



倍顯(香港)有限公司
Facelcd(HongKong) Limited

SPECIFICATION FOR LCD MODULE

Customer :

Product Model:

FB057EXV303-A

Sample code:

Designed by	Checked by	Approved by

Final Approval by Customer

<input type="checkbox"/> LCM Machinery OK Checked By _____ <input type="checkbox"/> LCM Display OK Checked By _____	<input type="checkbox"/> LCM OK <input type="checkbox"/> NG , Problem survey: Approved By _____
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※The specification of “TBD” should refer to the measured value of sample . If there is difference between the design specification and measured value, we naturally shall negotiate and agree to solution with customer.

[illegible]



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1. General Description

FB057EXV303-A is a 5.7 inch TFT Liquid Crystal Display module with a LED backlight unit and a-20pin 6bit LVDS interface controller board. The converter for the LED Backlight Unit is built in. This module supports 640 (R.G.B) x 480 WVGA mode which main application is the automotive display and industrial field.

2. Module Parameter

Features	Details	Unit
Display Size(Diagonal)	5.7"	
LCD type	IPS TFT	
Display Mode	Transmissive /Normally Black	
Resolution	640 RGB x 480	Pixels
View Direction	Full View	Best Image
Gray Scale Inversion Direction	-	
Module Outline	126.5(W) × 100(H) × 7.6(D) mm	mm
Active Area	115.2(H) x 86.4 (V)	mm
Pixel Size	60 x180	um
Pixel Arrangement	R.G.B. Vertical Stripe	
Display Colors	16.7M	
Interface	LVDSinterface	
With or without touch panel	without	
Driver IC		-
Operating Temperature	-30~80	°C
Storage Temperature	-30~85	°C
Weight	-	g

3. Absolute Maximum Ratings

V_{SS}=0V, Ta=25°C

Item	Symbol	Min.	Max.	Unit
Supply Voltage	V _{CI}	-0.3	5.0	V
Storage temperature	T _{stg}	-30	+85	°C
Operating temperature	T _{op}	-30	+80	°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		V _{CI}	2.5	3.0	3.3	V
Logic Low input voltage		V _{IL}	GND	-	0.3*V _{CI}	V
Logic High input voltage		V _{IH}	0.7*V _{CI}	-	V _{CI}	V
Logic Low output voltage		V _{OL}	GND	-	0.2*V _{CI}	V
Logic High output voltage		V _{OH}	0.8*V _{CI}	-	V _{CI}	V
Current Consumption All Black	Logic	I _{CC} + I _{IN}	-	9	-	mA
	Analog					

5. Backlight Characteristic

T_a = 25 ± 2 °C

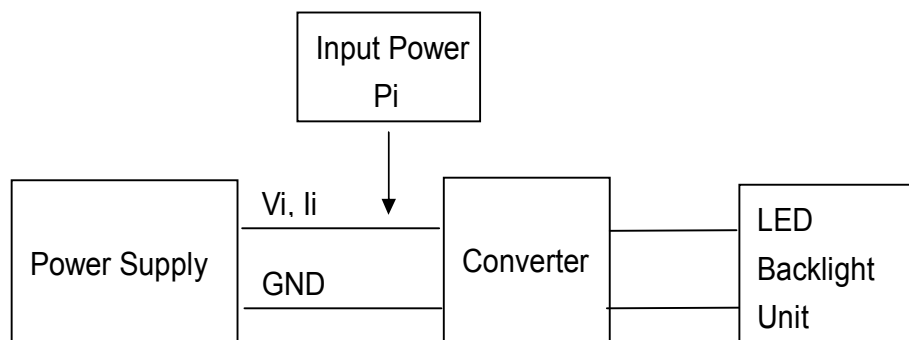
5.1 BACKLIGHT UNIT

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Converter Power Supply Voltage	V _i	10.8	12.0	13.2	V	
Converter Power Supply Current	I _i	---	0.24	0.264	A	@ V _i = 12V (Duty 100%)
Converter Power Consumption	P _{LED}	---	2.8	3.08	W	@ V _i = 12V (Duty 100%)
EN Control Level	Backlight on	2.5	---	5	V	
	Backlight off	0	---	0.3	V	
PWM Control Voltage		0.7	---	2.5	V	
PWM Control Duty Ratio		10		100	%	
PWM Control Frequency	f _{PWM}	100		500	Hz	
LED Life Time	L _L	30,000			Hrs	(2)

Note (1) LED current is measured by utilizing a high frequency current meter as shown below:

Note (2) The lifetime of LED is defined as the time when it continues to operate under the conditions at
T_a = 25 ±2 °C and I_{LED} = 50mA_{DC}(LED forward current) until the brightness becomes ≤ 50% of its
original value.

Note (3) Please note that LED life will be shorter than the average life described in the specification if
operate in higher ambient temperature.



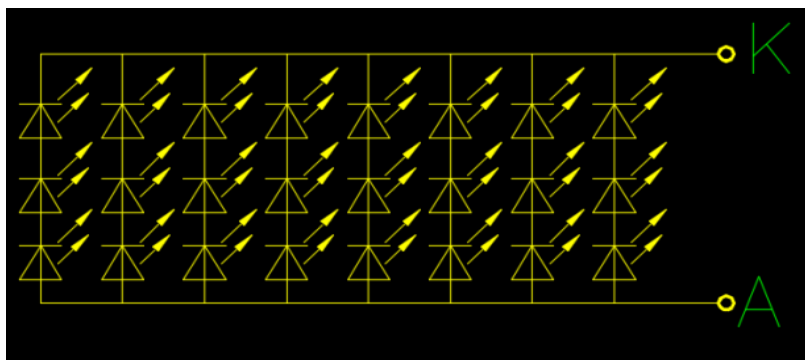


5.2. Backlight

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	$T_a=25\text{ }^{\circ}\text{C}$, $I_F=20\text{mA/LED}$	8.4	9.0	10.5	V
Forward Current	I_F	$T_a=25\text{ }^{\circ}\text{C}$, $V_F=3.0\text{V/LED}$	-	160	-	mA
Power dissipation	P_D		-	1260	-	mW
Uniformity	Avg		80	-	-	%
LED working life(25°C)	-		-	30,000	-	Hrs
Drive method	Constant current					
LED Configuration	24 White LEDs (3 LEDs in one string and 8 groups in 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 $T_a=25\pm 2\text{ }^{\circ}\text{C}$, $60\%\text{RH}\pm 5\%$, $I_F=20\text{mA/LED}$.

