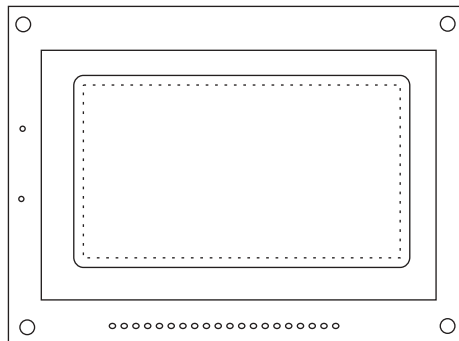




# PRODUCT SPECIFICATION

## HDM64GS12L-5

128 x 64 GRAPHICS  
LCD DISPLAY MODULE



<b>HANTRONIX, INC.</b> 10080 BUBB RD. CUPERTINO, CA 95014	<b>Q.A.:</b>	<b>REV.:</b>	<b>HDM64GS12L-5</b>	<b>SHEET 1 OF 8</b>
	JK	1.0		<b>DATE:</b> 1/30/03

## I. General Specifications

### 1. General

The Hantronix dot matrix graphic LCD module consist of liquid crystal display CMOS common driver and CMOS segment driver, a Gray STN Positive LCD, a Yellow-Green LED Backlight and a dc-dc-converter.

### 2. Features

- A. 64 Bits Shift Register to Internal LCD Circuit.
- B. Display Data Is Stored In Display Data Ram From MPU
- C. High Voltage CMOS Process.
- D. Drive Method: 1/64 Duty, 1/9 Bias
- E. The Module Operating Voltage: 5V
- F. The LCD Operating Voltage: 9.0V;
- G. Viewing Direction: 6:00 or 12:00 h
- H. Operating Temperature: -20°C~70°C
- I. Storage Temperature: -30°C~85°C
- J. The Connector Method Between LCD And PCB: Zebra.
- K. Built-in Controller : Samsung KS108B

### 3. Mechanical Data:

- (1) Module Size ----- 75.0 w x 52.7 h mm
- (2) Viewing Area ----- 60.5 w x 33.0 h mm
- (3) Dot Size ----- 0.4 w x 0.4 h mm
- (4) Dot Quality----- 128\*64

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4. Pin Connections:

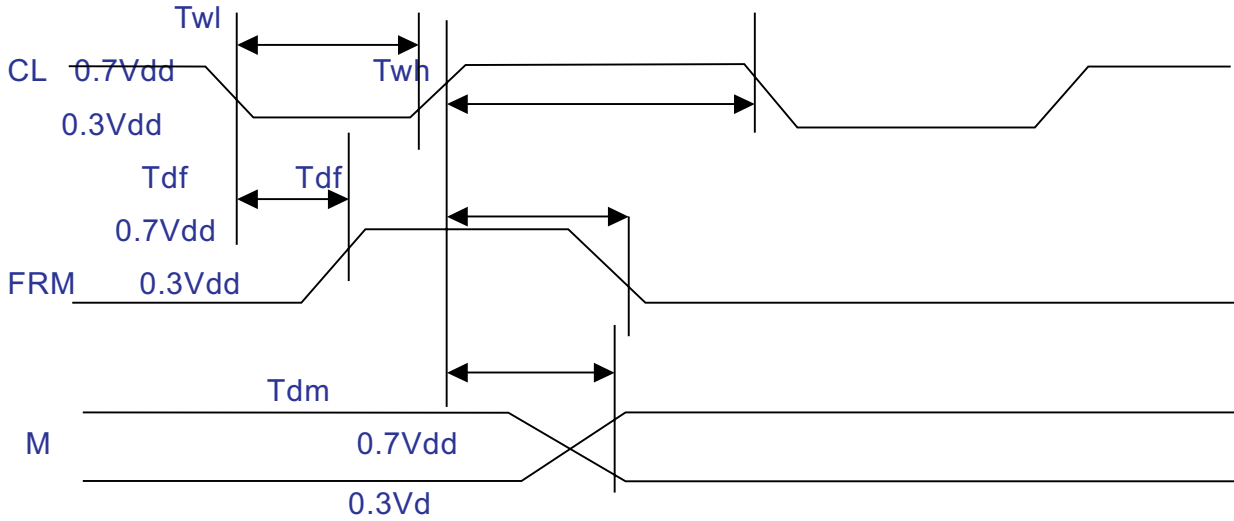
Pin No.	Symbol	Function
1	VSS	Ground(0v)
2	VDD	Logic Supply Voltage (+5.0v)
3	V0	LCD Driver Voltage Input (+13.0v)
4	R/S	Data Or Instruction
5	R/W	Read/Write Select
6	E	Enable Signal
7~14	DB0~DB7	Data Bus Line
15	CS1	Chip Selection(Segment Driver 1)
16	CS2	Chip Selection(Segment Driver 2)
17	RSTB	Reset Signal
18	Vout	Dc-Dc-Converter Output
19	A	LED Backlight (Anode)
20	K	LED Backlight (Cathode)

