

Technical documentation

Last changed on: 2020-12-02

BPS series

Small High Voltage Module for PCB mounting up to 4 Watt

- Versions from 300 V – 6 kV, 1W / 3W / 4W available
- patented resonance converter technology
- controlled by analog set voltage
- analog monitor voltage
- wide supply range
- low ripple and noise, low EMI



Document history

Version	Date	Major changes
2.5	2020-12-02	Corrections of documentation (item code BP060674x12)
2.4	2020-11-05	Improved documentation Intended Use, Depiction of the safety instructions, Modules BPx 25 404 5, BPx 25 125 12 discontinued, new item Code (Table 3: Technical data: Options and order information) for modified dimensions for 1W / 3W modules (Figure 1: dimensional drawing BPS 1/3W),
2.3	2020-07-08	Improved documentation
2.2	2019-06-03	Corrections of documentation
2.1	2018-09-04	Extended operation temperature
	2018-09-25	Fixed typo
2.0	2017-02-28	Relayouted documentation
	2018-06-13	Corrections of documentation
	2018-11-01	Fixed typo BPx60 674 12

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The information in this manual is subject to change without notice. We take no responsibility for any mistake in the document. We reserve the right to make changes in the product design without reservation and without notification to the users. We decline all responsibility for damages and injuries caused by an improper use of the device.

Safety

This section contains important security information for the installation and operation of the device. Failure to follow safety instructions and warnings can result in serious injury or death and property damage.

Safety and operating instructions must be read carefully before starting any operation.

We decline all responsibility for damages and injuries caused which may arise from improper use of our equipment.

Depiction of the safety instructions

DANGER!	
 DANGER!	<p>“Danger!” indicates a severe injury hazard. The non-observance of safety instructions marked as “Danger!” will lead to possible injury or death.</p>
WARNING!	
 WARNING!	<p>“Warning!” indicates an injury hazard. The non-observance of safety instructions marked as “Warning!” could lead to possible injury or death.</p>
CAUTION!	
 CAUTION!	<p>Advices marked as “Caution!” describe actions to avoid possible damages to property.</p>
INFORMATION	
 INFORMATION	<p>Advices marked as “Information” give important information.</p>



Read the manual.



HIGH VOLTAGE

Attention high voltage!



Important information.

Intended Use

The device may only be operated within the limits specified in the data sheet. The permissible ambient conditions (temperature, humidity) must be observed. The device is designed exclusively for the generation of high voltage as specified in the data sheet. Any other use not specified by the manufacturer is not intended. The manufacturer is not liable for any damage resulting from improper use.

Qualification of personnel

A qualified person is someone who is able to assess the work assigned to him, recognize possible dangers and take suitable safety measures on the basis of his technical training, his knowledge and experience as well as his knowledge of the relevant regulations.

General safety instructions

- Observe the valid regulations for accident prevention and environmental protection.
- Observe the safety regulations of the country in which the product is used.
- Observe the technical data and environmental conditions specified in the product documentation.
- You may only put the product into operation after it has been established that the high-voltage device complies with the country-specific regulations, safety regulations and standards of the application.
- The high-voltage power supply unit may only be installed by qualified personnel.

Important safety instructions

WARNING!



WARNING!

Do not operate the unit in wet or damp conditions.

WARNING!



WARNING!

Do not operate the unit in an explosive atmosphere.

WARNING!



WARNING!

Do not operate the unit if you suspect the unit or the connected equipment to be damaged.

INFORMATION



INFORMATION

It is strongly recommended to read the manual before operation!

1 General description

The BPS High Voltage Power Supply module is a small DC/DC converter which can be mounted and soldered on printed circuit boards (PCB). The output voltage is controllable with an analog control voltage. Therefore a potentiometer or fixed resistor can be used. The patented resonance converter technology and moulded metal box shielding guarantee lowest electromagnetic interference and low ripple and noise of the output voltage.

Customized versions can be produced on request.

