Shenzhen Leadtek Electronics Co.,Ltd

PRODUCT SPECIFICATION

TFT-LCD MODULE

Module No：LTK068WSBCT10-V0

☑ Preliminary Specification

☐ Approval Specification

Designed by	Checked by	Approved by
		

Final Approval by Customer

Approved by	Comment

※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.

Document Revision History

Version	Contents	Date	Note
V0	Original	2023.09.10	

1.0 General Description

ITEM	STANDARD VALUES	UNITS
LCD type	6.8”TFT	--
Dot arrangement	1024(RGB)×600	dots
Color filter array	RGB vertical stripe	--
Display mode	IPS / Transmissive / Normally Black	--
Viewing Direction	ALL	--
TFT Driver IC	JD9168_DS	--
CTP type	G+G	--
Surface hardness	6H	--
CTP Driver IC	FT7311	mm
LCM+CTP Outline Dimension	175.56(W)×107.60(H)×7.51(T)	mm
Active area	151.76(W)×79.80(H)	mm
Dot pitch	0.309(H) x 0.348(V)	mm
Interface	LVDS	--
Operating temperature	-30 ~ +80	℃
Storage temperature	-30 ~ +80	℃
Back Light	24pcs White LED	--
Weight	TBD	g

2.0 Absolute Maximum Ratings

2.1 Electrical Absolute Rating

Parameter	Symbol	Min.	Max.	Unit	Note
Power supply voltage	VCC	-0.3	+3.6	V	GND=0
	IOVCC	+0.3	+3.3	V	GND=0

2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	Topa	-30	80	℃	
Storage Temperature	Tstg	-30	80	℃	

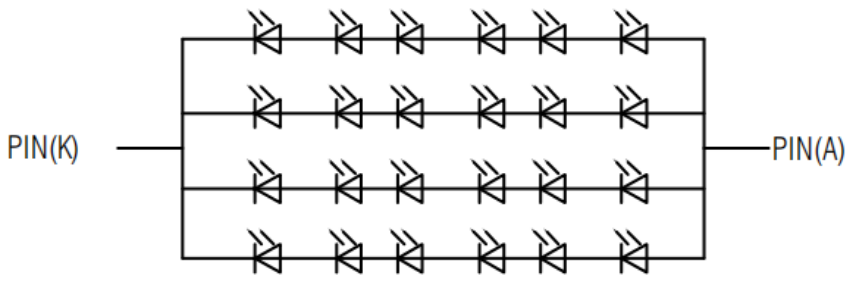
2.3 Back-light Unit:

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
LED Current	IF	–	100	–	mA	–	–
LED Voltage	VF	–	18	–	V	I=100mA	–
Life Time		–	30000	–	Hr.	I≦100mA	–
Brightness	Luminance	–	850	--	cd/m2	I=100mA	
Color	White						

Note (1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.

(2)Ta=25±2℃

(3)Test condition: LED Current 100mA



If= 100 mA, Vf= 18.0 V(typ)

3.0 OPTICAL CHARACTERISTICS

3.1 Optical Specification

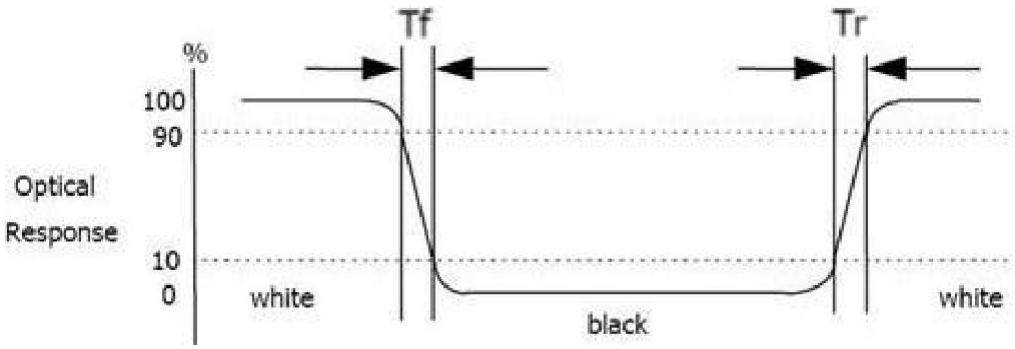
Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remark
Viewing Angle	Horizontal	Θ_3	CR > 10	80	85	-	Deg.	Note 1
		Θ_9		80	85	-	Deg.	
	Vertical	Θ_{12}		80	85	-	Deg.	
		Θ_6		80	85	-	Deg.	
Cell Transmittance			Θ = 0° (Center) Normal Viewing Angle	3.6	4.75		%	
Contrast ratio		CR		800:1	1000:1	-		Note 2
Reproduction of color	White	W_x		TYP. - 0.03	0.309	TYP. + 0.03		Note 3
		W_y			0.348			
	Red	R_x			-			
		R_y			-			
	Green	G_x			-			
		G_y			-			
	Blue	B_x			-			
		B_y			-			
Color Gamut				50	55	-	% NTSC	
Response Time		Tr+Td		-	30	35	ms	Note 4
Gamma Scale				1.9	2.2	2.5		

Note :

1. Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface.
2. Contrast measurements shall be made at viewing angle of θ= 0° and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. (See Figure 1 shown in Appendix) Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

3. The color chromaticity coordinates specified in Table 15.shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel. The BLU is used by BOE.
4. The electro-optical response time measurements shall be made as Figure 2 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Tf.



