

JHD204A SERIES

CHARACTERISTICS :

DISPLAY CONTENT : 20 CHAR x 4ROW

CHAR. DOTS : 5 x 8

DRIVING MODE : 1/16D

AVAILABLE TYPES :

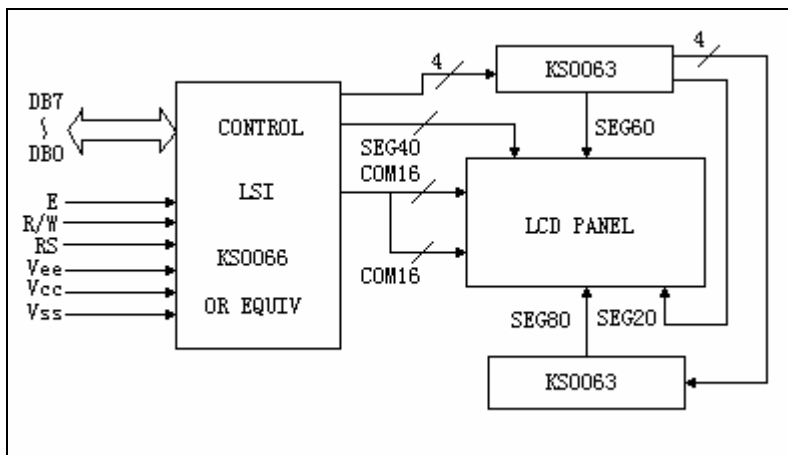
TN , STN(YELLOW GREEN、 GREY、 B/W)

REFLECTIVE

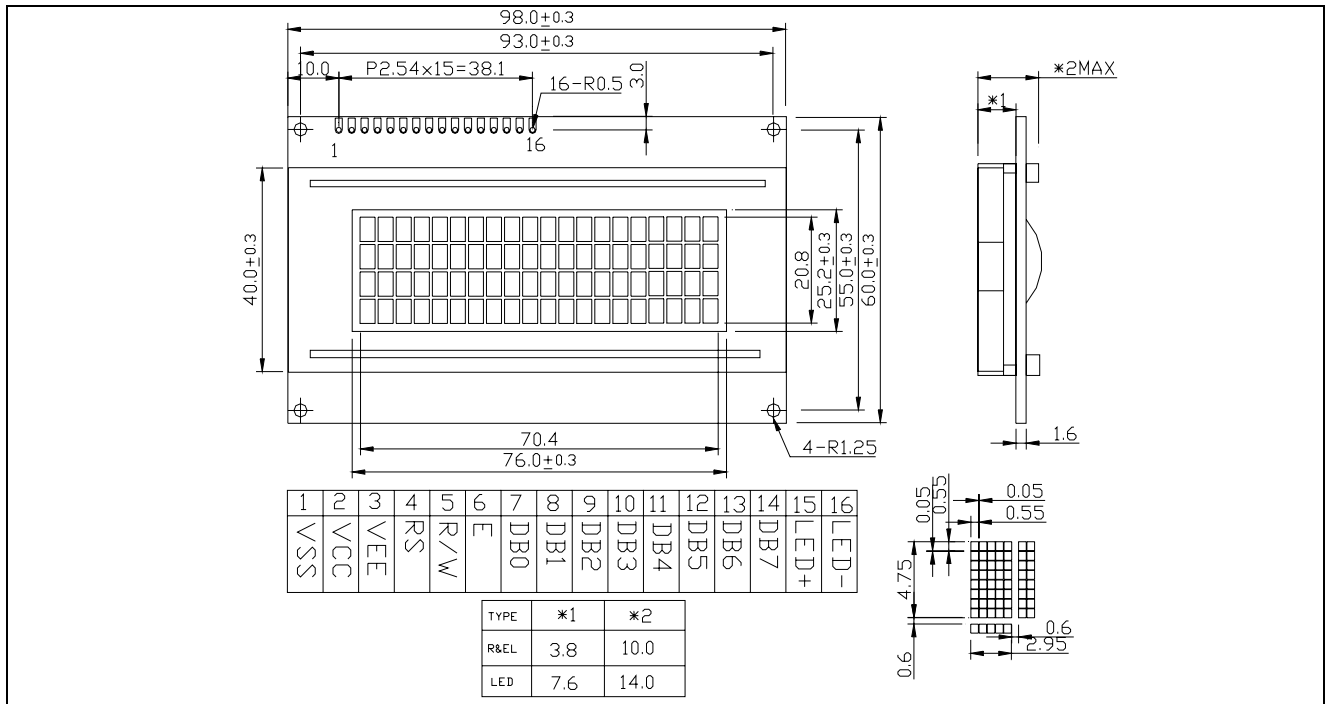
PARAMETER ($V_{DD}=5.0V \pm 10\%$, $V_{SS}=0V$, $T_a=25$)

