Shenzhen Leadtek Electronics Co.,Ltd

PRODUCT SPECIFICATION

TFT-LCD MODULE

Module No：LTK070WSBLM35-V0

☑ Preliminary Specification

☐ Approval Specification

Designed by	Checked by	Approved by
jona	Tom	lan

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	NEW	2023.03.09	

1.0General Description

1.1 Introduction

LTK070WSBLM35-V0 is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel and a driving circuit.This TFT LCD has a 7 (16:9) inch diagonally measured active display area with (1024 horizontal by600vertical pixel) resolution.

1.2. Features

7 (16:9 diagonal) inch configuration
Compatible with NTSC & PAL system
Image Reversion: UP/DOWN and LEFT/RIGHT
ROHS design

1.3. General information

Item	Specification	Unit
LCM Outline Dimension	165.00 (H) x 100.10 (V) x3.45 (D)	mm
Display area	154.21 (H) x 85.92 (V)	mm
Number of Pixel	1024 RGB (H) x 600 (V)	pixels
Pixel pitch	0.1178 (H) x 0.1088(V)s	mm
Pixel arrangement	RGB Vertical stripe	
Display mode	IPS（Normal Black）	
Color Filter Array	RGB vertical stripes	
Backlight	White LED	
Weight	TBD	g
Data Transfer	MIPI	
OPERATING TEMP	-20°C~ +70°	C°
STORAGE TEMP	-30°C~ +80°	C°
weight	TBD	

2.0 Absolute Maximum Ratings

2.1 DC Characteristics

Item	Sym	Min.	Typ.	Max.	Unit
Analog Supply Voltage 模拟供电电压	AVDD		9.6	-	V
Digital Supply Voltage 数字电源电压	VDD		1.8	2.0	V
Gate On Voltage	VGH	-	18	-	V
Gate Off Voltage	VGL	-	-6	-	V
Common Driving Voltage	VCOM	-	3.7	-	V

2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	Topa	-20	70	℃	
Storage Temperature	Tstg	-30	80	℃	

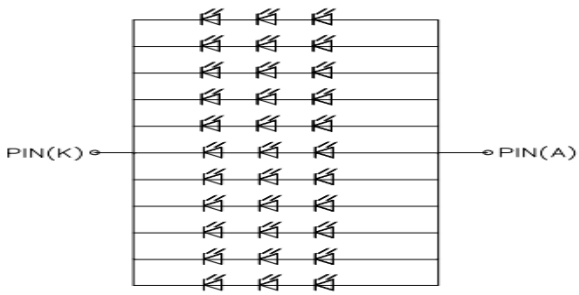
2.3 Back-light Unit:

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
LED Current	IF	–	220	–	mA	–	–
LED Voltage	VF	9.0	9.9	–	V	I=220mA	–
Luminous	IV		450	–	Cd/m²	I=220mA	–
Life Time		–	20000	–	Hr.	I=220mA	–
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 220mA.



If= 220 mA (20mA/LED)

Vf= 9.6 V (typ)

3.0 Optical Characteristics

3.1 Optical specification

< Table 6. Optical Specifications>

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle range	Horizontal	Θ_3	CR > 10	-	80	-	Deg.	WV-Pol Note 1
		Θ_9		-	80	-	Deg.	
	Vertical	Θ_{12}		-	80	-	Deg.	
		Θ_6		-	80	-	Deg.	
Luminance Contrast ratio		CR	Θ = 0°	-	800	-		Note 2
Cell Transmittance		Tr		4.8	5.0	-	%	Base on C Light Note 3
White Chromaticity		x_w		TYP. - 0.03	0.308	TYP. + 0.03		Note 4 Base on C Light
		y_w			0.336			
Reproduction of color (C light)	Red	R_x			0.599			
		R_y			0.338			
	Green	G_x			0.299			
		G_y			0.550			
	Blue	B_x			0.139			
		B_y			0.131			
Color Gamut (C light)				-	50	-	%	
Response Time (Rising + Falling)		T_{RT}	Ta= 25° C Θ = 0°	-	30	40	ms	Note 5

