AZ DISPLAYS

SPECIFICATIONS FOR
LIQUID CRYSTAL DISPLAY

CUSTOMER APPROVAL			
※ **PART NO. :** ATM0240B20 (AZ DISPLAYS) VER1.0			
APPROVAL		**COMPANY CHOP**	
CUSTOMER COMMENTS			

AZ DISPLAYS ENGINEERING APPROVAL		
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REVISION RECORD

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1. GENERAL SPECIFICATIONS

Item	Specification	Remark
1. LCD size	2.4 inch(Diagonal)	
2. Driver element	a-Si TFT active matrix	
3. Resolution	240x(RGB)x320	
4. Display mode	Normally Black,Transmissive (IPS)	
5. Dot Pitch (W*H)	0.153mm(W) x 0.153mm(H)	
6. Active Area(W*H)	36.72mm(W) x 48.96mm(H)	
7. Module size (W*H)	42.72mm(W) x 60.26mm(H) x 2.1mm(D)	Note 1
8. Color arrangement	RGB-stripe	
9. Driver IC	ILI9341	
10. Interface	See the MCU Selection interface	
11. Viewing angle	All	
12. RoHS	RoHS compliant	

Note 1: Please refer to mechanical drawing.

2. PIN ASSIGNMENT

FPC Connector is used for the module electronics interface. The recommended model is "FH19SC-40S-0.5SH" manufactured by Hirose.

<table>
<tr><th>NO</th><th>Symbol</th><th>Function</th><th>I/O</th></tr>
<tr><td>1</td><td>GND</td><td>Ground</td><td>P</td></tr>
<tr><td>2</td><td>IOVCC</td><td>Power supply for internal circuit, 2.8V typical</td><td>P</td></tr>
<tr><td>3</td><td>VCC</td><td>Power supply(3.3V)</td><td>P</td></tr>
<tr><td>4</td><td>IM2</td><td rowspan="3">Select the MCU interface
<table>
<tr><th>IM2</th><th>IM1</th><th>IM0</th><th>Interface type</th><th>BD in use</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>DBI Tyb_8bit interface</td><td>DB7-DB0</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>DBI Tyb_16bit interface</td><td>DB15-DB0</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>DBI Tyb_9bit interface</td><td>DB8-DB0</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>DBI Tyb_18bit interface</td><td>DB17-DB0</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>3-Wire 9 BIT DATA serial interface</td><td>SDA SCL CS</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>4-Wire 8 BIT DATA serial interface</td><td>SDA SCL CS RS</td></tr>
</table></td><td>I</td></tr>
<tr><td>5</td><td>IM1</td><td>I</td></tr>
<tr><td>6</td><td>IM0</td><td>NOTE:
1.If not use PIN,fix to the GND ,IOVCC or NC.
2.If use RGB mode must select serial interface</td><td>I</td></tr>
<tr><td>7</td><td>RESET</td><td>Reset the chip</td><td>I</td></tr>
<tr><td>8</td><td>CS</td><td>Chip select</td><td>I</td></tr>
<tr><td>9</td><td>DC</td><td>Data or command select pin</td><td>I</td></tr>
<tr><td>10</td><td>WR</td><td>Write enable</td><td>I</td></tr>
<tr><td>11</td><td>RD</td><td>Read enable</td><td>I</td></tr>
<tr><td>12</td><td>VSYNC</td><td>Frame synchronizing signal for RGB interface operation</td><td>I</td></tr>
<tr><td>13</td><td>HSYNC</td><td>Line synchronizing signal for RGB interface operation</td><td>I</td></tr>
<tr><td>14</td><td>EN</td><td>Data enable signal for RGB interface operation</td><td>I</td></tr>
<tr><td>15</td><td>DCLK</td><td>Dot clock signal for RGB interface operation</td><td>I</td></tr>
<tr><td>16</td><td>SDA</td><td>Serial in/out signal.</td><td>I/O</td></tr>
<tr><td>17-34</td><td>DB0-DB17</td><td>Data bus</td><td>I/O</td></tr>
<tr><td>35</td><td>SDO</td><td>Serial output signal.</td><td>O</td></tr>
<tr><td>36</td><td>NC</td><td>No connection</td><td>-</td></tr>
<tr><td>37</td><td>LEDA</td><td>LED anode</td><td>P</td></tr>
<tr><td>38</td><td>LEDK</td><td>LED cathode</td><td>P</td></tr>
<tr><td>39</td><td>NC</td><td>No connection</td><td>-</td></tr>
<tr><td>40</td><td>GND</td><td>Ground</td><td>P</td></tr>
</table>

I: input, O: output, P: Power

3. Operating Specification

3.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Logic Voltage	V_{DD}	-0.3	3.3	V	
Operation Temperature	T_{OP}	-20	70	ºC	
Storage Temperature	T_{ST}	-30	80	ºC	
LED Reverse Voltage	V_R	-	13	V	
LED Forward Current	I_F		20	mA	Each LED

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

3.1.1 Typical Operation Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Logic Voltage	V_{DD}	1.8	2.8	3.3	V	
Input Logic High Voltage	V_{IH}	$0.8V_{DD}$	--	V_{DD}	V	
Input Logic Low Voltage	V_{IL}	0	--	$0.2DV_{DD}$	V	

3.1.2 Backlight driving conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED Backlight	V_L	11.6	12	13.2	V	Note 1
Current for LED Backlight	I_L	--	20	--	mA	
LED life time	--	30000	--	--	Hr	Note 2

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and I_L =20mA.

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and I_L =20mA.

3.2 Power on/off Sequence

VDDI and VCI can be applied in any order.

VCI and VDDI can be powered down in any order.

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

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

CSX can be applied at any timing or can be permanently|grounded. RESX has priority over CSX.

Note 1: There will be no damage to the display module if the power sequences are not met.

