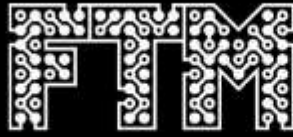


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**NPIs, DESIGN AND  
TECHNOLOGY NEWS**



**26-V**  
**Power Solutions**

# Integrated 700V GaN flyback converter for high-density power

The STMicroelectronics VIPERGAN100WBTR, is a highly integrated 700V GaN flyback converter delivering 90% efficiency, ultra-low standby power, and up to 100W output for compact, high-density power designs.



The VIPERGAN100WBTR is the member of the VIPerGaN family of offline flyback converters. It integrates a 700V enhancement-mode Gallium Nitride High Electron Mobility Transistor (GaN HEMT), which offers high performance when used in power electronics applications such as fast-charging adapters, 5G base stations, and electric vehicles, together with a peak-current controller on a single chip.

The VIPERGAN100WBTR achieves efficiencies above 90% under typical operating conditions with GaN's low on-state resistance and the quasi-resonant (QR) control scheme. The controller operates in valley-skipping mode with dynamic blanking and valley synchronization. This zero-voltage switching (ZVS) approach minimizes switching losses across varying line and load conditions.

This level of integration reduces component count and enables more compact layouts. The VIPERGAN100WBTR supports up to 100W output power, in European range or with a PFC in the front end, with up to 75W available across the full ac mains range. Its single-switch QR flyback topology incorporates zero-voltage switching and frequency jitter to minimize losses, delivering high conversion efficiency and low standby consumption. Internal peak-current regulation ensures stable control, while built-in frequency jitter helps to spread the electromagnetic interference (EMI) spectrum.

With power management and adaptive burst mode, no-load power consumption falls below 30mW. These features translate into superior power density and improved energy savings for industrial power supplies and telecom power modules.

Part Number	Package	RDS(ON) @ 25°C	Max. POUT @ 85V to 265Vac	Max. POUT @ 185V to 265Vac
VIPERGAN50WTR	QFN 5mm x 6mm	0.47Ω	50W	75W
VIPERGAN65WTR		0.29Ω	65W	85W
VIPERGAN100WTR		0.27Ω	85W	100W
VIPERGAN100WBTR		0.27Ω	85W	100W



## FEATURES

- Embedded protections:
  - Input over-voltage
  - Output over-voltage
  - Output overload
  - Short-circuit rectifier
  - Thermal shutdown
  - Brown-in and brown-out
- All protection trips use auto-restart mode
- Operating temperature range: -40°C to 125°C

## APPLICATIONS

- High-power USB-C PD chargers
- Compact wall adapters
- Industrial and consumer PSUs
- Communications infrastructure supplies
- Base stations
- Network equipment power modules

## FREE DEV BOARD

Evaluation board accelerates compact GaN power design.

**Orderable Part Number**  
**EVLVIPGAN100WP**

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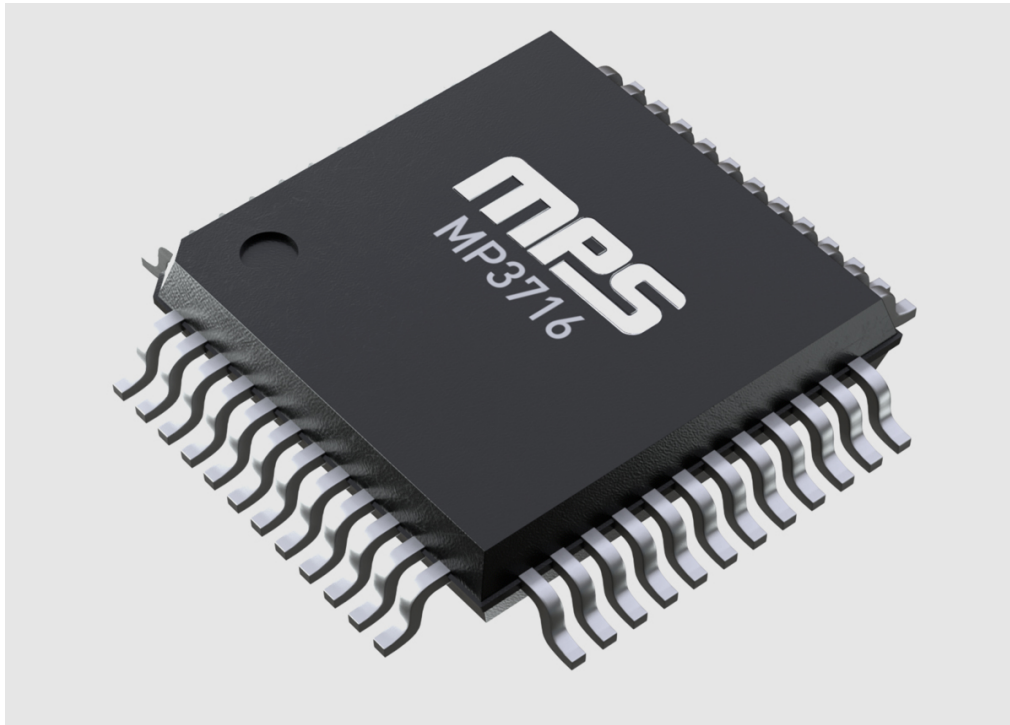
CONSUMER



TELECOMS

# High-accuracy battery monitor and protector simplifies multiple cell pack management

The Monolithic Power Systems MP3716 battery monitor and protector integrated circuit (IC) combines precision sensing of voltage, temperature, and current sensing, with independent charge and discharge MOSFET control, to simplify design.



The MP3716 provides a complete analog front-end (AFE) monitoring and protection solution for series battery packs from 3 cells to 18 cells, with an absolute voltage exceeding 80V on particular pins. The AFE can also operate in standalone mode without a microcontroller unit (MCU), which can simplify safety-critical designs or provide a protection backstop even when the host processor is unavailable.

To support both protection and fuel gauging, MP3716 integrates two separate analog-to-digital converters (ADCs). One ADC measures differential cell voltages across up to 18 channels, die temperature, and up to seven external temperature points using negative temperature coefficient thermistors (NTC). The second ADC measures charge and discharge current through an external current-sense resistor.

On the power path, MP3716 includes high-side N-channel MOSFET drivers for independent charge and discharge control. The discharge (DSG) driver adds configurable scaled current soft-start (SS), providing a controlled turn-on that can eliminate the need for an external pre-charge circuit in many architectures. Protection coverage includes over-current protection (OCP), short-circuit protection (SCP), cell under-voltage protection (UVP) and over-voltage protection (OVP), pack UVP and OVP, and high and low temperature protections, plus die high-temperature protection.

The MP3716 integrates a fuse driver with protections such as severe under-voltage protection (SUVP), severe over-voltage protection (SOVP), MOSFET damage protection, and extensive self-diagnostics. It is available in a thin quad flat package (TQFP) with 48 pins and 7mm x 7mm dimensions.

**MPS**

## FEATURES

- Cell voltage measurement error below 5mV
- Current and coulomb counter error below  $\pm 0.3\%$
- SOC accuracy within 2% when paired with MPF4279x fuel gauge
- High-side MOSFET drivers for independent charge and discharge control
- Passive balancing up to 58mA per cell
- Standalone mode without MCU
- Integrated 3.3V and 5V low-dropout (LDO) regulators

## APPLICATIONS

- High-voltage energy storage systems
- Battery modules
- Transportation battery packs
- Industrial battery-backed equipment



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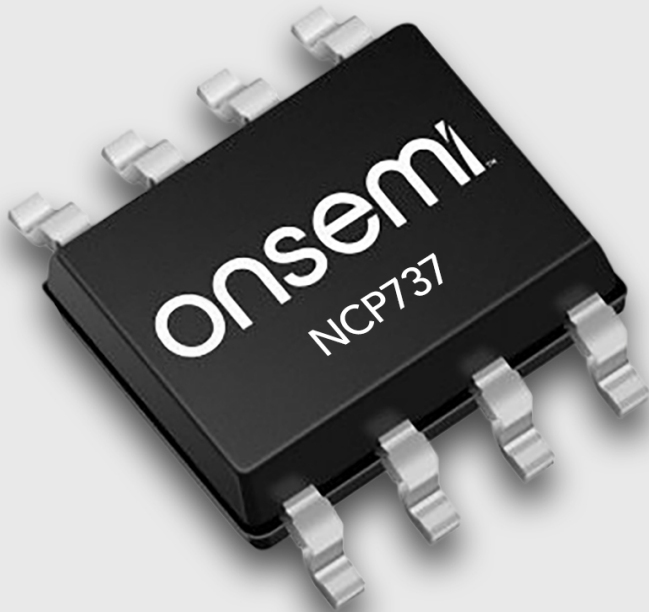
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TELECOMS

# 65V linear regulator extends battery life with low quiescent current

The NCP737 series from onsemi are high-voltage linear regulators featuring low quiescent current and a wide input range, ideal for extending operating life in battery-powered industrial and consumer electronics.



**onsemi**

## FEATURES

- Available in MSOP8 EP and DFNW8 3x3 packages
- 0.5µA standby current
- Enable pin compatible with standard CMOS logic
- 265mV dropout voltage
- Output active discharge functions

## APPLICATIONS

- Battery-powered hand tools
- Drone flight controllers and sensors
- eFuse protected power rails
- High-voltage rail sensors
- Home automation
- Smart meters
- Security systems

Combining a quiescent current of less than 5µA with an input voltage range from 3V to 65V, the NCP737 linear regulators give engineers flexibility when designing eFuses, low-dropout (LDO) regulators, and power rails in drones. The wide input voltage range allows the regulator to withstand continuous dc or transient input voltages, suitable to serve in various product designs.

onsemi offers NCP737 variants including a fixed output voltage of 3.3V, or an adjustable output voltage from 1.2V to 20V, with a high output voltage accuracy of ±0.5% ensuring stable power delivery for precision analog circuitry and flight controllers. The linear regulator remains stable even with small 1µF ceramic output capacitors, allowing for smaller PCB designs.

