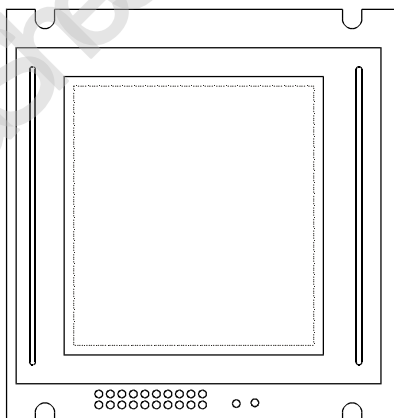


HANTRONIX

PRODUCT SPECIFICATION

HDM128GS12

128x128 GRAPHICS
LCD DISPLAY MODULE



HANTRONIX, INC.
10080 BUBB RD.
CUPERTINO, CA 95014

Q.A.:
JB

REV.:
1.0

HDM128GS12

SHEET 1 OF 15

DATE:
9/18/98

MECHANICAL DATA

- (1) Product No.
- (2) Module Size 85.0 (W)mm x 100.0 (H)mm x MAX14.0 (D)mm
(EL B.L.)
- (3) Dot Size 0.39 (W)mm x 0.39 (H)mm
- (4) Dot Pitch 0.43 (W)mm x 0.43 (H)mm
- (5) Number of Dots 128 (W) x 128 (H)Dots
- (6) Duty 1/128
- (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 ☐ LED ☐ EL ☐ CCFT
- (10) Weight EL B/L: 126g

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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	V _{IH}	H level	0.8VDD	—	VDD	V
	V _{IO}	L level	0	—	0.2VDD	V
Recommended LCD Driving Voltage (Normal Temp. LCM)	VDD-V _O	Duty= 1/128	0℃	—	18.9	19.5
			25℃	16.9	17.5	18.1
			50℃	15.6	16.0	—
Recommended LCM Driving Voltage (Wide Temp. LCM)	VDD-V _O	Bias= 1/11	-20℃	—	—	—
			0℃	—	—	—
			25℃	—	—	—
			50℃	—	—	—
Power Supply Current	IDD	VDD = 5.0V PATTERN: ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■	—	18.5	30	mA
LED Power Supply Current	I _{LED}	V _{BL} = 2.2V _{DC} (R _{BL} = 0Ω)	—	—	—	mA
EL Power Supply Current	I _{EL}	V _{EL} = 110V _{AC} 400Hz	—	—	6.0	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	3.0	4.0	30	40	20	30
	C	—	—	—	—	—	—
	J	—	—	—	—	—	—
S	A	2.5	3.5	25	35	20	30
	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℃	—	450	900	ms	NOTE 2
		25℃	—	110	220		
		50℃	—	65	130		
Response Time (fall)	Tf	0℃	—	650	1100	ms	NOTE 2
		25℃	—	135	250		
		50℃	—	80	150		

