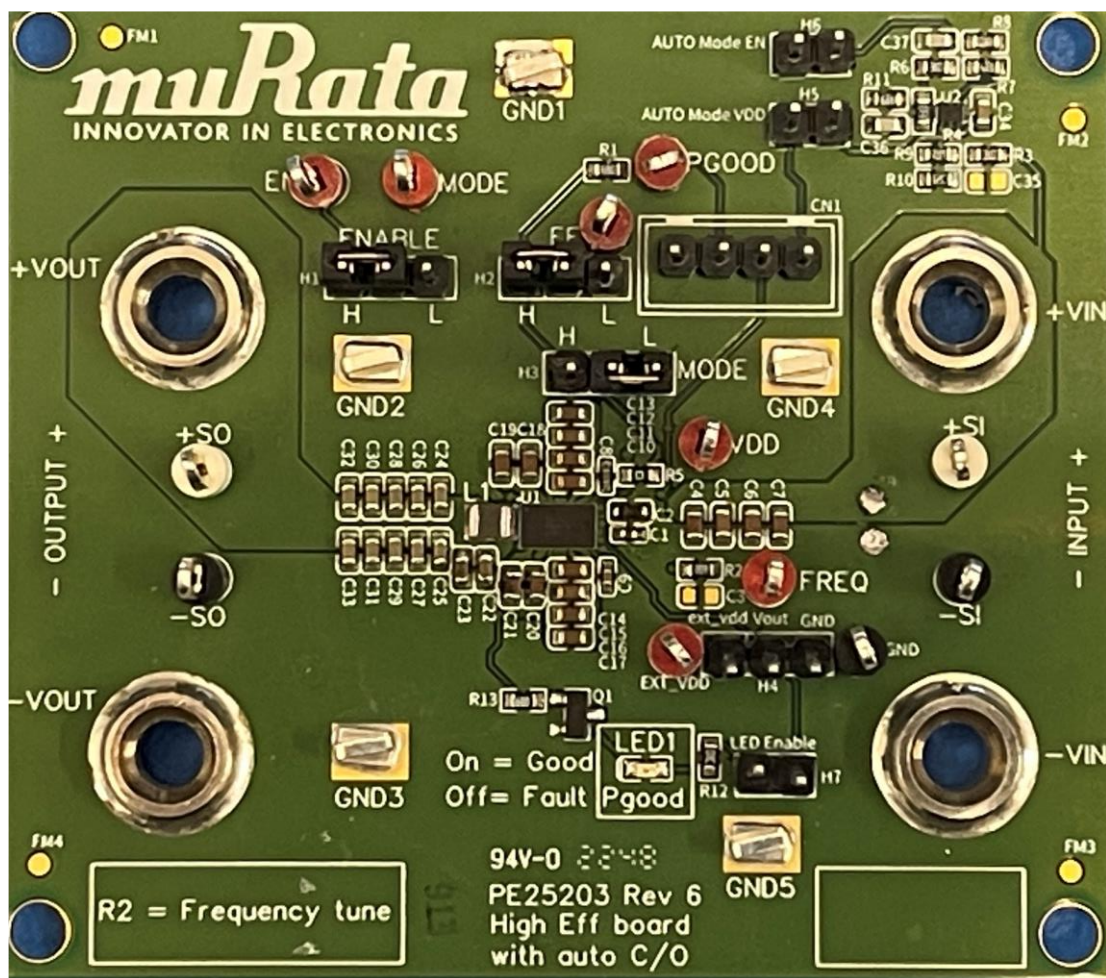


PE25203 Evaluation Kit (EVK) User's Manual

4A High Efficiency 5.7–15V Front-End DC-DC Converter



Introduction

The PE25203 is an ultra-high efficiency front-end charge pump that is configurable to divide down an input voltage by two or three and deliver up to 4A output at up to 99% peak efficiency. The PE25203 supports an input voltage range of 5.7V to 15V and is available in a WLCSP package.

The PE25203 evaluation kit (EVK) is intended and made available for evaluation and testing purposes only.

Evaluation Kit Overview

The PE25203 evaluation kit (EVK) is a hardware platform that allows customers to easily test the charge pump converter. The PE25203 EVK can be operated in different modes. The table below provides an overview of the electrical parameters of the PE25203 evaluation kit (EVK), please see datasheet for more details.

