1 W DC-DC Converter P1B-Series

PHI-CON

- 4 Pin SIL
- Low ripple and noise
- 1000 V_{DC} isolation
- Optional 3000 V_{DC} isolation
- Output voltage not regulated

CE

Model guide

Type	Input voltage		Input current		Output voltage [V_{DC}]	Output current [mA] max.	Efficiency [%] typ.	Capacitive load [µF] max.
	nominal [V_{DC}]	range [V_{DC}]	no load [mA] typ.	full load [mA] typ.				
P1B3R33R3S	3.3	2.97 ... 3.63	25	420	3.3	303	72	220
P1B3R305S	3.3	2.97 ... 3.63	25	395	5.0	200	77	220
P1B3R37R2S	3.3	2.97 ... 3.63	25	385	7.2	139	79	220
P1B3R309S	3.3	2.97 ... 3.63	30	405	9.0	111	75	220
P1B3R312S	3.3	2.97 ... 3.63	45	475	12.0	83	77	220
P1B3R315S	3.3	2.97 ... 3.63	35	385	15.0	67	79	220
P1B3R318S	3.3	2.97 ... 3.63	35	400	18.0	56	76	220
P1B3R324S	3.3	2.97 ... 3.63	55	460	24.0	42	79	220
P1B053R3S	5.0	4.5 ... 5.5	20	255	3.3	303	78	220
P1B0505S	5.0	4.5 ... 5.5	25	245	5.0	200	81	220
P1B057R2S	5.0	4.5 ... 5.5	15	241	7.2	139	83	220
P1B0509S	5.0	4.5 ... 5.5	26	250	9.0	111	80	220
P1B0512S	5.0	4.5 ... 5.5	25	300	12.0	83	80	220
P1B0515S	5.0	4.5 ... 5.5	35	244	15.0	67	82	220
P1B0518S	5.0	4.5 ... 5.5	25	247	18.0	56	81	220
P1B0524S	5.0	4.5 ... 5.5	35	290	24.0	42	83	220
P1B123R3S	12	10.8 ... 13.2	15	107	3.3	303	78	220
P1B1205S	12	10.8 ... 13.2	16	105	5.0	200	79	220
P1B127R2S	12	10.8 ... 13.2	16	100	7.2	139	83	220
P1B1209S	12	10.8 ... 13.2	15	107	9.0	111	78	220
P1B1212S	12	10.8 ... 13.2	20	125	12.0	83	80	220
P1B1215S	12	10.8 ... 13.2	15	105	15.0	67	79	220
P1B1218S	12	10.8 ... 13.2	20	104	18.0	56	80	220
P1B1224S	12	10.8 ... 13.2	25	123	24.0	42	71	220
P1B153R3S	15	13.5 ... 16.5	15	89	3.3	303	75	220
P1B1505S	15	13.5 ... 16.5	9	82	5.0	200	81	220
P1B157R2S	15	13.5 ... 16.5	12	88	7.2	139	76	220
P1B1509S	15	13.5 ... 16.5	10	90	9.0	111	74	220
P1B1512S	15	13.5 ... 16.5	13	100	12.0	83	80	220
P1B1515S	15	13.5 ... 16.5	15	84	15.0	67	79	220
P1B1518S	15	13.5 ... 16.5	12	85	18.0	56	78	220
P1B1524S	15	13.5 ... 16.5	10	99	24.0	42	81	220
P1B243R3S	24	21.6 ... 26.4	8	54	3.3	303	77	220
P1B2405S	24	21.6 ... 26.4	8	52	5.0	200	80	220
P1B247R2S	24	21.6 ... 26.4	10	54	7.2	139	77	220
P1B2409S	24	21.6 ... 26.4	7	54	9.0	111	77	220
P1B2412S	24	21.6 ... 26.4	8	62	12.0	83	80	220
P1B2415S	24	21.6 ... 26.4	8	51	15.0	67	81	220
P1B2418S	24	21.6 ... 26.4	8	52	18.0	56	80	220
P1B2424S	24	21.6 ... 26.4	9	60	24.0	42	83	220

Ordering information									
Output power	Series	Input voltage		Output voltage		Outputs		Primary / secondary isolation	
P1	B	05		05		S		H	
1 Watt		3R3	3.3 V	3R3	3.3 V	S	single	blanc	1 kV_{DC}
		05	5 V	05	5 V			H	3 kV_{DC}
		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				

