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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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RECORDS OF REVISION

DATE	REVISED NO.	REVISED DESCRIPTIONS	PREPARED	CHECKED	APPROVED
6.18.2012	01	FIRST ISSUE			

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
(4) LED Backlight: WHITE, If=20mA & Vf=3.0±0.1V
(5) VDD:5.0V Vop：5.0V

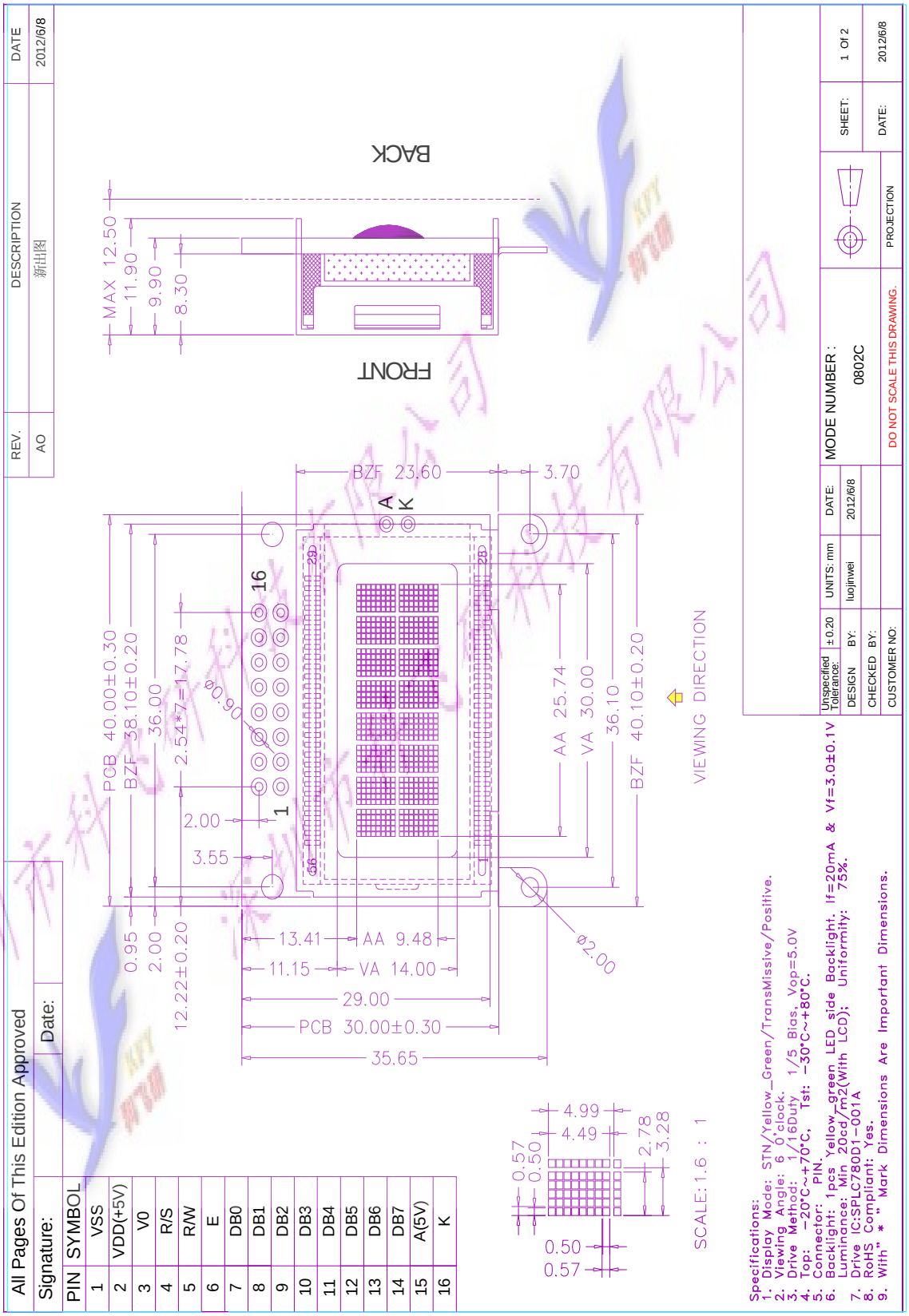
5. MACHANICAL SPECIFICATIONS：

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



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	^{0}C
Storage Temperature	TSTG	-30	—	+80	^{0}C
Input Voltage	VIN	-0.3	—	VDD+0.3	V

