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SPECIFICATION FOR APPROVAL

客户名称

CUSTOMER :

客户型号

CLIENT TYPE :

产品编号

PRODUCTION NO.: 0802C

出品日期

SHIPMENT DATE: 2012年6月18日

客户确认签章:

VALIDATED:

	签名 SIGNATURE	日期 DATE
拟制 PREPARED	王俏	2012.6.18
审核 CHECKED	罗锦炜	2012.6.18
批准 APPROVED	罗锦炜	2012.6.18

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3. GENERAL SPECIFICATIONS :

3-1 SCOPE:

This specification covers the delivery requirements for the liquid crystal display delivered by QUALITY to Customer.

3-2 PRODUCTS:

Liquid Crystal Display Module (LCM)

3-3 MODULE NAME:

0802C

4. FEATURES :

(1) Display Type: STN/YELLOW_GREEN, 6 O'CLOCK, Transmissive/Positive.

(2) Driving Method: 1/16 DUTY, 1/5 BIAS

(3) Built-in controller: SPLC780D1-001A-C,SPLC100B1-C

(5) VDD:5.0V Vop: 5.0V

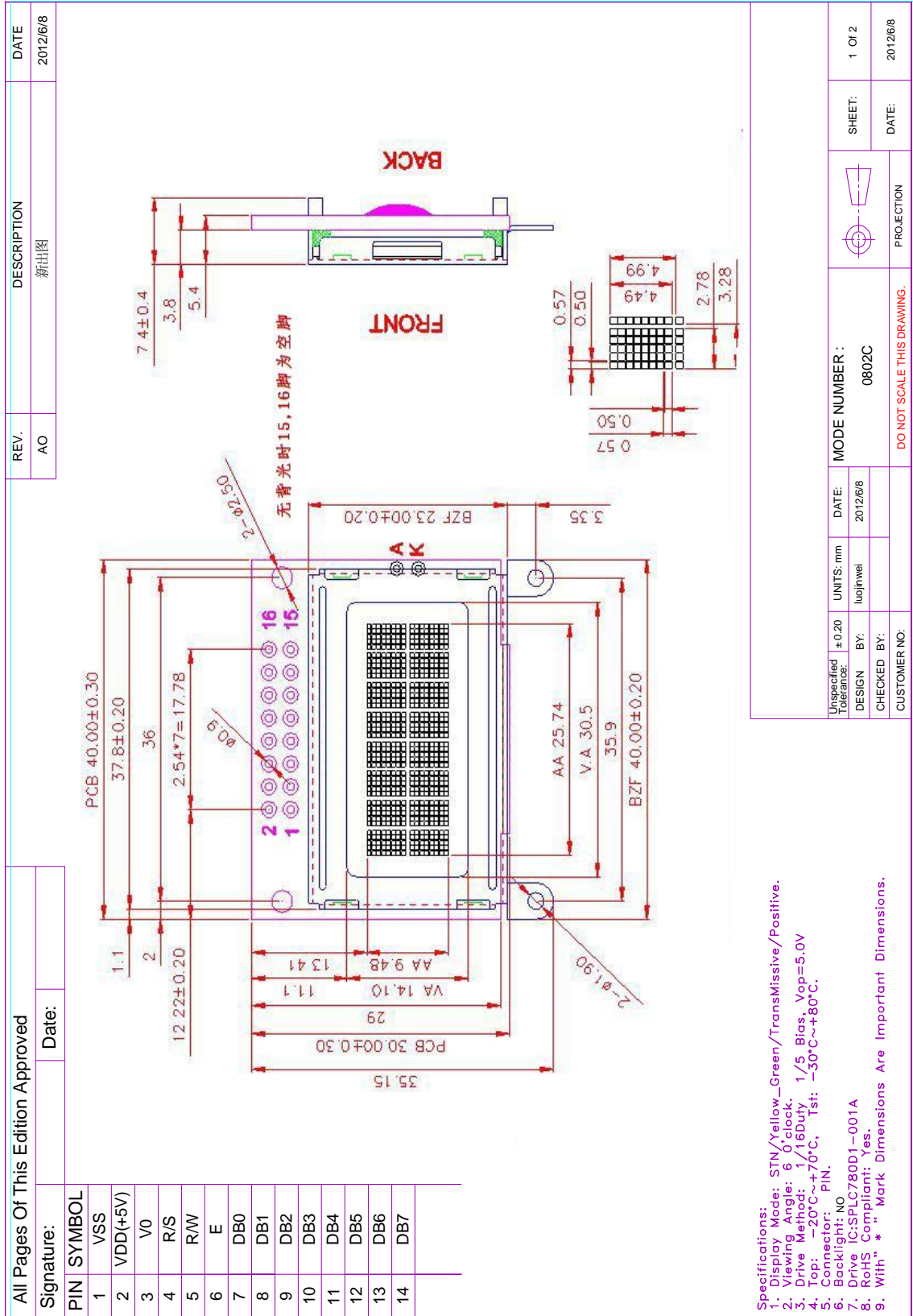
5. MACHANICAL SPECIFICATIONS :

