LCD / LCM SPECIFICATION



WINSTAR Display Co.,Ltd.
華凌光電股份有限公司

Represented by:

FIRST Components s.r.l.
www.first-components.com
technical@first-components.com
+39 0332 1888005

Winstar Display Co., LTD

SPECIFICATION

CUSTOMER : _____

MODULE NO.: WO2004-85HB#FC

APPROVED BY:	
(FOR CUSTOMER USE ONLY)	PCB VERSION: DATA:

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY

VERSION	DATE	REVISED PAGE NO.	SUMMARY
A	2023/01/18		Modify Backlight Information(Note)

Winstar Display Co.,

MODLE NO :

RECORDS OF REVISION	DOC. FIRST ISSUE

VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2022/09/09		First issue
A	2023/01/18		Modify Backlight Information(Note)

first FC components

General Specification

Item	Dimension	Unit
Module dimension	74.3 x 36.4 x 6.0	mm
View area	60.5 x 22.18	mm
Active area	58.5 x 20.18	mm
Dot size	0.45x 0.54	mm
Dot pitch	0.50 x 0.59	mm
Character size	2.45 x 4.67	mm
Character pitch	2.95 x 5.17	mm
LCD type	FSTN Positive Transflective (In LCD production, It will occur slightly color difference. We can only guarantee the same color in the same batch.)	
Duty	1/33DUTY,1/6BIAS	
View direction	6 o'clock	
Backlight Type	LED, White	
IC	IST3602	
Interface	I2C	

first FC components

Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	-20	—	+70	℃
Storage Temperature	TST	-30	—	+80	℃
Input Voltage	VIN	-0.3	—	V_{DD}+0.3	V
Power Supply Voltage	V_{DD}	-0.3	—	4.0	V
LCD Driver Voltage	VLCD	-0.3	—	18.0	V

first FC components

Electrical Characteristics

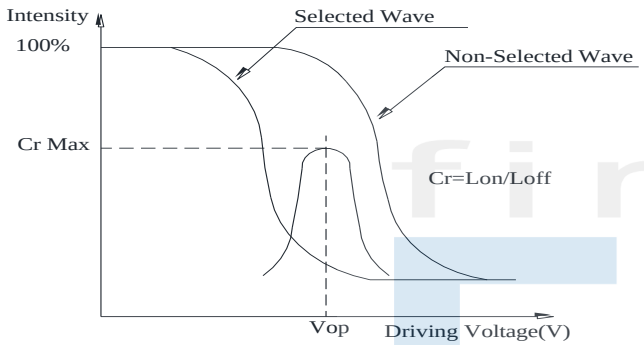
Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	V_{DD}	–	2.7	3.0	3.3	V
Supply Voltage For LCD	V_O-V_{SS}	Ta=-20℃	–	–	–	V
		Ta=25℃	7.6	7.8	8.0	V
		Ta=70℃	–	–	–	V
Input High Volt.	V_{IH}	–	0.8 V_{DDIO}	–	V_{DD}	V
Input Low Volt.	V_{IL}	–	V_{SS}	–	0.2V_{DD}	V
Output High Volt.	V_{OH}	–	0.8 V_{DDIO}	–	V_{DD}	V
Output Low Volt.	V_{OL}	–	–	–	0.2 V_{DD}	V
Supply LCM current	IDD	VDD=3.0V	–	0.5	–	mA

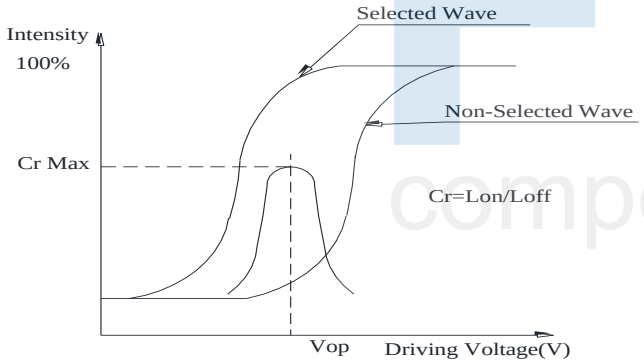
Please kindly consider to design the Vop to be adjustable while programing the software to match LCD contrast tolerance.

