



PHI-CON

6 W DC-DC Converter P6Z-Series

- Wide 4:1 input range
- 1500 V_{DC} isolation
- 3500 V_{DC} isolation optional
- MTBF >1.121 Mio. h
- Continuous short circuit protection
- Plastic package optional



Metal package



Plastic package

Model guide

Type	Input voltage		Input current		Output voltage [V _{DC}] nom.	Output current		Efficiency [%] typ.	Capacitor load (see 1) [mA] max.
	Nominal [V _{DC}]	Range [V _{DC}]	No load [mA] max.	Full load [mA] typ.		[mA] min.	[mA] max.		
Single output									
P6Z243R3S	24	9...36	18	260	3.3	0	1400	74	1000
P6Z2405S	24	9...36	18	313	5.0	0	1200	80	1000
P6Z247R2S	24	9...36	18	305	7.2	0	833	82	680
P6Z2409S	24	9...36	18	300	9.0	0	666	83	680
P6Z2412S	24	9...36	18	305	12.0	0	500	82	330
P6Z2415S	24	9...36	18	300	15.0	0	400	83	220
P6Z2418S	24	9...36	18	305	18.0	0	333	82	68
P6Z2424S	24	9...36	18	305	24.0	0	250	82	68
P6Z483R3S	48	18...72	15	128	3.3	0	1400	75	1000
P6Z4805S	48	18...72	15	155	5.0	0	1200	80	1000
P6Z487R2S	48	18...72	15	153	7.2	0	833	82	220
P6Z4809S	48	18...72	15	155	9.0	0	666	81	220
P6Z4812S	48	18...72	15	151	12.0	0	500	83	220
P6Z4815S	48	18...72	15	149	15.0	0	400	80	220
P6Z4818S	48	18...72	15	152	18.0	0	333	81	220
P6Z4824S	48	18...72	15	152	24.0	0	250	81	220
Dual output									
P6Z243R3D	24	9...36	18	335	±3.3	0	±909	75	2 x 470
P6Z2405D	24	9...36	18	313	±5.0	0	±600	80	2 x 470
P6Z247R2D	24	9...36	18	305	±7.2	0	±416	82	2 x 470
P6Z2409D	24	9...36	18	310	±9.0	0	±333	81	2 x 100
P6Z2412D	24	9...36	18	300	±12.0	0	±250	83	2 x 100
P6Z2415D	24	9...36	22	312	±15.0	0	±200	80	2 x 47
P6Z2418D	24	9...36	30	310	±18.0	0	±166	81	2 x 22
P6Z2424D	24	9...36	30	310	±24.0	0	±125	81	2 x 22
P6Z483R3D	48	18...72	15	163	±3.3	0	±909	77	2 x 330
P6Z4805D	48	18...72	15	155	±5.0	0	±600	81	2 x 330
P6Z487R2D	48	18...72	15	151	±7.2	0	±416	83	2 x 330
P6Z4809D	48	18...72	15	155	±9.0	0	±333	81	2 x 100
P6Z4812D	48	18...72	15	153	±12.0	0	±250	82	2 x 68
P6Z4815D	48	18...72	15	150	±15.0	0	±200	84	2 x 22
P6Z4818D	48	18...72	15	156	±18.0	0	±166	80	2 x 22
P6Z4824D	48	18...72	15	156	±24.0	0	±125	80	2 x 22

Specifications

Input	
Filter	Pi Network
Reflected input ripple current	35 mA _{p-p} (Figure 1)
Isolation:	
In / Out Rated voltage (60 s)	1500 V _{DC} , Standard 3500 V _{DC} , Suffix "H"
Input or output to metall case	1000 V _{DC}
Resistance	10 ⁹ Ω
Capacitance	470 pF, typ.
Output	
Voltage accuracy	± 1 %
Ripple and noise (at 20 MHz BW)	60 mV _{p-p} , max.
Short circuit protection	Continuous, hiccup automatic restart
Line regulation	± 0.5 %, max.
Load voltage regulation	± 1.5 % @ P6Zxx3R3x ± 0.5 % all others
Temperature coefficient	± 0.02 % / °C
General	
Switching frequency	270 kHz, typ.
Safety standards	IEC 60950-1
Reliability calc. MTBF @ Ta 25 °C (MIL-HDBK-217F)	1.12 Mio. h

