

10 W DC-DC Converter P10G-Series



PHI-CON

- Wide 4:1 input range
- Efficiency up to 88 %
- Remote control on/off
- 1500 V_{DC} isolation
- Continuous short circuit protection
- Over voltage protection
- Standard package 1" x 1"
- MTBF > 1 Mio. hours
- -40...+85 °C operating temperature range



Model guide

Type	Input voltage		Input current		Output voltage [V _{DC}]	Output current		Efficiency @ full load		Capacitive load (see note 3) [μF] max.	
	nominal [V _{DC}]	Range [V _{DC}]	no load [mA]	full load [mA]		minimum load [mA]	maximum load [mA]	[%] min.	[%] typ.		
Single Output											
P10G243R3S	24	9...36	8	510	3.3	0	2400	77	79	2200	
P10G2405S	24	9...36	8	510	5	0	2000	81	83	2200	
P10G2409S	24	9...36	8	510	5	0	1111	84	86	680	
P10G2412S	24	9...36	8	510	12	0	833	85	87	470	
P10G2415S	24	9...36	8	510	15	0	667	85	87	330	
P10G24245S	24	9...36	8	510	24	0	416	86	88	100	
P10G483R3S	48	18...75	6	255	3.3	0	2400	77	79	2200	
P10G4805S	48	18...75	6	255	5	0	2000	81	83	2200	
P10G4812S	48	18...75	6	255	12	0	1111	85	87	680	
P10G4815S	48	18...75	6	255	15	0	833	85	87	470	
P10G4824S	48	18...75	6	255	24	0	667	86	88	330	
Dual Output											
P10G2405D	24	9...36	8	510	±5	0	±1000	81	83	2 x 1000	
P10G2409D	24	9...36	8	510	±9	0	±555	84	86	2 x 680	
P10G2412D	24	9...36	8	510	±12	0	±416	85	87	2 x 470	
P10G2415D	24	9...36	8	510	±15	0	±333	85	87	2 x 330	
P10G2424D	24	9...36	8	510	±24	0	±208	85	87	2 x 100	
P10G4805D	48	18...75	6	255	±5	0	±555	81	83	2 x 1000	
P10G4812D	48	18...75	6	255	±12	0	±416	85	87	2 x 470	
P10G4815D	48	18...75	6	255	±15	0	±333	85	87	2 x 330	
P10G4824D	48	18...75	6	255	±24	0	±208	85	87	2 x 100	

With suffix "K" heatsink version

1) Typical circuit

The P10G series is been tested according to the following recommended test circuit before leaving the factory (see Figures 1).

If you want to further decrease the input / output ripple, you can increase a capacitance values properly or choose capacitors with low ESR, but the total capacitance of the filter capacitor must not exceed the maximum load capacitance value (see Model guide table).

Figure 1a

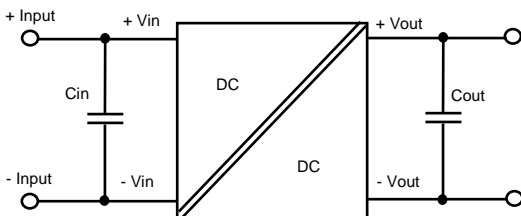
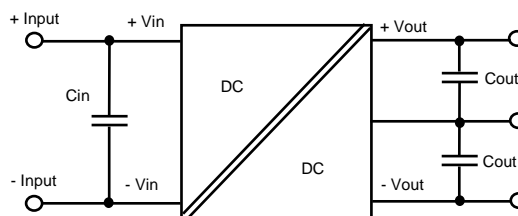


Figure 1b



Recommended peripheral components to figure 1a & 1b		
	C _{in}	C _{out}
P10G24xxx	100 μF, 50 V	10 μF
P10G48xxx	10...47 μF, 100 V	10 μF