Optical Characteristics

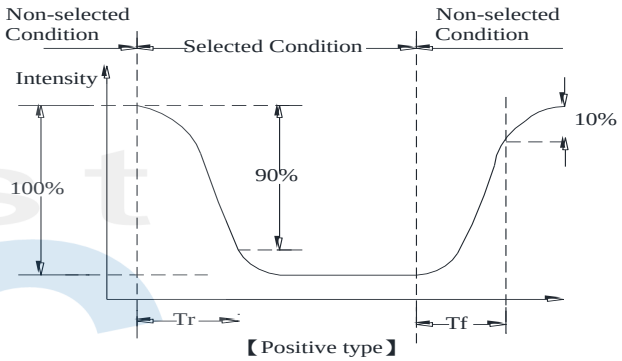
Item	Symbol	Condition	Min	Typ	Max	Unit
View Angle	θ	CR≧2	0	—	30	ϕ = 180°
	θ	CR≧2	0	—	60	ϕ = 0°
	θ	CR≧2	0	—	45	ϕ = 90°
	θ	CR≧2	0	—	45	ϕ = 270°
Contrast Ratio	CR	—	—	5	—	—
Response Time	T rise	—	—	150	200	ms
	T fall	—	—	150	200	ms

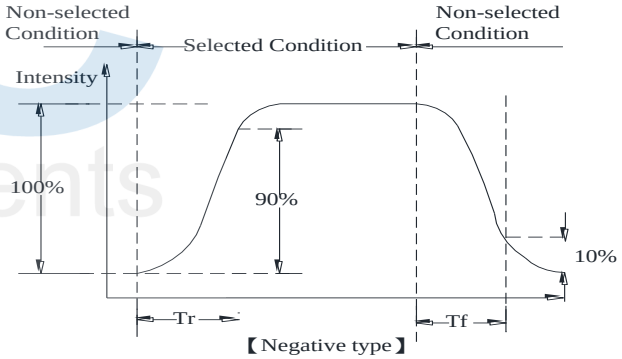
Definition of Operation Voltage (Vop)





Definition of Response Time (Tr , Tf)



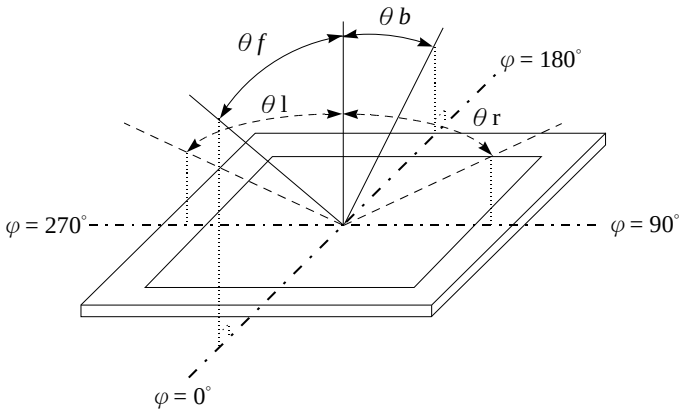


Conditions :

Operating Voltage : Vop　　Viewing Angle(θ ， φ) : 0°， 0°

Frame Frequency : 64 HZ　　Driving Waveform : 1/N duty , 1/a bias

Definition of viewing angle(CR≧2)