REFERENCE	DESCRIPTION	CONDITIONS	MIN	MAX	UNITS
Vin+	Input Voltage, in divide by 3 mode		8.4	15	V
Vin+	Input Voltage, in divide by 2 mode		5.7	10	V
Iout	Output current			4	A
Fsw	Switching frequency	Fixed Frequency	200	1000	KHz
		Cycle skip	3.5	1000	KHz

Evaluation Kit User's manual Overview

The PE25203 evaluation kit (EVK) user's manual includes information about the hardware required to control and evaluate the functionality of the DC-DC converter.

Evaluation Kit Contents and Requirements

Kit Contents

The PE25203 EVK includes the following hardware required to evaluate the DC-DC converter.

QUANTITY	DESCRIPTION
1	PE25203 DC-DC converter evaluation board assembly (EK25203-01)

Hardware Requirements

In order to evaluate the performance of the evaluation board, the following equipment is required:

- Bench DC power supply
- DC load (power resistors or electrical load)
- 4 High accuracy digital multi-meters
- Four-channel oscilloscope with probes (optional to view waveforms)
- DC test leads

Caution: The PE25203 DC-DC converter EVK contains components that might be damaged by exposure to voltages in excess of the specified voltage, including voltages produced by electrostatic discharges. Handle the board in accordance with procedures for handling static-sensitive components. Avoid applying excessive voltages to the power supply terminals or signal inputs or outputs.

When connecting the EVK to the source power supply, ensure the power supply is off. Connecting the EVK to a live power supply unit may cause failures.

Quick Start Guide

Quick Start Overview

The evaluation board is designed to ease customer evaluation of the PE25203 DC-DC converter. This section guides you through configuring the hardware and the startup procedures.

Evaluation Board Overview

The evaluation board is designed to ease customer evaluation of Murata's products. The board contains:

- Input/output terminals
- PCB headers
- Sense points

Input/Output terminals

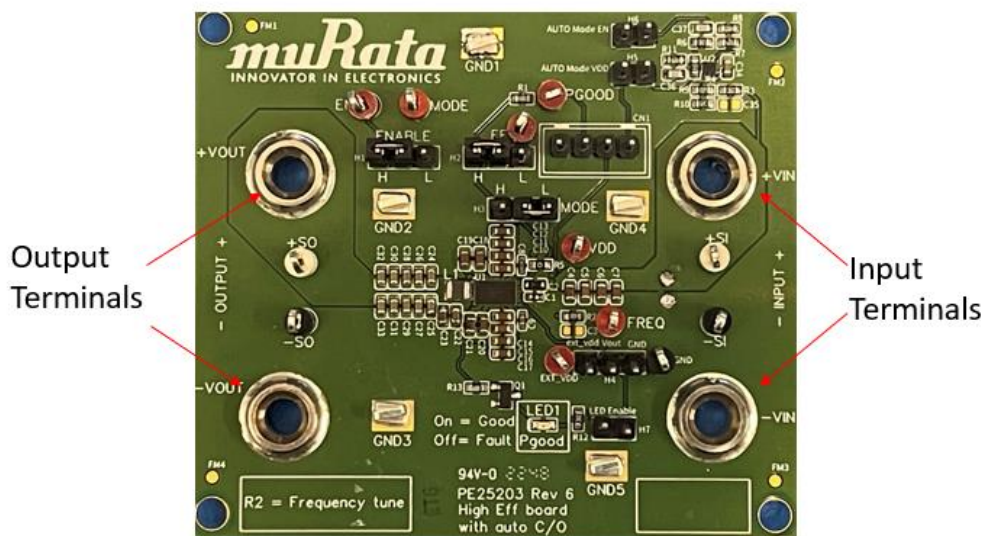


Figure 1. PE25203 Evaluation Board Assembly.

PCB headers

The PE25203 evaluation kit (EVK) has two types of PCB headers. 3-way PCB headers are used to configure the EVK. 2-way PCB headers are used to enhance the functionality of the EVK.

Configuration PCB headers

H2 and H3 PCB headers settings are loaded at IC power up. If H2 are changed during operation, the system needs to be disabled and then enable to allow the IC to load the new settings. H3 can be changed while the system is power up and during operation.

Table 1 provides information about each PCB header and figure 2 shows how to use a jumper to set the PCB header in HIGH or LOW position.

HEADER	SIGNAL NAME	FUNCTION	HIGH	LOW
H1	ENABLE	Allows the system to operate.	Enable	Disable
H2	FF/CS	Select charge pump clock mode.	Fixed Frequency	Cycle skip
H3	MODE	Selects the charge pump voltage division ratio.	Divide by 2	Divide by 3

Table 1. 3-way PCB headers information.

