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. : VGG128004-5TSLWG(RoHS)

REVISION : 2

☐APPROVAL FOR SPECIFICATIONS ONLY

■APPROVAL FOR SPECIFICATIONS AND SAMPLE

CUSTOMER :	APPROVED BY :
STD.	

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1. Table of Contents

2. Record of Revisions

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1	Preliminary Specification was first issued.	All	12/1515
2	Modify 6 General Specifications	5	2/19’16
2	Modify 8 Electrical Characteristics	7	2/19’16

3. Module Numbering System

V G G 1280 04 – 5 T S L W G

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

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, and backlight unit.

5. Features

- WXGA (1280×800 pixels) resolution.
- LVDS Receiver 24 bit Interface
- Dot inversion mode with stripe type.
- LED driver circuit is built in this module to provide PWM Dimmer function.

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	209	g
RoHS Compliance	Eversion 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.	-

7. Absolute Maximum Ratings

7.1 Absolute Ratings of Environment

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T_{ST}	-20	+60	°C	(1)(2)
Operating Ambient Temperature	T_{OP}	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

(Ta=25±2°C, GND=V_{SS}=0V)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Digital Power Supply Voltage	V_{CC}	-0.3	4.0	V	-
LVDS Driver Output Voltage	-	-0.3	V_{CC} + 0.3	V	-

7.2.2 LED Driver Absolute Maximum Ratings

(Ta=25±2°C)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
LED Driver Supply Voltage	VLED	-0.3	17	V	(1)
LED Driver PWM	PWM	-0.3	6	V	(1)

Note (1) Permanent damage to the device may occur if maximum values are exceeded or reverse voltage is loaded.

8. Electrical Characteristics

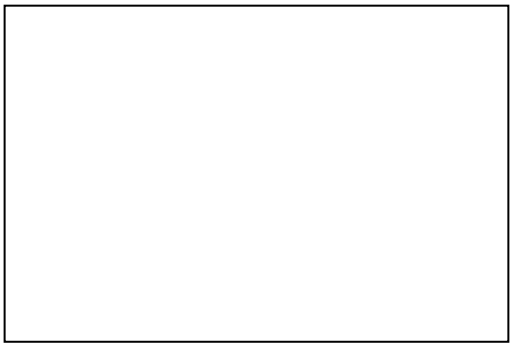
8.1 TFT-LCD Module

(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Supply Voltage	V_{CC}	3.0	3.3	3.6	V	-
Power Supply Current	I_{CC}	-	270	378	mA	(1)
Differential Input High Threshold Voltage	V_{TH}	-	-	100	mV	-
Differential Input Low Threshold Voltage	V_{TL}	-100	-	-	mV	-
Power Consumption	P_L	-	891	1247	mW	(1)
VSYNC Frequency	F_V	-	60	-	Hz	-
DCLK Frequency	DCLK	-	71.1	-	MHz	-

Note (1) The specified power consumption is under the conditions at V_{CC}=3.3V, F_V=60Hz, whereas a power dissipation check pattern below is displayed.

White Pattern / 255 Gray



Active Area

8.2 LED Driver Unit

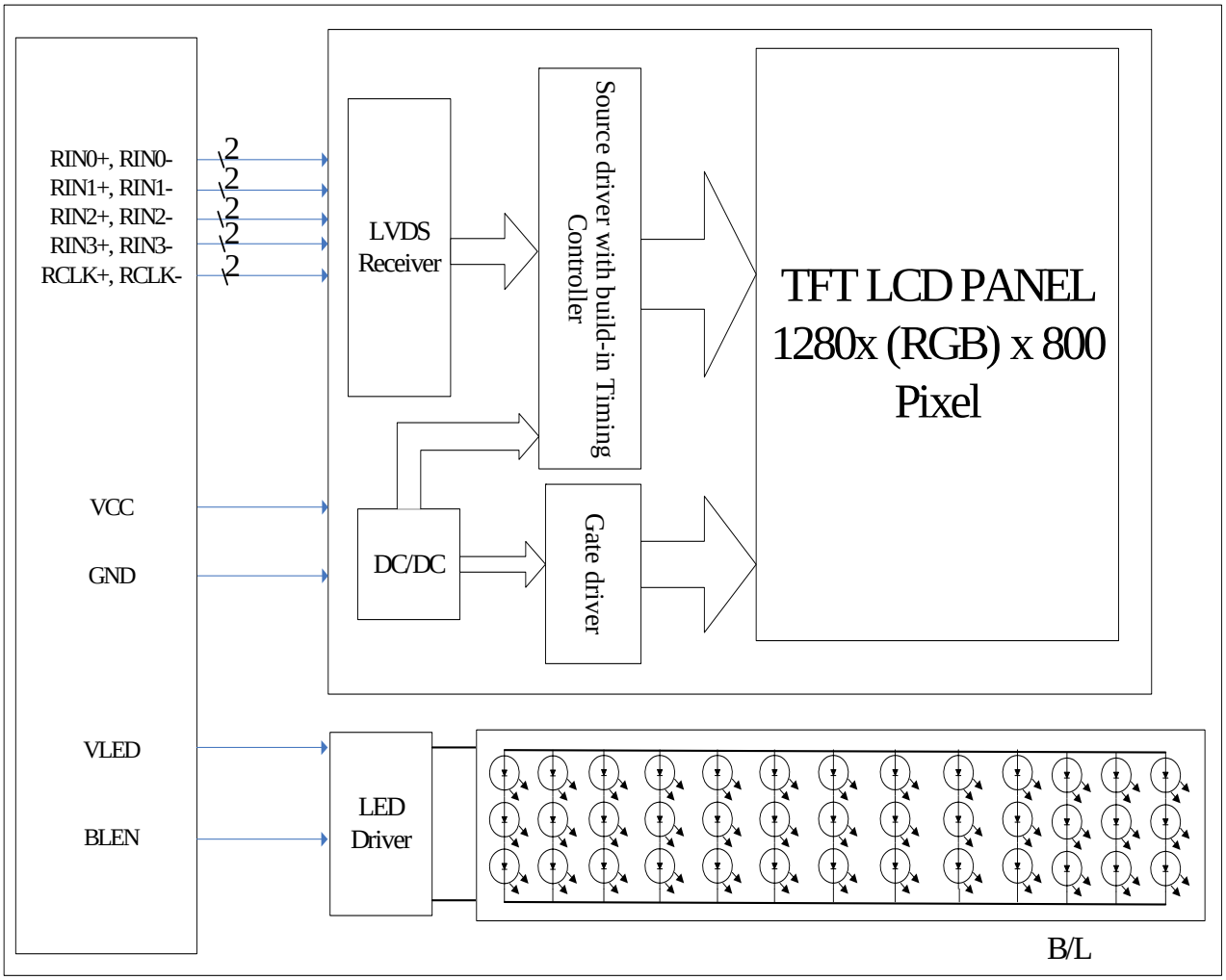
(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Voltage of LED Driver Unit	V_{LED}	11.5	12.0	12.5	V	-
Current of LED Driver Unit	I_{LED}	-	260	364	mA	V_{LED}=12V、B/L=260mA
Voltage of LED Driver Unit	V_{LED}	4.5	5.0	5.5	V	-
Current of LED Driver Unit	I_{LED}	-	630	882	mA	V_{LED}=5V、B/L=260mA
PWM signal Low voltage	V_{PWML}	0	-	0.2	V	-
PWM signal High voltage	V_{PWMH}	4	5.0	5.5	V	-
PWM frequency	f_{PWM}	100	-	1000	Hz	-
PWM Pulse width	t_{PWMH}	10	-	-	us	-
LED Life Time(25℃)	-	50000	60000	-	hr	(1)

