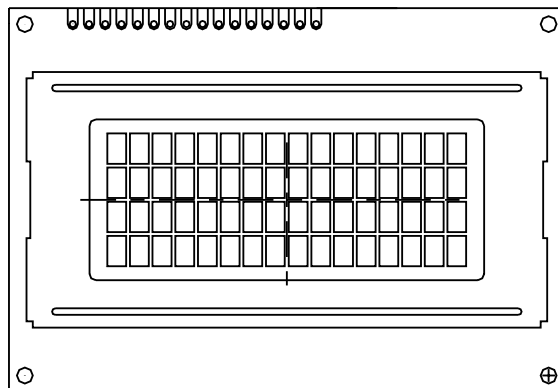




PRODUCT SPECIFICATION

HDM16416H-S00S

16 CHARACTERS , 4 LINES
LCD DISPLAY MODULE



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? ?General Specifications

1.Features

- A. Drive Method: 1/16 Duty, 1/5 Bias
- B. The Module Operating Voltage: 5.0V;
- C. The LCD Operating Voltage : 4.7V;
- D. Viewing Direction: 6:00
- E. Operating Temperature: 0°C ~50°C
- F. Storage Temperature: -20°C ~70°C
- G. Display type: STN mode, Positive type display

2.Mechanical Data and Conditions:

- (1) Module Size-----87.0 w *60.0 h mm
- (2) Viewing Area ----- 61.8 w * 25.2 h mm
- (3) Dot Size -----0.55 w * 0.55 h mm
- (4) Character Size -----2.95 w *4.75 h mm
- (5) Number of Characters -----16 Characters*4 Line
- (6) Outline Dimensions-----See Attached Drawing `

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3.Pin Connections:

Pin No.	Symbol	Function
1	VSS	Ground(0v)
2	VDD	Logic Supply Voltage(+5.0v)
3	VEE	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
15	LED+	LED Power
16	LED-	LED Power

4. Absolute Maximum Ratings

Characteristics	Symbol	Ratings	Unit	Note
Operating Voltage	VDD	-0.3 to +7.0	V	
Driver Supply Voltage	V _{LCD}	VDD - 10 to VDD + 0.3	V	
Input Voltage Range	V _{IN}	-0.3 to VDD + 0.3	V	

Note: Stresses beyond those given in the Absolute Maximum Rating table may cause operational errors or damage to the device. For normal operational conditions see AC/DC Electrical Characteristics.

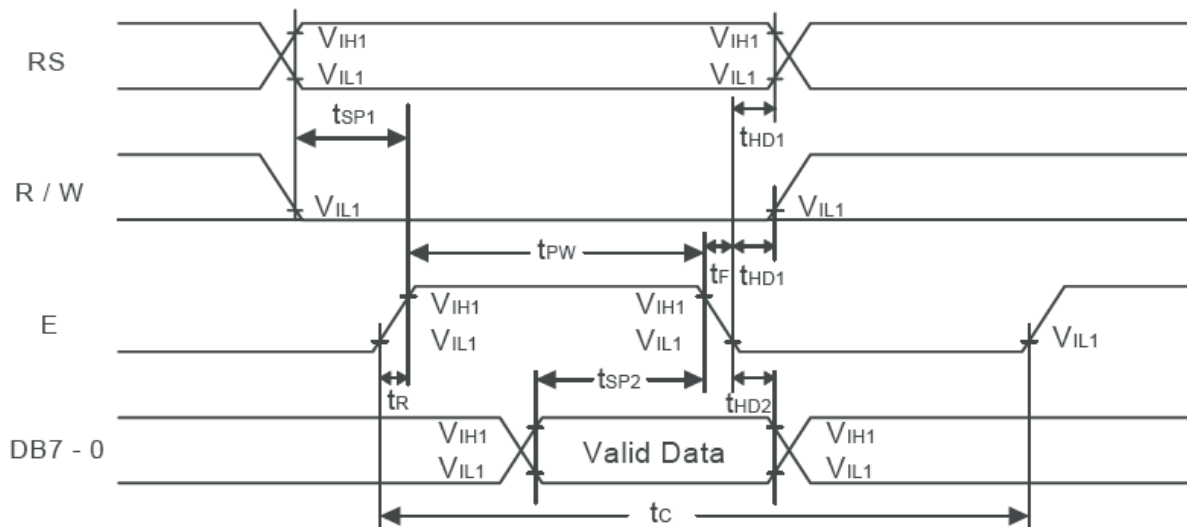
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5. Timing Characteristics:

