DATA MODUL

SPECIFICATION

ORTUSTECH

COM70H7M53FLC

7.0" – 800 x 480 – LVDS – Blanview

Version: 0.1
Date: 21.02.2024

Note: This specification is subject to change without prior notice

This product is under development and specifications are subject to change.

Specifications for

Blanview TFT-LCD Monitor (TENTATIVE)
(7.0" WVGA 800 x RGB x 480 Landscape)

Version 0.1
(Please be sure to check the specifications latest version.)

MODEL COM70H7M53FLC

Customer's Approval

Signature :

Name :

Section :

Title :

Date :

ORTUSTECH

TOPPAN INC.
Electronics Division
Technological Development Department III

Approved by

_____

Checked by

_____

Prepared by

_____

TOPPAN INC.

	SPECIFICATIONS № 23TLM041	Issue:Feb.21,2024

Version History

Ver.	Date	Page		Description
0.0	Feb.16,2024	-	-	Tentative issue
0.1 ⚠ ×1	Feb.21,2024	P.23	Correct	11. Reliability Test Test condition (Vibration test / Impact test)

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SPECIFICATIONS № 23TLM041	Issue:Feb.21,2024

Contents

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SPECIFICATIONS № 23TLM041	Issue:Feb.21,2024

1. Application

This Specification is applicable to 178.0 mm (7.0 inch) Blanview TFT-LCD monitor for non-military use.

◎ TOPPAN makes no warranty or assume no liability that use of this Product and/or any information
   including drawings in this Specification by Purchaser is not infringing any patent or other intellectual
   property rights owned by third parties, and TOPPAN shall not grant to Purchaser any right to use
   any patent or other intellectual property rights owned by third parties. Since this Specification contains
   TOPPAN's confidential information and copy right, Purchaser shall use them with high degree of
   care to prevent any unauthorized use, disclosure, duplication, publication or dissemination of
   TOPPAN's confidential information and copy right.

◎ If Purchaser intends to use this Products for an application which requires higher level of reliability
   and/or safety in functionality and/or accuracy such as transport equipment (aircraft, train, automobile, etc.),
   disaster-prevention/security equipment or various safety equipment,
   Purchaser shall consult TOPPAN on such use in advance.

◎ This Product shall not be used for application which requires extremely higher level of
   reliability and/or safety such as aerospace equipment, telecommunication equipment for trunk lines,
   control equipment for nuclear facilities or life-support medical equipment.

◎ It must be noted as an mechanical design manner, especial attention in housing design to prevent
   arcuation/flexure caused by stress to the LCD module shall be considered.

◎ TOPPAN assumes no liability for any damage resulting from misuse, abuse, and/or
   miss-operation of the Product deviating from the operating conditions and precautions
   described in the Specification.

◎ It shall be mutually conferred if nonconforming defect
   which result from unspecified cause in this specification arises.

◎ If any issue arises as to information provided in this Specification or any other information,
   TOPPAN and Purchaser shall discuss them in good faith and seek solution.

◎ TOPPAN assumes no liability for defects such as electrostatic discharge failure occurred
   during peeling off the protective film or Purchaser's assembly process.

◎ This Product is compatible for RoHS(2.0) directive.

Object substance	Maximum content [ppm]
Cadmium and its compound	100
Hexavalent Chromium Compound	1000
Lead & Lead compound	1000
Mercury & Mercury compound	1000
Polybrominated biphenyl series（PBB series）	1000
Polybrominated biphenyl ether series（PBDE series）	1000
Bis(2-ethylhexyl)phthalate series(DEHP series)	1000
Butyl benzyl phthalate series(BBP series)	1000
Dibutyl phthalate series(DBP series)	1000
Diisobutyl phthalate series(DIBP series)	1000

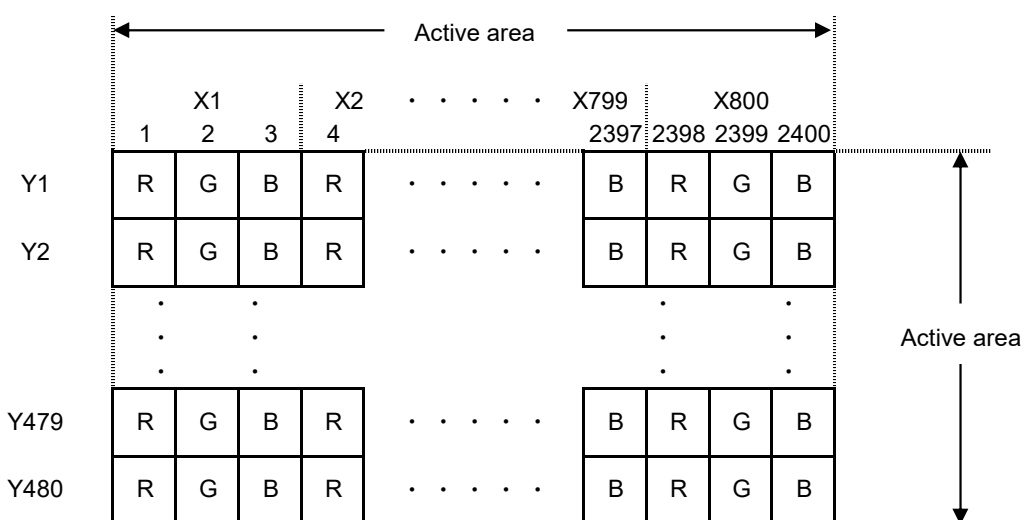# TOPPAN INC.

2. Outline Specifications

2.1 Features of the Product

- 7.0 inch diagonal display, 800 x RGB [H] x 480 [V] dots.
- 16.7 M colors (8-bit) / 262 K colors (6-bit).
- 3.3V voltage single power source.
- Timing generator [TG], Counter-electrode driving circuitry, Built-in power supply circuit.
- Long life & High bright white LED back-light.
- Blanview TFT-LCD, improved outdoor readability.

	Indoor		Outdoor	
	Readability	Power Efficiency (Battery Life)	Readability	Power Efficiency (Battery Life)
Transmissive	Good	Good	Fair	Poor
Transflective	Fair	Poor	Good	Good
Blanview	Good	Good	Good	Good

2.2 Display Method

Items	Specifications	Remarks
Display type	FFS , 16.7 M colors. / 262 k colors. Blanview, Normally black.	
Driving method	a-Si TFT Active matrix. Line-scanning, Non-interlace.	
Dot arrangement	RGB stripe arrangement.	Refer to "Dot arrangement"
Signal input method	8-bit / 6-bit LVDS interface (VESA format)	
Backlight type	Long life & High bright white LED.	
NTSC ratio	50%	

Active area

	X1			X2	· · · · ·	X799	X800		
	1	2	3	4		2397	2398	2399	2400
Y1	R	G	B	R	· · · · ·	B	R	G	B
Y2	R	G	B	R	· · · · ·	B	R	G	B
Y479	R	G	B	R	· · · · ·	B	R	G	B
Y480	R	G	B	R	· · · · ·	B	R	G	B

Active area

Dot arrangement (FPC cable placed down side)

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<Features of Blanview>

- Backlight power consumption required to assure visibility. (equivalent to 3.5"QVGA)

*Comparison with our conventional products
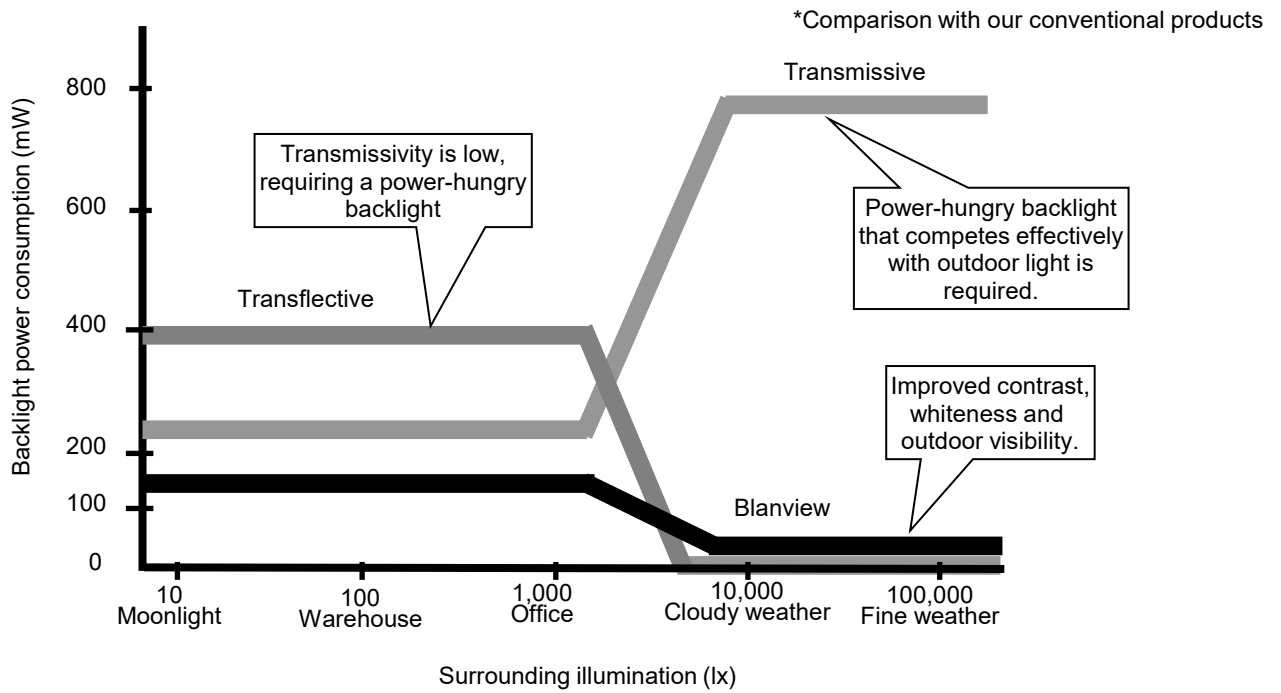
- Contrast characteristics under 100,000lx. (same condition as direct sunlight.)
  With better contrast (higher contrast ratio), Blanview TFT-LCD has the best outdoor readability
  in three different types of TFT-LCD.
  Below chart shows contrast value against panel surface brightness. (Horizontal: Panel surface brightness/
  Vertical: Contrast value) LCD panel has enough outdoor readability above our Standard line.
  (TOPPAN criteria)

