HANTRONIX

PRODUCT SPECIFICATION

HDM64GS20

640x200 GRAPHICS
LCD DISPLAY MODULE

HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	**Q.A.:** JB	**REV.:** 2.0	HDM64GS20	SHEET 1 OF 18 **DATE:** 2-8-01

MECHANICAL DATA

(1) Product No.	HDM64GS20
(2) Module Size	210.6 (W)mm x 89.9 (H)mm x 2.8 (D)mm
(3) Dot Size	0.24 (W)mm x 0.30 (H)mm
(4) Dot Pitch	0.27 (W)mm x 0.33 (H)mm
(5) Number of Dots	640 (W) x 200 (H)Dots
(6) Duty	1/200
(7) LCD Display Mode	FSTN: Black and White(Normally White/Positive Image) Rear Polcrizer: Reflective
(8) Viewing Direction	6 O'clock
(9) Backlight	Without
(10) Controller	Excluded
(11) DC/DC Converter	Excludec
(12) Weight	approx. 100g

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ABSOLUTE MAXIMUM RATINGS

(1) ELECTRICAL ABSOLUTE RATINGS

VSS=0 V Standard

ITEM	SYMBOL	MIN	MAX	UNIT	COMMENT
Power Supply for Logic	VDD−VSS	−0.3	6.5	V	
Input Voltage	VDD−V5	0	27	V	
Static Electricity	−	−	−	−	Note 1

Note 1 LCM should be grounded during handling LCM.

(2) ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	NORMAL TEMP.			
	OPERATING		STORAGE	
	MIN.	MAX.	MIN.	MAX.
Ambient Temperature	0	50	−20	70
Humidity (Without Condensation)	Note 2,4		Note 3,4	

Note 2 Ta ≤ 50°C : 85%RH max
Ta > 50°C : Absolute humidity must be lower than the humidity of 85%RH at 50°C

Note 3 Ta at −20°C will be < 48hrs, at 70°C will be< 120hrs

Note 4 Background color will change slightly depending on ambient temperature. That phenomenon is reversible.

ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT
Power Supply for Logic	VDD−VSS	−		2.7	3.0	3.3	V
				4.75	5.0	5.25	V
Input Voltage	VIL	L level		VSS	−	0.2VDD	V
	VIH	H level		0.8VDD	−	VDD	V
LCM Recommand LCD Module Driving Voltage	VDD−V5	Duty=1/200 Bias=1/13	0°C	22.0	22.4	22.8	V
			25°C	21.3	21.7	22.1	
			50°C	19.5	19.9	20.3	
Power Supply Current for LCM	IDD	VDD=3~5V VDD−V5=21.7V FLM=70Hz		−	9.6	−	mA
	I5	PATTERN : 		−	7.0	−	

OPTICAL CHARACTERISTICS

AT Vop

ITEM / MODE		Cr(Contrast Ratio)		θ(Viewing Angle)		ϕ(Viewing Angle)	
		25℃		25℃		25℃	
		MIN.	TYP.	MIN.	TYP.	MIN.	TYP.
R	J	4	8	–	50	–	40
NOTE		FIG6		FIG5			

AT ϕ=0° θ=0°

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Response Time (rise)	Tr	0℃	–	340	680	ms	FIG 2
		25℃	–	120	240		
		50℃	–	90	180		
Response Time (fall)	Tr	0℃	–	370	710	ms	FIG 2
		25℃	–	170	290		
		50℃	–	80	170		

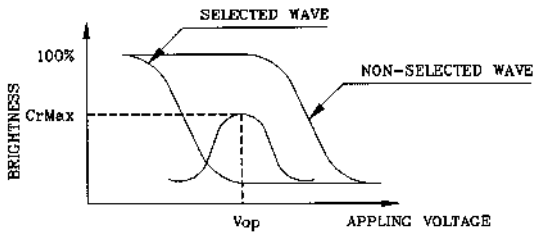
NOTE :

R: REFLECTIVE

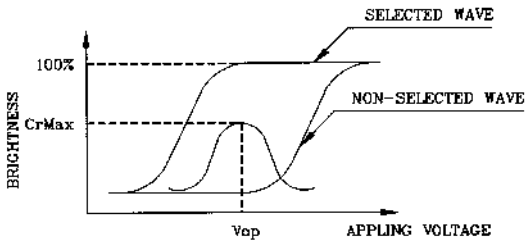
J: NORMALLY WHITE

(FIG 1)

Definition of Operation Voltage(Vop)



(positive type)



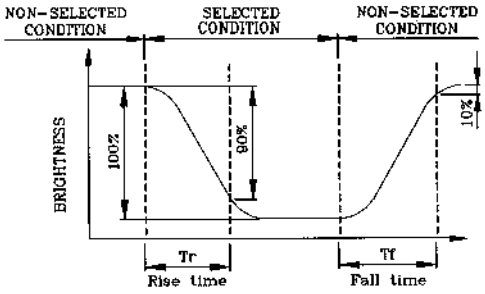
(negative type)

