億力光電股份有限公司

EVERVISION ELECTRONICS CO., LTD.

Product Specification For LCD Module

(KVPF-7B-002-16)

Model NO.：VGG644817-0TSLWB(RoHS)

REVISION：3

□APPROVAL FOR SPECIFICATIONS ONLY

■APPROVAL FOR SPECIFICATIONS AND SAMPLE

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STD.	

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2. Record of Revisions

Rev.	Comments	Page	Date
1	Preliminary Specification was first issued	All	9/23'20
2	Modify 6. General Specifications	5	12/2'20
2	Modify 8. Electrical Characteristics	7	12/2'20
2	Modify 8.2 Backlight Unit:Note	8	12/2'20
2	Modify 9. Block Diagram	9	12/2'20
2	Modify 10. Input / Output Terminals Pin Assignment	10~11	12/2'20
2	Modify 11.1 Input Signal Characteristics	13	12/2'20
2	Modify 11.3 Power On / Off Sequence	16	12/2'20
2	Modify 12. Optical Characteristics	17	12/2'20
2	Modify 16.Outline Drawing	24	12/2'20
2	Modify 18. Incoming Inspection Standards	27	12/2'20
3	Modify 8.1 TFT-LCD Module: Note	7	1/5'21

3. Module Numbering System

V G G 6448 17 – 0 T S L W B

Serial No:A~Z

Backlight Color:
N:Without Backlight;
A:Amber; **B:**Blue; **G:**Green;
L:Yellow; **O:**Orange; **R:**Red;
W:White; **Y:**YellowGreen;
X:Others

Backlight Type:
N:Without Backlight; **E:**EL; **F:**CCFL;
L:General LED; **H:**High NTSC LED ;
R:RGB LED; **X:**Others

LCD Model:
A:ASTN; **B:**STN Blue; **C:**CSTN; **D:**DSTN;
E:MSLC; **F:**TFT; **G:**STN Gray;
H:HTN ; **I:**IBN; **K:**Black Mask TN; **L:**LTPS; **M:**MVA;
N:Others; **O:**OLED; **P:**PLED; **S:**IPS;
T:TN; **U:**FSC TN; **W:**FSTN Black/White;
X:FFSTN; **Y:**STN Yellow

LCD Type:
R: Reflective/Positive;
S : Reflective/Negative ;
F : Transflective/Positive ;
G: Transflective/Negative ;
U: Transmissive/Positive ;
T: Transmissive/Negative ; **N:**Others

Temperature Range & View Direction:
General Purpose : **1:**6H **2:**12H **3:**3H **4:**9H **5:**Others
High Performance: **6:**6H **7:**12H **8:**3H **9:**9H **0:**Others

STD Product Serial No.: 01~99
Customer Made Serial No.: A1,A2…A9,B1,B2…B9,C1..

Display Function:
Segment Number / Characters Lines / Column and Row Dots / Length * Width of Other

Display Type:
C:Character Type; **G:**Graphic Type; **S:**Segment Type; **O:**Other

LCM Type:
B:COB; **F:**COF; **G:**COG; **H:**Heat Seal; **K:**Touch Key ; **S:**SMT; **T:**TAB; **O:**Others;

4. Application

This specification is applied to the 3.5 inch VGA supported TFT-LCD module, and can display 16.7M(8bit RGB) colors.

5. Features

- VGA (640×480 pixels) resolution.
- Digital 24 bit parallel RGB

6. General Specifications

Item	Specifications	Unit
Screen Size	3.5 (Diagonal)	inch
Display Format	640RGB(H)×480(V)	dot
Active Area	70.08(H)×52.56(V)	mm
Pixel Pitch	0.1095(H)×0.1095(V)	mm
Pixel Configuration	RGB Vertical Stripe	-
Display Mode	IPS Type Transmissive Mode Normally Black	-
Surface Treatment	Anti-Glare	-
Viewing Direction	Full view angle	-
Outline Dimension	76.9(W)×63.9(H)×3.2(D)	mm
Weight	(32)	g
RoHS Compliance	RoHS Compliance	-

7. Absolute Maximum Ratings

7.1 Absolute Ratings of Environment

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T_{ST}	-30	+80	°C	(1)(2)
Operating Ambient Temperature	T_{OP}	-20	+70	°C	(1)(2)

Note1: Background color changes slightly depending on ambient temperature.
This phenomenon is reversible.

Note2: Please refer to item of RELIABILITY.

7.2 Electrical Absolute Ratings

7.2.1 TFT-LCD Module

(Ta=25±2°C, GND=V_{SS}=0V)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	VDD	-0.3	3.6	V	-
Logic Signal Input Voltage	VDDIO	-0.3	3.6	V	-

8. Electrical Characteristics

8.1 TFT-LCD Module

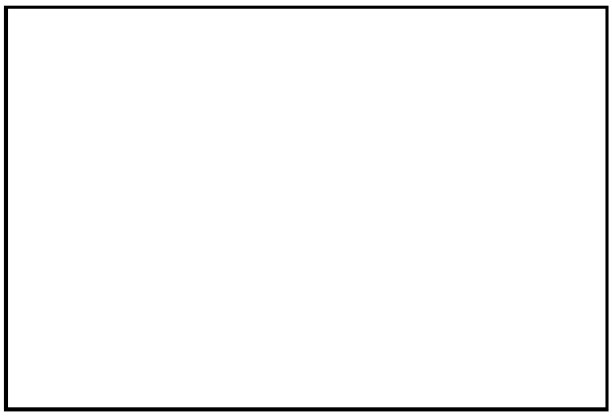
(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Supply Voltage	VDD	2.65	2.8	3.6	V	-
Logic Signal Input Voltage	VDDIO	1.65	1.8	3.6	V	(1)
Digital Current	IVDD+ IVDDIO	-	35	49	mA	(2)
Input High Threshold Voltage	VIH	0.7xVDDIO	-	VDDIO	V	-
Input Low Threshold Voltage	VIL	0	-	0.3xVDDIO	V	-

Note (1) VDDIO must be less than VDD or equal to VDD (VDDIO≦VDD)

Note (2) The specified power consumption is under the conditions at VDD=VDDIO=2.8V, FV=60Hz, whereas a power dissipation check Pattern below is displayed.

White Pattern / 255 Gray



Active Area

8.2 Backlight Unit

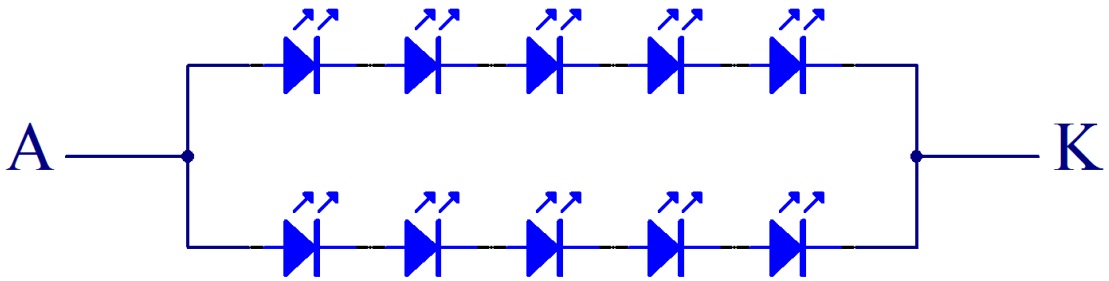
(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
LED Voltage	VL	-	(16.5)	-	V	(1),(3)
LED Current	IL	-	40	-	mA	(1)
LED Life Time(25℃)	-	50000	-	-	hr	(2)