ITEM	SPECIFICATIONS	UNIT
MODULE SIZE	40.00(W)x36.65 (H)x12.50MAX(D)	mm
VIEWING AREA	30.00 (W) x 14.00(H)	mm
ACTIVE AREA	25.74 (W) x9.48(H)	mm
DOT SIZE	0.50(W) x0.50 (H)	mm
DOT PITCH	0.57(W) x0.57(H)	mm
BACKLIGHT	Yellow_Green	
ASSY.TYPE	COB	---
WEIGHT	TBD	

NOTES:

LCM should be grounded during handling LCM.

6. OUTLINE DIMENSIONS



Specifications:

1. Display Mode: STN/Yellow_Green/Transmissive/Positive.
2. Viewing Angle: 6° clock.
3. Drive Method: 1/16Duty 1/5 Bias, Vop=5.0V
4. Top: -20°C~+70°C, Tst: -50°C~+80°C.
5. Connector: PIN.
6. Backlight: NO
7. Drive IC: SPLC780D1-001A
8. RoHS Compliant: Yes.
9. With* * Mark Dimensions Are Important Dimensions.

UNspecified
Tolerance:
± 0.20

DESIGN BY: luojinwei
CHECKED BY:
CUSTOMER NO:

MODE NUMBER :
0802C

DATE: 2012/6/8
SHEET: 1 Of 2
PROJECTION

DATE: 2012/6/8

DO NOT SCALE THIS DRAWING.

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7. ABSOLUTE MAXIMUM RATING

Characteristic	Symbol	Standard Value			Unit
		MIN	TYP	MAX	
Power Supply Voltage(1)	VDD	-0.3	5.0	+5.5	V
Power Supply Voltage(2)	LCD	VSS+7.0	5.0	VSS-0.3	V
Operating Temperature	TOPR	-20	—	+70	°C
Storage Temperature	TSTG	-30	—	+80	°C
Input Voltage	VIN	-0.3	—	VDD+0.3	V

8. ELECTRICAL CHARACTERISTICS (VDD=2.7~4.5V)

(V_{DD} = 2.7V to 4.5V, T_A = -30 to +85°C)

Characteristic	Symbol	Condition	Min	Typ	Max	Unit
Operating Voltage	V _{DD}	—	2.7	—	4.5	V
Operating Current	I _{DD}	Internal oscillation or external clock (V _{DD} = 3.0V, f _{osc} = 270kHz)	—	0.15	0.3	mA
Input Voltage (1) (except OSC1)	V _{IH1}	—	0.7 V _{DD}	—	V _{DD}	V
	V _{IL1}	—	-0.3	—	0.55	
Input Voltage (2) (OSC1)	V _{IH2}	—	0.7V _{DD}	—	V _{DD}	V
	V _{IL2}	—	—	—	0.2 V _{DD}	
Output Voltage (1) (DB0 to DB7)	V _{OH1}	I _{OH} = -0.1mA	0.75 V _{DD}	—	—	V
	V _{OL1}	I _{OL} = 0.1mA	—	—	0.2 V _{DD}	
Output Voltage (2) (except DB0 to DB7)	V _{OH2}	I _O = -40μA	0.8V _{DD}	—	—	V
	V _{OL2}	I _O = 40μA	—	—	0.2V _{DD}	
Voltage Drop	V _{dCOM}	I _O = ± 0.1mA	—	—	1	V
	V _{dSEG}		—	—	1	
Input Leakage Current	I _{LKG}	V _{IN} = 0V — V _{DD}	-1	—	1	μA
Input Low Current	I _{IL}	V _{IN} = 0V, V _{DD} = 3V (pull up)	-10	-50	-120	
Internal Clock (external Rf)	f _{OSC1}	Rf = 75kΩ ± 2% (V _{DD} = 3V)	190	270	350	kHz
External Clock	f _{OSC2}	—	125	270	410	kHz
	duty		45	50	55	%
	t _R , t _F		—	—	0.2	μS
LCD Driving Voltage	V _{LCD}	V _{DD} -V5 (1/5, 1/4 bias)	3.0	—	13.0	V

