User's Guide

SDM11 – Post-Regulator

SDM-Series – DIN Rail Mounting Modules

SISYPH
Signals & Systems for Physics

www.sisyph.com

1 General Information

1.1 Important Notice

1.2 Scope

This manual provides the user with a description of the operation for the SDM11 Linear Post-Regulator module.

1.3 Related Documents

All documents listed below are available online. See the product page.

Document	Release Number
Datasheet	SDM11-SS01-R20A

1.4 Certification

Signals and Systems for Physics certifies that this product met its published specifications at the time of shipment.

1.5 Warranty

This *Signals and Systems for Physics* product is warranted against defects in materials and workmanship for a period of one (1) year from the date of shipment.

1.6 Absolute Maximum Ratings

The SDM11 module is designed to be operated in laboratory environment.

Parameter	Rating
Environmental Temperature	+15 °C to +30 °C
Environmental Humidity	< 60 %

1.7 Specifications

All specifications regarding the product are reported in the datasheet available online. See section 1.3.

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2 Overview

The *SDM11 Post-Regulator* module is aimed at noise reduction of switched-mode power supplies (SMPS). Indeed, if SMPS are very attractive for their high efficiency and small size, they are much noisier than their linear counterparts. While the linear power supplies' noise mainly consists in ripple voltage at line harmonics, the DC-output voltage of SMPS presents ripple at frequencies ranging from 100 kHz to 1000 kHz and broadband noise, which is transmitted from the switcher through common-mode and differential-mode coupling.

The *SDM11 Post-Regulator* module operates from the DC-output of an SMPS. It features a passive filter attenuating both common-mode and differential-mode components of the SMPS's output. A low-dropout voltage regulator provides an active attenuation of the SMPS's ripple for frequencies up to 1 MHz. An additional output filter extends this frequency range beyond 10 MHz.

Because the SDM11 is capable of delivering output voltages from 3 V to 30 V under 2-A current levels, the SDM11 is the perfect choice to filter the noise of low-power SMPS. A control input is provided to allow power shutdown from an isolated remote signal. The power device is both protected against overloading or overheating operations. The current limitation can be adjusted by modifying a resistor. Likewise, the user can set the output voltage using two programming resistors. The SDM11 is attached to the chassis both using a DIN-rail adapter or M3 screws.

