LM032XMBL DK66

- 20 characters x 2 lines
- Controller LSI HD44780 built-in (See page 115).
- +5V single power supply

MECHANICAL DATA (Nominal Dimensions)

Module size	116W x 39H x 10.5T (max)	mm
Effective display area	83W x 18.6H	mm
Character size (5 x 7 dots)	3.2W x 4.85H	mm
Character pitch	3.7	mm
Dot size	0.6W x 0.65H	mm
Weight	about 50g	

ABSOLUTE MAXIMUM RATINGS

	min	max
Power supply for logic (VDD - VSS)	0	6.5 V
Power supply for LCD drive (VDD - VO)	0	6.5 V
Input Voltage (Vi)	VSS	VDD V
Operating temperature (Ta)	0	40°C
Storage temperature (Tstg)	-20	60°C

ELECTRICAL CHARACTERISTICS

Ta = 25°C, VDD = 5.0V ± 0.25V

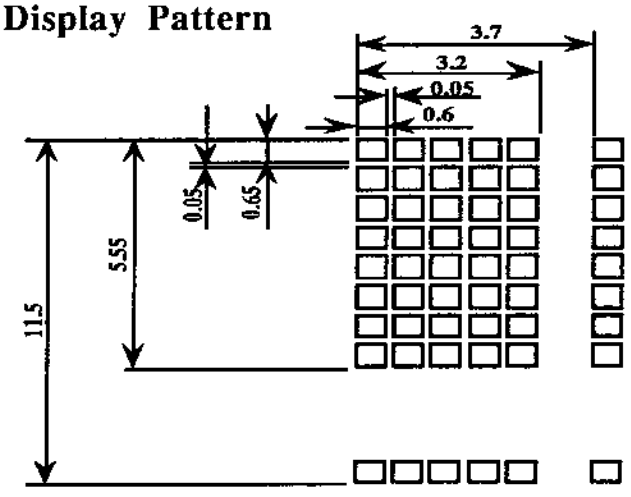
Input "high" voltage (ViH)	2.2V	min
Input "low" voltage (ViL)	0.6V	max
Output "high" voltage (VOH) (-IOH = 0.2mA)	2.4V	min
Output "low" voltage (VOL) (IOL = 1.2mA)	0.4V	max
Power supply current (IDD) (VDD = 5.0V)	2.0mA	typ
	3.0mA	max
Power supply for LCD drive (recommended)	(VDD - VO)	
	Duty 1/16	
Range of VDD - VO	1.5 ~ 5.25V	
Ta = 0°C	4.6V	typ
Ta = 25°C	4.4V	typ
Ta = 40°C	4.2V	typ

Internal Pin Connection

Pin No	Symbol	Level	Function
1	VSS	-	0V
2	VDD	-	+5V
3	V0	-	-
4	RS	H/L	L : Instruction code input H : Data input
5	R/W	H/L	L : Data read (LCD → MPU) H : Data write (LCD ← MPU)
6	E	H, H/L	Enable signal
7	DB0	H/L	Data Bus Line Notes (1) and (2)
8	DB1	H/L	
9	DB2	H/L	
10	DB3	H/L	
11	DB4	H/L	
12	DB5	H/L	
13	DB6	H/L	
14	DB7	H/L	

Notes :
In the HD44780, the data can be sent in either 4-bit 2-operation or 8-bit 1-operation so that it can interface to both 4- and 8-bit MPU's.
(1) When interface data is 4-bits long, data is transferred using only 4 buses of DB4 ~ DB7 and DB0 ~ DB3 are not used. Data transfer between the HD44780 and the MPU completes when 4-bit data is transferred twice. Data of the higher order 4-bits (contents of DB4 ~ DB7 when interface data is 8-bits long) is transferred first and then lower order 4-bits (contents of DB0 ~ DB3 when interface data is 8-bits long).
(2) When interface data is 8-bits long, data is transferred using 8 data buses of DB0 ~ DB7.