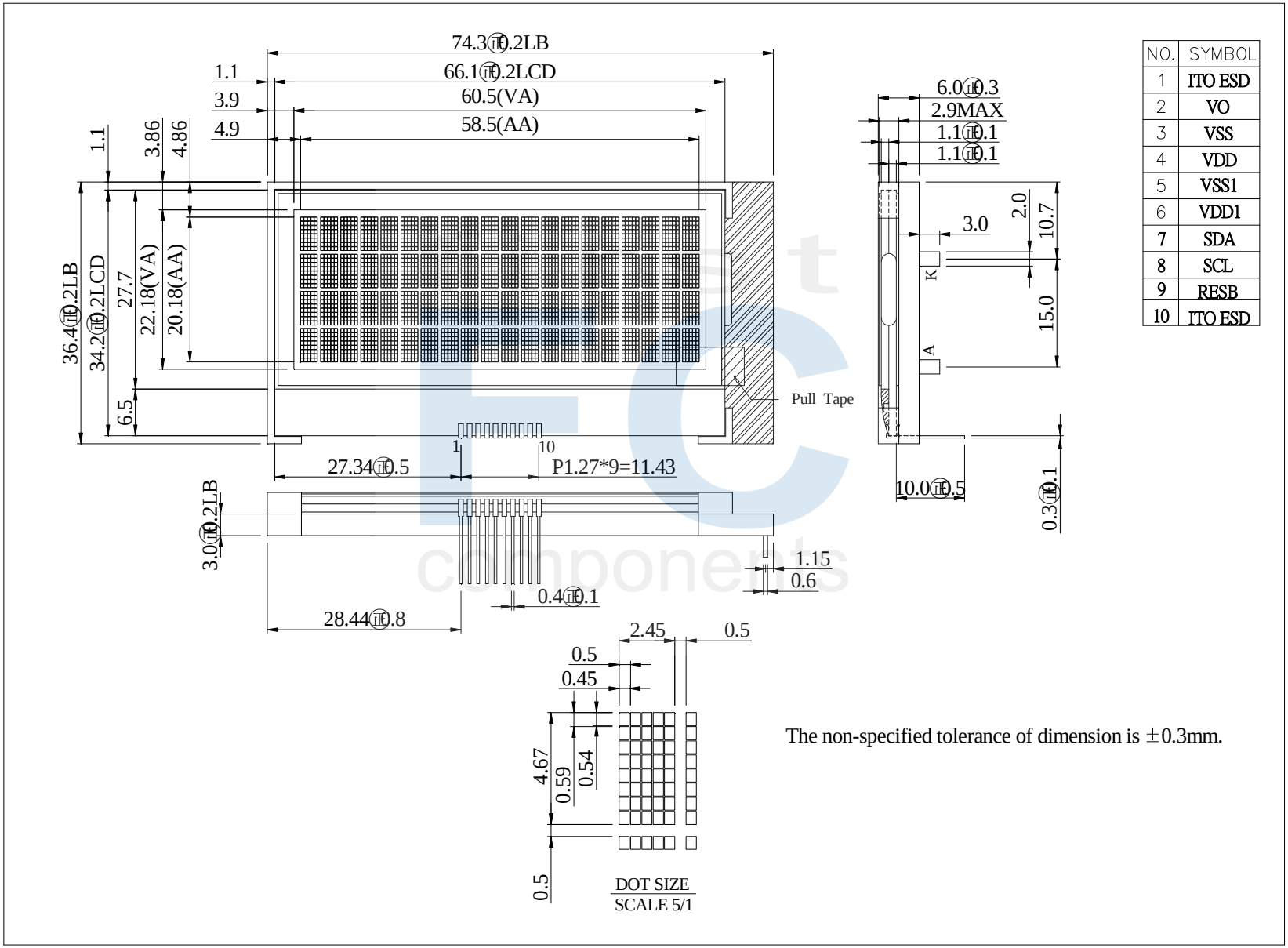


Interface Pin Function

Pin	Symbol	Function Description
1	ITO ESD	Ground
2	V0	LCD Power Supply
3	VSS	Ground(VSS2&VSS3)
4	VDD	Power Supply(VDD2&VDD3)
5	VSS1	Ground(VSS1)
6	VDD1	Power Supply(VDD1)
7	SDA	Serial input data
8	SCL	Serial input clock
9	RESB	Hardware Reset input pin
10	ITO ESD	Ground

First FC components

Contour Drawing



NO.	SYMBOL
1	ITO ESD
2	VO
3	VSS
4	VDD
5	VSS1
6	VDD1
7	SDA
8	SCL
9	RESB
10	ITO ESD

The non-specified tolerance of dimension is ±0.3mm.

