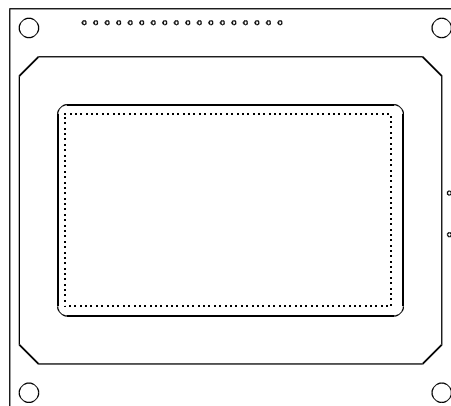


PRODUCT SPECIFICATION

HDM64GS12Y-1

128X64 GRAPHICS
LCD DISPLAY MODULE



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MECHANICAL DATA

(1) Part Name LM_77_077__5__
 (2) Module Size 78.0(W)mm X 70.0(H)mm X MAX9.5(D)mm
 (W/O,EL B/L)
 78.0(W)mm X 70.0(H)mm X MAX13.0(D)mm
 (LED B/L)
 (3) Dot Size 0.39 (W)mm x 0.55 (H)mm
 (4) Dot Pitch 0.44 (W)mm x 0.60 (H)mm
 (5) Number of Dots 128 (W) x 64 (H)Dots
 (6) Duty 1/64
 (7) LCD Display Mode STN: ☐ Gray Mode ☐ Yellow Mode ☐ Blue Mode
 FSTN: ☐ Black and White(Normal White/Positive Image)
☐ Black and White(Normal Black/Negative Image)
 Rear Polarizer: ☐ Reflective ☐ Transflective ☐ Transmissive
 (8) Viewing Direction ☐ 6 O'clock ☐ 12 O'clock ☐ ____O'clock
 (9) Backlight ☐ W/O ☐ EL ☐ LED
 (10) Weight W/O B/L: 55 g
 EL B/L: 58 g
 LED B/L: 71 g

PS: Special Requirement

LMX77X077XXXXX



C: Anti-glare
 D: Wide-temperature Range

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ABSOLUTE MAXIMUM RATINGS

(1) ELECTRICAL ABSOLUTE RATINGS

V_{SS}=0V

ITEM	SYMBOL	MIN	MAX	UNIT	COMMENT
Power Supply for Logic	VDD-VSS	-0.3	7.0	V	
Input Voltage	V _I	-0.3	VDD	V	
Static Electricity	-	-	-	-	Note 1

Note 1 LCM should be grounded during handling LCM

(2) ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	NORMAL TEMP.				WIDE TEMP.			
	OPERATING		STORAGE		OPERATING		STORAGE	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
Ambient Temperature	0	50	-20	70	-20	70	-30	80
Humidity (Without Condensation)	Note 1,3		Note 2,3		Note 3,4		Note 3,5	

Note 1 Ta ≤ 50°C : 85%RH max

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

Note 2 Ta at -20°C will be < 48hrs, at 70°C will be < 120hrs

Note 3 Background color changes slightly depending on ambient temperature.
This phenomenon is reversible.

Note 4 Ta ≤ 70°C : 75%RH max

Ta > 70°C : Absolute humidity must be lower
than the humidity of 75%RH at 70°C

Note 5 Ta at -30°C will be < 48hrs, at 80°C will be < 120hrs

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ELECTRICAL CHARACTERISTICS

(VDD = 5V ± 10%)

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Input Voltage	VIH	H level	0.7VDD	—	VDD	V
	VIO	L level	0	—	0.3VDD	V
Recommended LC Driving Voltage (Normal Temp. LCM)	VDD—VO (R12=0Ω)	0℃	—	10.6	11.1	V
		25℃	9.8	10.3	10.8	
		50℃	8.8	9.3	—	
Recommended LC Driving Voltage (Wide Temp. LCM)	VDD—VO'	—20℃				V
		25℃				
		70℃				
Power Supply Current	IDD	VDD = 5.0V	—	5.9	10.0	mA
	IEE	VDD—VO'=10.3V	—	0.54	1.5	
LED Power Supply Current	I LED	VBL = 5Vdc (RBL = 5Ω)	—	220	—	mA
EL Power Supply Current	I EL	VBL = 110VAC 400Hz	—	—	10.0	mA