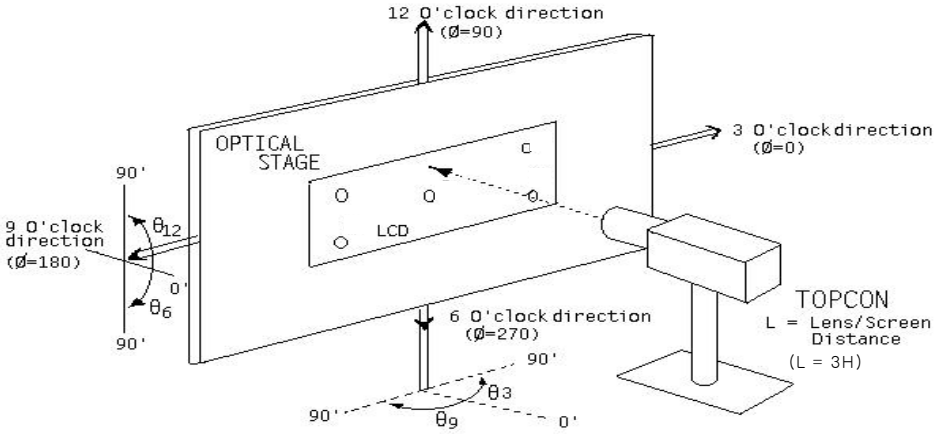
5. Definition of Transmittance (T%) :

OC is with white(L255) signal input

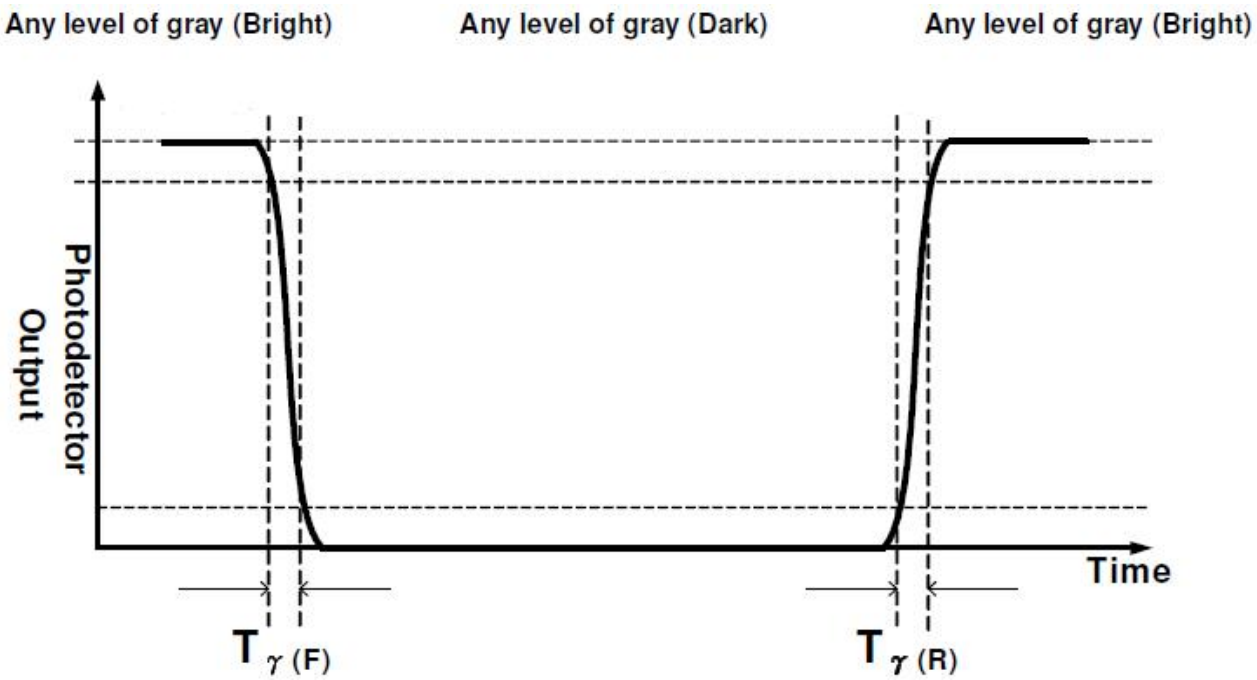
$$\text{Transmittance} = \frac{\text{Luminance of LCD OC}}{\text{Luminance of LCD BL}} \times 100\ \%$$