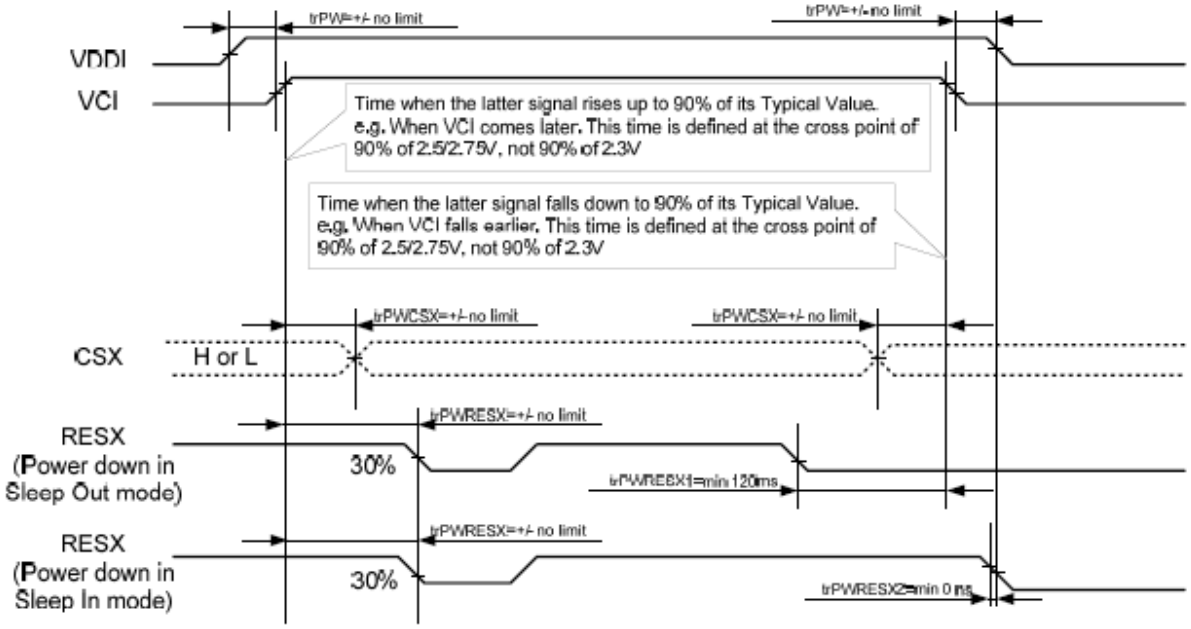
Note 2: There will be no abnormal visible effects on the display panel during the Power On/Off Sequences.

Note 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.

Note 4: If RESX line is not held stable by host during Power On Sequence as defined in Sections 12.1 and 12.2, then it will be necessary to apply a Hardware Reset (RESX) after Host Power On Sequence is complete to ensure correct operation. Otherwise function is not guaranteed.

Case 1 – RESX line is held High or Unstable by Host at Power ON

If RESX line is held High or unstable by the host during Power On, then a Hardware Reset must be applied after both VCI and VDDI have been applied – otherwise correct functionality is not guaranteed. There is no timing restriction upon this hardware reset.

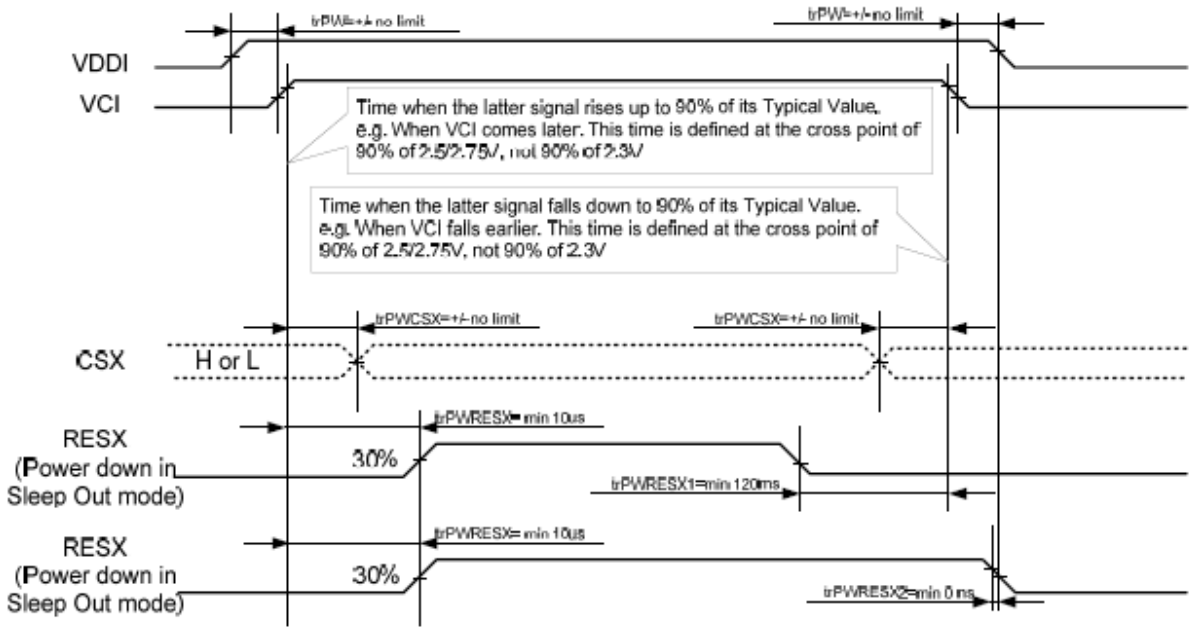


trPWRESX1 is applied to RESX falling in the Sleep Out Mode
trPWRESX2 is applied to RESX falling in the Sleep In Mode

Note 1: Unless otherwise specified, timings herein show cross point at 50% of signal power level.

