

Wincom Tech CO., LTD.

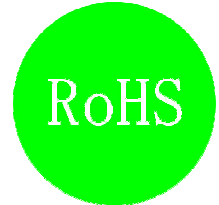
The LCD(M) Specialist

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PART NO. : WC1602A V8.1-STBLWHC06

FOR MESSRS. : _____

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ACCEPTED BY:

PROPOSED BY:

3. General specifications

3.1 General specifications

PLEASE REFER TO:

“CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-10000)”.

3.2 Quality Assurance and Warranty

PLEASE REFER TO:

“QUALITY ASSURANCE MANUL (MS-10-10001)”.

3.3 This individual specification is prior to general specifications

4. Mechanical data

- Display format: 16 characters x 2 lines
- Microprocessor interface: Support industry standard 3-wire (S9) and 2-wire (I²C) serial bus
- LCD type: STN Negative, Blue, Transmissive
- Backlight color: White, LED
- Viewing angle: 6 o'clock
- LCD controller: UCi7066C OR Equivalent
- Module size: 80x 36 x12mm
- View area: 64x16 mm
- Char size: 2.95 x 5.55 mm
- Dot pitch: 0.7 x 0.6mm
- Driving method: 1/16 duty, 1/5 bias

5. Absolute maximum ratings

5.1 Electrical absolute maximum ratings

<i>I T E M</i>	<i>SYMBOL</i>	<i>MIN.</i>	<i>MAX.</i>	<i>UNIT</i>	<i>COMMENT</i>
POWER SUPPLY FOR LOGIC	V _{DD} -V _{SS}	0	5.5	V	-----
INPUT VOLTAGE	V _I	V _{SS}	V _{DD}	V	-----
STATIC ELECTRICITY	-----	-----	-----	V	
POWER SUPPLY FOR BACKLIGHT	V _S	0	3.3	V _{rms}	-----
	f _{FL}	-----	-----	KHz	-----
STARTING VOLTAGE FOR BACKLIGHT	-----	-----	-----	V _{rms}	Ta = 25°C
	-----	-----	-----	V _{rms}	Ta = 25°C
POWER SUPPLY FOR LCD	V _{DD} -V ₀	-----	5.5	V	-----

5.2 Environmental absolute maximum ratings

<i>I T E M</i>	<i>OPERATING</i>		<i>STORAGE</i>		<i>COMMENT</i>
	<i>MIN.</i>	<i>MAX.</i>	<i>MIN.</i>	<i>MAX.</i>	
AMBIENT TEMPERATURE	-20°C	70°C	-30°C	80°C	-----
HUMIDITY	NOTE (2)		NOTE (2)		NO CONDENSATION
VIBRATION NOTE (3)	-----	0.5G	-----	2G	10~300Hz XYZ DIRECTIONS 1 Hr EACH
SHOCK NOTE (3)	-----	3G	-----	5G	10 msec XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		-----

NOTE (2): Ta ≦ 70°C : 75% RH MAX.

Ta > 70°C : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF
75% RH AT 70°C.

NOTE (3) : 1G = 9.8 m/s²

6. Electrical characteristics

Ta = 25°C VDD = 5.0 V

<i>I T E M</i>	<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>
Power supply voltage for circuit	V _{DD} -V _{SS}	-----	4.75	5.0	5.25	V
Power supply voltage for LCD drive	V _{DD} -V ₀	-----	-----	4.9	-----	V
LCD display duty ratio	DUTY	-----	-----	1/16	-----	-----
LED BACKLIGHT	I _{fp}	I mse0 plus 10% Dutg cyele		-----		mA
		Operating voltage	-----	3.1	3.2	V
		Forward current		15	20	mA
LED Lifetime	-----	V _{FL} =3.1Vrms f _{FL} = KHZ	-----	100,000	-----	Hr
Power supply LCD current	I _{EE}	V _{DD} -V ₀ = 4.9 V	-----	----	-----	mA

LED backlight: Due to the LED backlight working current is XXX Max, and LED chips Vop may be different, Wincom will adjust the backlight resistor according to the LED chips Vop, to meet the brightness maximum.

