* Records of Revision *

Rev.	Page	Description of changes	Date	prepared by
o	All	Original Release	10.05.04	Mu.J.F

☑ 一般事项　　☐ 特殊事项

特殊事项内容：

* Contents *

1. Features

The features of BTL353248-L363L are as follows

* Display mode : TFT 260K Colors,Transmissive,Normally White

* Driving Condition : 320x3Ch-Source / 480Ch-Gate

* Connection :ZIF Type (39pins,Hirose:FH26-39S-0.3SHW)

* LCD Driver & Control IC
:R61581(RENESAS)

* Back Light : White LED Back Light (6 Chips in Parallel)

* MPU Interface : 80-Series, 16bits Parallel Data Bus

* Type of Surface Contion
:Clear Type

2. Mechanical Specifications

Item		Specification	Unit
Resolution	Main	320(x RGB) x 480	Dot
	Sub	NA	
LCM Outline Demension		54.66 x82.94x2.2(TYP)	mm
Active Area (W × H)	Main	48.96x 73.44	mm
	Sub	NA	
Pixel Pitch (W x H)	Main	0.153×0.153	mm
	Sub	NA	
Viewing Direction (Human Eye)	Main	9	O'clock
	Sub	NA	
Gray Scale Inversion Direction (Contrast Ratio)	Main	3	O'clock (Rubbing Direction)
	Sub	NA	
Weight		15	g

3. Absolute Maximum Ratings

(Ta=25℃ Note1)

Items	Symbol	Min.	Max.	Unit	Remark
Logic voltage	I_{OVCC}	-0.3	4.6	V	
Analog voltage	V_{CI}	-0.3	4.6	V	
Input signal voltage	V_{IN}	-0.3	IOVCC+0.3	V	
LED forward current	I_{LED}	-	20	mA	For each LED
Operation temeprature	T_{OPR}	-20	70	℃	
Storage temperature	T_{STG}	-30	80	℃	
Humidity (ambient	Ta≤60℃		90% RH Max.		

Note1 : Device is subject to be damaged permanently,
if stresses beyond those absolute maximum ratings listed above.

4. Electrical Characteristics

Main Ta=25℃

Items		Symbol	Min.	Typ.	Max.	Unit	Remark
Logic voltage		I_{OVCC}	1.65	1.8/2.8	3.6	V	
Analog(Power) voltage		V_{CC}	2.72	2.8	2.88	V	
Gate voltage	High level	V_{GH}	12	-	18	V	Note 1
	Low level	V_{GL}	-10	-	-7	V	
Input signal voltage	High level	V_{IH}	0.8×IOVcc	-	IOVcc	V	
	Low level	V_{IL}	0	-	0.2×IOVcc	V	
current consumption		Icc	-	16	24	mA	Note 2

Note 1) The value can be adjusted by software to optimize display quality
Note 2) Display Black Pattern

5. Recommended Software Setting Value (LDI： R61581)

INITIAL CODE	
hardware reset	
delay 10ms	
cmd_write	0xFF
cmd_write	0xFF
delay 5ms	
cmd_write	0xFF
cmd_write	0xFF
cmd_write	0xFF
cmd_write	0xFF
delay 10ms	
cmd_write	0xB0
parameters	0x00
cmd_write	0xB3
parameters	0x02
parameters	0x00
parameters	0x00
parameters	0x10
cmd_write	0xB4
parameters	0x00
cmd_write	0xC0
parameters	0x13
parameters	0x3B
parameters	0x00
parameters	0x00
parameters	0x00
parameters	0x01
parameters	0x00
parameters	0x43
cmd_write	0xC1
parameters	0x08
parameters	0x15
parameters	0x08
parameters	0x08
cmd_write	0xC4
parameters	0x15
parameters	0x03
parameters	0x03
parameters	0x01
cmd_write	0xC8
parameters	0x0c
parameters	0x05

parameters	0x0a
parameters	0x6b
parameters	0x04
parameters	0x06
parameters	0x15
parameters	0x10
parameters	0x00
parameters	0x31
parameters	0x10
parameters	0x15
parameters	0x06
parameters	0x64
parameters	0x0b
parameters	0x0a
parameters	0x05
parameters	0x0c
parameters	0x31
parameters	0x00
cmd_write	0x2A
parameters	0x00
parameters	0x00
parameters	0x01
parameters	0x3F
cmd_write	0x2B
parameters	0x00
parameters	0x00
parameters	0x01
parameters	0xDF
cmd_write	0x35
parameters	0x00
cmd_write	0x3A
parameters	0x05
cmd_write	0x44
parameters	0x00
parameters	0x01
cmd_write	0x2C
cmd_write	0x11
delay 150ms	
cmd_write	0xD0
parameters	0x07
parameters	0x07
parameters	0x14

parameters	0xA2
cmd_write	0xD1
parameters	0x03
parameters	0x33
parameters	0x0a
cmd_write	0xD2
parameters	0x03
parameters	0x04
parameters	0x04
cmd_write	0x29

BLOCK WRITE	
cmd_write	0x2A
parameters	startx_hi_byte
parameters	startx_low_byte
parameters	endx_hi_byte
parameters	endx_low_byte
cmd_write	0x2B
parameters	starty_hi_byte
parameters	starty_low_byte
parameters	endy_hi_byte
parameters	endy_low_byte
cmd_write	0x2C

ENTER SLEEP	
cmd_write	0x10
delay 10ms	

EXIT SLEEP	
cmd_write	0x11
delay 10ms	
cmd_write	0xD0
parameters	0x07
parameters	0x07
parameters	0x14
parameters	0xA2
cmd_write	0xD1
parameters	0x03
parameters	0x33
parameters	0x0a
delay 10ms	
cmd_write	0x2C

NOTE: BOE requires the customer to follow the above instructions strictly. If customer would like to change the above instructions,the customer should inform BOE and get re-check from BOE, or the customer will be responsible for any unexpected result because of the change.

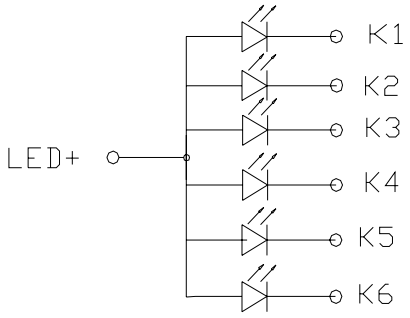
6. Back Light System Characteristics

Ta=25℃

Items	Symbol	Min.	Typ.	Max.	Unit	Remark
Forward current	**If**	**-**	**18**	**20**	mA	**Note1**
Forward voltage	**Vf**	**3.0**	**-**	**3.4**	**V**	**Note1**
B/L Power consumption	**P_{BL}**	**-**	**-**	**408**	**mW**	**Note2**

Note 1: The Driving conditon is defined for each LED chip.

