



PHI-CON

# 20W DC-DC Converter P20G-Series

## Preliminary

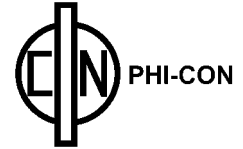
- Wide 2:1 Input Range
- MTBF >560 kHours
- 1600 V<sub>DC</sub> Isolation
- No Minimum Load Required
- Continuous Short Circuit Protection
- Over Current Protection
- Over Voltage Protection
- Efficiency up to 90%
- Wide Operation Temperature Range -40...75°C
- On / Off Remote Control Input
- Soft Start



### Model selection guide

Typ	Input voltage range [V <sub>DC</sub> ]	Input current		Output voltage [V <sub>DC</sub> ]	Output current range [mA]	Efficiency typ. [%]	Capacitor Load [μF]
		no load [mA]	full load [mA]				
Single output							
P20G123R3S	9...18	60	1440	3.3	0...4500	86	6800
P20G1205S	9...18	60	1850	5.0	0...4000	90	4700
P20G1212S	9...18	30	1875	12.0	0...1670	89	680
P20G1215S	9...18	30	1875	15.0	0...1330	89	680
P20G243R3S	18...36	35	720	3.3	0...4500	86	6800
P20G2405S	18...36	35	935	5.0	0...4000	89	4700
P20G2412S	18...36	25	935	12.0	0...1670	89	680
P20G2415S	18...36	25	935	15.0	0...1330	89	680
P20G483R3S	36...72	25	360	3.3	0...4500	86	6800
P20G4805S	36...72	25	470	5.0	0...4000	89	4700
P20G4812S	36...72	15	470	12.0	0...1670	89	680
P20G4815S	36...72	15	465	15.0	0...1330	90	680
Dual output							
P20G1212D	9...18	30	1870	±12.0	0...±833	89	2 x 220
P20G1215D	9...18	30	1870	±15.0	0...±667	89	2 x 100
P20G2412D	18...36	30	940	±12.0	0...±833	89	2 x 220
P20G2415D	18...36	30	940	±15.0	0...±667	89	2 x 100
P20G4812D	36...72	20	470	±12.0	0...±833	89	2 x 220
P20G4815D	36...72	20	470	±15.0	0...±667	89	2 x 100

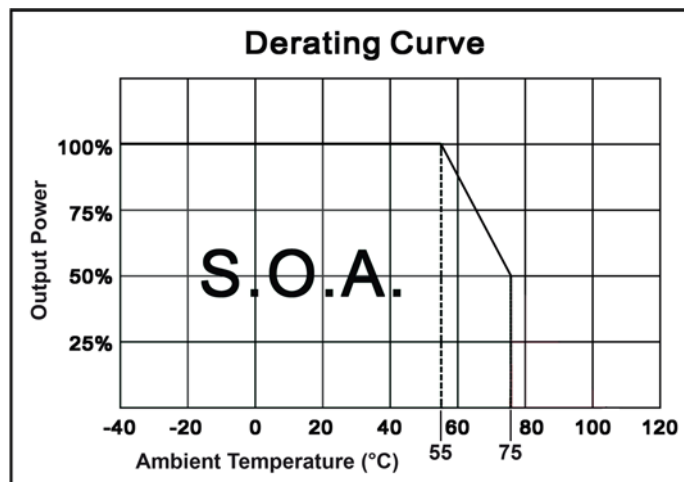
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## Specifications

Input	
Filter	Pi Network
Start up time with R-load	30 ms typ.
Remote CTRL on/off, Pin3	On: 3...12 V or open input Off: 0...1.2 V Standby current 5 mA typ
Under voltage shut down	
12V types	lock on 8.6 V, lock off 7.9 V
24V types	lock on 17.8 V, lock off 16 V
48V types	lock on 33.5 V, lock off 30.5 V
Output	
Voltage accuracy	± 1 %, max.
Voltage trim range (only single output type)	± 10 %
Temperature coefficient	± 0.02% / °C
Ripple and noise (at 20 MHz BW)	100 mVp-p, max.
Short circuit protection	Indefinite (hiccup), Automatic restart
Over load protection	150 % typ. off full load
Over voltage protection	Z-diode clamping
3.3 V out type	3.9 V
5 V & ±5 V out type	6.2 V
12 V & ±12 V out type	15 V
15 V & ±15 V out type	18 V
Line voltage regulation	± 0.5 %, max.
Load regulation 0...100% load	single ± 0.5%, max. dual ± 1%, max. @ balanced load
Cross balance (dual outputs)	± 5 % @ 75 % load difference
Transient recovery time	250 µs typ.
Transient response drift @ 75%...50%...25% load	3 %, max.