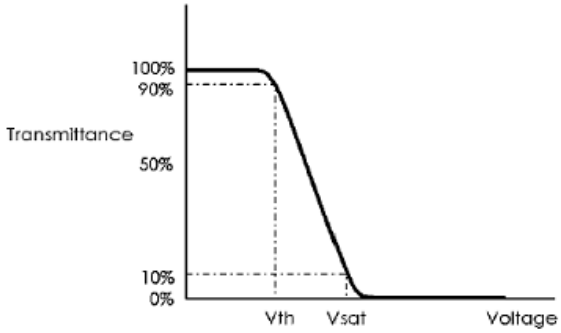
3.2 Measuring Condition

- Measuring surrounding : dark room
- Ambient temperature : 25±2℃
- 30min. warm-up time.

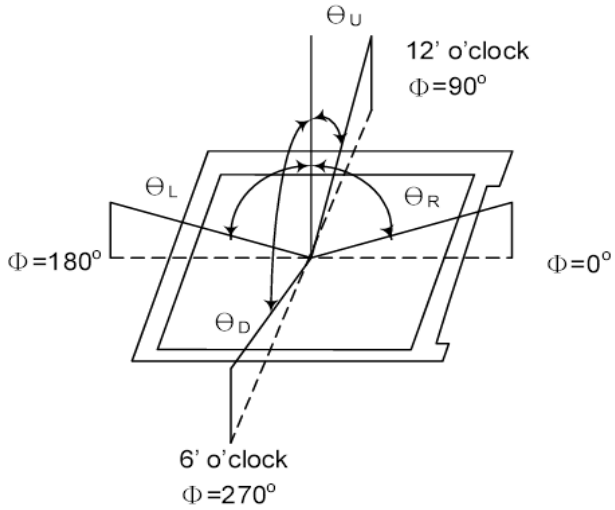
3.3 Measuring Equipment

- TOPCON BM-7
- Measuring spot size : field 2°

Note (1) Definition of Vsat and Vth (at 20℃)



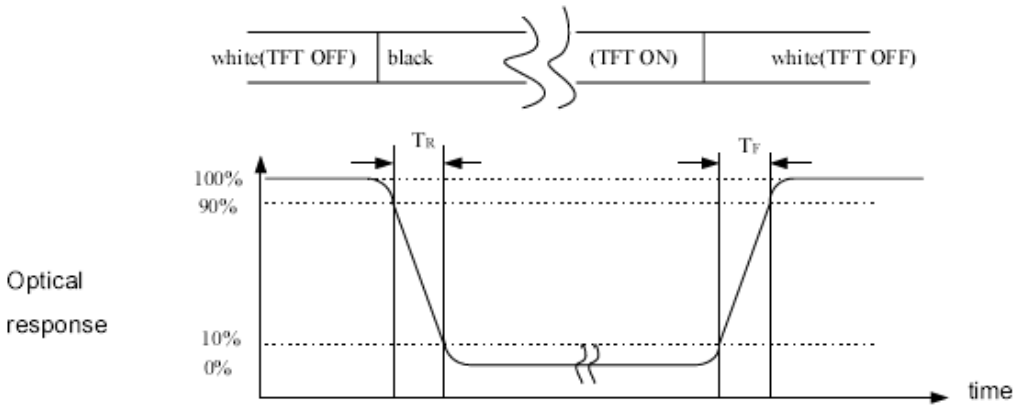
Note (2) Definition of Viewing Angle :



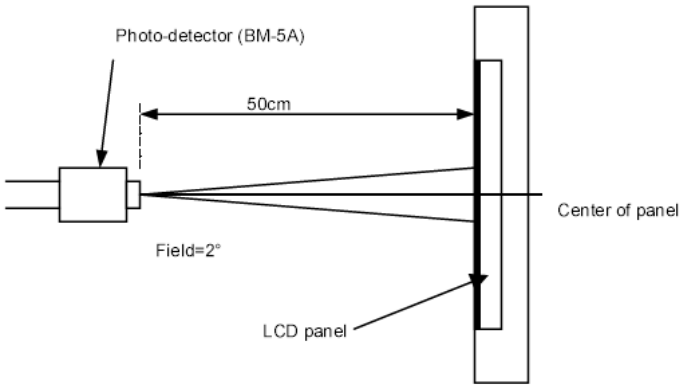
Note (3) Definition of Contrast Ratio(CR) :
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