Note 2: The B/L Power consumption is defined for the backlight module.the schematic drawing of the backlight module as the figure.



Ref. Total power consumpation(max) depends on LED current/ LED driver efficiency, etc.

7. Optical Characteristics

Transmissive Mode

Ta=25℃

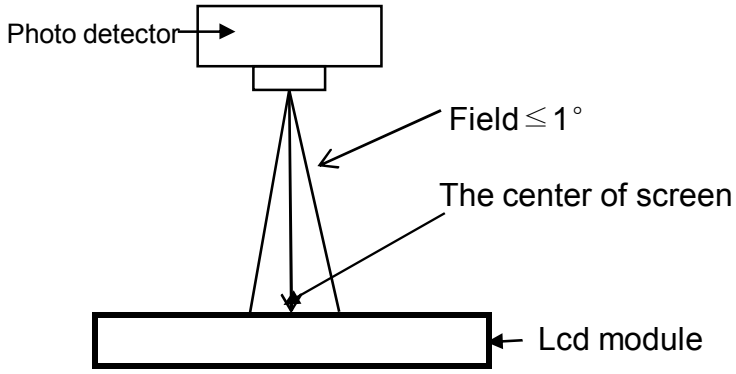
Item		Symbol		Min.	Typ.	Max.	Unit	Condition	Note
Viewing Angle		θ	Ø=0° (X1)	-	70	-	deg.	Cr > 10	Note2
			Ø=180° (X2)	-	65	-			
			Ø=90° (Y1)	-	70	-			
			Ø=270° (Y2)	-	70	-			
Contrast ratio (transmissive)		Cr		140	260	-	-	θ = 0	Note1 Note4
Response Time		Tr + Tf		-	20	-	ms	θ = 0	Note3
CIE Coordi - nate	R	(x,y)		0.58,0.29	0.62,0.33	0.66,0.37		θ = 0 Ø = 0	
	G	(x,y)		0.29,0.57	0.33,0.61	0.37,0.65			
	B	(x,y)		0.11,0.05	0.15,0.09	0.19,0.13			
	W	(x,y)		0.25,0.28	0.29,0.32	0.33,0.36			
Brightness		L		160	200	-	cd/m2	18mA/LED	Note5
Uniformity				70	-	-		18mA/LED	Note6

* Ø = 0 ° , Ø = 90 ° ,Ø = 180 ° ,Ø = 270 ° means viewing direction.

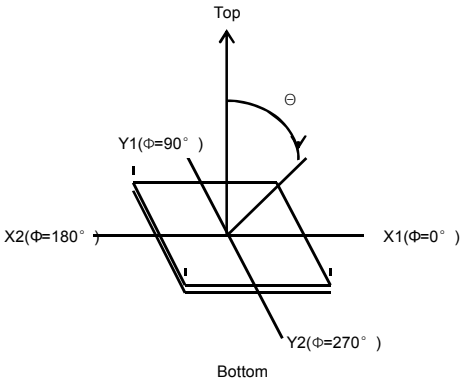
* B/L is turned on.

The optical characteristics should be measured in dark room,and after 5 minutes operation, the measurment begin.

Note1. Definition of Measure System

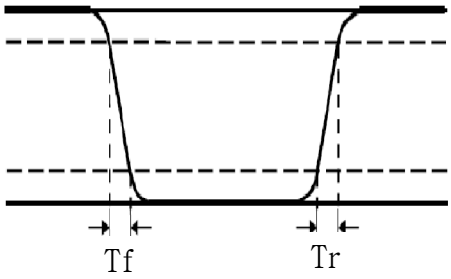


Note2. Definition of Angle Θ.



Note3. Definition of Response Time

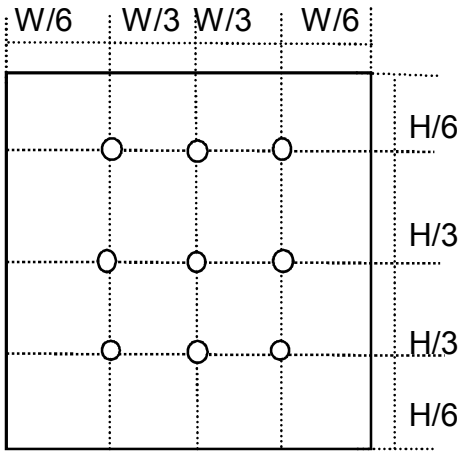
White(TFT off)	Black(TFT on)	White(TFT off)



Note4.definition of contrast ratio

$$Cr = \frac{\text{Liuminance of LCD white state}}{\text{Liuminance of LCD Black state}}$$

Note 5. Measuring Point(9 Points) (WxH)