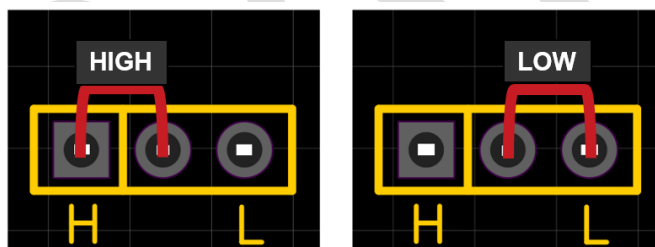


Figure 2. 3-way PCB header configuration settings example.

Functionality PCB header

2-way PCB headers are optional to use, their main purpose is to add extra functions to the evaluation kit (EVK). To use any of the functions describe in the table below, a jumper should be used to ensure the signal path is not left open.

HEADER	SIGNAL NAME	FUNCTION
H4	EXT VDD	External VDD supplied by the customer. The part does not need this to be supplied to operate, but if externally applied, it can increase the system efficiency.
H5	AUTO div EN	Enable auto division ratio.
H6	AUTO div EN	Connects Enable auto division ratio output to the MODE pin.
H7	PGOOD	On-board LED indicator for PGOOD.

Table 2. 2-way PCB header information.

Sensing points

Table 2 includes all the test points (TP) that can be found in the PE25203 evaluation kit (EVK). The aim of each TP is to facilitate users the capture of waveforms from critical signals,

To make accurate measurements from input and output voltages, it is critical to use the SO and SI test points already included in the PE25203 evaluation kit (EVK).

TEST POINT	DESCRIPTION
EN	Status of the enable signal
MODE	Status of the mode signal
FF	Status of the charge pump clock mode (Fixed Freq or Cycle Skip).
+SO	Positive TP to measure Vout
-SO	Negative TP to measure Vout
+SI	Positive TP to measure Vin
-SI	Negative TP to measure Vin
EXT VDD	Positive TP to measure EXT VDD
GND2 – GND5	GND reference TP

Table 3. Test point description.

EVK Connection

Connect the EVK and the measuring equipment as shown in the example below.

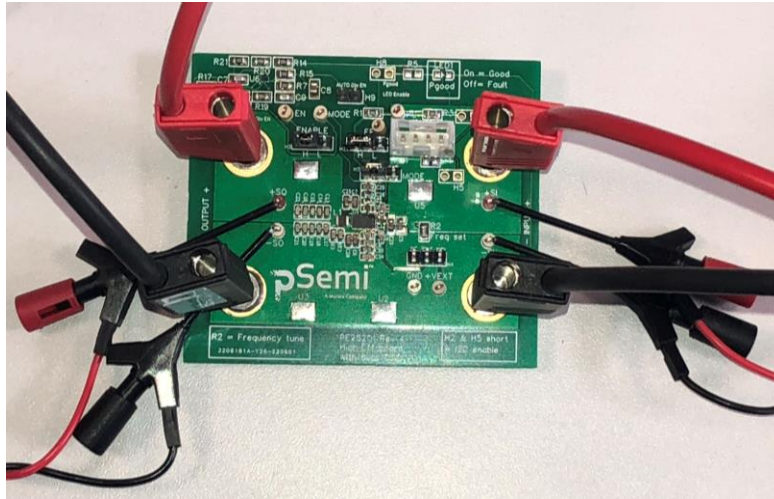


Figure 3. EVK Connection Example.

Connections for only voltage measurements.

