623-374/386

PRELIMINARY ENGINEERING SPECIFICATIONS

16 X 2 DOT MATRIX LCD MODULE
3v VERSION
LED Backlight version avaiable

MDLS 16265SS-XLV(3v VERSION)
16 CHARACTERS X 2 LINES

Specification may be changed without notice in order to improve performance and quality

Trident Microsystems Ltd
Perrywood Business Park
Honeycrock Lane
Salfords
REDHILL,SURREY,RH1 5JQ
Tel 01737 765900 Fax 01737 771908

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VARITRONIX LIMITED

Preliminary Specification
of
LCD Module Type
MDLS16265SS-XLV

1. General Description

- 16 characters x 2 lines STN XLV Positive Green Yellow Dot Matrix LCD module
- Viewing Angle: 6 O'clock direction
- Driving duty: 1/16 Duty, 1/3 bias
- 'SAMSUNG' KS0070B die form LCD Controller & Driver.
- Optional LED01G / LED04G backlight available.

2. Mechanical Specifications

The mechanical detail is shown in Fig. 1A and summarized in Table 1 below.

Table 1

Parameter	Specifications	Unit
Outline dimensions	84.0(W) x 44.0(H) x 10.0 MAX.(D) (see Note 1) 84.0(W) x 44.0(H) x 12.0 MAX.(D) (see Note 2) 84.0(W) x 44.0(H) x 14.0 MAX.(D) (see Note 3)	m.m.
Effective viewing area	61.0(W) x 15.8(H)	m.m.
Display format	16 characters x 2 lines	-
Character size	2.95(W) x 5.55(H) (5 x 8 dots)	m.m.
Character spacing	0.60(W) x 0.40(H)	m.m.
Character pitch	3.55(W) x 5.95(H)	m.m.
Dot size	0.55(W) x 0.65(H)	m.m.
Dot spacing	0.05(W) x 0.05(H)	m.m.
Dot pitch	0.60(W) x 0.70(H)	m.m.
Weight: without LED04 backlight with LED04 backlight with LED01 backlight	approx. 30.5 approx. 39.0 TBD	gram

Note 1: Without LED04 backlight.(see Fig. 1A).
Note 2: With LED01 backlight.(see Fig. 1A)
Note 3: With LED04 backlight.(see Fig. 1A).