Note (1)：LED life time is defined as under 25±2°C , when the average brightness decrease to 50% of original brightness

9. Block Diagram

9.1 TFT-LCD Module with Backlight Unit



10. Input / Output Terminals Pin Assignment

10.1 TFT-LCD Module

Connector: HIROSE DF19G-30P-1H

Pin No.	Symbol	I/O	Description
1	V_{CC}	I	+3.3V power supply
2	V_{CC}	I	+3.3V power supply
3	GND	I	Ground
4	GND	I	Ground
5	RIN3+	I	LVDS Signal (+) Channel 3
6	RIN3-	I	LVDS Signal (-) Channel 3
7	GND	I	Ground
8	RCLK+	I	LVDS Clock Signal (+)
9	RCLK-	I	LVDS Clock Signal (-)
10	GND	I	Ground
11	RIN2+	I	LVDS Signal (+) Channel 2
12	RIN2-	I	LVDS Signal (-) Channel 2
13	GND	I	Ground
14	RIN1+	I	LVDS Signal (+) Channel 1
15	RIN1-	I	LVDS Signal (-) Channel 1
16	GND	I	Ground
17	RIN0+	I	LVDS Signal (+) Channel 0
18	RIN0-	I	LVDS Signal (-) Channel 0
19	GND	I	Ground
20	GND	I	Ground
21	NC	I	Not Connection
22	NC	I	Not Connection
23	NC	I	Not Connection

24	NC	I	Not Connection
25	BLEN	I	Note 1
26	NC	I	Not Connection
27	VLED	I	LED driver power supply
28	VLED	I	LED driver power supply
29	GND	I	Ground
30	GND	I	Ground

Note 1: On/Off Control Input and Dimming Command Input.
A voltage greater than 0.7V will turn on the chip.
When the BLEN pin voltage rises from 0.7V to 1.4V,The LED current will change from 0% to 100% of the maximum LED current.

To use PWM dimming, apply a 100Hz to 1kHz square wave signal with amplitude greater than 1.4V to this pin.

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
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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	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	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	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
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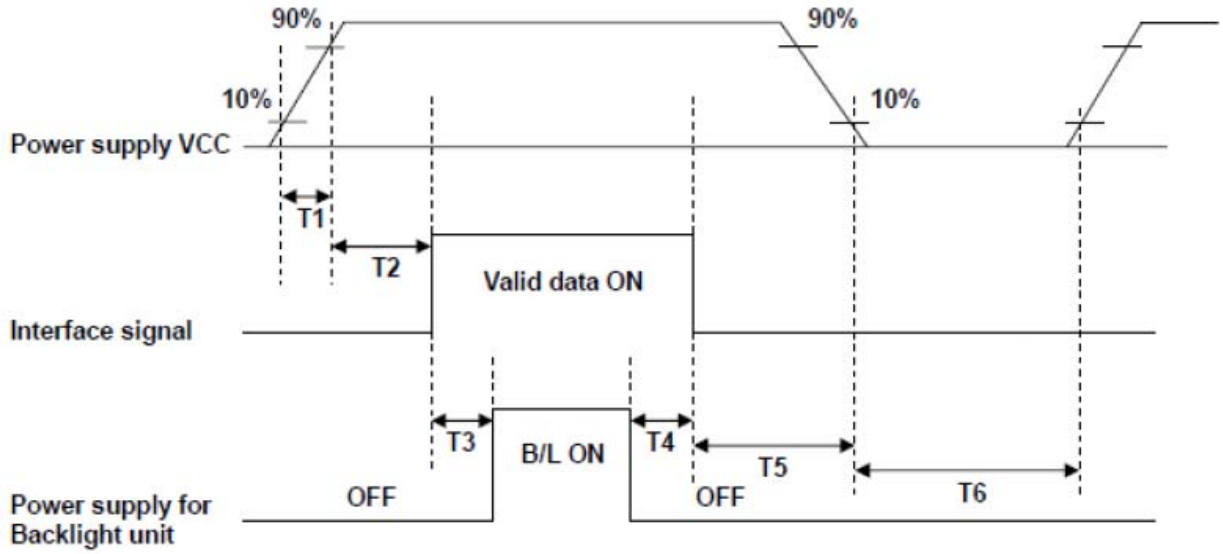
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

10.3 Power ON/OFF Sequence



POWER SEQUENCE TABLE

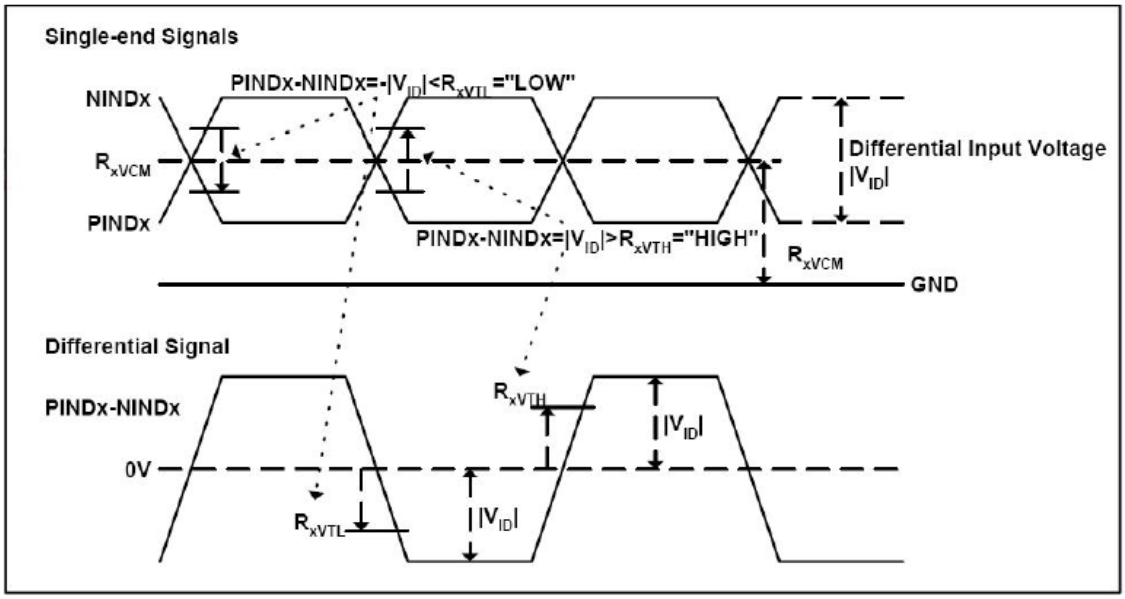
Parameter	Value			Units
	Min.	Typ	Max.	
T1	0.5	-	10	ms
T2	20	-	70	ms
T3	200	-	-	ms
T4	200	-	-	ms
T5	20	-	70	ms
T6	1000	-	-	ms

