



PHI-CON

6 W DC-DC Converter P6B-Series

- Wide 4:1 input range
- -40...85°C operation temperature range
- Isolation up to 3500 V_{DC}
- MTBF > 1.12 Mio. h
- Continuous short circuit protection
- Efficiency up to 84%



Metal case

Plastic case

Model guide

Type	Input voltage		Input current		Output voltage [V _{DC}]	Output current		Efficiency [%] typ.	Capacitive load (see note 2) [μF] max.
	Nominal [V _{DC}]	range [V _{DC}]	No load [mA] typ.	Full load [mA] typ.		[mA] min.	[mA] max.		
Single output									
P6B243R3S	24	9...36	20	253	3.3	0	1400	76	1000
P6B2405S	24	9...36	20	312	5.0	0	1200	80	1000
P6B247R2S	24	9...36	20	305	7.2	0	833	82	330
P6B2409S	24	9...36	20	300	9.0	0	666	83	220
P6B2412S	24	9...36	20	300	12.0	0	500	83	220
P6B2415S	24	9...36	20	300	15.0	0	400	83	220
P6B2418S	24	9...36	20	305	18.0	0	333	82	47
P6B2424S	24	9...36	20	305	24.0	0	250	82	47
P6B483R3S	48	18...72	15	125	3.3	0	1400	76	1000
P6B4805S	48	18...72	15	156	5.0	0	1200	80	1000
P6B487R2S	48	18...72	15	156	7.2	0	833	80	470
P6B4809S	48	18...72	15	152	9.0	0	666	82	470
P6B4812S	48	18...72	15	151	12.0	0	500	83	470
P6B4815S	48	18...72	15	149	15.0	0	400	84	100
P6B4818S	48	18...72	15	151	18.0	0	333	83	10
P6B4824S	48	18...72	15	151	24.0	0	250	83	10
Dual output									
P6B243R3D	24	9...36	20	340	±3.3	0	± 909	74	2 x 470
P6B2405D	24	9...36	20	313	±5.0	0	± 600	80	2 x 470
P6B247R2D	24	9...36	20	305	±7.2	0	± 416	82	2 x 470
P6B2409D	24	9...36	20	309	±9.0	0	± 333	81	2 x 470
P6B2412D	24	9...36	20	300	±12.0	0	± 250	83	2 x 330
P6B2415D	24	9...36	20	305	±15.0	0	± 200	82	2 x 100
P6B2418D	24	9...36	20	305	±18.0	0	± 166	82	2 x 10
P6B2424D	24	9...36	20	309	±24.0	0	± 125	81	2 x 10
P6B483R3D	48	18...72	15	162	±3.3	0	± 909	77	2 x 330
P6B4805D	48	18...72	15	158	±5.0	0	± 600	79	2 x 330
P6B487R2D	48	18...72	15	156	±7.2	0	± 416	80	2 x 220
P6B4809D	48	18...72	15	152	±9.0	0	± 333	82	2 x 220
P6B4812D	48	18...72	15	152	±12.0	0	± 250	82	2 x 220
P6B4815D	48	18...72	15	149	±15.0	0	± 200	84	2 x 47
P6B4818D	48	18...72	15	156	±18.0	0	± 166	80	2 x 22
P6B4824D	48	18...72	15	154	±24.0	0	± 125	81	2 x 22

Specifications

Input :	
Filter	Pi Network
Input reflected ripple current	35 mA _{p-p} (see Figure 1)
Absolute maximum input voltage	P6B24xxx: ≤ 40 V, ≤ 100 ms P6B48xxx: ≤ 80 V, ≤ 100 ms
Isolation:	
Rated voltage Input / output (60 s)	Standard: 1500 V _{DC} Suffix "H": 3500 V _{DC}
Input or output to case (60 s)	1000 V _{DC} , only metal case version
Resistance input to output	≥ 10 ⁹ Ω
Input/output capacitance	500 pF, typ.
Output:	
Voltage tolerance	≤ ± 1 %
Line voltage regulation	≤ ± 0.5 %
Load voltage regulation	P6Bxx3R3x: ≤ ± 1.5 % All others: ≤ ± 0.5 %
Temperature coefficient	± 0.02 % / °C
Ripple and noise (20 MHz BW)	≤ 60 mV _{p-p} (see Figure 2)
Short circuit protection	Continuous, hiccup, automatic restart
General:	
Switching frequency	270 kHz, typ.
Reliability calc. MTBF	1.12 Mio. h
MIL-HDBK-217 F at 25 °C	

