

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. : VGG106004-6UFLWH(RoHS)

REVISION : 2

APPROVAL FOR SPECIFICATIONS ONLY

APPROVAL FOR SPECIFICATIONS AND SAMPLE

CUSTOMER :

STD.


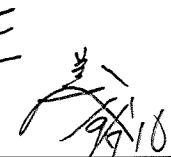
APPROVED BY :

EVERVISION LCM R&D CENTER


APPROVED BY

CHECKED BY

PREPARED BY


JE

9/16

DIRECTOR


9/16

MANAGER


P/h/16

Mechanism Engineer


9/16

Electronic Engineer

億力光電股份有限公司總公司
EVERVISION ELECTRONICS CO., LTD.
台北市中和區建一路 186 號 6 樓之 5
6F.-5, No.186, Jian 1st Rd., Zhonghe Dist.,
New Taipei City 235, Taiwan (R.O.C.)
TEL : +886 2 8227-2788
FAX : +886 2 8227-2799

億力光電股份有限公司台中分公司
EVERVISION ELECTRONICS CO., LTD.
-Taichung Branch
台中市潭子區建國路 19 號
No.19, Jianguo Rd., Tanzi Dist.,
Taichung City 427, Taiwan (R.O.C.)
TEL : +886 4 2532-8889
FAX : +886 4 2532-6689

勁佳光電(昆山)有限公司
VBEST ELECTRONICS(KUNSHAN) Co., Ltd.
江蘇省昆山市玉山鎮高科技工業園城北路 8 號
No.8, Chengbei Rd., Hi-Tech Industry Park,
Yushan Town, Kunshan City, Jiangsu, China.
TEL : +86 512 5778 7288
FAX : +86 512 5777 0688

勁佳光電(昆山)有限公司東莞分公司
VBEST ELECTRONICS(KUNSHAN) Co., Ltd.
- DongGuan Branch
東莞市莞城區東縱大道天寶路 23 號
No.23 Tian Bao Rd., Dong Zong St.,
Dong Guan City, Guang Dong, China.
TEL : +86 769 3887 5000
FAX : +86 769 3896 0580

<http://www.evervisionlcd.com>

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3. Module Numbering System

V G G 1060 04 – 6 U F L W H

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 7 inch WSVGA supported TFT-LCD module, and can display true 16.7M colors (RGB 6-bits + HiFRC data). 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 7" TFT-LCD panel, a driver circuit and backlight unit.

5. Features

- WSVGA (1024×600 pixels) resolution.
- 8 bit LVDS 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	7 (Diagonal)	inch
Display Format	1024RGB(H)×600(V)	dot
Active Area	153.6(H)×86.64(V)	mm
PIXEL Pitch	0.15(H)×0.1444(V)	mm
Pixel Configuration	RGB Vertical Stripe	-
Display Mode	TN Type Transmissive Mode Normally White	-
Surface Treatment	Antiglare, Hard-Coating(3H)	-
Viewing Direction	6 O'clock (The Gray Inversion will appear at this direction)	-
Outline Dimension	165.0(W)×104.0(H)×8.06(D)	mm
Weight	129	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 _{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.		
Digital Power Supply Voltage	V _{CC}	-0.3	5.0	V	-

7.2.2 LED Driver Absolute Maximum Ratings

(Ta=25±2°C)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
LED Driver Supply Voltage	V _{LED}	-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

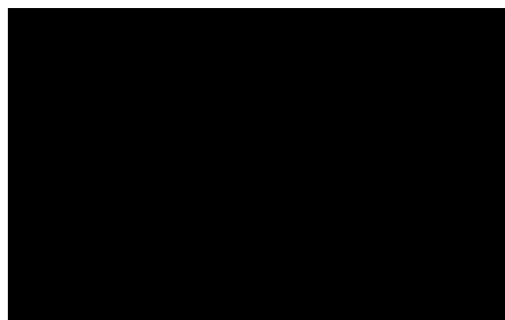
8.1 TFT-LCD Module

(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Digital Power Supply Voltage	V _{DD}	3.0	3.3	3.6	V	-
Digital Power Supply Current	I _{DD}	-	130	182	mA	(1)
Input logic high voltage	V _{IH}	0.7 V _{DD}	-	V _{DD}	V	(2)
Input logic low voltage	V _{IL}	0	-	0.3 V _{DD}	V	
Differential Input High Threshold Voltage	RX _{VTH}	-	-	0.1	V	RXVCM=1.2V
Differential Input Low Threshold Voltage	RX _{VTL}	-0.1	-	-	V	
Input voltage range (singled-end)	RxVIN	0	-	2.4	V	-
Differential input common mode voltage	RxVCM	VID /2	-	2.4 - VID /2	V	-
Differential voltage	VID	0.2	-	0.6	V	-
Differential input leakage current	RVxliz	-10	-	+10	uA	-
DCLK Frequency	DCLK	-	51.2	-	MHz	-

Note (1) The specified power consumption is under the conditions at V_{DD} =3.3V, DCLK =51.2MHz, whereas a power dissipation check pattern below is displayed.

Black Pattern / 0 Gray



Active Area

Note (2): LVDS, Reset.

