APPLICATION NOTE

VACUUM FLUORESCENT DISPLAY MODULE

AN-E-2228

CHARACTER DISPLAY MODULE

M202LD06BA INSTRUCTION MANUAL

GENERAL DESCRIPTION

Futaba Vacuum Fluorescent Display Module M202LD06BA, with FUTABA VFD 202-LD-06GNK, produces 20 digits on 2 rows.
Each character is displayed in 5×7 dot matrix, Decimal Point, and Comma. And indicator triangle mark is underneath of each character of 2nd row.
Consisting of a VFD, microcomputer, driver IC, the module can be connected directly to the system bus, thus simplifying interfacing.

⚠ Important Safety Notice

Please read this note carefully before using the product.

Warning

- The module should be disconnected from the power supply before handling.
- The power supply should be switched off before connecting or disconnecting the power or interface cables.
- The module contains electronic components that generate high voltages which may cause an electrical shock when touched.
- Do not touch the electronic components of the module with any metal objects.
- The VFD used on the module is made of glass and should be handled with care. When handling the VFD, it is recommended that cotton gloves be used.
- The module is equipped with a circuit protection fuse.
- Under no circumstances should the module be modified or repaired.
  Any unauthorized modifications or repairs will invalidate the product warranty.
- The module should be abolished as the factory waste.

1. FEATURES

1-1. Using a one chip computer, the module can be connected to the system bus directly.

1-2. Two hundred sixteen different characters consisting of alpha-numeric and other symbols can be displayed.

1-3. By using dimming function, brightness can be controlled into four levels.

1-4. Since a DC/DC converter is included, only a 5V power source is required to operate the module.

1-5. High quality reliability and long life can be achieved with FUTABA VFD.

1-6. Either parallel or serial mode can be selected as the data input form.

1-7. The module’s surface mount components allow for maximum reliability.

2. GENERAL SPECIFICATIONS

2-1. DIMENSIONS, WEIGHT (Refer to FIGURE-1)

Table-1

Item	Specifications	Unit
Outer Dimensions	(W) 273.0±1.0 (H) 76.2±1.0 (T) 31.5 Max.	mm
Weight	Approx. 290	g

2-2. SPECIFICATIONS OF THE DISPLAY PANEL

Table-2

Item	Specifications	Unit
Display Area (W×H)	216.2×32.3	mm
Number of Digits	20 digits (5×7dots) ×2rows	–
Digits Size (W×H)	7.2×11.25	mm
Digits Pitch (W×H)	10.9×17.7	mm
Color of Illumination	Green (λp=505nm)	–

(Note) Color of illumination can be blue to orange also white is feasible by selection of optical filters.
The luminance is the value under the paragraph 2-5. Recommended operating condition.

2-3. ENVIRONMENT CONDITION

Table-3

Item	Symbol	Min.	Max.	Unit
Operating Temperature	*T*opr	-20	+70	°C
Storage Temperature	*T*stg	-40	+85	°C
Operating Humidity *1	*H*opr	20	85	%
Storage Humidity *1	*H*stg	20	90	%
Vibration (10 ~ 55Hz)	–	–	4	G
Shock	–	–	40	G

*1) Avoid operations and storage in moist environmental condition.

2-4. ABSOLUTE MAXIMUM RATINGS

Table-4

Item	Symbol	Min.	Max.	Unit
Supply Voltage	*V*cc	–	7.0	Vdc
Input Signal Voltage	V_{IS}	-0.4	5.5	V

2-5. RECOMMENDED OPERATING CONDITIONS

Table-5

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage	*V*cc	–	4.5	5.0	5.5	Vdc
H-Level Input Voltage	V_{IH}	*V*cc=5V	2.0	–	5.25	V
L-Level Input Voltage	V_{IL}	*V*cc=5V	–	–	0.8	V

