

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. : VGG128023-5TSLWA(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	
			
DIRECTOR	MANAGER	Mechanism Engineer	Electronic Engineer

億力光電股份有限公司總公司
EVERVISION ELECTRONICS CO., LTD.
新北市中和區建一路 186 號 6 樓
6F., No.186, Jian 1st Rd., Zhonghe Dist.,
New Taipei City 235, Taiwan
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
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 1280 23 – 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;
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;

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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). 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.

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
Pixel Pitch	0.1695(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)×4.95(D)	mm
Weight	(TBD)	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

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	VGH	-0.3	42	V	-
Gate Low Voltage	VGL	-19	0.3	V	-
Gate High To Gate Low Voltage	VGH-VGL	12	40	V	-

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.

7.2.2 Backlight Unit

Note1

(Ta=25±2°C)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
LED Reverse Voltage	VF	-	(TBD.)	V	Each LED
LED Forward Current	IR	-	(TBD.)	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

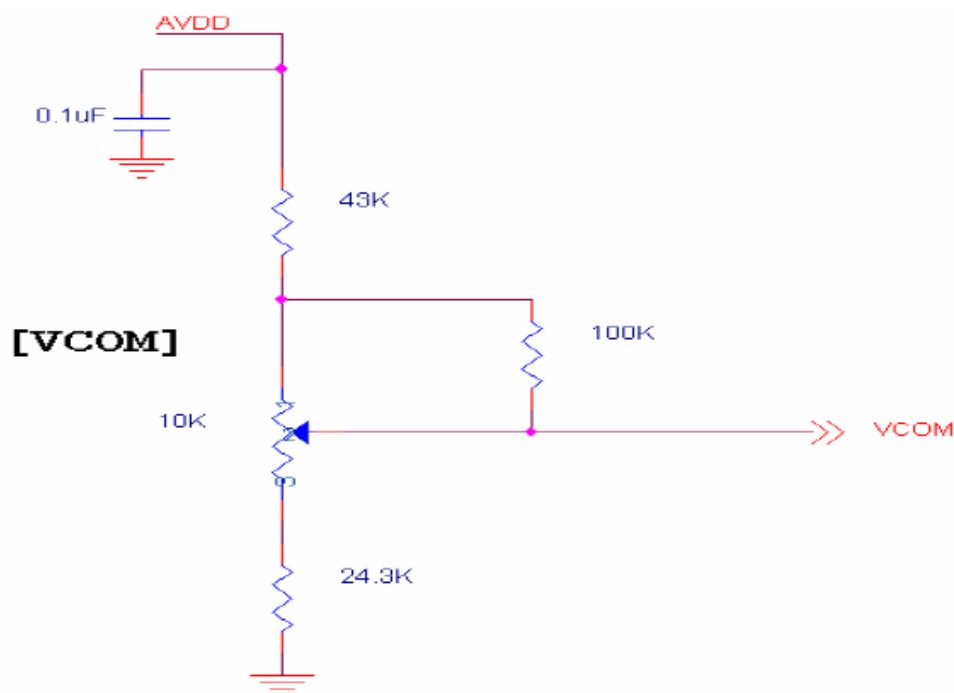
(Ta=25±2°C)

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	VGH	21.7	22	22.3	V	-
Gate Low Voltage	VGL	-7.3	-7	-6.7	V	-
Input signal voltage	VCOM	2.7	3.0	3.3	V	(3)
Current for Driver	IGH	300	705	1000	uA	VGH =22V
	IGL	300	705	1000	uA	VGL = -7V
	IVDD	50	95	120	mA	VDD =2.5V
	IAVDD	8	45	70	mA	AVDD =8.2V
Input logic high voltage	V _{IH}	0.8VDD	-	3.6	V	-
Input logic low voltage	V _{IL}	0	-	0.2VDD	V	

Note 1: Be sure to apply VDD and VGL to the LCD first, and then apply VGH

Note 2: VDD setting should match the signals output voltage of customer's system board.

Note 3: Typical VCOM is only a reference value, it must be optimized according to each LCM. Be sure to use VR.



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8.2 Backlight Unit


(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Voltage for LED backlight	V _L	16.5	(18.3)	20.1	V	(1),(3)
Current for LED backlight	I _L	-	200	-	mA	-
LED Life Time(25°C)	-	(TBD)	(TBD)	-	hr	(2)

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C and I_L =200mA.

