



VL-FS-VLMS4044-02 REV. B
(VLMS4044-ZEBRA VERSION)

JULY/2002.

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VARITRONIX GRAPHIC LCD MODULE
FORMAT = 240x64

MGLS-24064-C-HV-G-LED3G

Provided with 2-position cable harness pre-assembled for LED Backlight access
Provided with 10x2-position pin-header.

DOCUMENT TITLE:
SPECIFICATION
OF
LCD MODULE TYPE
P.I.D.#/ITEM NO.: VLMS4044-02

DEPARTMENT	NAME	SIGNATURE	DATE
PREPARED BY	PHILIP CHENG		2002.7.4
CHECKED BY	Z.B.HE		7.4.2002
APPROVED BY	CYRUS CHEUNG		2002/7/4



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MGLS-24064-C-HV-G-LED3G

DOCUMENT REVISION HISTORY1:

DOCUMENT REVISION FROM TO	DATE	DESCRIPTION	CHANGED BY	CHECKED BY
0.0	2001.06.11	FirstRelease.	PHILIP CHENG	C.M.LUN
0.0 B	2002.07.04	Items1to2wereupdated. 1.)(Wholedocument) Thenumbersofpageswere updated. 2.)(Page8,table5) Minimumvalueandmaximum valueofsupplyvoltage(LED03 backlight)werechangedfrom4.0V and4.2Vto3.9Vand4.3V respectively.	PHILIP CHENG	Z.B.HE



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MGLS-24064-C-HV-G-LED3G

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FORMAT = 240x64

MGLS-24064-C-HV-G-LED3G

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Specification

VARITRONIX GRAPHIC LCD MODULE

FORMAT = 240x64

MGLS-24064-C-HV-G-LED3G

Provided with 2-position cable harness pre-assembled for LED Backlight access

1. Provided with 10x2-position pin-header.

- 240x64dotmatrixSTNSTD2PositiveYellow-GreenTransflectiveLCDGraphicModule.
- Drivingscheme:1/64duty,1/9bias.
- ViewingAngle:6O'clockdirection.
- 'Toshiba'T6963C(flatpack)orequivalentLCDcontroller.
- 'Toshiba'T6A39(flatpack)orequivalentLCDsegmentdrivers.
- 'Toshiba'T6A40(flatpack)orequivalentLCDcommondrivers.
- 8KbytedisplaySRAM.
- Yellow-greenLED03backlight.
- Connector:10pinsx2rowsmaleconnector.
- Connectorassembly.

2. Mechanical Specifications

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

Table 1

Parameter	Specifications	Unit
Outlinedimensions	180.0(W)x65.0(H)x14.0MAX.(D)(excludedconnectors)	mm
Effectiveviewingarea	32.0(W)x39.0(H)	mm
Activearea	127.15(W)x33.87(H)	mm
Displayformat	240(Horizontal)x64(Vertical)	dots
Dotsize	0.48(W)x0.48(H)	mm
Dotspaceing	0.05(W)x0.05(H)	mm
Dotpitch	0.53(W)x0.53(H)	mm
Weight:	Approx.154.3	grams



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GRAPHIC LCD MODULE

VL-FS-VLMS4044-02REV.B
(VLMS4044-ZEBRAVERSION)

