

Embedded Motor Controllers

TDK presents a new embedded motor controller with 2 A peak current for driving BLDC and BDC motors

- TDK developed a new embedded motor controller that can output 2 A peak current for driving brushless DC (BLDC) and brush DC (BDC) motors
- The embedded motor control technology is designed to provide enhanced performance and reliability for automotive and industrial applications
- Applicable in hybrid and electric vehicle thermal systems, automotive actuators, small fans and pumps, and passenger climate systems

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TDK Corporation (TSE:6762) is expanding its Micronas embedded motor controller family HVC with the HVC 5223C, an Automotive Grade 1 qualified, fully integrated motor controller to drive small brushed (BDC) or brushless (BLDC) motors with a peak phase current of 2 A. The HVC 5223C comes in a compact 5x5 mm² 24-pin QFN package and is functionally and pin compatible with the HVC 5222C with 1 A peak current. Samples are now available for customer evaluation.

In addition to the ability to drive 1 A or 2 A peak current, the HVC 5222C and HVC 5223C devices offer many motor-specific analog and digital functions, such as phase comparators, a virtual star-point and current sense amplifier to enable sensor-based and sensor-less control of a single BLDC or up to two BDC motors and driving of various other loads.

The HVC family, including HVC 4x and HVC 5x, has now expanded to seven fully integrated motor controllers with three to six motor outputs capable of delivering from 500 mA to 2 A of peak currents. All devices feature a 32-bit ARM® Cortex®-M3 CPU core and 32 KB or 64 KB Flash Memory options. Additionally, all devices are equipped with a 12-bit, 1-μs ADC for various measurements, making them versatile options for applications requiring accurate sensing. They also come equipped with a LIN transceiver and UART for communication and auto-addressing* using the BSM method, which adds to their versatility in various applications.

All HVC devices are automotive qualified according to AEC-Q100 for temperature Grade 1, making them a solution for compact automotive actuator applications primarily targeted at HEV/EV thermal systems.** The AEC-Q100 qualification ensures that the HVC 5223C meets the highest standards of quality and reliability, making it a trusted choice for automotive and industrial applications.

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 °C, junction temperature 150 °C
- HVC: High Voltage Microcontrollers
- LIN: Local Interconnect Network for automotive applications
- QFN: Quad Flat No Lead package
- UART: Universal Asynchronous Receiver / Transmitter

Main applications**

- Passenger climate systems, seats
- Hybrid and electric vehicle thermal systems
- Automotive actuators
- Small fans and pumps

Key data***	
Type	HVC 5223C
Motor terminals	3
Drive current	2 A peak current
High- and low-side on-resistance	0.7 Ohm (typ)
Current measurement	External shunt via integrated ADC
Microcontroller	32-bit ARM® Cortex®-M3
Flash memory	32 KB
RAM	2 KB
EEPROM	512 Byte
NVR	256 Byte
Package	QFN-24 (5x5 mm ²)

* 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/pr2303>.

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

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