* Records of Revision *

Rev.	Page	Description of changes	Date	prepared by
O	All	Original Release	2012.03.23	Little Fan

☑ 一般事项　　　□ 特殊事项
特殊事项内容：

* Contents *

Model	BTL221722-276L	3/28	PRODUCT SPECIFICATION

1. Features

The features of BTL221722-276L are as follows

* Display mode   : TFT 262K Colors,Transmissive,Normally White

* Driving Condition : 176x3Ch-Source / 220Ch-Gate

* Connection   : Soldering Type

* LCD Driver & Control IC ： ILI9225B

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

* MPU Interface   : Serial Peripheral Interface

* Type of Surface Condition
                     : Clear Type

2. Mechanical Specifications

Item		Specification	Unit
Resolution	Main	176(x RGB) x 220	Dot
	Sub	NA	
LCM Outline Demension		39.3x54.26x3.35(without D/A tape)	mm
Active Area (W × H)	Main	34.848X43.56	mm
	Sub	NA	
Pixel Pitch (W x H)	Main	0.066X0.198	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		About 12	g

3. Absolute Maximum Ratings

(Ta=25℃ Note1)

Items	Symbol	Min.	Max.	Unit	Remark
Logic voltage	I_{OVCC}	-0.3	3.6	V	
Analoge voltage	V_{CI}	-0.3	4.2	V	
Input signal voltage	V_{IN}	-0.3	Iovcc+0.5	V	
LED forward current	I_{LED}	-	25	mA	For each LED
Operation temeprature	T_{OPR}	-20	70	℃	
Storage temperature	T_{STG}	-30	80	℃	
Humidity (ambient temeprature=Ta)	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	2.8	3.3	V	
Anolog(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}	-11	-	-7	V	
Input signal voltage	High level	V_{IH}	0.7×Iovcc	-	Iovcc	V	
	Low level	V_{IL}	VSSD	-	0.3×Iovcc	V	
current consumption		Icc	-	3	5	mA	Note 2

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

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}	-	-	205	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.
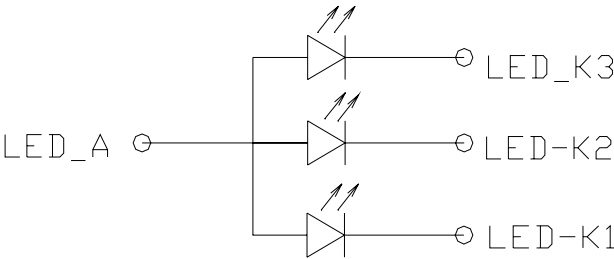
Ref. Total power consumpation(max) depends on LED current/ LED driver efficiency, etc.

7. Optical Characteristics

Transmissive Mode

Ta=25℃

Item		Symbol	Min.	Typ.	Max.	Unit	Condition	Note
Viewing Angle	θ	Ø=0˚ (X1)	-	45	-	deg.	Cr > 10	Note2
		Ø=180˚ (X2)	-	45	-			
		Ø=90˚ (Y1)	-	35	-			
		Ø=270˚ (Y2)	-	15	-			
Contrast ratio (transmissive)		Cr	230	440	-	-	θ = 0 Ø = 0	Note1 Note4
Response Time		Tr + Tf	-	25	-	ms	θ = 0 Ø = 0	Note3
CIE Coordi - nate	R	(x,y)	0.55,0.29	0.59,0.33	0.63,0.37		θ = 0 Ø = 0	
	G	(x,y)	0.29,0.56	0.33,0.60	0.37,0.64			
	B	(x,y)	0.11,0.06	0.15,0.10	0.19,0.14			
	W	(x,y)	0.25,0.27	0.29,0.31	0.33,0.35			
Brightness		L	270	340	-	cd/m2	18mA/LED	Note5
Uniformity			70	-	-		18mA/LED	Note6

* Ø = 0 ˚ , Ø = 90 ˚ ,Ø = 180 ˚ ,Ø = 270 ˚   means viewing direction.
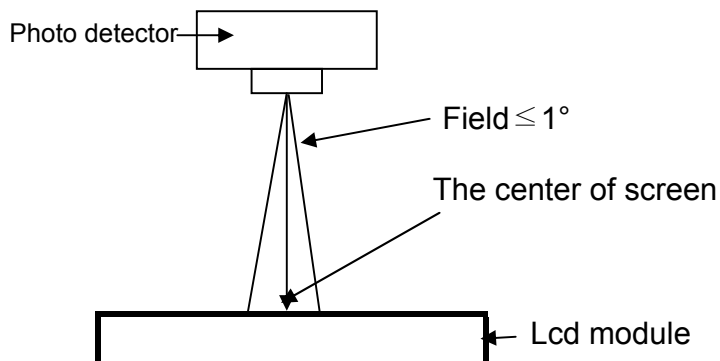
* B/L is turned on.
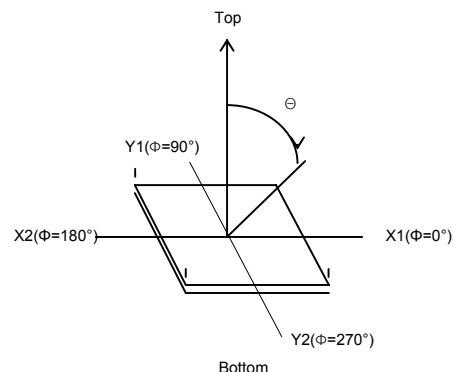
Model	BTL221722-276L	9/28	PRODUCT SPECIFICATION

