SPEC. No.	TQ3C-8EAC0-E1DKA06-01
DATE	May 17, 2005

SPEC

FOR :

TYPE:KHG062HV1AH-G00

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Issued
Date: MAY. 25.2005
KYOCERA
Hayato LCD Division

KYOCERA CORPORATION
KAGOSHIMA HAYATO PLANT
LCD DIVISION

This specification is subject to change without notice.
Consult Kyocera before ordering.

Original	Designed by :Engineering Dept.			Confirmed by :QA Dept.	
Issue Data	Prepared	Checked	Approved	Checked	Approved
November 25, 2003	Y. Yamazaki	S. Oshita	M.Fujitani	Y. Yoshida	S. Hayashi

Caution

1. This Kyocera LCD module has been specifically designed for use only in electronic devices in the areas of audio control, office automation, industrial control, home appliances, etc. The modules should not be used in applications where module failure could result in physical harm or loss of life, and Kyocera expressly disclaims any and all liability relating in any way to the use of the module in such applications.

2. Customer agrees to indemnify, defend and hold Kyocera harmless from and against any and all actions, claims, losses, damages, liabilities, awards, costs, and expenses, including legal fees, resulting from or arising out of Customer's use, or sale for use, of Kyocera modules in applications.

3. Kyocera shall have the right, which Customer hereby acknowledges, to immediately scrap or destroy tooling for Kyocera modules for which no Purchase Orders have been received from the Customer in a two-year period.

Revision Record

Date	Designed by: Engineering Dept.			Confirmed by: QA Dept.	
	Prepared	Checked	Approved	Checked	Approved
May 17, 2005	Y. Yamazaki	S. Oshita	M.Fujitani	Y. Yoshida	S. Hayashi

Rev. No.	Date	Page	Descriptions
01	May 17, 2005	1	1. Application ～Add comment ″『RoHS Compliance』″
		2	3. Mechanical Specifications ～Change ″Dot size″ 0.067×0.221 → 0.057×0.211 ～″Mass″ Delete()
		4	5-1. VDD = 5.0V ～Delete () ～Add Frame Frequency ″MAX 150 Hz″
		5	5-2. VDD = 3.3V ～Delete () ～Add Frame Frequency ″MAX 150 Hz″
		6	6. Optical Characteristics ～Delete ()
		9	6-10. Measurement method of reflectance ～Delete
		11	7-1. Power supply ～Change ″Vcont″ (+0.8V～+2.8V) → (+1.2V～+2.4V)
		12	8-1. LCD ～Change LCD connector ″08-6210-020-340-800″ → ″08-6210-020-340-800+″
			8-2. CFL ～Add Recommended matching connector ″SM02-(8.0)B-BHS-1-TB(LF)(SN) (JST)″
		19	13. Backlight Characteristics ～Delete ()
		20	14. Lot Number Identification ～Change ″YEAR″, ″CODE″
		21	16-1. Installation of the LCD ～Change comment 16-5. Screen Surface ～Add comment ″6. Please do not use～″ ～Add comment ″7. Liquid crystal may～″
		23	18. Outline Drawing ～Change Drawing

1. Application

This data sheet defines the specification for a (640×R.G.B)×240 dot, STN Transflective color dot matrix type Liquid Crystal Display with CFL backlight. 『RoHS Compliance』

2. Construction and Outline

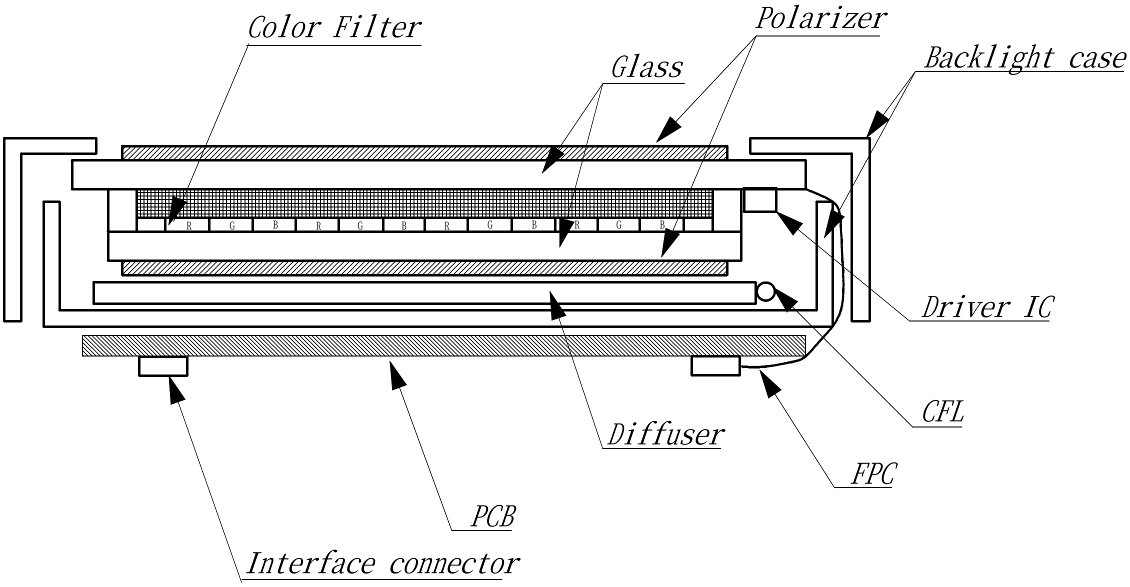
(640×R.G.B)×240 dots, COG type LCD with CFL backlight.

Backlight system : Side-edge type CFL (1 tube).

Inverter : Option.
Recommended Inverter : PH-BLC08-K2(HITACHI MEDIA ELECTRONICS)
or Equivalent.

Polarizer : Glare treatment.

Additional circuit : Bias voltage circuit, Randomizing circuit, DC-DC converter


Color Filter
Polarizer
Glass
Backlight case
R G B R G B R G B R G B
Driver IC
CFL
Diffuser
FPC
PCB
Interface connector

This drawing is showing conception only.

3. Mechanical Specifications

ITEM	SPECIFICATION	UNIT
Outline dimensions	174.2 (W) × 73.4 (H) × 7.6 (D) (PCB and components not included.) ※ Refer outline drawing in detail	mm
Effective viewing area	149.8 (W) × 57.4 (H)	mm
Dot number	(640×R.G.B) (W) × 240 (H)	Dots
Dot size	0.057 (W) × 0.211 (H)	mm
Dot pitch	0.077 (W) × 0.231 (H)	mm
Display color *1	White *2	—
Base color *1	Black *2	—
Mass	135	g

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

*2 Negative-type display
Display data "H" :R.G.B Dots ON : White
Display data "L" :R.G.B Dots OFF : Black

4．Absolute Maximum Ratings

4-1. Electrical absolute maximum ratings

ITEM	SYMBOL	MIN.	MAX.	UNIT
Supply voltage for logic	VDD	0	6.0	V
Supply voltage for LCD driving	VCONT	0	VDD	V
Input signal voltage *1	Vin	0	VDD	V
FRM frequency	fFRM	—	150	Hz

*1 Input signal : CP, LOAD, FRM, DISP, D0〜D7

4-2. Environmental absolute maximum ratings

ITEM	SYMBOL	MIN	MAX	UNIT
Operating temperature *1	Top	0	50	°C
Storage temperature *2	T_{STO}	-20	60	°C
Operating humidity *3	Hop	10	*4	%RH
Storage humidity *3	H_{STO}	10	*4	%RH
Vibration	—	*5	*5	—
Shock	—	*6	*6	—

*1 LCD's display quality shall not be guaranteed at the temperature range of :
below 0°C and upper 40°C.

*2 Temp. = -20°C ＜ 48 h , Temp = 60°C ＜ 168 h
Store LCD panel at normal temperature/humidity.
Keep it free from vibration and shock.
LCD panel that is kept at low or high temperature for a long time can be defective due to the other conditions, even if the temperature satisfies standard.
(Please refers to 16. Precautions for use as detail)

*3 Non-condensation.

*4 Temp. ≦ 40°C, 85% RH Max.
Temp. ＞ 40°C, Absolute Humidity shall be less than 85%RH at 40°C.