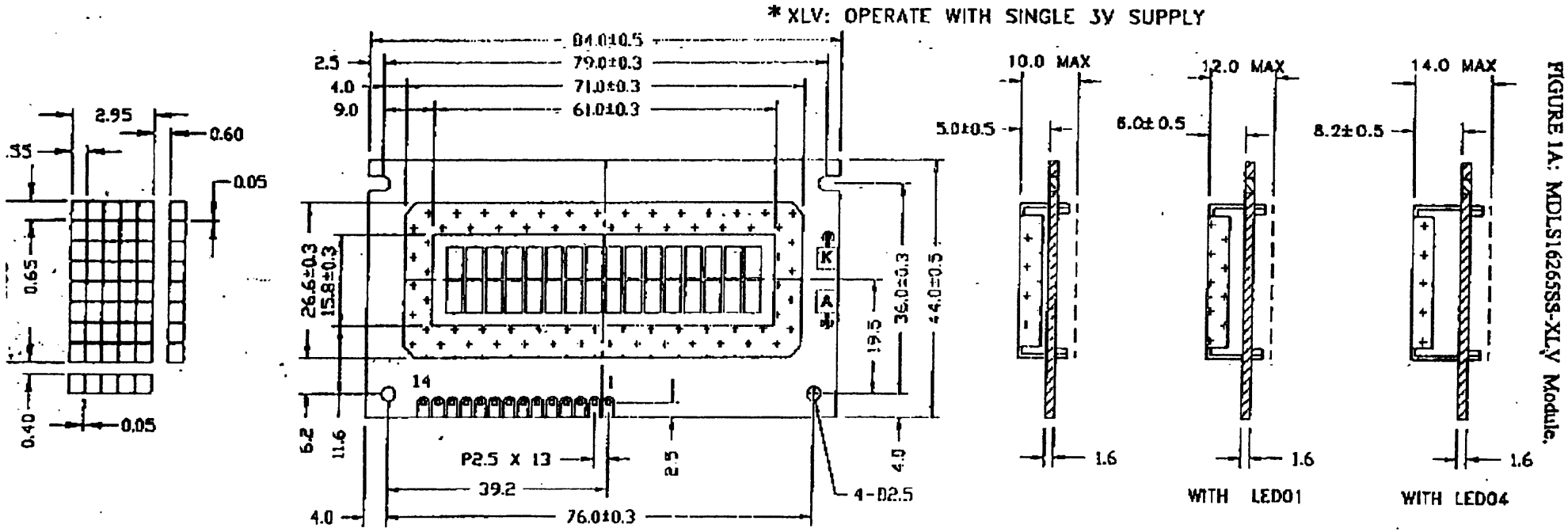

FIGURE 1A: MDLS16265SS-XLV Module.

14 PIN CONNECTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	A	K
	VSS	VDD	VO	RS	R/W	E	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	LED(+)	LED(-)

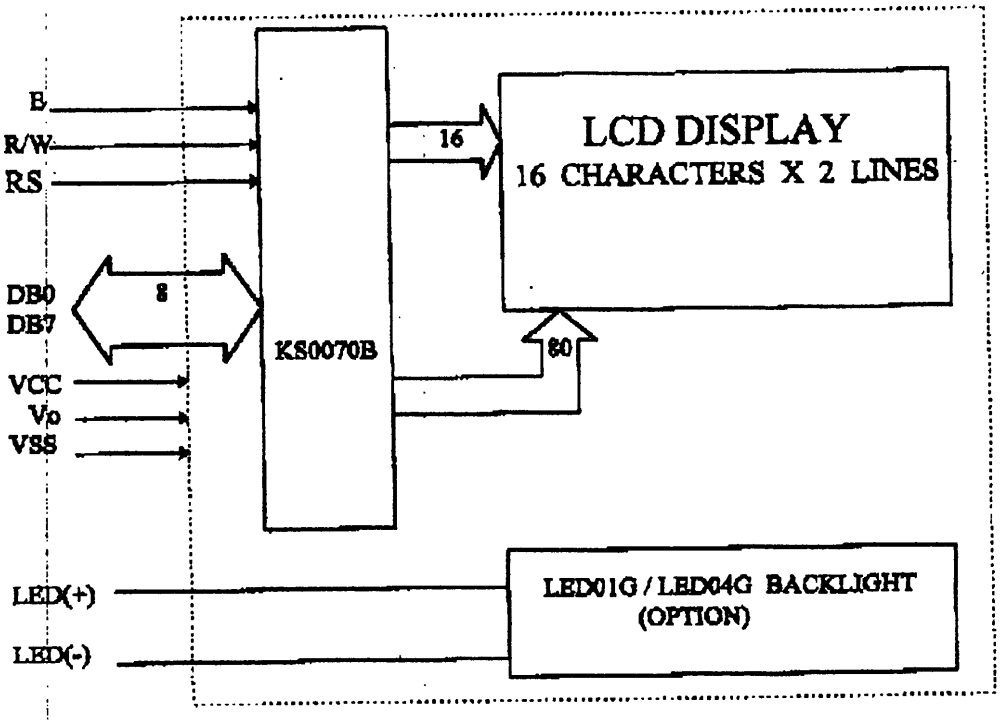

FIGURE 1B: A block diagram of MDLS16265SS-XLV Module.