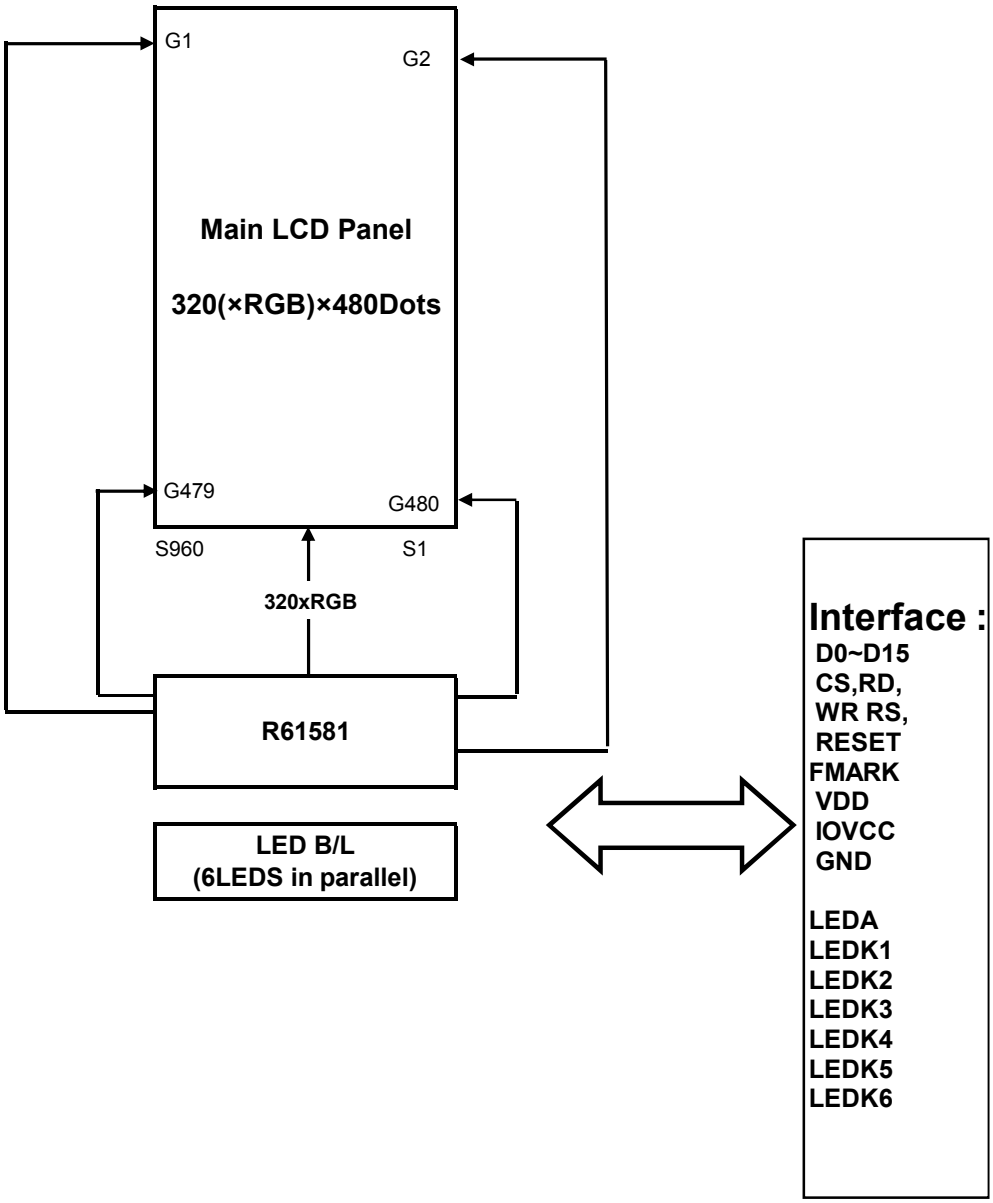


Rating is defined as the average brightness inside the viewing area

Note 6. definition of Uniformity

$$Uniformity = \frac{\text{max. Liuminance of measurede point}}{\text{max. Liuminance of measurede poin}}$$

