* Records of Revision *

Rev.	Page	Description of changes	Date	prepared by
o	All	Original Release	10.03.12	Mu.J.F

☑ 一般事项　　☐ 特殊事项

特殊事项内容：

* Contents *

1. Features

The features of BTL222432-305L are as follows

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

* Driving Condition : 240x3Ch-Source / 320Ch-Gate

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

* LCD Driver & Control IC
:HX8347-G(HIMAX)

* Back Light : White LED Back Light (3 Chips in Parallel)

* MPU Interface : 80-Series, 16bits/8bits Parallel Data Bus

* Type of Surface Contion
:Clear Type

2. Mechanical Specifications

Item		Specification	Unit
Resolution	Main	240(x RGB) x 320	Dot
	Sub	NA	
LCM Outline Demension		55.10 x40.90x2.05(TYP)	mm
Active Area (W × H)	Main	33.84x 45.12	mm
	Sub	NA	
Pixel Pitch (W x H)	Main	0.141×0.141	mm
	Sub	NA	
Viewing Direction (Human Eye)	Main	6	O'clock
	Sub	NA	
Gray Scale Inversion Direction (Contrast Ratio)	Main	12	O'clock (Rubbing Direction)
	Sub	NA	
Weight		12	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+0.5	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	3.6	V	
Analog(Power) voltage		V_{CC}	2.5	2.8	3.6	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}	0.7×IOVcc	-	IOVcc	V	
	Low level	V_{IL}	0	-	0.3×IOVcc	V	
current consumption		Icc	-	6	9	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：HX8347-G)

Initial Code

INDEX	DATA
Hardware Reset	
00EA	0000
00EB	0020
00EC	003C
00ED	00C4
00E8	0048
00E9	0038
00F1	0001
00F2	0008
000C	0000
000D	0000
000F	0000
GAMMA Correction	
0040	0001
0041	0007
0042	0016
0043	001E
0044	001B
0045	0026
0046	0025
0047	006F
0048	0002
0049	001B
004A	001D
004B	001B
004C	0016
0050	0019
0051	0024
0052	0021
0053	0029
0054	0038
0055	003E
0056	0010
0057	005A
0058	0009
0059	0004
005A	0002
005B	0004
005C	001D
005D	00CC

POWER VOTAGE SETTING	
001B	001B
001A	0001
0024	0070
0025	0058
0023	005A
POWER ON	
0018	0036
0019	0001
0001	0000
001F	0088
DELAY 10ms	
001F	0080
DELAY 10ms	
001F	0090
DELAY 10ms	
001F	00D0
DELAY 10ms	
SET PANEL	
0017	0005
0036	0009
0028	0038
DELAY 50ms	
0028	003C
SET GRAM AREA	
0002	0000
0003	0000
0004	0000
0005	00EF
0006	0000
0007	0000
0008	0001
0009	003F
0022	--

Into Standby Mode

INDEX	DATA
0028	0038
DELAY 50ms	
001F	0089
DELAY 50ms	
0028	0020
DELAY 50ms	
0019	0000
DELAY 10ms	
0001	00C0

Exit Standby Mode

0001	0000
DELAY 10ms	
0019	0001
001F	0088
DELAY 10ms	
001F	0080
DELAY 10ms	
001F	90
DELAY 10ms	
001F	D0
DELAY 10ms	
0028	0038
DELAY 50ms	
0028	003C

Partial Display Setting

INDEX	DATA
0002,0003	StartX
0004,0005	EndX
0006,0007	StartY
0008,0009	EndY

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.

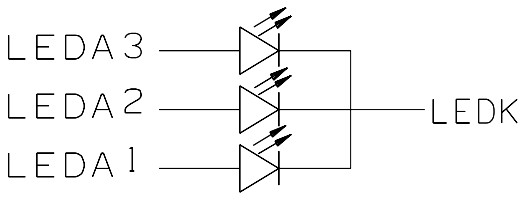
6. Back Light System Characteristics

Ta=25℃

Items	Symbol	Min.	Typ.	Max.	Unit	Remark
Forward current	**If**	**-**	**15**	**20**	mA	**Note1**
Forward voltage	**Vf**	**3.0**	**-**	**3.4**	**V**	**Note1**
B/L Power consumption	**P_{BL}**	**-**	**-**	**204**	**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.