Write Operation Writing Data from MPU to SPLC780D1

Characteristics	Symbol	Limit			Unit	Test Condition
		Min.	Typ.	Max.		
E Cycle Time	t_c	400	-	-	ns	Pin E
E Pulse Width	t_{PW}	150	-	-	ns	Pin E
E Rise/Fall Time	t_R, t_F	-	-	25	ns	Pin E
Address Setup Time	t_{SP1}	30	-	-	ns	Pins: RS, R/W, E
Address Hold Time	t_{HD1}	10	-	-	ns	Pins: RS, R/W, E
Data Setup Time	t_{SP2}	40	-	-	ns	Pins: DB0 - DB7
Data Hold Time	t_{HD2}	10	-	-	ns	Pins: DB0 - DB7

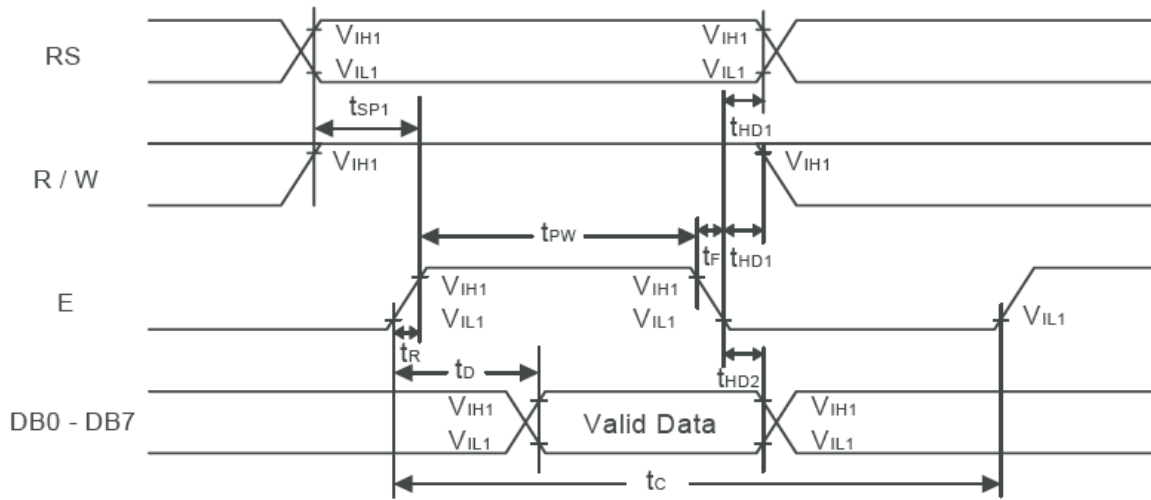
Write mode timing diagram Writing Data from MPU to SPLC780D1



Read Operation Reading Data from SPLC780D1 to MPU

Characteristics	Symbol	Limit			Unit	Test Condition
		Min.	Typ.	Max.		
E Cycle Time	t_c	400	-	-	ns	Pin E
E Pulse Width	t_w	150	-	-	ns	Pin E
E Rise/Fall Time	t_r, t_f	-	-	25	ns	Pin E
Address Setup Time	t_{SP1}	30	-	-	ns	Pins: RS, R/W, E
Address Hold Time	t_{HD1}	10	-	-	ns	Pins: RS, R/W, E
Data Output Delay Time	t_d	-	-	100	ns	Pins: DB0 - DB7
Data hold time	t_{HD2}	5.0	-	-	ns	Pin DB0 - DB7

