

# 12 W DC-DC Converter P12D-Series



- Wide 4:1 input range
- 1600 V<sub>DC</sub> isolation
- Continuous short circuit protection
- Over load protection
- Over voltage protection
- Efficiency up to 90 %
- 15 mA no load input current
- Wide operation temperature range -40...85 °C
- On / Off remote control input
- Soft start



## Model guide

Type	Input voltage		Input current		Output voltage [V <sub>DC</sub> ]	Output current		Efficiency [%] typ.	Capacitor Load [μF]
	Nominal [V <sub>DC</sub> ]	range [V <sub>DC</sub> ]	no load [mA] max.	full load [mA] typ.		[mA] min.	[mA] max.		
<b>Single output</b>									
P12D243R3S	24	9...36	15	570	3.3	0	3500	87	2000
P12D245R1S	24	9...36	15	580	5.1	0	2400	89	2000
P12D2412S	24	9...36	15	575	12.0	0	1000	90	430
P12D2415S	24	9...36	15	575	15.0	0	800	90	300
P12D483R3S	48	18...75	15	290	3.3	0	3500	87	2000
P12D485R1S	48	18...75	15	290	5.1	0	2400	89	2000
P12D4812S	48	18...75	15	290	12.0	0	1000	90	430
P12D4815S	48	18...75	15	290	15.0	0	800	90	300
<b>Dual output</b>									
P12D2405D	24	9...36	15	595	± 5.0	0	± 1200	87	2 x 1250
P12D2412D	24	9...36	15	575	± 12.0	0	± 500	90	2 x 200
P12D2415D	24	9...36	15	575	± 15.0	0	± 400	90	2 x 120
P12D4805D	48	18...75	15	300	± 5.0	0	± 1200	87	2 x 1250
P12D4812D	48	18...75	15	290	± 12.0	0	± 500	90	2 x 200
P12D4815D	48	18...75	15	290	± 15.0	0	± 400	90	2 x 120

## Specifications

Input	
Filter	Pi Network
Start up time with R-load	20 ms, typ.
ON/OFF Remote CTRL threshold	ON OFF
(see Figure 4)	3...12 V or open input 0...1.2 V
OFF Standby idle current	5 mA, typ.
Ripple current	≤ 20 mAp-p (see Figure 1)
<b>Isolation:</b>	
Isolation voltage for 1 minute In/Out, In/Case and Out/Case	1600 V <sub>DC</sub>
Isolation resistance	10 <sup>9</sup> Ω
Capacitance	1500 pF, typ.
<b>Output</b>	
Voltage tolerance	± 1.2 %
Line regulation	P12DxxxS ≤ 0.2 % P12DxxxD ≤ 0.5 %
Dual output voltage balance	± 1 %
Dual output cross regulation	± 5 % @ ≤ 75 % load difference
Load regulation	P12DxxxS ≤ ± 0.5 % 0...100 % load P12DxxxD ≤ ± 1 % at balanced load
Temperature coefficient	± 0.02 % / °C
Ripple and noise, BW 20 MHz	≤ 85 mVp-p (see Figure 2)
Transient recovery time @ 25% load change steps	250 μs, typ.
Transient response deviation @ 25% load change steps	≤ 3 %.
Short circuit protection	Continuous, hiccup, autom. restart
Over current protection	170 %, typ.
Output over voltage Protection	P12Dxx3R3x 3.9 V P12Dxx05x 6.2 V P12Dxx12x 15 V P12Dxx15x 18 V
	TVS-diode clamping

