

VACUUM FLUORESCENT DISPLAY MODULE

## ENGINEERING PROPOSAL

GP1238A01A

## EVALUATION

- ACCEPTED WITHOUT ANY CHANGE  
 THE FOLLOWING CHANGE IS REQUIRED

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## 51. FEATURES

GP1238A01A is graphic display module using a FUTABA 192x16dots VFD.

The module can be configured for 8bit Parallel interface.

Since a DC/DC converter is included, 5V power source is required to operate the module.

## 2. GENERAL SPECIFICATIONS

### 2-1. DIMENSIONS, WEIGHT (Refer to FIG-3)

Table-1

Item	Specification	Unit
Outer Dimensions	(L) $180 \pm 1.0$	mm
	(W) $40 \pm 1.0$	
	(T) 24.1 Max.	
Weight	100	g

### 2-2. SPECIFICATIONS OF THE DISPLAY PANEL

Table-2

Item	Specification	Unit
Display Area	124.6×10.2	mm
Number of Dots	192×16	Dot
Dot Pitch	0.65×0.65	mm
Dot Size	0.4×0.4	mm
Color Illumination	Green( $\lambda_p=505\text{nm}$ )	—
Luminance	500 Typ.	cd/m <sup>2</sup>

(Note)

By using a filter, uniform color ranging from blue to orange (including white) can be obtained.

### 2-3. ENVIRONMENT CONDITIONS

Table-3

Item	Symbol	Min.	Max.	Unit
Operating Temperature	<i>T<sub>opr</sub></i>	-20	+70	°C
Storage Temperature	<i>T<sub>stg</sub></i>	-20	+70	°C
Operating Humidity	<i>H<sub>opr</sub></i>	20	85	%
Storage Humidity	<i>H<sub>stg</sub></i>	20	90	%
Vibration (10 ~ 55Hz)	—	—	4	G
Shock	—	—	40	G

(Note) Avoid operations and or storage in moist environmental conditions.

## 2-4. ABSOLUTE MAXIMUM RATINGS

Table-4

Item	Symbol	Min.	Max.	Unit
Supply Voltage	V <sub>cc1</sub>	-0.4	6.0	Vdc
Input Signal Voltage	V <sub>IS</sub>	0.5	V <sub>cc1</sub> +0.5	V

## 2-5. RECOMMENDED OPERATING CONDITIONS

Table-5

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	V <sub>cc1</sub>	4.5	5.0	5.5	Vdc
H-Level Input Voltage	V <sub>IH</sub>	2.2	–	–	V
L-Level Input Voltage	V <sub>IL</sub>	–	–	0.8	V

## 2-6. ELECTRICAL CHARACTERISTICS

Table-6

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Current <sup>(Note 1)</sup>	I <sub>cc1</sub>	V <sub>cc</sub> = 5.0Vdc All on	–	0.8	1.2	A
Power Consumption	–		–	4	6	W
Luminance	L		250	500	–	cd/m <sup>2</sup>
H-Level output Voltage	V <sub>OH</sub>	V <sub>cc</sub> = 4.5V I <sub>OH</sub> = -2mA	3.8	–	–	V
L-Level output Voltage	V <sub>OL</sub>	V <sub>cc</sub> = 4.5V I <sub>OL</sub> = 3.2mA	–	–	0.4	V

Note 1) The surge current can be approx.5 times the specified supply current at power on.

**3. BASIC FUNCTIONS**

## 3-1. Function Table

Table-7

$\overline{CS}$	$\overline{WR}$	$\overline{RD}$	$C/\overline{D}$	Mode
L	↑	H	H	Command Write-in
L	↑	H	L	Data Write-in
L	H	L	H	—
L	H	L	L	Data Read-out

## 3-2. Function of Signal Lines

Table-8

Signal	I/O	Function
D0~D7	I/O	Data Bus
$\overline{WR}$	I	Write Signal
$\overline{RD}$	I	Read Signal
$\overline{CS}$	I	Chip Select Signal
$C/\overline{D}$	I	Command / Data Select Signal $C/\overline{D} = "H"$ : Command, $C/\overline{D} = "L"$ : Data
INT	O	Frame Signal (One output pulse per one display frame)
Vcc1	—	+5V
GND	—	GND

## 3-3. Command Table

This module has the 32k bytes for display memory (S-RAM).

It is used as display memories which capable to have two display memories. And each one can be displayed independently and ON/OFF controlled as well. Also each screen can be composed (OR,EX-OR and AND).

The followings are all commands of this module.

