

EiceDRIVER™ 1EDI304xAS isolated gate driver ICs for EV

Automotive Smart Power | Motor Control Solutions

April 2026

Public

EiceDRIVER™ 1EDI304xAS – the most advanced gate driver combining highest performance with lowest system cost

Product highlights and benefits

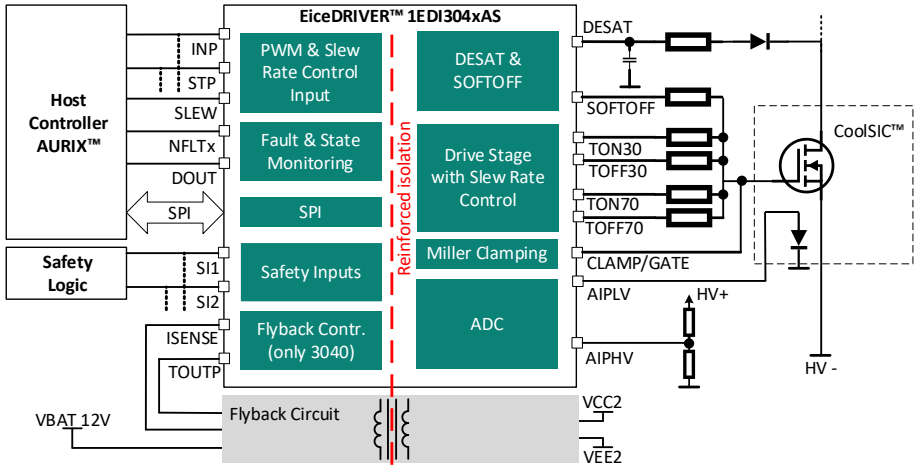
Slew rate control feature
- For 35% WLTP inverter loss saving
- Boost mode reducing dead time; helps reducing SiC body-diode losses and THD

Integrated flyback controller using internal closed loop feedback for ≤2% VCC2 error
- Runtime adjustability saving conduction losses at peak currents (e.g. for ASC & hill hold)
- Saving Inverter BOM cost: no pre-reg, no post-reg & no flyback controller needed.

Advanced monitoring incl. ASIL D compliance
- Compensated VDS meas. for sensorless RDSON & Tj estimation
- Smart DESAT protection for fastest short circuit detection & turn-off (<1us)
- Power Stage End-to-End state monitoring via DOUT pin



Typical connection diagram/application diagram



Key specifications

	1EDI3040AS	1EDI3041AS
Variant	Device with flyback controller	Device without flyback controller
Isolation & CMTI	Reinforced 8kV; CMTI >150V/ns; Package: CTI >600	
Interface & power stage techn.	Fast Pins & SPI. SPI to configure for IGBT or SiC	
Drive stage	3 level slew rate control (14A + 6A) & boost modes	
Active miller clamp	Yes, internal & also external	
SC detection	DESAT & OCP; separate SOFTOFF pin for fast turn-off	
ISO-26262 compliant	ASIL-D; Safe state inputs at primary & secondary side	
ADC	Yes, fast 11-Bit ADC; 6 channels; triggerable	
Package	PG LFDSO-36 (Body: 10.3 mm x 7.5 mm; fine pitch 0.5 mm)	

Typical applications

- xEV Traction Inverter (BEV, REEV, PHEV)
- HV eFuse / HV battery disconnect

Product information

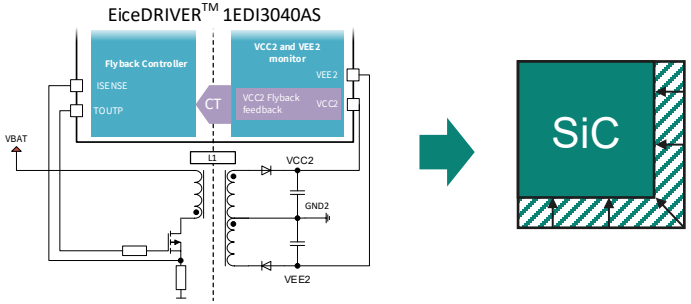
- Released and in Production
- https://www.infineon.com/part/1EDI3040AS
- https://www.infineon.com/part/1EDI3041AS

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EiceDRIVER™ 1EDI304xAS
Matching & supporting latest traction inverter trends

