



MULTI-INNO TECHNOLOGY CO., LTD.

www.multi-inno.com

LCD MODULE SPECIFICATION

Model : MI0430J3T

This module uses ROHS material

For Customer's Acceptance:

Customer	
Approved	
Comment	

This specification may change without prior notice in order to improve performance or quality. Please contact Multi-Inno for updated specification and product status before design for this product or release of this order.

Revision	1.4
Engineering	
Date	2013-07-25
Our Reference	

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■ GENERAL INFORMATION

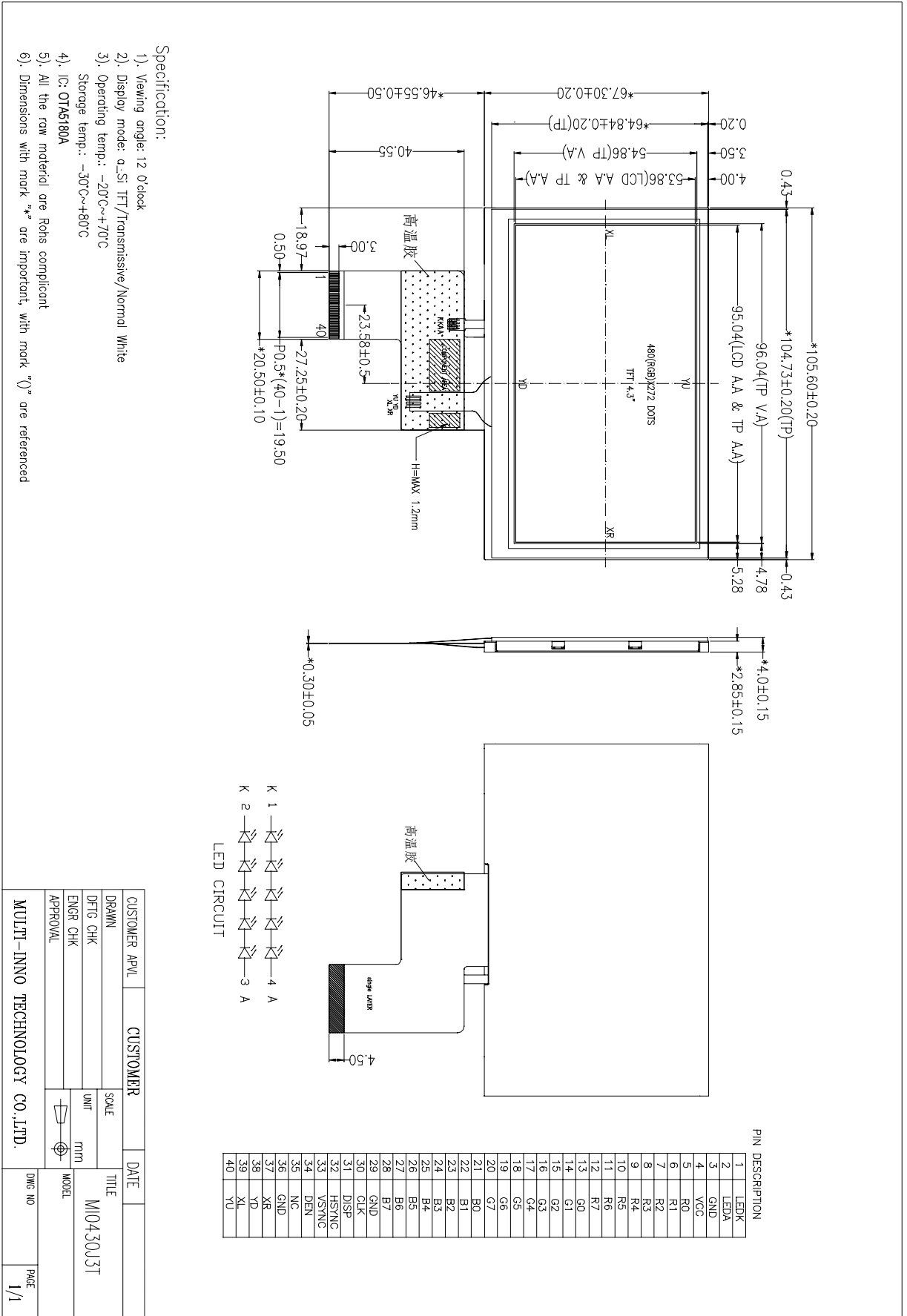
Item	Contents	Unit
LCD type	TFT/Transmissve/Normally white	/
Size	4.3	Inch
Viewing direction	12:00	O' Clock
Gray scale inversion direction	6:00	O' Clock
LCM (W × H × D)	105.60×67.30×4.00	mm ³
Active area (W×H)	95.04×53.86	mm ²
Pixel size (W×H)	0.198×0.198	mm ²
Number of dots	480 (RGB) × 272	/
Driver IC	OTA5180A× 1	/
Backlight type	10 LEDs	/
Interface type	24bit RGB	/
Color depth	16.7M	/
Input voltage	3.3	V
With/Without TSP	With TSP	/
Weight	TBD	g

Note 1:Viewing direction for best image quality is different from TFT definition, there is a 180 degree shift.

Note 2 : RoHS compliant;

Note 3: LCM weight tolerance: ± 5% .

EXTERNAL DIMENSIONS



■ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Digital supply voltage	VDDIO	-0.3	4.5	V
Power supply for pump	VDD	-0.3	4.5	V
Anglog supply voltage	VDD2	-0.3	7.0	V
Operating temperature	T _{OP}	-20	70	°C
Storage temperature	T _{ST}	-30	80	°C
Humidity	RH	-	90%(Max60°C)	RH

RECOMMENDED OPERATING RANGE

Parameter	Symbol	Min	Typ	Max	Unit
Charge pump supply voltage	PVDD	3.0	3.3	3.6	V
	PVDD	2.25	2.5	3.0	V
Digital supply voltage	VDD	3.0	3.3	3.6	V
	VDD	2.25	2.5	3.0	V
Digital interface supply voltage	VDDIO	1.65	1.8	VDD	V
Digital input voltage	Din	0	-	VDDIO	V
OTP supply voltage	V _{OTP}	7.4	7.5	7.6	V
VCOM AC voltage	VCOMH-VCOML	3.46	-	6.2	V

DC CHARACTERISTICS FOR DIGITAL CIRCUIT

Parameter	Symbol	Min	Typ	Max	Unit
Low level input voltage	V _{il}	GND	-	0.3xVDDIO	V
High level input voltage	V _{ih}	0.7xVDDIO	-	VDDIO	V
High level output voltage	V _{oh}	VDDIO-0.4	-	VDDIO	V
Low level output voltage	V _{ol}	GND	-	GND+0.4	V
Input leakage current	I _{il}	-	-	+/-1.0	mA
Pull high/low resistor	R _p	-	100K	-	ohm
Digital stand-by current	I _{st}	-	5.0	20	uA
Digital operating current	I _{cc}	-	4.0	-	mA

■ ELECTRICAL CHARACTERISTICS

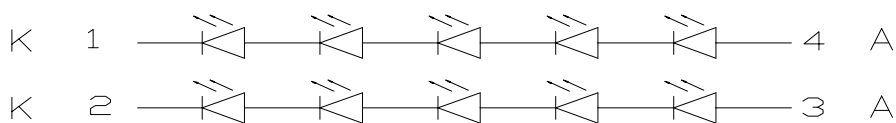
VDDIO=1.8V, VDD = 3.3V, AVDD = 6V, AGND = 0V, T_A = -20°C to 80°C

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Analog Supply Voltage	VDD2		5		V	
Positive High-voltage power	VGH	9	15	16	V	No Load. By VGH_SEL setting.
Negative High-voltage power	VGL	-11	-10	-7	V	No Load. By VGL_SEL setting.
VCOMH Output Level	VCOMH	3.26		5.8	V	By VCOMH setting.
VCOML Output Level	VCOML	-2		-0.2	V	By VCOML setting.
DRV Output Voltage	VDRV	0	-	VDD	V	
DCDC Feed Back Voltage	VFB	0.28	0.6	0.79	V	By LED_VFB setting.
Base Drive Current	IDRV	-	20	25	mA	By LED_VFB setting.
Output Voltage Deviation	Vod	-	±20	±35	mV	V _o = 0.15V ~ 0.5V, 3.45V~3.8V
		-	±15	±20		V _o = 0.5V ~ 3.45V
Output Dynamic Range	Vdr	0.2	-	5.3	mV	MVA Mode
		0.15		4.8		TN Mode
VCOM Low Level Output Current	IOLFRP		-10		mA	VCOM AC output = 0.5V
VCOM High Level Output Current	IOHFRP		-10		mA	VCOM AC output = 5.7V
Analog Standby Current	I _{ast}	-	-	20	uA	
Analog Operation Current	IDD	-	5.0	-	mA	Without panel loading

■ BACKLIGHT CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	V _f	15	16	17	V	
Forward current	I _f	-	40	-	mA	
Uniformity(with L/G)	ΔBp	80	-	-	%	
LED lifetime	-	30,000	40,000	-	Hrs	