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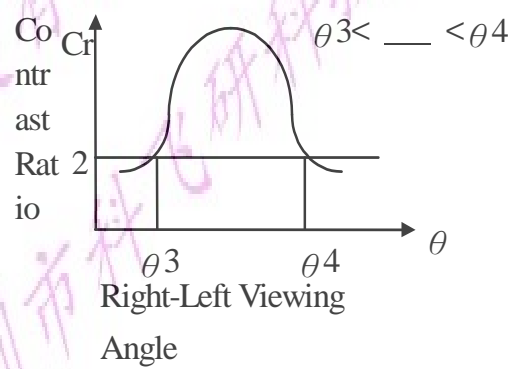
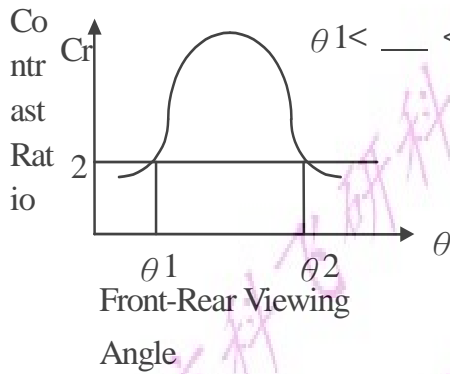
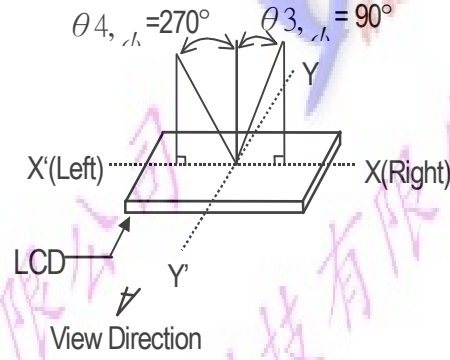
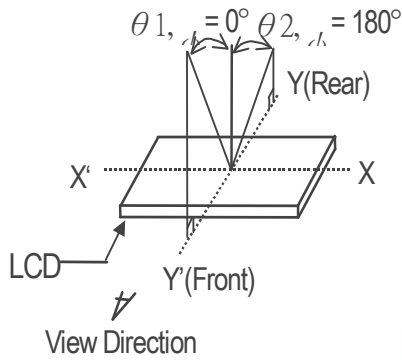
9. LED BACKLIGHT

NO



10 .OPTICAL CHARACTERISTICS

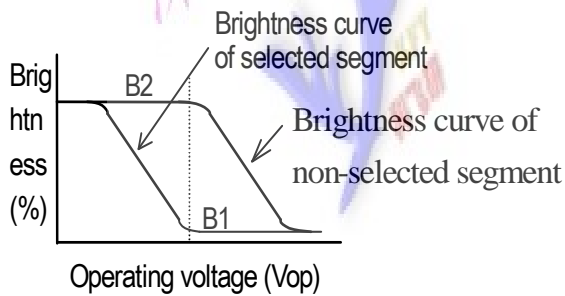
(1) DEFINITION OF VIEWING ANGLE



(2) DEFINITION OF CONTRAST

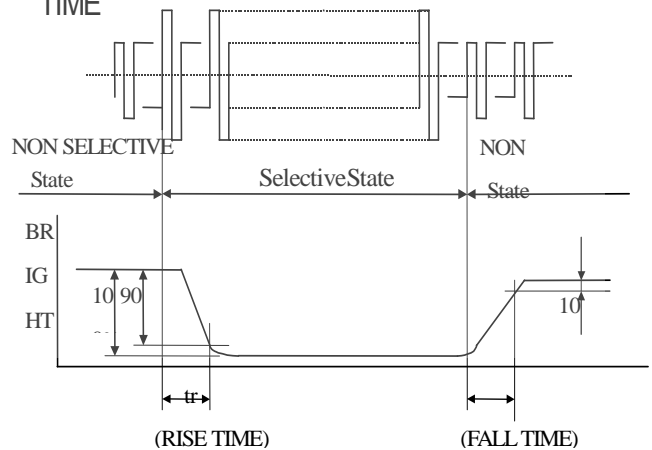
RATIO

$$C.R = \frac{\text{Brightness of nonselected segment (B2)}}{\text{Brightness of selected segment}}$$