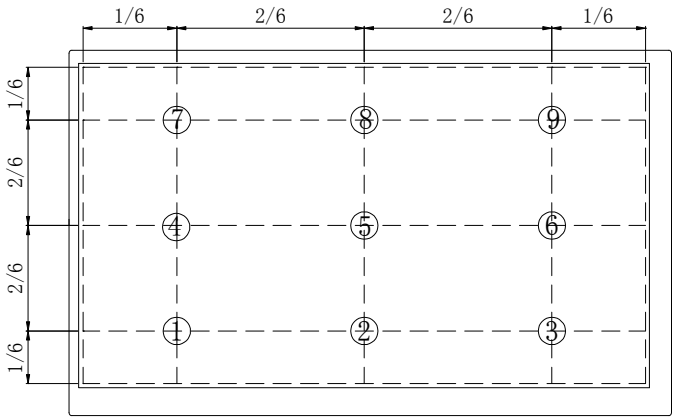
Note (4) Definition of Response Time : Sum of T_R and T_F



Note (5) Definition of optical measurement setup



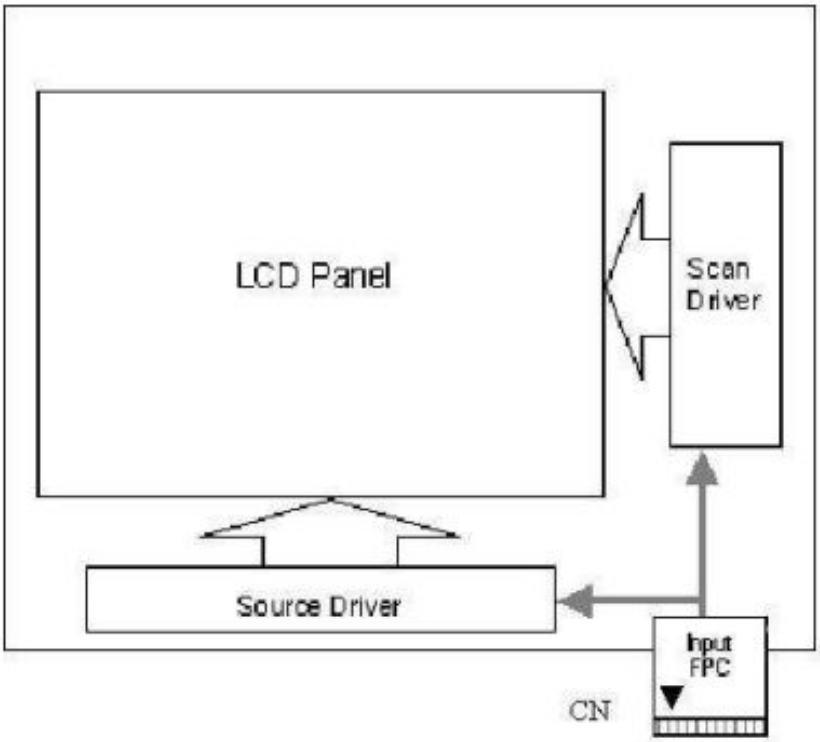
Note (6) Definition of brightness uniformity



