



PHI-CON

# 1 W DC-DC Converter P1Z-Series

- DIL 8 Pin
- Low ripple and noise
- 1000 V<sub>DC</sub> isolation
- 3000 V<sub>DC</sub> isolation optional
- Unregulated



## Model guide

Type	Input voltage		Input current		Output voltage [V <sub>DC</sub> ]	Output current [mA] max.	Efficiency [%] typ.	Capacitive load [μF] max.
	nominal [V <sub>DC</sub> ]	range [V <sub>DC</sub> ]	no load [mA] typ.	full load [mA] typ.				
P1Z3R33R3D	3.3	2.97 ... 3.63	25	410	3.3	303	74	220
P1Z3R305D	3.3	2.97 ... 3.63	25	395	5.0	200	77	220
P1Z3R37R2D	3.3	2.97 ... 3.63	30	405	7.2	139	75	220
P1Z3R309D	3.3	2.97 ... 3.63	30	400	9.0	111	76	220
P1Z3R312D	3.3	2.97 ... 3.63	45	485	12.0	100	75	220
P1Z3R315D	3.3	2.97 ... 3.63	25	385	15.0	67	79	220
P1Z3R318D	3.3	2.97 ... 3.63	35	400	18.0	56	76	220
P1Z3R324D	3.3	2.97 ... 3.63	90	485	24.0	50	75	220
P1Z053R3D	5.0	4.5 ... 5.5	15	255	3.3	303	78	220
P1Z0505D	5.0	4.5 ... 5.5	15	255	5.0	200	79	220
P1Z057R2D	5.0	4.5 ... 5.5	15	240	7.2	139	83	220
P1Z0509D	5.0	4.5 ... 5.5	25	255	9.0	111	79	220
P1Z0512D	5.0	4.5 ... 5.5	25	295	12.0	100	81	220
P1Z0515D	5.0	4.5 ... 5.5	25	245	15.0	67	82	220
P1Z0518D	5.0	4.5 ... 5.5	25	240	18.0	56	83	220
P1Z0524D	5.0	4.5 ... 5.5	30	295	24.0	50	82	220
P1Z123R3D	12	10.8 ... 13.2	15	110	3.3	303	77	220
P1Z1205D	12	10.8 ... 13.2	15	105	5.0	200	79	220
P1Z127R2D	12	10.8 ... 13.2	15	100	7.2	139	83	220
P1Z1209D	12	10.8 ... 13.2	15	105	9.0	111	79	220
P1Z1212D	12	10.8 ... 13.2	20	125	12.0	100	80	220
P1Z1215D	12	10.8 ... 13.2	15	105	15.0	67	79	220
P1Z1218D	12	10.8 ... 13.2	15	105	18.0	56	81	220
P1Z1224D	12	10.8 ... 13.2	25	125	24.0	50	79	220
P1Z153R3D	15	13.5 ... 16.5	15	89	3.3	303	75	220
P1Z1505D	15	13.5 ... 16.5	10	83	5.0	200	80	220
P1Z157R2D	15	13.5 ... 16.5	10	88	7.2	139	76	220
P1Z1509D	15	13.5 ... 16.5	10	85	9.0	111	78	220
P1Z1512D	15	13.5 ... 16.5	15	98	12.0	100	82	220
P1Z1515D	15	13.5 ... 16.5	15	83	15.0	67	80	220
P1Z1518D	15	13.5 ... 16.5	10	85	18.0	56	78	220
P1Z1524D	15	13.5 ... 16.5	10	99	24.0	50	81	220
P1Z243R3D	24	21.6 ... 26.4	8	55	3.3	303	80	220
P1Z2405D	24	21.6 ... 26.4	8	55	5.0	200	80	220
P1Z247R2D	24	21.6 ... 26.4	10	55	7.2	139	75	220
P1Z2409D	24	21.6 ... 26.4	7	55	9.0	111	79	220
P1Z2412D	24	21.6 ... 26.4	8	65	12.0	100	80	220
P1Z2415D	24	21.6 ... 26.4	8	50	15.0	67	80	220
P1Z2418D	24	21.6 ... 26.4	8	50	18.0	56	82	220
P1Z2424D	24	21.6 ... 26.4	9	60	24.0	50	82	220

Ordering information									
Output power	Series	Input voltage		Output voltage		Outputs		Primary / secondary isolation	
P1	Z	05		05		D		H	
1 Watt		3R3	3.3 V	3R3	3.3 V	D	DIL, single output	blanc	1 kV <sub>DC</sub>
		05	5 V	05	5 V			H	3 kV <sub>DC</sub>
		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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# 1 W DC-DC Converter P1Z-Series

