QODE_Series_Single_Evaluation_Board

Contents

1 Description

The QODEA0B Osprey™ series of dc-dc converters is a new generation of non-isolated, regulated DC/DC power modules designed to support $12V_{dc}$ intermediate bus applications. The QODEA0B series modules operate from an input voltage range of 40 to $60V_{dc}$ and 12V output in an industry-standard, modified DOSA digital quarter brick. The converter incorporates digital control, synchronous rectification technology, a regulated control topology, and innovative packaging techniques to achieve high efficiency. Standard features include a heat plate to attach external heat sinks or contact a cold wall, on/off control, remote sense, output overcurrent and over voltage protection, over temperature protection, input under and over voltage lockout and PMBus interface. For more details refer to the product datasheet.

QODE Series Single Evaluation Board (later refers to EVM) provides user a quick start for performance evaluation.

2 Precautions

The QODE Single EVM can deliver up to 180A DC output current. Any unintended connection can cause danger to both the EVM and user, user precaution is advised. QODE Single EVM can only be evaluated at room temperature of 25 degrees Celsius and is assumed to have proper air flow for heat dissipating. Do NOT apply reverse voltage, larger than ±0.5V, on the output terminal, this will damage the EVM.

3 Getting Started

3.1 Required Equipment and Accessory

QODE Single EVM is preconfigured which provides maximum ease to evaluate. See below list of required equipment and accessories.

- Power supply (Chroma 62050P-100-100 DC Power Supply is recommended, 54V/55A and up is recommended)
- DC Load (Chroma 63206A-150-600 DC Electronics Load is recommended)
- OmniOn Power™ USB to I^2C dongle
- PC with OmniOn Power™ DPI-CLI Tool

3.2 Optional Equipment and Accessory

Standard probing technics can be performed, OmniOn Power™ encourages users to use co-axial cable for output signal measurement to examine the ideal performance of QODE series module. User is recommended to prepare the following equipment and accessory for proper measurement and on-board pulse load control.

- SMA to Oscilloscope cable (Digikey PN: ACX1717-ND or equivalent)
- Multimeter

3.3 EVM Board Terminals/Ports

The following diagram and table illustrate locations and purposes of main terminals/ports.

