0.5 W DC-DC Converter P0B-Series

PHI-CON

- 8 Pin DIL
- Low ripple and noise
- 1000 V_{DC} isolation
- 3000 V_{DC} isolation optional
- Unregulated

CE

Model guide

Type	Input voltage		Input current		Output voltage	Output current	Efficiency	Capacitive load [µF]
	Nominal [V_{DC}]	range [V_{DC}]	no load [mA] typ.	full load [mA] typ.	[V_{DC}]	[mA] max.	[%] typ.	max.
P0B3R33R3D	3.3	2.97 ... 3.63	20	205	3.3	152	76	100
P0B3R305D	3.3	2.97 ... 3.63	25	215	5.0	100	70	100
P0B3R37R2D	3.3	2.97 ... 3.63	25	215	7.2	70	70	100
P0B3R309D	3.3	2.97 ... 3.63	25	215	9.0	56	70	100
P0B3R312D	3.3	2.97 ... 3.63	25	200	12.0	42	72	100
P0B3R315D	3.3	2.97 ... 3.63	25	210	15.0	33	73	100
P0B3R318D	3.3	2.97 ... 3.63	25	210	18.0	28	73	100
P0B3R324D	3.3	2.97 ... 3.63	25	210	24.0	21	73	100
P0B053R3D	5	4.5 ... 5.5	20	130	3.3	152	76	100
P0B0505D	5	4.5 ... 5.5	15	120	5.0	100	81	100
P0B057R2D	5	4.5 ... 5.5	15	135	7.2	70	75	100
P0B0509D	5	4.5 ... 5.5	15	130	9.0	56	78	100
P0B0512D	5	4.5 ... 5.5	18	125	12.0	42	79	100
P0B0515D	5	4.5 ... 5.5	20	130	15.0	33	77	100
P0B0518D	5	4.5 ... 5.5	20	125	18.0	28	79	100
P0B0524D	5	4.5 ... 5.5	25	135	24.0	21	75	100
P0B123R3D	12	10.8 ... 13.2	15	58	3.3	152	73	100
P0B1205D	12	10.8 ... 13.2	10	54	5.0	100	78	100
P0B127R2D	12	10.8 ... 13.2	15	57	7.2	70	73	100
P0B1209D	12	10.8 ... 13.2	15	58	9.0	56	73	100
P0B1212D	12	10.8 ... 13.2	20	58	12.0	42	72	100
P0B1215D	12	10.8 ... 13.2	20	61	15.0	33	69	100
P0B1218D	12	10.8 ... 13.2	15	61	18.0	28	68	100
P0B1224D	12	10.8 ... 13.2	15	59	24.0	21	71	100
P0B153R3D	15	13.5 ... 16.5	10	44	3.3	152	75	100
P0B1505D	15	13.5 ... 16.5	8	43	5.0	100	78	100
P0B157R2D	15	13.5 ... 16.5	12	44	7.2	70	75	100
P0B1509D	15	13.5 ... 16.5	12	44	9.0	56	75	100
P0B1512D	15	13.5 ... 16.5	10	44	12.0	42	77	100
P0B1515D	15	13.5 ... 16.5	15	48	15.0	33	70	100
P0B1518D	15	13.5 ... 16.5	12	51	18.0	28	66	100
P0B1524D	15	13.5 ... 16.5	10	51	24.0	21	66	100
P0B243R3D	24	21.6 ... 26.4	8	31	3.3	152	69	100
P0B2405D	24	21.6 ... 26.4	10	29	5.0	100	74	100
P0B247R2D	24	21.6 ... 26.4	10	31	7.2	70	69	100
P0B2409D	24	21.6 ... 26.4	10	30	9.0	56	71	100
P0B2412D	24	21.6 ... 26.4	10	31	12.0	42	69	100
P0B2415D	24	21.6 ... 26.4	9	31	15.0	33	69	100
P0B2418D	24	21.6 ... 26.4	10	29	18.0	28	73	100
P0B2424D	24	21.6 ... 26.4	10	29	24.0	21	72	100