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5. Timing Characteristics: (VDD=5V ± 10%)

(1) Display Control Timing

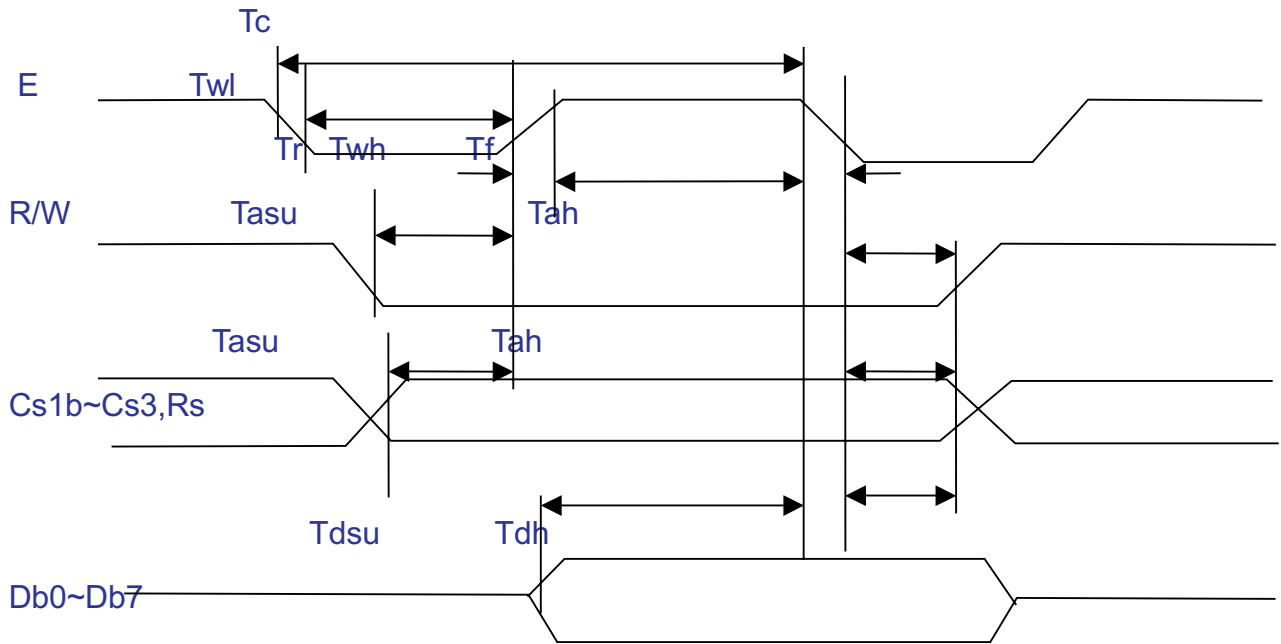
Characteristic	Symbol	Min.	Typ.	Max.	Unit
Frm Delay Time	Tdf	-2	--	+2	μs
M Delay Time	Tdm	-2	--	+2	μs
Cl"Low" Level Width	Twl	35	--	--	μs
Cl"High" Level Width	Twh	35	--	--	μs



