6 W DC-DC Converter P6N-Series

PHI-CON

- Wide 2:1 input range
- -40...85 °C operation temperature range
- Isolation up to 3000 V_{DC}
- Continuous short circuit protection
- Under voltage protection
- Efficiency up to 85 %
- DIL24 plastic case

Model guide

Type	Input voltage		Input current		Output voltage	Output current		Efficiency	Capacitive load (note 1)
	nominal [V_{DC}]	range [V_{DC}]	No load [mA] typ.	Full load [mA] typ.	[V_{DC}]	[mA] min.	[mA] max.	[%] typ.	[µF] max.
Single output									
P6N123R3S	12	9...18	7	515	3.3	0	1400	76	470
P6N1205S	12	9...18	7	635	5.0	0	1200	80	470
P6N1212S	12	9...18	10	600	12.0	0	500	84	100
P6N1215S	12	9...18	10	600	15.0	0	400	85	100
P6N1224S	12	9...18	20	610	24.0	0	250	83	47
P6N243R3S	24	18...36	7	260	3.3	0	1400	75	470
P6N2405S	24	18...36	7	315	5.0	0	1200	80	470
P6N2412S	24	18...36	7	300	12.0	0	500	84	100
P6N2415S	24	18...36	7	300	15.0	0	400	84	100
P6N2424S	24	18...36	10	305	24.0	0	250	83	47
P6N483R3S	48	36...75	7	125	3.3	0	1400	77	470
P6N4805S	48	36...75	7	150	5.0	0	1200	83	470
P6N4812S	48	36...75	7	150	12.0	0	500	85	100
P6N4815S	48	36...75	7	150	15.0	0	400	85	100
P6N4824S	48	36...75	7	150	24.0	0	250	85	47
Dual output									
P6N123R3D	12	9...18	10	660	±3.3	0	±910	77	2 x 220
P6N1205D	12	9...18	10	625	±5.0	0	±600	81	2 x 220
P6N1212D	12	9...18	15	600	±12.0	0	±250	84	2 x 100
P6N1215D	12	9...18	20	600	±15.0	0	±200	84	2 x 100
P6N1224D	12	9...18	35	625	±24.0	0	±125	81	2 x 47
P6N243R3D	24	18...36	7	330	±3.3	0	±910	77	2 x 220
P6N2405D	24	18...36	7	315	±5.0	0	±600	80	2 x 220
P6N2412D	24	18...36	10	305	±12.0	0	±250	83	2 x 100
P6N2415D	24	18...36	15	300	±15.0	0	±200	84	2 x 100
P6N2424D	24	18...36	20	310	±24.0	0	±125	82	2 x 47
P6N483R3D	48	36...75	7	160	±3.3	0	±910	79	2 x 220
P6N4805D	48	36...75	7	150	±5.0	0	±600	83	2 x 220
P6N4812D	48	36...75	7	150	±12.0	0	±250	84	2 x 100
P6N4815D	48	36...75	7	150	±15.0	0	±200	84	2 x 100
P6N4824D	48	36...75	15	160	±24.0	0	±125	81	2 x 47

Add suffix “H” for 3 kV isolation voltage

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Specifications

Input :	
Filter	Pi Network
Input reflected ripple current	20 mAp-p, typ. (see Fig. 1)
Start up time @ Vin nominal & R-load	20 ms
Under voltage protection	
P6N48xxx	Start up 8.5 V, typ.
	Lock off 7 V, typ.
P6N12xxx	Start up 16.5 V, typ.
	Lock off 14.5 V, typ.
P6N24xxx	Start up 34.5 V, typ.
	Lock off 30 V, typ.
Isolation:	
Input / output rated voltage 60 sec.	Standard. 1500 V_{DC} Suffix "H": 3000 V_{DC}
Resistance input to output	10^9 Ω
Capacitance	1 nF, typ.
Output:	
Voltage tolerance	± 2 %, max.
Voltage balance @ dual outp.	± 2 %, max.
Cross deviation @ 75 % load difference between outputs	± 5 %, max.
Line regulation	± 0.5 %, max.
Load regulation	± 1.2 %, max.
Temperature coefficient	± 0.02 % / °C
Ripple and noise (at 20 MHz BW)	<80 mVp-p, (see fig 2) <100 mVp-p, only P6Nxx24D
Over load protection	160 % of specified current
Short circuit protection	Continuous, automatic restart
Transient recovery time @ 25 % load steps	300 µs, typ.
Transient response deviation @ 25 % load steps	± 3 %, ± 5 % only P6Nxx3R3x

