SPECIFICATION

FOR

DOUBLE LIN TFT- LCD MODULE

Module: 12.1” Color TFT-LCD

Model Name: KEG121GHTN-L01

Approved	Checked	Prepared
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Content

1 Handling Precautions

1) Since front polarizer is easily damaged, pay attention not to scratch it.
2) Be sure to turn off power supply when inserting or disconnecting from input connector.
3) Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
4) When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
5) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface.
6) Since CMOS LSI is used in this module, take care of static electricity and insure human earth when handling.
7) Do not open or modify the Module Assembly.
8) Do not press the reflector sheet at the back of the module to any directions.
9) In case if a Module has to be put back into the packing containerslot after once it was taken out from the container, do not press the center of LED light bar edge. Instead, press at the far ends of the LED light bar edge softly. Otherwise the TFT Module may be damaged.
10) At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.
11) After installation of the TFT Module into an enclosure, do not twist nor bend the TFT Module even momentary. At designing the enclosure, it should betaken into consideration that no bending/twisting forces are applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.
12) Small amount of materials having no flammability grade is used in the LCD module. The LCD module should be supplied by power complied with requirements of Limited Power Source (IEC60950 or UL1950), or be applied exemption.
13) Avoid touching COF position while doing mechanical design.
14) While storing modules as spares for a long time, the following precautions are necessary:
    > Store modules in adark place. Do not expose them to sunlight or fluorescent light.
    > Keep the temperature between 5°C and 35°C at normal humidity.

2 General Description

This specification applies to the 12.1 inch wide Color TFT/LCD Module KEG121GHTN-L01

The screen format is intended to support the 1280×RGB×800dots panel and 262k colors (RGB 6-bits data driver). All input signals are LVDS interface compatible.

The LED driver circuit is not integrated into the module.**2.**

1 Display Characteristics

The following items are characteristics summary on the table under 25°C condition:

Parameter	Unit	SPECIFICATIONS
Active Area	[mm]	12.1
Pixels H x V	pixels	261.12(W)×163.2(H) mm
Pixel Pitch	[mm]	1280（H)×800（V)
Pixels Arrangement	-	R.G.B. Vertical Stripe
Display Mode	-	Normally White
White Luminance (Center)	[cd/m2]	400 cd/m2 (Typ.)
Viewing Angle	[degree]	80/80/65/80 (Typ.)(CR≥10)
Response Time	[msec]	30 (Typ.)(Tr+Td)
Outline Dimension	[mm]	278.0（W)×184.0（H)×8.6(D)
Contrast Ratio	-	30 (Typ.)
Surface Treatment	-	Antiglare, Hard coating (3H)
Support Color	-	262K/16.2M 70% NTSC
Interface Type	-	LVDS (1 ch, 6/8-bit) , 20 pins Connector
Temperature Range Operating Storage (Shipping)	[℃] [℃]	-30 ~ 80 °C -30 ~ 80 °C
Weight		

2.2 Absolute Maximum Rating

Absolute maximum ratings of the module is as following:

Parameter	Symbol	Condition	Pin	Ratings	Unit	Remark
Supply voltage	Vcc	Ta=25℃	VCC	-0.3 ～+4.0	V	【*1,2】
	VDD	Ta=25℃	VDD	-0.3 ～+15.0	V	【*1,2】
Input voltage	V I1	Ta=25℃	RxINi-/+ CK IN-/+	-0.3～Vcc+0.3	V	=0,1,2,3
	V I2	Ta=25℃	RL/UD,SELLVDS	-0.3～Vcc+0.3	V	
	V I4	Ta=25℃	XSTABY, VBR	-0.3～+VDD	V	
Storage temperature	TSTG	-	-	-30 ～+80	℃	【*1】
Operating temperature	TOPA	-	-	-30 ～+80	℃	【*1,3,4】

【*1】 Humidity：95%RH Max.(Ta≦40℃) Note static electricity.

Maximum wet-bulb temperature at 39℃ or less. (Ta>40℃) No condensation.

【*2】 The Vcc power supply capacity must use the one of 2A or more.

The Vcc power supply capacity musTOPA：-20℃~70℃ ? -30℃~80℃

【*3】There is a possibility of causing det TSTG：-30℃~70℃ => -30℃~80℃

the display fineness though the liquid crystal module doesn't arrive at destruction when using it at 65 80℃ or -30 0℃.

There is a possibility of causing the fineness deterioration by the prolonged use in the (high temperature) humidity environment (60% or more).

【*4】 In the operating temperature item, the low temperature side is the ambient temperature regulations.

The high temperature side is the panel surface temperature regulations.

3 Optical Characteristics

Ta=+25℃, Vcc=＋3.3V

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle range	Horizontal	θ21,θ22	CR>10	70	80	-	Deg.	【*1,2,4】
	Vertical	θ11		45	65	-	Deg.	
		θ12		70	80	-	Deg.	
Contrast ratio		CR	optimized angle	450	800	-		【*2,4】
Response Time	White Black	τr +τd	θ=0°	-	30	-	ms	【*3,4】
Chromaticity of White		Wx		0.260	0.310	0.360		【*4】
		Wy		0.285	0.335	0.385		
Chromaticity of Red		Rx		-	0.630	-		
		Ry		-	0.345	-		
Chromaticity of Green		Gx		-	0.315	-		
		Gy		~70℃ ⇒ -	0.630	-		
Chromaticity of Blue		Bx		~70℃ => -	0.150	-		
		By		-	0.075	-		
Luminance of white		Y_{L1}		320	400	-	cd/m^2	【*4】
White Uniformity				-	-	1.33		【*5】

※The measurement shall be executed 30 minutes after lighting at rating.