Safety standard (designed to meet)	EN-, IEC-, UL 60950-1 EN-, IEC-, UL 62368-1
EMC	
RE	EN 55032 Class A
CE	EN 55032 Class A (see Figure 3)
ESD	EN-, IEC 61000-4-2 perf. criteria A
RS	EN-, IEC 61000-4-3 perf. criteria A
EFT	EN-, IEC 61000-4-4 perf. criteria A
Surge	EN-, IEC 61000-4-5 perf. criteria A (see Figure 3)
CS	EN-, IEC 61000-4-6 perf. criteria A
PFMF	EN-, IEC 61000-4-8 perf. criteria A
Environmental:	
Operating ambient temperature	-40...85 °C
Storage temperature	-40...125 °C
Case temperature max.	100 °C
Derating	see diagram
Humidity	95 %, max., not condensing
Cooling	Free air convection, 30...65 LFM
Physical	
Dimensions	31.8 x 20.3 x 10.2 mm
Weight	Metal 13 g, typ., Plastic 14 g
Case material	Aluminum Suffix "P": Plastic
Potting material	Epoxy resin, UL94V-0 rated
Soldering temperature	≤ 260 °C duration ≤ 10 s ≥ 1.5 mm distance from case

Notes:

1. All specifications at Ta 25 °C, nominal input voltage and full load unless otherwise specified!
2. Capacitive load specified by nominal input voltage and constant resistor load

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Part number ordering information													
	Output power		Series	Input voltage		Output voltage		Output		Isolation voltage		Case material	
PHI-CON	6	6 W	W	24	24 V	3R3	3.3 V	S	single	blanc	1.5 kV _{DC}	blanc	metal
				48	48 V	05	5 V	D	dual ±	H	3.5 kV _{DC}	P	plastic
						7R2	7.2 V						
						09	9 V						
						12	12 V						
						15	15 V						
						18	18 V						
						24	24 V						
Example	P6W2405SH	Pout: 6 W, Vin: 24 (9..36) V, Vout: 5 V, Single output, Isolation: 3.5 kV _{DC}											

Figure 1 Test circuit for reflected input ripple current

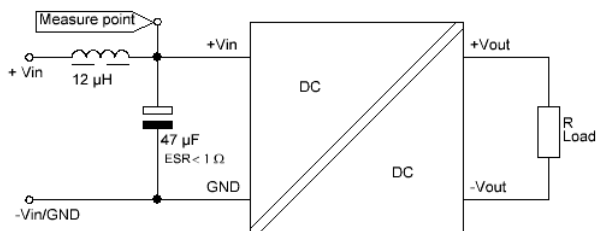
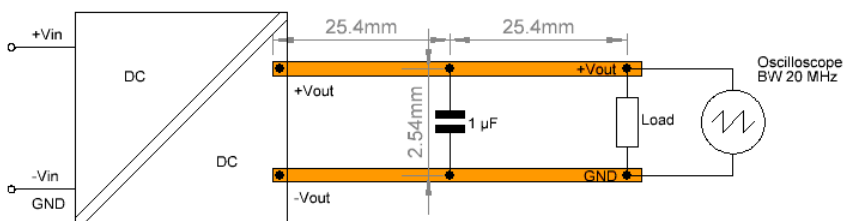
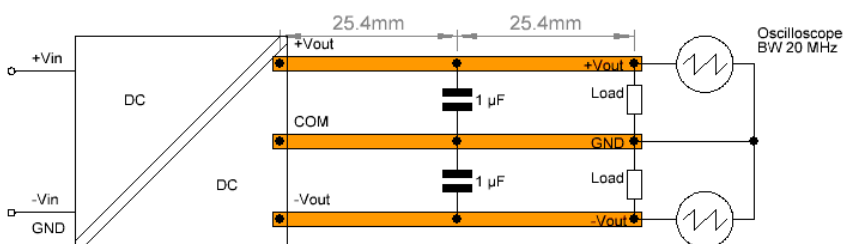


Figure 2 Test circuit for output ripple and noise (BW 20 MHz)