General:		
Switching frequency		330 kHz, typ.
Safety standard		IEC, EN, UL, cUL 60950-1
Reliability calc. MTBF MIL-HDBK-217 F @ 25 °C		>800000 h
Environmental:		
Operating ambient temperature range		-40…85 °C, see SOA -40…60 °C, without derating
Storage temperature range		-55…125 °C
Case temperature max.		100 °C
Humidity		95 %, max., not condensing
Cooling		Free air convection
Physical :		
Dimensions		31.75 x 20.32 x 10.16 mm
Weight		13 g
Case material		Black plastic, UL94V-0 rated
Potting material		Epoxy resin, UL94V-0 rated
EMC in accordance with		
Radiated emissions		EN55032 class A
Conducted emissions		EN55032 class A
ESD		IEC61000-4-2 perf. criteria A
RS		IEC61000-4-3 perf. criteria A
EFT		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
Absolute maximum ratings		
Input voltage	P6N12xxx P6N24xxx P6N48xxx	25 V_{DC}, 0.1 s, max. 50 V_{DC}, 0.1 s, max. 100 V_{DC}, 0.1 s, max.
Soldering temperature		260 °C for 10 s distance 1.5 mm from case

Note:
All parameters are specified at Ta 25 °C, nominal input voltage and full load unless otherwise specified!
*1 Specified by nominal input voltage and constant resistive load

Fig.1 Measure circuit for reflected input ripple current

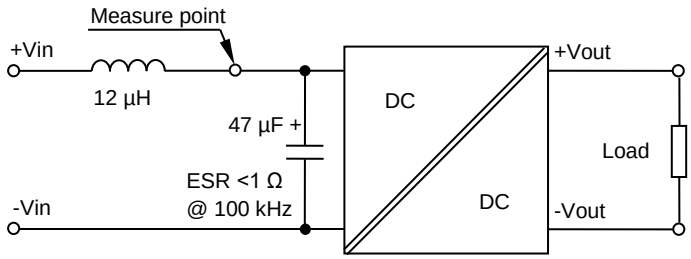

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Fig.2 Measure circuit for output ripple and noise

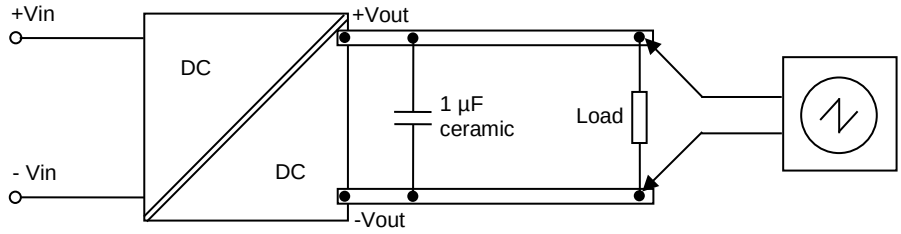
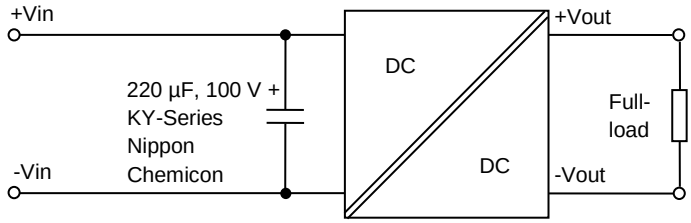
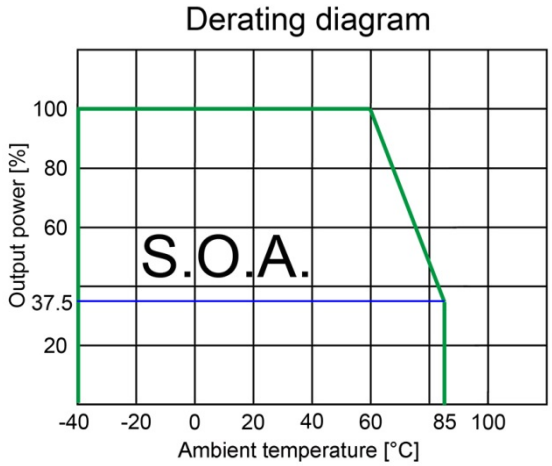