3. Absolute Maximum Ratings

3.1 Electrical Maximum Ratings(Ta = 25 °C)

Table 2

Parameter	Symbol	Min.	Max.	Unit
Power Supply voltage (Logic)	V_{DD} - GND	0	7.0	V
Power Supply voltage (LCD drive)	V_{DD} - V_O	0	11.5	V
Input voltage	Vin	0	V_{DD}	V

3.2 Environmental Condition

Table 3

Item	Operating Temperature (Topr)		Storage Temperature (Tstg)		Remark
	Min.	Max.	Min.	Max.	
Ambient Temperature	0°C	+50°C	-10°C	+60°C	
Humidity	Note1		Note1		no condensation
Vibration	Note2		Note2		3 directions
Shock	Note3		Note3		3 directions

Note 1: 95% max. RH for Ta ≤ 40°C
< 95% RH for Ta > 40°C

Note 2: Frequency: 10 ~ 55 Hz
Amplitude: 1.5 m.m.
Duration: 10 Hz ~ 55 Hz ~ 10 Hz (in 1 min.) for 6 hours
(2 hours in each direction).

Note 3: 3 shocks in 3 mutually perpendicular directions.
Direction normal to surface of LCD glass :
acceleration 80G , half-sine pulse of duration 11 ms.
Other 2 directions : acceleration 100G with same waveform.

4. Electrical Specifications

4.1 Interface signals

Table 4

Pin No.	Symbol	Description
1	Vss	Ground
2	V_{DD}	Power supply for logic (+3V)
3	V_O	Power supply for LCD driver
4	RS	Register Select Input: 'High' for Data register (for read and write) 'Low" for Instruction regioster (for write), Busy flag, address counter (for read)
5	R/W	Read/Write signal: 'High' for Read mode. 'Low' for Write mode.
6	E	Enable . To read and write the data.
7	DB0	Data input/output (LSB)
8	DB0	Data input/output
9	DB2	Data input/output
10	DB3	Data input/output
11	DB4	Data input/output
12	DB5	Data input/output
13	DB6	Data input/output
14	DB7	Data input/output (MSB)
15	LED(+)	Anode of backlight
16	LED(-)	Cathode of backlight

4.2 Electrical characteristics at Ta = 25 °C, V_{DD} = 3.0V, V_{SS} = 0V

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Remarks
Supply voltage (Logic+LCD)	V_{DD}-Vss		-	3.0	-	V	
Supply voltage (LCD)	V_{LCD}=V_{DD}-V_0	V_{DD}=3.0V	2.5	2.7	3.0	V	Note (1)
Input signal voltage 1 for E,DB0-DB7,R/W,RS	V_{IH1}	"H" level	1.9	-	V_{DD}	V	
	V_{IL1}	"L" level	-0.3	-	0.4	V	
Input signal voltage 2 for OSC1	V_{IH2}	"H" level	0.7V_{DD}	-	V_{DD}	V	
	V_{IL2}	"L" level	0	-	0.2 V_{DD}	V	
Supply Current(Logic+LCD)	I_{DD}		0.50	0.52	0.55	mA	
Supply Current (LCD)	I_0	Note (1)	0.18	0.20	0.23	mA	
Supply Voltage (LED01)	V_{LED01}	Note(2)	-	2.1	-	V	Option
Supply Current (LED01)	I_{LED01}	Note(2)	-	40	-	mA	Option
Supply Voltage (LED04)	V_{LED04}	Note(3)	4.0	4.1	4.2	V	Option
Supply Current (LED04)	I_{LED04}	Note(3)	65	90	140	mA	Option

Note (1): Driving scheme: 1/16 duty, 1/3 bias.
Note (2): Number of LED chips for LED01 = 4 LED chips.
Note (3): Number of LED chips for LED04 = 18 LED chips.

4.3 Timing Specifications at Ta = -25 ~ +75°C , V_{DD} = 3V±10% , V_{SS} = 0V

Refer to Fig. 2 , the bus timing diagram for write mode of KS0070B.