LED CIRCUIT

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

7. Optical Characteristics

Transmissive Mode

Ta=25℃

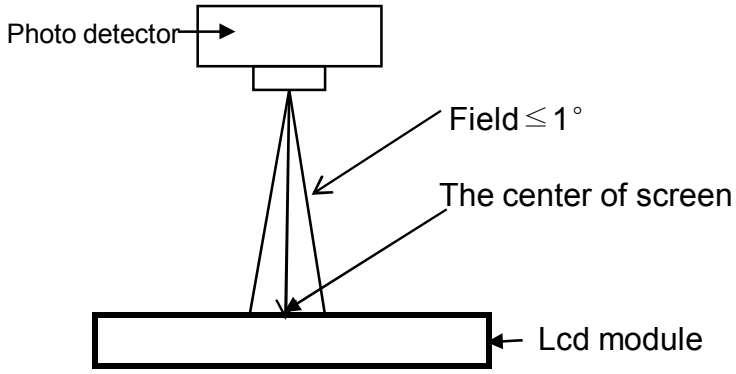
Item		Symbol		Min.	Typ.	Max.	Unit	Condition	Note
Viewing Angle		θ	Ø=0° (X1)	-	45	-	deg.	Cr > 10	Note2
			Ø=180° (X2)	-	45	-			
			Ø=90° (Y1)	-	50	-			
			Ø=270° (Y2)	-	20	-			
Contrast ratio (transmissive)		Cr		170	320	-	-	θ = 0	Note1 Note4
Response Time		Tr + Tf		-	30	-	ms	θ = 0	Note3
CIE Coordi - nate	R	(x,y)		0.57,0.29	0.61,0.33	0.65,0.37		θ = 0 Ø = 0	
	G	(x,y)		0.31,0.51	0.35,0.56	0.39,0.60			
	B	(x,y)		0.11,0.06	0.15,0.10	0.19,0.14			
	W	(x,y)		0.26,0.29	0.30,0.33	0.34,0.37			
Brightness		L		200	250	-	cd/m2	15mA/LED	Note5
Uniformity				70	-	-		15mA/LED	Note6

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

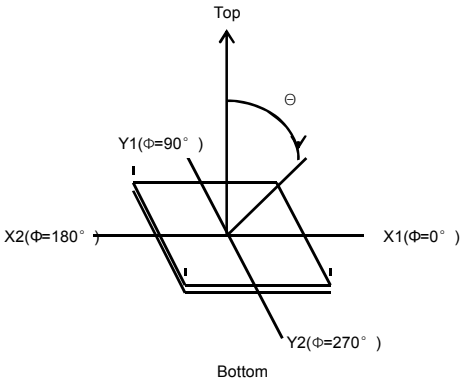
* B/L is turned on.

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

Note1. Definition of Measure System

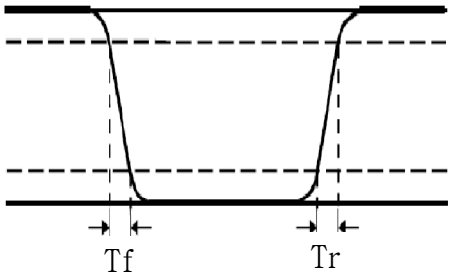


Note2. Definition of Angle Θ.



Note3. Definition of Response Time

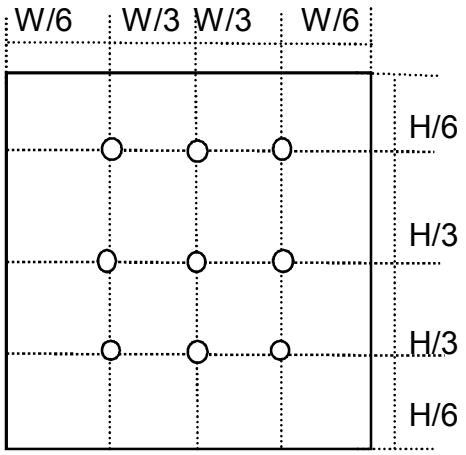
White(TFT off)	Black(TFT on)	White(TFT off)



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)