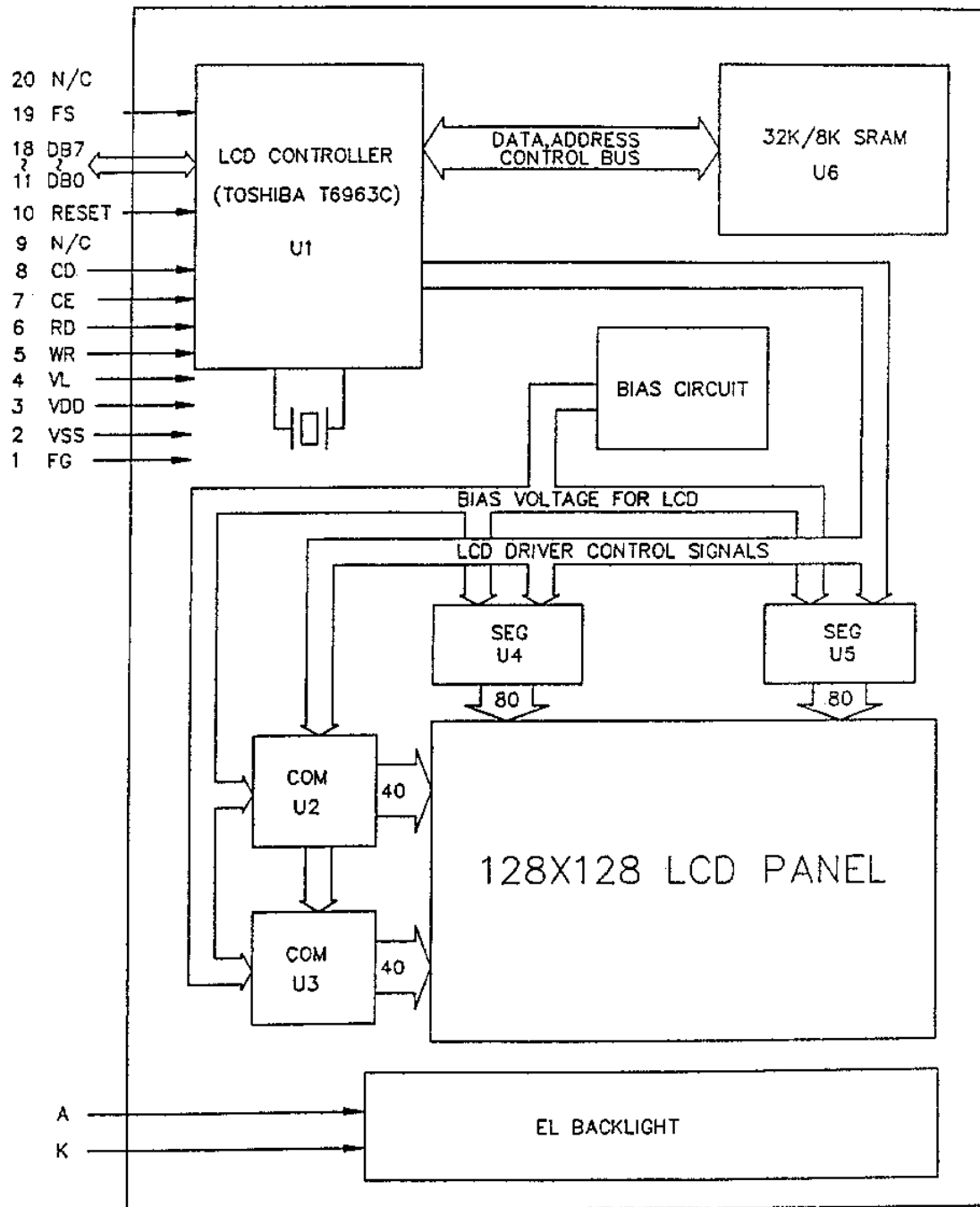
note :

R: REFLECTIVE
 S: TRANSFLECTIVE
 T: TRANSMISSIVE
 A/B: GRAY
 C/D: YELLOW
 E/F: BLUE
 G/H: NORMALLY BLACK
 J/K: NORMALLY WHITE

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BLOCK DIAGRAM



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INTERNAL PIN CONNECTION

PIN NO.	SYMBOL	FUNCTION	
1	FG	To Frame PAD	
2	VSS	0V	Power Supply
3	VDD	+5V	
4	VL	LCD Contrast Voltage Input	
5	WR	Command and Data Write	
6	RD	Data and Status Read	
7	CE	Chip Enable	
8	CD	WR="L",C/D="H" :Command Write RD="L",C/D="H" :Status Read	C/D="L" :Data Write C/D="L" :Data Read
9	N/C	NO CONNECTION	
10	RESET	Reset Signal	
11	DB0	DATA BUS LINE	
12	DB1		
13	DB2		
14	DB3		
15	DB4		
16	DB5		
17	DB6		
18	DB7		
19	FS	Pins For Selection of Font (6X8 or 8X8)	
20	N/C	NO CONNECTION	

