



PHI-CON

# 2W SMD DC-DC Converter P2AS-Series

- SMD Package
- Dual output
- Up to 1000 V<sub>DC</sub> isolation
- MTBF > 3,500,000 h at 25°C
- -40...85°C operating temperature range
- Efficiency up to 85 %

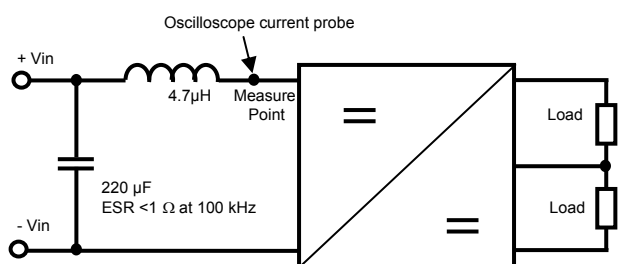
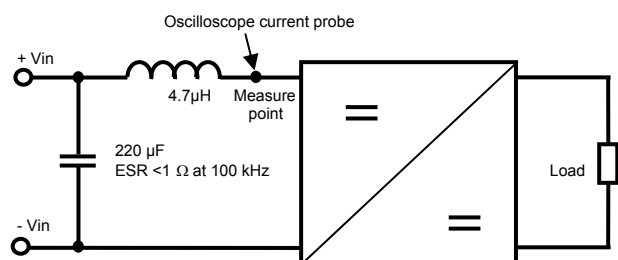


## Model guide

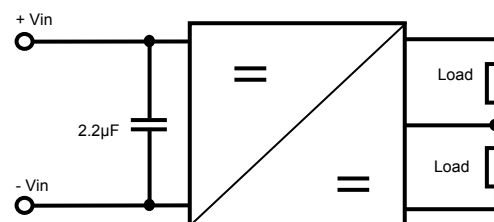
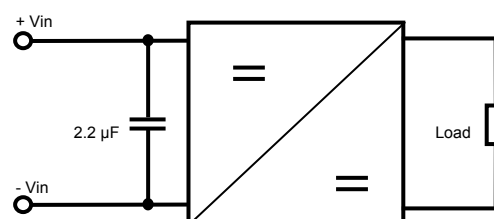
Type	Input voltage range [V <sub>DC</sub> ]	Output voltage [V <sub>DC</sub> ]	Input current		Output current		Reflected input ripple current typ. [mA]	Efficiency typ. [%]	Capacitive load max. (See note 2) [μF]
			no-load typ. [mA]	full-load typ. [mA]	min. [mA]	max. [mA]			
P2AS0505S	4.5..5.5	5.0	40	494	40	400	54	80	220
P2AS0509S	4.5..5.5	9.0	36	468	22	222	40	82	220
P2AS0512S	4.5..5.5	12.0	36	468	17	167	50	84	220
P2AS0515S	4.5..5.5	15.0	35	478	14	133	42	84	220
P2AS1205S	10.8..13.2	5.0	20	205	40	400	49	82	220
P2AS1209S	10.8..13.2	9.0	22	196	22	222	49	83	220
P2AS1212S	10.8..13.2	12.0	19	189	17	167	53	85	220
P2AS1215S	10.8..13.2	15.0	21	202	14	133	48	85	220
P2AS0505D	4.5..5.5	±5.0	33	484	±20	±200	37	82	100
P2AS0509D	4.5..5.5	±9.0	38	472	±11	±110	36	83	100
P2AS0512D	4.5..5.5	±12.0	33	461	±8	±83	25	84	100
P2AS0515D	4.5..5.5	±15.0	48	473	±7	±67	45	82	100
P2AS1205D	10.8..13.2	±5.0	16	193	±20	±200	45	83	100
P2AS1209D	10.8..13.2	±9.0	15	191	±11	±110	41	84	100
P2AS1212D	10.8..13.2	±12.0	18	186	±8	±83	46	84	100
P2AS1215D	10.8..13.2	±15.0	20	193	±7	±67	46	85	100

Part designation structure												
Output power		Series designation	Mounting technology		Input voltage		Output voltage		Output configuration		Packing	
P2	1 W	A	S	SMD	05	5 V	05	5 V	D	Dual	blanc	Tube
					12	12 V	09	9 V	S	Single	TR	Reel
							12	12 V				
							15	15 V				