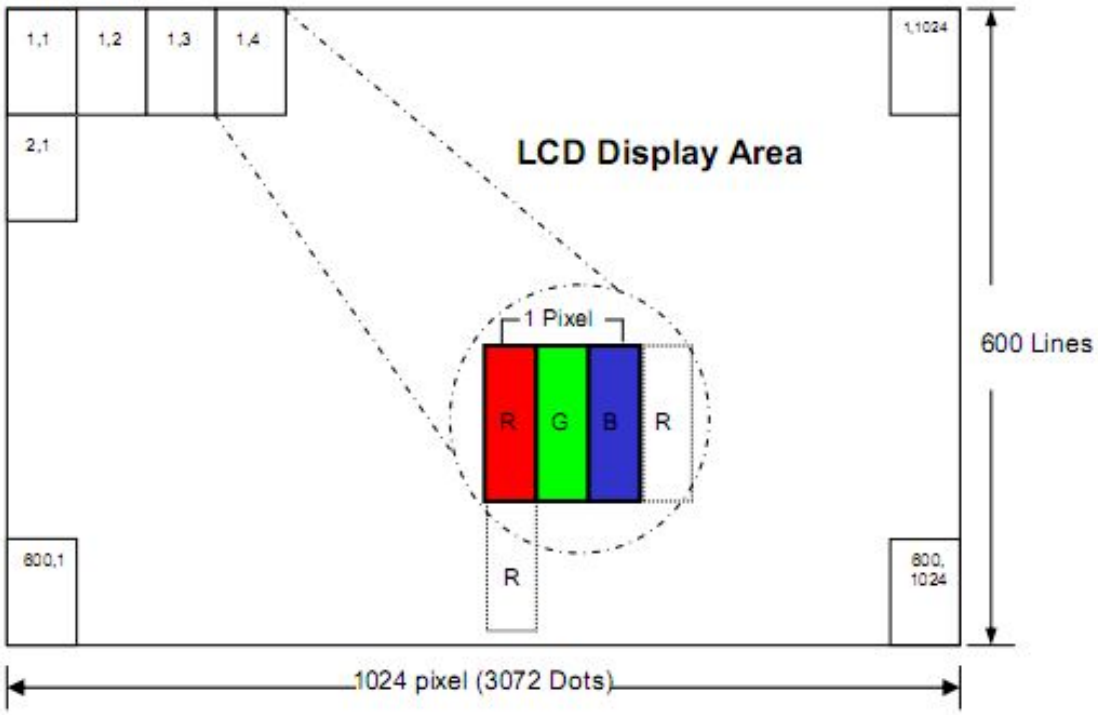
Note (7) Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.

4.0 Block Diagram

4.1 TFT LCD Module



4.2 Pixel Format



5.0 Interface Pin Connection

(Input signal): FPC Down Connector, (FH19SC-40S-0.5SH (HIROSE), 40pin, pitch = 0.5mm)

Pin No.	Symbol	I/O	Function	Remark
1	VCOM	P	Common Voltage	
2	VDD	P	Power Voltage for digital circuit (1.8V)	
3	VDD	P	Power Voltage for digital circuit (1.8V)	
4	NC	---	No connection	
5	Reset	I	Global reset pin. Follow VDD Voltage.	
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	MIPI-0N	I	- MIPI differential data input	
9	MIPI-0P	I	+MIPI differential data input	
10	GND	P	Ground	
11	MIPI-1N	I	- MIPI differential data input	
12	MIPI-1P	I	+MIPI differential data input	
13	GND	P	Ground	
14	MIPI-2N	I	- MIPI differential data input	
15	MIPI-2P	I	+MIPI differential data input	
16	GND	P	Ground	
17	CLKN	I	- MIPI differential clock input	
18	CLKP	I	+MIPI differential clock input	
19	GND	P	Ground	
20	MIPI-3N	I	- MIPI differential data input	
21	MIPI-3P	I	+MIPI 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	NC	---	NC	Note1
29	AVDD	P	Power for Analog Circuit	
30	GND	P	Ground	
31	LED-	P	LED Cathode	
32	LED-	P	LED Cathode	
33	L/R	I	Horizontal inversion （与 VDD 幅值保持一致）	Note1
34	U/D	I	Vertical inversion （与 VDD 幅值保持一致)	Note1
35	VGL	P	Gate OFF Voltage	
36	NC	---	No connection	
37	NC	---	No connection	
38	VGH	P	Gate ON Voltage	
39	LED+	P	LED Anode	
40	LED+	P	LED Anode	

Note(1) Selection of scanning mode (please refer to the following table)

