

Embedded Motor Controllers

TDK introduces the first embedded gate driver powering efficiency in EV thermal systems

- Designed for LIN controlled automotive blowers, pumps, and fans in thermal systems*
- Also powers smart BLDC actuators in seats, doors, lift-gates and charge-doors*
- Fully supports Field Oriented Control (FOC) algorithms for low noise and high efficiency

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TDK Corporation (TSE:6762) extends the power capability of its Micronas HVC 5x embedded motor controller family with the new HVC 5481G for automotive applications. The HVC 5481G is a programmable gate driver system-on-chip (SoC) for control of an external power bridge with 6 N-channel FETs to drive actuators, fans, and pumps.* Samples of the HVC 5481G are available now and production will begin in 2026.

The HVC 5481G SoC is compatible to the existing HVC 5x family software, integrating an ARM® Cortex®-M3 CPU with 64 KB flash memory and 8 KB SRAM. It operates directly from the 12 V automotive supply rail and integrates a LIN transceiver for communication. The IC supports various motor control algorithms from sensor-less 6-step commutation using BEMF detection to single shunt FOC. The device includes 7 general-purpose IO pins, internal timers, and capture compare registers, allowing seamless interfacing with the Micronas Hall-effect or TDK TMR sensors.

Available in a compact 5 x 5 mm PQFN32 package and certified according to AEC-Q100 Grade 1 standards for automotive, the HVC 5481G delivers a reliable and efficient solution for medium power BLDC applications. Its robust design and advanced features make it the device of choice for automotive and industrial applications, ensuring high performance and adaptability.

Glossary

- ADC: Analog to digital converter
- BLDC: Brushless DC motor
- FOC: Field oriented control
- CPU: Central processing unit
- AEC-Q100: Qualification standard for automotive applications
- 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

Main applications*

- Blowers, pumps and fans in automotive applications
- LIN based seat movers
- Smart higher power actuators for doors and lift-gates

Main features and benefits**

- High integration, low BOM cost

Type	Package	Motor terminals	Drive current	Current measurement	Micro-controller	Flash memory	SRAM	EEPROM (emulated)	NVR (Non-Volatile Register)
HVC 5481G	PQFN32	DC or BLDC (3phase)	From 3 A to 50 A	Single shunt	ARM® Cortex®-M3	64 KB	8 KB	2056 byte	1028 byte

- * 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 2024, TDK posted total sales of USD 14.6 billion and employed about 101,000 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 seven 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/pr2502>.

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

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