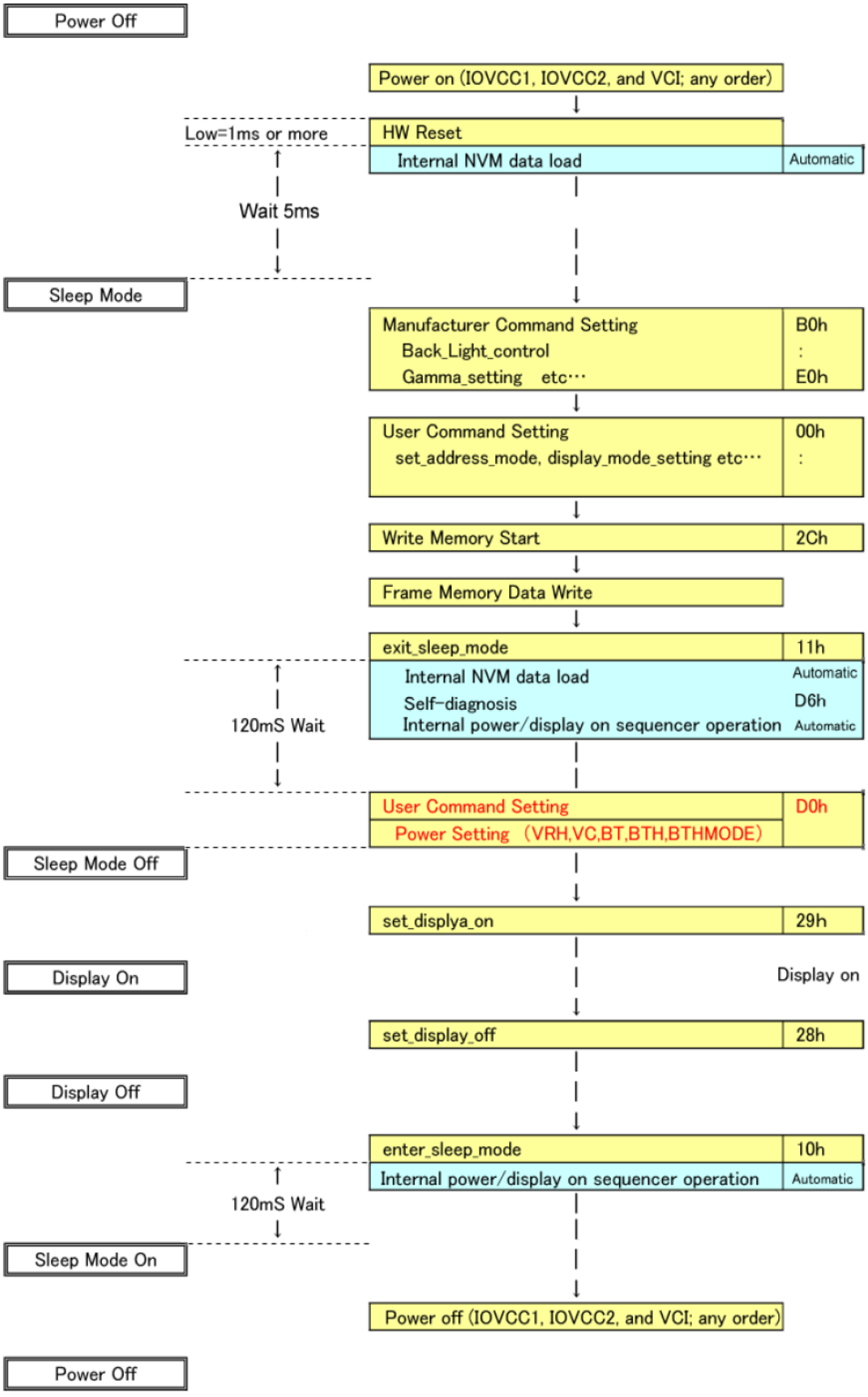
8. Block Diagram



9. Interface Pin Assignment

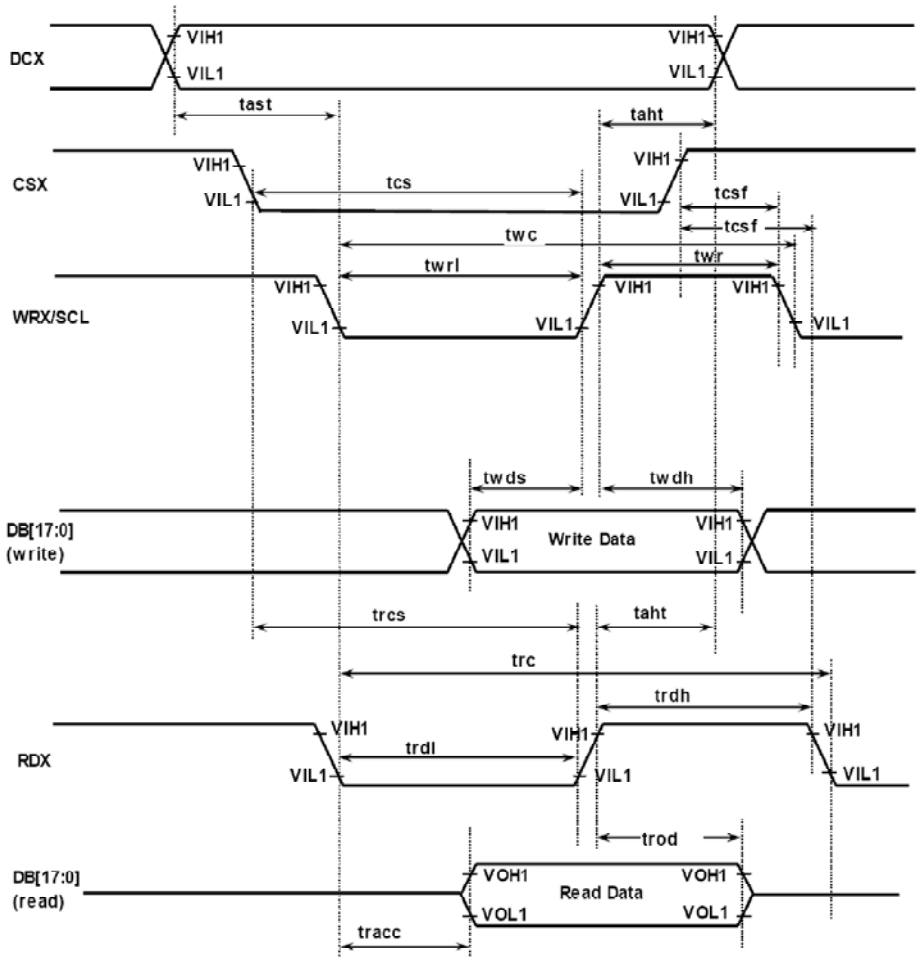
No	Symbol	Description
1	GND	Ground
2	Y+	Touch Panel
3	X+	Touch Panel
4	Y-	Touch Panel
5	X-	Touch Panel
6	GND	Ground
7	VDD	Power Supply(2.8V)
8	IOVCC	Power Supply(1.8V/2.8V)
9	/CS	Chip Select Signal(low active)
10	RS	RS Signal (RS=0:Control, RS=1:data)
11	/WR	Write Signal (low active)
12	/RD	Read Signal(low active)
13	DB0	Bi-directional (I/O) Data Line
14	DB1	Bi-directional (I/O) Data Line
15	DB2	Bi-directional (I/O) Data Line
16	DB3	Bi-directional (I/O) Data Line
17	DB4	Bi-directional (I/O) Data Line
18	DB5	Bi-directional (I/O) Data Line
19	DB6	Bi-directional (I/O) Data Line
20	DB7	Bi-directional (I/O) Data Line
21	DB8	Bi-directional (I/O) Data Line
22	DB9	Bi-directional (I/O) Data Line
23	DB10	Bi-directional (I/O) Data Line
24	DB11	Bi-directional (I/O) Data Line
25	DB12	Bi-directional (I/O) Data Line
26	DB13	Bi-directional (I/O) Data Line
27	DB14	Bi-directional (I/O) Data Line
28	DB15	Bi-directional (I/O) Data Line
29	NC	NC
30	FMARK	Frame head pulse signal
31	RESET	Hardware Reset Signal(low active)
32	LED-K6	LED Cathode(-)
33	LED-K5	LED Cathode(-)
34	LED-A	LED Anode(+)
35	LED-K1	LED Cathode(-)
36	LED-K2	LED Cathode(-)
37	LED-K3	LED Cathode(-)
38	LED-K4	LED Cathode(-)
39	GND	Ground

10. Power Supply Sequence



11. Read/Write Timing characteristics (80 series MPU)

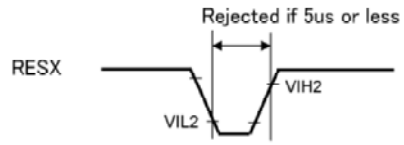
1）Read/Write Timing



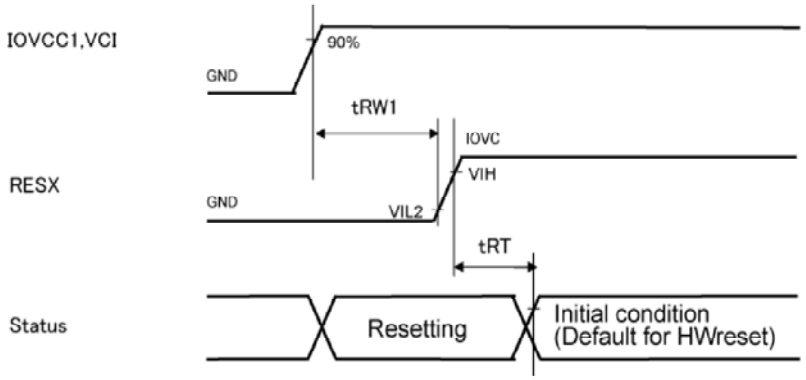
Item		Symbol		Unit	Test Condition	Min.	Max.
Address setup time		DCX	tast	ns		0	-
Address hold time (Write/Read)			taht	ns		10	-
Chip select setup time (Write)		CSX	tcs	ns		30	-
Chip select setup time (Read)			trcs	ns		170	-
Chip select wait time (Write)			tcsfw	ns		20	-
Chip select wait time (Read)			tcsfr	ns		20	
1 transfer	Write cycle time	WRX	twc1	ns		60	-
	Write control pulse "High" period		twrh1	ns		30	-
	Write control pulse "Low" period		twrl1	ns		30	-
3/2 transfers 2 transfers	Write cycle time		twc2	ns		40	-
	Write control pulse "High" period		twrh2	ns		20	-
	Write control pulse "Low" period		twrl2	ns		20	-
Read cycle time		RDX	trc	ns		450	-
Read control pulse "High" period			trdh	ns		250	-
Read control pulse "Low" period			trdl	ns		170	-
Write data setup time		DB[17:0]	twds	ns	CL Max.30pF Min.0pF	15	-
Write data hold time			twdh	ns		20	-
Read access time			tracc	ns		10	150
Output disable time			trod	ns		10	-

