

# XIAMEN PRECISE DISPLAY

## *SPECIFICATIONS FOR LIQUID CRYSTAL DISPLAY*

*PART NUMBER:*

*PCM0802A-FL-YBS-03*

*DATE:*

*2007.12.08*

## 1.0 MECHANICAL SPECS

1. Overall Module Size	40.0mm(W) x 35.4mm(H) x max 13.0mm(D) for LED backlight version
2. Dot Size	0.55mm(W) x 0.55mm(H)
3. Dot Pitch	0.60mm(W) x 0.60mm(H)
4. Duty	1/16
5. Controller IC	ST7066U or Equivalent
6. LC Fluid Options	STN
7. Polarizer Options	Positive Yellow-green and Transflective
8. Viewing Angle	6:00 o'clock
9. Backlight Options	LED(Yellow-green)
10. Temperature Range Options	Operating:-20°C ~ 70°C; Storage:-30°C ~ 80°C

## 2.0 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min	Typ	Max	Unit
Operating temperature (Wide Temp)	Top	-20	-	70	°C
Storage temperature (Wide Temp)	Tst	-30	-	80	°C
Input voltage	Vin	Vss		Vdd	V
Supply voltage for logic	Vdd- Vss	4.5	5.0-	5.0	V
Supply voltage for LCD drive	Vdd- Vo	4.2	4.5	5.5	V