Read mode timing diagram Reading Data from SPLC780D1 to MPU



.The Characteristics and The Reliability Test

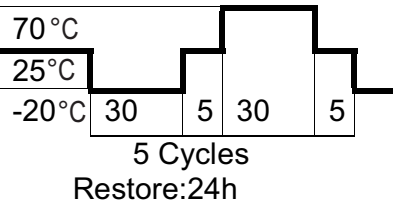
1.Electro-Optic Characteristics:

Condition:TEMP=(23 ± 3) °C

NO	Item	Symbol	Min.	Typ.	Max.	Unit	Condition
1	Supply Voltage(Logic)	Vdd-Vss		5.0		V	
3	LCD Operating Voltage	Vdd-V ₀		4.9		V	0°C
				4.7		V	25°C
				4.5		V	50°C
4	Response Time	Ton		180		ms	
		Toff		212		ms	
5	Contrast	CR	2				
6	Viewing Angel	12H	1	50		Deg.	(CR ≥ 2.0)
		6H	2	65			
		3H	3	58			
		9H	4	58			

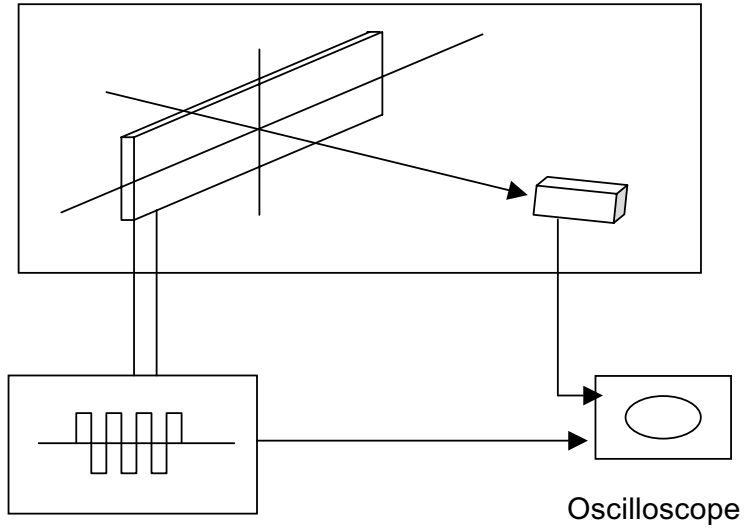
:

3. Reliability Test

No	Items	Test Condition	Equipment	Test Result
1	High Temp Storage	Temp: $70 \pm 2^\circ\text{C}$ Time: 96h Restore: 24h	Tenny	Passed
2	Low Temp Storage	Temp: $-20 \pm 3^\circ\text{C}$ Time: 96h Restore: 24h	Tenny	Passed
3	High Temp Static drive	Temp: $50 \pm 2^\circ\text{C}$ Vop: 5V Time: 24h Restore: 24h	Tenny	Passed
4	Low Temp Static drive	Temp: $0 \pm 3^\circ\text{C}$ Vop: 5V Time: 24h Restore: 24h	Tenny	Passed
5	High Temp High Hum Storage	Temp: $40 \pm 2^\circ\text{C}$ Hum: 95%Rh Time: 96h Restore: 24h	Tenny	Passed
6	Thermal Shock	Temp: ($^\circ\text{C}$)  70 $^\circ\text{C}$ 25 $^\circ\text{C}$ -20 $^\circ\text{C}$ 30 5 30 5 5 Cycles Restore: 24h	Tenny	Passed