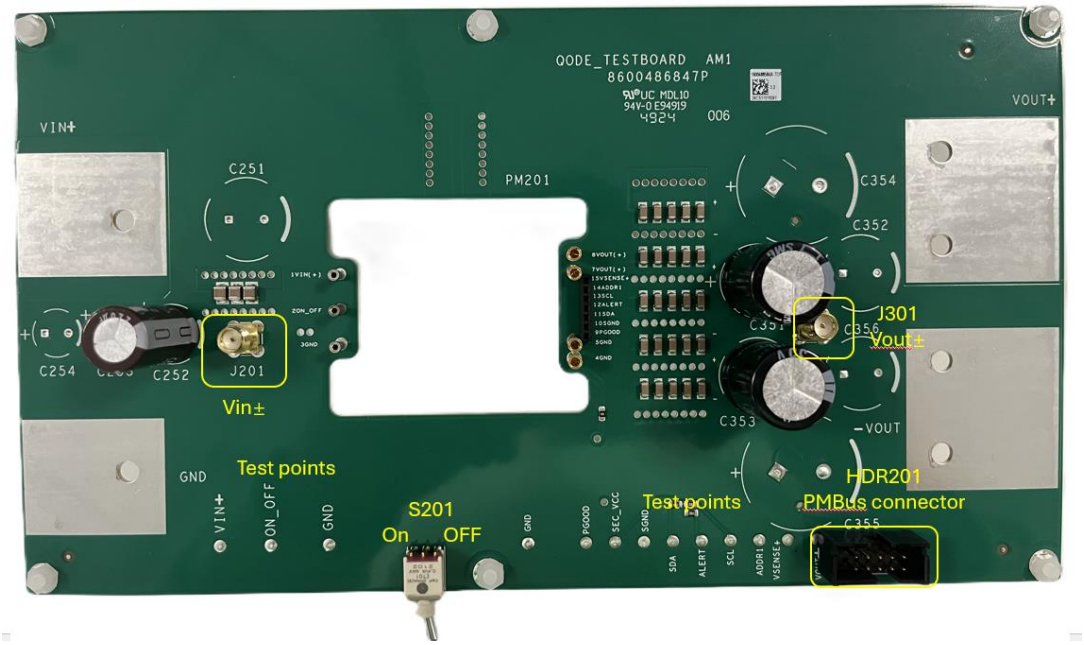

Figure 1. Top view of QODE Series Single EVM

Name	Description
V_{IN}+	M5*0.8 stud, positive input voltage terminals
V_{IN}-	M5*0.8 stud, negative input voltage terminals
V_{out}+	M5*0.8 stud, positive output voltage terminals
V_{out}-	M5*0.8 stud, negative output voltage terminals
PM201	QODE series modules
S201	Main on/off switch
J201	V_{IN} voltage test connector, after input capacitors
J301	V_{IN} voltage test connector, after input capacitors
HDR201[1]	PMBus port for connecting to OmniOn Power™ DPI-CLI tool

Table 1. Footprint description

Note 1: The EVM board can be used for 6.35mm and 8.00mm pin lengths version module directly (See Fig 2). For 2.79mm , 3.68mm, 4.57mm short pin length version a transiting socket is required(See Fig 3).

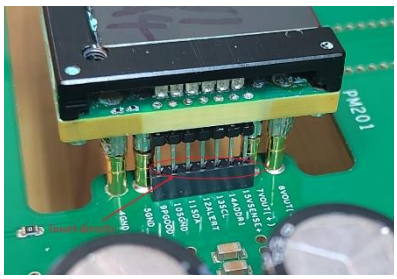

Fig. 2 Inserting Pins

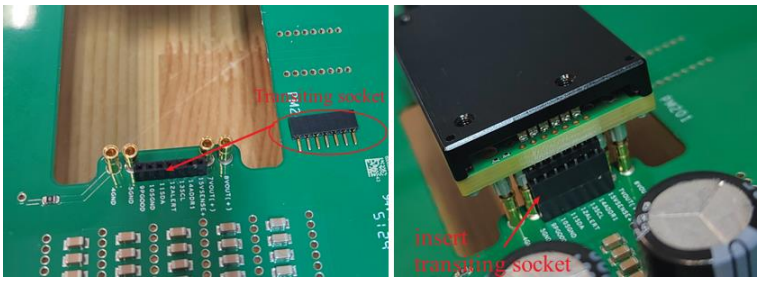

Fig. 3 Inserting Transiting Socket

Characteristic	Character	Definition
Pin Length	8 6 5 3	Omit = Default Pin Length shown in Mechanical Outline : 6.35 mm ± 0.25mm, (0.250 in. ± 0.010 in.) 8 = 2.79 mm ± 0.25mm, (0.110 in. ± 0.010 in.) 6 = 3.68 mm ± 0.25mm, (0.145 in. ± 0.010 in.) 5 = 4.57mm ± 0.25mm,(0.180 in. ± 0.010 in.) 3 = 8.00mm ± 0.25mm, (0.315 in. ± 0.010 in.)

