SHMYTOV

# HIGH-VOLTAGE POWER SUPPLY

**Revision: July 2026**

**FEATURES:**

- **High output-voltage stability**
- **Cost-effective design**
- **Shielded metal enclosure**
- **Easy integration and operation**
- **Adjustable output voltage**
- **Output voltage up to 2.5 kV**
- **Positive or negative output polarity, selected at the time of order**


**APPLICATIONS:**

- **Photomultiplier tubes (PMTs)**
- **Geiger-Müller counters**
- **Photon-counting systems**
- **$^3$He neutron detectors**
- **High-resolution spectrometry systems**

**Table 1 - ABSOLUTE MAXIMUM RATINGS**

| Parameter | Absolute maximum rating |
|---|---|
| Supply voltage, VCC | 13 V |
| Output-voltage magnitude, \|VOUT\|; polarity selected at the time of order | 2500 V |
| Control input voltage, VCTRL | 2.5 V |

**Table 2 - ELECTRICAL CHARACTERISTICS**

| Parameter | Min. | Typical | Max. |
|---|---|---|---|
| Supply voltage, VCC | 4.5 V | | 12 V |
| Control input voltage, VCTRL (1) | 0 V | | 2.5 V |
| Regulated output-voltage range, \|VOUT\| | 200 V | | 2450 V |
| Reference-voltage output, VREF | | 2.5 V | |
| OUT/1000 monitor output | - | ≈ VOUT/1000 | - |
| Standby supply current, ISLEEP, at VCC = 12 V and VCTRL = 0 V | | | 7 mA |
| Weight | | | 115 g |

(1) Within the regulated output-voltage range, |VOUT| ≈ 1000 × VCTRL.

**Table 3 - PIN ASSIGNMENT**

| Pin # | Symbol | Function |
|---|---|---|
| 1 | GND | GND |
| 2 | OUT/1000 | Output-voltage monitor; nominal 1:1000 divider ratio (2) |
| 3 | VREF | 2.5 V reference-voltage output |
| 4 | VCTRL | Output-voltage control input (3) |
| 5 | VCC | Supply-voltage input (8) |
| 6 | OUTRES | Current-sense shunt terminal; high voltage (4)(5)(6) |
| 7 | OUT | High-voltage output (5) (6) |
| CASE | GND | Metal-enclosure ground connection; PCB ground-plane shielding is recommended (7) |

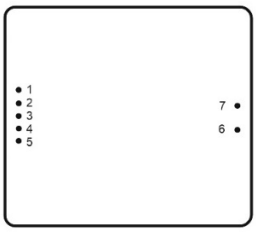


Fig. 1. Pin assignment, bottom view.

(2) The OUT/1000 pin provides a nominal 1:1000 scaled replica of the high-voltage output. On negative-output versions, the OUT/1000 voltage is also negative. This output is intended for output-voltage indication only and is not suitable for calibrated or precision measurements.

(3) The VCTRL input controls the output-voltage magnitude. Connecting VCTRL to GND disables the high-voltage output. VCTRL may be varied continuously to adjust the output voltage. Do not apply power unless VCTRL is connected to a defined control voltage between 0 and 2.5 V. Do not allow VCTRL to float or exceed 2.5 V.

(4) OUTRES is connected to OUT through an internal 1 kΩ ±5% current-sense resistor. The output current can be determined from the voltage drop between the OUTRES and OUT terminals.

(5) Maintain a minimum clearance of 5 mm between the high-voltage terminals and all other conductors. Optional RC filters may be used to reduce output noise.

**Notes to Table 3 (continued)**

(6) Improper use or accidental contact with the OUTRES or OUT terminals may cause serious injury or death.
(7) The metal enclosure must be connected to GND for electrical safety and noise reduction.
(8) Connect an electrolytic capacitor of at least 1000 µF between VCC and GND.