The Equipment and LCD Measuring Method

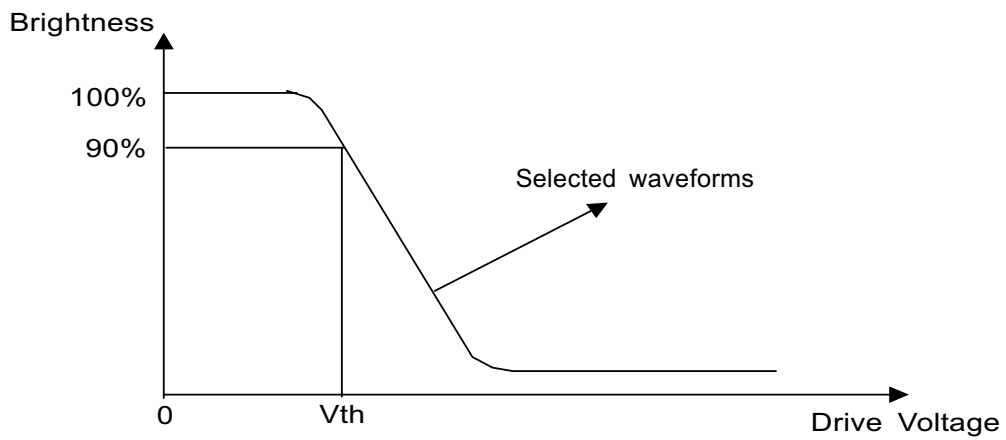
1. Equipment



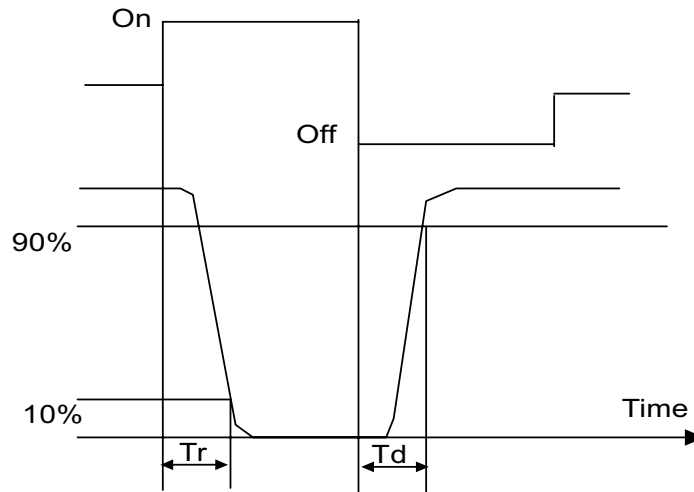
Waveform Generator

(2) Definition

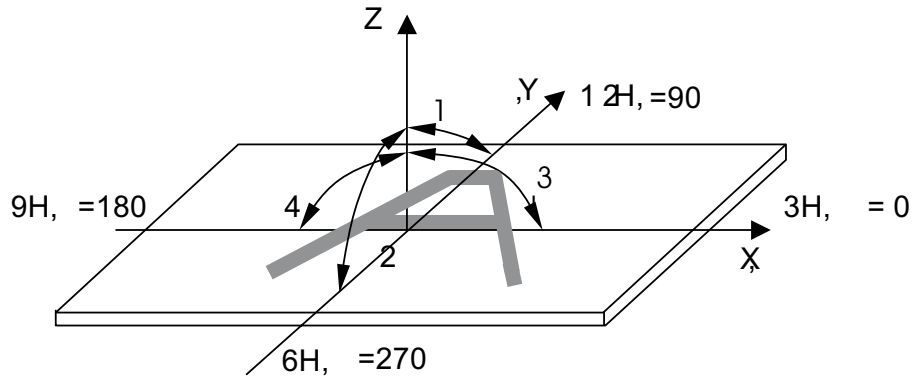
a. Threshold Voltage (V_{th})



b. Response Time



a. Viewing Angle:



b. Contrast Ratio (positive)

