# Infineon EiceDRIVER™ gate driver ICs

Selection guide 2019

## Every switch needs a driver

www.infineon.com/gatedriver
www.infineon.com/gdbrochure

## Dear Customer and Partner,

Power electronics applications employ power device switches. And power device switches require optimum gate drive solutions.

Applications such as battery-driven power tools, small and major home appliances, computing and telecom servers, EV charging, solar, and robotics all have special requirements. An optimum gate drive configuration is essential for all power switches, whether they are in discrete form or in a power module. State-of-the art discrete switch families including CoolMOS™ and OptiMOS™ silicon MOSFETs, TRENCHSTOP™ IGBTs, CoolGaN™ gallium nitride HEMTs, and CoolSiC™ silicon carbide MOSFETs as well as open-frame modules such as Easy and Econo power modules, require tuning of gate drive circuits to take full advantage of their capacity and capabilities. One of the most common questions for our new wide-bandgap power devices such as CoolGaN™ or CoolSiC™ is "how do you drive one of these?"

Infineon gate drivers provide a wide range of typical output current options, from 0.1-A up to 10-A, suitable for any power device size. Robust gate drive protection features such as fast short-circuit protection, programmable dead-time, shoot-through protection, and active shutdown, make the drivers well-suited for all power devices, including CoolGaN™ and CoolSiC™. Infineon gate drivers also provide advanced features such as integrated bootstrap diodes, enable and fault reporting functions, input filters, OPAMP and DESAT functions. Active Miller clamps and  separate sink and source outputs options also provide design flexibility for all applications. Infineon EiceDRIVER™ family of gate drivers makes it easier for our customers to drive all power switches and power modules. For galvanic isolation requirements, both basic and reinforced isolated product options are available.

We do what we promise. That's quality made by Infineon. With our modern and proactive quality management system, we support the operational excellence of Infineon by translating customer requirements into actions. We are committed to being the best in class on cost, quality and time to market. Our quality guidelines serve as a security fence to prevent productivity measures that compromise our quality.

Infineon is a world leader in power semiconductor solutions that make your life easier, safer, and greener. We empower the efficient generation, transmission and consumption of electrical energy. In short, we empower a world of unlimited energy. The EiceDRIVER™ Gate Driver Selection Guide 2019 provides innovative and optimum gate driver solutions to take full advantage of our state-of-the-art switch technologies to come closer to this goal.

**Roland Stele**
GM and VP
Gate Driver ICs
Industrial Power Control

# Contents

# Infineon EiceDRIVER™ gate driver IC

## Overview

Gate driver ICs serve as the interface between control signals (digital or analog controllers) and power switches (IGBTs, MOSFETs, SiC MOSFETs, and GaN HEMTs). The integrated gate-driver solutions reduce your design complexity, development time, bill of materials (BOM), and board space while improving reliability over discretely-implemented gate-drive solutions.

Every switch needs a driver, and every driver needs a switch. Infineon offers a comprehensive portfolio of driver ICs with a variety of configurations, voltage classes, isolation levels, protection features, and package options. These flexible gate driver ICs are complementary to Infineon IGBT discretes and modules, silicon (CoolMOS™, OptiMOS™ and StrongIRFET™) and silicon carbide MOSFETs (CoolSiC™), gallium nitride HEMTs (CoolGaN™), or as part of integrated power modules (CIPOS™ IPM and iMOTION™ smart IPM).
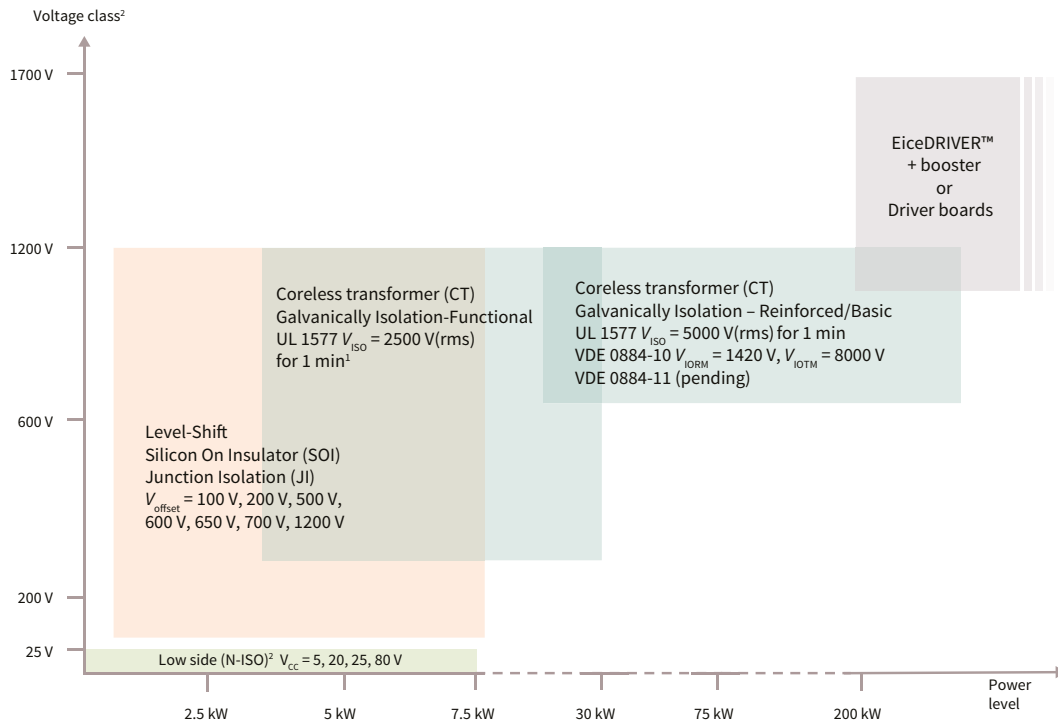


Note 1: 1EDC Compact only
Note 2: Voltage class is defined based on different driver configurations.
    1. For single high-side, high- and low-side, half bridge and three phase gate drivers, voltage class is defined as switch break down voltage in applications.

2. For low side drivers, voltage class is defined as maximum operating range supply voltage.
3. For special cases as 1EDNx550 (1EDN-TDI), common mode rejection (CMR) voltage range up to 80 V.

| Gate driver configuration | | | 5 V | 25 V | 100 V | 200 V | 500 V | 600 V | 650 V | 1200 V |
|---|---|---|---|---|---|---|---|---|---|---|
| Gate drivers | 1-Channel | High-side | | | 🟠 | 🟠 | 🟠 | 🟠 | 🟢 | 🟢 |
| | | Low-side | 🟢 | 🟢 | | | | | | |
| | 2-Channel | High-side | | | | | | | 🟢 | 🟢 |
| | | Low-side | | 🟢 | | | | | | |
| | | High- and low-side | | | | 🟠 | 🟠 | 🟠🟣 | 🟣 | 🟠 |
| | | Half-bridge | | | 🟠 | 🟠 | | 🟠🟣 | 🟢🟢 | 🟠🟢 |
| | 4-Channel | Full-bridge | | | 🟠 | | | | | |
| | 6-Channel | Three-phase | | | | 🟣 | | 🟠🟣 | | 🟠🟣 |
| System building blocks | | Current sense | | | | | | 🟠 | | 🟠 |
| | | Start-up | | | | | 🟠 | | | |

🟢 Non-isolated (N-ISO)　🟠 Junction isolation (JI)　🟣 Silicon on insulator (SOI)　🟢 Coreless transformer (CT)

# Infineon gate driver IC applications

Leveraging the application expertise and advanced technologies of Infineon and International rectifier, our gate driver ICs are well-suited for many applications such as industrial motor drives, major home appliances, solar inverters, automotive applications, EV charging, UPS, switch-mode power supplies (SMPS), high-voltage lighting, battery-powered applications, and small home appliances.

**Level-shifting technology (SOI&JI)**

**Coreless transformer (CT) technology**

| Fridge | Washing machine | Power Tools |
| Multicopter | Home & Garden | Service robots |
| Dishwasher | Laundry dryer | Vacuum cleaner |
| PFC | Induction | Sewing machine |
| Industrial SMPS | Aircon | Lighting |

| LEV | Automotive |
| Motor Control | eBike |
| Pumps | Fans |
| Server | Telecom |

| CAV | Industrial robotics | Traction |
| UPS | Industrial Automation | LV-drives |
| EV charger | Drives |
| Solar |

**Non-Isolated (N-ISO) technology**

# Infineon gate driver IC technologies

| Low-side only | Level-shift | | Galvanic isolation |
|---|---|---|---|
| 🟢 Non-isolated | 🟠 Junction isolation | 🟣 Silicon on insulator | 🟢 Coreless transformer |

| **Comprehensive families** of single- and dual-low-side drivers with flexible output current, logic configurations, and UVLOs | **20 years proven technology** | **Infineon SOI technology** for high-voltage applications with inherent integrated bootstrap diode capability and lower level-shift losses | **Magnetically-coupled isolation technology** provides galvanic isolation (functional, basic and reinforced) |
| **Rugged technology** of the high-voltage gate drivers, and the state-of-the-art 130-nm process | **Largest portfolio** of 200 V, 600 V, 700 V and 1200 V industry standard gate drivers using rugged proprietary HVIC process | Industry **best-in-class robustness** against negative transient voltage spikes on VS pin | **Strongest gate-drive output currents** (up to 10 A) reducing need for external booster circuits |

# Infineon non-isolated (N-ISO) technology

**Non-isolated (N-ISO) technology** refers to gate driver ICs utilizing low-voltage circuitry with the robust technology of high-voltage gate drivers, and the state-of-the-art 0.13-µm process. Infineon's world-class fabrication techniques enable high-current gate drivers for high-power-density applications in industry-standard DSO-8 and small form-factor SOT23 and WSON packages. Infineon offers comprehensive families of single-low-side and dual-low-side gate driver ICs with flexible options for output current, logic configurations, packages, and protection features such as under-voltage lockout (UVLO), integrated overcurrent protection (OCP), and truly differential inputs (TDI).

## Truly differential inputs (TDI)
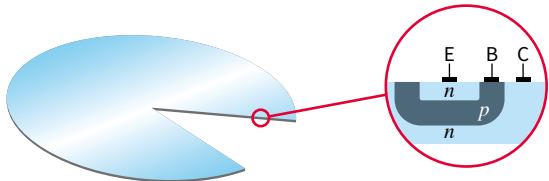
› The input signal levels of conventional low-side gate driver ICs are referenced to the ground potential of the gate driver IC. If in the application the ground potential of the gate driver IC shifts excessively, false triggering of the gate driver IC can occur.
› The 1EDN7550/1EDN8550 gate driver ICs have truly differential inputs. Their control signal inputs are largely independent from the ground potential. Only the voltage difference between its input contacts is relevant.
› This prevents false triggering of power MOSFETs.
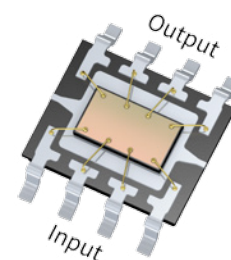
# Infineon junction-isolation (JI) technology

**Infineon p-n junction-isolation (JI)** technology is a mature, proven industry-standard MOS/CMOS fabrication technique. Infineon's proprietary HVIC and latch-immune CMOS technologies enable rugged monolithic construction. The advanced process allows monolithic high-voltage and low-voltage circuitry construction with the best price per performance for specific motor-control and switch-mode power applications.

**Main benefits of Infineon JI technology:**
› High current capability
› Precision analog circuitry (tight timing/propagation delay)
› Most comprehensive portfolio with industry-standard gate driver ICs
› Voltage classes: 1200 V, 600 V, 500 V, 200 V, and 100 V
› Configurations: three phase, half bridge, single channel, and more
› Driver ICs tailored towards the best price-performance ratio

Pioneered by International Rectifier (IR) since 1989 with the introduction of the first monolithic product, the high-voltage integrated circuit (HVIC) technology uses patented and proprietary monolithic structures integrating bipolar, CMOS, and lateral DMOS devices with breakdown voltages above 700 V and 1400 V for operating offset voltages of 600 V and 1200 V.
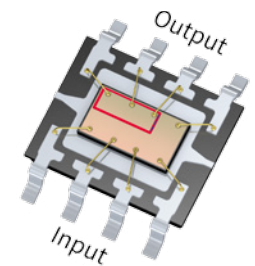
Using this mixed-signal HVIC technology, both high-voltage level-shifting circuits and low-voltage analog and digital circuits can be implemented. With the ability to place high-voltage circuitry (in a 'well' formed by polysilicon rings) , that can 'float' 600 V or 1200 V, on the same silicon away from the rest of the low-voltage circuitry, high-side power MOSFETs or IGBTs exist in many popular off-line circuit topologies such as buck, synchronous boost, half-bridge, full-bridge and three-phase.

These HVIC gate drivers with floating switches are well-suited for topologies requiring high-side, half-bridge, and three-phase configurations.
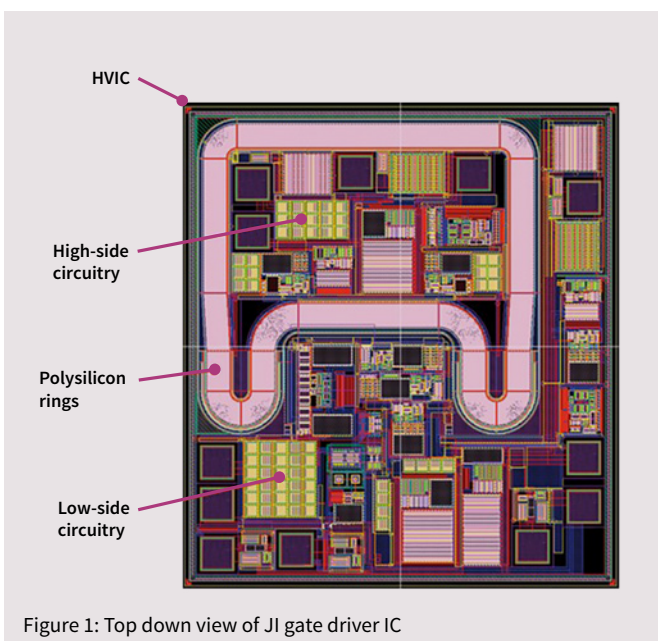
Figure 1: Top down view of JI gate driver IC
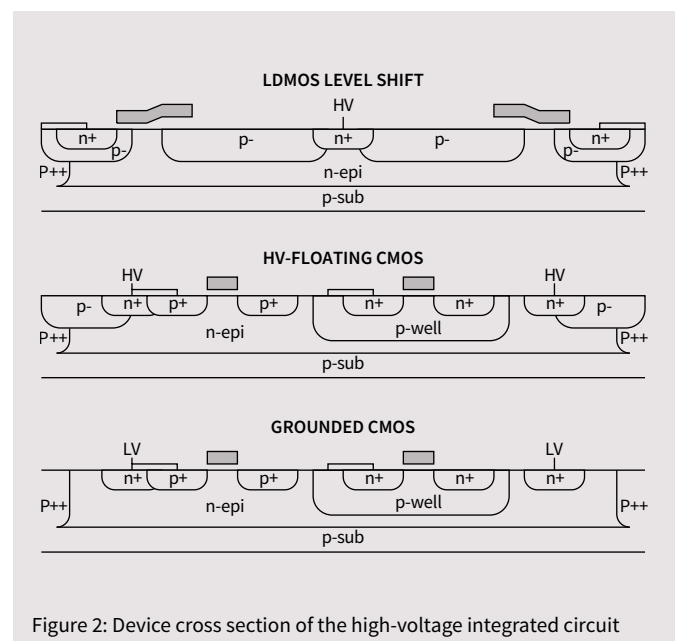
Figure 2: Device cross section of the high-voltage integrated circuit

# Infineon silicon-on-insulator (SOI) technology

**Infineon silicon-on-insulator (SOI) technology** is a high-voltage, level-shift technology providing unique, measurable and best-in-class advantages, including integrated bootstrap-diode (BSD) and industry-best-in-class robustness to protect against negative transient voltage spikes. Each transistor is isolated by buried silicon dioxide, which eliminates the parasitic bipolar transistors that causing latch-up. This technology can also lower the level-shift power losses to minimize device-switching power dissipation. The advanced process allows monolithic high-voltage and low-voltage circuitry construction with technology-enhanced benefits.



SiO₂
Active area
Substrate

**Main benefits of Infineon SOI technology:**
› Best-in-class immunity to negative transient voltage prevents erratic operation and latch-up while improving reliability
› Low ohmic integrated bootstrap diodes (BSD) have the lowest reverse recovery and forward losses resulting in increased efficiency, faster switching, lower temperature, and increased reliability
› Minimum level-shift losses improve driver efficiency and allow flexible housing designs
› Integrated input filters enhance noise immunity
› 200 V, 600 V, 650 V and 1200 V withstand voltages for each voltage design class providing operating margin

## Operation robustness of negative transient voltage at the VS pin (-VS)

Today's high-power switching inverters and drives carry a large load current. The voltage swing on VS pin does not stop at the level of the negative DC bus. It swings below the level of the negative DC bus due to the parasitic inductances in the power circuit and from the die bonding to the PCB tracks. This undershoot voltage is called "negative transient voltage".
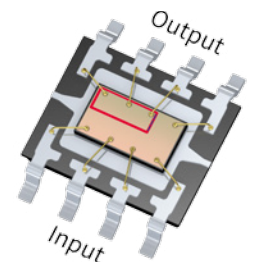
EiceDRIVER™ high-voltage level-shift gate driver IC products using Infineon SOI technology have the best-in-the-industry operational robustness. In Figure 4, the safe operating line of 6ED2230S12T* is shown at $V_{BS}$ = 15 V for pulse widths up to 1000 ns. In the green area, the products do not show unwanted functional anomalies or permanent damage to the IC.
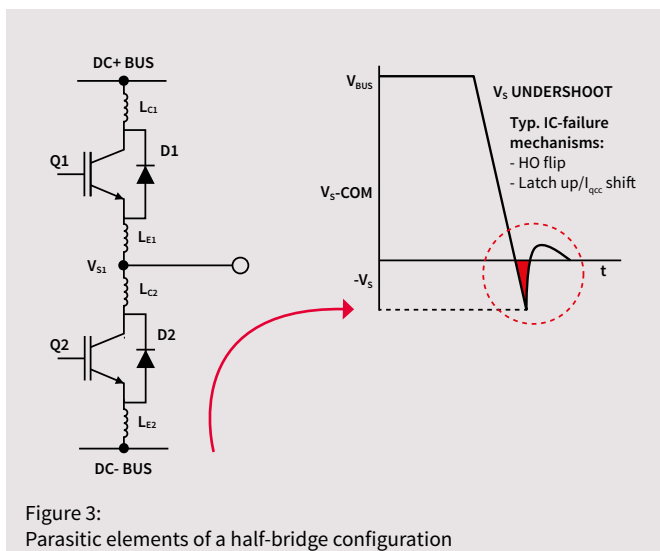


Figure 3:
Parasitic elements of a half-bridge configuration
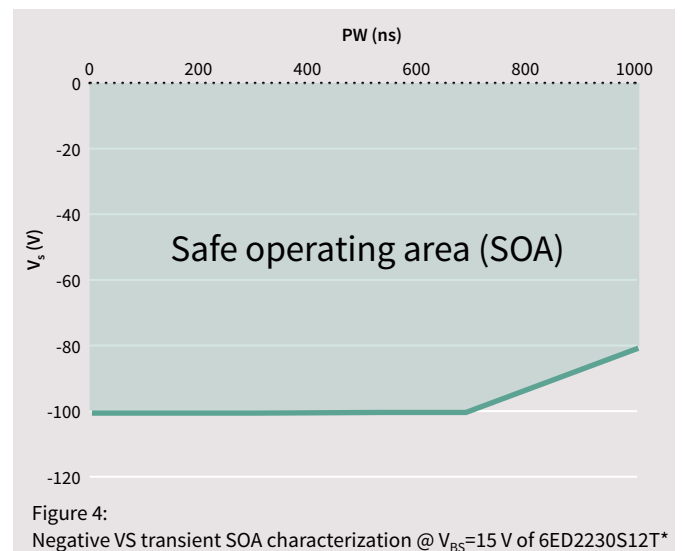


Figure 4:
Negative VS transient SOA characterization @ $V_{BS}$=15 V of 6ED2230S12T*

*Coming soon

# Infineon silicon-on-insulator (SOI) technology

## Integrated bootstrap diode (BSD)

The bootstrap power supply is one of the most common techniques for suppling power to the high-side driver circuitry due to its simplicity and low cost. As shown in Figure 5, the bootstrap power supply consists of a bootstrap diode and capacitor. The floating channel of level-shift gate drivers is typically designed for bootstrap operation. Infineon SOI drivers feature excellent integrated ultra-fast bootstrap diodes. The low diode resistance of $R_{BS} \leq 40\ \Omega$ enables a wide operating range.

The Infineon SOI drivers with this feature can drive larger IGBTs without the risk of self-heating, minimize BOM count, and reduce system cost.
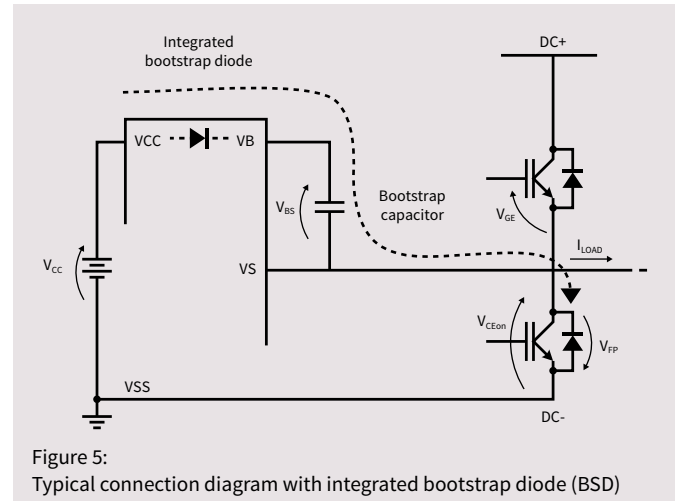


Figure 5:
Typical connection diagram with integrated bootstrap diode (BSD)

## Low level-shift losses

Level-shift losses count as a significant part when the operating frequency increases. A level-shift circuit is used to transmit the switching information from the low-side to the high-side. The necessary charge of the transmission determines the level-shift losses.

EiceDRIVER™ high-voltage level-shift gate driver IC products using the Infineon SOI technology require a very low charge to transmit the information. Minimizing level-shifting power consumption allows the design flexibility of higher frequency operations, as well as longer lifetime, improved system efficiency and application reliability.

In Figure 6, the thermal diagrams on the same PCB board show a temperature difference of 55.6°C lower in the power dissipation of the Infineon SOI-based products (2ED2106S06F*).
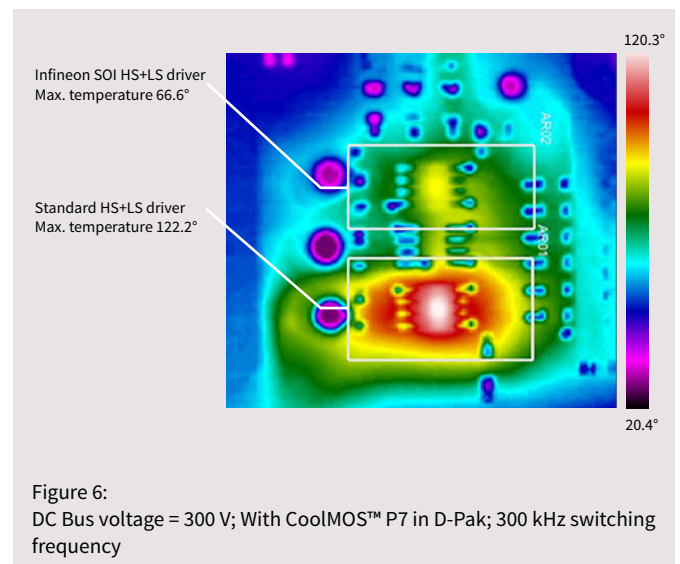


Figure 6:
DC Bus voltage = 300 V; With CoolMOS™ P7 in D-Pak; 300 kHz switching frequency

*Coming soon

# Infineon galvanically isolated coreless transformer (CT) technology

**Infineon coreless transformer (CT) technology** is a magnetically coupled, galvanically isolated technology which uses semiconductor manufacturing processes to integrate an on-chip transformer consisting of metal spirals and silicon oxide insulation. The on-chip coreless transformers are used for transmitting switching information between the input chip and output chip(s) and other signals. The technology provides short propagation delays, excellent delay matching, and strong robustness for driving SiC MOSFETs and state-of-the-art IGBTs.
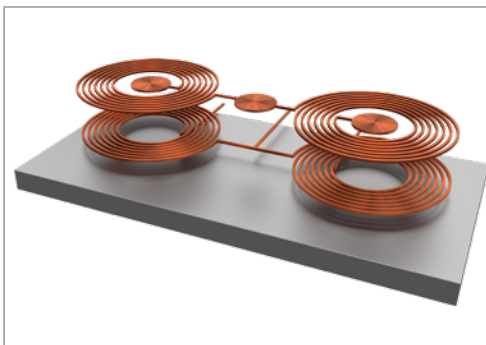
**Main benefits of Infineon CT technology:**
› Galvanic isolation (functional, basic, reinforced)
› Allows very large voltage swings of ±1200 V or larger
› Immunity against negative and positive transients
› Increases reliability of the end product
› Low power losses for switching frequencies into MHz range
› Flexible configurations and options such as
 - Output current (up to 10 A)
 - DESAT protection
 - Active Miller clamp
 - Short-circuit clamp
 - Isolation rating and certification
 - 150 mil and 300 mil packages

## Robustness

› Extremely robust signal transfer independent of common mode noise
› Common mode transit immunity (CMTI) up to 100 V/ns
› Tight propagation-delay matching: tolerance improves application robustness without variations due to aging, current, and temperature
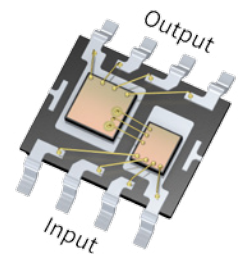
## Design flexibility

› Wide range of gate voltages up to 40 V, including negative gate voltage
› CT technology is ready for use with silicon carbide (SiC) MOSFETs
› Closed-loop gate current control option

## Precise timing control

› Precise, integrated filters reduce propagation-delay variation over a wide range of operating conditions
› Integrated filters reduce the need of external filters
› Tight propagation delay allows minimum deadtime improving system efficiency and decreasing harmonic distortion

Integrated ramp-based filter

Input pad structure

IN

GND
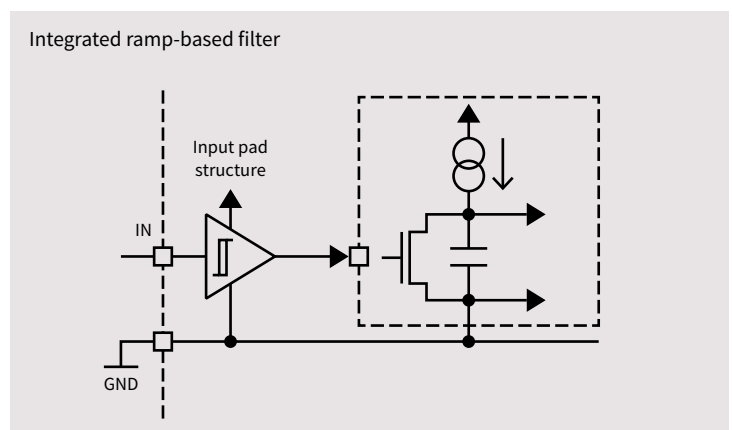
## Protection

› Reliable short-circuit detection via accurate desaturation (DESAT) detection circuits (current source and comparator) protects the power switches from damage during short-circuit condition
› Two-level turn-off (TLTO) for short-circuit current protection to lower collector-emitter voltage overshoot
› Active Miller clamping option protects against parasitic turn-on due to high dV/dt
› Built in short-circuit clamping limits the gate voltage during short circuit
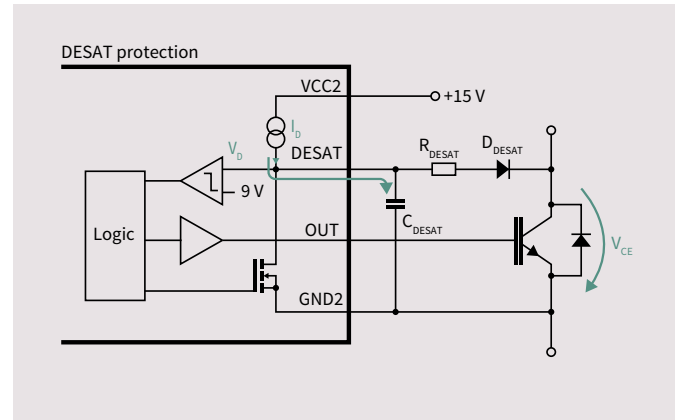


## Safety certification

› Safety certification available for VDE 0884 and UL 1577



## For SiC MOSFET switching

+SiC

› Ideal for ultra-fast switching 1200 V and 650 V silicon carbide power transistors such as CoolSiC™ MOSFETs
› The drivers incorporate most important key features and parameters for SiC driving:
  – DESAT for short circuit protection
  – Active Miller clamp

– Tight propagation delay matching
– Precise input filters
– Wide output side supply range
– Negative gate voltage capability
– Extended common mode transient immunity (CMTI) capability

## Definitions of the various isolation types



**Supplementary isolation**
Additional isolation to basic isolation as a fallback solution in case basic isolation fails

**Basic isolation**
Certified isolation applied to live parts to provide basic protection against electric shock

**Double galvanic isolation**
Certified isolation consisting of both basic isolation and supplementary isolation

**Galvanic isolation**

**Functional isolation**
Isolation between conductive parts only for the purpose of correct equipment operation

**Reinforced isolation**
Single certified isolation applied to live parts to protect against electric shock

Sources: IEC60747-5-5, VDE 0884-5/-10, UL 1577

# Galvanically isolated gate driver ICs

## Galvanically isolated gate driver ICs

Typical connection
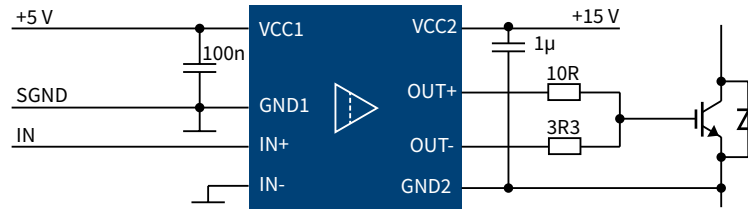


| Configuration | Voltage class [V] | Isolation type | Isolation rating | $I_{O+}/I_{O-}$ typ. [mA] |
|---|---|---|---|---|
| Single high-side | 1200 | Functional isolation | $V_{ISO} = \pm 1200$ V | 1300/900 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = \pm 1200$ V | 2200/2300 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = \pm 1200$ V | 4000/3500 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = \pm 1200$ V | 4000/3500 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = \pm 1200$ V | 4000/3500 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = \pm 1200$ V | 4400/4100 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = \pm 1200$ V | 5900/6200 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = \pm 1200$ V | 7500/6800 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = \pm 1200$ V | 10000/9400 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = \pm 1200$ V | 10000/9400 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = \pm 1200$ V | 2000/2000 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = \pm 1200$ V | 2000/2000 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = \pm 1200$ V | SRC/2000 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = 2500$ V(rms) for 1 min | 1300/900 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = 2500$ V(rms) for 1 min | 2200/2300 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = 2500$ V(rms) for 1 min | 4000/3500 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = 2500$ V(rms) for 1 min | 4000/3500 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = 2500$ V(rms) for 1 min | 4400/4100 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = 2500$ V(rms) for 1 min | 5900/6200 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = 2500$ V(rms) for 1 min | 7500/6800 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = 2500$ V(rms) for 1 min | 10000/9400 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = 2500$ V(rms) for 1 min | 10000/9400 |
| Single high-side | 1200 | Functional isolation | $V_{ISO} = 5000$ V(rms) for 1 min | SRC/2000 |
| Single high-side | 1200 | Basic isolation | $V_{IORM} = 1420$ V; $V_{IOTM} = 6000$ V; $V_{ISO} = 3750$ V(rms) for 1 min | 2000/2000 |
| Single high-side | 1200 | Basic isolation | $V_{IORM} = 1420$ V; $V_{IOTM} = 6000$ V; $V_{ISO} = 3750$ V(rms) for 1 min | 2000/2000 |
| Single high-side | 1200 | Basic isolation | $V_{IORM} = 1420$ V; $V_{IOTM} = 6000$ V; $V_{ISO} = 3750$ V(rms) for 1 min | 2000/2000 |
| Single high-side | 1200 | Basic isolation | $V_{IORM} = 1420$ V; $V_{IOTM} = 6000$ V; $V_{ISO} = 3750$ V(rms) for 1 min | 2100/2100 |
| Single high-side | 1200 | Basic isolation | $V_{IORM} = 1420$ V; $V_{IOTM} = 6000$ V; $V_{ISO} = 3750$ V(rms) for 1 min | 2000/2000 |
| Single high-side | 1200 | Basic isolation | $V_{IORM} = 1420$ V; $V_{IOTM} = 6000$ V; $V_{ISO} = 3750$ V(rms) for 1 min | 2000/2000 |
| Single high-side | 1200 | Basic isolation | $V_{IORM} = 1420$ V; $V_{IOTM} = 6000$ V; $V_{ISO} = 3750$ V(rms) for 1 min | 2000/2000 |
| Single high-side | 1200 | Reinforced isolation | $V_{IORM} = 1420$ V; $V_{IOTM} = 8000$ V; $V_{ISO} = 5000$ V(rms) for 1 min | SRC/2000 |
| Single high-side | 650 | Reinforced isolation | $V_{IORM} = 1000$ V(rms); $V_{IOTM} = 8000$ V; $V_{ISO} = 5700$ V(rms) for 1 min | 4000/8000 |
| Single high-side | 650 | Functional isolation | $V_{IORM} = 510$ V(rms); $V_{ISO} = 1500$ V(rms) for 10 ms | 4000/8000 |
| Single high-side | 250 | Functional isolation | $V_{IORM} = 460$ V(rms); $V_{ISO} = 1500$ V(rms) for 10 ms | 4000/8000 |
| Half-bridge | 1200 | Functional isolation on high-side | $V_{ISO} = \pm 1200$ V | 1500/2500 |
| Half-bridge | 650 | Functional isolation on high-side | $V_{ISO} = \pm 650$ V | 1500/2500 |
| Dual high-side/half-bridge | 1200 | Functional isolation | $V_{ISO} = \pm 1200$ V | 2000/2000 |
| Dual high-side/half-bridge | 1200 | Basic isolation | $V_{IORM} = 1420$ V; $V_{IOTM} = 6000$ V; $V_{ISO} = 3750$ V(rms) for 1 min | 2000/2000 |
| Dual high-side/half-bridge | 650 | Reinforced isolation | $V_{IOWM} = 1000$ V(rms); $V_{IOTM} = 8000$ V; $V_{ISO} = 5700$ V(rms) for 1 min | 4000/8000 |
| Dual high-side/half-bridge | 650 | Reinforced isolation | $V_{IOWM} = 1000$ V(rms); $V_{IOTM} = 8000$ V; $V_{ISO} = 5700$ V(rms) for 1 min | 1000/2000 |
| Dual high-side/half-bridge | 650 | Functional isolation | $V_{IOWM} = 510$ V(rms); $V_{ISO} = 1500$ V(rms) for 10 ms | 4000/8000 |
| Dual high-side/half-bridge | 650 | Functional isolation | $V_{IOWM} = 510$ V(rms); $V_{ISO} = 1500$ V(rms) for 10 ms | 1000/2000 |
| Dual high-side/half-bridge | 250 | Functional isolation | $V_{IOWM} = 460$ V(rms); $V_{ISO} = 1500$ V(rms) for 10 ms | 4000/8000 |
| Dual high-side/half-bridge | 250 | Functional isolation | $V_{IOWM} = 460$ V(rms); $V_{ISO} = 1500$ V(rms) for 10 ms | 4000/8000 |

SRC=Turn on slew rate control

| UVLO on/off typ. [V] | Prop delay off/on typ. [ns] | Base PN | Technology | Active Miller clamp | Automotive qualified | Comparator | Desaturation protection | Enable | Fault reporting | Fault reset | Operational amplifier | Over-current protection | Separate pin for logic ground | Separate sink/source outputs | Shoot-through protection | Shutdown | Soft over-current shutdown | Two-level turn-off | UL 1577 | VDE 0884-10 | DSO-8 | DSO-8 300mil | DSO-16 | DSO-16 WB | DSO-18 | DSO-20 | DSO-36 | TFLGA-13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Features (see page 58) | | | | | | | | | | | | | | | | | Package (see page 59) | | | | | | | |
| 12/11.1 | 300/300 | 1EDI05I12A | CT | | | | | | | | | | ✓ | ✓ | | | | | | | ✓ | ✓ | | | | | | |
| 12/11.1 | 300/300 | 1EDI10I12M | CT | ✓ | | | | | | | | | ✓ | | | | | | | | ✓ | ✓ | | | | | | |
| 9.1/8.5 | 120/115 | 1EDI20N12A | CT | | | | | | | | | | ✓ | ✓ | | | | | | | ✓ | | | | | | | |
| 12/11.1 | 125/120 | 1EDI20H12A | CT | | | | | | | | | | ✓ | ✓ | | | | | | | | ✓ | | | | | | |
| 12/11.1 | 300/300 | 1EDI20I12A | CT | | | | | | | | | | ✓ | ✓ | | | | | | | ✓ | ✓ | | | | | | |
| 12/11.1 | 300/300 | 1EDI20I12M | CT | ✓ | | | | | | | | | ✓ | | | | | | | | ✓ | ✓ | | | | | | |
| 12/11.1 | 300/300 | 1EDI30I12M | CT | ✓ | | | | | | | | | ✓ | | | | | | | | ✓ | ✓ | | | | | | |
| 12/11.1 | 300/300 | 1EDI40I12A | CT | | | | | | | | | | ✓ | ✓ | | | | | | | ✓ | ✓ | | | | | | |
| 12/11.1 | 125/120 | 1EDI60H12A | CT | | | | | | | | | | ✓ | ✓ | | | | | | | | ✓ | | | | | | |
| 12/11.1 | 300/300 | 1EDI60I12A | CT | | | | | | | | | | ✓ | ✓ | | | | | | | ✓ | ✓ | | | | | | |
| 12/11 | 165/170 | 1ED020I12-F2 | CT | ✓ | | | ✓ | | ✓ | ✓ | | | ✓ | | | | | | | | | | | ✓ | | | | |
| 12/11 | 1750/1750 | 1ED020I12-FT | CT | ✓ | | | ✓ | | ✓ | ✓ | | | ✓ | | | | | ✓ | | | | | | ✓ | | | | |
| 11.9/11 | 460/460 | 1EDI20I12SV NEW | CT | | | | ✓ | ✓ | ✓ | | | ✓ | ✓ | | | | ✓ | ✓ | | | | | | | | | | ✓ |
| 12/11.1 | 300/300 | 1EDC05I12A NEW | CT | | | | | | | | | | ✓ | ✓ | | ✓ | | | | | | ✓ | | | | | | |
| 12/11.1 | 300/300 | 1EDC10I12M NEW | CT | ✓ | | | | | | | | | ✓ | | | ✓ | | | | | | ✓ | | | | | | |
| 12/11.1 | 125/120 | 1EDC20H12A NEW | CT | | | | | | | | | | ✓ | ✓ | | ✓ | | | | | | ✓ | | | | | | |
| 12/11.1 | 300/300 | 1EDC20I12A NEW | CT | | | | | | | | | | ✓ | ✓ | | ✓ | | | | | | ✓ | | | | | | |
| 12/11.1 | 300/300 | 1EDC20I12M NEW | CT | ✓ | | | | | | | | | ✓ | | | ✓ | | | | | | ✓ | | | | | | |
| 12/11.1 | 300/300 | 1EDC30I12M NEW | CT | ✓ | | | | | | | | | ✓ | | | ✓ | | | | | | ✓ | | | | | | |
| 12/11.1 | 300/300 | 1EDC40I12A NEW | CT | | | | | | | | | | ✓ | ✓ | | ✓ | | | | | | ✓ | | | | | | |
| 12/11.1 | 125/120 | 1EDC60H12A NEW | CT | | | | | | | | | | ✓ | ✓ | | ✓ | | | | | | ✓ | | | | | | |
| 12/11.1 | 300/300 | 1EDC60I12A NEW | CT | | | | | | | | | | ✓ | ✓ | | ✓ | | | | | | ✓ | | | | | | |
| 11.9/11 | 460/460 | 1EDU20I12SV NEW | CT | | | | ✓ | ✓ | ✓ | | | ✓ | ✓ | | | | ✓ | ✓ | ✓ | | | | | | | | | ✓ |
| 12.5/11.7 | 215/215 | 1EDI2001AS | CT | | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | | | | ✓ | | ✓ | ✓ | | | | | | ✓ | |
| 12.5/11.7 | 215/215 | 1EDI2002AS | CT | | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | | | | ✓ | | ✓ | ✓ | | | | | | ✓ | |
| 12.5/11.7 | 215/215 | 1EDI2010AS | CT | | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | | | | ✓ | | ✓ | ✓ | | | | | | ✓ | |
| 12/11 | 165/170 | 1ED020I12FA2 | CT | | ✓ | ✓ | | ✓ | | | | | | | | | | | ✓ | ✓ | | | | | ✓ | | |
| 12/11 | 1900/1750 | 1ED020I12FTA | CT | | ✓ | ✓ | | ✓ | | | | | | | | | | ✓ | ✓ | ✓ | | | | | ✓ | | |
| 12/11 | 165/170 | 1ED020I12-B2 | CT | ✓ | | ✓ | | | ✓ | ✓ | | | ✓ | | | | | | ✓ | ✓ | | | | | ✓ | | |
| 12/11 | 1750/1750 | 1ED020I12-BT | CT | ✓ | | ✓ | | | ✓ | ✓ | | | ✓ | | | | | ✓ | ✓ | ✓ | | | | | ✓ | | |
| 11.9/11 | 460/460 | 1EDS20I12SV NEW | CT | | | | ✓ | ✓ | ✓ | | | ✓ | ✓ | | | | ✓ | ✓ | ✓ | ✓ | | | | | | | ✓ |
| 5.8/5.2 | 37/37 | 1EDS5663H NEW | CT | | | | | ✓ | | | | | | ✓ | | | | ✓ | ✓ | ✓ | | | | ✓ | | | |
| 5.8/5.2 | 37/37 | 1EDF5673F NEW | CT | | | | | ✓ | | | | | | ✓ | | | | ✓ | | | | | ✓ | | | | |
| 5.8/5.2 | 37/37 | 1EDF5673K NEW | CT | | | | | ✓ | | | | | | ✓ | | | | ✓ | | | | | | | | | ✓ |
| 12.2/11.2 | 85/85 | 2ED020I12-FI | CT | | | ✓ | | | | | ✓ | | | | ✓ | ✓ | | | | | | | | | ✓ | ✓ | |
| 13.5/0 | 85/85 | 2ED020I06-FI | CT | | | | | | | | | | | | ✓ | ✓ | | | | | | | | | ✓ | | |
| 12/11 | 165/170 | 2ED020I12-F2 | CT | ✓ | | | ✓ | | ✓ | ✓ | | | ✓ | | | | | | | | | | | | | | |
| 12/11 | 165/170 | 2ED020I12FA | CT | | ✓ | ✓ | | ✓ | | | | | | | ✓ | | | | ✓ | ✓ | | | | | | ✓ | |
| 8/7 | 37/37 | 2EDS8265H NEW | CT | | | | | ✓ | | | | | | | | | | | ✓ | ✓ | | | ✓ | | | | |
| 8/7 | 37/37 | 2EDS8165H NEW | CT | | | | | ✓ | | | | | | | | | | | ✓ | ✓ | | | ✓ | | | | |
| 4.2/3.9 | 37/37 | 2EDF7275F NEW | CT | | | | | ✓ | | | | | | | | | | | | | | | ✓ | | | | |
| 4.2/3.9 | 37/37 | 2EDF7175F NEW | CT | | | | | ✓ | | | | | | | | | | | | | | | ✓ | | | | |
| 4.2/3.9 | 37/37 | 2EDF7275K NEW | CT | | | | | ✓ | | | | | | | | | | | | | | | | | | | ✓ |
| 4.2/3.9 | 37/37 | 2EDF7235K NEW | CT | | | | | ✓ | | | | | | | | | | | | | | | | | | | ✓ |

# Infineon power switch and iMOTION™ technologies

## OptiMOS™ and StrongIRFET™ power MOSFET

**Highest quality and performance**

Infineon's semiconductors are designed to bring more efficiency, power density and cost effectiveness. The full range of OptiMOS™ and StrongIRFET™ power MOSFETs enables innovation and performance in applications such as switch mode power supplies (SMPS), motor control and drives, inverters and computing.