2) Reset Timing characteristics

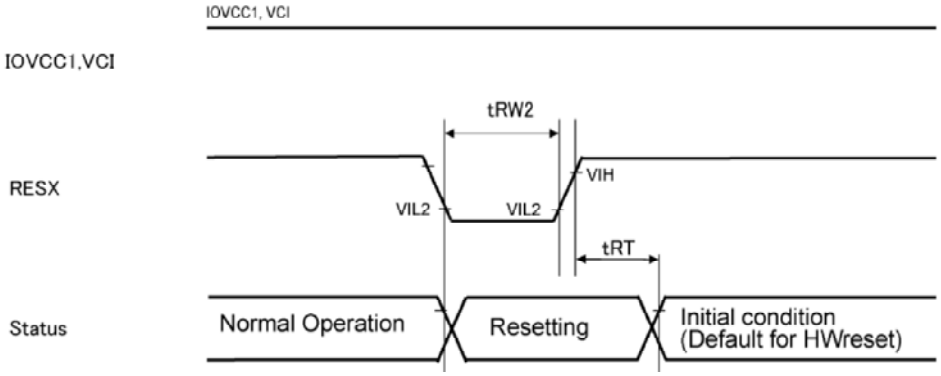
Reset Reject



1) Reset Timing when power is on

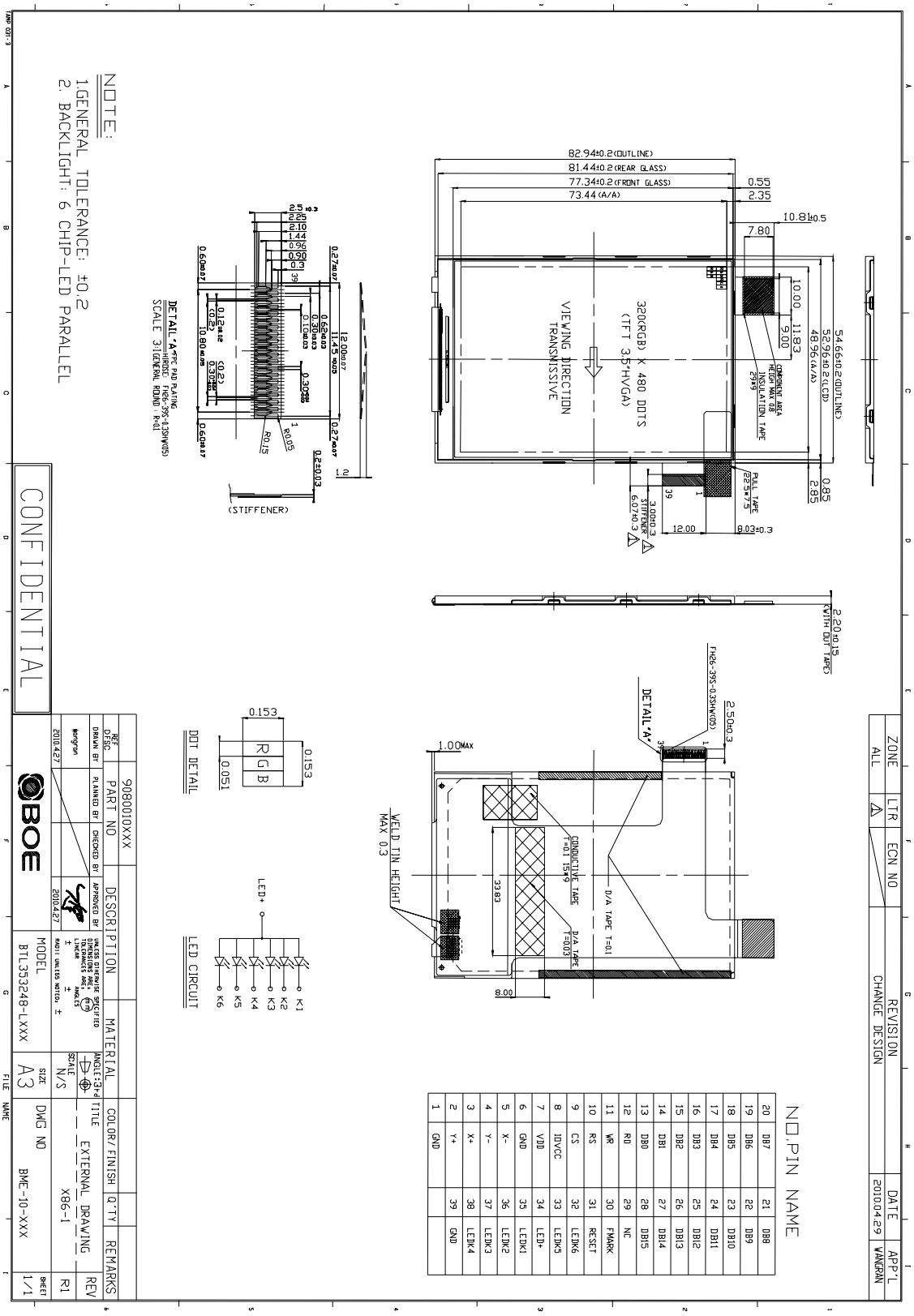


2) Reset Timing when in operation



Item	Symbol	Unit	Test Condition	Min.	Max.
Reset "Low" level width 1	tRW1	ms	Power On	1	—
Reset "Low" level width 2	tRW2	us	Operation	10	—
Reset time	tRT	ms		—	5

12. External Dimension



13. COLOR LCD MODULE NUMBERING SYSTEM

B	T	L	3	5	3	2	4	8	-	L		3	6	3	L		
(1)	(2)	(3)	(4)		(5)					(6)			(7)		(8)	(9)	(10)

(1) B：BHL

(2) Drive System

C : CSTN T : TFT E : OLED M：MONO

(3) Product Status

L：LCD Model F：FOG Model G：COG Model P：PANEL Model C：CELL Model

(4) Display size(精确到小数点后1位,四舍五入）

EX) 2.22 inch:22 1.76 inch:18 2.0 inch:20 10.1inch:A1

1.9 inch:19 1.12 inch:11 1.8 inch:18 15.5inch:F5

(5) Resolution

Number of Row Dots * Number of column Dots(前两位有效）

EX) 128 * 128 = 1212 96 * 64 = 9664 128 * 160 = 1216 101 * 80 = 1080

176 * 220 =1722 128 * 96 = 1296 320 * 240 =3224 1024*576 =1057

(6) Viewing Direction

Nil: 6 H U: 12 H L: 9 H R: 3 H W: Wide view E: 其他

(7) Serial Number (*001-9999：按照产品状态，各类产品序列号实行大排行处理, *为0时省略不写)