Input reflected ripple current measure circuit



EMI recommended external circuit



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## Specifications

<b>Input</b>	
Voltage range	± 10 %
Filter	Capacitors
<b>Input / output:</b>	
DC-Isolation voltage tested for 60 sec. @ leakage < 1mA	1 kV <sub>DC</sub>
Isolation Resistance @ 500 V <sub>DC</sub>	10 <sup>9</sup> Ω, min.
Capacitance	30 pF, typ.
<b>Output</b>	
Input voltage derivation	± 1.2 % @ 1% V <sub>in</sub> change
<b>Output voltage drift @ 10 % to 100 % load change</b>	
5 V output version	12.8 % typ., 15 % max.
9 V output version	8.3 % typ., 10 % max.
12 V output version	6.8 % typ., 10 % max.
15 V output version	6.3 % typ., 10 % max.
Output voltage balance	0.4 % @ 5 % load asymmetry
Temperature coefficient	0.03 % / °C, max., at full load
Short circuit duration	1 sec., max.
Ripple & noise, 20 MHz BW	150 mVp-p, max.
<b>General</b>	
Switching frequency	70 kHz, typ.

<b>Environmental</b>	
EMI CE, with external filter circuit	CISPR22 / EN55022 CLASS A
EMS, ESD	IEC-,EN61000-4-2, contact ±8 kV perf.criteria B
Operating temperature (ambient)	-40 °C to +85 °C
Storage temperature	-55 °C to +125 °C
Case temperature rise at full load	25 °C
Humidity	Up to 95 %, non-condensing
Cooling	Free-air convection
<b>Physical</b>	
Package material	Epoxy resin (UL94-V0)
Weight	2.1 g
Reliability, MTBF (MIL-HDBK-217 @ 25 °C)	3.5 Mio. hours
<b>Absolute maximum ratings</b>	
V <sub>in</sub> 5 V types	-0.7 ~ 9 V <sub>DC</sub> , max. 1 s
V <sub>in</sub> 12 V types	-0.7 ~ 18 V <sub>DC</sub> , max. 1 s
Manual soldering lead temperature	300 °C max. 10 s max., 1.5 mm distance from case body
Soldering temperature	217 °C for 60 s max., 245 °C peak
Moisture sensitivity level (MSL)	IPC/JEDEC J-STD-020D.1

### Notes:

1. Operation less minimum load will not damage the converter, however, they may not meet all specification listed.
2. Max. capacitive load tested at input voltage range and full load.
3. All date in the datasheet are measured according to nominal input voltage, rated output load, Ta 25 °C, humidity <75%, unless otherwise specified.
4. Not for parallel and hot swap applications!

