Shenzhen Leadtek Electronics Co.,Ltd

PRODUCT SPECIFICATION

TFT-LCD-TP MODULE

Module No：LTK0695I4018W-QC-V2

☑ 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.

Contents

Document Revision History

Version	Contents	Date	Note
V0	Original	2022.03.17	
V1	Modify the length of FPC	2021.03.18	
V2	Modify the cover glass, the mounting tape and the back printing	2021.04.19	

1.0 General Description

1.1 Introduction

LTK0695I4018W-QC-V2 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 6.95 (9:16) inch diagonally measured active display area with (600 horizontal by 1024 vertical pixel) resolution.

1.2. Features

6.95 (9:16 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	118.46(H) x 230.82 (V) x5.92 (D)	mm
Display area	89.28 (H) x 152.37 (V)	mm
Number of Pixel	600 RGB (H) x 1024 (V)	pixels
Pixel pitch	0.0496(H) x3x 0.1448(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	

2.0 Absolute Maximum Ratings

2.1 Electrical Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Power supply voltage	V_{DD}	-0.3	2.5	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	2.5	V	

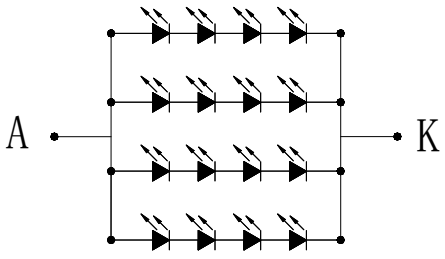
2.2 Back-light Unit:

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
LED Current	IF	–	80	–	mA	–	–
LED Voltage	VF	12	12.8	13.6	V	I=80mA	–
Luminous	IV	250	300	–	Cd/m^2	I=80mA	–
Life Time		–	20000	–	Hr.	I=80mA	–
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 80mA



LED 电路图
led circuit diagram

3.0 Optical Characteristics

3.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	Θ=0 Normal viewing angle	700	800	—		(1)(2)(4)
Response time		Tr+ Tf		—	15	30	msec	(1)(3)
Color chromaticity (CIE1931)		White	W_x	-0.050	0.31	+0.050		(1)(4) CF Glass C light
			W_y		0.33			
		Red	Rx		-			
			Ry		-			
		Green	Gx		-			
			Gy		-			
		Blue	Bx		-			
			By		-			
Viewing angle	Hor.	Θ_L	CR>10	75	85	—		
		Θ_R		75	85	—		
	Ver.	Θ_U		75	85	—		
		Θ_D		75	85	—		
Transmittance (with polarizer)		T(%)		-	4.77	—		(5)
NTSC					50%	--	%	
Luminance Uniformity		YU		70			%	

