Smart Actuator Solutions for Automotive Applications

Embedded Motor Control with HVC 4223F and HVC 4420F
Embedded Motor Control for Direct Control of Electric Motors (Stepper / BLDC / BDC)

- Enables cost-effective realization of powerful and compact DC motor control
- Economically addresses growing challenges in the automotive market and beyond (industrial, consumer, instrumentation, etc.)
- Powered by a 32-bit CPU core (ARM® Cortex®-M3) and integrating high-performance analog functions
- Flexible peripherals provide all means to directly control brush-type, stepper (bipolar or three phase), or brushless direct current (BLDC) motors via integrated high-performance half-bridges without the need for external components
- HVC 4420F offers extended memory size to address the OEM diagnostics requirements. An integrated memory protection unit (MPU) supports RTOS requirements.
Typical Motor Control Applications with

- Adaptive Headlights
- Intelligent Fluid Valves
- Door Mirrors
- Grille Shutter
- EPS Force-Feedback
- HVAC Flap-Control
- Rear-View Cam
- Automatic Flap
- Intelligent Fluid Valves
- Seat Climatization
HVC 4223F/HVC 4220F in Automotive

- Automatic Flap
- Rear-View Cam
- Force-Feedback EPS
- HVAC Flap-Control
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Typical Motor Control Applications with HVC 4223F / HVC 4220F in Automotive:
- Adaptive Headlights
- Door Mirrors
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- EPS
- Intelligent Fluid Valves
- Automatic Flap
- Rear-View Cam
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Examples for HVC Motor Control

**Sensor-Controlled Block/Six-Step Commutation or Sensor-Controlled Space Vector Modulation.** Motor currents driven by internal MOSFET bridge. For continuous motor currents up to 1000 mA.

**Stepper Motor Current Control.** Motor currents driven by internal MOSFET bridge. For continuous motor currents up to 500 mA.
## Product Versions

<table>
<thead>
<tr>
<th>Device</th>
<th>Package</th>
<th>Core &amp; Memory</th>
<th>Motor Function</th>
<th>Major Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVC 4223F</td>
<td>PQFN40 6x6</td>
<td>ARM Cortex M3 2 kB SRAM 32 kB Flash 512 byte NVRAM</td>
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## Package Drawing

![Package Drawing](image_url)
Development Tools and Compiler

- **SDB-I**
  - First steps with HVC 4223F and HVC 4420F to evaluate the small yet “all-onboard” solution.

- **KEIL MDK for ARM® Cortex®-M3**
  - Complete software development environment
  - Ask for free version.

- **Application board**
  - Flexible due to onboard programming socket

- **ULINK-ME**
  - Debug adapter via JTAG or SWD

Application Support

- **Firmware Package**

- **J-Link**
  - In-circuit programmer via JTAG or SWD

TKD-Micronas Contact

<table>
<thead>
<tr>
<th>Contact</th>
<th>Information available</th>
</tr>
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<tbody>
<tr>
<td><a href="http://www.micronas.com">www.micronas.com</a></td>
<td>General</td>
</tr>
<tr>
<td><a href="http://www.service.micronas.com">www.service.micronas.com</a> (registration needed)</td>
<td>Data sheets, application notes, programming guides, software...</td>
</tr>
<tr>
<td><a href="mailto:product.support@micronas.com">product.support@micronas.com</a></td>
<td>Technical support</td>
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TDK-Micronas Company Profile

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.

- 4 billion HAL® sensors shipped
- No. 1 supplier of linear Hall sensors (IHS 2017)

Global Presence