深圳市晶鸿电子有限公司

LCD Module Specification

Module P/N: JH057N00900

Version: 1.0

Description : 5.7 inch TFT 720*1440 Pixels with LED backlight, wide viewing angle

TEL: 0086-755-85256648

Fax: 0086-755-85292148

E-mail: hanwei@rocktech.com.hk

Web: www.rocktech.com.hk

Jinghong

DESIGNED BY	
CHECKED BY	
APPROVED BY	

Customer

INSPECTION RESULT	
TESTED BY	
APPROVED BY	

Revision History

Date	Rev.	Page	Description
2018-05-10	1.0	All	First issue

CONTENTS

1. General Features

Item	Spec	Remark
Display Mode	Normally Black transmissive	
Viewing Direction	ALL o'clock	ALL
Input Signals	MIPI VIDEO MODE	
Outside Dimensions	70.0 (W) x147.5(H) x2.75(D)	mm
Active Area	65.2(W)×129.86(H)	mm
Number of Pixels	720×RGB×1440Pixels	
Dot Pitch	0.090×0.090	um
Pixel Arrangement	RGB Vertical stripes	
Drive IC	ST7703	

2. Absolute Maximum Ratings

The following are maximum values which, if exceeded may cause operation or damage to the unit.

ITEM	Sym.	Min.	Typ.	Max.	Unit	Remark
Power for Circuit Driving	Vcc	2.3	-	4.6	V	
Power for Circuit Logic	Vt	1.65	-	3.3	V	
Storage Humidity	H_{ST}	10	-		%RH	At 25±5℃
Storage Temperature	T_{ST}	-30	-	70	℃	
Operating Ambient Humidity	H_{OP}	10	-		%RH	
Operating Ambient temperature	T_{OP}	-20	-	60	℃	

3. Electrical Specification

3.1 Driving TFT LCD Panel

Item		Sym.	Min	Typ.	Max	Unit	Note
Power for Circuit Driving		VCC	2.5	2.8	3.3	V	
Power For Circuit Logic		IOVCC	1.65	1.8	3.3	V	
Logic Input Voltage	Low Voltage	V_{IL}	0.0	-	0.2 IOVCC	V	
	High Voltage	V_{IH}	0.8 IOVCC	-	IOVCC	V	
Logic Output Voltage	Low Voltage	V_{OL}	0.0	-	0.2 IOVCC	V	
	High Voltage	V_{OH}	0.8 IOVCC	-	IOVCC	V	
Power Consumption	Black Mode	P_b	--	--	--	mW	
	Standby Mode	P_w	--	--	--	mW	

3.2 Driving Backlight

Item	Sym.	Min	Typ.	Max	Unit	Note
Backlight driving voltage	V_F	--	22.4	--	V	
Backlight driving current	I_F	--	40	--	mA	
Backlight Power Consumption	W_{BL}	-	-	-	mW	
Life Time	-	-	20,000	-		Note 3

Note 1: (Unless specified, the ambient temperature Ta=25℃)
Note 2: The recommended operating conditions refer to a range in which operation of this product is guaranteed. Should this range is exceeded, the operation cannot be guaranteed even if the values may be without the absolute maximum ratings.
Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

4. Optical Specifications

Optical characteristics are determined after the unit has been 'ON' and stable for approximately 30 minutes in a dark environment at 25 ℃. The values specified are at an approximate distance 500mm from the LCD surface at a viewing angle of Φ and θ equal to 0°.