The optical characteristics should be measured in dark room,and after 5 minutes operation, the measurment begin.
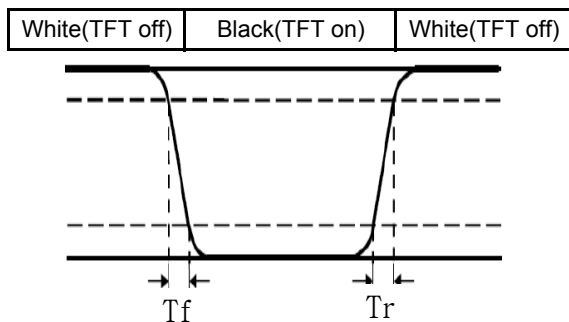
Note1. Definition of Measure System

Photo detector

Field ≤ 1°

The center of screen

Lcd module

Note2. Definition of Angle Θ.

Top

Θ

Y1(Φ=90°)

X2(Φ=180°)

X1(Φ=0°)

Y2(Φ=270°)

Bottom

Note3. Definition of Response Time

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

Tf   Tr

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)

W/6   W/3 W/3   W/6

H/6

H/3

H/3

H/6
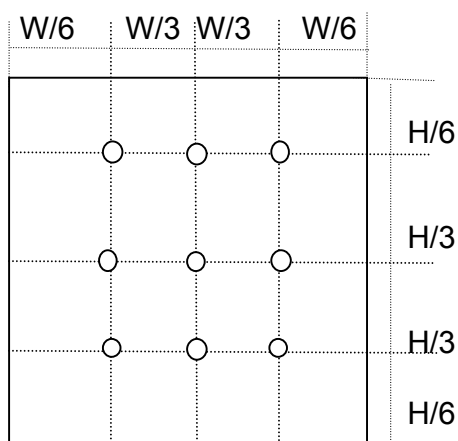
Rating is defined as the average

brightness inside the viewing area

Note 6. definition of Uniformity

$$Uniformity= \frac{\text{max. Liuminance of measurede point}}{\text{max. Liuminance of measurede poin}}$$
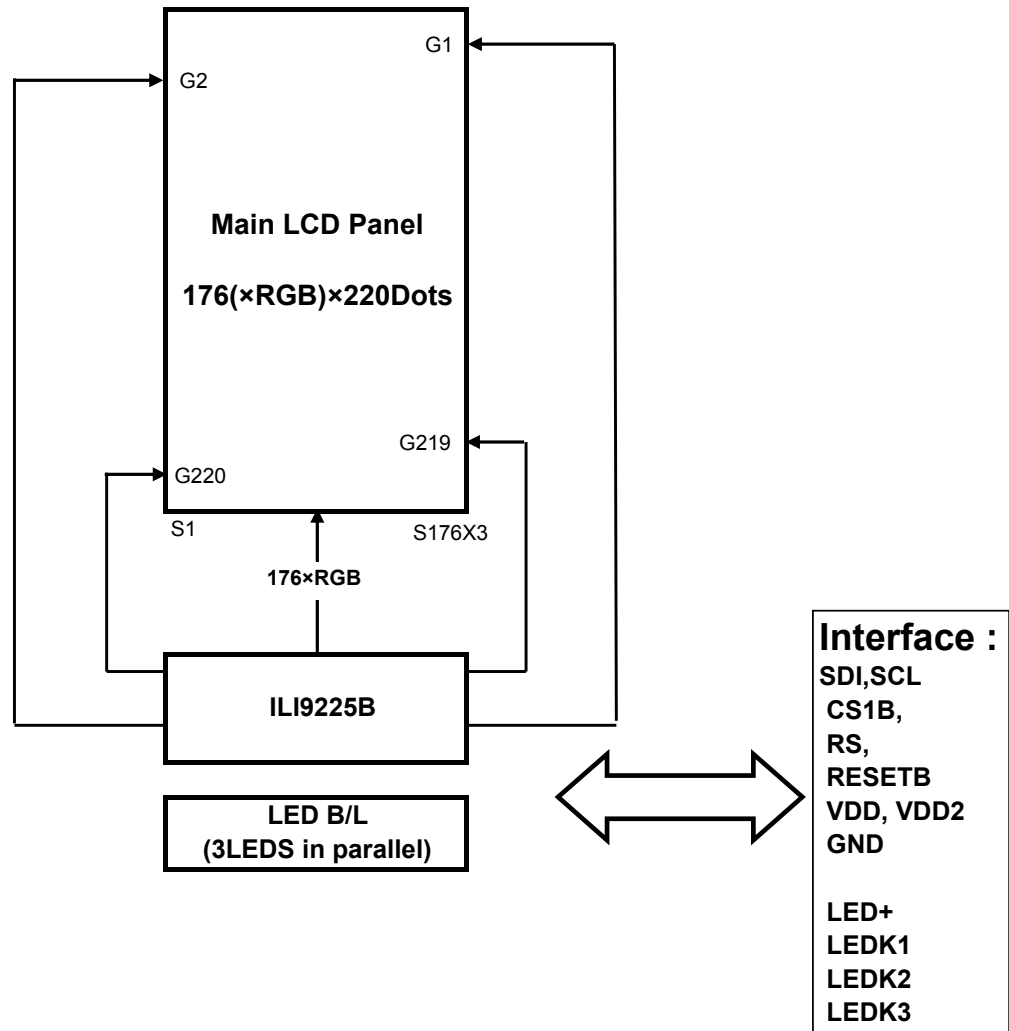
| Model | BTL221722-276L | 10/28 | PRODUCT SPECIFICATION |

