LCM APPROVAL SHEET

Project No.	IE-F-2531CS05S-CB-1		
Customer			
Module No.			
Product type	Type : TFT LCD Display		
	Resolution : 240x240 Dots		
	Screen Size : 1.3 inch		
Signature by customer:			
Structure size:	☐ OK_____ ☐ NG_____		
Electric property:	☐ OK_____ ☐ NG_____		
Company	Designed by	Checked by	Approved by
Signature			
Rev.	Date	Description	
V0	2019-12-11	Preliminary Specification Release	

◇ LCD MODULE PHYSICAL DATA

◠ General Description

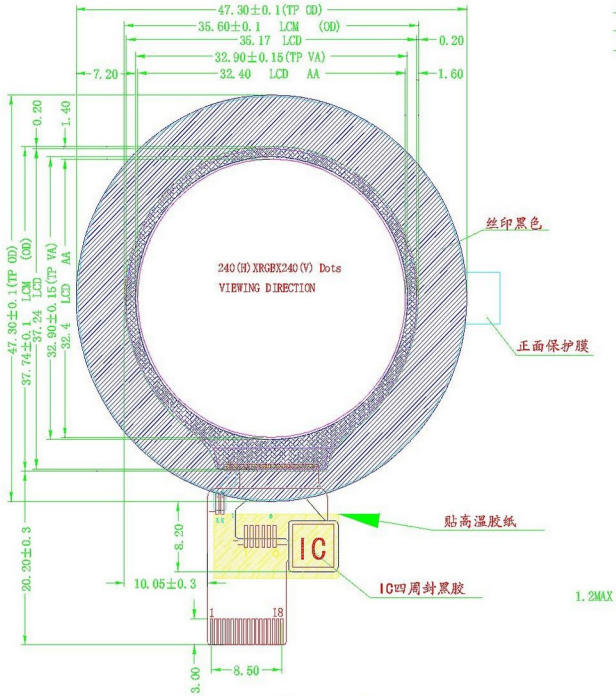
Item	Standard Value	Unit
LCD Type	Transmissive TFT , 262K color	---
Number of Dots	240 (RGB) X240	---
Viewing Direction	ALL	o'clock
LCM Outline Dimension	47.30(W)X47.30(H) X3.05(T)	mm
Active area	32.4(W) X32.4 (H)	mm
Operating temperature	-20℃~70℃	---
Storage temperature	-30℃~80℃	---
Driving IC	GC9A01	---
CTP IC	CHSC6413	
Approx. weight	TBD	g

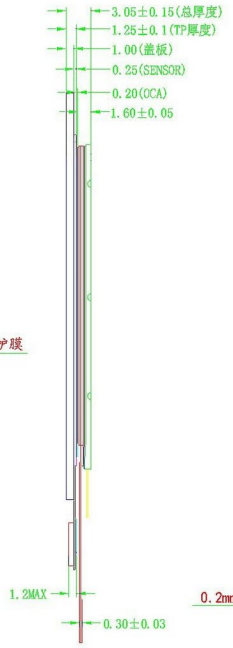
◠ The backlight electrical-optical characteristics

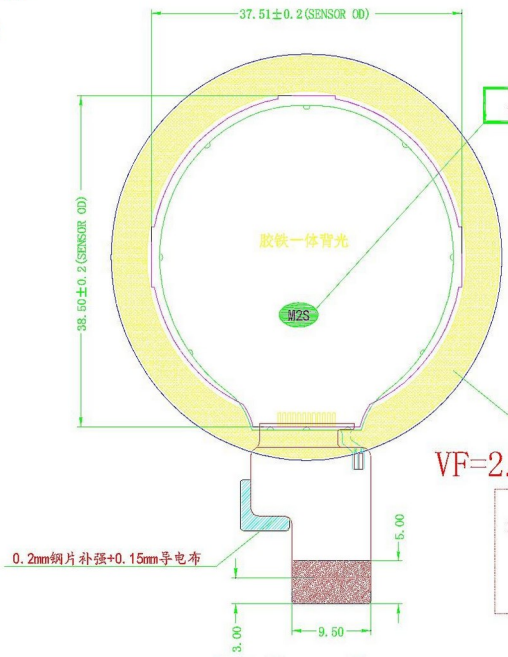
Item	Symbol	Min	Typ	Max	Unit	Unit
Forward voltage	Vf	2.9	3.0	3.1	V	If=40mA/Ta=25℃
Uniformity	△Bp	80			%	
Luminance for BL	Lv	550	600		Cd/mˆ2	If=40mA/Ta=25℃

