CCCV48XX

Ultrathin 8.8mm 48V DIN Rail Constant Current Constant Voltage (CCCV) DC/DC converter

CCCV4805, CCCV4812, CCCV4824
product photography

Feature summary

- Constant Current Constant Voltage
- 90% typical efficiency (94% peak)
- Factory Programmable output voltage range (0 V .. 30 V)
- Factory Programmable output current range (0 A to 4 A)
- Output paralleling possible with diodes
- Wide input voltage (8 V to 50 V)
- Internal temperature monitoring with Thermal Shutdown
- Factory programmable Undervoltage Lock-out
- Input reverse polarity protection
- Output short circuit proof

Product description

The CCCV48XX is a constant current constant voltage digital DIN Rail buck converter with perfect output stability. It's a powerful tool to provide additional lower output voltages in control cabinets. The input voltage ranges from 8V (min. 0.9 Vout) to 50V. For more power, outputs can be paralleled using a diode. Output voltages and currents are factory digitally programmable. The input voltage must always be higher than the input voltage.

All devices features a universal RGB led, indicating, constant voltage, constant current, undervoltage lockout and overtemperature.

The device is resilient to typical operating failures: Input reverse polarity, output short circuit, open circuit, moderate input transients.

It between -40°C und 50°C. A derating over temperature is required.

Specification overview

Description	Value
General	
Input Voltage Range	8 - 50 V
Max. Output Voltage	U_{in} - 2V
Max. Output Current	4A
Typical Efficiency	90 %
Control Strategy	CCCV
Indicator	RGB LED
Protection	
Input Fuse	yes
Input Reverse polarity protection	yes
Short circuit protection	yes
Input Overvoltage supressor	TVS

Ordering information

Ordercode	Description
CCCV4805	U_{out} = 5V
CCCV4812	U_{out} = 12V
CCCV4824	U_{out} = 24V
Customisation available. Contact DPS.	

Engineering standards

Applied engineering standards	
IEC 55032	IEC 61000-4-2
IEC 61000-4-3	IEC 61000-4-4
IEC 61000-4-5	IEC 61000-4-6
IEC 61000-4-7	IEC 61000-4-8

1 Functional description

1.1 Overview

The CCCV48XX is a constant current constant voltage digital DIN Rail buck converter with perfect output stability. It's a powerful tool to provide additional lower output voltages in control cabinets. The input voltage ranges from 8V (min. 0.9 Vout) to 50V. For more power, outputs can be paralleled using a diode. Output voltages and currents are factory digitally programmable. The input voltage must always be higher than the input voltage.

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The device is resilient to typical operating failures: Input reverse polarity, output short circuit, open circuit, moderate input transients.

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1.2 Output Paralleling

For increased output power, outputs can be easily paralleled with an output diode. Operation without an output diode is not possible. Fitting output diodes modules are available from DPS. The Constant Current Constant Voltage behavior of the power supply ensures stable operation. For paralleling, identical supplies of the same partnumber must be used.

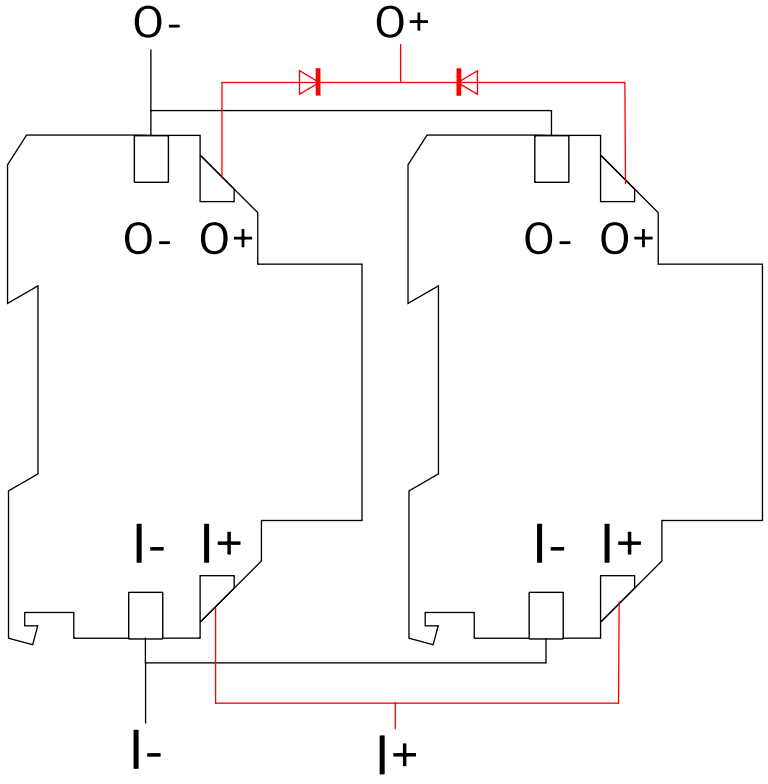

Figure 1: For output paralleling, two output diodes on the O+ Pins have to be inserted. By that, also redundancy can be achieved.

1.3 Protections

The following output protections are in place:

- **Input Reverse polarity:** The input may be connected in reverse polarity with an input of $U_{in,max}$ = -48 V.
- **Programmable Input Voltage Lockout:** The input voltage lockout (UVLO) can be digitally programmed. The UVLO disables the device when a too low input voltage is present.
- **Thermal protection:** The maximum temperature is exceeded, the device stops operation. When the re-enabling temperature is reached,
- **Short circuit proof:** The output of the converter can be shortcircuited without problems for infinite time.
- **Open circuit proof** The output may be operated in open circuit for infinite time.
- **Input TVS diode** The converter features an input TVS diode for protection.

1.4 Output Power

The maximum output power is limited by the case power dissipation. The maximum continuous recommended output power is denoted in the specification table. It should be verified in the application. In case the output power is too high, the DC/DC converter will shut down in thermal protection.

1.5 Safety Advice / Risk of Damage

To prevent potential damage, ensure that the output and input connections of the CCCV48XX are not interchanged. Carefully verify the wiring before applying power.

1.6 Ordering Information

Ordercode	Description	EAN
CCCV4824	Output Voltage U_{out} = 24 V	0735654854074
CCCV4812	Output Voltage U_{out} = 12 V	0735654854067
CCCV4805	Output Voltage U_{out} = 5 V	0735654854050
Custom output voltages and currents available! Contact DPS.		

2 Pinout

The pinout of the converter is depicted in Figure 2.

