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ELECTRONICS**

A WT Microelectronics Company



**NPIs, DESIGN AND
TECHNOLOGY NEWS**



26-vii Motor/Motion Control

100V MOSFET raises power density in 48V motor-control stages

Higher efficiency in 48V motor drives comes from the Diodes Incorporated DMTH10H1M7SPGWQ N-channel power MOSFET, combining very low on-resistance with strong thermal performance in a compact PowerDI8080-5 package.



FEATURES

- Gate-source voltage range: $\pm 20V$
- Pulsed drain current, 10 μs pulse: 1400A
- Gate threshold voltage: 2V to 4V
- Reverse transfer capacitance: 101pF
- Body diode reverse-recovery time: 99ns
- Moisture sensitivity Level 1
- 2,000 tape-and-reel packing

APPLICATIONS

- Brushless dc motor control
- High-power dc-dc converters
- Charging system applications
- Engine management systems
- Body control electronics

The DMTH10H1M7SPGWQ is a choice for motor-control hardware because this MOSFET helps to reduce heat loss. This means that the motor-control hardware can be made smaller and cooler. The MOSFET is rated at 100V and has a very low resistance of 1.5m Ω when the voltage is 10V. This makes it perfect for use in steering and braking systems where high current and efficiency is needed.

The DMTH10H1M7SPGWQ can also handle power designs because there is a lot of thermal headroom. The MOSFET can handle a current of up to 352A when it is 25°C and up to 249A when it is 100°C. It can also handle a power dissipation of up to 405W, and works at high temperatures of up to 175°C which makes it perfect for use in automotive applications.

The design of the MOSFET package is also very important. The package uses a format that is 8mm x 8mm and has a small footprint of 64mm² with a height of 1.7mm. The DMTH10H1M7SPGWQ also has some features, like copper clip bonding and low package inductance, that help to reduce heat and interference, which makes it easy to inspect and assemble.

The gullwing format supports automated inspection while the wettable flank construction, and the way it is made, support strong assembly and qualification processes. The PowerDI8080-5 family in a 3-phase brushless motor drive that is built around a microcontroller and gate drivers, shows that the DMTH10H1M7SPGWQ is a good fit for traction-adjacent auxiliaries and other motion subsystems.



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TELECOMS

High-quality signal processing from secured MCU eases motor control and power conversion

The PSOC™ Control C3 microcontrollers from Infineon help to create high-performance motor-control systems and EV chargers with dedicated hardware features, PSA Certified Level 2 security, and software in the ModusToolbox™ platform.



FEATURES

PSOC Control C3M5

- Up to 256kbytes of Flash memory
- 12-bit, 6Msamples/s SAR ADC
- 16-channel sample-and-hold functions
- Feature-rich timer, counter, PWM blocks

APPLICATIONS

- Dc EV chargers
- Dc-dc converters
- Home appliances
- Industrial drives
- Robots
- Light electric vehicles
- HVAC systems

The PSOC Control C3, the newest family of Arm® Cortex®-M33-based MCUs from Infineon, allows developers to create motor-control and power-conversion systems which offer high performance, high efficiency and high security.

These new PSOC Control C3 MCUs enable the control of systems which need to respond to real-time events with minimal delay. The Cortex-M33 core of the MCU is supported by a DSP and a floating-point unit. A coordinate rotation digital computer (CORDIC), and hardware accelerator for mathematical functions, speed up the performance of control loop calculations.

The MCU features are particularly well suited to EV charging applications. This MCU offers large Flash and SRAM memory provision, fast ADCs and multiple communication interfaces, all integrated in a QFP package.

PSA Certified™ to Level 2/EPC2 security, the MCUs provide the cyber-protection capabilities required by EV charging stations. Security features include a cryptographic accelerator, a TrustZone execution environment, and secured key storage, providing protection for both IP and firmware updates. PSOC Control C3 MCUs are also equipped with robust safety features such as Class B and SIL 2 safety libraries.

The PSOC Control family is supported by the ModusToolbox™ unified platform consisting of tools and software solutions. The platform provides a dedicated ecosystem including the Motor Suite software library. ModusToolbox™ Motor Suite provides a seamless graphical user interface which streamlines evaluation and training, with real-time monitoring of performance, allowing engineers to identify issues and optimize designs.

FREE DEV BOARD

Compact kit designed with the PSOC™ C3M5 series MCU.

Orderable Part Number
KIT_PSC3M5_2GO

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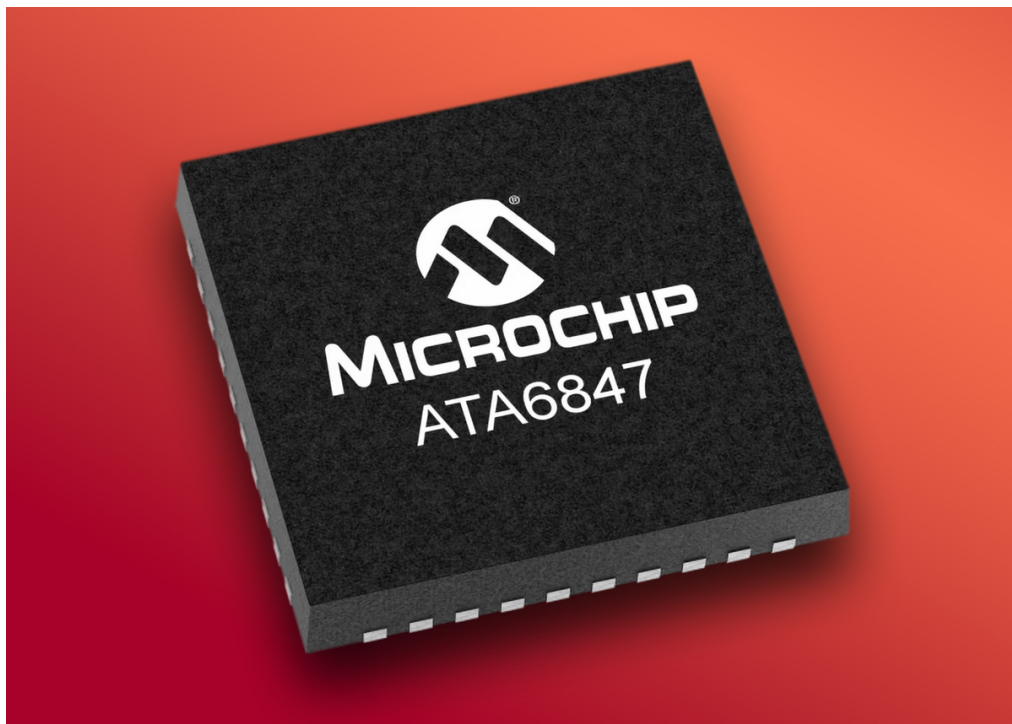
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TELECOMS

High-performance motor gate driver with LIN transceiver for brushless motor control

The ATA6847L from Microchip works with external controller and power devices to provide a complete solution for brushless dc motor system control and integrates a LIN transceiver and diagnostics for safe operation.



The Microchip ATA6847L is a three-phase motor driver system basis chip (SBC) for use in automotive and industrial brushless dc (BLDC) motor-control systems.

Built on advanced silicon-on-insulator (SOI) technology, this highly integrated motor driver SBC, supplied in a compact QFN package, includes a local interconnect network (LIN) transceiver and provides precise gate control, robust diagnostic capabilities for safe operations.

The ATA6847L works alongside a microcontroller and six external NMOS transistors to enable independent gate-drive control for each MOSFET, allowing full 0% to 100% PWM duty cycle operation via dual charge pumps. This enables sensorless BLDC motors to operate at high efficiency, even during start/stop or crank pulse events.

The chip includes two precision current-sense amplifiers with configurable gain and output offset, plus advanced current limitation using an operational amplifier and DAC. The integrated back-EMF detection module enables sensorless motor control with motor neutral point emulation, eliminating the need for external position sensors.

Safety mechanisms such as cross-conduction protection, MOSFET voltage monitoring, dead-time control, and configurable fault filter/blanking times are included on the ATA6847L, ensuring reliable operation under varying conditions.



FEATURES

- Operating-voltage range: 3V to 42V
- Integrated 5V and 3.3V low dropout regulators
- 15µA current in deep sleep mode
- 3.3V or 5V MCU interface
- Protection features:
 - Short-circuit detection
 - Over-voltage detection
 - Under-voltage detection
- Window watchdog for cyclic wake-up
- Limp-home mode
- 4MHz serial peripheral interface
- NIRQ pin for external interrupts

APPLICATIONS

- Automotive electrification
- Industrial automation
- E-mobility
- Home appliances
- Power tools
- Hobby aircraft and boats
- Drones

FREE DEV BOARD

Evaluation board for the ATA6847L motor control gate driver.

Orderable Part Number
EV94U98A

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TELECOMS

Automotive 100V Power MOSFET cuts losses in compact high-current designs

Built for efficient switching in automotive power stages, the STMicroelectronics STK295N10F8AG N-channel Power MOSFET combines low on-resistance and low gate charge, with robust thermal capability in a compact package.



FEATURES

- Maximum on-resistance: 1.9mΩ
- Pulsed drain current, 10μs: 1209A
- Gate-source voltage range: ±20V
- Power dissipation: 382W
- MSL1 grade

APPLICATIONS

- Automotive motor control
- Body and convenience
- Chassis and safety
- Power train for ICE
- Heating systems
- 48V mild hybrid systems

Lower conduction loss and faster commutation to help raise power density in automotive power stages. The STK295N10F8AG pairs a 100V drain-source rating with a maximum on-resistance of 1.9mΩ and continuous drain current capability up to 302A.

At the technology level, the STripFET F8 construction reduces internal capacitances and gate charge for faster, more efficient switching. In the wider STripFET F8 series, lower output capacitance helps to curb drain-source voltage spikes and charge-discharge losses, while an enhanced body-drain diode improves switching softness to reduce electromagnetic interference and ease EMC verification in low-voltage automotive systems.

For demanding under-bonnet and high-current systems, the STK295N10F8AG also offers strong robustness margins. The power MOSFET is AEC-Q101 qualified, 100% avalanche tested, and specified for a maximum operating junction temperature of 175°C, while the PowerLeaded 8×8 package supports thermal performance with 0.39°C/W junction-to-case thermal resistance.



