Shenzhen Leadtek Electronics Co.,Ltd

PRODUCT SPECIFICATION

TFT-LCD MODULE

Module No：LTK101H5029W-08KC-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.

Revision History

Version	Contents	Date	Note
V0	Original	2021.10.19	

1.0General Description

1.1 Introduction

LTK101H5029W-08KC-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 10.1 (16:9) inch diagonally measured active display area with (1024 horizontal by600vertical pixel) resolution.

1.2. Features

10.1 (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
Outline Dimension	267.4 (H) x 162.5 (V) x5.1(D)	mm
Display area	222.72 (H) x 125.28 (V)	mm
Number of Pixel	1024 RGB (H) x 600 (V)	pixels
Pixel pitch	0.2178 (H) x 0.2088(V)s	mm
Pixel arrangement	RGB Vertical stripe	
Display mode	Normally white	
Color Filter Array	RGB vertical stripes	
Backlight	White LED	
Weight	TBD	g
Data Transfer	RGB	

2.0 Absolute Maximum Ratings

2.1 Electrical Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Power supply voltage	V_{DD}	-0.3	5.0	V	
	V_{GH}	-0.3	20.0	V	
	V_{GL}	-20.0	0.3	V	
	AV_{DD}	6.5	13.5	V	
Logic Signal Input Level	V_{DD}	-0.3	5.0	V	

2.2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	Topa	-20	50	℃	
Storage Temperature	Tstg	-30	60	℃	

2.3 Back-light Unit:

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
LED Current	IF	–	140	–	mA	–	–
LED Voltage	VF	9	9.6	10.5	V	–	–
Life Time		–	20000	–	Hr.	I≦140mA	–
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 140mA

3.0 Optical Characteristics

3.1 Optical specification

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	Φ=180°(9 o'clock)	60	70	-	degree	Note 1
	θ_R	Φ=0°(3 o'clock)	60	70	-		
	θ_T	Φ=90°(12 o'clock)	50	60	-		
	θ_B	Φ=270°(6 o'clock)	60	70	-		
Response time	T_{ON}	Normal θ=Φ=0°	-	10	20	msec	Note 3
	T_{OFF}		-	15	30	msec	Note 3
Contrast ratio	CR		400	500	-	-	Note 4
Color chromaticity	W_X		0.26	0.31	0.36	-	Note 2 Note 5 Note 6
	W_Y		0.28	0.33	0.38	-	
Luminance	L			200	-	cd/m²	Note 6
Luminance uniformity	Y_U		70	75	-	%	Note 7