Display Pattern



Unit: mm

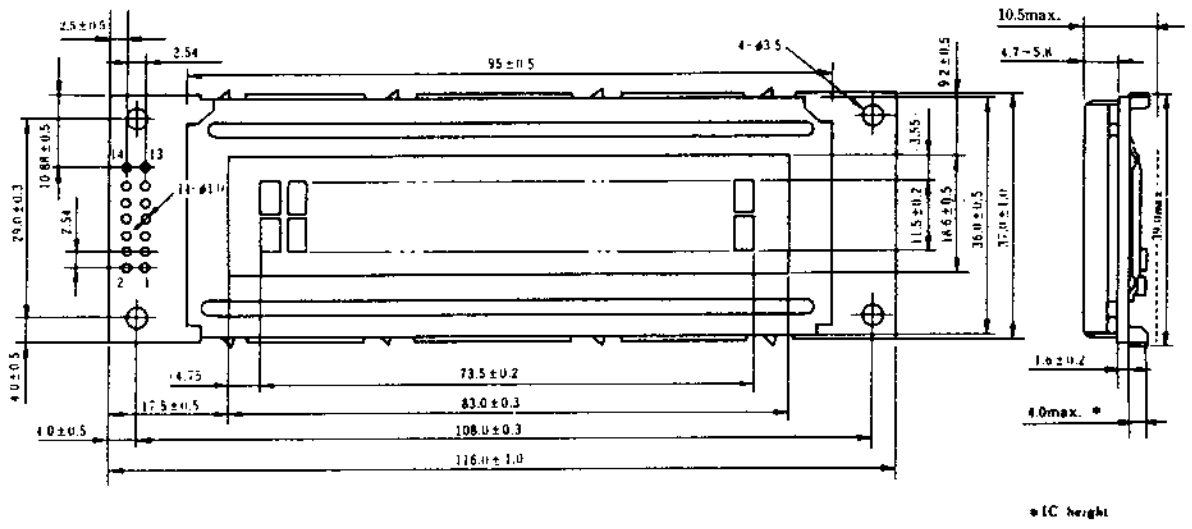


Fig. 2 External dimensions

Interface Timing

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Enable cycle time	tcyc	Fig. 5, Fig. 6	1.0	-	-	µs
Enable pulse width	PWEH	Fig. 5, Fig. 6	450	-	-	ns
Enable rise/fall time	tEr, tEf	Fig. 5, Fig. 6	-	-	25	ns
RS, R/W set up time	tAS	Fig. 5, Fig. 6	140	-	-	ns
Data delay time	tDDR	Fig. 6	-	-	320	ns
Data set up time	tDSW	Fig. 5	195	-	-	ns
Hold time	tH	Fig. 5, Fig. 6	20	-	-	ns

Fig. 5 : Interface Timing (data write)

