

Type : LM211

Description : 64 x 480 dots matrix

1. ABSOLUTE MAXIMUM RATINGS

1.1 Electrical Absolute Maximum Ratings

ITEM	SYMBOL	MIN	MAX	UNIT
Logic circuit power supply voltage	$V_{DD}-V_{SS}$	0	7	V
LC driver circuit power supply voltage	$V_{DD}-V_{EE}$	0	15	V
LC driving voltage	$V_{DD}-V_O$	0	15	V
Input voltage (FLM, CL1, CL2, M, D1, D2)	V_i	V_{SS}	V_{DD}	V
Static Electricity	Note 1		100	V

1.2 Environmental Absolute Maximum Ratings

ITEM	OPERATING		STORAGE		COMMENT
	MIN	MAX	MIN	MAX	
Temperature	0 °C	40 °C	-20 °C	60 °C	<168 Hours
Vibration		0.5G		0.5G	
Shock		3G		10G	XYZ direction
Corrosive Gas	Not acceptable		Not acceptable		
Humidity	Note 2		Note 2		without condensation

Note 1 ; Test Method and Condition

After charging up 200pF capacitor by stated voltage ,
the capacitor is connecting pins in the module.

Note 2 ; $T_a \leq 40^\circ\text{C}$: 92 %RH max.

$T_a > 40^\circ\text{C}$: Absolute humidity must be lower than
the humidity of 92 %RH at 40°C.

2. ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITION	MIN	NOM	MAX	UNIT
Logic circuit power supply voltage	$V_{DD}-V_{SS}$		4.75	5.0	5.25	V
LC driver circuit power supply voltage	$V_{EE}-V_{SS}$		-8.55	-9.0	-9.45	V
Latch memory clock waveform	CL1	High level	3.6		VDD	V
		Low level	0		0.8	
Data waveform	D1 D2	High level	3.6		VDD	V
		Low level	0		0.8	
Shift data clock waveform	CL2	High level	3.6		VDD	V
		Low level	0		0.8	
AC driving control signal waveform	H	High level	3.6		VDD	V
		Low level	0		0.8	
FLM signal waveform	FLM	High level	3.6		VDD	V
		Low level	0		0.8	
Logic circuit power supply current (note 1)	I_{DD}	$V_{DD}=5.0V$ $V_{EE}=-9.0V$		16.0		mA
LC driver circuit power supply current (note 1)	I_{EE}	$V_{DD}=5.0V$ $V_{EE}=-9.0V$		6.0		mA
Recommended LC driving voltage	$V_{DD}-V_O$	$T_a=0^\circ C$ $\phi=25^\circ$		12.8		V
		$T_a=25^\circ C$ $\phi=25^\circ$		11.2		V
		$T_a=40^\circ C$ $\phi=25^\circ$		10.0		V
Frequency of CL2	f_{CL2}		610	920	1200	KHz

Note 1 ; $f_{CL2}=920KHz$, $D1, D2=GND(V_{SS})$, $V_{DD}-V_O=11.2V$

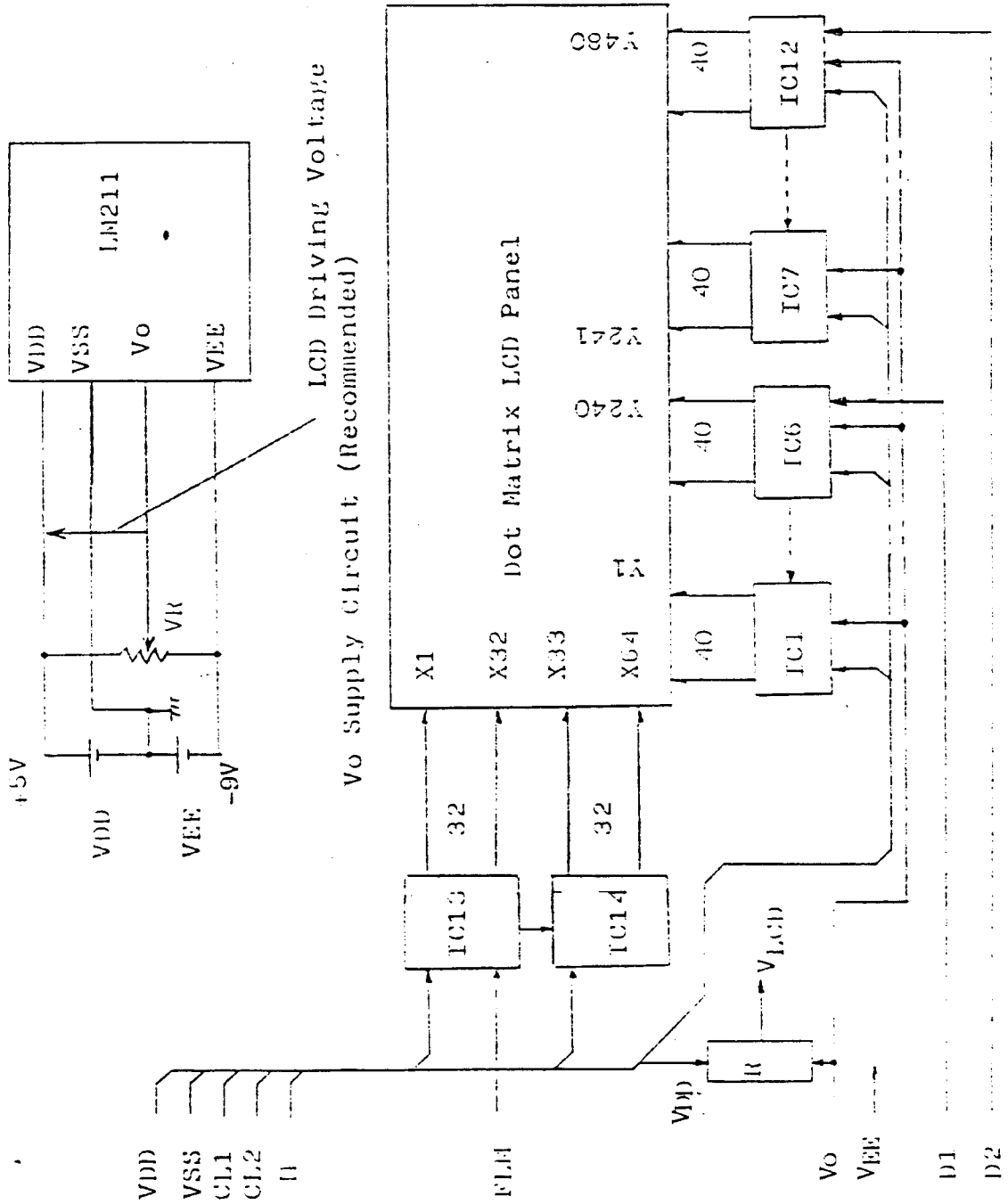
3. OPTICAL CHARACTERISTICS

$T_a=25^\circ C$

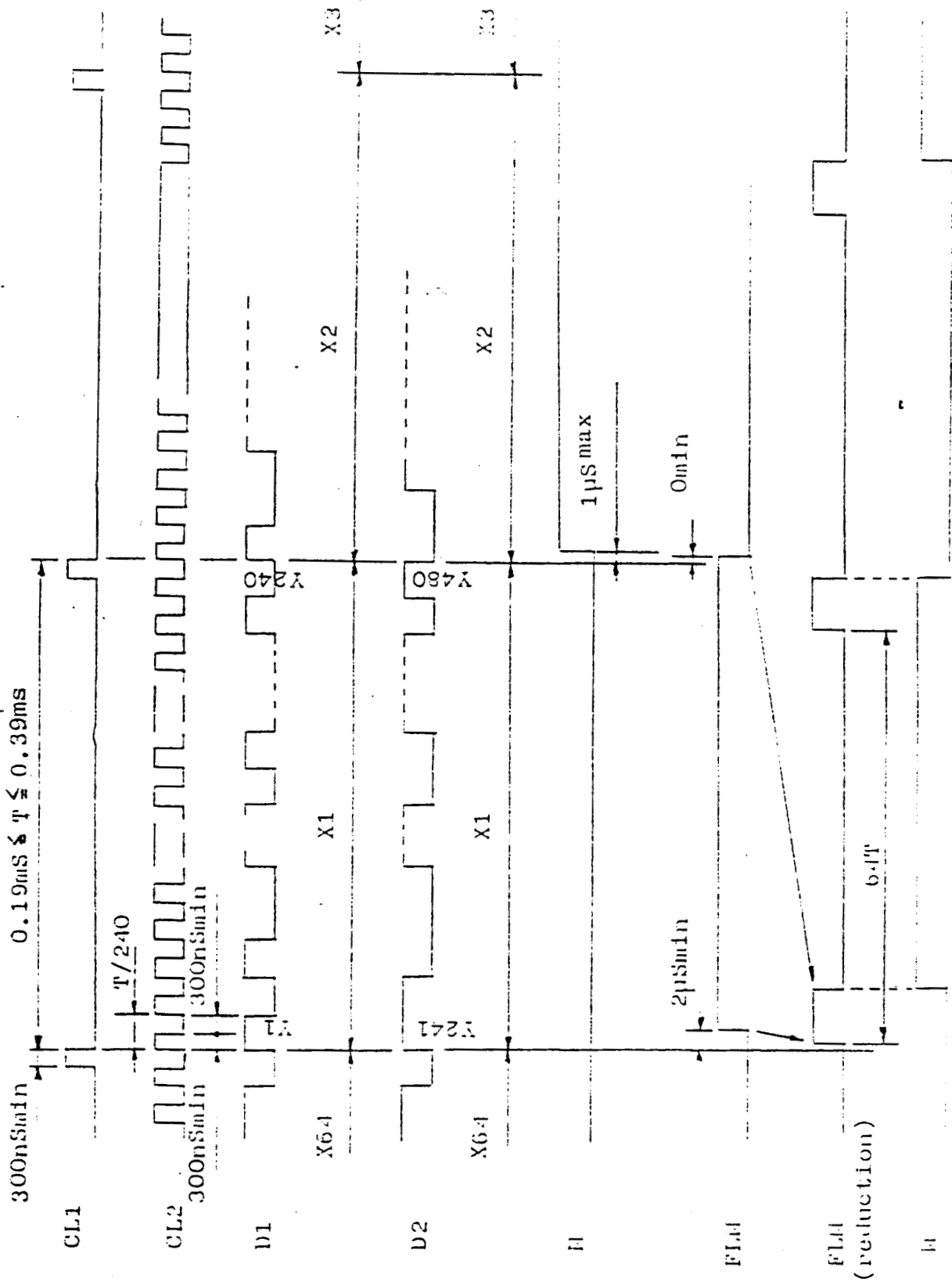
ITEM	SYMBOL	COND.	MIN	NOM	MAX	UNIT
Viewable area	$\phi 2-\phi 1$	$K=1.4$		15		deg. note1
Contrast ratio	K	$\phi=25^\circ$		2		
Response time(Rise)	t_r	$\phi=25^\circ$		250		mS
Response time(fall)	t_f	$\phi=25^\circ$		250		mS