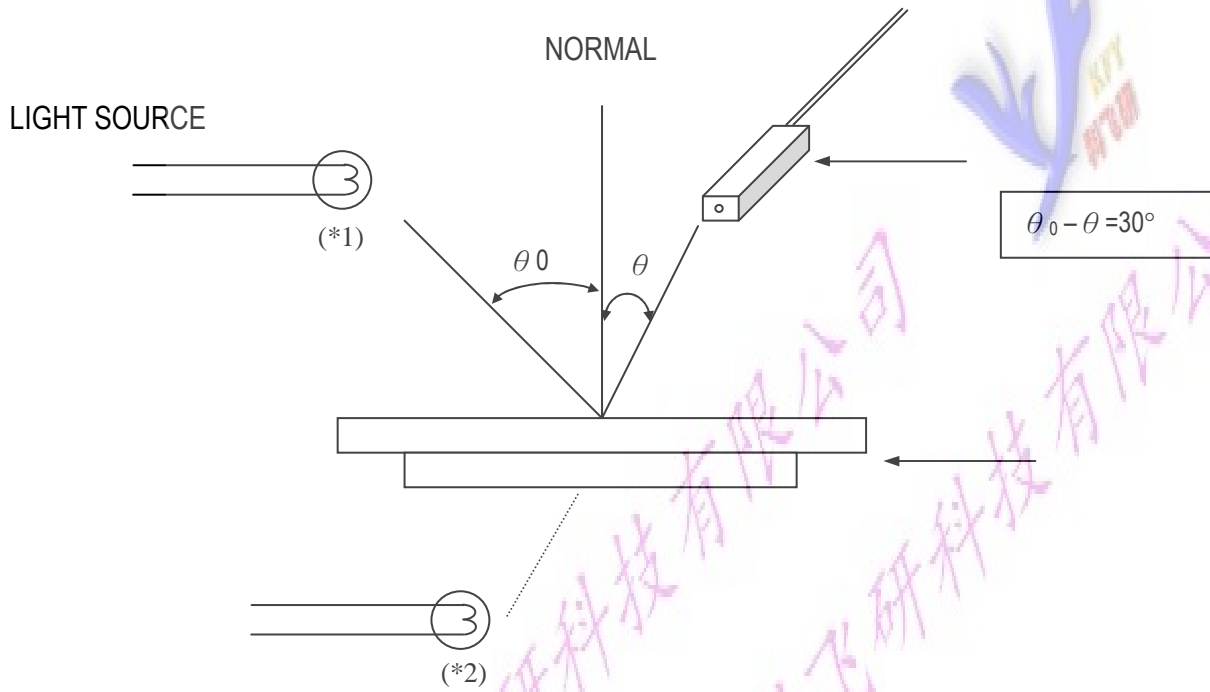


(3) DEFINITION OF RESPONSE

TIME



(3) Measuring Instruments For Electro-optical Characteristics

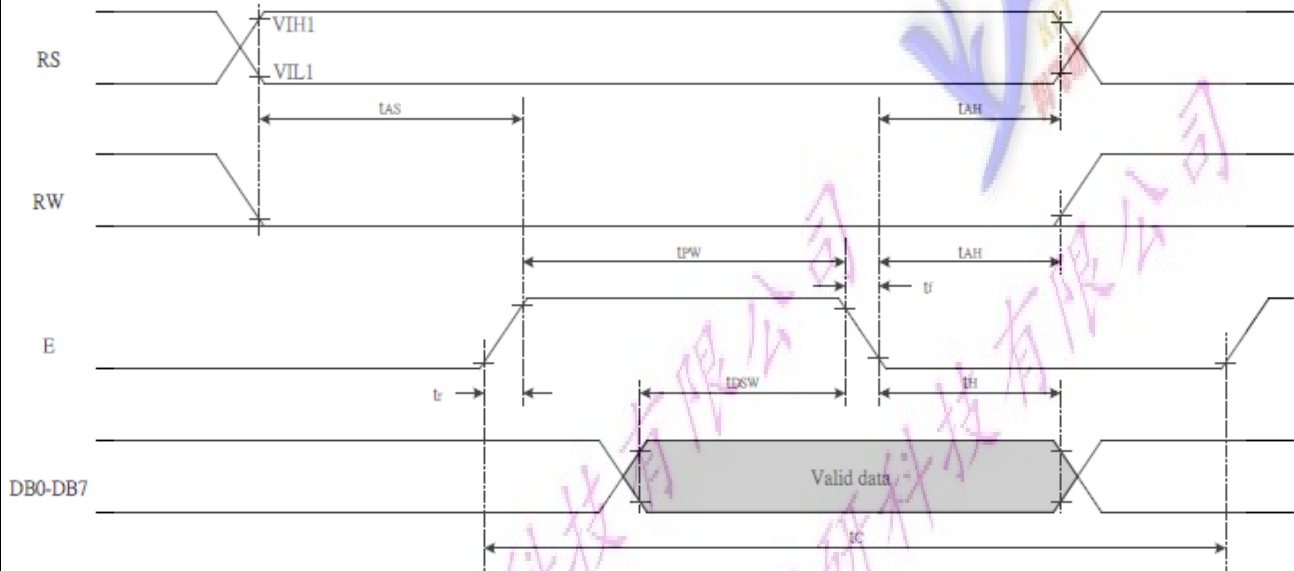


