DOCUMENT NUMBER AND REVISION
VL-FS-MDLS16265D-03 REV. A
(MDLS16265D-LV-G)

DOCUMENT TITLE:
SPECIFICATION
OF
LCD MODULE TYPE

MODEL NUMBER: MDLS16265D-03

DEPARTMENT	NAME	SIGNATURE	DATE
PREPARED BY	SUNNY LEE	Sunny	2003.12.24
CHECKED BY	YU HAO	Yu Hao	2003.12.24
APPROVED BY	DERRICK TAM	Derrick	2003.12.24

DISTRIBUTION LIST: MARKETING

DOCUMENT REVISION HISTORY 1:

DOCUMENT REVISION FROM TO	DATE	DESCRIPTION	CHANGED BY	CHECKED BY
A	2003.12.24	First Release. (Based on Test Specification VL-TS-MDLS16265D-XX REV.M 2003-06-28).	SUNNY LEE	YU HAO

CONTENTS

VARITRONIX LIMITED

Specification
of
LCD Module Type
Model No.: MDLS16265D-03

1. General Description

- 16 characters (5 x 8 dots) x 2 lines STN Positive Yellow Reflective LCD Character Module.
- Viewing Angle: 6 O'clock direction.
- Driving duty: 1/16 Duty, 1/5 bias.
- 'SAMSUNG' KS0066UP-10BCC(Die form) LCD Controller & Driver or equivalent.
- 'SAMSUNG' KS0065B-PCC(Die form) LCD Segment Driver or equivalent.

2. Mechanical Specifications

The mechanical detail is shown in Fig. 1(a) 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)	mm
Viewing area	61.0(W) x 16.0(H)	mm
Display format	16 characters x 2 lines	-
Character size	2.95(W) x 5.55(H) (5 x 8 dots)	mm
Character spacing	0.6(W) x 0.4(H)	mm
Character pitch	3.55(W) x 5.95(H)	mm
Dot size	0.55(W) x 0.65(H)	mm
Dot spacing	0.05(W) x 0.05(H)	mm
Dot pitch	0.60(W) x 0.70(H)	mm
Weight	TBD	grams

