

PHI-CON

500mA DC-DC Step Down Converter P78A-Series

- Non Isolated
- 3 Pin SIL
- Pin compatible with 78Mxx linear regulator
- Efficiency up to 97 %
- Operating temperature range -40...+85 °C
- Wide Input Range
- Continuous short circuit protected



Model guide

Typ	Input nominal voltage [V _{DC}]	Input current			Output			Efficiency	
		No-load [mA]	Full load		Voltage [V _{DC}]	Current [mA]	Capacitive load max. [μF] (*2)	@ V _{in} min. [%]	@ V _{in} max. [%]
			@ V _{in} min. [mA]	@ V _{in} max. [mA]					
P78A1R5	4.75...30	8	200	37	1.5	500	220	78	65
P78A1R8	4.75...34	8	230	38	1.8	500	220	82	70
P78A2R5	4.75...34	8	300	48	2.5	500	220	87	76
P78A3R3	4.75...34	8	380	60	3.3	500	220	91	81
P78A05	6.5...34	8	410	86	5.0	500	220	94	85
P78A6R5	8...34	8	425	108	6.5	500	220	95	88
P78A7R2	9...34	8	420	118	7.2	500	220	95	89
P78A09	11...34	8	425	144	9.0	500	220	96	92
P78A12	15...34	8	412	188	12.0	500	220	97	94
P78A15	18...34	8	430	232	15.0	500	220	97	95

Specifications

Input	
Input reflected ripple current @source induct. 12 μH (*3)	35 mA p-p
Filter	Capacitors
Output	
Voltage accuracy	± 2 %, max.
Input voltage regulation	± 0.5 %
Load regulation	± 0.6 % @ load 10..100%
Short circuit protection	not limited, automatic recovery
Ripple and noise (*1)	60 mVp-p, max.
Temperature coefficient	± 0.02% / °C
Minimum load (*7)	50 mA
General	
Switching frequency	330 kHz, typ.
Reliability calculated MTBF	>4.5 Mio. h
EMC Characteristics	
ESD	EN 61000-4-2 Perf. Crit. A
RS	EN 61000-4-3 Perf. Crit. A
EFT (*5)	EN 61000-4-4 Perf. Crit. A
CS	EN 61000-4-6 Perf. Crit. A
PFMF	EN 61000-4-8 Perf. Crit. A

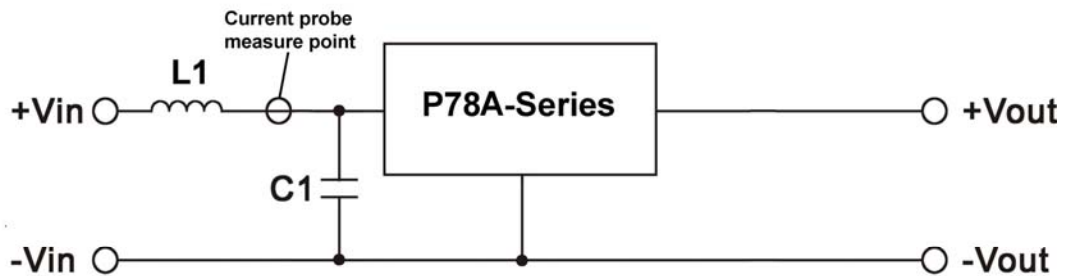
EMC Characteristics	
Radiated emissions	EN55022 class B
Conducted emissions (*4)	EN55022 class B
Environmental	
Operating temperature amb.	-40 °C ... +85 °C
Case temperature	100 °C, max.
Storage temperature	-40 °C ... +125 °C
Derating	see diagram
Humidity	Up to 95%, non-condensing
Cooling	nature convection
Physical	
Dimensions	11.68 x 7.5 x 10.16 mm
Weight	1.8 g
Case material	Non-conductive black plastic, UL94V-0
Potting material	Epoxy UL94V-0
Absolute maximum ratings (*6)	
Input voltage range	0...34 V _{DC} , 0.1 s max.
Soldering temperature 1,5 mm distance from case	260 °C for 10s

Note:

1. Ripple & Noise measured with 20 MHz bandwidth. Load condition: 10% ~ 100%, output noise arise when load is under 10%.
2. Tested by minimal V_{in} and constant resistive load.
3. Measured input reflected ripple current with a simulated source inductance of 12 μH.
4. Input filter components (C1, C2, L) are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.
5. An external filter capacitor is required if the module has to meet EN61000-4-4.
Recommended filter capacitor: Nippon Chemicon KY series, 470 μF / 100V.
6. Do not operate the units exceeding the absolute maximum rating, over rating causes damage to the units.
7. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.