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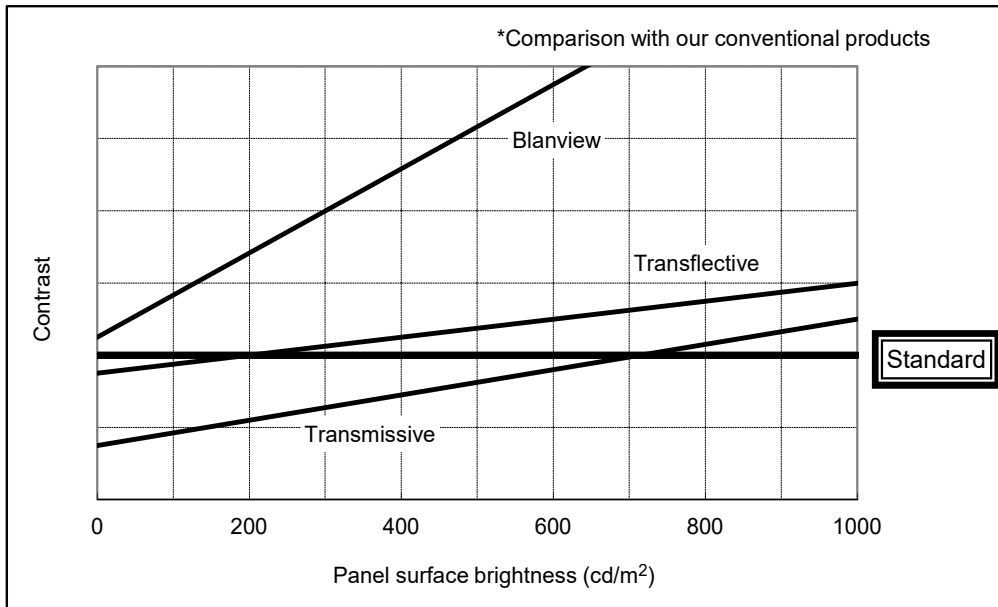
3. Dimensions and Shape

3.1 Dimensions

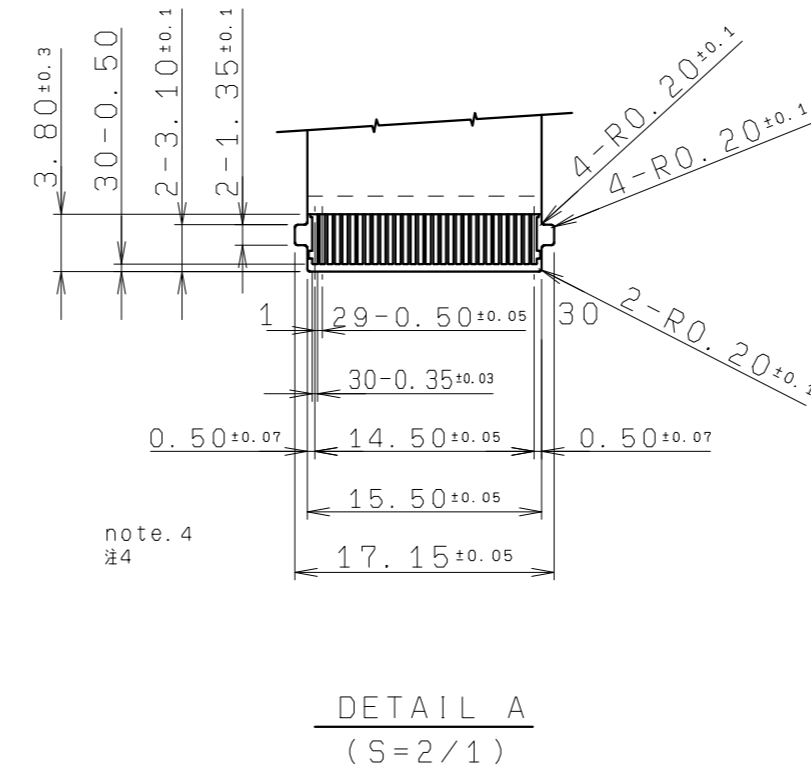| Items	Specifications	Unit	Remarks
Outline dimensions	169.80[H] × 109.70[V] × 6.20[D]	mm	Exclude FPC cable and parts on FPC.
Active area	152.40[H] × 91.44[V]	mm	178.0 mm diagonal
Number of dots	2400[H] × 480[V]	dot	
Dot pitch	63.5[H] × 190.5[V]	um	
Surface hardness of the polarizer	3H	H	4.90N Reference judgment standard:JIS-K5600
Weight	(170)	g	Include FPC cable

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EC No.	REV.No.		REVISE	DATE (Y:M:D)	APPROVED	CHECKED	PREPARED
				： ：			

169.80

(4.90)

155.90
(S CASE A OPENING)

82.60

(5.08)

4-R2.00

7.0

52.30

109.70

94.94
(S CASE A OPENING)

Note.1
注1

(Active area center)

91.44 (Active area)

152.40 (Active area)

(12.27)
(Bending area)

35.00±1.0

60.00±1.0

note.3
注3

note.6
注6

22.73
(Parts mount area)

30   1

(17.60)   (21.37)

33.12
(Parts mount area)

5.00 (Reinforcing plate)

(20.00) (Bending area)

84.90±1.0

6.20±0.3
(総厚：(S CASE A ～ S CASE C))
Total thickness

2.00MIN

R1.0MIN

3.00MAX
(FPC表面からの電子部品
及び、半田盛り高さ)
＊テープ、FPC厚さ含む
(Max electronic
parts height)
＊Including TAPE
and LCD FPC thickness

Terminal Side
導体接触面側

(Connector Thickness)
＊ Contain Reinforcement plate thickness
FPC基厚(補強板厚さを含む)

0.30±0.05

Serial code
(inkjet)

＊＊＊＊＊＊
012345

3 7

5

4

A

1   30

1
2

6

3.80±0.3

30-0.50

2-3.10±0.1

2-1.35±0.1

4-R0.20±0.1
4-R0.20±0.1

1   29-0.50±0.05

30-0.35±0.03

2-R0.20±0.1

0.50±0.07   14.50±0.05   0.50±0.07

15.50±0.05

17.15±0.05

note.4
注4

DETAIL A
(S=2/1)

PART NAME	ITEM			
S CASE C	7		SUS (t=0.30)	
S CASE A	6		SUS (t=0.20)	
FPC B	5			Use of LED
FPC A	4		Au/Ni plating AU/NIメッキ	Use of LCD
Frame	3		PC	
Polarizer	2			
TFT-LCD PANEL	1		Glass thickness=0.50+0.50t	
PART NAME	ITEM	PART CODE	MODEL NUMBER	REMARK

APPROVED 木下	GENERAL TOLERANCE ±0.5	SCALE 1/1	UNIT mm	TOPPAN
CHECKED 加藤	ISSUE (Y:M:D) 23:12:01	MODEL DX-7M53FL＊		TOPPAN INC.
CHECKED	NAME			DO NOT DUPLICATE, CONFIDENTIAL AND PROPRIETARY
DESIGN 前田創				DRAWING NO. / REV. SHEET DIV.
DRAW 前田創	OUTLINE-D7M53			SJD604603D201 / ASS'Y

2020.3 Electronics Division

3.3 Serial № print (S-print)

3.3.1 Display Items
S-print indicates the least significant digit of manufacture year (1digit), manufacture month with below alphabet (1letter), model code (5characters), serial number (6digits).

* Contents of Display

```
*     *     *****      ******
-     -     -----      ------
a     b       c          d
```

	Contents of display			
a	The least significant digit of manufacture year			
b	Manufacture month	Jan-A	May-E	Sep-I
		Feb-B	Jun-F	Oct-J
		Mar-C	Jul-G	Nov-K
		Apr-D	Aug-H	Dec-L
c	Model code	70BPC (Made in Japan)		
		70BQC (Made in Malaysia)		
d	Serial number			

* Example of indication of Serial № print (S-print)

・Made in Japan

> 5L70BPC000125

   means "manufactured in December 2025, 7.0 inch, BP type, C specifications, serial number 000125"

・Made in Malaysia

> 5L70BQC000125

   means "manufactured in December 2025, 7.0 inch, BQ type, C specifications, serial number 000125"

3.3.2 Location of Serial № print (S-print)
Refer to 3.2 "Outward Form".

3.3.3 Others
Please note that it is likely to disappear with an organic solvent about the Serial print.

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4. Pin Assignment

No.	Symbol	Function	I/O
1	BLH	LED drive power source. (Anode side)	P
2	BLL2	LED drive power source . (Cathode side 2)	P
3	BLL1	LED drive power source . (Cathode side 1)	P
4	GND	Ground	P
5	VDD	Power supply input.	P
6	VDD	Power supply input.	P
7	TEST1	TEST input (Connect to VDD)	I
8	TEST2	TEST input (Connect to GND)	I
9	TEST3	TEST input (Connect to GND)	I
10	NC	No connection	-
11	UL/DR	Up & Left / Down & Right switching terminal (Low : DR , High or NC : UL)	I
12	IM	6 / 8 bit (based on VESA) switching terminal (Low : 6bit , High or NC : 8bit	I
13	STBYB	Standby signal (Low:Standby operation,High:Normal operation)	I
14	GND	Ground	P
15	R0-	LVDS DATA0(-)	I
16	R0+	LVDS DATA0(+)	I
17	GND	Ground	P
18	R1-	LVDS DATA1(-)	I
19	R1+	LVDS DATA1(+)	I
20	GND	Ground	P
21	CLK-	LVDS CLK(-)	I
22	CLK+	LVDS CLK(+)	I
23	GND	Ground	P
24	R2-	LVDS DATA2(-)	I
25	R2+	LVDS DATA2(+)	I
26	GND	Ground	P
27	R3-	LVDS DATA3(-)	I
28	R3+	LVDS DATA3(+)	I
29	GND	Ground	P
30	NC	No connection	-

- Recommended connector : HIROSE ELECTRIC CO., LTD. FH69series   FH69-30S-0.5SH
- Please make sure to check a consistency between pin assignment in "3.2 Outward Form" and
  your connector pin assignment when designing your circuit.
  Inconsistency in input signal assignment may cause a malfunction.
- Since FPC cable has gold plated terminals, gilt finish contact shoe connector is recommended.