Product ordering information								
Series	Input voltage		Output voltage		Output		Isolation voltage	
PHI-CON 0.5 W	3R3	3.3 V	3R3	3.3 V	D	DIL8, single output	blank	1 kV
	05	5 V	05	5 V			H	3 kV
	12	12 V	7R2	7.2 V				
	15	15 V	09	9 V				
	24	24 V	12	12 V				
			15	15 V				
			18	18 V				
			24	24 V				
Example	P0B1205DH		Pout: 0.5 W, Vin: 12 V, Vout: 5 V single, Isolation: 3 kV					

HY-LINE Power Components Vertriebs GmbH
Inselkammerstraße 10
D-82008 Unterhaching
Tel.: 089 614 503-10
E-Mail: power@hy-line.de

HY-LINE AG
Hochstrasse 355
CH-8200 Schaffhausen
Tel.: 052 647 42 00
E-Mail: info@hy-line.ch

0.5 W DC-DC Converter P0B-Series

PHI-CON

Specifications

Input		
Voltage range		≤ ± 10%
Filter		Capacitors
Reflected ripple current		≤ 20 mAp-p (see figure 1)
I/O-Isolation:		
DC-Isolation voltage for 60 s		Standard, suffix blanc: 1 kV Suffix "H": 3 kV
Resistance		≥ 10^9 Ω
Capacitance		60 pF, typ.
Output		
Voltage tolerance		≤ ± 3 %
Ripple and noise @ 20 MHz BW		≤ 100 mVp-p, (see figure 2)
Short circuit protection		No
Line voltage deviation @ 1% Vin change		≤ ± 1.2 %
Voltage stability at load change 20...100 %		≤ ± 20 % @ only P0Bxx3R3x ≤ ± 10 % all others types
Temperature drift		≤ ± 0.02 %/°C
EMC		
RE	EN 55032	Class B see Figure 3
CE	EN 55032	Class B 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 see Figure 3
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

General	
Safety standard, designed to meet	EN-, IEC-, UL 60950-1 EN-, IEC-, UL 62368-1
Switching frequency	~ 80 kHz
Reliability calculated MTBF (MIL-HDBK-217 F)	≥ 1.12 Mio. h
Environmental	
Operating ambient temperature	-40 … 85 °C
Case temperature	≤ 100 °C
Storage temperature	-40 … 125 °C
Derating	None required
Humidity	Up to 95 %, non condensing
Cooling	Free air convection, ≥ 35 LFM
Physical	
Weight	1.8 g
Case material	Non conductive black plastic (UL94V-0 rated)
Potting material	Epoxy (UL94V-0 rated)
Capacitive load at 100 % resistive load and minimal input voltage	≤ 100 µF
Absolute maximum ratings	
P0B3R3xxD-Series	6 VDC, ≤ 100 ms
P0B05xxD-Series	7 VDC , ≤ 100 ms
P0B12xxD-Series	15 VDC , ≤ 100 ms
P0B15xxD-Series	18 VDC , ≤ 100 ms
P0B24xxD-Series	28 VDC , ≤ 100 ms
Pin soldering temperature	≤ 260 °C duration ≤ 10 s ≥ 1.5 mm distance from body

Note:

1. Specifications at 25 °C, nominal input voltage and full load unless otherwise specified.
2. Capacitive load is specified by minimal Vin and constant resistive load.
3. Not usable for high voltage IGBT- and MOSFET- driver applications.
4. Operation under no load conditions will not damage the converter, however they may not meet all listed specifications.

Figure 1 Measure circuit for input ripple current

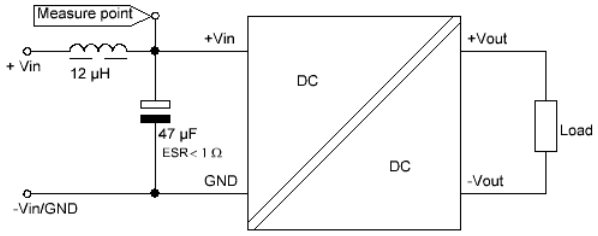
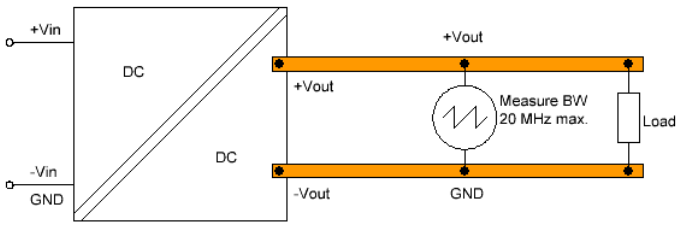