(8) Back Light

Nil:Without backlight + Reflective H:CCFL + Translective

T:Without backlight + Transflective E:LED Frontlight + Reflective

F:CCFL Frontlight + Reflective D:LED + Transflective

L:LED + Transmissive

(9)DUAL LCD

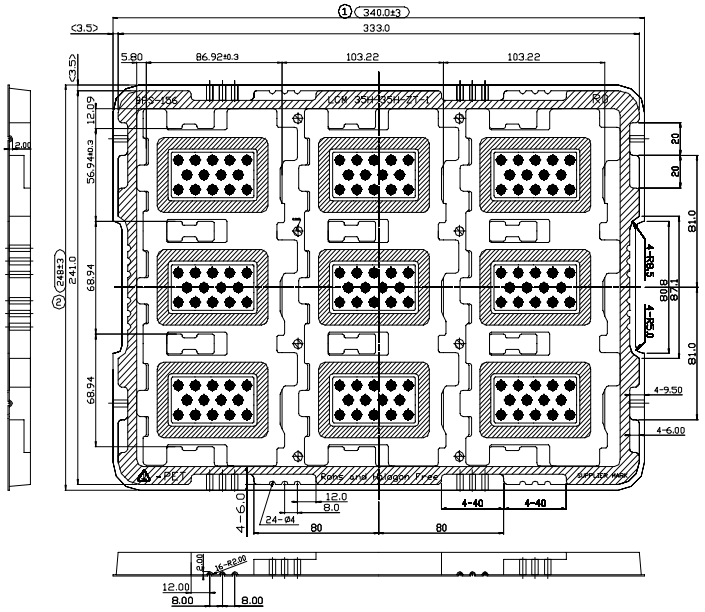
Nil: Single LCD M:MONO C:CSTN T:TFT O:OLED

(10)TOUCH PANEL

Nil:Without TP P:with TP

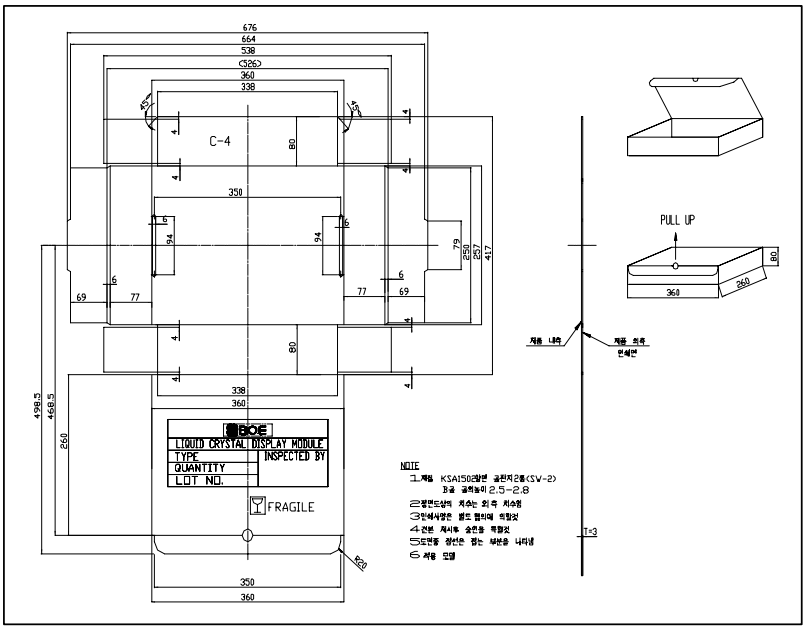
14. Package Terms

1、Tray Size
L:340mm
W:248mm
（**9pcs LCM/Tray**）



Tray Drawing

2、Inner BOX Size
L:360mm
W:260mm
H:80mm
（7pcs Tray）/ Inner Box）



Inner Box Drawing

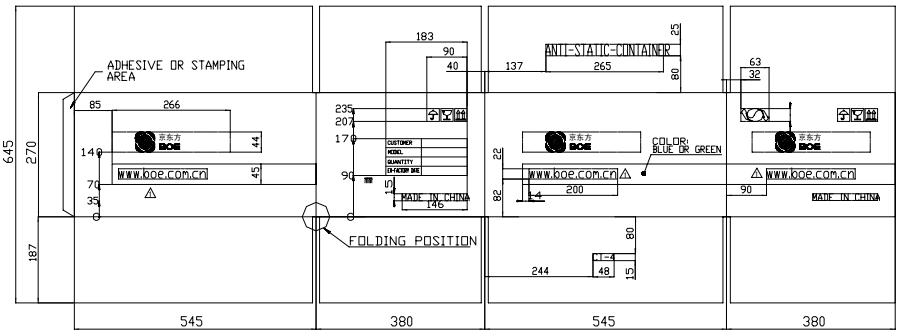
3、Out BOX Size

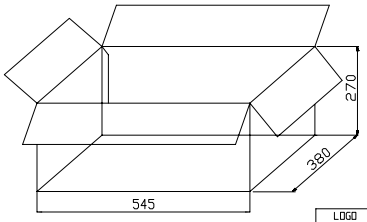
L：545mm

W：380mm

H：270mm

（6pcs Inner / Out）

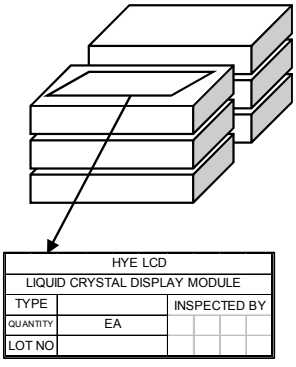




LOGO	COLOR
BOE	BLUE OR GREEN
WWW.BOE.COM.CN	CLEARNESS
OTHERS	BLUE OR GREEN

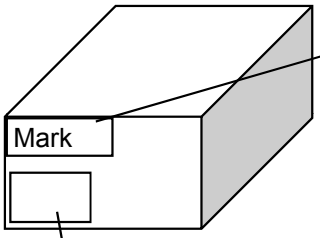
NOTE
1.MATERIAL: KSA 1531,DW2(T=8mm)
2.DRAWING DIMESIONS ARE EQUAL TO OUTSIDE DIMENSION.
3.INNER BOX(C-4) ARRANGEMENT: 3STEPS X?2ROWS
4.MARKS ARE REFER TO SEPERATE CONSULTATION.

4、Packing label content



HYE LCD		
LIQUID CRYSTAL DISPLAY MODULE		
TYPE		INSPECTED BY
QUANTITY	EA	
LOT NO		

Inner Box



HYE LCD Hyundai LCD Inc			
CUSTOMER		Q'TY	
MODEL		DATE	YYYY-MM-DD
RUN NO		LOC CODE	
ORIGIN		(QA)	

OUT BOX

Custmer Address
Product No.
P/O No.
Lot No.
Box No.

Mark Item

5、Packing notice

[1]Sub LCD should be placed upwardly while in the tray.

[2] Every seven full trays with a blank one while twining twice on both sides by adhesive tape.

[3].Every tray should be put crossedly.

6、Product label

[1] There should be Logo and product modle of BOE on FPC ASS'Y.

7、Packing Q'ty list

	INNER BOX	TRAY	MODULE
OUT BOX	6	42	324
INNER BOX	1	7	54
TRAY	-	1	9

1.LCD Module Out-Going Quality Level

(1.0) Purpose

The LCD specification provides outgoing provision and its expected quality level based on our outgoing inspection of LCD.

(2.0) Applicable Scope

The LCD specification is applicable to the arrangement in regard to outgoing Inspection and quality assurance after it.