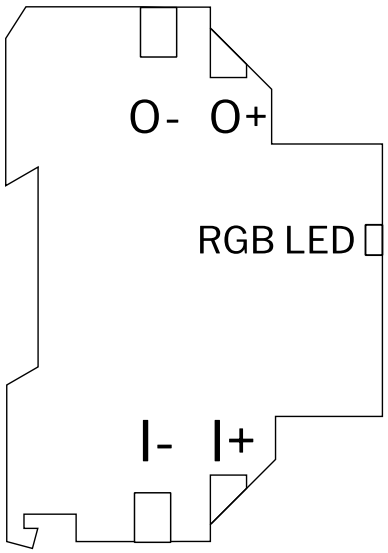

Figure 2: Power Supply connection Diagram

2.1 Pin description

Pin	Functional description
Input	
I-	Negative Input Pin
I+	Positive Input Pin
Output	
O-	Negative Output Pin
O+	Positive Output Pin

2.2 RGB LED Color Codes

Color	Functional State	Power
Green	Operation in Constant Voltage Mode	OK
Yellow	Operation in Constant Current Mode	OK
Purple	Input Voltage too low (UVLO)	Not OK
Blue	Overtemperature protection engaged	Not OK
Red	Control out of range	Not OK

3 Specification

The specification is shown in the following table. If not otherwise specified the following parameters have been used: T_{amb}=25°C and U_{in}=30 V_{dc}.

	Min	Typ	Max	Unit
Eingang Input				
Eingangsspannung Input Voltage	8		50	V_{dc}
Sicherungstyp Fuse Type		2410-1400		
Eingangskapazität Input Capacitance		16		µF
Schutzmosfet Eingang Input protection Mosfet		yes		
Unterspannungsschutz, an Undervoltage Lockout on		8		V_{dc}
Unterspannungsschutz, aus Undervoltage Lockout off		7		V_{dc}
Unterspannungsschutz, programmierbarkeit Undervoltage configurable		yes		
Eingang Generell Output General				
Regelstrategie Control Strategy		Constant Current Constant Voltage (CCCV)		
Spannung Output Voltage	0		50	V_{dc}
Spannung, max Output Voltage$_{max}$		0.9 U_{in}		V_{dc}
Emfohlene Max Leistung Recommended Max Power cont.	20		40	W
CCCV4805 CCCV4805				
Aussgangsspannung I_{Load}=0 Output Voltage I_{Load}=0	4.7	5.0	5.5	V_{dc}
Strom Peak Current Peak	0		4000	mA_{dc}
Strom Mittel Current Average		3000		mA_{dc}
CCCV4812 CCCV4812				
Aussgangsspannung I_{Load}=0 Output Voltage I_{Load}=0	11.5	12	12.6	V_{dc}
Strom Peak Current Peak	0		3000	mA_{dc}
Strom Mittel Current Average		2000		mA_{dc}

	Min	Typ	Max	Unit
CCCV4824 CCCV4824				
Aussgangsspannung I_{Load}=0 Output Voltage I_{Load}=0	23.3	24	25.3	V_{dc}
Strom Peak Current Peak	0		2000	mA_{dc}
Strom Mittel Current Average		1500		mA_{dc}
Gehäuse Case				
Montageform Mounting Type		Din Rail		
Breiteneinheiten Mounting Width		8.8		mm
Montagehöhe Mounting Height		Household Installation BOX		
Programmierbarkeit Programmability				
Interface Interface		Factory		
Sicherheitsfeatures Safety Features				
Verpolungsschutz Reverse polarity protection		yes		
Neg. Eingangsspannung Negative Reverse Voltage			- 50	V_{dc}
Kurzschlussschutz Short circuit protection		yes		
Leerlaufschutz Open circuit protection		yes		
Betriebsbedingungen Operating Conditions				
Temperaturbereich Temperature Range	-40		50	°C
Technische Merkmale Technical Characteristics				
Elektrolytkondensatoren Electrolytic Capacitors		No electrolytic capacitors		

4 Measurements

4.1 Efficiency U_{in}=48V

The efficiency for an input voltage of 48 V_{dc} is plotted over the output current. Figure 3 shows the efficiency overview while the Figure 4 shows the zommed efficiency.

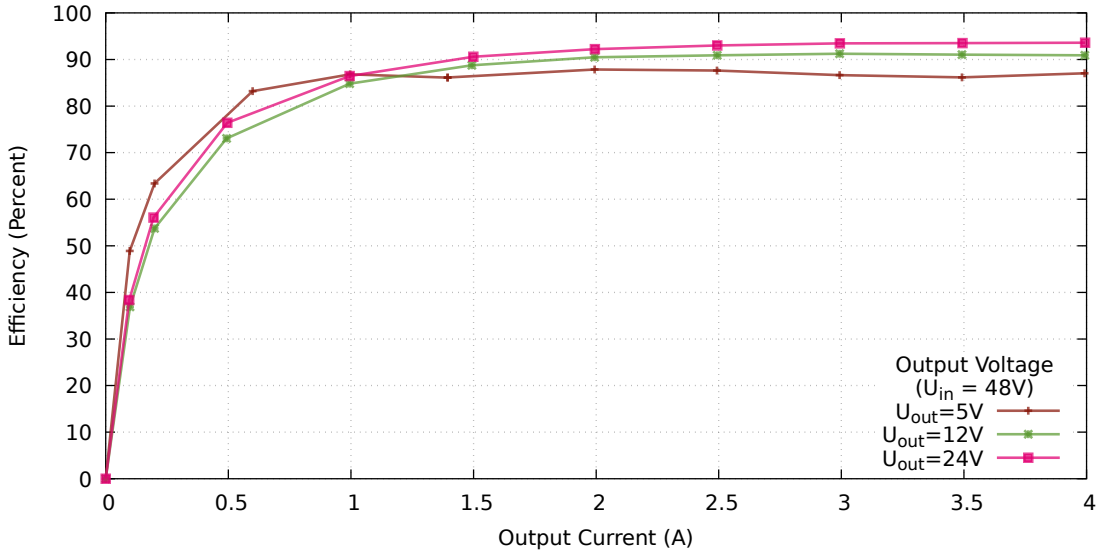

Figure 3: Efficiency in percent depicted over the output current.