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5. Absolute Maximum Rating

GND=0V

Item	Symbol	Condition	Rating		Unit	Applicable terminal
			MIN	MAX		
Supply voltage	VDD		-0.3	3.9	V	VDD
Input voltage for logic	VI		-0.3	VDD+0.3	V	UL/DR , IM , STBYB
Forward current	IL1,IL2		--	TBD	mA	BLH-BLL1/BLL2
Storage temperature range	Tstg		-40	95	℃	

6. Recommended Operating Conditions

GND=0V

Item	Symbol	Condition	Rating			Unit	Applicable terminal
			MIN	TYP	MAX		
Supply voltage	VDD		3.0	3.3	3.6	V	VDD
Input voltage for logic	VI		0	--	VDD	V	UL/DR , IM , STBYB
Operational temperature range	Top	Note1	-30	+25	+85	℃	Panel surface temperature

Note1: This monitor is operatable in this temperature range. With regard to optical characteristics, refer to Item 9."Characteristics".

7. Electrical Characteristics

7.1 DC Characteristics

(Unless otherwise noted, Ta=25 ℃,VDD=3.3V,GND=0V)

Item	Symbol	Condition	Rating			Unit	Applicable terminal
			MIN	TYP	MAX		
High Level Input Voltage	VIH		0.7VDD	—	VDD	V	UL/DR,IM,STBYB
Low Level Input Voltage	VIL		0	—	0.3VDD	V	
Pull up/down resistor	RI		90	100	110	kΩ	Pull up : IM , STBYB
			45	50	55	kΩ	Pull up : UL/DR
Operating Current	IDD	Color Bar fclk = 27.2 MHz	—	TBD	TBD	mA	VDD

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(BackLight)

Item	Symbol	Condition	Rating			Unit	Applicable terminal
			MIN	TYP	MAX		
Forward current	IL1	Ta=25 ℃ , Note1	--	TBD	TBD	mA	BLH - BLL1
	IL2		--	TBD	TBD	mA	BLH - BLL2
Forward voltage *Reference value	VF1	Ta=25 ℃ IL1=IL2=(TBD) mA	--	TBD	TBD	V	BLH - BLL1
	VF2		--	TBD	TBD	V	BLH - BLL2
Estimated Life of LED	LL	Ta=25 ℃ Note2 IL1=IL2=(TBD) mA	--	TBD	--	hrs	

Note1: - Please control so that each current does not vary (IL1 = IL2).

Note2: - The lifetime of the LED is defined as a period till the brightness of the LED
 decreases to the half of its initial value.
 - This figure is given as a reference purpose only, and not as a guarantee.
 - This figure is estimated for an LED operating alone.
 As the performance of an LED may differ when assembled as a monitor
 - Estimated lifetime could vary on a different temperature and usually
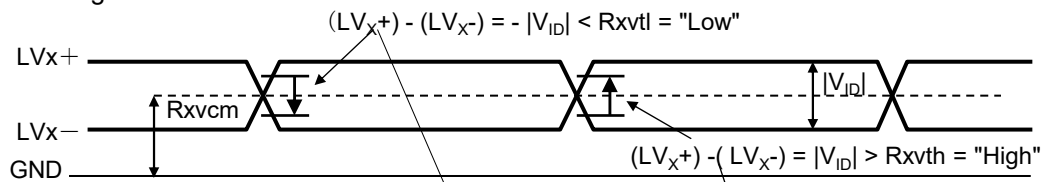 higher temperature could reduce the life significantly.

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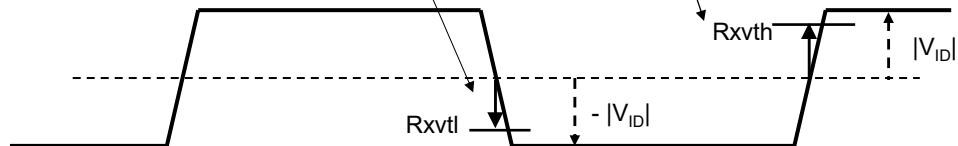## 7.2 LVDS interface

7.2.1 LVDS DC Characteristics

(Unless otherwise noted, Ta=25 °C,VDD=3.3V,GND=0V)

Item	Symbol	Condition	Rating			Unit	Applicable terminal
			MIN	TYP	MAX		
Differential input high threshold voltage	Rxvth	Rxvcm=1.2V	-	-	(0.2)	V	CLK+、CLK- R0+、R0-、R1+、R1- R2+、R2-、R3+、R3-
Differential input low threshold voltage	Rxvtl		(-0.2)	-	-	V	
Differential input common Mode voltage	Rxvcm		$|VID|/2$	-	VDD-1.2-$|VID|$/2	V	
Differential input voltage	$|V_{ID}|$		0.2	-	0.6	V	
Differential input leakage current	RV_{leak}		-10	―	+10	μA	

Single end signals

$(LV_X+) - (LV_X-) = - |V_{ID}| < $ Rxvtl = "Low"

LVx+

Rxvcm

$|V_{ID}|$

LVx-

GND

$(LV_X+) -(LV_X-) = |V_{ID}| >$ Rxvth = "High"

Differential signals

Rxvth

$|V_{ID}|$

Rxvtl

$- |V_{ID}|$

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7.2.2 LVDS AC Characteristics

(Unless otherwise noted, Ta=25 ℃,VDD=3.3V,GND=0V)

Item	Symbol	Rating			Unit	
		MIN	TYP	MAX		
CLK Frequency	f clk	25.2	27.2	30.5	MHz	
1 data bit time	UI	-	1/7	-	1/fclk	
CLK High time	T LVCH	-	4/(7*fclk)	-	ns	
CLK Low time	T LVCL	-	3/(7*fclk)	-	ns	
Position 1	Tpos_1	-0.21	0	0.21	UI	
Position 0	Tpos_0	0.79	1	1.21	UI	
Position 6	Tpos_6	1.79	2	2.21	UI	
Position 5	Tpos_5	2.79	3	3.21	UI	
Position 4	Tpos_4	3.79	4	4.21	UI	
Position 3	Tpos_3	4.79	5	5.21	UI	
Position 2	Tpos_2	5.79	6	6.21	UI	
Reciever Strobe Position 7	TEYEW	0.58	-	-	UI	
Reciever Strobe Position 8	TEX	-	-	0.21	UI	

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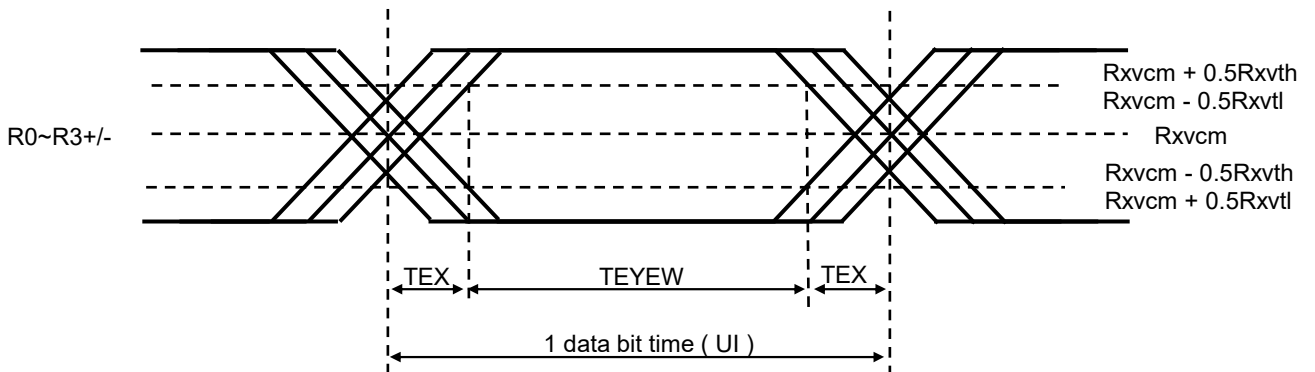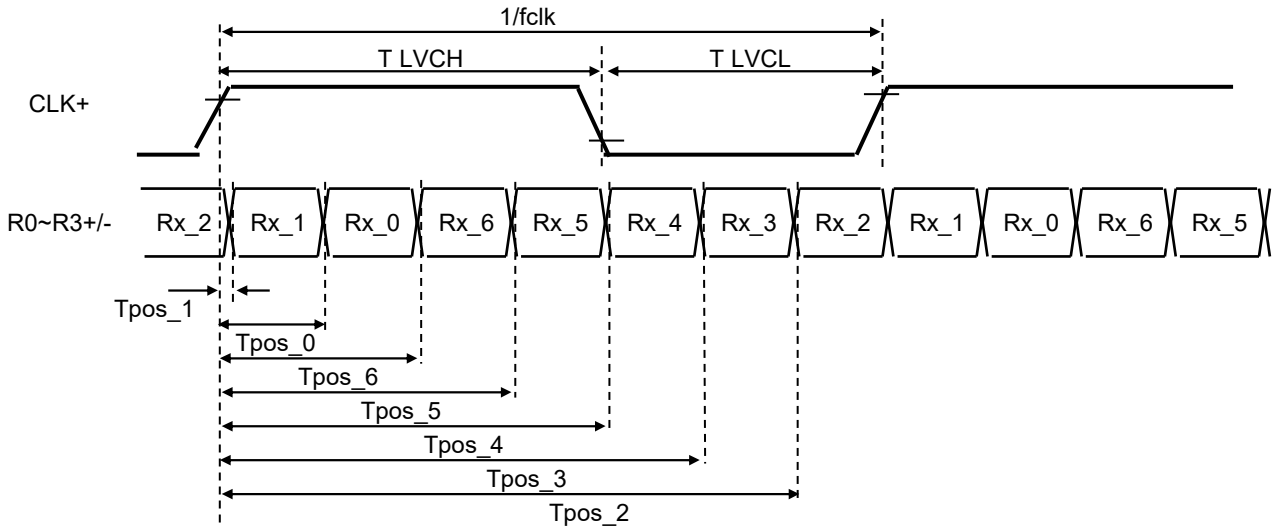
7.2.3 LVDS Data Format