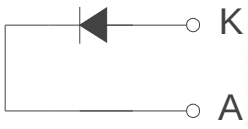
8.ELECTRICAL CHARACTERISTICS (VDD=2.7~4.5V)

(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, fosc = 270kHz)	–	0.15	0.3	mA
Input Voltage (1)	V_{IH1}	–	0.7 V_{DD}	–	V_{DD}	V
(except OSC1)	V_{IL1}	–	-0.3	–	0.55	
Input Voltage (2)	V_{IH2}	–	0.7V_{DD}	–	V_{DD}	V
(OSC1)	V_{IL2}	–	–	–	0.2 V_{DD}	
Output Voltage (1)	V_{OH1}	I_{OH} = -0.1mA	0.75 V_{DD}	–	–	V
(DB0 to DB7)	V_{OL1}	I_{OL} = 0.1mA	–	–	0.2 V_{DD}	
Output Voltage (2)	V_{OH2}	I_O = -40μA	0.8V_{DD}	–	–	V
(except DB0 to DB7)	V_{OL2}	I_O = 40μA	–	–	0.2V_{DD}	
Voltage Drop	Vd_{COM}	I_O = ± 0.1mA	–	–	1	V
	Vd_{SEG}		–	–	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

9. LED BACKLIGHT

9-1 POWER SUPPLY FOR LED BACKLIGHT



WHITE LED(SMD): 1X1=1 Dies

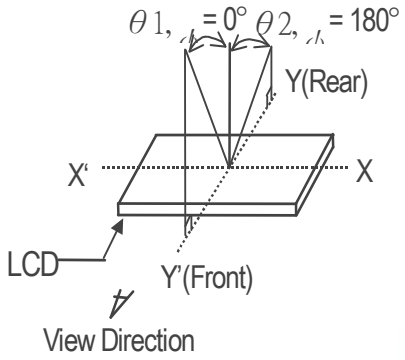
9-2 ELECTRICAL-OPTICAL CHARACTERISTICS

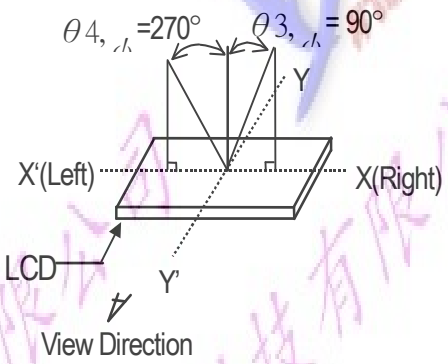
(Ta=25℃.Unless specified,The Ambient temperature Ta=25℃)

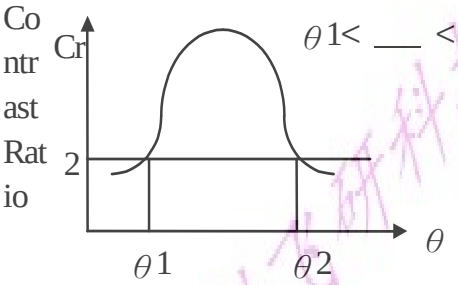
Item	Symbol	CONDITIONS	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
Forward Voltage	Vf	If=20mA	4.9	5.0	5.1	V
Reverse Current	Ir	Vr=5V	-	-	100	uA
Spectral Line Half width	△λ	IF=20mA T=25℃	-	-	-	nm
Peak wave length	λp			-		nm
Luminance	Lv	IF=20mA	70		-	Cd/m²
Uniformity	△	MIN/MAX=100%	75	-		%