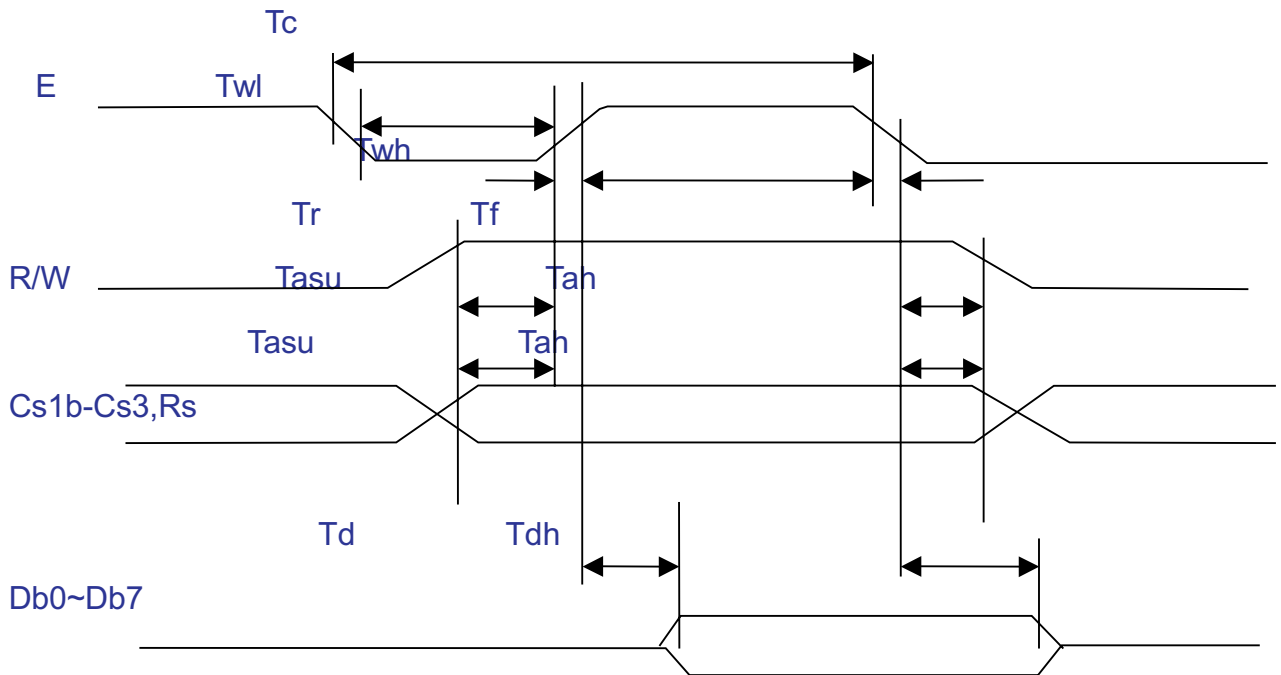
(2) Mpu Interface:

Characteristic	Symbol	Min.	Typ.	Max.	Unit
E Cycle	Tc	1000	--	--	ns
E High Level Width	Twh	450	--	--	
E Low Level Width	Twl	450	--	--	
E Rise Time	Tr	--	--	25	
E Fall Time	Tf	--	--	25	
Address Set-Up Time	Tasu	140	--	--	
Address Hold Time	Tah	10	--	--	
Data Set-Up Time	Tdsu	200	--	--	
Data Delay Time	Td	--	--	320	
Data Hold Time(Write)	Tdhw	10	--	--	
Data Hold Time(Read)	Tdhr	20	--	--	

MPU Write Timing:



Mpu Read Timing:



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## II. The Characteristics

### 1. Electro-Optic Characteristics:

Condition: TEMP=(23±3)°C, Hum=(70±5)%RH

V<sub>dd</sub>: 5.0V

F<sub>osc</sub>: 450KHZ

NO	Item	Symbol	Min	Typ.	Max	Unit	Condition
1	Supply Voltage(Logic)	Vdd-Vss	4.5	5.0	5.5	V	
2	Supply Current (Logic)	Idd		3.8		mA	Vdd=5V
3	LCD Operating Voltage	Vdd-V <sub>0</sub>		9.2		V	0°C
			8.0	9.0	10.0	V	25°C
				8.8		V	50°C
4	Response Time	Ton		288		ms	
		Toff		87		ms	
5	Contrast	CR	3				
6	Viewing Angel	12H	θ1		37	Deg	(CR>3.0)
		6H	θ2		25		
		3H	θ3		50		
		9H	θ4		50		
7	LCD Threshold Voltage	Vth		1.29		V	25°C