*Conditions

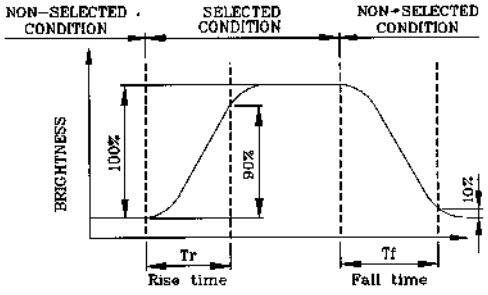
Viewing Angle : 0
Frame Frequency : 70Hz
Appling Waveform : I/N duty 1/a bias

(FIG 2)

Definition of Response Time(Tr,Tf)



(positive type)



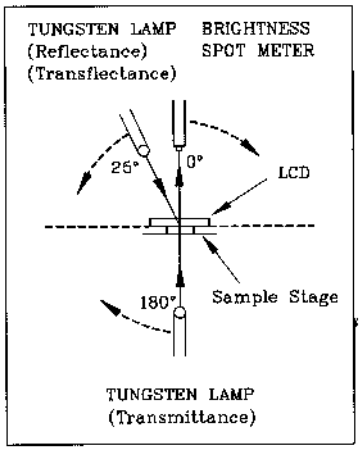
(negative type)

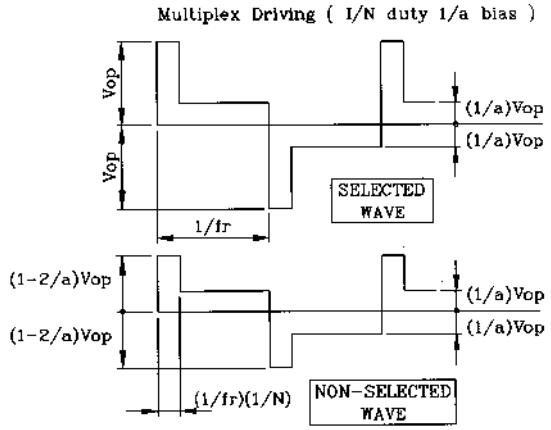
*Conditions

Operating Voltage : Vop
Viewing Angle (θ,ϕ) : (0,0)
Frame Frequency : 70Hz
Appling Waveform : I/N duty 1/a bias

(FIG 3)

Description of Measuring Equipment and Driving Waveforms





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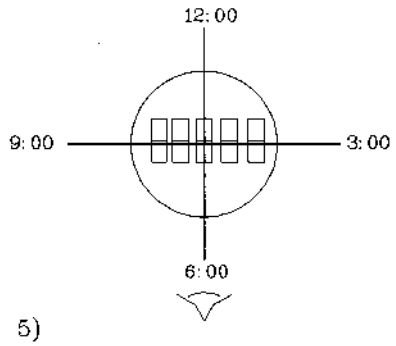
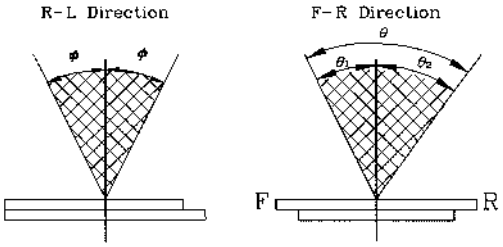
(FIG 4)

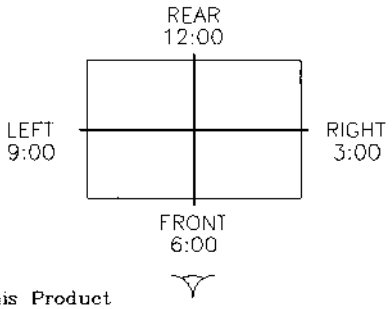
Definition of Viewing Direction



(FIG 5)

Definition of Viewing Angle





*For This Product

The Viewing Direction Is 6 O'clock

So $\theta 1 > \theta 2$

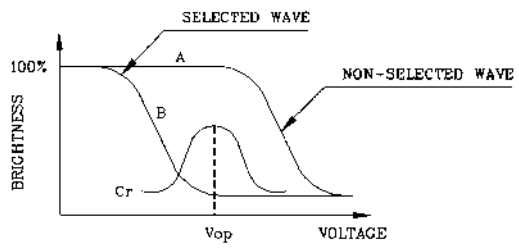
$\theta = \theta_1 + \theta_2$

*Conditions

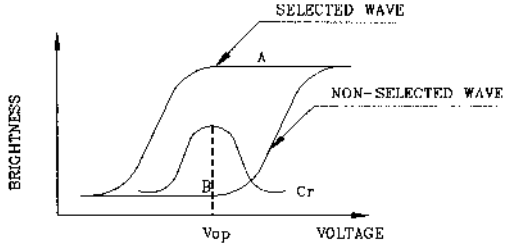
Operating Voltage : Vop
Frame Frequency : 70Hz
Appling Waveform : 1/N duty 1/a bias
Contrast Ratio : larger than 2

