

SPECIFICATION



YM12232A

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Version 1.01



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一. 基本特征

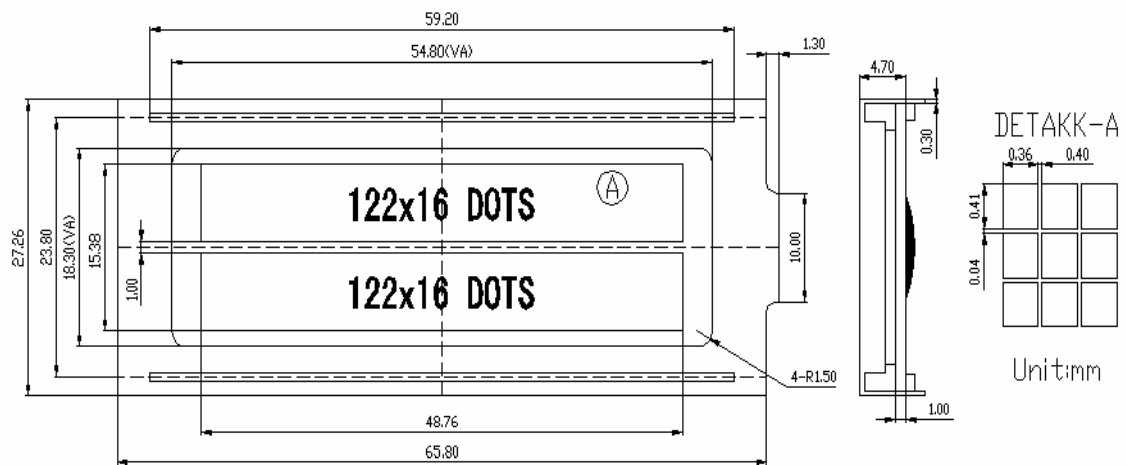
1. 概述

YM12232A 是一种图形点阵液晶显示器,它主要由行驱动器/列驱动器及 122×32 全点阵液晶显示器组成。可完成图形显示,也可以显示七个半(16×16 点阵)汉字。

主要技术参数和性能:

1. 电源: VDD=+2.7V~+5V; LCD 外接驱动电压 VDD-V0=5.0V。
2. 显示内容: 122(列)×32(行)点
3. 显示颜色: 绿底兰字
4. 显示角度: 6 点钟直视
5. STN 正视反射模式
6. 驱动方式: 1/32 Duty, 1/6 Bias
7. 工作温度: -20℃~+60℃, 存储温度: -30℃~+70℃
8. 连接方式: 外部接口由带缆连接

