FAD1101X Evaluation Board User's Manual

EVBUM2936/D

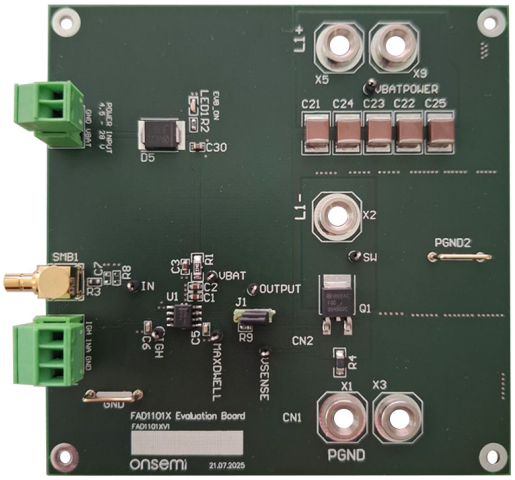

Figure 1. Board Picture

Introduction

This document describes FAD1101 evaluation board for the FAD1101 Ignition driver. The board consists of the Ignition driver and Ignition IGBT transistor. The evaluation board contains all the application components allowing evaluation of FAD1101 functionality and its major parameters.

EVALUATION BOARD FEATURES

- Battery voltage supplying 12 V
- Two supply connectors
- Signal connector for firing event
- Signal connector for FLAG event
- Two current limits and current sense configurability
- LED for voltage status indicator
- Good thermal connection of FGD3040 allowing high current capability
- Oscilloscope test-points on all important signals
- Header providing stacking of the evaluation boards and connection of the board into a more complex application setup

