DATA MODUL

KYOCERA

Specification

TCG121WXLBABNN-AN20-SA

12,1" - 1280 x 800 – LVDS

Spec Revision:
Revision Date: 25.11.2024

Note: This specification is subject to change without prior notice

Passion Displayed

Spec No.	TQ3C-8EAF0-E1YAM62-00
Date	November 25, 2024

SPEC for Mass Production

TYPE : TCG121WXLBABNN-AN20-SA

<12.1 inch WXGA transmissive color TFT with LED backlight,
constant current circuit for LED backlight>

CONTENTS

1. Application
2. Construction and outline
3. Mechanical specifications
4. Absolute maximum ratings
5. Electrical characteristics
6. Optical characteristics
7. Interface signals
8. Input timing characteristics
9. Lot number identification
10. Warranty
11. Precautions for use
12. Reliability test data
13. Outline drawing

Issued
Nov. 25, 2024
KYOCERA
Corp.

KYOCERA CORPORATION

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

Original Issue Date	Designed by: Engineering dept.			Confirmed by: dept.
	Prepared	Checked	Approved	Approved
November 25, 2024	*K. Komurasaki*	*T. Fukui*	*M. Kato*	*T. Sawada*

Warning

1. This Kyocera LCD module has been specifically designed for use only in electronic devices and industrial machines in the area of audio control, office automation, industrial control, home appliances, etc. The module should not be used in applications where the highest level of safety and reliability are required and module failure or malfunction of such module results in physical harm or loss of life, as well as enormous damage or loss. Such fields of applications include, without limitation, medical, aerospace, communications infrastructure, atomic energy control. Kyocera expressly disclaims any and all liability resulting 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, damages, liabilities, awards, costs, and expenses, including legal expenses, resulting from or arising out of Customer's use, or sale for use, or Kyocera modules in applications.

Caution

1. 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.

2. Please note that we may not be able to respond to new environmental regulations after receiving the final mass production order for this product.

Revision record

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

Rev. No.	Date	Page	Descriptions

1. Application

This document defines the specification of TCG121WXLBABNN-AN20-SA. (RoHS Compliant)

2. Construction and outline

LCD	: Transmissive color dot matrix type TFT
Backlight system	: LED
Polarizer	: Anti-Glare treatment
Interface	: LVDS
Additional circuit	: Timing controller, Power supply (3.3V input)
	: Constant current circuit for LED Backlight (12V input)

3. Mechanical specifications

Item	Specification	Unit
Outline dimensions 1)	277.7(W)×(182.5)(H)×9.8(D)	mm
Active area	261.12(W)×163.2(H) (30.8cm/12.1 inch(Diagonal))	mm
Dot format	1280×(R,G,B)(W)×800(H)	dot
Dot pitch	0.068(W)×0.204(H)	mm
Base color 2)	Normally Black	-
Mass	680	g

1) Projection not included. Please refer to outline for details.

2) Due to the characteristics of the LCD material, the color varies with environmental temperature.

4. Absolute maximum ratings

4-1. Electrical absolute maximum ratings

Item		Symbol	Min.	Max.	Unit
Supply voltage(+3.3V)		V_{DD}	-0.3	4.0	V
Supply voltage(+12V)		V_{IN}	-0.3	14.0	V
Input signal Voltage 1)	RxINi+, RxINi- (i=0,1,2,3)	V_{I1}	-0.3	2.8	V
	CK IN+, CK IN-	V_{I2}	-0.3	2.8	V
	SELLVDS, BITSEL, SC	V_{I3}	-0.3	V_{DD}+0.5	V
	BLBRT, BLEN	V_{I4}	-0.3	V_{IN}	V

1) V_{DD}, V_{IN} must be supplied correctly within the range described in 5-1.

4-2. Environmental absolute maximum ratings

Item	Symbol	Min.	Max.	Unit
Operating temperature 1)	T_{OP}	-20	70	°C
Storage temperature 2)	T_{STO}	-30	80	°C
Operating humidity 3)	H_{OP}	10	4)	%RH
Storage humidity 3)	H_{STO}	10	4)	%RH
Vibration	-	5)	5)	-
Shock	-	6)	6)	-

1) Operating temperature means a temperature which operation shall be guaranteed. Since display performance is evaluated at 25°C, another temperature range should be confirmed.

2) Ta (Ambient Temperature) = -30°C＜48h , Ta = 80°C＜168h
Store LCD at normal temperature/humidity. Keep them free from vibration and shock.
An LCD that is kept at a low or a high temperature for a long time can be defective due to other conditions, even if the low or high temperature satisfies the standard.
(Please refer to “Precautions for Use” for details.)

3) Non-condensing

4) Ta ≦40°C, 85%RH Max.
Ta ＞40°C, Absolute humidity shall be less than 85%RH at 40°C.

5)

Frequency	10～55 Hz	Acceleration value (0.3～9 m/s^2)
Vibration width	0.15mm	
Interval	10-55-10 Hz 1 minutes	

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

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

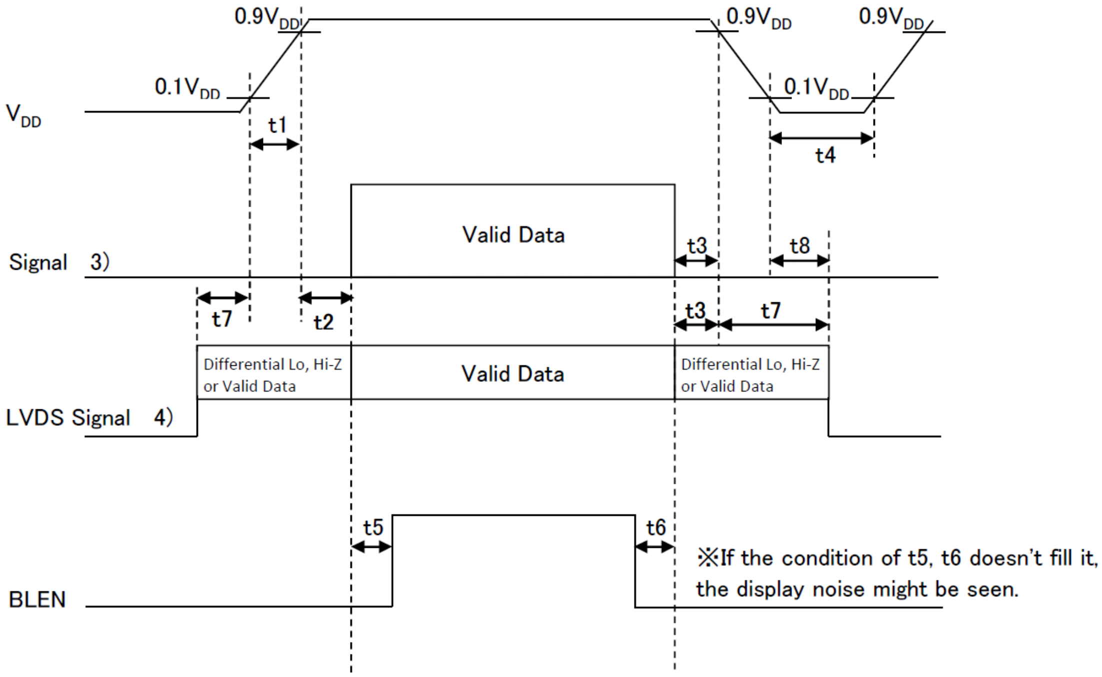
5. Electrical characteristics

5-1. LCD

Ta = -20～70°C

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	1)	V_{DD}	-	3.0	3.3	3.6	V
Current consumption		I_{DD}	2)	-	470	615	mA
Permissive input ripple voltage		V_{RP}	V_{DD}=3.3V	-	-	100	mVp-p
Input signal voltage	3)	V_{IL}	"Low" level	0	—	0.8	V
		V_{IH}	"High" level	2.0	—	V_{DD}	V
Input leak current		I_{OL}	V_{I3}=0V	-10	-	10	μA
		I_{OH}	V_{I3}=3.3V	-	-	400	μA
LVDS Input voltage	4)	V_L	-	0	-	1.9	V
Differential input voltage	4)	V_{ID}	-	100	-	600	mV
Differential input threshold voltage	4) 5)	V_{TL}	"Low" level	V_{CM}-100	—	—	mV
		V_{TH}	"High" level	—	—	V_{CM}+100	mV
Terminator		R_1	-	-	100	-	Ω
V_{DD}-turn-on conditions	1) 6)	t1	-	0.1	-	10	ms
		t2	-	0	-	-	ms
		t3	-	0	-	-	ms
		t4	-	1.0	-	-	s
		t5	-	200	-	-	ms
		t6	-	200	-	-	ms
		t7	-	0	-	10	s
		t8	-	0	-	-	ms

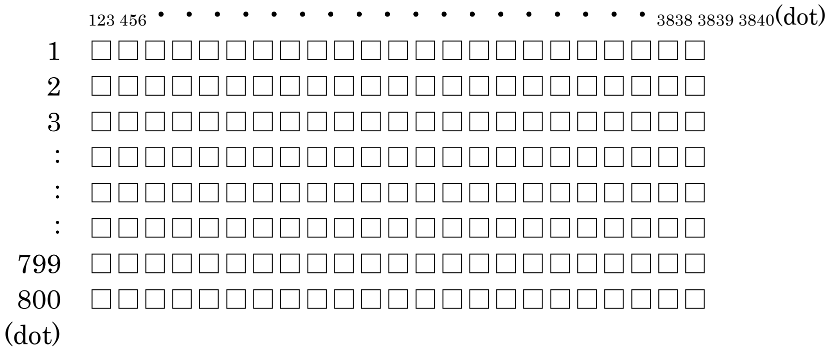
1) V_{DD}-turn-on conditions


0.9VDD
0.1VDD
VDD
t1
0.9VDD
0.1VDD
0.9VDD
t4
Valid Data
Signal 3)
t3
t8
t7
t2
t3
t7
Differential Lo, Hi-Z or Valid Data
Valid Data
Differential Lo, Hi-Z or Valid Data
LVDS Signal 4)
t5
t6
BLEN

※If the condition of t5, t6 doesn't fill it, the display noise might be seen.

