Technical documentation
Last changed on: 2022-11-14

CPS mini series

Built-in Compact High Voltage Module

- Versions from 1 kV – 6 kV
- patented resonance converter technology
- INHIBIT
- low ripple and noise, low EMI
- hardware limits for voltage and current

Document history

Version	Date	Major changes
1.1	2022-11-21	Increase of the current (I_{in}), The module name includes only voltage and current, rename the document
1.0	2021-09-30	Documentation separation of the modules CPS mini series, fixed dimensions

Disclaimer / Copyright

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!

"Danger!" indicates a severe injury hazard. The non-observance of safety instructions marked as "Danger!" will lead to possible injury or death.

WARNING!


WARNING!

"Warning!" indicates an injury hazard. The non-observance of safety instructions marked as "Warning!" could lead to possible injury or death.

CAUTION!


CAUTION!

Advices marked as "Caution!" describe actions to avoid possible damages to property.

INFORMATION


INFORMATION

Advices marked as "Information" give important information.

Read the manual.

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!

To avoid injury of users it is not allowed to open the unit. There are no parts which can be maintained by users inside of the unit. Opening the unit will void the warranty.

WARNING!

Do not operate the unit in wet or damp conditions.

WARNING!

Do not operate the unit in an explosive atmosphere.

WARNING!

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

Table of Contents

1. General description

CPS mini modules are highly stable analog controlled High Voltage Power supplies. Modules of the CPS series can be used as standalone DC/DC converters. The output voltage is controllable with an analog interface with either a potentiometer (internal reference voltage) or an input analog control voltage. The modules are equipped with INHIBIT, current and voltage limits.

Customized versions can be produced on request.

2. Overview

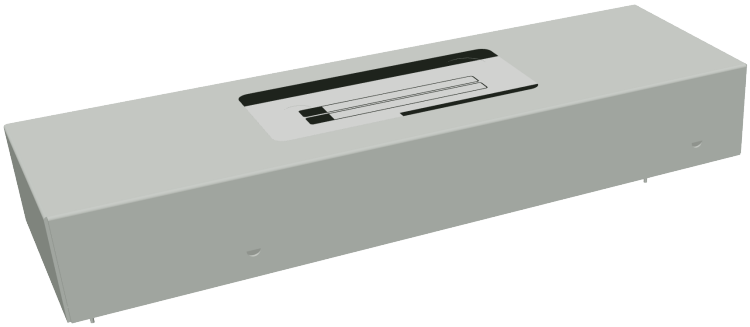


Figure 1: TOP view

[2] [1]

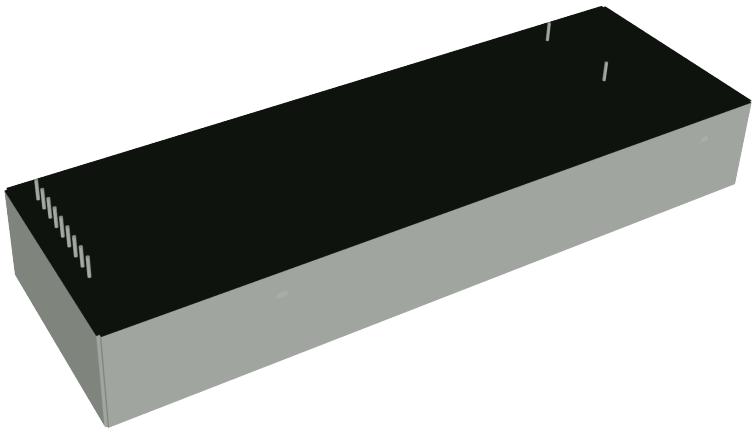


Figure 2: Bottom view

Number		Description	Detailed explanation in chapter
[1]	Connection pins	PIN 10 and 11	Table 5: PIN Assignment, 5 Connectors and PIN assignments, 4 Dimensional drawings
[2]	Connection pins	PIN 1 to 9	Table 5: PIN Assignment, 5 Connectors and PIN assignments, 4 Dimensional drawings