Note (1) LED Light Bar Circuit 5S2P =10pcs LED

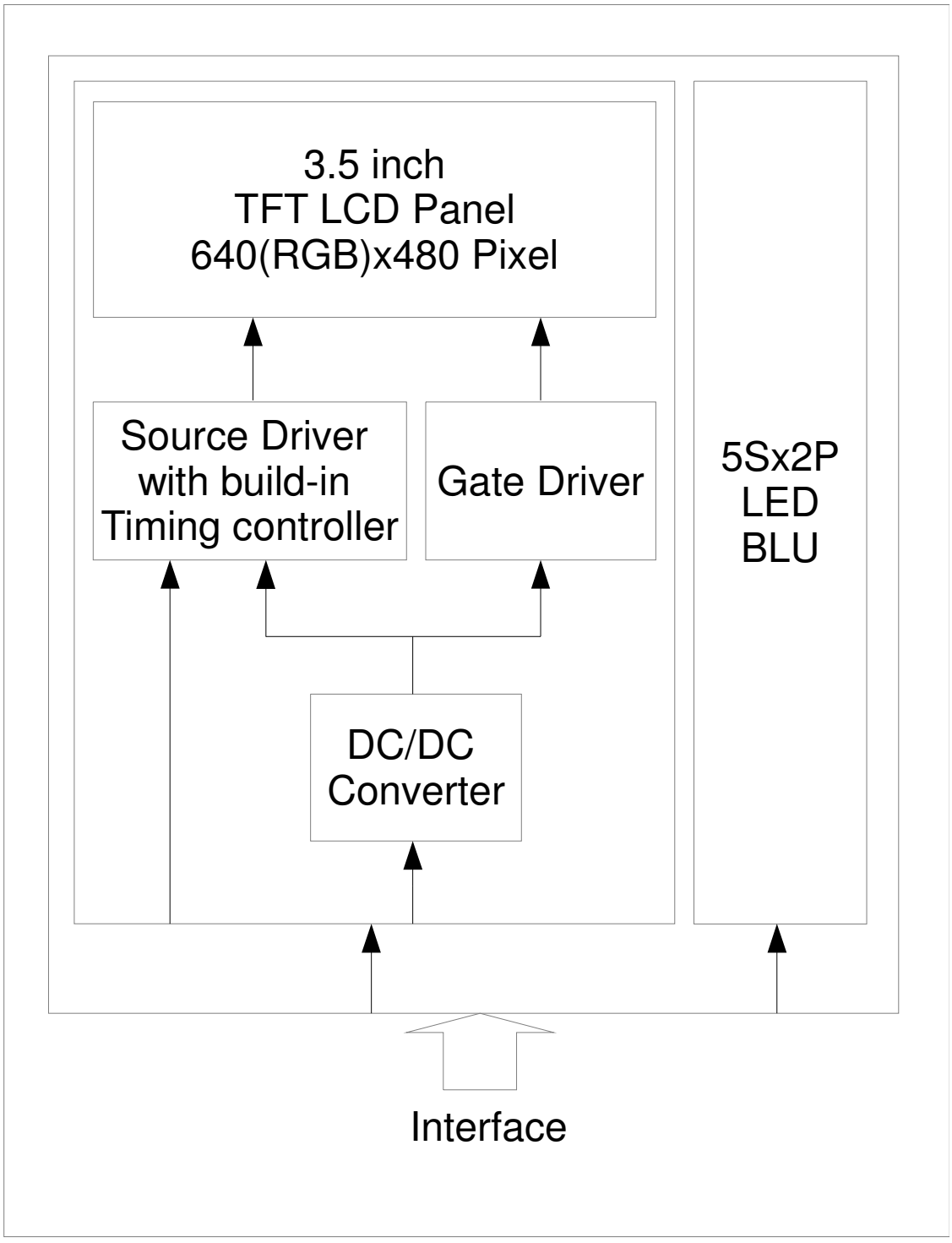
Note (2) LED life time is defined as under 25±2°C , when the average brightness decrease to 50% of original brightness

Note (3) The module is driven by constant current, the voltage value is for reference only.



9. Block Diagram

TFT-LCD Module with Backlight Unit



10. Input / Output Terminals Pin Assignment

10.1 TFT-LCD Module

Reference Connector: CF25541D0R0-05 or compatible

Pin No.	Symbol	I/O	Description
1	LED-	I	Backlight LED Cathode
2	LED-	I	Backlight LED Cathode
3	LED+	I	Backlight LED Anode
4	LED+	I	Backlight LED Anode
5	NC	I	EVERVISION test pin, please leave it open
6	NC	I	EVERVISION test pin, please leave it open
7	NC	I	EVERVISION test pin, please leave it open
8	NC	I	EVERVISION test pin, please leave it open
9	NC	I	EVERVISION test pin, please leave it open
10	NC	I	EVERVISION test pin, please leave it open
11	NC	I	EVERVISION test pin, please leave it open
12	B0	I	Blue data(LSB)
13	B1	I	Blue data
14	B2	I	Blue data
15	B3	I	Blue data
16	B4	I	Blue data
17	B5	I	Blue data
18	B6	I	Blue data
19	B7	I	Blue data(MSB)
20	G0	I	Green data(LSB)
21	G1	I	Green data
22	G2	I	Green data
23	G3	I	Green data
24	G4	I	Green data
25	G5	I	Green data
26	G6	I	Green data
27	G7	I	Green data(MSB)
28	R0	I	Red data(LSB)
29	R1	I	Red data
30	R2	I	Red data

Pin No.	Symbol	I/O	Description
31	R3	I	Red data
32	R4	I	Red data
33	R5	I	Red data
34	R6	I	Red data
35	R7	I	Red data(MSB)
36	HS	I	Horizontal Sync Input
37	VS	I	Vertical Sync Input
38	PCLK	I	Pixel clock input pin.
39	NC	I	EVERVISION test pin, please leave it open
40	NC	I	EVERVISION test pin, please leave it open
41	VDDIO	I	Logic I/O power supply
42	VDD	I	Power supply for analog circuits
43	NC	I	EVERVISION test pin, please leave it open
44	NC	I	EVERVISION test pin, please leave it open
45	NC	I	EVERVISION test pin, please leave it open
46	NC	I	EVERVISION test pin, please leave it open
47	NC	I	EVERVISION test pin, please leave it open
48	NC	I	EVERVISION test pin, please leave it open
49	NC	I	EVERVISION test pin, please leave it open
50	NC	I	EVERVISION test pin, please leave it open
51	NC	I	EVERVISION test pin, please leave it open
52	DE	I	Data Enable Input
53	GND	I	Ground
54	GND	I	Ground

10.2 Color Data Input Assignment

The brightness of each primary color(red, green and blue) is based on the 8 bit gray scale data input for the color. The higher the binary input, the brighter the color. The table provides the assignment of color versus data input.

Color		Data Signal																							
		Red								Green								Blue							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale Of RED	Red(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
Gray Scale Of Green	Green(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
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	Green(253)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1		0	0	0	0	0	0	0
Gray Scale Of Blue	Blue(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1		1

