

Eval-1ED3321MC12N

Evaluation board description and getting started guide

About this document

Scope and purpose

This user guide is intended to introduce and provide an overview of the gate driver evaluation board Eval-1ED3321MC12N with the [1ED3321MC12N](#) gate driver ICs, including the functionality, adjustment possibilities and key features of the Infineon EiceDRIVER™ 1ED3321MC12N gate driver IC family.

The [Eval-1ED3321MC12N](#) board is designed to evaluate the functionalities and capabilities of 1ED3321MC12N gate driver ICs.

This user guide presents only selected key features of the gate driver, and the datasheet should be consulted to ensure the full functionality and flexibility of the 1ED3321MC12N gate driver and Eval-1ED3321MC12N.

Intended audience

This document is intended for all technical specialists who want to evaluate the functionality, performance and features of 1ED3321MC12N gate driver ICs. The evaluation board is intended to be used under laboratory conditions only by trained specialists.

It is a prerequisite to read the [datasheet](#) of the 1ED3321MC12N to become familiar with the parameters of the gate driver.

It is highly recommended to have an [EiceDRIVER™ Eval-PSIR2085](#) power supply board to provide an isolated power supply to the Eval-1ED3321MC12N evaluation board from a single power supply rail.

Evaluation board

This board is to be used during the design-in process for evaluating and measuring characteristic curves, and for checking datasheet specifications.

Note: PCB and auxiliary circuits are NOT optimized for final customer design.

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Safety precautions

Safety precautions

Note: Please note the following warnings regarding the hazards associated with development systems.

Table 1 Safety precautions







| | |
|---|--|
|  | <p>Warning: The DC link potential of this board is up to 900 VDC. When measuring voltage waveforms by oscilloscope, high voltage differential probes must be used. Failure to do so may result in personal injury or death.</p> |
|  | <p>Warning: The evaluation or reference board contains DC bus capacitors which take time to discharge after removal of the main supply. Before working on the drive system, wait five minutes for capacitors to discharge to safe voltage levels. Failure to do so may result in personal injury or death. Darkened display LEDs are not an indication that capacitors have discharged to safe voltage levels.</p> |
|  | <p>Warning: Remove or disconnect power from the drive before you disconnect or reconnect wires, or perform maintenance work. Wait five minutes after removing power to discharge the bus capacitors. Do not attempt to service the drive until the bus capacitors have discharged to zero. Failure to do so may result in personal injury or death.</p> |
|  | <p>Caution: Only personnel familiar with the drive, power electronics and associated machinery should plan, install, commission and subsequently service the system. Failure to comply may result in personal injury and/or equipment damage.</p> |
|  | <p>Caution: The evaluation or reference board contains parts and assemblies sensitive to electrostatic discharge (ESD). Electrostatic control precautions are required when installing, testing, servicing or repairing the assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with electrostatic control procedures, refer to the applicable ESD protection handbooks and guidelines.</p> |
|  | <p>Caution: A drive that is incorrectly applied or installed can lead to component damage or reduction in product lifetime. Wiring or application errors such as undersizing the motor, supplying an incorrect or inadequate AC supply, or excessive ambient temperatures may result in system malfunction.</p> |

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Eval-1ED3321MC12N

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The board at a glance

1 The board at a glance

The Eval-1ED3321MC12N evaluation board was designed to be used by design engineers to evaluate the 1ED3321MC12N EiceDRIVER™ isolated gate driver IC in a half-bridge configuration. The evaluation board can be used to evaluate other ICs from the EiceDRIVER™ 1ED332xMC12N family by swapping the two gate driver ICs.

The board comes with two Infineon TRENCHSTOP™ IGBT4 [IKW40N120H3](#) power transistors, as seen in Figure 1. The switches can be substituted by any other desired switches, such as Infineon IGBTs, CoolSiC™ or CoolMOS™ transistors.

Details about the EiceDRIVER™ 1ED3321MC12N can be found on our product pages at <https://www.infineon.com/gdisolated> or by using the product search.

The board has a size of 85 × 55 × 28 mm³ without any power switches assembled. As the board was designed for non-continuous evaluation, such as double-pulse testing, special consideration should be taken regarding the power track's current capabilities and to ensure proper cooling of the power switches. It is also recommended to add additional high-voltage decoupling capacitors at the high-voltage input.

The board is designed to be supplied using an EiceDRIVER™ Eval-PSIR2085 power supply board, which offers 2 galvanically isolated power rails for the switch side of the gate driver ICs and a supply rail for the primary side of the gate driver ICs. **It is highly recommended to include an EiceDRIVER™ Eval-PSIR2085 in your initial order.**

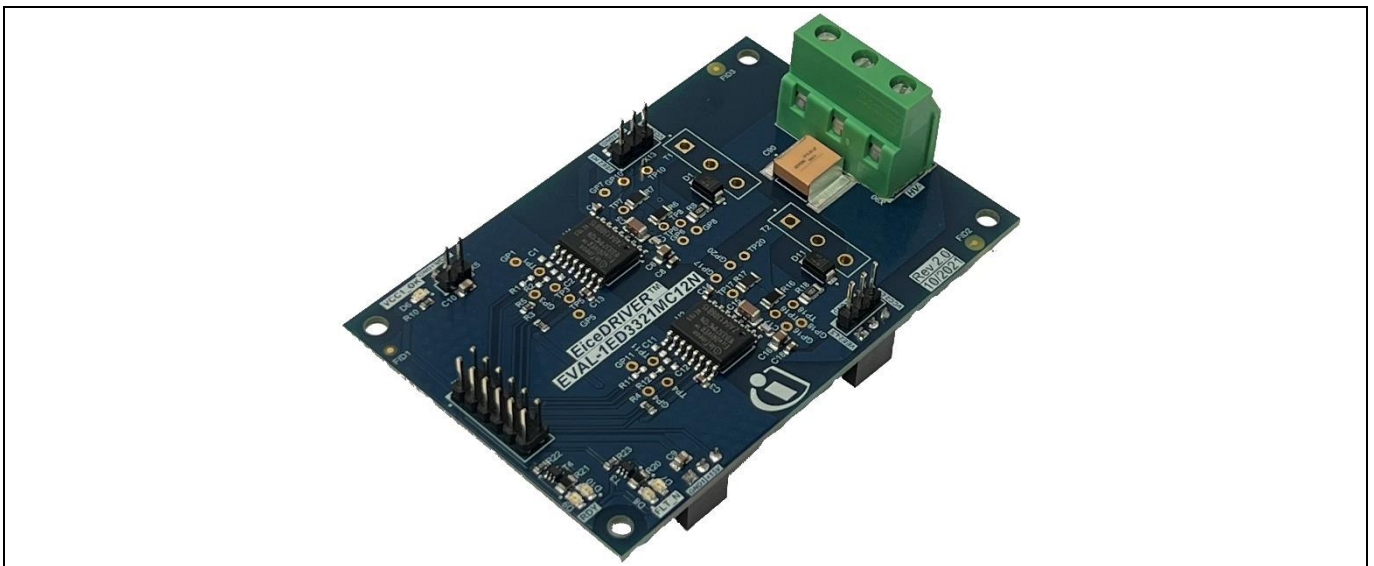


Figure 1 Eval-1ED3321MC12N evaluation board

1.1 Scope of supply

The delivery contains the evaluation board Eval-1ED3321MC12N only.

1.2 Block diagram

Figure 2 shows the block diagram of the Eval-1ED3321MC12N evaluation board.

