Shenzhen CS Display Technology Co., Ltd

PRODUCT SPECIFICATION

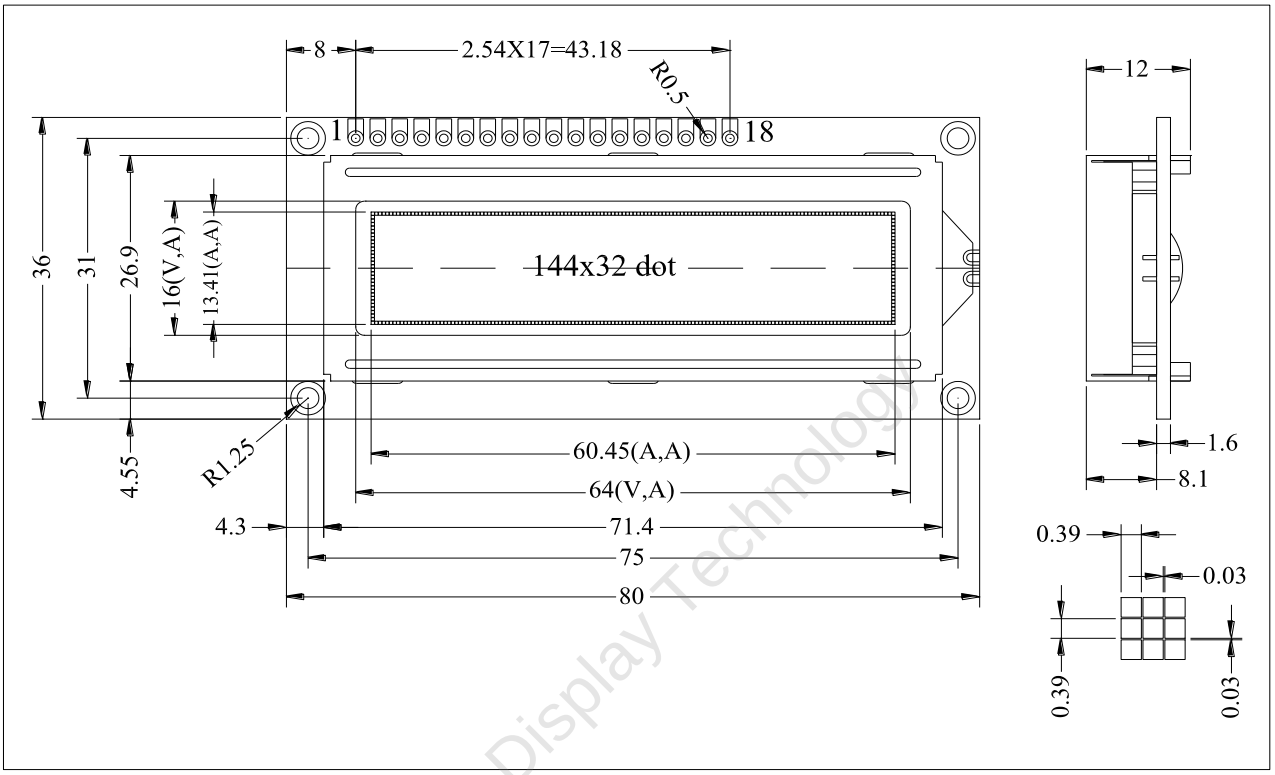
GRAPHIC LCD

MODEL: HS14432ZWA-B1833

Customer Approval:

Shenzhen CS Display Technology Co., Ltd

Drawing for LCD



Item	Description
Display Mode	STN, Blue, Negative
Resolution	144*32dots
Outline Dimensions	80.0x36.0x12.0mm
Visual Area	64.0x16.0mm
Dot Space	0.42×0.42mm
Dot Size	0.39×0.39mm
Controller IC	AIP31020
Communication Interface	Parallel
Number of Pins	18PIN
Operating Voltage	3.3V
Viewing Direction	6 O'clock
Operating Temp	-20~70°
Storage Temp	-30~80°

