

勁佳光電股份有限公司

VBEST ELECTRONICS LTD.

Product Specification For LCD Module
(KVPF-7B-002-16)

Model NO. : VGG644803-6UFLWB(LF)

REVISION : 2

☒ **APPROVAL FOR SPECIFICATIONS ONLY**



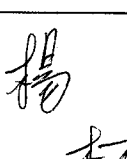

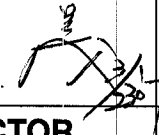

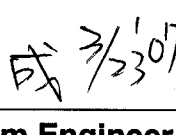
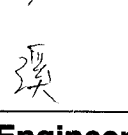
☐ **APPROVAL FOR SPECIFICATIONS AND SAMPLE**

CUSTOMER :

STD.

APPROVED BY :

VBEST LCM R&D CENTER

APPROVED BY	CHECKED BY	PREPARED BY	
 正	 正	 材	 清
 3/23/07	 3/23/07	 成 3/23/07	 溪
DIRECTOR	MANAGER	Mechanism Engineer	Electronic Engineer

勁佳光電股份有限公司總公司
VBEST ELECTRONICS LTD.
台北縣中和市建一路 186 號 12 樓
12F, NO. 186, JIAN 1st RD., CHUNG HO CITY,
TAIPEI HSIEN, TAIWAN, R.O.C
TEL : +886 2 8227-2788
FAX : +886 2 8227-2789

勁佳光電股份有限公司台中分公司
VBEST ELECTRONICS(T.C) LTD
台中縣潭子鄉台中加工出口區建國路 19 號
NO. 19, CHIEN KUO ROAD, T.E.P.Z TANTZE
427 TAICHUNG HSIEN TAIWAN R.O.C
TEL : +886 4 2532-8889
FAX : +886 4 2532-6689

東莞城區勁佳光電電子廠
VBEST ELECTRONICS(B.V.I) LTD.
廣東省東莞市城區東縱大道天寶路 9 號
NO. 9, Tian Bao Rd., Dong Zong St., Dong Guan City
Guang Dong, China.
TEL : +86 769 220 5258
FAX : +86 769 220 7258

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

<http://www.vbest.com.tw>

**1. Table of Contents**

No.	Contents	Page
1	Table of Contents	2
2	Record of Revisions	3
3	Module Numbering System	4
4	Application	5
5	Features	5
6	General Specifications	5
7	Absolute Maximum Ratings	6
8	Electrical Characteristics	7
9	Block Diagram	9
10	Input / Output Terminals Pin Assignment	10
11	Interface Timing	13
12	Optical Characteristics	15
13	Reliability Test	18
14	Packaging	19
15	Precautions	20
16	Outline Drawing	22
17	Definition of Labels	23



3. Module Numbering System

V G G 644803 – 6 U F L W B

Serial No:A~Z

Backlight Color:

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

Backlight Type:

N:Without Backlight;
E:EL; **F**:CCFL; **L**:LED; **P**:LAMP

LCD Model:

T:TN; **H**:HTN; **G**:STN Gray; **E**:ECB
Y:STN Yellow;**B**:STN Blue; **W**:FSTN
Black/White;
N:Others;**O**:OLED ;**P**:PLED;**C**:CSTN;
F:TFT;**L**:LTPS

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. : 01~49

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

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 5.7 inch VGA supported TFT-LCD module, and can display true 262,144 colors(6 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 5.7" TFT-LCD panel, a driver circuit and LED backlight unit and used as the input devices for general electric appliances via both finger and pen-entry.

5. Features

- VGA (640×480 pixels) resolution.
- Digital 18 bit parallel RGB.
- Dot inversion mode with stripe type.
- Transparent Touch panel
 - 4-Wire
 - Analog Resistive

6. General Specifications

Item	Specifications	Unit
Screen Size	5.7 (Diagonal)	inch
Display Format	640RGB(H)×480(V)	dot
Active Area	115.2(H)×86.4(V)	mm
Dot Size	0.060(H)×0.180(V)	mm
Pixel Configuration	RGB Vertical Stripe	-
Display Mode	TN Type Transmissive Mode Normally White	-
Surface Treatment	Anti-Glare	-
Viewing Direction	6 O'clock	-
Outline Dimension	144.0(W)×104.6(H)×14.5(D)	mm
Weight	(TBD)	g



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)
Operating Ambient Temperature	T _{OP}	-20	+70	°C	(1)

Note (1) Temperature and relative humidity range are shown in the figure below.

(a) 90%RH Max. ($T_a \leq 40^\circ\text{C}$).

(b) Wet-bulb temperature should be 39°C Max. ($T_a > 40^\circ\text{C}$).

(c) No condensation.

7.2 Electrical Absolute Ratings

7.2.1 TFT-LCD Module

($T_a = 25 \pm 2^\circ\text{C}$, GND=VSS=0V)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Digital Power Supply Voltage	VCC	-0.3	4.3	V	-

7.2.2 Backlight Unit

($T_a = 25 \pm 2^\circ\text{C}$)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Current of Backlight Unit	I _B	-	385	mA	(1)
Reverse voltage	V _R	-	15	V	(1)

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



8. Electrical Characteristics

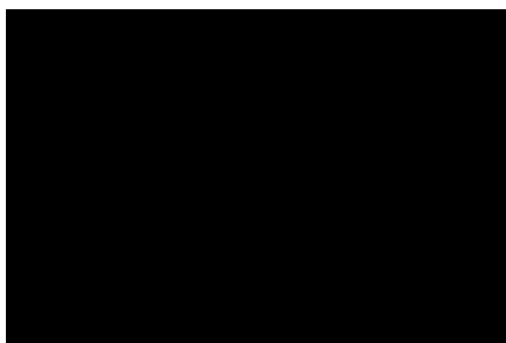
8.1 TFT-LCD Module

(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Supply Voltage	VCC	3.0	3.3	3.6	V	-
Input High Threshold Voltage	VIH	0.7VCC	-	VCC	V	-
Input Low Threshold Voltage	VIL	0	-	0.3VCC	V	-
Power Consumption	P _L		(TBD)		W	(1)
Frame Frequency	F _V	-	60	-	Hz	-
Dot Clock	DCLK	-	25.175	-	MHz	-

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

Black Pattern / 0 Gray



Active Area

8.2 Backlight Unit

(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Current of Backlight Unit	I _B	-	280	-	mA	-
Voltage of Backlight Unit	V _B	-	12.0	(13.0)	V	I _B =60mA
Power Consumption	P _{BL}	-	(TBD)	-	W	I _B =60mA
LED Life Time(25°C)	-	40000	50000	--	hr	(1)

Note (1) : The data for LED is for your reference, because LED is consumable component.



