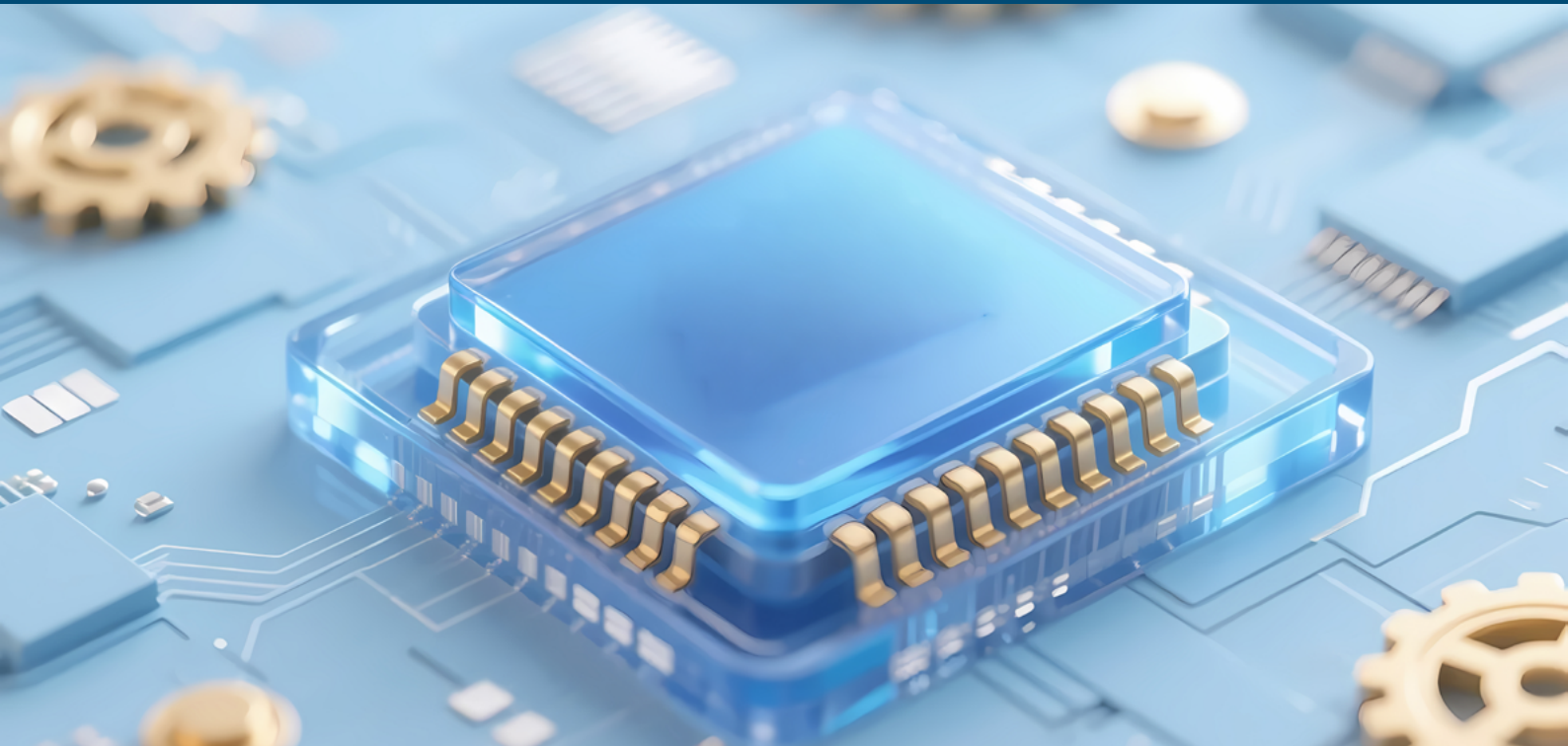


Intelligent Power Switching SoC Framework



About eInfochips

eInfochips is a product engineering and semiconductor design services company offering ASIC/SoC design, Analog & Mixed-Signal IP development, FPGA design, and embedded engineering services across multiple industry segments.

eInfochips provides silicon-proven Analog IPs and custom design solutions for power management, data conversion, connectivity, and mixed-signal applications. The company enables customers to accelerate chip development and deliver high-performance, power-efficient semiconductor products.

eInfochips Advantages

- **30** Years of experience in system design
- **17** Design centres worldwide
- **400+** Tapeouts
- **100M+** Product deployments across globe
- **180nm to 18A** expertise

Silicon-Implemented Mixed-Signal Framework for Automotive & Industrial Power Control

The **Intelligent Power Switching SoC Framework** is an internally developed mixed-signal engineering framework created to demonstrate and strengthen eInfochips' capabilities in **automotive and industrial semiconductor design**. Implemented on **GlobalFoundries' GF130BCD process**, the framework provides a silicon-backed reference for developing intelligent motor-control and power-control subsystems.

The 6-channel **Intelligent Power Switching reference implementation** is designed to control up to **six external N-channel MOSFETs** for high-current three-phase motor-drive applications or individual high- and low-side drive stages. It supports **12 V, 24 V, and 48 V** battery systems, with bridge, motor, and supply pins rated up to **64 V** and motor-related pins tolerant to negative transients down to **-4 V**.

The framework demonstrates **floating high- and low-side gate-drive stages** capable of driving MOSFETs with a total gate charge of up to **220 nC at frequencies up to 20 kHz** in 12 V applications. An integrated **RISC-V** core provides programmable configuration, diagnostics, and monitoring through internal firmware and SPI-Flash parameters.

Integrated **SAR-ADC, SD-ADC, and current-sense amplifier** functions support measurement of drain-source current, voltage, output voltage, and temperature. The framework also incorporates configurable **diagnostic and protection functions** for monitoring supply voltages and system parameters.

Features

- 6-channel high-side / low-side power-control architecture
- Supply ranges from 4 V – 32 V
- Support for 12V / 24V / 48V system architectures
- Powerful driver stage with typ. 1A, 5A, 10A and 40A output current per channel
- 0 to 100% duty cycle range
- Two integrated current sense amplifiers for shunt signal
- Integrated RISC-V-based programmable control
- Extended diagnostics, protection & supervision
- QFN-88 packaging
- AEC Q-100 -40°C to +105°C

Output Sense Amplified Output 5 Channel Data

- **Channel Current Range:** 1 A to 40 A
- **Signal Input:** 5.78 V to 5.98 V
- **Expected Output:** 288.85 mV to 298.88 mV
- **Simulated Output:** 288.91 mV to 298.94 mV
- **Absolute Error:** ~0.06 mV
- **Absolute % Error:** 0.020% to 0.022%

External Components Requirements

- Requires external **Boost Converter components** including diode, 50–100 µH inductor, and 4.7–10 µF capacitor.
- Requires external **high-side and low-side charge-pump components** with 1N4148 diodes and 10 µF capacitors
- Requires external **bias, temperature-sensing, and decoupling components** for reliable operation
- Requires external **power filtering and PMOS switches** for supply regulation and ripple reduction
- Supports external **32 MHz oscillator and 3.3 V SPI EEPROM/Flash (512 KB)** for clocking and configuration storage

About eInfochips

eInfochips, an Arrow Electronics company, is a leading provider of digital transformation and product engineering services.

eInfochips accelerates time to market for its customers with its expertise in the areas of IoT, AI/ML, security, sensors, wireless, cloud, and power. It has been recognized as a leader in Engineering R&D services by many top analysts and industry bodies, including Gartner, Zinnov, ISG, IDC, Nasscom, and others.

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