Interface definition

PIN	SIGNAL	DIRECTION	DESCRIPTION
1	VSS	--	Negative terminal of power supply (0V)
2	VDD	--	Positive terminal of power supply (+3.3V or +5.0V, factory default +5V)
3	V0	--	LCD drive voltage (adjustable/can be connected)
4	RS(CS)	I	Parallel mode: ● RS=0: When the MPU performs a read module operation, it points to the address counter. When the MPU performs a write module operation, it points to the instruction register. ● RS=1: Points to the data register regardless of MPU read/write operations. Serial port mode: CS: Serial chip select signal, active high level
5	R/W(SID)	I	Parallel mode: ● R/W=0 write operation. ● R/W=1 read operation. Serial port mode: SID: Serial Data Input
6	E(SCLK)	I	Parallel port mode: enable signal, active at high level. Serial port mode: SCLK serial clock signal
7-14	DB0 ~ DB7	I/O	The data transmission channel of the parallel port between the MPU and the module, D0 ~ D3 pins are disconnected in 4-bit bus mode
15	LEDA	--	Positive terminal of backlight power supply (+3.3V or +5.0V, factory default +5.0V)
16	LEDK	--	Negative terminal of backlight power (0V)
17	PSB	I	Serial/parallel port control selection: (can be suspended/internal adjustable point)
18	RST	I	Reset active low (can be suspended)

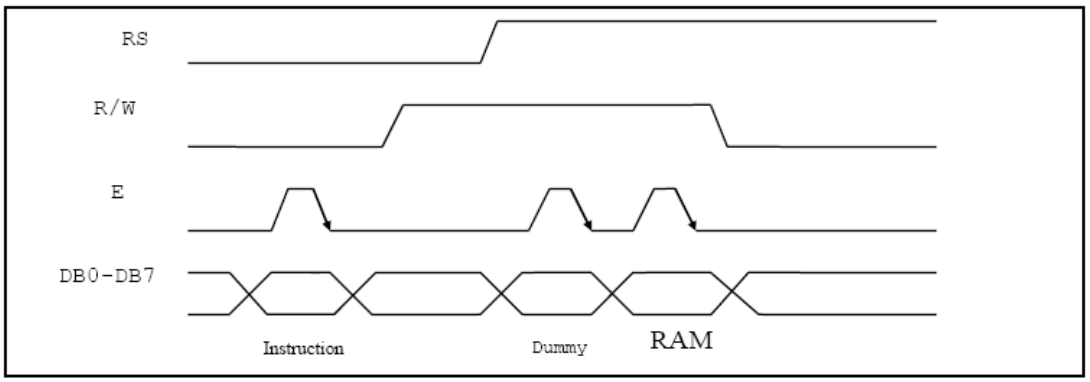
Electrical parameters (DC)

ITEM	SYMBLE	TEST CONDITION	PAREMETER RANGE			UNIT
			MIN	TYP	MAX	
working voltage for module	VDD	-	4.5/3.1	5.0/3.3	5.5/3.5	V
Glass voltage	V0	V0-VDD	4.5	5.0	7.0	V
Backlight working voltage	VLED	-	4.5/3.1	5.0/3.3	5.5/3.5	V
IO input high level	VIH	-	0.7VDD	-	VDD	V
IO input low level	VIL	-	-	-	0.6	V
LCM output high level	VOH	-	0.8VDD	-	VDD	V
LCM output low level	VOL	-	-	-	0.4	V
Working current for module	IDD	=VDD	-	-	0.5	MA
Stand-by current for module	IDO	=VDD	-	-	10	uA
Backlight working current	ILED	=VLED	8	15	20	MA

