PRODUCT SPECIFICATIONS

TNS-G240128FGDSY-3W

Ⅰ.General Specifications

1.The Features

(1). Low power consumption 3.0V power supply

(2). 1/128 duty,1/12 bias

(3). Viewing direction: 6:00

(4). Operating tempration: -20~70℃

(5). Storage tempration: -30~80℃

(6). Display type: FSTN , Positive

2.Mechanical Data and Conditions:

(1) Number of Characters---------- 240 Dots * 128 Dots Graphic LCD Module

(2) Module Size----------154.70 w * 129.68 h mm

(3) Viewing Area ---------- 114.98 w * 63.58 h mm

(4) Dot Size ----------0.43 w * 0.43 h mm

(5) Dot Pitch ----------0.45 w * 0.45 h mm

(6) Outline Dimensions----------See Attached Drawing

3. Absolute Maximum Ratings

Symbol	Parameter	Min.	Max.	Unit
V_{DD}	Logic Supply voltage	-0.3	+4.0	V
V_{DD2}	LCD Generator Supply voltage	-0.3	+4.0	V
V_{DD3}	Analog Circuit Supply voltage	-0.3	+4.0	V
$V_{DD2/3}$-V_{DD}	Voltage difference between V_{DD} and $V_{DD2/3}$	--	1.6	V
V_{LCD}	LCD Generated voltage (-30°C ~ +80°C)	-0.3	+17.0	V
V_{IN}	Any input voltage	-0.4	V_{DD} + 0.5	V

4. Pin Connections:

Pin No.	Symbol	Function
1	RESB	Reset signal
2	CSB	Chip select signal
3	RS	Control/data select signal

4	WRB	Signal to select write
5	RDB	Signal to select read
6-13	D0-D7	Data bit
14	VDD	Power supply for logic
15	VSS	Groud
16	VLCD	No connect
17	NC	No connect
18	VOUT	No connect
19,20	LED+\-	LED BACKLIGHT

5.

AC CHARACTERISTICS

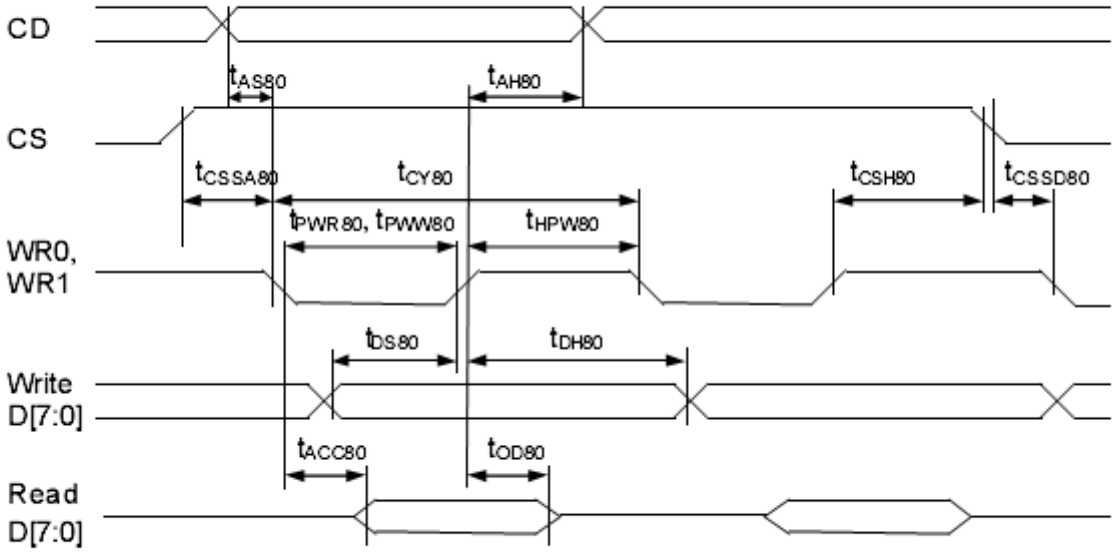


FIGURE 15: Parallel Bus Timing Characteristics (for 8080 MCU)

($2.7V \leq V_{DD} < 3.3V$, Ta= −30 to +85°C)