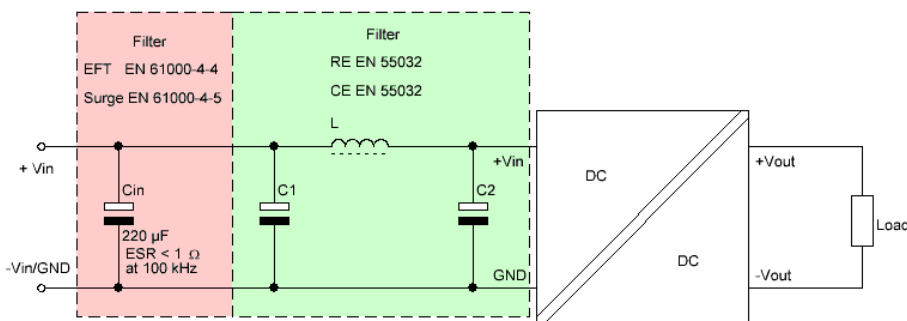
Single output



Dual output



EFT & EMI filter test circuit for EN 61000-4-5 and EN 55032 Class A



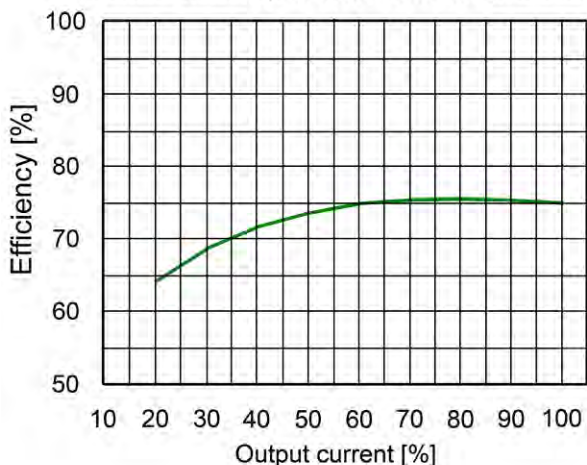
Cin	220 µF, 100 V
C1	68 µF, 100 V
L	12 µH
C2	33 µF, 100 V



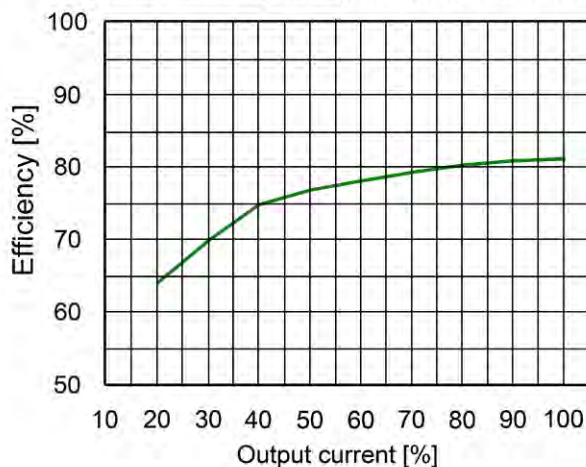
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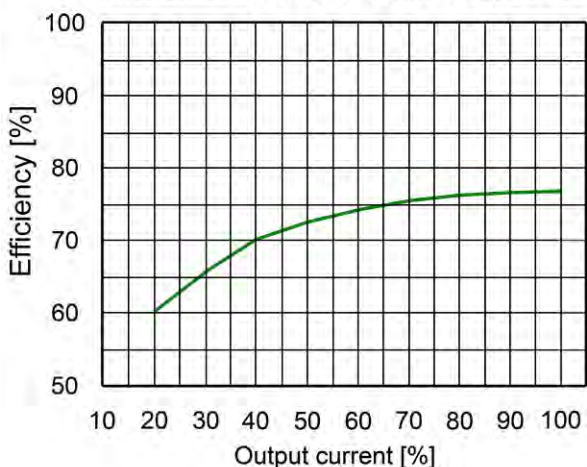
P6B24xxx Efficiency vs output load at Vin 9 Vdc



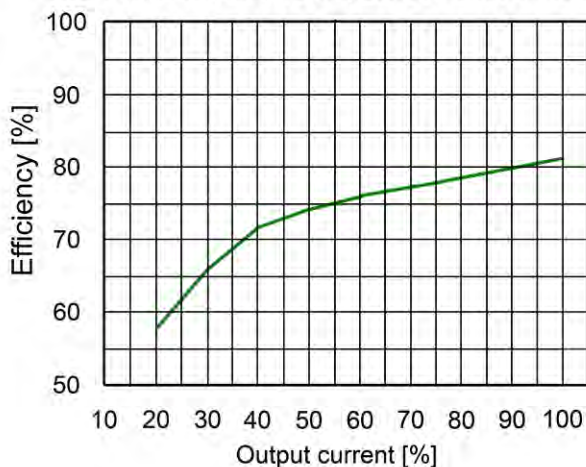
P6B48xxx Efficiency vs output load at Vin 18 Vdc



