

# 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. : VGG128004-5TSLWA(RoHS)

REVISION : 6

APPROVAL FOR SPECIFICATIONS ONLY

APPROVAL FOR SPECIFICATIONS AND SAMPLE

CUSTOMER :

STD.

APPROVED BY :

### EVERVISION LCM R&D CENTER


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
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## 2. Record of Revisions

<b>Rev.</b>	<b>Comments</b>	<b>Page</b>	<b>Date</b>
1	Preliminary Specification was first issued.	All	12/16'14
2	Modify 7.2.2 Backlight Unit	6	3/31'15
2	Modify 8.1 TFT-LCD Module	7	3/31'15
2	Modify 8.2 Backlight Unit	8	3/31'15
2	Modify 12. Optical Characteristics	17	3/31'15
2	Modify 14 Packaging	21	3/31'15
2	Modify 16 Outline Drawing	23	3/31'15
2	Modify 18 Incoming Inspection Standards	26	3/31'15
3	Modify 4 Application	5	4/22'15
4	Modify 6 General Specifications	5	5/12'15
4	Modify 8.1 TFT-LCD Module	7	5/12'15
4	Modify 10.1 TFT-LCD Module	10	5/12'15
4	Modify 11.2 Power Sequence	16	5/12'15
4	Modify 12 Optical Characteristics	17	5/12'15
4	Modify 13 Reliability Test	20	5/12'15
4	Modify 14 Packaging	21	5/12'15
4	Modify 16 Outline Drawing	23	5/12'15
4	Modify 18 Incoming Inspection Standards	26	5/12'15
5	Modify 1 Table of Contents	2	5/26'15
5	Modify 15 Precautions	22	5/26'15
5	Modify 18 Incoming Inspection Standards	27	5/26'15
6	Modify 8.1 TFT-LCD Module	7	6/12'15

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### 3. Module Numbering System

**V G G 1280 04 – 5 T S L W A**

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;  
**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

Package Type:  
**B:** COB; **F:** COF; **G:** COG; **H:** Heat Seal; **S:** SMT; **T:** TAB; **O:** Others

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#### 4. Application

This specification is applied to the 10.1 inch WXGA supported TFT-LCD module, and can display true 16.7M colors (8 bit/ color). The module is designed for OA, Car TV application and other electronic products which require flat panel display of digital signal interface. This module is composed of a 10.1" TFT-LCD panel, a driver circuit.

#### 5. Features

- WXGA (1280×800 pixels) resolution.
- LVDS Receiver 24 bit Interface
- Dot inversion mode with stripe type.

#### 6. General Specifications

Item	Specifications	Unit
Screen Size	10.1 (Diagonal)	inch
Display Format	1280RGB(H)×800(V)	dot
Active Area	216.96(H)×135.6(V)	mm
Dot Pitch	0.0565(H)×0.1695(V)	mm
Pixel Configuration	RGB Vertical Stripe	-
Display Mode	AAS Type Transmissive Mode Normally Black	-
Surface Treatment	Hard coating	-
Viewing Direction	Full view angle	-
Outline Dimension	229.46(W)×149.1(H)×2.5(D)	mm
Weight	192.2	g
RoHS Compliance	Evervision certifies this product to be in compliance with European Union Directive 2011/65/EU on the restriction of certain hazardous substances in electrical and electronic equipment.	-

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## 7. Absolute Maximum Ratings

### 7.1 Absolute Ratings of Environment

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T <sub>ST</sub>	-20	+60	°C	(1)(2)
Operating Ambient Temperature	T <sub>OP</sub>	0	+50	°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

Note1

(Ta=25±2°C)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Digital Power Supply Voltage	VDD	-0.3	3.9	V	-
Analog Power Supply Voltage	AVDD	-0.3	14	V	-
Gate High Voltage	V <sub>GH</sub>	-0.3	42	V	-
Gate Low Voltage	V <sub>GL</sub>	-19	0.3	V	-
Gate High To Gate Low Voltage	V <sub>GH</sub> - V <sub>GL</sub>	12	40	V	-

#### 7.2.2 Backlight Unit

Note1

(Ta=25±2°C)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
LED Reverse Voltage	VF	-	5	V	Each LED
LED Forward Current	IR	-	60	mA	Each LED

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

## 8. Electrical Characteristics

### 8.1 TFT-LCD Module

Note1

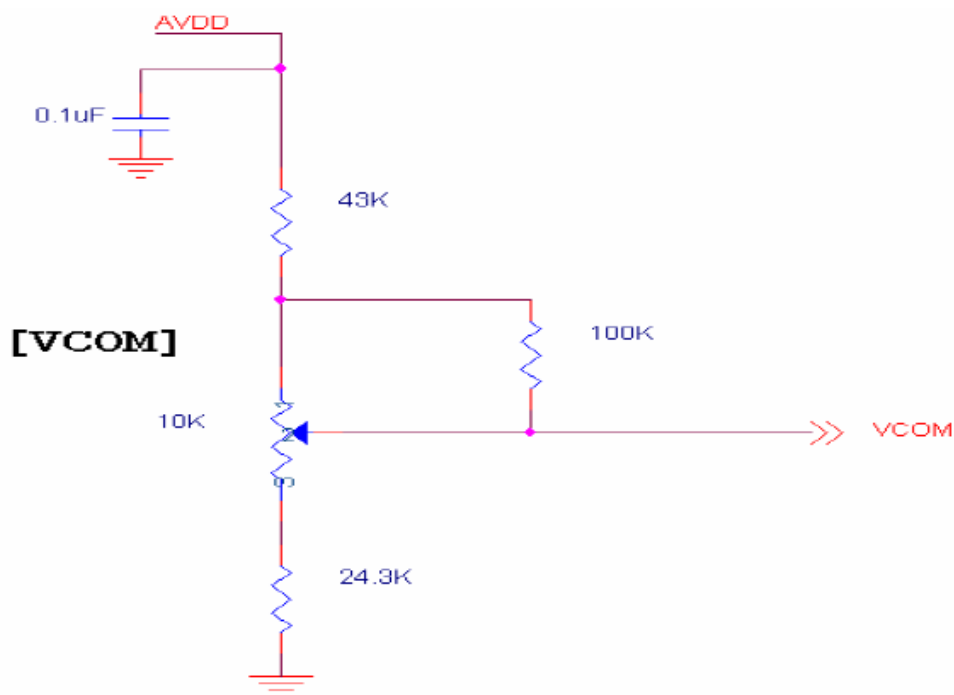
(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Digital Power Supply Voltage	VDD	2.3	2.5	2.7	V	(2)
Analog Power Supply Voltage	AVDD	8.0	8.2	8.4	V	-
Gate High Voltage	V <sub>GH</sub>	21.7	22	22.3	V	-
Gate Low Voltage	V <sub>GL</sub>	-7.3	-7	-6.7	V	-
Input signal voltage	VCOM	2.7	3.0	3.3	V	(4)
Current for Driver	I <sub>GH</sub>	-	705	750	uA	V <sub>GH</sub> =22V
	I <sub>GL</sub>	-	705	750	uA	V <sub>GL</sub> = -7V
	I <sub>VDD</sub>	-	95	120	mA	VDD =2.5V
	I <sub>AVDD</sub>	-	45	70	mA	AVDD =8.2V
Input logic high voltage	V <sub>IH</sub>	0.8VDD	-	3.6	V	(3)
Input logic low voltage	V <sub>IL</sub>	0	-	0.2VDD	V	

Note 1: Be sure to apply VDD and V<sub>GL</sub> to the LCD first, and then apply V<sub>GH</sub>.