LED CIRCUIT



■ELECTRO-OPTICAL CHARACTERISTICS

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark	Note
Response time	Tr+Tf	$\theta=0^\circ$ $\varnothing=0^\circ$ $Ta=25^\circ C$	-	20	-	ms	FIG 1.	4
Contrast ratio	Cr		250	350	-	---	FIG 2.	1
Luminance uniformity	δ WHITE		-	TBD	-	%	FIG 2.	3
Surface Luminance	Lv		-	300	-	cd/m ²	FIG 2.	2
Viewing angle range	θ	$\varnothing = 90^\circ$	-	65	-	deg	FIG 3.	6
		$\varnothing = 270^\circ$	-	45	-	deg	FIG 3.	
		$\varnothing = 0^\circ$	-	70	-	deg	FIG 3.	
		$\varnothing = 180^\circ$	-	70	-	deg	FIG 3.	
CIE (x, y) chromaticity	Red	x	0.590	0.620	0.650	FIG 2.	5	
		y	0.314	0.344	0.374			
	Green	x	0.276	0.306	0.336			
		y	0.533	0.563	0.593			
	Blue	x	0.103	0.133	0.163			
		y	0.119	0.149	0.179			
	White	x	0.281	0.311	0.341			
		y	0.319	0.349	0.379			

Note 1. Contrast Ratio(CR) is defined mathematically as For more information see FIG 2.

$$\text{Contrast Ratio} = \frac{\text{Average Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}{\text{Average Surface Luminance with all black pixels (P1, P2, P3, P4, P5)}}$$

Note 2. Surface luminance is the LCD surface from the surface with all pixels displaying white. For more information see FIG 2.

$$L_v = \text{Average Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}$$

Note 3. The uniformity in surface luminance , δ WHITE is determined by measuring luminance at each test position 1 through 5, and then dividing the maximum luminance of 5 points luminance by minimum luminance of 5 points luminance. For more information see FIG 2.

$$\delta \text{ WHITE} = \frac{\text{Minimum Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}{\text{Maximum Surface Luminance with all white pixels (P1, P2, P3, P4, P5)}}$$

Note 4. Response time is the time required for the display to transition from White to black(Rise Time, Tr) and from black to white(Decay Time, Tf). For additional information see FIG 1. The test equipment is Autronic-Melchers's ConoScope. Series.

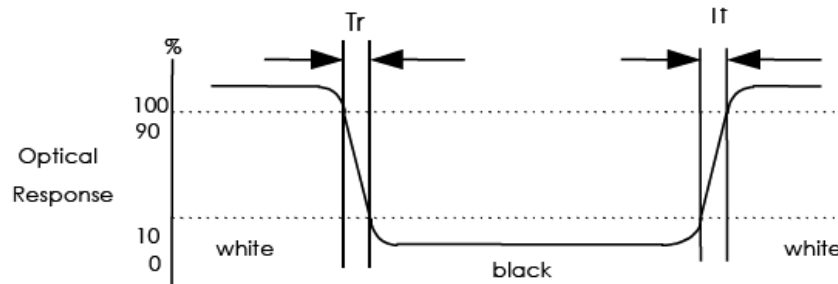
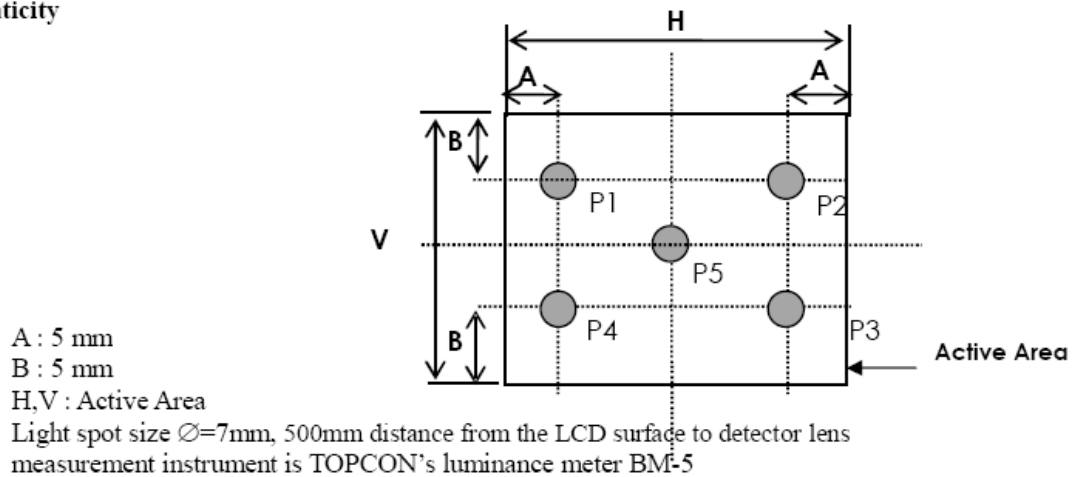
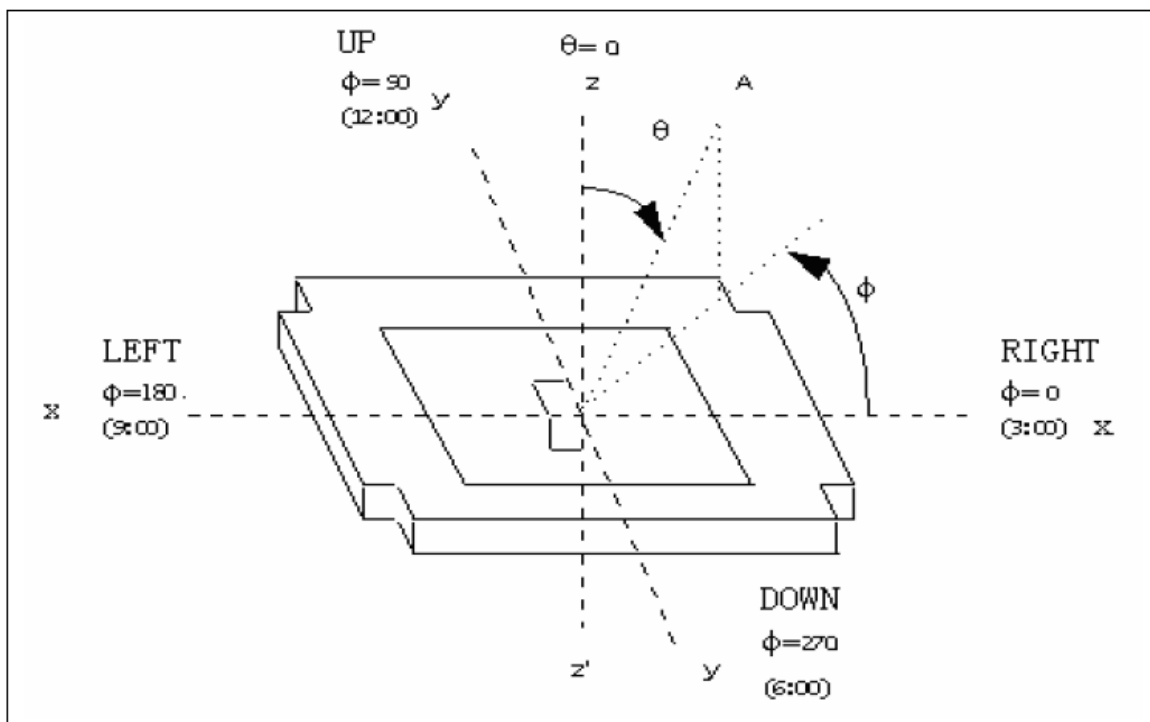
Note 5. CIE (x, y) chromaticity, The x, y value is determined by measuring luminance at each test position 1 through 5, and then make average value.

Note 6. Viewing angle is the angle at which the contrast ratio is greater than 2. For TFT module the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG 3.

Note 7. For viewing angle and response time testing, the testing data is base on Autronic-Melchers's ConoScope. Series Instruments For contrast ratio, Surface Luminance, Luminance uniformity, CIE The test data is base on TOPCON's BM-5 photo detector.

FIG. 1 The definition of Response Time

The response time is defined as the following figure and shall be measured by switching the input signal for “black” and “white”.


FIG. 2 Measuring method for Contrast ratio, surface luminance, Luminance uniformity , CIE (x, y) chromaticity

FIG. 3 The definition of viewing angle


■ INTERFACE DESCRIPTION

PIN NO.	Symbol	Description
1	LED-K	LED backlight(Cathode)
2	LED-A	LED backlight(anode)
3	GND	Ground
4	VCC	Power supply (Digital +3.0V)
5-12	R0-R7	Red Data
13-20	G0-G7	Green Data
21-28	B0-B7	Blue Data
29	GND	Ground
30	CLK	Clock signal
31	DISP	Display on/off
32	HSYNC	Horizontal sync input in RGB mode (short to GND if not used)
33	VSYNC	Vertical sync input in RGB mode (short to GND if not used)
34	DEN	Data Enable
35	NC	NC
36	GND	Ground
37	XR	Touch Panel Right
38	YD	Touch Panel Bottom
39	XL	Touch Panel Left
40	YU	Touch Panel Up

