



PHI-CON

# 500 mA DC-DC Step Down Converter P78H-Series

- Low cost
- Non Isolated
- 3 Pin SIL compatible with 78Mxx linear regulator
- Efficiency up to 95 %
- Operating temperature range -40...+85 °C
- Wide Input Range
- Continuous short circuit protected



## Model selection guide

Type	Input voltage		Input current			Output			Efficiency	
	nominal [V <sub>DC</sub> ]	range [V <sub>DC</sub> ]	No load [mA] max.	Full load		Voltage [V <sub>DC</sub> ]	Current [mA]	Capacitive load max. [μF] (note 3)	@ V <sub>in</sub> min. [%]	@ V <sub>in</sub> max. [%]
				@ V <sub>in</sub> min. [mA] typ.	@ V <sub>in</sub> max. [mA] typ.					
P78H3R3		9...72	3	31	225	3.3	500	100	82	75
P78H05		9...72	3	44	315	5.0	500	100	88	80
P78H6R5		9...72	3	55	397	6.5	500	100	91	83
P78H7R2		14...72	3	60	285	7.2	500	100	91	84
P78H09		14...72	3	75	350	9.0	500	100	92	86
P78H12		17...72	3	95	375	12.0	500	100	94	89
P78H15		21...72	3	95	300	15.0	400	100	95	89

## Specifications

Input	
Start up time @ V <sub>in</sub> nominal and resistive load	10 ms, typ.
Filter	Capacitors
Reflected input ripple current (see figure 1)	35 mA pp, typ.
Output	
Voltage accuracy	± 3 %, max.
Line regulation	± 1 %
Load regulation	± 1 % @ load 10..100 %
Minimum output current (see note 2)	10 mA
Short circuit protection	continuously, automatic restart
Ripple and noise (see figure 2)	35 mVp-p, max.
Temperature coefficient	± 0.02% / °C
General	
Switching frequency	120...800 kHz
Reliability calculated MTBF @ 25 °C (MIL-HDBK-217F)	>4.5 Mio. h

Environmental	
Operating ambient temperature	-40 ... 85 °C, Derating see diagram
Case temperature	100 °C, max.
Storage temperature	-40 ... 125 °C
Humidity	≤ 95 %, non condensing
Cooling	Free air convection
Physical	
Dimensions of SIP3-case	11.68 x 7.5 x 10.15 mm
Weight	2 g
Case material	Non conductive plastic, (UL94V-0 rated)
Potting material	Silicon (UL94V-0 rated)
EMC characteristics (*6)	
Radiated emissions	EN 55032 class B
Conducted emissions	EN 55032 class B
ESD	IEC61000-4-2 Perf. Criteria A
RS	IEC61000-4-3 Perf. Criteria A
EFT	IEC61000-4-4 Perf. Criteria A
Surge	IEC61000-4-5 Perf. Criteria A
CS	IEC61000-4-6 Perf. Criteria A
PFMF	IEC61000-4-8 Perf. Criteria A
Absolute maximum ratings (*5)	
Input voltage range	75 V <sub>DC</sub> for max. 0.1 s
Soldering temperature,	≤ 260 °C for ≤ 10 s, ≥ 1.5 mm distance from case

## Notes:

1. All values are specified at Ta 25 °C, nominal input voltage and full load unless otherwise specified.
2. Operation without load will not damage, however they may not meet all specifications. A minimum load of 10 mA is recommended.
3. Maximum capacitive output load is specified at minimal input voltage and constant resistive output load.

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Figure 1 Input ripple current measure circuit

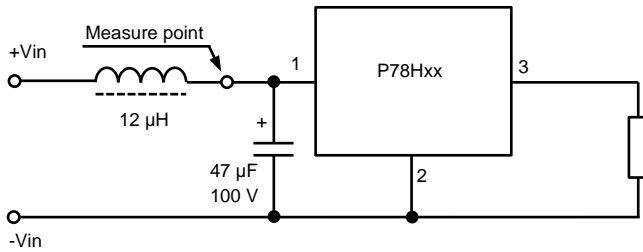
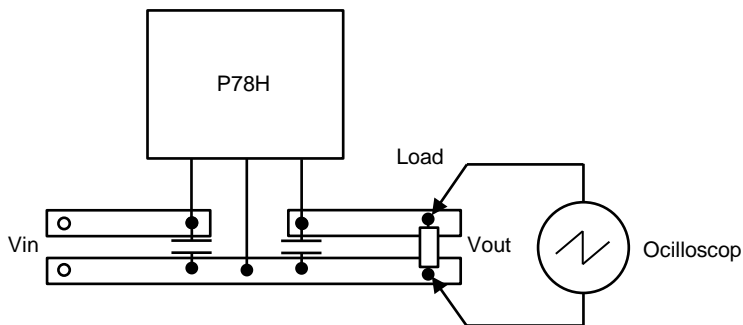


