

PRODUCT SPECIFICATION

MODEL NO: SEL018QQAB0

< ◇ > PRELIMINARY SPECIFICATION

< ◆ > APPROVAL SPECIFICATION

CUSTOMER
APPROVED BY
DATE:

DESIGNED	CHECKED	APPROVED

REVISION STATUS

Version	Revise Date	Page	Content	Modified by
V1.0	2010.11.24	-	First Issued.	Iris

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1. GENERAL DESCRIPTION

1.1 DESCRIPTION

The specifications is a transmissive type color active matrix liquid crystal display (LCD) which uses amorphous thin film transistor (TFT) as switching devices. This product is composed of a TFT LCD panel, driver ICs , and a backlight unit. The following table described the features of SEL018QQAB0.

1.2 FEATURES:

No.	Item	Specification	Unit
1	Panel Size	1.8"	inch
2	Number of Pixels	128(W) × RGB × 160(H)	pixels
3	LCD Active Area	28.03(W) x35.04(H)	mm
4	Pixel Pitch	0.2189(RGB)(W) x 0.2189(H)	mm
5	Outline Dimension	34.(W) x 47(H) x 2.5(D)	mm
6	Number of Colors	65/262K	-
7	Display Mode	TN / Normally White / Transmissive	-
8	Viewing Direction	12 o'clock	-
9	Interface	8-bits data bus (I80 system interface)	-
10	Backlight	White LED	-
11	Driver IC	ILI9163C	-
12	Operation Temperature	-20~70	°C
13	Storage Temperature	-30~80	°C
14	Weight	TBD	g

3. PIN DESCRIPTION

Table 2: Pin assignment

Pin No.	Symbol	Description
1	VSS	Ground
2	XL	The signal ports for Touch panel(Dummy)
3	YU	
4	XR	
5	YD	
6	VSS	
7	VDD	Power supply for analog and logic circuits(2.8V)
8	/CS	Chip select pin
9	/RS	Register select signal. 0:index register; 1: data register
10	WR	Write signal and write data when it is low
11	RD	Read signal and read data out when it is low
12-19	DB0-DB7	Data bus 0-7
20	/RESET	Chip reset signal
21	GND	Ground
22-23	LED-A	Power supply for LED-A
24	NC	DUMMY
25	LED-K	Power supply for LED-K

4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min	Max.		
Supply Voltage for Source Driver	V _{CC}	-0.3	4.0	V	
	V _{DDIO}	-0.3	3.6	V	

Note:

1. IOVCC, VCC, GND must be maintained.
2. The modules may be destroyed if they are used beyond the absolute maximum ratings.

4.2 ENVIRONMENTAL CONDITION

Item	Operating temperature (Topr)		Storage temperature (TSgt) (Note 1)		Remark
	Min.	Max.	Min.	Max.	
Ambient temperature	-20°C	+70°C	-30°C	+80°C	Dry
Humidity (Note 1)	80% max. RH for Ta ≤ 40°C < 50% RH for 40°C < Ta ≤ Maximum operating temperature				No condensation

Note 1: Product cannot sustain at extreme storage conditions for long time.

4.2 DC ELECTRICAL CHARACTERISTICS

4.2.1 OPERATING CONDITIONS

Typical Operating Conditions (Ta=25°C)

Typical Electrical Characteristics

At Ta = 25 °C, VCC=2.5V to 3.3V, IOVCC= 1.65V to 3.3V, GND=0V.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (analog)	VCC-GND		2.5	2.8	3.3	V
Supply voltage (logic)	IOVCC-GND		1.65	1.8/2.8	3.3	V
Supply current (Logic & LCD)	ICC	VCC=2.8V	-	-	10	mA
Supply voltage of white LED backlight	VLED = V(BL+) - V(BL-)	Forward current = 40mA	3.0	3.2	3.4	V
Luminance (on the module surface)		Number of LED dies = 2	-	180	-	cd/m ²

