Display Elektronik GmbH

DATA SHEET

TFT MODULE

DEM 160240A TMH-PW-N

1,5“ TFT

Product Specification **Ver.: 0**

28.10.2017

Revision History

Revision	Date	Originator	Detail	Remarks
0	28.10.2017	ZFY	Initial Release	-

Table of Contents

1. General Description

The specification 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 IC and a backlight unit.

2. Module Parameter

Features	Details	Unit
Display Size (Diagonal)	1.5”	-
LCD Type	TN TFT	-
Display Mode	Transmissive / Normally White	-
Resolution	160 x RGB x 240	Pixels
View Direction	12 O’clock	Best Image
Gray Scale Inversion Direction	6 O’clock	-
Module Outline	37.10 x 32.70 x 2.50 (Note1)	mm
Active Area	29.76 x 22.32	mm
Pixel Size	0.186 x 0.93	mm
Pixel Arrangement	RGB Delta	-
Polarizer Surface Treatment	Normal	-
Display Colors	262k	-
Interface	8-Bit-RGB + 3-Wire SPI	-
Driver IC	OTA5182A (Orise Tech)	-
With or without Touch Panel	without	-
Operating Temperature	-10°C to +60°C	ºC
Storage Temperature	-20°C to +70°C	ºC
Weight	(4)	G

Note 1: Exclusive hooks, posts, FFC/FPC tail etc.

3. Absolute Maximum Ratings

V_{SS}=0V, Ta=25ºC

Item	Symbol	Min.	Max.	Unit
Power Supply	VCC	-0.3	4.6	V
Storage Temperature	T_{stg}	-20	+70	ºC
Operating Temperature	T_{op}	-10	+60	ºC

Note 1: If Ta below 50ºC, the maximal humidity is 90%RH, if Ta over 50ºC, absolute humidity should be less than 60%RH.

Note 2: The response time will be extremely slow when the operating temperature is around -10°C, and the back ground will become darker at high temperature operating.

4. DC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	VCC	2.5	2.8	3.3	V
Logic Low Input Voltage	V_{IL}	GND	-	0.3*VCC	V
Logic High Input Voltage	V_{IH}	0.7*VCC	-	VCC	V
Logic Low Output Voltage	V_{IL}	GND	-	GND+0.4	V
Logic High Output Voltage	V_{IH}	VCC-0.4	-	VCC	V
Current Consumption for LCD All Black	I_{CC}	-	(10)	-	mA

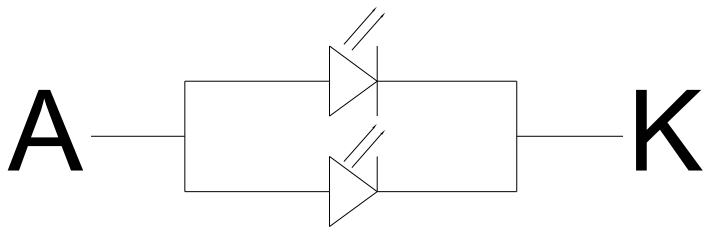
5. Backlight Characteristic

5.1. Backlight Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	Ta=25 ºC, I_F=20mA/LED	2.8	3.2	3.4	V
Forward Current	I_F	Ta=25 ºC, V_F=3.2V/LED	-	40	-	mA
Power Dissipation	Pd		-	128	-	mW
Uniformity	Avg		-	80	-	%
LED Lifetime (25°C)	-		20000	30000	-	Hrs
Drive Method	Constant Current					
LED Configuration	2 White LED Parallel					

Note1：LED life time defined as follows: The final brightness is at 50% of original brightness.
The environmental conducted under ambient air flow, at Ta=25°C±2ºC, 60%RH±5%, I_F=20mA

5.2. Backlighting Circuit



6. Optical Characteristics

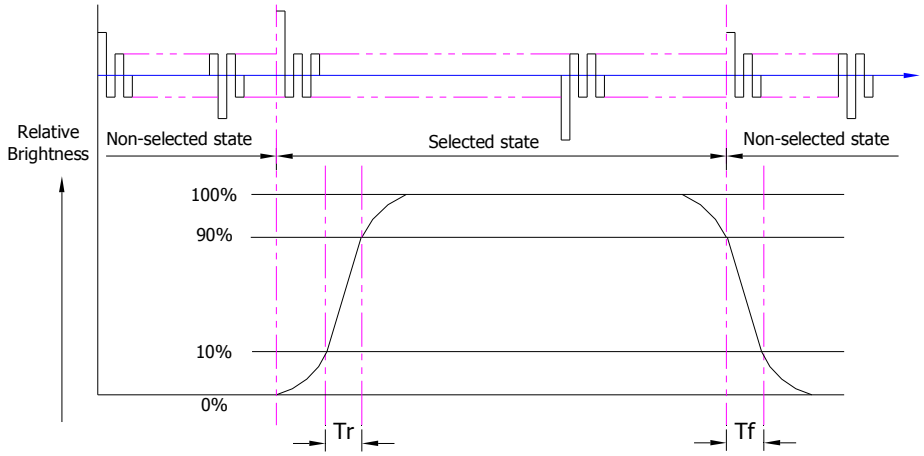
6.1. Optical Characteristics

Ta=25ºC, V_{DD} =2.8V, TN LC+ Polarizer

	Item		Symbol	Condition	Specification			Unit
					Min.	Typ.	Max.	
Backlight On (Transmissive Mode)	Luminance on TFT(I_f =20mA/LED)		Lv	Normally viewing angle θX = φY =0º	120	150	-	cd/m²
	Contrast ratio(See 6.3)		CR		200	300	-	
	Response time (See 6.2)		TR+TF		-	25	50	ms
	Chromaticity Transmissive (See 6.5)	Red	XR		0.533	0.583	0.633	
			YR		0.269	0.319	0.369	
		Green	XG		0.251	0.301	0.351	
			YG		0.573	0.623	0.673	
		Blue	XB		0.095	0.145	0.195	
			YB		0.016	0.066	0.116	
		White	XW		0.192	0.242	0.292	
			YW		0.213	0.263	0.313	
	Viewing Angle (See 6.4)	Horizontal	θX+	Center CR≥10	30	40		Deg.
			θX-		30	40		
		Vertical	φY+		10	20		
			φY-		40	50		
	NTSC Ratio(Gamut)				-	54.3	-	%

6.2. Definition of Response Time

6.2.1. Normally Black Type (Negative)

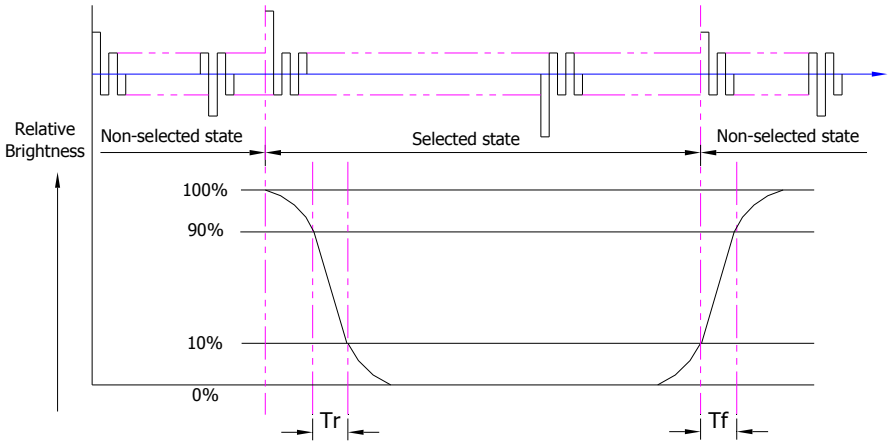


Tr is the time it takes to change form non-selected stage with relative luminance 10% to selected state with relative luminance 90%;

Tf is the time it takes to change from selected state with relative luminance 90% to non-selected state with relative luminance 10%.