Case 2 – RESX line is held Low by Host at Power ON

If RESX line is held Low (and stable) by the host during Power On, then the RESX must be held low for minimum 10µsec after both VCI and VDDI have been applied.

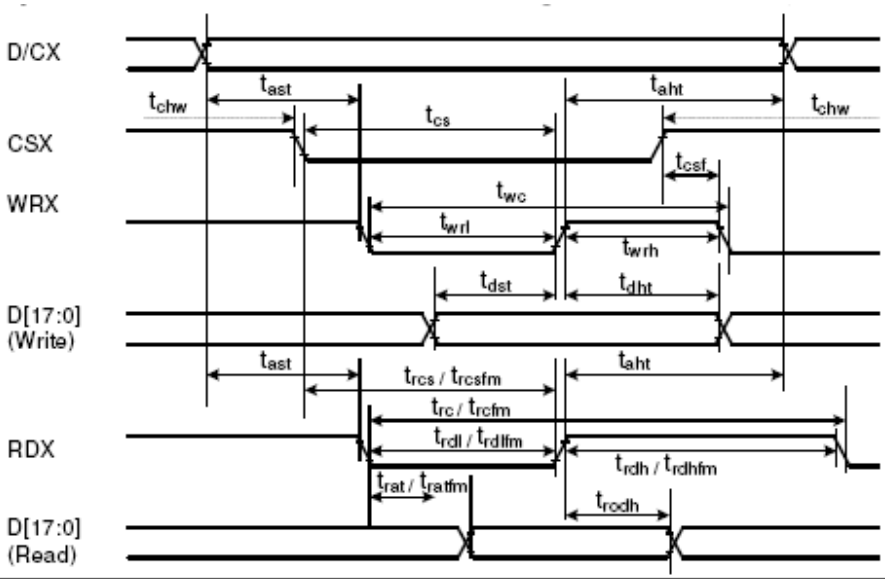


trPWRESX1 is applied to RESX falling in the Sleep Out Mode
trPWRESX2 is applied to RESX falling in the Sleep In Mode

Note 1: Unless otherwise specified, timings herein show cross point at 50% of signal power level.

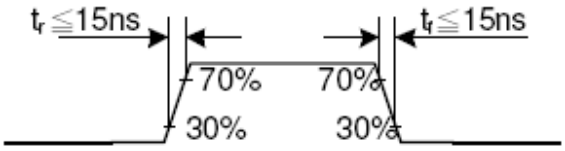
3.3 Timing Characteristics

3.3.1 Display Parallel 18/16/9/8-bit Interface Timing Characteristics

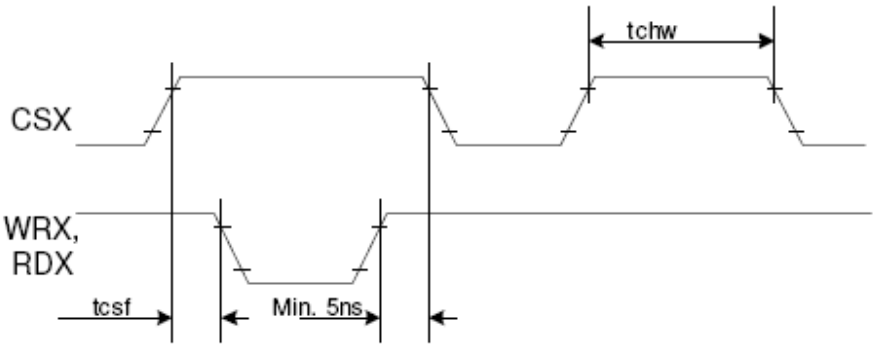


Signal	Symbol	Parameter	min	max	Unit	Description
DCX	tast	Address setup time	0	-	ns	
	taht	Address hold time (Write/Read)	0	-	ns	
CSX	tchw	CSX "H" pulse width	0	-	ns	
	tcs	Chip Select setup time (Write)	15	-	ns	
	trcs	Chip Select setup time (Read ID)	45	-	ns	
	trcsfm	Chip Select setup time (Read FM)	355	-	ns	
	tcsf	Chip Select Wait time (Write/Read)	10	-	ns	
WRX	twc	Write cycle	66	-	ns	
	twrh	Write Control pulse H duration	15	-	ns	
	twrl	Write Control pulse L duration	15	-	ns	
RDX (FM)	trcfm	Read Cycle (FM)	450	-	ns	
	trdhfm	Read Control H duration (FM)	90	-	ns	
	trdlfm	Read Control L duration (FM)	355	-	ns	
RDX (ID)	trc	Read cycle (ID)	160	-	ns	
	trdh	Read Control pulse H duration	90	-	ns	
	trdl	Read Control pulse L duration	45	-	ns	
D[17:0], D[15:0], D[8:0], D[7:0]	tdst	Write data setup time	10	-	ns	For maximum CL=30pF For minimum CL=8pF
	tdht	Write data hold time	10	-	ns	
	trat	Read access time	-	40	ns	
	tratfm	Read access time	-	340	ns	
	trod	Read output disable time	20	80	ns	

Note: Ta = -30 to 70 ℃, VDDI=1.65V to 3.3V, VCI=2.5V to 3.3V, VSS=0V

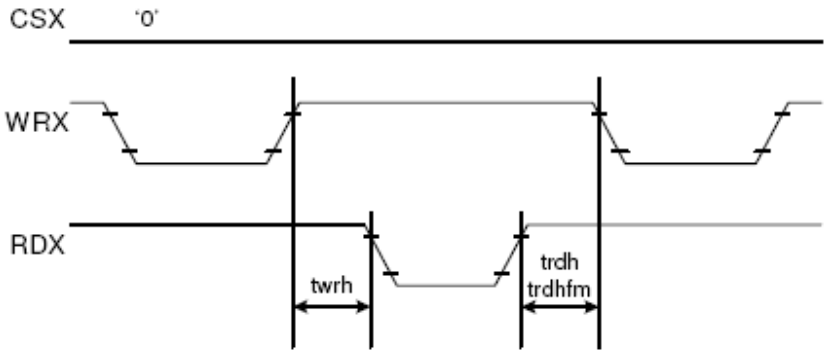


CSX timings :



