



PHI-CON

5 W DC-DC Converter P5A-Series

- Wide 2:1 input range
- 1500 V_{DC} & 3500 V_{DC} isolation
- MTBF >1.121 Mio. Hours
- Continuous short circuit protection



Model guide

Type	Input voltage		Input current		Output voltage [V _{DC}] nom.	Output current		Efficiency [%] typ.	Capacitor load (see 1) [mA] max.
	Nominal [V _{DC}]	Range [V _{DC}]	No load [mA] max.	Full load [mA] typ.		[mA] min.	[mA] max.		
Single output									
P5A123R3S	12	9...18	30	490	3.3	0	1300	73	1000
P5A1205S	12	9...18	30	540	5.0	0	1000	77	1000
P5A127R2S	12	9...18	30	535	7.2	0	695	78	680
P5A1209S	12	9...18	30	535	9.0	0	556	78	680
P5A1212S	12	9...18	30	515	12.0	0	417	81	330
P5A1215S	12	9...18	30	520	15.0	0	333	80	220
P5A1218S	12	9...18	30	520	18.0	0	277	80	68
P5A1224S	12	9...18	30	520	24.0	0	209	80	68
P5A243R3S	24	18...36	20	240	3.3	0	1300	75	1000
P5A2405S	24	18...36	20	260	5.0	0	1000	80	1000
P5A247R2S	24	18...36	20	255	7.2	0	695	78	680
P5A2409S	24	18...36	20	255	9.0	0	556	82	680
P5A2412S	24	18...36	20	260	12.0	0	417	80	330
P5A2415S	24	18...36	20	255	15.0	0	333	82	220
P5A2418S	24	18...36	20	255	18.0	0	277	82	68
P5A2424S	24	18...36	20	255	24.0	0	209	82	68
P5A483R3S	48	36...72	12	120	3.3	0	1300	75	1000
P5A4805S	48	36...72	12	130	5.0	0	1000	80	1000
P5A487R2S	48	36...72	12	125	7.2	0	695	82	680
P5A4809S	48	36...72	12	125	9.0	0	556	82	680
P5A4812S	48	36...72	12	130	12.0	0	417	80	330
P5A4815S	48	36...72	12	125	15.0	0	333	83	220
P5A4818S	48	36...72	12	125	18.0	0	277	83	68
P5A4824S	48	36...72	12	125	24.0	0	209	83	68
Dual output									
P5A123R3D	12	9...18	30	565	±3.3	0	±750	73	2 x 680
P5A1205D	12	9...18	30	540	±5.0	0	±500	77	2 x 330
P5A127R2D	12	9...18	30	520	±7.2	0	±347	80	2 x 220
P5A1209D	12	9...18	30	520	±9.0	0	±278	80	2 x 220
P5A1212D	12	9...18	30	520	±12.0	0	±208	80	2 x 100
P5A1215D	12	9...18	30	530	±15.0	0	±167	79	2 x 47
P5A1218D	12	9...18	30	520	±18.0	0	±138	80	2 x 33
P5A1224D	12	9...18	30	520	±24.0	0	±105	80	2 x 33
P5A243R3D	24	18...36	20	275	±3.3	0	±750	75	2 x 680
P5A2405D	24	18...36	20	265	±5.0	0	±500	78	2 x 330
P5A247R2D	24	18...36	20	250	±7.2	0	±347	83	2 x 220
P5A2409D	24	18...36	20	250	±9.0	0	±278	83	2 x 220
P5A2412D	24	18...36	20	260	±12.0	0	±208	80	2 x 100
P5A2415D	24	18...36	20	260	±15.0	0	±167	80	2 x 47
P5A2418D	24	18...36	20	260	±18.0	0	±138	80	2 x 33
P5A2424D	24	18...36	20	260	±24.0	0	±105	80	2 x 33
P5A483R3D	48	36...72	12	140	±3.3	0	±750	73	2 x 680
P5A4805D	48	36...72	12	130	±5.0	0	±500	79	2 x 330
P5A487R2D	48	36...72	12	130	±7.2	0	±347	79	2 x 220
P5A4809D	48	36...72	12	130	±9.0	0	±278	79	2 x 220
P5A4812D	48	36...72	12	130	±12.0	0	±208	80	2 x 100
P5A4815D	48	36...72	12	130	±15.0	0	±167	80	2 x 47
P5A4818D	48	36...72	12	130	±18.0	0	±138	80	2 x 33
P5A4824D	48	36...72	12	130	±24.0	0	±105	80	2 x 33