8.2 LED Driver Unit

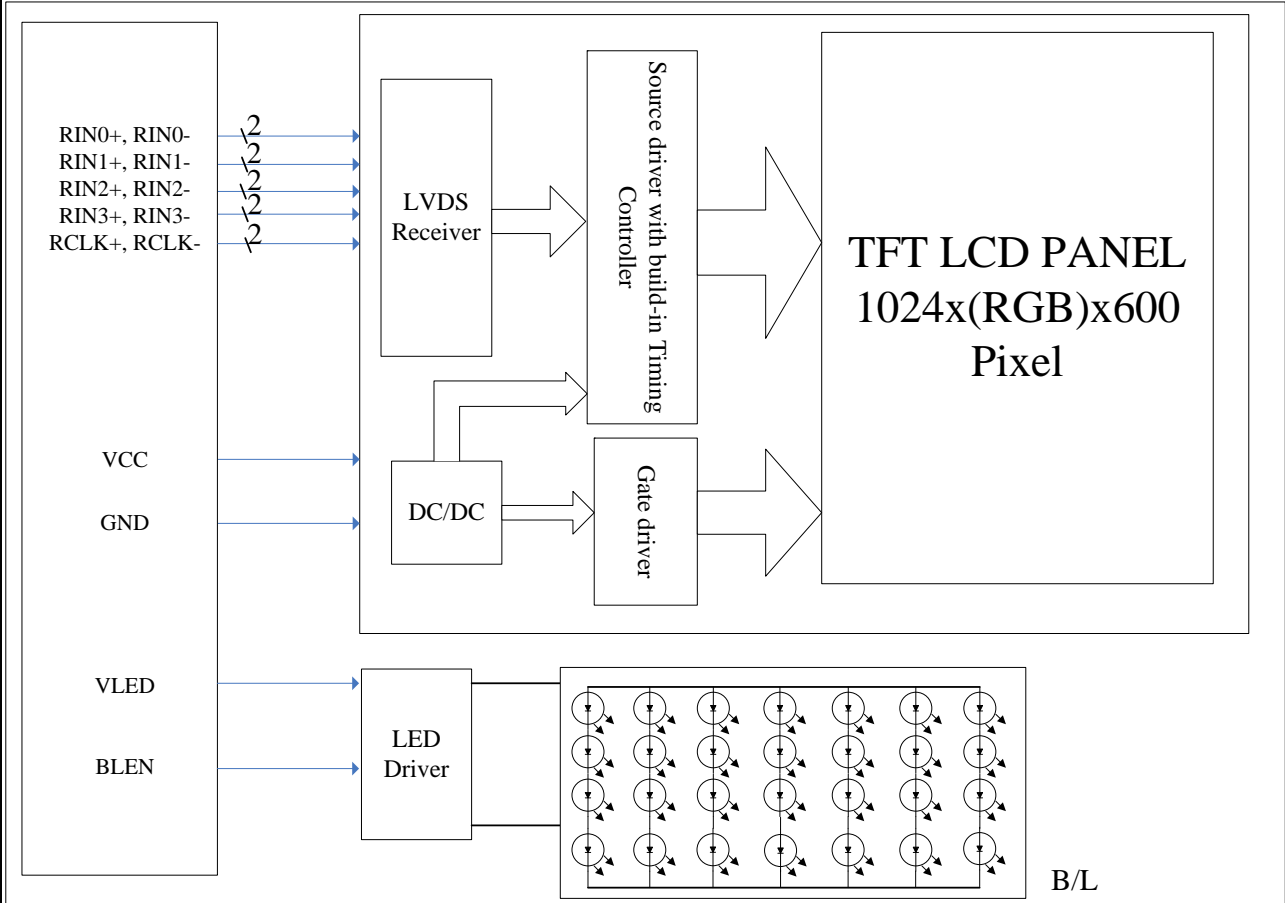
(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Voltage of LED Driver Unit	V _{LED}	4.5	5.0	5.5	V	-
Current of LED Driver Unit	I _{LED}	-	440	616	mA	V _{LED} =5V、 B/L=140mA
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°C)	-	50000	-	-	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

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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.

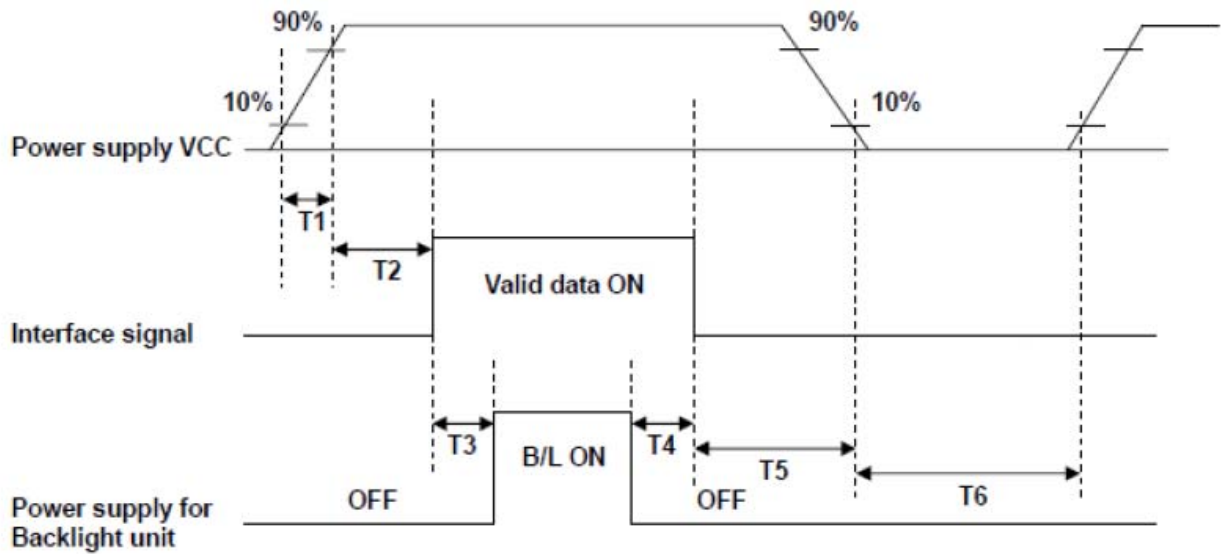
To use PWM dimming, apply a 100Hz to 1kHz square wave signal with amplitude greater than 1.4V to this pin.