11. Interface Timing

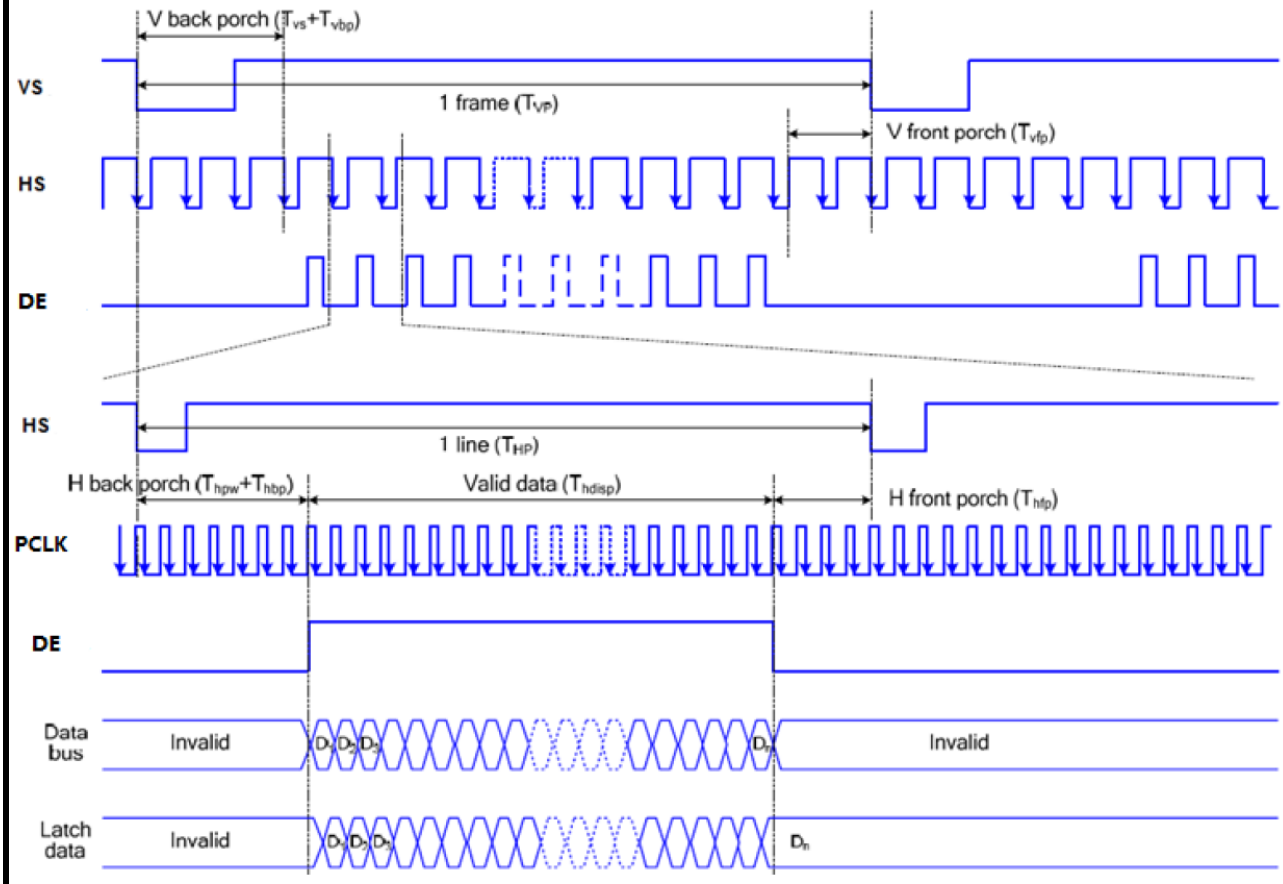
11.1 Input Signal Characteristics

Below Table provide the timing parameter by external Vertical-cycle

Parameters	Symbols	Min.	Typ	Max.	Unit
DCLK Frequency	FCLK	-	20	-	MHz
Horizontal Synchronization	T_{hpw}	-	2	-	PCLK
Horizontal Back Porch	$T_{hpw+hbp}$	-	20	-	PCLK
Horizontal Front Porch	T_{hfp}	-	20	-	PCLK
Horizontal Address (Display area)	T_{hdisp}	-	640	-	PCLK
Vertical Synchronization	T_{vs}	-	2	-	Line
Vertical Back Porch	$T_{vs}+T_{vbp}$	-	6	-	Line
Vertical Front Porch	T_{vfp}	-	12	-	Line
Vertical Address (Display area)	T_{vdisp}	-	480	-	Line
Frame-Rate	-	-	60	-	Hz

11.2 Waveform

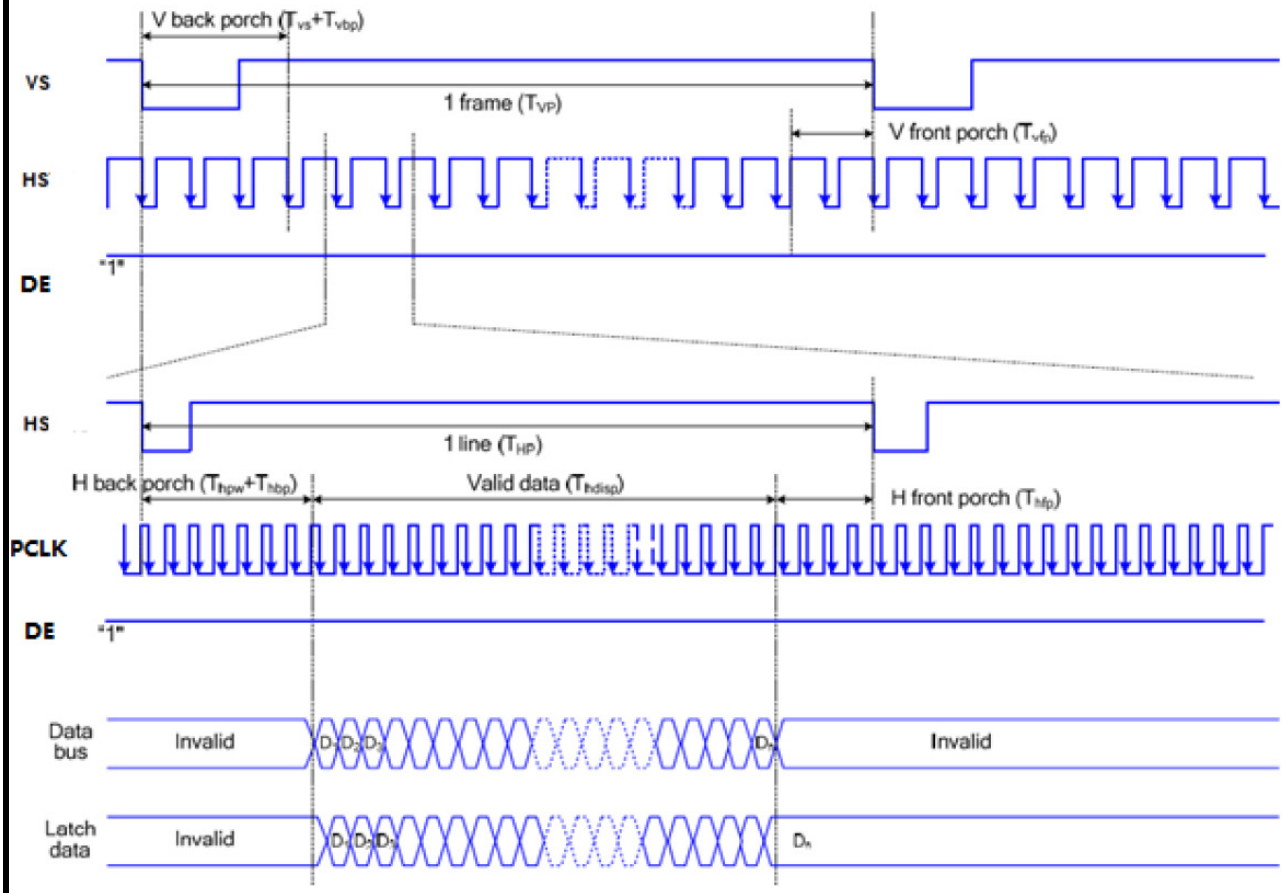
The timing chart of RGB interface DE mode is shown as follows.