Figure 2 Output ripple & noise measure circuit



The output ripple & noise measured with 20 MHz bandwidth and 10...100 % loading.

Figure 3 Typical application circuit

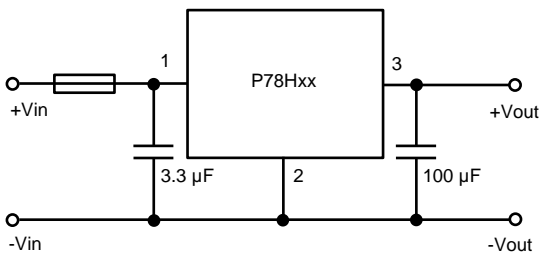
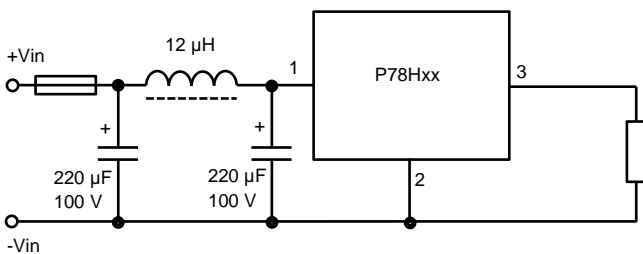


Figure 4 Typical application circuit



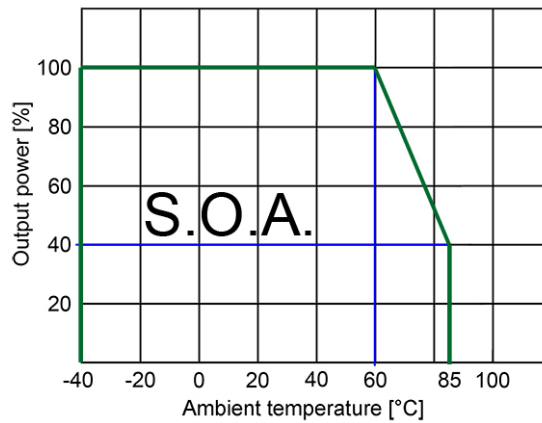
The input filter components are to fulfil the EMI & EMS requirements.



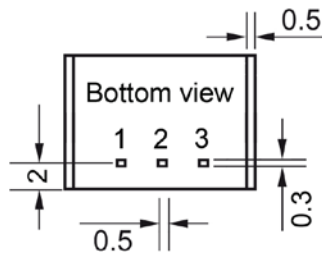
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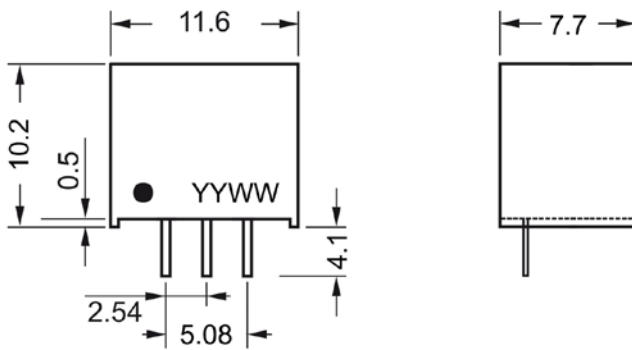
Derating diagram



## Dimensions



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



All dimensions in mm  
 Pitch tolerance  $\pm 0.35$  mm  
 Pin cross section tolerance  $\pm 0.05$  mm  
 Pin to package tolerance  $\pm 0.5$  mm  
 Package tolerance  $\pm 0.5$  mm

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