Figure 2, EMI recommended external circuit

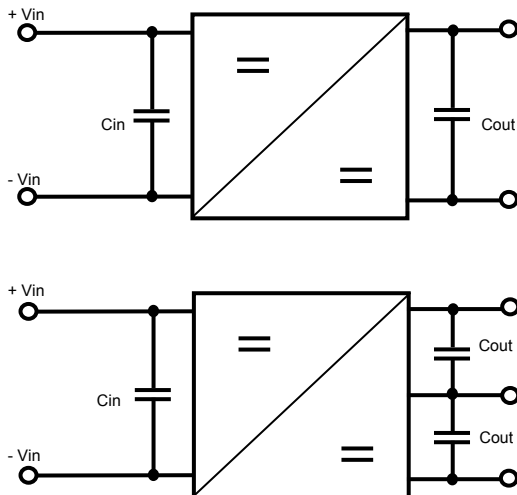


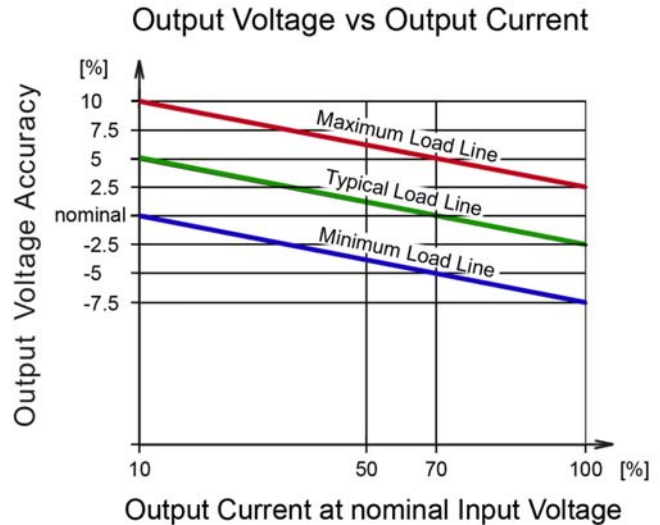
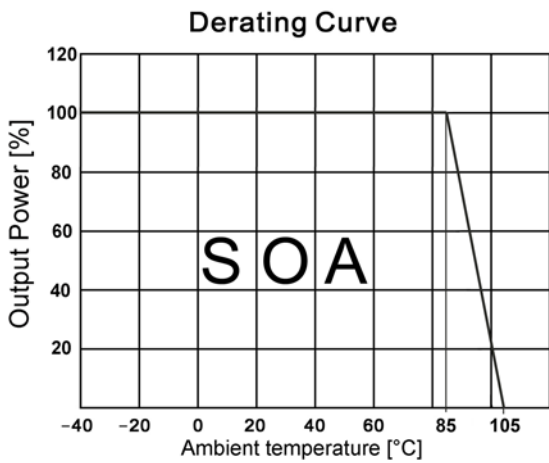
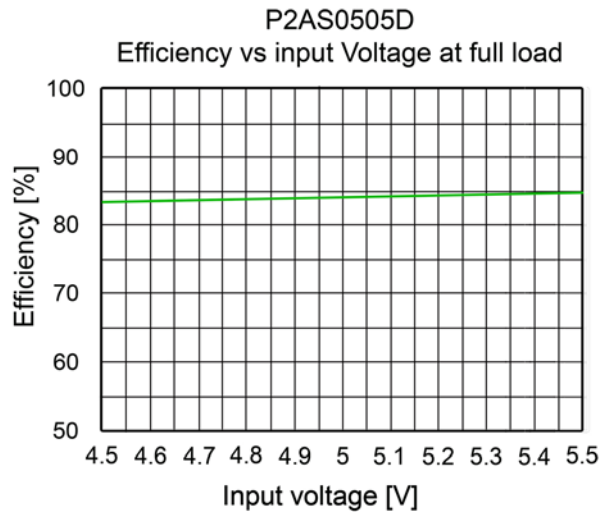
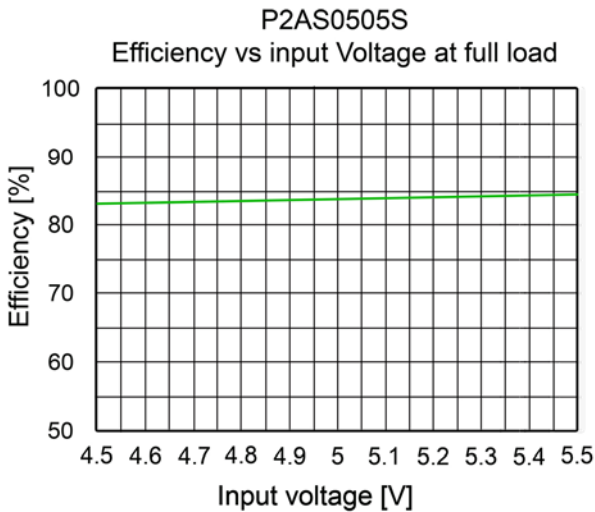
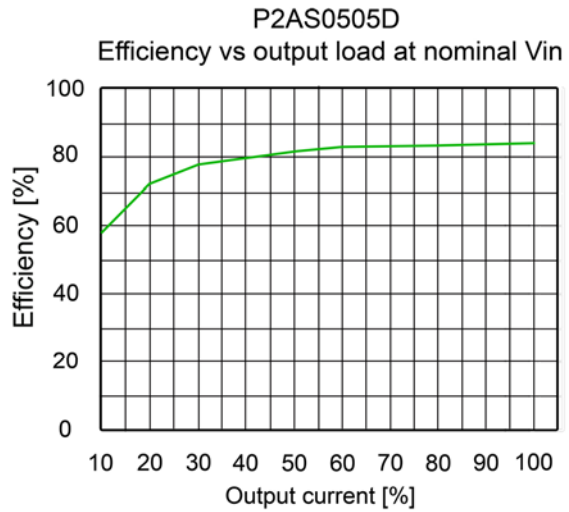
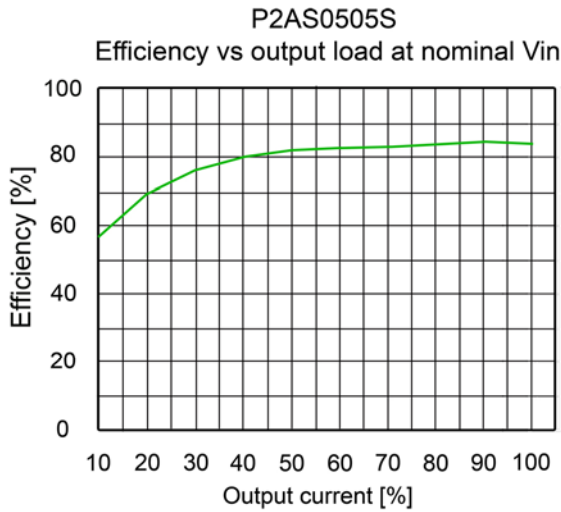
Table 1, filter capacitors		
Type	Cin [μF]	Cout [μF]
<b>Single output</b>		
P2AS0505S	4.7	2 x 10
P2AS0509S	4.7	2 x 4.7
P2AS0512S	4.7	2 x 2.2
P2AS0515S	4.7	2 x 1
P2AS1205S	2.2	2 x 10
P2AS1209S	2.2	2 x 4.7
P2AS1212S	2.2	2 x 2.2
P2AS1215S	2.2	2 x 1
<b>Dual output</b>		
P2AS0505D	4.7	4.7
P2AS0509D	4.7	2.2
P2AS0512D	4.7	1
P2AS0515D	4.7	0.47
P2AS1205D	2.2	4.7
P2AS1209D	2.2	2.2
P2AS1212D	2.2	1
P2AS1215D	2.2	0.47