Note: Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

Write to read or read to write timings:



Note: Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

4.0 OPTICAL SPECIFICATIONS

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing Angle	θ_L	Φ=180°(9 O'CLOCK)	--	85	--	degree	Note 1
	θ_R	Φ=0°(3 O'CLOCK)	--	85	--		
	θ_T	Φ=90°(12 O'CLOCK)	--	85	--		
	θ_B	Φ=270°(6 O'CLOCK)	--	85	--		
Response Time	$T_{ON+}T_{OFF}$	Normal Θ=Φ=0°	--	25	50	msec	Note 3
Contrast Ratio	CR		300	900	--	--	Note 4
Color Chromaticity	W_X		0.26	0.31	0.36	--	Note 2
	W_Y		0.28	0.33	0.38	--	Note 5 Note 6
Luminance	L		--	250	--	cd/m^2	Note 6
Luminance Uniformity	YU		75	80	--	%	Note 7

Test Conditions:
1. V_{DD}=3.3V, IL=20mA (Backlight current), the ambient temperature is 25℃.
2. The test systems refer to Note 2.

Note 1: Definition of viewing angle range

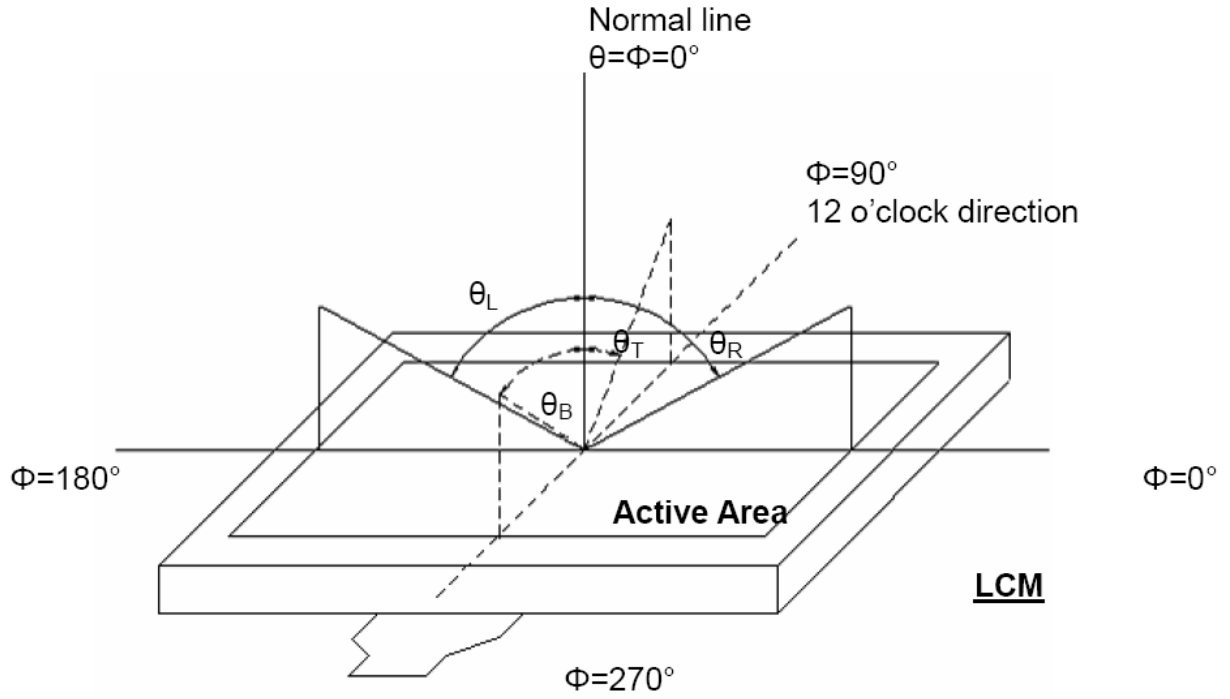


Figure 4.1 Definition of viewing angle.

Note 2: Definition of optical measurement system.
The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON

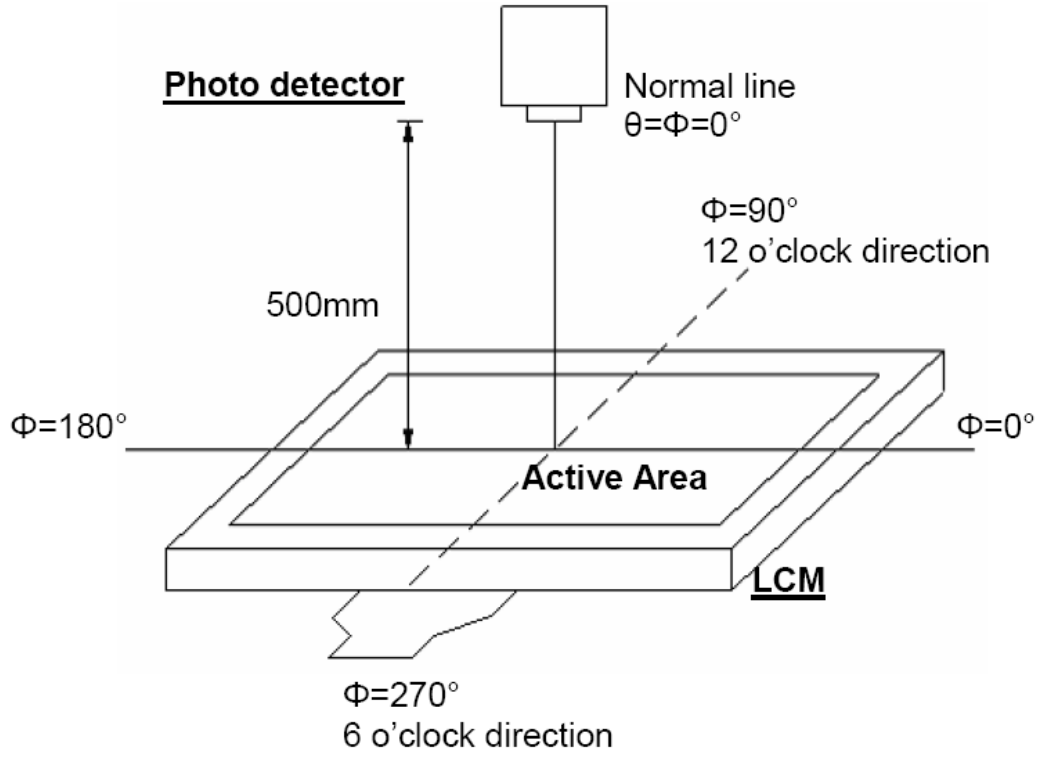


Figure 4.2 Optical measurement system setup

Note 3: Definition of Response time
The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.

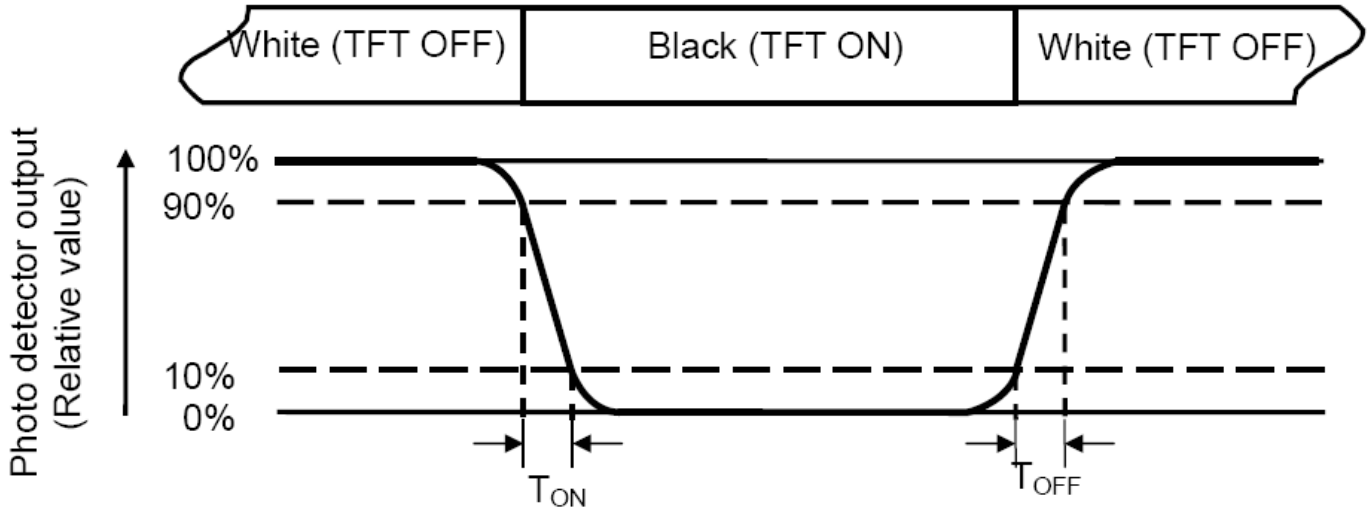


Figure 4.3 Definition of response.

Note 4: Definition of contrast ratio

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

Note 5: Definition of color chromaticity (CIE1931)
Color coordinates measured at center point of LCD.

Note 6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is I_L=60mA .

Note 7: Definition of Luminance Uniformity
Active area is divided into 9 measuring areas (Refer to Fig. 4-4).Every measuring point is placed at the center of each measuring area.

$$Luminance\ \ Uniformity\ (Yu) = \frac{B_{min}}{B_{max}}$$

L-------Active area length W----- Active area width

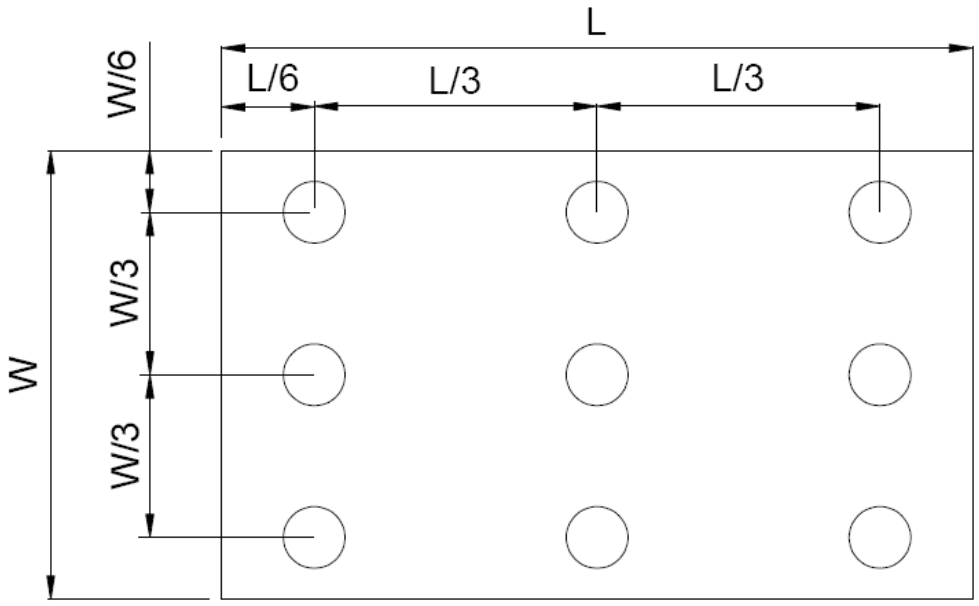


Figure 4.3 Definition of measuring points.

