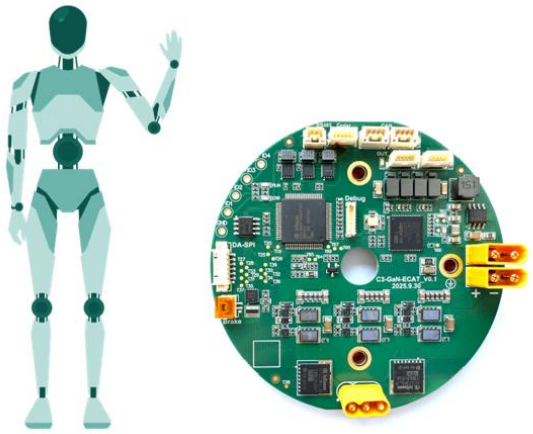
G-Pulse: GaN servo drives for agile, next-generation robots

Infineon Premium Partner

Solution for higher power density, fine motion control and lower thermal overhead



G-Pulse Electronics is a design and engineering house specializing in high-performance motor-control and power-electronics boards for robotics and industrial applications. As a Premium Partner of Infineon, G-Pulse supports customers from early concept through validation and ramp-up.

Robotics OEMs are under pressure to deliver higher speeds, tighter precision and safer human-robot collaboration, often in smaller mechanical envelopes. G-Pulse tackles this challenge with a GaN-based servo motor driver that combines high power density with fine motion control for 48 V systems.

By integrating Infineon's CoolGaN™ power devices, PSOC™ Control C3 microcontroller and XENSIV™ magnetic current and position sensors on a single circular board, G-Pulse turns the motor driver into a compact module that is easy to embed into joints, end-effectors or mobile platforms.

Key solution benefits

- **Smoother torque and higher efficiency**
  GaN-based switching at 100 kHz reduces losses and thermal overhead, delivering cleaner motion and less heat generation for agile, next-generation robots.
- **Compact form factor**
  The lightweight circular board design fits easily inside joints, end-effectors and mobile platforms, freeing designers to optimize mechanical layout without sacrificing torque or control accuracy
- **Precise motion control**

Enabled by



PSOC™ Control C3 MCU
Handles FOC-based torque, speed, and position control loops while managing multiple communication interfaces, simplifying system architecture for low-voltage motor drives.



XENSIV™ current and position sensing solutions
Enables precise servo feedback for accurate positioning and stable operation in compact, thermally constrained designs.



EiceDRIVER™ Gate Drivers
Enables 100 kHz high-frequency switching, low current ripple, and excellent efficiency — reducing losses and shrinking cooling requirements.



CoolGaN™
Enables high-frequency switching with ultra-low losses, maximizing power density and minimizing thermal overhead in compact robotic drives.

XENSIV™ magnetic current and rotation angle sensors enable accurate positioning and stable operation even in compact, thermally constrained designs.

- **Scalable platform**
  The unified GaN servo driver can be replicated across multiple axes and robot types, connected over industrial communication interfaces to support coordinated motion and synchronized trajectories.
- **Faster time-to-market**
  G-Pulse supports OEMs from early concept through validation and production ramp-up, providing a ready-to-adapt reference for low-voltage GaN servo drives that can be tuned quickly to different motors and mechanics.

Power, control and sensing in one board

- **GaN-based power stage with high-frequency switching**
  CoolGaN™ power devices paired with EiceDRIVER™ gate drivers deliver 100 kHz switching, low current ripple and excellent efficiency — reducing losses and shrinking cooling requirements for thermally constrained robot designs.
- **FOC-based torque, speed and position control**
  PSOC™ Control C3 MCU (Arm® Cortex®-M33) handles field-oriented control loops while managing multiple communication interfaces, simplifying system architecture for low-voltage motor drives.
- **Precise magnetic current and angle sensing**
  XENSIV™ magnetic current sensor and rotation angle sensors enable accurate feedback for servo control, supporting stable positioning even in compact, high-temperature environments.
- **Unified circular board platform**
  The lightweight circular form factor can be replicated across multiple axes and robot types — from joint-level servo modules mounted close to the motor to multi-axis configurations connected over industrial communication interfaces for coordinated motion and synchronized trajectories.

Target applications



Discover more

Published by
Infineon Technologies AG
Am Campeon 1-15, 85579 Neubiberg
Germany

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Public

Version: V1.0_EN
Date: 07/2026

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