Fig.3 EMI filter circuit to comply IEC61000-4-5 performance criteria A





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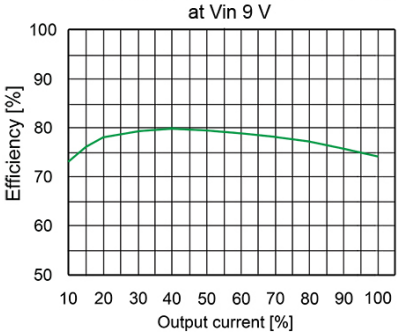
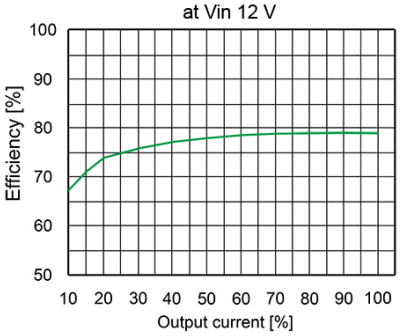
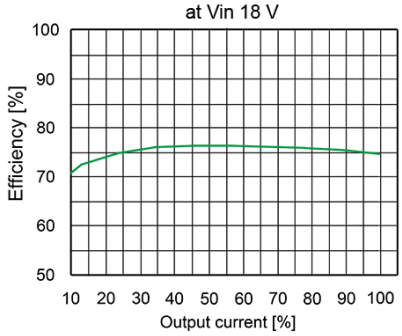
P6N123R3D Efficiency vs output load at Vin 9 V



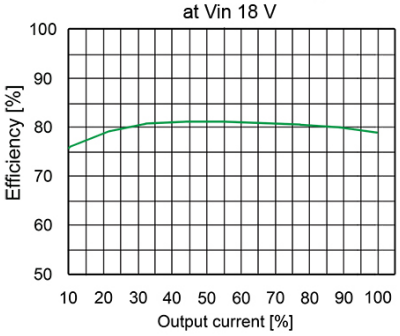
P6N123R3D Efficiency vs output load at Vin 12 V



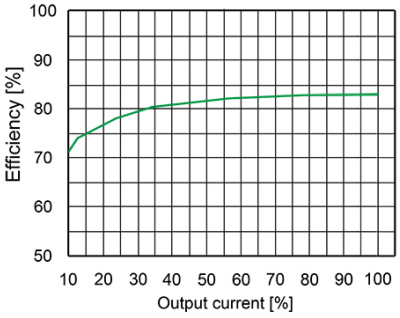
P6N123R3D Efficiency vs output load at Vin 18 V



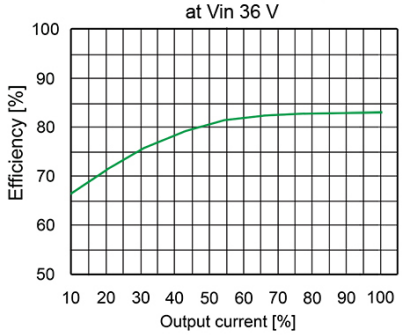
P6N2405S Efficiency vs output load at Vin 18 V



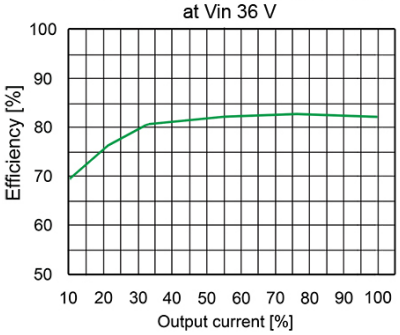
P6N2405S Efficiency vs output load at Vin 24 V



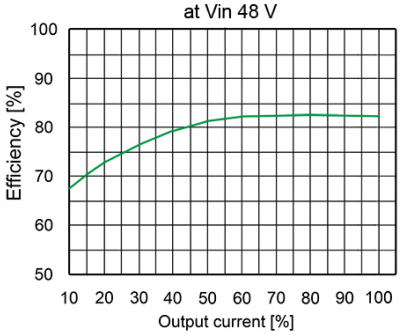
P6N2405S Efficiency vs output load at Vin 36 V



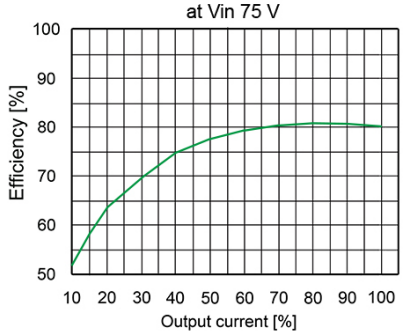
P6N4805S Efficiency vs output load at Vin 36 V



