



DM-TFT121-410

**12.1" 1024 × 768 TFT LCD DISPLAY
PANEL - LVDS**

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1 Revision History

Date	Changes
2020-03-16	First release

2 Main Features

Item	Specification	Unit
Diagonal Size	12.1	inch
Base color	Normally black	-
Display Mode	Transmissive color dot matrix type TFT	-
Polarizer	Anti-Glare treatment	-
Resolution	1024 x 768	-
Interface	LVDS	-
Active Area	245.76 x 184.32	mm
Module Dimension	260.5 x 203.0 x 10.4	mm
Pixel Pitch	0.08 x 0.24	mm
Weight	555	g

3 Pin Description

3.1 Interface Signal

Pin No.	Symbol	Function Description
1	VDD	+3.3V power supply
2	VDD	+3.3V power supply
3	GND	GND
4	GND	GND
5	RxIN0-	LVDS receiver signal CH0(-)
6	RxIN0+	LVDS receiver signal CH0(+)
7	GND	GND
8	RxIN1-	LVDS receiver signal CH1(-)
9	RxIN1+	LVDS receiver signal CH1(+)
10	GND	GND
11	RxIN2-	LVDS receiver signal CH2(-)
12	RxIN2+	LVDS receiver signal CH2(+)
13	GND	GND
14	CK IN1-	LVDS receiver signal CK(-)
15	CK IN1+	LVDS receiver signal CK(+)
16	GND	GND
17	RxIN3-	LVDS receiver signal CH3(-)
18	RxIN3+	LVDS receiver signal CH3(+)
19	MODE	Bit data select signal(GND: 6bit mode、 High: 8bit mode)
20	SC	Scan direction control(GND: Normal、 High: Reverse)

LCD connector: 20186-020E-11F (I-PEX)

Matching connector: 20197-020U-F (I-PEX)

20197-T20U-F (I-PEX)

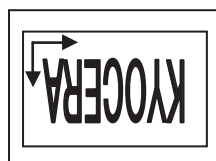
LVDS receiver: Embedded in ASIC

Matching LVDS transmitter: THC63LVDM83R(THine Electronics) or compatible

Scanning

SC : GND

SC : High



3.2 Backlight LED

Pin No.	Symbol	Function
1	VIN	+12V power supply
2	VIN	+12V power supply
3	BLBRT	PWM signal(Brightness adjustment)
4	BLEN	ON/OFF terminal voltage
5	GND	GND
6	GND	GND

LCD connector: SM06B-SHLS-G-TF(LF)(SN) (JST)

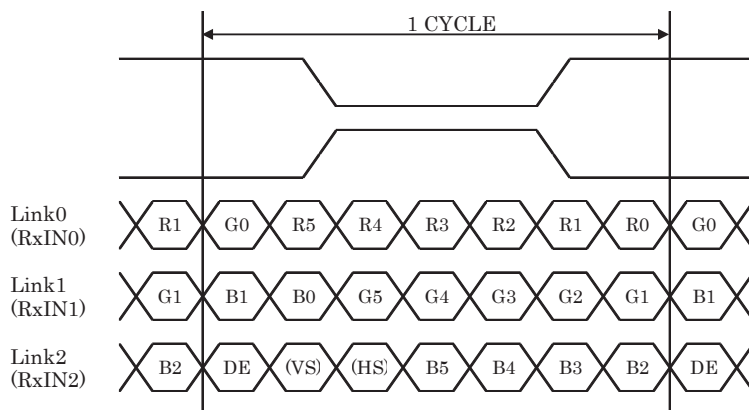
Matching connector : SHLP-6V-S-B (JST)

3.3 Data mapping(6 bit input)

Location of MODE (THC63LVDM83R(THine Electronics) or compatible)

Transmitter		MODE
Pin No.	Data	=L(GND)
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	(NA)

MODE=L(GND)