1. Suffix: "H" option isolation voltage 3.5 kV
2. Suffix: "P" option plastic case



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5 W DC-DC Converter P5A-Series

Specifications

Input	
Filter	Pi Network
Reflected input ripple current	35 mA _{p-p} (Figure 1)
Isolation:	
In / Out Rated voltage (60 s)	1500 V _{DC} , Standard 3500 V _{DC} , Suffix "H"
Input or output to case	1000 V _{DC}
Resistance	10 ⁹ Ω
Capacitance	500 pF, typ.
Output	
Voltage accuracy	± 1 %
Ripple and noise (at 20 MHz BW)	60 mV _{p-p} , max.
Short circuit protection	Continuous (automatic restart)
Line regulation	± 0.5 %, max.
Load voltage regulation	± 0.5 % ± 1.5 % @ P5Ax3R3x
Temperature coefficient	± 0.02 % / °C
General	
Switching frequency	270 kHz, typ.
Safety standards	IEC, EN, UL, cUL60950-1 IEC, EN, UL, cUL62368-1
Reliability calc. MTBF (MIL-HDBK-217F)	1.12 Mio. h @ Ta 25 °C

EMC specifications	
Radiated emissions	EN55032 Class A
Only metal case version	
Conducted emissions	EN55032 Class A (see Fig. 3)
ESD	IEC61000-4-2 perf. criteria A
RS	IEC61000-4-3 perf. criteria A
EFT (see Fig. 3)	IEC61000-4-4 perf. criteria A
Surge (see Fig. 3)	IEC61000-4-5 perf. criteria A
CS	IEC61000-4-6 perf. criteria A
PFMF	IEC61000-4-8 perf. criteria A
Environmental	
Operating ambient temperature	-40 ... 85 °C
Case temperature	100 °C, max.
Storage temperature	-40 ... 125 °C
Derating	None required
Humidity	95 % max., non condensing
Cooling	Free air convection
Physical	
Weight	17 g metal case, standard 13.5 g plastic case, Suffix "P"
Potting material	Epoxy (UL94V-0 rated)
Case material	Metal: Nickel coated copper Black Plastic (UL94V-0 rated)
Absolute maximum ratings	
Input voltage < 100 ms	
P5A12xxx	24 V _{DC}
P5A24xxx	40 V _{DC}
P5A48xxx	80 V _{DC}
Lead soldering Temperature	260 °C for 10 s, distance from package 1.5 mm

1. Specified by nominal in voltage and constant resistive load.
2. Parallel operation of DC/DC-Converter outputs is not recommendet.
3. The P5A-series is not usable in IGBT and MOSFET driver applications.

