

## **Highly Integrated Motor Controllers For Battery-Powered Products**

[Infineon Technologies'](#) MOTIX IMD700A and IMD701A are fully programmable motor controllers in 9-mm x 9-mm 64-pin VQFN packages. According to the vendor, these controllers, offer the desired integration and higher power density needed in battery-powered, cordless power tools, gardening products, drones, e-bikes, and automated guided vehicles where three-phase brushless dc (BLDC) motors are employed. These controllers support product developers in their efforts to reduce product size and weight to enhance ergonomics while maximizing battery life.

In one package, the MOTIX IMD70xA controllers combine all of the MOTIX 6EDL7141 three-phase gate driver IC features with an additional XMC1404 microcontroller (MCU), whose peripherals and specifications are optimized for motor control and drives. Infineon's XMC1404 MCU includes a MATH coprocessor clocked at 96 MHz to enhance calculations commonly used in sensorless field-oriented control (FOC) algorithms enabling higher system performance.

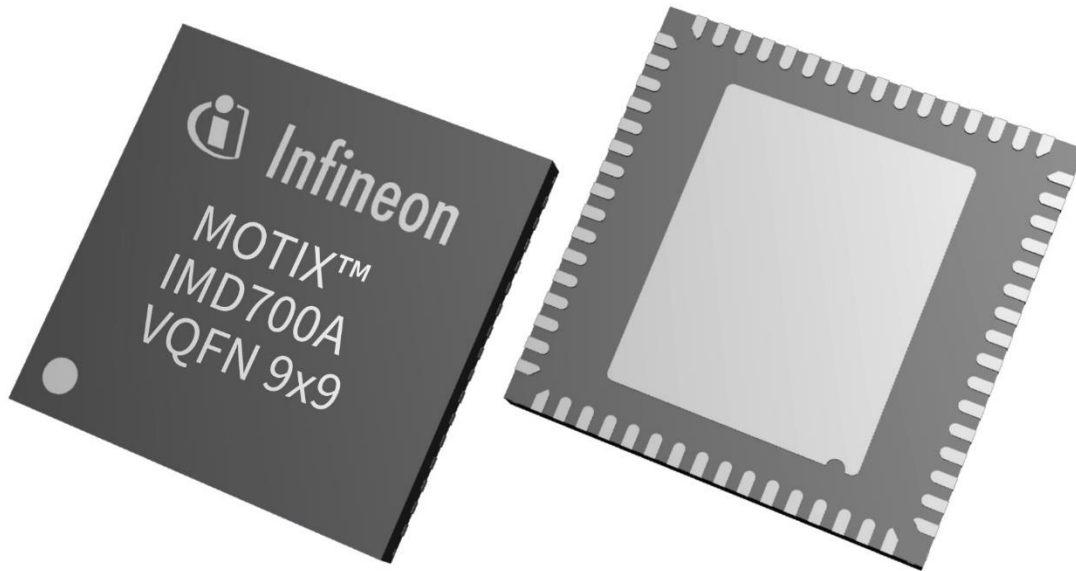
Moreover, in order to ensure what'd described as best-in-class control, the XMC1404 inherits most of the high-end peripherals found in the XMC4000 family, including PWM timers, position interface (POSIF), and serial communication modules (including CAN). The IMD700A and IMD701A are identical except for output voltage of the on-chip 300-mA LDO, which is 3.3 V for the '700A and 5 V for the 701A.

The motor control ICs feature controllability of the gate-drive slew rate to minimize system EMI. The IMD70xA controllers support adjustable gate drive supply voltage even at low battery voltage levels thanks to built-in high- and low-side charge pumps, as well as many other adjustable gate driver parameters.