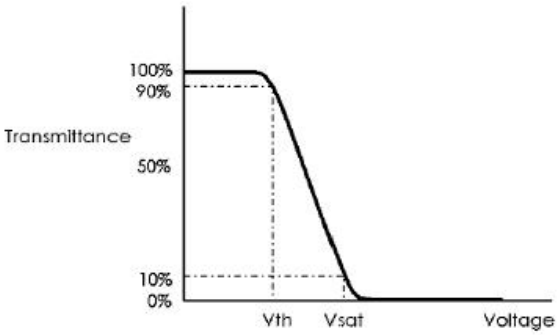
3.2 Measuring Condition

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

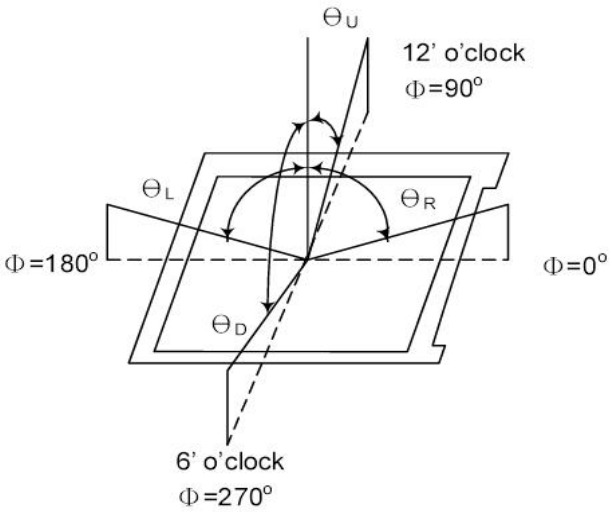
3.3 Measuring Equipment

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

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



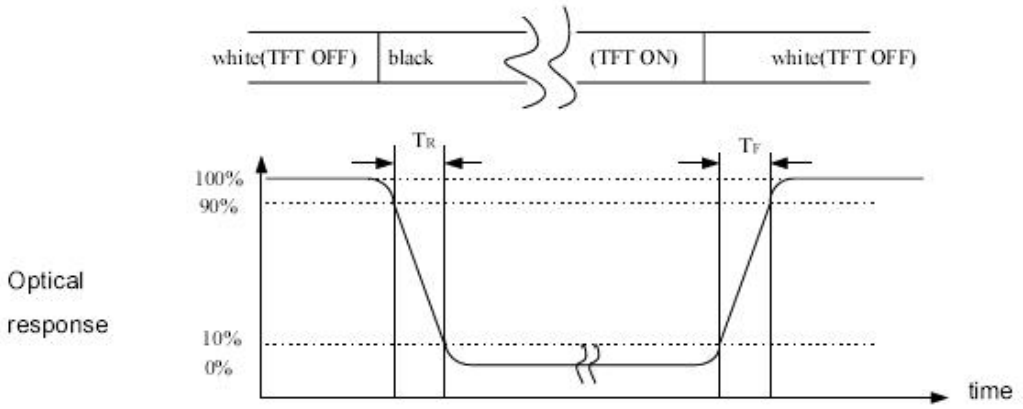
Note (2) Definition of Viewing Angle :



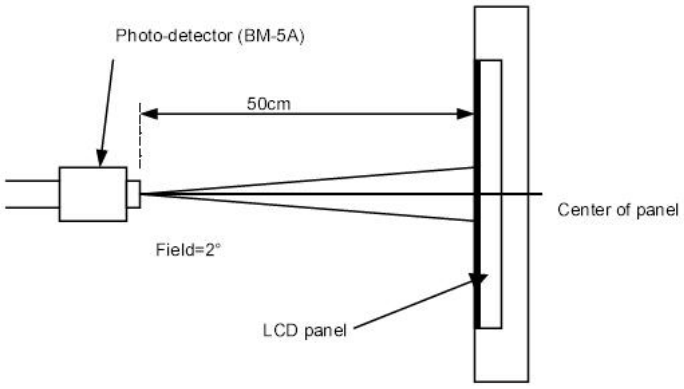
Note (3) Definition of Contrast Ratio(CR) :
measured at the center point of panel

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

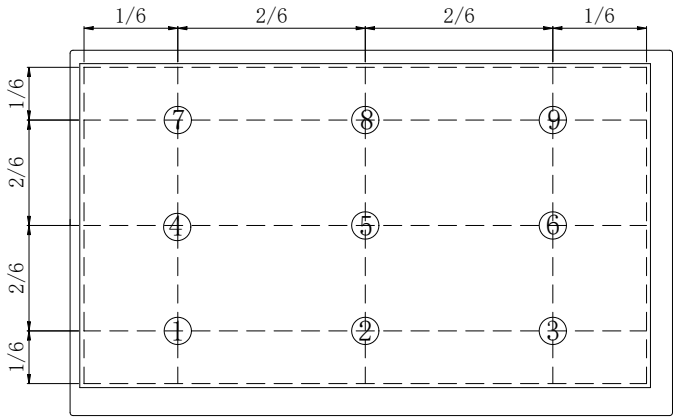
Note (4) Definition of Response Time : Sum of T_R and T_F