Note 2: VDD setting should match the signals output voltage (refer to Note 3) of customer's system board.

Note 4: Typical VCOM is only a reference value, it must be optimized according to each LCM. Be sure to use VR.



## 8.2 Backlight Unit

(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Voltage for LED backlight	V <sub>L</sub>	-	9.3	10.2	V	(1)
Current for LED backlight	I <sub>L</sub>	-	260	-	mA	-
LED Life Time(25°C)	-	50000	60000	-	hr	(2)

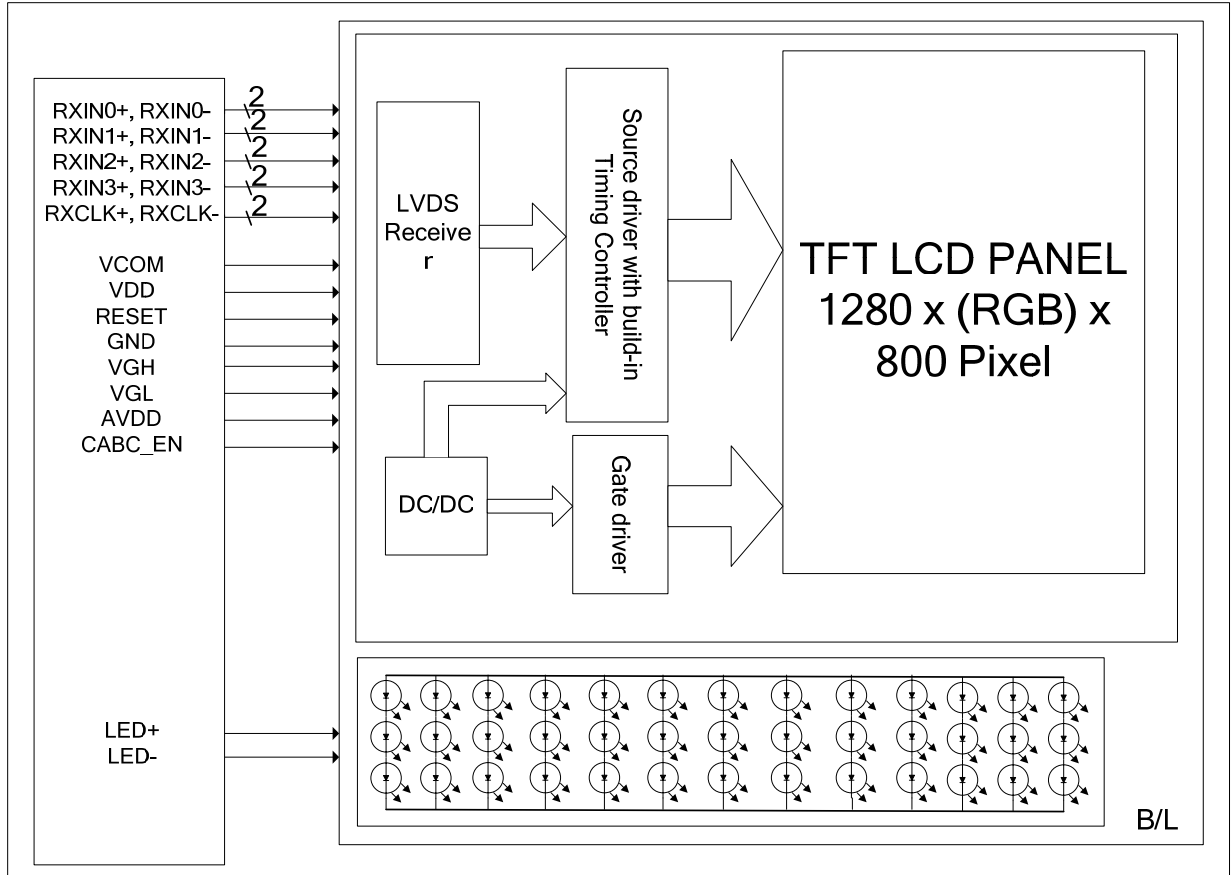
Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C and IL =260mA.

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and IL =260mA. The LED life time could be decreased if operating IL is lager than 260mA.



**9. Block Diagram**

**9.1 TFT-LCD Module with Backlight Unit**



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## 10. Input / Output Terminals Pin Assignment

### 10.1 TFT-LCD Module

A 40pin connector is used for the module electronics interface. The recommended model is F62240-H1210B manufactured by Vigorconn.

Pin No.	Symbol	I/O	Function	Remark
1	VCOM	P	Common Voltage	
2	VDD	P	Power Supply	
3	VDD	P	Power Supply	
4	NC	---	No connection	
5	NC	---	No connection	
6	NC	---	No connection	
7	GND	P	Ground	
8	Rxin0-	I	-LVDS Differential Data Input	R0-R5, G0
9	Rxin0+	I	+LVDS Differential Data Input	
10	GND	P	Ground	
11	Rxin1-	I	-LVDS Differential Data Input	G1~G5, B0,B1
12	Rxin1+	I	+LVDS Differential Data Input	
13	GND	P	Ground	
14	Rxin2-	I	-LVDS Differential Data Input	B2-B5,HS,VS, DE
15	Rxin2+	I	+LVDS Differential Data Input	
16	GND	P	Ground	
17	RxCLK-	I	-LVDS Differential Clock Input	LVDS CLK
18	RxCLK+	I	+LVDS Differential Clock Input	
19	GND	P	Ground	
20	Rxin3-	I	-LVDS Differential Data Input	R6, R7, G6, G7, B6, B7
21	Rxin3+	I	+LVDS Differential Data Input	
22	GND	P	Ground	
23	NC	---	No connection	
24	NC	---	No connection	
25	GND	P	Ground	
26	NC	---	No connection	

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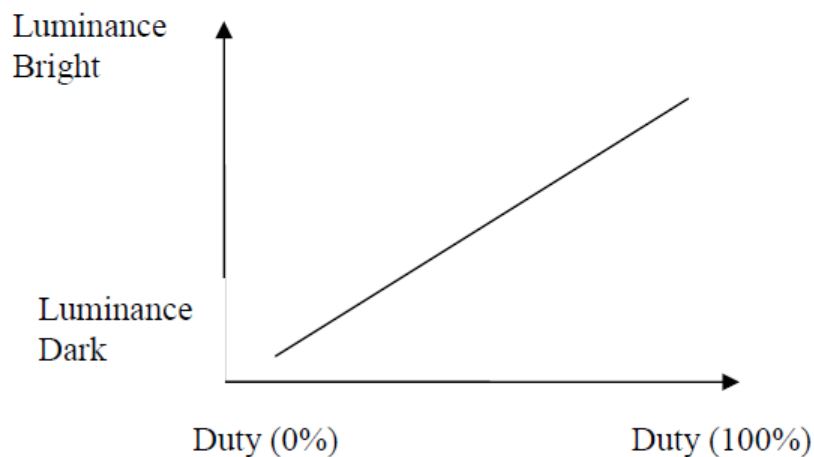
27	LED_PWM	O	CABC controller signal output for backlight	Note2
28	NC	---	No connection	
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-	P	LED Cathode	
32	LED-	P	LED Cathode	
33	NC	---	No connection	
34	NC	---	No connection	
35	VGL	P	Gate OFF Voltage	
36	NC	---	No connection	
37	CABC_EN	I	CABC Enable Input	Note1
38	VGH	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

I: input, O: output, P: Power

Note1: The setting of CABC function are as follows.