*5

Frequency	10〜55 Hz	Converted to acceleration value : (0.3〜9 m/s^2)
Vibration width	0.15 mm	
Interval	10-55-10 Hz 1 minute	

2 hours in each direction X/Y/Z (6 hours as total)
EIAJ ED-2531

*6 Acceleration: 490m/s^2
Pulse width : 11 ms
3 times in each direction : ±X/±Y/±Z.
EIAJ ED-2531

5. Electrical Characteristics

5-1. VDD=5.0V

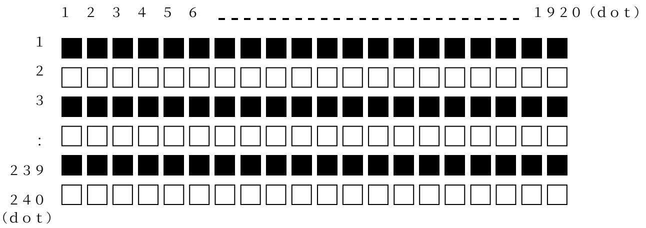
VDD = +5.0V ± 5%, Temp. = 0～50°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply voltage for logic	VDD	—	4.75	5.00	5.25	V
LCD driving voltage *1	Vop= VCONT	0 °C	1.20	—	—	V
		25 °C	1.30	1.80	2.30	V
		50 °C	—	—	2.40	V
Input voltage (FRM,LOAD,CP,DISP,D0～D7)	Vin	"H" level	0.8VDD	—	VDD	V
		"L" level	0	—	0.2VDD	V
Input current	Iin	Input signal	-100	—	100	μA
Rush current for logic	Irush	When rush current happens	3.0A(Peak) × 1ms			
Clock frequency	f_{cp}	—	4.03	4.32	10.00	MHz
Frame frequency *2	f_{FRM}	—	70	75	150	Hz
Current consumption for logic	IDD	*3	—	40	60	mA
Power consumption	Pdisp		—	200	300	mW

*1 Maximum contrast ratio is obtained by adjusting the LCD supply voltage (Vop = VCONT) for driving LCD.

*2 In consideration of display quality, it is recommended that frame frequency is set in the range of 70-80Hz. When you have to use higher frame and clock frequencies, confirm the LCD's performance and quality prior to finalizing the frequency values:
Generally, as frame and clock frequencies become higher current consumption will get bigger and display quality will be degraded.

*3 Display high frequency pattern, (see below).
Vop = VCONT , f_{FRM} = 75 Hz , fcp = 4.32MHz, Temp. = 25°C
Pattern:



5-2. VDD=3.3V

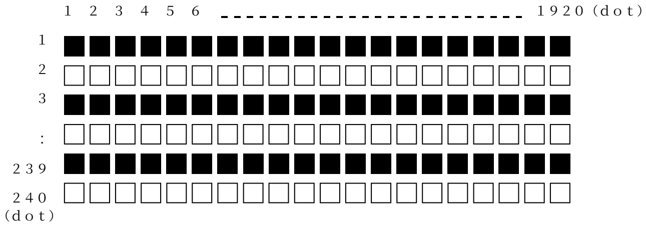
VDD = +3.3V ± 0.3V, Temp. = 0～50°C

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply voltage for logic	VDD	—	3.0	3.3	3.6	V
LCD driving voltage *1	Vop= VCONT	0 °C	1.20	—	—	V
		25 °C	1.30	1.80	2.30	V
		50 °C	—	—	2.40	V
Input voltage (FRM,LOAD,CP,DISP,D0～D7)	Vin	"H" level	0.8VDD	—	VDD	V
		"L" level	0	—	0.2VDD	V
Input current	Iin	Input signal	-100	—	100	μA
Rush current for logic	Irush	When rush current happens	3.0A(Peak) × 1ms			
Clock frequency	fcp	—	4.03	4.32	10.00	MHz
Frame frequency *2	f_{FRM}	—	70	75	150	Hz
Current consumption for logic	IDD	*3	—	55	83	mA
Power consumption	Pdisp		—	182	274	mW

*1 Maximum contrast ratio is obtained by adjusting the LCD supply voltage (Vop= VCONT) for driving LCD.

*2 In consideration of display quality, it is recommended that frame frequency is set in the range of 70-80Hz. When you have to use higher frame and clock frequencies, confirm the LCD's performance and quality prior to finalizing the frequency values:
Generally, as frame and clock frequencies become higher current consumption will get bigger and display quality will be degraded.

*3 Display high frequency pattern, (see below).
Vop = VCONT , f_{FRM} = 75 Hz , fcp = 4.32MHz, Temp. = 25°C
Pattern:



6. Optical Characteristics

6-1. Reflective mode

Measuring Spot = ϕ6mm , Temp. = 25°C

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Response time	Rise	Tr	$\theta=\phi=0^\circ$	—	190	290	ms
	Down	Td	$\theta=\phi=0^\circ$	—	180	280	ms
Contrast ratio		CR	$\theta=\phi=0^\circ$	5.0	10.0	—	—
Reflectance		ρ	—	15.0	30.0	—	%

Optimum contrast is obtained by adjusting the LCD driving voltage(Vop) while at the viewing angle of $\theta = \phi = 0^\circ$.

6-2. Transmissive mode

Temp. = 25°C

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
Response time	Rise	Tr	$\theta=\phi=0^\circ$		—	190	290	ms
	Down	Td	$\theta=\phi=0^\circ$		—	180	280	ms
Viewing angle range		θ	$CR \geqq 2$	Upper	—	30	—	deg.
				Lower	—	20	—	
		ϕ		Left	—	45	—	deg.
				Right	—	45	—	
Contrast ratio		CR	$\theta=\phi=0^\circ$		10.0	20.0	—	—
Brightness		L	IL=5.0mA		35	55	—	cd/m^2
Chromaticity coordinates	Red	x	$\theta=\phi=0^\circ$		0.35	0.40	0.45	—
		y			0.22	0.27	0.32	
	Green	x	$\theta=\phi=0^\circ$		0.22	0.27	0.32	
		y			0.30	0.35	0.40	
	Blue	x	$\theta=\phi=0^\circ$		0.15	0.20	0.25	
		y			0.16	0.21	0.26	
	White	x	$\theta=\phi=0^\circ$		0.23	0.28	0.33	
		y			0.24	0.29	0.34	

Optimum contrast is obtained by adjusting the LCD driving voltage(Vop) while at the viewing angle of $\theta = \phi = 0^\circ$.

6-3. Definition of Reflectance

$$\rho\,(\text{Reflectance}) = \frac{\text{Measured Reflection Brightness}}{\text{Reflection Brightness against Standard White Board}} \times 100[\%]$$

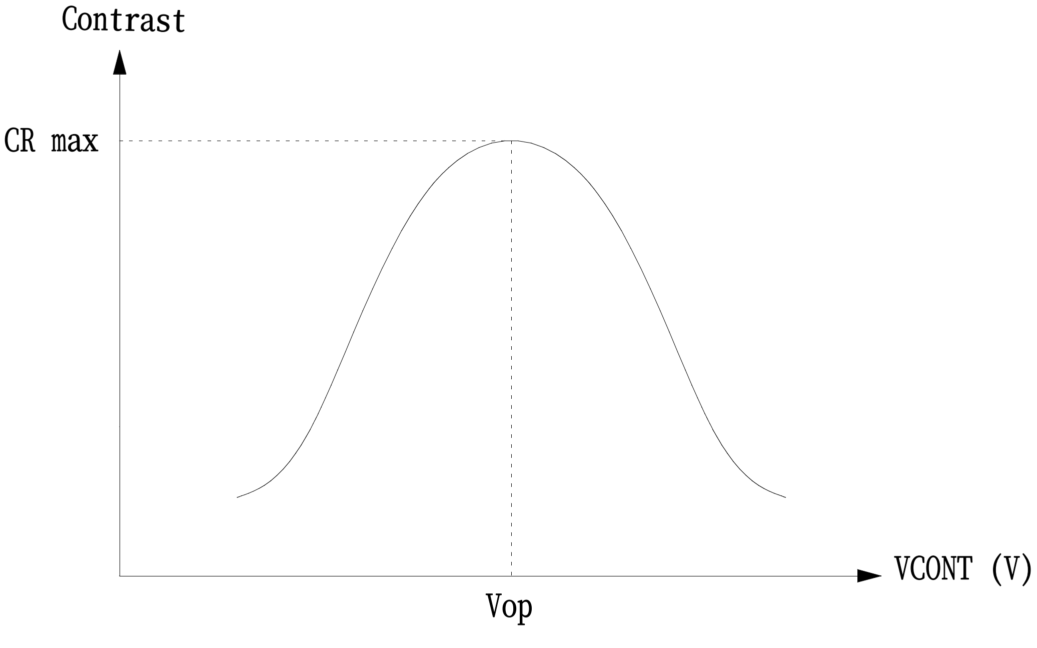
6-4. Definition of Contrast (Reflective Mode)

$$CR\,(\text{Contrast}) = \frac{\text{Reflectance at all pixels "White"}}{\text{Reflectance at all pixels "Black"}}$$