11. Interface Timing

11.1 Input Signal Characteristics

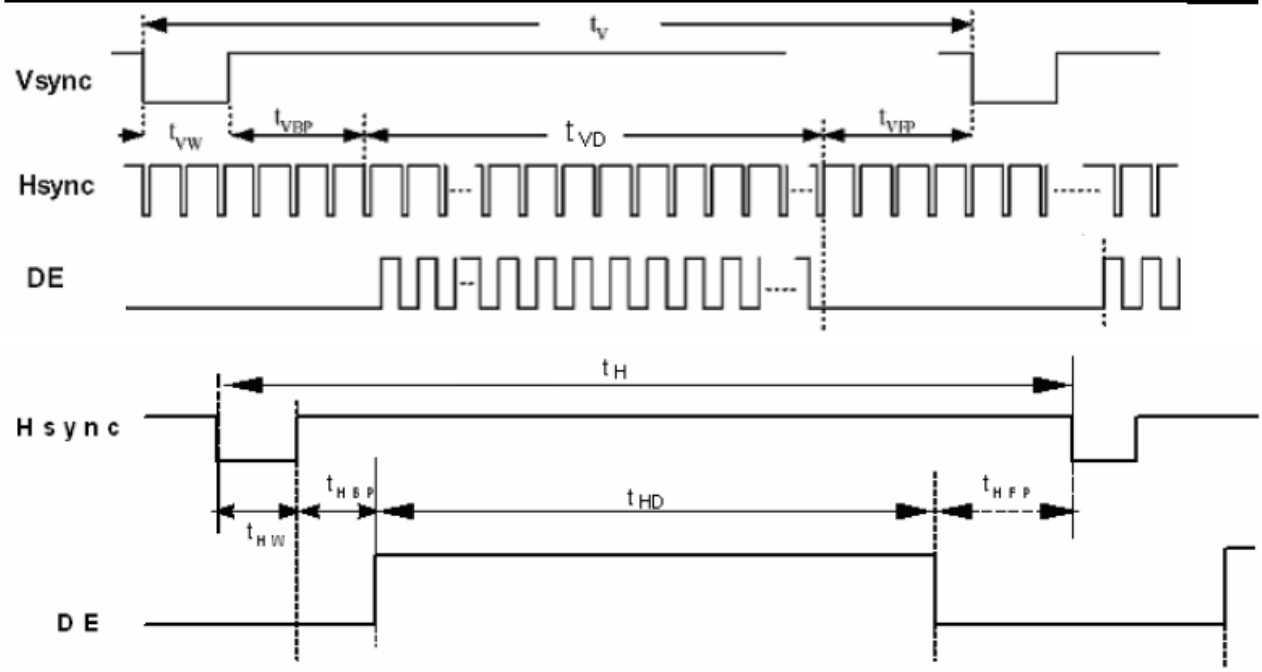
11.1.1.AC Electrical Characteristics

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	

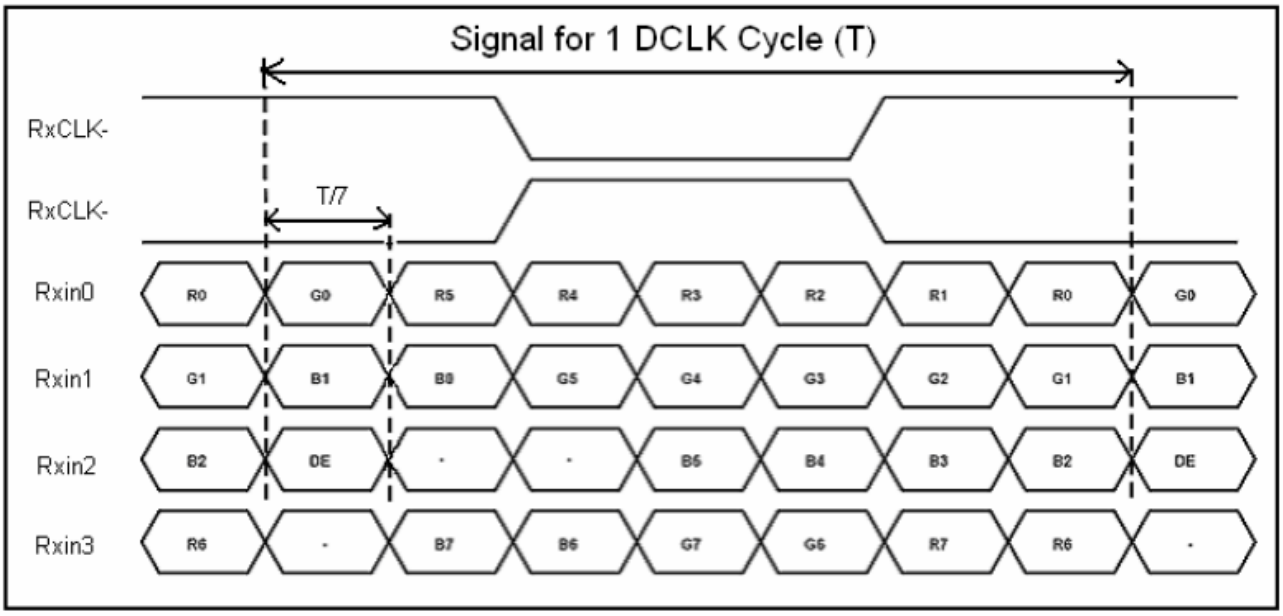


11.1.2.Timing

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	tVW+ tVBP +tVFP	(15)	23	(33)	tH	



11.1.3. LVDS Data Input Format

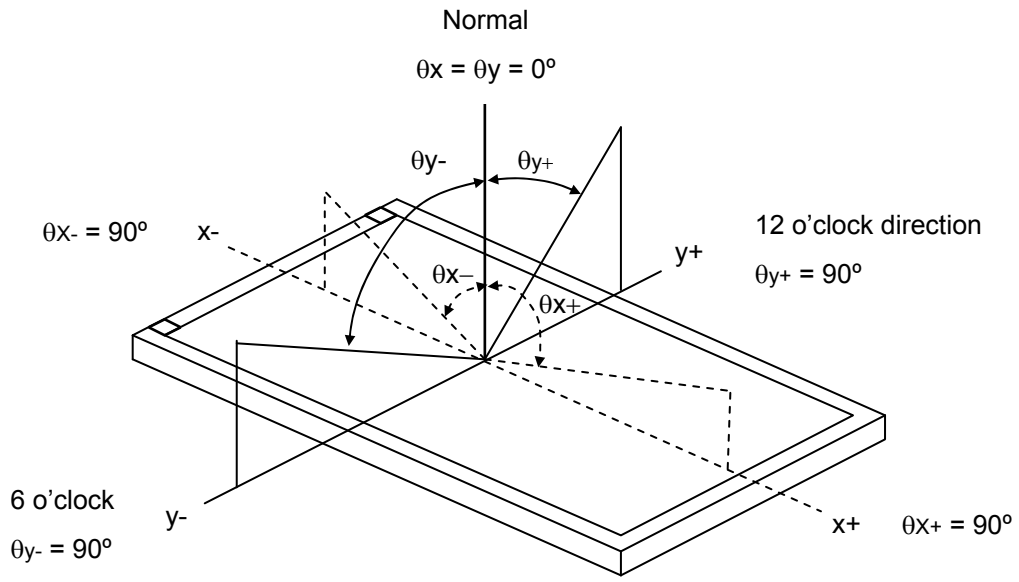


12. Optical Characteristics

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		-	10	20	ms	(3)
		T_F		-	15	30	ms	
Luminance(Center)		Y		500	（550）	-	cd/m^2	(4)
Brightness uniformity		BUNI		75	（80）	-	%	(5)
Color Chromaticity	White	Wx		0.260	0.310	0.360	-	(1),(4)
		Wy		0.280	0.330	0.380	-	
	Red	Rx		0.550	0.600	0.650	-	
		Ry		0.290	0.340	0.390	-	
	Green	Gx		0.290	0.340	0.390	-	
		Gy		0.540	0.590	0.640	-	
	Blue	Bx		0.105	0.155	0.205	-	
		By		0.090	0.140	0.190	-	
Viewing Angle	Horizontal	θ_x+	CR≥10	75	（85）	-	deg.	
		θ_x-		75	（85）	-		
	Vertical	θ_Y+		75	（85）	-		
		θ_Y-		75	（85）	-		