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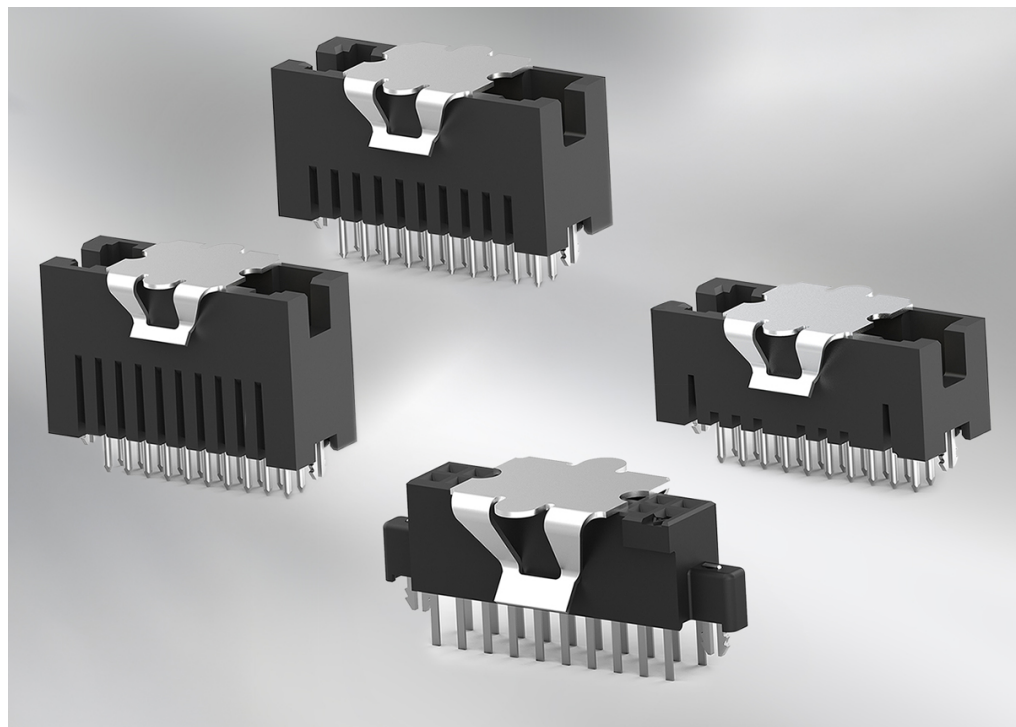
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TELECOMS

Scalable small centerline connectors support more compact industrial control and motion PCBs

The AMPMODU family of small centerline connectors from TE connectivity, with a 1.0mm centerline, offers up to 85% space savings compared to standard connectors, enabling smaller industrial control systems without sacrificing signal integrity.



FEATURES

- Gold plating
- Surface mounted
- Vertical mounting angle
- Operating temperature range: -55°C to 125°C
- Re-flow capable up to 260°C

APPLICATIONS

- Industrial control systems
- Building and home automation
- Servo drives
- Programmable logic controllers
- Telecommunication equipment
- Instrumentation and test equipment

The AMPMODU family of small centerline connectors are built to serve as the primary board-level interconnect platform. With a current rating of up to 1A per contact and an operating voltage of 30V ac, the connectors are versatile and fit for a wide variety of industrial applications such as motor controllers, programmable logic controllers (PLCs), and I/O modules.

AMPMODU features a modular design with multiple pitches, and a dual-beam contact structure that can be scaled. The connectors offer up to 100 positions with two plating options and 1.0mm centerline to serve a range of applications, and are vibration resistant to maintain reliability under rough conditions.

TE Connectivity supplies a range of products that complement AMPMODU, such as:

- Micro-MaTch™ contact system engineered to prevent fretting corrosion for low-level signal connections
- ENTRELEC® DIN-rail terminal blocks to provide an interface between control electronics and peripherals



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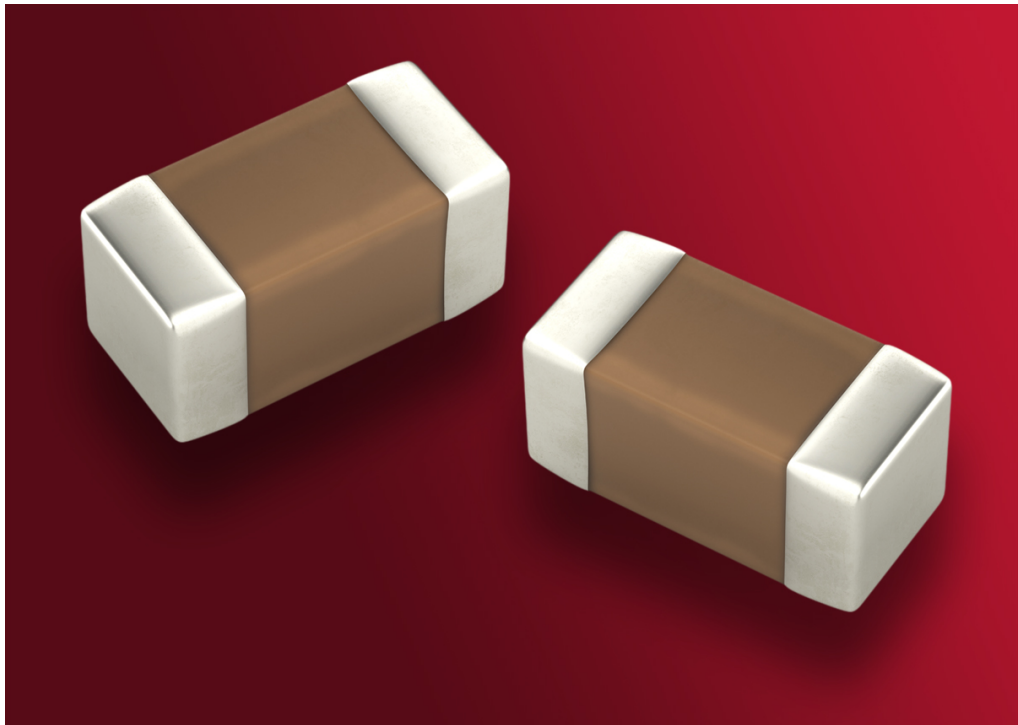
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TELECOMS

MLCCs support snubber and smoothing in motor-control power stages

From inverter dc links to snubber networks, Murata Electronics Europe B.V. offers GRM series multilayer ceramic capacitors (MLCCs) for industrial drives, and the GCM series MLCCs for automotive powertrain and safety systems.



muRata
INNOVATOR IN ELECTRONICS

FEATURES

- GRM for consumer electronics and industrial equipment
- GCM for automotive powertrain and safety equipment
- Large-capacity multilayer structure
- Sn-plated external electrodes
- Excellent solderability
- No polarity

APPLICATIONS

- Industrial
 - Inverter
 - Servo smoothing
 - Snubber networks
 - Resonance capacitor
- Automotive
 - Powertrain control
 - Safety equipment
 - Drive-system control

Capacitor choice in motor and motion-control hardware is no longer only about capacitance value. In Murata reference material for industrial motor drives, the GRM series appears in the inverter or servo power stage for Class 2 smoothing and for snubber or resonance positions, where the capacitor has to cope with high switching stress around the power semiconductors.

The GRM series covers snubber and resonance duties with voltage ratings from 630V up to 1,250V dc and U2J or C0G dielectric characteristics. The broader line-up spans capacitance from 0.1pF to 330µF across a voltage range from 2.5V dc to 3,150V dc.

That makes the GRM series particularly relevant in industrial inverter and servo designs using insulated-gate bipolar transistor (IGBT), silicon carbide, or gallium nitride switches. These MLCCs can be used in ac or dc conversion stages, inverter sections, and controller supply rails, where low loss, stable capacitance, and compact size matter in factory automation, robotics, and mechatronics equipment.

For automotive motion-control designs, the GCM series serves as the more rugged MLCC. The GCM MLCCs are designed for automotive powertrain and safety equipment, with AEC-Q200 compliance and line-up options that support operation up to 150°C. These MLCCs are qualified to significantly more demanding test conditions than the GRM series, with humidity loading at 85°C for 1,000 hours versus 40°C for 500 hours, and 1,000 temperature cycles versus five. This is why the GCM family fits under-bonnet and safety-relevant control hardware more naturally.

The practical value of specifying both series is clear. GRM gives industrial motor-drive designers a broad ceramic capacitor platform for smoothing, snubber, and control-board decoupling, while GCM gives automotive engineers a line built for harsher environmental, and qualification demands in powertrain and safety electronics.



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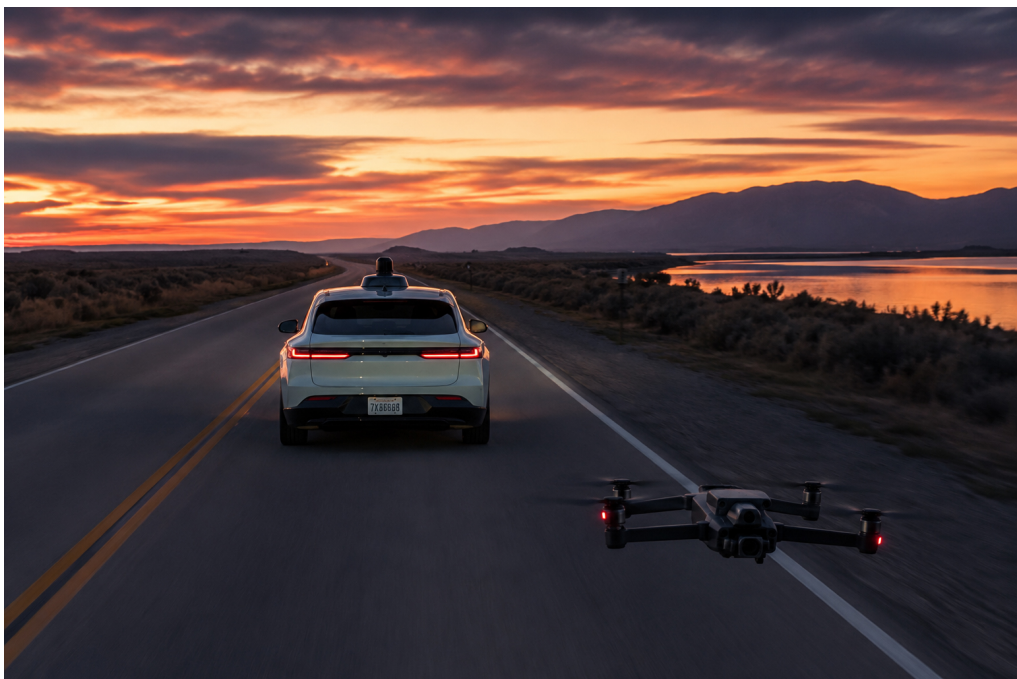
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TELECOMS

IMUs as navigation copilots enable precision in automotive and industrial systems

It takes more than one picture from a camera, one sweep from a LiDAR or one signal from a radar to get the location right. An inertial measurement unit (IMU) is important because it gives us information about how something is moving all the time.