■ APPLICATION NOTES

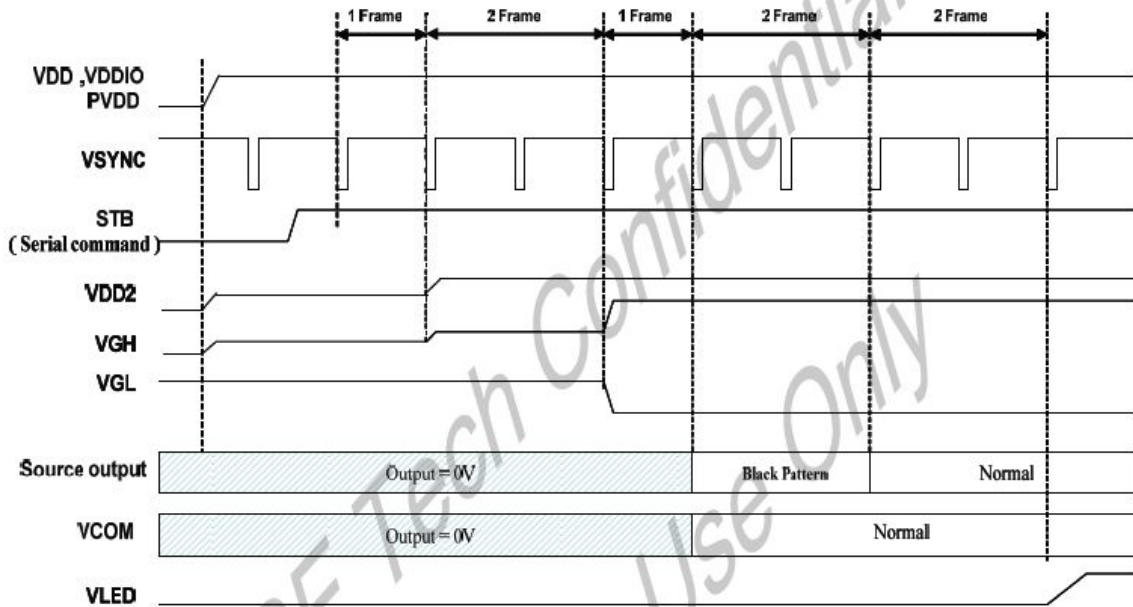
1 AC CHARACTERISTICS

VDDIO=1.8V, VDD = 3.3V, AVDD = 6V, AGND = 0V, T_A = -20°C to 80°C

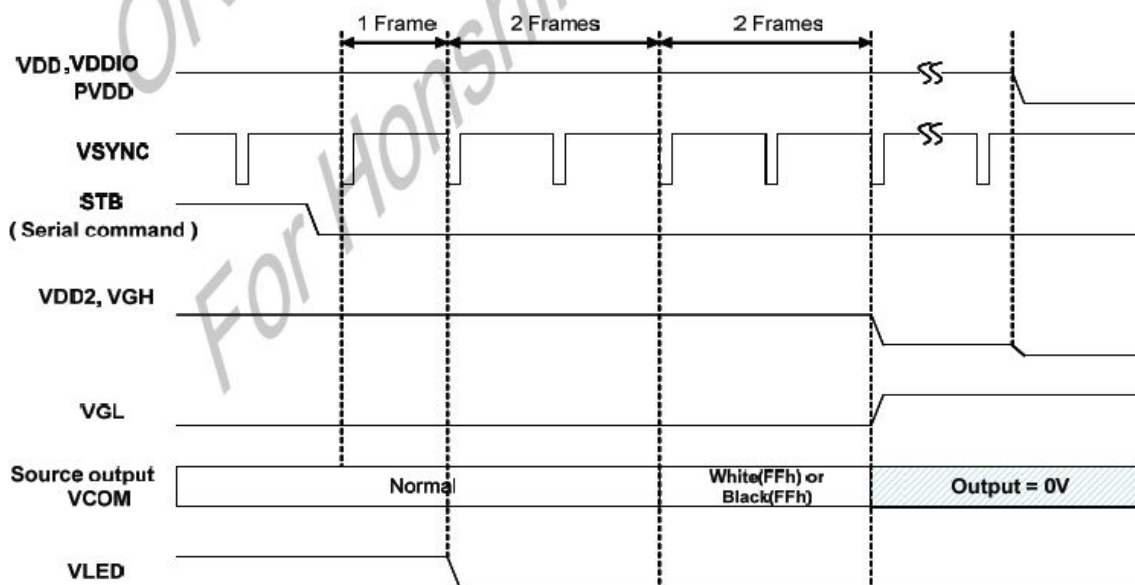
Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK pulse duty	Tcw	40	50	60	%	
Hsync width	Thw	1.0	-	-	DCLK	
Hsync period	Th	55	60	65	us	
Vsync setup time	Tvst	12	-	-	ns	
Vsync hold time	Tvhd	12	-	-	ns	
Hsync setup time	Thst	12	-	-	ns	
Hsync hold time	Thhd	12	-	-	ns	
Data set-up time	Tdsu	12	-	-	ns	
Data hold time	Tdhd	12	-	-	ns	
DE set-up time	Tdesu	12	-	-	ns	
DE hold time	Tdehd	12	-	-	ns	
SD output stable time	Tst	-	10	12	us	
GD output rise and fall time	Tgst	-	500	1000	ns	
Serial communication						
Delay between CSB and Vsync	Tcv	1			us	
CS input setup time	Ts0	50			ns	
Serial data input setup time	Ts1	50			ns	
CS input hold time	Th0	50			ns	
Serial data input hold time	Th1	50			ns	
SCL pulse high width	Twh1	50			ns	
SCL pulse low width	Twl1	50			ns	
CS pulse high width	Tw2	400			ns	

