



# 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
- Wide input voltage (8 V to 50 V)
- Internal temperature monitoring with Thermal Shutdown
- Digitally programmable Undervoltage Lockout
- 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 to 50V. For more power, outputs can be paralleled. 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
<b>General</b>	
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
<b>Protection</b>	
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 CCC48XX 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 to 50V. For more power, outputs can be paralleled. 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, under-voltage 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.

### 1.2 Output Paralleling

For increased output power, outputs can be easily paralleled. The Constant Current Constant Voltage behavior of the power supply ensures stable operation. For paralleling, identical supplies of the same partnumber must be used.

### 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  $U_{in,max} = -48\text{ V}$ .
- **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.





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DC/DC converter

## 1.5 Ordering Information

Ordercode	Description	EAN
CCCV4824	Output Voltage $U_{out} = 24\text{ V}$	0735654854074
CCCV4812	Output Voltage $U_{out} = 12\text{ V}$	0735654854067
CCCV4805	Output Voltage $U_{out} = 5\text{ V}$	0735654854050
Customisation available. Contact DPS.		



## 2 Pinout

The pinout of the converter is depicted in Figure 1.

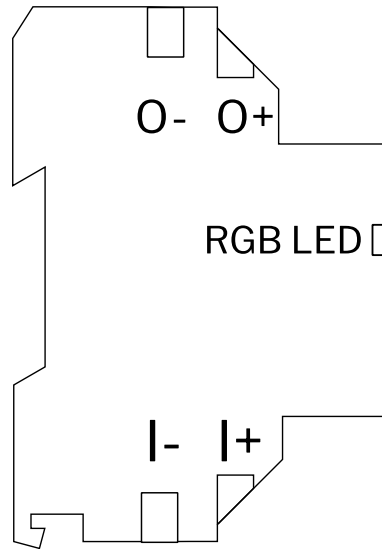


Figure 1: Power Supply connection Diagram

### 2.1 Pin description

Pin	Functional description
<b>Input</b>	
I-	Negative Input Pin
I+	Positive Input Pin
<b>Output</b>	
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:  $T_{amb}=25^{\circ}\text{C}$ .

	Min	Typ	Max	Unit
<b>Eingang</b>				
<b>Input</b>				
Eingangsspannung Input Voltage	8		50	V <sub>dc</sub>
Sicherungstyp Fuse Type	2410-1400			
Eingangskapazität Input Capacitance		16		μF
Schutzmosfet Eingang Input protection Mosfet	yes			
Unterspannungsschutz, an Undervoltage Lockout on		8		V <sub>dc</sub>
Unterspannungsschutz, aus Undervoltage Lockout off		7		V <sub>dc</sub>
Unterspannungsschutz, programmierbarkeit Undervoltage configurable	yes			
<b>Eingang</b>				
<b>Output</b>				
Regelstrategie Control Strategy	Constant Current Constant Voltage (CCCV)			
Ausgangsspannung Output Voltage	0		50	V <sub>dc</sub>
Ausgangsspannung, max Output Voltage <sub>max</sub>	0.9 U <sub>in</sub>			V <sub>dc</sub>
Ausgangsstrom Output Current	0		4000	mA <sub>dc</sub>
Empfohlene Max Leistung Recommended Max Power cont.	30		40	W
<b>Gehäuse</b>				
<b>Case</b>				
Montageform Mounting Type	Din Rail			
Breiteneinheiten Mounting Width	8.8			mm
Montagehöhe Mounting Height	Household Installation BOX			
<b>Programmierbarkeit</b>				
<b>Programmability</b>				
Interface Interface	Factory			





# CCCV48XX

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	Min	Typ	Max	Unit
<b>Sicherheitsfeatures</b> <b>Safety Features</b>				
Verpolungsschutz Reverse polarity protection		yes		
Neg. Eingangsspannung Negative Input Voltage			- 50	V <sub>dc</sub>
Kurzschlusschutz Short circuit protection		yes		
Leerlaufschutz Open circuit protection		yes		
<b>Betriebsbedingungen</b> <b>Operating Conditions</b>				
Temperaturbereich Temperature Range	-40		50	°C
<b>Technische Merkmale</b> <b>Technical Characteristics</b>				
Elektrolytkondensatoren Electrolytic Capacitors	No electrolytic capacitors			



## 4 Measurements

### 4.1 Efficiency $U_{in}=48V$

The efficiency for an input voltage of 48 V<sub>dc</sub> is plotted over the output current. Figure 2 shows the efficiency overview while the Figure 3 shows the zoomed efficiency.