Note (5) Definition of optical measurement setup



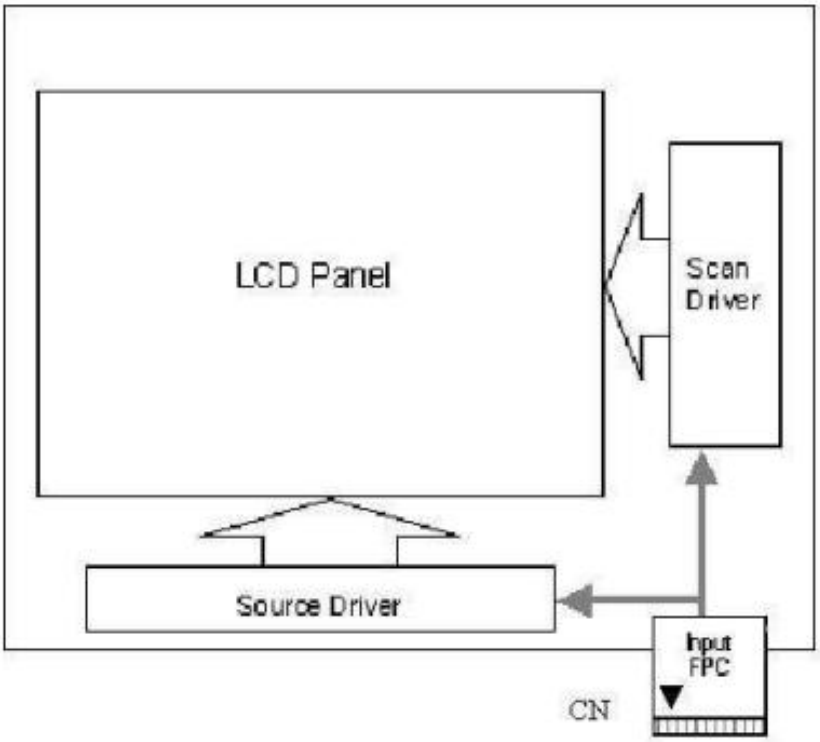
Note (6) Definition of brightness uniformity



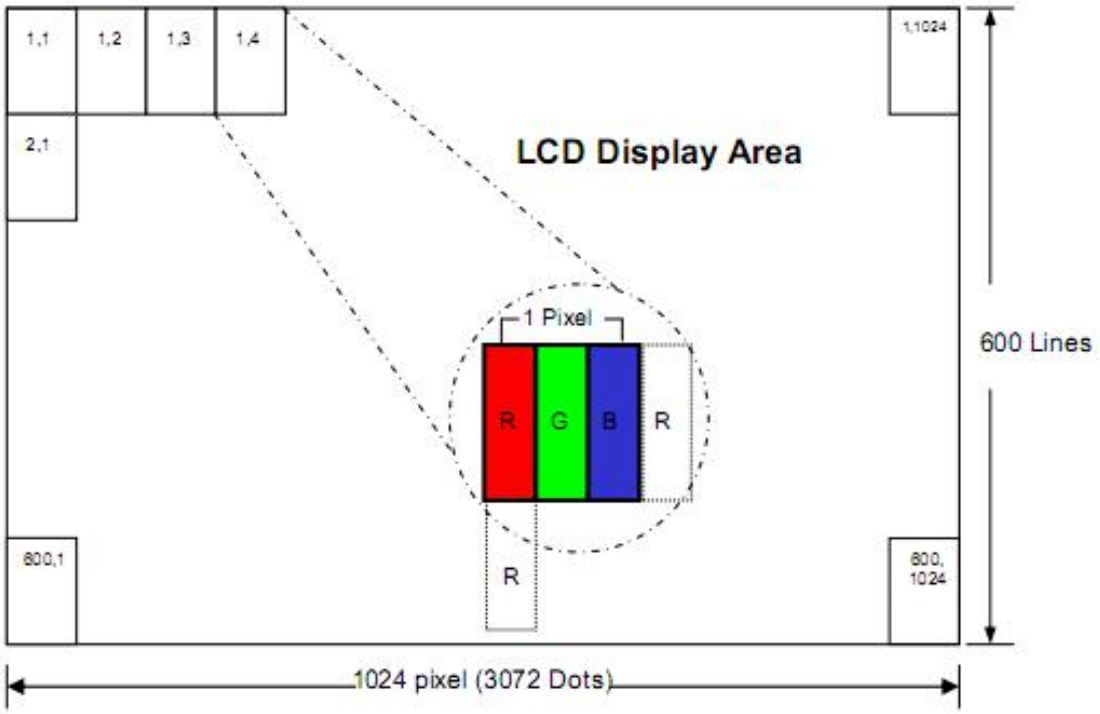
Note (7) Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.

