2 W DC-DC Converter P2B-Series

PHI-CON

- 7 Pin SIL
- Low ripple and noise
- MTBF > 1.12 Mio. h
- Single output
- Dual ± output with center tap

Model guide

Type	Input voltage		Input current		Output voltage	Output current	Efficiency	Capacitive load
	Nominal [V_{DC}]	Range [V_{DC}]	No load [mA] typ.	Full load [mA] typ.	[V_{DC}]	[mA] max.	[%] typ.	[µF] max.
Single output								
P2B3R33R3SS	3.3	2.97...3.63	25	800	3.3	400	76	470
P2B3R305SS	3.3	2.97...3.63	30	800	5.0	400	76	470
P2B3R37R2SS	3.3	2.97...3.63	30	810	7.2	278	76	470
P2B3R309SS	3.3	2.97...3.63	30	760	9.0	222	80	470
P2B3R312SS	3.3	2.97...3.63	35	750	12	167	81	470
P2B3R315SS	3.3	2.97...3.63	35	780	15	133	78	470
P2B3R318SS	3.3	2.97...3.63	35	780	18	111	78	470
P2B3R324SS	3.3	2.97...3.63	35	770	24	83	79	470
P2B053R3SS	5	4.5…5.5	30	370	3.3	400	72	470
P2B0505SS	5	4.5…5.5	30	510	5.0	400	78	470
P2B057R2SS	5	4.5…5.5	30	500	7.2	278	80	470
P2B0509SS	5	4.5…5.5	30	500	9.0	222	80	470
P2B0512SS	5	4.5…5.5	30	490	12.0	167	82	470
P2B0515SS	5	4.5…5.5	30	490	15.0	133	82	470
P2B0518SS	5	4.5…5.5	30	490	18.0	111	82	470
P2B0524SS	5	4.5…5.5	30	490	24.0	83	82	470
P2B123R3SS	12	10.8...13.2	20	170	3.3	400	65	470
P2B1205SS	12	10.8...13.2	20	215	5.0	400	77	470
P2B127R2SS	12	10.8...13.2	20	210	7.2	278	80	470
P2B1209SS	12	10.8...13.2	20	210	9.0	222	80	470
P2B1212SS	12	10.8...13.2	20	205	12.0	167	82	470
P2B1215SS	12	10.8...13.2	20	205	15.0	133	82	470
P2B1218SS	12	10.8...13.2	20	210	18.0	111	80	470
P2B1224SS	12	10.8...13.2	20	210	24.0	83	80	470
P2B243R3SS	24	21.6...26.4	10	75	3.3	400	72	470
P2B2405SS	24	21.6...26.4	10	105	5.0	400	79	470
P2B247R2SS	24	21.6...26.4	10	105	7.2	278	80	470
P2B2409SS	24	21.6...26.4	10	105	9.0	222	80	470
P2B2412SS	24	21.6...26.4	10	100	12.0	167	80	470
P2B2415SS	24	21.6...26.4	10	100	15.0	133	82	470
P2B2418SS	24	21.6...26.4	10	100	18.0	111	82	470
P2B2424SS	24	21.6...26.4	10	105	24.0	83	80	470
Dual output								
P2B3R33R3S	3.3	2.97...3.63	25	800	±3.3	±200	76	2 x 220
P2B3R305S	3.3	2.97...3.63	40	780	±5.0	±200	78	2 x 220
P2B3R37R2S	3.3	2.97...3.63	40	800	±7.2	±139	76	2 x 220
P2B3R309S	3.3	2.97...3.63	40	800	±9.0	±111	76	2 x 220
P2B3R312S	3.3	2.97...3.63	45	780	±12.0	±84	78	2 x 220
P2B3R315S	3.3	2.97...3.63	45	780	±15.0	±67	78	2 x 220
P2B3R318S	3.3	2.97...3.63	45	780	±18.0	±56	78	2 x 220
P2B3R324S	3.3	2.97...3.63	45	770	±24.0	±42	79	2 x 220
P2B053R3S	5	4.5…5.5	30	405	±3.3	±200	65	2 x 220
P2B0505S	5	4.5…5.5	30	555	±5.0	±200	72	2 x 220
P2B057R2S	5	4.5…5.5	30	555	±7.2	±139	72	2 x 220
P2B0509S	5	4.5…5.5	30	520	±9.0	±111	77	2 x 220
P2B0512S	5	4.5…5.5	30	510	±12.0	±84	78	2 x 220
P2B0515S	5	4.5…5.5	30	500	±15.0	±67	80	2 x 220
P2B0518S	5	4.5…5.5	30	500	±18.0	±56	80	2 x 220
P2B0524S	5	4.5…5.5	30	500	±24.0	±42	80	2 x 220
P2B123R3S	12	10.8...13.2	20	165	±3.3	±200	67	2 x 220
P2B1205S	12	10.8...13.2	20	220	±5.0	±200	75	2 x 220
P2B127R2S	12	10.8...13.2	20	220	±7.2	±139	76	2 x 220
P2B1209S	12	10.8...13.2	20	215	±9.0	±111	77	2 x 220
P2B1212S	12	10.8...13.2	20	205	±12.0	±84	82	2 x 220
P2B1215S	12	10.8...13.2	20	205	±15.0	±67	82	2 x 220
P2B1218S	12	10.8...13.2	20	205	±18.0	±56	82	2 x 220
P2B1224S	12	10.8...13.2	20	205	±24.0	±42	82	2 x 220