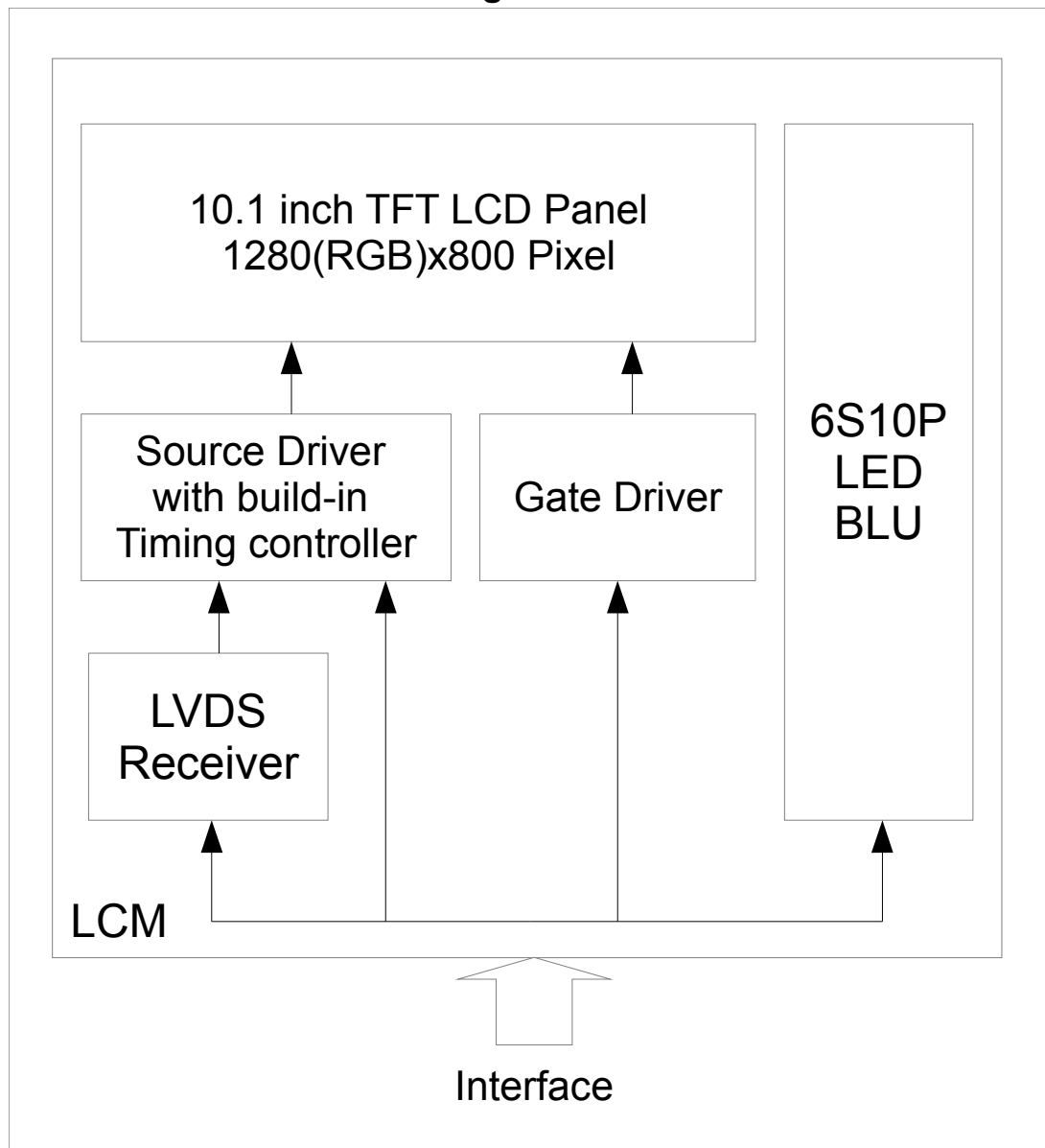
Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and I_L =200mA. The LED life time could be decreased if operating I_L is larger than 200mA.

Note 3: The BLU is driven by constant current, the voltage value is for reference only.

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9. Block Diagram

9.1 TFT-LCD Module with Backlight Unit



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 196479-40041-3 manufactured by P2 connector

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	

27	NC	---	No connection	
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	NC	---	No connection	
38	VGH	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

I: input, O: output, P: Power

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.

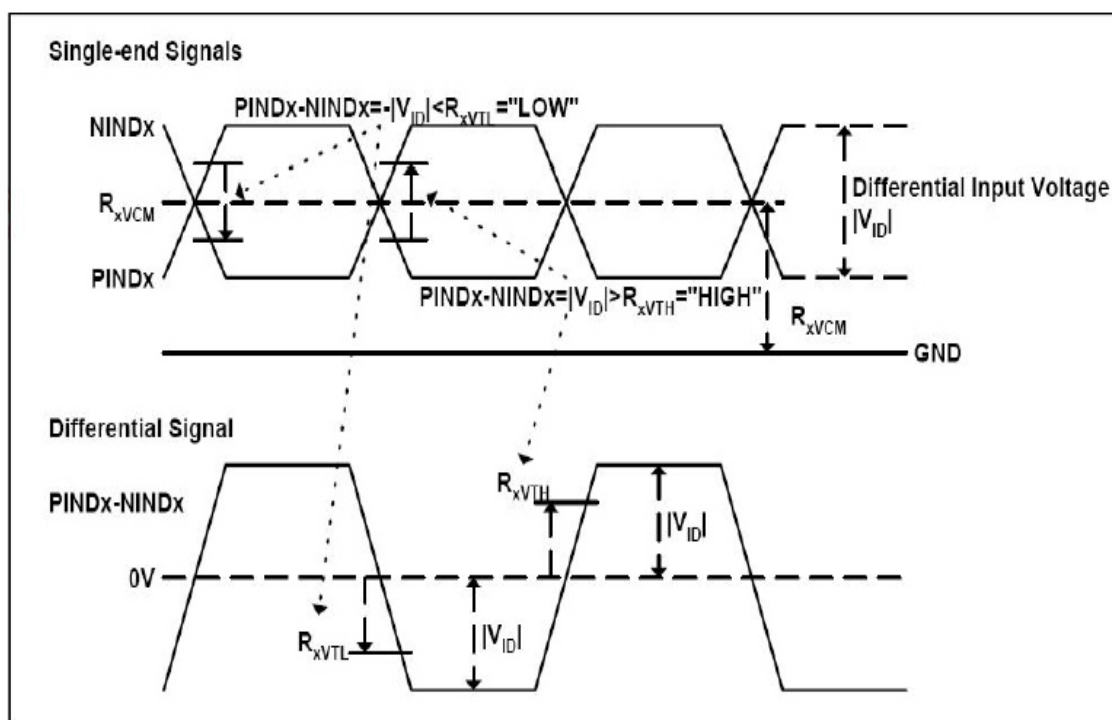
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11. Interface Timing