2. 外形尺寸图

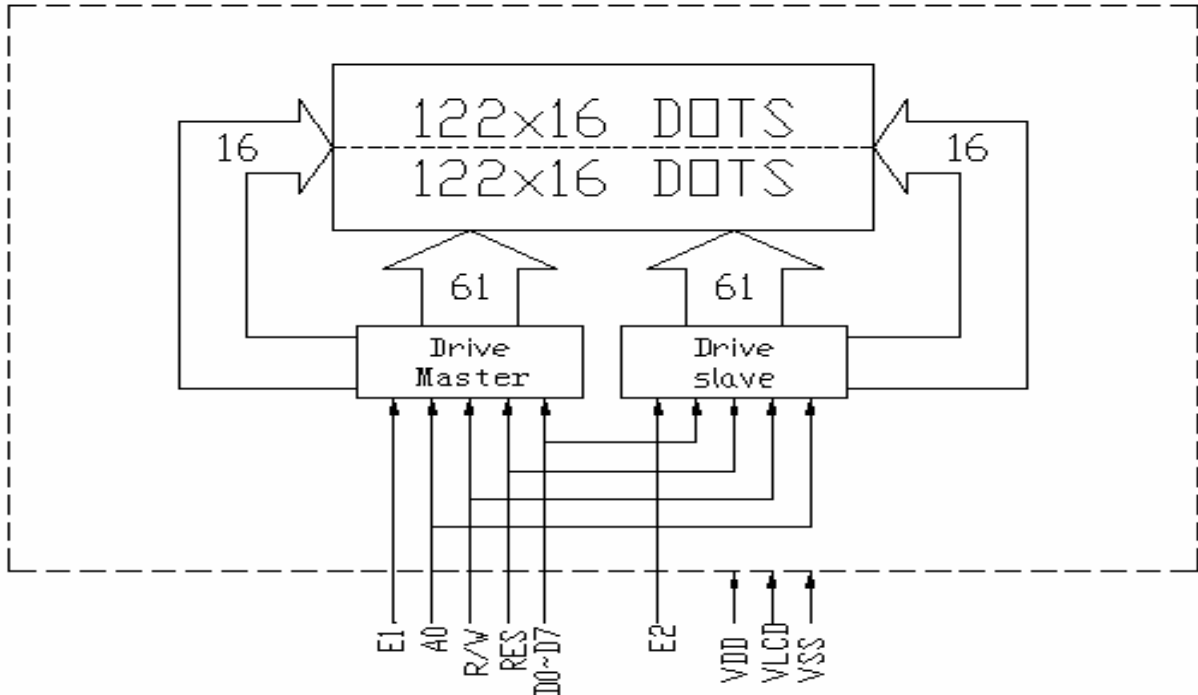


3. 机械尺寸一览:

项目	标准尺寸	单位
模块体积	67.1×27.2×8.4	mm
视域	54.8×18.3	mm
行列点阵数	122×32	dots
点距离	0.40×0.45	mm
点大小	0.36×0.41	mm



二. 原理图:



三. 限定参数

Item	Symbol	Standard Value	Unit	Condition
Power supply voltage	VDD	0~+7.0	V	No condition
LCD driving voltage	VDD~VLCD	+3.5~+12.0		
Input voltage	VIN	$GND \leq V_{IN} \leq V_{DD}$		
Operating temperature range	Top	-20~+60	°C	
Storage temperature range	Tst	-30~+70		

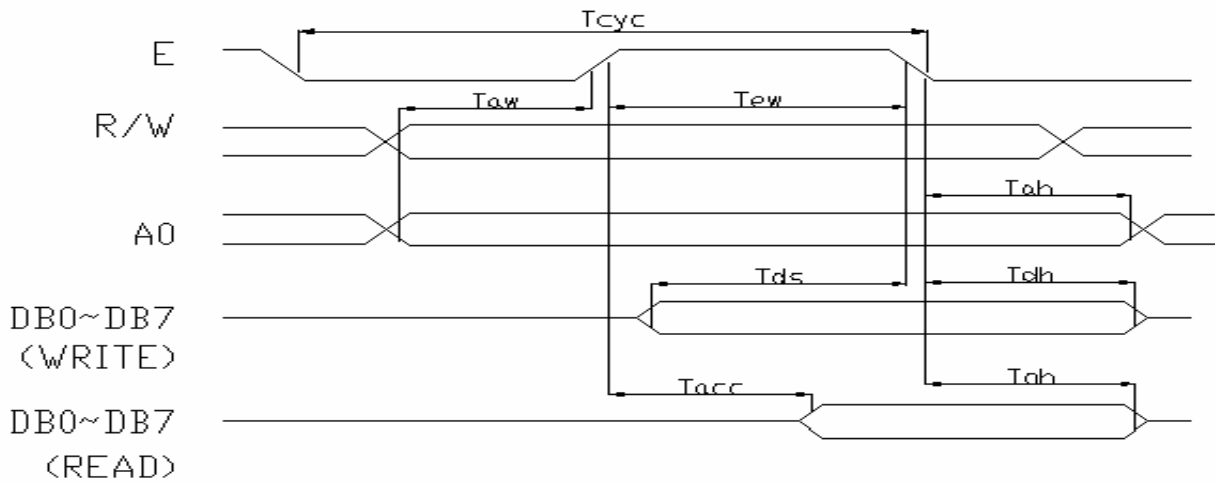
四. 直流特性: (Ta=0~40°C, VDD=2.7~6.0V)

Item	Symbol	Standard Value	Unit
Power Supply	VDD	+2.4 ~ +6.0	V
LCD Driving Voltage	VLCD	-----	V
Input High Voltage	VIN	$0.8V_{DD} \leq V_{IN} \leq V_{DD}$	V
Output High Voltage	VOH	$0.5V_{DDmin}$	V
Input Low Voltage	VIL	$0 \leq V_{IL} \leq 0.2V_{DD}$	V
Output Low Voltage	VOL	$0.1V_{DDmax}$	V
Power Supply Current	IDD	2max	mA
LCD Power Supply Current	ILCD	220max	uA