The NCP737 implements an internal power good circuit with a user-programmable delay, via an external capacitor. This feature supports power sequencing, or acts as a microcontroller reset. The linear regulator also features thermal shutdown, current limit protection and a built-in soft start circuit suppressing inrush current during the startup of drone subsystems.

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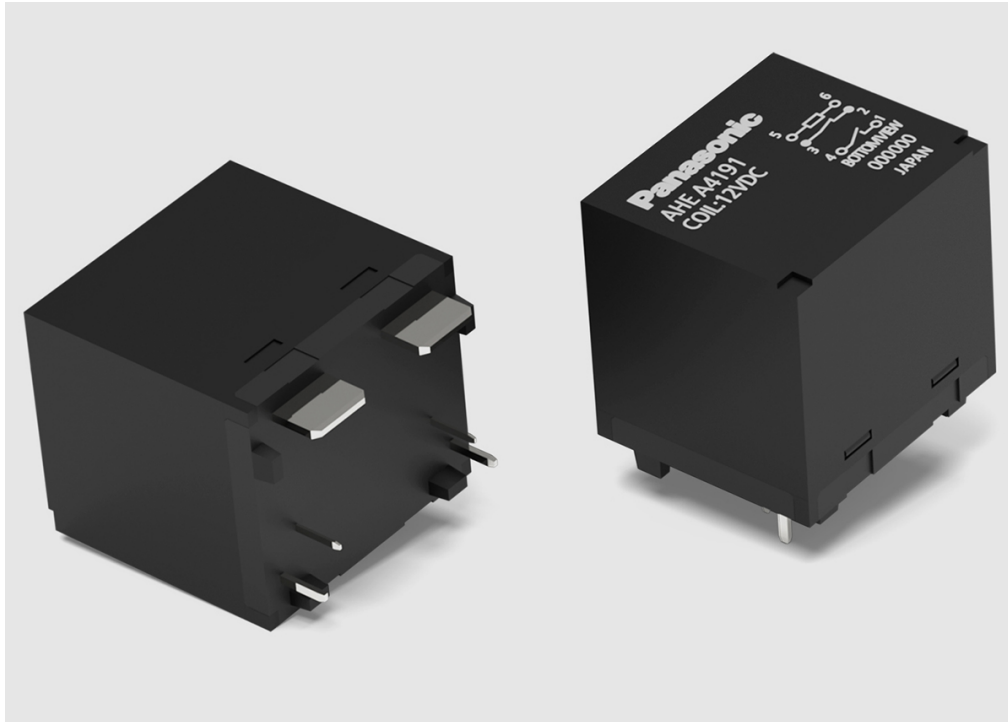
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TELECOMS

# Compact power relay carries 110A and adds welding detection for energy switching

In a high-capacity format, the HE-A AHEAxxx power relay family from Panasonic Industry helps high-voltage designers to improve safety and reliability in solar inverters, electric vehicle charging, and industrial power switching.



## Panasonic INDUSTRY

### FEATURES

- Compact size: 33mm x 38mm x 38.8mm
- Maximum carrying current: 110A
- Contact gap, initial, Form A: 3.6mm minimum
- Welding detection function using mirror contact mechanism
- Low operating power is 1.92W
- Holding power 0.31W with holding-voltage method
- Short-circuit capability is 5000Arms
- Compliant with UL 508
- UL C-UL and VDE approved

### APPLICATIONS

- Inverter systems
- Charging station
- Industrial equipment

The HE-A AHEAxxx power relays focus on high carrying current and reinforced insulation in a space-conscious package, supporting power stages that must switch high loads while keeping creepage, clearance, and contact separation under control. The family includes Form 1A and Form 1B options, with different variants adding a mirror contact mechanism to support welding detection.

Designed around a compact footprint, the HE-A family still supports 110A maximum carrying current. For demanding energy infrastructure, the HE-A relays add short-circuit capability and high dielectric strength. UL 508 short-circuit capability is specified as 5000Arms at 240V ac with a Class K5 fuse rated 100A. Dielectric strength is specified up to 5000Vrms for 1 minute between Form A contact and coil, with surge withstand voltage up to 10,000V between Form A contact.

Low operating power supports thermal design in densely packed systems. Coil operating power is 1.92W, and holding power can be reduced to 310mW when using the recommended holding-voltage method after 100ms. The operating temperature range for usage, transport, and storage is -40°C to 85°C, with guidance on reduced coil holding voltage.

Part Number	Contact Arrangement	Rated Coil Voltage	Coil Resistance	Rated Operating Current
AHEA3191	Form 1A	12V dc	75Ω	160mA
AHEA3192	Form 1A	24V dc	300Ω	80mA
AHEA4191	Form 1A, Form 1B	12V dc	75Ω	160mA
AHEA4192	Form 1A, Form 1B	24V dc	300Ω	80mA



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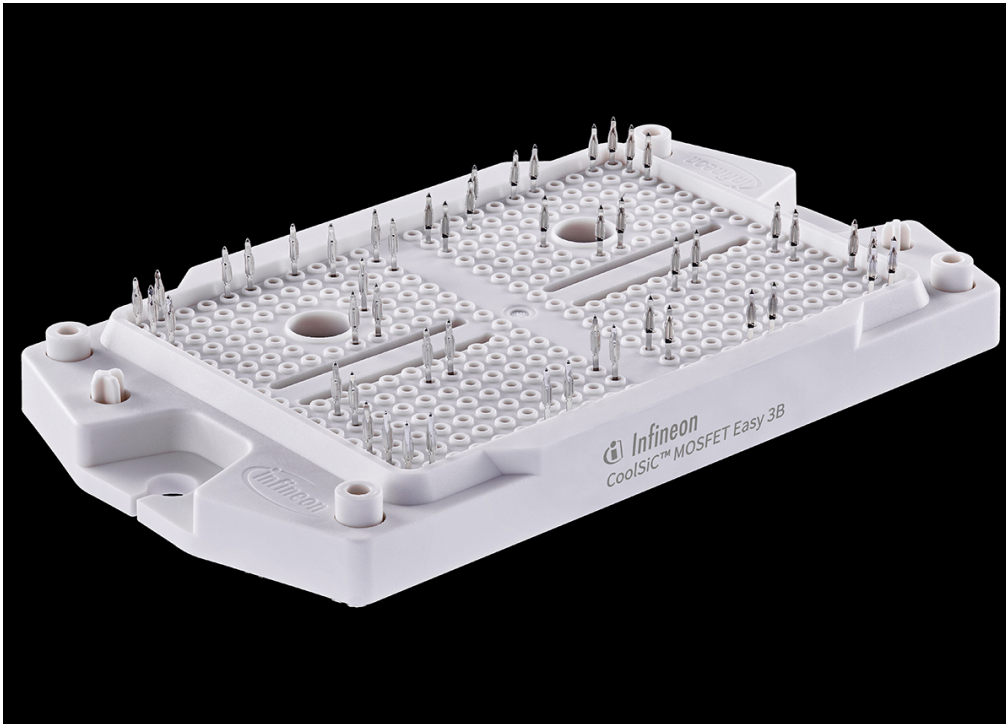
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TELECOMS

# 2,000V MOSFET module supports high efficiency in power designs

An EasyPACK™ power module featuring CoolSiC™ trench MOSFET technology, the FF3MR20W3M1H\_H11 from Infineon is providing high current density and low switching losses for rugged energy and industrial systems.



## FEATURES

- Operating temperature range: -40°C to 175°C
- 640A repetitive peak drain current
- 17nH typical stray inductance
- 1.57μC total gate charge
- Module weight: 78g

## APPLICATIONS

- Energy storage systems
- EV chargers
- Solar power inverters
- Uninterruptible power supplies

The FF3MR20W3M1H\_H11 module contains silicon-carbide (SiC) trench MOSFETs arranged for efficient operation in high-voltage switching applications including energy storage systems and solar power. The design supports a drain-source voltage of up to 2,000V, providing continuous dc drain current up to 275A.

The CoolSiC MOSFET structure inside the module has on-resistance of 2.6Ω, minimizing conduction and switching losses. The 2,000V M1H SiC MOSFET technology combined in the EasyPACK 3B is a fit for 2-level systems with 1,500V dc link voltage. The isolation test voltage of 3.2kV and integrated temperature sense enables a safe and reliable design of increasingly compact power stages.

Engineers can install the module easily as the FF3MR20W3M1H\_H11 uses PressFIT contact technology for solder-free mounting, as well as integrated mounting clamps for rugged installation.



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TELECOMS

# Synchronous step-down converter simplifies power conversion with up to 93% efficiency

The STMicroelectronics DCP3603BCMR synchronous step-down converter combines high efficiency, low quiescent current, and comprehensive protection for battery-powered or industrial mains-powered designs.



## FEATURES

- Input operating voltage range is 3.3V to 36V
- 89% efficiency at 1A load, 24V input, 5V output
- 93% efficiency at 1A load, 12V input, 5V output
- Operating quiescent current is 85µA for the LCM:
  - ACMR/BCMR/ACDMR/BCDMR
- Operating quiescent current is 1.4mA for the LNM:
  - ANMR/BNMR/ANDMR/BNDMR
- Switching frequency up to 1MHz
- Synchronous rectification
- Internal compensation network
- Internal soft-start
- Protection features:
  - Under-voltage lockout (UVLO)
  - Over-current
  - Thermal shutdown (TSD)
  - Output over-voltage
- Operating junction temperature: -40°C to 150°C
- Surface-mount SOT23-6L package

## APPLICATIONS

- Smart metering
- Industrial 12V and 24V bus conversion
- Building automation equipment

The DCP3603BCMR is a synchronous step-down converter that provides up to 3A of output current from input sources between 3.3V and 36V. It is designed to simplify power conversion designs, while supporting a wide range of applications from battery-powered systems to industrial 12V and 24V rails.

Switching frequency of the DCP3603BCMR is fixed at 1MHz, allowing the use of small inductors and capacitors to minimize solution footprint. Efficiency reaches 93% at 1A load with 12V input and 5V output, while integrated protections such as output over-voltage protection and thermal shutdown.