8.3 Transparent Touch panel

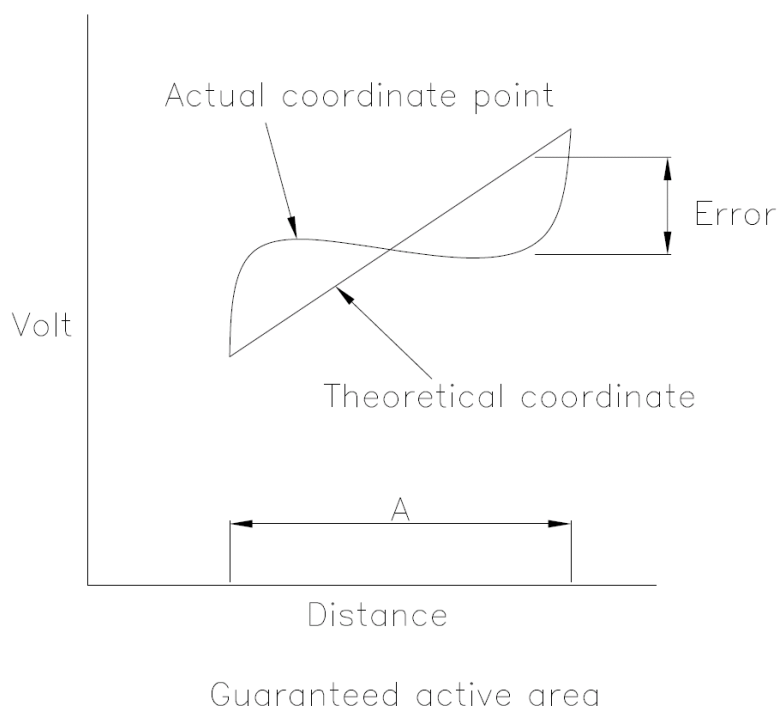
Electrical characteristics

Item		Value			Unit	Note
		Min.	Typ.	Max.		
Operating Voltage		-	5	7	V	-
Terminal Resistance	X-direction	300	-	900	Ω	At connector
	Y-direction	200	-	600	Ω	At connector
Insulation Resistance		$\geq 10\text{M}\Omega$				At DC25V
Chatting		$\leq 20\text{ ms Max}$				At connector
Linearity		$\leq 1.5\%$				(1)

Note(1): Measurement condition of Linearity

Difference between actual voltage & Theoretical voltage is an error at any points.

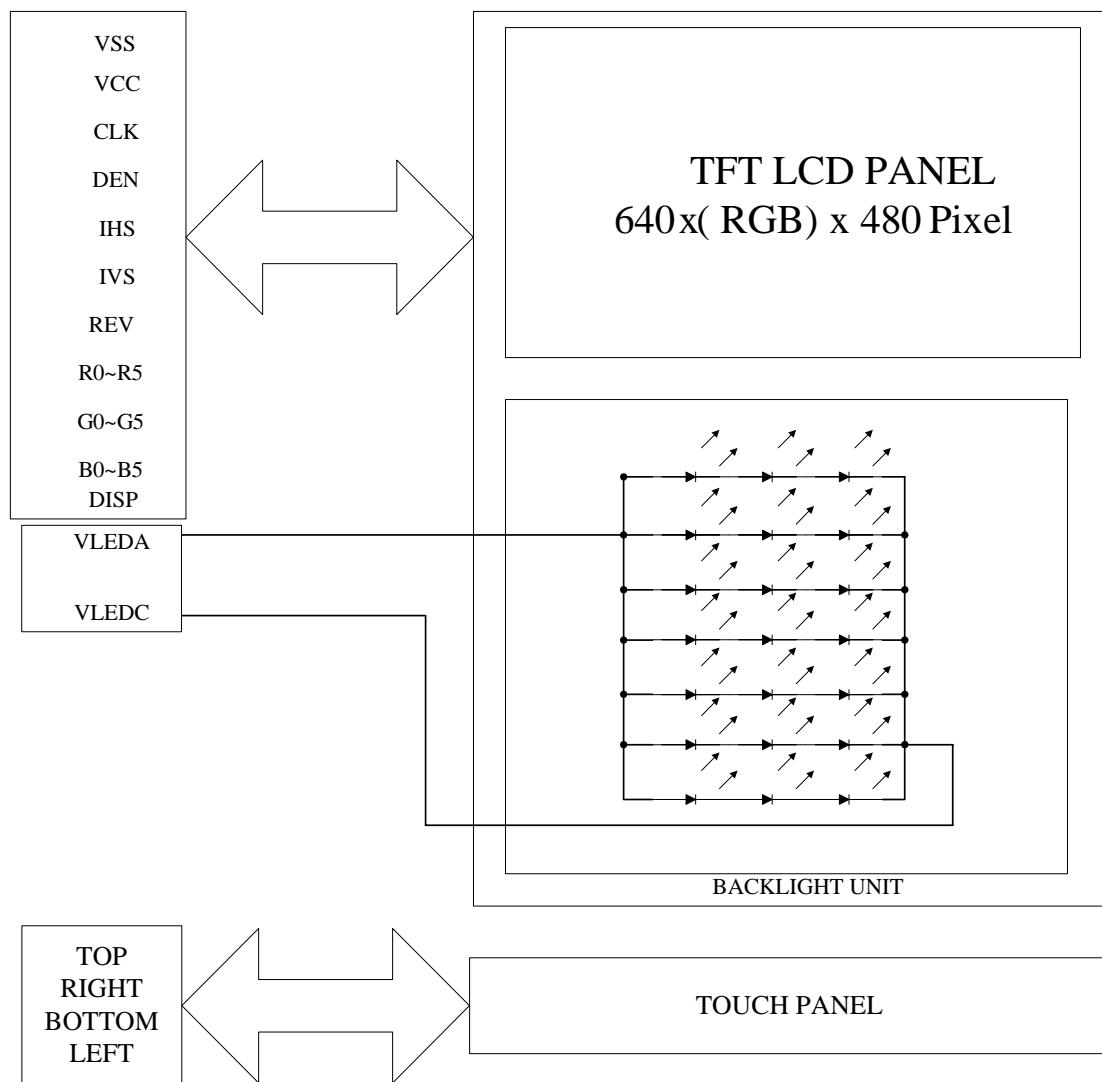
Linearity is the value max. Error voltage divided by voltage difference on active area.