Right performance

Cost optimization

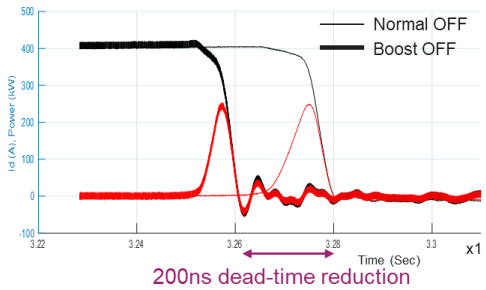


Integrated Flyback controller with runtime adjustability

- Enabling dynamic RDSON reduction (5 - 10%) for e.g. ASC or Hill Hold
- Closed loop control for <2% VCC2 error:
  - no ext. flyback, no pre-reg and no post-reg needed
- Works with planar transformers for BOM reduction!

More efficiency

Cost optimization



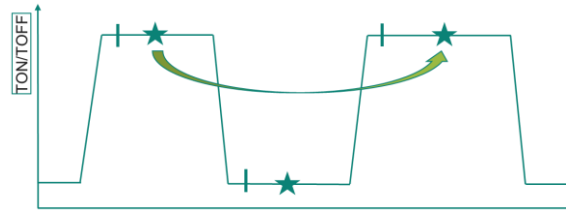
200ns dead-time reduction

Multi-Level Slew Rate Control

- 35% partial load loss reduction for more range over the cycle!
- Dynamic Boost modes to reduce deadtimes
  - helps at peak currents to reduce body diode conduction (~5 x worst then MOSFET) hence increasing SiC current capability

Volume production

Cost optimization



AIPLV	AIPHV	DESAT	Int. Temp	VCC2	VEE2

Advanced Monitoring

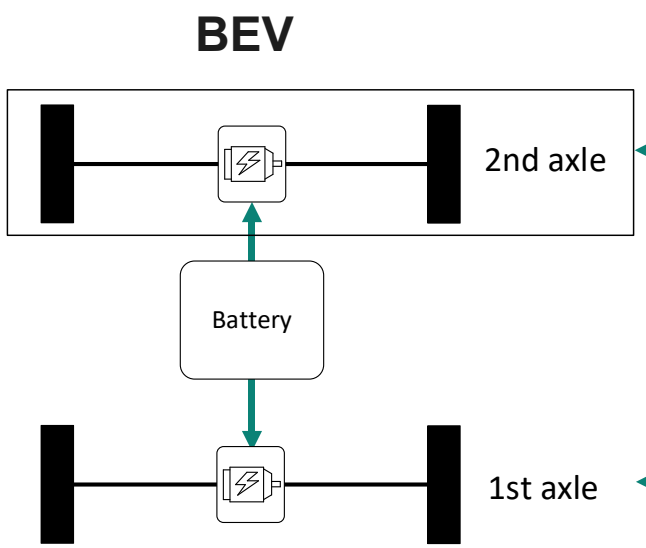
- Triggerable ADC incl. 6 measurements:
  - For Inverter temp sensing & DC Link
  - Supply monitoring via VCC2 & VEE2 meas.
  - DESAT Circuit compensation for VDS meas.
- Fast (1us) power device state feedback
- Gate rise & fall time measurement

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Traction inverter application trend & gate driver requirements
High performance inverter vs. standard inverter

The market is shifting from a generic platform to enhanced optimization also at the gate driver, resulting in a segmentation:

- High Performance Traction Inverter (1st axle, relevant for drive cycles like WLTP, CLTC)
- Standard Traction Inverter (2nd Axle, EREV, PHEV, Entry BEV <80kW)



–Standard Inverter

- Used for 2nd Axle, EREV, PHEV & entry BEV (<80kW)
- Usually QM – ASIL-C
- Today often IGBT; future also SiC*
- Cost optimization goes over advanced features

–High Performance Inverter

- 1st Axle Drive Cycle Relevant
- Usually ASIL-D
- Usually SiC, in the future also GAN (400V)?
- Requires advanced gate features to e.g. optimize efficiency/performance (EV range) & monitor health

*driven by power density requirements and falling SiC prices

Infineon's Matching Portfolio

1EDI3025AS (IGBT) & 1EDI3035AS (SiC)