The optical characteristics shall be measured in a dark room or equivalent state with the method shown in Fig.2 below.

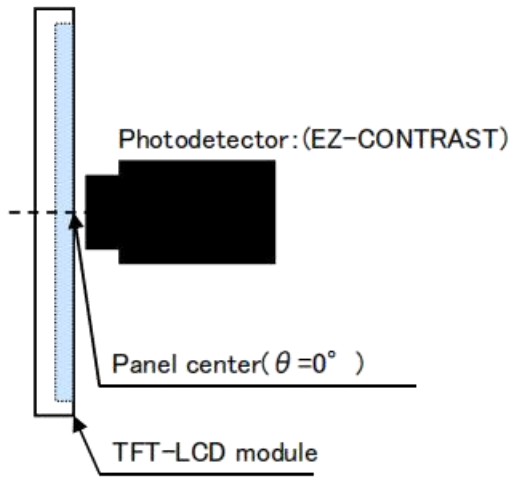


fig.2-1 Measuring method of Viewing angle range.

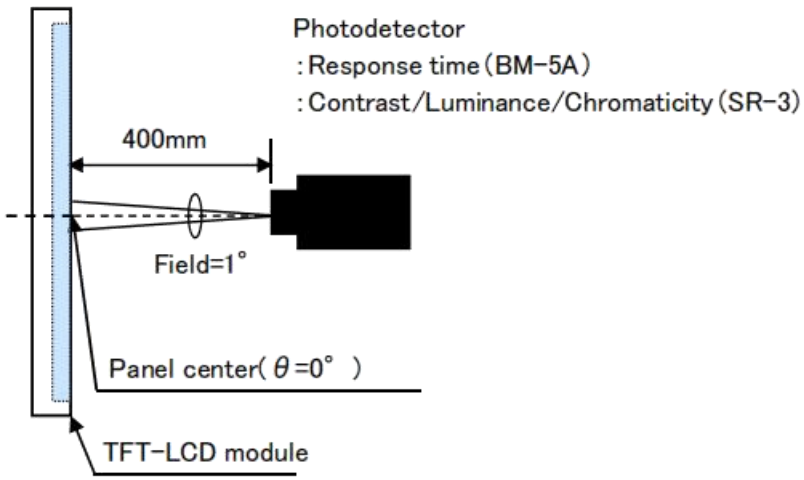
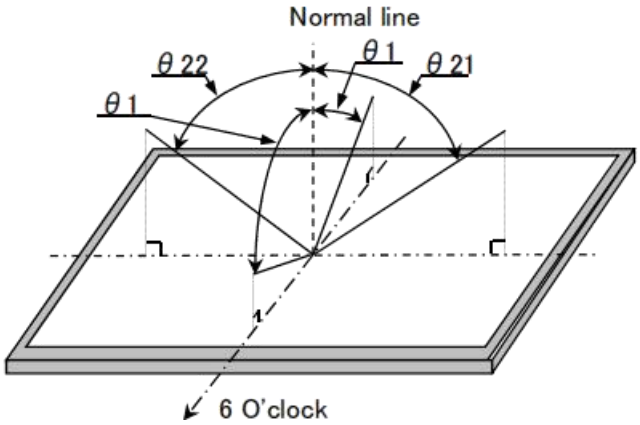


fig.2-2 Measuring method of contrast, luminance, response time, and Chromaticity.

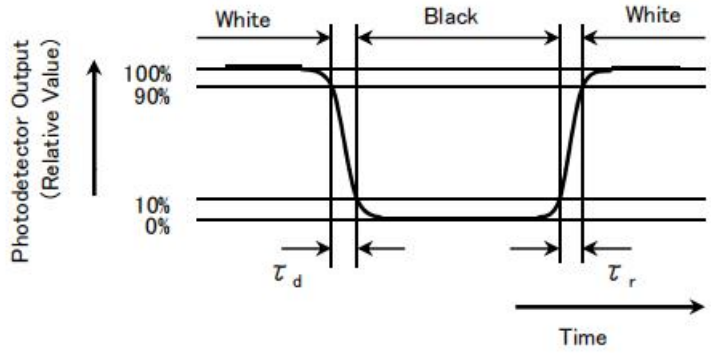
Fig.2 Optical characteristics measurement method

【*1】Definitions of viewing angle range:

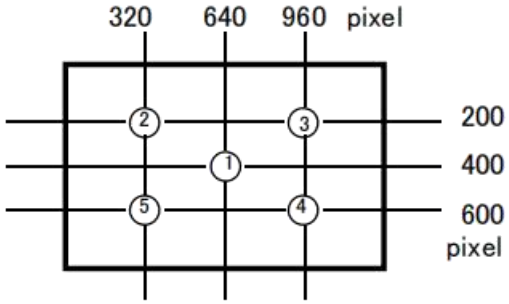


【*2】Definition of response time:

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".



【*4】This shall be measured at center of the screen.