2 Technical Data

SPECIFICATIONS	BPS 1 W	BPS 3W	BPS 4W
Polarity	Factory fixed, positive or negative		
Ripple and noise (f > 10 Hz) ⁽¹⁾	typ. < 10 mV max. 25 mV _{p-p}	typ. < 20 mV _{p-p} max. 60 mV _{p-p}	typ. < 5 mV _{p-p} max. 10 mV _{p-p}
Stability [ΔV_{out} vs. ΔV_{in}] ⁽¹⁾	< $5 \cdot 10^{-4} \cdot V_{nom}$		< $2 \cdot 10^{-4} \cdot V_{nom}$
Stability - [ΔV_{out} vs. Δr_{load}] ⁽¹⁾	< $2 \cdot 10^{-3} \cdot V_{nom}$		< $5 \cdot 10^{-4} \cdot V_{nom}$
Temperature coefficient	50 ppm/K ⁽²⁾		
Supply voltage V_{in}	4.5 – 5.5 V	11.5 – 15.5 V	11.4 – 12.6 V
Supply current I_{in} at $V_{out} = 0$ at $V_{out} = V_{nom}$ / no load at $V_{out} = V_{nom}$ / with load	< 10 mA < 50 mA < 400 mA	< 10 mA < 50 mA < 500 mA	< 10 mA < 40 mA < 500 mA
Set / Monitor voltage	0 – 2.5 V	0 – 5 V	
Adjustment accuracy	$\pm 1\%$ ⁽²⁾		
Signal - ON	TTL-Pegel LOW → HV = 0, HIGH or open → HV according to V_{set}		
Signal - /ON			TTL-Pegel HIGH → HV = 0, LOW or open → HV according to V_{set}
Reference voltage V_{REF} (internal)	2.5 V / 0.5 mA	5 V / 0.5 mA	
Control V_{set} - version 1	Remote control with an ext. potentiometer (10 – 100k Ω) between REF and GND, sliding contact on V_{set}		
Control V_{set} - version 2	with V_{set} $0 \leq V_{set} \leq V_{ref} \rightarrow 0 \leq V_{out} \leq V_{nom} \pm 1\%$ ⁽²⁾		
	Attention! Output voltage is internally not limited! Do not use $V_{set} > 2.5V$ (1W) or 5V (3W)! Output current is internally limited to approx. $1.5 \cdot I_{nom}$		Attention! Output voltage and output current are internally limited to $1.1 \cdot V_{nom}$ resp. I_{nom}
Protection	Overload and short circuit protected		
HV connector	Pin		
Case	Metal box, moulded		
Dimensions – L/W/H	40 / 40 / 18mm ³		50 (55) / 40 / 17mm ³
Operating temperature	-20 – 60 °C		
Storage temperature	-20 – 60 °C		
¹⁾ Specifications for stability, ripple and noise are guaranteed in the range $2\% \cdot V_{nom} < V_{out} \leq V_{nom}$			
²⁾ Temperature coefficient and accuracy are guaranteed in the temperature range 0 – 40 °C; for -20 – 60°C max. 150 ppm/K and $\pm 1.5\%$ resp.			

Table 1: Technical data: Specifications

CONFIGURATIONS						
Type	V _{nom}	I _{nom}	Ripple / Noise typ. (mV _{p-p})	Ripple / Noise max. (mV _{p-p})	Length (mm)	Item code
BPS 1 W						
BPx 05 205 5	500 V	2 mA	< 10	< 20	40	BP005205x050A
BPx 10 105 5	1 kV	1 mA	< 10	< 20	40	BP010105x050A
BPx 15 604 5	1.5 kV	0.6 mA	< 10	< 20	40	BP015604x050A
BPx 20 504 5	2 kV	0.5 mA	< 10	< 20	40	BP020504x050A
BPx 30 304 5	3 kV	0.3 mA	< 15	< 25	40	BP030304x050A
BPS 3 W						
BPx 03 106 12	300 V	10 mA	< 15	< 30	40	BP003106x120A
BPx 05 605 12	500 V	6 mA	< 15	< 30	40	BP005605x120A
BPx 10 305 12	1 kV	3 mA	< 20	< 40	40	BP010305x120A
BPx 15 205 12	1.5 kV	2 mA	< 25	< 50	40	BP015205x120A
BPx 20 155 12	2 kV	1.5 mA	< 30	< 55	40	BP020155x120A
BPx 30 105 12	3 kV	1 mA	< 35	< 60	40	BP030105x120A
BPS 4 W						
BPx 05 805 12	500 V	8 mA	< 5	< 10	50	BP005805x12
BPx 10 405 12	1 kV	4 mA	< 5	< 10	50	BP010405x12
BPx 20 205 12	2 kV	2 mA	< 5	< 10	50	BP020205x12
BPx 30 135 12	3 kV	1.3 mA	< 5	< 10	50	BP030135x12
BPx 40 105 12	4 kV	1 mA	< 5	< 10	50	BP040105x12
BPx 60 674 12	6 kV	0.67 mA	< 5	< 10	55	BP060674x12

Table 2: Technical data: Configurations

CONFIGURATION ORDER GUIDE (item code parts)					
BP	005	805	P	12	XX
Type BPS	V _{nom}	I _{nom} (nA)	Polarity	Input Voltage	Revision
	three significant digits • 100V For Example: 005 = 500V	two significant digits + number of zeros For Example: 805 = 8mA	p = positive n = negative	two significant digits 05 = 5 Volt 12 = 12 Volt	