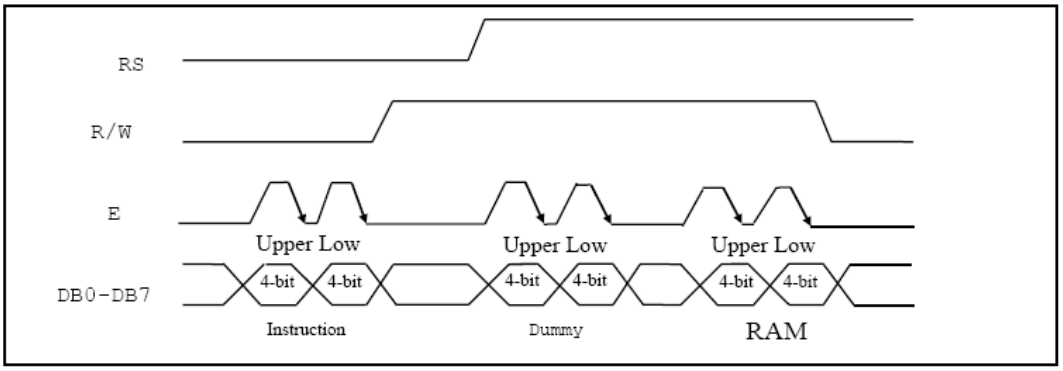
Timing Characteristics

Parallel port timing

Parallel port mode normal temperature (environment 25 degree, VDD=4.5V or VDD=2.7V)



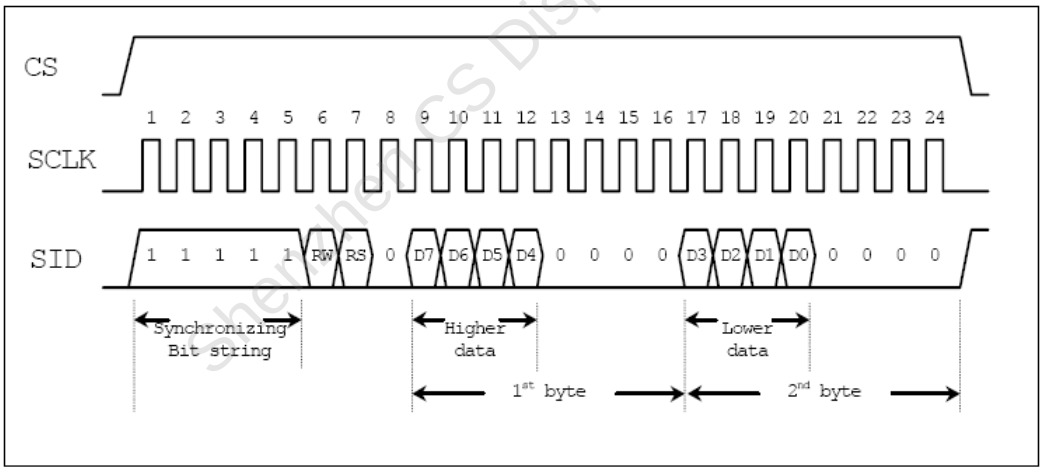
Timing Diagram of 8-bit Parallel Bus Mode Data Transfer



Timing Diagram of 4-bit Parallel Bus Mode Data Transfer

Serial port timing

Serial port mode normal temperature (environment 25 degree, VDD=4.5V or VDD=2.7V)



Timing Diagram of Serial Mode Data Transfer

Display Control Instruction

Instruction set1: (RE=0： Basic instruction)

Inst.	Code										HEX	说明	执行时间（540KHZ）
	RS	R W	D7	D6	D5	D4	D3	D2	D1	D0			
清除显示	0	0	0	0	0	0	0	0	0	1	0X01	将DDRAM填满”20H”，并且设定DDRAM的地址计数器(AC)到“00H”	1.6ms
地址归零	0	0	0	0	0	0	0	0	1	X	0X02	设定DDRAM的地址计数器(AC)到”00H”，并且将光标移到开头原点位置，这个指令并不改变DDRAM的内容	72us
输入点设定	0	0	0	0	0	0	0	1	I/D	S	0X4X	指定在数据的读取与写入时，设定光标的移动方向及指定显示的移位	72us
显示状态开/关	0	0	0	0	0	0	1	D	C	B	0x8x	D=1；整体显示ON C=1；光标ON B=1；光标位置反白ON	72us
光标或显示移位控制	0	0	0	0	0	1	S/C	R/L	X	X	0x1x	设定光标的移动与显示的移位控制位；这个指令并不改变DDRAM的内容	72us
功能设定	0	0	0	0	1	DL	X	0RE	X	X	0X2X	DL=1；8位控制模式 DL=0；4位控制模式 RE=1；选择扩展指令集 RE=0；选择基本指令集	72us
设定CGRAM地址	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	0X4X	设定CGRAM地址到地址计数器(AC) 需确认扩展指令中SR=0（卷动地址或RAM地址选择	72us
设定DDRAM地址	0	0	1	0AC6	AC5	AC4	AC3	AC2	AC1	AC0	0X8X	设定CGRAM地址到地址计数器(AC) AC6固定为0	72us
读取忙碌标志（BF）和地址	0	1	BF	AC6	AC5	AC4	AC3	AC2	AC1	AC0		读取忙碌标志(BF)可以确认内部动作是否完成，同时可以读出地址计数器(AC)的值	0us
写数据到RAM	1	0	D7	D6	D5	D4	D3	D2	D1	D0		写入数据到内部RAM(DDRAM/CGRAM/GDRAM)	72us