4.0 Block Diagram

4.1 TFT LCD Module



4.2 Pixel Format



5.0 Interface Pin Connection

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

Terminal No.	Symbol	IO	Functions
1--2	LED+	P	Power for LED backlight (Anode)
3--4	LED-	P	Power for LED backlight (Cathode)
5	GND	P	Analog Ground
6	VCOM	I	Common voltage
7	DVDD	P	Power for Digital Circuit
8	MODE	I	DE/SYNC mode select
9	DEN	I	Data Input Enable
10	VSD	I	Vertical Sync Input
11	HSD	I	Horizontal Sync Input
12	B7	I	Blue data(MSB)
13	B6	I	Blue data
14	B5	I	Blue data
15	B4	I	Blue data
16	B3	I	Blue data
17	B2	I	Blue data
18	B1	I	Blue data
19	B0	I	Blue data
20	G7	I	Green data(MSB)
21	G6	I	Green data
22	G5	I	Green data
23	G4	I	Green data
24	G3	I	Green data
25	G2	I	Green data
26	G1	I	Green data
27	G0	I	Green data (LSB)
28	R7	I	Red data(MSB)
29	R6	I	Red data
30	R5	I	Red data
31	R4	I	Red data
32	R3	I	Red data
33	R2	I	Red data
34	R1	I	Red data
35	R0	I	Red data
36	GND	P	Power Ground
37	DCK	I	Sample clock
38	GND	P	Power Ground
39	SHLR	I	Left / right selection
40	UPDN	I	Up/down selection
41	VGH	P	Gate ON Voltage

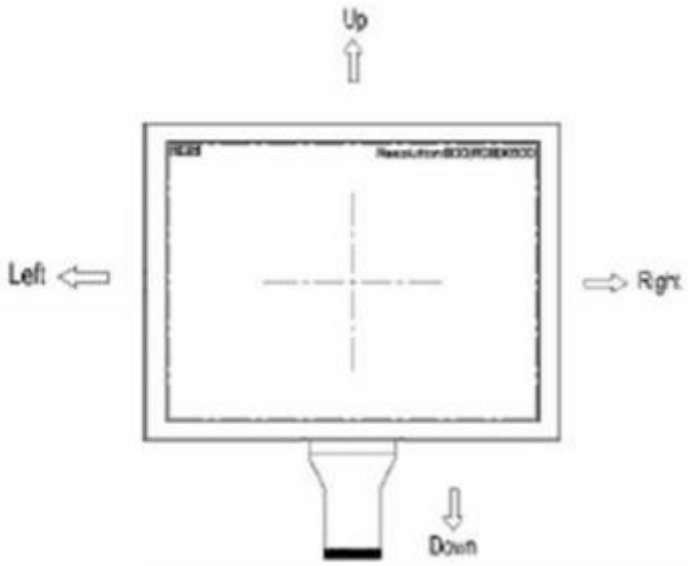
42	VGL	P	Gate OFF Voltage
43	AVDD	P	Power for Analog Circuit
44	RESET	I	Global reset pin.
45	NC	-	No connection
46	VCOM	I	Common Voltage
47	DITH	I	Dithering function
48	GND	P	Power Ground
49	NC	-	No connection
50	NC	-	No connection

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	DVDD	Output	input	output	input	up to down, and from left to right
DVDD	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
DVDD	DVDD	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.

