

# **New Product Introduction**



# September 2021

EconoDUAL<sup>™</sup> 3 with TRENCHSTOP<sup>™</sup> IGBT7 1200 V

Thyristor/Thyristor modules 110 mm Power Start

OptiMOS<sup>™</sup> Power Stage 100 V - DHP1050N10N5

650 V CoolMOS<sup>™</sup> CFD7 superjunction MOSFET in TO-247

TLE8082ES - engine management IC

**OPTIREG™** automotive tracking LDOs - TLx125D0EJ

OPTIREG™ linear voltage regulator - TLS820D2EL VSE

EiceDRIVER™ gate driver ICs 1EDI302xAS/1EDI303xAS

Reference design for 22 kW general purpose drives featuring EasyPIM<sup>™</sup> 3B power module - REF-22K-GPD-INV-Easy3B

Evaluation board - EVAL-1ED3251MC12H

Evaluation board - EVAL-1ED3241MC12H

Evaluation board - EVAL-M5-IGBT7

# EconoDUAL<sup>™</sup> 3 with TRENCHSTOP<sup>™</sup> IGBT7 1200 V

The EconoDUAL<sup>™</sup> 3 modules with the latest TRENCHSTOP<sup>™</sup> IGBT7 chip generation extend the existing 1200 V IGBT4 portfolio with current ratings from 300 to 900 A. The FF750R12ME7\_B11 features an improved housing for handling higher currents, and temperatures within the same footprint. FF300R12ME7\_B11, FF450R12ME7\_B11 and FF600R12ME7\_B11 complete the portfolio towards lower current ratings.

In combination with the TRENCHSTOP<sup>™</sup> IGBT7 technology, they show a significant reduction of losses, a high level of controllability and switching softness, as well as high short-circuit capability. Together with the maximum operation temperature of 175°C at overload, high efficiency and power density are achieved, enabling system simplification and cost reduction.

#### Features

- > Full 300 900 A portfolio
- > 1200 V
- > TRENCHSTOP™ IGBT7 chip generation
- $\,>\,$  Improved housing for higher current classes (750 A & 900 A version)
- > PressFIT control pins and screw power terminals

#### Target applications

- > General purpose drives
- > Hybrid electric vehicles
- > CAV
- > Solar

#### System diagram—Industrial drives



Product overview incl. data sheet link

OPN	SP Number	Package
FF300R12ME7B11BPSA1	SP005418163	AG-ECONOD-741
FF450R12ME7B11BPSA1	SP005418168	AG-ECONOD-741
FF600R12ME7B11BPSA1	SP005418158	AG-ECONOD-711
FF750R12ME7B11BPSA1	SP005418154	AG-ECONOD-741



#### Benefits

- > Suitable for a broad inverter family
- > Lowest static and switching losses
- > Up to 30% higher inverter output current for the same frame size
- > 16% higher output current in comparison to IGBT4 (600 A version)
- > Simplification of the inverter systems

#### Competitive advantage

> Reduced system cost by highest power density and performance

Product collaterals / Online support Product page FF300R12ME7\_B11 Product page F450R12ME7\_B11 Product page F600R12ME7\_B11 Product page F750R12ME7\_B11 Simulation tool Webinar Video

# Thyristor/Thyristor modules 110 mm Power Start

Infineon's Soft Starter module family - Power Start with 1400 V and 1800 V in pressure contact technology provide cost effective and fully integrated solution for overloads up to 5000 A. With its new design, Power Start focusses on reducing complexity and number of components. It allows a broad range of current classes. This new feature enables straightforward integration of the module together with the bypass contactor into the typical design space.

Power Start provides an integrated heatsink and can be mounted easily and without having to use thermal grease. The module makes use of double-sided cooling; thus it can withstand highest overload currents.