项次	版别	日 期	变 更 内 容
01	0/D	2021.07.07	

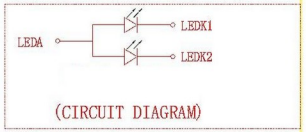
PIN	
1	LEDA
2	LEDK
3	GND
4	TP-VCC
5	TP-RST
6	TP-INT
7	TP-SDA
8	TP-SCL
9	GND
10	TE
11	SDA
12	WR/A0
13	SCL
14	CS
15	RESET
16	IOVCC
17	VCC
18	GND







VF=2.9-3.1V IF=40MA



(CIRCUIT DIAGRAM)

PIN#	Assignment
1	VDD(3.3V)
2	RST
3	INT
4	SDA(3.3V)
5	SCL(3.3V)
6	GND

TP NOTES:
1. 结构G+F, IC: (COF) CHSC6413
2. 工作电压:2.8V-3.3V
3. 盖板: 1.0mm 玻璃
4. 表面硬度:≥4H
5. 透光率:≥84%
6. 工作环境:-10℃~+60℃, ≤90%RH
7. 储存环境:-20℃~+70℃, ≤90%RH
8. 未注尺寸公差按±0.2mm

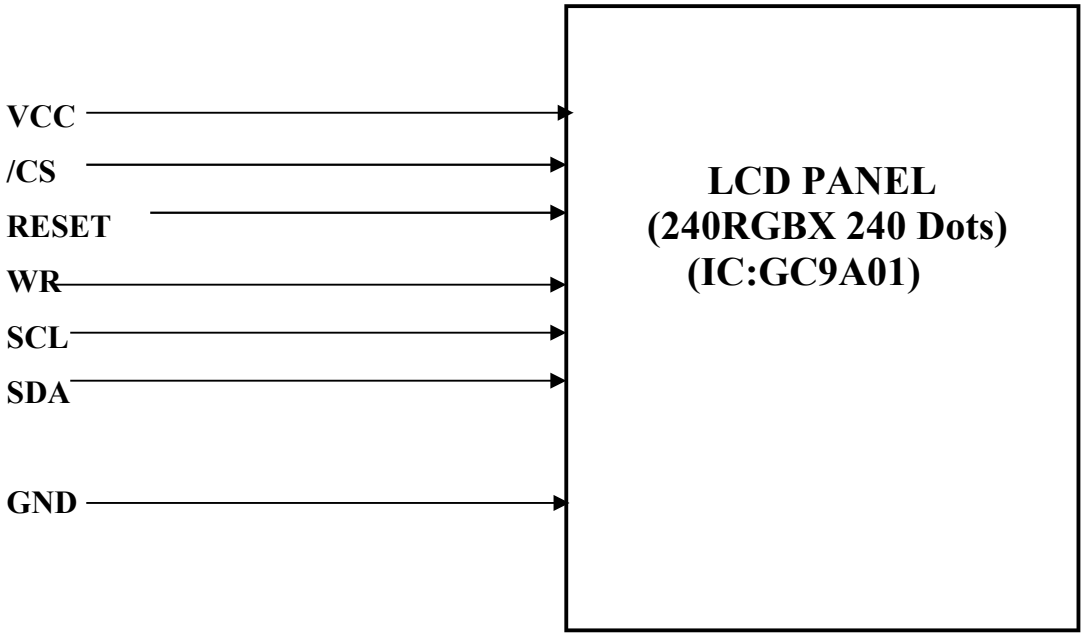
LCM NOTES:
1. DISPLAY TYPE:
   Main LCD: 1.28" TFT, WIDE VIEW DIRECTION
2. OPERATING TEMP: -20℃--70℃
3. STORAGE TEMP: -30℃--80℃
4. MAIN LCD DRIVER: GC9A01 or Equivalent
5. BACKLIGHT: 2CHIP-WHITE LED, Parallel connection
6. 产品满足ROHS要求
7. GENERAL TOLERANCE: ±0.2

