Embedded motor controllers

TDK presents enhanced embedded motor controllers with increased memory, power, and reliability

- Capable of 4 x 1 A peak current for driving brushless DC (BLDC), brushed DC (BDC), and stepper motors
- Featuring 4 KB SRAM, 2 KB EEPROM in 32 KB, and 64 KB flash memory variants
- SEooC ASIL B ready according to ISO 26262 to support Functional Safety applications

April 4, 2024

TDK Corporation (TSE:6762) further extends its Micronas embedded motor controller family, HVC 5x, of fully integrated motor controllers with HVC 5222D and HVC 5422D to drive small brushed (BDC), brushless (BLDC), or stepper motors. * They offer significant enhancements compared to the popular HVC 5221D, doubling drive current, SRAM, and 4x EEPROM while maintaining pin compatibility. Samples are now available for customer evaluation. Start of production is planned for the first quarter of 2025.

The latest motor controller models, HVC 5222D and HVC 5422D, feature expanded flash memory capacities of 32 KB and 64 KB respectively, support currents up to 1 A for BLDC and stepper motors, and up to 2 A for DC motors, along with advanced motor-specific functions such as current programming for micro-stepping and integrated phase voltage comparators, virtual star-point, and current sense amplifier for sensor-based and sensor-less motor control, meeting ISO26262 standards for ASIL applications.

The HVC family has expanded to include nine fully integrated motor controllers featuring three to six motor outputs, capable of delivering peak currents ranging from 500 mA to 2 A. Each device is powered by a 32-bit Arm® Cortex®-M3 CPU core, offering options of 32 KB or 64 KB Flash Memory. Equipped with a 12-bit, 1-µs ADC for diverse measurements, these devices allow seamless integration of Hall and TMR sensors from TDK. Additionally, the HVC family devices come with a LIN transceiver and UART for communication, supporting auto-addressing via the Bus Shunt Method (BSM), enhancing their adaptability across various applications. PWM control via the LIN pin is also supported. Certified to automotive standards AEC-Q100 for temperature Grade 1, all HVC devices ensure reliability, catering to automotive and industrial applications with power requirements of up to 30 W.

Glossary

- AEC-Q100: Qualification standard for automotive applications
- ADC: Analog to Digital Converter
- BDC: Brushed DC motor
- BLDC: Brushless DC motor
- BSM: Bus Shunt Method for LIN auto addressing*
- CPU: Central Processing Unit
- Grade 1: Ambient temperature 125 ºC, junction temperature 150 ºC
- HVC: High Voltage Microcontrollers
- LIN: Local Interconnect Network for automotive applications
- QFN: Quad Flat No Lead package
- UART: Universal Asynchronous Receiver / Transmitter

Main applications**

- Smart actuators in combustion and electric vehicles

Key data***		
Type	HVC 5222D	HVC 5422D
Motor terminals	4	
Drive current	1 A peak	
High- and low-side on-resistance	Total power path resistance < 3.2 Ohm	
Current measurement	Internal or with external shunt	
Microcontroller	Arm® Cortex®-M3	
Flash memory	32 KB	64 KB
RAM	4 KB SRAM	
EEPROM (Emulated)	2 KB	
NVR (Non-Volatile Register)	1 KB	
Package	5x5 24-pin PQFN with exposed pad	

* IP-Notice: If LIN auto-addressing features are used, third-party rights such as EP 1490 772 B should be considered.
** Any mention of target applications for our products are made without a claim for fit for purpose as this has to be checked at system level.
*** All operating parameters must be validated for each customer application by customers' technical experts.

About TDK Corporation

TDK Corporation is a world leader in electronic solutions for the smart society based in Tokyo, Japan. Built on a foundation of material sciences mastery, TDK welcomes societal transformation by resolutely remaining at the forefront of technological evolution and deliberately "Attracting Tomorrow." It was established in 1935 to commercialize ferrite, a key material in electronic and magnetic products. TDK's comprehensive, innovation-driven 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 automotive, industrial and consumer electronics, and information and communication technology. The company has a network of design and manufacturing locations and sales offices in Asia, Europe, and in North and South America. In fiscal 2023, TDK posted total sales of USD 16.1 billion and employed about 103,000 people worldwide.

About TDK-Micronas

TDK-Micronas is the center of competence for magnetic-field sensors and CMOS integration within the TDK Group. TDK-Micronas has gained operational excellence for sensors and actuators production in over 25 years of in-house manufacturing. It was the first company to integrate a Hall-effect based sensor into CMOS technology in 1993. Since then, TDK-Micronas has shipped over six billion Hall sensors to the automotive and industrial market. The operational headquarters are located in Freiburg im Breisgau (Germany). Currently, TDK-Micronas employs around 1,000 people.

You can download this text and associated images from https://www.micronas.tdk.com/en/tradenews/pr2402.

Further information on the products can be found https://www.micronas.tdk.com/en/products/embedded-motor-controllers/hvc-5x.

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