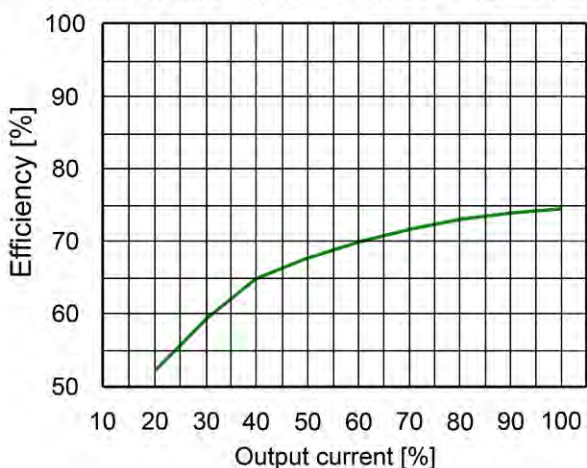
P6B24xxx Efficiency vs output load at Vin 24 Vdc



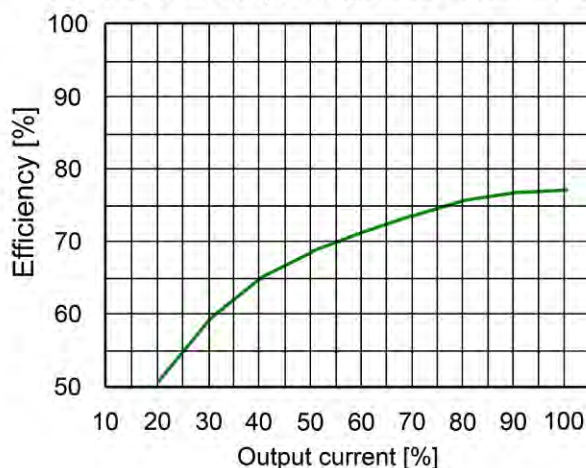
P6B48xxx Efficiency vs output load at Vin 48 Vdc



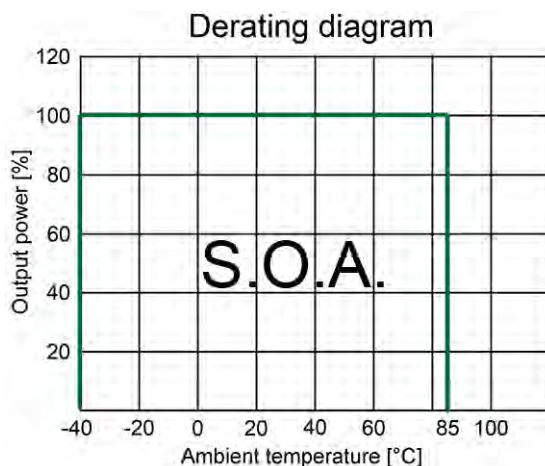
P6B24xxx Efficiency vs output load at Vin 48 Vdc



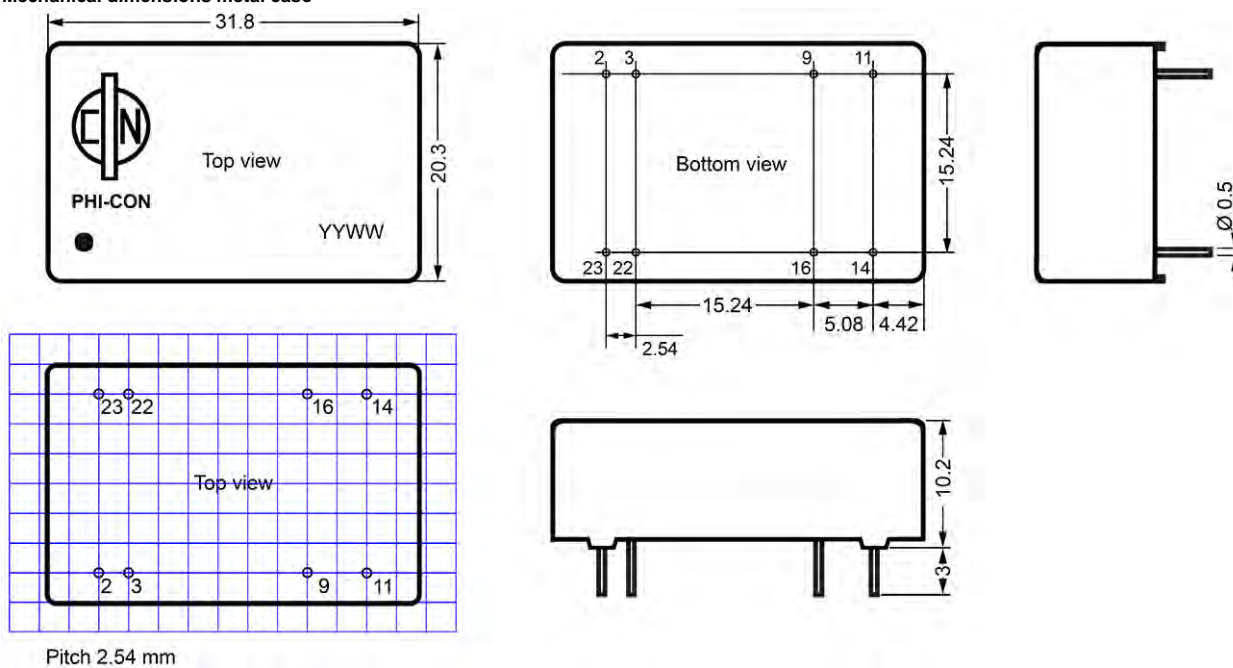
P6B48xxx Efficiency vs output load at Vin 72 Vdc



