VARITRONIX LIMITED

LCM Design Engineering

PRELIMINARY SPECIFICATION

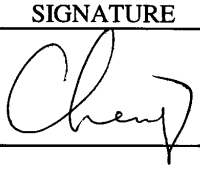
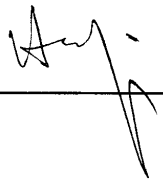
FOR

LCD MODULE TYPE

ITEM NO.: MGLS24064-45C

MGLS24064-HT-HV-LED04-G-SCH C-C15

(DOC. REVISION 0.0)

DEPARTMENT	NAME	SIGNATURE	EFFECTIVE DATE
PREPARED BY	PHILIP CHENG		1999.09.03
APPROVED BY	K.P.HO		1999.09.03

VARITRONIX LIMITED

LCM Design Engineering

PRELIMINARY SPECIFICATION

FOR

LCD MODULE TYPE

ITEM NO.: MGLS24064-45C

MGLS24064-HT-HV-LED04-G-SCH C-C15

(DOC. REVISION 0.0)

DEPARTMENT	NAME	SIGNATURE	EFFECTIVE DATE
PREPARED BY	PHILIP CHENG		1999.09.03
APPROVED BY	K.P.HO		1999.09.03

DOCUMENT REVISION HISTORY

DOCUMENT REVISION FROM TO	DATE	DESCRIPTION	CHANGED BY	CHECKED BY
0.0	1999.09.03			

CONTENTS

VARITRONIX LIMITED

Preliminary Specification
of
LCD Module Type
Item No.: MGLS24064-45C
MGLS24064-HT-HV-LED04-G-SCH C-C15

1. General Description

- 240 x 64 dot matrix STN Yellow Transflective LCD Graphic Module.
- Driving scheme: 1/64 duty, 1/8.7 bias.
- Viewing Angle: 6 O'clock direction.
- 0.48(W) x 0.48(H) m.m. dot size.
- 132.0(W) x 39.0(H) m.m. viewing area.
- Toshiba T6963C or equivalent LCD controller.
- 8K byte display SRAM.
- Yellowish-green LED04 backlight.

2. Mechanical Specifications

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

Table 1

Parameter	Specifications	Unit
Outline dimensions	180.0(W) x 65.0(H) x 16.0 MAX. (D)	m.m.
Effective viewing area	132.0(W) x 39.0(H)	m.m.
Active area	127.15(W) x 33.87(H)	m.m.
Display format	240(Horizontal) x 64(Vertical)	dots
Dot size	0.48(W) x 0.48(H)	m.m.
Dot spacing	0.05(W) x 0.05(H)	m.m.
Dot pitch	0.53(W) x 0.53(H)	m.m.
Weight:	TBD	gram