五. 交流特性

Signal	Parameter	Symbol	MIN	MAX	Unit	Condition
A0, /RW	System cycle time	T _{cyc}	2000	--	ns	
	Address setup time	T _{aw}	40	--	ns	
	Address hold time	T _{ah}	20	--	ns	
D0~D7	Data setup time	T _{ds}	160	--		CL=100p F
	Data hold time	T _{dh}	20	--	ns	
	Output disable time	T _{ch}	20	120	ns	
	Access time	T _{acc}	--	180	ns	
E	Enable pulse width(Read)	T _{ew}	200	--		
	Enable pulse width(Write)		160	--	ns	
Input wave width rise time		Tr	--	15	ns	



六. 引脚特性

管脚号	管脚名称	LEVER	管脚功能描述
1	VDD	+5.0V	电源电压
2	VSS	0	电源地
3	VLCD	0~+5V	LCD 外接驱动负电压
4	/RET	H/L	复位信号。在系统需要硬件复位时，在/RES端产生一个上升沿信号。当内部电路复位后，/RES端保持高电平。
5	E1	H/L	读写使能信号(MASTER)
6	E2	H/L	读写使能信号(SLAVE)
7	R/W	H/L	读写选择信号
8	D/I	H/L	D/I=“H”，表示 DB7~DB0 为显示数据 D/I=“L”，表示 DB7~DB0 为显示指令数据
9	DB0	H/L	数据线
10	DB1	H/L	数据线



11	DB2	H/L	数据线
12	DB3	H/L	数据线
13	DB4	H/L	数据线
14	DB5	H/L	数据线
15	DB6	H/L	数据线
16	DB7	H/L	数据线
17	NC	--	悬空
18	NC	--	悬空

注:) 当 VDD=+3V 时, VLCD=0~-5V

七. 指令表

INSTRCTI ON	CODE										FUNCTION
	R/W	D/I	D7	D6	D5	D4	D3	D2	D1	D0	
DISPLAY ON/OFF	0	0	1	0	1	0	1	1	1	1/0	Switch the entire display ON or OFF, regardless of the display RAM's Data or the internal status. 1: ON 0: OFF
Display Start Line	0	0	1	1	0	Display start Line (0 •••• 31)				Determines the line of RAM data to be displayed at the display's top line (COM0)	
Page Address set	0	0	1	0	1	1	1	0	PAGE: (0~3)		Sets the page of the Display in the Address register(X address)
Column (seg) Address set	0	0	0	Column address(0~79)							Sets the column of the Display in the column address register(Y address)
Status Read	1	0	B u s y	A D C	ON / OFF	R S T	0	0	0	0	Read status Busy 1: internal operation 0: Ready ADC 1: Rightward output 0: Leftward RST 1: Resetting 0: Normal ON/OFF 1: Display on 0: Display off
Write Display Data	0	1	Write data								Writes the data on the Data bus to RAM
Read Display Data	1	1	Read data								Reads data from the Display RAM onto the Data BUS
ADC Select	0	0	1	0	1	0	0	0	0	0/1	Determine the clockwise or Counterclockwise reading of the display Data RAM



											0: Clockwise 1: Counterclockwise
Static Drive ON/OFF	0	0	1	0	1	0	0	1	0	0/1	Select the dynamic or static Driving. 1:Static driving 0: Dynamic driving
Duty Ratio Select	0	0	1	0	1	0	1	0	0	0/1	Select the duty ratio 1:1/32 duty 0:1/16 duty
Read Modify Write	0	0	1	1	1	0	0	0	0	0	Increment the column Address register when writing. But no-change when reading.
End	0	0	1	1	1	0	1	1	1	0	Release from the Read Modify Write Mode.
Reset	0	0	1	1	1	0	0	0	1	1	Set the Display Start Line Register to 1 st line, column Address count to 0 and Page Add. Resister to 0.
Power Save(dualcommand)	0 0	0 0	0 0	1 1	0 0	1 1	0 0	1 1	1 0	0 1	Set the power save mode by selecting display off and static driving on

八. DDRAM 地址表

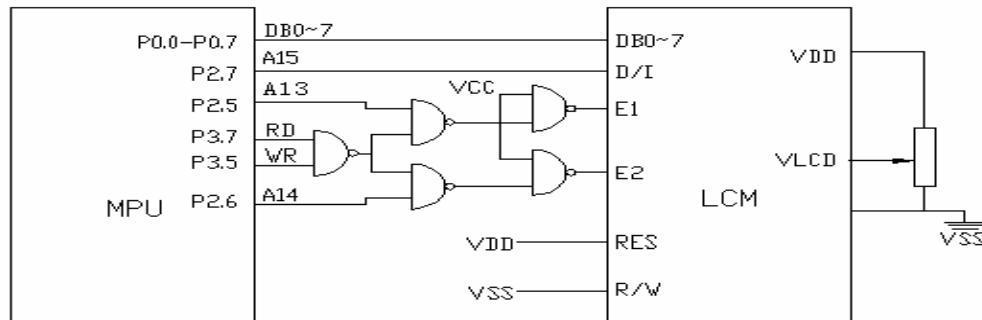
Page	Data	Com No	Drive
2	D0	1	Slave
	D7		
3	D0	16	Slave
	D7		
0	D0	17	Master
	D7		
1	D0	32	Master
	D7		
Column Addr	ADC=0	00H •••• 3C	00H •••• 3C
	Seg No	0 •••• 60	0 •••• 60
	Drive	Slave	Master