The board at a glance

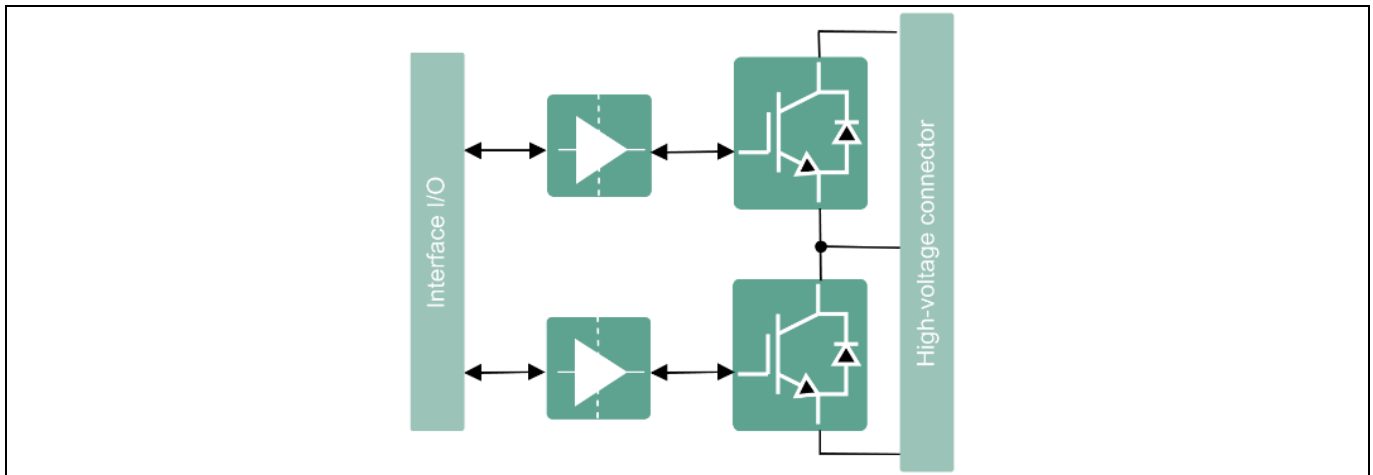


Figure 2 Eval-1ED3321MC12N evaluation board block diagram

1.3 Main features

The Eval-1ED3321MC12N is an evaluation board for the 1ED3321MC12N gate driver ICs. It was designed in a half-bridge configuration with a 900 V maximum blocking capability across the power terminals. The board is designed for easy measurement and configuration of the gate driver parameters, and the main features of the board and gate driver include:

- 40 V absolute maximum output supply voltage
- Up to +6 A / -8.5 A typical output current
- Separate source and sink output for optimized gate driving
- DESAT short-circuit protection
- Soft-off turn-off option
- Active Miller clamp function
- Active shutdown
- High common-mode transient immunity CMTI > 300 kV/μs
- 85 ns typical propagation delay
- Tight IC-to-IC propagation delay matching
- 3.3 V and 5 V input supply voltage
- DSO-16 wide body package with 8 mm creepage
- Gate driver safety certification:
 - UL 1577 recognized with $V_{ISO, test} = 6840$ V (rms) for 1 s, $V_{ISO} = 5700$ V (rms) for 60 s
 - IEC 60747-17/VDE 0884-11 approval (pending) with $V_{IORM} = 1.767$ kV (peak, reinforced)
- Infineon TRENCHSTOP™ IGBT4 IKW40N120H3 power transistors

1.4 Board parameters and technical data

The absolute maximum ratings are summarized in Table 2.

Table 2 Absolute maximum ratings

| Parameter/Pin | Symbol | Conditions/Notes | Value | Unit |
|-------------------------------------|--------|--|-------------|------|
| Isolated power supply input voltage | +15V | Referenced to SGND. To be used only with Eval-PSIR2085 | -0.3 ... 20 | V |

The board at a glance

| Parameter/Pin | Symbol | Conditions/Notes | Value | | | Unit |
|---|-----------------|--|-------|------|------|---------|
| | | | Min. | Typ. | Max. | |
| Primary side supply voltage | VCC1 | Referenced to SGND | -0.3 | | 7 | V |
| Positive input for low side gate driver | INP_L | Referenced to SGND | -0.3 | | 7 | V |
| Positive input for high side gate driver | INP_P | Referenced to SGND | -0.3 | | 7 | V |
| Ready status output for both gate drivers | RDY | Referenced to SGND | -0.3 | | 7 | V |
| Fault output for both gate drivers | FLT_N | Referenced to SGND | -0.3 | | 7 | V |
| Reset input for both gate drivers | RST_N | Referenced to SGND | -0.3 | | 7 | V |
| Reserved | .res | Reserved for future use | | | | |
| DC-link voltage | HV+ | Referenced to GND power terminal. Limited by component ratings and design clearances. For voltages above 42 V, special safety measures should be taken | -0.2 | | 900 | V |
| Secondary side positive supply voltages | VCC2H/ VCC2L | Referenced to VEE2H/VEE2L. Not to be used with Eval-PSIR2085 | -0.3 | | 40 | V |
| Secondary side negative supply voltages | VEE2H/ VEE2L | Referenced to GND2H/GND2L. Not to be used with Eval-PSIR2085 | -40 | | 0.3 | V |
| Phase peak current | I_{out} | | 30 | | | A |
| | t_{pulse} | Maximum ON pulse length for double-pulse tests. Power dissipation should be considered | 100 | | | μ s |
| | f_{sw} | Maximum switching frequency for continuous operation. Power dissipation should be considered | 100 | | | kHz |

The recommended operating conditions are summarized in Table 3.

Table 3 Recommended operating conditions and supply for 3.3 V

| Parameter/Pin | Symbol | Conditions/Notes | Value | | | Unit |
|---|--------|--|-------|------|----------|------|
| | | | Min. | Typ. | Max. | |
| Isolated power supply input voltage | +15V | Referenced to SGND. To be used only with Eval-PSIR2085 | 15 | 15.5 | 16 | V |
| Primary side supply voltage | VCC1 | Referenced to SGND | 3.2 | 3.3 | 3.5 | V |
| Positive input for low side gate driver | INP_L | Referenced to SGND | -0.1 | VCC1 | VCC1+0.1 | V |
| Positive input for high side gate driver | INP_P | Referenced to SGND | -0.1 | VCC1 | VCC1+0.1 | V |
| Ready status output for both gate drivers | RDY | Referenced to SGND | -0.1 | VCC1 | VCC1+0.1 | V |
| Fault output for both gate drivers | FLT_N | Referenced to SGND | -0.1 | VCC1 | VCC1+0.1 | V |

The board at a glance

| Parameter/Pin | Symbol | Conditions/Notes | Value | | | Unit |
|---|-----------------|--|-------|------|----------|------|
| | | | Min. | Typ. | Max | |
| Reset input for both gate drivers | RST_N | Referenced to SGND | -0.1 | VCC1 | VCC1+0.1 | V |
| Reserved | .res | Reserved for future use | - | - | - | - |
| DC-link voltage | HV+ | Referenced to GND power terminal. Limited by component ratings and design clearances. For voltages above 42 V, special safety measures should be taken | 25 | - | 800 | V |
| Secondary side positive supply voltages | VCC2H/ VCC2L | Referenced to VEE2H/VEE2L. Not to be used with Eval-PSIR2085 | 12 | 17 | 20 | V |
| Secondary side ground reference supply voltages | GND2H/ GND2L | Referenced to VEE2H/VEE2L. Not to be used with Eval-PSIR2085 | 0 | 7.5 | 15 | V |

2 System and functional description

2.1 Getting started

The Eval-1ED3321MC12N is optimized to be used with both 5 V and 3.3 V VCC1 primary side supply voltage. The threshold values for the primary-side input signals are always proportional to the VCC1 supply voltage.

It is recommended to use the board with the EiceDRIVER™ Eval-PSIR2085 isolated power supply board. For a nominal input voltage, +15V, of 15.5 V, the EiceDRIVER™ Eval-PSIR2085 isolated power supply will provide a bipolar +15 V/-7.5 V supply voltage for the secondary sides for both high-side and low-side gate drivers.

Note: In case separate power supplies will be used for the secondary side, EiceDRIVER™ Eval-PSIR2085 does not have to be connected, and the board can be supplied using connector X5 for the primary-side supply voltage, VCC1, and connectors X3 and X13 for the secondary-sides power voltages: VCC2H/VCC2L, GND2H/GND2L, VEE2H/VEE2L.

2.1.1 Prerequisites

- EiceDRIVER™ Eval-PSIR2085 isolated power supply board
- Assembled external high-voltage decoupling capacitor (100 µF) across the high-voltage power terminals: X90-1 (HV+) and X90-3 (HV-)
- Low-voltage power supply for supplying primary-side power supply circuit, capable of supplying 15 V, 100 mA (+15V, SGND)
- Suitable function generator for double-pulse pattern generation
- High-voltage power supply for supplying the power stage between X90-1 (HV+) and X90-3 (HV-)
- A suitable inductive load for double-pulse testing

2.1.2 Power-up sequence

Note: It is assumed that the board will be used with the EiceDRIVER™ Eval-PSIR2085 isolated power supply board.