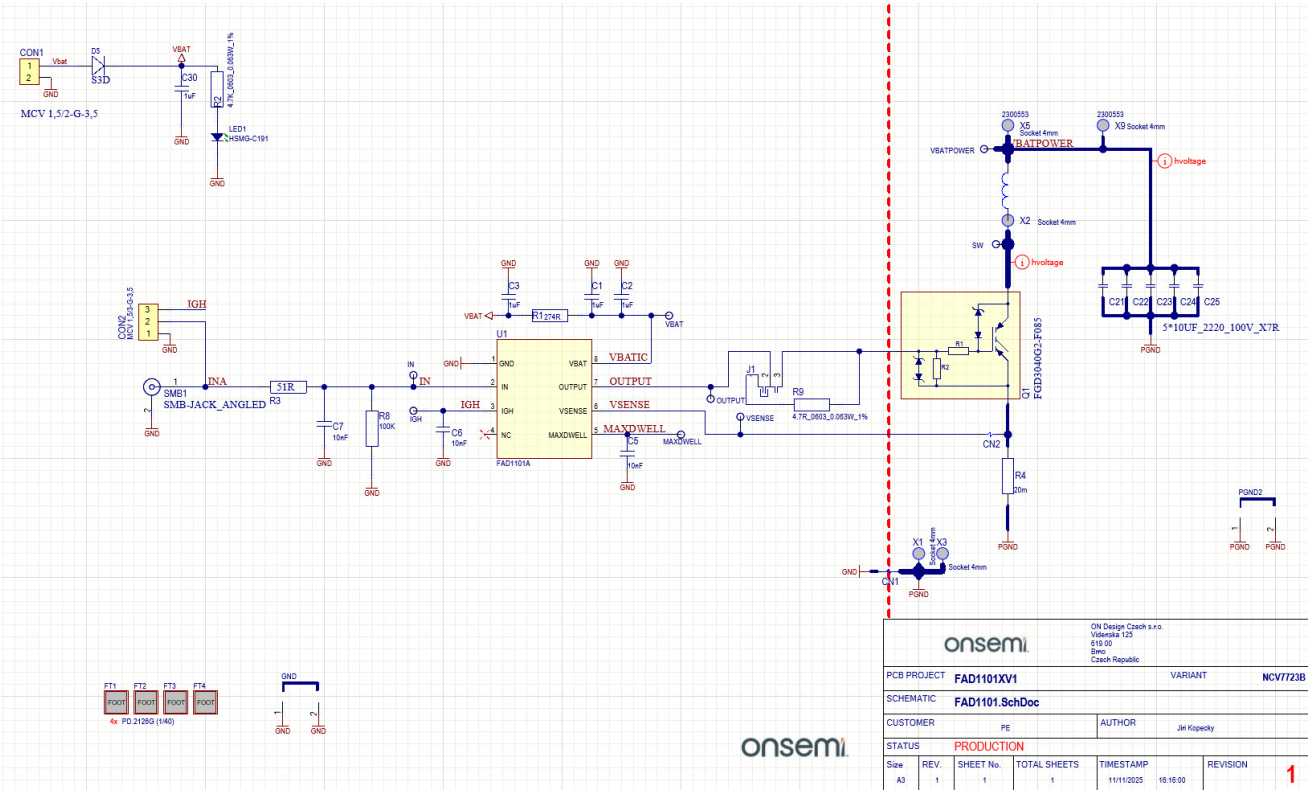

Figure 2. FAD1101 Evaluation Board Schematic

MAXIMUM RATINGS

Rating	External Pin	Min	Max	Unit
Power Supply Voltage 1	Vbat CON1	4,5	28	V
Power Supply Voltage 2	VBATPOWER X5, X9	4,5	28	V
Voltage at IGF Pin	IGH CON2	5	5	V
Input Current	VBATPOWER X5, X9	0	Internally limited	A
VMaxdwell	VMaxdwell	−0.3	3,6	V
VOUTPUT	VOUTPUT	−0.3	6,5	V
VSENSE	VSENSE	0	400	mV
FAD1101 Junction Temperature	−	−50	+150	°C
Board Temperature	−	−50	+150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

RECOMMENDED OPERATING RANGES

Rating	External Pin	Min	Max	Unit
Power Supply Voltage 1	Vbat CON1	4,5	28	V
Power Supply Voltage 2	VBATPOWER X5, X9	4,5	28	V
Voltage at IGF Pin	IGH CON2	5	5	V
Input Current	VBATPOWER X5, X9	0	Internally limited	A
VMaxdwell	VMaxdwell	−0.3	3,6	V
VOUTPUT	VOUTPUT	−0.3	6,5	V
VSENSE	VSENSE	0	400	mV
FAD1101 Junction Temperature	−	−50	+150	°C
Board Temperature	−	−50	+150	°C

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

FUNCTIONAL DESCRIPTION

The FAD1101 is switching target device featuring switching ignition IGBT and sense current of the ignition coil. Ignition driver keeps current limit of the coil and also reduce current by the dwell time and driver has a own thermal protection. The driver has open drain protection. An on-state close load diagnostic supports system-level fault detection.

Supply Strategy

The supply is divided into two main paths:

- VBATPOWER X5, X9 − this path supplies VBATPOWER of FAD1101 is supplied from 12 V. This path isn't protected against reverse polarity voltage.
- Vbat CON1 supply − this path is directly connected to VIN1 pin of FAD1101 and therefore can withstand reverse polarity.

GETTING STARTED

The board supports SMA connector from which is generated PWM signal of ignition event. Between L1+ and L1− is connected primary side of ignition transformer and secondary negative side is connected to the primary PGND. As is illustrated in the Figure 3.

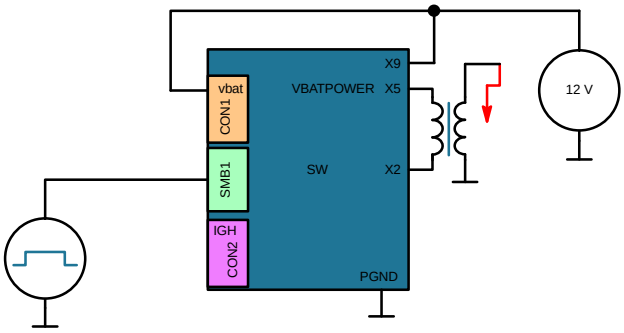

Figure 3. Application Schema of Ignition System

Current Limit

The device contains a current limit for IGBT ignition. It is defined by R4 resistor. By default, a limit of 15 A is selected. It might be changed under datasheets convert table.