2-6. ELECTRICAL CHARACTERISTICS

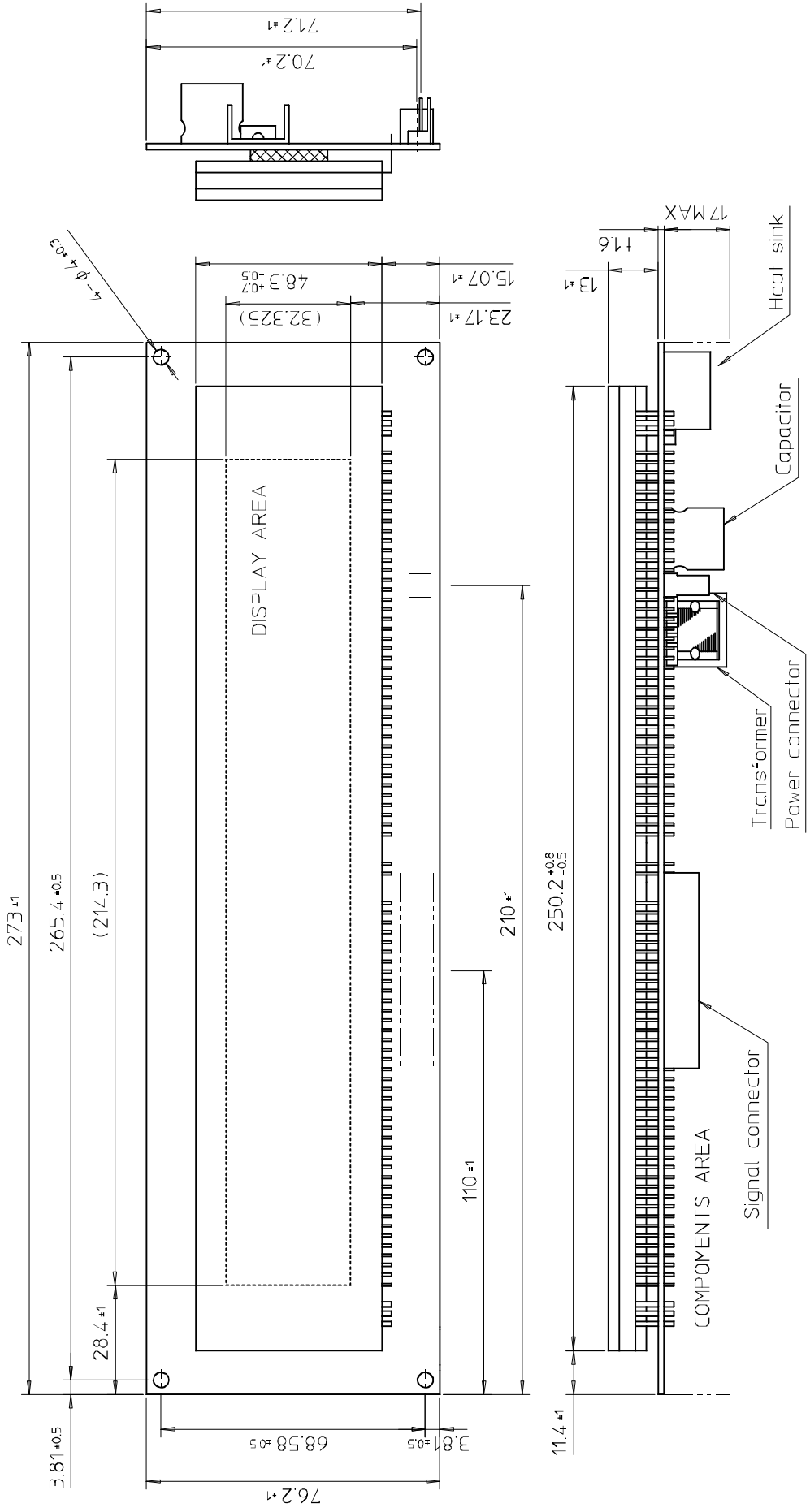
Table-6

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Current *1	*I*cc	*V*cc=5V All On	–	1.0	1.5	A
Power Consumption	–		–	5.0	–	W
Luminance	*L*		340 (100)	690 (200)	–	cd/m^2 (fL)
H-Level Input Current	I_{IH}	*V*cc=5.5V	–	–	2.0	μA
L-Level Input Current	I_{IL}	*V*cc=5.5V	–	–	-0.36	mA
H-Level Output Voltage	V_{OH}	*V*cc=4.5V I_{OH}=-2.6mA	2.4	–	–	V
L-Level Output Voltage	V_{OL}		0.25	–	0.4	V

*1) At power on the surge current may reach approx.10 times the specified current.