General	
Switching frequency	270 kHz
Designed to meet Safety standard	EN-, IEC-, UL 60950-1 EN-, IEC-, UL 62368-1
Reliability calculated MTBF (MIL-HDBK-217F@25°C)	≥ 1 Mio. h
<b>EMC Characteristics</b>	
RE	EN 55032 Class A
CE	EN 55032 Class A
ESD	EN 61000-4-2 Perf. Crit. B
RS	EN 61000-4-3 Perf. Crit. A
EFT	EN 61000-4-4 Perf. Crit. A (see Figure 3)
Surge	EN 61000-4-5 Perf. Crit. A (see Figure 3)
CS	EN 61000-4-6 Perf. Crit. A
PFMF	EN 61000-4-8 Perf. Crit. A
<b>Environmental</b>	
Operating temperatur (ambient)	-40 ... +85 °C, See derating curve
Case temperature	≤ 105 °C
Storage temperature	-55 ... 125 °C
Storage humidity	Up to 95 %, non condensing
Cooling	Free air convection, ≥ 35 LFM
<b>Physical</b>	
Dimensions	31.8x 20.3 x 10.7 mm
Weight	14 g
Case material	Aluminum
Potting material	Epoxy (UL94V-0 rated)
<b>Absolute maximum ratings</b>	
Pin soldering temperature	≤ 260 °C, peak duration ≤ 10 s, ≥ 1.5 mm distance from body
Input peak voltage	P12D24xxx 50 V <sub>DC</sub> duration ≤ 1 s P12D48xxx 100 V <sub>DC</sub> duration ≤ 1 s

1. All parameter typical at T<sub>a</sub> 25 °C, nominal input voltage and full load unless otherwise specified.
2. Capacitor load is specified at nominal input voltage and constant resistive load.
3. Parallel operation of DC/DC-Converter outputs is not recommended.
4. These DC/DC converters are not suitable for IGBT and MOSFET driver applications.

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Figure 1 Input ripple current measurement method

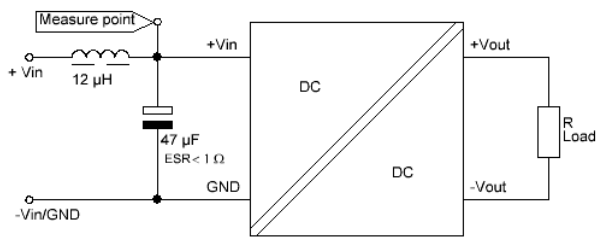
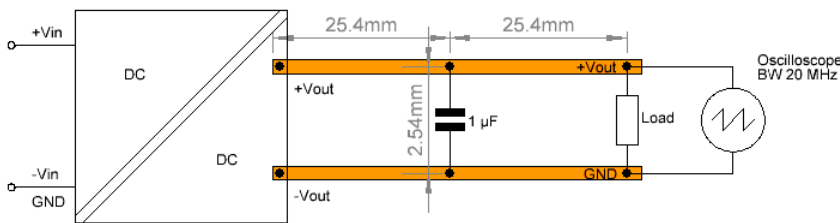


Figure 2 Output ripple and noise voltage measurement method (BW 20MHz)  
Single Output



Dual Output

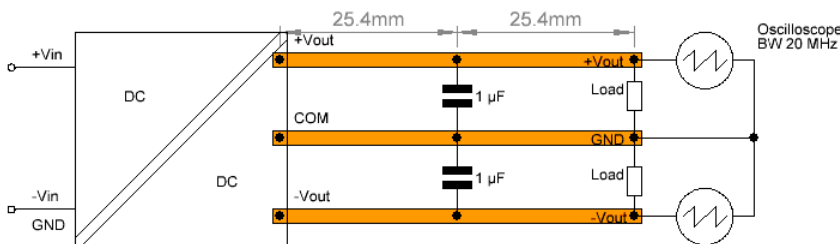
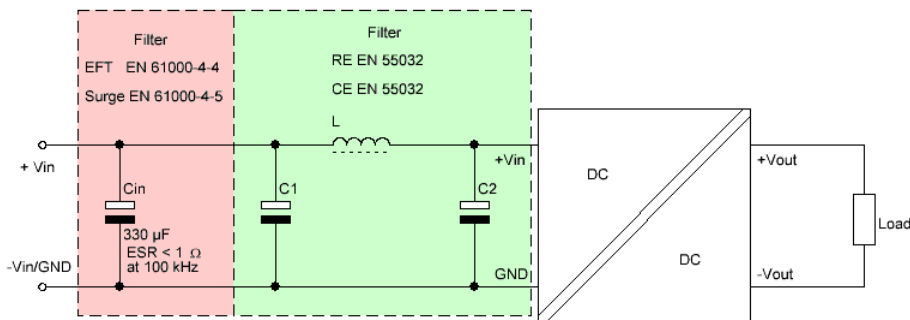


