



SPECIFICATION
FOR
LCM Module
KD043WVFPD017-RT

MODULE:	KD043WVFPD017-RT
CUSTOMER:	

REV	DESCRIPTION	DATE
1.0	FIRST ISSUE	2017.06.26

STARTEK	INITIAL	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

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* Description

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 4.3'TFT-LCD contains 480x800 pixels, and can display up to 65K/262K/16.7M colors.

* Features

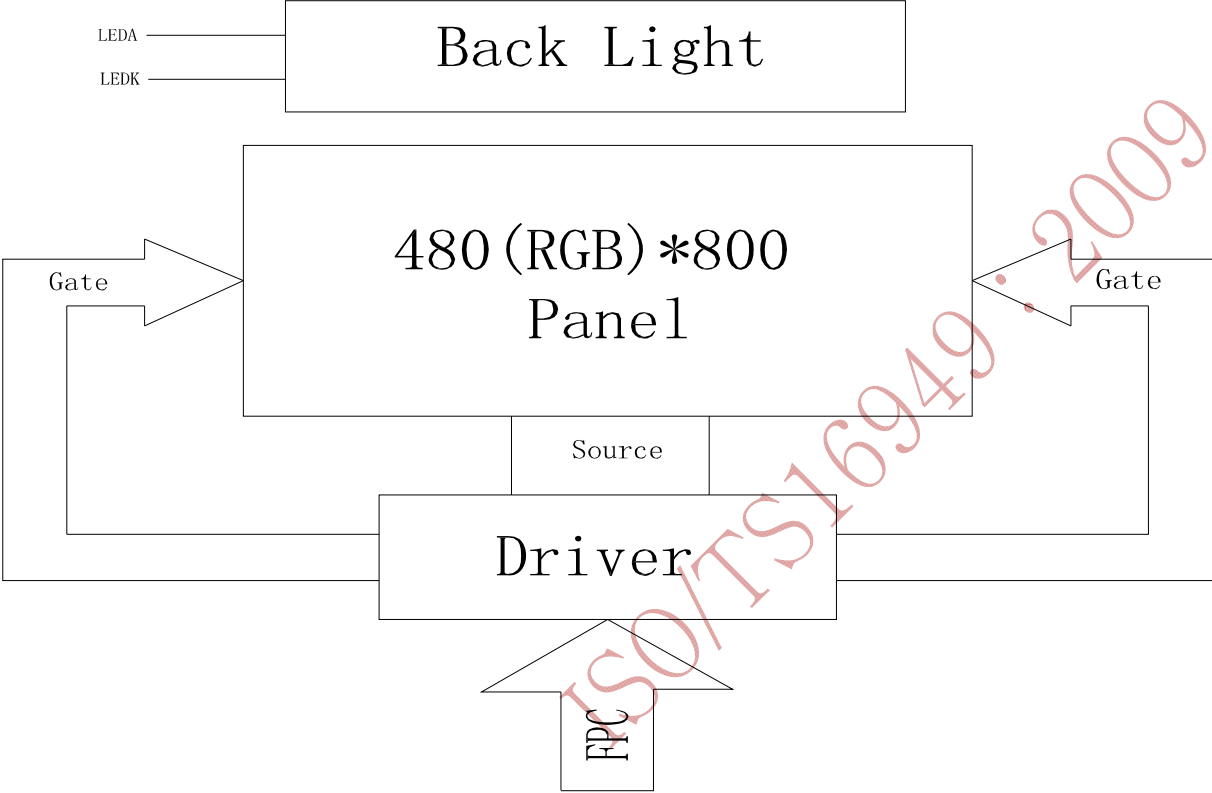
- Low Input Voltage: 3.3V(TYP)
- Display Colors of TFT LCD: 65K/262K/16.7M colors
- Interface: 3SPI+16/18/24BIT RGB

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	56.16(H)*93.60(V) (4.3inch)	mm	-
Driver element	TFT active matrix	-	-
Display colors	65K/262K/16.7M	colors	-
Number of pixels	480(RGB)*800	dots	-
TFT Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.117(H)*0.117(V)	mm	-
Viewing angle	ALL	o'clock	-
TFT Controller IC	ILI9806E	-	-
Display mode	Transmissive/Normally Black	-	-
Operating temperature	-20~+70	°C	-
Storage temperature	-30~+80	°C	-

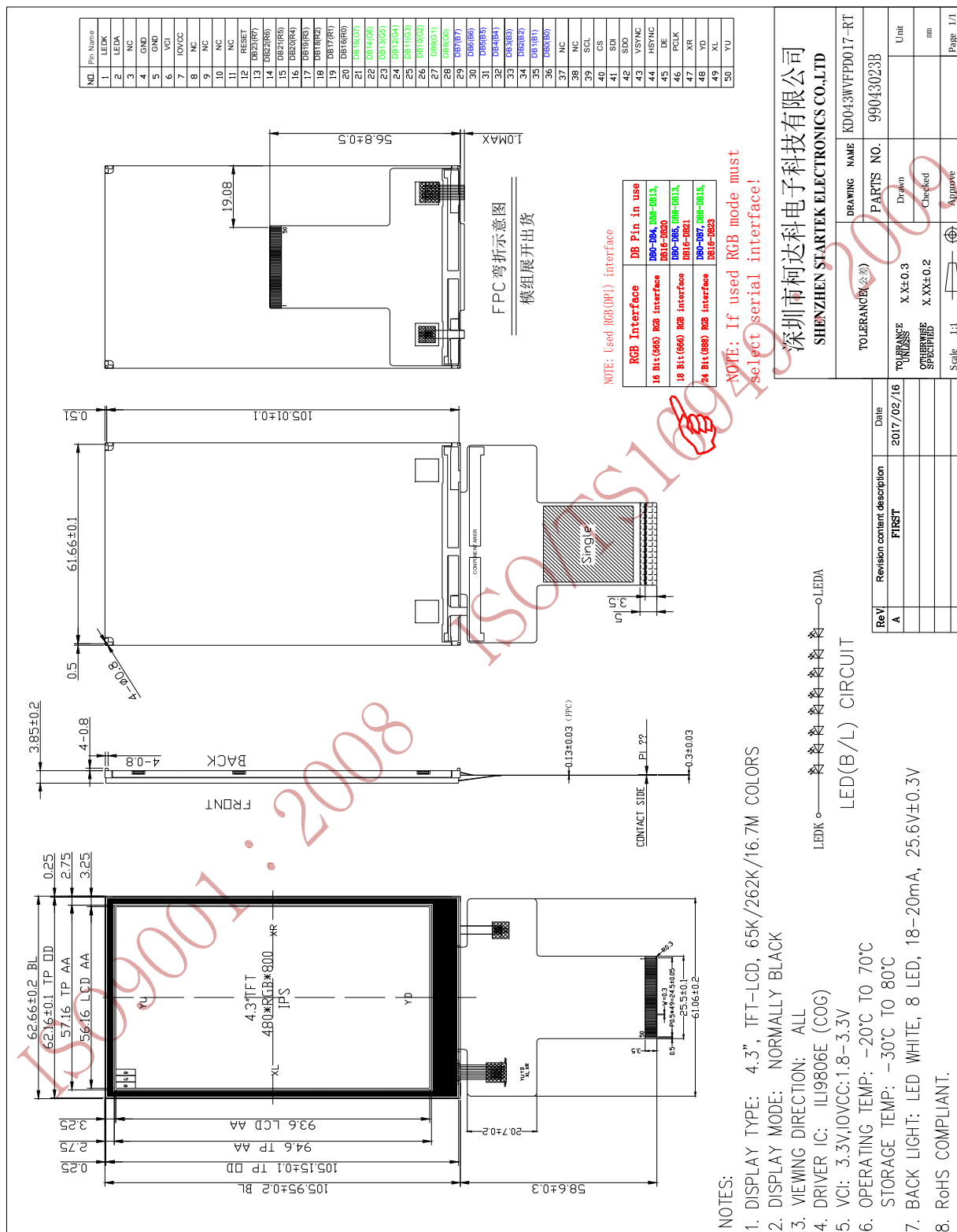
* Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		62.66		mm	-
	Vertical(V)		105.95		mm	-
	Depth(D)		3.85		mm	-
Weight			--		g	-