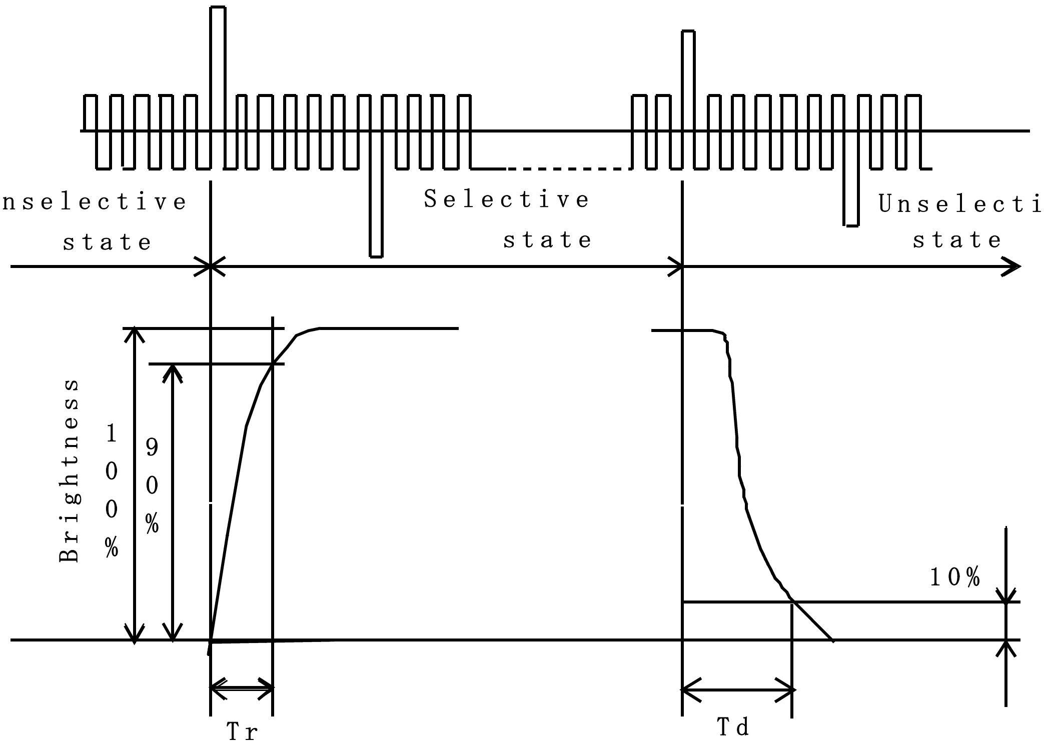
6-5. Definition of Contrast (Transmissive Mode)

$$CR\,(\text{Contrast}) = \frac{\text{Brightness at all pixels "White"}}{\text{Brightness at all pixels "Black"}}$$

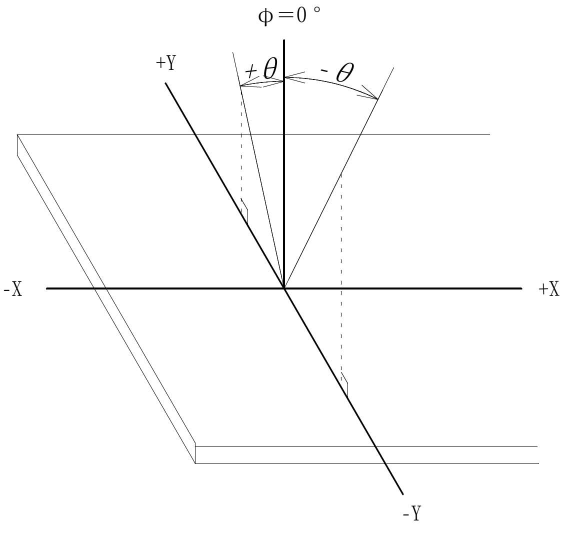
6-6. Definition of Vop



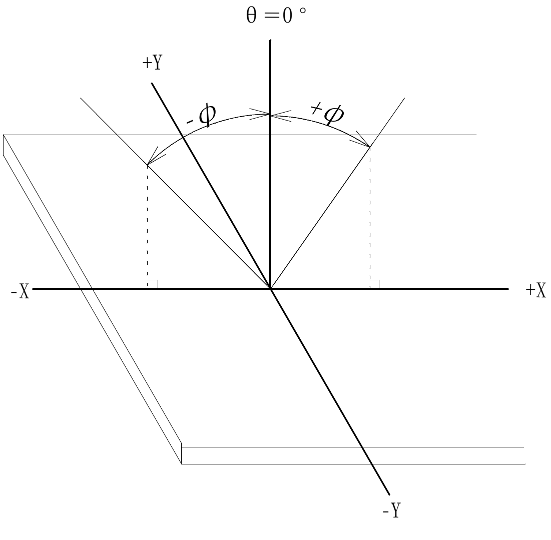
6-7. Definition of response time


Unselective state
Selective state
Unselective state
Brightness
100%
90%
10%
Tr
Td

6-8. Definition of viewing angle

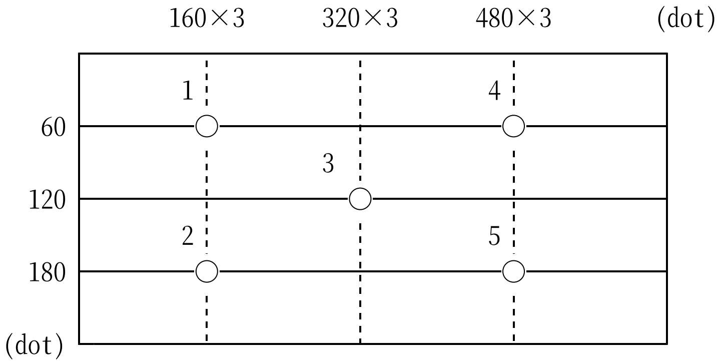


(θ direction)



(φ direction)

6-9. Measuring points


160×3
320×3
480×3
(dot)
1
4
3
2
5
60
120
180
(dot)

1) Rating is defined as the average brightness inside the viewing area.
2) 30 minutes after CFL is turned on. (Ambient Temp.= 25°C)
3) The inverter should meet the eccentric conditions;
   -Sine, symmetric waveform without spike in positive and negative.
4) Measuring Inverter ; PH-BLC08-K2(HITACHI MEDIA ELECTRONICS)

6-10. Measurement method of reflectance (Reflectance)

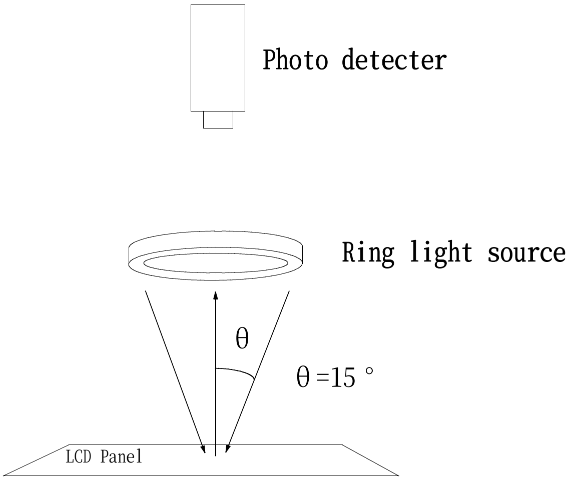
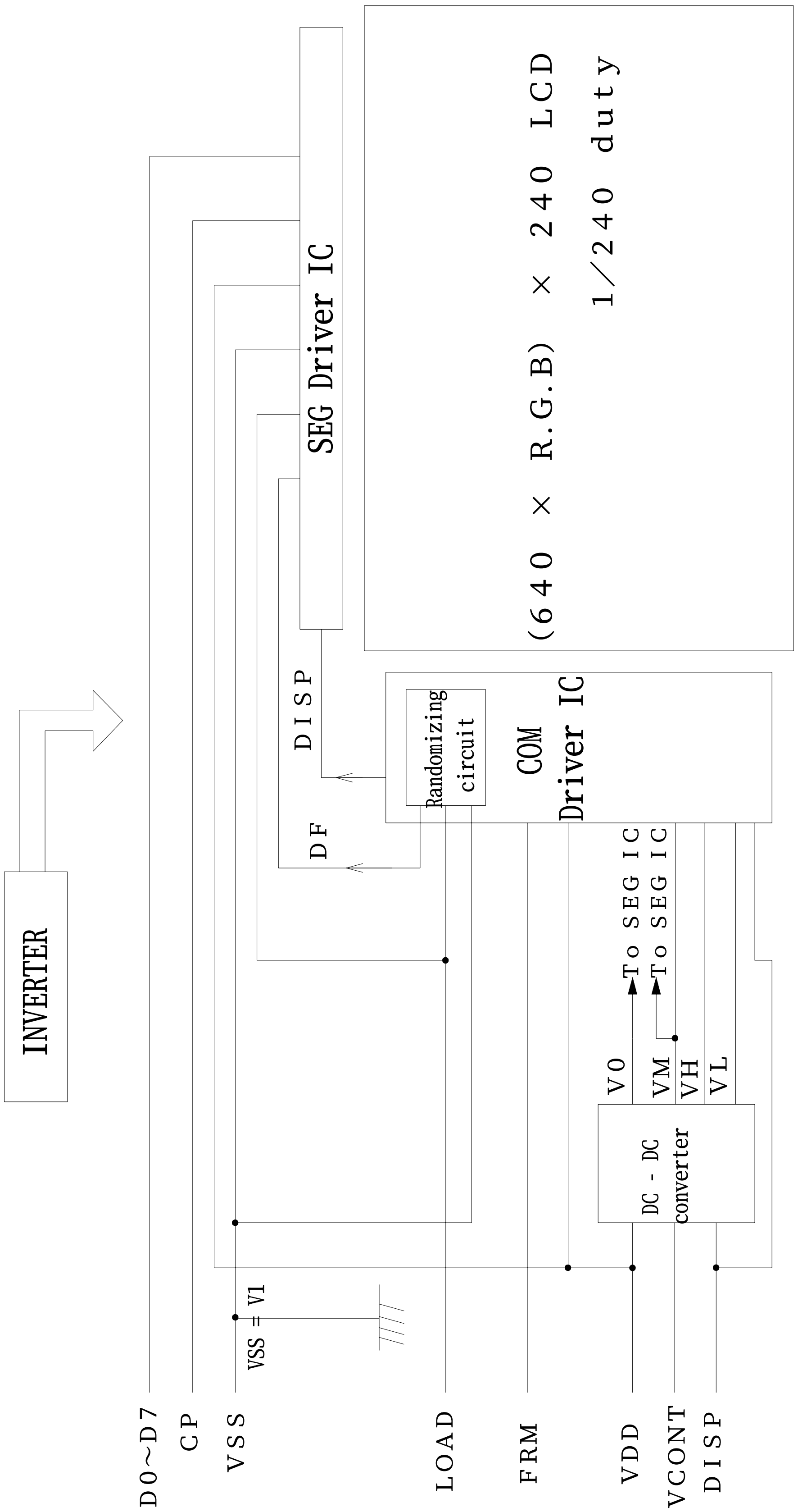