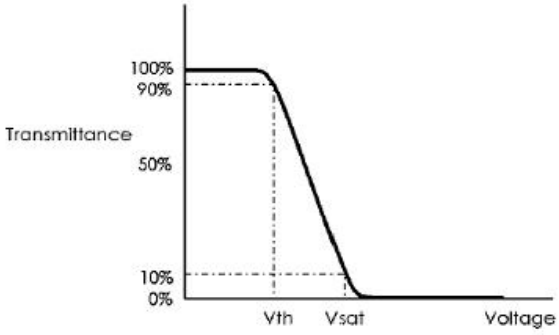
3.2 Measuring Condition

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

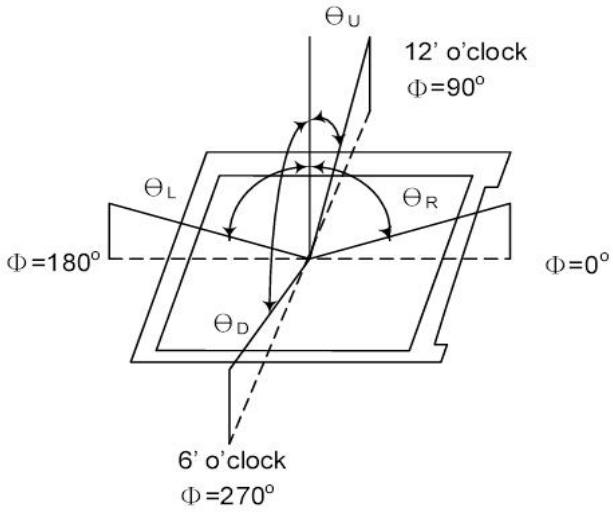
3.3 Measuring Equipment

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

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



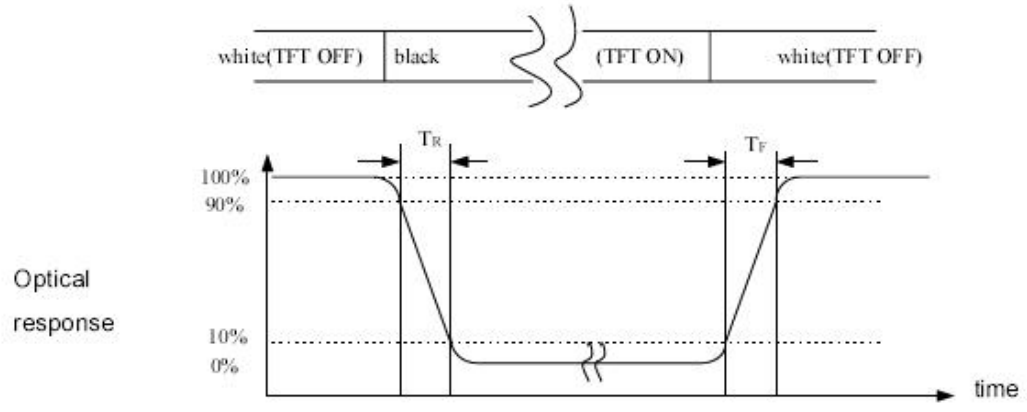
Note (2) Definition of Viewing Angle :



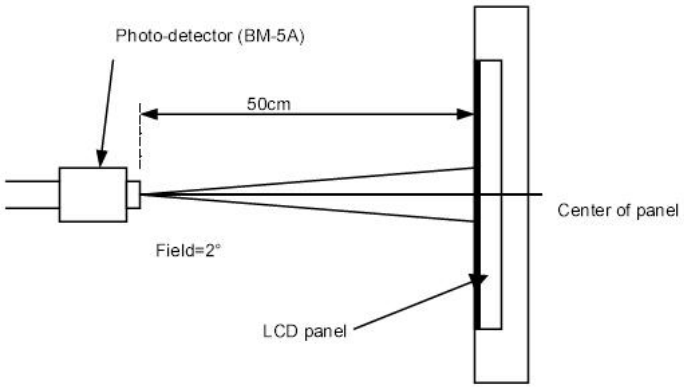
Note (3) Definition of Contrast Ratio(CR) :
measured at the center point of panel

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

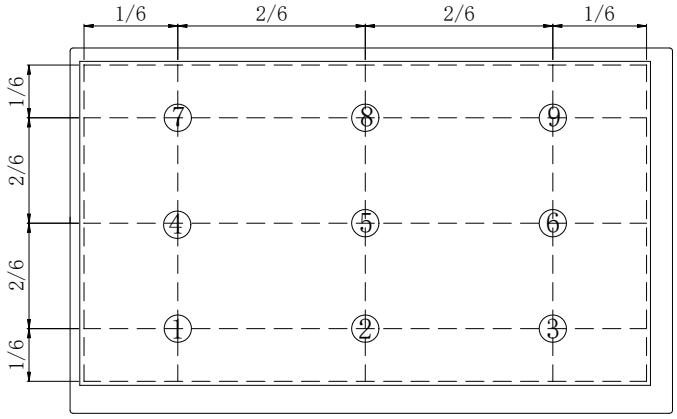
Note (4) Definition of Response Time : Sum of T_R and T_F