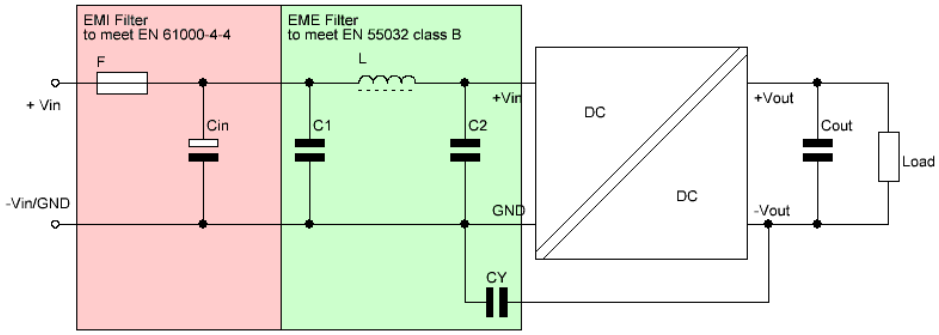
Figure 2 Measure circuit for output ripple & noise (Oscilloscope BW 20 MHz)



HY-LINE Power Components Vertriebs GmbH
Inselkammerstraße 10
D-82008 Unterhaching
Tel.: 089 614 503-10
E-Mail: power@hy-line.de

HY-LINE AG
Hochstrasse 355
CH-8200 Schaffhausen
Tel.: 052 647 42 00
E-Mail: info@hy-line.ch

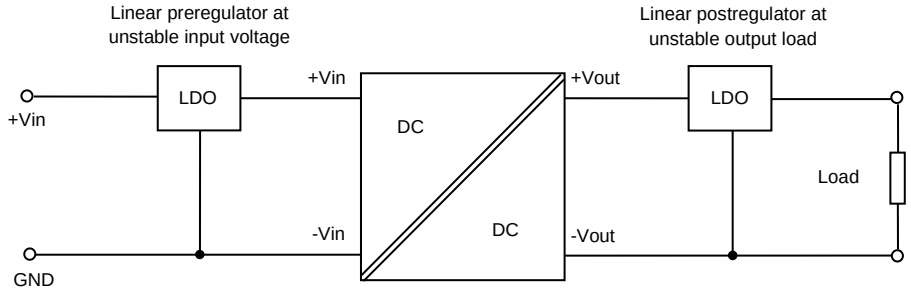
Figure 3 Application circuit to meet EN 61000-4-4-, EN 61000-4-5 performance criteria A and EN 55032 class B