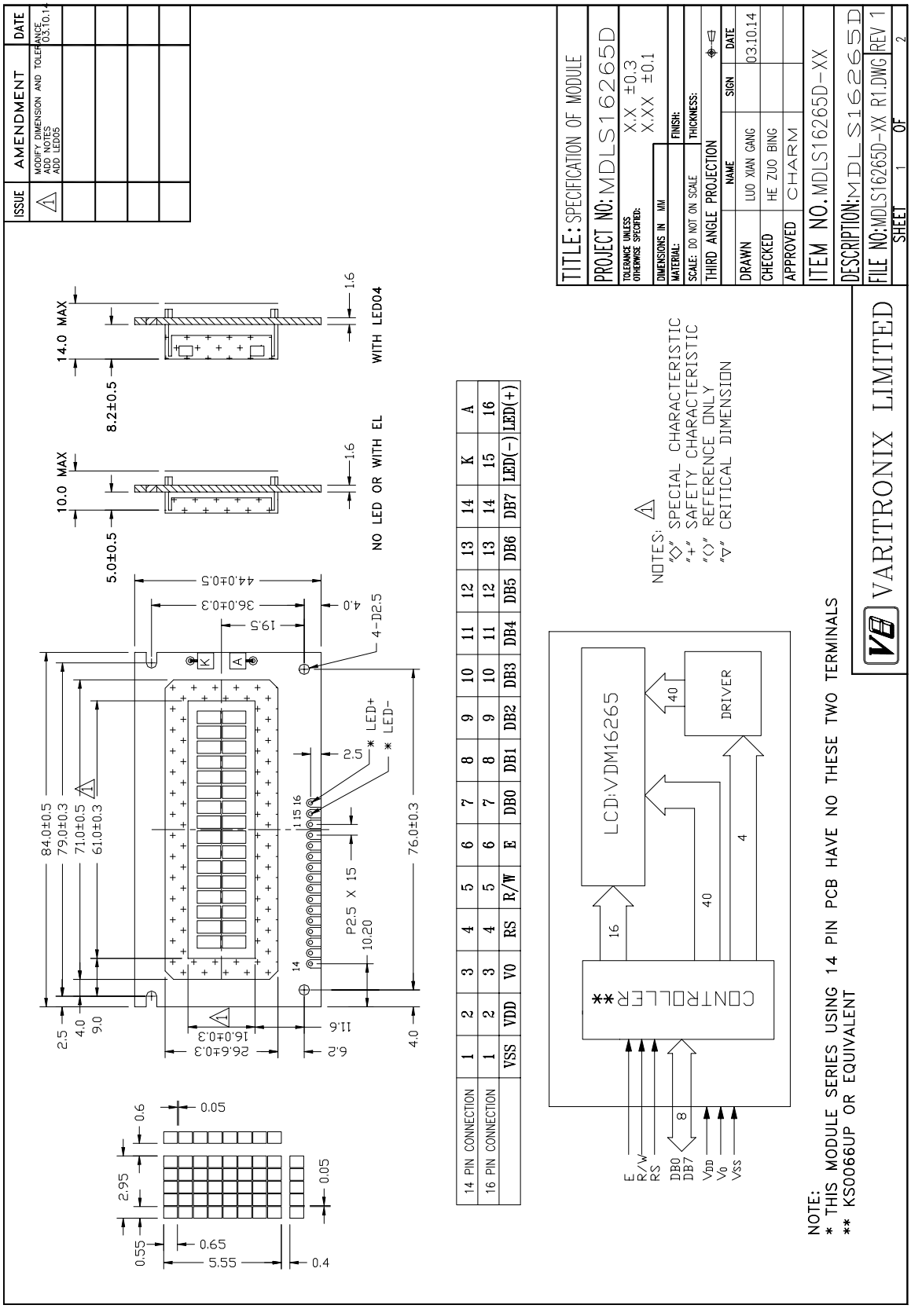


Figure 1(a): Module Specification

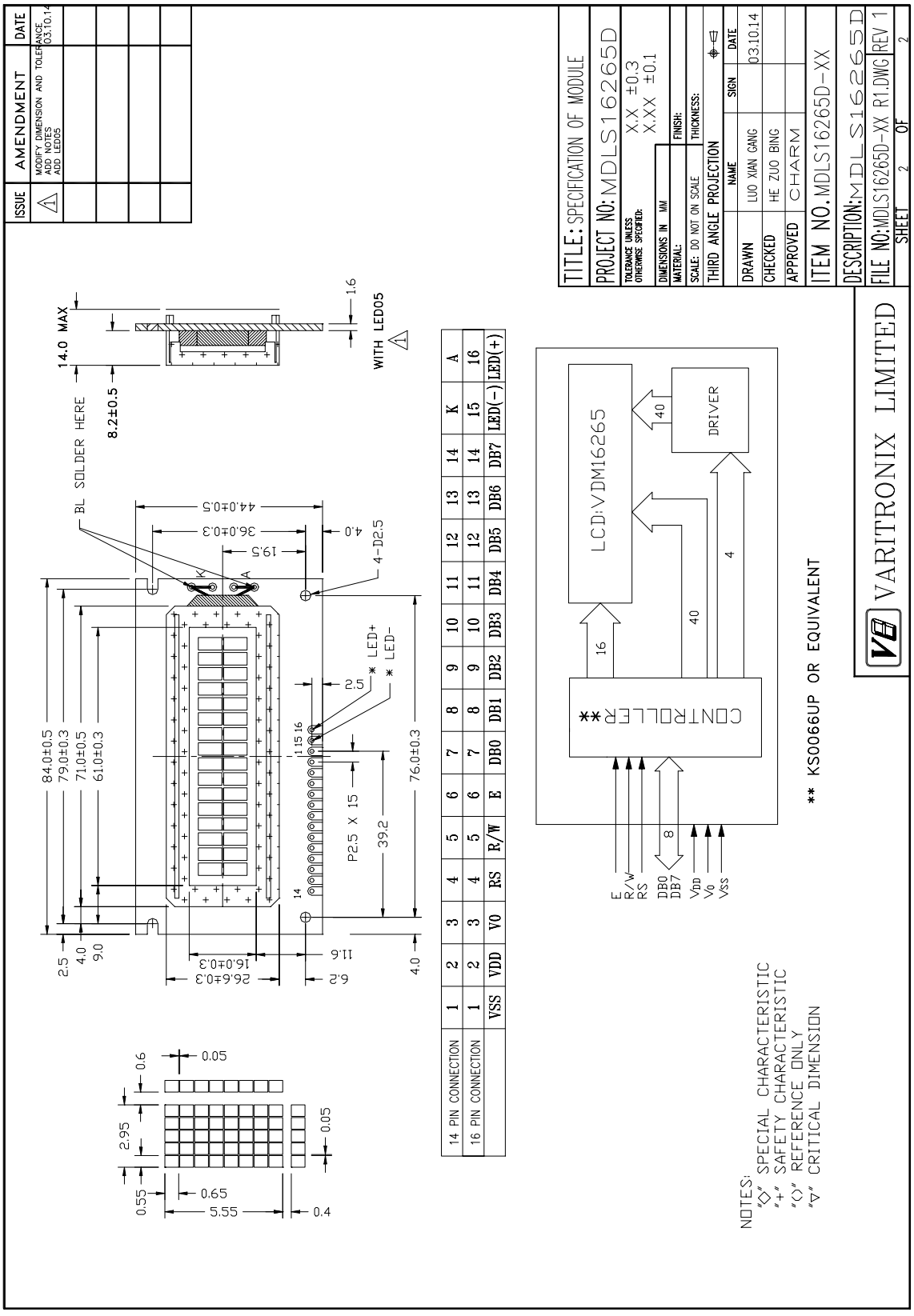


Figure 1(b): Module Specification

3. Interface signals

Table 2

Pin No.	Symbol	Description
1	VSS	Ground (0V).
2	VDD	Power supply for logic (+5.0V).
3	V0	Power supply for LCD driver.
4	RS	Register Select Input: "High" for Data register (for read and write). "Low" for Instruction register (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. Start signal for data read /write.
7	DB0	Data input/output (LSB)
8	DB1	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)
K	LED(-)	Cathode of LED Backlight
A	LED(+)	Anode of LED Backlight

4. Absolute Maximum Ratings

4.1 Electrical Maximum Ratings (Ta = 25 ºC)

Table 3

Parameter	Symbol	Min.	Max.	Unit
Power Supply voltage (Logic)	VDD-VSS	-0.3	+7.0	V
Power Supply voltage (LCD drive)	VLCD =VDD-V0	-0.3	+15.0	V
Input voltage	Vin	-0.3	VDD+0.3	V

Note:

The modules may be destroyed if they are used beyond the absolute maximum ratings.

All voltage values are referenced to VSS = 0V.

4.2 Environmental Condition

Table 4

Item	Operating Temperature (Topr)		Storage Temperature (Tstg)		Remark
	Min.	Max.	Min.	Max.	