Flag Output

The current sensing flag IGH function communicates the IGBT collector current value to the main engine control device. The flag pin is an open drain output and requires an external pull up impedance to a nominal 5.0 V supply.

PCB DRAWINGS

Assembly Drawings

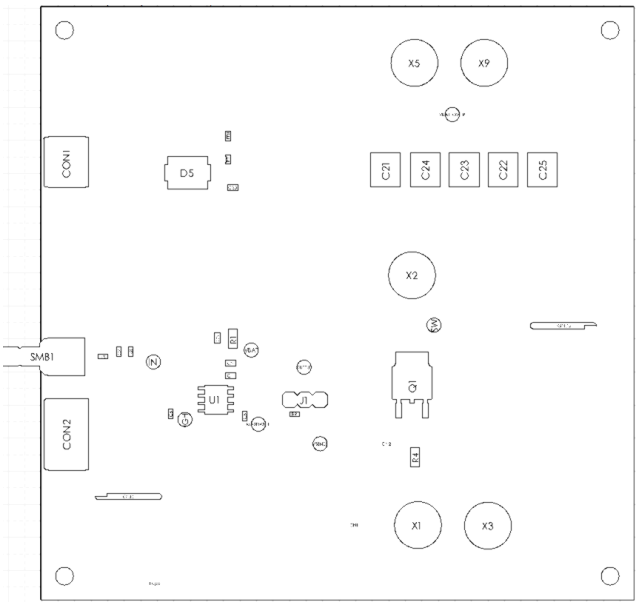

Figure 4. FAD1101 EVB PCB Top Assembly Drawing

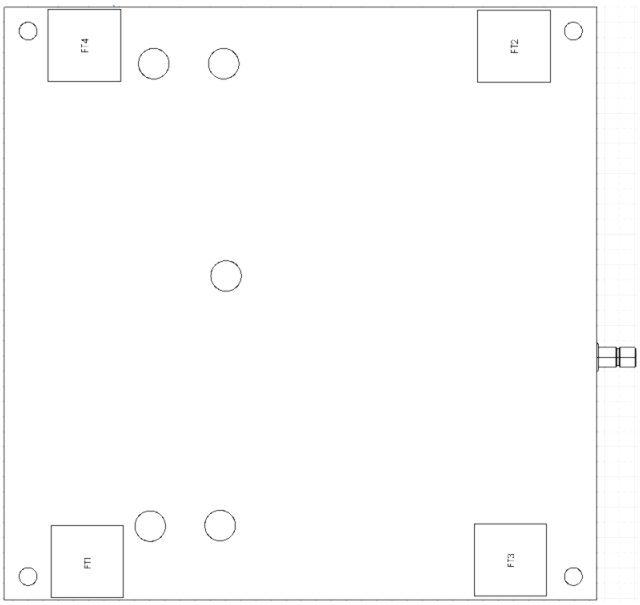

Figure 5. FAD1101 EVB PCB Bottom Assembly Drawing (Bottom View)