GENERAL TOLERANCE	
DIM.	TOL.
0 ~ 5	±0.10
6 ~ 15	±0.12
16 ~ 50	±0.15
51 ~ 250	±0.20
HOLES	±0.10
ANGLE	±0.5°

Project		SCALE: N.T.S		TITLE:	TP DRAWING
		UNIT: mm			
	DRAWING	CHECK	APPROVE	FILE NAME:	
NAME:	Jason			FILE NO.:	
DATE:	2021.07.07			PART NO.:	

REV:	0/D
SHEET:	1/1

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Operating temperature	Top	-20-70	℃
Storage temperature	Tst	-30-80	℃
Input voltage	Vin	-0.3-4.6	V
Supply voltage for logic	VCC	-0.3-4.6	V
Driver supply voltage	VGH - VGL	0-30.0	V

NOTE:

1. If the module is used above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.
2. VCC>GND must be maintained.

ELECTRICAL CHARACTERISTICS

DC Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
Input high voltage	V_{IH}	-	0.7IOVCC	-	IOVCC	V
Input low voltage	V_{IL}	-	0	-	0.3IOVCC	V
Voltage for logic	VCC	Ta=25℃	2.5	2.8	3.3	V
Voltage for analog	VCI	Ta=25℃	2.5	2.8	3.3	V
Voltage for I/O	IOVCC	Ta=25℃	1.65	1.8/2.8	3.3	V
Output high voltage	VOH		0.8IOVCC	-	IOVCC	V
Output low voltage	VOL		0		0.2IOVCC	V
Current consumption for LCD normal operation	I_{DD}	V_{DD} = 2.8	-	TBD		Ma

AC Characteristics

Refer to the SPEC of : GC9A01

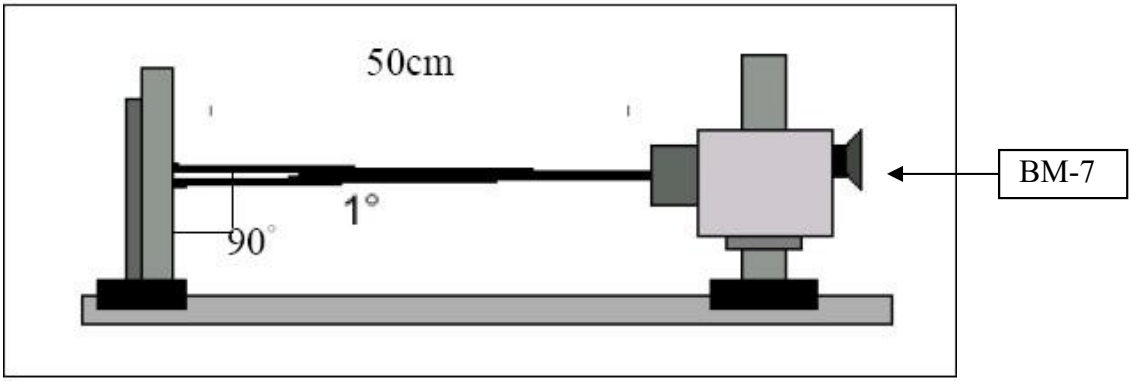
ELECTRO-OPTICAL CHARACTERISTICS

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Response time	Tr+Tf	Θ=0°; Φ=0°;	-	35	50	ms	Note4
Contrast ratio	Cr		900	1100	-	-	Note3
Luminance uniformity	δ WHITE		80	90	-	%	Note7
Surface luminance	Lv			380		cd/㎡	Note6
View angle range (with polarizer)	Top	CR≥10	-	80	-	Degree	Note5
	Bottom		-	80	-		
	Left		-	80	-		
	Right		-	80	-		
CIE (X, Y)	Rx	Θ=0°	0.637	0.657	0.677	-	Note8
	Ry		0.300	0.320	0.340		
	Gx		0.267	0.287	0.307		
	Gy		0.571	0.591	0.611		
	Bx		0.120	0.140	0.160		
	By		0.060	0.080	0.100		
	Wx		0.290	0.310	0.330		
	Wy		0.307	0.327	0.347		