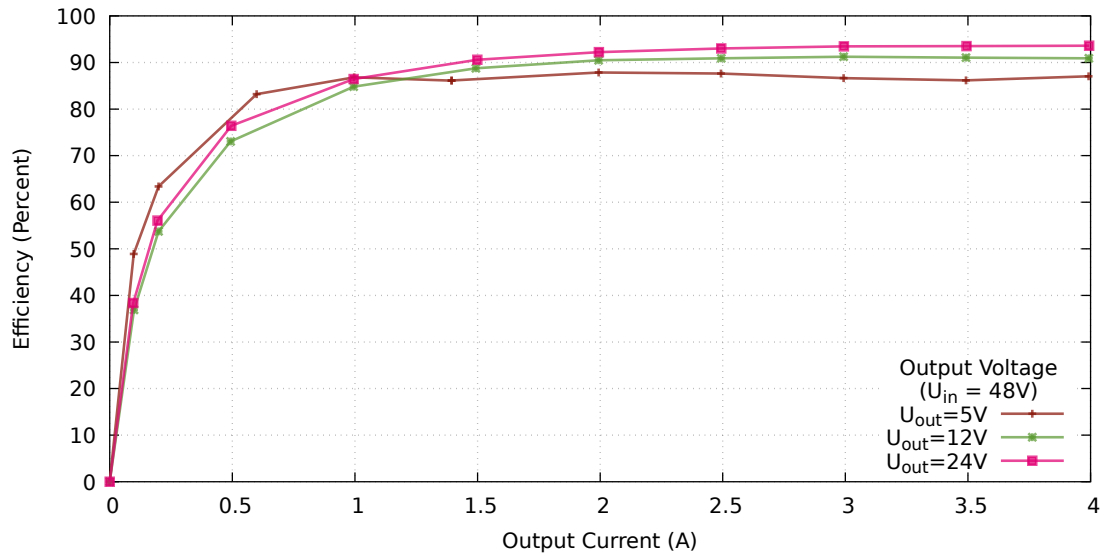


Figure 2: Efficiency in percent depicted over the output current.

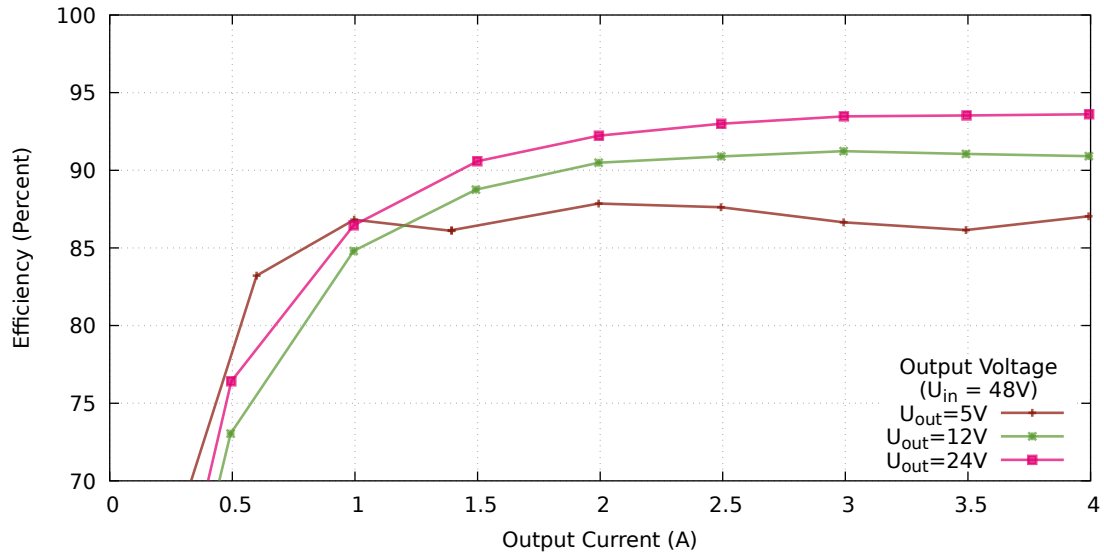


Figure 3: Zoomed Efficiency in percent depicted over the output current.



## 4.2 Losses $U_{in}=48V$

The losses over the output current are depicted in Figure 4.

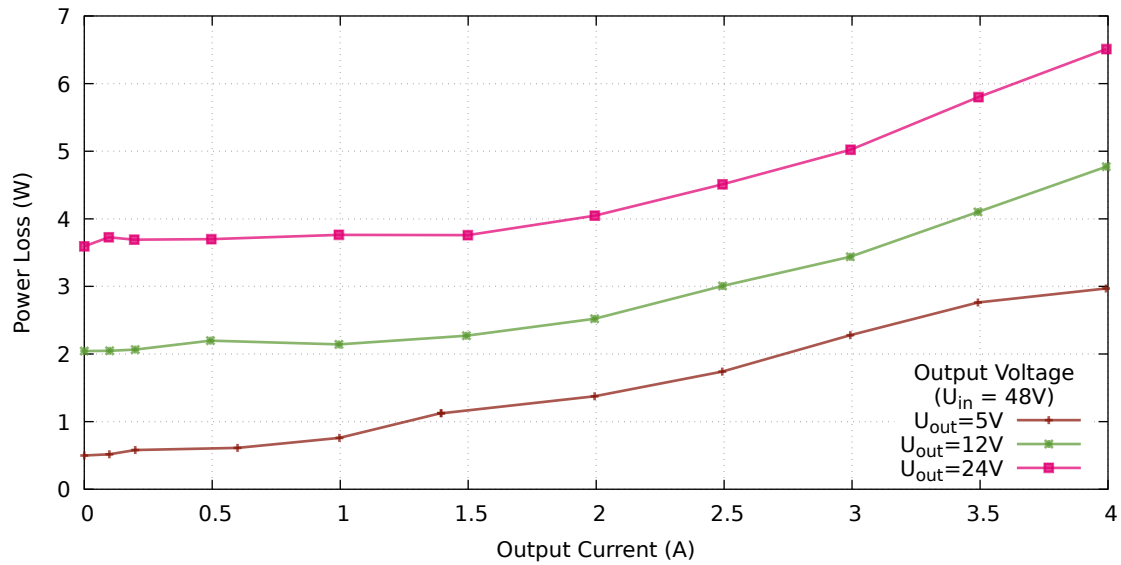


Figure 4: Losses over the output current.

## 4.3 Output Voltage Stability $U_{in}=48V$

The output voltage stability is depicted in Figure 5.