#### Features

- > Reduced to essential components
- > Integrated heatsink & no thermal grease
- > Thermal capacity directly coupled to silicon
- > Double side cooling

#### Target applications

- > Soft Starters for
  - Water pumps
  - Mills
  - Belt conveyors

#### **Block diagram**



Product overview incl. data sheet link

OPN	SP Number	Package
STT5000N14P110XPSA1	SP005566693	BG-CBPS110-1
STT5000N18P110XPSA1	SP005558105	BG-CBPS110-1

#### Benefits

- > Best power to price ratio for cost sensitive applications
- > Less complexity
- > Easy mounting
- > Faster time-to-market

#### Competitive advantage

- > Three foot-prints covers all current classes
- > Only one external housing needed

Product collaterals / Online support

Product page STT5000N14P110

Product page STT5000N18P110

# OptiMOS™ Power Stage 100 V - DHP1050N10N5

DHP1050N10N5 is a 100 V half-bridge integrated power stage designed for advanced DC-DC converter applications such as telecom bus converters. With an ever-increasing requirement for higher power density and smaller footprint for the newest DC-DC telecom converters, DHP1050N10N5 utilizes the latest advancement in silicon to offer a solution for engineers to meet these difficult design parameters while improving performance and reliability.



#### Features

- > Symmetrical half-bridge 100 V MOSFETs integrated with level-shift driver
- > OptiMOS<sup>™</sup> 5 power MOSFET 100 V technology
- > Differential input for superb robustness with inherent shoot-through protection
- > 120 V on-chip bootstrap diode
- > Reduced footprint for PCB design
- > Lead-free RoHS compliant package

#### **Target applications**

- > Telecom
- > Server
- > Solar
- > Motor drives for robotics and multicopters

#### **Benefits**

- > Optimized PCB layout for area saving
- > Overshooting improvement
- > Best fit for 48 V input systems and converters
- > Enables usage of thermal vias directly under the MOSFET chip, which results in a lower  $R_{thJA}$

#### Competitive advantage

> Up to 50% board space reduction

#### System diagram - 48 V-12 V isolated DC-DC brick converter



#### Product overview incl. data sheet link

OPN	SP Number	Package
DHP1050N10N5AUMA1	SP001655248	PG-IQFN-36

Product collaterals / Online support

Product page

# 650 V CoolMOS™ CFD7 superjunction MOSFET in TO-247

The IPW65R018CFD7 is the latest product of the 650 V CoolMOS<sup>™</sup> CFD7 superjunction MOSFET family. It comes with an integrated fast body diode in a TO-247 package and is ideally suited for resonant topologies in industrial applications, such as server, telecom, solar, and EV-charging stations, in which it enables significant efficiency improvements compared to competition.



#### Features

- > Ultrafast body diode and very low Q<sub>rr</sub>
- > 650 V breakdown voltage
- > Significantly reduced switching losses compared to competition
- > Lowest R<sub>DS(on)</sub> dependency over temperature

#### **Target applications**

- > Fast EV charging
- > Server power supply
- > Solutions for solar energy systems
- > Telecom infrastructure

#### Benefits

- > Excellent hard-commutation ruggedness
- > Extra safety margin for designs with increased bus voltage
- > Enabling increased power density
- > Outstanding light-load efficiency in industrial SMPS applications
- > Improved full load efficiency in industrial SMPS applications
- Price competitiveness compared to alternative offerings in the market



#### System diagram: 800 W 130 kHz switched-mode power supply

Product overview incl. data sheet link

OPN	SP Number	Package
IPW65R018CFD7XKSA1	SP005413353	PG-TO247-3

Product collaterals / Online support

Product page
<u>Application note</u>
<u>Product brief</u>

## TLE8082ES - engine management IC

TLE8082ES is a companion IC to TLE8080-xEM or TLE8088EM that includes enhanced functions and features to support OBDIIcompliant EURO5/BHARATVI 2-/3-wheeler combustion engine systems with the focus on enhanced Electronic Fuel Injection (EFI) technologies.