Item	Conditions		Min.	Typ.	Max.	Unit	Note
Transmittance	Center		(3.5)	(4.1)	-	%	Under C-light (1),(5),(7),(8) θx=θy=0°
Contrast Ratio	Center		(1,000)	(1,500)	-	-	(1),(3),(6),(7),(8) θx=θy=0°
Response Time	Rising + Falling		-	(35)	(40)	ms	(1),(4),(6),(7),(8) θx=θy=0°
CF Color Chromaticity (CIE1931)	Red x		Typ. -0.03	(0.659)	Typ. +0.03	-	Under C-light (1),(5),(8) θx=θy=0°
	Red y			(0.319)		-	
	Green x			(0.276)		-	
	Green y			(0.599)		-	
	Blue x			(0.137)		-	
	Blue y			(0.101)		-	
	White x			(0.298)		-	
	White y			(0.334)		-	
NTSC	CIE1931		(68)	(70)	-	%	
Viewing Angle (CR≥10)	Horizontal	θ_{x+}	(80)	(85)	-	degree	(1),(2),(6),(7),(8)
		θ_{x-}	(80)	(85)	-		
	Vertical	θ_{y+}	(80)	(85)	-		
		θ_{y-}	(80)	(85)	-		

◆ Measurement System

Notes:

1. Contrast Ratio(CR) is defined mathematically as :

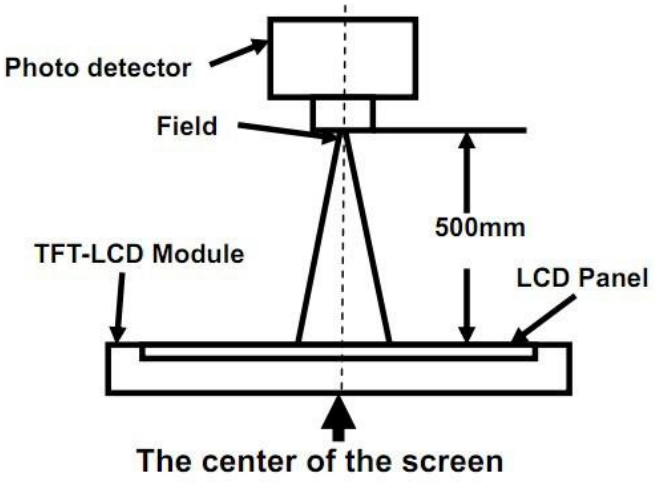
$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

2. Surface luminance is the center point across the LCD surface 500mm from the surface with all pixels displaying white. For more information see FIG 1.

3. Response time is the time required for the display to transition from white to black (Rising Time, Tr) and from black to white (Falling Time, Tf). For additional information see FIG 2.

4. Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG 3.

FIG. 1 Optical Characteristic Measurement Equipment and Method



Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°

FIG. 2 The definition of Response Time

The response time is defined as the following figure and shall be measured by switching the input signal for “black” and “white”.

Response Time = Rising Time(Tr) + Falling Time(Tf)

- Rising Time(Tr) : Full White 90% → Full White 10% Transmittance.
- Falling Time(Tf) : Full White 10% → Full White 90% Transmittance.

