

# PROFET™ +2 12V customer evaluation board

## Quick start guide

BTS7002-1EPP, BTS7004-1EPP, BTS7006-1EPP, BTS7008-1EPP

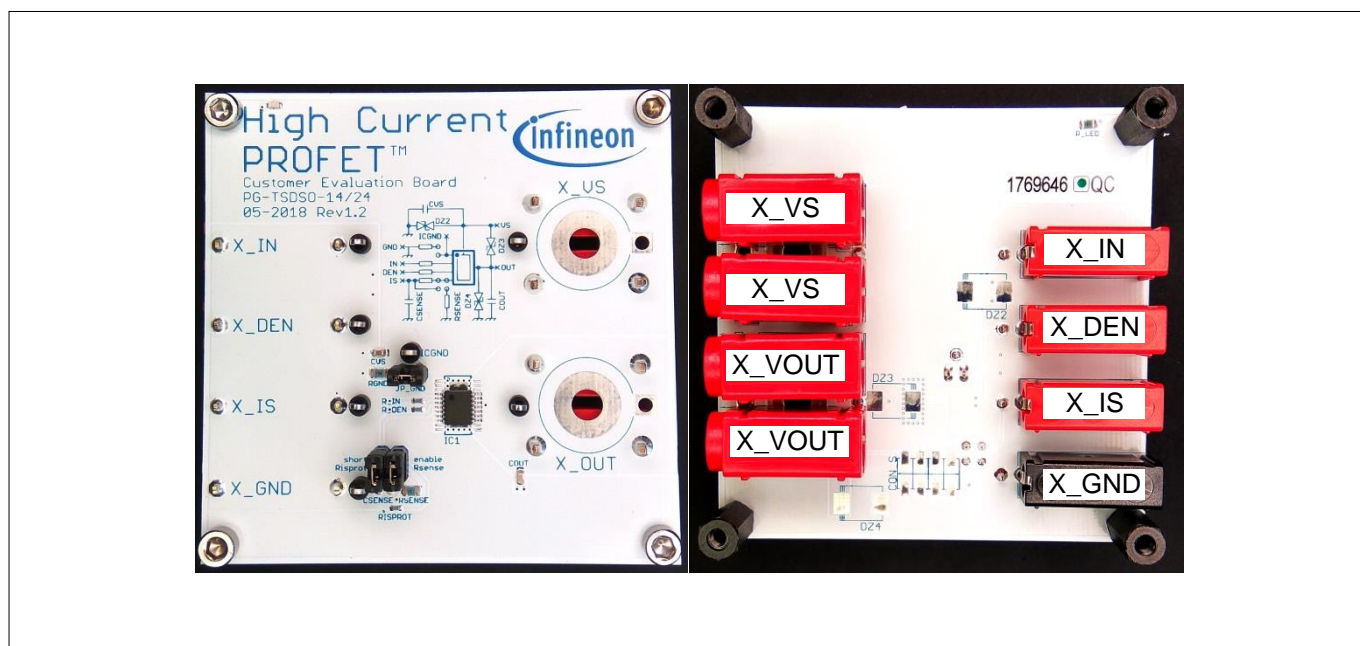
## About this document

### Scope and purpose

This document provides a quick introduction to the PROFET™ +2 12V customer evaluation board, which is designed to handle all devices in the PROFET™ +2 12V family.

The intention of the evaluation board is to give the customers a quick start for lab evaluation of the performance to this product family.

Infineon's automotive qualified PROFET™ +2 12V family consists of single channel devices which are able to drive resistive, inductive, and capacitive loads. Typical loads are glow plugs, heating loads, and DC motors. Other applications for the devices include power distribution for example.



**Figure 1** Customer Evaluation Board

The evaluation board is a small PCB (70 mm x 70 mm, 2 layers of 70 µm copper), equipped with one sample of the PROFET™ +2 12V family (IC1).

Banana connectors are provided for the connection to the signal as well as to the power lines, and there are jumpers placed on the board in order to give a higher flexibility in testing the device.

The evaluation board may be connected by lab cables to a signal generator or, for software evaluation, with a microcontroller evaluation kit.

### Intended audience

Customers requiring a quick start guide to the evaluation board.

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**1 Evaluation board description**

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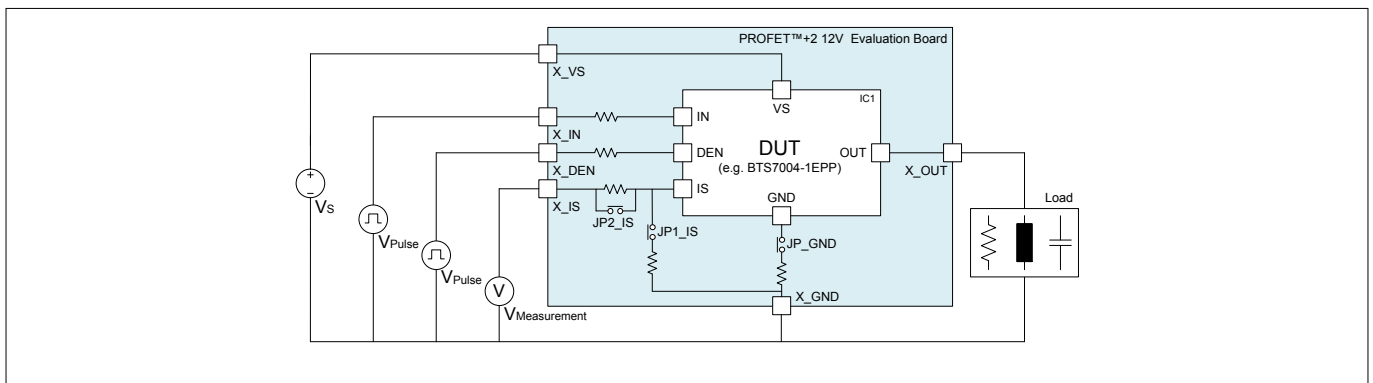
**1.1 Protection features**

- Absolute and dynamic temperature limitation with controlled reactivation
- Overcurrent protection (tripping) with intelligent latch
- Undervoltage shutdown
- Overvoltage protection with external components

**1.2 Diagnostic features**

- Proportional load current sense
- Open Load in "on" and "off" state
- Short circuit to ground and battery

**1.3 Block diagram and set-up details**



**Figure 2 Standalone connection example of the PROFET™ +2 12V evaluation board**

The figure shows a typical setup for the evaluation board.

**Set-up**

- Jumper JP\_GND must be set
- It is recommended that jumper JP1\_IS is set
- For quick start it is recommended that jumper JP2\_IS is open
- A DC power supply (typically 12 V) needs to be connected to X\_VS
- A load (for example, a bulb or a power resistor) can be connected to X\_OUT
- To enable the device a 3.3 V or 5 V signal, such as the digital output of a microcontroller or signal generator for example, needs to be available to X\_IN and X\_DEN, respectively
- The ground reference of the digital enable signal (X\_GND contact), the negative load contact, and the negative/GND output of the DC power supply have to be connected together

The voltage at X\_IS can be measured with a voltmeter. If IN=DEN=high, the load current can be calculated with this formula:

$$I_{load} = \text{voltage}(X\_IS) \times k_{ILIS} / 1.2 \text{ k}\Omega$$

*Note:* For  $k_{ILIS}$ , please refer to the datasheet of the respective PROFET™ +2 12V. For example, for BTS7004-1EPP  $k_{ILIS}$  typically = 20000.

**2 Board connectors and functions**

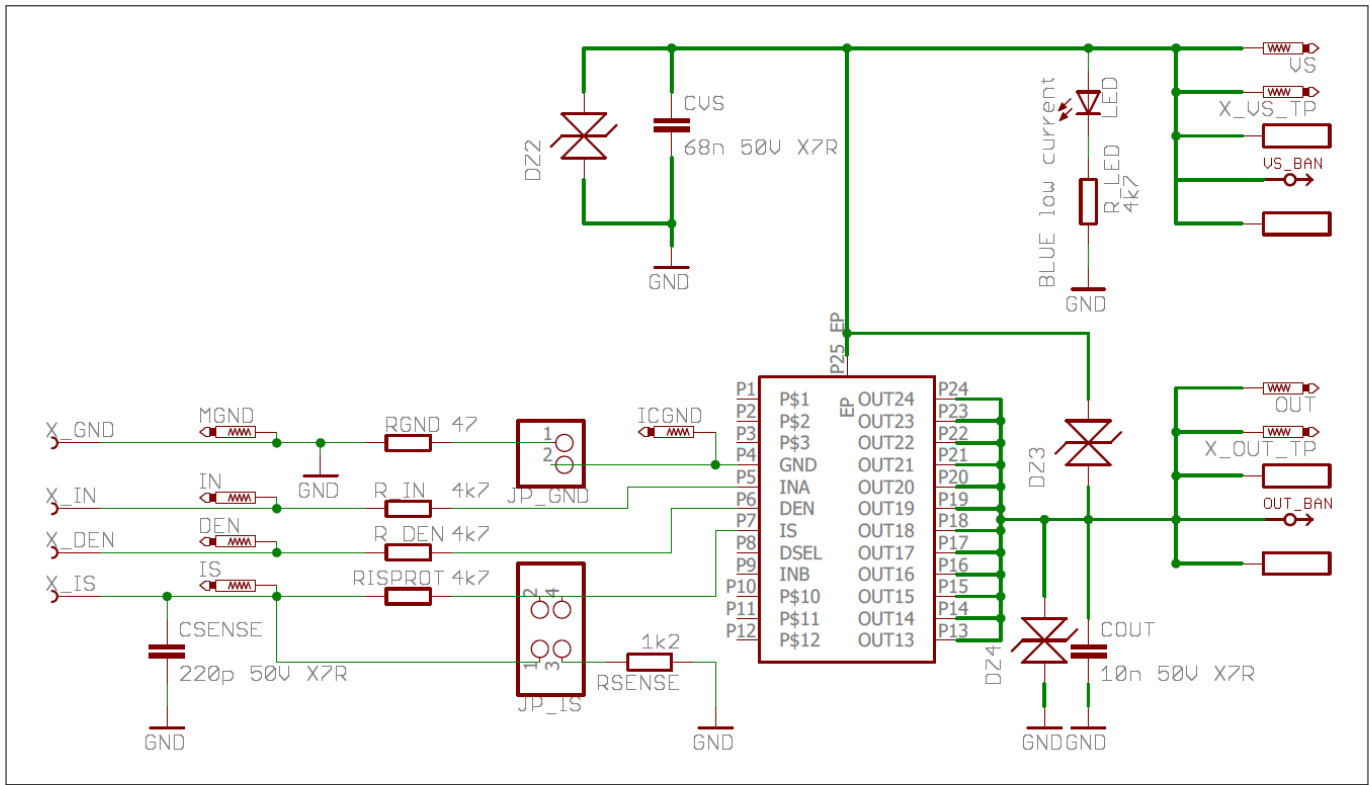
**2 Board connectors and functions**

**Table 1 Evaluation board connectors and functions**

<b>Connector</b>	<b>Function</b>
X_VS	Supply pin <ul style="list-style-type: none"> <li>Connect the positive supply voltage (4.1 V ... 28 V, Typical 12 V DC) to this pin</li> </ul>
X_OUT	Output of IC1 <ul style="list-style-type: none"> <li>Connect a grounded load to this pin, such as a power resistor, 12 V heating elements, or a glow plug for example</li> </ul>
X_IN	Input signal of IC1 <ul style="list-style-type: none"> <li>3.3 V or 5 V logical input.</li> <li>Turns the device "on"/"off" and resets the fault if triggered</li> </ul>
X_DEN	Sense enable signal of IC1 <ul style="list-style-type: none"> <li>3.3 V or 5 V logical input.</li> <li>Turns measurements signaled at the IS pin "on"/"off" and resets the fault if triggered</li> </ul>
X_IS	Sense output of IC1
X_GND	Ground pin <ul style="list-style-type: none"> <li>Connection for the module X_GND to the device GND</li> </ul>
JP1_IS	"enable Rsense" sense resistor <ul style="list-style-type: none"> <li>Close the jumper to use the 1.2 kΩ default sense resistor</li> </ul>
JP2_IS	"short Risprot" ADC protection resistor <ul style="list-style-type: none"> <li>Open the jumper to use the 4.7 kΩ default protection resistor</li> </ul>
JP_GND	Ground resistor <ul style="list-style-type: none"> <li>Close the jumper to use the 47 Ω default sense resistor</li> </ul>

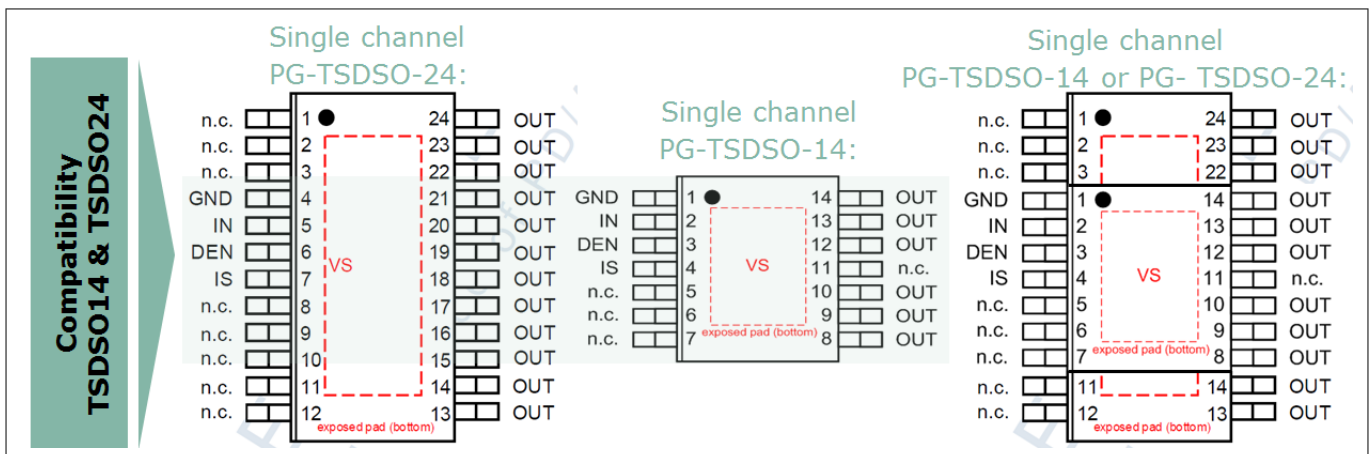
**3 Schematic**

**3 Schematic**



**Figure 3 Schematic of the PROFET™+2 12V customer evaluation board**

**3.1 Pin compatibility PG-TSDSO-14 to PG-TSDSO-24**

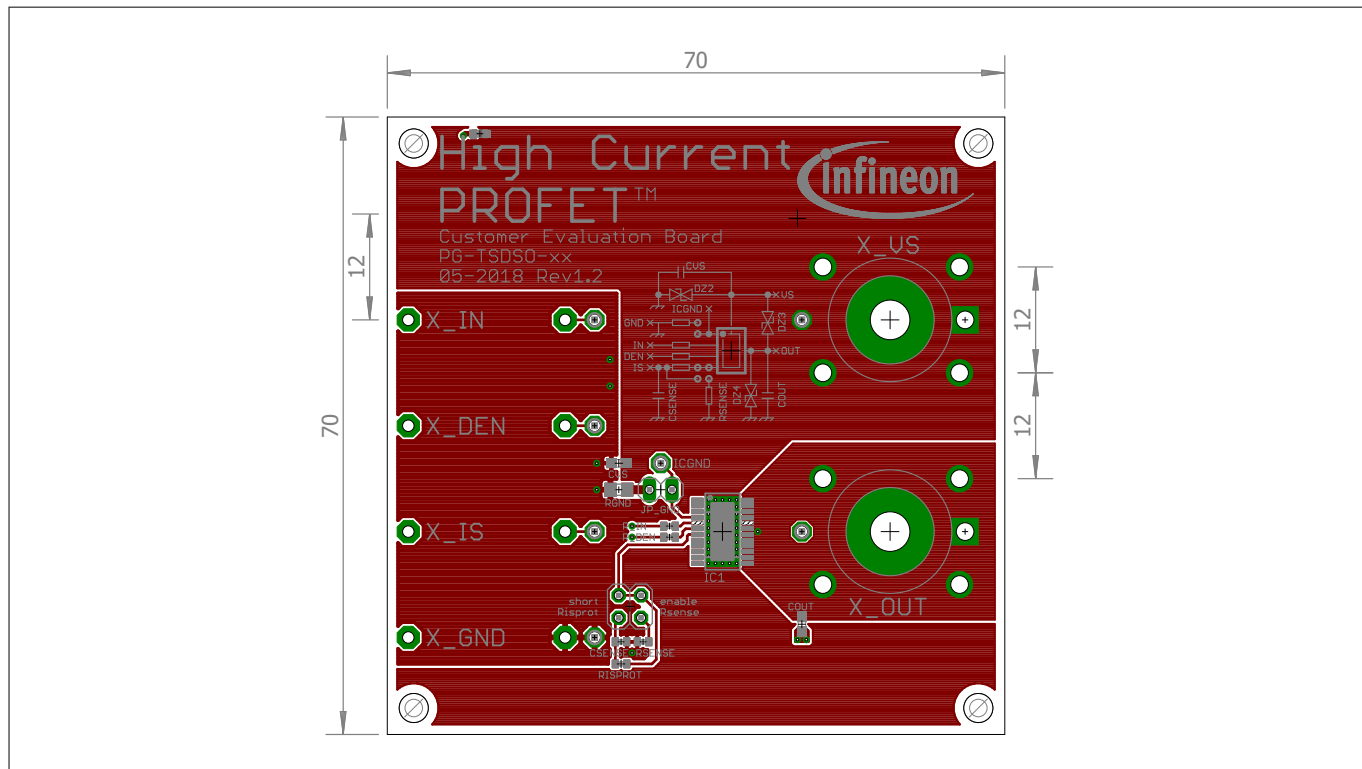


**Figure 4 Mounting diagram for PG-TSDSO-14 and PG-TSDSO-24**

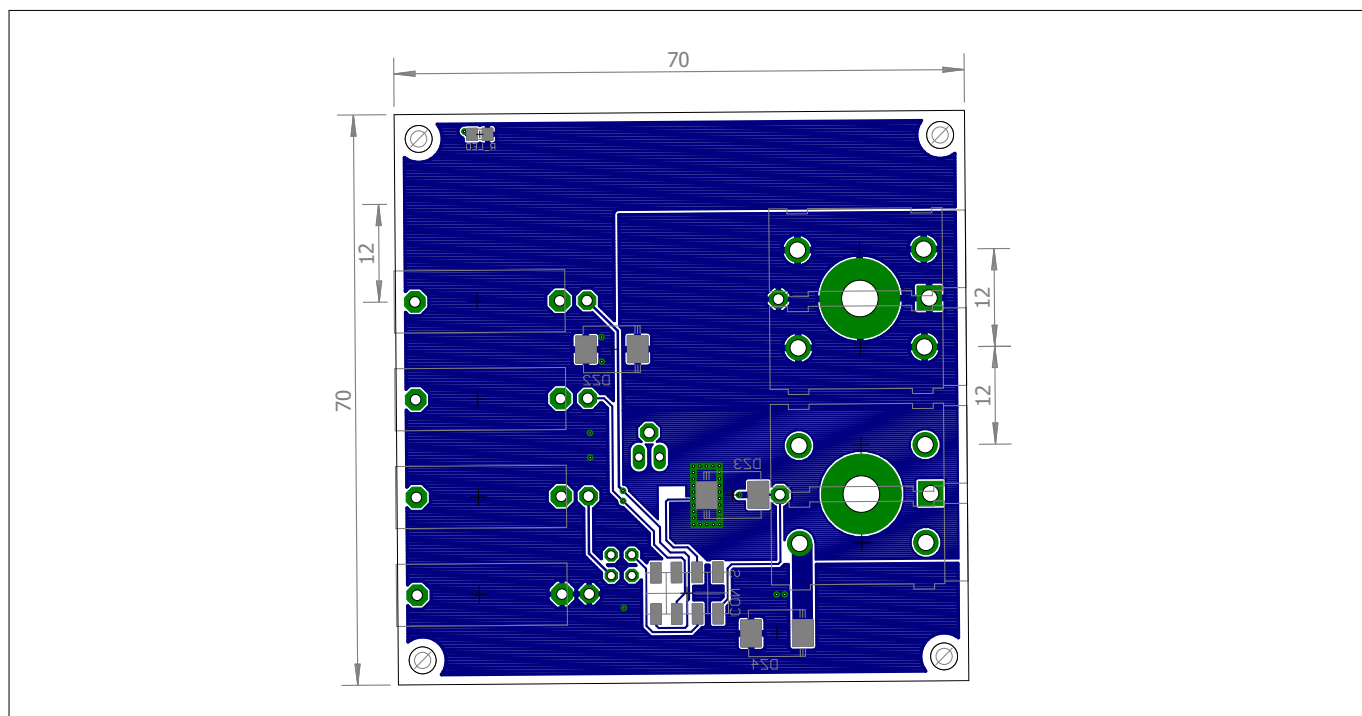
**4 Layout**

**4 Layout**

**Top layout**



**Figure 5 Top layout**



**Figure 6 Bottom layout**

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**5 Revision history**

## **5 Revision history**

<b>Document version</b>	<b>Date of release</b>	<b>Description of changes</b>
Rev. 3.00	2019-05-08	<ul style="list-style-type: none"><li>• Name change from High Current PROFET™ to PROFET™ +2 12V - updated relevant text and diagrams</li></ul>
Rev. 2.00	2018-08-17	<ul style="list-style-type: none"><li>• Updated <b>Figure 1</b></li><li>• Corrected board measurements in text on page 1</li><li>• Board connectors in <b>Table 1</b></li><li>• Added comparison of pins PG-TSDSO-14 vs PG-TSDSO-24 <b>Figure 4</b></li><li>• Corrected typos throughout document</li></ul>
Rev. 1.00	2018-04-13	Initial Customer evaluation board: Quick start guide

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