Note : Measuring machine: LCD-5100

6.2.2. Normally White Type (Positive)



Tr is the time it takes to change form non-selected stage with relative luminance 90% to selected state with relative luminance 10%;

Tf is the time it takes to change from selected state with relative luminance 10% to non-selected state with relative luminance 90%;

Note: Measuring machine: LCD-5100 or EQUI

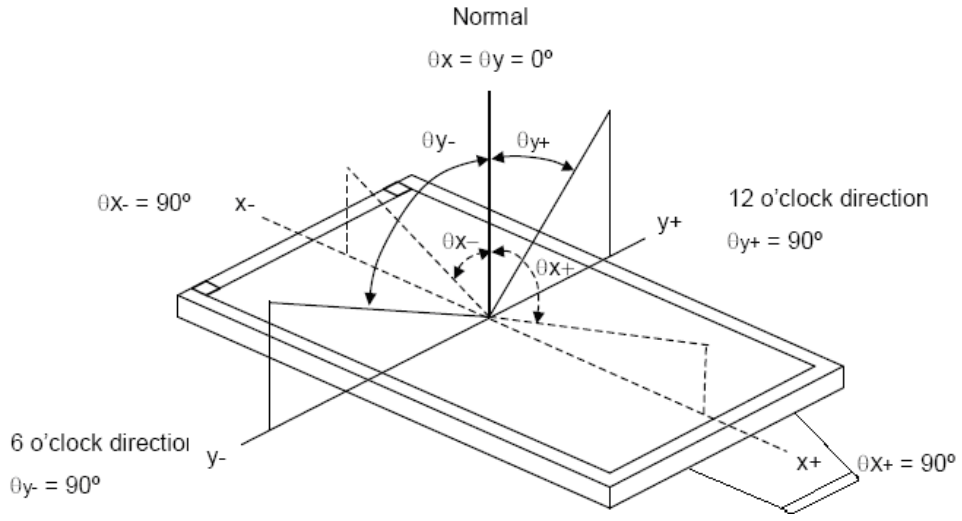
6.3. Definition of Contrast Ratio

Contrast is measured perpendicular to display surface in reflective and transmissive mode. The measurement condition is:

Measuring Equipment	Eldim or Equivalent
Measuring Point Diameter	3mm//1mm
Measuring Point Location	Active Area centre point
Test pattern	A: All Pixels white
	B: All Pixel black
Contrast setting	Maximum

Definitions: CR (Contrast) = Luminance of White Pixel / Luminance of Black Pixel

6.4. Definition of Viewing Angles



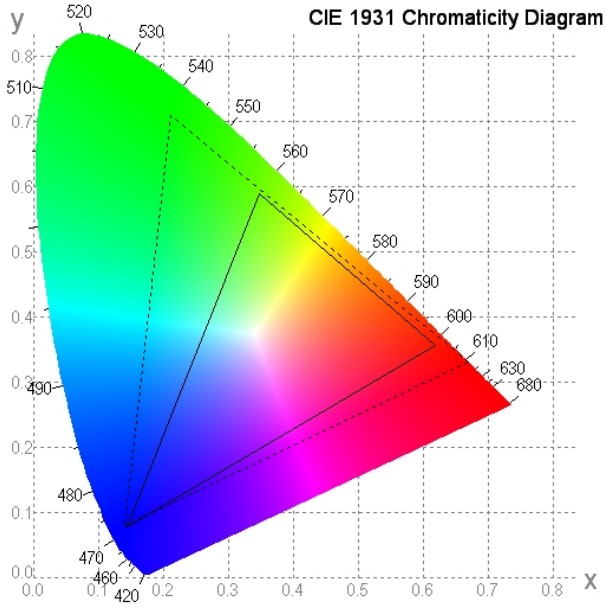
Measuring machine: LCD-5100 or EQUI

6.5. Definition of Color Appearance

R,G,B and W are defined by (x, y) on the IE chromaticity diagram

NTSC=area of RGB triangle/area of NTSC triangleX100%

Measuring picture: Red, Green, Blue and White (Measuring machine: BM-7)



6.6. Definition of Surface Luminance, Uniformity and Transmittance

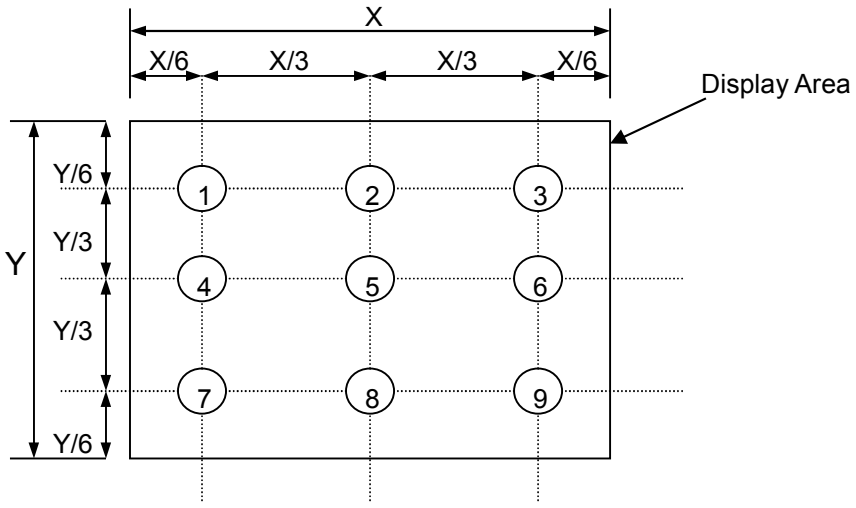
Using the transmissive mode measurement approach, measure the white screen luminance of the display panel and backlight.