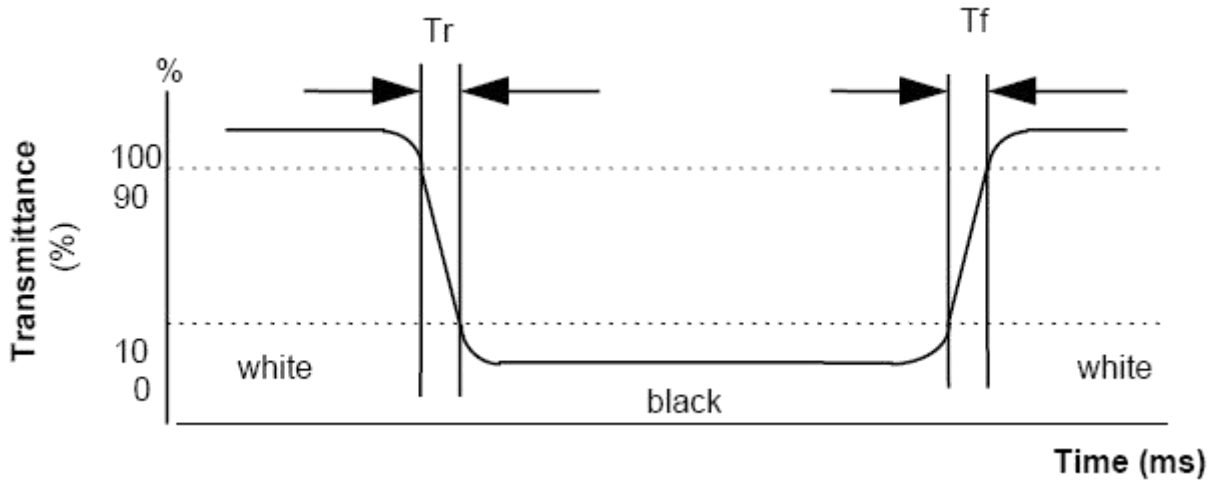
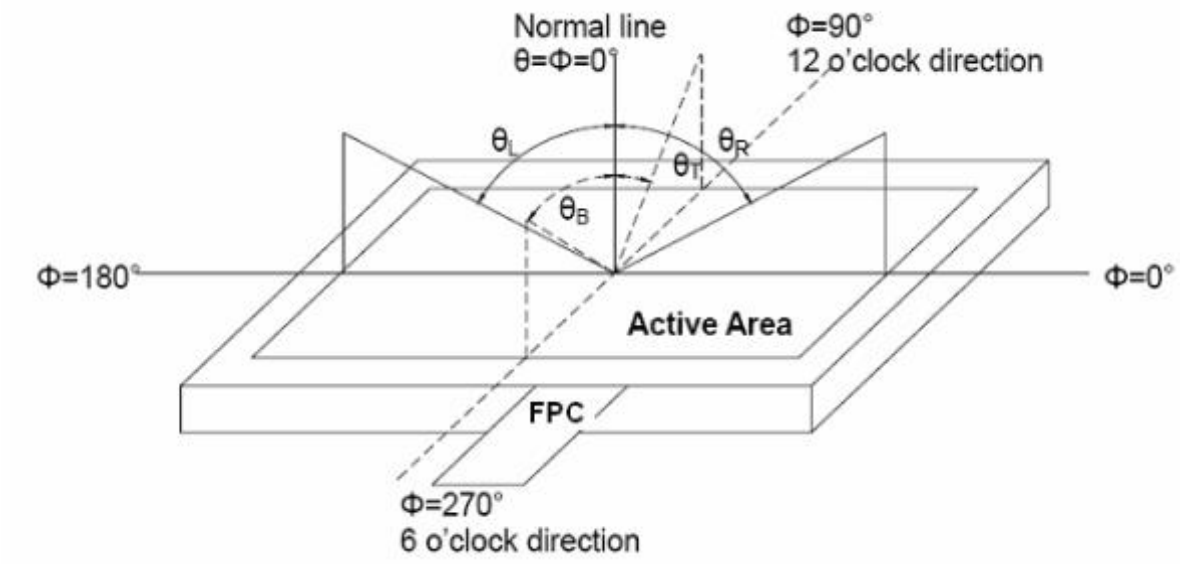
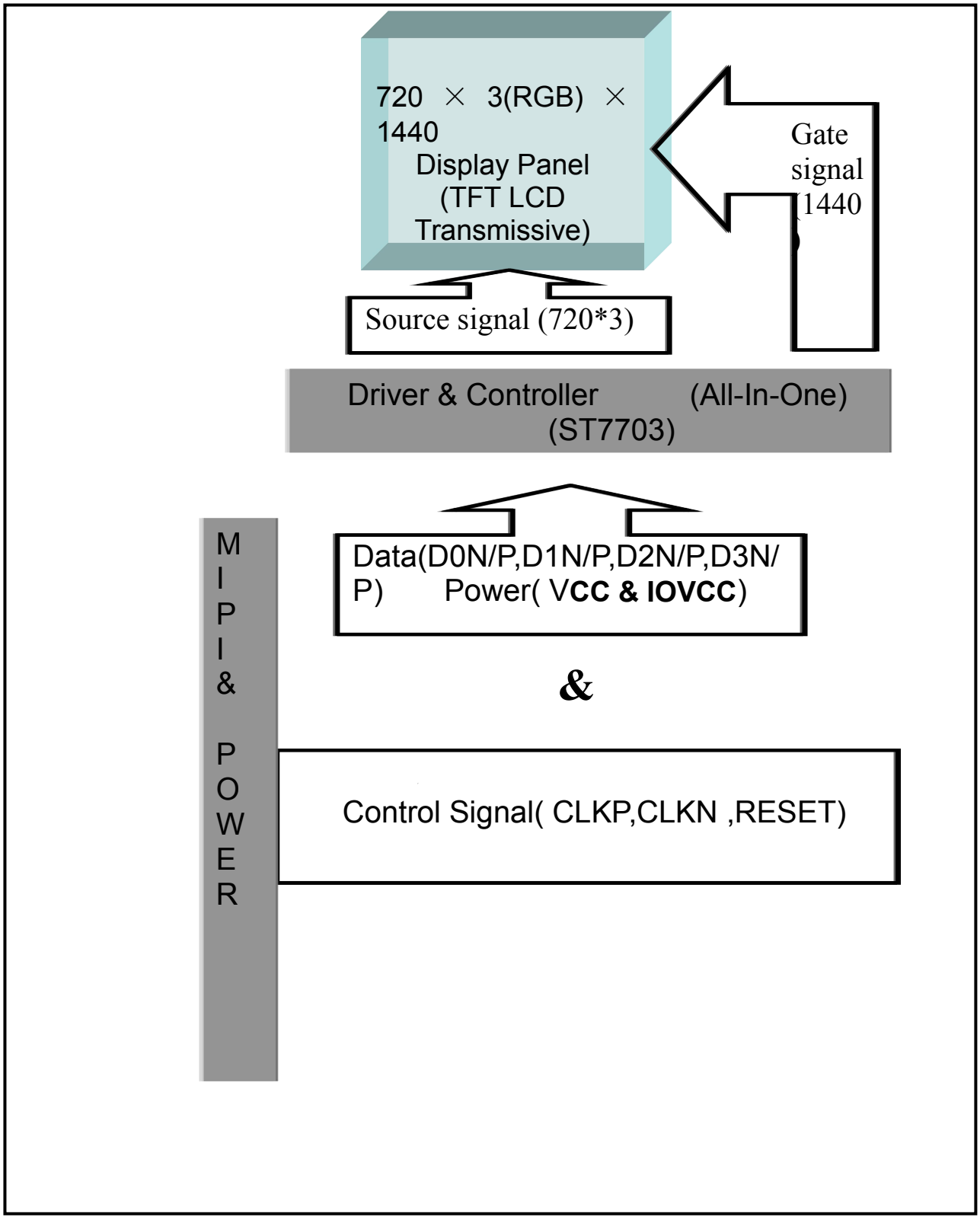