Note Definition of scanning direction.
Refer to the figure as below:



Note Global reset pin. Active low to enter reset state. Suggest to connect with an RC reset circuit for stability. Normally pull high.

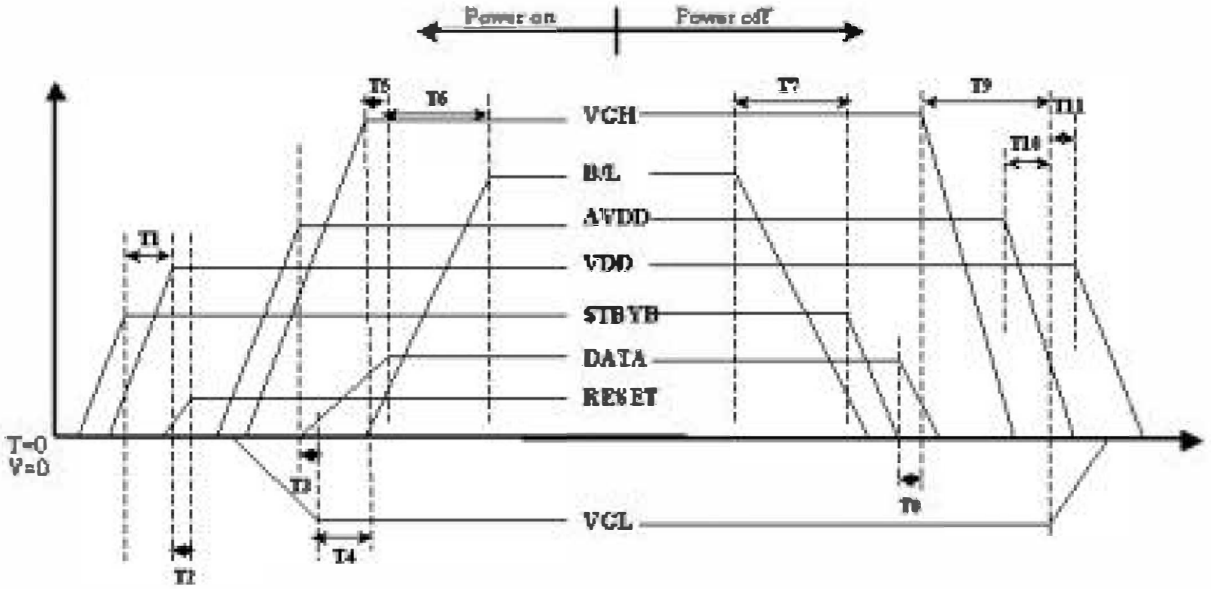
Note Dithering function enable control, normally pull high.
When DITHB="1",Disable internal dithering function,
When DITHB="0",Enable internal dithering function,

6. Electrical Characteristics

6.1 TFT LCD Module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	DV_{DD}	3.0	3.3	3.6	V	
	V_{GH}	14.55	15	16	V	
	V_{GL}	-7.25	-6.9	-6.25	V	
	AV_{DD}	**9.6**	**10**	**10.4**	**V**	
	Vcom	**3.6**	**3.8**	**4.0**	**V**	
Input signal voltage	V_{IH}	0.7DV_{DD}	-	DV_{DD}	V	
	V_{IL}	0	-	0.3DV_{DD}	V	
Current of power supply	I_{DD}	-	22		mA	DV DD=3.3V
	I_{ADD}	-	23		mA	AV_{DD}=10V
	I_{GH}	-	1		uA	V_{GH}=15V
	I_{GL}	-	1		mA	V_{GL}=-6.9V
	I_{VCOM}	-	0.85		mA	VCOM=3.8V

6.4 Power On / Off Sequence



Item	Min.	Typ.	Max.	Unit
T1	0	--	--	ms
T2	50	--	--	ms
T3	5	--	--	ms
T4	10	--	--	ms
T5	20	--	--	ms
T6	50	--	--	ms
T7	20	--	--	ms
T8	10	--	--	ms
T9	20	--	--	ms
T10	10	--	--	ms
T11	20	--	--	ms

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: Ta=25±3 °C, typical IL value indicated in the above table until the brightness becomes less than 50%.