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	
	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	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	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		
	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		

10.3 Power ON/OFF Sequence



POWER SEQUENCE TABLE

Parameter	Value			Units
	Min.	Typ	Max.	
T1	0.5	-	10	ms
T2	50	-	100	ms
T3	200	-	-	ms
T4	200	-	-	ms
T5	50	-	100	ms
T6	1000	-	-	ms

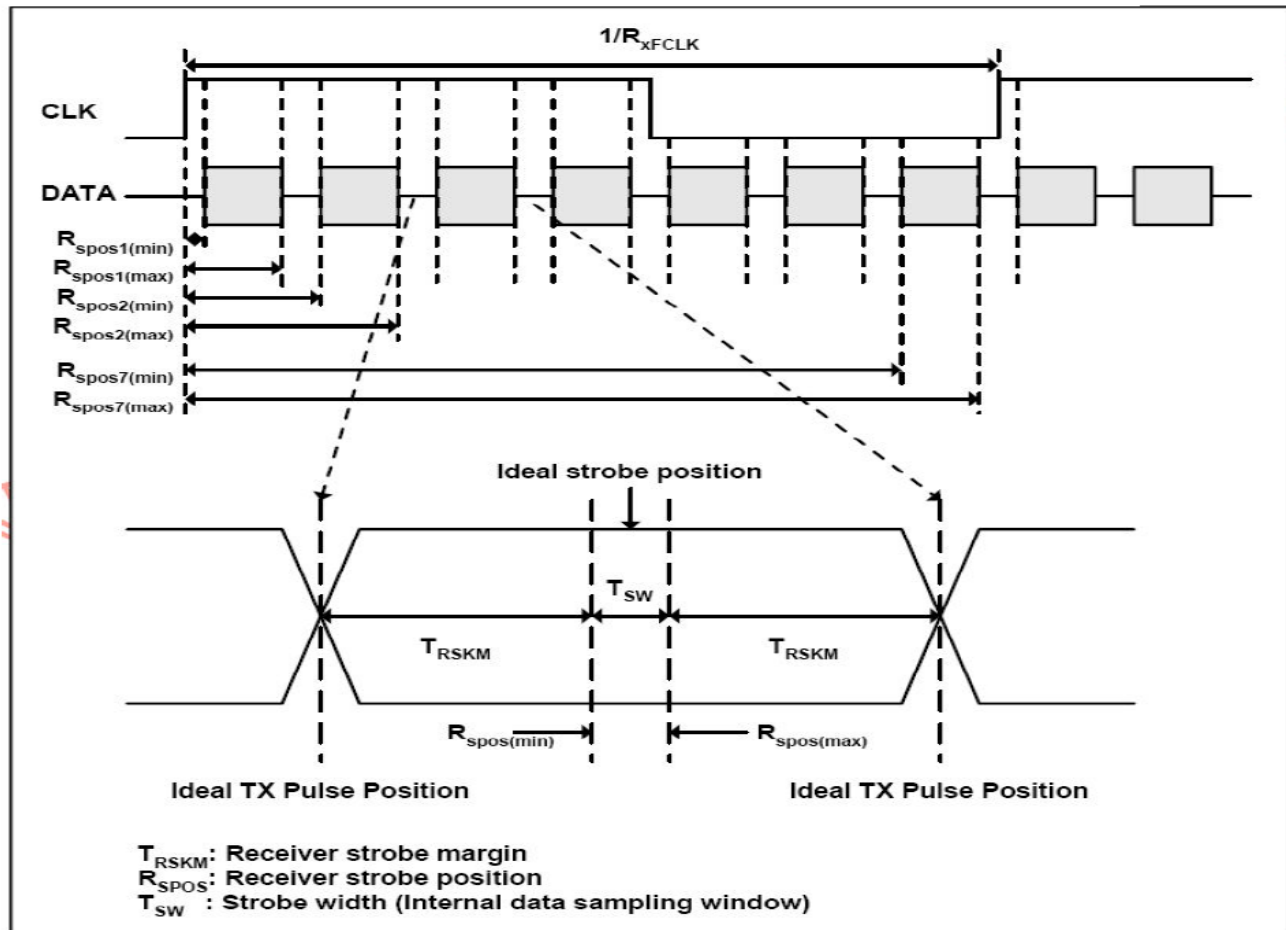
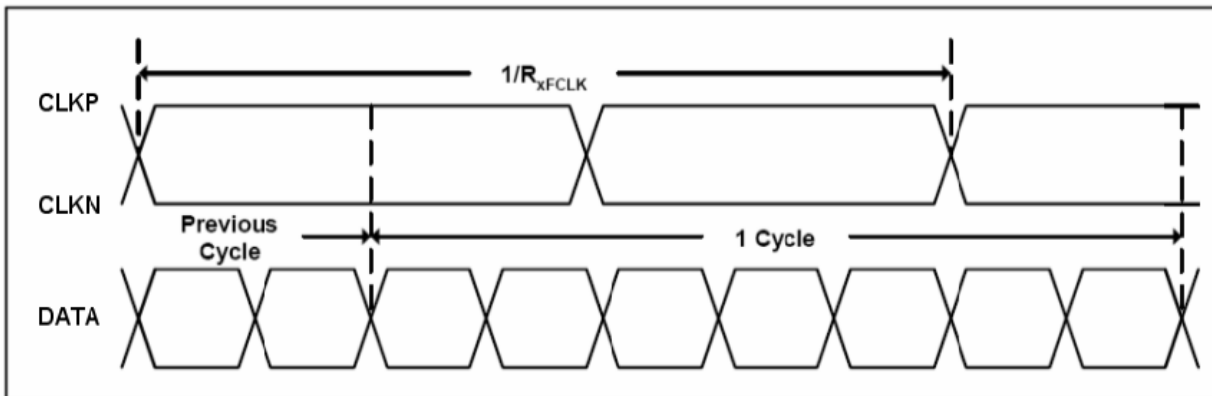
11. Interface Timing

11.1 Input Signal Characteristics

11.1.1.AC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock frequency	R_{xFCLK}	40.8	51.2	67.2	MHz	
Input data skew margin	T_{RSKM}	500	-	-	ps	
Clock high time	T_{LVCH}	-	$4/(7 * R_{xFCLK})$	-	ns	
Clock low time	T_{LVCL}	-	$3/(7 * R_{xFCLK})$	-	ns	