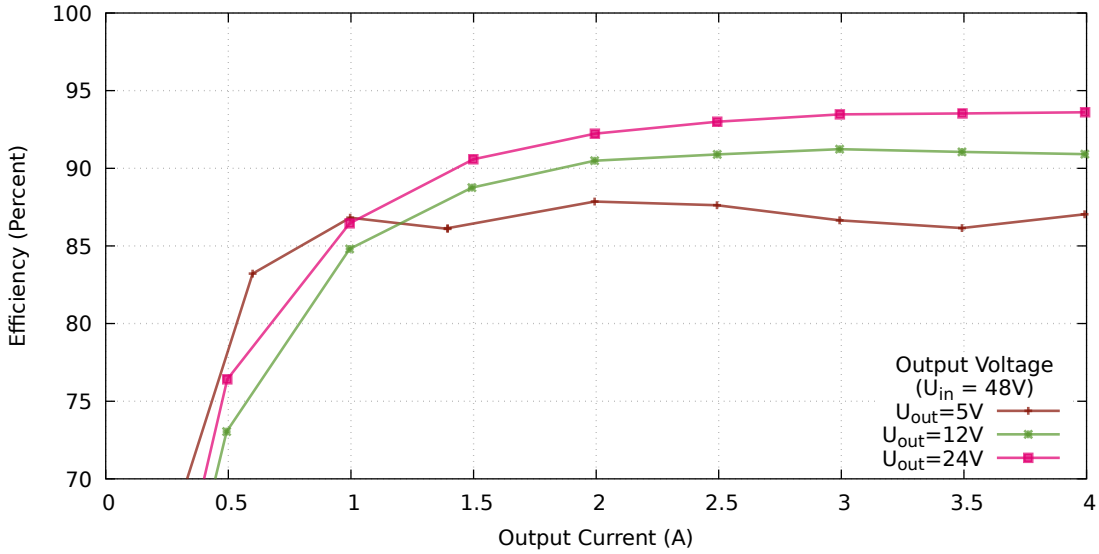

Figure 4: Zoomed Efficiency in percent depicted over the output current.

4.2 Losses U_{in}=48V

The losses over the output current are depicted in Figure 5.

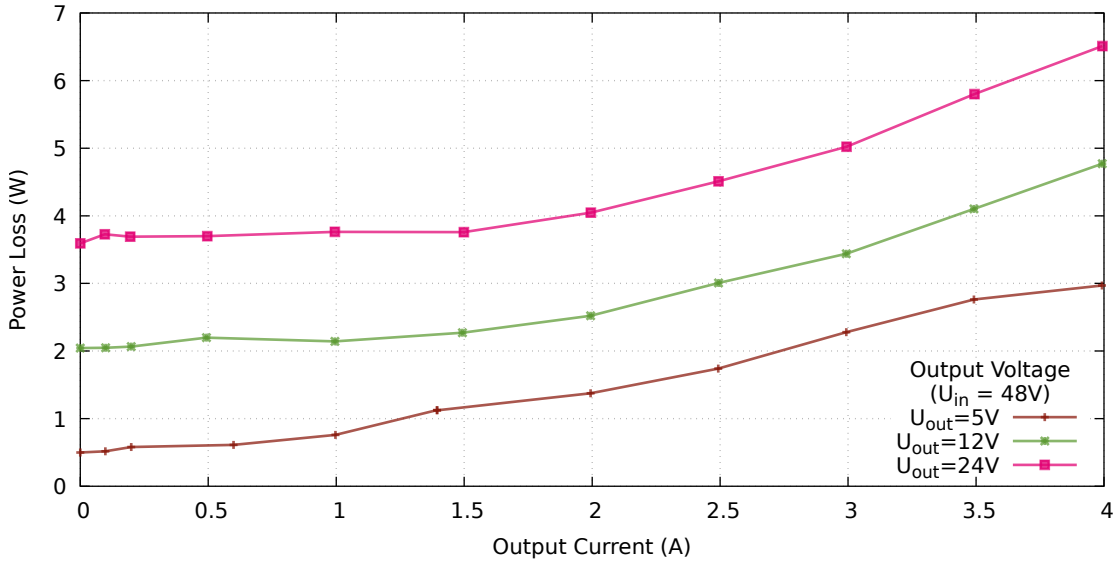

Figure 5: Losses over the output current.

4.3 Output Voltage Stability U_{in}=48V

The output voltage stability is depicted in Figure 6.

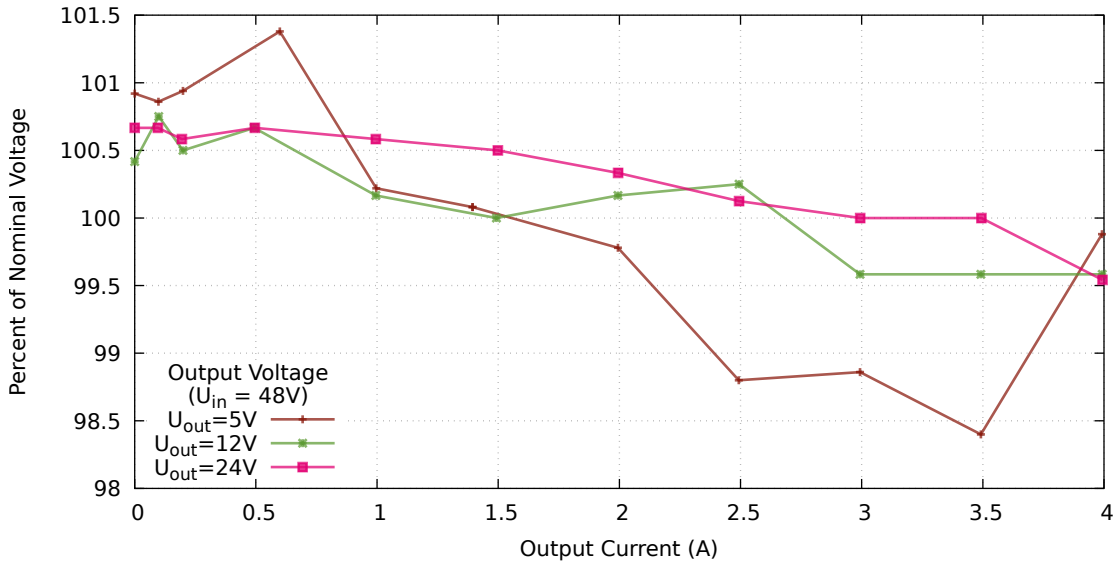

Figure 6: Losses over the output current.

4.4 Efficiency U_{in}=24V

The efficiency for an input voltage of 24 V_{dc} is plotted over the output current. Figure 7 shows the efficiency overview while the Figure 8 shows the zommed efficiency.

