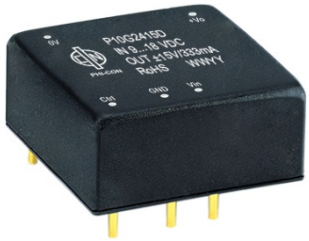
10 W DC-DC Converter P10G-Series

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	Output current		Efficiency @ full load		Capacitive load (see note 3)
	nominal [V_{DC}]	Range [V_{DC}]	no load [mA]	full load [mA]	[V_{DC}]	minimum load [mA]	maximum load [mA]	[%] min.	[%] typ.	[µF] max.
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

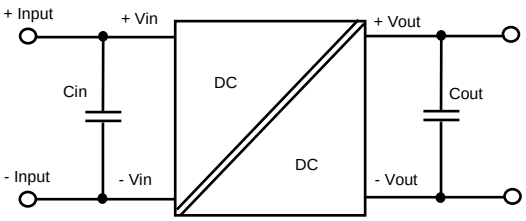
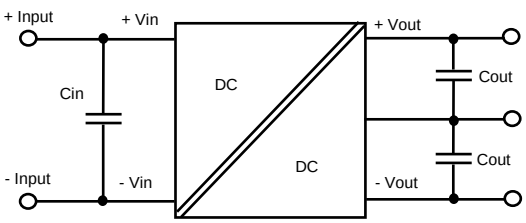


Figure 1b



Recommended peripheral components to figure 1a & 1b		
	Cin	Cout
P10G24xxx	100 µF, 50 V	10 µF
P10G48xxx	10...47 µF, 100 V	10 µF

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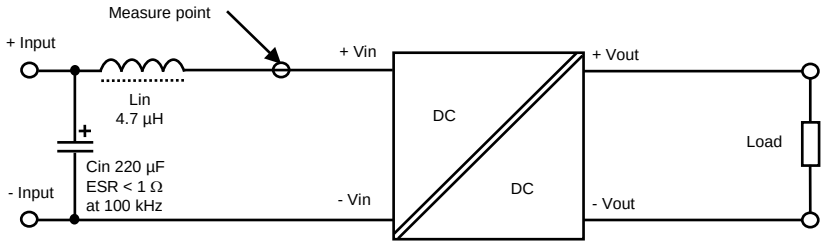
Specifications

Input			
Under voltage lockout	P10G24xxx	on @ ≤ 9 V_{DC}	off @ ≥ 5.5 V_{DC}
	P10G48xxx	on @ ≤ 18 V_{DC}	off @ ≥ 14 V_{DC}
Filter		π - type	
Reflected ripple current *6		P10G24xxx: P30 mAp-p, typ. P10G48xxx: P40 mAp-p, typ.	
Remote control theshold	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 Ω, measured @ 500 V_{DC}	
Capacitance		1000 pF, typ.	
Output			
Voltage tolerance		± 3 %, max.	
Voltage load regulation		± 1.5 %, max. @ 5 %...100 % load	
Voltage cross balance (dual outputs)		± 1.5 %, max. @ balanced load	
Voltage cross balance (dual outputs)		± 5 %, max. @ 50 % load difference	
Voltage regulation		± 1 %, max @ full Vin range	
Temperature coefficient		± 0.03 % / °C	
Transient recovery time		≤ 500 µs, @ 25 % load steps	
Transient response deviation		≤ 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 Vout	

General		
Start up time		10 ms, typ @ R-load
Switching frequency		350 kHz, typ.
Reliability Calculated MTBF MIL-HDBK-217F @ 25 °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 °C to +85 °C with derating -40 °C to +65 °C at full load
Storage temperature		-55 °C to +125 °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 °C for 10 sec
Max. input voltage < 1 s	P10G48xxx	-0.7…50 V_{DC}
	P10G24xxx	-0.7…100 V_{DC}

Note:
1. 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.
2. 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.
3. Maximum capacitive load is tested at input voltage range and full load.
4. All specifications measured at Ta 25 °C, humidity < 75 %, nominal input voltage and rated output load unless otherwise specified.
5. It is not recommended to increase the output power capability by connecting two or more converters in parallel.
6. 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.