【*5】Definition of white uniformity:

White uniformity is defined as the following with five measurements. (①～⑤)

$$\delta_w = \frac{\text{Maximum luminance of 5 points(①～⑤).}}{\text{Minimum luminance of 5 points(①～⑤).}}$$

4 Input Terminals

4.1 TFT-LCD panel driving

CN1（Interface signals and +3.3V power supply）

CN1

Pin	Symbol	Function	Remark
1	**VCC**	+3.3V Power supply	
2	VCC	+3.3V Power supply	
3	GND	GND	
4	GND	GND	
5	RxIN0-	LVDS receiver signal CH0(-)	LVDS
6	RxIN0+	LVDS receiver signal CH0(+)	LVDS
7	GND	GND	
8	RxIN1-	LVDS receiver signal CH1(-)	LVDS
9	RxIN1+	LVDS receiver signal CH1(+)	LVDS
10	GND	GND	
11	RxIN2-	LVDS receiver signal CH2(-)	LVDS
12	RxIN2+	LVDS receiver signal CH2(+)	LVDS
13	GND	GND	
14	CK IN-	LVDS receiver signal CK(-)	LVDS
15	CK IN+	LVDS receiver signal CK(+)	LVDS
16	GND	GND	
17	RxIN3-	LVDS receiver signal CH3(-)	LVDS
18	RxIN3+	LVDS receiver signal CH3(+)	LVDS
19	RL/UD	Horizontal/Vertical display mode select signal	**【*1】**
20	SELLVDS	LVDS SET	**【*2】**

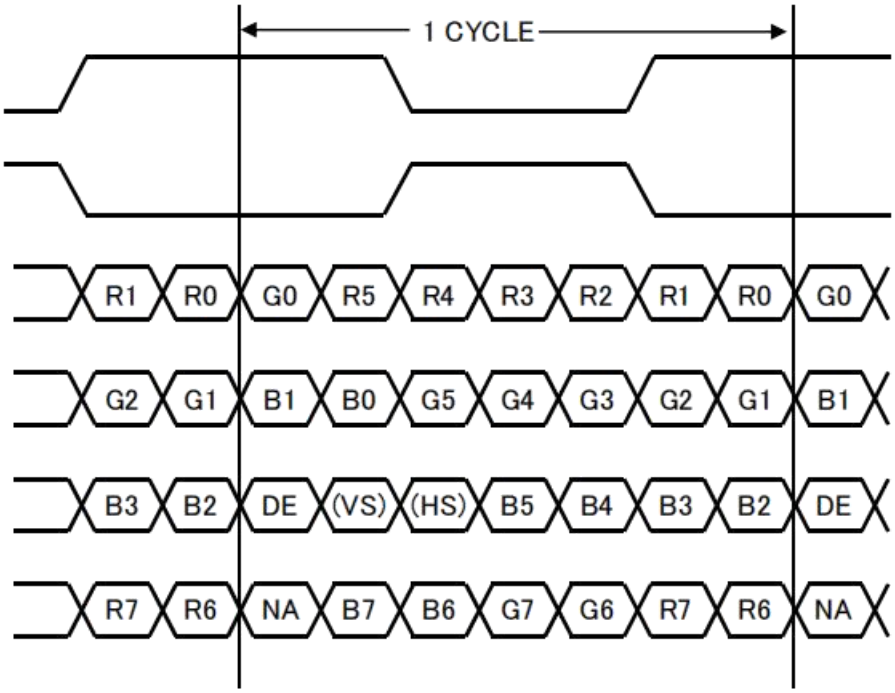
4.2 Data Mapping

1) 8 bit input

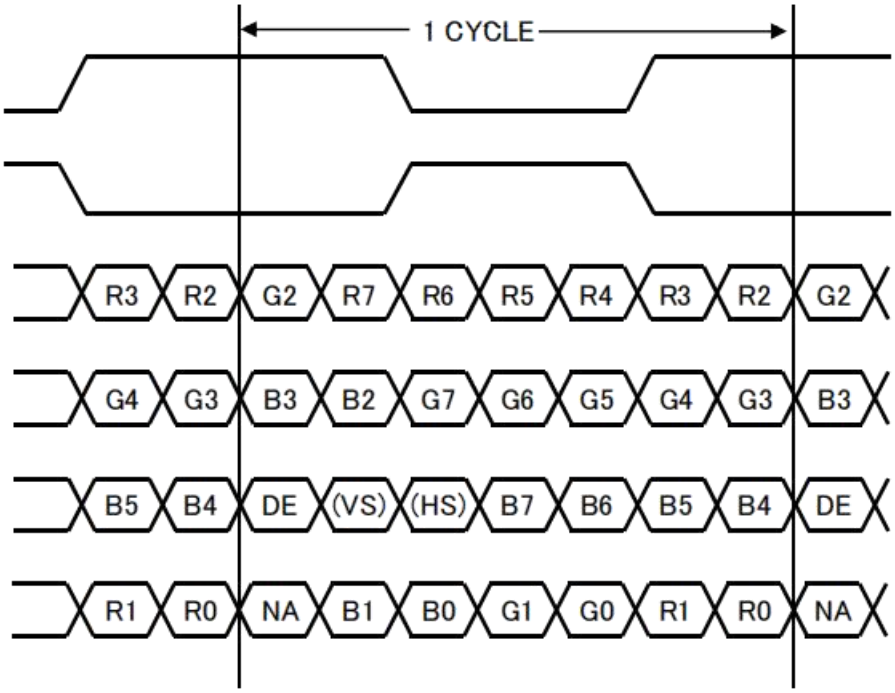
pin assignment with SELLVDS pin（THC63LVDM83R（Thine electronics） or Compatible product)

Transmitter		20Pin SELLVDS	
Pin No	Data	=L(GND)or Open	=H(3.3V)
51	TA0	RO(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	RO(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)