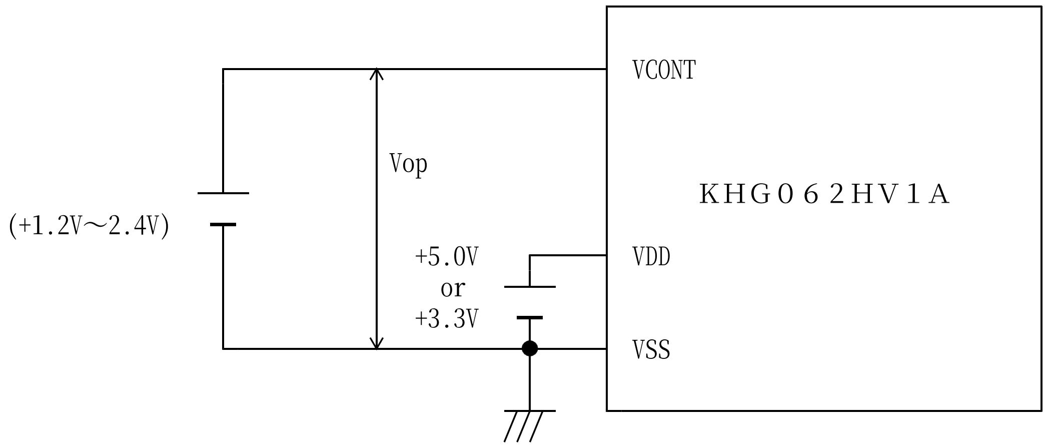
Photo detecter
Ring light source
θ
θ=15 °
LCD Panel

7. Circuit Block Diagram



INVERTER
SEG Driver IC
(640 × R.G.B) × 240 LCD
1/240 duty
DISP
DF
Randomizing circuit
COM Driver IC
To SEG IC
To SEG IC
V0
VM
VH
VL
DC - DC converter
VSS = V1
D0~D7
CP
VSS
LOAD
FRM
VDD
VCONT
DISP

7-1. Power supply


VCONT
Vop
KHG062HV1A
(+1.2V～2.4V)
+5.0V
or
+3.3V
VDD
VSS

8. Interface signals

8-1. LCD

PIN №	SYMBOL	DESCRIPTION	LEVEL
1	FRM	Synchronous signal for driving scanning line	H
2	LOAD	Data signal latch clock	H → L
3	CP	Data signal shift clock	H → L
4	DISP	Display control signal	H(ON),L(OFF)
5	VDD	Power supply for logic	—
6	VSS	GND	—
7	VCONT	LCD adjust voltage	—
8	D7	Display data	H(ON),L(OFF)
9	D6		
10	D5		
11	D4		
12	D3		
13	D2		
14	D1		
15	D0		
16	VDD	Power supply for logic	—
17	VDD		
18	VSS	GND	—
19	VSS		
20	VSS		

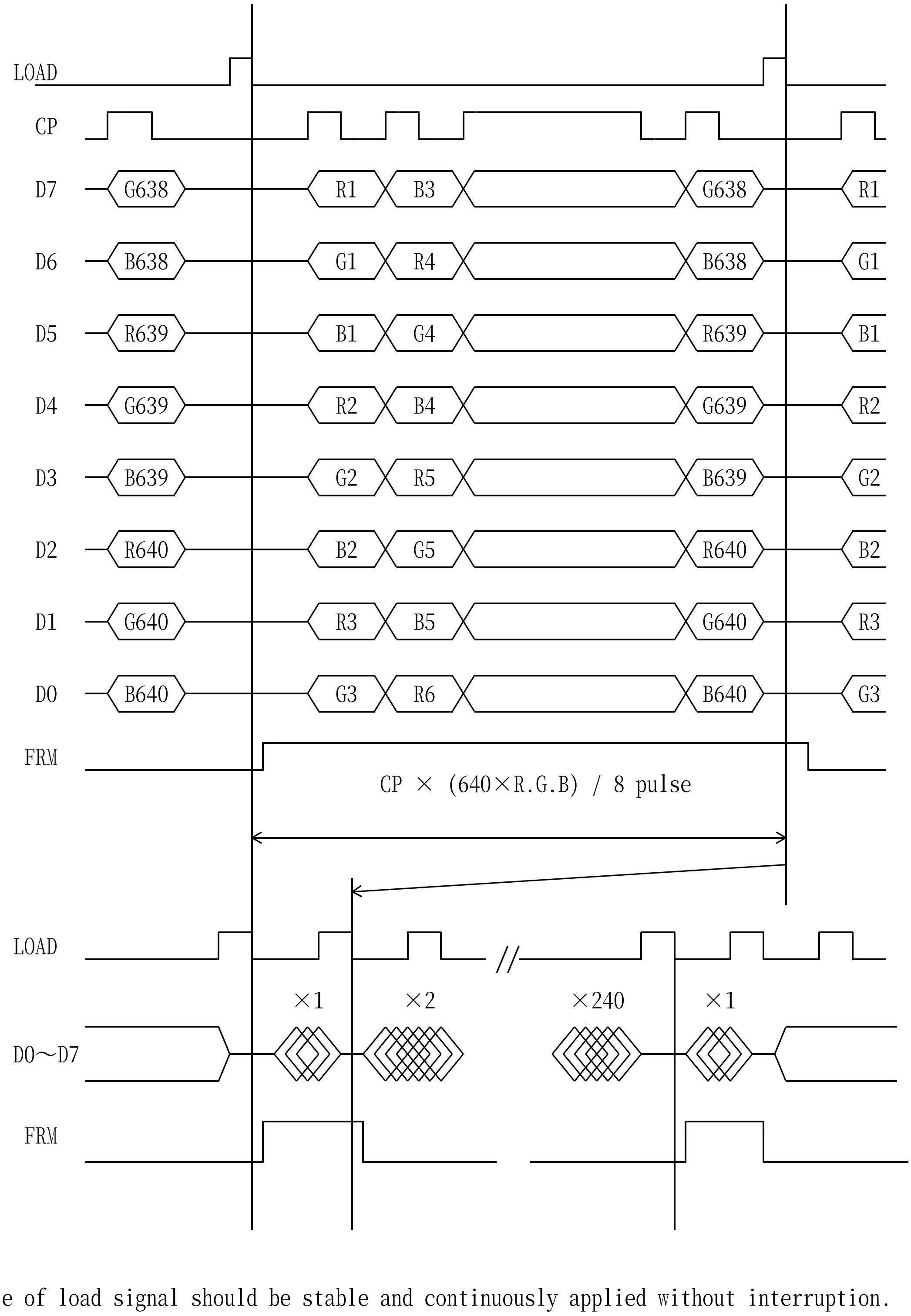
LCD connector : 08-6210-020-340-800+ (ELCO)
Recommended matching connector : 0.5mm pitch FFC or FPC