9. Block Diagram

9.1 TFT-LCD Module with Backlight Unit





10. Input / Output Terminals Pin Assignment

10.1 TFT-LCD Module

Pin No.	Symbol	I/O	Description
1	VSS	I	Ground
2	CLK	I	Clock signal
3	IHS	I	Horizontal synchronous signal
4	IVS	I	Vertical synchronous signal
5	VSS	I	Ground
6	R0	I	RED data (LSB)
7	R1	I	RED data
8	R2	I	RED data
9	R3	I	RED data
10	R4	I	RED data
11	R5	I	RED data(MSB)
12	VSS	I	Ground
13	G0	I	GREEN data(LSB)
14	G1	I	GREEN data
15	G2	I	GREEN data
16	G3	I	GREEN data
17	G4	I	GREEN data
18	G5	I	GREEN data(MSB)
19	VSS	I	Ground
20	B0	I	Blue data(LSB)
21	B1	I	Blue data
22	B2	I	Blue data
23	B3	I	Blue data
24	B4	I	Blue data
25	B5	I	Blue data(MSB)
26	VSS	I	Ground
27	DEN	I	Input data enable control
28	VCC	I	+3.3V power supply
29	VCC	I	+3.3V power supply
30	REV	I	Selection signal for horizontal/ vertical scanning direction



Pin No.	Symbol	I/O	Description
31	VSS	I	Ground
32	DISP	I	ON/OFF control signal input
33	VSS	I	Ground

10.2 Backlight Unit

Pin No.	Symbol	I/O	Description	Wire Color
1	VLEDA	I	Backlight LED Anode.	Red
2	VLEDC	I	Backlight LED Cathode.	Black

10.3 Transparent Touch Panel

Pin No.	Symbol
1	TOP
2	RIGHT
3	BOTTOM
4	LEFT



10.4 Color Data Input Assignment

The brightness of each primary color(red, green and blue) is based on the 6 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					
		D05	D04	D03	D02	D01	D00	D15	D14	D13	D12	D11	D10	D25	D24	D23	D22	D21	D20
Basic Colors	Black	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	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	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
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
	Red(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(61)	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(63)	1	1	1	1	1	1	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
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(61)	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0
	Green(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	Green(63)	0	0	0	0	0	0	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
	Blue(1)	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	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(61)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1
	Blue(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1