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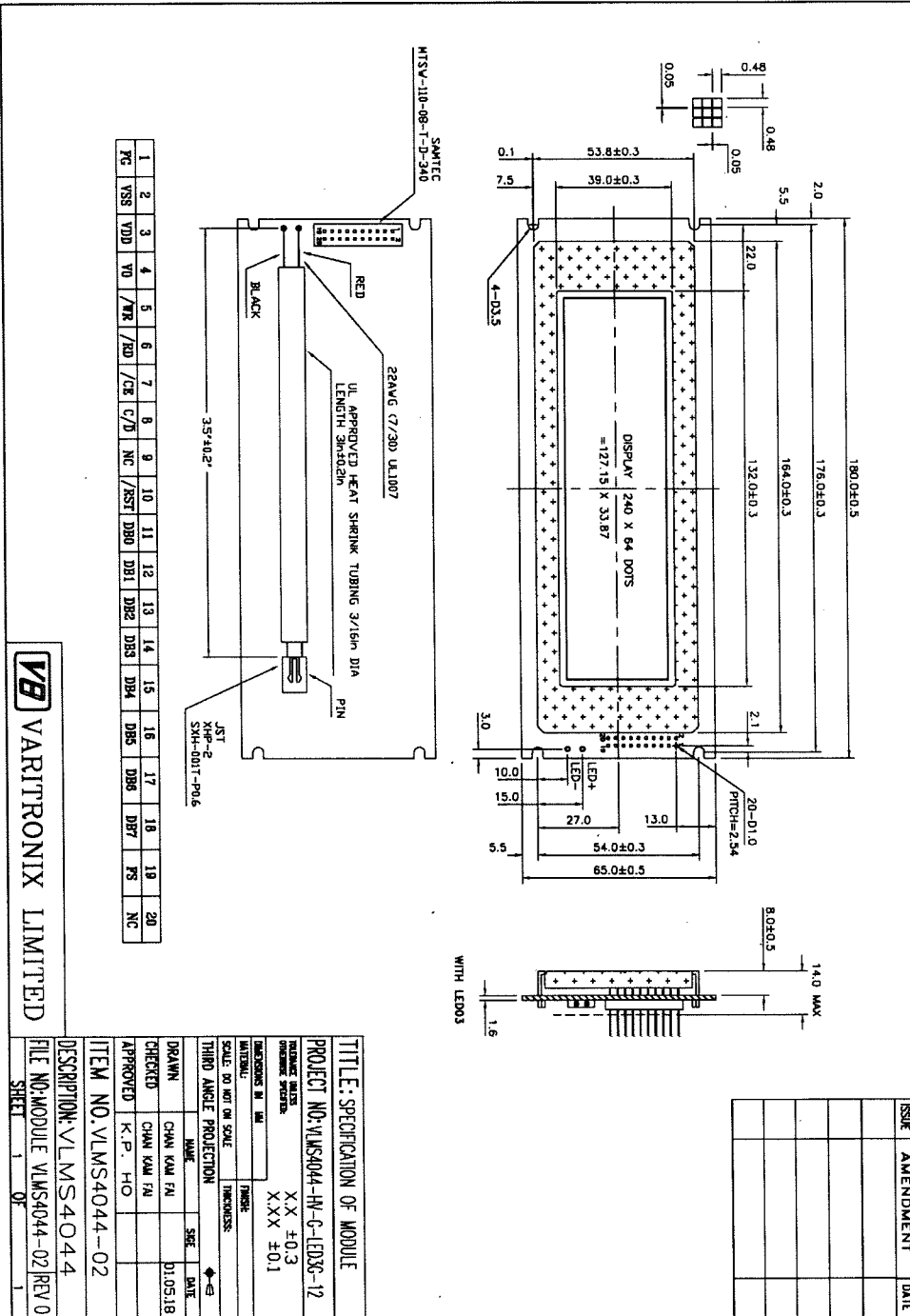


Figure 1: Specification of VLMS4044-ZEBRAVERSION module.



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VARITRONIX GRAPHIC LCD MODULE FORMAT = 240X64
MGLS-24064-C-HV-G-LED3G
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3. AbsoluteMaximumRatings

3.1 ElectricalMaximumRatings(Ta=25°C)

Table2

Parameter	Symbol	Min.	Max.	Unit
Supplyvoltage(Logic)	VDD-VSS	0	6.0	V
Supplyvoltage(LCDdrive)	VLCD=VDD-V0	0	28.0	V
Inputvoltage	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 EnvironmentalCondition

Table3

Item	Operating Temperature (Topr)		Storage Temperature (Tstg)		Remark
	Min.	Max.	Min.	Max.	
Ambient Temperature	0°C	+50 °C	-20 °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



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4. Electrical Specifications

4.1. Interfacesignals

Table 4

PinNo.	Symbol	Description
1	FG	Frameground(see note 1)
2	Vss	Ground(0V).
3	VDD	Powersupplyforlogic(+5V)
4	V0	PowersupplyforLCDdrive
5	/WR	Datawrite. Writedata 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/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 6x8 font & "L" for 8x8 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).

User can choose to connect this pin to VSS or leave it open.



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4.2 TypicalElectricalCharacteristics

AtTa=25 °C,VDD=5V ±5%,VSS=0V.