Parameter	Symbol	Testing Criteria	Standard Values			Unit
			Min.	Typ.	Max	
Supply voltage	$V_{DD}-V_{SS}$	-	4.5	5.0	5.5	V
Input high voltage	V_{IH}	-	2.2	-	V_{DD}	V
Input low voltage	V_{IL}	-	-0.3	-	0.6	V
Output high voltage	V_{OH}	$-I_{OH}=0.2mA$	2.4	-	-	V
Output low voltage	V_{OL}	$I_{OL}=1.2mA$	-	-	0.4	V
Operating voltage	I_{DD}	$V_{DD}=5.0V$	-	2.0	5.0	mA

APPLICATION CIRCUIT



DIMENSIONS/DISPLAY CONTENT



PIN CONFIGURATION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
VSS	VCC	VEE	RS	R/W	E	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	LED+	LED-

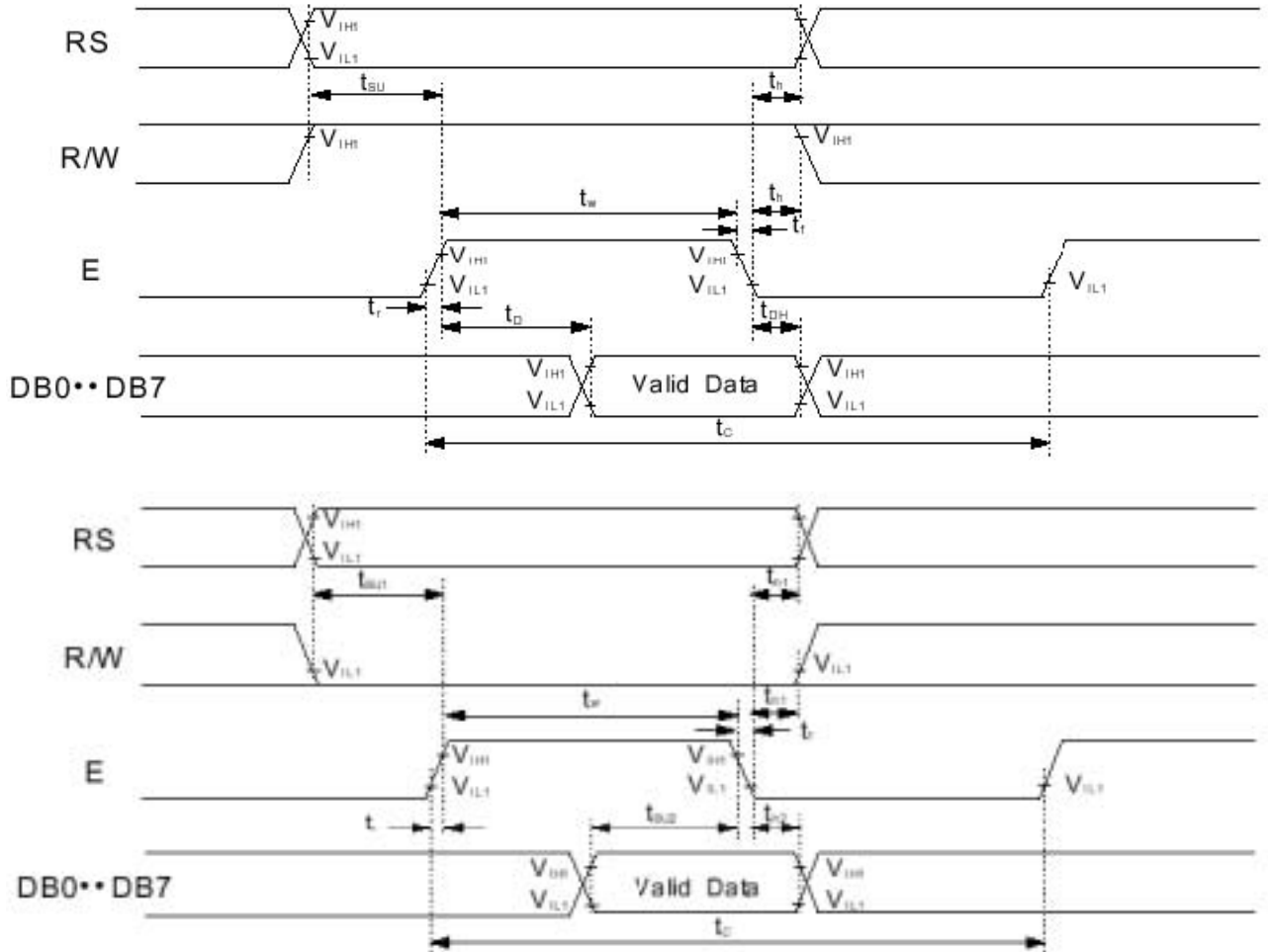
AC Characteristics Read Mode Timing Diagram