This gives the control system some knowledge of what is going on between the instances that external information is received from a camera, LiDAR or radar. So, an IMU helps to determine the position of drones, autonomous mobile robots, self-driving cars, and other systems that move.

The helping role of the IMU becomes more vital when the environment is not good. For example, when it is foggy, dusty, dark or there are tunnels or tall buildings, it may be difficult to obtain information from cameras or satellites. That is because the IMU is not reliant on light or satellites and hence it can come in handy when the position of an object is uncertain, or the incoming data from the camera, LiDAR or radar is insufficient. For this purpose, there are algorithms that are supported by the IMU, that help to keep track of the position of drones, robots, self-driving cars and other things that can move.

Selecting the right IMU

For engineers who pair an IMU with radar or LiDAR, the main design considerations are simple:

- Gyroscope bias stability, because lower drift improves orientation accuracy over time
- Accelerometer noise and bias stability, because both directly affect dead reckoning
- Sampling rate, with 1 kHz or higher, is often preferred in fast-moving systems
- Noise density, because cleaner motion data reduces fusion errors
- Temperature compensation and scale-factor accuracy, because calibration quality matters when multiple sensors must agree

One architecture, different priorities

The same principle of sensing is used for very different markets, but the target of optimization changes.

When talking about consumer applications, size, power consumption, and cost become critical factors. For example, the **LSM6DSV** from STMicroelectronics uses low-power 6-axis IMU architecture, sensor fusion, finite state machine (FSM) embedded into the chip so that designers do not need to create the topology themselves in code, and a triple channel design for user interface, optical image stabilization, and electronic image stabilization functions. This is why the LSM6DSV is an ideal choice when dealing with applications such as smartphones, wearable gadgets, and augmented reality/virtual reality gadgets that require low power and high-quality motion.

In terms of industrial applications, factors such as reliability and stability become more important. The **ISM330DHCX** is designed specifically to address Industry 4.0 needs, featuring high accuracy, stability, low noise levels, and full data synchronization. Apart from this, the ISM330DHCX is complemented by the ISM330IS. The ISM330IS has a built-in intelligent sensor processing unit (ISPU) that acts like a programmable core used to handle signal processing and artificial intelligence at the edge.

The specification of automotive platforms now requires attention to meet qualification and functional safety. **ASM330LHB** and ASM330LHBG1 come in handy when dealing with more stringent requirements for automotive applications. These IMUs help to address automotive specifications such as extended temperature range and safety software flow compliance. This becomes valuable for advanced driver assistance systems (ADAS) or vehicle controllers that have an increased demand for precision, safety support, and robust operation.

Calibration still matters

Even a strong IMU needs to be properly calibrated. A factory calibration is for correcting bias, scale-factor and alignment errors before shipment, while a field calibration is for adjusting the sensor to the final mechanical mounting and operating environment.

Accurate calibration can be achieved by standardizing the environment during measurement, including controlling temperature and avoiding vibration or magnetic disturbance.

After initial calibration, sensor fusion algorithms can then be used to enable real-time bias control, with corrective recalibration measures used to maintain accuracy, especially under long-life installations.

Where IMU technology is heading

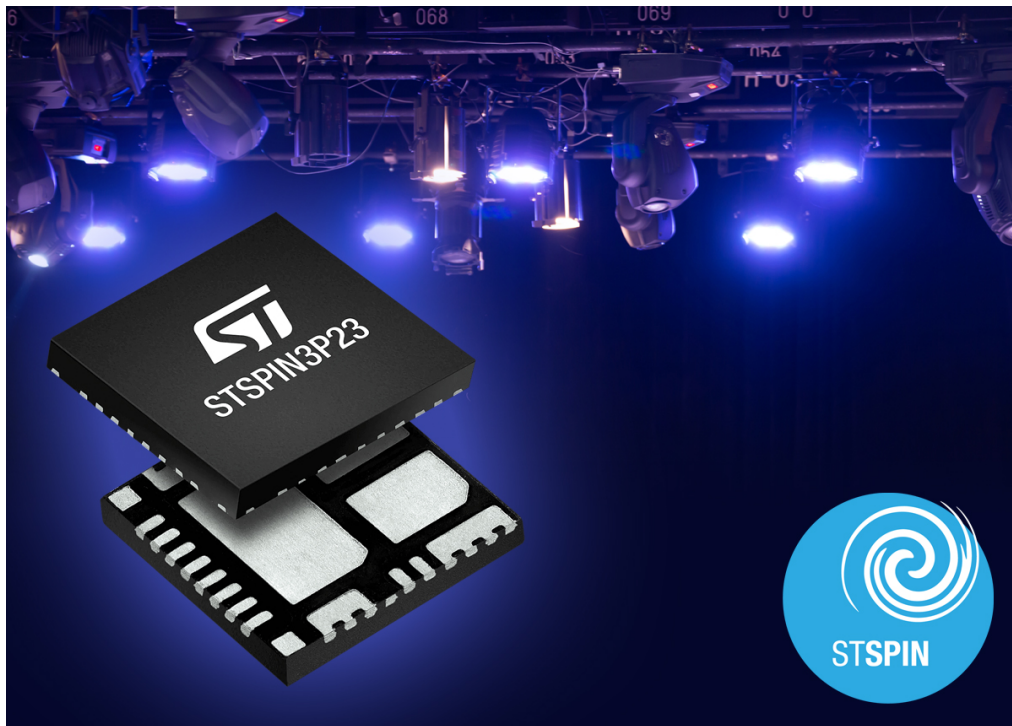
The future direction of IMU technology is apparent within the STMicroelectronics portfolio. More IMUs now include machine learning cores that enable lightweight models to process and categorize sensor data locally for edge-based motion classification, and low-power design continues to push inertial sensing towards always-on use cases. At the same time, ongoing improvements in micro-electromechanical systems (MEMS) stability and temperature resilience help to realize improved long-term performance in industrial and automotive systems. Immediate improvements for current designs will come from sensor fusion, fewer power requirements, and reliable calibrated motion data.



SAMPLES

Integrated motor driver combines 35A output with built-in diagnostics

The STMicroelectronics STSPIN3P23 full bridge motor driver integrates power switches, current sensing, temperature warning, and fault reporting, helping engineers to simplify brushed dc motor and solenoid control in compact designs.



FEATURES

- Multisense analog motor current feedback
- Multisense chip temperature monitoring
- Protection features:
 - Under-voltage shutdown
 - Over-voltage clamp
 - Thermal shutdown
 - Cross-conduction protection
 - Current and power limitation
- Protection against loss of ground and supply voltage
- Operating-temperature range: -40°C to 150°C
- QFN 6mm x 6mm triple pad 26+2L package

APPLICATIONS

- Stage lighting
- Factory automation
- Home appliances
- Robotics
- Brushed dc motors
- Solenoids

Board space and control circuitry both shrink because the STSPIN3P23 combines a dual high-side driver and two low-side switches in one fully integrated full bridge. That makes the motor driver well suited to low-voltage motion designs which need fewer external parts and a cleaner interface to a host controller.

Wide operating flexibility supports a broad spread of industrial loads. The motor driver runs from a 4V to 16V supply, tolerates up to 32V, accepts 3V CMOS logic inputs, and supports pulse-width modulation operation up to 25kHz for speed control and braking functions.

Efficiency receives particular attention in the STSPIN3P23. The output stage offers 30mΩ on-resistance per leg and a 35A current rating, with very low standby power consumption of 1μA at 25°C. That combination helps when designers need both compact thermal behavior and low quiescent drain in intermittently active equipment.

Monitoring and diagnostics form a strong differentiator. The multisense output provides analog motor current feedback, chip temperature monitoring, and fault reporting, selected through two control pins. A separate status output provides feedback on the driver output state, allowing the controller to verify whether the load is being actively driven or turned off. This supports safety-related functions and helps to confirm correct operation during normal running and fault monitoring.

Protection coverage matches the demands of motors, actuators, and solenoid loads in industrial equipment. The STSPIN3P23 includes diagnostics for output short to ground, output short to supply voltage, and off-state open-load conditions.

The package also supports dense layouts. ST assembles the STSPIN3P23 in a package with three exposed islands for improved heat dissipation, and provides PCB thermal guidance for both 2-layer and 6-layer implementations.



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TELECOMS

Three-phase gate driver IC offers high-side switching up to 600V for motor inverters

The MCP8062136 three-phase half-bridge gate driver from Microchip Technology allows high-voltage switching and includes numerous protection functions to power more efficient and safer industrial inverters.



FEATURES

- Source voltage range: 10V to 20V
- SOIC-28 package
- Protection functions:
 - Shoot-through logic
 - Under-voltage lockout
 - Over-current protection
- Operating temperature range: -40°C to 125°C
- Matched propagation delay across channels
- Schmit triggered logic inputs

APPLICATIONS

- Industrial motor drives
- HVAC and white goods
- General-purpose three-phase inverters

As a three-phase half-bridge gate driver IC, the MCP8062136 addresses the need for high-voltage, fast-switching inverter applications. Built on a high-voltage process, the gate driver supports high-side switching up to 600V using bootstrap operation, making it suitable for driving N-channel MOSFETs and IGBTs in industrial and appliance-grade three-phase systems.