Table5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supplyvoltage (Logic)	$V_{DD}-V_{SS}$		4.75	5.00	5.25	V
Supplyvoltage(LCD)	V_{LCD} $=V_{DD}-V_0$	$V_{DD}=5V$,Note 1	13.9	14.6	15.3	V
Inputsignalvoltage	V_{IN}	“H”level	$V_{DD}-2.2$	-	V_{DD}	V
		“L”level	0	-	0.8	V
Supplycurrent (Logic&LCD)	I_{DD}	$V_{DD}=5V$, Charactermode	-	8.7	13.2	mA
		$V_{DD}=5V$, Checkerboard mode	-	9.1	13.8	mA
Supplycurrent(LCD)	I_0	$V_{DD}=5V$, Charactermode, Note1	-	3.2	4.9	mA
		$V_{DD}=5V$, Checkerboard mode, Note1	-	3.4	5.3	mA
Supplyvoltage (LED03backlight)	V_{LED03}	Forwardcurrent $=22 \times 10$ $=220mA$ NumberofLED chips $=22 \times 2$ $=44$	3.9	4.1	4.3	V

Note(1):

ThereistoleranceinoptimumLCDdrivingvoltagegduringproductionanditwillbewithin
thespecifiedrange.



4.3 Timing Specifications

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

Refer to Fig. 2, the bus timing diagram.

Table 6

Parameter	Symbol	Min.	Max.	Unit
C/ \bar{D} Set-up time	t_{CDS}	100	-	ns
C/ \bar{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

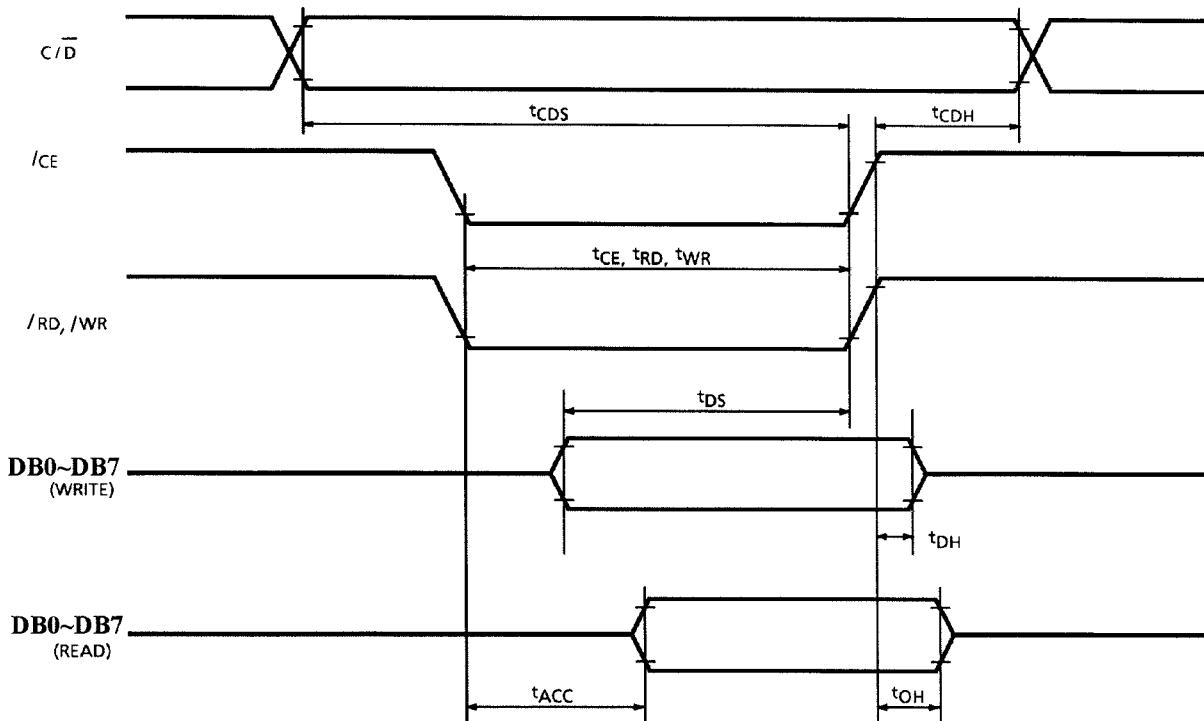


Figure 2: Bus Timing Diagram



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4.4 Timing Diagram of VDD Against V0.

Power on sequences shall meet the requirement of Figure 3, the timing diagram of VDD against V0.