Pin	Enable	Disable
CABC_EN	High Voltage	Low Voltage or open

Note2: LED\_PWM is used to adjust backlight brightness.



### 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.

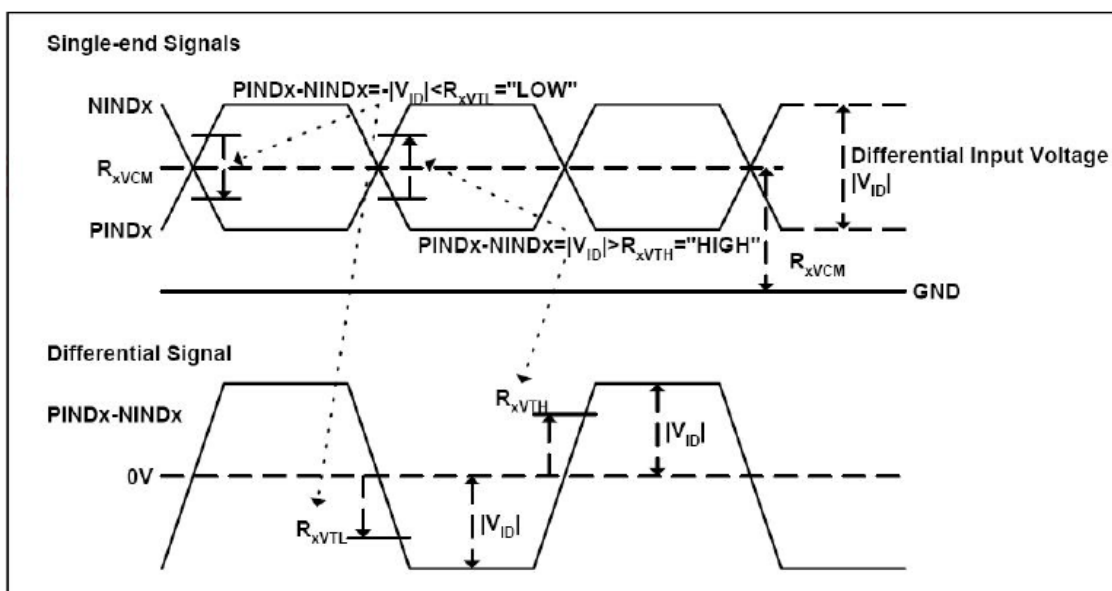
Color		Data Signal																							
		Red								Green								Blue							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Green	0	0	0	0	0	0	0	0	1	1	1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

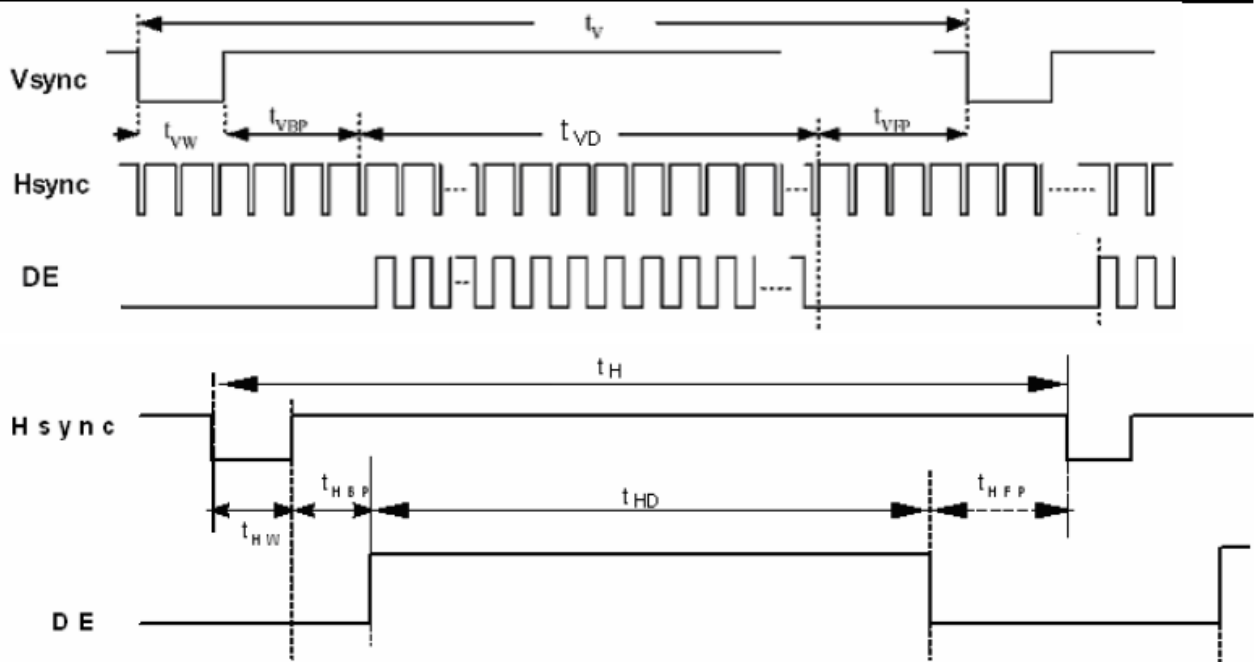
#### 11.1.1.AC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
LVDS Differential input high Threshold voltage	$R_{xVTH}$	-	-	+100	mV	$R_{xVCM}=1.2V$
LVDS Differential input low Threshold voltage	$R_{xVTL}$	-100	-	-	mV	
LVDS Differential input common mode voltage	$R_{xVCM}$	0.7	-	1.6	V	
LVDS Differential voltage	$ V_{ID} $	200	-	600	mV	