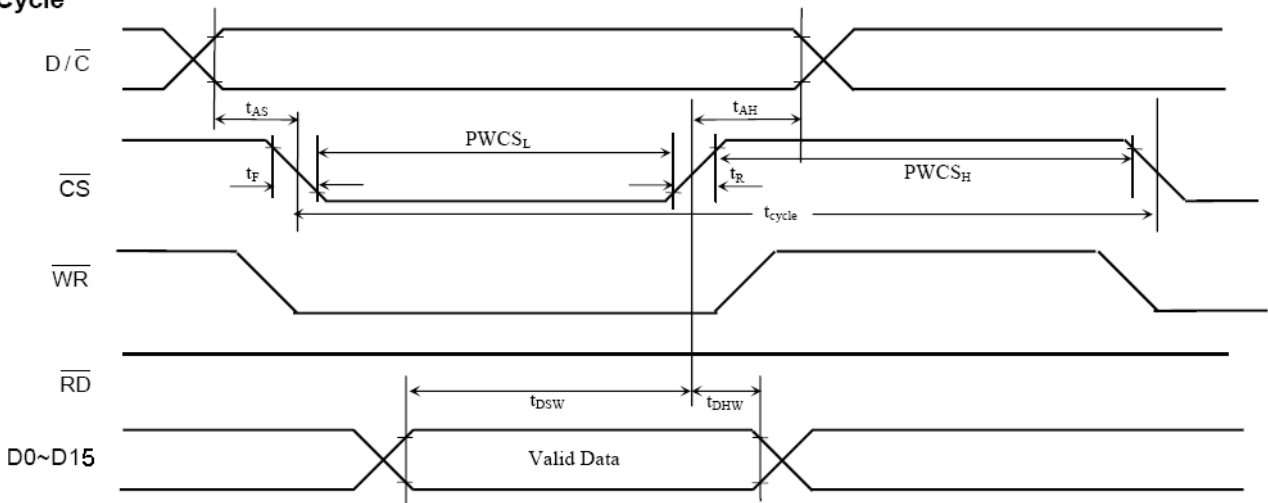
4.3 TIMING CHARACTERISTICS

4.3.1 80-system Bus Interface Timing Characteristics of IC

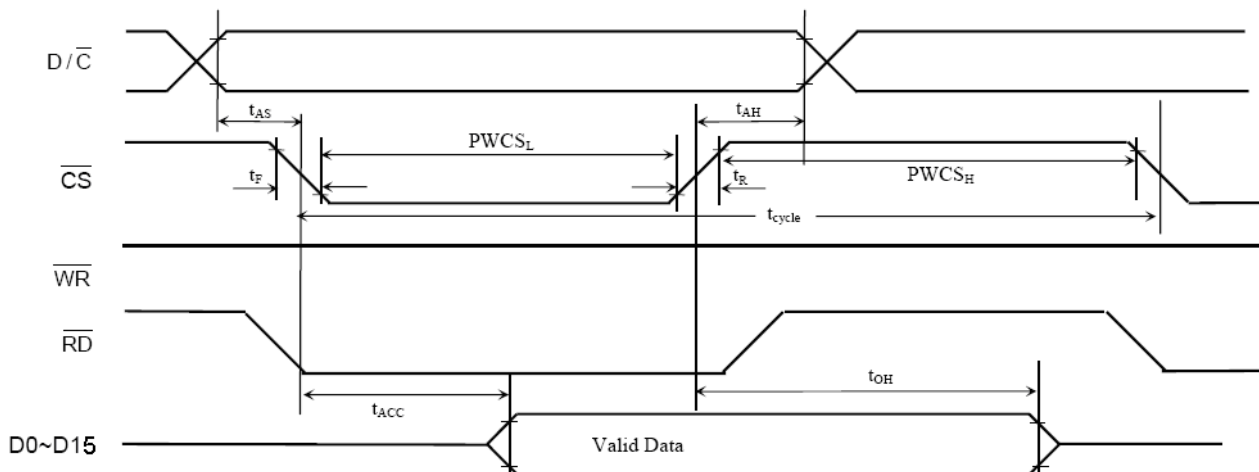
Table 8: Normal Write Mode (VCC= 2.5~3.3V)