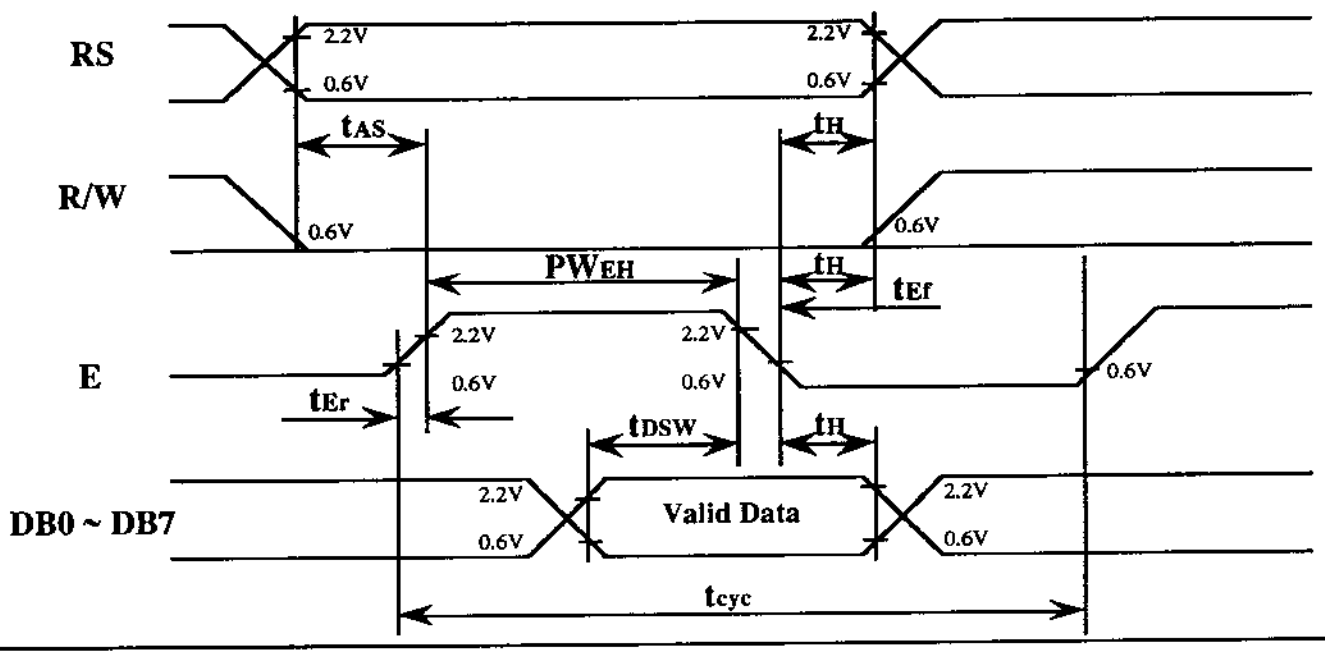
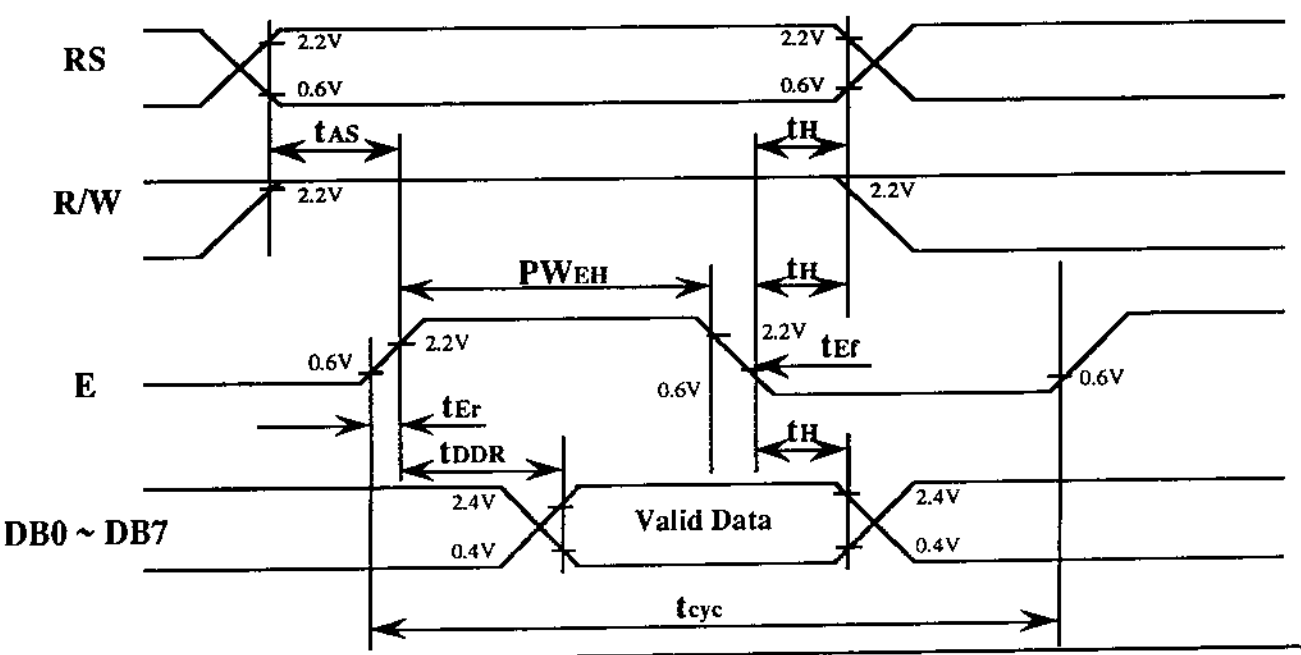
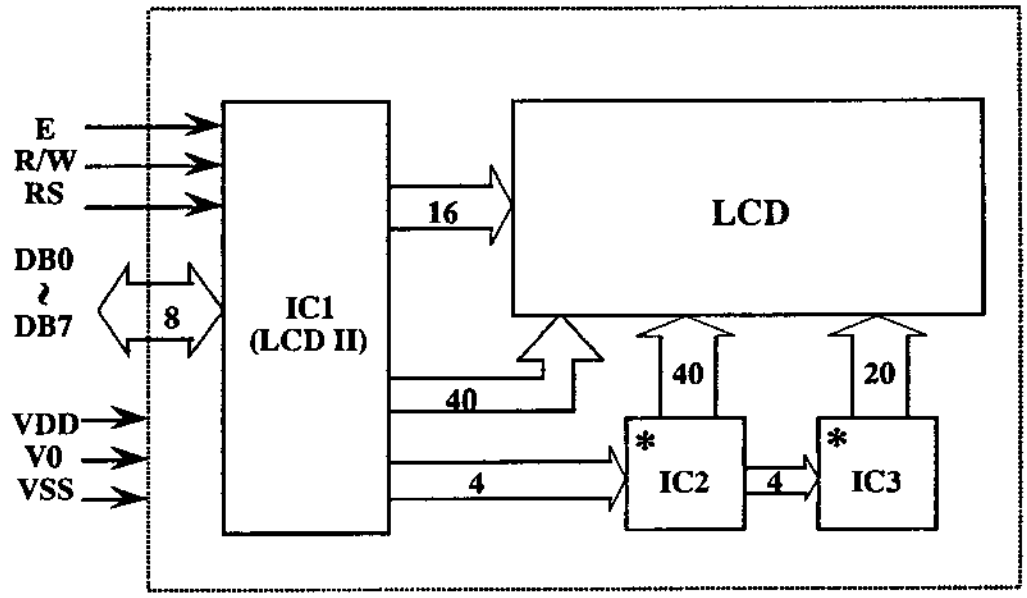


