

Volume 52 (Feb 09, 2006)

NEC Electronics' motor driver ICs for lens control in today's most talked-about digital movie cameras (1/2)

Motor driver ICs and the evolution of digital movie cameras

Digital movie cameras integrate digital camera and movie functions, and make it possible to enjoy movies anytime and anywhere—all from the convenience of a digital camera. And thanks to the use of a memory card as a recording medium, there is no need for a driving mechanism in the recording part, thus making it possible to achieve a high level of reliability and compactness. Digital movie cameras are capable of capturing 5.0-megapixel still images while simultaneously shooting moving images, and continue to evolve both in terms of ease of use and image quality.

Although a driving mechanism is no longer necessary within the recording part, motor driving is needed for focus, zoom and other functions. It is the job of the driver IC to use voltage and electric current to rotate the motor after receiving control signals from the microcontroller.

Motors controlled by motor driver ICs include stepping motors used for focus motor driving, DC motors used for zoom motor driving and spindle motors used for disk rotation (Figure 1). NEC Electronics offers a vast array of motor driver ICs suitable for use in the driving of these and other motors.

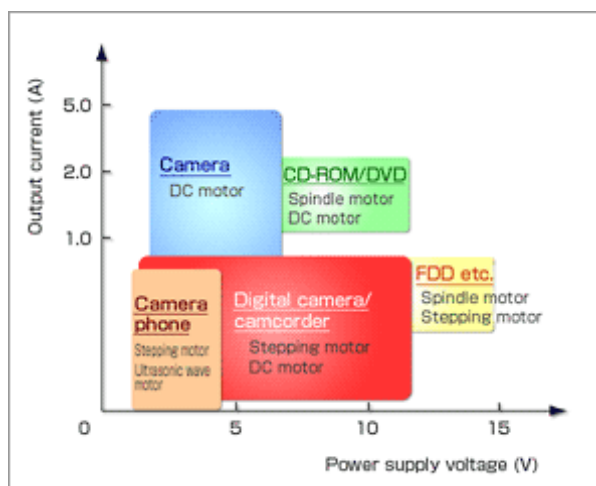


Figure 1 Application fields for motor driver ICs

Digital movie cameras and motor driver IC performance

Silence is highly desired when it comes to motor driving in digital movie cameras. Since images and sound are simultaneously recorded during the filming of moving images, even the sound of the zoom (motor driving sound), which isn't a concern when using a digital camera, ends up being recorded as noise. To make motor driving even quieter, current waveforms must be made smoother. To this end, motor driver ICs employ what is referred to as the "micro step driving method." With this method, the difference in the value of the current that flows between the adjoining magnetic poles is converted in incremental steps, thus enabling rotation of the stepping motor in small steps. The micro step driving method, which has already evolved from 64 steps to 128 steps, has significantly contributed to making motor driving quieter than ever before.

In line with the trend toward smaller, thinner and lighter digital movie cameras, demand is increasing for motor driver ICs to not only perform better, but also to be smaller and thinner. Since sales of digital movie cameras are easily swayed by design, it is imperative that motor driver ICs be made smaller and thinner to increase design flexibility.

Features of NEC Electronics' motor driver ICs

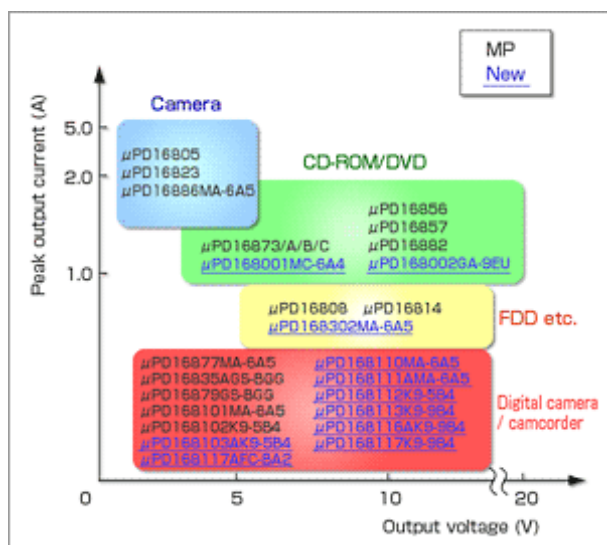


Figure 2 Motor driver IC product map

NEC Electronics offers a complete lineup of motor driver ICs that are ideal for reducing noise, size, thickness and weight in digital movie cameras (Figure 2). Take, for example, the μ PD168117AFC-BA2. This stepping motor driver IC enables 128 steps via pulse input, thus making motor driving with little noise or vibration possible. In addition, use of the MOS process reduces power dissipation and voltage loss during the output stage to a degree beyond what is possible with conventional drivers that employ bipolar transistors. This 7-channel H-bridge driver also enables simultaneous driving of two stepping motors, two DC motors and a coil. Furthermore, both package area and height can be reduced thanks to the use of a 64-pin FLGA package (6 mm x 6 mm).