Symbol	Parameter	Min	Typ	Max	Unit
t_{cycle}	Clock Cycle Time (write cycle)	100	-	-	ns
t_{cycle}	Clock Cycle Time (read cycle)	1000	-	-	ns
t_{AS}	Address Setup Time	0	-	-	ns
t_{AH}	Address Hold Time	0	-	-	ns
t_{DSW}	Data Setup Time	5	-	-	ns
t_{DHW}	Data Hold Time	5	-	-	ns
t_{ACC}	Data Access Time	250	-	-	ns
t_{OH}	Output Hold time	100	-	-	ns
PWCS _L	Pulse Width /CS low (write cycle)	50	-	-	ns
PWCS _H	Pulse Width /CS high (write cycle)	50	-	-	ns
PWCS _L	Pulse Width /CS low (read cycle)	500	-	-	ns
PWCS _H	Pulse Width /CS high (read cycle)	500	-	-	ns
t_R	Rise time	-	-	4	ns
t_F	Fall time	-	-	4	ns

Write Cycle



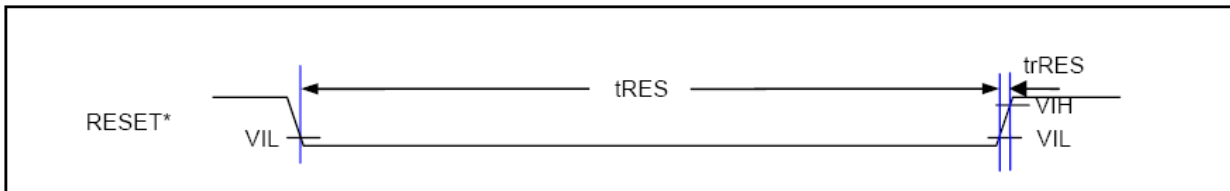
Read Cycle



4.3.2 Reset Operation of IC

Table 9: Reset Timing Characteristics (VCC = 2.5~3.3V, IOVCC=1.65~3.3V)

Item	Symbol	Unit	Min.	Typ.	Max.
Reset low-level width	tRES	ms	1	-	-
Reset rise time	trRES	μ s	-	-	10



6. OPTICAL CHARACTERITICS

6.1 SPECIFICATION

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state with the methods shown in Note.1.

Items	Symbol	Condition	Specifications			Unit
			Min.	Typ.	Max.	
Contrast Ratio	CR		-	250	-	-
Response Time	T_R		-	10	10	ms
	T_F		-	15	20	ms
Chromaticity	Red	X_R	0.633	0.653	0.673	-
		Y_R	0.311	0.331	0.351	-
	Green	X_G	0.291	0.311	0.331	-
		Y_G	0.554	0.574	0.594	-
	Blue	X_B	0.114	0.134	0.154	-
		Y_B	0.114	0.134	0.154	-
	White	X_W	0.288	0.308	0.328	-
		Y_W	0.322	0.342	0.362	-
Viewing angle	Hor.	$\phi 1(3 \text{ o'clock})$	-	45	-	deg.
		$\phi 2(9 \text{ o'clock})$	-	45	-	
	Ver.	$\theta 2(12 \text{ o'clock})$	-	30	-	
		$\theta 1(6 \text{ o'clock})$	-	20	-	
NTSC ratio			61		%	

Note

Note 1: Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

L63: Luminance of gray level 63

L0: Luminance of gray level 0

$$\text{CR} = \text{CR} (10)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note 5.