Table 1: Overview

3. Technical Data

3.1. Specifications

SPECIFICATIONS	CPS mini
Out voltage V_{nom}	1 – 6 kV
Polarity	Factory fixed, positive or negative
Ripple and noise (f > 10 Hz) [1]	< 2.5 • 10^{-6} • V_{nom}
Stability - [ΔV_{out} vs. ΔV_{in}] [1]	< 5 •10^{-5} • V_{nom}
Stability - [ΔV_{out} vs. ΔR_{load}] [1]	< 2 •10^{-4} • V_{nom}
Temperatur coefficient	50 ppm / K
Supply voltage V_{in}	22.8 – 25.2V
Supply current I_{in} at V_{out} = 0 at V_{out} = V_{nom} / with load	 < 25 mA < 0.5 A
Set / Monitor voltage	0 – 5 V
Set / Monitor accuracy	± 1 % • V_{nom}
Voltage ramp up/down	0.25 • V_{nom} / s
Protection	Overload and short circuit protected (**ATTENTION: there is only one short circuit or arc per second allowed!**) V_{limit}/I_{limit}: Output voltage and current internally limited to approx 1.1 • V_{nom} resp. I_{nom}
System / Remote connector	Pin
HV connector	Pin
Case	metal box moulded
Dimensions – L/W/H	120 / 40 / 25 mm^3
Operating temperature	0 – 40 °C
Storage temperature	-20 – 60 °C
Humidity	max. 70 %

Notes:
[1)] Specifications for stability, ripple and noise are guaranteed in the range 2% • V_{nom} < V_{out} ≤ V_{nom}; I_{set} ≥ 1% I_{nom}

Table 2: Technical data: Specifications

3.2. Configurations

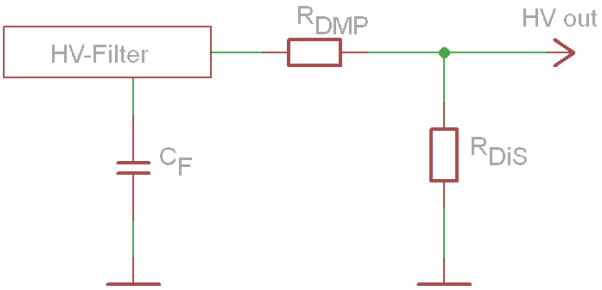


Figure 3

CONFIGURATIONS								
	V_{nom}	**I_{nom}**	**Standard Ripple** mV_{p-p}	**Internal Capacitance nominal** C_F / nF	**Damping Resistor** R_{DMP} / kOhm	**Discharge Resistor** R_{DiS} / MOhm	**HV connector**	**Item Code**
CPx 10 805	1 kV	8 mA	3	110	0.22	55	PIN	CM010805x2450ooo98rk
CPx 20 405	2 kV	4 mA	5	45	1	55	PIN	CM020405x2450ooo98rk
CPx 30 255	3 kV	2.5 mA	8	33	1.5	55	PIN	CM030255x2450ooo98rk
CPx 40 205	4 kV	2 mA	10	24	1.5	200	PIN	CM040205x2450ooo98rk
CPx 60 135	6 kV	1.3 mA	15	18	5.1	200	PIN	CM060135x2450ooo98rk
Notes: replacement characters: o – options, r – revision, k – customization, x – polarity (negative/positive)								

Table 3 Configurations

3.3. Options

ORDER INFO	INFO		EXAMPLE
POLARITY	Positive:	x = p	CP**p** 10 805 24 5 M PBP
	Negative:	x = n	CP**n** 10 805 24 5 M PBP

Table 4: Technical data: Options and order information

3.4. Functional description

CPS mini modules can be operated as constant voltage or constant current source, depending on the limiting set value (V_{SET} or I_{SET}). The specification for ripple and noise and stability is valid for constant voltage mode only.

Via PIN “INH” the voltage generation is switched on with ramp, but switched off without ramp. A monitor voltage for the output current and output voltage is available via the I_{MON} and V_{MON} connections.