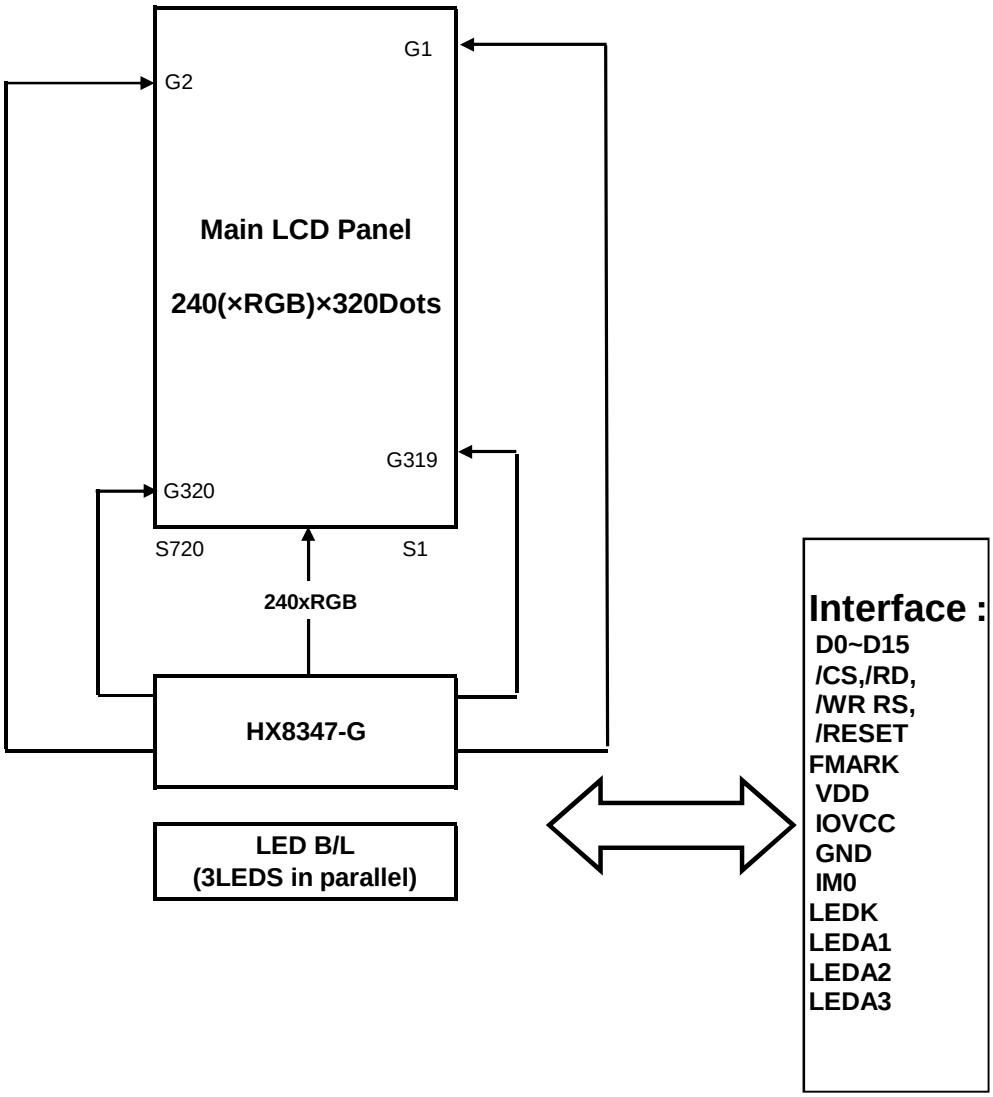


Rating is defined as the average brightness inside the viewing area

Note 6. definition of Uniformity

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

8. Block Diagram

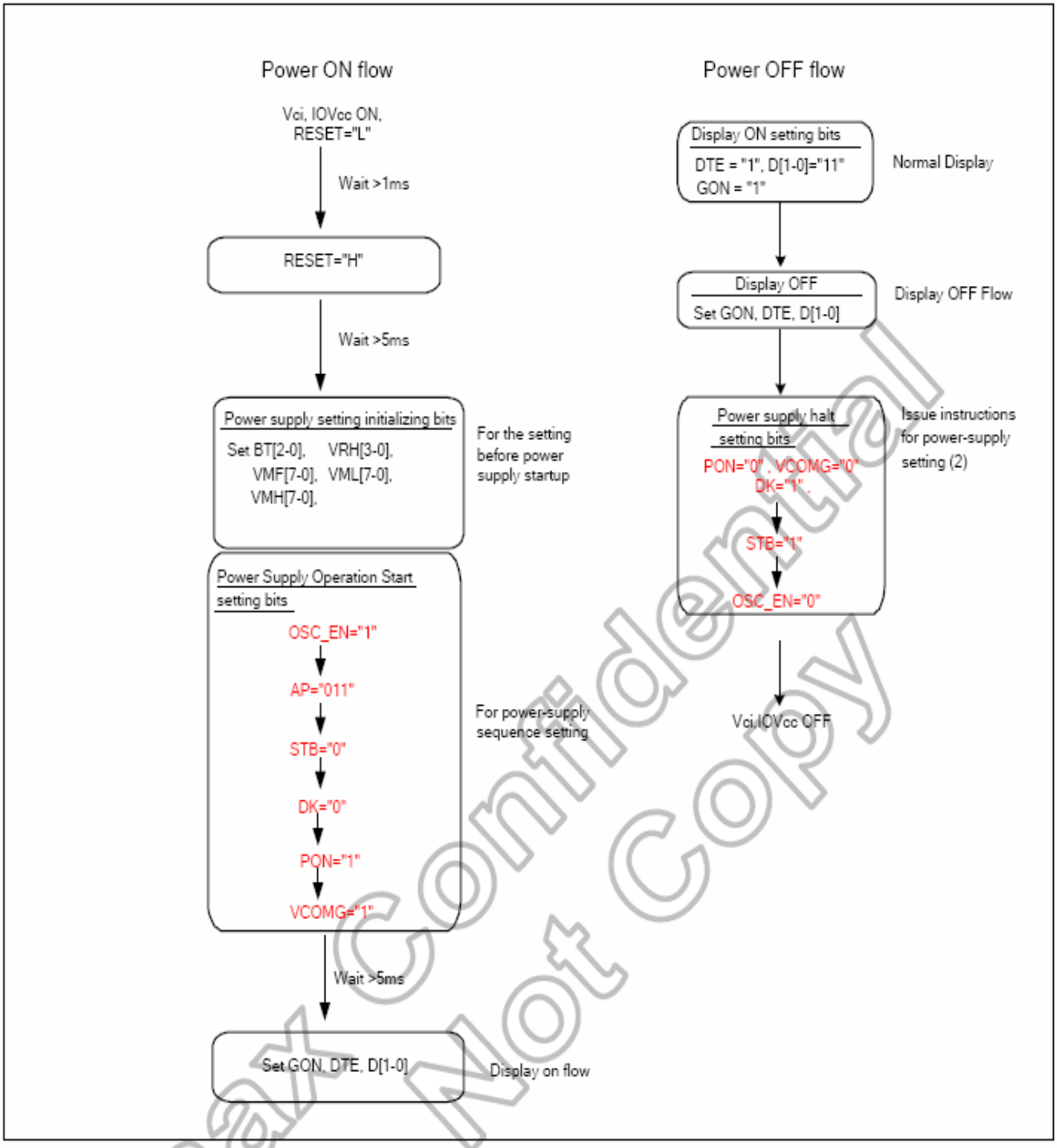


IM0=0	80-Series, 16bits Parallel Data Bus (DB0--DB15)
IM0=1	80-Series, 8bits Parallel Data Bus (DB8--DB15)

9. Interface Pin Assignment

No	Symbol	Description
1	GND	Ground
2	/CS	Chip Select Signal(low active)
3	RS	RS Signal (RS=0:Control, RS=1:data)
4	/WR	Write Signal (low active)
5	/RD	Read Signal(low active)
6	DB0	Ground
7	DB1	Bi-directional (I/O) Data Line
8	DB2	Bi-directional (I/O) Data Line
9	DB3	Bi-directional (I/O) Data Line
10	DB4	Bi-directional (I/O) Data Line
11	DB5	Bi-directional (I/O) Data Line
12	DB6	Bi-directional (I/O) Data Line
13	DB7	Bi-directional (I/O) Data Line
14	DB8	Bi-directional (I/O) Data Line
15	DB9	Bi-directional (I/O) Data Line
16	DB10	Bi-directional (I/O) Data Line
17	DB11	Bi-directional (I/O) Data Line
18	DB12	Bi-directional (I/O) Data Line
19	DB13	Bi-directional (I/O) Data Line
20	DB14	Bi-directional (I/O) Data Line
21	DB15	Bi-directional (I/O) Data Line
22	IM0	Selec the MPU system interface mode
23	FLM	Frame head pulse signal
24	/RESET	Hardware Reset Signal(low active)
25	GND	Ground
26	X+(R)	Touch Panel
27	Y+(U)	Touch Panel
28	X-(L)	Touch Panel
29	Y-(D)	Touch Panel
30	GND	Frame head pulse signal
31	IOVCC	Power Supply(1.8V/2.8V)
32	VDD	Power Supply(2.8V)
33	LED1+	LED Anode(+)
34	LED2+	LED Anode(+)
35	LED3+	LED Anode(+)
36	NC	NC
37	NC	NC
38	NC	NC
39	LED-	LED Cathode(-)