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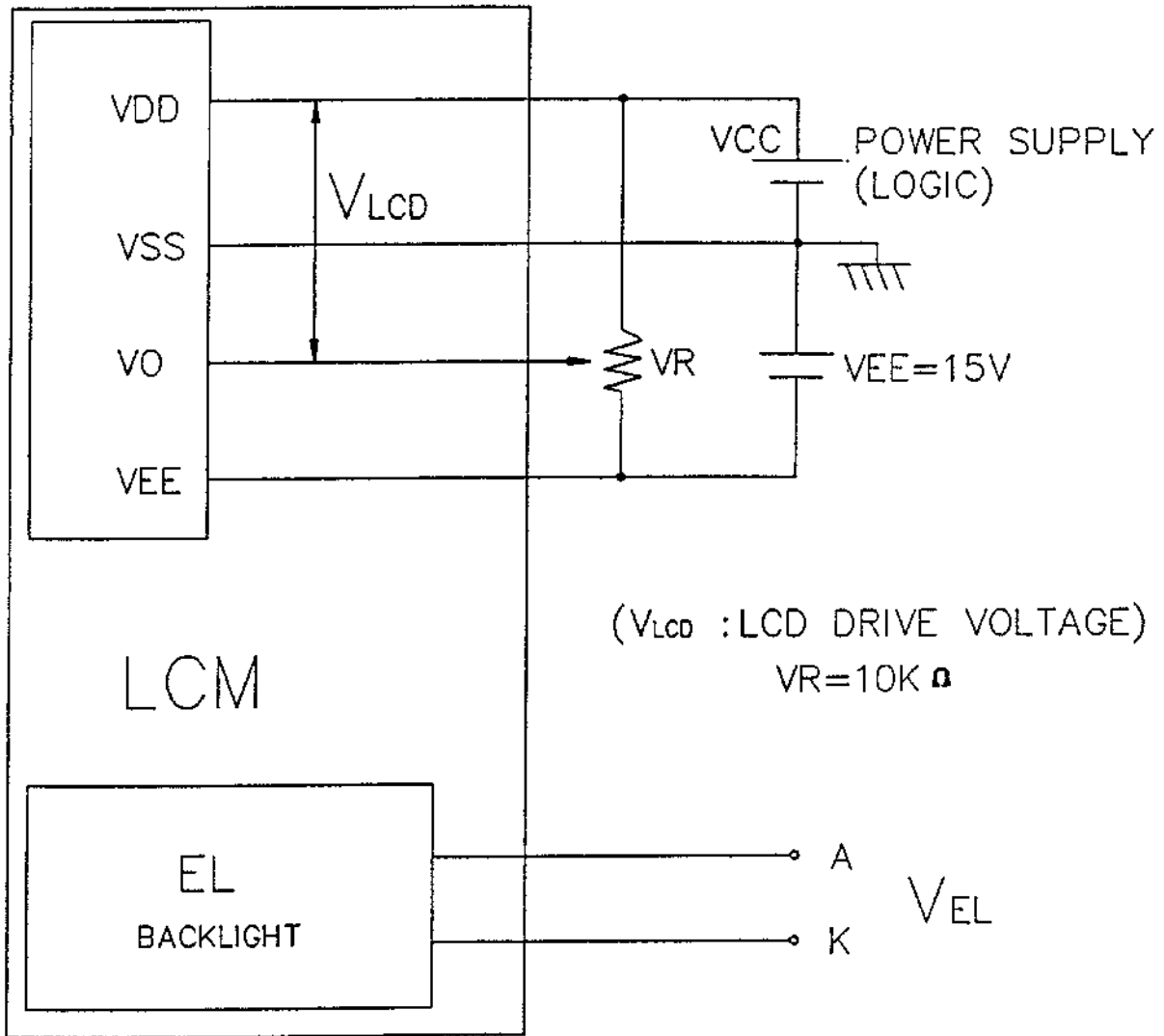
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POWER SUPPLY



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INTERFACE TIMING CHARACTERISTICS

(VDD=5.0V±10%, VSS=0V, T_a=-20 To 75°C)

ITEM	SYMBOL	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 _{CE} , t _{RD} , t _{WR}	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

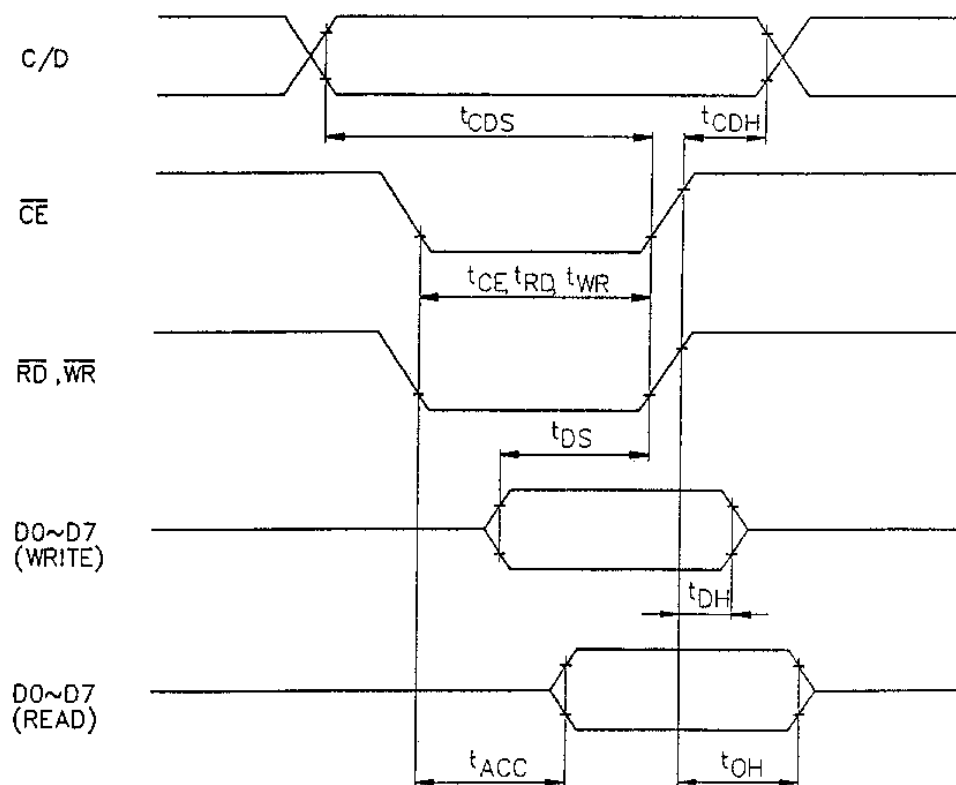


Fig. INTERFACE TIMING CHART

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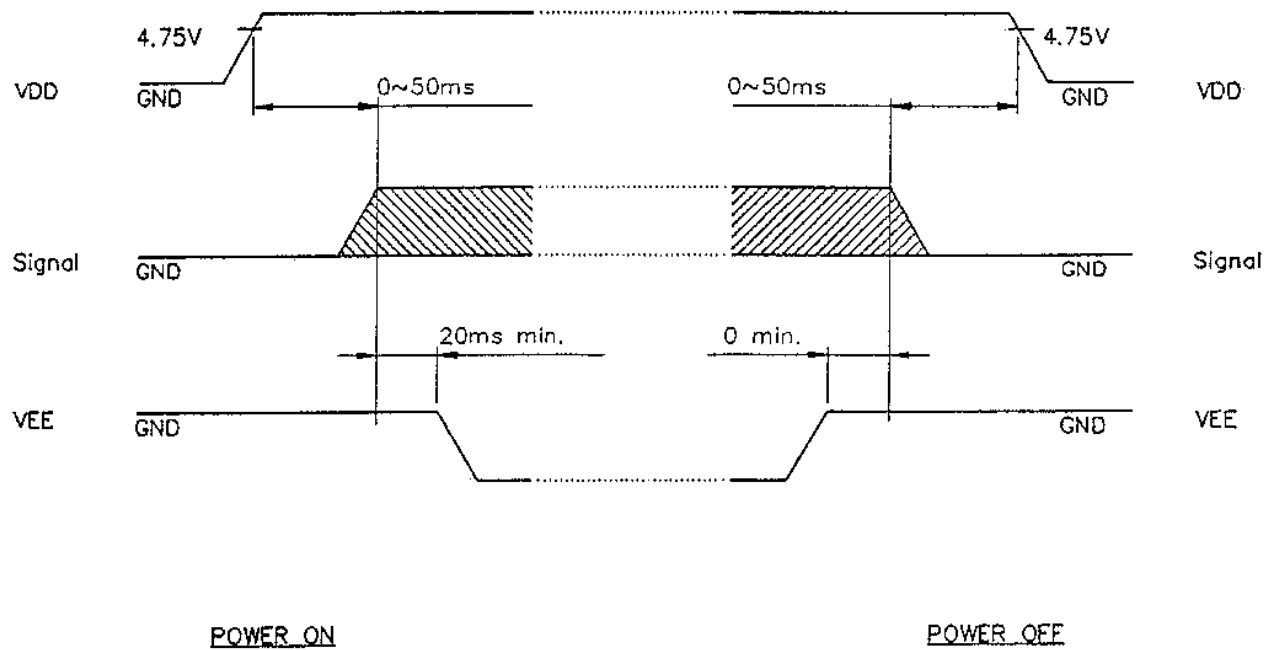
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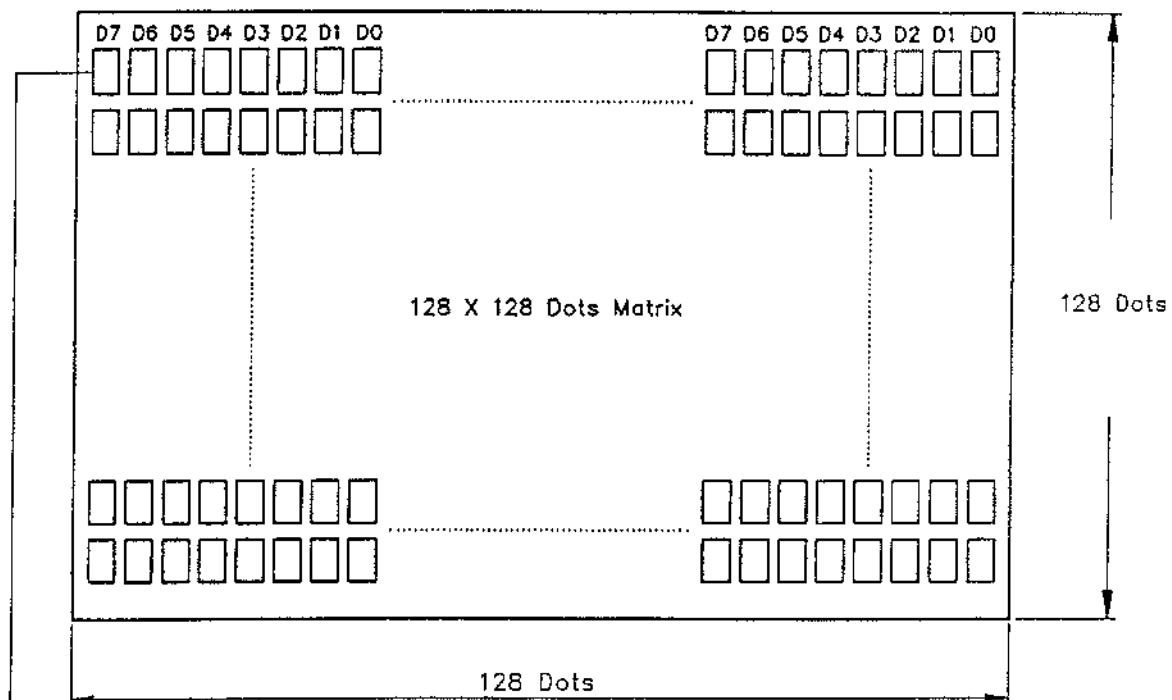
POWER ON/OFF TIMING CHARACTERISTICS



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.

DB0~DB7 are 8 bits transmitted data ,where DB0 is LSB and DB7 is MSB.

RELIABILITY TEST

NO	ITEM	CONDITION			STANDARD	NOTE
1	High Temp. Leaving	70°C	120HR		Appearance without defect	
2	Low Temp. Leaving	-20°C	120HR		Appearance without defect	
3	High Temp. & High Humi. Leaving	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

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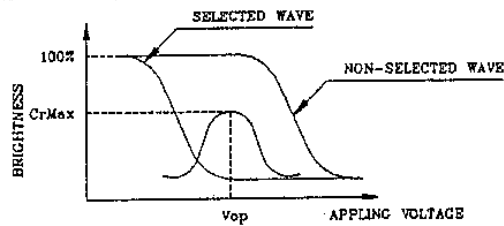
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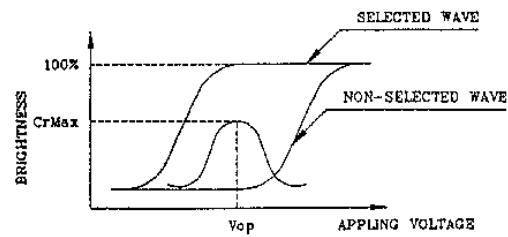
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(NOTE 1)