4.0 APPENDIX

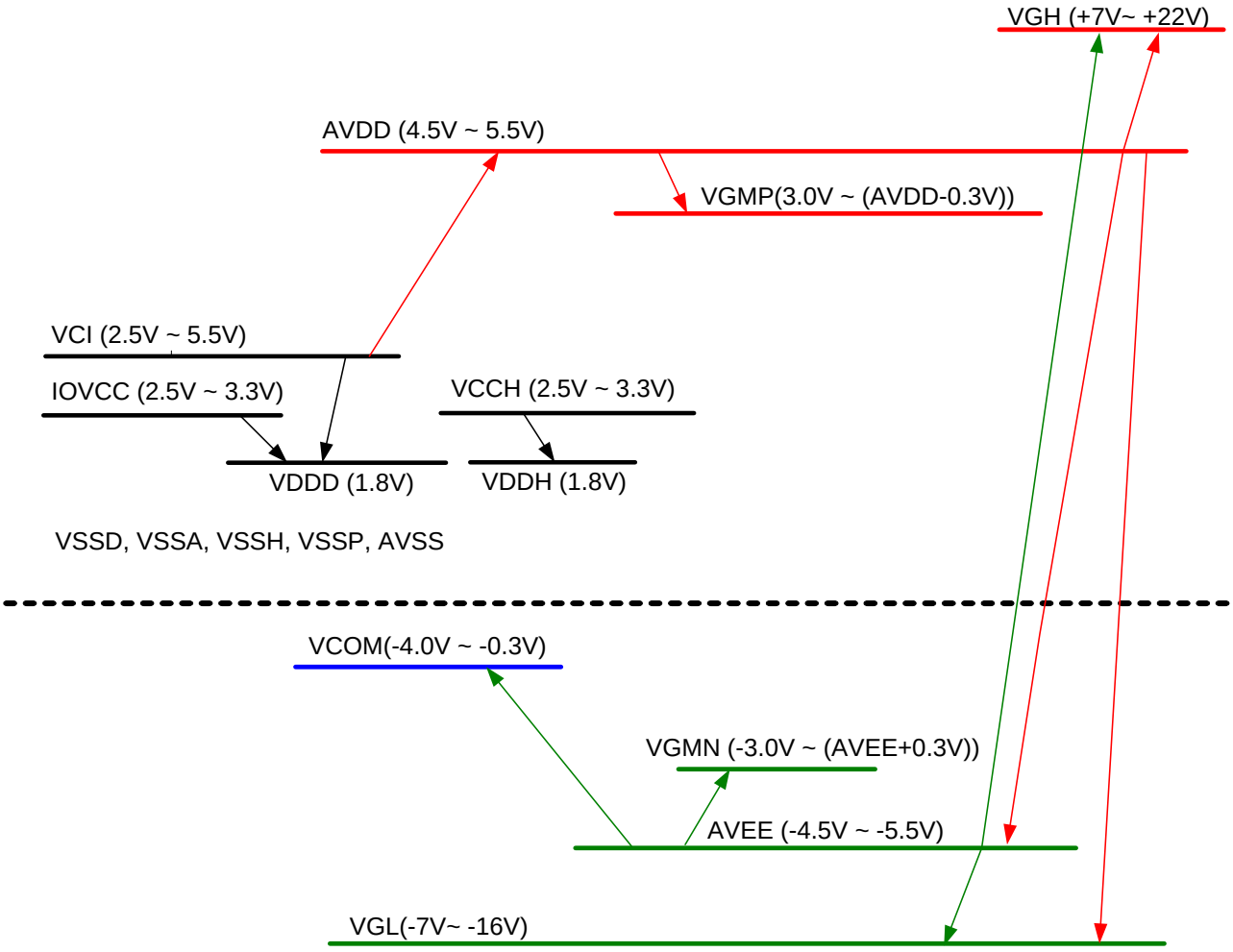
< Figure 1. Measurement Set Up >



< Figure 4.1. Response Time Testing >



4.2. LCD power generation scheme



4.3 Power generation scheme

Name	Function	Set up value	Note
AVDD	DC/DC converter circuit output	+4.5V ~ +5.5V	
AVEE	DC/DC converter circuit output	-4.5V ~ -5.5V	
VGMP	Reference voltage for gamma circuit	+3.0V ~ (AVDD – 0.3V)	Reference register
VGMN	Reference voltage for gamma circuit	-3.0V ~ (AVEE + 0.3V)	Reference register
VGH	Positive gate driver output voltage level	+7V ~+22V	Depend on AVDD & AVEE
VGL	Negative gate driver output voltage level	-7V ~ -16V	Depend on AVDD & AVEE
VCOM	VCOM DC voltage	-0.3V ~ -4.0V	
VDDH	Analog power for High speed interface circuit	1.8V	Depend on DSI I/F
VDDD	Digital power for internal digital circuit.	1.8V	

5.0 Interface Pin Connection

(Input signal): FPC Down Connector, (FH19SC-60S-0.5SH (HIROSE), 50pin, pitch = 0.5mm)

Pin No.	Symbol	I/O	Function	Remark
1	NC	P	No connection	
2	VDD	P	Power Voltage for digital circuit	
3	VDD	P	Power Voltage for digital circuit	
4	NC	---	No connection	
5	Reset	I	Global reset pin	
6	STBYB	I	Standby mode, Normally pulled high STBYB = “1”, normal operation STBYB = “0”, timing controller, source driver will turn off, all output are High-Z	
7	GND	P	Ground	
8	RXIN0-	I	- LVDS differential data input	
9	RXIN0+	I	+ LVDS differential data input	
10	GND	P	Ground	
11	RXIN1-	I	- LVDS differential data input	
12	RXIN1+	I	+ LVDS differential data input	
13	GND	P	Ground	
14	RXIN2-	I	- LVDS differential data input	
15	RXIN2+	I	+ LVDS differential data input	
16	GND	P	Ground	
17	RXCLKIN-	I	- LVDS differential clock input	
18	RXCLKIN+	I	+ LVDS differential clock input	
19	GND	P	Ground	
20	RXIN3-	I	- LVDS differential data input	
21	RXIN3+	I	+ LVDS differential data input	
22	GND	P	Ground	
23	NC	---	No connection	
24	NC	---	No connection	
25	GND	P	Ground	
26	NC	---	No connection	