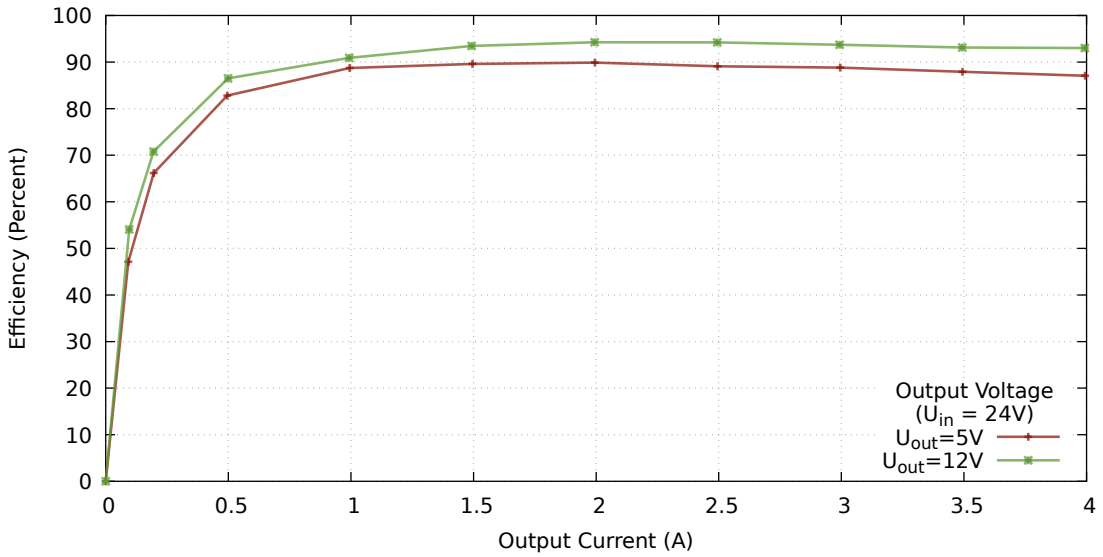

Figure 7: Efficiency in percent depicted over the output current.

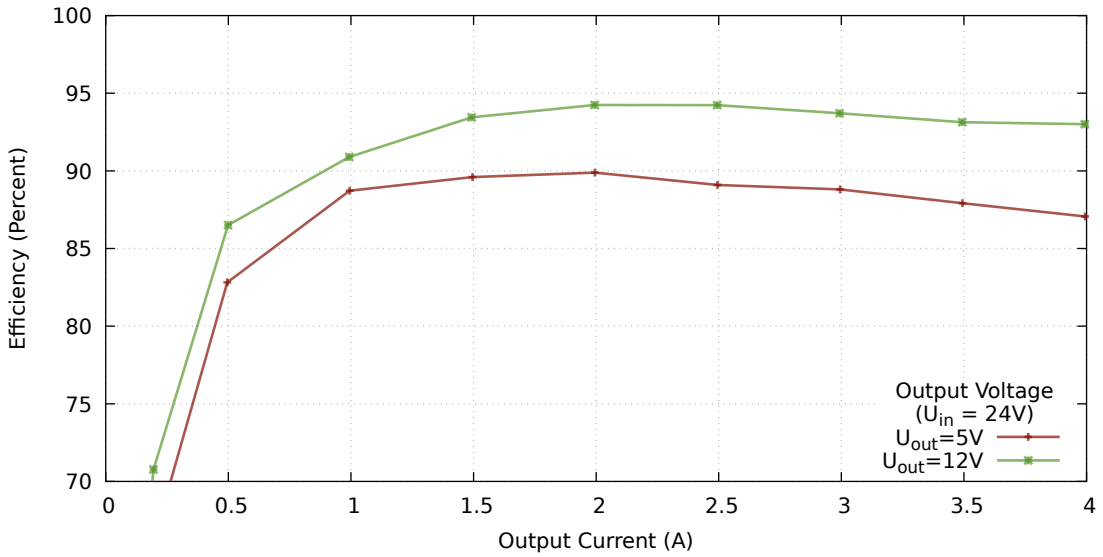

Figure 8: Zoomed Efficiency in percent depicted over the output current.

4.5 Losses U_{in}=24V

The losses over the output current are depicted in Figure 5.

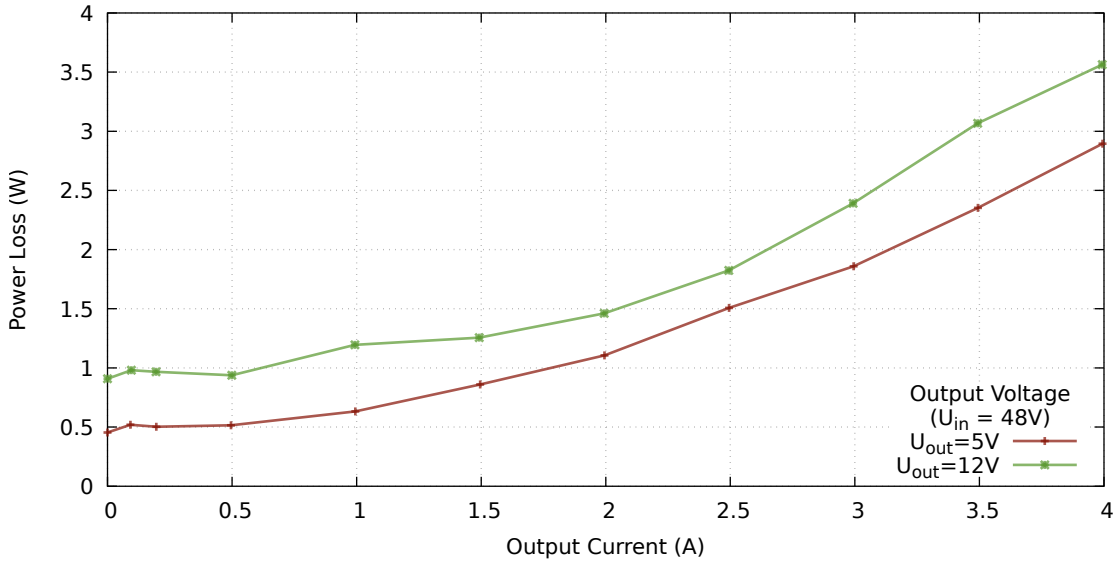

Figure 9: Losses over the output current.

4.6 Output Voltage Stability U_{in}=24V

The output voltage stability is depicted in Figure 10.