Table 6

Parameter	Symbol	Min.	Max.	Unit	Test pin
E cycle time	t_C	1400	-	ns	E
E rise time	t_r	-	25	ns	E
E fall time	t_f	-	25	ns	E
E pulse width (High, Low)	t_W	500	-	ns	E
R/W and RS set-up time	t_{SU1}	60	-	ns	R/W,RS
R/W and RS hold time	t_{H1}	20	-	ns	R/W, RS
Data set-up time	t_{SU2}	140	-	ns	DB0-DB7
Data hold time	t_{H2}	10	-	ns	DB0-DB7

Refer to Fig. 3 , the bus timing diagram for read mode of KS0070B.

Table 7

Parameter	Symbol	Min.	Max.	Unit	Test pin
E cycle time	t_C	1400	-	ns	E
E rise time	t_r	-	25	ns	E
E fall time	t_f	-	25	ns	E
E pulse width	t_W	500	-	ns	E
R/W and RS set-up time	t_{SU}	60	-	ns	R/W,RS
R/W and RS hold time	t_H	20	-	ns	R/W, RS
Data output delay time	t_D	-	360	ns	DB0-DB7
Data hold time	t_{DH}	5	-	ns	DB0-DB7

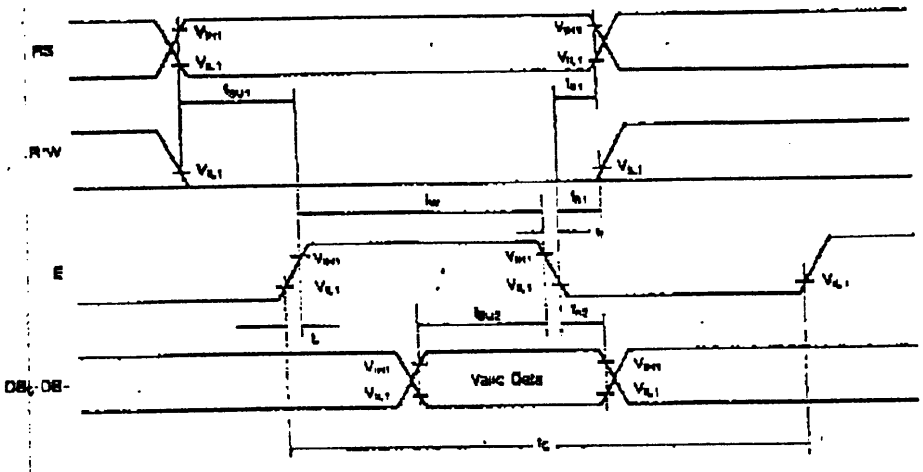

Fig. 2 , The bus timing diagram for write mode of KS0070B
(Writing data from Micom to KS0070B).

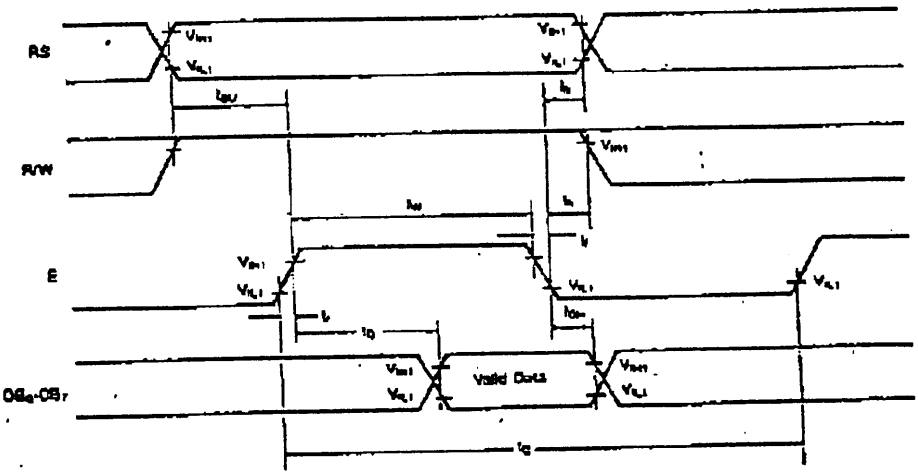

Fig. 3 , The bus timing diagram for read mode of KS0070B.
(Reading data from KS0070B)