6 W DC-DC Converter P6B-Series



Mechanical dimensions metal case



Pin assignment		
Pin	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

All units in mm

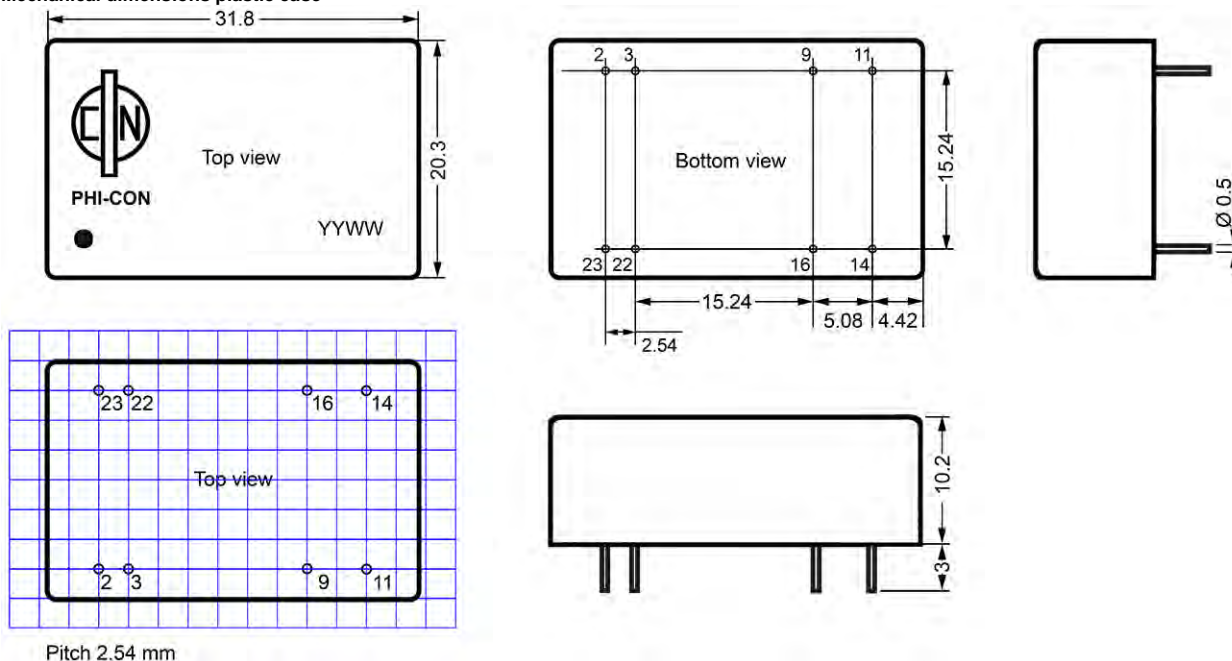
1. Pin tolerance ± 0.05 mm
2. Pitch tolerance ± 0.35 mm
3. Pin length tolerance ± 0.35 mm
4. Case tolerance ± 0.5 mm



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6 W DC-DC Converter P6B-Series

Mechanical dimensions plastic case



Pitch 2.54 mm

Pin assignment		
Pin	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

All units in mm

5. Pin tolerance ± 0.05 mm
6. Pitch tolerance ± 0.35 mm
7. Pin length tolerance ± 0.35 mm
8. Case tolerance ± 0.5 mm

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