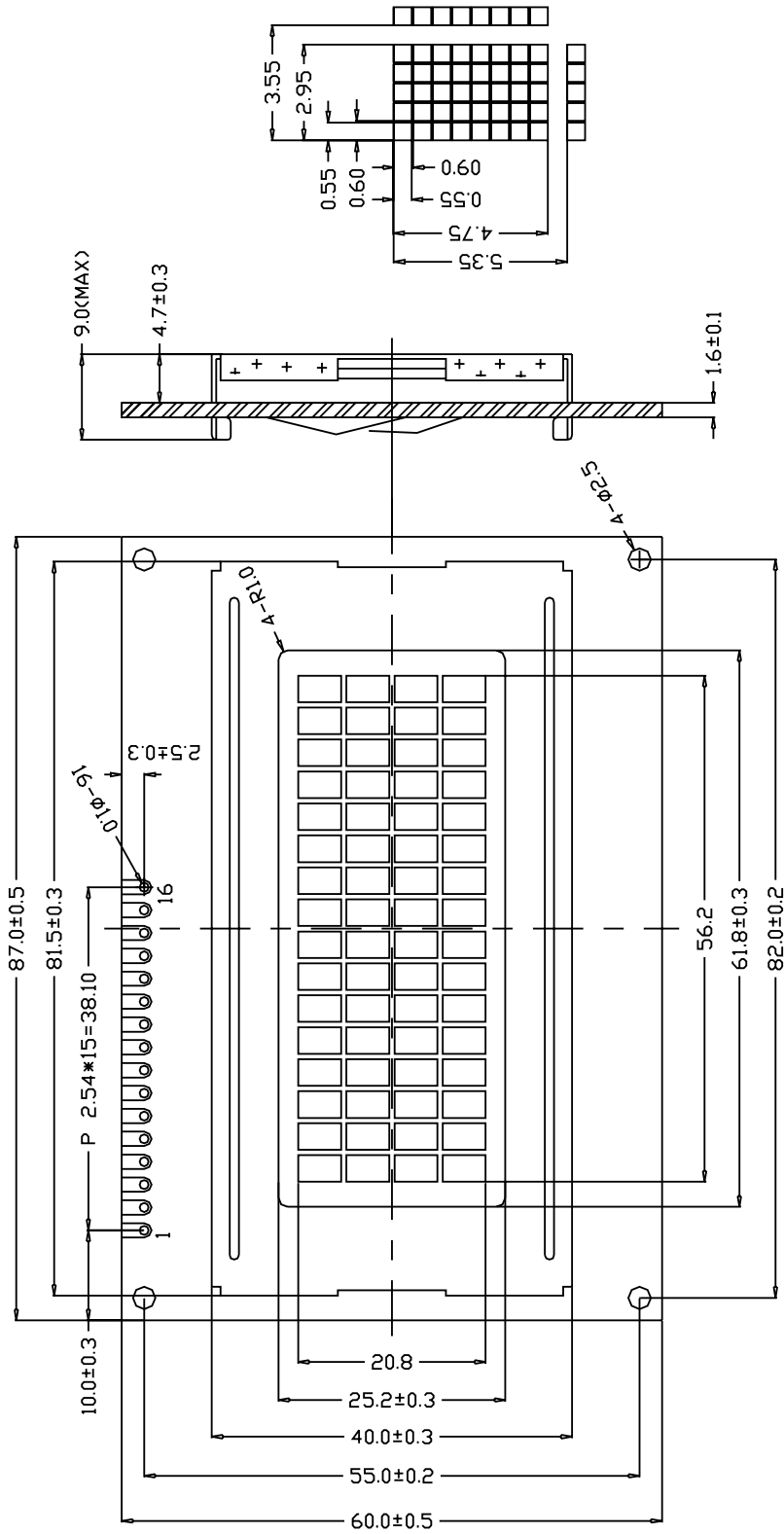
$$CR = \frac{\text{Brightness of non-selected wave-form}}{\text{Brightness of selected wave-form}}$$

