 (Panasonic)

Fig. 13 Outline dimensions