Display Elektronik GmbH

DATA SHEET

TFT MODULE

DEM 240320O VMH-PW-N

2,0" TFT

Product Specification   Ver.: 3

30.08.2016

Revision History

Revision	Date	Originator	Detail	Remarks
0	26.06.2015	MH	Initial Release	-
1	02.07.2015	MH	Add Weight Add Current Consumption All Black Modify Interface Pins Definition Modify Outline Drawing	P4 P5 P10 P25
2	02.09.2015	MH	Modify Chromacity Transmissive	P6
3	30.08.2016	MH	Modify Current Consumption Modify Chromacity	P5 P6

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 ICs and a backlight unit.

2.   Module Parameter

Features	Details	Unit
Display Size (Diagonal)	2.0"	-
LCD Type	MVA TFT	-
Display Mode	Transmissive / Normally White	-
Resolution	240 x RGB x 320	Pixels
View Direction	FULL VIEW	Best Image
Module Outline	37.68 x 51.30 x 2.50 (Note1)	mm
Active Area	30.60 x 40.80	mm
Pixel Size	0.1275 x 0.1275	mm
Pixel Arrangement	R.G.B. Vertical Stripe	-
Polarizer Surface Treatment	Anti-glare	-
Display Colors	262K	-
Interface	18 bit RGB Interface + 3-wire SPI	-
Driver IC	ILI9341V (Ilitek)	-
With or Without Touch Panel	Without	-
Operating Temperature	-20°C to +70°C	°C
Storage Temperature	-30°C to +80°C	°C
Weight	~ 9	g

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

3.   Absolute Maximum Ratings

V_{SS}=0V, Ta=25°C

Item	Symbol	Min.	Max.	Unit
Supply Voltage	VDD	-0.3	4.6	V
	IOVCC	-0.3	4.6	V
Storage Temperature	T_{STG}	-30	80	°C
Operating Temperature	T_{OP}	-20	70	°C

Note 1: If Ta below 50°C, the maximal humidity is 90%RH, if Ta over 50°C, 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		VDD	2.5	3.3	3.3	V
		IOVCC	1.65	1.8	3.3	V
Logic Low Input Voltage		V_{IL}	GND	-	0.3*IOVCC	V
Logic High Input Voltage		V_{IH}	0.7*IOVCC	-	IOVCC	V
Logic Low Output Voltage		V_{OL}	GND	-	0.2*IOVCC	V
Logic High Output Voltage		V_{OH}	0.8*IOVCC	-	IOVCC	V
Current Consumption All Black	Logic	$I_{CC+}\ I_{IN}$	-	10	-	mA
	Analog					

5. Backlight Characteristic

5.1. Backlight Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	Ta=25 ºC, I_F=15mA/LED	2.8	3.2	3.4	V
Forward Current	I_F	Ta=25 ºC, V_F=3.2V/LED	-	45	-	mA
Power Dissipation	P_D		-	144	-	mW
Uniformity	Avg		80	-	-	%
LED Lifetime (25°C)	-		-	30,000	-	Hrs
Drive Method		Constant current				
LED Configuration		3 White LEDs in Parallel				

Note: 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±2ºC, 60%RH±5%, I_F=15mA.

5.2. Backlighting Circuit

A(+) o————————————o K(−)
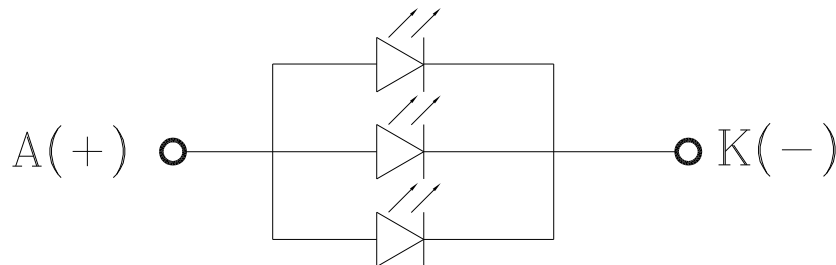
(CIRCUIT DIAGRAM)

6. Optical Characteristics

6.1. Optical Characteristics

Ta=25ºC, VDD=2.8V, TN LC+ Polarizer

Item		Symbol	Condition	Specification			Unit
				Min.	Typ.	Max.	
Backlight On (Transmissive Mode)	Luminance on TFT(I_f=15mA/LED)	Lv	Normally viewing angle $\theta_X = \varphi_Y = 0º$	240	300	-	cd/m²
	Contrast Ratio(See 6.3)	CR		150	300	-	
	Response Time (See 6.2)	T_R+T_F		-	25	50	ms
	Chromaticity Transmissive (See 6.5) — Red	X_R		0.580	0.630	0.680	
	Red	Y_R		0.305	0.355	0.405	
	Green	X_G		0.281	0.331	0.381	
	Green	Y_G		0.571	0.621	0.671	
	Blue	X_B		0.095	0.145	0.195	
	Blue	Y_B		0.074	0.124	0.174	
	White	X_W		0.254	0.304	354	
	White	Y_W		0.308	0.358	0.408	
	Viewing Angle (See 6.4) — Horizontal	θ_{X+}	Center CR≥10	-	70	-	Deg.
	Horizontal	θ_{X-}		-	70	-	
	Vertical	φ_{Y+}		-	70	-	
	Vertical	φ_{Y-}		-	70	-	
	NTSC Ratio(Gamut)			-	58	-	%