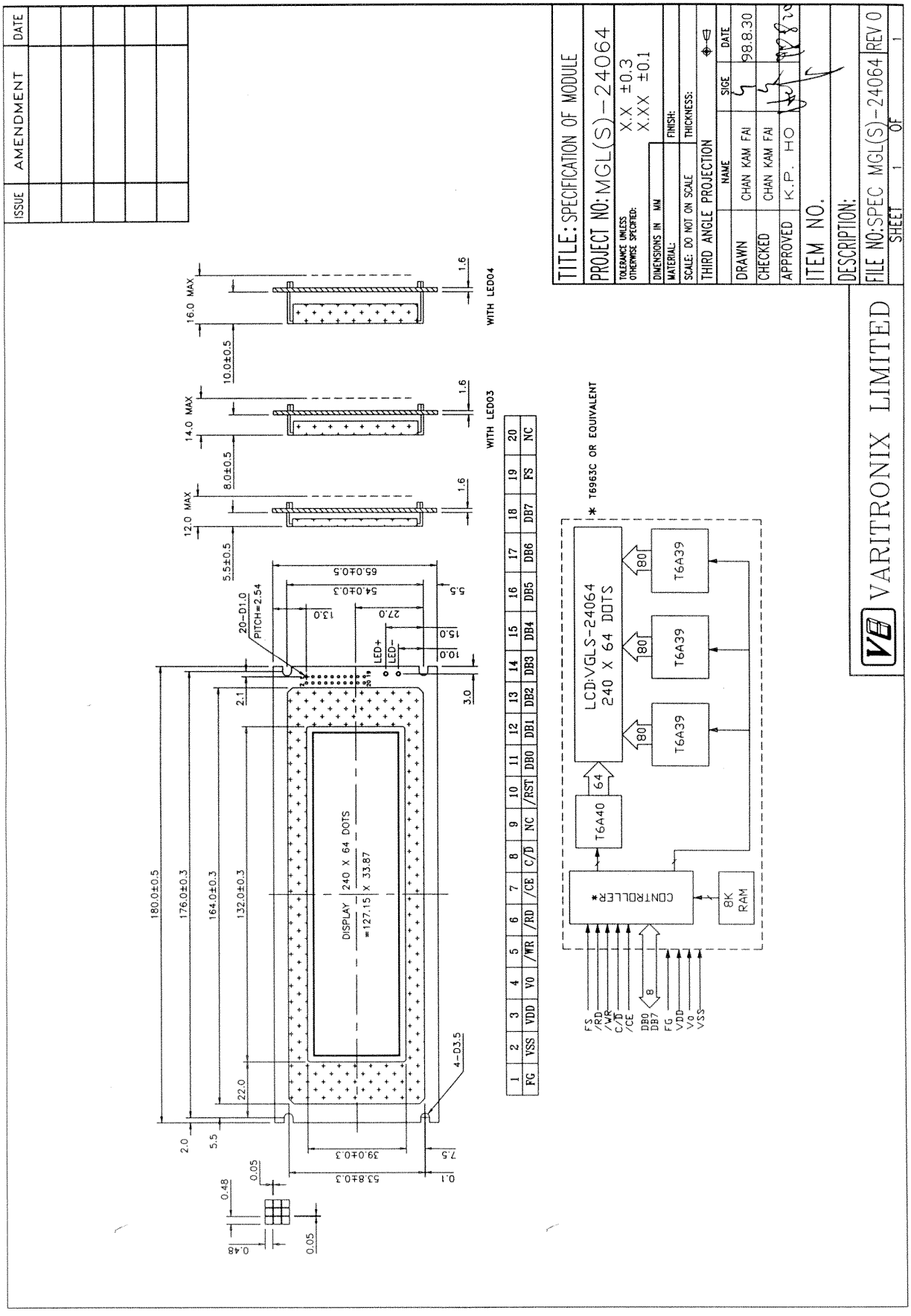


Figure 1: Specification of MGLS24064-HT-HV-LED04-G-SCH C-C15 module.

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} - V_{SS}	0	6.0	V
Power Supply voltage (LCD drive)	V_{DD} - V_O	0	28.0	V
Input voltage	Vin	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 Vss = 0V.

3.2 Environmental Condition

Table 3

Item	Operating Temperature (Topr)		Storage Temperature (Tstg)		Remark
	Min.	Max.	Min.	Max.	
Ambient Temperature	-20°C	+70°C	-30°C	+80°C	
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 Ta ≤ 40°C
< 95% RH for Ta > 40°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 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	FG	Frame ground (see note 1)
2	Vss	Ground
3	VDD	Power supply for logic (+5V)
4	Vo	Power supply for LCD drive
5	/WR	Data write. Write data to controller T6963C when “L”.
6	/RD	Data read. Read data from controller T6963C when “L”.
7	/CE	Chip enable of controller when ”L”.
8	C / $\overline{D}$	Command/Data read/write. “H” for command read/write and “L” for data read/write.
9	NC	Not connected
10	/RST	Controller reset when “L”.
11	DB0	Data input/output (LSB)
12	DB1	Data input/output
13	DB2	Data input/output
14	DB3	Data input/output
15	DB4	Data input/output
16	DB5	Data input/output
17	DB6	Data input/output
18	DB7	Data input/output (MSB)
19	FS	Font select. ”H” for 6 x 8 font & ”L” for 8 x 8 font
20	NC	Not connected
-	LED(+)	Anode of LED backlight
-	LED(-)	Cathode of LED backlight

Note 1:This pin is electrically connected to the metal bezel(frame),but,is otherwise not connected. User can choose to connect this pin to Vss or leave it open.

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	Remarks
Supply voltage (Logic)	V_{DD}-Vss		4.75	5.00	5.25	V	
Supply voltage (LCD)	V_{DD} -V_0	V_{DD} = 5V	-	TBD	-	V	Note 1
Input signal voltage	VIN	"H" level	V_{DD}-2.2	-	V_{DD}	V	
		"L" level	0	-	0.8	V	
Supply current (Logic & LCD)	I_{DD}	V_{DD} = 5V	-	TBD	-	mA	Character mode, Note 1
		V_{DD} = 5V	-	TBD	-	mA	Checker mode, Note 1
Supply current (LCD)	I_0	V_{DD} = 5V	-	TBD	-	mA	Character mode, Note 1
		V_{DD} = 5V	-	TBD	-	mA	Checker mode, Note 1
Supply voltage of LED04 backlight	VLED04	Note (2)	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.