Infineon's highly innovative OptiMOS™ and StrongIRFET™ families consistently meet the highest quality and performance demands in key specifications for power system design such as on-state resistance and figure-of-merit characteristics.

OptiMOS™ power MOSFETs provide excellent best-in-class performance. Features include ultra-low $R_{DS(on)}$, as well as low charge for high switching-frequency applications. StrongIRFET™ power MOSFETs are designed for rugged applications, and are ideal for designs with a low switching frequency as well as those that require a high current-carrying capability.

| OptiMOS™ | StrongIRFET™ |
|---|---|
| Best-in-class technology | Robust and excellent price/performance ratio |
| Designed for high performance applications | Product validation according to JEDEC standard |
| Optimized for high switching frequency | Optimized for low switching frequency |
| Industry's best figure-of-merit | High current carrying capability |
| High efficiency and power density | Rugged silicon |



www.infineon.com/powermosfet-20V-300V

15

# CoolMOS™ SJ MOSFETs

Trusted leader in high voltage MOSFETs

The revolutionary CoolMOS™ power MOSFET family sets new standards in the field of energy efficiency. Our CoolMOS™ products offer a significant reduction of conduction, switching and driving losses, and enable high power density and efficiency for superior power conversion systems.

High voltage superjunction MOSFETs address consumer applications, such as smartphone/tablet chargers, notebook adapters, LED lighting, PC Power, as well as audio and TV power supplies. Increasingly, customers replace standard MOSFETs by superjunction MOSFETs to benefit from higher efficiency and less power consumption for the end users. CoolMOS™ P7 sets a new benchmark by offering high performance and competitive price all at once.

Also for industrial applications such as server, telecom, PC power, solar, UPS, EV-charging and others, Infineon's latest CoolMOS™ 7 superjunction MOSFETs with C7, G7, CFD7 and P7 product families offer what you need - from highest efficiency to best price performance. Infineon meanwhile has also complemented the portfolio with first CoolGaN™ e-mode HEMTs products to further optimize efficiency and system cost.

Infineon's CoolMOS™ superjunction MOSFET offering is complemented by the automotive qualified series 600 V CPA, 650 V CFDA and 800 V C3A. Gain your momentum in the rapidly growing on-board charger and DC-DC converter markets with our excellent performing automotive series with proven outstanding quality standards that go well beyond AEC Q101.

**CoolMOS™ superjunction MOSFET for consumer applications (<400 W)**

| Not for new design | Active | Active and preferred |
|---|---|---|
| | 900 V C3 → | 950 V P7 [1] |
| | 800 V CE → / 800 V C3 | 800 V P7 [1] |
| 600/650 V C6/E6 | 650/700 V CE → | 700 V P7 [1] |
| 500/600/650 V C3 | 600 V CE → / 600 V P6 | 600 V P7 |
| | | 500 V CE |

→ Time

**CoolMOS™ superjunction MOSFET for industrial applications (>250 W), and automotive**

| Not for new design | Active | Active and preferred |
|---|---|---|
| 500/600 V CP | | 600/650 V G7 |
| | | 600/650 V C7 |
| 600/650 V C6/E6 | 600 V P6 | 600 V P7 |
| 500/600/650 V C3 | | |
| 600 V CFD | 650 V CFD2 | 600 V CFD7 |
| | 600 V CPA | 650 V CFDA |
| | | 800 V C3A |

→ Time

[1] Optimized for flyback topologies

■ Price-performance  ■ Highest performance  ■ Fast recovery diode  ■ Automotive

www.infineon.com/coolmos

**The following Infineon gate driver ICs are recommended as most suitable for Infineon MOSFETs**

| Application | Power switch family | Gate driver configuration | Typically recommended gate driver part number |
|---|---|---|---|
| PFC | CoolMOS™ C7/P7 | Single low-side | 1ED44176N01F NEW, 1EDN8550B NEW, IRS44273L, 1EDN8511B |
| | | Dual low-side | IRS4427S, 2EDN8524F |
| | | Half-bridge | 2EDF7175F NEW, 2EDF7275F NEW, 2EDL23N06PJ |
| Battery powered application – inverter | StrongIRFET™ OptiMOS™ 3/5 | High and low-side | IRS2005S/M, IRS2011S, IRS2301S, IRS21867S |
| | | Half-bridge | IRS2008S/M NEW, IRS2007S/M NEW, 2EDL05N06PF, IRS2302S, 2EDL8xxx* |
| | | Three-phase | 6EDL04N02PR, 6ED003L02-F2, 6ED003L06-F2, 6EDL04N06PT |
| | CoolMOS™ P7 | Half-bridge | IRS2183S, 2EDL23N06PJ |
| Major home appliance – inverter | CoolMOS™ CFD2/CE | Half-bridge | 2ED2304S06F NEW, IRS2890DS |
| Major home appliance – SMPS | CoolMOS™ P7 | Dual low-side | 2EDN8524F, IRS4427S |
| | | High and low-side | IRS2186(4)S |
| | | Half-bridge | IRS2153(1)DS |
| Lighting | CoolMOS™ P7 | Single high-side | IRS10752L, IRS20752L, IRS2117S, IRS25752L |
| | | Half-bridge | 2ED2304S06F NEW, 2EDL05N06PF, IRS2153(1)DS, 2ED2106S06F* |
| Drives – inverter <3.5 kW | StrongIRFET™ OptiMOS™ 3/5 | Single high-side | IRS2127S |
| Drives – SMPS | CoolMOS™ P7/C7 | Dual low-side | 2EDN8524F |
| | | High and low-side | IRS2186(4)S, 2ED2106S06F*, 2ED218xS06F/J* |
| EV charging – DC-DC | CoolMOS™ CFD7 | Single high-side | 1EDI20I12AF, IR2214SS, 1EDI40I12AF, 1EDI60I12AF, 1EDS20I12SV NEW |
| | | High and low-side | IRS2113S, IRS2186(4)S, 2ED218xS06F/J*, 2EDS8265H NEW, 2EDS8165H NEW |
| EV-Charging – PFC | CoolMOS™ P7/C7/ CFD2/CFD7 | Single high-side | 1EDI20N12AF, 1EDF5673F NEW |
| | | Dual high-side | 2EDF7275F NEW |
| | | Single low-side | 1ED44176N01F NEW, IRS44273L, 1EDN8511B, 1EDN8550B NEW |
| | | Dual low-side | IRS4427S, 2EDN8524F |
| Solar inverter – boost/SMPS | CoolMOS™ C7 | Single low-side | 1ED44176N01F NEW, IRS44273L |
| | | Dual low-side | IRS4427S, 2EDN8524F |
| | | Single high-side | 1EDI20N12AF, 1EDI60I12AF |
| Solar – micro inverter | OptiMOS™ 5 CoolMOS™ C7/CFD2 | Single high-side | 1EDI20N12AF |
| | | Half-bridge | 2ED2304S06F NEW, IR2114SS, 2EDL05N06PJ, 2EDF7175F NEW, 2EDF7275F NEW |
| Solar – string/central inverter | OptiMOS™ 5 | Single high-side | 1EDI60N12AF, 1ED020I12-F2 |
| | | Dual high-side | 2ED020I12-F2 |
| | | High and low-side | IR2213S |
| | | Half-bridge | IR2214SS |
| UPS – main inverter | StrongIRFET™ | Half-bridge | 2EDL23N06PJ |
| | | High and low-side | IRS2186(4)S, 2ED2106S06F*, 2ED218xS06F/J* |
| UPS – active bridge rectifier | CoolMOS™ P7/C7 | Single high-side | 1ED020I12-F2, 1ED020I12-FT |
| SMPS – Vienna rectifier | CoolMOS™ C7/P7 | Dual high-side | 2EDF7175F NEW, 2EDF7275F NEW |
| SMPS – Sync rectifier | OptiMOS™ 5 | Single low-side | 1ED44176N01F NEW, 1EDN7550B NEW |
| | | Dual low-side | IR11688S (synchronous rectification), 2EDN7524F |
| | | Dual high-side | 2EDF7275K NEW |
| | CoolGaN™ | Single high-side | 1EDF5673K NEW |
| SMPS – LLC/ZVS PSFB | CoolGaN™ | Single high-side | 1EDS5663H NEW |
| | CoolMOS™ P7/CFD7 | Dual high-side | 2EDS8165H NEW, 2EDS8265H NEW |
| | | Dual low-side | 2EDN7524F, 2EDN8524F |
| | | High and low-side | IRS2186(4)S |
| Electric and hybrid vehicle – on-board charger & DC-DC converter | CoolMOS™ CFDA | High and low-side | AUIRS2113S, AUIRS2181/4S, AUIRS2191S |
| | | Single low-side | AUIRS1170S (synchronous rectification) |
| | | Dual low-side | AUIRB24427S |
| | | Half-bridge | AUIR2085S |
| | | Dual high-side | 2ED020I12FA |
| Electric and hybrid vehicle – wireless in-cabin phone charging | OptiMOS™ 5 | High and low-side | AUIRS2301S |

* Coming soon

# Discrete IGBTs

Nomenclature: IGBT
IKpccNvvvdH3 – IGBT + diode
IGpccNvvvH3 – Single IGBT
p = package
c = current
v = voltage
d = diode

| | IGBT |
|---|---|
| Soft | Diode commutation |

| **Frequency range** | | | |
|---|---|---|---|
| 8 kHz – 60 kHz | 2 kHz – 40 kHz | | |
| RC series (monolithic) | RC-Drives (monolithic) | TRENCHSTOP™ / TRENCHSTOP™ Performance | TRENCHSTOP™ IGBT6  NEW! |

| **Voltage range** | | | |
|---|---|---|---|
| 600 V, 650 V, 1100 V, 1200 V, 1350 V, 1600 V | 600 V | 600 V, 1200 V | 650 V, 1200 V |

| **Part number** | | | |
|---|---|---|---|
| IHpccNvvvR5 IHpccNvvvR2 IHpccNvvvR3 IHpccN60R/RF IHpccNvvvE1 | IKpccN60R IKpccN60RF | IKpccN60T IKpccN60TP IKpccN120T2 IKpccN120CT2  IGpccN60T IGpccN60dTP IGpccT120 IGpccN120T2 | IKpccN120BH6 IKpccN120CS6 IKpccN65ET6 |

| **Applications** | |
|---|---|
| **Induction cooking** **Microwave** **Multifunction printers** **Half-bridge resonant** **(Current resonance > 650 V)**  **Single switch** **(Voltage resonance > 650 V)** | Conduction loss optimized  **Solar inverter** **Asymmetrical bridge** Symmetrical full-bridge 3-level type I or 3-level type II converter  **Motor control** Three-phase inverter Full-bridge inverter  **Uninterruptable power supply** UPS bridge 3-level type II converter  **Major and small home appliance** Symmetrical full-bridge |

www.infineon.com/igbtdiscretes

**Market leadership through groundbreaking innovation and application focus**

From the low-power applications such as motor drives for fans to multi-megawatt applications of wind and traction, Infineon provides a comprehensive IGBT family of 600 V, 650 V, and 1200 V technologies in multiple package choices. Our new IGBT chip technologies, combined with innovative packaging, use trench structures and a field stop concept, and are partially empowered by SiC freewheeling diodes. The technologies guarantee robust and reliable devices with maximum power integration and minimum power losses.

**Hard/no diode for IG** parts**

| 10 kHz – 40 kHz medium speed | > 18 kHz – 60 kHz high speed | 10 kHz – 100 kHz high speed | > 18 kHz – 60 kHz high speed | 50 Hz – 20 kHz low speed |
|---|---|---|---|---|
| Soft turn-off TRENCHSTOP™ 5 (S5) | HighSpeed 3 (H3) | TRENCHSTOP™ 5 H5/F5 | RC TRENCHSTOP™ 5 (WR5) | Low $V_{CE(sat)}$ TRENCHSTOP™ 5 (L5) |
| 650 V | 600 V, 1200 V | 650 V | 650 V | 650 V |
| IKpccN65dS5 | IKpccN60H3 IKpccN120H3 IKpccN120CH3 IGpccN60H3 IGpccN120H3 | IKpccN65H5 IKpccN65F5 IGpccN65H5 IGpccN65F5 | IKpccN65WR5 | IKpccN65dL5 IGpccN65L5 |
| **UPS** **Energy storage** **Battery charger** **Welding** **Solar Inverter** | **PFC** **Battery charger** **Welding** **UPS** **Solar** **Energy storage** **SMPS** **Air conditioning** **HVDC (Telecom/data centers)** | | **PFC** **Welding inverter** Full-brigde Half-bridge Two transistor forward | **UPS** 3-level NPC1 and NPC2 topology, inner switches **Solar** 3-level NPC1 and NPC2 topology, inner switches **Welding** AC output (Al/Mag welding) |

# Low to medium power modules

## The EasyPIM™/EasyPACK™ and the EconoPIM™/EconoPACK™ families

The EasyPIM™/EasyPACK™ as well as the EconoPIM™/EconoPACK™ families have been developed to provide a cost-effective, compact design as well as simplified and reliable assembly.  With these modules, we offer an optimized product generation for low- and medium-power industrial drives.

The Easy family with its EasyPIM™, EasyPACK™ and EasyDUAL™ configurations covers the full power range from $I_C$ 6 A up to 200 A at 600 V, 650 V, and 1200 V. The modules are without base plates, and include the latest IGBT4 technology. The screw clamp provides a new, fast and reliable, low-cost mounting concept.

This series has been extended to include the Easy1B and Easy2B sizes to offer more flexibility, with reduced height from 17 mm to 12 mm, and injected screw clamps for mounting.

The Econo family extends the power range from 15 A up to 300 A with nominal current at 600 V, 650 V, 1200 V and 1700 V. The available configurations are the well-known EconoPIM™ and EconoPACK™ series. The Econo housing features a copper base plate for optimized heat spread, and includes a thermistor (NTC). The Econo modules are available with solderable pins or PressFIT pins, and an increasing number of Econo modules are available with pre-applied TIM.

Besides the standard planar IGBT chip technology for low switching losses, saturation voltage and high-switching frequency, the Econo family also includes the optimized IGBT4 in 650 V, 1200 V and 1700 V. For ease of design, IGBTs with 10 μs short-circuit robustness are now available in 650 V, 1200 V and 1700 V in the same mechanical design. Selected Econo modules feature integrated shunts for accurate and cost-efficient current sensing.



**1700 V**
EconoPACK™
Econo 6-pack

**1200 V**
EconoPACK™
EasyPACK
EasyDUAL
Econo  6-pack
Econo fourpack
Econo 12-pack
Easy 6-pack    EasyDUAL
Easy 3-level

**600 V / 650 V**
EconoPACK™
EasyPACK
Econo 6-pack
Econo 4-pack
Easy 6-pack
Easy 4-pack    EasyDUAL
Easy 3-level

10   20   50   75   100   150   175   200   $I_c$ [A]

**1700 V**
EconoPIM™
EconoPIM™

**1200 V**
EconoPIM™
EasyPIM™
EconoPIM™
EasyPIM™

**600 V / 650 V**
EconoPIM™
EasyPIM™
EconoPIM™
EasyPIM™

10   20   50   75   100   150   175   200   $I_c$ [A]

www.infineon.com/Easy
www.infineon.com/Econo

The following Infineon gate driver ICs are recommended as most suitable for Infineon IGBT discretes and modules.

| Application | Power switch family | Gate driver configuration | Typically recommended gate driver part number |
|---|---|---|---|
| PFC | TRENCHSTOP™ 5 | Single low-side | 1ED44176N01F NEW, IRS44273L, 1EDN8511B |
| | HighSpeed 3 | Dual low-side | IRS4427S, 2EDN8524F |
| Home appliance – inverter/ compressor/drive | RC drives fast | Half-bridge | 2ED2304S06F NEW, IRS2890DS |
| | TRENCHSTOP™ IGBT6 | Half-bridge | 2EDL23I06PJ, 2EDL05I06PF, IRS2183S |
| | | High and low-side | IRS2113S |
| | | Three-phase | 6EDL04I06PT, IRS2334S, 6ED003L06-F2 |
| Drives – inverter | TRENCHSTOP™ IGBT6; TRENCHSTOP™ 5 TRENCHSTOP™ Performance; RC Drives | Half-bridge | 2EDL23I06PJ |
| | | Three-phase | 6EDL04I06PT |
| | TRENCHSTOP™ TRENCHSTOP™ 2 | Single high-side | 1EDC20I12AH NEW, 1EDC30I12MH NEW, 1EDI30I12MF |
| | | Half-bridge | 2ED020I12-FI, IR2214SS |
| | | Three-phase | 6ED2230S12T* |
| | EasyPIM™ 1B/2B EasyPACK™ 1B/2B EconoPIM™ 2 | Single high-side | IRS2127S |
| | | Half-bridge | 2EDL23I06PJ, IR2214SS |
| | | Three-phase | 6ED2230S12T*, 6EDL04I06PT |
| | EasyPIM™ 1B/2B; EasyPACK™ 1B EconoPIM™ 2/3; EconoPACK™ 2/3/4 EconoDUAL™ 3; EconoPACK™+ 34 / 62 mm module CoolSiC™ SiC MOSFET module | Single high-side | 1EDC20I12AH NEW, 1EDC30I12MH NEW, 1EDI30I12MF, 1ED020I12-BT, 1EDI60I12AF, 1EDS20I12SV NEW, 1ED020I12-B2 |
| | | Dual high-side | 2ED020I12-F2 |
| | | Half-bridge | 2ED020I12-FI, 2EDL23I06PJ, IR2214SS |
| Drives – SMPS | TRENCHSTOP™ 5 | Dual low-side | 2EDN8524F |
| | | High and low-side | IRS2186(4)S, 2ED2106S06F*, 2ED218xS06F* |
| Drives – brake chopper | TRENCHSTOP™ 2 | Single low-side | IRS44273L |
| | | Single high-side | 1EDI05I12AF, 1EDI10I12MF |
| EV charging – DC-DC | EasyPACK™ 1B/2B; EconoPIM™ 2 EconoPACK™ 2/3/4; EconoDUAL™ 3 EconoPACK™+ ; 34 / 62 mm module CoolSiC™ SiC MOSFET module HighSpeed 3; TRENCHSTOP™ IGBT6 | Single high-side | 1EDI40I12AF, 1EDI20I12AF, 1EDS20I12SV NEW |
| | | Half-bridge | IR2214SS |
| | TRENCHSTOP™ 5 | High and low-side | IRS2113S, IRS2186(4)S |
| Solar inverter – boost | TRENCHSTOP™ EasyPACK™ 1B/2B CoolSiC™ SiC MOSFET module | Single low-side | 1ED44176N01F NEW, IRS44273L |
| | | Dual low-side | IRS4427S, 2EDN8524F |
| | | Single high-side | 1EDI20N12AF, 1EDI60I12AF |
| Solar – string/central inverter/ Heat pump – inverter >2 kW | EasyPACK™ 1B/2B; EconoPACK™ 2/3 EconoDUAL™ 3; EconoPACK™+ 34 / 62 mm module CoolSiC™ SiC MOSFET module HighSpeed 3; TRENCHSTOP™ IGBT6 | Single high-side | 1EDI60I12AF, 1ED020I12-F2, 1EDI20I12AF |
| | | Dual high-side | 2ED020I12-F2 |
| | | High and low-side | IR2213S |
| | | Half-bridge | IR2214SS |
| | EasyPACK™ 1B/2B TRENCHSTOP™ IGBT6; HighSpeed 3 | Three-phase | IR2235S |
| Heat pump – inverter <2 kW | TRENCHSTOP™ 5 TRENCHSTOP™ | Half-bridge | 2ED2304S06F NEW, 2EDL05I06PF |
| | | Three-phase | 6EDL04I06PT |
| UPS | TRENCHSTOP™ 5 TRENCHSTOP™ | Half-bridge | 2EDL05I06PJ, 2EDL23I06PJ, IR2114SS |
| | HighSpeed 3 TRENCHSTOP™ IGBT6 | Single high-side | 1EDI20I12AF, 1EDI60I12AF, 1EDS20I12SV NEW, 1ED020I12-FT |
| | EasyPACK™ 1B/2B EconoPIM™ 2/3 EconoPACK™ 2/3/4 EconoDUAL™ 3 EconoPACK™+ 34 / 62 mm module CoolSiC™ SiC MOSFET module | Single high-side | 1EDI20I12MF, 1EDI60I12AF, 1ED020I12-F2, 1EDS20I12SV NEW, 1ED020I12-FT |
| | | Dual high-side | 2ED020I12-F2 |
| | | High and low-side | IRS2186(4)S, 2ED2106S06F*, 2ED218xS06F/J* |
| | | Half-bridge | 2EDL05I06PJ, 2EDL23I06PJ, IR2114SS |
| Electric and hybrid vehicle – main inverter | IGBT3 / TRENCHSTOP™ Trench Gen 6.2 HybridPACK™ Family | Single high-side | 1EBN1001AE, 1EDI2001AS, 1EDI2002AS, 1EDI2004AS, 1EDI2010AS |
| Electric and hybrid vehicle – on-board charger & DC-DC converter | TRENCHSTOP™ 5 AUTO Planar Gen 5 CooliR Gen 1 EasyPACK™ 1B/2B | High and low-side | AUIRS2113S, AUIRS2181/4S, AUIRS2191S |
| | | Single low-side | AUIRS1170S synchronous rectification |
| | | Dual low-side | AUIRB24427S |
| | | Half-bridge | AUIR2085S |
| | | Dual high-side | 2ED020I12FA |
| Electric and hybrid vehicle – auxiliaries | IGBT3 / TRENCHSTOP™ Trench Gen6.2 CooliR Gen 2 EasyPACK™ 1B/2B | High and low-side | AUIRS2113S, AUIRS2181/4S |
| | | Single high-side | AUIRS2123, AUIRS2127S |
| | | Three-phase | AUIRS2336S |

* Coming soon

# CoolSiC™ Silicon Carbide MOSFET

A revolution to rely on

**Infineon's CoolSiC™ technology enables radical new product designs**

Infineon's CoolSiC™ silicon carbide (SiC) MOSFETs open up new degrees of freedom for designers to improve efficiency and system flexibility.

The CoolSiC™ MOSFET offers advantages of the low gate charge and device capacitance levels in 1200 V switches, negligible reverse-recovery losses of the internal body diode, temperature-independent low switching losses. Infineon's unique 1200 V SiC MOSFET adds additional advantages of superior gate-oxide reliability enabled by state-of-the-art trench design, best-in-class switching and conduction losses, highest transconductance (gain), and short-circuit robustness at gate voltage at 15 V.

The result is a robust SiC MOSFET which is ideal for hard and resonant-switching topologies. It can be driven like an IGBT using standard drivers delivering the highest level efficiency at switching frequencies unreachable by Si-based switches, which allows for system size reduction, higher power density and improved lifetime.

**CoolSiC™ MOSFET features**
› Revolutionary semiconductor
  material - Silicon Carbide
› Very low switching losses
› Threshold-free on state characteristic
› Wide gate-source voltage range
› Benchmark gate threshold voltage, $V_{GS(th)}$ = 4.5 V
› Fully controllable dV/dt
› Commutation robust body diode, ready for
  synchronous rectification
› Temperature independent turn-off switching
  losses

**Benefits**
› Best-in-class system performance
› Efficiency improvement and reduced cooling effort
› Significant reduction in junction temperature for longer
  lifetime and higher reliability
› Enables higher frequency operation for reduction in
  system costs
› Allows for increase in power density
› 2-level can replace 3-level topologies with the same
  efficiency at lower complexity and cost
› Excellent for hard-switching and resonant-switching
  topologies like LLC and ZVS

| Sales product | $R_{DS(on)}$ | $V_{DS}$ | Package |
|---|---|---|---|
| IMW120R045M1* | 45 mΩ | 1200 V | TO-247 3pin |
| IMZ120R045M1* | 45 mΩ | 1200 V | TO-247 4pin |

* Coming soon

The TO-247 4-pin package contains an additional connection to the source (Kelvin connection) that is used as a reference potential for the gate-driving voltage, thereby eliminating the effect of voltage drops over the source inductance. The result is even lower switching losses than for the TO-247 3-pin version, especially at higher currents and higher switching frequencies.

www.infineon.com/SiC

# CoolSiC™ Silicon Carbide MOSFET Modules

Based on our experience and expertise in the area of compatibility, Infineon has introduced the revolutionary CoolSiC™ MOSFET technology, which enables radically new product designs. Easy1B modules, for example, offer a very good thermal interface, a low stray inductance and robust design as well as PressFIT connections.

| Easy 1B (Sixpack, booster, Half-bridge) | Easy 2B (Half-bridge) | 62 mm (Half-bridge) |
|---|---|---|
| FF11MR12W1M1_B11 DF11MR12W1M1_B11 FF23MR12W1M1_B11 DF23MR12W1M1_B11 FS45MR12W1M1_B11 | FF8MR12W2M1_B11 | FF6MR12KM1 |



**62mm**

6 mΩ

coming soon

**Easy 2B**

8 mΩ

coming soon

**Easy 1B**

≥ 11 mΩ

NEW

**Discrete & Easy 1B**

**Sixpack**

≥ 45 mΩ

coming soon

2 kW

Inverter power

200 kW
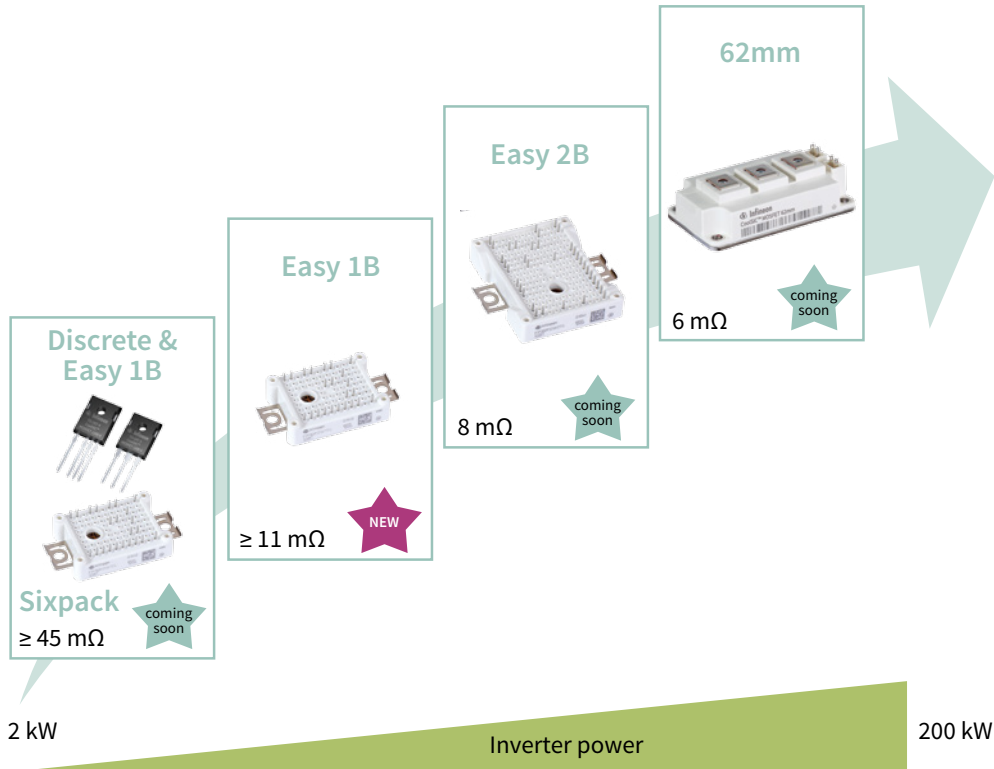
**+SiC** Silicon carbide MOSFET gate driver ICs

Ultra-fast switching 1200 V power transistors such as CoolSiC™ MOSFETs can be more easily handled by means of isolated gate output sections. Therefore, the following EiceDRIVER™ galvanically isolated gate-driver ICs based on Infineon's core-less transformer technology are recommended as most suitable.

For a larger selection of isolated gate drivers, refer to the page 14 of this selection guide. These drivers incorporate most important key features and parameters for SiC MOSFET driving such as tight propagation delay matching, precise input filters, wide output-side supply range, negative gate voltage capability, extended CMTI capability, active Miller clamp, and DESAT short circuit protection.

| Product | Part number | Typ. peak drive current | VCC2-VEE2 | Typ. UVLO thresholds | Typ. prop. delay | Active Miller clamp | Other key features | Package |
|---|---|---|---|---|---|---|---|---|
| 1ED Compact Isolated high-side Driver Family | 1EDI20I12MF | 3.5 A | 20 V | 11.9 V / 11 V | ≤ 300 ns | Yes | Functional isolation | DSO-8 |
| | 1EDC20H12AH  NEW | 3.5 A | 35 V | 12 V / 11.1 V | ≤ 125 ns | No | 8 mm creepage clearance; UL 1577-certified with $V_{ISO}$ = 2500 V(rms) for 1 min | DSO-8 |
| | 1EDC60H12AH  NEW | 9.4 A | 35 V | 12 V / 11.1 V | ≤ 125 ns | No | | |
| | 1EDC20I12MH  NEW | 3.5 A | 20 V | 11.9 V / 11 V | ≤ 300 ns | Yes | | |
| 1ED-F2 Isolated high-side Driver with Integrated Protection | 1ED020I12-F2 | 2.0 A | 28 V | 12 V / 11 V | ≤ 170 ns | Yes | Short circuit clamping; DESAT protection; Active shutdown | DSO-16 |
| 2ED-F2 Isolated Dual high-side driver with Integrated Protection | 2ED020I12-F2 | 2.0 A | 28 V | 12 V / 11 V | ≤ 170 ns | Yes | | DSO-36 |
| 1EDU Slew rate control (SRC) isolated High-side driver | 1EDU20I12SV  NEW | 2.0 A | 28 V | 11.9 V / 11 V | ≤ 485 ns | Yes | Real-time adjustable gate current control; Over-current protection; Soft turn-off shut down; Two-level turn-off; UL 1577-certified with $V_{ISO}$ = 5000 V(rms) for 1 min | DSO-36 |

www.infineon.com/gd-SiC

# CoolGaN™ e-mode HEMTs

Tailor-made for the highest efficiency and power density in switch mode
power supplies

CoolGaN™– in comparison to the next best silicon alternative –enables higher power density through the ability to switch at high frequencies and highest efficiency, especially in the partial load range, through novel topologies such as the CCM totem pole PFC stage. GaN enhancement mode (e-mode) HEMT performance features low reverse recovery charge and excellent dynamic performance in reverse conduction compared to silicon FET solutions. This enables more efficient operation at existing frequencies, and much higher frequency operation which can improve power density by shrinking the size of passive components in power electronics. CoolGaN™ enables doubled output power in a given energy storage slot size, freeing up space and realizing higher efficiency at the same time.

Infineon's CoolGaN™ is the one of most reliable and globally qualified GaN solutions in the market. During the quality management process not only the device is tested, but also its behavior in the application. The performance of CoolGaN™ goes beyond other GaN products in the market. It offers a predicted lifetime of more than 15 years, with a failure rate less than 1 FIT.

```
┌──────────────┬──────────────┬──────────────┬──────────────┐
│ Application  │ QRP – quality│ Degradation  │ Rel. invest- │
│ profile      │ requirement  │ models       │ igation at   │
│              │ profile      │              │ development  │
│              │              │              │ phase        │
└──────┬───────┴──────┬───────┴──────┬───────┴──────┬───────┘
┌─────────────────────────────────────────────────────────┐
│                    Qualification plan                     │
└──────────────────────────┬──────────────────────────────┘
                  ┌──────────────────┐
                  │    Released      │
                  │    product       │
                  └──────────────────┘
```

**Efficiency versus load (f$_{sw}$ = 65 kHz)***



Efficiency values: 98.75, 99.18, 99.33, 99.33, 99.31, 99.25, 99.17, 99.07, 99.00, 98.90

IGO60R070D1

**MEASURED VALUES**
All available boards within +/- 0.1%

**FLAT EFFICIENCY**
> 99 % over wide load range

Output power [W]

\* No external power supplies – everything included.
$V_{in}$ = 230 $V_{AC}$, $V_{out}$ = 390 $V_{DC}$, $t_{ambient}$ = 25 °C

| Application | Power switch family | Gate driver configuration | Typically recommended gate driver part number | Benefits |
|---|---|---|---|---|
| SMPS PFC Vienna rectifier Multi-level switches | High-voltage CoolGaN™ IGO60R070D1 NEW IGOT60R070D1 NEW IGT60R070D1 NEW IGT60R190D1S NEW IGLD60R070D1 NEW | Single high-side | 1EDF5673K NEW<br>1EDF5673F NEW | |
| SMPS LLC/ZVS PSFB | | | 1EDS5663H NEW | **Power:** source: 0.85 Ω, sink: 0.35 Ω<br>**Pace:** 18 ns minimum output pulse-width<br>**Precision:** 13 ns propagation delay window<br>**Protection:** Functional isolation and Reinforced isolation, $V_{IOTM}$ = 8 kV$_{pk}$, VDE 0884-10, CMTI > 200 V/ns<br><br>Two-level negative gate-drive voltage, even for 1st pulse<br>› Less spurious GaN HEMT turn-on<br>› Robust SMPS operation<br>› Up to 50% lower dead-time losses<br><br>GaN turn-on transient independent of duty cycle or switching speed<br>› Constant GaN HEMT switching slew rates<br>› Great operational robustness<br>› Least R&D effort<br>› Integrated galvanic isolation<br>› Strong CMTI<br>› Robust for hard switching Half-bridges |

www.infineon.com/GaN

# Infineon solid-state relays (SSR) technologies

Using Infineon power-switch technologies, Infineon solid-state relays (SSRs) are remotely controlled switches (on/off) with complete galvanic isolation from input to output. No power supply is needed on the output.