Compliance with the latest technologies

Amidst the debut of new high-performance products on the market and ever-shortening product life cycles, NEC Electronics has received high acclaim from users for quickly adopting micro step control of 128 divisions and providing customers with high-level technologies that not only meet customer needs, but are also reasonably priced. The package itself has gone from a 48-pin TQFP (9 mm x 9 mm) to a 64-pin FPLGA (6 mm x 6 mm), and its thickness has been reduced from 1.2 mm to 0.75 mm, thus making sets thinner and more compact. In these and other ways, NEC Electronics continues to strive to be among the first in the industry to make technological innovations that meet the needs of today's digital movie cameras.

So what do users have to say about our motor driver ICs? To find out, we spoke with Kazuhiko Sugimoto (Personal Electronics Group, DI Company, DI Technical Designing Unit, General Manager) of Sanyo Electric Co., Ltd. about how his unit employed NEC Electronics' motor driver ICs in the development of the Xacti VPC-C5 digital movie camera.

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The reliability that comes with products from NEC Electronics

We began our interview with Sugimoto by asking him to tell us a little about the development concept behind the Xacti VPC-C5. "From the very beginning, our company has primarily focused its business development activities on movie cameras. We therefore incorporated the moving image technology we had developed over the years into the development of a new lightweight, compact digital camera capable of simultaneously taking still pictures and recording moving images."

By focusing its efforts on development of the Xacti series and generically classifying digital movie cameras that use a memory card as a recording medium as "silicon movie cameras," Sanyo has managed to carve out an entirely new market. And while the original Xacti series proved to be immensely popular with those middle-aged or older with families, the Xacti VPC-C5 is targeted at active men and women in their 20s and 30s. Thus, this model is not only compact and lightweight, but also sophisticated in terms of design.



Photo 1 Kazuhiko Sugimoto, Sanyo Electric Co., Ltd., Personal Electronics Group, DI Company, DI Technical Designing Unit, General Manager



Photo 2 Xacti VPC-C5 digital movie camera

Sanyo has been using NEC Electronics' motor driver ICs since the launch of its Xacti VPC-C1 model in 2003. Sugimoto explains the reason behind this, saying, "Although there are other companies out there that offer various types of ICs, we chose to use motor driver ICs from NEC Electronics because of the reliability of its products and of its supply." He went on to praise the products themselves and highly evaluate NEC Electronics' prompt after service support.

NEC Electronics' outstanding technological capabilities and sincere approach to customer satisfaction

So what is it that users look for in a motor driver IC? As previously mentioned, silence during motor driving is a must when it comes to digital movie cameras. Sugimoto emphasizes this, saying, "Motor driver ICs are dealt the task of further reducing noise and vibrations caused by the use of two stepping motors. Although we of course focused on noise reduction in the development of previous models, we made an even more concerted effort to reduce noise in the Xacti VPC-C5. In fact, we placed just as much emphasis on reducing noise as we did on making this model lighter and more compact. In this respect, we are very satisfied with the performance of the motor driver IC we are currently using. We still feel, however, that there is room for improvement in terms of

noise reduction. To date, there has been little discussion about what can be done to make operation of the actuator quieter. I feel that at this point it is necessary for us to consider how to best match components with motor driver ICs and collectively think about actuators, software and motor driver ICs."

Sugimoto also discussed his expectations for further reductions in size and weight. "It is no exaggeration to say that further reductions in size and weight are absolutely vital to the success of digital movie cameras. Therefore, it is only natural for us to have high expectations for the continued miniaturization of motor driver ICs. Although NEC Electronics already has a 64-pin FLGA package (6 mm x 6 mm) motor driver IC in its product lineup, we hope to work together to miniaturize sets by reducing circuit board space through the integration of power supply and other functions on a single chip."