*1. Light source position for measuring the reflective type of LCD panel

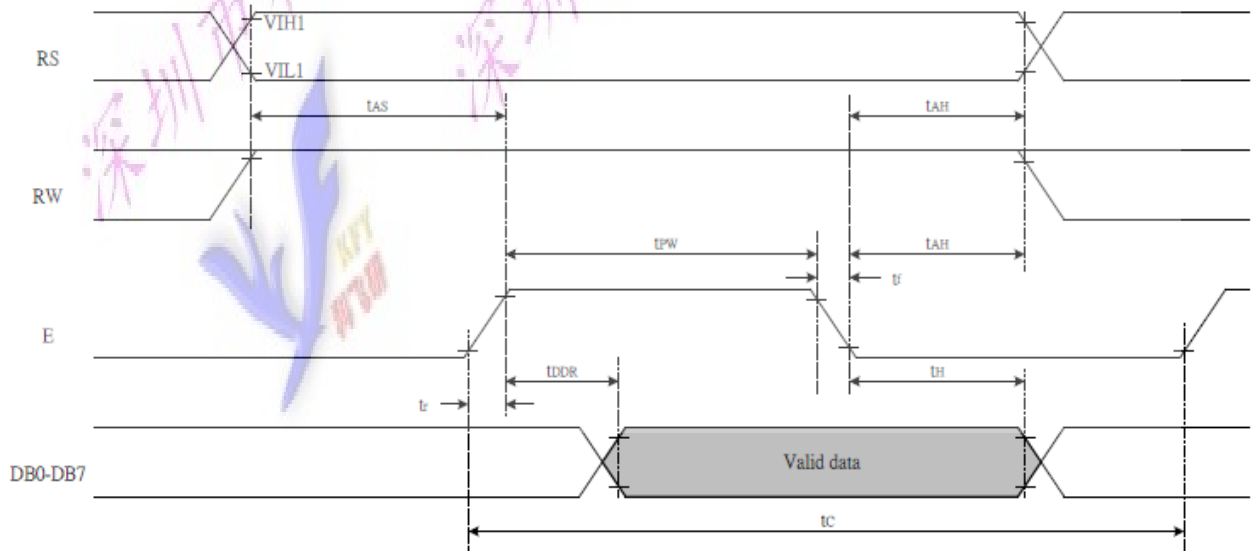
*2. Light source position for measuring the transmissive / transmissive types of LCD panel