Note (5) Definition of optical measurement setup

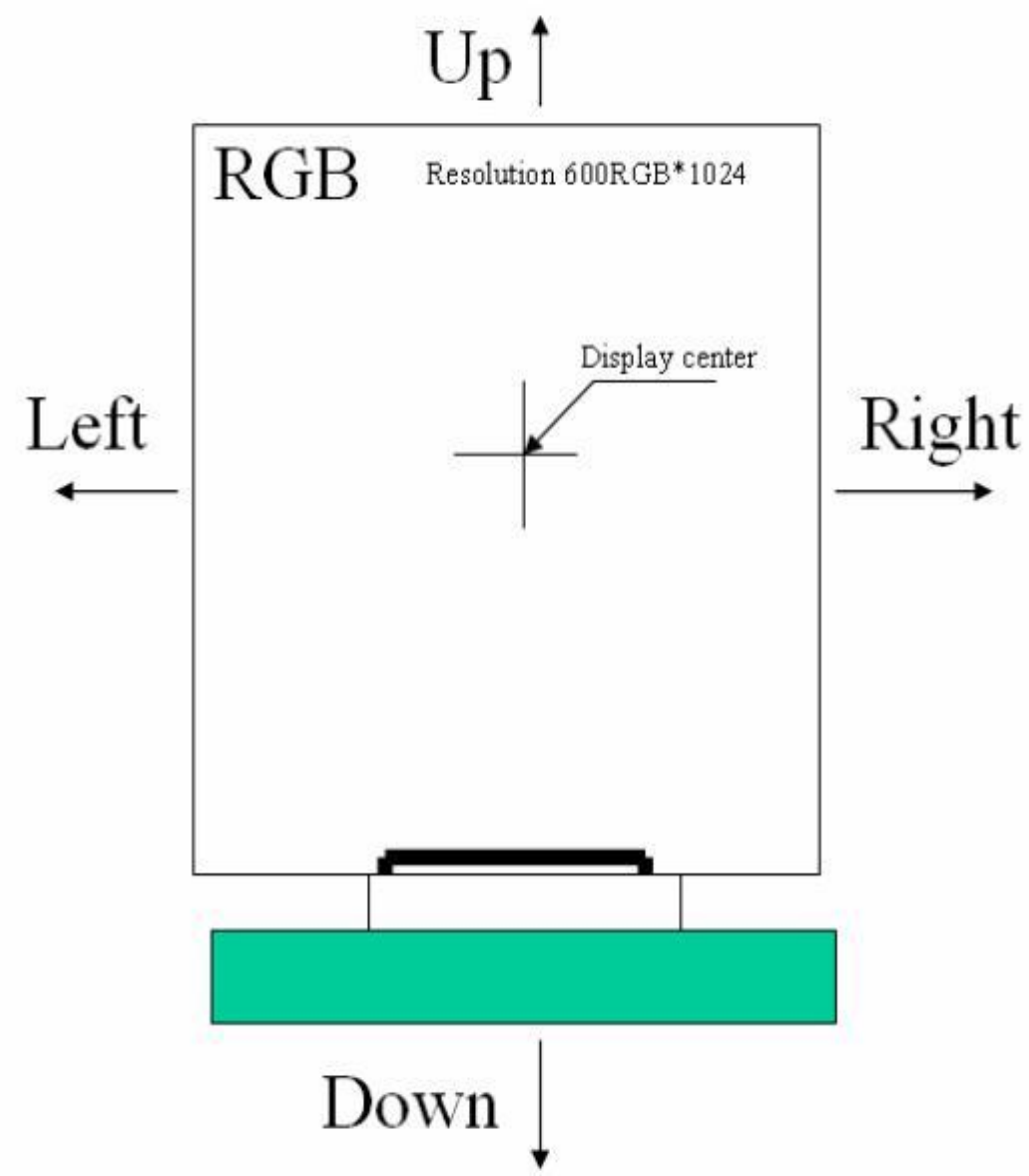


Note (6) Definition of brightness uniformity



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

4.0 Block Diagram



5.0 Interface Pin Connection

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

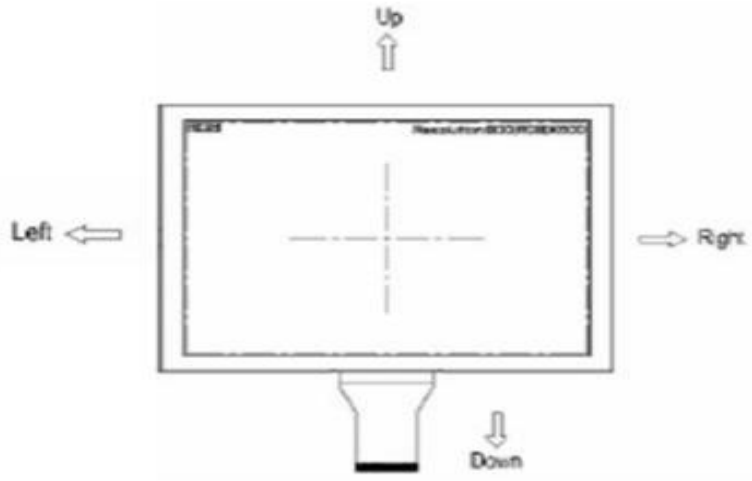
Pin No.	Symbol	I/O	Function	Remark
1	VCOM	P	Common Voltage	
2-3	VDD	P	Power Supply Voltage for LCD	
4	CTP_VCC	P	Power Supply Voltage for TP	
5	RESET	I	Global reset pin for LCD. Voltage Follow VDD	
6	STBYB	I	Standby mode, Normally pulled high STBYB = 1,normal operation STBYB = 1, timing controller,source driver will turn off,all output are High-Z. Voltage Follow VDD	
7	GND	P	Ground	
8	MIPI-D0N	I	-MIPI differential data input	
9	MIPI-D0P	I	+ MIPI differential data input	
10	GND	P	Ground	
11	MIPI-D1N	I	-MIPI differential data input	
12	MIPI-D1P	I	+ MIPI differential data input	
13	GND	P	Ground	
14	MIPI-CKN	I	-MIPI differential clock input	
15	MIPI-CKP	I	+MIPI differential clock input	
16	GND	P	Ground	
17	MIPI-D2N	I	-MIPI differential data input	