Figure 1 Measure circuit input reflected ripple current

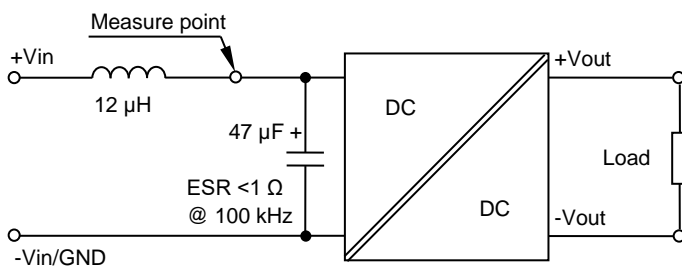
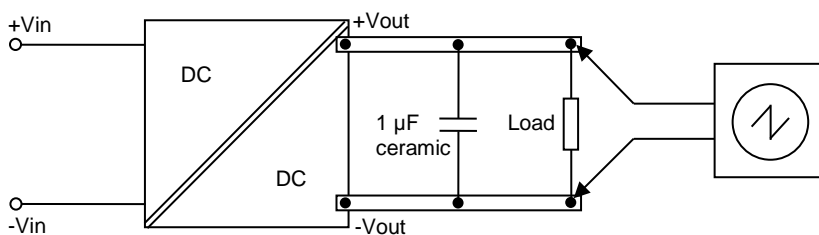
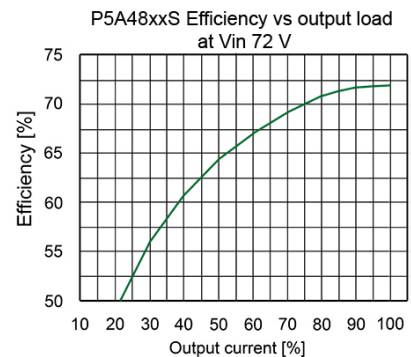
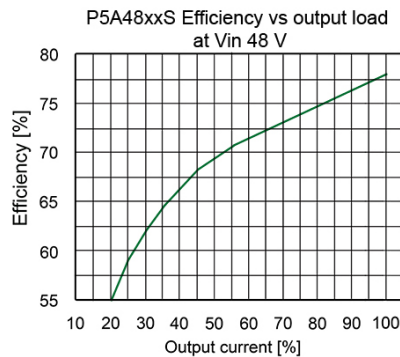
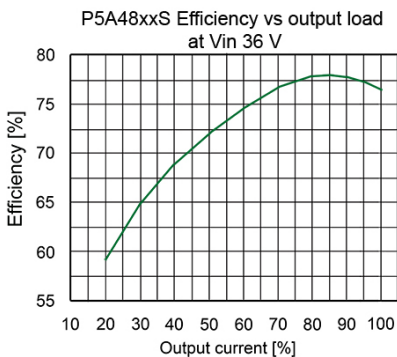
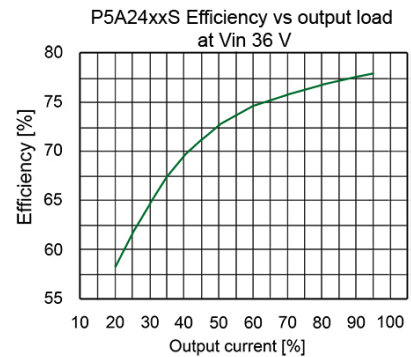
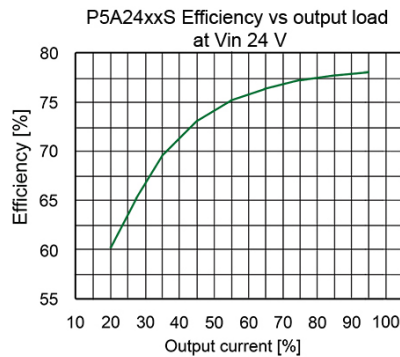
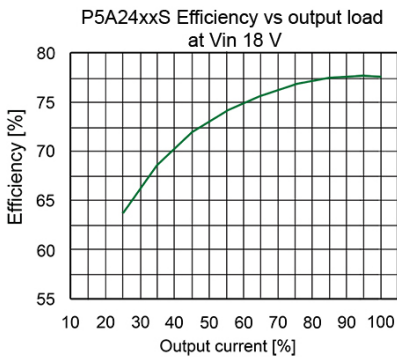
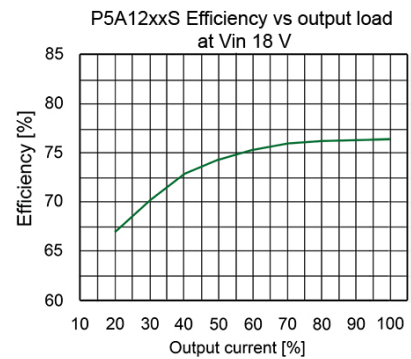
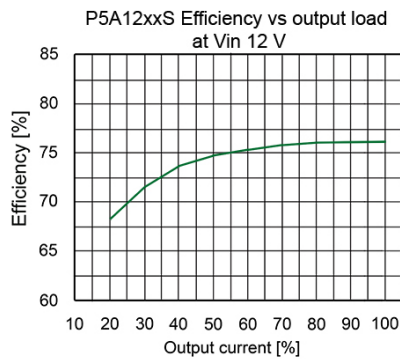
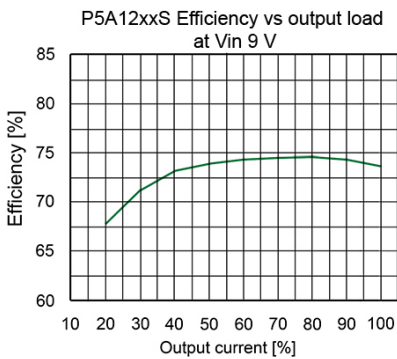
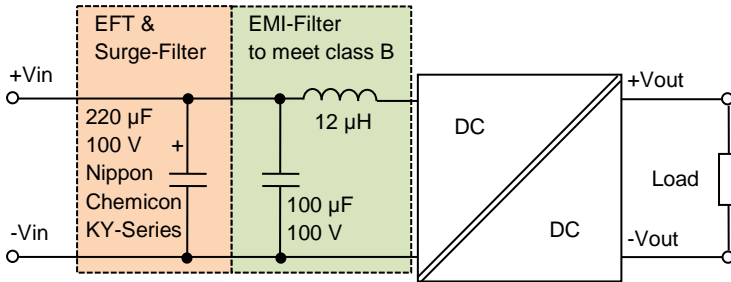