Timing Chart of Signals in RGB Interface DE Mode

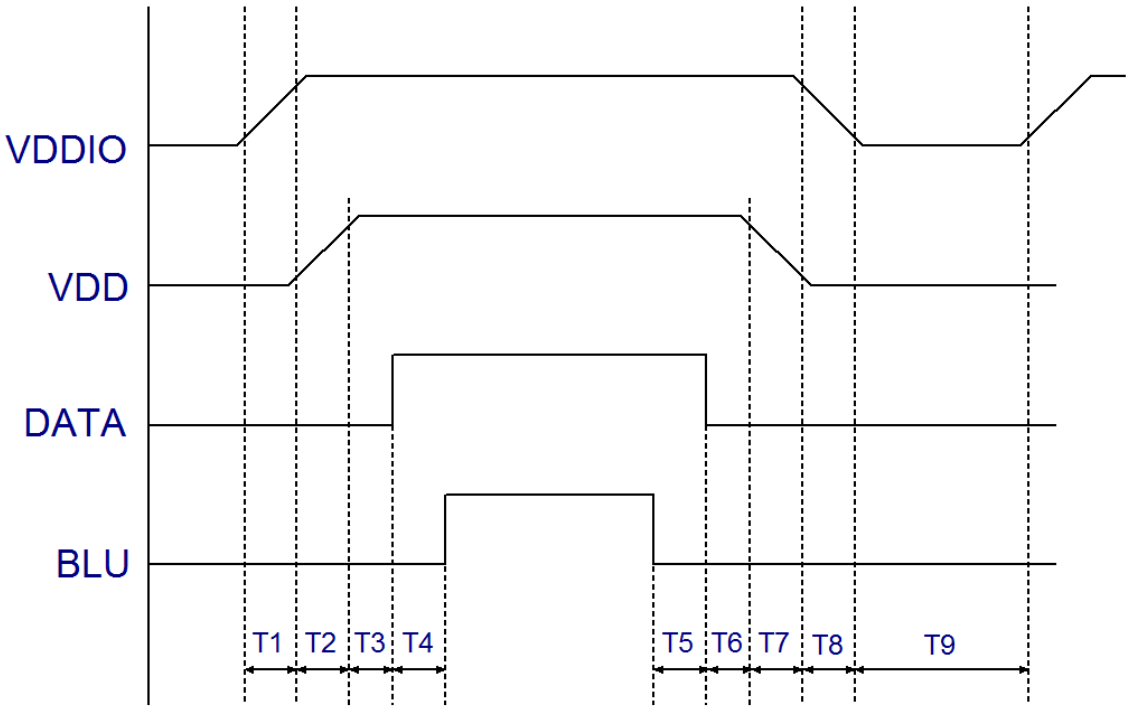
Note: The setting of front porch and back porch in host must match that in IC as this mode.

The timing chart of RGB interface SYNC mode is shown as follows.



Timing chart of RGB interface SYNC mode

11.3 Power On / Off Sequence



POWER SEQUENCE TABLE

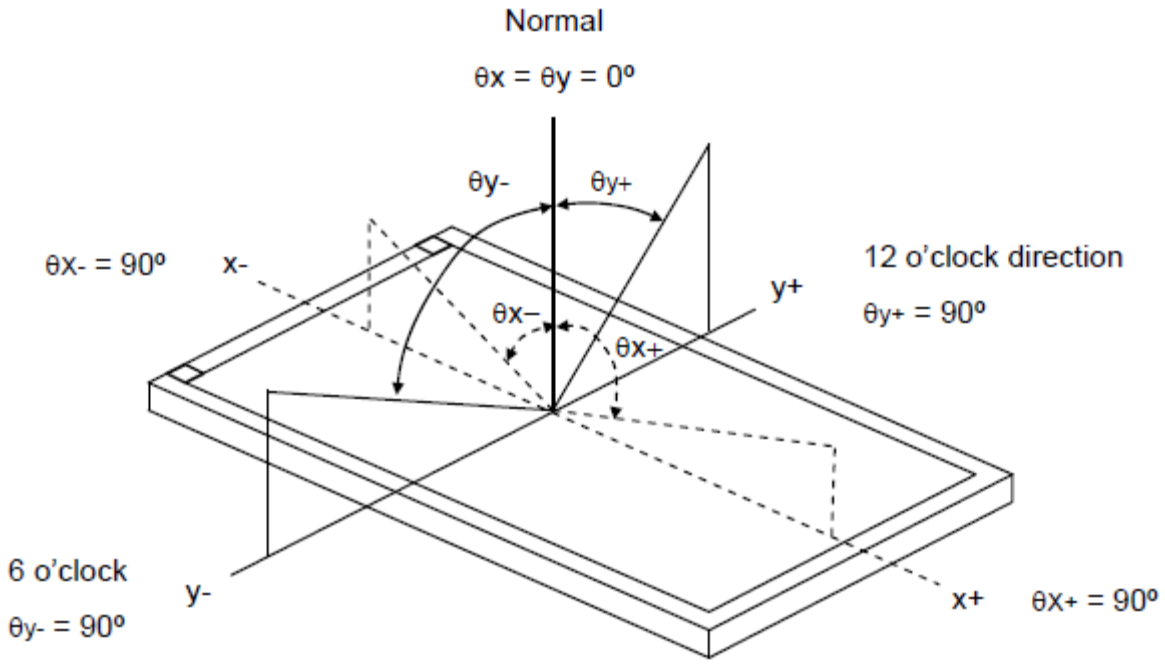
Parameter	Value			Units
	Min.	Typ	Max.	
T1	-	-	10	ms
T2	-	-	10	ms
T3	200	-	-	ms
T4	250	-	-	ms
T5	250	-	-	ms
T6	200	-	-	ms
T7	-	-	10	ms
T8	-	-	10	ms
T9	1000	-	-	ms

12. Optical Characteristics

The optical characteristics should be measured in a dark environment (≦ 1 lux) or equivalent state with the methods shown in Note (4).

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	θ_X=0°, θ_Y =0° Viewing Normal Angle	600	(800)	-	-	(2)
Response Time		T_{R+} T_F		-	25	-	ms	(3)
Luminance (Center)		LC		700	(800)	-	cd/m^2	(4)
Brightness uniformity		BUNI		70	(75)	-	%	(5)
Color Chromaticity	White	Wx		0.250	0.300	0.350	-	(1),(4)
		Wy		0.300	0.350	0.400	-	
Viewing Angle	Horizontal	θ_X+	CR≥10	75	(85)	-	deg.	
		θ_X-		75	(85)	-		
	Vertical	θ_Y+		75	(85)	-		
		θ_Y-		75	(85)	-		

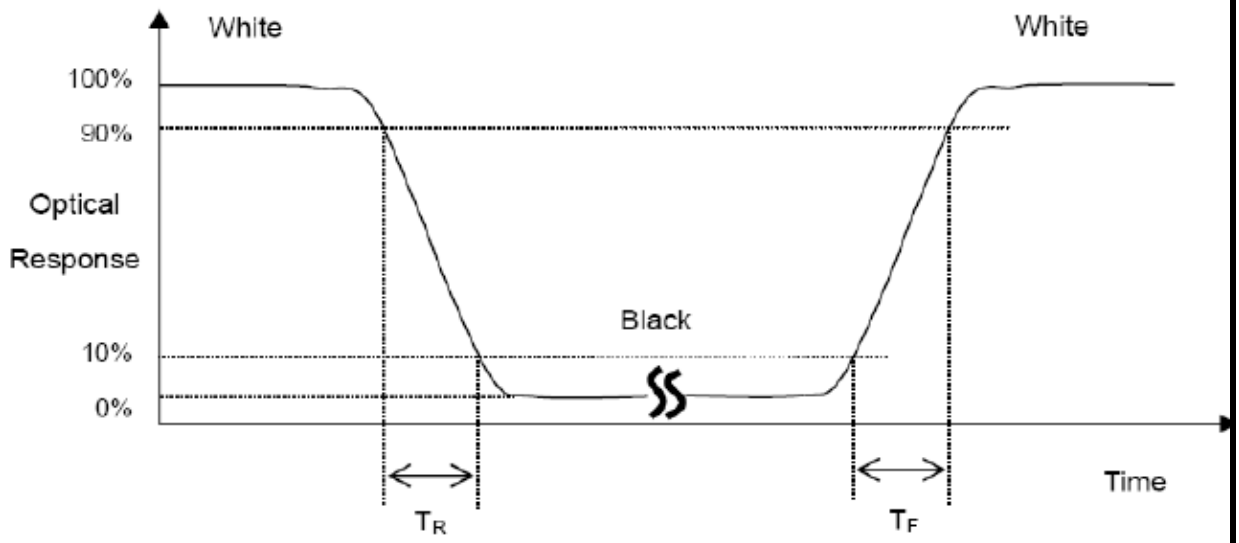
Note (1) Definition of Viewing Angle (θx, θy):



