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.：VGG482711-6UFLWE(RoHS)

REVISION：3

☐APPROVAL FOR SPECIFICATIONS ONLY

■APPROVAL FOR SPECIFICATIONS AND SAMPLE

CUSTOMER：	APPROVED BY：
STD.	

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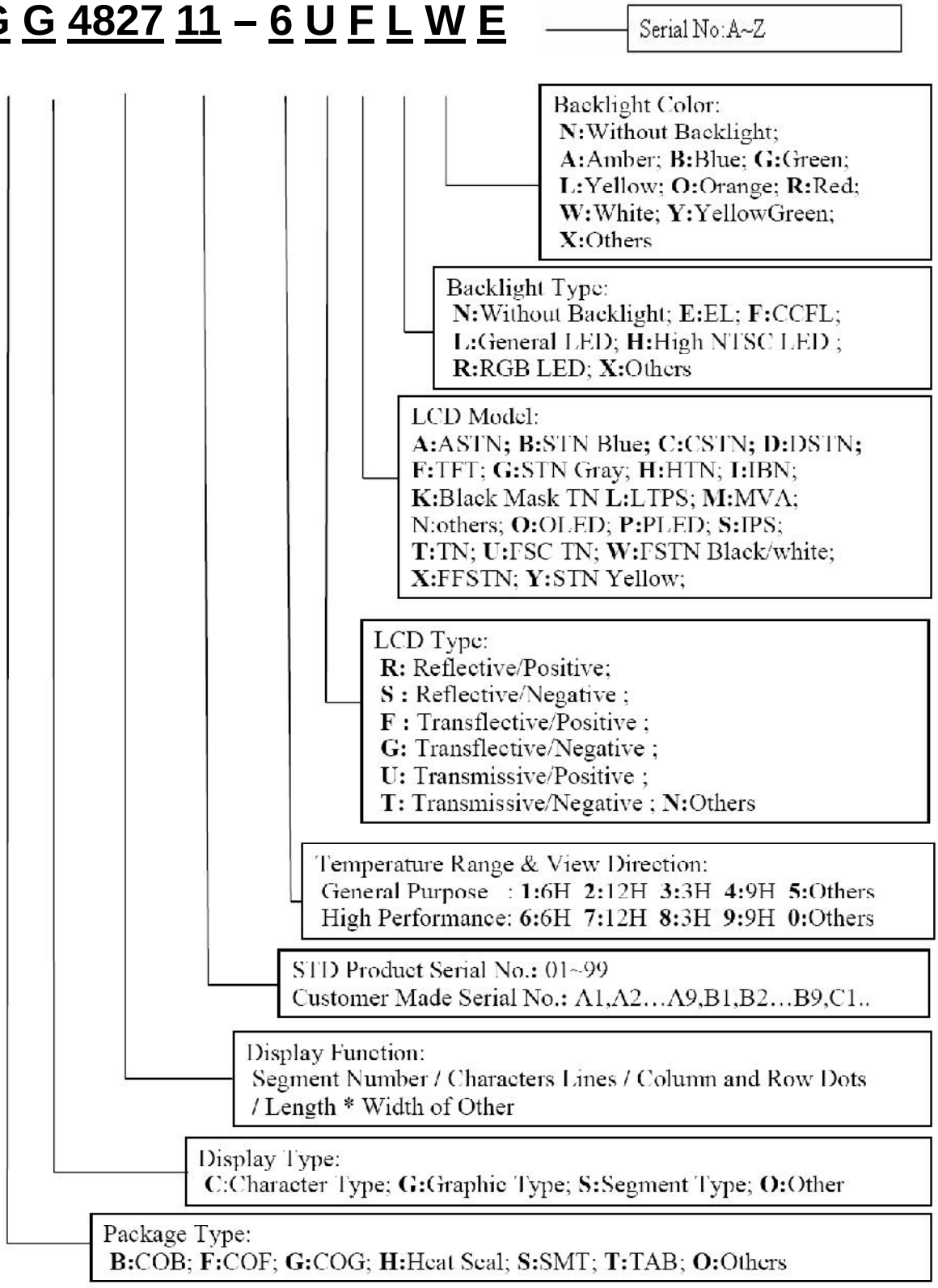
1. Table of Contents

2. Record of Revisions

Rev.	Comments	Page	Date
1	Preliminary Specification was first issued.	All	10/25'12
2	Modify Incoming Inspection Touch Panel	32	12/03'12
3	Modify 1. Table of Contents	2	2/19'13
3	Modify 5. Features	5	2/19'13
3	Modify 8.3 Projected Capacitive Touch	8	2/19'13
3	Modify 11.2.4 I2C Operating Mode Register Map	17	2/19'13

3. Module Numbering System

V G G 4827 11 – 6 U F L W E



4. Application

This specification is applied to the 4.3 inch supported TFT-LCD module With projected capacitive touch (PCT) and can display true 16.7M colors (8 bit/ color). The module is designed for PMP, GPS, DMB, other electronic products which require flat panel display of digital signal interface.The model is composed of a TFT LCD panel, a driver circuit and a back-light system.

5. Features

- WQVGA (480×272 pixels) resolution.
- 8 bit MCU interface.
- LCD Controller :SSD1963
- Projected Capacitive Touch
  - I^2C Interface
  - Multi Touch (Ten points)

6. General Specifications

Item	Specifications	Unit
Screen Size	4.3 (Diagonal)	inch
Display Format	480RGB(H)×272(V)	dot
Active Area	95.04(H)×53.856(V)	mm
PIXEL Pitch	0.198(H)×0.198(V)	mm
Pixel Configuration	RGB Vertical Stripe	-
Display Mode	TN Type Transmissive Mode Normally White	-
Surface Treatment	Clear(7H)	-
Viewing Direction	6 O'clock (The Gray Inversion will appear at this direction)	-
Outline Dimension	105.5(W)×67.2(H)×9.6(D)	mm
Weight	78	g
RoHS Compliance	Eversion certifies this product to be in compliance with European Union Directive 2002/95/EC 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}	-30	+80	°C	(1)(2)
Operating 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, VSS=0V)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Digital Power Supply Voltage	VCC	-0.5	4.6	V	-

7.2.2 LED Driver Absolute Maximum Ratings

(Ta=25±2°C)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
LED Driver For EN	EN	-	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	VCC	3.0	3.3	3.6	V	-
Input High Threshold Voltage	VIH	0.7VCC	-	VCC	V	-
Input Low Threshold Voltage	VIL	0	-	0.3 VCC	V	-
VSYNC Frequency	F_V	-	60	-	Hz	-
Digital Current	ICC	-	250	350	mA	-
Power Consumption	PC	-	0.825	1.155	W	(1)
Pixel Clock	PCLK	-	9.0	15.0	MHz	-

Note (1) The specified power consumption is under the conditions at VCC = 3.3V,

FV=60Hz, DCLK=9.0 MHz, whereas a power dissipation check Pattern below is displayed.

Black Pattern / 0 Gray

Active Area

8.2 LED Driver Unit

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
EN Voltage High	VIH	2.0	-	3.6	V	-
EN Voltage Low	VIL	0	-	0.8	V	-
LED Life Time(25℃)	-	20000	30000	-	hr	-

Note (1) The driving design of backlight unit is dependent on serial consideration of 10 LEDs.

(2) The LED life time is defined as the module brightness decrease to 50%, original brightness at Ta=25℃ , I_{LED} =20mA.