**WARNING: LETHAL HIGH VOLTAGE**

**This power supply generates potentially lethal voltages. Improper use or accidental contact with the OUTRES or OUT terminals may cause severe injury or death. Persons with pacemakers or other implanted electronic medical devices must not operate, adjust, or service this power supply. Before servicing the power supply or any connected equipment, set VCTRL to 0 V, disconnect the VCC supply, and verify that no hazardous voltage remains at any high-voltage node. Do not rely solely on VCTRL to make the equipment safe. Noise or transients at the VCTRL input may unintentionally enable the high-voltage output, potentially causing injury or equipment damage. Hazardous voltage may remain present at the high-voltage terminals for some time after the input power has been disconnected. Insufficient clearance from the OUTRES or OUT terminal to other conductors may cause electrical arcing, fire, equipment damage, or power-supply failure. The manufacturer assumes no responsibility for consequences resulting from improper installation, operation, or use of the device, including equipment damage, fire, injury, permanent disability, or death.**

## PMT HV PS EVALUATION MODULE

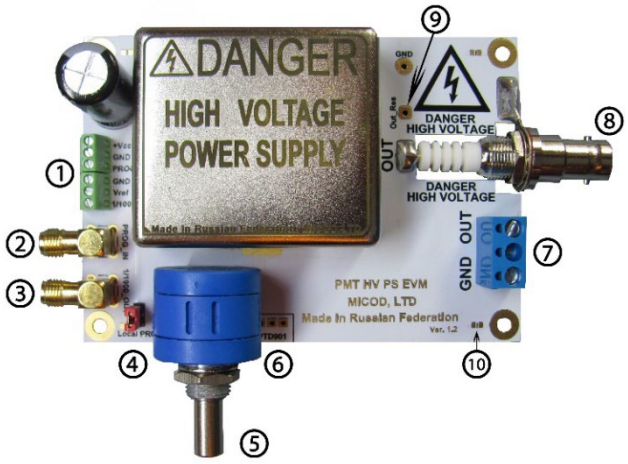


Fig. 2. EVM board.

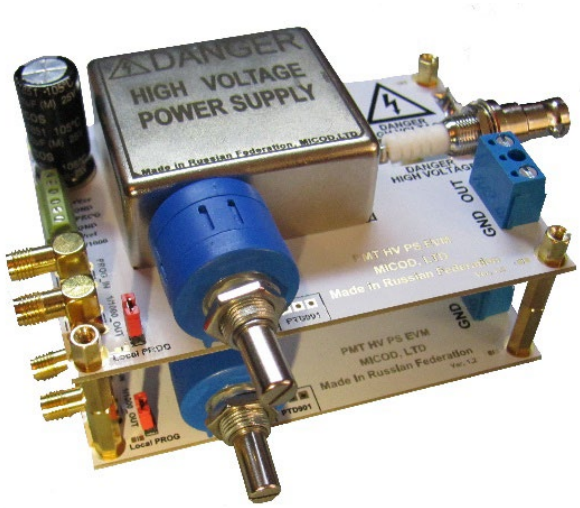


Fig. 3. Multichannel configuration.

1 Main connector: VCC, GND, external PROG input, GND, VREF output, and OUT/1000 output;
2 External PROG input, SMA connector;
3 OUT/1000 monitor output, SMA connector;
4 External/local PROG selector; local mode: jumper installed;
5 Precision potentiometer, Bourns 3590S-2, 2–20 kΩ (recommended);
6 Alternative potentiometer, Bourns PTD901, 2–20 kΩ;
7 High-voltage output terminal block;
8 High-voltage output, SHV connector;
9 OUTRES high-voltage current-sense terminal; internal shunt resistance: 1 kΩ ±5%;
10 Each of the four mounting holes may be connected to GND if required.

Optional RC filtering may be added to the high-voltage outputs to reduce output noise.