6.6.1. Surface Luminance: L_V = average (L_{P1}:L_{P9})

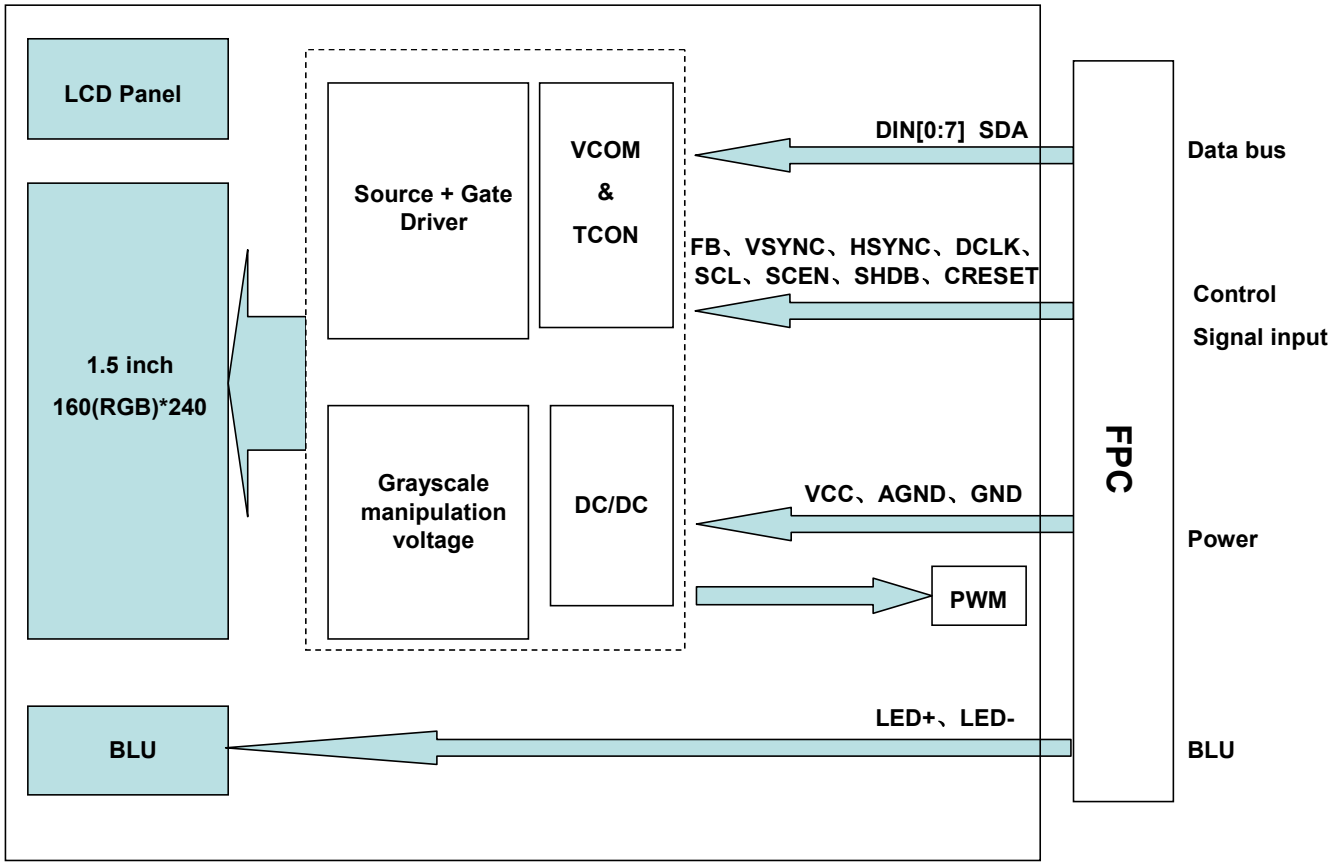
6.6.2. Uniformity = Minimal (L_{P1}:L_{P9}) / Maximal (L_{P1}:L_{P9}) * 100%

6.6.3. Transmittance = L_V on LCD / L_V on Backlight * 100%

Note: Measuring machine: BM-7



7. Block Diagram and Power Supply



8. Interface Pins Definition

No.	Symbol	Function	Remark
1	VDD_25V	Digital power supply.	
2	VDD3	Intermediate voltage for Charge Pump.	
3	NC	No connection.	
4	NC	No connection.	
5	NC	No connection.	
6	NC	No connection.	
7	NC	No connection.	
8	NC	No connection.	
9	NC	No connection.	
10	NC	No connection.	
11	NC	No connection.	
12	AGND	Ground.	
13	DUMMY	Dummy pin. Leave it open.	
14	VCAC	Defines the amplitude of the VCOM swing(VCOM_AC value).	
15	FRP	Frame polarity output.	
16	VCOM	A supply voltage to the common electrode of TFT panel.	
17	DRV	Gate signal for the power transistor of the boost converter.	
18	FB	Main boost regulator feedback input.	
19	LED-	LED Cathode.	
20	DUMMY	Dummy pin. Leave it open.	
21	DUMMY	Dummy pin. Leave it open.	
22	LED+	LED Anode.	
23	GND	Ground.	
24	VCC	Power supply.	
25	VSYNC	Frame synchronizing signal for RGB.	
26	HSYNC	Line synchronizing signal for RGB.	
27	DCLK	Dot clock signal for RGB.	
28	DIN0	Data bus.	
29	DIN1		
30	DIN2		
31	DIN3		
32	DIN4		
33	DIN5		
34	DIN6		
35	DIN7		
36	SDA	Serial communication data input.	
37	SCL	Serial communication clock input.	
38	SCEN	Serial communication chip select.	
39	SHDB	DC-DC converter shutdown setting.	
40	CREST	Reset pin.	

9. AC Characteristics

9.1. AC Characteristics

Table 1: AC characteristics (VDD=3.3V, AGND=GND=0V, T_{OPR} = -30°C to +85°C)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CLK pulse duty	Tcw		40	50	60	%
Delay between Hsync and DCLK	Thc		-	-	1.0	DCLK
Hsync width	Twh		1.0	-	-	DCLK
Hsync period	Th		60	63.56	67	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	D00~D07 to DCLK	12	-	-	ns
Data hold time	Tdhd	D00~D07 to DCLK	12	-	-	ns
VSync to 1st gate Output	Tstv	Sel="111";By HDL[3..0] settings	6	13	21	Th
CCIR V to 1st gate Output	Tstv	Sel="111" NTCS (PAL=0); By HDL[3..0] settings	14	21	29	Th
CCIR V to 1st gate Output	Tstv	Sel="111" PAL=1; By HDL[3..0] settings	20	27	35	Th
SD output stable time	Tst	30mV precision; CL=6.75pF, R=3.62K	-	25	30	us
GD output delay time	Tgd	CL=17.6pF, R=1.29K	-	900	1500	ns
GD output rise and fall time	Tgst	CL=17.6pF, R=1.29K 10% to 90%	-	900	1500	ns
Serial communication						
Serial clock period	Tsck		320	-	-	ns
Serial clock duty cycle	Tscw		40	50	60	%

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Serial clock width low/high	Tssw		120			ns
Serial data setup time	Tist		120			ns
Serial data hold time	Tihd		120			ns
CSB setup time	Tcst		240			ns
CSB data hold time	Tchd		120			ns
Chip select distinguish	Tcd		1			us
Delay between CSB and Vsync	Tcv		1			us

9.2. Operating mode dependent AC characteristics

SERIAL RGB MODE

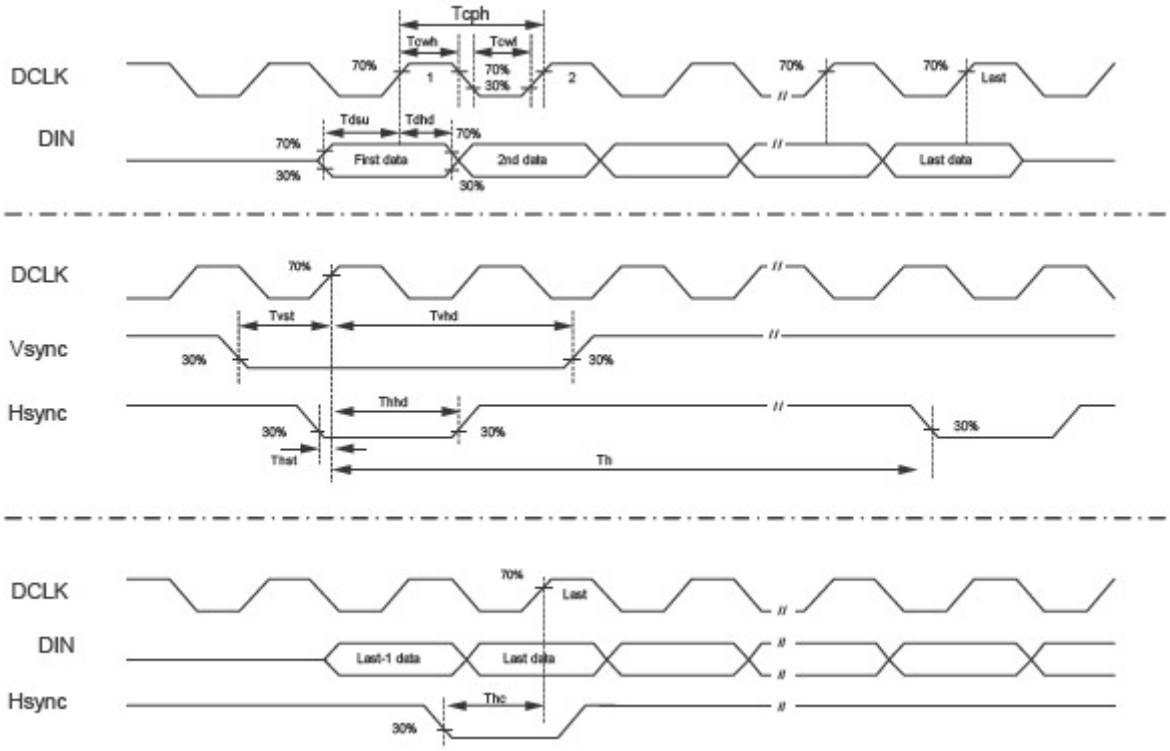
The below specifications apply for:

SEL2	SEL1	SEL0
0	0	1

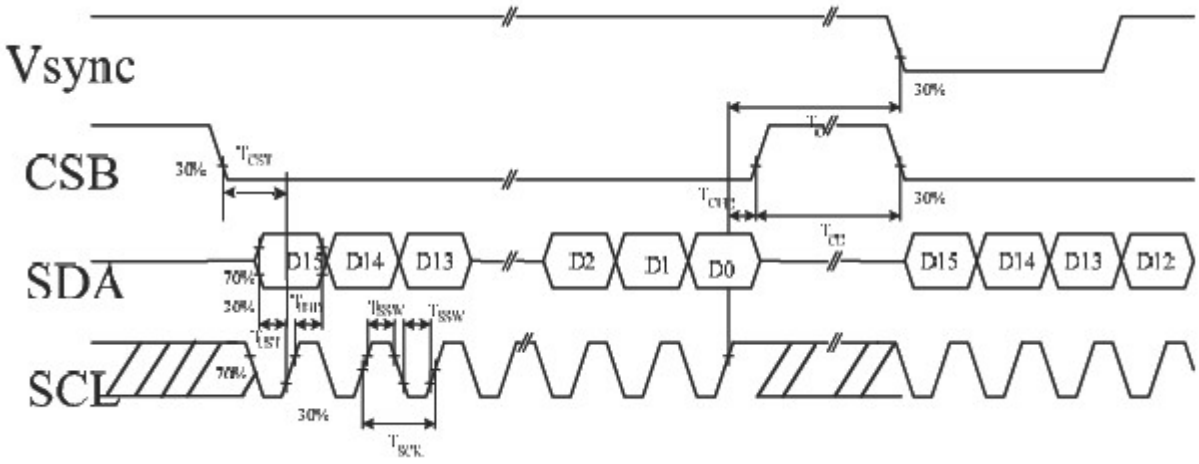
Table 3: SERIAL MODE, AC characteristics (VDD=3.3V, AGND=GND=0V, T_{OPR} = -30°C to +85°C)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
DCLK frequency	Fclk		-	24.54/27	-	MHz
DCLK cycle time	Tcph		-	40/37	-	ns
Delay from Hsync to Source Output	Thso		-	143	-	DCLK
Delay from Hsync to Gate Output	Thgo		-	113	-	DCLK
Delay from Hsync to Gate Output off	Thgz		-	48	-	DCLK

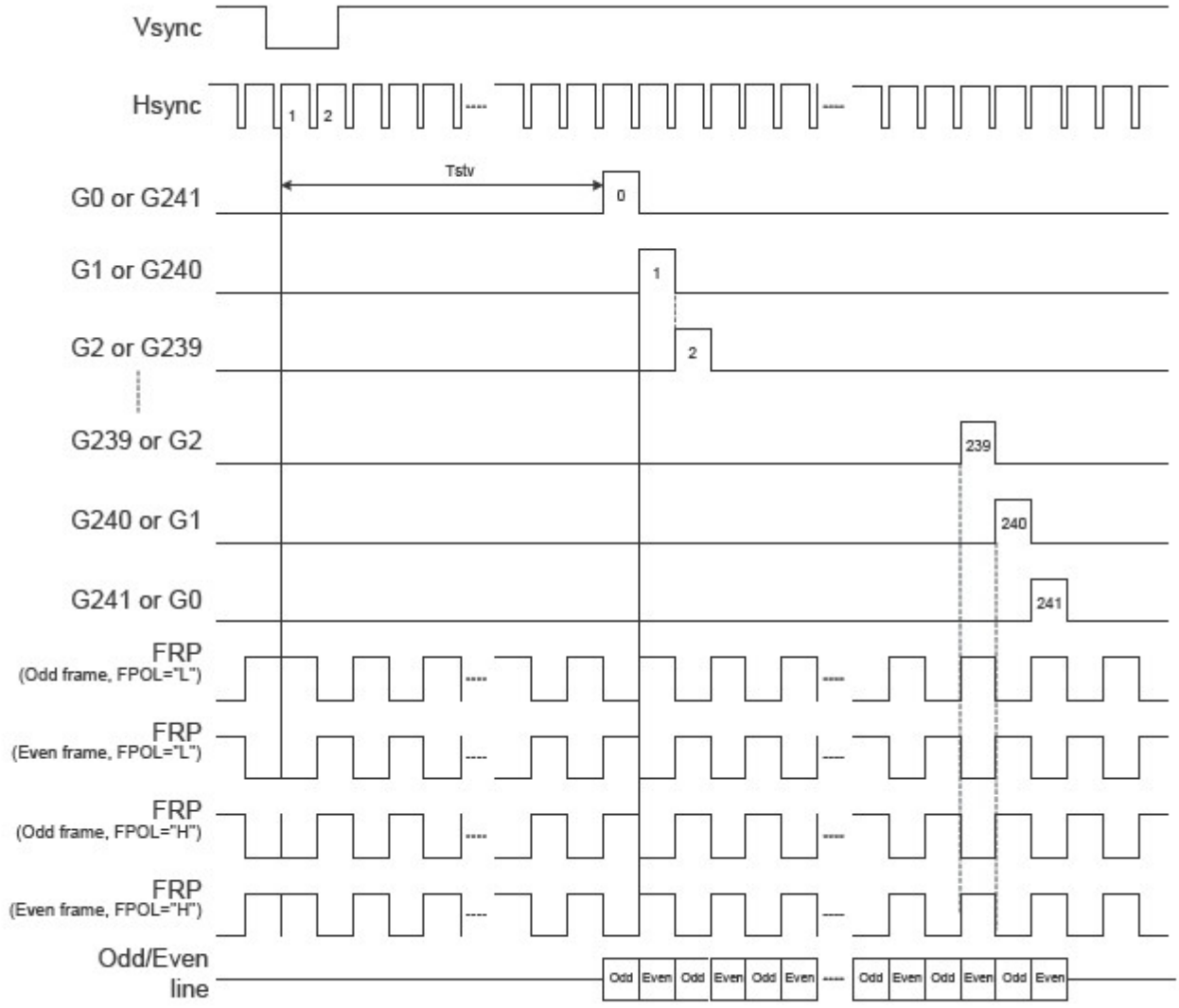
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Delay from Hsync to Q1H	Thq		-	100	-	DCLK
Delay from Hsync to FRP	Thf			143		DCLK
Delay from Hsync to 1st data input	Ths	Function of DDL[5..0] settings	220	252	283	DCLK
DC converter osc. Frequency	Fosc	Fclk/64 = 383.4kHz / 421.9kHz	-	383.4 / 421.9	-	kHz