11. Interface Timing

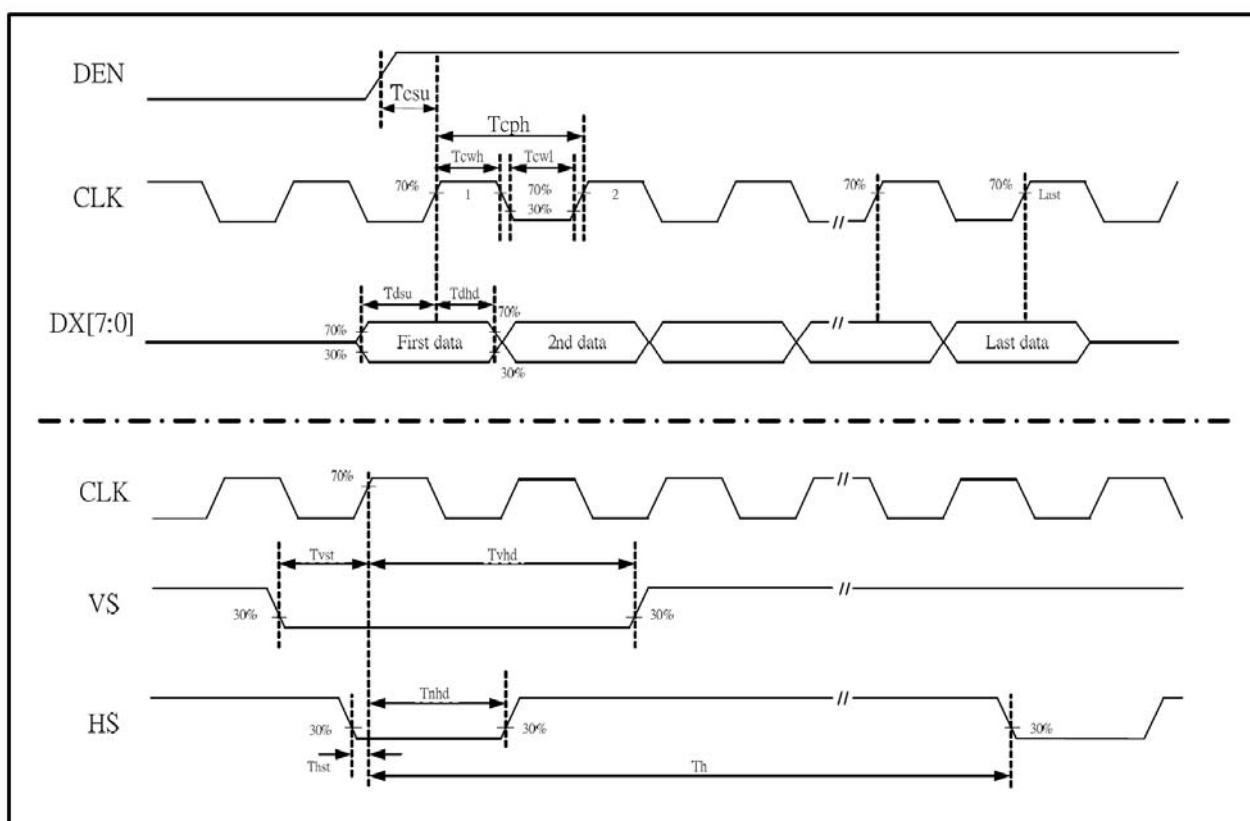
11.1 Input Signal Characteristics

PARAMETER	Symbol	Min.	Typ.	Max.	Unit
CLK frequency	F_{CPH}	-	25.175	-	MHz
CLK period	T_{CPH}	-	39.7	-	ns
CLK pulse duty	T_{CWH}	40	50	60	%
HS period	T_H	-	800	-	T_{CPH}
HS pulse width	T_{WH}	5	30	-	T_{CPH}
HS-DEN time	T_{HS}	112	144	175	T_{CPH}
DEN pulse width	T_{EP}	-	640	-	T_{CPH}
VS pulse width	T_{WV}	1	3	5	T_H
VS-DEN time	T_{STV}	-	35	-	T_H
VS period	T_V	-	525	-	T_H

Note: When SYNC mode is used, 1st data start from 144th CLK after HS falling (when $STHD[5:0]=00000$)