Note 1: Ambient temperature = 25 ± 2 ℃;

Note 2: To be measured in the dark room;

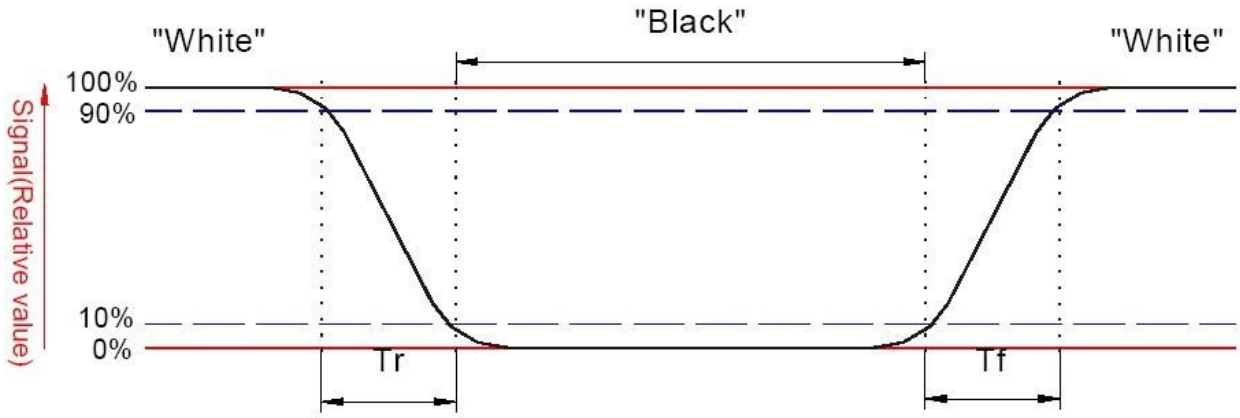
Note 3: To be measured at the center area of the panel with a view cone of 1° by BM-7, after 10 minutes operation (module).



FLG1

Note 4: Define the response time:

The output signals of photo detector are measured when the input signals are charged from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



FLG2

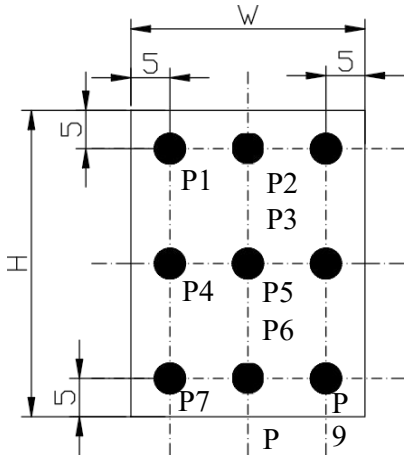
Note 5: Contrast Ratio (CR) is defined mathematically as For more information from FLG3 Contrast Ratio= Average surface luminance with all white pixel (P1,P2,P3,P4,P5,P6,P7,P8,P9) / Average surface luminance with all black pixel (P1,P2,P3,P4,P5,P6,P7,P8,P9)

Note 6: Surface luminance is the center point across the LCD surface 500mm from the surface with all pixel displaying white, For more information see the FLG3
Lv= Average Surface luminance with all white pixel(P1,P2,P3,P4,P5,P6,P7,P8,P9)

Note 7: The uniformity in surface luminance, δ white is determined by measuring luminance at each test position 1to 5, and then dividing the maximum luminance of 5 points luminance by minimum luminance of 5 points luminance. For more information see FLG3.