Ambient Temperature	0°C	+50°C	-10°C	+60°C	Dry
Humidity	95% max. RH for Ta ≤ 40°C < 95% RH for Ta > 40°C				no condensation
Vibration (IEC 68-2-6) cells must be mounted on a suitable connector	Frequency: 10 ~ 55 Hz Amplitude: 0.75 mm Duration: 20 cycles in each direction.				3 directions
Shock (IEC 68-2-27) Half-sine pulse shape	Pulse duration : 11 ms Peak acceleration: 981 m/s^2 = 100g Number of shocks : 3 shocks in 3 mutually perpendicular axes.				3 directions

5. Electrical Specifications

5.1 Typical Electrical Characteristics

At Ta = 25 °C, VDD = 5V±5%, VSS=0V.

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (Logic)	VDD -VSS		4.75	5.0	5.25	V
Supply voltage (LCD)	VLCD =VDD –V0	VDD = 5V, Note (1)	4.3	4.6	4.9	V
Input signal voltage for E,DB0-DB7,R/W,RS.	V_{IH}	"H" level	2.2	-	VDD	V
	V_{IL}	"L" level	-0.3	-	0.6	V
Supply Current (Logic & LCD)	IDD	Character mode, VDD=5V, Note 1	-	1.0	1.5	mA
		Checker board mode, VDD=5V, Note 1	-	1.3	2.0	mA
Supply Current (LCD)	I0	Character mode, VDD=5V, Note 1	-	0.2	0.3	mA
		Checker board mode, VDD=5V, Note 1	-	0.2	0.3	mA

Note (1): There is tolerance in optimum LCD driving voltage during production and it will be within the specified range.

5.2 Timing Specifications

At Ta = 0 °C To +50 °C, VDD = +5V±5%, VSS = 0V.

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

Table 6

Parameter	Symbol	Min.	Max.	Unit
E Cycle Time	tc	500	-	ns
E Rise/Fall Time	t_R,t_F	-	20	ns
E Pulse Width(high, low)	t_W	230	-	ns
R/W and RS Setup Time	t_{SU1}	40	-	ns
R/W and RS Hold Time	t_{H1}	10	-	ns
Data Set-up Time	t_{SU2}	80	-	ns
Data Hold Time	t_{H2}	10	-	ns

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

Table 7

Parameter	Symbol	Min.	Max.	Unit
E Cycle Time	tc	500	-	ns
E Rise/Fall Time	t_R,t_F	-	20	ns
E Pulse Width(high, low)	t_W	230	-	ns
R/W and RS Setup Time	t_{SU}	40	-	ns
R/W and RS Hold Time	t_H	10	-	ns
Data Output Delay Time	t_D	-	120	ns
Data Hold Time	t_{DH}	5	-	ns

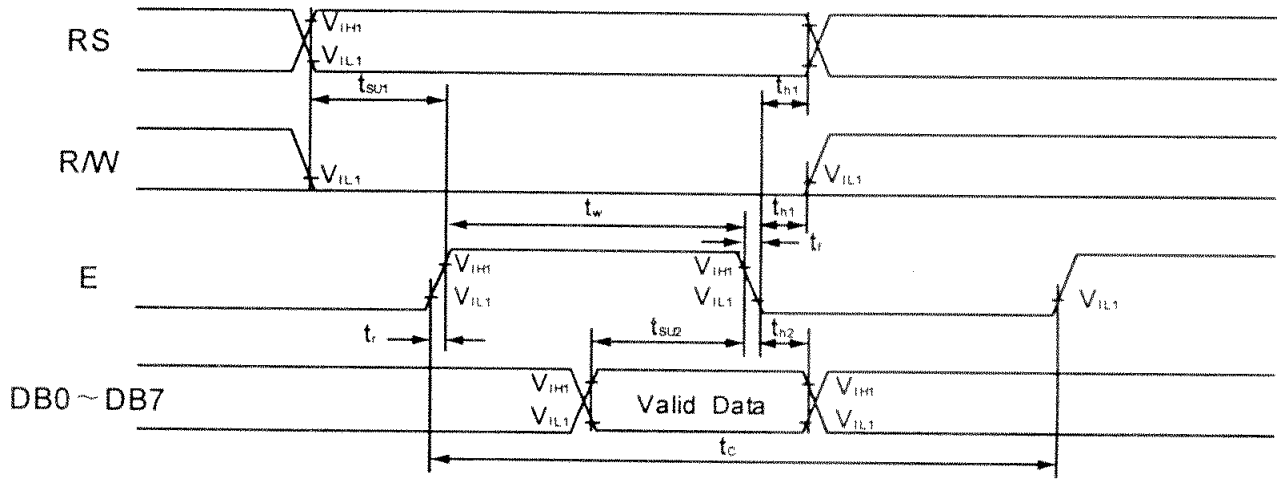


Figure 2: Write Mode Timing Diagram

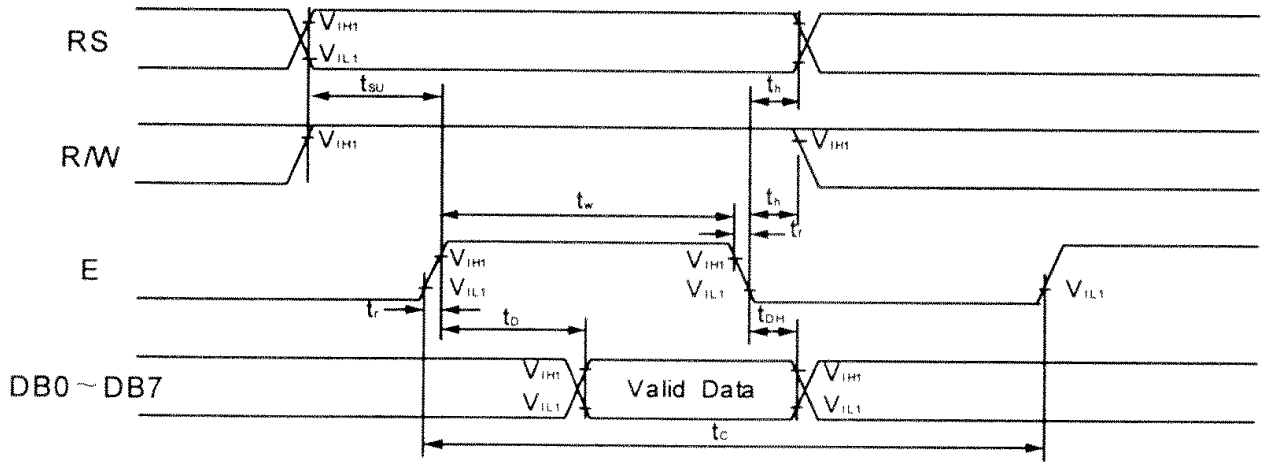


Figure 3: Read Mode Timing Diagram

5.3 Timing Diagram of VDD Against V0.

Power on sequence shall meet the requirement of Figure 4, the timing diagram of VDD against V0.