1. Block Diagram



2. Outline dimension



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**3. Input terminal Pin Assignment**

Pin NO.	Symbol	Function	I/O
1.	LEDK	Cathode pin of backlight.	P
2	LEDA	Anode pin of backlight.	P
3	NC	NC.	
4	GND	Ground.	P
5	GND	Ground.	P
6	VCI	Supply voltage (3.3V).	P
7	IOVCC	I/O power supply voltage.	P
8-11	NC	NC.	
12	RESET	Reset pin. Setting either pin low initializes the LSI. Must be reset after power is supplied.	I
13~36	DB23-DB16 (R7-R0) DB15-DB8 (G7-G0) DB7-DB0 (B7-B0)	Data bus PINS. When Operation in DPI interface mode, RGB data bus. 24-bit bus: use DB23-DB0 18-bit bus: use DB0-DB5, DB8-DB13, DB16-DB21 16-bit bus: use DB0-DB4, DB8-DB13, DB16-DB20 If not used PINS, please must connect to GND.	I/O
37	NC		
38	NC		
39	SCL	Serial clock input.	I
40	CS	Chip select signal. Low: chip can be accessed; High: chip cannot be accessed.	I

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41	SDI	Serial data input pin used for the SPI Interface. SDI : Serial data input pin SDA : Serial data input/output bidirectional pin.	I
42	SDO	Serial data output pin in serial bus system interface. If not used, please open this pin.	O
43	VSNC	Serves VS signal pin on RGB interface. (Input pad). Must be connected to GND if not used.	I
44	HSNC	Line synchronizing signal. Must be connected to GND or VCC if not used.	I
45	DE	A DATA ENABLE signal for DPI I/F mode. If not use, please connect to GND.	I
46	PCLK	Dot clock signal. Must be connected to GND if not used.	I
47	XR(NC)	Touch panel Right Glass Terminal	A/D
48	YD(NC)	Touch panel Bottom Film Terminal	A/D
49	XL(NC)	Touch panel LIFT Glass Terminal	A/D
50	YU(NC)	Touch panel Top Film Terminal	A/D