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

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Model guide

Type	Input voltage		Input current		Output voltage	Output current	Efficiency	Capacitive load
	Nominal [V_{DC}]	Range [V_{DC}]	No load [mA] typ.	Full load [mA] typ.	[V_{DC}]	[mA] max.	[%] typ.	[µF] max.
Dual output								
P2B243R3S	24	21.6...26.4	10	80	±3.3	±200	68	2 x 220
P2B2405S	24	21.6...26.4	10	110	±5.0	±200	75	2 x 220
P2B247R2S	24	21.6...26.4	10	110	±7.2	±139	75	2 x 220
P2B2409S	24	21.6...26.4	10	105	±9.0	±111	80	2 x 220
P2B2412S	24	21.6...26.4	10	100	±12.0	±84	82	2 x 220
P2B2415S	24	21.6...26.4	10	100	±15.0	±67	82	2 x 220
P2B2418S	24	21.6...26.4	10	100	±18.0	±56	82	2 x 220
P2B2424S	24	21.6...26.4	10	100	±24.0	±42	82	2 x 220

Specifications

Input		
Voltage range		± 10 %
Filter		Capacitors
Input reflected ripple current		20 mAp-p, typ. (see Figure 1)
Isolation:		
Rated voltage		1000 V_{DC} Standard see ordering infomation table
Resistance		10^9 Ω
Capacitance		60 pF, typ.
Output		
Voltage accuracy		± 3 %, max.
Voltage balance (dual outputs)		± 1 %
Ripple and noise, BW 20 MHz		75 mVp-p, max. (see Figure 2)
Short circuit protection		Not integrated
Line voltage regulation		± 1.2 % / ΔV_{in} 1.0 %
Load deviation at load 20..100 %		P2Bxx3R3: ± 20%, all others: ± 10 %
Temperature coefficient		± 0.02 %/°C
EMC specifications		
RE	EN 55032	Class B
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
Surge	EN-, IEC 61000-4-5	perf. criteria A
CS	EN-, IEC 61000-4-6	perf. criteria A
PFMF	EN-, IEC 61000-4-8	perf. criteria A

General	
Safety in accordance	EN-, IEC 60950-1
Reliability calculated MTBF (MIL-HDBK-217F at 25°C)	1.12 Mio h
Switching frequency	80 kHz, typ.
Environmental	
Operating temperature (ambient)	-40 … 85 °C
Case temperature maximum	100 °C
Storage temperature	-40 °C to +125 °C
Derating	None required
Humidity	Up to 90 %, non condensing
Cooling	Free air convection, 30…65 LFM
Physical	
Dimensions see drawing	6 x 19.5 x 10 mm
Weight	2.3 g
Case material	Non conductive black plastic
Absolute maximum ratings	
P2B3R3xxx types	Vin ≤ 6 V, duration ≤ 100 ms
P2B05xxx types	Vin ≤ 7 V, duration ≤ 100 ms
P2B12xxx types	Vin ≤ 15 V, duration ≤ 100 ms
P2B24xxx types	Vin ≤ 28 V, duration ≤ 100 ms
Pin soldering temperature	≤ 260 °C, duration ≤ 10 s max., ≥ 1.5 mm distance from body

Note:

1. All values are rated at 25 °C, nominal input voltage and full load unless otherwise specified.
2. Maximum output capacitive load tested by minimal input voltage and constant resistive load.
3. Operation under no load conditions will not damage the converter however they may not meet all listed specifications.
4. Not usable for MOSFET- and IGBT driver applications.