Table2. Pin length Options

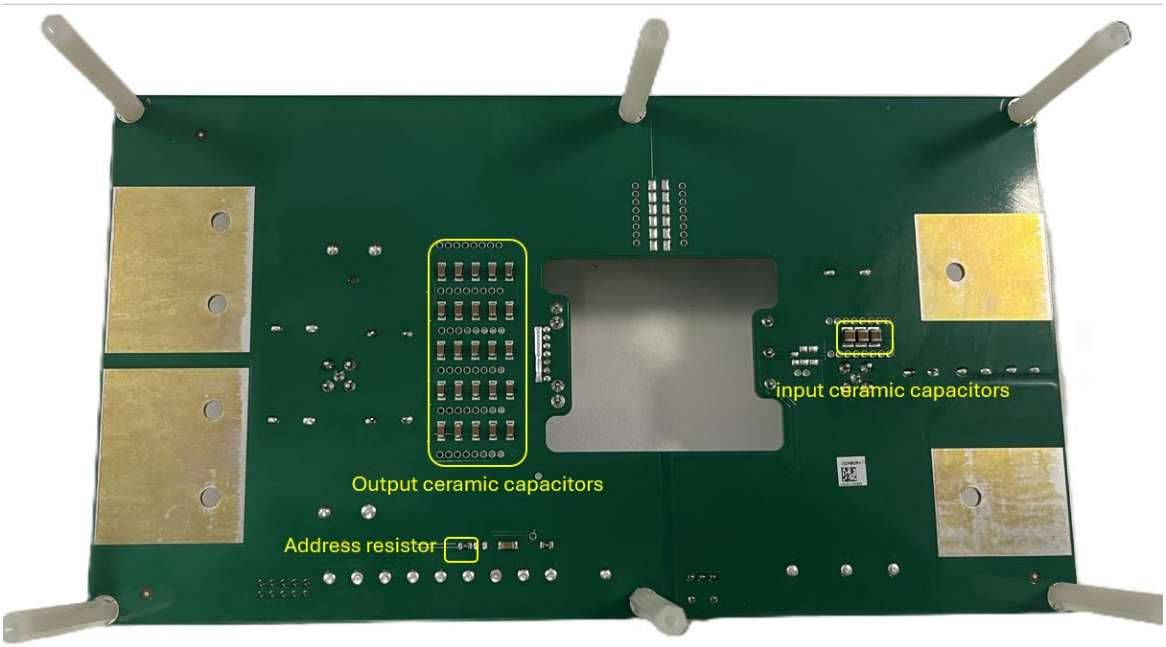

Figure 4. Bottom view of QODE Series Single EVM

3.4 Input/Output Cable

The EVM provides M5x0.8 stud for external connections. The maximum input current for EVM can go over 55A, user must choose proper input cable size. The output voltage of the EVM can range from 9.5V to 12.5V and can deliver up to 180A. Cable voltage drop must be controlled in this application. In general, output connection should be kept as short as possible by means of reducing voltage drop on each cable.

3.5 Input/Output Measurement

To measure Input/Output voltage properly, co-axial cables are recommended to be populated at V_{IN} and Vout_ripple. Ideally oscilloscope should use 50Ω input impedance for measuring output voltage ripple or use a 50Ω attenuator in series with 1MΩ input impedance. Set the oscilloscope to 10mV/div or below to examine ultra-low ripple performance of QODE series modules.

3.6 Address Resistor

By default, the PMBus address resistors are set to 10kΩ for PM201. Any need to change the address must be done prior powering up the EVM. For PMBus address resistor selection, please refer to QODE series module datasheet.

3.7 Input/Output Capacitor

The EVM comes with limited amount of input and output capacitors. Although the number of capacitors is sufficient to evaluate the basic performance, users need to decide whether to change/add more capacitors to unleash superior performance of QODE series module. For output impedance matching purposes, capacitors should be placed symmetrically. POSCAP is recommended.

The initial capacitance values of each module on the EVM board are as follows:

- Input capacitor: 220µF (Aluminum Polymer)
- Output capacitor: 2 x 2200µF + 50x10µF (Ceramic)

4 Start EVM

The input voltage for the EVM is from 40V to 60V, and the input voltage must not exceed 65V. The input current should be limited to 55A. The default output of QODE series module EVM is set to be 12V. Turn on the switch S201 to start the module. Connect OmniOn Power™ DPI-CLI dongle to PMBus port to use PMBus commands. Upon complete, power the EVM to examine the performance.

All EVM boards are pre-configured in the factory, users don't require to perform any additional configuration before turning on the EVM. Refer to DPI-CLI User Guide and QODE series modules datasheet for detailed PMBus commands.