Composite Drawings

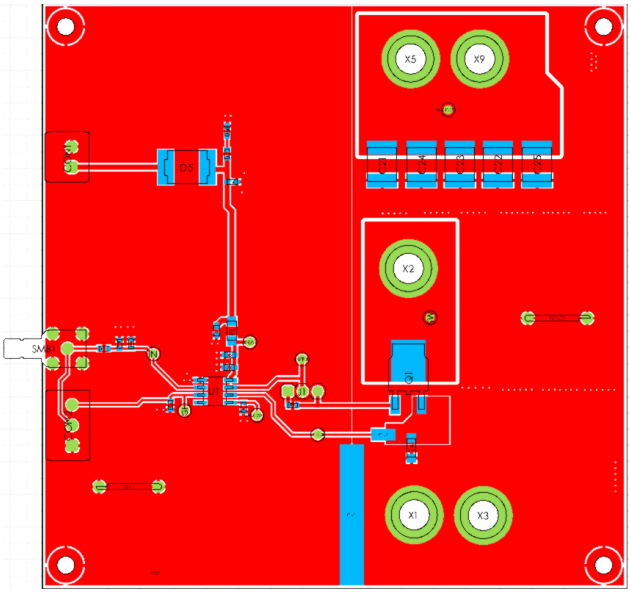

Figure 6. FAD1101 EVB PCB Top Composite Drawing

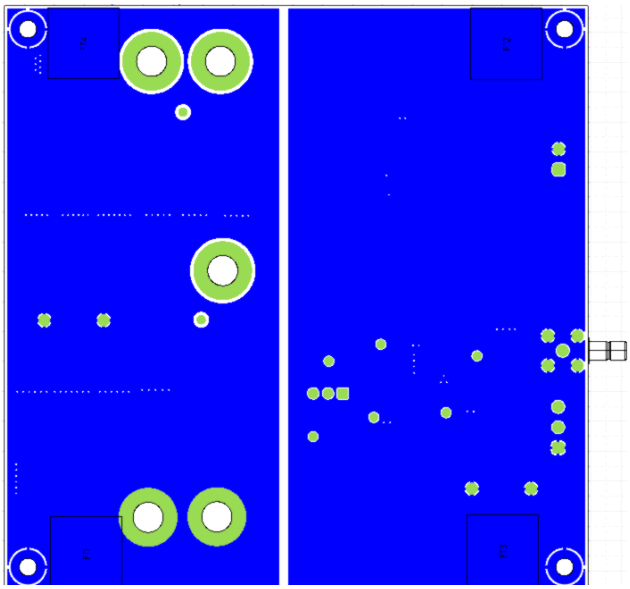

Figure 7. FAD1101 EVB PCB Bottom Composite Drawing (Bottom View)

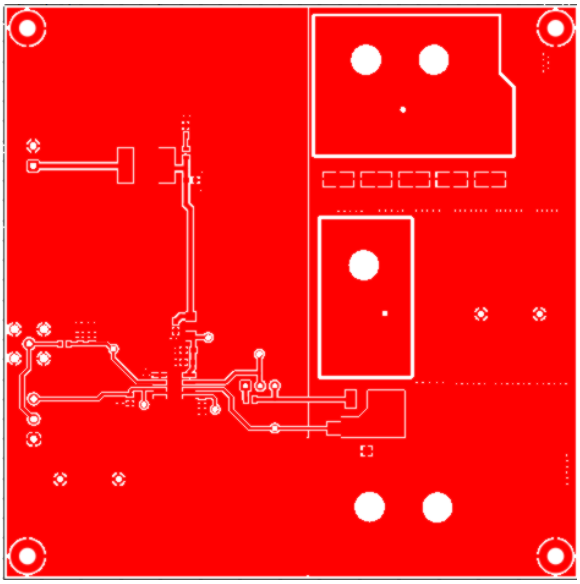

Figure 8. FAD1101 EVB PCB Internal Plane 1 Drawing

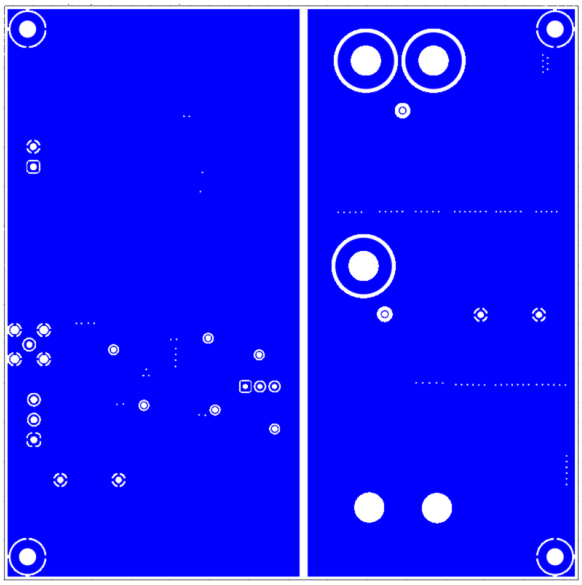

Figure 9. FAD1101 EVB PCB Internal Plane 2 Drawing

REVISION HISTORY

Revision	Description of Changes	Date
0	Initial document release.	12/9/2025

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales