

Specification

MGLS 240128T-FF-HT-LEDWHITE

Version July 2004



VL-FS-MGLS240128T-73 REV. E
(MGLS240128T-FF-HT LED WHITE)

JUL/2004

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DOCUMENT NUMBER AND REVISION
VL-FS-MGLS240128T-73 REV. E
(MGLS240128T-FF-HT LED WHITE)

DOCUMENT TITLE:
SPECIFICATION
OF
LCD MODULE TYPE
ITEM NO.: MGLS240128T-73

DEPARTMENT	NAME	SIGNATURE	DATE
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A B	2004.03.15	Item 1 was updated: 1.) (Page 5, Figure 1) Module Specification was updated. 2.) (Page 11, Point 7) Appendix – LED Specifications were added.	HELEN HE	HE ZUO BING
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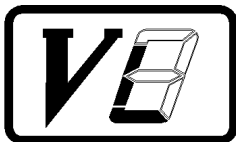
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DOCUMENT REVISION FROM TO		DATE	DESCRIPTION	CHANGED BY	CHECKED BY
D	E	2004.7.22	Item 1 was updated: 1.) (Page 6,Figure 1) Module Specification was updated.	ZHANG YAN FANG	TANG ZHAO BIN



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VARITRONIX LIMITED

Specification of LCD Module Type Model No.: MGLS240128T-73

1. General Description

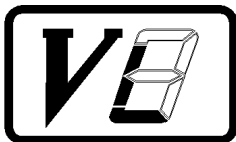
- 240 x 128 dots FFSTN Negative Black Transmissive LCD graphic module.
- Driving scheme: 1/128 multiplexed drive, 1/12.4 bias.
- Viewing direction: 6 O'clock.
- 'TOSHIBA' T6963C flat pack or equivalent LCD controller.
- 'TOSHIBA' T6A39 flat pack or equivalent LCD segment drivers.
- 'TOSHIBA' T6A40 flat pack or equivalent LCD common drivers.
- 8 K byte display SRAM.
- White LED05 backlight.
- FPC

2. Mechanical Specifications

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

Table 1

Parameter	Specifications	Unit
Outline dimensions	144.0(W) x 104.0(H) x 15.0 MAX.(D)	mm
Viewing area	114.0(W) x 64.0(H)	mm
Active area	107.95(W) x 57.55(H)	mm
Display format	240 (Horizontal) x 128 (Vertical)	dots
Dot size	0.40(W) x 0.40(H)	mm
Dot spacing	0.05(W) x 0.05(H)	mm
Dot Pitch	0.45(W) x 0.45(H)	mm
Weight	TBD	grams



3. Absolute Maximum Ratings

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

Table 2

Parameter	Symbol	Min.	Max.	Unit
Supply voltage (Logic)	VDD - VSS	-0.3	+7.0	V
Supply voltage (LCD drive)	VLCD=VDD - V0	-0.3	+30.0	V
Input voltage	Vin	-0.3	VDD+0.3	V

Note:

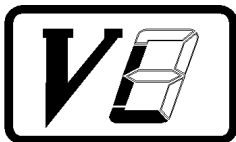
The modules may be destroyed if they are used beyond the absolute maximum ratings.

All voltage values are referenced to VSS = 0V.

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	Dry
Humidity	95% max. RH for $T_a \leq 40^\circ\text{C}$ < 95% RH for $T_a > 40^\circ\text{C}$				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: $981 \text{ m/s}^2 = 100\text{g}$ Number of shocks : 3 shocks in 3 mutually perpendicular axes.				3 directions



4. Electrical Specifications

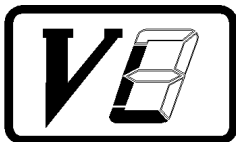
4.1 Interface signals

Table 4

Pin No.	Symbol	Description
1	FG	Frame Ground (see note 1).
2	VSS	Ground (0 V).
3	VDD	Power supply for logic (+5V)
4	V0	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	$\overline{\text{C/D}}$	Command/Data read /write. “H” for command read/write and “L” for data read/write.
9	/RST	Controller reset when “L”
10	DB0	Data input/output (LSB)
11	DB1	Data input/output
12	DB2	Data input/output
13	DB3	Data input/output
14	DB4	Data input/output
15	DB5	Data input/output
16	DB6	Data input/output
17	DB7	Data input/output (MSB)
18	FS	Font select. “H” for 6 x 8 font & “L” for 8 x 8 font

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.