8-2. CFL

PIN №	SYMBOL	DESCRIPTION
1	HOT	Inverter output high voltage side
2	NC	—
3	COLD	Inverter output low voltage side

LCD side connector : BHR-03VS-1 (JST)
Recommended matching connector : SM02-(8.0)B-BHS-1 (JST)
: SM02-(8.0)B-BHS-1-TB(LF)(SN) (JST)・・・(RoHS)

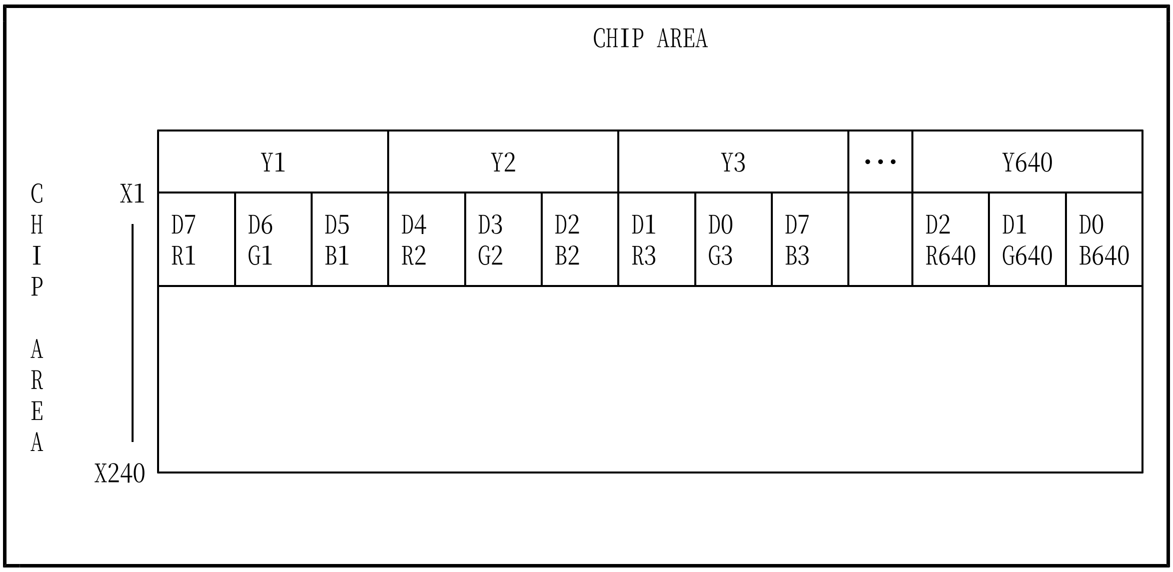
9. Interface Timing Chart


LOAD
CP
D7
G638
R1
B3
G638
R1
D6
B638
G1
R4
B638
G1
D5
R639
B1
G4
R639
B1
D4
G639
R2
B4
G639
R2
D3
B639
G2
R5
B639
G2
D2
R640
B2
G5
R640
B2
D1
G640
R3
B5
G640
R3
D0
B640
G3
R6
B640
G3
FRM
CP × (640×R.G.B) / 8 pulse
LOAD
×1
×2
×240
×1
D0～D7
FRM

* The cycle of load signal should be stable and continuously applied without interruption.

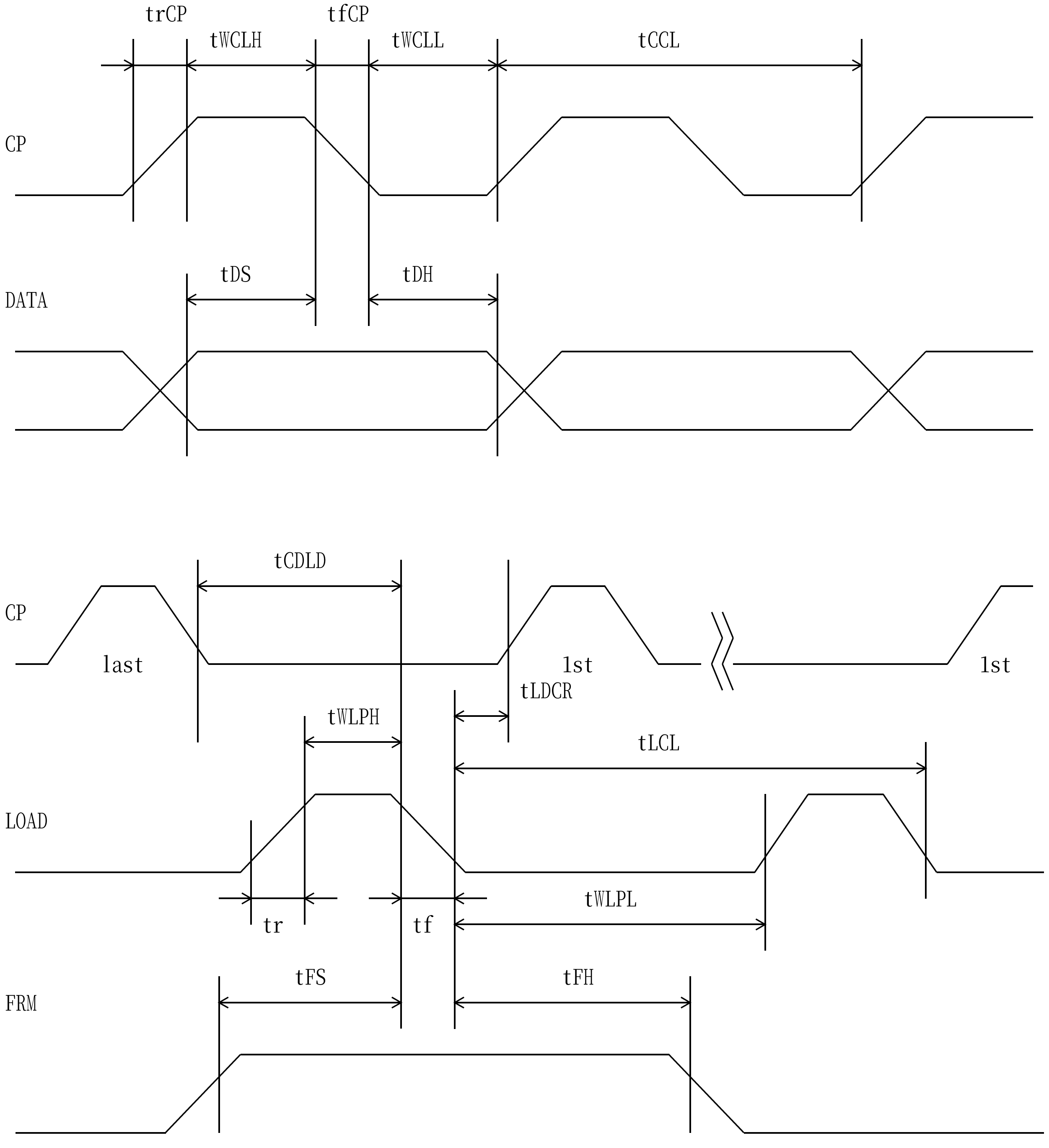
* The above-mentioned timing chart shows a reference to set up a LCD module, not an electrical rating.

１０. Data and Screen


CHIP AREA
CHIP AREA
X1
X240

Y1			Y2			Y3			···	Y640		
D7 R1	D6 G1	D5 B1	D4 R2	D3 G2	D2 B2	D1 R3	D0 G3	D7 B3		D2 R640	D1 G640	D0 B640

１１. Input Timing Characteristics


trCP
tfCP
tWCLH
tWCLL
tCCL
CP
tDS
tDH
DATA
tCDLD
CP
last
1st
1st
tLDCR
tWLPH
tLCL
LOAD
tr
tf
tWLPL
tFS
tFH
FRM

11-1. Switching characteristics (VDD=5.0V)

Input Characteristics ; VDD = +5.0V ± 5%, Temp. = 0～50 °C

ITEM	SYMBOL	MIN.	MAX.	UNIT
CP Cycle *1	tCCL	100	—	ns
CP "H" Pulse Width	tWCLH	30	—	ns
CP "L" Pulse Width	tWCLL	30	—	ns
CP Rise Up Time	trCP	—	15	ns
CP Fall Down Time	tfCP	—	15	ns
Data Set Up Time	tDS	25	—	ns
Data Hold Time	tDH	25	—	ns
LOAD "H" Pulse Width	tWLPH	40	—	ns
LOAD "L" Pulse Width	tWLPL	400	—	ns
LOAD Cycle *2	tLCL	500	—	ns
CP Down→LOAD Down Delay Time	tCDLD	60	—	ns
LOAD Down→CP Rise Delay Time	tLDCR	60	—	ns
Input Signal Rise Up Time	tr	—	20	ns
Input Signal Fall Down Time	tf	—	20	ns
FRM Data Set Up Time	tFS	120	—	ns
FRM Data Hold Time	tFH	30	—	ns

*1 CP Cycle is adjust so that FRM signal is 75Hz.