6.5 Timing Diagram of Interface Signal

- **DE mode**

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	40.8	51.2	67.2	MHz
Horizontal Display Area	thd		1024		DCLK
HSD Period	th	1114	1344	1400	DCLK
HSD Blanking	thb+ thfp	90	320	376	DCLK
Vertical Display Area	tvd		600		T_H
VSD Period	tv	610	635	800	T_H
VSD Blanking	tvbp+ tvfp	10	35	200	T_H

- **HV mode**

Horizontal timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DCLK Frequency	fclk	44.9	51.2	63	MHz
Horizontal Display Area	thd		1024		DCLK
HSD Period	th	1200	1344	1400	DCLK
HSD Pulse Width	thpw	1	-	140	DCLK
HSD Back Porch	thbp		160		DCLK
HSD Front Porch	thfp	16	160	216	DCLK

Vertical Timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd		600		T_H
VSD Period	tv	624	635	750	T_H
VSD Pulse Width	tvpw	1	-	20	T_H
VSD Back Porch	tvbp		23		T_H
VSD Front Porch	tvfp	1	12	127	T_H

7.0 Reliability test items

NO	Item	Conditions	Remark
1	High Temperature Storage	Ta=+60℃,24hrs	
2	Low Temperature Storage	Ta=-30℃,24hrs	
3	High Temperature Operation	Ta=+50℃,24hrs	
4	Low Temperature Operation	Ta=-20℃,24hrs	
5	High Temperature and High Humidity (operation)	Ta=+60℃,90%RH,24hrs	
6	Thermal Cycling Test (non operation)	-20℃(0.5hr)→+70℃(0.5hr),200cycles	
7	Vibration	1.Random:1.04G,10-500HZ,X,Y,Zdirection 30min/each direction 2.Sweep sine:1.5G, 5~500Hz, X/Y/Z,30min/each direction	
8	Shock	100G,6ms, ±X, ±Y, ±Z 3 time for each direction	JIS C7021, A-10 (Condition A)
9	Vibration (with carton)	Random:1.04Grms, 10~500Hz, X/Y/Z 45min/each direction Fixed:5Hz, 1.5Grms, X/Y/Z 45min/each direction	
10	Drop (with carton)	Height: 60cm 1 corner, 3 edges, 6 surfaces	JIS Z0202
11	Electrostatic Discharge	±200V,200PF,0Ω1 time/each terminal	