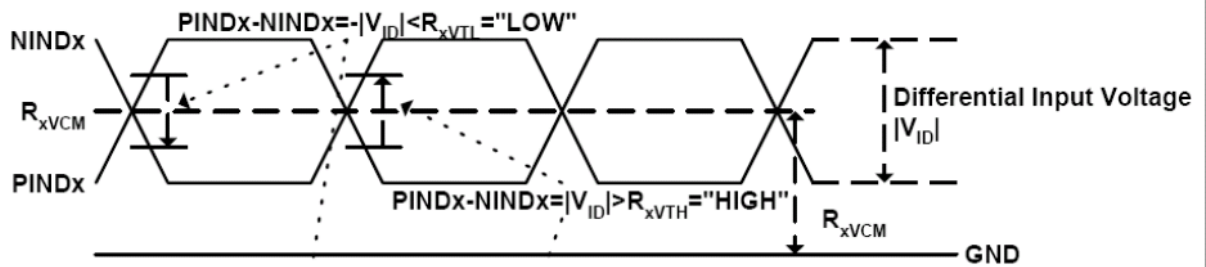
11.1.2. Input Clock and Data Timing Diagram



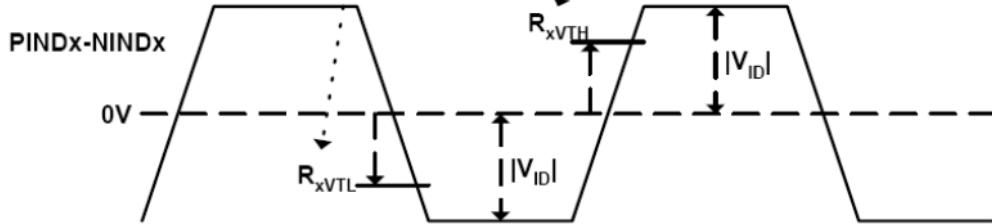
11.1.3. DC Electrical Characteristics

Parameter	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Differential input high Threshold voltage	R_{xVTH}	-	-	+0.1	V	$R_{xVCM}=1.2V$
Differential input low Threshold voltage	R_{xVTL}	-0.1	-	-	V	
Input voltage range (singled-end)	R_{xVIN}	0	-	2.4	V	
Differential input common mode voltage	R_{xVCM}	$ V_{ID} /2$	-	$2.4- V_{ID} /2$	V	
Differential voltage	$ V_{ID} $	0.2	-	0.6	V	
Differential input leakage current	$R_{V_{xIIZ}}$	-10	-	+10	μA	

Single-end Signals



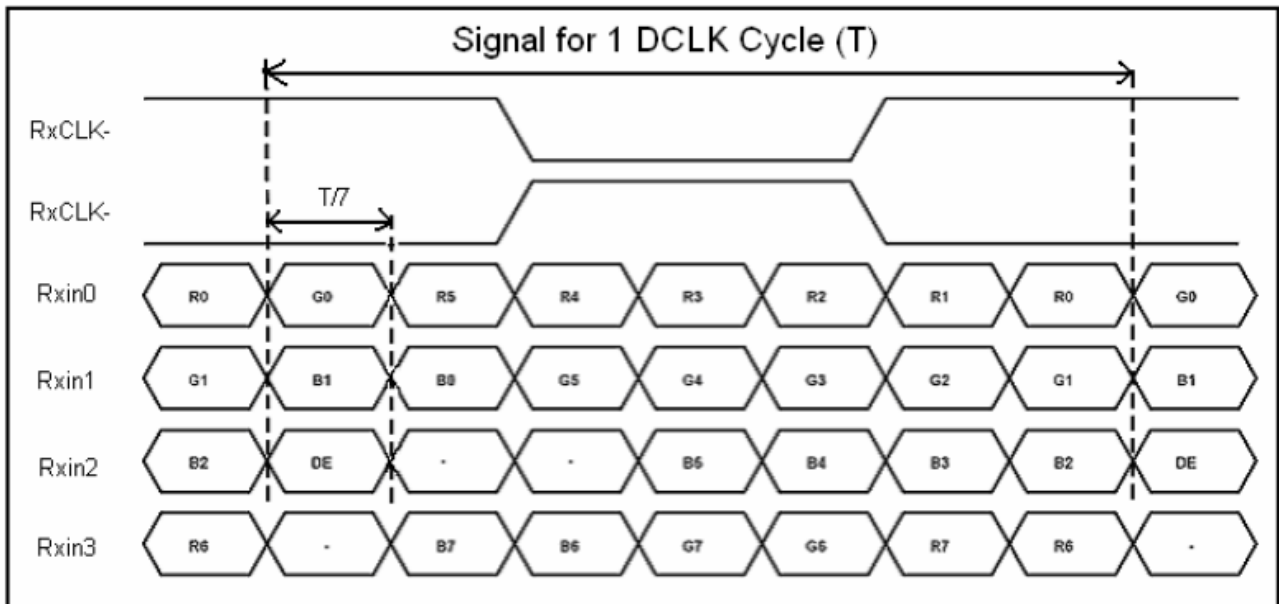
Differential Signal



11.1.4.Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Clock Frequency	fclk	40.8	51.2	67.2	MHz	Frame rate =60Hz
Horizontal display area	thd	1024			DCLK	
HS period time	th	1114	1344	1400	DCLK	
HS Blanking	thb	90	320	376	DCLK	
Vertical display area	tvd	600			H	
VS period time	tv	610	635	800	H	
VS Blanking	thb	10	35	200	H	

11.1.5. LVDS Data Input Format



Note: Support DE timing mode only, SYNC mode not supported.