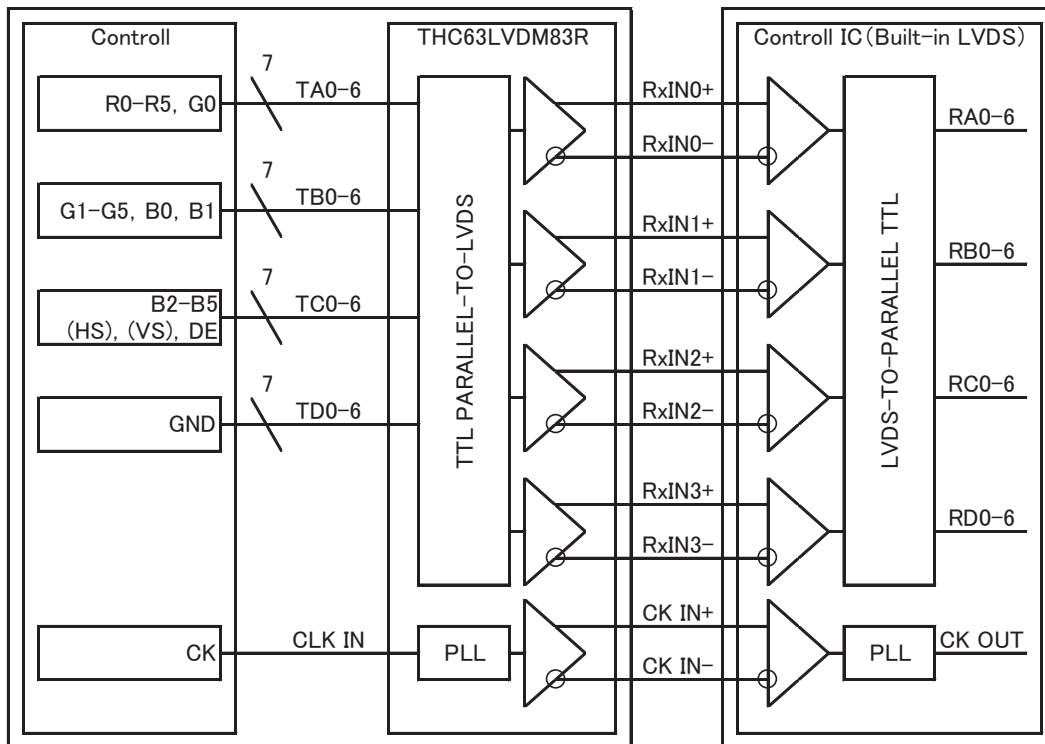
DE: DATA ENABLE

HS: H_{SYNC}

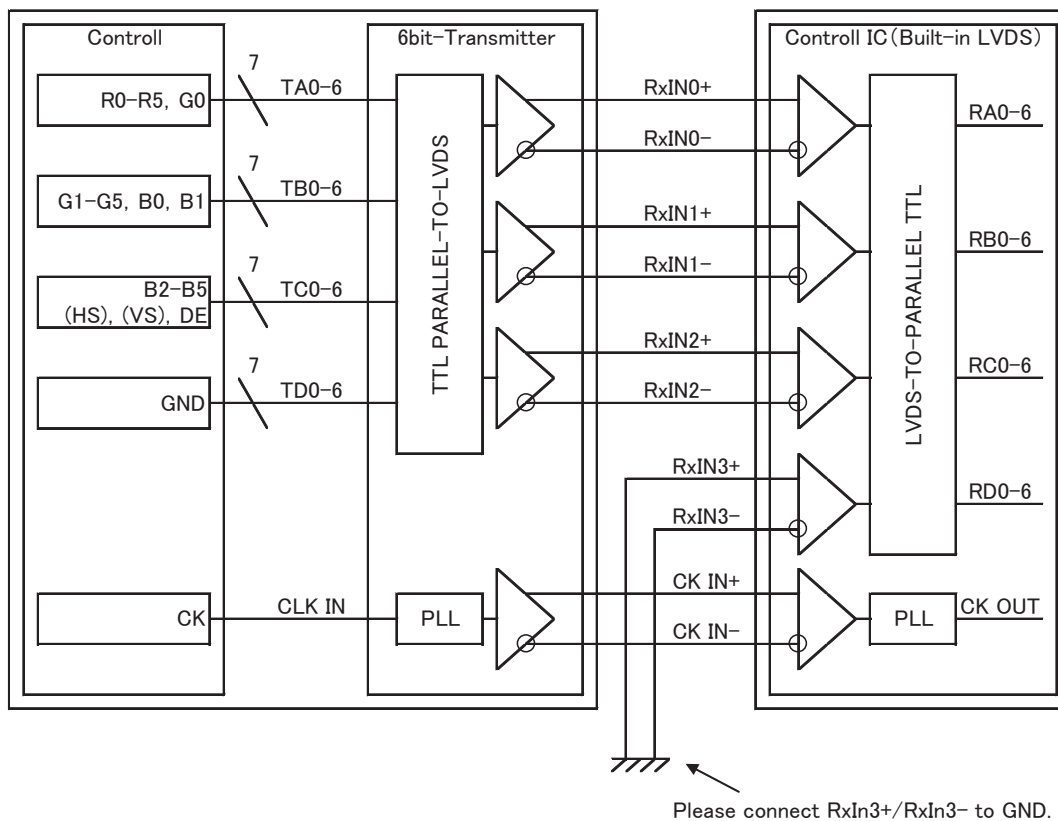
VS: V_{SYNC}

Block Diagram

MODE=L(GND)



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

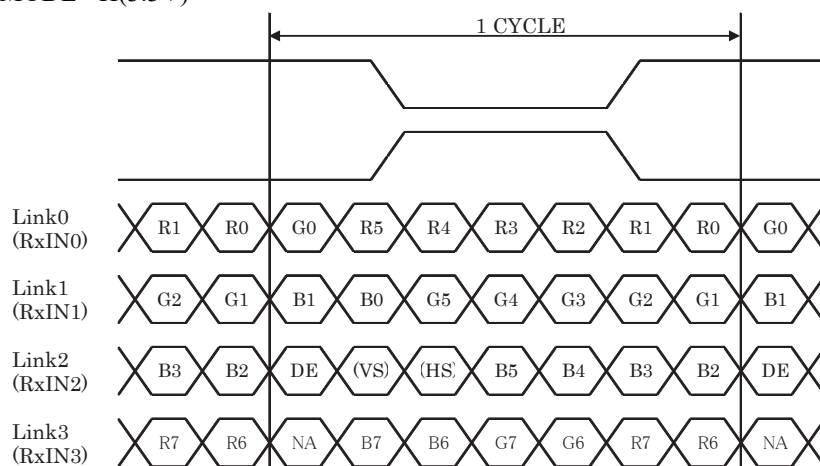


3.4 Data mapping(8 bit input)

Location of MODE (THC63LVDM83R(THine Electronics) or compatible)

Transmitter		MODE
Pin No.	Data	=H(3.3V)
51	TA0	R0(LSB)
52	TA1	R1
54	TA2	R2
55	TA3	R3
56	TA4	R4
3	TA5	R5
4	TA6	G0(LSB)
6	TB0	G1
7	TB1	G2
11	TB2	G3
12	TB3	G4
14	TB4	G5
15	TB5	B0(LSB)
19	TB6	B1
20	TC0	B2
22	TC1	B3
23	TC2	B4
24	TC3	B5
27	TC4	(HS)
28	TC5	(VS)
30	TC6	DE
50	TD0	R6
2	TD1	R7(MSB)
8	TD2	G6
10	TD3	G7(MSB)
16	TD4	B6
18	TD5	B7(MSB)
25	TD6	(NA)

MODE= H(3.3V)