2. SIGNAL TIMING DIAGRAM

2.1. Power on sequence

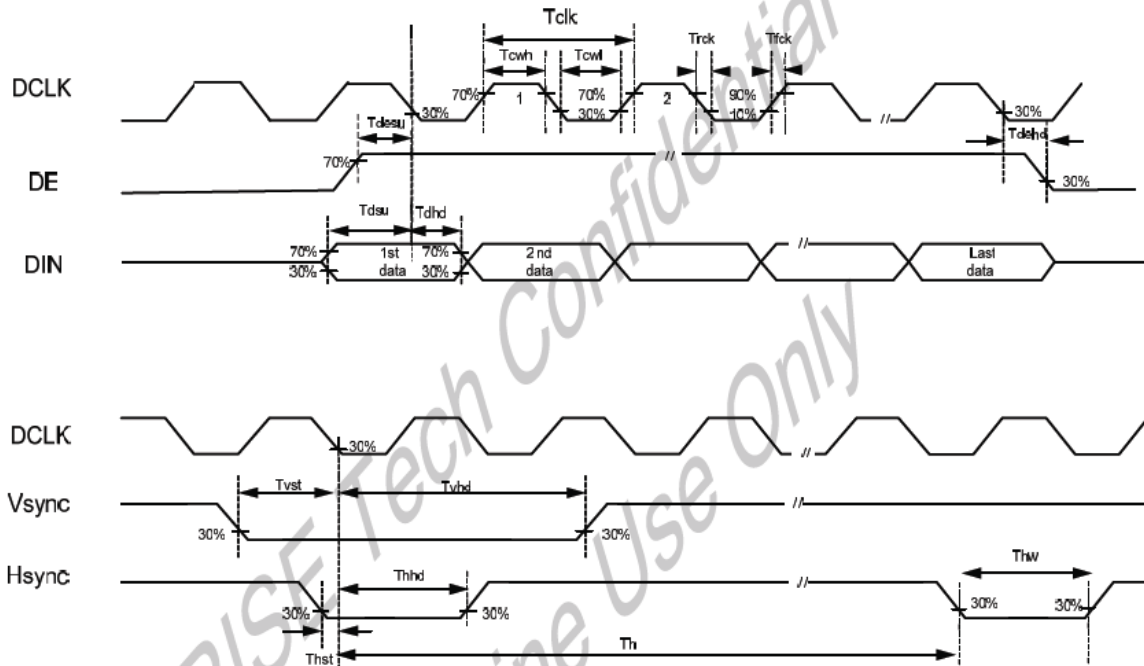


2.2. Power off sequence



2.3. Timing diagram of interface signal

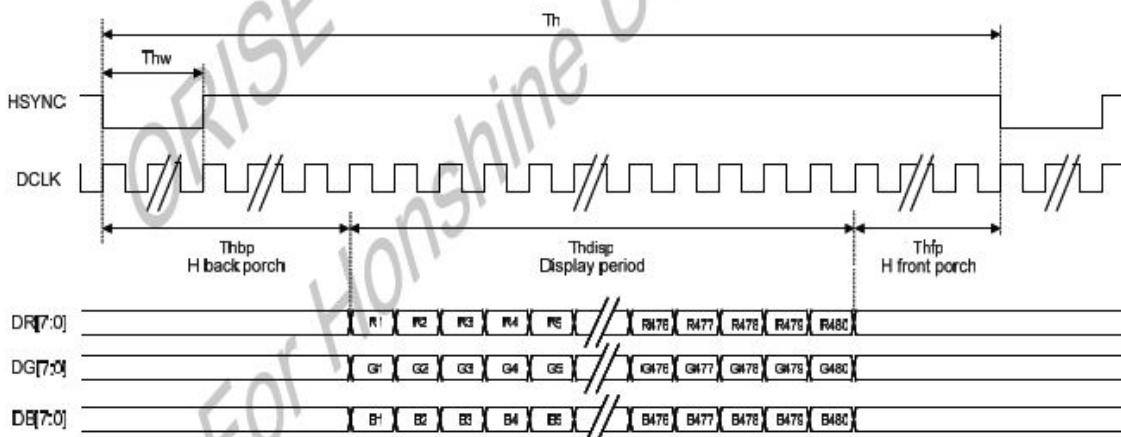
Clock and Data Input Timing Diagram

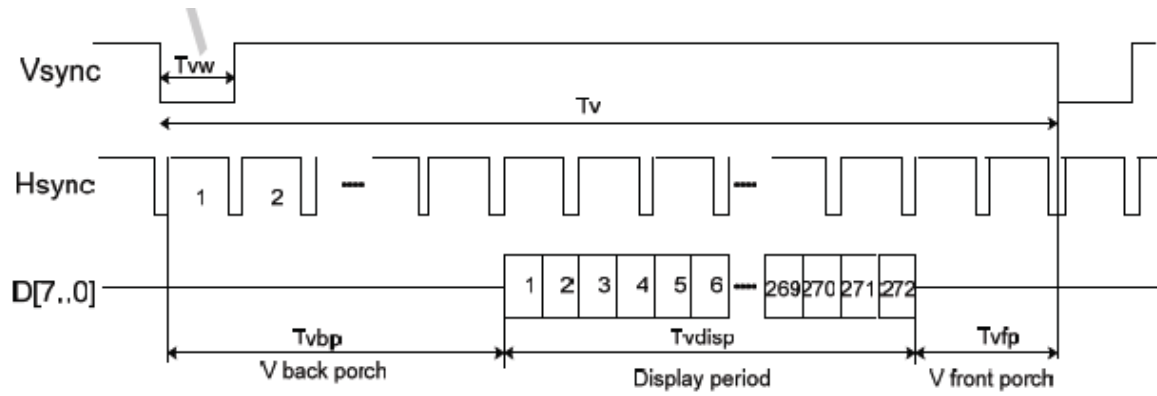


2.4. Input setup timing requirement

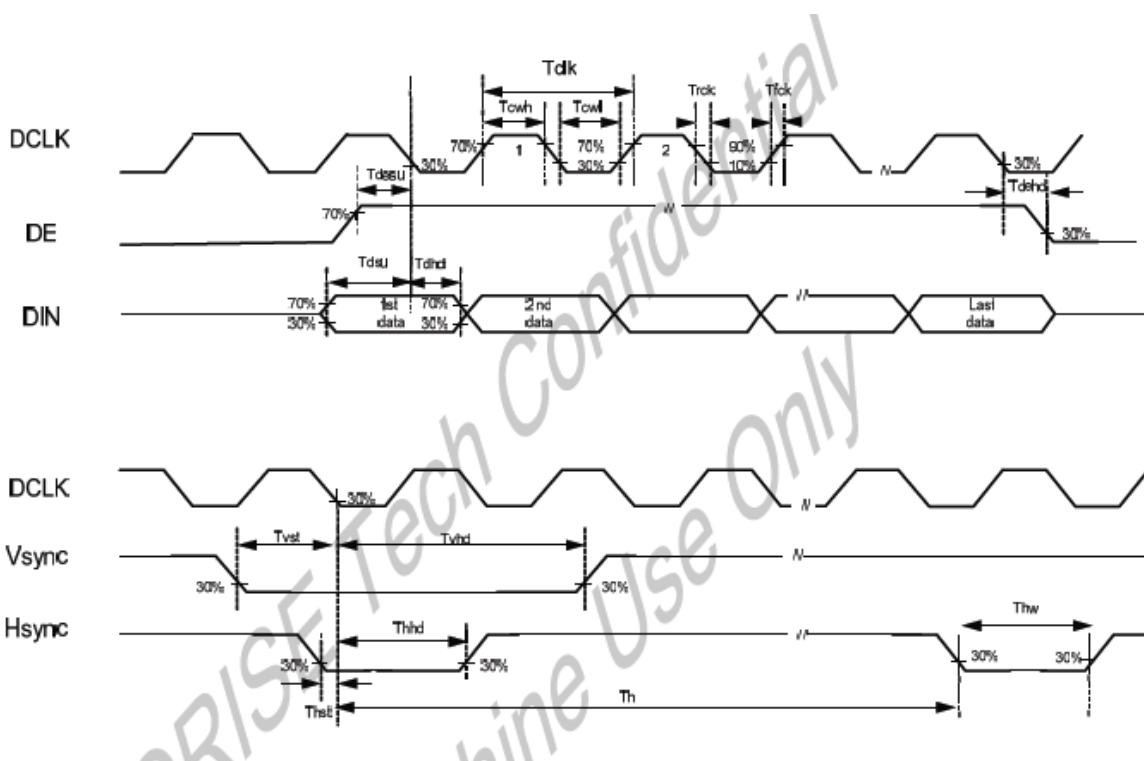
Item	Symbol	Min.	Typ.	Max.	Unit		
DCLK Frequency	Fclk	10	15	20	MHz		
DCLK Period	Tclk	83	110	200	ns		
Hsync	Period Time	Th	490	531	605	DCLK	
	Display Period	Thdisp		480		DCLK	
	Back Porch	Thbp	8	43		DCLK	By H_BLANKING setting
	Front Porch	Thfp	2	8		DCLK	
	Pulse Width	Thw	1			DCLK	
Vsync	Period Time	Tv	275	288	335	H	
	Display Period	Tvdisp		272		H	
	Back Porch	Tvbp	2	12		H	By V_BLANKING setting
	Front Porch	Tvfp	1	4		H	
	Pulse Width	Tvw	1	10		H	

SYNC Mode Timing Diagram





3. WRITE/READ SPI TIMING




■ RELIABILITY TEST

No.	Test Item	Test Condition	Inspection after test
1	High Temperature Storage	80±2°C/120 hours	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the LCD; 2.Sealleak; 3.Non-display; 4.missing segments; 5.Glass crack; 6.Current Idd is twice higher than initial value. 7. The surface shall be free from damage. 8.Linearity must be no more than 1.5% by the linearity tester. 9..The Electric characteristics requirements shall be satisfied.
2	Low Temperature Storage	-30±2°C/120 hours	
3	High Temperature Operating	70±2°C/120 hours	
4	Low Temperature Operating	-20±2°C/120 hours	
5	Temperature Cycle	-30±2°C~25~80±2°C×20cycles	
6	Damp Proof Test	60°C±5°C×90%RH/96 hours	
7	Vibration Test	Frequency: 10Hz~55Hz~10Hz Amplitude: 1.5mm, X, Y, Zdirectionfortotal 2hours (Packing condition)	
8	Drooping test	Drop to the ground from 1m height, one time, every side of carton. (Packing condition)	
9	ESD test	Gap mood:±1KV~±8KV(10 times air discharge with positive/negative voltage voltage gap:1KV) Touch mood:±1KV~±4KV	
10	Hitting test	1,000,000 times in the same point, Hitting pad: tip R3.75 mm,Silicone rubber, Hardness:40 deg.; Load: 2.45N; Hitting speed: Twice/sec; Electric load: None; Test area should be at 1.8 mm inside of insulation.	
11	Pen sliding durability test	100,000 times minimum Hitting pad: tip R0.8 mm Plastic pen; Load: 1.47N; Sliding speed: 60 mm/sec; Electric load: None Test area should be at 1.8 mm inside of insulation.	

Remark:

- 1.The test samples should be applied to only one test item.
- 2.Sample size for each test item is 5~10pcs.
- 3.For Damp Proof Test, Pure water(Resistance>10MΩ) should be used.
- 4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.
- 5.EL evaluation should be excepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has.
- 6.Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

■ INSPECTION CRITERION

	OUTGOING QUALITY STANDARD	PAGE 1 OF 8
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA		

This specification is made to be used as the standard acceptance/rejection criteria for Wider Screen TFT-LCD module product.

1. Sample 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 0.65

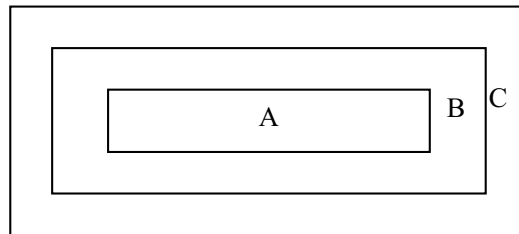
Minor defect: AQL 1.5

2. Inspection condition

Viewing distance for cosmetic inspection is about 30cm with bare eyes, and under an environment of 20~40W light intensity, all directions for inspecting the sample should be within 45° against perpendicular line. All inspection ND3% use.

3. Definition of Inspection Item.

3.1 Definition of inspection zone in LCD.



Zone A: character/Digit area

Zone B: viewing area except Zone A (ZoneA+ZoneB=minimum Viewing area)

Zone C: Outside viewing area (invisible area after assembly in customer's product)

ZoneB+ZoneC= Around opaque edge area on TP.

Fig.1 Inspection zones in an LCD.

Note: As a general rule, visual defects in Zone C are permissible, when it is no trouble for quality and assembly of customer's product.

3.2 Definition of some visual defect

Bright dot.	Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.
Dark dot.	Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture, or pure whiter picture.
Dark / Bright Lines.	Lines on display which appear dark/bright and usually result from the contamination.

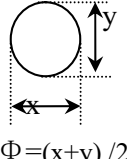
 OUTGOING QUALITY STANDARD	PAGE 2 OF 8
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TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA

4. Major Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.1	All functional defects	1) No display 2) Display abnormally 3) Open or missing segment 4) Short circuit 5) Excess power consumption 6) Back-light no lighting, flickering and abnormal lighting.	Major
4.2	Missing	Missing component	
4.3	Outline dimension	Overall outline dimension beyond the drawing is not allowed.	
4.4	Crack	Creaks tend to break are not allowed.	