27	NC	---	No connection	
28	SELB	I	6bit/8bit mode select	Note1
29	NC	P	No connection	
30	GND	P	Ground	
31	LED-	P	LED Cathode	
32	LED-	P	LED Cathode	
33	L/R	I	Horizontal inversion	Note3
34	U/D	I	Vertical inversion	Note3
35	NC	P	No connection	
36	NC	P	No connection	
37	NC	P	No connection	
38	NC	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

Note() Selection of scanning mode (please refer to the following table)

Setting of scan control input		**IN/OUT state for start pulse**				**Scanning direction**
U/D	L/R	STVD	STVU	STHR	STHL	
GND	DV_{DD}	Output	input	output	input	up to down, and from left to right
DV_{DD}	GND	input	output	input	output	down to up, and from right to left
GND	GND	output	input	input	output	up to down, and from right to left
DV_{DD}	DV_{DD}	input	output	output	input	down to up, and from left to right

Note() MOD=H: Simultaneous sampling.(Please check CPH2 and CPH3 to GND when MOD=H)
MOD=L: Sequential sampling.

6.0. LVDS interface

6.1.1. LVDS Data format

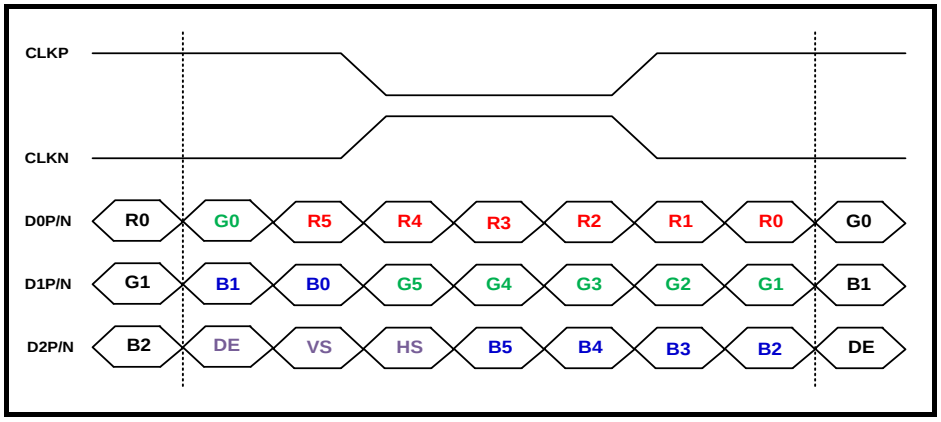


Figure 6.1.2 : 6-bit LVDS input (IM[1:0]=01, LANSEL[1:0]=10, LVFMT=Don't care)

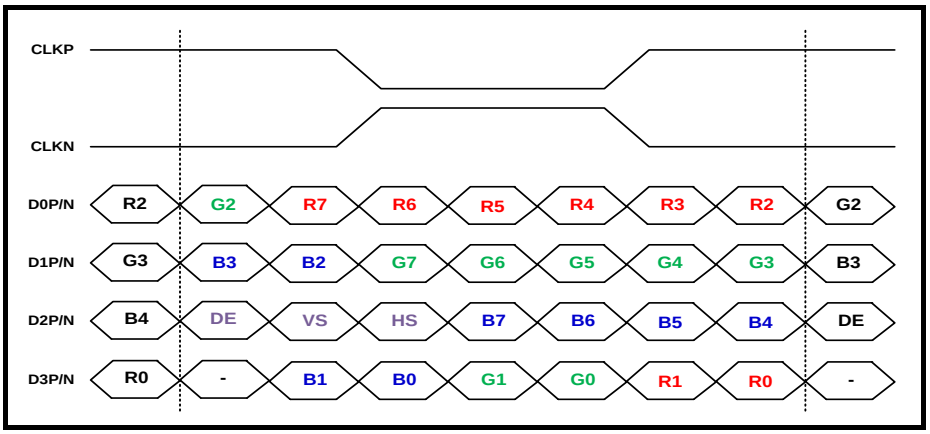


Figure 7.1.3 : 8-bit LVDS input (IM[1:0]=01, LANSEL[1:0]=11, LVFMT=1(JEIDA))

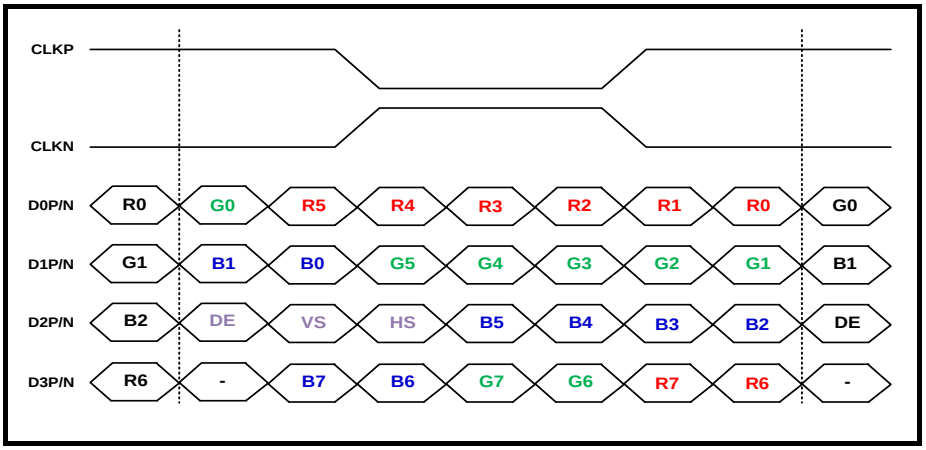


Figure 6.1.4 : 8-bit LVDS input (IM[1:0]=01, LANSEL[1:0]=11, LVFMT=0(VESA))