8. Block Diagram

```
                              G1  ◄─────────────┐
        ┌──────────────►  G2                    │
        │           ┌──────────────────────┐    │
        │           │                      │    │
        │           │   Main LCD Panel      │    │
        │           │                      │    │
        │           │  176(×RGB)×220Dots    │    │
        │           │                      │    │
        │           │             G219  ◄──┐│    │
        │      ┌───► G220                  ││    │
        │      │    │S1          S176X3    ││    │
        │      │    └──────────────────────┘│    │
        │      │          ▲                 │    │
        │      │      176×RGB               │    │
        │      │    ┌──────────────────────┐│    │
        │      └────│      ILI9225B         │────┘
        └───────────│                      │
                    └──────────────────────┘
                    ┌──────────────────────┐
                    │      LED B/L          │        ◄════════►
                    │  (3LEDS in parallel)  │
                    └──────────────────────┘
```

Interface :
SDI,SCL
 CS1B,
 RS,
 RESETB
 VDD, VDD2
 GND

 LED+
 LEDK1
 LEDK2
 LEDK3

Model	BTL221722-276L	11/28	PRODUCT SPECIFICATION

9. Interface Pin Assignment

No	Symbol	Description
1	NC	No Connection
2	CS	Chip Select Signal(low active)
3	SCL	Serial clock
4	SDI	Serial data input/output PIN
5	RS	Register Subselect Terminal
6	RESET	Hardware Reset Signal
7	VSS	Ground
8	VDD	VCI,Power Supply 2.8-3.3V
9	VDD2	VDD,Power Supply for Internal Logic(2.8-3.3V)
10	LED+	LED Anode(+)
11	LEDK1	LED Cathode(-)
12	LEDK2	LED Cathode(-)
13	LEDK3	LED Cathode(-)
14	YD	Y-
15	XR	X+
16	YU	Y+
17	XL	X-
18	NC	No Connection

External Dimension

No	Symbol
1	NC
2	CS
3	SCL
4	SDI
5	RS
6	RESET
7	VSS
8	VDD
9	VDD2
10	LED+
11	LEDK1
12	LEDK2
13	LEDK3
14	YD
15	XR
16	YU
17	XL
18	NC

LED CIRCUIT DIAGRAM

DOTS DEATIL'A'
MAIN TFT LCD(N/S)

176(RGB)×220 DOTS
(TFT 2.2"QCIF+)

VIEWING DIRECTION
TRANSMISSIVE

BENDING AREA

NOTES:
1.GENERAL TOLERANCE ±0.2
2.BACKLIGHT; 3 CHIP WHITE LED

Model	BTL221722-276L	13/28	PRODUCT SPECIFICATION

REVISION
CHANGE DIMENSION

DESCRIPTION
PART NO 9080010531
TITLE EXTERNAL DRAWING
DWG NO BME-09-153
SIZE A3
REV R1
SHEET 1/1
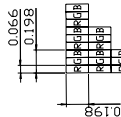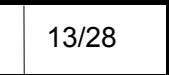
10. Power Supply Sequence

tRPW= +/- no limit

tFPW= +/- no limit

IOVCC

VCI

Time when the latter signal rises up to 90% of its typical value

Time when the former signal falls down to 90% of its Typical value

tRPWNCS = +/- no limit

tFPWNCS = +/- no limit

NCS   H or L

tRPWNRES= + no limit

tFPWNRES1 = min120ms

NRESET
(Power down in sleep out mode)

tRPWNRES= + no limit

NRESET
(Power down in sleep in mode)

tFPWNRES2 = min0ns

tFPWNRES1 is applied to NRESET falling in the Sleep Out Mode
tFPWNRES2 is applied to NRESET falling in the Sleep In Mode

Power source IOVCC, VCI can be applied and powered down in any order.