5.3. Backlighting circuit





6. Optical Characteristics

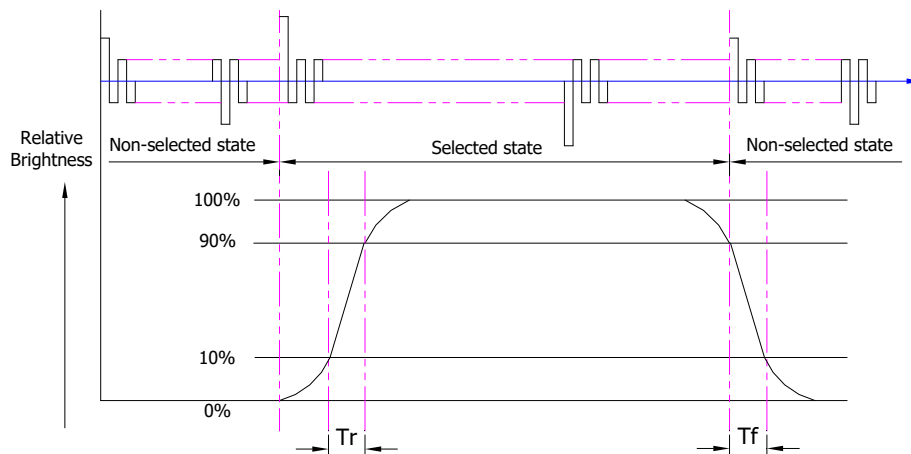
6.1. Optical Characteristics

Ta=25°C, VCI=2.8V

Backlight On (Transmissive Mode)	Item		Symbol	Condition	Specification			Unit
					Min.	Typ.	Max.	
	Luminance on TFT(I_f =15mA/LED)		Lv	Normally viewing angle $\theta_x = \varphi_y = 0^\circ$	300	350	-	cd/m ²
	Contrast ratio(See 6.3)		CR		1000	1200	-	
	Response time (See 6.2)		T _R +T _F		-	30	35	ms
	Chromaticity Transmissive (See 6.5)	White	Xw		-	-	-	
			Yw		-	-	-	
	Viewing Angle (See 6.4)	Horizontal	θx+	Center CR≥10	75	80	-	Deg.
			θx-		75	80	-	
		Vertical	φy+		75	80	-	
φy-			75		80	-		
NTSC Ratio(Gamut)				55	60	-	%	

6.2. Definition of Response Time

6.2.1. Normally Black Type (Negative)

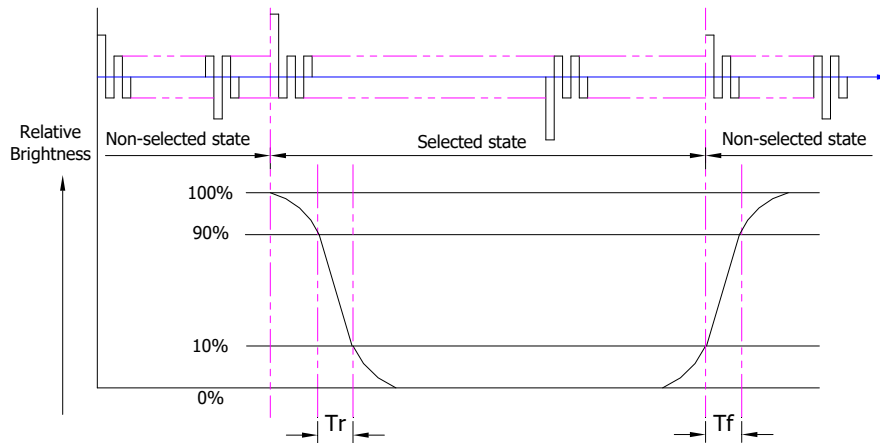


Tr is the time it takes to change from non-selected state with relative luminance 10% to selected state with relative luminance 90%;

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 from non-selected state 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

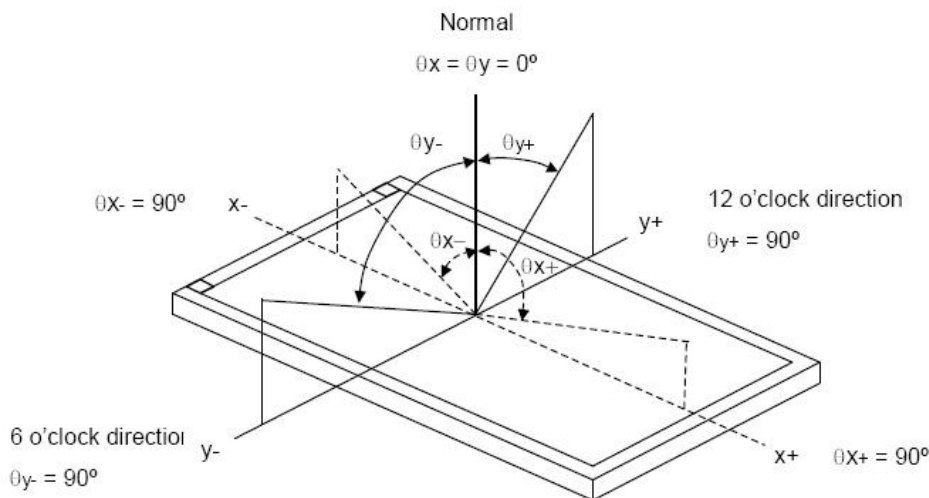
Contrast is measured perpendicular to display surface in reflective and transmissive mode.