3 Description

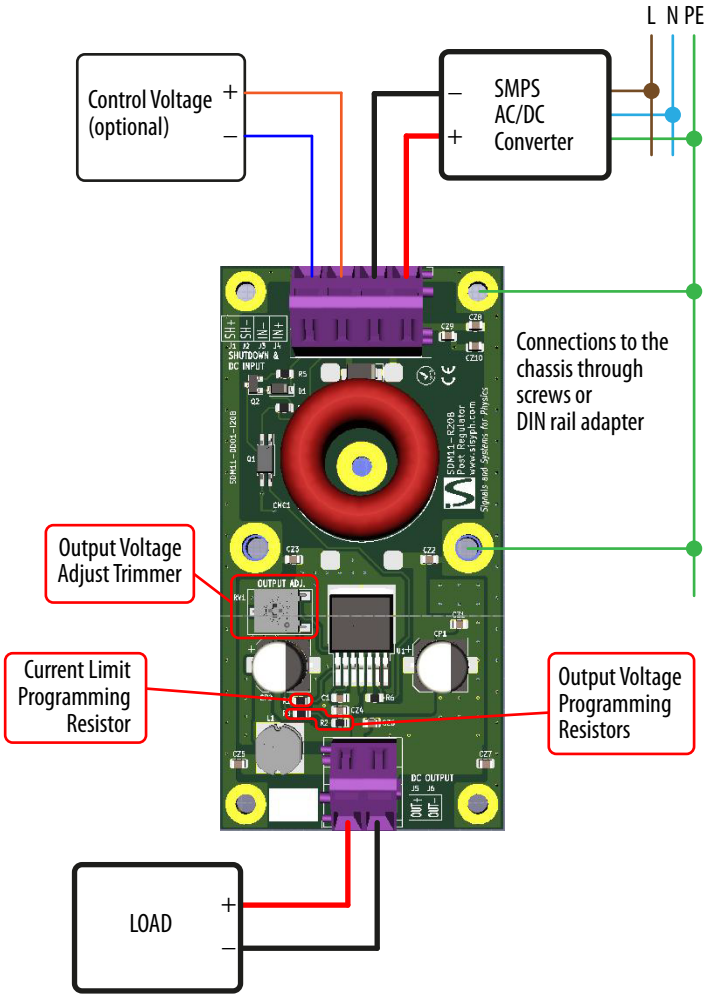

Figure 1: SDM11 Connections

3.1 DC-Input Terminal Blocks

Two terminal blocks are used to connect the SMPS to the SDM11 module (see Figure 1):

- connect the SMPS's positive lead to the `IN+` terminal.
- connect the SMPS's negative lead to the `IN-` terminal.

3.2 Power Shutdown Terminal Blocks

Two terminal blocks are used to connect the remote control signal (see Figure 1):

- connect the positive lead to the `SH+` terminal.
- connect the negative lead to the `SH-` terminal.

The power shutdown signal is active-high: when the differential input voltage is above 3 V, the SDM11's output is turned off. Pulling this input below 1 V turns the output on. Can be let open if not used.

3.3 DC-Output Terminal Blocks

Two terminal blocks are used to connect the SDM11 module to the load (see Figure 1):

- connect the load's positive lead to the `OUT+` terminal.
- connect the load's negative lead to the `OUT-` terminal.

A minimimal loading (2 mA) must be provided to ensure proper operation of the internal voltage regulator.

3.4 Output Voltage Adjust Trimmer

Use the trimmer to adjust the SDM11's output voltage, in order to compensate voltage drop in load's wires for example. The trimming voltage range is 0 mV to 500 mV. Refer to Figure 1 to locate this trimmer.

3.5 Output Voltage Programming Resistors

The SDM11's output voltage can be fixed in factory or by the user using two resistors, `R2` and `R3`. Calculate the programming resistors values using (1). Some typical values are also given in Table 1. Refer to Figure 1 to locate these resistors.

$$R_{\mathrm{SET}} = R_2 + R_3 = \frac{V_{\mathrm{OUT}} - 0.4}{50 \times 10^{-6}} \tag{1}$$

3.6 Current Limit Programming Resistor

The SDM11 output is current limited to 2 A but other values can be programmed using the resistor `R1`. Calculate this resistor value using (2). Typical values are also given in Table 2. Refer to Figure 1 to locate this resistor.

$$R_{\mathrm{LIM}} = R_1 = 1000 \times \frac{0.8}{I_{\mathrm{LIM}}} \tag{2}$$

DC Output	R2	R3
3.3 V	49.9 kΩ	8.2 kΩ
5 V	91 kΩ	1 kΩ
12 V	220 kΩ	12 kΩ
15 V	270 kΩ	22 kΩ
24 V	470 kΩ	2 kΩ

Table 1: Typical Programming Resistors Values

I LIM	R1
1 A	750 Ω
1.5 A	560 Ω
2 A	390 Ω
2.2 A	0 Ω

Table 2: Typical Current Limitation Resistor Values

4 DIN Rail Mounting

The SDM11 module can be rail-mounted using accessories (see *Ordering Information* section in the *Datasheet*). The board is mounted on a 35-mm DIN rail adapter using two M4 screws. A insulation pad must be used to prevent short-circuits between the SDM11's negative output and the chassis *via* the metallic adapter. Mounting the module on the DIN rail also extends the maximal power dissipation (refer to the *Datasheet*). See online for 3D step model.

Document Identifier

This document is identified as **SDM11-SN01-R20A**.