Table 3: Technical data: Options and order information

3 Dimensional drawing

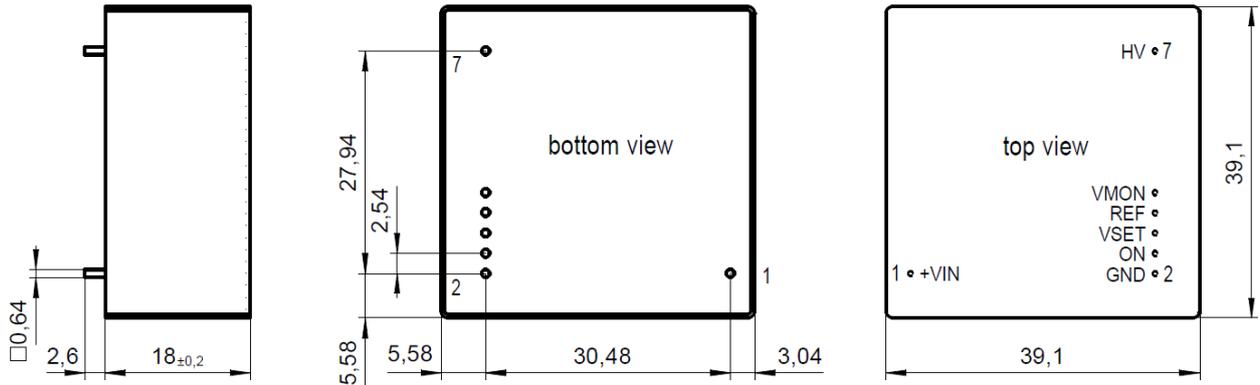


Figure 1: dimensional drawing BPS 1/3W

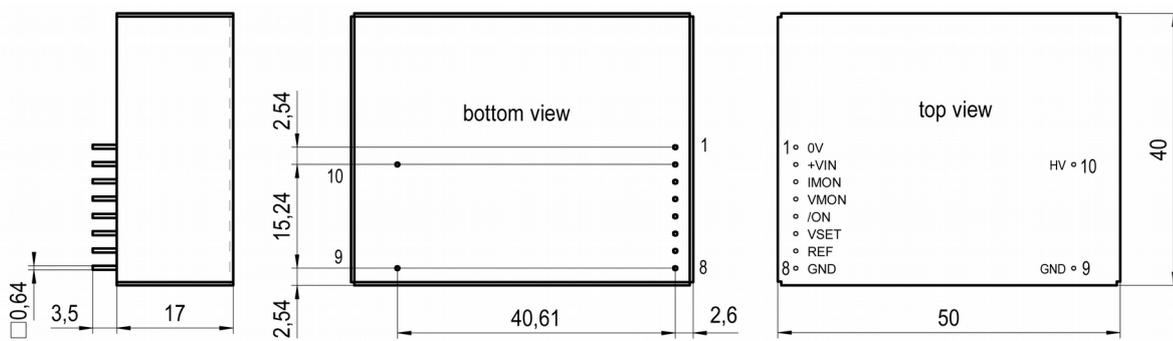


Figure 2: dimensional drawing BPS 4W

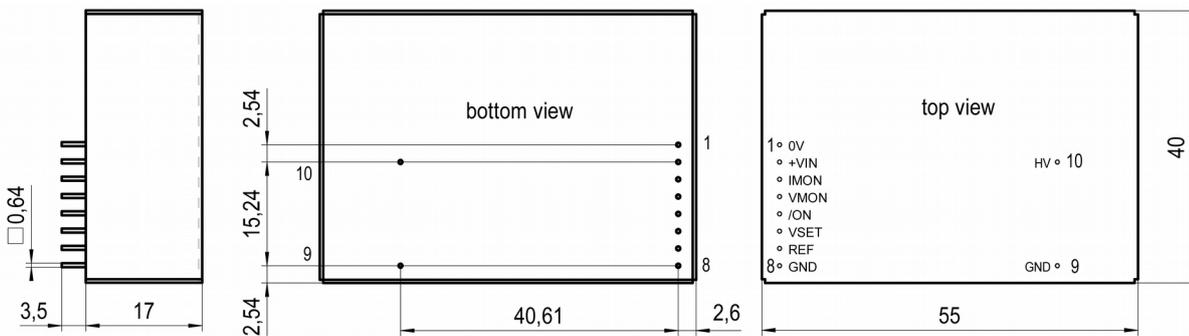


Figure 3: dimensional drawing BPS 4W/6kV

4 PIN assignment

4.1 BPS 1W / 3W

PIN	NAME	DESCRIPTION	VALUE
1	VIN	V _{in} supply voltage	+5 V / +12 V DC
2	GND	Ground	
3	ON	Signal ON	TTL-level: LOW → HV OFF HIGH or n.c. → HV ON
4	VSET	V _{set} Set value of output voltage	0 ... 2.5 V 0 ... 5 V
5	REF	V _{ref} Internal reference voltage	2.5 V 5V
6	VMON	V _{mon} Monitor voltage	0 ... 2.5 V 0 ... 5 V
7	HV	V _{out} High voltage output	