1. Connect Eval-1ED3321MC12N to the EiceDRIVER™ Eval-PSIR2085 isolated power supply board.
2. Connect the double-pulse pattern generator to the Eval-1ED3321MC12N input pin. For evaluating the low-side switching capability, connect the patter generator to INP_L and SGND and short INP_H to SGND. For evaluation of the high-side switching capability, connect the pattern generator to INP_H and SGND and short INP_L to SGND.
3. Connect one end of the inductive load to terminal X90-2 (PHASE) and the other end, depending on the double-pulse test requirements, to either X90-1 (HV+) for the low side testing or X90-3 (HV-) for the high side testing.
4. Supply the isolated power supply input voltage at connector X1-12 (+15V) and X1-9 (SGND) with +15.5 V and ground.
5. The green LED D6 (VCC1_OK) will turn on to signal the primary-side supply voltage is present.
6. The green LED D10 (RDY) will turn on to signal that the gate driver internal communication is working as expected, that both primary and secondary power supplies are present and above the UVLO levels, and that the gate driver is operating as expected.
7. The green LED D7 (FLT_N) will turn on to signal that the gate driver is not registering any fault.
8. Connect the high-voltage power supply to the connector X90-1 (HV+) and X90-3 (HV-).

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The board is now ready for double-pulse evaluation.

2.2 Example: Normal operation

Figure 3 shows the Eval-1ED3321MC12N in a typical double-pulse test of the low side IGBT. The evaluation board was supplied using the EiceDRIVER™ Eval-PSIR2085 isolated power supply board. The IGBTs gates were driven with +15 V and -7.5 V. The board was supplied with 600 V between terminals X90-1 (HV+) and X90-3 (HV-). A 200 μ H load inductor was connected in parallel with the high side IGBT, between terminals X90-1 (HV+) and X90-2 (PHASE).

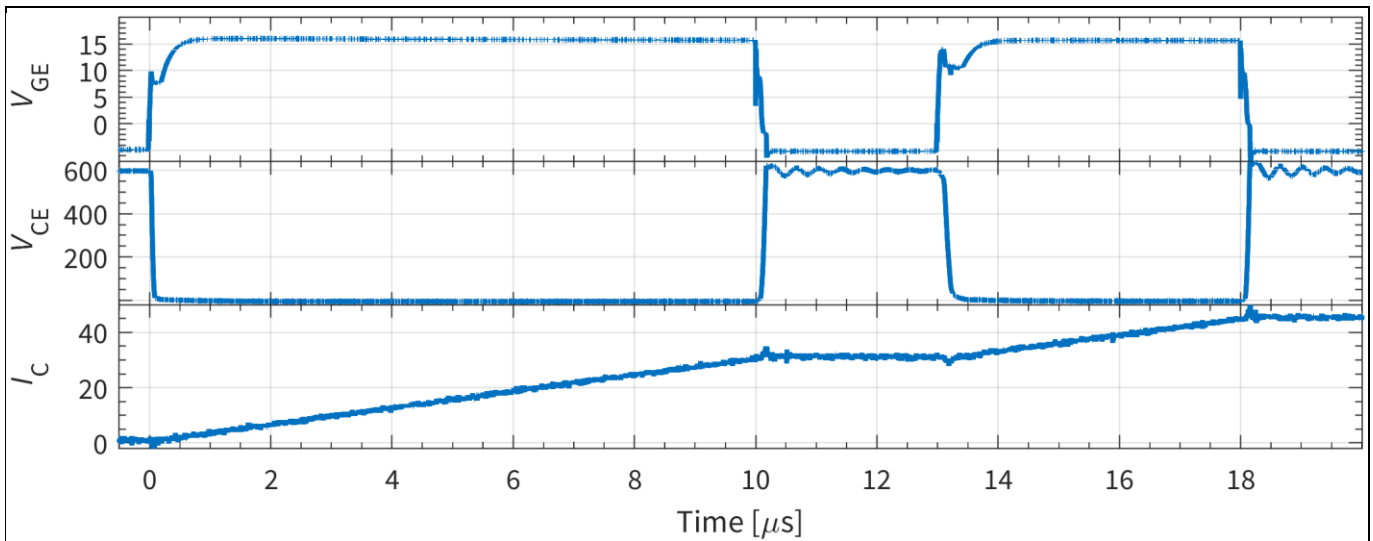


Figure 3 Eval-1ED3321MC12N – Double-pulse test of the low side IGBT with a 200 μ H load

2.3 Example: Short-circuit turn-off

Figure 4 shows the Eval-1ED3321MC12N in a type I short-circuit transient. The board was supplied with a 600 V DC-link between terminals X90-1 (HV+) and X90-3 (HV-). A short-circuit was created in parallel to the high side IGBT by placing a jumper between terminal X90-1 (HV+) and X90-2 (PHASE).

As the low side transistor was turned on, it directly went into deasaturation as can be observed in Figure 4. The current increased up to 150 A. After the DESAT leading-edge blanking time elapsed, the internal clamp released the DESAT pin, and the DESAT capacitor started charging. Once the DESAT pin voltage surpassed the desaturation reference level, $V_{DESATth}$, desaturation is detected and the internal circuitry starts to initiate a turn-off.

Because the 1ED3321MC12N isolated gate driver IC has a soft-off function, the gate current is controlled in order to limit the turn-off overshoot on the collector-emitter voltage, V_{CE} .

Afterwards the 1ED3321MC12N gate driver IC will go into fault mode, ignoring further input PWM signals. By design, the FLT pins are connected together on the Eval-1ED3321MC12N, so that in case one of the gate driver ICs detects a fault, it will pull the FLT pin of the other gate driver, effectively disabling operation of both gate drivers until the fault is reset by the microcontroller.