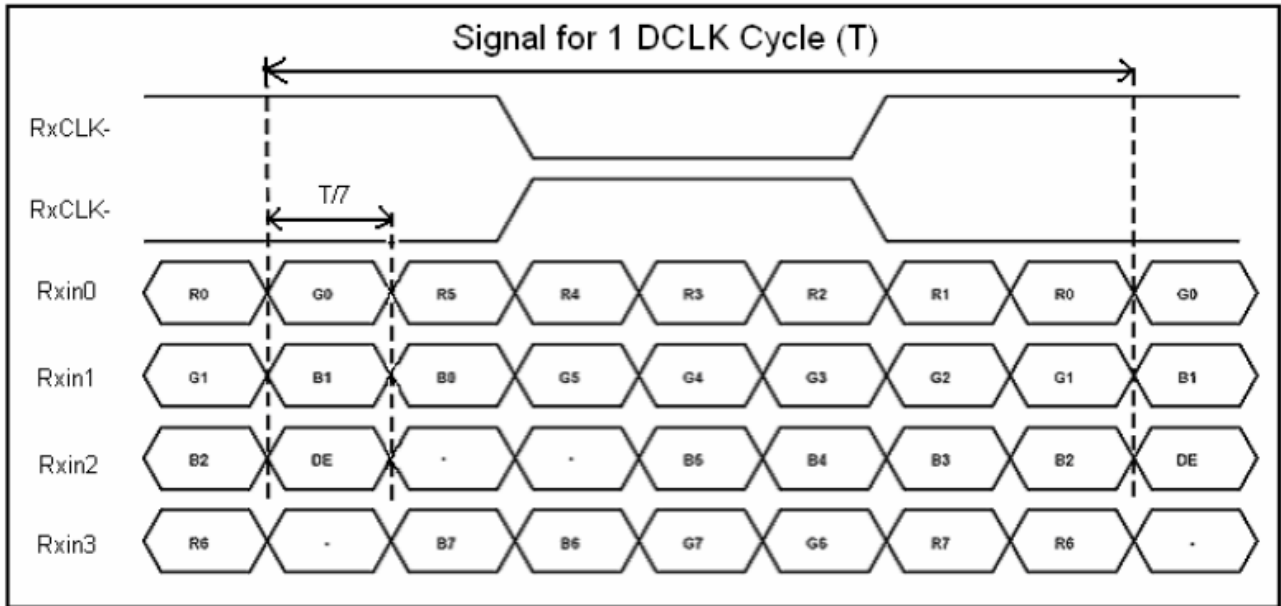


**11.1.2. Timing**

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	1/Tc	(68.9)	71.1	(73.4)	MHz	Frame rate =60Hz
Horizontal display area	tHD	1280			Tc	
HS period time	tH	(1410)	1440	(1470)	Tc	
HS Width +Back Porch +Front Porch	tHW+ tHBP +tHFP	(60)	160	(190)	Tc	
Vertical display area	tVD	800			tH	
VS period time	tV	(815)	823	(833)	tH	
VS Width +Back Porch +Front Porch	twV+ tvBP +tvFP	(15)	23	(33)	tH	