Table 12. AC Characteristics ($V_{DD} = 4.5V \sim 5.5V$, $T_a = -30 \sim +85^{\circ}C$)

Mode	Characteristic	Symbol	Min.	Typ.	Max.	Unit
Write Mode (Refer to Fig-6)	E Cycle Time	t_c	500	-	-	ns
	E Rise / Fall Time	$t_{R,tF}$	-	-	20	
	E Pulse Width (High, Low)	t_w	230	-	-	
	R/W and RS Setup Time	t_{su1}	40	-	-	
	R/W and RS Hold Time	t_{H1}	10	-	-	
	Data Setup Time	t_{su2}	80	-	-	
	Data Hold Time	t_{H2}	10	-	-	
Read Mode (Refer to Fig-7)	E Cycle Time	t_c	500	-	-	ns
	E Rise / Fall Time	$t_{R,tF}$	-	-	20	
	E Pulse Width (High, Low)	t_w	230	-	-	
	R/W and RS Setup Time	t_{su}	40	-	-	
	R/W and RS Hold Time	t_H	10	-	-	
	Data Output Delay Time	t_D	-	-	120	
	Data Hold Time	t_{DH}	5	-	-	

Table 13. AC Characteristics ($V_{DD} = 2.7V \sim 4.5V$, $T_a = -30 \sim +85^{\circ}C$)

Mode	Characteristic	Symbol	Min.	Typ.	Max.	Unit
Write Mode (Refer to Fig-6)	E Cycle Time	t_c	1000	-	-	ns
	E Rise / Fall Time	$t_{R,tF}$	-	-	25	
	E Pulse Width (High, Low)	t_w	450	-	-	
	R/W and RS Setup Time	t_{su1}	60	-	-	
	R/W and RS Hold Time	t_{H1}	20	-	-	
	Data Setup Time	t_{su2}	195	-	-	
	Data Hold Time	t_{H2}	10	-	-	
Read Mode (Refer to Fig-7)	E Cycle Time	t_c	1000	-	-	ns
	E Rise / Fall Time	$t_{R,tF}$	-	-	25	
	E Pulse Width (High, Low)	t_w	450	-	-	
	R/W and RS Setup Time	t_{su}	60	-	-	
	R/W and RS Hold Time	t_H	20	-	-	
	Data Output Delay Time	t_D	-	-	360	
	Data Hold Time	t_{DH}	5	-	-	