4. Reliability Test:

Equipment : Tenny

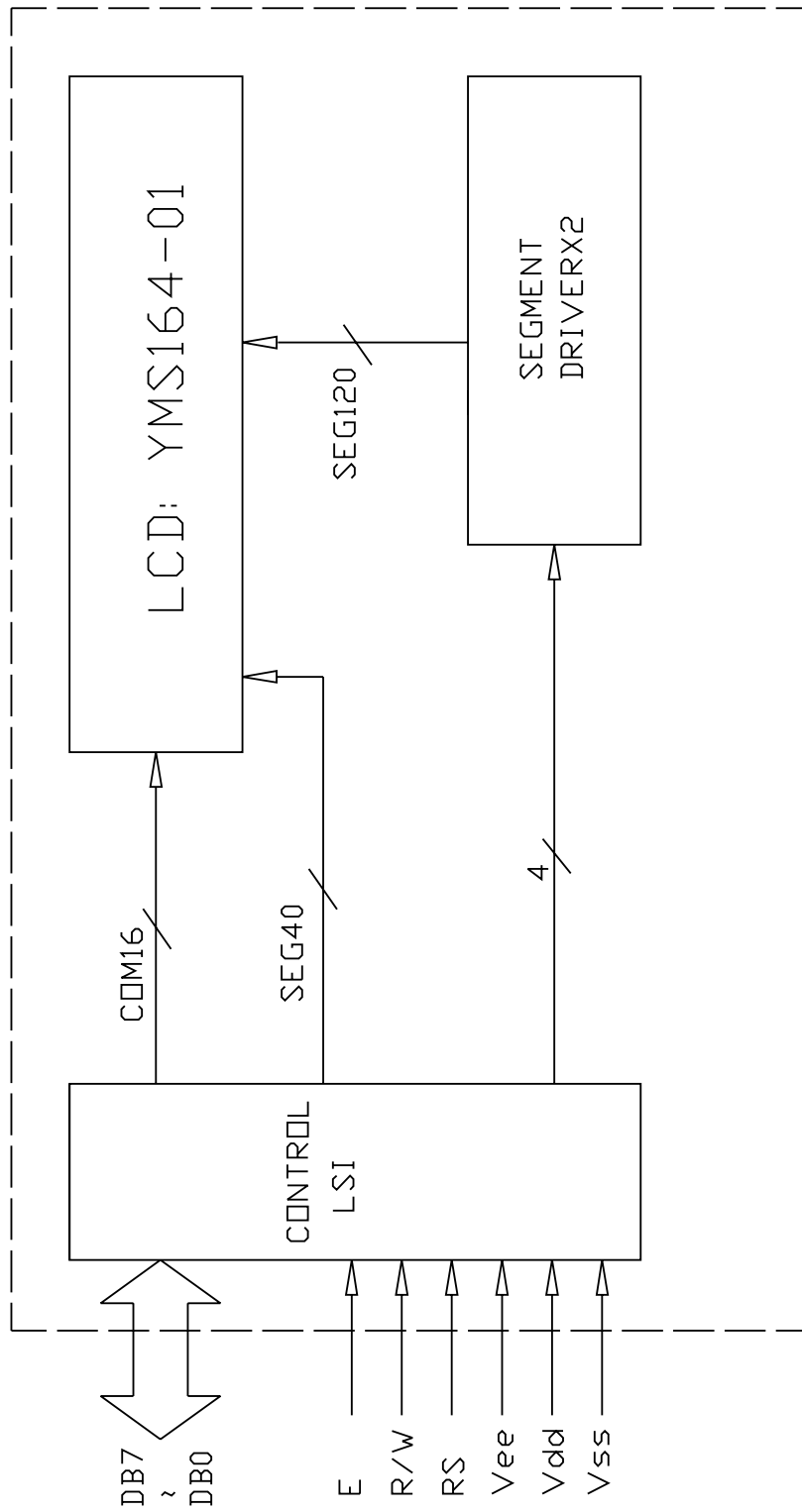
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.Attached Drawing



- Note:
1. Operating Voltage: 5V
 2. Drive method: 1/16Duty, 1/5 Bias
 3. Viewing Direction: 6:00
 4. Operating Temp: 0°C~50°C
 5. Storage Temp: -20°C~70°C
 6. Display type: STN,Positive

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PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SYMBOL	Vss	Vdd	Vee	RS	R/W	E	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	LED+	LED-

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