九. 应用举例

YM12232A 有(1)直接访问方式和(2)间接控制方式两种 Y
M12232A 与单片机 8031 的直接访问接口如图 5 所示: (VDD=+5V)



YM12232A 与单片机 8031 的直接访问接口如图 6 所示：(VDD=+5V)



利用图 5 举例介绍编程实例

```

    ORG 0100H
INITM: MOV A, #0E2H      ; RESET
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0AEH    ; OFF DISPLAY
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0A4H    ; OFF STATIC DRIVE
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0A9H    ; SELECT 1/32 DUTY
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0A0H    ; ADC SELECT RIGHTWARS OUTPUT
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #0EEH    ; READ MODIFY WRITE OFF
        LCALL OUTMI
        LCALL OUTSI
        MOV A, #00H     ; COLUMN ADDRESS SET
        LCALL OUTMI
        LCALL OUTSI

```



```
MOV A, #0C0H          ; SET DISPLAY START LINE
LCALL OUTMI
LCALL OUTSI
MOV A, #0AFH          ; ON DISPLAY
LCALL OUTMI
LCALL OUTSI
; DISPLAY "*"
MOV R2, #0B8H
DIS2: MOV A, R2
LCALL OUTMI
LCALL OUTSI
MOV A, #00H
LCALL OUTMI
LCALL OUTSI
MOV R1, #1FH
DIS1: MOV A, #55H
LCALL OUTMI
LCALL OUTSI
MOV A, #0AAH
LCALL OUTMI
LCALL OUTSI
DJNZ R1, DIS1
INC R2
CJNE R2, #0BCH, DIS2
LCALL MS40
LCALL MS40
LCALL MS40
LCALL MS40
MOV A, #0AFH
; DISPLAY "横条"
MOV R2, #0B8H
DIS3: MOV A, R2
LCALL OUTMI
LCALL OUTSI
MOV A, #00H
LCALL OUTMI
LCALL OUTSI
MOV R1, #3DH
DIS4: MOV A, #55H
LCALL OUTMD
LCALL OUTSD
DJNZ R1, DIS4
```



```
INC R2
CJIE R2, #0BCH, DIS3
LCALL MS40
LCALL MS40
LCALL MS40
LCALL MS40
MOV A, #0AFH
LCALL OUTMI
LCALL OUTSI

; DISPLAY “竖条”
MOV R2, #0B8H
DIS5: MOV A, R2
LCALL OUTMI
LCALL OUTSI
MOV A, #00H
LCALL OUTMI
LCALL OUTSI
MOV R1, #1EH
DIS6: MOV A, #00H
LCALL OUTMI
LCALL OUTSI
MOV A, #0FFH
LCALL OUTMI
LCALL OUTSI
DJNZ R1, DIS6
MOV A, #3CH
LCALL OUTMI
LCALL OUTSI
MOV A, #00H
LCALL OUTMI
LCALL OUTSI
INC R2
CJNE R2, #0BCH, DIS5
LCALL MS40
LCALL MS40
LCALL MS40
LCALL MS40
MOV A, #0AFH

; DISPLAY 汉字 “两只黄鹂鸣翠柳 一行白鹭上青天”
INITMC: MOV DPTR, #CHINESE
```



```
MOV R1 #00H
MOV B, #B8H
DISPWORDM: PUSH B
MOV A, B
LCALL OUTMI
LCALL OUTST
MOV A, #00H
LCALL OUTMI
MOV R2 #7AH
DISPWORD1: MOV A, R1
MOVC A, @A+DPTR
LCALL OUTMD
INC DPTR
DEC R2
CJNE R2, #3DH, DISPWORD1
MOV A, #00H
LCALL OUTST
DISPWORD2: MOV A, R1
MOVC A, @A+DPTR
LCALL OUTSD
INC DPTR
DJNZ R2, DISPWORD2

MOV R1, #00H
POP B
INC B
MOV A, B
CINZ A, #0BCH, DISPWORDM
LCALL MS40
LCALL MS40
LCALL MS40
LCALL MS40

AJMP INITM

MS40: MOV R7, #0E8H
MS2: MOV R6, #0FFH
MS1: DJNA R6, MS1
DJNZ R7, MS2
RET
```