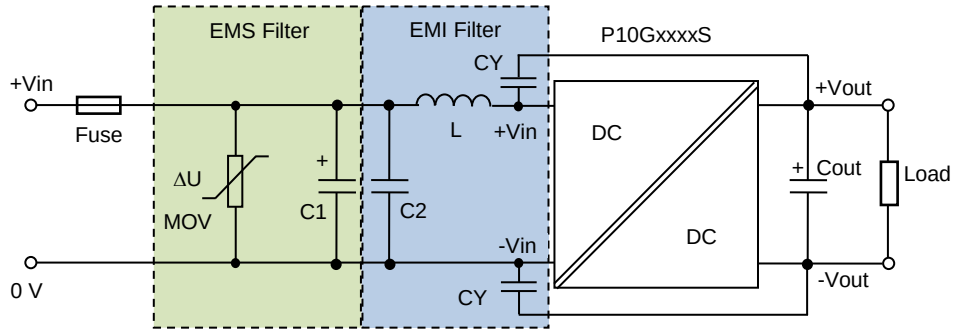
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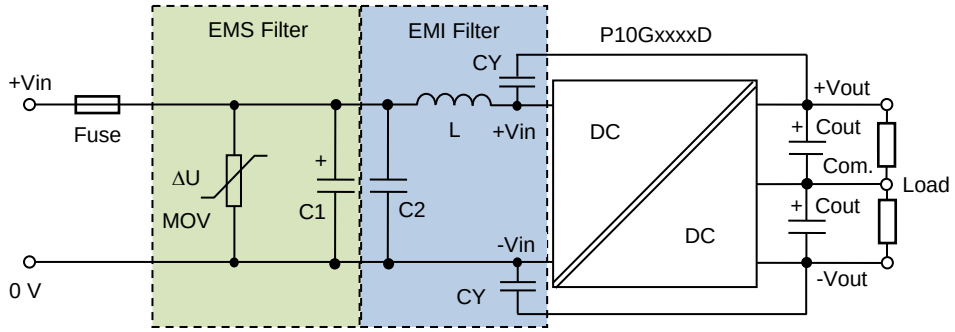
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Figures 2, Recommended EMC circuit

Single output

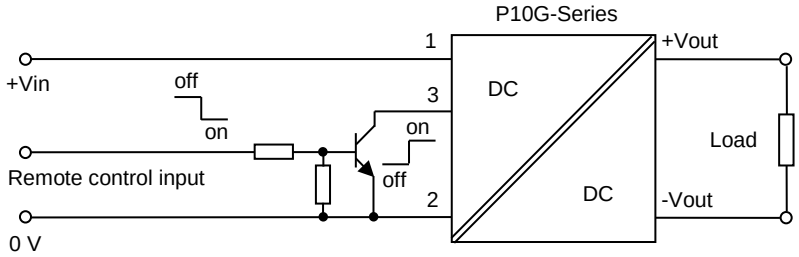


Dual output



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 µH	330 µF, 50 V	1 µF, 50 V	1 nF, 2 kV
P10G24xxD	2 A	S14K35	4.7 µH	330 µF, 50 V	1 µF, 50 V	1 nF, 2 kV
P10G48xxS	1 A	S14K60	4.7 µH	330 µF; 100 V	1 µF, 100 V	1 nF, 2 kV
P10G48xxD	1 A	S14K60	4.7 µH	330 µF, 100 V	1 µF, 100 V	1 nF, 2 kV

Application remote control

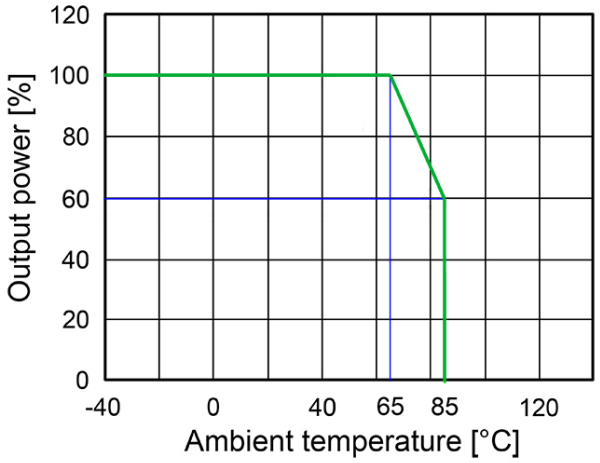


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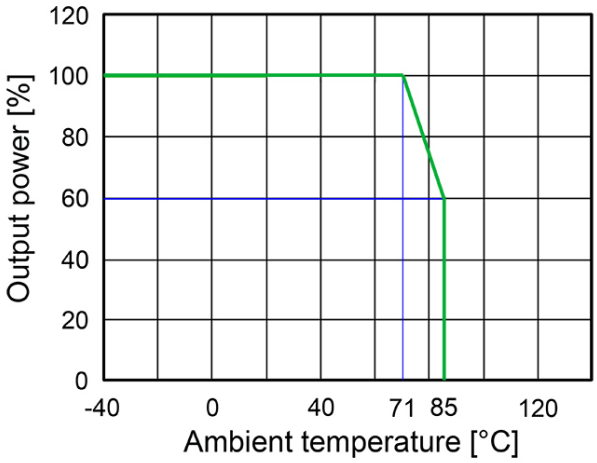
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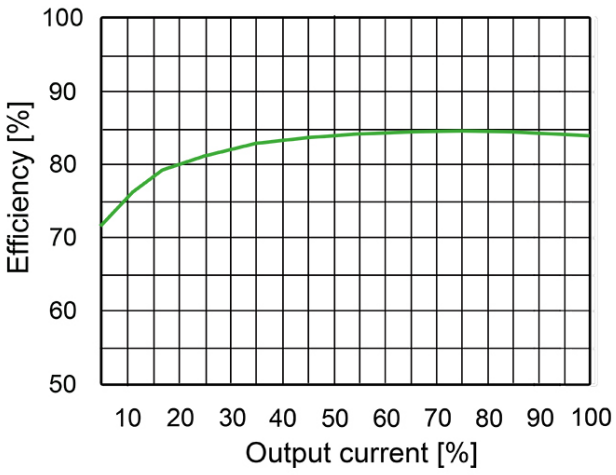
P10Gxx3R3S, P10Gxx05S
Temperature derating curve



