20 W DC-DC Converter P20CxxxxBx-Series

PHI-CON

- Wide 4:1 input range
- 3000 V_{DC} isolation
- Continuous short circuit protection
- Over current-, continuous short circuit- and over voltage- protection
- Wide operation temperature range -40...100 °C
- Adjustable output voltage
- On / Off remote control input
- Soft start function

Model guide

Type	Input voltage		Input current		Output voltage	Output current		Efficiency	Capacitor load (note2)
	Nominal [V_{DC}]	Range [V_{DC}]	no load [mA] typ.	full load [mA] typ.	[V_{DC}]	[mA] min.	[mA] max.	[%] typ.	[µF] max.
Single output									
P20C243R3BS	24	9...36	10	850	3.3	0	5500	89	10000
P20C2405BS	24	9...36	10	940	5.0	0	4000	89	6800
P20C2412BS	24	9...36	10	945	12.0	0	1670	89	1000
P20C2415BS	24	9...36	15	945	15.0	0	1330	88	680
P20C483R3BS	48	18...75	8	420	3.3	0	5500	90	10000
P20C4805BS	48	18...75	8	460	5.0	0	4000	90	6800
P20C4812BS	48	18...75	8	465	12.0	0	1670	90	1000
P20C4815BS	48	18...75	8	455	15.0	0	1330	91	680
Dual output									
P20C2405BD	24	9...36	10	970	±5.0	0	±2000	86	2 x 2200
P20C2412BD	24	9...36	15	945	±12.0	0	±835	89	2 x 470
P20C2415BD	24	9...36	15	940	±15.0	0	±665	89	2 x 330
P20C4805BD	48	18...75	8	480	±5.0	0	±2000	87	2 x 2200
P20C4812BD	48	18...75	8	465	±12.0	0	±835	90	2 x 470
P20C4815BD	48	18...75	10	460	±15.0	0	±665	91	2 x 330

Specifications

Input	
Start up voltage	P20C24xxBx: 8.8 V_{DC} P20C48xxBx: 17.5 V_{DC}
Under voltage lockout	P20C24xxBx: 7.6 V_{DC} P20C48xxBx: 16.5 V_{DC}
Filter	Pi Network
Start up time with R-load	30 ms, typ.
Reflected ripple current	20 mAp-p, (see fig. 2)
ON / OFF Control threshold (see figures 6)	On: 3...12 V_{DC} or open input Off: 0...1.2 V_{DC} Standby idle current 2 mA, typ.
Isolation:	
Input / output voltage Input or output to case	3000 V_{DC} 1600 V_{DC}
Resistance	10^9 Ω
Capacitance	2000 pF, typ.
Output	
Voltage accuracy	± 1 %, max.
Voltage trim range (see fig. 5)	± 10 %
Voltage balance at dual outputs	± 1 % at balanced load
Line voltage regulation	± 0.5 %, max.
Cross deviation @ dual outputs	± 5 % @ 75 % load difference
Load regulation 0...100 % load	single ± 0.5 %, max. Dual ± 1 %, max. @ balanced load
Transient recovery time	250 µs, typ.
Transient response drift @ 25 % load change steps	± 3 %, max. @ all others ± 5 %, max. @ P20Cxx3R3Bx
Temperature coefficient	± 0.02 % / °C
Ripple and noise (at 20 MHz BW)	Single: ≤ 75 mVp-p, (see figures 3) Dual: ≤ 60 mVp-p, (see figures 3)
Short circuit protection	Indefinite (hiccup), automatic restart
Over current protection	170 % of Iout, typ.
Over voltage protection	140 % of Vout, typ.

General	
Switching frequency	300 kHz, typ.
Safety Standard	EN 60950-1, IEC 60950-1
Reliability calculated MTBF MIL-HDBK-217F	400.000 h at 25 °C
EMC Characteristics	
Radiated Emissions	EN55032 class A
Conducted Emissions (see fig.4)	EN55032 class A
ESD	IEC61000-4-2 perf. criteria B
RS	IEC61000-4-3 perf. criteria A
EFT (see fig. 4)	IEC61000-4-4 perf. criteria A
Surge (see fig. 4)	IEC61000-4-5 perf. criteria A
CS	IEC61000-4-6 perf. criteria A
PFMF	IEC61000-4-8 perf. criteria A
Environmental	
Operating ambient temperature (see derating diagram)	-40…65 °C, without derating -40…100 °C, with derating
Case temperature	105 °C max.
Thermal resistance	12 K / W, typ.
Storage temperature	-55…125 °C
Humidity	Up to 95 %, non condensing
Free air convection cooling	15..33 cm/s
Physical	
Dimensions	40.64 x 25.4 x 10.9 mm
Weight	29 g
Case material	Copper
Potting material	Epoxy (UL94V-0 rated)
Absolute maximum ratings	
Input voltage P20C24xxBx	50 V_{DC}, 100 ms, max.
Input voltage P20C48xxBx	100 V_{DC}, 100 ms, max.
Pin soldering temperature 1.5 mm distance from body	260 °C max., 10 s max.

