When building automotive and industrial controls, it is crucial to consider design complexity, cost and system-level expertise. Mixed-signal systems help build robust and reliable solutions because they are cost-effective and offer higher performance, low power and compact design.

NXP’s S12 MagniV® portfolio of microcontrollers provide a comprehensive solution built on proven S12 technology. With the integration of high-voltage (HV) analog features into a standard automotive MCU, the S12 MagniV family simplifies system design by helping to improve manufacturing efficiency and reduce bill of materials costs.

**EMBEDDED S12Z CORE**
- Provides improved code efficiency and core performance with enhanced mathematic capabilities and linear address space.
- Enables sophisticated motor control algorithm: sensorless Field Oriented Control (FOC)
- Offers MCUs in several package options and a range of on-chip flash memory sizes

**INTEGRATED PHYSICAL INTERFACES**
- Integrates CAN or LIN physical interfaces to save space, design and test time as no external LIN or CAN interfaces are needed
- Delivers reduced system cost and physical footprint by integrating low- and high-side drivers for up to 6 power-MOSFET, relays or LEDs
- Offers built-in voltage regulator directly operating from battery between 3.5 to 40 V
- Provides double battery, crank voltage or load dump conditions

**DESIGNED FOR SAFETY AND RELIABILITY**
- Many follow ISO 26262 development process for Safety Element out of Context (SEooC) components
- Offers up to ASIL B compliance, AEC-Q100 Grade 0: -40°C to 150°C ambient temperature
- Provides high reliability using Error Code Correction (ECC)
- Meets automotive and industrial OEM specifications for EMC/ESD
- Support customer achievement of Functional Safety by providing FMEDA, Safety Manual, FIT rate data, and Dynamic FMEDA.

**COMPREHENSIVE ENABLEMENT ECOSYSTEM**
- Offers a complete tools and software portfolio
- Provides technical support with its dedicated engineering community
S12 MagniV MCUs combine 16-bit S12 and S12Z MCU cores with HV analog peripherals to provide a simpler and smaller solution. A single MagniV device replaces a standard MCU, voltage regulator, physical layer communications interface and (in some versions) motor control gate drive functionality helping engineers to shrink automotive and industrial designs containing motor control and interface nodes.

S12 MagniV MCUs help with system integration and miniaturization, leading to small printed circuit boards (PCBs) by minimizing the overall size module (fewer components and reduced complexity) and decreasing weight (less material and fewer solder joints and test points). S12 MagniV MCUs benefit costs and readiness to market while improving quality, testability, reliability and system efficiency.

S12 MagniV MCUs have one of the biggest portfolios of integrated solutions for motor control and interface nodes in the industry, resulting of the more than 20 years of experience in integrated solutions:

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S12 MagniV MCUs have one of the biggest portfolios of integrated solutions for motor control and interface nodes in the industry, resulting of the more than 20 years of experience in integrated solutions:
MagniV® INTEGRATED SOLUTIONS:
MCU + VREG. + CAN PHY / LIN PHY / GATE DRIVE UNIT SUPPORTING ASIL B SAFETY