EMC specifications		
RE	EN 55032	Class A
CE	EN 55032	Class A (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
Environmental		
Operating ambient temperature	-40 ... 85 °C	
Storage temperature	-40 ... 125 °C	
Case temperature	100 °C, max.	
Derating	None required	
Humidity	95 % max., non condensing	
Cooling	Free air convection, 30 ... 65 LFM	
Physical		
Weight	13 g, typ. metal case, standard 13.5 g plastic case, Suffix "P"	
Potting material	Epoxy (UL94V-0 rated)	
Case material	Metal: Aluminum or Black Plastic (UL94V-0 rated)	
Absolute maximum ratings		
P6Z24xxx	V _{in} 40 V _{DC} , max., < 100 ms	
P6Z48xxx	V _{in} 80 V _{DC} , max., < 100 ms	
Lead soldering Temperature	≤ 260 °C duration for ≤ 10 s, distance from package ≥ 1.5 mm	

6 W DC-DC Converter P6Z-Series

Part number ordering information												
P	Output power	Series	Input voltage		Output voltage		Output		Isolation voltage		P	
PHI-CON	6 W	Z	24	24 V	3R3	3.3 V	S	single	blanc	1.5 kV	blanc	metal
			48	48 V	05	5 V	D	dual ±	H	3.5 kV	P	plastic
					7R2	7.2 V						
					09	9 V						
					12	12 V						
					15	15 V						
					18	18 V						
					24	24 V						

Notes:

1. Capacitor load is specified at nominal input voltage and constant resistive load.
2. Parallel operation of DC/DC-Converter outputs is not recommended.
3. The P6Z-series is not usable in IGBT and MOSFET driver applications.
4. All parameter typical at Ta 25 °C , nominal input voltage and full load unless otherwise specified

Figure 1 Measure circuit input reflected ripple current

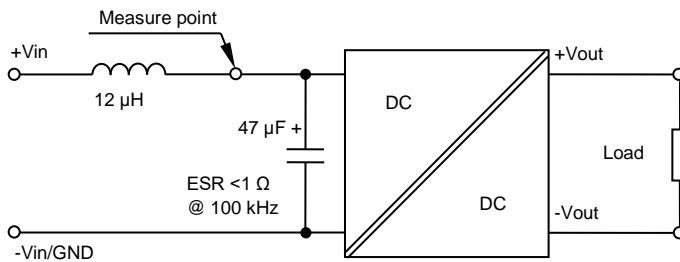
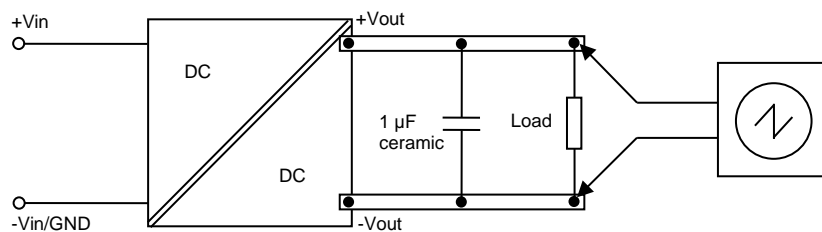