Ordering information									
Output Power	Series	Input voltage		Output voltage		Outputs		Primary / secondary isolation	
P2	B	05		24		SS		H	
PHI-CON 2 Watt		3R3	3.3 V	3R3	3.3 V	SS	Single output	Blanc	1 kV
		05	5 V	05	5 V	S	Dual output	H	3 kV
		12	12 V	7R2	7.2V			H6	6 kV
		24	24 V	09	9 V				
				12	12 V				
				15	15V				
				18	18 V				
				24	24 V				

HY-LINE Power Components Vertriebs GmbH
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D-82008 Unterhaching
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HY-LINE AG
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CH-8200 Schaffhausen
Tel.: 052 647 42 00
E-Mail: info@hy-line.ch

Figure 1 Measure circuit for input ripple current

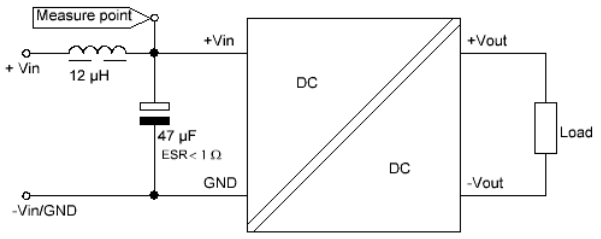
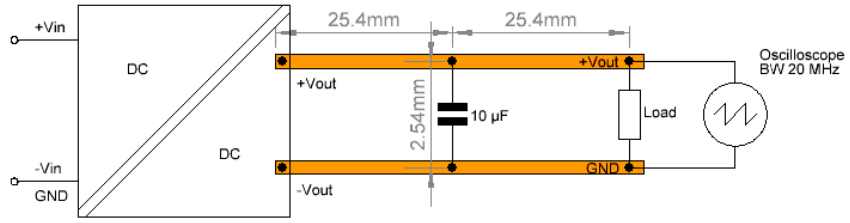


Figure 2 Measure circuit for output ripple and noise voltage
Single output



Dual output

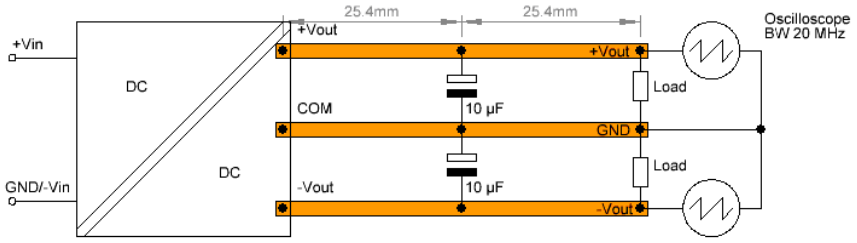
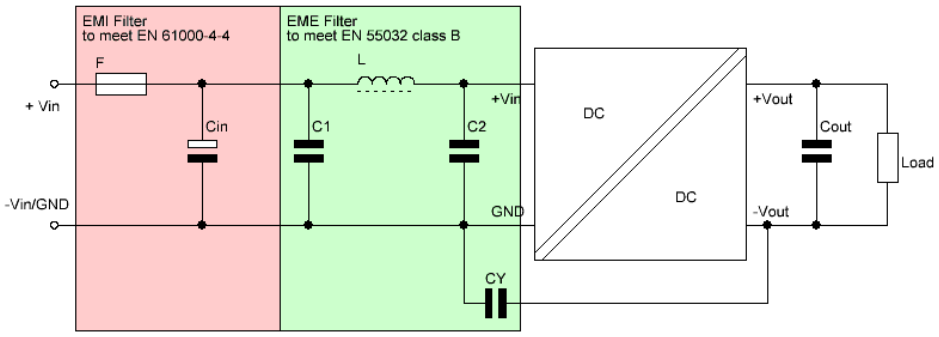


Figure 3 Application circuit to meet EN 61000-4-4 and EN 61000-4-5 and EN 55032 class B



Type	Fuse time delay [mA]	Cin		L	C1		C2		CY	
		[µF]	[V]	[µH]	[µF]	technology	[µF]	type	[pF]	[kV]
P2B3R3xxx	800	470	100	18	2.2	MLCC	-		-	
P2B05xxx	500	470	100	18	2.2	MLCC	-		-	
P2B12xxx	300	470	100	18	2.2	MLCC	-		-	
P2B15xxx	300	470	100	18	2.2	MLCC	-		-	
P2B24xxx	300	470	100	18	2.2	MLCC	2.2	MLCC	470	≥ 2

