
VARITRONIX LIMITED

LCM Design Engineering

SPECIFICATION



FOR

LCD MODULE TYPE

ITEM NO.: MDLS16265-04

MDLS16265-LV-G-LED04G (BB)

(DOC. REVISION 1.0)

DEPARTMENT	NAME	SIGNATURE	EFFECTIVE DATE
PREPARED BY	PHILIP CHENG		1999.10.14
APPROVED BY	ANDY LEUNG		1999.10.14

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DOCUMENT REVISION HISTORY

DOCUMENT REVISION FROM TO	DATE	DESCRIPTION	CHANGED BY	CHECKED BY
1.0	1999.10.14	The specification was modified from (Item No.: MDLS16265-22) MDLS16265-LV-G-LED04G (BB,16 PINS)		

CONTENTS

- 1. GENERAL DESCRIPTION P.1

- 2. MECHANICAL SPECIFICATIONS P.1

- 3. ABSOLUTE MAXIMUM RATINGS P.3
 - 3.1 ELECTRICAL MAXIMUM RATINGS(Ta=25°C) P.3
 - 3.2 ENVIRONMENTAL CONDITION P.3

- 4. ELECTRICAL SPECIFICATIONS P.4
 - 4.1 INTERFACE SIGNALS P.4
 - 4.2 TYPICAL ELECTRICAL CHARACTERISTICS AT Ta=25°C, V_{DD}=5V±5%,
V_{SS}=0V P.5
 - 4.3 TIMING SPECIFICATIONS AT Ta=0 °C to +50°C , V_{DD} =5V±5%,V_{SS}=0V.... P.6
 - 4.4 TIMING DIAGRAM OF V_{DD} AGAINST VO..... P.9

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Specification of LCD Module Type Item No.: MDLS16265-04 MDLS16265-LV-G-LED04G (BB)

1. General Description

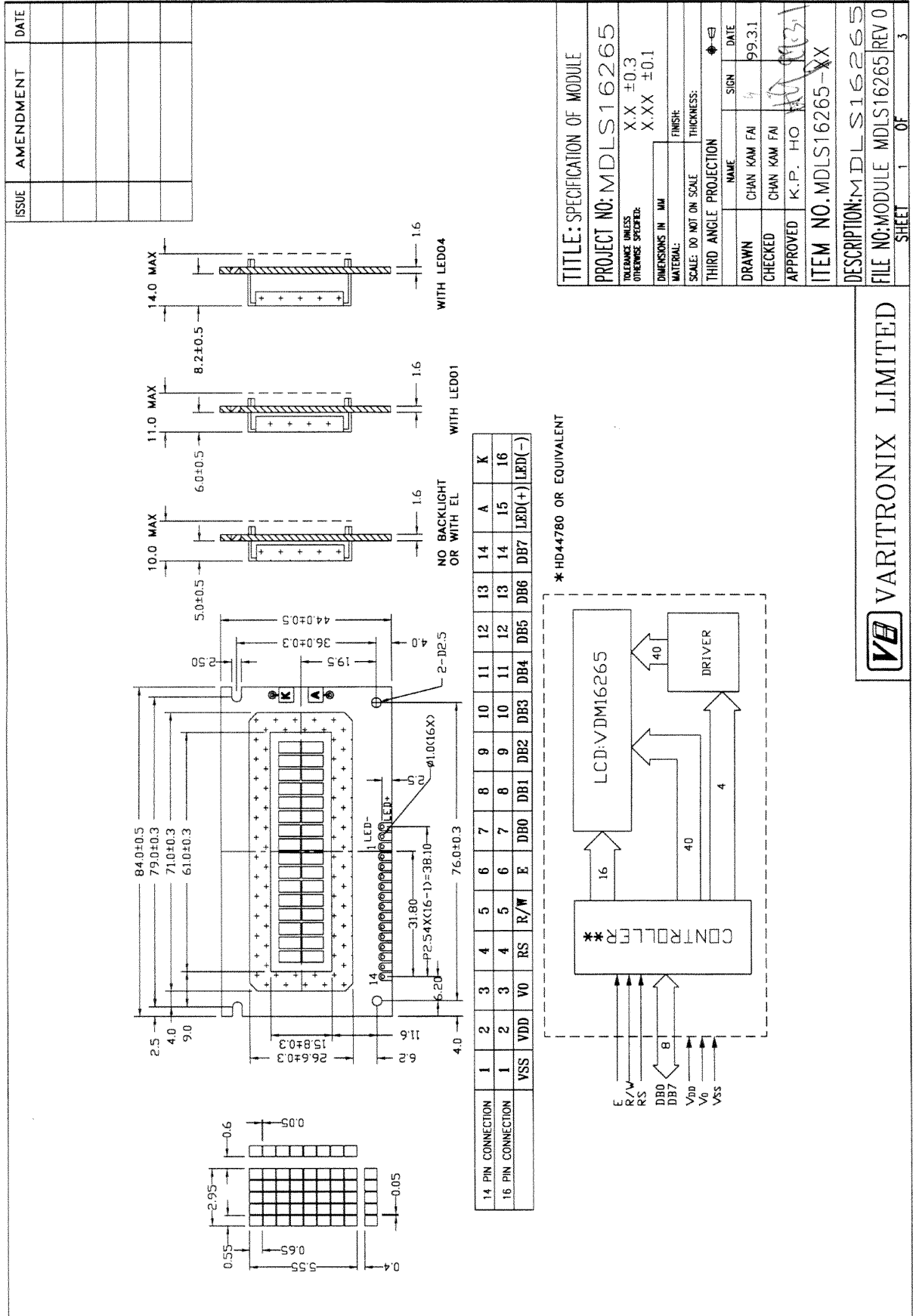
- 16 characters x 2 lines STN LV4 Positive Transflective Yellow-Green LCD Character Module.
- Viewing Angle: 6 O'clock direction.
- Driving duty: 1/16 Duty, 1/5 bias
- 'HITACHI' HD44780 UA00FS flat pack or equivalent LCD Controller.
- 'HITACHI' HD44100RFS flat pack or equivalent LCD Segment Driver.
- Yellow-Green LED-04 type backlight