Symbol	Signal	Description	Condition	Min.	Max.	Units
t_{AS80} t_{AH80}	CD	Address setup time Address hold time		0 20	–	nS
t_{CY80}		System cycle time 8 bits bus (read) (write) 4 bits bus (read) (write)		 140 140 140 140	–	nS
t_{PWR80}	WR1	Pulse width 8 bits (read) 4 bits		65 65	–	nS
t_{PWW80}	WR0	Pulse width 8 bits (write) 4 bits		35 35	–	nS
t_{HPW80}	WR0, WR1	High pulse width 8 bits bus (read) (write) 4 bits bus (read) (write)		 65 35 65 35	–	nS
t_{DS80} t_{DH80}	D0~D7	Data setup time Data hold time		30 20	–	nS
t_{ACC80} t_{OD80}		Read access time Output disable time	C_L = 100pF	– 12	60 20	nS
t_{SSA80} t_{CSSD80} t_{CSH80}	CS1/CS0	Chip select setup time		10 10 20		nS

2.The Characteristics and The Reliability Test

1.Electro-Optic Characteristics:

Condition:TEMP=(23±3)℃ Hum=(70±5)%RH

V_{dd}: 5.0V

NO	Item		Symbol	Min	Typ.	Max	Unit	Condition
1	Supply Voltage(Logic)		Vdd-Vss		3.0		V	
2	Supply Current (Logic)		Idd		1.63		mA	Vdd=3V
4	LCD Operating Voltage		Vdd-V_0		15.4		V	-20℃
					15		V	25℃
					14.6		V	80℃
5	Response Time		Ton		84		ms	
			Toff		484		ms	
6	Contrast		CR	3				
7	Viewing Angel	12H	θ 1		47		Deg.	(CR≥ 3.0)
		6H	θ 2		56			
		3H	θ 3		50			
		9H	θ 4		50			

8	LCD Threshold Voltage	Vth		13.2		V	25℃

2. Characteristics of backlight (LED unit)

(1).Absolute Maximum Ratings:

Item	Symbol	Rating	Unit	Condition
Forward Current	IFM	· 200	mA	Ta=25℃
Reverse Voltage	VR	5.0	V	Ta=25℃
Power Dissipation	PD	500	mW	Ta=25℃

(2).Electrical-optical Characteristics:

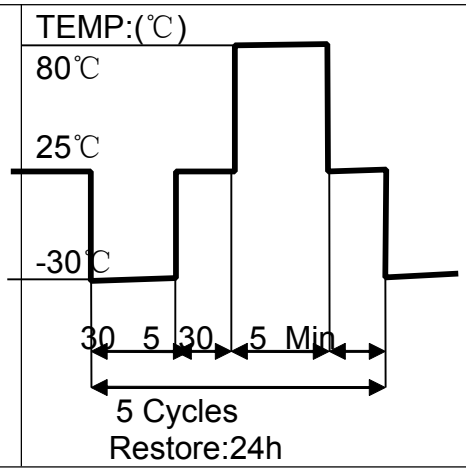
Item	Symbol	Min	Typ	Max	Unit	Condition
Forward Voltage	VF	1.7	1.9	2.1	V	IF=100mA
Reverse current Voltage	IR		100	500	uA	VR=5V
Color	YELLOW-GREEN					

WARNING:

A BACKLIGHT IS A KIND OF CURRENT DEVICE,IT MUST CONNECT A RESISTANCE FOR LIMITING CURRENT ,OR IT WILL BE DAMAGED.

3.Reliability Test

No	Items	Test Condition	Equipment	Test Result
1	High TEMP Storage	TEMP:80±2℃ Time: 96h Restore:24h	Tenny	Passed
2	Low TEMP Storage	TEMP: -30±3℃ Time: 96h Restore:24h	Tenny	Passed
3	High TEMP Operating	TEMP:70±2℃ Vop: 5V Timp: 24h Restore:24h	Tenny	Passed
4	Low TEMP Operating	TEMP:-20±2℃ Vop: 5V Timp: 24h Restore:24h	Tenny	Passed
5	High TEMP High Hum Storage	TEMP:40±2℃ Hum: 95%Rh Time: 96h Restore:24h	Tenny	Passed

6	Thermal Shock		Tenny	Passed

3.Instruction Sets

COMMAND TABLE

The following is a list of host commands supported by UC1608

C/D: 0: Control, 1: Data
W/R: 0: Write Cycle, 1: Read Cycle
Useful Data bits
– Don't Care