< SELLVDS = L(GND) or Open >



< SELLVDS = H(3.3V) >



DE:DATA ENABLE

HS:Hsync

VS:Vsync

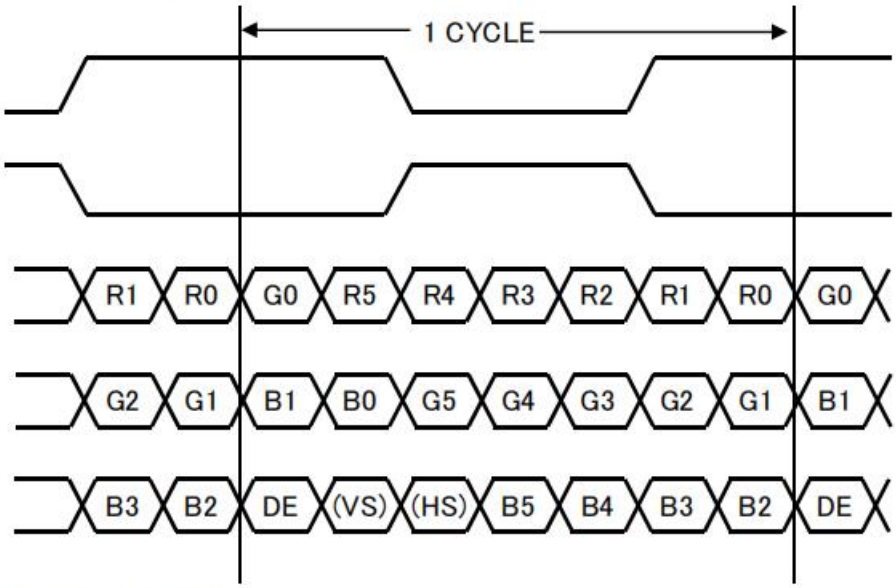
NA:Non Available

2) 6bit input

pin assignment with SELLVDS (THC63LVDM83R（Thine electronics） or Compatible product)

Pin No	Data	=L(GND)or Open	=H(3.3V)
51	TA0	—	RO(LSB)
52	TA1	—	R1
54	TA2	—	R2
55	TA3	—	R3
56	TA4	—	R4
3	TA5	—	R5(MSB)
4	TA6	—	GO(LSB)
6	TB0	—	G1
7	TB1	—	G2
11	TB2	—	G3
12	TB3	—	G4
14	TB4	—	G5(MSB)
15	TB5	—	BO(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)