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OPTICAL CHARACTERISTICS

(For Normal Temperature Mode LCM)

AT Vop

MODE	ITEM	Cr(Contrast Ratio)		θ (Viewing Angle)		ϕ (Viewing Angle)	
		25℃		25℃		25℃	
		MIN.	TYP.	MIN.	TYP.	MIN.	TYP.
R	A						
	C	4.0	6.0	40	80	20	30
	J						
S	A						
	C						
	J						
T	E						
	G						
note		NOTE6		NOTE5			

AT $\phi=0^\circ$ $\theta=0^\circ$

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Response Time (rise)	Tr	0℃	—	500	750	ms	NOTE 2
		25℃	—	110	215		
		50℃	—	90	100		
Response Time (fall)	Tf	0℃	—	1000	1500	ms	NOTE 2
		25℃	—	320	420		
		50℃	—	110	200		

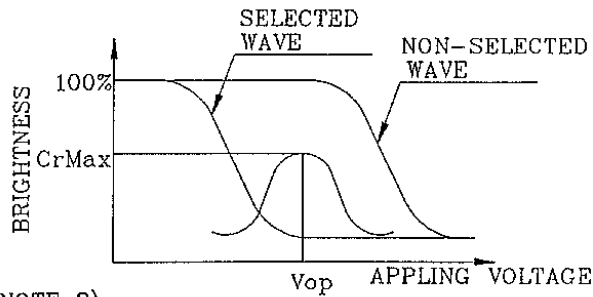
note:

R: REFLECTIVE
 S: TRANSFLECTIVE
 T: TRANSMISSIVE
 A: GRAY
 C: YELLOW
 J: NORMALLY WHITE
 G: NORMALLY BLACK
 E: BLUE

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(NOTE 1)

Definition of Operation Voltage(V_{op})



*Conditions

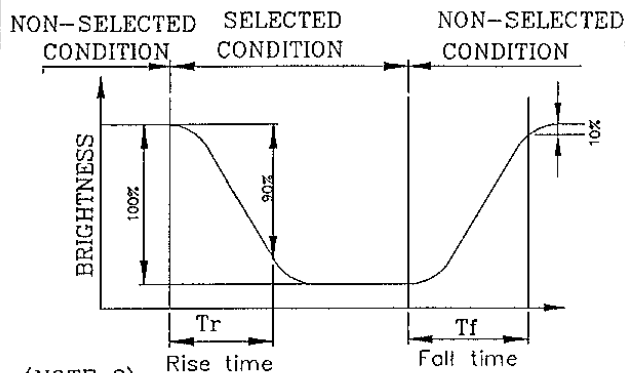
Viewing Angle : 0

Frame Frequency: 70Hz

Applying Waveform: 1/N duty 1/a bias

(NOTE 2)

Definition of Response Time(T_r, T_f)