; OUT INSTRUCTION TO MASTER 6450



DB 00, 40H, 44H, 54H, 54H, 54H, 54H, 54H, 7FH, 54H, 54H, 54H, 54H, 56H, 44H, 40H, 00
DB 00, 40H, 42H, 42H, 42H, 42H, 42H, 42H, 0FEH, 42H, 42H, 42H, 42H, 43H, 62H, 40H, 00
0B 00

; (PAGE1)

DB 00, 00
0B 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00
DB 00, 02H, 01H, 00, 0FFH, 00, 00, 00, 00, 00, 40H, 80H, 7FH, 00, 00, 00, 00
DB 00, 00, 00, 7FH, 21H, 21H, 21H, 21H, 21H, 21H, 21H, 21H, 21H, 7FH, 00, 00, 00
DB 00, 00, 40H, 40H, 5H, 52H, 53H, 56H, 5AH, 52H, 5AH, 56H, 90H, 90H, 78H, 10H, 00
DB 00, 40H, 40H, 40H, 40H, 40H, 40H, 40H, 7FH, 40H, 40H, 40H, 40H, 40H, 60H, 40H, 00
DB 00, 00, 00, 00, 0FFH, 15H, 15H, 15H, 15H, 15H, 55H, 95H, 7FH, 00, 00, 00, 00
DB 00, 80H, 80H, 40H, 20H, 10H, 0CH, 03H, 00, 03H, 0CH, 10H, 20H, 40H, 0C0H, 40H, 00
DB 00

; (PAGE2)

DB 00, 00
DB 00, 02H, 02H, 0F2H, 12H, 12H, 0FEH, 12H, 12H, 12H, 0FEH, 12H, 12H, 0F2H, 03H, 02H, 00
DB 00, 00, 00, 00, 0FCH, 04H, 04H, 04H, 04H, 04H, 04H, 04H, 0FEH, 04H, 00, 00, 00
DB 00, 20H, 20H, 24H, 24H, 24H, 3FH, 24H, 0E4H, 24H, 3FH, 24H, 24H, 24H, 30H, 20H, 00
DB 00, 04H, 0E4H, 24H, 0E4H, 04H, 0E4H, 26H, 0E4H, 00, 0FCH, 06H, 55H, 84H, 7CH, 00, 00
DB 00, 00, 0FCH, 04H, 04H, 0FCH, 04H, 00, 0FCH, 06H, 15H, 44H, 84H, 7EH, 04H, 00, 00
DB 00, 00, 40H, 41H, 55H, 0C9H, 41H, 5FH, 60H, 41H, 55H, 0C9H, 41H, 5FH, 40H, 00, 00
DB 00, 10H, 0D0H, 0FFH, 90H, 10H, 0FEH, 02H, 02H, 0F9H, 00, 0FEH, 02H, 02H, 0FFH, 02H, 00
DB 00

; (PAGE3)

DB 00, 00
DB 00, 00, 00, 0FFH, 08H, 04H, 03H, 14H, 08H, 04H, 03H, 44H, 98H, 7FH, 00, 00, 00
DB 00, 00, 80H, 40H, 23H, 11H, 19H, 01H, 01H, 01H, 09H, 11H, 23H, 60H, 0C0H, 00, 00
DB 00, 00, 80H, 80H, 5FH, 55H, 35H, 15H, 1FH, 15H, 35H, 35H, 5FH, 40H, 80H, 00, 00
DB 00, 00, 7FH, 02H, 7FH, 00, 7FH, 02H, 7FH, 10H, 13H, 12H, 1AH, 52H, 82H, 7EH, 00
DB 00, 00, 0FH, 04H, 04H, 0FH, 10H, 10H, 13H, 12H, 12H, 1AH, 52H, 82, 7FH, 02H, 00
DB 00, 08H, 08H, 0AH, 09H, 08H, 09H, 0AH, 0FCH, 0AH, 09H, 08H, 09H, 0AH, 08H, 08H, 00
DB 00, 01H, 00, 0FFH, 00, 01H, 8FH, 44H, 22H, 1FH, 00, 0FFH, 08H, 10H, 0FH, 00, 00
DB 00