Bmax: The measured maximum luminance of all measurement position.
Bmin: The measured minimum luminance of all measurement position.

5. RELIABILITY TEST

Item	Test Condition Item	Remark
High temperature storage	Ta= 80 ºC 240hrs	Note 1 Note 4
Low temperature storage	Ta=-30 ºC 240hrs	Note 1 Note 4
High temperature operation	Ts= 70 ºC 240hrs	Note 2 Note 4
Low temperature operation	Ts=-20 ºC 240hrs	Note 1 Note 4
High temperature/High humidity operation	90% RH 40ºC 240hrs	Note 4
Thermal Shock	-30℃/30 min ~ +80℃/30 min for a total 10 cycles, Start with cold temperature and end with high temperature.	Note 4

Note 1: Ta is the ambient temperature of samples.
Note 2: Ts is the temperature of panel's surface.
Note 3: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.
Note 4: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

6. PRECAUTION FOR USING LCM

1. When design the product with this LCD Module, make sure the viewing angle matches to its purpose of usage.
2. As LCD panel is made of glass substrate, Dropping the LCD module or banging it against hard objects may cause cracking or fragmentation. Especially at corners and edges.
3. Although the polarizer of this LCD Module has the anti-glare coating, always be careful not to scratch its surface. Use of a plastic cover is recommended to protect the surface of polarizer.
4. If the LCD module is stored at below specified temperature, the LC material may freeze and be deteriorated. If it is stored at above specified temperature, the molecular orientation of the LC material may change to Liquid state and it may not revert to its original state. Excessive temperature and humidity could cause polarizer peel off or bubble. Therefore, the LCD module should always be stored within specified temperature range.
5. Saliva or water droplets must be wiped off immediately as those may leave stains or cause color changes if remained for a long time. Water vapor will cause corrosion of ITO electrodes.
6. If the surface of LCD panel needs to be cleaned, wipe it swiftly with cotton or other soft cloth. If it is not still clean enough, blow a breath on the surface and wipe again.
7. The module should be driven according to the specified ratings to avoid malfunction and permanent damage. Applying DC voltage cause a rapid deterioration of LC material. Make sure to apply alternating waveform by continuous application of the M signal. Especially the power ON/OFF sequence should be kept to avoid latch-up of driver LSIs and DC charge up to LCD panel.
8. Mechanical Considerations
   a) LCM are assembled and adjusted with a high degree of precision. Avoid excessive shocks and do not make any alterations or modifications. The following should be noted.
   b) Do not tamper in any way with the tabs on the metal frame.
   c) Do not modify the PCB by drilling extra holes, changing its outline, moving its components or modifying its pattern.
   d) Do not touch the elastomer connector; especially insert a backlight panel (for example, EL).
   e) When mounting a LCM makes sure that the PCB is not under any stress such as bending or twisting. Elastomer contacts are very delicate and missing pixels could result from slight dislocation of any of the elements.
   f) Avoid pressing on the metal bezel, otherwise the elastomer connector could be deformed and lose contact, resulting in missing pixels.
9. Static Electricity
   a) Operator

Wear the electrostatics shielded clothes because human body may be statically charged if not ware shielded clothes.
Never touch any of the conductive parts such as the LSI pads; the copper leads on the PCB and the interface terminals with any parts of the human body.

   b) Equipment

There is a possibility that the static electricity is charged to the equipment, which has a function of peeling or friction action (ex: conveyer, soldering iron, working table). Earth the equipment through proper resistance (electrostatic earth: $1x10^8$ ohm).
Only properly grounded soldering irons should be used.
If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.
The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended.

   c) Floor

Floor is the important part to drain static electricity, which is generated by operators or equipment.
There is a possibility that charged static electricity is not properly drained in case of insulating floor. Set the electrostatic earth (electrostatic earth: $1x10^8$ ohm).

   d) Humidity

Proper humidity helps in reducing the chance of generating electrostatic charges. Humidity should be kept over 50%RH.

   e) Transportation/storage

The storage materials also need to be anti-static treated because there is a possibility that the human body or storage materials such as containers may be statically charged by friction or peeling.
The modules should be kept in antistatic bags or other containers resistant to static for storage.

   f) Soldering

Solder only to the I/O terminals. Use only soldering irons with proper grounding and no leakage.
Soldering temperature : 280° C ± 10° C
Soldering time: 3 to 4 sec.
Use eutectic solder with resin flux fill.
If flux is used, the LCD surface should be covered to avoid flux spatters. Flux residue should be removed afterwards.

