3256600

LM238XB

- 240 dot (W) x 128 dot (H) graphic and alpha-numeric display
- Controller LSI HD61830 is built-in. (see page 132).

MECHANICAL DATA (Nominal dimensions)

Module size	180W x 120H x 13.8T (max.) mm
Effective display area	148W x 75.0H mm
Number of dots	240W x 128H dot
Dot size	0.50W x 0.50H mm
Dot pitch	0.55W x 0.55H mm
Weight	about 220 g

ABSOLUTE MAXIMUM RATINGS

	min.	max.
Power supply for logic ($V_{DD} - V_{SS}$)	0	7.0V
Power supply for LCD drive ($V_{DD} - V_{EE}$)	0	19.0 V
Input voltage (Vi) (Note 1)	V_{SS}	V_{DD} V
Operating temperature (Ta)	0 ~ 40°C	
Storage temperature (Tstg)	−20 ~ 60°C	

ELECTRICAL CHARACTERISTICS

Ta = 25°C, $V_{DD} - V_{SS}$ = 5.0V ±0.25V,
$V_{EE} - V_{SS}$ = −13.5V ±0.25V

Input "high" voltage (V_{IH})	2.2 V min.
Input "low" voltage (V_{IL})	0.8 V max.
Power supply current (I_{DD})	34 mA typ.
(I_{EE})	3 mA typ.
Clock frequency (f_{CL2}) (Internal clock)	1.2 MHz max.
Input leak current (I_{IN})	−5 ~ 5 μA
Output leak current (I_{OUT})	−10 ~ 10 μA
Power consumption	250 mW max.

(V_{DD} = 5V, Ta = 25°C, $V_{DD} - V_0$ = 13.7V)

Power supply for LCD drive (Recommended) ($V_{DD} - V_$
Duty = 1 6

Ta = 0°C	14.9 V typ.
Ta = 25°C	13.5 V typ.
Ta = 40°C	11.9 V typ.

OPTICAL DATA ..... See page

Notes 1. Applied to CL1, CL2, D1 ~ D2, M, FLM.

INTERNAL PIN CONNECTION

Pin No.	Symbol	Function
A1	V_{SS} (0V)	Ground
A2	V_{DD} (+5V)	Power supply for logic
A3	V_0	Power supply for LCD drive
A4	RS	Register select
A5	R/W	Read/write
A6	E	Enable
A7 ~ 14	DB0 ~ DB7	Data bus
A15	$\overline{CS}$	Chip select
A16	$\overline{RES}$	Reset
A17	V_{EE} (−13.5V)	Power supply for LCD drive
A18 ~ 20	N.C	No connection

Unit: mm

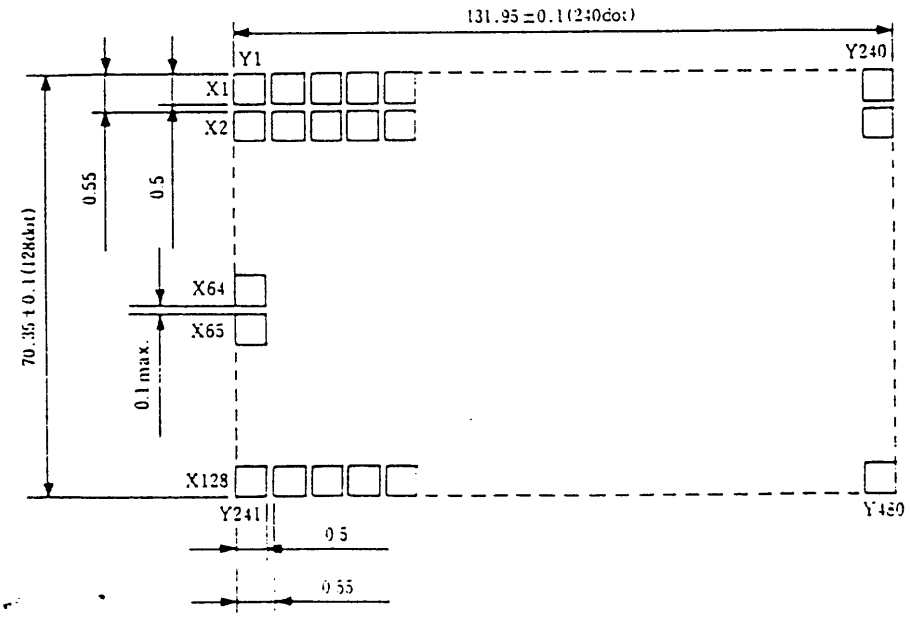
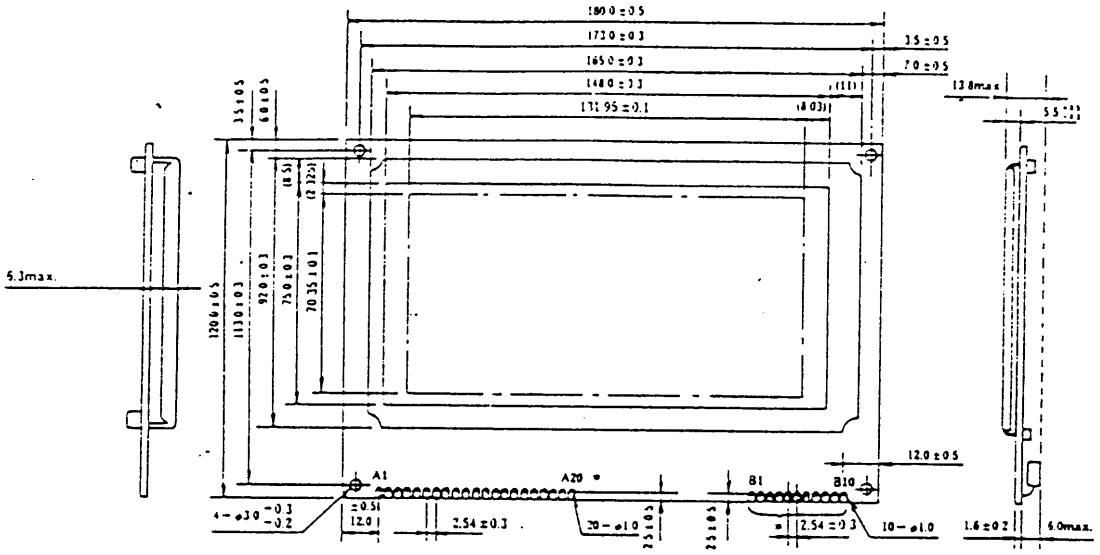


Fig. 1 Display pattern

Unit: mm



*B1 ~ B10 pads should not be used for LM238XB.
Do not connect any signals to these pads.
Use A1 ~ A20 for interface.