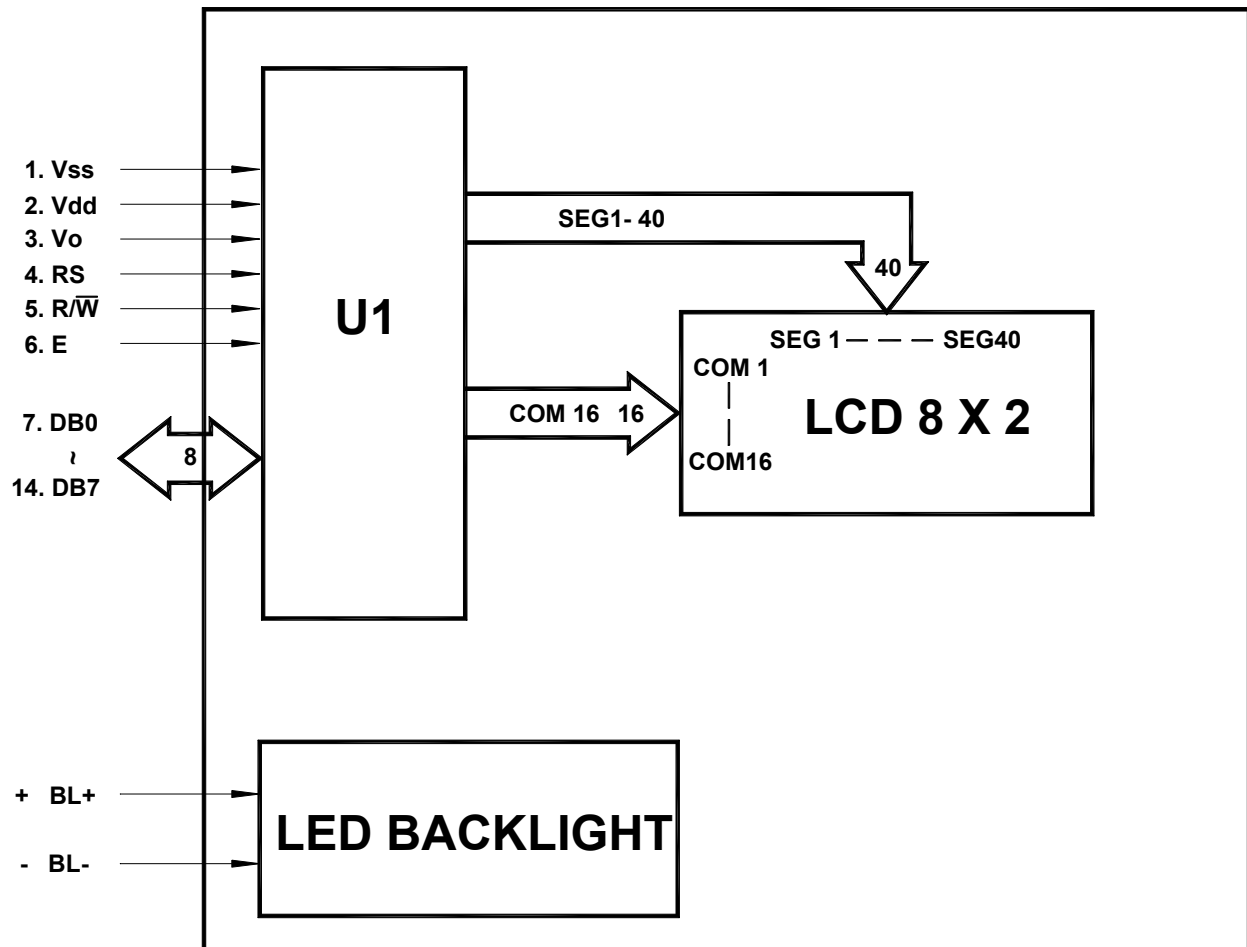
**3.0 ELECTRICAL CHARACTERISTICS**

Item	Symbol	Condition	Min	Typ	Max	Unit
Power Supply Voltage	Vdd	fosc=270kHz	2.7	5.0	5.5	V
Power Supply Current	Idd	Vdd=5.0V, fosc=270kHz	-	0.5	1.0	mA
Recommended LC Driving Voltage (Wide Temp)	Vdd - Vo	-20°C	-	4.8	5.4	V
		25°C	4.2	4.5	-	
		70°C	3.9	4.3	-	
BackLight Power Supply Voltage	Vf	R=6.8Ω	4.0	4.2	4.5	V
BackLight Power Supply Current	If	R=6.8Ω	-	70	-	mA

**4.0 OPTICAL CHARACTERISTICS (Ta=25°C, Vdd= 5.0V±0.25V, STN LC fluid)**

Item	Symbol	Condition	Min	Typ	Max	Unit
Viewing angle (horizontal)	θ	Cr ≥ 2.0	-60	-	35	deg
Viewing angle (vertical)	φ	Cr ≥ 2.0	-40	-	40	deg
Contrast Ratio	Cr	φ=0°, θ=0°	-	6	-	
Response time (rise)	Tr	φ=0°, θ=0°	-	150	250	ms
Response time (fall)	Tf	φ=0°, θ=0°	-	150	250	ms

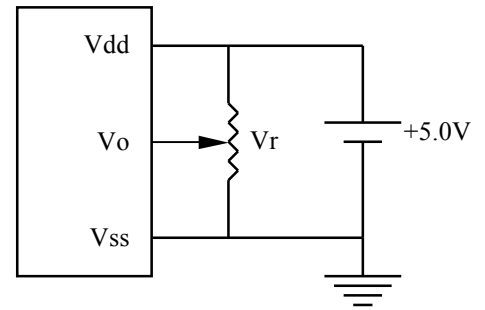
5.0 BLOCK DIAGRAM



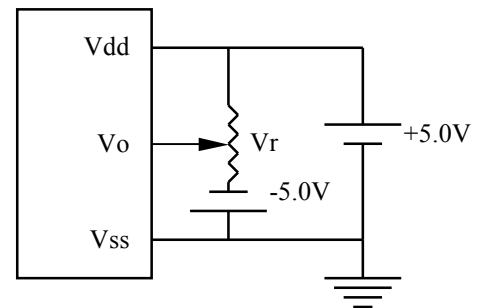
## 6.0 PIN ASSIGNMENT

Pin No.	Symbol	Function
1	Vss	Ground
2	Vdd	+5.0V
3	Vo	LCD contrast adjust
4	RS	Register select
5	R/W	Read / write
6	E	Enable
7	DB0	Data bit 0
8	DB1	Data bit 1
9	DB2	Data bit 2
10	DB3	Data bit 3
11	DB4	Data bit 4
12	DB5	Data bit 5
13	DB6	Data bit 6
14	DB7	Data bit 7
15	A	Power Supply for BL+
16	K	Power Supply for BL-