- ASIL compliant with just enough monitoring, saving ext. BOM
- Full IGBT & leading edge SiC support
- **Leanest & most cost effective ASIL driver on the market!**



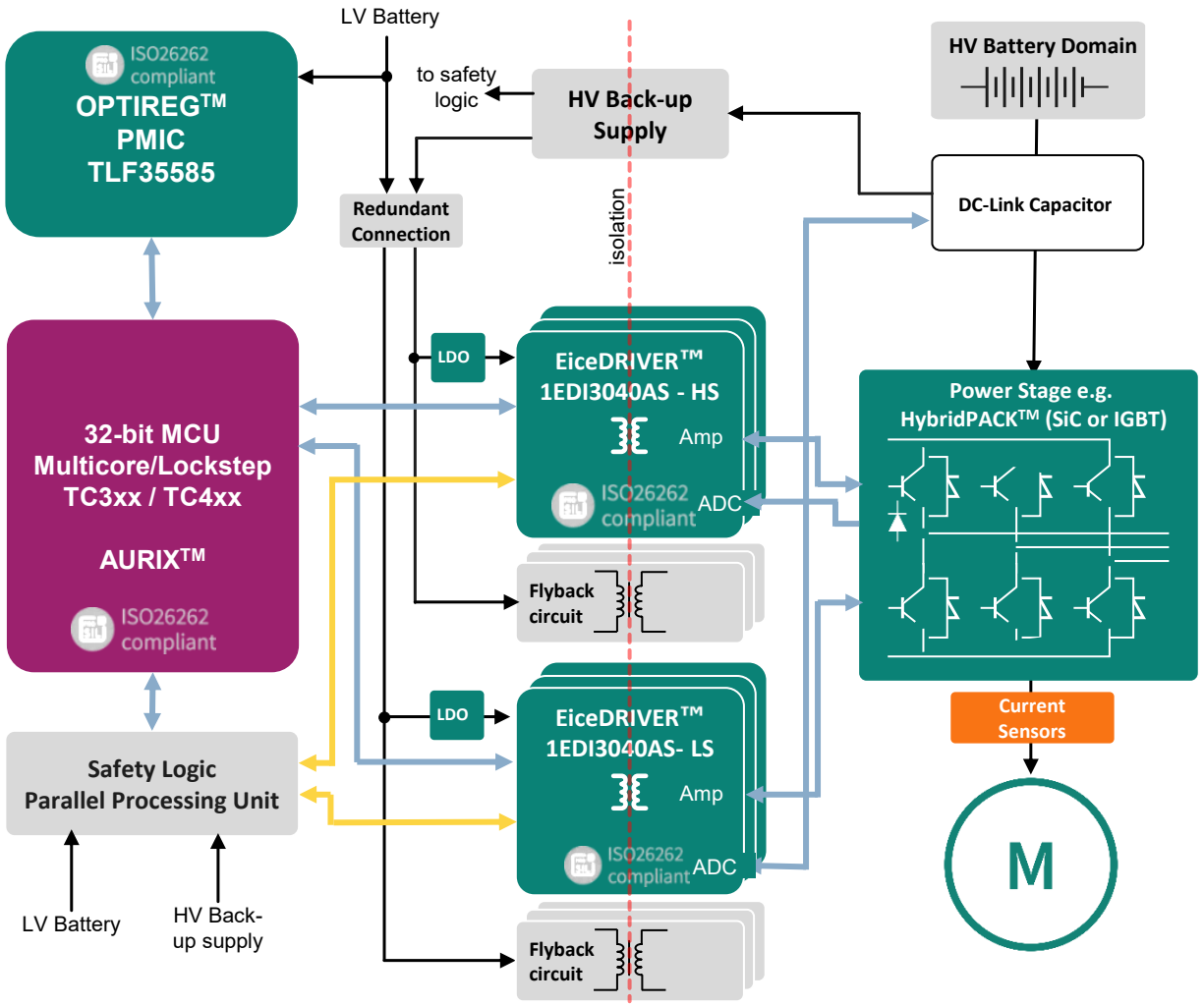
1EDI304xAS

- Advanced feature integration for BOM reduction & highest efficiencies
- **Leading the cost-to-performance ratio** & enabling best-in-class efficiencies