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Input		
Voltage range		± 10 %
Filter		Capacitors
Reflected ripple current		20 mAp-p (see figure 1)
I/O-Isolation:		
DC-Isolation voltage input/output		Standard, suffix blanc: 1 kV Suffix "H": 3 kV
Resistance		10^9 Ω, max.
Capacitance		60 pF, typ.
Output		
Voltage accuracy		± 3 %, max.
Ripple and noise @ 20 MHz BW		100 mVp-p, max. (see figure 2)
Short circuit protection		No
Line voltage deviation @ 1% Vin change		± 1.2 %, max.
Voltage stability at load change 20...100 %		± 10 % ± 20 % @ only P1Bxx3R3x 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 61000-4-2	perf. criteria A
RS	EN 61000-4-3	perf. criteria A
EFT	EN 61000-4-4	perf. criteria A (see figure 3)
Surge	EN 61000-4-5	perf. criteria A (see figure 3)
CS	EN 61000-4-6	perf. criteria A
PFMF	EN 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 @ 25 °C)	1.12 Mio. h
Environmental	
Operating temperature (ambient)	-40 … 85 °C
Case temperature	100 °C, max.
Storage temperature	-40 … 125 °C
Derating	None required
Humidity	Up to 95 %, non condensing
Cooling	Free air convection
Physical	
Mechanical dimensions	6 x 10.68 x 10.15 mm
Weight	1.5 g
Case material	Non conductive black plastic (UL94V-0 rated)
Potting material	Epoxy (UL94V-0 rated)
Absolute maximum ratings	
P1B3R3xxS-Series	6 VDC, 100 ms, max.
P1B05xxS-Series	7 VDC , 100 ms, max.
P1B12xxS-Series	15 VDC , 100 ms, max.
P1B15xxS-Series	18 VDC , 100 ms, max.
P1B24xxS-Series	28 VDC , 100 ms, max.
Pin soldering temperature	≤ 260 °C peak 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 specification

Figure 1 Measure circuit for input ripple current

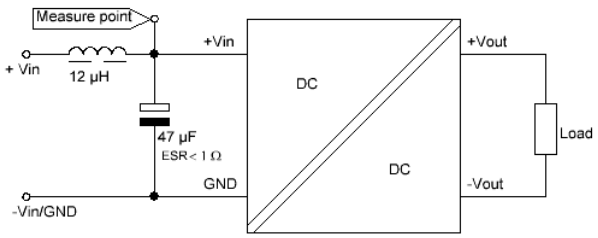

Figure 2 Measure circuit for output ripple & noise (BW 20 MHz)

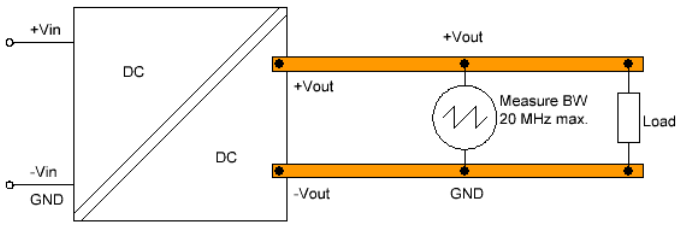

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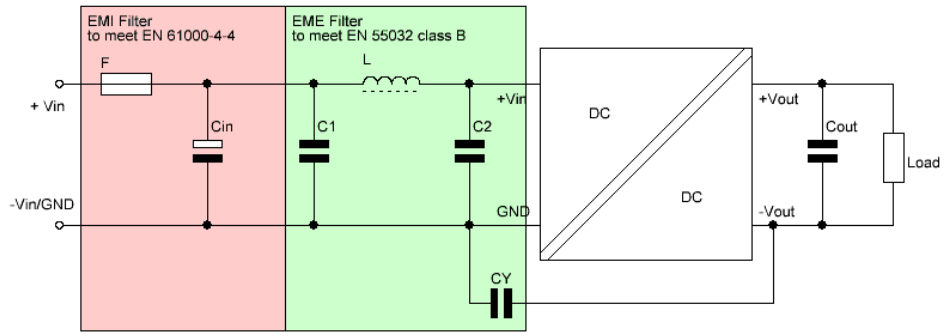
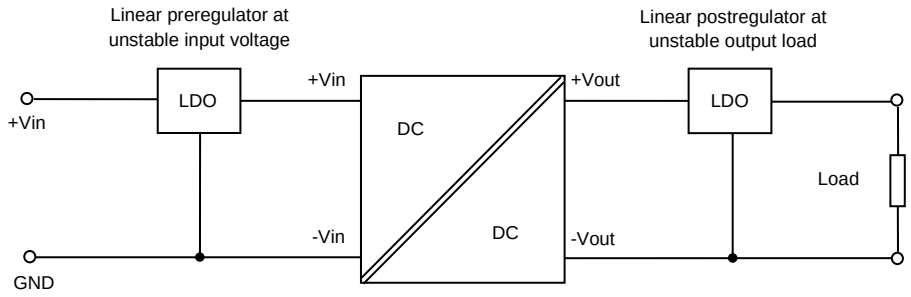
Figure 3 Application circuit to meet EN 61000-4-4 and EN 61000-4-5 and EMI class B