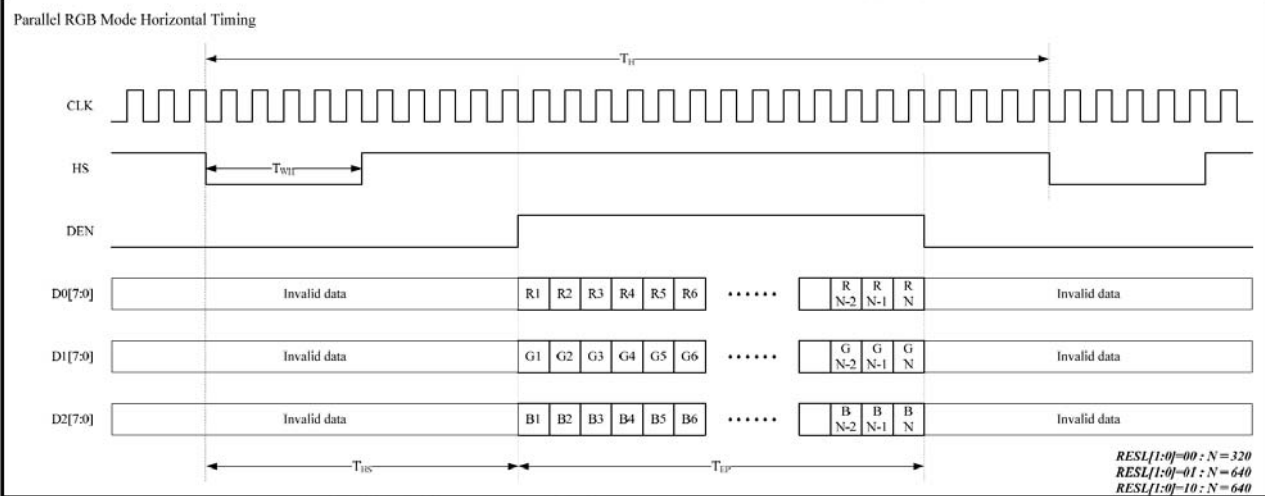
11.2 Waveform

11.2.1 Clock and Data input waveforms

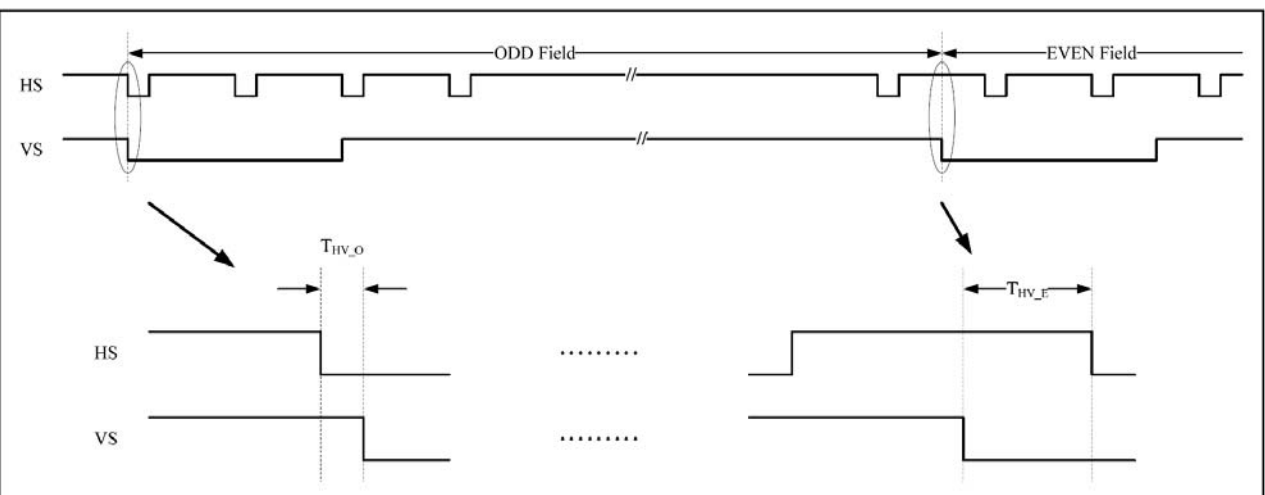




11.2.2 Data input format for RGB Mode



11.2.3 The HS & VS timing of the ODD/EVEN field.





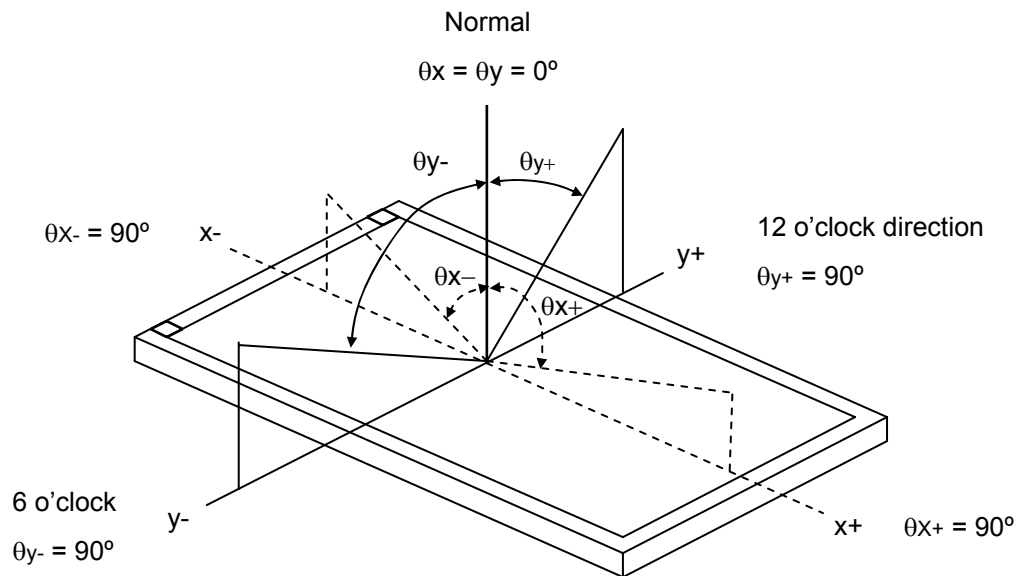
12. Optical Characteristics

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	(200)	(400)	-	-	(2)
Response Time		T _R		-	15	-	ms	(3)
		T _F		-	35	-	ms	
Luminance(Center)		Y		(250)	(300)	-	cd/m ²	(4)
Brightness uniformity		BUNI		80	(85)	-	%	(5)
Color Chromaticity	Red	R _x		(0.585)	(0.615)	(0.645)	-	(1),(4)
		R _y		(0.314)	(0.344)	(0.374)	-	
	Green	G _x		(0.277)	(0.307)	(0.337)	-	
		G _y		(0.532)	(0.562)	(0.592)	-	
	Blue	B _x		(0.103)	(0.133)	(0.163)	-	
		B _y		(0.120)	(0.150)	(0.180)	-	
	White	W _x		(0.279)	(0.309)	(0.339)	-	
		W _y		(0.320)	(0.350)	(0.380)	-	
Viewing Angle	Horizontal	θ_x+	CR≥10	(55)	(60)	-	deg.	
		θ_x-		(55)	(60)	-		
	Vertical	θ_Y+		(35)	(50)	-		
		θ_Y-		(45)	(55)	-		



