



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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**VARITRONIX GRAPHIC LCD MODULE**  
FORMAT = 240x64

**MGLS-24064-C-HV-G-LED3G**

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

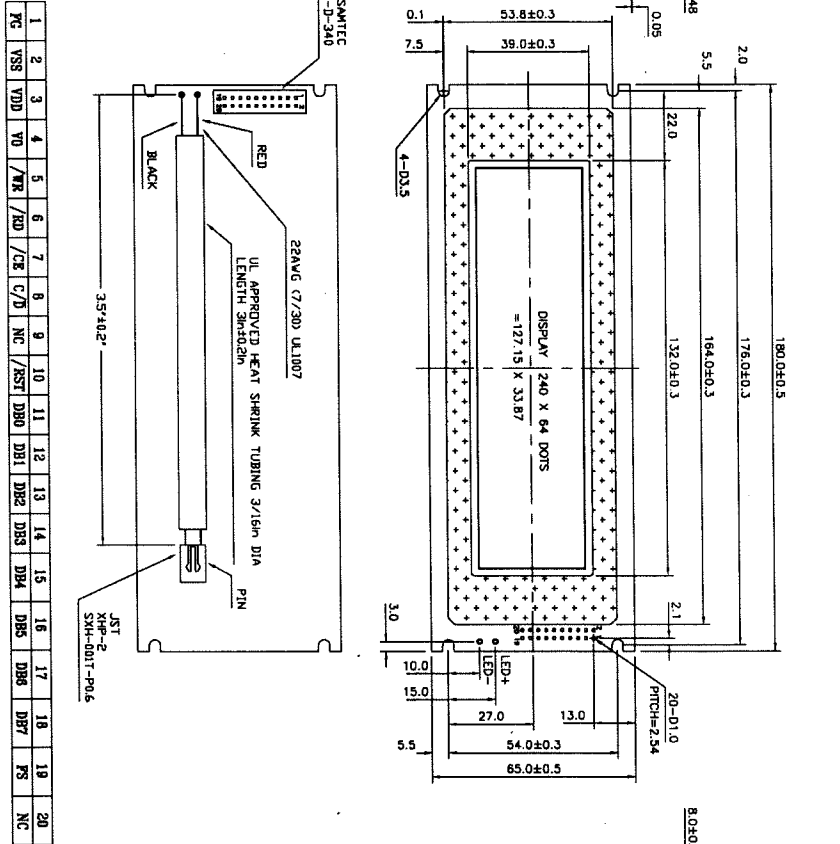
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MGLS-24064-C-HV-G-LED3G

MGLS-24064-C-HV-G-LED3G



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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.

TITLE: SPECIFICATION OF MODULE	
PROJECT NO: VLMS4044-HV-G-LED3G-12	
REVISIONS: X.X ±0.3	
DIMENSIONS IN MM: X.XX ±0.1	
SCALE: DO NOT ON SCALE	
THIRD ANGLE PROJECTION	
DRAWN: CHAN KAM FUI	DATE: 01.05.18
CHECKED: CHAN KAM FUI	
APPROVED: K.P. HO	
ITEM NO. VLMS4044-02	
DESCRIPTION: VLMS4044	
FILE NO: MODULE VLMS4044-02 REV 0	
SHEET 1 OF 1	

Figure 1: Specification of VLMS4044-ZEBRAVERSION module.



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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 <sub>DD</sub>	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(IEC68-2-6) cells must be mounted on a suitable connector	Frequency: 10 ~ 55Hz Amplitude: 0.75mm Duration: 20 cycles in each direction.				3 directions
Shock(IEC68-2-27) Half-sine pulse shape	Pulse duration: 11 ms Peak acceleration: 981 m/s <sup>2</sup> = 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	Dataread. Read data from controller T6963C when "L".
7	/CE	Chipenable 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