AC Drivers Timing

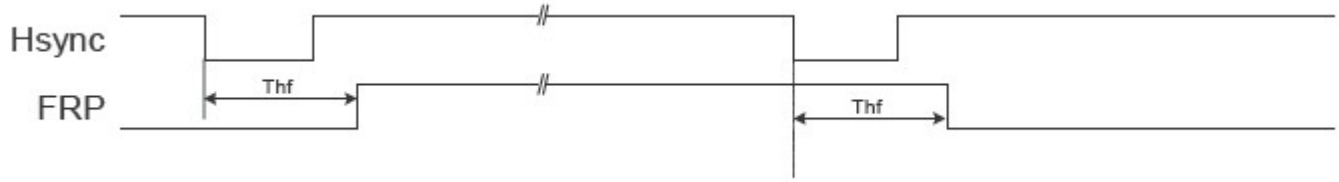


AC Serial communication timing



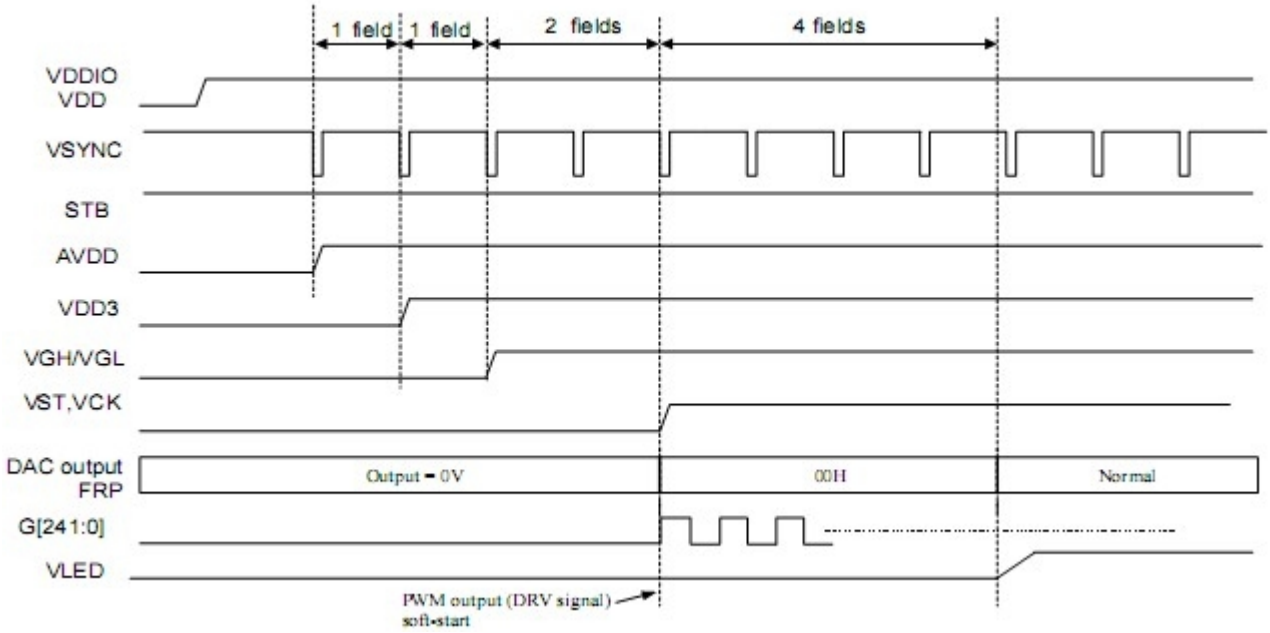
Note: SD Line 1,3,5,..., 241 =Odd line, : SD Line 2,5, 6,..., 242 =Even line

Vertical Timing Diagram

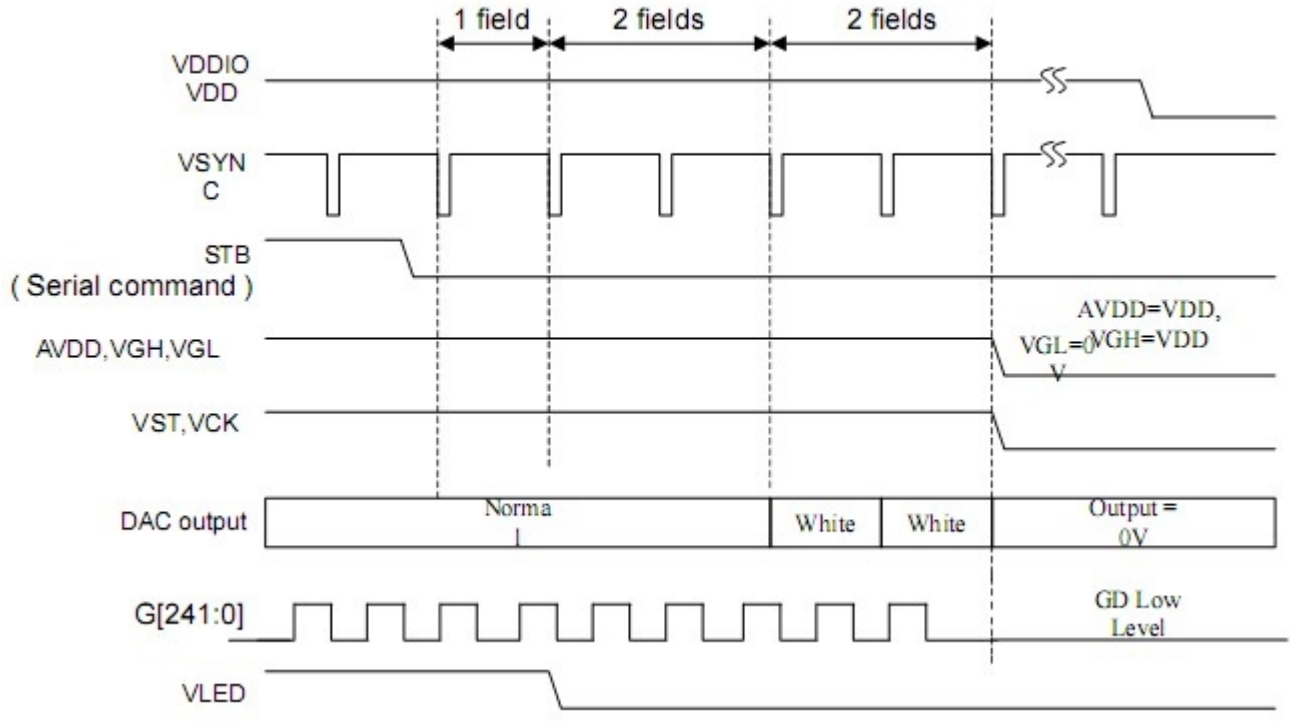


Horizontal Timing Diagram

9.3. Power on/off sequence



Power On Sequence



Power Off Sequence

10. Quality Assurance

10.1 Purpose

This standard for Quality Assurance assures the quality of LCD module products supplied to customer.

10.2 Standard for Quality Test

10.2.1 Sampling Plan:

GB2828.1-2012

Single sampling, normal inspection.

10.2.2 Sampling Criteria:

Visual inspection: AQL 1.5%

Electrical functional: AQL 0.65%.

10.2.3 Reliability Test:

Detailed requirement refer to Reliability Test Specification.

10.3 Nonconforming Analysis & Disposition

10.3.1 Nonconforming analysis:

10.3.1.1 Customer should provide overall information of non-conforming sample for their complaints.

10.3.1.2 After receipt of detailed information from customer, the analysis of nonconforming parts usually should be finished in one week.