FIG. 3 The definition of Viewing Angle

Use Fig. 1(Test Procedure) under Measurement System to measure the contrast from the measuring direction specified by the conditions as the following figure.



5.Block Diagram



6.Pin Description

Item	Terminal	Functions
1-4	NC	NC
5-6	SPK-	Use by customer
7-8	SPK+	
9	GND	Ground
10	MIC-	Use by customer
11	MIC+	
12	NC	NC
13	IOVCC	Interface power supply:IOVCC=1.8V
14	VDD_2.8V	Logic power supply: VCC = 2.8V
15-16	NC	NC
17	RESET	Reset pin
18	TE	Tearing effect output pin to synchronize MCU to frame writing, activated by S/W command.
19	LCD-ID	
20	GND	Ground
21	D3P	Differential data pairs for MIPI interface.
22	D3N	Differential data pairs for MIPI interface.
23	GND	Ground
24	D1P	Differential data pairs for MIPI interface.
25	D1N	Differential data pairs for MIPI interface.
26	GND	Ground
27	CLKP	Differential clock or strobe pair for MIPI interfaces.
28	CLKN	Differential clock or strobe pair for MIPI interfaces.
29	GND	Ground
30	D0P	Differential data pairs for MIPI interface.
31	D0N	Differential data pairs for MIPI interface.
32	GND	Ground
33	D2P	Differential data pairs for MIPI interface.
34	D2N	Differential data pairs for MIPI interface.
35	GND	Ground
36	NC	NC
37	NC	NC
38	LEDK	B/L Power input PIN negative
39	LEDA	B/L Power input PIN anode