IOVCC, VCI can be powered down in any order.

During power off, if LCD is in the Sleep Out mode, IOVCC, VCI must be powered down minimum 120msec after NRESET has been released.

During power off, if LCD is in the Sleep In mode, IOVCC, VCI can be powered down minimum 0msec after NRESET has been released.

NCS can be applied at any timing or can be permanently grounded. NRESET has priority over NCS.

Note: (1) There will be no damage to the display module if the power sequences are not met.
 (2) There will be no abnormal visible effects on the display panel during the Power On/Off Sequences.
 (3) There will be no abnormal visible effects on the display between end of Power on Sequence and before receiving Sleep Out command. Also between receiving Sleep In command and Power Off Sequence.

| Model | BTL221722-276L | 13/28 | PRODUCT SPECIFICATION |

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

1）Read/Write Timing
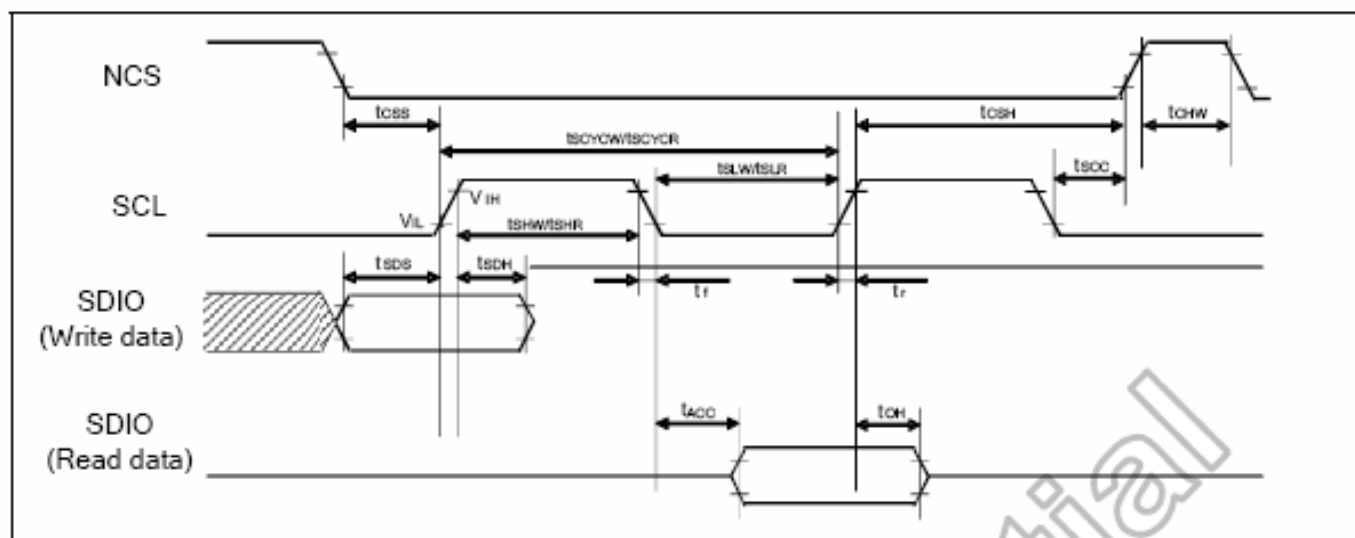
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Serial clock cycle (Write)	tscycw		66		-	
SCL "H" pulse width (Write)	tsHW	SCL	15		-	ns
SCL "L" pulse width (Write)	tsLW		15		-	
Data setup time (Write)	tsDS	SDIO	10		-	ns
Data hold time (Write)	tsDH		10		-	
Serial clock cycle (Read)	tscycR		150		-	
SCL "H" pulse width (Read)	tsHR	SCL	60		-	ns
SCL "L" pulse width (Read)	tsLR		60		-	
Access Time	tACC	SDI for maximum C$_L$=30pF For minimum C$_L$=8pF	10		50	ns
Output disable time	toH	SDO For maximum C$_L$=30pF For minimum C$_L$=8pF	15		50	ns
SCL to Chip select	tscc	SCL, NCS	20			ns
NCS "H" pulse width	tcHW	NCS	40			ns
Chip select setup time	tcss	NCS	15		-	ns
Chip select hold time	tcsH		15		-	

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.