6.2. Definition of Response Time

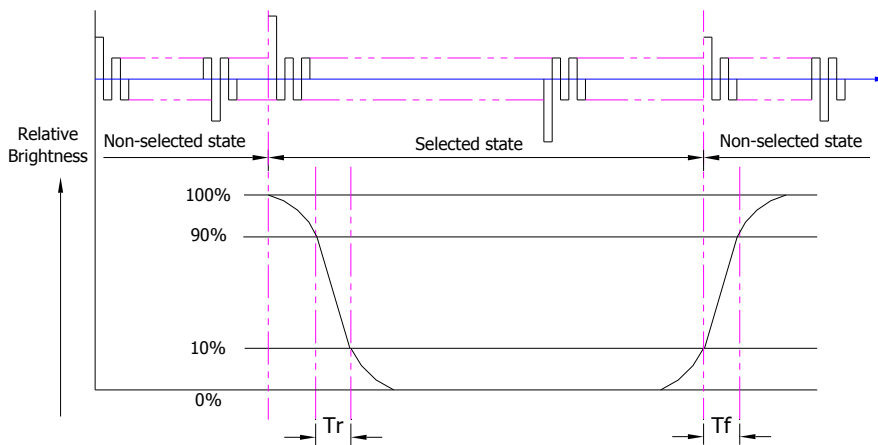6.2.1. Normally Black Type (Negative)
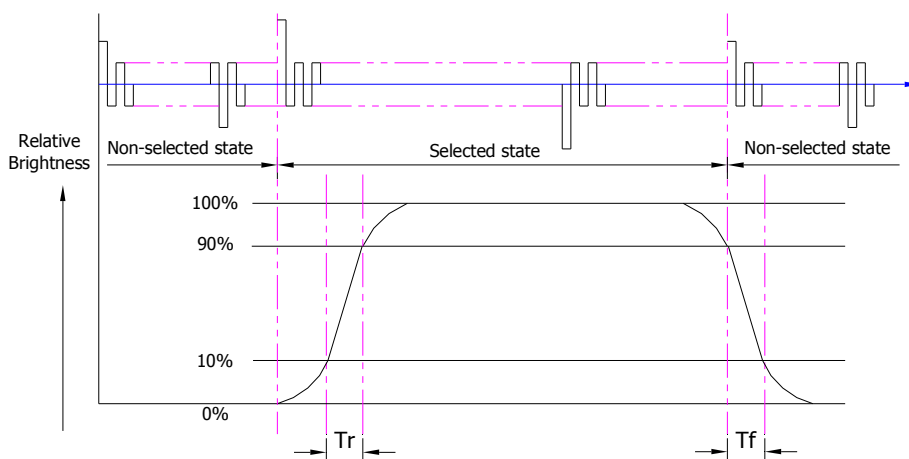
Tr is the time it takes to change form non-selected stage with relative luminance 10% to selected state with relative luminance 90%;

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%;
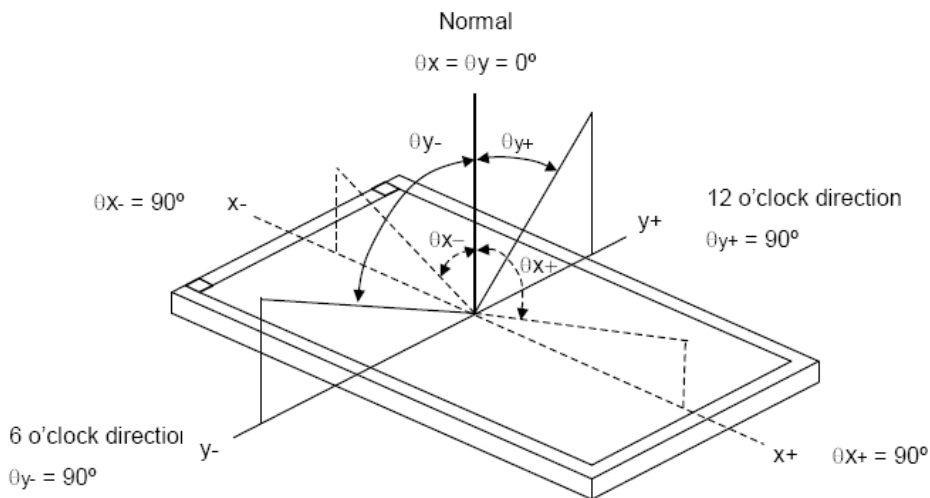
Note: Measuring machine: LCD-5100 or EQUI

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
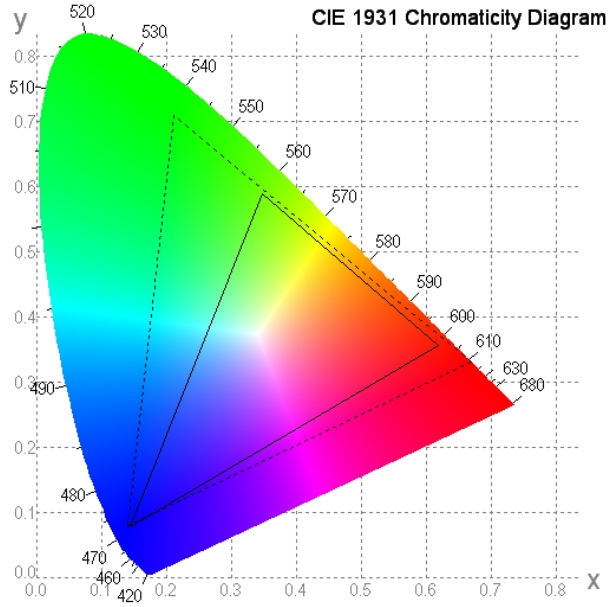
6.4. Definition of Viewing Angles

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)

