

## DC-DC Converter AVP-3/Ks and ...-3/Ksp

### Output power up to 36 Watts

Isolated – Tripolar Output  
PCB (.../Ksp) and Chassis Mounting (.../Ks)

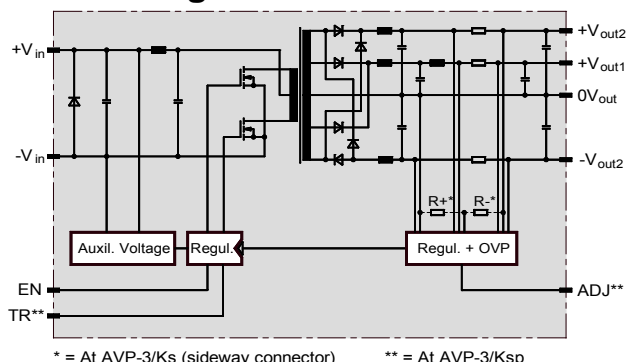


AVP-3/Ks



AVP-3/Ksp

### Block Diagram



### Technology

- Power section in 67kHz-MOSFET-technology
- Regulator section in SMT

### Special Features

- Electrostatic discharge according to EN 61000-4-2:2009 (testing level 4): 8 kV contact (base plate)/ 15 kV air
- Burst transients according to EN 61000-4-4:2004 (class 3): 2 kV
- Surge according to EN 61000-4-5:2006 (class 2): 0,5 kV symmetric
- Conducted emission:
  - Input filtering according to EN 55022:2006, class B (QP)\*
- Reverse polarity protection
- Short circuit protected
- Overtemperature shutdown
- Remote off (EN) with TTL – L-signal
- Overvoltage protection in the output circuit, at the 2. positive voltage even in case of external supply (OVP)
- Extremely low thermal stress of sensitive components due to dissipated power loss over mounting surface
- Vibration resistant and indifferent to humidity due to encapsulated case

### Specifications

at  $\vartheta_{amb}=25^{\circ}\text{C}$ ,  $V_{in\ nom}$ ,  $I_{out\ nom}$

#### Temperature

Ambient air	$\vartheta_{amb}$	= $-40^{\circ}\text{C}...+85^{\circ}\text{C}$
Storage	$\vartheta_s$	= $-40^{\circ}\text{C}...+100^{\circ}\text{C}$
Rise in case	$\Delta\vartheta_{Cperm}$	$\leq 20\text{ K}$
Permissible rise on base plate	$\Delta\vartheta_{Bperm}$	$\leq 25\text{ K}$
Necessary thermal resistance of mounting surface (chassis) to ambient	$R_{thBA}$	$\leq 3\text{ K/W}$

#### Output voltages

Tolerance	$\Delta V_{out1/out2}$	$\leq \pm 1,5/\pm 5\%^{**}$
Ripple at $\vartheta_{amb} = -40^{\circ}\text{C}...+85^{\circ}\text{C}$	$V_{out1\ ripple}$	$\leq 3,5\%$
	$V_{out2\ ripple}$	$\leq 7\%$
Temperature coefficient	TC	$\leq 0,016\%/K$

#### Regulation at $\vartheta_{amb} = -40^{\circ}\text{C}...+85^{\circ}\text{C}$

Line reg. for $V_{in\ range}$	$\Delta V_{out}$	$\leq 2\text{ mV}$
Load reg. static.	$\Delta V_{out1/out2}$	$\leq 13/350\text{ mV/A}^{***}$
Load change ( $25^{\circ}\text{C}$ )	$\Delta V_{out1/out2}$	$\leq 175/750$ $(140/700)\text{ mV/A}^{***}$

#### OVP

Starting point /%	$V_{out\ off}$	$\leq 130\% V_{out\ nom}$
Admissible continuous external current	$I_{ext}$	$\leq 4,5\text{ A}$

