Evaluation board for PMIC BD96801

BD96801-EVK-302

This quick start guide will help you understand the connection, operating Instructions and important notices and warnings that need to be carefully reviewed prior to use of the board (Figure 1).

The evaluation board has been designed to be used as a daughter board (DB) in combination with the main board PMIC-MB-EVK (MB) and the software GUI interface. It can also be operated in stand-alone mode without GUI software. The BD96801 contains 4 buck converters and 3 LDOs that can be flexibly configured via factory OTP settings, user EEPROM settings or I2C commands.

For further information please refer to the user guide (No. 65UG014E Rev.001).

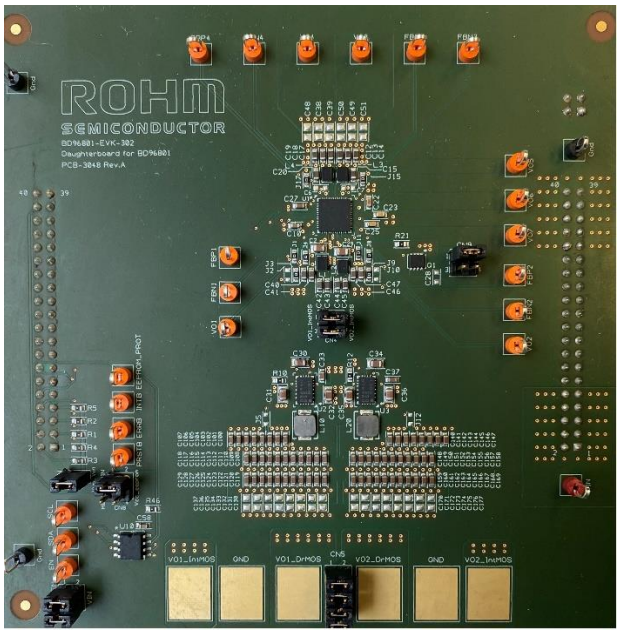

Figure 1: Evaluation board

Important Notice

This evaluation board is intended for **product evaluation in a research and development context only** and is not intended for resale to end consumers and it is not authorized for end customer or household use. This board may not comply with CE or similar standards (including, but not limited to the EMC directive 2004/EC/108) and may not fulfil other requirements of the country it will be operated in by the user. The user shall ensure that the evaluation board will be handled in a way that is compliant with all the standards and regulations in the country it will be operated in.

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The evaluation board provided here has only been subjected to functional testing under typical load conditions. The design of this evaluation board is tested by ROHM only as described in the user guide for this board. The design is not qualified in terms of safety requirements, manufacturing and operation over the entire operating temperature range or lifetime.

This evaluation board may only be used by authorized personnel that is properly trained in recognizing and dealing with the dangers of testing high voltage equipment and generally experimenting with high voltage circuits. Ensure you review this user guide as it contains important safety warnings. At all times, follow the applicable safety rules for dealing with high voltages. Do not connect or disconnect any wires or probes to the evaluation board, while it is connected to a power supply. Take care that capacitors on the board have discharged fully before touching any part of the board. Always place the evaluation board under appropriate covers, such as in a Perspex box, to protect against accidental touching of high voltage parts BEFORE applying a voltage supply to the board.

＜High Voltage Safety Precautions＞

◇ Read all safety precautions before use

Please note that this document covers only the BD96801evaluation board and its functions. For additional information, please refer to the datasheet.

To ensure safe operation, please carefully read all precautions before handling the evaluation board

Depending on the configuration of the board and voltages used,

Potentially lethal voltages may be generated.

Therefore, please make sure to read and observe all safety precautions described in the red box below.

Before Use

[1] Verify that the parts/components are not damaged or missing (i.e. due to the drops).
[2] Check that there are no conductive foreign objects on the board.
[3] Be careful when performing soldering on the module and/or evaluation board to ensure that solder splash does not occur.
[4] Check that there is no condensation or water droplets on the circuit board.

During Use

[5] Be careful to not allow conductive objects to come into contact with the board.
[6] **Brief accidental contact or even bringing your hand close to the board may result in discharge and lead to severe injury or death.**

Therefore, DO NOT touch the board with your bare hands or bring them too close to the board.

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In addition, as mentioned above please exercise extreme caution when using conductive tools such as tweezers and screwdrivers.
[7] If used under conditions beyond its rated voltage, it may cause defects such as short-circuit or, depending on the circumstances, explosion or other permanent damages.
[8] Be sure to wear insulated gloves when handling is required during operation.