10 W DC-DC Converter P10G-Series

Specifications

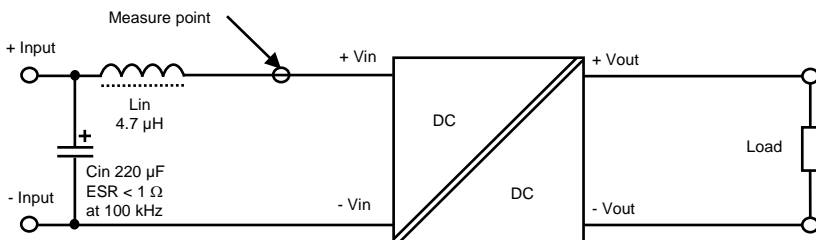
Input			
Under voltage lockout	P10G24xxx	on @ $\leq 9 V_{DC}$	off @ $\geq 5.5 V_{DC}$
	P10G48xxx	on @ $\leq 18 V_{DC}$	off @ $\geq 14 V_{DC}$
Filter	π - type		
Reflected ripple current *6	P10G24xxx: P30 mAp-p, typ. P10G48xxx: P40 mAp-p, typ.		
Remote control threshold	On state	3.5...12 V_{DC} , or open input	
	Off state	0...1.2 V_{DC}	
Input idle current @ Off state	6...10 mA		
Isolation input - output:			
Rated voltage (tested for 1 min.)	1500 V_{DC} , at ≤ 1 mA		
Resistance	$> 10^9 \Omega$, measured @ 500 V_{DC}		
Capacitance	1000 pF, typ.		
Output			
Voltage tolerance	$\pm 3\%$, max.		
Voltage load regulation	$\pm 1.5\%$, max. @ 5%...100% load		
Voltage cross balance (dual outputs)	$\pm 1.5\%$, max. @ balanced load		
Voltage cross balance (dual outputs)	$\pm 5\%$, max. @ 50% load difference		
Voltage regulation	$\pm 1\%$, max @ full V_{in} range		
Temperature coefficient	$\pm 0.03\%$ / $^{\circ}C$		
Transient recovery time	$\leq 500 \mu s$, @ 25% load steps		
Transient response deviation	$\leq 5\%$, @ 25% load steps		
Short circuit protection	Continuous, hiccup		
Short circuit restart	Automatic		
Over current protection	140% of rated current, typ. 190% of rated current, max.		
Rippel & noise, BW 20MHz	80 mVp-p, max.		
Over voltage protection	110...160% of rated V_{out}		

General		
Start up time	10 ms, typ @ R-load	
Switching frequency	350 kHz, typ.	
Reliability Calculated MTBF MIL-HDBK-217F @ 25 $^{\circ}C$	> 1 Mio. hours	
EMC characteristics		
Radiated emissions	CISPR22 / EN55022 Class A	
Radiated emissions, (with Fig. 2)	CISPR22 / EN55022 Class B	
Conducted emissions	CISPR22 / EN55022 Class A	
Conducted emissions, (with Fig. 2)	CISPR22 / EN55022 Class B	
ESD, (with Fig. 2)	EN61000-4-2 Contact ± 4 kV perf. crit. B	
RS	EN61000-4-3 10V/m perf. crit. A	
EFT (with Fig. 2)	EN61000-4-4 ± 2 kV perf. crit. B	
Surge (with Fig. 2)	EN61000-4-5 ± 2 kV perf. crit. B	
CS	EN61000-4-6 3 Vrms perf. crit. A	
Voltage dips, short interruptions and voltage variations immunity	EN61000-4-29 0...70% perf. crit. B	
Environmental		
Operating temperature (ambient)	-40 $^{\circ}C$ to +85 $^{\circ}C$ with derating -40 $^{\circ}C$ to +65 $^{\circ}C$ at full load	
Storage temperature	-55 $^{\circ}C$ to +125 $^{\circ}C$	
Humidity	5...95%, non condensing	
Cooling	Free air convection	
Vibration	10...55 Hz, 10G, 30 min., X, Y and Z axis	
Physical		
Dimensions	25.40 x 25.40 x 11.7 mm	
Weight	15 g	
Case material	Aluminium Alloy	
Potting Material	Epoxy (UL94V-0 rated)	
Absolute max. ratings		
Pin soldering temperature 1.5 mm distance from body	300 $^{\circ}C$ for 10 sec	
Max. input voltage < 1 s	P10G48xxx	-0.7...50 V_{DC}
	P10G24xxx	-0.7...100 V_{DC}

Note:

- Min. load should not be less than 5%, otherwise ripple maybe increased dramatically, If the product operates under min. load, it may not be guaranteed to meet all specifications listed. Operation under minimum load will not damage the converter.
- The recommended unbalanced load of dual output converter should be low than 5%. If the load asymmetry greater than 5%, it may not be guaranteed to meet all specifications listed. Please contact our technical support for more details.
- Maximum capacitive load is tested at input voltage range and full load.
- All specifications measured at T_a 25 $^{\circ}C$, humidity < 75%, nominal input voltage and rated output load unless otherwise specified.
- It is not recommended to increase the output power capability by connecting two or more converters in parallel.
- The converters are not hot swappable

Input reflected ripple measure circuit

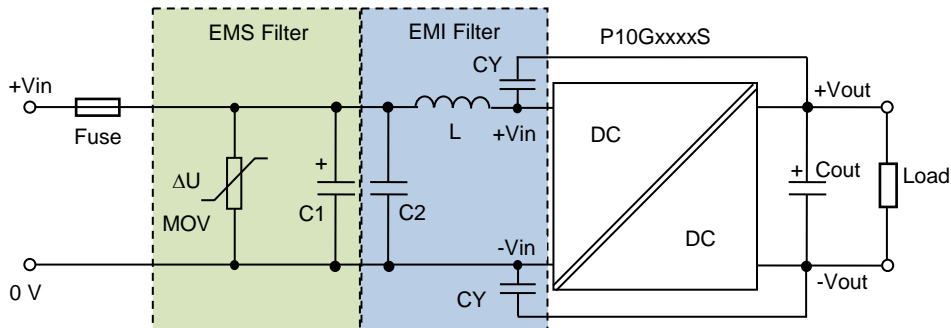


The input reflected ripple current is measured with inductor L_{in} and capacitor C_{in} to simulate source impedance.