### Recommended circuit

If you want to further decrease the input/output ripple, a capacitor filtering network may be connected to the input and output ends of the DC/DC converter. (see figure 2).

It should also be noted that the capacitance of filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the recommended capacitance of filter capacitor (see table 1). It's not recommended to connect any external capacitor in the application field at output power less than 0.5 watt.

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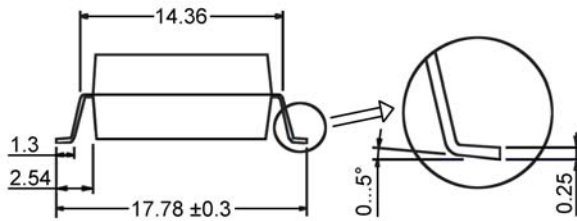
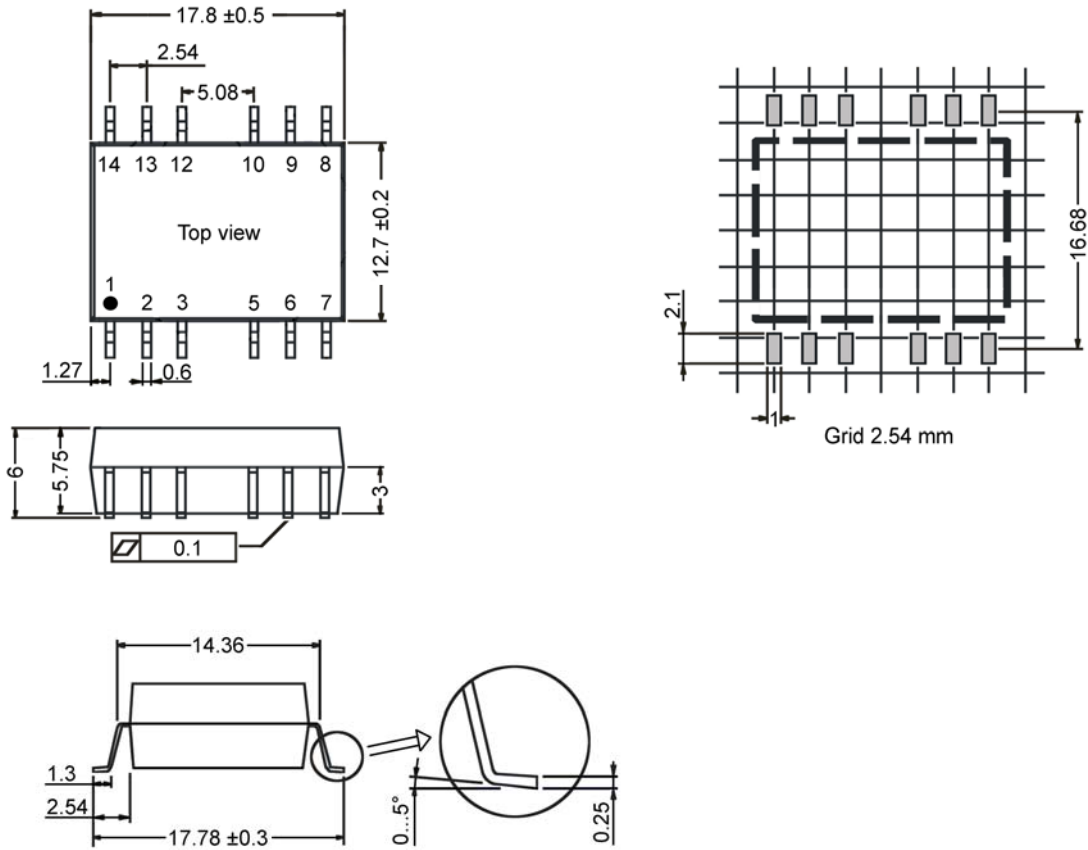