7. Optical characteristics

Ta = 25°C

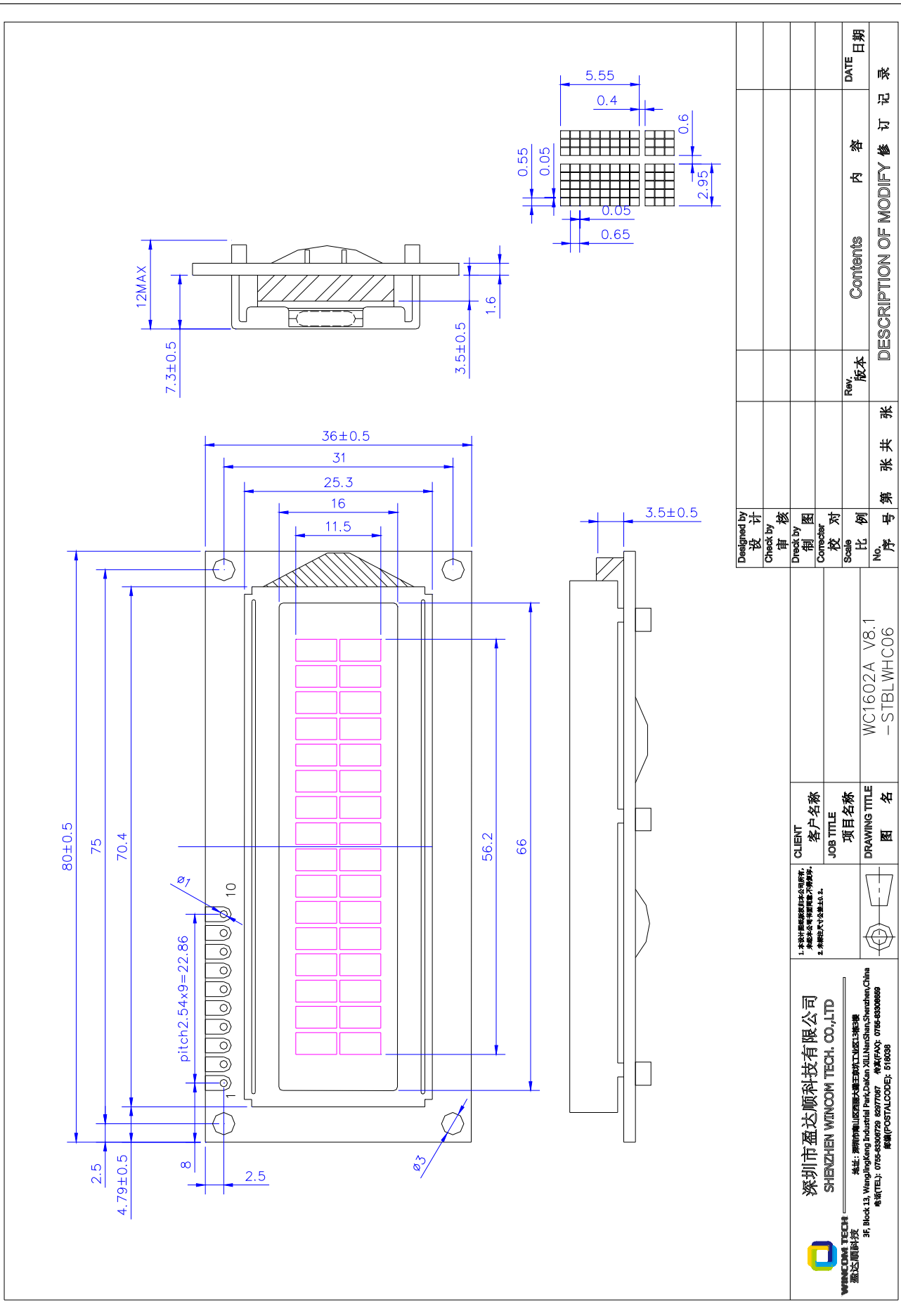
V_{DD}-V₀ = 4.9V

<i>I T E M</i>	<i>SYMBOL</i>	<i>CONDITION</i>	<i>MIN.</i>	<i>TYP.</i>	<i>MAX.</i>	<i>UNIT</i>	<i>NOTE</i>
Viewing angle	Φ2-Φ1	K ≥ 2.0	-35	-----	20	deg.	1
Contrast ratio	K	Φ = 10° θ = 0°	4.0	-----	-----	-----	1
Response time (at 25°C)	tr (rise)	Φ = 10° θ = 0°	-----	-----	250	ms	1
	tf (fall)	Φ = 10° θ = 0°	-----	-----	250	ms	1
The brightness of backlighting source	B	V _{FL} =3.0Vrms f _{FL} = KHZ	----	220	----	cd/m ²	2