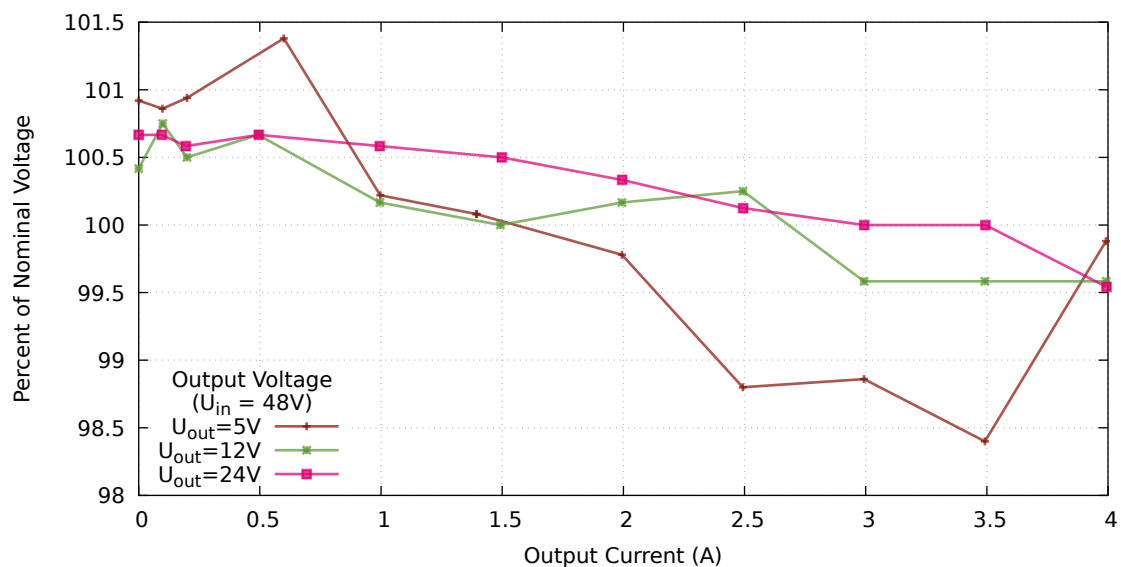


Figure 5: Losses over the output current.





## 4.4 Efficiency $U_{in}=24V$

The efficiency for an input voltage of 24 V<sub>dc</sub> is plotted over the output current. Figure 6 shows the efficiency overview while the Figure 7 shows the zoomed efficiency.

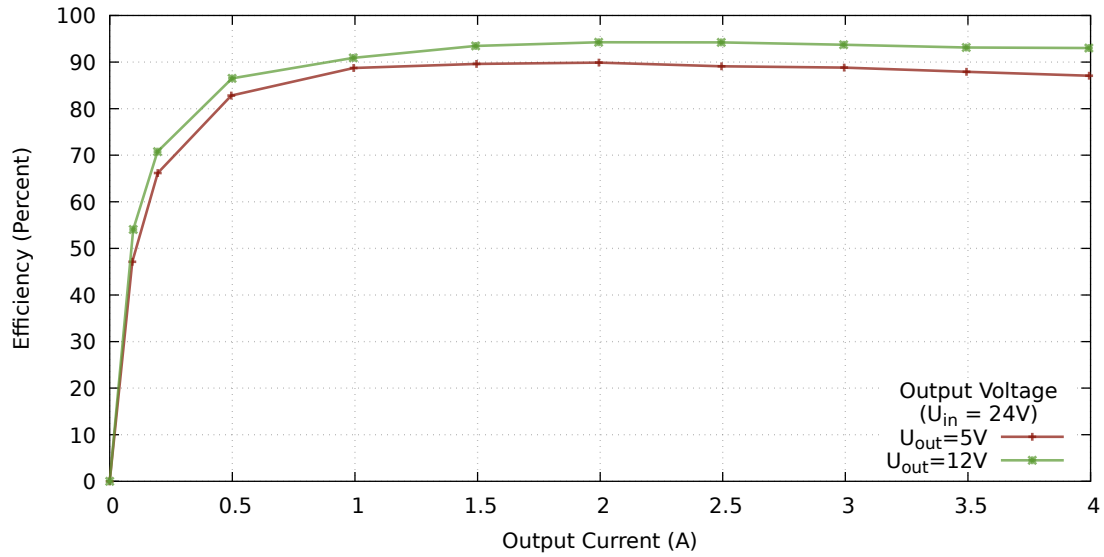


Figure 6: Efficiency in percent depicted over the output current.

