



DM-TFTR128-446

1.28" 240 X 240 TFT ROUND
DISPLAY MODULE-SPI

Contents

- 1 Revision History
- 2 Main Features
- 3 Pin Description
- 4 Mechanical Drawing
- 5 Optics & Electrical Characteristics
 - 5.1 Optics Characteristics
 - 5.2 Absolute Maximum Ratings
 - 5.3 Operating Conditions
 - 5.4 Backlight Unit
 - 5.5 AC Characteristics
 - 5.5.1 5 AC Timing Characteristic of The LCD
- 6 Reliability
- 7 Warranty and Conditions

1 Revision History

Date	Changes
2022-6-30	First release

2 Main Features

Item	Specification	Unit
Diagonal Size	1.28	inch
Resolution	240 RGB x 240	pixel
Dot pitch	0.135(H) x 0.135(V)	mm
Drive IC	GC9A01	-
Interface	4 Line SPI	-
Active Area	32.4 x 32.4	mm
Module Dimension	35.6(H) x 38.1(V) x 1.5(D)	mm
Luminance	400	Cd/m ²
View angle	ALL	-
Backlight	2 LED Parallel	
Operating Temp	-20°C ~ +70°C	°C
Storage Temp	-30°C ~ +80°C	°C
Weight	TBD	g

3 Pin Description

Pin No.	Symbol	Function Description
1	GND	Power Ground
2	LEDK	LED Cathode
3	LEDA	LED Anode
4	VDD	Power Supply for Analog
5	GND	Power Ground
6	GND	Power Ground
7	D/C	Display data/command selection pin in 4-line serial interface
8	CS	Chip selection pin, Low enable, high disable
9	SCL	This pin is used to be serial interface clock
10	SDA	SPI interface input/output pin. the data is latched on the rising edge of the SCL signal
11	RESET	This signal will reset the device and it must be applied to properly initialize the chip. Signal is active low
12	GND	Power Ground

4 Mechanical Drawing

Item A	Date 20190710	Remark Original Drawing
-----------	------------------	----------------------------

PIN	DESCRIPTION
1	GND
2	LEDK
3	LEDA
4	VDD
5	GND
6	GND
7	D/C
8	CS
9	SCL
10	SDA
11	RESET
12	GND

4线SPI
FPC弯折示意图
FPC展开出货

FPC弯折突出背光胶框
背光胶框处高度(H=0.45MAX)
请注意机壳避空

$I_f = 40\text{mA}$ $V_f = 2.9 \sim 3.1\text{V}$

NOTES:

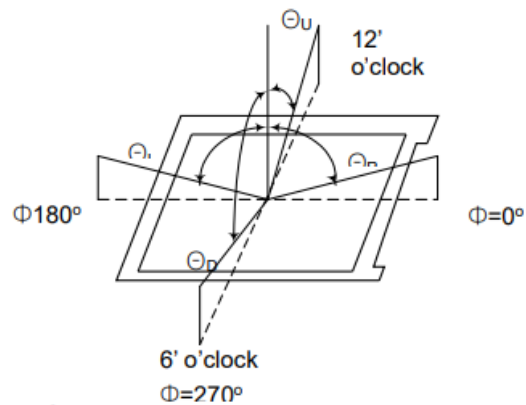
1. DISPLAY TYPE: 1.28" TFT
2. VIEWING DIRECTION: ALL
3. POLARIZER MODE: TRANSMISSIVE/NORMALLY BLACK
4. DRIVER IC: GC9A01
5. OPERATING TEMP.: -20° C~70° C
6. STORAGE TEMP.: -30° C~80° C
7. BACK LIGHT: 2 CHIP-WHITE LED
8. LCM Luminance: 400 CD/M2 (TYP)
9. UNMARKED TOLERANCE: ±0.2
10. 建议机壳开窗可视区比 LCD A, A区单边大 0.3mm
11. 产品符合ROHS标准

5 Optics & Electrical Characteristics

5.1 Optics Characteristics

Item	Symbol	Min	Typ	Max	Unit	Remark
View Angles TOP	Θ_U	80	85	-	deg	Note1
View Angles Bottom	Θ_D	80	85	-	deg	
View Angles Right	Θ_R	80	85	-	deg	
View Angles Left	Θ_L	80	85	-	deg	
C.I.E(Red)	(x) (y)	-0.02	0.644 0.333	+0.02	-	BM-7A
C.I.E(Green)	(x) (y)		0.325 0.566		-	
C.I.E(Blue)	(x) (y)		0.134 0.124		-	
C.I.E(White)	(x) (y)		0.324 0.347		-	
Response Time	$T_R + T_F$	-	30	35	ms	Note3
Contrast Ratio	CR	900	1100	-	--	Note2

Note 1 Definition of Viewing Angle:

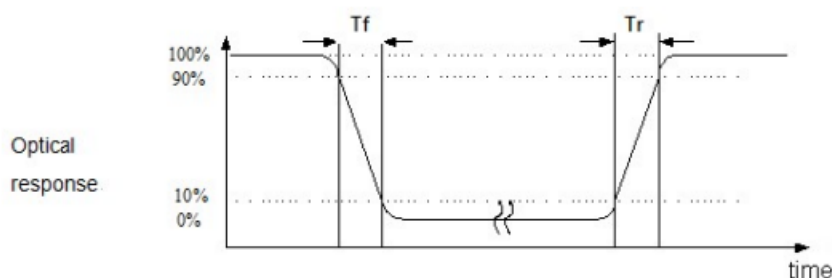


Note 2 Definition of Contrast Ratio (CR) :

measured at the center point of panel

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

Note 3 Definition of Response Time : Sum of T_r and T_f :



