ASIL D functional safety for automotive IP cores

DCD-Semi (Poland), a provider of synthesizable IP cores for ASIC and FPGA designs announced that its complete automotive IP cores family is now available as Safety Element out of Context for ISO 26262 functional safety up to ASIL D, the highest automotive safety integrity level (ASIL).

The automotive IP cores family is available for CAN CC, CAN FD, CAN XL but also for LIN, PSI5, and SENT. This means that all automotive IP cores can be delivered with safety mechanisms tailored to customer requirements – from QM (quality management) versions without additional safety logic, through ASIL B, up to ASIL D. This flexibility allows automotive OEMs (original equipment manufacturers) and Tier 1 suppliers to choose the optimal implementation for each specific function, reducing overdesign, silicon area, and cost while ensuring compliance with global safety standards.

"By reaching full ASIL-D readiness across our automotive IP portfolio, we give system architects and safety engineers complete freedom to define their safety targets," said Jacek Hanke, CEO (Chief Executive Officer) of DCD-Semi. "Whether it's a non-safety QM implementation for body electronics or an ASIL D CAN XL controller for autonomous driving, our cores are ready — verified, checked by third party assessor, and optimized for both ASIC and FPGA flows."

ASIL-D safety for mission-critical automotive designs

ISO 26262 defines ASIL D as the highest safety level required for life-critical automotive systems, such as ADAS (advanced driver assistance systems), powertrain control, braking systems, and autonomous driving functions. DCD-Semi's IP cores implement end-to-end safety mechanisms that ensure compliance, including:

- Hardware redundancy support;
- Safety monitors and diagnostics;
- ECC-protected (ECC: error-correcting code) memories and buses;
- CRC (cyclic redundancy check) protection;
- Integrated safety management interfaces;
- Sophisticated failure detection mechanisms.

The ASIL package is delivered with a complete safety documentation including Safety Manual, FMEDA analysis, and supporting documentation required for customer safety cases and third-party certification processes.

Tailored safety levels

The same IP core can be configured at delivery to match the exact safety integrity needs of a given ECU (electronic control unit):

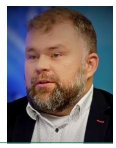
- QM (quality management): minimal footprint, no additional safety logic;
- ASIL B: standard safety measures for non-critical systems like infotainment or HVAC (heating ventilation and air-conditioning);
- ASIL D: highest safety integrity for braking, steering, or ADAS functions.

This modular approach gives design teams fine-grained control over area, performance, and safety overhead, avoiding unnecessary complexity while accelerating time-to-market.

CAN XL for next-generation vehicles

The portfolio includes support for CAN XL, the latest evolution of the CAN protocol, offering payloads up to 2048 byte and data rates up to 20 Mbit/s, making it suitable for software-defined vehicles and zonal architectures.

Combined with ASIL-D readiness, the company is one of the few IP providers ready to support next-generation autonomous and connected vehicle designs. DCD-Semi has presented its automotive IP cores during the China Roadshow 2025 organized by CAN in Automation in Beijing, Shenzen, and Shanghai from November 18 to 21, 2025.



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Servo controller for fans and logistics robots

The CANopen-connectable Escon2 servo controllers by Maxon (Switzerland) utilize modern semiconductors and PCB (printed circuit board) manufacturing. The products can be engineered by means of the Motion Studio software.

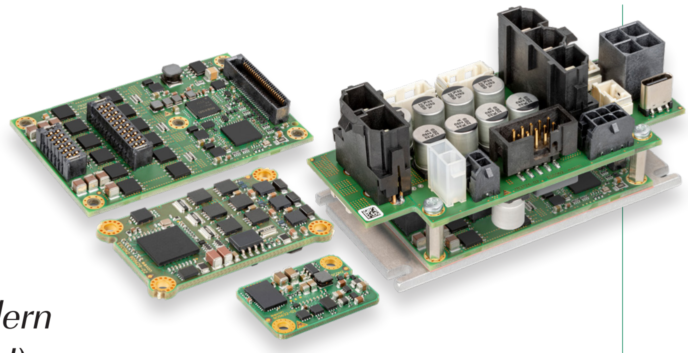

Figure: The modular Escon2 servo controller features an optional CANopen interface compliant with CiA 301 and CiA 402 (Source: Maxon)