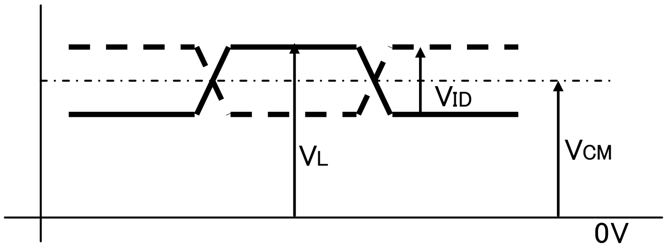
2) Display pattern:

V_{DD} = 3.3V, Ta = 25°C


123 456
3838 3839 3840(dot)
1
2
3
:
:
:
799
800
(dot)

3) Input signal: SELLVDS, BITSEL, SC

4) Input signal: RxIN3+, RxIN3-, RxIN2+, RxIN2-, RxIN1+, RxIN1-, RxIN0+, RxIN0-, CK IN+, CK IN-


VID
VL
VCM
0V

5) V_{CM}: LVDS Common mode voltage (V_{CM}=1.25V)

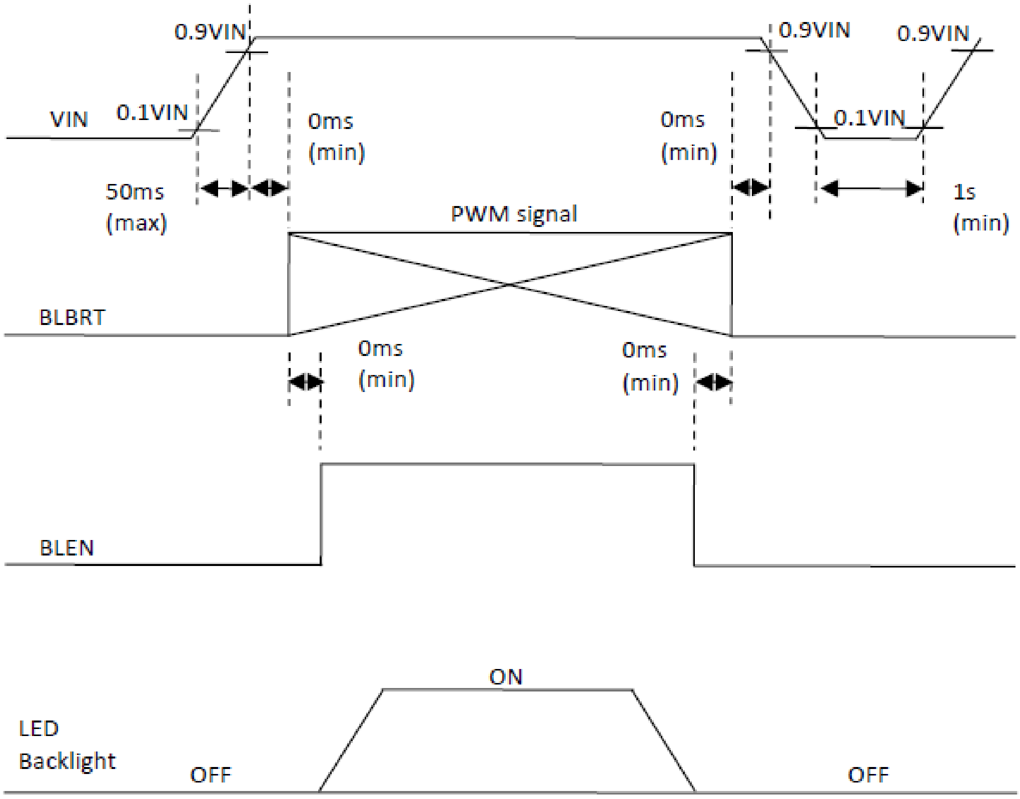
6) Please power on LVDS transmitter at the same time as VDD, or LVDS transmitter should be powered on first.

5-2. LED

Ta = -20～70°C

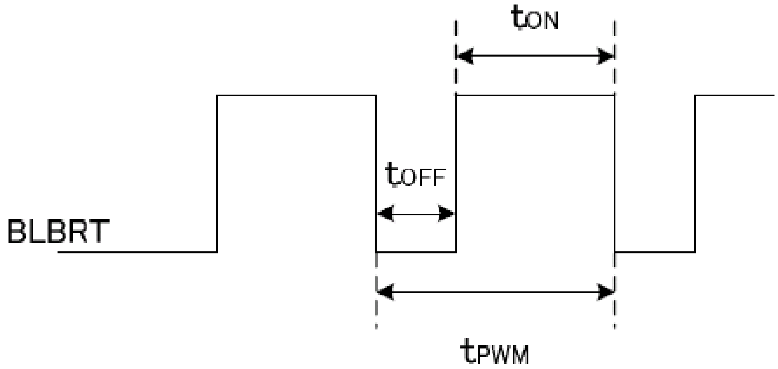
Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	1)	V_{IN}	-	10.8	12.0	13.2	V
Current consumption		I_{IN}	2)	-	295	415	mA
Permissive input ripple voltage		V_{RP_BL}	V_{IN}=12.0V	-	-	100	mVp-p
BLBRT Input signal voltage		V_{IL_BLBRT}	"Low" level	0	-	0.4	V
		V_{IH_BLBRT}	"High" level	1.5	-	V_{IN}	V
BLBRT Input pull-down resistance		R_{IN_BLBRT}	-	-	100	-	kΩ
BLEN Input signal voltage		V_{IL_BLEN}	"Low" level	0	-	0.6	V
		V_{IH_BLEN}	"High" level	2.3	-	V_{IN}	V
BLEN Input pull-down resistance		R_{IN_BLEN}	-	-	100	-	kΩ
PWM Frequency	3)	f_{PWM}	-	200	—	20k	Hz
PWM Duty ratio	3)	D_{PWM}	f_{PWM}=200Hz	1	—	100	%
			f_{PWM}=2kHz	1	—	100	%
			f_{PWM}=10kHz	10	—	100	%
Operating life time	4) 5)	T	Temp.=25°C	-	50,000	-	h

1) V_{IN}-turn-on conditions


0.9VIN
VIN
0.1VIN
0ms
(min)
50ms
(max)
0.9VIN
0.9VIN
0.1VIN
0ms
(min)
1s
(min)
PWM signal
BLBRT
0ms
(min)
0ms
(min)
BLEN
ON
LED
Backlight
OFF
OFF

2) V_{IN} = 12V, Ta= 25℃, D_{PWM} = 100%

3) PWM timing diagram



$t_{PWM} \geqq 50$us, $t_{ON} \geqq 5$us, $t_{OFF} \geqq t_{PWM} \times 0.01$ us

In case of lower frequency, the deterioration of the display quality, flicker etc., may occur.

4) When brightness decrease 50% of minimum brightness.
The average life of LED will decrease when the LCD is operating at higher temperatures.

5) Life time is estimated data. (Condition: D_{PWM} = 100%, Temp. =25℃ in chamber).

6. Optical characteristics

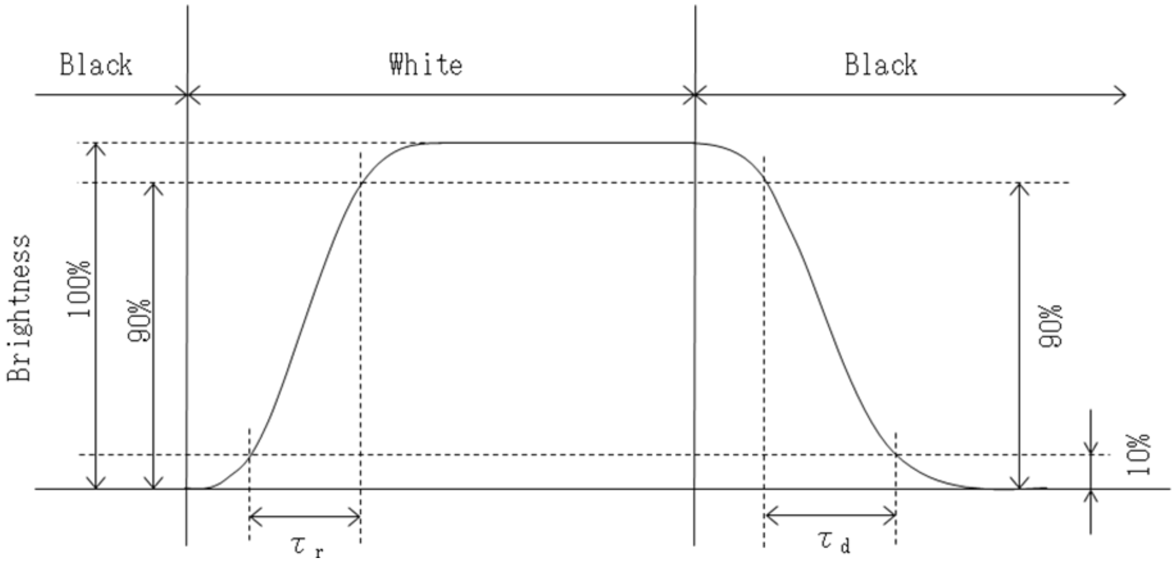
Measuring spot = ϕ 6.0mm, Ta = 25°C

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Response time	Rise	τ_r	$\theta = \phi = 0°$	—	18	—	ms
	Down	τ_d	$\theta = \phi = 0°$	—	12	—	ms
Viewing angle range		θ UPPER	CR≧10	—	85	—	deg.
		θ LOWER		—	85	—	
		ϕ LEFT		—	85	—	deg.
		ϕ RIGHT		—	85	—	
Contrast ratio		CR	$\theta = \phi = 0°$	500	750	—	-
Brightness		L	D_{PWM} = 100%	350	500	—	cd/m^2
Chromaticity coordinates	Red	x	$\theta = \phi = 0°$	0.560	0.610	0.660	-
		y		0.295	0.345	0.395	
	Green	x	$\theta = \phi = 0°$	0.290	0.340	0.390	
		y		0.510	0.560	0.610	
	Blue	x	$\theta = \phi = 0°$	0.105	0.155	0.205	
		y		0.095	0.145	0.195	
	White	x	$\theta = \phi = 0°$	0.270	0.320	0.370	
		y		0.305	0.355	0.405	

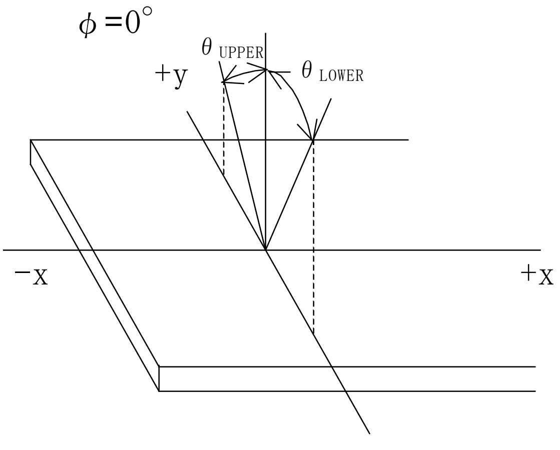
6-1. Definition of contrast ratio

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

6-2. Definition of response time

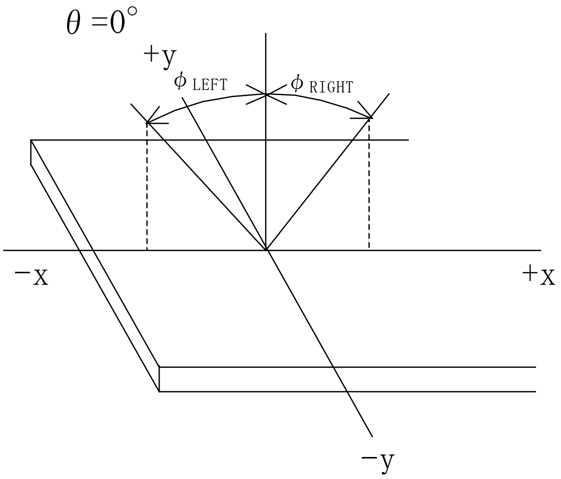


6-3. Definition of viewing angle



ϕ =0°
θ UPPER
θ LOWER
+y
−x
+x
−y

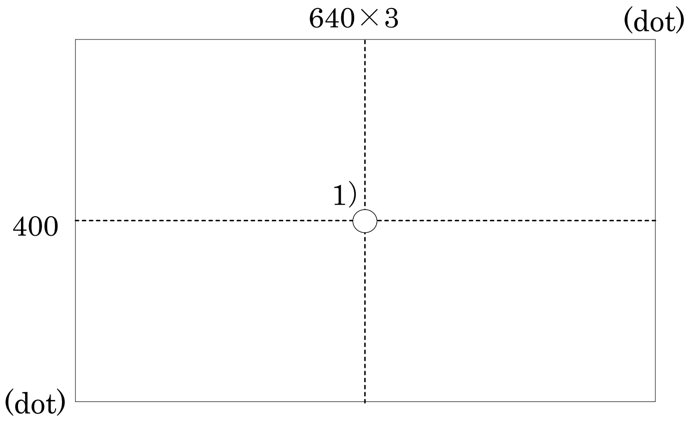
θ direction



θ =0°
+y
ϕ LEFT
ϕ RIGHT
−x
+x
−y

ϕ direction

6-4. Brightness measuring point



640×3
(dot)
1)
400
(dot)

