2W DC-DC Converter P2F-Series

PHI-CON

- 8 Pin SIL
- Wide 4:1 input range
- MTBF >1.7 Mio. Hours
- 1600 V_{DC} isolation
- Continuous short circuit protection
- Remote control input on / off

Model guide

Type	Input nominal voltage [V_{DC}]	Input current no-load [mA]	Input current full-load [mA]	Output voltage [V_{DC}]	Output current [mA]	Efficiency typ. [%]	Capacitive load max.(3) [µF]
Single Output							
P2F123R3S	4.5…18	40	196	3.3	500	70	1000
P2F1205S	4.5…18	40	225	5.0	400	74	1000
P2F1212S	4.5…18	40	215	12.0	167	78	220
P2F1215S	4.5…18	40	213	15.0	133	78	100
P2F243R3S	9…36	25	96	3.3	500	71	1000
P2F2405S	9…36	20	106	5.0	400	78	1000
P2F2412S	9…36	30	105	12.0	167	79	220
P2F2415S	9…36	30	105	15.0	133	79	100
P2F483R3S	18...75	10	47	3.3	500	72	1000
P2F4805S	18...75	15	55	5.0	400	75	1000
P2F4812S	18...75	15	55	12.0	167	75	220
P2F4815S	18...75	15	54	15.0	133	76	100
Dual Output							
P2F1205D	4.5…18	30	219	±5.0	±200	77	2 x 470
P2F1212D	4.5…18	30	213	±12.0	±83	78	2 x 100
P2F1215D	4.5…18	40	216	±15.0	±66	77	2 x 47
P2F2405D	9…36	30	111	±5.0	±200	75	2 x 470
P2F2412D	9…36	30	108	±12.0	±83	77	2 x 100
P2F2415D	9…36	30	106	±15.0	±66	78	2 x 47
P2F4805D	18...75	15	56	±5.0	±200	74	2 x 470
P2F4812D	18...75	15	56	±12.0	±83	74	2 x 100
P2F4815D	18...75	15	55	±15.0	±66	75	2 x 47

Part number structure							
Output power	Series	Input voltage		Output voltage		Outputs	
P2	F	12		3R3		S	
2 Watt		12	4.5..18 V	3R3	3.3 V	S	single
		24	9..36 V	05	5 V	D	dual
		48	18..75 V	12	12 V		
				15	15 V		

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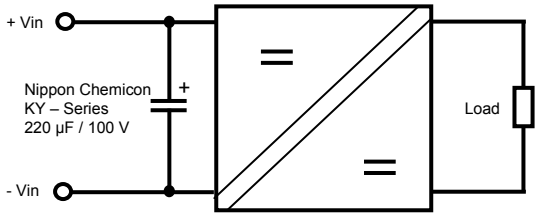
Specifications

Input	
Filter	Capacitors
Input reflected ripple current	20 mAp-p
On / off controll pin	on: open off: -2...-4 mA control current (via series resistor 1 kΩ, see figure 3)
Standby current consumption	2.5 mA typ.
Isolation:	
I/O isolation voltage	1600 V_{DC} (tested for 3 s)
Resistance	10^9 Ω, min.
Capacitance	200 pF, typ.
Output	
Voltage accuracy	Single outp. ± 1 % @ load 0..100 % Dual outp. ± 1 % @ load 10..100 %
Line voltage regulation	± 0.2 %, max.
Load regulation	± 1 %, max.
Cross regulation, dual output	± 5 % (see note 1)
Short circuit protection	Continuous
Short circuit restart	Automatic
Start up time @ Vin nom & R - load	30 ms, typ
Ripple and noise (at 20 MHz BW)	30 mVp-p, max. (see note 2)
Temperature coefficient	± 0.02 % / °C
Transient recovery time	250 µs, typ., (see note 4)
Transient responce deviation	± 3 %, max. (see note 4)
General	
Switching frequency	100 kHz, min.
Reliability calculated MTBF (Mil-HDBK-217F)	1.7 Mio.h @ 25°C
Safety in accordance with	IEC60950-1