<b>Input</b>	
Voltage range	± 10%
Filter	Capacitors
Reflected ripple current	20 mA <sub>p-p</sub> (see Figure 1)
<b>I/O-Isolation:</b>	
DC-Isolation voltage input/output	Standard, suffix blanc: 1 kV Suffix "H": 3 kV
Resistance	≥ 10 <sup>9</sup> Ω
Capacitance	60 pF, typ.
<b>Output</b>	
Voltage tolerance	≤ ± 3 %
Ripple and noise @ 20 MHz BW	≤ 100 mV <sub>p-p</sub> (see Figure 2)
Short circuit protection	No
Line voltage deviation @ 1% Vin change	≤ ± 1.2 %
Voltage stability at load change 20...100 %	P1Zxx3R3D: ≤ ± 20 % All others: ≤ ± 10 %
Temperature drift	± 0.02 %/°C
<b>EMC</b>	
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 (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

<b>General</b>	
Safety standard	IEC 60950-1
Switching frequency	~ 80 kHz
Reliability calculated MTBF (MIL-HDBK-217 F)	≥ 1.12 Mio. h
<b>Environmental</b>	
Operating ambient temperature	-40 ... 85 °C
Case temperature	≤ 100 °C, max.
Storage temperature	-40 ... 125 °C
Derating	None required
Humidity	≤ 95 %, non condensing
Cooling	Free air convection, 30...65 LFM
<b>Physical</b>	
Weight	1.5 g 1.8 g only P1Z48xxS
Mechanical dimensions	10.2 x 12.7 x 6.9 mm
Case material	Non conductive black plastic (UL94V-0 rated)
Potting material	Epoxy (UL94V-0 rated)
<b>Absolute maximum ratings</b>	
Input voltage surge ≤ 100 ms	P1Z3R3xxD: 6 V <sub>dc</sub> P1Z05xxD: 7 V <sub>dc</sub> P1Z12xxD: 15 V <sub>dc</sub> P1Z15xxD: 18 V <sub>dc</sub> P1Z24xxD: 28 V <sub>dc</sub> P1Z48xxD: 54 V <sub>dc</sub>
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 specification

Figure 1 Measure circuit for input ripple current

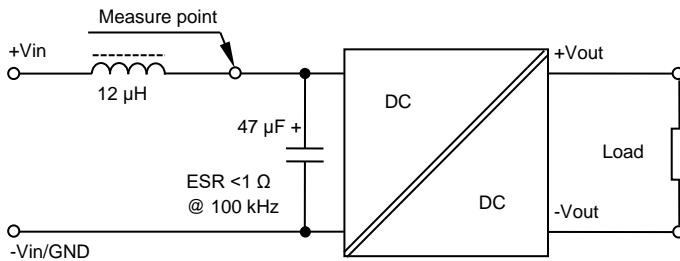
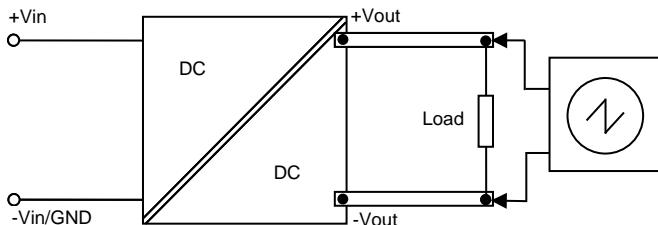
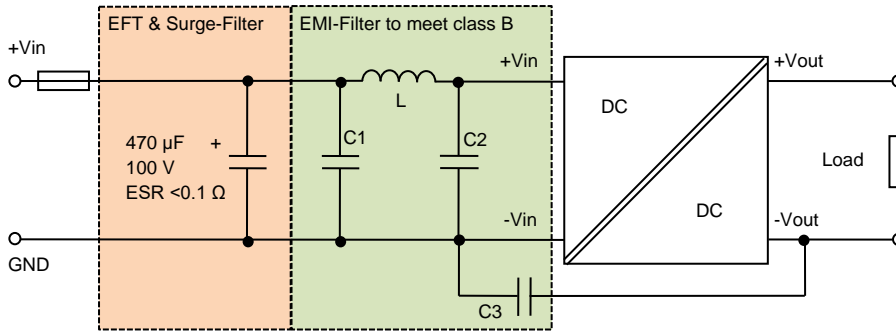


Figure 2 Measure circuit for output ripple & noise (Oscilloscope BW 20 MHz)