Note 2: Definition of Response Time (T_R , T_F):

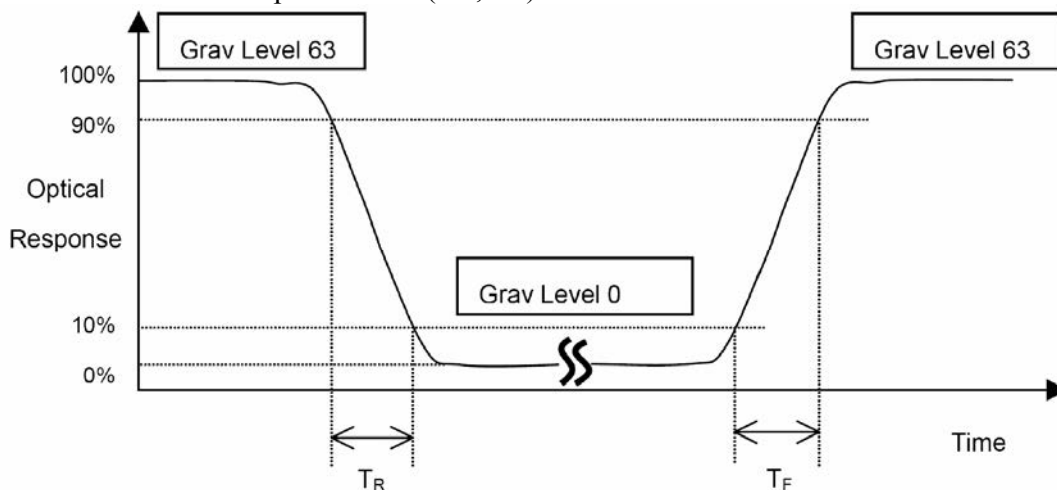
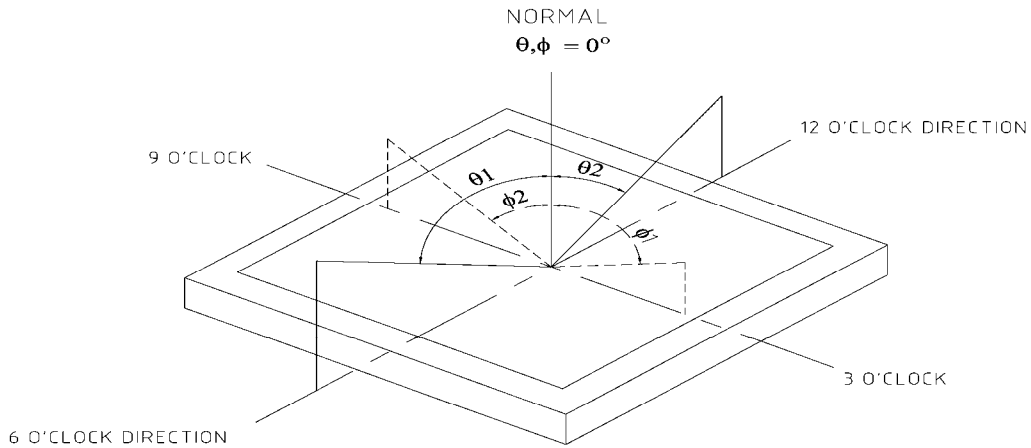


Figure 3

Note 3: Viewing Angle



The above “Viewing Angle” is the measuring position with Largest Contrast Ratio; not for good image quality. View Direction for good image quality is 6 O’clock. Module maker can increase the “Viewing Angle” by applying Wide View Film.

Note 4: Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.