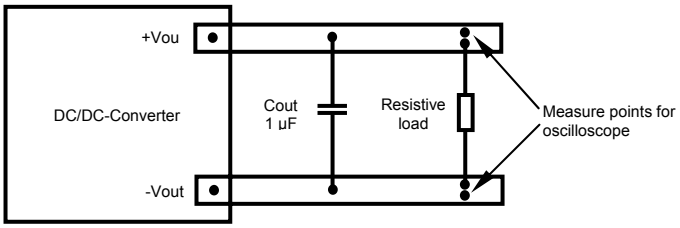
Environmental	
Operating temperatur (ambient)	-40 °C to +85 °C (see derating curve)
Case temperature	100 °C, max.
Storage temperature	-40 °C ... +125 °C
Derating	None required
Humidity	Up to 95 %, non condensing
Cooling	Free air convection
Physical	
Dimensions SIP8	21.9 x 11.1 x 9.2 mm
Weight	4.8 g
Case material	Non conductive black plastic, UL94-V0
Potting material	Silicon UL94-V0
EMC Specifiations	
Radiated emissions	EN55022 level A
Conducted emissions	EN55022 level A (see note 7)
ESD	EN61000-4-2 pref. criteria A
Radiated immunity	EN61000-4-3 pref. criteria A
Fast transient (see note 8)	EN61000-4-4 pref. criteria A
Surge (see note 8)	EN61000-4-5 pref. criteria A
Conducted surge	EN61000-4-6 pref. criteria A
PFMF	EN61000-4-8 pref. criteria A
Absolute maximum ratings	
Input surge voltage (100 ms)	
Vin 12V types	-0.7...25 Vdc
Vin 24V types	-0.7...50 Vdc
Vin 48V types	-0.7...100 Vdc
Soldering Temperature	
1.5 mm from package 10 s	260 °C

Notes:
1. One output is 25 % to 100 % burdened, the other output is 100 % burdened. The output voltage deviation can be ± 5 %.
2. Measured with a 1 µF ceramic capacitor. (see Figure 1)
3. Test by minimal Vin and constant resistive load.
4. Test by nominal Vin and 100 % to 25 % load at 25 % load step change.
5. Measured input reflected ripple current with a simulated source inductance of 12 µH and source capacitance of 47 µF, ESR <1 Ω at 100 kHz. (see Figure 2)
6. Exceeding the absolute ratings of the converter could cause damage. It is not allowed for continuous operatin ratings.
7. Input filter components are be required to help meet conducted emission class A, which application refer to the EMI filter of design and feature configuration.
8. An external filter capacitor is required if the module has to meet IEC61000-4-4 and IEC61000-4-5. Suggested is a value of 220 µF / 100 V of Nippon Chemicon's KY-Series.
9. All specifications are typical at 25 °C, nominal input voltage and full load unless otherwise noted.

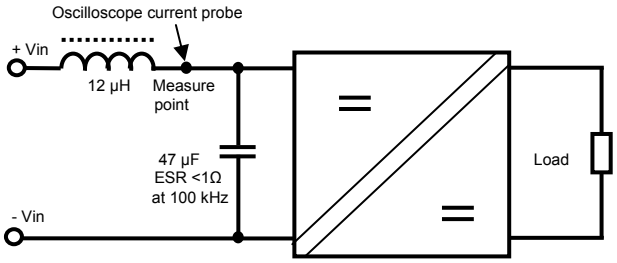
Application circuit IEC61000-4-4 and IEC61000-4-5, see note 8



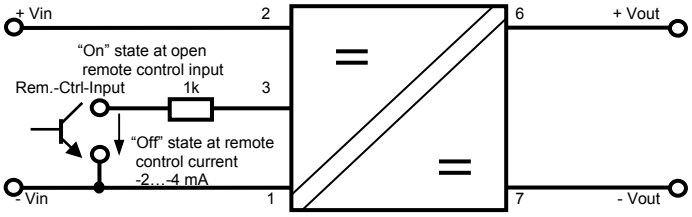
Output ripple & noise measurement test method (Figure 1)
Use the following measurement circuit. The oscilloscope mesurement bandwidth must be > 20 MHz.



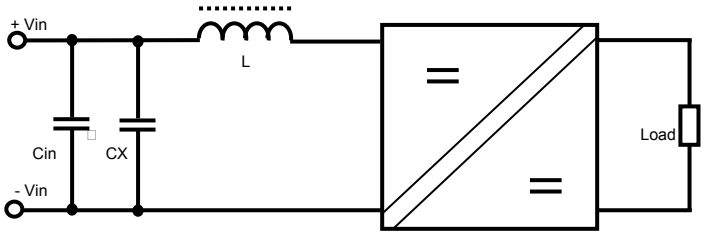
Input reflected ripple current measure circuit (Figure 2)
Input reflected current is measured through a source inductor and a source capacitor at nominal input voltage and full load.



Remote control function



EMI Filter
The filter components are used to help meet conducted emissions requirement for the module. These components should be closed mounted as possible to the module. All leads should be minimized to decrease radiated noise.