#### Features

#### > Power supplies

- Voltage pre-regulator with external FET
- 5 V sensor supply (tracking 5 V supply input)
- 5 V communication supply (tracking 5 V supply input)

#### > Permanent supply feature

- dedicated KEY input
- After-run functionality
- > 4 low side drivers for inductive loads with over temperature and overcurrent protection and open load/short to GND in off diagnosis
  - 3 low-side power stages
  - 1 low-side power stage with current measurement feature (O2-heater)
- > Window watchdog module
- > Serial Peripheral Interface (SPI)
- > Green Product (RoHS compliant)
- > AEC-Q100 qualification

#### System diagram



#### Benefits

- Fulfillment of new emission regulations to support to BSVI/OBDII standards
- > Fulfilment of automotive standards and specific needs in 2w application e.g.: current feedback for O<sub>2</sub> heater
- > Upgraded Diagnostics for OBDII
- > Scalable approach based on existing EFI-ECU solutions to reduce software effort
- > Dual chip-set solution instead of discrete one
- > Smallest package enables most optimized PCB space for 2-wheeler EFI
- > Addressing thermal limitations
- > For customers already using TLE8080-xEM:
  - High modularity for PCB design for flexible using of chip set in different platforms and at different OEMs
    Reduced routing effort on PCB
  - Reduced routing enore on FCB
- > Offering design-in enablers to support customer journey
- > Available evaluation kits with software

#### **Target applications**

All automotive applications, in particular:

- > Motorcycles, 2- and 3-wheelers and scooters
- > Watercraft, marines and jet-skis
- > Snow mobiles

#### Competitive advantage

- > Scalable approach based on existing EFI-ECU solutions to reduce software effort
- > Smallest package enables most optimized PCB space for 2wheeler EFI
- > Addressing thermal limitations
- > Local support for every regions

Product overview incl. data sheet link

OPN	SP Number	Package
TLE8082ESXUMA1	SP002683638	PG-TSDSO-24

Product collaterals / Online support

Product page

# OPTIREG<sup>™</sup> automotive tracking LDOs - TLx125D0EJ

The OPTIREG<sup>™</sup> linear TLS125D0EJ and TLT125D0EJ are automotive low-dropout voltage tracking regulators (LDO) with high tracking accuracy, reverse current protection and power good in DSO-8 (exposed pad) package.

Both are designed to supply off-board systems, for example sensors in powertrain management systems under the severe conditions of automotive applications. Therefore, TLS125D0EJ and LT125D0EJ, are equipped with protection functions against reverse polarity and against short circuit to GND and battery.

Up to a supply voltage of 40 V and output currents up to 250 mA, the output voltage follows the reference voltage that is applied to the ADJ input with very high accuracy. The required minimum reference voltage at ADJ is 2.0 V.

#### Features

- > 250 mA max. Output Current
- > Very High Tracking Accuracy
- > Reverse Current Protection
- > Soft Start
- > Power Good

#### **Target applications**

- > Body and convenience
- > Powertrain
- > Chassis and transmission

#### Block diagram TLT125D0EJ



# псе

**Benefits** 

- > Protection against reverse current
- > Fast voltage regulation loop
- > Very good thermal performance
- > Stable transient response
- > Supervisory functionality (Power Good)

#### Competitive advantage

> A single device for both 5 V and 3.3 V supply

# Product collaterals / Online support

Product page TLT125D0EJ Simulation tool TLT125D0EJ Product page TLS125D0EJ Simulation tool TLS125D0EJ

#### Product overview incl. data sheet link

OPN	SP Number	Package
TLT125D0EJXUMA1	SP002285218	PG-DSO-8
TLS125D0EJXUMA1	SP001788246	PG-DSO-8



## OPTIREG<sup>™</sup> linear voltage regulator - TLS820D2EL VSE

The OPTIREG<sup>™</sup> linear TLS820D2ELVSE is a linear voltage regulator with high performance, very low dropout voltage and very low quiescent current. With an input voltage range of 3 V to 40 V and very low quiescent current of only 20 µA, this regulator is perfectly suitable for automotive or other supply systems permanently connected to the battery.

The TLS820D2ELVSE can be applied for potential automotive applications, such as body and comfort applications, always-on battery-connected applications and powertrain and electric-power-steering system (EPS).