18	MIPI-D2P	I	+ MIPI differential data input	
19	GND	P	Ground	
20	MIPI-D3N	I	-MIPI differential data input	
21	MIPI-D3P	I	+ MIPI differential data input	
22	GND	P	Ground	
23	CTP_SDA	I	Serial Data Input And Output	
24	CTP_SCL	I	Serial Clock Input	
25	GND	P	Ground	
26	CTP_RST	I	Touch Panel Reset Signal PIN	
27	LED_PWM	I	PWM Signal, If not used, Please NC. Voltage Follow VDD	
28	CTP_INT	I	An interrupt signal to inform the host processor that touch data is ready for read	
29	AVDD	P	Power for Analog Circuit	

30	GND	P	Ground	
31-32	LED-	P	LED Cathode	
33	L/R	I	Horizontal inversion（Normally pull high. Voltage Follow VCC）	
34	U/D	I	Vertical inversion（Normally pull high. Voltage Follow VCC）	
35	VGL	P	Gate OFF Voltage	
36-37	CABCEN1/ CABCEN0	I	NC（No Connect）	
38	VGH		Gate ON Voltage	
39-40	LED+		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	
VCC	VCC	Output	input	output	input	up to down, and from left to right
GND	VCC	input	output	input	output	down to up, and from right to left
VCC	GND	output	input	input	output	up to down, and from right to left
GND	GND	input	output	output	input	down to up, and from left to right