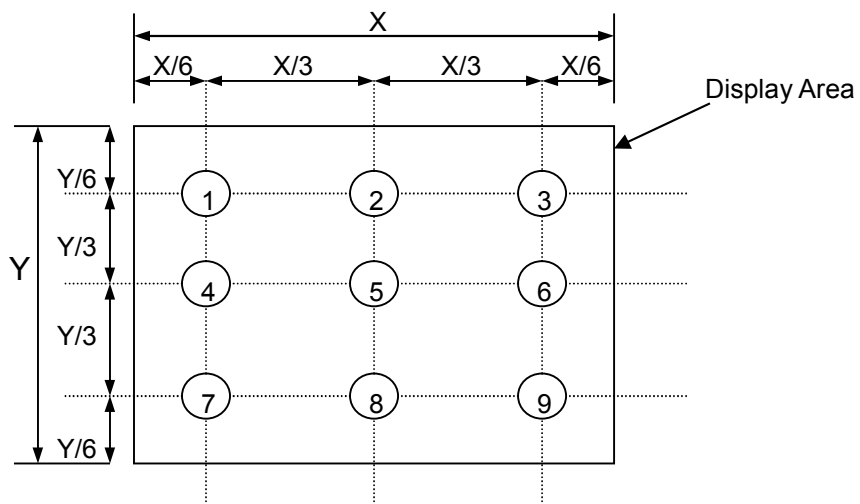### 6.6. Definition of Surface Luminance, Uniformity and Transmittance

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
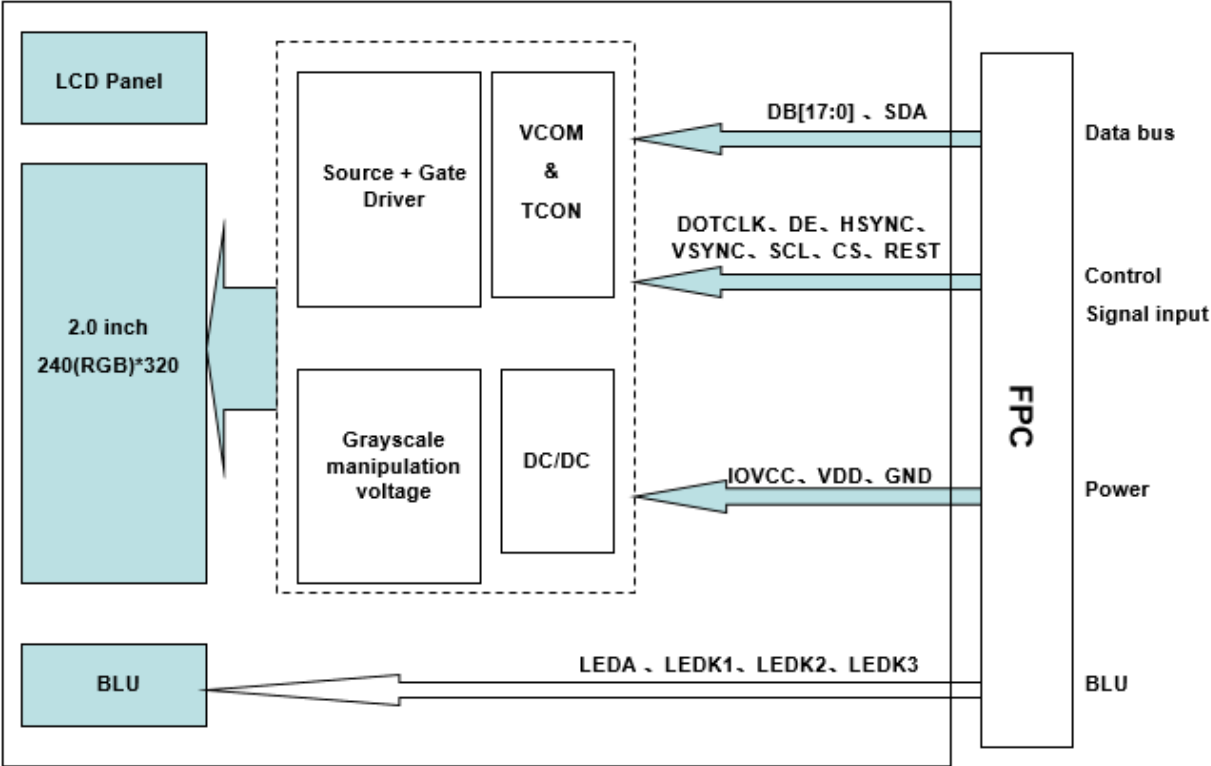
8. Interface Pins Definition

| No.	Symbol	Function	Remark
1	GND	Ground.	
2	GND	Ground.	
3	LEDA	LED Anode.	
4	LEDA	LED Anode.	
5	LEDK3	LED Cathode.	
6	LEDK2	LED Cathode.	
7	LEDK1	LED Cathode.	
8	IOVCC	Power Supply Voltage for internal logic circuit	
9	IOVCC	Power Supply Voltage for internal logic circuit	
10	B0	Blue data signal	
11	B1	Blue data signal	
12	B2	Blue data signal	
13	B3	Blue data signal	
14	B4	Blue data signal	
15	B5	Blue data signal	
16	G0	Green data signal	
17	G1	Green data signal	
18	G2	Green data signal	
19	G3	Green data signal	
20	G4	Green data signal	
21	G5	Green data signal	
22	R0	Red data signal	
23	R1	Red data signal	
24	R2	Red data signal	
25	R3	Red data signal	
26	R4	Red data signal	
27	R5	Red data signal	
28	SDA	Serial data input.	
29	SCL	Serial clock.	
30	REST	Reset signal	
31	CS	Chip select signal.	
32	DE	Data enable signal.	
33	DOTCLK	Pixel clock signal in RGB I/F mode	
34	HSYNC	Horizontal sync. Signal in RGB I/F mode	
35	VSYNC	Vertical sync. Signal in RGB I/F mode	
36	VDD	Power supply.	
37	VDD	Power supply.	
38	GND	Ground.	
39	GND	Ground.	