5.2 Absolute Maximum Ratings

Item	Symbol	Min	Max	Unit
Supply Voltage	VDD	-0.3	4.0	V
Analog Supply Voltage	VDDIO	-0.3	4.0	V
Logic Input Voltage	VIN	-0.3	VDDIO+0.5	V
Operating Temperature	T _{OP}	-20	+70	°C
Storage Temperature	T _{ST}	-30	80	°C

5.3 Operating Conditions

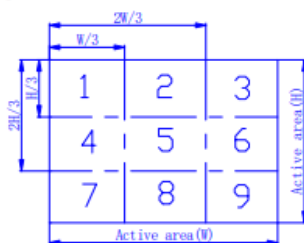
Item	Symbol	Min	Typ	Max	Unit
System Voltage	VDD	2.4	2.8	3.3	V
Interface Operation Voltage	VDDIO	1.65	1.8	3.3	V
Gate Driver High Voltage	VGH	8	--	16.5	V
Gate Driver Low Voltage	V _{GL}	-10	-	-5	V
Operating Current for VDD	I _{DD}	-	8	10	mA
Sleep_In Mode VDD	I _{dd}	-	15	30	uA
Sleep_In Mode VDDIO	I _{ddio}	-	5	10	uA

5.4 Backlight Unit

Item	Symbol	Min	Typ	Max	Unit	Remark
Voltage for LED backlight	VLED	2.9	3.0	3.1	V	
Current for LED backlight	ILED	-	40	60	mA	2 LED Parallel
Power Consumption	Pbl	-	120	186	mW	1
Brightness	Lbr	350	400	-	cd/m ²	2
LED Life time	-	20000	-	-	hr	3

Note:

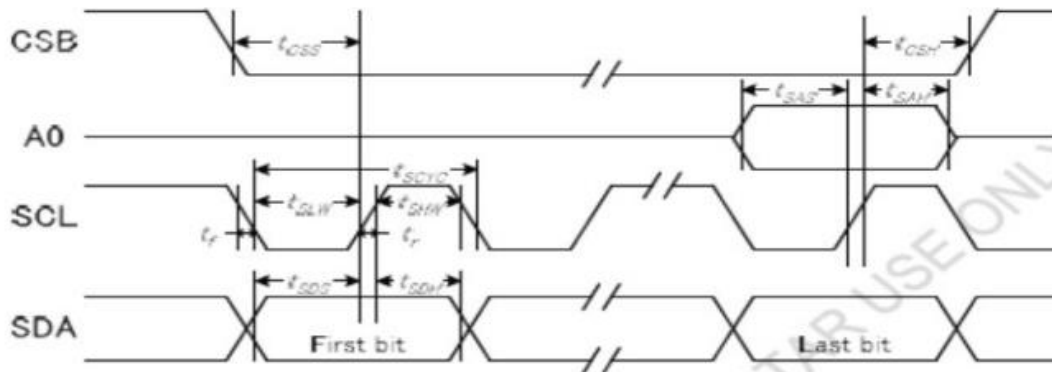
- Where ILED =40mA , VLED=3.0V , Pbl= ILED x VLED
- Uniform measure condition:
 - Measure 9 point, Measure location is show below:
 - Uniform=(Min brightness/Max.brightness)x100%
 - Best Contrast.



- The environmental conducted under ambient air flow ,at Ta=25±2°C,60%RH±5%

5.5 AC Characteristics

5.5.1 5 AC Timing Characteristic of The LCD



Item	Signal	Symbol	Condition	Min.	Max.	Unit
Serial clock period	SCL	tSCYC		30	—	ns
SCLK "H" pulse width		tSHW		15	—	
SCLK "L" pulse width		tSLW		15	—	
Address setup time	A0	tSAS		10	—	
Address hold time		tSAH		10	—	
Data setup time	SDA	tSDS		10	—	
Data hold time		tSDH		10	—	
CSB-SCLK time	CSB	tCSS		10	—	
CSB-SCLK time		tCSH		10	—	

Note:

1. The input signal rise and fall time (t_r , t_f) are specified at 15 ns or less.
2. All timing is specified using 20% and 80% of VDDI as the standard.

6 Reliability

Test Item	Content of Test	Test Condition	Note
High Temperature Storage	Endurance test applying the high storage temperature for a long time.	90°C 96hrs	2
Low Temperature Storage	Endurance test applying the high storage temperature for a long time.	-40°C 96hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	85°C 96hrs	-
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-30°C 96hrs	1
High Temperature/	The module should be allowed to stand at	60°C,90%RH	1,2

Humidity Operation	60°C,90%RH max, for 96hrs under no-load condition excluding the polarizer. Then taking it out and drying it at normal temperature.	96hrs	
Thermal Shock Resistance	The sample should be allowed stand the following 10 cycles of operation.	-30°C/85°C 20 cycles	-
Vibration Test	Endurance test applying the vibration during transportation and using.	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55 Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package condition).	3
Static Electricity Test	Endurance test apply the electric stress to the terminal.	C=150pF, R=330,5points /panel Air:±8KV, 5times; Contact:±6KV, 5 times; (Environment: 15°C~35°C, 30%~60%).	-

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal. Temperature and humidity after remove from the rest chamber.

Note3: Test performed on product itself, not inside a container

7 Warranty and Conditions

<http://www.displaymodule.com/pages/faq>