(FIG 6)

Definition of Contrast Ratio (Cr)



(positive type)



(negative type)

Contrast Ratio : Cr=A/B

*Conditions

Viewing Angle : 0
Frame Frequency : 70Hz
Appling Waveform : 1/N duty 1/a bias

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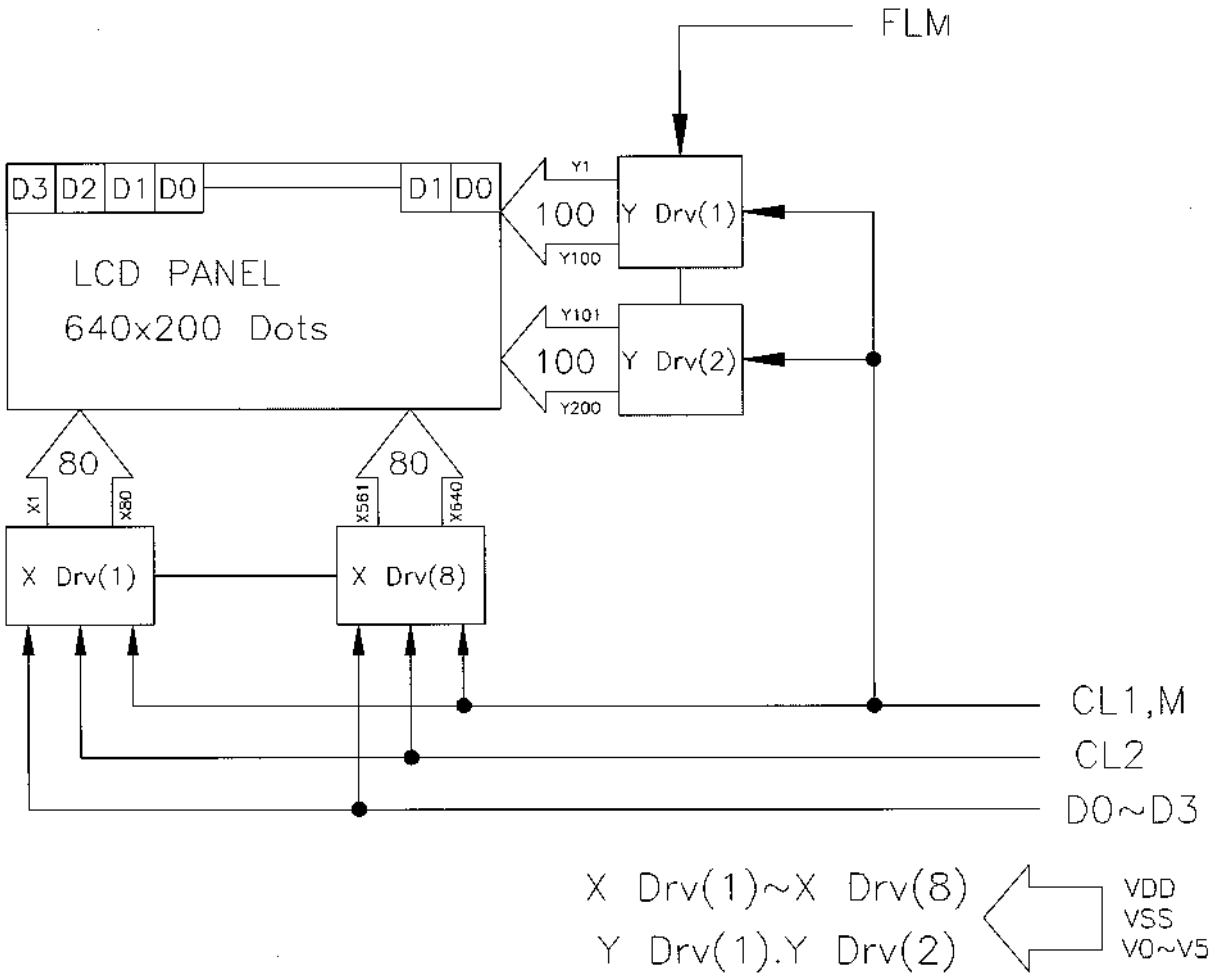
BLOCK DIAGRAM