5. Minor Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects																	
5.1	Bright dot defect.  $\Phi=(x+y)/2$	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 20%;">Zone Size(mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th style="width: 15%;">A</th> <th style="width: 15%;">B</th> <th style="width: 10%;">C</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.15$</td> <td colspan="2">Acceptable (clustering of spot not allowed)</td> <td rowspan="3" style="text-align: center;">Acceptable</td> </tr> <tr> <td>$0.15 < \Phi \leq 0.25$</td> <td colspan="2" style="text-align: center;">$N \leq 6.$</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.50$</td> <td colspan="2" style="text-align: center;">$N \leq 2$</td> </tr> </tbody> </table>	Zone Size(mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.15$	Acceptable (clustering of spot not allowed)		Acceptable	$0.15 < \Phi \leq 0.25$	$N \leq 6.$		$0.25 < \Phi \leq 0.50$	$N \leq 2$		Minor
Zone Size(mm)	Acceptable Qty																			
	A	B	C																	
$\Phi \leq 0.15$	Acceptable (clustering of spot not allowed)		Acceptable																	
$0.15 < \Phi \leq 0.25$	$N \leq 6.$																			
$0.25 < \Phi \leq 0.50$	$N \leq 2$																			
5.2	Dark dot defect.	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 20%;">Zone Size(mm)</th> <th colspan="3">Acceptable Q'ty</th> </tr> <tr> <th style="width: 15%;">A</th> <th style="width: 15%;">B</th> <th style="width: 10%;">C</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.15$</td> <td colspan="2">Acceptable</td> <td rowspan="3" style="text-align: center;">Acceptable</td> </tr> <tr> <td>$0.15 < \Phi \leq 0.30$</td> <td colspan="2" style="text-align: center;">$N \leq 6$</td> </tr> <tr> <td>$0.30 < \Phi \leq 0.50$</td> <td colspan="2" style="text-align: center;">$N \leq 4$</td> </tr> </tbody> </table>	Zone Size(mm)	Acceptable Q'ty			A	B	C	$\Phi \leq 0.15$	Acceptable		Acceptable	$0.15 < \Phi \leq 0.30$	$N \leq 6$		$0.30 < \Phi \leq 0.50$	$N \leq 4$		
Zone Size(mm)	Acceptable Q'ty																			
	A	B	C																	
$\Phi \leq 0.15$	Acceptable		Acceptable																	
$0.15 < \Phi \leq 0.30$	$N \leq 6$																			
$0.30 < \Phi \leq 0.50$	$N \leq 4$																			
5.3	Bright / Dark line.	$0.01 < W \leq 0.10,$ $0.30 < L \leq 1.50,$ $N \leq 1$	Acceptable																	

Note: 1. Total defective dots shall not exceed 6 pcs.
 2. Minimum distance between defective dots is more than 5mm.
 3. 2 Adjacent dark sub pixel defect or bright sub pixel defect is not more than 1pair.
 4. W: Width, L: Length, N: Count.

OUTGOING QUALITY STANDARD	PAGE 3 OF 8
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA	

Item No	Items to be inspected	Inspection Standard	Classification of defects																										
5.4	Linear defect Foreign material under polarizer,	<table border="1" style="width:100%; border-collapse: collapse; text-align: center;"> <tr> <th colspan="2">Size(m)</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>$W \leq 0.05$</td> <td colspan="2">Acceptable</td> <td rowspan="3" style="writing-mode: vertical-rl; transform: rotate(180deg);">Acceptable</td> </tr> <tr> <td>$L \leq 5.0$</td> <td>$0.05 < W \leq 0.15$</td> <td colspan="2">$N \leq 5$</td> </tr> <tr> <td>$5.0 \leq L$</td> <td>$0.15 \leq W$</td> <td colspan="2">0</td> </tr> </table>	Size(m)		Acceptable Qty			L(Length)	W(Width)	Zone			A	B	C	Ignore	$W \leq 0.05$	Acceptable		Acceptable	$L \leq 5.0$	$0.05 < W \leq 0.15$	$N \leq 5$		$5.0 \leq L$	$0.15 \leq W$	0		Minor
	Size(m)		Acceptable Qty																										
L(Length)	W(Width)	Zone																											
		A	B	C																									
Ignore	$W \leq 0.05$	Acceptable		Acceptable																									
$L \leq 5.0$	$0.05 < W \leq 0.15$	$N \leq 5$																											
$5.0 \leq L$	$0.15 \leq W$	0																											
	Circular Defect, Foreign material under polarizer, <div style="text-align: center; margin-top: 10px;"> <p>$\Phi = (x+y) / 2$</p> </div>	<table border="1" style="width:100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="2">Zone \ Size(mm)</th> <th colspan="3">Acceptable Q'ty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> <tr> <td>$\Phi \leq 0.25$</td> <td colspan="2">Acceptable</td> <td rowspan="3" style="writing-mode: vertical-rl; transform: rotate(180deg);">Acceptable</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.50$</td> <td colspan="2">$N \leq 4$</td> </tr> <tr> <td>$0.50 \leq \Phi$</td> <td colspan="2">0</td> </tr> </table>	Zone \ Size(mm)	Acceptable Q'ty			A	B	C	$\Phi \leq 0.25$	Acceptable		Acceptable	$0.25 < \Phi \leq 0.50$	$N \leq 4$		$0.50 \leq \Phi$	0		Minor									
Zone \ Size(mm)	Acceptable Q'ty																												
	A	B	C																										
$\Phi \leq 0.25$	Acceptable		Acceptable																										
$0.25 < \Phi \leq 0.50$	$N \leq 4$																												
$0.50 \leq \Phi$	0																												
5.5	Polarizer defect.	5.4.1 Polarizer Position (i) Shifting in position should not exceed the glass outline dimension. (ii) Incomplete covering of the viewing area due to shifting is not allowed. 5.4.2 Dirt on polarizer Dirt which can be wiped easily should be accepted. 5.4.3 Polarizer Nick & Dent <table border="1" style="width:100%; border-collapse: collapse; text-align: center; margin-top: 10px;"> <tr> <th rowspan="3">Sizes(mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th colspan="3">Zone</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> <tr> <td>$\Phi < 0.25$</td> <td colspan="2">Acceptable</td> <td rowspan="3" style="writing-mode: vertical-rl; transform: rotate(180deg);">Acceptable</td> </tr> <tr> <td>$0.25 \leq \Phi \leq 0.5$</td> <td colspan="2">$N \leq 4$</td> </tr> <tr> <td>$\Phi > 0.5$</td> <td colspan="2">0</td> </tr> </table>	Sizes(mm)	Acceptable Qty			Zone			A	B	C	$\Phi < 0.25$	Acceptable		Acceptable	$0.25 \leq \Phi \leq 0.5$	$N \leq 4$		$\Phi > 0.5$	0		Minor						
Sizes(mm)	Acceptable Qty																												
	Zone																												
	A	B	C																										
$\Phi < 0.25$	Acceptable		Acceptable																										
$0.25 \leq \Phi \leq 0.5$	$N \leq 4$																												
$\Phi > 0.5$	0																												



	OUTGOING QUALITY STANDARD	PAGE 4 OF 8
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TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA

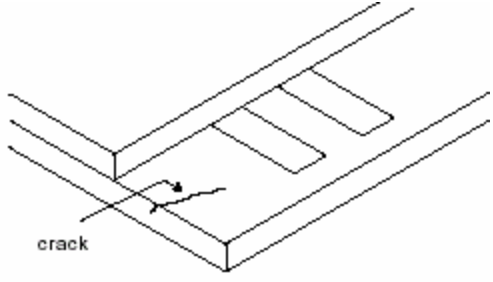
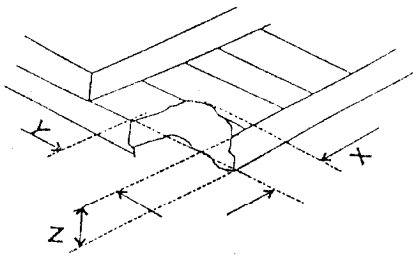
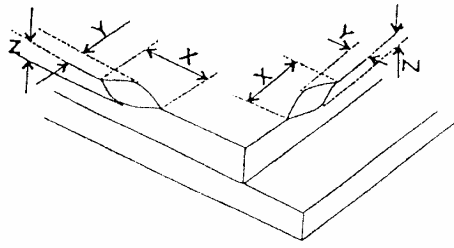
5. Minor Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects																										
5.6	Polarizer defect	5.4.4 Air bubbles between glass & polarizer: <table border="1" style="margin-left: 20px; margin-top: 10px;"> <thead> <tr> <th rowspan="3" style="text-align: center;">Size(mm)</th> <th colspan="3" style="text-align: center;">Acceptable Qty</th> </tr> <tr> <th colspan="3" style="text-align: center;">Zone</th> </tr> <tr> <th style="text-align: center;">A</th> <th style="text-align: center;">B</th> <th style="text-align: center;">C</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">$\Phi \leq 0.3$</td> <td colspan="2" style="text-align: center;">Acceptable</td> <td rowspan="4" style="text-align: center; vertical-align: middle;">Acceptable</td> </tr> <tr> <td style="text-align: center;">$0.3 < \Phi \leq 1.0$</td> <td colspan="2" style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">$1.0 < \Phi \leq 1.5$</td> <td colspan="2" style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">$\Phi > 1.5$</td> <td colspan="2" style="text-align: center;">0</td> </tr> </tbody> </table>	Size(mm)	Acceptable Qty			Zone			A	B	C	$\Phi \leq 0.3$	Acceptable		Acceptable	$0.3 < \Phi \leq 1.0$	3		$1.0 < \Phi \leq 1.5$	1		$\Phi > 1.5$	0		Minor			
		Size(mm)		Acceptable Qty																									
Zone																													
A	B		C																										
$\Phi \leq 0.3$	Acceptable		Acceptable																										
$0.3 < \Phi \leq 1.0$	3																												
$1.0 < \Phi \leq 1.5$	1																												
$\Phi > 1.5$	0																												
		5.4.5 Polarizer scratch <p>(i) If the Polarizer scratch can be seen after cover assembling or in the operating condition, judge by the line defect of 5.4.</p> <p>(ii) If the Polarizer scratch can be seen only in non-operating condition or some special angle, judge by the following.</p> <table border="1" style="margin-left: 20px; margin-top: 10px;"> <thead> <tr> <th colspan="2" style="text-align: center;">Size(mm)</th> <th colspan="3" style="text-align: center;">Acceptable Qty</th> </tr> <tr> <th rowspan="2" style="text-align: center;">L(Length)</th> <th rowspan="2" style="text-align: center;">W(Width)</th> <th colspan="3" style="text-align: center;">Zone</th> </tr> <tr> <th style="text-align: center;">A</th> <th style="text-align: center;">B</th> <th style="text-align: center;">C</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Ignore</td> <td style="text-align: center;">$W \leq 0.02$</td> <td colspan="2" style="text-align: center;">Ignore</td> <td rowspan="3" style="text-align: center; vertical-align: middle;">Ignore</td> </tr> <tr> <td style="text-align: center;">$1.0 < L \leq 5.0$</td> <td style="text-align: center;">$0.02 < W \leq 0.2$</td> <td colspan="2" style="text-align: center;">$N \leq 4$</td> </tr> <tr> <td style="text-align: center;">$5.0 < L$</td> <td style="text-align: center;">$0.2 < W$</td> <td colspan="2" style="text-align: center;">0</td> </tr> </tbody> </table>	Size(mm)		Acceptable Qty			L(Length)	W(Width)	Zone			A	B	C	Ignore	$W \leq 0.02$	Ignore		Ignore	$1.0 < L \leq 5.0$	$0.02 < W \leq 0.2$	$N \leq 4$		$5.0 < L$	$0.2 < W$	0		Minor
Size(mm)		Acceptable Qty																											
L(Length)	W(Width)	Zone																											
		A	B	C																									
Ignore	$W \leq 0.02$	Ignore		Ignore																									
$1.0 < L \leq 5.0$	$0.02 < W \leq 0.2$	$N \leq 4$																											
$5.0 < L$	$0.2 < W$	0																											