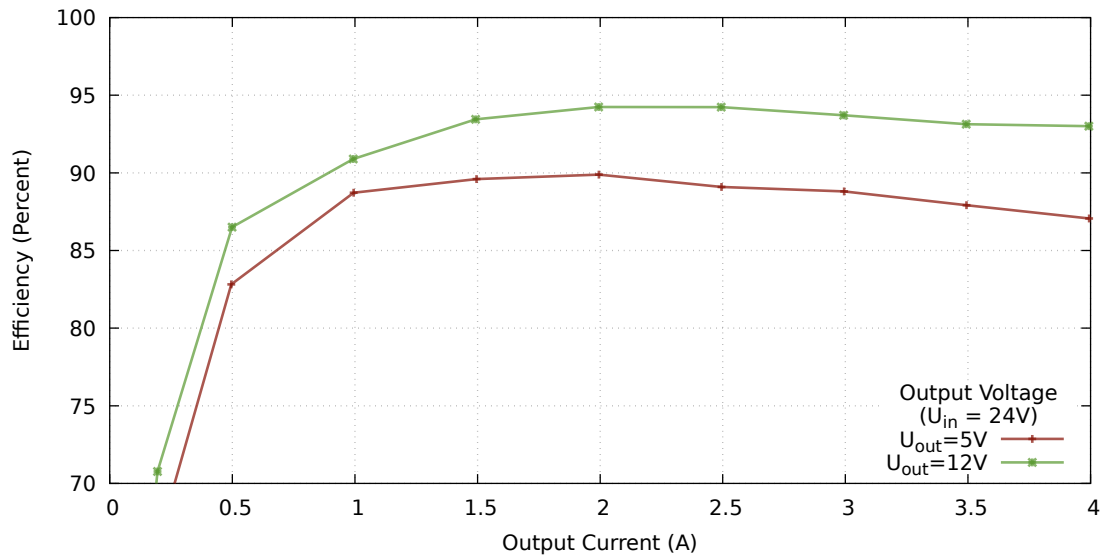


Figure 7: Zoomed Efficiency in percent depicted over the output current.



## 4.5 Losses $U_{in}=24V$

The losses over the output current are depicted in Figure 4.

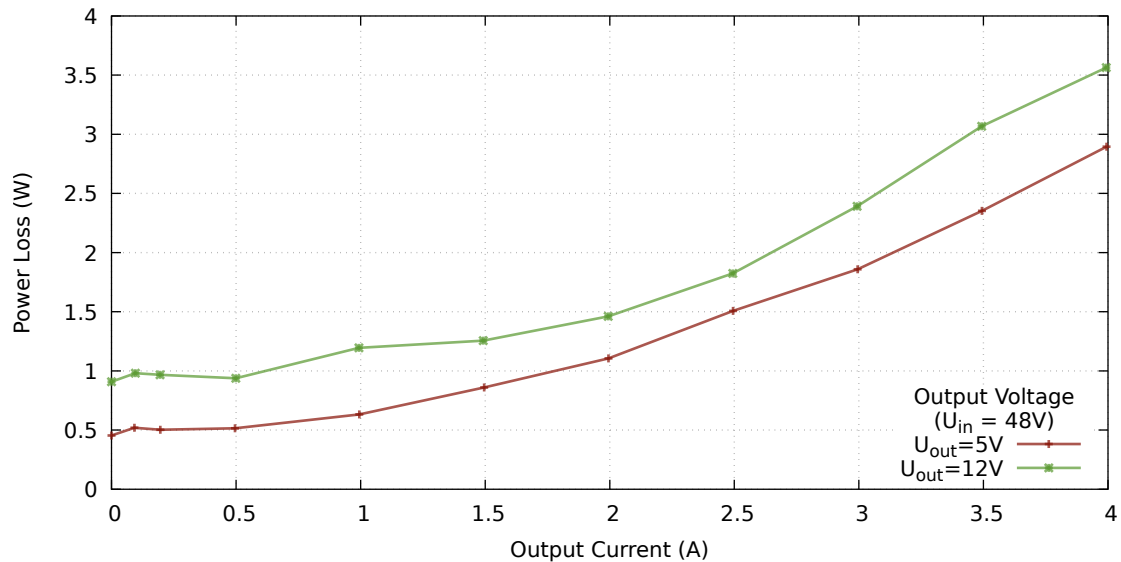


Figure 8: Losses over the output current.

## 4.6 Output Voltage Stability $U_{in}=24V$

The output voltage stability is depicted in Figure 9.

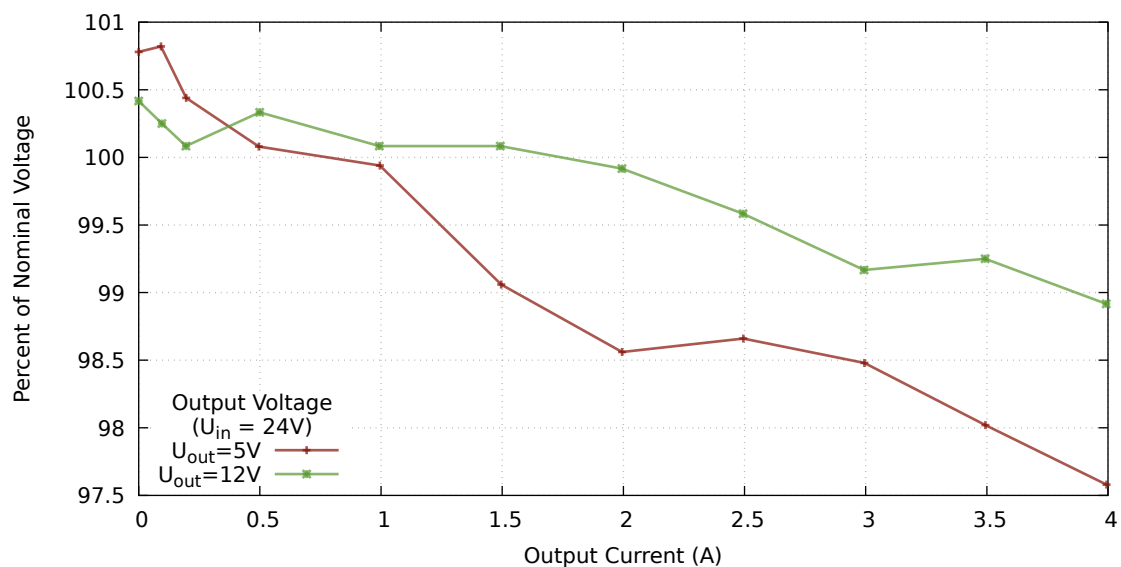


Figure 9: Losses over the output current.