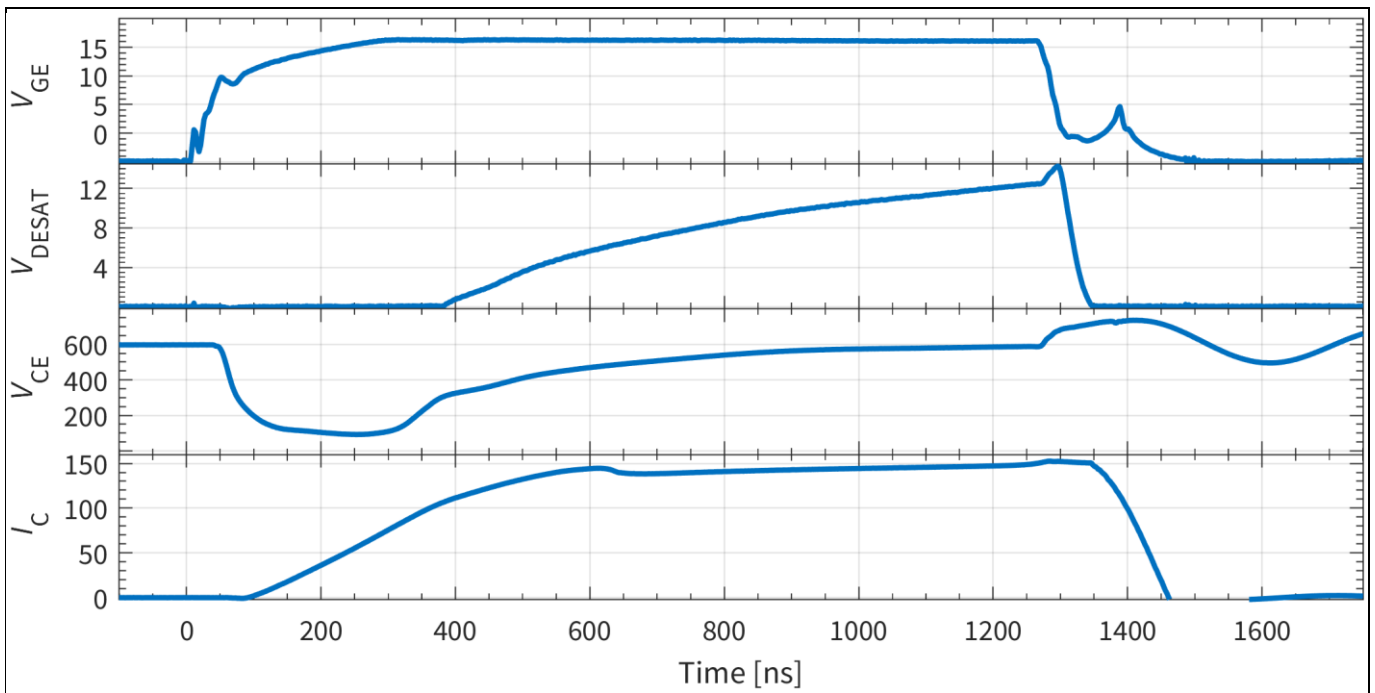


Figure 4 Eval-1ED3321MC12N – Turn-off of Type I short-circuit

2.4 Example: Short-circuit turn-off with CoolSiC™ MOSFETs and default configuration

The Eval-1ED3321MC12N was reconfigured to be used with SiC MOSFETs. The Infineon TRENCHSTOP™ IGBT4 IKW40N120H3 power transistors were desoldered and replaced with Infineon CoolSiC™ [IMW120R045M1](#) MOSFETs. The Eval-PSIR2085 isolated power supply was adjusted, so that the secondary sides of the gate driver ICs were supplied with +15 V/-2 V, in order to correctly drive the gate of the SiC MOSFETs. Similarly, as before, the board DC-link was supplied with 400 V between terminals X90-1 (HV+) and X90-3 (HV-). A short-circuit was created in parallel to the high side CoolSiC™ by placing a jumper between terminal X90-1 (HV+) and X90-2 (PHASE).

Figure 5 shows the low side transistor turning on directly into a type I short-circuit. The transistor goes into saturation with the current rising up to 250 A. Similar to before, when the leading-edge blanking time elapses, the DESAT pin voltage starts increasing, and once it surpasses the desaturation reference level, $V_{DESATth}$, desaturation is detected and the internal circuitry starts to initiate a turn-off.

When the CoolSiC™ turns-off and the current reaches zero in approximately 2.1 μ s, the protection is adequate for the CoolSiC™ IMW120R045M1 MOSFET, which is rated for 3 μ s short-circuit withstand time capability.

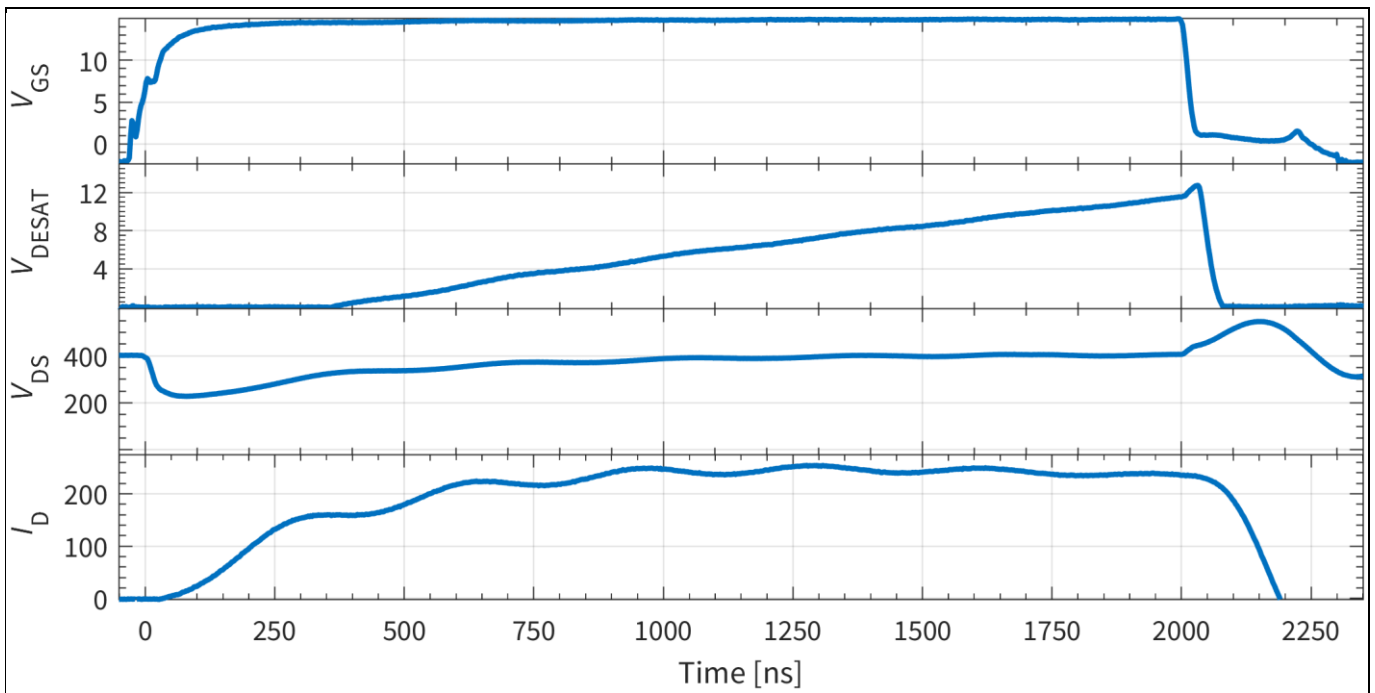


Figure 5 Eval-1ED3321MC12N – Turn-off of Type I short-circuit with CoolSiC™ and default board configuration

2.5 Example: Short-circuit turn-off with CoolSiC™ MOSFETs without desaturation capacitor

In the previous example, a 2.2 μs short-circuit protection time was achieved. If the desaturation protection time needs to be faster, the desaturation capacitor can be reduced or completely removed. Here, we must note that there will always be a parasitic capacitance component due to the layout and the parasitics of the other components connected to the DESAT pin of the gate driver.

C7 and C17 are the desaturation capacitors for the high and low side, respectively. By removing them, the DESAT short-circuit protection time is reduced to a minimum allowed by the circuit.

Figure 6 shows the low-side transistor turning on directly into a type I short-circuit. The transistor goes into saturation with the current rising up to 250 A. As previously described, the leading-edge blanking time elapses and the desat pin voltage starts increasing. As there is no desaturation capacitor to be charged, the voltage rises much faster up to the desaturation reference level, $V_{DESATth}$ and the protection mechanism is activated.

In this case, the short circuit is detected and turned off in approximately 1.2 μs.

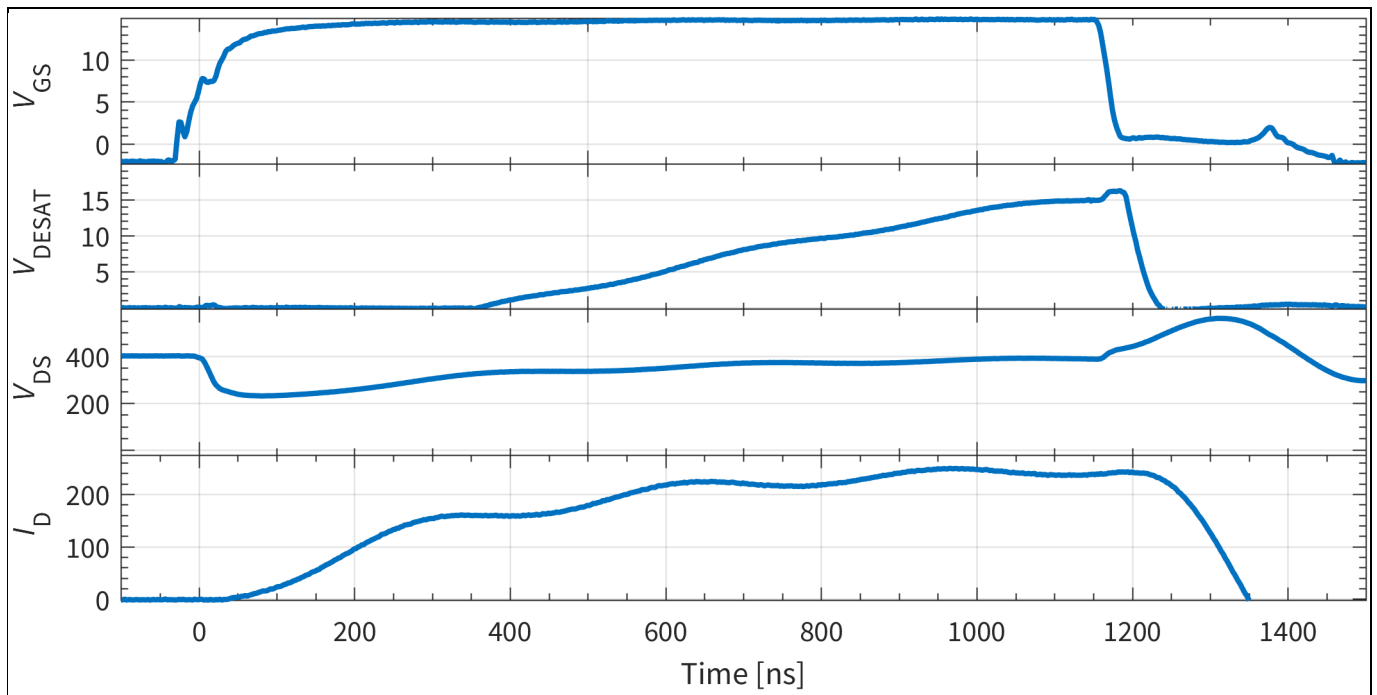


Figure 6 Eval-1ED3321MC12N – Turn-off of Type I short-circuit with CoolSiC™ without desaturation capacitor