Model	BTL221722-276L	14/28	PRODUCT SPECIFICATION
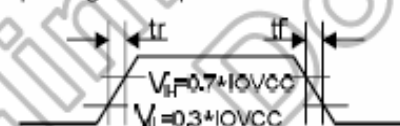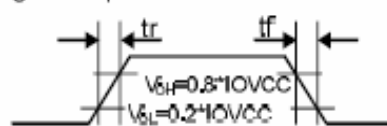
2) Reset Timing characteristics
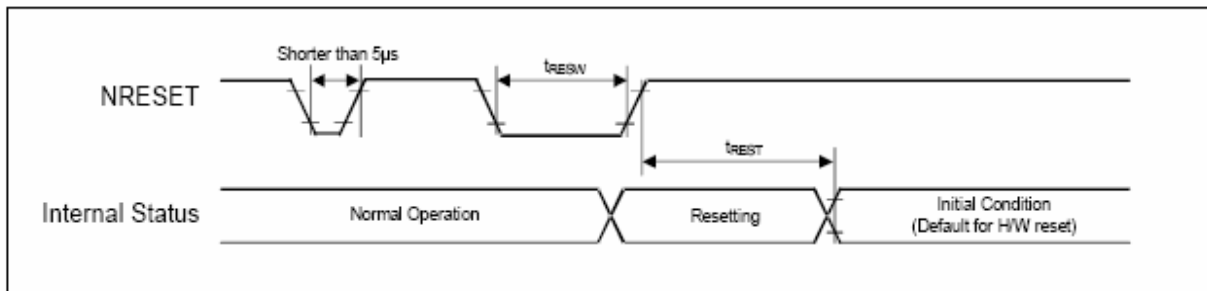
Figure 11. 6 Reset Input Timing

Symbol	Parameter	Related Pins	Min.	Typ.	Max.	Note	Unit
t_{RESW}	*1) Reset low pulse width	NRESET	10	-	-	-	µs
t_{REST}	*2) Reset complete time	-	-	-	5	When reset applied during Sleep In mode	ms
		-	-	-	120	When reset applied during Sleep Out mode	ms

Note:
1. Spike due to an electrostatic discharge on !RES line does not cause irregular system reset according to the following table.

NRESET Pulse	Action
Shorter than 5 µ	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 Sleep Out –mode. The display remains the blank state in Sleep In –mode) and then return to Default condition for H/W reset.
3. During Reset Complete Time, ID2 and VCOMOF 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 RESET.
4. Spike Rejection also applies during a valid reset pulse as shown as below:
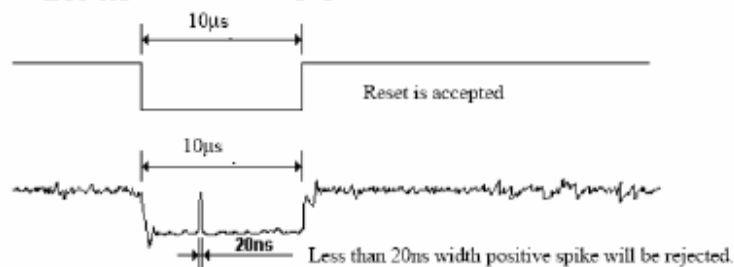
5. It is necessary to wait 5msec after releasing RESET before sending commands. Also Sleep Out command cannot be sent for 120msec.

Model	BTL221722-276L	15/28	PRODUCT SPECIFICATION

13.COLOR LCD MODULE NUMBERING SYSTEM

B	T	L	2	2	1	7	2	2	-			2	7	6	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

Model	BTL221722-276L	17/28	PRODUCT SPECIFICATION

14. Package Terms

1、Tray Size
   L:340mm
   W:248mm
   （12 **PCS LCM/Tray**）

Tray Drawing

2、Inner BOX Size
   L:360mm
   W:260mm
   H:80mm

（**7pcsTray/ Inner Box**）

   Note: there's one empty
   tray in every inner box.

Inner Box Drawing

Model	BTL221722-276L	18/28	PRODUCT SPECIFICATION

3、Out BOX Size
　　L：545mm
　　W：380mm
　　H：270mm
　　（6pcs Inner / Out）

ADHESIVE OR STAMPING AREA

FOLDING POSITION

ANTI-STATIC-CONTAINER

CUSTOMER
MODEL
QUANTITY
EX-FACTORY DATE

MADE IN CHINA

COLOR:
BLUE OR GREEN

WWW.BOE.COM.CN

MADE IN CHINA

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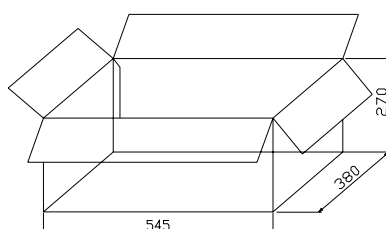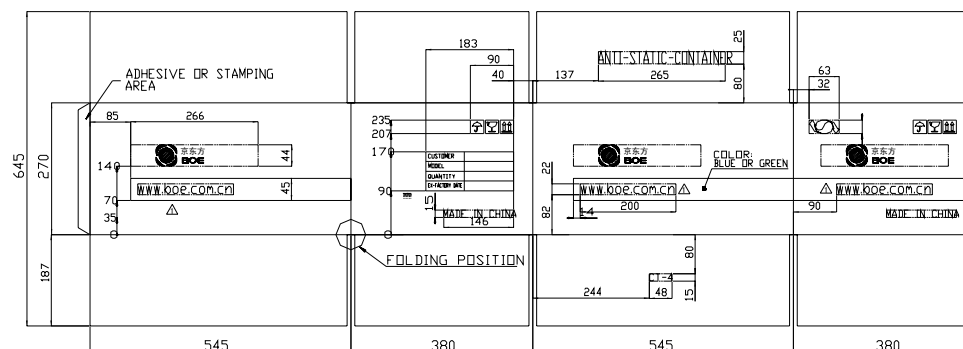
NOTE
1.MATERIAL: KSA 1531,DW2(T=8mm)
2.DRAWING DIMESIONS ARE EQUAL TO OUTSIDE DIMENSION.
3.INNER BOX(C-4) ARRANGEMENT: 3STEPS X?2ROWS
4.MARKS ARE REFER TO SEPERATE CONSULTATION.