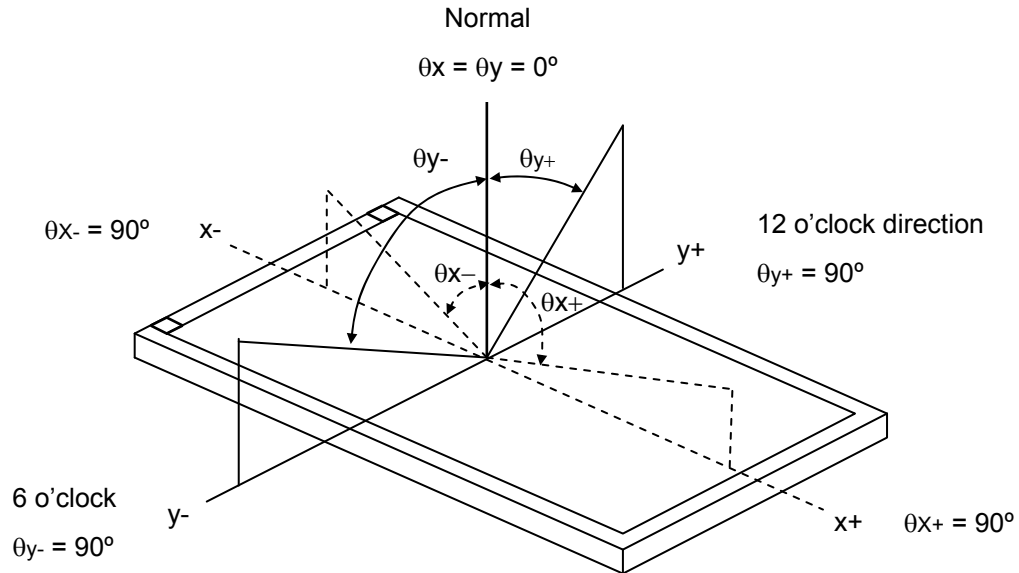
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12. Optical Characteristics

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	$\theta_x=0^\circ, \theta_y=0^\circ$ Viewing Normal Angle	560	(700)	-	-	(2)
Response Time		T_R		-	4	8	ms	(3)
		T_F		-	12	24	ms	
Luminance(Center)		Y		450	(500)	-	cd/m ²	(4)
Brightness uniformity		BUNI		-	(70)	-	%	(5)
Color Chromaticity	Red	Rx		0.576	0.626	0.676	-	(1),(4)
		Ry		0.275	0.325	0.375	-	
	Green	Gx		0.278	0.328	0.378	-	
		Gy		0.498	0.548	0.598	-	
	Blue	Bx		0.086	0.136	0.186	-	
		By		0.091	0.141	0.191	-	
	White	Wx		0.260	0.310	0.360	-	
		Wy		0.280	0.330	0.380	-	
Viewing Angle	Horizontal	θ_{x+}	CR \geq 10	60	(70)	-	deg.	(1),(4)
		θ_{x-}		60	(70)	-		
	Vertical	θ_{y+}		60	(70)	-		
		θ_{y-}		50	(60)	-		

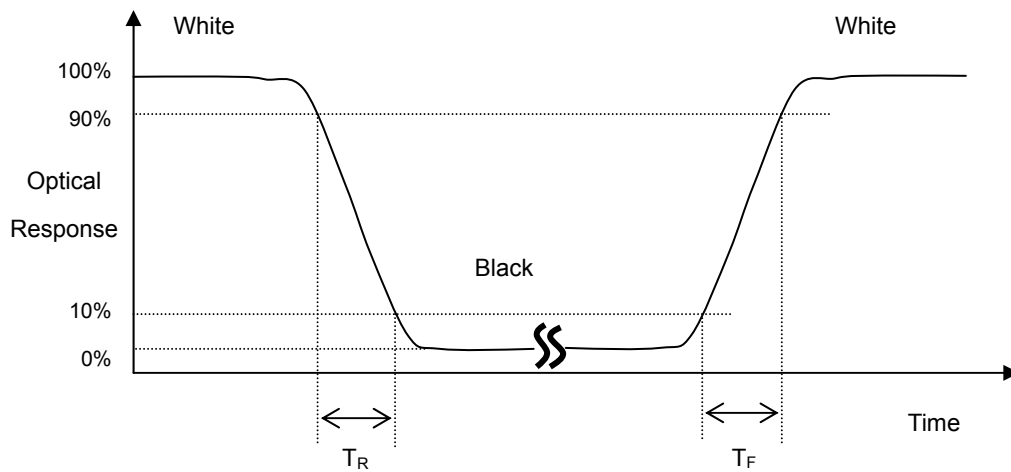
Note (1) Definition of Viewing Angle (θ_x , θ_y):



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

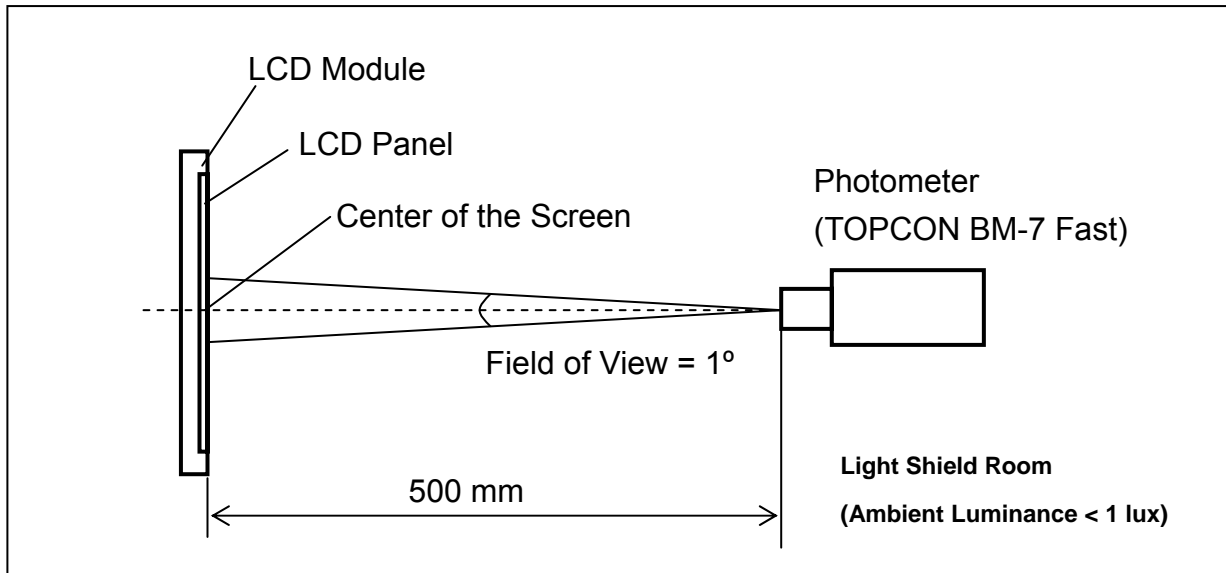
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