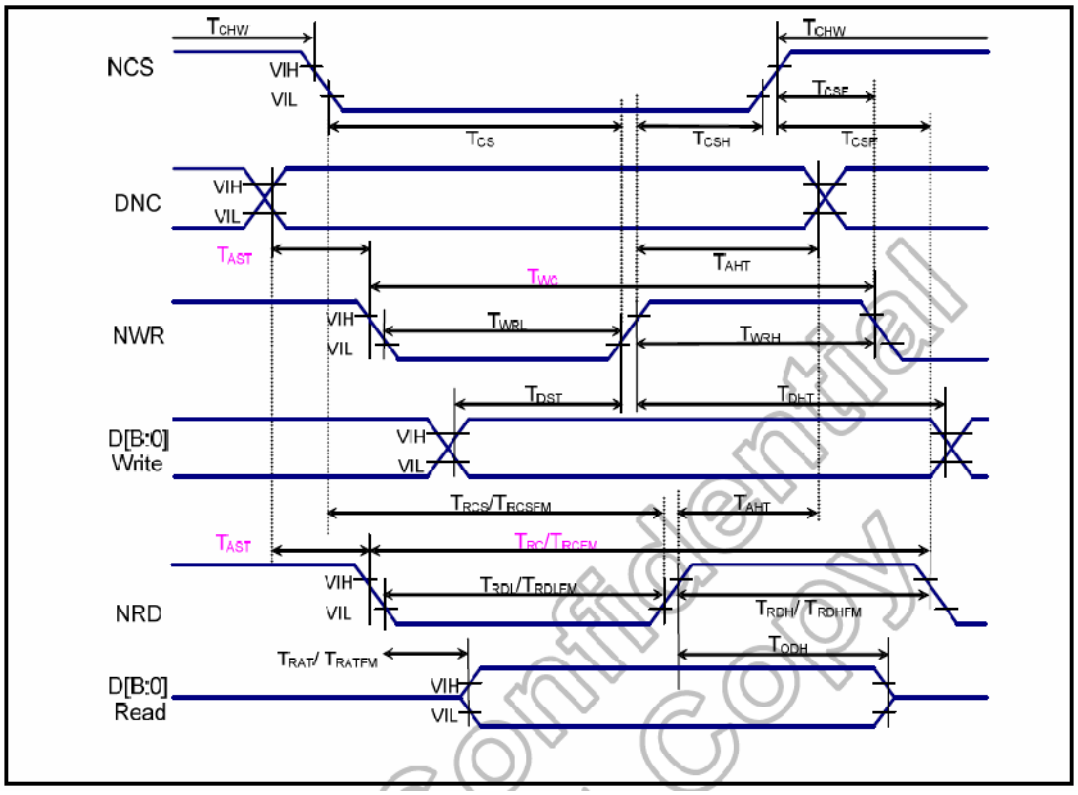
10. Power Supply Sequence



Power supply setting flow

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

1）Read/Write Timing

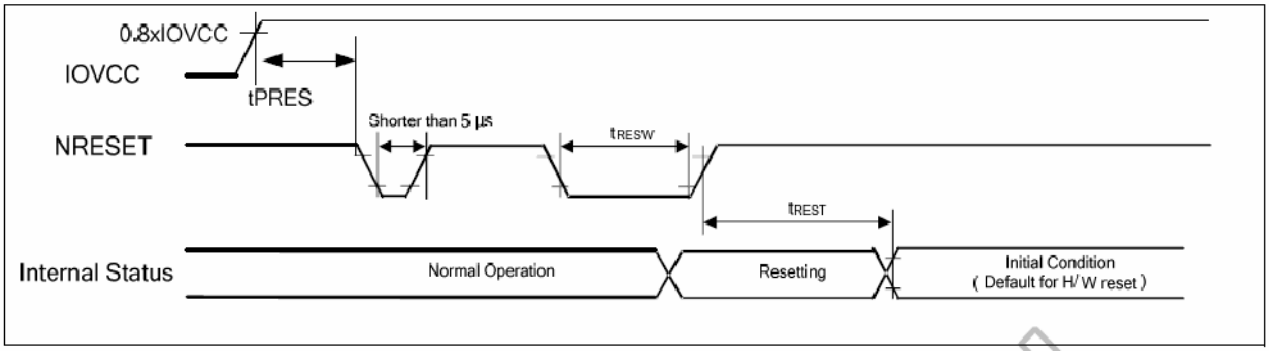


(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.3V to 3.3V, T_A = -30 to 70° C)

Signal	Symbol	Parameter	Spec. Min.	Spec. Typ	Spec. Max.	Unit	Description
DNC_SCL	tAST tAHT	Address setup time Address hold time (Write/Read)	10 10	- -	- -	ns	-
NCS	tCHW tCS tRCS tRCSFM tCSF tCSH	Chip select “H” pulse width Chip select setup time (Write) Chip select setup time (Read ID) Chip select setup time (Read FM) Chip select wait time (Write/Read) Chip select hold time	0 15 45 355 10 10	- - - - - -	- - - - - -	ns	-
NWR_SCL	tWC tWC tWRH tWRL	Write cycle(1pixel for one write) Write cycle (1 pixel for 2 or 3 write) Control pulse “H” duration Control pulse “L” duration	100 50 15 15	- - -	- - -	ns	-
NRD(ID)	tRC tRDH tRDL	Read cycle (ID) Control pulse “H” duration (ID) Control pulse “L” duration (ID)	160 90 45	- - -	- - -	ns	When read ID data
NRD(FM)	tRCFM tRDHFM tRDLFM	Read cycle (FM) Control pulse “H” duration (FM) Control pulse “L” duration (FM)	450 90 355	- - -	- - -	ns	When read from frame memory
DB17 to DB0	tDST tDHT tRAT tRATFM tODH	Data setup time Data hold time Read access time (ID) Read access time (FM) Output disable time	10 10 - - 20	- - - - 	- - 100 340 80	ns	For maximum CL=30pF For minimum CL=8pF