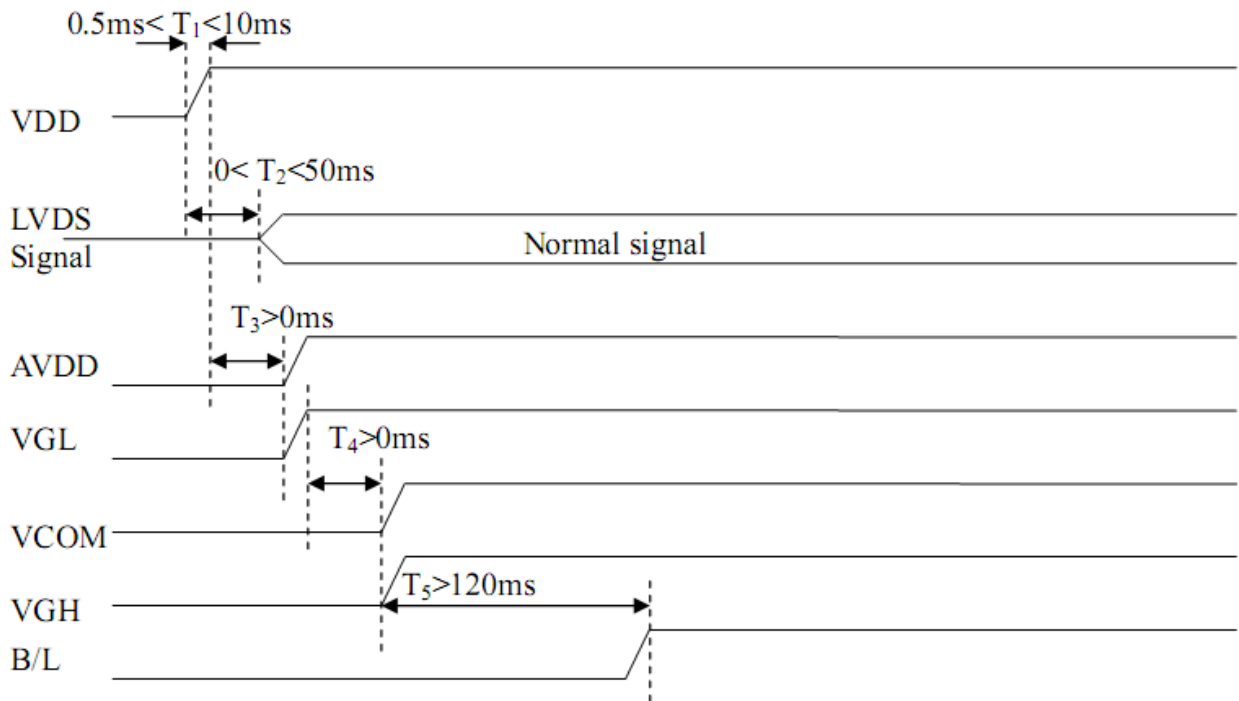


**11.1.4. LVDS Data Input Format**

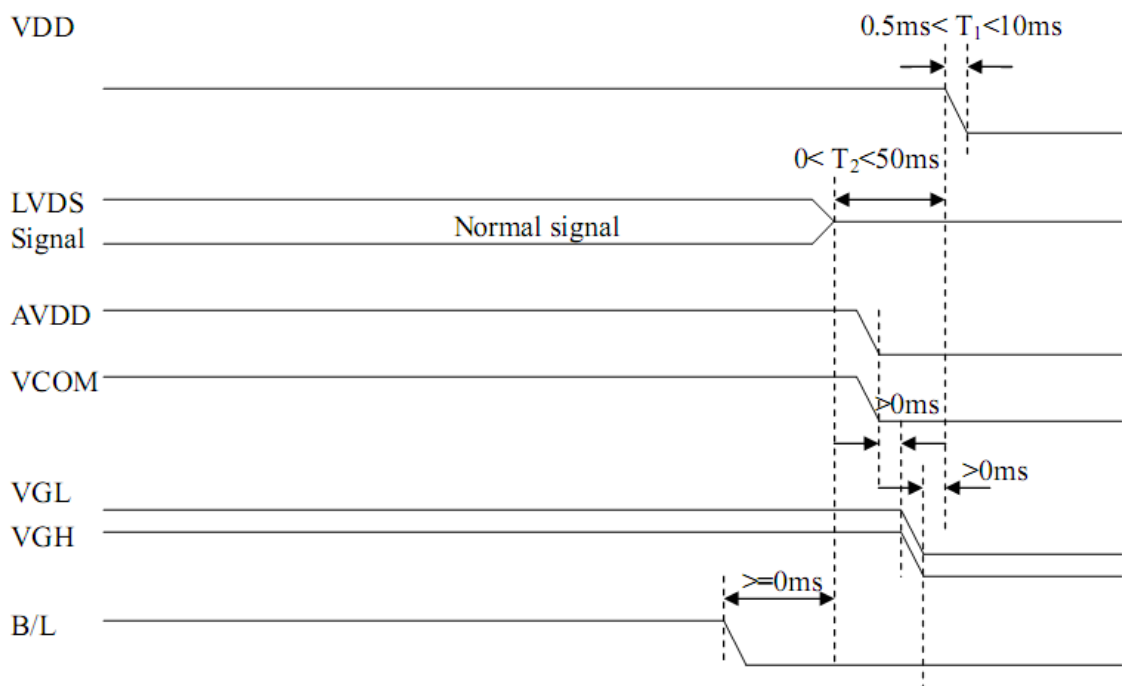


### 11.2 Power Sequence

**a. Power on:**



**b. Power off:**



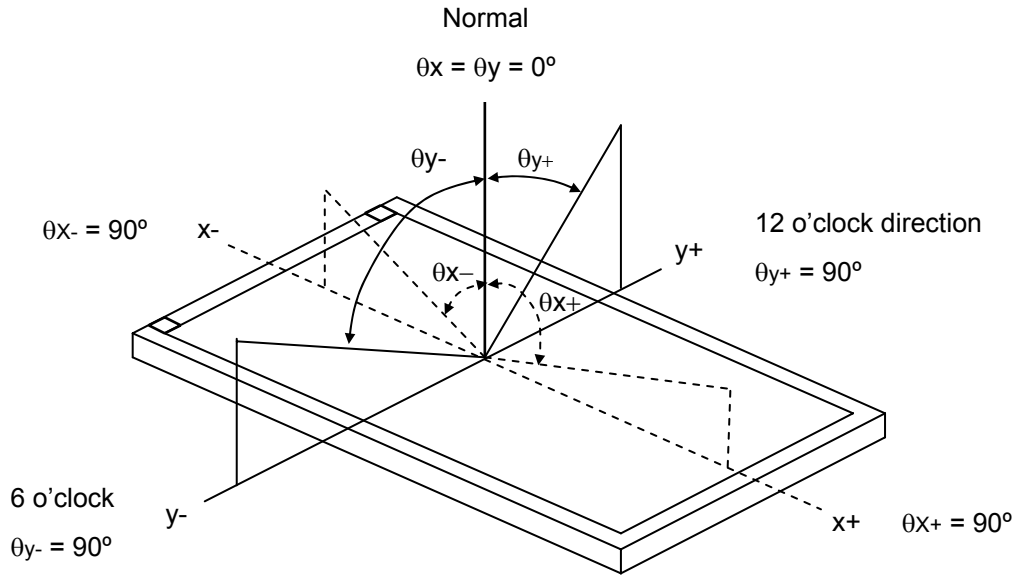


**12. Optical Characteristics**

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

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	$\theta_x=0^\circ, \theta_y=0^\circ$ Viewing Normal Angle	600	( 800 )	-	-	(2)
Response Time		$T_R$		-	10	20	ms	(3)
		$T_F$		-	15	30	ms	
Luminance(Center)		Y		500	( 550 )	-	cd/m <sup>2</sup>	(4)
Brightness uniformity		BUNI		75	( 80 )	-	%	(5)
Color Chromaticity	White	$W_x$		0.260	0.310	0.360	-	(1),(4)
		$W_y$		0.280	0.330	0.380	-	
	Red	$R_x$		0.550	0.600	0.650	-	
		$R_y$		0.290	0.340	0.390	-	
	Green	$G_x$		0.290	0.340	0.390	-	
		$G_y$	0.540	0.590	0.640	-		
	Blue	$B_x$	0.105	0.155	0.205	-		
		$B_y$	0.090	0.140	0.190	-		
Viewing Angle	Horizontal	$\theta_{x+}$	$CR \geq 10$	75	( 85 )	-	deg.	
		$\theta_{x-}$		75	( 85 )	-		
	Vertical	$\theta_{y+}$		75	( 85 )	-		
		$\theta_{y-}$		75	( 85 )	-		

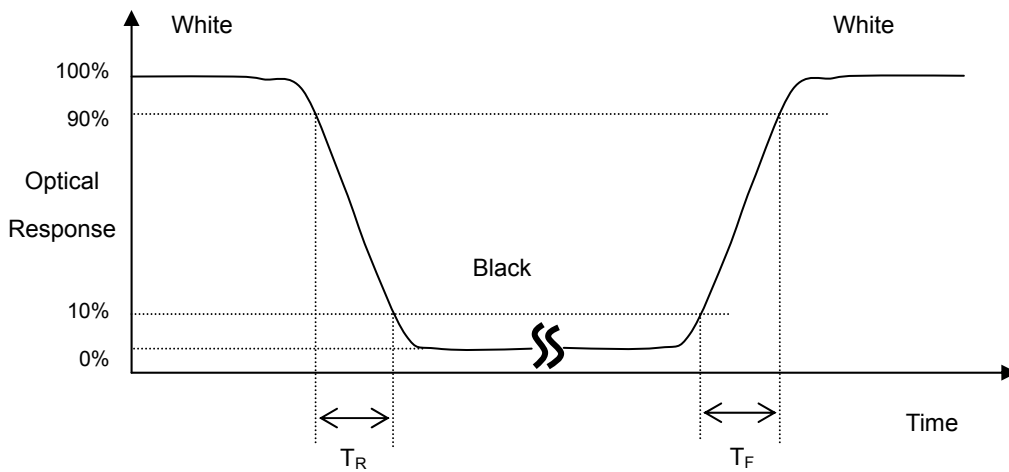
Note (1) Definition of Viewing Angle ( $\theta_x, \theta_y$ ):



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

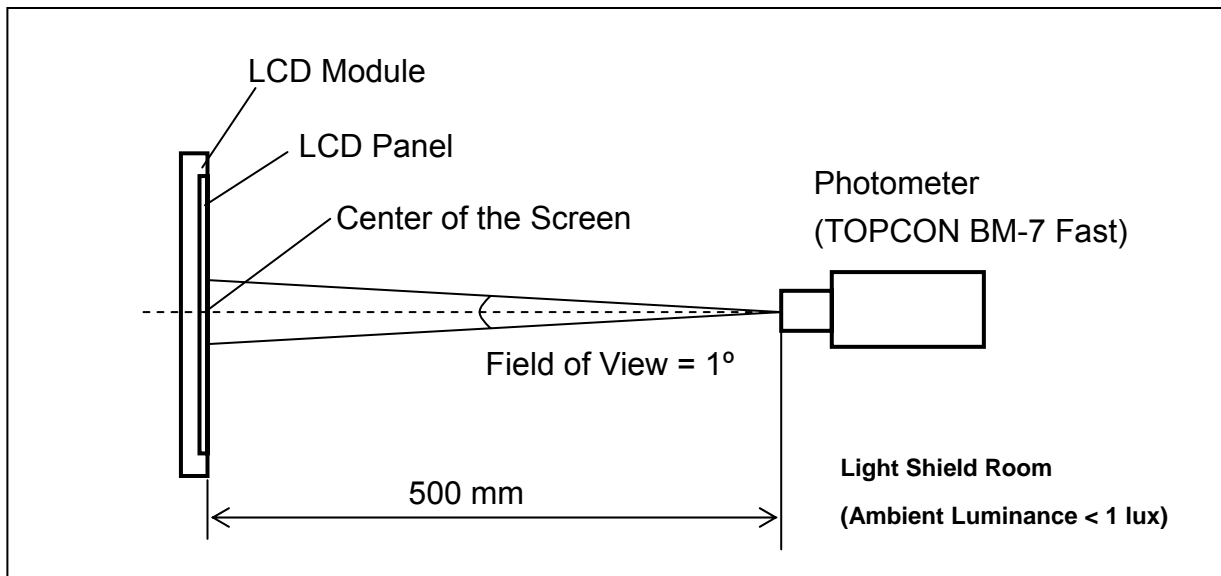
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