9. Timing Characteristics

9.1. Display Serial Interface Timing Characteristics (3-line SPI system)
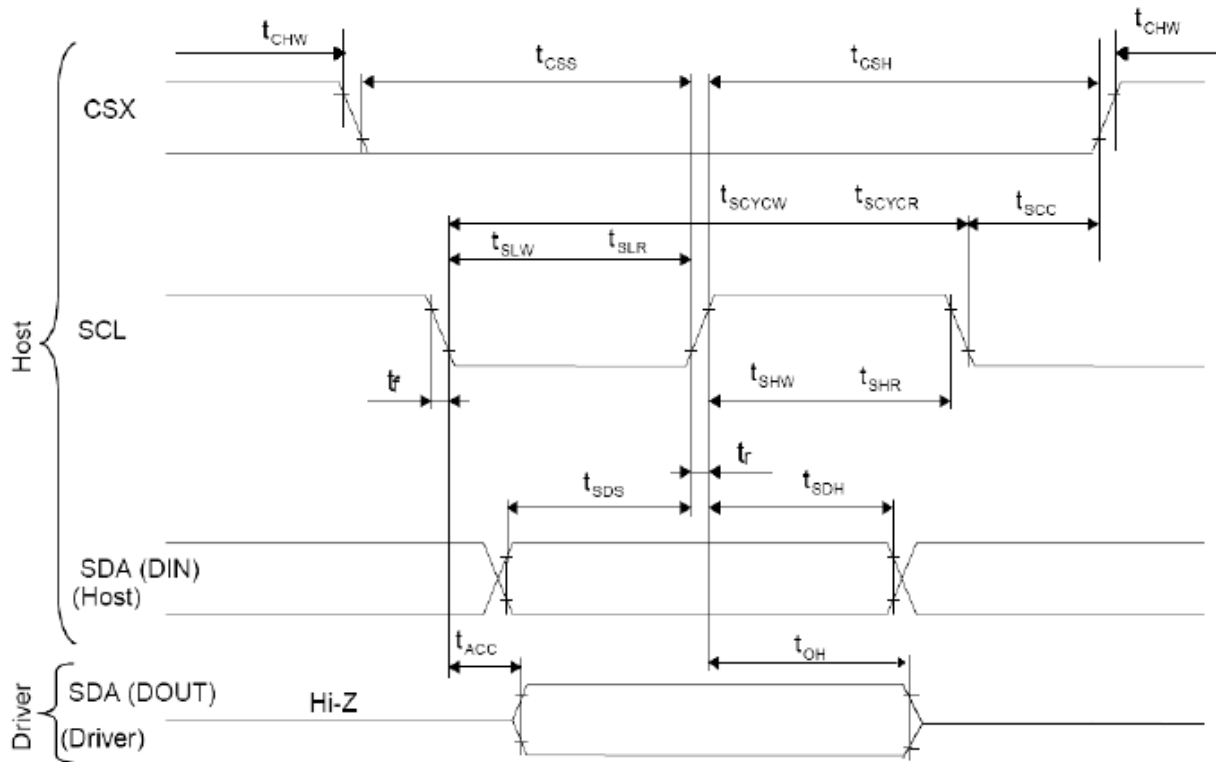
Signal	Symbol	Parameter	min	max	Unit	Description
SCL	tscycw	Serial Clock Cycle (Write)	100	-	ns	
	tshw	SCL "H" Pulse Width (Write)	40	-	ns	
	tslw	SCL "L" Pulse Width (Write)	40	-	ns	
	tscycr	Serial Clock Cycle (Read)	150	-	ns	
	tshr	SCL "H" Pulse Width (Read)	60	-	ns	
	tslr	SCL "L" Pulse Width (Read)	60	-	ns	
SDA / SDI (Input)	tsds	Data setup time (Write)	30	-	ns	
	tsdh	Data hold time (Write)	30	-	ns	
SDA / SDO (Output)	tacc	Access time (Read)	10	-	ns	
	toh	Output disable time (Read)	10	50	ns	
CSX	tscc	SCL-CSX	20	-	ns	
	tchw	CSX "H" Pulse Width	40	-	ns	
	tcss	CSX-SCL Time	60	-	ns	
	tcsh		65	-	ns	