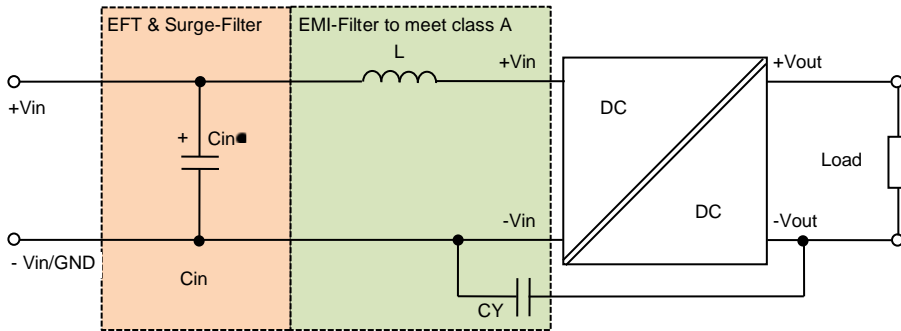
Figure 2 Measure circuit output ripple & noise voltage, oscilloscope bandwidth 20 MHz



6 W DC-DC Converter P6Z-Series

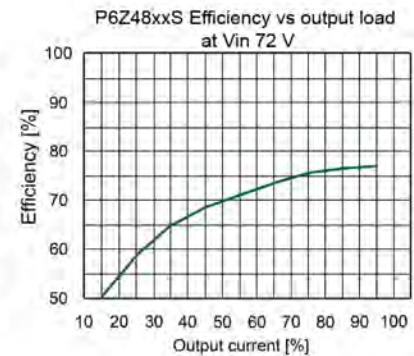
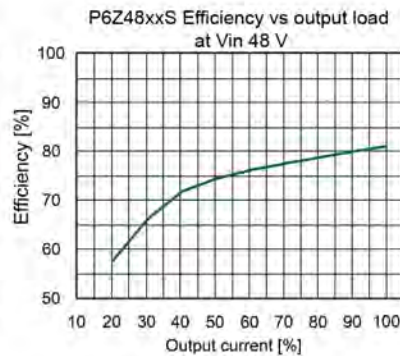
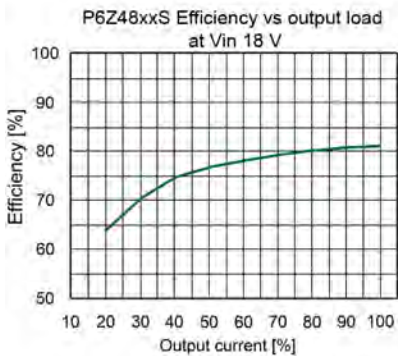
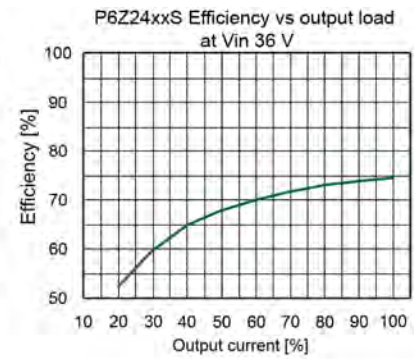
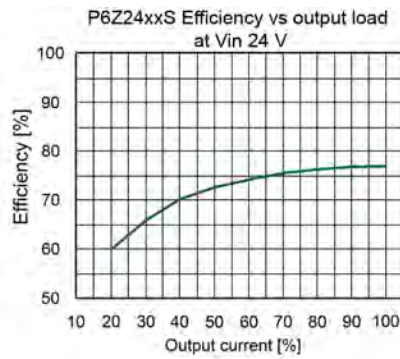
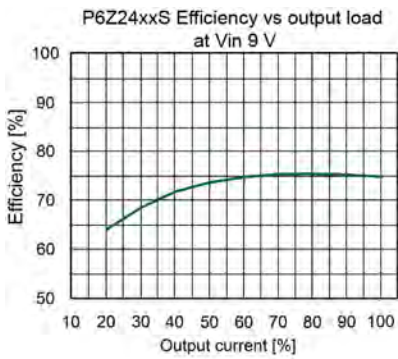
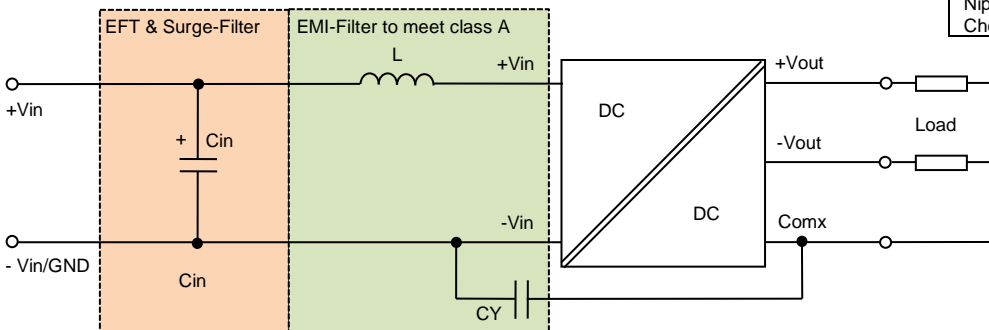
Figure 3 Application circuit to meet EFT IEC 61000-4-4 class A, surge IEC 61000-4-5 class A and EMI conducted emission EN 55032 class A