*2 LOAD Cycle is constant.

11-2. Switching characteristics (VDD=3.3V)

Input Characteristics ; VDD = +3.3V ± 0.3V, Temp. = 0～50 ℃

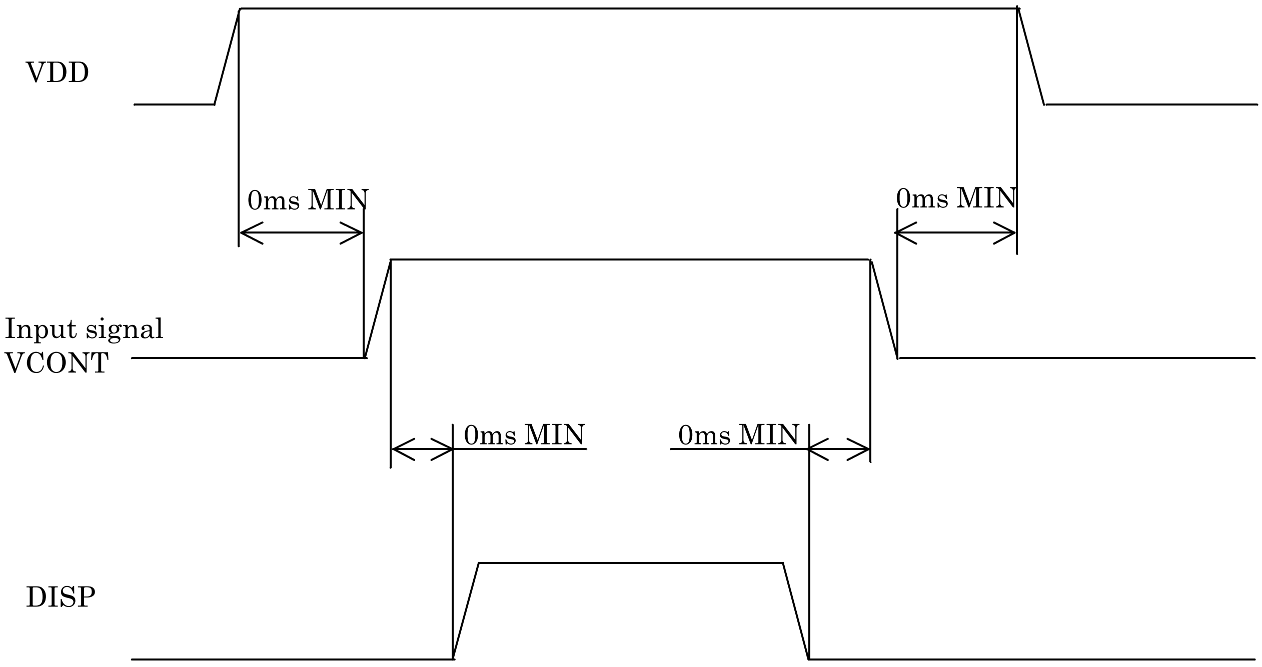
ITEM	SYMBOL	MIN.	MAX.	UNIT
CP Cycle *1	tCCL	100	—	ns
CP "H" Pulse Width	tWCLH	40	—	ns
CP "L" Pulse Width	tWCLL	40	—	ns
CP Rise Up Time	trCP	—	20	ns
CP Fall Down Time	tfCP	—	20	ns
Data Set Up Time	tDS	35	—	ns
Data Hold Time	tDH	35	—	ns
LOAD "H" Pulse Width	tWLPH	50	—	ns
LOAD "L" Pulse Width	tWLPL	400	—	ns
LOAD Cycle *2	tLCL	500	—	ns
CP Down→LOAD Down Delay Time	tCDLD	60	—	ns
LOAD Down→CP Rise Delay Time	tLDCR	80	—	ns
Input Signal Rise Up Time	tr	—	20	ns
Input Signal Fall Down Time	tf	—	20	ns
FRM Data Set Up Time	tFS	120	—	ns
FRM Data Hold Time	tFH	30	—	ns

*1 CP Cycle is adjust so that FRM signal is 75Hz.

*2 LOAD Cycle is constant.

１２. Supply Voltage Sequence Condition

DO NOT apply DC voltage to the LCD panel. DC voltage induce irreversible electrochemical reactions and reduce LCD life. Always follow the power supply ON/OFF sequence of VDD first, input signal second, VCONT third and finally DISP. This will prevent DC driving of the LCD or CMOS LSI latch up as shown below.



* Input signal : CP,LOAD,FRM,VCONT,D0～D7
Each signal(CP,LOAD,FRM)is constant

* The above sequence should be designed as to keep each normal figure on condition that liquid crystal module is loaded on your system.

* Control the supply voltage sequence not to float all signal line when the LCD panel is driving.

１３. Backlight Characteristics

Temp.= 25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	NOTE
Starting discharge Voltage *1	VS	—	—	965 Vrms.	0 °C
		—	—	645 Vrms.	25 °C
Discharging tube current *2,*3	IL	2.0 mArms.	5.0 mArms.	6.0 mArms.	—
Discharging tube voltage	VL	—	395 Vrms.	—	—
Operating life *4 (IL=5.0 mArms.)	T	36,000 h	54,000 h	—	—
Operating frequency	F	40 kHz	—	100 kHz	—

*1 The Non-load output voltage (VS) of the inverter should be designed to have some margin, because VS may increase due to the leak current which may be caused by wiring of CFL cables. (Reference value: 1255 Vrms MIN.)

*2 We recommend that you should set the discharging tube current at lower than typical value so as to prevent the heat accumulation of CFL tube from deteriorating a performance of the LCD.

*3 Do not apply more than 6.0mA discharging tube current. Because CFL maybe broken due to over current.

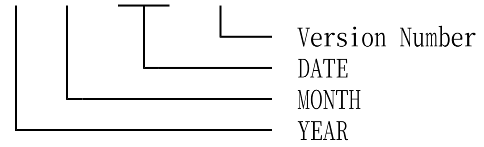
*4 When the illuminance or quantity of light has decreased to 50 % of the initial value. Average life time of CFL will be decreased when LCD is operating at lower and higher temperature.

* The inverter should meet the eccentric conditions ; sine, symmetric waveform without spike in positive and negative.

１４．Lot Number Identification

The lot number shall be indicated on the back of the backlight case of each LCD.

ＫＨＧ０６２ＨＶ１ＡＨ－Ｇ００－ □ □－□ □－□



YEAR	2005	2006	2007	2008	2009	2010
CODE	5	6	7	8	9	0

MONTH	JAN.	FEB.	MAR.	APR.	MAY	JUN.
CODE	1	2	3	4	5	6

MONTH	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
CODE	7	8	9	X	Y	Z

１５．Warranty

15-1. Incoming inspection

Please inspect the LCD within one month after your receipt.

15-2. Production Warranty

Kyocera warrants its LCDs for a period of 12 months after receipt by the purchaser, and within the limits specified. Kyocera shall, by mutual agreement, replace or rework defective LCDs that are shown to be Kyocera's responsibility.

１６. Precautions for use

16-1. Installation of the LCD

1. LCD hole(right side) are not connected with GND, but the LCD is structured to have GND connection available to protect against noise. We recommend to connect customer's frame GND to LCD frame in order to stabilize the display performance.
2. A transparent protection plate shall be added to protect the LCD and its polarizers.
3. The LCD shall be installed so that there is no pressure on the LSI chips.
4. The LCD shall be installed flat, without twisting or bending.
5. The display window size should be the same as the effective viewing area.
6. In case you use outside frame of effective viewing area as outward appearance of your product, unevenness of its outward appearance is out of guarantee.
7. Do not pull the CFL lead wires and do not bend the root of the wires.
   Housing should be designed to protect CFL lead wires from external stress.
8. This Kyocera LCD module has been specifically designed for use in general electronic devices, but not for use in a special environment such as usage in an active gas.
   Hence, when the LCD is supposed to be used in a special environment, evaluate the LCD thoroughly beforehand and do not expose the LCD to chemicals such as an active gas.

16-2. Static Electricity

1. Since CMOS ICs are mounted directly onto the LCD glass, protection from static electricity is required. Operation should wear ground straps.

16-3. LCD Operation

1. The LCD shall be operated within the limits specified. Operation at values outside of these limits may shorten life, and/or harm display images.
2. Adjust "LCD driving voltage" to obtain optimum viewing angle and contrast.
3. Operation of the LCD at temperature below the limit specified may cause image degradation and/or bubbles.
   It may also change the characteristics of the liquid crystal.
   This phenomenon may not recover. The LCD shall be operated within the temperature limits specified.