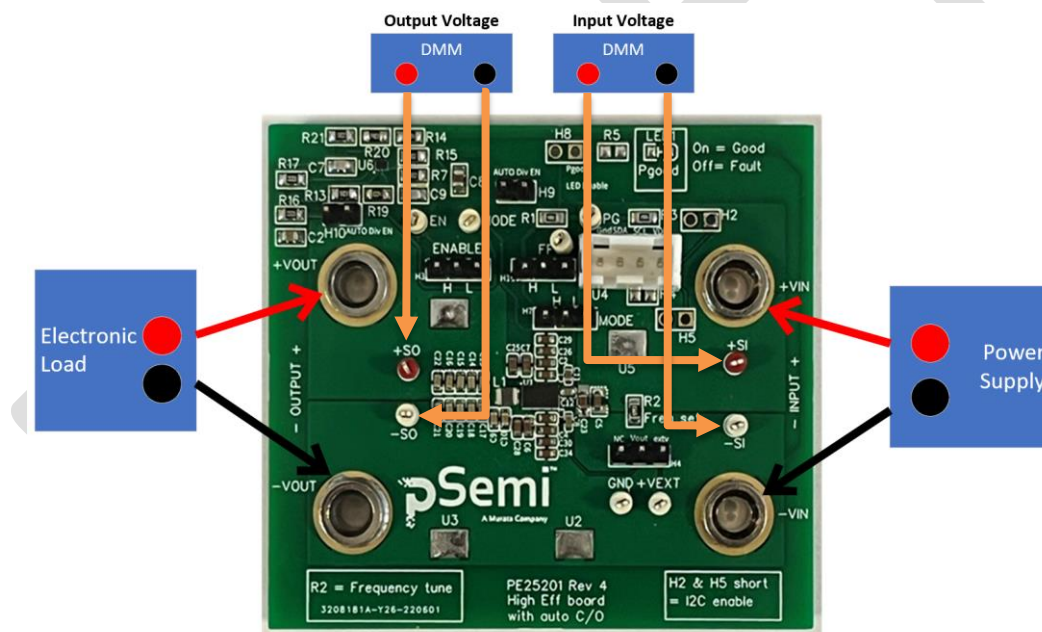


Figure 4. PE25203 EVK connection to measure voltage.

Connections for voltage and current measurements

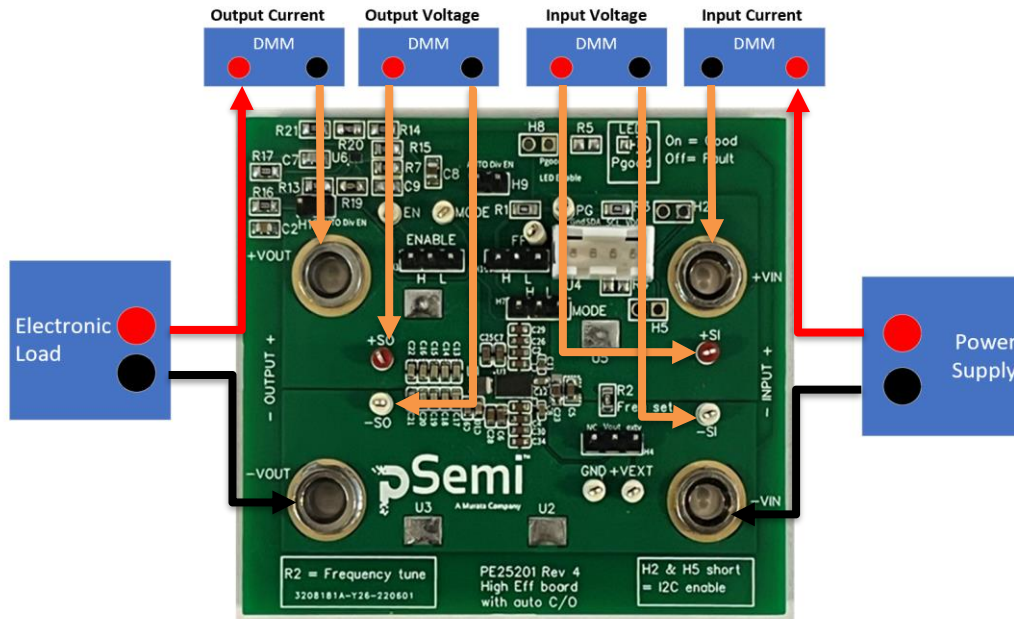


Figure 5. PE25203 EKV connections to measure voltage and current.

Hardware Operation

The general guidelines for operating the hardware evaluation board are listed in this section. Follow the steps below to configure the hardware properly to achieve an optimal performance.

1. Before powering up the EVK, H1 and H3 PCB header must be set. Figure 6 is used as an example, H2 in fixed frequency mode, H1 in enable position and H3 in divide by 2 mode. (Not extra functions are being implemented).
2. Ensure all power and sensing connections are done correctly. Try to minimize the length of the wires.
3. Apply input voltage.
4. Apply load current after output startup.