Note: The input signal rise time and fall time (tr, tf) is specified at 15 ns or less.
Logic high and low levels are specified as 30% and 70% of IOVCC for input signals.

2) Reset Timing characteristics



Symbol	Parameter	Related Pins	Spec.			Note	Unit
			Min.	Typ.	Max.		
tRESW	Reset low pulse width[1]	NRESET	10	-	-	-	µs
tREST	Reset complete time[2]	-	5	-		When reset applied during STB OUT mode	ms
		-	120	-		When reset applied during STB mode	ms
tPRES	Reset goes high level after Power on time	NRESET & IOVCC	1	-	-	Reset goes high level after Power on	ms

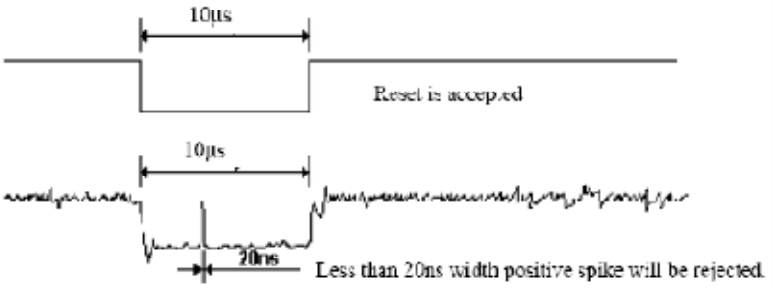
Note: (1) Spike due to an electrostatic discharge on NRESET line does not cause irregular system reset according to the table below.

NRESET Pulse	Action
Shorter than 5 µs	Reset Rejected
Longer than 10 µs	Reset
Between 5 µs and 10 µs	Reset Start

(2) During the resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in STB Out mode. The display remains the blank state in STB –mode) and then return to Default condition for H/W reset.

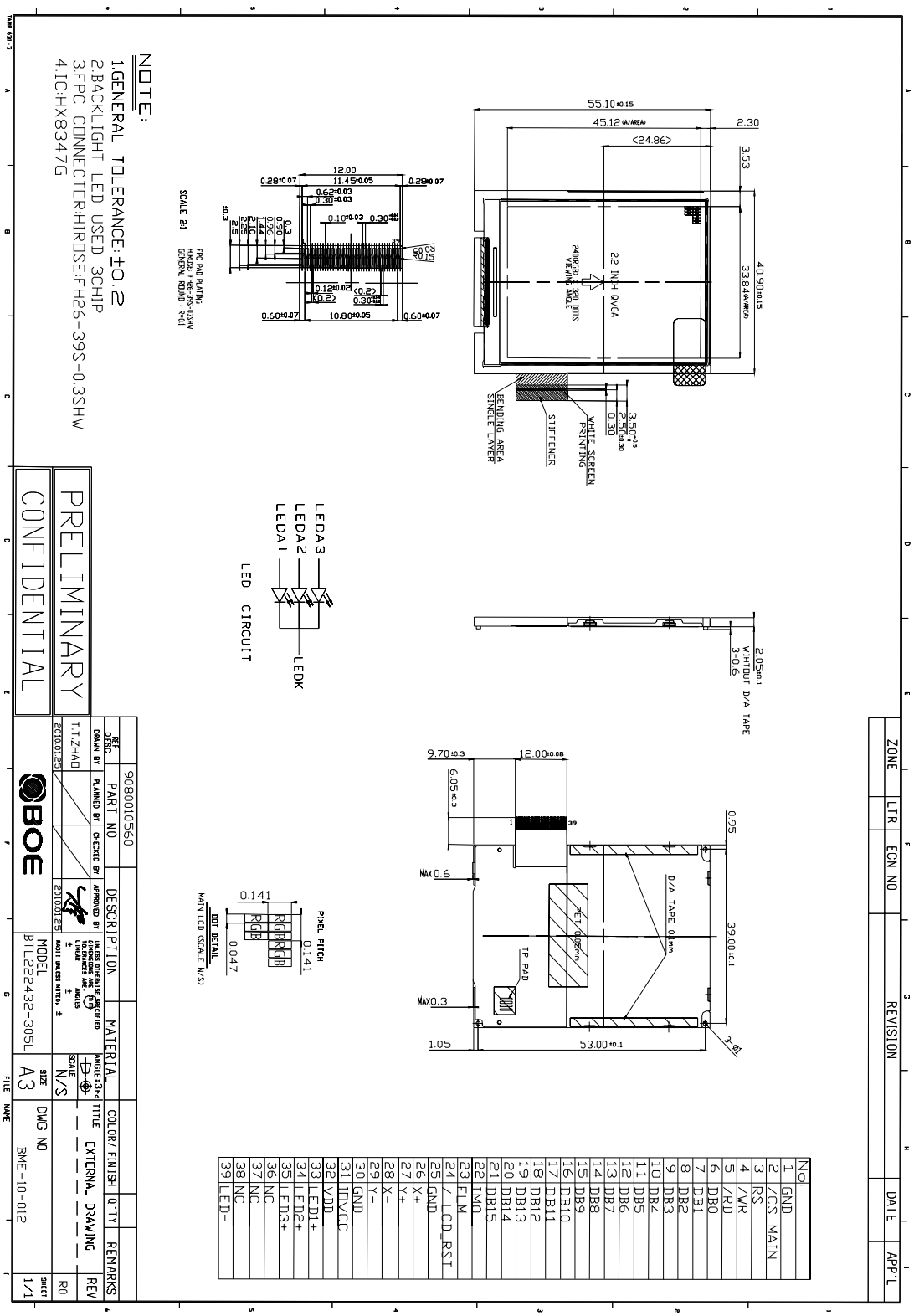
(3) During Reset Complete Time, VMF value in OTP will be latched to internal register during this period. This loading is done every time when there is H/W reset complete time (tREST) within 5ms after a rising edge of NRESET.

(4) Spike Rejection also applies during a valid reset pulse as shown below.



(5) It is necessary to wait 5msec after releasing !RES before sending commands. Also STB Out

12. External Dimension



13. COLOR LCD MODULE NUMBERING SYSTEM

B	T	L	2	2	2	4	3	2	-			3	0	5	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

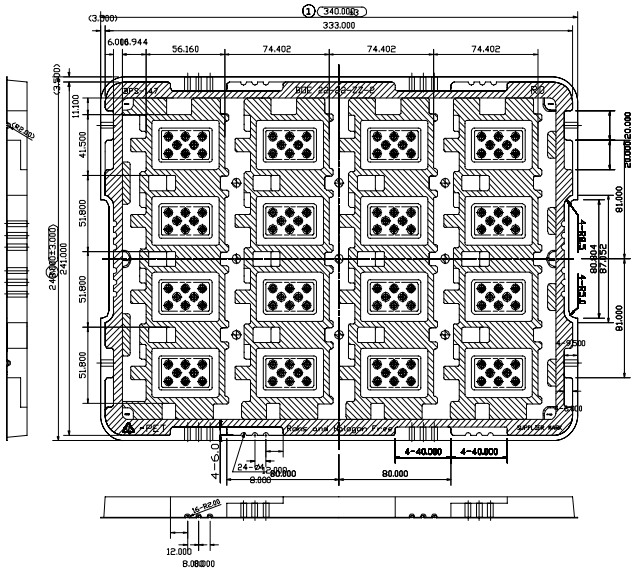
Nil: Single LCD M:MONO C:CSTN T:TFT O:OLED