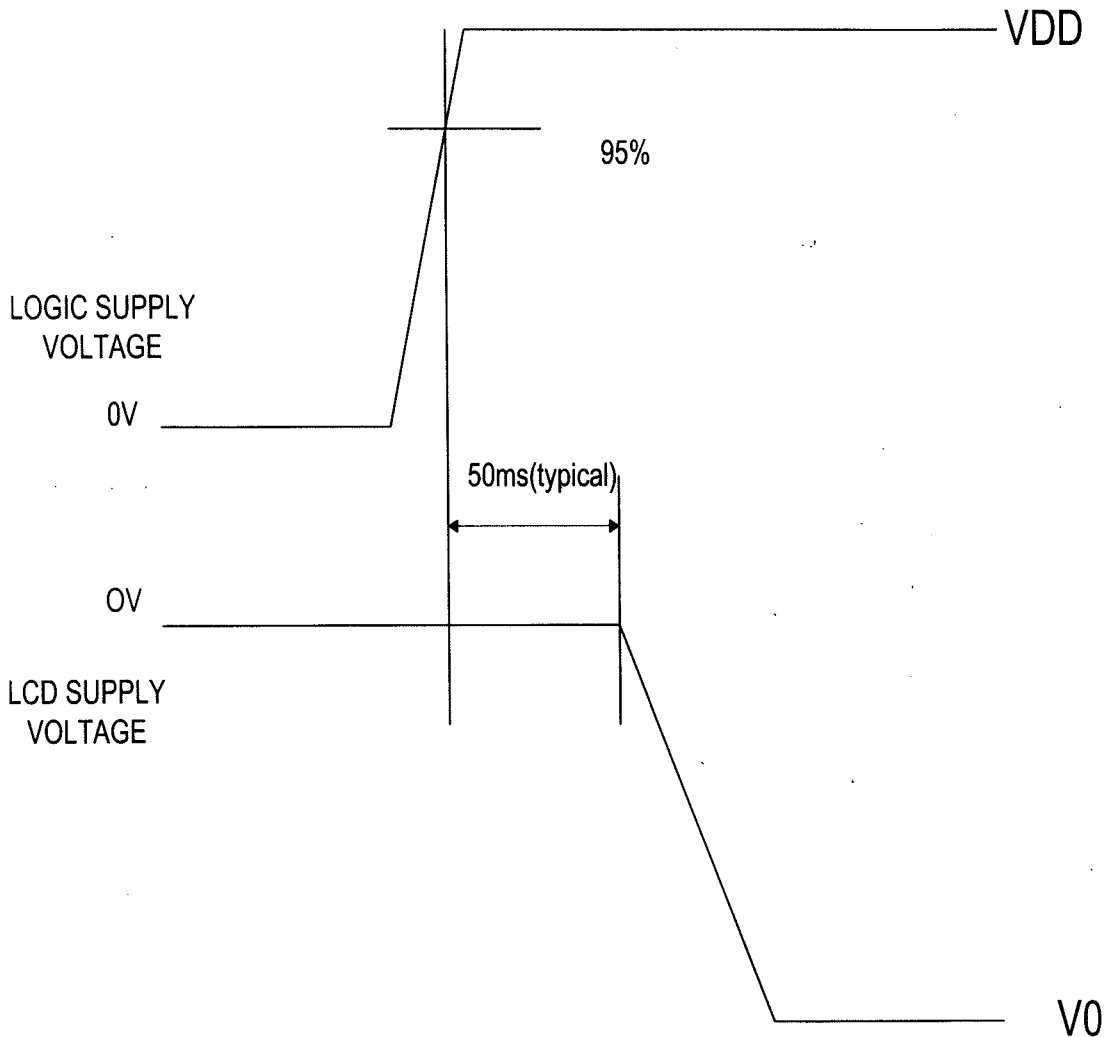


Figure 3: Timing Diagram of VDD Against V0.

