

DEVELOPMENT OF POWER SUPPLY PACKAGE FOR ELECTRET VIBRATION GENERATOR

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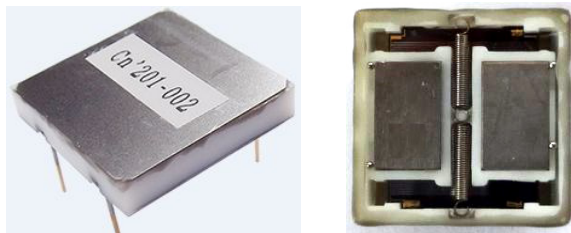
Abstract. Development of power supply package for electret vibration generator. To use the electret vibration generator widely in the market the power supply unit of the package where the circuit of making to direct current had been integrated with the control circuit was developed. And the application was examined.

1. Introduction

The vibration generator and two electric circuits were designed as one unit.

Because two or more pieces were able to be combined according to the usage, the package design of the hope output of the user was enabled.

Module is vibration generator combined 2 pieces to suppress the difference of the performance of the vibration generator and the electric circuit, and leveled the performance when mass-producing it.



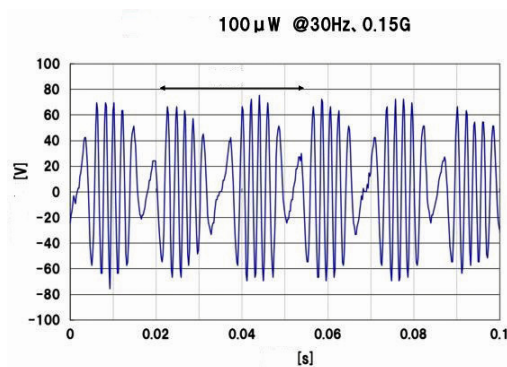
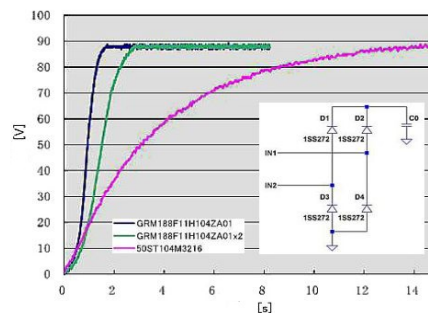
(Figure 1. Vibration Generator: OMRON)

2. Design of module

The device adopted the diode and the low loss capacitor to make the output of the Polymer electret type vibration generator of high impedance direct current efficiently.

Output of the Polymer electret type vibration dynamo is a high voltage of $\pm 120V$ or more of impedance and $\pm$ output that about $20M\Omega$ is high, and the diode that

Rectifies this exchange output should have enough directions of easy flow resisting pressure and an appropriate recovery characteristic.

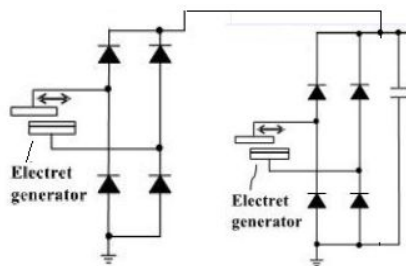
(Figure2.Vibration Generator output: $\pm 75V$)

(Figure3.Charge characteristic)

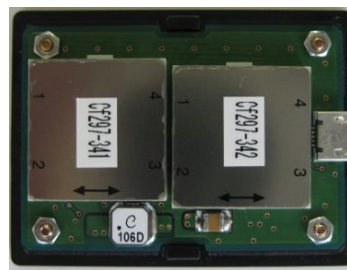
Moreover, the capacitor where direct current was temporarily saved had the Chemical capacitor and the film type, etc. ceramic type of a low loss was especially adopted here.

This adopted the converter circuit in the circuit that controlled the direct-current output after it had rectified it with stability.

The direct-current output saved in the capacitor by the continuing vibration rises up to about 90V at time.



(Figure4.Vibration generator mixer)



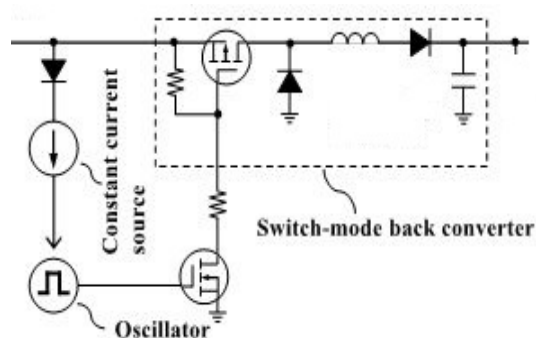
(Figure5.Generator mounted circuit board)

It uses the DC-DC converter circuit of the fixed voltage drive for the control of this voltage, and conversion into the output of 5V.

