0.25 W DC-DC Converter P0D-Series

PHI-CON

- 4 Pin SIL
- Low ripple and noise
- 1000 V_{DC} isolation
- Optional 3000 V_{DC} isolation

CE

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.
P0D3R33R3DL	3.3	2.97 ... 3.63	25	125	3.3	75.7	61	100
P0D3R305DL	3.3	2.97 ... 3.63	25	118	5.0	50.0	64	100
P0D3R37R2DL	3.3	2.97 ... 3.63	25	118	7.2	34.7	64	100
P0D3R309DL	3.3	2.97 ... 3.63	25	118	9.0	27.7	64	100
P0D3R312DL	3.3	2.97 ... 3.63	32	120	12.0	20.8	63	100
P0D3R315DL	3.3	2.97 ... 3.63	25	118	15.0	16.6	64	100
P0D3R318DL	3.3	2.97 ... 3.63	25	115	18.0	13.8	66	100
P0D3R324DL	3.3	2.97 ... 3.63	20	115	24.0	10.4	66	100
P0D053R3DL	5.0	4.5 ... 5.5	20	83	3.3	75.7	60	100
P0D0505DL	5.0	4.5 ... 5.5	15	72	5.0	50.0	69	100
P0D057R2DL	5.0	4.5 ... 5.5	18	71	7.2	34.7	70	100
P0D0509DL	5.0	4.5 ... 5.5	18	71	9.0	27.7	70	100
P0D0512DL	5.0	4.5 ... 5.5	20	74	12.0	20.8	68	100
P0D0515DL	5.0	4.5 ... 5.5	20	74	15.0	16.6	68	100
P0D0518DL	5.0	4.5 ... 5.5	17	68	18.0	13.8	73	100
P0D0524DL	5.0	4.5 ... 5.5	23	72	24.0	10.4	69	100
P0D123R3DL	12.0	10.8 ... 13.2	12	31	3.3	75.7	67	100
P0D1205DL	12.0	10.8 ... 13.2	10	32	5.0	50.0	65	100
P0D127R2DL	12.0	10.8 ... 13.2	15	32	7.2	34.7	65	100
P0D1209DL	12.0	10.8 ... 13.2	12	35	9.0	27.7	60	100
P0D1212DL	12.0	10.8 ... 13.2	13	31	12.0	20.8	68	100
P0D1215DL	12.0	10.8 ... 13.2	16	37	15.0	16.6	57	100
P0D1218DL	12.0	10.8 ... 13.2	16	38	18.0	13.8	55	100
P0D1224DL	12.0	10.8 ... 13.2	18	41	24.0	10.4	51	100
P0D153R3DL	15.0	13.5 ... 16.5	12	26	3.3	75.7	63	100
P0D1505DL	15.0	13.5 ... 16.5	10	26	5.0	50.0	63	100
P0D157R2DL	15.0	13.5 ... 16.5	12	28	7.2	34.7	60	100
P0D1509DL	15.0	13.5 ... 16.5	12	28	9.0	27.7	60	100
P0D1512DL	15.0	13.5 ... 16.5	12	28	12.0	20.8	60	100
P0D1515DL	15.0	13.5 ... 16.5	13	28	15.0	16.6	59	100
P0D1518DL	15.0	13.5 ... 16.5	12	29	18.0	13.8	57	100
P0D1524DL	15.0	13.5 ... 16.5	12	29	24.0	10.4	57	100
P0D243R3DL	24.0	21.6 ... 26.4	8	18	3.3	75.7	58	100
P0D2405DL	24.0	21.6 ... 26.4	7	17	5.0	50.0	60	100
P0D247R2DL	24.0	21.6 ... 26.4	8	18	7.2	34.7	59	100
P0D2409DL	24.0	21.6 ... 26.4	8	18	9.0	27.7	58	100
P0D2412DL	24.0	21.6 ... 26.4	10	19	12.0	20.8	55	100
P0D2415DL	24.0	21.6 ... 26.4	7	18	15.0	16.6	59	100
P0D2418DL	24.0	21.6 ... 26.4	10	20	18.0	13.8	53	100
P0D2424DL	24.0	21.6 ... 26.4	10	19	24.0	10.4	55	100

Product ordering information								
Series	Input voltage		Output voltage		Package		Isolation voltage	
P0D	12		05		DL		H	
PHI-CON 0.25 W	3R3	3.3 V	3R3	3.3 V	DL	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				