11.1 Input Signal Characteristics

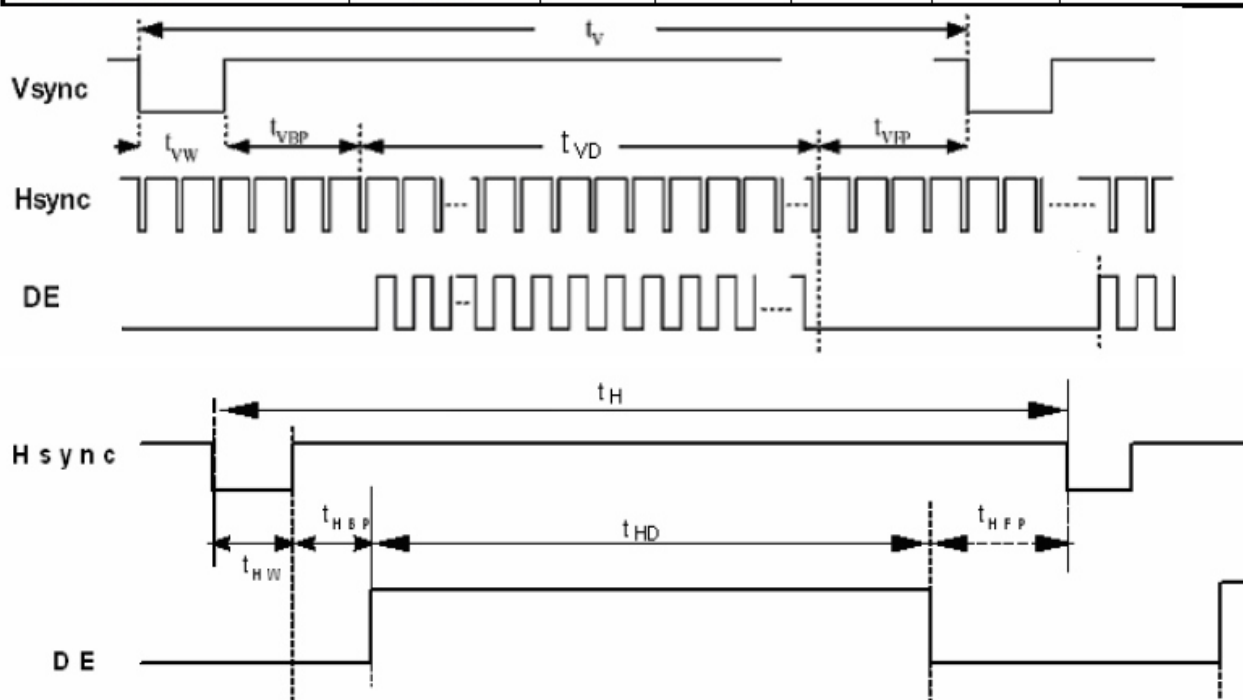
11.1.1.AC Electrical Characteristics

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	

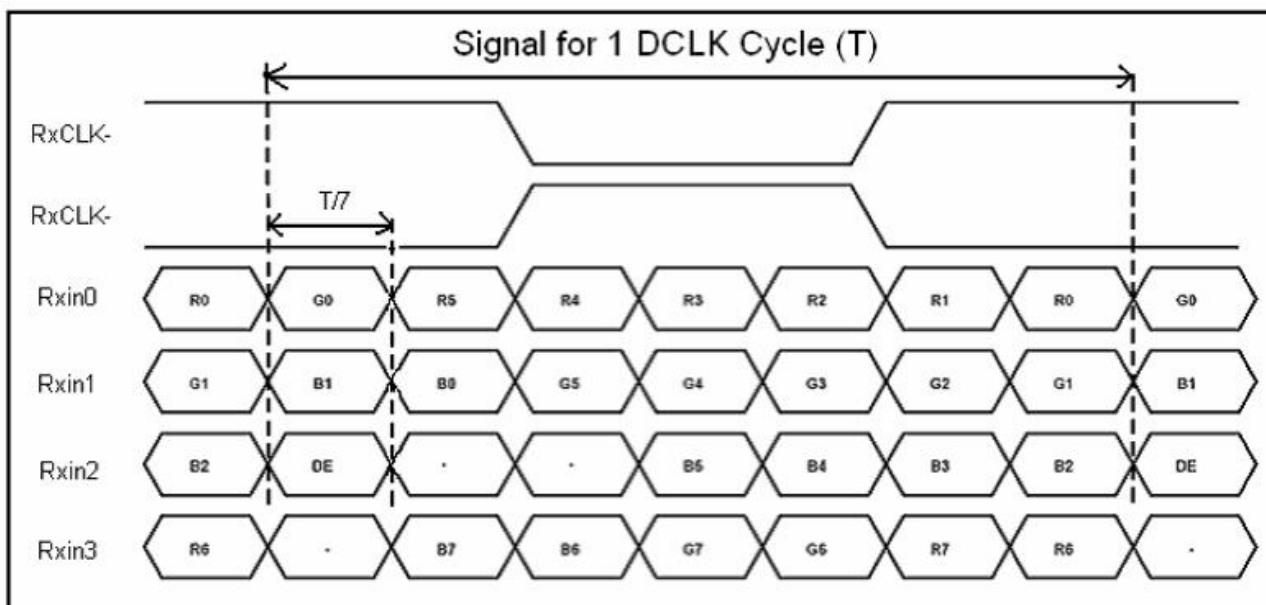


11.1.2.Timing

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	t _{HD}	1280			Tc	
HS period time	t _H	(1410)	1440	(1470)	Tc	
HS Width +Back Porch +Front Porch	t _{HW} + t _{HBP} +t _{HFP}	(60)	160	(190)	Tc	
Vertical display area	t _{VD}	800			t _H	
VS period time	t _V	(815)	823	(833)	t _H	
VS Width +Back Porch +Front Porch	t _{VW} + t _{VBP} +t _{VFP}	(15)	23	(33)	t _H	