**Two main sub-groups:**
› Photovoltaic isolators (PVI)
  – Isolated, low-power DC voltage sources capable of driving MOSFET or IGBT gates directly
› Photovoltaic relays (PVR)
  – PVI plus internal power MOSFET
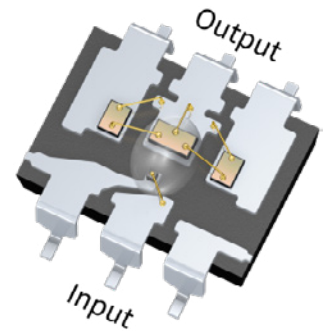
**Main benefits of Infineon SSR technology:**
› **Optically isolated** technology provides galvanic isolation for **safety** applications
› **Wide range of applications** from industrial automation to test equipment
› Established and reliable products with **over 20 years of history**

**Key advantages over electromechanical relays:**
› Silent operation
› No contact bounce
› Compact solution
› Fast response time
› High input sensitivity
› High reliability with long operational life
› Insensitivity to stray EMF, shock and vibration
› Stable contact resistance over life

**Infineon SSRs can be used in a wide range of applications:**
› Electro-mechanical relay (EMR) replacement
› Battery management systems
› UPS
› Automatic test equipment
› Instrumentation systems
› Industrial automation
› Thermostats
› Programmable logic controllers

PVI: Photovoltaic isolators    PVR: Photovoltaic relays

www.infineon.com/SSR
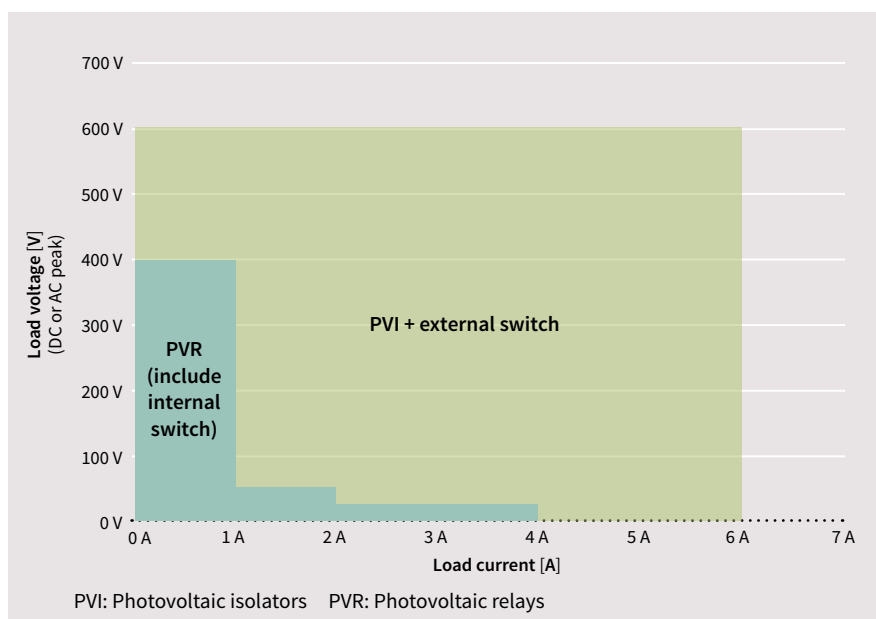
# Infineon iMOTION™ technologies

## Flexible and scalable platform for motor control solutions

iMOTION™ products are highly integrated devices used to control variable speed drives. By integrating both the required hardware and algorithms to perform control of Permanent Magnet Synchronous Motors (PMSM), they provide the shortest time-to-market and highest efficiency for inverterized motor systems at the lowest system and development cost.

## iMOTION™ product offering



**Motion control engine (MCE)**
built-in sinusoidal FOC algorithm allows smooth operation at wide speed ranges

IRMCK099/IMC100T

**MCE + additional MCU**
customer specific application code can be added

IRMCF100/IMC300A
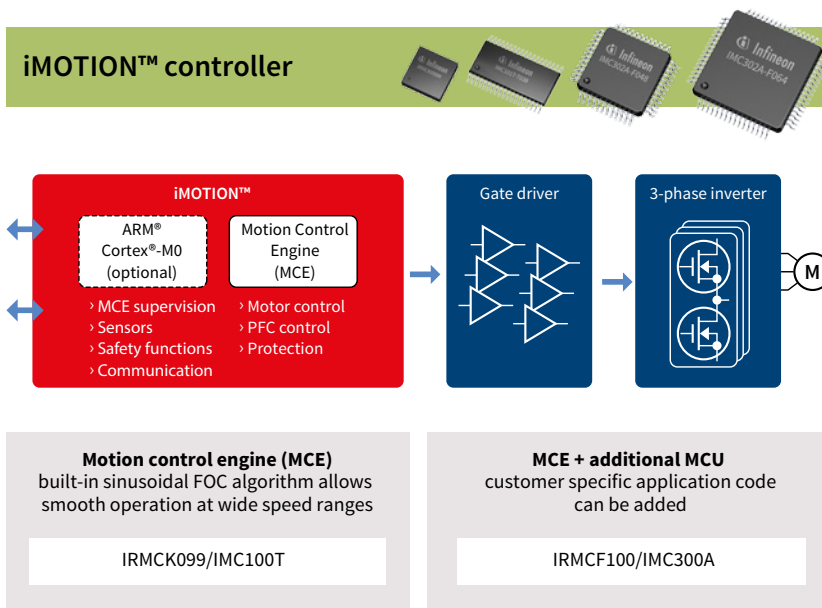
**Market requirements**

› Energy-efficiency regulations drive inverterization rate
› Shorter design cycles are driven by reduced product life cycles
› Focus on key differentiators drives trend to outsourcing
› Increased price pressure requires system cost reduction

**Key benefits**

› Easy to use – no special motor control know-how required
› High performance and energy-optimized solution
› Simplify the system solution by eliminating the Hall sensor for control
› Fastest time-to-market

| Application | Power controller family | Gate driver configuration | Typically recommended gate driver part number |
|---|---|---|---|
| Battery powered applications – motor inverter/BLDC <2 kW | iMOTION™ (IMC101T, IMC301A*) | High and low-side | IRS2005S/M, IRS2011S |
| | | Half-bridge | IRS2008S/M NEW, IRS2007S/M NEW |
| | | Three-phase | 6EDL04N02PR, 6ED003L02-F2 |
| Home appliance – PFC | iMOTION™ (IMC102T, IMC302A*) | Single low-side | 1ED44176N01F NEW, IRS44273L, 1EDN8511B |
| | | Dual low-side | IRS4427S, 2EDN8524F |
| Home appliance – inverter/compressor/drive | iMOTION™ (IMC101T, IMC301A*) | High and low-side | IRS2113S |
| | | Half-bridge | 2ED2304S06F NEW, IRS2890DS, 2EDL23I06PJ, 2EDL05(I,N)06PF, IRS2183S |
| | | Three-phase | 6EDL04(I,N)06xT, IRS2334S, 6ED003L06-F2 |

* Coming soon

www.infineon.com/iMOTION

# Typical gate-driver applications

A system is a set of interacting or independent components forming an integrated whole.

From product thinking to system understanding, Infineon enables total solutions which make generation, transmission and conversion of electrical energy more efficient and reliable.

The following pages describe typical applications using Infineon gate drivers, power switches and modules.

**Level-shifting technology (SOI&JI)**

**Coreless transformer (CT) technology**

**Non-Isolated (N-ISO) technology**

| Fridge | Washing machine | Power Tools | | LEV | Automotive | | CAV | Industrial robotics | Traction |
| Multicopter | Home & Garden | Service robots | | Motor Control | eBike | | UPS | Industrial Automation | LV-drives |
| Dishwasher | Laundry dryer | Vacuum cleaner | | Pumps | Fans | | EV charger | Drives | |
| PFC | Induction | Sewing machine | | | | | | | |
| Industrial SMPS | Aircon | Lighting | | Server | Telecom | | Solar | | |

# Drives

**Electronic speed-control systems for energy and performance gains**

Infineon's gate driver ICs are the expert's choice. With the breadth and depth of the portfolio, customers can quickly design and build efficient and robust systems for motor drive application.

## Drive applications

> Commercial sewing machines
> Elevators/escalators
> Fans and pumps (PFC, inverter)
> General purpose drives
> Heavy duty drives (<200 kW)
> Servo and stepper motors
> Automatic gate and door opening system (inverter <1 kW)
> Commercial, construction & agricultural vehicles (CAV, i.e. E-Bus)
> Forklift trucks (hydraulic pump inverter, motor inverter)
> Commercial air-conditioner (CAC compressor, fan <17 kW)
> Robotics



## Recommended gate drivers (Drives)

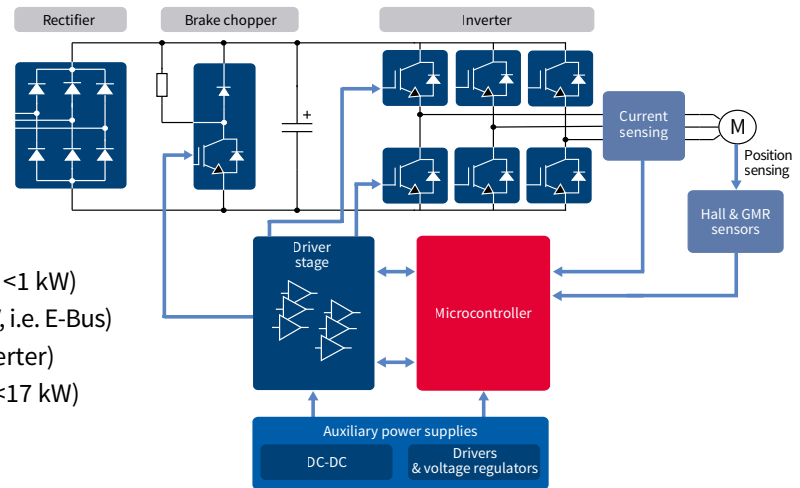| Application | Driver voltage class [V] | Driver configuration | Part number | Source/ sink current typ. [A] | Packages | Description | Suitable power switches and modules |
|---|---|---|---|---|---|---|---|
| Inverter (<3.5 kW) | 200 | Half-bridge | IRS2007S/M NEW | 0.29/0.6 | DSO-8, VQFN-14 | 200 V half-bridge with $V_{CC}$ & $V_{BS}$ UVLO | StrongIRFET™ (IRF135B203, IRF135SA204) OptiMOS™ 3 (IPB072N15N3, IPB042N10N3 G, IPB107N20N3) |
| | 600 | Single high-side | IRS2127S | 0.29/0.6 | DSO-8 | 600 V single high-side driver with FAULT-RPT, OCP | TRENCHSTOP™ IGBT+Diode (IKD10N60RF, IKA15N65ET6, IKW30N60DTP, IKB40N65ES5) EasyPIM™ 1B/2B module (FP10R06W1E3_B11, FP15R06W1E3_B11, FB20R06W1E3, FP20R06W1E3_B11, FB30R06W1E3) EasyPACK™ 1B module (FS20R06W1E3_B11) |
| | | Half-bridge | 2EDL23I06PJ | 2.3/2.8 | DSO-14 | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | |
| | | High and low-side | IRS2186(4)S | 4/4 | DSO-14, DSO-8 | 600 V high and low-side driver with high current | |
| | | Three-phase | 6EDL04I06PT | 0.165/0.375 | DSO-28 300 mil | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | |
| | | | IR2136S/J | 0.2/0.23 | DSO-28 300 mil, LCC-32 | OCP, EN, FAULT-RPT | |
| | 1200 | Half-bridge | IR2214SS | 2/3 | SSOP-24 | 1200 V half-bridge driver with DESAT, Synchronization, soft shutdown, FAULT-RPT | TRENCHSTOP™ IGBT+Diode (IKW25N120T2, IKW40N120T2, IKQ75N120CT2) EasyPIM™ 1B/2B module (FP15R12W1T4_B11, FP15R12W2T4) EasyPACK™ 1B/2B module (FS25R12W1T4_B11) Easy 1B/2B 3-Level module (F3L15R12W2H3_B27) EconoPIM™ 2 module (FP25R12KT4_B15) |
| | | Three-phase | 6ED2230S12T* | 0.35/0.65 | DSO-24 | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | TRENCHSTOP™ IGBT+Diode (IKW08T120, IKW15N120T2) EasyPIM™ 1B/2B module (FP15R12W1T4, FP15R12W1T4_B11, FP15R12W2T4) |
| Inverter (<7.5 kW) | 1200 | Single high-side | 1EDC20I12AH NEW | 4/3.5 | DSO-8 300 mil | Functional isolation, ≥ 100 kV/µs CMTI, short circuit clamping, $V_{ISO}$ = 2500 V(rms) for 1 min (1EDC only), active Miller clamp (MH/MF only), separate sink/source output (AH only) | CoolSiC™ SiC MOSFET (IMZ120R045M1* - 4-pin) TRENCHSTOP™ IGBT+Diode (IKW40N120T2, IKQ50N120CT2, IKQ75N120CT2) EasyPIM™ 1B/2B module (FP25R12W2T4_B11, FP35R12W2T4_B11) EasyPACK™ 1B module (FS25R12W1T4_B11, FS50R12W2T4_B11) Easy 1B/2B 3-level (F3L15R12W2H3_B27) EconoPIM™ 2 module (FP25R12KT4_B15, FP50R12KT4G) EconoPACK™ 2/3 module (FS50R12KT4_B15) |
| | | | 1EDC30I12MH NEW | 5.9/6.2 | DSO-8 300 mil | | |
| | | | 1EDI30I12MF | 5.9/6.2 | DSO-8 | | |
| | | Three-phase | 6ED2230S12T* | 0.35/0.65 | DSO-24 | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | TRENCHSTOP™ IGBT+Diode ( IKW40N120T2) EasyPIM™ 1B/2B module (FP15R12W1T4, FP15R12W1T4_B11, FP15R12W2T4) |
| | | Half-bridge | 2ED020I12-FI | 1.5/2.5 | DSO-18 | Functional isolation on high-side, comparator, OPAMP, SD | TRENCHSTOP™ IGBT+Diode (IKW40N120T2, IKQ50N120CT2, IKQ75N120CT2) EasyPIM™ 1B/2B module (FP15R12W1T4_B11, FP15R12W2T4, FP25R12W2T4_B11) EasyPACK™ 1B module (FS25R12W1T4_B11) Easy 1B/2B 3-level (F3L15R12W2H3_B27) |

* Coming soon

29

# Drives

Electronic speed-control systems for energy and performance gains

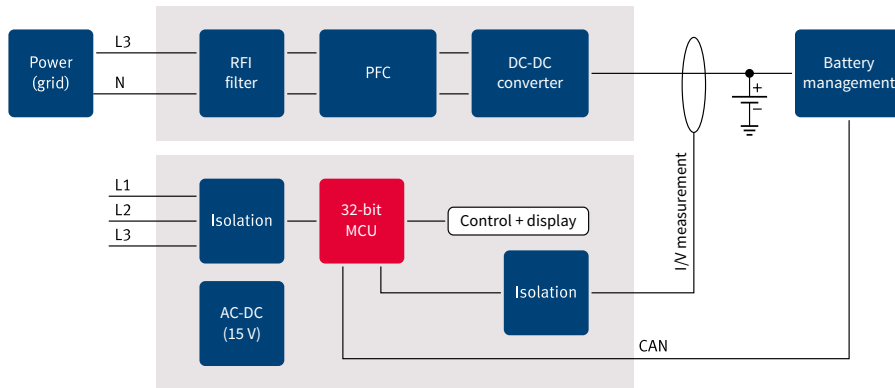## Recommended gate drivers (Drives) continued

| Application | Driver voltage class [V] | Driver configuration | Part number | Source/Sink current typ. [A] | Packages | Description | Suitable power switches and modules |
|---|---|---|---|---|---|---|---|
| Inverter (<30 kW) | 1200 | Single high-side | 1ED020I12-F2 | 2/2 | DSO-16 300mil | Functional isolation, ≥ 100 kV/µs CMTI, active Miller clamp, DESAT, short circuit clamping, FAULT-RST | CoolSiC™ SiC MOSFET (IMZ120R045M1* – 4-pin) EasyPIM™ 1B/2B module (FP15R12W1T4_B11, FP25R12W2T4_B11) EasyPACK™ 1B module (FS25R12W1T4_B11, FS50R12W2T4_B11) EconoPIM™ 2 module (FP25R12KT4_B15, FP50R12KT4G) EconoPACK™ 2/3 module (FS50R12KT4_B15) |
| | | Dual high-side | 2ED020I12-F2 | 2/2 | DSO-36 | | |
| | | Single high-side | 1ED020I12-BT | 2/2 | DSO-16 300mil | Basic isolation, VDE 0884-10 certified, $V_{IORM}$ = 1420 V, $V_{IOTM}$ = 6000 V; UL 1577 certified, $V_{ISO}$ = 3750 V(rms) for 1 min, ≥ 100 kV/µs CMTI, active Miller clamp, DESAT, short circuit clamping, two level turn off, FAULT-RST | |
| Inverter (<200 kW) | 1200 | Single high-side | 1EDI60H12AH | 10/9.4 | DSO-8 300mil | Functional isolation, ≥ 100 kV/µs CMTI, Separate sink/source output, short circuit clamping, 125-ns propagation delay | CoolSiC™ SiC MOSFET module (FF11MR12W1M1_B11; FF23MR12W1M1_B11) EconoPIM™ 2/3 module (FP150R12KT4(P)_B11) EconoPACK™ 2/3/4 module (FS150R12KT4(P)_B11) EconoDUAL™ 3 module (FF300R12ME4_B11) EconoPack™+ module (FS300R12OE4, FS450R12OE4) 34 mm module (FF150R12RT4) 62 mm module (FF300R12KE4) |
| | | | 1EDS20I12SV NEW | SRC/2 | DSO-36 | Reinforced isolation, VDE 0884-10, $V_{IORM}$ = 1420 V, $V_{IOTM}$ = 8000 V; UL 1577; $V_{ISO}$ = 5000 V(rms); soft shutdown, DESAT, FAULT-RPT, OCP, slew rate control, TLTO | CoolSiC™ SiC MOSFET module (FF11MR12W1M1_B11; FF23MR12W1M1_B11) EasyPACK™ 1B module (FS50R12W2T4_B11, FS75R12W2T4_B11) Easy 1B/2B 3-level (FS3L50R07W2H3F_B11, F3L75R12W1H3_B11, F3L100R12W2H3_B11) EconoPIM™ 2/3 module (FP75R12KT4_B15, FP100R12KT4(P)_B11) EconoPACK™ 2/3/4 module (FS75R12KT4_B15, FS100R12KT4G(P)_B11) 34 mm module (FF50R12RT4, FF100R12RT4) |
| | | | 1ED020I12-B2 | 2/2 | DSO-16 300mil | Basic isolation, VDE 0884-10 certified, $V_{IORM}$ = 1420 V, $V_{IOTM}$ = 6000 V; UL 1577 certified, $V_{ISO}$ = 3750 V(rms) for 1 min, ≥ 100 kV/µs CMTI, active Miller clamp, DESAT, short circuit clamping, FAULT-RST, TLTO | |
| PFC | 25 | Single low-side | 1ED44176N01F NEW | 0.8/1.75 | DSO-8 | Low-side gate driver with integrated overcurrent protection (±5%), fault reporting, and enable functionality | TRENCHSTOP™ IGBT+Diode (IKW30N65H5, IKW40N65WR5, IKFW40N60DH3E, IKFW50N60DH3E) Rapid Diode (IDW30E65D1, IDW60C65D1) CoolMOS™ MOSFET (IPP60R060P7, IPP60R080P7, IPP60R099P7, IPP60R120P7, IPP60R180P7, IPP60R280P7, IPP60R360P7) CIPOS™ Mini (IFCM15S60GD, IFCM15P60GD, IFCM10P60GD, IFCM10S60GD) |
| | | | IRS44273L | 1.5/1.5 | SOT23-5 | Low-side gate driver in small, easy-to-use package | |
| | 20 | Single low-side | 1EDN8511B | 4/8 | SOT23-6 | Low-side gate driver with fast propagation delay and high drive current | |
| | | Dual low-side | 2EDN8524F | 5/5 | DSO-8 | | |
| | 25 | Dual low-side | IRS4427S | 2.3/3.3 | DSO-8 | Industry proven dual-low-side gate driver | |
| SMPS (<3 kW) | 20 | Dual low-side | 2EDN8524F | 5/5 | DSO-8 | 20 V non-inverting dual-low-side driver with CMOS inputs | TRENCHSTOP™ IGBT+Diode (IKP30N65F5, IKB40N65EF5) CoolMOS™ MOSFET (IPP60R060P7, IPP60R080P7, IPP60R099P7, IPP60R120P7, IPP60R180P7, IPP60R280P7, IPP60R360P7, IPW65R019C7, IPW65R045C7, IPW65R065C7, IPW65R095C7, IPW65R125C7, IPW65R190C7) |
| | 600 | High and low-side | IRS2186(4)S | 4/4 | DSO-14, DSO-8 | 600 V high and low-side driver with high current | |
| Brake chopper (<3.5 kW) | 25 | Single low-side | IRS44273L | 1.5/1.5 | SOT23-5 | non-inverting low-side driver with CMOS inputs in small 5 pin SOT-23 package | TRENCHSTOP™ IGBT+Diode (IKW40N120T2, IKQ50N120CT2, IKQ75N120CT2) |
| | 1200 | Single high-side | 1EDI05I12AF | 1.3/0.9 | DSO-8 | Functional isolation, ≥ 100 kV/µs CMTI, short circuit clamping, separate sink/source output (AF only), active Miller clamp (MF only) | |
| | | | 1EDI10I12MF | 2.2/2.3 | DSO-8 | | |

*Coming soon

# Electric vehicles and hybrid vehicles

In (hybrid) electric vehicles, efficiency is a key success factor for extending the range of the vehicle, which also applies to auxiliary applications. Our automotive-qualified gate driver ICs help simplify design, and optimize performance in all MOSFETs and IGBTs driving stages.



**(Hybrid) electric vehicles applications**
› On-board charger
› HV/LV DC-DC converter
› Auxiliary loads
› Wireless in-cabin phone charging

## Recommended gate drivers (Electric vehicles & hybrid vehicles)

| Application | Driver voltage class [V] | Driver configuration | Part number | Source/ Sink current typ. [A] | Packages | Description | Suitable power switches and modules |
|---|---|---|---|---|---|---|---|
| On-board charger & DC-DC converter | 20 | Dual low-side | AUIRB24427S | 6/6 | DSO-8 | Booster for automotive motor drives above 10 kW, peak current up to ±15 A, support for active clamping with very fast reaction time, active clamping disable, ASC input signals | AIGW40N65H5, AIGW40N65F5, AIKW40N65DH5, AIKW40N65DF5, AIGW50N65H5, AIGW50N65F5, AIKW50N65DH5, AIKW50N65DF5, AUIRGP35B60PD, AUIRGP35B60PD-E, AUIRGP50B60PD1, AUIRGP65G40D0, AUIRGF65G40D0, AUIRGP66524D0, AUIRGF66524D0; CoolMOS™ CPA (IPB60R099CPA, IPP60R099CPA IPW60R045CPA, IPI60R099CPA) CoolMOS™ CFDA (IPD65R420CFDA, IPB65R110CFDA, IPP65R110CFDA, IPW65R048CFDA) EasyPACK™ 1B/2B (FS75R07W2E3) |
| | 100 | Half bridge | AUIR2085S | 1/1 | DSO-8 | Enable half-bridge DC-bus converters for 48 V distributed systems with reduced component count and board space, programmable switching frequency < 500 kHz, adjustable dead-time | |
| | 200 | Single low-side | AUIRS1170S | 3/6 | DSO-8 | Secondary side high speed synchronous rectification controller, ccm operation with SYNC function, > 500 kHz, cycle by cycle MOT check | |
| | 600 | High and low-side | AUIRS2113S | 2.5/2.5 | DSO-16 | Tolerant to negative transient voltage, UVLO | |
| | | High and low-side | AUIRS2191S | 3.5/3.5 | DSO-16 | Tolerant to negative transient voltage, UVLO, matched propagation delay | |
| Auxiliary drives (fans, pumps, HVAC, heat pump, PTC heater) | 600 | High and low-side | AUIRS21814S | 1.9/2.3 | DSO-14 | Tolerant to negative transient voltage, UVLO, matched propagation delay | AUIRG4BC30U-S, AUIRG4PC40S-E AUIRGB4062D1, AUIRGSL4062D1 AUIRGS4062D1, AUIRGP4062D AUIRGP4062D-E, AUIRGP4063D AUIRGP4063D-E, AUIRGR4045D AUIRGU4045D, AUIRGP4066D1 AUIRGS30B60K, AUIRGSL30B60K AIKB20N60CT, AIKP20N60CT AIKW20N60CT, AIKW30N60CT AIKW50N60CT EasyPACK™ 1B/2B (FS75R07W2E3) |
| | | Three-phase | AUIRS2336S | 0.2/0.35 | DSO-28 | Drives up to six IGBT/MOSFET power devices, OCP, over-temperature shutdown input, advanced input filter, integrated dead-time protection, shoot-through protection, UVLO | |
| | 700 | Single high-side | AUIR2114SS* | 3/3 | SSOP-24 | UVLO on both supply lines (with hysteresis), desaturation detection on both sides, with internal biasing resistor, soft shutdown function and pin | AUIRG4PH50S AUIRGDC0250 |
| Wireless in-cabin phone charging | 600 | High and low-side | AUIRS2301S | 0.2/0.35 | DSO-8 | Tolerant to negative transient voltage, UVLO, matched propagation delay | IPG20N04S4L-11A IPZ40N04S5L-4R8 IPZ40N04S5L-7R4 |

*Coming soon

eMobility

# Electric vehicles and hybrid vehicles – main inverter

**Typical application diagram - main inverter**
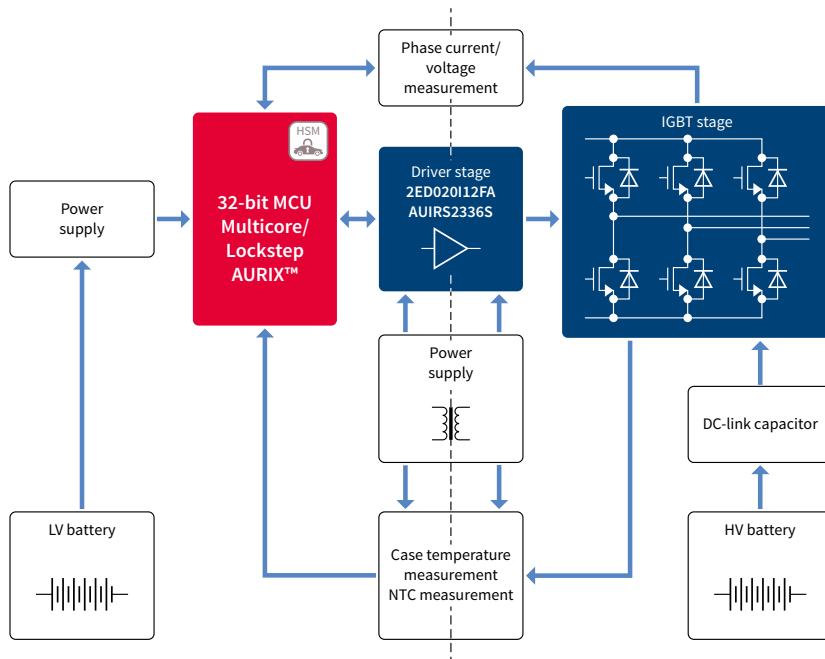


In vehicles with an electric drive train, the inverter controls the electric motor, and is a key component in the car, as it determines driving behavior. Regardless of whether the motor is synchronous, asynchronous or brushless DC, the inverter is controlled by an integrated PCB, which should be designed to minimize switching losses and maximize thermal efficiency, as the range of the vehicle is directly related to the efficiency of the main inverter. The Infineon EiceDRIVER™ gate driver family includes single and dual-channel automotive IGBT driver ICs that provide galvanic isolation and bidirectional signal transmission. These products are ideal for the main inverter systems in automotive applications where efficiency, space savings and monitoring functions are priorities. Our automotive-qualified gate driver ICs help simplify design and optimize performance in all MOSFETs and IGBTs driving stages.

## Recommended gate drivers (Electric vehicles & hybrid vehicles - main inverter)

| Application | Driver voltage class [V] | Driver configuration | Part number | Output current [A] | Packages | Description | Suitable power switches |
|---|---|---|---|---|---|---|---|
| Main inverter | 400 | Single high-side | 1EBN1001AE | 15 | DSO-14 | IGBT / MOSFET gate driver booster for automotive motor drives above 10 kW, peak current up to ±15 A, support for active clamping with very fast reaction time, active clamping disable, ASC Input signals | IGBT3 / TRENCHSTOP™ (AIKW75N60CT, AIKQ100N60CT, AIKQ120N60CT, AUIRGPS4070D0) Trench Gen 6.2 HybridPACK™ Family (FS200R07A02E3_S6, FS820R08A6P2B, FS820R08A6P2LB, FS400R07A1E3_S7, FS200R07A1E3) |
|  | 1200 | Single high-side | 1EDI2001AS | 2 | DSO-36 | On-chip galvanic insulation (up to 6 kV), support of 5 V logic levels, 16-bit standard SPI interface (up to 2 MBaud) with daisy chain support, enable input pin, pseudo-differential inputs for critical signals. Power-on reset pin, debug mode, pulse suppressor, TLTO |  |
|  |  | Single high-side | 1EDI2002AS | 2 | DSO-36 |  |  |
|  |  | Single high-side | 1EDI2010AS | 2 | DSO-36 | On-chip galvanic insulation (up to 6 kV), support of 5 V logic levels, 16-bit standard SPI interface (up to 2 MBaud) with daisy chain support, enable input pin, pseudo-differential inputs for critical signals. Power-on reset pin, debug mode, pulse suppressor, TLTO, integrated ADC |  |

# EV Charging

**EV charger**

As electro-mobility increasingly becomes part of our daily lives, there is a growing need for more efficient charging solutions. Today, a DC charger with 150 kW can supply an EV with a 200 km charge in around 15 minutes. As fast-charging and battery technologies continue to evolve and improve, experts anticipate that charging time will drop even further. The unique expertise in e-mobility and power supplies makes Infineon the natural partner for advancing DC electric vehicle charging in terms of efficiency, performance, optimal cost and innovation.
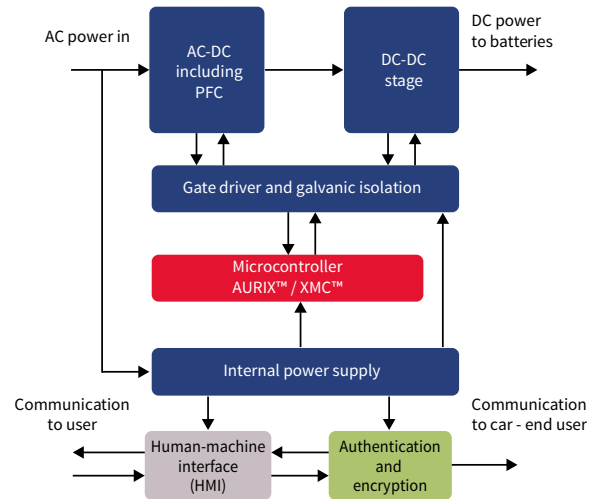


## Recommended gate drivers (EV charging)

| Application | Driver Voltage class [V] | Driver configuration | Part number | Source/ Sink current typ. [A] | Packages | Description | Suitable power switches and modules |
|---|---|---|---|---|---|---|---|
| DC-DC (<3 kW) | 600 | High and low-side | IRS2113S/M | 2.5/2.5 | DSO-16 300mil, VQFN-14 | 600 V high and low-side gate driver with SD | TRENCHSTOP™ IGBT+Diode (IKB40N65EH5, IKW75N65EH5, IKZ75N65EH5) CoolMOS™ MOSFET (IPP65R110CFD, IPP65R310CFD, IPP65R420CFD, IPP65R660CFD, IPW60R105CFD7, IPW60R145CFD7, IPP60R170CFD7, IPP60R280CFD7) |
| | | | IRS2186(4)S | 4/4 | DSO-14, DSO-8 | 600 V high and low-side driver with high current | |
| | 1200 | Single high-side | 1EDI05I12AF | 1.3/0.9 | DSO-8 | Functional isolation, ≥ 100 kV/µs CMTI, separate sink/source output, short circuit clamping | TRENCHSTOP™ IGBT+Diode (IKW40N120H3) CoolMOS™ MOSFET (IPP65R110CFD, IPP65R310CFD, IPP65R420CFD, IPP65R660CFD, IPW60R105CFD7, IPP60R170CFD7, IPP60R280CFD7) |
| DC-DC (<30 kW) | 1200 | Single high-side | 1EDC20H12AH NEW | 4/3.5 | DSO-8 300 mil | Functional isolation, ≥ 100 kV/µs CMTI, separate sink/source output, short circuit clamping, 125-ns propagation delay | CoolSiC™ SiC MOSFET (IMW120R045M1* - 3-pin, IMZ120R045M1* - 4-pin) TRENCHSTOP™ IGBT+Diode (IKQ50N120CH3, IKQ75N120CS6) |
| | | | 1EDI40I12AF | 7.5/6.8 | DSO-8 | Functional isolation, ≥ 100 kV/µs CMTI, separate sink/source output, short circuit clamping | |
| DC-DC (<60 kW) | 650 | Dual high-side | 2EDS8265H NEW | 4/8 | DSO-16 300 mil | Reinforced isolation, 150 kV/µs CMTI, EN | CoolMOS™ MOSFET (IPW65R041CFD, IPW65R080CFD, IPW60R018CFD7, IPW60R040CFD7, IPW60R070CFD7, IPW60R090CFD7, IPL60R060CFD7) |
| | 1200 | Single high-side | 1EDC60H12AH NEW | 10/9.4 | DSO-8 | Functional isolation, ≥ 100 kV/µs CMTI, separate sink/source output, short circuit clamp, 125-ns propagation delay | CoolSiC™ SiC MOSFET module (FF11MR12W1M1_B11; FF23MR12W1M1_B11; DF11MR12W1M1_B11; DF23MR12W1M1_B11) EasyPack™ 1B/2B module (F4-3L50R07W2H3F_B11) EconoPIM™ 2 module (FP50R07N2E4_B11) EconoPACK™ 2/3/4 module (FS75R12KT4_B15, FS100R12KT4G(P)_B11, FS200R12KT4R(P)_B11, FS225R12OE4) EconoDUAL™ 3 module (FF225R12ME4_B11) 34mm module (FF50R12RT4, FF150R12RT4) 62mm module (FF200R12KE4) |
| | | | 1EDS20I12SV NEW | SRC/2 | DSO-36 | Reinforced isolation, VDE 0884-10, $V_{IORM}$ = 1420 V, $V_{IOTM}$ = 8000 V; UL 1577, $V_{ISO}$ = 5000 V(rms); slew rate control, soft shutdown, DESAT, FAULT-RPT, OCP, TLTO | |
| PFC | 650 | Dual high-side | 2EDF7275F NEW | 4/8 | DSO-16 150mil | Dual-channel galvanically isolated gate-driver ICs | TRENCHSTOP™ 5 H5 (IKW50N65EH5, IKZ50N65EH5, IKW75N65EH5, IKZ75N65EH5) CoolMOS™ MOSFET (IPP60R060P7, IPP60R120P7, IPP60R180P7, IPP60R360P7, IPW65R019C7, IPW65R065C7, IPW65R125C7, IPW65R190C7) |
| | | | 2EDF7175F NEW | 1/2 | | | |
| | 1200 | Single high-side | 1EDI40I12AH | 7.5/6.8 | DSO-8 300 mil | Functional isolation, ≥ 100 kV/µs separate sink/source output, short circuit clamping | |
| | 20[1] | Single low-side | 1EDN8550B NEW | 4/8 | SOT23-6 | 20 V non-inverting signal Low-side driver with truly differential inputs, especially for kelvin source 4 pin device in PFC boost | |
| | 20 | Single low-side | 1EDN8511B | 4/8 | SOT23-6 | 20 V non-inverting single low-side driver with CMOS inputs in small 6-pin SOT-23 package | |
| | 25 | Dual low-side | IRS4427S | 2.3/3.3 | DSO-8 | 25 V non-inverting dual low-side driver with CMOS inputs | |

Note [1]: Common mode rejection (CMR) voltage range up to 80 V.
*Coming soon

# Lighting



## Lighting applications
› Commercial lighting
› Industrial lighting
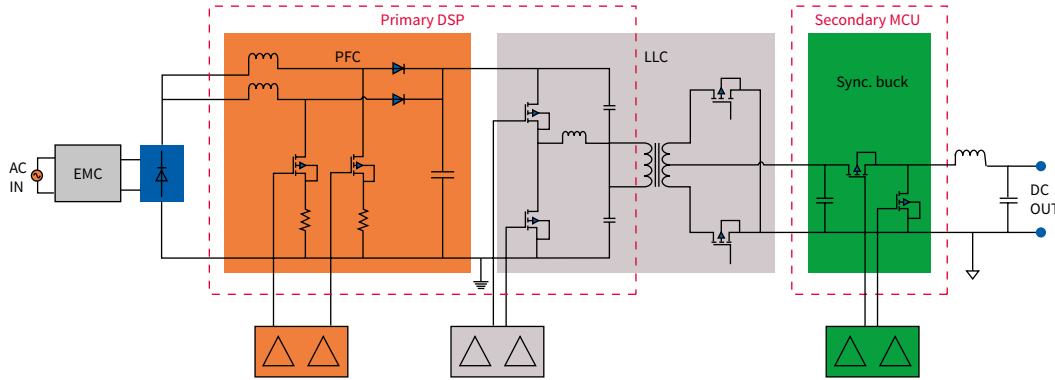› Agricultural lighting

## Recommended gate drivers (Lighting)

| Application | Drige voltage class [V] | Drive configuration | Part number | Source/ Sink current typ. [A] | Packages | Description | Suitable power switches |
|---|---|---|---|---|---|---|---|
| PFC | 25 | Single low-side | 1ED44176N01F  NEW | 0.8/1.75 | DSO-8 | OCP (±5%), EN, FAULT-RPT, programmable fault clear time | CoolMOS™ MOSFET (IPP60R060P7, IPP60R080P7, IPP60R099P7, IPP60R120P7, IPP60R180P7, IPP60R280P7, IPP60R360P7) |
| | | | IRS44273L | 1.5/1.5 | SOT23-5 | 25 V non-inverting single low-side driver with CMOS inputs in small 5 pin SOT-23 package | |
| | 20 | | 1EDN8511B | 4/8 | SOT23-6 | 20 V non-inverting single low-side driver with CMOS inputs in small 6 pin SOT-23 package | |
| | 25 | Dual low-side | IRS4427S | 2.3/3.3 | DSO-8 | 25 V non-inverting dual low-side driver with CMOS inputs | |
| | 20 | | 2EDN8524F | 5/5 | DSO-8 | 20 V non-inverting dual low-side driver with CMOS inputs | |
| HS buck (<100 W) | 100 | Single high-side | IRS10752L | 0.16/0.24 | SOT23-6 | 100 V single high-side driver in small 6 pin SOT-23 package | CoolMOS™ MOSFET (IPP80R280P7, IPP80R360P7, IPP80R450P7, IPP80R600P7, IPP80R750P7, IPP80R900P7, IPP80R1K2P7, IPP80R1K4P7, IPD80R2K0P7, IPD80R2K4P7, IPD80R3K3P7, IPD80R4K5P7) |
| | 200 | | IRS20752L | 0.16/0.24 | SOT23-6 | 200 V single high-side driver in small 6 pin SOT-23 package | |
| | 600 | | IRS2117S | 0.29/0.6 | DSO-8 | 600 V single high-side gate driver | |
| | | | IRS25752L | 0.16/0.24 | SOT23-6 | 600 V single high-side driver in small 6 pin SOT-23 package | |
| HB(LLC) (<200 W) | 650 | High and low-side | 2ED2106S06* | 0.29/0.7 | DSO-8 | Infineon SOI technology with integrated bootstrap diode | CoolMOS™ MOSFET (IPP60R060P7, IPP60R080P7, IPP60R099P7, IPP60R120P7, IPP60R180P7, IPP60R280P7, IPP60R360P7) |
| | 600 | | IRS2101S | 0.29/0.6 | DSO-8 | 600 V high-side and low-side gate driver | |
| | 650 | Half-bridge | 2ED2304S06F  NEW | 0.36/0.7 | DSO-8 | Infineon SOI technology with integrated bootstrap diode | |
| | 600 | | IRS2153(1)DS | 0.18/0.26 | DSO-8 | Self-oscillating, Integrated bootstrap FET, SD and SD-PROG | |
| Sync buck | 200 | High and low-side | IR2010S | 3/3 | DSO-8 | 200 V high and low-side driver with SD | CoolMOS™ MOSFET (IPP80R280P7, IPP80R360P7, IPP80R450P7, IPP80R600P7, IPP80R750P7, IPP80R900P7, IPP80R1K2P7, IPP80R1K4P7, IPD80R2K0P7, IPD80R2K4P7, IPD80R2K4P7, IPD80R4K5P7) |
| | 600 | Half-bridge | 2EDL05N06PF | 0.36/0.7 | DSO-8 | Infineon SOI technology with integrated bootstrap diode | |