7.Timing Characteristics

7.1. High Speed Mode-Clock Channel Timing

High Speed Mode

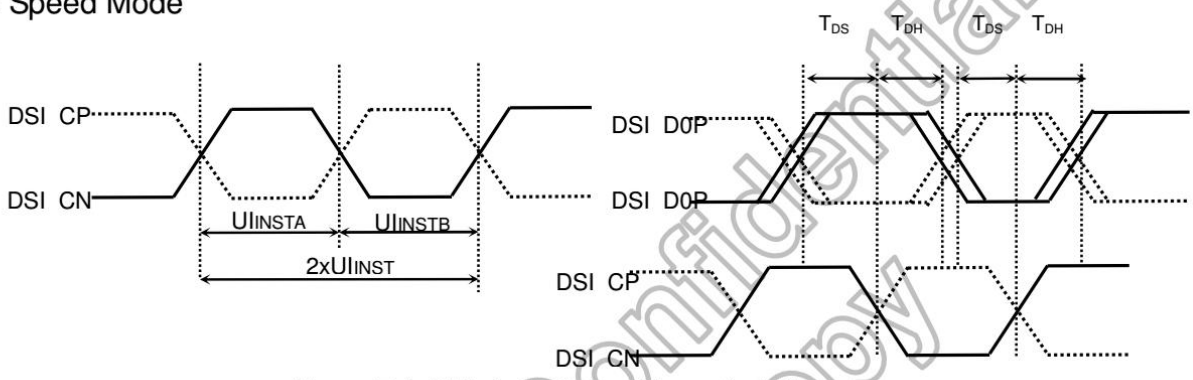


Figure 7.4: DSI clock timing Characteristics

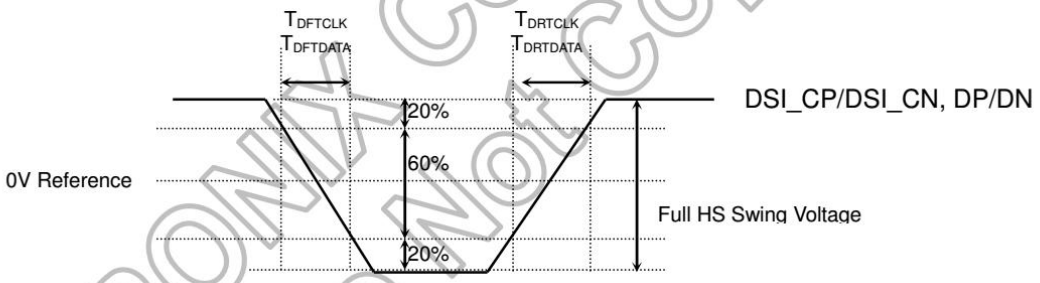


Figure 7.5: Rising and falling time on clock and data channel

(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.5V to 3.3V,T_A = -30 to 70°C)

Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_CP/ DSI_CN	Double UI instantaneous	$2xU_{INST}$	TBD	-	25	ns
	UI instantaneous	U_{INSTA} U_{INSTB}	TBD	-	12.5	ns
DP/DN	Data to clock setup time	T_{DS}	0.15xUI	-	-	ps
	Data to clock hold time	T_{DH}	0.15xUI	-	-	ps
DSI_CP/ DSI_CN	Differential rise time for clock	T_{DRTCLK}	150	-	0.3UI	ps
	Differential fall time for clock	T_{DFTCLK}	150	-	0.3UI	ps
DP/DN	Differential rise time for data	$T_{DRTDATA}$	150	-	0.3UI	ps
	Differential fall time for data	$T_{DFTDATA}$	150	-	0.3UI	ps

Table 7.3: DSI High Speed Mode Characteristics

7.2 Reset Operation

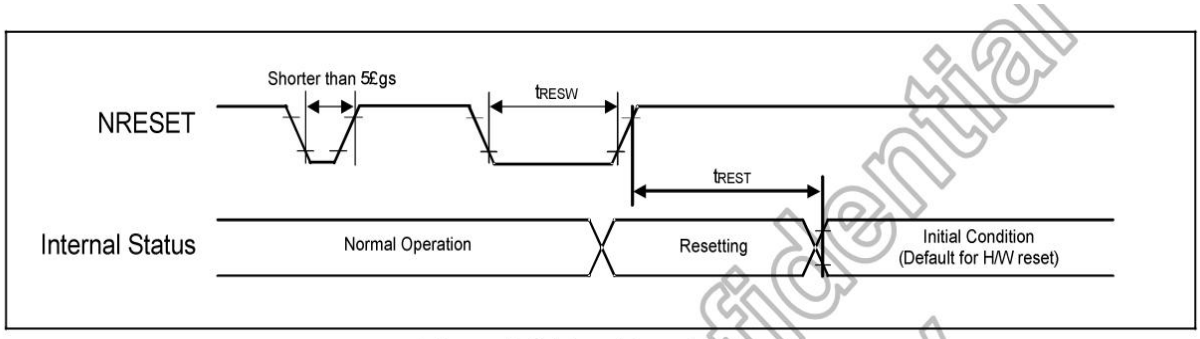


Figure 7.8: Reset input timing

Symbol	Parameter	Related Pins	Spec.			Note	Unit
			Min.	Typ.	Max.		
tRESW	Reset low pulse width(1)	NRESET	10	-	-	-	µs
tREST	Reset complete time(2)	-	15	-	-	When reset applied during SLPIN mode	ms
		-	120	-	-	When reset applied during SLPOUT mode	ms

Table 7.8: Reset Input Timing

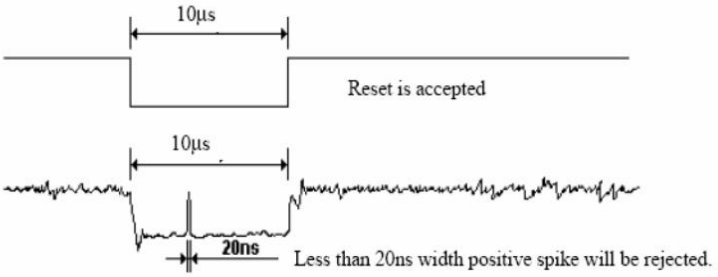
Note: (1) Spike due to an electrostatic discharge on NRESET line does not cause irregular system reset according to the following table.

NRESET Pulse	Action
Shorter than 5 µs	Reset Rejected
Longer than 10 µs	Reset
Between 5 µs and 10 µs	Reset Start

(2) During the resetting period, the display will be blanked (The display is entering blanking sequence, which Maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In –mode) and then return to Default condition for H/W reset.