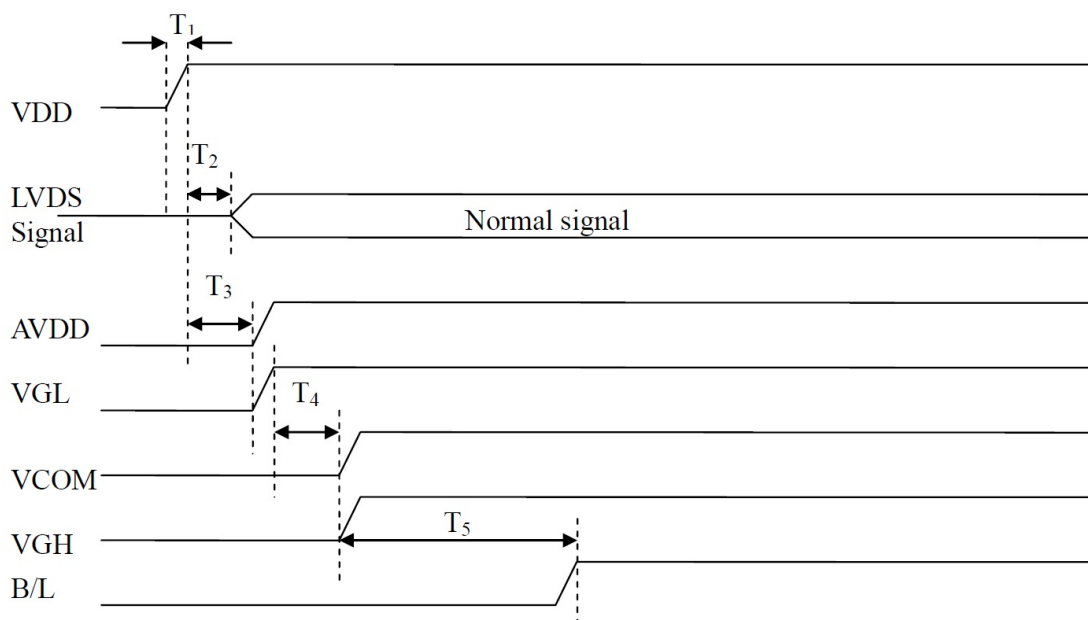


11.1.4. LVDS Data Input Format

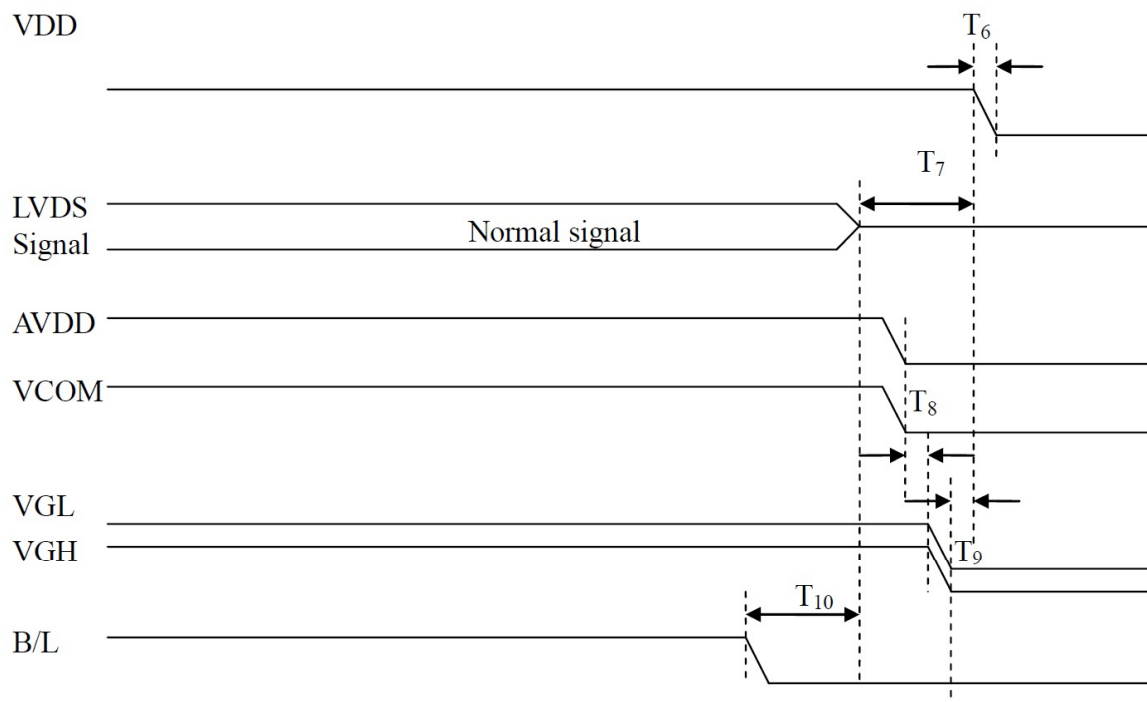


11.2 Power Sequence


Power on:



Symbol	Value			Unit
	Min.	Typ.	Max.	
T1	0.5	2	10	ms
T2	0	5	50	ms
T3	0	5	50	ms
T4	0	6	100	ms
T5	120	130	200	ms

Power off:


Symbol	Value			Unit
	Min.	Typ.	Max.	
T6	0.5	2	10	ms
T7	0	7	50	ms
T8	0	5	10	ms
T9	0	1	10	ms
T10	0	2	100	ms

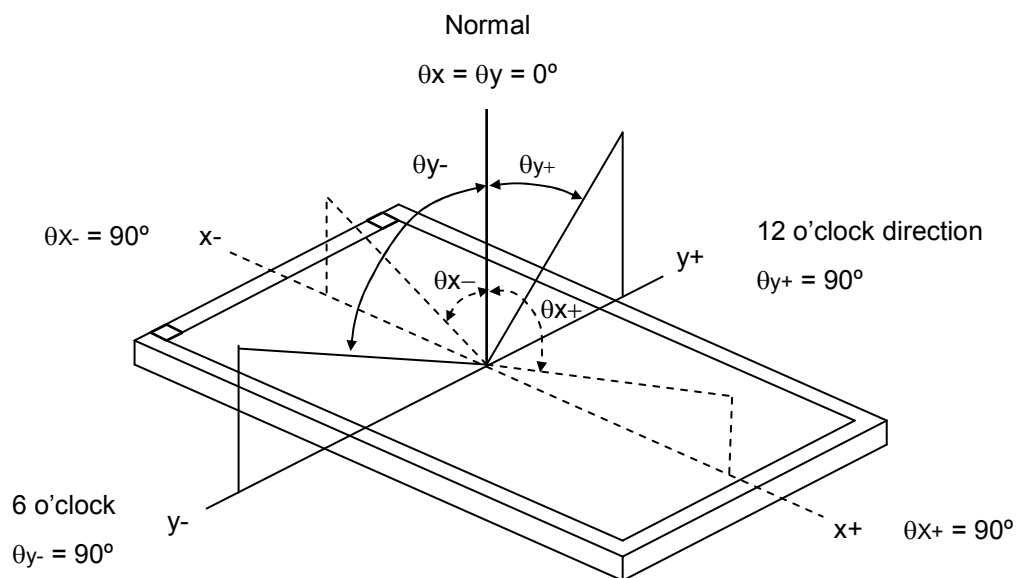
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12. Optical Characteristics