Type	Cin	CX	L
P2F12xxxx	220 µF	10 µF Ceramic	2.5 µH
P2F24xxxx	220 µF	2.2 µF Ceramic	10 µH
P2F48xxxx	220 µF	2.2 µF Ceramic	18 µH

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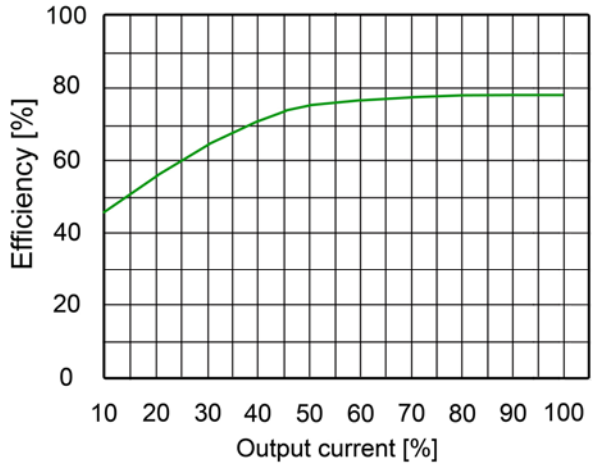
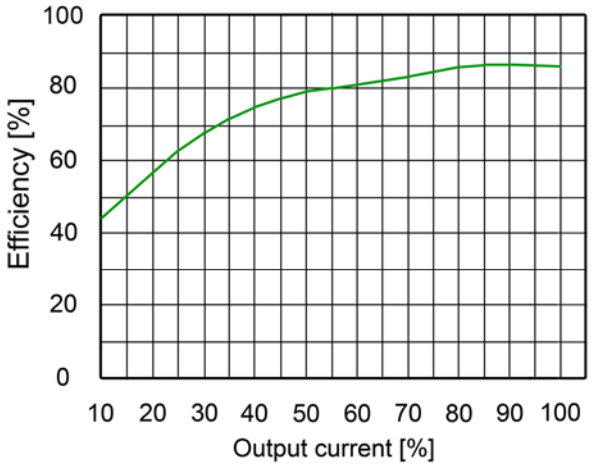
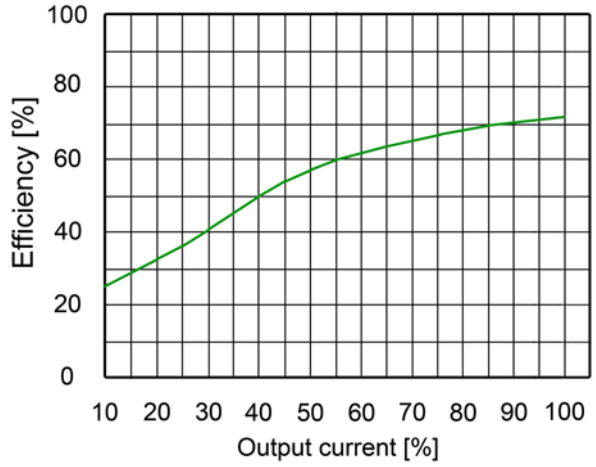
P2F123R3S
Efficiency vs output load at Vin 4.5 VDC



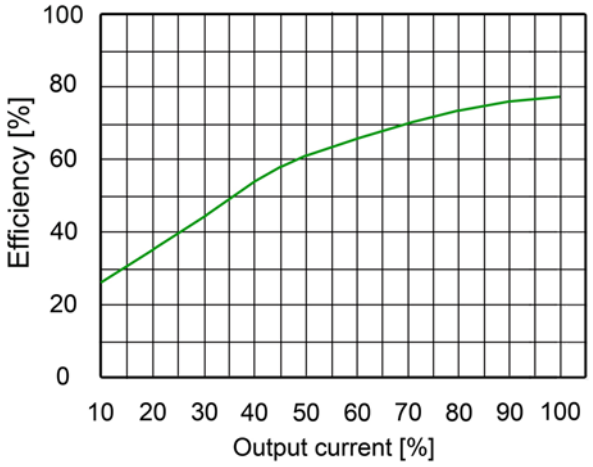
P2F4815D
Efficiency vs output load at Vin 18 VDC



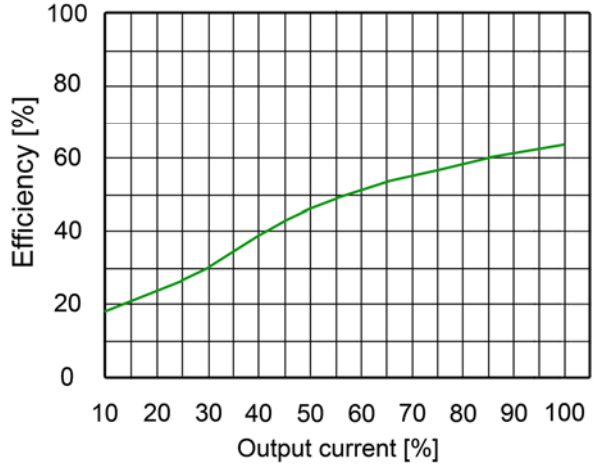
P2F123R3S
Efficiency vs output load at Vin 12 VDC