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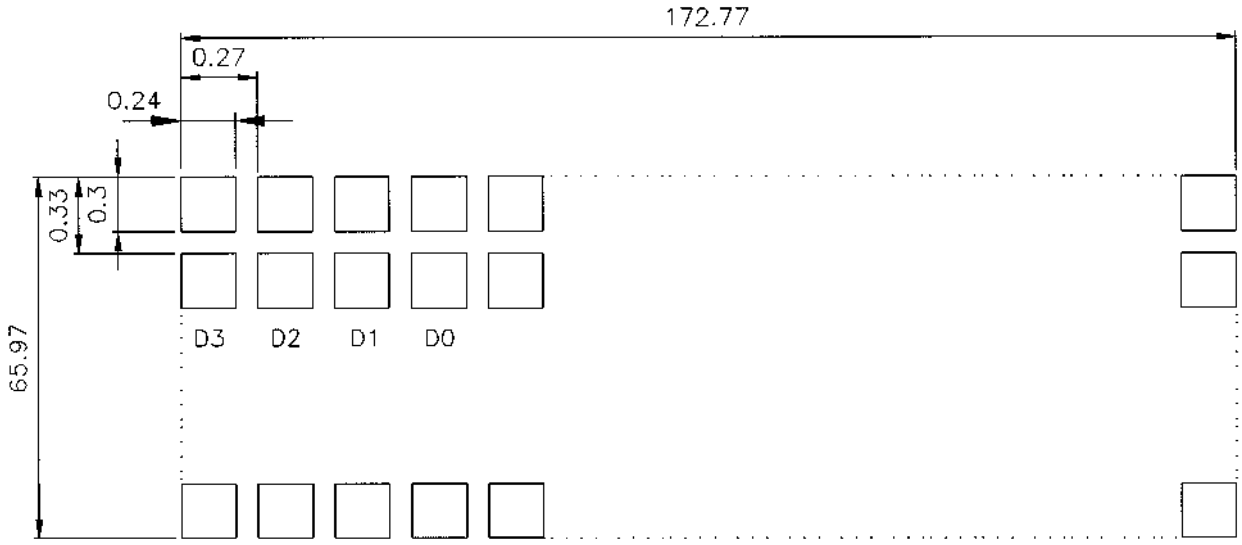
INTERNAL PIN CONNECTION

Pin No.	Symbol	Function	Level
1	VDD	Power supply for logic (+2.5~+5.5V)	
2	VSS	Power supply (GND)	
3	FLM	First line marker	H
4	CL1	Display data latch clock	H → L
5	CL2	Display data shift clock	H → L
6	M	Control signal for AC driving	H/L
7	D0	Display data	H/L
8	D1	Display data	H/L
9	D2	Display data	H/L
10	D3	Display data	H/L
11	V0	Power supply for LCD(COM,SEG selected level)	
12	V1	Power supply for LCD(COM non-selected level)	
13	V2	Power supply for LCD(SEG non-selected level)	
14	V3	Power supply for LCD(SEG non-selected level)	
15	V4	Power supply for LCD(COM non-selected level)	
16	V5	Power supply for LCD(COM,SEG selected level)	

DISPLAY PATTERN



Unit:mm

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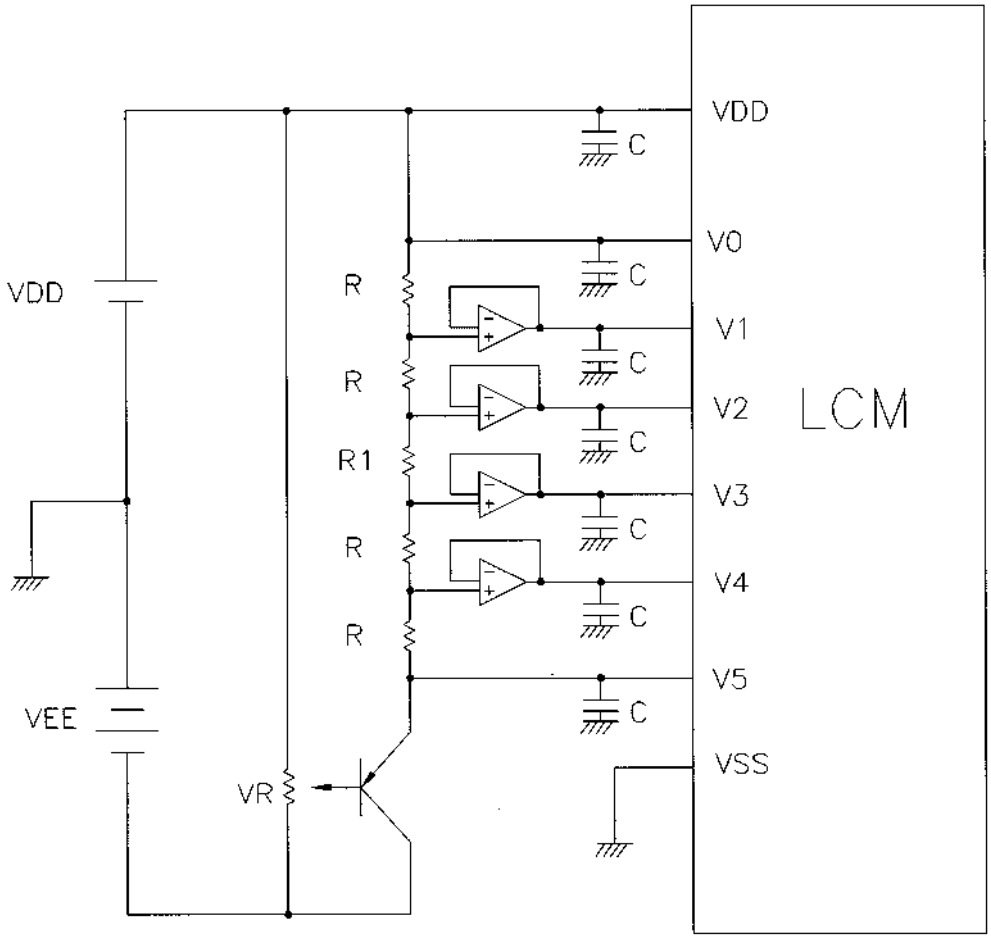
POWER SUPPLY