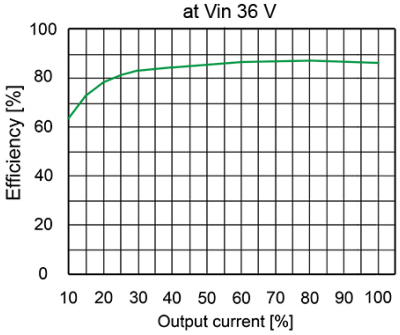
P6N4805S Efficiency vs output load at Vin 48 V



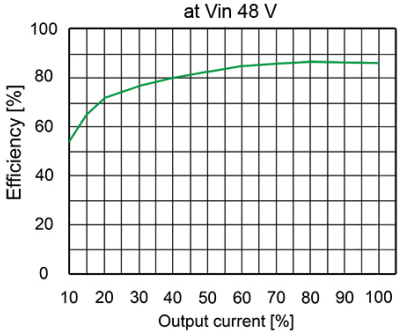
P6N4805S Efficiency vs output load at Vin 75 V



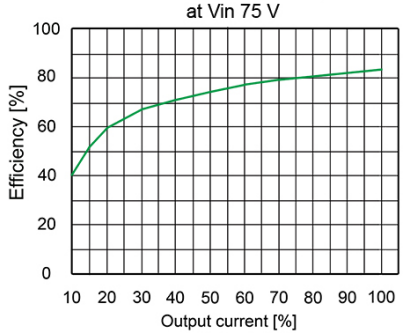
P6N4824D Efficiency vs output load at Vin 36 V



P6N4824D Efficiency vs output load at Vin 48 V



P6N4824D Efficiency vs output load at Vin 75 V



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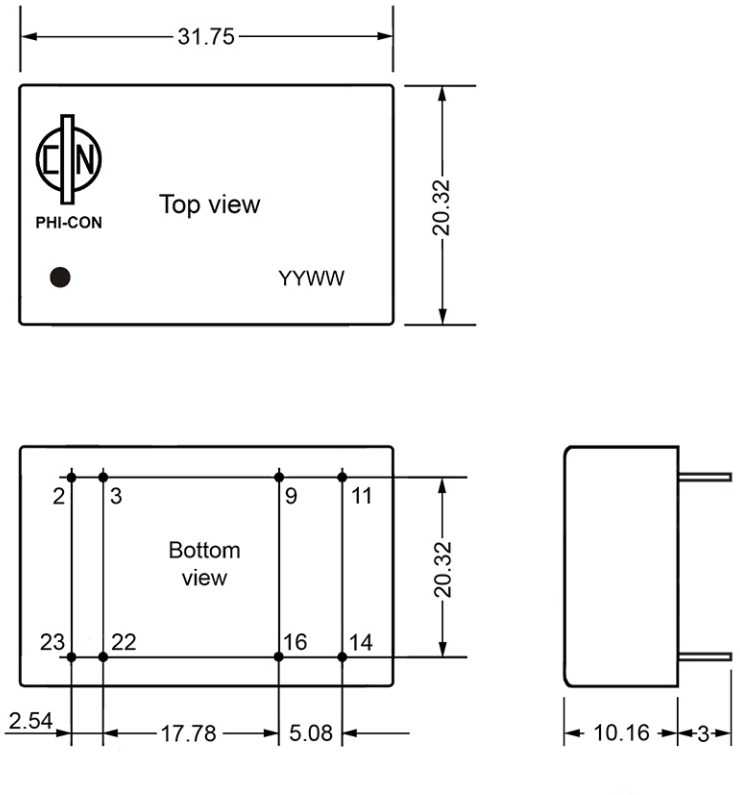
Dimensions



Pin assignment		
	Single	Dual
2	-V Input	-V Input
3	-V Input	-V Input
9	No pin	Common Output
11	Not connected.	-V Output
14	+V Output	+V Output
16	-V Output	Common Output
22	+V Input	+V Input
23	+V Input	+V Input

All units in mm
1. Pin tolerance ±0.05 mm
2. Pitch tolerance ±0.35 mm
3. Pin length tolerance ±0.35 mm
4. Case tolerance ±0.5 mm

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