Note (2) Definition of Contrast Ratio (CR):

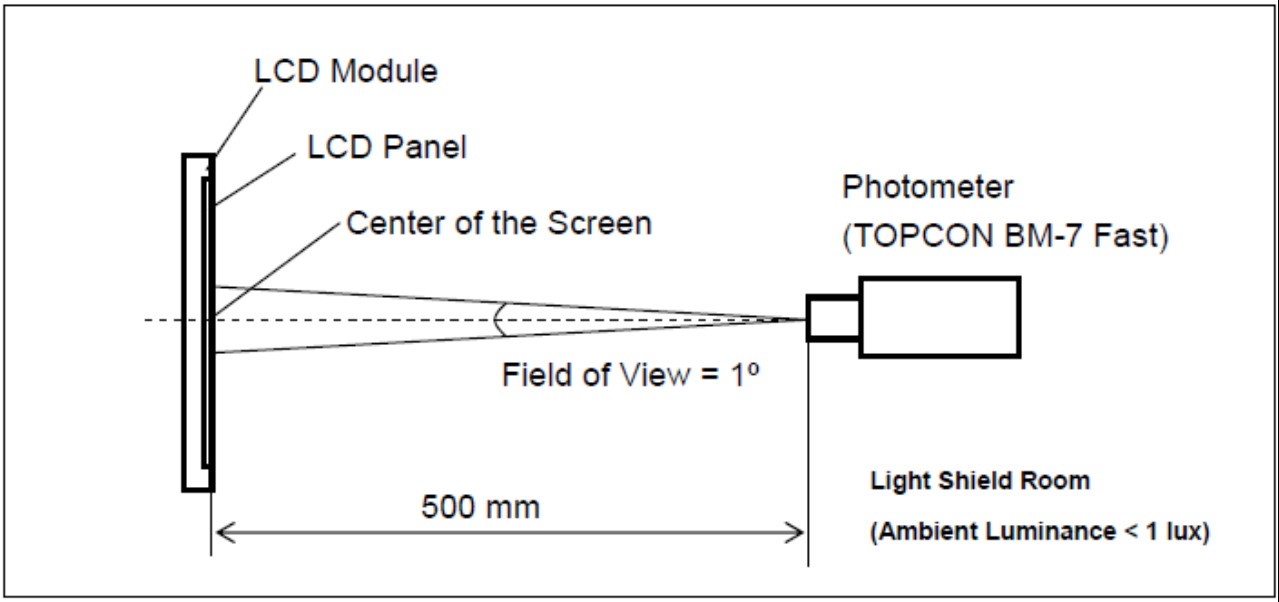
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note (3) Definition of Response Time (T_R, T_F):



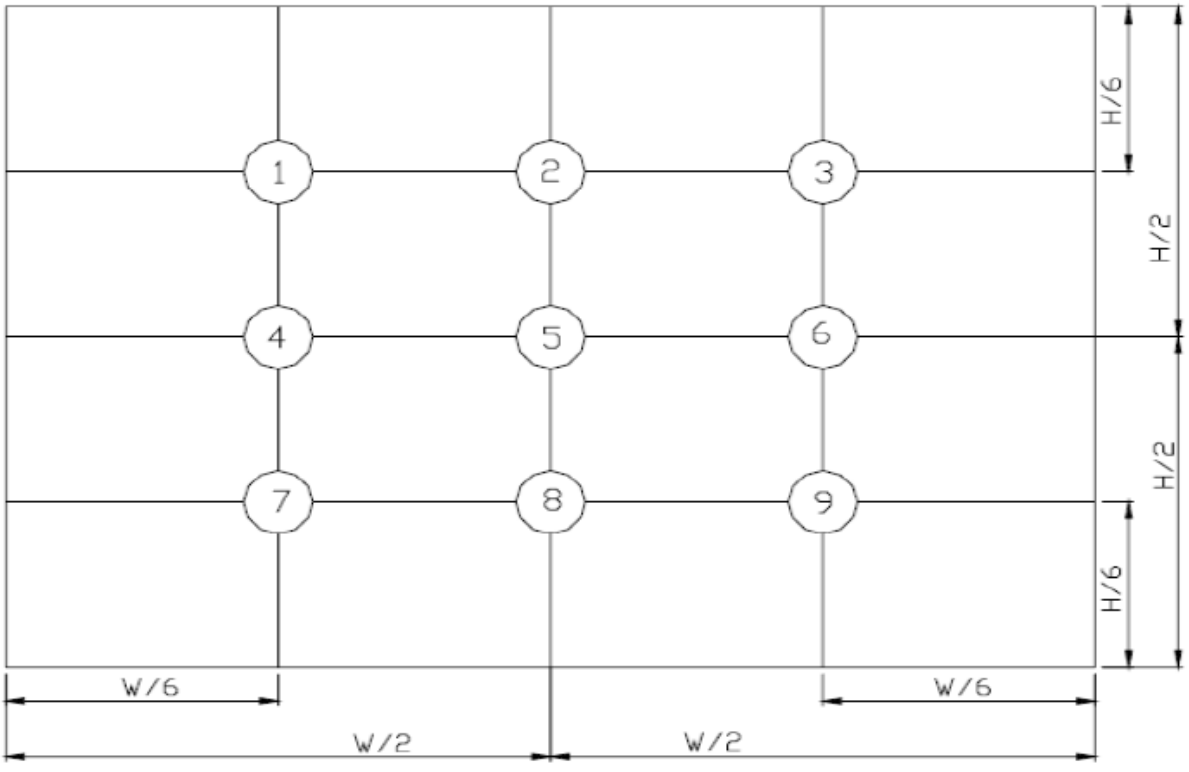
Note (4) Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a dark room or equivalent condition.



Note (5) Definition of brightness uniformity

Brightness uniformity=(Min Luminance of 9 points)/(Max Luminance of 9 points)×100%



13. Reliability Test

No.	Test Items	Test Condition	Remark
1	High Temperature Storage Test	T_a= 80℃ 240 hours	(1),(3),(4)
2	Low Temperature Storage Test	T_a= -30℃ 240 hours	(1),(3),(4)
3	High Temperature Operation Test	T_S= 70℃ 240 hours	(2),(3),(4)
4	Low Temperature Operation Test	T_a= -20℃ 240 hours	(1),(3),(4)
5	High Temperature and High Humidity Operation Test	T_a=60℃ 90%RH 240 hours	(3),(4)
6	Mechanical Shock Test （non-operating）	Half sine wave, 100G, 6ms 3 times shock of each six surfaces	(3)
7	Vibration Test （non-operating）	Sine wave：10 ~ 55 ~ 10Hz amplitude：1.5mm 3 axis, 2 hours/axis	(3)
8	Thermal Shock Test （non-operating）	-20℃（30min）~ 70℃（30min）, 10 cycles	(3),(4)
9	Drop Test(with Carton)	Height：80㎝ 1 corner, 3 edges, 6 surfaces	(3)