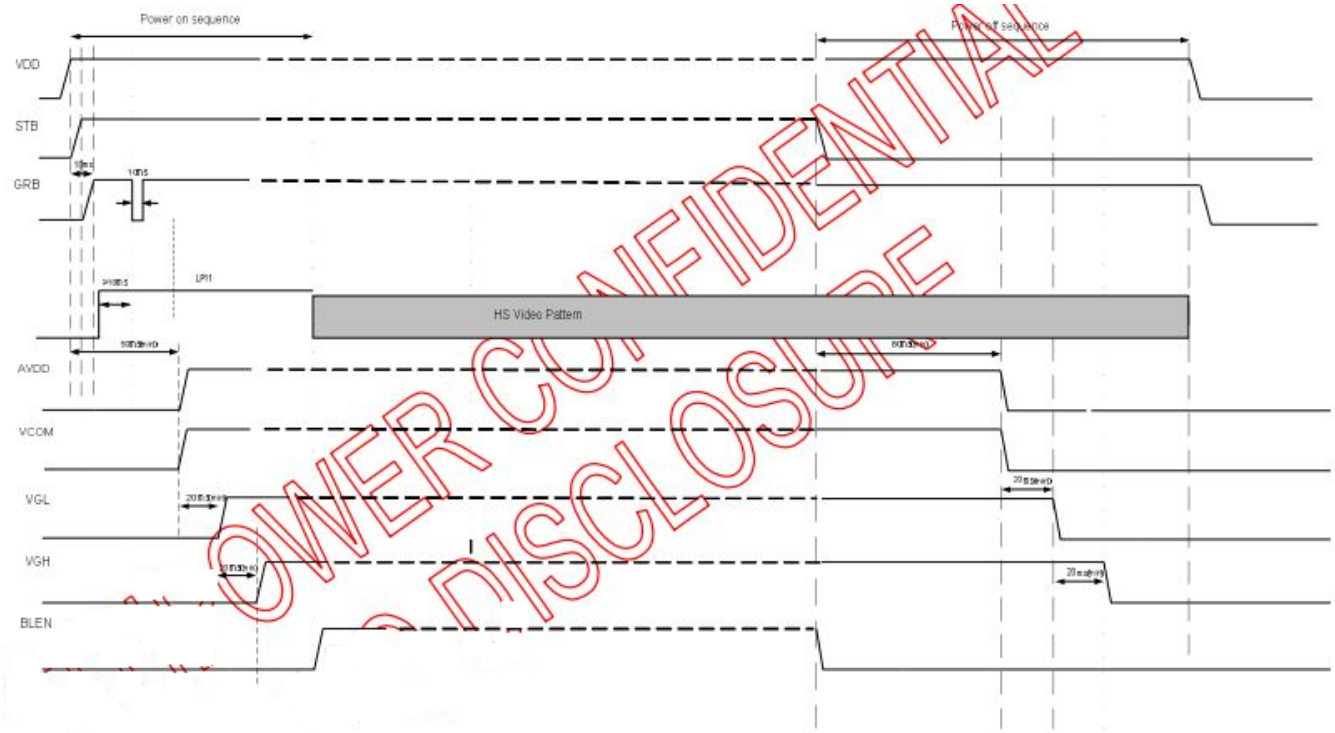
Setting of scan control input		**IN/OUT state for start pulse**				**Scanning direction**
U/D	L/R	STVD	STVU	STHR	STHL	
GND	V_{DD}	Output	input	output	input	up to down, and from left to right
DV_{DD}	GND	input	output	input	output	down to up, and from right to left
GND	GND	output	input	input	output	up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

6. Electrical Characteristics

6.1 TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	V_{DD}	1.71	1.8	1.89	V	
	V_{GH}	17	18	19	V	
	V_{GL}	-7	-6	-5	V	
	AV_{DD}	9.4	9.6	9.8	V	
Input signal voltage	V_{IH}	$0.7V_{DD}$	-	V_{DD}	V	
	V_{IL}	0	-	$0.3V_{DD}$	V	

6.2 Power on/off sequence



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6.3 *Input timing chart*

For 1024RGB x 600 panel
DE mode

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60hz	fclk	40.8	51.2	67.2	Mhz
Horizontal display area	thd		1024		DCLK
HSYNC period time	th	1114	1344	1400	DCLK
HSYNC blanking	thb+thfp	90	320	376	DCLK
Vertical display area	Tvd		600		H
VSYNC period time	Tv	610	635	800	H
VSYNC blanking	Tvb+Tvfp	10	35	200	H