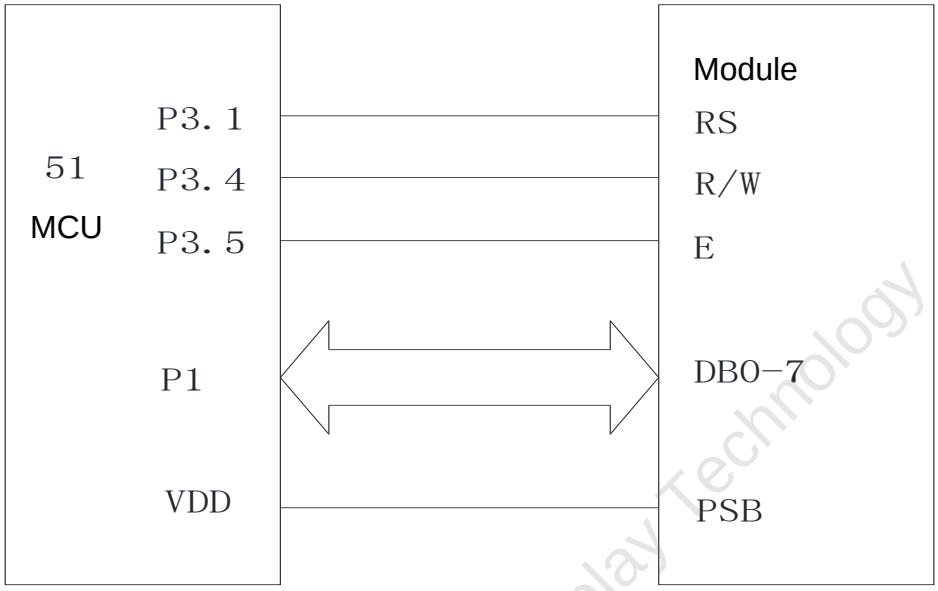
读出RAM的数据	1	0	D7	D6	D5	D4	D3	D2	D1	D0		从内部RAM读取数据(DDRAM/CGRAM/GDRAM)	72us

Instruction set 2: (RE=1: extended instruction)

Inst.	Code										HEX	说明	执行时间（540KHZ）
	RS	RW	D7	D6	D5	D4	D3	D2	D1	D0			
待机模式	0	0	0	0	0	0	0	0	0	1	0X01	进入待机模式，执行任何其它指令都可终止待机模式(COM1~32停止动作)	72us
卷动地址或RAM地址选择	0	0	0	0	0	0	0	0	1	SR	0X02	SR=1；允许输入垂直卷动地址SR=0；允许设定CGRAM地址(基本指令)	72us
反白选择	0	0	0	0	0	0	0	1	R1	R0	0X4X	选择4行中的任一行反白显示，并可决定反白与否R1，R0初什为‘00，当第一次设定时为反白显示，再一次设定时为正常显示	72us
扩充功能设定	0	0	0	0	1	DL	X	1RE	G	0	0X3X	DL=1；8位控制模式 DL=0；4位控制模式 RE=1；选择扩展指令集 RE=0；选择基本指令集 G=1；绘图显示ON G=0；绘图显示OFF	72us
设定IRAM地址或卷动地址	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	0X4X	SR=1：AC5~AC0为垂直卷动地址	72us
设定绘图RAM地址	0	0	1	00	0AC5	0AC4	AC3AC3	AC2AC2	AC1AC1	AC0AC0	0X8X	设定（GDRAM地址到地址计数器(AC) 先设垂直地址再设水平地址(连续写入两个字节的坐标地址) 垂直地址范围AC5~AC0 水平地址范围AC3~AC0	2us

MCU diagram

8-bit parallel interface



4-bit parallel interface