The modular concept makes it possible to integrate our products smoothly into any application, said Philipp Marchand from Maxon. The servos are suitable for simple analog/digitally commanded standalone applications such as fans, scanners, and pumps as well as for CANopen-based systems in AGVs (automated guided vehicles), hand tools, or logistics and transport applications. Philipp Marchand added: "This approach ensures that both simple and complex drives benefit from our technology."

The Motion Studio software supports the Escon2 products and other Escon controllers, providing a unified tool for the entire drive range. "Thanks to this software, working with our products will be even easier and more efficient," Philipp Marchand explained. Evaluation board is available for easy commissioning. The servo controllers support DC (direct current) and BLDC (brushless DC) motors with different feedback options. They also provide local I/O (input/output) functions.

The CANopen interface

The CAN CC (classic) hardware interface complies with ISO 11898-1, supporting bit rates up to 1 Mbit/s. A CAN HS (high-speed) transceiver compliant with ISO 11898-2:2003 needs to be added to the motherboard. By default, the bit rate is set to 1 Mbit/s. The automatic bit rate detection feature is enabled by connecting a dedicated pin to GND (ground). The CANopen node-ID is configurable by means of the Motion Studio software, a fixed external wiring, or an optional DIP (dual-inline package) switch. The configured node-ID is accessible by means of SDO (service data object) services at index 2000_h. The CANopen protocol stack complies with CiA 301 version 4.2.0. The implemented motion control profile confirms with CiA 402 profile for drives and motion controllers. It implements the CiA 402 finite state automaton (FSA). The products provide the 32-bit controlword (6040_h) and the 32-bit statusword (6041_h) mapped into PDOs (process data objects). The controlword is used to transit to dedicated CiA 402 states. State transitions can also be caused by internal events.

Additionally, the devices implement several manufacturer-specific parameters in the CANopen object dictionary index range 2000_h to $5FFF_h$, for example several custom-persistent memories, power supply parameters, commutation sensor parameters, I/O line parameters, etc. The products provide a value set function for the manufacturer-specific PWM (pulse-width modulation) function. The value scaling (write access) is only permitted in the "power disabled" device state. Invalid scaling settings (first and second duty cycle identical) result in the first velocity being used (velocity set value first velocity). This functionality is supported in I/O Velocity Mode (IOVM). The IOVM is used for velocity control in correspondence with I/O commanding. There are implemented manufacturer-specific parameters for value settings. The IOVM uses also some standardized CiA 402 parameters in the index range 6000_h to $67FF_h$, for example motor-rated torque, max-motor speed, quick-stop deceleration, etc. The servo controllers feature also the I/O Current Mode (IOCM). It is used for current control in correspondence with I/O commanding. The configured input parameter provides a current set value to the drive, which then performs the current control. The host controller can switch the two modes by means of the "modes of operation" parameter (6060_h). The servo controller does not support other operating modes as specified in the CiA 402. This means, the products cannot replace other CiA 402 compliant devices. The mapping of PDOs (process data objects) is application-specific and can be configured by means of the Motion Studio or SDO write services. ◀

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The Escon2 series

- Module 60/30 (the most powerful derivative):
  - 1,8-kW continuous power
  - 3,6-kW peak power
  - 60-V voltage
  - 30-A current
- Compact 60/30 (with industrial connectors for direct connection):
  - Performance: same as Module 60/30
- Micro 60/5 (the smallest in space):
  - 300-W continuous power
  - 600-W peak power
  - 60-V voltage
  - 5-A current
- Nano 24/2 (for miniaturized applications)
- Module/Compact 60/12 (for applications with medium power requirements)
- Module 60/8 (robust version)
- Compact 60/5 (for applications with moderate power requirements)

Devices