HV mode
Horizontal input timing

Parameter		Symbol	Value			Unit
Horizontal display area		thd		1024		DCLK
DCLK frequency@ Frame rate=60hz		fclk	Min.	Typ.	Max.	
			44.9	51.2	63	Mhz
1 Horizontal Line		th	1200	1344	1400	DCLK
HSYNC pulse width	Min.	thpw		1		
	Typ.			—		
	Max.			140		
HSYNC blanking		thb	160	160	160	
HSYNC front porch		thfp	16	160	216	

HV mode
Vertical input timing

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd		768		H
VSYNC period time	tv	792	806	840	H
VSYNC pulse width	tvpw	1	—	20	H
VSYNC back porch	tvb	23	23	23	H
VSYNC front porch	tvfp	1	15	49	H

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6.4 MIPI interface DC characteristic

(VDD=VDD_IF=1.8V,AVDD=8 to 13.5V,GND=AGND=GND_IF=0V,TA=-20℃ to 85℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit
MIPI Characteristics for High Speed Receiver					
Single-ended input low voltage	V_{ILHS}	-40	-	-	mV
Single-ended input high voltage	V_{IHHS}	-	-	460	mV
Common-mode voltage	V_{CDRXDC}	70	-	330	mV
Differential input impedance	Z_{ID}		100		ohm
HS transmit differential voltage(VOD=VDP-VDN)	$\|V_{OD}\|$	140	200	250	mV
MIPI Characteristics for Low Power Mode					
Pad signal voltage range	V_I	-50		1350	mV
Ground shift	V_{GNDSH}	-50	-	50	mV
Logic 0 input threshold	V_{IL}	0	-	550	mV
Logic 1 input threshold	V_{IH}	880	-	1350	mV
Input hysteresis	V_{HYST}	25	-	-	mV
Output low level	V_{OL}	-50	-	50	mV
Output high level	V_{OH}	1.1	1.2	1.3	V
Output impedance of Low Power Transmitter	Z_{OLP}	80	100	125	ohm
Logic 0 contention threshold	$V_{ILCD,MAX}$	-	-	200	mV
Logic 0 contention threshold	$V_{IHCD,MIN}$	450	-	-	mV

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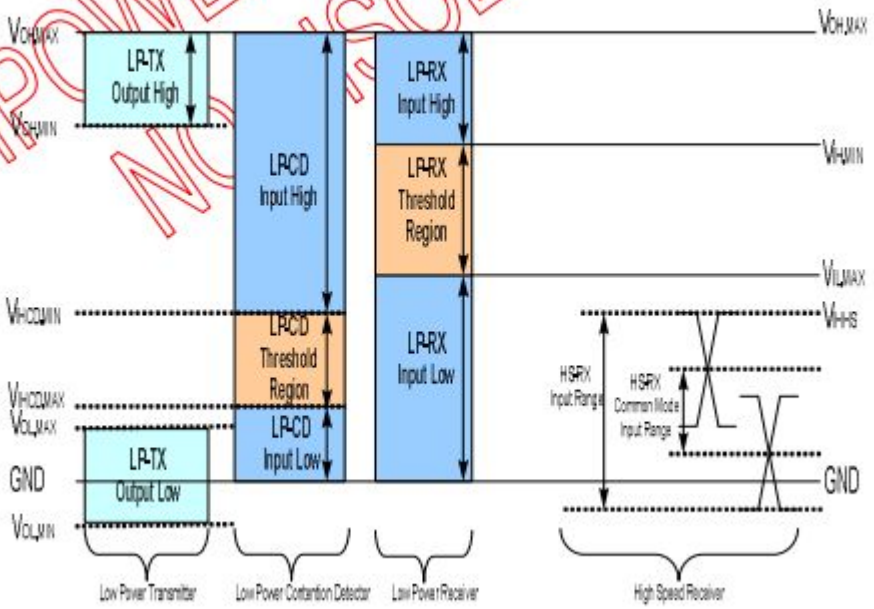
NO DISCLOSURE