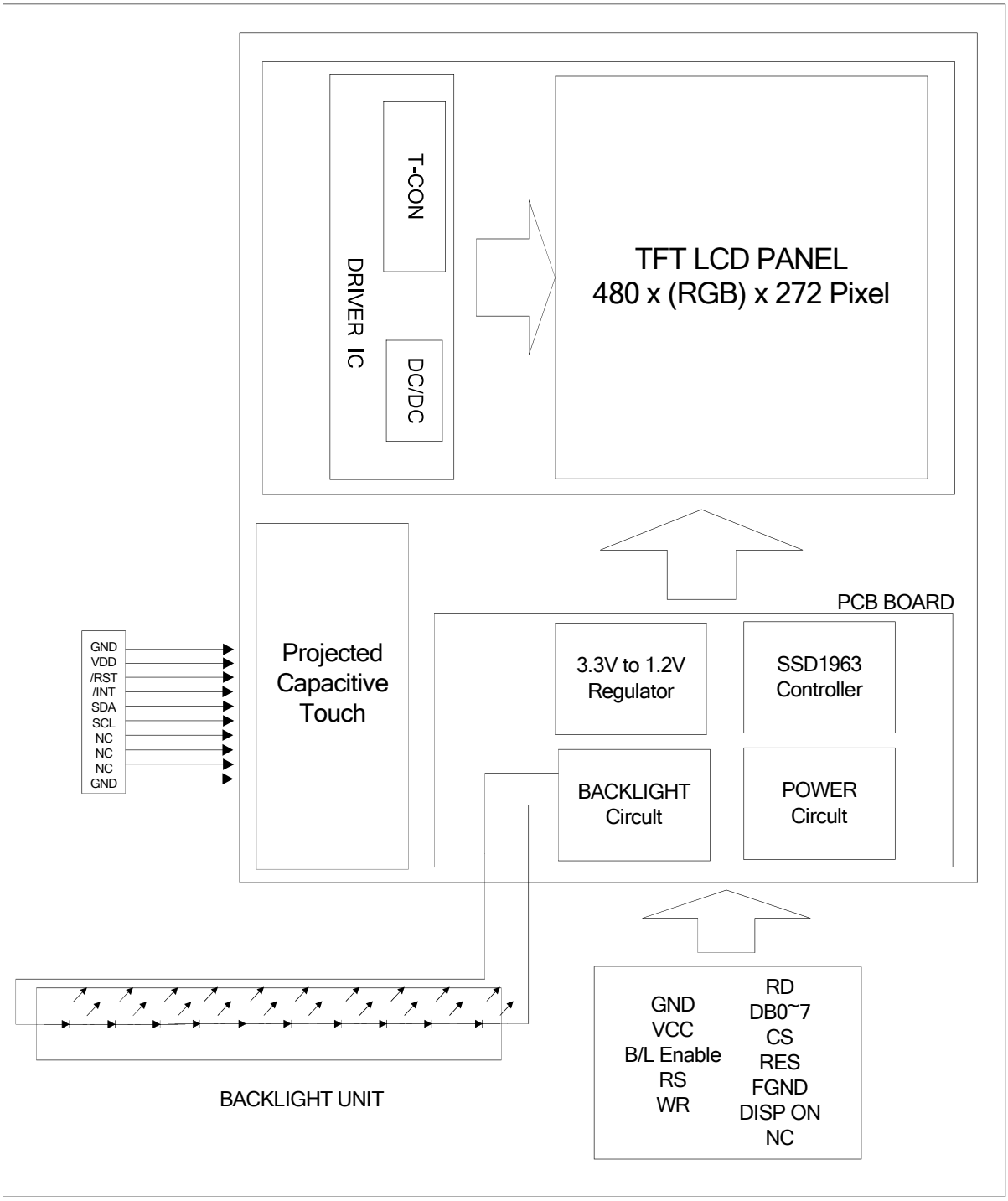
8.3 Projected Capacitive Touch

Item	Value			Unit	Note
	Min.	Typ.	Max.		
Operating Voltage	3.0	3.3	3.6	V	-
Power Supply Current	-	10.0	14.0	mA	(1)
Power Consumption	-	33.3	46.2	mW	@3.3V
Interface	I^2C				-
Function	Multi Touch				-

Note (1) This test condition is touched with 10 points.

9. Block Diagram

TFT-LCD Module with Backlight Unit



10. Input / Output Terminals Pin Assignment

10.1 TFT-LCD Module

Recommendation CN:CF25201D0R0-10

Pin No.	Symbol	Description
1	GND	Ground
2	VCC	POWER SUPPLY(+3.3V)
3	B/L ENABLE	Backlight control
4	RS	Data/Command select
5	WR	8080 mode: WR# (write strobe signal)
6	RD	8080 mode: RD# (read strobe signal)
7	DB0	Data bus
8	DB1	Data bus
9	DB2	Data bus
10	DB3	Data bus
11	DB4	Data bus
12	DB5	Data bus
13	DB6	Data bus
14	DB7	Data bus
15	CS	Chip select
16	RES	RESET
17	NC	NC
18	FGND	Ground
19	DISP ON	Display ON/OFF Signal
20	NC	NC

10.2 Projected Capacitive Touch

Connector: CVILUX CF25101D0R0-05

Pin No.	Symbol	I/O	Description
1	GND	I	System ground.
2	VDD	I	+3.3V power supply.
3	/RST	I	External reset signal, active low.
4	/INT	O	Interrupt signal, active low, asserted to request Host start a new transcation.
5	SDA	I/O	I^2C data signal.
6	SCL	I	I^2C clock signal.
7	NC	-	Not Connection
8	NC	-	Not Connection
9	NC	-	Not Connection
10	GND	I	System ground.

10.3 Pixel Data Format

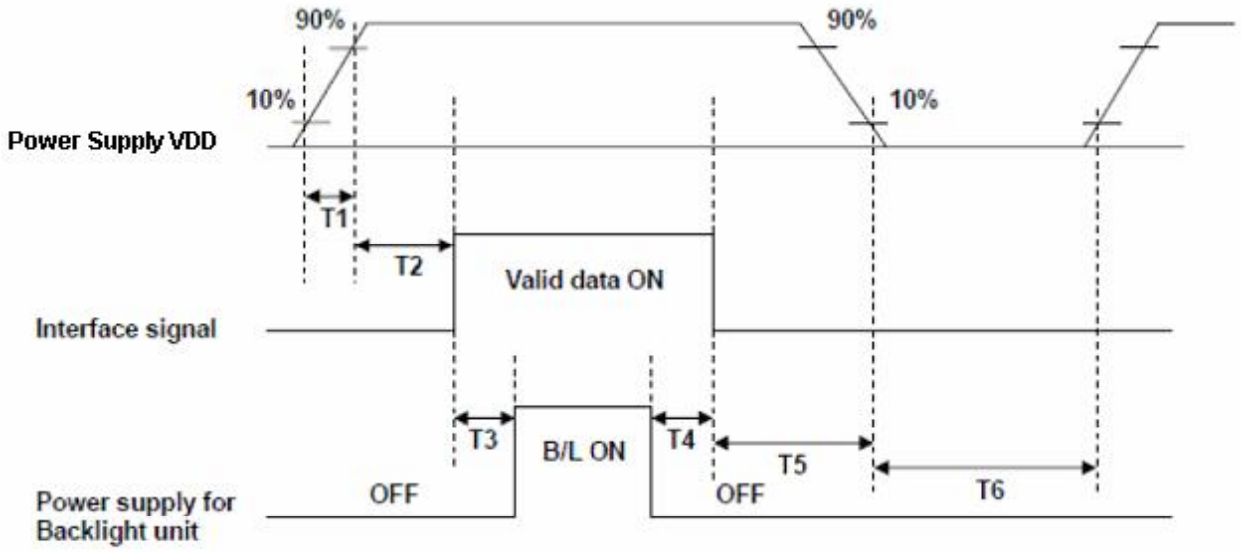
8080 support 8-bit. Depending on the width of the data bus, the display data are packed into the data bus in different ways

Table: Pixel Data Format

Interface Cycle

Interface	Cycle	D[23]	D[22]	D[21]	D[20]	D[19]	D[18]	D[17]	D[16]	D[15]	D[14]	D[13]	D[12]	D[11]	D[10]	D[9]	D[8]	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
8 bits	1st																	R7	R6	R5	R4	R3	R2	R1	R0
	2nd																	G7	G6	G5	G4	G3	G2	G1	G0
	3rd																	B7	B6	B5	B4	B3	B2	B1	B0