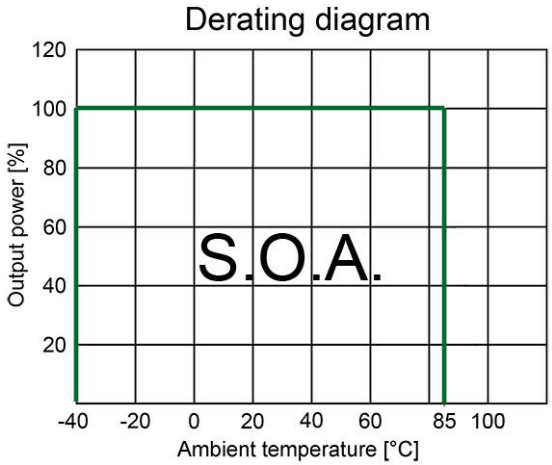


BOM to Figure 3						
Type	Fuse time delayed type [mA]	Cin	C1	L	C2	CY
P1B3R3xxx	800	470 µF, 100 V	2.2 µF ceramic chip	18 µH	-	-
P1B05xxx	500		2.2 µF ceramic chip	18 µH	-	-
P1B12xxx	300		2.2 µF ceramic chip	18 µH	-	-
P1B15xxx	300		2.2 µF ceramic chip	18 µH	-	-
P1B24xxx	300		2.2 µF ceramic chip	18 µH	2.2 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





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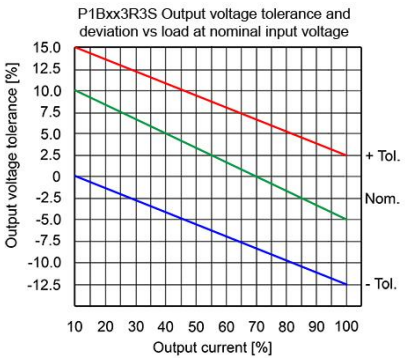
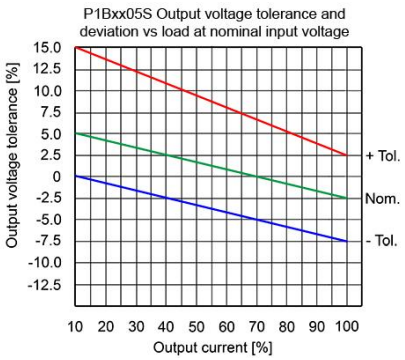
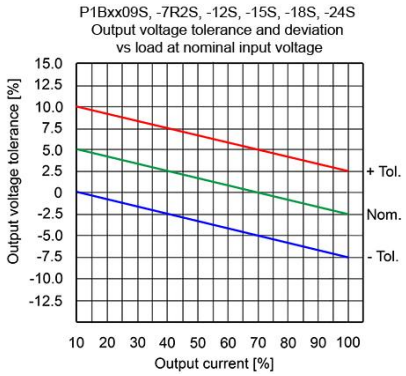
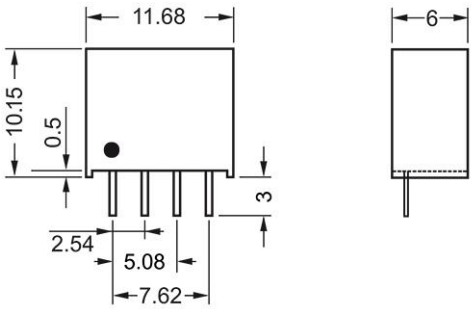
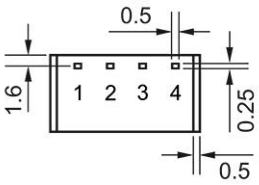






Mechanical dimensions





Pin assignment	
1	-V Input
2	+V Input
3	-V Output
4	+V Output

All dimensions in mm
1. Pin cross sectiontolerance ± 0.02 mm
2. Pin length tolerance ± 0.35 mm
3. Pin pitch tolerance ± 0.35 mm
4. Case tolerance ± 0.5 mm

Rev: 20210827 f

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