STMicroelectronics offers DCP3603 in multiple variants. In addition to the DCP3603BCMR, which is the low consumption mode (LCM) 1MHz version with dithering off, there are variants such as DCP3603BNMR for low noise mode (LNM), as well as DCP3603BCDMR and DCP3603BNDMR including switching frequency dithering for improved electromagnetic interference (EMI) performance. There are also 500kHz options, ACMR, ANMR, ACDMR, ANDMR, to support designs that prefer a lower switching frequency.

## FREE DEV BOARD

36V, 3A synchronous buck converter evaluation board based on DCP3603.

**Orderable Part Number**  
**STEVAL-3603BC1**

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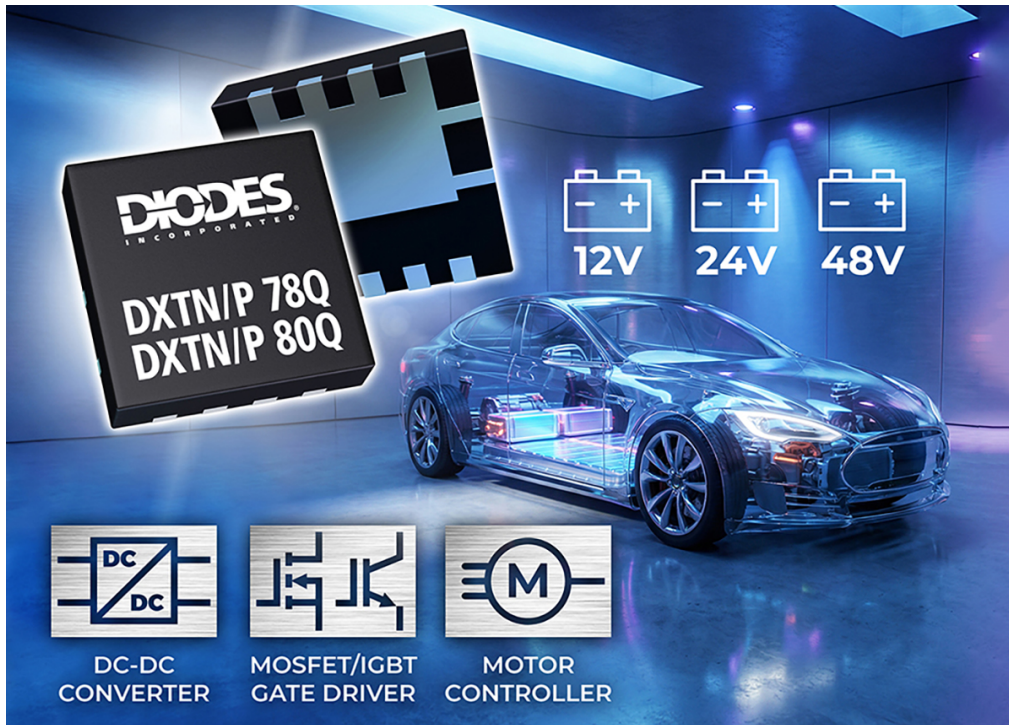
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TELECOMS

# High-efficiency bipolar transistors minimize conduction losses in automotive designs

Delivering high conduction efficiency and thermal performance, the DXTN and DXTP 78Q and 80Q series of bipolar transistors, from Diodes Incorporated, enable higher power density in automotive switching and control applications.



**DIODES**  
INCORPORATED

## FEATURES

- Side wall plateable terminals
- 2.4W power dissipation
- Operating temperature range: -55°C to 175°C
- Maximum continuous collector current range: 4A to 10A

## APPLICATIONS

- MOSFET and IGBT gate drivers
- Low-dropout voltage regulators
- Dc-dc converters
- Power line and load switching circuits
- Solenoid and relay drivers

Diodes Incorporated supply the DXTN and DXTP 78Q and 80Q series of bipolar transistors providing a broad range of collector-emitter breakdown voltage ratings from 30V to 100V. These transistors handle continuous currents up to 10A, and peak pulses up to 20A, supporting 12V, 24V, and 48V automotive systems.

With a saturation as low as 17mV, the transistors reduce conduction losses by up to 50% compared to previous generations, and low on-resistance down to 12mΩ further minimizes heat generation in gate driving, power line switching and dc-dc conversion tasks.

For space-constrained designs, the transistors are supplied in a surface-mount PowerDI@3333-8 package measuring 3.3mm x 3.3mm. This compact footprint reduces PCB footprint by up to 75% relative to traditional SOT223 alternatives, and includes a large underside heatsink.

The transistors have an operating temperature of up to 175°C, ensuring reliability in harsh environments, as well as high ESD robustness with human body model (HBM) rating of 4kV and a charged device model (CDM) rating of 1kV.



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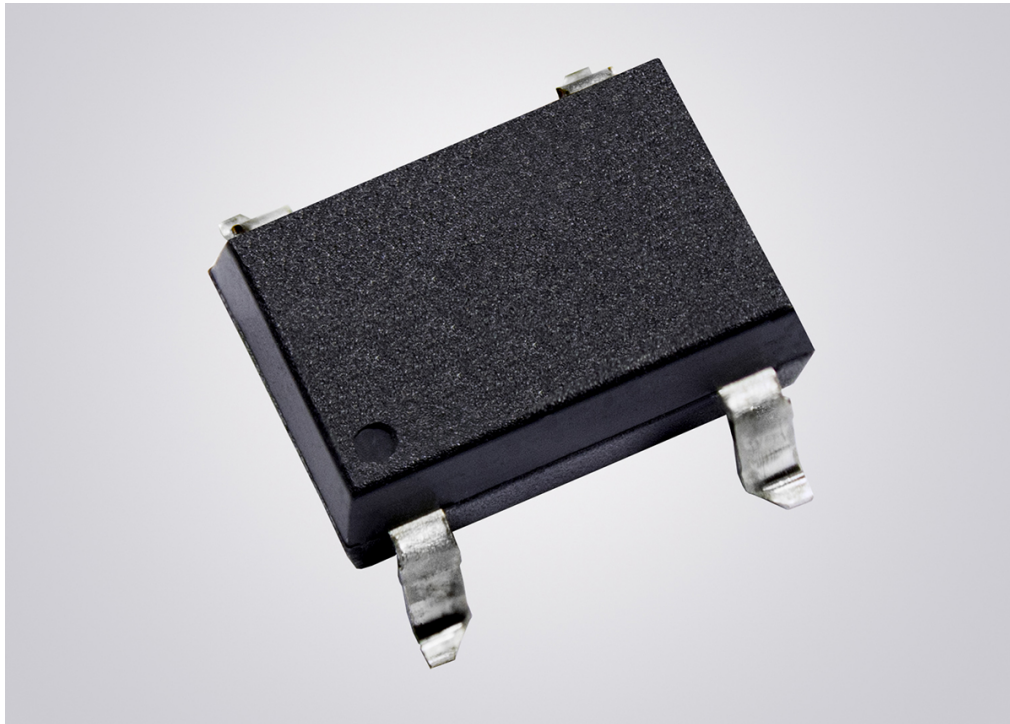
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TELECOMS

# 1-Form-A solid-state 1500V relay built for high-voltage power solutions

Rated for load currents up to 50mA, the Vishay Intertechnology VORA1150 solid-state relay, provides reinforced isolation and long lifetime for high-voltage power systems, and fast bounce-free switching.



The DNA of tech.™

## FEATURES

- 1500V load voltage rating
- 50mA load current rating
- 5300Vrms isolation test voltage
- 100Ω on-resistance
- Temperature range: -40°C to 125°C

## APPLICATIONS

- Battery isolation measurement in EV
- Pre-charge relay
- On-board charger
- Battery management system
- Solar panel leakage current detection

The optical isolation of the VORA1150 is achieved via an infrared emitter coupled with high-voltage MOSFETs between the output terminals, delivering clean, bounce-free switching and a practically unlimited number of switching cycles for long lifetime and high reliability in demanding power applications. Fast switching performance supports system monitoring and control tasks, with turn-on time of 50μs and turn-off time of 80μs.

This AEC-Q102-qualified 1-Form-A solid-state relay is designed to support modern high-voltage power architecture, including 800V automotive platforms. The relay is housed in a 4-pin SMD-8 package that provides more than 5mm creepage distance between the output pins, helping designers to meet spacing requirements in compact layouts.

For insulation robustness, the relay offers a high isolation test voltage of 5300Vrms according to UL 1577, and the package supports creepage and clearance distances of at least 8mm from input to output for reinforced insulation designs.



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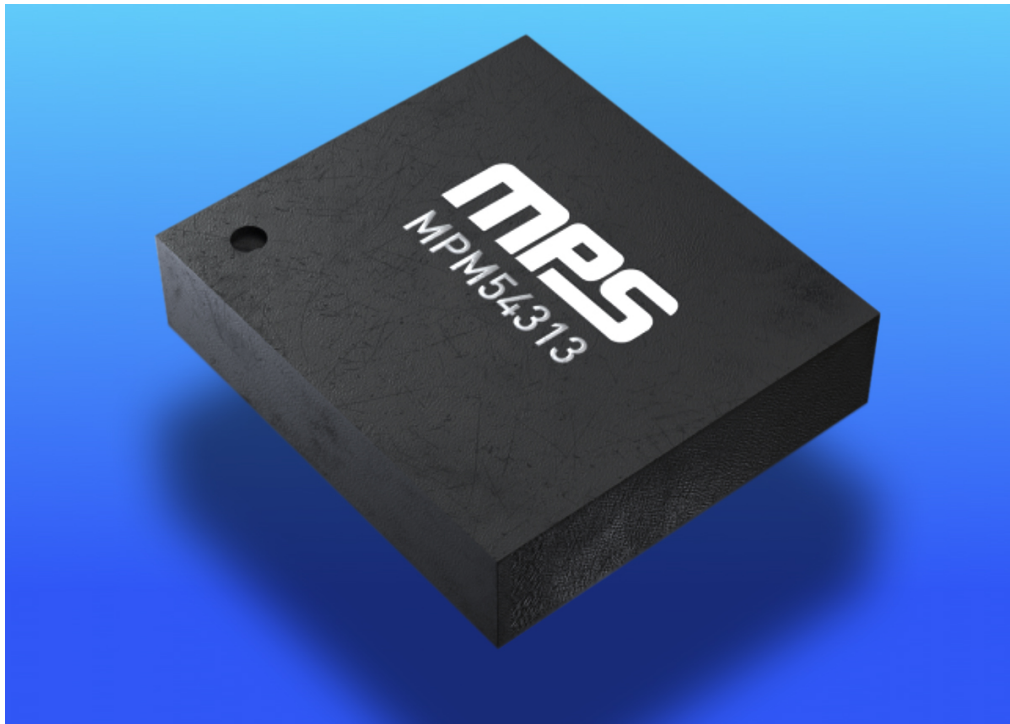
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TELECOMS

# Power module streamlines digital rails with programmable circuit control and sequencing

The Monolithic Power Systems triple-output MPM54313 power module combines three buck rails, integrated inductors, and I2C programmability to simplify multi-rail power, with monitoring, sequencing, and flexible paralleling options.



