TBC008002A SIRES Data Sheet

version 2.0

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MODULE DESCRIPTION

- **Control LSI is KS0066.**
- **Only 1.25mA Typical Input Current.**
- **5.545mm×2.945mm dot size.**
- **Jarless, Easy used, Good compatible.**
- **Typical Operation Voltage 3v-5v.**
- **Wide Operation Temperature From-40℃ To 70℃.**
- **STN positive display(green/yellow) and negative display(white/blue) are available.**
- **Contrast- AUTO-Electrical- Compensate Against Temprature is available freely .**

Ordering Information

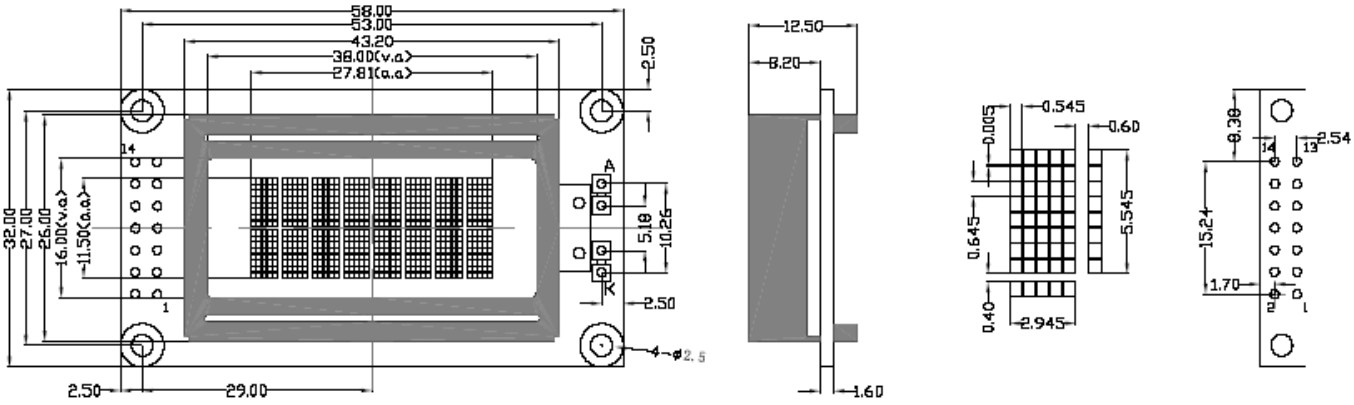
Model	Display model	Functional Definition
TBC008002D05	5V, STN Yellow-green	Base display function with LED. Operation Temperature From-20℃ To 70℃ "Standart English and Cirillic Font" inside HTC0802B-FL-YTP-03 is marked on the back of module.
TBC008002D10	3V-5V,STN Yellow-green	Contrast- AUTO-Electrical- Compensate Against Temprature Wide Operation Temperature From-40℃ To 70℃ Viewing angel 12:00 O'clock "Standart English and Cirillic Font" inside HTC0802B-FL-TBW-03 is marked on the back of module.

For Other more Display Model & Functional Definition Contact us please!
Manufacture_data Label is necessary for communications .

PHYSICAL DATA

Item	Contents	Unit
LCD type	STN	---
LCD duty	1/16	---
LCD bias	1/4	---
Viewing direction	6	o'clock
Module size (W×H×T)	58.0 × 32.0 ×12.5MAX	mm
Viewing area (W×H)	38.0 × 16.0	mm
Number of characters (characters ×lines)	8 × 2	---
Character matrix (W×H)	5 × 8	dots
Character size (W×H)	5.545 × 2.945	mm
Character pitch (W×H)	5.945×3.545	mm
Dot size (W×H)	0.645 ×0.545	mm
Dot pitch (W×H)	0.65x0.55	mm

EXTERNAL DIMENSIONS



INTERFACE PIN CONNECTIONS

PIN	SYMBOL	SIGNAL DESCRIPTION
1	VDD	Logic voltage supply(+5.0V)
2	VSS	Ground(0V)
3	V0	LCD driver voltage input
4	RS	Data/Instruction register select
5	R/W	Read/Write select
6	E	Enable signal
7~14	DB0~DB7	Data bus line
	A	LED backlight anode
	K	LED backlight cathode
*LCD can be driven by pin1, pin2,or A and K		

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

PARAMETER	SYMBOL	MIN	MAX	Unit
Supply voltage for logic	VDD	-0.3	7.0	V
Supply voltage for LCD	VDD- VO	-0.3	13.5	V
Input voltage	VI	-0.3	VDD+0.3	V
Operating temperature	TOP	-20	70	°C
Storage temperature	TST	-30	80	°C