## 7.0 POWER SUPPLY



STANDARD TEMP RANGE



WIDE TEMP RANGE

$V_r = 10K\Omega \sim 20K\Omega$

## 8.0 TIMING CHARACTERISTICS

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Enable cycle time	$t_c$	Fig. a, Fig. b	500	-	-	ns
Enable pulse width	$t_w$	Fig. a, Fig. b	220	-	-	ns
Enable rise/fall time	$t_r, t_f$	Fig. a, Fig. b	-	-	25	ns
RS, R/W set up time	$t_{su}$	Fig. a, Fig. b	40	-	-	ns
RS, R/W hold time	$t_h$	Fig. a, Fig. b	10	-	-	ns
Data delay time	$t_d$	Fig. b	-	-	120	ns
Data set up time	$t_{dsu}$	Fig. a	60	-	-	ns
Data hold time	$t_{dh}$	Fig. a, Fig. b	20	-	-	ns

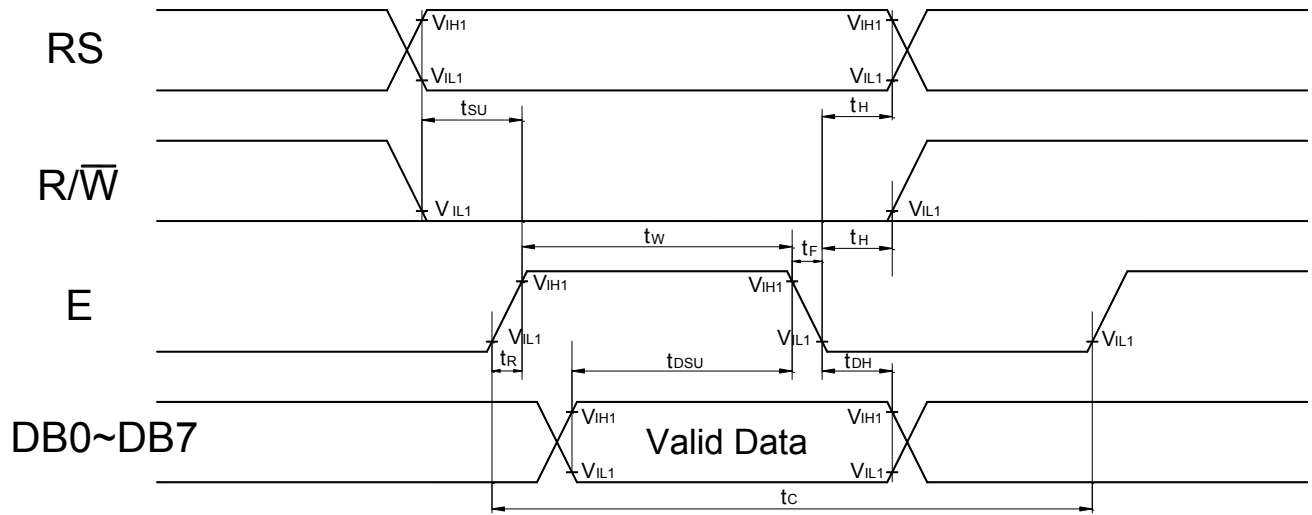


Fig. a Interface timing (data write)