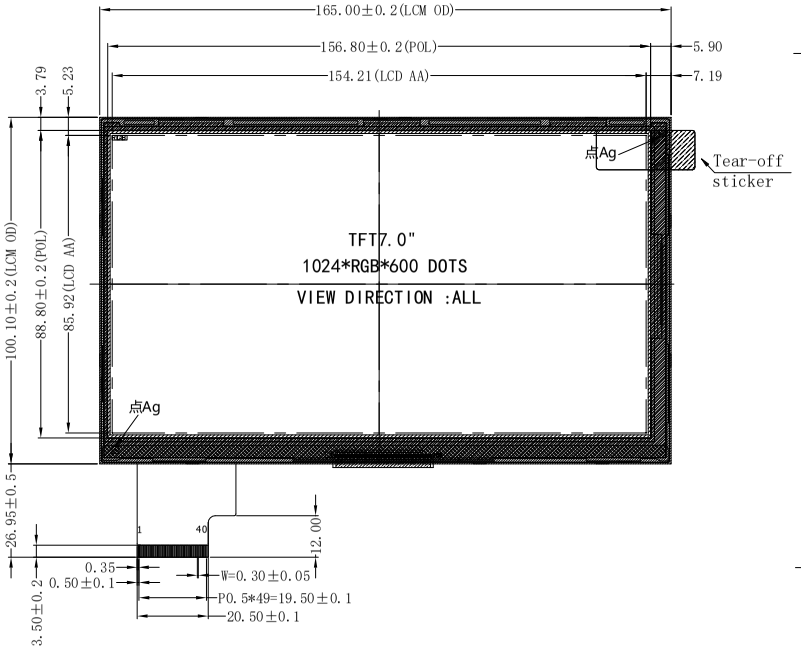
7.0 Reliability test items

NO	Item	Conditions	Remark
1	High Temperature Storage	Ta=+80℃,48hrs	
2	Low Temperature Storage	Ta=-30℃,48hrs	
3	High Temperature Operation	Ta=+70℃,48hrs	
4	Low Temperature Operation	Ta=-20℃,48hrs	
5	High Temperature and High Humidity (operation)	Ta=+40℃,90%RH,48hrs	

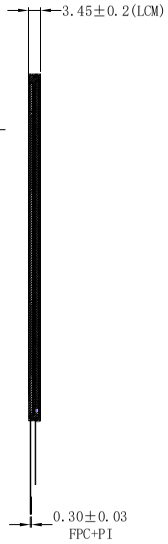
Note: All tests above are practiced at module type.
There is no display function NG issue occurred, All the cosmetic specification is judged before the reliability stress.

8.0 Mechanical Drawing

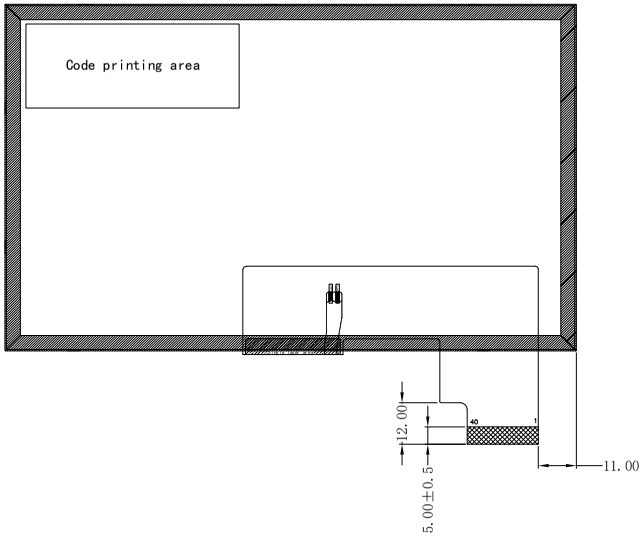
Front View



Side View

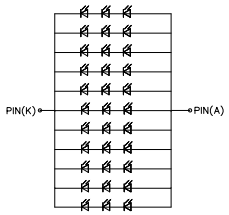


Back View



TFT PIN

1	VCOM
2	VDDIO1.8V
3	VDDIO1.8V
4	NC
5	RESET
6	STBYB
7	GND
8	MIPI-D0N
9	MIPI-D0P
10	GND
11	MIPI-D1N
12	MIPI-D1P
13	GND
14	MIPI-D2N
15	MIPI-D2P
16	GND
17	MIPI-CLKN
18	MIPI-CLKP
19	GND
20	MIPI-D3N
21	MIPI-D3P
22	GND
23	NC
24	NC
25	GND
26	NC
27	NC
28	NC
29	AVDD
30	GND
31	VLED-
32	VLED-
33	L/R
34	U/D
35	VGL
36	NC
37	NC
38	VGH
39	VLED+
40	VLED+