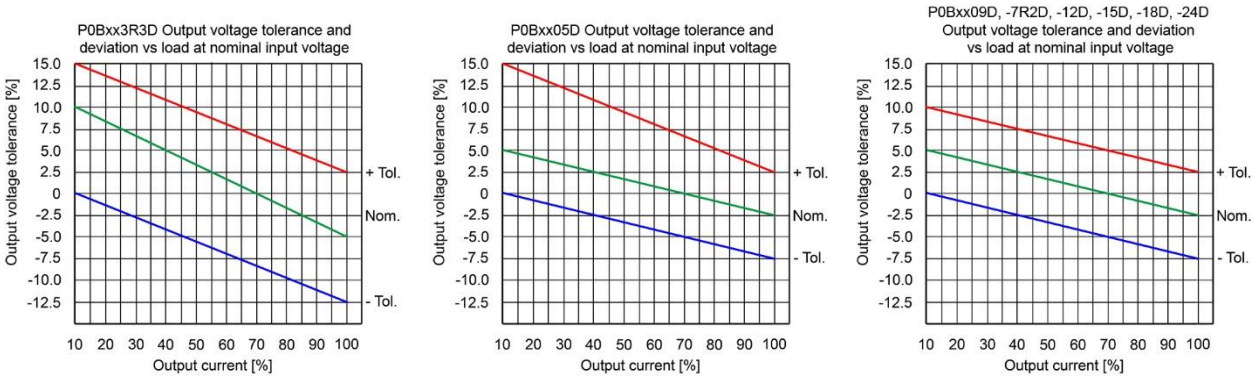


BOM to Figure 3						
Type	Fuse, time delayed type [mA]	Cin	C1	L	C2	C3
P0B3R3xxx	800	470 µF, 100 V	2.2 µF ceramic chip	18 µH	-	-
P0B05xxx	500	470 µF, 100 V	2.2 µF ceramic chip	18 µH	-	-
P0B12xxx	300	470 µF, 100 V	2.2 µF ceramic chip	18 µH	-	-
P0B15xxx	300	470 µF, 100 V	2.2 µF ceramic chip	18 µH	-	-
P0B24xxx	300	470 µF, 100 V	2.2 µF ceramic chip	18 µH	2.2 µF, ceramic chip	470 pF, 2 kV ceramic chip

The EMI filter components are to meet the contucted emissions requirement of the converter. These components should be as near as possible mounted to the converter. All leads should be as short as possible to minimize the radiation.

Application example with low drop out linear voltage regulator for input or output stabilisation

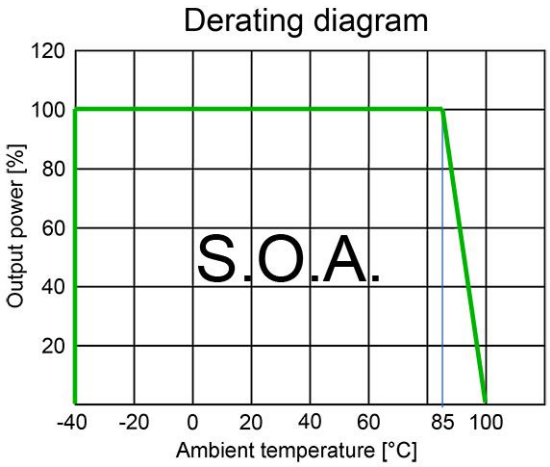




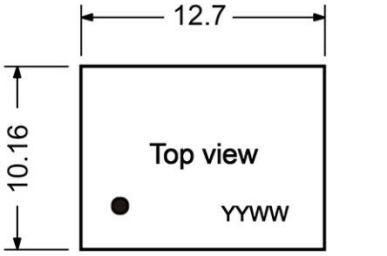
HY-LINE Power Components Vertriebs GmbH
Inselkammerstraße 10
D-82008 Unterhaching
Tel.: 089 614 503-10
E-Mail: power@hy-line.de

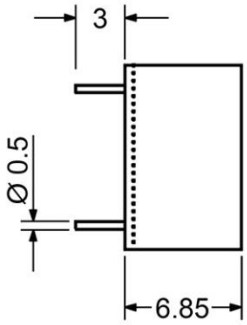
HY-LINE AG
Hochstrasse 355
CH-8200 Schaffhausen
Tel.: 052 647 42 00
E-Mail: info@hy-line.ch

0.5 W DC-DC Converter P0B-Series

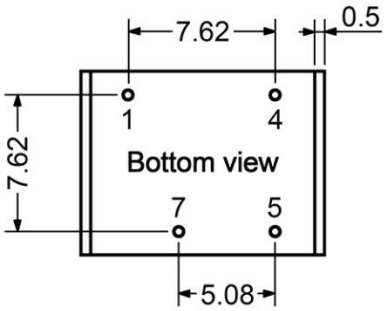


Mechanical package dimensions





Pin assignment	
1	-V Input
2	No pin
3	No pin
4	+V Input
5	+V Output
6	No pin
7	-V Output
8	No pin



All dimensions in mm
1. Pin diameter tolerance ± 0.05 mm
2. Pin length tolerance ± 0.35 mm
3. Pin pitch tolerance ± 0.35 mm
4. Case tolerance ± 0.5 mm

Rev: 20210902 f

HY-LINE Power Components Vertriebs GmbH
Inselkammerstraße 10
D-82008 Unterhaching
Tel.: 089 614 503-10
E-Mail: power@hy-line.de

HY-LINE AG
Hochstrasse 355
CH-8200 Schaffhausen
Tel.: 052 647 42 00
E-Mail: info@hy-line.ch