Table-9

Command (C/D = "H")	Setting Data (C/D = "L")	Function
00H	–	Screen 1 & 2 are Displayed off
01H	–	Screen 1 is Displayed on
02H	–	Screen 2 is Displayed on
03H	–	Screen 1 & 2 are Displayed on
04H	–	Write/Read address is automatically incremented
05H	–	Write/Read address is holed
06H	–	Unused
07H	–	Screen 2 select
08H	D0 ~ D7	Display data write-in
09H	D0 ~ D7	Display data read-out
0AH	D0 ~ D7	Setting lower address for Screen 1 started
0BH	D0 ~ D4	Setting upper address for Screen 1 started
0CH	D0 ~ D7	Setting lower address for Screen 2 started
0DH	D0 ~ D4	Setting upper address for Screen 2 started
0EH	D0 ~ D7	Setting lower address of Write/Read
0FH	D0 ~ D4	Setting upper address of Write/Read
10H	–	OR display of Screen 1 & 2
11H	–	EX-OR display of Screen 1 & 2
12H	–	AND display of Screen 1 & 2

Note) "–" in the above table is shown that the setting data is not needed.

**5. INTERFACE CONNECTION**

## 5-1. CONNECTOR PIN ASSIGNMENT

Connector : IL-402-20S-SIL-SA (JAE)

FFC : 1mm Pitch 20 pin

Connector Pin Assignment

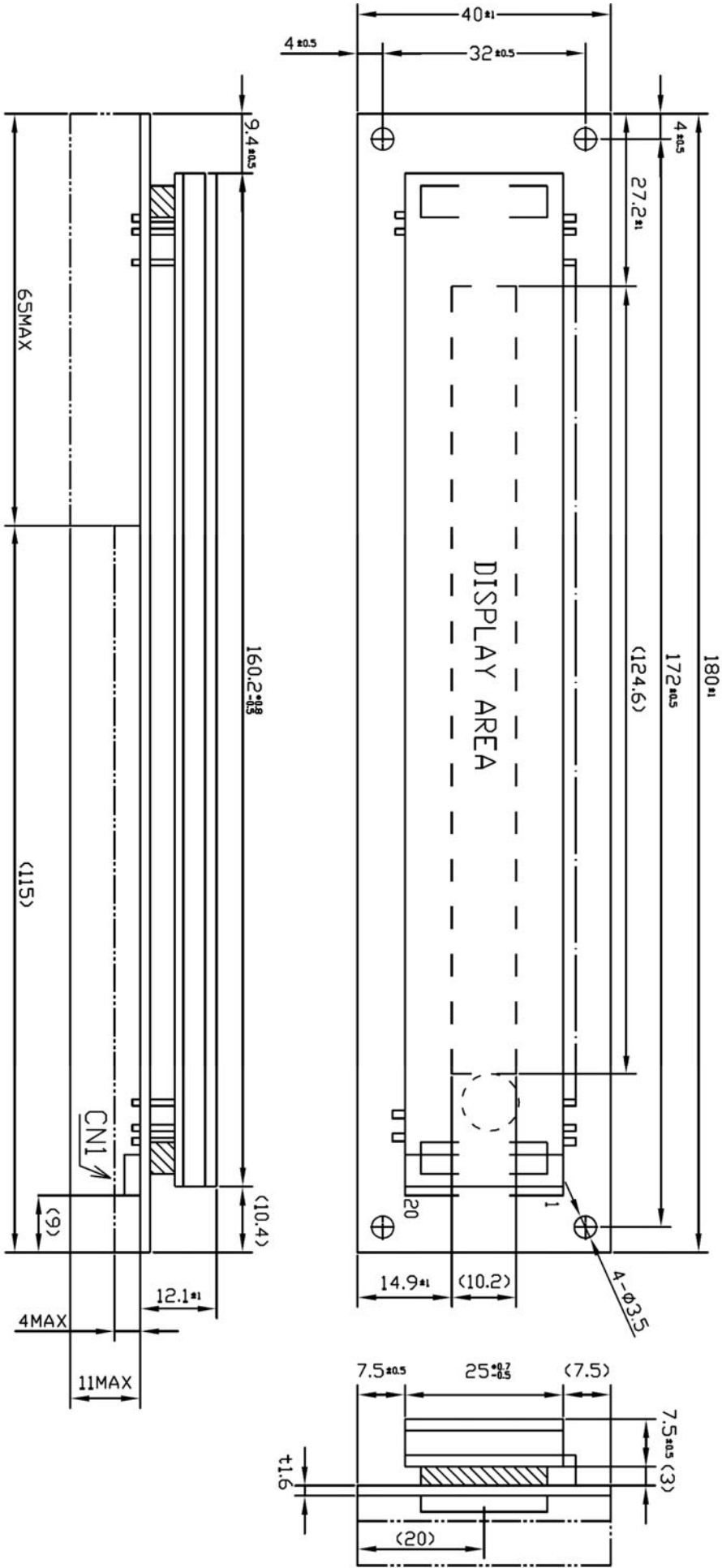
Table-10

Pin No.	Description	Pin No.	Description
1	D0	2	D1
3	D2	4	D3
5	D4	6	D5
7	D6	8	D7
9	GND	10	INT
11	WR	12	RD
13	CS	14	C/D
15	5V	16	5V
17	5V	18	GND
19	GND	20	NC

All GND terminal are connected together on the PWB.

**OUTER DIMENSION**

FIG-3



CIRCUIT BLOCK DIAGRAM

FIG-4

