

## Test Procedure for NCP1031 POE Evaluation Board

ON Semiconductor®

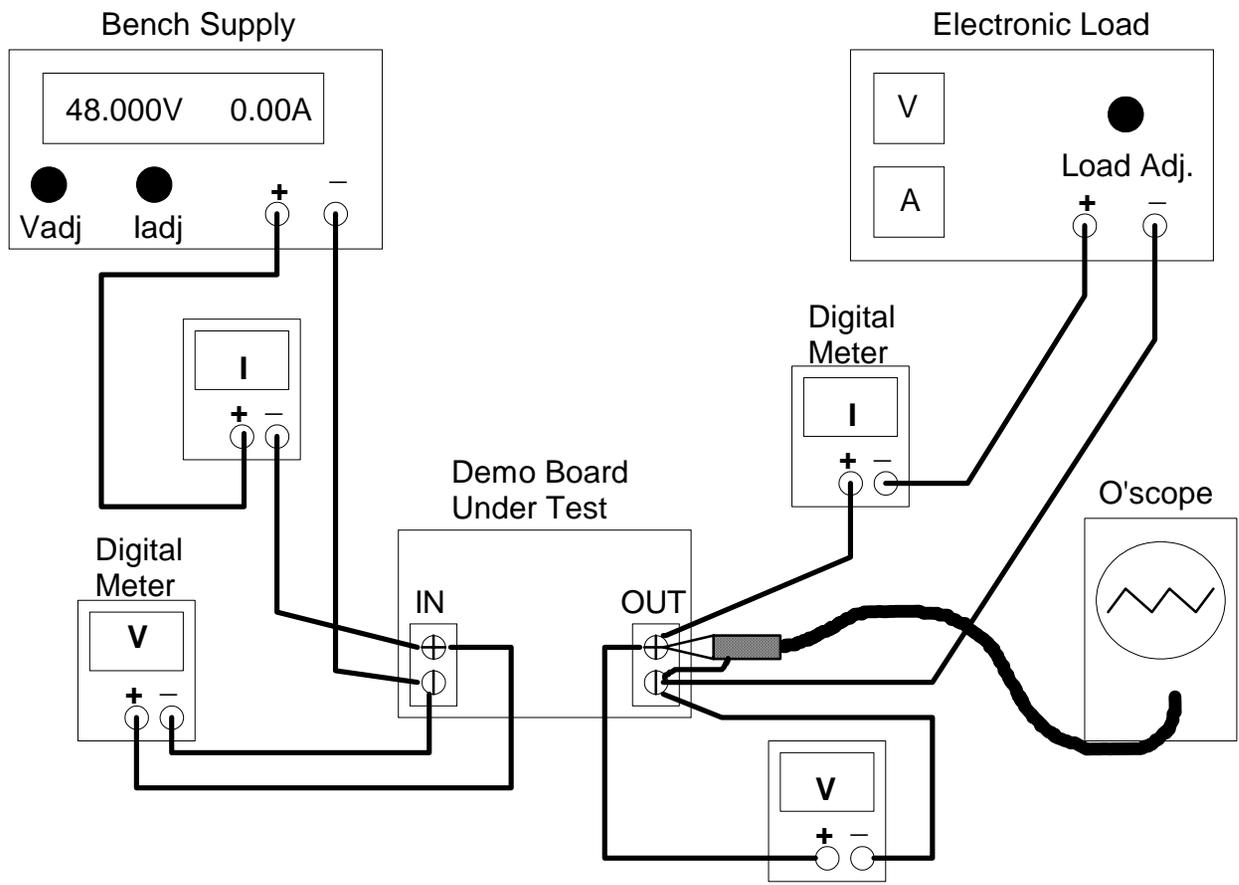


Introduction: The POE (Power Over the Ethernet) demo board is a 6.5 watt dc-dc converter using the ON Semi NCP1031 monolithic controller/mosfet chip in a flyback topology. The input is 48 Vdc nominal and the output is 5 Vdc at 1.3 A maximum. There is additional input circuitry that responds to Ethernet protocol defined as “Signature” and “Classification” detection. Signature just indicates that the power supply does exist and classification allows the upstream Power Sourcing Equipment (PSE) to determine the rated power level of the supply or Powered Device (PD). Both of these detection modes are performed at low input voltages in which the main converter does not operate. The converter will only come on with  $V_{in}$  above 35 Vdc.

Equipment Required:

1. Adjustable bench power supply capable of up to 50 Vdc with an output current of up to 0.5 amps.
2. Digital volt/amp meters to measure input and output current and voltage to the demo board.
3. A variable electronic load or rheostat capable of up to a 2 amp load.
4. Oscilloscope with probe to monitor output ripple on the demo converter.

Setup Procedure: Set the equipment as shown in the diagram below so that the input and output voltage and current to the demo board can be measured and the output ripple can be monitored.



## Test Procedure:

1. Switch the electronic load on and set to zero load; switch all of the digital meters on (assuming they are wired properly for voltage and current sensing); turn the oscilloscope on with sensing in AC mode and 50 mV per division vertical and a sweep rate of 5  $\mu$ s per division. Connect the scope probe to the demo board's output terminals.
2. Set the voltage adjust to zero on the bench supply and switch it on.
3. Adjust the bench supply to 5.00 volts output. The input current meter to the demo board should read between 0.190 mA and 0.230 mA. Both demo board output meters should read essentially zero.
4. Adjust the bench supply to 18.00 Vdc output. The input current to the board under test should read between 17 and 21 mA.
5. Adjust the bench supply to 48 Vdc output and the converter should start and show an output voltage of 4.9 to 5.1 Vdc. The scope should show less than 50 mV ripple and indicate output stability by a constant, non-jittering trace.
6. Adjust the electronic load slowly from zero to 1.3 amps as evidenced by the output current meter.. The output should still be between 4.9 and 5.1 volts and the ripple on the scope should be less than 100 mV and indicate a stable output throughout this load range.
7. With 1.3 amps on the output check the input current and make sure it's below 200 mA (efficiency check.)
8. Adjust the bench supply slowly down to approximately 35 Vdc. The converter should shut off between 34 and 36 Vdc and the output will go to zero. Adjust the input back to 38 Vdc and the converter should come back on with normal output.
9. Adjust the input voltage back to 48 Vdc and then slowly increase the load to over 1.5 amps. The output voltage should start collapsing around 1.4 to 1.6 amps indicating current limiting.
10. Set the current back to 1.3 amps and allow the demo board to run for about 5 minutes to assure that it doesn't thermally limit by shutting down. Note: This last test may not be necessary after several demo boards and the test procedure are validated.
11. Turn the bench supply off and disconnect the demo board. Testing is complete.