1) Rating is defined as the white brightness at center of display screen.
2) 5 minutes after LED is turned on. (Ta =25℃)

7. Interface signals

7-1. LCD

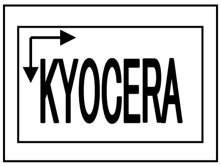
No.	Symbol	Description	Note
1	SC	Scan direction control (GND or Open : Normal、High : Reverse)	1)
2	BITSEL	Bit data select signal (GND or Open: 8bit mode、High: 6bit mode)	2)
3	RxIN3+	LVDS receiver signal CH3(+)	LVDS
4	RxIN3-	LVDS receiver signal CH3(-)	LVDS
5	GND	GND	
6	CK IN+	LVDS receiver signal CK(+)	LVDS
7	CK IN-	LVDS receiver signal CK(-)	LVDS
8	GND	GND	
9	RxIN2+	LVDS receiver signal CH2(+)	LVDS
10	RxIN2-	LVDS receiver signal CH2(-)	LVDS
11	GND	GND	
12	RxIN1+	LVDS receiver signal CH1(+)	LVDS
13	RxIN1-	LVDS receiver signal CH1(-)	LVDS
14	GND	GND	
15	RxIN0+	LVDS receiver signal CH0(+)	LVDS
16	RxIN0-	LVDS receiver signal CH0(-)	LVDS
17	GND	GND	
18	SELLVDS	Mode select signal(LVDS Data mapping)	
19	V_{DD}	+3.3V power supply	
20	V_{DD}	+3.3V power supply	

LCD connector (CN1) : DF19G-20P-1H(52) (HIROSE)
Matching connector (CN1) : DF19G-20S-1C(06) (HIROSE)

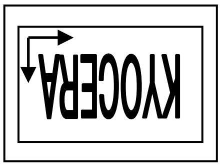
LVDS receiver : Embedded in ASIC
Matching LVDS transmitter : THC63LVDM83D(THine Electronics) or compatible

1) Scan direction

SC : GND or Open



SC : High



2) BITSEL

Number of colors
8 bit mode: 16.2M colors
6 bit mode: 262k colors

7-2. LED

No.	Symbol	Description	Note
1	GND	GND	
2	BLBRT	PWM signal (Brightness adjustment)	
3	BLEN	ON/OFF signal	
4	GND	GND	
5	V_{IN}	+12V power supply	
6	V_{IN}	+12V power supply	
7	V_{IN}	+12V power supply	
8	GND	GND	

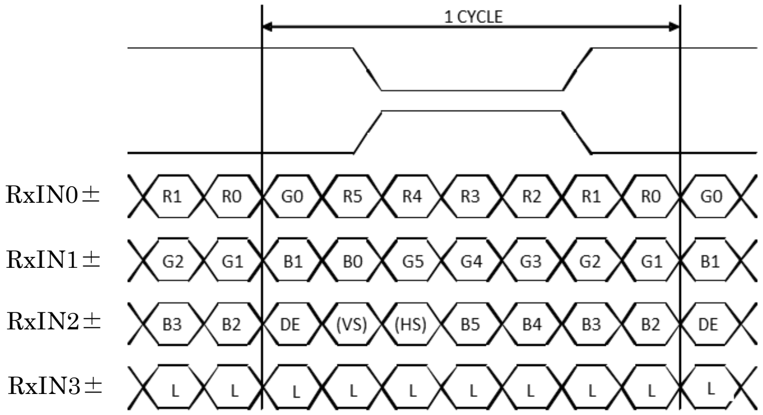
LCD connector (CN2)	:	SM08B-SHLS-G-TF(LF)(SN)	(JST)
Matching connector (CN2)	:	SHLP-08V-S-B	(JST)

7-3. Data mapping (6bit input / 8bit mode)

1) Location of BITSEL, SELLVDS (THC63LVDM83D (THine Electronics) or compatible)

Transmitter		2Pin BITSEL = "L" or OPEN	2Pin BITSEL = "L" or OPEN
Pin No.	Data	18Pin SELLVDS = "L" or OPEN	18Pin SELLVDS = "H"
51	TA0	—	R0(LSB)
52	TA1	—	R1
54	TA2	—	R2
55	TA3	—	R3
56	TA4	—	R4
3	TA5	—	R5(MSB)
4	TA6	—	G0(LSB)
6	TB0	—	G1
7	TB1	—	G2
11	TB2	—	G3
12	TB3	—	G4
14	TB4	—	G5(MSB)
15	TB5	—	B0(LSB)
19	TB6	—	B1
20	TC0	—	B2
22	TC1	—	B3
23	TC2	—	B4
24	TC3	—	B5(MSB)
27	TC4	—	(HS)
28	TC5	—	(VS)
30	TC6	—	DE
50	TD0	—	GND
2	TD1	—	GND
8	TD2	—	GND
10	TD3	—	GND
16	TD4	—	GND
18	TD5	—	GND
25	TD6	—	GND

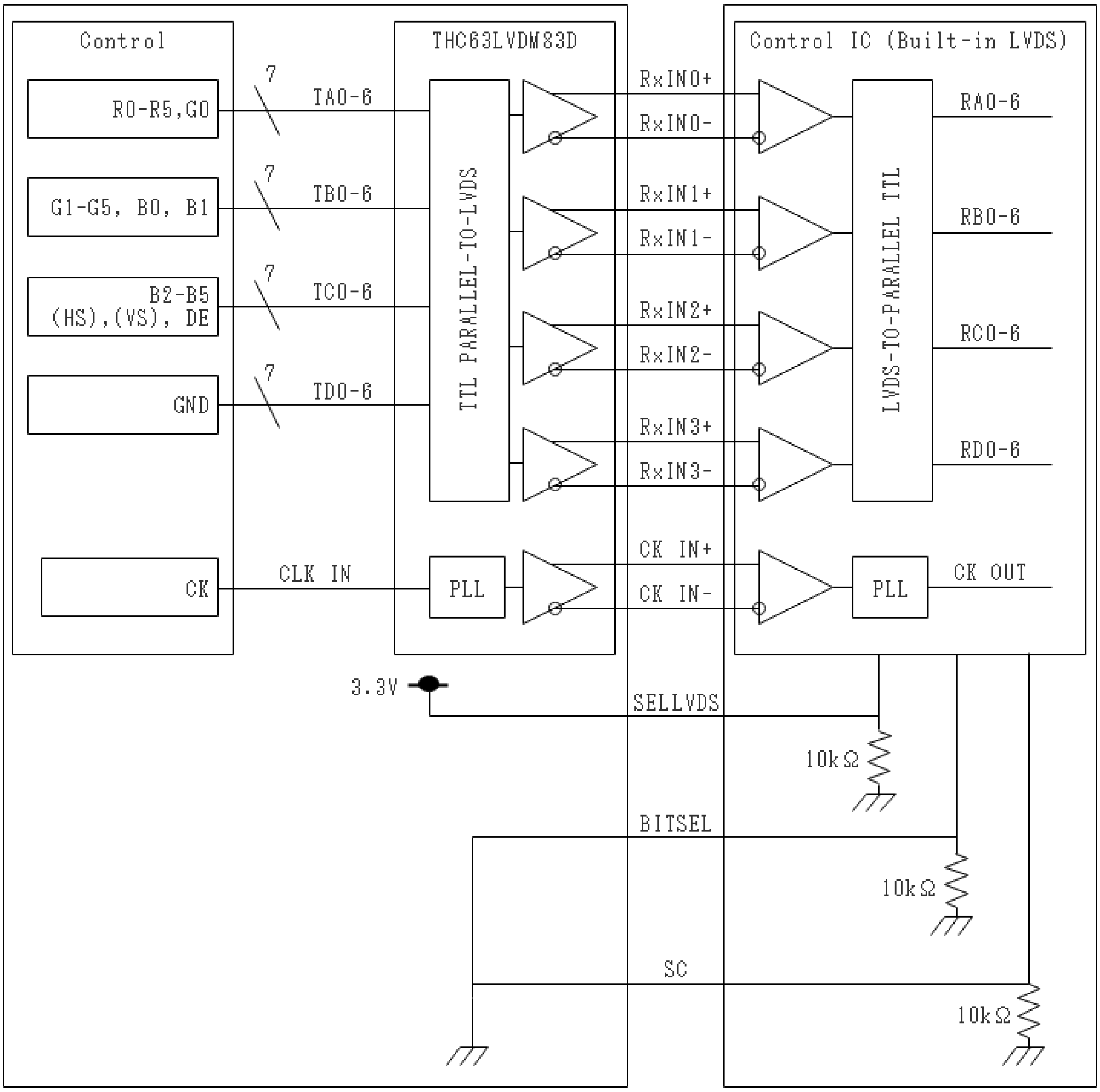
BITSEL=L(GND) or OPEN
SELLVDS=H(3.3V)


1 CYCLE
RxIN0±
R1
R0
G0
R5
R4
R3
R2
R1
R0
G0
RxIN1±
G2
G1
B1
B0
G5
G4
G3
G2
G1
B1
RxIN2±
B3
B2
DE
(VS)
(HS)
B5
B4
B3
B2
DE
RxIN3±
L
L
L
L
L
L
L
L
L
L

DE : DATA ENABLE
HS : HSYNC
VS : VSYNC

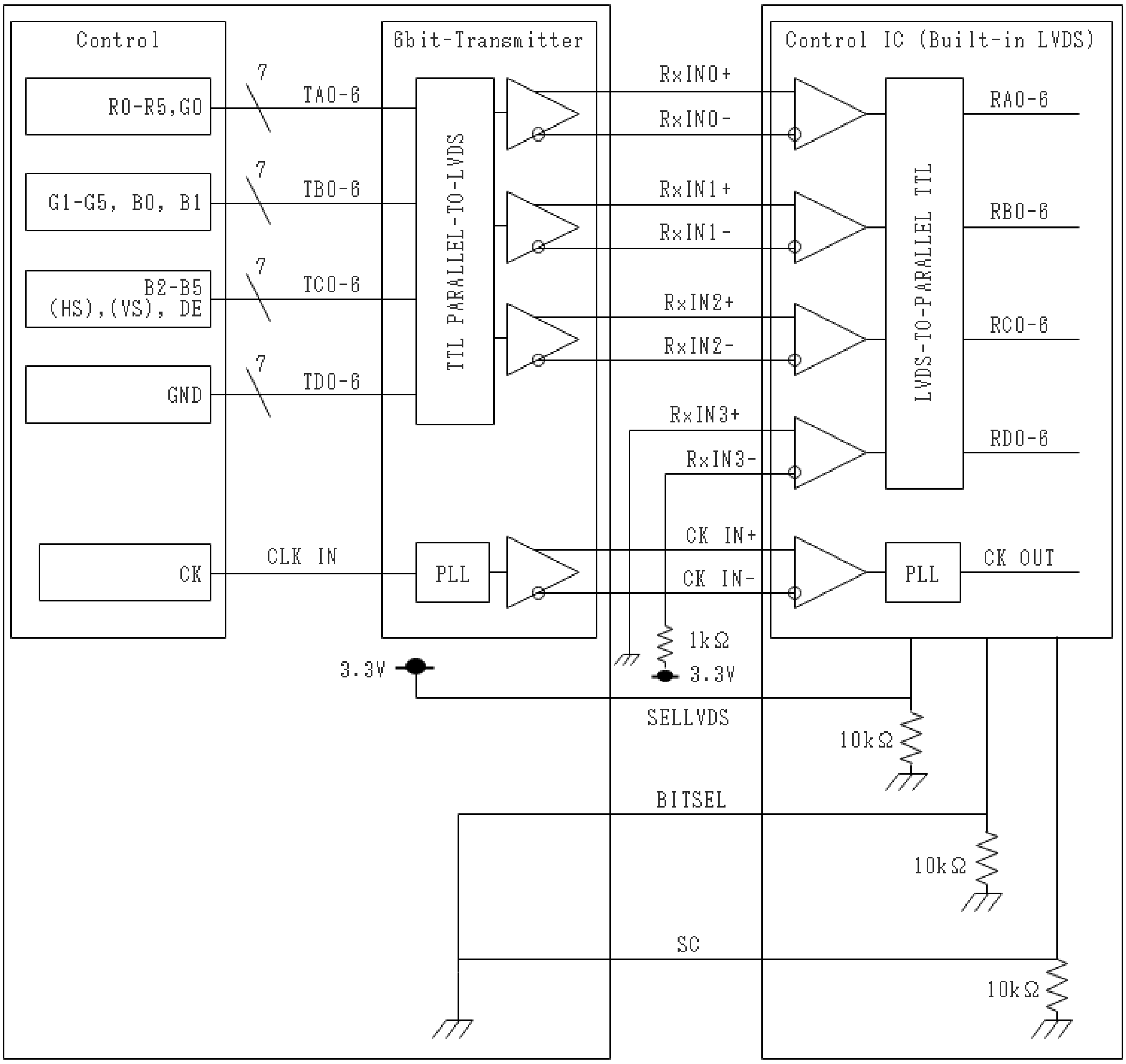
2) Block diagram

BITSEL=L(GND) or OPEN
SELLVDS=H(3.3V)


Control
R0-R5,G0
G1-G5, B0, B1
B2-B5
(HS),(VS), DE
GND
CK
7
TA0-6
7
TB0-6
7
TC0-6
7
TD0-6
CLK IN
THC63LVDM83D
TTL PARALLEL-TO-LVDS
PLL
RxIN0+
RxIN0-
RxIN1+
RxIN1-
RxIN2+
RxIN2-
RxIN3+
RxIN3-
CK IN+
CK IN-
Control IC (Built-in LVDS)
LVDS-TO-PARALLEL TTL
RA0-6
RB0-6
RC0-6
RD0-6
PLL
CK OUT
3.3V
SELLVDS
10kΩ
BITSEL
10kΩ
SC
10kΩ

*SELLVDS, BITSEL and SC signal line has 10 k Ω pull-down resistor.

When using "6-bit Transmitter", please connect the unused channel of the control IC receiver as described in the diagram below.


Control
R0-R5,G0
G1-G5, B0, B1
B2-B5
(HS),(VS), DE
GND
CK
7
TA0-6
TB0-6
TC0-6
TD0-6
CLK IN
6bit-Transmitter
TTL PARALLEL-TO-LVDS
PLL
RxIN0+
RxIN0-
RxIN1+
RxIN1-
RxIN2+
RxIN2-
RxIN3+
RxIN3-
CK IN+
CK IN-
1kΩ
3.3V
SELLVDS
BITSEL
SC
10kΩ
Control IC (Built-in LVDS)
LVDS-TO-PARALLEL TTL
RA0-6
RB0-6
RC0-6
RD0-6
PLL
CK OUT

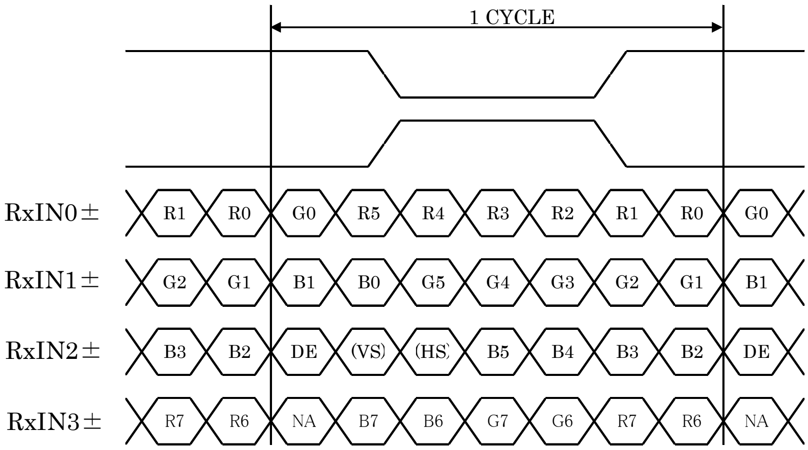
*SELLVDS, BITSEL and SC signal line has 10 k Ω pull-down resistor.

7-4. Data mapping (8bit input / 8bit mode)

1) Location of BITSEL, SELLVDS (THC63LVDM83D (THine Electronics) or compatible)

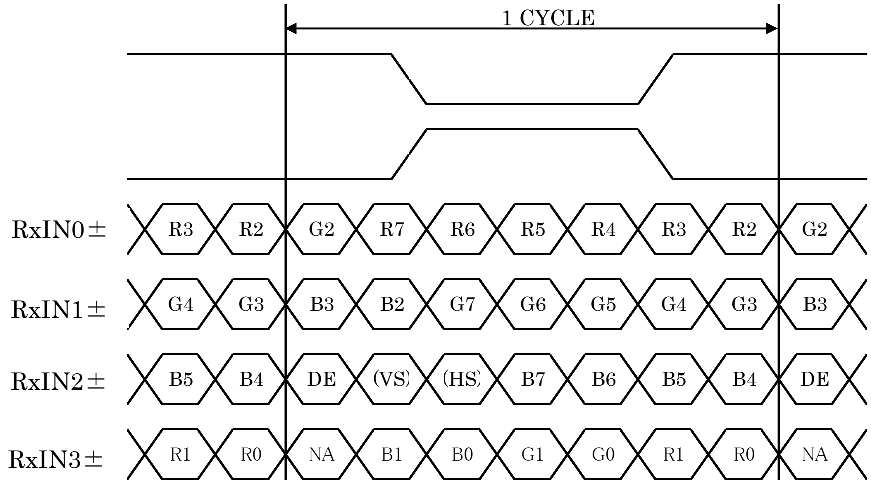
Transmitter		2Pin BITSEL = "L" or OPEN	2Pin BITSEL = "L" or OPEN
Pin No.	Data	18Pin SELLVDS = "L" or OPEN	18Pin SELLVDS = "H"
51	TA0	R0(LSB)	R2
52	TA1	R1	R3
54	TA2	R2	R4
55	TA3	R3	R5
56	TA4	R4	R6
3	TA5	R5	R7(MSB)
4	TA6	G0(LSB)	G2
6	TB0	G1	G3
7	TB1	G2	G4
11	TB2	G3	G5
12	TB3	G4	G6
14	TB4	G5	G7(MSB)
15	TB5	B0(LSB)	B2
19	TB6	B1	B3
20	TC0	B2	B4
22	TC1	B3	B5
23	TC2	B4	B6
24	TC3	B5	B7(MSB)
27	TC4	(HS)	(HS)
28	TC5	(VS)	(VS)
30	TC6	DE	DE
50	TD0	R6	R0(LSB)
2	TD1	R7(MSB)	R1
8	TD2	G6	G0(LSB)
10	TD3	G7(MSB)	G1
16	TD4	B6	B0(LSB)
18	TD5	B7(MSB)	B1
25	TD6	(NA)	(NA)

BITSEL=L(GND) or OPEN
SELLVDS=L(GND) or OPEN


1 CYCLE
RxIN0±
R1 R0 G0 R5 R4 R3 R2 R1 R0 G0
RxIN1±
G2 G1 B1 B0 G5 G4 G3 G2 G1 B1
RxIN2±
B3 B2 DE (VS) (HS B5 B4 B3 B2 DE
RxIN3±
R7 R6 NA B7 B6 G7 G6 R7 R6 NA

DE : DATA ENABLE
HS : HSYNC
VS : VSYNC

BITSEL=L(GND) or OPEN
SELLVDS=H(3.3V)

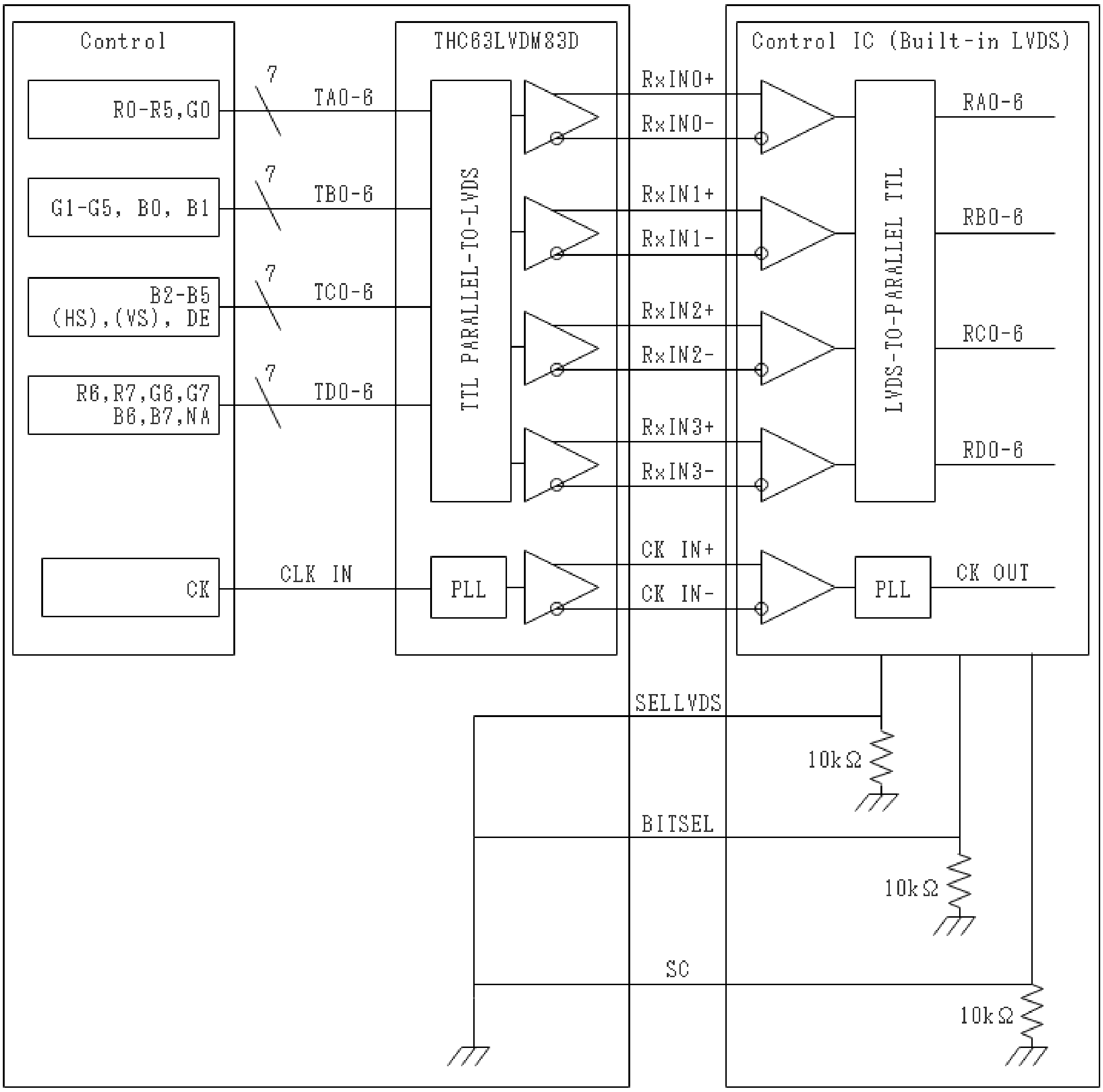


1 CYCLE
RxIN0±
R3 R2 G2 R7 R6 R5 R4 R3 R2 G2
RxIN1±
G4 G3 B3 B2 G7 G6 G5 G4 G3 B3
RxIN2±
B5 B4 DE (VS) (HS) B7 B6 B5 B4 DE
RxIN3±
R1 R0 NA B1 B0 G1 G0 R1 R0 NA

DE : DATA ENABLE
HS : HSYNC
VS : VSYNC

2) Block diagram

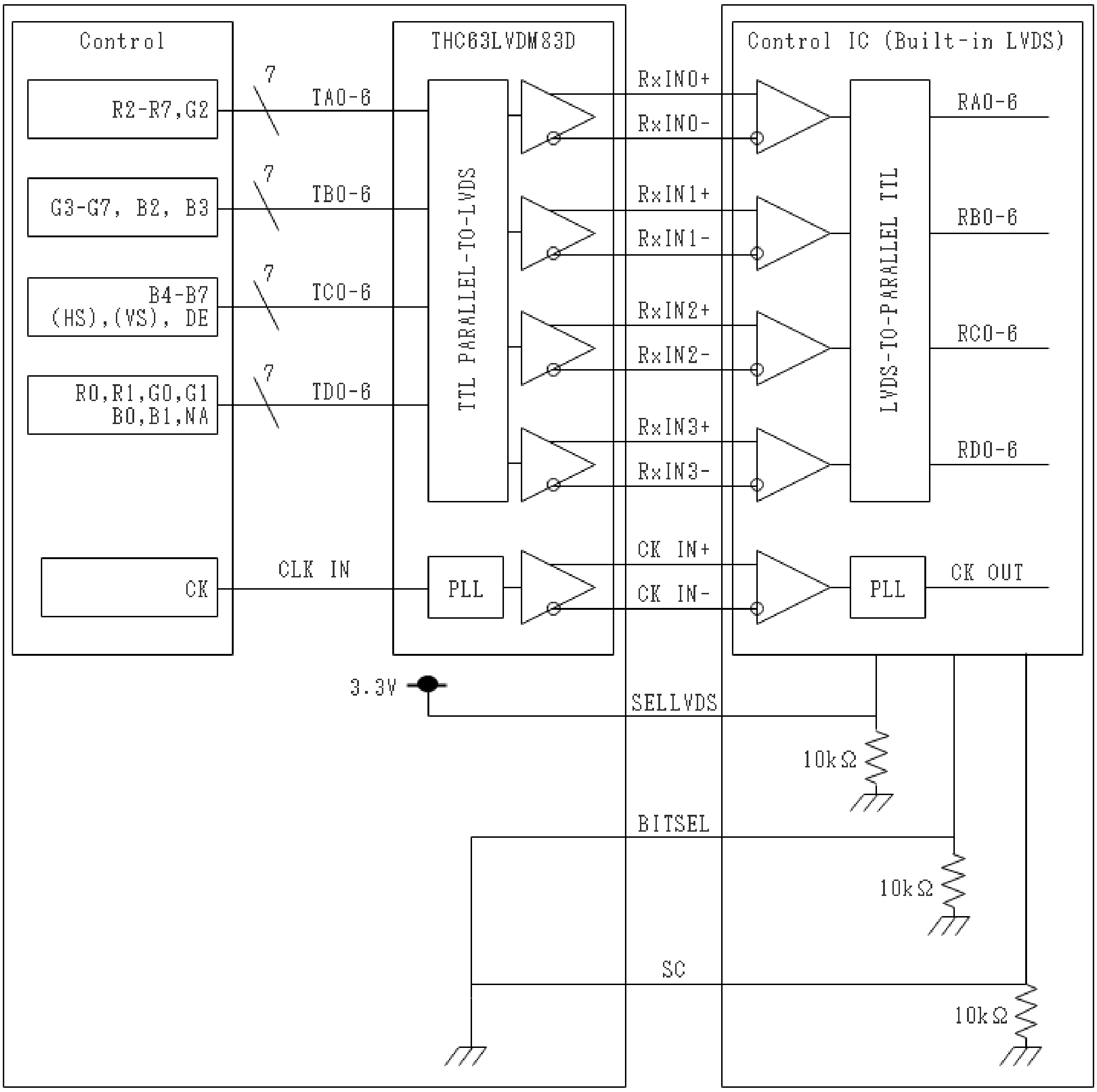
BITSEL=L(GND) or OPEN
SELLVDS=L(GND) or OPEN



Control
R0-R5,G0
G1-G5, B0, B1
B2-B5
(HS),(VS), DE
R6,R7,G6,G7
B6,B7,NA
CK
7
TA0-6
7
TB0-6
7
TC0-6
7
TD0-6
CLK IN
THC63LVDM83D
TTL PARALLEL-TO-LVDS
PLL
RxIN0+
RxIN0-
RxIN1+
RxIN1-
RxIN2+
RxIN2-
RxIN3+
RxIN3-
CK IN+
CK IN-
Control IC (Built-in LVDS)
LVDS-TO-PARALLEL TTL
RA0-6
RB0-6
RC0-6
RD0-6
PLL
CK OUT
SELLVDS
10kΩ
BITSEL
10kΩ
SC
10kΩ

*SELLVDS, BITSEL and SC signal line has 10 k Ω pull-down resistor.

BITSEL=L(GND) or OPEN
SELLVDS=H(3.3V)


Control
R2-R7,G2
G3-G7, B2, B3
B4-B7
(HS),(VS), DE
R0,R1,G0,G1
B0,B1,NA
CK
7
TA0-6
TB0-6
TC0-6
TD0-6
CLK IN
THC63LVDM83D
TTL PARALLEL-TO-LVDS
PLL
RxIN0+
RxIN0-
RxIN1+
RxIN1-
RxIN2+
RxIN2-
RxIN3+
RxIN3-
CK IN+
CK IN-
Control IC (Built-in LVDS)
LVDS-TO-PARALLEL TTL
RA0-6
RB0-6
RC0-6
RD0-6
CK OUT
3.3V
SELLVDS
10kΩ
BITSEL
SC

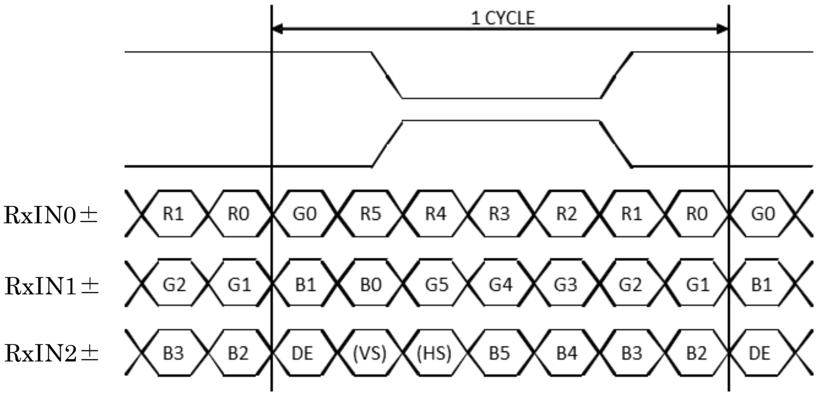
*SELLVDS, BITSEL and SC signal line has 10 k Ω pull-down resistor.