Initial code

```
void Initial(void)
{
      RST = 1;
      delay_ms(10);
      RST = 0;
      delay_ms(10);
      RST = 1;
      delay_ms(10);

      Start();              //i2c_start
      Write_byte(0x78);// salve address
==========================================================
      // IS Instruction Table 0
      WriteIns(0x20);    //Function Set
      WriteIns(0x01);    //Clear Display
      delay_ms(20);

      WriteIns(0x90);    //Set DDRAM address
      WriteIns(0x00);    //Set DDRAM address

      WriteIns(0x06);     //Set Entry Mode
      WriteIns(0x0C);     //Display Control
// ========================================================
    // IS Instruction Table 1
      WriteIns(0x21);     //Function Set    : 0 0 1 0 0 0 IS2 IS1
      WriteIns(0x12);     //Follows Control   :0 0 0 1 0 0 BS2 BS1      Bias select:1/6B
      WriteIns(0x40);     //Set ICON RAM Address
      WriteIns(0x30);     //Power Control 1     :0 0 1 1 0 0 0 SLEEP
      WriteIns(0x6F);     //ICON/Power Control2
      WriteIns(0x70);     //Set booster ;V0 Control 2
      delay_ms(100);
// ========================================================
      // IS Instruction Table 3
      WriteIns(0x23);      //Function Set    : 0 0 1 0 0 0 IS2 IS1
      WriteIns(0x81);      //Contrast: VOP SET
      WriteIns(0x27);      // VOP SET

      WriteIns(0x82);      //start line setting
      WriteIns(0x00);      //start line setting    : 0 0 ST[5:0]

      WriteIns(0xA7);      //Rgain set :1 0 1 0 RR[3:0]
// ========================================================
      // IS Instruction Table 2
      WriteIns(0x22);    //Function Set    : 0 0 1 0 0 0 IS2 IS1
      WriteIns(0x60);    //Set Display pattern    : 0 1 1 0 0 0 INV AP
      WriteIns(0x13);    //Set Display Mode      :0 0 0 1 DH1 DH0 N2 N1       1/33D
      WriteIns(0x44);    //Select CGRAM & COM/SEG direction

// ========================================================
      // IS Instruction Table 3
      WriteIns(0x23);          //Function Set    : 0 0 1 0 0 0 IS2 IS1
      WriteIns(0x88);          // Set 88H 4 times to entry IST test command mode
```

```
        WriteIns(0x88);
        WriteIns(0x88);
        WriteIns(0x88);

        WriteIns(0x28);         //Frame rate adjusting enable

        WriteIns(0xB2);         //1st Frame rate control
        WriteIns(0xEF);         //2nd LN[7:0]
        WriteIns(0x00);         //3rd LN[15:8]      95Hz

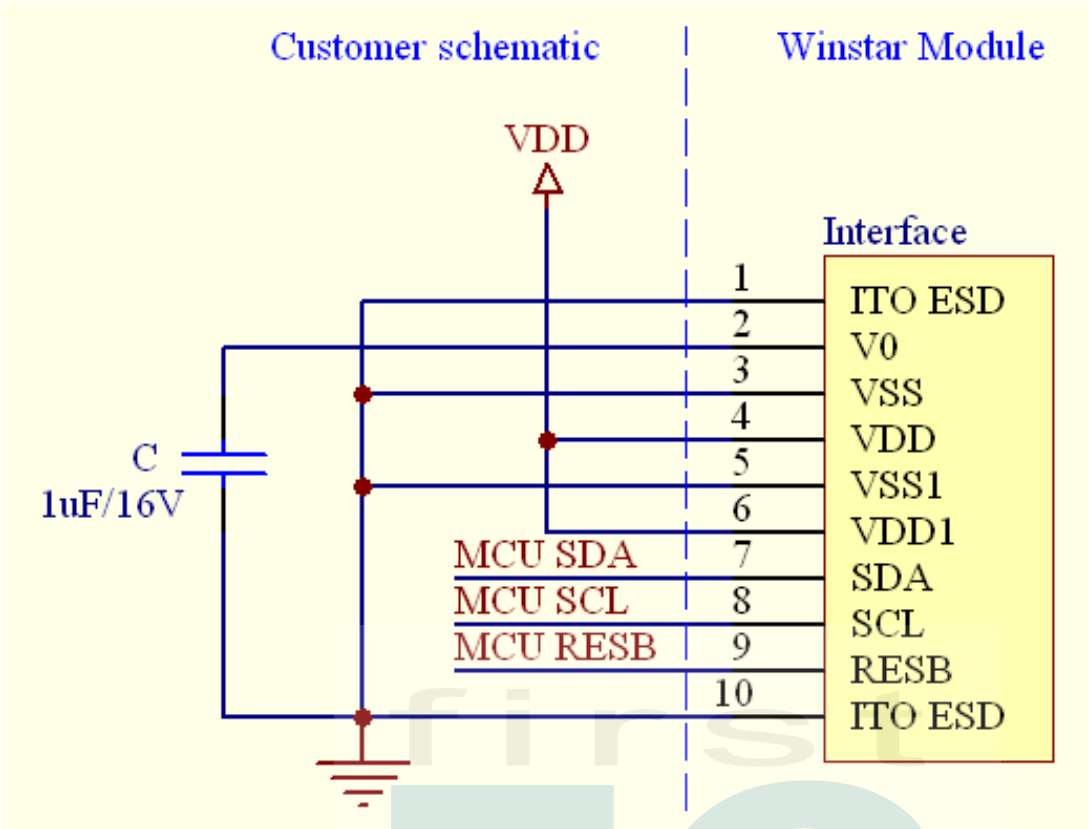

        WriteIns(0x93);         //OSC Clock Select    :Fosc/1
        WriteIns(0x99);         //OSC Divide Select   :750KHz

        WriteIns(0xE3);         //Exit IST test command
// ============================================================
        Stop();                 //i2c_stop
}
```

*NOTE:

This Initial code is a suggested value, and customers can change the parameters according to a ctual needs.

APPLICATION EXAMPLES



first FC components