## 4.7 Output Voltage Ripple

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

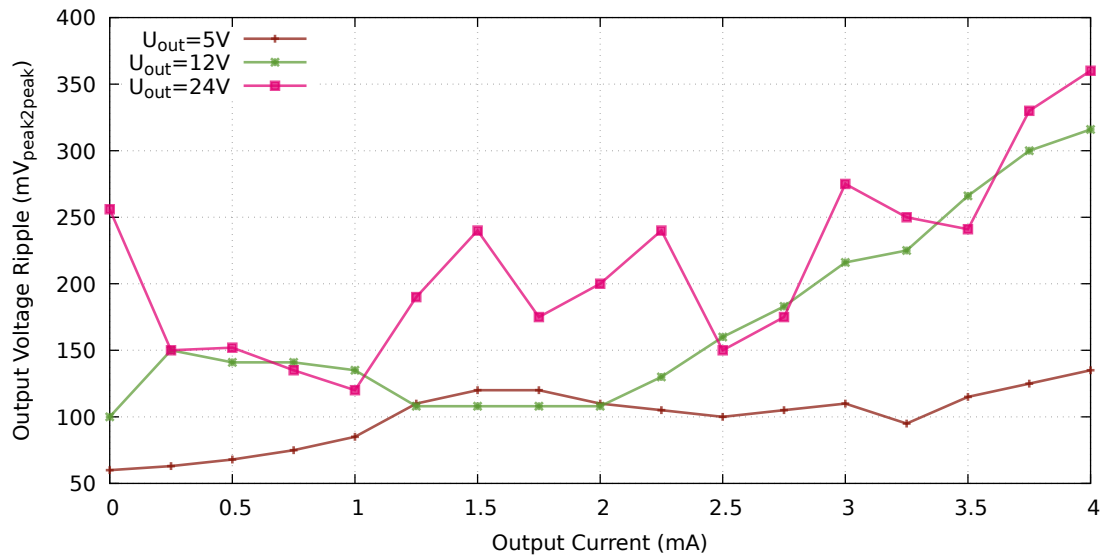


Figure 10: Output Voltage Ripple at U<sub>in</sub>=24V



## 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.

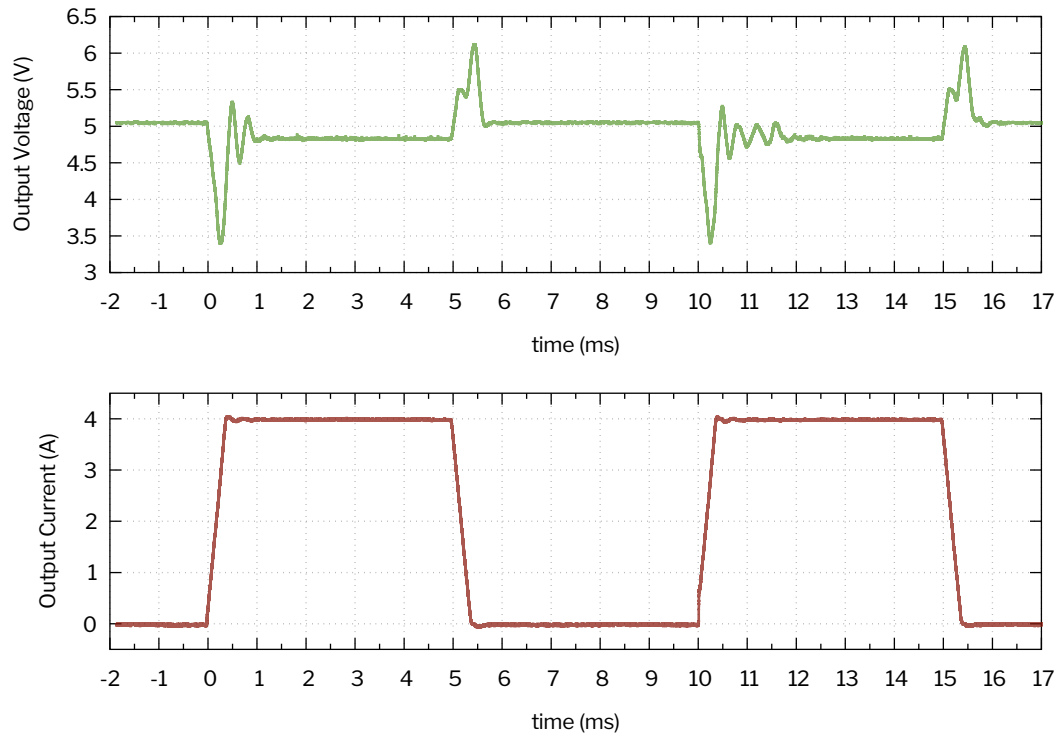


Figure 11: Transient Response  $U_{out}=15V$



## 4.8.2 Output Voltage 12V

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