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Harmonized traction inverter ASIL D system solution AURIX™, OPTIREG™, EiceDRIVER™, HybridPACK™



ASIL-D compliant 1EDI3040AS enables simplified inverter safety & supply concept:

- 1EDI3040AS includes an integrated flyback controller for individual secondary side gate driver supply
- Each driver is supplied redundantly through a HV back-up supply

Inverter advantages:

- Two paths exist for entering safe state (Free wheeling or ASC)
  - Via MCU and PWM inputs
  - Via Safety logic and SIx inputs (if LV 12V or MCU is down)
- Saving Inverter BOM:
  - Flyback controller operational till 6V, no pre-reg needed
  - Flyback controller with internal feedback controls VCC2 to 2%, no post-reg needed
  - No external supply controller needed
  - No secondary safety logic and digital isolator needed
- 1EDI304xAS supports active discharge via power stage if LV 12V or MCU is down

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EiceDRIVER™ 3rd generation
Product family feature overview

[1]STP = Shoot Through Protection

	1EDI302xAS (IGBT) & 1EDI303xAS (SiC) (x=5,8) • Most compact ISO-26262 compliant driver on the market • Package: DSO-20 (Footprint: 10.3mm x 6.4mm) 	**1EDI304xAS (x=0,1),** Combining highest performance with lowest system cost Package: DSO-36 (Footprint: 10.3mm x 10.3mm) 
Isolation & CMTI	Reinforced 8kV, CMTI >150V/ns	
Interface	Fast pins & **PWM data stream**	Fast Pins & **SPI**
Power technology	**Variants either for SiC or IGBT**	**SPI to configure for SiC or IGBT**
Drive stage strength	20A (15A for 3028 & 3038)	20A (14A + 6A)
Drive stage	**Split output (TON & TOFF)**	**Adjustable slew rate control with 5 ON & 5 OFF options**
Active miller clamp	Yes, internal	Yes, internal and external
Digital isolated I/O	No	**Yes, 1ch configurable in both directions**
SC detection	DESAT (incl. BIST)	DESAT & OCP (both incl. BIST)
SC reaction	SOFTOFF pin (~1us SC Detection & Reaction)	SOFTOFF pin & **digital DESAT filter (<1us SC detection & reaction)**
ISO-26262 compliant	**Yes, ASIL B**	**Yes, ASIL D**
Additional safety features	Gate & output stage monitoring Supply monitoring (VCC1/VCC2/VEE2) Internal pri. to sec. supervision Internal supply rail monitoring	Gate & output stage monitoring Supply monitoring (VCC1/VCC2/VEE2) Internal pri. to sec. supervision Internal supply rail monitoring **DOUT power stage monitoring**
Safe state pin (ASC)	Yes, on primary & secondary side	
Integrated flyback	**No**	**Yes, with 2% VCC2 accuracy (only 3040)**
ADC	Yes, **12-Bit DS-ADC; 1 channel (except 3038)**	Yes, fast **11-Bit SAR-ADC; 6 channels**
Status	In Production (active & preferred)	In Production (active & preferred)

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Product naming nomenclature
Example 3rd generation of automotive qualified EiceDRIVER™



Channel
- 1: single

EiceDRIVER™
- ED: EiceDriver™

Isolation class
- I: Galvanic Isolation

Generation
- 3: 3rd Generation

Package type
- S: DSO300MIL

Quality category
- A: Automotive grade

Product family variant
- X = 0,1,2,3,5,8

Product family ID
- 02: IGBT (Enhanced+)
- 03: SiC (Enhanced+)
- 04: IGBT/SiC (Advanced)

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EiceDRIVER™ 1EDI304xAS
Design resources

Design support - evaluation boards

1EDI3040 EVAL BOARD – 1EDI3040EVALBOARDTOBO1

1EDI3040AS Evaluation Board for use with HybridPACK™ Drive G2 SiC and AURIX™ TC375 based microcontroller board. Comes with GUI-software running on the AURIX™ incl. automatic double pulse generation.