10 .OPTICAL CHARACTERISTICS

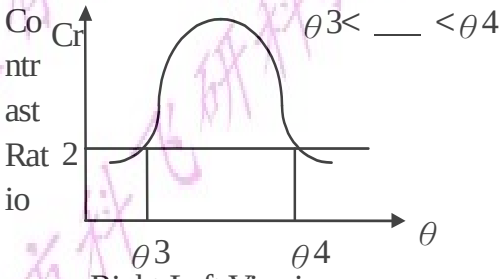
(1) DEFINITION OF VIEWING ANGLE







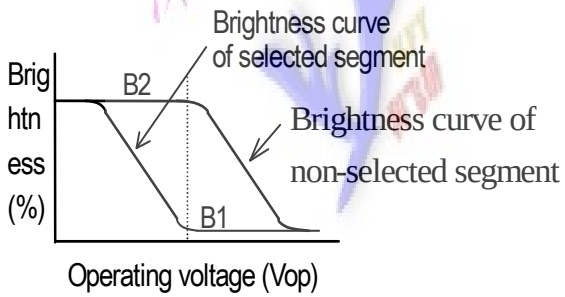
Front-Rear Viewing Angle



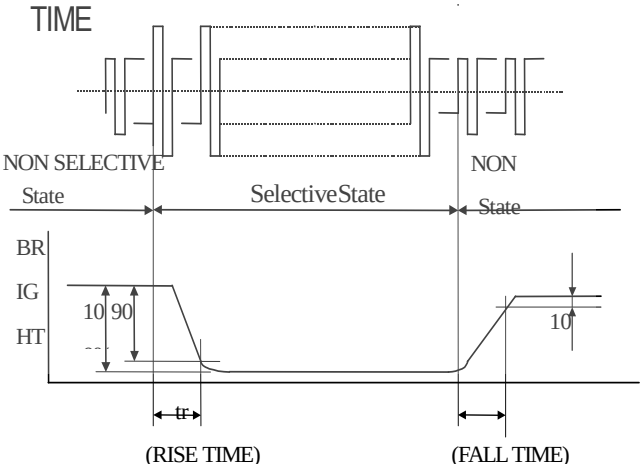
Right-Left Viewing Angle

(2) DEFINITION OF CONTRAST RATIO

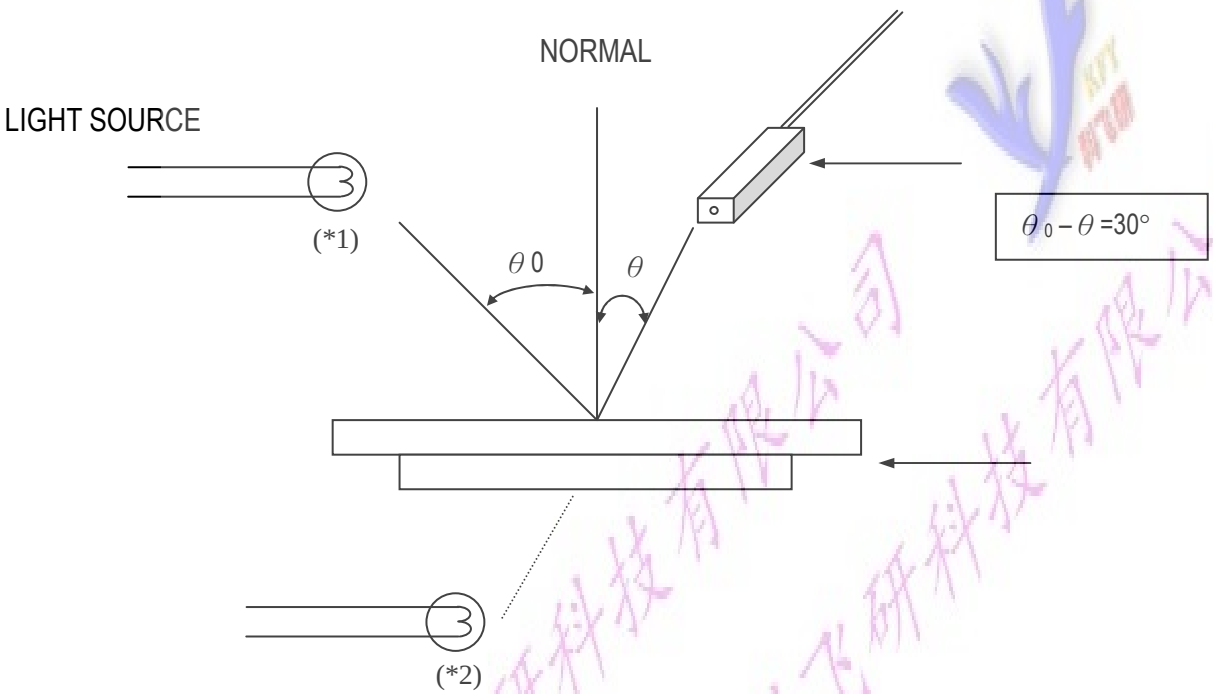
$$C.R = \frac{\text{Brightness of non-selected segment (B2)}}{\text{Brightness of selected segment}}$$