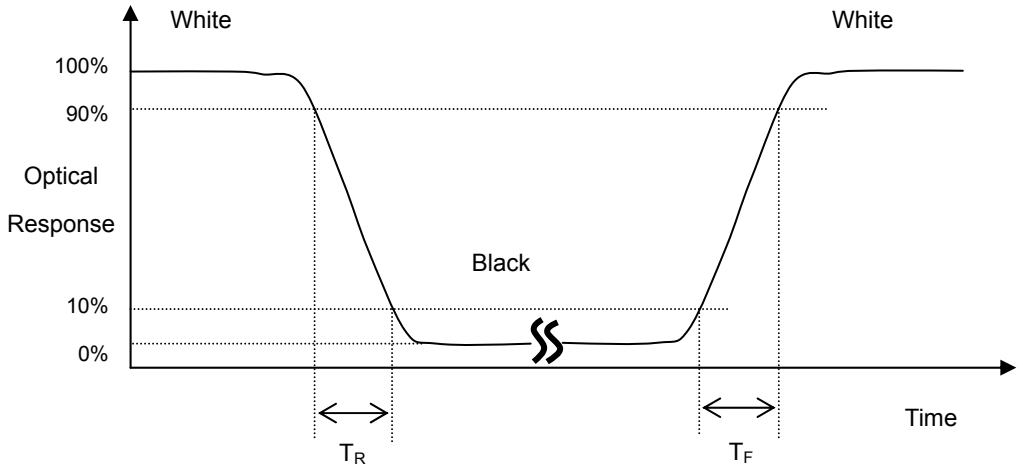
Note (1) Definition of Viewing Angle (θx, θy):



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

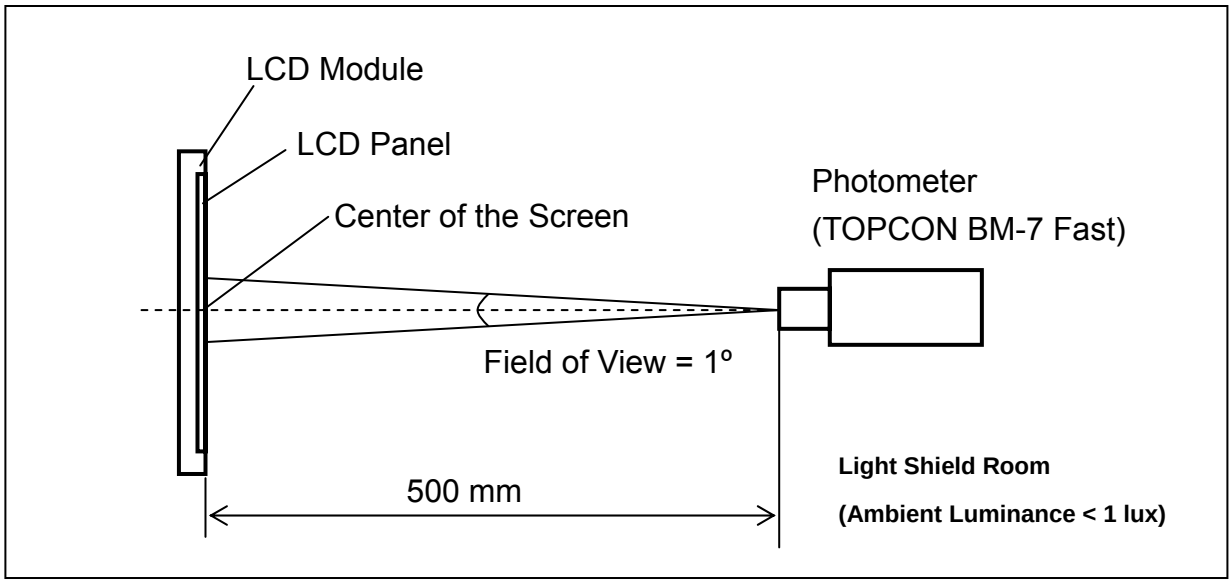
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

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



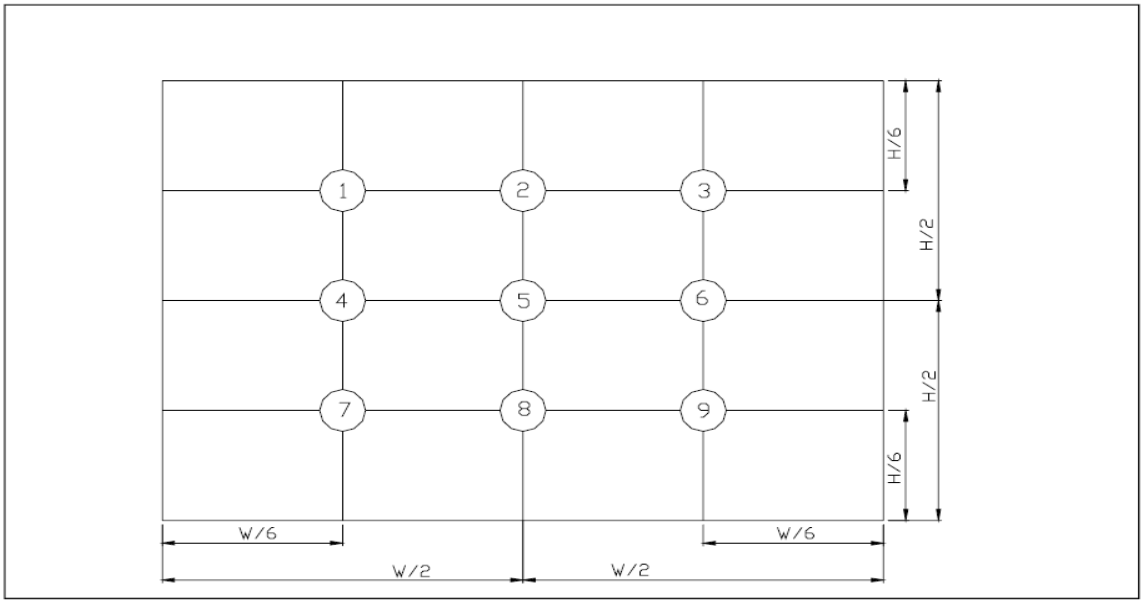
Note (4) Measurement Set-Up:

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%



(單位 ：mm)

13. Reliability Test

No.	Test Items	Test Condition	Remark
1	High Temperature Storage Test	T_a= 60℃ 120 hours	(1),(3),(4)
2	Low Temperature Storage Test	T_a= -20℃ 120 hours	(1),(3),(4)
3	High Temperature Operation Test	T_S= 50℃ 120 hours	(2),(3),(4)
4	Low Temperature Operation Test	T_a= 0℃ 120 hours	(1),(3),(4)
5	High Temperature and High Humidity Operation Test	T_a=40℃ 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℃(30min) ~ 50℃(30min),10 cycles	(3),(4)
10	Drop Test(with Carton)	Height: 80cm 1 corner, 3 edges, 6 surfaces	(3)

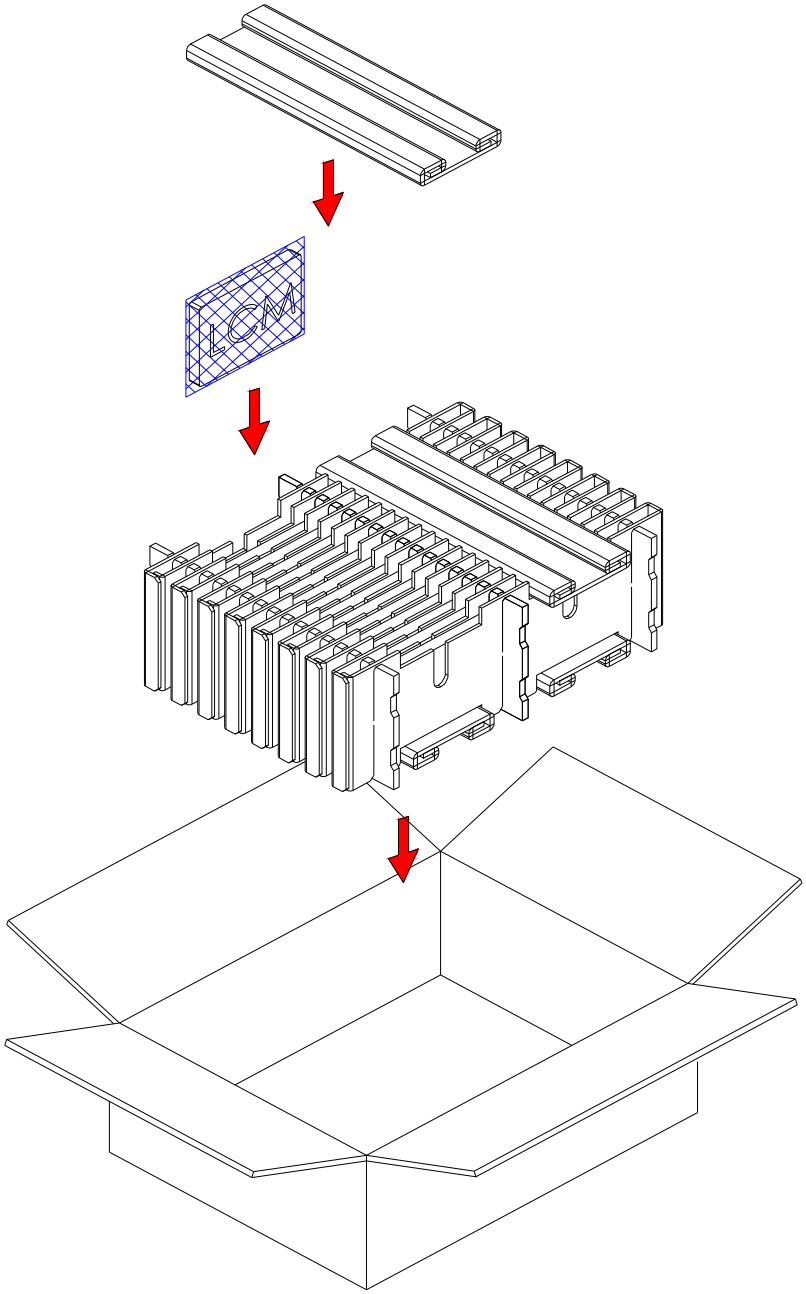
Note 1：Ta is the ambient temperature of samples.