Note1: 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 <sub>DD-VSS</sub>		4.75	5.00	5.25	V
Supplyvoltage(LCD)	V <sub>LCD</sub> =V <sub>DD</sub> -V <sub>0</sub>	V <sub>DD</sub> =5V,Note 1	13.9	14.6	15.3	V
Inputsignalvoltage	V <sub>IN</sub>	"H"level	V <sub>DD</sub> -2.2	-	V <sub>DD</sub>	V
		"L"level	0	-	0.8	V
Supplycurrent (Logic&LCD)	I <sub>DD</sub>	V <sub>DD</sub> =5V, Charactermode	-	8.7	13.2	mA
		V <sub>DD</sub> =5V, Checkerboard mode	-	9.1	13.8	mA
Supplycurrent(LCD)	I <sub>0</sub>	V <sub>DD</sub> =5V, Charactermode, Note1	-	3.2	4.9	mA
		V <sub>DD</sub> =5V, Checkerboard mode, Note1	-	3.4	5.3	mA
Supplyvoltage (LED03backlight)	V <sub>LED03</sub>	Forwardcurrent =22x10 =220mA  NumberofLED chips =22x2 =44	3.9	4.1	4.3	V

Note(1):

ThereistoleranceinoptimumLCDdrivingvoltage duringproductionanditwillbewithin  
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
$\bar{C}/\bar{E}$ , $\bar{R}/\bar{D}$ , $\bar{W}/\bar{R}$ 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

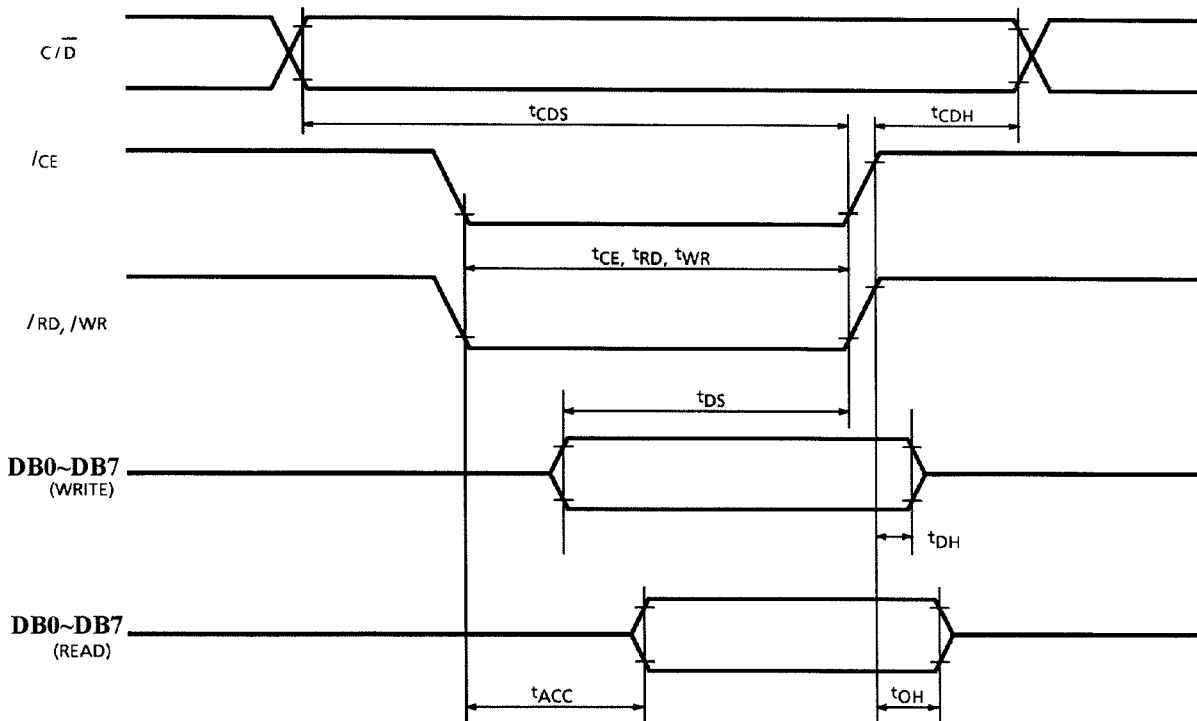


Figure 2: Bus Timing Diagram



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#### 4.4 TimingDiagramofVDD AgainstV0.

PoweronsequenceshallmeettherequirementsofFigure3,thetimingdiagramofVDDagainstV0.