(3) DEFINITION OF RESPONSE TIME



(3) Measuring Instruments For Electro-optical Characteristics

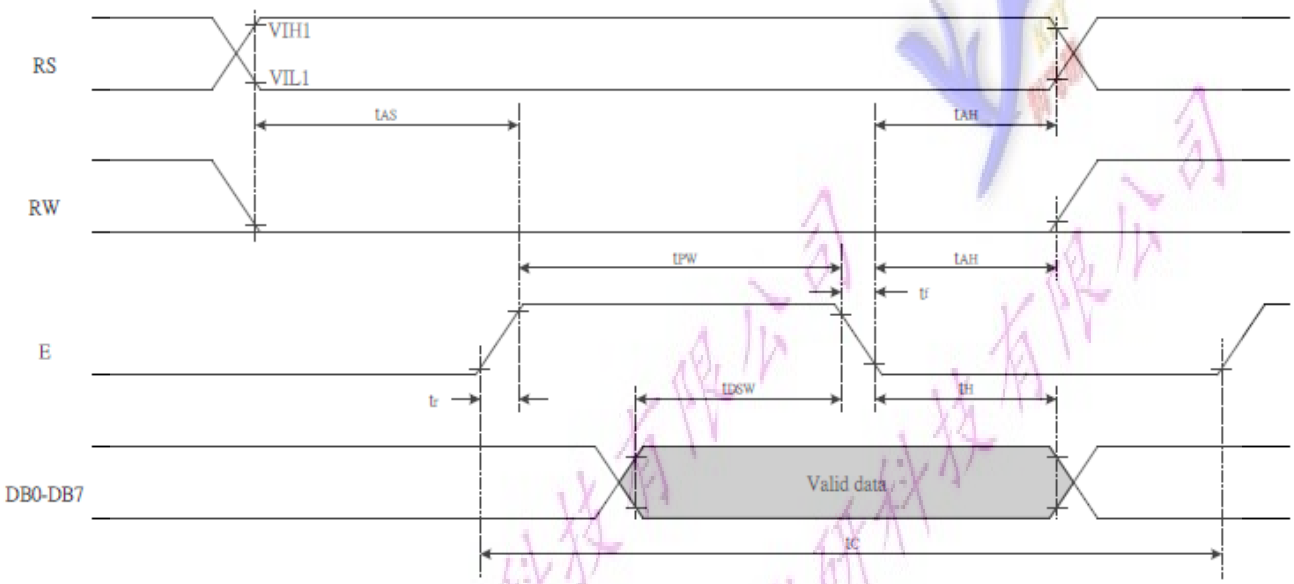


*1.Light source position for measuring the reflective type of LCD panel

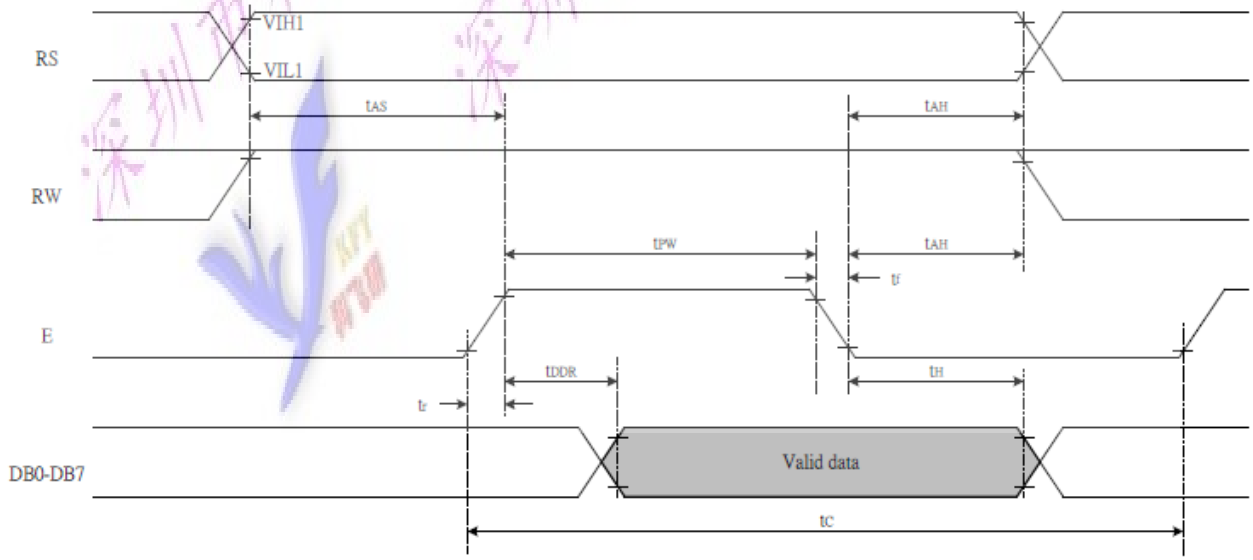
*2.Light source position for measuring the transflective / transmissive types of LCD panel