#### Features

- > Selectable output voltage 5 V or 3.3 V
- > Wide input voltage range from 3.0 V to 40 V
- > Ultra low current consumption, typical 20 µA
- > Very low dropout voltage, typical 100 mV, at output currents below 100 mA
- > Adjustable reset threshold down to 2 V
- > Adjustable reset delay

#### **Target applications**

- > Body and convenience
- > Powertrain
- > Chassis and transmission

#### Benefits

- > A single device for 5 V and 3.3 V supply
- > Very wide input voltage range
- > Fast voltage regulation loop
- > Low passive component BOM cost
- > Supervisory functionality (RESET)
- > Suitable for cranking condition
- > Low current consumption

#### Competitive advantage

> A single device for both 5 V and 3.3 V supply

#### System diagram



#### Product overview incl. data sheet link

OPN	SP Number	Package
TLS820D2ELVSEXUMA2	SP004565802	PG-SSOP-14

Product collaterals / Online support

Product page
Simulation tool
Simulation models



# EiceDRIVER™ gate driver ICs - 1EDI302xAS/1EDI303xAS

The EiceDRIVER<sup>™</sup> gate driver ICs 1EDI302xAS/1EDI303xAS are automotive qualified high voltage gate drivers using the Infineon Coreless Transformer Technology to provide signal transfer across the galvanic isolation.

Pin-compatible product variants are optimized for IGBT and SiC power technologies.

The highly compact package design and high level of feature integration save valuable PCB space, while pre-configured settings reduce design efforts and speed up Time2Market.

Comprehensive safety features and ISO26262 compliance (ASIL B component) facilitate the ASIL D implementation on system level.

#### Features

- Single channel isolated IGBT/SiC driver using coreless transformer technology
- > For IGBTs/SiC MOSFETs up to 1200 V
- > CMTI up to 150 V/ns at 1000 V
- > 8 kV basic insulation according to DIN EN 60747-5-2 (VDE 0884-11)
- > Basic insulation recognized under UL 1577
- > 11.5 A peak current rail-to-rail output
- > Propagation delay 60 ns typical
- Strong integrated active Miller clamp supports unipolar switching
- > ASC pin for PMSM motor drive application
- ISO 26262 Safety Element out of Context for safety requirements up to ASIL B

#### **Block diagram**



#### Product overview incl. datasheet link

OPN	SP Number	Package
1EDI3020ASXUMA1	SP003493674	PG-DSO-20
1EDI3021ASXUMA1	SP003493678	PG-DSO-20
1EDI3023ASXUMA1	SP002355558	PG-DSO-20
1EDI3030ASXUMA1	SP003493682	PG-DSO-20
1EDI3031ASXUMA1	SP003493686	PG-DSO-20
1EDI3033ASXUMA1	SP005423624	PG-DSO-20

## Benefits

- > Enabling application software reuse for fast T2M
- > Easy product use (no programming required)
- > High re-use factor for different power technologies (IGBT, SiC)
- > Facilitates system integration for ASIL C/D compliant systems
- > Reduced BoM
- > Reduced PCB space

#### **Target applications**

- > Main inverter
- > DCDC converter
- > OBC
- > Industrial drives
- > CAV

#### Product collaterals / Online support

Product family page

- Application note
- Product brief



# Reference design for 22 kW general purpose drives featuring EasyPIM<sup>™</sup> 3B power module - REF-22K-GPD-INV-Easy3B

The REF-22K-GPD-INV-Easy3B is a reference kit developed for applications like pumps, fans, compressors, conveyor belts. The design has the look and feel of a typical drive and includes EMI filter, precharge and capacitor bank, isolated power supplies, power module, controls and heat sink with fan.

It can be operated directly on a three-phase grid, enabling a fast evaluation of TRENCHSTOP<sup>™</sup> IGBT7, gate driver, current sensor and control in one system. In addition customers can see how these technologies work together.

The REF-22K-GPD-INV-EASY3B is offered with and without housing, which encloses all electronic components and the cooling system. Beside the power connection, the housing has a touchscreen to display current operation conditions, as well as EtherCAT and USB interfaces for external connections to sensors.