RECOMMENDED :

R1=9R

C=3.3uF

VR=10K~20K

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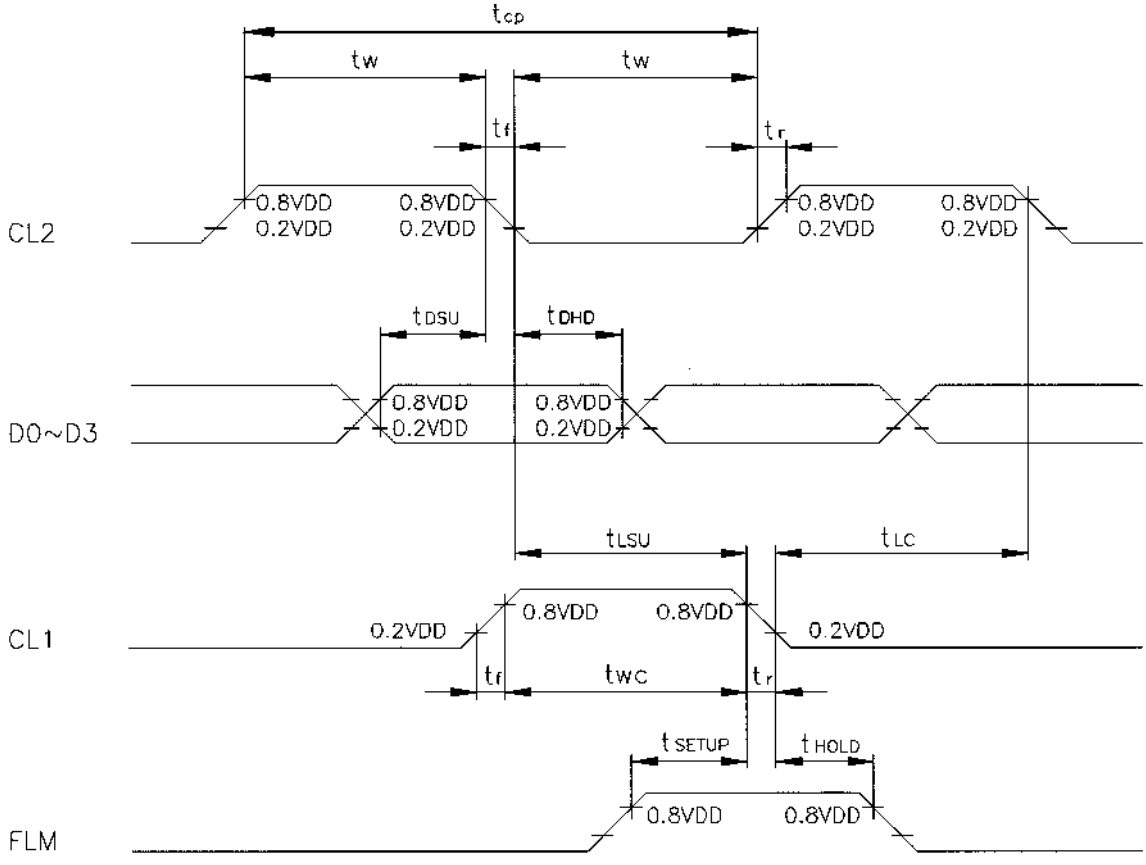
TIMING CHARACTERISTICS