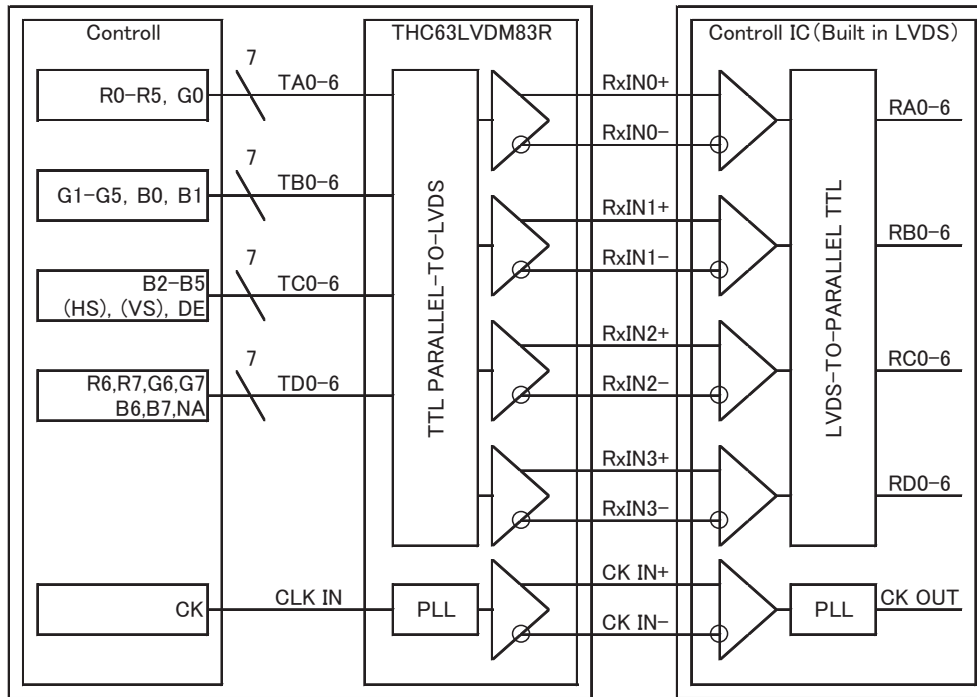
DE: DATA ENABLE

HS: H_{SYNC}

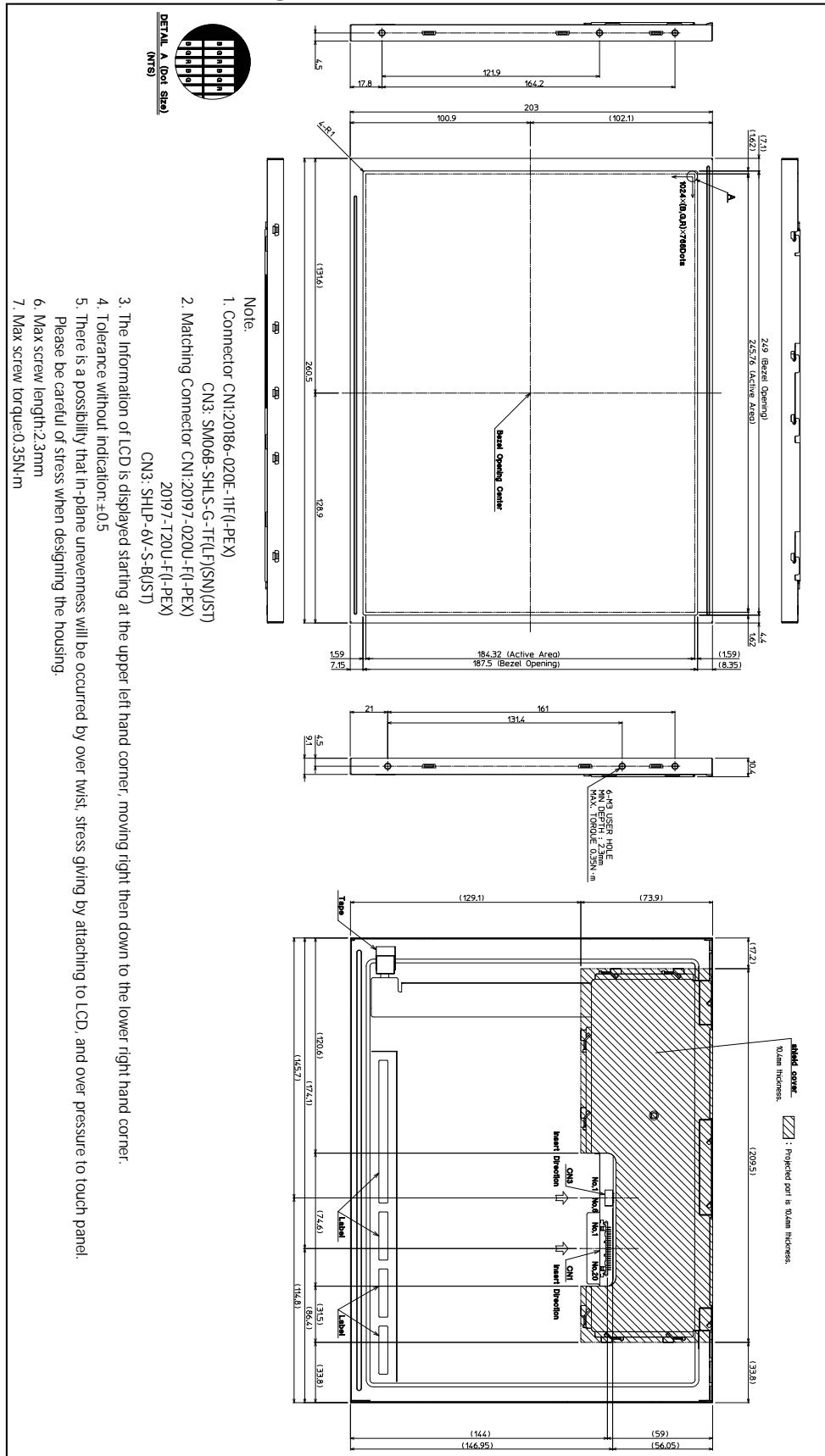
VS: V_{SYNC}

Block Diagram

MODE= H(3.3V)



4 Mechanical Drawing



5 Optics & Electrical Characteristics

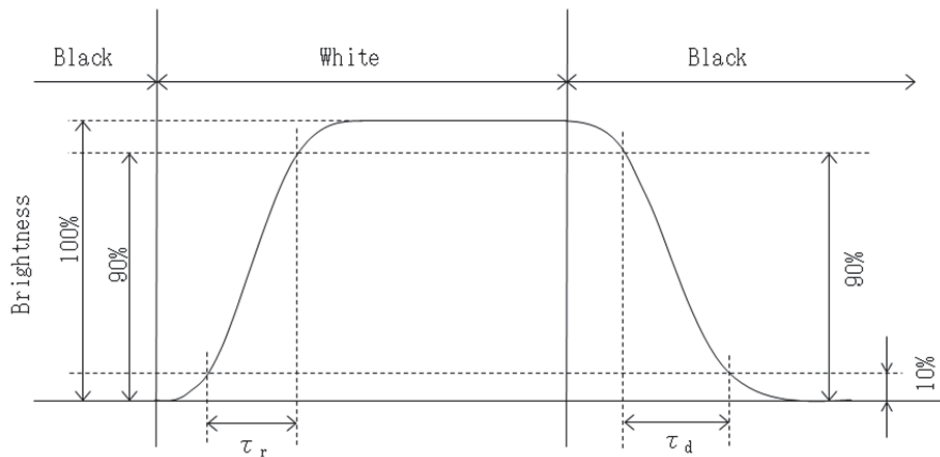
5.1 Optical Characteristics

Item	Symbol	Min	Typ	Max	Unit	Remark
View Angles	θ_{Upper}	-	85	-	$^{\circ}$	CR \geq 10
	θ_{Lower}	-	85	-	$^{\circ}$	
	ϕ_{Left}	-	85	-	$^{\circ}$	
	ϕ_{Right}	-	85	-	$^{\circ}$	
C.I.E. (White)	(x) (y)	0.270 0.295	0.320 0.345	0.370 0.395	-	$\theta=0^{\circ}$
C.I.E(Red)	(x) (y)	0.550 0.300	0.600 0.350	0.650 0.400	-	
C.I.E(Green)	(x) (y)	0.285 0.520	0.335 0.570	0.385 0.620	-	
C.I.E(Blue)	(x) (y)	0.100 0.070	0.150 0.120	0.200 0.170	-	
Response time Rise	τ_r	-	18	-	ms	
Response time Down	τ_d	-	12	-	ms	
Contrast Ratio	CR	500	750	-	-	
Pixel Luminance	L	840	1200	-	cd/m ²	