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TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA

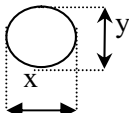
5. Minor Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects								
5.7	Glass defect	(i) Crack Cracks are not allowed. 	Minor								
		(ii) TFT chips on corner  <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 25%;">X</th> <th style="width: 25%;">Y</th> <th style="width: 25%;">Z</th> <th style="width: 25%;">Acceptable</th> </tr> </thead> <tbody> <tr> <td>≤ 3.0</td> <td>≤ 3.0</td> <td>Not more than the thickness of glass.</td> <td>$N \leq 3.$</td> </tr> </tbody> </table> Chips on the corner of terminal shall not be allowed to extend into the ITO pad or expose perimeter seal.	X	Y	Z	Acceptable	≤ 3.0	≤ 3.0	Not more than the thickness of glass.	$N \leq 3.$	Minor
		X	Y	Z	Acceptable						
≤ 3.0	≤ 3.0	Not more than the thickness of glass.	$N \leq 3.$								
(iii) Usual surface cracks  <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 25%;">X</th> <th style="width: 25%;">Y</th> <th style="width: 25%;">Z</th> <th style="width: 25%;">Acceptable</th> </tr> </thead> <tbody> <tr> <td>≤ 1.5</td> <td>≤ 1.5</td> <td>Not more than the thickness of glass.</td> <td>$N \leq 4.$</td> </tr> </tbody> </table> It is only applicable to the upper glass of LCD.	X	Y	Z	Acceptable	≤ 1.5	≤ 1.5	Not more than the thickness of glass.	$N \leq 4.$	Minor		
X	Y	Z	Acceptable								
≤ 1.5	≤ 1.5	Not more than the thickness of glass.	$N \leq 4.$								

 OUTGOING QUALITY STANDARD	PAGE 6 OF 8
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TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA

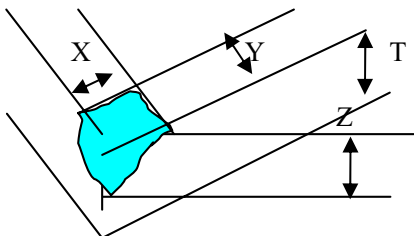
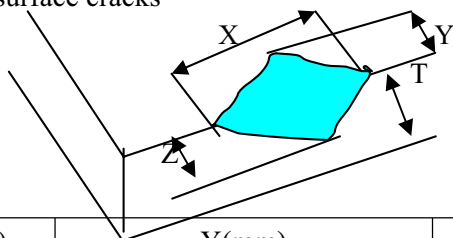
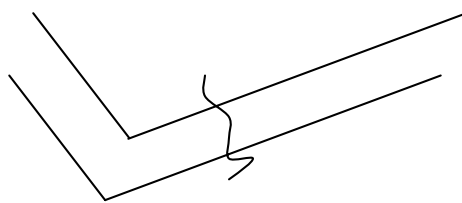
6. TP Cosmetic Defect.


Item No	Items to be inspected	Inspection Standard	Classification of defects																								
6.1	Black and white Spot defect Foreign Particle,	<p>For dark/white spot, size Φ is defined as $\Phi = \frac{(x+y)}{2}$</p>  <table border="1" style="width:100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="2" style="width: 20%;">Zone</th> <th colspan="3" style="text-align: center;">Acceptable Qty</th> </tr> <tr> <th style="width: 15%;">A</th> <th style="width: 15%;">B+C</th> <th style="width: 50%;"></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">$\Phi \leq 0.15$</td> <td colspan="2" style="text-align: center;">Ignore</td> <td rowspan="4" style="text-align: center; vertical-align: middle;">distance 5mm over</td> </tr> <tr> <td style="text-align: center;">$0.15 < \Phi \leq 0.25$</td> <td colspan="2" style="text-align: center;">6</td> </tr> <tr> <td style="text-align: center;">$0.25 < \Phi \leq 0.50$</td> <td colspan="2" style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">$\Phi > 0.5$</td> <td colspan="2" style="text-align: center;">0</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total defective dots shall not exceed 6 pcs on the same TP.</td> </tr> </tbody> </table>	Zone	Acceptable Qty			A	B+C		$\Phi \leq 0.15$	Ignore		distance 5mm over	$0.15 < \Phi \leq 0.25$	6		$0.25 < \Phi \leq 0.50$	4		$\Phi > 0.5$	0		Total defective dots shall not exceed 6 pcs on the same TP.				Minor
Zone	Acceptable Qty																										
	A	B+C																									
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$\Phi > 0.5$	0																										
Total defective dots shall not exceed 6 pcs on the same TP.																											

Item No	Items to be inspected	Inspection Standard	Classification of defects																																	
6.2	Black line, White line, Scratch, Foreign material under film,	<table border="1" style="width:100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th colspan="2" style="text-align: center;">Size(mm)</th> <th colspan="3" style="text-align: center;">Acceptable Qty</th> </tr> <tr> <th rowspan="2" style="width: 20%;">L(Length)</th> <th rowspan="2" style="width: 20%;">W(Width)</th> <th colspan="3" style="text-align: center;">Zone</th> </tr> <tr> <th style="width: 10%;">A</th> <th style="width: 10%;">B+C</th> <th style="width: 20%;"></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Ignore</td> <td style="text-align: center;">$W \leq 0.03$</td> <td colspan="3" style="text-align: center;">Ignore</td> </tr> <tr> <td style="text-align: center;">$L \leq 5.0$</td> <td style="text-align: center;">$0.03 < W \leq 0.05$</td> <td colspan="3" style="text-align: center;">5</td> </tr> <tr> <td style="text-align: center;">$L \leq 5.0$</td> <td style="text-align: center;">$0.05 < W \leq 0.1$</td> <td colspan="3" style="text-align: center;">2</td> </tr> <tr> <td></td> <td style="text-align: center;">$0.1 < W$</td> <td colspan="3" style="text-align: center;">0</td> </tr> </tbody> </table>	Size(mm)		Acceptable Qty			L(Length)	W(Width)	Zone			A	B+C		Ignore	$W \leq 0.03$	Ignore			$L \leq 5.0$	$0.03 < W \leq 0.05$	5			$L \leq 5.0$	$0.05 < W \leq 0.1$	2				$0.1 < W$	0			Minor
Size(mm)		Acceptable Qty																																		
L(Length)	W(Width)	Zone																																		
		A	B+C																																	
Ignore	$W \leq 0.03$	Ignore																																		
$L \leq 5.0$	$0.03 < W \leq 0.05$	5																																		
$L \leq 5.0$	$0.05 < W \leq 0.1$	2																																		
	$0.1 < W$	0																																		

TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA

6. TP Cosmetic Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects						
6.3	TP defect	<p>(i) Chips on corner</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">X(mm)</td> <td style="text-align: center;">Y(mm)</td> <td style="text-align: center;">Z(mm)</td> </tr> <tr> <td style="text-align: center;">≤ 3.0</td> <td style="text-align: center;">≤ 3.0</td> <td style="text-align: center;">$Z < T$</td> </tr> </table>	X(mm)	Y(mm)	Z(mm)	≤ 3.0	≤ 3.0	$Z < T$	Minor
		X(mm)	Y(mm)	Z(mm)					
		≤ 3.0	≤ 3.0	$Z < T$					
<p>(ii) Usual surface cracks</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">X(mm)</td> <td style="text-align: center;">Y(mm)</td> <td style="text-align: center;">Z(mm)</td> </tr> <tr> <td style="text-align: center;">≤ 6.0</td> <td style="text-align: center;">< 2.0</td> <td style="text-align: center;">$Z < T$</td> </tr> </table>	X(mm)	Y(mm)	Z(mm)	≤ 6.0	< 2.0	$Z < T$	Minor		
X(mm)	Y(mm)	Z(mm)							
≤ 6.0	< 2.0	$Z < T$							
		<p>(iii) Crack Cracks tending to break are not allowed.</p> 	Major						
6.4	Total number of dots	The total number of luminous dots, dark dots, contamination particles, bubbles, scratch defects, pinholes must not exceed 10 /piece on the same TP.							