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(L×W×H) unit : mm	MATERIAL	Q.T.Y	NOTE
1	STATIC SHIEDING BAGS	245.0×300.0×0.09		30	
2	CARD BOARD	355.0×235.0×3.5	CARTON	3	
3	CARD BOARD	515.0×23.0×235.0	CARTON	8	
4	EXTERNAL BOX	520.0x355.0x241.0	CARTON	1	
5	PRODUCT	229.46×149.1×2.5		30	

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.

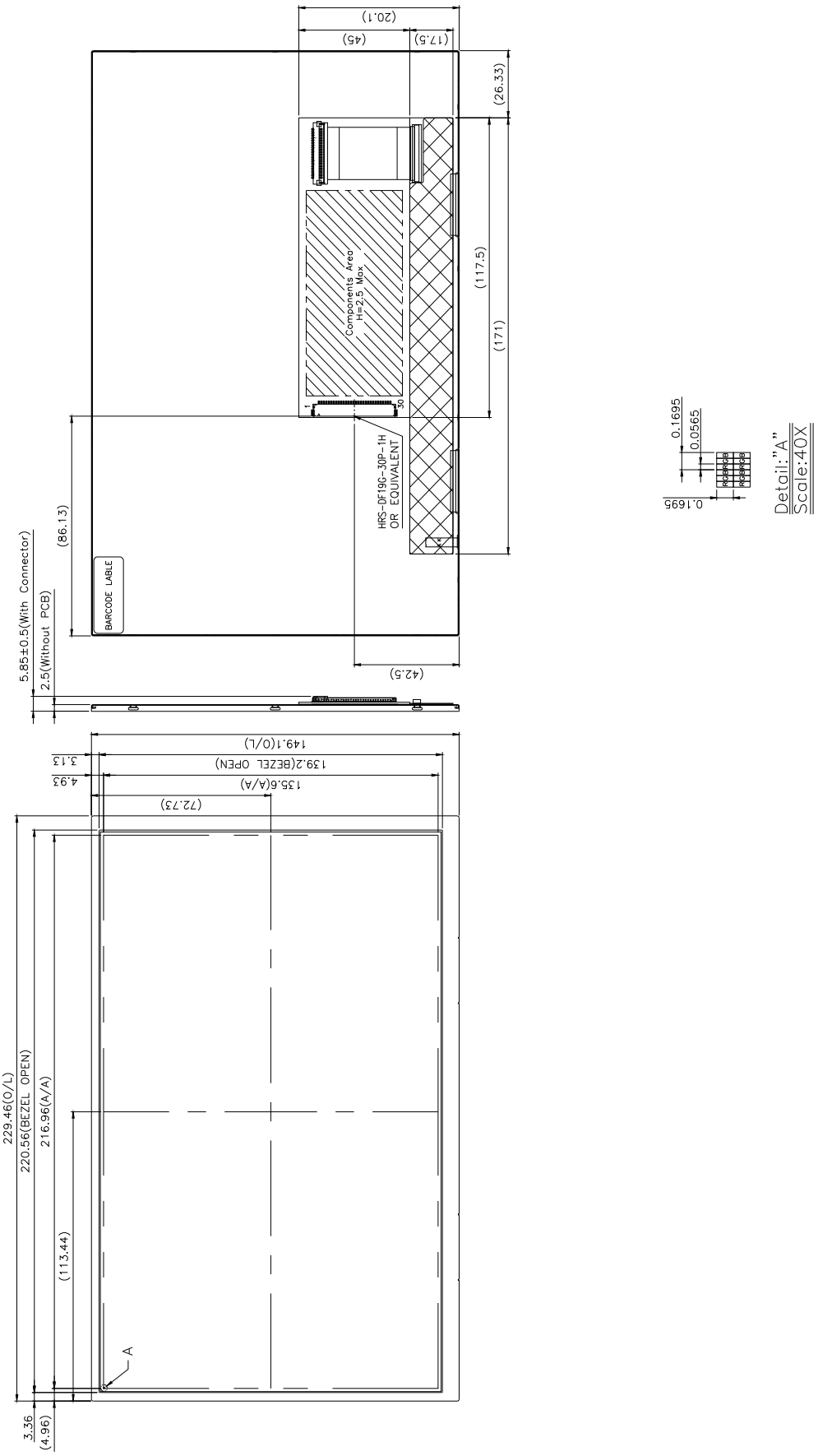
(2) Applicable warrant period

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

15.4 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.

16.Outline Drawing



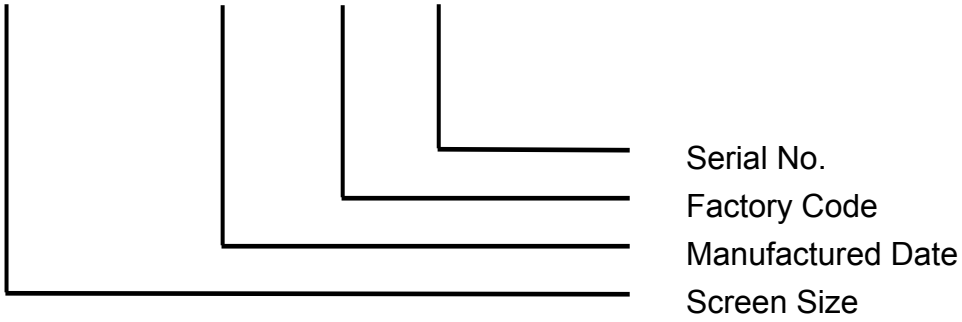
17.Definition of Labels

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

（a） Module Name：VGG128004-5TSLWG

（b） Serial ID：

A B C D E F G H IJ K L



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

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 ± 5℃

(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 (± 45°)

