

PROFET™ +2 12 V Grade0 customer evaluation board

Quick start guide

BTS7004-1EPZ BTS7006-1EPZ, BTS7008-1EPZ, BTS7008-2EPZ, BTS7040-1EPZ, BTS7080-2EPZ

About this document

Scope and purpose

This document provides a quick introduction to the Grade0 PROFET™ +2 12V customer evaluation board, which is designed to handle all devices in the PROFET™ +2 12V Grade0 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 six different high-side switches (from 4 mOhm to 80 mOhm) and offers an extended junction temperature range up to 175°C that allows partitioning at high ambient temperatures with higher ohmic parts. Furthermore, thanks to the AEC-Q100 Grade0 qualification, the PROFET™ +2 12V Grade0 portfolio is able to fulfill extended lifetime at elevated temperatures. The PROFET™ +2 12V Grade0 devices are suitable to drive resistive, inductive and/or capacitive loads and are the perfect fit for applications with extended or/and high temperature mission profiles, such as under the hood, powertrain and transmission applications.

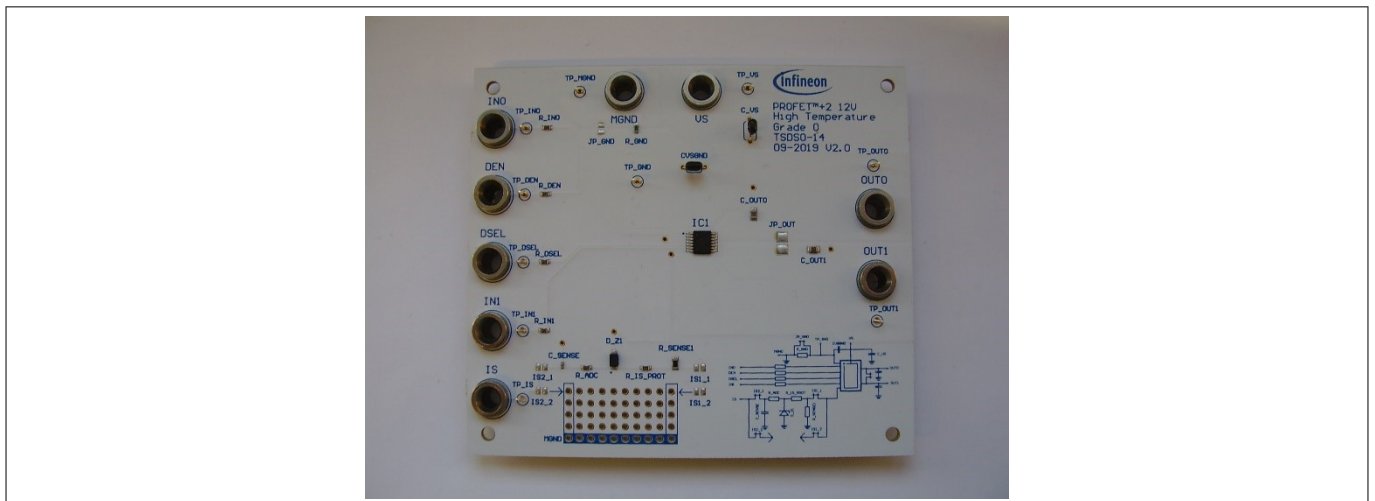


Figure 1 Customer evaluation board

Intended audience

Customers requiring a quick start guide to the evaluation board.

Table of contents

	About this document	1
	Table of contents	2
1	Evaluation board description	3
1.1	Basic features	3
1.2	Protection features	3
1.3	Diagnostic features	3
1.4	Product validation	3
1.5	Set up details	3
2	Board connectors and functions	4
3	Schematic	6
4	Layout	7
5	Revision history	8
	Disclaimer	9

1 Evaluation board description

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1.1 Basic features

- High-side switch with diagnosis and embedded protection
- Part of PROFET™+2 12V family
- ReverseON for low power dissipation in reverse polarity
- Green product (RoHS compliant)

1.2 Protection features

- Absolute and dynamic temperature limitation with controlled reactivation
- Overcurrent protection (tripping) with Intelligent Latch or Intelligent Restart Control
- Undervoltage shutdown
- Overvoltage protection with external components
- Maximum temperature for board and device: 175 °C

1.3 Diagnostic features

- Proportional load current sense
- Open load in ON and OFF state
- Short circuit to ground and battery

1.4 Product validation

Qualified for automotive applications. Product validation according to AEC-Q100 Grade0.