VESA Format 8bit

* (MSB : R[7],G[7],B[7])

	Previous cycle		Current cycle					Next cycle		
R0+ / R0-	R[1]	R[0]	G[0]	R[5]	R[4]	R[3]	R[2]	R[1]	R[0]	G[0]
R1+ / R1-	G[2]	G[1]	B[1]	B[0]	G[5]	G[4]	G[3]	G[2]	G[1]	B[1]
R2+ / R2-	B[3]	B[2]	ENAB	VD	HD	B[5]	B[4]	B[3]	B[2]	ENAB
R3+ / R3-	R[7]	R[6]	—	B[7]	B[6]	G[7]	G[6]	R[7]	R[6]	—

VESA Format 6bit

* (MSB : R[5],G[5],B[5])

	Previous cycle		Current cycle					Next cycle		
R0+ / R0-	R[1]	R[0]	G[0]	R[5]	R[4]	R[3]	R[2]	R[1]	R[0]	G[0]
R1+ / R1-	G[2]	G[1]	B[1]	B[0]	G[5]	G[4]	G[3]	G[2]	G[1]	B[1]
R2+ / R2-	B[3]	B[2]	ENAB	VD	HD	B[5]	B[4]	B[3]	B[2]	ENAB
R3+ / R3-	—	—	—	—	—	—	—	—	—	—

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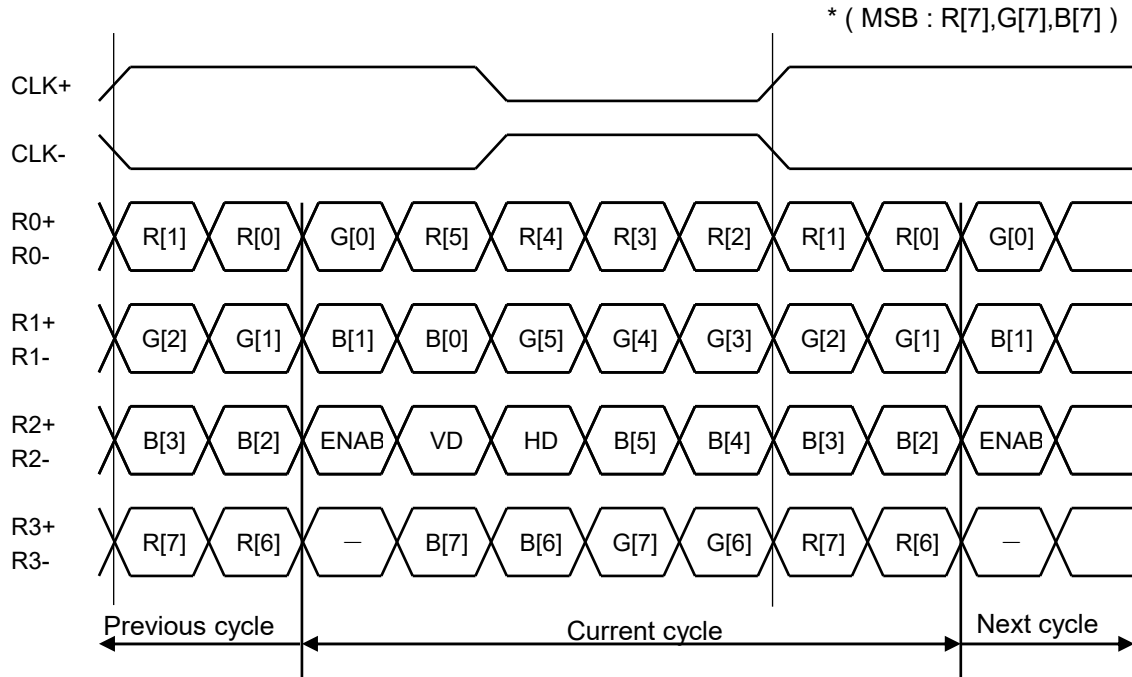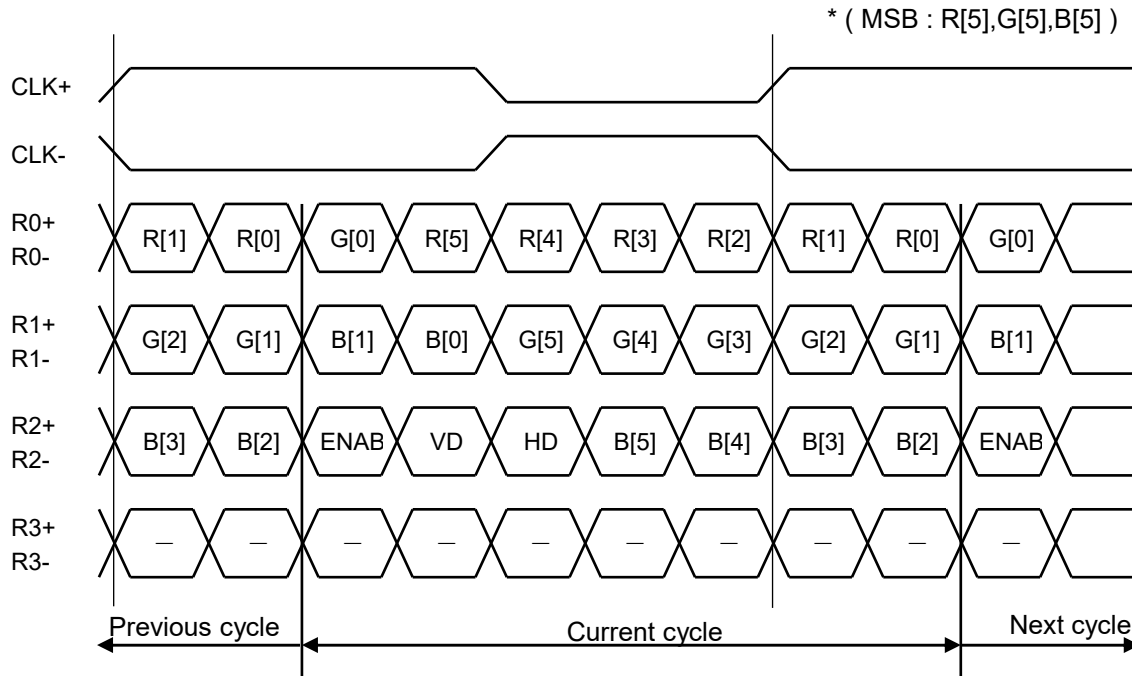
7.3 Input timing

Item	Symbol	Rating			Unit	Signal (*)
		MIN	TYP	MAX		
CLK frequency	fCLK	25.2	27.2	30.5	MHz	CLK
VD frequency	fVD	-	60	-	Hz	VD
1 vertical field	tv	490	528	552	H	
VD pulse width	tvp	1	2	66	H	
VD back porch	tvb	5	10	67	H	VD,HD,ENAB
VD front porch	tvf	5	38	67	H	R[7:0],G[7:0],B[7:0]
Vertical valid data	tvdp		480		H	
HD frequency	fHD	-	28.8	-	kHz	HD
1 horizontal field	th	856	860	920	CLK	
HD pulse width	thp	1	2	100	CLK	
HD back porch	thb	5	16	101	CLK	CLK,HD,ENAB
HD front porch	thf	19	44	115	CLK	R[7:0],G[7:0],B[7:0]
ENAB pulse width	tenp		800		CLK	
Horizontal valid data	thdp		800		CLK	

(*) Input terminals are (R0+/- , R1+/- , R2+/- , R3+/- , CLK+/-).