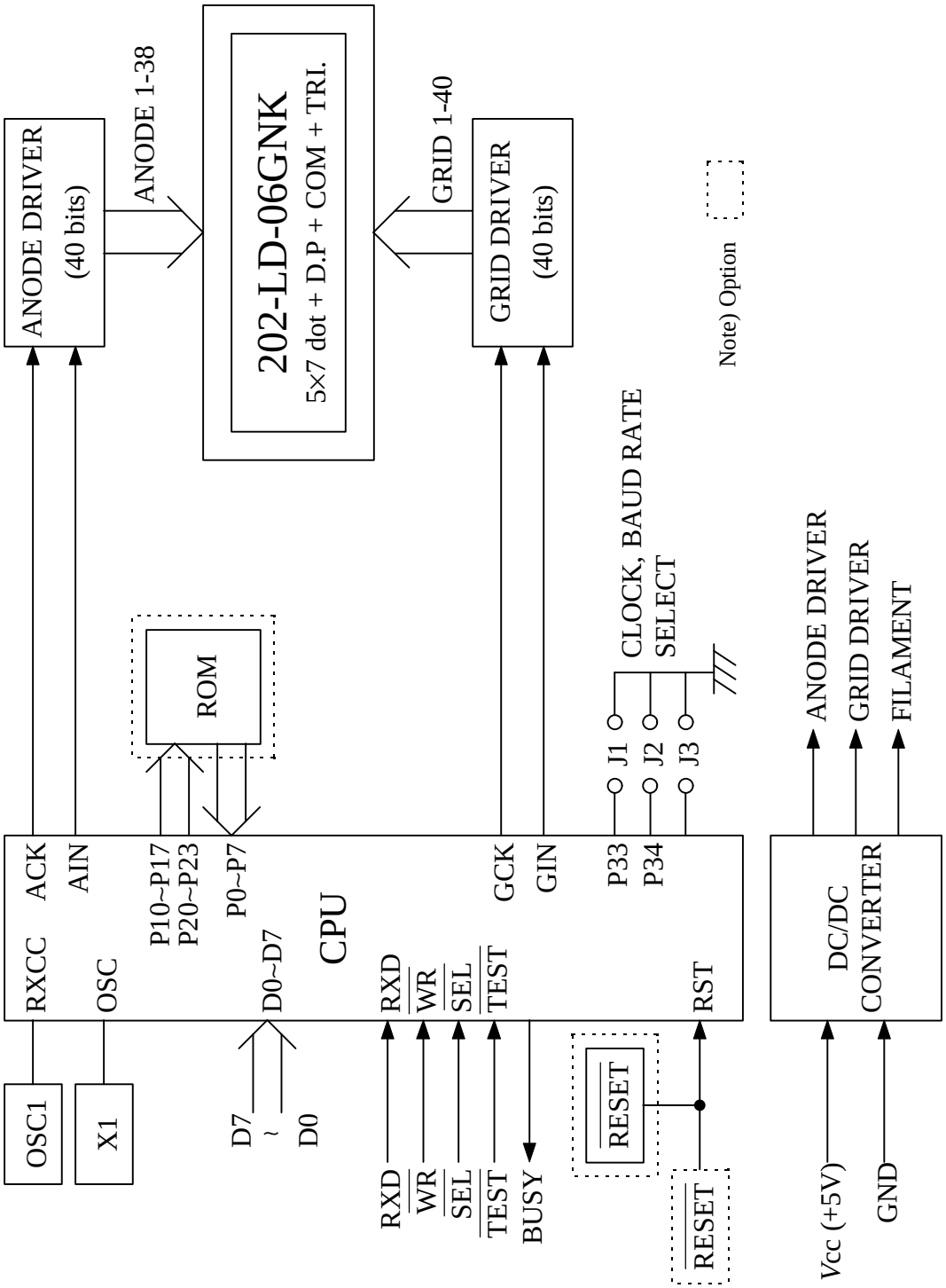
M202LD06BA　OUTER DIMENSIONS

FIGURE-1



M202LD06BA CIRCUIT BLOCK DIAGRAM

FIGURE-2



M202LD06BA DISPLAY CHARACTER CODE

FIGURE-3

D7 D6 D5 D4 / D3 D2 D1 D0		0 0 0 0	0 0 0 1	0 0 1 0	0 0 1 1	0 1 0 0	0 1 0 1	0 1 1 0	0 1 1 1	1 0 0 0	1 0 0 1	1 0 1 0	1 0 1 1	1 1 0 0	1 1 0 1	1 1 1 0	1 1 1 1
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0 0 0 0	0		DP	SP													
0 0 0 1	1		DC1														
0 0 1 0	2		DC2														
0 0 1 1	3																
0 1 0 0	4	DIM															
0 1 0 1	5																
0 1 1 0	6		DC5														
0 1 1 1	7		DC6														
1 0 0 0	8	BS	DC7														
1 0 0 1	9	HT	DC8														
1 0 1 0	A	LF	DC9														
1 0 1 1	B																
1 1 0 0	C																
1 1 0 1	D	CR															
1 1 1 0	E																
1 1 1 1	F		RST														

SP : SPACE