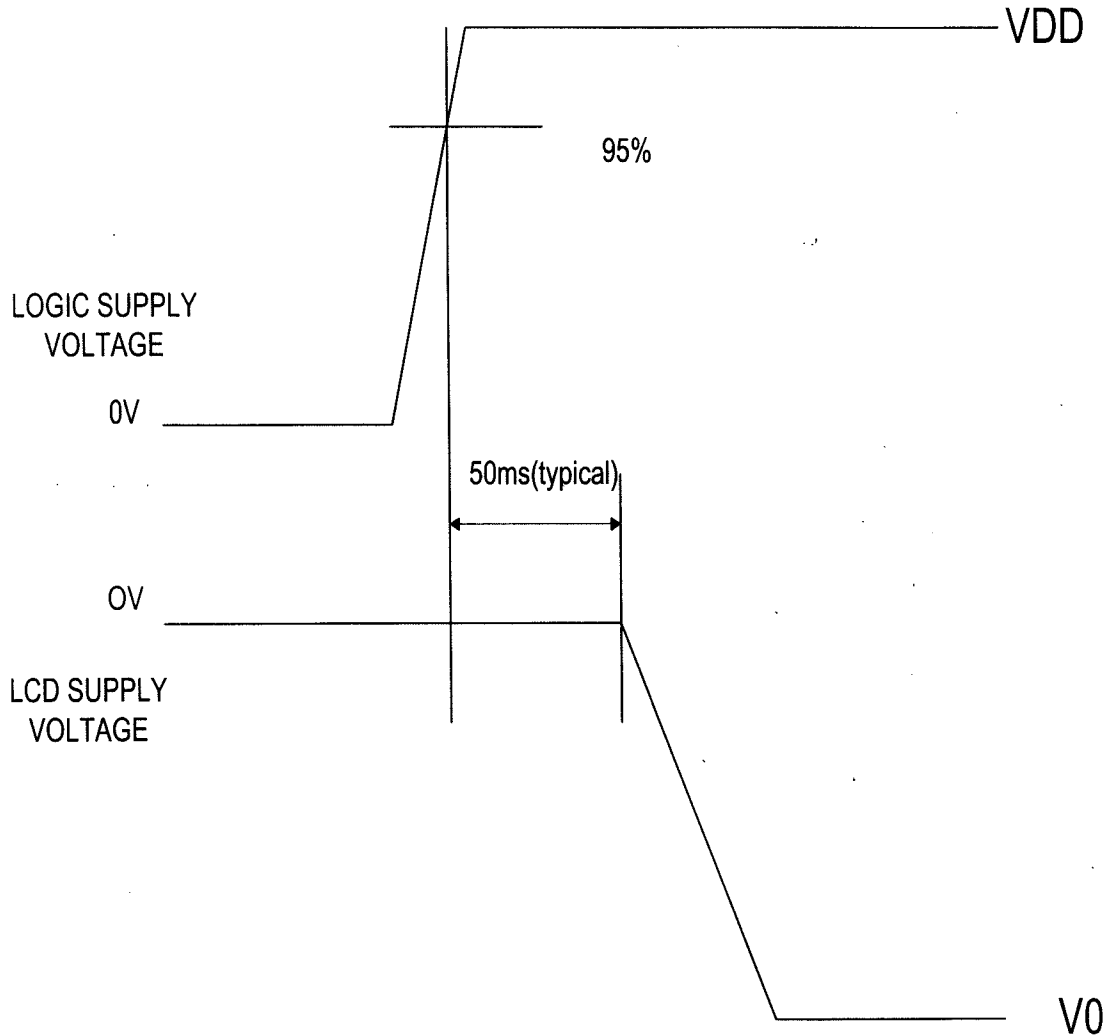


Figure3:TimingDiagramofVDDAgainstV0.