INTERFACE TIMING

@VDD=2.5~5.5V

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
Shift Clock Period	t_{cp}	152	–	–	ns
"CL2" PULSE WIDTH	t_w	65	–	–	ns
CLOCK RISE, FALL TIME	t_r , t_f	–	–	50	ns
DATA SETUP TIME	t_{DSU}	50	–	–	ns
DATA HOLD TIME	t_{DHD}	40	–	–	ns
"CL2"→ "CL1" FALL TIME	t_{LSU}	65	–	–	ns
"CL1"→ "CL2" FALL TIME	t_{LC}	65	–	–	ns
"FRAME" SETUP TIME	t_{SETUP}	100	–	–	ns
"FRAME" HOLD TIME	t_{HOLD}	100	–	–	ns
"CL1" PULSE WIDTH	t_{WC}	65	–	–	ns



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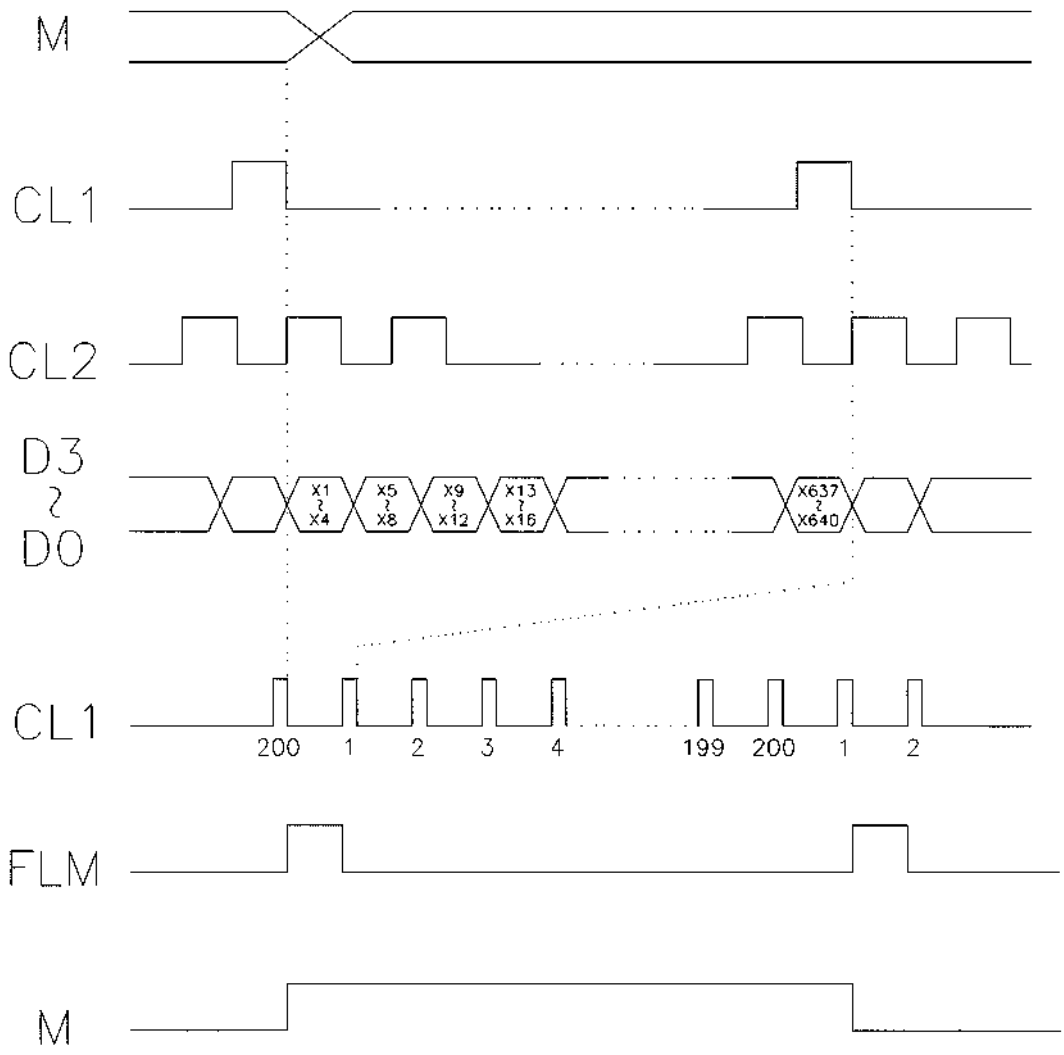
INTERFACE TIMING CHART