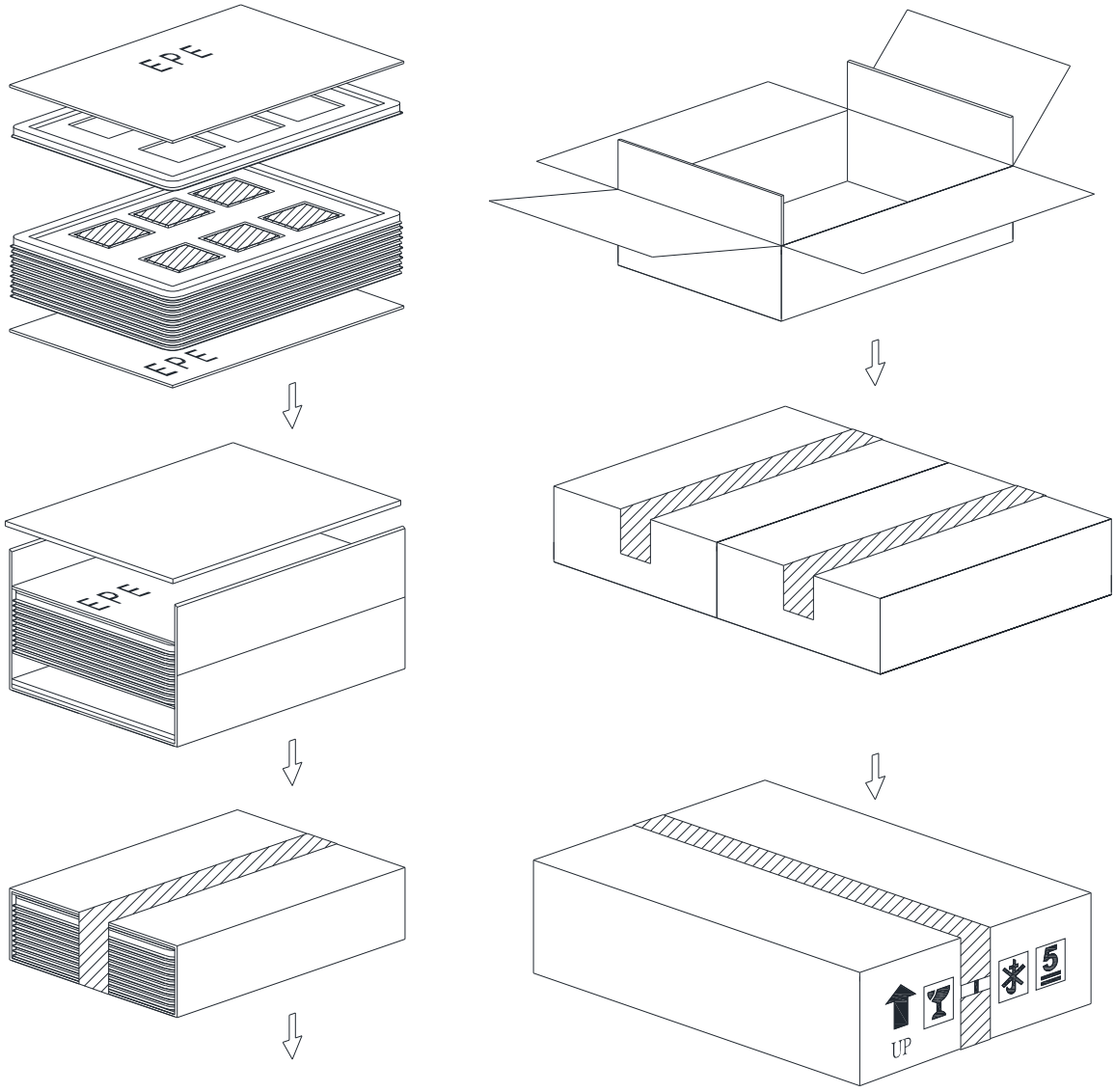
Note 1：Ta is the ambient temperature of samples.

Note 2：Ts is the temperature of panel's surface.

Note 3：In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note 4：Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

14. Packaging



	PARTS LIST				
	ITEM	SIZE(LxWxH) unit:mm	MATERIAL	Q.T.Y	NOTE
1	TRAY	372.0x262.0x16.6	PET	28	
2	EPE(J46)	372.0x262.0x5.0	EPE	4	
3	CARD BOARD(P01)	816.0x375.0x3.5	CARTON	2	
4	CARD BOARD(P02)	945.0x275.0x3.5	CARTON	2	
5	CARD BOARD(P03)	375.0x265.0x3.5	CARTON	4	
6	INTERNAL BOX(S01)	400.0x290.0x150.0	CARTON	2	
7	EXTERNAL BOX(L28)	600.0x420.0x180.0	CARTON	1	
8	PRODUCT	76.9x63.9x3.2		156	

15. Precautions

15.1 Assembly and Handling Precautions

(1) Do not apply rough force such as bending or twisting to the module during assembly.

(2) It's recommended to assemble or to install a module into the user's system in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.

(3) Don't apply pressure or impulse to the module to prevent the damage of LCD panel and Backlight.

(4) Always follow the correct power-on sequence when the LCD module is turned on. This can prevent the damage and latch-up of the CMOS LSI chips.

(5) Do not plug in or pull out the I/F connector while the module is in operation.

(6) Do not disassemble the module.

(7) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.

(8) Moisture can easily penetrate into LCD module and may cause the damage during operation.

(9) High temperature or humidity may deteriorate the performance of LCD module. Please store LCD module in the specified storage conditions.

(10) When ambient temperature is lower than 10ºC, the display quality might be reduced. For example, the response time will become slow.

15.2 Safety Precautions

(1) 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.

(2) After the module's end of life, it is not harmful in case of normal operation and storage.

15.3 Terms of Warrant

(1) Acceptance inspection period

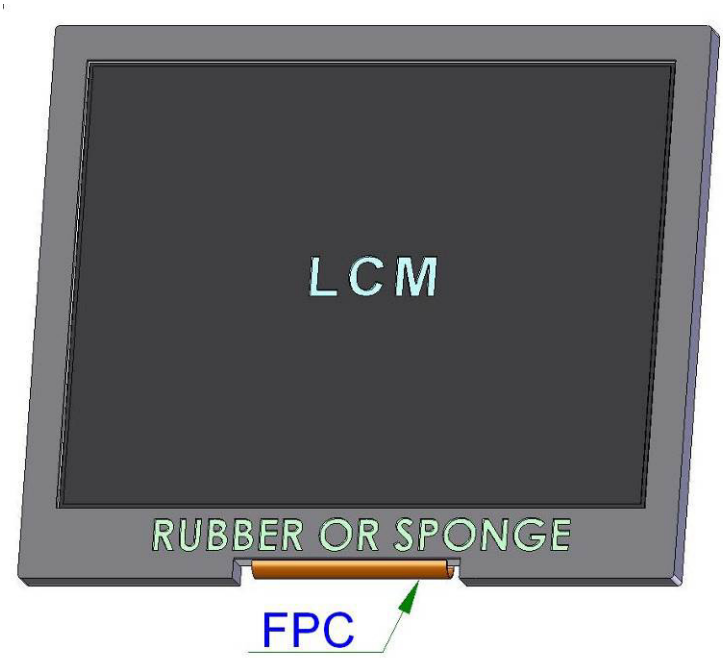
The period is within one month after the arrival of contracted commodity at the buyer's factory site.

(2) Applicable warrant period

The period is within twelve months since the date of shipping out under normal using and storage conditions.

15.4 Cautions for LCM's installing and assembling

Please keep away the FPC while assembling or fixing the LCM to avoid FPC being damaged or extruded or other related problems. Please see below picture.



15.5 Caution

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

15.6 Precautions of Storage

If the displays are going to be stored for years, please be aware the following notices.