Definition of Operation Voltage(Vop)



(positive type)



(negative type)

*Conditions

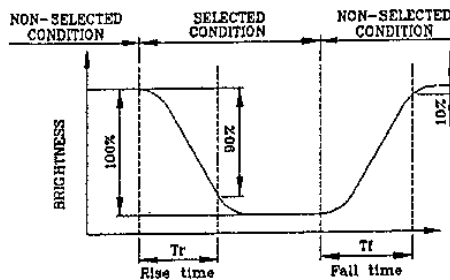
Viewing Angle : 0

Frame Frequency : 70Hz

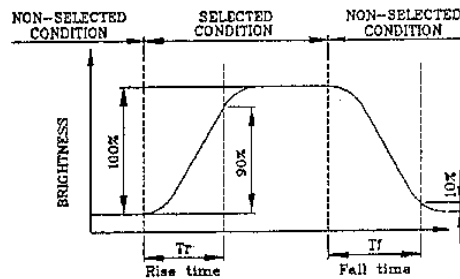
Applying Waveform : 1/N duty 1/a bias

(NOTE 2)

Definition of Response Time(Tr,Tf)



(positive type)



(negative type)

*Conditions

Operating Voltage : Vop

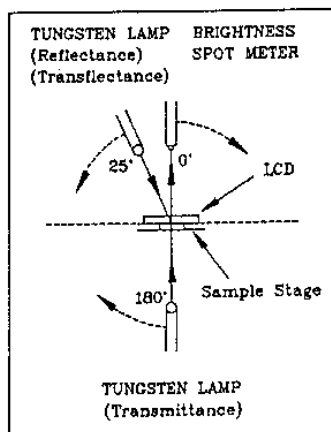
Viewing Angle (θ,φ) : (0,0)

Frame Frequency : 70Hz

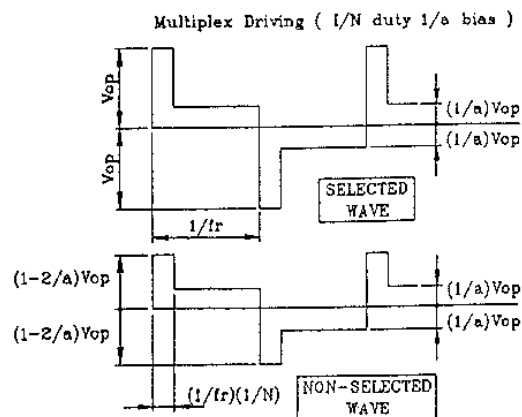
Applying Waveform : 1/N duty 1/a bias

(NOTE 3)

Description of Measuring Equipment and Driving Waveforms



CONST.
TEMP.
CHAMBER



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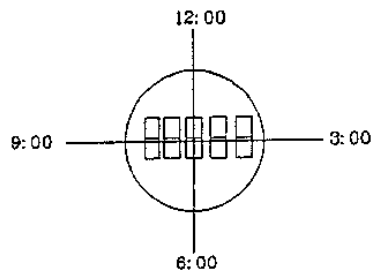
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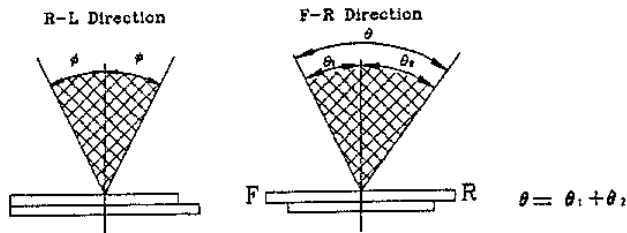
(NOTE 4)

Definition of Viewing Direction



(NOTE 5)