5 Schematic

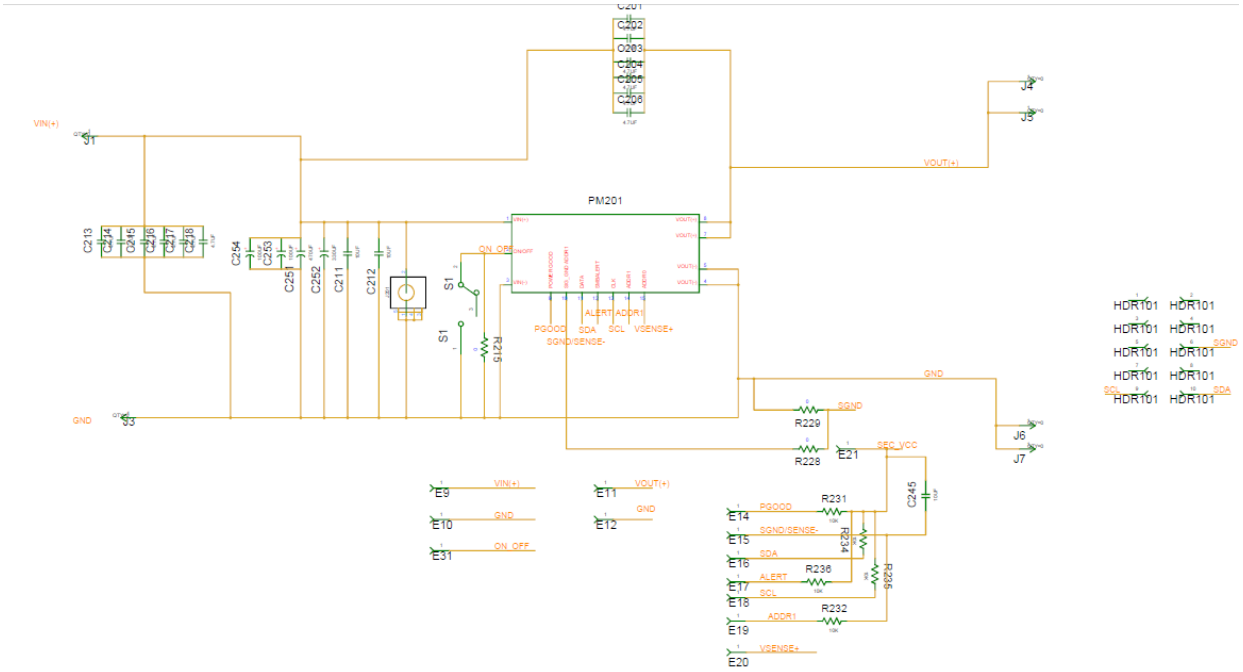

Figure 5. PM201 Power module external circuit

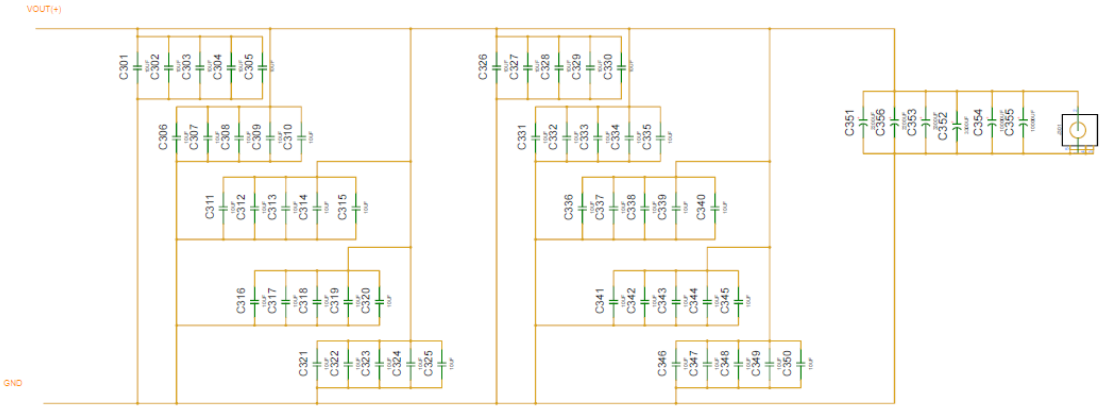

Figure 6. Terminals/Ports and output ceramic capacitors

Change History (excludes grammar & clarifications)

Revision	Date	Description of the change
1.0	01/6/2025	Initial Release
1.1	06/04/2026	Updated as per OmniOn Power template

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