## TYPICAL CONNECTION DIAGRAM

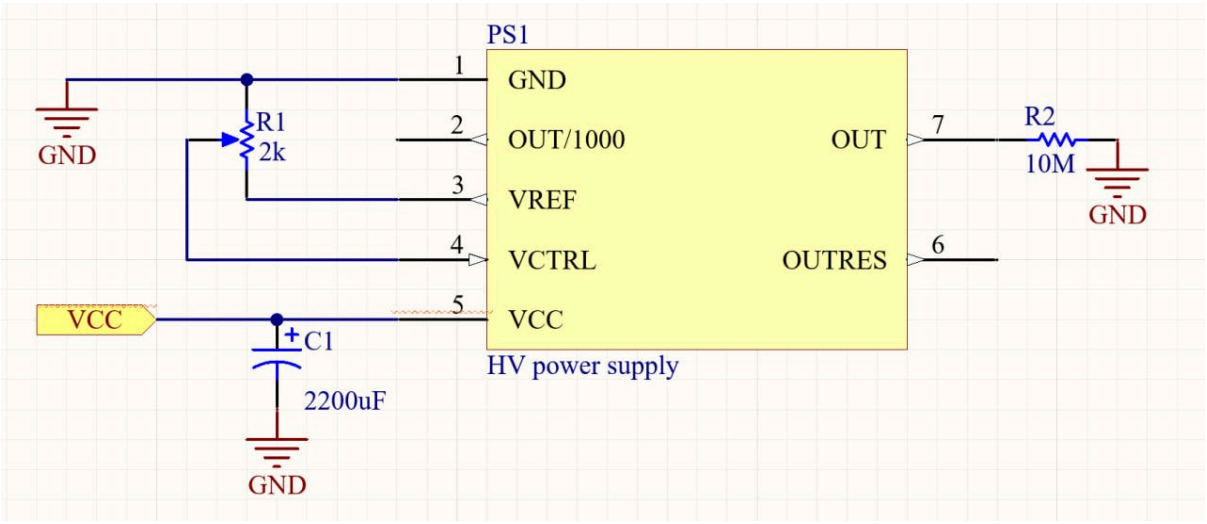


Fig. 4. Typical connection diagram.