	Command	C/D	W/R	D7	D6	D5	D4	D3	D2	D1	D0	Action	Default
1	Write Data Byte	1	0	#	#	#	#	#	#	#	#	Write 1 byte	N/A
2	Read Data Byte	1	1	#	#	#	#	#	#	#	#	Read 1 byte	N/A
3	Get Status	0	1	BZ	MX	DE	RS	WA	GN1	GN0	1	Get Status	N/A
4	Set Column Address LSB	0	0	0	0	0	0	#	#	#	#	Set CA[3:0]	0
	Set Column Address MSB	0	0	0	0	0	1	#	#	#	#	Set CA[7:4]	0
5	Set Mux Rate and temperature compensation.	0	0	0	0	1	0	0	#	#	#	Set {MR, TC[1:0]}	MR: 1b TC: 00b
6	Set Power Control	0	0	0	0	1	0	1	#	#	#	Set PC[2:0]	101b
7	Set Adv. Program Control. (double byte command)	0	0	0	0	1	1	0	0	0	R	For UltraChip only. Do not use.	N/A
		0	0	#	#	#	#	#	#	#	#		
8	Set Start Line	0	0	0	1	#	#	#	#	#	#	Set SL[5:0]	0
9	Set Gain and Potentiometer (double-byte command)	0	0	1	0	0	0	0	0	0	1	Set {GN[1:0], PM[5:0]}	GN=3 PM=0
		0	0	#	#	#	#	#	#	#	#		
10	Set RAM Address Control	0	0	1	0	0	0	1	#	#	#	Set AC[2:0]	001b
11	Set All-Pixel-ON	0	0	1	0	1	0	0	1	0	#	Set DC[1]	0=disable
12	Set Inverse Display	0	0	1	0	1	0	0	1	1	#	Set DC[0]	0=disable
13	Set Display Enable	0	0	1	0	1	0	1	1	1	#	Set DC[2]	0=disable
14	Set Fixed Lines	0	0	1	0	0	1	#	#	#	#	Set FL[3:0]	0
15	Set Page Address	0	0	1	0	1	1	#	#	#	#	Set PA[3:0]	0
16	Set LCD Mapping Control	0	0	1	1	0	0	#	#	#	#	Set LC[3:0]	0
17	System Reset	0	0	1	1	1	0	0	0	1	0	System Reset	N/A
18	NOP	0	0	1	1	1	0	0	0	1	1	No operation	N/A
19	Set LCD Bias Ratio	0	0	1	1	1	0	1	0	#	#	Set BR[1:0]	10b=12
20	Reset Cursor Mode	0	0	1	1	1	0	1	1	1	0	AC[3]=0, CA=CR	N/A
21	Set Cursor Mode	0	0	1	1	1	0	1	1	1	1	AC[3]=1, CR=CA	N/A
22	Set Test Control (double byte command)	0	0	1	1	1	0	0	1	TT		For UltraChip only. Do not use.	N/A
		0	0	#	#	#	#	#	#	#	#		

* Other than commands listed above, all other bit patterns may result in undefined behavior.

4.Standard Specifications for Product Quality

1. Manner of Test:：

1.1.The Test Must be Under 40w Flourescent Light, and The Distance of View Must Be At 30cm.

1.2.The Test Direction Is Based On Around 15°- 45° of Vertical Line.

2. Definition of Defects

2.1 Major Defects

A:Non-Display

B:Segment Missing

C:Over Current

D:Segment Short

E:Sealant Dishardexn

F:Wrong Polarizer Direction

2.2minor Defects: The Others.