*Conditions

Operating Voltage: V_{op}

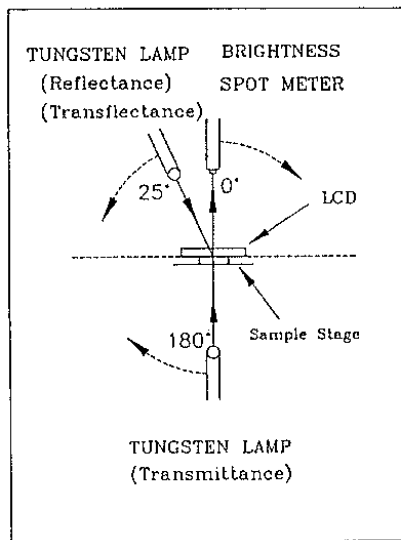
Viewing Angle : 0

Frame Frequency: 70Hz

Applying Waveform: 1/N duty 1/a bias

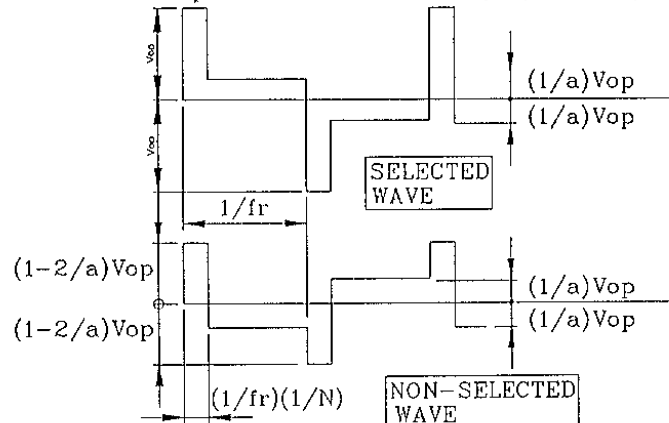
(NOTE 3)

Description of Measuring Equipment and Driving Waveforms



CONST.
TEMP.
CHAMBER

Multiplex Driving (1/N duty 1/a bias)



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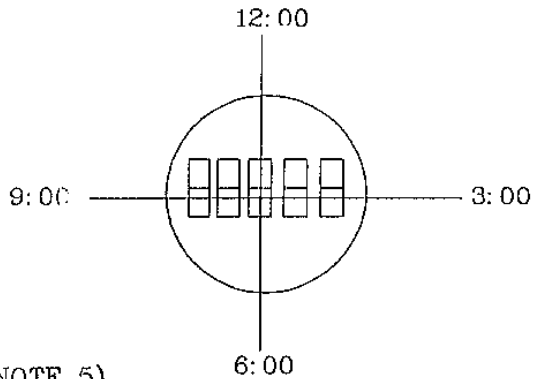
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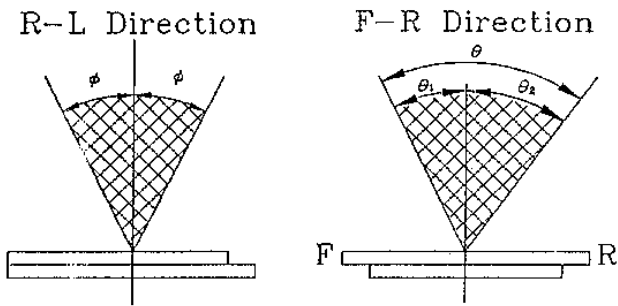
(NOTE 4)

Definition of Viewing Direction



(NOTE 5)

Definition of Viewing Angle



*Conditions

Operating Voltage: V_{op}

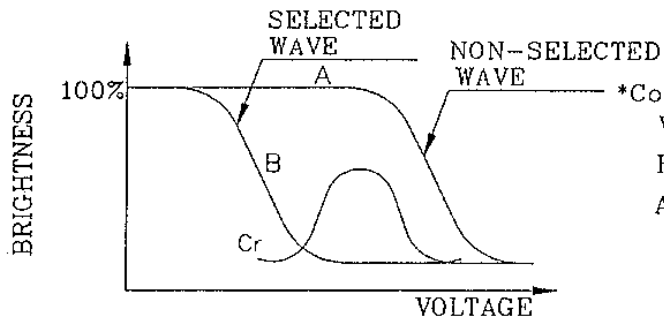
Frame Frequency: 70Hz

Applying Waveform: 1/N duty 1/a bias

$$\theta = \theta_1 + \theta_2$$

(NOTE 6)

Definition of Contrast Ratio (Cr)