Note: Ta = 25 °C, VDDI=1.65V to 3.3V, VCI=2.5V to 3.3V, AGND=VSS=0V
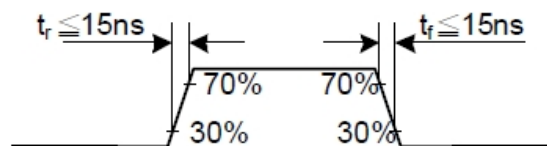
9.2. Parallel 18/16/6-bit RGB Interface Timing Characteristics
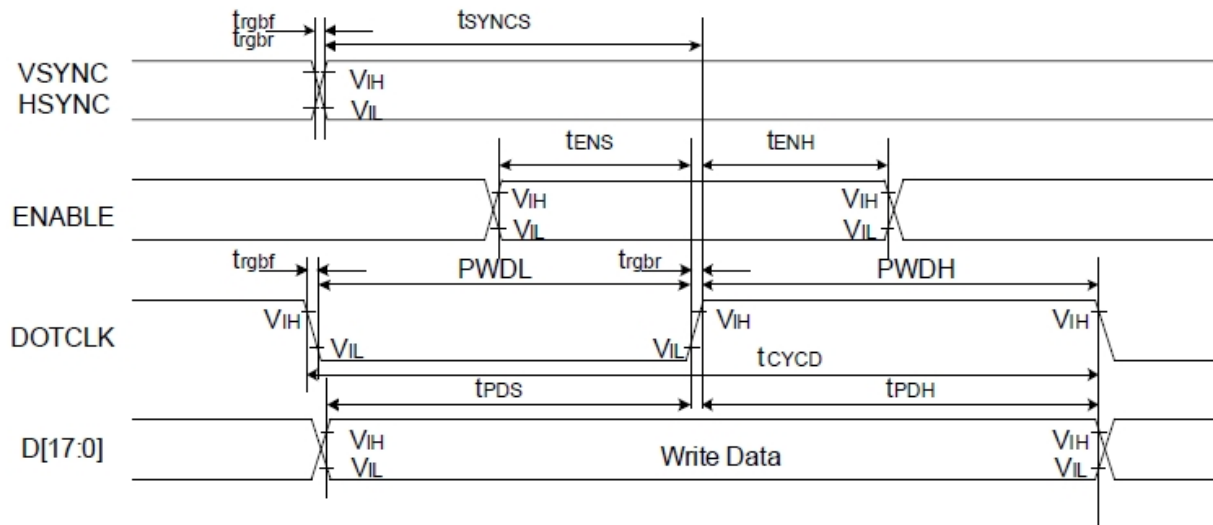
Signal	Symbol	Parameter	min	max	Unit	Description
VSYNC / HSYNC	t_{SYNCS}	VSYNC/HSYNC setup time	15	-	ns	
	t_{SYNCH}	VSYNC/HSYNC hold time	15	-	ns	
DE	t_{ENS}	DE setup time	15	-	ns	
	t_{ENH}	DE hold time	15	-	ns	
D[17:0]	t_{POS}	Data setup time	15	-	ns	18/16-bit bus RGB
	t_{PDH}	Data hold time	15	-	ns	interface mode
DOTCLK	PWDH	DOTCLK high-level period	15	-	ns	
	PWDL	DOTCLK low-level period	15	-	ns	
	t_{CYCD}	DOTCLK cycle time	100	-	ns	
	t_{rgbr} , t_{rgbf}	DOTCLK,HSYNC,VSYNC rise/fall time	-	15	ns	
VSYNC / HSYNC	t_{SYNCS}	VSYNC/HSYNC setup time	15	-	ns	
	t_{SYNCH}	VSYNC/HSYNC hold time	15	-	ns	
DE	t_{ENS}	DE setup time	15	-	ns	
	t_{ENH}	DE hold time	15	-	ns	
D[17:0]	t_{POS}	Data setup time	15	-	ns	6-bit bus RGB
	t_{PDH}	Data hold time	15	-	ns	interface mode
DOTCLK	PWDH	DOTCLK high-level pulse period	15	-	ns	
	PWDL	DOTCLK low-level pulse period	15	-	ns	
	t_{CYCD}	DOTCLK cycle time	50	-	ns	
	t_{rgbr} , t_{rgbf}	DOTCLK,HSYNC,VSYNC rise/fall time	-	15	ns	

Note: Ta = -30 to 70 °C, VDDI=1.65V to 3.3V, VCI=2.5V to 3.3V, AGND=VSS=0V
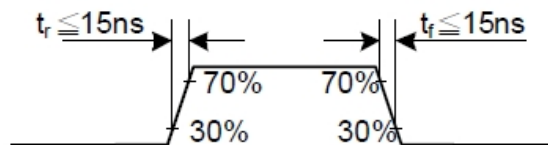
9.3. Reset timing
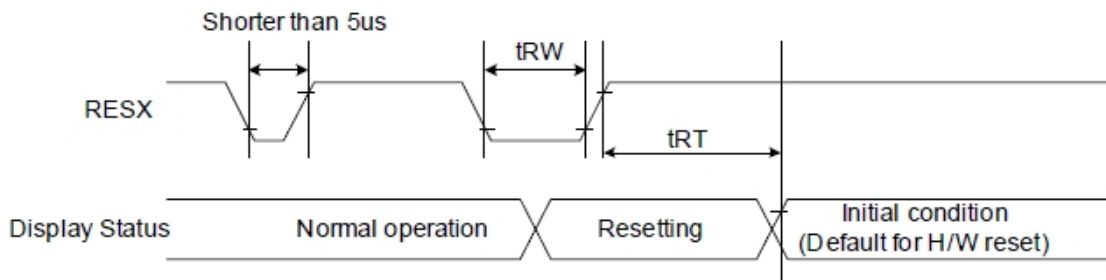
| Signal	Symbol	Parameter	Min	Max	Unit
RESX	tRW	Reset pulse duration	10		uS
	tRT	Reset cancel		5 (note 1,5)	mS
				120 (note 1,6,7)	mS

Note 1: The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NV memory to registers. This loading is done every time when there is HW reset cancel time (tRT) within 5 ms after a rising edge of RESX.

Note 2: Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below: -

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 10us	Reset
Between 5us and 10us	Reset starts

Note 3: During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In -mode.) And then return to Default condition for Hardware Reset.

Note 4: Spike Rejection also applies during a valid reset pulse as shown below:
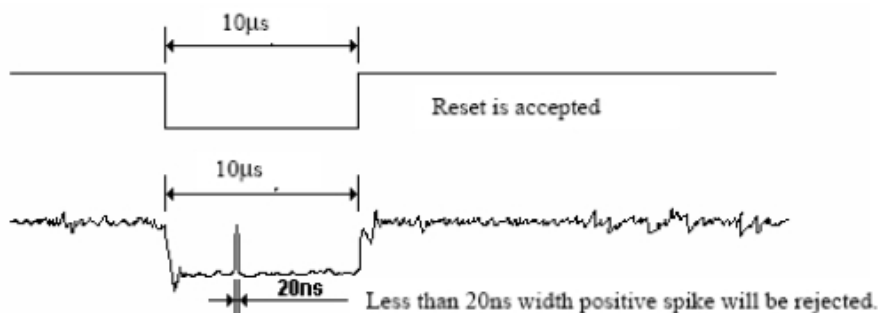
Note 5: When Reset applied during Sleep In Mode.