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

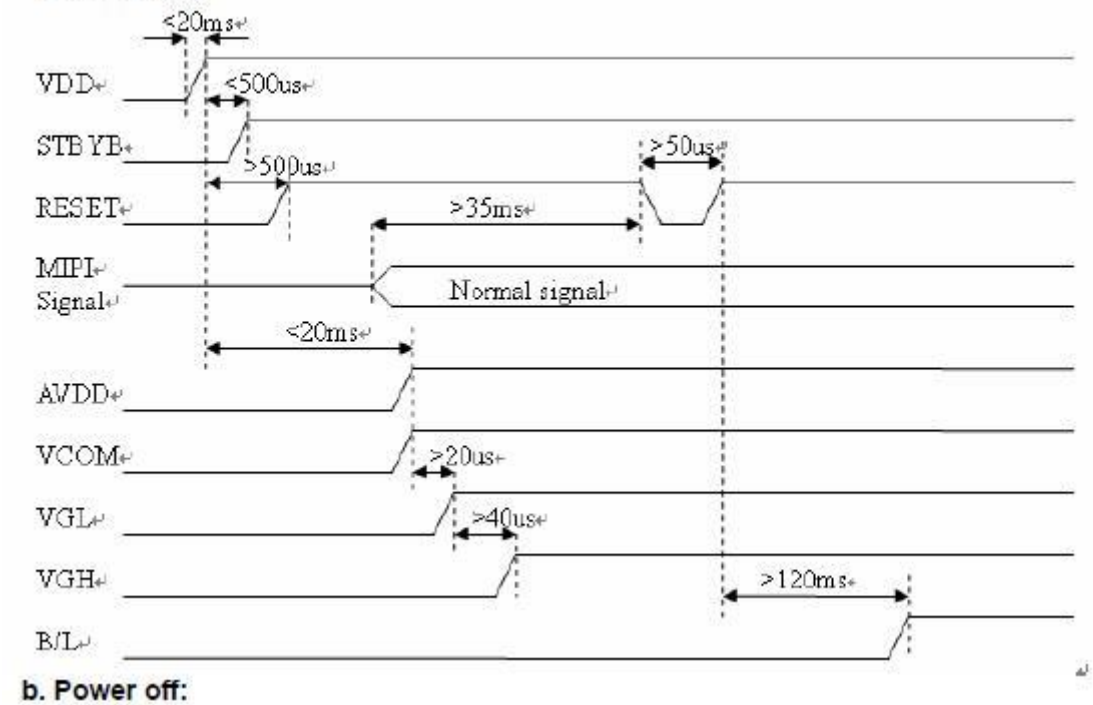
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	V_{DD}	2.7	3.3	3.6	V	
	VCC	1.5	1.6	1.7	V	Note(2)
	V_{GH}	20.5	21	21.5	V	
	V_{GL}	-7.5	-7	-6.5	V	
	AV_{DD}	9.9	10	10.1	V	
	Vcom	3.9	(4.0)	4.1	V	Note(1)
Input signal voltage	V_{IH}	0.7V_{DD}	-	V_{DD}	V	
	V_{IL}	0	-	0.3V_{DD}	V	

Note (1): The brightness of LCD panel could be changed by adjusting the AC component of VCOM. VCOM confirm according to the actual effect.

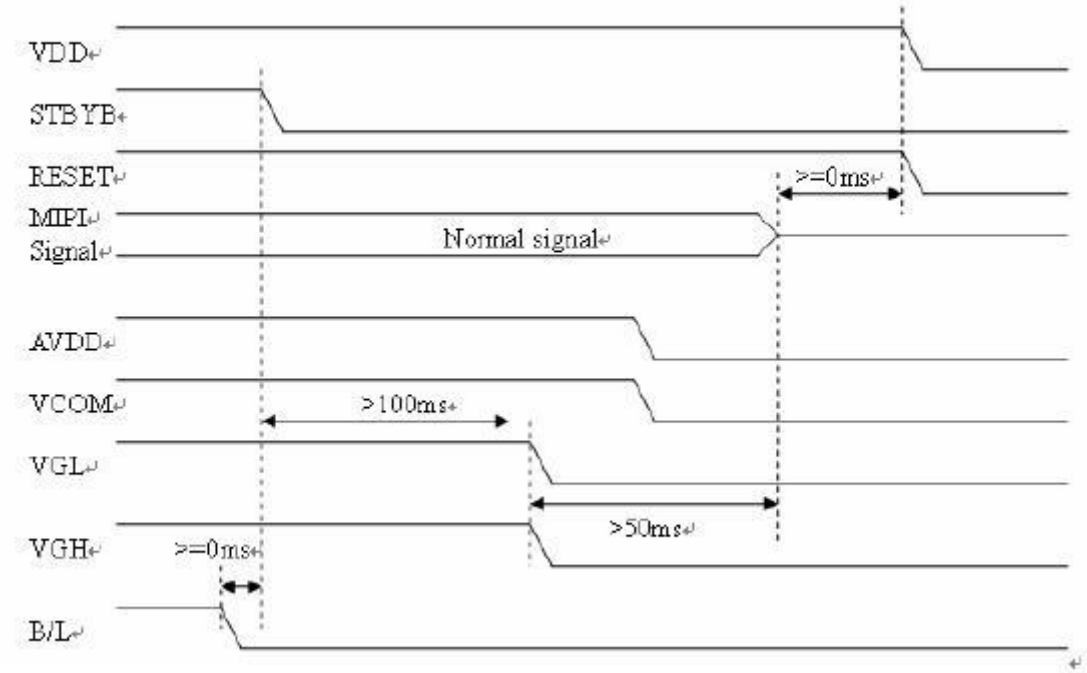
Note(2)： LCD TCON supply voltage. High Voltage of SHLR and UPDN follows VCC.