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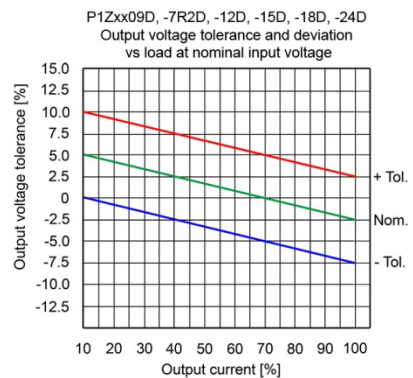
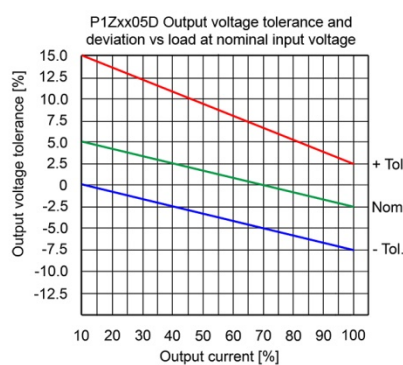
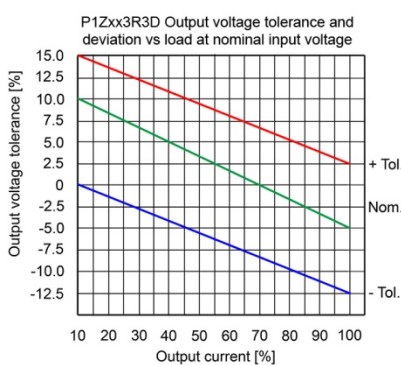
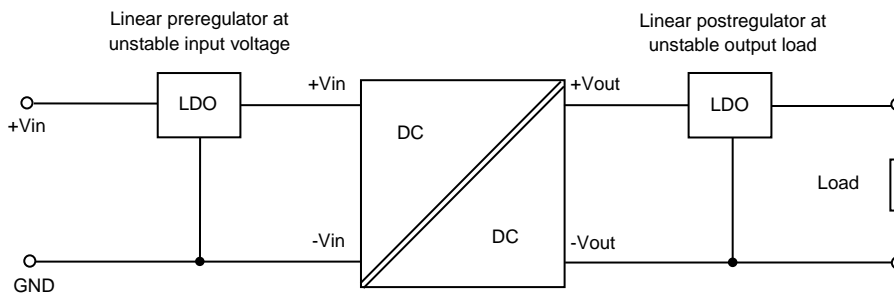
Figure 3 Application circuit to meet EN 61000-4-4 and EN 61000-4-5 performance criteria A and EN 55032 class B



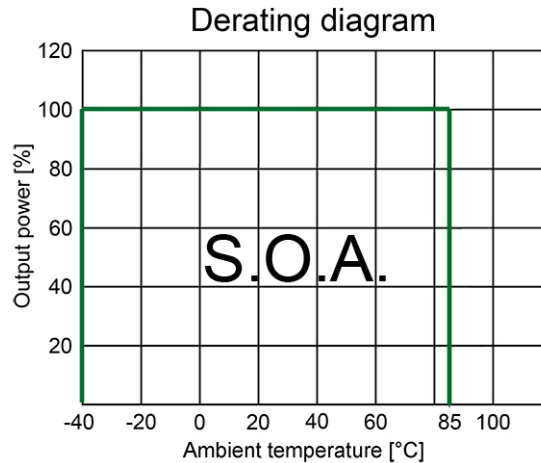
BOM to Figure 3					
Type	Fuse time delayed type [mA]	C1	L	C2	C3
P1Z3R3xxx	800	2.2 µF ceramic chip	18 µH	-	-
P1Z05xxx	500	2.2 µF ceramic chip	18 µH	-	-
P1Z12xxx	300	2.2 µF ceramic chip	18 µH	-	-
P1Z15xxx	300	2.2 µF ceramic chip	18 µH	-	-
P1Z24xxx	300	2.2 µF ceramic chip	18 µH	2.2 µF ceramic chip	470 pF, 2 kV ceramic chip
P1Z48xxx	300	10 µF electrolytic cap.	18 µH	2.2 µF ceramic chip	470 pF, 2 kV ceramic chip

The EMI filter components are to meet the conducted 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.

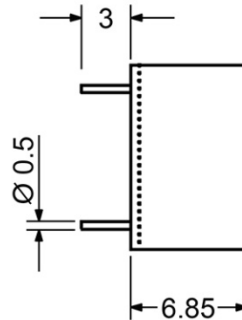
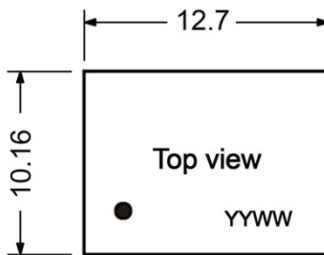
Application example with low drop out linear voltage regulator for input or output stabilisation and short circuit protection



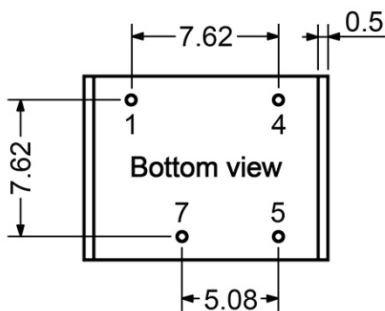
# 1 W DC-DC Converter P1Z-Series



## 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  $\pm 0.05$  mm
2. Pin length tolerance  $\pm 0.35$  mm
3. Pin pitch tolerance  $\pm 0.35$  mm
4. Case tolerance  $\pm 0.5$  mm

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