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



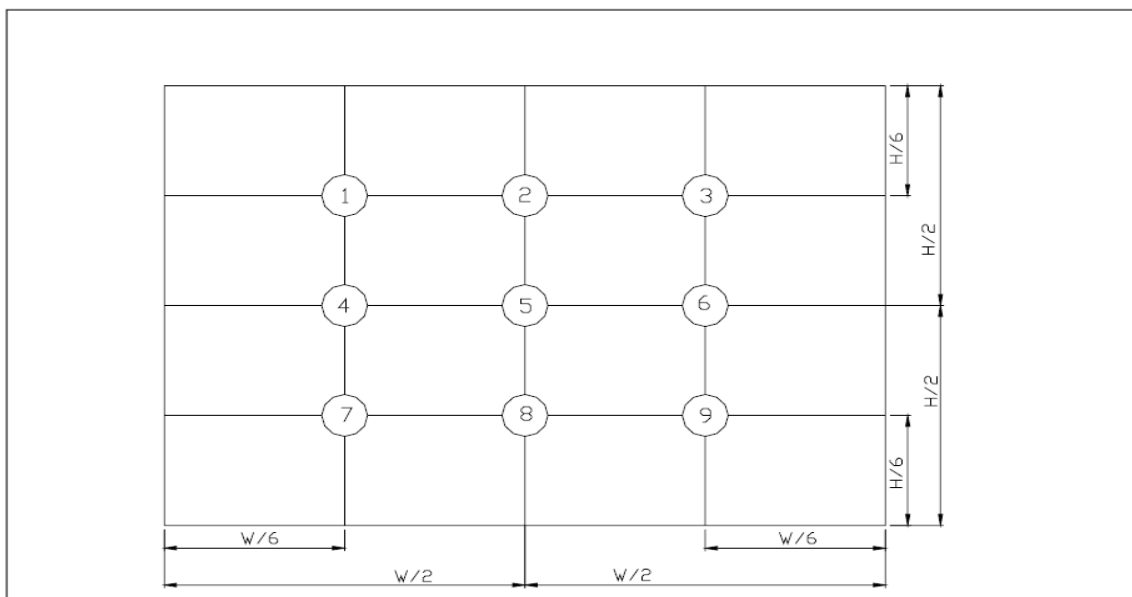
**Note (4) Measurement Set-Up:**

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**

$$\text{Brightness uniformity} = (\text{Min Luminance of 9 points}) / (\text{Max Luminance of 9 points}) \times 100\%$$



( 單位 : mm )

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### 13. Reliability Test

No.	Test Items	Test Condition	Remark
1	High Temperature Storage Test	T <sub>a</sub> = 60°C 120 hours	(1),(3),(4)
2	Low Temperature Storage Test	T <sub>a</sub> = -20°C 120 hours	(1),(3),(4)
3	High Temperature Operation Test	T <sub>s</sub> = 50°C 120 hours	(2),(3),(4)
4	Low Temperature Operation Test	T <sub>a</sub> = 0°C 120 hours	(1),(3),(4)
5	High Temperature and High Humidity Operation Test	T <sub>a</sub> =40°C 90%RH 120 hours	(3),(4)
6	Electro Static Discharge Test (non-operating)	-Panel Surface/Top Case : 150pF, 330Ω Air: ±15kV, Contact: ±8kV	(3)
7	Mechanical Shock Test (non-operating)	Half sine wave, 100G, 6ms 3 times shock of each six surfaces	(3)
8	Vibration Test (non-operating)	Sine wave : 10 ~ 55 ~ 10Hz amplitude : 1.5mm 3 axis , 2 hours/axis	(3)
9	Thermal Shock Test (non-operating)	0°C (30min) ~ 50°C (30min), 10 cycles	(3),(4)
10	Drop Test(with Carton)	Height: 80cm 1 corner, 3 edges, 6 surfaces	(3)

Note 1 : T<sub>a</sub> is the ambient temperature of samples.

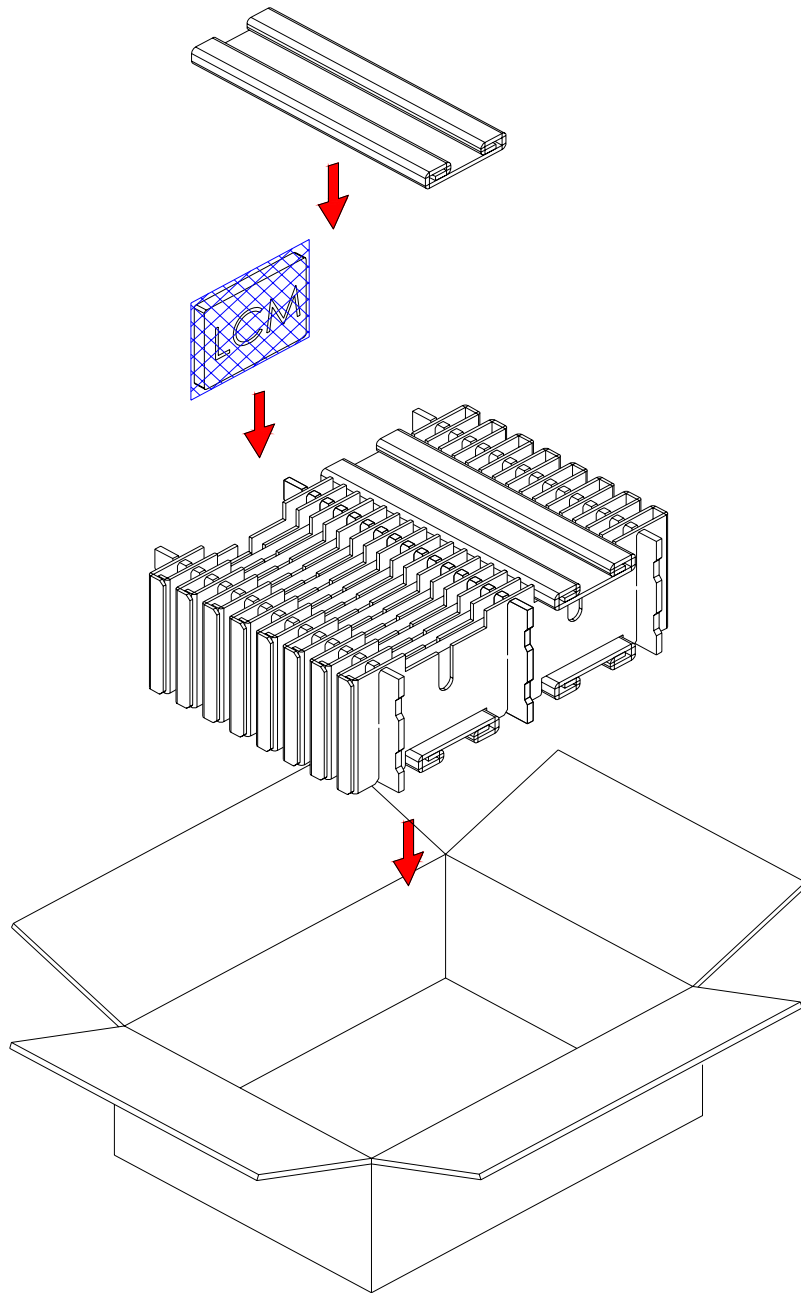
Note 2 : T<sub>s</sub> is the temperature of panel's surface.