Fig. 2 External dimension

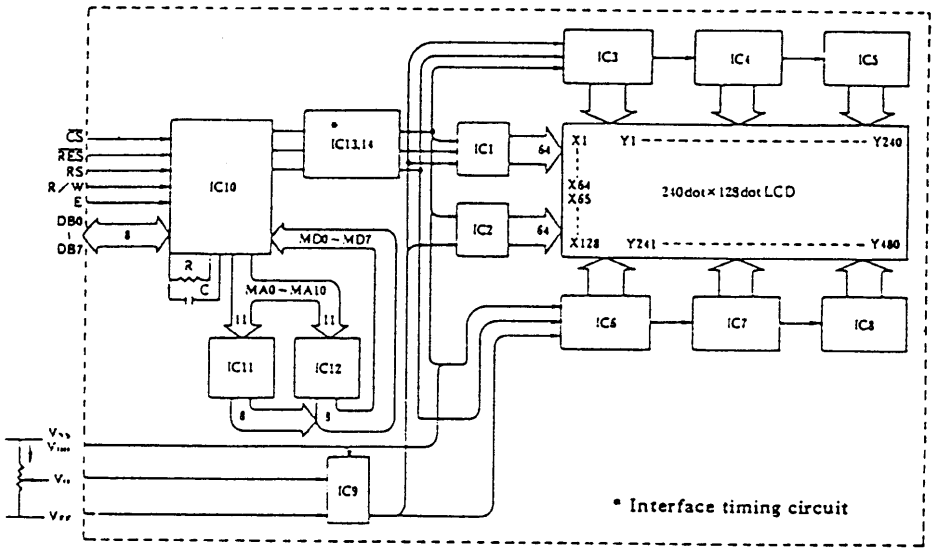


Fig. 3 Block diagram

$V_{DD} - V_0$: LCD driving voltage
VR: 10kΩ ~ 20kΩ

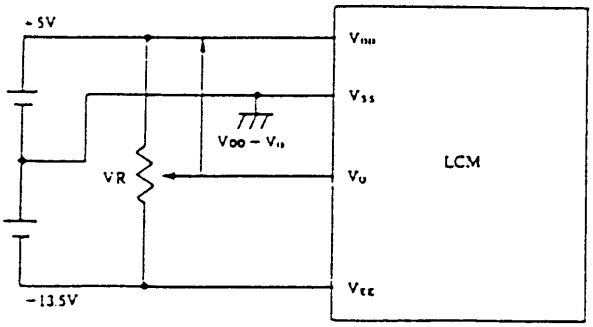


Fig. 4 Power supply

$V_{DD} - V_0$: LCD driving voltage
VR: 10kΩ ~ 20kΩ

TIMING CHARACTERISTICS

Item		Symbol	Min.	Typ.	Max.	Unit
Enable cycle time		t_{CYC}	1.0	–	–	μs
Enable pulse width	H level	t_{WEH}	0.45	–	–	μs
	L level	t_{WEL}	0.45	–	–	μs
Enable rise time		t_{Er}	–	–	25	ns
Enable fall time		t_{Ef}	–	–	25	ns
CS, R/W, RS set up time		t_{AS}	140	–	–	ns
Data set up time		t_{DIS}	225	–	–	ns
Data delay time		t_{DD}	–	–	225	ns
Data hold time		t_H	10	–	–	ns
CS, R/W, RS →hold time		t_{AH}	10	–	–	ns

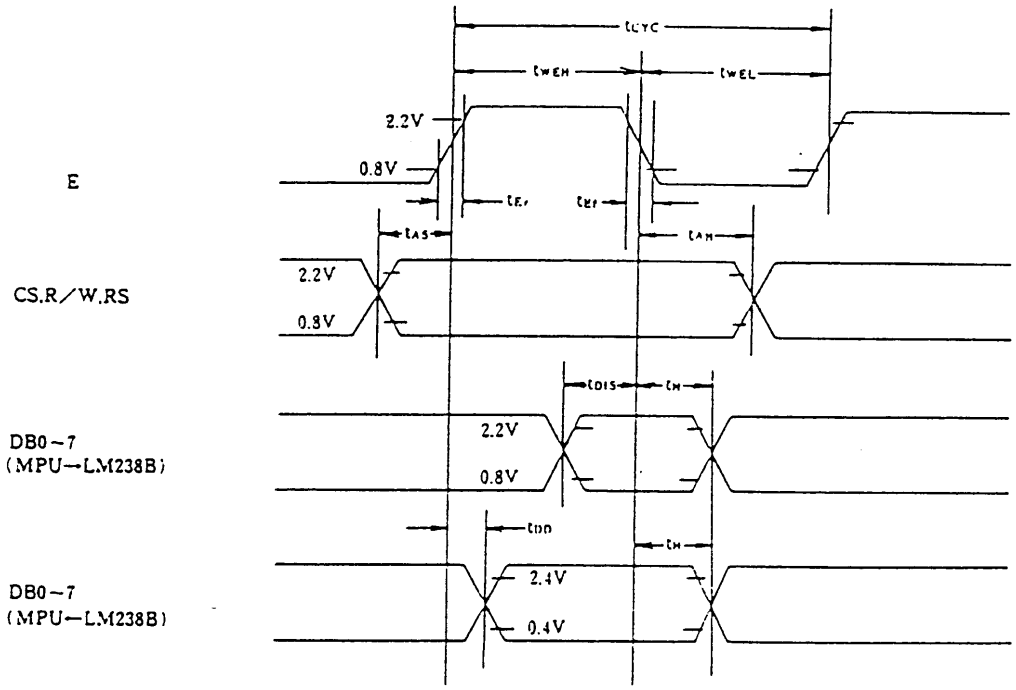


Fig. 5 Interface timing (MPU ↔ LM238XB)