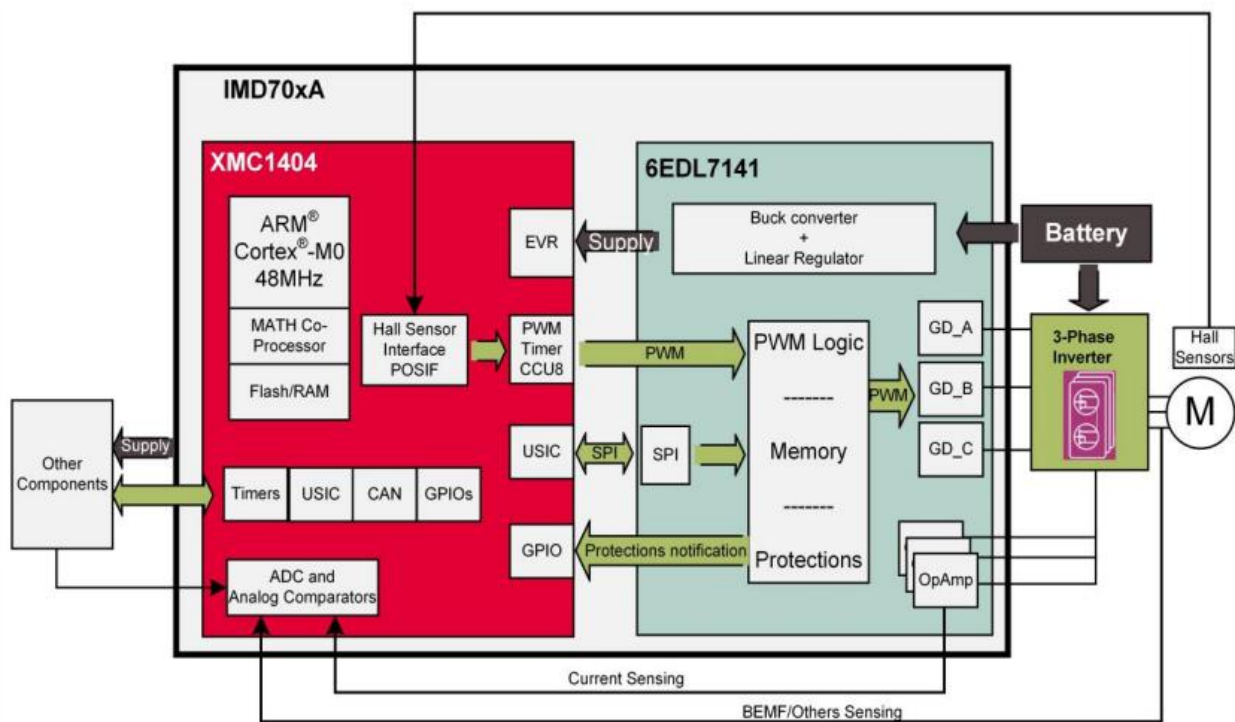
According to the vendor, EMI management by the digital configuration of the gate drive offers a major advantage, enabling optimization at the EMI test facility without needing to change any components on the board. In addition, both products come with a full suite of motor-drive-specific system protection features such as OCP, UVLO, overtemperature, and locked rotor detection, offering increased reliability and robustness.

These devices offer integrated precision power supply and current-sense amplifiers, further reducing the need for peripheral circuitry and thus reducing external component count and PCB space. This leads to simplified routing and brings down BOM and assembly costs while offering improved system packaging possibilities for designers to meet the challenges of housing motor drives in small and awkwardly-shaped cavities found in such applications. On top of that, thanks to the 6EDL7141 gate driver, the ICs offer maximum flexibility and many highly-configurable functions able to be set from a user-friendly GUI tool, which interfaces with a PC through an SPI interface connected via a USB port.

The MOTIX IMD700A and IMD701A three-phase motor controller ICs are available in a 64-pin VQFN package with exposed bottom-side thermal pads and can be ordered now. In sample quantities, the IMD700A and IMD701A are priced at \$8.90 and \$9.79, respectively. According to the vendor, the difference in pricing between the two models reduces as order size increases. More information is available at [www.infineon.com/imd700a](http://www.infineon.com/imd700a) and [www.infineon.com/imd701a](http://www.infineon.com/imd701a).



(a)



(b)

Figure. The MOTIX IMD700A motor controller is a fully programmable motor controller integrating an XMC1404 microcontroller with a 6EDL7141 three-phase gate driver IC in one package—a 9-mm x 9-mm 64-pin VQFN—to enable the development of next-generation battery operated products using BLDC or PMSM motors. With integrated precision power supply and current shunt amplifiers, this IC eliminates much of the peripheral circuitry typically required, allowing a reduction in PCB space and improved system packaging possibilities. Shown here are the device package (a) and a simplified system-level block diagram where the IMD70xA is used as three-phase BLDC controller in a Hall-sensored BLDC motor control system. (b).