7-5. Data mapping (6bit input / 6bit mode)

1) Location of BITSEL, SELLVDS (THC63LVDM83D (THine Electronics) or compatible)

Transmitter		2Pin BITSEL = "H" 18Pin SELLVDS = "L" or OPEN	2Pin BITSEL = "H" 18Pin SELLVDS = "H"
Pin No.	Data		
44	TA0	R0(LSB)	—
45	TA1	R1	—
47	TA2	R2	—
48	TA3	R3	—
1	TA4	R4	—
3	TA5	R5(MSB)	—
4	TA6	G0(LSB)	—
6	TB0	G1	—
7	TB1	G2	—
9	TB2	G3	—
10	TB3	G4	—
12	TB4	G5(MSB)	—
13	TB5	B0(LSB)	—
15	TB6	B1	—
16	TC0	B2	—
18	TC1	B3	—
19	TC2	B4	—
20	TC3	B5(MSB)	—
22	TC4	(HS)	—
23	TC5	(VS)	—
25	TC6	DE	—

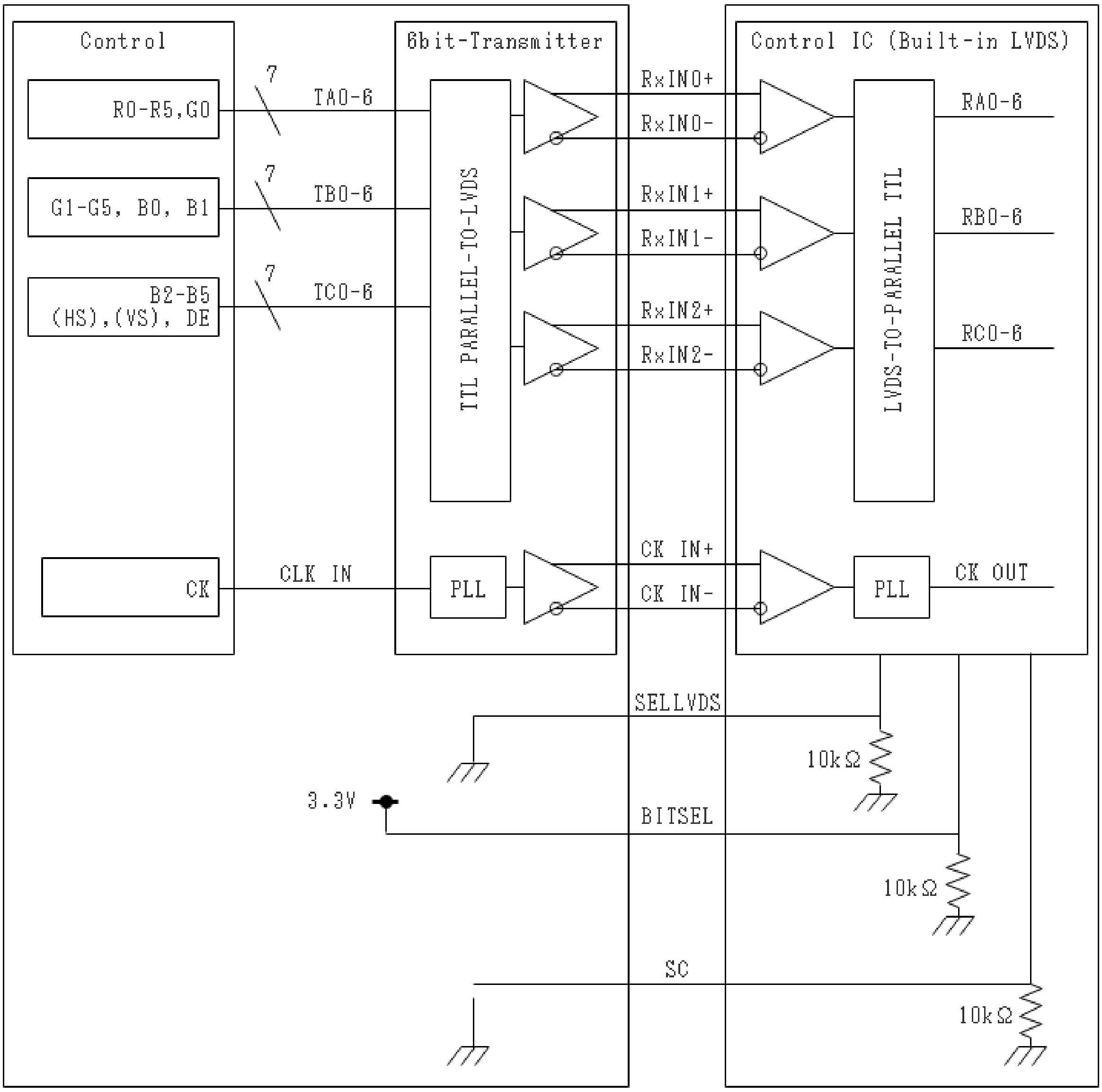
BITSEL=H(3.3V)
SELLVDS=L(GND) or OPEN


1 CYCLE
RxIN0±
R1
R0
G0
R5
R4
R3
R2
R1
R0
G0
RxIN1±
G2
G1
B1
B0
G5
G4
G3
G2
G1
B1
RxIN2±
B3
B2
DE
(VS)
(HS)
B5
B4
B3
B2
DE

DE : DATA ENABLE
HS : HSYNC
VS : VSYNC

2) Block diagram

BITSEL=H(3.3V)
SELLVDS=L(GND) or OPEN



Control
R0-R5,G0
G1-G5, B0, B1
B2-B5
(HS),(VS), DE
CK
7
TA0-6
7
TB0-6
7
TC0-6
CLK IN
6bit-Transmitter
TTL PARALLEL-TO-LVDS
PLL
RxIN0+
RxIN0-
RxIN1+
RxIN1-
RxIN2+
RxIN2-
CK IN+
CK IN-
Control IC (Built-in LVDS)
LVDS-TO-PARALLEL TTL
RA0-6
RB0-6
RC0-6
PLL
CK OUT
SELLVDS
10kΩ
3.3V
BITSEL
10kΩ
SC
10kΩ

*SELLVDS, BITSEL and SC signal line has 10 k Ω pull-down resistor.

8. Input timing characteristics

8-1. Timing characteristics

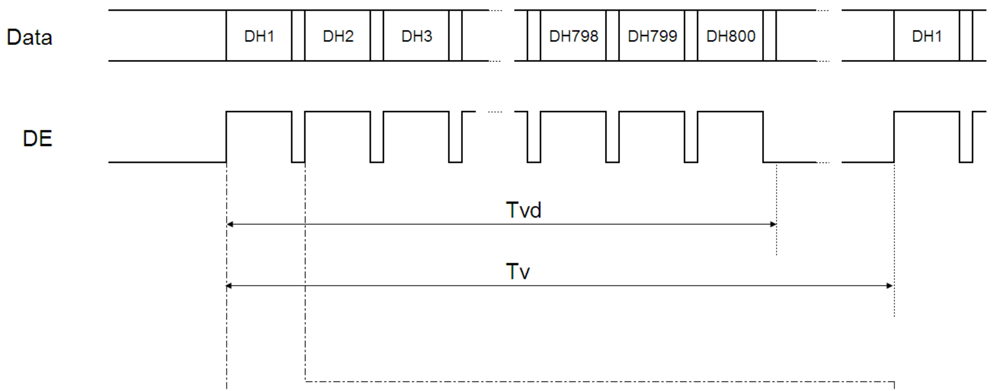
Item		Symbol	Min.	Typ.	Max.	Unit	Note
Clock (CK)	Frequency	1/Tc	60	71.1	80	MHz	1)
Enable signal (DE)	Horizontal Period	Th	1300	1440	1800	Dot	
			16.25	20.25	-	μ s	2)
	Horizontal display period	Thd	1280				
	Vertical Period	Tv	803	823	1024	Line	
	Vertical display period	Tvd	800				
Refresh rate		fv	50	60	70	—	3)

1) If the display is used under the condition which is out of specifications such as higher clock frequency than specified value, there is a possibility phenomenon such as display error including white display, malfunction and no image may occur.
Please use the display under the conditions written in the specification.

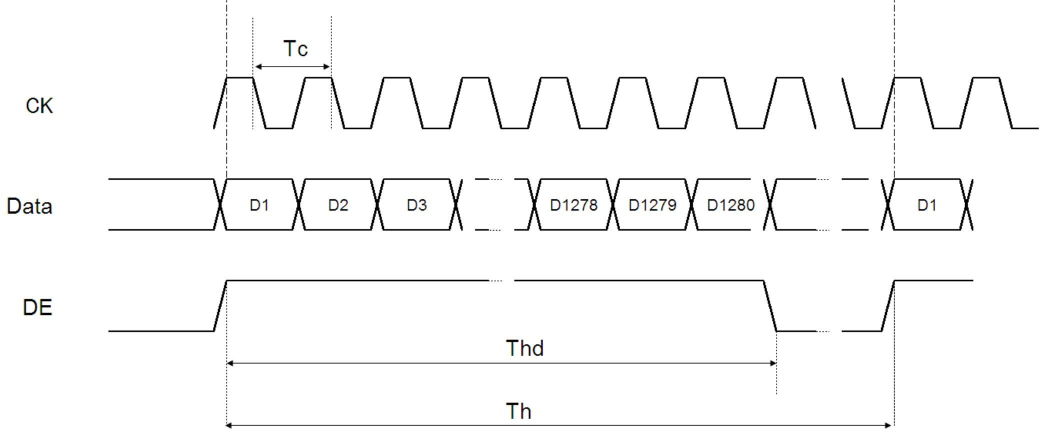
2) Please set a clock frequency, a vertical dormant period, and the horizontal dormant period so that the Horizontal Period should not reach less than Min. value.

3) If the refresh rate reach less than Min. value, the deterioration of the display quality, flicker etc., may occur. (fv=1/Tv)

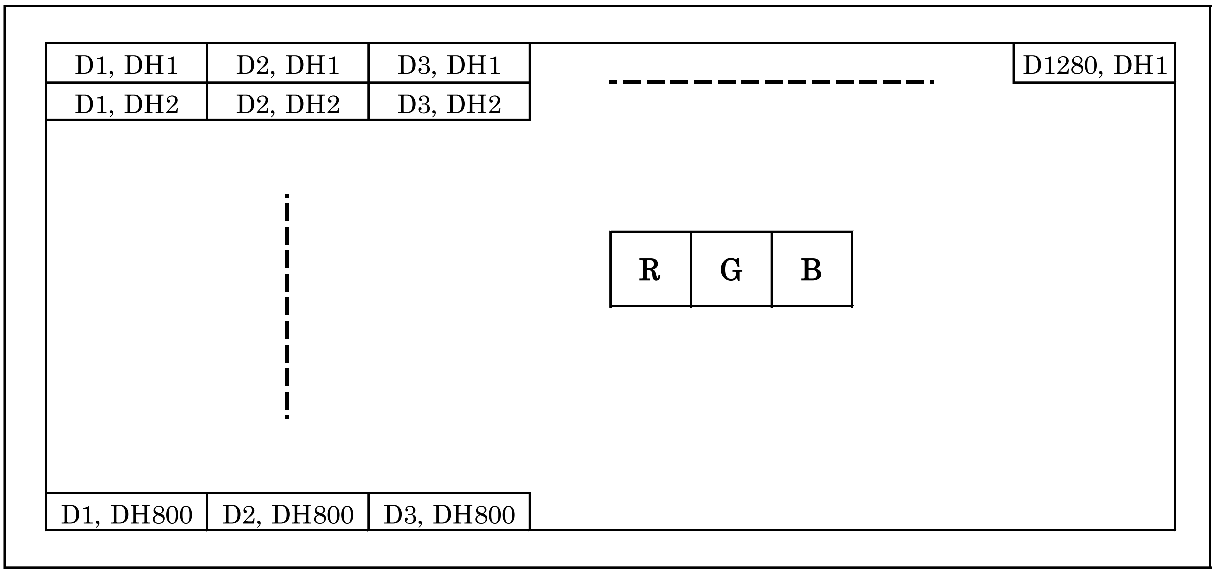
Vertical Timing Diagram



Horizontal Timing Diagram



8-2. Input data signals and display position on the screen



D1, DH1
D2, DH1
D3, DH1
D1280, DH1
D1, DH2
D2, DH2
D3, DH2
R
G
B
D1, DH800
D2, DH800
D3, DH800

9. Lot number identification

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

▦ TCG121WXLBABNN-AN20-SA:□□-□□ ▭ MADE IN ▭
↓ ↓↓ ↓ ↓ ↓
① ②③ ④ ⑤ ⑥

No① – No⑥ above indicate
- ① Data matrix (For internal control purpose only)
- ② Year code (The last digit of the year)
- ③ Month code
- ④ Day code
- ⑤ Version number (Max. 7 characters)
- ⑥ Country of origin

③ Month code

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

10. Warranty

10-1. Incoming inspection

Please inspect the LCD within one month after your receipt.