* Coming soon

# Light electric vehicles (LEV)

**LEV**

## Light electric vehicles applications

› E-bikes/E-scooters (<2 kW)

› Low-speed electric vehicles (forklift, golf cart; <15 kW, <70 km/h)

› Small electric vehicle (<30 kW, <200 km/h)
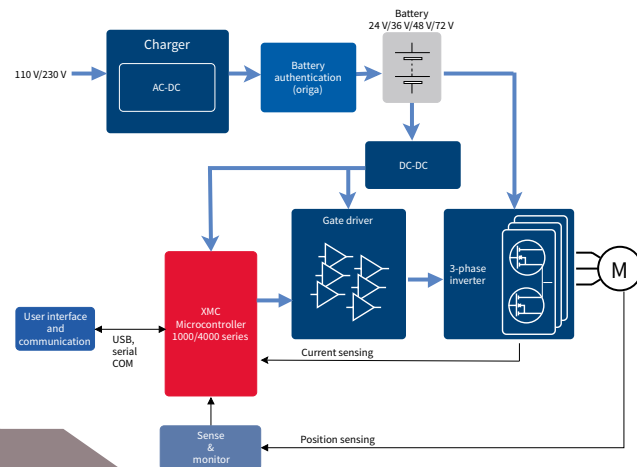


## Recommended gate drivers (Light electric vehicles)

| Application | Driver voltage class [V] | Driver configuration | Part number | Source/ Sink current typ. [A] | Packages | Description | Suitable power switches modules and controllers |
|---|---|---|---|---|---|---|---|
| Motor inverter/ BLDC (<2 kW) | 200 | High and low-side | IRS2005S/M | 0.29/0.6 | DSO-8, VQFN-14 | 200 V high and low-side driver with $V_{CC}$ & $V_{BS}$ UVLO | StrongIRFET™ (IRFB7530PBF,IRFS7530PBF, IRF100B201, IRF100S201, IRF135B203, IRF135S203, IRFB4115, IRFS4115) OptiMOS™ 3/5 (IPB017N06N3, IPT012N06N, IPB017N08N5, IPB017N10N5, IPB042N10N3, IPB048N15N5, IPB073N15N5, IPB107N20N3, IPT015N10N5, IPT059N15N3) |
| | | | IRS2011S | 1/1 | DSO-8 | 200 V, 1-A high and low-side driver with $V_{CC}$ & $V_{BS}$ UVLO | |
| | | Half-bridge | IRS2008S/M   NEW | 0.29/0.6 | DSO-8, VQFN-14 | 200 V half-bridge with SD, $V_{CC}$ & $V_{BS}$ UVLO | |
| | | | IRS2007S/M   NEW | 0.29/0.6 | DSO-8, VQFN-14 | 200 V half-bridge with $V_{CC}$ & $V_{BS}$ UVLO | |
| | | Three-phase | 6EDL04N02PR | 0.165/0.375 | TSSOP-28 | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | |
| | | | 6ED003L02-F2 | 0.165/0.375 | TSSOP-28 | Infineon SOI technology with OCP, EN, FAULT-RPT | |
| Motor inverter (<15 kW) | 650 | Dual high-side | 2EDF7275F   NEW | 4/8 | DSO-16 150 mil | Functional isolation, disable | TRENCHSTOP™ IGBT+Diode (IKD10N60RF, IKA15N65ET6, IKW30N60DTP, IKB40N65ES5, IKW50N60DTP, IKW75N60T) StrongIRFET™ (IRFB7530PBF,IRFS7530PBF, IRF100B201, IRF100S201, IRF135B203, IRF135S203, IRFB4115, IRFS4115) OptiMOS™ 3/5 (IPB017N06N3, IPT012N06N, IPB017N08N5, IPB017N10N5, IPB042N10N3, IPB048N15N5, IPB072N15N5, IPB107N20N3, IPT015N10N5, IPT059N15N3) |
| | | | 2EDF7175F   NEW | 1/2 | | | |
| | 600 | High and low-side | IRS21867S | 4/4 | DSO-8 | 600 V high and low-side gate driver with Low UVLO (6 V/5.5 V) | |
| | | | IRS2301S | 0.2/0.35 | DSO-8 | 600 V high and low-side gate driver | |
| | | Half-bridge | 2EDL05N06PF | 0.36/0.7 | DSO-8 | Infineon SOI technology with integrated bootstrap diode | |
| | | | IRS2302S | 0.2/0.35 | DSO-8 | 600 V high and low-side gate driver with SD | |
| | | Three-phase | 6ED003L06-F2 | 0.165/0.375 | DSO-28 300mil | Infineon SOI technology with OCP, EN, FAULT-RPT | |
| | | | 6EDL04N06PT | 0.165/0.375 | DSO-28 300mil | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | |
| Motor inverter (<30 kW) | 600 | Half-bridge | IRS2183S | 1.9/2.3 | DSO-8 | 600 V half-bridge gate driver | CoolMOS™ MOSFET (IPP60R060P7, IPP60R080P7, IPP60R099P7, IPP60R120P7, IPP60R180P7, IPP60R280P7, IPP60R360P7) EasyPIM™ 1B/2B module family (FP20R06W1E3_B11, FP50R06W2E3_B11) EasyPACK™ 1B module family (FS30R06W1E3_B11, FS50R06W1E3_B11) |
| | | | 2EDL23N06PJ | 2.3/2.8 | DSO-14 | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | |
| | 1200 | Single high-side | 1EDI60(I,N)12AF | 10/9.4 | DSO-8 | Functional isolation, ≥ 100 kV/μs CMTI, separate sink/source output, short circuit clamping | EasyPIM™ 1B/2B module family (FP25R12W2T4_B11) EasyPACK™ 1B module family (FS35R12W1T4_B11, FS50R12W2T4_B11) EconoPIM™ 2 module family (FP35R12KT4_B15, FP50R12KT4G) EconoPACK™ 2/3 module family (FS50R12KT4_B15) |
| | | Three-phase | 6ED2230S12T* | 0.35/0.65 | DSO-24 | Infineon 1200 V SOI technology with integrated bootstrap diode, OCP (±5%), EN, FAULT-RPT | EasyPIM™ 1B/2B module family (FP15R12W1T4_B11, FP15R12W2T4) |
| | | | IR2235S/J | 0.25/0.5 | DSO-28 300mil, LCC-32 | 1200 V 3-phase driver with OCP, SD, OPAMP, FAULT-RPT | |

\* Coming soon

# Major home appliances (MHA)

**Major Home Appliance**

**Major home appliance applications**

› Refrigerators (compressors)
› Air-conditioners (PFC, compressors, fans, SMPS)
› Washing machines (drum motors, drain pumps)
› Dryers (drum drives, compressors, fan drives)
› Dish washers (drain pumps, spray/main circulator pumps)
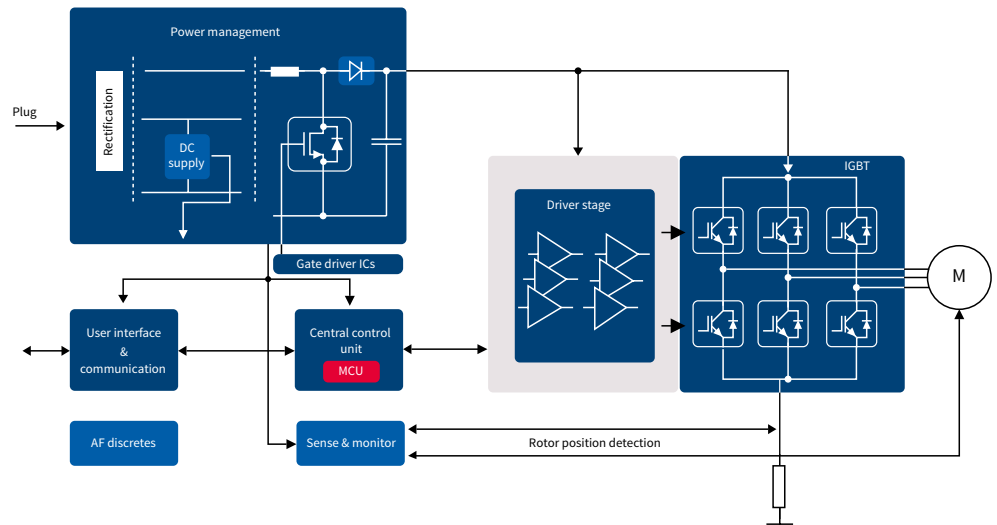


## Recommended gate drivers (Major home appliances)

| Application | Driver voltage class [V] | Driver configuration | Part number | Source/ Sink current typ. [A] | Packages | Description | Suitable power switches IPMs and controllers |
|---|---|---|---|---|---|---|---|
| PFC | 25 | Single low-side | 1ED44176N01F NEW | 0.8/1.75 | DSO-8 | OCP (±5%), EN, FAULT-RPT, programmable fault clear time | TRENCHSTOP™ (IKW30N65H5, IKW40N65WR5, IKFW40N60DH3E, IKFW50N60DH3E) Rapid diode (IDW30E65D1, IDW60C65D1, IDFW40E65D1E, IDFW60C65D1) CoolMOS™ MOSFET (IPP60R060P7, IPP60R099P7, IPP60R120P7, IPP60R180P7, IPP60R280P7, IPP60R360P7) CIPOS™ Mini (IFCM15S60GD, IFCM15P60GD, IFCM10P60GD, IFCM10S60GD) iMOTION™ (IMC102T, IMC302A*) |
| | | | IRS44273L | 1.5/1.5 | SOT23-5 | non-inverting single low-side driver with CMOS inputs in small SOT-23 package | |
| | 20 | | 1EDN8511B | 4/8 | SOT23-6 | | |
| | 25 | Dual low-side | IRS4427S | 2.3/3.3 | DSO-8 | non-inverting dual low-side driver with CMOS inputs | |
| | 20 | | 2EDN8524F | 5/5 | DSO-8 | | |
| | 600 | Half-bridge | 2EDL23(I,N)06PJ | 2.3/2.8 | DSO-14 | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | |
| Inverter/ compressor/ drive/fans | 650 | Half-bridge | 2ED2304S06F NEW | 0.36/0.7 | DSO-8 | Infineon SOI technology with integrated bootstrap diode | TRENCHSTOP™ IGBT+Diode (IKD03N60RF, IKD04N60RF, IKD06N60RF) TRENCHSTOP™ IGBT6 (IKA08N65ET6, IKA10N65ET6, IKA15N65ET6, IKD06N65ET6*, IKD08N65ET6*) CoolMOS™ MOSFET (IPD65R1K4CFD, IPD65R950CFD, IPN60R1K0CE, IPN60R1K5CE, IPD60R1K5CE, IPD60R1K0CE) iMOTION™ (IMC101T, IMC301A*) |
| | 600 | | IRS2890DS NEW | 0.22/0.48 | DSO-14 | Integrated bootstrap FET, FAULT-RPT, OCP | |
| | | | 2EDL23(I,N)06PJ | 2.3/2.8 | DSO-14 | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | |
| | | | 2EDL05(I,N)06PF | 0.36/0.7 | DSO-8 | Infineon SOI technology with integrated bootstrap diode | |
| | | Three-phase | 6EDL04(I,N)06xT | 0.165/0.375 | DSO-28 300mil | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | |
| | | | IRS2334S/M | 0.2/0.35 | DSO-20 300mil, VQFN-28 | 600 V Three-phase gate driver IC | |
| | | | 6ED003L06-F2 | 0.165/0.375 | DSO-28 300mil | Infineon SOI technology with OCP, EN, FAULT-RPT | |
| SMPS (100 W) | 20 | Dual low-side | 2EDN8524F | 5/5 | DSO-8 | non-inverting dual low-side driver with CMOS inputs | CoolMOS™ MOSFET (IPP60R060P7, IPP60R080P7, IPP60R099P7, IPP60R120P7, IPP60R180P7, IPP60R280P7, IPP60R360P7) |
| | 25 | | IRS4427S | 2.3/3.3 | DSO-8 | | |
| | 650 | High and low-side | 2ED2106S06* | 0.29/0.7 | DSO-8 | Infineon SOI technology with integrated bootstrap diode | |
| | 600 | High and low-side | IRS2186(4)S | 4/4 | DSO-14, DSO-8 | 600 V high and low-side driver with high current | |
| | | Half-bridge | IRS2153(1)DS | 0.18/0.26 | DSO-8 | Self-oscillating, Integrated bootstrap FET, SD and SD-PROG | |

*Coming soon

Renewables

# Renewable energy

## Renewable energy applications

› Solar (string & central inverters)
› Solar (micro inverters)
› Heat pumps (pump inverters)

## Recommended gate drivers (Renewable energy)

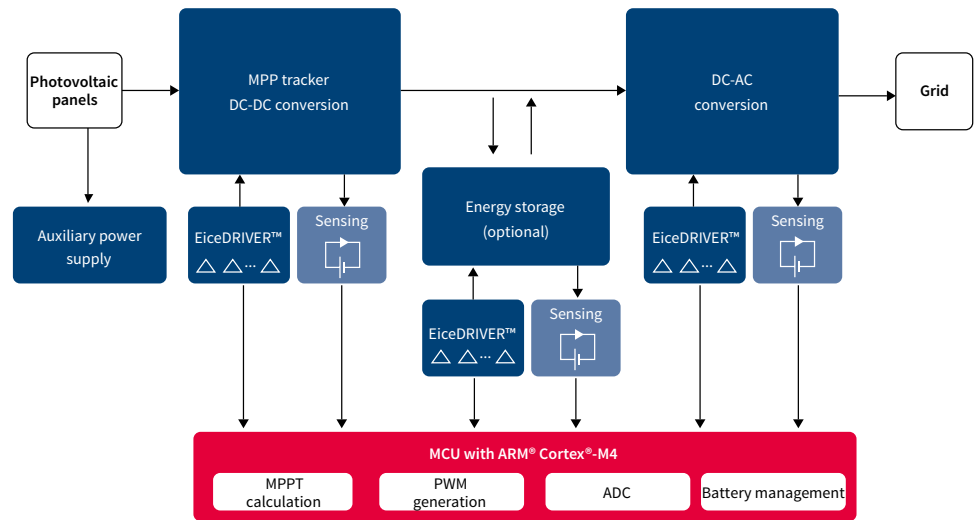| Application | Driver voltage class [V] | Driver configuration | Part number | Source/Sink current typ. [A] | Packages | Description | Suitable power switches |
|---|---|---|---|---|---|---|---|
| Solar inverter Boost/SMPS | 25 | Single low-side | 1ED44176N01F NEW | 0.8/1.75 | DSO-8 | OCP (±5%), EN, FAULT-RPT, programmable fault clear time | CoolMOS™ MOSFET (IPW65R019C7, IPW65R065C7, IPW65R095C7, IPW65R190C7) |
| | | | IRS44273L | 1.5/1.5 | SOT23-5 | non-inverting low-side driver with CMOS inputs | |
| | | Dual low-side | IRS4427S | 2.3/3.3 | DSO-8 | | |
| | 20 | Dual low-side | 2EDN8524F | 5/5 | DSO-8 | | |
| | 1200 | Single high-side | 1EDI20N12AF | 4/3.5 | DSO-8 | Functional isolation, ≥ 100 kV/µs CMTI, separate sink/source output, short circuit clamping, 125-ns propagation delay | CoolSiC™ SiC MOSFET module (DF11MR12W1M1_B11, DF23MR12W1M1_B11) EasyPACK™ 1B/2B module family (DF100R07W1H5FP_B54, DF160R12W2H3F_B11) CoolMOS™ MOSFET (IPW65R019C7, IPW65R065C7, IPW65R095C7, IPW65R190C7) |
| | | | 1EDC60H12AH NEW | 10/9.4 | DSO-8 300mil | | |
| Solar micro inverter DC-AC (<200 W) | 650 | Half-bridge | 2ED2304S06F NEW | 0.36/0.7 | DSO-8 | Infineon SOI technology with integrated bootstrap diode | OptiMOS™ 5 (BSC035N10NS5, BSC093N15NS5) CoolMOS™ MOSFET (IPP65R110CFD, IPP65R190CFD, IPP65R420CFD, IPP65R660CFD, IPW65R019C7, IPW65R065C7, IPW65R095C7, IPW65R190C7) |
| | 600 | | IR2114SS | 2/3 | SSOP-24 | DESAT, Synchronization, SD-SOFT, FAULT-RPT | |
| | | | 2EDL05N06PJ | 0.36/0.7 | DSO-14 | Infineon SOI technology with integrated bootstrap diode | |
| | 650 | Dual high-side | 2EDF7275F NEW | 4/8 | DSO-16 150 mil | Functional isolation | |
| | 1200 | Single high-side | 1EDI20N12AF | 4/3.5 | DSO-8 | Functional isolation, ≥ 100 kV/µs CMTI, separate sink/source output, short circuit clamping, 120-ns propagation delay | |
| Solar string/central inverter DC-AC (>200 W) | 1200 | Single high-side | 1EDI60(I,N)12AF | 10/9.4 | DSO-8 | | CoolSiC™ SiC MOSFET (IMW120R045M1* - 3-pin, IMZ120R045M1* - 4-pin) CoolSiC™ SiC MOSFET module (FF11MR12W1M1_B11; FF23MR12W1M1_B11; DF11MR12W1M1_B11; DF23MR12W1M1_B11) TRENCHSTOP™ IGBT+Diode (IKW40N120CS6, IK(Q/Y)75N120CS6, IK(W/Z)75N65ES5, IK(W/Z)75N65EH5) EasyPACK™ 1B/2B module (F3L75R12W1H3_B11, F3L200R12W2H3_B11, F4-3L50R07W2H3F_B11, F4-75R07W2H3_B51) EconoPACK™ 2 module (F3L200R12N2H3) EconoDUAL™ 3 module (FF225R12ME4_B11, FF300R12ME4_B11) EconoPack™+ module (FS225R12OE4, FS300R12OE4) 34 mm module (FF50R12RT4, FF150R12RT4) 62 mm module (FF200R12KE4, FF300R12KE4) |
| | | | 1ED020I12-F2 | 2/2 | DSO-16 300mil | Functional isolation, ≥ 100 kV/µs CMTI, active Miller clamp, DESAT, short circuit clamping, FAULT-RST | |
| | | Dual high-side | 2ED020I12-F2 | 2/2 | DSO-36 | | |
| | | High and low-side | IR2213S | 2/2.5 | DSO-16 300mil | 1200 V high and low side gate driver with SD and Separate power supply | |
| | | Half-bridge | IR2214SS | 2/3 | SSOP-24 | 1200 V Half-bridge driver with DESAT, Synchronization, SD-SOFT, FAULT-RPT | |
| | | Three-phase | 6ED2230S12T* | 0.35/0.65 | DSO-24 | Infineon 1200 V SOI technology with integrated bootstrap diode, OCP (±5%), EN, FAULT-RPT | TRENCHSTOP™ IGBT+Diode (IKW40N120H3, IKW40N120CS6, IKQ50N120CH3) EasyPACK™ 1B/2B module (FS25R12W1T4_B11, FS50R12W2T4_B11) |
| Heat pump inverter (<2 kW) | 650 | Half-bridge | 2ED2304S06F NEW | 0.36/0.7 | DSO-8 | Infineon SOI technology with integrated bootstrap diode | TRENCHSTOP™ (IKW30N65H5, IKW75N65ES5, IKFW75N60ET) EasyPACK™ 1B/2B module (F3L225R07W2H3P_B63) |
| | 600 | | 2EDL05I06PF | 0.36/0.7 | DSO-8 | | |
| | | Three-phase | 6EDL04I06xT | 0.165/0.375 | DSO-28 300mil | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | |
| Heat pump inverter (>2 kW) | 1200 | Single high-side | 1EDI20I12AF | 4/3.5 | DSO-8 | Functional isolation, ≥ 100 kV/µs CMTI, separate sink/source output, short circuit clamping | CoolSiC™ SiC MOSFET module (FF11MR12W1M1_B11, FF23MR12W1M1_B11) TRENCHSTOP™ IGBT+diode (IKW40N120H3, IKQ50N120CH3, IKQ75N120CS6) EasyPACK™ 1B/2B module (FS25R12W1T4_B11, FS50R12W2T4_B11, F4-3L50R07W2H3F_B11, F4-75R06W1E3) EconoPIM™ 2 module (FP25R12KT4_B15, FP50R12KT4G) EconoPACK™ 2/3 module (FS50R12KT4_B15) 34 mm module (FF50R12RT4, FF150R12RT4) |
| | | High and low side | IR2213S | 2/2.5 | DSO-16 300mil | 1200 V high and low side gate driver with SD and separate power supply | |
| | | Half-bridge | IR2214SS | 2/3 | SSOP-24 | 1200 V Half-bridge driver with DESAT, Synchronization, SD-SOFT, FAULT-RPT | |
| | | Three-phase | 6ED2230S12T* | 0.35/0.65 | DSO-24 | Infineon 1200-V SOI technology with integrated bootstrap diode, OCP (±5%), EN, FAULT-RPT | TRENCHSTOP™ IGBT+diode (IKW40N120H3, IKW40N120CS6, IKQ50N120CH3) EasyPACK™ 1B/2B module (FS25R12W1T4_B11, FS50R12W2T4_B11) |

* Coming soon

39

# Small home appliances and battery-powered applications

**Typical small home appliance application diagram**
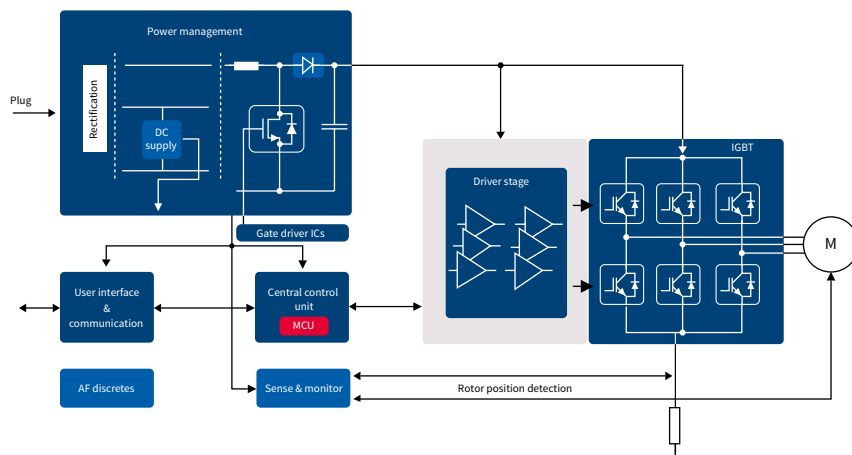


**Small home appliance applications**

> Vacuum cleaner (SR motor, BLDC, PFC)
> Hair dryers
> Induction heating (half bridge-topology)
> Microwave ovens
> Fans (hood fans, ceiling fans, freezer fans)
> Battery chargers (PFC)

**Typical battery powered three-phase system: a one-stop-shop for battery powered drives**
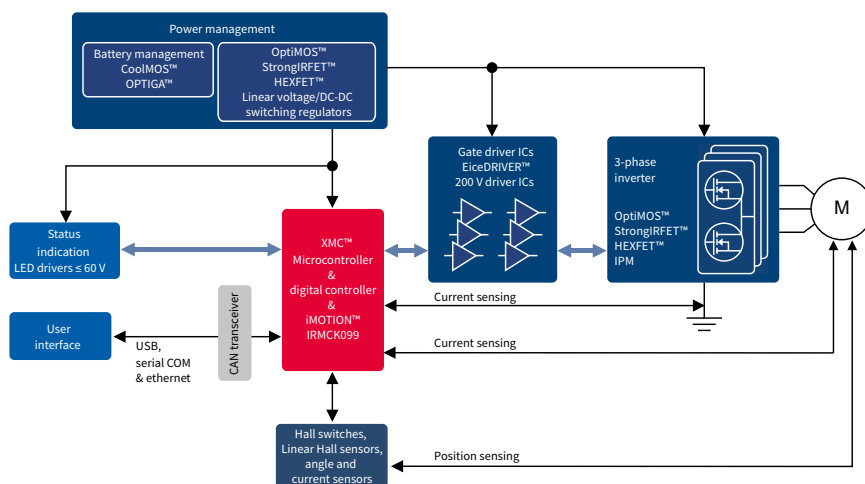


**Battery-powered applications**

> Drones / multicopters (<1 kW)
> Lawn mower (<1 kW)
> Cordless power tools (<1 kW)
> Service robotics (<1 kW)
> Cordless vacuum cleaners (<1 kW)
> Toys (RC cars) (<1 kW)
> Fast battery chargers

## Recommended gate drivers (Small home applicances and battery-powered applications)

| Application | Driver voltage class [V] | Driver configuration | Part number | Source/ Sink current typ. [A] | Packages | Description | Suitable power switches and controllers |
|---|---|---|---|---|---|---|---|
| PFC | 25 | Single low-side | 1ED44176N01F NEW | 0.8/1.75 | DSO-8 | OCP (±5%), EN, FAULT-RPT, programmable fault clear time | TRENCHSTOP™ (IKW30N65H5, IKW40N65WR5, IKFW40N60DH3E, IKFW50N60DH3E) Rapid Diode (IDW30E65D1, IDW60C65D1) CoolMOS™ MOSFET (IPP60R060P7, IPP60R099P7, IPP60R180P7, IPP60R360P7) iMOTION™ (IMC102T, IMC302A*) |
| | | | IRS44273L | 1.5/1.5 | SOT23-5 | Non-inverting low-side driver with CMOS inputs | |
| | 20 | | 1EDN8511B | 4/8 | SOT23-6 | | |
| | 25 | Dual low-side | IRS4427S | 2.3/3.3 | DSO-8 | | |
| | 20 | | 2EDN8524F | 5/5 | DSO-8 | | |
| Battery powered Motor Inverter/BLDC (<1 kW) | 20[1] | Single low-side | 1EDN7550B NEW | 4/8 | SOT23-6 | Single-channel gate driver IC with truly differential inputs | StrongIRFET™ (IRL40SC209, IRL40SC228, IRL40T209) OptiMOS™ 5 (BSC0925ND, BSZ0909ND, IPT004N03L, IRL40T209, BSC054N04NS) iMOTION™ (IMC101T, IMC301A*) |
| | 200 | High and low side | IRS2005S/M | 0.29/0.6 | DSO-8, VQFN-14 | 200 V driver with $V_{CC}$ & $V_{BS}$ UVLO, and shutdown (IRS2008 only) | |
| | | | IRS2011S | 1/1 | DSO-8 | | |
| | | Half-bridge | IRS2008S/M NEW | 0.29/0.6 | DSO-8, VQFN-14 | | |
| | | | IRS2007S/M NEW | | | | |
| | | Three-phase | 6EDL04N02PR | 0.165/0.375 | TSSOP-28 | Infineon SOI technology with integrated bootstrap diode (6EDL only), OCP, EN, FAULT-RPT | |
| | | | 6ED003L02-F2 | 0.165/0.375 | TSSOP-28 | | |
| Inverter/ Compressor/ Drive | 650 | Half-bridge | 2ED2304S06F NEW | 0.36/0.7 | DSO-8 | Infineon SOI technology with integrated bootstrap diode | TRENCHSTOP™ IGBT+Diode (IKD03N60RF, IKD04N60RF, IKD06N60RF) TRENCHSTOP™ IGBT6 (IKA08N65ET6, IKA10N65ET6, IKA15N65ET6) TRENCHSTOP™ RC-H5 (IHW20N120R5, IHW40N120R5, IHW20N135R5, IHW40N135R5) iMOTION™ (IMC101T, IMC301A*) |
| | 600 | | IRS2890DS NEW | 0.22/0.48 | DSO-14 | Integrated bootstrap FET, FAULT-RPT, OCP | |
| | | | IRS2183S | 1.9/2.3 | DSO-8 | 600-V Half-bridge gate driver | |
| | | | 2EDL23I06PJ | 2.3/2.8 | DSO-14 | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | |
| | | | 2EDL05(I,N)06PF | 0.36/0.7 | DSO-8 | Infineon SOI technology with integrated bootstrap diode | |
| | | High and low side | IRS2113S/M | 2.5/2.5 | DSO-16 300mil, VQFN-14 | 600-V High and low side gate driver with SD | |
| | | | IRS2186(4)S | 4/4 | DSO-8 DSO-14 | 600-V high and low side driver with high current | |
| | | Three-phase | 6EDL04(I,N)06xT | 0.165/0.375 | DSO-28 300 mil | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | |
| | | | IRS2334S/M | 0.2/0.35 | DSO-20 300 mil, VQFN-28 | 600-V Three-phase gate driver IC | |

Note [1]: Common mode rejection (CMR) voltage range up to 80 V.
* Coming soon

# Switch-mode power supply (SMPS)

## Typical application diagram



PFC
LLC
Sync. rec.

110 V$_{AC}$ - 240 V$_{AC}$

CoolSiC™ Schottky diode

CoolMOS™ C7 or P7

CoolMOS™ CFD7 or P7

CoolMOS™ CFD7 or P7

OptiMOS™ 5

OptiMOS™ 5

+12 V

GND

GND

Gate driver

Pulse transformer

Gate driver

Gate driver

PFC controller

ICE3PCS01G or XMC1300

PWM controller

ICE2HS01G or XMC4200

Isolation
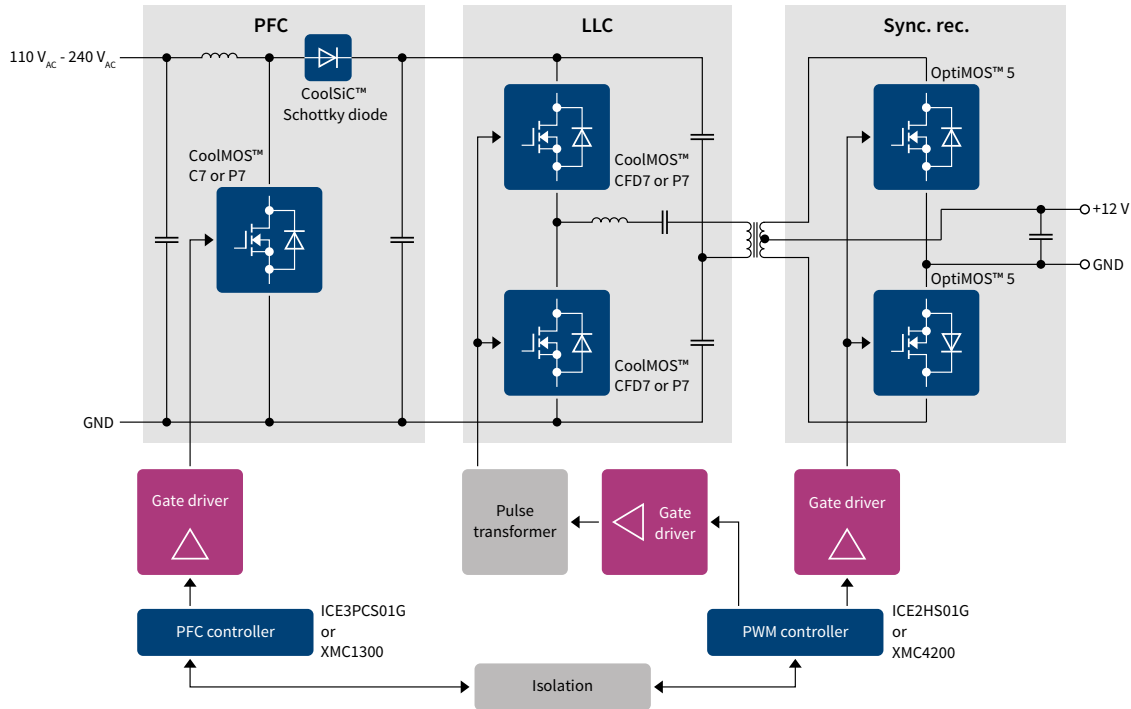
## Recommended gate drivers (Switch-mode power supply)

| Application | Driver voltage class [V] | Driver configuration | Part number | Source/ Sink current typ. [A] | Packages | Description | Suitable power switches |
|---|---|---|---|---|---|---|---|
| PFC | 20[1] | Single low-side | 1EDN8550B NEW | 4/8 | SOT23-6 | Non-inverting signal low-side driver with truly differential inputs, especially for kelvin source 4 pin device in PFC boost | CoolMOS™ 7 series: IPP60RyyyC7 → x: T = HSOF-8; yyy: $R_{DS(on)}$ range (017 mW - 99 mW); IPP65RyyyC7 → x: Z = TO-247-4pin; yyy: $R_{DS(on)}$ range (019 mW - 95 mW); IPP60RyyyG7→ x: DD = DDPAK, T= HSOF-8; yyy: $R_{DS(on)}$ range (028 mW - 190 mW); IPP65RyyyG7→ x: T= HSOF-8; yyy: $R_{DS(on)}$ range (033 mW - 195 mW); IPP60RyyyP7→ x: Z = TO-247-4pin; yyy: $R_{DS(on)}$ range (037 mW - 180 mW); |
| | 25 | Single low-side | 1ED44176N01F NEW | 0.8/1.75 | DSO-8 | OCP (±5%), EN, FAULT-RPT, programmable fault clear time | CoolMOS™ 7 series: IPP60RyyyC7 → x: P = TO-220, W=TO-247, T = HSOF-8; yyy: $R_{DS(on)}$ range (017 mW - 180 mW); IPP65RyyyC7 → x: P = TO-220, W=TO-247; yyy: $R_{DS(on)}$ range (019 mW - 225 mW); IPP60RyyyG7→ x: DD = DDPAK, T= HSOF-8; yyy: $R_{DS(on)}$ range (028 mW - 190 mW); IPP65RyyyG7→ x: T= HSOF-8; yyy: $R_{DS(on)}$ range (033 mW - 195 mW); IPP60RyyyP7→ x: P = TO-220, W=TO-247; yyy: $R_{DS(on)}$ range (037 mW - 380 mW); IPP60RyyyCFD7→ x: P = TO-220, W=TO-247; yyy: $R_{DS(on)}$ range (018 mW - 280 mW); |
| | 20 | | 1EDN8511B | 4/8 | SOT23-6 | 20 V non-inverting signal low-side driver with CMOS inputs | |
| | | Dual low-side | 2EDN8524F | 5/5 | DSO-8 | 20 V non-inverting dual low-side driver with CMOS inputs | |
| Totem pole PFC | 650 | Single high-side | 1EDF5673F NEW | 4/8 | DSO-16 150 mil | Functional isolation | CoolGaN™ IGxx60RyyyD1 → Ron 70 mW and 190 mW; DSO-20-87, DSO-20-85, HDSOF-8-3 and DFN 8x8. (CCM) |
| | | Dual high-side | 2EDF7275F NEW | 4/8 | DSO-16 150 mil | Functional isolation | IPP60RyyyCFD7→ x: P = TO-220, W=TO-247; yyy: $R_{DS(on)}$ range (018 mW - 280 mW).  (TCM) |
| | 600 | Half-bridge | 2EDL23I06PJ | 2.3/2.8 | DSO-14 | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | |
| Vienna rectifier | 650 | Dual high-side | 2EDF8275F NEW | 4/8 | DSO-16 150 mil | Functional isolation, 150 kV/µs CMTI, EN | IPP60RyyyG7/C7→ x: P = TO-220, W=TO-247, T = HSOF-8; yyy: $R_{DS(on)}$ range (017 mW - 180 mW); IPP65RyyyC7 → x: P = TO-220, W=TO-247; yyy: $R_{DS(on)}$ range (019 mW - 225 mW) IPP60RyyyP7→ x: P = TO-220, W=TO-247; yyy: $R_{DS(on)}$ range (037 mW - 380 mW); |
| Sync rectifier | 25 | Single low-side | 1ED44176N01F NEW | 0.8/1.75 | DSO-8 | OCP (±5%), EN, FAULT-RPT, programmable fault clear time | OptiMOS™ 5 (BSC035N10NS5) OptiMOS™ 3 (BSC030N04NS) |
| | 20[1] | | 1EDN7550B NEW | 4/8 | SOT23-6 | Non-inverting low-side driver with truly differential inputs | |
| | 20 | Dual low-side | 2EDN7523F | 5/5 | DSO-8 | 20 V non-inverting dual low-side driver with CMOS inputs | |
| | 200 | Dual low-side | IR11688S | 1/4 | DSO-8 | Dual synchronous rectification control IC | |
| | 250 | Dual high-side | 2EDF7275K NEW | 4/8 | LGA-13 | Functional isolation, 150 kV/µs CMTI, Disable | |
| | | Single high-side | 1EDF5673K NEW | 4/8 | LGA-13 | Functional isolation | CoolGaN™ → $R_{on}$ 70 mW and 190 mW; DSO-20-87, DSO-20-85, HDSOF-8-3 and DFN 8x8. (CCM) |
| LLC/ZVS PSFB | 650 | Single high-side | 1EDS5663H NEW | 4/8 | DSO-16 300 mil | Reinforced isolation, 200 kV/µs CMTI, EN | |
| | | Dual high-side | 2EDS8265H NEW | 4/8 | DSO-16 300 mil | Reinforced isolation, 150 kV/µs CMTI, EN | IPP60RyyyCFD7→ x: P = TO-220, W=TO-247; yyy: $R_{DS(on)}$ range (018 mW - 280 mW); |
| | 600 | High and low-side | IRS2186(4)S | 4/4 | DSO-14, DSO-8 | 600-V high and low side driver with high current | |

Note [1]: Common mode rejection (CMR) voltage range up to 80 V.