2. Mechanical Specifications

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

Table 1

Parameter	Specifications	Unit
Outline dimensions	84.0(W) x 44.0(H) x 14.0max(D)	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:	Approx. 42	gram



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Figure 1: Specification of MDLS16265-LV-G-LED04G (BB) module.

3. Absolute Maximum Ratings

3.1 Electrical Maximum Ratings($T_a = 25\text{ }^\circ\text{C}$)

Table 2

Parameter	Symbol	Min.	Max.	Unit
Power Supply voltage (Logic)	$V_{DD} - V_{SS}$	0	6.0	V
Power Supply voltage (LCD drive)	$V_{DD} - V_O$	0	11.0	V
Input voltage	V_{in}	0	V_{DD}	V

Note: The modules may be destroyed if they are used beyond the absolute maximum ratings.
All voltage values are referenced to $V_{SS} = 0V$.

3.2 Environmental Condition

Table 3

Item	Operating Temperature (T_{opr})		Storage Temperature (T_{stg})		Remark
	Min.	Max.	Min.	Max.	
Ambient Temperature	0°C	+50°C	-10°C	+60°C	Dry
Humidity	Note 1		Note 1		no condensation
Vibration (IEC 68-2-6) cells must be mounted on a suitable connector	Note 2		Note 2		3 directions
Shock (IEC 68-2-27) Half-sine pulse shape	Note 3		Note 3		3 directions

Note 1: 95% max. RH for $T_a \leq 40^\circ\text{C}$
< 95% RH for $T_a > 40^\circ\text{C}$

Note 2: Frequency: 10 ~ 55 Hz
Amplitude: 0.75 m.m.
Duration: 20 cycles in each direction.

Note 3: Pulse duration : 11 ms
Peak acceleration: $981\text{ m/s}^2 = 100g$
Number of shocks : 3 shocks in 3 mutually perpendicular axes.

4. Electrical Specifications

4.1 Interface signals

Table 4

Pin No.	Symbol	Description
1	V _{SS}	Ground
2	V _{DD}	Power supply for logic (+5V)
3	V _O	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)
A	LED(+)	Anode of LED Backlight.
K	LED(-)	Cathode of LED Backlight.

4.2 Typical Electrical Characteristics at Ta = 25 °C, V_{DD} = 5V±5%, V_{SS} = 0V.Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (Logic)	V _{DD} - V _{SS}		4.75	5.00	5.25	V
Supply voltage (LCD)	V _{DD} - V ₀	V _{DD} = 5V, Note (1)	4.4	4.65	4.9	V
Input signal voltage 1 for E,DB0-DB7,R/W,RS	V _{IH1}	“High” level	2.2	-	V _{DD}	V
	V _{IL1}	“Low” level	0	-	0.6	V
Input signal voltage 2 for OSC1	V _{IH2}	“High” level	V _{DD} - 1.0	-	V _{DD}	V
	V _{IL2}	“Low” level	0	-	1.0	V
Supply Current (Logic & LCD)	I _{DD}	Note(1)	-	1.7	2.3	mA
Supply Current (LCD)	I ₀	Note(1)	-	0.2	0.3	mA
Supply Voltage of LED04 backlight		Forward current = 18 x5= 90mA	3.8	4.1	4.5	V

Note (1):

There is tolerance in optimum LCD driving voltage during production and it will be within the specified range.