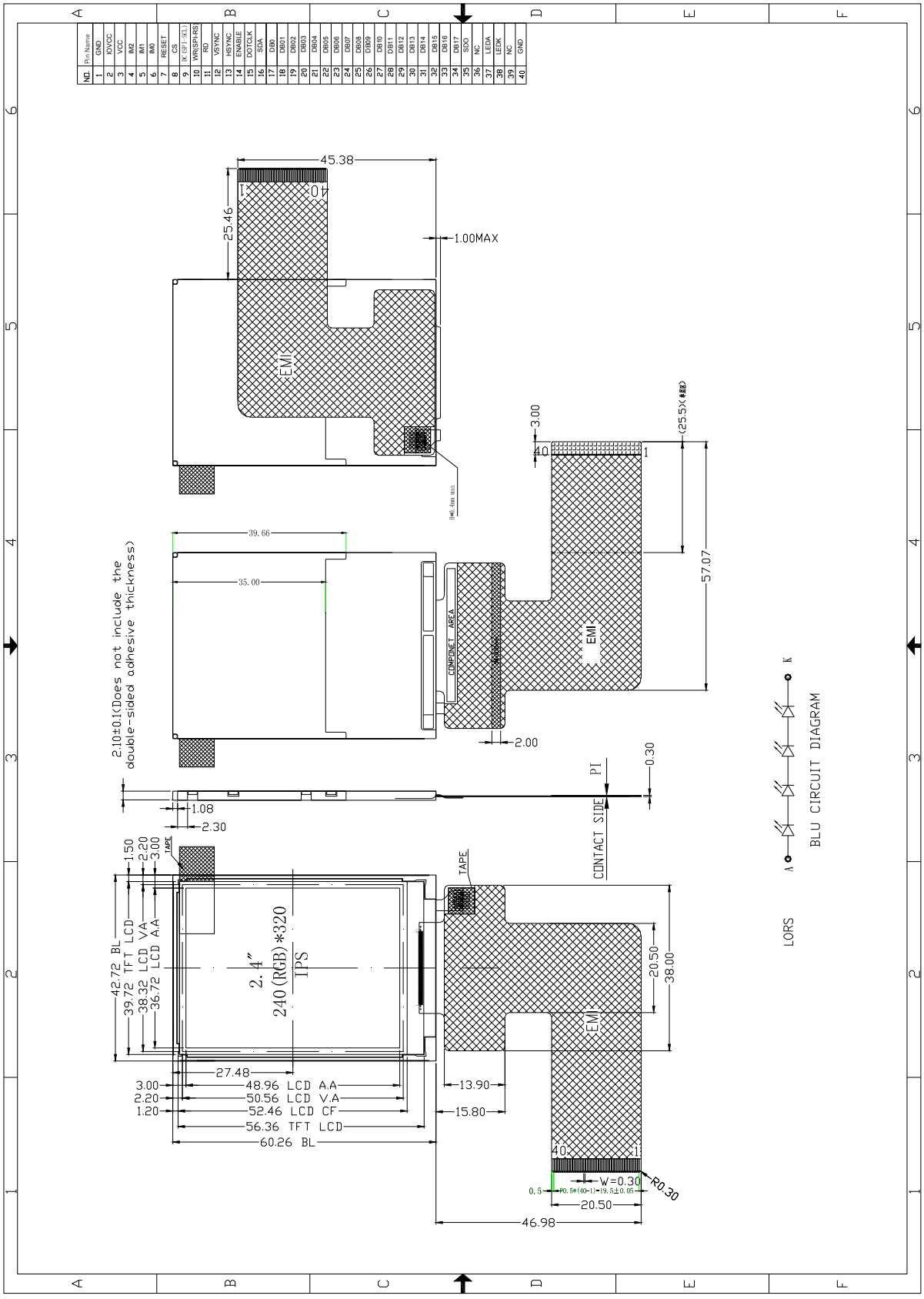
   g) Others

The laminator (protective film) is attached on the surface of LCD panel to prevent it from scratches or stains. It should be peeled off slowly using static eliminator.
Static eliminator should also be installed to the workbench to prevent LCD module from static charge.

10. Operation
    a) Driving voltage should be kept within specified range; excess voltage shortens display life.
    b) Response time increases with decrease in temperature.
    c) Display may turn black or dark blue at temperatures above its operational range; this is (however not pressing on the viewing area) may cause the segments to appear “fractured”.
    d) Mechanical disturbance during operation (such as pressing on the viewing area) may cause the segments to appear “fractured”.
11. If any fluid leaks out of a damaged glass cell, wash off any human part that comes into contact with soap and water. The toxicity is extremely low but caution should be exercised at all the time.
12. Disassembling the LCD module can cause permanent damage and it should be strictly avoided.
13. LCD retains the display pattern when it is applied for long time (Image retention). To prevent image retention, do not apply the fixed pattern for a long time. Image retention is not a deterioration of LCD. It will be removed after display pattern is changed.
14. Do not use any materials, which emit gas from epoxy resin (hardener for amine) and silicone adhesive agent (dealcohol or deoxym) to prevent discoloration of polarizer due to gas.
15. Avoid the exposure of the module to the direct sunlight or strong ultraviolet light for a long time.

The brightness of LCD module may be affected by the routing of CCFL cables due to leakage to the chassis through coupling effect. The inverter circuit needs to be designed taking the level of leakage current into consideration. Thorough evaluation is needed for LCD module and inverter built into its host equipment to ensure specified brightness.

7. MECHANICAL DRAWING



8. INSPECTION SPECIFICATION

1. SCOPE SPECIFICATIONS CONTAIN

1.1 DISPLAY QUALITY EVALUATION
1.2 MECHANICS SPECIFICATION

2. SAMPLING PLAN

Sampling plan according to GB/T2828.1-2003/ISO 2859-1：1999 and ANSI/ASQC Z1.4-1993, normal level 2 and based on:

Major defect: AQL 0.45
Minor defect: AQL 0 65

3. PANEL INSPECTION CONDITION

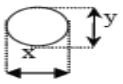
3.1 ENVIRONMENT:
ROOM TEMPERATURE: 25±5°C.
HUMIDITY: 65±5% RH.
ILLUMINATION: 300 ~ 700 LUX.
3.2 INSPECTION DISTANCE:
35±5 CM
3.3 INSPECTION ANGLE:
THE VISION OF INSPECTOR SHOULD BE PERPENDICULAR TO THE SURFACE OF THE MODULE.
3.4 INSPECTION TIME：
PERCEPTIBILITY TEST TIME: 20 SECONDS MAX.