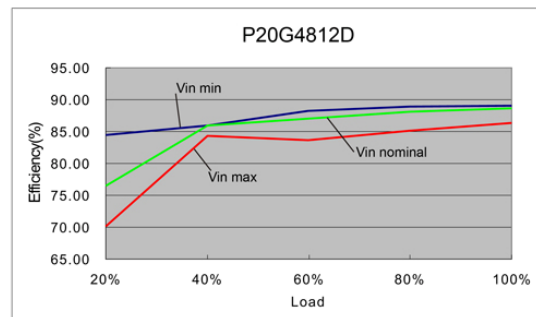
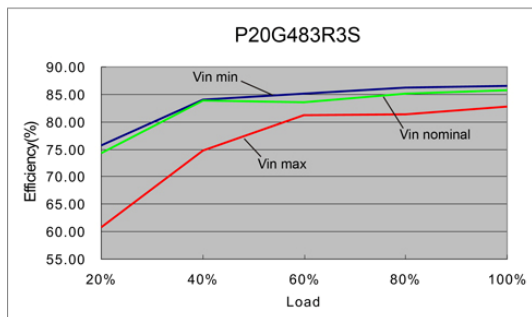
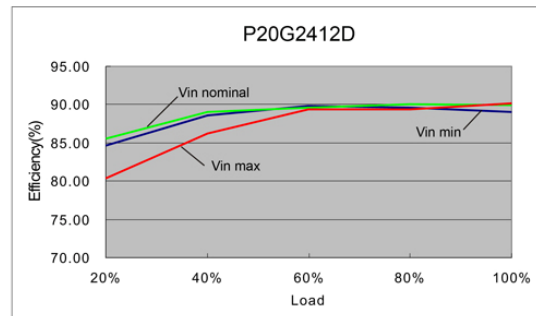
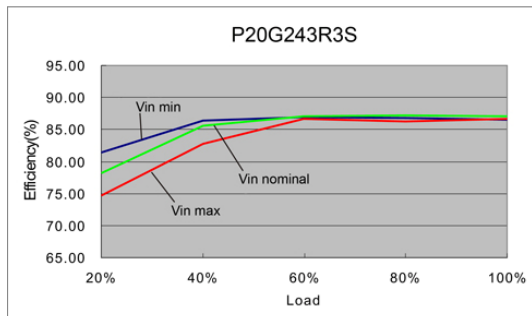
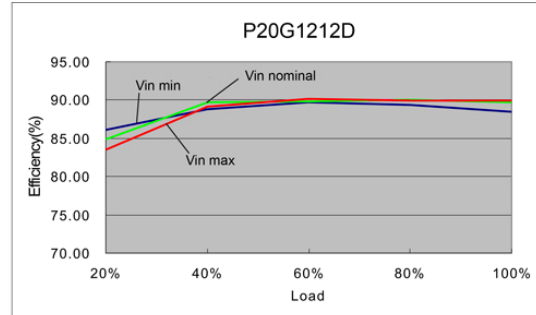
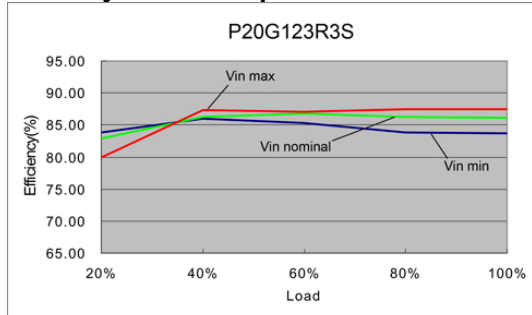
General	
Switching frequency	330 kHz, typ
Safety Standard	IEC 60950-1:2001
Reliability calculated MTBF MIL-HDBK-217 F)	560 khrs
Isolation:	
Rated voltage	1600 V <sub>DC</sub> (flash tested for 3 s)
Resistance	10 <sup>9</sup> Ω
Capacitance	1000 pF, max.
EMC Characteristics	
Radiated Emissions	EN55022 class A
Conducted Emissions	EN55022 class A
ESD	EN61000-4-2 Crit. B
RS	EN61000-4-3 Crit. A
EFT	EN61000-4-4 Crit. B
Surge	EN61000-4-5 Crit. B
CS	EN61000-4-6 Crit. A
PFMF	EN61000-4-8 Crit. A
Environmental	
Operating temperatur (ambient)	-40 °C to +75 °C
Case temperature	105 °C max.
Storage temperature	-40 °C to +125 °C
Derating	see diagram
Humidity	Up to 95 % non-condensing
Cooling	Free-air convection
Physical	
Dimensions	25.4 x 25.4 x 9.9 mm
Weight	18 g
Case material	Nickel-coated copper
Potting material	Epoxy (UL94V-0 rated)
Absolute maximum ratings	
Input voltage for 100 ms max.	
Vin 12 V types	-0,7...25 V
Vin 24 V types	-0,7...50 V.
Vin 48 V types	-0,7...100 V
Pin soldering temperature 1.5mm distance from body	260°C for 10sec