10.4 Power ON/OFF Sequence



POWER SEQUENCE TABLE

Parameter	Value			Units
	Min.	Typ	Max.	
T1	1	-	2	ms
T2	101	-	-	ms
T3	34	-	-	ms
T4	34	-	-	ms
T5	34	-	-	ms
T6	1000	-	-	ms

11. Interface Timing

11.1 Timing Requirement

Clock Timing

Table 11-1 :Clock Input Requirements for CLK (PLL-bypass)

Symbol	Parameter	Min	Max	Units
F_{CLK}	Input Clock Frequency (CLK)		110	MHz
T_{CLK}	Input Clock period (CLK)	$1/f_{CLK}$		ns

Table 11-2 : Clock Input Requirements for CLK

Symbol	Parameter	Min	Max	Units
F_{CLK}	Input Clock Frequency (CLK)	2.5	50	MHz
T_{CLK}	Input Clock period (CLK)	$1/f_{CLK}$		ns

Table 11-3 : Clock Input Requirements for crystal oscillator XTAL

Symbol	Parameter	Min	Max	Units
F_{XTAL}	Input Clock Frequency	2.5	10	MHz
T_{XTAL}	Input Clock period	$1/f_{XTAL}$		ns

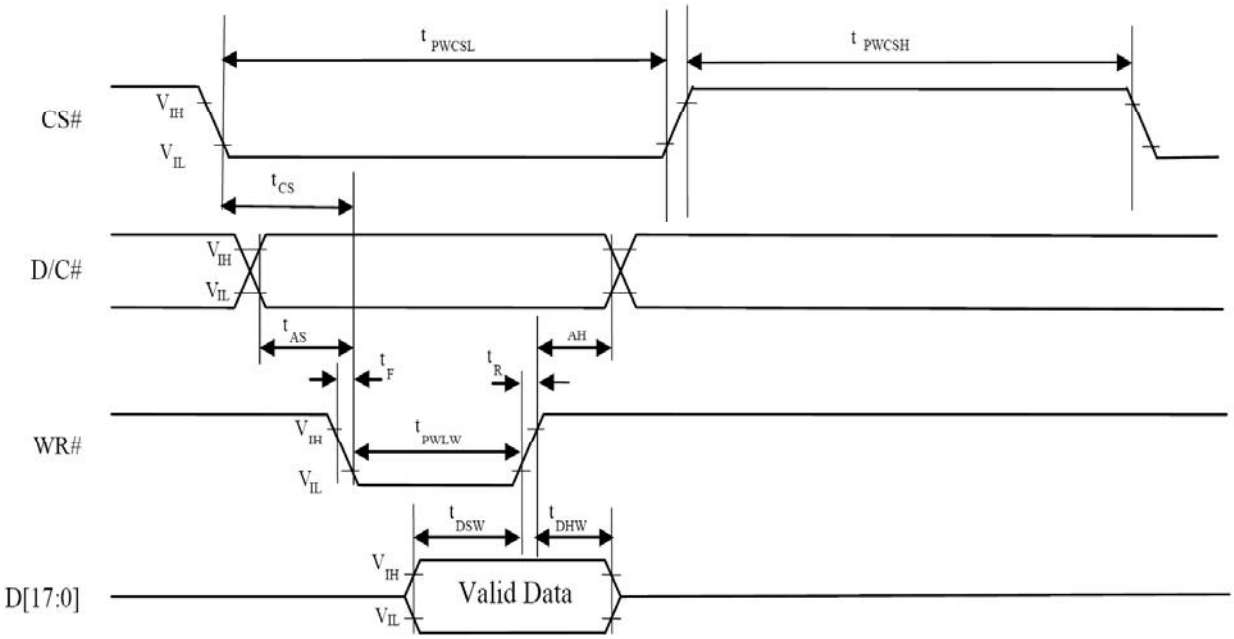
Parallel 8080-series Interface Timing

Table : Parallel 8080-series Interface Timing Characteristics

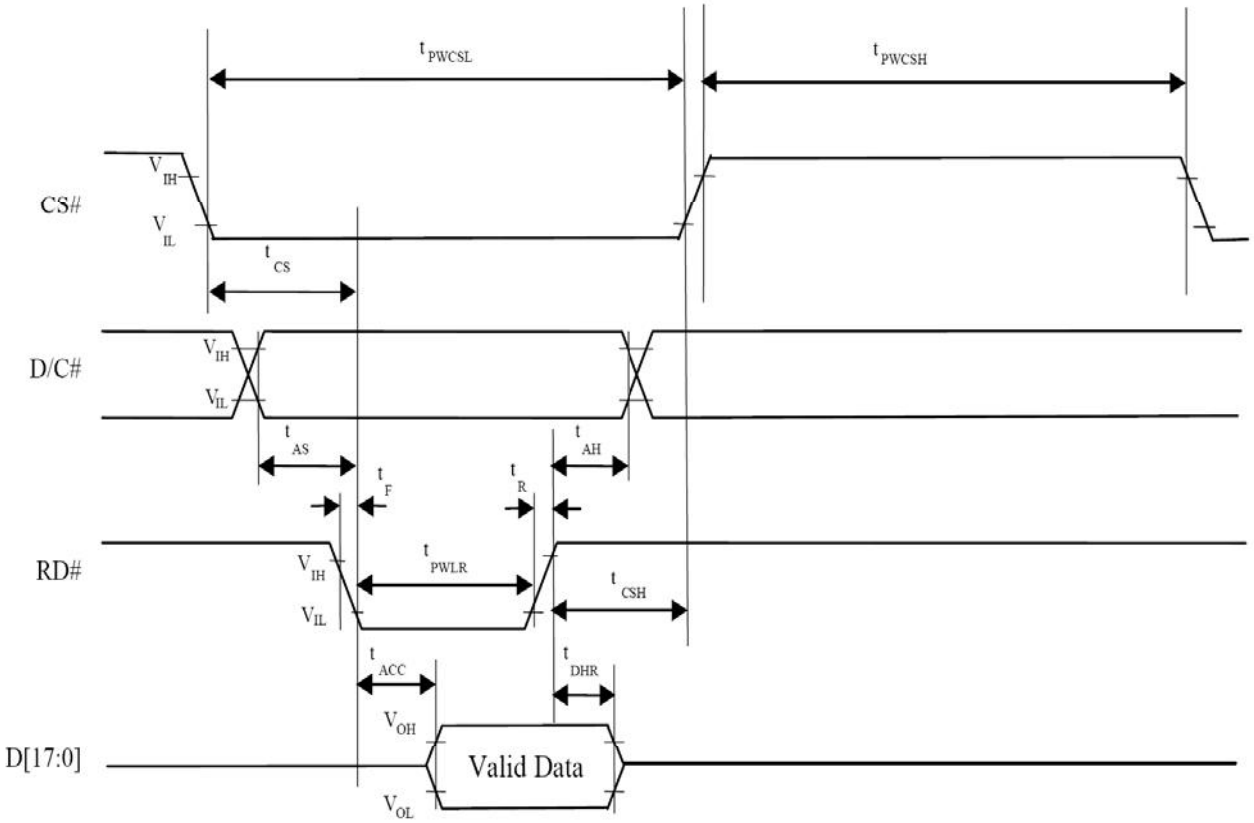
Symbol	Parameter		Min	Typ	Max	Unit
f_{MCLK}	System Clock Frequency*		1	-	110	MHz
t_{MCLK}	System Clock Period*		$1/f_{MCLK}$	-	-	ns
t_{PWCSL}	Control Pulse High Width	Write	13	$1.5* t_{MCLK}$	-	ns
		Read	30	$3.5* t_{MCLK}$		
t_{PWCSH}	Control Pulse Low Width	Write (next write cycle)	13	$1.5* t_{MCLK}$	-	ns
		Write (next read cycle)	80	$9* t_{MCLK}$		
		Read	80	$9* t_{MCLK}$		
t_{AS}	Address Setup Time		1	-	-	ns
t_{AH}	Address Hold Time		2	-	-	ns
t_{DSW}	Write Data Setup Time		4	-	-	ns
t_{DHW}	Write Data Hold Time		1	-	-	ns
t_{PWLW}	Write Low Time		12	-	-	ns
t_{DHR}	Read Data Hold Time		1	-	-	ns
t_{ACC}	Access Time		32	-	-	ns
t_{PWLR}	Read Low Time		36	-	-	ns
t_R	Rise Time		-	-	0.5	ns
t_F	Fall Time		-	-	0.5	ns
t_{CS}	Chip select setup time		2	-	-	ns
t_{CSH}	Chip select hold time to read signal		3	-	-	ns

