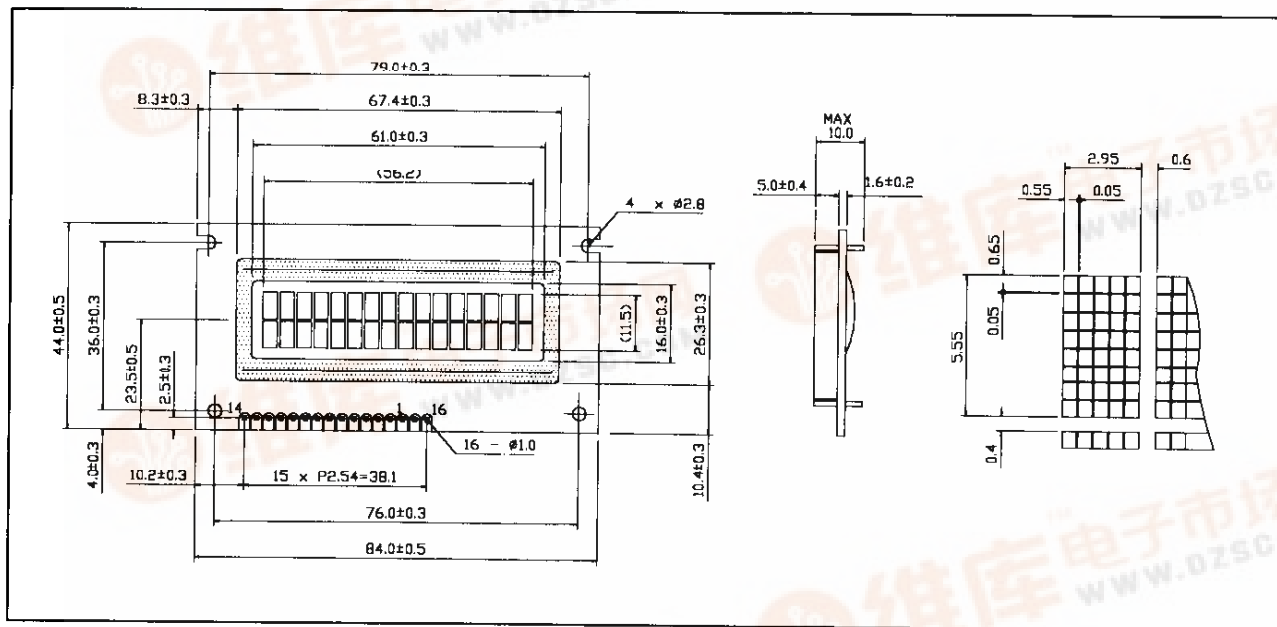


* EXTERNAL DIMENSIONS AND DISPLAY PATTERNS



MECHANICAL DATA (Nominal dimensions)

Module size	84W x 44 H x 10T (max.)mm
Effective display area	61.0W x 16.0H mm
Character size (5 x 8 dots)	2.95W x 5.55H mm
Character pitch	3.55 mm
Dot size	0.55W x 0.65H mm
Weight	about 35g (Approx.)

ABSOLUTE MAXIMUM RATINGS

	MIN.	MAX.
Power supply for logic ($V_{DD} - V_{SS}$)	-0.3	7.0 V
Power supply for LCD drive ($V_{DD} - V_o$)	0	13.5 V
Input voltage (V_i)	0	V_{DD} V
Operating temperature (T_a)	0	+50°C
Storage temperature (T_{stg})	-20	+70°C

ELECTRICAL CHARACTERISTICS

$T_a = 25^\circ\text{C}$, $V_{DD} = 5.0\text{V} \pm 0.25\text{V}$

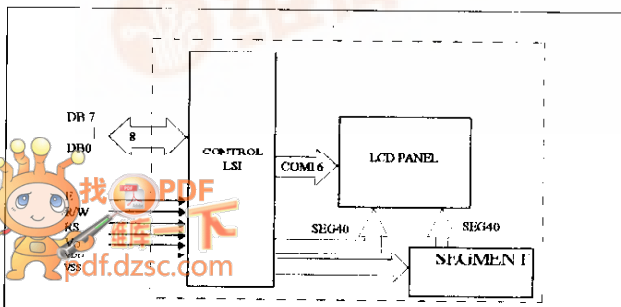
Input "high" voltage (V_{ih})	2.2V min.
Input "low" voltage (V_{il})	0.6V max.
Output "high" voltage (V_{oh}) ($-I_{oh} = 0.2\text{mA}$)	2.4V min.
Output "low" voltage (V_{ol}) ($I_{ol} = 1.6\text{mA}$)	0.4V max.
Power supply current (I_{dd}) ($V_{DD} = 5.0\text{V}$)	1.0mA typ. 2.0mA max.

Drive method

Power supply LCD drive ($V_{DD} - V_o$)

$T_a = 0^\circ\text{C}$	4.6V typ.
$T_a = 25^\circ\text{C}$	4.4V typ.
$T_a = 50^\circ\text{C}$	4.2V typ.

* BLOCK DIAGRAM



* PIN CONNECTIONS

Pin	Symbol	Function
1	V_{SS}	0V
2	V_{DD}	+5V
3	V_o	LCD DRIVING VOLTAGE
4	RS	H: DATA INPUT L: INSTRUCTION INPUT
5	R/W	H: DATA READ L: DATA WRITE
6	E	ENABLE SIGNAL
7	DB0	DATA BUS LINE
8	DB1	NOTES: In the controller 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
9	DB2	
10	DB3	
11	DB4	
12	DB5	
13	DB6	
14	DB7	
15	K(-)	BACKLIGHT VERSION
16	A(+)	

- (1) When interface data is 4 bits is long, data is transferred using only 4 buses of DB4~DB7 and DB0~DB3 are not used. Data transfer between the control LSI 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.

* BACKLIGHT CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

LED Characteristic	Symbol	Condition	Typ	Max	Unit
Forward Voltage	V_f	$I_f = 120\text{mA}$	4.2	4.6	V
Reverse Current	I_r	$V_r = 5\text{V}$	0.12		mA
Luminous Intensity	I_k	$I_f = 120\text{mA}$	150		mcd
Peak Emission Wave Length		$I_f = 120\text{mA}$	570		nm
Spectral Line Half Width		$I_f = 120\text{mA}$	30		nm

Item	Symbol	Standard	Unit
Voltage	V_{el}	Typ 100	Vrms
Frequency	F_{el}	Max 400	Hz