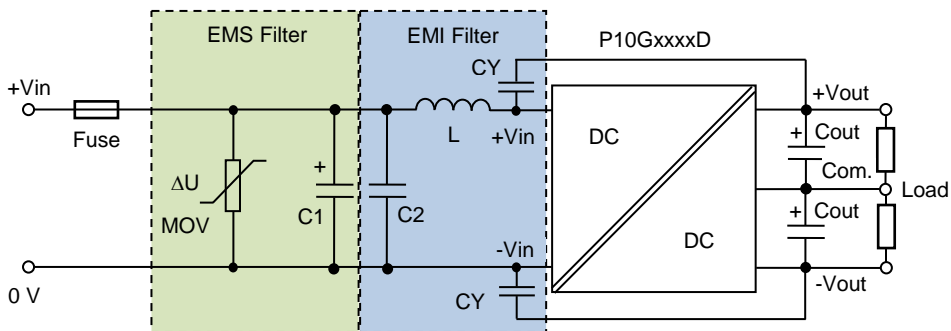
10 W DC-DC Converter P10G-Series

Figures 2, Recommended EMC circuit

Single output

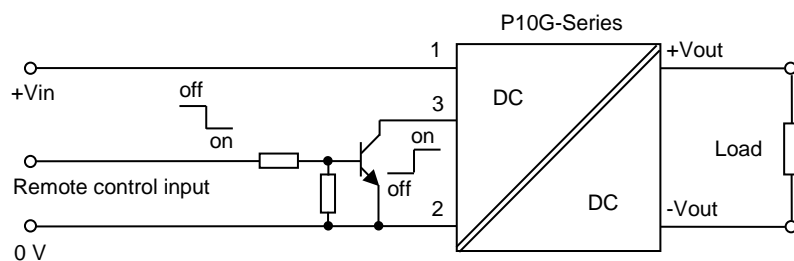


Dual output



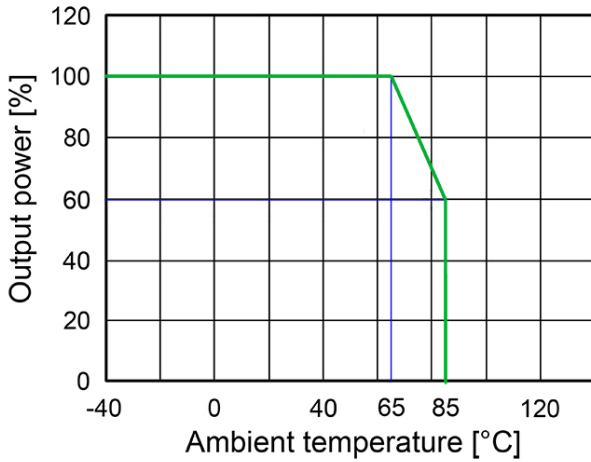
Recommended peripheral components to circuits in figures 2						
Type	Fuse Time delay type	MOV Type	L	C1	C2	CY
P10G24xxS	2 A	S14K35	4.7 μ H	330 μ F, 50 V	1 μ F, 50 V	1 nF, 2 kV
P10G24xxD	2 A	S14K35	4.7 μ H	330 μ F, 50 V	1 μ F, 50 V	1 nF, 2 kV
P10G48xxS	1 A	S14K60	4.7 μ H	330 μ F; 100 V	1 μ F, 100 V	1 nF, 2 kV
P10G48xxD	1 A	S14K60	4.7 μ H	330 μ F, 100 V	1 μ F, 100 V	1 nF, 2 kV

Application remote control

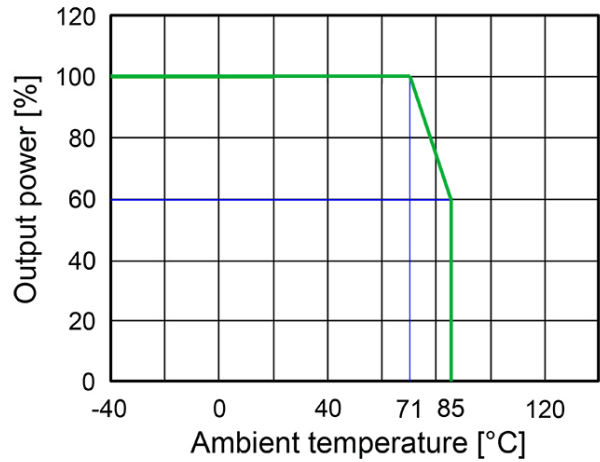


10 W DC-DC Converter P10G-Series

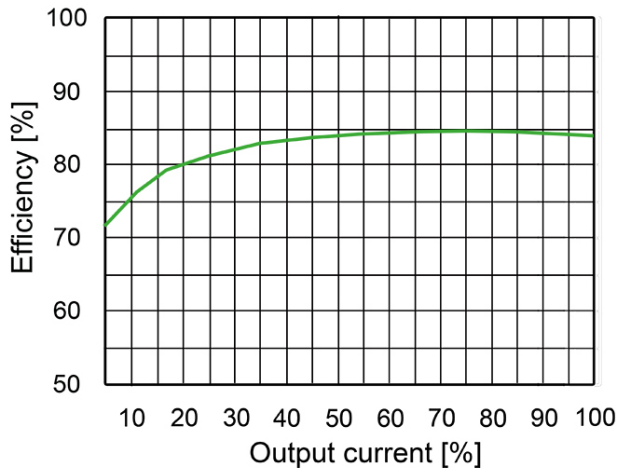
P10Gxx3R3S, P10Gxx05S
Temperature derating curve



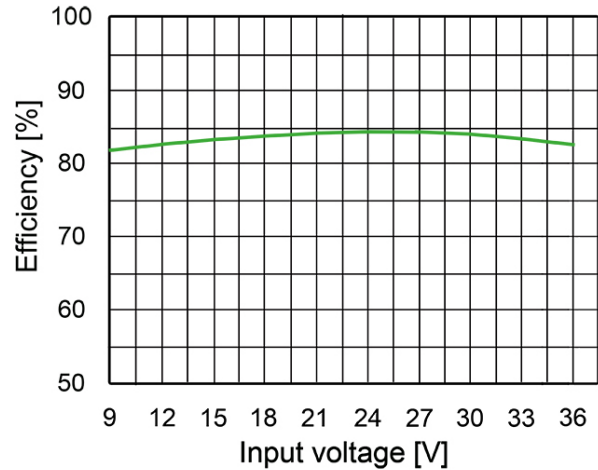
P10Gxx09S, -12x, -15x, -24x
Temperature derating curve