Single output

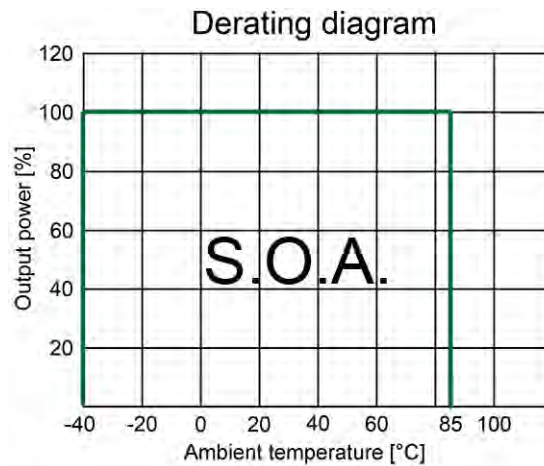


Components to figures 3		
Cin	L	CY
220 μ F, 100 V KY-Series, ESR <1 Ω Nippon Chemicon	12 μ H	1 nF, 4 kV

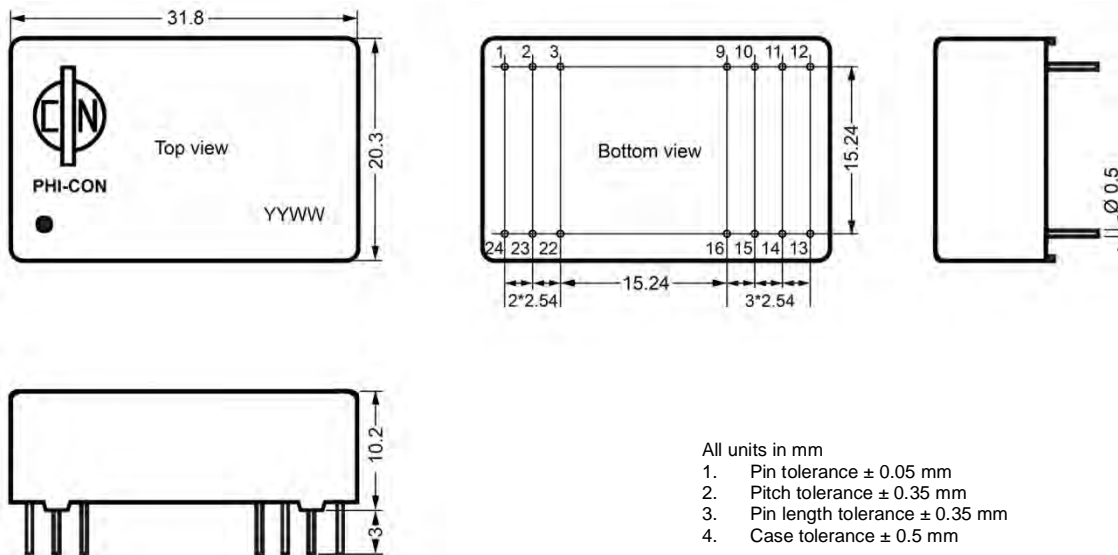
Dual output



6 W DC-DC Converter P6Z-Series



Dimensions metal case version



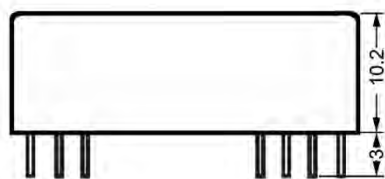
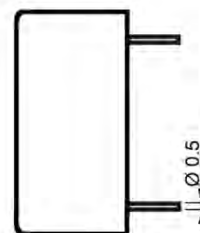
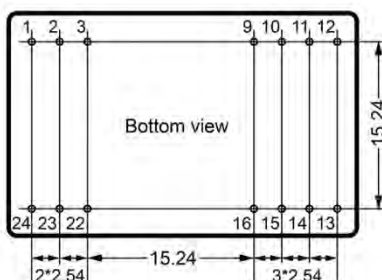
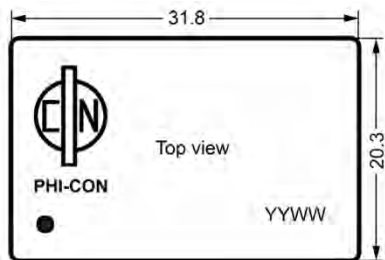
Pin assignment				
Pin	1.5 kV _{DC} isolation version		3.5 kV _{DC} isolation version	
	Single output	Dual output	Single output	Dual output
1	+V Input	+V Input	No Pin	No Pin
2	Not Connected	-V Output	-V Input	-V Input
3	Not Connected	Common	-V Input	-V Input
9	No Pin	No Pin	No Pin	Common
10	-V Output	Common	No Pin	No Pin
11	+V Output	+V Output	Not Connected	-V Output
12	-V Input	-V Input	No Pin	No Pin
13	-V Input	-V Input	No Pin	No Pin
14	+V Output	+V Output	+V Output	+V Output
15	-V Output	Common	No Pin	No Pin
16	No Pin	No Pin	-V Output	Common
22	Not Connected	Common	+V Input	+V Input
23	Not Connected	-V Output	+V Input	+V Input
24	+V Input	+V Input	No Pin	No Pin



PHI-CON

6 W DC-DC Converter P6Z-Series