(10)TOUCH PANEL

Nil:Without TP P:with TP

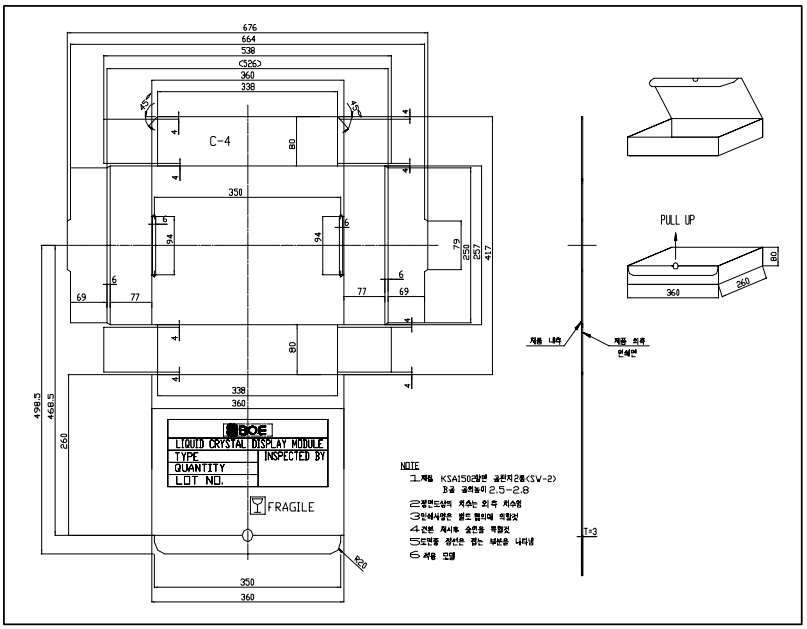
14. Package Terms

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



Tray Drawing

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



Inner Box Drawing

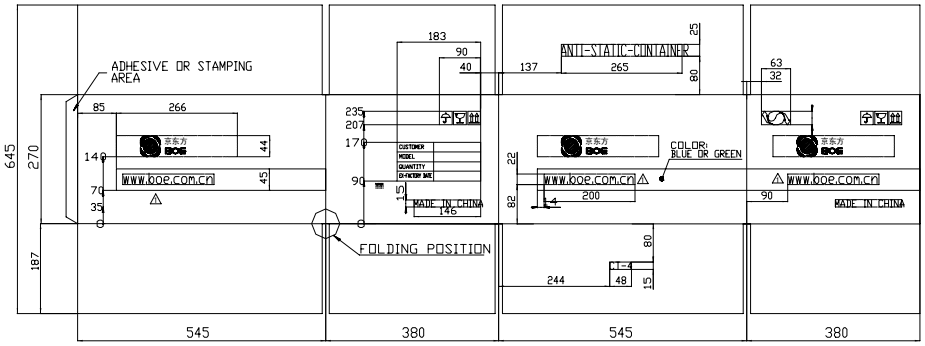
3、Out BOX Size

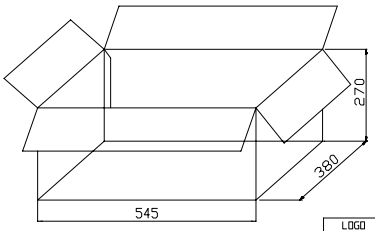
L：545mm

W：380mm

H：270mm

（6pcs Inner / Out）

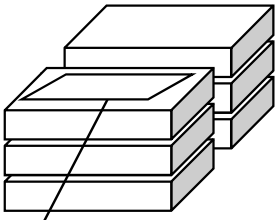




LOGO	COLOR
BOE	BLUE OR GREEN
WWW.BOE.COM.CN	CLEARNESS
OTHERS	BLUE OR GREEN

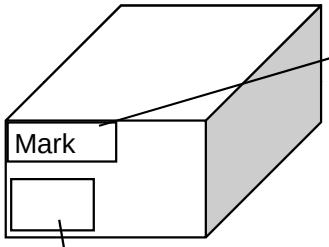
NOTE
1.MATERIAL: KSA 1531,DW2(T=8mm)
2.DRAWING DIMESIONS ARE EQUAL TO OUTSIDE DIMENSION.
3.INNER BOX(C-4) ARRANGEMENT: 3STEPS X?2ROWS
4.MARKS ARE REFER TO SEPERATE CONSULTATION.

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	576
INNER BOX	1	7	96
TRAY	-	1	16

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.

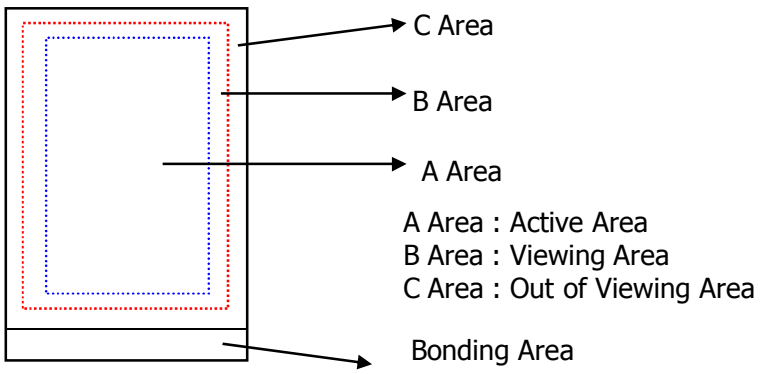
Rank	Item	AQL	Note
Major(MA)	Parts Short, Parts Mounting Back Light, Open Solder Bridging Outside Dimension Solder Ball, Abnormal/No Display	0.65	
Minor (MI)	Stains on LCD Panel Surface Stains, Scratchs, Foreign Substance, Spots, Air Bubbles	1.0	

(3.2) Appearance Standards

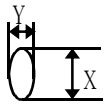
1) Inspection Conditions

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>

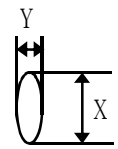
Note : A limitation sample is given top priority

(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.