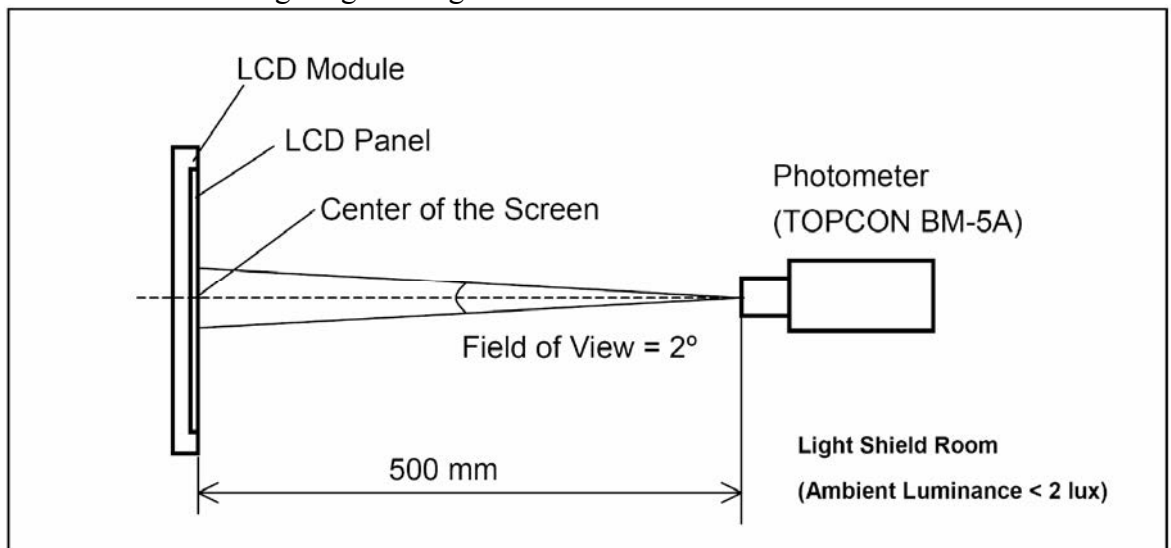
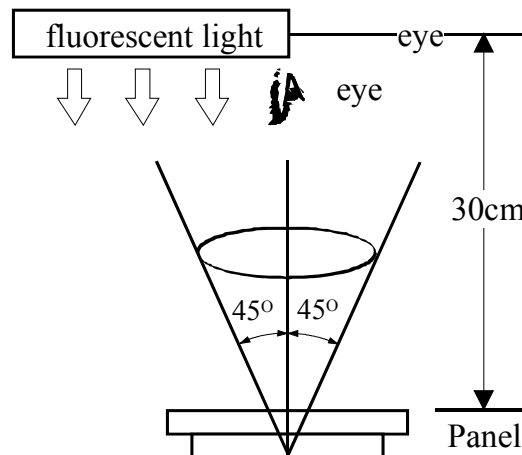


Figure 5

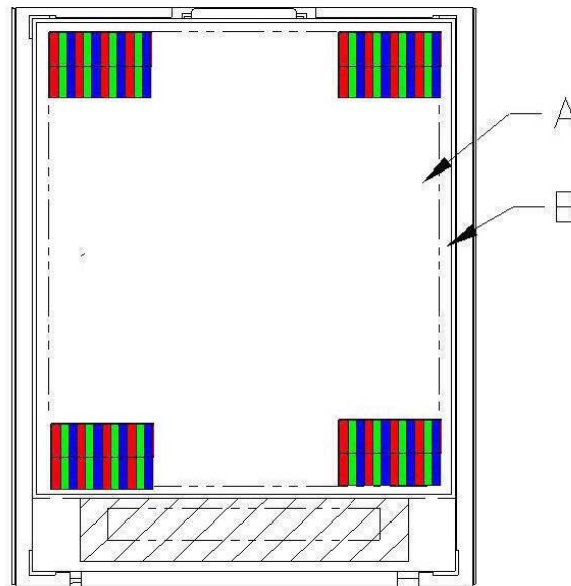
7. QUALITY SPECIFICATIONS

7.1 INSPECTION CONDITION

- (1) Inspect under 300~500Lux fluorescent light, leaving 30~35cm between panels and eyes, and between panels and lights.
- (2) Inspection condition is $23\pm 5^{\circ}\text{C}$, $50\pm 20\%\text{RH}$ maximum.