6.2 Power on/off sequence

a. Power on:



b. Power off:



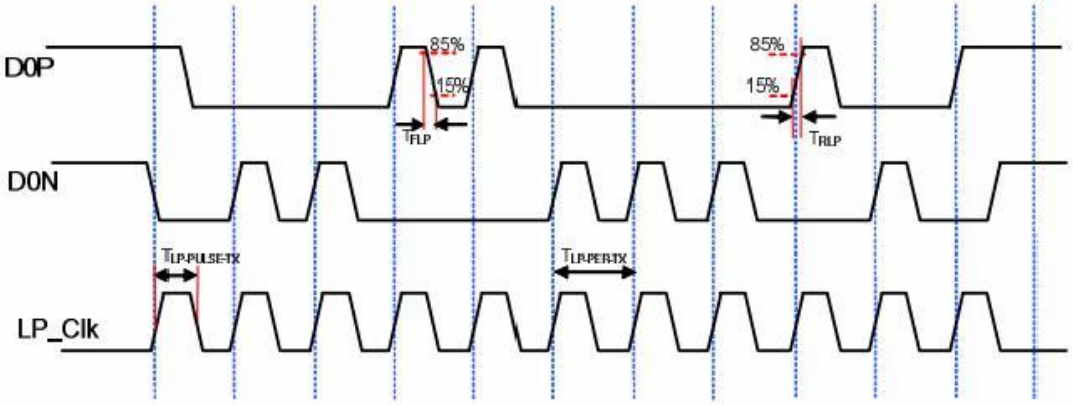
6.3 Input timing chart

Parameter	Symbol	Min.	Typ.	Max.	Unit
MIPI data frequency	F_{DATA}	277	304	420	Mbps
Horizontal display area	T_{HD}		600		pixel
Hsync period time	T_H	675	741	901	pixel
Hsync pulse width	T_{HPW}	1	1	1	pixel
Hsync back porch	T_{HBP}	32	60	100	pixel
Hsync front porch	T_{HFP}	42	80	200	pixel
Vertical display area	T_{VD}		1024		H
Vsync period time	T_V	1085	1085	1225	H
Vsync pulse width	T_{VPW}	1	1	1	H
Vsync back porch	T_{VBP}		25		H
Vsync front porch	T_{VFP}	35	35	200	H

6.4 MIPI AC Electrical characteristic

6.4.1 LP Transmission

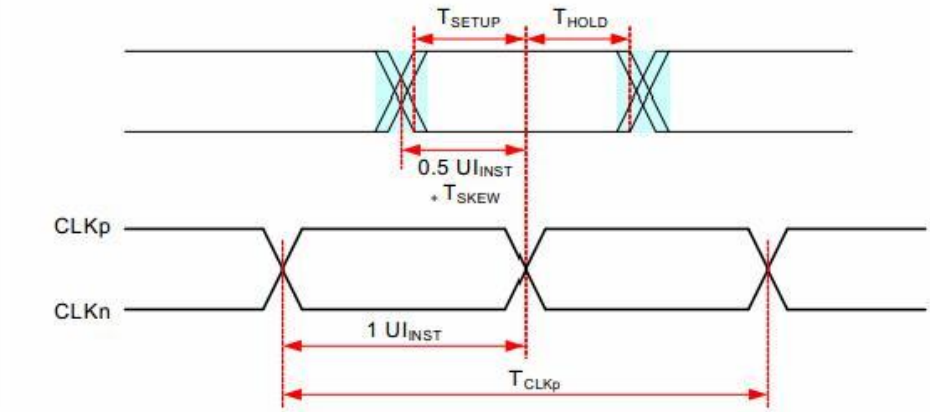
Parameter	Symbol	Min	Typ	Max	Units
15%-85% rise time and fall time	T_{RLP} / T_{FLP}	-	-	25	ns
Pulse width of the LP exclusive-OR clock	$T_{LP\text{-}PULSE\text{-}TX}$	50	-	-	ns
Period of the LP exclusive-OR clock	$T_{LP\text{-}PER\text{-}TX}$	100	-	-	ns