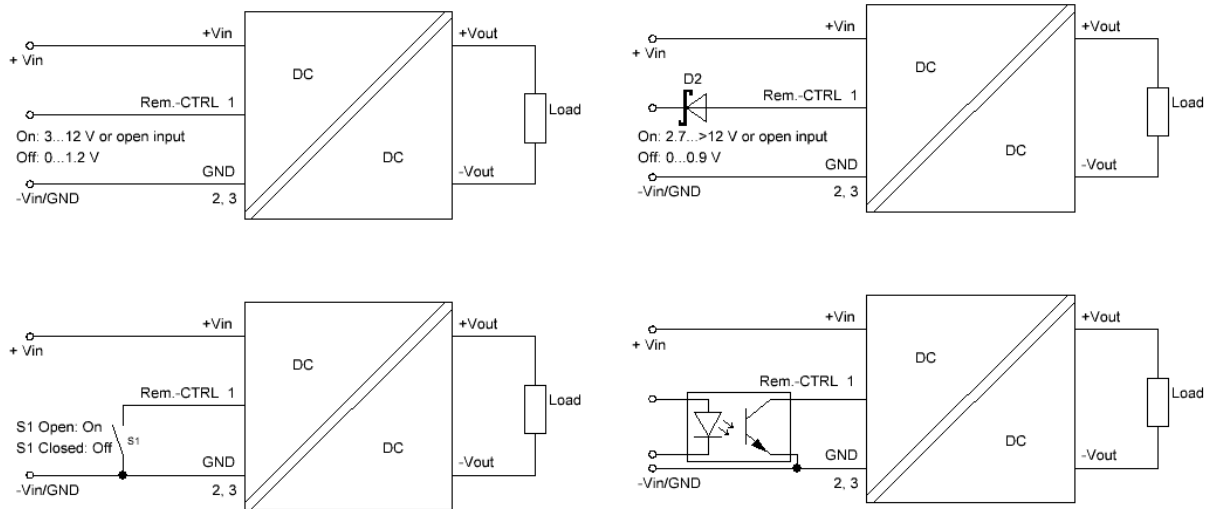
Figure 3 Output ripple and noise voltage measurement



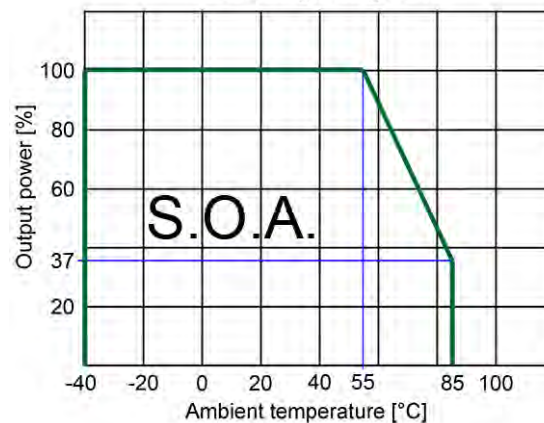
Components table to figure 3		
C1	L	C2
2.2 µF, 100 V	12 µH	2.2 µF, 100 V