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	STATIC SHIEDING BAGS	245.0x300.0x0.09		30	
2	CARD BOARD	355.0x235.0x3.5	CARTON	3	
3	CARD BOARD	515.0x23.0x235.0	CARTON	8	
4	EXTERNAL BOX	520.0x355.0x241.0	CARTON	1	
5	PRODUCT	229.46x149.1x2.5		30	

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## **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 10°C, 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**

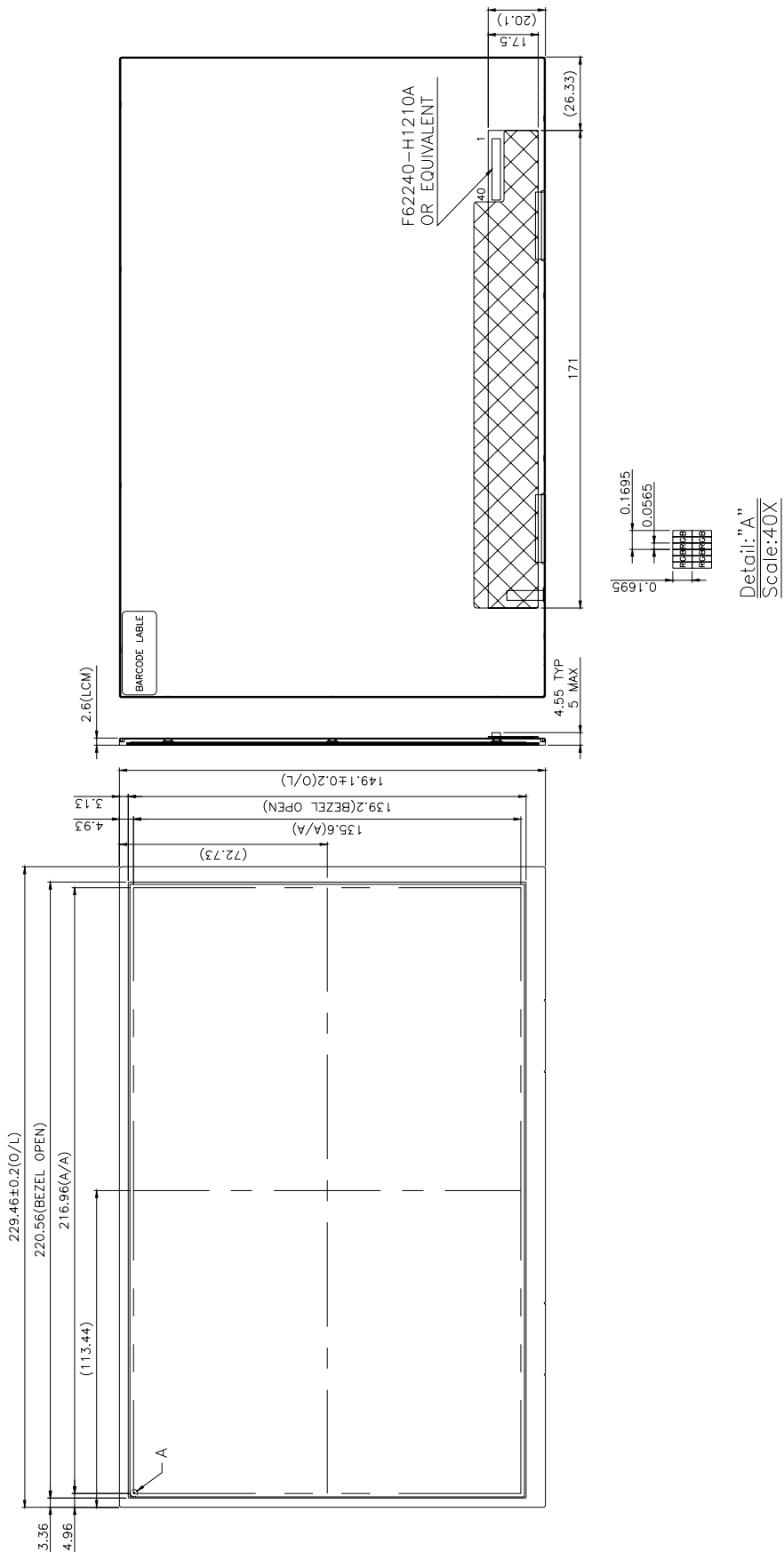
- (1) Acceptance inspection period  
The period is within one month after the arrival of contracted commodity at the buyer's factory site.
- (2) Applicable warrant period  
The period is within twelve months since the date of shipping out under normal using and storage conditions.

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#### **15.4 Caution**

This Evervision 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 Evervision expressly disclaims any and all liability relating in any way to the use of the module in such applications.

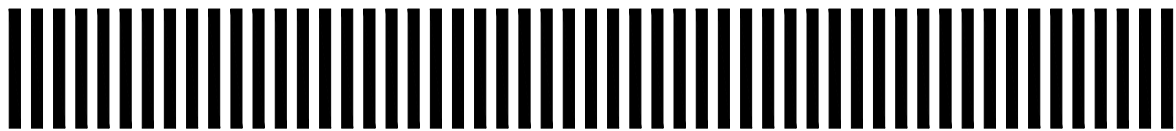
**16.Outline Drawing**



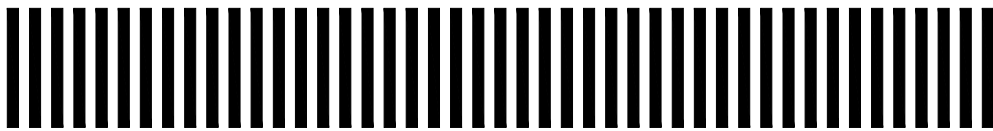


**17. Definition of Labels**

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



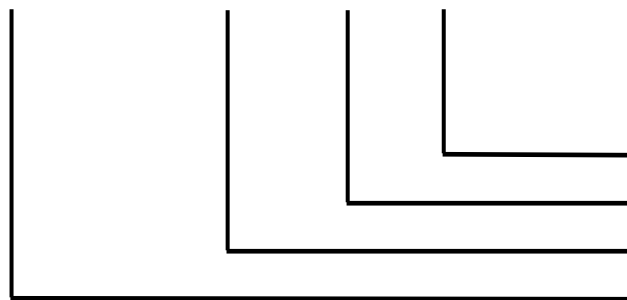
VGG128004-5TSLWA



ABCDEFGHIJKL

- (a) Module Name : VGG128004-5TSLWA
- (b) Serial ID :

A B C D    E F G    H    IJKL



Serial No.  
 Factory Code  
 Manufactured Date  
 Screen Size

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

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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):

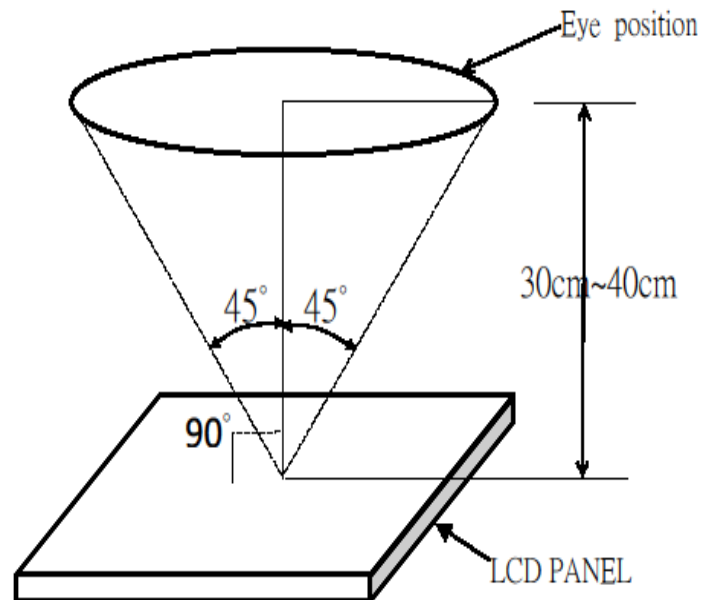
Manufacturing sequence of product, for example : 0001~9999.