4.3 Timing Specifications at $T_a = 0\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$, $V_{DD} = 5V \pm 5\%$, $V_{SS} = 0V$

Refer to [Fig. 2](#) , the bus timing diagram for write mode.

Table 6

Parameter	Symbol	Min.	Max.	Unit
Enable cycle time	t_{CYCE}	500	-	ns
Enable "High" level pulse width	PW_{EH}	230	-	ns
Enable rise time	t_{Er}	-	20	ns
Enable fall time	t_{Ef}	-	20	ns
Address set-up time(RS, R/W to E)	t_{AS}	40	-	ns
Address hold time	t_{AH}	10	-	ns
Data set-up time	t_{DSW}	80	-	ns
Data hold time	t_H	10	-	ns

Refer to [Fig. 3](#) , the bus timing diagram for read mode .

Table 7

Parameter	Symbol	Min.	Max.	Unit
Enable cycle time	t_{CYCE}	500	-	ns
Enable "High" level pulse width	PW_{EH}	230	-	ns
Enable rise time	t_{Er}	-	20	ns
Enable fall time	t_{Ef}	-	20	ns
Address set-up time(RS, R/W to E)	t_{AS}	40	-	ns
Address hold time	t_{AH}	10	-	ns
Data delay time	t_{DDR}	-	160	ns
Data hold time	t_{DHR}	5	-	ns