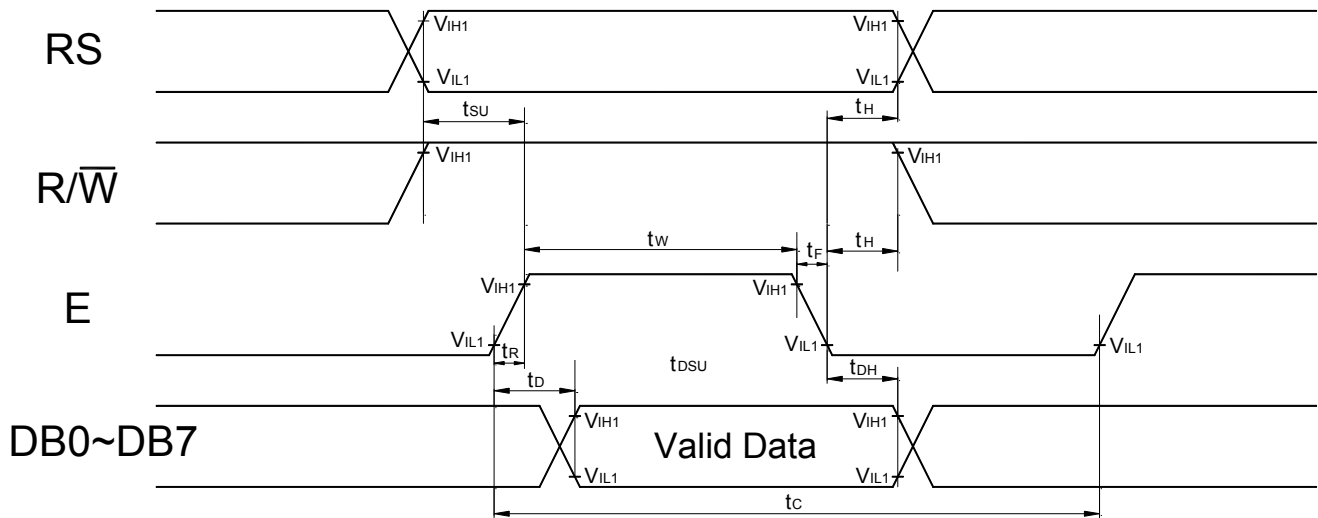
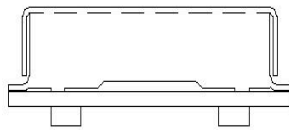
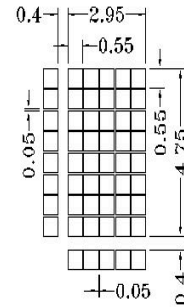
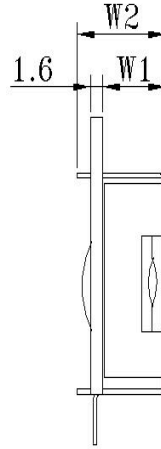
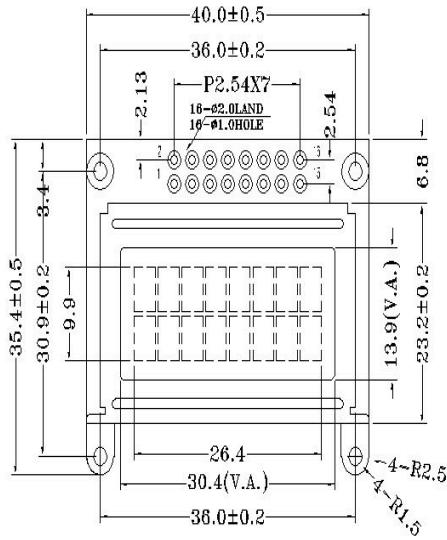


Fig. b Interface timing (data read)

**9.0 MECHANICAL DIAGRAM**



PERFORMANCE FEATURES	
LC FLUID:	STN
SUPPLY VOLTAGE:	VDD=5.0V
POLARIZER:	TRANSFLECTIVE, POSITIVE
VIEWING ANGLE:	6:00
COLOR:	YELLOW-GREEN
BACKLIGHT:	YELLOW-GREEN, Vbkl=5.0V
OPERATING TEMP:	-20°C TO 70°C
STORAGE TEMP:	-30°C TO 80°C
DRIVER:	ST7066U-0A or Equivalent

Version	W1	W2
LED BKL	9.00±0.5	13.00 MAX

TOLERANCES UNLESS OTHERWISE SPECIFIED ±0.2

PIN	1	2	3	4	5	6	7	8
SIGNAL	VSS	VDD	V0	RS	R/W	E	DB0	DB1
PIN	9	10	11	12	13	14	15	16
SIGNAL	DB2	DB3	DB4	DB5	DB6	DB7	A	K

厦门精显电子有限公司 XIAMEN PRECISE DISPLAY CO., LTD.	绘图: 张瑞 审核: CMO 批准: JZJAWG	绘图编号: PCM0802A-FL-YBS-03 客户编号: LCM0802A-FL-YBS-03 图纸版号: V1.0	单位: mm 日期: 2007.12.8 页数: 1/1
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## 10.0 RELIABILITY TEST

Storage Condition	Content	Evaluations and Assessment*			
		Current Consumption	Oozing	Contrast	Other Appearances
Operation at high temperature and humidity	40°C,90% RH,240hrs	Twice initial value or less	none	More than 80% of initial value	No abnormality
High temperature storage	60°C, 240hrs	Twice initial value or less	none	More than 80% of initial value	No abnormality
Low temperature storage	-20°C, 240hrs	Twice initial value or less		More than 80% of initial value	No abnormality

\*Evaluations and assessment to be made two hours after returning to room temperature (25°C±5°C).