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



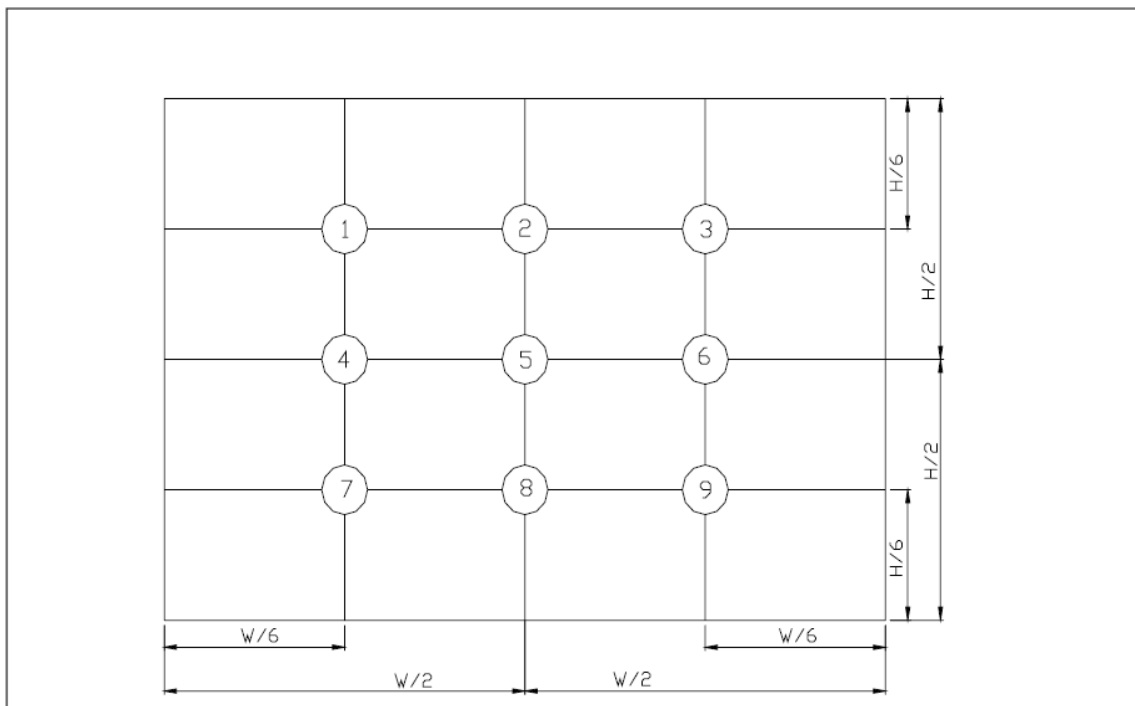
Note (4) Measurement Set-Up:

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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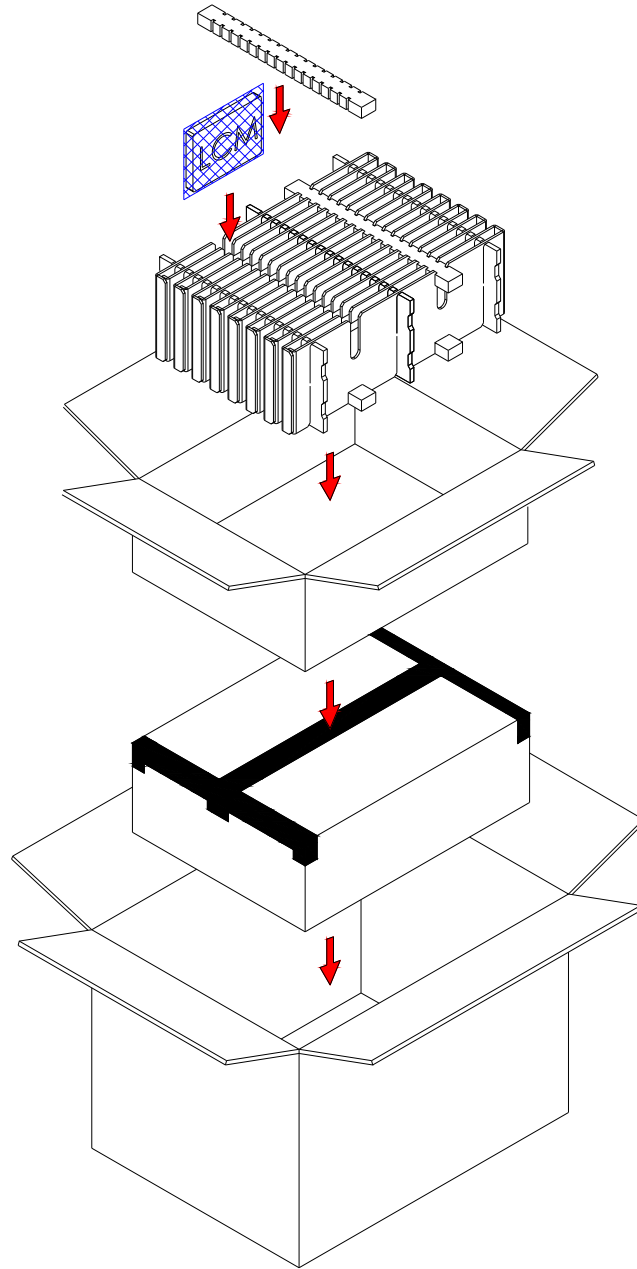
13. Reliability Test