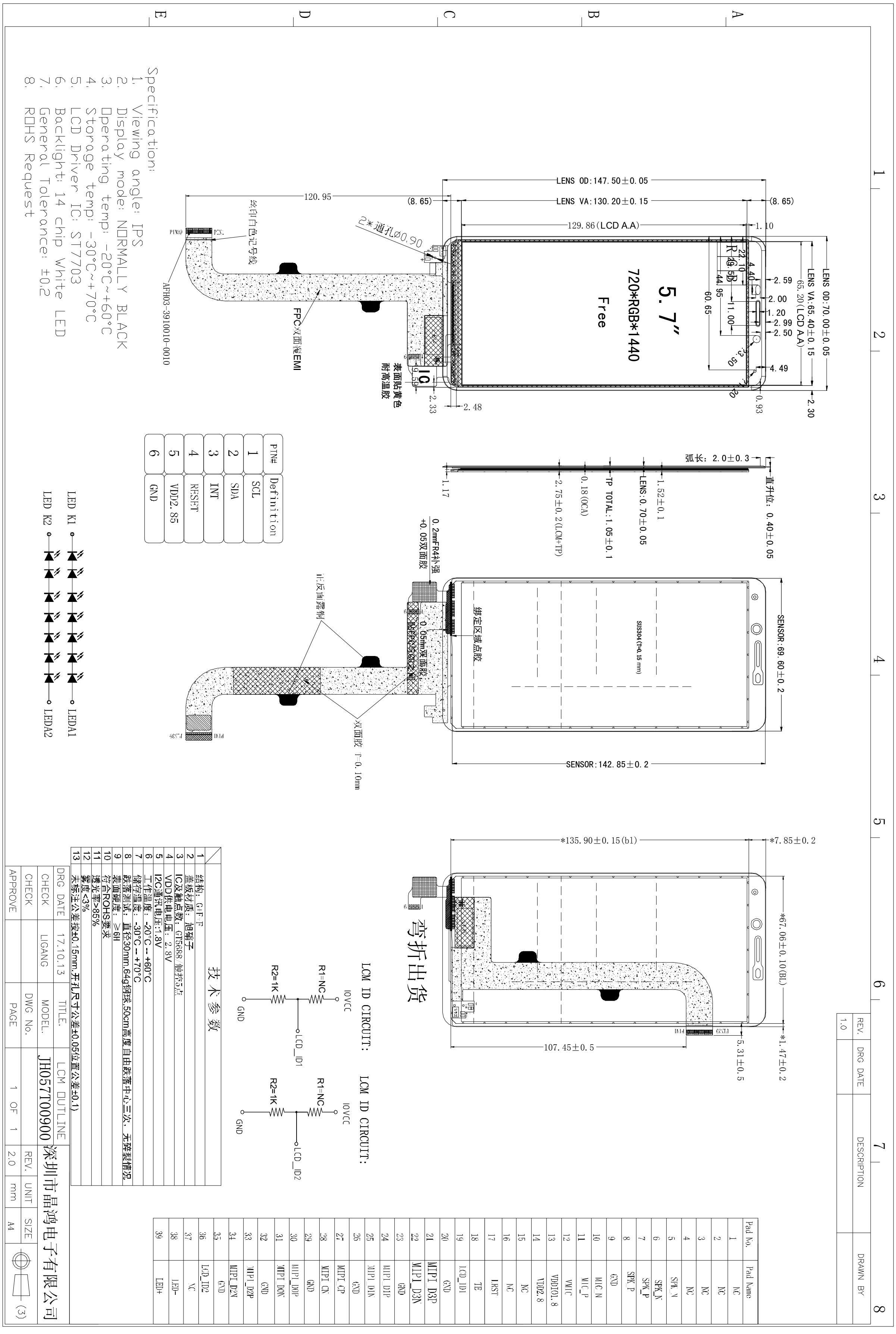
(3) During Reset Complete Time, ID and VCOM value in OTP will be latched to internal register during this period. This loading is done every time when there is H/W reset complete time (tREST) within 15ms after a rising edge of NRESET.

(4) Spike Rejection also applies during a valid reset pulse as shown as below:



(5) It is necessary to wait 15msec after releasing NRESET before sending commands. Also Sleep Out command cannot be sent for 120msec.