*Conditions

Viewing Angle : 0

Frame Frequency: 70Hz

Applying Waveform: 1/N duty 1/a bias

$$\text{Contrast Ratio: } Cr = A/B$$

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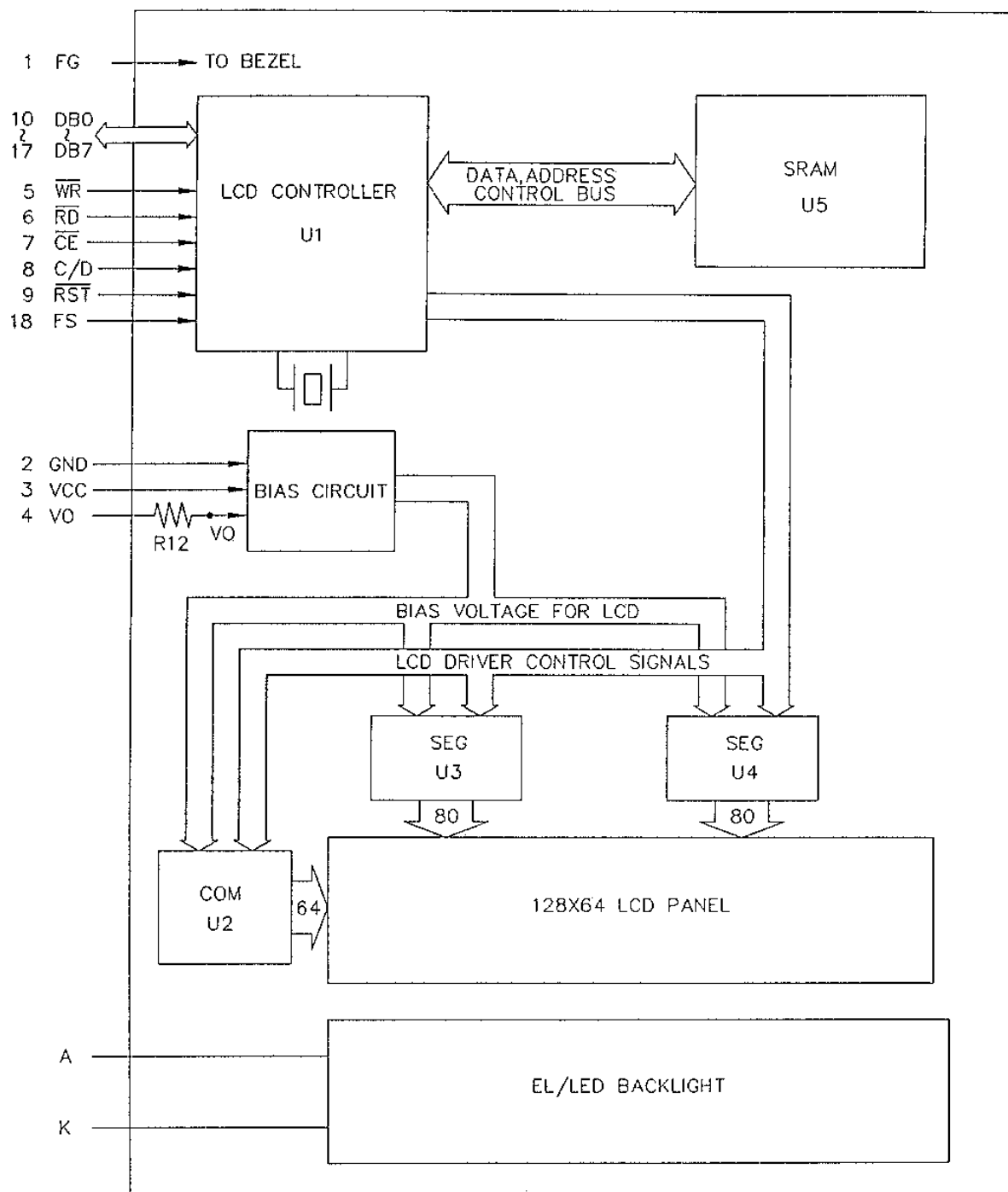
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BLOCK DIAGRAM