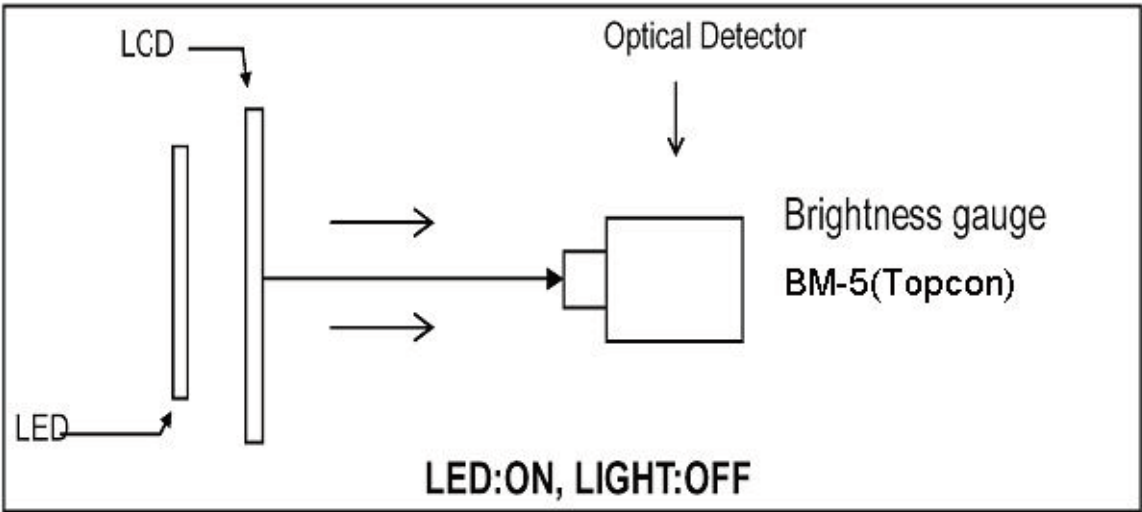
4. LCD Optical Characteristics

4.1 Optical specification

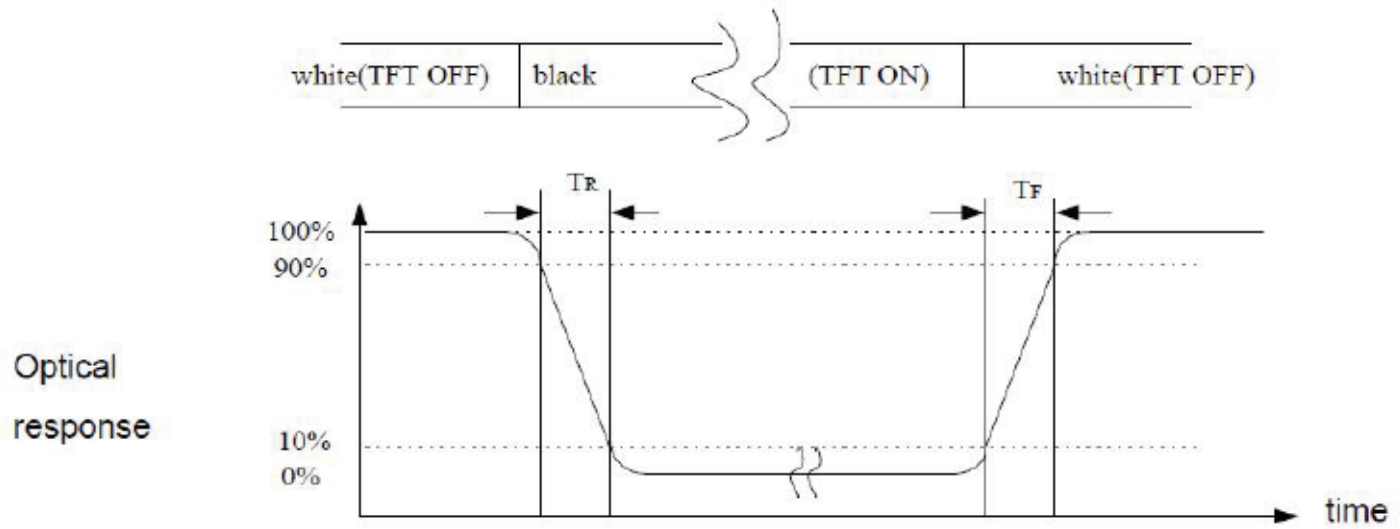
Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	$\Theta=0$ Normal viewing angle	700	800	--		(3)
Response time	Rising	T_{R+T_F}		--	30	45	msec	(2)
	Falling			--				
Color gamut		S(%)		--	70	--	%	C-light
Color Filter Chromaticity	White	W_X		0.285	0.325	0.365	-	
		W_Y		0.326	0.366	0.386		
	Red	R_X		0.616	0.636	0.656		
		R_Y		0.317	0.337	0.357		
	Green	G_X		0.300	0.320	0.340		
		G_Y		0.587	0.607	0.627		
	Blue	B_X		0.127	0.147	0.167		
		B_Y		0.033	0.053	0.073		
Viewing angle	Hor.	Θ_L	CR>10	--	80	--	-	(1)(4) Measuring with Polarizer, Reference Only
		Θ_R		--	80	--		
	Ver.	Θ_U		--	80	--		
		Θ_D		--	80	--		
Option View Direction		Free						

NOTE 1 :Test equipment setup

After stabilizing and leaving the panel alone at a given temperature for 30 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-5A with a viewing angle of 2° at a distance of 50cm and normal direction.



NOTE 2: Response Time



NOTE 3: Definition of contrast ratio:

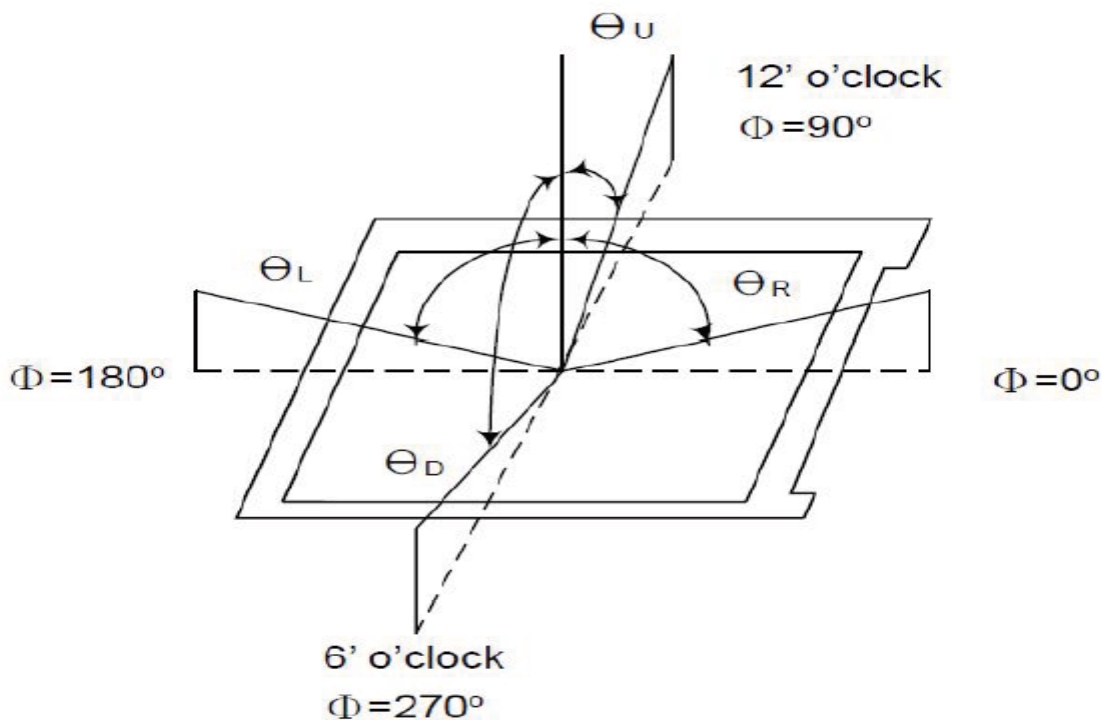
Contrast ratio (CR) =

Luminance measured when LCD is at "white state"

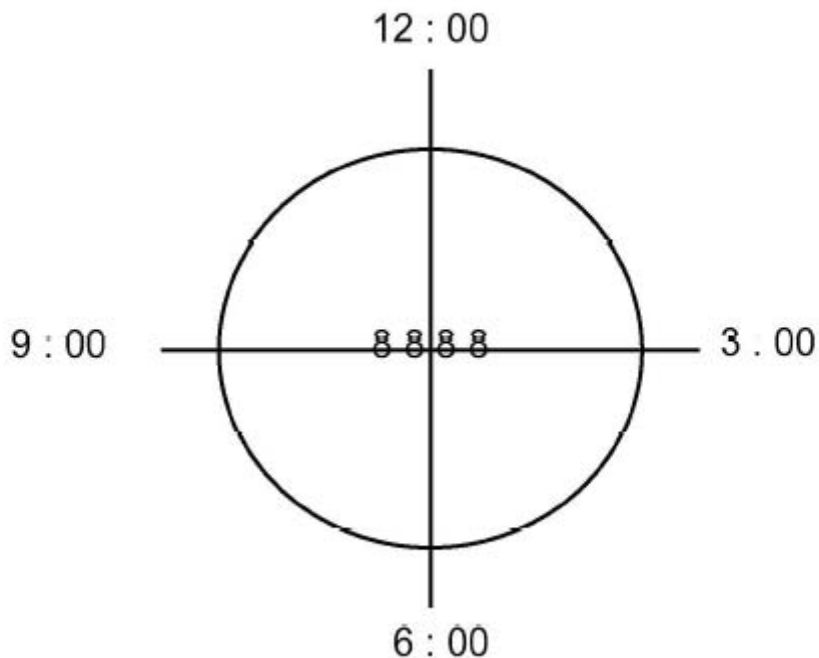
Luminance measured when LCD is at "black state"



NOTE 4 : Φ 、 θ Definition



NOTE 5: Visual angle direction priority



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5. TFT Electrical Characteristics