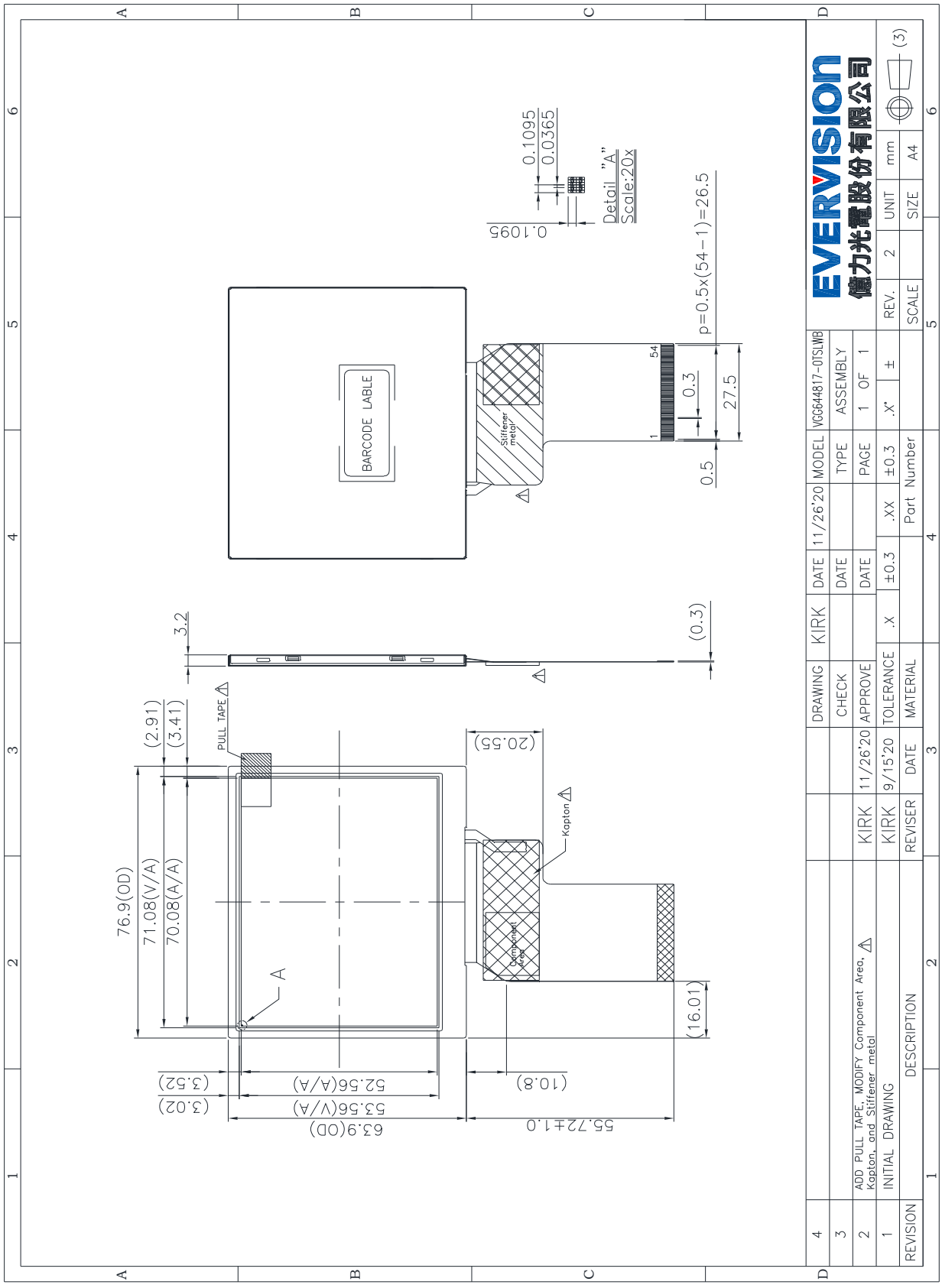
(1) Please store the displays in a dark room to avoid any damages from sunlight and other sources of UV light.

(2) The recommended long term storage temperature is between 10 ~35℃ and <60% humidity to avoid causing bubbles between polarizer and LCD glasses, and polarizer peeling from LCD glasses.

(3) It would be better to keep the displays in the container, which is shipped from Eversion, and do not unpack it.

(4) Please do not stick any labels on the display surface for a long time, especially on the polarizer.

16.Outline Drawing



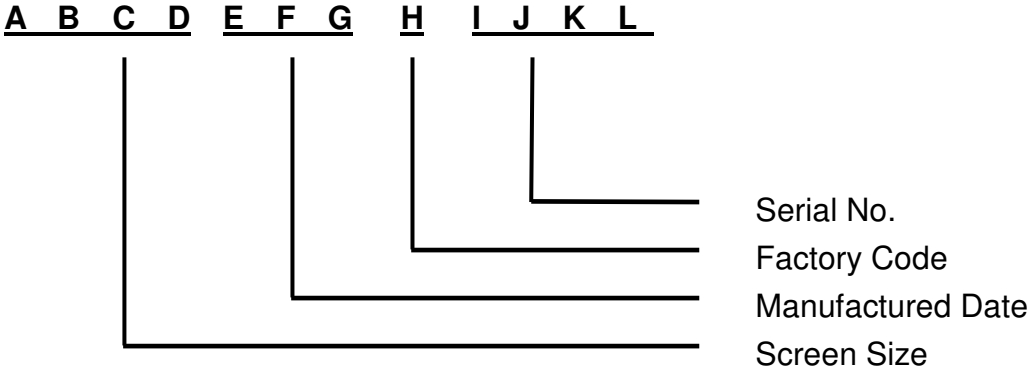
17.Definition of Labels

The bar code nameplate is pasted on each module as illustration, and its definitions are as following explanation.



（a）Module Name：VGG644817-0TSLWB

（b）Serial ID：



Serial ID includes the information as below：

（a） Screen size （Diagonal）： Inch Code （ABCD）

3.5” → 0350

10.4” → 1040

（b） Manufactured Date： Year, Month, Day （EFG）

Year（E）

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Mark	0	1	2	3	4	5	6	7	8	9
Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Mark	A	B	C	D	E	F	G	H	I	J
Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mark	K	L	M	N	O	P	Q	R	S	T
Year	2030	2031	2032	2033	2034	2035				
Mark	U	V	W	X	Y	Z				

Month（F）

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Mark	1	2	3	4	5	6	7	8	9	A	B	C

Day（G）

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Mark	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G
Day	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Mark	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	

（c）Factory Code（H）:

For EVERVISION internal use.

（d）Serial No.（IJKL）:

Manufacturing sequence of product, for example： 0001~9999.

18. Incoming Inspection Standards

1.The environmental condition of inspection

The environmental condition and visual inspection shall be conducted as below.

(1) Ambient temperature 25 ± 5℃

(2) Humidity: 45 ~ 75 % RH

(3) Viewing distance is approximately 30 ~ 40 cm

(4)Viewing angle is normal to the LCD panel as Fig _1 (± 45°)