11. TIMING CHARACTERISTICS (VDD = 5.0V)

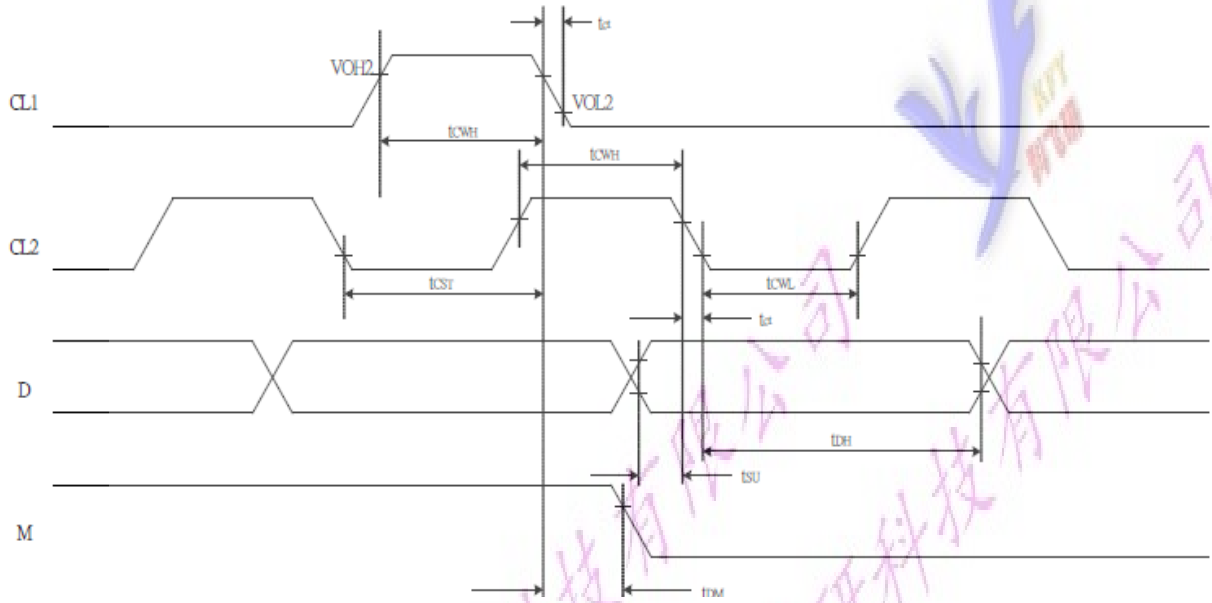
Write data from mpu to splc780d1



Read data from splc780d1 to mpu



● Interface Timing with External Driver



12. PIN ASSIGNMENT

PIN NO.	FUNCTION DESCRIPTIONS	SYMBOL
1	Ground	VSS
2	Supply Voltage for logical circuit,"+5V"	VDD (5V)
3	LCD driver circuit	VO
4	Data or Instruction. "L" is instruction,"H" is Data	RS
5	Read or Write. "L" is Write, "H" is Read	R/W
6	Enable signal. write mode (R/W=L) → data of DB<0:7> is latched at the falling edge of E. read mode (R/W=H) → DB<0:7> appears the reading data while E is at high level.	E
7-14	Data bus. There state I/O common terminal.	<u>D0-D7</u>
15	Backlight "+" ,+5V"	<u>LEDA (5V)</u>
16	Backlight "-".	<u>LEDK</u>

13.INSTRUCTIONS

Instruction	Instruction Code										Description	Description Time (270KHz)
	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		
Clear Display	0	0	0	0	0	0	0	0	0	1	Write "20H" to DDRAM. and set DDRAM address to "00H" from AC	1.52 ms
Return Home	0	0	0	0	0	0	0	0	1	x	Set DDRAM address to "00H" from AC and return cursor to its original position if shifted. The contents of DDRAM are not changed.	1.52 ms
Entry Mode Set	0	0	0	0	0	0	0	1	I/D	S	Sets cursor move direction and specifies display shift. These operations are performed during data write and read.	37 us
Display ON/OFF	0	0	0	0	0	0	1	D	C	B	D=1:entire display on C=1:cursor on B=1:cursor position on	37 us
Cursor or Display Shift	0	0	0	0	0	1	S/C	R/L	x	x	Set cursor moving and display shift control bit, and the direction, without changing DDRAM data.	37 us
Function Set	0	0	0	0	1	DL	N	F	x	x	DL:interface data is 8/4 bits N:number of line is 2/1 F:font size is 5x11/5x8	37 us
Set CGRAM address	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	Set CGRAM address in address counter	37 us
Set DDRAM address	0	0	1	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Set DDRAM address in address counter	37 us
Read Busy flag and address	0	1	BF	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Whether during internal operation or not can be known by reading BF. The contents of address counter can also be read.	0 us
Write data to RAM	1	0	D7	D6	D5	D4	D3	D2	D1	D0	Write data into internal RAM (DDRAM/CGRAM)	37 us
Read data from RAM	1	1	D7	D6	D5	D4	D3	D2	D1	D0	Read data from internal RAM (DDRAM/CGRAM)	37 us