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TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA			
7. Module Cosmetic Criteria			
Item No	Items to be inspected	Inspection Standard	Classification of defects
1	Difference in Spec.	None allowed	Major
2	Pattern peeling	No substrate pattern peeling and floating	Major
3	Soldering defects	No soldering missing No soldering bridge No cold soldering	Major Major Minor
4	Resist flaw on Printed Circuit Boards	visible copper foil (Ø0.5mm or more) on substrate pattern.	Minor
5	Accretion of metallic Foreign matter	No accretion of metallic foreign matters (Not exceed Ø0.2mm).	Minor Minor
6	Stain	No stain to spoil cosmetic badly.	Minor
7	Plate discoloring	No plate fading, rusting and discoloring.	Minor
8	Solder amount	a. Soldering side of PCB Solder to form a 'Filet' all around the lead. Solder should not hide the lead form perfectly. (too much)	Minor
	1. Lead parts	b. Components side (In case of 'Through Hole PCB') Solder to reach the Components side of PCB.	
	2. Flat packages	Either 'Toe' (A) or 'Seal' (B) of the lead to be covered by 'Filet'. Lead form to be assume over solder.	
	3. Chips	$(3/2) H \geq h \geq (1/2) H$	Minor
9	Solder splash	a.The spacing between solder ball and the conductor or solder pad $h \geq 0.13\text{mm}$.The diameter of solder ball $d \leq 0.15\text{mm}$. b.The quantity of solder balls or solder. Splashes isn't beyond 5 in 600 mm ² . c.Solder balls/Solder splashes do not violate minimum electrical clearance. d.Solder balls/Solder splashes must be entrapped / encapsulated or attached to the metal surface . Note: Entrapped/encapsulated/attached is intended to mean that normal service environment of the product will not cause a solder ball to become dislodged.	Minor Minor Major Minor

■ PRECAUTIONS FOR USING LCD MODULES

Handling Precautions

(1) The display panel is made of glass and polarizer. As glass is fragile. It tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring. Do not subject it to a mechanical shock by dropping it or impact.

(2) If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.

(3) Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary. Do not touch the display with bare hands. This will stain the display area and degraded insulation between terminals (some cosmetics are determined to the polarizer).

(4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully. Do not touch, push or rub the exposed polarizers with anything harder than an HB pencil lead (glass, tweezers, etc.). Do not put or attach anything on the display area to avoid leaving marks on. Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizer. After products are tested at low temperature they must be warmed up in a container before coming is contacting with room temperature air.

(5) If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten cloth with one of the following solvents

- Isopropyl alcohol
- Ethyl alcohol

Do not scrub hard to avoid damaging the display surface.

(6) Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.

- Water
- Ketone
- Aromatic solvents

Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading. Avoid contacting oil and fats.

(7) Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.

(8) Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.

(9) Do not attempt to disassemble or process the LCD module.

(10) NC terminal should be open. Do not connect anything.

(11) If the logic circuit power is off, do not apply the input signals.

(12) Electro-Static Discharge Control, Since this module uses a CMOS LSI, the same careful attention should be paid to electrostatic discharge as for an ordinary CMOS IC. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

- Before remove LCM from its packing case or incorporating it into a set, be sure the module and your body have the same electric potential. Be sure to ground the body when handling the LCD modules.

- Tools required for assembling, such as soldering irons, must be properly grounded. make certain the AC power source for the soldering iron does not leak. When using an electric screwdriver to attach LCM, the screwdriver should be of ground potentiality to minimize as much as possible any transmission of electromagnetic waves produced sparks coming from the commutator of the motor.

- To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions. To reduce the generation of static electricity be careful that the air in the work is not too dried. A relative humidity of 50%-60% is recommended. As far as possible make the electric potential of your work clothes and that of the work bench the ground potential

- The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated

(13) Since LCM has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the module or making any alterations or modifications to it.

- Do not alter, modify or change the shape of the tab on the metal frame.
- Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
- Do not damage or modify the pattern writing on the printed circuit board.
- Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector.
- Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
- Do not drop, bend or twist LCM.

Storage Precautions

When storing the LCD modules, the following precaution is necessary.

- (1) Store them in a sealed polyethylene bag. If properly sealed, there is no need for the dessicant.
- (2) Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0°C and 35°C.
- (3) The polarizer surface should not come in contact with any other objects. (We advise you to store them in the container in which they were shipped).

Others

Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

- Exposed area of the printed circuit board.
- Terminal electrode sections.

Handling precaution for LCM

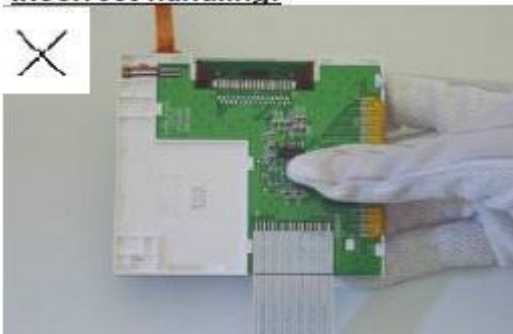
LCM is easy to be damaged.
Please note below and be careful for handling!

Correct handling:

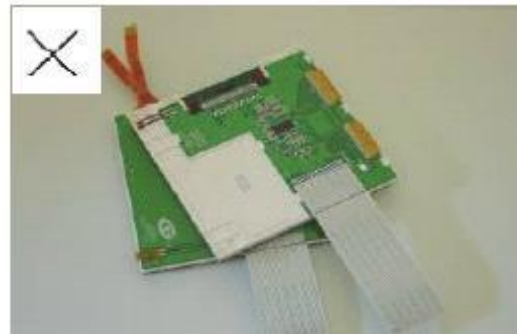


As above picture, please handle with anti-static gloves around LCM edges.

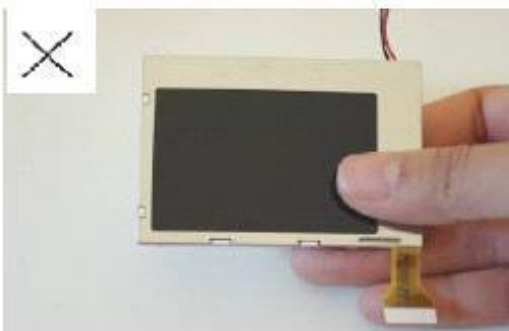
Incorrect handling:



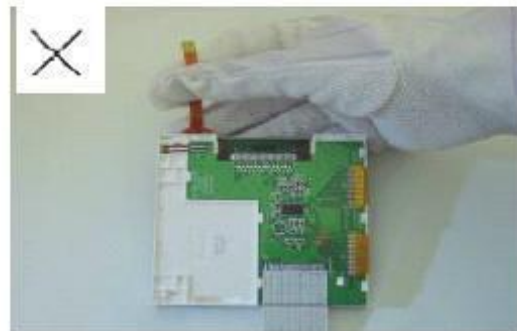
Please don't touch IC directly.



Please don't stack LCM.



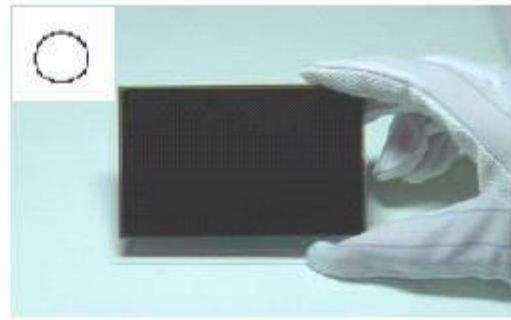
Please don't hold the surface of panel.



Please don't stretch interface of output, such as FPC cable.

Handling precaution for LCD

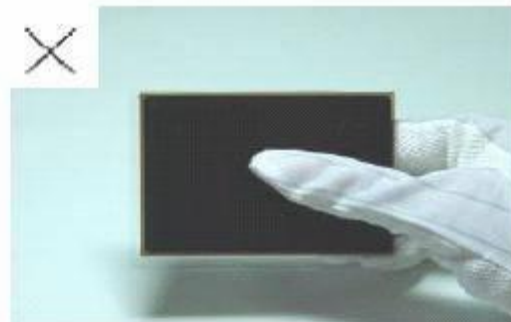
LCD is easy to be damaged.
Please note below and be careful for handling!

Correct handling:

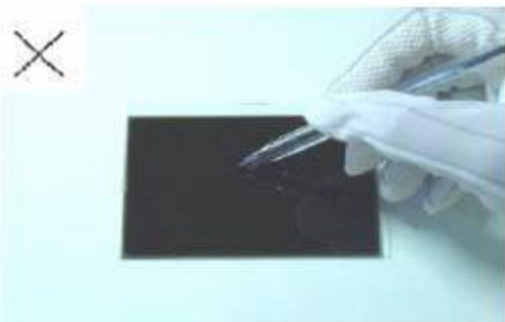
As above photo, please handle with anti-static gloves around LCD edges.