The need the composition that is appropriate for the vibration type generator with a little amount of power generation ($100\mu W$ level) to compose this converter.

Adopted not the bipolar transistor of the current control.

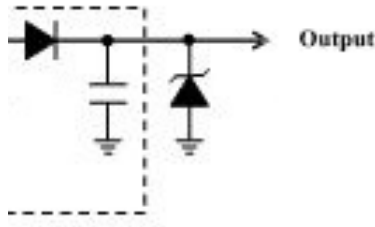
Type but MOS-FET of the voltage control type in the switch device that controlled the converter, and aimed at the decrease of the control current.



(Figure6.Switching converter circuit)

Adopt a resonance coil of a low loss and a Large-scale capacitor of $100\mu\text{F}$ in the output circuit from which the stability of the output voltage is requested.

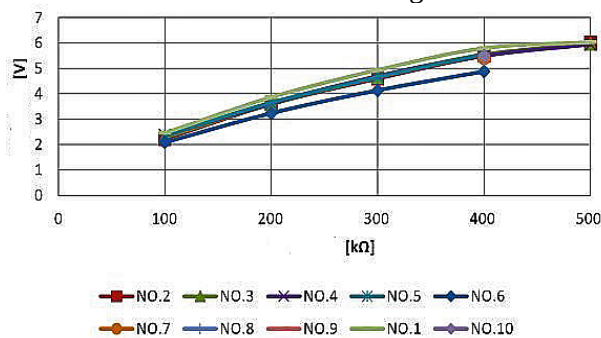
Moreover, to prevent the output voltage from Rising, Zener-diode is inserted in the final steps.



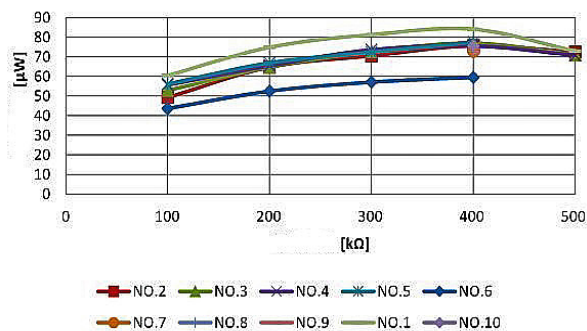
(Figure7.Output Zener diode)

Obtain the addition impedance and obtain the power supply of $90\mu\text{W}$ or more as for the output at this about 5V impedance at $300\text{k}\Omega$.

The diode for the armature voltage control has been added.



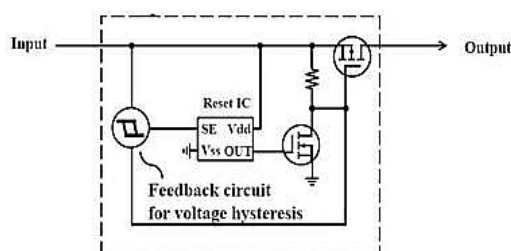
(Figure8.Output impedance / voltage)



(Figure9.Output impedance/power-mW)

The power outlet becomes and when the output becomes “zero” because of the vibration stop etc., the reset signal might become necessary as a condition of connected equipment drive such as digital wireless machines.

For model BP-06, the reset signal output terminal has been added.



(Figure10.For Reset signal module)

3. Battery Pack Specification

MODEL: BP-02

3.2V / 0.10mW (38×54×10 mm 20g)

30Hz / 0.15G

MODEL: BP-06

3.2V / 0.30mW (55×70×10 mm 35g)

30Hz / 0.15G

With Reset Signal Output



(Figure11.BP—02 & USB Type Output)



(Figure12.BP—06)

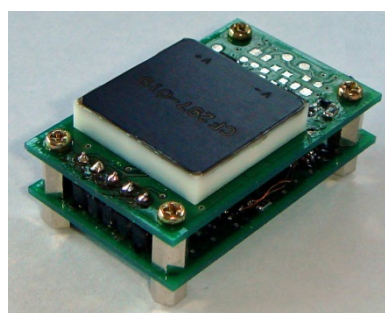
4. Conclusions

At developed a small, light vibration generator module so that the development of the environmental generator system might improve in the speed by using the Polymer electret type vibration generator.

The equipment of the temperature hygrometer with a liquid crystal type clock on the market was made to work without trouble by 5V output model. &Wireless Module.



(Figure13.Liquid crystal panel)



(Figure14.Wireless Module)



(Figure15.Wireless transmitter Demonstration)

5. References

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