10.3.1.3 If can not finish the analysis on time, customer will be notified with the progress status.

10.3.2 Disposition of nonconforming:

10.3.2.1 Non-conforming product over PPM level will be replaced.

10.3.2.2 The cause of non-conformance will be analyzed. Corrective action will be discussed and implemented.

10.4 Agreement Items

Shall negotiate with customer if the following situation occurs:

10.4.1 There is any discrepancy in standard of quality assurance.

10.4.2 Additional requirement to be added in product specification.

10.4.3 Any other special problem.

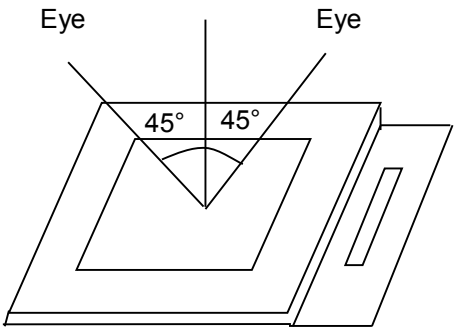
10.5 Standard of the Product Visual Inspection

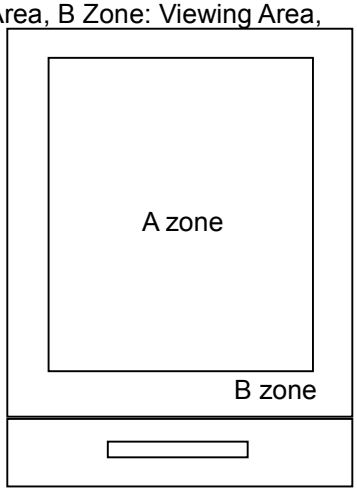
10.5.1 Appearance inspection:

10.5.1.1 The inspection must be under illumination about 1000 – 1500 lx, and the distance of view must be at 30cm ± 2cm.

10.5.1.2 The viewing angle should be 45° from the vertical line without reflection light or follows customer's viewing angle specifications.

10.5.1.3 Definition of area: A Zone: Active Area, B Zone: Viewing Area,



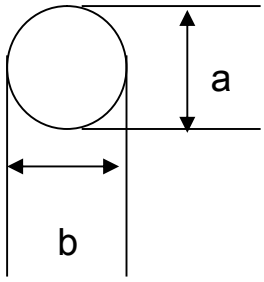


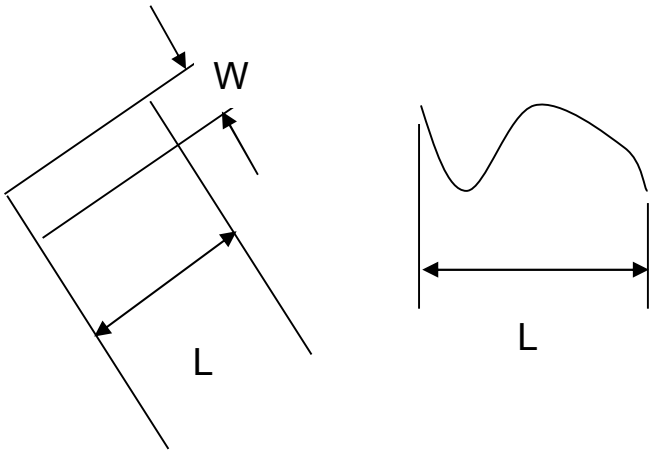
10.5.2 Basic principle:

10.5.2.1 A set of sample to indicate the limit of acceptable quality level must be discussed by both us and customer when there is any dispute happened.

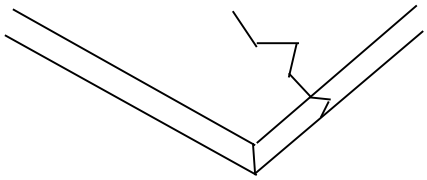
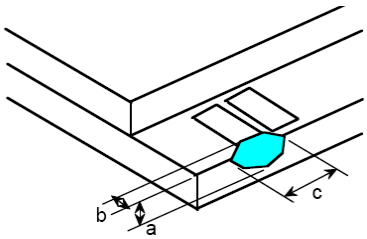
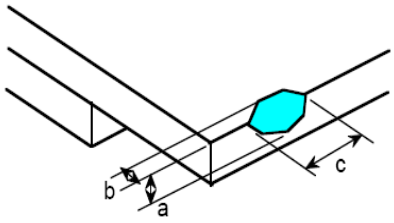
10.5.2.2 New item must be added on time when it is necessary.

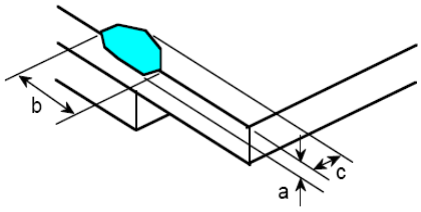
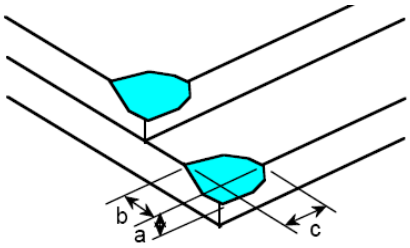
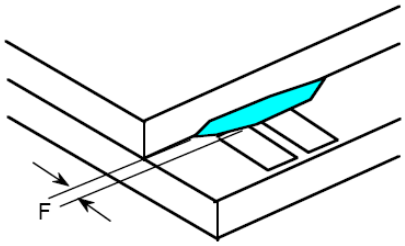
10.6 Inspection Specification

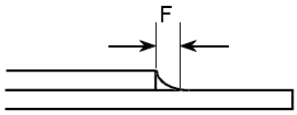
<table>
<tr><th>No.</th><th>Item</th><th>Criteria (Unit: mm)</th></tr>
<tr><td>01</td><td>Black / White spot
Foreign material
(Round type)
Pinholes
Stain
Particles inside cell.
(Minor defect)</td><td>


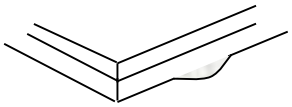
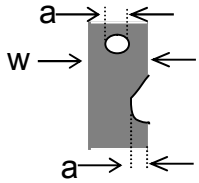
φ= (a + b) /2
<table>
<tr><th>Area / Size</th><th>Acc. Qty</th></tr>
<tr><td>φ≤0.10</td><td>Ignore</td></tr>
<tr><td>0.10<φ≤0.15</td><td>2</td></tr>
<tr><td>0.15<φ≤0.25</td><td>1</td></tr>
<tr><td>0.25<φ</td><td>0</td></tr>
<tr><td>Total</td><td>2 no include φ≤ 0.10</td></tr>
</table>
Distance between 2 defects should more than 3mm apart.
</td></tr>
<tr><td>02</td><td>Electrical Defect
(Minor defect)</td><td>
<table>
<tr><th></th><th>Display Area</th><th>Total</th><th rowspan="4">Note1</th></tr>
<tr><td>Bright dot</td><td>0</td><td>0</td></tr>
<tr><td>Dark dot</td><td>N≤2</td><td>N≤2</td></tr>
<tr><td>Total dot</td><td>N≤2</td><td>N≤2</td></tr>
<tr><td>Mura</td><td colspan="2">Not visible through 5% ND filter.</td><td>Note 2</td></tr>
</table>
Remark:
1. Bright dot caused by scratch and foreign object accords to item 1.
</td></tr>
<tr><td>03</td><td>Black and White line
Scratch
Foreign material
(Line type)
(Minor defect)</td><td>


<table>
<tr><th>Length</th><th>Width</th><th>Acc. Qty</th></tr>
<tr><td>/</td><td>W ≦ 0.03</td><td>Ignore</td></tr>
<tr><td>L ≦ 2.5</td><td>0.03 < W ≦ 0.05</td><td>3</td></tr>
<tr><td>L ≦ 2.5</td><td>0.05 < W ≦ 0.10</td><td>2</td></tr>
<tr><td>/</td><td>0.1 < W</td><td>0</td></tr>
<tr><td colspan="2">Total</td><td>3</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td></td><td>Distance between 2 defects should more than 3mm apart. Scratches not viewable through the back of the display are acceptable.</td></tr>
<tr><td>04</td><td>Glass Crack
(Minor defect)</td><td> 
Crack is potential to enlarge, any type is not allowed.</td></tr>
<tr><td>05</td><td>Glass Chipping Pad Area:
(Minor defect)
  </td><td><table><tr><th>Length and Width</th><th>Acc. Qty</th></tr><tr><td>c > 3.0, b< 1.0</td><td>1</td></tr><tr><td>c< 3.0, b< 1.0</td><td>3</td></tr><tr><td colspan="2">a<Glass Thickness</td></tr></table></td></tr>
<tr><td>06</td><td>Glass Chipping Rear of Pad Area:
(Minor defect)
  </td><td><table><tr><th>Length and Width</th><th>Acc. Qty</th></tr><tr><td>c > 3.0, b< 1.0</td><td>1</td></tr><tr><td>c< 3.0, b< 1.0</td><td>2</td></tr><tr><td>c< 3.0, b< 0.5</td><td>4</td></tr><tr><td colspan="2">a<Glass Thickness</td></tr></table></td></tr>
</table>