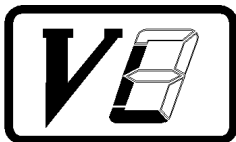
4.2 Typical Electrical Characteristics

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	5.00	5.25	V
Supply voltage (LCD)	VLCD =VDD –V0	VDD = 5V,Note 1	19.8	20.3	20.8	V
Input signal voltage	VIN	“H” level	VDD -2.2	-	VDD	V
		“L” level	0	-	0.8	V
Supply Current (Logic & LCD)	IDD	Character mode, VDD=5V, Note 1	-	11.4	17.1	mA
		Checker board mode, VDD=5V, Note 1	-	12.4	18.6	mA
Supply Current (LCD)	I0	Character mode, VDD=5V, Note 1	-	4.6	6.9	mA
		Checker board mode, VDD=5V, Note 1	-	5.3	8.0	mA
Supply voltage of white LED05 backlight	VLED05	Forward current =80mA Number of LED dies =1 x 4=4.	3.6	4.0	4.4	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 $T_a = -20^{\circ}\text{C}$ To $+70^{\circ}\text{C}$, $V_{DD} = 5\text{V} \pm 5\%$, $V_{SS} = 0\text{V}$

Refer to Fig. 2, the bus timing diagram.

Table 6

Parameter	Symbol	Min.	Max.	Unit
$\overline{C/D}$ Set-up time	t_{CDS}	100	-	ns
$\overline{C/D}$ Hold Time	t_{CDH}	10	-	ns
$\overline{/CE}, \overline{/RD}, \overline{/WR}$ 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

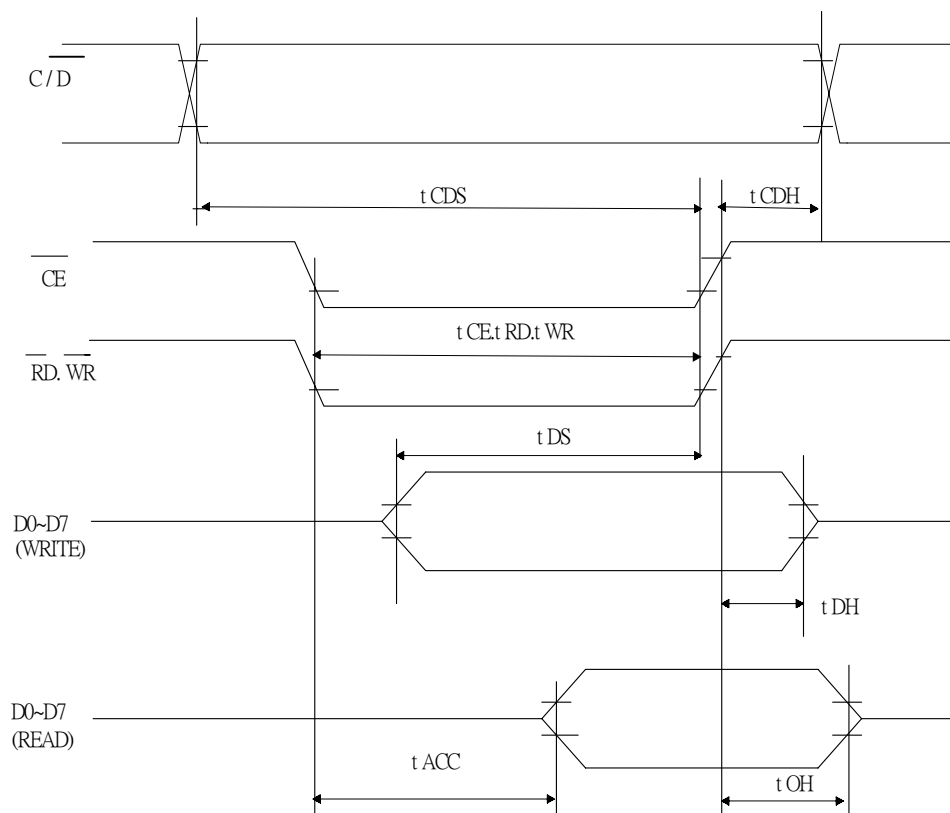
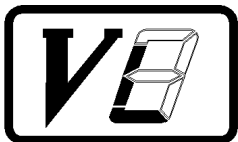