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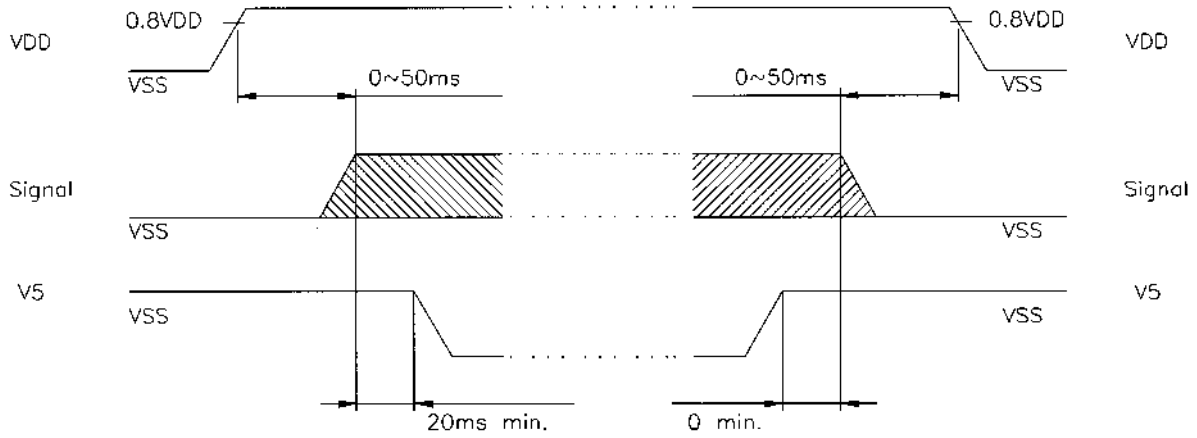
POWER ON/OFF TIMING



POWER ON

POWER OFF

The missing pixels may occur when the LCM is driven beyond above power interface timing sequence.

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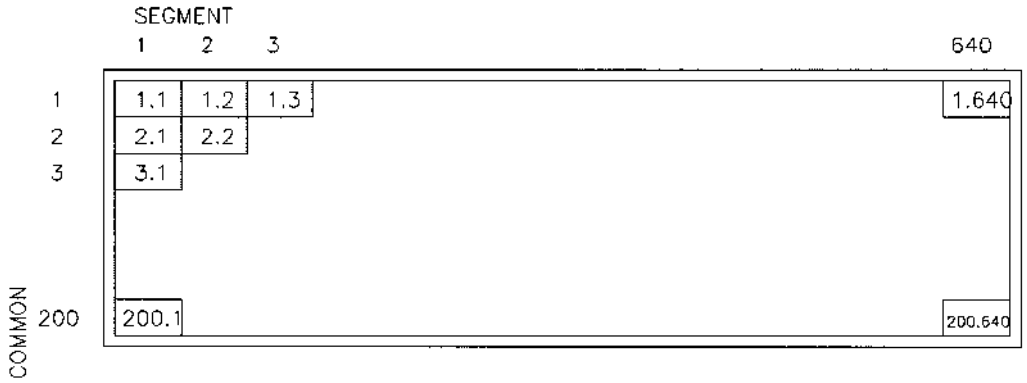
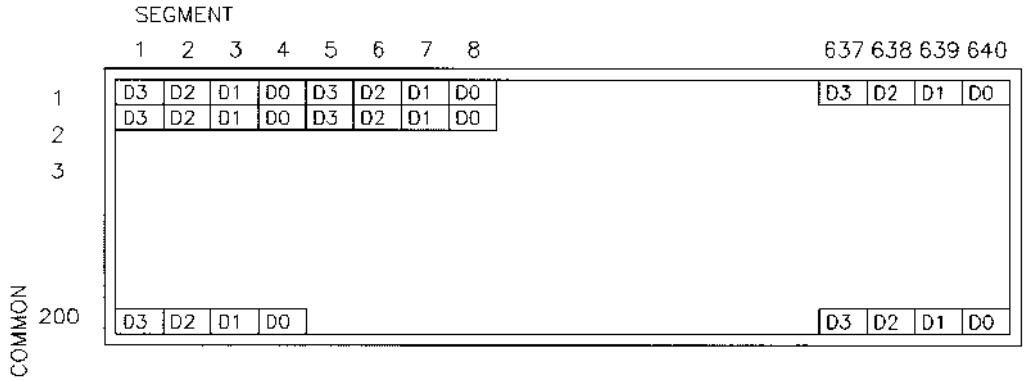
DISPLAY PATTERM



NOTE : 1.1 MEANS 1ST COMMON 1ST SEGMENT DOT



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RELIABILITY TEST

NO	ITEM	CONDITION			STANDARD	NOTE
1	High Temp. Storage	70°C	120HR		Appearance without defect	
2	Low Temp. Storage	−25°C	120HR		Appearance without defect	
3	High Temp. & High Humi. Storage	40°C 90%RH	120HR		Appearance without defect	
4	Thermal Shock	−20°C,30min→25°C.5min →60°C,30min→25°C.5min (1cycle)			Appearance without defect	5 cycles