After Use
[9] The ROHM Evaluation Board contains the circuits which store the high voltage. Since it stores the charges even after the connected power circuits are cut, please discharge the electricity after using it, and please deal with it after confirming such electric discharge.
[10] Protect against electric shocks by wearing insulated gloves when handling.

This evaluation board is intended for use only in research and development facilities and should by handled **only by qualified personnel familiar with all safety and operating procedures.**

We recommend carrying out operation in a safe environment that includes the use of high voltage signage at all entrances, safety interlocks, and protective glasses.

Safety Precautions

Caution: This evaluation board may only be used by authorized personnel that is properly trained in recognizing and dealing with the dangers of testing high voltage equipment and generally experimenting with high voltage circuits. This board should only be used in a lab facility properly equipped for the safe testing of power electronic systems at the relevant voltage levels. Failure to comply may result in damage to equipment, personal injury or death.

Warning: The DC link and input voltage of this board may reach up to 900 V. Ensure that only suitable high voltage differential probes are used to measure at this voltage. Failure to do so may result in damage to equipment, personal injury or death.

Warning: This evaluation board contains DC bus capacitors which take time to discharge after removal of the power supplies. Before working on the evaluation board wait at least six minutes after deactivating all connected power supplies to ensure that the capacitors have discharged to a safe level.

Warning: Ensure that you use only appropriate measurement equipment for the voltage levels present on the board. Ensure not to ground live parts through unsuitable measurement probes or tie different grounds together using passive probes. Suitable high voltage differential probes should be used. Failure to do so may result in damage to equipment, personal injury or death.

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Warning: Before disconnecting, connecting or reconnecting wires or measurement probes to the board or before touching the board or performing any manipulations on the board ensure that all external power is removed or disconnected from the board and at least six minutes have passed to ensure the capacitors have discharged to a safe level and then ensure that the capacitor voltages have dropped to a safe level.
Failure to do so may result in damage to equipment, personal injury or death.

Caution: The heatsink and some component surfaces on the evaluation board may become hot during testing and remain hot for a certain time after turn-off. Take appropriate measures while handling the board after use. Failure to do so may cause personal injury.

Caution: Incorrect connection of power supplies or loads can damage the board. Carefully review the information in this document.

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Board details

The main specifications for the evaluation board are summarized in Table 1 below.

Parameter	Description	Value
V_{IN}	Input voltage	2.5 V to 5.5 V
$V_{OUT1,2,3,4}$	Output voltage buck1 to buck4 (Internal FET mode)	0.5 V to 3.3 V
$V_{OUT1,2}$	Output voltage buck1, buck2 (DRMOS mode)	0.5 V to 1.0 V
$I_{OUT1,2}$	Output current buck1, buck2 (Internal FET mode)	2 A
$I_{OUT1,2}$	Output current buck1, buck2 (DRMOS mode)	Up to 40 A
$I_{OUT3,4}$	Output current buck3, buck4 (Internal FET mode)	4 A
f_{SW}	Switching frequency	2.25 MHz, 4 MHz
$V_{OUT5,6,7}$	Output voltage LDO5 to LDO7	0.3 V to 3.3 V
$I_{OUT5,6,7}$	Output current LDO5 to LDO7	300 mA
T_{OPR}	Operating temperature	-40°C to 125°C

Table 1: Specification of evaluation board

Evaluation board overview

Locations of connectors in the evaluation board

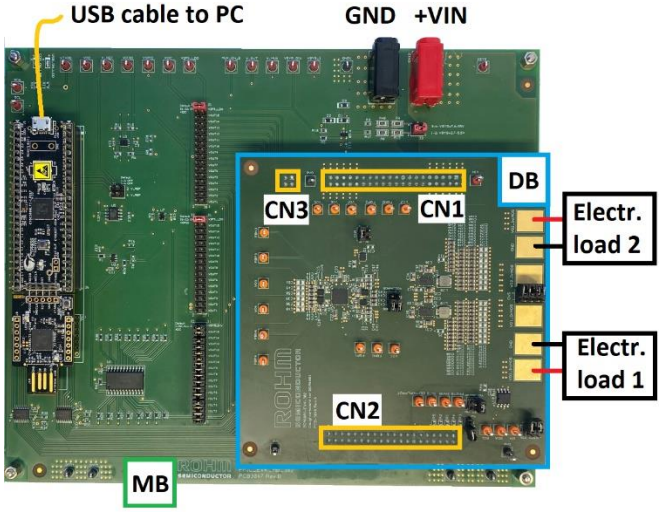

Figure 2: Top view of the evaluation boards (MB + DB)

Operating Instructions

The below procedures must be followed before beginning with the tests.