10-2. Production warranty

Kyocera warrants its LCD's for a period of 12 months from the ship date. Kyocera shall, by mutual agreement, replace or re-work defective LCD's that are shown to be Kyocera's responsibility.

11. Precautions for use

11-1. Installation of the LCD

1) Please ground in order to stabilize brightness and display quality.
2) A transparent protection plate shall be added to protect the LCD and its polarizer.
3) The LCD shall be installed so that there is no pressure on the LSI chips.
4) Since this product is wide viewing product, occurrence level of in-plane unevenness by the external stress is different compared to current normal viewing product. So there is a possibility that in-plane unevenness will be occurred by over twist, strain giving by attaching to LCD, and over pressure to touch panel. Please be careful of stress when designing the housing.
5) A transparent protection sheet is attached to the polarizer.
   Please remove the protection film slowly before use, paying attention to static electricity.

11-2. Static electricity

1) Since CMOS ICs are mounted directly onto the LCD glass, protection from static electricity is required.
2) Workers should use body grounding. Operator should wear ground straps.

11-3. 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) Please select the best display pattern based on your evaluation because flicker, lines or nonuniformity or unevenness can be visible depending on display patterns.

11-4. Storage

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

11-5. Usage

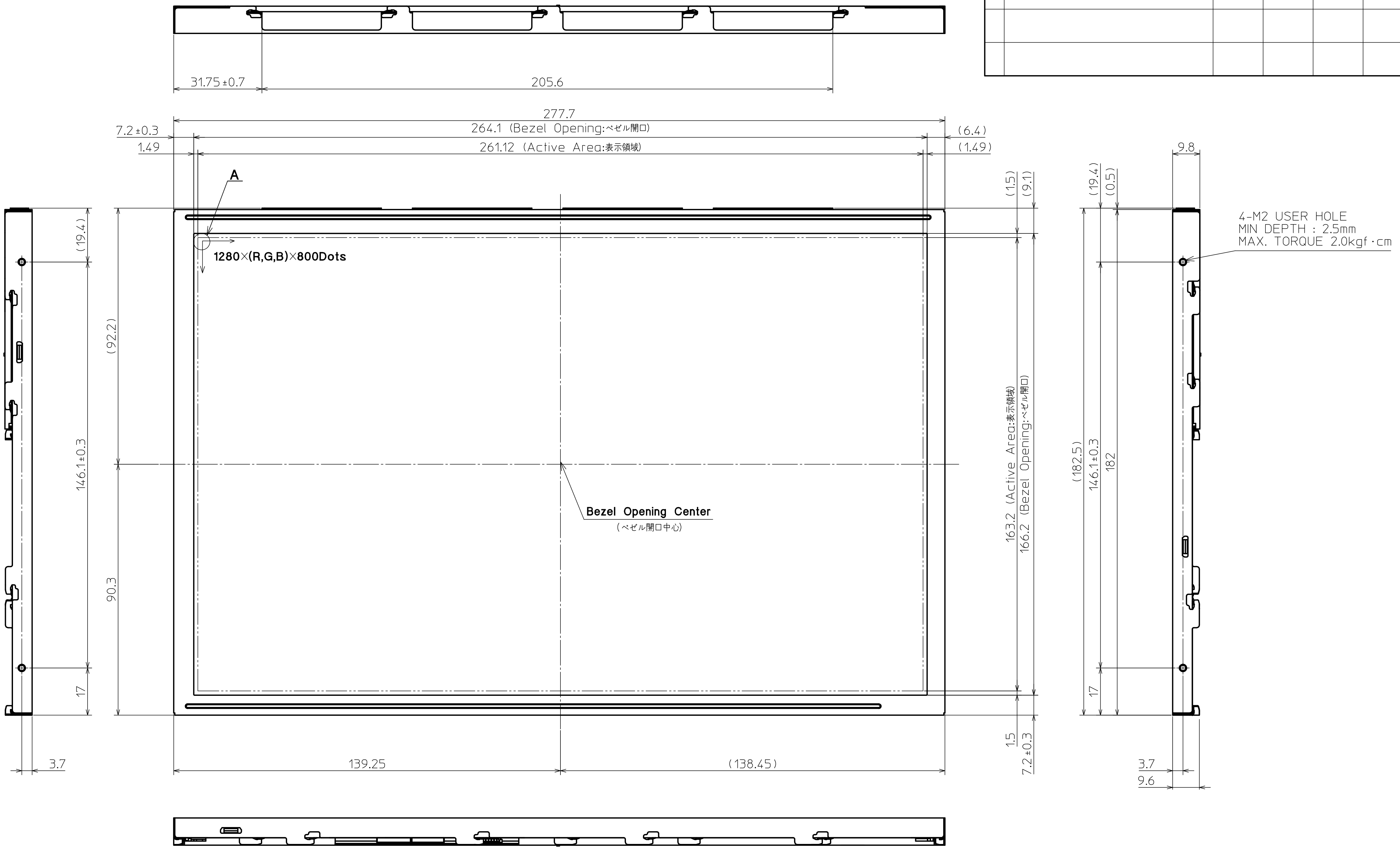
1) DO NOT store in a high humidity environment for extended periods. Polarizer degradation bubbles, and/or peeling off of the polarizer may result.
2) The front polarizer is easily scratched or damaged. Prevent touching it with any hard material, and from being pushed or rubbed.
3) The LCD screen may be cleaned by wiping the screen surface with a soft cloth or cotton pad using a little Ethanol.
4) Water may cause damage or discoloration of the polarizer. Clean condensation or moisture from any source immediately.
5) Always keep the LCD free from condensation during testing. Condensation may permanently spot or stain the polarizer.
6) Do not disassemble LCD because it will result in damage.
7) This Kyocera LCD 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.
8) Please do not use solid-base image pattern for long hours because a temporary afterimage may appear. We recommend using screen saver etc. in cases where a solid-base image pattern must be used.
9) Liquid crystal may leak when the LCD 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.

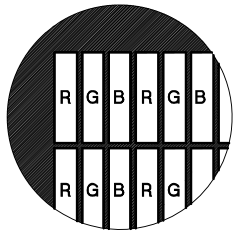
12. Reliability test data

Test item	Test condition	Test time	Judgement
High temp. atmosphere	80°C	240h	Display function : No defect Display quality : No defect Current consumption : No defect
Low temp. atmosphere	-30°C	240h	Display function : No defect Display quality : No defect Current consumption : No defect
High temp. humidity atmosphere	40°C 90% RH	240h	Display function : No defect Display quality : No defect Current consumption : No defect
Temp. cycle	-30°C 0.5h R.T. 0.5h 80°C 0.5h	10cycles	Display function : No defect Display quality : No defect Current consumption : No defect
High temp. operation	70°C	500h	Display function : No defect Display quality : No defect Current consumption : No defect

1) Each test item uses a test LCD only once. The tested LCD is not used in any other tests.
2) The LCD is tested in circumstances in which there is no condensation.
3) The reliability test is not an out-going inspection.
4) The result of the reliability test is for your reference purpose only.
The reliability test is conducted only to examine the LCD's capability.

No	Description	Drawn	Checked	Checked	Approved


31.75±0.7
205.6
277.7
7.2±0.3
264.1 (Bezel Opening:ベゼル開口)
(6.4)
1.49
261.12 (Active Area:表示領域)
(1.49)
9.8
A
1280×(R,G,B)×800Dots
(1.5)
(9.1)
(19.4)
(0.5)
4-M2 USER HOLE
MIN DEPTH : 2.5mm
MAX. TORQUE 2.0kgf·cm
(19.4)
(92.2)
146.1±0.3
90.3
17
Bezel Opening Center
(ベゼル開口中心)
163.2 (Active Area:表示領域)
166.2 (Bezel Opening:ベゼル開口)
(182.5)
146.1±0.3
182
17
1.5
7.2±0.3
3.7
139.25
(138.45)
3.7
9.6


R G B R G B
R G B R G

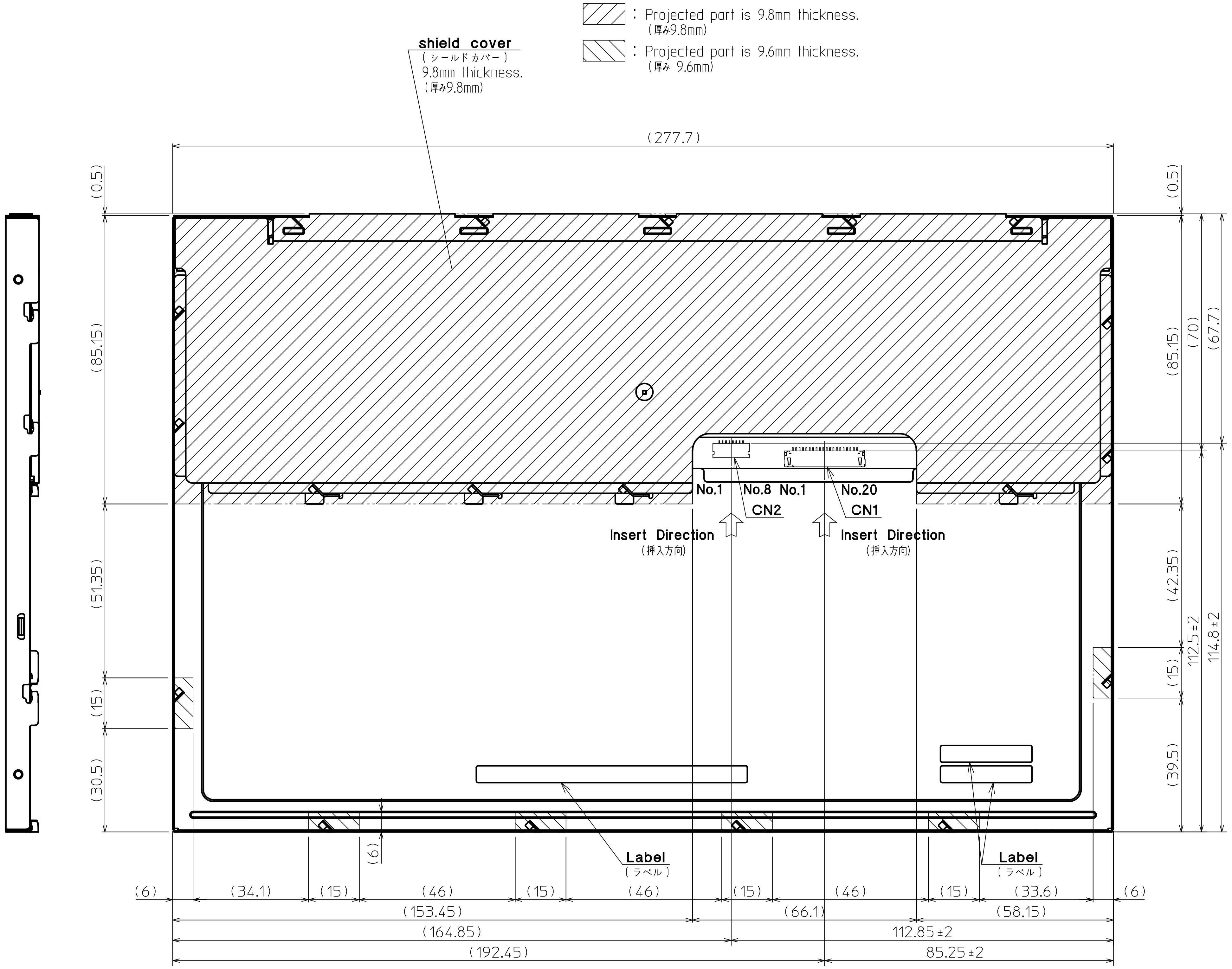
DETAIL A (Dot Size)
(NTS)

