EiceDRIVER™ 1EDI305xAS
isolated gate driver ICs for EV applications
optimized for IGBT & SiC power technologies up to 1200 V

Infineon Technologies

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EiceDRIVER™ 1EDI305xAS: Maximizing the performance/cost ratio and supporting IGBT & SiC through high feature integration & SPI

Main features

- Split TON & TOFF output with strong internal booster stage for up to 20A
- Strong integrated active miller clamp & pin for external miller clamping
- Accurate dual 12-Bit DS-ADC with (total accuracy ≤±2%)

ISO-26262 ASIL-B (D) compliant incl. the following safety features:

- Safety inputs on primary (SI1 & SI2) & secondary side (ASCS)
- Configurable supply monitoring (UVLO for VCC1 & OVLO/UVLO for VCC2 & VEE2) & internal supervision for both chips
- VGS gate & output stage monitoring
- DESAT & differential OCP pin for fastest overcurrent detection & reaction
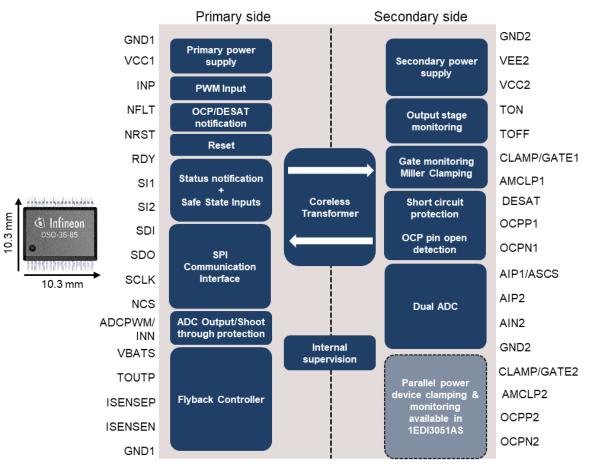
Key benefits

- **Integrated SPI for advanced configurability** to optimize the device behaviour **for SiC & IGBT traction inverters**
- 1EDI3051AS with **second monitoring & clamping** stage for parallel driving and monitoring
- Flyback controller w/ **high accuracy (≤±2%)** minimizing conduction losses

Target applications

- EV traction inverter
- eFuse (solid state HV auxiliaries disconnection)
- eDisconnect (solid state battery main disconnection)

Block diagram

Status: in production

Application example:
Infineon ASIL D traction inverter chipset

Main component	Infineon product offering
– Power supply	– OPTIREG™ PMIC TLF35585
– Microcontroller	– AURIX™ TC3xx microcontrollers
– Gate driver	– EiceDRIVER™ 1EDI302xAS, 1EDI303xAS and 1EDI305xAS high-voltage gate driver ICs for xEV
– Power stage	– HybridPACK™ Drive/DSC Automotive IGBT & CoolSiC™ MOSFET modules

For more info and product recommendations visit our webpage:
Traction inverter

EiceDRIVER™ 1EDI305xAS
Product table

Product name	Voltage class	Output current sink/source	Isolation	Channel	Configuration	Swtich Type	Parallel devices	IS0 26262	Package
1EDI3050AS	1200 V	+/-20 A	6.8 kV reinforced	1	high-side	IGBT & SiC MOSFET	Single clamping and monitoring	ASIL B	DSO-36
1EDI3051AS	1200 V	+/-20 A	6.8 kV reinforced	1	high-side	IGBT & SiC MOSFET	Dual clamping and monitoring	ASIL B	DSO-36