NOTE (1): SEE CUSTOMER ACCEPTANCE STANDARD SPECIFICATION FOR DEFINITION OF OPTICAL CHARACTERISTICS

NOTE (2): UNDER NORMAL TEMPERATURE AND HUMIDITY IN A DARK ROOM

8. Outline dimension




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8.1 Interface

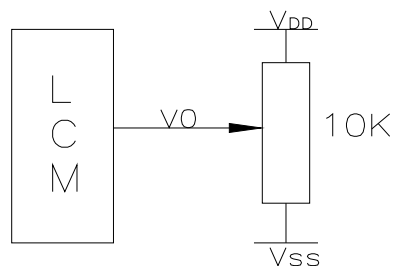
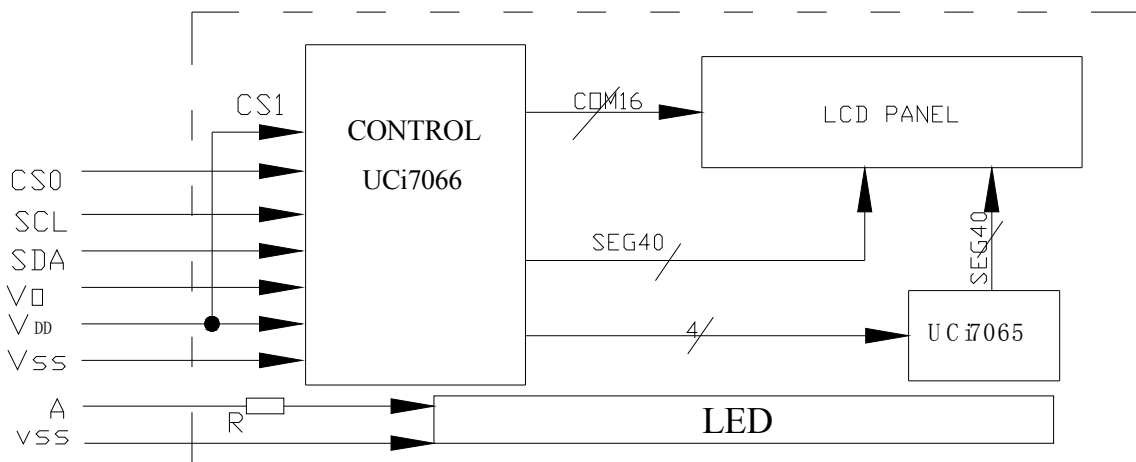
Pin Assignment

Pin NO.	Symbol		Level	Function	
	S9	I ² C			
1	V _{SS}	V _{SS}	0V	Ground	
2	V _{DD}	V _{DD}	5.0V	Power supply voltage for LCM(+)	
3	V ₀	V ₀	----	Contrast Adjust	
4	--	SDA	H/L	S9: NC I ² C: Serial Data	
5	--	SCL	H/L	S9: NC I ² C: Serial Clock	
6	CS ₀	--	H/L	S9: Chip Selection Signal. I ² C: NC	NOTE(1)
7	SCL	--	H/L	S9: Serial Clock I ² C: NC	
8	SDA	ID ₀	H/L	S9: Serial Data I ² C: Symbol of I ² C serial Bus address	NOTE(2)
9	--	ID ₁	H/L	S9: NC I ² C: Symbol of I ² C serial Bus address	NOTE(2)
10	A		(+5.0V)	Power supply for LED BL (+)	

NOTE(1): In SPI-S9 mode, SPI-S9 slave is selected when CS1="1" and CS0="0".

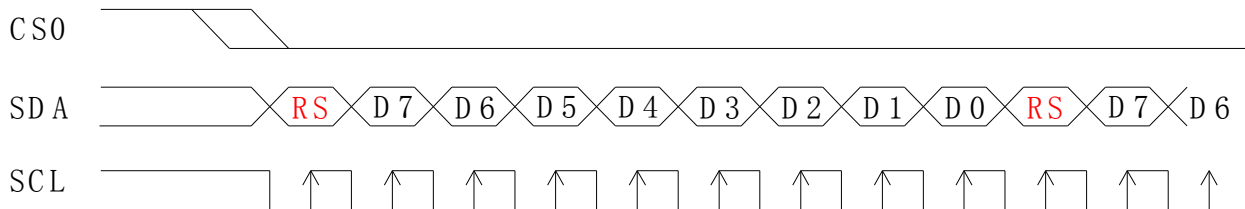
NOTE(2): In I²C mode, ID₀&ID₁, as the bus address, are selected for use.

9. Block diagram



10. S9 (3-wire) Interface

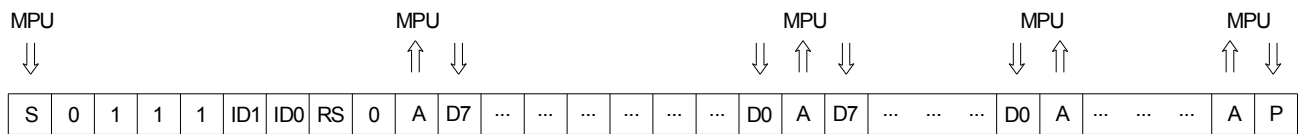
Only write operations are supported in this 3-wire serial mode. Pins CS\[1:0] are used for chip select and bus cycle reset. On each write cycle, the first bit is RS, which determines the content of the following 8 bits of data, MSB first. These 8 command or data bits are latched on rising SCK edges into an 8-bit data holder. If RS=0, the data byte will be decoded as command. If RS=1, this 8-bit will be treated as data and transferred to proper address in the Display Data RAM at the rising edge of the last SCK pulse. By sending RS information explicitly in the bit stream, control pin RS is not used, and should be connected to either VDD or VSS. The toggle of CS0 for each byte of data/command is recommended but optional.



11. 2-wire Serial Interface (I²C)

In I²C mode, Please refer to I²C standard for details of the bus signaling protocol. Please refer to AC Characteristic section for timing parameters of UltraChip implementation.

Each UCi7066c's I²C interface sequence starts with a START condition (S) from the bus master, followed by a sequence header, containing a device address, the mode of transfer (RS, 0:Control, 1:Data), and the direction of the transfer (R/W, 0:Write, 1:Read). Since both WR and RS are expressed explicitly in the header byte, the control pins CS[1:0].



2-wire Serial Interface (I²C)-Write mode



2-wire Serial Interface (I²C)-Read mode