- Control with AURIX Shield Buddy
- Integrated PWM pulse pattern generation
- Gate driver with own flyback supply
- ADC for HV-DC link and temp. measurement
- Various test-points for easy probing

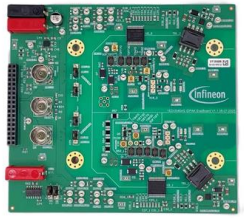


View product

1EDI3040 EVAL IDPAK – 1EDI3040EVALIDPAKTOBO1

1EDI3040AS Evaluation Board for use with IDPAK SiC and AURIX™ TC375 based microcontroller board. Comes with GUI-software running on the AURIX™ incl. automatic double pulse generation.

- Control with AURIX Shield Buddy
- Integrated PWM pulse pattern generation
- Gate driver with own flyback supply
- ADC for HV-DC link and temp. measurement
- Various test-points for easy probing



View product

1EDI3040 EVAL HPACK_HD – 1EDI3040EVALHPACKHDTOBO1

1EDI3040AS Evaluation Board for use with HybridPACK™ Heavy Duty (HD) and AURIX™ TC375 based microcontroller board. Comes with GUI-software running on the AURIX™ incl. automatic double pulse generation.

- Control with AURIX Shield Buddy
- Integrated PWM pulse pattern generation
- Gate driver with own flyback supply
- ADC for HV-DC link and temp. measurement
- Various test-points for easy probing



View product

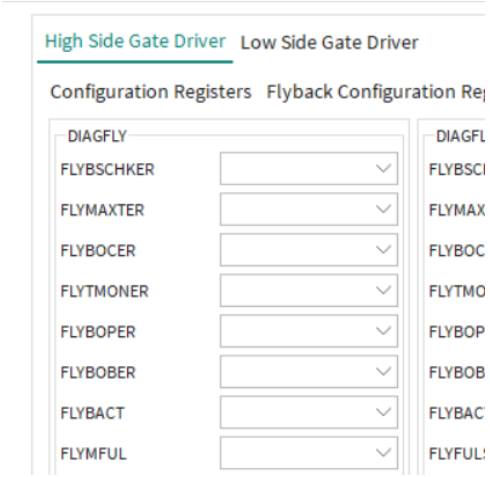
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1EDI304xAS software offering to ease design in process PART 1
Device Driver & Eval Board GUI

Device Driver Software (DD)

- Example SW tested on 1EDI3040AS Eval Kit with TC375
- Covering: SPI comm (incl. daisy chain), initialization, etc.
- **Available** as C-Code via Infineon Development Center (IDC) on request

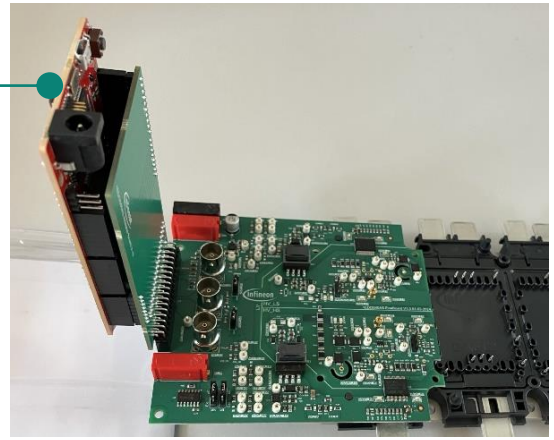
Link to DD page at Infineon Development center



GUI for 1EDI3040AS Eval Boards

- One common GUI for all 1EDI3040AS Eval Boards available via Infineon Development Center (IDC) on request
- Works with TC375 AURIX ShieldBuddy Board
- Includes automatic double pulse generation to speed up evaluations
- GUI can access and configure all registers of 1EDI3040AS
- GUI configuration wizard available at Infineon Developer Center (IDC)

AURIX™ board (red)