Test Item	Test Conditions	Notes
High temperature Operation	70±3°C ,T=240hrs	
Low temperature Operation	-20±3°C ,T=240hrs	
High Temperature Storage	80±3°C ,T=240hrs	1,2
Low Temperature Storage	-30±3°C ,T=240hrs	1,2
Humidity Test	40°C ,Humidity 90% ,240hrs	1,2
Thermal Shock Test	-30°C,30min~70°C,30min (200 cycle)	1,2
Vibration Test(Packing)	Sweep frequency 10~55~10HZ/min Amplitude:0.75mm Test direction:X,Y,Z/3 axis Duration 30min/each axis	2
Static Electricity	150Pf 330ohm ±8KV, 10time air discharge ±4KV, 10time connect discharge	

Note 1: Temperature is the ambient temperature of samples.

Note 2: 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 SHIELDING BAGS	230.0×190.0×0.09		60	
2	EPE PAD	345.0×30.0×20.0	EPE	8	
3	CARD BOARD	345.0×150.0×3.5	CARTON	6	
4	CARD BOARD	450.0×23.0×150.0	CARTON	16	
5	INTERNAL BOX	455.0×350.0×164.0	CARTON	2	
6	EXTERNAL BOX	475.0×370.0×375.0	CARTON	1	
7	PRODUCT	165.0×104.0×8.06		60	

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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

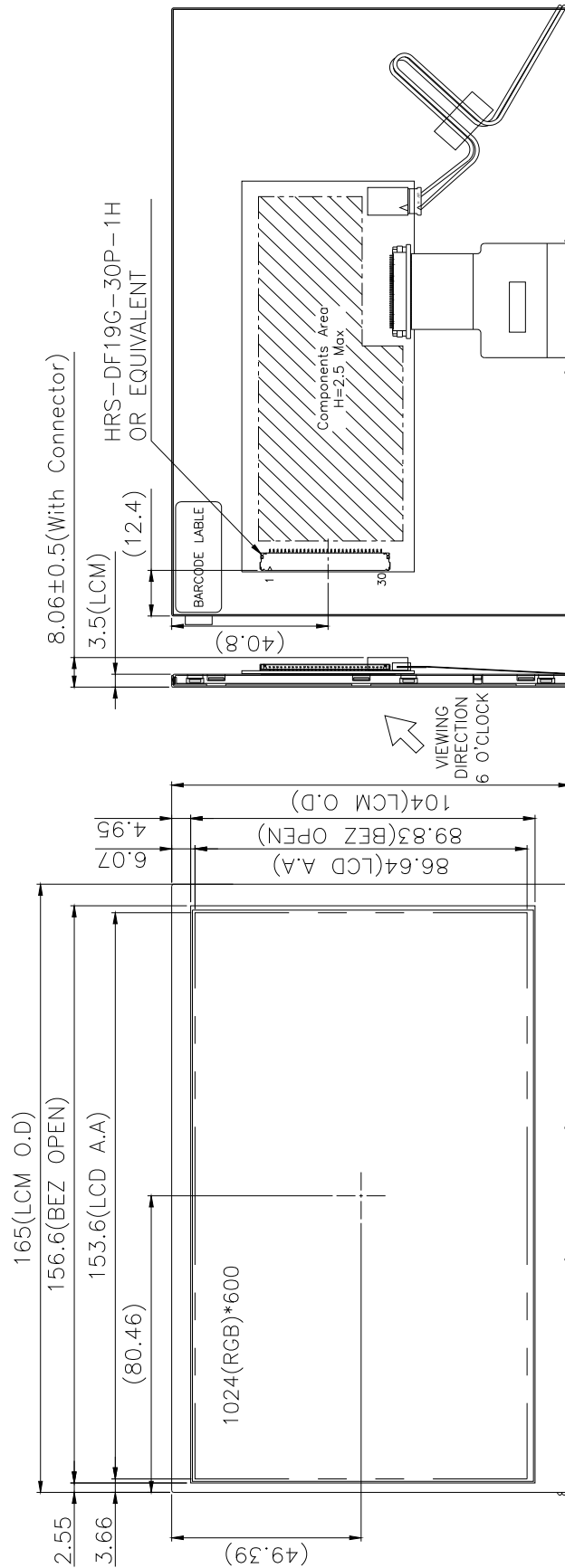
- (1) Acceptance inspection period
The period is within one month after the arrival of contracted commodity at the buyer's factory site.
- (2) Applicable warrant period
The period is within twelve months since the date of shipping out under normal using and storage conditions.

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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



NOTE: Unspecified Tolerance: ±0.3

17. Definition of Labels

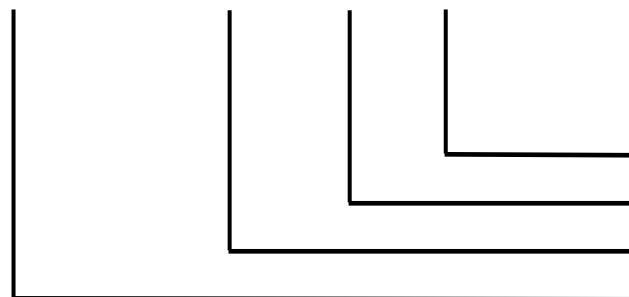
The bar code nameplate is pasted on each module as illustration, and its definitions are as following explanation.



(a) Module Name : VGG106004-6UFLWH

(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.