(5) Ambient Illumination: 300 ~ 500 Lux for external appearance inspection

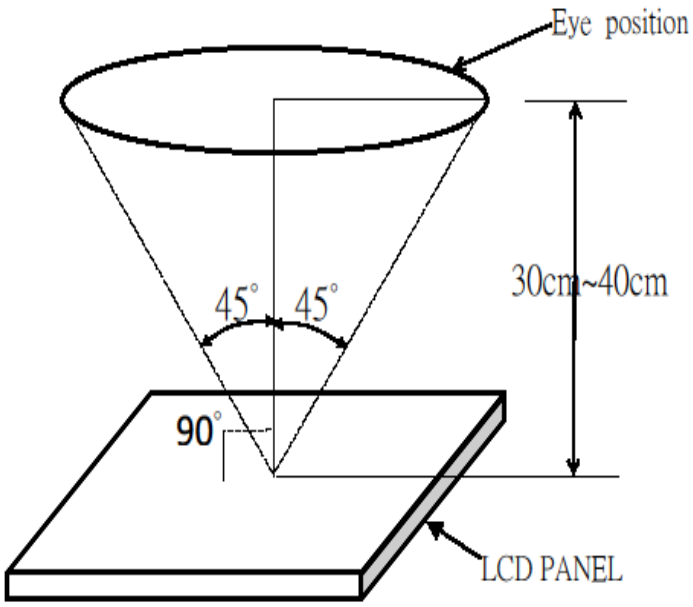


Fig_1

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

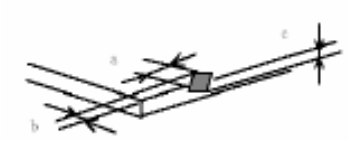
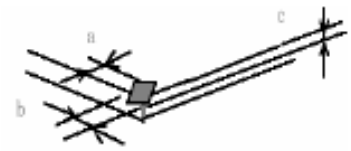
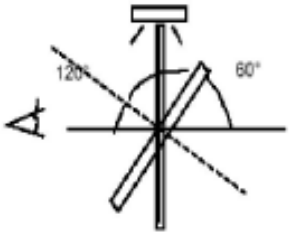
(2) The defects classify of AQL as following:

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

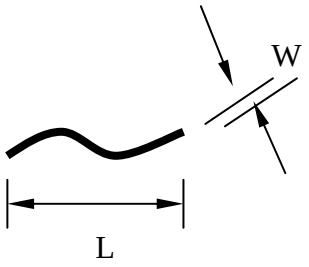
Item		Specification/Description			Note
Display	Function	No Display			-
		Malfunction			-
Operating	Contrast ratio	Out of Spec			-
	Line defect	No obvious Vertical and Horizontal line defect in bright , dark and colored.			-
	Point Defect (red ,green , blue, dark , white)	Item		Acceptable number	Note: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

Incoming Inspection Touch Panel

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

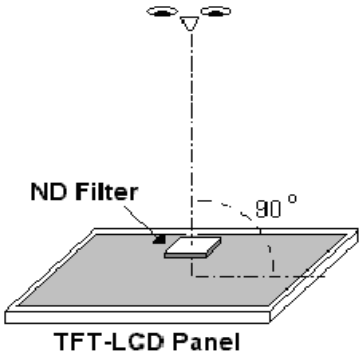
Note1. The definition of dot defect : The dot defect was judged after repair and the size of a defective dot over 1/2 of whole dot is regarded as one defective dot.

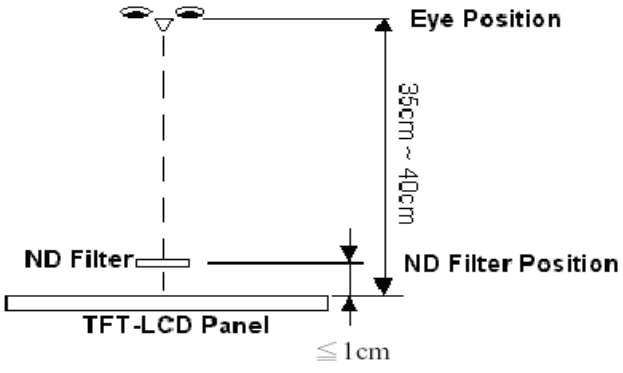
Note2.



Note3. D：Diameter D=(a+b)/2

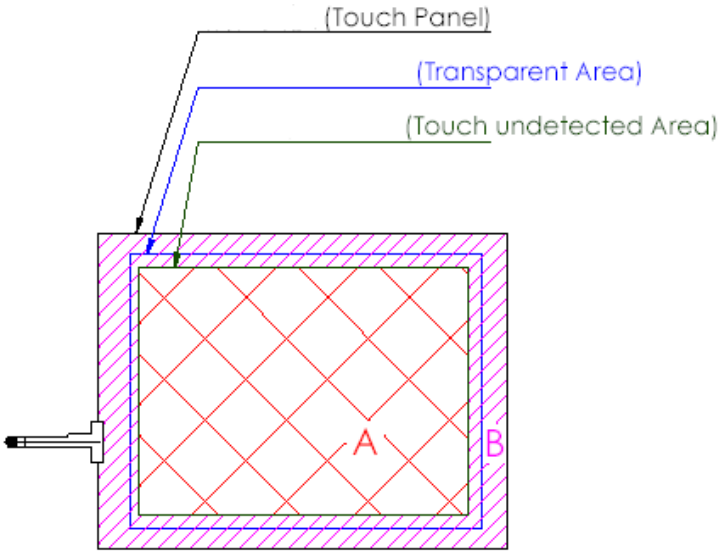
Note4. Bright dot is defined through 2% transmission ND Filter as following.





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.