(3.0) Quality Specification

(3.1) Quality Level

The quality level of BHL&BMDT are based on GB/T2828.1-2003, Apply Level II, normal inspection by single sampling.

Rank	Item	AQL	Note
Major(MA)	Parts Short, Parts Mounting Back Light, Open Solder Bridging Outside Dimension Solder Ball, Abnormal/No Display	0.65	
Minor (MI)	Stains on LCD Panel Surface Stains, Scratchs, Foreign Substance, Spots, Air Bubbles	1.0	

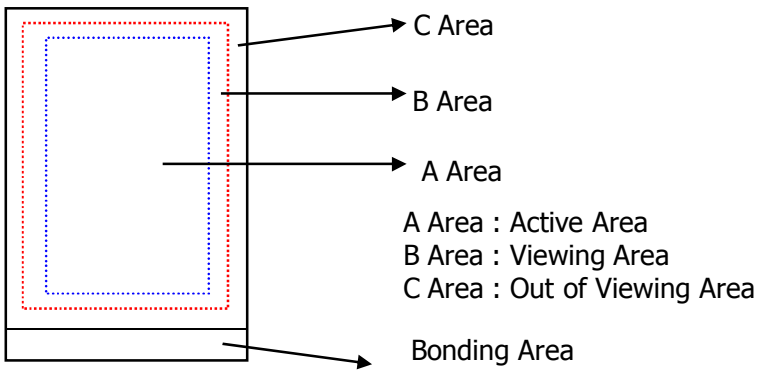
(3.2) Appearance Standards

1) Inspection Conditions

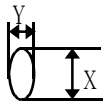
The inspection shall be applied under 20W white fluorescent lamp light at a distance between 400-500mm, with the eyes 300mm away from products and and the angle of view within 30º to perpendicular line.

The mobile lens should be fixed on when doing inspection in case the mobile with len

2) Definition of the Area



(3.3) Apperance Spec

<table>
<tr><th>No</th><th>Item</th><th>Criteria</th><th>Rank</th><th>Remark</th></tr>
<tr><td>1</td><td>Parts Short</td><td>Not allowed</td><td>MA</td><td></td></tr>
<tr><td>2</td><td>Solder Bridging</td><td>Any bridging between components,except common circuit, is not allowed</td><td>MA</td><td></td></tr>
<tr><td>3</td><td>Outside Dimension</td><td>Drawing & specification must be within permitable tolerance</td><td>MA</td><td></td></tr>
<tr><td>4</td><td>Open</td><td>Not allowed</td><td>MA</td><td></td></tr>
<tr><td>5</td><td>Cold Solder</td><td>Not allowed</td><td>MA</td><td rowspan="4"> 
Diameter
(X + Y)/2</td></tr>
<tr><td>6</td><td>Stains On
LCD Panel Surface</td><td>Stains which can be wiped off with soft cloth are counted as defect

Stains which can't be removed even with soft cloth are not allowed</td><td>MI</td></tr>
<tr><td>7</td><td>Back Light</td><td>No light and short of light and abnormal lighting are not allowed</td><td>MA</td></tr>
<tr><td>8</td><td>Air Bubles Between Glass & Polarizer (Polarizer Defects)</td><td>
<table>
<tr><th rowspan="2">Area
Dimension**</th><th colspan="2">Acceptable Q'ty</th><th rowspan="2">Remark</th></tr>
<tr><th>A Area</th><th>B Area</th></tr>
<tr><td>Φ ≤ 0.15</td><td colspan="2">Ignore</td><td rowspan="5"></td></tr>
<tr><td>0.15 < Φ ≤ 0.30</td><td>3</td><td>Ignore</td></tr>
<tr><td>0.30 < Φ ≤ 0.50</td><td>2</td><td>Ignore</td></tr>
<tr><td>0.50 < Φ ≤ 0.80</td><td>1</td><td>Ignore</td></tr>
<tr><td>Total</td><td>5</td><td>Ignore</td></tr>
</table>
</td><td>MI</td></tr>
</table>

<table>
<tr><th>No</th><th>Item</th><th>Criteria</th><th>Rank</th><th>Remar</th></tr>
<tr><td>9</td><td>Parts Mounting</td><td>Parts mounting failure is not allowed
Wrong parts mounted is not allowed</td><td>MA</td><td></td></tr>
<tr><td>10</td><td>Stains
Foreign Substance
Scratches
Spots</td><td>(1) Round shape
<table>
<tr><th rowspan="2">Area
Dimension</th><th colspan="2">Acceptable Q'ty</th><th rowspan="2">Remark</th></tr>
<tr><th>A Area</th><th>B Area</th></tr>
<tr><td>Φ ≤ 0.10</td><td colspan="2">Ignore</td><td></td></tr>
<tr><td>0.10 < Φ ≤ 0.20</td><td>2</td><td>Ignore</td><td></td></tr>
<tr><td>0.20 < Φ ≤ 0.30</td><td>1</td><td>Ignore</td><td></td></tr>
<tr><td>0.30 < Φ</td><td>0</td><td>Ignore</td><td></td></tr>
</table>
(2) Line shape
<table>
<tr><th colspan="2">Dimension</th><th colspan="2">Acceptable Q'ty</th><th rowspan="2">Remark</th></tr>
<tr><th>Length</th><th>Width</th><th>A Area</th><th>B Area</th></tr>
<tr><td>-</td><td>≤ 0.025</td><td colspan="2">Ignore</td><td></td></tr>
<tr><td>≤ 2.5</td><td>≤ 0.05</td><td>3</td><td>Ignore</td><td></td></tr>
<tr><td>≤ 1.5</td><td>≤0.075</td><td>2</td><td>Ignore</td><td></td></tr>
<tr><td></td><td>0.075 <</td><td colspan="2">Follow round shape</td><td></td></tr>
</table>
(1) & (2) total defect q'ty can not exceed 5</td><td></td><td></td></tr>
<tr><td>11</td><td>Abnormal Display</td><td>Not allowed</td><td>MA</td><td></td></tr>
<tr><td>12</td><td>No Display</td><td>Not allowed</td><td>MA</td><td></td></tr>
</table>

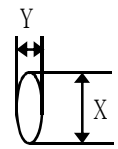
Note : A limitation sample is given top priority

(4.0) Specification for Touch Panel Inspection

(4.1) Inspection Criterion and Level

Rank	Item	AQL	Note
Major (MA)	Function Failure	0.65	
Minor (MI)	Bubble, Scratch, Foreign Particle	1.0	

(4.2) Inspection Criterion

<table>
<tr><th>No</th><th>Item</th><th>Criteria</th><th>Rank</th><th>Note</th></tr>
<tr><td>1</td><td>Function</td><td>Fail to adjust, hard to adjust (can't be adjusted within 3 times): Reject
Stroke Drift, Stroke Suspension: Reject</td><td>MA</td><td rowspan="2"> 