<table>
<tr>
<td>07</td>
<td>Glass Chipping Except Pad Area:
(Minor defect)
 
</td>
<td><table>
<tr><th>Length and Width</th><th>Acc. Qty</th></tr>
<tr><td>c > 3.0, b< 1.0</td><td>1</td></tr>
<tr><td>c< 3.0, b< 1.0</td><td>2</td></tr>
<tr><td>c< 3.0, b< 0.5</td><td>4</td></tr>
<tr><td colspan="2">a<Glass Thickness</td></tr>
</table></td>
</tr>
<tr>
<td>08</td>
<td>Glass Corner Chipping:
(Minor defect)
 
</td>
<td><table>
<tr><th>Length and Width</th><th>Acc. Qty</th></tr>
<tr><td>c < 3.0, b< 3.0</td><td>Ignore</td></tr>
<tr><td colspan="2">a<Glass Thickness</td></tr>
</table></td>
</tr>
<tr>
<td>09</td>
<td>Glass Burr:
(Minor defect)
 

  </td>
<td><table>
<tr><th>Length</th><th>Acc. Qty</th></tr>
<tr><td>F < 1.0</td><td>Ignore</td></tr>
</table>
Glass burr don’t affect assemble and module dimension.</td>
</tr>
<tr>
<td>10</td>
<td>FPC Defect:
(Minor defect)
 
</td>
<td>10.1 Dent, pinhole width a<w/3.
(w: circuitry width.)
10.2 Open circuit is unacceptable.
10.3 No oxidation, contamination and distortion.</td>
</tr>
</table>

<table>
<tr><td>11</td><td>Bubble on Polarizer
(Minor defect)</td><td><table><tr><th>Diameter</th><th>Acc. Qty</th></tr><tr><td>φ≤0.20</td><td>Ignore</td></tr><tr><td>0.20 <φ≤0.30</td><td>4</td></tr><tr><td>0.30 < φ</td><td>None</td></tr></table></td></tr>
<tr><td>12</td><td>Dent on Polarizer
(Minor defect)</td><td><table><tr><th>Diameter</th><th>Acc. Qty</th></tr><tr><td>φ≤0.20</td><td>Ignore</td></tr><tr><td>0.20 <φ≤0.30</td><td>4</td></tr><tr><td>0.30 < φ</td><td>None</td></tr></table></td></tr>
<tr><td>13</td><td>Bezel</td><td>13.1 No rust, distortion on the Bezel.
13.2 No visible fingerprints, stains or other contamination.</td></tr>
<tr><td>14</td><td>Touch Panel</td><td>D: Diameter W: width L: length
14.1 Spot: D<0.25 is acceptable
0.25≤D≤0.4
2dots are acceptable and the distance between defects should more than 10 mm.
D>0.4 is unacceptable
14.2 Dent: D>0.40 is unacceptable
14.3 Scratch: W≤0.03, L≤10 is acceptable,
0.03<W≤0.10, L≤10 is acceptable
Distance between 2 defects should more than 10 mm.
W>0.10 is unacceptable.</td></tr>
<tr><td>15</td><td>PCB</td><td>15.1 No distortion or contamination on PCB terminals.
15.2 All components on PCB must same as documented on the BOM/component layout.
15.3 Follow IPC-A-600F.</td></tr>
<tr><td>16</td><td>Soldering</td><td>Follow IPC-A-610C standard</td></tr>
<tr><td>17</td><td>Electrical Defect
(Major defect)</td><td>The below defects must be rejected.
17.1 Missing vertical / horizontal segment,
17.2 Abnormal Display.
17.3 No function or no display.
17.4 Current exceeds product specifications.
17.5 LCD viewing angle defect.
17.6 No Backlight.
17.7 Dark Backlight.
17.8 Touch Panel no function.</td></tr>
</table>

Remark: LCD Panel Broken shall be rejected. Defect out of LCD viewing area is acceptable.

10.7 Classification of Defects

10.7.1 Visual defects (Except no / wrong label) are treated as minor defect and electrical defect is major.

10.7.2 Two minor defects are equal to one major in lot sampling inspection.

10.8 Identification/marking criteria

Any unit with illegible / wrong /double or no marking/ label shall be rejected.

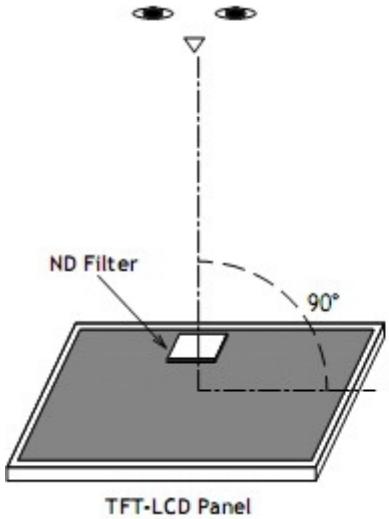
10.9 Packaging

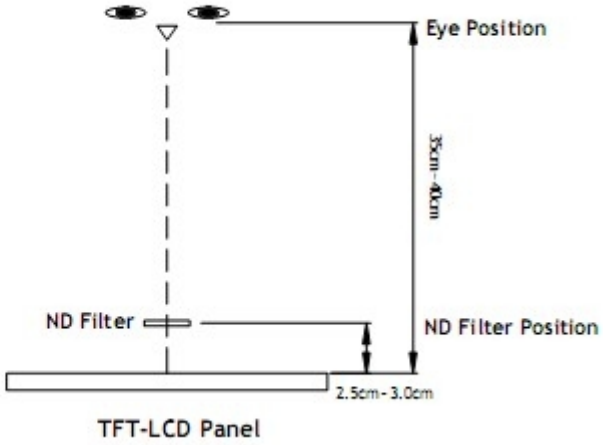
10.9.1 There should be no damage of the outside carton box, each packaging box should have one identical label.

10.9.2 Modules inside package box should have compliant mark.

10.9.3 All direct package materials shall offer ESD protection.

Note1: Bright dot is defined as the defective area of the dot is larger than 50% of one sub-pixel area.





Bright dot: The bright dot size defect at black display pattern. It can be recognized by 2% transparency of filter when the distance between eyes and panel is 350mm±50mm.

Dark dot: Cyan, Magenta or Yellow dot size defect at white display pattern. It can be recognized by 5% transparency of filter when the distance between eyes and panel is 350mm±50mm.

Note2: Mura on display which appears darker / brighter against background brightness on parts of display area

11. Reliability Specification

No	Item	Condition	Quantity	Criteria
1	High Temperature Operating	+60°C, 96Hrs	2	GB/T2423.2 -2008
2	Low Temperature Operating	-10°C, 96Hrs	2	GB/T2423.1 -2008
3	High Humidity	+50°C, 90%RH, 96Hrs	2	GB/T2423.3 -2006
4	High Temperature Storage	+70°C, 96Hrs	2	GB/T2423.2 -2008
5	Low Temperature Storage	-20°C, 96Hrs	2	GB/T2423.1 -2008
6	Thermal Cycling Test	-10°C, 60min~+60°C, 60min, 20 cycles.	2	GB/T2423.22 -2012
7	Packing vibration	Frequency range:10Hz~50Hz Acceleration of gravity:5G X, Y, Z 30 min for each direction.	2	GB/T5170.14 -2009
8	Electrical Static Discharge	Air:±8KV 150pF/330Ω 5 times	2	GB/T17626.2 -2006
		Contact:±4KV 150pF/330Ω 5 times		
9	Drop Test (Packaged)	Height:80 cm,1 corner, 3 edges, 6 surfaces.	2	GB/T2423.8 -1995

Note1. No defection cosmetic and operational function allowable.