3.Major Defects Should Be In AQL 0.25,And The Minor In AQL 1.00

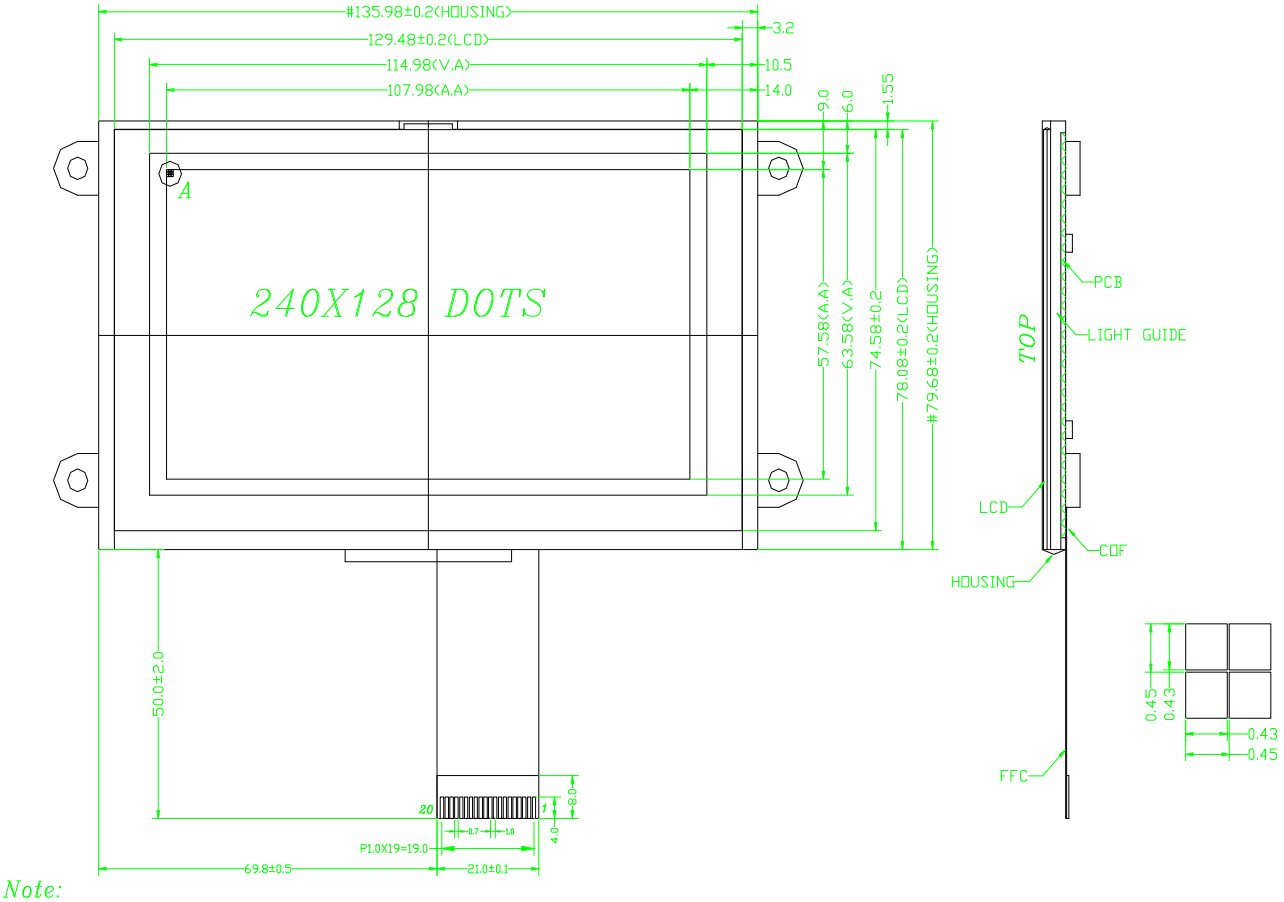
4.Inspection Item and Standards

Item	The standard of quality inspection	Checking Manner	Quality Ratio
1.Frame	Smooth and even surface,no crack,no scratch,no rusty,and not be wrenched out of shape.the range between convex and concave is:d≤0.35mm,and the frame must be connected to the ground.	Checking With Eyes And Using Vernier Caliper, Multimeter	100%
2.LCD	1.The major defects would be reject. 2.No scratch and no dusty on the LCD glass surface. 3.D≤0.15mm n≤2 diameter of bubble:d≤0.5 n≤2 damaged size of polarizer:d≤0.15mm, n≤2. 4.No scratch and dusty between the LCD and led.	Check It When Displaying	100%
3.The Relative Position of LCD and Frame	1.The LCD should not be twisted. 2.The LCD graphic should be in the middle position of the frame.	Checking With Eyes	100%

4.The Relative Position of PCB Panel and Frame	1.The frame installing direction must be correct. 2.The twisted angle of the pin is from 45° to 60°. 3.The pin is vertical to PCB panel and it should be in the middle position of the installing holes.	Checking With Eyes	100%
5.LED	1.The led would be yellow-green. 2.The led would be uniform.	Checking With Eyes	100%
6.Function Test	1. The major defects must be reject. 2. Test flow chart (see attached chart) 3. Background changes evenly and no disorderly displaying phenomenon. 4. Display no shortage.	Check It When Displaying	100%