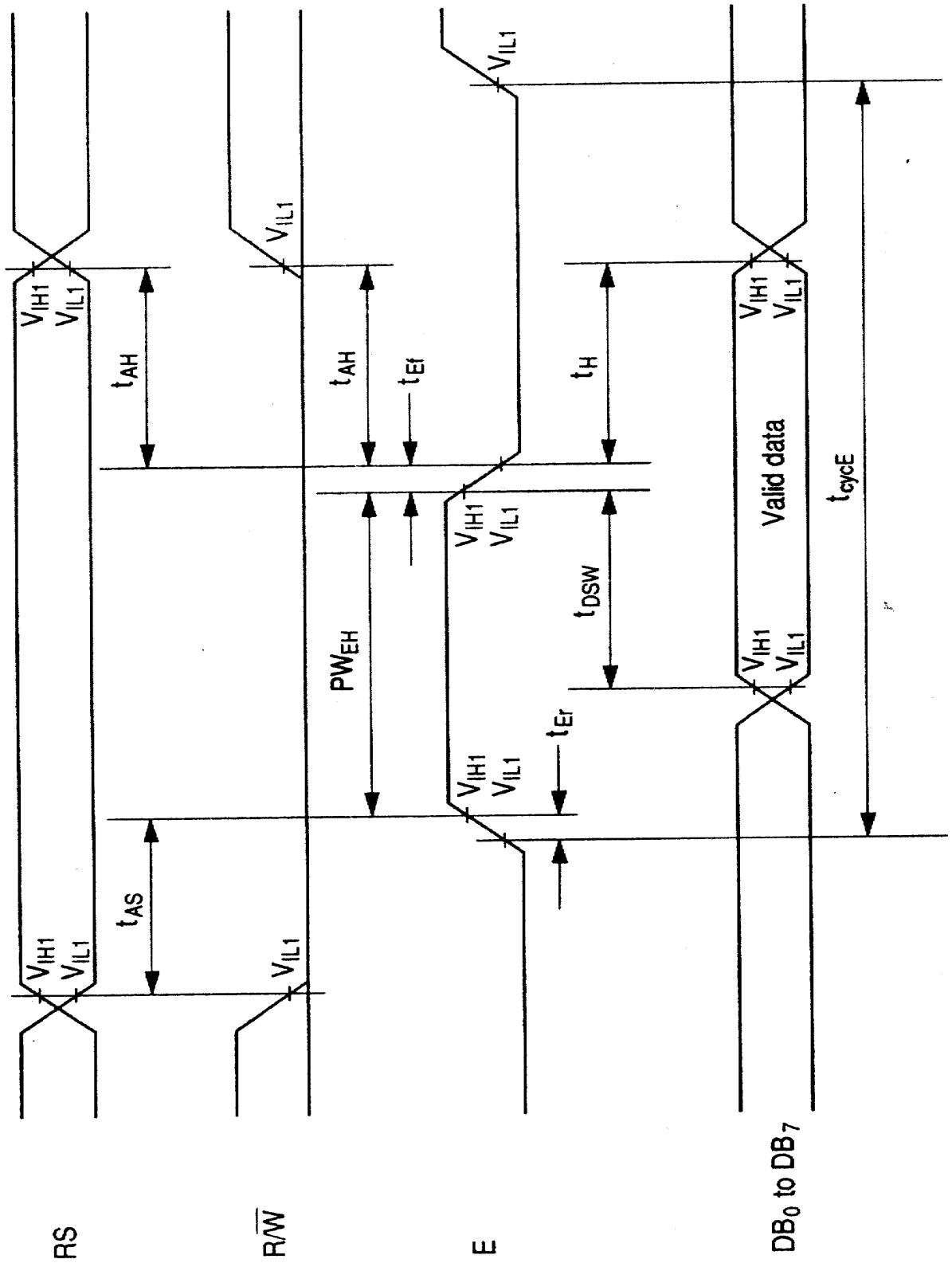


Figure 2: The bus write operation sequence (Writing data from MPU to controller)

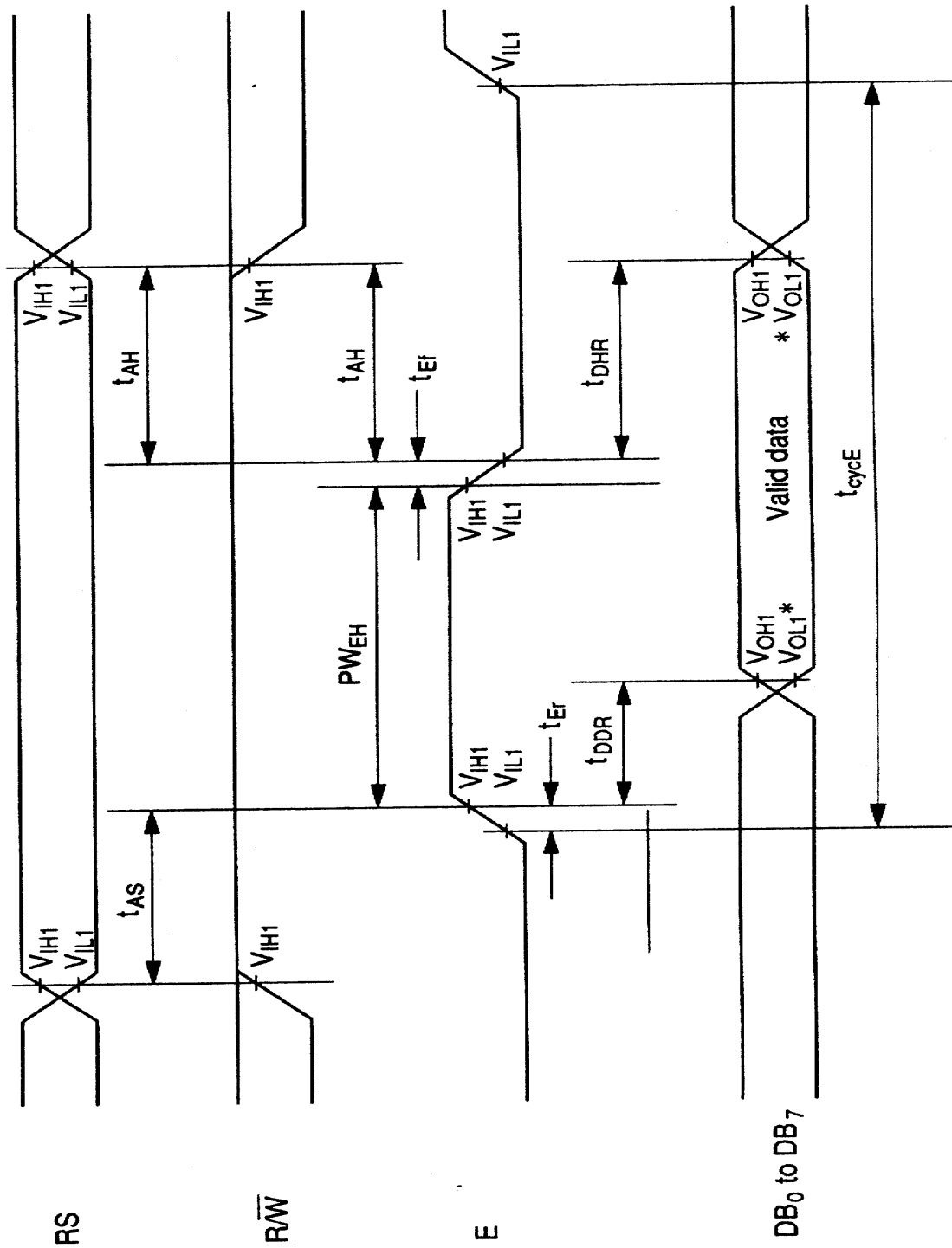


Figure 3 : The bus read operation sequence (Reading out data from controller to MPU).