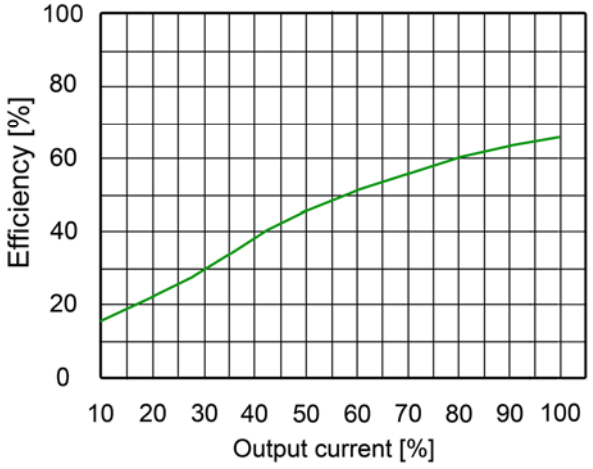
P2F4815D
Efficiency vs output load at Vin 48 VDC



P2F123R3S
Efficiency vs output load at Vin 18 VDC



P2F4815D
Efficiency vs output load at Vin 72 VDC



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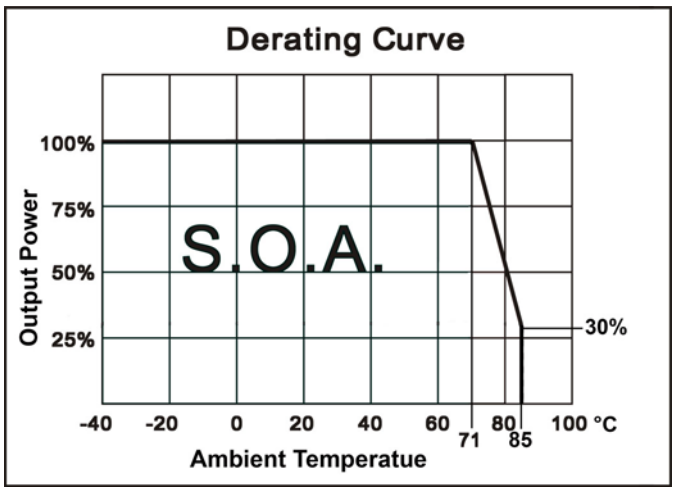
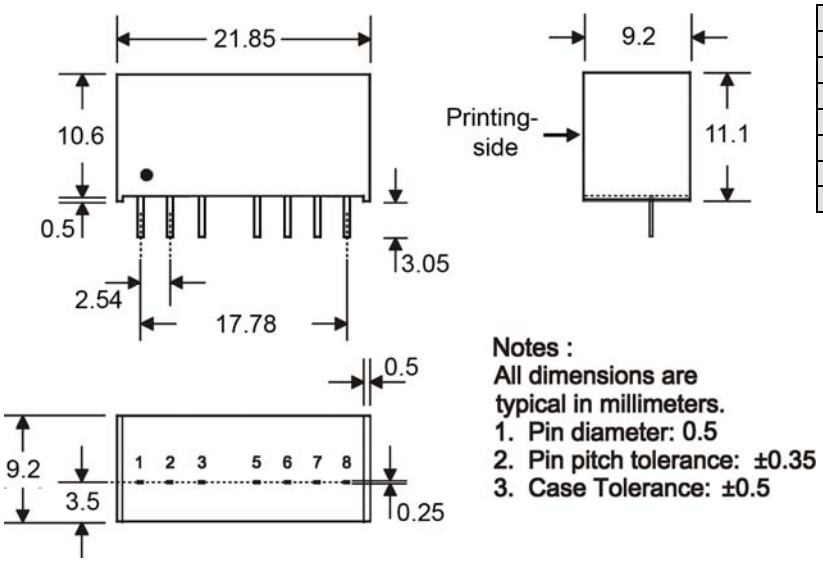


Dimensions



Pin connections

Pin	Single	Dual
1	-V Input	-V Input
2	+V Input	+V Input
3	Rem. Ctrl. on/off	Rem. Ctrl. on/off
5	N.C.	N.C.
6	+V Output	+V Output
7	-V Output	Common
8	N.C.	-V Output

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