* System Clock denotes external input clock (PLL-bypass) or internal generated clock (PLL-enabled)

Parallel 8080-series Interface Timing Diagram (Write Cycle)

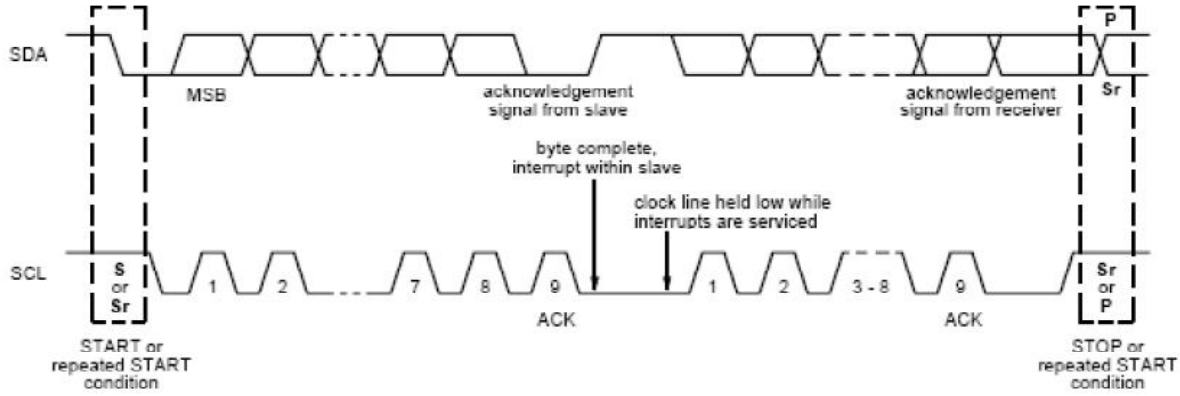


Parallel 8080-series Interface Timing Diagram (Read Cycle)



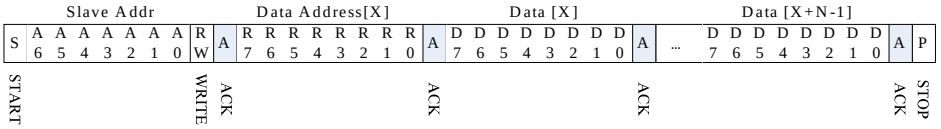
11.2 Timing Requirement of Projected Capacitive Touch

11.2.1 I2C Data Transfer Format

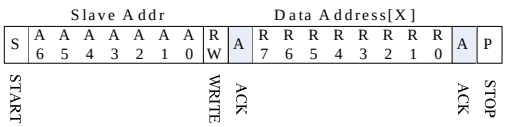


Mnemonics	Description
S	I^2C Start or I^2C Restart
A[6:0]	Slave Address = 0x70
W	1'b0: Write
R	1'b1: Read
C	ACK
P	STOP: the indicate the end of a packet (if this bit is missing, S will indicate the end of the current packet and the beginning of the next packet)

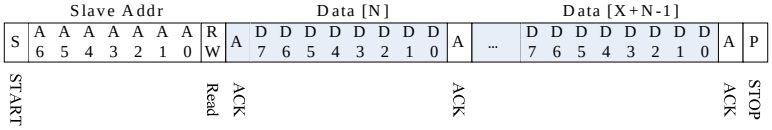
Write N bytes to I2C slave



Set Data Address



Read X bytes from I^2C Slave

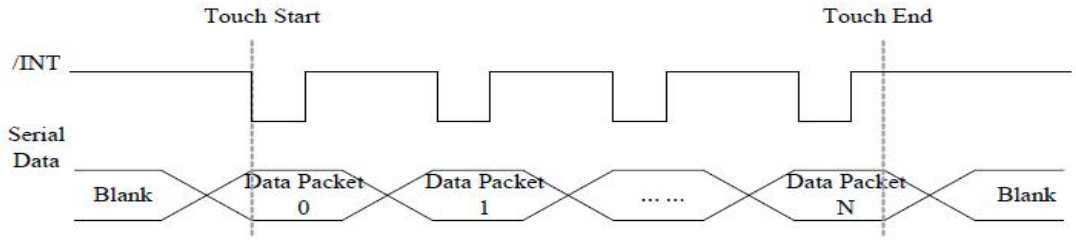


11.2.2 I2C Timing Characteristics

(Ta=25±2°C)

Parameter	Min	Max	Unit
SCL frequency	-	400	kHz
Bus free time between a STOP and START condition	4.7	-	μs
Hold time (repeated) START condition	4.0	-	μs
Data setup time	250	-	ns
Setup time for a repeated START condition	4.7	-	μs
Setup time for STOP condition	4.0	-	μs

11.2.3 Interrupt Trigger Mode



11.2.4 I2C Operating Mode Register Map

Address	Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Host Access
Op,00h	DEVICE_MODE		Device Mode[2:0]							RW
Op,01h	Reserved									R
Op,02h	TD_STATUS					Number of touch points[3:0]				R
Op,03h	TOUCH1_YH	1st Event Flag				1st Touch Y Position[11:8]				R
Op,04h	TOUCH1_YL	1st Touch Y Position[7:0]								R
Op,05h	TOUCH1_XH	1st Touch ID[3:0]				1st Touch X Position[11:8]				R
Op,06h	TOUCH1_XL	1st Touch X Position[7:0]								R
Op,07h	Reserved									R
Op,08h	Reserved									R

Op,09h	TOUCH2_YH	2nd Event Flag		2nd Touch Y Position[11:8]	R
Op,0Ah	TOUCH2_YL	2nd touch Y Position[7:0]			R
Op,0Bh	TOUCH2_XH	2nd Touch ID[3:0]		2nd Touch X Position[11:8]	R
Op,0Ch	TOUCH2_XL	2nd Touch X Position[7:0]			R
Op,0Dh	Reserved				R
Op,0Eh	Reserved				R
Op,0Fh	TOUCH3_YH	3rd Event Flag		3rd Touch Y Position[11:8]	R
Op,10h	TOUCH3_YL	3rd Touch Y Position[7:0]			R
Op,11h	TOUCH3_XH	3rd Touch ID[3:0]		3rd Touch X Position[11:8]	R
Op,12h	TOUCH3_XL	3rd Touch X Position[7:0]			R
Op,13h	Reserved				R
Op,14h	Reserved				R
Op,15h	TOUCH4_YH	4th Event Flag		4th Touch Y Position[11:8]	R
Op,16h	TOUCH4_YL	4th Touch Y Position[7:0]			R
Op,17h	TOUCH4_XH	4th Touch ID[3:0]		4th Touch X Position[11:8]	R
Op,18h	TOUCH4_XL	4th Touch X Position[7:0]			R
Op,19h	Reserved				R
Op,1Ah	Reserved				R
Op,1Bh	TOUCH5_YH	5th Event Flag		5th Touch Y Position[11:8]	R
Op,1Ch	TOUCH5_YL	5th Touch Y Position[7:0]			R
Op,1Dh	TOUCH5_XH	5th Touch ID[3:0]		5th Touch X Position[11:8]	R
Op,1Eh	TOUCH5_XL	5th Touch X Position[7:0]			R
Op,1Fh	Reserved				R
Op,20h	Reserved				R
Op,21h	TOUCH6_YH	6th Event Flag		6th Touch Y Position[11:8]	R
Op,22h	TOUCH6_YL	6th Touch Y Position[7:0]			R
Op,23h	TOUCH6_XH	6th Touch ID[3:0]		6th Touch	R