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

4、Packing label content
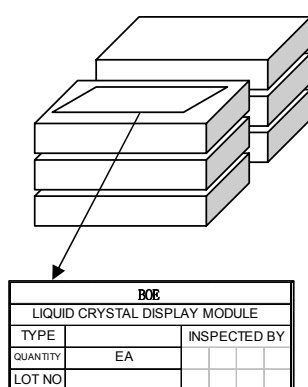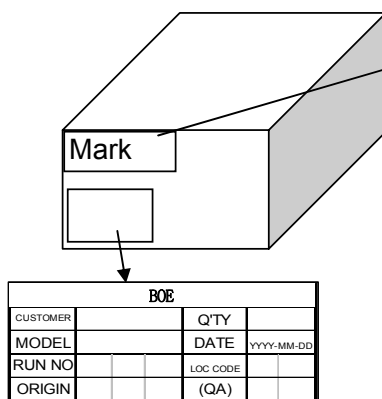
Mark

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

Mark Item

BOE		
LIQUID CRYSTAL DISPLAY MODULE		
TYPE		INSPECTED BY
QUANTITY	EA	
LOT NO		

Inner Box

BOE			
CUSTOMER		Q'TY	
MODEL		DATE	YYYY-MM-DD
RUN NO		LOC CODE	
ORIGIN		(QA)	

OUT BOX

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	432
	INNER BOX	1	7	72
		TRAY	-	1	12

Model	BTL221722-276L	19/28	PRODUCT SPECIFICATION

15. 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, Apply Level II,
   normal inspection by single sampling.

Rank	Item	AQL	Note
Major(MA)	Segment Short	0.65	
	Segment Missing		
	Solder Bridging		
	Outside Dimension		
	Cold Solder		
Minor (MI)	Black Spots, Foreign Substance, White Spots, Pinhole, Segment Deformation Air Bubbles between Glass & Polarizer, Scratchs(Glass & Polarizer), Color Variation, Solder Ball, Misalignment	1.0	

Note) AQL- Acceptable Quality Level

(3.2) Appearance Standards
   1) Inspection Conditions
   The LCD shall be inspected under 20W white fluorescent lamp light.
   The distance between the eyes and the sample shall be 30cm.
   All directions for inspecting the sample should be within 30º to perpendicular line.
   2) Definition of the Area
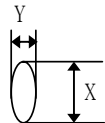
C Area

B Area

A Area

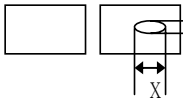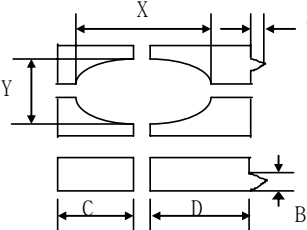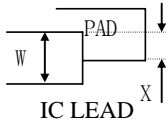A Area : Active Area
B Area : Viewing Area
C Area : Out of Viewing Area

Bonding Area
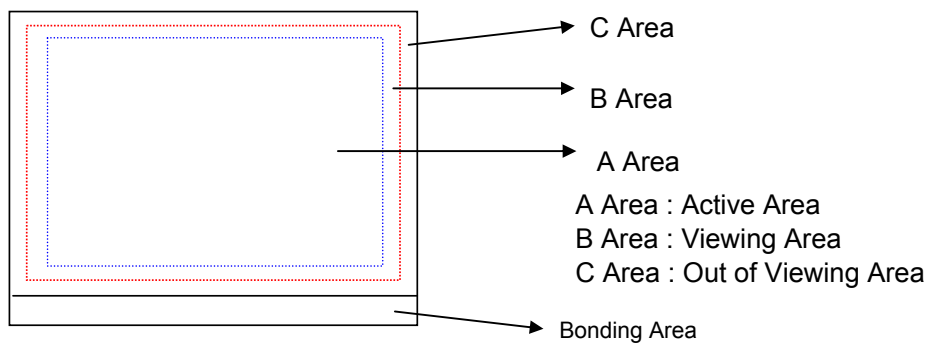
Model	BTL221722-276L	20/28	PRODUCT SPECIFICATION