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



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

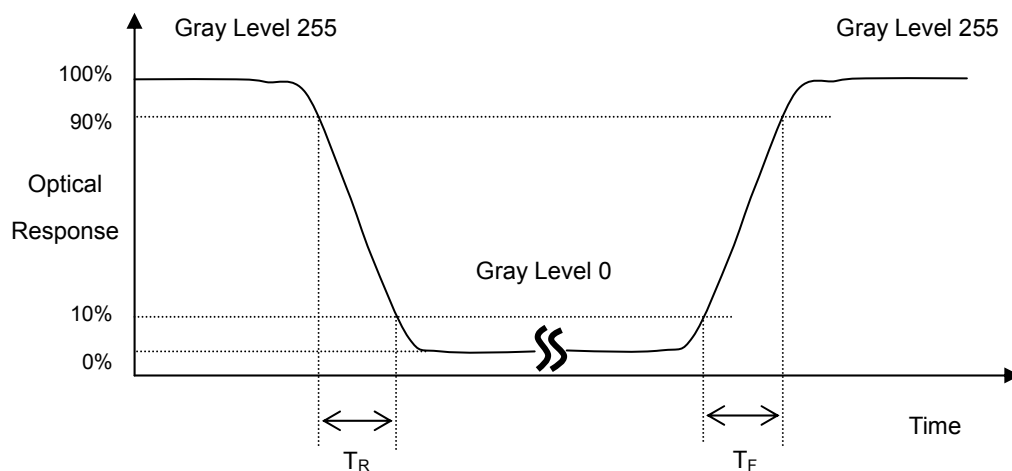
Measured at the center point of panel

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

L255: Luminance of gray level 255

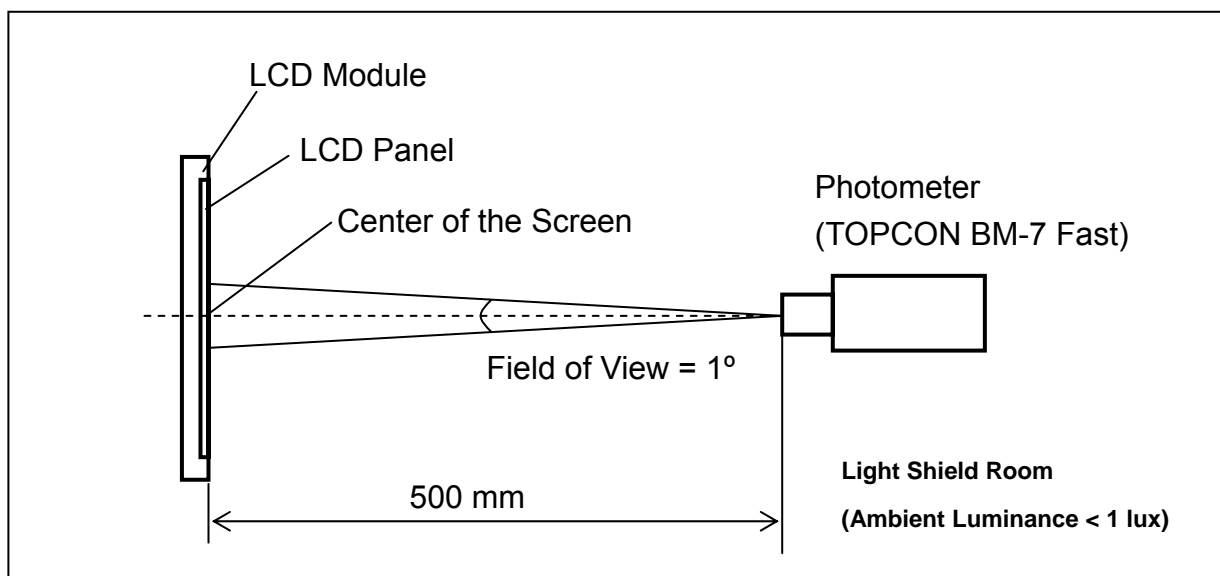
L 0: Luminance of gray level 0.

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

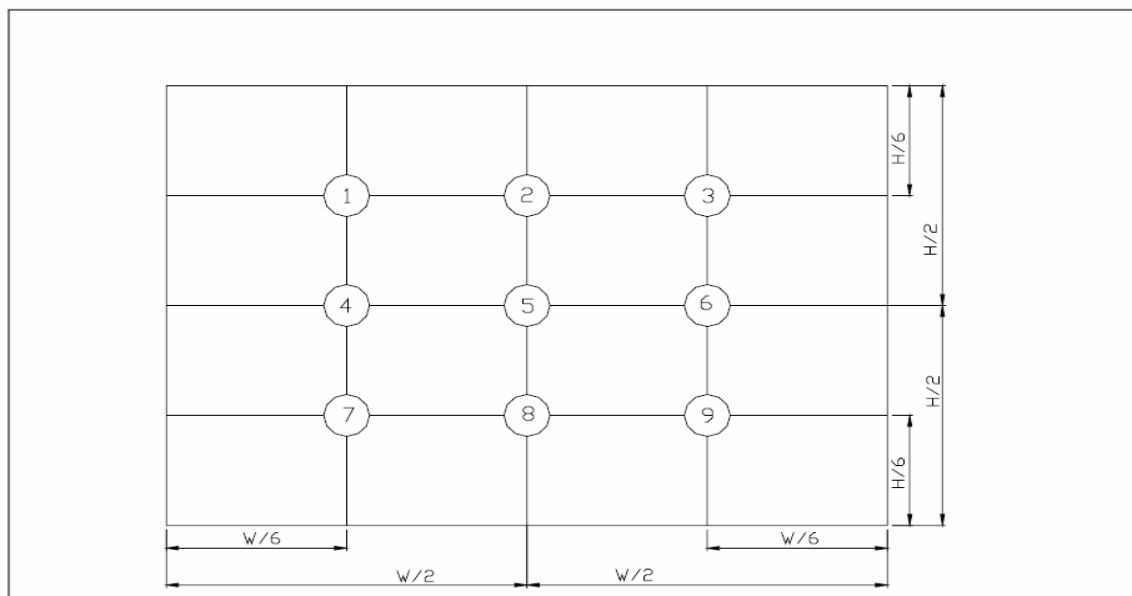


**Note (4) Measurement Set-Up:**

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 windless room.

**Note (5) Definition of brightness uniformity**

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



(單位 : mm)