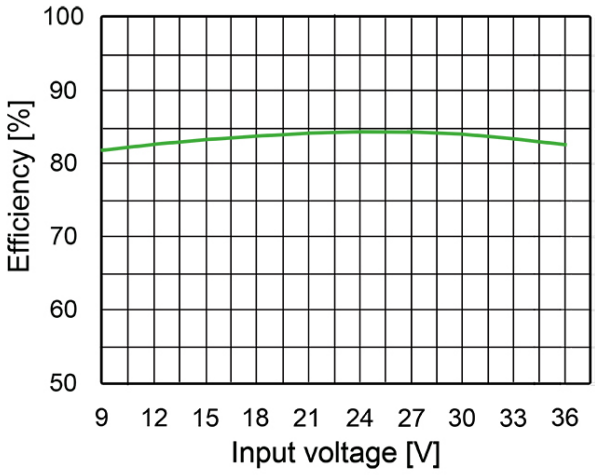
P10Gxx09S,-12x, -15x, -24x
Temperature derating curve



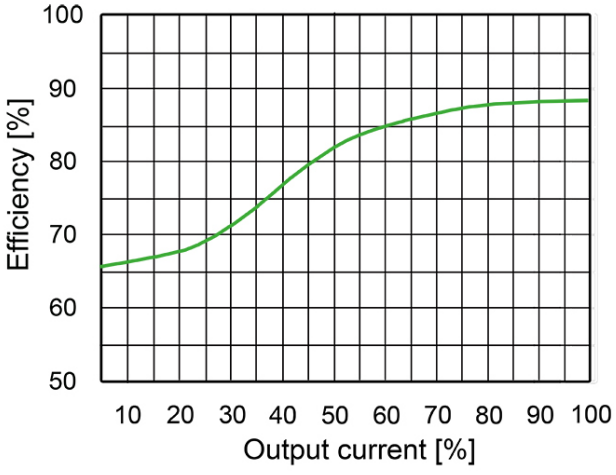
P10G2405S efficiency vs output load



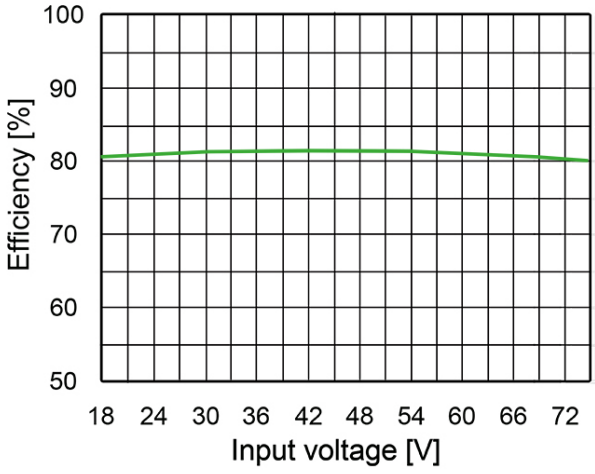
P10G2405S efficiency vs input voltage



P10G4815D efficiency vs output load



P10G4815D efficiency vs input voltage



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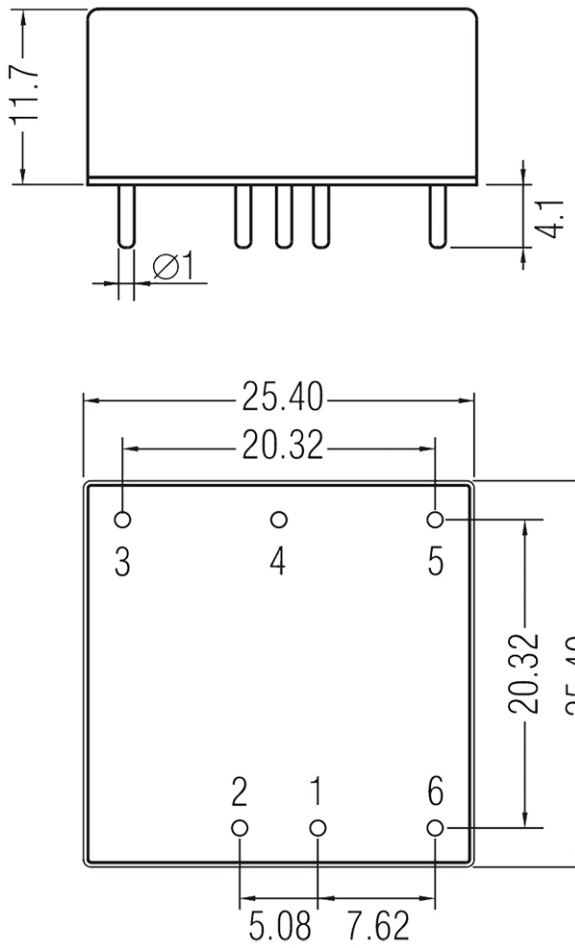
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Dimensions



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

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