If= 220 mA(20mA/LED)

Vf= 9.6 V(typ)

Notes:
1. Display : 7.0″, TFT
2. Resolution: 1024xRGBx600
3. LCD Viewing Direction: ALL,
4. Display Mode: Normally Black/Transmissive
5. LCM Bringhtness: 450cd/m²(TYP),uniformity≥80%
6. unmark Tolerance:±0.2
7. OPERATING TEMP: -20° C~ +70° C
8. STORAGE TEMP: -30° C~ +80° C
9. Requirements on Environmental Protection: ROHS

REV	DESCRIPTION	DATE	NAME
3			
2			
1			
0	NEW	2023.02.27	IAN

LEADTEK DISPLAY

LEADTEK COMPANY LIMITED

SCALE:1/1	UNIT:mm	PAGE:1/1		Approve	Check	Drawn
Part No:	LTK070WSBLM35		VER:V0		JONA	IAN
Customer No:						

9. Packing form

TBD

10.0 General Precaution

10.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

10.2 Asembly Precaytton

10.2.1 Please use the mounting hole on the module side in installing and do not bending or wrenching LCD in assembling. And please do not drop, bend or twist LCD module in handling.
10.2.2 Please design display housing in accordance with the following guide lines.
10.2.2.1 Housing case must be destined carefully so as not to put stresses on LCD all sides and not to wrench module. The stresses may cause non-uniformity even if there is no non-uniformity statically.
10.2.2.2 Keep sufficient clearance between LCD module back surface and housing when the LCD module is mounted. The clearance in the design is recommended taking into account the tolerance of LCD module thickness and mounting structure height on the housing.
10.2.3 Please do not push or scratch LCD panel surface with any-thing hard. And do not soil LCD panel surface by touching with bare hands. (Polarizer film, surface of LCD panel is easy to be flawed.)
10.2.4 Please do not press any parts on the rear side such as source IC, gate IC, and FPC during handling LCD module. If pressing rear part is unavoidable, handle the LCD module with care not to damage them.
10.2.5 Please wipe out LCD panel surface with absorbent cotton or soft cloth in case of it being soiled.
10.2.6 Please wipe out drops of adhesives like saliva and water on LCD panel surface immediately. They might damage to cause panel surface variation and color change.
10.2.7 Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.

10.3 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. HannStar does not warrant the module, if customers disassemble or modify the module.

10.4 Breakage of LCD Panel

10.4.1 If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.
10.4.2 If liquid crystal contacts mouth or eyes, rinse out with water immediately.
10.4.3 If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.
10.4.4 Handle carefully with chips of glass that may cause injury, when the glass is broken.

10.5 Absolute Maximum Ratings and Power Protection Circuit

10.5.1 Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.
10.5.2 Please do not leave LCD module in the environment of high humidity and high temperature for a long time.
10.5.3 It's recommended employing protection circuit for power supply.

10.6 Operation

10.6.1 Do not touch, push or rub the polarizer with anything harder than HB pencil lead.Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.
10.6.2 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.
10.6.3 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.
10.6.4 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

10.7 Static Electricity

10.7.1 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.
10.7.2 Because LCD module uses CMOS-IC on TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge.
10.7.3 Persons who handle the module should be grounded through adequate methods.

10.8 Disposal

When disposing LCD module, obey the local environmental regulations.

10.9 OTHERS

10.9.1 A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight land strong UV rays.
10.9.2 Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.
10.9.3 For the packaging box, please pay attention to the followings:
10.9.3.1 Packaging box and inner case for LCD are designed to protect the LCDs from the damage or scratching during transportation. Please do not open except picking LCDs up from the box.
10.9.3.2 Please do not pile them up more than 6 boxes. (They are not designed so.) And please do not turn over.
10.9.3.3 Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
10.9.3.4 Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)