<table>
<thead>
<tr>
<th>Device</th>
<th>Bus Frequency</th>
<th>Flash</th>
<th>RAM</th>
<th>EEPROM</th>
<th>ECC</th>
<th>CAN</th>
<th>CAN- PHY</th>
<th>LIN- PHY</th>
<th>SPI</th>
<th>High-Voltage Input</th>
<th>Packaging Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>S12ZVCA</td>
<td>32 MHz</td>
<td>64-192 KB</td>
<td>4-12 KB</td>
<td>1-2 KB</td>
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<td>1</td>
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<td></td>
<td>2-ch. HVI, VSUP Sense</td>
<td>48 LQFP, 64 LQFP-EP</td>
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<tr>
<td>S12ZVC</td>
<td>32 MHz</td>
<td>64-192 KB</td>
<td>4-12 KB</td>
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<td></td>
<td>2-ch. HVI, VSUP Sense</td>
<td>48 LQFP, 64 LQFP-EP</td>
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<tr>
<td>S12ZVLA</td>
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<td>4-8 KB</td>
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<td>1</td>
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<td></td>
<td>1-ch. HVI, VSUP Sense</td>
<td>48 LQFP, 32 LQFP, 32 QFN</td>
</tr>
<tr>
<td>S12ZVL</td>
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<td>8-128 KB</td>
<td>1-8 KB</td>
<td>0-1-2 KB</td>
<td>0-1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1-ch. HVI, VSUP Sense</td>
<td>48 LQFP, 32 LQFP, 32 QFN</td>
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<tr>
<td>S12ZVLS</td>
<td>32 MHz</td>
<td>16-32 KB</td>
<td>1 KB</td>
<td>128 KB</td>
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<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1-ch. HVI, VSUP Sense</td>
<td>32 QFN</td>
</tr>
<tr>
<td>S12ZVMC256</td>
<td>50 MHz</td>
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<td>1KB</td>
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<td>1</td>
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<td>1-ch. HVI, VSUP Sense</td>
<td>80 LQFP-EP</td>
</tr>
<tr>
<td>S12ZVML</td>
<td>50 MHz</td>
<td>32-128 KB</td>
<td>4-8 KB</td>
<td>0.1-0.5 KB</td>
<td>0-1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>VSUP Sense</td>
<td>48 LQFP-EP, 64 LQFP-EP</td>
</tr>
<tr>
<td>S12ZVMC</td>
<td>50 MHz</td>
<td>64-128 KB</td>
<td>4-8 KB</td>
<td>512 B</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>VSUP Sense</td>
<td>64 LQFP-EP</td>
</tr>
<tr>
<td>S12ZVM</td>
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<td>16-32 KB</td>
<td>2-4 KB</td>
<td>128 B</td>
<td>1</td>
<td></td>
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<td></td>
<td></td>
<td>VSUP Sense</td>
<td>64 LQFP, 48 LQFP-EP</td>
</tr>
<tr>
<td>S12ZVMB</td>
<td>32 MHz</td>
<td>48-64 KB</td>
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<td>512 B</td>
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<td>VSUP Sense</td>
<td>64 LQFP, 48 LQFP</td>
</tr>
<tr>
<td>S12ZVMA</td>
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<td>16-32 KB</td>
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<td>128 B</td>
<td>1</td>
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<td></td>
<td></td>
<td>VSUP Sense</td>
<td>32 LQFP, 48 LQFP</td>
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<tr>
<td>S12VR</td>
<td>25 MHz</td>
<td>16-64 KB</td>
<td>2 KB</td>
<td>0.1-0.5 KB</td>
<td>1</td>
<td>1</td>
<td>4-ch. HVI, VBAT Sense, VSUP Sense</td>
<td>32 LQFP, 48 LQFP</td>
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<td></td>
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<td>48-64 KB</td>
<td>6 KB</td>
<td>2-4 KB</td>
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<td></td>
<td>4-ch. HVI, VBAT Sense, VSUP Sense</td>
<td>32 LQFP, 48 LQFP</td>
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<tr>
<td>S12ZVH</td>
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<td>64-128 KB</td>
<td>4-8 KB</td>
<td>4 KB</td>
<td>1</td>
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<td>VBAT Sense, VSUP Sense</td>
<td>100 LQFP, 144 LQFP</td>
</tr>
<tr>
<td>S12ZVHY</td>
<td>32 MHz</td>
<td>32-64 KB</td>
<td>2-4 KB</td>
<td>2 KB</td>
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<td>VBAT Sense, VSUP Sense</td>
<td>100 LQFP, 144 LQFP</td>
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<td>S12ZVHL</td>
<td>32 MHz</td>
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<td>1-2 KB</td>
<td>1</td>
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<td></td>
<td></td>
<td></td>
<td>VBAT Sense, VSUP Sense</td>
<td>100 LQFP, 144 LQFP</td>
</tr>
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<td>S12ZVF</td>
<td>32 MHz</td>
<td>4 KB</td>
<td>2 KB</td>
<td>1-2 KB</td>
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<td></td>
<td></td>
<td>VBAT Sense, VSUP Sense</td>
<td>100 LQFP, 144 LQFP</td>
</tr>
</tbody>
</table>
**MOTOR CONTROL DEVELOPMENT KIT**

Enables rapid prototyping and evaluation of BLDC and PMSM six-step motor control applications without having to wait for the final hardware design. The kit contains motor control development board and 3-phase Permanent Magnet motor on the frame, power supply and cables. The application software takes advantage of the AMMCLib and provides a complete reference implementation for both 3-phase BLDC and PMSM motor control.

**AUTOSAR® (CLASSIC) SOFTWARE**

Supports the development of standardized electronic systems that improve quality, performance, safety and environmental friendliness. It also helps to simplify the process of updating software over the lifetime of a vehicle.

**AUTOMOTIVE MATH AND MOTOR CONTROL LIBRARY (AMMCLib) SET**

A precompiled, off-the-shelf software library with building blocks for motor control, digital signal processing and general mathematical applications.
ENABLEMENT HARDWARE ECOSYSTEM

MOTOR CONTROL

- **MTRCKTSPNZVM128**
  - 3-phase PMSM
  - Motor control kit

- **MTRCKTSBNZVM128**
  - 3-phase BLDC
  - Motor control kit

- **S12ZVML-MINIxxx**
  - 3-phase PMSM
  - Motor control kit

- **MC5XR1CS12ZVM**
  - 3-phase BLDC and PMSM
  - S12VML128 High-current evaluation board

- **S12ZVMC256EVB**
  - 3-phase BLDC and PMSS
  - S12ZVM(C)128 evaluation board

- **S12ZVMEVB**
  - 3-phase BLDC and PMSM
  - S12ZVM(C)128 evaluation board

- **S12ZVM32EVB**
  - 3-phase BLDC and PMSM
  - S12ZVM32 evaluation board

- **S12ZVMBEVB**
  - Reversible DC
  - S12ZVMB evaluation board

- **S12ZVMAEVB**
  - Unidirectional DC
  - S12ZVMA evaluation board

- **DEVKIT-S12VRP**
  - Relay-based DC
  - S12VRP64 evaluation board

- **DEVKIT-S12VR64**
  - Relay-based DC
  - S12VR64 evaluation board

- **S12VR64EVB3**
  - Relay-based DC
  - S12VR64 evaluation board

- **S12VR32EVB**
  - Relay-based DC
  - S12VR32 evaluation board

- **S12ZVM-EFP**
  - Electrical Fuel Pump
  - S12ZVML128 reference design

- **S12ZVM-EWP**
  - Electrical Water Pump
  - S12ZVML64 reference design

www.nxp.com/MagniV