Figure 2: Bus Timing Diagram



5. Timing Diagram of VDD Against V0.

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

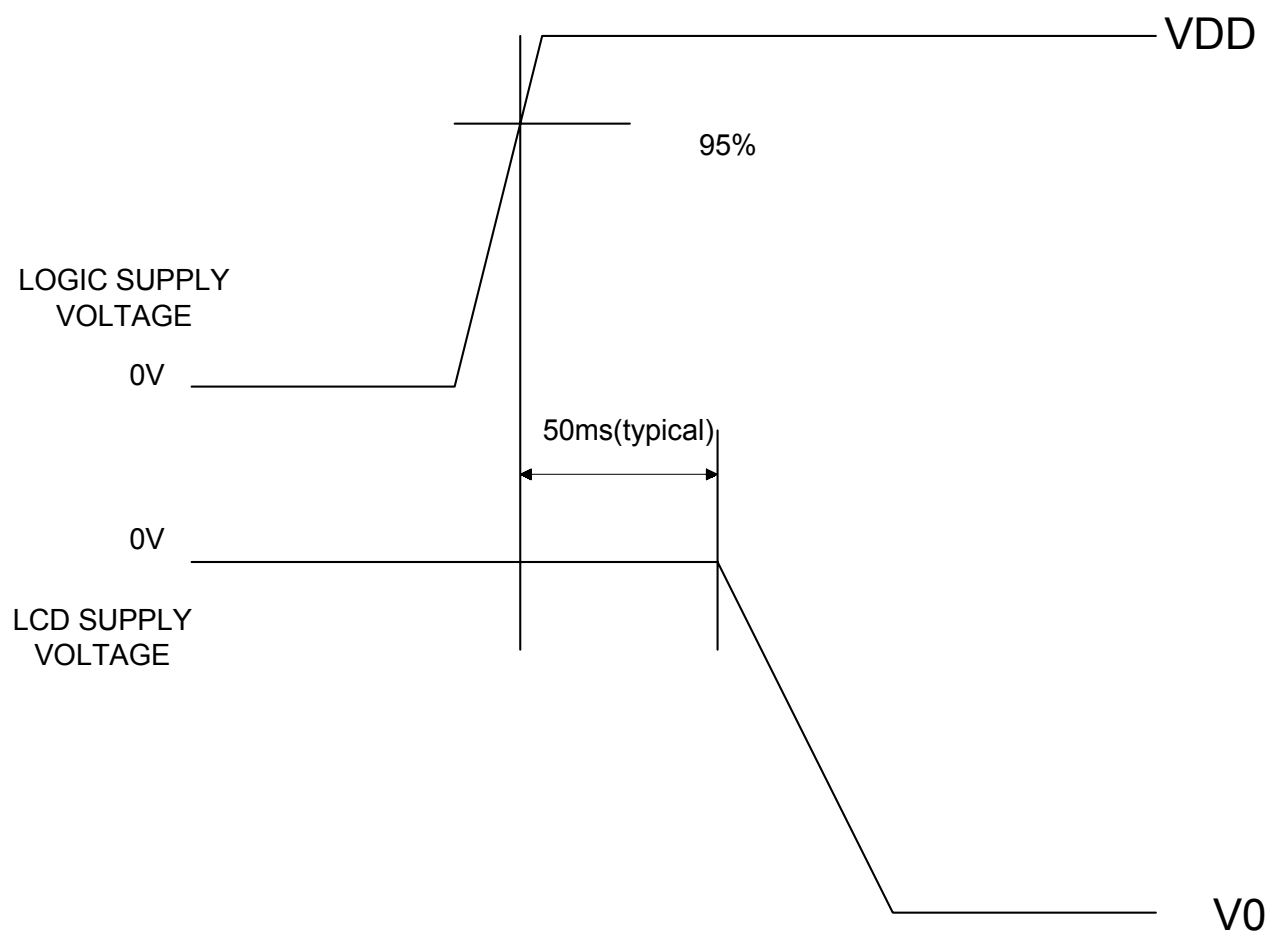
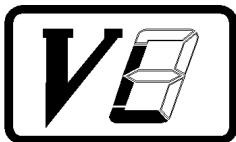


Figure 3: Timing Diagram of VDD Against V0.



6. Appendix – LED Specifications

6.1 极限参数 ABSOLUTE MAXIMUM RATINGS

(除非特别说明,环境温度 Ta=25°C. Unless specified, The Ambient temperature Ta=25°C)

项目 Item	符号 Symbol	条件 Conditions	值 Rating	单位 Unit
* 极限直流正向电流 Absolute maximum forward current	Ifm		100	mA
* 脉冲驱动时极限正向电流 Peak forward current	Ifp	1 msec 脉冲, 1/10 占空比 1 msec Plus 10% Duty Cycle	240	mA
反向电压 Reverse Voltage	Vr		5	V
* 极限功耗 Power dissipation	Pd		400	mW
工作温度 Operating Temperature Range	Topr		-30~+70	°C
贮存温度 Storage Temperature Range	Tstg		-40~+80	°C

- * 当工作温度高于 25°C 时, Ifm, Ifp 和 Pd 必须降低; 电流降低率是 -1.44 mA/°C (直流驱动), 或 -3.44 mA/°C (脉冲驱动), 功耗降低率是 -3 mW/°C. 产品的工作电流不能大于对应工作温度条件 Ifm 或 Ifp 的 60 %.
- For operation above 25°C, The Ifm Ifp & Pd must be derated, the Current derating is -1.44 mA/°C for DC drive and -3.44 mA/°C for Pulse drive, the Power dissipation is -3 mW/°C. The product working current must not more than the 60 % of the Ifm or Ifp according to the working temperature.