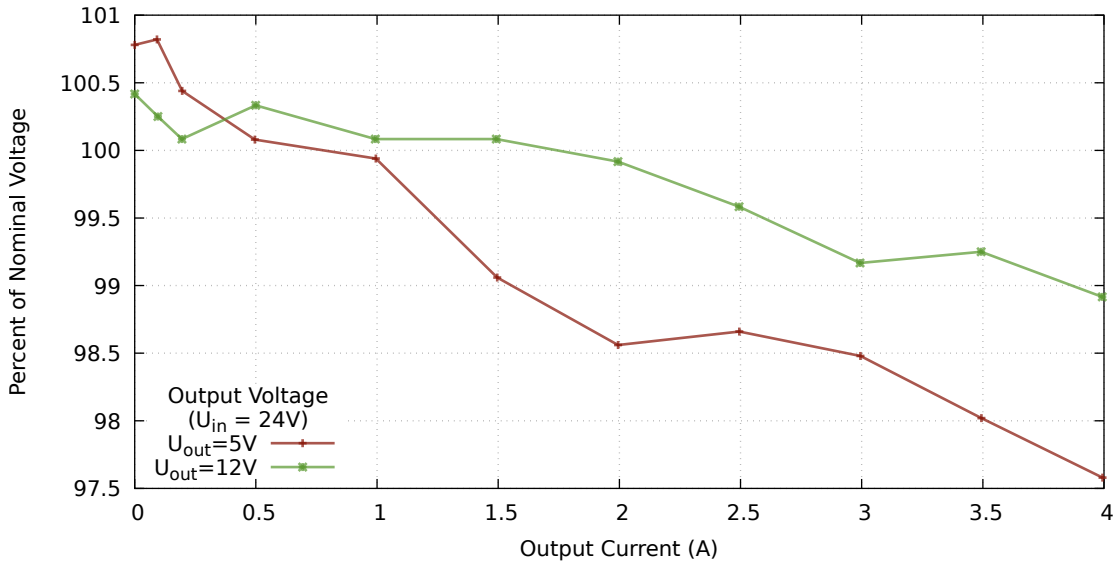

Figure 10: Losses over the output current.

4.7 Output Voltage Ripple

The output voltage ripple is measured at input voltage of 48 V.

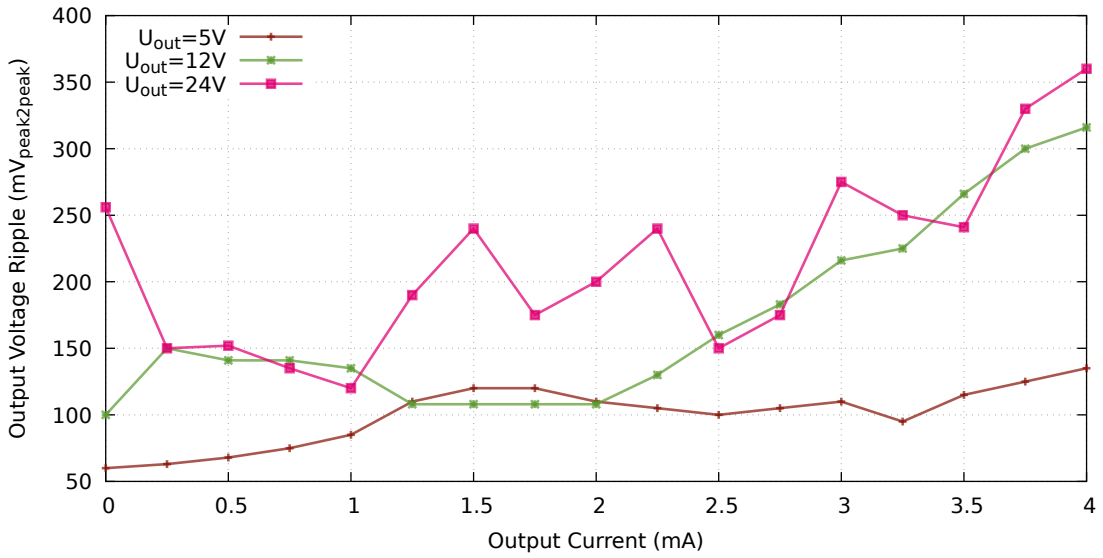

Figure 11: Output Voltage Ripple at U_{in}=24V

4.8 Transient Response

The output transient response was measured at an Input Voltage of U_{in}=48 V_{dc}.

4.8.1 Output Voltage 5V

The output Voltage is set to 5V with the default parameters.

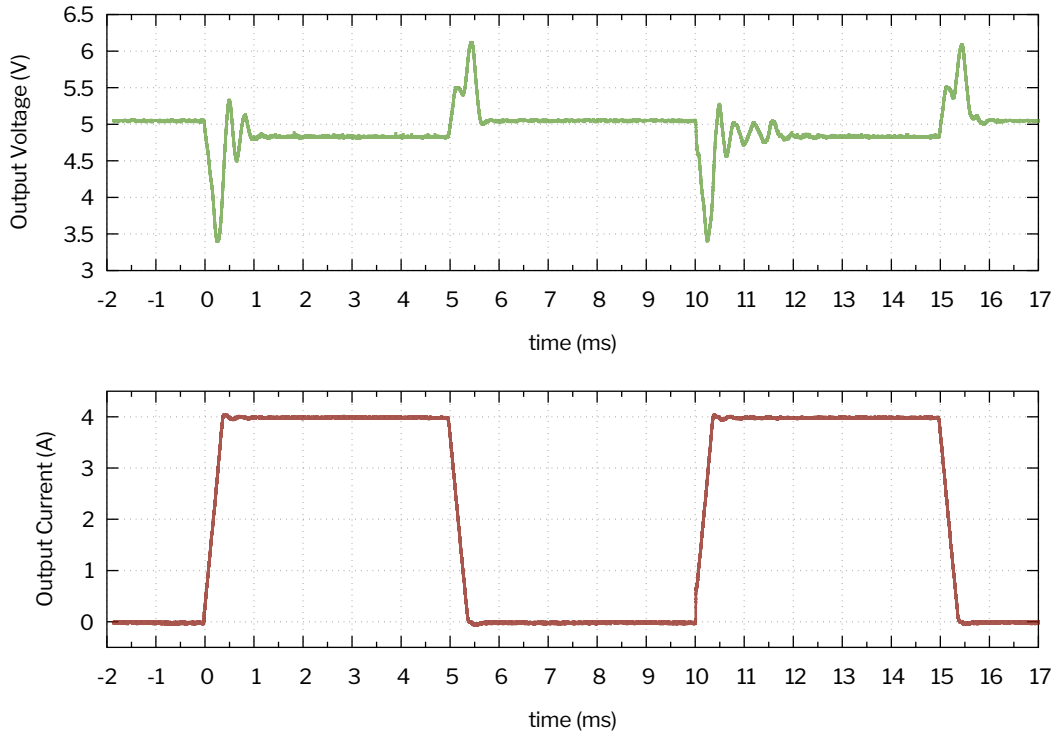

Figure 12: Transient Response U_{out}=15V

4.8.2 Output Voltage 12V

The output Voltage is set to 12V with the default parameters.