** : 平均直 径
(X + Y)/2</td></tr>
<tr><td>2</td><td>Air Bubble
Scratch
Foreign Particle</td><td>1) Round shape
<table>
<tr><th rowspan="2">Dimension</th><th colspan="2">Acceptable Q'ty</th><th rowspan="2">Remark</th></tr>
<tr><th>A area</th><th>B area</th></tr>
<tr><td>Φ ≤ 0.10</td><td colspan="2">Ignore</td><td rowspan="4"></td></tr>
<tr><td>0.10 < Φ ≤ 0.20</td><td>2</td><td>Ignore</td></tr>
<tr><td>0.20 < Φ ≤ 0.30</td><td>1</td><td>Ignore</td></tr>
<tr><td>0.30 < Φ</td><td>0</td><td>Ignore</td></tr>
</table>
2) Line shape
<table>
<tr><th colspan="2">Dimension</th><th colspan="2">Acceptable Q'ty</th><th rowspan="2">Remark</th></tr>
<tr><th>length</th><th>Width</th><th>A area</th><th>B area</th></tr>
<tr><td>-</td><td>W≤0.025</td><td colspan="2">Ignore</td><td rowspan="5">Ignore</td></tr>
<tr><td>L≤3.0</td><td rowspan="2">W≤0.05</td><td colspan="2">Ignore</td></tr>
<tr><td>3.0<L≤5.0</td><td colspan="2">2</td></tr>
<tr><td>≤ 7</td><td>W≤0.1</td><td colspan="2">1</td></tr>
<tr><td>-</td><td>W>0.1</td><td colspan="2">Follow Round shape</td></tr>
</table></td><td>MI</td></tr>
</table>

(5.0) Reliability Test - Module Middle Reliability

No.	Item	Condition	Duration	Sample Quantity	Creteria (Acc/Rej)	Note
1	High Temp Operation	70 ± 2℃	48 hrs	3	0/1	
2	Low Temp Operation	-20 ± 2℃	48 hrs	3	0/1	
3	High Temp and High Humidity Storage	60℃,90% RH 90%rh	48 hrs	3	0/1	
4	Thermal Shock	30min Stage -20℃ ↔ 70℃	10cycles/	3	0/1	

(5.1) Criteria

a. No changes for indication and appearance.
b. Leave the all samples under room temperature 4 hours after reliability test ends.

2. BHL&BMDT Customer Quality Service Process

In order to provide better service for Customer, BHL&BMDT shall apply the after-sales product quality service process as below:

1> According to the P/O from Customer, BHL&BMDT should deliver required product to the right place appointed by Customer.
2> Customer shall apply inspection to the incoming procuct.
3> Inspection standard should be provided by BHL&BMDT, and it will become effective after confirmed by Customer. Inspection and Defects determination should be carried out according to the standard agreed by both Parties.
4> In order to guarantee in-time communication of product quality situation and effective service, QA staff on Customer side should send Weekly Quality Report to the appointed CS staff in BHL&BMDT.
5> After BHL&BMDT get related information, both sides should arrange time and place to determin the non-performing products found by Customer.
6> BHL&BMDT should cooperate with Customer in case of special quality requirement.
7> After confirmed by both side, BHL&BMDT should be responsible for the defect part caused by our quality problem. BHL&BMDT take back the confirmed defect products and return normal goods to customer.
8> BHL&BMDT agree to provide related training of LCD product technology and usage.
9> Customer should use the LCD product according to the instruction. BHL&BMDT will not be responsible for the defect product caused by violation of Users' Instruction.
10> Both parties should deal with the quality problem under the principle of mutual consultation and cooperation.And both parties should negotiate to handle the defect products of which the cause isn't clear.

3.LCD Module Operation Instruction

3.1 Cautions for storage

1> Avoid hitting the LCD Panel in any way because the LCD is made of glass.
2> Physical status of liquid crystal will change under extrem temperature, and it can not be resumed when the temperature returns to normal. So LCD module should be stored in required temperature. Same reason, LCD module should be stored in required humidity. Low hymidity may add static, while high humidity may corrode the ITO circuit of LCD product. The suitable storage environment is: temperature: 22±5 ℃, humidity: 55%±10%.
3> Avoid exposing LCD module under sunshine, strong fluorescence or ultraviolet radiation for a long time. It should be stored in dark area.
4> Chemical liquid is forbidden to clean the LCD, such as alcohol, acetone and IPA. Because all of these can do damage to the LCD. Water on the LCD surface must be cleaned as soon as possible, or it will cause POL color change or other defect.
5> LCD products should be stored in static-protective polythene bag under certain requirement.

3.2 Cautions for installing and assembling

1> Please make sure that operators wear static-protective bands correctly and working tables are effectively grounded during operation.
2> Please place LCD module on the tray provided by BHL&BMDT while moving it, in order to avoid mechanical damage. Hold the module's side frames to avoide damage during moving.
Please move and assemble LCD very carefully during assembly, and avoid pushing or twisting it.
3> Avoid disassembling LCD module or damage the FPC or permanent defect may happen.
4> Avoid cleaning the LCD surface with hard materials. Please clean LCD with Air-gun or very soft cloth when necessary. The protective film on the POL is prohibited to be removed until assembly, otherwise,dust,spit or other foreign matter may fall on the LCD surface. After the protective film is removed, only air-gun can be applied to remove any dust or foreign matter. Fingure or cloth MUST NOT be used in such cases.
5> Avoid twisting, disassembling, squeezing or hitting the PCB. It will damage the circuit or component on PCB and cause functional defect.
6> Please use the connector according to the instruction provided by BHL&BMDT.
7> Please place dual module with the sub-panel upward. Trays should be placed in contrary direction. An empty tray should be placed on the top.
8> Sealing operation on PCB must be very careful to avoid short or cutting the original circuit on PCB. Otherwise, permenant damage to the LCD may happen.
9> Please take great care to use connector. Defect caused by wrong or careless operation on Customer side are not within the compensation range.

3.3 Cautions for operation

1> Avoid adding direct DC or high voltage to LCD panel. It will cause functional damage to the LCD or shorten the life of LCD product.
2> LCD may respond slowly or display abnormally in extrem temperature (lower than -20 ℃ or higher than 50℃). But this doesn't mean LCD functional defect. LCD will display normally in regular temperature. Therefore, avoid using LCD product in extrem temperature.
3> Avoid pushing the display area of LCD panel which may cause abnormal display. This doesn't mean LCD functional defect, neither. LCD will display normally in regular temperature.
4> The black tape on IC on LCD product is used to protect the IC from light. Please do NOT remove it.
5> Electrical inspection for LCD product is carried out by using mobile phone provided by Customer. Special test equipment could be applied under mutual consent.