ELECTRICAL CHARACTERRISTICS (VDD = +5V±10% , VSS = 0V, Ta = 25°C)

ITEM	SYMBOL	MIN	TYP	MAX	Unit	CONDITION
Input high voltage	V_{IH}		-	VDD	V	
Input low voltage	V_{IL}	-0.3	-	0.6	V	
Output high voltage	V_{OH}	2.4	-	VDD	V	
Output low voltage	V_{OL}	-	-	0.4 V		
Frame frequency	F_f	-	84.33	-	HZ	FOSC=270 KHZ
Oscillation frequency	F_{OSC}	-	270	-	KHZ	VDD=5V Rf=91kΩ±2%

Typical Electro-Optic Characteristics

No.	ITEM		SYMBOL	MIN	TYP	MAX	Unit	CONDITION
1	Supply voltage(Logic)		VDD-VSS	3.0	5.0	5.5	V	
2	Supply current (Logic)		IDD		1.25		mA	VDD=5V
3	LCD operating voltage		VDD-V0		4.4		V	0℃
				4.2	4.2	4.7	V	25℃
					4.0		V	50℃
4	Response time		Ton		176		ms	
			Toff		77		ms	
5	Contrast		CR	3				
6	Viewing angel	12H	⊖1		45		Deg.	(CR≥3.0)
		6H	⊖2		45			
		3H	⊖3		60			
		9H	⊖4		60			

RELIABILITY TEST

ITEM	SYMBOL	MIN	TYP	MAX	Unit	CONDITION
Forward Voltage	VF	4.0	4.2	4.4	V	IF=80mA
Reverse Voltage	VR		5		V	
Reverse Current	IR			100	μA	VR=4V
Power Dissipation	PD		75×16		mW	
Luminous Intensity	LV	115	140		cd/m^2	IF=80mA
Emission Wavelength	Λ P	569	572	575	nm	IF=80mA
Spectral Range	ΔΛ		25		nm	Ta=25℃

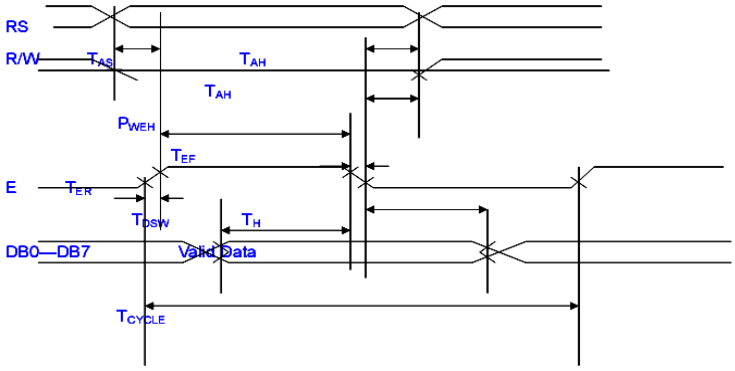
TIMING CHARACTERISTICS (VDD=4.5 to 5.5V)

Write operation and Read operation

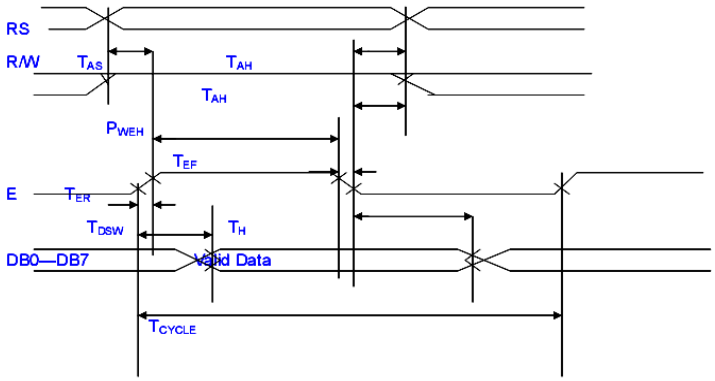
ITEM	SYMBOL	MIN	TYP	MAX	Unit
Enable Cycle Time	T_{CYCLE}	400	-	--	nS
Enable Pulse Width	P_{WEH}	150	-	--	nS
Enable Rise & Fall Time	T_{ER},T_{EF}	--	-	25	nS
Address Set-Up Time	T_{AS}	30	-	--	nS
Address Hold Time	T_{AH}	10	-	--	nS
Data Set-Up Time	T_{DSW}	40	-	--	nS
Data Hold Time	T_H	10	-	--	nS