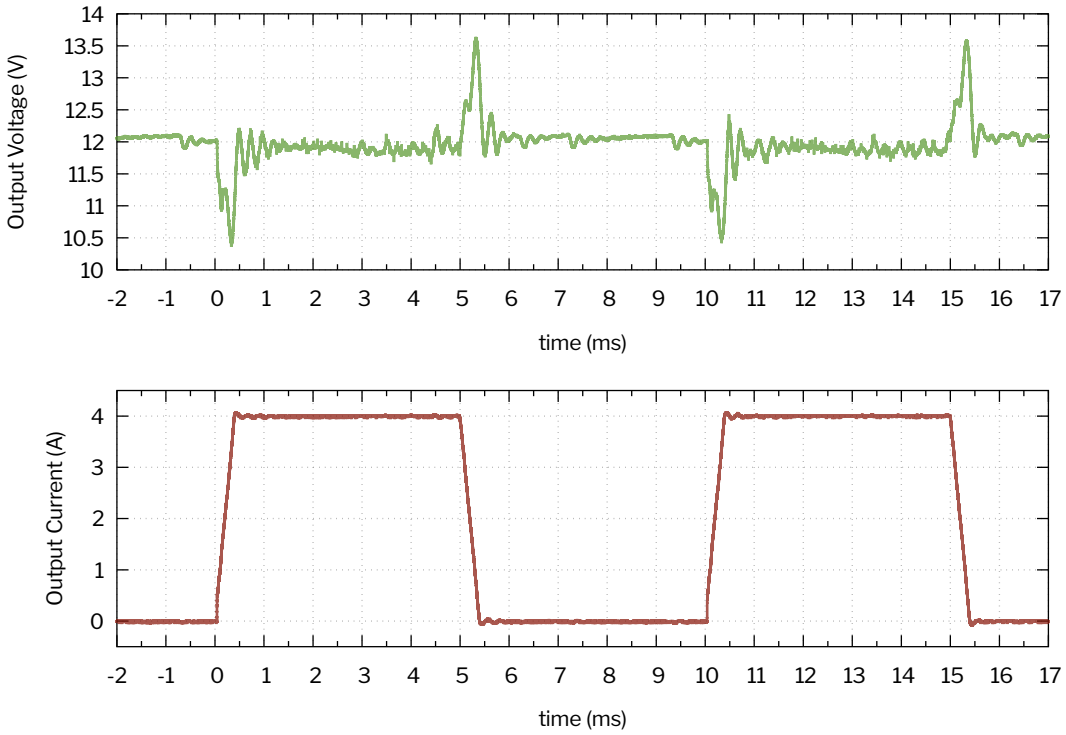

Figure 13: Transient Response U_{out}=12V

4.8.3 Output Voltage 24V

The output Voltage is set to 24V with the default parameters.