Fig. 6 : Interface Timing (data read)

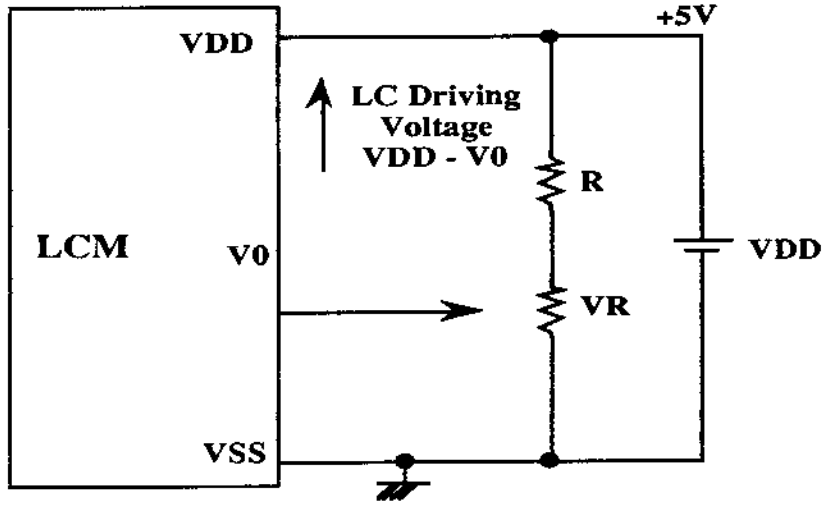


Block Diagram



* HD44100 or equivalent

Power Supply



VDD - V0 : LC Driving Voltage (1.5 ~ 5.25V)
VR : 10KΩ ~ 20KΩ
R : Value must be fit for VDD - V0 ≥ 1.5V