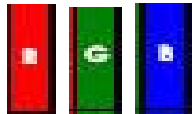
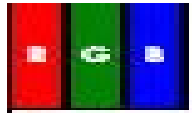
7.2 DEFINITION OF AREA


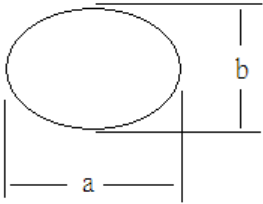


A Area : Viewing area.

B Area : Out of viewing.(outside viewing area)

7.3 INSPECTION SPECIFICATION

NO	Item	Acceptable specification	Judgment Criterion
1	Electrical Testing	<p>1-1 sub pixel classification</p> <ul style="list-style-type: none"> ● Sub Pixel: Number of sub pixel doesn't exceed one dot. <div style="text-align: center;">  <p>Sub Pixel (Dot)</p> </div> <p>a> Dark dot ----one Allowed b> Bright dot ---- one Allowed</p> <ul style="list-style-type: none"> ● Pixel : Three dots link together doesn't exceed ones <div style="text-align: center;">  <p>Pixel</p> </div> <p>1-2 Leakage to light</p> <ul style="list-style-type: none"> ● Leakage to light be not allowed. <p>1-3 Picture to shake</p> <ul style="list-style-type: none"> ● Picture had shake, twinkle and noise etc. instable of defect that be not allowed. <p>1-4 Function</p> <ul style="list-style-type: none"> ● No display or No function. ● Source Line, Gate Line. ● Contrast Ratio ● Current consumption exceeds product specifications. ● Display malfunction. 	<p>$N \leq 1$</p> <p>$N \leq 0$</p> <p>$N=0$</p> <p>$N=0$</p> <p>$N=0$</p>
2	Mechanical Dimension	<p>2-1 Mechanical Dimension exceeds product specifications.</p> <p>2-2 Out of frame and boss of plastic changed shape that be not allowed</p>	<p>$N=0$</p>

NO	Item	Acceptable specification	Judgment Criterion																		
3	Cosmetic Inspection	<p>3-1 Blemish: Line shapes of defect</p> <table border="1"> <thead> <tr> <th>Length</th> <th>Width</th> <th>Acceptable number</th> <th>Mini. space</th> </tr> </thead> <tbody> <tr> <td>---</td> <td>$W \leq 0.03$</td> <td>Ignore</td> <td rowspan="3">5 m m</td> </tr> <tr> <td>$L \leq 2.5$</td> <td>$0.03 < W \leq 0.05$</td> <td>3</td> </tr> <tr> <td>$L \leq 2.5$</td> <td>$0.05 < W \leq 0.1$</td> <td>2</td> </tr> <tr> <td>--</td> <td>$W > 0.1$</td> <td>Not allowed</td> <td>---</td> </tr> </tbody> </table> <p>L: length(mm) W: width(mm)</p> 	Length	Width	Acceptable number	Mini. space	---	$W \leq 0.03$	Ignore	5 m m	$L \leq 2.5$	$0.03 < W \leq 0.05$	3	$L \leq 2.5$	$0.05 < W \leq 0.1$	2	--	$W > 0.1$	Not allowed	---	
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		<p>3-2 Blemish: dot shapes of defect.</p> <table border="1"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Mini. Space</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.10$</td> <td>Ignore</td> <td>---</td> </tr> <tr> <td>$0.10 < \Phi \leq 0.15$</td> <td>2</td> <td rowspan="2">5 m m</td> </tr> <tr> <td>$0.15 < \Phi \leq 0.25$</td> <td>1</td> </tr> <tr> <td>$\Phi > 0.25$</td> <td>0</td> <td>---</td> </tr> </tbody> </table>	Dimension	Acceptable number	Mini. Space	$\Phi \leq 0.10$	Ignore	---	$0.10 < \Phi \leq 0.15$	2	5 m m	$0.15 < \Phi \leq 0.25$	1	$\Phi > 0.25$	0	---					
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<p>3-3 Polarizer Bubble</p> <table border="1"> <thead> <tr> <th>Dimension</th> <th>Acceptable number</th> <th>Mini. Space</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.20$</td> <td>Ignore</td> <td>---</td> </tr> <tr> <td>$0.20 < \Phi \leq 0.30$</td> <td>2</td> <td>15 m m</td> </tr> <tr> <td>$\Phi > 0.30$</td> <td>0</td> <td>---</td> </tr> </tbody> </table>	Dimension	Acceptable number	Mini. Space	$\Phi \leq 0.20$	Ignore	---	$0.20 < \Phi \leq 0.30$	2	15 m m	$\Phi > 0.30$	0	---									
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$\Phi > 0.30$	0	---																			
<p>Foreign Substances</p>  <p style="text-align: right;">$\Phi = (a+b)/2$</p>																					

