

Test Procedure for the NCP1381 Evaluation Board

ON Semiconductor®



4.19.2006

Table of required equipment:

Measurement equipment description	Concrete example	Quantity
Regulated AC Supply	Agilent 6812B	1
Electronic Load	Agilent 6060B	1
Digital multimeter	Keithley 2000	2
Oscilloscope	Tektronix TDS3000	1
Digital multimeter	Keithley 2016	2
Digital multimeter	Fluke 189	1
Connection cable	-	12
NCP1381 evaluation board	-	1

Please follow these steps during the first start of the NCP1381 evaluation board:

1. Check if all of the components have the right values and are mounted in the right positions.
2. Connect the demo board to the AC supply and electronic load (Figure 3).
3. Set the input voltage to 85 VAC/ 60 Hz and electronic load to 0 A, switch ON the AC supply output. Using a digital multimeter check the voltages between these test points (Figure 3):

GND – TP1: This is the output voltage of the PFC stage. The right value for unloaded converter is 118 VDC.

GND – TP3: This is the supply voltage for the PFC control circuits. This stage is not operating during no-load conditions – thus the right voltage value is 0 V.

GND – TP4: This is the rectified auxiliary winding voltage. The right voltage level is 23 VDC for unloaded converter.

GND – TP5: This is the Vcc voltage of the NCP1381 controller. The right voltage level is 18 VDC for unloaded converter.

The output voltage: should be $19.5 \text{ VDC} \pm 1\%$.

To check the skip mode operation use an oscilloscope with a high voltage probe. Set vertical scale to 100 V/division. Probe between GND and TP2 (M2 drain) and check if the SMPS working under skip mode for zero output current (Figure 1).

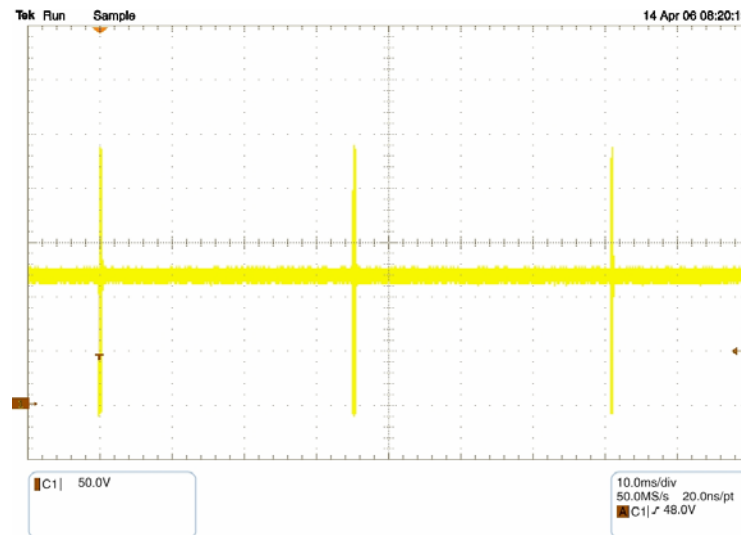


Figure 1: M2 drain waveform when SMPS works under no load

4. Slowly increase the load current. The skip mode operation should disappear when load current is higher than 900 mA. Continue increasing the load while monitoring TP1 voltage. The TP1 voltage should grow to 280 VDC when output current is higher than 2.3 A (PFC ON signal comes from NCP1381).

5. Continue increasing the load current. The over current protection should take over when load current value exceeds 6.8 A.
6. Set the load current to 6.3 A and check the drain voltage waveform. The expected waveform can be seen in Figure 2.

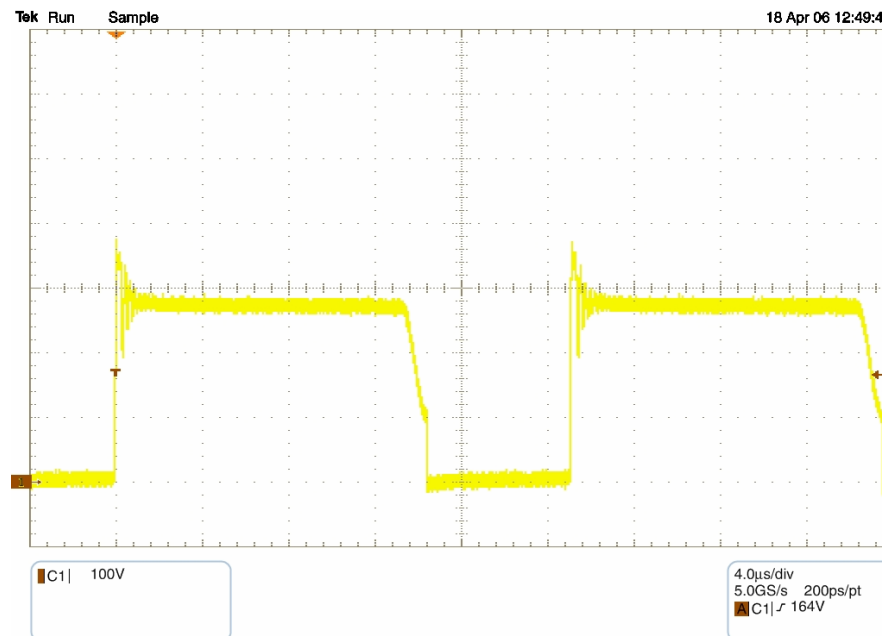


Figure 2: M2 drain waveform when SMPS works under full load (i.e. 6.3A) and 85 VAC input voltage