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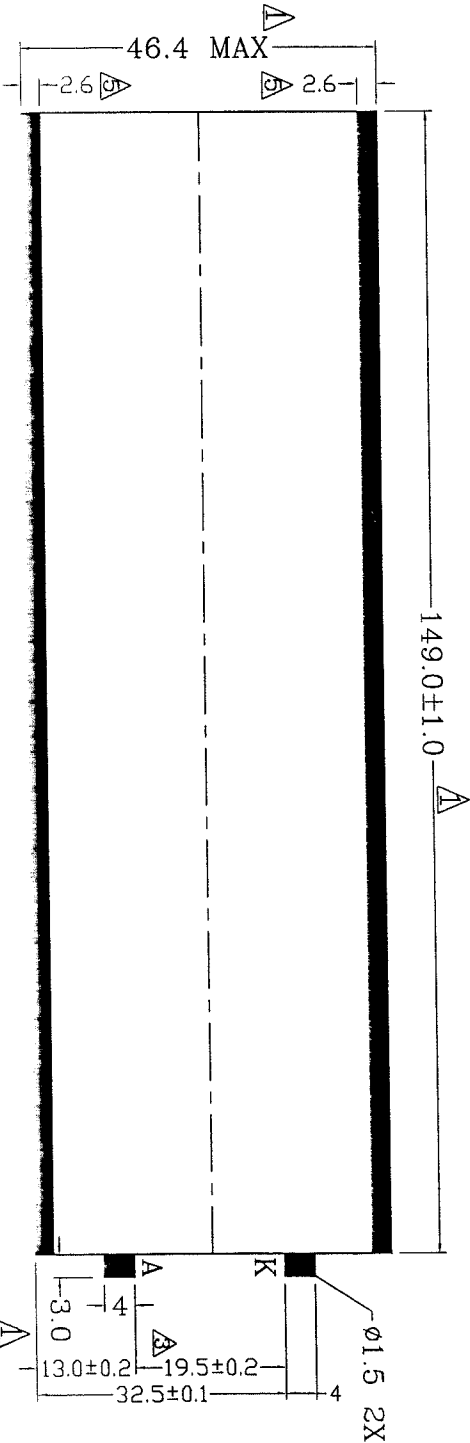
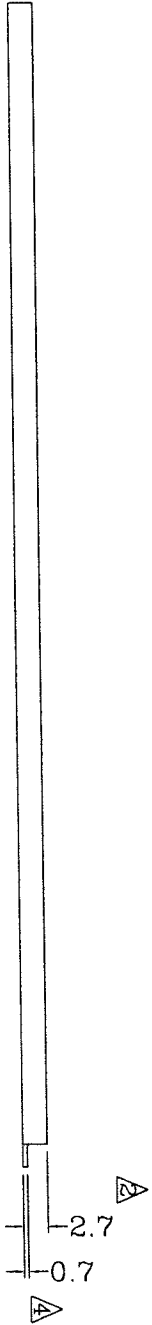
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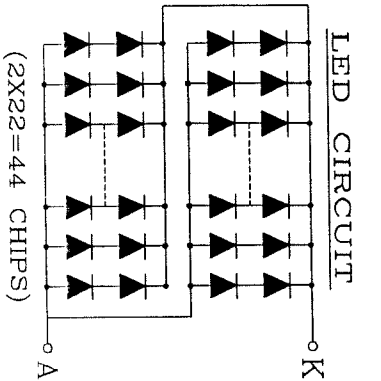
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LED BACKLIGHT FOR MGLS-24064  
LED3G-24064



ISSUE	AMENDMENT	DATE
Δ	ADDED TOLERANCE CHANGE DIMENSIONS	9/1/97
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	220			mA