14.FONT

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	2	3	4	5	6	7	8	9	A	B	C
0001	(2)	!	1	A	0	a	9			.	7	*	4	a	g	
0010	(3)	"	2	B	R	b	r			T	Y	X	P	0		
0011	(4)	#	3	C	S	c	s			J	0	T	e	s	x	
0100	(5)	\$	4	D	T	d	t			\	L	K	P	a		
0101	(6)	%	5	E	U	e	u			*	7	*	L	a	0	
0110	(7)	&	6	F	V	f	v			9	0	=	3	P	Z	
0111	(8)	'	7	G	W	g	w			7	#	X	7	g	π	
1000	(1)	<	8	H	X	h	x			4	0	*	U	r	X	
1001	(2)	>	9	I	Y	i	y			5	7	J	U	'	Y	
1010	(3)	*	:	J	Z	j	z			=	0	0	V	j	7	
1011	(4)	+	;	K	L	k	l			*	7	E	0	*	A	
1100	(5)	,	<	L	#	l	l			8	9	7	7	*	m	
1101	(6)	-	=	M	I	m	i			a	X	>	U	l	-	
1110	(7)	.	>	N	^	n	^			3	E	E	^	n		
1111	(8)	/	?	O	_	o	_			9	U	7	"	o	■	

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15. ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	CONDITIONS	CRITERION
OPERATING TEMPERATURE	TOPR	-20°C ~ +70°C	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
STORAGE TEMPERATURE	TSTG	-30°C ~ +80°C	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION

16. RELIABILITY

ITEM	CONDITIONS	CRITERION
OPERATING TEMPERATURE	HIGH TEMPERATURE +70°C 96HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
	LOW TEMPERATURE -20°C 96HRS	
STORAGE TEMPERATURE	HIGH TEMPERATURE +80°C 96HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
	LOW TEMPERATURE -30°C 96HRS	
HUMIDITY	40°C 90%RH 96HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
VIBRATION	<ul style="list-style-type: none"> • Operating Time: thirty minutes exposure for each direction (X,Y,Z) • Sweep Frequency: 10~55Hz (1 min) • Amplitude: 1.5mm 	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
THERMAL SHOCK	-20°C (30mins) ←→ +70°C (30mins) 10 cycles	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION

*NOTE: TEST CONDITION

(1) TEMPERATURE AND HUMIDITY: IF NO SPECIFICATION, TEMP. SET AT 25±2°C, HUMIDITY SET AT 60±5%RH

(2) OPERATING STATE: SAMPLES SUBJECT TO THE TESTS SHALL BE IN "OPERATING" CONDITION

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17. Precaution for Use

The following precautions should be followed, since this module contains precise parts.

- (1) Do not store module for an extended periods of time under the conditions of high temperature and high humidity.
- (2) Avoid using or storing the module in areas that expose it to direct sunlight or ultraviolet rays.
- (3) Use protective finger covers when handling the module to avoid scratching or staining the module.
- (4) Care should be taken not to expose the module to static electricity, because the module contains C-MOS LSI's.
- (5) The LSI is sensitive to light.

The user's product should be designed so that LSI is not exposed to any light during operation.

- (6) During installation, cover the display area with acrylic protection plates to protect the polarizer plate and LCD cells.
- (7) Do not apply any excessive shocks to the module because the module contains sensitive LCD cells. Do not use a module, which has experienced strong mechanical shock.
- (8) Care should be taken when the power supply turns on as following.
 - (a) Do not apply any input signals before the supplying voltage is applied.
 - (b) Do not turn off the power supply while any input signals are applied.

Caution

- (1) Dangerous. Do not shock glass because glass can break.
- (2) If module breaks, do not touch it directly.
(Glass could stick or cut skin.)
- (3) Do not swallow Liquid Crystal.
(In case of broken LCD panel, do not swallow liquid crystal even if there is no proof that liquid crystal is poisonous.)
- (4) If liquid crystal is exposed to skin, wash the area thoroughly with alcohol or soap.
- (5) When disposing of the product, please observe industrial waste disposal laws in each country and district.
- (6) In case of injury, give immediate treatment and consult with a doctor.
- (7) This product is constructed precisely. Don't disassemble or modify.

※ Neglecting this mark can cause injury to humans and damage to materials