## LOAD CHARACTERISTICS

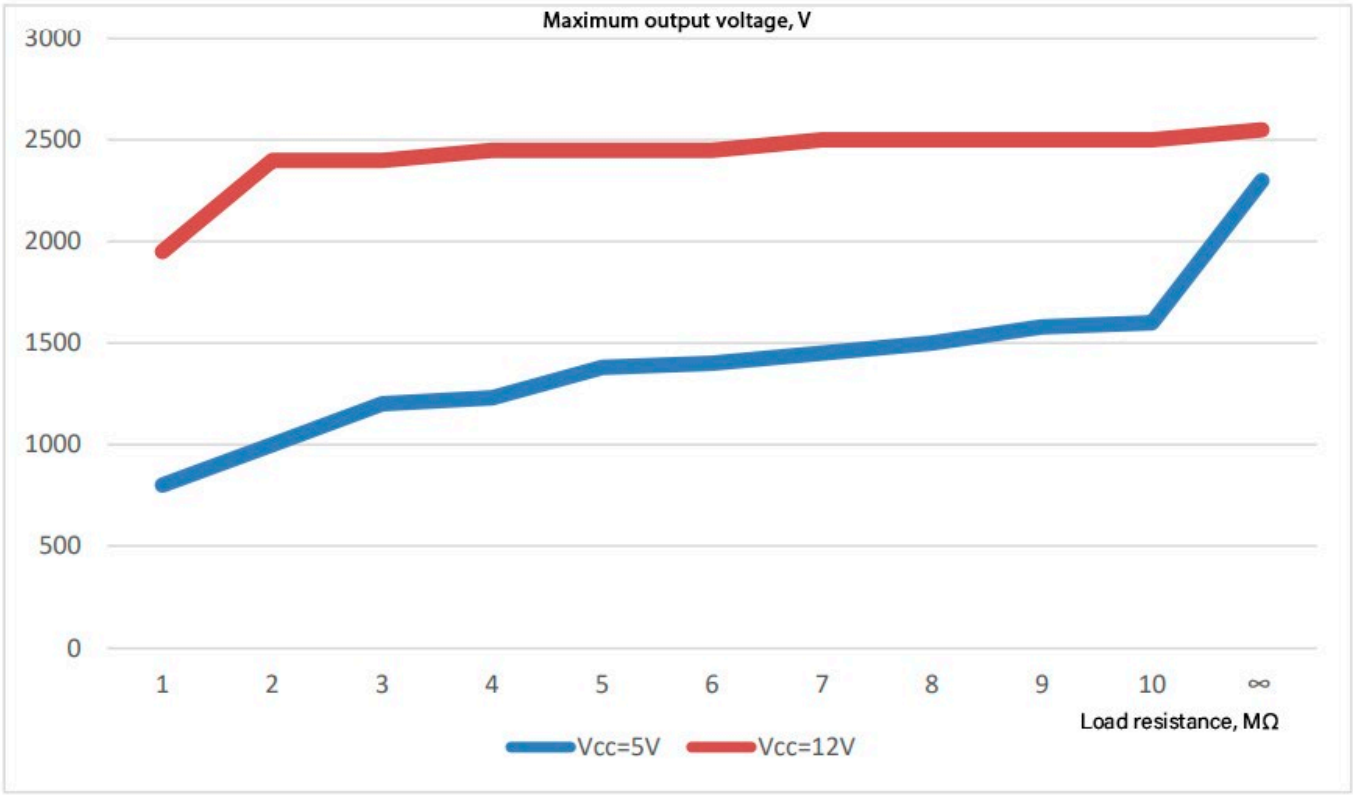


Fig. 5. Maximum output voltage as a function of load resistance for VCC = 5 V and VCC = 12 V.

**MECHANICAL DIMENSIONS**

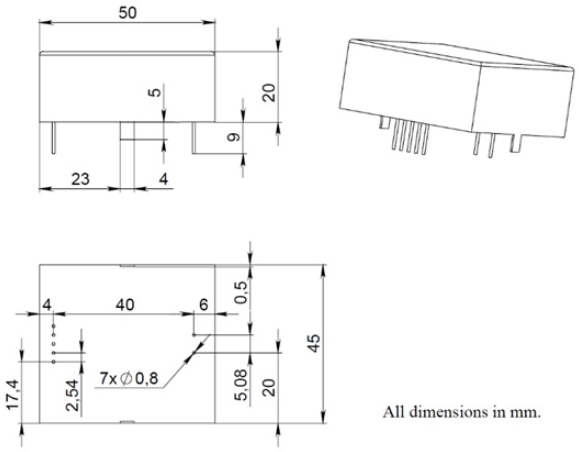


Fig. 6. Power-supply enclosure dimensions.

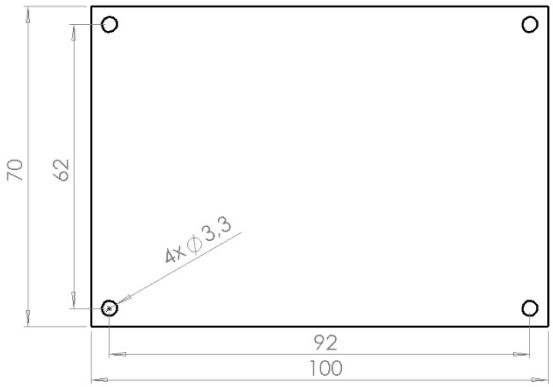


Fig. 7. EVM board dimensions.

**Web: https://shmytov.com**

**TERMS AND CONDITIONS FOR THE PURCHASE AND USE OF OEM PRODUCTS**

**OEM products are intended solely for integration into electronic equipment by qualified developers and manufacturers and are not intended for direct use by end users. The manufacturer cannot verify the customer's installation, operating, or storage conditions; compliance with the Absolute Maximum Ratings, Electrical Characteristics, and other requirements specified in this document; or the technical qualifications of the personnel integrating or operating the product. By purchasing this product, the customer acknowledges that it is not eligible for return or replacement. All units undergo quality-control testing before shipment.**