The pin REF (reference) can be used for the V_{SET} voltage via an additional circuit (see Figure 4: VSET)

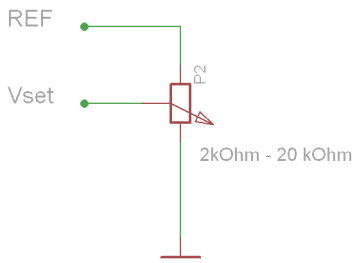


Figure 4: VSET

4. Dimensional drawings

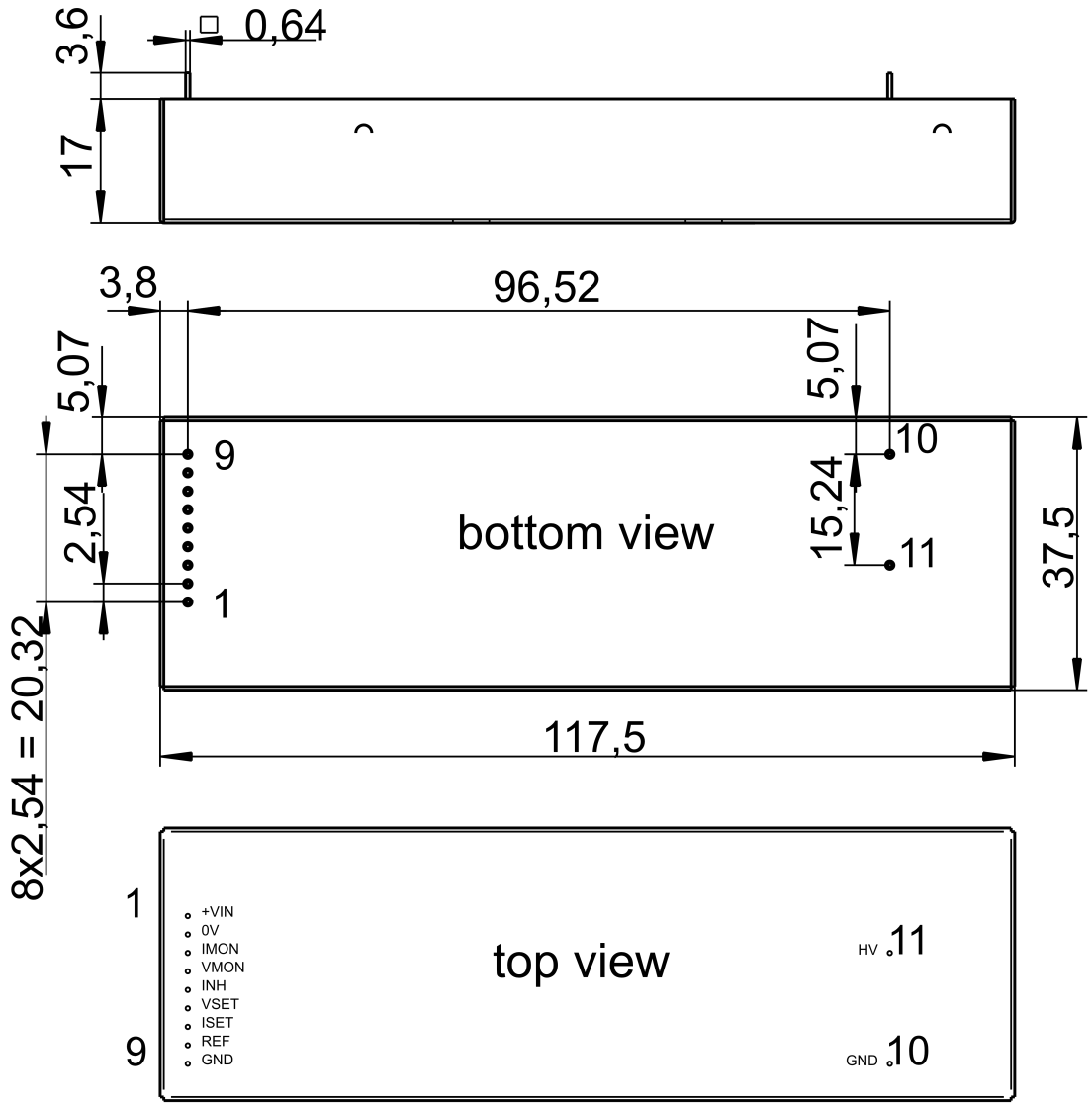
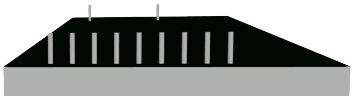
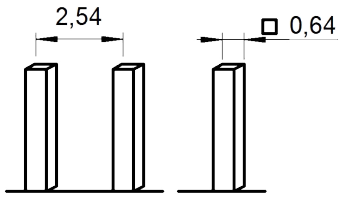