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



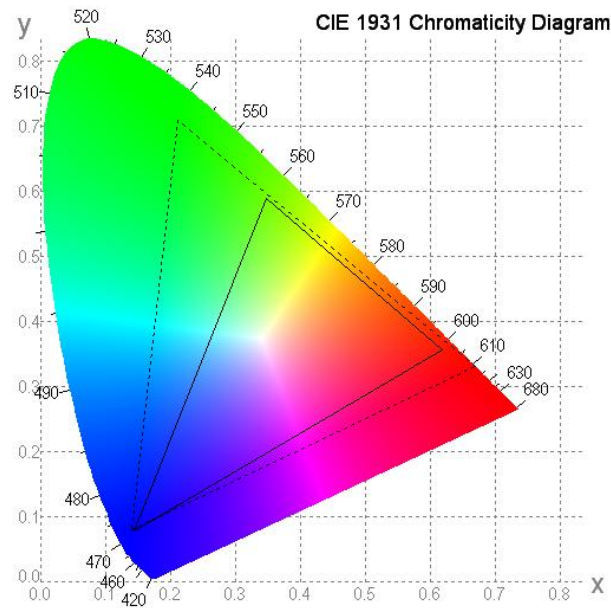
Measuring machine: LCD-5100 or EQUI

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

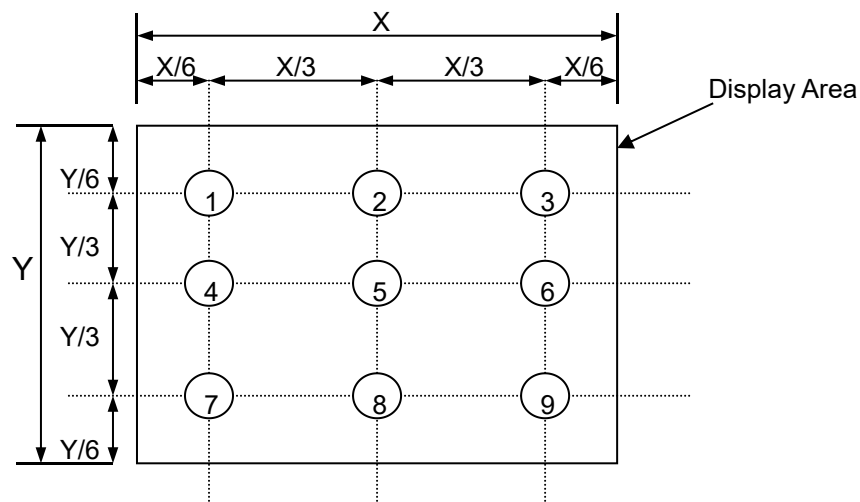
Using the transmissive mode measurement approach, measure the white screen luminance of the display panel and backlight.

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

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

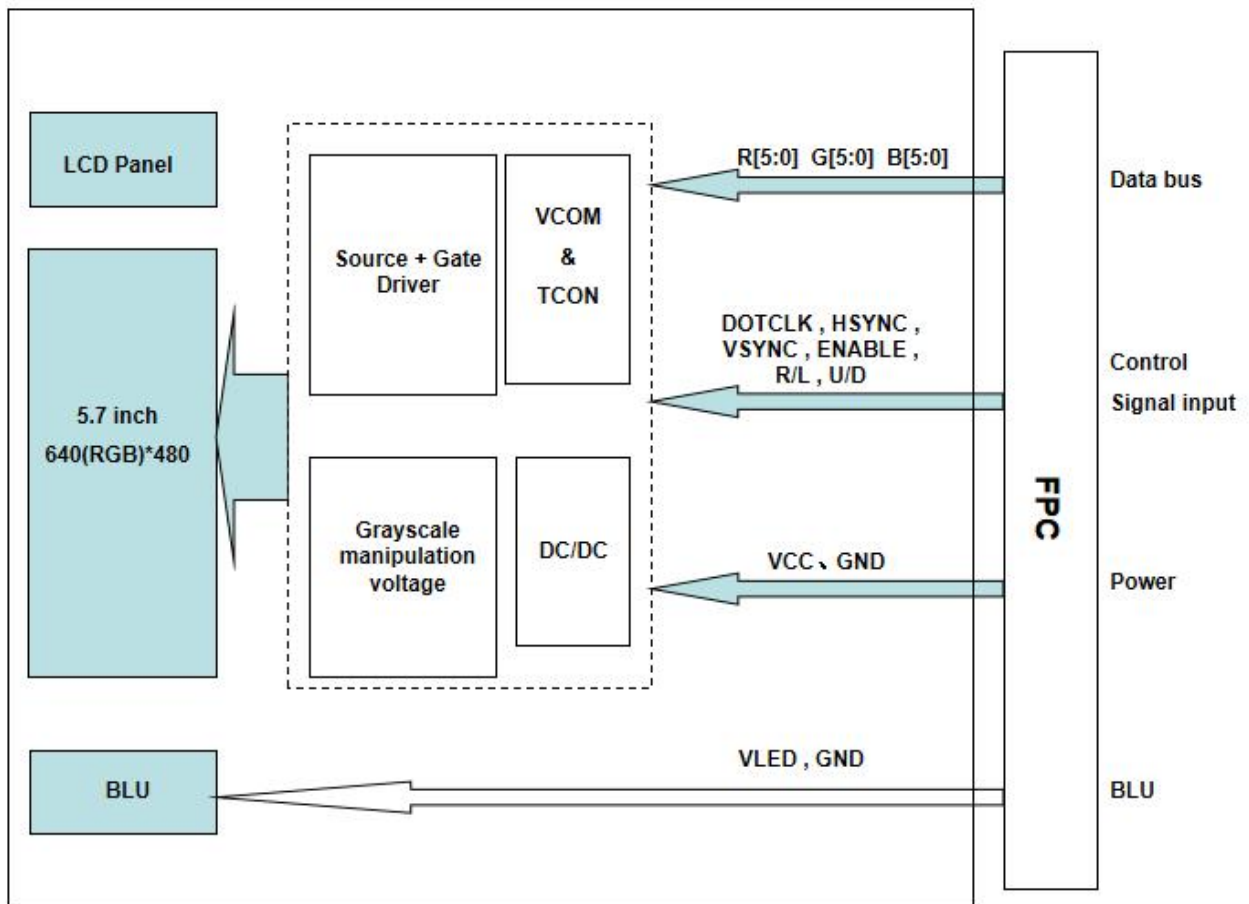
6.6.3. Transmittance = $L_V \text{ on LCD} / L_V \text{ on Backlight} * 100\%$

Note: Measuring machine: BM-7





7. Block Diagram and Power Supply





8. Interface Pins Definition

8.1 LVDS I/O PIN ASSIGNMENT

CN1

Pin	Name	I/O	Description
1	VCC_IN	I	Digital power supply (+3.3V)
2	VCC_IN	I	Digital power supply (+3.3V)
3	GND	I	Ground
4	GND	I	Ground
5	RX0-	I	LVDS differential data input Pair 0
6	RX0+	I	
7	GND	I	Ground
8	RX1-	I	LVDS differential data input Pair 1
9	RX1+	I	
10	GND	I	Ground
11	RX2-	I	LVDS differential data input Pair 2
12	RX2+	I	
13	GND	I	Ground
14	RXC-	I	LVDS differential Clock input Pair
15	RXC+	I	
16	NC	I	No Connected
17	NC	I	No Connected
18	NC	I	No Connected
19	NC	I	No Connected
20	NC	I	No Connected

Note (1) Connector Part No.: 076B20-0048RA-G4, Starconn or equivalent

8.2 BACKLIGHT PIN ASSIGNMENT (Converter connector pin)

CN3

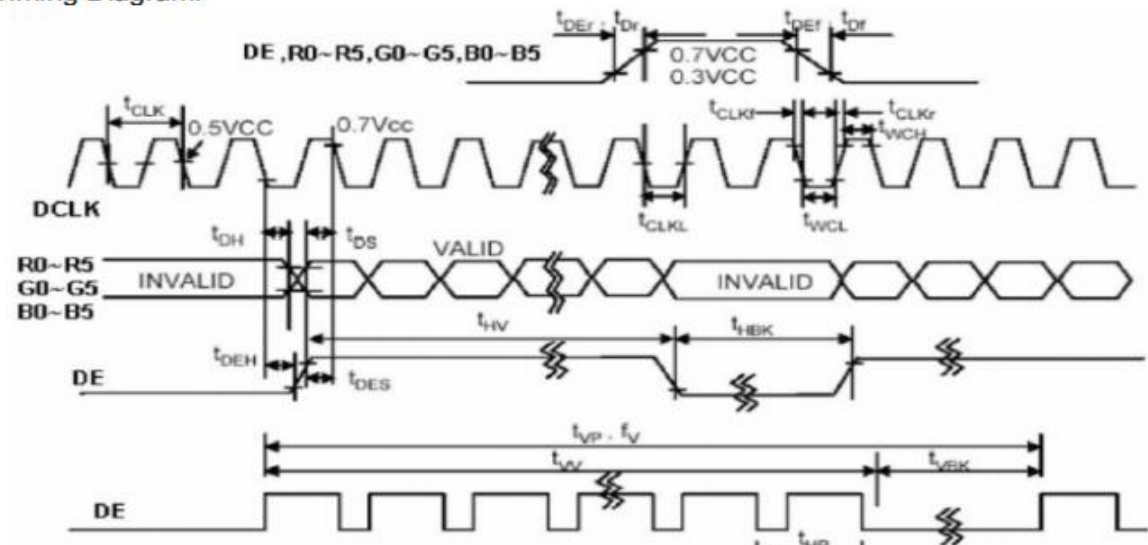
No	Symbol	I/O	Description
1	Vi	I	Converter input voltage
2	ADJ	I	Backlight Adjust
3	EN	I	Enable pin
4	V _{GND}		Converter ground



9. AC Characteristics

Data R, G, B	Vertical Valid	tw	480	480	480	tHP	
	Vertical Blank	tvBK	35	45	80	tHP	
	Vertical Frequency	fv	55	60	65	HZ	
	Setup time	tds	5	-	-	ns	
	Hold time	tdH	10	-	-	ns	
	Rise, Fall time	tDr, tDf	-	-	3	ns	

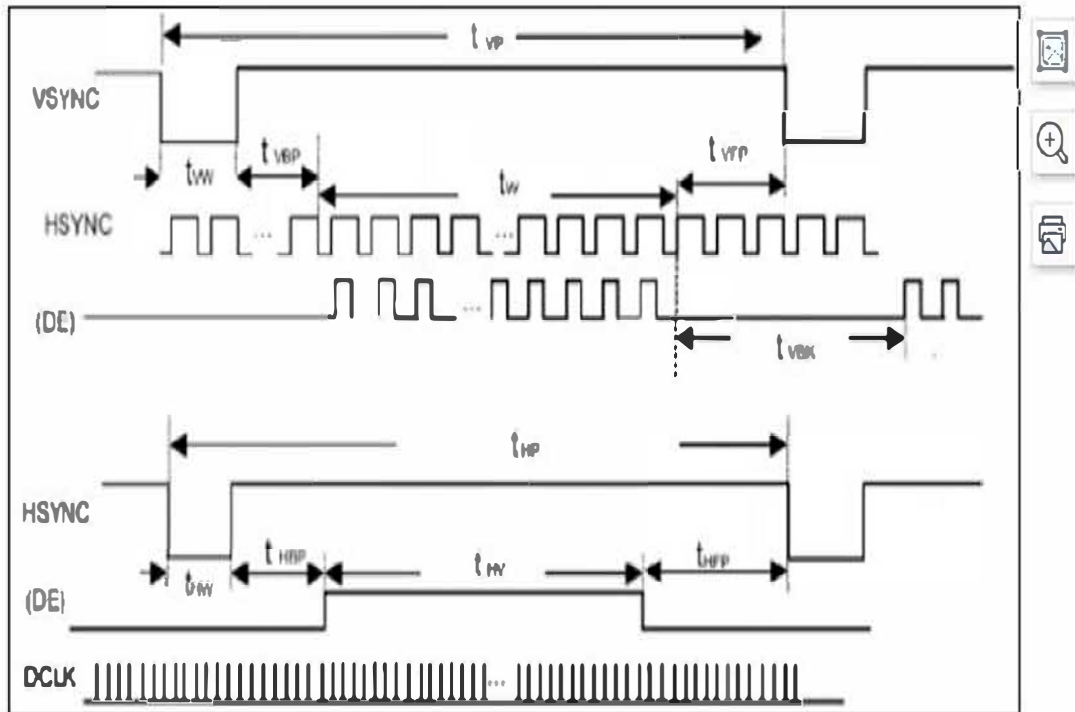
Timing Diagram:



Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
Clock Period	tCLK	33	40	43	ns	
Clock Frequency	fCLK	23	25	30	MHz	
Clock Low Level Width	twCL	6	-	-	ns	
Clock High Level Width	twCH	6	-	-	ns	
Clock Rise, Fall Time	tCLKr, tCLKf	-	-	3	ns	
HSYNC Period	tHP	750	800	900	tCLK	
HSYNC Pulse Width	tHW	5	30	-	tCLK	
HSYNC Front Porch	tHFP	1	16	116	tCLK	
HSYNC Back Porch	tHBP	1	114	139	tCLK	
HSYNC Width + Back Porch	tHW + tHBP	144	144	144	tCLK	
Horizontal Blank	tHBK	1	160	260	tCLK	
Horizontal Valid	tHV	640	640	640	tCLK	
VSYSN Period	tVP	515	525	560	tHP	
VSYSN Pulse Width	tVW	1	3	5	tHP	
VSYSN Front Porch	tVFP	1	10	45	tHP	

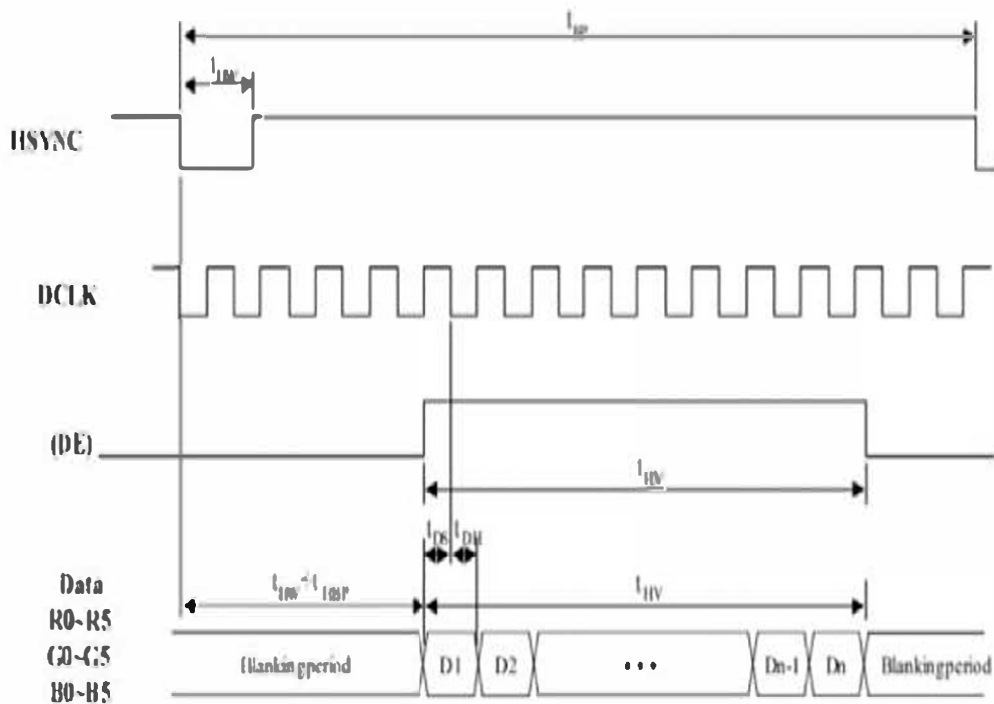


Input Vertical Timing



Note: If SYNC mode is used, please fix DE signal to low, DE timing waveform is for reference only.

Input Horizontal Timing



Note: If SYNC mode is used, please fix DE signal to low, DE timing waveform is for reference only.



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.

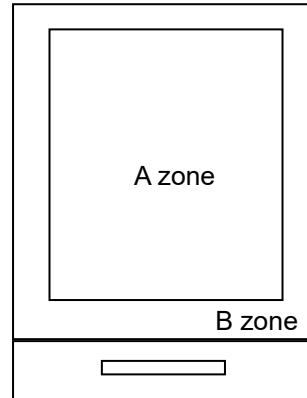
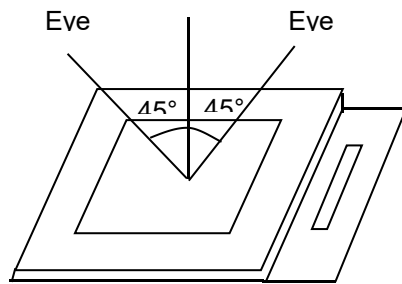
10.5.Standard of the Product Visual Inspection

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 \pm 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,

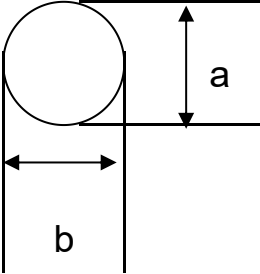


10.5.2. Basic principle:

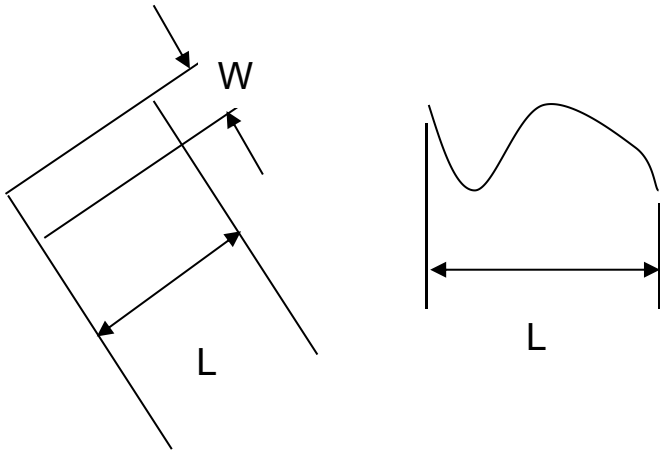
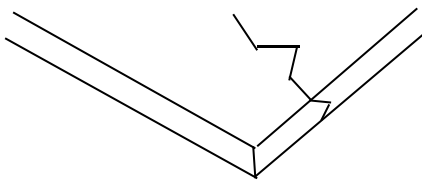
10.5.2.1. A set of sample to indicate the limit of acceptable quality level must be discussed by both us and customer when there is any dispute happened.

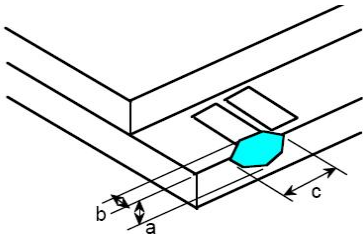
10.5.2.2. New item must be added on time when it is necessary.

10.6. Inspection Specification

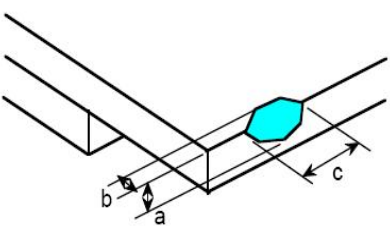
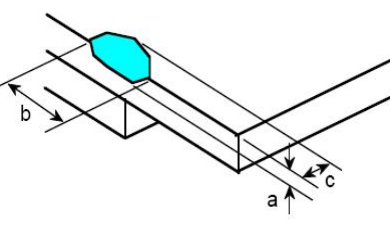
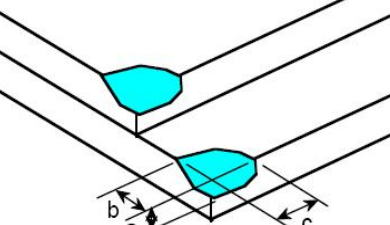
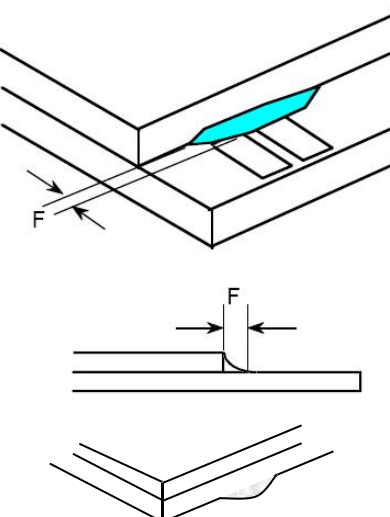
No.	Item	Criteria (Unit: mm)																	
01	Black / White spot Foreign material (Round type) Pinholes Stain Particles inside cell. (Minor defect)	 $\phi = (a + b) / 2$ Distance between 2 defects should more than 3mm apart.	<table><tr><th>Size \ Area</th><th>Acc. Qty</th></tr><tr><td>$\phi \leq 0.10$</td><td>Ignore</td></tr><tr><td>$0.10 < \phi \leq 0.15$</td><td>2</td></tr><tr><td>$0.15 < \phi \leq 0.25$</td><td>1</td></tr><tr><td>$0.25 < \phi$</td><td>0</td></tr><tr><td>Total</td><td>2 no include $\phi \leq 0.10$</td></tr></table>	Size \ Area	Acc. Qty	$\phi \leq 0.10$	Ignore	$0.10 < \phi \leq 0.15$	2	$0.15 < \phi \leq 0.25$	1	$0.25 < \phi$	0	Total	2 no include $\phi \leq 0.10$				
			Size \ Area	Acc. Qty															
			$\phi \leq 0.10$	Ignore															
			$0.10 < \phi \leq 0.15$	2															
			$0.15 < \phi \leq 0.25$	1															
$0.25 < \phi$	0																		
Total	2 no include $\phi \leq 0.10$																		
02	Electrical Defect (Minor defect)	<table><tr><td></td><td>Display Area</td><td>Total</td><td rowspan="3">Note1</td></tr><tr><td>Bright dot</td><td>0</td><td>0</td></tr><tr><td>Dark dot</td><td>$N \leq 2$</td><td>$N \leq 2$</td></tr><tr><td>Total dot</td><td>$N \leq 2$</td><td>$N \leq 2$</td><td rowspan="2">Note2</td></tr><tr><td>Mura</td><td colspan="2">Not visible through 5% ND filters.</td></tr></table>		Display Area	Total	Note1	Bright dot	0	0	Dark dot	$N \leq 2$	$N \leq 2$	Total dot	$N \leq 2$	$N \leq 2$	Note2	Mura	Not visible through 5% ND filters.	
				Display Area	Total		Note1												
			Bright dot	0	0														
			Dark dot	$N \leq 2$	$N \leq 2$														
			Total dot	$N \leq 2$	$N \leq 2$	Note2													
Mura	Not visible through 5% ND filters.																		
Remark: 1. Bright dot caused by scratch and foreign object accords to item 1.																			