Note 6: When Reset applied during Sleep Out Mode.

Note 7: It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.'

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, general inspection level II

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 cannot 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,
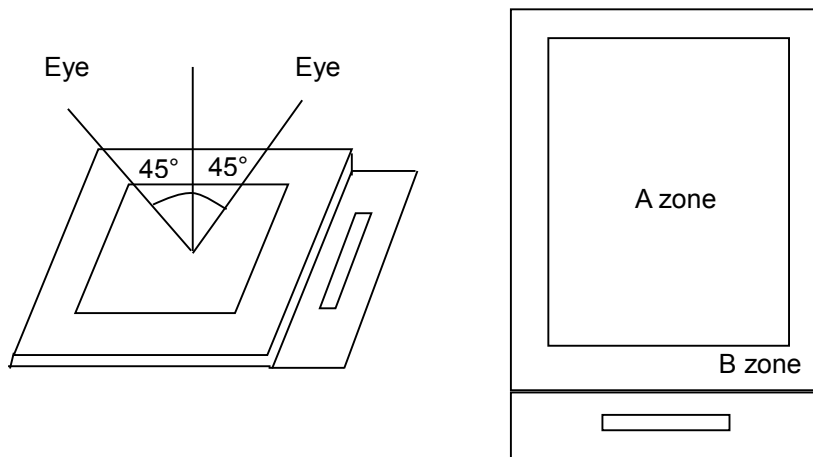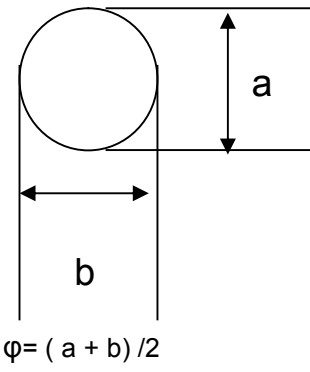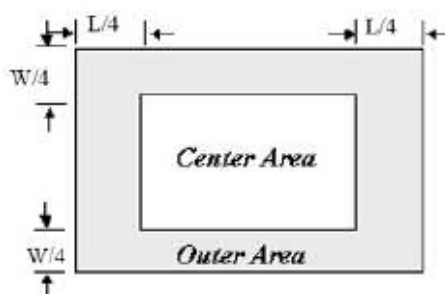
10.5.2 Basic principle:
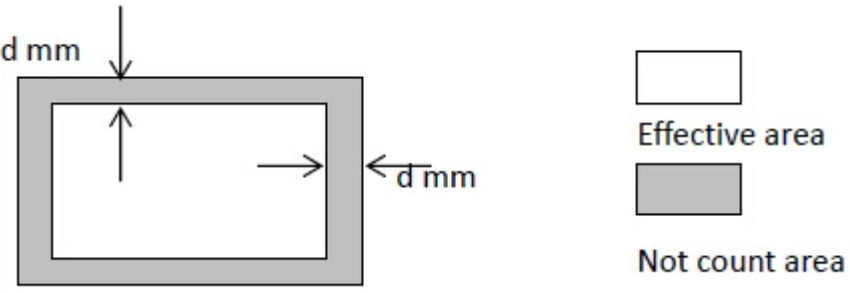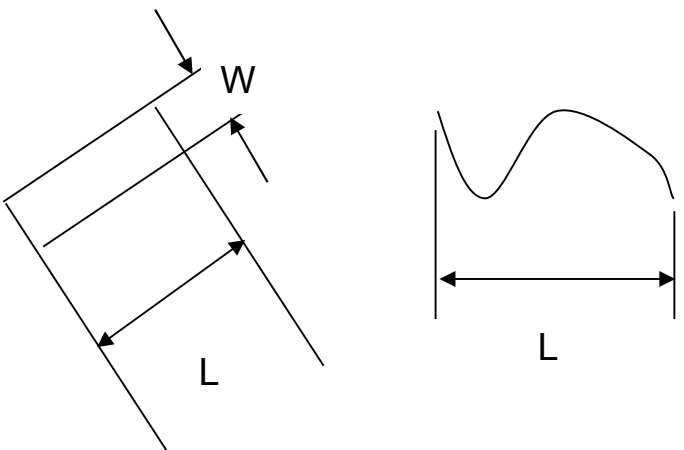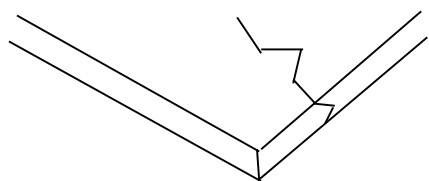
      10.5.2.1 A set of sample to indicate the limit of acceptable quality level must be discussed by both us and customer when there is any dispute happened.
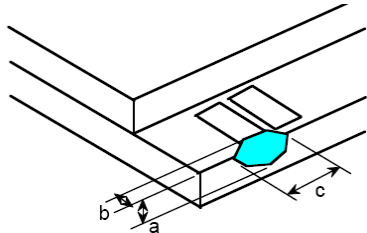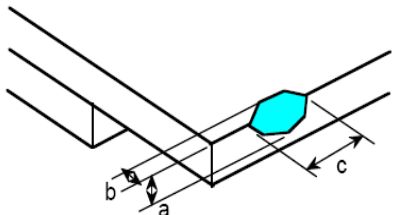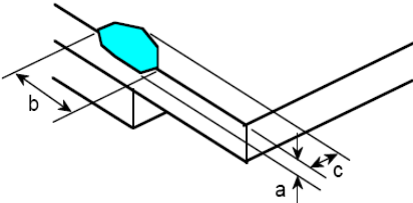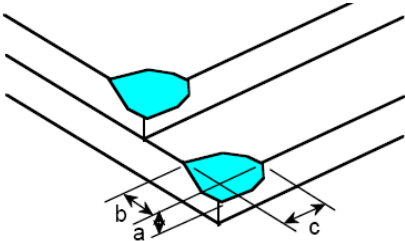
      10.5.2.2 New item must be added on time when it is necessary.
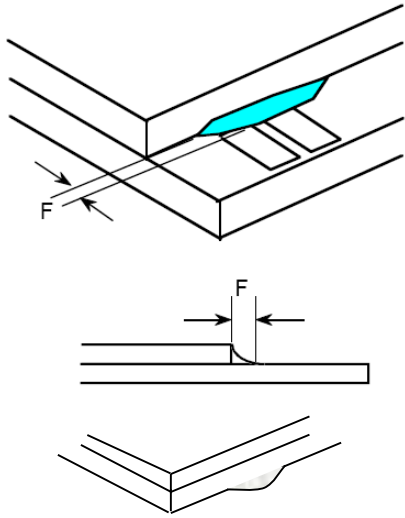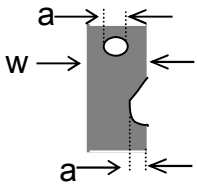
10.6   Inspection Specification