(5) Ambient Illumination: 700 ~ 1000 Lux for external appearance inspection

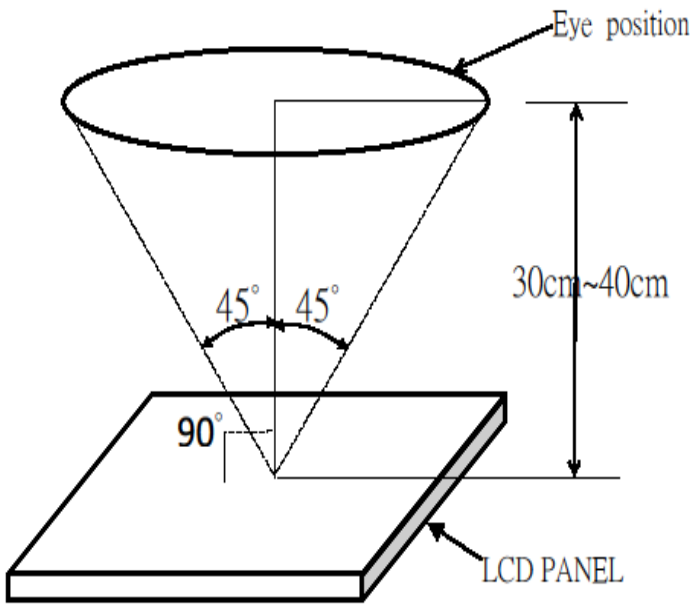


Fig_1

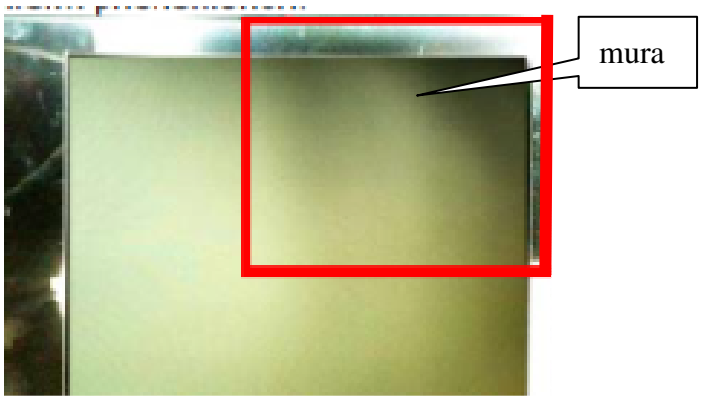
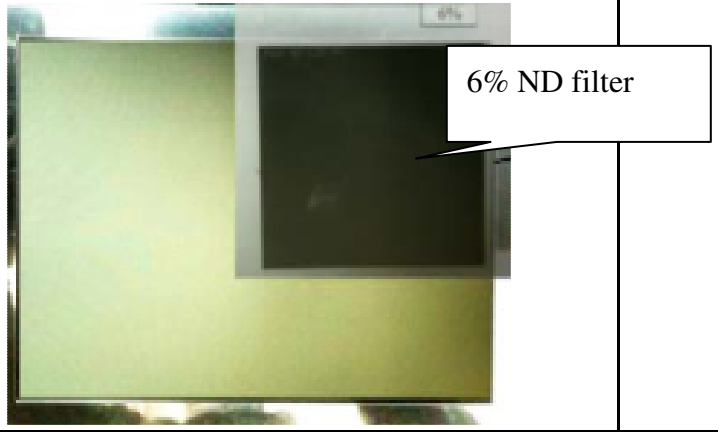
2.The defects classify of AQL as following:

(1) Test method: According to **ANSI/ASQC Z 1.4** .General Inspection Level Ⅱ take a single time

(2) The defects classify of AQL as following:

Class of defects	AQL	Definition
Major	0.65 %	It is defect that is likely to result in failure or to reduce materially the usability of the intended function.
Minor	1.5%	It is a defect that will not result in functioning problem with deviation classified.

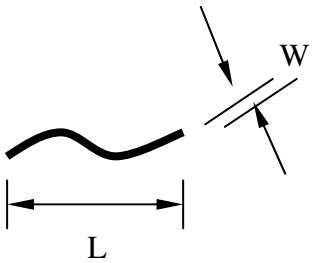
3. Inspection Parameters

Item		Specification/Description		Note
Display	Function	No Display		-
		Malfunction		-
Operating	Contrast ratio	Out of Spec		-
	Line defect	No obvious Vertical and Horizontal line defect in bright, dark and colored.		-
	Point Defect (red, green, blue, dark, white)	Item	Acceptable number	Note: 1、4、5、6
		BRIGHT Dot	N≦0	
		DARK Dot	N≦2 Two dark Dots≧10 mm	
		TOTAL Dot	N≦2	
		Tiny-Bright Dot	N≦5 Through 10% ND	
		Two or more Adjacent Dot	NOT ALLOWED	
	MURA (50% Grey)	Has the non-uniform phenomenon 		-
		Weak defect will be defined as mura if it can be observed through ND filter 6% 		

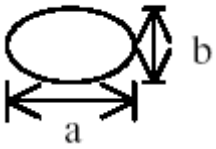
<table>
<tr><th colspan="2">Item</th><th>Specification/Description</th><th>Note</th></tr>
<tr><td rowspan="4">External Inspection (non-operating or operating)</td><td>Scratch (in display area)</td><td><table><tr><td>L(mm)</td><td>W(mm)</td><td>Acceptable number</td></tr><tr><td>L≦2.5</td><td>W≦0.1</td><td>3</td></tr><tr><td>L＞2.5</td><td>W＞0.1</td><td>0</td></tr></table></td><td>Note:2</td></tr>
<tr><td>Polarizer dent or bubble (in display area)</td><td><table><tr><td>Dimension(mm)</td><td>Acceptable number</td></tr><tr><td>D≦0.25</td><td>Disregard</td></tr><tr><td>D≦0.5</td><td>4</td></tr></table></td><td>Note:3</td></tr>
<tr><td>Line Shape (Particles and Lint in display area)</td><td><table><tr><td>L(mm)</td><td>W(mm)</td><td>Acceptable number</td></tr><tr><td>-</td><td>W≦0.07</td><td>Disregard</td></tr><tr><td>L≦5</td><td>W≦0.1</td><td>4</td></tr><tr><td>L≧5</td><td>W≧0.1</td><td>0</td></tr></table></td><td>Note:2</td></tr>
<tr><td>Dot Shape (Particle in Display area)</td><td><table><tr><td>Dimension(mm)</td><td>Acceptable number</td></tr><tr><td>D≦0.25</td><td>Disregard</td></tr><tr><td>D≦0.5</td><td>4</td></tr></table></td><td>Note:3</td></tr>
</table>

Note1. The definition of dot defect : The dot defect was judged after repair and the size of a defective dot over 1/2 of whole dot is regarded as one defective dot.

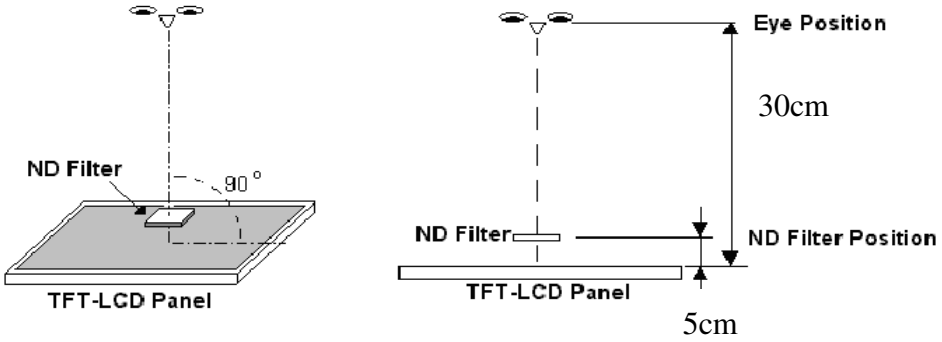
Note2.



Note3. D：Diameter D=(a+b)/2



Note4. The tiny-bright dot is defined through 10% ND Filter, The size of a defective dot less than 1/2 of a whole dot is regarded as one tiny-bright defective dot .



Note5. ADJACENT DOT



Note6. Others

a).The defects that are not defined above and considered to be problem shall be reviewed and discussed by both parties.

b).Defects on the Black Matrix, out of Display area, are not considered as a defect or counted.

4. Handling of LCM

(1)Don't give external shock.

(2)Don't apply excessive force on the surface.

(3)Liquid in LCD is hazardous substance. Must not lick and swallow. when the liquid is attach to your hand, skin, cloth etc. Wash it out thoroughly and immediately.

(4)Don't operate it above the absolute maximum rating.

(5)Don't disassemble the LCM.