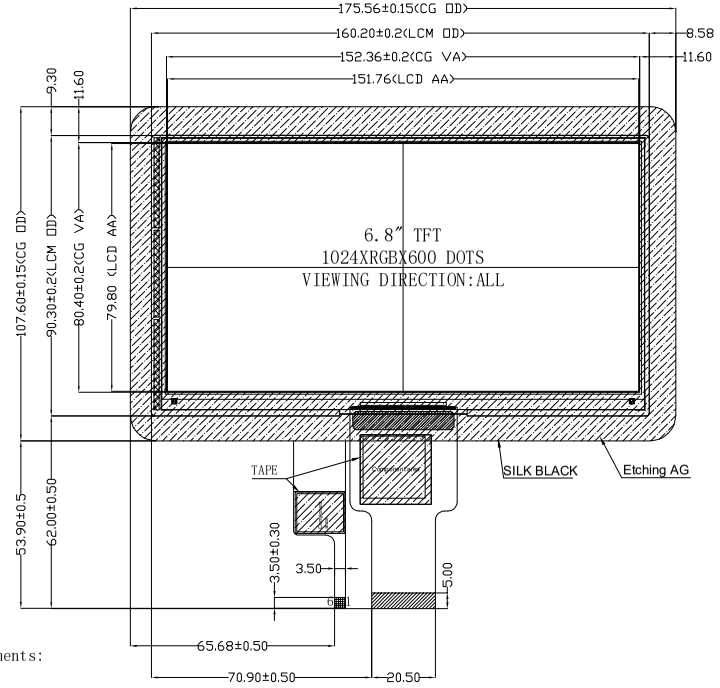
7.0 Reliability test items

NO	Item	Conditions	Remark
1	High Temperature Storage	Ta=+80℃,48hrs	
2	Low Temperature Storage	Ta=-30℃,48hrs	
3	High Temperature Operation	Ta=+80℃,48hrs	
4	Low Temperature Operation	Ta=-30℃,48hrs	
5	High Temperature and High Humidity (operation)	Ta=+50℃,90%RH,48hrs	
6	Thermal Cycling Test (non operation)	-20℃(0.5hr)→+60℃(0.5hr),100cycles	

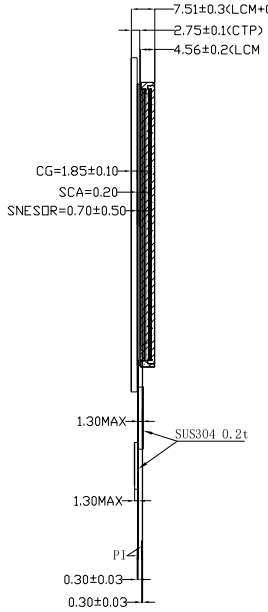
Note: All tests above are practiced at module type.
There is no display function NG issue occurred, All the cosmetic specification is judged before the reliability stress.

8.0 Outline dimension

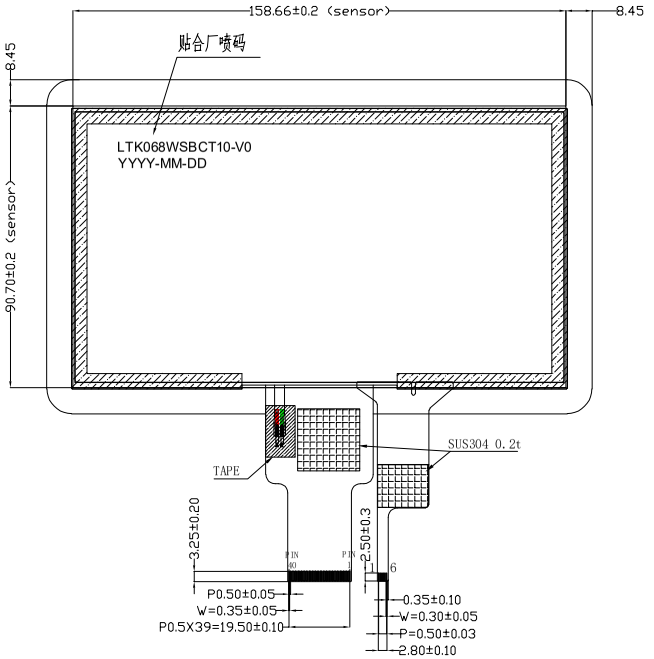
Front View



Side View



Back View



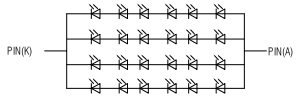
PIN DESCRIPTION

1	NC
2	VDD=3.3V
3	VDD=3.3V
4	NC
5	RESET
6	STBYB
7	GND
8	RXIN0-
9	RXIN0+
10	GND
11	RXIN1-
12	RXIN1+
13	GND
14	RXIN2-
15	RXIN2+
16	GND
17	RXCLKIN-
18	RXCLKIN+
19	GND
20	RXIN3-
21	RXIN3+
22	GND
23~24	NC
25	GND
26~27	NC
28	SELB
29	NC
30	GND
31~32	LED-
33	SHLR
34	UPDN
35	NC
36~37	NC
38	NC
39~40	LED+

CTP PIN	Definition
PIN1	GND
PIN2	SCL-1.8V
PIN3	SDA-1.8V
PIN4	INT-1.8V
PIN5	RESET-1.8V
PIN6	VCC-3.3V

Technical requirements:
1. structure: G+G.
2. transmittance: ≥85%.
3. All unmarked tolerance: ±0.15mm.
4. IC: FT7311
5. Toughened degrees: 110g steel ball, 40cm drop height is not broken, surface hardness Test: ≥6H (pencil hardness test)
6. CG unmarked hole and edge≤0.20mm.
7. operate temperature: -30℃~80℃;
   storage temperature:-30~80℃;
8. All material compliant with ROHS.