2.6 Example: Short-circuit turn-off with CoolSiC™ MOSFETs with overdrive circuit for DESAT charge circuit

In the rare cases when even reducing the desaturation capacitance is not sufficient, the desaturation detection circuit can be overdriven by external circuitry. The Eval-1ED3321MC12N PCB was designed with such a circuit that was left unassembled.

Figure 7 shows the overdrive circuit for the DESAT circuit. The circuit shown here performs two functions:

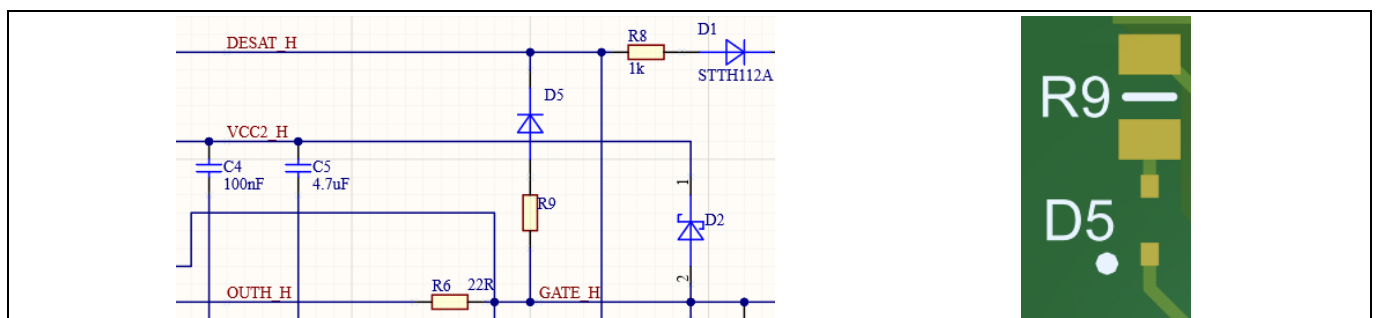


Figure 7 DESAT pin overdrive circuit

First, it increases the DESAT-pin charging current. Besides the internal 500 μA internal current source, current will also flow from the transistor gate terminal via R9 and D5 for the high side or R19 and D15 for the low side. The value of the resistor connected to the gate voltage will determine the extra charge current flowing to the DESAT-pin. D5 and D15 are there to ensure that during turn-off, no current flows from the DESAT pin into the gate path. The increased current will decrease the DESAT reaction time.

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Secondly, the steady state voltage at the DESAT pin is increased. This is because R9 forms a resistive voltage divider with R8 in steady state for the high side (similarly, R19 and R18 for the low side). This reduces even further the reaction time of the DESAT circuit.

In this example, the diodes D5 and D15 are populated with a 60 V SOD 523 diode, and the resistors R9 and R19 with a 3 k Ω resistor.

Figure 8 shows the results of the type I short-circuit on the low side transistor with the above-mentioned modifications.

As can be observed, the protection circuit reacts in this case, and the device is turned off in approximately 800 ns.

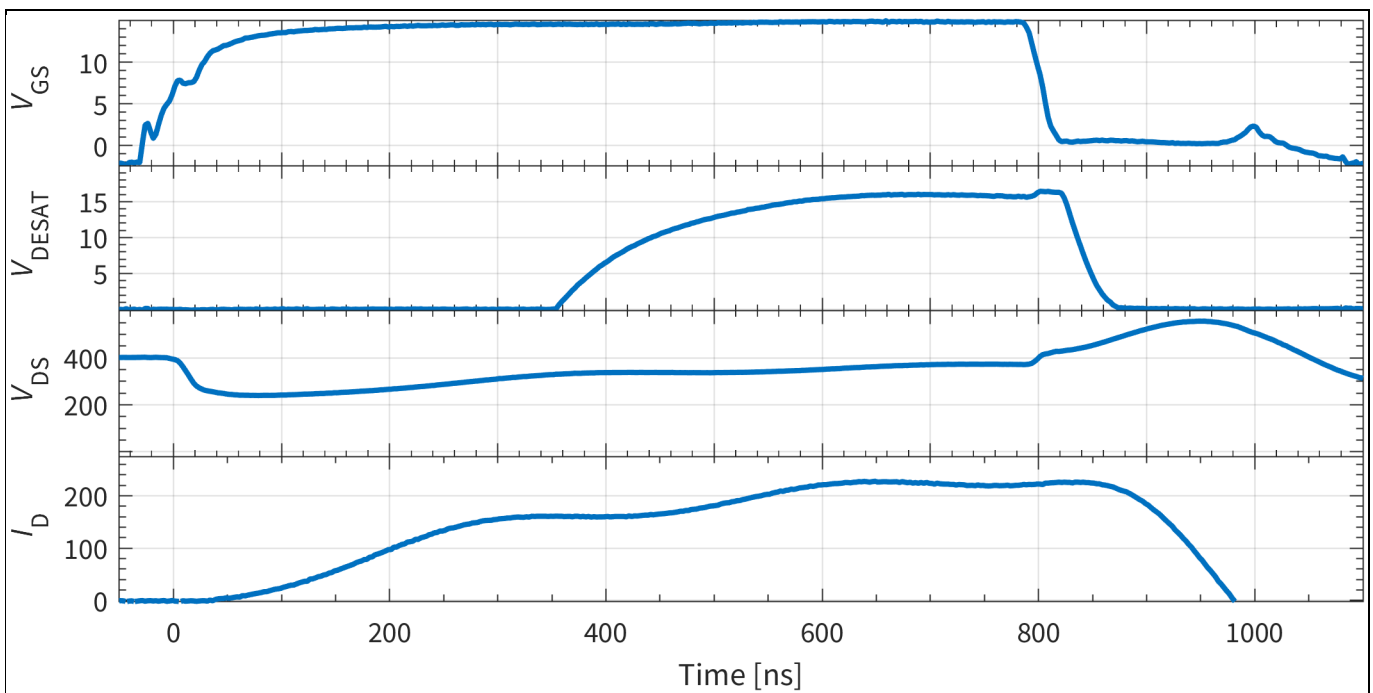


Figure 8 Eval-1ED3321MC12N – Turn-off of Type I short-circuit with CoolSiC™ without desaturation capacitor, 60 V SOD523 for D5 and D15 and 3 k Ω for R9 and R19

3 System design

The Eval-1ED3321MC12N evaluation board is designed to evaluate the EiceDRIVER™ 1ED332xMC12N family gate driver ICs. To support the customer in getting started with the design, the schematics, Gerber data and Altium project files can be found on the Infineon homepage.

3.1 Schematics

The schematic of the evaluation board is shown below.