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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 accuracy		≤ ± 3 %
Ripple and noise at BW 20 MHz (see Figure 2)		≤ 100 mVp-p
Short circuit protection		No
Output voltage deviation @ 1% Vin change		± 1.2 %
Voltage stability at load change 20...100 %		± 20 % @ only P0Dxx3R3DL ± 10 % @ all others
Temperature drift		± 0.02 % / °C
EMC		
RE	EN 55032	Class B
CE	EN 55032	Class B (see Figure 3)
ESD	EN-, IEC 61000-4-2	Perf. crit. A
RS	EN-, IEC 61000-4-3	Perf. crit. A
EFT	EN-, IEC 61000-4-4	Perf. crit. A (see Figure 3)
Surge	EN-, IEC 61000-4-5	Perf. crit. A (see Figure 3)
CS	EN-, IEC 61000-4-6	Perf. crit. A
PFMF	EN-, IEC 61000-4-8	Perf. crit. A

General	
Safety standards	EN-, IEC 60950-1
Switching frequency	~ 80 kHz
Reliability calculated MTBF (MIL-HDBK-217 F)	≥ 1.12 Mio. h
Environmental	
Operating temperature (ambient)	-40 … 85 °C
Case temperature	≤ 100 °C
Storage temperature	-40 … 125 °C
Derating	None required
Storage humidity	Up to 95 %, non condensing
Cooling	Free air convection, 35…60 LFM
Physical	
Weight	1.5 g 1.8 g only P0A48xxs
Case material	Non conductive black plastic (UL94V-0 rated)
Potting material	Epoxy (UL94V-0 rated)
Absolute maximum input voltage	
P0D3R3xxDL-Series	5 V_{DC}, ≤ 100 ms
P0D05xxDL-Series	7 V_{DC}, ≤ 100 ms
P0D12xxDL-Series	15 V_{DC}, ≤ 100 ms
P0D15xxDL-Series	18 V_{DC}, ≤ 100 ms
P0D24xxDL-Series	28 V_{DC}, ≤ 100 ms
P0D48xxDL-Series	54 V_{DC}, ≤ 100 ms
Pin soldering temperature	≤ 260 °C for ≤ 10 s and ≥ 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

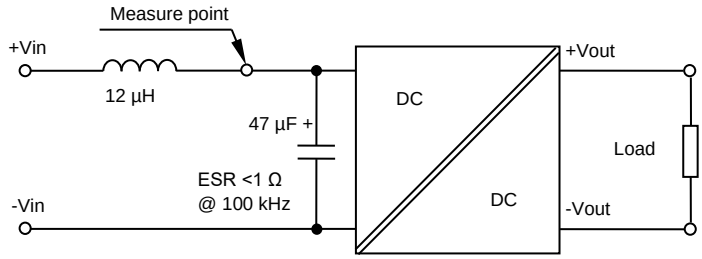

Figure 2 Measure circuit for output ripple and noise voltage (Bandwidth 20 MHz)

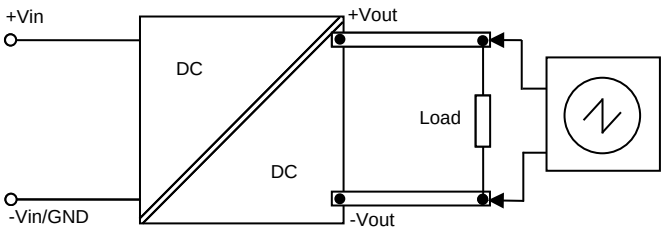

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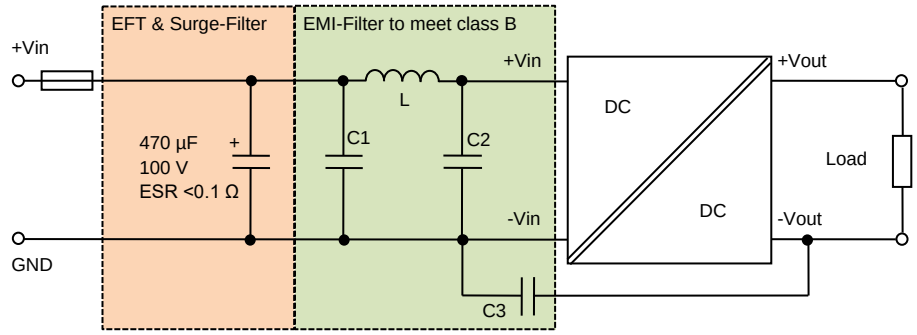
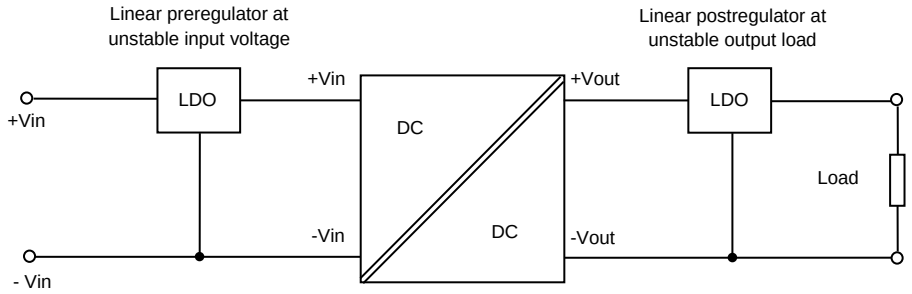
Figure 3 Application circuit to meet EN 61000-4-4-, IEC 61000-4-5 performance criteria und EN 55032 class B