Note:
Case is connected to GND

Table 4: PIN Assignment BPS 1/3W

4.2 BPS 4W

PIN	NAME	DESCRIPTION	VALUE
1	0V ⁽¹⁾	Supply ground	
2	+VIN	V _{in} Supply voltage	+12 V DC
3	IMON	I _{mon} Monitor voltage of output current	0 ... 5 V
4	VMON	V _{mon} Monitor voltage	0 ... 5 V
5	/ON	Signal ON	TTL-level: LOW or n.c. → HV ON HIGH → HV OFF
6	VSET	V _{set} Set value of output voltage	0 ... 5 V
7	REF	V _{ref} Internal reference voltage	5 V
8	GND ⁽¹⁾	Signal ground	
9	GND ⁽¹⁾	HV ground	
10	HV	V _{out} High voltage output	

Note:
¹⁾ Case is connected to GND, internally connected

Table 5: PIN Assignment BPS 4W

5 Control principle

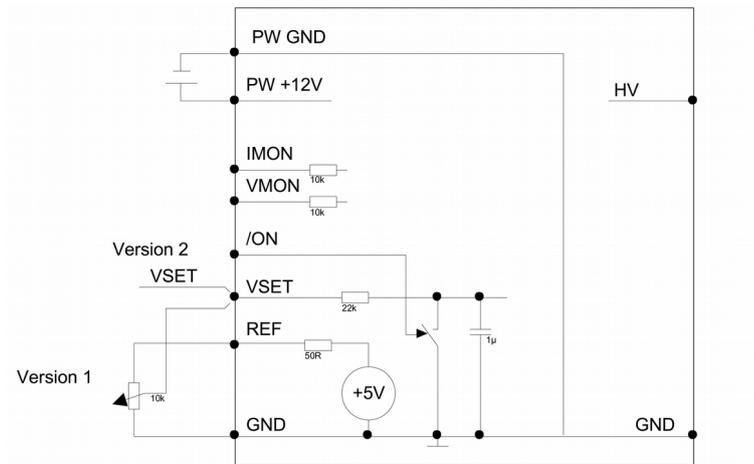


Figure 4: Control principle BPS 1/3W

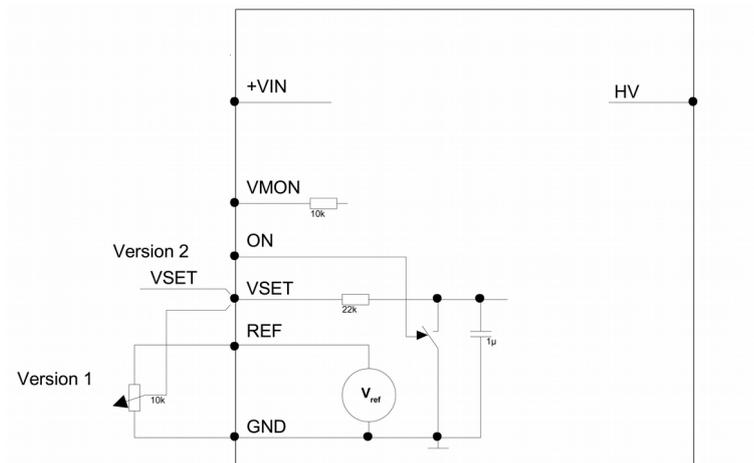


Figure 5: Control principle BPS 4W

6 Appendix

For more information please use the following download links:

This document
http://download.iseg-hv.com/DC_DC/BPS/iseg_datasheet_BPS_en.pdf

7 Warranty & Service

This device is made with high care and quality assurance methods. The standard factory warranty is 12 months. Please contact the iseg sales department if you wish to extend the warranty.

CAUTION!



CAUTION!

Repair and maintenance may only be performed by trained and authorized personnel.

For repair please follow the RMA instructions on our website: www.iseg-hv.com/en/support/rma

8 Disposal

INFORMATION



INFORMATION

All high-voltage equipment and integrated components are largely made of recyclable materials. Do not dispose the device with regular residual waste. Please use the recycling and disposal facilities for electrical and electronic equipment available in your country.

9 Manufacturer contact

iseg Spezialelektronik GmbH

Bautzner Landstr. 23

01454 Radeberg / OT Rossendorf

GERMANY

FON: +49 351 26996-0 | FAX: +49 351 26996-21

www.iseg-hv.com | info@iseg-hv.de | sales@iseg-hv.de