(3.3) Apperance Spec

No	Item	Criteria	Rank	Remark
1	Segment Short Segment Missing	Not allowed	MA	
2	Solder Bridging	Any bridging between components, except common circuit, is not allowed.	MA	
3	Outside Dimension	Drawing & specification must be within permitable tolerance.	MA	
4	Cold Solder	Cold solder is not allowed.	MA	
5	Black(White) Spots, Foreign Substances	1) Round Type (see below); 2) Liner Type (see below)	MI	Y / X ** : Mean Diameter $(X + Y)/2$
6	OC Spot	(see below)	MI	
7	Air Bubles Between Glass & Polarizer (Polarizer Defects)	(see below)	MI	

Item 5 — 1) Round Type

Area Dimension**	Acceptable Q'ty A Area	Acceptable Q'ty B Area	Remark
≤ 0.1	Ignore		
≤ 0.2	2	Ignore	
≤ 0.3	1	Ignore	
0.3 <	0	Ignore	

Item 5 — 2) Liner Type

Length	Width	Acceptable Q'ty A Area	Acceptable Q'ty B Area	Remark
-	≤ 0.025	Ignore		
≤ 2.5	≤ 0.05	3	Ignore	
≤ 1.5	≤ 0.075	2	Ignore	
	0.075 <	Follow round type		

At (1) & (2) total defect q'ty is must not exceed 5 pieces.

Item 6 — OC Spot

Area Dimension**	Acceptable Q'ty A Area	Acceptable Q'ty B Area	Remark
≤ 0.2	Ignore		
≤ 0.8	3	Ignore	
≤ 1.0	1	Ignore	

Item 7 — Air Bubles Between Glass & Polarizer

Area Dimension**	Acceptable Q'ty A Area	Acceptable Q'ty B Area	Remark
≤ 0.15	Ignore		
≤ 0.3	3	Ignore	
≤ 0.5	2	Ignore	
≤ 0.7	1	Ignore	
Total	5	Ignore	
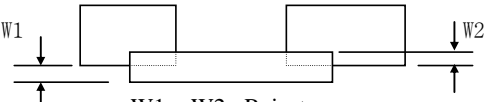
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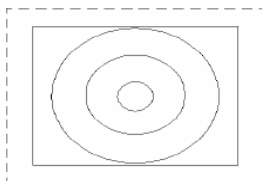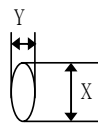
(3.3) Appearance Spec

No	Item	Criteria	Rank	Remark
8	Pin hole (On Segment)	$(X+Y)/2 \leq 0.2\text{mm}$ Within 1 per one segment (Less than 0.1mm is not counted) Total defects q'ty is must not exceed 5 pieces.	MI	
9	Segment Deformation	$(X+Y)/2 \leq 0.2\text{mm}$ $A \leq 0.2\text{mm}$ $B \leq 0.2\text{mm}$ $(C-D) \leq 0.2\text{mm}$ _Acceptable Q'ty:_ Dot, Segment — 1; LCD — 5; ≤ 0.1 — Ignore all defect Each visible dot must be more than half effective dot area	MI	$(X + Y)/2$ $\leq 0.2\text{mm}$
10	Color Variation	Within the three colors, except LCD Standard color is acceptable.	MI	
11	Glass & Polarizer Scratch	Follow NO.5(2) condition	MI	
12	Solder Ball	1)Acceptable if the size of void is less than 0.18mm 2)Acceptable if a solder ball is not movable 3)Rejectable if the solder ball exceed 5EA in 2.54×2.54 mm area.	MI	
13	Miss Alignment	1)Acceptable if it dose not exceed 50% of the lead width IC. $X \leq W/2$: Accept $X > W/2$: Reject 2)Rejectable, provided that it does exceed 50% of the component termination width. W1 > W2 : Reject		

Note : A limitation sample is given top priority

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(3.3) Appearance Spec

No	Item	Criteria	Rank	Remark
14	Touch Panel	1) Round Type、Foreign Substances	MI	

1) Round Type、Foreign Substances

Area Dimension**	Acceptable Q'ty		Remark
	A Area	B Area	
≤ 0.1	Ignore		
≤ 0.2	2	Ignore	
≤ 0.3	1	Ignore	
0.3 <	0	Ignore	

** : Mean Diameter (X + Y)/2

2) Liner Type & Scratch

Dimension		Acceptable Q'ty		Remark
Length	Width	A Area	B Area	
-	W≤0.025	Ignore		Ignore
L≤3.0	W≤0.05	Ignore		
3.0<L≤5.0		2		
≤ 7	W≤0.1	1		
-	W>0.1	Follow round type		

3) Newton Ring
 a)Regular

The area of the Newton ring is more than 1/3area of the touch panel It's NG.
The area of the Newton ring is less than 1/3 area of the touch panel It's OK.

 b)None-regularity

The area of the Newton ring is more than 1/2area of the touch panel It's NG.
The area of the Newton ring is less than 1/2 area of the touch panel It's OK.