1.5 Set up details

- Jumper JP_GND must be set
- A DC power supply (typically 12 V) needs to be connected to VS
- A load (for example, a bulb or a power resistor) can be connected to OUT0 or OUT1
- 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 IN0 and/or IN1 and DEN, respectively
- The ground reference of the digital enable signal (MGND contact), the negative load contact, and the negative/GND output of the DC power supply have to be connected together

The voltage at IS can be measured with a voltmeter. If IN=DEN=high, the load current can be calculated with this formula: $I_{load} = \text{voltage}(IS) \times kILIS / 1.2 \text{ k}\Omega$

2 Board connectors and functions

2 Board connectors and functions

Table 1 Evaluation board connectors and functions

Connector	Function
INO	Input signal for channel 0 of IC1 <ul style="list-style-type: none"> • 3.3 V or 5 V logical input • Turns the device ON/OFF and resets the fault if triggered
DEN	Sense enable signal of IC1 <ul style="list-style-type: none"> • 3.3 V or 5 V logical input • Turns measurements signalized at the IS pin ON/OFF and resets the fault if triggered
DSEL	Diagnostic select signal <ul style="list-style-type: none"> • 3.3 V or 5 V logical input • Selects the channel which has to be diagnosed
IN1	Input signal for channel 1 of IC1 <ul style="list-style-type: none"> • 3.3 V or 5 V logical input • Turns the device ON/OFF and resets the fault if triggered
IS	Sense output of IC1
OUT0	Output0 of IC1 <ul style="list-style-type: none"> • Connects a grounded load to this pin, such as a power resistor, 12 V heating elements, or a glow plug for example
OUT1	Output1 of IC1 <ul style="list-style-type: none"> • Connects a grounded load to this pin, such as a power resistor, 12 V heating elements, or a glow plug for example
VS	Supply pin <ul style="list-style-type: none"> • Connects the positive supply voltage (4.1 V ... 28 V, typical 12 V DC) to this pin
MGND	Ground pin <ul style="list-style-type: none"> • Connection for the module X_GND to the device GND
JP_GND	Ground resistor <ul style="list-style-type: none"> • Closes the jumper to use the 47 Ω default sense resistor
JP_OUT	Output connection <ul style="list-style-type: none"> • Closes the jumper to increase the current capabilities performances in case of a single channel device

Table 2 Component values

Component name	Value	Description
C_VSGND	47 nF	High Operating Temperature Radial Leded Multilayer Ceramic Capacitor

2 Board connectors and functions

Table 2 **Component values (continued)**

Component name	Value	Description
R_ADC, R_DEN, R_DSEL, R_IN0, R_IN1, R_IS_PROT	4.7 k	Metal thin film chip resistor
R_SENSE1	1.21 k	Metal thin film chip resistor
C_VS	68 nF	MLCC RHS series Used for Automotive Electronic Equipment
C_SENSE	220 pF	SMD Industrial Ceramic, High Temperature, Ultra-Stable, Low Loss, 0402
R_GND	49.9 R	Thick film chip resistor
C_OUT0, C_OUT1	10 nF	Ultra-Stable, Low Loss, Multi-layer Ceramic Capacitor
D_Z1	$V_Z = 6.2\text{ V}$	Zener diode with Surge Current