#### Isolation – voltage strength

In-/Output	$\geq 1,5\text{ kVrms}$
Input to base plate	$\geq 1,5\text{ kVrms}$
Output to base plate	$\geq 0,5\text{ kVrms}$
Resistance	$R_{iso} \geq 1,5\text{ GOhm}$
Capacitance	$C_{iso} \geq 2200\text{ pF}$

#### Weight AVP-3/Ks / AVP-3/Ksp

M	ca. 315/295g
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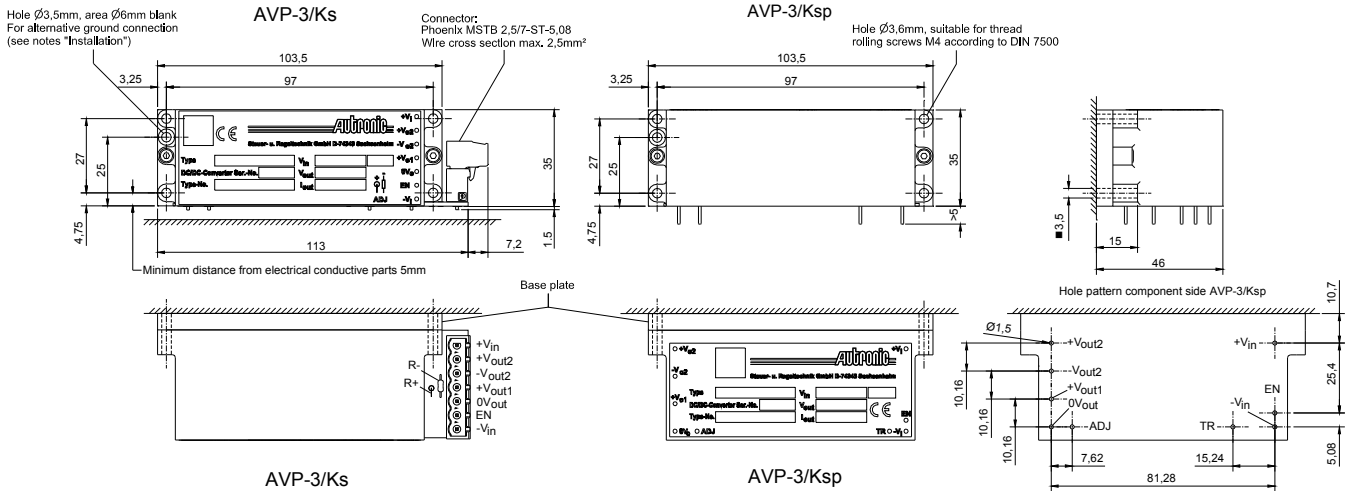
\* When heat sink is not connected. Class A (QP) when heat sink is connected to earth. In built-in condition our devices may show different EMC properties.

\*\* At every combination of  $I_{out1}$  between 10% and 100% and  $\pm I_{out2}$  between 5% and 100% or  $I_{out1}$  between 100% and 200% and  $\pm I_{out2}$  between 80% and 100% for  $P_{tot} \leq 36\text{ W}$  or  $I_{out1}$  between 30% and 100% and  $+ I_{out2}$  between 100% and 200% resp.  $-I_{out2}$  between 5% and 100% for  $P_{tot} \leq 36\text{ W}$

\*\*\* The respective other output burdens with  $I_{out\ nom}$ . At the AVP-3/Ksp 12mV smaller values

# Drawings

Dimensions in mm  
Tolerance: general ± 1mm



## Operating Instructions

**Installation:** The converters have to be installed according to the guidelines currently in force, like other open electronic component assemblies. Attention must be paid to sufficient ventilation, fastening and protection against accidental contact! The mounting surface has to be even with a thermal resistance as described under "Specifications". If more than one converter is mounted on the same mounting surface the thermal resistance has to be divided by the quantity of converters used. The base plate has to be grounded by using thread rolling screws M 4 according to DIN 7500. An alternative connection to ground can be realized by a special mounting hole, which is free of anodizing surface.