The driver delivers up to 200mA source and 350mA sink current, providing sufficient drive strength for reliable switching in medium-power inverter stages while maintaining control in electrically-noisy environments.

Featuring an internal deadtime of 290s, the drivers prevent MOSFET or IGBT damage in operation, and output out of phase with inputs to function better in noisy environments typical of industrial motors. The MCP8062136 also includes high-pulse-current buffers to minimize driver cross conduction enabling more efficient operation.

Logic inputs are compatible with industry-standard transistor-transistor logic (TTL) and CMOS levels down to 3.3V, allowing engineers to integrate the MCP8062136 easily with control devices.

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TELECOMS

Compact low-power FPGAs add flexible logic to motor-control boards

Programmable logic can simplify motion-control hardware, and the ForgeFPGA™ family from Renesas Electronics gives designers a compact, low-power way to add interface bridging, timing control, and supervisory logic.



Deterministic timing, interface glue, and fast supervisory logic can add overhead to the main controller in servo and inverter electronics. The ForgeFPGA™ range is well suited for supporting functions, such as protocol conversion, glue logic, edge processing, and power sequencing. This maps well to encoder adaptation, control-path housekeeping, safety interlocks, and interface bridging in motor and motion-control boards around the main control microcontroller (MCU).

For example, the ForgeFPGA family is suitable for encoder adaptation while leaving the control path intact and safe. The FPGAs can also support board-level supervisory and interlock logic, as well as bridge different interfaces to the main control MCU.

The ForgeFPGA family is well suited for industrial designs. SLG47912 has 1120 look-up tables and 40 general-purpose input/outputs (GPIO). The SLG47920 and SLG47921 have 2240 look-up tables. The SLG47920 has 32 GPIOs, and the SLG47921 has 40 GPIOs.

Software flow is the most significant part of the value. ForgeFPGA is supported by the free [Go Configure Software Hub](#) and ForgeFPGA Workshop, which allow engineers to choose between graphical design entry or developing designs in Hardware Description Language (HDL). The program can support design creation, simulation, programming, synthesis, bitstream generation, and debug all-inside-one workflow. This lowers friction if a motor-control design requires quick logic changes.

The development hardware is notably capable for rapid prototyping and validation. The SLG4DVKGOCONF Go Configure Development Board supports read, emulation, and programming functions, and the hardware manual adds three programmable power sources with configurable overcurrent protection, up to 32 digital pattern generator channels, and up to 16 analog waveform generator channels. It is then possible to prototype and validate support logic around motion-control hardware, not just configure the FPGA itself in this way.

The SLG47912V-SKT and SLG47921V-SKT use ForgeFPGA Socket Card with an LQFN-48 socket, SLG47920V-SKT uses a Socket Card with an LQFN-40 socket, and SLG47912C-SKT and SLG47921C-SKT use a Socket Card with a WLCSP-48 socket. All socket-card variants have onboard 4-Mbit SPI flash, PMOD connectors, standalone boot and power connectors, and a clock generator ranging from 2.5kHz to 200MHz.



FEATURES

- OTP or SPI configuration modes
- SPI controller mode
- SPI target mode
- Dual I/O voltage domains
- 50MHz internal oscillator with programmable divider
- Phase-locked loop support
- CRC integrity check
- AES bitstream decryption
- Operating temperature range: -40°C to 85°C

APPLICATIONS

- Motor-control interface bridging
- Encoder and sensor adaptation
- Power sequencing and safety interlocks
- Industrial instrumentation and control
- Protocol conversion
- Glue logic and edge processing

FREE DEV BOARD

Universal development board accelerates ForgeFPGA evaluation and debug.

Orderable Part Number
SLG4DVKGOCONF

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TELECOMS

Effective battery protection from compact 30V dual MOSFET with low on-resistance

The AW2K21 dual N-channel Power MOSFET from ROHM enables smaller and more efficient switching topologies in USB power delivery circuits, and contributes to the ongoing miniaturization of consumer devices.



FEATURES

- Power dissipation rating: 1.6W
- Operating-temperature range: -55°C to 150°C
- $\pm 40\text{A}$ pulsed drain current
- 2V maximum gate-source threshold
- 100nA gate-source leakage current
- Backside coating

APPLICATIONS

- USB voltage bus protection
- Battery protection
- Load switch

As a common-source N-channel power MOSFET, the AW2K21 is ideal for mobile or space-constrained battery applications which demand efficient operation. The AW2K21 is packaged in a surface-mount 2.0mm x 2.0mm WLCSP2020 form factor which can be placed close to USB-C® connectors or power controllers.

A total gate charge of 29nC and low gate-source-on voltage enables the MOSFET to be driven directly by common USB-PD gate-driver ICs, simplifying power-path control while maintaining low component count and reduced board footprint.

Despite its small size, the AW2K21 features a very low 4m Ω on-resistance and current-handling capacity of up to 20A. These characteristics are perfectly suited for high-speed electronic switching with minimal loss, helping to reduce conduction losses in high-current paths contributing to reduced thermal load.



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TELECOMS

Accelerate motor-control design with this software development kit

Faster motor-drive bring-up comes from the X-CUBE-MCSDK software expansion from STMicroelectronics, which combines firmware, configuration tools and tuning utilities to speed field-oriented control and sensorless 6-step drive implementation.



FEATURES

- Architecture based on HAL and LL libraries
- Current reading topologies:
 - 1 shunt resistor
 - 3 shunt resistors
 - 2 isolated current sensors
- Speed and position feedback support:
 - Encoder
 - Hall
 - Sensorless operation, state observer
- Speed control
- Torque control
- Motor-control algorithms for specific applications:
 - Maximum torque per ampere (MTPA)
 - Flux weakening
 - Feed forward
 - Start-on-the-fly
- On-the-fly start-up for fans
- Full customization and real time communication through STM32 Motor Control Workbench PC software
 - New project creation starting from the board
 - Workflow supporting the STM32CubeMX GUI configurator
 - Wide range of STM32 microcontrollers supported

APPLICATIONS

- Air conditioning
- Home appliances
- Drones
- Industrial automation
- Medical
- E-bikes

Less time is spent on manual setting since the software expansion kit has combined the permanent magnet synchronous motor (PMSM) firmware library, the Motor Control Workbench configuration environment, and the Motor Profiler utility into one STM32Cube package. The workflow can start from the target board, benefit from the STM32CubeMX integration, and some of the variables of the algorithm can be observed and adjusted on-the-fly.

Startup tuning is something that works better in sensorless 6-step control. This is because X-CUBE-MCSDK software expansion firmware helps with alignment and getting the motor started. It also helps with loop acceleration and switching to closed loop operation using the back electromotive force (BEMF) signal. The user gets to choose if they want to use voltage mode or current mode when setting up the rev-up profile. This means that engineers have control over how long each phase lasts, what speed they want to reach and if they want to use voltage or current before generating code.

When the code is generated, that is not the end of the development process. The Motor Pilot graphical user interface (GUI) is a tool that lets users change the rev-up values in time without having to start the project all over again. The start-up guide has some tips for making sure the BEMF sensing divider is the right size. This means that the motor phase voltage will fit into the analog-to-digital converter range and work well when switching over. Values for the filter capacitors catering for the sensing network are from 47pF to 220pF.

The STMicroelectronics roadmap now includes enhanced sensorless control, including full support of sensorless FOC based on the high sensitivity observer (HSO) for the STM32 parts based on Arm Cortex-M33® with compatibility with the new STM32CubeMX.



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TELECOMS

Radial film dc-link capacitors provide high reliability and stability

To enable developers to match dc filtering characteristics for each application, the AEC-Q200-qualified NPDC series of radial film capacitors from NIC Components provides a wide range of capacitance and tolerance options.



FEATURES

- Capacitance range: 1 μ F to 200 μ F
- Operating-temperature range: -40°C to 105°C
- 3kV withstanding voltage at 25°C
- 100,000-hours operating life expectancy at 85°C

APPLICATIONS

- Renewable energy systems
- HVAC units
- Motor drives
- Power supplies

The NPDC series of metallized polypropylene film capacitors offers high reliability and stability in demanding applications. The capacitors are optimized for use in dc filtering in dc-link applications.

The NPDC capacitors are notable for low ESR. The capacitors also handle high currents, providing for robust performance in power-conversion circuits. The NPDC series is AEC-Q200 qualified, ensuring high reliability and stable performance in harsh conditions in automotive and other applications.

The molded box construction of the NPDC capacitors produces a compact form factor which enables integration into tight spaces without compromising performance. The capacitors are available with tolerance options of $\pm 5\%$, $\pm 10\%$ and $\pm 20\%$.

The AEC-Q200-qualified NPDC capacitors are available in three lead-space options of 27.5mm, 37.5mm, and 52.5mm.



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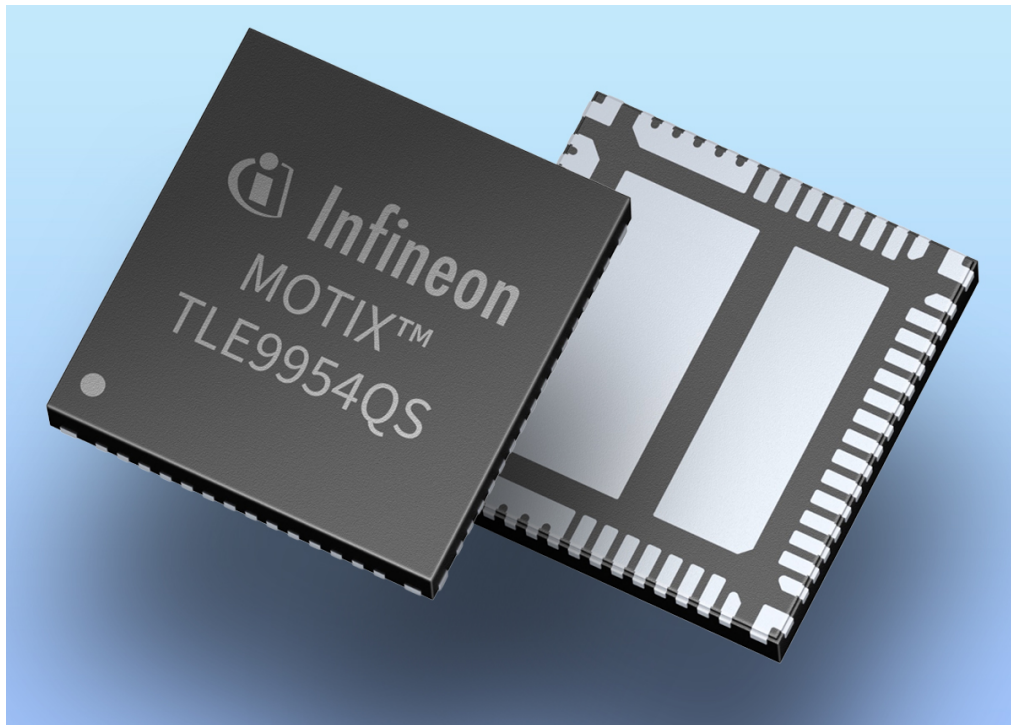
CONSUMER



TELECOMS

System-in-package with integrated features saves space in automotive motor controllers

The MOTIX™ TLE9954QSW40-33 system-in-package from Infineon combines both a microcontroller and a power stage to simplify brushless dc motor systems.