LP_Clk = EXOR(D0P,D0N)

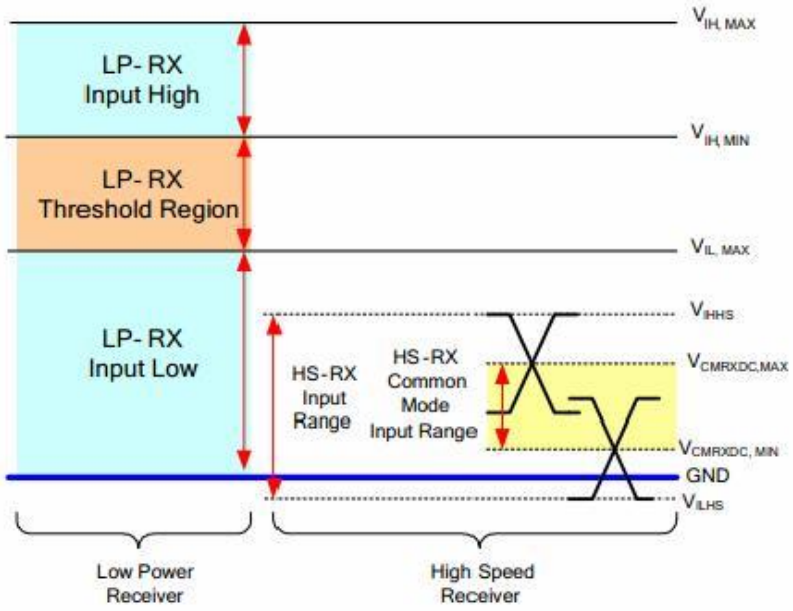
3.3.1.2 HS Transmission

Parameter	Symbol	Min	Typ	Max	Units
UI instantaneous	UI_{INST}	1.0	-	12.5	ns
Data to Clock Setup Time	T_{SETUP}	0.3	-	-	UI_{INST}
Data to Clock Hold Time	T_{HOLD}	0.3	-	-	UI_{INST}



6.5 DC Electrical characteristic

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
MIPI digital operation current	I_{VCCIF}	-	TBD	TBD	mA	VCC=VCC_IF=1.5V, Data Rate=500Mbps, Input pattern: 55h→AAh→55h→AAh
MIPI digital stand-by current	$I_{VCCIFST}$	-	200	-	uA	VCC_IF input current. All input signal are stopped.
MIPI Characteristics for High Speed Receiver						
Single-endedl input low voltage	V_{ILHS}	-40	-	-	mV	
Single-endedl input high voltage	V_{IHHS}	-	-	460	mV	
Common-mode voltage	V_{CMRXDC}	155	-	330	mV	
Differential input impedance	Z_{ID}	80	100	125	ohm	
Differential input high threshold	V_{IDTH}	-	-	70	mV	
Differential input low threshold	V_{IDTL}	70	-	-	mV	
MIPI Characteristics for Low Power Mode						
Pad signal voltage range	V_I	-50	-	1350	mV	
Ground shift	V_{GNDSH}	-50	-	50	mV	
Output low level	V_{OL}	-150	-	150	mV	
Output high level	V_{OH}	1.1	1.2	1.3	V	