				X Position[11:8]	
Op,24h	TOUCH6_XL	6th Touch X Position[7:0]			R
Op,25h	Reserved				R
Op,26h	Reserved				R
Op,27h	TOUCH7_YH	7thEvent Flag		7th Touch Y Position[11:8]	R
Op,28h	TOUCH7_YL	7thTouch Y Position[7:0]			R
Op,29h	TOUCH7_XH	7th Touch ID[3:0]		7th Touch X Position[11:8]	R
Op,2Ah	TOUCH7_XL	7th Touch X Position[7:0]			R
Op,2Bh	Reserved				R
Op,2Ch	Reserved				R
Op,2Dh	TOUCH8_YH	8thEvent Flag		8th Touch Y Position[11:8]	R
Op,2Eh	TOUCH8_YL	8thTouch Y Position[7:0]			R
Op,2Fh	TOUCH8_XH	8th Touch ID[3:0]		8th Touch X Position[11:8]	R
Op,30h	TOUCH8_XL	8th Touch X Position[7:0]			R
Op,31h	Reserved				R
Op,32h	Reserved				R
Op,33h	TOUCH9_YH	9thEvent Flag		9th Touch Y Position[11:8]	R
Op,34h	TOUCH9_YL	9thTouch Y Position[7:0]			R
Op,35h	TOUCH9_XH	9th Touch ID[3:0]		9th Touch X Position[11:8]	R
Op,36h	TOUCH9_XL	9th Touch X Position[7:0]			R
Op,37h	Reserved				R
Op,38h	Reserved				R
Op,39h	TOUCH10_YH	10thEvent Flag		10th Touch Y Position[11:8]	R
Op,3Ah	TOUCH10_YL	10thTouch Y Position[7:0]			R
Op,3Bh	TOUCH10_XH	10th Touch ID[3:0]		10th Touch X Position[11:8]	R
Op,3Ch	TOUCH10_XL	10th Touch X Position[7:0]			R
Op,3Dh	Reserved				R
Op,3Eh	Reserved				R

11.2.5 DEVICE_MODE

This register is the device mode register, configure it to determine the current mode of the chip.

Address	Bit Address	Register Name	Description
Op,00h	6:4	Device Mode [2:0]	000b Normal operating Mode 001b System Information Mode (Reserved) 100b Test Mode – read raw data (Reserved)

11.2.6 TD_STATUS

This register is the Touch Data status register.

Address	Bit Address	Register Name	Description
Op,02h	3:0	Number of touch points[3:0]	How many points detected. 1-10 is valid.

11.2.7 TOUCHn_YH (n:1-10)

This register describes MSB of the Y coordinate of the nth touch point and the corresponding event flag.

Address	Bit Address	Register Name	Description
Op,03h ~ Op,39h	7:6	Event Flag	00b: Put Down 01b: Put Up 10b: Contact 11b: No event
	5:4		Reserved
	3:0	Touch Y Position [11:8]	MSB of Touch Y Position in pixels

11.2.8 TOUCHn_YL (n:1-10)

This register describes LSB of the Y coordinate of the nth touch point.

Address	Bit Address	Register Name	Description
Op,04h ~ Op,3Ah	7:0	Touch Y Position [7:0]	LSB of the Touch Y Position in pixels

11.2.9 TOUCHn_XH (n:1-10)

This register describes MSB of the X coordinate of the nth touch point and corresponding touch ID.

Address	Bit Address	Register Name	Description
Op,05h ~ Op,3Bh	7:4	Touch ID[3:0]	Touch ID of Touch Point
	3:0	Touch X Position [11:8]	MSB of Touch X Position in pixels

11.2.10 TOUCHn_XL (n:1-10)

This register describes LSB of the X coordinate of the nth touch point.

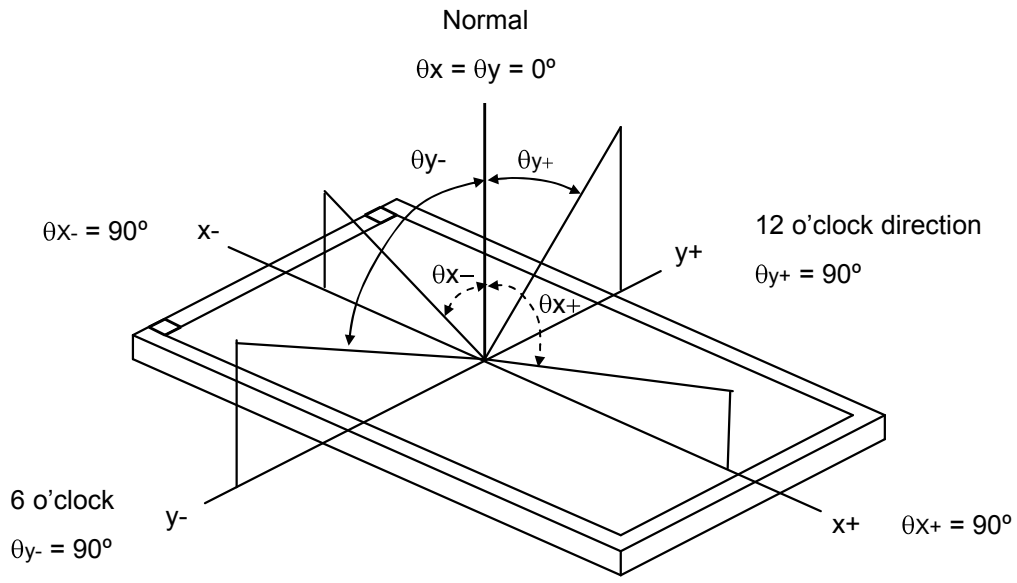
Address	Bit Address	Register Name	Description
Op,06h ~ Op,3Ch	7:0	Touch X Position [7:0]	LSB of The Touch X Position in pixels

12. Optical Characteristics

The optical characteristics should be measured in a dark environment (≦ 1 lux) or equivalent state with the methods shown in Note (5).

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	θ_X=0°, θ_Y =0° Viewing Normal Angle	300	（450）	-	-	(2),(5)
Response Time		T_{R+} T_F		-	20	-	ms	(3)
Luminance(Center)		LC		420	560	-	cd/m^2	(4),(5)
Brightness uniformity		BUNI		70	（75）	-	%	(5),(6)
Color Chromaticity	Red	Rx		0.570	0.620	0.670	-	(1),(5)
		Ry		0.290	0.340	0.390	-	
	Green	Gx		0.300	0.350	0.400	-	
		Gy		0.520	0.570	0.620	-	
	Blue	Bx		0.090	0.140	0.190	-	
		By		0.050	0.100	0.150	-	
	White	Wx		0.270	0.320	0.370	-	
		Wy		0.280	0.330	0.380	-	
Viewing Angle	Horizontal	θ_X+	CR≥10	55	（65）	-	deg.	
		θ_X-		55	（65）	-		
	Vertical	θ_Y+		40	（50）	-		
		θ_Y-		50	（60）	-		