FEATURES

- 72kbyte Flash memory
- 6kbyte RAM
- Five GPIO pins
- Three GPI pins
- Fast synchronous communication interface
- High -voltage monitoring pin

APPLICATIONS

- Automotive auxiliary drives:
 - Pumps
 - Fans
 - Windows
 - Seat adjustment
 - Mirror adjustment

Infineon has introduced the MOTIX™ TLE9954QSW40-33, a system-in-package (SiP) designed for brushless dc (BLDC) automotive applications. The SiP integrates a 32-bit Arm Cortex™-M23 core, local interconnect network (LIN) transceiver, a three-phase gate driver, and six OptiMOS™ 7 power MOSFETs inside a single package. Combining all of these features into one package enables 2-layer PCBs and allows designers to reduce board footprint by up to 40% compared to standard designs.

The TLE9954QSW40-33 is part of the MOTIX™ family of low-voltage motor control solutions, and can be used to control automotive auxiliary drives such as pumps or fans, or compact smart motors, with one example being seat adjustment.

Several peripherals are included to support BLDC applications:

- Fast 12-bit analog-to-digital converters measuring up to 16 inputs
- Ten 16-bit timers and one 24-bit timer
- Low-side shunt current sense amplifier and comparator
- On-chip clock generation

Integrated Arm™ TrustZone™ technology provides hardware-based isolation of safety- and security-relevant functions for automotive applications. With AEC-Q100 Grade 0 qualification and support for ISO 26262 up to ASIL B, the MOTIX TLE9954QSW40-33 meets the reliability and safety requirements of modern automotive motor control applications.

Measuring just 9.5mm x 9mm in a LIQFN-58-1 package, the SiP has an operating temperature range of -40°C to 175°C suitable for harsh conditions often found inside automobiles.

Designers using the SiP can get a head start using the MOTIX™ TLE994_5x Software Development Kit (SDK) which includes a peripheral driver library as well as boot, startup, and example code. The SDK is supported by Infineon Device Configurator plus Arm™ Keil and IAR IDEs for a development experience which is familiar to many engineers.

FREE DEV BOARD

Miniature comfort motor control reference design with SiP.

Orderable Part Number
Z8F80908363

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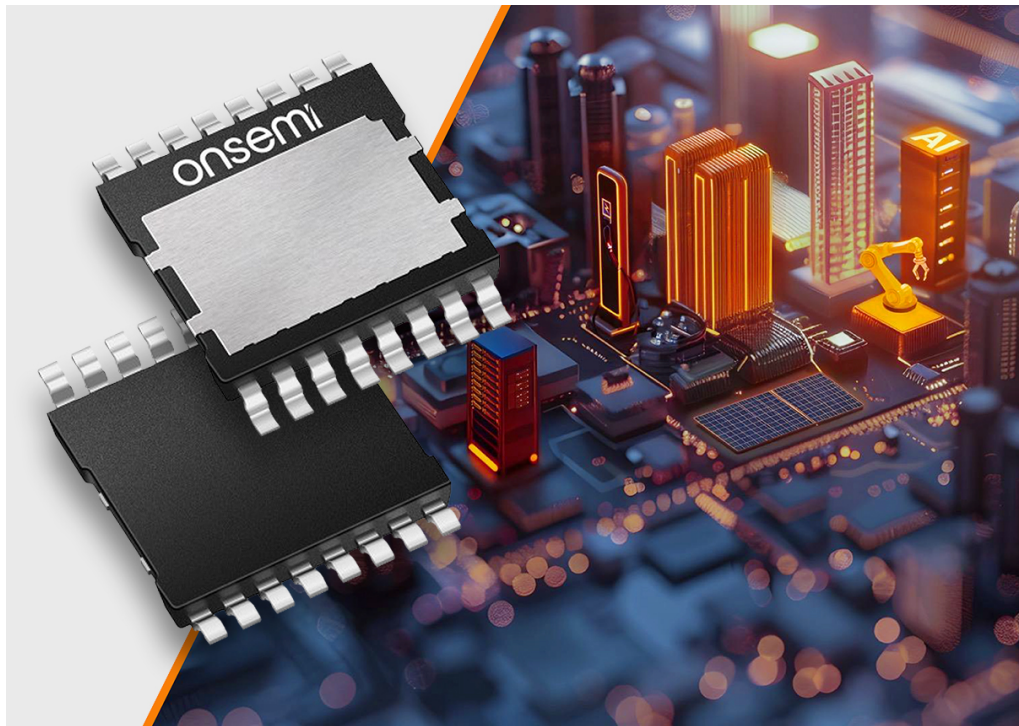
CONSUMER



TELECOMS

Top-side-cooled power MOSFETs offer efficient thermal management

The exposed drain pad on top side of the TCPAK1012 package of onsemi NVBYST1D4N08X power MOSFETs allows engineers to directly transfer heat to a heat-sink to vastly improve thermal performance.



onsemi

FEATURES

- Negative standoff design
- Clip-based structure
- Vibration resistant

APPLICATIONS

- Electric vehicle traction inverters
- On-board chargers
- Industrial power supplies
- Motor drives

Standard MOSFETs are bottom-cooled, relying on the printed-circuit board (PCB) for heat dissipation which, in already thermally-constrained environments such as on-board chargers, necessitates vias and complex board layouts. The TCPAK1012 package of the onsemi range of NVBYST1D4N08X power MOSFETs instead exposes a drain pad at the top of the package to directly provide a surface to which an engineer can attach a heat-sink or heat-conductive channel.

Surface-mounted NVBYST1D4N08X MOSFETs measure approximately 10mm x 12mm with a low-profile height of 1.3mm to 1.4mm. Combined with a reduced thermal resistance of up to 60%, compared to a traditional TOLL package, engineers can place other components in the space previously unavailable using conventional packages. This contributes to more compact power electronic circuits.

The NVBYST1D4N08X MOSFETs benefit from the latest onsemi T10 technology, achieving a reduction in on-resistance of up to 40% compared to existing technology to reduce switching losses and improve power supply efficiency. Other benefits of T10 include:

- 50% reduction in typical gate capacitance
- Excellent body-diode softness
- 10% improvement in unclamped inductive switching (UIS) capability



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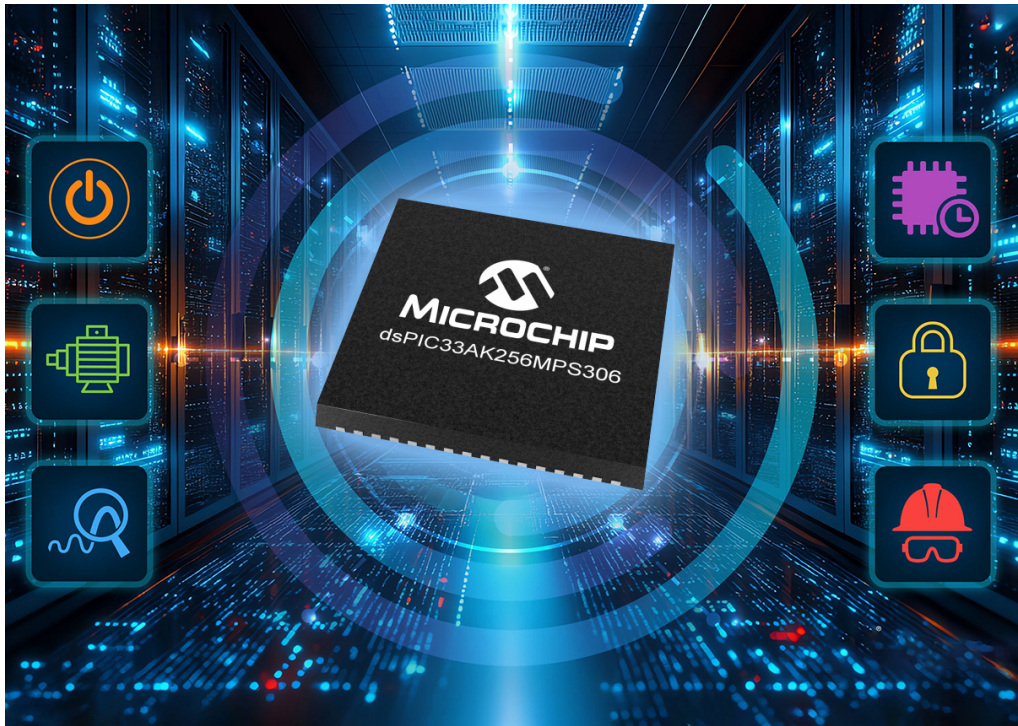
CONSUMER



TELECOMS

Digital signal controllers streamline complex motor-control systems integrating many peripherals into one package

The dsPIC33AK256MPS306 family of digital signal controllers from Microchip combines a 200MHz core and high-speed analog peripherals, which includes a resolver interface, to support industrial motor controllers.



Microchip has introduced the new dsPIC33AK256MPS306 digital signal controllers (DSCs) with a high-performance 200MHz CPU speed and digital signal processor. The controllers are ideal for the increasing processing demands of modern efficient industrial drive designs.