Dimensions plastic case version



All units in mm

1. Pin tolerance ± 0.05 mm
2. Pitch tolerance ± 0.35 mm
3. Pin length tolerance ± 0.35 mm
4. Case tolerance ± 0.5 mm

Pin assignment				
Pin	1.5 kV _{DC} isolation version		3.5 kV _{DC} isolation version	
	Single output	Dual output	Single output	Dual output
1	+V Input	+V Input	No Pin	No Pin
2	Not Connected	-V Output	-V Input	-V Input
3	Not Connected	Common	-V Input	-V Input
9	No Pin	No Pin	No Pin	Common
10	-V Output	Common	No Pin	No Pin
11	+V Output	+V Output	Not Connected	-V Output
12	-V Input	-V Input	No Pin	No Pin
13	-V Input	-V Input	No Pin	No Pin
14	+V Output	+V Output	+V Output	+V Output
15	-V Output	Common	No Pin	No Pin
16	No Pin	No Pin	-V Output	Common
22	Not Connected	Common	+V Input	+V Input
23	Not Connected	-V Output	+V Input	+V Input
24	+V Input	+V Input	No Pin	No Pin

PHI-CON is a trademark of HY-LINE Holding GmbH.

Only for professional use by professionals! Not for resale or distribution to the general public in any way! Read the instructions carefully before using!

Life Support Policy: HY-LINE does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

Rev: 20240808 g