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	600	(800)	-	-	(2)
Response Time		T_R		-	10	20	ms	(3)
		T_F		-	15	30	ms	
Luminance(Center)		Y		830	(1200)	-	cd/m ²	(4)
Brightness uniformity		BUNI		75	(80)	-	%	(5)
Color Chromaticity	White	Wx		0.270	0.320	0.370	-	(1),(4)
		Wy		0.290	0.340	0.390	-	
	Red	Rx		(TBD)	(TBD)	(TBD)	-	
		Ry		(TBD)	(TBD)	(TBD)	-	
	Green	Gx		(TBD)	(TBD)	(TBD)	-	
		Gy		(TBD)	(TBD)	(TBD)	-	
	Blue	Bx		(TBD)	(TBD)	(TBD)	-	
		By		(TBD)	(TBD)	(TBD)	-	
Viewing Angle	Horizontal	θ_{x+}	CR \geq 10	75	(85)	-	deg.	
		θ_{x-}		75	(85)	-		
	Vertical	θ_{y+}		75	(85)	-		
		θ_{y-}		75	(85)	-		

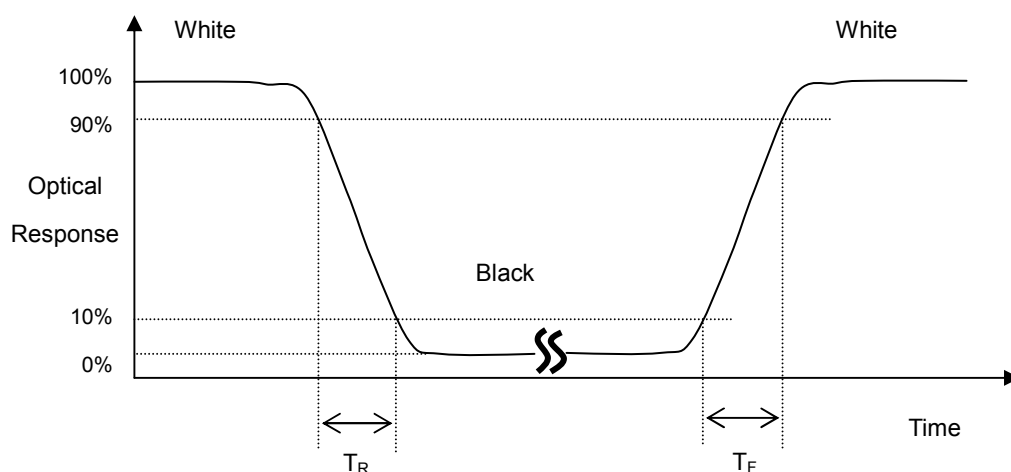
Note (1) Definition of Viewing Angle (θ_x , θ_y):



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

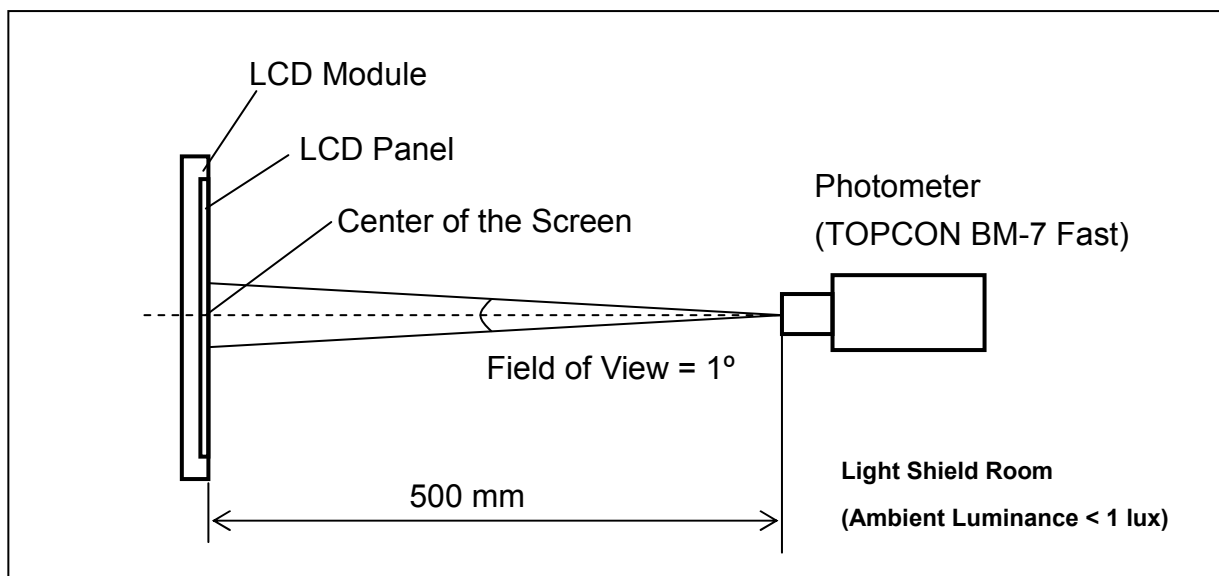
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