The DSCs can efficiently implement complex control algorithms with minimal latency using a single- and double-precision floating-point unit coprocessor. This simplifies software development while improving response times in dynamic load conditions.

The controllers feature many peripherals such as pulse-width modulation (PWM) generators with 78ps resolution for use in high-frequency switching topologies commonly found in power conversion applications.

The PWM generators are complemented by three 12-bit resolution analog-to-digital converters capable of up to 40Msamples/s, enabling oversampling techniques that minimize noise and improve current-sensing accuracy. The result is smoother motor operation and reduced torque ripple. The dsPIC33AK256MPS306 also includes dedicated hardware for direct memory access (DMA) to streamline data movement between peripherals and memory, without loading the CPU.

Other peripherals include a resolver-to-digital converter allowing direct feedback from brushless DC motors for further control, as well as three dedicated 32-bit timer/counter modules.

For automotive systems, security is critical, so the dsPIC33AK256MPS306 incorporates robust hardware safety features such as:

- Flash and RAM error correcting code (ECC)
- Memory built-in self-test (MBIST)
- On-chip secure boot
- Post-quantum cryptographic accelerator
- Windowed watchdog timer
- Fail-safe clock monitor

These features enable the controller to be compliant with ISO 26262 ASIL B and IEC 61508 SIL 2 functional safety standards.



FEATURES

- Memory provision:
 - Up to 256kbyte of Flash program memory
 - Up to 64kbyte of ECC RAM
 - Programmable OTP regions
- 32-bit wide data paths
- Up to 14 analog pins
- One quadrature encoder interface
- Virtual peripheral pin select (PPS) pins
- I2C, I3C and CAN-FD modules
- 16-bit sampling capability
- Four sampling modes:
 - Oversampling of multiple samples
 - Integration of multiple samples
 - Window
 - Single conversion
- Up to five analog comparators
- Integrated touch controller module

APPLICATIONS

- Motor-control systems
- Digital power supplies
- Automotive drives
- Industrial equipment
- On-board chargers



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TELECOMS

IPX8-rated waterproof, shielded circular connectors ensure secure in-line connections

The LF series of IPX8-rated circular connectors, from Hirose, are robust and compact, featuring an electrically shielded structure for interconnecting a wide range of high-performance equipment including machining and telecommunications.



HRS HIROSE
ELECTRIC
EUROPE B.V.

FEATURES

- Up to 125V ac or 175V dc
- Rated current: up to 10A
- Shell sizing options: 7mm, 10mm, 13mm
- Vibration resistant
- Shock resistant
- Straight and right-angle plugs

APPLICATIONS

- Machine tooling
- Measuring equipment
- Camera sensors
- Servo motors
- Transmission stations
- LED lighting
- Factory automation robots

The Hirose LF series are small, bayonet-locking circular connectors designed for use as cable-mount plugs, jacks, and panel-mount receptacles for in-line connections. The connectors feature waterproof gaskets placed at each joint to enable up to IPX8 water resistance. This permits use in environments such as outdoor LED lighting, security cameras, and monitoring equipment which are often exposed to the elements.

The connectors are available in many different configurations with 3, 4, 6, 8, 11, 12, and 20 position options, including variants with hybrid power and signal functionality. The LF series supports data rates of up to 10Gbits/s via Cat6A suitable for use in modern internet-of-things (IoT) devices tethered to the cloud.

Easy assembly and shielding termination reduces component and assembly costs meaning engineers waste little time installing the LF series into existing designs. The design is rated for up to 1,000 mating cycles and has an operating temperature range of -25°C to 85°C to complement waterproofing.



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TELECOMS

Current sense amplifier delivers precision in 100V switching systems

High-precision current measurement in noisy power systems becomes easier with the TSC240 from STMicroelectronics, a bidirectional current sense amplifier combining a wide common-mode handling, low offset, and rejection of pulse-width modulation noise.



Accurate shunt measurement becomes difficult when fast switching edges, wide bus voltages, and small shunt drops coexist. The TSC240 addresses this challenge with a zero-drift architecture for high-side and low-side bidirectional sensing, and enhanced rejection of pulse-width modulation transients.

The TSC240 can sense current via a shunt resistor across a wide common-mode voltage range from -4V to 100V while operating from a separate 2.7V to 5.5V supply. A preset gain of 20V/V simplifies the design. This makes the TSC240 suitable for current measurement, over-current protection, monitoring, and feedback loops in motor drives, power stages, telecom equipment, and automotive electronics.

Precision is the key feature. The TSC240 offers excellent 132dB dc common-mode rejection (CMRR), a maximum gain error of 0.2%, a maximum gain drift of 2.5ppm/°C, and a maximum input offset voltage of $\pm 20\mu\text{V}$, in addition to maximum offset drift of 150nV/°C. This level of accuracy enables the use of lower-value shunt resistors, which reduces power loss while maintaining measurement accuracy.

Dynamic behavior also suits fast-switching environments. The current sense amplifier offers up to 560kHz bandwidth. Controlled recovery from 12V, 48V, and 100V common-mode steps supports stable sensing in switching converters and motor-control systems.



FEATURES

- Bandwidth up to 560kHz
- Settling time: 5 μs
- Pulse-width modulation rejection settling time: 2.5 μs
- Operating-temperature range: -40°C to 125°C
- Enhanced pulse width modulation (PWM) rejection
- SO8 and TSSOP8 packages
- AEC-Q100 qualified

APPLICATIONS

- Motor controls
- Solenoid and valve controls
- Power management
- Industrial process control
- Telecom equipment
- Automotive



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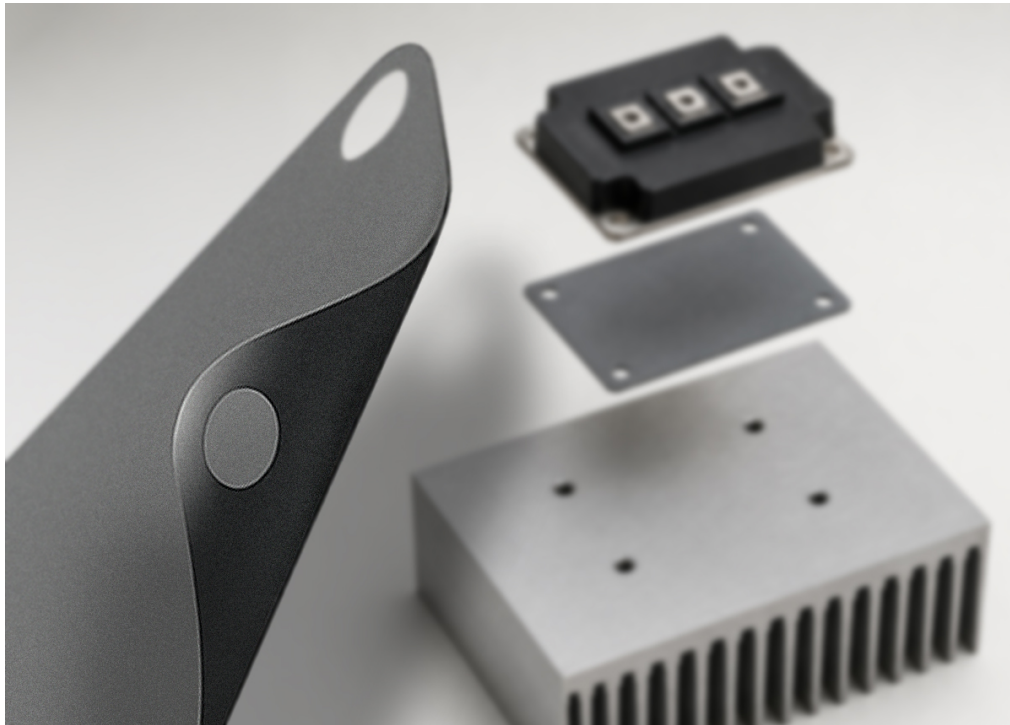
CONSUMER



TELECOMS

Graphite thermal interface sheet improves IGBT module cooling

Built for IGBT module assemblies, GraphiteTIM from Panasonic Industry Europe provides grease-like thermal resistance, stable long-term performance, and simpler installation at the heatsink interface in motion-control power stages.



Panasonic INDUSTRY

FEATURES

- Thickness options: 200µm, 250µm, 350µm
- Flame resistance: V-0 equivalent
- Operating temperature range: -55°C to 400°C
- Conductive material, for parts not requiring insulation
- Standard line-up for multiple module housing
- Custom shape processing support

APPLICATIONS

- IGBT power modules
- Motor drive inverter stages
- Servo and motion-control power stages
- Heatsink interfaces in power conversion assemblies
- Server base stations

Lower contact thermal resistance at the module-to-heatsink interface can directly improve thermal margin in inverter stages. GraphiteTIM is an artificial graphite sheet developed as a thermal interface material for power modules, with Panasonic showing the intended stack-up as an IGBT module, GraphiteTIM, and heatsink. High compressibility helps the sheet follow surface unevenness and reduce contact thermal resistance, allowing performance comparable to thermal grease when adequate pressure is applied.

When it comes to power electronics that need to last a long time, reliability is what sets them apart. The GraphiteTIM does not break down even after being heated and cooled many times between temperatures from -40°C to 175°C. This makes GraphiteTIM a strong choice for motor and motion-control hardware, where consistent thermal performance and minimal maintenance matter as much as longevity.

Ease of handling is another advantage in both production and service. Because the material is supplied as a sheet rather than a paste, it simplifies inventory control, maintenance, and repair work while reducing assembly effort, as no separate application process is required. Standard sizes cover a range of multiple insulated-gate bipolar transistor (IGBT) module housings, and custom shapes are available for modules that fall outside that range.