HY-LINE® POWER COMPONENTS

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Notes:
1. All parameter are typical at 25 °C, nominal input voltage and full load specified, unless otherwise noted.
2. Capacitive load tested by minimal input voltage and constant resistive load.
3. An external filter is required to meet EFT standard IEC 61000-4-4 and IEC 61000-4-5. (see Figue 4)

Figure 2 Measure circuit input ripple current

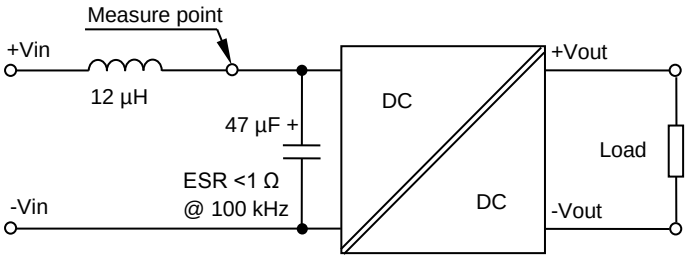
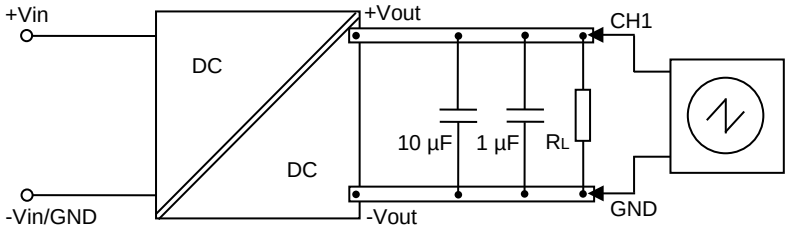


Figure 3
A) Single output measure circuit output ripple & noise voltage



To meet the specified ripple and noise level are for the output filter circuit multilayer ceramic capacitors necessary.

B) Dual output measure circuit output ripple & noise voltage

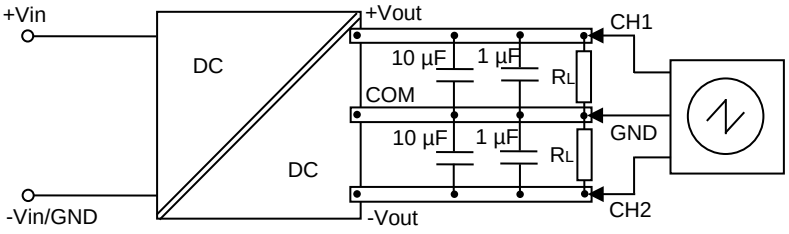
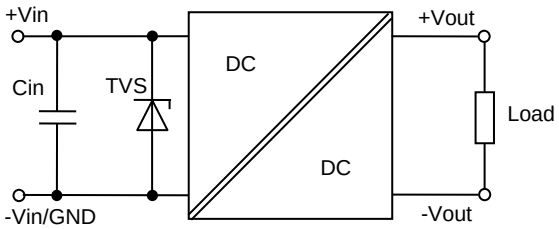


Figure 4 Application circuit to meet EFT standard IEC61000-4-4 and IEC61000-4-5



Type	Cin	TVS Diode
P20C24xxBx	330 µF	58 V, 3 kW
P20C48xxBx	330 µF	120 V, 3 kW

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Fig. 5 Output voltage trimming application

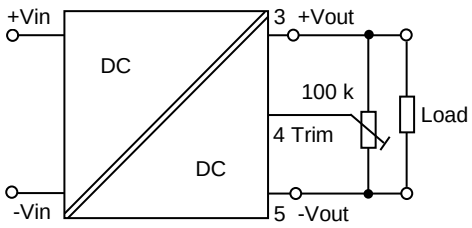
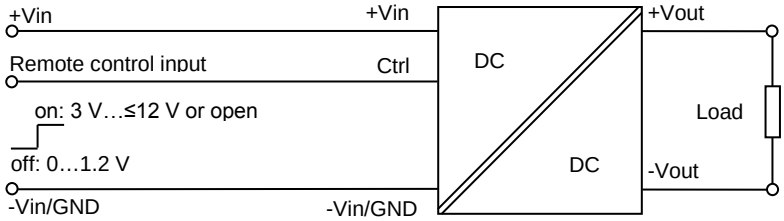
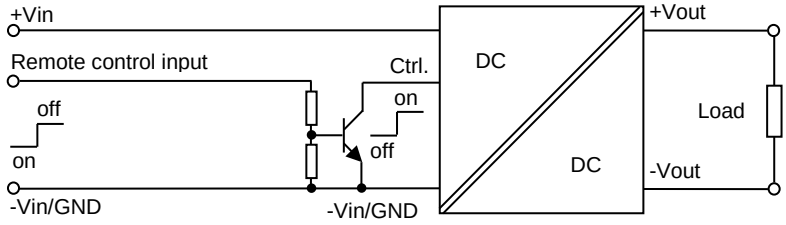