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

HY-LINE®

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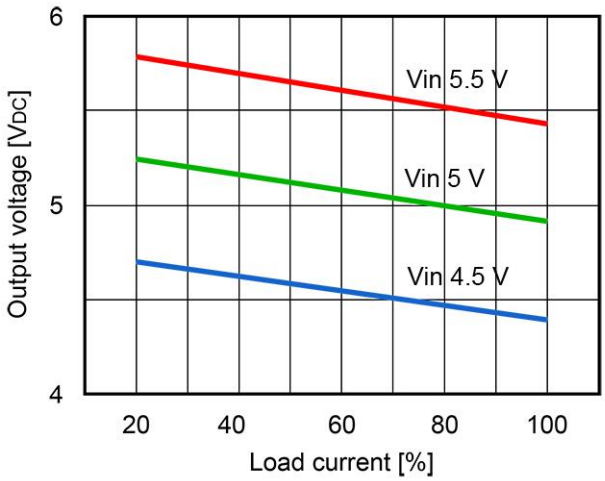
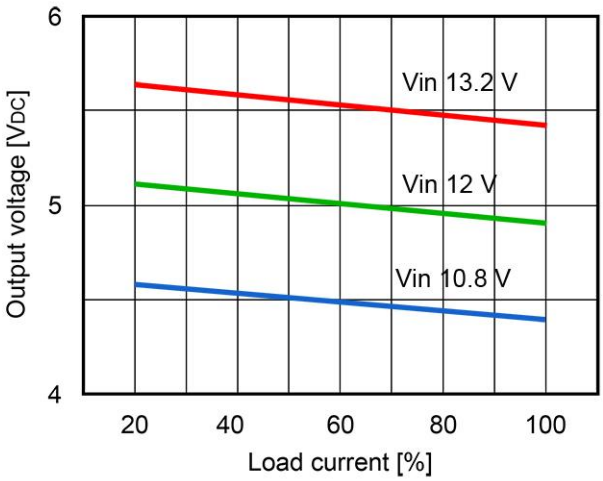
Tel.: 052 647 42 00
E-Mail: info@hy-line.ch