< SELLVDS = H(3.3V) >



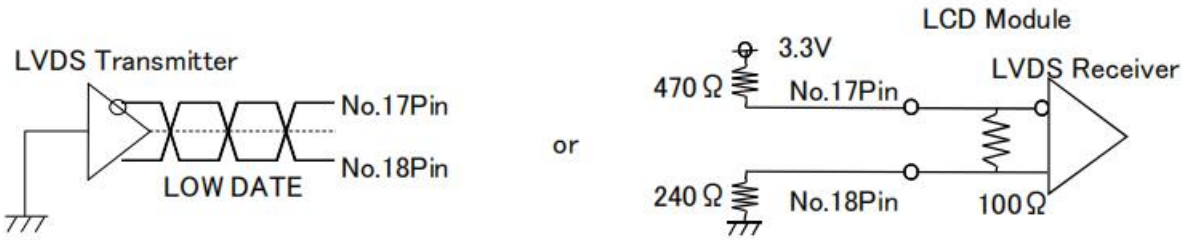
DE:DATA ENABLE

HS:Hsync

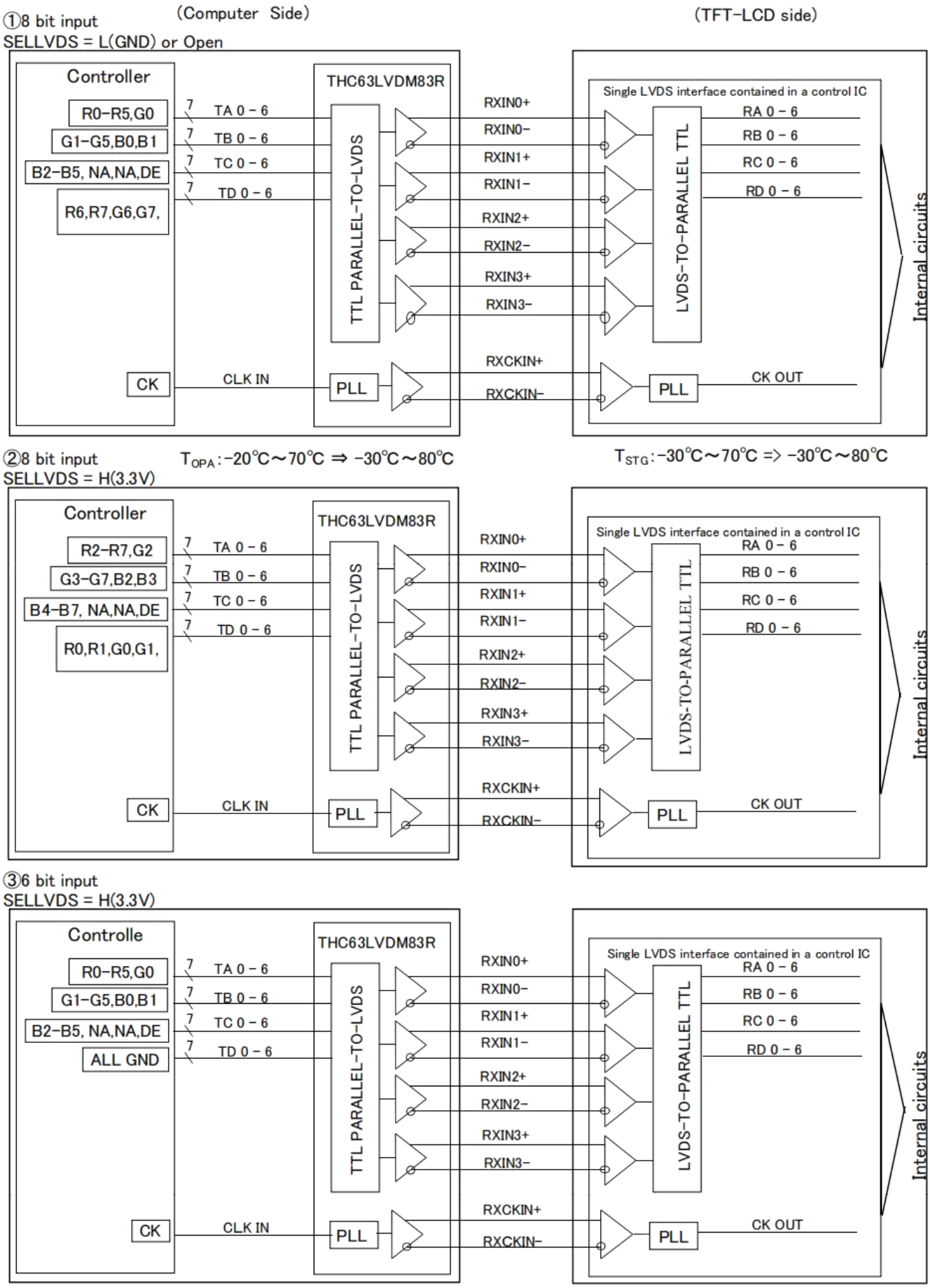
VS:Vsync

NA:Non Available

Recommended input (17pin, 18pin at 6bit)



4.3 Interface block diagram



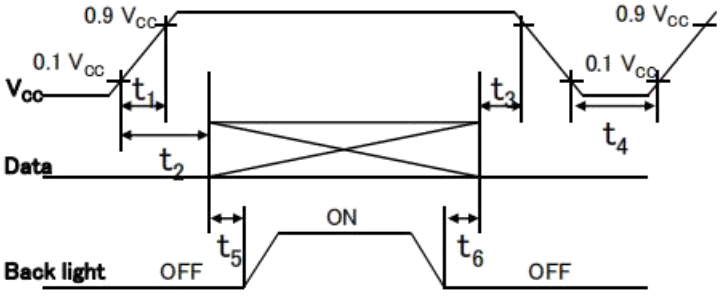
5 Electrical Characteristics

5.1 TFT-LCD panel driving

T_a=+25℃

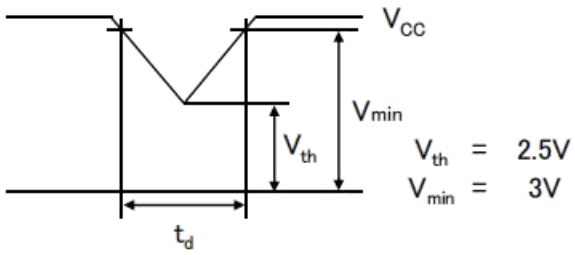
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Supply voltage	Vcc		3.0	3.3	3.6	V	【*1】
Current dissipation	Icc	Vcc=3.3V	—	450	750	mA	【*2】
Input voltage width for LVDS receiver	VL		0	—	2.4	V	
Permissive input ripple voltage	VRP		—	—	200	mV_{p-p}	Vcc=3.3V
Differential input Threshold voltage	VTH		—	—	Vcm+100	mV	VcM=+1.2V 【*3】
	VTL		VcM-100	—	—	mV	
Input voltage	VIH		2.1	—	—	V	【*4】
	VL		—	—	0.8	V	
Input reak current	IoH		—	—	400	μA	V_{12}=+3.3V[*4】
	IoL		-10	—	+10	μA	Vi_2=0V【*4】
Terminal resistor	RT		—	100	—	Ω	Differential input

【*1】On-off conditions for supply voltage



$20\mu s < t_1 \leqq 10ms$
$0 < t_2 \leqq 20ms$
$0 < t_3 \leqq 1s$
$1s \leqq t_4$
$300ms \leqq t_5$
$200ms \leqq t_6$

Vcc-dip conditions



- $V_{th} < V_{CC} \leqq V_{min}$
  $t_d \leqq 10ms$
- $V_{CC} < V_{th}$

Vcc-dip conditions should also follow the On-off conditions for supply voltage

- Hsync/Vsync need not be input so that this model may drive only by the ENAB signal. Even if Hsync/Vsync is input, it doesn't become a malfunction.
- The relation between the data input and the backlight lighting will recommend the above-mentioned input sequ When the backlight is turned on before the panel operates, there is a possibility of abnormally displaying. The liquid crystal module is not damaged.