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## Dimensions

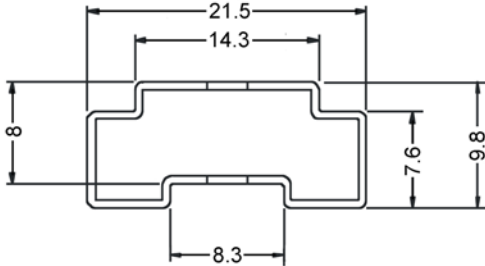


Lead	Single output	Dual output
1	- Vinput	- Vinput
2	+ Vinput	+ Vinput
3	Not connected	Not connected
4	No pin	No Pin
5	Not connected	- Voutput
6	- Voutput	common output
7	+ Voutput	+ Voutput
8	Not connected	Not connected
9	Not connected	Not connected
10	Not connected	- Voutput
11	No Pin	No Pin
12	Not connected	Not connected
13	Not connected	Not connected
14	Not connected	Not connected

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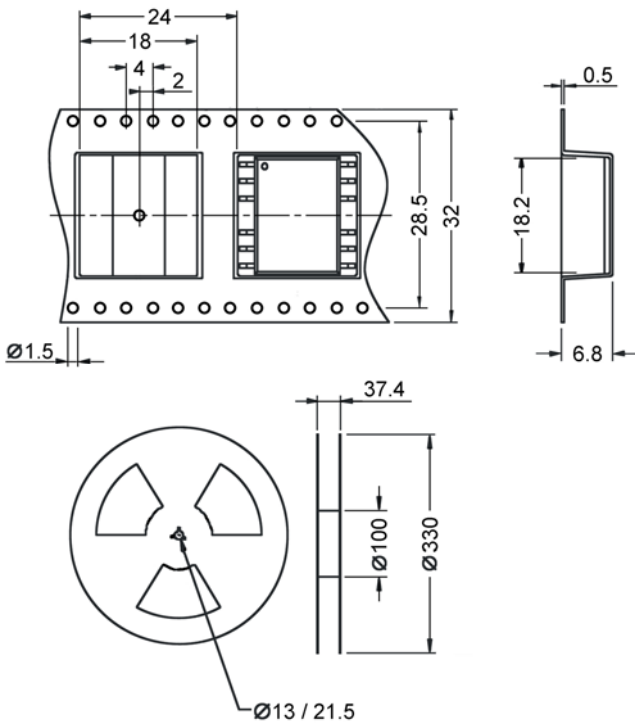
Dimensions tube packing



Note

All units in mm  
 General tolerances:  $\pm 0.5$  mm  
 Long tube: L 530 mm, quantity per tube: 28 pcs  
 Short tube: L 220 mm, quantity per tube: 10 pcs

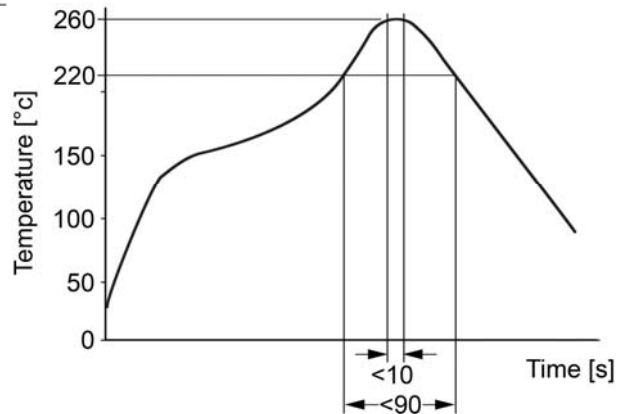
Dimensions tape & reel packing



Note

All units in mm  
 General tolerances:  $\pm 0.5$  mm  
 Quantity per reel: 400 pcs

Recommended IR-reflow soldering profile



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