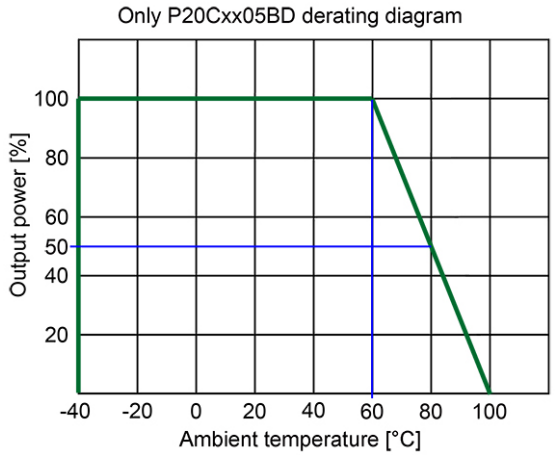
Fig. 6 ON/OFF remote control application circuit



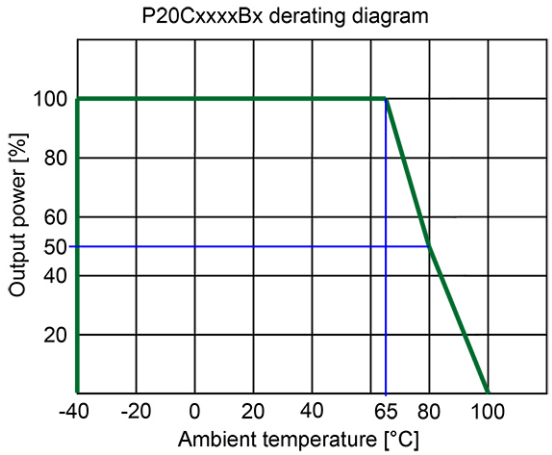
ON/OFF remote control application circuit for inverse logic and higher input level possibility



Only P20Cxx05BD derating diagram



P20CxxxxBx derating diagram



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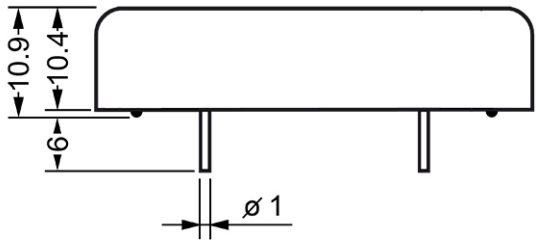
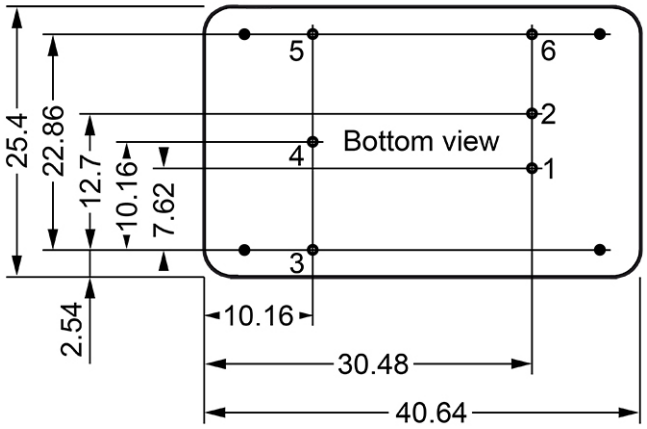
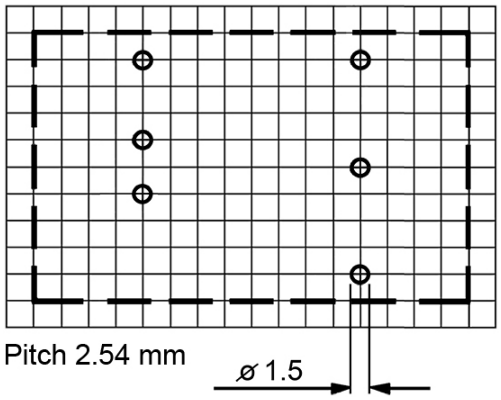
Dimensions



Pin assignment		
Pin	Single out	Dual out
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	Trim	Common
5	-Vout	-Vout
6	Rem. Ctrl.	Rem. Ctrl.





Note:
All dimensions in mm

1. Pin diameter tolerance ±0.05 mm
2. Pin pitch tolerance ±0.35 mm
3. Pin to case tolerance ±0.5 mm
4. Case tolerance ±0.5 mm
5. Stand off tolerance ±0.1 mm
6. Recommented Pin hole diameter 1.5 mm

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