8.Outline Dimension



PIN#	Definition
1	SCL
2	SDA
3	INT
4	RESET
5	VDD2.85
6	GND

技术参数

1	结构: G+F F
2	盖板材质: 旭硝子
3	IC及触点数: GT5688 触摸5点
4	VDD供电电压: 2.8V
5	I2C通讯电压: 1.8V
6	工作温度: -20°C~+60°C
7	储存温度: -30°C~+70°C
8	跌落测试: 直径30mm,64g钢球,50cm高度自由跌落中心三次,无破裂情况
9	表面硬度: ≥6H
10	符合ROHS要求
11	透光率>85%
12	雾度<3%
13	未标注公差按±0.15mm,开孔尺寸公差±0.05/位置公差±0.1

Pad No.	Pad Name
1	NC
2	NC
3	NC
4	NC
5	SPK_N
6	SPK_N
7	SPK_P
8	SPK_P
9	GND
10	MIC_N
11	MIC_P
12	VMIC
13	VDDIO1.8
14	VDD2.8
15	NC
16	NC
17	LRST
18	TE
19	LCD_ID1
20	GND
21	MIPI_D3P
22	MIPI_D3N
23	GND
24	MIPI_D1P
25	MIPI_D1N
26	GND
27	MIPI_CP
28	MIPI_CN
29	GND
30	MIPI_D0P
31	MIPI_D0N
32	GND
33	MIPI_D2P
34	MIPI_D2N
35	GND
36	LCD_ID2
37	NC
38	LED-
39	LED+

DRG DATE	17.10.13	TITLE.	LCM OUTLINE
CHECK	LIGANG	DWG No.	JH057T00900
APPROVE		PAGE	1 OF 1
REV. 2.0	UNIT mm	SIZE A4	(3)

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9.Reliability and Inspection Standard

No.	Test Item		Test Conditions	Remark
1	High Temperature	Storage	70℃, 96Hr	Note
		Operation	60℃, 96Hr	Note
2	Low Temperature	Storage	-30℃, 96Hr	Note
		Operation	-20℃, 96Hr	
3	High Temperature and High Humidity		40℃, 90%RH, 96Hr	Note

Note:

1) The test samples should be applied to only one test item.
2) Sample size for each test item is 5~10pcs.

10.PRECAUTIONS FOR USING LCD MODULES

Handing Precautions

(1) The display panel is made of glass and polarizer. As glass is fragile, it tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring. Do not subject it to a mechanical shock by dropping it or impact.
(2) If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.
(3) Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary. Do not touch the display with bare hands. This will stain the display area and degraded insulation between terminals (some cosmetics are determined to the polarizer).
(4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully. Do not touch, push or rub the exposed polarizers with anything harder than an HB pencil lead (glass, tweezers, etc.). Do not put or attach anything on the display area to avoid leaving marks on. Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizer. After products are tested at low temperature they must be warmed up in a container before coming is contacting with room temperature air.
(5) If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten cloth with one of the following solvents
- Isopropyl alcohol
- Ethyl alcohol
Do not scrub hard to avoid damaging the display surface.
(6) Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.
- Water
- Ketone
- Aromatic solvents
Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading. Avoid contacting oil and fats.
(7) Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.
(8) Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.
(9) Do not attempt to disassemble or process the LCD module.
(10) NC terminal should be open. Do not connect anything.
(11) If the logic circuit power is off, do not apply the input signals.
(12) Since LCM has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the module or making any alterations or modifications to it.
- Do not alter, modify or change the shape of the tab on the metal frame.
- Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
- Do not damage or modify the pattern writing on the printed circuit board.
- Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal

connector.
- Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
- Do not drop, bend or twist LCM.

Storage Precautions

When storing the LCD modules, the following precaution is necessary.
(1) Store them in a sealed polyethylene bag. If properly sealed, there is no need for the dessicant.
(2) Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0°C and 35°C.
(3) The polarizer surface should not come in contact with any other objects. (We advise you to store them in the container in which they were shipped).

Others

Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.
If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.
To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.
- Exposed area of the printed circuit board.
-Terminal electrode sections.