No.	Item	Criteria (Unit: mm)
01	Black / White spot Foreign material (Round type) Pinholes Stain Particles inside cell. (Minor defect)	$\varphi = (a + b) / 2$ **Table:** Area / Size — Acc. Qty $\varphi \leq 0.10$ — Ignore $0.10 < \varphi \leq 0.15$ — 2 $0.15 < \varphi \leq 0.25$ — 1 $0.25 < \varphi$ — 0 Total — 2 no include $\varphi \leq 0.10$ Distance between 2 defects should more than 3mm apart.
02	Electrical Defect (Minor defect)	See table below
03	Inactive Area (Minor defect)	See below

Item 01 table:

Area / Size	Acc. Qty
$\varphi \leq 0.10$	Ignore
$0.10 < \varphi \leq 0.15$	2
$0.15 < \varphi \leq 0.25$	1
$0.25 < \varphi$	0
Total	2 no include $\varphi \leq 0.10$

Distance between 2 defects should more than 3mm apart.

Item 02 table:

	Display Area	Total	
Bright dot	0	0	Note1
Dark dot	$N \leq 2$	$N \leq 2$	
Total dot	$N \leq 2$	$N \leq 2$	
Mura	Not visible through 5% ND filters.		Note2

Remark:
    1. Bright dot caused by scratch and foreign object accords to item 1.

Item 03:

Line Criteria: $L \leqq 1mm$, $W \leqq 0.1mm$,

Dot Criteria: Please refer to Note 1,2&3

Note1: Definition of Area

Note 2:

Size	Inactive dot	Center	Outer	Total	Remark
All	$\Phi < 0.2mm$	Is not counted			
<6"	$0.2 \leqq \Phi \leqq 0.3mm$ $L \leqq 1mm, W \leqq 0.1mm$	$N \leqq 1$	$N \leqq 2$	$N \leqq 3$	

Note3: Inactive area $D < 0.2mm$ is not counted without appearance observation.

Remark:

Effective area is from the POL cutting side to 0.5mm of inside. This is no count area. Other part is effective area. In no count area, any defect can

		ignore. In effective area, have to judge from above-mentioned specification.

04	Black and White line Scratch Foreign material (Line type) (Minor defect)	

Length	Width	Acc. Qty
/	W ≦ 0.03	Ignore
L ≦ 2.5	0.03 ＜ W ≦ 0.05	3
L ≦ 2.5	0.05 ＜ W ≦ 0.10	2
/	0.1 ＜ W	0
Total		3

Distance between 2 defects should more than 3mm apart. Scratches not viewable through the back of the display are acceptable.

05	Glass Crack (Minor defect)	 Crack is potential to enlarge, any type is not allowed.

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

| 10 | Glass Burr:
(Minor defect)
 | | Length | Acc. Qty |
Glass burr don't affect assemble and module dimension. |

Length	Acc. Qty
F < 1.0	Ignore

Glass burr don't affect assemble and module dimension.

---

11 FPC Defect:
(Minor defect)

11.1 Dent, pinhole width a<w/3.

(w: circuitry width.)

11.2 Open circuit is unacceptable.

11.3 No oxidation, contamination and distortion.

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12 Bubble on Polarizer
(Minor defect)

Diameter	Acc. Qty
$\varphi \leq 0.20$	Ignore
$0.20 < \varphi \leq 0.30$	4
$0.30 < \varphi \leq 0.50$	1
$0.50 < \varphi$	None

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13 Dent on Polarizer
(Minor defect)

Diameter	Acc. Qty
$\varphi \leq 0.20$	Ignore
$0.20 < \varphi \leq 0.30$	4
$0.30 < \varphi \leq 0.50$	1
$0.50 < \varphi$	None

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14 Bezel

14.1 No rust, distortion on the Bezel.

14.2 No visible fingerprints, stains or other contamination.

15	Touch Panel	D: Diameter W: width L: length
		15.1 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
		15.2 Dent: D>0.40 is unacceptable
		15.3 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.

16	PCB	16.1 No distortion or contamination on PCB terminals. 16.2 All components on PCB must same as documented on the BOM/component layout. 16.3 Follow IPC-A-600F.
17	Soldering	Follow IPC-A-610C standard
18	Electrical Defect (Major defect)	The below defects must be rejected. 18.1 Missing vertical / horizontal segment, 18.2 Abnormal Display. 18.3 No function or no display. 18.4 Current exceeds product specifications. 18.5 LCD viewing angle defect. 18.6 No Backlight. 18.7 Dark Backlight. 18.8 Touch Panel no function.