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

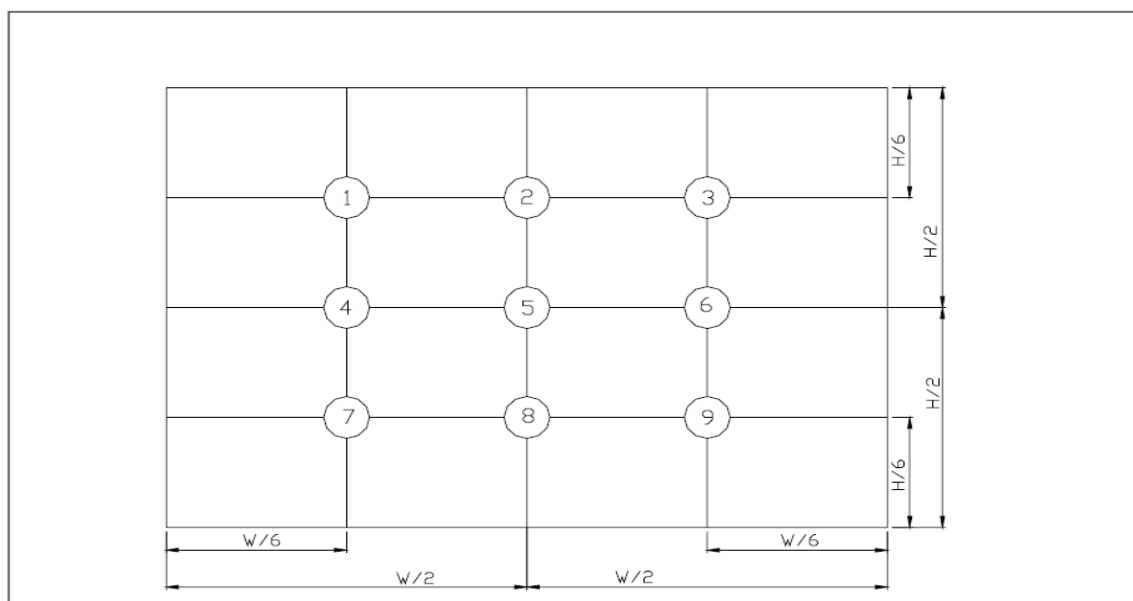


Note (4) Measurement Set-Up:


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

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



(單位 : mm)

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13. Reliability Test

No.	Test Items	Test Condition	Remark
1	High Temperature Storage Test	T _a = 80℃ 120 hours	(1),(3),(4)
2	Low Temperature Storage Test	T _a = -30℃ 120 hours	(1),(3),(4)
3	High Temperature Operation Test	T _S = 70℃ 120 hours	(2),(3),(4)
4	Low Temperature Operation Test	T _a = -20℃ 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 : T_a is the ambient temperature of samples.

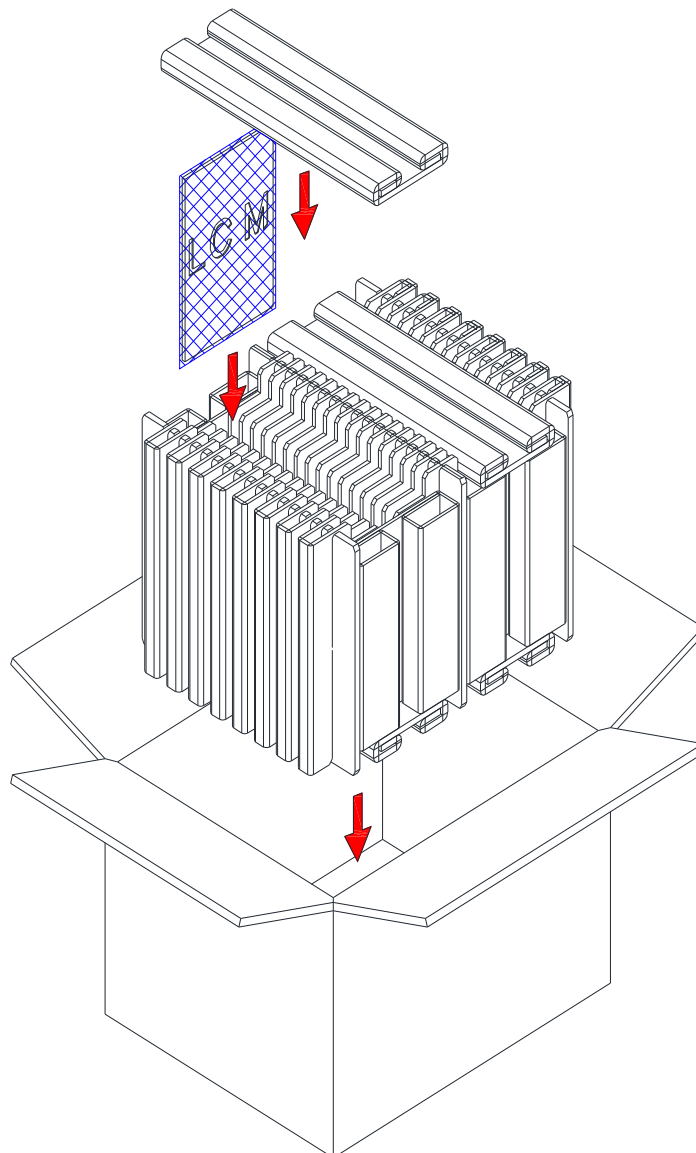
Note 2 : T_s is the temperature of panel's surface.