Note 1 ; $\phi 1 \geq 10^\circ$, $\phi 2 \leq 40^\circ$

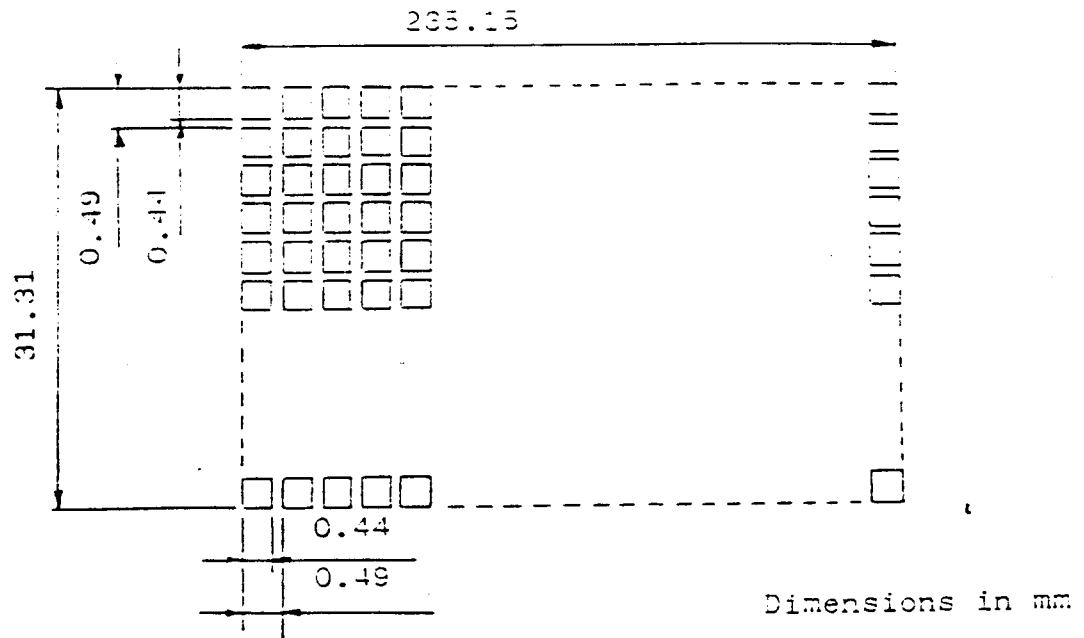
4. BLOCK DIAGRAM



3. INTERFACE TIMING CHART



Note 1; Detail Drawing of Matrix Pattern



Note 2; Interface Pin Assignment

Pin No.	Symbol	Level	Function
1	D1	H/L	Serial row data
2	FLM	H	The FLM signal indicates the beginning of each display cycle
3	M	H/L	Control signal for AC driving
4	CL1	H L	The CL1 latches the serial data in the shift registers.
5	CL2	H L	Clock signal for shifting the serial data
6	D2	H/L	Serial row data
7	VDD	-	Power supply for logic circuit
8	VSS	-	Ground
9	VEE	-	Power supply for LC driving
10	Vo	-	Operating voltage for LC driving