16-4. Storage

1. The LCD shall be stored within the temperature and humidity limits specified.
   Store in a dark area, and protected the LCD from direct sunlight or fluorescent light.
2. Always store the LCD so that it is free from external pressure onto it.

16-5. Screen Surface

1. DO NOT store in a high humidity environment for extended periods.
   Image degradation, bubbles, and/or peeling off of polarizer may result.
2. The front polarizer is easily scratched or damaged. Prevent touching it with any hard material, and from being pushed or rubbed.
3. The LCD screen may be cleaned with a soft cloth or cotton pad. Methanol, or Isopropyl Alcohol may be used, but insure that all solvent residue is removed.
4. Water may cause damage or discoloration of the polarizer. Clean any condensation or moisture from any source immediately.
5. Always keep the LCD free from condensation during testing.
   Condensation may permanently spot or stain the polarizers.
6. Please do not use solid-base image pattern for long hours because a temporary afterimage may appear. We recommend to use screen saver etc. in cases where a solid-base image pattern must be used.
7. Liquid crystal may leak when the module is broken. Be careful not to let the fluid go into your eyes and mouth. In the case the fluid touches your body, rinse it off right away with water and soap.

17. Reliability Data / Environmental Test

TEST ITEM	TEST CONDITION	TEST TIME	RESULT
High Temp. Atmosphere	70°C	240 h	Display Quality : No defect Display Function : No defect Current Consumption : No defect
Low Temp. Atmosphere	-20°C	240 h	Low Temp. Bubble : None Solid Crystallization of Liquid Crystal : None Display Quality : No defect Display Function : No defect Current Consumption : No defect
High Temp. Humidity Atmosphere	40°C 90%RH	240 h	Display Quality : No defect Display Function : No defect Peel-off of Organic Sealing : None Current Consumption : No defect
Temp. Cycle	-20°C 0.5 h R.T. 0.5 h 70°C 0.5 h	10 cycles	Display Quality : No defect Display Function : No defect Peel-off of Organic Sealing : None Bubble on Cell : None
High Temp. Operation	50°C Vop	500 h	Display Quality : No defect Current Consumption : No defect
Point Activation life	Polyacetal stylus (R0.8) Hitting force 3N Hitting speed 2 time/s	one million times	Display Quality : No defect Current Consumption : No defect

- * Each test item uses a test LCD only once. The tested LCD is not used in any other tests.

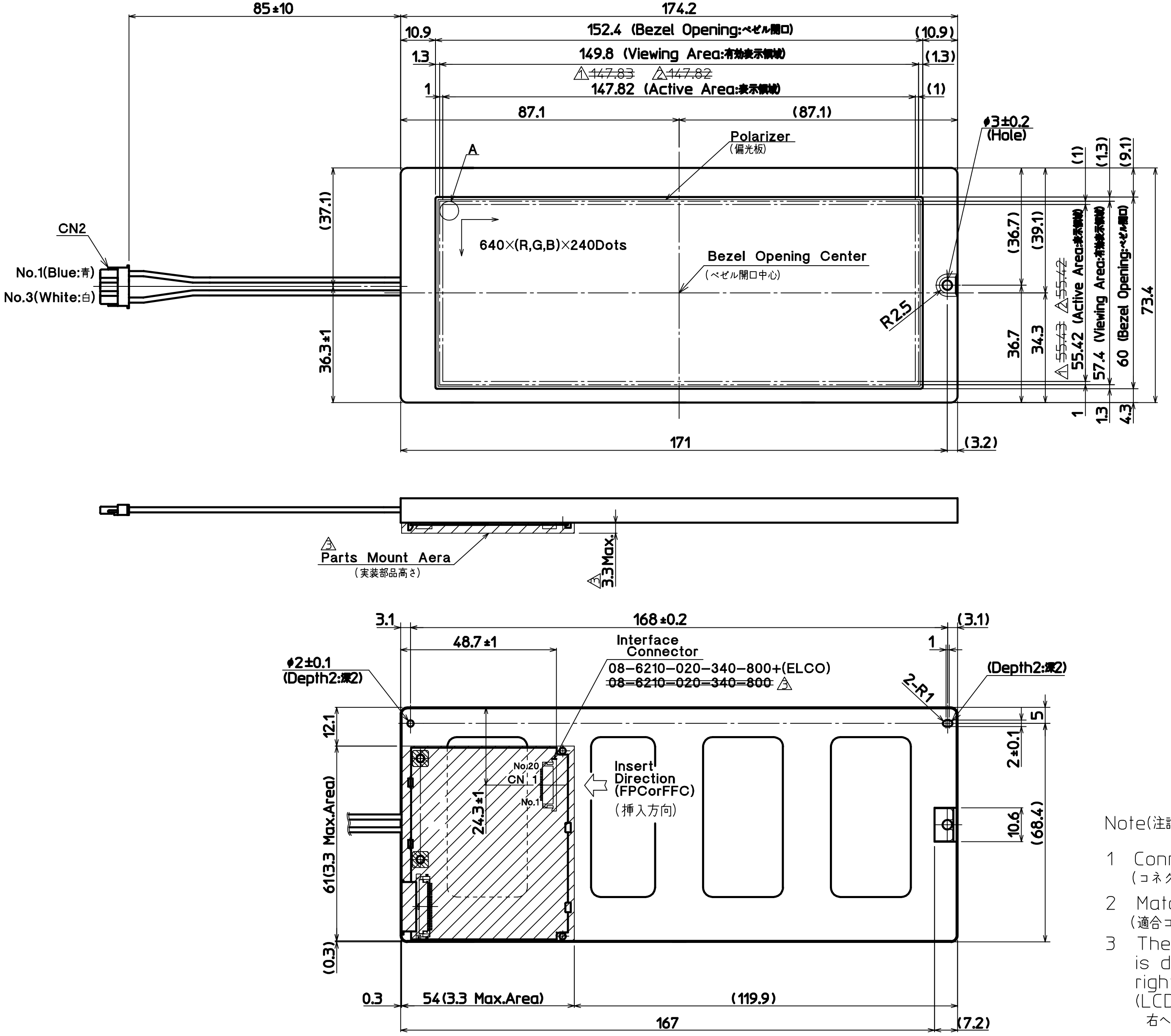
- * The LCD is tested in circumstances in which there is no condensation.

- * The tested LCD is inspected after 24 hours of storage at room temperature and room humidity after each test is finished.

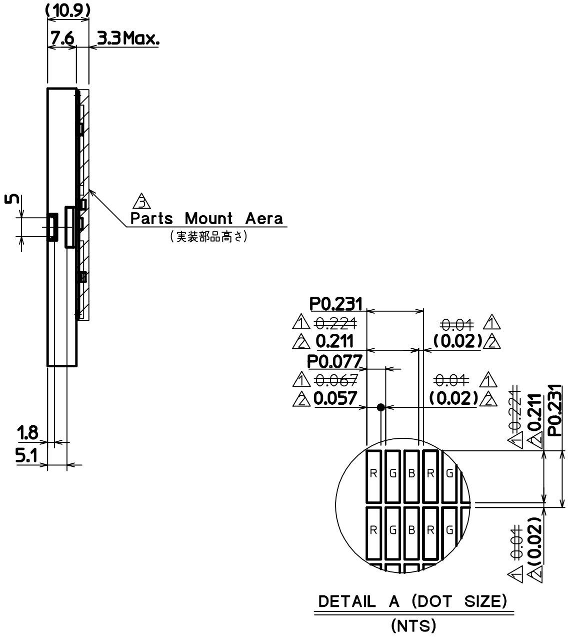
- * The reliability test is not an out-going inspection.

- * The results of the reliability test are for your reference purpose only.
  The reliability test is conducted only to examine the LCD's capability.