5.1 Absolute Maximum Rating (Ta=25 VSS=0V)

Characteristics	Symbol	Min.	Max.	Unit
Digital Supply Voltage	VCI	-0.3	4.6	V
Digital interface supply Voltage	IOVCC	-0.3	4.6	V
Operating temperature	T _{OP}	-20	+70	°C
Storage temperature	T _{ST}	-30	+80	°C

NOTE: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

5.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VCI	2.5	2.8/3.3	3.6	V	--
Digital interface supply Voltage	IOVCC	1.65	1.8	3.6	V	--
Normal mode Current consumption	IDD	--	30	--	mA	--
Level input voltage	V _{IH}	0.7 IOVCC	--	IOVCC	V	--
	V _{IL}	-0.3	--	0.3 IOVCC	V	--
Level output voltage	V _{OH}	0.8* IOVCC	--	IOVCC	V	--
	V _{OL}	GND	--	0.2 IOVCC	V	--

5.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 8 chips White LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I _F	15	20	--	mA	--
Forward Voltage	V _F	--	25.6	--	V	--
LCM Luminance	L _v	350	400	--	cd/m2	Note3
LED life time	Hr	50000			Hour	Note1,2

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Uniformity	AVg	80	--	--	%	Note3
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Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: $T_a=25\pm3\text{ }^{\circ}\text{C}$, typical IL value indicated in the above table until the brightness becomes less than 50%.

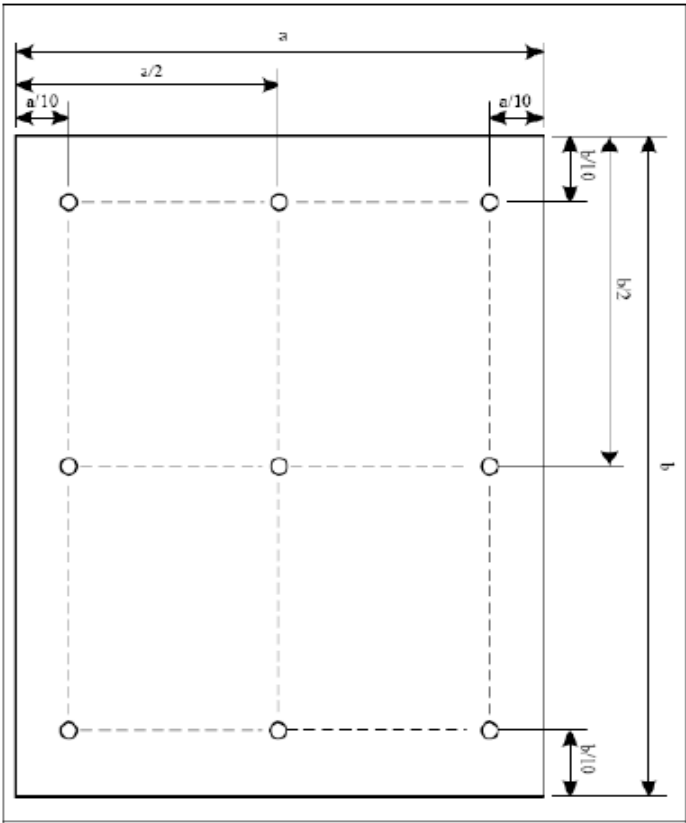
Note (2) The "LED life time" is defined as the module brightness decrease to 50% original brightness at $T_a=25^{\circ}\text{C}$ and $I_L=20\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 20mA. The constant current driving method is suggested.



LED (B/L) CIRCUIT



NOTE 3: Luminance Uniformity of these 9 points is defined as below:



Uniformity = $\frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$

Luminance = $\frac{\text{Total Luminance of 9 points}}{9}$

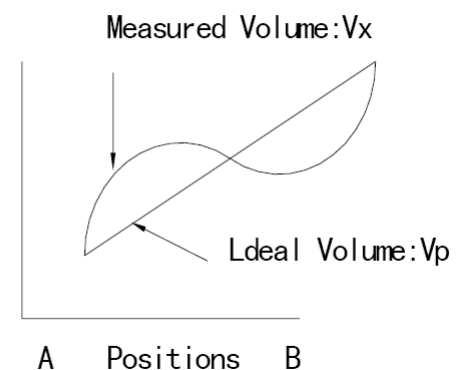
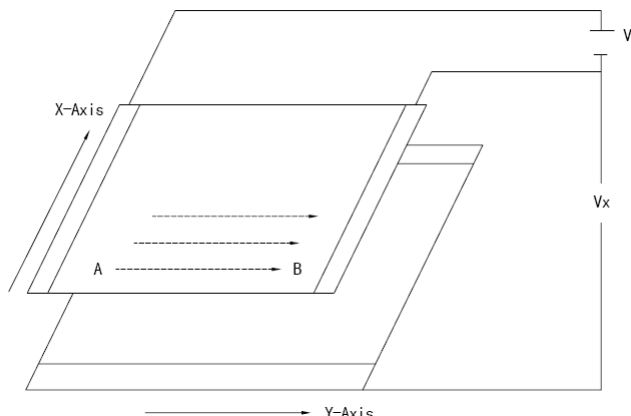
6. TP Feature

6.1 Conditions of use and storage

Item	Value(condition)	Note
Temperature range upon operation	Humidity: 20%~90% non dew, condensation -20℃~70℃	In a simple substance
Temperature range upon storage	Humidity: 20%~90% non dew, condensation -30℃~80℃	In a simple substance

6.2 Electrical property

Item	Value	Note
Maximum voltage	DC5V	
Resistance between terminals	X direction[Film side]:200-600Ω	
	Y direction [Glass side]:300-900Ω	
Insulation resistance	DC 25V 20MΩor above	Connect X + ~X- and Y+ ~Y-, apply 25VDC Between X and Y for perform measurements
Chattering	10 msec or below	
Rating	Voltage is DC 5V	



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6.3 Mechanical property

Item	Performance		Note
Input method	Used of an exclusive pen or finger		
Load upon operation	Exclusive pen	60-100g or below	Operation and measurement with a pen must be carried out under the following tip condition s: Stylus pen material : POM(ployacetal) . Tip : Diameter 3.0mm, SR 0.8 mm
	Finger	60-100g or below	Operations and measurement methods simulate d for a finger must be carried out under the fo llowing tip conditions. Material :Silicon rubber (Hardness : 30°Hs) Tip : Diameter 12.0 mm, SR 12.5mm
Surface hardness	Pencil hardness : 3H or above		It complies with the way of test method JIS K5400.