Definition of contrast ratio

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

Definition of response time



5.2 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Remark	
Supply voltage(+3.3V)	V _{DD}	-0.3	3.95	V		
Supply voltage(+12V)	V _{IN}	-0.3	14.0	V		
Input Signal Voltage	RxINi+, RxINi- (i=0,1,2,3)	V _{I1}	-0.3	V _{DD} +0.3	V	Note 1
	CK IN+, CK IN-	V _{I2}	-0.3	V _{DD} +0.3	V	
	MODE, SC	V _{I3}	-0.3	V _{DD} +0.3	V	
	BLBRT, BLEN	V _{I4}	-0.3	V _{IN}	V	
Operating Temperature (Ambient)	T _{OP} (Ambient)	-30	80	°C	Note 2	
Operating Temperature (Panel)	T _{OP} (Panel)	-30	80	°C	Note 3	
Storage Temperature	T _{STO}	-30	80	°C	Note 4	
Operating humidity	H _{OP}	10	Note 6	%RH	Note 5	
Storage humidity	H _{STO}	10	Note 6	-	Note 5	
Vibration	-	Note 7	Note 7	-	-	
Shock	-	Note 8	Note 8	-	-	

Note 1: V_{DD} must be supplied correctly within the range described in 5.3.

Note 2: Operating temperature means a temperature which operation shall be guaranteed. Since display performance is evaluated at 25°C, another temperature range should be confirmed.

Note 3: Panel surface temperature (all the surface).

Temp. = -30°C<48h , Temp. = 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.)

Note 4: Non-condensing

Note 5: Temp.≤40°C, 85%RH Max.

Note 6: Temp.>40°C, Absolute humidity shall be less than 85%RH at 40°C.

Note 7:

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

2 hours in each direction X, Y, Z (6 hours total)

EIAJ ED-2531

Note 8:

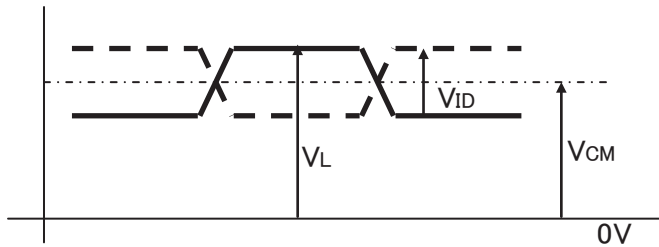
Acceleration: 490 m/s², Pulse width: 11 ms

3 times in each direction: ±X, ±Y, ±Z

EIAJ ED-2531

Note 3: Input signal : MODE, SC

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



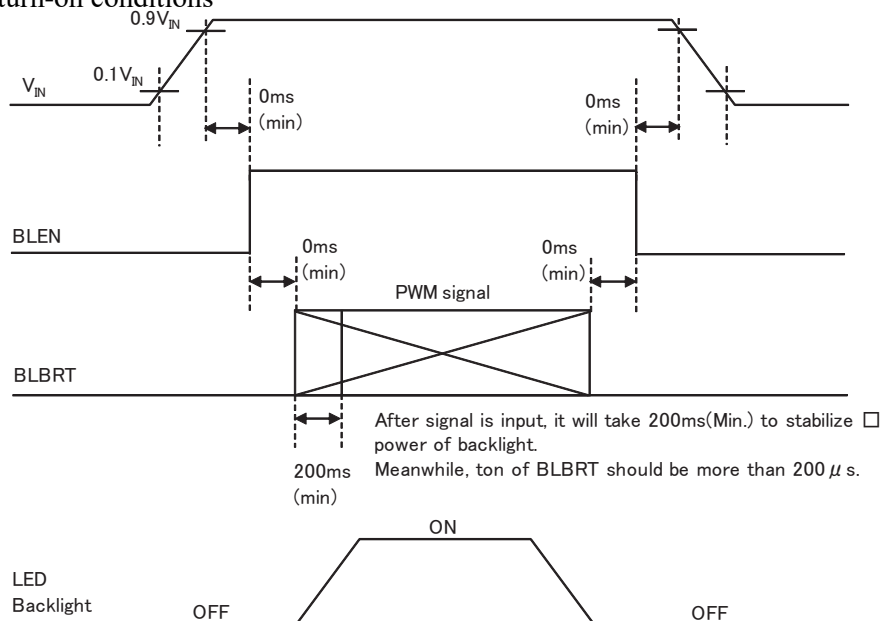
Note 5: V_{CM} : LVDS Common mode voltage ($V_{CM}=1.25V$)