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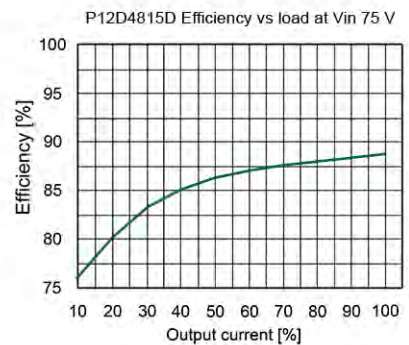
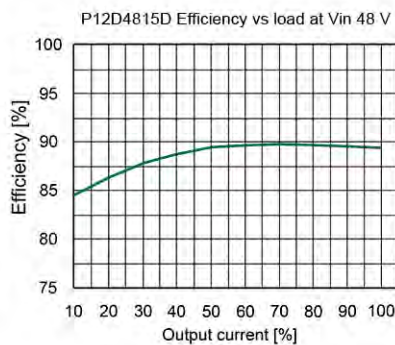
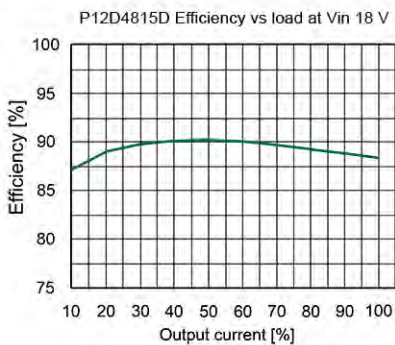
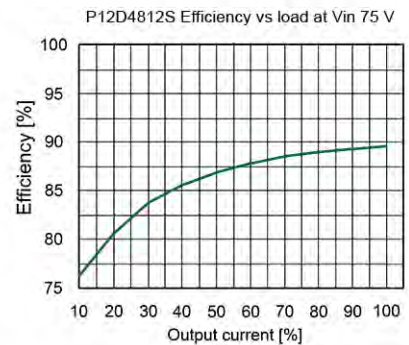
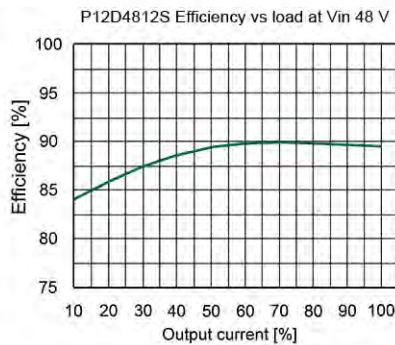
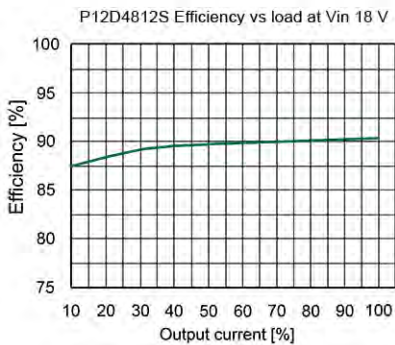
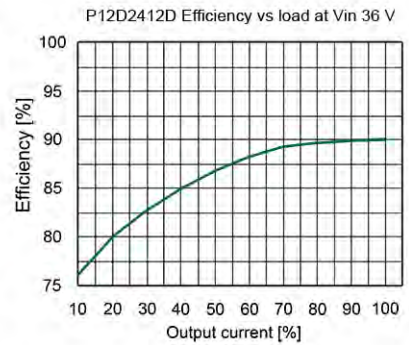
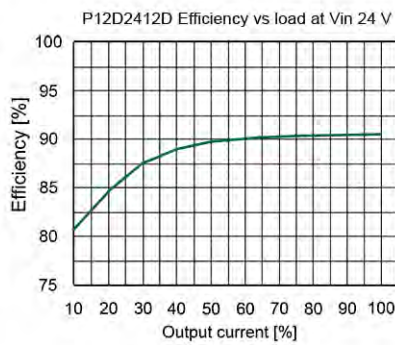
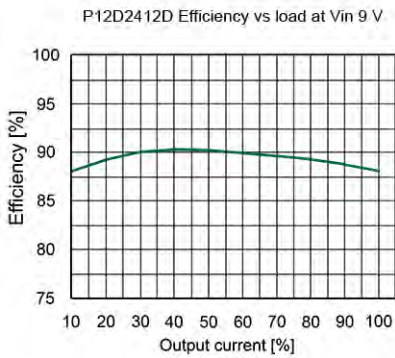
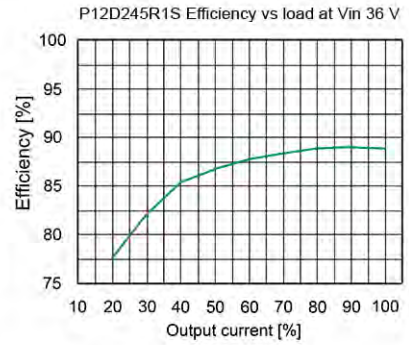
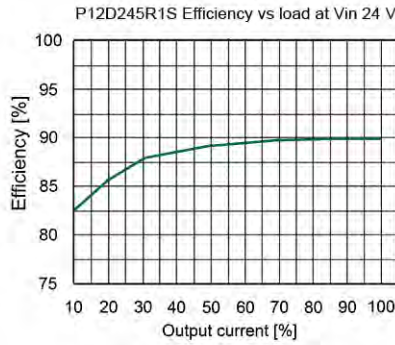
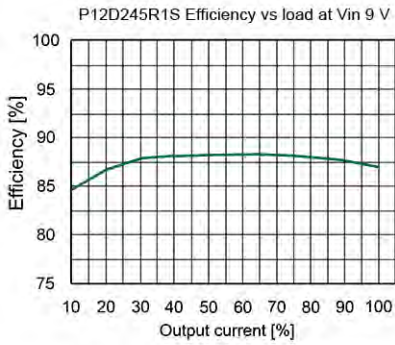
Figure 4 ON/OFF remote control application circuits