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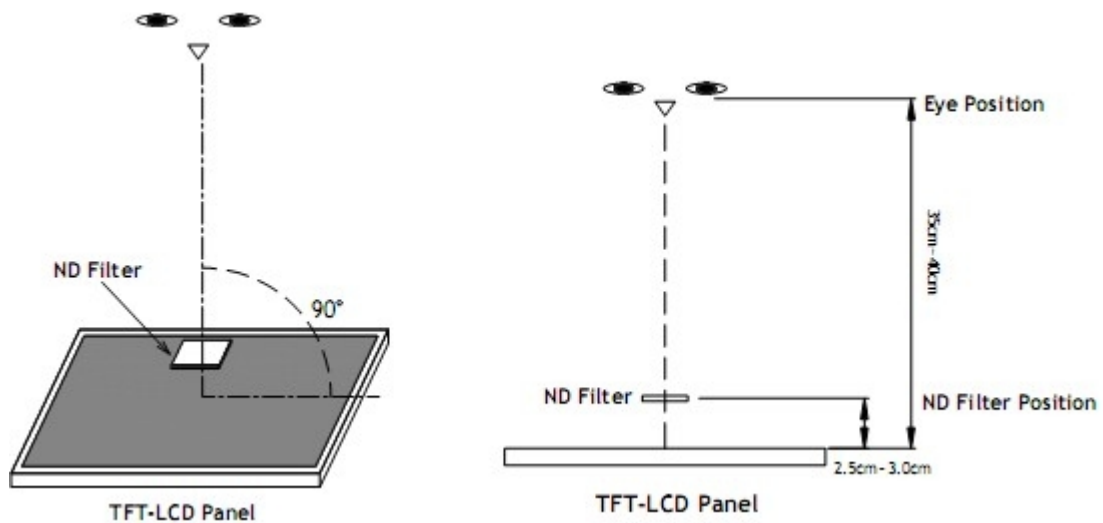
Bright dot: The bright dot size defect at black display pattern. It can be recognized by 2% transparency of filter when the distance between eyes and panel is 350mm±50mm.

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	70°C, 96Hrs	2	GB/T2423.2 -2008
2	Low Temperature Operating	-20°C, 96Hrs	2	GB/T2423.1 -2008
3	High Humidity	50°C, 90%RH, 96Hrs	2	GB/T2423.3 -2006
4	High Temperature Storage	80°C, 96Hrs	2	GB/T2423.2 -2008
5	Low Temperature Storage	-30°C, 96Hrs	2	GB/T2423.1 -2008
6	Thermal Cycling Test	-20°C, 60min~70°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 Contact:±4KV 150pF/330Ω 5 times	2	GB/T17626.2 -2006
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

Solder Pin Lead	Solder Pin Lead
Recommended	Not Recommended
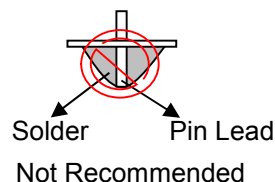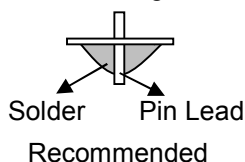
12.4.2   Pins of EL

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

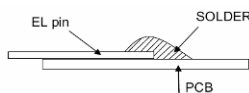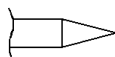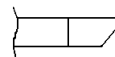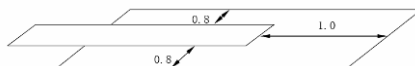12.4.2.8 Solder Pad

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.

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13. Outline Drawing

LCM 37.68±0.2
LCD 34±0.2
A.A 30.6
1.84±0.2
(3.54)
1.18±0.2
(2.88)

LCM 51.3±0.2
LCD 47.4±0.2
LCD 44.3±0.2
A.A 40.8

2.0"TFT
240*RGB*320

3.5±0.5
2.5±0.3

single area
PI
1
39

SILK LINE

single area

tear tape

1.5Max

2.5±0.2(Include POL thickness)
2.3±0.2
2-0.7±0.1

Front
Back

4±0.5
0.5
0.5
Ø0.7

2±0.5

DEM 240320O VMH-PW-N / E
W Y W

Double side conductive fabric
T=0.1MM

20±0.5
3±0.5

10±0.5

7±1

UL and E-number

12±0.15
1
39

4.37±0.5

CONNECTOE TYPE:
HRS FH26-39S-0.3SHW

2.5±0.3
2.1±0.1
1.1±0.1
0.1±0.1
R0.2

11.4±0.03
0.3±0.03
0.6±0.03   0.3±0.03

0.3±0.07

0.2±0.03

CONTACT
SIDE
PI

DETAIL: A 2/1

A — K

NOTES:
1. Display size: 2.0"TFT
2. Viewing direction: Full view
3. Display mode: Transmissive/Normal white /Anti-glare
4. Operation temperature: -20°C~+70°C
5. Storage temperature: -30°C~+80°C
6. Driver IC: ILI9341V (Ilitek)
7. Power supply voltage: 3.3V (typ.)
8. Backlight :White(3 LED)/3.2(TYP)V/45mA
   LED life:30000h
9. Luminance: 300 cd/m² (typ.)
10. ROHS must be complied
* Unspecification tolerance are ±0.2mm

PIN FUNCTION	
PIN	SYMBOL
1	GND
2	GND
3	LEDA
4	LEDA
5	LEDK3
6	LEDK2
7	LEDK1
8	IOVCC
9	IOVCC
10	B0
11	B1
12	B2
13	B3
14	B4
15	B5
16	G0
17	G1
18	G2
19	G3
20	G4
21	G5
22	R0
23	R1
24	R2
25	R3
26	R4
27	R5
28	SDA
29	SCL
30	REST
31	CS
32	DE
33	DOTCLK
34	HSYNC
35	VSYNC
36	VDD
37	VDD
38	GND
39	GND