**Reverse polarity protection:** If reverse polarity connection of the input voltage can not be excluded, an external time-lag fuse must be installed. Size:  $I_{rat} = 1,5 \times I_{in,max}$  (max. 10 A). Pay attention on sufficient current of current source in case of short-circuit!

**Excess temperature protection:** In case temperature exceeds 101°C, typ. 105°C, (due to inadmissible operation conditions) the output voltage is automatically switched off and restarted after cooling down about 10 K.

**Overvoltage protection:** Internally caused overvoltage at the outputs lead to a thyristor-controlled short-circuit of the 2. positive output shutdown of all outputs. External caused overvoltages at the 2. positive output lead also to a thyristor-controlled short-circuit of these outputs. After elimination of the overvoltages the outputs restart automatically.

**External shut down (EN):**  $V < 0,8 V$  at pin "EN" to pin  $-V_{in}$  switches off the outputs.  $I_{source} 500 \mu A$

**Current limiting:**  $I_{out,lim} = 1,1 \dots 1,2 I_{out,nom}$ . At more than 50% overload and in case of short circuit (even at one output only) all outputs switch off and restart automatically latest after 1s of elimination of the overload.

**Tracking operation at the AVP-3/Ksp:** If the TR pins of two or more converters are connected, the output voltages in case of short-circuit or overload go synchronously down.

**Adjustment:** Connection of the pins "ADJ" and "GND<sub>out</sub>" for the AVP-3/Ksp modules or inserting a wire to "R+" for the AVP-3/Ks modules increases all output voltages of about 6%. Intermediate values are obtained by means of a resistor. By connecting "ADJ" and "+V<sub>out1</sub>" pins respectively "+V<sub>out1</sub>" pins with a resistor (AVP-3/Ksp) i.e. adding a resistor for "R-" (AVP-3/Ks) ensures that the output voltages may be lowered by max. 8%.

## Standard converters AVP-3/Ks and AVP-3/Ksp

V <sub>out</sub> V	I <sub>out,nom</sub> <sup>2)</sup> A	V <sub>in,nom</sub> V	V <sub>in,range</sub> V	I <sub>in,max</sub> A	η <sup>3)</sup> %	Typ	Order Number	
							AVP-3/Ks	AVP-3/Ksp
5 <sup>1)</sup> /±12	1,2/±1,3 <sup>2)</sup>	12/24	9...40	4,7	82	AVP-3	09 41 62 0112 2	09 41 62 0172 2
	1,2/±1,3 <sup>2)</sup>	24	15...36	2,8	83		09 41 92 0112 5	09 41 92 0172 5
	1,2/±1,3 <sup>2)</sup>	48	32...74	1,3	84		09 41 52 0112 4	09 41 52 0172 4
	1,2/±1,3 <sup>2)</sup>	110	66...154	0,6	85		09 41 72 0112 9	09 41 72 0172 9
+5 <sup>1)</sup> /±15	1,2/±1 <sup>3)</sup>	12/24	9...40	4,9	82		09 41 63 0112 1	09 41 63 0172 1
	1,2/±1 <sup>3)</sup>	24	15...36	2,8	84		09 41 93 0112 4	09 41 93 0172 4
	1,2/±1 <sup>3)</sup>	48	32...74	1,3	85		09 41 53 0112 3	09 41 53 0172 3
	1,2/±1 <sup>3)</sup>	110	66...154	0,6	86		09 41 73 0112 8	09 41 73 0172 8

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DIN EN ISO 9001 certified

1) Adjusted to 5,05...5,1V

2) Permissible current sharing: 2,4/±1A or 1,2A/+2,6A, -0,04A or 1,2A/+0,04A, -2,6A

3) Permissible current sharing: 2,4/±0,8A or 1,2A/+2A, -0,03A or 1,2A/+0,03A, -2A

4) At V<sub>in,nom</sub>