# Uninterruptible power supply (UPS)

UPS

## Typical application diagram



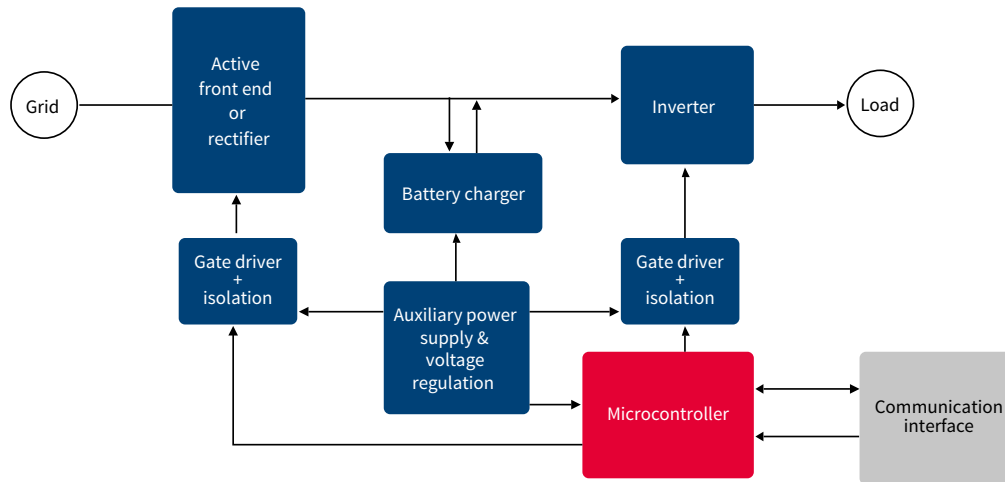## Recommended gate drivers (Uninterruptible power supply)

| Application | Driver voltage class [V] | Driver configuration | Part number | Source/Sink current typ. [A] | Packages | Description | Suitable power switches |
|---|---|---|---|---|---|---|---|
| Battery DC-DC (<3.5 kW) | 600 | Half-bridge | 2EDL05I06PJ | 0.36/0.7 | DSO-14 | Infineon SOI technology with integrated bootstrap diode | TRENCHSTOP™ and TRENCHSTOP™ 5 (IK(W/Z)50N65EH5, IK(W/Z)50N65ES5, IKFW50N60ET) |
| | | | 2EDL23I06PJ | 2.3/2.8 | DSO-14 | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | EasyPACK™ 1B/2B module (FS20R06W1E3_B11, FS50R06W1E3_B11, F4-75R06W1E3) |
| | 1200 | Single high-side | 1EDI20I12AF | 4/3.5 | DSO-8 | Functional isolation, ≥ 100 kV/µs CMTI, separate sink/source output, short circuit clamping | TRENCHSTOP™ IGBT+Diode (IKW40N120CS6) EasyPIM™ 1B/2B module (FP15R12W1T4_B11, FP15R12W2T4) |
| | | High and low side | IR2213S | 2/2.5 | DSO-16 300 mil | SD and Separate power supply | EasyPACK™ 1B/2B module (FS25R12W1T4_B11) |
| Battery DC-DC (<100 kW) | 1200 | Single high-side | 1EDI60H12AH | 10/9.4 | DSO-8 300mil | Functional isolation, ≥ 100 kV/µs CMTI, separate sink/source output, short circuit clamping | CoolSiC™ SiC MOSFET (IMW120R045M1*- 3-pin, IMZ120R045M1*- 4-pin) CoolSiC™ SiC MOSFET module (FF11MR12W1M1_B11, FF23MR12W1M1_B11) TRENCHSTOP™ IGBT (IKW40N120CS6, IK(Q/Y)75N120CS6, IK(W/Z)75N65ES5, IK(W/Z)75N65EH5) EasyPACK™ 1B/2B module family (F3L100R07W2E3_B11, F3L150R07W2E3_B11, FS50R12W2T4_B11, F4-3L50R07W2H3F_B11) EconoPIM™ 2/3 module family (FP75R12KT4_B15, FP150R12KT4(P)_B11) EconoPACK™ 2/3/4 module family (FS75R12KT4_B15, FS100R12KT4G(P)_B11, FS100R12PT4, FS150R12KT4(P)_B11, FS150R12PT4) EconoDUAL™ 3 module family (FF225R12ME4_B11, FF300R12ME4_B11) EconoPack™+ module family (FS225R12OE4, FS300R12OE4) 34 mm module family (FF50R12RT4, FF150R12RT4) 62 mm module family (FF200R12KE4, FF300R12KE4) |

\* Coming soon

## Recommended gate drivers
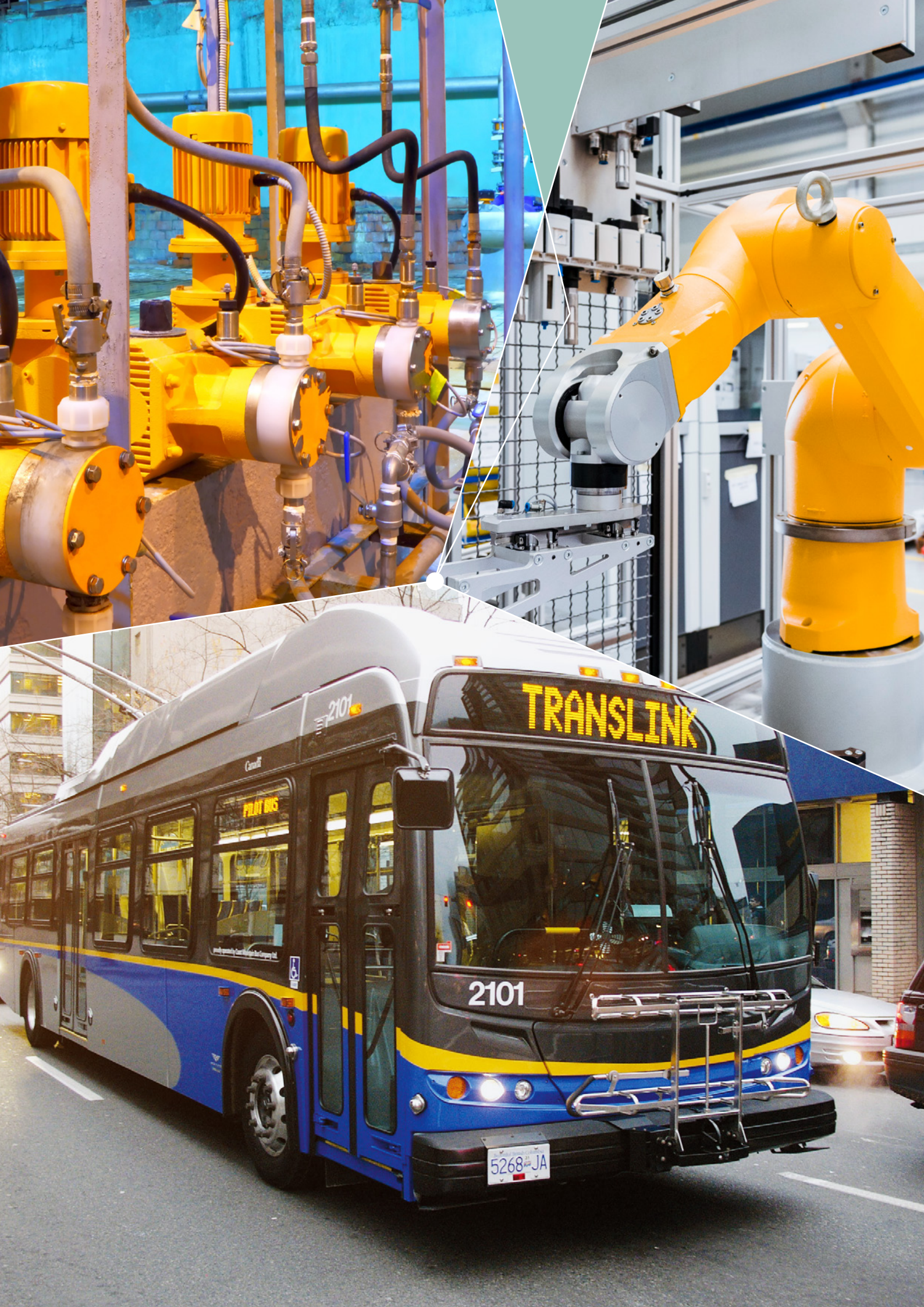## (Uninterruptible power supply) continued

| Application | Driver voltage class [V] | Driver configuration | Part number | Source/ sink current typ. [A] | Packages | Description | Suitable power switches |
|---|---|---|---|---|---|---|---|
| Mains inverter (<5 kVA) | 600 | Half-bridge | 2EDL23I06PJ | 2.3/2.8 | DSO-14 | Infineon SOI technology with integrated bootstrap diode, OCP, EN, FAULT-RPT | TRENCHSTOP™ (IKW50N65H5, IKW75N65ES5, IKZ75N65ES5, IKFW75N60ET) StrongIRFET™ (IRF200P222, IRF250P224, IRF300P226) EasyPACK™ 1B/2B module family (FS20R06W1E3_B11, FS50R06W1E3_B11, FB20R06W1E3, FB30R06W1E3) |
| | | | IR2114SS | 2/3 | SSOP-24 | DESAT, Synchronization, SD-SOFT, FAULT-RPT | |
| | | High and low side | IRS2186(4)S | 4/4 | DSO-14, DSO-8 | 600-V high and low side driver with high current | |
| | 1200 | Single high-side | 1EDI60H12AH | 10/9.4 | DSO-8 300mil | Functional isolation, ≥ 100 kV/μs CMTI, separate sink/source output, short circuit clamping, 125-ns propagation delay | CoolSiC™ SiC MOSFET (IMW120R045M1* - 3-pin, IMZ120R045M1* - 4-pin) CoolSiC™ SiC MOSFET module (FF11MR12W1M1_B11; FF23MR12W1M1_B11) TRENCHSTOP™ IGBT+Diode (IKW40N120CS6) EasyPACK™ 1B/2B module family (FS25R12W1T4_B11) EconoPIM™ 2 module family (FP25R12KT4_B15) |
| | | | 1EDI20I12MF | 4/3.5 | DSO-8 | Functional isolation, ≥ 100 kV/μs CMTI, active Miller clamp, short circuit clamping | |
| Mains inverter (<100 kVA) | 1200 | Single high-side | 1EDS20I12SV   NEW | SRC/2 | DSO-36 | Reinforced isolation, VDE 0884-10, $V_{IORM}$ = 1420 V, $V_{IOTM}$ = 8000 V; UL 1577, $V_{ISO}$ = 5000 V(rms); slew rate control, DESAT, FAULT-RPT, OCP, SD-SOFT, two level turn off | CoolSiC™ SiC MOSFET (IMW120R045M1* - 3-pin, IMZ120R045M1* - 4-pin) CoolSiC™ SiC MOSFET module (FF11MR12W1M1_B11; FF23MR12W1M1_B11) TRENCHSTOP™ IGBT+Diode (IKW40N120H3, IKW40N120CS6, IKQ50N120CH3, IKQ75N120CS6) EasyPACK™ 1B module (FS50R12W2T4_B11, FS75R12W2T4_B11) Easy 1B/2B 3-level (FS3L50R07W2H3F_B11, F3L100R12W2H3_B11) Easy 1B/2B Booster module (DF75R12W1H4F_B11, DF120R12W2H3_B27) EconoPIM™ 2/3 module (FP75R12KT4_B15, FP150R12KT4(P)_B11) EconoPACK™ 2/3/4 module (FS75R12KT4_B15, FS150R12KT4(P)_B11, FS150R12PT4) 34 mm module (FF50R12RT4, FF150R12RT4) |
| | | | 1ED020I12-FT | 2/2 | DSO-16 300mil | Functional isolation, ≥ 100 kV/μs CMTI, DESAT, active Miller clamp, short circuit clamping, FAULT-RST, two level turn off (FT only) | |
| | | | 1ED020I12-F2 | 2/2 | DSO-16 300mil | | |
| | | Dual high-side | 2ED020I12-F2 | 2/2 | DSO-36 | | |
| | | Single high-side | 1EDI60I12AF | 10/9.4 | DSO-8 | Functional isolation, ≥ 100 kV/μs CMTI, separate sink/source output, short circuit clamping | |
| PFC/SMPS | 25 | Single low-side | 1ED44176N01F   NEW | 0.8/1.75 | DSO-8 | OCP (±5%), EN, FAULT-RPT, programmable fault clear time | TRENCHSTOP™ IGBT+Diode (IKW30N65H5, IKW40N65WR5, IKFW40N60DH3E, IKFW50N60DH3E, IKW50N65F5) CoolMOS™ MOSFET (IPP60R060P7, IPP60R080P7, IPP60R099P7, IPP60R120P7, IPP60R180P7, IPP60R280P7, IPP60R360P7, IP(W/Z)65R019C7, IP(W/Z)65R045C7, IP(W/Z)65R065C7, IP(W/Z)65R095C7, IPW65R125C7, IPW65R190C7) |
| | | | IRS44273L | 1.5/1.5 | SOT23-5 | Non-inverting low-side driver with CMOS inputs | |
| | 20 | | 1EDN8511B | 4/8 | SOT23-6 | | |
| | | Dual low-side | 2EDN8524F | 5/5 | DSO-8 | | |
| | 25 | | IRS4427S | 2.3/3.3 | DSO-8 | | |
| Active bridge rectifier (<100 kVA) | 1200 | Single high-side | 1ED020I12-F2 | 2/2 | DSO-16 300 mil | Functional isolation, 100 kV/μs CMTI, DESAT, active Miller clamp, short circuit clamping, FAULT-RST, two level turn off (FT only) | CoolSiC™ SiC MOSFET (IMW120R045M1* - 3-pin, IMZ120R045M1* - 4-pin) CoolSiC™ SiC MOSFET module (FF11MR12W1M1_B11; FF23MR12W1M1_B11) TRENCHSTOP™ 5 IGBT (IK(W/Z)75N65ES5, IK(W/Z)75N65EH5) EasyPACK™ 1B/2B module family (FS50R12W2T4_B11, FS75R12W2T4_B11, F3L75R07W2E3_B11, F3L100R07W2E3_B11) 34 mm module family (FF50R12RT4, FF150R12RT4) CoolMOS™ MOSFET (IPP60R060P7, IPP60R099P7, IPP60R180P7, IPP60R360P7, IP(W/Z)65R019C7, IP(W/Z)65R045C7, IP(W/Z)65R095C7, IPW65R190C7) |
| | | Single high-side | 1ED020I12-FT | 2/2 | DSO-16 300 mil | | |
| | | Dual high-side | 2ED020I12-F2 | 2/2 | DSO-36 | | |

* Coming soon

45

# Driver configuration overview

## Single-channel low-side driver

Allows low offset of the voltage between input and output
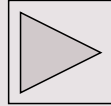
## Single-channel high-side driver

Allows high voltage offset between input and output
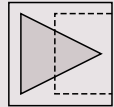
## Dual-channel low-side driver

Both channels allow individual low voltage offsets, no interlock
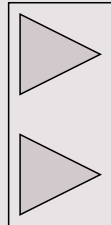
## Dual-channel high-side driver

Both channels allow individual high voltage offsets, no interlock
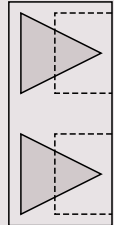
## High and low-side driver

Two non-interlocked channels, one for high, one for low voltage offsets
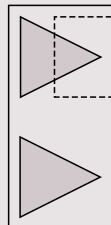
## Half-bridge driver

Two interlocked channels where one of the channel allows a high voltage offset
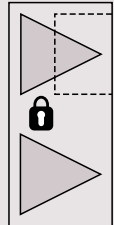
## Full-bridge driver

Four channels in a package with two independent half bridges
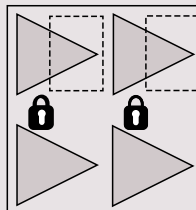
## Three-phase bridge

Six channels in a package with three independent half bridges
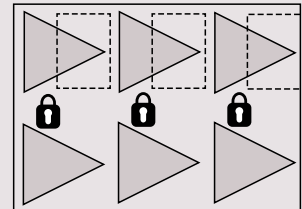
## Current sense

Current sensing across a high-voltage offset between sense input and data output
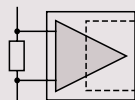
## Synchronous-buck driver

High speed drivers for dual high side and low side MOSFETs in synchronous rectified buck converters
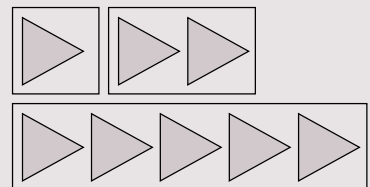
# Product portfolio overview

Infineon's gate driver IC solutions are the expert's choice. With more than 500 reliable and efficient gate driver solutions, we provide a comprehensive portfolio for virtually any application. To ease the selection process, this overview is structured along the configurations of the gate driver ICs, as opposed to application topology.

## Three-phase gate driver ICs

**Typical connection**



| Voltage class [V] | $I_{O+}/I_{O-}$ typ. [mA] | UVLO on/off typ. [V] | Prop delay off/on typ. [ns] | Base PN | Technology | Brake chopper | Operational amplifier | Desaturation protection | Enable | Fault reporting | Integrated bootstrap diode | Over-current protection | Programmable dead time | Separate pin for logic ground | Shoot-through protection | Shutdown | DSO-20 WB | DSO-24 | DSO-28 WB | DIP-28 | LCC-32 | MQFP-64 | TSSOP-28 | VQFN-28 | VQFN-34 | CHIP[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1200 | 350/650 | 11.4/10.4 | 600/600 | 6ED2230S12* | SOI | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | ✓ | | | | | | | |
| 1200 | 250/500 | 8.6/8.2 | 700/750 | IR2233 | JI | | ✓ | | ✓ | | ✓ | ✓ | | | ✓ | | | | | ✓ | ✓ | ✓ | | | | ✓ |
| 1200 | 250/500 | 10.4/9.4 | 700/750 | IR2235 | JI | | ✓ | | ✓ | | ✓ | ✓ | | | ✓ | | | | | ✓ | ✓ | ✓ | | | | |
| 1200 | 350/540 | 11.2/10.2 | 550/550 | IR2238 | JI | ✓ | | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | | | | | | | ✓ | | | |
| 600 | 165/375 | 11.7/9.8 | 490/530 | 6ED003L06-F2 | SOI | | | | ✓ | ✓ | | ✓ | | | ✓ | | | | ✓ | | | | | | | ✓ |
| 600 | 165/375 | 11.7/9.8 | 490/530 | 6EDL04I06(N,P) | SOI | | | | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | ✓ | | | | | | | ✓ |
| 600 | 165/375 | 9/8.1 | 530/530 | 6EDL04N06P | SOI | | | | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | ✓ | | | | | | | ✓ |
| 600 | 200/350 | 8.9/8.2 | 400/425 | IR2136 | JI | | | ✓ | ✓ | | | ✓ | | | ✓ | | | | | ✓ | ✓ | ✓ | | | | ✓ |
| 600 | 200/350 | 11.1/10.9 | 400/425 | IR21363 | JI | | | ✓ | ✓ | | | ✓ | | | ✓ | | | | | ✓ | | ✓ | | | | ✓ |
| 600 | 200/350 | 11.1/10.9 | 400/425 | IR21365 | JI | | | ✓ | ✓ | | | ✓ | | | ✓ | | | | | ✓ | | | | | | |
| 600 | 200/350 | 8.9/8.2 | 400/425 | IR21368 | JI | | | ✓ | ✓ | | | ✓ | | | ✓ | | | | | ✓ | | | | | | ✓ |
| 600 | 200/350 | 10.4/9.4 | 530/500 | IR21364 | JI | | | ✓ | ✓ | | | ✓ | | | ✓ | | | | | ✓ | | | | | | ✓ |
| 600 | 200/350 | 11.1/10.9 | 530/530 | IRS2334 | JI | | | | | | | | | | | | | ✓ | | | | | | ✓ | | |
| 600 | 200/350 | 8.9/8.2 | 530/530 | IRS2336 | JI | | | ✓ | ✓ | | | ✓ | | | ✓ | | | | | ✓ | ✓ | | | | | |
| 600 | 200/350 | 8.9/8.2 | 530/530 | IRS2336D | JI | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | | ✓ | ✓ | | | ✓ | | ✓ |
| 600 | 200/350 | 8.9/8.2 | 530/530 | IRS23364D | JI | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | | ✓ | ✓ | | | | | ✓ |
| 600 | 200/350 | 8.9/8.2 | 530/530 | IRS23365D | JI | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | | | | | | | ✓ | |
| 600 | 250/500 | 9/8.7 | 425/675 | IR213(0,2) | JI | | ✓ | | ✓ | | | ✓ | | | ✓ | | | | | ✓ | ✓ | ✓ | | | | ✓ |
| 600 | 250/500 | 8.7/8.3 | 600/1300 | IR2131 | JI | | | | ✓ | | | ✓ | | ✓ | ✓ | | | | | ✓ | ✓ | ✓ | | | | |
| 600 | 250/500 | 8.6/8.2 | 700/750 | IR2133 | JI | | ✓ | | ✓ | | | ✓ | | | ✓ | | | | | ✓ | ✓ | ✓ | | | | |
| 600 | 250/500 | 10.4/9.4 | 700/750 | IR2135 | JI | | ✓ | | ✓ | | | ✓ | | ✓ | ✓ | | | | | ✓ | | ✓ | | | | ✓ |
| 200 | 165/375 | 11.7/9.8 | 490/530 | 6ED003L02-F2 | SOI | | | | ✓ | ✓ | | ✓ | | | ✓ | | | | | | | | | ✓ | | |
| 200 | 165/375 | 9/8.1 | 530/530 | 6EDL04N02P | SOI | | | | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | | | | | | ✓ | | |

*Coming soon          Note [1]:  Please contact sales team for additional information

# Half-bridge gate driver ICs

**Typical connection**



Up to 1200 V — To load

| Voltage class [V] | $I_{O+}/I_{O-}$ typ. [mA] | UVLO on/off typ. [V] | Prop delay off/on typ. [ns] | Base PN | Technology | Comparator | Operational amplifier | Desaturation protection | Enable | Fault reporting | Integrated bootstrap diode | Over-current protection | Programmable dead time | Programmable shutdown | Self-oscillating (oscillator) | Separate pin for logic ground | Shoot-through protection | Shutdown | Soft over-current shutdown | DSO-8 | DSO-14 | DSO-16 | DSO-16 WB | DSO-18 | DIP-8 | DIP-14 | SSOP-24 | VDSON-8 | VQFN-14 | CHIP[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Features (see page 58) → Package (see page 59) | |
| 1200 | 1500/2500 | 12.2/11.2 | 85/85 | 2ED020I12-FI | CT | ✓ | ✓ | | | | | | | | ✓ | ✓ | | | | | | | | ✓ | | | | | | |
| | 2000/3000 | 10.2/9.3 | 440/440 | IR2214 | JI | | | ✓ | | ✓ | | | | | ✓ | ✓ | | | ✓ | | | | | | | | | | ✓ | |
| 650 | 2500/2500 | 9.1/8.2 | 200/200 | 2ED2182S06* | SOI | | | | | | ✓ | | | | | ✓ | | | | ✓ | | | | | | | | | | ✓ |
| | | | | 2ED21824S06* | SOI | | | | | | ✓ | ✓ | | | ✓ | ✓ | | | | | | | ✓ | | | | | | | ✓ |
| | | | | 2ED2183S06* | SOI | | | | | | ✓ | | | | | ✓ | | | | ✓ | | | | | | | | | | ✓ |
| | | | | 2ED21834S06* | SOI | | | | | | ✓ | ✓ | | | ✓ | ✓ | | | | | | | ✓ | | | | | | | ✓ |
| | | | | 2ED2184S06* | SOI | | | | | | ✓ | | | | | ✓ | | ✓ | | ✓ | | | | | | | | | | ✓ |
| | | | | 2ED21844S06* | SOI | | | | | | ✓ | ✓ | | | ✓ | ✓ | | ✓ | | | | | ✓ | | | | | | | ✓ |
| | 290/700 | | | 2ED2108S06* | SOI | | | | | | ✓ | | | | | ✓ | | | | ✓ | | | | | | | | | | ✓ |
| | | | | 2ED21084S06* | SOI | | | | | | ✓ | ✓ | | | ✓ | ✓ | | | | | | | ✓ | | | | | | | ✓ |
| | | | | 2ED2109S06* | SOI | | | | | | ✓ | | | | | ✓ | | ✓ | | ✓ | | | | | | | | | | ✓ |
| | | | | 2ED21094S06* | SOI | | | | | | ✓ | ✓ | | | ✓ | ✓ | | ✓ | | | | | ✓ | | | | | | | ✓ |
| | | | | 2ED21091S06* | SOI | | | | | | ✓ | ✓ | | | | ✓ | | ✓ | | | | | | | | | | | | ✓ |
| | 360 / 700 | 9.1 / 8.3 | 300/310 | 2ED2304S06F NEW | SOI | | | | | | ✓ | | | | | ✓ | | | | ✓ | | | | | | | | | | ✓ |
| | 1500/2500 | 12.2/11.2 | 85/85 | 2ED020I06-FI | CT | | | | | | | | | | ✓ | ✓ | | | | | | | | ✓ | | | | | | |
| 600 | 78/169 | 8.9/8.2 | 220/220 | IR2304 | JI | | | | | | | | | | | ✓ | | | | ✓ | | | | | | | | ✓ | | |
| | | 8.9/8.2 | 220/220 | IR25601 | JI | | | | | | | | | | | ✓ | | | | ✓ | | | | | | | | | | |
| | 180/260 | 9/8 | N.A. | IR21531 | JI | | | | | | | | ✓ | | ✓ | ✓ | ✓ | | | ✓ | | | | | | | | ✓ | | ✓ |
| | | 9/8 | | IR21531D | JI | | | | | | ✓ | | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | | | ✓ | | |
| | | 9/8 | | IR25603 | JI | | | | | | | | ✓ | | ✓ | ✓ | ✓ | | | ✓ | | | | | | | | ✓ | | |
| | | 11/9 | | IRS2153(1)D | JI | | | | | | ✓ | | ✓ | | ✓ | ✓ | ✓ | | | ✓ | | | | | | | | ✓ | | ✓ |
| | 200/350 | 8.9/8.2 | 200/220 | IR2108 | JI | | | | | | | | | | | ✓ | | | | ✓ | | | | | | | | ✓ | | |
| | | | | IR21084 | JI | | | | | | | ✓ | | | ✓ | ✓ | | | | | | | ✓ | | | | ✓ | | | |
| | | | | IR2308 | JI | | | | | | | | | | | ✓ | | | | ✓ | | | | | | | | ✓ | | |
| | | | | IR25606 | JI | | | | | | | | | | | ✓ | | | | ✓ | | | | | | | | | | |
| | | | 200/750 | IR2109 | JI | | | | | | | | | | | ✓ | | ✓ | | ✓ | | | | | | | | ✓ | | |
| | | | | IR21091 | JI | | | | | | | ✓ | | | | ✓ | | ✓ | | ✓ | | | | | | | | ✓ | | |
| | | | | IR21094 | JI | | | | | | | ✓ | | | ✓ | ✓ | | ✓ | | | | | ✓ | | | | | | ✓ | |
| | | 4.1/3.8 | | IR2302 | JI | | | | | | | | | | | ✓ | | ✓ | | ✓ | | | | | | | | ✓ | | |
| | 210/360 | 8.9/8.2 | 150/680 | IR2103 | JI | | | | | | | | | | | ✓ | | | | ✓ | | | | | | | | ✓ | | |
| | | 8.9/8.2 | | IR2104 | JI | | | | | | | | | | | ✓ | | ✓ | | ✓ | | | | | | | | ✓ | | |
| | | 8.9/8.2 | | IR25602 | JI | | | | | | | | | | | ✓ | | ✓ | | ✓ | | | | | | | | | | |
| | 220/480 | 8.9/7.7 | 500/500 | IRS2890D NEW | JI | | | ✓ | ✓ | ✓ | | | | | | ✓ | | | | | | | | | ✓ | | | | | |
| | 250/500 | 8.6/8.2 | 150/750 | IR2111 | JI | | | | | | | | | | | ✓ | | | | ✓ | | | | | | | | ✓ | | |
| | 290/600 | 8.9/8.2 | 150/150 | IRS2304 | JI | | | | | | | | | | | ✓ | | | | ✓ | | | | | | | | ✓ | | ✓ |
| | | 8.9/8.2 | 150/680 | IRS2103 | JI | | | | | | | | | | | ✓ | | | | ✓ | | | | | | | | ✓ | | ✓ |
| | | 8.9/8.2 | | IRS2104 | JI | | | | | | | | | | | ✓ | | ✓ | | ✓ | | | | | | | | ✓ | | ✓ |
| | | 8.6/8.2 | 150/750 | IRS2111 | JI | | | | | | | | | | | ✓ | | | | ✓ | | | | | | | | ✓ | | ✓ |
| | | 8.9/8.2 | 200/220 | IRS2(1,3)08 | JI | | | | | | | | | | | ✓ | | | | ✓ | | | | | | | | ✓ | | ✓ |
| | | 8.9/8.2 | | IRS21084 | JI | | | | | | | ✓ | | | ✓ | ✓ | | | | | | | ✓ | | | | ✓ | | | |
| | | 8.9/8.2 | 200/750 | IRS2109 | JI | | | | | | | | | | | ✓ | | ✓ | | ✓ | | | | | | | | ✓ | | ✓ |
| | | 8.9/8.2 | | IRS21091 | JI | | | | | | | ✓ | | | | ✓ | | ✓ | | ✓ | | | | | | | | ✓ | | |
| | | 8.9/8.2 | | IRS21094 | JI | | | | | | | ✓ | | | ✓ | ✓ | | ✓ | | | | | ✓ | | | | | | ✓ | |
| | 360/700 | 9.1/8.3 | 300/310 | 2EDL05N06P | SOI | | | | | | ✓ | | | | | ✓ | | | | ✓ | ✓ | | | | | | | | | |
| | | 12.5/11.6 | 400/420 | 2EDL05I06P | SOI | | | | | | ✓ | | | | | ✓ | | | | ✓ | ✓ | | | | | | | | | |
| | 1900/2300 | 8.9/8.2 | 220/180 | IRS2183 | JI | | | | | | | | | | | ✓ | | | | ✓ | | | | | | | | ✓ | | ✓ |
| | | 8.9/8.2 | | IR2183 | JI | | | | | | | | | | | ✓ | | | | ✓ | | | | | | | | ✓ | | |
| | | 8.9/8.2 | | IR(S)21834 | JI | | | | | | | ✓ | | | ✓ | ✓ | | | | | | | ✓ | | | | ✓ | | | |
| | | 8.9/8.2 | 270/680 | IRS2184 | JI | | | | | | | | | | | ✓ | | ✓ | | ✓ | | | | | | | | ✓ | | ✓ |
| | | 8.9/8.2 | | IR2184 | JI | | | | | | | | | | | ✓ | | ✓ | | ✓ | | | | | | | | ✓ | | |
| | | 8.9/8.2 | | IR21844 | JI | | | | | | | ✓ | | | ✓ | ✓ | | ✓ | | | | | ✓ | | | | | | ✓ | |
| | | 8.9/8.2 | | IRS21844 | JI | | | | | | | ✓ | | | ✓ | ✓ | | ✓ | | | | | ✓ | | | | | | ✓ | ✓ |
| | 2000/3000 | 10.2/9.3 | 440/440 | IR2114 | JI | | | ✓ | | ✓ | | | | | ✓ | ✓ | | | ✓ | | | | | | | | | | ✓ | |
| | 2300/2800 | 9.1/8.3 | 300/310 | 2EDL23N06P | SOI | | | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | | | | | | | ✓ | | | | | | | |
| | | 12.5/11.6 | 400/420 | 2EDL23I06P | SOI | | | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | | | | | | | ✓ | | | | | | | |
| 200 | 290/600 | 8.9/8.2 | 150/160 | IRS2007 NEW | JI | | | | | | | | | | | ✓ | | | | ✓ | | | | | | | | | ✓ | |
| | | | 150/680 | IRS2008 NEW | JI | | | | | | | | | | | ✓ | | ✓ | | ✓ | | | | | | | | | ✓ | |
| 120 | 2000/6000 | 7/6.5 | 47/47 | 2EDL8112* | JI | | | | | | ✓ | | | | | ✓ | | | | | | | | | | | | ✓ | | |
| | 3000/6000 | | | 2EDL8113* | JI | | | | | | ✓ | | | | | ✓ | | | | | | | | | | | | ✓ | | |
| | 4000/6000 | | | 2EDL8114* | JI | | | | | | ✓ | | | | | ✓ | | | | | | | | | | | | ✓ | | |

*Coming soon    Note [1]: Please contact sales team for additional information

# Single high-side gate driver ICs

**Typical connection**

VCC — VB
COM — HO
IN — VS

$V_{CC}$   IN   Up to 200 V   to load

| Voltage class [V] | IO+/IO- typ. [mA] | UVLO on/off typ. [V] | Prop delay off/on typ. [ns] | Base PN | Technology | Active Miller clamp | Dedicated control for JFET | Desaturation protection | Enable | Fault reporting | Fault reset | Over-current protection | Separate pin for logic ground | Separate sink/source outputs | Soft over-current shutdown | Two-level turn-off | UL 1577 | VDE 0884-10 | DSO-8 | DSO-8 300mil | DSO-16 | DSO-16 WB | DSO-19 | DSO-36 | DIP-8 | SOT23-6 | TFLGA-13 | CHIP[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1200 | 1300/900 | 12/11.1 | 300/300 | 1EDI05I12A | CT | | | | | | | ✓ | ✓ | | | | | | ✓ | ✓ | | | | | | | | |
| 1200 | 1300/900 | 12/11.1 | 300/300 | 1EDC05I12AH NEW | CT | | | | | | | ✓ | ✓ | | ✓ | | | | | ✓ | | | | | | | | |
| 1200 | 2000/2000 | 12/11 | 165/170 | 1ED020I12-F2 | CT | ✓ | | ✓ | ✓ | ✓ | | ✓ | | | | | | | | | | | ✓ | | | | | |
| 1200 | 2000/2000 | 12/11 | 165/170 | 1ED020I12-B2 | CT | ✓ | | ✓ | ✓ | ✓ | | ✓ | | | ✓ | ✓ | | | | ✓ | | | | | | | | |
| 1200 | 2000/2000 | 12/11 | 1750/1750 | 1ED020I12-FT | CT | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | | | | | | | | ✓ | | | | | |
| 1200 | 2000/2000 | 12/11 | 1750/1750 | 1ED020I12-BT | CT | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ | | | | ✓ | | | | | | | | |
| 1200 | 2200/2300 | 12/11.1 | 300/300 | 1EDI10I12M | CT | ✓ | | | | | | ✓ | | | | | | | ✓ | ✓ | | | | | | | | |
| 1200 | 2200/2300 | 12/11.1 | 300/300 | 1EDC10I12M NEW | CT | ✓ | | | | | | ✓ | | | ✓ | | | | | ✓ | | | | | | | | |
| 1200 | 4000/3500 | 9.1/8.5 | 120/115 | 1EDI20N12A | CT | | | | | | | ✓ | ✓ | | | | | | ✓ | | | | | | | | | |
| 1200 | 4000/3500 | 12/11.1 | 125/120 | 1EDI20H12A | CT | | | | | | | ✓ | ✓ | | | | | | | ✓ | | | | | | | | |
| 1200 | 4000/3500 | 12/11.1 | 125/120 | 1EDC20H12A NEW | CT | | | | | | | ✓ | ✓ | | ✓ | | | | | ✓ | | | | | | | | |
| 1200 | 4000/3500 | 12/11.1 | 300/300 | 1EDI20I12A | CT | | | | | | | ✓ | ✓ | | | | | | ✓ | ✓ | | | | | | | | |
| 1200 | 4000/3500 | 12/11.1 | 300/300 | 1EDC20I12A NEW | CT | | | | | | | ✓ | ✓ | | ✓ | | | | | ✓ | | | | | | | | |
| 1200 | 4400/4100 | 12/11.1 | 300/300 | 1EDI20I12M | CT | ✓ | | | | | | ✓ | | | | | | | ✓ | ✓ | | | | | | | | |
| 1200 | 4400/4100 | 12/11.1 | 300/300 | 1EDC20I12M NEW | CT | ✓ | | | | | | ✓ | | | ✓ | | | | | ✓ | | | | | | | | |
| 1200 | 4000/4000 | 16.9/16.4 | 80/80 | 1EDI30J12C | CT | | ✓ | ✓ | | | | | | | | | | | | | | | | | | | ✓ | |
| 1200 | 5900/6200 | 12/11.1 | 300/300 | 1EDI30I12M | CT | ✓ | | | | | | ✓ | | | | | | | ✓ | ✓ | | | | | | | | |
| 1200 | 5900/6200 | 12/11.1 | 300/300 | 1EDC30I12M NEW | CT | ✓ | | | | | | ✓ | | | ✓ | | | | | ✓ | | | | | | | | |
| 1200 | 7500/6800 | 12/11.1 | 300/300 | 1EDI40I12A | CT | | | | | | | ✓ | ✓ | | | | | | ✓ | ✓ | | | | | | | | |
| 1200 | 7500/6800 | 12/11.1 | 300/300 | 1EDC40I12A NEW | CT | | | | | | | ✓ | ✓ | | ✓ | | | | | ✓ | | | | | | | | |
| 1200 | SRC/2000 | 11.9/11 | 460/460 | 1EDI20I12SV NEW | CT | | | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ | | | | | | | | | | ✓ | | |
| 1200 | SRC/2000 | 11.9/11 | 460/460 | 1EDU20I12SV NEW | CT | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | | | | ✓ | | |
| 1200 | SRC/2000 | 11.9/11 | 460/460 | 1EDS20I12SV NEW | CT | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | | | ✓ | | |
| 1200 | 10000/9400 | 12/11.1 | 125/120 | 1EDI60H12A | CT | | | | | | | ✓ | ✓ | | | | | | ✓ | ✓ | | | | | | | | |
| 1200 | 10000/9400 | 12/11.1 | 125/120 | 1EDC60H12A NEW | CT | | | | | | | ✓ | ✓ | | ✓ | | | | | ✓ | | | | | | | | |
| 1200 | 10000/9400 | 12/11.1 | 300/300 | 1EDI60I12A | CT | | | | | | | ✓ | ✓ | | | | | | ✓ | ✓ | | | | | | | | |
| 1200 | 10000/9400 | 12/11.1 | 300/300 | 1EDC60I12A NEW | CT | | | | | | | ✓ | ✓ | | ✓ | | | | | ✓ | | | | | | | | |
| 600 | 160/240 | 9/8 | 215/140 | IRS25752 | JI | | | | | | | | | | | | | | | | | | | | | ✓ | |
| 600 | 250/500 | 8.6/8.2 | 105/125 | IR2117 | JI | | | | | | | | | | | | | | ✓ | | | | | ✓ | | ✓ |
| 600 | 250/500 | 8.6/8.2 | 105/125 | IR2118 | JI | | | | | | | | | | | | | | ✓ | | | | | ✓ | | |
| 600 | 250/500 | 10.3/9 | 150/200 | IR212(7,8) | JI | | | | | ✓ | | ✓ | | | | | | | ✓ | | | | | ✓ | | ✓ |
| 600 | 250/500 | 7.2/6.8 | 150/200 | IR21271 | JI | | | | | ✓ | | ✓ | | | | | | | ✓ | | | | | ✓ | | |
| 600 | 290/600 | 8.6/8.2 | 105/125 | IRS211(7,8) | JI | | | | | | | | | | | | | | ✓ | | | | | ✓ | | ✓ |
| 600 | 290/600 | 10.3/9 | 150/150 | IRS2127 | JI | | | | | ✓ | | ✓ | | | | | | | ✓ | | | | | ✓ | | ✓ |
| 600 | 290/600 | 7.2/6.8 | 150/150 | IRS21271 | JI | | | | ✓ | ✓ | | ✓ | | | | | | | ✓ | | | | | ✓ | | |
| 500 | 1600/3300 | 9.2/8.3 | 200/170 | IR2125 | JI | | | | | ✓ | | ✓ | | | | | | | | | ✓ | | | | ✓ | |
| 200 | 160/240 | 9/8 | 215/140 | IRS20752 | JI | | | | | | | | | | | | | | | | | | | | | ✓ | |
| 100 | 160/240 | 9/8 | 215/140 | IRS10752 | JI | | | | | | | | | | | | | | | | | | | | | ✓ | |
| 650 | 4000/8000 | 4.5/5.0 | 41/37 | 1EDS5663H NEW | CT | | | | | | | | | | | | ✓ | ✓ | | | | ✓ | | | | | |
| 650 | 4000/8000 | 4.5/5.0 | 41/37 | 1EDF5673F NEW | CT | | | | | | | | | | | | | | | | ✓ | | | | | | |
| 250 | 4000/8000 | 4.5/5.0 | 41/37 | 1EDF5673K NEW | CT | | | | | | | | | | | | | | | | | | | | | | ✓ |

Features (See page 58)    Package (See page 59)

SRC=Turn on slew rate control      Note [1]: Please contact sales team for additional information
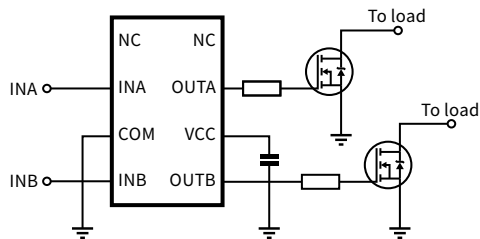
## Dual high-side/half-bridge

Typical connection



| Voltage class [V] | I_O+/I_O- typ. [mA] | UVLO on/off typ. [V] | Prop delay off/on typ. [ns] | Base PN | | Technology | Active Miller clamp | Deadtime control | Desaturation protection | Disable | Fault reporting | Fault reset | Separate pin for logic ground | UL 1577 | VDE 0884-10 | DSO-16 | DSO-16 WB | DSO-36 (w/o 4 pins) | TFLGA-13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Features (see page 58)** | | | | | | | | | **Package (see page 59)** | | | |
| 1200 | 2000/2000 | 12/11 | 165/170 | 2ED020I12-F2 | | CT | ✓ | | ✓ | | ✓ | ✓ | ✓ | | | | | ✓ | |
| 650 | 4000/8000 | 4.2/3.9 | 37 / 37 | 2EDF7275F | NEW | CT | | | ✓ | | | | | | | ✓ | | | |
| | 1000/2000 | | | 2EDF7175F | NEW | CT | | | ✓ | | | | | | | ✓ | | | |
| | 4000/8000 | 8/7 | | 2EDS8265H | NEW | CT | | | ✓ | | | | | ✓ | ✓ | | ✓ | | |
| | 1000/2000 | | | 2EDS8165H | NEW | CT | | | ✓ | | | | | ✓ | ✓ | | ✓ | | |
| 250 | 4000/8000 | 4.2/3.9 | | 2EDF7235K | NEW | CT | | | ✓ | | | | | | | | | | ✓ |
| | | | | 2EDF7275K | NEW | CT | | ✓ | ✓ | | | | | | | | | | ✓ |

## Single low-side gate driver ICs

Typical connection



| Voltage class [V] | I_O+/I_O- typ. [mA] | UVLO on/off typ. [V] | Prop delay off/on typ. [ns] | Base PN | | Technology | Automatic minimum on time protection | Enable | Fault reporting | Over-current protection | Programmable fault clear time | Programmable minimum on time | Separate sink/source outputs | Synchronous rectification | Truly differential inputs | DSO-8 | DIP-8 | SOT23-5 | SOT23-6 | WSON-6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Features (see page 58)** | | | | | | | | | **Package (see page 59)** | | | | |
| 200 | 1000/4000 | 10.55/9 | 50/60 | IR11662 | | N-ISO | ✓ | ✓ | | | ✓ | | ✓ | | | ✓ | | | | |
| | 2000/7000 | 10.55/9 | 50/60 | IR11672A | | N-ISO | ✓ | ✓ | | | ✓ | | ✓ | | | ✓ | | | | |
| | 1000/2500 | 4.5/4.4 | 50/50 | IR1161 | | N-ISO | ✓ | | | | ✓ | | ✓ | | | | | ✓ | | |
| 20[1] | 4000/8000 | 4.2/3.9 | 45 / 45 | 1EDN7550 | NEW | N-ISO | | | | | | | ✓ | | | | | | ✓ | |
| | | 8/7 | 45 / 45 | 1EDN8550 | NEW | N-ISO | | | | | | | ✓ | | | | | | ✓ | |
| 25 | 800/1750 | 11.9/11.4 | 50/50 | 1ED44176N01 | NEW | N-ISO | | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | | | | |
| | 1500/1500 | 10.2/9.2 | 50/50 | IRS44273 | | N-ISO | | | | | | | | | | | | | ✓ | |
| 20 | 300/550 | 5/4.15 | 50/50 | IR44252 | | N-ISO | | | | | | | | | | | | | ✓ | |
| | 1700/1500 | 5/4.15 | 50/50 | IR44272 | | N-ISO | | ✓ | | | | | | | | | | | ✓ | |
| | | 5/4.15 | | IR44273 | | N-ISO | | | | | | | | | | | | | ✓ | |
| | 4000/8000 | 4.2/3.9 | 19/19 | 1EDN7511 | | N-ISO | | | | | | | | | | | | | ✓ | |
| | | 8/7 | | 1EDN8511 | | N-ISO | | | | | | | | | | | | | ✓ | |
| | | 4.2/3.9 | | 1EDN7512 | | N-ISO | | | | | | | | | | | | | ✓ | ✓ |
| 5 | 1600/3300 | 8.9/8 | 200/150 | IR2121 | | N-ISO | | | ✓ | ✓ | | | | | | ✓ | | | | |

Note [1]: Common mode rejection (CMR) voltage range up to 80 V.