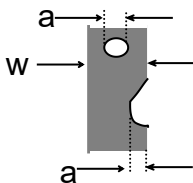
03	<p>Black and White line Scratch Foreign material (Line type) (Minor defect)</p>	 <table border="1" data-bbox="616 831 1241 1137"> <thead> <tr> <th>Length</th><th>Width</th><th>Acc. Qty</th></tr> </thead> <tbody> <tr> <td>/</td><td>$W \leq 0.03$</td><td>Ignore</td></tr> <tr> <td>$L \leq 2.5$</td><td>$0.03 < W \leq 0.05$</td><td>3</td></tr> <tr> <td>$L \leq 2.5$</td><td>$0.05 < W \leq 0.10$</td><td>2</td></tr> <tr> <td>/</td><td>$0.1 < W$</td><td></td></tr> <tr> <td colspan="2">Total</td><td>3</td></tr> </tbody> </table> <p>Distance between 2 defects should more than 3mm apart. Scratches not viewable through the back of the display are acceptable.</p>	Length	Width	Acc. Qty	/	$W \leq 0.03$	Ignore	$L \leq 2.5$	$0.03 < W \leq 0.05$	3	$L \leq 2.5$	$0.05 < W \leq 0.10$	2	/	$0.1 < W$		Total		3
Length	Width	Acc. Qty																		
/	$W \leq 0.03$	Ignore																		
$L \leq 2.5$	$0.03 < W \leq 0.05$	3																		
$L \leq 2.5$	$0.05 < W \leq 0.10$	2																		
/	$0.1 < W$																			
Total		3																		
04	<p>Glass Crack (Minor defect)</p>	 <p>Crack is potential to enlarge, any type is not allowed.</p>																		

05	Glass Chipping Pad Area: (Minor defect)								
		<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">$a < \text{Glass Thickness}$</td></tr></table>	Length and Width	Acc. Qty	$c > 3.0, b < 1.0$	1	$c < 3.0, b < 1.0$	3	$a < \text{Glass Thickness}$
Length and Width	Acc. Qty								
$c > 3.0, b < 1.0$	1								
$c < 3.0, b < 1.0$	3								
$a < \text{Glass Thickness}$									



06	<p>Glass Chipping Rear of Pad Area: (Minor defect)</p> 	<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">$a < \text{Glass Thickness}$</td></tr></table>	Length and Width	Acc. Qty	$c > 3.0, b < 1.0$	1	$c < 3.0, b < 1.0$	2	$c < 3.0, b < 0.5$	4	$a < \text{Glass Thickness}$	
Length and Width	Acc. Qty											
$c > 3.0, b < 1.0$	1											
$c < 3.0, b < 1.0$	2											
$c < 3.0, b < 0.5$	4											
$a < \text{Glass Thickness}$												
07	<p>Glass Chipping Except Pad Area: (Minor defect)</p> 	<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">$a < \text{Glass Thickness}$</td></tr></table>	Length and Width	Acc. Qty	$c > 3.0, b < 1.0$	1	$c < 3.0, b < 1.0$	2	$c < 3.0, b < 0.5$	4	$a < \text{Glass Thickness}$	
Length and Width	Acc. Qty											
$c > 3.0, b < 1.0$	1											
$c < 3.0, b < 1.0$	2											
$c < 3.0, b < 0.5$	4											
$a < \text{Glass Thickness}$												
08	<p>Glass Corner Chipping: (Minor defect)</p> 	<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">$a < \text{Glass Thickness}$</td></tr></table>	Length and Width	Acc. Qty	$c < 3.0, b < 3.0$	Ignore	$a < \text{Glass Thickness}$					
Length and Width	Acc. Qty											
$c < 3.0, b < 3.0$	Ignore											
$a < \text{Glass Thickness}$												
09	<p>Glass Burr: (Minor defect)</p> 	<table><tr><th>Length</th><th>Acc. Qty</th></tr><tr><td>$F < 1.0$</td><td>Ignore</td></tr></table> <p>Glass burr don't affect assemble and module dimension.</p>	Length	Acc. Qty	$F < 1.0$	Ignore						
Length	Acc. Qty											
$F < 1.0$	Ignore											



10	FPC Defect: (Minor defect) 	10.1 Dent, pinhole width $a < w/3$. (w: circuitry width.) 10.2 Open circuit is unacceptable. 10.3 No oxidation, contamination and distortion.										
11	Bubble on Polarizer (Minor defect)	<table><tr><th>Diameter</th><th>Acc. Qty</th></tr><tr><td>$\varphi \leq 0.20$</td><td>Ignore</td></tr><tr><td>$0.20 < \varphi \leq 0.30$</td><td>4</td></tr><tr><td>$0.30 < \varphi \leq 0.50$</td><td>1</td></tr><tr><td>$0.50 < \varphi$</td><td>None</td></tr></table>	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
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											
12	Dent on Polarizer (Minor defect)	<table><tr><th>Diameter</th><th>Acc. Qty</th></tr><tr><td>$\varphi \leq 0.20$</td><td>Ignore</td></tr><tr><td>$0.20 < \varphi \leq 0.30$</td><td>4</td></tr><tr><td>$0.30 < \varphi \leq 0.50$</td><td>1</td></tr><tr><td>$0.50 < \varphi$</td><td>None</td></tr></table>	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
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											
13	Bezel	13.1 No rust, distortion on the Bezel. 13.2 No visible fingerprints, stains or other contamination.										
14	Touch Panel	D: Diameter W: width L: length 14.1 Spot: $D < 0.25$ is acceptable $0.25 \leq D \leq 0.4$ 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: $W \leq 0.03$, $L \leq 10$ is acceptable, $0.03 < W \leq 0.10$, $L \leq 10$ is acceptable Distance between 2 defects should more than 10 mm. $W > 0.10$ is unacceptable.										
15	PCB	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.										
16	Soldering	Follow IPC-A-610C standard										
17	Electrical Defect (Major defect)	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.
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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.