3 Schematic

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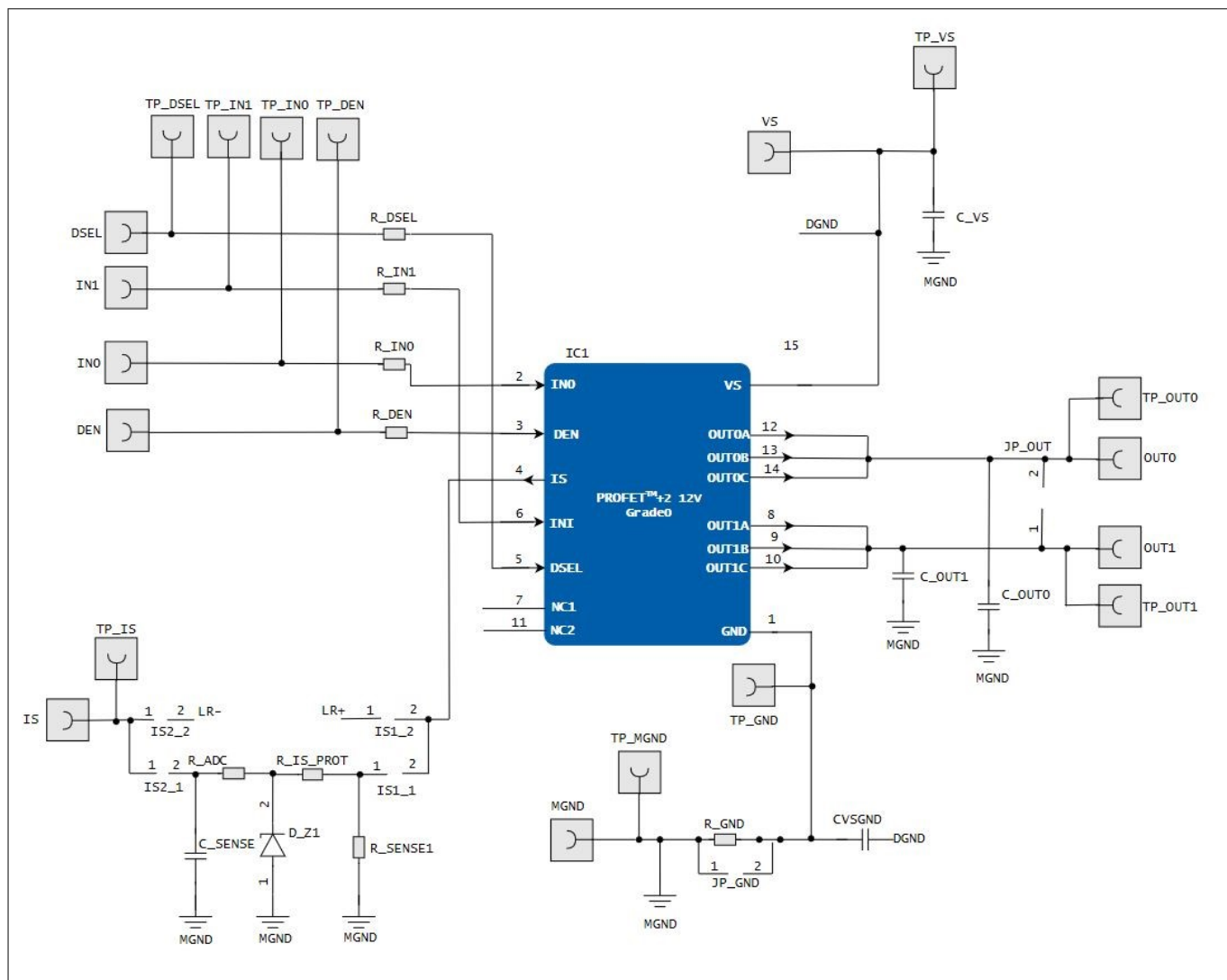