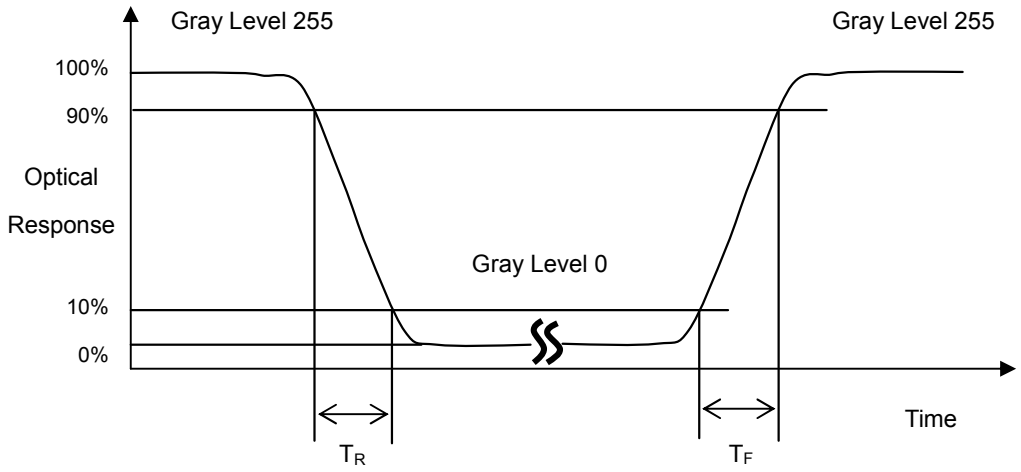
Note (1) Definition of Viewing Angle (θx, θy):



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

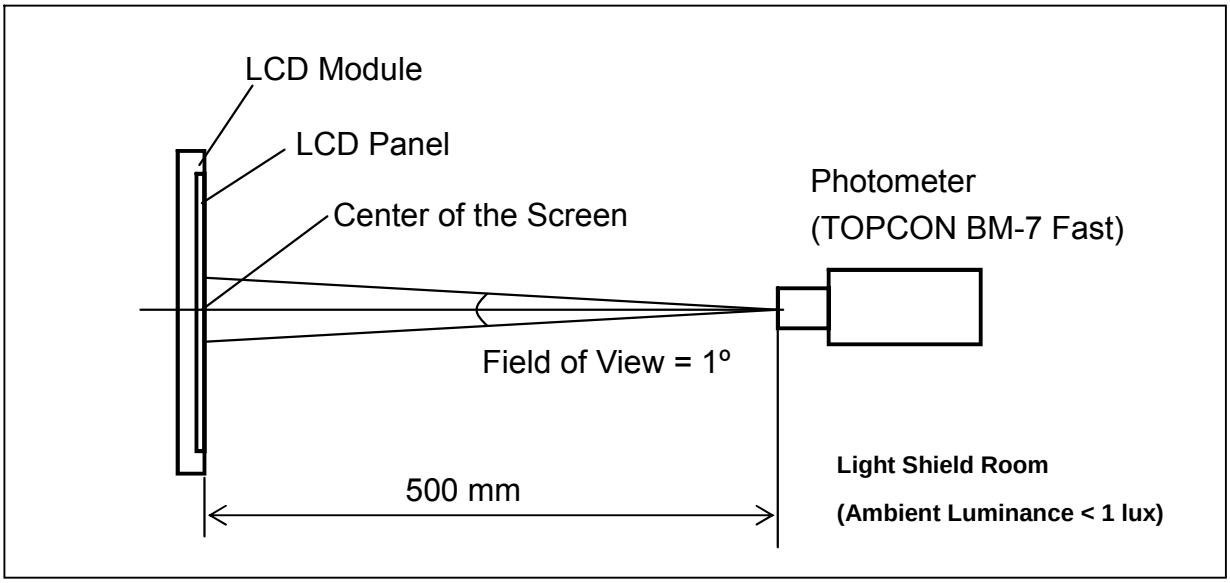
$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

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



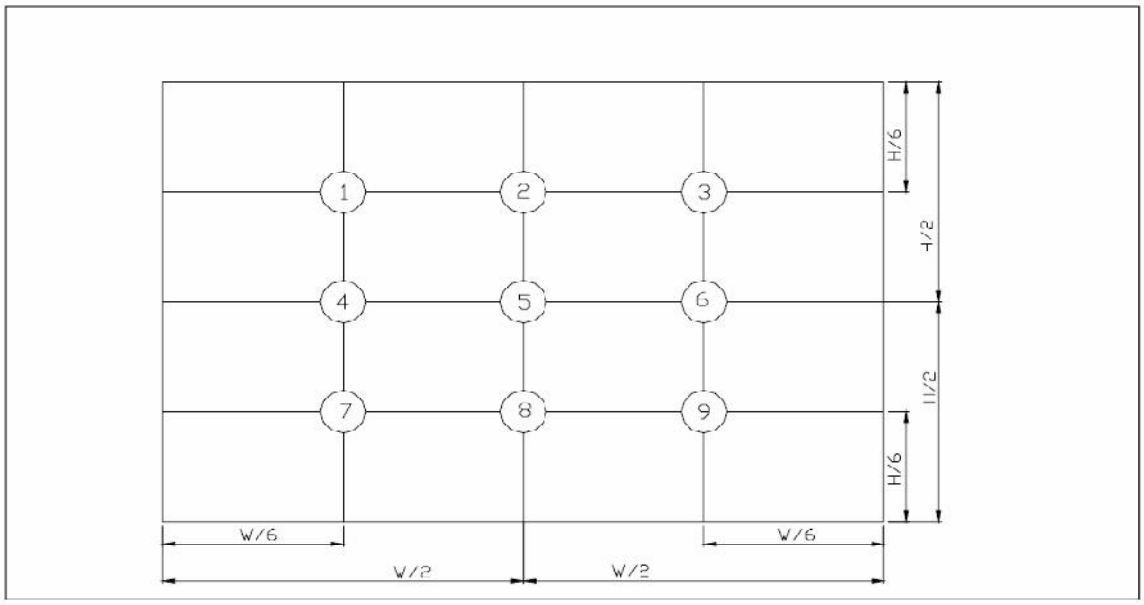
Note (4) Measurement Set-Up:

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 windless room.



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= 80℃ 240 hours	(1),(3),(4)
2	Low Temperature Storage Test	T_a= -30℃ 240 hours	(1),(3),(4)
3	High Temperature Operation Test	T_S= 70℃ 240 hours	(2),(3),(4)
4	Low Temperature Operation Test	T_a= -20℃ 240 hours	(1),(3),(4)
5	High Temperature and High Humidity Operation Test	T_a=60℃ 90%RH 240 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）	-20℃（30min）~ 70℃（30min）,10 cycles	（3），（4）
10	Drop Test(with Carton)	Height：80㎝ 1 corner, 3 edges, 6 surfaces	（3）