Note2. Total current Consumption should be below double of initial value

12. Precautions and Warranty

12.1 Safety

12.1.1 The liquid crystal in the LCD is poisonous. Do not put it in your mouth. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water.

12.1.2 Since the liquid crystal cells are made of glass, do not apply strong impact on them. Handle with care.

12.2 Handling

12.2.1 Reverse and use within ratings in order to keep performance and prevent damage.

12.2.2 Do not wipe the polarizer with dry cloth, as it might cause scratch. If the surface of the LCD needs to be cleaned, wipe it swiftly with cotton or other soft cloth soaked with petroleum IPA, do not use other chemicals.

12.3 Storage

12.3.1 Do not store the LCD module beyond the specified temperature ranges.

12.4 Metal Pin (Apply to Products with Metal Pins)

12.4.1 Pins of LCD and Backlight

12.4.1.1 Solder tip can touch and press on the tip of Pin LEAD during the soldering

12.4.1.2 Recommended Soldering Conditions

Solder Type: Sn96.3~94-Ag3.3~4.3-Cu0.4~1.1

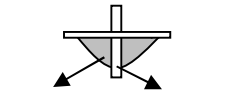
Maximum Solder Temperature: 370℃

Maximum Solder Time: 3s at the maximum temperature

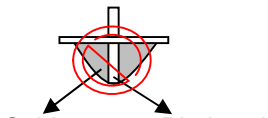
Recommended Soldering Temp: 350±20℃

Typical Soldering Time: ≤3s

12.4.1.3 Solder Wetting



Recommended



Not Recommended

12.4.2Pins of EL

12.4.2.1 Solder tip can touch and press on the tip of EL leads during soldering.

12.4.2.2 No Solder Paste on the soldering pad on the motherboard is recommended.

12.4.2.3 Recommended Soldering Conditions

Solder type: Nippon Alimit Leadfree SR-34, size 0.5mm

Recommended Solder Temperature: 270～290℃

Typical Soldering Time: ≤2s

Minimum solder distance from EL lamp (body):2.0mm

12.4.2.4 No horizontal press on the EL leads during soldering.

12.4.2.5 180° bend EL leads three times is not allowed.

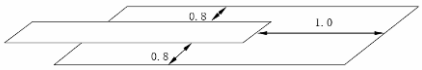
12.4.2.6 Solder Wetting

Recommended Not Recommended

12.4.2.7 The type of the solder iron:

Recommended Not Recommended

12.4.2.8 Solder Pad



12.5 Operation

12.5.1 Do not drive LCD with DC voltage

12.5.2 Response time will increase below lower temperature

12.5.3 Display may change color with different temperature

12.5.4 Mechanical disturbance during operation, such as pressing on the display area, may cause the segments to appear “fractured”.

12.6 Static Electricity

12.6.1 CMOS LSIs are equipped in this unit, so care must be taken to avoid the electro-static charge, by ground human body, etc.

12.6.2 The normal static prevention measures should be observed for work clothes and benches.

12.6.3 The module should be kept into anti-static bags or other containers resistant to static for storage.

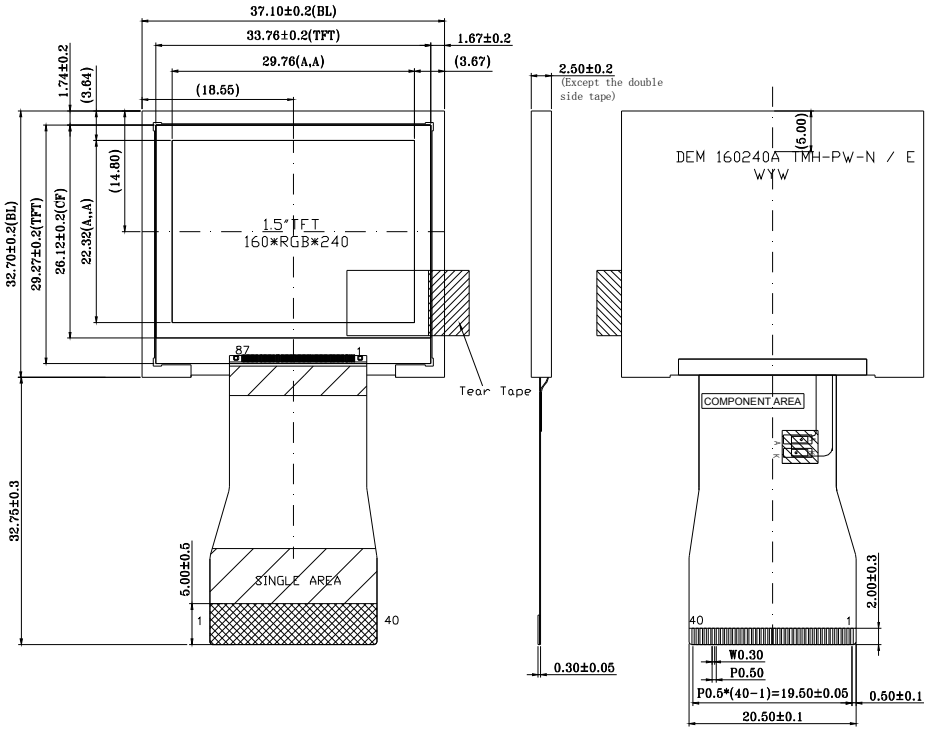
12.7 Limited Warranty

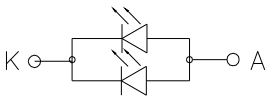
12.7.1 Our warranty liability is limited to repair and/or replacement. We will not be responsible for any consequential loss.

12.7.2 If possible, we suggest customer to use up all modules in six months. If the module storage time over twelve months, we suggest that recheck it before the module be used.

12.7.3 After the product shipped, any product quality issues must be feedback within three months, otherwise, we will not be responsible for the subsequent or consequential events.

13. Outline Drawing





PIN	ASSIGNMENT
1	VDD_25V
2	VDD3
3	NC
4	NC
5	NC
6	NC
7	NC
8	NC
9	NC
10	NC
11	NC
12	AGND
13	DUMMY
14	VCAC
15	FRP
16	VCOM
17	DRV
18	FB
19	LED-
20	DUMMY
21	DUMMY
22	LED+
23	GND
24	VCC
25	VSYNC
26	HSYNC
27	DCLK
28	DIN0
29	DIN1
30	DIN2
31	DIN3
32	DIN4
33	DIN5
34	DIN6
35	DIN7
36	SDA
37	SCL
38	SCEN
39	SHDB
40	CREST

NOTES:
1.Display Size: 1.5" TFT
2.Viewing Direction: 12 O'CLOCK
3.Gary Scale Inversion Direction: 6 O'CLOCK
3.Display Mode: Transmissive / Normal White
4.Operation Temperature: -10°C to +60°C
5.Storage Temperature:-20°C to +70°C
6.Driver IC: OTA5182A (Orise Tech)
7.Power Supply Voltage: 2.8V (typ.)
8.Backlight: White (2xLEDs) / 3.2V / 40mA (typ.)
LED Lifetime: ~30000h (typ.)

* Unspecification Tolerances are ±0.2mm