NO	Item	Acceptable specification	Judgment Criterion			
3	Cosmetic Inspection	3-4 Scratch <ul style="list-style-type: none"> ● Sensate scratch not allowed. ● Impassive scratch as below. 				
		Unit:mm				
		Length		Width	Acceptable numbe	Mini. space
		-----		$W \leq 0.03$	Ignore	5 m m
		$L \leq 2.5$		$0.03 < W \leq 0.05$	3	
		$L \leq 2.5$		$0.05 < W \leq 0.1$	2	
		----		$0.1 < W$	Not allowed	---
		$L > 2.5$		----	Not allowed	
4	Package	4-1 Mixed product types 4-2 Shipping q'ty should be the same as "shipping notice form" q'ty. 4-3 Outer box can't broken.	N=0			

8. RELIABILITY

Test Item	Sample Type	Test Condition	Test result determinant gist
High temperature storage	Normal temperature	70±3°C;96H	the inspection of appearance and function character.
	Wide temperature	80±3°C;96H	
Low temperature storage	Normal temperature	-20±3°C;120H	
	Wide temperature	-30±3°C;120H	
High temperature /humidity storage	Normal temperature	50°C±3°C,90%±3%RH;96H	
	Wide temperature	60°C±3°C,90%±3%RH;96H	
High temperature operation	Normal temperature	60±3°C;96H	no objection of the function character; no fatal objection of the appearance.
	Wide temperature	70±3°C;96H	
Low temperature operation	Normal temperature	0±3°C;96H	
	Wide temperature	-20±3°C;96H	
High temperature /humidity operation	Normal temperature	40°C±3°C,90%±3%RH;96H	
	Wide temperature	50°C±3°C,90%±3%RH;96H	
Temperature Shock	Normal temperature	- 20±3°C,30min→70±3°C,30min;10cycle	inspect the objections appearance、 function & the whole structure
	Wide temperature	-30±3°C,30min 80±3,30min;10cycle	The inspection of appearance、 function & the whole structure

9. HANDLING PRECAUTION

9.1 SAFETY

- (1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
- (2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

9.2 STORAGE CONDITIONS

- (1) Store the panel or module in a dark place where the temperature is $23\pm 5^{\circ}\text{C}$ and the humidity is below $50\pm 20\% \text{RH}$.
- (2) Store in anti-static electricity container.
- (3) Store in clean environment, free from dust, active gas, and solvent.
- (4) Do not place the module near organics solvents or corrosive gases.
- (5) Do not crush, shake, or jolt the module.

9.3 HANDLING PRECAUTIONS

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- (6) Do not use ketonic solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.

9.4 WARRANTY

The period is within twelve months since the date of shipping out under normal using and storage conditions.