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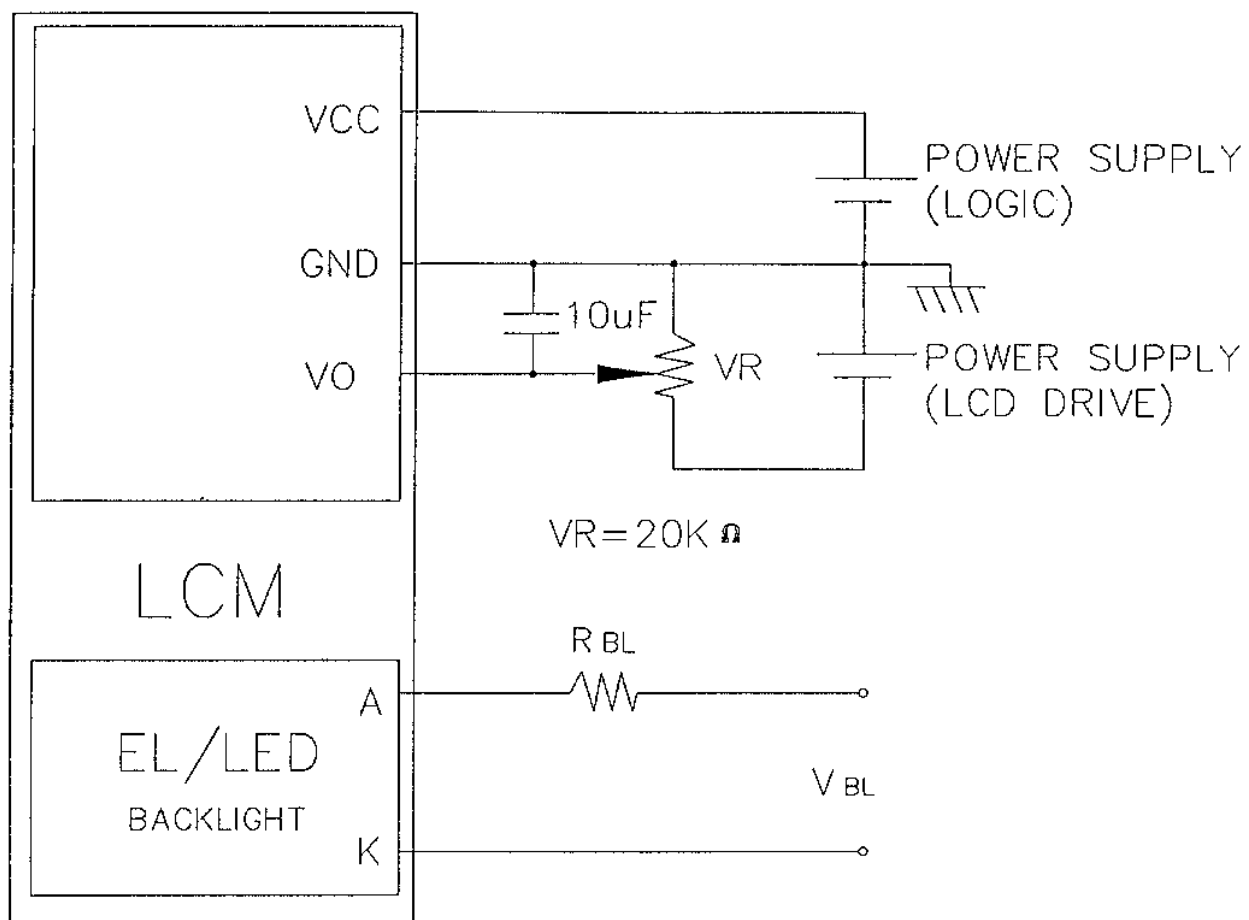
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INTERNAL PIN CONNECTION