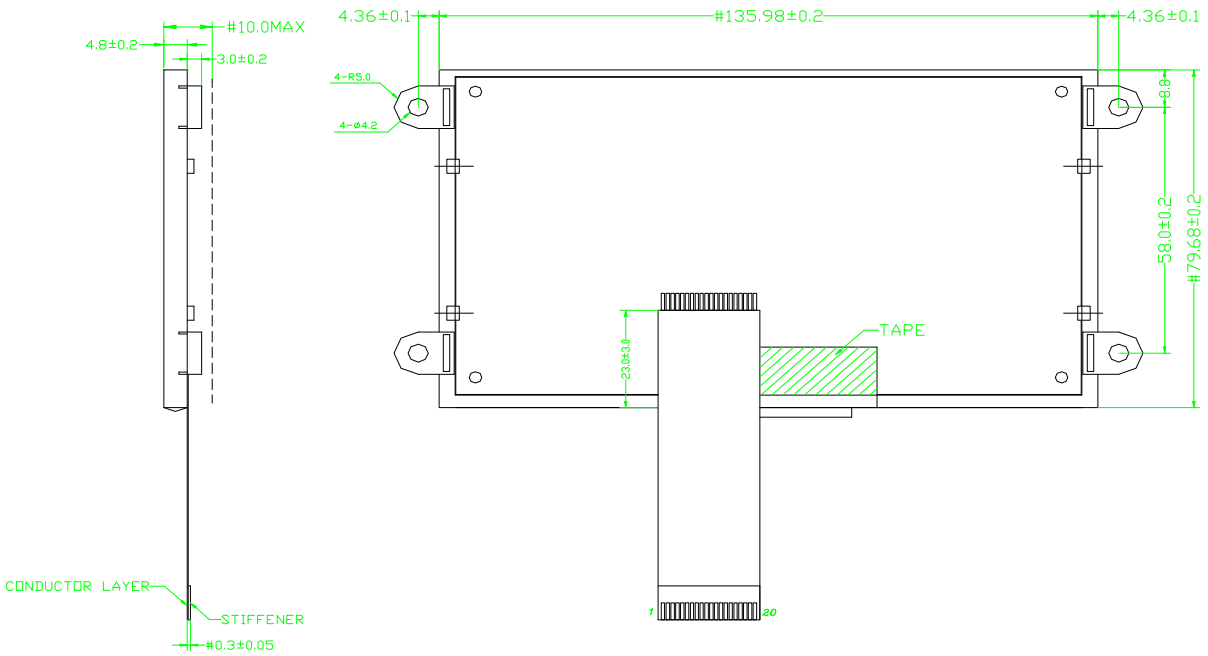
Note:D～Diameter N～Quantity Unit:mm

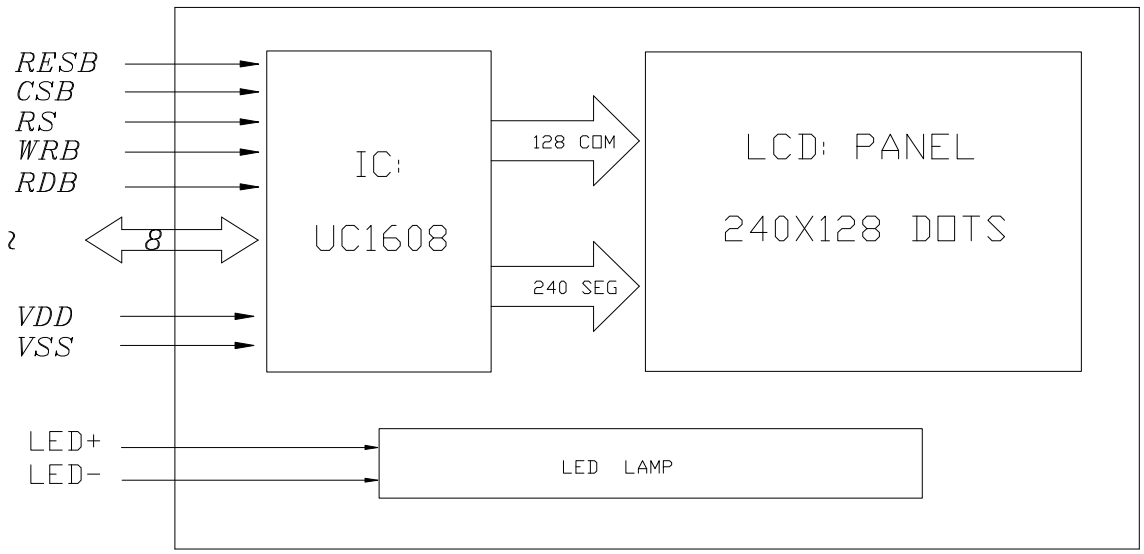
5. Attached Drawing



Note:

1. *Operating Voltage:* *3.0V*
2. *Drive method:* *1/128Duty, 1/12 Bias*
3. *Viewing Direction:* *6:00*
4. *Operating Temp:* *-20°C~70°C*
5. *Storage Temp:* *-30°C~80°C*
6. *Display type:* *FSTN,Positive*





PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
SYMBOL	RESB	CSB	RS	WRB	RDB	D0	D1	D2	D3	D4	D5	D6	D7	VDD	VSS	VLCD	NC	VOUT	LED+	LED-