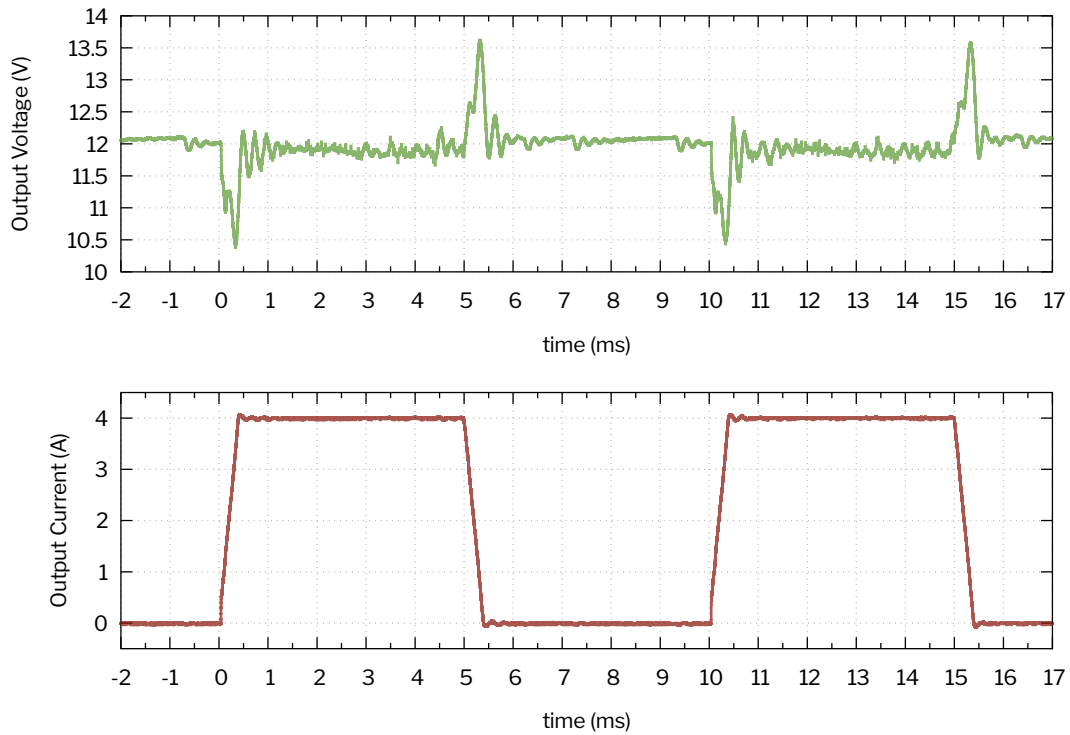


Figure 12: Transient Response  $U_{out}=12V$



### 4.8.3 Output Voltage 24V

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

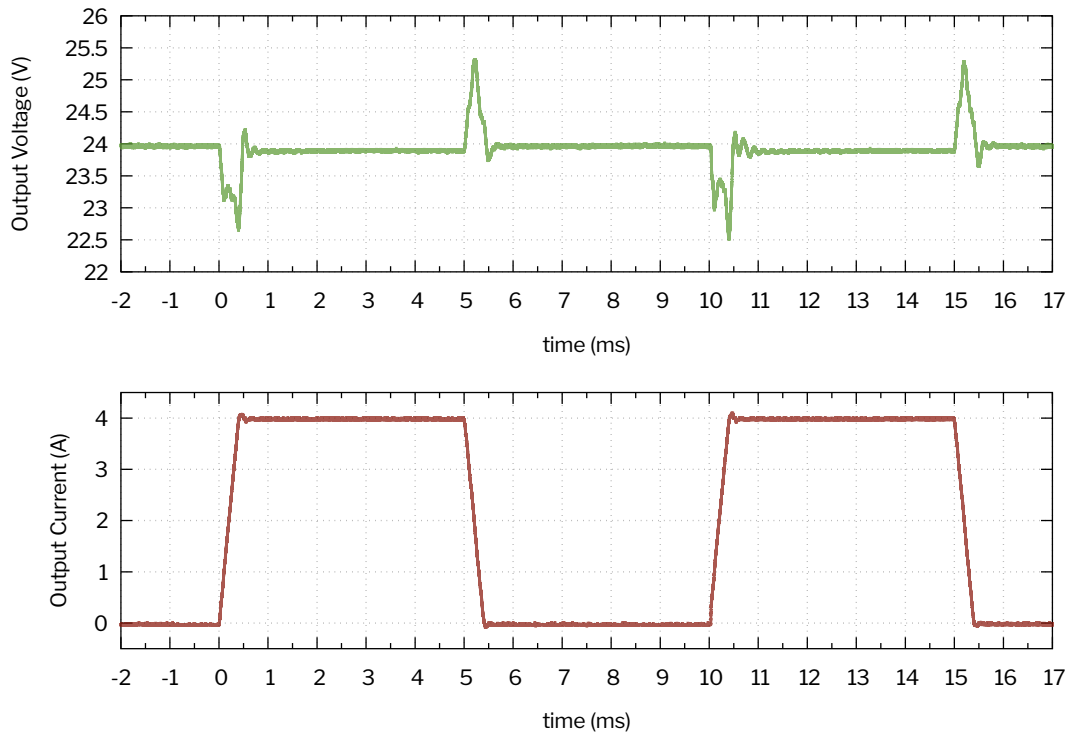


Figure 13: Transient Response  $U_{out}=12V$



## 5 EMC Measurements

### 5.1 Conducted Emissions (Line Input)

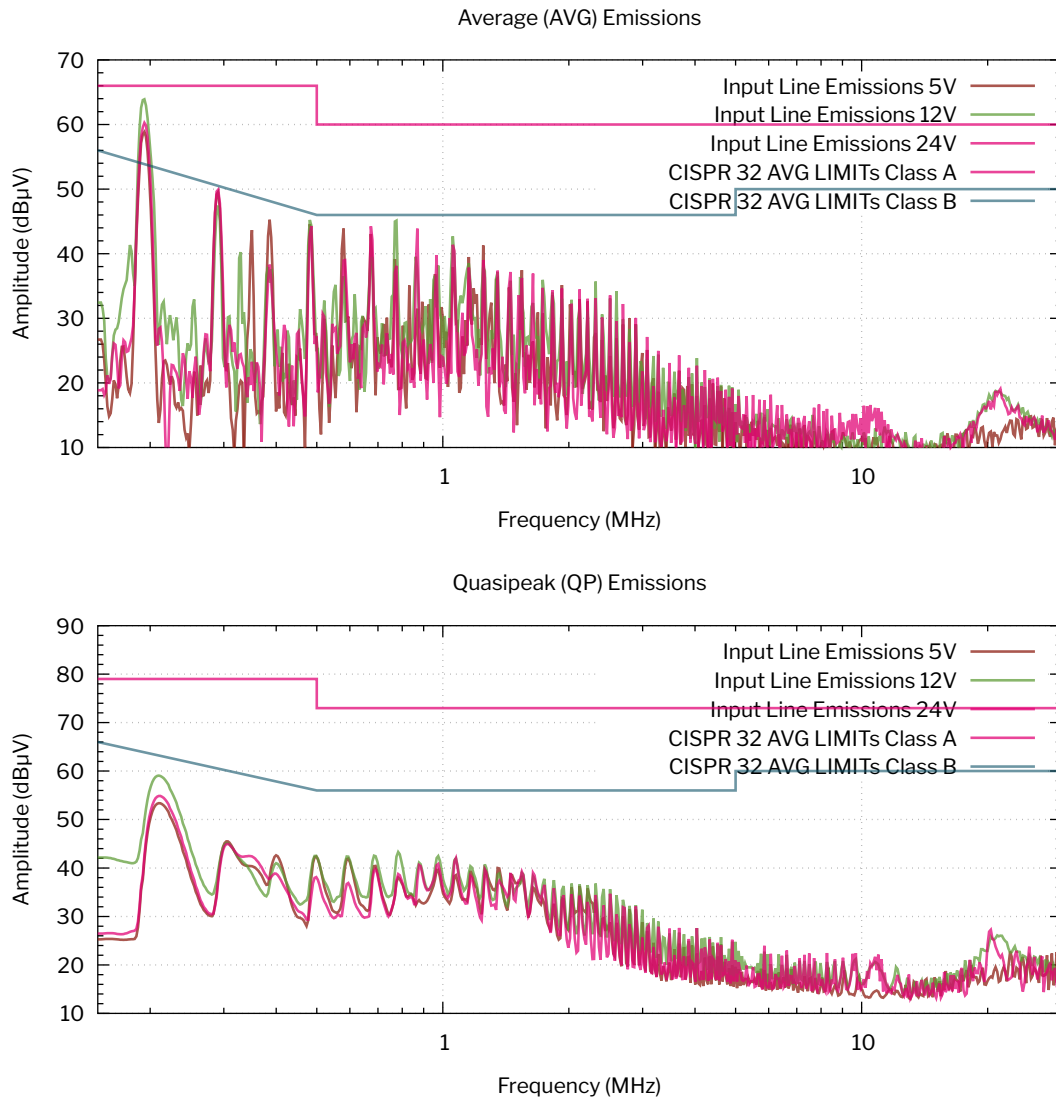