δ WHITE= Minimum surface luminance with all white pixel(P1,P2,P3,P4,P5,P6,P7,P8,P9) / Maximum surface luminance with all white pixel(P1,P2,P3,P4,P5,P6,P7,P8,P9)

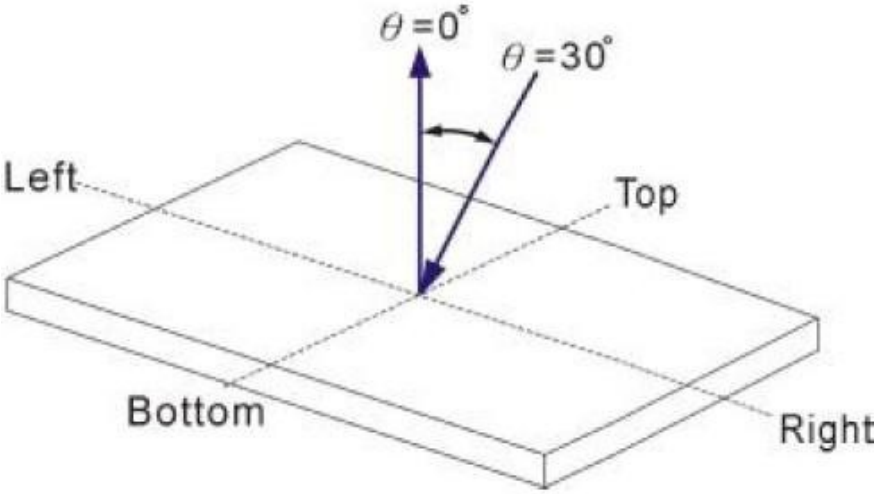
Note 8: CIE(X, Y), the X, Y value is determined by measuring luminance at each test position 1 to 5, and then make average value. For more information see FLG3



FLG3

H,V: Active area
Light source spot size: Φ=2.0mm
Measure device: BM-7

Note 9: Viewing angle is the angle at which the contrast ratio is greater than 2, TFT module 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 the FLG 4.



FLG4

INTERFACE PIN CONNECTIONS

NO.	Symbol	Level	Function
1	LEDA		LED, anode.
2	LEDK		LED, cathode.
3	GND		Ground
4	TP-VCC		Power setting
5	TP-RESET		TP RESET PIN
6	TP-INT		TP INT
7	TP-SDA		TP SDA
8	TP-SCL		TP SCL
9	GND		Ground
10	TE		TE
11	SDA		SPI interface input/output pin.
12	WR/A0		command selection pin in 4-line serial interface
13	SCL		This pin is used to be serial interface clock
14	CS		-Chip selection pin
15	RESET		Reset signal.
16	IOVCC	1.8V	Power supply for digital interface
17	VDD	2.8V(typ)	Power supply.
18	GND		Ground

RELIABILITY

NO	Test Item	Description	Test Condition
1	High temperature storage	Endurance test applying the high storage temperature for a long time	80℃,200 H
2	Low temperature storage	Endurance test applying the low storage temperature for a long time	-30℃,200H
3	High temperature operation	Endurance test applying the electric stress under high temperature for a long time	70℃,120H
4	Low temperature operation	Endurance test applying the electric stress under low temperature for a long time	-20℃,120H
5	High temperature /humidity storage	Endurance test applying the high temperature and high humidity storage for a long time	50℃, 90% R.H 200H
6	High temperature /humidity operation	Endurance test applying electric stress under high temperature and high humidity for a long time	40℃ 90% R.H 96H
7	Temperature Cycle	Endurance test applying the low and high temperature cycle -20℃ → 25℃ → 70℃ →25℃ 30min 5min 30min 5min one cycle	-20℃/70℃ 10 cycles
8	Vibration test	Endurance test applying the vibration during transportation and using	Frequency:10Hz~55Hz~10Hz Amplitude:1.5mm X,Y,Z direction for total 3hours (parking condition)
9	Fall test	Endurance test dropping the LCM from a high place	600mm height
10	Static electricity test	Endurance test applying static electric stress to terminal	Air discharge 10 times R=330Ω, C=150pF. ±8KV **Remark**: if malfunction can be recovered to normal state after reset or power on, it wil be judged to be a good part