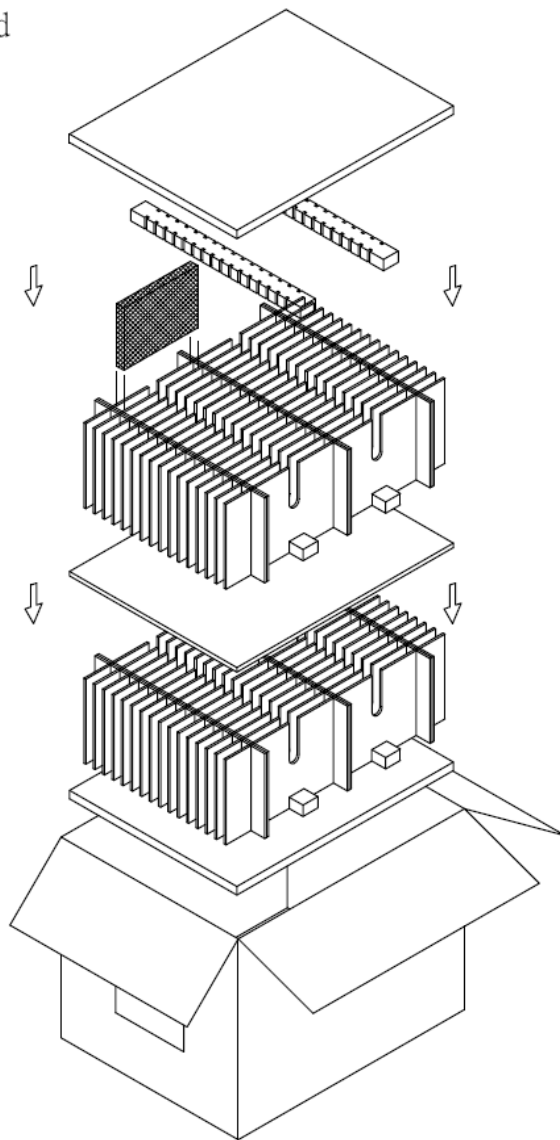
13. Reliability Test

No.	Test Items	Test Condition	Remark
1	High Temperature Storage Test	T _a = 80°C 240 hours	-
2	Low Temperature Storage Test	T _a = -30°C 240 hours	-
3	High Temperature Operation Test	T _a = 70°C 240 hours	-
4	Low Temperature Operation Test	T _a = -20°C 240 hours	-
5	High Temperature and High Humidity Operation Test	T _a =60°C 90%RH 240 hours	-
6	Electro Static Discharge Test (non-operating)	-Panel Surface/Top Case : 150pF, 330Ω Air: ±15kV, Contact: ±8kV	-
7	Mechanical Shock Test (non-operating)	Half sine wave, 80G, 11ms 3 times shock of each six surfaces	-
8	Vibration Test (non-operating)	Sine wave, 10 ~ 55 ~ 10Hz, 3 axis, 2 hours/axis	-
9	Thermal Shock Test	-20°C (1h) ~ 70°C, 200 cycles, 30min 30min	-
10	Drop Test(with Carton)	Height: 80cm 1 corner, 3 edges, 6 surfaces	-



14. Packaging

Packing Method



	PARTS LIST				
	ITEM	SIZE(LxWxH) unit:mm	MATERIAL	Q.T.Y	NOTE
1	抗靜電袋	537.0x317.0x23.6	PET	60	
2	PU FOAM	440.0x340.0x15.0	SPONGE	2	
3	EPE PAD	345.0x30.0x20.0		8	
4	CARD BOARD	345.0x150.0(16刀)	CARTON	12	
5	CARD BOARD	450.0x150.0(3刀)	CARTON	32	
6	CARD BOARD	440.0x340.0x8.0	CARTON	1	
7	EXTERNAL BOX	460.0x360.0x355.0	CARTON	1	
8	PRODUCT	144.0x104.6x14.5		60	



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.

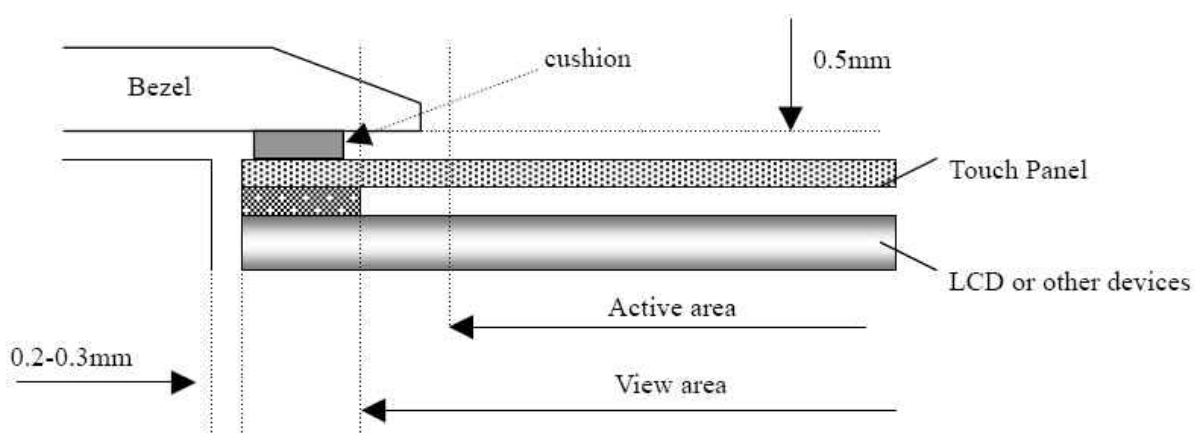


15.3 Cautions for installing and assembling

Bezel edge must be positioned in the area between the Active area and View area.