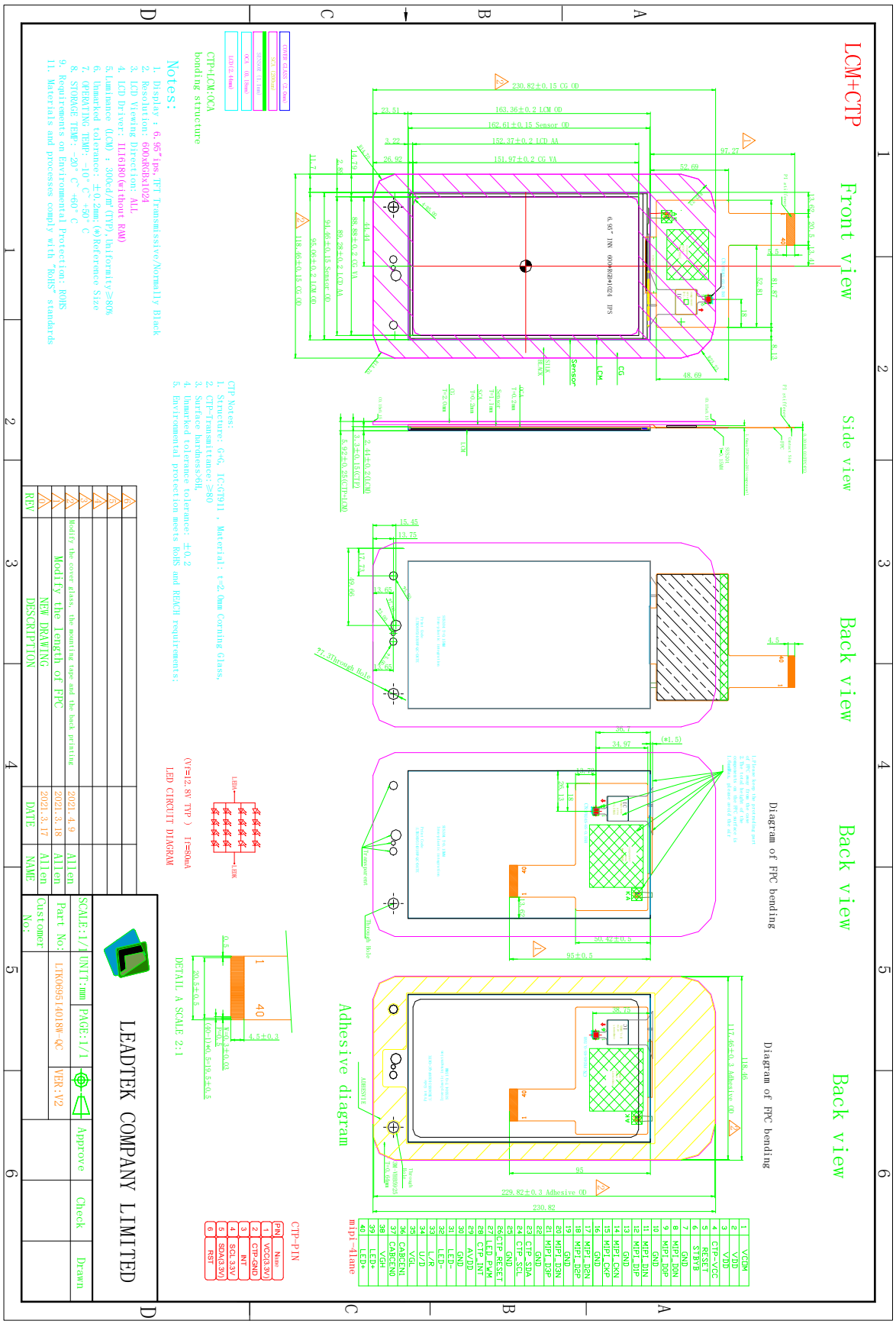


7.0 Reliability test items

NO	Item	Conditions	Remark
1	High Temperature Storage	Ta=+60℃,48hrs	
2	Low Temperature Storage	Ta=-20℃,48hrs	
3	High Temperature Operation	Ta=+50℃,48hrs	
4	Low Temperature Operation	Ta=-10℃,48hrs	
5	High Temperature and High Humidity (operation)	Ta=+40℃,90%RH,48hrs	
6	Thermal Cycling Test (non operation)	0℃(0.5hr)→+55℃(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



9.0 Packing form

9.1 Packing form 1

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.)