Note (2): Forward current=630mA. Number of LED chips=126.

4.3 Timing Specifications at Ta = +25°C, V_{DD} = 5V±10%,Vss=0V

Refer to Figure 2, the bus timing diagram.

Table 6

Parameter	Symbol	Min.	Max.	Unit
C/D Set-up time	t_{CDS}	100	-	nS
C/D Hold Time	t_{CDH}	10	-	nS
/CE,/RD,/WR Pulse Width	t_{CE}, t_{RD}, t_{WR}	80	-	nS
Data Set-up Time	t_{DS}	80	-	nS
Data Hold Time	t_{DH}	40	-	nS
Access Time	t_{ACC}	-	150	nS
Output Hold Time	t_{OH}	10	50	nS

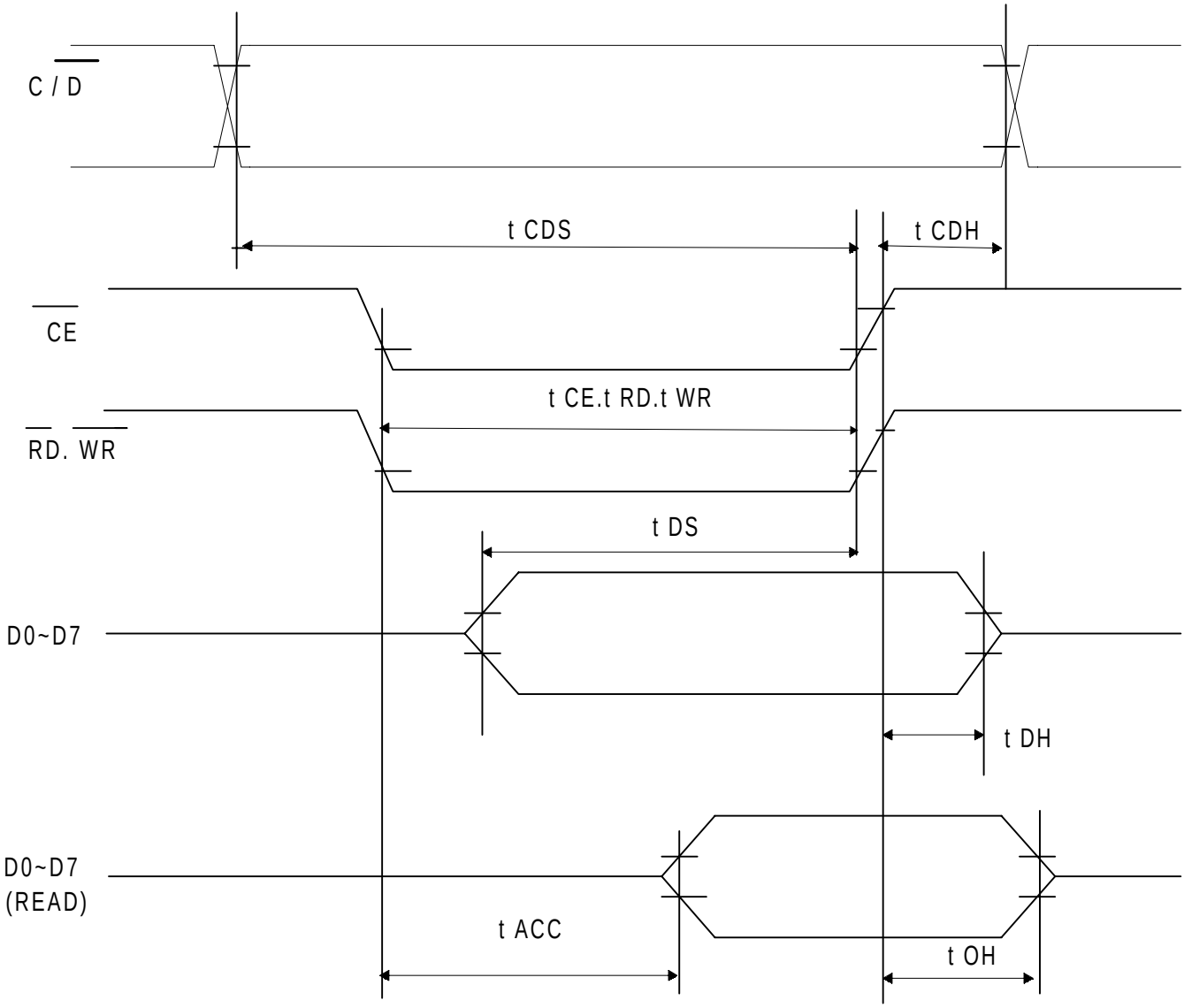


Figure 2 : The bus timing diagram .