Figure 2 Measure circuit output ripple & noise voltage

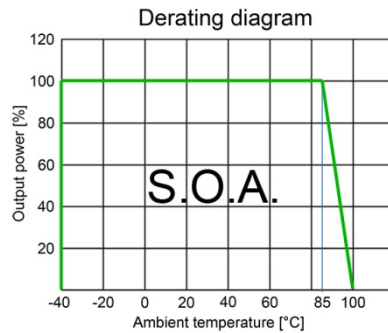


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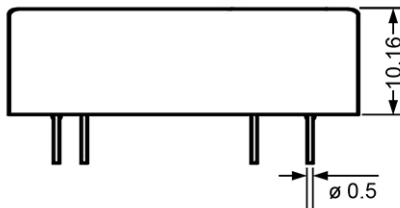
Figure 3
Application circuit to meet EFT IEC61000-4-4 class A, Surge IEC61000-4-5 class A and EMI conducted emission EN55032 Class A



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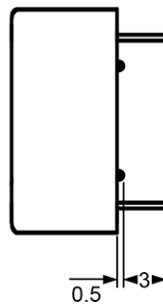
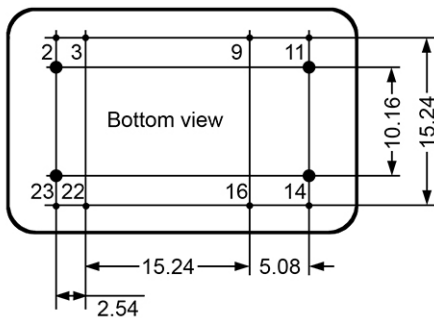


Dimensions



All units in mm

1. Pin diameter tolerance ± 0.05 mm
2. Pin pitch tolerance ± 0.35 mm
3. Case tolerance ± 0.5 mm



Pin assignment		
Pin	1.5 kV & 3.5 kV isolation	
	Single	Dual
2	-V Input	-V Input
3	-V Input	-V Input
9	No Pin	Common
11	Not Connected.	-V Output
14	+V Output	+V Output
16	-V Output	Common
22	+V Input	+V Input
23	+V Input	+V Input

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