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

5.4 LED Backlight Characteristics

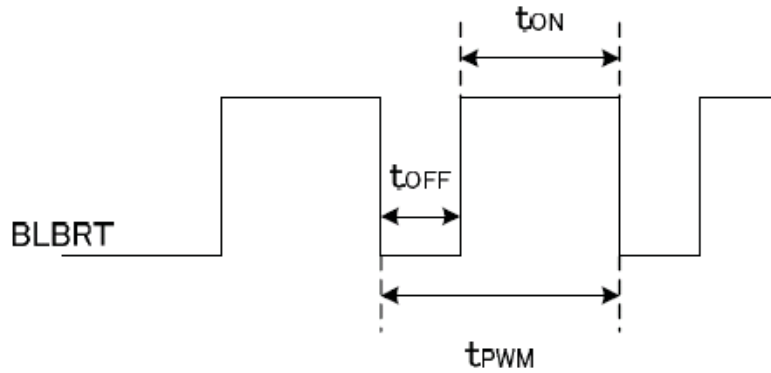
Parameter	Symbol	Min	Typ	Max	Unit	Remark
Supply voltage	V_{IN}	10.8	12.0	13.2	V	
Current consumption	I_{IN}	-	900	1110	mA	
Permissible input ripple voltage	V_{RP_BL}	-	-	100	mVp-p	$V_{IN}=12.0V$
BLBRT Input signal voltage	V_{IL_BLBRT}	0	-	0.8	V	"Low" level
	V_{IH_BLBRT}	2.3	-	V_{IN}	V	"High" level
BLBRT Input pull-down resistance	R_{IN_BLBRT}	100	300	500	k Ω	-
BLEN Input signal voltage	V_{IL_BLEN}	0	-	0.8	V	"Low" level
	V_{IH_BLEN}	2.3	-	V_{IN}	V	"High" level
BLEN Input pull-down resistance	R_{IN_BLEN}	100	300	500	k Ω	-
PWM Frequency	f_{PWM}	200	-	10k	Hz	-
PWM Duty ratio	D_{PWM}	1	-	100	%	$f_{PWM}=200Hz$
		10	-	100	%	$f_{PWM}=2kHz$
		50	-	100	%	$f_{PWM}=10kHz$
Operating life time	T	-	70,000	-	h	Temp=25°C

Note 1: V_{IN} -turn-on conditions



Note 2: $V_{IN} = 12V$, Temp. = $25^{\circ}C$, $D_{PWM} = 100\%$

Note 3: PWN Timing Diagram



$t_{ON}, t_{OFF} \geq 50 \mu s$.

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

Note 4: When brightness decrease 50% of minimum brightness.

The average life of a LED will decrease when the LCD is operating at higher temperatures.

Note 5: Life time is estimated data.(Condition : $I_F=(75)mA$, $T_a=25^{\circ}C$ in chamber).