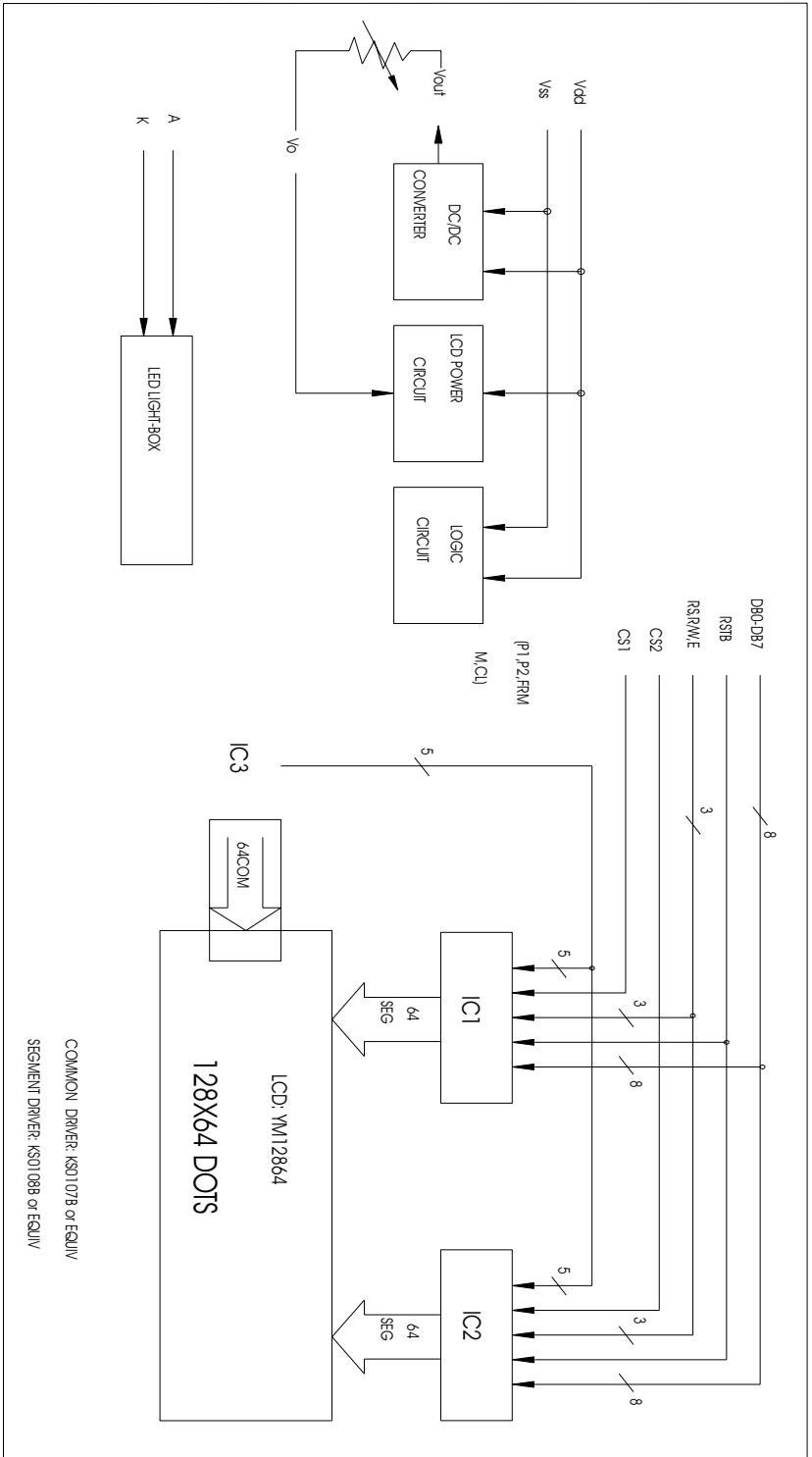
### 2. Absolute Maximum Ratings(LED unit):

Item	Symbol	Typ.	Max.	Unit	Condition
Forward Current	IFM	100	200	mA	Ta=25°C
Reverse Voltage	VR	10		V	Ta=25°C
Power Dissipation	PD	420		mW	Ta=25°C