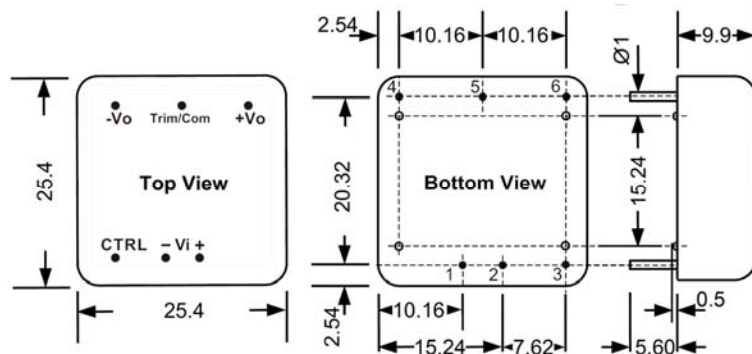
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## Efficiency versus output current



## Dimensions



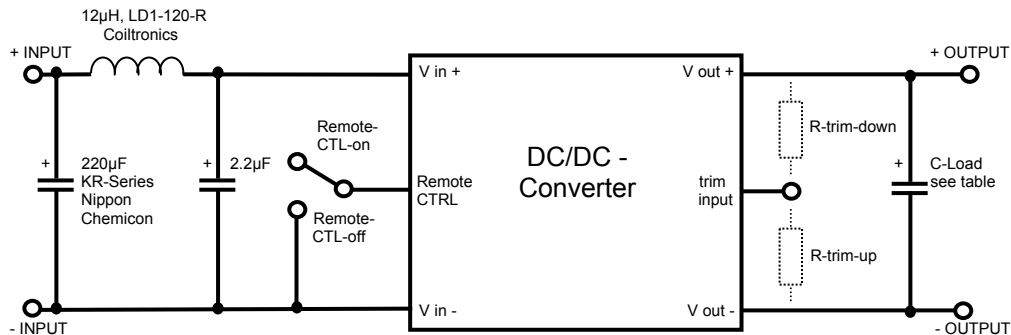
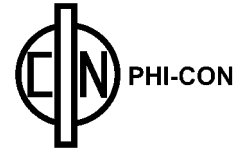
All dimensions are typical in millimeters

1. Pin diameter:  $1.0 \pm 0.05$
2. Pin pitch tolerance:  $\pm 0.35$
3. Case tolerance:  $\pm 0.5$
4. Stand off tolerance:  $\pm 0.1$

## Pin connections

Pin	Single	Dual
1	+V Input	+V Input
2	-V Input	-V Input
3	Remote control	Remote control
4	+V Output	+V Output
5	Trim Input	Common
6	-Vout	-Vout

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**Table of trimming resistors**

Vout 3.3V - types											
Trim down	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	%
Vout=	3.267	3.234	3.201	3.168	3.135	3.102	3.069	3.036	3.003	2.970	Volts
Rtrim-down	286.268	154.699	100.178	70.355	51.546	38.601	29.147	21.940	16.264	11.678	KOhms
Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout=	3.333	3.366	3.399	3.432	3.465	3.498	3.531	3.564	3.597	3.630	Volts
Rtrim-up	494.831	167.448	93.381	60.637	42.176	30.327	22.077	16.002	11.342	7.655	KOhms

Vout 5V - types											
Trim down	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	%
Vout=	4.950	4.900	4.850	4.800	4.750	4.700	4.650	4.600	4.550	4.500	Volts
Rtrim-down	230.566	106.182	64.301	43.281	30.643	22.207	16.177	11.651	8.129	5.310	KOhms
Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout=	5.050	5.100	5.150	5.200	5.250	5.300	5.350	5.400	5.450	5.500	Volts
Rtrim-up	244.547	113.776	70.631	49.142	36.274	27.707	21.592	17.010	13.447	10.598	KOhms

Vout 12V - types											
Trim down	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	%
Vout=	11.880	11.760	11.640	11.520	11.400	11.280	11.160	11.040	10.920	10.800	Volts
Rtrim-down	273.344	135.217	84.017	57.325	40.944	29.865	21.873	15.836	11.114	7.320	KOhms
Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout=	12.120	12.240	12.360	12.480	12.600	12.720	12.840	12.960	13.080	13.200	Volts
Rtrim-up	462.903	197.859	120.658	83.855	62.317	48.178	38.184	30.746	24.994	20.413	KOhms

Vout 15V - types											
Trim down	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	%
Vout=	14.850	14.700	14.550	14.400	14.250	14.100	13.950	13.800	13.650	13.500	Volts
Rtrim-down	433.811	174.916	100.946	65.907	45.468	32.077	22.625	15.596	10.165	5.842	KOhms
Trim up	1	2	3	4	5	6	7	8	9	10	%
Vout=	15.150	15.300	15.450	15.600	15.750	15.900	16.050	16.200	16.350	16.500	Volts
Rtrim-up	347.293	178.523	115.235	82.084	61.683	47.863	37.882	30.336	24.430	19.682	KOhms

*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: 12.11 f