Figure 5: Dimensional drawings

5. Connectors and PIN assignments

CONNECTORS	PART NUMBERS (manufacturer code / iseg accessory parts item code)		
98	**CABLE SIDE**		
 *Figure 6*  *Figure 7*	part number manufacturer iseg part number	none	Mounting on printed circuit board, Grid dimensions 2.54mm

PIN	NAME	DESCRIPTION	VALUE
1	**VIN**	V_{in} Supply voltage	+24 V DC
2	**0V** [2]	Supply ground	
3	**IMON**	I_{mon} Monitor voltage of output current	0 ... 5 V
4	**VMON**	V_{mon} Monitor voltage	0 ... 5 V
5	**INH**	Inhibit, LOW = active, shut down the output voltage	TTL-level: LOW ➞ Vout = 0V HIGH or n.c. ➞ HV ON
6	**VSET**	V_{set} Set value of output voltage	0 ... 5 V
7	**ISET**	I_{set} Set voltage of output current	0 ... 5 V
8	**REF**	V_{ref} Internal reference voltage	5 V, I_{max} = 2.5 mA
9	**GND** [1]	Signal ground	
10	**GND** [1]	HV ground	
11	**HV**	V_{out} High voltage output	

Notes:
Case is connected to GND
[1] internally connected
[2] electrically isolated from GND

Table 5: PIN Assignment

6. Order guides

CONFIGURATION ORDER GUIDE (item code parts)									
CM	**030**	**255**	**P**	**24**	**50**	**000**	**98**	**0**	**0**
Type	V_{nom}	I_{nom} (nA)	Polarity	Input Voltage	Monitor Voltage	Option	connector	Revision	Customized Version
CPS mini series	three significante digits • 100V For Example: 030 = 3000V	two significante digits + number of zeros For Example: 255 = 2,5 mA	P = positive N = negative	two significante digits 24 = 24 Volt	two significante digits 1.th hex • 1V 2.th dez • 0,1V 50 = 5 Volt		98 = PIN	one digit For Example: A = first revision B = second revision	one digit For Example: 0 = no custo-mization

Table 6: Configuration item code

7. Appendix

For more information please use the following download links:

This document
https://iseg-hv.com/download/DC_DC/CPS/iseg_datasheet_CPSmini_en.pdf
CPS Series
https://iseg-hv.com/en/products/detail/CPS
Archives
https://iseg-hv.com/download/?dir=DC_DC/CPS/archive

8. Glossary

SHORTCUT	MEANING
V_{nom}	nominal output voltage
V_{out}	output voltage
V_{set}	set value of output voltage
V_{mon}	monitor voltage of output voltage
V_{meas}	digital measured value of output voltage
V_{p-p}	peak to peak ripple voltage
V_{in}	input / supply voltage
V_{type}	type of output voltage (AC, DC)
V_{ref}	internal reference voltage
V_{max}	limit (max.) value of output voltage
V_{limit}	voltage limit
ΔV_{out} [ΔV_{in}]	deviation of V_{out} depending on variation of supply voltage
ΔV_{out} [ΔR_{load}]	deviation of V_{out} depending on variation of output load
V_{bounds}	Voltage bounds, a tolerance tube $V_{set} \pm V_{bounds}$ around V_{set}.
I_{nom}	nominal output current
I_{out}	output current
I_{set}	set value of output current
I_{mon}	monitor voltage of output current
I_{meas}	digital measured value of current
I_{trip}	current limit to shut down the output voltage
I_{in}	input / supply current
I_{max}	limit (max.) value of output current
I_{limit}	Current Limit.
I_{bounds}	Current bounds, a tolerance tube $I_{set} \pm I_{bounds}$ around I_{set}.
P_{nom}	nominal output power
P_{in}	input power
P_{in_nom}	nominal input power
T	temperature
T_{REF}	Reference temperature
ON	HV ON/OFF
/ON	HV OFF/ON
CH	channel(s)
HV	high voltage
LV	low voltage
GND	signal ground
INH	Inhibit
POL	Polarity
KILL	KillEnable

9. 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

10. 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.

11. Manufacturer contact

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