Evaluation boards
1EDI3050AS Eval Board
1EDI3051AS Eval Board

www.infineon.com/eicedriver-xEV

EiceDRIVER™ 1EDI305xAS:
Key features and benefits

Key features	Key benefits	Value
Integrated SPI interface	– High configurability to optimize for SiC or IGBT power stages and to ease platform development	Scalability
6.8 kV reinforced insulation (DIN VDE)	– Highest system efficiency thanks to accurate flyback controller reducing SiC conduction losses	System efficiency
ISO 26262 ASIL B (D) compliant	– ASIL-compliant internal safety mechanisms to facilitate ASIL D traction inverter developments	Dependability, robustness
Safety features e.g. DESAT & OCP protection, gate, output stage & supply monitoring	– Proven high quality and product robustness	
Robust and field-proven Infineon Coreless Transformer (CT) technology	– Saving external components such as isolated ADC, flyback regulator, etc.	System cost reductions, space savings
Integrated flyback controller (closed loop regulation for 2% accuracy)	– Compact DSO-36 fine pitch package	
Integrated booster (up to 20 A peak) and 12-Bit DS-ADC	– Sophisticated support material for fast and easy design-in	Fast time to market
Evaluation boards, simulation, techn. documentation, design examples, global support		
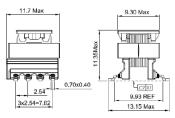
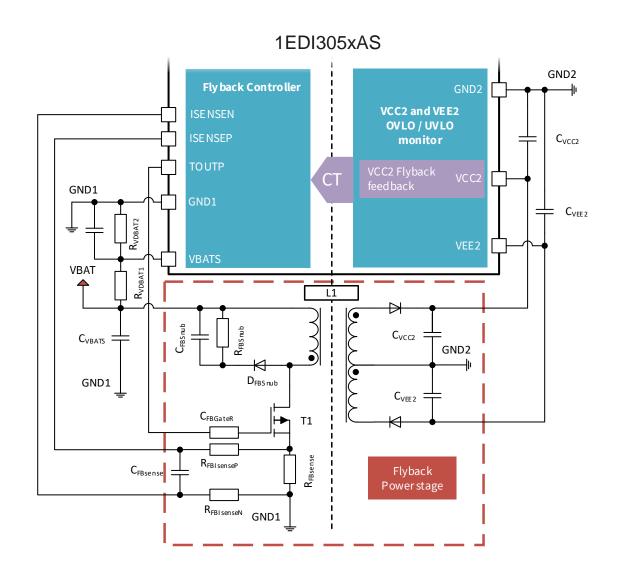# EiceDRIVER™ 1EDI305xAS: Accurate closed loop flyback controller overview

- The flyback controller is implemented on the primary chip of the gate driver

- The secondary chip includes a voltage monitor to supervise VCC2 and VEE2

- Information about the outptut voltage VCC2 is transmitted back to the primary chip

- The flyback controller regulates the flow of power via the means of a state-machine „Hysteretic Constant Peak Current Mode Control"

- The flyback is optimized to operate in **DCM** (discontinous conduction mode)

- Fitting external parts:

TDK SMD Transformer
P302631-A1-51

Logic Level MOSFET
IAUZ30N06S5L140

1EDI305xAS

EiceDRIVER™ 1EDI305xAS: Accurate closed loop flyback controller Simulation example
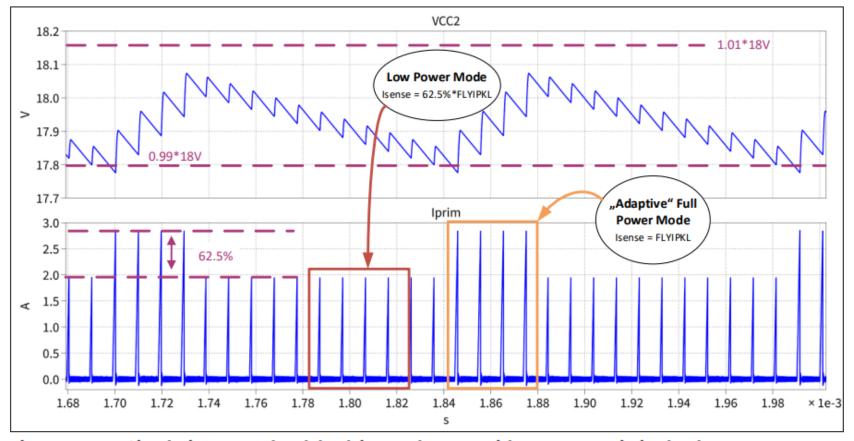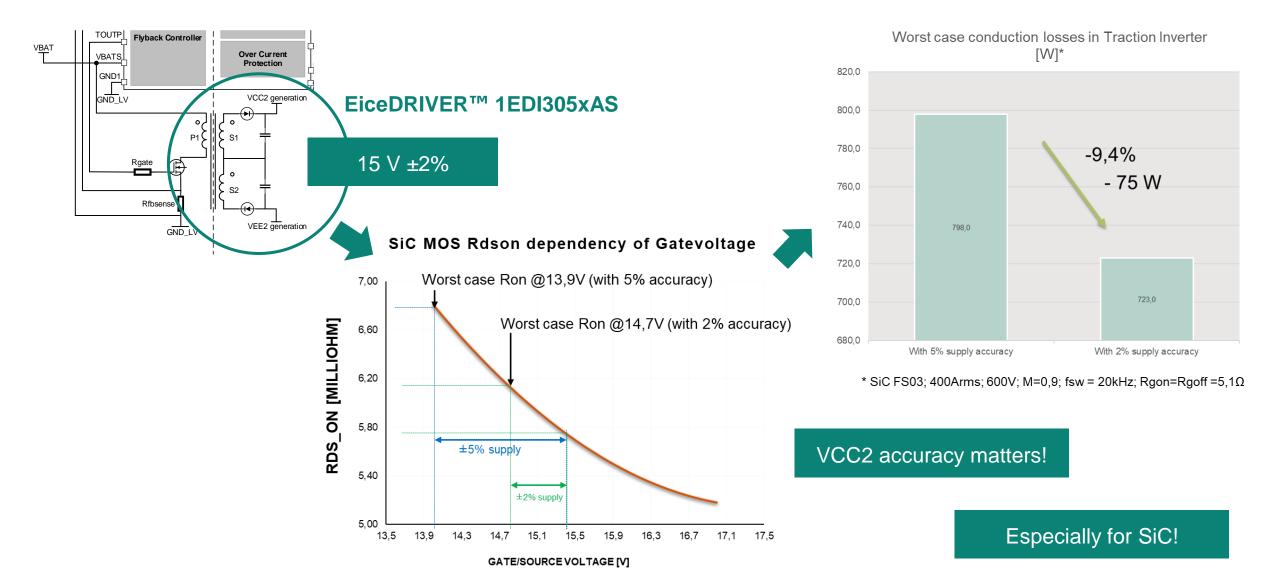