(4.0) Reliability Condition

Item	Content
Room Temperature Operation	50,000 hrs

(4.1) Reliability Test - Module Middle Reliability

No.	Item	Condition	Test Time	Sample Numbers	Creteria (Acc/Rej)	Note
1	High Temp Operation	70 ± 2℃	120 hrs	3	0/1	
2	High Temp Storage	80 ± 2℃	120 hrs	3	0/1	
3	Low Temp Operation	-20 ± 2℃	120 hrs	3	0/1	
4	Low Temp Storage	-30 ± 2℃	120 hrs	3	0/1	
5	High Humidity Storage	60℃ 90%rh	120 hrs	3	0/1	
6	Thermal Shock	-25℃(0.5h) ↔ 70℃(0.5h)	20cycle	3	0/1	
7	Vibration Test	To be measured after subjecting to total fixed amplitude of 1.5mm vibrating frequency 10 to 55Hz, one cycle 60 seconds to direction of X,Y,Z for each 15 minutes,(Total 45minutes) and after removing vibration(Non-operation state)				
8	Shock Test (Drop Test)	To be measured after dropping from 60cm high onto steel board of 15mm thick and from 3 direction X,Y,Z each one time (Non-Operation State)				
9	ESD	- Condition:150pf, 330Ω, ±8KV, 5 times Air Discharge (ESD which is made by above condition should be shot on LCD glass panel, not other's area(such as on IC and so on) - After testing, cosmetic and electrical defects should not happen. - Total current consumption should be below double of initial value. - In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.				

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(4.2) Criteria

a. No. 1 ~ 8 : No changes for indication and appearance.

b. No. 1 ~ 3, 5 ~ 8 : Leave the all samples under room temperature 4 hours after reliability test ends.

c. No. 4 : Leave the all samples under room temperature 12 hours after reliability test ends.

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16. BHL&BMDT Customer Quality Service Process

In order to provide better service to 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 place appointed by Customer.
2. Customer will do IQC for the incoming product.
3. Inspection standard should be provided by BHL&BMDT, and it will be valid 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 information 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 defects found by Customer.
6. BHL&BMDT should cooperate with Customer for special quality requirement.
7. After confirmed by both side, BHL&BMDT should be responsible for the defect products which caused by its quality problem. BHL&BMDT should take back the confirmed defect product and return the good product to the place required by 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 with friendly cooperative policy. And both parties should negotiate to deal with the defect products of which the responsibility is not very clear.

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17. LCD Module Operation Instruction

BHL&BMDT

Part I. How to use the LCD Module

1. Don't hit the LCD Panel in any way because the LCD is made of glass.
2. Don't clean the surface of LCD with hard things. Please clean LCD with Air-gun or very soft cloth when necessary. The protective film on the POL can be removed just before assembly, otherwise, dust, spit or other foreign matter may attached on the LCD under the protective film. After the protective film is removed, only air-gun can be used to remove any dust or foreign matter. Fingure or cloth MUST NOT be used in such cases.
3. No chemical liquid is allowed to clean the LCD, such as alcohol, acetone and IPA. All of these can damage the LCD. Water on the LCD must be cleaned as soon as possible, for it will cause POL color change or other defect.
4. Please move and assemble LCD very carefully during assembly, and don't push or twist it.
5. Don't damage the FPC of LCD module. It will cause permanent defect.
6. Don't disassemble LCD module. It will cause permanent defect.
7. Don't expose LCD module under sunshine, strong fluorescence or ultraviolet radiation.
8. Please make sure that operators wear static-protective bands effectively and working tables are effectively earthing during operation.
9. 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.
10. Don't twist, disassemble, squeeze or hit the PCB. It will damage the circuit or component on PCB and cause functional defect.
11. Please use the connector according to the instruction provided by BHL&BMDT.
12. 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.
13. Sealing operation on PCB must be very careful to avoid short or cut the original circuit on PCB. Otherwise, it will cause permenant damage to the LCD.
14. Don't add direct DC or high voltage to LCD panel. It will cause functional damage to the LCD or shorten the life of LCD product.
15. 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, don't use LCD product in extrem temperature.
16. Don't push the display area of LCD panel, it will cause abnormal display. This doesn't mean LCD functional defect, neither. LCD will display normally in regular temperature.
17. Electrical test of LCD product is made by using mobile phone provided by Customer. We can use special test equipment to do the test, also.
18. The black band on IC on LCD product is used to protect the IC from light. Please do NOT remove it.
19. Please take great care to use connector. Customer should be responsible for connector defect caused by operation on Customer side.

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Part II Storage

1. Physical status of liquid crystal will change in extrem temperature, and it can not be resumed when the temperature returns to be normal. So LCD module should be stored in required temperature.
2. 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. Don't expose LCD module under sunshine, strong fluorescence or ultraviolet radiation for a long time. It should be stored in dark area.
4. LCD should be stored in static-protective polythene bag. Don't expose it in the air for a long time.

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