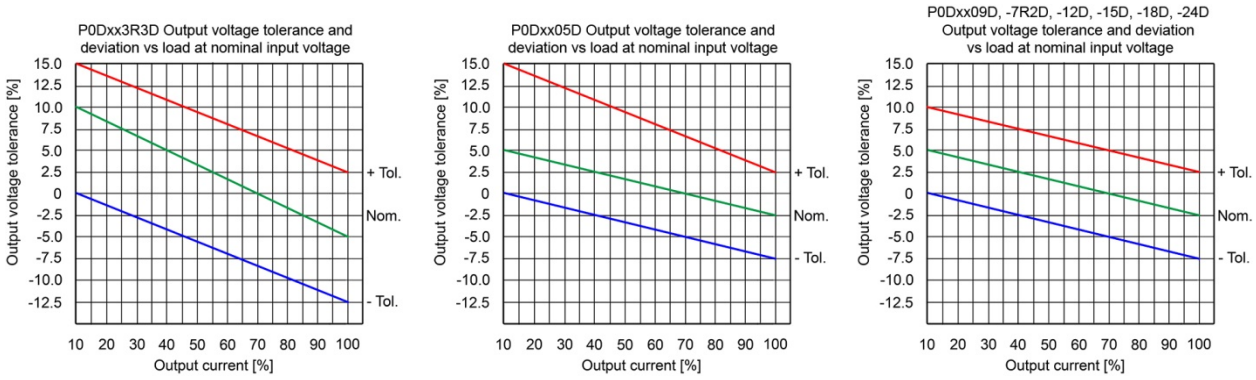


BOM to Figure 3					
Type	Fuse time delayed type [mA]	C1	L	C2	C3
P0D3R3xxx	500	2.2 µF ceramic chip	18 µH	-	-
P0D05xxx	500	2.2 µF ceramic chip	18 µH	-	-
P0D12xxx	300	2.2 µF ceramic chip	18 µH	-	-
P0D15xxx	300	2.2 µF ceramic chip	18 µH	-	-
P0D24xxx	300	2.2 µF ceramic chip	18 µH	2.2 µF ceramic chip	470 pF, 2 kV ceramic chip
P0D48xxx	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 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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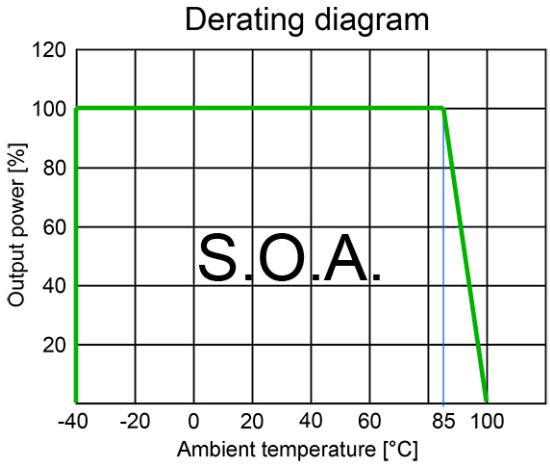
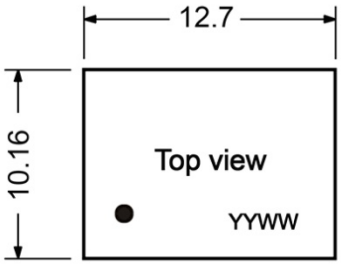
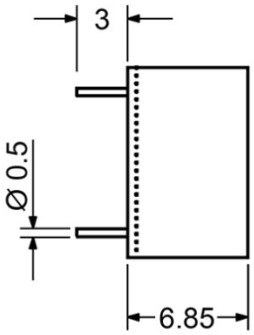
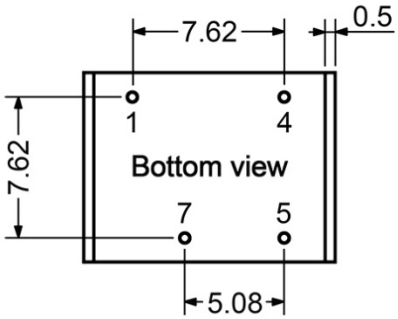


Mechanical package dimensions





Pin assignment	
1	-V Input
2	
3	
4	+V Input
5	+V Output
6	
7	-V Output
8	



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

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