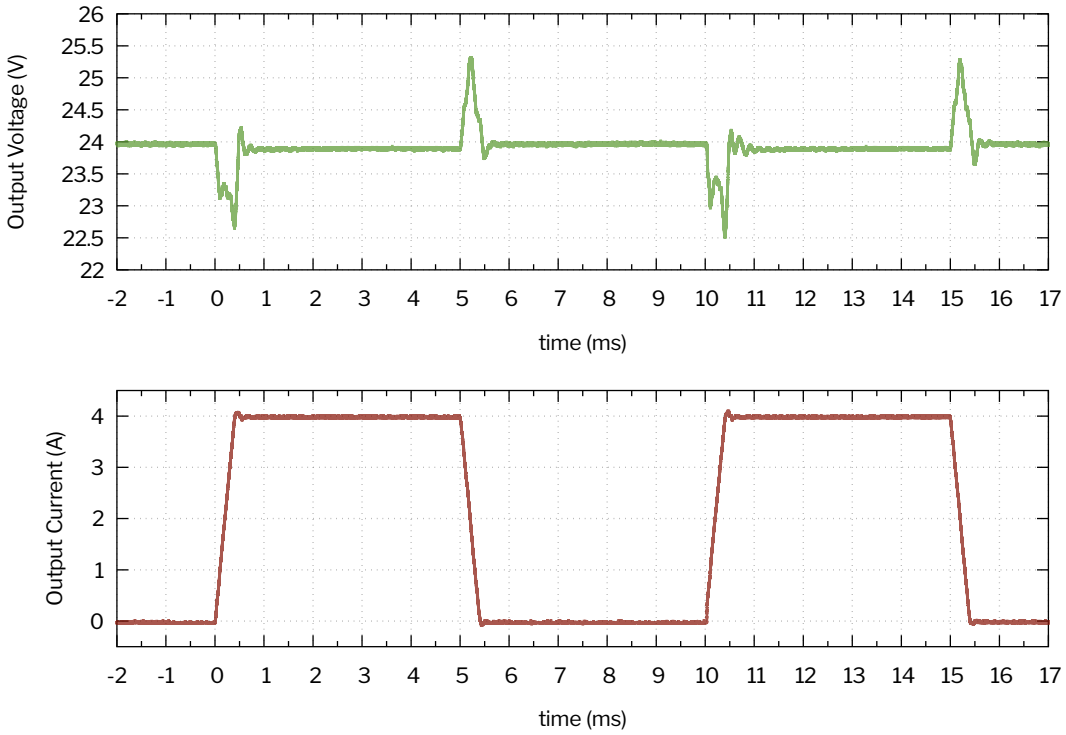

Figure 14: Transient Response U_{out}=12V

5 EMC Measurements

5.1 Conducted Emissions (Line Input)

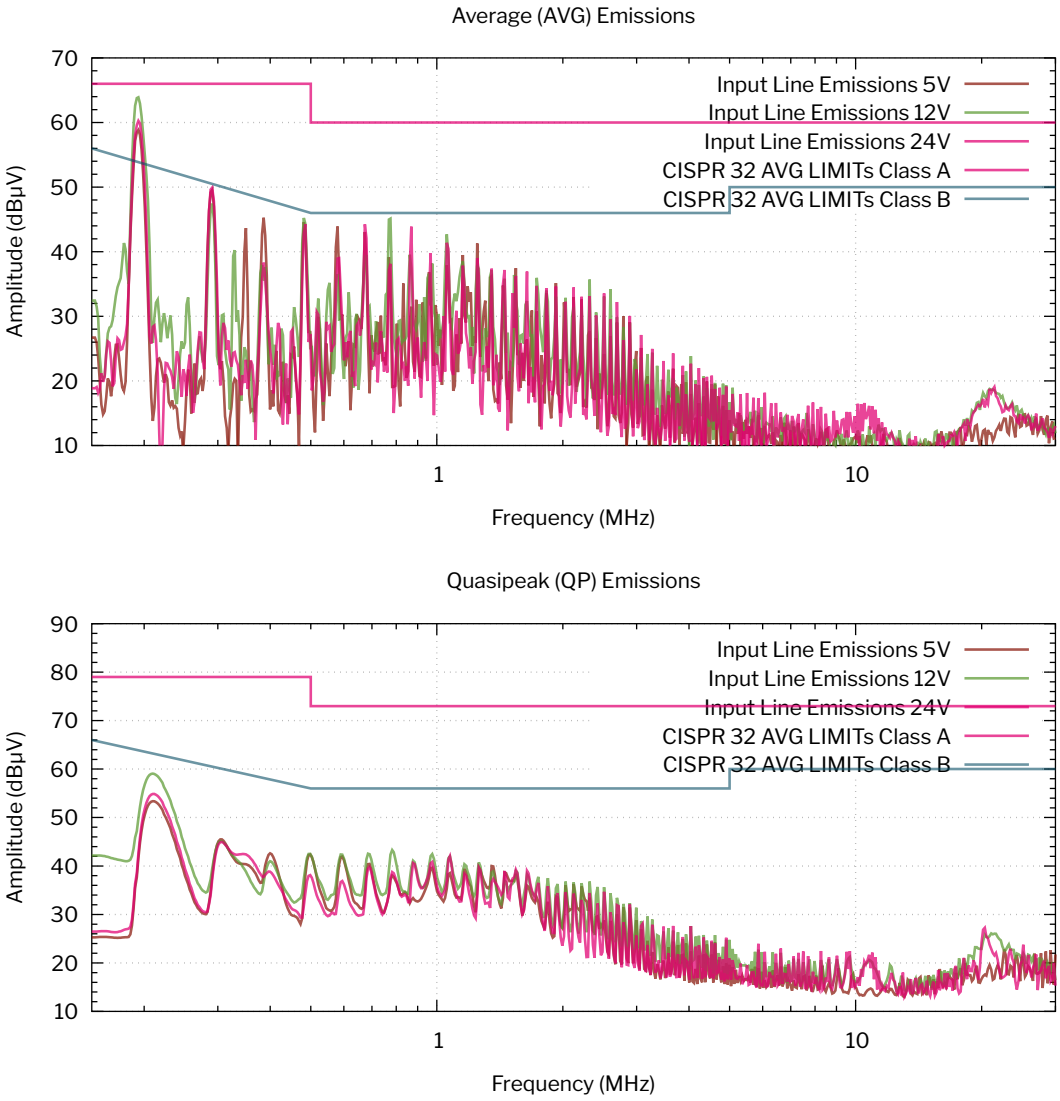

Figure 15: Conducted Line Emissions Input

5.2 Conducted Emissions (Line Output)

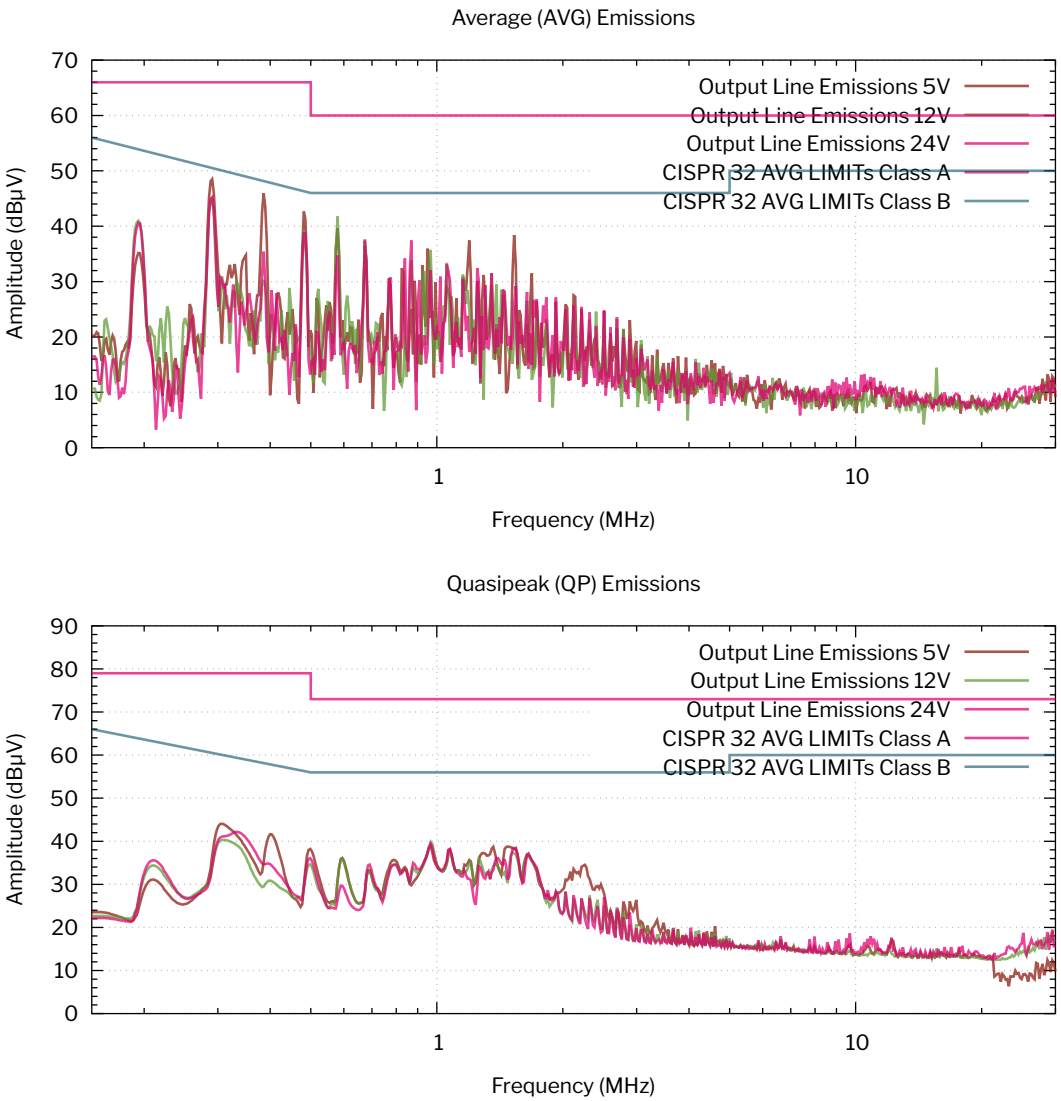

Figure 16: Conducted Line Emissions Output

6 Case

The case drawing is shown in Figure 17.