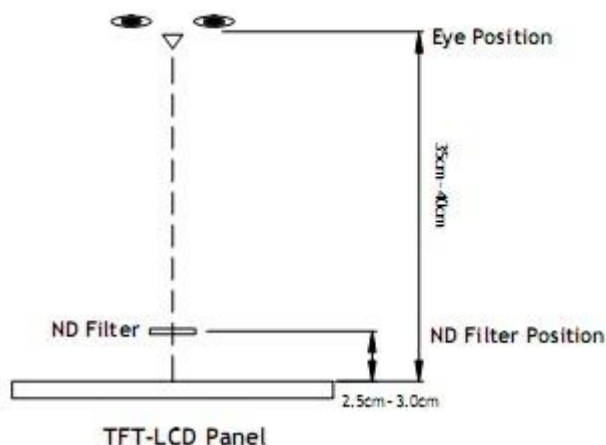
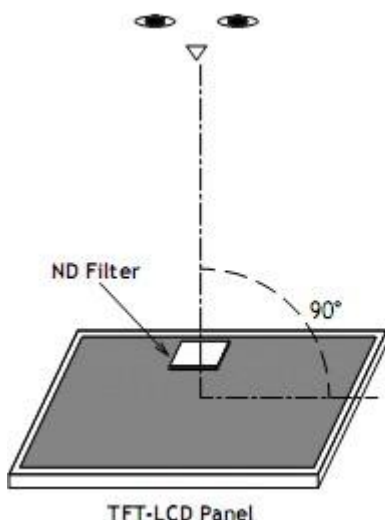
10.8. Identification/marketing criteria

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 $350\text{mm} \pm 50\text{mm}$.

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 $350\text{mm} \pm 50\text{mm}$.

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	80℃, 96Hrs	2	GB/T2423.2-2008
2	Low Temperature Operating	-30℃, 96Hrs	2	GB/T2423.1-2008
3	High Humidity	50℃, 90%RH, 96Hrs	2	GB/T2423.3-2006
4	High Temperature Storage	85℃, 96Hrs	2	GB/T2423.2-2008
5	Low Temperature Storage	-30℃, 96Hrs	2	GB/T2423.1-2008
6	Thermal Cycling Test	-30℃, 60min~80℃, 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/330 Ω 5 times Contact: ±4KV 150pF/330 Ω 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.
- 12.3.2. Strong light exposure causes degradation of polarizer and color filter.

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

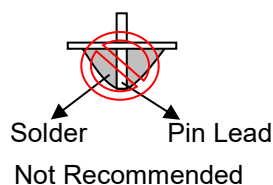
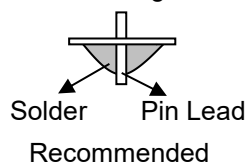
Maximum Solder Temperature: 370°C

Maximum Solder Time: 3s at the maximum temperature

Recommended Soldering Temp: 350±20°C

Typical Soldering Time: ≤3s

12.4.1.3. Solder Wetting



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°C

Typical Soldering Time: ≤2s

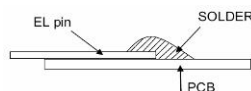
Minimum solder distance from EL lamp (body): 2.0mm

- 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

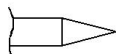


Recommended

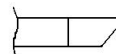


Not Recommended

12.4.2.7. The type of the solder iron:

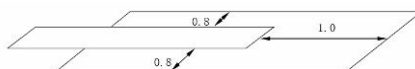


Recommended



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”.
- 12.5.5. Do not connect or disconnect the LCM to or from the system when power is on.
- 12.5.6. Never use the LCM under abnormal condition of high temperature and high humidity.
- 12.5.7. Module has high frequency circuits. Sufficient suppression to the electromagnetic interface shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
- 12.5.8. Do not display the fixed pattern for long time (we suggest the time not longer than one hour) because it may develop image sticking due to the TFT structure.

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. Packaging

TBD



	1	2	3	4	5	6	7	8
APPROVED: (批准)			SPECIFICATION FOR BACKLIGHT			规格		
CHECKED: (检查)			CUSTOMER'S CODE: (客户型号)			EDITION: (版本号)		
DESIGN: (设计)	朱崑		D. C. MODEL NO.: (公司型号)			EDITION: (版本号)		
Date: (日期)	2024.02.19	Page: (页数)	1/1	图纸视脚:		A		

NOTES:

1. LED CIRCUIT DIAGRAM:

Measuring Point (测试点)

光源

Measuring Point (测试点)

(恒定电流测试)

2. Do not scale drawing.
3. Δ Modification rev. number.
4. General Tolerance: ± 0.3
5. Draft angle 1.5° .
7. Operating Temperature: -30~+80°C; Storage Temperature: -40~+80°C
8. possession materials are insulated (ex PPC ,LED)
9. () reference dimension, : \diamond critical dimension

项目 Item	符号 Symbol	最小值 min.	典型值 typ.	最大值 max.	单位 unit	测定条件 Condition
亮度 Lumiance	Lv	300	350	—	c.d./m ²	IF=160mA (恒定电流测试)
均匀性 Uniformity	Avg	80	—	—	%	
色度坐标 Colour Coordinate	X	0.26	—	—	—	
色度坐标 Colour Coordinate	Y	0.26	—	—	—	
正向电压 Forward Voltage	Vf	8.2	9.2	10.5	V	V=5.0V
反向漏电流 Reverse Current	Ir	—	—	20	uA	

Customer Name:

check by:

Approved by:

Please Confirm Thoroughly On/Before
请 签 回 此 图