4. DISPLAY QUALITY

4.1 Major Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.1.1	All functional defects	1) No display 2) Display abnormally 3) Missing vertical, horizontal segment 4) Short circuit 5) Back-light no lighting, flickering and abnormal lighting.	Major
4.1.2	Missing	Missing component	
4.1.3	Outline dimension	Overall outline dimension beyond the drawing is not allowed.	

4.2 Cosmetic Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.2.1	**Clear Spots** **Black and white Spot defect Pinhole, Foreign Particle, Dirt under polarizer**	For dark/white spot, size Φ is defined as $\Phi = \frac{(x+y)}{2}$  1.	Minor
	Dim Spots Circle shaped and dim edged defects	2.	Minor

1.

Zone / Size(mm)	Acceptable Qty A	B	C
Φ≤0.15	Ignore		Ignore
0.15<Φ≤0.2	1		
0.2<Φ≤0.25	1		
Φ>0.25	0		

2.

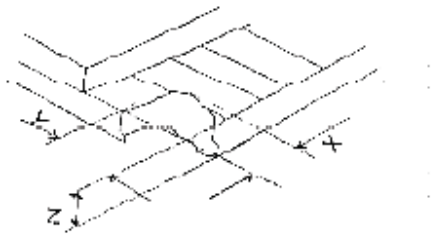
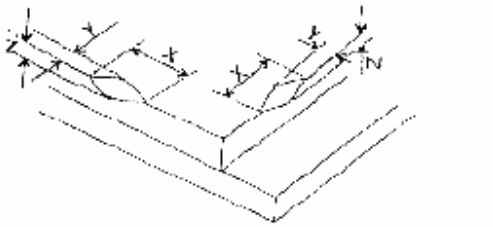
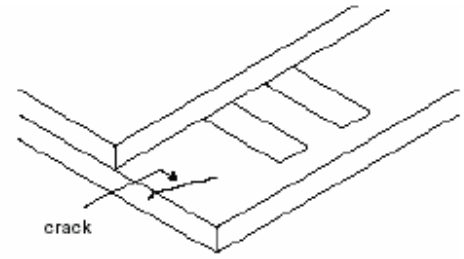
2. Zone / Size(mm)	Acceptable Qty A	B	C
Φ≤0.2	Ignore		Ignore
0.20<Φ≤0.60	1		
0.60<Φ≤0.80	1		
0.80<Φ≤1.0	0		
1.0<Φ	0		

:

4.2. Cosmetic Defect

<table>
<tr><th>Item No</th><th>Items to be inspected</th><th>Inspection Standard</th><th>Classification of defects</th></tr>
<tr><td>4.2.2</td><td>Line defect
Black line,
White line,
Foreign material under polarizer,</td><td>
<table>
<tr><th colspan="2">Size(mm)</th><th colspan="3">Acceptable Qty</th></tr>
<tr><th rowspan="2">L(Length)</th><th rowspan="2">W(Width)</th><th colspan="3">Zone</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Ignore</td><td>W≤0.02</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>L≤3.0</td><td>0.01＜W≤0.03</td><td colspan="2">2</td></tr>
<tr><td>L≤2.0</td><td>0.03＜W≤0.05</td><td colspan="2">1</td></tr>
<tr><td></td><td>0.05＜W</td><td colspan="2">Define as spot defect</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>4.2.3</td><td>Polarizer scratch</td><td>If the Polarizer scratch can be seen after mobile phone cover assembling or in the operating condition, judge by the line defect of 4.2.2.
If the Polarizer scratch can be seen only in non-operating condition or some special angle, judge by the following.
<table>
<tr><th colspan="2">Size(mm)</th><th colspan="3">Acceptable Qty</th></tr>
<tr><th rowspan="2">L(Length)</th><th rowspan="2">W(Width)</th><th colspan="3">Zone</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Ignore</td><td>W≤0.03</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>5.0＜L≤10.0</td><td>0.03＜W≤0.05</td><td colspan="2">0</td></tr>
<tr><td>L≤5.0</td><td>0.01＜W≤0.05</td><td colspan="2">2</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>4.2.4</td><td>Polarize Air bubble</td><td>Air bubbles between glass & polarizer
<table>
<tr><th>2. Zone
Size(mm)</th><th colspan="3">Acceptable Qty</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Φ≤0.2</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>0.20＜Φ≤0.30</td><td colspan="2">2</td></tr>
<tr><td>0.30＜Φ≤0.50</td><td colspan="2">1</td></tr>
<tr><td>0.50＜Φ</td><td colspan="2">0</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

4.3. Cosmetic Defect

<table>
<tr><th>Item No</th><th>Items to be inspected</th><th>Inspection Standard</th><th>Classification of defects</th></tr>
<tr><td rowspan="3">4.3.5</td><td rowspan="3">Glass defect</td><td>(i) Chips on corner
 
<table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>≤2.0</td><td>≤S</td><td>Disregard</td></tr></table>Notes: S=contact pad length
Chips on the corner of terminal shall not be allowed to extend into the ITO pad or expose perimeter seal.</td><td>Minor</td></tr>
<tr><td>(ii)Usual surface cracks
 
<table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>≤3.0</td><td><Inner border line of the seal</td><td>Disregard</td></tr></table></td><td>Minor</td></tr>
<tr><td>(iii) Crack
Cracks tend to break are not allowed.
 
</td><td>Major</td></tr>
<tr><td>4.3.6</td><td>Parts alignment</td><td>1) Not allow IC and FPC/heat-seal lead width is more than 50% beyond lead pattern.
2) Not allow chip or solder component is off center more than 50% of the pad outline.</td><td>Minor</td></tr>
<tr><td>4.3.7</td><td>SMT</td><td>According to the <Acceptability of electronic assemblies> IPC-A-610C class 2 standard. Component missing or function defect are Major defect, the others are Minor defect.</td><td></td></tr>
</table>