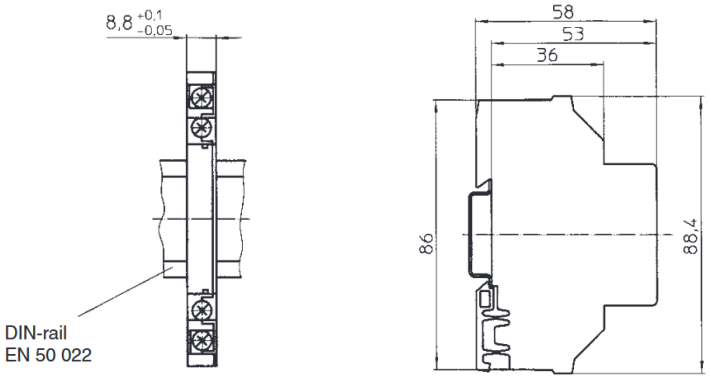

Figure 17: Product case.

7 Product label

The Label for the CCCV48XX is depicted in the following Figure 20.

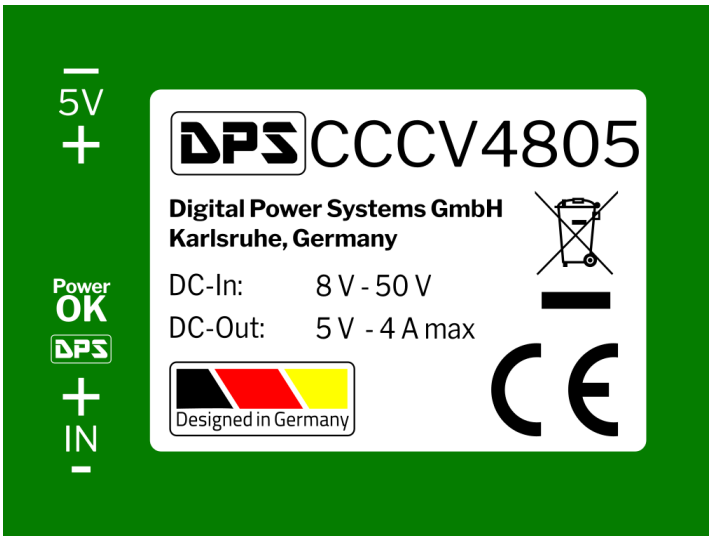

Figure 18: The product label of the CCCV4805.

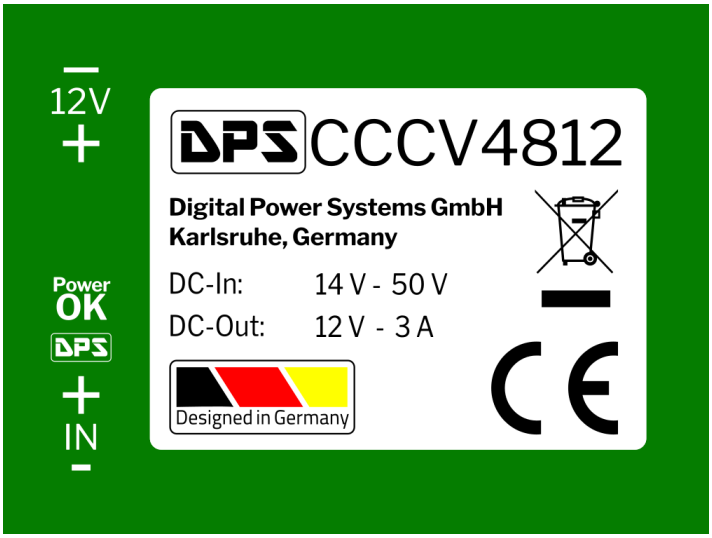

Figure 19: The product label of the CCCV4812.

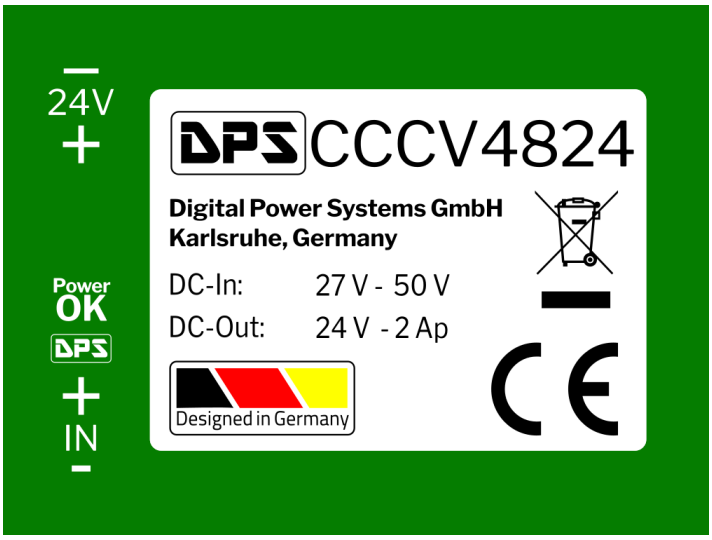

Figure 20: The product label of the CCCV4824.

8 Document

8.1 Datasheet Quality

Digital Power Systems aims for the highest datasheet quality. We value your feedback to improve this document. Please email:

`datasheet (ät) digitalpowersystems (döt) eu`

8.2 Revision History

The revision history is depicted in the following table.

Date	Changes in Revision
9.1.2024	Datasheet released
7.2.2025	Clarified Output Specifications for CCCV4805, CCCV4812 and CCCV4824.

8.3 Contact Information

This is a product of the Digital Power Systems GmbH (DPS).

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