4.4 Timing Diagram of V_{DD} against Vo.

Power on sequence shall meet the requirement of Figure 3, the timing diagram of VDD against Vo.

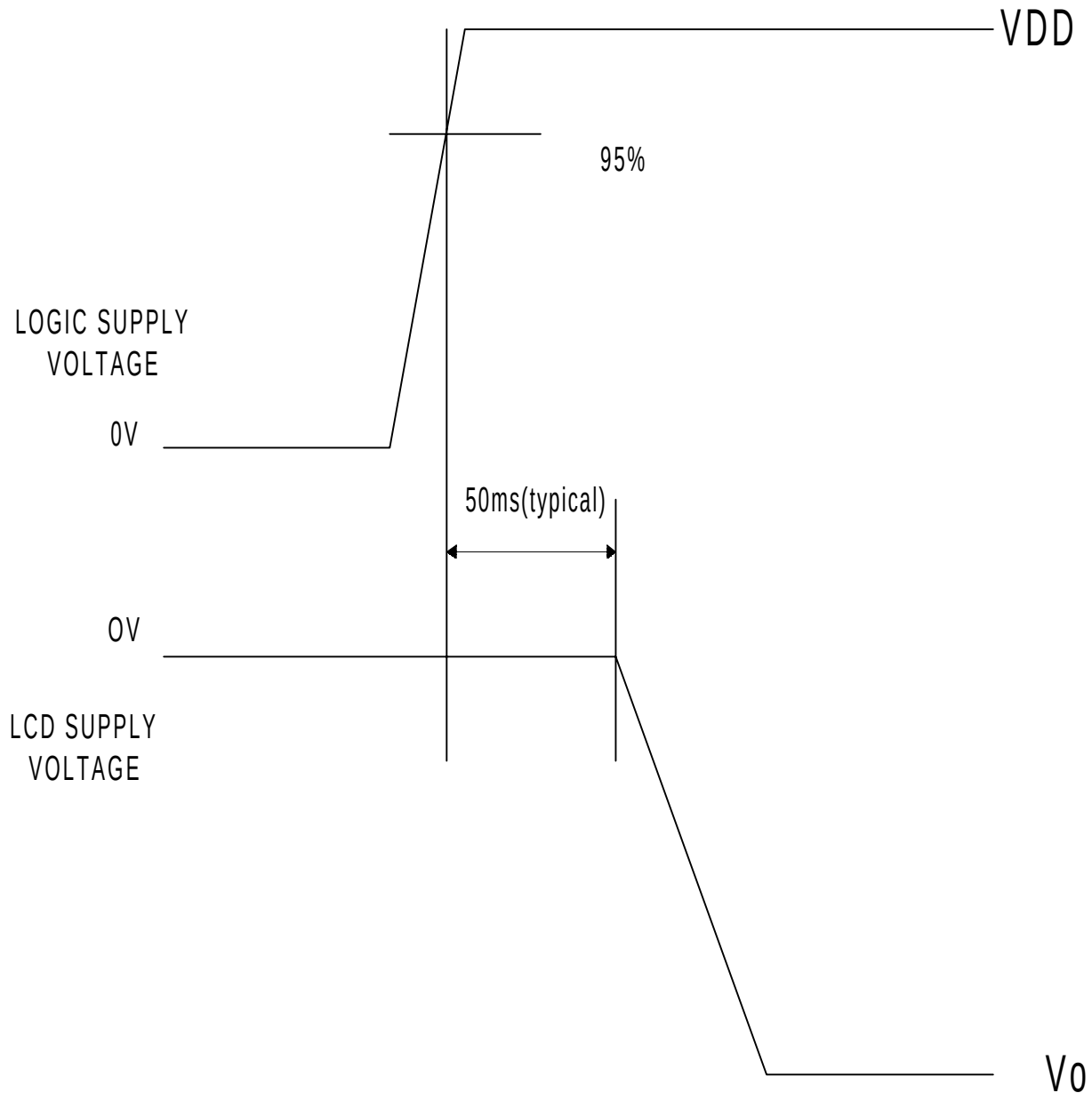


Figure 3: Timing diagram of VDD against Vo.