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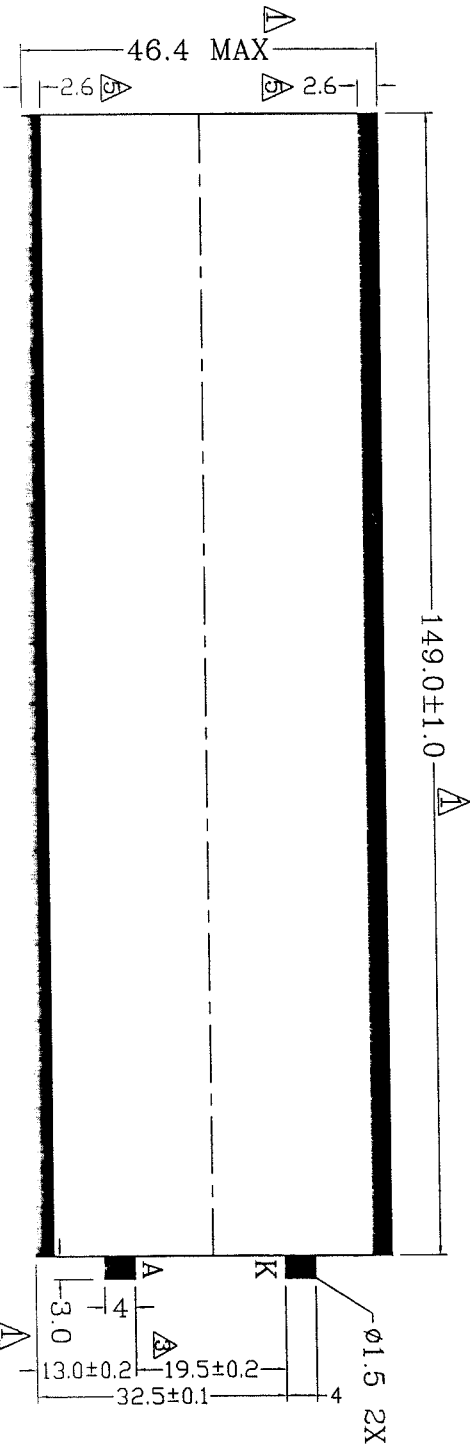
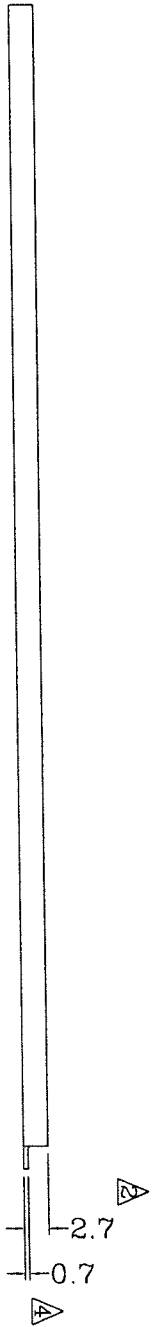


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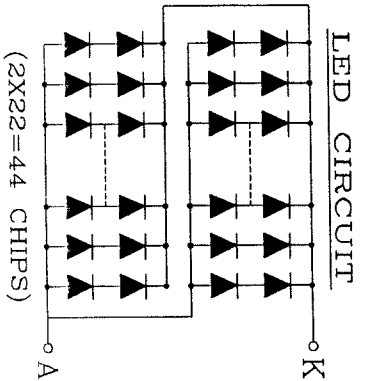
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LED BACKLIGHT FOR MGLS-24064
LED3G-24064



ISSUE	AMENDMENT	DATE
Δ	ADDED TOLERANCE CHANGE DIMENSIONS	9/11/97
Δ	CHANGE DIMENSIONS	97/4/8
Δ	CHANGE DIMENSIONS	97/12/9
Δ	CHANGE DIMENSIONS	98/3/12
Δ	CHANGE DIMENSIONS	98/4/16



PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
FORWARD VOLTAGE	TEMPERATURE=+25°C	4.0	4.1	4.2	V
FORWARD CURRENT	TEMPERATURE=+25°C				mA