11.TIMING CHARACTERISTICS (VDD = 5..0V)

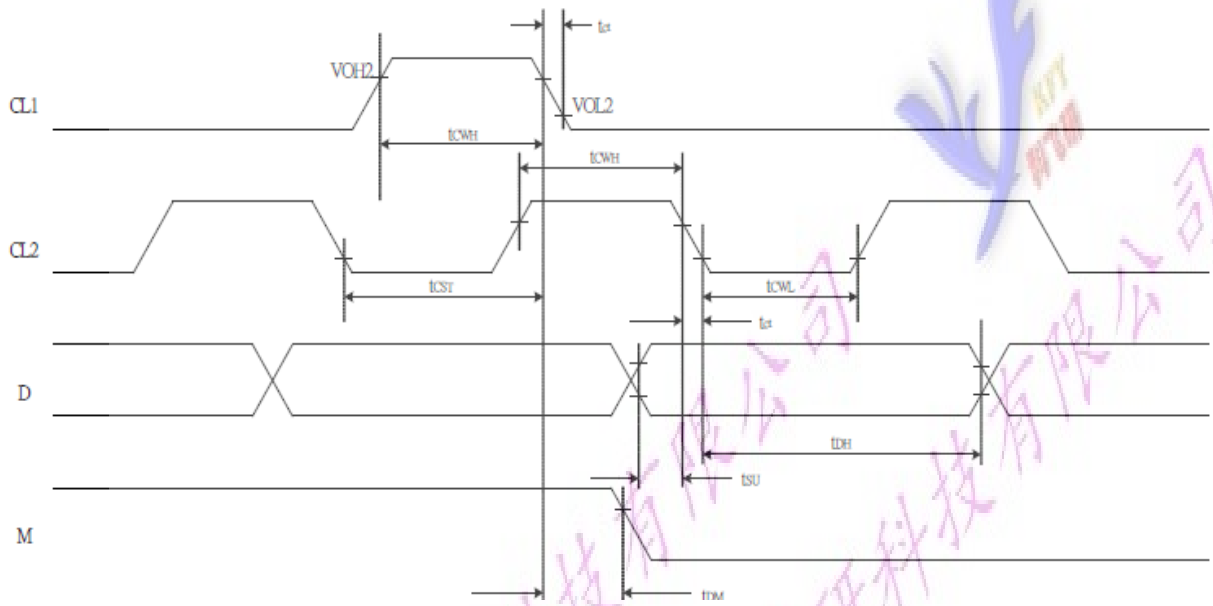
Write data from mpu to splc780d1



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.	D0-D7
15	Backlight "+" ,+5V"	LEDA（5V）
16	Backlight "-".	LEDK

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)
0001 (2)
0010 (3)
0011 (4)
0100 (5)
0101 (6)
0110 (7)
0111 (8)
1000 (1)
1001 (2)
1010 (3)
1011 (4)
1100 (5)
1101 (6)
1110 (7)
1111 (8)

ABLE

15. ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

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

16.RELIABILITY

ITEM	CONDITIONS	CRITERION
OPERATING TEMPERATURE	HIGH TEMPERTURE +70℃ 96HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
	LOW TEMPERTURE -20℃ 96HRS	
STORAGE TEMPERATURE	HIGH TEMPERTURE +80℃ 96HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
	LOW TEMPERTURE - 30℃ 96HRS	
HUMIDITY	40℃ 90%RH 96HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
VIBRATION	• 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℃(30mins) ←→+70℃(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℃, HUMIDITY SET AT 60±5%RH

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

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