PIN NO.	SYMBOL	FUNCTION
1	FG	FRAME GROUND (0V)
2	GND	GROUND
3	VCC	POWER SUPPLY FOR LOGIC (+5V)
4	VO	POWER SUPPLY FOR LC DRIVING
5	$\overline{WR}$	DATA WRITE
6	$\overline{RD}$	DATA READ
7	$\overline{CE}$	CHIP ENABLE
8	C/D	$\overline{WR}$ ="L",C/D="H" : COMMAND WRITE $\overline{WR}$ ="L",C/D="L" : DATA WRITE $\overline{RD}$ ="L",C/D="H" : STATUS READ $\overline{RD}$ ="L",C/D="L" : DATA READ
9	$\overline{RST}$	CONTROLLER RESET
10	DB0	DATA INPUT/OUTPUT
11	DB1	DATA INPUT/OUTPUT
12	DB2	DATA INPUT/OUTPUT
13	DB3	DATA INPUT/OUTPUT
14	DB4	DATA INPUT/OUTPUT
15	DB5	DATA INPUT/OUTPUT
16	DB6	DATA INPUT/OUTPUT
17	DB7	DATA INPUT/OUTPUT
18	FS	FONT SELECT CONNECT TO VDD : 6X8 PIXELS/CHARACTER CONNECT TO GND : 8X8 PIXELS/CHARACTER

POWER SUPPLY



Recommended Value for R_{BL} and V_{BL}

ITEM Back Light Interface	R _{BL}		V _{BL}	
	LED	EL	LED	EL
A,K PIN	5 Ω	0 Ω	5V _{DC}	110 V _{AC} 400Hz

INTERFACE TIMING CHARACTERISTICS

ITEM	ITEM	CONDITION	MIN.	MAX.	UNIT
C/D SET UP TIME	t_{CDS}	Fig.	100	—	ns
C/D HOLD TIME	t_{CDH}	Fig.	10	—	ns
$\overline{CE}$, $\overline{RD}$, $\overline{WR}$ CLOCK WIDTH	t_{CP}, t_{RP}, t_{WP}	Fig.	80	—	ns
DATA SET UP TIME	t_{DS}	Fig.	80	—	ns
DATA HOLD TIME	t_{DH}	Fig.	40	—	ns
ACCESS TIME	t_{ACC}	Fig.	—	150	ns
DATA OUTPUT HOLD TIME	t_{OH}	Fig.	10	50	ns

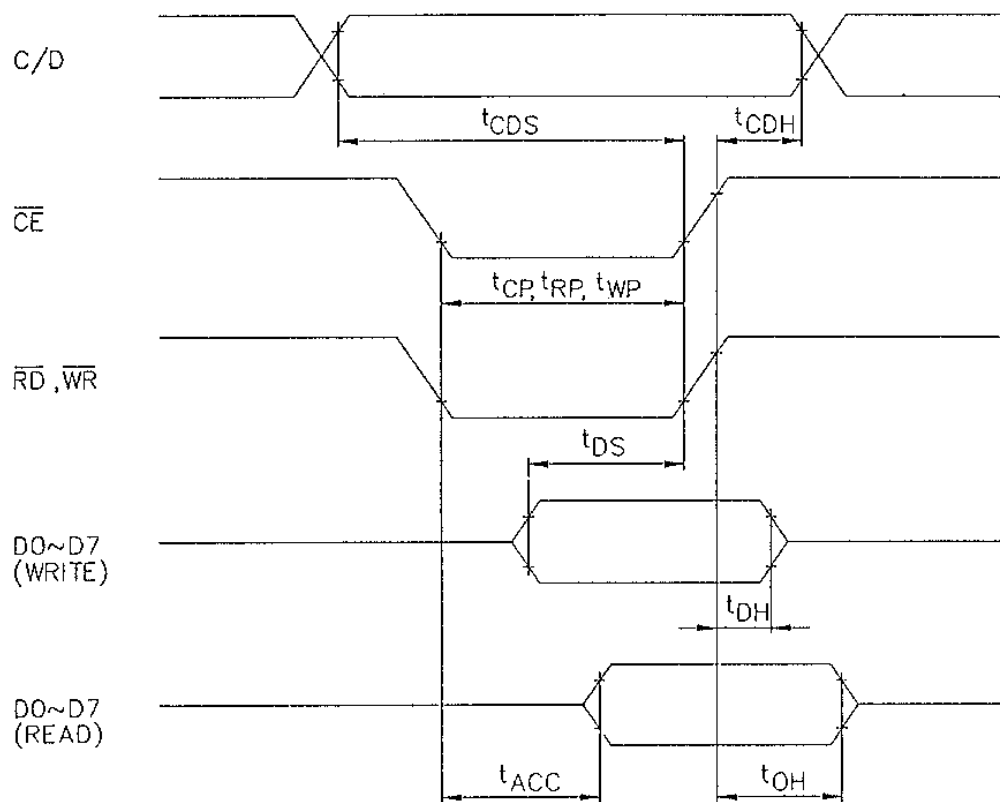
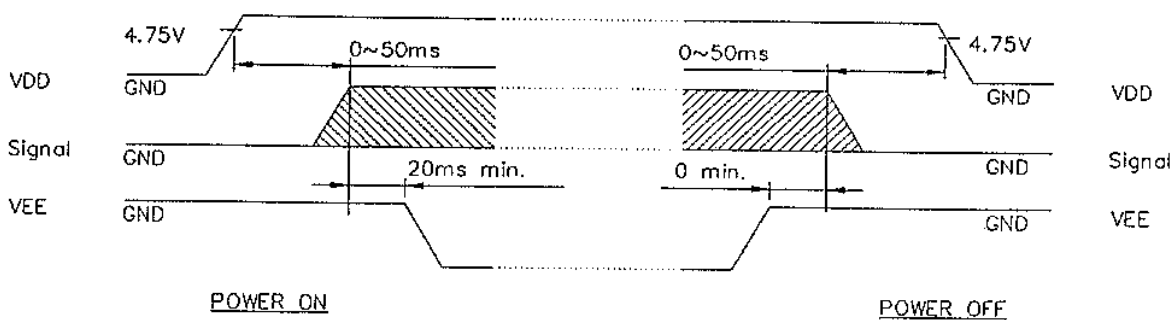