#### Features

- > High current and high power density enabled by EasyPIM<sup>™</sup> power module with TRENCHSTOP<sup>™</sup> IGBT7
- > TLI4971-A120T5: XENSIV™ current sensor for measuring high currents with minimal power loss
- > Optimal switching control and high common-mode transient immunity, thanks to 1ED3131MC12H EiceDriver<sup>™</sup> singlechannel gate driver"
- > IMBF170R1K0M1: CoolSiC<sup>™</sup> MOSFET 1700 V enables direct drive by most fly-back controllers
- > XMC4800-F144F2048: Microcontroller for motor drive

#### Competitive advantage

> The design offers a "plug-and-produce" solution for customers to evaluate the Infineon chip-set offering under real operating conditions

# Renefits

- > Pre-tested solution
- > Suitable for customization
- > Superior power density
- Increased energy efficiency, thanks to the IGBT7 (lower conduction losses)
- > Competitive cost-position

#### **Target applications**

- > General purpose drives
- > Industrial motor drives and controls
- > Motor control and drives

### Block diagram



Product overview incl. user manual link

OPN	SP Number	Package
REF22KGPDINVEASY3BTOBO1	SP005419417	board
REF22KGPDINVEASY3BTOBO2	SP005569734	board

Product collaterals / Online support

- Product page
- <u>User manual</u>

Altium Designer



# Evaluation board - EVAL-1ED3251MC12H

EVAL-1ED3251MC12H is in half-bridge configuration with two-level slewrate control (2L-SRC) enabled gate driver ICs (1ED3251MC12H) and active Miller clamp. This board enables the evaluation of the slew-rate control switching scheme. The switch type can be freely chosen. TRENCHSTOP™ IGBT IKQ75N120CT2 is recommended. An additional gate driver IC is used for ultra-fast isolated over-current feedback signal from the high voltage side to the logic control which enables it for use with SiC MOSFETs. This board is best suited for double-pulse testing.

1ED3251MC12H belongs to the EiceDRIVER<sup>™</sup> 1ED32xx family (2L-SRC Compact family). 1ED3251MC12H offers two separate outputs with 18 A typical peak output current to control two independent gate resistances for turn-on thus enabling two-level slew-rate control. It implements active Miller clamp to avoid parasitic turn-on. The driver can operate over a wide supply voltage range, either unipolar or bipolar.

#### Features

- > EiceDRIVER™ 2L-SRC Compact single channel isolated gate driver 1ED32xx family
- > Two-level slew-rate control feature (2L-SRC)
- > For use with 650 V/1200 V/1700 V/2300 V IGBTs, Si and SiC MOSFETs
- > 2300 V functional offset voltage capable for selected applications
- > Galvanically isolated coreless transformer gate driver
- > 18 A typical sourcing and 9 A sinking peak output current
- > 40 V absolute maximum output supply voltage
- > Max. 110 ns propagation delay with typ. 35 ns input filter
- > High common-mode transient immunity CMTI >200 kV/µs
- > Active Miller clamp

Block diagram

- > Short-circuit clamping and active shutdown
- DSO-8 300-mil wide-body package with large creepage distance (>8 mm)

#### Benefits

- > Integrated filters reduce the need of external filters
- > Tight IC-to-IC turn on propagation delay matching (15 ns max.), tolerance improves application robustness without variations due to aging, current, and temperature
- > 1 ns propagation delay matching between outputs
- > UL 1577 (planned) VISO = 6.8 kV (rms) for 1 s, 5.7 kV (rms) for 1 min
- > IEC 60747-17/VDE 0884-11 with VIORM = 1767 V (peak, reinforced)
- > Tight propagation delay matching between outputs enables superior slew-rate control functionality over discrete solutions
- > The precise threshold and timings, combined with UL and VDE-11 certification enable superior application safety
- High isolation capability, can be used in 1700 V drives inverter applications

#### **Target applications**

- > AC and brushless DC motor drives
- > High voltage DC/DC converter and DC/AC converter
- > UPS systems
- > Welding

# Signal interface

Product overview incl. user manual link

OPN	SP Number	Package
EVAL1ED3251MC12HTOBO1	SP005572875	board

Product collaterals / Online support

Product page

User manual

# Evaluation board - EVAL-1ED3241MC12H

EVAL-1ED3241MC12H is in half-bridge configuration with two-level slewrate control (2L-SRC) enabled gate driver ICs (1ED3241MC12H). This board enables the evaluation of the slew-rate control switching scheme. The switch type can be freely chosen. TRENCHSTOP™ IGBT IKQ75N120CT2 is recommended. An additional gate driver IC is used for ultra-fast isolated over-current feedback signal from the high voltage side to the logic control which enables it for use with SiC MOSFETs. This board is best suited for double-pulse testing.

