

Embedded Motor Controllers

New fully integrated embedded motor controller with extended memory for automotive applications

- New embedded motor controller with 64 KB flash memory and 4 KB SRAM
- Responds to OEMs' demands for increased diagnostic capabilities in the area of smart actuators
- Presentation at Embedded World exhibition from February 26 to 28, 2019, in Nuremberg at booth 438 in hall 3A

February 19, 2019

TDK Corporation (TSE 6762) expands its Micronas embedded motor controller portfolio with the HVC 4420F, featuring extended flash memory for the drive of small brush-type, stepper, or brushless motors. It is designed to satisfy the latest needs of the automotive industry to provide diagnostics capability newly introduced in the field of smart actuators. Samples will be available in March 2019. Start of production is planned for 2020.

With an extension of the flash memory to 64 KB and SRAM to 4 KB, the HVC 4420F is the answer for the OEMs' increased functional and diagnostic demands. Currently, OEMs use own ideas and approaches on diagnostics. This includes sensor data fusion strategy, actuator status and resulting activities. To ensure the required data analysis, software routines have to be implemented, which activate the underlying hardware diagnostic features, while respecting the OEMs' framework to ensure proper integration. Due to its larger memory and the built-in diagnostic feature set, the HVC 4420F offers the storage capacity and processing capability to execute these actions which are unique in the environment of smart actuators.

The new HVC 4420F is part of the Micronas high-voltage controller family (HVC) for smart actuators. The HVC family combines an ARM® standard microcontroller core with a wide range of additional functions in order to enable particularly compact and cost-efficient system designs for use in automotive applications and beyond. Powered by a 32-bit CPU core (ARM® Cortex®-M3) with 64 kB flash memory, the HVC 4420F contains, amongst others, timers/counters, interrupt controllers, multichannel ADC, SPI, and enhanced PWMs with diagnosis functions, important for utilization in safety relevant applications. An advanced LIN UART with a LIN 2.x transceiver as well as voltage regulators to connect the device directly to the automotive board net (5.4 V – 18 V) do round up the all-in-one approach. Several power management modes help reducing the current consumption. Various integrated digital and analog circuit units, such as comparators with virtual star point reference, current scaling and an embedded programmable gain amplifier allow users to minimize the number of external components.

Due to its high processing power, the HVC 4420F allows complex motor control algorithms such as Space Vector Modulation (SVM) for permanent magnet synchronous motors (PMSM), six-step commutation with sensor feedback or sensorless control, as well as various stepper configurations.

The HVC 4220F optionally comes with production-ready and highly flexible, parameterizable firmware with sophisticated communication, monitoring and power management functions (ASIL A ready) as well as a configuration tool. Customers can develop application software, based on the firmware, that is both efficient and effective and thus optimally design the combination of motor and control by gaining significant reduction in their time to market.

HVC 4220F will be presented for the first time at Embedded World exhibition from February 26 to 28, 2019, in Nuremberg at the TDK booth 438 in hall 3A.

Glossary

- SRAM = Static RAM, volatile memory without the need to refresh
- Multichannel ADC = ADC with multiple input channels selectable
- PWM = Pulse Width Modulation
- LIN = Local Interconnect Network
- UART = Universal Asynchronous Receiver Transmitter

Main applications

- Grille shutter
- Smart valves and pumps
- HVAC flaps

Main features and benefits

- Full integration
- OEM diagnostic support
- Re-usability and flexibility

Key data

Type	HVC 4420F
Package	QFN40
Temperature Range	Automotive Grade-1
Built-in μ C	ARM® Cortex M3®
Drivability	Special peak drive up to 1 A
Diagnostics	Built-in support by hardware and software
Sample availability	March 2019

About TDK-Micronas

TDK-Micronas is the most preferred partner for sensing and control. TDK-Micronas serves all major automotive electronics customers worldwide, many of them in long-term partnerships for lasting success. Operational headquarters are based in Freiburg im Breisgau (Germany). Currently, TDK-Micronas employs around 1000 persons. For more information about TDK-Micronas and its products, please visit www.micronas.com.

About TDK Corporation

TDK Corporation is a leading electronics company based in Tokyo, Japan. It was established in 1935 to commercialize ferrite, a key material in electronic and magnetic products. TDK's comprehensive portfolio features passive components such as ceramic, aluminum electrolytic and film capacitors, as well as magnetics, high-frequency, and piezo and protection devices. The product spectrum also includes sensors and sensor systems such as temperature and pressure, magnetic, and MEMS sensors. In addition, TDK provides power supplies and energy devices, magnetic heads and more. These products are marketed under the product brands TDK, EPCOS, InvenSense, Micronas, Tronics and TDK-Lambda. TDK focuses on demanding markets in the areas of information and communication technology and automotive, industrial and consumer electronics. The company has a network of design and manufacturing locations and sales offices in Asia, Europe, and in North and South America. In fiscal 2018, TDK posted total sales of USD 12 billion and employed about 103,000 people worldwide.

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