## High-side and low-side gate driver ICs

Typical connection



| Voltage class [V] | $I_{O+}/I_{O-}$ typ. [mA] | UVLO on/off typ. [V] | Prop delay off/on typ. [ns] | Base PN | Technology | Integrated bootstrap diode | Separate pin for logic ground | Shutdown | DSO-8 | DSO-14 | DSO-16 WB | DIP-8 | DIP-14 | VQFN-14 | CHIP[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Features (see page 58) | | | Package (see page 59) | | | | | | |
| 1200 | 2000/2500 | 10.2/9.3 | 225/280 | IR2213 | JI | | ✓ | ✓ | | ✓ | | | ✓ | | ✓ |
| 650 | 290/700 | 9.1/8.2 | 200/200 | 2ED2106S06* | SOI | ✓ | | | ✓ | | | | | | ✓ |
| | | | | 2ED21064S06* | SOI | ✓ | | | | ✓ | | | | | ✓ |
| | 2500/2500 | | | 2ED2181S06* | SOI | ✓ | | | ✓ | | | | | | ✓ |
| | | | | 2ED21814S06* | SOI | ✓ | | | | ✓ | | | | | ✓ |
| 600 | 200/350 | 8.9/8.2 | 200/220 | IR2106 | JI | | | | ✓ | | | ✓ | | | |
| | | 8.9/8.2 | | IR21064 | JI | | ✓ | | ✓ | | | | ✓ | | |
| | | 4.1/3.8 | | IR2301 | JI | | | | ✓ | | | ✓ | | | |
| | | 8.9/8.2 | | IR25604 | JI | | | | ✓ | | | | | | |
| | | 4.1/3.8 | | IRS2301 | JI | | | | ✓ | | | | | | |
| | 210/360 | 8.9/8.2 | 150/160 | IR2101 | JI | | | | ✓ | | | ✓ | | | ✓ |
| | | | | IR2102 | JI | | | | ✓ | | | ✓ | | | |
| | 250/500 | 8.6/8.2 | 105/125 | IR2112 | JI | | | ✓ | | ✓ | | | ✓ | | |
| | 290/600 | 8.6/8.2 | 130/135 | IRS2112 | JI | | ✓ | ✓ | | ✓ | | | ✓ | | ✓ |
| | | 8.9/8.2 | 150/160 | IRS2101 | JI | | | | ✓ | | | ✓ | | | ✓ |
| | | 8.9/8.2 | 200/220 | IRS2106 | JI | | | | ✓ | | | ✓ | | | ✓ |
| | | 8.9/8.2 | | IRS21064 | JI | | ✓ | | | ✓ | | | ✓ | | |
| | 360/700 | 12.5/11.6 | 400/420 | 2EDL05I06BF | SOI | ✓ | | | ✓ | | | | | | |
| | 1900/2300 | 8.9/8.2 | 220/180 | IRS2181 | JI | | | | ✓ | | | ✓ | | | ✓ |
| | | 8.9/8.2 | | IR2181 | JI | | | | ✓ | | | ✓ | | | |
| | | 8.9/8.2 | | IR21814 | JI | | ✓ | | | ✓ | | | ✓ | | |
| | | 8.9/8.2 | | IRS21814 | JI | | ✓ | | | ✓ | | | ✓ | ✓ | |
| | 2500/2500 | 8.6/8.2 | 94/120 | IR2113 | JI | | ✓ | ✓ | | ✓ | | | ✓ | | ✓ |
| | | 8.6/8.2 | | IR25607 | JI | | ✓ | ✓ | | ✓ | | | | | |
| | | 8.5/8.2 | 120/130 | IRS2113 | JI | | ✓ | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| | 4000/4000 | 8.9/8.2 | 170/170 | IRS2186 | JI | | | | ✓ | | | ✓ | | | ✓ |
| | | 8.9/8.2 | | IRS21864 | JI | | ✓ | | | ✓ | | | ✓ | | |
| | | 6/5.5 | | IRS21867 | JI | | | | ✓ | | | | | | |
| 500 | 2500/2500 | 8.6/8.2 | 94/120 | IR2110 | JI | | ✓ | ✓ | | ✓ | | | ✓ | | |
| | | 8.5/8.2 | 120/130 | IRS2110 | JI | | ✓ | ✓ | | ✓ | | | ✓ | | ✓ |
| 200 | 290/600 | 8.9/8.2 | 150/160 | IRS2005 NEW | JI | | | | ✓ | | | | | ✓ | |
| | 1000/1000 | 9/8.2 | 60/60 | IRS2011 | JI | | | | ✓ | | | ✓ | | | ✓ |
| | | 9/8.2 | 75/80 | IR2011 | JI | | | | ✓ | | | ✓ | | | |
| | 3000/3000 | 8.6/8.2 | 65/95 | IR2010 | JI | | ✓ | ✓ | | | | ✓ | | ✓ | |

*Coming soon    Note [1]:  Please contact sales team for additional information

## Full bridge gate driver ICs
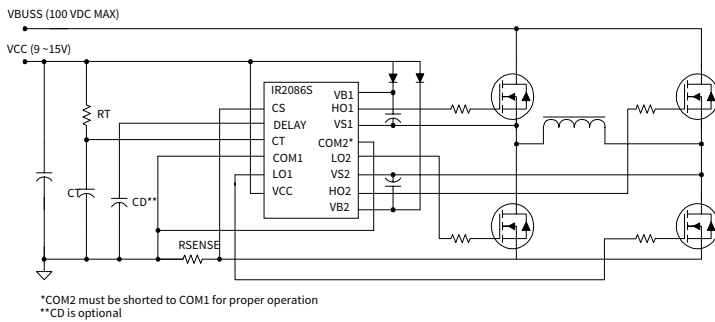
### Typical connection

VBUSS (100 VDC MAX)

VCC (9 ~15V)

IR2086S

CS · VB1
DELAY · HO1
CT · VS1
COM1 · COM2*
LO1 · LO2
VCC · VS2
· HO2
· VB2

RT

CT

CD**

RSENSE

*COM2 must be shorted to COM1 for proper operation
**CD is optional

| Voltage class [V] | $I_{O+}/I_{O-}$ typ. [mA] | UVLO on/off typ. [V] | Prop delay off/on typ. [ns] | Base PN | Technology | Over-current protection | Programmable dead time | Self-oscillating (oscillator) | PG-DSO-16 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Features (See page 58) | | | Package (see page 59) |
| 100 | 1200/1200 | 7.25/6.8 | 40/60 | IR2086S | JI | ✓ | ✓ | ✓ | ✓ |

## Dual low-side gate driver ICs

### Typical connection

NC · NC
INA · OUTA
COM · VCC
INB · OUTB

INA

INB

To load

To load

| Voltage class [V] | $I_{O+}/I_{O-}$ typ. [mA] | UVLO on/off typ. [V] | Prop delay off/on typ. [ns] | Base PN | Technology | Automatic minimum on time protection | Enable | Programmable minimum on time | Synchronous rectification | DSO-8 | DIP-8 | WSON-8 | TSSOP-8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Features (see page 58) | | | | Package (see page 59) | | | |
| 200 | 1000/4000 | 8.1/7.6 | 70/60 | IR1168 | N-ISO | ✓ | | | ✓ | ✓ | | | |
| | 1000/4000 | 8.1/7.6 | 80/100 | IR11682 | N-ISO | ✓ | | | ✓ | ✓ | | | |
| | 1000/4000 | 4.55/4.35 | 60/250 | IR11688 | N-ISO | ✓ | | ✓ | ✓ | ✓ | | | |
| 25 | 2300/3300 | 10.2/9.2 | 50/50 | IRS44262 | N-ISO | | | | | ✓ | | | |
| | | N.A. | | IRS4426 | N-ISO | | | | | ✓ | | | |
| | | | | IRS4427 | N-ISO | | | | | ✓ | ✓ | | |
| | | | 65/85 | IR25600 | N-ISO | | | | | ✓ | ✓ | | |
| | | | | IR442(6,7) | N-ISO | | | | | ✓ | ✓ | | |
| 20 | 5000/5000 | 4.2/3.9 | 19/19 | 2EDN752(3,4) | N-ISO | | ✓ | | | ✓ | | ✓ | ✓ |
| | | 8/7 | | 2EDN852(3,4) | N-ISO | | ✓ | | | ✓ | | | ✓ |
| | 4000/4000 | 4.2/3.9 | 19/19 | 2EDN7424 | N-ISO | | ✓ | | | ✓ | | | ✓ |

## Complementary: current sense ICs

**Typical connection**
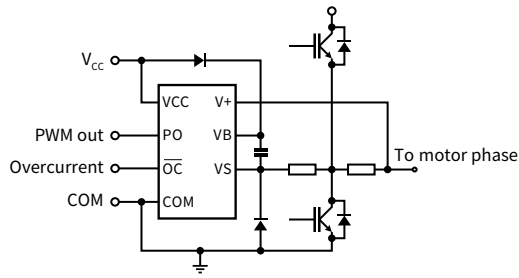


| Voltage class [V] | Base PN | Technology | Current sense | Over-current protection | DSO-8 | DSO-16 WB | DIP-8 | SOT23-5 |
|---|---|---|---|---|---|---|---|---|
| | | | **Features (see page 58)** | | **Package (see page 59)** | | | |
| 600 | IR2175 | JI | ✓ | ✓ | ✓ | | ✓ | |
| | IR25750 | JI | ✓ | | | | | ✓ |

## Complementary: high-voltage start-up IC

**Typical connection**
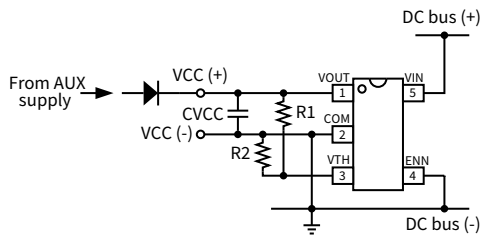


| Voltage class [V] | Base PN | Technology | Enable | High voltage start-up | Over temperature shutdown | SOT23-5 |
|---|---|---|---|---|---|---|
| | | | **Features (see page 58)** | | | **Package (see page 59)** |
| 480 | IRS25751 | N-ISO | ✓ | ✓ | ✓ | ✓ |

## Driver boards

**Typical connection**
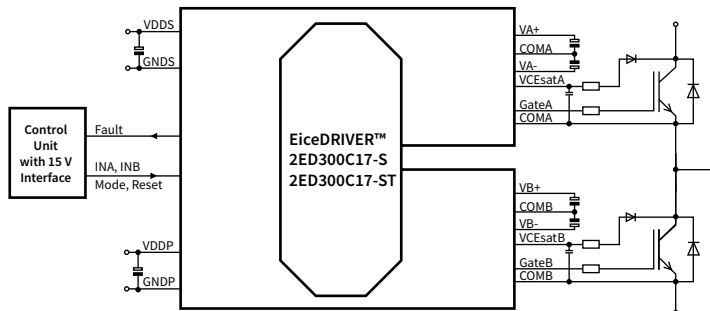


| Voltage class [V] | I$_{O+}$/I$_{O-}$ typ. [mA] | UVLO on/off typ. [V] | Prop delay o ff/on typ. [ns] | Base PN | Desaturation protection | Fault reset | Over-current protection | Soft over-current shutdown | AG-EICE-45 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | **Features (See page 58)** | | | | **Package (see page 59)** |
| 1700 | 30/30 | 10.9/9.3 | 670/580 | 2ED300C17-S | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1700 | 30/30 | 10.9/9.3 | 670/580 | 2ED300C17-ST | ✓ | ✓ | ✓ | ✓ | ✓ |

## Automotive gate driver ICs
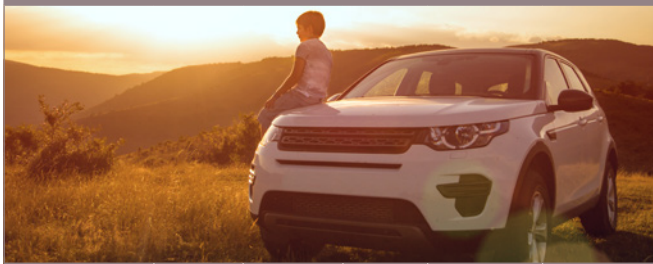
| Configuration | Work. volt. class [V] | I$_{O+}$/I$_{O-}$ typ. [mA] | UVLO on/off typ. [V] | Prop delay off/on typ. [ns] | Base PN | Technology | Buffer | Operational amplifier | Desaturation protection | Enable | Fault reporting | Over-current protection | Programmable frequency | Programmable dead time | Self-oscillating (Oscillator) | Separate pin for logic ground | Shoot-through protection | Shutdown | Synchronous rectification | Two-level turn-off | UL 1577 | VDE 0884-10 | DSO-8 | DSO-14 | DSO-16 NB | DSO-16 WB | DSO-20 | DSO-28 | DSO-36 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Single high-side | 1200 | 2000/2000 | 12.5/11.7 | 215/215 | 1EDI2001AS | CT | | | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | | | ✓ | ✓ | ✓ | | | | | | | ✓ |
| Single high-side | 1200 | 2000/2000 | 12.5/11.7 | 215/215 | 1EDI2002AS | CT | | | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | | | ✓ | ✓ | ✓ | | | | | | | ✓ |
| Single high-side | 1200 | 2000/2000 | 12.5/11.7 | 215/215 | 1EDI2010AS | CT | | | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | | | ✓ | ✓ | ✓ | | | | | | | ✓ |
| Single high-side | 1200 | 2100/2100 | 12/11 | 165/170 | 1ED020I12FA2 | CT | | | ✓ | | | ✓ | | | | | | | | ✓ | ✓ | | | | | | | ✓ | |
| Single high-side | 1200 | 2000/2000 | 12/11 | 1900/1750 | 1ED020I12FTA | CT | | | ✓ | | | ✓ | | | | | | | | ✓ | ✓ | ✓ | | | | | | ✓ | |
| Single high-side | 600 | 500/500 | 8.6/8 | 140/140 | AUIRS2123 | JI | | | | | | | | | | | | | | | | | ✓ | | | | | | |
| Single high-side | 600 | 290/600 | 8.6/8.2 | 140/140 | AUIRS2117S | JI | | | | | | | | | | | | | | | | | ✓ | | | | | | |
| Single high-side | 600 | 290/600 | 7.2/6.8 | 150/150 | AUIRS21271S | JI | | | | | | | ✓ | ✓ | | | | | | | | | ✓ | | | | | | |
| Single high-side | 600 | 290/600 | 10.3/9 | 150/150 | AUIRS2127S | JI | | | | | | | ✓ | ✓ | | | | | | | | | ✓ | | | | | | |
| Single high-side | 600 | 290/600 | 8.6/8.2 | 140/140 | AUIRS2118S | JI | | | | | | | | | | | | | | | | | ✓ | | | | | | |
| Single high-side | 600 | 500/500 | 8.6/8 | 140/140 | AUIRS2124 | JI | | | | | | | | | | | | | | | | | ✓ | | | | | | |
| High and low-side | 600 | 1900/2300 | 8.9/8.2 | 135/135 | AUIRS21811S | JI | | | | | | | | | | | | | | | | | ✓ | | | | | | |
| High and low-side | 600 | 1900/2300 | 8.9/8.2 | 200/160 | AUIRS21814S | JI | | | | | | | | | ✓ | | | | | | | | | | ✓ | | | | |
| High and low-side | 600 | 1900/2300 | 8.9/8.2 | 200/160 | AUIRS2181S | JI | | | | | | | | | | | | | | | | | ✓ | | | | | | |
| High and low-side | 600 | 3500/3500 | 8.9/8.2 | 90/90 | AUIRS2191S | JI | | | | | | | | | ✓ | | | | | | | | | | | ✓ | | | |
| High and low-side | 600 | 200/350 | 4.1/3.8 | 200/220 | AUIRS2301S | JI | | | | | | | | | | | | | | | | | ✓ | | | | | | |
| High and low-side | 600 | 2500/2500 | 8.5/8.2 | 120/140 | AUIRS2113S | JI | | | | ✓ | | | | | ✓ | | | ✓ | | | | | | | | | ✓ | | |
| Half-bridge | 1200 | 2000/2000 | 12/11 | 165/170 | 2ED020I12FA | CT | | ✓ | | | | ✓ | | | | | ✓ | | | ✓ | ✓ | | | | | | | | ✓ |
| Half-bridge | 100 | 1000/1000 | 7.3/6.8 | N.A. | AUIR2085S | JI | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | ✓ | | | | | | |
| Three-phase | 600 | 200/350 | 8.9/8.2 | 530/530 | AUIRS2336S | JI | | ✓ | | ✓ | ✓ | ✓ | | | | ✓ | ✓ | | | | | | | | | | | ✓ | |
| Single low-side | 200 | 3000/6000 | 10.2/9.3 | 60/90 | AUIRS1170S | N-ISO | | | | | | | | | | | | | ✓ | | | | ✓ | | | | | | |
| Single low-side | 40 | 10000/10000 | 11.7/10.5 | 230/150 | AUIR08152S | N-ISO | ✓ | | | | | | | | | ✓ | | | | | | | ✓ | | | | | | |
| Dual low-side | 20 | 6000/6000 | 11.5/10 | 55/40 | AUIRB24427S | N-ISO | | | ✓ | | | | | | | | | ✓ | | | | | ✓ | | | | | | |

Features (See page 58). Package (see page 59)

## Automotive three-phase bridge driver IC
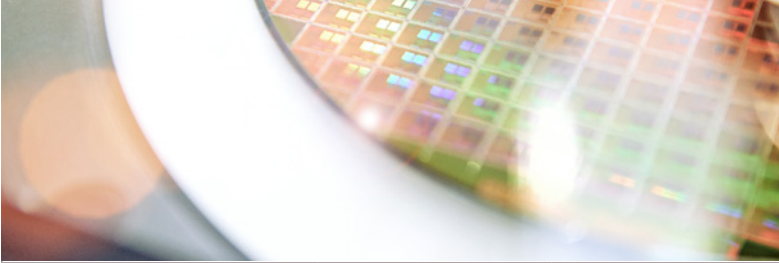
| Product name | Operating range [V] | Drives stage | D.C.-range @20 kHz [%] | Numbers of integrated OpAmps for load current measurement | Adjustable dead time | SIL3 features | Diagnosis | Package |
|---|---|---|---|---|---|---|---|---|
| TLE7183F | 5.50 … 28.00 | 1.50/1.50 A | 0 … 100 | 1 | ● | | OT, UV, OV, OC, OCD | VQFN-48 |
| TLE7183QU | 5.50 … 28.00 | 1.50/1.50 A | 0 … 100 | 1 | ● | | OT, UV, OV, OC, SCD | TQFP-48 EP |
| TLE7184F<br>TLE7184F-3V[1]<br>TLE7186F | 7.00 … 32.00 | 12.50/9.00 Ω<br>12.50 Ω | 0 … 95 | 1 | ● | | UV, OV, OC, SCD, OT, VDD supervision | VQFN-48 |
| TLE7185E | 5.50 … 32.00 | 12.50/9.00 Ω | 0 … 95 | 0 | ● | | UV, OV, SCD, OT | DSO-36 EP |
| TLE7189F | 5.50 … 28.00 | 1.50/1.50 A | 0 … 100 | 3 | | ● | UV, OV, SCD, OT, VDD supervision | VQFN-48 |
| TLE7189QK | 5.50 … 28.00 | 1.50/1.50 A | 0 … 100 | 3 | | ● | UV, OV, SCD, OT, VDD supervision | LQFP-64 |
| AUIRS20302 | 8.00 … 17.00 Output offset 200 V | 0.20/0.35 A | 0 … 95 | 1 (SC protection) | | | One error flag for OTW, UV, CS | DSO-28 (28 lead SOIC) |

[1]: System IC for fans and pumps with integrated LDO and PWM interfcace

# Gate driver IC chips for integrators

Infineon offers gate driver IC chips and wafers to address the on-going trend of integrating the driver, power stages, controllers and other components into a smaller, more efficient single package.

| Driver configuration | Voltage class [V] | Io+/Io- typ [mA] | typ prop delay: off/on [ns] | Base PN | Technology | Operational amplifier | Current sense | Enable | Fault reporting | Integrated bootstrap diode | Over-current protection | Programmable dead time | Programmable shutdown | Self-oscillating (oscillator) | Separate pin for logic ground | Shoot-through protection | Shutdown | Under voltage lockout | CHIP[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Single high-side driver | 600 | 250/500 | 105/250 | IR2117 | JI | | | | | | | | | | | | | ✓ | ✓ |
| | | | 150/200 | IR2127 | JI | | ✓ | | ✓ | | ✓ | | | | | | ✓ | ✓ | ✓ |
| | | | | IR2128 | JI | | ✓ | | ✓ | | ✓ | | | | | | | ✓ | ✓ |
| | | 290/600 | 105/125 | IRS211(7,8) | JI | | | | | | | | | | | | ✓ | ✓ | ✓ |
| | | | 150/150 | IRS2127 | JI | | ✓ | | ✓ | | ✓ | | | | | | | ✓ | ✓ |
| High-side and low-side | 1200 | 2000/2500 | 225/280 | IR2213 | JI | | | | | | | | | | ✓ | | | ✓ | ✓ |
| | 650 | 290/700 | 200/200 | 2ED2106S06* | SOI | | | | | ✓ | | | | | | | | ✓ | ✓ |
| | | | | 2ED21064S06* | SOI | | | | | ✓ | | | | | | | | ✓ | ✓ |
| | | 2500/2500 | | 2ED2181S06* | SOI | | | | | ✓ | | | | | | | | ✓ | ✓ |
| | | | | 2ED21814S06* | SOI | | | | | ✓ | | | | | | | | ✓ | ✓ |
| | 600 | 210/360 | 150/160 | IR2101 | JI | | | | | | | | | | | | | ✓ | ✓ |
| | | 290/600 | 130/135 | IRS2112 | JI | | | | | | | | | | ✓ | | ✓ | ✓ | ✓ |
| | | | 150/160 | IRS2101 | JI | | | | | | | | | | | | ✓ | ✓ | ✓ |
| | | | 200/220 | IRS2106 | JI | | | | | | | | | | | | | ✓ | ✓ |
| | | 1900/2300 | 220/180 | IRS2181 | JI | | | | | | | | | | | | ✓ | ✓ | ✓ |
| | | 2500/2500 | 94/120 | IR2113 | JI | | | | | | | | | | ✓ | | | ✓ | ✓ |
| | | | 120/130 | IRS2113 | JI | | | | | | | | | | ✓ | | ✓ | ✓ | ✓ |
| | | 4000/4000 | 170/170 | IRS2186 | JI | | | | | | | | | | | | | ✓ | ✓ |
| | 500 | 2500/2500 | 120/130 | IRS2110 | JI | | | | | | | | | | ✓ | | | ✓ | ✓ |
| | 200 | 1000/1000 | 60/60 | IRS2011 | JI | | | | | | | | | | | | | ✓ | ✓ |
| | | 3000/3000 | 65/95 | IR2010 | JI | | | | | | | | | | ✓ | | | ✓ | ✓ |
| Half bridge | 650 | 2500/2500 | 200/200 | 2ED2182S06* | SOI | | | | | ✓ | | | | | | ✓ | | ✓ | ✓ |
| | | | | 2ED21824S06* | SOI | | | | | ✓ | ✓ | | | | ✓ | ✓ | | ✓ | ✓ |
| | | | | 2ED2183S06* | SOI | | | | | ✓ | | | | | | ✓ | | ✓ | ✓ |
| | | | | 2ED21834S06* | SOI | | | | | ✓ | ✓ | | | | ✓ | ✓ | | ✓ | ✓ |
| | | | | 2ED2184S06* | SOI | | | | | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ |
| | | | | 2ED21844S06* | SOI | | | | | ✓ | ✓ | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | | 290/700 | | 2ED2108S06* | SOI | | | | | ✓ | | | | | | ✓ | | ✓ | ✓ |
| | | | | 2ED21084S06* | SOI | | | | | ✓ | ✓ | | | | ✓ | ✓ | | ✓ | ✓ |
| | | | | 2ED2109S06* | SOI | | | | | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ |
| | | | | 2ED21094S06* | SOI | | | | | ✓ | ✓ | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | | | | 2ED21091S06* | SOI | | | | | ✓ | ✓ | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | | 360 / 700 | 300 / 310 | 2ED2304S06F        NEW | SOI | | | | | ✓ | | | | | | ✓ | | ✓ | ✓ |
| | 600 | 180/260 | na | IR21531 | JI | | | | | | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | | | | IRS2153(1)D | JI | | | | | | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | | 290/600 | 150/150 | IRS2304 | JI | | | | | | | | | | | ✓ | | ✓ | ✓ |
| | | | 150/680 | IRS2103 | JI | | | | | | | | | | | ✓ | | ✓ | ✓ |
| | | | | IRS2104 | JI | | | | | | | | | | | ✓ | ✓ | ✓ | ✓ |
| | | | 150/750 | IRS2111 | JI | | | | | | | | | | | ✓ | | ✓ | ✓ |
| | | | 200/220 | IRS2108 | JI | | | | | | | | | | | ✓ | | ✓ | ✓ |
| | | | | IRS2308 | JI | | | | | | | | | | | ✓ | | ✓ | ✓ |
| | | | 200/750 | IRS2109 | JI | | | | | | | | | | | ✓ | ✓ | ✓ | ✓ |
| | | 1900/2300 | 220/180 | IRS2183 | JI | | | | | | | | | | | ✓ | | ✓ | ✓ |
| | | | 270/680 | IRS2184 | JI | | | | | | | | | | | ✓ | ✓ | ✓ | ✓ |
| Three-phase | 1200 | 250/500 | 700/750 | IR2233 | JI | ✓ | | | ✓ | | ✓ | | | | ✓ | | | ✓ | ✓ |
| | 600 | 165/375 | 490/530 | 6ED003L06-F2 | SOI | | ✓ | ✓ | | | ✓ | | | | ✓ | | | ✓ | ✓ |
| | | | | 6EDL04I06(N,P) | SOI | | ✓ | ✓ | ✓ | | ✓ | | | | ✓ | | | ✓ | ✓ |
| | | | 530/530 | 6EDL04N06P | SOI | | ✓ | ✓ | ✓ | | ✓ | | | | ✓ | | | ✓ | ✓ |
| | | 200/350 | 400/425 | IR2136 | JI | | ✓ | ✓ | | | ✓ | | | | ✓ | | | ✓ | ✓ |
| | | | | IR21363 | JI | | ✓ | ✓ | | | ✓ | | | | ✓ | | | ✓ | ✓ |
| | | | | IR21368 | JI | | ✓ | ✓ | | | ✓ | | | | ✓ | | | ✓ | ✓ |
| | | | 530/500 | IR21364 | JI | | ✓ | ✓ | | | ✓ | | | | ✓ | | | ✓ | ✓ |
| | | | 530/530 | IRS2336D | JI | | ✓ | ✓ | ✓ | | ✓ | | | | ✓ | | | ✓ | ✓ |
| | | | | IRS23364D | JI | | ✓ | ✓ | ✓ | | ✓ | | | | ✓ | | | ✓ | ✓ |
| | | 250/500 | 425/675 | IR213(0,2) | JI | ✓ | | | ✓ | | ✓ | | | | ✓ | | | ✓ | ✓ |
| | | | 700/750 | IR2135 | JI | ✓ | | | ✓ | | ✓ | | | | ✓ | | ✓ | ✓ | ✓ |

*Coming soon

# Features

Addressing various application requirements, Infineon delivers solutions with an assortment of features intended to optimize performance, minimize size and reduce cost. Below is a table of additional gate driver IC features available in the current portfolio.

| Features | Abbreviation | Benefits |
|---|---|---|
| Active Miller clamp | M-CLAMP | Protection against inadvertent dynamic turn-on because of parasitic Miller effects |
| Active shutdown | SD-ACT | Ensures a safe IGBT off-state in case the output chip is not connected to the power supply or an undervoltage lockout is in effect |
| Brake chopper | BRAKE | Integrated brake IGBT driver with protection |
| Comparator | CMP | General purpose comparator included |
| Current sense | CS | Senses the motor phase current through an external shunt resistor, converts from analog to digital signal, and transfers the signal to the low side |
| Dedicated JFET control | JFETDRIVE | Optimized to drive SiC JFET |
| Desaturation protection | DESAT | Protects the IGBT at short circuit |
| Enable | EN | Dedicated pin terminates all outputs |
| Fault reporting | FAULT-RPT | Indicates an overcurrent or under-voltage shutdown has occurred |
| Fault reset | FAULT-RST | Dedicated pin resets the DESAT-FAULT-state of the chip |
| High-voltage start-up | HVSTART | Provides easy and fast circuit start-up while enabling low circuit standby losses |
| Integrated bootstrap diode | BSD | Integrated bootstrap reduces BOM |
| Operational amplifier | OPAMP | An independent op-amp for current measurement or overcurrent detection |
| Self-oscillating (oscillator) | OSC | Integrated front end oscillator |
| Over-current protection (ITRIP) | OCP | Ensures safe application operation in case of overcurrent |
| Over temperature shutdown | SD-OT | Internal over temperature protection circuit protects the IC against excessive power loss and overheating |
| Programmable deadtime | DT-PROG | Deadtime is programmable with external resistor for flexible design |
| Programmable fault clear time | FLTC | The length of the fault clear time period ($t_{FLTC}$) is programmed by external capacitor which connected between FLTC and VSS ($C_{FLTC}$). |
| Programmable shutdown | SD-PROG | A shutdown feature has been designed into a pin |
| Separate pin for logic ground | SEP-GND | Dedicated pin or logic ground for improved noise immunity |
| Separate sink/source outputs | SEP-OUT | Simplifies gate resistor selection, reduces BOM, and improves dV/dt control |
| Shoot-through protection | STP | Additional shoot-through protection logic such as interlock |
| Short-circuit clamping | SC-CLAMP | During short circuit the IGBT's gate voltage tends to rise because of the feedback via the Miller capacitance. An additional protection circuit connected to OUT+ limits this voltage to a value slightly higher than the supply voltage. |
| Shutdown | SD | Dedicated pin disables the IC outputs |
| Soft overcurrent shutdown | SD-SOFT | Dedicated pin turns off the desaturated transistor, preventing overvoltages |
| Truly Differential Inputs | TDI | ±70 $V_{DC}$ and ±150 $V_{AC}$ ground-shift robustness of low-side gate driver ICs |
| Two-level turn-off | TLTO | Lowers VCE overshoots at turn-off during short circuits or overcurrent events |
| UL 1577 | UL | Double galvanic isolation certification |
| Undervoltage lockout | UVLO | Ensures safe application operation by avoiding unexpected driver behavior at low voltages |
| VDE 0884-10 or VDE 0884-11 | VDE | Reinforced galvanic isolation certifications for non-optical couplers |

# Infineon gate driver package options

| DSO-8 (SOIC-8N) | DSO-8 300-mil (SOIC-8WB) | DSO-14 (SOIC-14N) | DSO-16 (SOIC-16N) | DSO-16 300-mil (SOIC-16WB) | DSO-18 |
|---|---|---|---|---|---|

| DSO-19 | DSO-20 (SOIC-20WB) | DSO-24 (DSO-28 w/o 4 pins) | DSO-28 (SOIC-28WB) | DSO-36 | DIP-8 (PDIP-8) |
|---|---|---|---|---|---|

| DIP-14 (PDIP-14) | DIP-28 (PDIP-28) | LLC-32 (PLCC-44) | LQFP-64 | MQFP-64 | SOT23-5 |
|---|---|---|---|---|---|

| SOT23-6 | SSOP-24 | TFLGA-13 | TQFN-48 | TSSOP-8 | TSSOP-28 |
|---|---|---|---|---|---|

| VQFN-14 (MLPQ 4X4 14L) | VQFN-28 (MLPQ 5X5 28L) | VQFN-34 (MLPQ 7X7 48L) | VQFN-48 | WSON-6 | WSON-8 |
|---|---|---|---|---|---|

| Driver board | CHIP |
|---|---|

## Complementary: Opto-isolated solid state relays

Typical connection
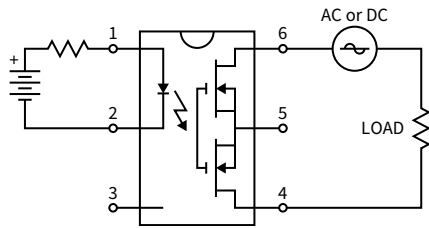


Microelectronic relays (MER) are power MOSFET or IGBT output photovoltaic relays where the output switch is controlled by radiation from a GaAlAs light emitting diode (LED) optically isolated from the output. MERs are a good choice to replace mechanical relays.

| Load voltage [V] | Load current [mA] | $R_{DS(on)}$ [Ω] | Isolation voltage [$V_{RMS}$] | Base PN | Package (see page 61) DIP-14 (with 4 pins) | DIP-6 | SMT-6 | DIP-8 | SMT-8 | DIP - 4 | SMT-8 (with 4 pins) | DIP-16 (with 10 pins) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 400 | 1000 AC-DC | --- | 3750 | PVX6012 | ✓ | | | | | | | |
| | 140 AC-DC | 27/7 | 4000 | PVU414 | | ✓ | ✓ | | | | | |
| | 120 AC-DC | 35/9 | 4000 | PVT412L | ✓ | ✓ | | | | | | |
| | 240 AC-DC | 6/2 | 4000 | PVT412A | | ✓ | ✓ | | | | | |
| | 140 AC-DC | 27/7 | 4000 | PVT412 | | ✓ | ✓ | | | | | |
| | 120 AC-DC | 35 | 4000 | PVT422 | | | | ✓ | ✓ | | | |
| 300 | 150 AC-DC | 24 | 4000 | PVA3354N | | | | | | ✓ | ✓ | |
| | 150 AC-DC | 24 | 4000 | PVA3324N | | | | | | ✓ | ✓ | |
| | 50 AC-DC | 160 | 4000 | PVA3055N | | | | | | ✓ | ✓ | |
| | 50 AC-DC | 160 | 4000 | PVA3054N | | | | | | ✓ | ✓ | |
| 250 | 170 AC-DC | 15/4.25 | 4000 | PVT312L | | ✓ | ✓ | | | | | |
| | 190 AC-DC | 10/3 | 4000 | PVT312 | | ✓ | ✓ | | | | | |
| | 170 AC-DC | 8 | 4000 | PVT322A | | | | ✓ | ✓ | | | |
| | 170 AC-DC | 10 | 4000 | PVT322 | | | | ✓ | ✓ | | | |
| 200 | 150 AC-DC | 24 | 4000 | PVA2352N | | | | | | ✓ | ✓ | |
| 150 | 550 AC-DC | 0.7/0.25 | 4000 | PVT212 | | ✓ | ✓ | | | | | |
| 100 | 360 AC | 5 | 1500 | PVR130(0,1) | | | | | | | | ✓ |
| | 550 DC | 1.5 | 4000 | PVD1354N | | | | | | ✓ | ✓ | |
| | 550 DC | 1.5 | 4000 | PVD1352N | | | | | | ✓ | ✓ | |
| | 375 AC-DC | 5 | 4000 | PVA1354N | | | | | | ✓ | ✓ | |
| | 375 AC-DC | 5 | 4000 | PVA1352N | | | | | | ✓ | ✓ | |
| 60 | 1500 DC | 0.25 | 4000 | PVDZ172N | | | | | | ✓ | ✓ | |
| | 1000 AC | 0.5 | 4000 | PVAZ172N | | | | | | ✓ | ✓ | |
| | 1000 AC/2000 DC | 0.5/0.15 | 4000 | PVG613[1] | | ✓ | ✓ | | | | | |
| | 2000 AC/4000 DC | 0.1/0.035 | 4000 | PVG612A | | ✓ | ✓ | | | | | |
| | 1000 AC/2000 DC | 0.5/0.15 | 4000 | PVG612 | | ✓ | ✓ | | | | | |
| 20 | 2500 AC/4500 DC | 0.1/0.04 | 4000 | PVN013[1] | | ✓ | ✓ | | | | | |
| | 4000 AC/6000 DC | 0.05/0.015 | 4000 | PVN012A | | ✓ | ✓ | | | | | |
| | 2500 AC/4500 DC | 0.1/0.04 | 4000 | PVN012 | | ✓ | ✓ | | | | | |