United efforts between users and vendors

Sugimoto concluded the interview by talking about his company's future expectations for its relationship with NEC Electronics. "Digital electronics can actually be thought of as 'perishables' due to the fact that they have extremely fast product cycles. To create products that can maintain pace with these cycles, semiconductor and set manufacturers must make a collaborative effort to delve into development. Moreover, these manufacturers need to freely share information on technologies they have already developed and are currently developing, and trends they are seeing in their respective markets. Since our company deals with digital products, both ICs and software are very valuable assets for us. Looking ahead to the coming year and even the year after that, I hope that through future discussions and the development of an even stronger cooperative framework with NEC Electronics, we will be able to continue creating excellent products."

NEC Electronics will continue to support Sanyo in its development of digital movie cameras.

Links

- Sanyo Electric Co., Ltd. website Product information: Products lineup VPC-C5
- Product information: ASSP Motor driver
- System Applications: PC and peripheral devices Digital camera

Was this article of interest to you?

Yes No

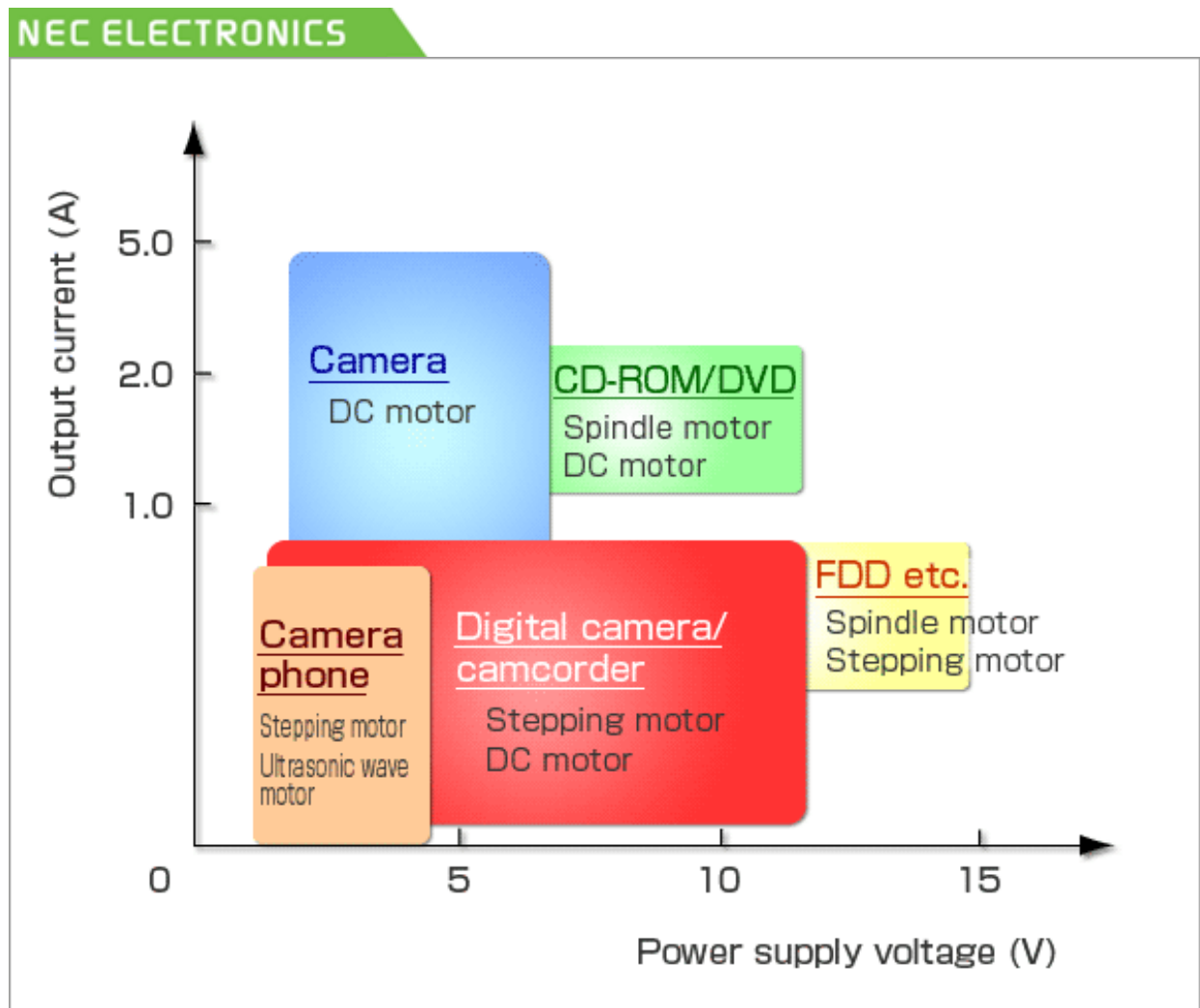


Figure 1 Application fields for motor driver ICs

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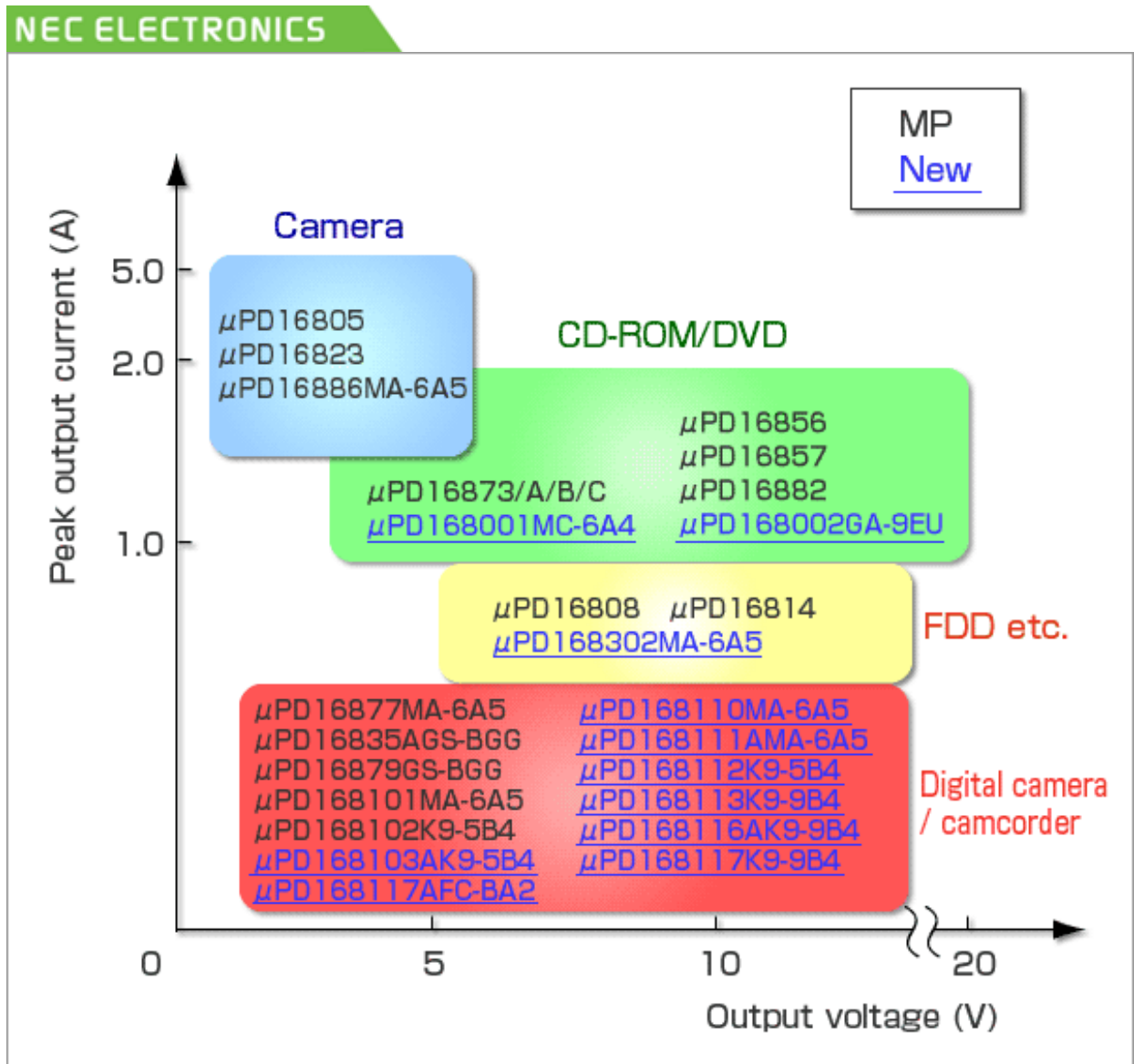


Figure 2 Motor driver IC product map

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