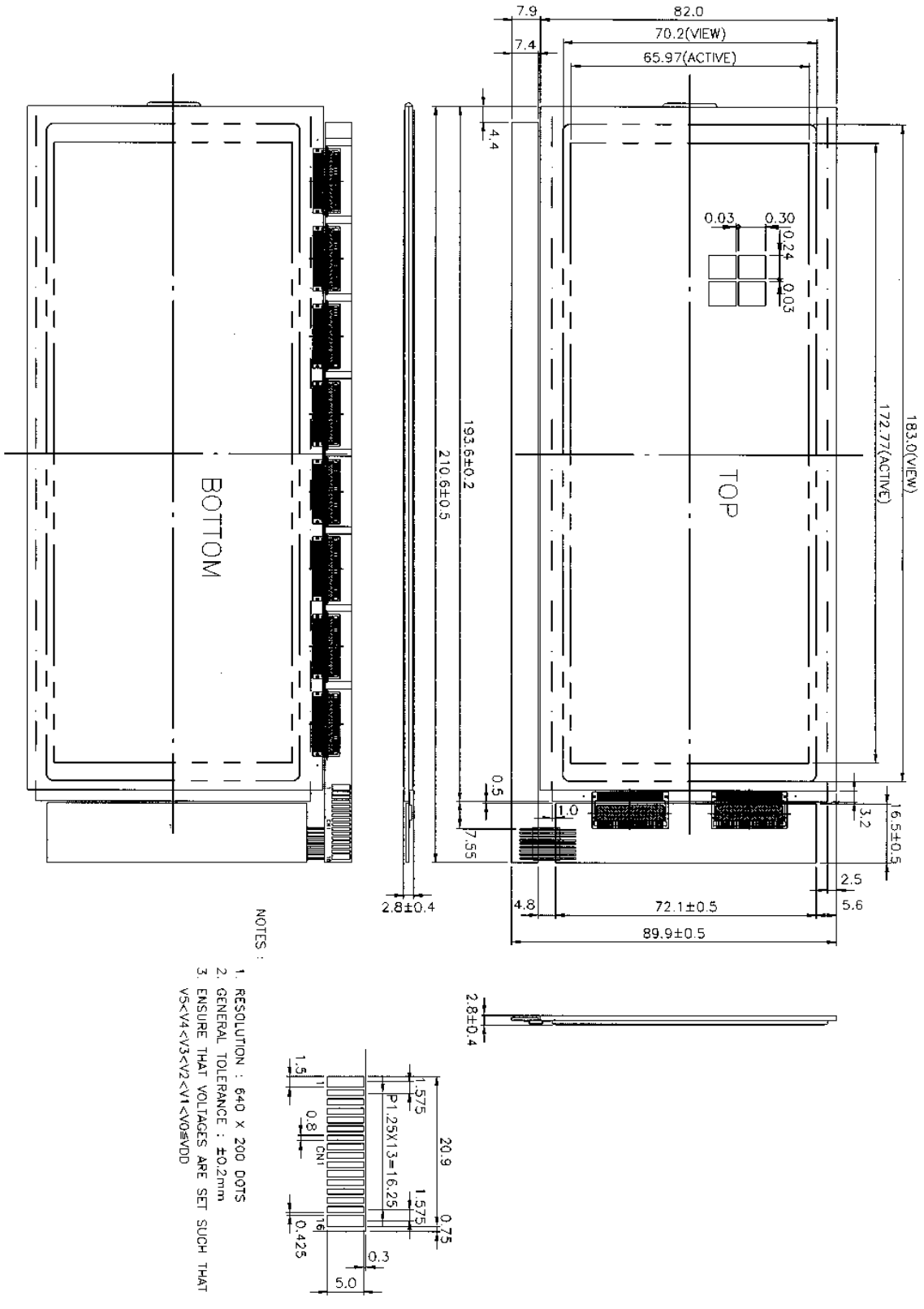
NOTE:

- SAFETY
  1. If the LCD panel breaks, be careful not to get the liquid crystal to touch your skin.
  2. If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

- HANDLING
  1. Avoid static electricity which can damage the CMOS LSI.
  2. Do not remove the panel or frame from the module.
  3. The polarizing plate of the display is very fragile. So, please handle it very carefully.
  4. Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
  5. Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.

- STORAGE
  1. Store the panel or module in a dark place where the temperature is 25°C±5°C and the humidity is below 65% RH.
  2. Do not place the module near organics solvents or corrosive gases.
  3. Do not crush, shake, or jolt the module.

- TERMS OF WARRANT
  1. Acceptance inspection period
     The period is within one month after the arrival of contracted commodity at the buyer's factory site.
  2. Applicable warrant period
     The period is within twelve months since the date of shipping out under normal using and storage conditions.



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