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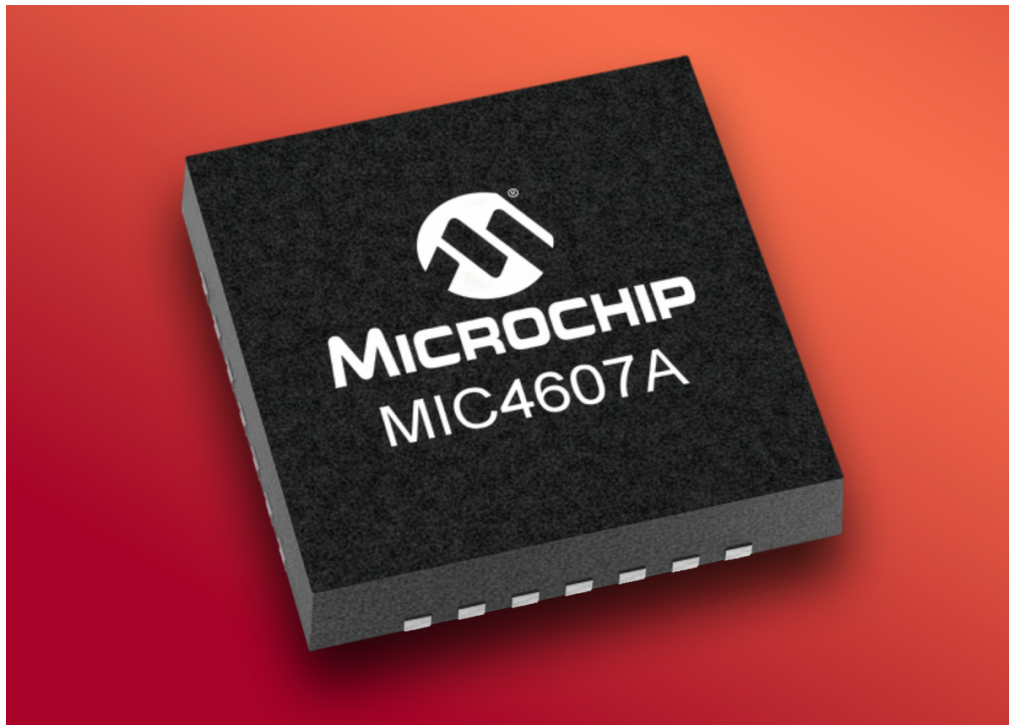
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TELECOMS

Three-phase motor drive efficiency from 85V MOSFET driver with adaptive dead-time

The MIC4607A MOSFET driver from Microchip features fast propagation delay and driver rise/fall time, in addition to protection features, for modern automotive and industrial motor drive designs.



Microchip has introduced the MIC4607A MOSFET driver with 35ns propagation delay time and 20ns driver rise/fall time, over a 1nF capacitive load, suitable for motors used in automobiles and industrial automation.

Modern motor drives are becoming more robust, and the MIC4607A supports that by featuring protection features such as:

- A high-speed and low-power level shifter for clean low-high output transitions
- Under-voltage protection provided on both low and high-side drivers
- Adaptive dead-time control ensuring MOSFETs of the same phase branch are not conducting at the same time

These features prevent the driver from being affected by supply glitches, high-side ringing below ground and skewing with fast voltage transitions.

The MIC4607A features wettable flanks in a 28-pin 4mm x 5mm VQFN package for reliable bonding to PCB layouts, and operates between -40°C to 125°C.



FEATURES

- Gate supply drive voltage up to 16V
- Independent or single PWM input modes
- Transistor-transistor logic (TTL) input thresholds
- On-chip bootstrap diodes

APPLICATIONS

- Three-phase and brushless dc motor drivers
- Three-phase inverters
- Automotive brushless dc motors

FREE DEV BOARD

MIC4607A evaluation board for driving brushless dc motors.

Orderable Part Number
EV42B57A

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TELECOMS

Automotive H-bridge motor driver makes 12V brushed motor control easy

The VNH9045AQ from STMicroelectronics integrates a full H-bridge, current sensing, diagnostics and protection functions, giving engineers a compact route to 12V automotive motor control with reduced external circuitry.



FEATURES

- Monitoring functions:
 - Analog motor current feedback
 - Chip temperature monitoring
- Diagnostic functions:
 - Output short-to-ground
 - Thermal shutdown
 - Off-state open-load
 - High-side power limitation
 - Low-side over-current shutdown
 - Output short-to-supply voltage
- Half-bridge operation
- Operating junction temperature range: -40°C to 150°C
- AEC-Q100 qualified
- ISO 26262 ready

APPLICATIONS

- Motor control automotive applications supplied by 12V board-net

When the power stage and protection are in one chip it saves board space, design work and fault management. The VNH9045AQ has two high-side drivers and two low-side switches in an integrated H-bridge. This is for motor control on 12V systems.

The VNH9045AQ works well in cars and other vehicles. The motor driver is good to go because it meets the AEC-Q100 standard and it is also ready for ISO 26262. The motor driver works with 3V complementary metal-oxide-semiconductor (CMOS) logic inputs. The motor driver operates from 4V to 28V, and can handle a transient supply voltage of 36V. Speed control is supported with pulse-width modulation up to 25kHz. When the motor driver is not being used the standby current is a really low at 1µA, at 25°C.

The VNH9045AQ offers protection which includes under-voltage shutdown, over-voltage clamp, thermal shutdown and cross-conduction protection. It also limits current and power and protects against loss of ground and loss of supply voltage. The outputs are protected against short-to-ground and short-to-supply voltage events. The side current limit is 23A to 46A and low-side shutdown current is 28A to 56A.

The chip also has built-in monitoring and diagnostics. The multisense pin gives analog motor feedback, chip temperature warning and fault reporting. A dedicated feedback pin reports the actual voltage state of one motor output terminal back to the microcontroller, allowing the system to verify correct H-bridge switching for safety monitoring. In the off state these pins also support load and short to supply voltage checks before the motor starts.

The quad flat no-lead (QFN) 6mm x 6mm triple pad 26+2L package helps with layout performance. The package uses three exposed islands for heat dissipation. ST also provides a six-layer printed circuit board (PCB) reference layout and thermal data.

FREE DEV BOARD

Evaluation board speeds prototyping with VNH9045AQ automotive H-bridge motor driver.

Orderable Part Number
EV-VNH9045AQ

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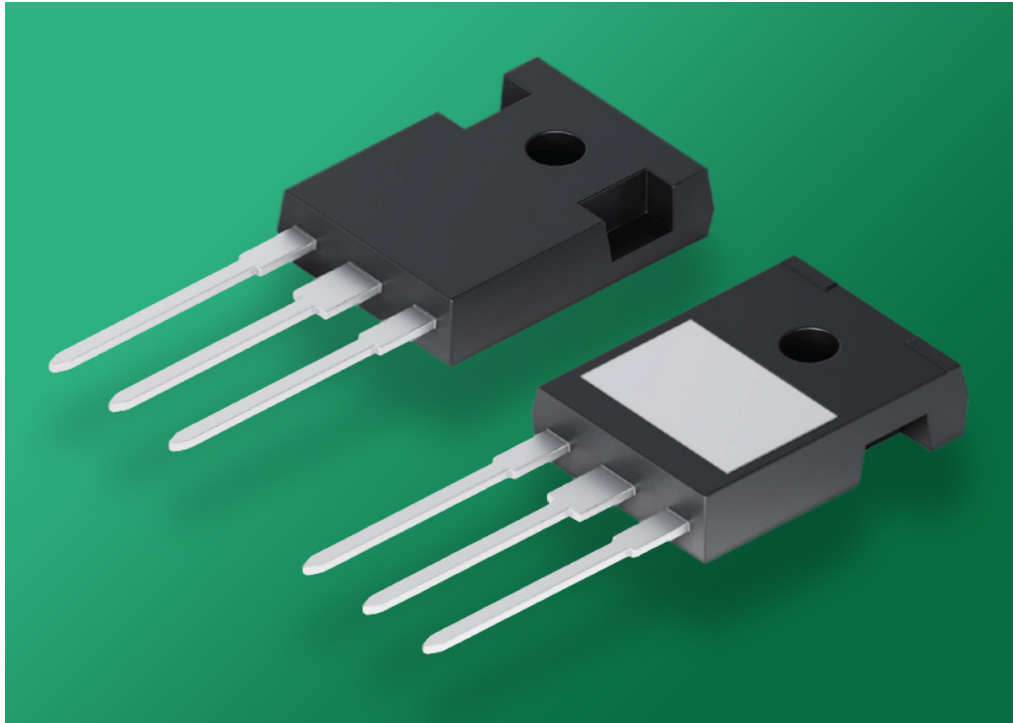
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TELECOMS

SiC MOSFET cuts inverter losses in industrial motor drives

Higher-efficiency switching in motor-drive inverters comes from the Littelfuse IXSJ80N120R1K, 1200V silicon carbide MOSFET combining low on-resistance with strong thermal handling in an isolated Kelvin-source package.



FEATURES

- Gate-source threshold voltage: 2.8V to 4.8V
- Maximum gate-source voltage: -4V to 21V dc
- Body-diode surge forward current: 80A
- Operating-temperature range: -40°C to 150°C
- Package isolation voltage: 2500V ac
- Package: ISO247-4L

APPLICATIONS

- EV charging infrastructure
- Solar inverters
- Switch mode power supplies
- Uninterruptible power supply
- Motor drives
- dc/dc converters
- Battery chargers
- Induction heating
- High-frequency applications

When it comes to frequency drives, reducing switching loss and thermal load are important. This is because these factors directly affect how large the enclosure must be, how much cooling is needed, and how much power can be handled. The IXSJ80N120R1K offers a solution for this. The SiC MOSFET has an on-resistance of 18mΩ, a drain rating of 80A, low gate charge of 155nC, and input capacitance of 4556pF. This means that designers can make fast-switching 1200V power stages for inverters and active front-end designs.

The way the drive stage is integrated also benefits from the package choice. The ISO247-4L outline includes a Kelvin source connection, which helps to reduce the effect of common-source inductance during fast switching. The isolated package construction also supports thermal handling and helps to simplify mounting in higher-power inverter designs.

Littelfuse is highlighting the use of 1200V silicon carbide MOSFETs in frequency drives. These are used in the rectification or active front-end stage and the inverter stage. Silicon carbide is also important for efficiency and low total harmonic distortion regenerative front ends. It is used in two-level or three-level inverter topologies for applications such as servo drives, conveyors, pumps, blowers, mixers and extruders.

The switching behavior of the IXSJ80N120R1K is also suited to higher-frequency control. This gives engineers a way to increase switching frequency while limiting the losses associated with older silicon power stages.