Incorrect handling:

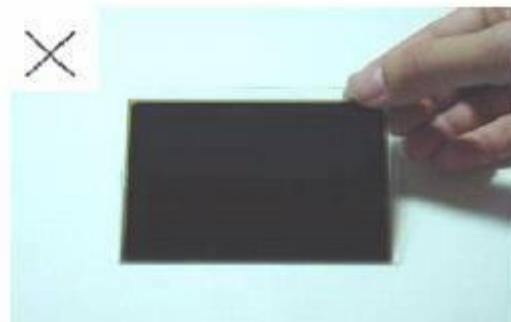
Please don't stack the LCDS.



Please don't hold the surface of LCD.



Please don't operate with sharp stick such as pens.



Please don't touch ITO glass without anti-static gloves.

Storage Precautions

When storing the LCD modules, the following precaution is necessary.

- (1) Store them in a sealed polyethylene bag. If properly sealed, there is no need for the dessicant.
- (2) Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0°C and 35°C, and keep the relative humidity between 40%RH and 60%RH.
- (3) The polarizer surface should not come in contact with any other objects. (We advise you to store them in the anti-static electricity container in which they were shipped.

Others

Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

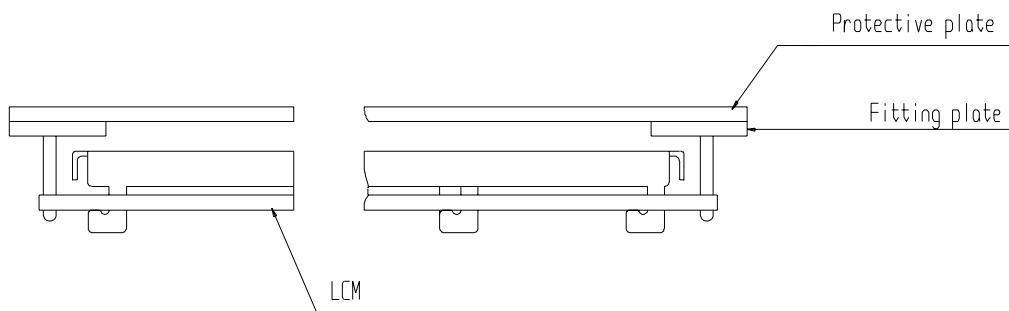
- Exposed area of the printed circuit board.
- Terminal electrode sections.

USING LCD MODULES

Installing LCD Modules

The hole in the printed circuit board is used to fix LCM as shown in the picture below. Attend to the following items when installing the LCM.

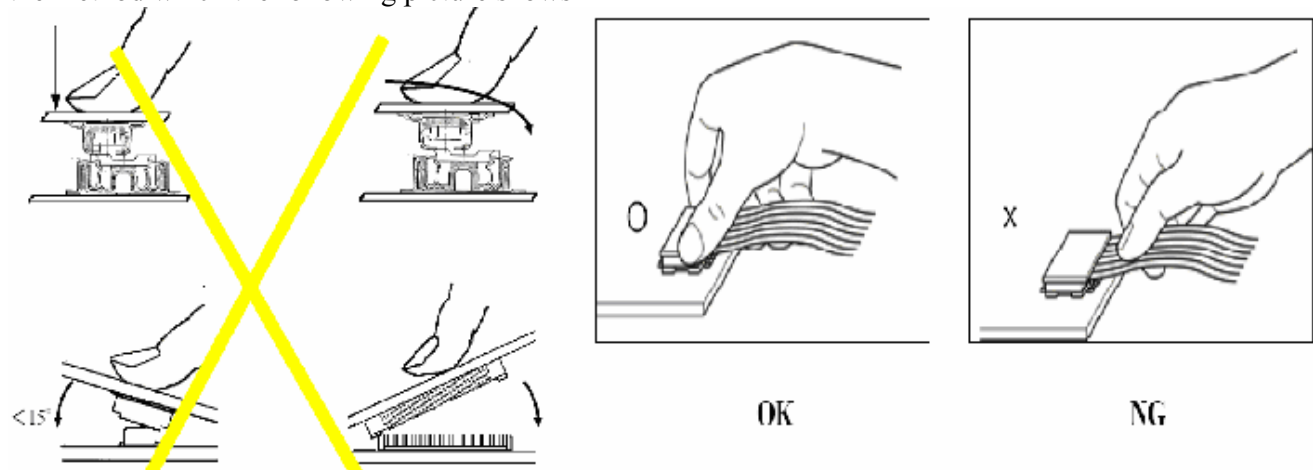
- (1) Cover the surface with a transparent protective plate to protect the polarizer and LC cell.



- (2) When assembling the LCM into other equipment, the spacer to the bit between the LCM and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements. The measurement tolerance should be $\pm 0.1\text{mm}$.

Precaution for assemble the module with BTB connector:

Please note the position of the male and female connector position, don't assemble or assemble like the method which the following picture shows



Precaution for soldering to the LCM

	Hand soldering	Machine drag soldering	Machine press soldering
No ROHS product	290°C ~350°C. Time : 3-5S.	330°C ~350°C. Speed : 4-8 mm/s.	300°C ~330°C. Time : 3-6S. Press: 0.8~1.2Mpa
ROHS product	340°C ~370°C. Time : 3-5S.	350°C ~370°C. Time : 4-8 mm/s.	330°C ~360°C. Time : 3-6S. Press: 0.8~1.2Mpa

(1) If soldering flux is used, be sure to remove any remaining flux after finishing to soldering operation. (This does not apply in the case of a non-halogen type of flux.) It is recommended that you protect the LCD surface with a cover during soldering to prevent any damage due to flux spatters.

(2) When soldering the electroluminescent panel and PC board, the panel and board should not be detached more than three times. This maximum number is determined by the temperature and time conditions mentioned above, though there may be some variance depending on the temperature of the soldering iron.

(3) When remove the electroluminescent panel from the PC board, be sure the solder has completely melted, the soldered pad on the PC board could be damaged.

Precautions for Operation

(1) Viewing angle varies with the change of liquid crystal driving voltage (VLCD). Adjust VLCD to show the best contrast.

(2) It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life. An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.

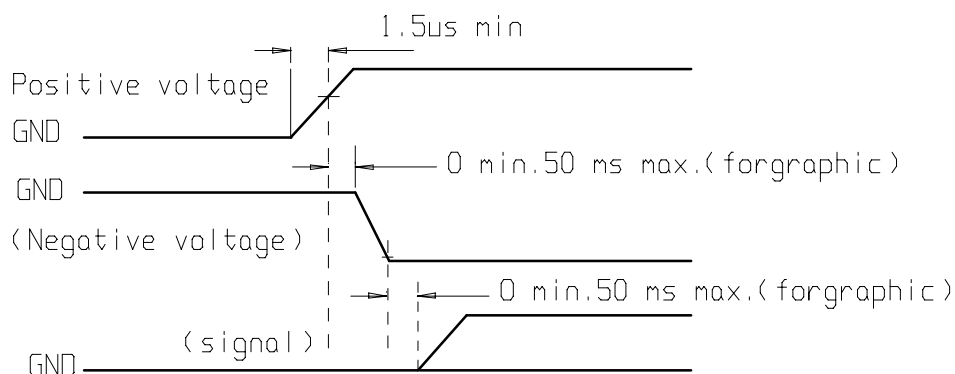
(3) Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD's show dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, Which will come back in the specified operating temperature.

(4) If the display area is pushed hard during operation, the display will become abnormal. However, it will return to normal if it is turned off and then back on.

(5) A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit. Usage under the maximum operating temperature, 50%RH or less is required.

(6) Input each signal after the positive/negative voltage becomes stable.

(7) Please keep the temperature within specified range for use and storage. Polarization degradation, bubble generation or polarizer peel-off may occur with high temperature and high humidity.



Safety

(1) It is recommended to crush damaged or unnecessary LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned.

(2) If any liquid leaks out of a damaged glass cell and comes in contact with the hands, wash off thoroughly with soap and water.

Limited Warranty

Unless agreed between Multi-Inno and customer, Multi-Inno will replace or repair any of its LCD modules which are found to be functionally defective when inspected in accordance with Multi-Inno LCD acceptance standards (copies available upon request) for a period of one year from date of production. Cosmetic/visual defects must be returned to Multi-Inno within 90 days of shipment. Confirmation of such date shall be based on data code on product. The warranty liability of Multi-Inno limited to repair and/or replacement on the terms set forth above. Multi-Inno will not be responsible for any subsequent or consequential events.

Return LCM under warranty

No warranty can be granted if the precautions stated above have been disregarded. The typical examples of violations are :

- Broken LCD glass.
- PCB eyelet is damaged or modified.
- PCB conductors damaged.
- Circuit modified in any way, including addition of components.
- PCB tampered with by grinding, engraving or painting varnish.
- Soldering to or modifying the bezel in any manner.

Module repairs will be invoiced to the customer upon mutual agreement. Modules must be returned with sufficient description of the failures or defects. Any connectors or cable installed by the customer must be removed completely without damaging the PCB eyelet, conductors and terminals.

■ PRIOR CONSULT MATTER

- 1.①For Multi-Inno standard products, we keep the right to change material, process ... for improving the product property without notice on our customer.
②For OEM products, if any change needed which may affect the product property, we will consult with our customer in advance.
2. If you have special requirement about reliability condition, please let us know before you start the test on our samples.