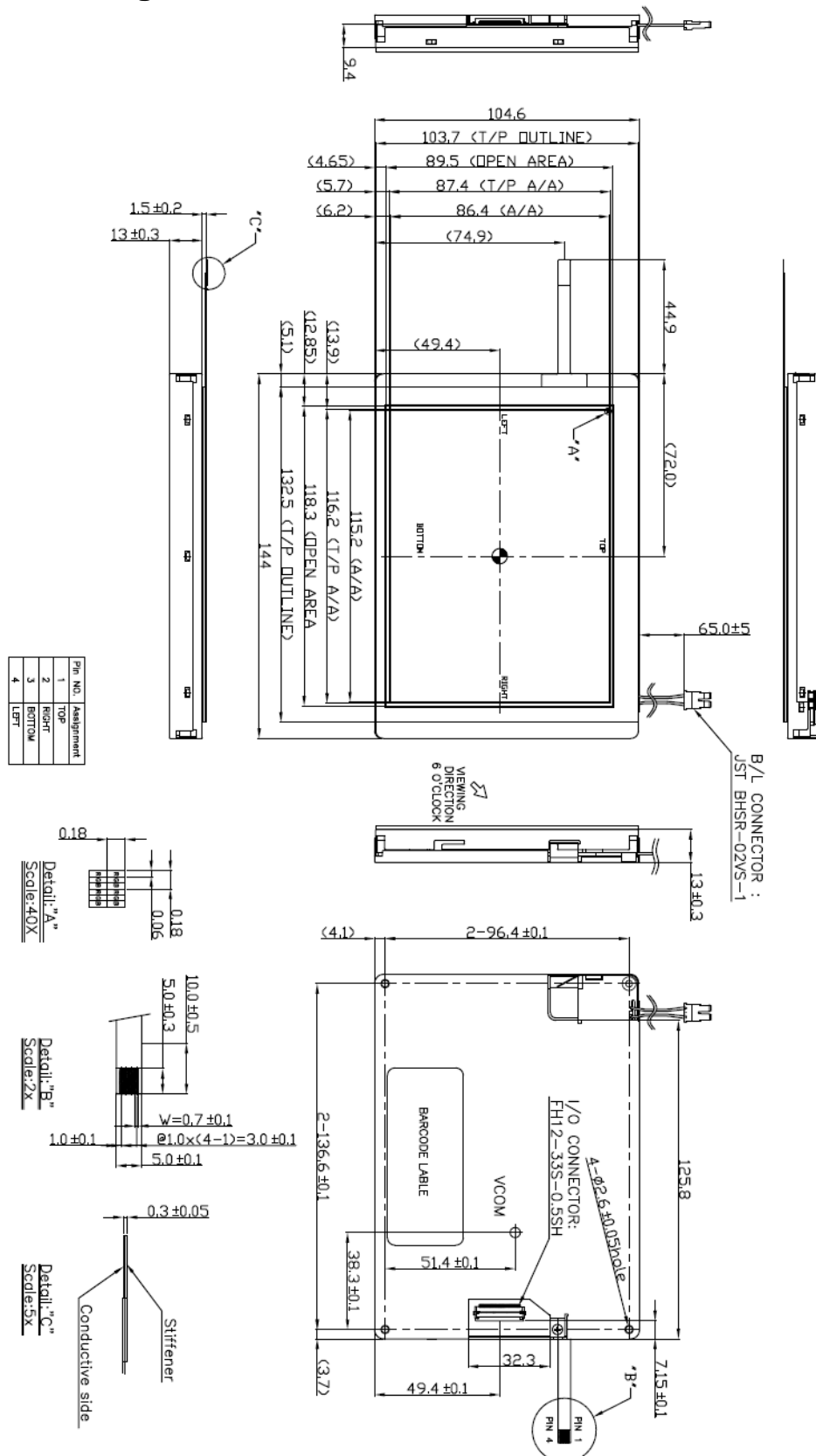
The bezel may press the touch screen and cause activation if the edge touches the active area. A gap of approximately 0.5mm is needed between the bezel and the top electrode.

It may cause unexpected activation if the gap is too narrow. There is a tolerance of 0.2 to 0.3mm for the outside dimensions of the touch panel and tail. A gap must be made to absorb the tolerance in the case and connector.





16.Outline Drawing



**VBEST****MODEL NO.**

VGG644803-6UFLWB

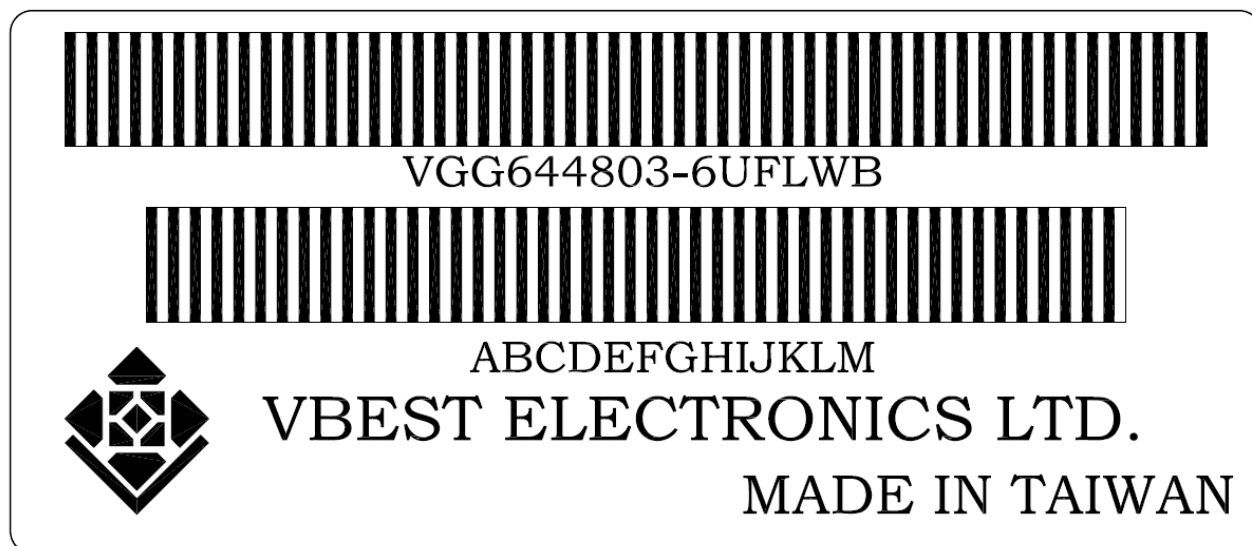
SPEC ONLY

PAGE

23/24

17. Definition of Labels

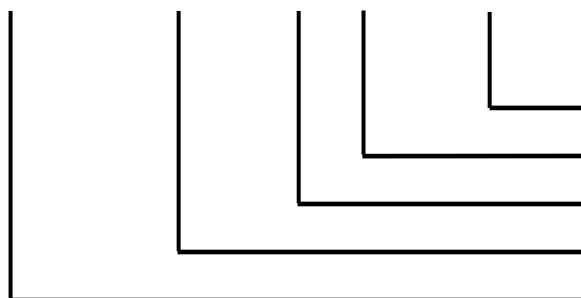
The bar code nameplate is pasted on each module as illustration, and its definitions are as following explanation.



(a) Module Name: VGG644803-6UFLWB

(b) Serial ID:

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



Serial No.
Revision Code
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

**VBEST****MODEL NO.**

VGG644803-6UFLWB

SPEC ONLY

PAGE

24/24

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 VBEST internal use.

(d) Revision Code (I):

Cover all the change, for example: 1: Rev.1, 2: Rev.2, 3: Rev.3...etc.

(e) Serial No. (JKLM):

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