**MPS**

## FEATURES

- Differential output remote sense
- Selectable pulse-frequency modulation (PFM)
- Pulse-width modulation (PWM)
- Open-drain power good (PG) indication
- Protection features:
  - Under-voltage lockout
  - Over-voltage
  - Under-voltage
  - Thermal shutdown

## APPLICATIONS

- Networking
- Telecommunication
- Optical module power supplies

The MPM54313 is a fully integrated, triple-output power module designed for dense digital loads that need multiple tightly regulated rails and fast transient response. The module uses adaptive constant-on-time (COT) control and integrates power-on and power-off sequencing, configurable soft-start and compensation, plus adjustable protection thresholds, reducing external components and tuning effort.

A key advantage is digital configurability. Output voltage can be set online via inter-integrated circuit (I2C) bus or pre-programmed using multiple-time programmable (MTP) memory, allowing the same hardware to be configured for different rail plans.

MPM54313 supports multiple ways to scale current without redesigning the power stage. It includes configurable active voltage positioning (AVP) to create droop for passive current sharing when paralleling up to three outputs. In addition, buck A and buck B can be configured to operate in parallel for up to 6A using interleaving mode, providing active current balancing and improved ripple performance for higher-current rails. Differential remote sense pins support accurate regulation at the load.

The module also adds telemetry and system-level control features that support monitoring of output voltage, output current, and junction temperature via I2C, provides open-drain power good (PG), and allows selection of pulse-frequency modulation (PFM) or pulse-width modulation (PWM) operating modes with frequency adjustment through I2C. Switching frequency is configurable from 500kHz to 1000kHz, enabling designers to trade-off efficiency and transient performance.

The MPM54313 operates from 4V to 16V input, supports 0.4V to 5.5V output range, and is offered in a ball grid array (BGA) 8mm x 9mm x 2.58mm package.

## FREE DEV BOARD

Triple-output, power module with an I2C interface evaluation board.

**Orderable Part Number**  
**EVM54313-BJ-00A**

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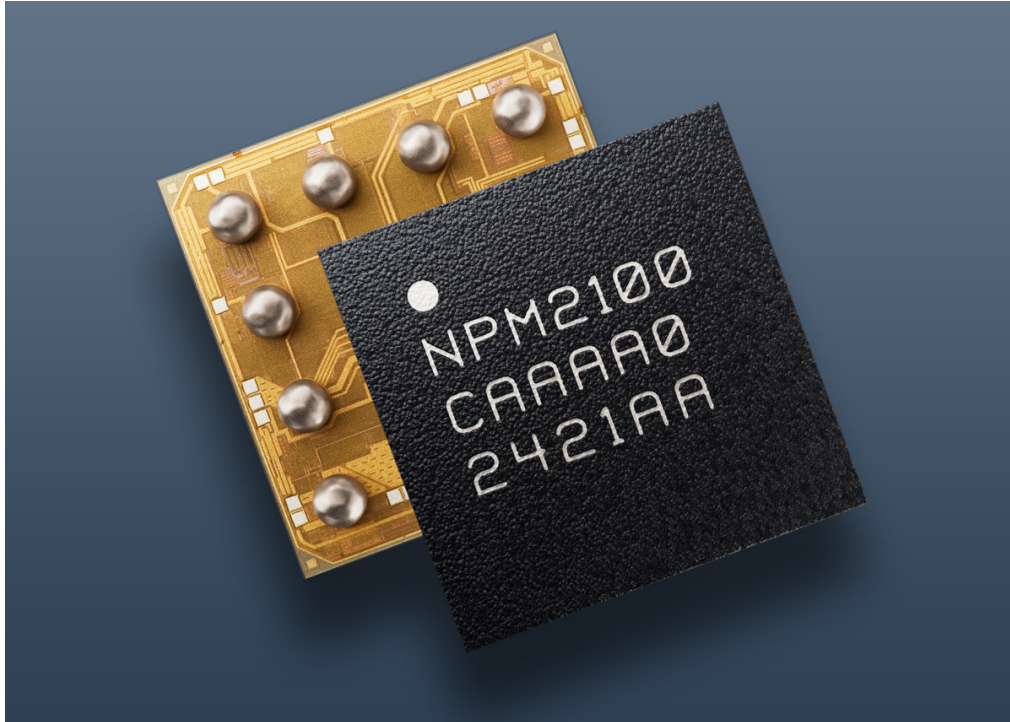
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TELECOMS

# Efficient PMIC extends primary-cell battery life for embedded IoT designs

The nPM2100 power management IC (PMIC) from Nordic Semiconductor features a toolbox of power-saving functions to maximize battery runtime in primary-cell battery-powered designs.



Nordic Semiconductor has introduced the nPM2100 PMIC to meet the challenges of limited battery life in wireless sensors and peripherals. The PMIC supports input voltages ranging from 0.7V to 3.4V, enabling operation from single or dual AA and AAA batteries, silver-oxide cells, or 3V CR2032 coin cells.

An integrated boost converter operating with 150nA quiescent current delivers up to 95% efficiency, ensuring longer life for power-limited products requiring higher operating voltages than provided by the battery.

Many IoT applications spend long durations in sleep: the nPM2100 includes a 175nA hibernate mode with wake-up functions that can extend battery-life by up to three times. To extend shelf life, 35nA ship mode disconnects the battery and eliminates the need for mechanical pull tabs during the shipping process.

The nPM2100 uses precise voltage and temperature-based fuel gauging on the host microprocessor, instead of solely standard voltage-based estimation, reducing the likelihood of premature replacement or unexpected shutdowns.

Software support is available for nRF52, nRF53, and nRF54 series wireless multiprotocol systems-on-chip (SoC) via the nRF Connect SDK, though the nPM2100 PMIC also interfaces with non-Nordic host processors.



**NORDIC**  
SEMICONDUCTOR

## FEATURES

- LDO regulator output range: 0.8V to 3.0V
- Supply voltage range: 0.7 to 3.4V
- Boost converter output range: 1.8 to 3.3V
- WLCSF and QFN16 package options
- 150mA maximum boost output current

## APPLICATIONS

- Computer peripherals
- Human interface devices
- Remote controls
- Smart home sensors
- Bluetooth asset trackers
- Fitness accessories
- Personal medical devices

## FREE DEV BOARD

Evaluation kit for nPM2100 PMIC with battery holders and software support.

**Orderable Part Number**  
**nPM2100-EK**

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# Automotive-grade MOSFET boosts power density for low-voltage power stages

STMicroelectronics offers its STripFET F8 switch in a surface-mount package which helps automotive designers to reduce conduction losses, limit switching noise, and ease thermal designs.



## FEATURES

- 40V drain-to-source maximum voltage rating
- 350A continuous drain current at 25°C, silicon limited
- 120A continuous drain current at 25°C, package limited
- 1400A pulsed drain current
- Thermal resistance junction-to-case: 0.8°C/W
- Total power dissipation is 188W at 25°C
- Operating temperature: -55°C to 175°C
- 100% avalanche tested
- 10-year product availability commitment
- AEC-Q101 qualified

## APPLICATIONS

- Automotive motor control
- Body and convenience
- Chassis and safety
- Power train for ICE

The STL325N4F8AG is an automotive-grade N-channel power MOSFET rated at 40V and 350A, with 0.85mΩ maximum drain-to-source on-resistance supporting very low conduction losses in demanding low-voltage automotive and industrial power conversion.

Built on the STMicroelectronics STripFET F8 technology with an enhanced trench gate structure, STL325N4F8AG reduces internal capacitances and gate charge for faster, more efficient switching. Total gate charge is 80nC, and capacitances include 6600pF input and 1970pF output, helping designers to manage switching transitions in high-current motor control and power distribution.

In the PowerFLAT 5mm x 6mm wettable flank package, STL325N4F8AG supports compact layouts and reliable assembly inspection, while the improved body-drain diode softness helps to reduce electromagnetic interference (EMI), in low-voltage switching applications.

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# DIN rail ac-dc power supplies save space in industrial applications

The RACPRO1 series from RECOM is available with rated power outputs up to 960W and offers excellent thermal characteristics, allowing the power supplies to be densely mounted on the DIN rail.



**RECOM**

## FEATURES

- Low no-load power consumption
- DC-OK signal
- 5kV isolation
- Conforms to EN 60715 DIN rail mechanical standard
- IEC/EN/UL 62368-1, IEC/EN/UL/CSA 61010-1 and IEC/EN/UL 61010-2-201 safety certificates
- Conforms to EN 61000-6-4 Class B and EN61000-6-2 EMC standards

## APPLICATIONS

- Factory automation
- Industrial equipment
- Renewable energy generation
- Power distribution equipment
- Test and measurement instruments

RECOM has introduced a range of three-phase ac-dc power supplies which can be densely packed on a DIN rail to save space in industrial equipment.

The RACPRO1 range includes power supplies rated for 240W, 480W and 960W outputs in units which are 43mm, 52mm and 80mm wide. Offering efficiency up to 97.1%, and benefiting from advanced thermal management, the power supplies require no clear space at either side, helping to maximize packing density in the system.

These power supplies can operate at full power up to 60°C with only convection cooling, and down to -40°C, lower than most competing parts. The RACPRO1 power supplies also offer a power boost feature which enables them to supply capacitive or high-inrush loads without requiring the designer to over-specify the power supply.

The 480W and 960W power supplies can supply a constant voltage/constant current output, enabling battery charging and output paralleling.

The power supplies, which are made in Europe, are designed for long operating life. Reliability is enhanced by high levels of input-surge and output-return voltage immunity, ideal for industrial environments and motor or inductive loads.

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# GaN half-bridge transistor boosts power density for compact motor inverter stages

Integrating a 650V gallium nitride (GaN) half-bridge with a high-voltage driver and protections, the STMicroelectronics GANSPIN61x helps designers to build smaller, efficient three-phase motor inverters while keeping voltage slew rate under control.



## FEATURES

- Externally adjustable turn-on voltage slew rate (dV/dt)
- Reverse conduction capability
- Zero reverse recovery loss
- Operating temperature is from -40°C to 125°C
- Low gate and output capacitances for high-speed switching efficiency
- Compact QFN package: 9mm x 9mm x 1mm
- 10-year product availability commitment

## APPLICATIONS

- Home appliances
- Industrial applications
- Factory automation
- Servo drives
- Power tools

STMicroelectronics brings its GaN half-bridge system-in-package in a quad flat no-lead (QFN) format, helping motor-drive designers tame fast edges, reduce electromagnetic interference (EMI), and cut thermal overhead in three-phase inverter stages.

The GANSPIN611TR and GANSPIN612TR are power system-in-package half-bridges that integrate two enhancement-mode GaN transistors with a high-voltage, high-frequency gate driver. GANSPIN611TR integrates two 138mΩ, 650V HEMT GaN with 10A drain current, while GANSPIN612TR provides a pin-to-pin option with 270mΩ and 5.5A drain current.

Designed for motion control, both variants optimize voltage slew rate output to 10V/ns in hard-on and hard-off transitions, tailored for EMI and motor reliability.

The integrated driver includes linear regulators for high-side and low-side supplies, an internal bootstrap diode, a comparator for overcurrent detection with smart shutdown, and under-voltage lockout (UVLO) monitoring on the voltage supply for logic, and for the high- and low-side driver. Interlocking, shutdown, standby and fault pins support robust system control, with a 55ns gate driver contributing to an overall 150ns output propagation delay. Inputs are compatible from 3.3V to 20V with hysteresis and pull-down.

## FREE DEV BOARD

Three-phase 400W motor control reference design with GANSPIN611 and STM32G431RB.

**Orderable Part Number**  
**EVLGANSPIN1-3PH**

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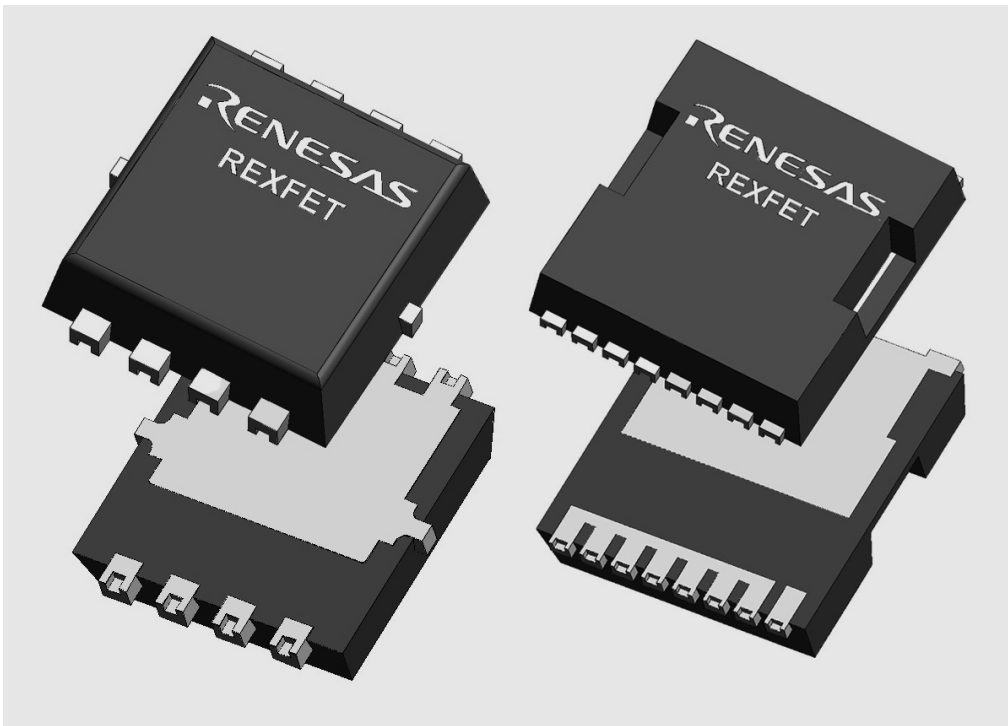
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TELECOMS

# Split-gate power MOSFETs streamline thermal and switching trade-offs

To boost efficiency and power density in high-current dc-dc rails, the Renesas REXFET-1 power metal oxide MOSFETs combine split-gate switching with compact packages.



**RENESAS**

## FEATURES

- REXFET-1 split-gate technology aimed at low on-resistance
- Standard level gate drive threshold voltage
  - 2V to 4V range for 100V MOSFETs
  - 2.2V to 3.7V for the 150V MOSFETs
- 100% avalanche tested
- MSL1 classification

## APPLICATIONS

- Industrial automation motor control
- Energy infrastructure conversion
- High-current dc-dc power conversion
- Power tools
- Robotics

Modern power designs are being pushed in two directions at once, higher current density on the PCB and tighter efficiency targets across load, temperature, and switching frequency. That creates a familiar set of trade-offs, conduction loss versus switching loss, plus thermal paths that often dictate overall size more than the schematic does.

The Renesas REXFET-1 N-channel power MOSFET family targets this balance with split-gate technology and package options that let designers scale from compact point-of-load stages to high-current conversion. Across the range, the MOSFETs are specified for low drain-to-source on-state resistance ( $R_{DS(on)}$ ), low input capacitance, and 100% avalanche testing, with operating junction temperature specified from  $-55^{\circ}\text{C}$  to  $175^{\circ}\text{C}$ .

Where the family becomes especially useful is packaging. For space-constrained layouts that still need solid thermal performance and automated optical inspection support, small outline, 8-pin, flat lead (SO8-FL) and ultra-small outline, 8-pin, flat lead ( $\mu\text{SO8-FL}$ ) packages use wettable flanks, helping assembly quality while keeping the footprint small. For higher power stages, the TO-Leadless (TOLL) and TO-Leaded top-side cooling (TOLT) options support top-side cooling, allowing heat extraction through the top of the package for compact, high-power boards. If thermal cycling robustness is a priority, the TO-Leaded with gullwing leads (TOLG) option keeps a similar profile to TOLL while using gullwing leads aimed at high thermal cycling capability.

Part Number	Drain-to-source Voltage	Continuous Drain Current at 25°C	On-resistance at 10V	Package	Package Focus
RBE034N15R1SZPW#KB0	150V	200A	3.4m $\Omega$	TOLT	Top-side cooling, heatsink pinout
RBE029N10R1SZN6#HB0	100V	160A	2.9m $\Omega$	SO8-FL, 5mm x 6mm	Wettable flanks, compact leadless
RBE015N10R1SZQ4#GB0	100V	340A	1.5m $\Omega$	TOLL	Top-side cooling, high-current footprint
RBE034N15R1SZQ4#GB0	150V	200A	3.4m $\Omega$	TOLL	Top-side cooling, high-current footprint
RBE111N10R1SZN2#HB0	100V	40A	11.1m $\Omega$	$\mu\text{SO8-FL}$ , 3mm x 3mm	Wettable flanks, ultra-compact
RBE015N10R1SZPV#GB0	100V	340A	1.5m $\Omega$	TOLG	Gullwing leads for thermal cycling

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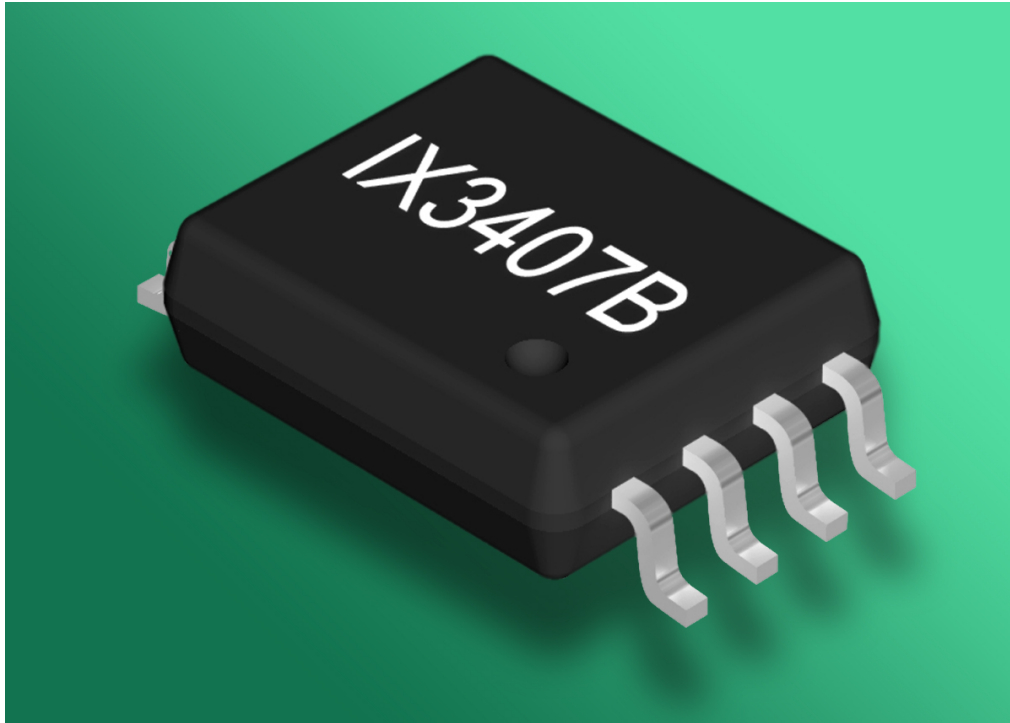
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TELECOMS

# Isolated IGBT gate driver delivers 7A peak drive for noisy power stages

Built to simplify robust IGBT and MOSFET gate drives in high slew rate environments, the Littelfuse IX3407B is a single-channel, capacitively isolated gate driver with separate source and sink outputs, and 2500Vrms isolation.



## FEATURES

- TTL and MOS compatible logic inputs, tolerant up to supply voltage
- Active shutdown (ASD)
- 2500Vrms galvanic isolation
- UL 1577 recognized

## APPLICATIONS

- Industrial motor drivers
- Industrial power supplies

The IX3407B targets power stages where switching edges, ground shifts, and common-mode transients can disrupt control signals, such as motor drives, industrial power supplies, and switched-mode power supplies.

A core benefit is drive strength combined with layout flexibility. The IX3407B provides 7A peak source and sink capability on separate output pins allowing designers to tune turn-on and turn-off independently using different gate resistors.

The driver supports a wide output-side supply range, VDD from 13V to 35V, which allows traditional 15V gate drive as well as higher bias levels where needed. The input side is powered from VCC, 3.1V to 17V. Both non-inverting and inverting inputs are provided, so designers can implement either polarity using a single control signal by tying the unused input high or low.

The IX3407B includes under-voltage lockout (UVLO) on both the input and output sides. When either supply is insufficient, the outputs are forced to an off state that clamps the power switch gate to the output voltage return, reducing the risk of partial turn-on.

Noise immunity is another highlight. The common-mode transient immunity (CMTI) is 150 kV/ $\mu$ s at 700V, supporting operation in fast-switching inverter and converter stages. Additional protection is provided through short-circuit clamping on the output when the output voltage rises above output supply voltage during severe events, with capability described as 500mA for up to 10 $\mu$ s. The IGBT gate driver is supplied in a wide body small outline integrated circuit (SOIC-WB) with an 8-pin package, and a tape and reel option on IX3407BTR.

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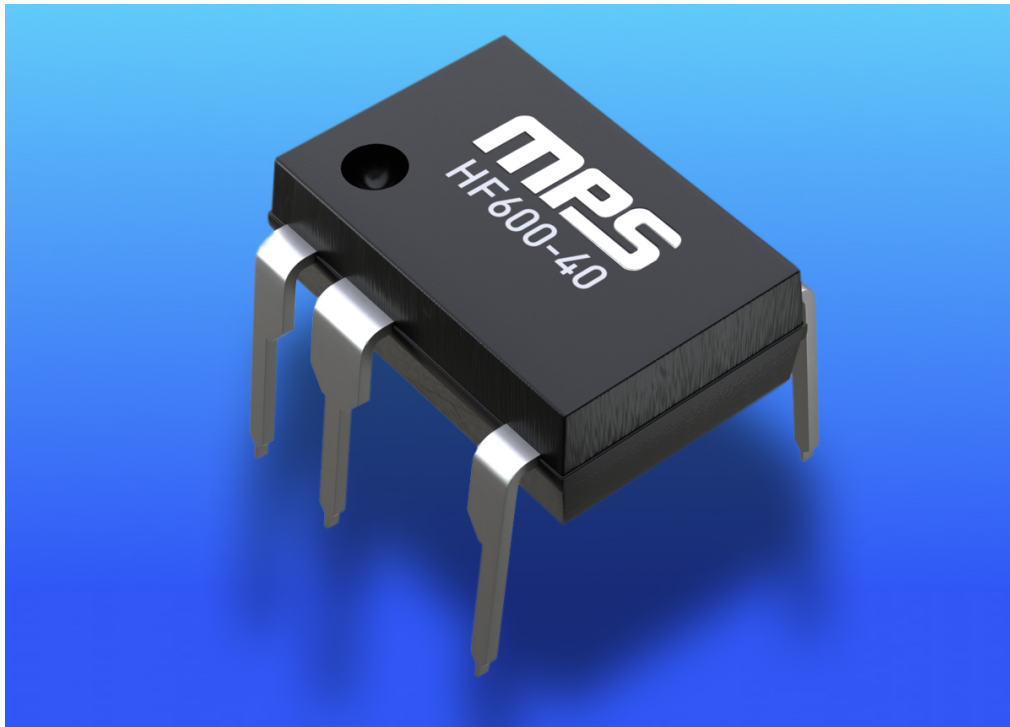
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# Multi-mode flyback regulator cuts standby power and eliminates audible noise

To enable efficient flyback supplies with no-load power below 30mW for compact home appliance designs, the Monolithic Power Systems HF600-40 integrates a 700V MOSFET and burst mode.



The HF600-40 is an integrated multi-mode flyback regulator designed for high-performance, high-efficiency offline power supplies. It supports continuous conduction mode (CCM) and quasi-resonant mode (QR), giving designers flexibility to optimize for load range, acoustic performance, and efficiency.

As a secondary-side regulation (SSR) based primary regulator, the HF600-40 is intended to work with secondary-side feedback circuitry. The converter integrates a high-voltage start-up circuit and uses burst mode at light load, enabling extremely low standby consumption, with the no-load power described as below 30mW. This makes it a strong fit for home appliance auxiliary supplies and always-on rails that must meet stringent standby targets.

To address one of the persistent pain points in QR flyback supplies, HF600-40 implements a patented valley lock technique that restrains valley jumping, helping to prevent audible noise. In addition, the regulator adopts multiple pulse-frequency modulation (PFM) modes based on input voltage, which increases output power capability in wide input designs. Frequency jittering is also included to help spread emissions and reduce the electromagnetic interference (EMI) signature.

**MPS**

## FEATURES

- Frequency foldback down to 25kHz at light loads
- Built-in high-voltage start-up circuit
- Peak current mode control with line compensation and leading-edge blanking
- Protection features:
  - Under-voltage lockout (UVLO)
  - Over-voltage
  - Zero-current detection over-voltage
  - Zero-current detection under-voltage
  - Overload
  - Brown-in
  - Short-circuit protection
  - Current-sensing short/open
  - Over-temperature

## APPLICATIONS

- Home appliances
- Three-phase smart power meters
- IR and RF designs
- Wireless speakers



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# 2-in-1 power modules reduce volume in multi-level inverters

The SCZ400x series from ROHM Semiconductor uses a 2-in-1 molded package to deliver high power density and flexible topology options for photovoltaic inverters, uninterruptible power supplies, and more energy systems.



## FEATURES

- 704W total power dissipation
- Up to 334V body diode surge current
- Gate-source voltage surge rating: -4V to 23V
- Operating temperature range: -40°C to 175°C

## APPLICATIONS

- Photovoltaic inverters
- Uninterruptible power supplies
- Semiconductor relays
- Dc-dc converters

ROHM has introduced the SCZ400x series of power modules which integrate 4th generation SiC MOSFET technology into the DOT-247 package. DOT-247 is a 2-in-1 molded module structure combining two dies to enable the use of larger chips than standard TO-247 footprints allow. This achieves a 15% reduction in thermal resistance and a 50% reduction in inductance compared to TO-247 components.

These improvements enable the SCZ400x series to deliver power density up to 2.3 times higher than equivalent TO-247 solutions in a half-bridge configuration, allowing designers to implement the same power circuitry in half the volume.

The series supports both half-bridge and common-source topologies, addressing demand for multi-level circuits such as three-level neutral point clamped (NPC), T-NPC, and five-level active NPC (ANPC) used in high-voltage photovoltaic systems.

The SCZ400x series includes 750V and 1200V options, with 750V power modules featuring on-resistance as little as 4mΩ and current capacity up to 251A, with 1200V modules offering resistance down to 6mΩ and up to 209A current.



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TELECOMS

# Automotive-grade 650V SiC MOSFET boosts power density in converters

The SCT027HU65G3AG silicon carbide (SiC) power MOSFET from STMicroelectronics supports compact high-voltage converters with fast switching, in addition to robust diode behavior with low thermal resistance.



## FEATURES

- 650V drain-to-source maximum voltage rating
- 60A continuous drain current at 25°C limited by case temperature
- 230A pulsed drain current
- Thermal resistance junction-to-case: 0.5°C/W
- Total power dissipation: 300W at 25°C
- Operating temperature: -55°C to 175°C
- Low gate and output capacitances for high-speed switching efficiency
- 10-year product availability commitment
- AEC-Q101 qualified

## APPLICATIONS

- EV/HEV traction inverters
- Dc-dc converters
- On-board charger (OBC)

The SCT027HU65G3AG is an automotive-grade SiC MOSFET rated at 650V and 60A, with a typical drain-to-source on-resistance of 29mΩ. Built on the STMicroelectronics third generation SiC MOSFET technology, it targets low conduction losses and high-frequency switching for electric vehicle (EV) power conversion stages such as traction inverters and on-board chargers.

In the 7-pin HU3PAK surface-mount, top-side cooling package, SCT027HU65G3AG is designed for high-current assemblies where thermal management is handled through an external heatsink mounted to the package top side. This approach helps to manage fast switching edges while maintaining a low thermal path from junction to case.

The SCT027HU65G3AG includes separate power-source and driver-source connections plus a source sensing pin to reduce parasitic effects and improve switching efficiency. Low capacitances and fast switching characteristics help to reduce switching losses, while the fast and robust intrinsic body diode supports bidirectional current flow needed in bidirectional conversion stages.

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# Galvanic isolated optocoupler provides current transfer ratio up to 600%

Providing low-power signal isolation for battery management and 48V power domains, the Vishay Intertechnology VOMA618A optocoupler offers benefits for automotive and high-reliability industrial systems.



The DNA of tech.™

## FEATURES

- Fast switching for feedback and control loops:
  - 2.5 $\mu$ s turn-on time
  - 3 $\mu$ s turn-off time
- Cut-off frequency is 165kHz
- Low-profile SOP-4 mini-flat package
- Ambient temperature range: -40°C to 110°C

## APPLICATIONS

- Galvanic and noise isolation
- Signal transmission
- Hybrid and electric vehicle applications
- Battery management
- 48V board net
- System control

The VOMA618A series of optocouplers brings power solutions for noisy supplies and mixed-voltage domains. The optocoupler supports galvanic and noise isolation for signal transmission between electrically separated circuits. The VOMA618A features a high collector emitter voltage of 80V, which offers current transfer ratio up to 600% at just 1mA input current, alongside low coupling capacitance of 1.2pF to help minimize noise coupling across the isolation barrier.

The optocoupler combines a gallium aluminum arsenide (GaAlAs) infrared emitting diode optically coupled with a silicon planar phototransistor detector. The high current transfer ratio at low input current helps to reduce LED drive requirements, supporting power-sensitive monitoring and control circuits that still need robust isolation.

The VOMA618A provides a maximum withstanding isolation voltage of 3750Vrms according to UL 1577, with creepage and clearance distance at least 5mm. It also supports safety insulation requirements with specified maximum transient isolation voltage of 6000V and maximum repetitive peak isolation voltage of 707V, helping designers to meet isolation targets in compact power control layouts.

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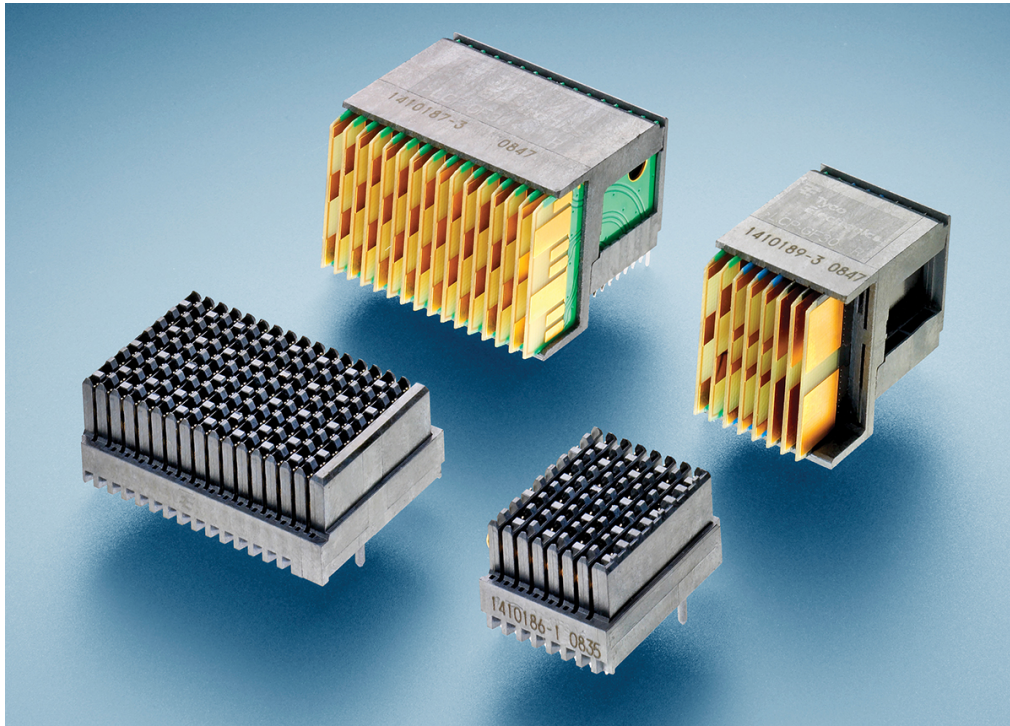
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# Ruggedized backplane connectors support high-speed data transmission in VPX systems

The MULTIGIG RT series of backplane connectors from TE Connectivity offers modularity and flexibility for high-speed board-to-board interconnects, supporting data rates up to 32Gbits/s in rugged computing environments.



AUTHORIZED DISTRIBUTOR

## FEATURES

- 200 to 500 mating cycles rating
- Quad-redundant contact system
- Ethernet, PCIe, InfiniBand, and Serial RapidIO support
- Ruggedized options available

## APPLICATIONS

- Defense systems
- Mass data storage
- High-end and midrange servers
- Telecommunications equipment:
  - Metro optical networks
  - SONET switched platforms
  - Aggregation switches

TE Connectivity supplies the scalable MULTIGIG RT interconnect family to provide the data throughput and signal integrity required for high-end servers and large data storage.

These board-to-board connectors use a printed circuit-based, pin-less interface to remove the need for pin connectors on backplane boards. This design reduces the risk of failure in card cage systems, allowing for custom impedance-matching and electrical sequencing. Wafers are manufactured for differential or single-ended performance, and the impedance, propagation delay, and crosstalk of the connectors can be altered to meet specific design requirements.

The MULTIGIG RT series is compliant with VITA 46 (VPX) standards and are available for 20.32mm or 25.40mm card pitch systems. MULTIGIG RT 2 connectors support data rates of 10Gbits/s, while MULTIGIG RT 3 connectors can reach over 32Gbits/s.

The connectors are tested to a highly accelerated life test (HALT) vibrations level of 0.2G<sup>2</sup>/Hz as per VITA 72 standards, and are easy to install needing only flat rock tooling.

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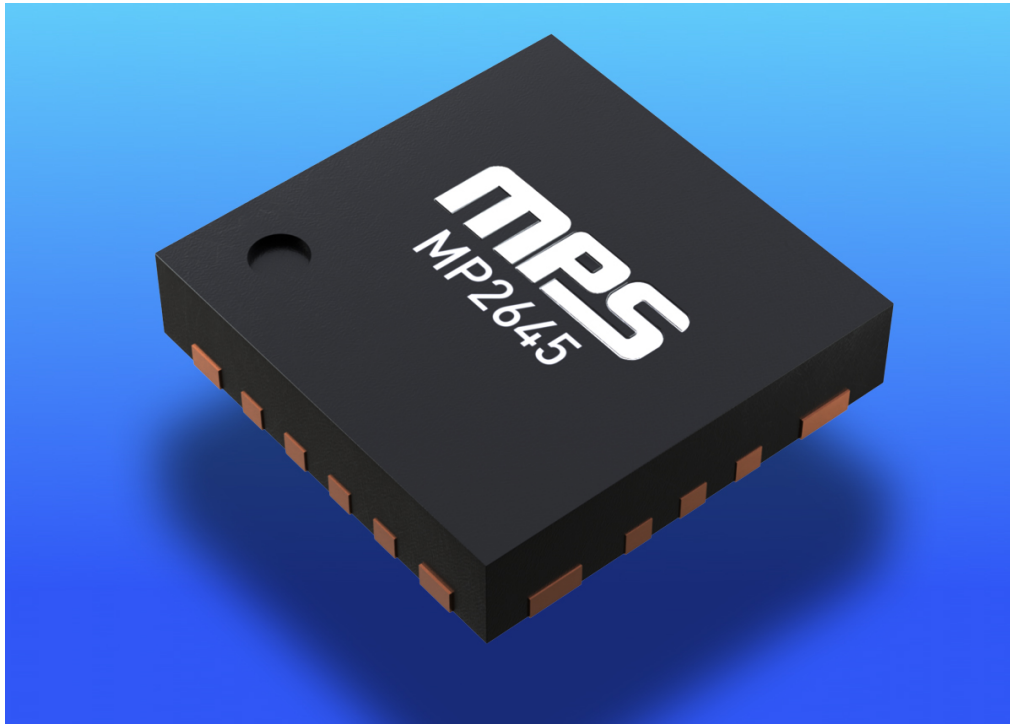
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# Bidirectional active balancer speeds cell equalization in stacked battery packs

Monolithic Power Systems (MPS) MP2645 is a 5-cell, bidirectional buck-boost active balancer that redistributes charge across series cells with up to 3.75A balance current, using a one-wire stackable interface to scale packs up to 33 series cells.



Passive balancing wastes energy as heat, which slows balancing and can create thermal hotspots in dense packs. MP2645 takes a different approach by moving charge between cells, enabling faster equalization with minimal heat generation, and helping to compensate for cell capacity mismatch to extend runtime in multi-cell battery systems.

A single MP2645 manages charge redistribution across five series cells, supporting chemistries such as Li-ion, Li-polymer, LiFePO<sub>4</sub>, and even supercapacitors. For larger packs, the active balancer uses a one-wire interface that supports up to eight cascaded devices, providing an easy path to active balancing for multiple series cells without needing complex multi-drop wiring.

This stacking model also helps with modular pack design. Designers can repeat the same 5-cell balancing block across higher-voltage strings, while keeping control and communication simple. The MP2645 is directly powered from the battery cells, reducing the need for extra bias rails or housekeeping supplies in the balancing section.

**MPS**

## FEATURES

- Up to 3.75A balance current for fast charge redistribution
- 40V maximum stack voltage
- One-wire interface for control and communication
- Stackable to 8 devices for packs up to 33 series cells
- Watchdog
- Pack over-voltage protection
- Thermal shutdown protection
- Quad flat no-lead (QFN), 19-pin, 4mm x 4mm package

## APPLICATIONS

- High-voltage energy storage systems
- Battery modules
- Transportation battery packs
- Industrial battery-backed systems
- Robotics



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TELECOMS

# Reliable connectors offer high current capability for use in industrial equipment

Hirose supplies the DF60 series of connectors in configurations for board or panel mounting. Compatible with 8 to 12 AWG wire, the DF60 connectors offer robust locking for secure connections.



**HRS** HIROSE  
ELECTRIC  
EUROPE B.V.

## FEATURES

- 10.16mm contact pitch
- 1 to 6 contact positions
- Cable sizes: AWG 8 to AWG 12
- 30 mating cycles
- 1,000V ac voltage rating
- UL, C-UL and TÜV certified
- Operating temperature range: -55°C to 105°C

## APPLICATIONS

- Robots
- Automotive devices
- Medical equipment
- Servers
- Industrial equipment
- Motors
- Telecoms equipment

Hirose supplies the DF60, a series of robust, high-power wire-to-board and wire-to-wire connectors which offers the high level of reliability needed for use in industrial equipment.

The DF60 range consists of cable-mount female crimp sockets and board-mount vertical, right-angle and panel-mount in-line male headers. The connectors can handle currents of up to 65A.

The low-profile plug and receptacle housings have a mated height of only 30mm when using the vertical receptacle and header.

The robust lock provides a positive tactile sensation and an audible click when mated. This confirms that the connector is fully engaged, guaranteeing complete electrical and mechanical connection. The lock is on the center of the housing to avoid uneven locking and cable entanglement, a common problem with side locks.

In addition, multiple connectors can be mounted closer together side-by-side. The cable-mount female socket housing uses crimp contacts which provide five independent points of contact. Two of the contact points are fixed in the upper section. The other three in the lower section are spring-based, allowing movement to follow the flat structure of the male contact during the mating operation. This provides high contact reliability, secure connection and strong resistance to vibration.

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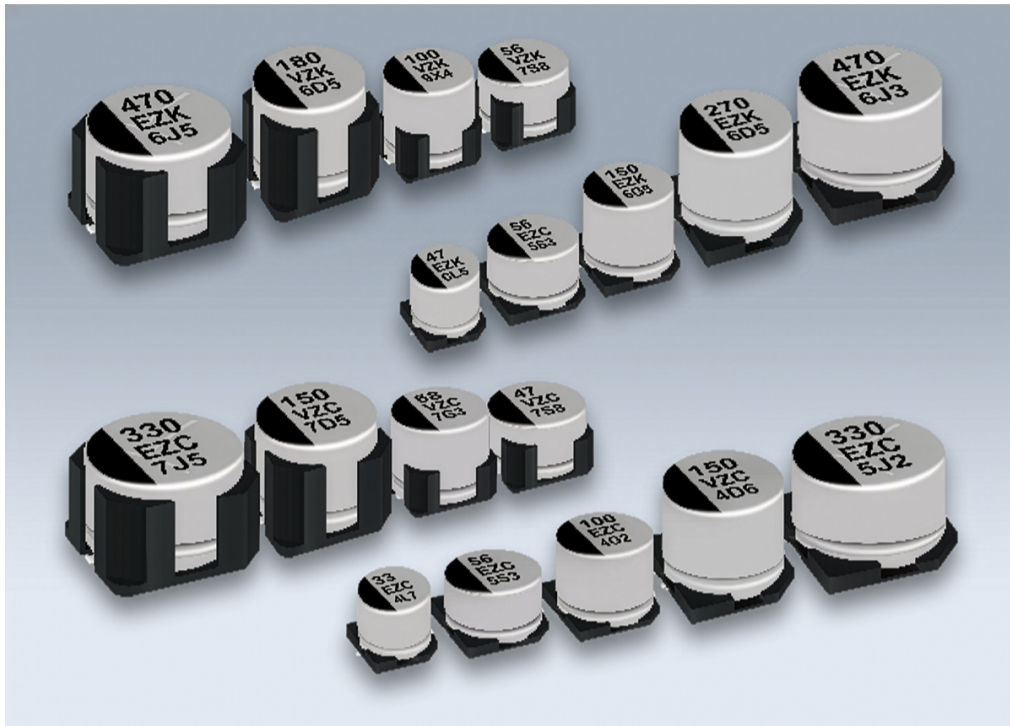
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# Hybrid capacitors push endurance and ripple current for compact power rails

Panasonic Industry ZC and ZK conductive polymer hybrid aluminum electrolytic capacitors combine low equivalent series resistance (ESR) and strong ripple capability for automotive and industrial power stages.



## Panasonic INDUSTRY

### FEATURES

- Conductive polymer hybrid aluminum electrolytic construction
- Low equivalent series resistance (ESR)
- Endurance at elevated temperature: 4000 hours at 125°C
- Operating temperature range: -55°C to 125°C
- AEC-Q200 compliant

### APPLICATIONS

- Industrial power rails
- Automotive and transportation
- Energy systems

The ZC and ZK series are surface-mount conductive polymer hybrid aluminum electrolytic capacitors designed for high-temperature, lead-free reflow assembly. Both families target designs that need low impedance at high switching frequencies and stable capacitance behavior over temperature, while keeping the footprint compact.

The ZC series is the higher-voltage option, supporting rated voltages up to 80V, which makes it a good fit for 48V systems, distributed industrial rails, and automotive subsystems where voltage margin is needed.

The ZK series focuses on higher capacitance and ripple current versus ZC, while keeping the same 4000 hours at 125°C endurance target. It is aimed at lower-voltage rails, 25V to 35V, where bulk energy storage and ripple handling are the priority.

Both families are offered in versions intended for demanding mechanical environments. Vibration-proof capacitors are available with Panasonic test conditions indicating maximum acceleration up to 30G. Vibration-proof capacitors are available with diameter options which include 6.3mm, 8mm and 10mm.

Series	Part No.	Rated Voltage Range (V)	ESR (mΩ)	Capacitance Range (μF)	Ripple Current (mA rms)	Tan (θ)	Size Code	Size (mm)	
								Ø D	L
ZC	EEHZCxx	25 to 50	80 to 120	10 to 33	500 - 550	0.1 to 0.14	C	5	5.8
		25 to 63	50 to 120	10 to 56	700 - 900	0.08 to 0.14	D	6.3	
			30 to 80	22 to 100	900 - 1400		D8		7.7
		25 to 80	27 to 45	22 to 220	1050 - 1900		F	8	10.2
			20 to 36	33 to 330	1360 - 2900	G	10		
ZK	EEHZKxx	25 to 35	80 to 100	33 to 47	750 - 850	0.12 to 0.14	C	5	5.8
			50 to 60	56 to 82	1200 - 1300		D	6.3	
			30 to 35	100 to 150	1700 - 1800		D8		8
			27	180 to 270	2000		F		
			20	330 to 470	2800		G	10	

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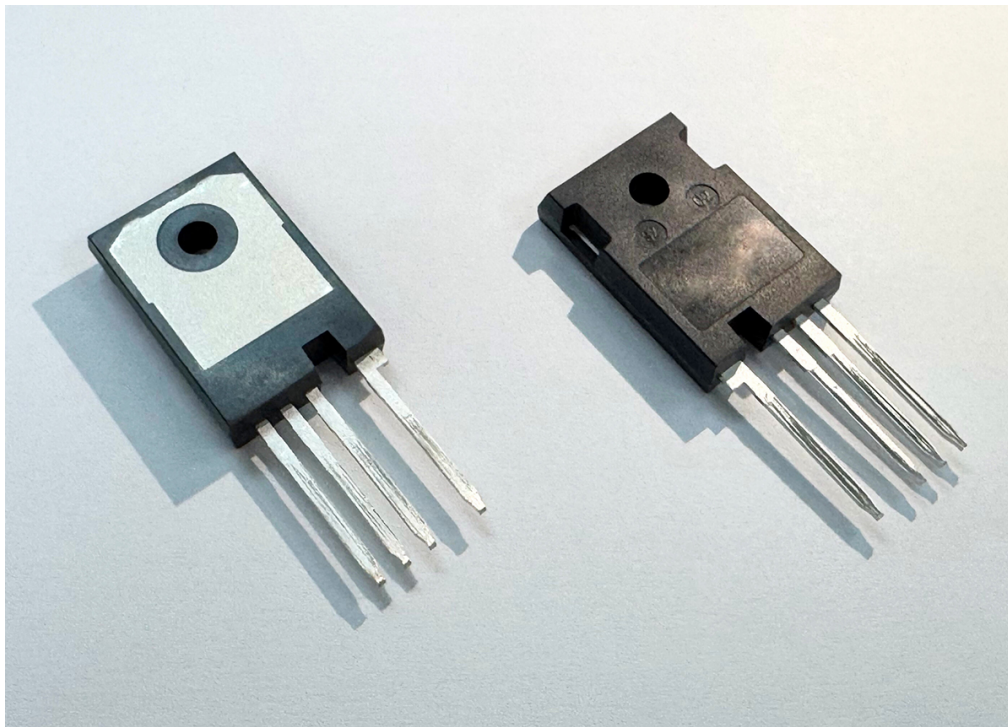
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# 1,500V SiC MOSFET reduces conduction losses in high-voltage power converters

The S3M0130150K from SMC Diode Solutions offers high blocking voltage and low on-resistance to improve efficiency and to reduce component count in automotive power and renewable energy systems.



## FEATURES

- 130m $\Omega$  on-resistance
- 31nC total gate charge
- 24pF output capacitance
- Operating temperature range: -55°C to 175°C

## APPLICATIONS

- EV fast charging modules
- On-board chargers
- Solar inverters
- Uninterruptible power supplies
- Switch-mode power supplies
- Dc-dc converters
- Energy storage systems

The S3M0130150K is a 1500V silicon carbide (SiC) power MOSFET which combines high blocking voltage capability with low on-resistance to improve the efficiency and to reduce the size of switching power converters.

In solar energy generation and energy storage, the S3M0130150K supports the trend toward higher system voltages. For auxiliary power supplies operating higher than 1000V dc, these SiC MOSFETs allow designers to implement a single-switch flyback topology. This reduces design complexity and component count compared to silicon MOSFETs that typically require a dual-transistor flyback topology.

Housed in a 4-pin TO-247-4 package, the MOSFET includes a Kelvin source pin, separating the gate drive loop from the power source loop. This reduces the effect of source inductance, enabling faster switching speeds and lower switching losses compared to standard 3-pin packages.

The S3M0130150K has positive temperature characteristics, which simplifies parallel connection for higher power requirements. It also features a robust intrinsic body diode with low reverse recovery charge, which is suitable for hard-switching designs.



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