[1]10 nA leakage current

# Infineon solid-state relay package options

**DIP-6**



**DIP-8 (with 4 pins)**



**DIP-8**



**DIP-14 (with 4 pins)**



**DIP-16 (with 10 pins)**



**SMT-6**



**SMT-8 (with 4 pins)**



**SMT-8**
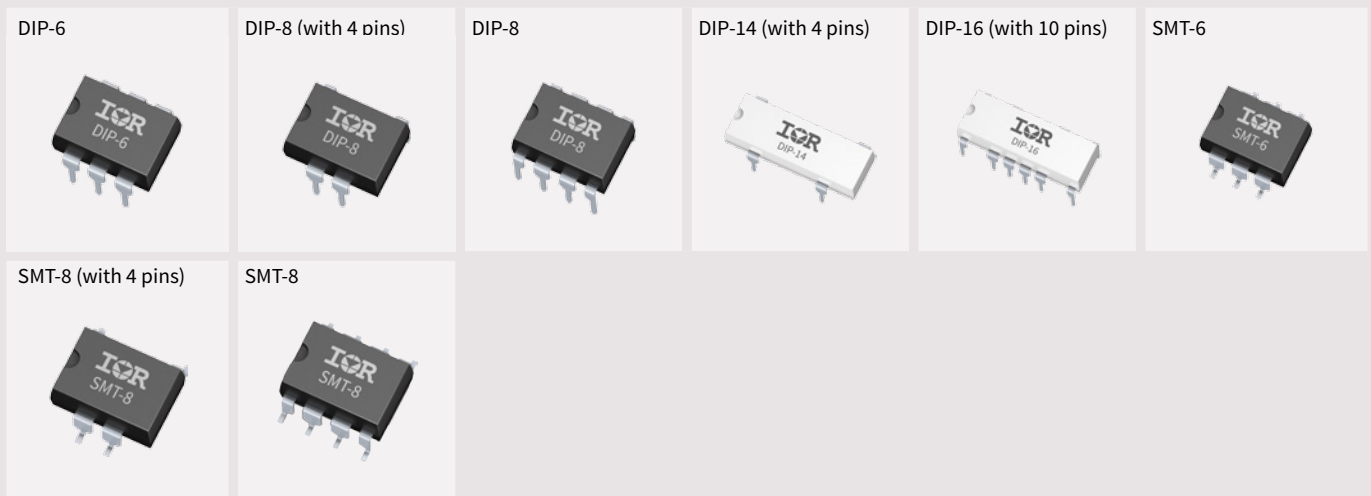


## Complementary: Opto-isolated gate drivers/voltage sources

Typical connection
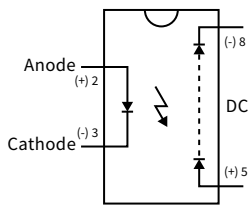


Photovoltaic isolators generate an electrically isolated DC voltage upon receipt of a DC input signal and are capable of directly driving MOSFET or IGBT gates. The output is controlled by radiation from a GaAlAs light emitting diode (LED) optically isolated from the output

| Output voltage DC [V] | Short current [µA] | Nominal control current (DC) [mA] | Isolation voltage [$V_{RMS}$] | Base PN | Package (see page 61) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | DIP-8 | SMT-8 | DIP-8 (with 4 pins) | SMT-8 (with 4 pins) |
| 5/10 | 10/5 | 5 | 3570 | PVI5033R | ✓ | ✓ | | |
| 3/6 | 2/1 | 5 | 3570 | PVI5013R | ✓ | ✓ | | |
| 5/10 | 10/5 | 10 | 2500 | PVI1050N | ✓ | ✓ | | |
| 5 | 8 | 10 | 4000 | PVI5080N | | | ✓ | ✓ |
| 5 | 5 | 10 | 4000 | PVI5050N | | | ✓ | ✓ |

www.infineon.com/SSR

# New product highlights

## 1EDC Compact - 1200 V single-channel, galvanically isolated gate driver family in 300 mil package with UL certification NEW

Infineon's new EiceDRIVER™ 1EDC Compact galvanically isolated family is recognized under UL 1577 with an insulation test voltage of $V_{ISO}$ = 2500 V(rms) for 1 min. The galvanically isolated 1EDI Compact 150 mil and 300 mil families without UL certification are also available.

| 1EDC Compact | Typ. output current [A] | Output configuration | Prop. delay [ns] |
|---|---|---|---|
| 1EDC60I12AH | 10 / -9.4 | Separate sink/ source outputs | 300 |
| 1EDC40I12AH | 7.5 / -6.8 | | 300 |
| 1EDC20I12AH | 4 / -3.5 | | 300 |
| 1EDC05I12AH | 1.3 / -0.9 | | 300 |
| 1EDC60H12AH | 10 / -9.4 | | 125 |
| 1EDC20H12AH | 4 / -3.5 | | 125 |
| 1EDC30I12MH | 5.9 / -6.2 | Active Miller clamp | 300 |
| 1EDC20I12MH | 4.4 / -4.1 | | 300 |
| 1EDC10I12MH | 2.2 / -2.3 | | 300 |

### Product features
› 1200 V input-to-output isolation voltage
› Functional isolation
› DSO-8 300 mil wide body package with 8 mm creepage distance
› For 600 V/1200 V IGBT, MOSFET and SiC MOSFET devices and modules
› Up to 10 A typical peak rail-to-rail output
› More than 100 kV/µs CMTI
› Suitable for operation at high ambient temperature
› Separate source and sink outputs or active Miller clamp
› Optimized pin-out for low inductance power supply
› No need to adapt signal voltage levels between microcontroller and driver
› Short-circuit clamping
› Active shutdown

### Potential applications
› Photovoltaic string inverters, EV charging
› Industrial drives, AC and brushless DC motor drives, high-voltage DC-DC converter and DC-AC inverter
› UPS systems
› Active shutdown

### Typical application diagram

**Separate sink/source outputs**
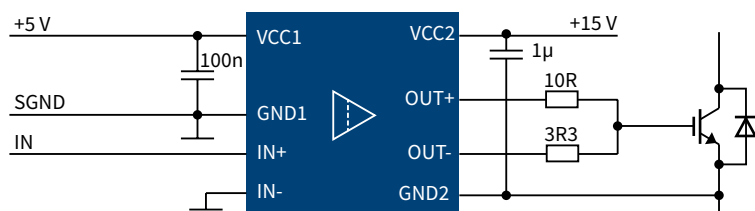


**Active Miller clamp**
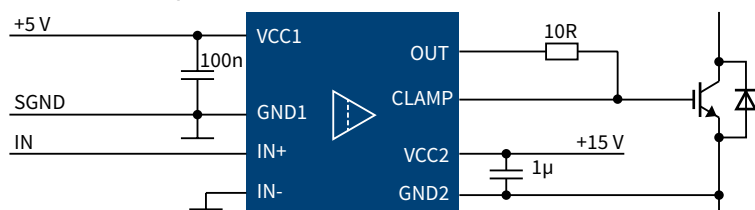


Evaluation board available:
EVAL-1EDC20H12AH-SIC

www.infineon.com/1EDcompact

# 1EDS-SRC - 1200 V single-channel, reinforced-isolated driver family with slew-rate control NEW

The new EiceDRIVER™ slew-rate control (SRC) family serves the latest generation of highly efficient low-EMI electric drive systems with improved efficiency. This is the first high-voltage isolated gate driver on the market with dynamic slew-rate control (SRC) which allows on-the-fly dV/dt control of electric drives through precise gate current control, providing the best trade-off between minimum power dissipation and minimum EMI depending on operating conditions.

## Product features

› Real-time adjustable gate current control
› DESAT short circuit protection
› Overcurrent protection
› Soft turn-off shut-down
› Two-level turn-off
› Drive power modules up to 900 A
› Unique: NPC1 short-circuit protection for three-level inverters
› Low EMI during low-load conditions and high efficiency during high-load conditions
› Reduction or elimination of dV/dt filter

## Potential applications

› AC and brushless DC motor drives
› High-voltage DC-DC converters
› UPS systems
› Welding
› Servo drives

Evaluation board available:
EVAL-1EDS20I12SV

www.infineon.com/SRC

| Part number | Isolation rating |
|---|---|
| 1EDS20I12SV | Reinforced isolation according VDE 0884-10 ($V_{IORM}$ = 1420 V) and UL 1577 certified with $V_{ISO}$ = 5 kV(rms) for 1 min |
| 1EDU20I12SV | UL 1577 certified with $V_{ISO}$ = 5 kV(rms) for 1 min |
| 1EDI20I12SV | Functional isolation |

## Feature - real time gate current control:



Gate current during idle load condition

SRC controlled gate current in 11 levels

Adjustable gate current

$I_{GATE}$ [A]

Preboost phase

Time

## Simplified application diagram
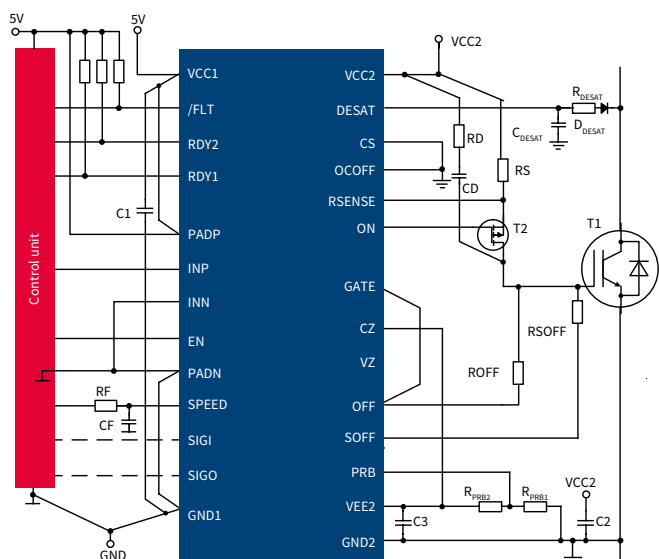
## 2ED2304S06F - 650 V Half-bridge gate driver with integrated bootstrap diode (BSD) NEW

The 2ED2304S06F is a 650-V Half-bridge gate driver. Its Infineon thin-film-SOI technology provides excellent ruggedness and noise immunity. The output drivers features a high pulse current buffer stage designed for minimum driver cross-conduction. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high side configuration which operates up to 650 V. Additionally, the offline clamping function provides an inherent protection of the parasitic turn-on by floating gate conditions when IC is not supplied.

**Typical application diagram**
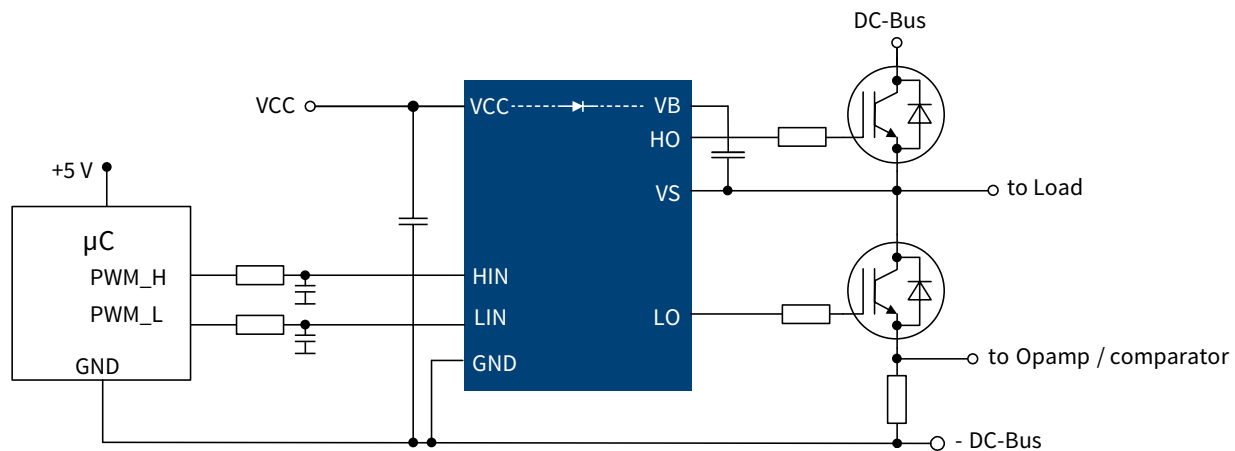


**Product features**

› Infineon thin-film-SOI-technology
› Fully operational to +650 V
› Floating channel designed for bootstrap operation
› Output source/sink current capability +0.36 A/-0.7 A
› Integrated ultra-fast, low RDS(ON) Bootstrap Diode
› Tolerant to negative transient voltage up to 100 V (pulse width is up 300 ns) given by SOI-technology
› 10 ns typ., 60 ns max. propagation delay matching
› dV/dt immune ±50 V
› Gate drive supply range from 10 V to 20 V
› Undervoltage lockout for both channels
› 3.3 V, 5 V and 15 V input logic compatible
› RoHS compliant

**Potential applications**

› Motor drives, general purpose inverters
› Refrigeration compressors
› Half-bridge and full-bridge converters in offline AC-DC power supplies for telecom and lighting

**Power dissipation of Infineon SOI**



Infineon SOI HS+LS driver Max. temperature 66.6°

Standard HS+LS driver Max. temperature 122.2°

120.3°

20.4°

DC = 300 V; CoolMOS™ P7 in D-Pak; 300 kHz switching frequency

www.infineon.com/2ED2304
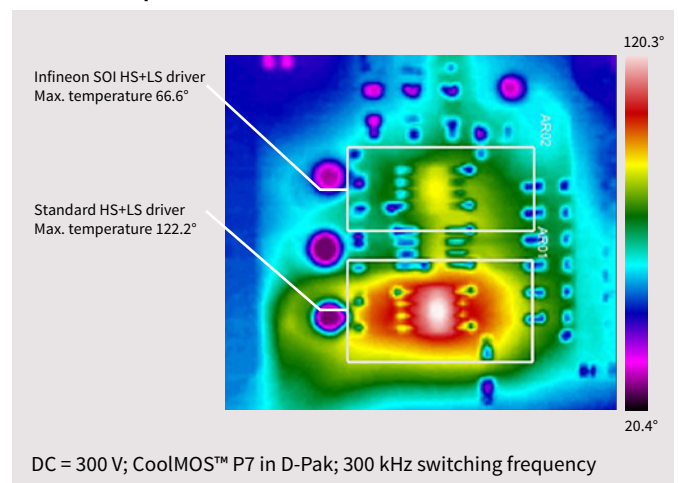
# 6ED2230S12T - 1200 V Three-phase gate driver with integrated bootstrap diodes (BSD) and overcurrent protection (OCP)*

The 6ED2230S12T is a 1200-V Three-phase SOI gate driver with integrated bootstrap diode and overcurrent protection, with typical 0.35 A source and 0.65 A sink currents in a DSO-24 package (DSO-28 with 4 pins removed) for driving IGBTs. Proprietary HVIC and latch-immune CMOS technologies enable a robust monolithic design. A current-trip function which terminates all six outputs can also be derived from this resistor. An open-drain FAULT signal is provided to indicate that an overcurrent or undervoltage shutdown has occurred. Fault conditions are cleared automatically after a delay programmed externally via an RC network. The output drivers feature a high-pulse current buffer stage designed for minimum driver cross conduction. Propagation delays are matched to simplify the driver's use in high-frequency applications.

## Product features

- › Infineon thin-film SOI technology
- › Fully operational to +1200 V
- › Floating channel designed for bootstrap operation
- › Output source/sink current capability +0.35 A/-0.65 A
- › Integrated ultra-fast, low RDS(ON) bootstrap diode
- › Tolerant to negative transient voltage up to -100 V (pulse width is up 700 ns) given by SOI-technology
- › Undervoltage lockout for both channels
- › 3.3 V, 5 V, and 15 V input logic compatible
- › Overcurrent protection (ITRIP ±5% reference)
- › Fault reporting, automatic fault clear and enable function on the same pin (RFE)
- › Matched propagation delay for all channels
- › Integrated 460 ns deadtime protection
- › Shoot-through (cross-conduction) protection
- › 2.5 kV HBM ESD protection

## Typical application diagram

## Typical applications

- › Industrial drives, motor control, general purpose inverters
- › Commercial air-conditioning (CAC)

Evaluation board available:
EVAL-M1-6ED2230-B1

## Negative transient voltage robustness of Infineon SOI

Negative transient voltage SOA characterization @ $V_{BS}$=15 V of 6ED2230S12T

* Coming soon
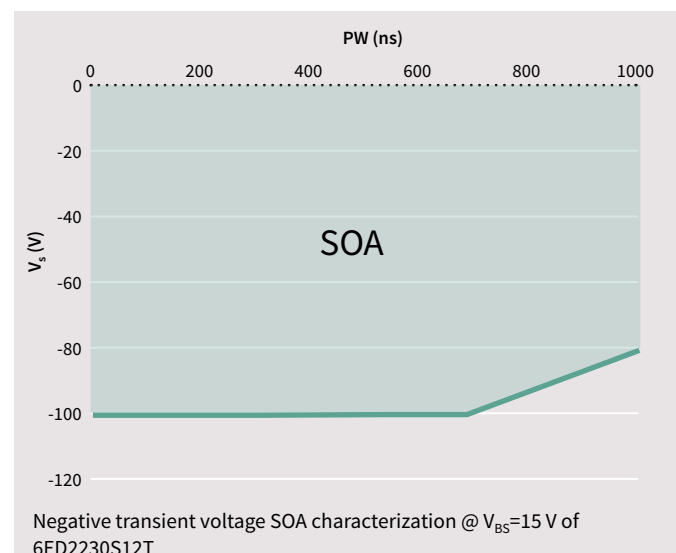
## 2ED2106/08/09/091S06 Gate driver family*
## 2ED2181/82/83/84S06 High-current gate driver family*
## 650 V Half-bridge & high and low-side gate driver with integrated BSD

The 2ED2106/08/09/091S06 gate driver family and 2ED2181/83/84S06 high-current gate driver family are high-voltage power MOSFET and IGBT driver families with Half-bridge & high and low-side configuration. Based on SOI-technology, this device has excellent robustness and noise immunity with the capability to maintain operational logic at negative voltages of up to -11 $V_{DC}$ on the VS pin ($V_{CC}$=15 V) on transient voltages. With no parasitic structures, the device is immune to parasitic latch-up at all temperature and voltage conditions. The logic input is compatible with standard CMOS or LSTTL output, down to 3.3 V logic. The output drivers feature a high-pulse current buffer stage designed for minimum driver cross-conduction. The floating channel can be used to drive an N-channel power MOSFET or IGBT in the high-side configuration which operates up to 650 V.

### Product features
› Infineon 650 V thin-film SOI-technology
› Ultra-fast bootstrap diode integration
› Tolerant to negative transient voltage at least -80 V with 500 ns pulse width
› dV/dt immune to ±50 V
› Logic input withstands swing to -5 V
› Logic and power ground ±5 V offset
› Gate drive supply range from 10 to 20 V
› Undervoltage lockout for both channels
› 3.3 V, 5 V and 15 V input logic compatible
› Schmitt trigger inputs with hysteresis and pull-up or pull-down
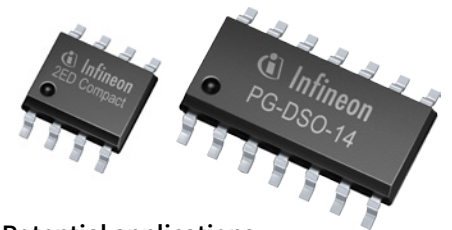
### Potential applications
› Motor drives, general purpose inverter drives
› Half-bridge and full-bridge converters in offline AC-DC power supplies for telecom and lighting
› Solar inverter and UPS drives

| Part | Output source/sink current | Input logic | Configuration | Deadtime | Package |
|---|---|---|---|---|---|
| 2ED2106S06F* | | HIN, LIN | Hide side + Low side | none | DSO-8 |
| 2ED21064S06J* | | | | | DSO-14 |
| 2ED2108S06F* | | HIN, /LIN | Half-bridge | 540 ns | DSO-8 |
| 2ED21084S06J* | +0.29 A/-0.7 A | | | Programmable | DSO-14 |
| 2ED2109S06F* | | IN, /SD | | 540 ns | DSO-8 |
| 2ED21094S06J* | | IN, DT/SD | | Programmable | DSO-14 |
| 2ED21091S06F* | | | | | DSO-8 |
| 2ED2181S06F* | | HIN, LIN | Hide side + Low side | None | DSO-8 |
| 2ED21814S06J* | | | | | DSO-14 |
| 2ED2182S06F* | | | Half-bridge | 400 ns | DSO-8 |
| 2ED21824S06J* | +2.5 A/-2.5 A | | | Programmable | DSO-14 |
| 2ED2183S06F* | | HIN, /LIN | | 400 ns | DSO-8 |
| 2ED21834S06J* | | | | Programmable | DSO-14 |
| 2ED2184S06F* | | IN, /SD | | 400 ns | DSO-8 |
| 2ED21844S06J* | | | | Programmable | DSO-14 |

\* Coming soon

### Simplified application diagrams



2ED2106S06F



2ED2184S06J
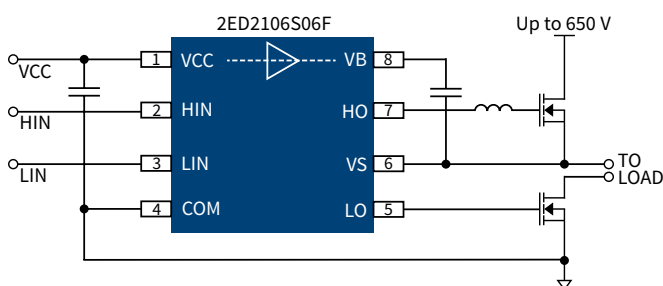
\* Coming soon
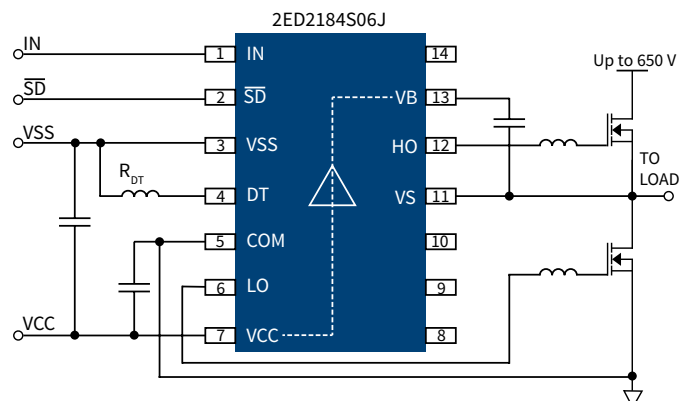
# 1ED44176N01F - 25 V Low-side gate driver with integrated overcurrent protection, fault reporting, and enable functionality NEW

The 1ED44176N01F is a low-voltage, non-inverting gate driver designed for ground-referenced applications such as digitally controlled power-factor correction (PFC) circuits requiring overcurrent protection (OCP). OCP is typically implemented using a current measurement circuit with a comparator such as LM293 and a network of resistors and capacitors. 1ED44176N01F provides up to 20% cost and 50% space savings by integrating the OCP comparator, which features an accurate current-sensing threshold tolerance of ±5%. 1ED44176N01F also integrates fault-output reporting to the controller and driver enable functionality on the same pin. The driver IC also has separate logic and power ground pins for operational robustness.

## Product features

› Overcurrent detection with positive voltage input
› +0.8 A/-1.75 A output source/sink current capability
› +0.5 V overcurrent threshold with ±5% tolerance
› Single pin for fault output and enable function
› Programmable fault clear time
› CMOS Schmitt-triggered inputs
› 3.3 V, 5 V and 15 V input logic-compatible
› Output in phase with input
› Separate logic and power ground
› 2 kV ESD HBM

## Simplified application diagram



## Potential applications

› General purpose low-side gate driver for single-ended topologies (e.g. digitally controlled PFC or digital power supplies)
› Residential and commercial air conditioners
› Home appliances
› Industrial applications
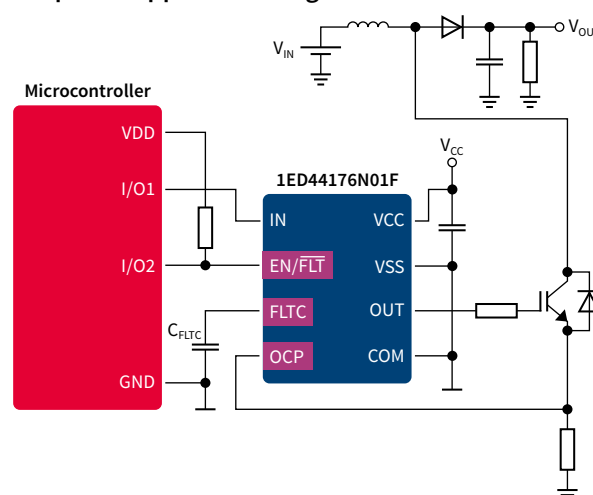
Application note, PSPICE or SiMetrix models, and evaluation board, **EVAL-1ED44176N01F** are available at www.Infineon.com/1ED44176

| Key features | Key specifications | System benefits |
|---|---|---|
| › Integrated overcurrent protection comparator with accurate OCP threshold | › 0.5 V overcurrent threshold with accurate ±5 percent tolerance | › Potential space savings up to 50 percent and cost savings up to 20 percent compared to the discrete solution |
| › Single pin for fault output and enable function | › Internal Schmitt trigger comparator for the enable function | |
| › Programmable fault clear time | › External capacitor ($C_{FLTC}$) sets the length of the fault clear time | › Flexible fault clear time set-up for different microcontroller processing speeds |
| › Low quiescent supply current | › Max $I_{QCC}$: 750 µA | › Minimizes power consumption |
| › Separate logic ground and gate driver return | › VSS and COM pins | › Avoids noise coupling from output to input which improves noise immunity |
| › Undervoltage lockout (UVLO) protection | › Specific UVLO level for IGBTs (typ. on/off = 11.9 V / 11.4 V) | › Eliminates switching loss at low $V_{CC}$ supply voltage |

www.Infineon.com/1ED44176

## 1EDN7550 and 1EDN8550 - 1-channel low-side gate driver family with truly differential inputs prevents false triggering of power MOSFETs NEW

The input signal levels of conventional low-side gate driver ICs are referenced to the ground potential of the gate driver IC. If in the application the ground potential of the gate driver IC shifts excessively false triggering of the gate driver IC can occur.

The 1EDN7550/1EDN8550 gate driver ICs have truly differential inputs. Their control signal inputs are largely independent from the ground potential. Only the voltage difference between its input contacts is relevant. This prevents false triggering of power MOSFETs.

### Product features
› Truly differential inputs
› 4 A source current
› 8 A sink current
› Separate source/sink outputs
› Low-ohmic output stage
› 29 ns input minimum pulse width
› 7 ns propagation delay accuracy
› 5 A reverse current robustness of the outputs
› 4 V and 8 V UVLO versions
› SOT-23 package, 6 pins

### Potential applications
› Servers
› Telecom
› DC-DC converters
› Telecom bricks
› Power tools
› Industrial SMPS
› Wireless charging
› Solar micro inverters

**1EDN7550 driving CoolMOS™ SJ MOSFET on 1-layer PCB**
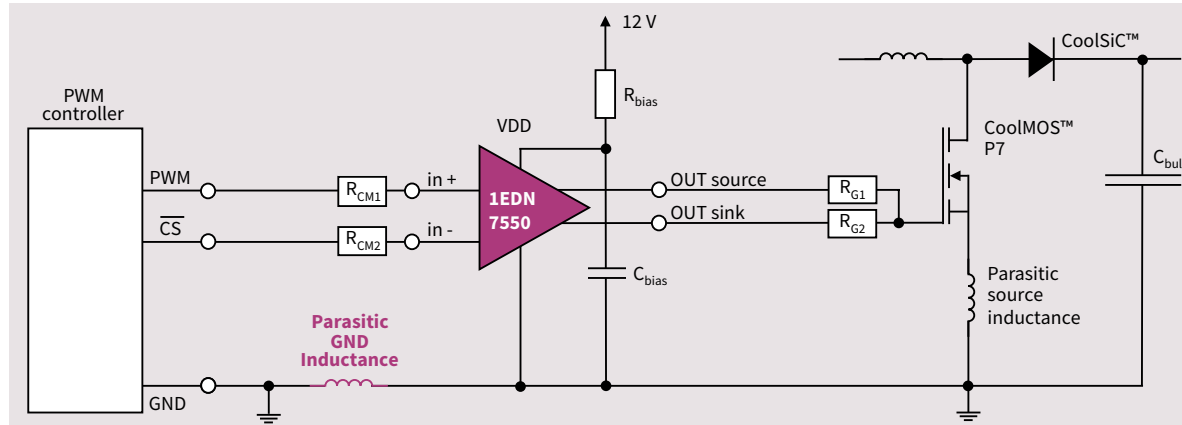


**1EDN8550 driving Kelvin source CoolMOS™ superjunction (SJ) MOSFET in boost PFC**



www.infineon.com/1EDN-TDI
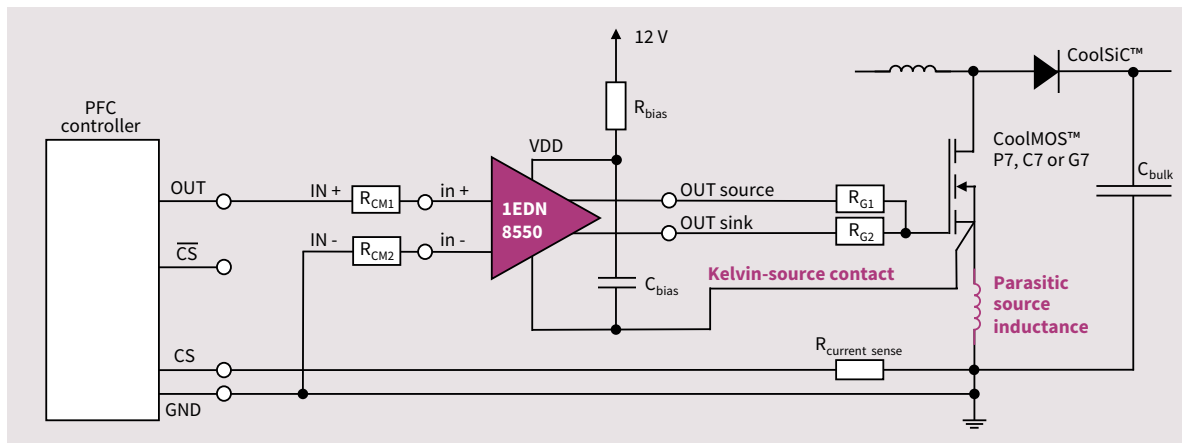
## GaN EiceDRIVER™ family NEW
## Single-channel isolated gate driver ICs for high voltage GaN switches

CoolGaN™ e-mode HEMTs are best driven by Infineon's EiceDRIVER™ ICs, the 1EDF5673K, 1EDF5673F and 1EDS5663H. They ensure robust and highly efficient high voltage GaN switch operation whilst concurrently minimizing R&D efforts and shortening time-to-market.

### Product features

› Low ohmic outputs:

Source: 0.85 Ω

Sink: 0.35 Ω

› Single-channel galvanic isolation:

Functional:    $V_{IO}$ = 1500 $V_{DC}$

$V_{IOWM}$ = 510 $V_{rms}$ (16-pin DSO)

$V_{IOWM}$ = 460 $V_{rms}$ (LGA 5x5)

Reinforced:    $V_{IOTM}$ = 8000 $V_{pk}$

(VDE 0884-10 pending)

$V_{IOWM}$ = 1420 $V_{DC}$

CMTI min:    200 V/ns

› Timing:

Minimum output pulse width: 18 ns

Propagation delay accuracy: 13 ns

### Potential applications

› Totem-pole PFCs

› Vienna rectifiers

› Multi-level topologies

› Resonant LLC

Evaluation board available:

**EVAL_1EDF_G1_HB_GAN**

### High power SMPS application example
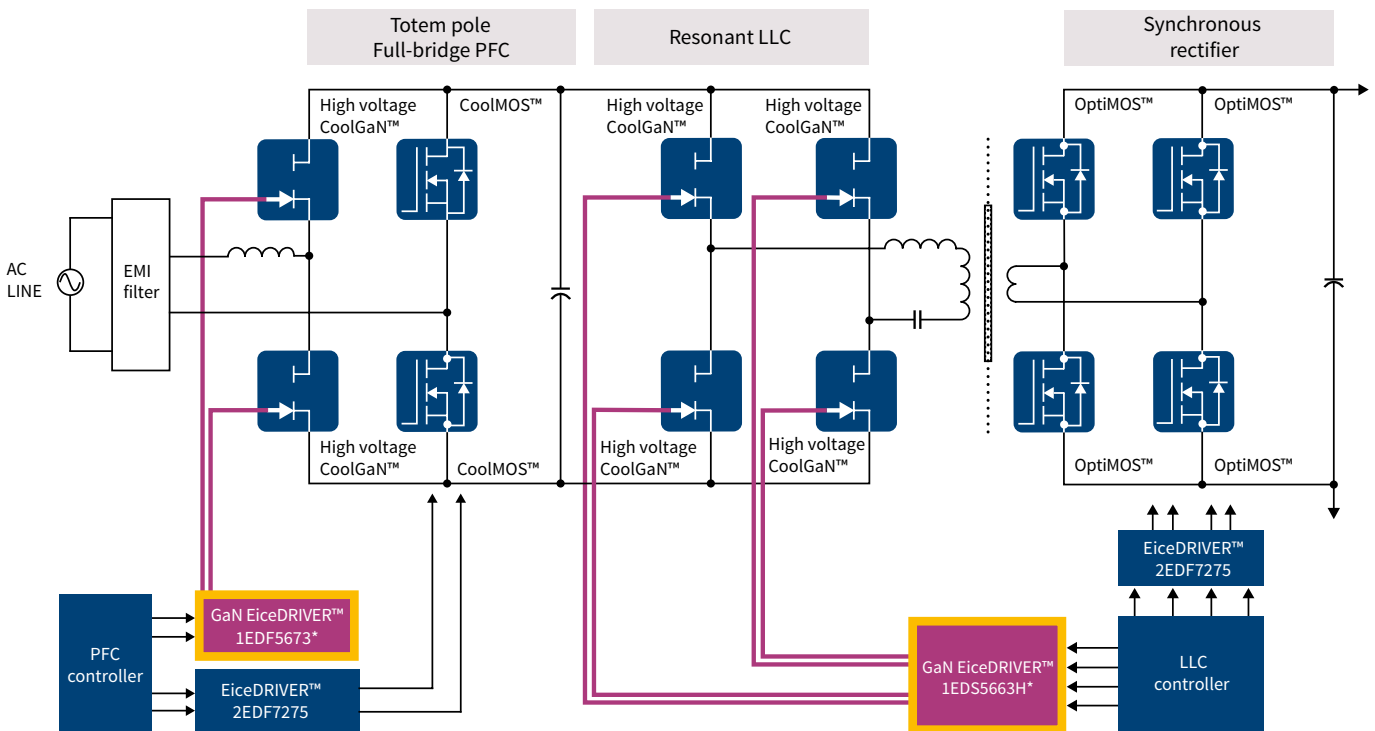


*GaN EiceDRIVER™ ICs are single-channel products

www.infineon.com/gan-eicedriver

# 2EDi Dual-channel functional and reinforced-isolated gate driver family for MOSFETs with accurate and stable timing  NEW

The EiceDRIVER™ 2EDi product family is designed for use in high-performance power-conversion applications. Very strong 4 A/8 A source/sink dual-channel gate drivers increase efficiency in CoolMOS™ and OptiMOS™ MOSFET Half-bridges. The low propagation delay of 37 ns, combined with highly accurate and stable timing over temperature and production, enables further efficiency gains within and across galvanically isolated power stages or in multi-phase/multi-level topologies. The availability of functional and reinforced isolated drivers in different packages makes these a perfect fit for both primary-side and (safe) secondary-side control. Gate driver outputs come with a high 5 A reverse-current capability and 150 V/ns CMTI robustness for high dV/dt power loops. For slower switching or driving smaller MOSFETs, 1 A/2 A peak current product variants are available as well.



**2EDF7175F 1 A/2 A**
**2EDF7275F 4 A/8 A**

Functional isolation

**2EDS8165H 1 A/2 A**
**2EDS8265H 4 A/8 A**

Reinforced isolation

**2EDF7235K 4 A/8 A w. DTC**
**2EDF7275K 4 A/8 A**

Functional isolation
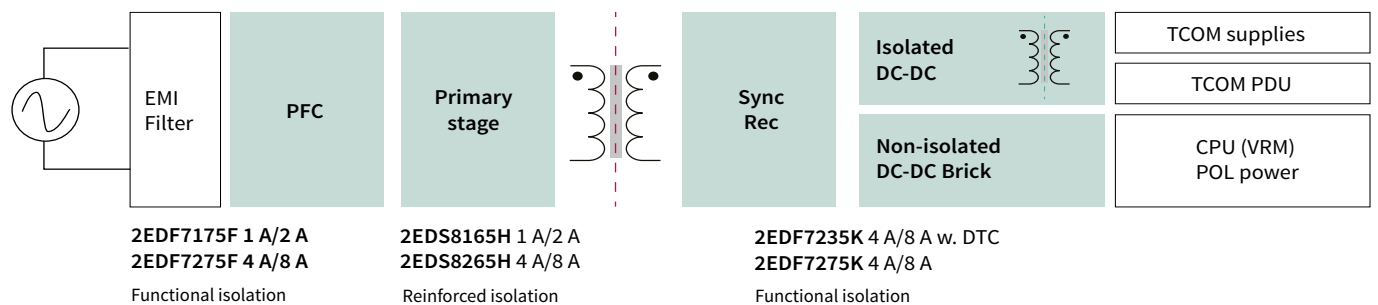
## Product features

› Easy-to-use small form factor driver + isolation in one package

› Stable and high-resolution PWM timing accuracy within and across power stages for optimizing full and light-load efficiency

› Galvanic isolation with 150 V/ns CMTI robustness for noisy high-voltage MOSFET power-switching environment

› Competitive overall system-component cost with improved protection

› Faster time to market with planned UL 1577, VDE 0884-1x, IEC 60950/62386 reinforced safety certifications

## Device overview
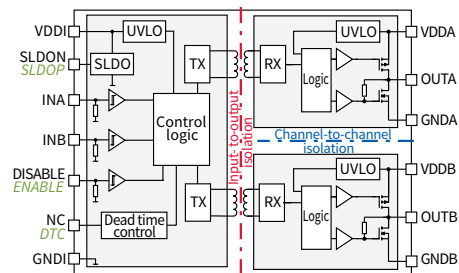


## Potential applications

› Telecom DC-DC
› Servers
› Industrial SMPS
› UPS

› Batteries
› EV-Charging
› DC-DC
› Smart grid

## Product portfolio

| Part number | Orderable part number (OPN) | Package | PWM Input type | Driver source/ sink current | Gate driver UVLO | Input to output isolation | | | | Dead-time control |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Isolation class | Rating | Surge testing | Safety certification* | |
| 2EDF7175F | 2EDF7175FXUMA1 | NB-DSO16 10 x 6 mm | Dual-mode (IN_A, IN_B) | 1 A/2 A | 4 V | Functional | $V_{IO} = 1.5$ kV$_{DC}$ | n.a. | n.a. | no |
| 2EDF7275F | 2EDF7275FXUMA1 | | | 4 A/8 A | | | | | | |
| 2EDS8165H | 2EDS8165HXUMA1 | WB-DSO16 10.3 x 10.3 mm | | 1 A/2 A | 8 V | Reinforced* | $V_{IOTM} = 8$ kV$_{peak}$ (VDE0884-10) $V_{ISO} = 5.7$ kV$_{rms}$ (UL1577) | $V_{IOSM} = 10$ kV$_{peak}$ (IEC60065) | VDE0884-10 UL1577 IEC60950 IEC62368 CQC | |
| 2EDS8265H | 2EDS8265HXUMA1 | | | 4 A/8 A | | | | | | |
| 2EDF7235K | 2EDF7235KXUMA1 | LGA13 5.0 x 5.0 mm | | | 4 V | Functional | $V_{IO} = 1.5$ kV$_{DC}$ | n.a. | n.a. | yes |
| 2EDF7275K | 2EDF7275KXUMA1 | | | | | | | | | no |

*Certification coming soon

www.infineon.com/2EDi

# 1EDI2004AS* - EiceDRIVER™ SIL 1200 V galvanically isolated automotive gate driver IC

1EDI2004AS is a high-voltage IGBT gate driver designed for automotive motor drives above 5 kW. It is based on Infineon's coreless transformer (CT) technology, providing galvanic isolation between low-voltage and high-voltage domains. The device has been designed to support 400 V, 600 V and 1200 V IGBTs. 1EDI2004AS can be connected on the low-voltage side (primary side) to 5 V logic. A standard SPI interface allows the logic to configure and to control the advanced functions implemented in the driver. On the high-voltage side (secondary side), it is dimensioned to drive an external booster stage, or directly, small IGBTs. Short propagation delays and controlled internal tolerances lead to minimal distortion of the PWM signal. The 1EDI2004AS can be used optimally with 1EBN100XAE 'EiceDRIVER™ Boost' booster stage family.