7. Turn OFF the AC supply.
8. Set the input voltage to 110 VAC/60 Hz, and the load current to 6.3 A. Check the converter efficiency for expected value of 85 %.
9. Set the input voltage to 230 VAC/50 Hz, and the load current to 6.3 A. Check the converter efficiency for expected value of 76 %.

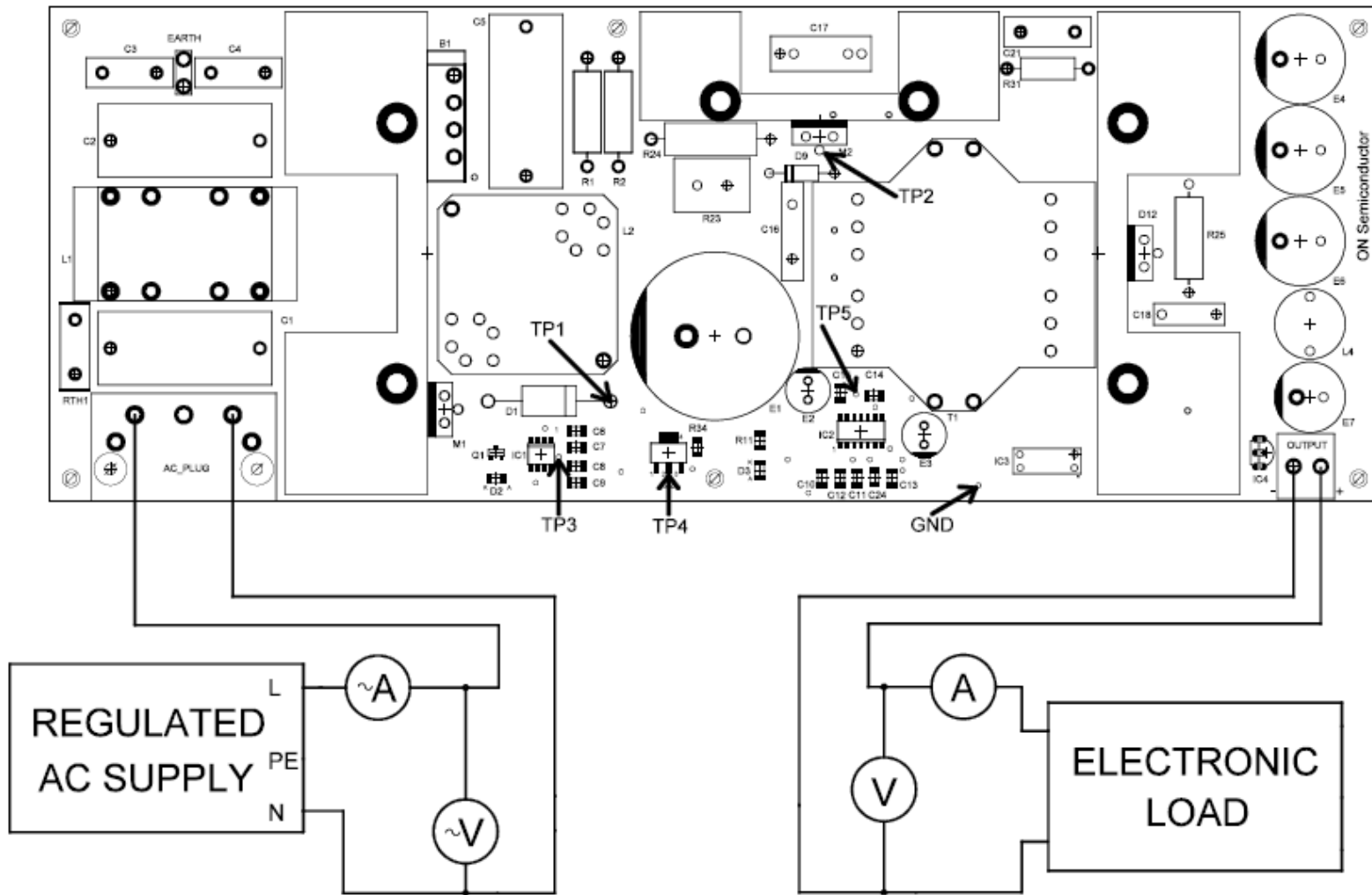


Figure 3: Connection of the evaluation board under testing