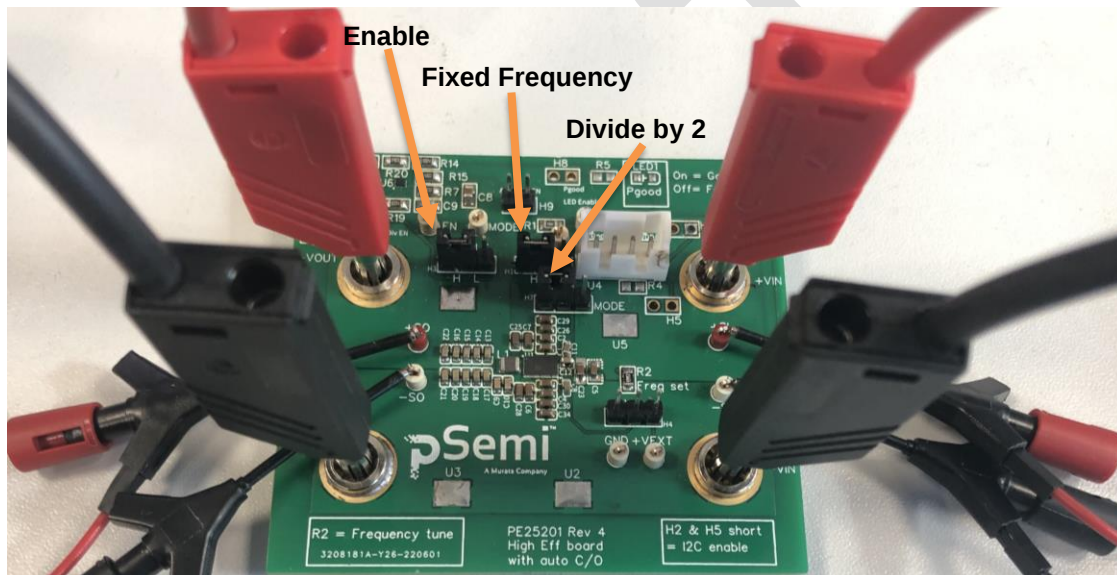


Figure 6. Configuration Jumpers Position.

EVK Startup

When starting the EVK, be sure to start it with no load.

If the EVK is started with a load, it may not start due to the soft start current limit.

Changing switching Frequency R2

The EVK default frequency is set to 200 KHz, however if the user requires to test the EVK at different frequencies, the tables below are provided as guidance to help selecting a resistor value for the required switching frequency.

Resistance	187kΩ	249kΩ	332kΩ	402kΩ	499kΩ
Frequency	500kHz	400kHz	300kHz	250kHz	200kHz

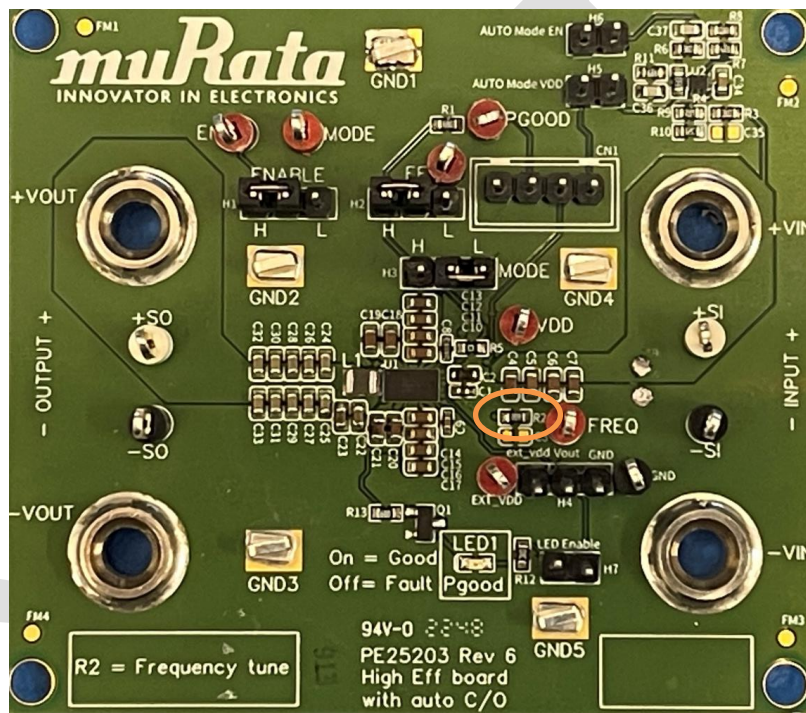


Figure 7. R2 Location

Technical Resources

Additional technical resources are available by contacting Sales at <https://www.murata.com/contactform>. These include the product specification datasheet, zip file, evaluation kit schematic and bill of materials, material declaration form and PC-compatible software file. Trademarks are subject to trademark claims.

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- Undersea equipment
- Power plant control equipment
- Surgical implants
- Transportation equipment (vehicles, trains, ships, etc.)
- Traffic signal equipment
- Disaster prevention / crime prevention equipment
- Application of similar complexity and/or reliability requirements to the applications listed in the above

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