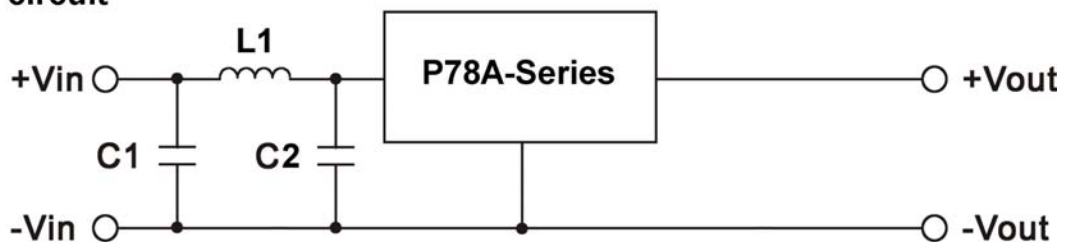
500mA DC-DC Step Down Converter P78A-Series

Ripple current measure circuit



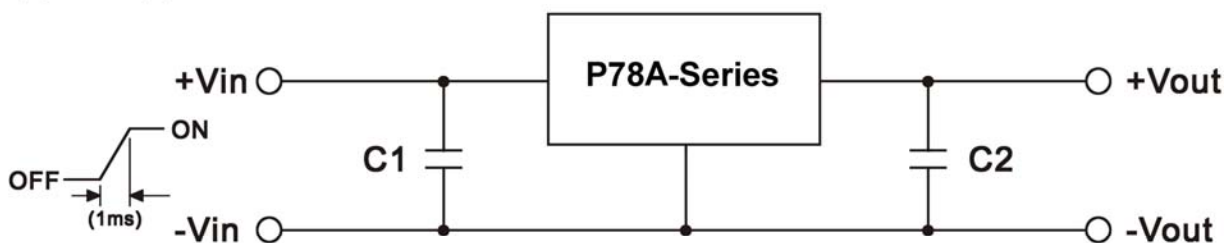
The input reflected ripple current is measured through a inductor L1: 12 μ H and a capacitor C1: 47 μ F at nominal input voltage and full load.

EMC Filter circuit



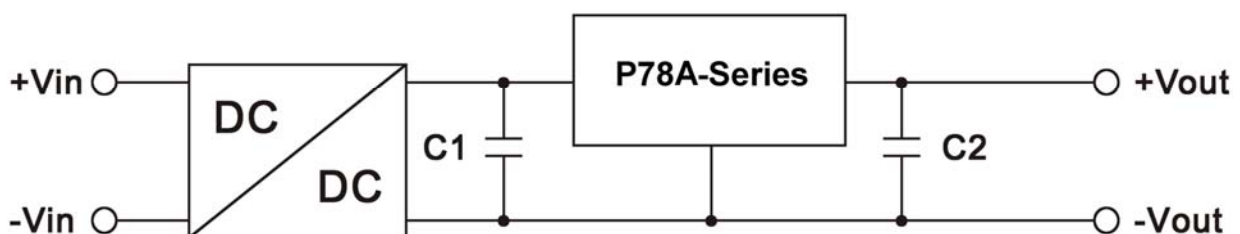
Input filter components C1, C2: 470 μ F, L1: 6.8 μ H are used to help meet conducted emissions requirement for the module. These components should be mounted as close as possible to the module and all leads should be minimized to decrease radiated noise. An external filter capacitor is required if the module has to meet EN61000-4-4. The suggested filter capacitor is: Nippon Chemicon KY series, 470 μ F / 100V.

Typical application circuit



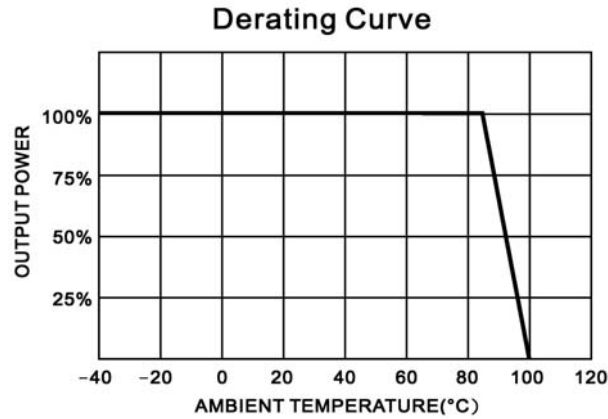
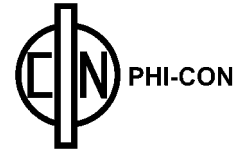
1. To protect the converter during power up, use soft start Vin and C1: 47 μ F
2. C2: 100 μ F optional

Isolated wide input range regulated output

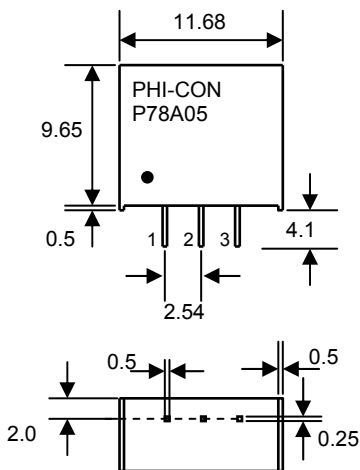


High isolation voltage
Improved loading / line regulation
Wide input voltage range
Point-of-load Architecture
C1: Required for further decoupling filtering may be necessary between the converters.
C2: Optional

500mA DC-DC Step Down Converter P78A-Series



Dimensions



All dimensions in mm
 Pitch tolerance ± 0.35 mm
 Pin tolerance ± 0.05 mm
 Package tolerance ± 0.5 mm

Pin connections

Pin	Connections
1	+V Input
2	GND
3	+V Output

PHI-CON is a trademark of HY-LINE Power Components.

Only for professional use by professionals! Not for resale or distribution to the general public in any way! Read the instructions for use carefully before using!

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: 5.13 f