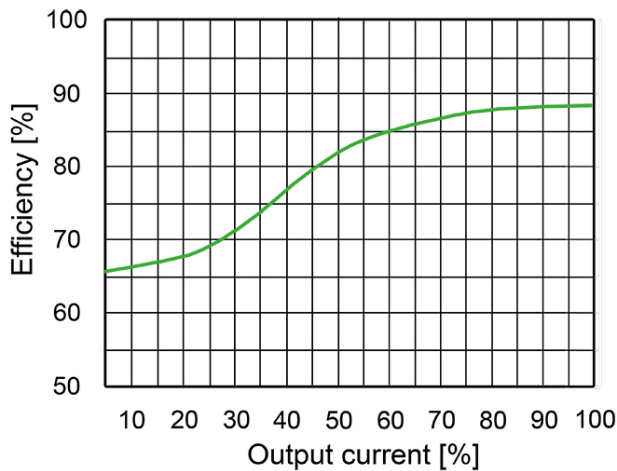
P10G2405S efficiency vs output load



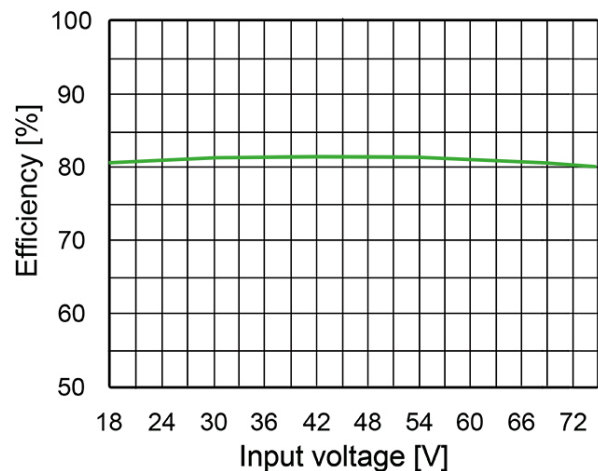
P10G2405S efficiency vs input voltage



P10G4815D efficiency vs output load



P10G4815D efficiency vs input voltage

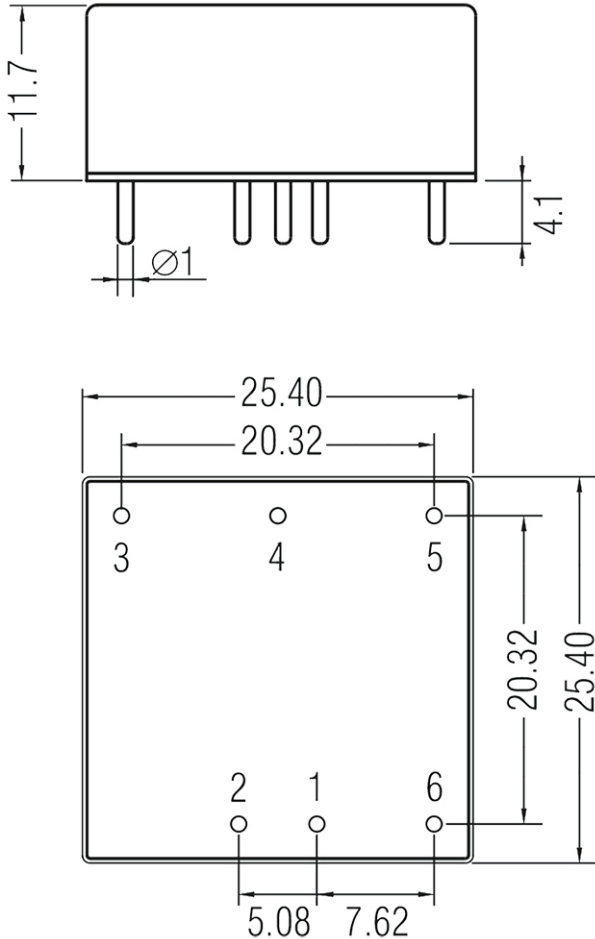


10 W DC-DC Converter P10G-Series



PHI-CON

Dimensions



Pin configuration

Pin assignment		
Pin	Single	Dual
1	- Vin	- Vin
2	+ Vin	+ Vin
3	+ Vout	+ Vout
4	No pin	Common
5	- Vout	- Vout
6	ON/OFF ctrl	ON/OFF ctrl

Unit: mm
 Pin diameter tolerance: 0.1 mm
 General tolerances: 0.5 mm

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: 09.16 f