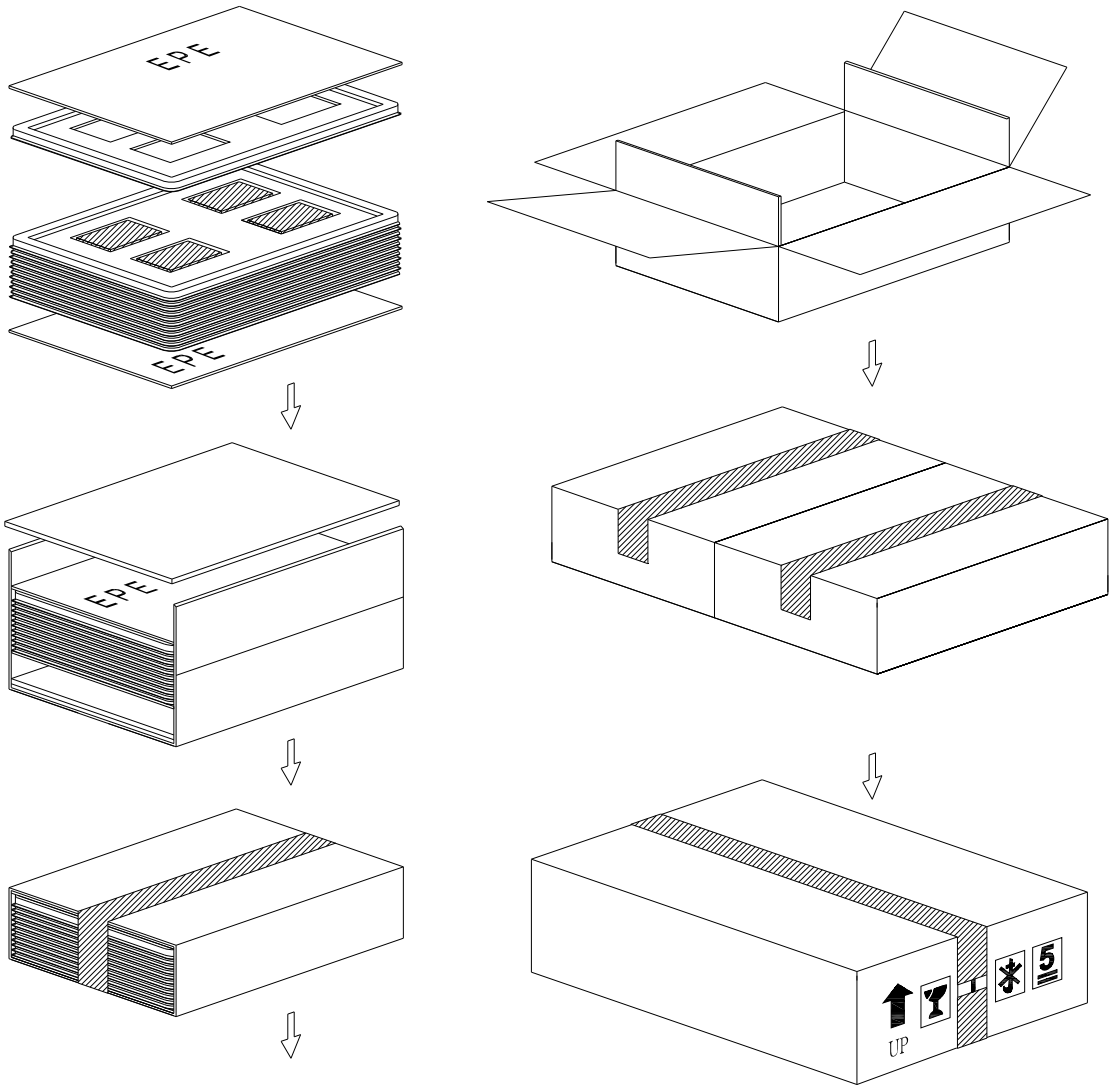
Note 1：Ta is the ambient temperature of samples.

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(LxWxH) unit:mm	MATERIAL	Q.T.Y	NOTE
1	TRAY	372.0x262.0x19.55		18	
2	EPE(J46)	372.0x262.0x5.0	EPE	4	
3	CARD BOARD(P01)	816.0x375.0x3.5	CARTON	2	
4	CARD BOARD(P02)	945.0x275.0x3.5	CARTON	2	
5	CARD BOARD(P03)	375.0x265.0x3.5	CARTON	4	
6	INTERNAL BOX(S01)	400.0x290.0x150.0	CARTON	2	
7	EXTERNAL BOX(L28)	600.0x420.0x180.0		1	
8	PRODUCT	105.5x67.2x9.6		64	

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

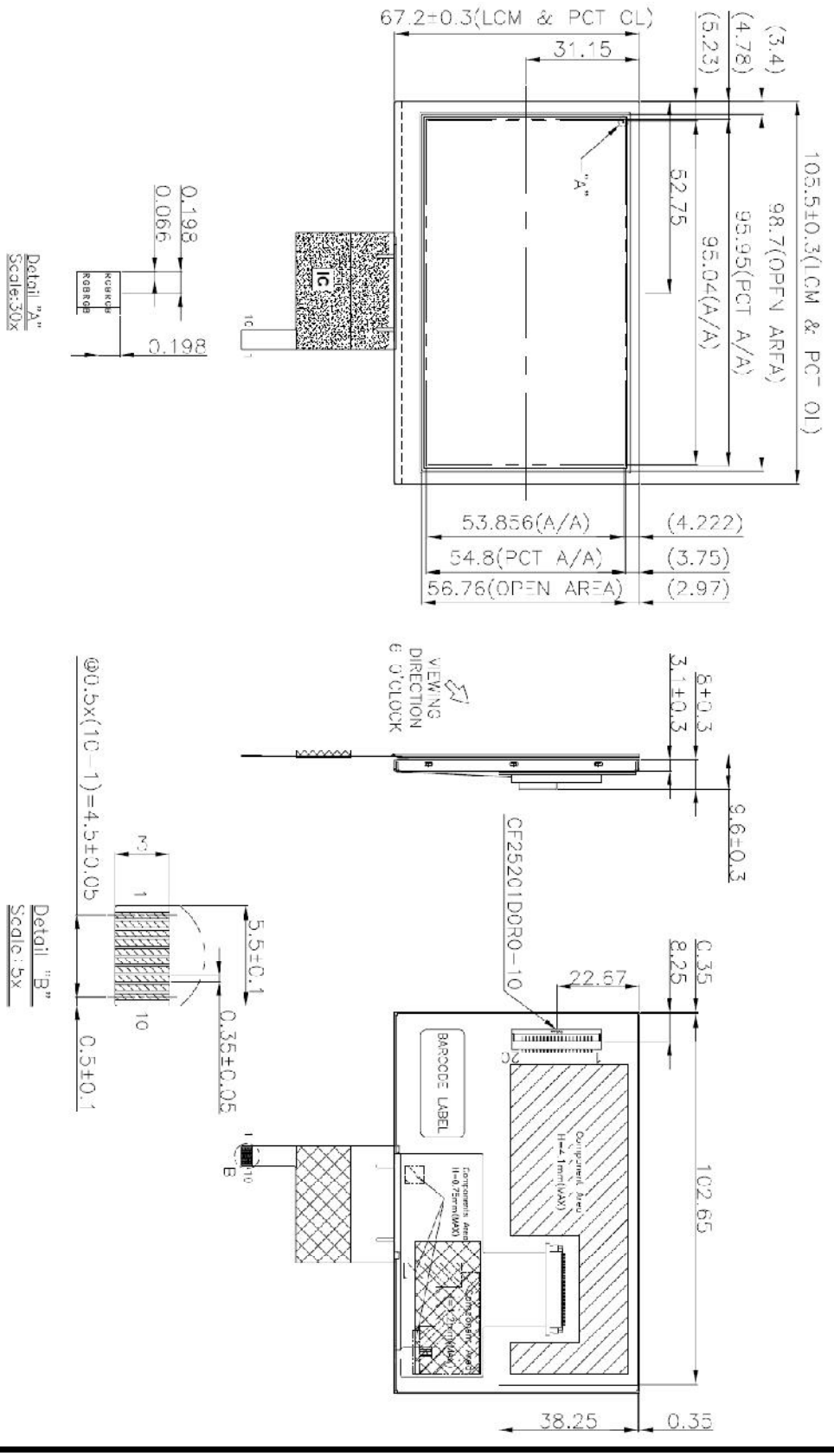
(1) Acceptance inspection period

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.

16.Outline Drawing

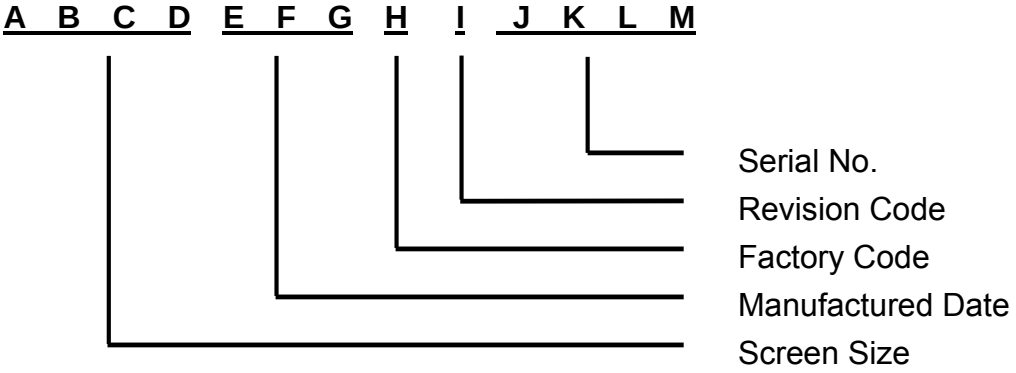


17.Definition of Labels

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

(a) Module Name: VGG482711-6UFLWE

(b) Serial ID:



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) 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.