6 Input timing characteristics

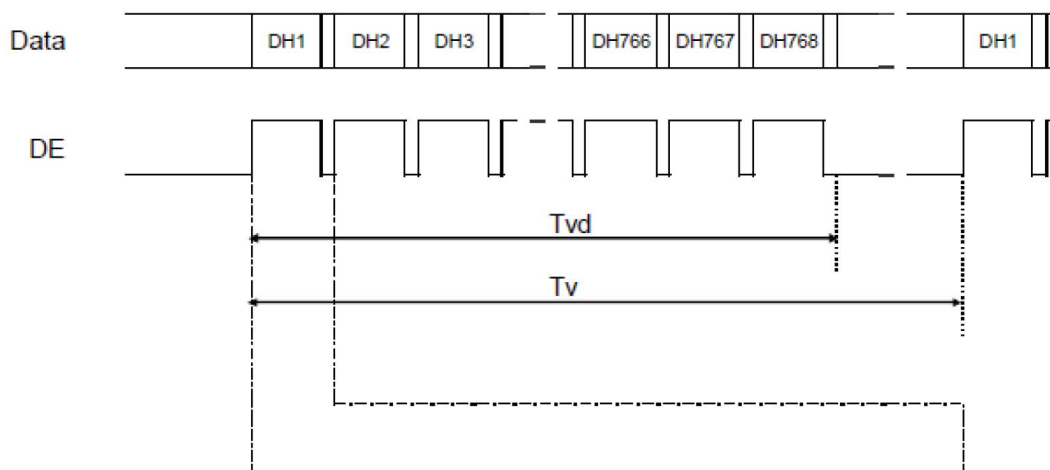
6.1 Timing characteristics

Item	Symbol	Min	Typ	Max	Unit	Remark	
Clock (CK)	Frequency	52	65	71	MHz		
Enable signal (DE)	Horizontal Period	Th	1,114	1,344	1,400	Dot	Note 1
			15.7	20.7	23.7	μ s	
	Horizontal display period	Thd	1,024			Tc	
	Vertical Period	Tv	778	806	845	Line	
	Vertical display period	Tvd	768			Th	
Refresh rate	fv	50	60	82	Hz	Note 2	

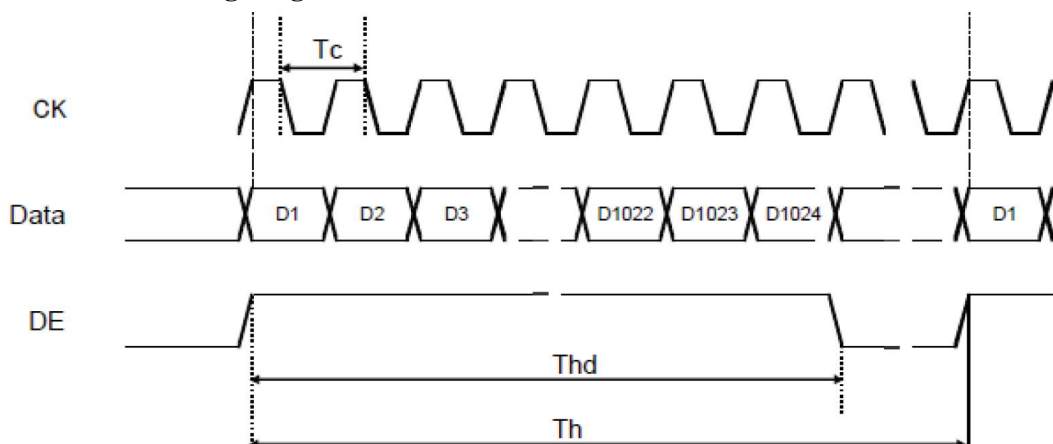
Please set a clock frequency, a vertical dormant period, and the horizontal dormant period so that the Horizontal Period should not reach less than Min. value.

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

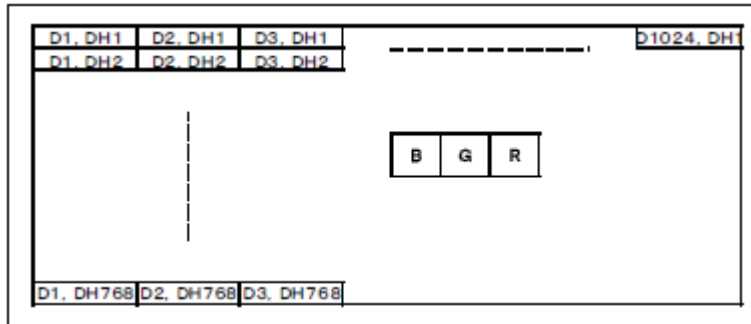
Vertical Timing Diagram



Horizontal Timing Diagram



6.2 Input Data Signals and Display position on the screen



7 Reliability

Test Item	Content of Test	Test Condition	Note
High Temperature Storage	Endurance test applying the high storage temperature for a long time.	80°C 240hrs	2
Low Temperature Storage	Endurance test applying the high storage temperature for a long time.	-30°C 240hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	80°C 240hrs	-
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-30 °C 240hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C,90%RH max, for 96hrs under no-load condition excluding the polarizer. Then taking it out and drying it at normal temperature.	40°C,90%RH 240hrs	1,2
Thermal Shock Resistance	The sample should be allowed stand the following 10 cycles of operation	-30°C/80°C 10 cycles	-

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal. Temperature and humidity after remove from the rest chamber.

8 Warranty and Conditions

<http://www.displaymodule.com/pages/faq> HYPERLINK

"http://www.displaymodule.com/pages/faq"