Figure 2 Schematic of PROFET™+2 12V Grade0 customer evaluation board

4 Layout

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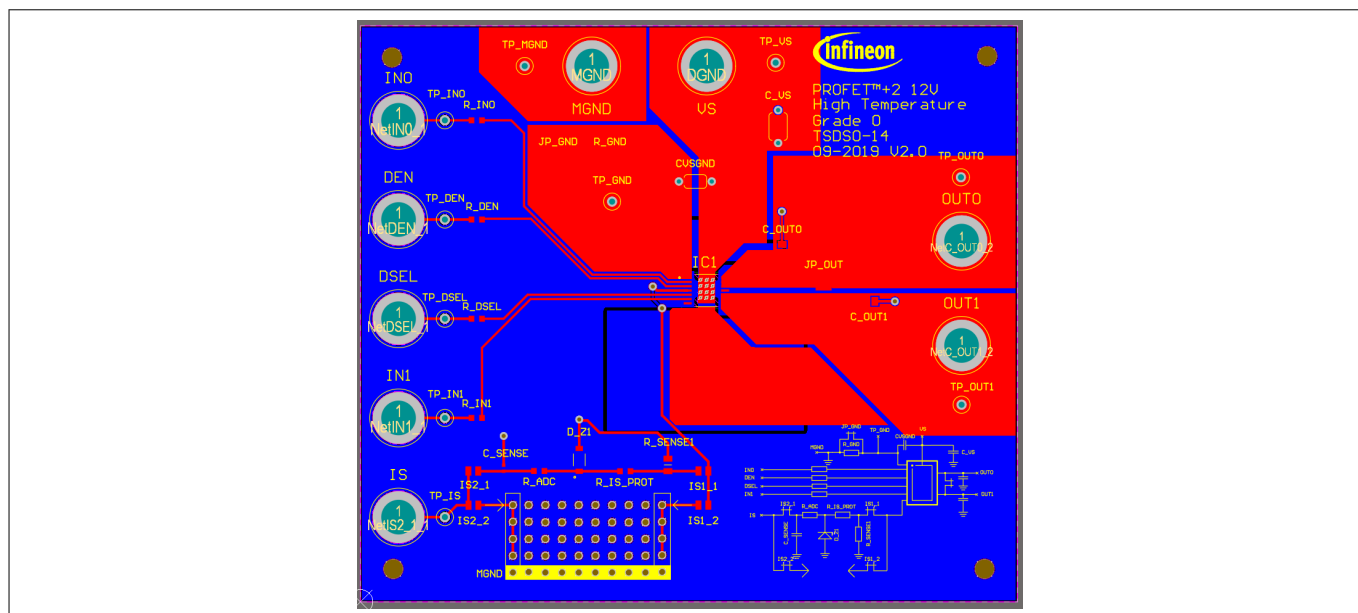


Figure 3 Top layout

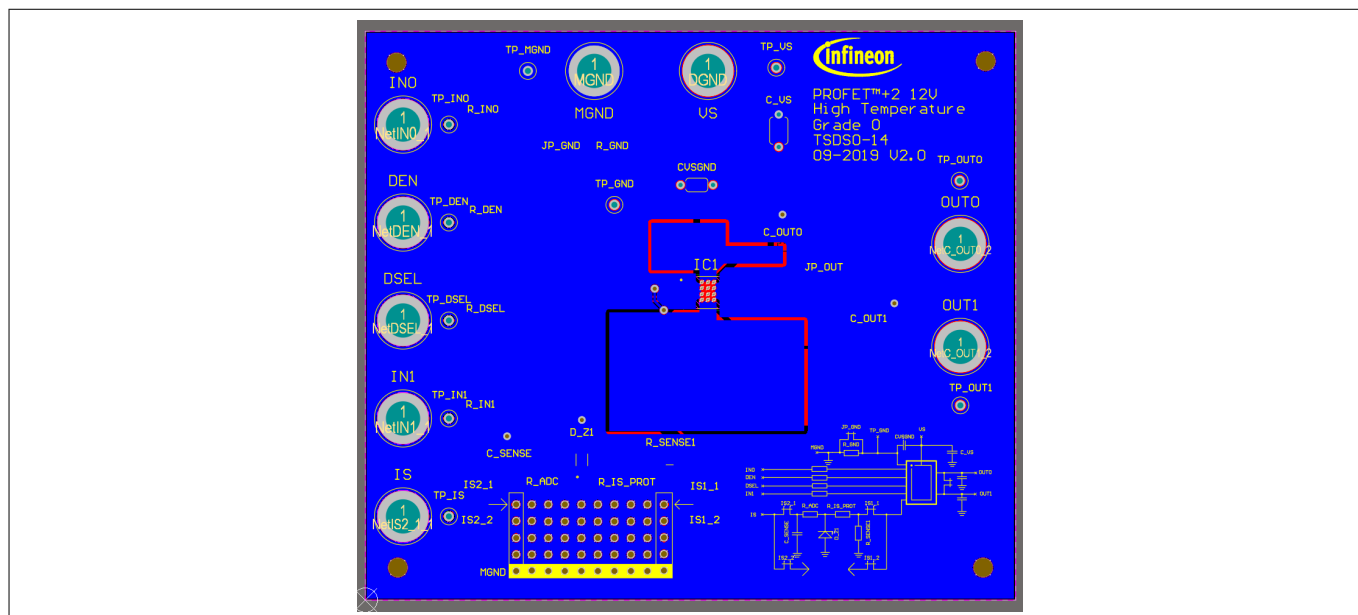


Figure 4 Bottom layout

5 Revision history

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Table 3 **Revision history**

Document version	Date of release	Description of changes
Rev. 0.01	2020-04-09	User manual creation

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