ITEM	SYMBOL	MIN	TYP	MAX	Unit
Enable Cycle Time	T_{CYCLE}	400	--	--	nS
- Enable Pulse Width	P_{WEH}	150	--	--	nS
Enable Rise& Fall Time	T_{ER},T_{EF}	-	--	25	nS
Address Set-Up Time	T_{AS}	30	--	--	nS
Address Hold Time	T_{AH}	10	--	--	nS
Data Output Delay Time	T_{DSW}	-	--	100	nS
Data Hold Time	T_H	20	--	--	nS

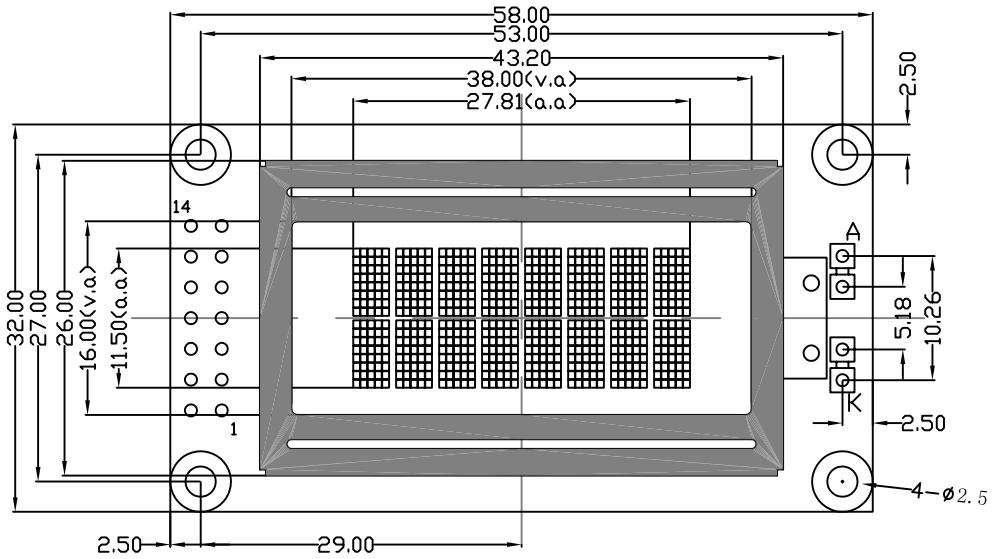
Write Operation:

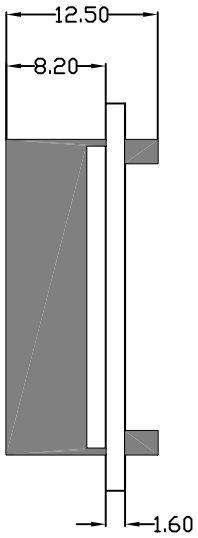


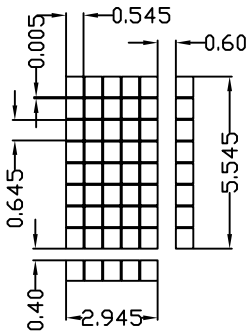
Read Operation

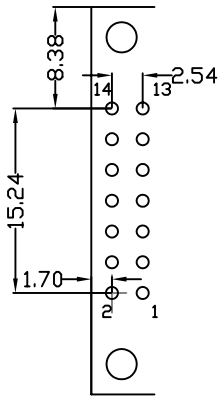


For more instruction information refer to KS0066 data-sheet.









PIN DETAIL

1 TOLERANCES UNLESS OTHERWISE SPECIFIED: ±0.25mm
2 ALL DIMENSION ARE IN mm
3 VIESING ANGLE: 12 O'CLOCK
4 POWER SUPPLY FOR LOGIC(VDD-VSS): 3.0V-5.0V
5 POWER SUPPLY FOR LCD(VDD-VEE): 4.2V
6 MULTIPLEX LEVEL: 1/16 DUTY,
7 OPERATING TEMPERATURE: -20°C TO 70°C for TBC008002A05 and -20°C TO 70°C for TBC008002A10
STORAGE TEMPERATURE: -30°C TO 70°C
8 LCD: STN (YELLOW-GREEN)
9 DISPLAY MODE: TRANSFLECTIVE / POSITIVE
10 Contrast- AUTO-Electrical- Compensate Against Temprature is available freely .
11 Drive IC:KS0066 or equel with Standart English and Cirillic Font.
12 Remark:HTC1602C-FL-YTW-03 is marked on the back of module.
13 With Manufacture_data Label

PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14
SIGNAL	VSS	VDD	V0	RS	R/W	E	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7

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DRAW BY:	DRAW NO: TBC008002A10-OUTLINE TBC008002A05-OUTLINE	
CHECKED BY:	UNIT: mm	
APPROVED BY:	SHEET NO:1 OF 1	REV: 1.0