Output voltage vs load current and input voltage

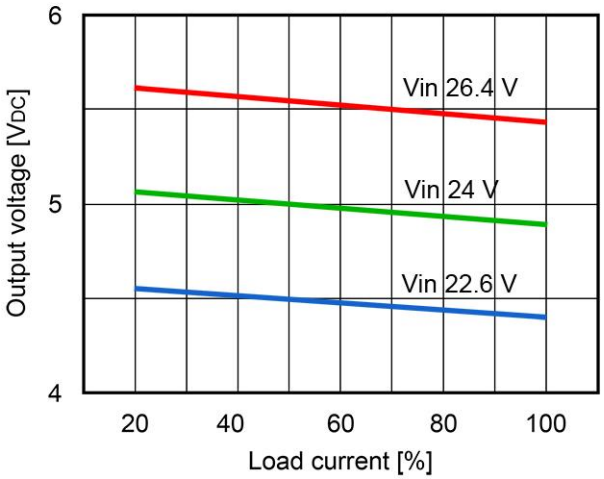
P2B0505SS



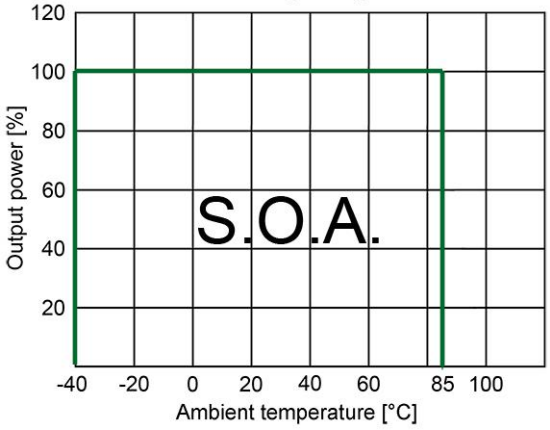
P2B1205SS



P2B2405SS



Derating diagram



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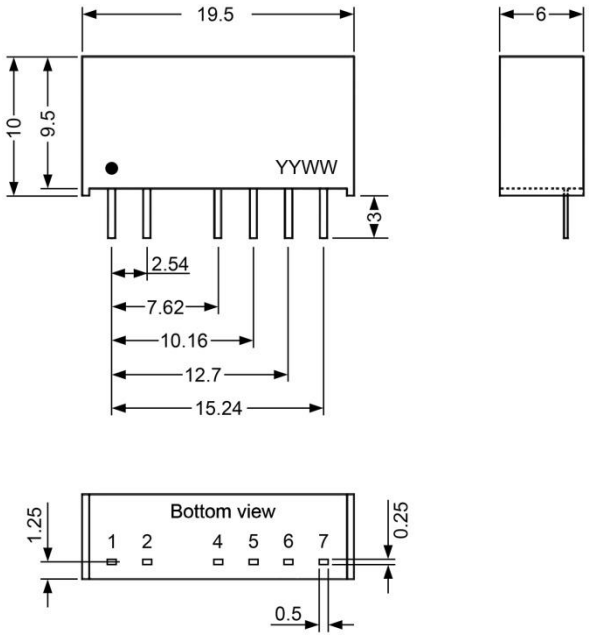
2 W DC-DC Converter P2B-Series

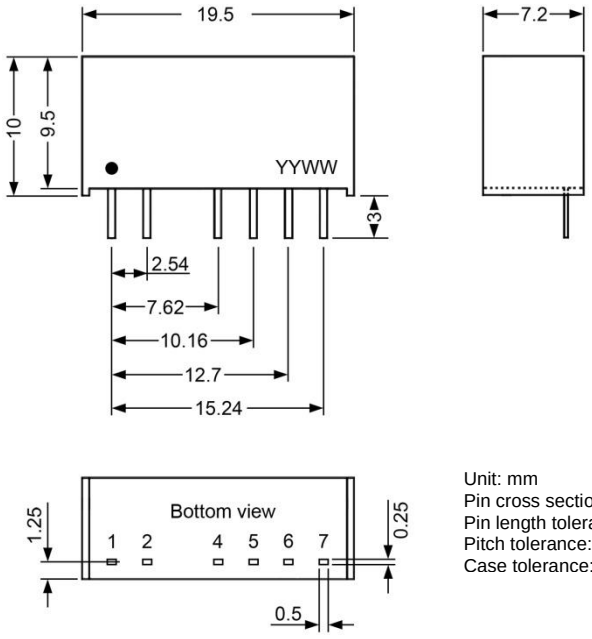
Mechnical dimensions for standard case with 6 mm thickness



Unit: mm
Pin cross section: 0.5 x 0.25 ± 0.05 mm
Pin length tolerance: ± 0.35 mm
Pitch tolerance: ± 0.35 mm
Case tolerance: ± 0.5 mm

Pin assignment				
Pin	Standard Isolation		3 kV_{DC} & 6 kV_{DC} Isolation	
	Single	Dual	Single	Dual
1	+V Input	+V Input	+V Input	+V Input
2	-V Input	-V Input	-V Input	-V Input
4	-V Output	-V Output	No Pin	No Pin
5	No Pin	Common	-V Output	-V Output
6	+V Output	+V Output	No Pin	Common
7	No Pin	No Pin	+V Output	+V Output

Mechnical dimensions for special case with 7.2 mm thickness



Unit: mm
Pin cross section: 0.5 x 0.25 ± 0.05 mm
Pin length tolerance: ± 0.35 mm
Pitch tolerance: ± 0.35 mm
Case tolerance: ± 0.5 mm

Listing for types with 7.2 mm thickness	
P2B3R305SS	P2B3R324SS
P2B3R305SSH	P2B3R324SSH
P2B3R305SSH6	P2B3R324SSH6
P2B3R37R2SS	P2B3R33R3S
P2B3R37R2SSH	P2B3R33R3SH
P2B3R37R2SSH6	P2B3R33R3SH6
P2B3R309SS	P2B3R305S
P2B3R309SSH	P2B3R305SH
P2B3R309SSH6	P2B3R305SH6
P2B3R312SSH	P2B3R37R2S
P2B3R312SSH6	P2B3R37R2SH
	P2B3R37R2SH6
P2B3R315SS	
P2B3R315SSH	P2B0515SH6
P2B3R315SSH6	
	P2B123R3SH6
P2B3R318SS	
P2B3R318SSH	
P2B3R318SSH6	

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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
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