Figure 14: Conducted Line Emissions Input



## 5.2 Conducted Emissions (Line Output)

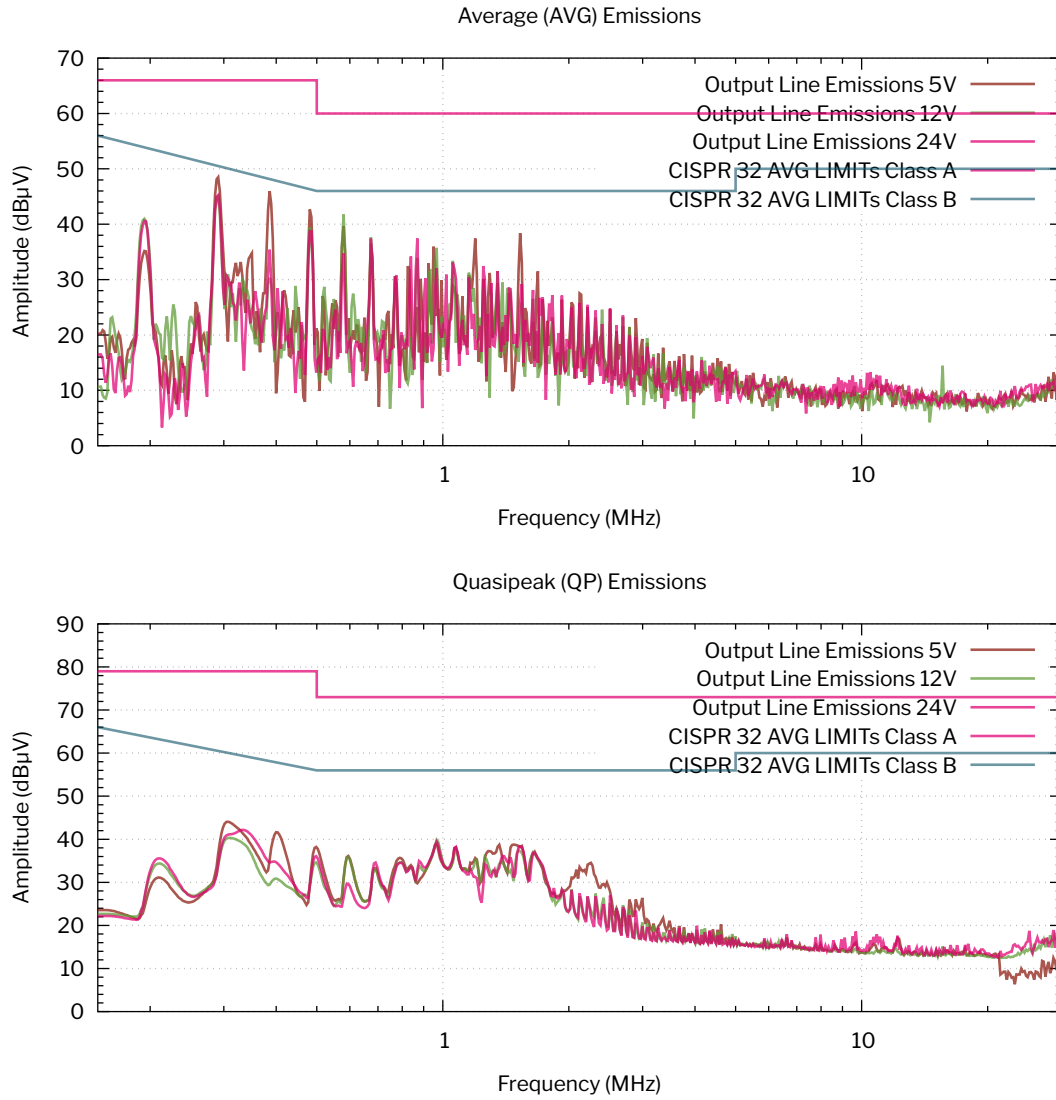


Figure 15: Conducted Line Emissions Output





## 6 Case

The case drawing is shown in Figure 16.

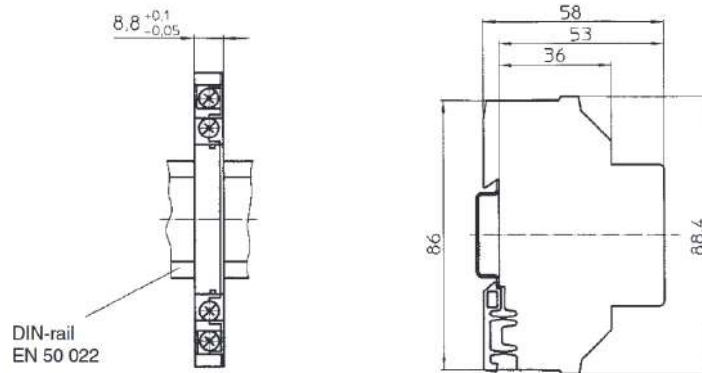


Figure 16: Product case.

## 7 Product label

The Label for the CCCV48XX is depicted in the following Figure 19.

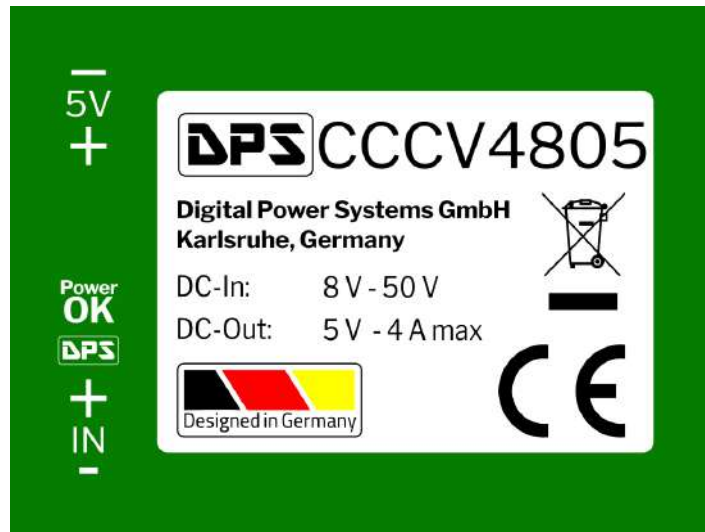