No	Description	Drawn	Checked	Checked	Approved
△1	Add Dot Pitch Size (6point) Change Active Area Size (147.82→147.83, 55.42→55.43)	'03.11.27 川田原	'03.11.27 今村		'03.11.27 朝倉
△2	Change Dot Pitch Size (6point) Change Active Area Size (147.83→147.82, 55.43→55.42)	'03.12.09 倉元	'03.12.10 阿部		'03.12.10 朝倉
△3	·Change Connector name (コネクター変更:鉛フリー品へ) ·Add Matching Connector(LEAD FREE) (適合コネクター追記:鉛フリー品) ·Add dimension(寸法追記) ·Add Japanese comment (日本語併記)	'05.03.01 堀	'05.03.01 今村		'05.03.01 阿部



85±10
174.2
10.9
152.4 (Bezel Opening:ベゼル開口)
(10.9)
1.3
149.8 (Viewing Area:有効表示領域)
(1.3)
△1 ~~147.83~~ △2 ~~147.82~~
1
147.82 (Active Area:表示領域)
(1)
87.1
(87.1)
Polarizer
(偏光板)
A
CN2
No.1(Blue:青)
No.3(White:白)
640×(R,G,B)×240Dots
Bezel Opening Center
(ベゼル開口中心)
ϕ3±0.2
(Hole)
R2.5
(37.1)
36.3±1
(36.7)
(39.1)
36.7
34.3
△1 ~~55.43~~ △2 ~~55.42~~
55.42 (Active Area:表示領域)
57.4 (Viewing Area:有効表示領域)
60 (Bezel Opening:ベゼル開口)
73.4
(1)
(1.3)
(9.1)
1
1.3
4.3
171
(3.2)
△3 Parts Mount Aera
(実装部品高さ)
△3 3.3Max.
3.1
168±0.2
(3.1)
48.7±1
Interface Connector
08-6210-020-340-800+(ELCO)
~~08-6210-020-340-800~~ △3
1
ϕ2±0.1
(Depth2:深2)
2-R1
(Depth2:深2)
5
12.1
2±0.1
No.20
CN 1
No.1
24.3±1
Insert Direction (FPCorFFC)
(挿入方向)
10.6
(68.4)
61(3.3 Max.Area)
(0.3)
0.3
54(3.3 Max.Area)
(119.9)
167
(7.2)



(10.9)
7.6
3.3Max.
5
△3 Parts Mount Aera
(実装部品高さ)
1.8
5.1
P0.231
△1 ~~0.221~~
△2 0.211
~~0.01~~ △1
(0.02)△2
P0.077
△1 ~~0.067~~
△2 0.057
~~0.01~~ △1
(0.02)△2
△1 ~~0.221~~
△2 0.211
P0.231
△1 ~~0.01~~
△2 (0.02)
R G B R G
R G B R G
DETAIL A (DOT SIZE)
(NTS)

Note(注記)

~~08-6210-020-340-800~~ △3

1 Connector CN1:08-6210-020-340-800+ (ELCO)
(コネクター) CN2:BHR-03VS-1 (JST)

2 Matching Connector CN2:SM02(8.0)B-BHS-1 (JST)
(適合コネクター) △3SM02(8.0)B-BHS-1-TB(LF)(SN) (JST)

3 The drawing is the front view of the LCD. Information is displayed starting at the upper left hand corner, moving right then down to the lower right hand corner.
(LCDの正面図において、画像データの表示は左上コーナーから始まり、右へ進み下へ送られ右下コーナーへ向かう。)

4 Tolerance without indication: ±0.5
(指示無き公差)

Material 材質	Treatment 処理	Approved	Checked	Checked	Drawn	Scale	Title			Year-Month-Day	Size
		'03.11.26 朝倉		'03.11.26 倉元	川田原	1:1(NTS)	KHG062HV1AH		KYOCERA	'03.11.26	2
Quantity 製作数	Description; 備考 RoHS 03008NDA						Outline Dimensions		Drawing No.	121A5026900-3	

SPEC.No.	TQ3C-8EAC0-E2DKA06-00
DATE	November 25, 2003

FOR:

KYOCERA INSPECTION STANDARD

TYPE : KHG062HV1AH-G00

KYOCERA CORPORATION
KAGOSHIMA HAYATO PLANT
LCD DIVISION

Original Issue Data	Designed by :Engineering Dept.			Confirmed by :QA Dept.	
	Prepared	Checked	Approved	Checked	Approved
November 25, 2003	W. Yano	M. Fujitani	H. Ohno	Y. Yoshida	S. Hayashi

Revision Record

Date	Designed by: Engineering Dept.			Confirmed by: QA Dept.	
	Prepared	Checked	Approved	Checked	Approved

Rev. No.	Date	Page	Descriptions

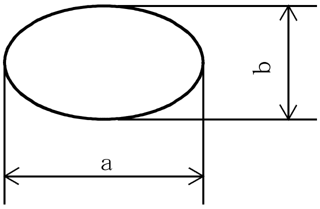
Visuals specification

1)Note

Item	Note	
General	1.When defects specified in this Inspection Standards are inspected, operating voltage(Vop) shall be set at the level where optimized contrast is available. Display quality is applied up to effective viewing area. (Bi-Level INSPECTION) 2.This inspection standard about the image quality shall be applied to any defect within the effective viewing area and shall not be applicable to outside of the area. 3.Should any defects which are not specified in this standard happen, additional standard shall be determined by mutual agreement between customer and Kyocera. 4.Inspection conditions Luminance : 500 Lux minimum . Inspection distance : 300 mm (from the sample) Temperature : 25 ± 5 ℃ Direction : right above	
Definition of Inspection item	Pinhole, Bright spot Black spot, Scratch Foreign particle	The color of a small area is different from the remainder. The phenomenon does not change with voltage.
	Contrast variation	The color of a small area is different from the remainder. The phenomenon changes with voltage.
	Polarizer (Scratch, Bubble, Dent)	Scratch, Bubble and Dent in the polarizer which can be observed in on / off state.

2)Standard

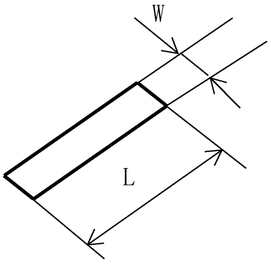
<table>
<tr><th>Inspection item</th><th>Judgement standard</th></tr>
<tr><td>Pinhole, Bright spot
Black spot,
Foreign particle</td><td>



$d = (a + b) / 2$

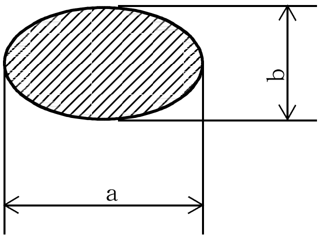
<table>
<tr><th>Category</th><th>Size (mm)</th><th>Acceptable number</th></tr>
<tr><td>A</td><td>$d \leqq 0.2$</td><td>neglected</td></tr>
<tr><td>B</td><td>$0.2 < d \leqq 0.3$</td><td>5</td></tr>
<tr><td>C</td><td>$0.3 < d \leqq 0.5$</td><td>3</td></tr>
<tr><td>D</td><td>$0.5 < d$</td><td>0</td></tr>
</table>

</td></tr>
<tr><td>Scratch,Foreign particle</td><td>



<table>
<tr><th></th><th>Width (mm)</th><th>Length (mm)</th><th>Acceptable No.</th></tr>
<tr><td>A</td><td>$W \leqq 0.03$</td><td>—</td><td>neglected</td></tr>
<tr><td>B</td><td rowspan="3">$0.03 < W \leqq 0.1$</td><td>$L \leqq 2.0$</td><td>neglected</td></tr>
<tr><td>C</td><td>$2.0 < L \leqq 4.0$</td><td>3</td></tr>
<tr><td>D</td><td>$4.0 < L$</td><td>0</td></tr>
<tr><td>E</td><td>$0.1 < W$</td><td>—</td><td>According to ' Circular '</td></tr>
</table>

</td></tr>
<tr><td>Contrast variation</td><td>

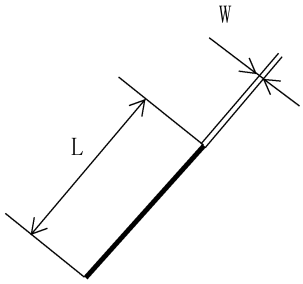


$d = (a + b) / 2$

<table>
<tr><th>Category</th><th>Size (mm)</th><th>Acceptable number</th></tr>
<tr><td>A</td><td>$d \leqq 0.5$</td><td>neglected</td></tr>
<tr><td>B</td><td>$0.5 < d \leqq 0.7$</td><td>3</td></tr>
<tr><td>C</td><td>$0.7 < d$</td><td>0</td></tr>
</table>

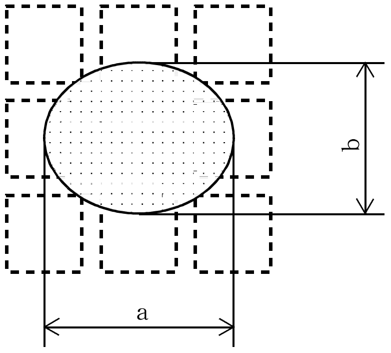
</td></tr>
</table>

Inspection item	Judgement standard
Polarizer (Scratch, Bubble, Dent)	(1) Scratch



	Width (mm)	Length (mm)	Acceptable No.
A	W ≦ 0.1	—	neglected
B	0.1 < W ≦0.3	L ≦ 5.0	neglected
C		5.0 < L	0
D	0.3 < W	—	0

(2)Bubble (dent)



d = (a + b) / 2

Category	Size (mm)	Acceptable number
A	d ≦ 0.2	neglected
B	0.2 < d ≦ 0.3	5
C	0.3 < d ≦ 0.5	3
D	0.5 < d	0