\*The LCDs subjected to the test must not have dew condensation.

## 11.0 DDRAM ADDRESS

1	2	3	4	5	6	7	8
00	01	02	03	04	05	06	07
40	41	42	43	44	45	46	47



**12.0 DISPLAY INSTRUCTION TABLE**

COMMAND	R S	R/ W	DB 7	DB 6	DB 5	DB 4	DB 3	DB 2	DB 1	DB 0	DESCRIPTION	Executing time fosc=250khz
Clear Display	0	0	0	0	0	0	0	0	0	1	Clears Display & Returns to Address 0.	1.64ms
Cursor at Home	0	0	0	0	0	0	0	0	1	x	Returns Cursor to Address 0. Also returns the display being shifted to the original position. DDRAM contents remain unchanged.	1.64ms
Entry Mode Set	0	0	0	0	0	0	0	1	I/D	S	I/D: Set Cursor Moving Direction I/D=1: Increment I/D=0: Decrement  S: Specify Shift of Display S=1: The display is shifted S=0: The display is not shifted	40µs
Display ON/OFF Control	0	0	0	0	0	0	1	D	C	B	Display D=1: Display on D=0: Display off Cursor C=1: Cursor on C=0: Cursor off Brink B=1: Brink on B=0: Brink off	40µs
Cursor / Display Shift	0	0	0	0	0	1	S/C	R/L	x	x	Moves cursor or shifts the display w/o changing DD RAM contents S/C=0: Cursor Shift (RAM unchanged) S/C=1: Display Shift (RAM unchanged) R/L=1: Shift to the Right R/L=0: Shift to the Left	40µs
Function Set	0	0	0	0	1	DL	N	F	x	x	Sets data bus length (DL), # of display lines (N), and character fonts (F). DL=1: 8 bits            F=0: 5x7 dots DL=0: 4 bits            F=1: 5x10 dots N=0: 1 line display N=1: 2 lines display	40µs
Set CG RAM Address	0	0	0	1	Character Generator (CG) RAM Address						Sets CG RAM address. CG RAM data is sent and received after this instruction.	40µs
Set DD RAM Address	0	0	1	Display Data (DD) RAM Address / Cursor Address						Sets DD RAM address. DD Ram data is sent and received after this instruction.	40µs	
Busy Flag / Address Read	0	1	B F	Address counter used for both DD & CG RAM address						Reads Busy Flag (BF) and address counter contents.	40µs	
Write Data	1	0	Write Data						Writes data into DDRAM or CGRAM.	46µs		
Read Data	1	1	Read Data						Reads data from DDRAM or CGRAM.	46µs		

x: Don't Care

**13.0 STANDARD CHARACTER PATTERNS**

NO.7066-0A

b7-b4 b3-b0	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	CG RAM (1)			0	1	P	^	F				-	9	3	8	P
0001	(2)		!	1	A	Q	a	4			.	7	7	4	3	q
0010	(3)		"	2	B	R	b	r			"	イ	ウ	×	P	B
0011	(4)		#	3	C	S	c	s			∪	ウ	7	E	3	∞
0100	(5)		\$	4	D	T	d	t			√	I	ト	ト	μ	∞
0101	(6)		%	5	E	U	e	u			.	オ	オ	∩	∞	∞
0110	(7)		&	6	F	V	f	v			ワ	カ	ニ	ヨ	P	Σ
0111	(8)		*	7	G	W	g	w			ア	キ	又	ワ	g	π
1000	(1)		(	8	H	X	h	x			イ	ウ	*	ウ	J	又
1001	(2)		)	9	I	Y	i	y			ウ	7	J	U	∩	U
1010	(3)		*	:	J	Z	j	z			α	コ	∩	∩	J	7
1011	(4)		+	:	K	L	k	l			*	ウ	E	∩	∞	π
1100	(5)		.	<	L	*	l	l			ト	ヨ	ウ	ウ	∞	π
1101	(6)		-	=	M	I	m	i			ユ	又	∩	∩	∞	÷
1110	(7)		.	>	N	^	n	→			ヨ	E	ホ	∩	∩	
1111	(8)		/	?	O	_	o	+			ウ	ウ	又	"	∩	■

Note: The character generator RAM is the RAM with which the user can rewrite character patterns by program.