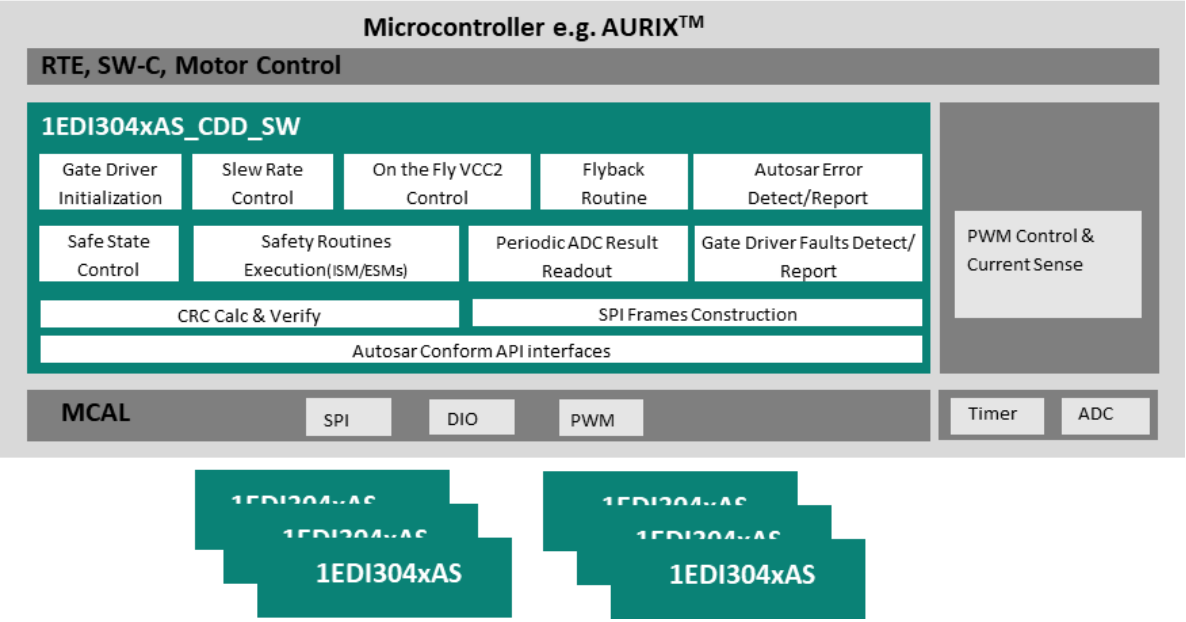
1EDI3040AS Eval Board

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1EDI304xAS software offering to ease design in process PART 2 Complex Device Driver (CDD)

Overview Complex Device Driver (CDD)

- Microcontroller independent C-code for 3 phase inverters (6x 1EDI304xAS)
  - AUTOSAR & MCAL compliant & ASIL-D ready
- Covering: SPI comm, Initialization, Safety Mechanisms, Safe State Control, Error detection & reporting, etc.



Availability Complex Device Driver (CDD)

Reference Design CDD

- For rapid prototyping & SW implementation guidance
- Not allowed to be used as productive SW. Customer develops & qualifies productive SW by themselves
- **Available** as C-Code free of charge via Infineon Development Center (IDC) on request

Link to CDD page of 1EDI3040AS at Infineon Development center

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EiceDRIVER™ 1EDI3040AS & 1EDI3041AS
Design support overview

Technical documents	Status
Datasheet Excerpt	Online
Datasheet	On request[1)]
User Manual	On request[1)]
Safety Manual	On request[1)]
AppNote Slew Rate	On request[1)]
AppNote Sensorless Tj Estimation via ADC	On request[1)]
AppNote Short Circuit Detection & turn-off	On request[1)]
AppNote General	On request[1)]

Software	Status
1EDI304x Device Driver: API for device configuration and core runtime functionality via SPI, for evaluation	On request[2)]
1EDI304x Application SW: Device Driver implementation example on AURIX™ TC3x and 1EDI304x EVAL BOARD	On request[2)]
1EDI304x Complex Device Driver: AUTOSAR compliant, supports application use cases incl. safety mechanisms, for evaluation	On request[2)]

Half-bridge evaluation boards	Status
1EDI3040 EVAL BOARD - fitting HP DRIVE G2 SIC or TO247 adapter board	Online
1EDI3040 EVAL IDPAK - fitting ID-PAK baseboard	Online
1EDI3040 EVAL HPACK_HD - fitting HP Heavy Duty	Online
Altium files of eval board to kick-start customer designs	On request[1)]

Design and simulation tools	Status
EiceDRIVER™ AMC Configuration Wizard – GUI for testing with AURIX™ TC3xx ShieldBuddy	On request[2)]
Simetrix, PSPICE model + Flyback model	On request[1)]

www.infineon.com/1EDI3040AS
www.infineon.com/1EDI3041AS

1) Available via myInfineon Collaboration Platform (myICP); please contact you regional Infineon sales partner in order to get access to restricted information
2) Available via Infineon Developer Center (IDC)

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