6.4 Optical property

Item	Performance	Note
Total light transmittance	80% or above	JIS K7105
Haze	5% or below	JIS K7136
Film specification	Polished type with hard coated surface	

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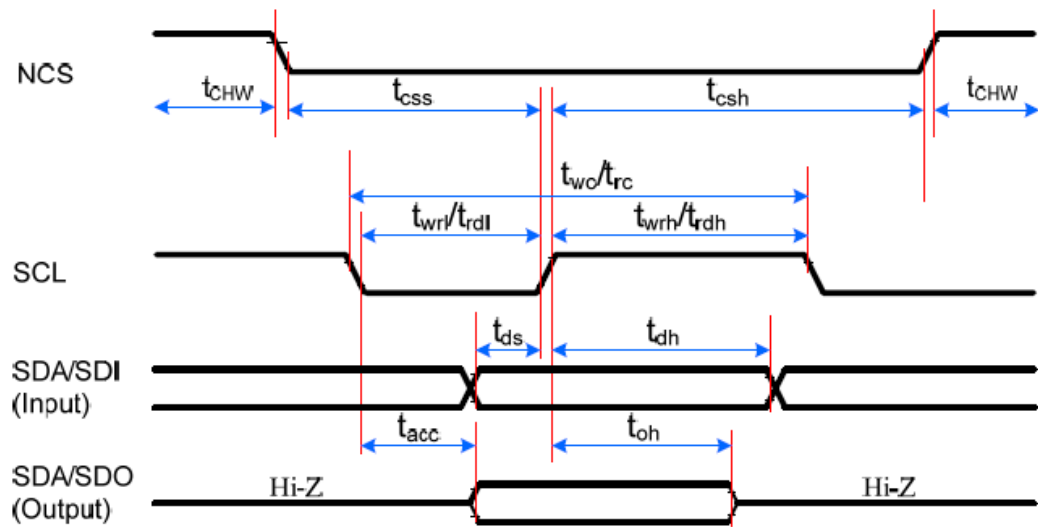
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7. TFT AC Characteristic

7.1 Display Serial Interface Timing Characteristics (3-line SPI system)

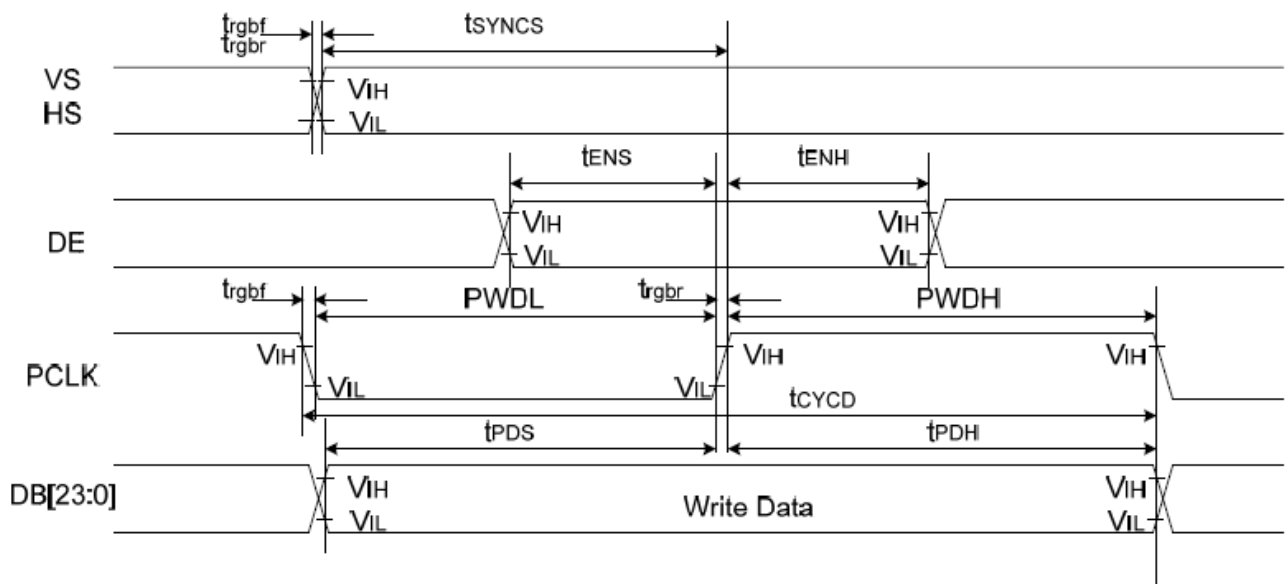


Signal	Symbol	Parameter	min	max	Unit	Description
CSX	tcss	Chip select time (Write)	15	-	ns	
	tcsH	Chip select hold time (Read)	15	-	ns	
	tCHW	CS "H" pulse width	40	-	ns	
SCL	twc	Serial clock cycle (Write)	30	-	ns	
	twrh	SCL "H" pulse width (Write)	10	-	ns	
	twrl	SCL "L" pulse width (Write)	10	-	ns	
	trc	Serial clock cycle (Read)	150	-	ns	
	trdh	SCL "H" pulse width (Read)	60	-	ns	
	trdl	SCL "L" pulse width (Read)	60	-	ns	
SDA/SDO (Output)	tacc	Access time (Read)	10	100	ns	For maximum CL=30pF
	toH	Output disable time (Read)	15	100	ns	For minimum CL=8pF
SDA/SDI (Input)	tds	Data setup time (Write)	10	-	ns	
	tdh	Data hold time (Write)	10	-	ns	

- Note:
- Ta = -30 to 70 °C, IOVCC=1.65V to 3.6V, VCI=2.5V to 3.6V, T=10+/-0.5ns.
 - Does not include signal rise and fall times.