Figure 14   Simulation example: Flyback in steady-state with constant resistive load

Closed loop controls achieving **±1% typical accuracy** (hysteresis limit), leading to **best-in-class ±2% min/max accuracy**

EiceDRIVER™ 1EDI305xAS: Accurate closed loop flyback controller Increasing system efficiency by reducing SiC conduction losses

EiceDRIVER™ 1EDI305xAS

15 V ±2%

SiC MOS Rdson dependency of Gatevoltage

Worst case Ron @13,9V (with 5% accuracy)

Worst case Ron @14,7V (with 2% accuracy)

±5% supply

±2% supply

Worst case conduction losses in Traction Inverter [W]*

-9,4%
- 75 W

798,0

723,0

With 5% supply accuracy   With 2% supply accuracy

* SiC FS03; 400Arms; 600V; M=0,9; fsw = 20kHz; Rgon=Rgoff =5,1Ω

VCC2 accuracy matters!

Especially for SiC!

EiceDRIVER™ 1EDI305xAS: Support material

Technical documents	Status
Datasheet	available
Application note (flyback)	available
Application note (general)	Q1/2024
Safety documentation*	available

Boards	Status
1EDI3050 EVAL BOARD	available
1EDI3051 EVAL BOARD	available
1EDI305xAS Evaluation Board Schematics	available
1EDI305xAS Evaluation Board GUI Software	available

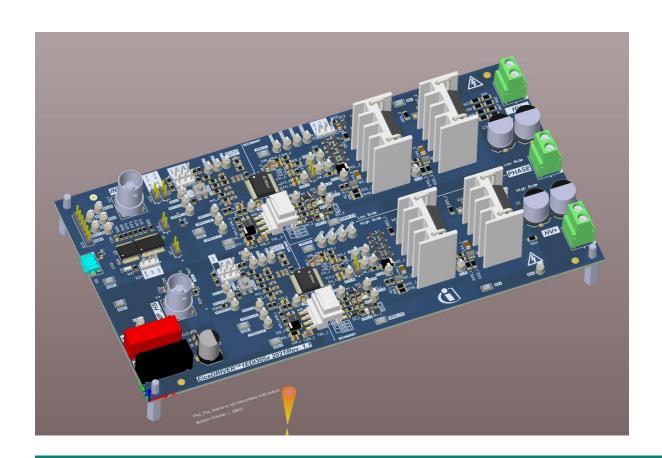| Design and simulation tools	Status
SIMetrix, PSPICE model + Flyback	available
Infineon Designer online template	coming soon

Check out the webpage for further information and design support:
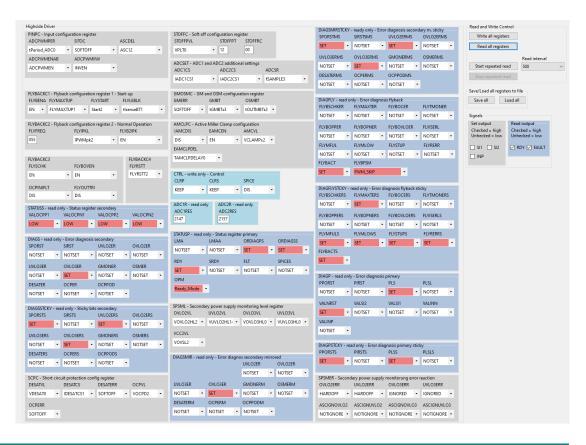www.infineon.com/eicedriver-xEV

* NDA restrictions

EiceDRIVER™ 1EDI305xAS:
Demoboards available with easy-to-use GUI

Connects to PC via USB

More info about
EiceDRIVER™ 1EDI305xAS products
& design support:

www.infineon.com/eicedriver-xev

www.infineon.com/1edi3050as