4.4 Timing Diagram of V_{DD} Against V_o .

Power on sequence shall meet the requirement of Figure 4, the timing diagram of V_{DD} against V_o .

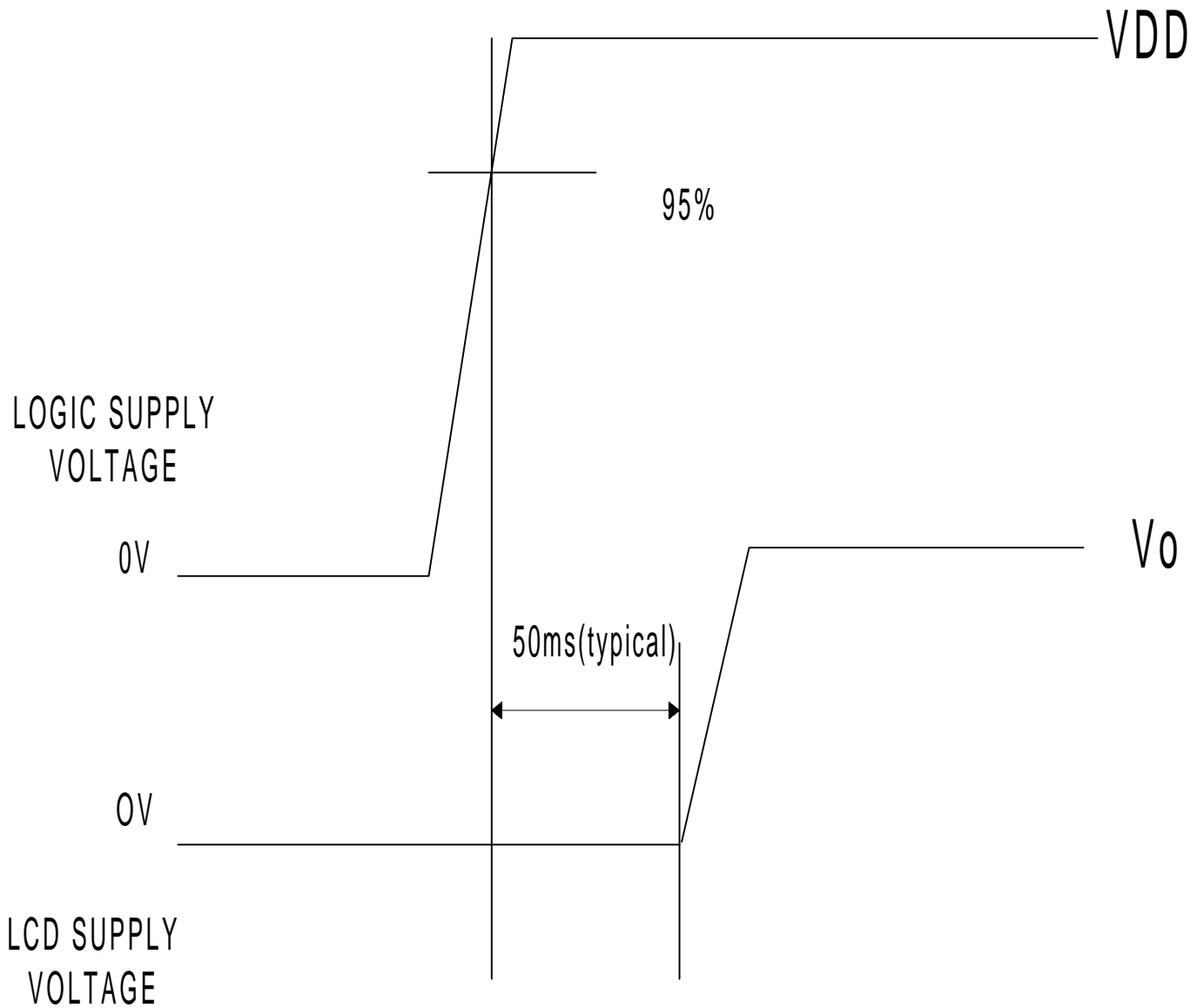


Figure 4: Timing Diagram of V_{DD} Against V_o .

“Varitronix Limited reserves the right to change this specification.”

FAX:(852) 2343-9555.