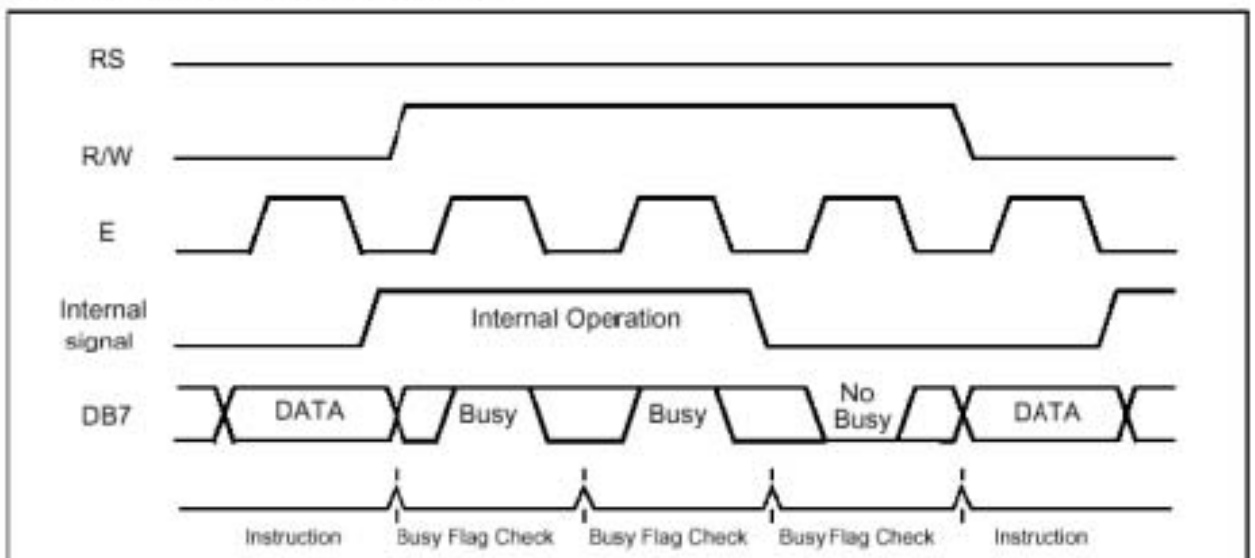


Write Mode Timing Diagram

Timing

1) Interface with 8-bit MPU

When interfacing data length are 8-bit, transfer is performed at a time through 8 ports, from DB0 to DB7. Example of timing sequence is shown below.




```
}
void soft_20ms()/******12MHZ 提供20MS 软件延时*****/
{  soft_10ms();
soft_10ms();
}
void hard_10ms(unsigned int delaytime) /*基于10MS 的硬件延时*/
{  sys10mscounter=delaytime;
while(sys10mscounter);
}
unsigned char data lcdcounter;
bit lcdusing1,lcdusing2;
bit lcd_checkbusy()/*检查LCD 忙*/
{  register lcdstate;
    dc=0;          /*dc=1为数据,=0 为命令*/
    rw=1;         /*rw=1为读,=0 为写*/
    cs=1;         /*cs=1选通*/
soft_nop();
lcdstate=lcdbus;
cs=0;
return((bit)(lcdstate&0x80));
}
void lcd_wrcmd(unsigned char lcdcmd) /*写LCD 命令*/
{  lcdusing1=1;
while(lcd_checkbusy());
lcdbus=lcdcmd;
    dc=0;          /*dc=1为数据,=0 为命令*/
    rw=0;         /*rw=1为读,=0 为写*/
    cs=1;         /*cs=1选通*/
soft_nop();

    cs=0;
    lcdbus=0xff;
    lcdusing1=0;
}

void lcd_moveto(char position) /*移动光标到指定位.0-79*/
{ register cmd=0x80;

    lcdcounter=position;
    if (position > 59)
        position += 0x18;
    else
```

```
        { if (position > 39)position -= 0x14;
          else
            { if (position > 19)position += 0x2c;
              }
        }

cmd=cmd|position;
lcd_wrcmd(cmd); } void lcd_wrdata(char lcddata) /*在当前显示位置显示数据*/ { char i;
lcdusing2=1;
while(lcd_checkbusy());
if(lcdcounter==20){

    lcd_moveto(20);
    while(lcd_checkbusy());
}

if(lcdcounter==40){
    lcd_moveto(40);
    while(lcd_checkbusy());
}

if(lcdcounter==60){
    lcd_moveto(60);
    while(lcd_checkbusy());
}

if(lcdcounter==80){
    lcd_moveto(0);
    while(lcd_checkbusy());
    lcdcounter=0;
} /*为通用而如此*/

lcdcounter++;
lcdbus=lcddata;
dc=1; /*dc=1为数据,=0 为命令*/
rw=0; /*rw=1为读,=0 为写*/
cs=1; /*cs=1选通*/
soft_nop();
cs=0;

lcdbus=0xff;
lcdusing2=0; } void lcd_string(char *strpoint) /*在当前显示位置显示LCD 字符串*/
{ register i=0;
  while(strpoint[i]!=0){
```



```
        lcd_wrdata(strpoint[i]);
        i++;
    }

} void lcd_init()/*初始化*/

{  lcd_wrcmd(0x38);    /*设置8 位格式,2 行,5*7*/
  lcd_wrcmd(0x0c);    /*整体显示,关光标,不闪烁*/
  lcd_wrcmd(0x06);    /*设定输入方式,增量不移位*/
  lcd_wrcmd(0x01);    /*清除显示*/
  lcdcounter=0;
}

void lcd_cls()/*清除显示*/ { lcd_wrcmd(0x01);
  lcdcounter=0; } void timer0(void) interrupt 1 /*T0 中断*/ { TH0=0xd8; /*12M,10ms*/
  TL0=0xf6;
  TR0=1;
  if(sys10mscounter!=0)sys10mscounter - - ; /*定时器10ms*/
  if(syslimitcounter!=0)syslimitcounter - - ; /*定时器10ms*/

}

    main()
    {
    unsigned char j;
    IE=0;P0=0xff;P1=0xff;P2=0xff;P3=0xff; /*初始化T*/
    lcd_init();soft_20ms();
    TMOD=0x51;
    TH0=0xd8; /*12M,10ms*/
    TL0=0xf6;
    TR0=1;ET0=1;EA=1;

    while(1)
    {
    /*全黑横一横二竖一竖二U Q ABCD... */
    lcd_init(); /*全黑*/
    for(j=0;j<80;j++){lcd_wrdata(0xff);}
    hard_10ms(50);
    lcd_init(); /*横一可参考自行设计符号*/
    lcd_wrcmd(0x40);
    for(j=0;j<8;j++){lcd_wrdata(path1[j]);

    for(j=0;j<100;j++){lcd_wrdata(0);
    hard_10ms(50);
    lcd_init(); /*横二*/
```


APLICACIONES

- TABLEROS INDICADORES
- INDICADORES PARA ASCENSORES
- INDICADORES DE NÚMEROS DE HABITACIÓN
- TORNIQUETES
- TABLEROS PARA ALARMA