Figure 17: The product label of the CCCV4805.





Figure 18: The product label of the CCCV4812.

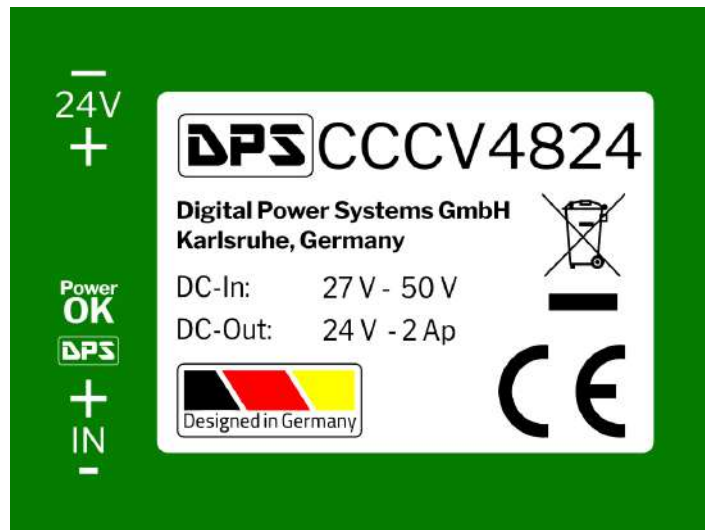


Figure 19: The product label of the CCCV4824.





## 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

### 8.3 Contact Information

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

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