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# 8 W Off-Line Non-Isolated Buck Regulator

ON Semiconductor

Device	Application	Input Voltage	Output Power	Topology	I/O Isolation
NCP1014	Industrial Control	90 to 270 Vac	8 W	Off-Line Buck	None

## Other Specifications

	Output 1	Output 2	Output 3	Output 4
<b>Output Voltage</b>	25 Vdc	N/A	N/A	N/A
<b>Ripple</b>	200 mV max	N/A	N/A	N/A
<b>Nominal Current</b>	325 mA	N/A	N/A	N/A
<b>Max Current</b>	400 mA	N/A	N/A	N/A
<b>Min Current</b>	zero	N/A	N/A	N/A

<b>PFC (Yes/No)</b>	No
<b>Minimum Efficiency</b>	80%
<b>Input Connector Fuse</b>	0.5 A fuse
<b>Operating Temp. Range</b>	0 to +70°C
<b>Cooling Method/Supply Orientation</b>	Convection

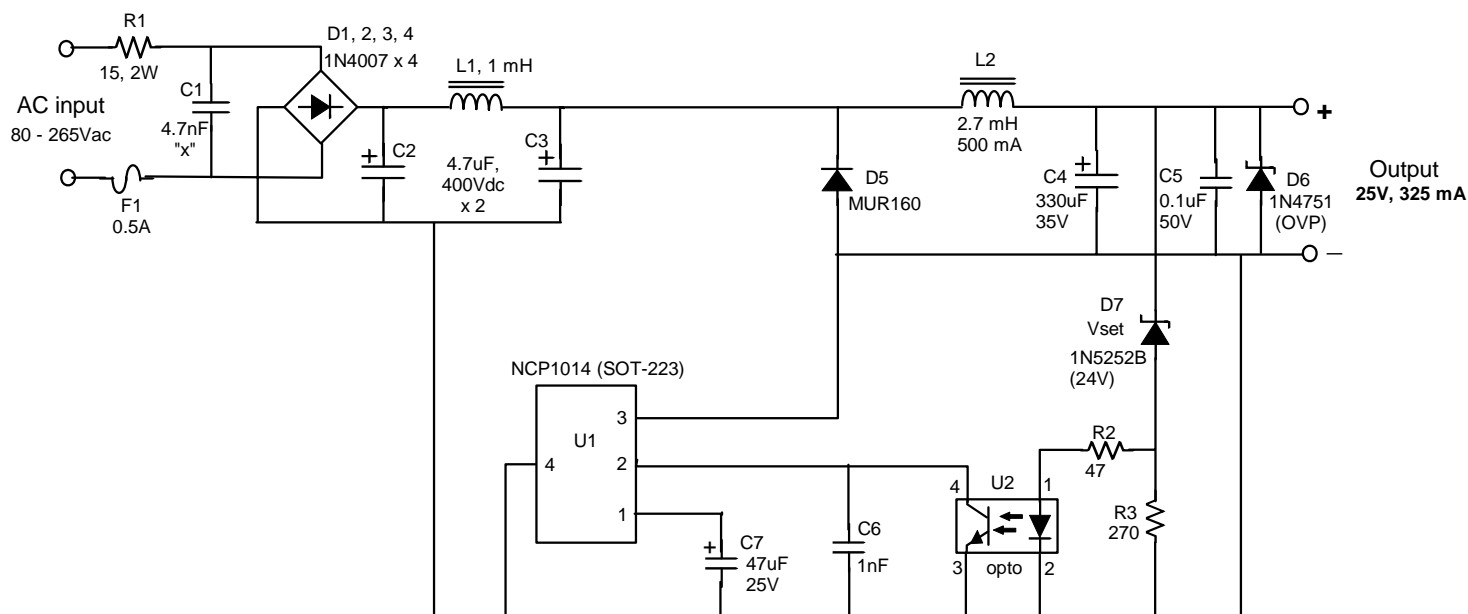
## Circuit Description

This off-line buck regulator is intended for industrial control or similar applications where a low power regulated output voltage is required, but ac mains isolation is not necessary. The buck circuit is designed around ON Semi's NCP1014 series of integrated, monolithic switching regulators and will provide up to 400 mA peak output current with proper heatsinking on the regulator. Magnetic components are "off-the-shelf" parts from Coilcraft Inc. Zener diode D7 can be changed to produce other output voltages as required down to around 3 volts and as high as 50 volts with appropriate voltage rating changes for C4, C5 and D6. An input conducted EMI filter is included (C1, L1), as is a simple "failsafe" OVP zener (D6). R1 is an optional inrush limiting resistor.

## Key Features

- Very simple and low cost circuit for low power, non-isolated off-line applications requiring a single output.
- Off-the-shelf magnetic components.
- Conducted EMI filter.
- Output voltage can easily be tailored to application.
- Over-current and over-temperature protection inherent in NCP1014 integrated regulator.

## Schematic



## NOTES:

1. L1 is Coilcraft part RFB0807-102 (1 mH @ 250 mA) for EMI compliance.
2. L2 is Coilcraft part PCH-45-275L (leaded inductor)
3. U1 is 100 kHz version of NCP1014.
4. D7 zener sets  $V_{out\ max}$ :  $V_{out} = V_z + 0.85V$ .
5. D6 provides failsafe OVP clamping if U1 fails (F1 will open).
6. Pin 4 tab of U4 should be soldered to sufficient copper pcb clad for adequate heatsinking.
7. Crossed schematic lines are not connected.
8. CAUTION: Output is not isolated from AC input and represents lethal hazard.

## 8 Watt Off-Line Buck Converter (Non-Isolated)

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Design note created by Frank Cathell, e-mail: [f.cathell@onsemi.com](mailto:f.cathell@onsemi.com)