Eval-1ED3321MC12N

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System design

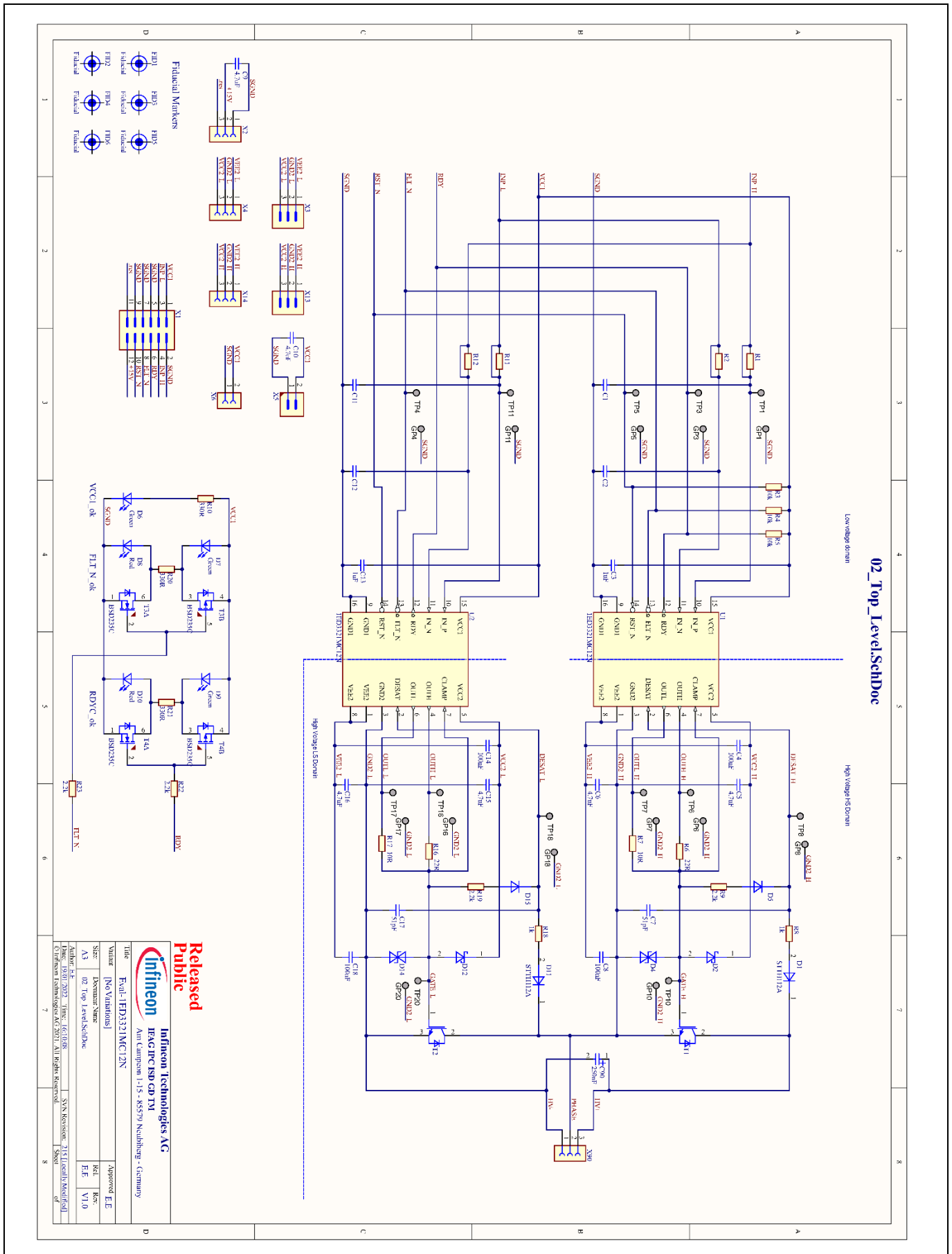


Figure 9 Eval-1ED3321MC12N - Schematic

Eval-1ED3321MC12N

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System design

3.2 Layout

The layout from this basic schematic is intended as a starting point for developing more complex application circuits. The evaluation board has a two-layer PCB. For orientation, the assembly diagram and the top and bottom layer are shown.