LED COLOR: YELLOW-GREEN

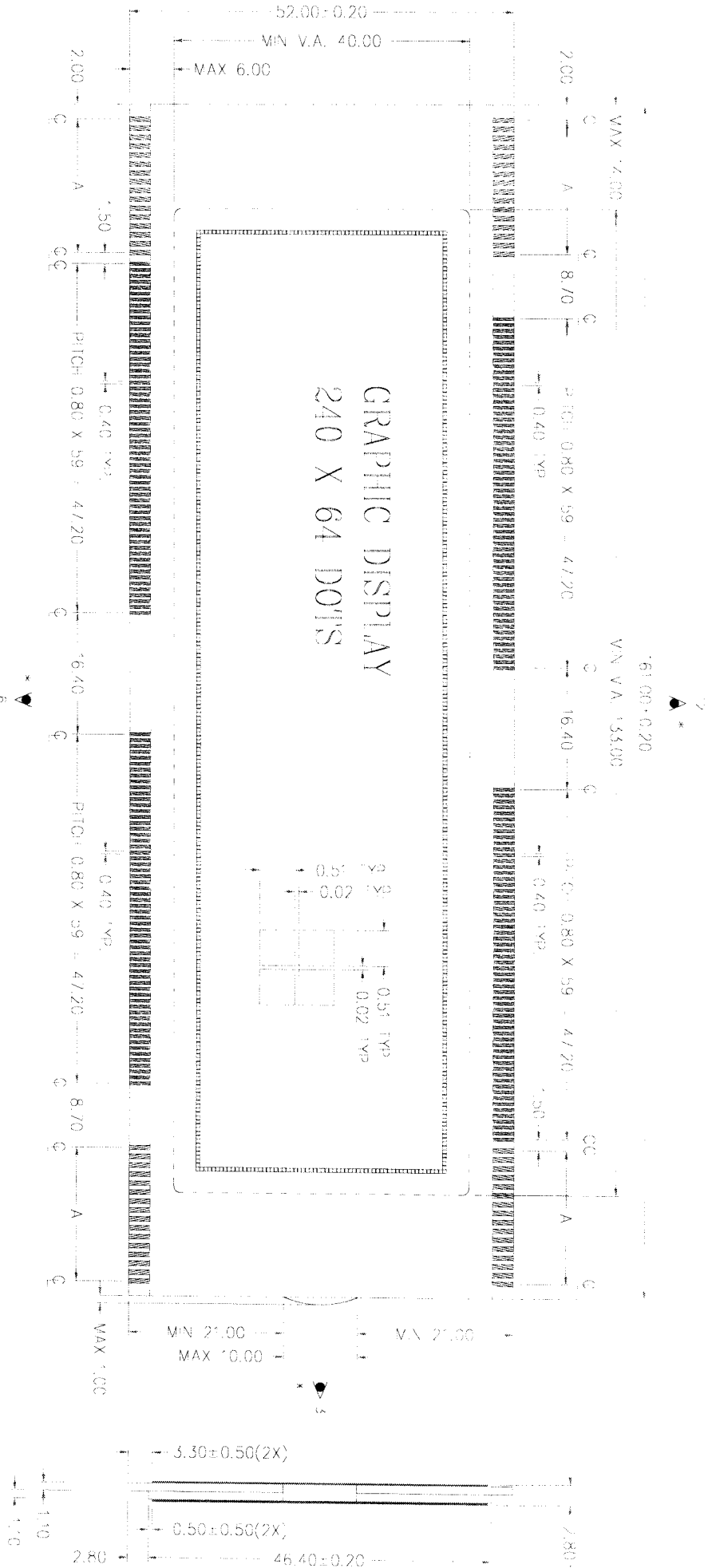
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TITLE: BACKLIGHT			
PROJECT NO: MGLS24064			
TOLERANCE UNLESS OTHERWISE SPECIFIED:	X.X ±0.3		
DIMENSIONS IN MM	X.XX ±0.1		
MATERIAL:	FINISH:		
SCALE: DO NOT ON SCALE	THICKNESS:		
THIRD ANGLE PROJECTION			
DRAWN	NAME	SIZE	DATE
CHECKED	CHAN KAM FAI		98.4.16
APPROVED	ANDY LEUNG		
ITEM NO. LBL-MGL24064-3G1P			
DESCRIPTION: LBL-MGL24064(LED03GP)			
FILE NO: WAI 3P24064			REV 5
SHEET 1	OF 1		

LCD GLASS MECHANICAL DRAWING



REF: VAKS 1) * REF: 10.30V ± 2A0
 2) A PITCH: 1.20 X 75 (8.00 & 2A0) WIDTH = 0.60 TYP.

WARRTRONIX LTD.
 Dimensions mm
 100 - 310 - V1 SPECIFY IN V1 SCALE DRAWING
 379 ANTI REFLECTIVE
 REV DRAW BY VIN STAN
 DATE 2001-04-11
 CHECKED BY SUTTO SNA
 DATE