1ED3241MC12H belongs to the EiceDRIVER<sup>™</sup> 1ED32xx family (2L-SRC Compact family). 1ED3241 MC12H offers two separate outputs with 18 A typical total peak output current to control two independent gate resistances for both turn-on and turn-off thus enabling two-level slew-rate control. The driver can operate over a wide supply voltage range, either unipolar or bipolar.

#### Features

- > EiceDRIVER™ 2L-SRC Compact single channel isolated gate driver 1ED32xx family
- > Two-level slew-rate control feature (2L-SRC)
- > For use with 650 V/1200 V/1700 V/2300 V IGBTs, Si and SiC MOSFETs
- > 2300 V functional offset voltage capable for selected applications
- > Galvanically isolated coreless transformer gate driver
- > 18 A typical sinking and sourcing peak output current
- > 40 V absolute maximum output supply voltage
- > Max. 110 ns propagation delay with typ. 35 ns input filter
- > High common-mode transient immunity CMTI >200 kV/µs
- > Short-circuit clamping and active shutdown
- > DSO-8 300-mil wide-body package with large creepage distance (>8 mm)

#### Benefits

- > Integrated filters reduce the need of external filters
- > Tight IC-to-IC turn on propagation delay matching (15 ns max.), tolerance improves application robustness without variations due to aging, current, and temperature
- > 1ns propagation delay matching between outputs
- > UL 1577 (planned) VISO = 6.8 kV (rms) for 1 s, 5.7 kV (rms) for 1 min
- > IEC 60747-17/VDE 0884-11 with VIORM = 1767 V (peak, reinforced)
- > Tight propagation delay matching between outputs enables superior slew-rate control functionality over discrete solutions
- > The precise threshold and timings, combined with UL and VDE-11 certification enable superior application safety
- > High isolation capability, can be used in 1700 V drives inverter applications and 1500 V DC solar applications

#### **Target applications**

- > AC and brushless DC motor drives
- > High voltage DC/DC converter and DC/AC converter
- > UPS systems
- > Welding



OPN	SP Number	Package
EVAL1ED3241MC12HTOBO1	SP005572873	board

Product collaterals / Online support

Product page

<u>User manual</u>

#### Block diagram



# **Evaluation board - EVAL-M5-IGBT7**

This complete evaluation board includes a 3-phase drive with TRENCHSTOP™ discrete IGBTs for industrial applications. In combination with control boards equipped with the M5 32-pin interface connector such as the XMC DriveCard 4400, it features and demonstrates our TRENCHSTOP™ discrete IGBTs in this application.

The evaluation board was developed to support customers during their first steps designing applications with the TRENCHSTOP™ IGBTs in discrete packages and EiceDRIVER™ isolated gate driver.



#### Features

- > TRENCHSTOP™ discrete IGBTs in TO247 3pin and 4pin package
- > Low inductive design
- > Isolated sensing with ∆∑-ADC
- > Overload and short-circuit hardware protection
- > Overtemperature hardware protection
- > Rugged gate driver technology with stability against transient and negative voltage
- > Measurement test points compatible with standard oscilloscope probes

#### Target applications

System diagram

- > Energy Storage Systems
- > Industrial motor drives and controls
- > Solutions for solar energy systems
- > Uninterruptible Power Supply (UPS)

#### Benefits

- > MADK is optimized to GPD / Servo drives with very high fsw
- > TRENCHSTOP™ discrete IGBTs in TO247 3pin and 4pin package
- Equipped with all assembly groups for sensorless field-oriented control (FOC)
- > Overtemperature and overcurrent protection as well as short circuit protection

#### Competitive advantage

- > Optimization for GPD and servo drives with very high fsw
- > Designed for sensorless field-oriented control (FOC) of the motor
- > Overtemperature, overcurrent as well as short circuit protection



Product collaterals / Online support

Product page
User manual
Board schematics
Board layout
Bill of material

#### Product overview incl. user manual link

OPN	SP Number	Package
EVALM5IGBT7TOBO1	SP005548239	board