## 18. Incoming Inspection Standards

### 18.1 The environmental condition of inspection

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

- (1) Ambient temperature  $25 \pm 5^{\circ}\text{C}$
- (2) Humidity: 45 ~ 65 % RH
- (3) Viewing distance is approximately 30~40 cm
- (4) Viewing angle is normal to the LCD panel as Fig \_1 ( $\pm 45^{\circ}$ )
- (5) Ambient Illumination: 300 ~ 500 Lux for external appearance inspection



Fig\_1

### 18.2 The defects classify of AQL as following:

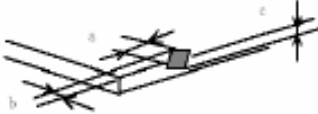


- (1) Test method: According to ANSI/ASQC Z 1.4 .General Inspection Level II take a single time
- (2) The defects classify of AQL as following:

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.

**18.3 Inspection Parameters**

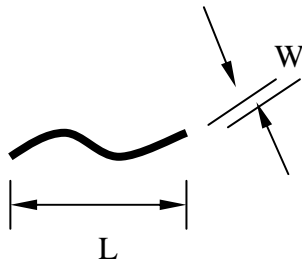
Item		Specification/Description			Note
Display	Function	No Display			-
		Malfunction			-
Operating	Contrast ratio	Out of Spec			-
	Line defect	No obvious Vertical and Horizontal line defect in bright , dark and colored.			-
	Point Defect (red ,green , blue, dark , white)	Item		Acceptable number	Note: 1、4、5
		BRIGHT DOT	Random	$N \leq 3$	
			2 dots adjacent	$N \leq 0$	
			3 dots adjacent	$N \leq 0$	
		Distance	Minimum Distance Between Bright Dots	5mm	
		DARK DOT	Random	$N \leq 4$	
			2 dots adjacent	$N \leq 0$	
			3 dots adjacent	$N \leq 0$	
TOTAL DOT		$N \leq 6$			
Distance	Minimum Distance Between Dark AND Bright Dots Minimum Distance Between Dark Dots	5mm			
External Inspection (non-operating or operating)	Scratch (in display area)	L(mm)	W(mm)	Acceptable number	
		-	$W \leq 0.07$	Disregard	
		$L \leq 5.0$	$0.07 < W \leq 0.1$	4	
	Polarizer dent or bubble (in display area)	Dimension(mm)		Acceptable number	
		$D \leq 0.3$		Disregard	
		$0.3 < D \leq 0.5$		4	
	Line Shape (Particles and Lint in display area)	L(mm)	W(mm)	Acceptable number	
		-	$W \leq 0.07$	Disregard	
		$L \leq 5$	$0.07 < W \leq 0.1$	4	
	Dot Shape (Particle in Display area)	Dimension(mm)		Acceptable number	
		$D \leq 0.3$		Disregard	
		$0.3 < D \leq 0.5$		4	

**Incoming Inspection Touch Panel**

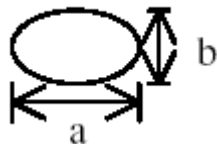
Item	Specification/Description			Note	
	L(mm)	W(mm)	Acceptable number		
Touch Panel	Scratch	$L \leq 10$	$W < 0.05$	Disregard	Note:2
			$0.05 \leq W < 0.1$	$N \leq 4$	
			$W \geq 0.1$	0	
	Foreign Materials (Linear shape)	$L \leq 10$	$W < 0.05$	Disregard	Note:2
			$0.05 \leq W < 0.1$	$N \leq 3$	
			$W \geq 0.1$	0	
	Foreign Materials (Circular shape)	Dimension(mm)		Acceptable number	Note:3
		$D \leq 0.25$		Disregard	
		$0.25 < D \leq 0.5$		$N \leq 6$	
		$D > 0.5$		0	
	Glass chipping			$a \leq 5\text{mm}$ $b \leq 3\text{mm}$ $c \leq t$ (t: Glass think)	Note:6
				$a \leq 3\text{mm}$ $b \leq 3\text{mm}$ $c \leq t$ (t: Glass think)	Note:6
Newton-ring	(In case of doubtful situations) Observe on $60^\circ$ from the product surface under a white Fluorescent lamp (3-wavelength lamp).		Average diameter $\leq 1/3$ Touch Panel area Disregard.	Note:6	
Membrane Drum			$H \leq 0.4\text{mm}$	-	

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.

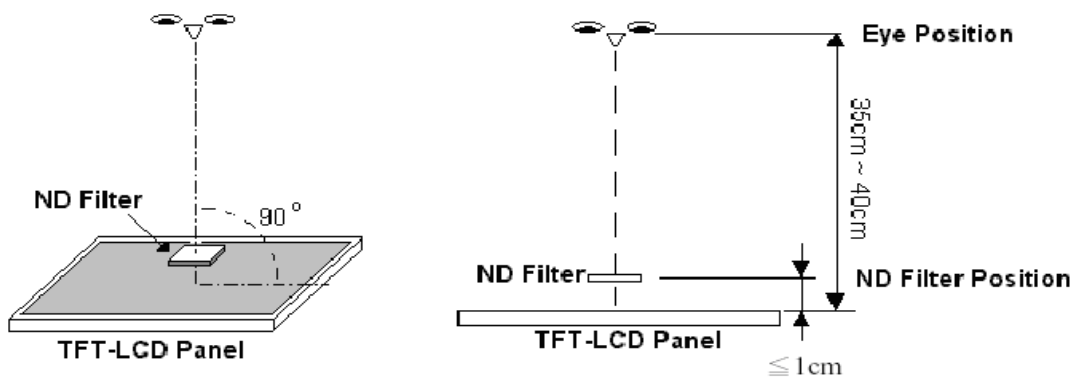
Note2.



Note3. D : Diameter  $D=(a+b)/2$



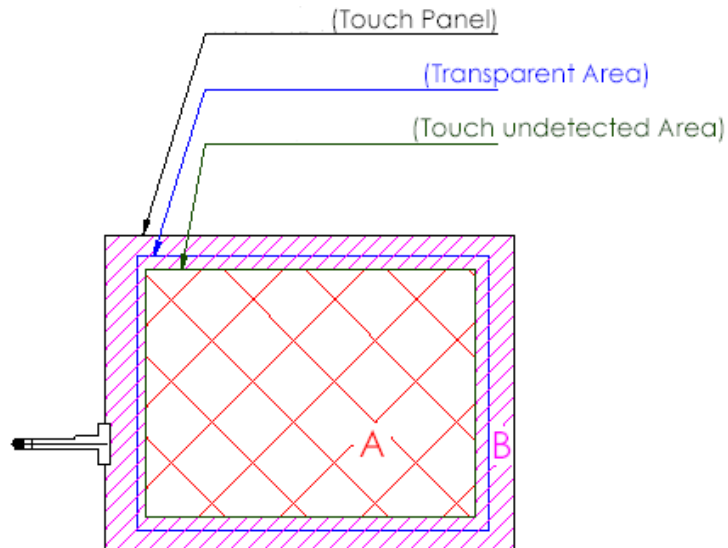
Note4. Bright dot is defined through 2% transmission ND Filter as following.



Note5. ADJACENT DOT



Note6.



A area : Without any defect point effect on normal operation.

B area : None-specify

#### 18.4 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.