Notes:
1. Display : 6.8″, TFT
2. Resolution: 1024xRGBx600
3. LCD Viewing Direction: ALL,
4. Drive IC:JD9168
5. Display Mode: Normally Black/Transmissive
6. LCM Bringhtness: 850cd/m²(TYP)
   LCM+CTP Bringhtness: 800cd/m²(TYP),uniformity≥80%
7. unmark Tolerance:±0.2
8. OPERATING TEMP: -30° C~ +80° C
9. STORAGE TEMP: -30° C~ +80° C
10. Requirements on Environmental Protection: ROHS



If= 100 mA, Vf= 18.0 V(typ)

REV	DESCRIPTION	DATE	NAME
3			
2			
1			
0	NEW	2022.07.27	JCAK

LEADTEK DISPLAY

LEADTEK COMPANY LIMITED

SCALE:1/1	UNIT:mm	PAGE:1/1		Approve	Check	Drawn
Part No:	LTK068WSBCT10		VER:V0	IAN	JONA	JCAK
Customer No:						

9.0 Packing form

TBD

LEADTEK DISPLAY

深圳市丽台电子有限公司

Shenzhen Leadtek Electronics Co.,Ltd

Quality inspection standards

品质允收标准

MODEL No. / 产品型号： **Applies 5.0~9.0 TFT-LCD Panel**
UPDATED DATE / 生效日期： **2022-05-20**
VERSION / 版 本： **A0**
Customer Signature/客户签字： _____

RECORD OF REVISION/修订履历：

Version 版本	Revision Record 修订内容	Compile 修订者	Date of Revision 修订日期
V0	首发/Starting	Green	2022.05.20

1.Scope 1适用范围

This document shall be applied to 5.0~9.0 TFT-LCD Panel.

本文件适用于5.0~9.0 TFT-LCD Panel.

2.Inspection and Environment onditions/检查条件与环境

2. 1 Inspection Conditions 检查条件:

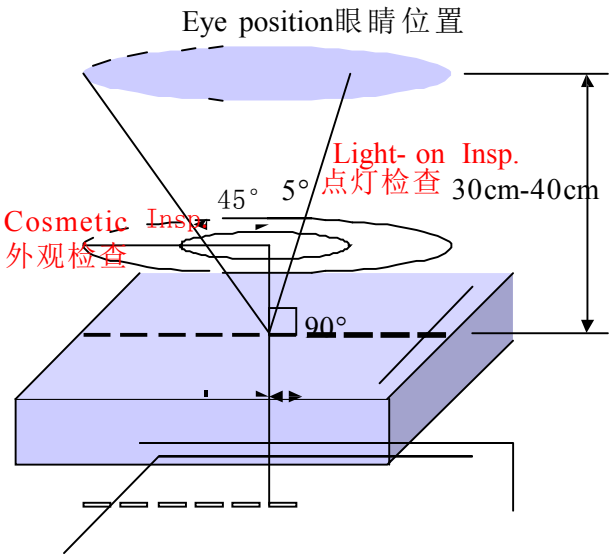
(1) Inspection Distance检测距离: 35 cm±5cm

(2) Each picture /每个画面：2~3 secs/秒，Cosmetic Inspection/外观10~12 secs/秒

(3) View Angle观看角度:

Light-on Inspection Angle点灯检验角度 ： ±45°

Cosmetic Inspection Angle外观检验角度 ： ±45°



(Perpendicular to LCD panel surface垂直于液晶显示表面)

2.2 Environment Conditions环境条件:

Ambient Temperature 温度		25℃±5℃
Ambient Humidity 湿度		55±5%RH
Ambient Illumination 亮度	Cosmetic Inspection 外观检验	800-1000 Lux
	Functional Inspection 点灯检验	200~300Lux

2.3 Sampling Conditions 抽样条件:

(1) Lot Size ： Quantity of shipment lot per model/.

批量：单次运送单一机型数量

(2) Sampling Method ：
抽样方法：

Sampling Plan 抽样计划		GB2828/2003
		Normal Inspection, Single Sampling 正常检验、单次抽样
		Geneal II Inspection 普通二级
AQL	Major Defect 主要缺点	0.25
	Minor Defect 次要缺点	0.65

(3) The classification of Major(MA) and Minor(MI) defects is shown as 3. Inspection Criteria.
主缺(MA)及次缺(MI)定义于”3.检查标准”

3.Terms and Definitions/术语和定义

3.1 Classification of defects缺陷的分类:

Major defects: A major defect is a defect that is likely to result in failure, or to reduce materially the usability of the product for its intended purpose.

主要缺陷：会导致产品功能失效或减少产品可用性的缺陷。

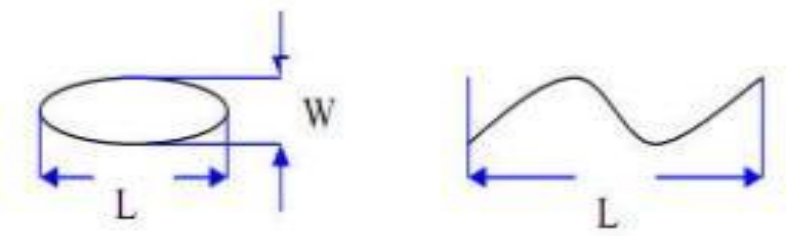
Minor defects: A minor defect either is a defect that is not likely to reduce materially the usability of the product for its intended purpose, or is a departure from an established having little bearing on the effective use or operation of the product.

次要缺陷：不会导致产品功能失效，不会减少产品的有效使用和操作。

3.2 Extraneous substances that can be wiped out ,like Finger point,Particles are not cnsidered as a defect . 可以被擦拭干净的表面物质不视为缺陷 (如手指印，尘粒) 。

3.3 Defects on the Black Matraix(outside ofActive Area) are not considered as a defect . BM 区域 (AA 区以外) 的缺陷不视为缺陷。

3.4 Size of circular defect,is defined by diameter”D” 。The defect average diameter D=1/2(W+L) 圆形缺陷的大小是由直径 D 定义的。缺陷的平均直径 D=1/2(W+L)



3.5 When defect size L≥2W,the defect count as liner type defect.Size of linear defect is defined by length(L) and the maximum width(W).

当缺陷尺寸 L≥2W 时，被视为线状缺陷。线状缺陷是由长度 (L) 和最大宽度 (W) 定义的。 3.6 3.6 Mura criteria :judged by ND filter6%,and can't be seen under at ND filter 6% .

3.6 MURA 判断标准：使用 ND6%判定，且透过 ND6% ，遮住不可见.

3.7 Dot defect is defind as the defective area of the dot is larger than 50% of the dot area and is visible through 6% ND filter

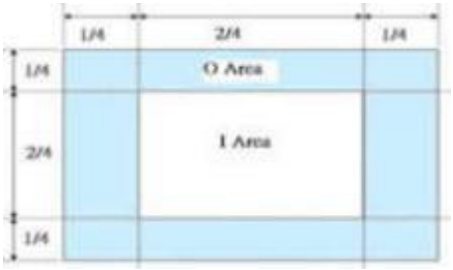
DOT 定义为点缺陷面积大于 50% DOT 面积, 且透过 ND6%遮住是可见的.

The drawing of 1/2 area sub-pixel definition: The 1/2 area sub-pixel can be defined as below one or more of specific shapes

1/2 面积的子像素定义绘图：1 / 2 面积的子像素可以定义为如下一个或多个特定形状图：

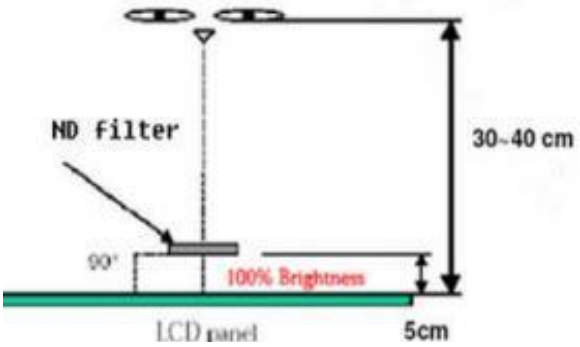
3.8 A dot defect that is smaller than the defined dot defect will be treated as small bright dot. 细碎亮点：小于"DOT 定义"的点缺陷视为细碎亮点。

I 区与 O 区比例：1：2：1



3.9 Inspection method of ND Filter - holding ND filter in front of the panel around 5cm and examine the panel from 35±5 cm in the front view for 2~3 second.

ND 卡的检查方法：在面板上方大约 5CM 处握住 ND 卡，眼睛距离面板 30-40CM ，通过 2~3 秒观察。



4. Inspection Criteria 检验标准

4.1 Appearance Inspection specification 外观检查规格:

Judge area 区域	Judge item 项目	Specification inspection 检查规格	Judge criterion	
			Major	Minor
Silicone 硅胶	Silicone spread 硅胶涂布	The height can't over C/F , color filter , or gomu 高度不能过超 C/F		MI
	Silicone residue 硅胶残余	Can't cover polarizer, FPC …etc. 不能覆盖 POL, FPC 等		MI
LCD 玻璃	Wire(on Array) 线路	No damage 不能损伤	MA	
	Edge 边缘	No extended crack 不可有延伸性裂纹	MA	
PCBA Connector FPC/ FFC	Appearance 外观	Scratch or damage result in copper expose is not allowed 划伤或损伤不允许导致出现露铜		MI
	Component 零件	No damage 不能损伤	MA	
	Connection status 连接状况	Need correct connection 需要正确连接	MA	
	Broken 破裂	Not allowable 不允许	MA	
	Folding sign 对位记号折叠	Not allowable 不允许	MA	
POL 偏光片	Scract on the polarizer 偏光片划伤	1.W≤0.07mm; L≤5mm, Ignore (忽略)		MI
		2.0.07mm<W≦0.15mm ; L≤5mm ; N≤4 ; DS≥10mm		
		3.0. 15mm＜W; 5mm＜ L , Not allowable不允许		