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18. Incoming Inspection Standards

1.0 Purpose:

This incoming inspection standards shall be apply to TFT-LCD Module

2.0: Visual inspection criteria

2.1. Inspection condition is as followings

- Viewing distance is approximately 30cm
- Viewing angle is referred to the CAS
- Ambient temperature is in the room temperature
- Ambient illumination is 300+-50 LUX

Defect type		Criteria	
Electrical defect	Area (Note 2)	I	O
	Bright dots(Note 3)	$N \leq 0$	$N \leq 2$
	Dark dots (Note 4)	$N \leq 2$	$N \leq 4$
	Bright dot-2Adjacent(note5)	$N \leq 0$	
	Dark dot-2Adjacent(note6)	$N \leq 0$	
	Dark or bright dots-3 and more adjacent(note6)	$N \leq 0$	
	Total bright and dark dots	$N \leq 4$	
	Minimum distance between bright dots	5mm	
	Minimum distance between dark dots	5mm	
	Minimum distance between bright and bright dots	5mm	
Visual defect	Foreign material	Circular foreign material: dark/bright sport	Visible under:ND5% 1: $D \leq 0.15\text{mm}$:No count 2: $0.15\text{mm} < D \leq 0.5\text{mm}$, $N \leq 4$ 3: $D > 0.5\text{mm}$:Not allowable
		Linear foreign material: bright or dark line	Invisible under ND5% $0.1\text{mm} < W \leq 0.5\text{mm}$, $0.3\text{mm} < L \leq 1.5\text{mm}$, $N \leq 4$ Visible under ND5% $0.05\text{mm} \leq w \leq 0.1\text{mm}$, $0.3\text{mm} \leq L \leq 0.7\text{mm}$, $N \leq 4$
	Polarizer	Linear scratch	1:BM:No Count 2:Pixel area $0.05\text{mm} \leq w \leq 0.2\text{mm}$, $1.0\text{mm} \leq L \leq 5.0\text{mm}$, $N \leq 4$
		Bubble peeling	1:BM:No Count 2:Pixel area $0.15\text{mm} \leq D < 0.5\text{mm}$, $N \leq 4$
	Mura & leak		ND5%

D: diameter, N: number, W: horizontal width, L: vertical height

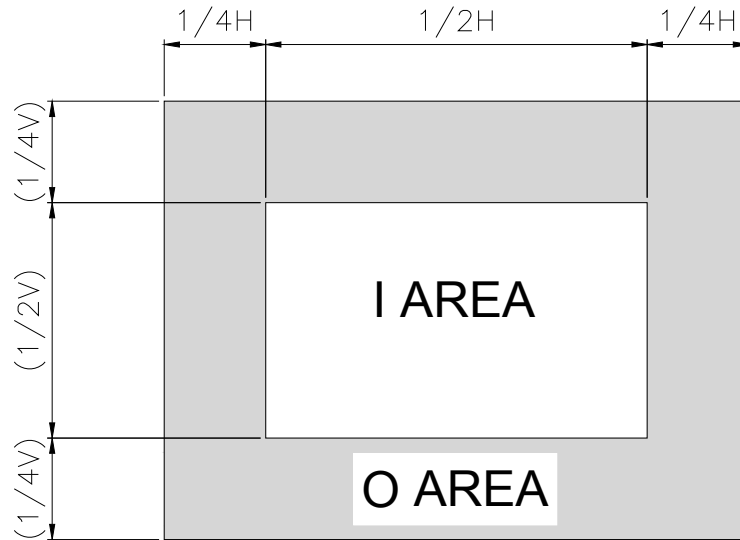
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2.2: others

Note(1)

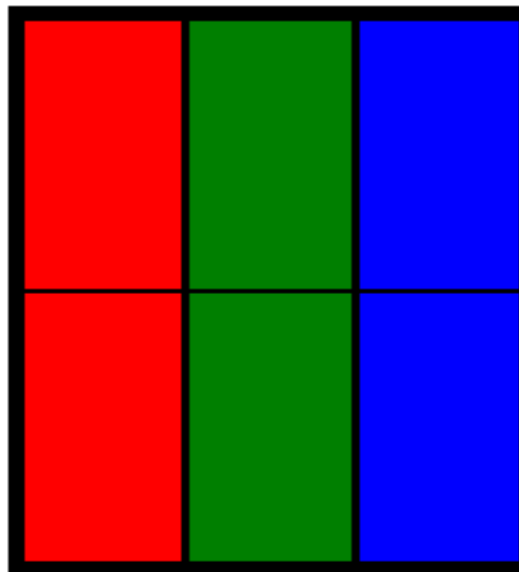
- a. every dot herein means sub-pixel(each red ,green ,blue color)
- b. damaged less than half size of sub-pixel is not counted as defect
- c. extraneous substances which can be wiped out are not considered as defect
- d. defects which is on the black(outside of active area) ore not considered as defect.

Note (2) definition of area.



Note(3) Bright dot defect definition

Bright area is more than 50% of one dot. All bright dot defect must be visible through 5% ND filter



A diagram of a pixel.

One dot refers to one upper and one lower R, G, or B combined. (The middle BM, or black mask, is thinner, while the top and bottom BM are thicker.)

Note(4) Dark dot defect definition

-dark area is more than 50% of one dot. All bright dot defect must be visible through 5% ND filter



Note (5) bright dot defect description

-two adjacent

Type 1



Note (6) Dark dot defect description

-two adjacent

Type1



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Note(7) dark dot defect description

-three adjacent

Type1



Type2



type3



type4



Note(8) minimum distance between dot defects

Bright dot to bright dot

The pitch is less than 5mm.

Dark dot to dark dot

The pitch is less than 5mm.

Bright dot to dark dot

The pitch is less than 5mm.

Note(9) "Average diameter" description

Average diameter=(a+b)/2

The defect that are not defined above and considered to be problem shall be reviewed and discussed by both parties

Note(10) Bright dot, mura and leak are defined through transmission ND Filter as following.

Form the eyes to the TFT LCM surface is 30cm.

18.2 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.