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: 60 ± 5% RH

(3) Viewing distance is approximately 35 ~ 40 cm

(4)Viewing angle is normal to the LCD panel as Fig _1(10°)

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

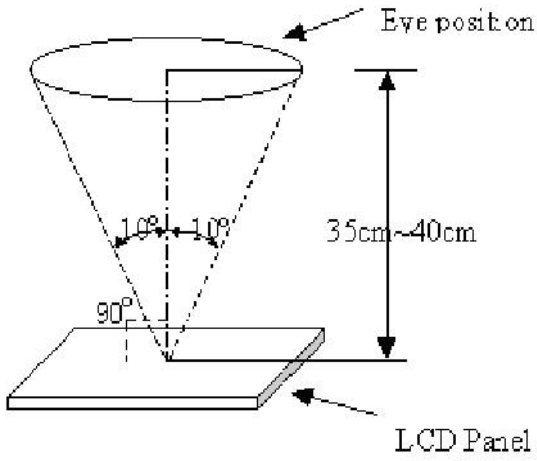


Fig _ 1

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

<table>
<tr><th colspan="2">Item</th><th colspan="5">Specification/Description</th><th>Note</th></tr>
<tr><td rowspan="2">Display</td><td rowspan="2">Function</td><td colspan="5">No Display</td><td>-</td></tr>
<tr><td colspan="5">Malfunction</td><td>-</td></tr>
<tr><td rowspan="8">Operating</td><td>Contrast ratio</td><td colspan="5">Out of Spec</td><td>-</td></tr>
<tr><td>Line defect</td><td colspan="5">No obvious Vertical and Horizontal line defect in bright , dark and colored.</td><td>-</td></tr>
<tr><td rowspan="7">Point Defect (red,green,blue,dark, white)</td><td colspan="2" rowspan="2">Item</td><td colspan="3">Acceptable number</td><td rowspan="7">Note: 1、4、5、6</td></tr>
<tr><td>A</td><td>B</td><td>Total</td></tr>
<tr><td colspan="2">BRIGHT DOT</td><td>N≦2</td><td>N≦2</td><td rowspan="3">N≦7</td></tr>
<tr><td colspan="2">DARK DOT</td><td>N≦3</td><td>N≦4</td></tr>
<tr><td colspan="2">TOTAL DOT</td><td>N≦4</td><td>N≦5</td></tr>
<tr><td colspan="2">TWO ADJACENT DOT</td><td colspan="3">NOT ALLOWED</td></tr>
<tr><td colspan="2">THREE OR MORE ADJACENT DOT</td><td colspan="3">NOT ALLOWED</td></tr>
<tr><td rowspan="3">External Inspection (non-operating)</td><td>Scratch on the polarizer</td><td colspan="5"><table><tr><td>L(mm)</td><td>W(mm)</td><td>Acceptable number</td></tr><tr><td>L≦2.5</td><td>W≦0.1</td><td>4</td></tr><tr><td>L＞2.5</td><td>W＞0.1</td><td>0</td></tr></table></td><td>Note:2</td></tr>
<tr><td>Dent or bubble on the polarizer</td><td colspan="5"><table><tr><td>Dimension(mm)</td><td>Acceptable number</td></tr><tr><td>D≦0.5</td><td>4</td></tr><tr><td>D≦0.15</td><td>Disregard</td></tr></table></td><td>Note:3</td></tr>
<tr><td>Foreign material on the polarizer</td><td colspan="5"><table><tr><td>Dimension(mm)</td><td>Acceptable number</td></tr><tr><td>D≦0.5</td><td>4</td></tr><tr><td>D≦0.15</td><td>Disregard</td></tr></table></td><td>Note:3</td></tr>
</table>

Incoming Inspection Touch Panel

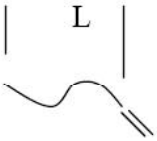
Circular Defects
Linear Defects
Scratch
Air Bubble
Crack

(1) Circular Defects

ϕ =(L+W)/2

Diameter(mm)	Spec
$\phi \leqq 0.2$	No quantity limit
$0.2 < \phi < 0.4$	Max 5defect
$0.4 \leqq \phi$	Reject

(2) Linear Defects



Length	Width	Acceptable
6.0≧L	0.06≧W	Accept
L≧6.0	W≧0.06	Reject

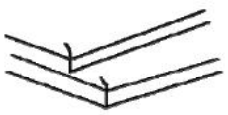
(3)Scratch

Length	Width	Acceptable
12.0≧L	0.06≧W	Accept
L≧12.0	W≧0.06	Reject
The Min distance of defects must be above 5.0mm.		

(4) Air Bubble

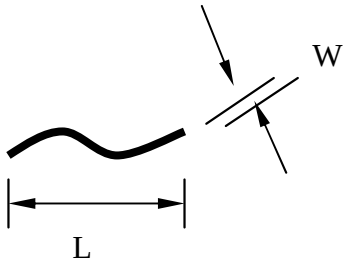
Diameter(mm)	Spec
$\phi \leqq 0.2$	No quantity limit
$0.2 < \phi \leqq 0.6$	Max 5 defect
The Min distance of defects must be above 5.0mm.	

(5)Crack Reject

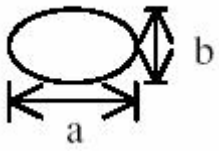


Note1. The definition of dot defect : The dot defect was judged after repair and the size of a defective dot over 1/2 of whole dot is regarded as one defective dot.

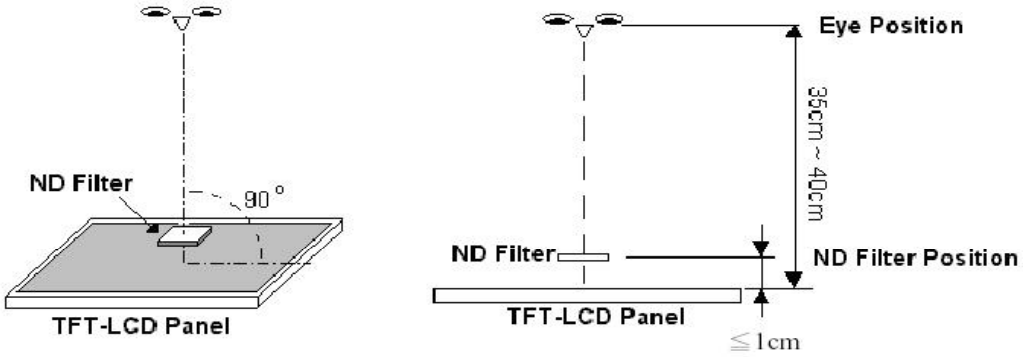
Note2.



Note3. D：Diameter D=(a+b)/2

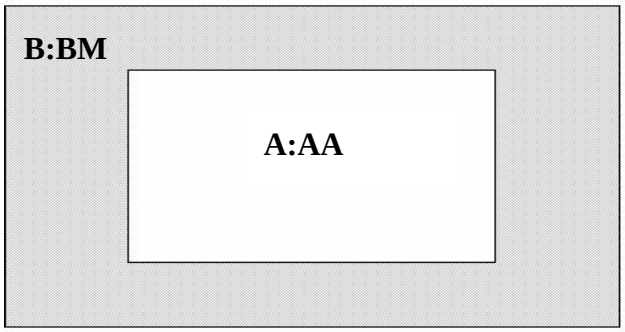


Note4. Bright dot is defined through 6% transmission ND Filter as following.



Note5. ADJACENT DOT

Note6.



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.