<Vertical timing>

<Horizontal timing>

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7.4 Power ON/OFF Sequence

VDD — 0.5ms ～ 20 ms

STBYB — > 20 ms，(≦5 frames)，≧0 ms

CLK+/CLK- — ≧0 ms，≧8 frames

R0+/R0-、R1+/R1-
R2+/R2-、R3+/R3-

ENAB

HD

VD — 1 2 3 4 5 6 7 ... 1 2 3 4 5 6 7 8

Display — Black disp | Normal disp ... Normal disp | Black disp

Auto Power on sequence

Back Light — OFF | ON | OFF
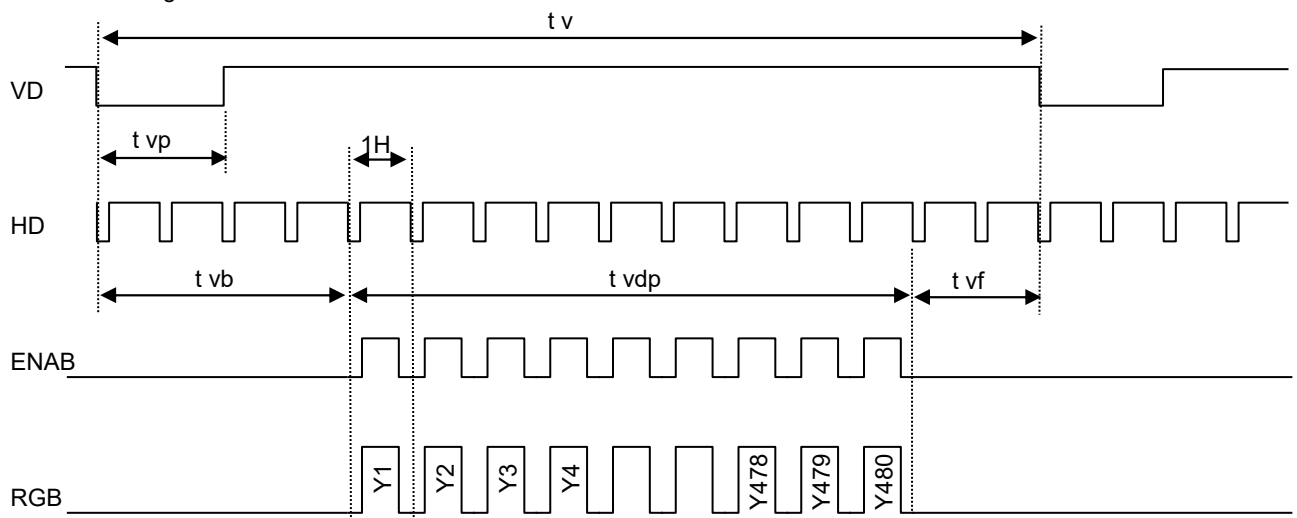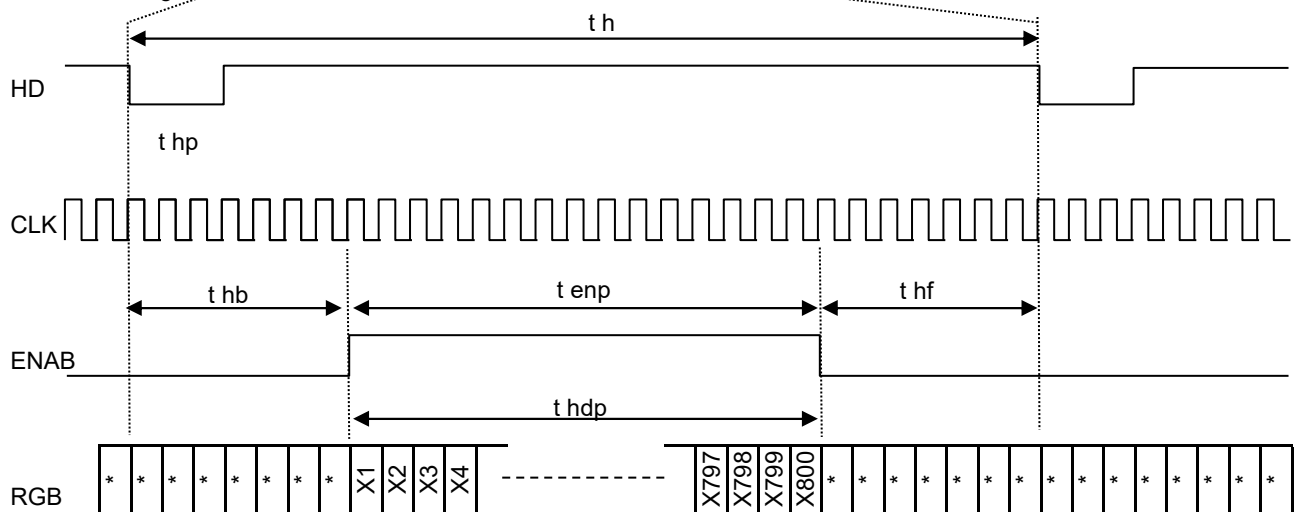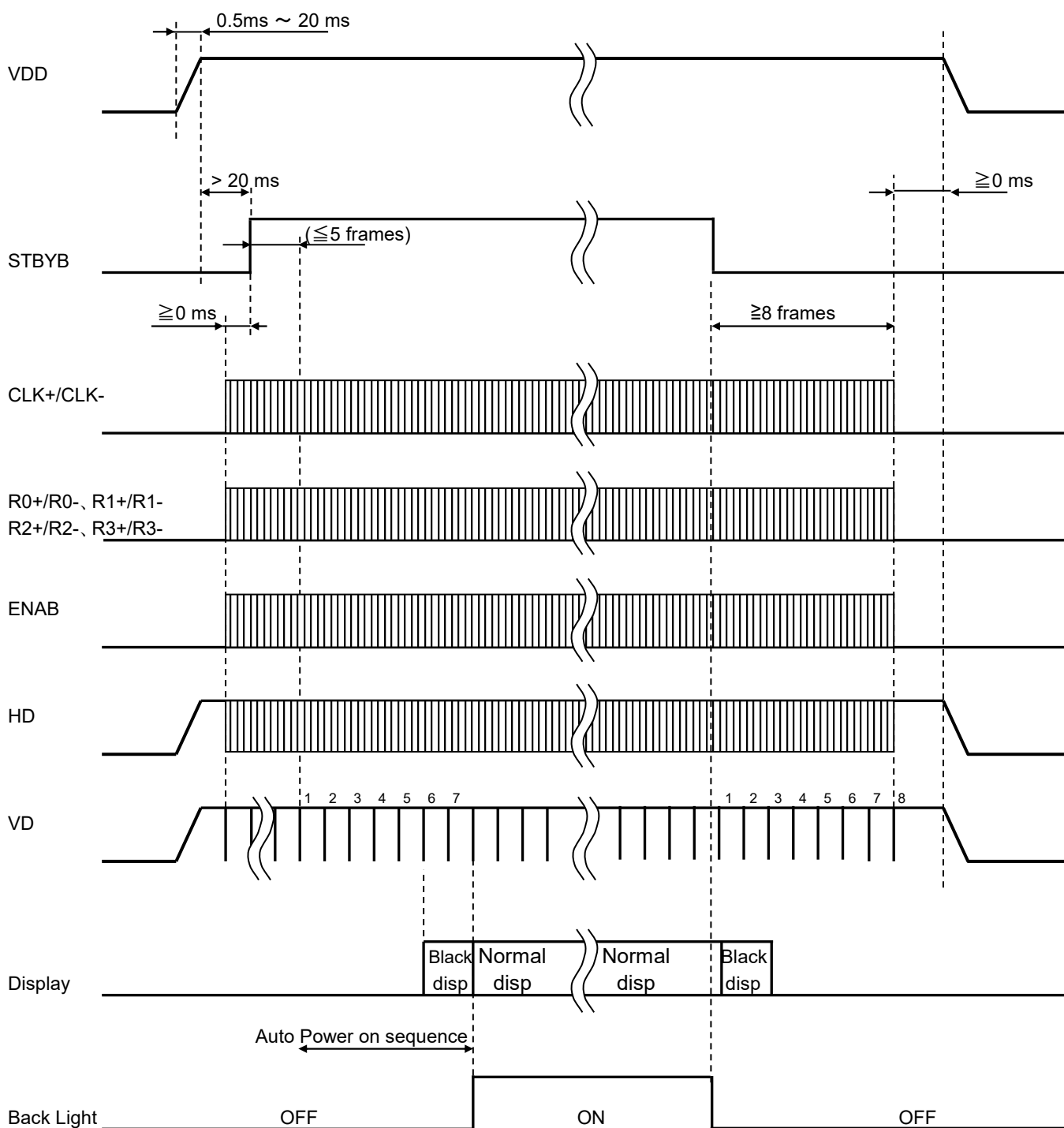
Note: ENAB, HD and VD are included in the R2 + / R2- terminals.

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8. LED Circuit

ESD Protection Device
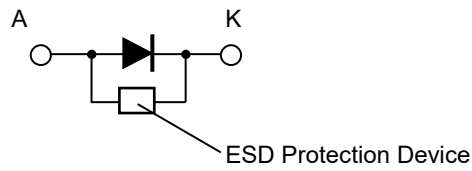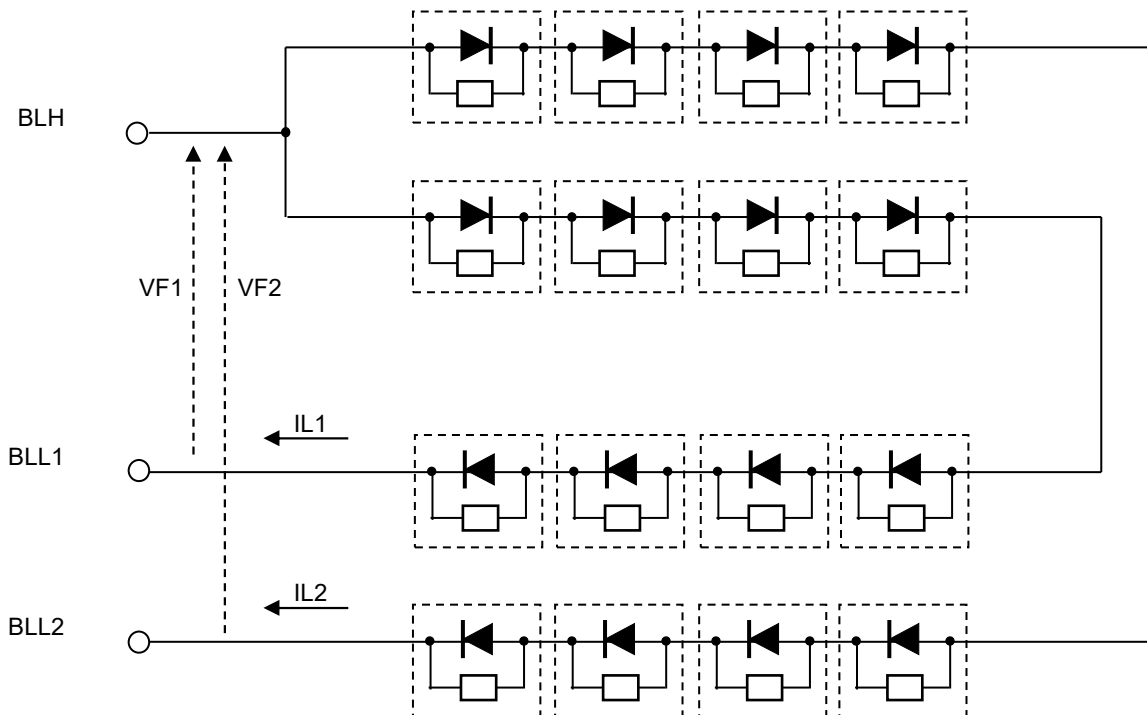
* It is recommended to control currents of BLL1 / BLL2 to equal current values (IL1 = IL2).

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9. Characteristics

9.1 Optical Characteristics

(Measurement Condition)
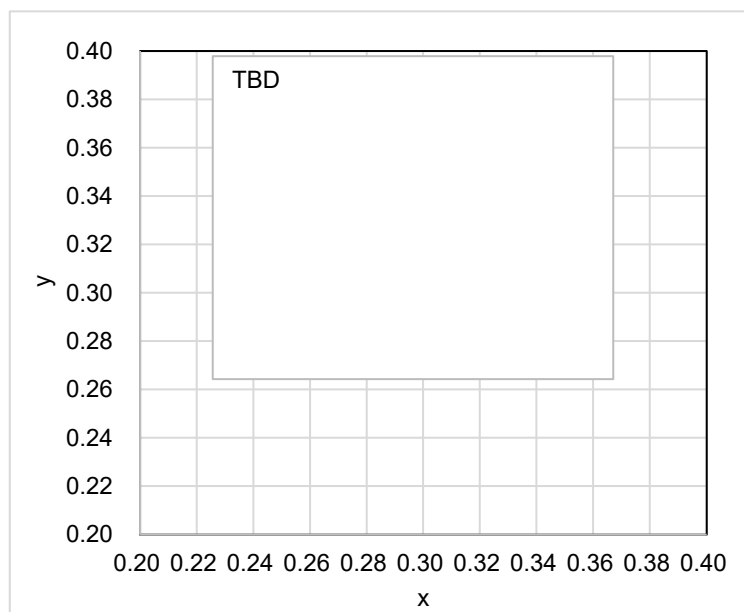Measuring instruments：CS2000 (KONICA MINOLTA), LCD7200 (OTSUKA ELECTRONICS), EZcontrastXL88 (ELDIM)
　　　　Driving condition：VDD=3.3V,GND=0V, Optimized VCOMDC
　　　　　　Backlight：IL1 = IL2 = (TBD) mA
　　Measured temperature：Ta = 25°C

	Item	Symbol	Condition	MIN	TYP	MAX	Unit	Note №	Remark
Response time	Rise time + Fall time	TON + TOFF	[Data]= 00h←→FFh	-	-	(TBD)	ms	1	
Contrast ratio	Backlight ON	CR	[Data]= FFh / 00h	(TBD)	(TBD)	-		2	
	Backlight OFF			-	(TBD)	-			
Viewing angle	Left	θL	[Data]= FFh / 00h CR ≧ (10)	(TBD)	-	-	deg	3	
	Right	θR		(TBD)	-	-	deg		
	Up	φU		(TBD)	-	-	deg		
	Down	φD		(TBD)	-	-	deg		
White Chromaticity		x	[Data]= FFh	White chromaticity range				4	
		y							
Center Brightness			[Data]= FFh	(TBD)	(TBD)	-	cd/㎡	5	
Brightness distribution			[Data]= FFh	(TBD)	-	-	%	6	
Burn-in				No noticeable burn-in image shall be observed after (2) hours of window pattern display.				7	

* Note number 1 to 7: Refer to the APPENDIX of "Reference Method for Measuring Optical Characteristics and Performance".

(White Chromaticity Range）

x	y
(TBD)	(TBD)
(TBD)	(TBD)
(TBD)	(TBD)
(TBD)	(TBD)
(TBD)	(TBD)
(TBD)	(TBD)
(TBD)	(TBD)
(TBD)	(TBD)

White Chromaticity Range

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9.2 Temperature Characteristics

(Measurement Condition)
  Measuring instruments： CS2000 (KONICA MINOLTA), LCD7200 (OTSUKA ELECTRONICS)
        Driving condition： VDD=3.3V,GND=0V, Optimized VCOMDC
          Backlight： IL1 = IL2 = (TBD) mA

Item		Symbol	Specification		Remark
			Ta = (-30) °C	Ta = (85) °C	
Response time	Rise time + Fall time	TON + TOFF	(TBD) msec or less	(TBD) msec or less	
Contrast ratio		CR	(TBD) or more	(TBD) or more	
Display Quality			No noticeable display defect or ununiformity should be observed.		

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10. Criteria of Judgment

10.1 Defective Display and Screen Quality

Test Condition: Observed TFT-LCD monitor from front during operation with the following conditions
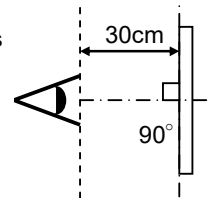Driving Signal: Raster Patter (RGB, white, black)
Signal condition: [Data]:00h, (TBD)h, FFh (3steps)
Observation distance: 30 cm
Illuminance: 200 to 350 lx
Backlight: IL1 = IL2 = (TBD) mA

30cm

90°

Defect item		Defect content		Criteria
Display Quality	Line defect	Black, white or color line, 3 or more neighboring defective dots		Not exists
	Dot defect	Uneven brightness on dot-by-dot base due to defective TFT or CF, or dust is counted as dot defect (brighter dot, darker dot) High bright dot: Visible through 2% ND filter at [Data]=00h Low bright dot: Visible through 5% ND filter at [Data]=00h Dark dot: Appear dark through white display at [Data]=(TBD)h		Refer to table 1
		Invisible through 5% ND filter at [Data]=00h		Acceptable
Screen Quality	Stain	Uneven brightness (white stain, black stain etc)		Invisible through 1% ND filter.
	Foreign particle	Point-like	TBD	TBD
		Liner	TBD	TBD
	Others			Use boundary sample for judgment when necessary

* φ (mm): Average diameter = (major axis + minor axis) / 2, W (mm): Width, L (mm): Length, N: Permissible number

Table1

Area	High bright dot	Low bright dot	Dark dot	Total	Criteria
A	0	2	2	3	Permissible distance between same color bright dots (includes neighboring dots): 3 mm or more
B	2	4	4	6	Permissible distance between same color high bright dots (includes neighboring dots): 5 mm or more
Total	2	4	4	7	

<Landscape model>

B zone
A zone
1
4
1
1 4 1
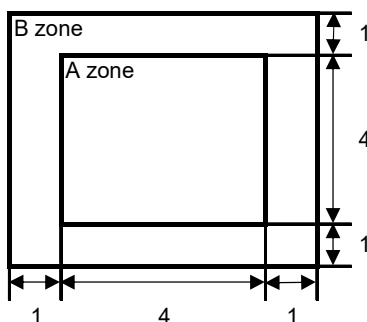
Division of A and B areas
B area: Active area
Dimensional ratio between A and B areas: 1: 4: 1
(Refer to the left figure)

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10.2 Screen and Other Appearance

Testing conditions
Observation distance： 30 cm
　　　　Illuminance： 1200 ～ 2000 lx

Item		Criteria	Remark
Polarizer	Flaw Stain Dirt Bubble Dust Dent	Ignore invisible defect when the backlight is on.	Applicable area: Active area only (Refer to the section 3.2 Outward Form)
S case		No functional defect occurs	
FPC		No functional defect occurs	

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⚠️A

11. Reliability Test

<table>
<tr><th colspan="2">Test item</th><th>Test condition</th><th>number of failures / number of examinations</th></tr>
<tr><td rowspan="9">Durability test</td><td>High temperature storage</td><td>Ta = 95°C   500hrs</td><td>TBD</td></tr>
<tr><td>Low temperature storage</td><td>Ta = -40°C   500hrs</td><td>TBD</td></tr>
<tr><td>High temperature & high humidity storage</td><td>Ta = 60°C, RH = 90%,   500hrs
non condensing   ※</td><td>TBD</td></tr>
<tr><td>High temperature operation</td><td>Tp = 85°C   500hrs</td><td>TBD</td></tr>
<tr><td>Low temperature operation</td><td>Tp = -30°C   500hrs</td><td>TBD</td></tr>
<tr><td>High temperature & high humidity operation</td><td>Tp = 40°C, RH = 90%,   500hrs
non condensing   ※</td><td>TBD</td></tr>
<tr><td>Thermal shock storage</td><td>-40°C ↔ 95°C (30min / 30min)   100cycles</td><td>TBD</td></tr>
<tr><td rowspan="8">Mechanical environmental test</td></tr>
<tr><td>Electrostatic discharge test (Non operation)</td><td>Confirms to EIAJ ED-4701/300, C=200pF,R=0Ω,V=±200V
Each 3 times of discharge on and power supply
and other terminals.</td><td>TBD</td></tr>
<tr><td>Surface discharge test (Non operation)</td><td>C=250pF, R=100Ω, V=(TBD)kV
Each 5 times of discharge in both polarities
on the center of screen with the case grounded.</td><td>TBD</td></tr>
<tr><td>FPC tension test (FPC of LCD only)</td><td>Pull the FPC with the force of 3N for 10 sec.
in the direction - 90-degree to its original direction.</td><td>TBD</td></tr>
<tr><td>FPC bend test (FPC of LCD only)</td><td>Pull the FPC with the force of 3N for 10 sec.
in the direction -180-degree to its original direction.
Reciprocate it 3 times.</td><td>TBD</td></tr>
<tr><td>Vibration test (Non operation)</td><td>Use TOPPAN original jig (see next page)
Vibration Acceleration : 66.64 m/s^2 (6.8 G)
Frequency : 20 ~ 500 Hz , Cycle : 10 min/sweep
Orientation : X,Y,Z-directions 10 hrs per direction (Total 30 hrs)</td><td>TBD</td></tr>
<tr><td>Impact test (Non operation)</td><td>Use TOPPAN original jig (see next page) and
make an impact with peak acceleration of 1000m/s^2 for 6 msec
with half sine-curve at 3 times to each X, Y, Z directions
in conformance with JIS C 60068-2-27-2011.</td><td>TBD</td></tr>
<tr><td rowspan="2">Packing test</td><td>Packing vibration-proof test</td><td>Acceleration of 19.6m/s^2 with frequency of 10→55→10Hz,
X,Y, Zdirection for each 30 minutes.</td><td>TBD</td></tr>
<tr><td>Packing drop test</td><td>Drop from 75cm high.
1 time to each 6 surfaces, 3 edges, 1 corner</td><td>TBD</td></tr>
</table>

Note:Ta=ambient temperature   Tp=Panel temperature

※ The profile of high temperature/humidity storage and High Temperature/humidity operation
(Pure water of over 10MΩ·cm shall be used.）
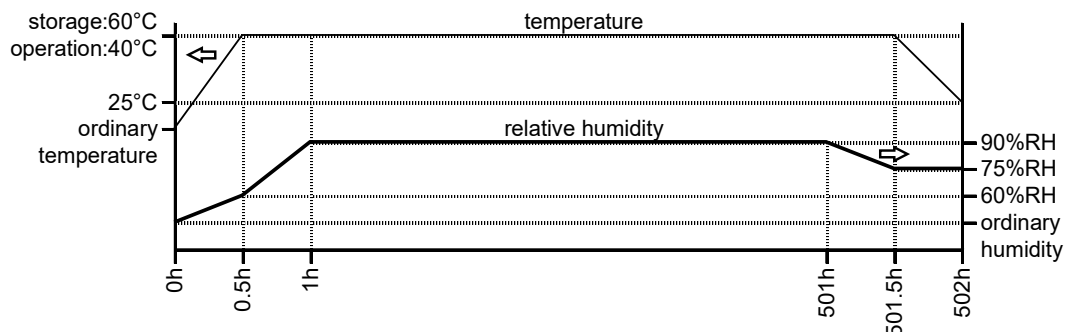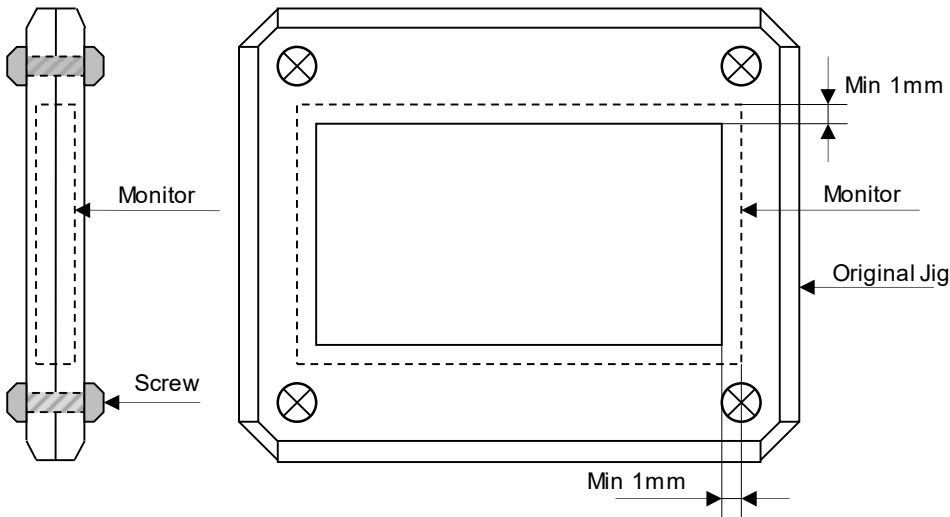

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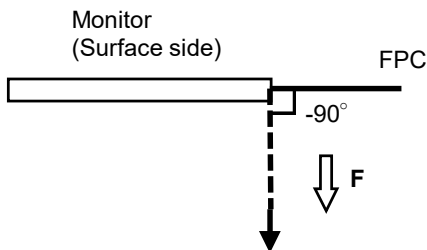
Table2. Reliability Criteria

The parameters should be measured after leaving the monitor at the ordinary temperature for 24 hours or more after the test completion.

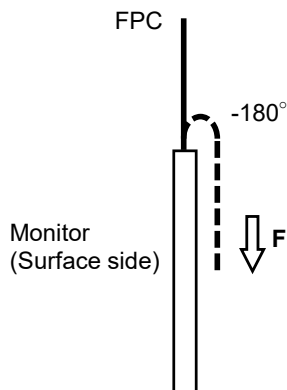| Item	Standard	Remark
Display quality	No visible abnormality shall be seen. (Except for unevenness by Pol deterioration.)	
Contrast ratio	(200) or more	Backlight ON

TOPPAN Original Jig

Monitor

Screw

Min 1mm

Monitor

Original Jig

Min 1mm

FPC tension test

Monitor
(Surface side)

FPC

-90°

F

FPC bend test

FPC

-180°

Monitor
(Surface side)

F

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12. Packing Specifications

TBD

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13. Handling Instruction

13.1 Cautions for Handling LCD panels

⚠ **Caution**

---

(1) Do not make an impact on the LCD panel glass because it may break and you may get injured from it.

(2) If the glass breaks, do not touch it with bare hands.
（Fragment of broken glass may stick you or you cut yourself on it.）

(3) If you get injured, receive adequate first aid and consult a medial doctor.

(4) Do not let liquid crystal get into your mouth.
（If the LCD panel glass breaks, try not let liquid crystal get into your mouth even toxic property
of liquid crystal has not been confirmed.）

(5) If liquid crystal adheres, rinse it out thoroughly.
（If liquid crystal adheres to your cloth or skin, wipe it off with rubbing alcohol or wash it thoroughly with soap.
If liquid crystal gets into eyes, rinse it with clean water for at least 15 minutes and consult an eye doctor.

(6) If you scrap this products, follow a disposal standard of industrial waste
that is legally valid in the community, country or territory where you reside.

(7) Do not connect or disconnect this product while its application products is powered on.

(8) Do not attempt to disassemble or modify this product as it is precision component.

(9) If a part of soldering part has been exposed, and avoid contact (short-circuit)
with a metallic part of the case etc. about FPC of this model, please.
Please insulate it with the insulating tape etc. if necessary.
The defective operation is caused, and there is a possibility to generation of heat and the ignition.

(10) Since excess current protection circuit is not built in this TFT module, there is the possibility that
LCD module or peripheral circuit become feverish and burned in case abnormal operation is generated.
We recommend you to add excess current protection circuit to power supply.

(11) The devices on the FPC are damageable to electrostatic discharge,
because the terminals of the devices are exposed.
Wear grounded wrist-straps and use electrostatic neutralization blowers to prevent static
charge and discharge when handling the TFT monitors.
Designate an appropriate operating area, and set equipment, tools, and machines properly
when handling this product.

Caution

⚠   **This mark is used to indicate a precaution or an instruction which,
if not correctly observed, may result in bodily injury, or material damages alone.**

13.2 Precautions for Handling

1) Wear finger tips at incoming inspection and for handling the TFT monitors to keep
display quality and keep the working area clean.
Do not touch the surface of the monitor as it is easily scratched.

2) Wear grounded wrist-straps and use electrostatic neutralization blowers to prevent static charge and discharge
when handling the TFT monitors as the LED in this TFT monitors is damageable to electrostatic discharge.
Designate an appropriate operating area, and set equipment, tools, and machines properly when handling this product.

3) Avoid strong mechanical shock including knocking, hitting or dropping to the TFT monitors for protecting their glass parts.
Do not use the TFT monitors that have been experienced dropping or strong mechanical shock.

4) Do not use or storage the TFT monitors at high temperature and high humidity environment.
Particularly, never use or storage the TFT monitors at a location where condensation builds up.

5) Avoid using and storing TFT monitors at a location where they are exposed to direct
sunlight or ultraviolet rays to prevent the LCD panels from deterioration by ultraviolet rays.

6) Do not stain or damage the contacts of the FPC cable .
FPC cable needs to be inserted until it can reach to the end of connector slot.
During insertion, make sure to keep the cable in a horizontal position to avoid an oblique insertion.
Otherwise, it may cause poor contact or deteriorate reliability of the FPC cable.

7) Do not bend or pull the FPC cable or carry the TFT monitor by holding the FPC cable.
Especially, it will cause mechanical damage or critical defect if FPC is pull up or bent up to short of display.

     Monitor(surface side)   ⇧ **DO NOT BEND UP**

                       FPC
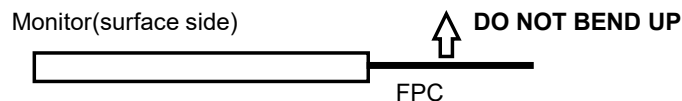
8) Peel off the protective film on the TFT monitors during mounting process.
Refer to the section 13.5 on how to peel off the protective film.
We are not responsible for electrostatic discharge failures or other defects occur when peeling off the protective film.

13.3 Precautions for Operation

1) Since this TFT monitors are not equipped with light shielding for the driver IC,
do not expose the driver IC to strong lights during operation as it may cause functional failures.

2) In case of powering up or powering off this LCD module,
be sure to comply the sequence as instructed in this specification.

3) Do not plug in or out the FPC cable while power supply is switch on.
Plug the FPC cable in and out while power supply is switched off.

4) Do not operate the TFT monitors in the strong magnetic field. It may break the TFT monitors.

5) Do not display a fixed image on the screen for a long time.
Use a screen-saver or other measures to avoid a fixed image displayed on the screen for a long time.
Otherwise, it may cause burn-in image on the screen due the characteristics of liquid crystal.

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13.4 Storage Condition for Shipping Cartons

(Storage environment)
- Temperature   0 to 40˚C
- Humidity   60%RH or less
  No-condensing occurs under low temperature with high humidity condition.
- Atmosphere   No poisonous gas that can erode electronic components and/or
  wiring materials should be detected.
- Time period   1 year
- Unpacking   To prevent damages caused by static electricity, anti-static precautionary measures
  (e.g. earthing, anti-static mat) should be implemented.
  After unpack, keep product in the appropriate condition,
  otherwise bubble seal of Protective film may be printed on Polarizer.
- Maximum piling up   (TBD) cartons

*Conditions to storage after unpacking

(Storage environment)
- Temperature   0 to 40˚C
- Humidity   60%RH or less
  No-condensing occurs under low temperature with high humidity condition.
- Atmosphere   No poisonous gas that can erode electronic components and/or
  wiring materials should be detected.
- Time period   1 year (Shelf life)
- Others   Keep/ store away from direct sunlight
  Storage goods on original tray made by TOPPAN.