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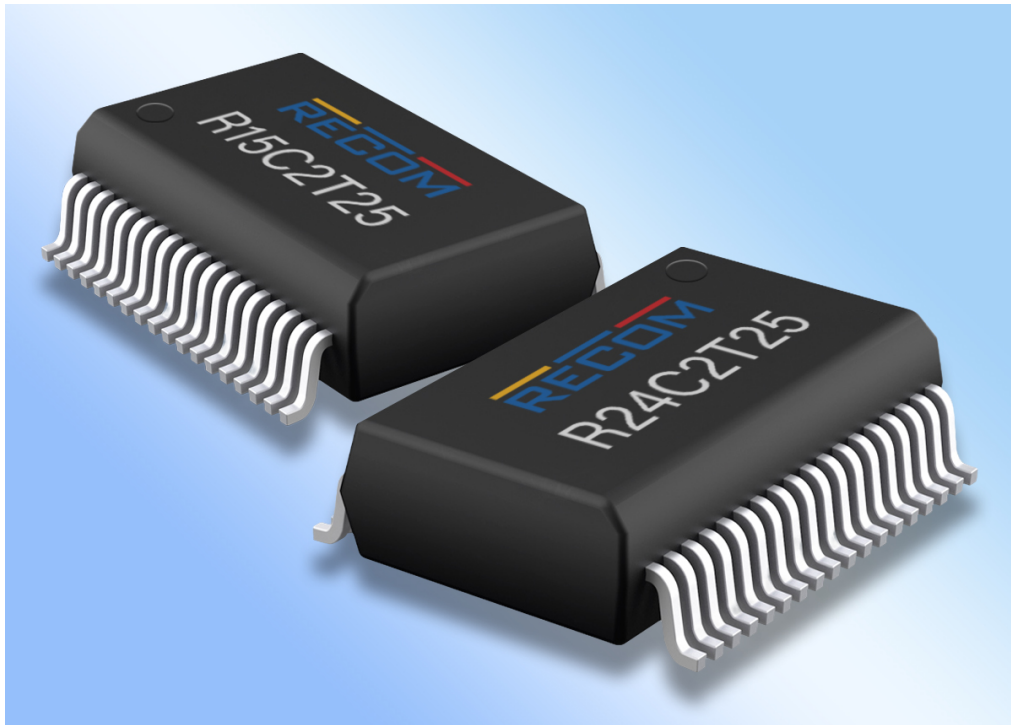
CONSUMER



TELECOMS

Programmable power modules enable precision control for electronic applications

The R24C2T25 dc-dc converter from RECOM provides isolated dc-dc conversion with programmable asymmetric output voltages for precise control and optimisation of IGBTs, silicon carbide (SiC) and gallium nitride (GaN) gate drivers.



RECOM

FEATURES

- Three-year warranty
- $\pm 1.5\%$ feedback voltage accuracy
- 3ms soft-start time
- Power Good pin

APPLICATIONS

- Industrial automation equipment
- Infrastructure power systems
- Uninterruptible power supplies

The R24C2T25 is a 24V isolated, programmable dc-dc converter which engineers can use to create isolated gate bias voltages, required by sensitive switching transistors used in power electronics.

The converter exhibits 3kV ac isolation and 150kV/ μ s common-mode transient immunity suitable for high-frequency switching environments which require strict noise and voltage control. A low isolation capacitance of less than 3.5pF reduces parasitics to ensure minimal noise propagation.

The R24C2T25 generates two regulated voltage outputs, and can be configured as a single-output converter or a dual-output converter. For the latter configuration, a COM pin regulates the midpoint voltage for accurate positive and negative outputs based on feedback voltage. The converter delivers up to 2W of power and can convert input voltages from 21V dc to 27V dc with a typical efficiency of 55%.

Featuring a number of safety features, the R24C2T25 is designed to offer reliability for long-term use:

- Under-voltage lockout
- Over-voltage lockout
- Over-power protection
- Over-temperature protection

Housed in a compact 36-pin 7.5mm x 12.83mm surface-mounted package, the R24C2T25 can be easily integrated close to the target transistors to minimize board footprint and enable the miniaturization of power stages in industrial applications.

In addition to the R24C2T25, the series includes the 12V R12C2T25, and 15V R15C2T25 dc-dc-converters.



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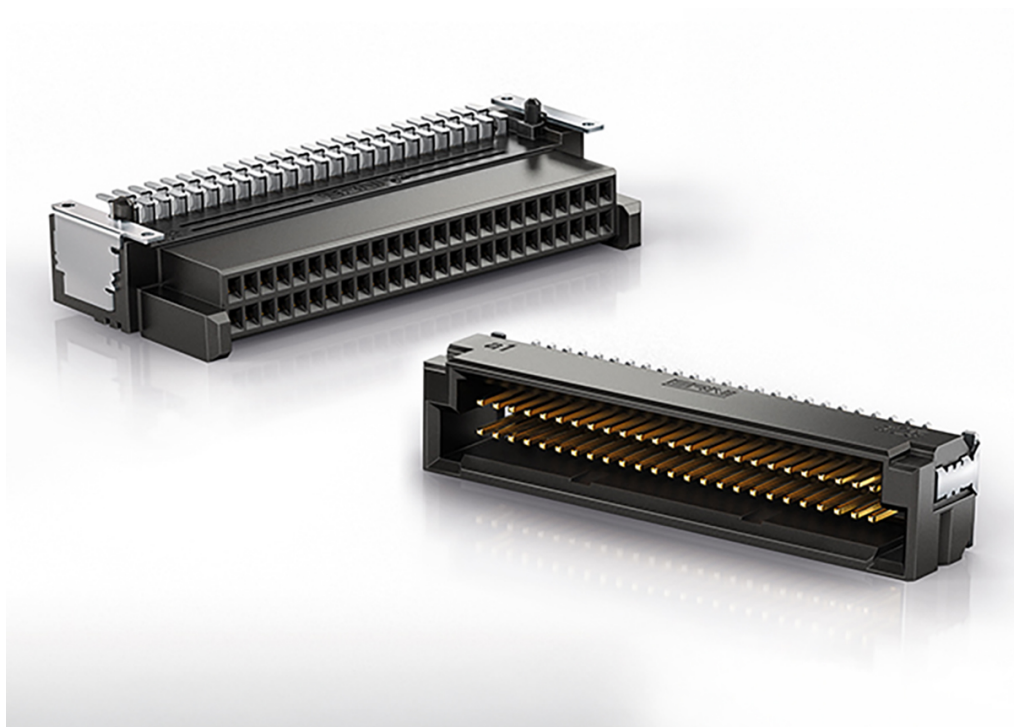
CONSUMER



TELECOMS

Small multiple connectors enable more space saving and reliability

The ERNI Small Multiple Connectors (SMC) family from TE Connectivity, with a grid of only 1.27mm, allows for more reliable and compact connections to be made inside a wide range of motor-control applications.



FEATURES

- Rated current up to 1.7A
- Surface-mount or Pressfit termination options
- Gold-plated contacts
- Lockable connector options
- Polarized mating face

APPLICATIONS

- Power electronics
- PLC
- Remote I/O
- Frequency converter
- Control of solar systems

The ERNI SMC series of connectors addresses the fact that modern motor drives and controllers are becoming smaller and more integrated, while boasting more features than ever before. The connectors feature a dual-row 1.27mm pitch with data rates up to 3Gbit/s, enabling high-speed signal interfacing between tightly-integrated PCBs.

The ERNI SMC family includes a range of different shapes such as straight or angled mate, as well as variable pin counts from 12 to 80. PCB pegs are included, and the connectors are rated for 500 mating cycles with a vibration-resistant contact design to ensure reliability even when under harsh conditions commonly found in motor control environments.

Designed to provide a signal path for control logic, feedback processing and monitoring circuits, ERNI SMC connectors are best suited for linking control PCBs to communication PCBs, or digital signal processor (DSP) boards to I/O expansion boards.

The ERNI family also includes:

- MicroSpeed Power modules rated up to 18A per contact, ideal for power distribution
- MicroCon connectors with 0.8mm pitch supporting the same 3Gbit/s data rate for even more dense designs
- MiniBridge cable-to-board connectors for sensor and auxiliary wiring into motor controllers

These modules work in tandem with the SMC connectors allowing engineers to build more complex motor circuits into small footprints.



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TELECOMS

Aluminum electrolytic capacitors stabilize dc buses in motor drives

The KYOCERA AVX aluminum electrolytic capacitor portfolio gives motor controller designers bulk filtering, dc-link stabilization, and power buffering options across wet, conductive polymer, and hybrid constructions.



FEATURES

- Portfolio options:
 - Wet aluminum
 - Conductive polymer aluminum
 - Hybrid aluminum
- Aluminum chip capacitors
- Radial-leaded aluminum electrolytic capacitors
- Commercial and industrial reliability levels
- Selected radial-leaded series available with ammo or bulk packaging

APPLICATIONS

- Three-phase BLDC motor controllers
- Power inverters
- Variable frequency drives
- Dc-dc converters
- Uninterruptible power supplies
- Industrial equipment
- Filtering circuits

Motor controllers need a bus voltage and a clean transient response. Aluminum electrolytic capacitors are used in the KYOCERA AVX three-phase brushless dc motor controller to improve power quality. They also provide the drive voltage that the motor needs to work.

In world motor and motion control hardware capacitors do a lot more than just filter. They handle power quality and electromagnetic interference filtering. These aluminum electrolytic capacitors are good for filtering, power stabilization and peak current support, and can be used in controllers and assemblies.

The range of capacitors is very wide and is split into three groups: electrolytic, hybrid aluminum electrolytic and conductive polymer aluminum electrolytic. This can balance cost against factors such as equivalent series resistance, higher ripple current capability, longer lifetime and stronger temperature tolerance.

The size of the package is also important in drive electronics. The KYOCERA AVX aluminum chip capacitor range delivers capacitance per volume in small packages. The polymer and hybrid versions are even better and can handle higher ripple current, inrush current and high temperatures.

This means that the KYOCERA AVX portfolio can be used for power networked motors and larger inverter stages. The wet and hybrid series are used in equipment, filtering circuits and power supplies. For people who design motor drives this means they can get products for cost bulk storage and lower loss higher ripple positions around the power stage.



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