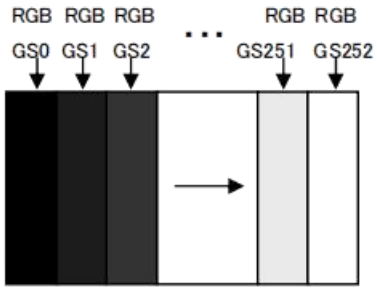
【*2】Current dissipation

Typical current situation : 253-gray-bar pattern

（Vcc=+3.3V、fck = 83.5MHz、Ta=25℃）

【*3】V：LVDS common mode voltage

【*4】RL/UD , SELLVDS

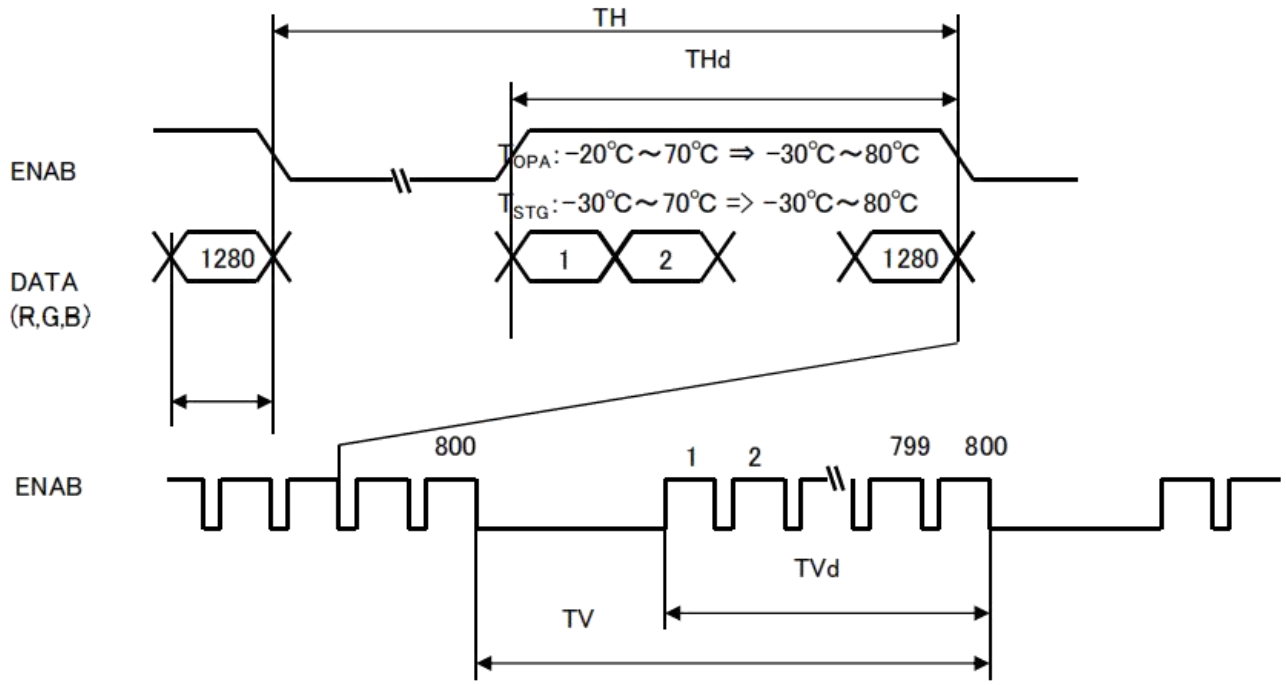


6 Timing characteristics of input signals

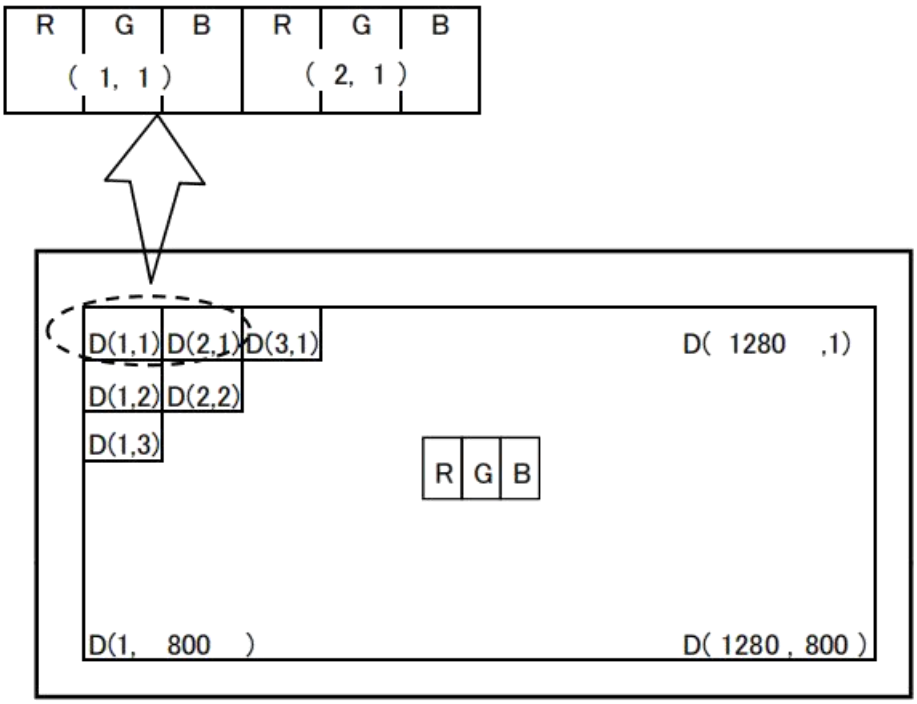
6.1 Timing characteristics

	Parameter		Symbol	Min.	Typ.	Max.	Unit	Remark
	Clock	**Frequency**	1/Tc	70.0	**83.5**	**85.0**	**MHz**	
△2	**ENAB**	Horizontal period	TH	1480	**1680**	**1880**	**clock**	
				17.4	20.1		*μs*	
		Horizontal period(High)	THd	1280	1280	1280	**clock**	
		Vertical Frequency	TV	810	831	852	**line**	**【*1】**
				15.9	16.7		**ms**	
		Vertical period(High)	TVd	800	800	800	**line**	

【*1】In case of using the long vertical period, the deterioration of display quality, flicker etc. may occur.