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 SHIELDING BAGS	245.0×300.0		30	
2	PARTITION	425.0×345.0×295.0	CARTON	1	
3	EXTERNAL BOX	450.0×335.0×355.0	CARTON	1	
4	PRODUCT	229.46×149.1×4.95		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

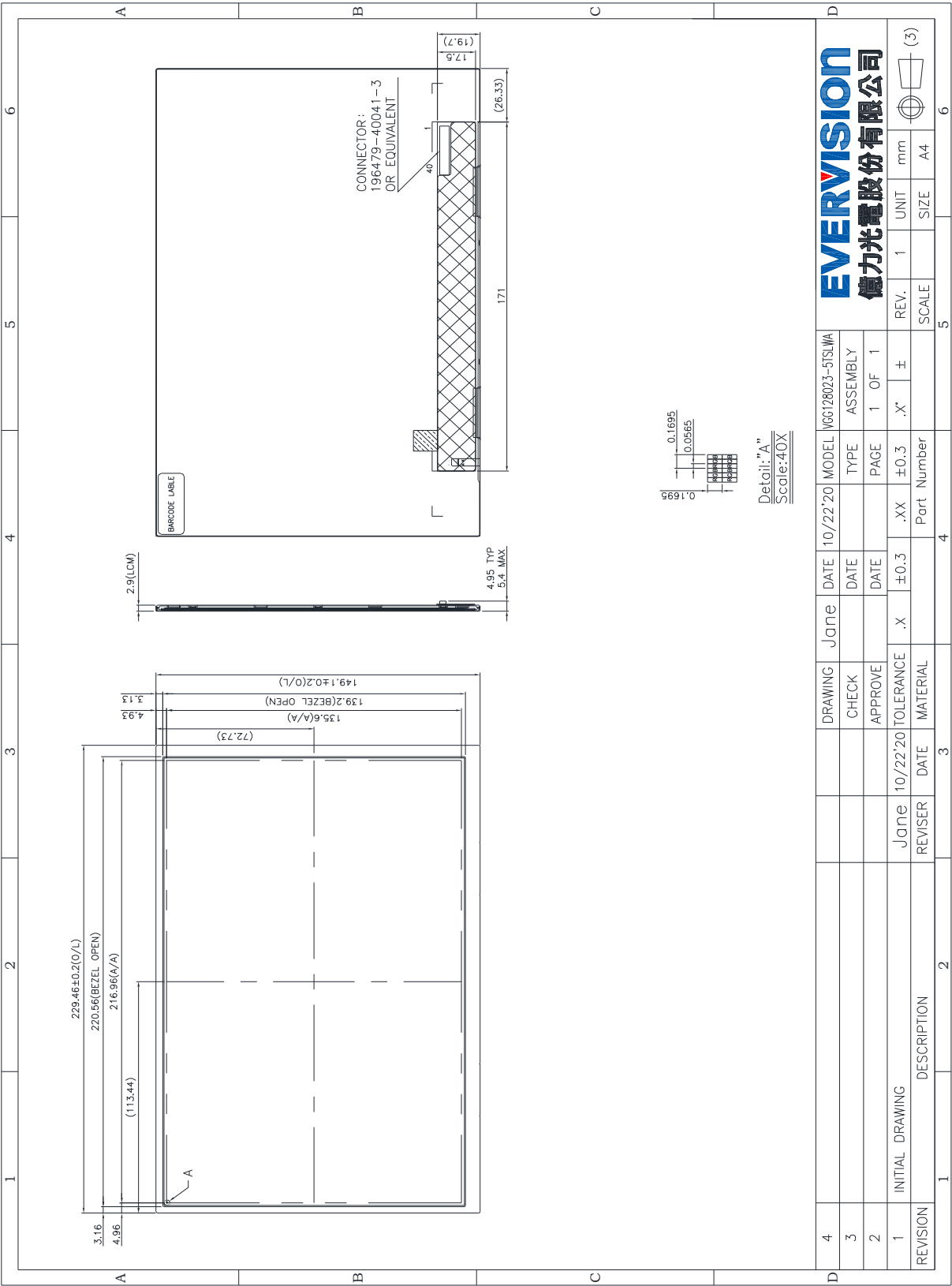
This Evervision LCD module has been specifically designed for use only in electronic devices in the areas of audio control, office automation, industrial control, home appliances, etc. The modules should not be used in applications where module failure could result in physical harm or loss of life, and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

15.5 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°C 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 Evervision, 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



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17.Definition of Labels

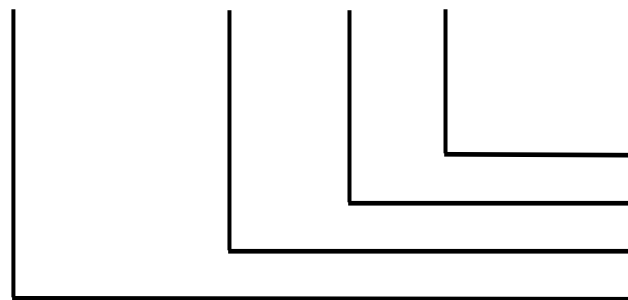
The bar code nameplate is pasted on each module as illustration, and its definitions are as following explanation.



(a) Module Name : VGG128023-5TSLWA

(b) Serial ID :

A B C D E F G H I J K L



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
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) :

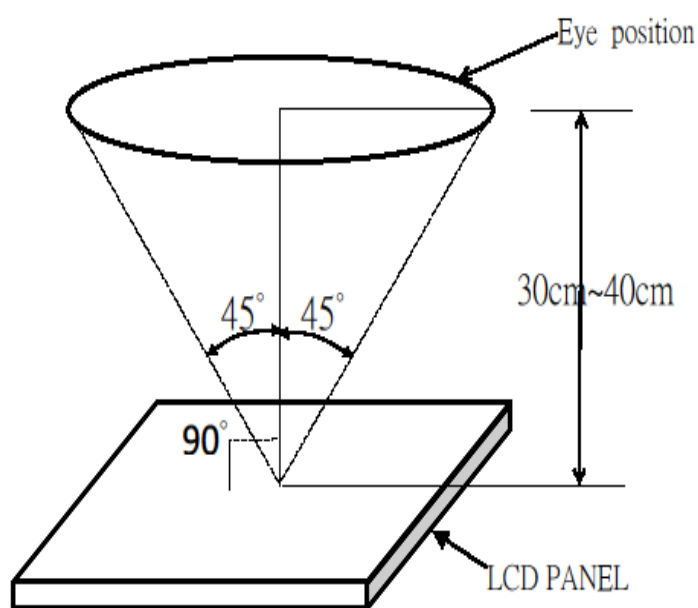
Manufacturing sequence of product, for example : 0001~9999.