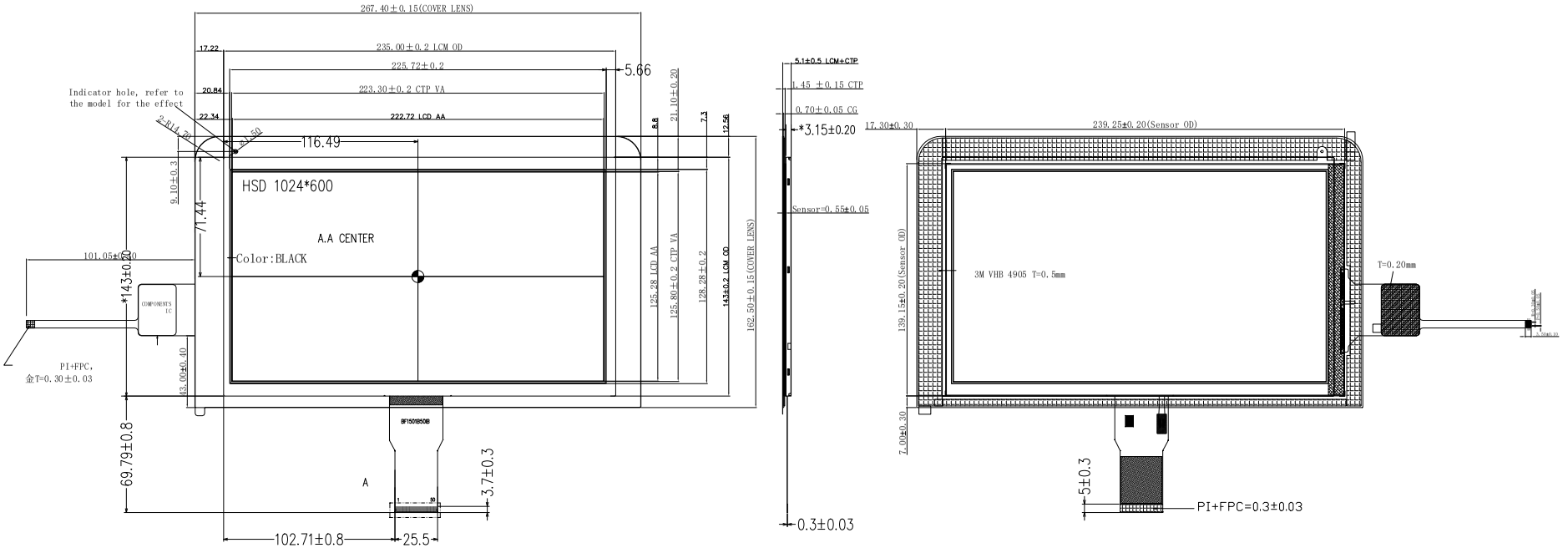
Note: All tests above are practiced at module type.
There is no display function NG issue occurred, All the cosmetic specification is judged before the reliability stress.

LCM+CTP

正面图 FRONT VIEW

侧面图 RIGHT SIDE VIEW

背面图 REAR VIEW

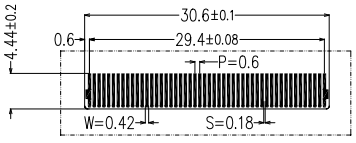


COVER GLASS (0.7mm)
SCA (200um)
SENSOR (0.55mm)
Foam (0.5mm)
LCD(3.15mm)

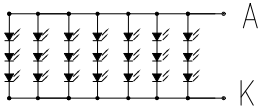
CTP+LCM:air bonding structure

Notes:
1. Structure: G+G.
2. Transmittance: ≥86% (550nm).
3. All unmarked tolerances: ±0.10mm.
4. IC: GT9271, DITO, 10-point touch, number of channels: 20*32
5. Degree of toughness: 110g steel ball, height 40cm drop without breaking, surface hardness
   Test: ≥6H (pencil hardness test).
6. The key hole and edge of the unmarked place in CG are safely chamfered ≤ 0.20mm.
7. Working temperature: -20~C~60~C, 20~85%RH, storage temperature -40~80~C, 10-95%RH
   All materials comply with ROHS.

Notes:
1. Display : 10.1", TFT-TN
2. Resolution: 1024xRGBx600
3. LCD Viewing Direction: /
4. Display Mode: Normally White/Transmissive
5. LCD Driver:
6. LCM luminance: 200cd/m²(TYP),Uniformity≥80%
7. Genral Tolerance:±0.2
8. OPERATING TEMP: -20° C~ +50° C
9. STORAGE TEMP: -30° C~ +60° C
10. Requirements on Environmental Protection: ROHS



A SC 1:4



IF=140mA,VF=9.6V(TYP)
LED CIRCUIT DIAGRAM:

REV	DESCRIPTION	DATE	NAME
3			
2			
1			
0	NEW	2021.4.19	Allen

LEADTEK COMPANY LIMITED

SCALE:1/1	UNIT:mm	PAGE:1/1	Approve	Check	Drawn
Part No:	LTK101H5029W-08KC	VER:V0			
Customer No:					

9.0 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.)