6.2 Input Data Signals and Display Position on the screen



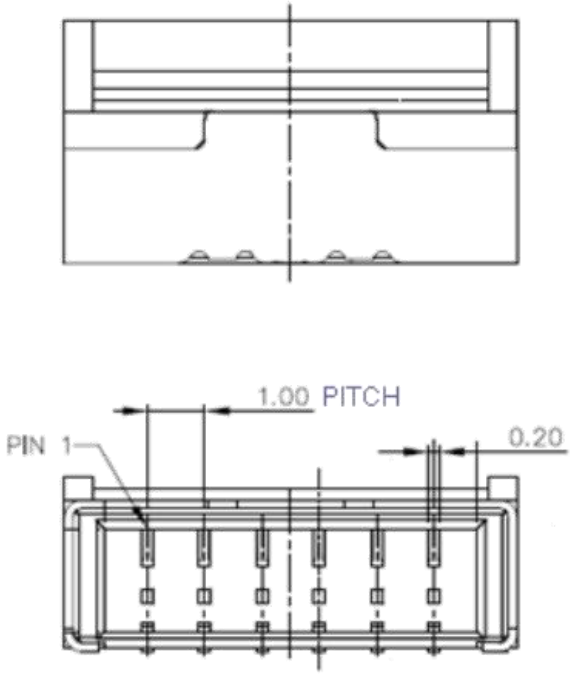
7 Backlight Unit

7.1 Connector Type

Backlight Connector	Manufacturer	ENTERY
	Part Number	3707K-S06N-21R
Mating Connector	Manufacturer	ENTERY
	Part Number	H112K-P06N-13B (Locking type)

Backlight Connector dimension:

H ×V × D = 13 9. × 00.3 × 25.4 , Pitch = (0.1 unit = mm)



7.2 Mechanical Characteristics

14. Storage conditions

Environmental condition range of storage temperature and humidity

Temperature 0 to 40 degrees Celsius

Relative humidity 95% and below

【Note】Please refer below as a mean value of the environmental conditions.

Summer time temperature 20 to 35 degrees Celsius humidity , 85% and below

Winter time temperature 5 to 15 degrees Celsius humidity , 85% and below

Please maintain within 240 hours of accumulated length of storage time, with conditions of 40 degrees Celsius and room humidity of 95%.

Direct sun light

Please keep the product in a dark room or cover the product to protect from direct sun light.

Atmospheric condition

Please refrain from keeping the product with possible corrosive gas or volatile flux.

Prevention of dew

Please store the product carton either on a wooden pallet or a stand / rack to prevent dew.

Do not place directly on the floor. In addition, to obtain moderate ventilation in between the pallet's top and bottom surfaces, pile the cartons up in a single direction and in order.

Please place the product cartons away from the storage wall.

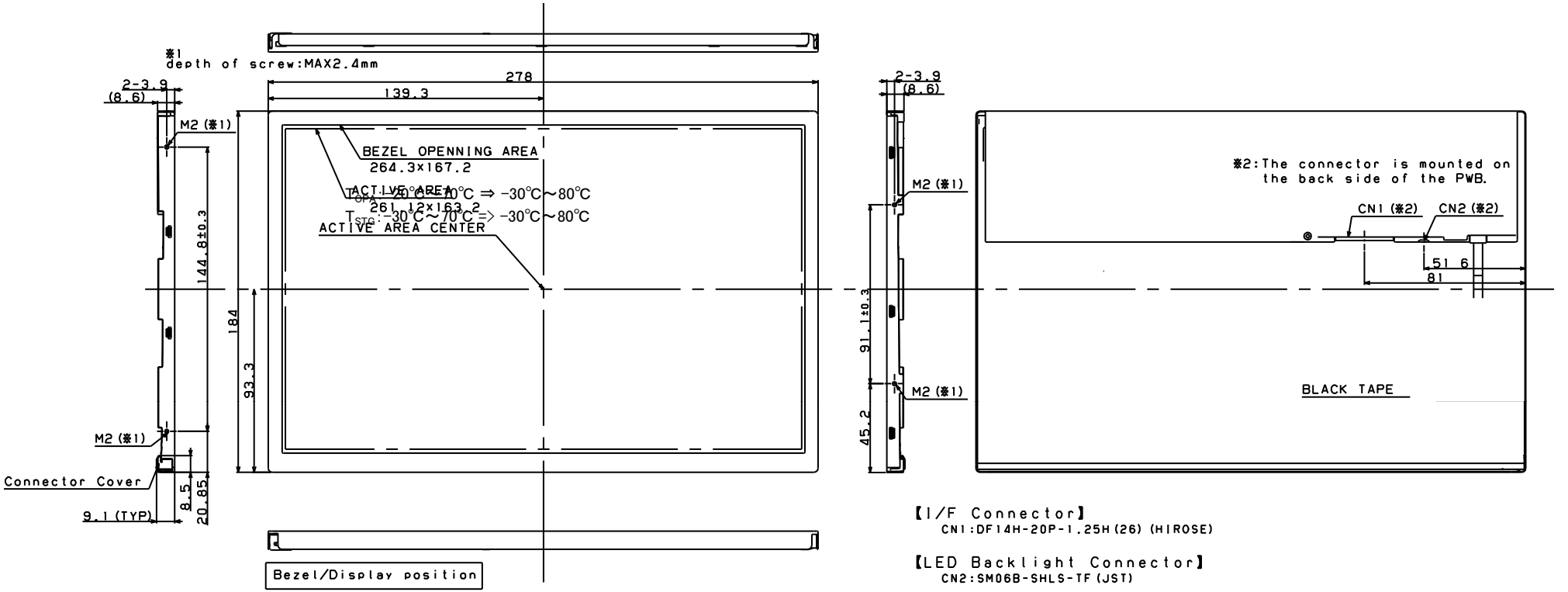
Storage period

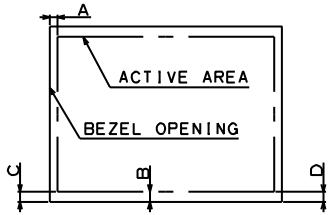
Within above mentioned conditions, maximum storage period should be one year.