7.2 Parallel 24/18/16-bit RGB Interface Timing Characteristics

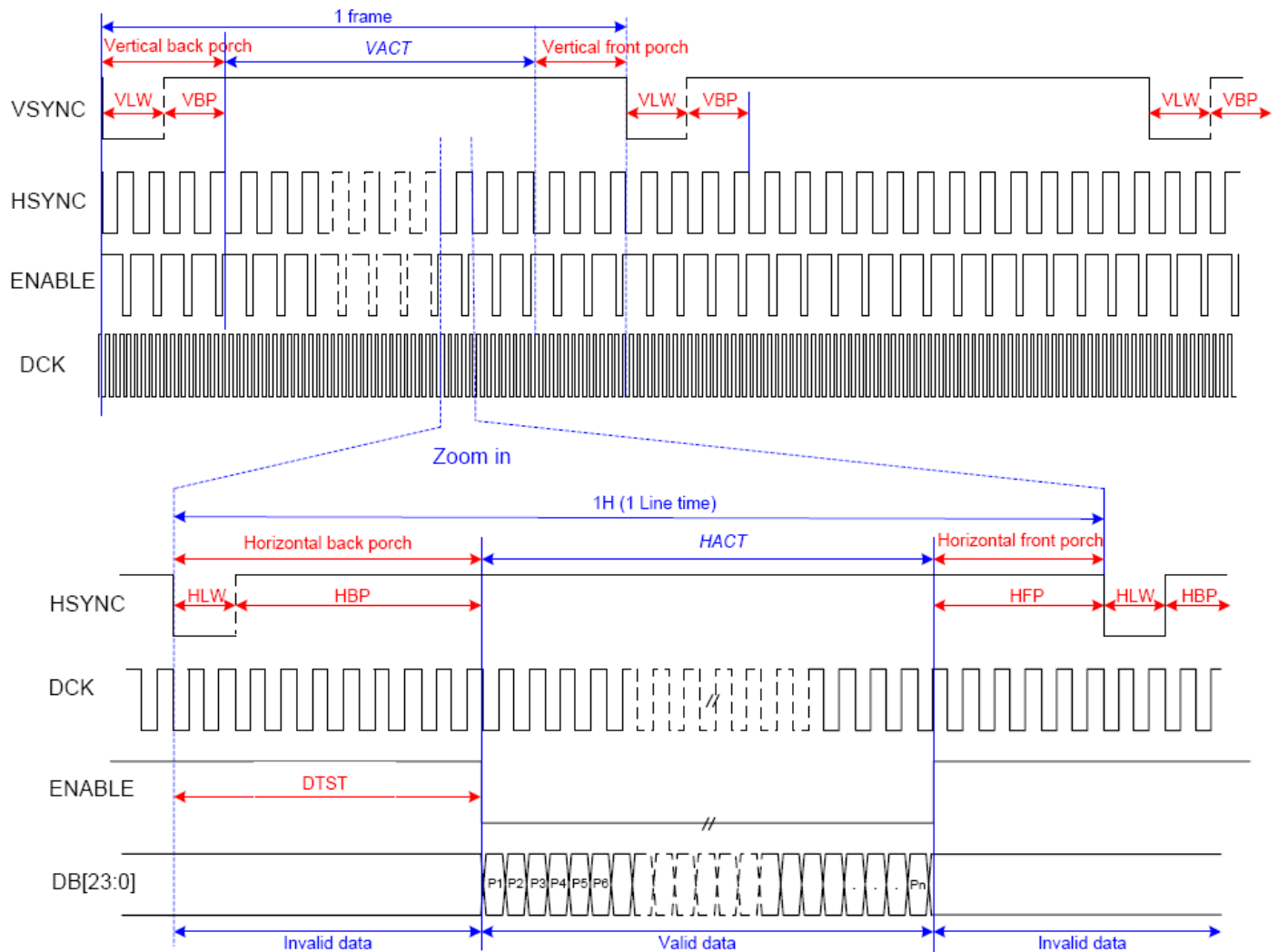


Signal	Symbol	Parameter	min	max	Unit	Description
VS/ HS	t _{SYNCS}	VS/HS setup time	5	-	ns	24/18/16-bit bus RGB interface mode
	t _{SYNCH}	VS/HS hold time	5	-	ns	
DE	t _{ENS}	DE setup time	5	-	ns	
	t _{ENH}	DE hold time	5	-	ns	
DB[23:0]	t _{POS}	Data setup time	5	-	ns	
	t _{PDH}	Data hold time	5	-	ns	
PCLK	PWDH	PCLK high-level period	13	-	ns	
	PWDL	PCLK low-level period	13	-	ns	
	t _{CYCD}	PCLK cycle time	28	-	ns	
	t _{rgbfr} , t _{grbr}	PCLK,HS,VS rise/fall time	-	15	ns	

Note: Ta = -30 to 70 °C, IOVCC=1.65V to 3.6V, VCI=2.5V to 3.6V, DGND=0V

ISO

7.3 DPI Interface Timing



VLW : VSYNC Low pulse Width
 HLW : HSYNC Low pulse Width
 DTST : Data Transfer Startup Time
 Pn : pixel 1, pixel 2..., pixel n.

Parameter	Symbols	Condition	Min.	Typ.	Max.	Units
Frame Rate	FR		54		66	fps
Horizontal Low Pulse width	HLW		1		-	DOTCLK
Horizontal Back Porch	HBP		2		126	DOTCLK
Horizontal Address	HACT			480		DOTCLK
Horizontal Front Porch	HFP		2		-	DOTCLK
Vertical Low Pulse width	VLW		1		126	Line
Vertical Back Porch	VBP		1		126	Line
Vertical Address	VACT				864	Line
Vertical Front Porch	VFP		1		255	Line
Data Clock	DCLK		16.6		41.7	MHz

7.4 Reset input timing

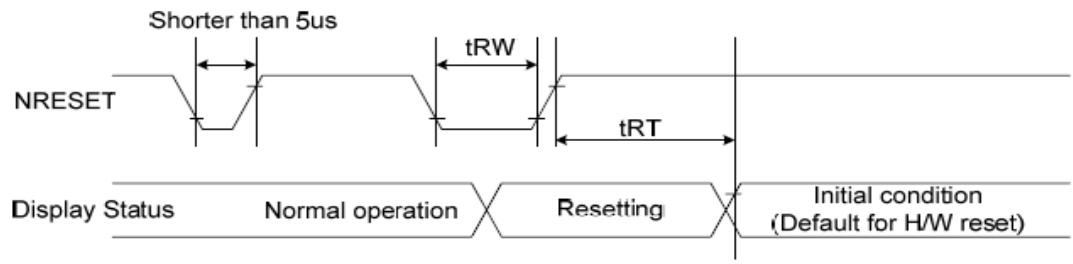


Figure 102 Reset Timing

Table 41 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 OTP to registers. This loading is done every time when there is H/W reset cancel time (tRT) within 5 ms after a rising edge of RESX.
2. Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the Table 43.

Table 42 Reset Descript

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9us	Reset starts

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.
4. Spike Rejection also applies during a valid reset pulse as shown below:

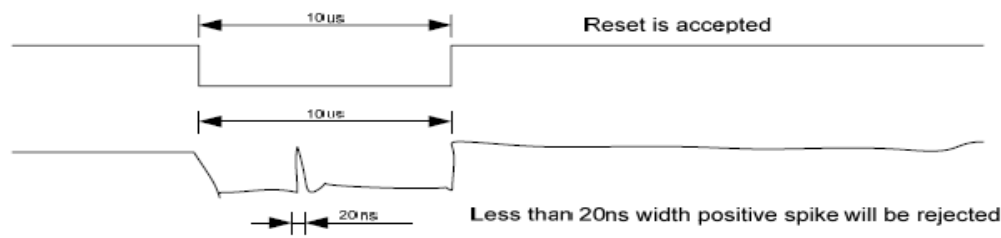


Figure 103 Positive Noise Pulse during Reset Low

5. When Reset applied during Sleep In Mode.
6. When Reset applied during Sleep Out Mode.
7. It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.