Note.（注記）

1. Connector CN1： DF19G-20P-1H(52) (HIROSE)
   (コネクター)　CN2： SM08B-SHLS-G-TF(LF)(SN) (JST)
2. Matching Connector CN1： DF19G-20S-1C(06) (HIROSE)
   (適合コネクター)　CN2： SHLP-08V-S-B (JST)
3. The Information of LCD is displayed starting at the upper left hand corner, moving right then down to the lower right hand corner.
   (LCD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)
5. Max screw length ： 2.5mm
   (最大ネジ長)
6. Max screw torque ： 2.0kgf·cm
   (最大ネジ締付トルク)
7. There is a possibility that in-plane unevenness will be occurred by over twist, stress giving by attaching to LCD, and over pressure to touch panel. Please be careful of stress when designing the housing.
   (過度な捻じり(ひずみ)、LCD固定時での応力発生、タッチパネルでの過度な押し圧によっては、パネル面内にムラが発生することがありますので、筐体設計において、事前に十分確認願います。)

Material 材 質	Treatment 処 理	Approved '24.07.09 倉元	Checked	Checked '24.07.04 本間	Drawn 蔭山	Scale 1:1 (NTS)	Title TCG121WXLBABNN	KYOCERA	Year-Month-Day '24.06.18	Size 2
Quantity 製作数	Description; RoHS 備 考 121A8079800-2						Outline Dimensions	Drawing No. 121A9039400		1/2

No	Description	Drawn	Checked	Checked	Approved


▨ : Projected part is 9.8mm thickness.
（厚み9.8mm）
▧ : Projected part is 9.6mm thickness.
（厚み 9.6mm）
shield cover
（シールドカバー）
9.8mm thickness.
（厚み9.8mm）
(277.7)
(0.5)
(0.5)
(85.15)
(51.35)
(15)
(30.5)
(85.15)
(70)
(67.7)
(42.35)
(15)
(39.5)
112.5±2
114.8±2
No.1
No.8
No.1
No.20
CN2
CN1
Insert Direction
（挿入方向）
Insert Direction
（挿入方向）
(6)
Label
（ラベル）
Label
（ラベル）
(6)
(34.1)
(15)
(46)
(15)
(46)
(15)
(46)
(15)
(33.6)
(6)
(153.45)
(66.1)
(58.15)
(164.85)
112.85±2
(192.45)
85.25±2

Note.（注記）
1. Tolerance without indication : ±0.5
（指示無き公差）

Material 材質
Quantity 製作数
Treatment 処理
Description; 備考 RoHS 121A8079800-2
Approved '24.07.09 倉元
Checked
Checked '24.07.04 本間
Drawn 蔭山
Scale 1:1
Title TCG121WXLBABNN
Outline Dimensions
KYOCERA
Year-Month-Day '24.06.18
Drawing No. 121A9039400
Size 2
2/2

Spec No.	TQ3C-8EAF0-E2YAM62-00
Date	November 25, 2024

KYOCERA INSPECTION STANDARD

TYPE : TCG121WXLBABNN-AN20-SA

KYOCERA CORPORATION

<table>
<tr><td rowspan="2">Original
Issue Date</td><td colspan="3">Designed by: Engineering dept.</td><td>Confirmed by:
dept.</td></tr>
<tr><td>Prepared</td><td>Checked</td><td>Approved</td><td>Approved</td></tr>
<tr><td>November 25, 2024</td><td><i>K. Komurasaki</i></td><td><i>T. Fukui</i></td><td><i>M. Kato</i></td><td><i>T. Sawada</i></td></tr>
</table>

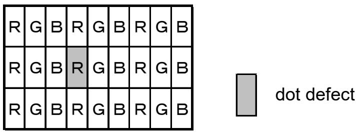
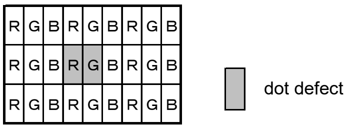
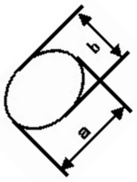
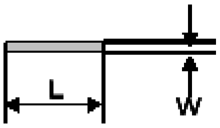
Revision record

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

Rev. No.	Date	Page	Descriptions

Visuals specification

1) Note

	Note		
General	1. Customer identified anomalies not defined within this inspection standard shall be reviewed by Kyocera, and an additional standard shall be determined by mutual consent. 2. This inspection standard about the image quality shall be applied to any defect within the active area and shall not be applicable to outside of the area. 3. Inspection conditions Luminance : 500 Lux min. Inspection distance : 300 mm. Temperature : 25 ± 5℃ Direction : Directly above		
Definition of inspection item	Dot defect	Bright dot defect	The dot is constantly “on” when power applied to the LCD, even when all “Black” data sent to the screen. Inspection tool: 5% Transparency neutral density filter. Count dot: If the dot is visible through the filter. Don’t count dot: If the dot is not visible through the filter.  R G B R G B R G B R G B R G B R G B R G B R G B R G B dot defect
		Black dot defect	The dot is constantly “off” when power applied to the LCD, even when all “White” data sent to the screen.
		White dot (Circular/foreign particle)	Pixel works electrically, however, circular/foreign particle makes dot appear to be “on” even when all “Black” data is sent to the screen.
		Adjacent dot	Adjacent dot defect is defined as two or more bright dot defects or black dot defects.  R G B R G B R G B R G B R G B R G B R G B R G B R G B dot defect
	External inspection	Bubble, Scratch, Foreign particle (Polarizer, Cell, Backlight)	Visible operating (all pixels “Black” or “White”) and non operating.
		Appearance inspection	Does not satisfy the value at the spec.
	Definition of size	Definition of circle size  a: major axis, b: minor axis d = (a + b) / 2	Definition of linear size 

2) Standard

<table>
<tr><th colspan="2">Classification</th><th colspan="2">Inspection item</th><th>Judgement standard</th></tr>
<tr><td rowspan="7">Defect
(in LCD glass)</td><td rowspan="2">Single dot</td><td colspan="2">Bright dot defect</td><td>Acceptable number : 4
Bright dot spacing : 5 mm or more</td></tr>
<tr><td colspan="2">Black dot defect</td><td>Acceptable number : 5
Black dot spacing : 5 mm or more</td></tr>
<tr><td rowspan="3">Adjacent dot</td><td rowspan="2">2 dots</td><td>Bright dot defect</td><td>Acceptable number : 2</td></tr>
<tr><td>Black dot defect</td><td>Acceptable number : 3</td></tr>
<tr><td colspan="2">3 or more dots</td><td>Acceptable number : 0</td></tr>
<tr><td colspan="3">Total dot defects</td><td>Acceptable number : 5 Max</td></tr>
<tr><td>Others</td><td colspan="2">White dot, Dark dot (Circle)</td><td>
<table>
<tr><th>Size (mm)</th><th>Acceptable number</th></tr>
<tr><td>$d \leqq 0.2$</td><td>(Neglected)</td></tr>
<tr><td>$0.2 < d \leqq 0.4$</td><td>5</td></tr>
<tr><td>$0.4 < d \leqq 0.5$</td><td>3</td></tr>
<tr><td>$0.5 < d$</td><td>0</td></tr>
</table>
</td></tr>
<tr><td colspan="2" rowspan="5">External inspection
(Defect on Polarizer or between Polarizer and LCD glass)</td><td colspan="2">Polarizer (Scratch)</td><td>
<table>
<tr><th>Width (mm)</th><th>Length (mm)</th><th>Acceptable number</th></tr>
<tr><td>$W \leqq 0.1$</td><td>—</td><td>(Neglected)</td></tr>
<tr><td rowspan="2">$0.1 < W \leqq 0.3$</td><td>$L \leqq 5.0$</td><td>(Neglected)</td></tr>
<tr><td>$5.0 < L$</td><td>0</td></tr>
<tr><td>$0.3 < W$</td><td>—</td><td>0</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Polarizer (Bubble)</td><td>
<table>
<tr><th>Size (mm)</th><th>Acceptable number</th></tr>
<tr><td>$d \leqq 0.2$</td><td>(Neglected)</td></tr>
<tr><td>$0.2 < d \leqq 0.3$</td><td>5</td></tr>
<tr><td>$0.3 < d \leqq 0.5$</td><td>3</td></tr>
<tr><td>$0.5 < d$</td><td>0</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Foreign particle
(Circular shape)</td><td>
<table>
<tr><th>Size (mm)</th><th>Acceptable number</th></tr>
<tr><td>$d \leqq 0.2$</td><td>(Neglected)</td></tr>
<tr><td>$0.2 < d \leqq 0.4$</td><td>5</td></tr>
<tr><td>$0.4 < d \leqq 0.5$</td><td>3</td></tr>
<tr><td>$0.5 < d$</td><td>0</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Foreign particle
(Linear shape)
Scratch</td><td>
<table>
<tr><th>Width (mm)</th><th>Length (mm)</th><th>Acceptable number</th></tr>
<tr><td>$W \leqq 0.03$</td><td>—</td><td>(Neglected)</td></tr>
<tr><td rowspan="3">$0.03 < W \leqq 0.1$</td><td>$L \leqq 2.0$</td><td>(Neglected)</td></tr>
<tr><td>$2.0 < L \leqq 4.0$</td><td>3</td></tr>
<tr><td>$4.0 < L$</td><td>0</td></tr>
<tr><td>$0.1 < W$</td><td>—</td><td>(According to circular shape)</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Color variation
(Mura)</td><td>Not to be significantly visible.
Consultation shall be held as necessary.</td></tr>
</table>

DATA MODUL
Passion Displayed

All good things come in threes:

With **Hardware**, **Software** and **Services**, we realise unique display solutions that turn your ideas into reality.

www.data-modul.com