Judge area 区域	Judge item 项目	Specification inspection 检查规格	Judge criterion	
			Major	Minor
POL 偏光片	Dent on the polarizer 偏光片凹痕	1.D＜0. 20mm，Ignore（忽略）		MI
		2.0.20mm＜D≤0.40mm；N≤4；DS≥10mm		
		3.0.40mm＜D，Not allowable不允许		
	POL Linear bubble 线状气泡	1.W≤0.07mm；L≤5mm，Ignore（忽略）		MI
		2.0.07mm<W≦0.15mm ; L≤5mm ; N≤4 ; DS≥10mm		
		3.0. 15mm＜W；5mm＜ L，Not allowable不允许		
	POL dot bubble 点状气泡	1.D＜0. 20mm，Ignore（忽略）		MI
		2.0.20mm＜D≤0.40mm；N≤4；DS≥10mm		
		3.0.40mm＜D，Not allowable不允许		
	POL edge bubble 片边缘气泡	1. The display area is 1/2BM outside，Not allowable 显示区往外 1/2BM 区域内，不允许 2. The display area is outside the outer 1/2BM area，Not allowable 显示区往外1/2BM区域以外，不管控		MI

Judge area 区域	Judge item 项目	Specification inspection 检查规格	Judge criterion	
			Major	Minor
TP&CG	Foreign Material in spot shape 点状异物	1.D≤0.20mm；Ignored（忽略） 2.0.20mm＜D≤0.40mm；N≤4；DS≥10mm 3.D＞0.40mm；Not allowable不允许		MI
	Fisheye/bubbles 鱼眼/气泡	1.D≤0.20mm；Ignored（忽略） 2.0.20mm＜D≤0.40mm；N≤4；DS≥10mm 3.D＞0.40mm；Not allowable不允许		MI
	Scratches on the surface 表面划伤	1.W≤0.07mm；Ignored（忽略） 2.0.07mm<W≤0.15mm，L≤5mm；N≤4；DS≥10mm 3.W＞0.15mm，L＞5mm；Not allowable不允许		MI
	Collapse corner、Crash edge 崩角、崩边	Product front:/产品正面： collapse corners, collapsed edges are not allowed 崩角、崩边不允许； Product back/产品背面： X≤ 0.5 , Y≤0.5，Z≤1/2T；N≤4；DS≥10mm	MA	
	Printed fonts/LOGO 丝印/LOGO	Printed fonts/LOGO clarity、complete、content right 字体/LOGO丝印清晰、完整、内容正确		MI
	Broken 破损	Not allowable不允许	MA	
	Dirty surfaces 表面脏污	Dirt cannot be wiped， Not allowable 不可擦拭的脏污，不允许		MI
	IR hole IR孔	Black spots/黑点： W ≤0.15mm，N≤2，Not visible against a black background/黑色背景下不可见		MI
		IR hole Scratches： 1.W＜0.05mm，Ignored（忽略） （Dense points Not allowable 不允许密集）； 2.0.05mm＜W≤0.07mm；L≤2mm；N≤2； 3.W＞0.07mm，L＞2mm，Not allowable 不允许		MI

4.2 Electrical Inspection specification电性检查规格:

Item 项目	Judgment Criteria 判定标准	Judge criterion	
		Major	Minor
LCD Bright /Dark dot 玻璃亮点/暗点	1.D≦0. 20mm， Ignored（忽略），Not dense（不可密集） 2.0.20mm<D≦0.40mm ； N≦4 ； DS≥10mm 3.D＞0.40mm ，Not allowed/不允许		MI
Mura	Invisible through 6% ND filter，200~300Lux 透过ND6% 遮住 ， 目测不可见即为OK， 200~300Lux		MI
Small bright dot 细碎亮点	Not allowed if it can be observed through ND Filter6% 透过ND6%目测看得见，不允许		MI
ZBD Rate 玻璃亮点比率	90:10		MI
Light Leakage 漏光	Invisible through 6% ND filter，OK 透过ND6%遮住目测不可见即为OK If necessary,set up set up Limit Sample. 如果有必要，可制订限度样品		MI
Bubble in Cell (LC Bubble/Actice Area) CELL气泡 (AA区LCD气泡)	Eyes should not find it . 目视观察不可见，视为 OK	MA	

Item 项目	Judgment Criteria 判定标准	Judge criterion	
		Major	Minor
Foreign Material in spot shape 点状异物	1.D≦0.20mm， Ignored（忽略） 2.0.20mm<D≦0.40mm ； N≦4； DS≥10mm 3.D＞0.40mm ， Not allowable/不允许		MI
Foreign Material in line or spiral shape 线状异物	1.W≦0.07mm ， Ignored（忽略） 2. 0.07mm<W≦0.15mm ； L≤5mm ； N≦4 3.W＞0.15mm ； L＞5mm ， Not allowable/不允许		MI
White dot in back-light 白点	1.D≦0. 20mm，Ignored（忽略） 2.0.20mm<D≦0.40mm ； N≦4 ； DS≥10mm 3.D＞0.40mm ， Not allowed/不允许		MI
TP no touch 无触摸	Not allowable 不允许	MA	
Abnormal Disply 显示异常	Not Allowed 不允许	MA	
NO display 无显示	Not Allowed 不允许	MA	
Line Defect 缺线	Not Allowed 不允许	MA	
Angle of view error 视角错误	Not Allowed 不允许	MA	
Tect crostalk 不消失的残影	Not Allowed 不允许	MA	