8.LCD Module Out-Going Quality Level

8.1 VISUAL & FUNCTION INSPECTION STANDARD

8.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

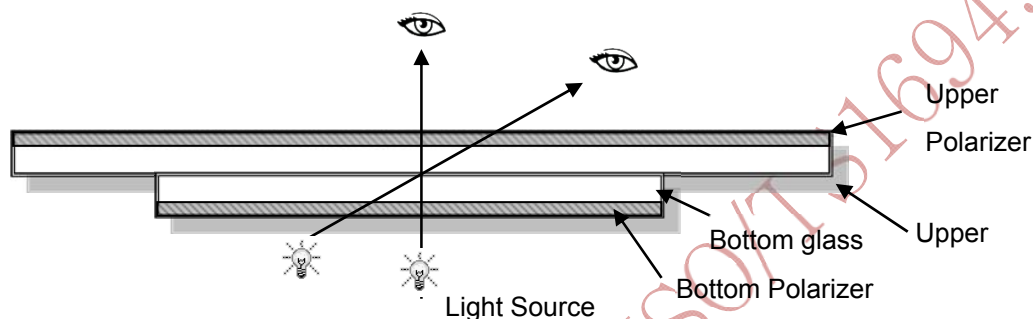
Temperature : $25\pm 5^{\circ}\text{C}$

Humidity : $65\%\pm 10\%\text{RH}$

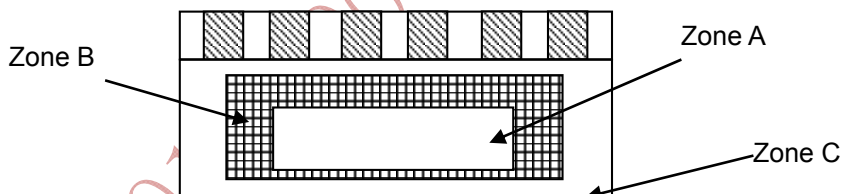
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



8.1.2 Definition



Zone A : Effective Viewing Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)

Note:

As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function or appearance after assembly by customer.

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8.1.3 Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class II

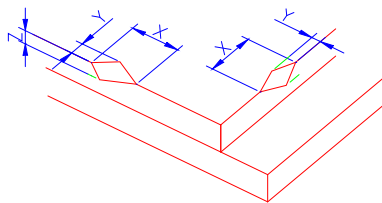
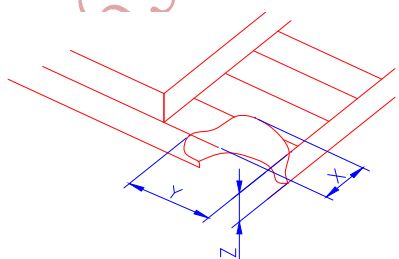
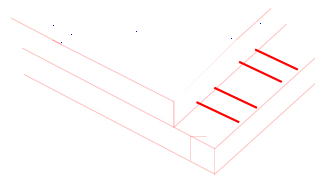
AQL:

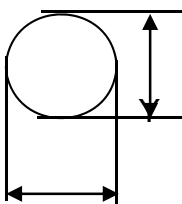
Major defect	Minor defect
0.65	1.5

LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module

No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Soldering appearance	Good soldering , Peeling off is not allowed.	
6	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

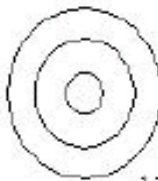
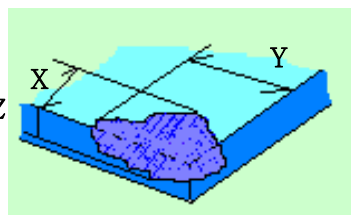
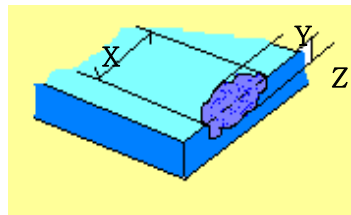
8.1.4 Criteria (Visual)

Number	Items	Criteria(mm)						
1.0 LCD Crack/Broken	(1) The edge of LCD broken	 <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤3.0mm</td><td><Inner border line of the seal</td><td>≤T</td></tr></table>	X	Y	Z	≤3.0mm	<Inner border line of the seal	≤T
	X	Y	Z					
	≤3.0mm	<Inner border line of the seal	≤T					
(2)LCD corner broken	 <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤3.0mm</td><td>≤L</td><td>≤T</td></tr></table>	X	Y	Z	≤3.0mm	≤L	≤T	
X	Y	Z						
≤3.0mm	≤L	≤T						
(3) LCD crack	 Crack Not allowed							

Number	Items	Criteria (mm)																								
2.0	Spot defect  X Φ=(X+Y)/2	① light dot (LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain)																								
		<table><tr><th rowspan="2">Zone Size (mm)</th><th colspan="3">Accep able Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>Φ≤0.10</td><td colspan="2">Ignore</td><td rowspan="4">Ignor</td></tr><tr><td>0.10<Φ≤0.20</td><td colspan="2">3(distance ≥ 10mm)</td></tr><tr><td>0.20<Φ≤0.25</td><td colspan="2">2</td></tr><tr><td>Φ > 0.25</td><td colspan="2">0</td></tr></table>	Zone Size (mm)	Accep able Qty			A	B	C	Φ≤0.10	Ignore		Ignor	0.10<Φ≤0.20	3(distance ≥ 10mm)		0.20<Φ≤0.25	2		Φ > 0.25	0					
		Zone Size (mm)		Accep able Qty																						
			A	B	C																					
		Φ≤0.10	Ignore		Ignor																					
		0.10<Φ≤0.20	3(distance ≥ 10mm)																							
		0.20<Φ≤0.25	2																							
		Φ > 0.25	0																							
		②Dim spot (LCD/TP/Polarizer dim dot, light leakage、 dark spot)																								
		<table><tr><th rowspan="2">Zone Size (mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>Φ≤0.1</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.10<Φ≤0.20</td><td colspan="2">3(distance ≥ 10mm)</td></tr><tr><td>0.20<Φ≤0.30</td><td colspan="2">2</td></tr><tr><td>Φ > 0.30</td><td colspan="2">0</td></tr></table>	Zone Size (mm)	Acceptable Qty			A	B	C	Φ≤0.1	Ignore		Ignore	0.10<Φ≤0.20	3(distance ≥ 10mm)		0.20<Φ≤0.30	2		Φ > 0.30	0					
		Zone Size (mm)		Acceptable Qty																						
			A	B	C																					
		Φ≤0.1	Ignore		Ignore																					
		0.10<Φ≤0.20	3(distance ≥ 10mm)																							
		0.20<Φ≤0.30	2																							
		Φ > 0.30	0																							
	③ Polarizer accidented spot																									
	<table><tr><th rowspan="2">Zone Size (mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>Φ≤0.2</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.3<Φ≤0.5</td><td colspan="2">2(distance ≥ 10mm)</td></tr><tr><td>Φ>0.5</td><td colspan="2">0</td></tr></table>	Zone Size (mm)	Acceptable Qty			A	B	C	Φ≤0.2	Ignore		Ignore	0.3<Φ≤0.5	2(distance ≥ 10mm)		Φ>0.5	0									
	Zone Size (mm)		Acceptable Qty																							
		A	B	C																						
	Φ≤0.2	Ignore		Ignore																						
0.3<Φ≤0.5	2(distance ≥ 10mm)																									
Φ>0.5	0																									
Line defect (LCD/TP /Polarizer black/white line, scratch, stain)	<table><tr><th rowspan="2">Width(mm)</th><th rowspan="2">Length(mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>Φ≤0.03</td><td>Igno e</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.03<W≤0.05</td><td>L≤3.0</td><td colspan="2">N≤2</td></tr><tr><td>0.05<W≤0.08</td><td>L≤2.0</td><td colspan="2">N≤2</td></tr><tr><td>0.08<W</td><td colspan="3">Define as spot defect</td></tr></table>	Width(mm)	Length(mm)		Acceptable Qty			A	B	C	Φ≤0.03	Igno e	Ignore		Ignore	0.03<W≤0.05	L≤3.0	N≤2		0.05<W≤0.08	L≤2.0	N≤2		0.08<W	Define as spot defect	
	Width(mm)			Length(mm)	Acceptable Qty																					
		A	B		C																					
	Φ≤0.03	Igno e	Ignore		Ignore																					
	0.03<W≤0.05	L≤3.0	N≤2																							
	0.05<W≤0.08	L≤2.0	N≤2																							
	0.08<W	Define as spot defect																								