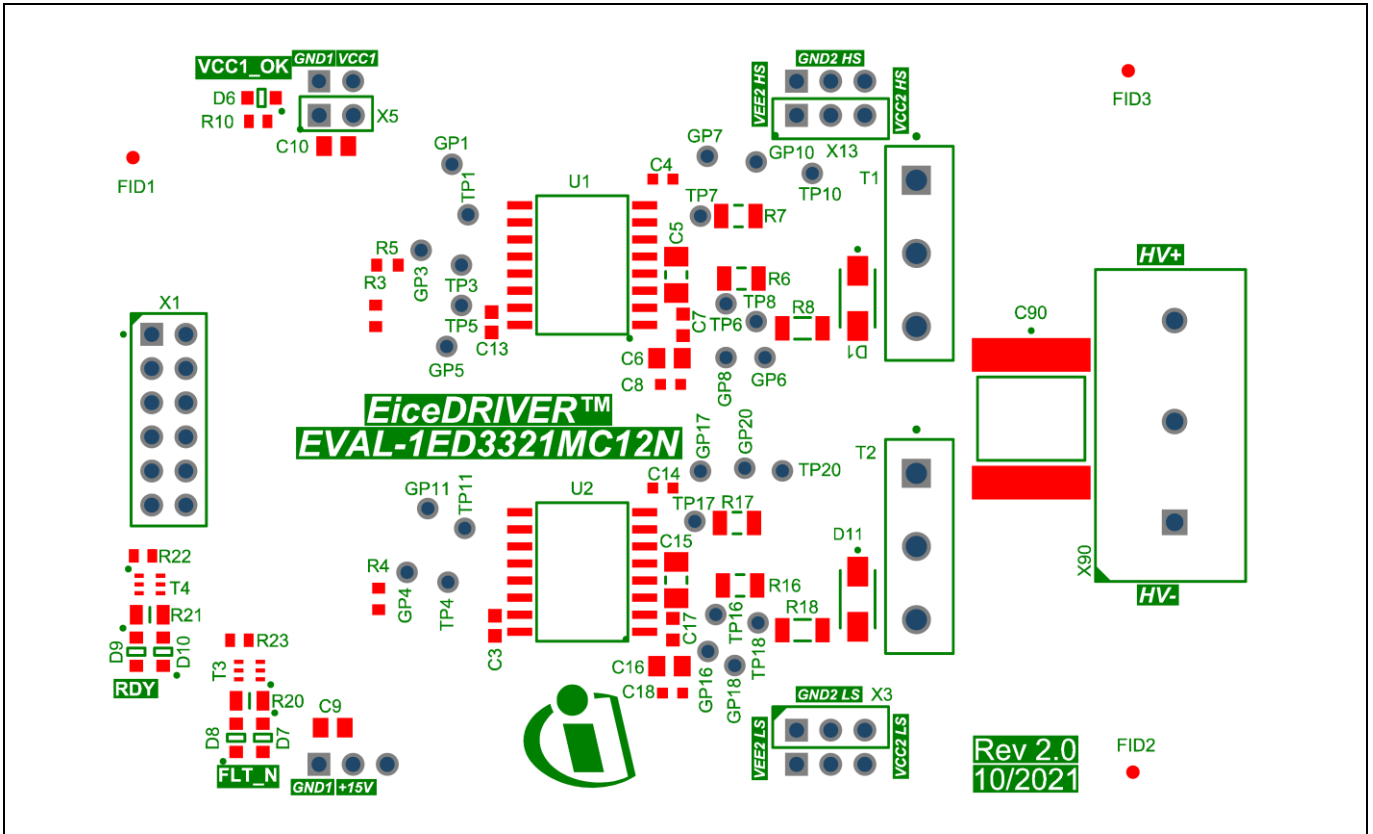


Figure 10 Eval-1ED3321MC12N – Assembly drawing top side

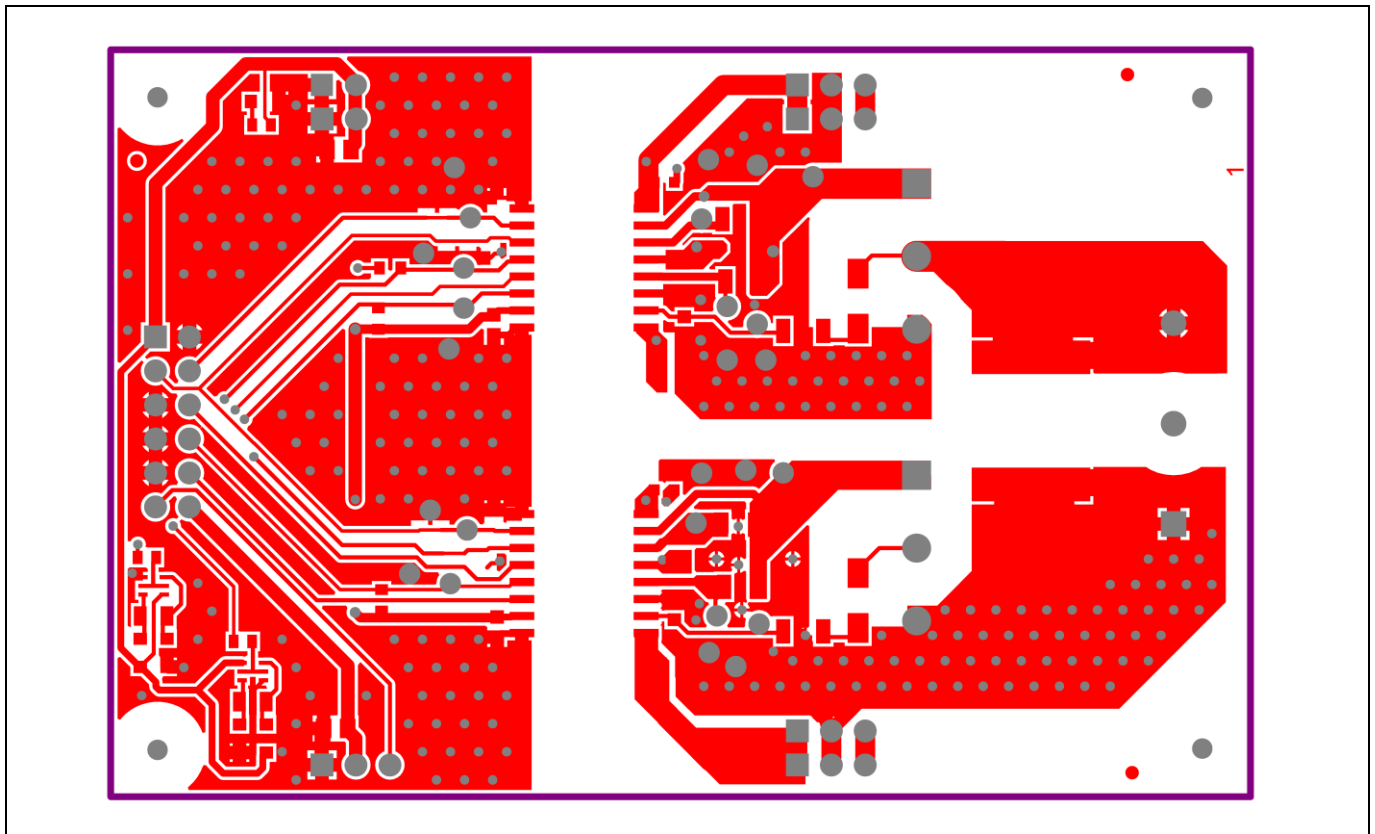


Figure 11 Eval-1ED3321MC12N – PCB top layer view

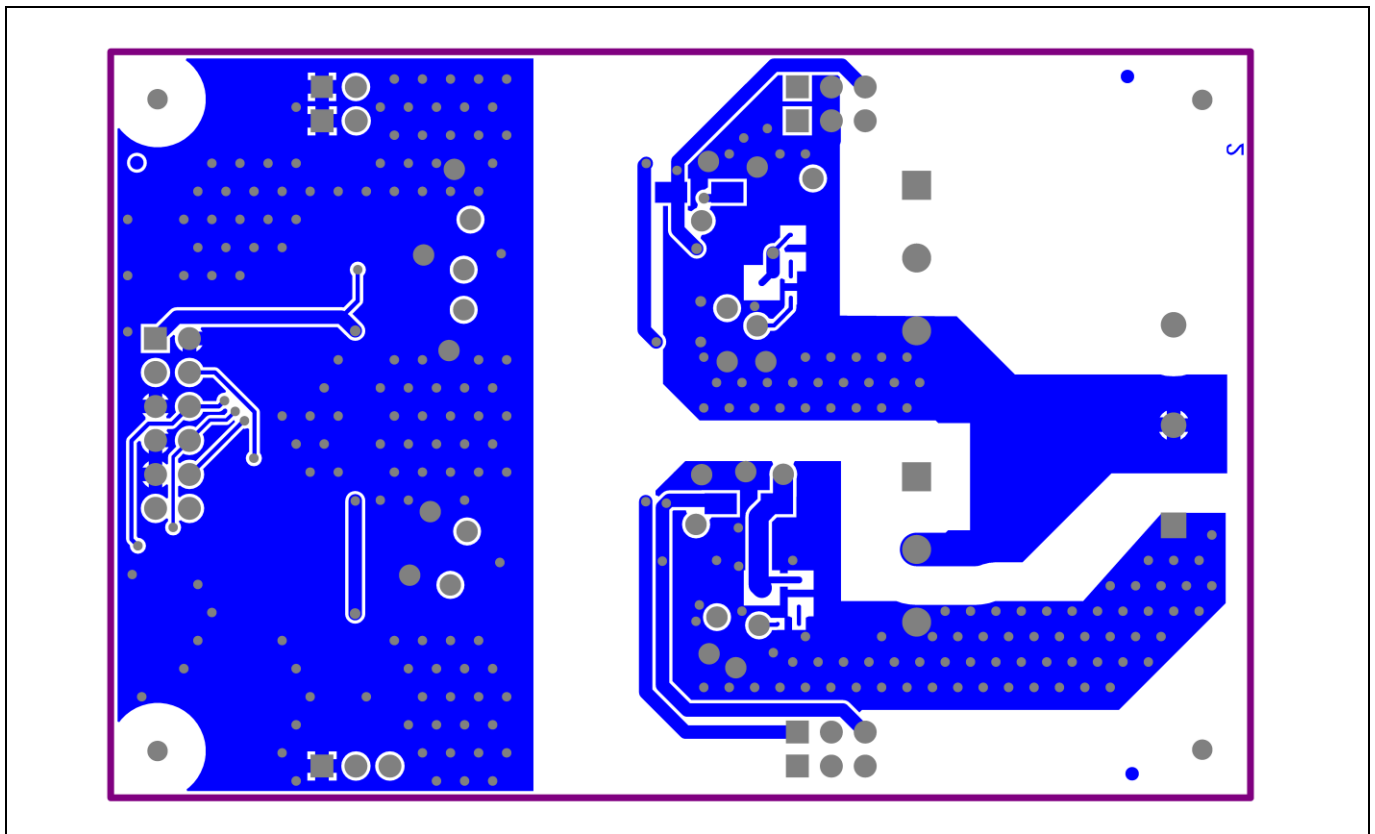


Figure 12 Eval-1ED3321MC12N – PCB bottom layer view

System design

3.3 Bill of material

The complete bill of material is available on the download section of the Infineon homepage.