Fig. INTERFACE TIMING CHART

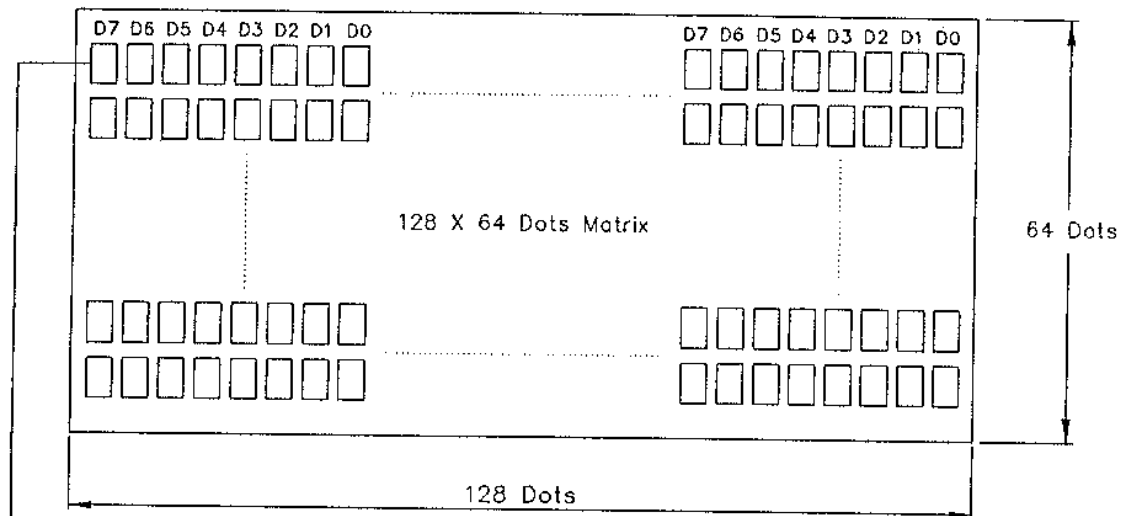
POWER ON/OFF TIMING CHARACTERISTICS



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

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DISPLAY PATTERN



Startting dot for the startting address of display RAM.

D0~D7 are 8 bits transmitted data ,where D0 is LSB and D7 is MSB.