3.0	Polarizer Bubble	<table><tr><th rowspan="2">Zone Size (mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>$\Phi \leq 0.2$</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$0.2 < \Phi \leq 0.4$</td><td colspan="2">3(distance ≥ 10 m)</td></tr><tr><td>$0.4 < \Phi \leq 0.6$</td><td colspan="2">2</td></tr><tr><td>$0.6 < \Phi$</td><td colspan="2">0</td></tr></table>	Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.2$	Ignore		Ignore	$0.2 < \Phi \leq 0.4$	3(distance ≥ 10 m)		$0.4 < \Phi \leq 0.6$	2		$0.6 < \Phi$	0	
Zone Size (mm)	Acceptable Qty																					
	A	B	C																			
$\Phi \leq 0.2$	Ignore		Ignore																			
$0.2 < \Phi \leq 0.4$	3(distance ≥ 10 m)																					
$0.4 < \Phi \leq 0.6$	2																					
$0.6 < \Phi$	0																					
4.0	SMT	According to IPC-A-610C class II standard . Function defect and missing part are major defect ,the others are minor defect.																				

		TP bubble/ accidented spot	<table><tr><th rowspan="2">Size Φ(mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>$\Phi \leq 0.1$</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$0.1 < \Phi \leq 0.25$</td><td colspan="2">3 (distance $\geq$</td></tr><tr><td>$0.25 < \Phi \leq 0.3$</td><td colspan="2">2</td></tr><tr><td>$0.3 < \Phi$</td><td colspan="2">0</td></tr></table>			Size Φ (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.1$	Ignore		Ignore	$0.1 < \Phi \leq 0.25$	3 (distance $\geq$		$0.25 < \Phi \leq 0.3$	2		$0.3 < \Phi$	0	
Size Φ (mm)	Acceptable Qty																								
	A		B	C																					
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$0.1 < \Phi \leq 0.25$	3 (distance $\geq$																								
$0.25 < \Phi \leq 0.3$	2																								
$0.3 < \Phi$	0																								
		Assembly deflection	beyond the edge of backlight $\leq 0.15\text{mm}$																						

5.0	TP Related	Newton Ring Newton Ring area>1/3 TP area NG Newton Ring area≤1/3 TP area OK	 1 规律性  2 非规律性  似牛顿环						
	TP corner broken X : length Y : width Z : height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>X≤3.0mm</td><td>Y≤3.0mm</td><td>Z<LCD thicknes</td></tr></table> * Circuitry broken is not allowed.	X	Y	Z	X≤3.0mm	Y≤3.0mm	Z<LCD thicknes	
X	Y	Z							
X≤3.0mm	Y≤3.0mm	Z<LCD thicknes							
	TP edge broken X : length Y : width Z : height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>X≤6.0mm</td><td>Y≤2.0mm</td><td>Z<LCD thicknes</td></tr></table> * Circuitry broken is not allowed.	X	Y	Z	X≤6.0mm	Y≤2.0mm	Z<LCD thicknes	
X	Y	Z							
X≤6.0mm	Y≤2.0mm	Z<LCD thicknes							

Criteria (functional items)

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	TP no function	Not allowed

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常备库存
Stock For Sale

长期供货
Long Time supply

支持小量
NO MOQ

品种齐全
In Full Range

9. Reliability Test Result

9.1 Condition

Item	Condition	Sample Size	Test Result	Note
Low Temperature Operating Life test	-20℃, 96HR	3ea	pass	-
Thermal Humidity Operating Life test	70℃90%RH, 96HR	3ea	pass	-
Temperature Cycle ON/OFF test	-20℃ ↔ 70℃, ON/OFF, 20CYC	3ea	pass	(1)
High Temperature Storage test	80℃, 96HR	3ea	pass	-
Low Temperature Storage test	-30℃, 96HR	3ea	pass	-
ESD test	150pF, 330Ω, ±6KV(Contact)/± 8KV(Air), 5 points/panel, 10 times/point	3ea	pass	
Thermal Shock Resistance	The sample should be allowed to stand the following 5 cycles of operation: TSTL for 30 minutes -> normal temperature for 5 minutes -> TSTH for 30 minutes -> normal temperature for 5 minutes, as one cycle, then taking it out and drying it at normal temperature, and allowing it stand for 24 hours	3ea	pass	
Box Drop Test	1 Corner 3 Edges 6 faces, 66cm(MEDIUM BOX)	1box	pass	-

Note (1) ON Time over 10 seconds, OFF Time under 10 seconds

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10. Cautions and Handling Precautions

10.1 Handling and Operating the Module

- (1) When the module is assembled, it should be attached to the system firmly.
Do not warp or twist the module during assembly work.
- (2) Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.
- (3) Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.
- (4) Do not allow drops of water or chemicals to remain on the display surface.
If you have the droplets for a long time, staining and discoloration may occur.
- (5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.
- (6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.
Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
- (7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.
- (8) Protect the module from static; it may cause damage to the CMOS ICs.
- (9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (10) Do not disassemble the module.
- (11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
- (12) Pins of I/F connector shall not be touched directly with bare hands.
- (13) Do not connect, disconnect the module in the "Power ON" condition.
- (14) Power supply should always be turned on/off by the item 6.1 Power On Sequence & 6.2 Power Off Sequence

10.2 Storage and Transportation.

- (1) Do not leave the panel in high temperature, and high humidity for a long time.
It is highly recommended to store the module with temperature from 0 to 35 °C and relative humidity of less than 70%
- (2) Do not store the TFT-LCD module in direct sunlight.
- (3) The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.
- (4) It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module.
In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.
- (5) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.

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11. Packing

----TBD-----

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