Definition of Viewing Angle

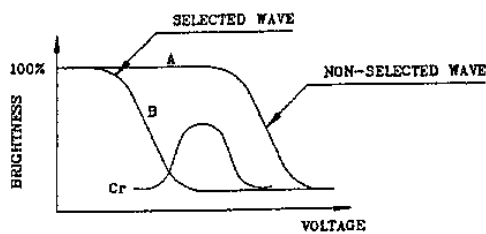


*Conditions

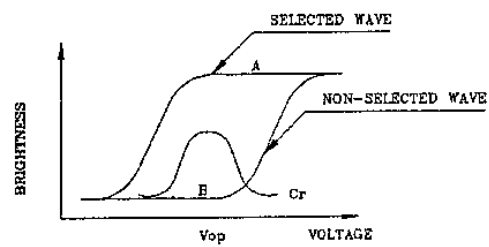
Operating Voltage : V_{op}
Frame Frequency : 70Hz
Applying Waveform : 1/N duty 1/a bias
Contrast Ratio : larger than 2

(NOTE 6)

Definition of Contrast Ratio (Cr)



(positive type)



(negative type)

Contrast Ratio : $Cr = A/B$

*Conditions

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

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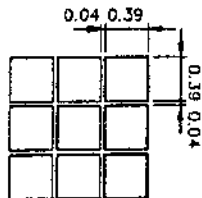
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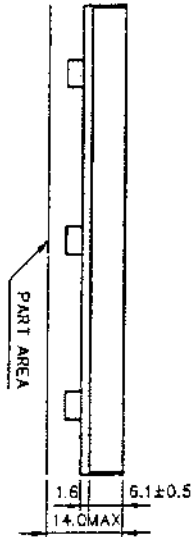
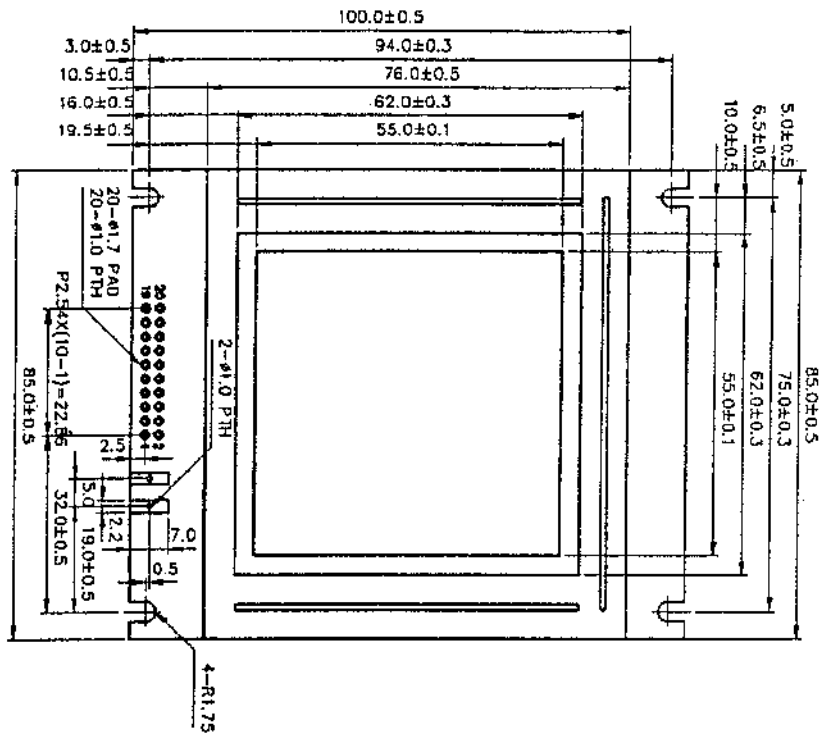
Pin No.	Symbol	FUNCTION
1	FG	FRAME GROUND
2	VSS	0V Ground
3	VDD	5V Power Supply for Logic
4	V _L	- LCD Contrast Voltage Input
5	WQ	L Data write
6	RD	L Data read
7	CE	L Chip enable
8	CD	H/L H=command, L=Data
9	N/C	NO CONNECTION
10	RESET	L Reset (LSB)
11	DB0	H/L
12	DB1	H/L
13	DB2	H/L
14	DB3	H/L
15	DB4	H/L
16	DB5	H/L
17	DB6	H/L
18	DB7	H/L (MSB)
19	FS	H/L Front select
20	N/C	NO CONNECTION



128 X 128 DOTS

NOTES :

1. RESOLUTION : 128 X 128 DOTS
2. GENERAL TOLERANCE : $\pm 0.5\text{mm}$
3. BACKLIGHT : NONE/EL



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