Derating diagram

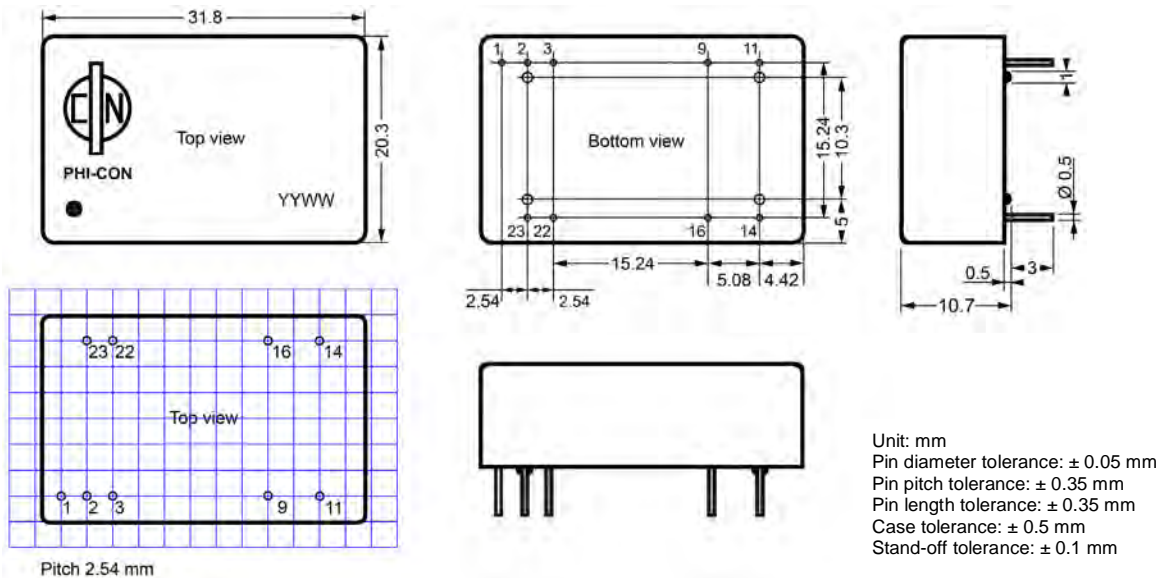


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## Mechanical dimensions



Pin assignment		
	Single	Dual
1	Remote ctrl	Remote ctrl
2	-V Input	-V Input
3	-V Input	-V Input
9	No Pin	Common
11	N.C.	-V Output
14	+V Output	+V Output
16	-V Output	Common
22	+V Input	+V Input
23	+V Input	+V Input

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