1. Download and install the ROHM EVK GUI SW for your Windows PC. The download link is *Accelerometer Evaluation Kit (rohm.com)*. After the installation, the shortcut ROHM EVK GUI appears in the startup menu as well as shortcut on the desktop.

   The configuration key is placed in the installation directory of the local drive:

   \\Documents\ROHM_EVK_v3\ROHM-EVK-GUI\ConfigurationKeys

   It is available on request from ROHM.

   The CY8CKIT-059 comes preloaded with Rohm's custom firmware. The firmware can be found in the installation directory:

   \\Documents\ROHM_EVK_v3\ROHM-EVK-Firmware\CY8CKIT-059

   The guide for programming the *RoKiX-CY8CKIT-059 firmware* to the *Cypress CY8CKIT-059 PSoC® 5LP Prototyping Kit* can be found in section 3.1 of the *ROHM EVK SW User's Guide*.

   MCU only FW is available on request from ROHM.
2. Connect the BD96801-EVK-302 board as follows:

   - Plug BD96801-EVK-302 board into PMIC-MB-EVK board (MB).

   - Connect +VIN (5V) and GND to main board (MB).

   - Optional: connect electronic load(s) to output(s).
3. Connect the CY8CKIT-059 to the PC using the provided micro-USB cable to establish the connection with the *ROHM EVK GUI*.

   Note: With Windows 10, the operating system should automatically use the correct driver. For earlier Windows versions, please follow the driver installation

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procedure in section 2 of the *ROHM EVK SW User's Guide*.

4. Start the ROHM EVK GUI software.

   (1) The blue LED on CY8CKIT-059, the green USB_ON_LED and the COM_ON_LED on the *PMIC-MB-EVK* board light up, indicating that the system is operational.

   (2) Select the board name "*BD96801-EVK-302 (CRC OFF, RnD)*" in the drop-down menu on the top right side of the GUI. See Figure 3.

   Once done, you need to press the "*Confirm board*" button. Now the field "*EVK Connected*" turns green.

   (3) Turn on the GUI switch "*STBY*", and then the switch "*EN*". The *BD96801-EVK-302* now starts. All status flags (*INTB*, *ERRB* and *PRSTB*) should be "High" now. Additionally, the GUI shows the voltage level of each output in the "ADC" box. See Figure 4.

5. The *BD96801-EVK-302* can operate without a *PMIC-MB-EVK* board in stand-alone mode as well. Refer to User Guide (No. 65UG014E Rev.001) for this.

6. The board can now be tested.

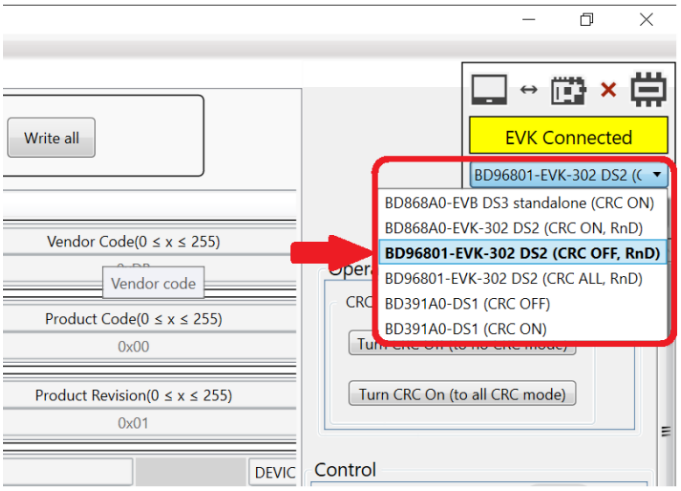

Figure 3: Choose appropriate EVK

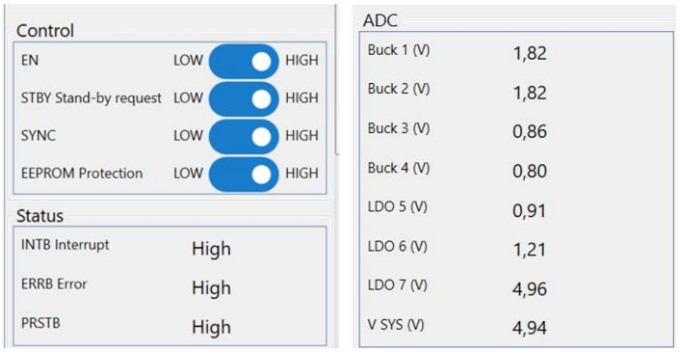

Figure 4: control- and status boxes (left), ADC box (right)

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