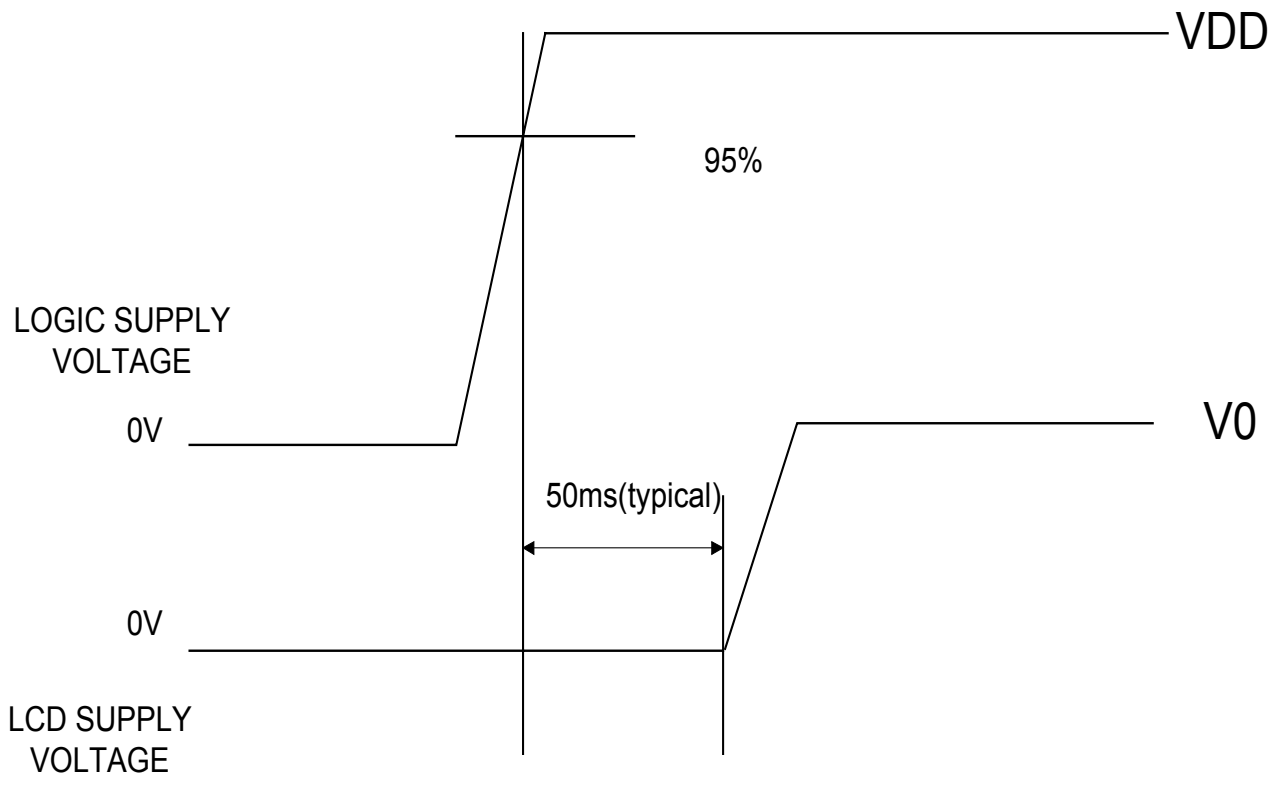
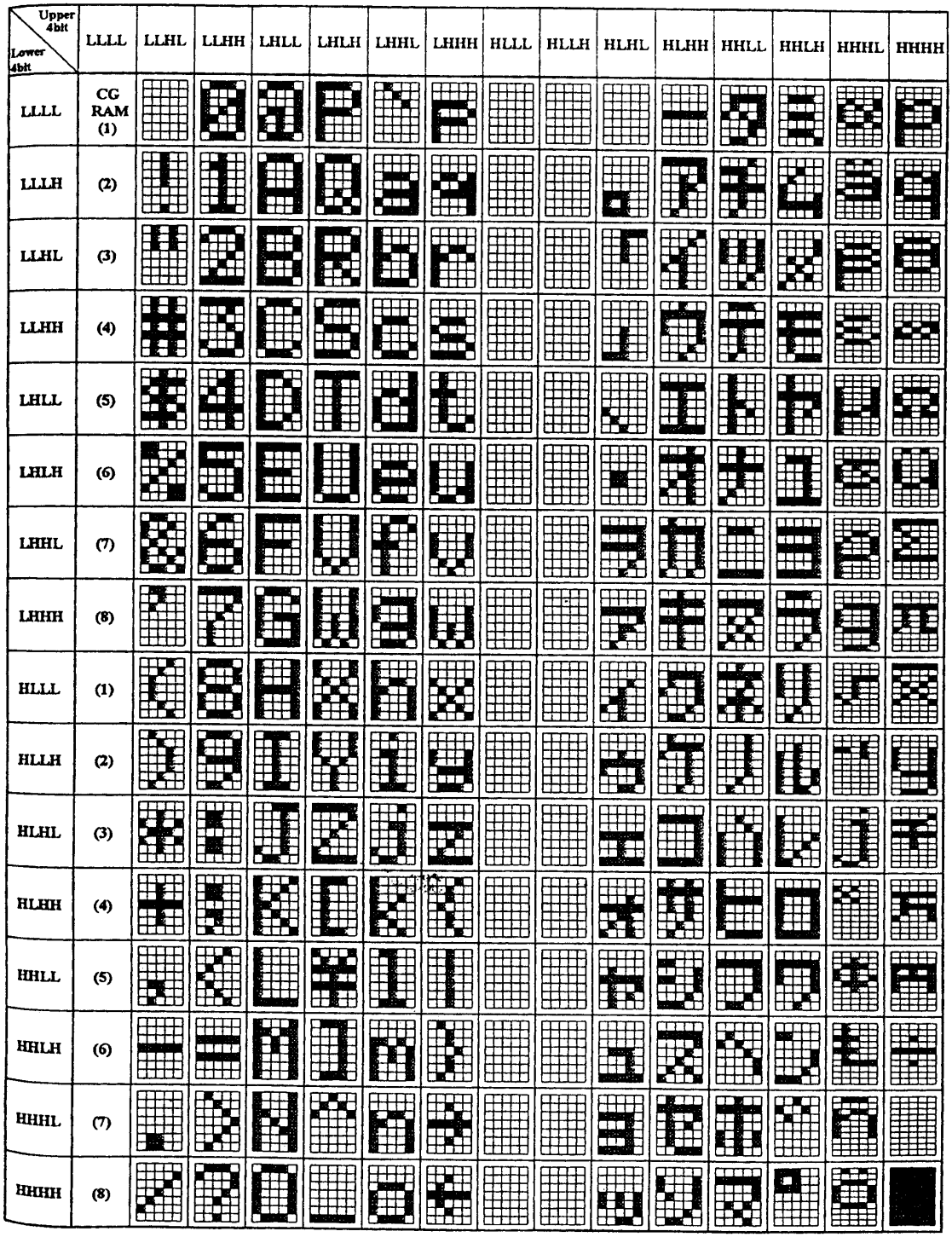


Figure 4: Timing Diagram of VDD Against V0.

6. Character Generator ROM (KS0066U-10B)



"Varitronix Limited reserves the right to change this specification."

FAX: (852) 2343-9555.

URL: http://www.varitronix.com

- END -