### 3. Electrical-optical Characteristics(LED unit):

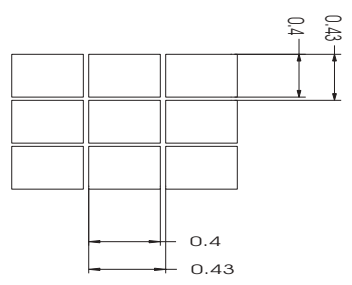
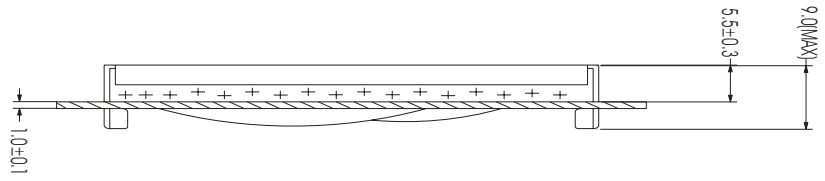
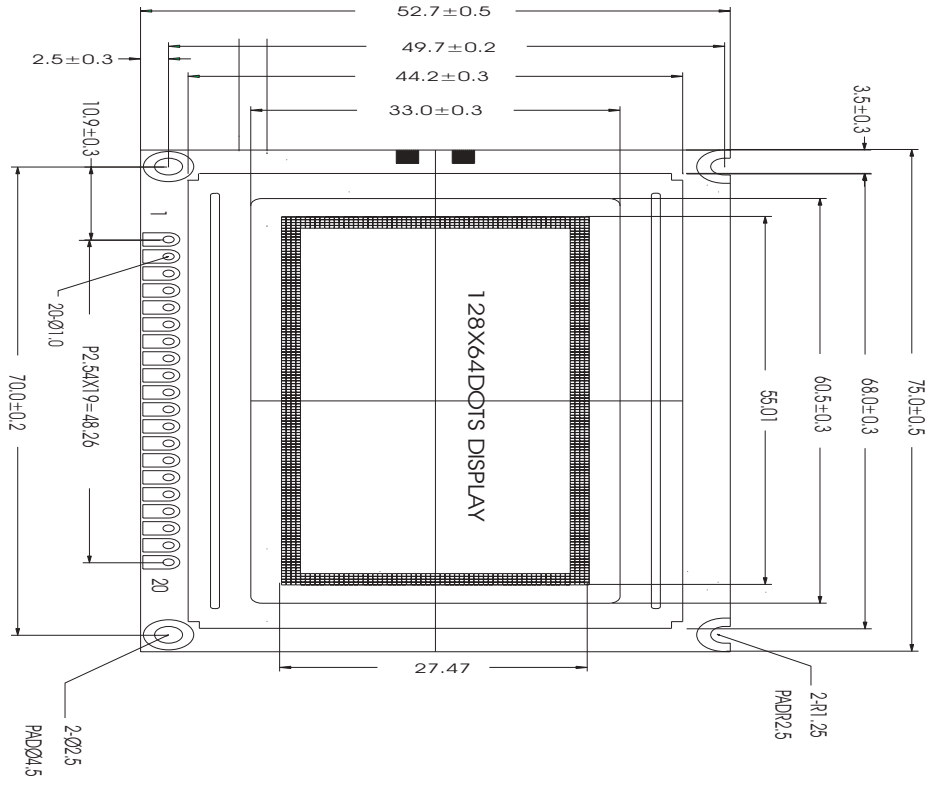
Ltem	Symbol	Min	Typ	Max	Unit	Condition
Forward Voltage	VF		4.2	4.6	V	IF=100mA
Reverse current	IR		0.2		mA	
Luminous	LV		60		cd/m <sup>2</sup>	IF=100mA

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COMMON DRIVER: KS0107B or EQUIV  
 SEGMENT DRIVER: KS0108B or EQUIV

PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
SYMBOL	Vss	Vdd	Vo	RS	R/W	E	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	CS1	CS2	RSTB	Vout	A	K



SC 16:1

- Note:
- 1. Operating voltage: 5.0V
  - 2. Drive method: 1/64 Duty, 1/9 Biss
  - 3. Viewing direction: 6:00
  - 4. Operating temp.: 0°C-50°C
  - 5. Storage temp.: -20°C-70°C
  - 6. Display type: STN, Positive

<b>HANTRONIX, INC.</b> 10080 BUBB RD. CUPERTINO, CA 95014	<b>Q.A.:</b> JK	<b>REV.:</b> 1.0	<b>HDM64GS12L-5</b>	<b>SHEET 8 OF 8</b>