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13.5 Precautions for Peeling off the Protective film

The followings work environment and work method are recommended to prevent the TFT monitors from
static damage or adhesion of dust when peeling off the protective films.

A) Work Environment
- a) Humidity: 50 to 70 %RH, Temperature15 to 27˚C
- b) Operators should wear conductive shoes, conductive clothes, conductive finger tips and grounded wrist-straps.
Use an electrostatic neutralization blower.
- c) Anti-static treatment should be implemented to work area's floor.
Use a room shielded against outside dust with sticky floor mat laid at the entrance to eliminate dirt.

TBD

13.6 Warranty

TOPPAN is only liable to defective goods which is stored and used under the condition complying
with this specifications and returned within 1 (one) year.
Warranty caused by manufacturing defect shall be conducted by replacement of goods or refundment at unit price.

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APPENDIX

Reference Method for Measuring Optical Characteristics and Performance

1. Measurement Condition

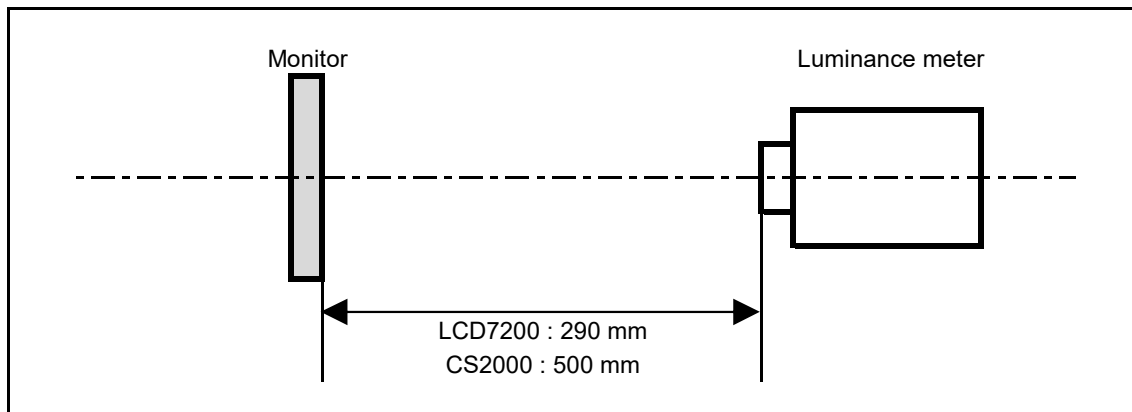Measuring instruments: CS2000（KONICA MINOLTA）, LCD7200(OTSUKA ELECTRONICS),EZcontrastXL88（ELDIM）
Driving condition: Refer to the section "Optical Characteristics"
Measured temperature: 25°C unless specified
Measurement system: See the chart below. The luminance meter is placed on the normal line of measurement system.
Measurement point: At the center of the screen unless otherwise specified
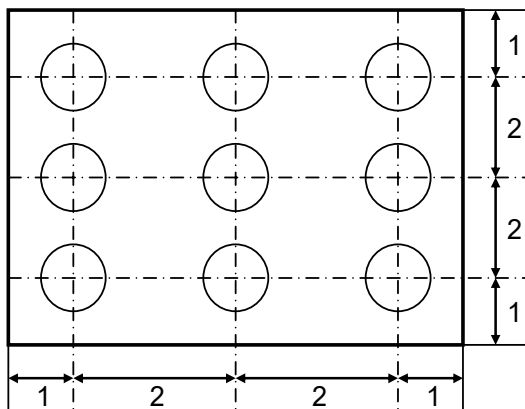
Dark box at constant temperature

Monitor

Luminance meter

LCD7200 : 290 mm
CS2000 : 500 mm

*Measurement is made after 30 minutes of lighting of the backlight.

Measurement point: At the center point of the screen
Brightness distribution: 9 points shown in the following drawing.

<Landscape model>

1
2
2
1

1   2   2   1

Dimensional ratio of active area

Backlight   IL1 = IL2 = (TBD) mA

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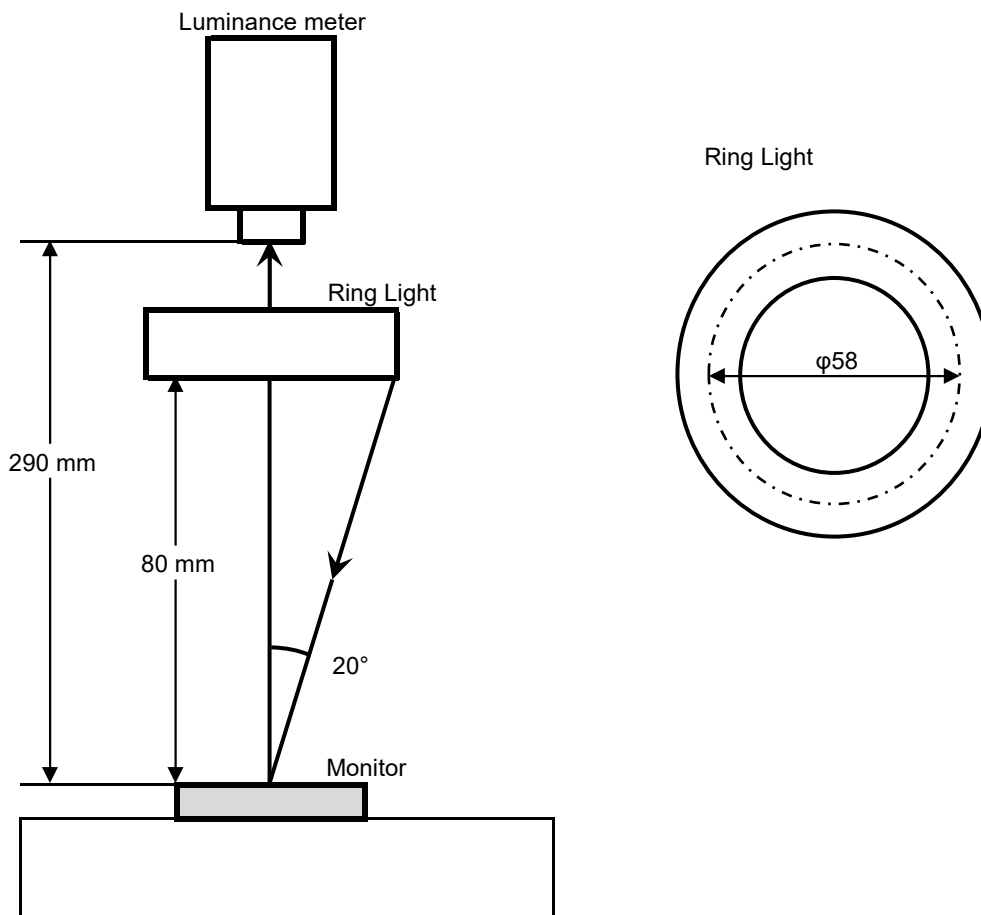| SPECIFICATIONS № 23TLM041	Issue:Feb.21,2024

Measurement Condition (Contrast ratio Backlight OFF only)

Measuring instruments: LCD7200(OTSUKA ELECTRONICS), Ring Light (40,000 lx, φ58)
Driving condition: Refer to the section "Optical Characteristics"
Measured temperature: 25°C unless specified
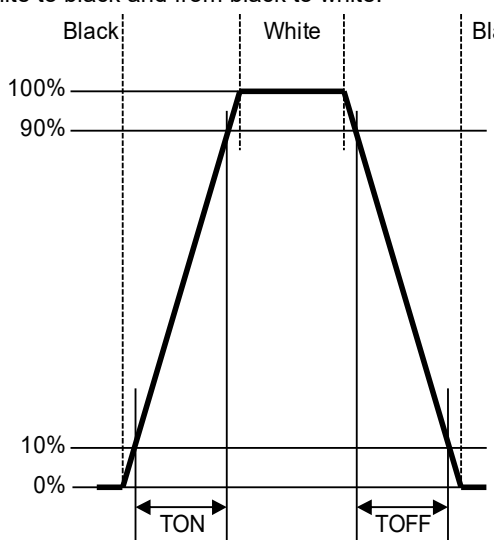Measurement system: See the chart below.
Measurement point: At the center of the screen unless otherwise specified

Luminance meter

Ring Light

Ring Light

φ58

290 mm

80 mm

20°

Monitor

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2. Test Method

Notice	Item	Test method	Measuring instrument	Remark

1	Response time	Measure output signal waveform by the luminance meter when raster of window pattern is changed from white to black and from black to white.
		
			LCD7200	Black display
				  [Data]=00h
				White display
				  [Data]=FFh
				TON
				  Rise time
				TOFF
				  Fall time

2	Contrast ratio	Measure maximum luminance Y1([Data]=FFh) and minimum luminance Y2([Data]=00h) at the center of the screen by displaying raster or window pattern. Then calculate the ratio between these two values.
		    Contrast ratio = Y1/Y2
		    Diameter of measuring point: 7.8mmφ(CS2000)
		    Diameter of measuring point: 3 mmφ(LCD7200)
			CS2000
			LCD7200
				Backlight ON
				Backlight OFF

3	Viewing angle Horizontalθ Verticalφ	Move the luminance meter from right to left and up and down and determine the angles where contrast ratio is (10).	EZcontrastXL88	

4	White chromaticity	Measure chromaticity coordinates x and y of CIE1931 colorimetric system at [Data] = FFh
		    Color matching function: 2°view
		    measurement angle: 1°
			CS2000	

5	Center brightness	Measure the brightness at the center of the screen.	CS2000	
6	Brightness distribution	(Brightness distribution) = 100 x B/A % A : max. brightness of the 9 points B : min. brightness of the 9 points	CS2000	
7	Burn-in	Visually check burn-in image on the screen after 2 hours of "window display" ([Data]=00h/FFh).		At optimized VCOMDC

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DATA MODUL

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