18. Incoming Inspection Standards

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:

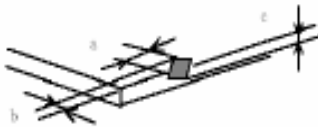
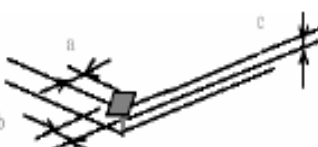
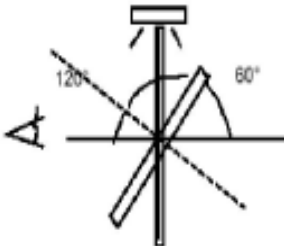

- (1) Test method: According to ANSI/ASQC Z 1.4 .General Inspection Level II take a single time
- (2) The defects classify of AQL as following:


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	Note:2
		-	$W \leq 0.07$	Disregard	
		$L \leq 5.0$	$0.07 < W \leq 0.1$	4	
	Polarizer dent or bubble (in display area)	Dimension(mm)		Acceptable number	Note:3
		$D \leq 0.3$		Disregard	
		$0.3 < D \leq 0.5$		4	
	Line Shape (Particles and Lint in display area)	L(mm)	W(mm)	Acceptable number	Note:2
		-	$W \leq 0.07$	Disregard	
		$L \leq 5$	$0.07 < W \leq 0.1$	4	
	Dot Shape (Particle in Display area)	Dimension(mm)		Acceptable number	Note:3
		$D \leq 0.3$		Disregard	
		$0.3 < D \leq 0.5$		4	

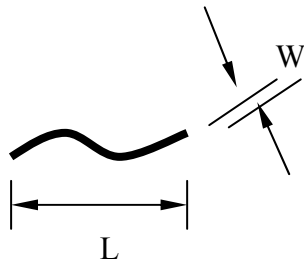
Incoming Inspection Touch Panel

Item		Specification/Description			Note
Touch Panel	Scratch	L(mm)	W(mm)	Acceptable number	Note:2
		$L \leq 10$	$W < 0.05$	Disregard	
			$0.05 \leq W < 0.1$	$N \leq 4$	
			$W \geq 0.1$	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				Note:6	
				Note:6	
Newton-ring	(In case of doubtful situations) Observe on 60° from the product surface under a white Fluorescent lamp (3-wavelength lamp). 			Note:6	
Membrane Drum				-	
	$H \leq 0.4\text{mm}$				

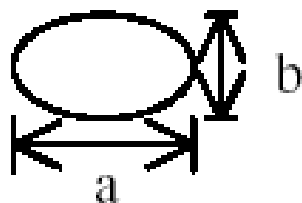
	MODEL NO.		PAGE
	VGG128023-5TSLWA	SPEC ONLY	30

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.

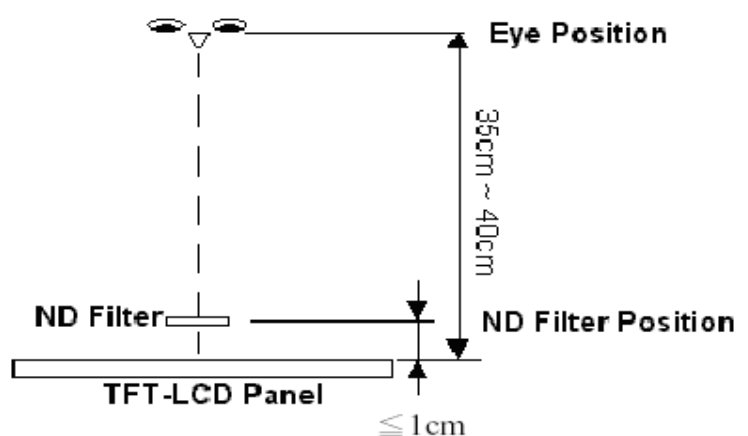
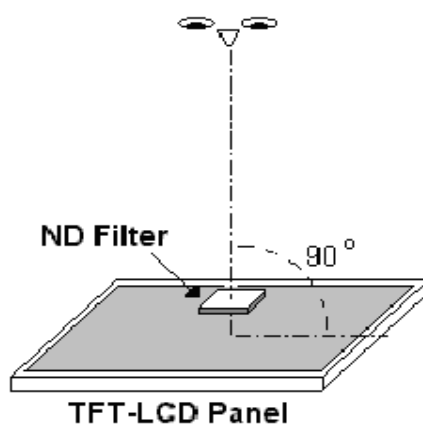
Note2.



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




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

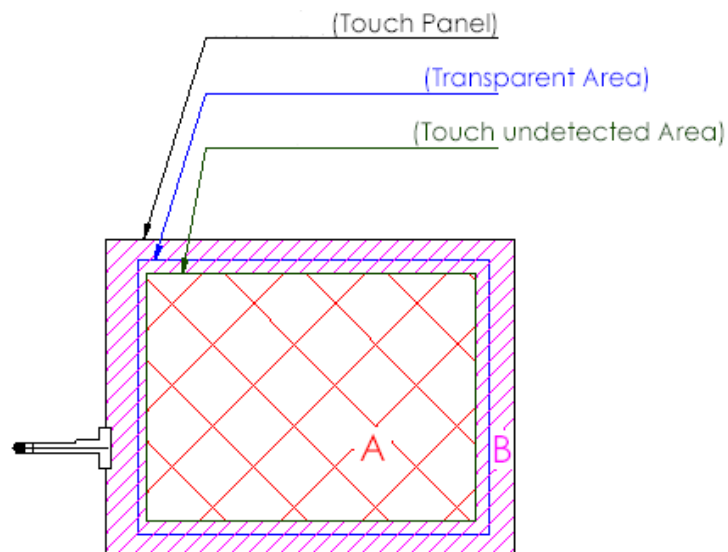


Note5. ADJACENT DOT



	MODEL NO.		PAGE
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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.