## Product features

› Low-propagation delay and minimal PWM distortion
› Support of 5 V logic levels (primary side)
› 16-bit standard SPI interface (up to 2 MBaud) with daisy-chain support (primary side)
› Fully programmable active clamping inhibit signal (secondary side)
› Operation with unipolar secondary supply possible
› Automotive-qualified (as per AEC Q100)

## Safety features

› Desaturation monitoring
› Overcurrent protection
› Fully programmable two-level turn-off
› Support for active short-circuit (ASC) strategies
› Compliant to ISO 26262 standard - ASIL A (suitable for systems up to ASIL D requirements)

## Potential applications

› Main inverters for automotive (hybrid) electric vehicles
› High-voltage DC-DC converter
› Industrial drive

## Simplified application diagram



*Coming soon
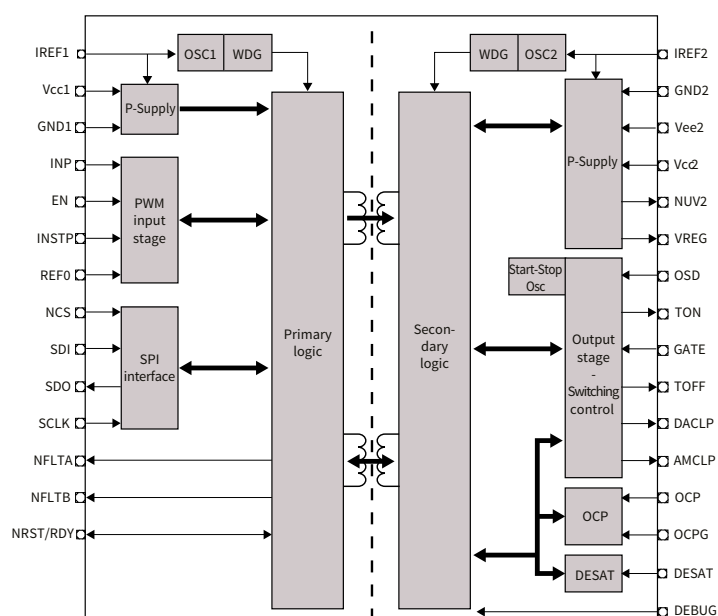
## AUIR2x14SS* – 1200 V Half-bridge automotive gate driver IC

The AUIR2x14SS gate driver family is suited to drive a single half bridge in automotive power-switching applications. These drivers provide high gate-driving capability (2 A source, 3 A sink) and require low quiescent current, which allows for the use of bootstrap power supply techniques in medium power systems. These drivers feature full short-circuit protection by means of power-transistor desaturation detection, and manage all Half-bridge faults by smoothly turning off the desaturated transistor via the dedicated soft shutdown pin, therefore preventing over-voltages and reducing electromagnetic emissions.

### Product features
› First Q100-qualified single-die 1200 V device
› Floating channel up to 700 V (AUIR2114SS) or 1200V (AUIR2214SS)
› Soft overcurrent shutdown
› Synchronization signal to synchronize shutdown with the other phases
› Integrated desaturation detection circuit
› Two-stage turn-on output for di/dt control
› Separate pull-up/pull-down output drive pins
› Matched delay outputs
› Undervoltage lockout with hysteresis band

### Potential applications
› Automotive auxiliaries
› Fans
› (Heat) Pumps
› HVAC compressors
› Brushless automotive applications

**Simplified application diagram**



*Coming soon

# Infineon gate driver evaluation boards

| Board Picture | Application | Product | Product description | Highlighted products | Target Application | Topology |
|---|---|---|---|---|---|---|
| | Battery powered applications | EVAL-6EDL04N02PR | Evaluation board for 3-Phase gate driver IC with LS-SOI technology to control MOSFET | 6EDL04N02PR | Battery powered drives; Stepper motor; e-bikes, e-scooters, e-toys; Drones; Robotic vacuums | B6 bridge |
| | Electric vehicles | 1EDI2002AS EVALKIT (1EDI2002ASEVALKITTOBO1) | EiceDRIVER™SIL Evaluation Kit | 1EDI2002AS 1EBN1001AE | Inverters for E-Vehicles; High-voltage DC-DC converter for E-Vehicles; Industrial drive | Half-bridge |
| | | 1EDI2004AS EVALKIT (1EDI2004ASEVALKITTOBO1) | | 1EDI2004AS 1EBN1001AE | | |
| | Electric vehicles | 1EDI2010AS EVALKIT (1EDI2010ASEVALKITTOBO1) | EiceDRIVER™ Sense IGBT gate driver evaluation kit for traction inverter applications | 1EDI2010AS 1EBN1001AE | Inverters for E-Vehicles; High-voltage DC-DC converter for E-Vehicles; Industrial drive | Half-bridge |
| | Electric vehicles | AUIRS1170S EVALKIT (AUIRS1170SEVALKITTOBO1) | Secondary side high speed synchronous rectification Evaluation Kit | AUIRS1170S | High-voltage DC-DC converter for E-Vehicles; On-Board Charger; Industrial drive | Full-bridge |
| | Electric vehicles | 2ED020I12FAEVALKITTOBO1 | Dual channel isolated IGBT Driver, For 600V/1200V IGBTs | 2ED020I12FA | Inverters for E-Vehicles; High-voltage DC-DC converter for E-Vehicles; Industrial drive; On-Board Charger | Full-bridge |
| | Electric vehicles | EVAL-6ED100HPDRIVE-AS (EVAL6ED100HPDRIVEAS-TOBO1) | Gate driver evaluation board for FSxxxR08A6P2xx with EiceDriver Sense/Lite/Boost, Standalone | 1EDI2010AS | Inverters for E-Vehicles; High-voltage DC-DC converter for E-Vehicles; Industrial drive | |
| | EV Charging | EVAL-1EDC20H12AH-SIC | Demonstrate the functionality and key features of 1EDC20H12AH and CoolSiC™ MOSFET | 1EDC20H12AH IZM120R045M1* | Drives, EV Charging, Telecom, Solar | Half-bridge |
| | Home appliance | EVAL-1ED44176N01F | Show the functionalities and key features of Infineon's low-side gate driver with integrated overcurrent protection, 1ED44176N01F. | 1ED44176N01F IRLML2803TRPBF | Home Appliances, PFC; digital power supplies; Residential and commercial air conditioners; Industrial | Single low-side |
| | Home appliance | EVAL_100W_DRIVE_CFD2 | Motor drive board offers a sensorless synchronous rectification BLDC/PMSM control algorithm to reduce reverse-current hard-commutation stress | IPD65R1K4CFD 2EDL05N06PF | Air conditioner fan; Water pump; Refrigerator compressors Dish washers; Heating systems Draining and recirculation pumps | 3-Phase Motor |
| | Home appliance | EVAL-2EDL05I06PF | Evaluation Board for 600 V half bridge gate driver IC with LS-SOI technology to control IGBTs. | 2EDL05I06PF | Consumer; Induction heating Industrial; Motor control & drives, CAV E-Bikes, E-Scooter, E-Forklift & Small E-Vehicles | Half-bridge |
| | Home appliance | EVAL-2EDL23I06PJ | Evaluation Board for 600 V HB gate driver IC with LS-SOI technology to control Highspeed3-IGBT | 2EDL23I06PJ IKP20N60H3 | Air conditioners; Drives; Fans; Power management; Pumps, | Half-bridge |
| | Home appliance | EVAL-2EDL23N06PJ | Evaluation Board for 600 V half bridge gate driver IC with LS-SOI technology to control MOSFET | 2EDL23N06PJ | Consumer, LEV, Power Management Server; Solar Inverter | Half-bridge |
| | Home appliance | EVAL-6EDL04I06PT | Evaluation Board for 3-Phase gate driver IC with LS-SOI technology to control power devices like MOSFET or 600 V IGBTs | 6EDL04N02PR | Fan; Refrigerator; Washing machine | B6 bridge |
| | Home appliance | WM_MOTOR_CONTROL_01 | Demonstrate sensorless FOC for washing machine PMSM motor control | IKD10N60R 6EDL04I06NT | Motor control & drives | 3-Phase motor |
| | Industrial | 2ED100E12-F2 | Evaluation Driver Board for EconoDUAL™3 Modules using a coreless transformer single-channel driver | 1ED020I12-F2 | Industrial; CAV; Induction motor control & drives; Solar/Wind energy systems | Half-bridge |

*Coming soon
Please contact your local sales or distribution partner for evaluation boards

# Infineon gate driver evaluation boards
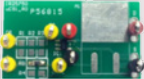
| Board picture | Application | Product | Product Description | Highlighted products | Target application | Topology |
|---|---|---|---|---|---|---|
| | Industrial | 2ED250E12-F | Evaluation Driver Board for Prime-PACK™ Modules up to 1200 V using a coreless transformer single-channel driver | 1ED020I12-F2 | Industrial; CAV; Motor control & drives Solar/Wind energy systems | Half-bridge |
| | Industrial | 2ED300E17-SFO | This evaluation board for the IGBT driver board can be used for all medium and high power IGBT modules up to 1700 V. | 2ED300C17-S / -ST | CAV; Drives; Power supply Renewable energy; solar; Wind traction | Half-bridge |
| | Industrial | 6ED100E12-F2 | Evaluation Driver board for EconoPACK™+ IGBT modules, using a coreless transformer single-channel driver | 1ED020I12-F2 | Industrial; CAV; Motor control & drives Solar/Wind energy systems | B6 bridge |
| | Industrial | 7ED020E12-FI-U1 | Evaluation Driver Board for SmartPIM 1 Modules up to 1200 V. Coreless transformer HB drivers are used for gate control and protection. | 2ED020I12-FI | Industrial; Motor control & drives | B6 bridge |
| | Industrial | 7ED020E12-FI-W2 | Evaluation Driver Board for EasyPIM™ 2B PressFIT Modules up to 1200 V. Coreless transformer HB drivers are used for gate control and protection. | 2ED020I12-FI | Industrial; Motor control & drives | B6 bridge |
| | Industrial | EVAL-M1-6ED2230-B1* | A complete power evaluation board including an EasyPIM™ 1200V Easy1B Three-phase module for motor-drive application. | 6ED2230S12T* | Industrial drives; Motor control, General Purpose Inverters; Commercial air Conditioning (CAC) | Three-phase |
| | Industrial | EVAL-1ED020I12-B2 | Evaluation Board for galvanic isolated Single channel driver IC with CT technology for 600V/1200V IGBTs | 1ED020I12-B2 | Industrial; UPS Motor control & drives Power supplies; Smart grid Solar energy systems | Half-bridge |
| | Industrial | EVAL-1ED020I12-BT | Evaluation Board for galvanic isolated Single channel driver IC with CT technology for 600V/1200V IGBTs | 1ED020I12-BT | Data Processing E-mobility; UPS Industrial; Motor control & drives Power supplies; Smart grid solar energy systems | Half bridge |
| | Industrial | EVAL-1EDS20I12SV | Evaluation of the product features of 1EDS20I12SV (SRC) in combination with EconoDUAL™3 modules | 1EDS20I12SV | Drives | Dual channel high-side Half-bridge |
| | Industrial | EVAL-2ED020I12-F2 | Evaluation Board for galvanic isolated dual channel driver IC with CT technology for 600V/1200V IGBTs | 2ED020I12-F2 IKP20N60H3 | CAV; Motor control & drives Power supplies; Solar energy systems | Half-bridge |
| | Industrial | F3L020E07-F-P | Evaluation Driver board for 650 V 3-level EconoPACK™ 4 modules in NPC1-topology. Coreless transformer drivers are used for gate control and protection. | 1ED020I12-F2 | Industrial; CAV Motor control & drives Solar/Wind energy systems | Half-bridge |
| | Industrial | F3L030E07-F-W2 | Evaluation Driver board for 650 V Easy2B 3-level modules in NPC1-topology. Coreless transformer drivers are used for gate control and protection. | 1ED020I12-F2 | Drives; Renewable energy Solar; UPS | Half-bridge |
| | Industrial | F3L2020E07-F-P | Evaluation Driver board for 650 V 3-level EconoPACK™ 4 modules in NPC2-topology. Coreless transformer drivers are used for gate control and protection. | 1ED020I12-F2 | Industrial; Motor control & drives Solar/Wind energy systems | Half-bridge |
| | Industrial | F3L2020E12-F-P_EVAL | Evaluation Driver board for 1200 V EconoPACK™ 4 3-Level Modules in NPC2-Topology. Coreless transformer drivers are used for gate control and protection. | 1ED020I12-F2 | Industrial; CAV Motor control & drives Solar/Wind energy systems | Half-bridge |

*Coming soon
Please contact your local sales or distribution partner for evaluation boards

# Infineon gate driver evaluation boards

| Board Picture | Application | Product | Product Description | Highlighted products | Target Application | Topology |
|---|---|---|---|---|---|---|
| | Industrial | IRUCS1 | IR25750L D2PAK/DPAK In-Circuit Evaluation Board | IR25750L | Current sense application | |
| | Industrial | KIT_XMC_DP_EXP_01 | The new XMC™ digital power explorer kit features synchronous buck converter with on-board resistive load banks | BSC0924NDI IRS2011S | Industrial, server and telecom DC/DC power conversion | Buck |
| | Multicopter | KIT_XMCI45_LARIX_PINU_1 | Quadrocopter demonstrator kit with 9-axis motion tracking, pressure sensor and authentication representation | BSC0925ND IR2301S | Multicopter | B6 bridge |
| | SMPS | EVAL_1K6W_PSU_G7_DD | 1600 W Titanium server power supply with 600 V CoolMOS™ G7 SJ MOSFET in DDPAK package | IPDD60R150G7 IPDD60R050G7 IDDD08G65C6 BSC007N04LS6 1EDI20N12AF 2EDN7524F | Server | PFC LLC |
| | SMPS | EVAL_2K5W_CCM_4P_V2 | 2500 W CCM PFC, 110/230 AC to 400 DC, | 1EDI60N12AF IPZ60R040C7 | Server,UPS,PC Power,-Telecom | Buck PFC Continuous conduction mode (CCM) |
| | SMPS | EVAL_3KW_2LLC_C7_20 | 3.0kW Dual LLC Evaluation Board | IPP60R040C7 BSC093N15NS5 2EDN7524R 1EDI60N12AF 2N7002 BSS316N | Telecom / Industrial SMPS | LLC |
| | SMPS | EVAL_3KW_2LLC_CFD7 | Full Infineon solution for the high voltage DC-DC stage of a 3KW telecom/industrial SMPS | IPW60R031CFD7 1EDI60N12AF BSC093N15NS5 2EDN7524R | Telecom / Industrial SMPS | LLC |
| | SMPS | EVAL_3KW_2LLC_P7_47 | Full IFX solution for the HV DCDC stage of a 3KW Telecom/industrial SMPS | IPW60R037P7 1EDI60N12AF BSC093N15NS5 2EDN7524 | Telecom /Industrial power supply | LLC |
| | SMPS | EVAL_3KW_DB_PFC_C7 | Full IFX solution for a Bridgeless Dual Boost PFC for a 3kW Server/Telecom/Industrial SMPS | IPZ65R045C7 IPW65R045C7 2EDN7524F 1EDI60N12AF | Server/Telecom/Industrial power supply | PFC |
| | SMPS | EVAL_600W_12V_LLC_C7 | 600W DCDC/LLC stage, 400V/12V DC, 97.8% peak efficiency | IPP60R180C7 BSC010N04LS 2EDL05N06PF 2EDN7524F | Server PC Power | Half-bridge LLC |
| | SMPS | EVAL_600W_12V_LLC_CFD7 | Full Infineon solution for the high voltage DC-DC stage of a 600W server and industrial SMPS | IPP60R170CFD7 2EDL05N06PF BSC010N04LS 2EDN7524 | Server Telecom | Half-bridge LLC |
| | SMPS | EVAL_600W_12V_LLC_P7 | Half bridge LLC stage of a server SMPS with the target to meet 80+ Titanium standard efficiency requirements | IPP60R180P7 2EDL05N06PF BSC010N04LS 2EDN7524 | Server /Industrial power supply | Half-bridge LLC |
| | SMPS | EVAL_800W_PSU_3P_P7 | This 800 W evaluation board is a cost optimized form, fit and function test platform for server applications | IPW60R099P7 IPP60R280P7 BSC014N04LS 1EDI20N12AF 2EDN7524F | Server power supplies | PFC LLC |
| | SMPS | EVAL_800W_PSU_4P_C7 | This 800 W evaluation board is intended to be a form, fit and function testplatform for server applications | IPZ60R099C7 IPP60R180C7 BSC014N04LS 1EDI20N12AF 2EDN7524F | Server power supplies | PFC LLC |

Please contact your local sales or distribution partner for evaluation boards

| Board picture | Application | Product | Product description | Highlighted products | Target application | Topology |
|---|---|---|---|---|---|---|
| | SMPS | EVAL-600W-12V-LLC-A | 600W DC-DC/LLC stage 400/12VDC, 97.4% peak efficiency (digital and analog version available) | 2EDL05N06PF 2EDN7524F BSC010N04LS IPP60R190P6 | Power supplies(DC-DC Resonant Converters) | Half-bridge LLC |
| | SMPS | EVAL-IGBT-1200V-247 | Adaptable double pulse tester for IGBTs in TO-247 4pin package | IKY75N120CH3 1EDI60I12AH | Server/Telecom power supplies Solar energy systems | Half-bridge |
| | SMPS | EVAL-IGBT-650V-TO247-4 | Adaptable double pulse tester for IGBTs in TO-247 4pin package | IKZ50N65EH5 IKZ50N65NH5 IKW50N65H5 1EDI60I12AF | Server/Telecom power supplies Solar energy systems | Half-bridge |
| | SMPS | KIT_DRIVER_2EDN7524F | This evaluation kit provides a test platform for Infineon's dual-channel non-isolated gate driver IC EiceDRIVER™ 2EDN7524 in DSO 8pin package, WSON 8pin package and TSSOP 8pin package | 2EDN7524F | Industrial power supply/ Server/Telecom | Dual low-side |
| | SMPS | KIT_DRIVER_2EDN7524G | | 2EDN7524G | | Dual low-side |
| | SMPS | KIT_DRIVER_2EDN7524R | | 2EDN7524R | | Dual low-side |
| | SMPS | KIT_DRIVER_2EDF7275F | This evaluation kit provides a test platform for Infineon's dual-channel functional isolated gate driver IC EiceDRIVER™ 2EDF7275F in DSO 16pin 150 mil package | 2EDF7275F | Industrial power supply/ Server/Telecom | Dual low-side |
| | SMPS | KIT_DRIVER_1EDN7550B | This evaluation kit provides a test platform for Infineon's single-channel non-isolated gate driver IC EiceDRIVER™ 1EDN7550B in SOT-23 6pin package. | 1EDN7550B | Industrial power supply/ Server/Telecom | Dual low-side |
| | SMPS | EVAL_HB_BC_1EDN8550B | This board is intended to evaluate the robustness of the EiceDRIVER™ 1EDN TDI (1EDN8550B) gate driver, based on an innovative truly differential inputs (TDI) concept. This allows to regulate DC and AC shifts between the microcontroller ground and the driver ground. | 1EDN8550B BSC026N08NS5 | Industrial power supply/ Server/Telecom | Half-bridge buck converter |
| | SMPS | EVAL_3K3W_BIDI_PSFB* | The EVAL_3K3W_BIDI_PSFB design consists of a phase shift full bridge with synchronous rectification (SR) in full bridge configuration | 2EDS8265H | Industrial power supply/ Server/Telecom | Full-bridge |
| | SMPS | EVAL_1EDF_G1_HB_GAN | This 600V gallium nitride (GaN) half-bridge evaluation board enables easy, rapid setup and test of CoolGaN™ transistors. The generic topology can be configured for boost or buck operation, pulse testing or continuous full-power operation. | IGOT60R070D1 1EDF5673K | Power Supplies | Boost Buck Half Bridge LLC |

Please contact your local sales or distribution partner for evaluation boards

# Gate driver IC forum

Discuss your technical topics directly with Infineon gate driver experts.
www.infineon.com/gdforum

*Coming soon
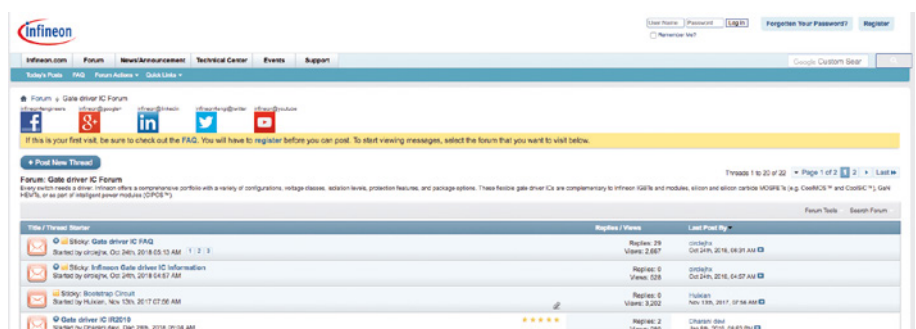
# Gate driver IC simulation model

## SPICE model



© suksao / Freepik

## Infineon Designer

Gate driver prototypes are available on www.infineon.com/ifxdesigner. Infineon Designer is an online prototyping engine combining analog and digital simulation functionalities in an Internet application. Requiring a web browser only, it is a perfect match for supporting customers in selecting the right product for a defined application.
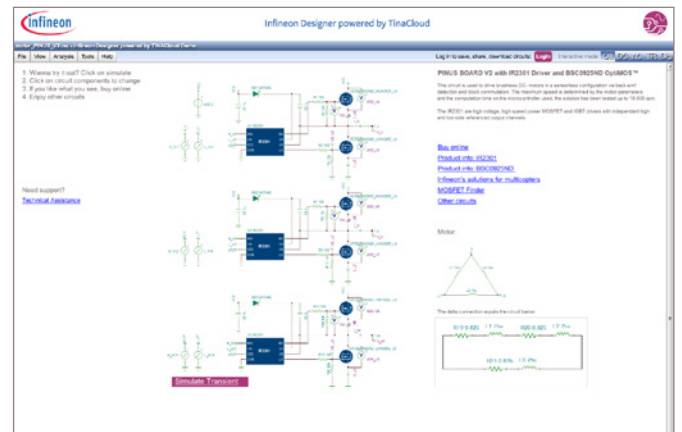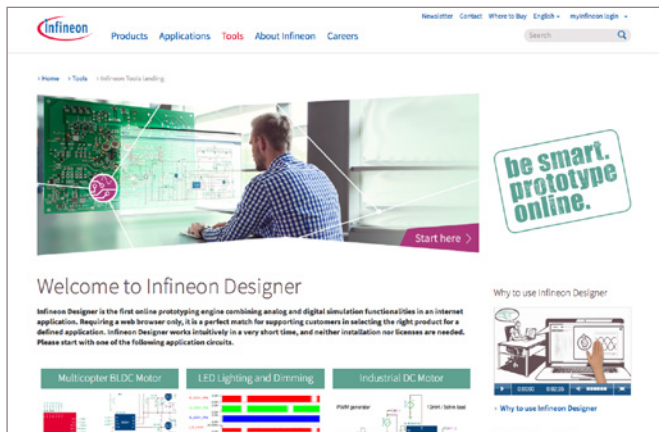
# Gate driver IC brochures

**Gate Driver Selection Guide**
(This document)
www.infineon.com/gdbrochure

**Power and Sensing
Selection Guide**
http://www.infineon.com/
powerandsensing-selectionguide

**Automotive application guide**

**Gate Driver Application Matrix**
www.infineon.com/gdapplication

门极驱动应用选型指南
www.infineon.com/gdapplica-
tion-cn

**Industrial Galvanically Isolated
Gate Driver**
www.infineon.com/gdiso

工业级隔离型门极驱动芯片
www.infineon.com/gdiso-cn

**1EDN-2EDN EiceDRIVER™ MOSFET
gate driver ICs-Application
Selection Guide**

**1EDN/2EDN Sample Kit**
ISAR ordering code:
KIT_1EDN_2EDN_SA_V1

# Gate driver selection tool

To simplify the gate driver selection process, Infineon offers an online easy-to-use gate driver selection tool.
By selecting a few key parameters, the tool quickly guides you in finding the right driver for your application.

**Visit the gate driver selection tool by going to www.infineon.com/gdfinder**



www.infineon.com/gdfinder

## Cross Reference Search

**Important Notice**

All information presented in IFX cross reference search tool is based on IFX best estimate of other manufacturers' published information at the time this information was collected by IFX. This information is for suggestion purposes only and shall in no event be regarded as a guarantee of conditions or characteristics. Customers who are interested in such cross reference will be encouraged to communicate with IFX local representatives in order to clarify their details of the needs and requests. IFX is not responsible for any incorrect or incomplete information.

**Enter partial or full manufacturer's device number and manufacturer**



| Vendor Product | Vendor Name | Infineon Product | Datasheet | Product Status | Order Online | Short Description | Similarity Info |
|---|---|---|---|---|---|---|---|
| FAN7380 | Fairchild Semiconductor | › IRS2304 | IRS2304 | active and preferred | Buy online | Half Bridge Driver, high voltage, high speed power MOSFET and IGBT driver with independent high and low side referenced output channels | Direct |
| FAN7380 | Fairchild Semiconductor | › IR2304 | IR2304 | active | Buy online | Half Bridge Driver, Soft Turn-On, Noninverting Inputs in a 8-Lead package | Direct |
| FAN7380 | Fairchild Semiconductor | › IR2308 | IR2308 | active | Buy online | High Voltage and High Speed power MOSFET and IGBT Half Bridge Driver in a 8-Lead package | Similar |
| FAN7380 | Fairchild Semiconductor | › IRS2308 | IRS2308 | active and preferred | Buy online | High Voltage and High Speed power MOSFET and IGBT Half Bridge Driver in a 8-Lead package | Similar |
| FAN7380 | Fairchild Semiconductor | › 2EDL05N06PF | 2EDL05N06PF | active and preferred | Buy online | EiceDRIVER™ Compact - Optimized 600V half bridge gate driver IC with LS-SOI technology to control MOS-transistors | Similar |

www.infineon.com/crs

# My Infineon sharing platform
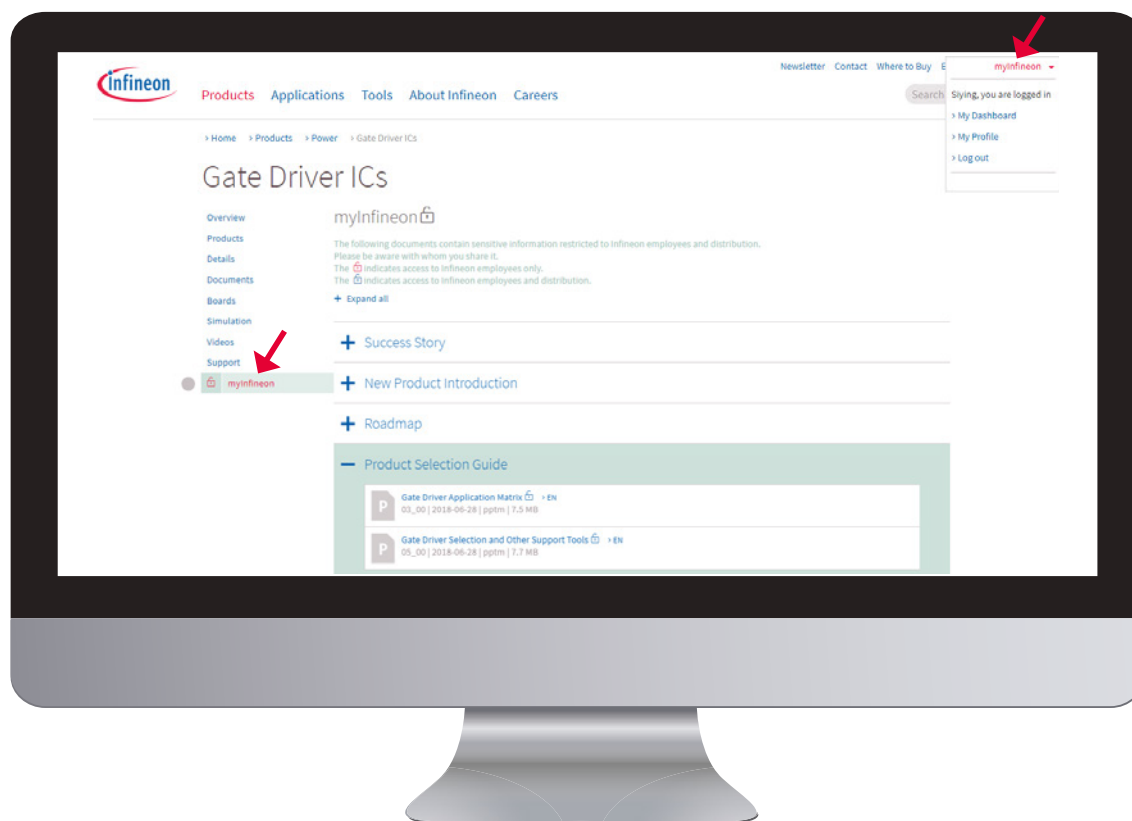


### Website Tools

> Infineon gate drivers home page / 中文版
> Gate driver finder tool (Web)
> Gate driver X-reference (Web)
> Simulation tools (Web)
> Evaluation boards (Web)
> Introduction to gate drivers (Video)
> 1EDN EiceDRIVER™ Gate Driver ICs (Video)
> 2EDL EiceDRIVER™ Gate Driver ICs (Video)

> www.infineon.com/gatedriver / www.infineon.com/gatedriver-cn
> www.infineon.com/gdfinder
> www.infineon.com/crs
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> www.infineon.com/gdevalboards
> www.infineon.com/gdvideointro
> www.infineon.com/gdvideo1EDN
> www.infineon.com/gdvideo2EDL

### Product promotion page

> 200 V Level-Shift Gate Driver ICs
> 500 - 700 V Level-Shift Gate Driver ICs
> 1200 V Level-Shift Gate Driver ICs
> SiC MOSFET Gate Driver ICs /中文版
> 1EDI/1EDC EiceDRIVER™ Compact /中文版
> The Slew-Rate Control EiceDRIVER™ /中文版
> 1EDN EiceDRIVER™ Gate Driver IC home page
> 2EDN EiceDRIVER™ Gate Driver IC home page
> µHVIC™ Family

> www.infineon.com/200vhvic
> www.infineon.com/700vhvic
> www.infineon.com/1200vhvic
> www.infineon.com/gdsic / www.infineon.com/gdsic-cn
> www.infineon.com/1edcompact / www.infineon.com/1edcompact-cn
> www.infineon.com/src / www.infineon.com/src-cn
> www.infineon.com/1EDN
> www.infineon.com/2EDN
> www.infineon.com/microhvic

# Infineon gate driver naming convention

## Naming convention for existing families of gate driver ICs

| AU | IR | 21 | 10 | D | S |

**Automotive rating**

**Technology generation**
IR = Gen2 high-voltage driver IC
IRS = Gen5 high-voltage driver IC

**Voltage class**
20 = 200 V
21 = 600 V
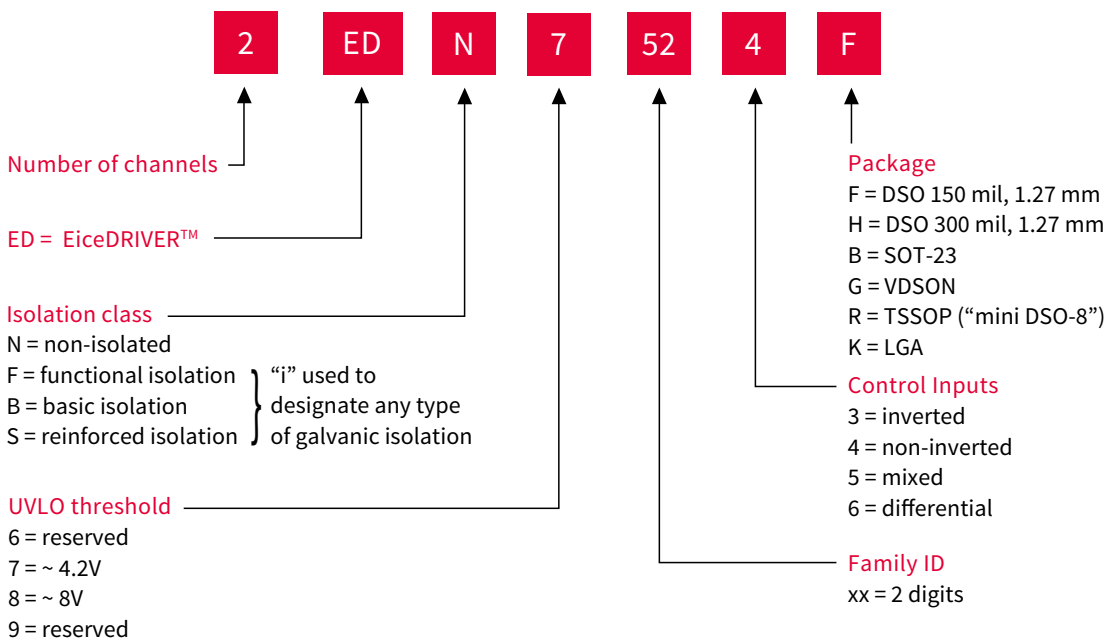22 = 1200 V
23 = 600 V
26 = 600 V feature adder
44 = low-side driver

**Driver type**
3 = 3-phase driver
7 = current-sense IC
Other: half-bridge, high-side/low-side, etc.

**Package type**
S = SOIC
J = PLCC44
M = MLPQ
Q = MFQP
L = SOT-23
B/F = die part
Blank: PDIP

**Additional features**
D = bootstrap
Blank = without bootstrap

| 1ED | I | 60 | I | 12 | A | F |

**Number of channels**
1 = 1-ch EiceDRIVER™
2 = 2-ch (half-bridge) EiceDRIVER™
6 = 6-ch (3-phase) EiceDRIVER™

**Isolation technology**
S = reinforced galvanic isolation
B = basic galvanic isolation
I = functional galvanic isolation
C = UL certified functional galvanic isolation
L = level-shifting (SOI)
N = non-isolated driver

**Minimum drive strength**
in hundreds of milliamps

**Optimal switch Type**
H = high-speed IGBT
I = IGBT
J= JFET
N = MOSFET

**Package type, e.g.**
F = DSO8-150 mil
H = DSO8-300 mil

**Key features, e.g.**
A = separate sink/source
B = Bootstrap diode
D = DESAT
M = active Miller clamp
S = Slew rate control
T = two-level turn-off

**Voltage class**
06 = 600 V
12 = 1200 V

# Infineon gate driver naming convention

## Naming convention for existing and upcoming families of gate driver ICs

| 2 | ED | 2304 | S[x] | 06 | F |

**Number of channels**
1 = 1-ch
2 = 2-ch
(half-bridge, hi/low)
6 = 6-ch (3-phase)

**ED = EiceDRIVER™**

**Product number/voltage**
Flexible

**Technology indicator**
M = Coreless transformer (inductive)
N = Non-isolated driver (low-side drivers)
J = Junction level shifting (non-SOI)
S = Infineon SOI

**[x] Optional**
C = Isolation-certified
S = Reinforced isolation
B = Basic Isolation
U/C = UL 1577-certified

**Voltage class, e.g.**
01 = <200 V
02 = 200 V
06 = 600 V/650 V
07 = 700 V
12 = 1200 V
16 = 1600 V
17 = 1700 V

**Package type, e.g.**
F = DSO8-150 mil
H = DSO8-300 mil
C = Bare die single chip
J = SO14-150 mil
M = SO16-300 mil
P = SO20-300 mil
R = TSSOP28-140 mil
T = SO28-300 mil
V = SO36-300 mil

| 2 | ED | N | 7 | 52 | 4 | F |

**Number of channels**

**ED = EiceDRIVER™**

**Isolation class**
N = non-isolated
F = functional isolation
B = basic isolation
S = reinforced isolation
} "i" used to designate any type of galvanic isolation

**UVLO threshold**
6 = reserved
7 = ~ 4.2V
8 = ~ 8V
9 = reserved

**Family ID**
xx = 2 digits

**Control Inputs**
3 = inverted
4 = non-inverted
5 = mixed
6 = differential

**Package**
F = DSO 150 mil, 1.27 mm
H = DSO 300 mil, 1.27 mm
B = SOT-23
G = VDSON
R = TSSOP ("mini DSO-8")
K = LGA

# Where to buy

Infineon distribution partners and sales offices:
www.infineon.com/WhereToBuy

# Service hotline

Infineon offers its toll-free 0800/4001 service hotline as one central number,
available 24/7 in English, Mandarin and German.

> Germany .................... 0800 951 951 951 (German/English)
> China, mainland ....... 4001 200 951 (Mandarin/English)
> India ......................... 000 800 4402 951 (English)
> USA ........................... 1-866 951 9519 (English/German)
> Other countries ......... 00* 800 951 951 951 (English/German)
> Direct access ............. +49 89 234-0 (interconnection fee, German/English)

\* Please note: Some countries may require you to dial a code other than "00" to access this international number.
   Please visit www.infineon.com/service for your country!

## Mobile product catalog

Mobile app for iOS and Android.

www.infineon.com

**Please note!**

**Additional information**
For further information on technologies, our products, the application of our products, delivery terms and conditions and/or prices, please contact your nearest Infineon Technologies office (www.infineon.com).

**Warnings**
Due to technical requirements, our products may contain dangerous substances. For information on the types in question, please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by us in a written document signed by authorized representatives of Infineon Technologies, our products may not be used in any life-endangering applications, including but not limited to medical, nuclear, military, life-critical or any other applications where a failure of the product or any consequences of the use thereof can result in personal injury.