LED COLOR: YELLOW-GREEN



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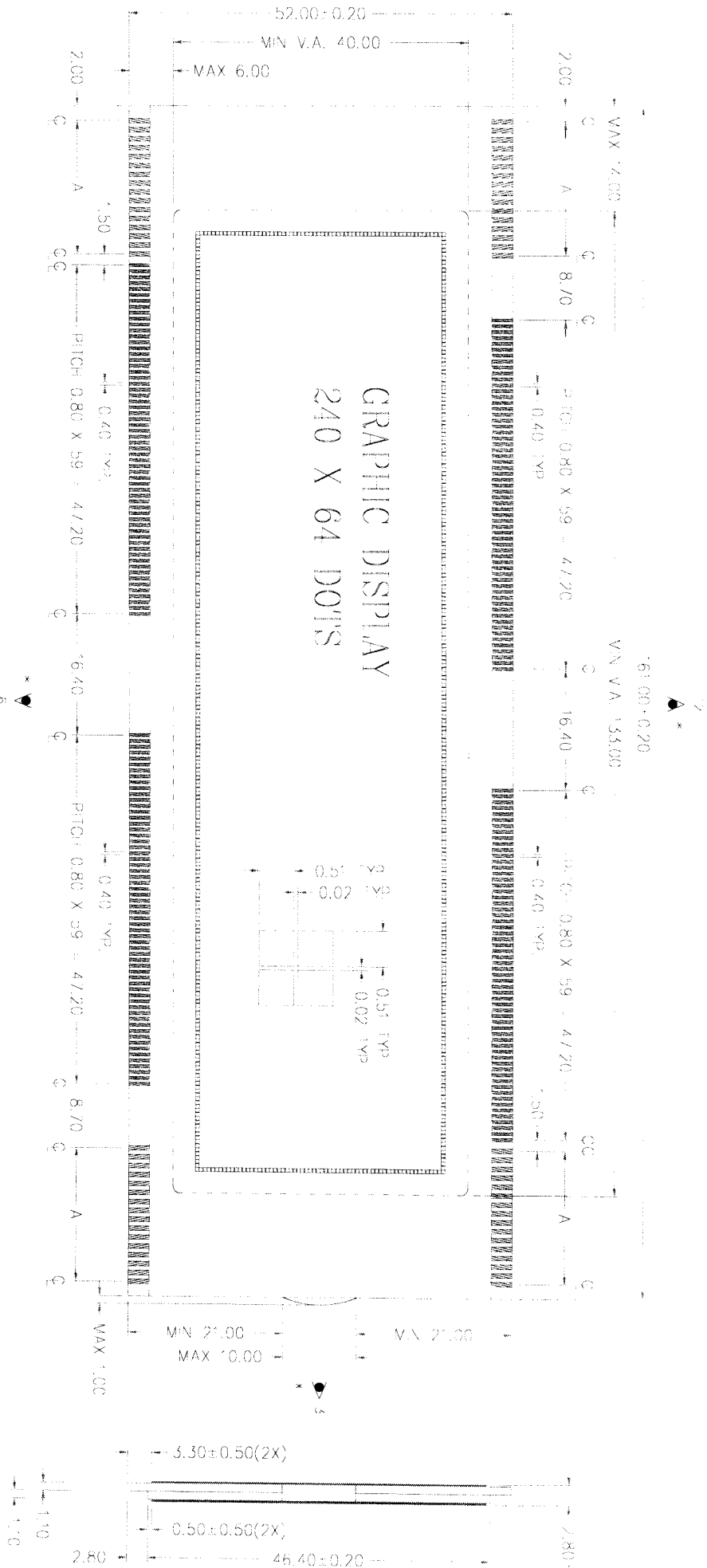
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<b>TITLE: BACKLIGHT</b>			
<b>PROJECT NO: MGLS24064</b>			
TOLERANCE UNLESS OTHERWISE SPECIFIED:	X.X ±0.3		
DIMENSIONS IN MM	X.XX ±0.1		
MATERIAL:	FINISH:		
SCALE: DO NOT ON SCALE	THICKNESS:		
<b>THIRD ANGLE PROJECTION</b>			
DRAWN	NAME	SIZE	DATE
CHECKED	CHAN KAM FAI		98.4.16
APPROVED	ANDY LEUNG		
<b>ITEM NO. LBL-MGL24064-3G1P</b>			
<b>DESCRIPTION: LBL-MGL24064(LED03G1P)</b>			
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 0.75 (8.00 & 2A) WIDTH = 0.60 (YP)  
**WARRTRONIX LTD.**  
 Dimensions mm  
 10 310 11 SPECIFY 31 17 SCALE DRAWING 379 ANTI REFLECTIVE  
 REV DRAWN BY VIN STA  
 CHECKED BY SUTTO SVA  
 Date 2001-04-11  
 Date