Table 4 Bill of materials

| Designator | Quantity | Description | Manufacturer | Manufacturer P/N |
|------------------|----------|-----------------|-----------------------|----------------------|
| C3, C13 | 2 | 1uF | Wurth Elektronik | 885012206076 |
| C4, C8, C14, C18 | 4 | 100nF | Wurth Elektronik | 885012206095 |
| C5, C15 | 2 | 4.7uF | TDK Corporation | CGA5L3X7R1H475K160AE |
| C6, C16 | 2 | 4.7uF | TDK Corporation | CGA4J1X7R1H475K125AE |
| C7, C17 | 2 | 51pF | MuRata | GCM1885C2A510JA16 |
| C9, C10 | 2 | 4.7uF | Wurth Elektronik | 885012107018 |
| C90 | 1 | 250nF | TDK Corporation | B58031I9254M062 |
| D1, D11 | 2 | STTH112A | STMicroelectronics | STTH112A |
| D2, D12 | 2 | STPS1L30A | STMicroelectronics | STPS1L30A |
| D6, D7, D9 | 3 | Green | Wurth Elektronik | 150080VS75000 |
| D8, D10 | 2 | Red | Wurth Elektronik | 150080RS75000 |
| R3, R4, R5 | 3 | 10k | Yageo | RC0603FR-0710KL |
| R6, R16 | 2 | 22R | Vishay | RCS120622R0FKEA |
| R7, R17 | 2 | 10R | Vishay | RCS120610R0FKEA |
| R8, R18 | 2 | 1k | Vishay | CRCW12061K00FK |
| R10 | 1 | 330R | Vishay | CRCW0603330RFK |
| R20, R21 | 2 | 330R | Vishay | CRCW0805330RFK |
| R22, R23 | 2 | 2.2k | Vishay | CRCW06032K20FK |
| T1, T2 | 2 | IKW40N120H3 | Infineon Technologies | IKW40N120H3 |
| T3, T4 | 2 | BSD235C | Infineon Technologies | BSD235C |
| U1, U2 | 2 | 1ED3321MC12N | Infineon Technologies | 1ED3321MC12N |
| X1 | 1 | TSW-106-07-L-D | Samtec | TSW-106-07-L-D |
| X2, X4, X14 | 3 | SSW-103-01-G-S | Samtec | SSW-103-01-G-S |
| X3, X13 | 2 | HTSW-103-07-G-S | Samtec | HTSW-103-07-G-S |
| X5 | 1 | HTSW-102-07-G-S | Samtec | HTSW-102-07-G-S |
| X6 | 1 | SSW-102-01-G-S | Samtec | SSW-102-01-G-S |
| X90 | 1 | 1731035 | Phoenix Contact | 1731035 |
| C3, C13 | 2 | 1uF | Wurth Elektronik | 885012206076 |
| C4, C8, C14, C18 | 4 | 100nF | Wurth Elektronik | 885012206095 |
| C5, C15 | 2 | 4.7uF | TDK Corporation | CGA5L3X7R1H475K160AE |
| C6, C16 | 2 | 4.7uF | TDK Corporation | CGA4J1X7R1H475K125AE |
| C7, C17 | 2 | 51pF | MuRata | GCM1885C2A510JA16 |
| C9, C10 | 2 | 4.7uF | Wurth Elektronik | 885012107018 |
| C90 | 1 | 250nF | TDK Corporation | B58031I9254M062 |
| D1, D11 | 2 | STTH112A | STMicroelectronics | STTH112A |
| D2, D12 | 2 | STPS1L30A | STMicroelectronics | STPS1L30A |
| D6, D7, D9 | 3 | Green | Wurth Elektronik | 150080VS75000 |

3.4 Connector details

General information about the connectors of the Eval-1ED3321MC12N evaluation board is provided in this section.

Table 5 shows the connection of the high-voltage connector X90.

System design
Table 5 High-voltage connector

| PIN | Label | Function |
|---------|-------|---------------------------------|
| X90 (1) | HV+ | DC-link high-side connection |
| X90 (2) | PHASE | Half-bridge midpoint connection |
| X90 (3) | HV- | DC-link ground side connection |

Table 6 shows the connections of the low voltage, input side connectors. This includes all four connectors, X1, X2, X5 and X6.

Table 6 Input side connectors pinout

| PIN | Label | Function |
|---------|-------|---|
| X1 (1) | VCC1 | Supply voltage for the input side of the gate drivers |
| X1(2) | SGND | Ground for the input side of the board |
| X1 (3) | INP_L | Noninverting input for the low side gate driver |
| X1 (4) | INP_H | Noninverting input for the high side gate driver |
| X1 (5) | SGND | Ground for the input side of the board |
| X1 (6) | RDY | Connection to both RDY pins of the gate driver ICs |
| X1 (7) | SGND | Ground for the input side of the board |
| X1 (8) | FLT_N | Connection to both FLT_N pins of the gate driver ICs |
| X1 (9) | SGND | Ground for the input side of the board |
| X1 (10) | RST_N | Connection to both RST_N pins of the gate driver ICs |
| X1 (11) | .res | Not used |
| X1 (12) | +15V | Supply voltage for the isolated power supply |
| X2 (1) | SGND | Ground for the input side of the board |
| X2 (2) | +15V | Supply voltage for the isolated power supply |
| X2 (3) | - | Not used |
| X5 (1) | VCC1 | Supply voltage for the input side of the gate drivers |
| X5 (2) | SGND | Ground for the input side of the board |
| X6 (1) | VCC1 | Supply voltage for the input side of the gate drivers |
| X6 (2) | SGND | Ground for the input side of the board |

Table 7 shows the connection of the low side supply connectors X3 and X4. This is used to supply the low side gate drive secondary side. If the EiceDRIVER™ Eval-PSIR2085 isolated power supply board is not used, VCC2, GND2, and VEE2 voltage can be supplied here by means of an isolated power supply that allows floating operation of the gate driver as per application.

Table 7 Low side gate driver IC -isolated secondary power supply

| PIN | Label | Function |
|-------------|--------|--|
| X13/X14 (1) | VEE2_L | Low side gate driver positive supply (VEE2_L) connection |
| X13/X14 (2) | GND2_L | Low side gate driver supply ground reference (GND2_L) connection |
| X13/X14 (3) | VCC2_L | Low side gate driver negative supply (VCC2_L) connection |

Table 8 shows the connection of the high side supply connectors X13 and X14. This is used to supply the high-side gate drive secondary side. If the EiceDRIVER™ Eval-PSIR2085 isolated power supply board is not used,

System design

VCC2, GND2, and VEE2 voltage can be supplied here by means of an isolated power supply that allows floating operation of the gate driver as per application.

Table 8 High side gate driver IC -isolated secondary power supply

| PIN | Label | Function |
|-------------|--------------|---|
| X13/X14 (1) | VEE2_H | High-side gate driver positive supply (VEE2_H) connection |
| X13/X14 (2) | GND2_H | High-side gate driver supply ground reference (GND2_H) connection |
| X13/X14 (3) | VCC2_H | High-side gate driver negative supply (VCC2_H) connection |

3.5 Test points

The test points used on the board are summarized in the table below.

Table 9 Test points

| Test point name | Signal measured | Ground reference for test point |
|------------------------|------------------------|--|
| TP1 | INP_H | SGND |
| GP1 | SGND | SGND |
| TP3 | RDY | SGND |
| GP3 | SGND | SGND |
| TP4 | FLT_N | SGND |
| GP4 | SGND | SGND |
| TP5 | RST_N | SGND |
| GP5 | SGND | SGND |
| TP11 | INP_L | SGND |
| GP11 | SGND | SGND |
| TP8 | DESAT_H | GND2_H |
| GP8 | GND2_H | GND2_H |
| TP6 | OUTH_H | GND2_H |
| GP6 | GND2_H | GND2_H |
| TP7 | OUTL_H | GND2_H |
| GP7 | GND2_H | GND2_H |
| TP10 | GATE_H | GND2_H |
| GP10 | GND2_H | GND2_H |
| TP18 | DESAT_L | GND2_L |
| GP18 | GND2_L | GND2_L |
| TP16 | OUTH_L | GND2_L |
| GP16 | GND2_L | GND2_L |
| TP17 | OUTL_L | GND2_L |
| GP17 | GND2_L | GND2_L |
| TP20 | GATE_L | GND2_L |
| GP20 | GND2_L | GND2_L |

4 References and appendices

4.1 References

- [1] [Datasheet of Infineon EiceDRIVER™ 1ED3321MC12N](#)
- [2] [User guide of EiceDRIVER™ Eval-PSIR2085](#)
- [3] [Datasheet of Infineon IKW40N120H3](#)
- [4] [Datasheet of Infineon IMW120R045M1](#)

4.2 Ordering information

| Base Part Number | Package | Standard Pack | | Orderable Part Number |
|-------------------|------------|---------------|----------|-----------------------|
| | | Form | Quantity | |
| Eval-1ED3321MC12N | - | Boxed | 1 | EVAL1ED3321MC12NTOBO1 |
| 1ED3320MC12N | PG-DSO-16 | TAPE & REEL | 1000 | 1ED3320MC12NXUMA1 |
| 1ED3321MC12N | PG-DSO-16 | TAPE & REEL | 1000 | 1ED3321MC12NXUMA1 |
| 1ED3322MC12N | PG-DSO-16 | TAPE & REEL | 1000 | 1ED3322MC12NXUMA1 |
| 1ED3323MC12N | PG-DSO-16 | TAPE & REEL | 1000 | 1ED3323MC12NXUMA1 |
| IKW40N120H3FKSA1 | PG-TO247-3 | Tube | 240 | IKW40N120H3FKSA1 |
| EVAL-PSIR2085 | - | Boxed | 1 | EVALPSIR2085TOBO1 |