9. When ambient temperature is lower than 10 C may reduce the display quality. For example, the response time will become slowly.

12.2 Safety precautions

1. It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.
2. If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth, in case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.
3. After the modlule's end of life, it is not harmful in case of normal operation and stora.





1) Torelance X direction A:1.59±0.8 △2
2) Torelance Y direction B:2.0±0.8
3) Obliquity of diplay area |C-D|<0.8

【I/F Connector】
CN1:DF14H-20P-1.25H(26) (HIROSE)

【LED Backlight Connector】
CN2:SM06B-SHLS-TF(JST)

NOTES
1) Unspecifiled tolerance to be ±0.5
2) Warp and flating for PWB cover and FPC are excluded from thickness and dimension of the unit.
3) Please do not contact the conductive things to the part of the PWB without the PWB cover.
4) Please do not peel off the black tape pasted to the product.
5) Recommended torque
0.147±0.02N·m(1.5±0.2kgf·cm)
※Please confirm whether there is the problem such as loosening of the screw in a real machine.

Fig. 1 : LQ121K1LG52 OUTLINE DIMENSIONS

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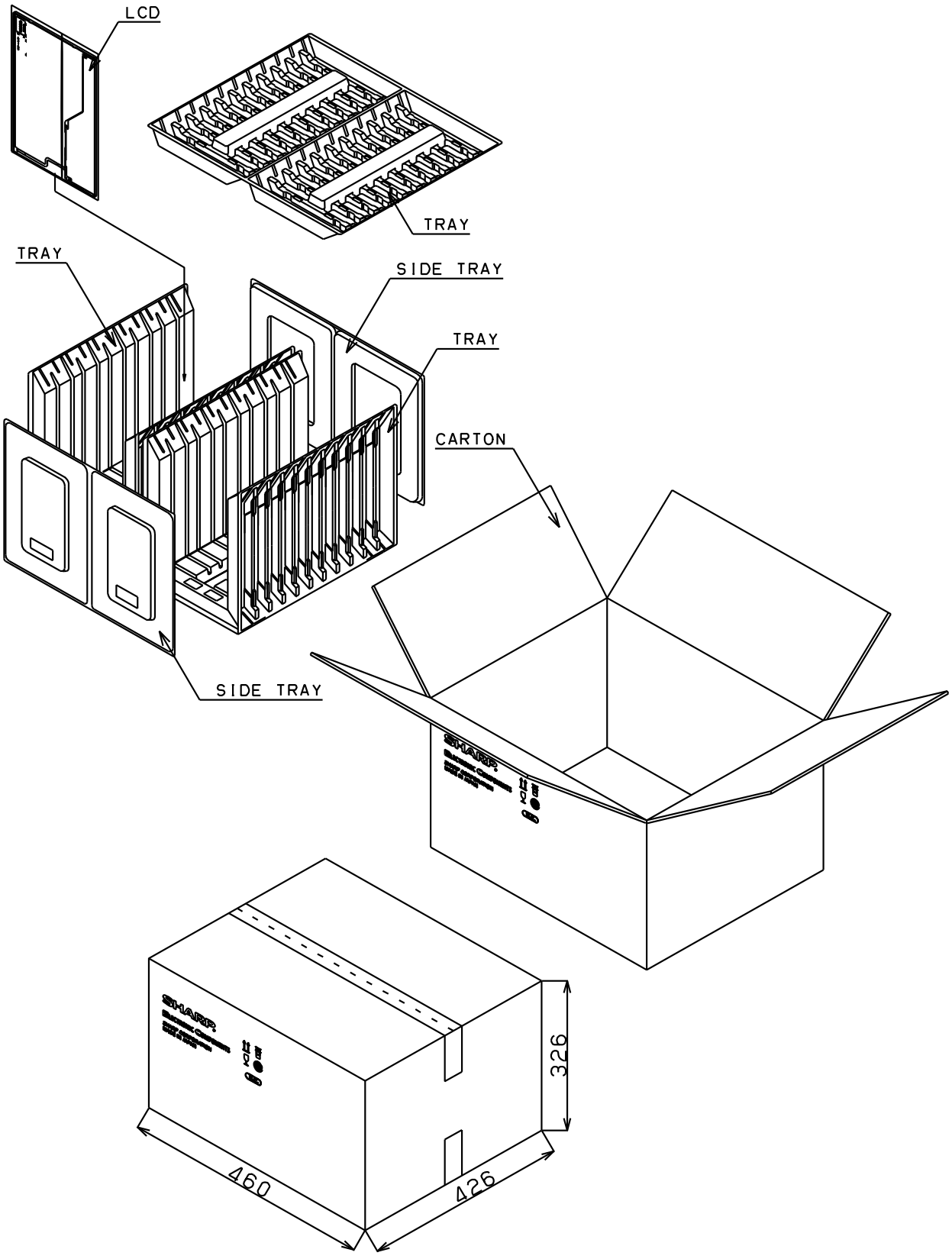

Fig.3 : PACKING FORM