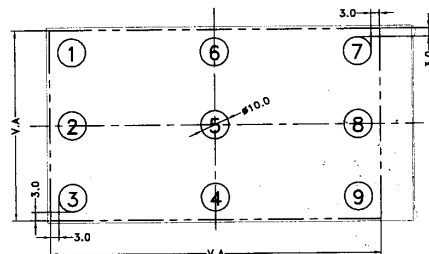
6.2 电. 光特性 ELECTRICAL-OPTICAL CHARACTERISTICS

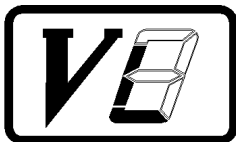
(除非特别说明,环境温度 Ta=25°C. Unless specified, The Ambient temperature Ta=25°C)

项目 Item	符号 Symbol	最小值 min.	典型值 typ.	最大值 max.	单位 Unit	测定条件 Condition
正向电流 Forward Current	If	60	80	100	mA	Vf= 4.0 V
反向电流 Reverse Current	Ir			15X4	μA	Vr= 3 V
峰值波长 Peak wave length	λP				nm	Vf= 4.0 V
频谱半宽度 Spectral Line Half width	Δλ				nm	Vf= 4.0 V
* 亮度 Luminance	Lv	90	120	180	cd/m ²	Vf= 4.0 V

- * 亮度值是 9 个测量点的平均值, 亮度最大值比最小值一般小于 1.5 (最大 1.7). 使用 BM-7 亮度色度仪测量, 测量光圈 φ10 mm.

The luminance is the average value of 9 points, and The Lvmax./Lvmin. is less than 1.5 Typical (max 1.7). The measurement instrument is BM-7 luminance Colorimeter. The aperture is φ10 mm.

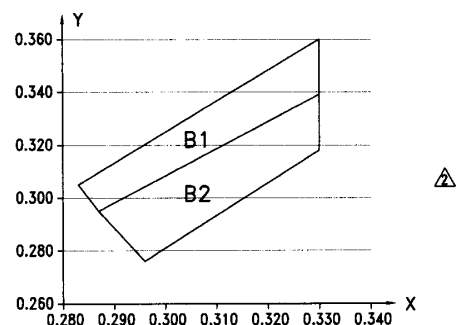




Colour Coordinate see the form.

	Rank B1 Limiting Region				Rank B2 Limiting Region			
X	0.287	0.283	0.330	0.330	0.296	0.287	0.330	0.330
Y	0.295	0.305	0.360	0.339	0.276	0.295	0.339	0.318

注: 色度坐标值公差 ± 0.01

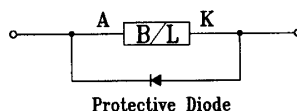


6.3 STATIC ELECTRICITY AND SURGE

- * Static electricity and surge will damage the LEDs. It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs.
- * All devices, equipment and machinery must be properly grounded.
- * When inspecting own final products on which LEDs were mounted, it is recommended to check also whether the mounted LEDs are damaged by static electricity or not. It is easy to find static-damaged LEDs by light emission test at lower current (below 1mA is recommended). Damaged LEDs will show some unusual characteristics such as leak current remarkably increases, starting forward voltage becomes lower, or the LEDs get unlighted at the low current.

6.4 RECOMMEND CONNECTION OF STATIC-ELECTRICITY RESISTANCE

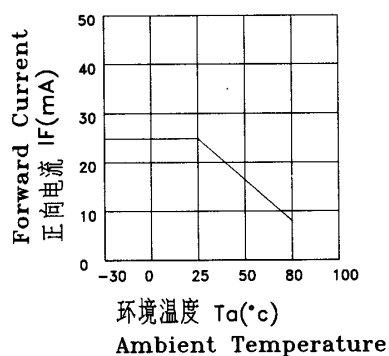
- * This circuit diagram is a common ESD protection circuit for all super bright blue, white and green color LED backlight application.



6.5 LED ELECTRICAL CHARACTERISTICS

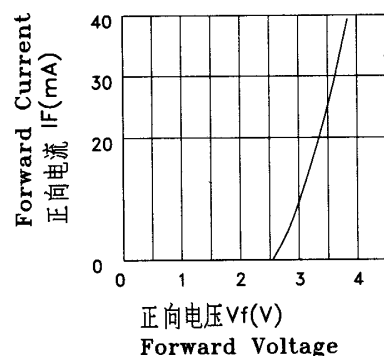
(1) 正向电流-周围温度

Forward Current VS. Ambient Temperature



(2) 正向电流-正向电压特性

Forward Current VS. Forward Voltage





7. LCD Cosmetic Conditions

- a.) Reference document follow VL-QUA-012B.
- b.) LCD size of the product is middle.

8. Label Note

- a.) Identification labels will be stuck on the module without obstructing the viewing area of display.

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

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