

Test Procedure for the NCP12700 45W PoE Compatible USB-PD EVB

ON Semiconductor®



April, 2020

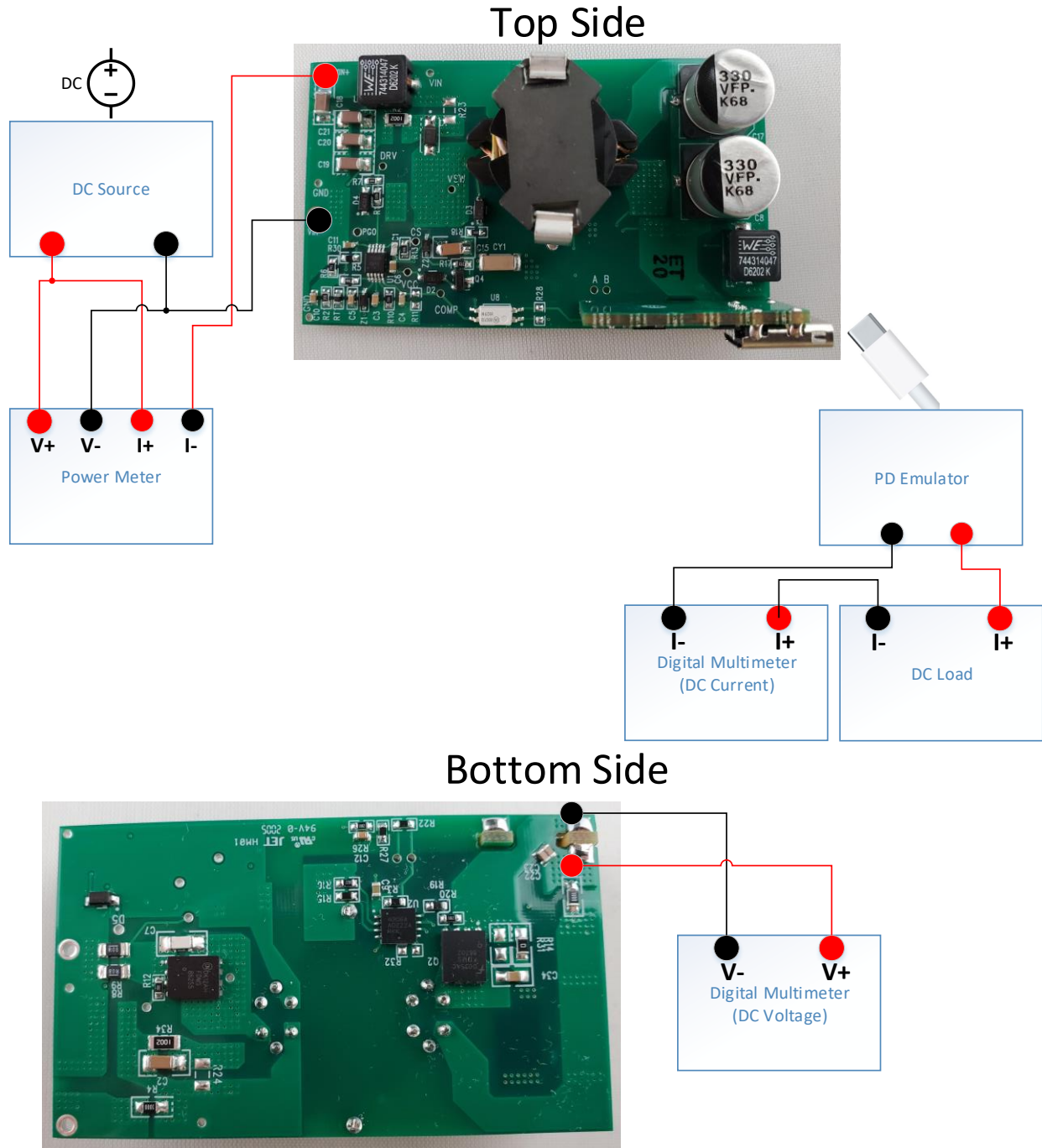


Figure 1 - Test Configuration

Table 1: Required Equipment

*Chroma 62012 DC Source	*Yokogawa WT210 Power Meter	*Agilent 34401A Digital Multimeter x2
*Kikusui PLZ303W DC Electronic Load		One NCP12700 USB-PD Board + PD Emulator

*Equivalent test equipment may be substituted

Test Procedure:

1. Leads will need to be soldered on the board in order to properly check output voltage. Solder insulated wires onto points featured on the bottom side in Figure 1.
2. Connect the output of the board to the PD emulator as shown in Figure 1.
3. Connect the Agilent 34401A Digital Multimeter (measuring DC I) in series with the output of the PD emulator and the Kikusui PLZ303W DC Electronic Load. Reference figure 1.
4. Set Kikusui PLZ303W DC Electronic Load to C.C. mode.
5. Set load current on Kikusui PLZ303W DC Electronic Load to 500 mA.
6. Connect the Agilent 34401A Digital Multimeter (measuring DC V) to the nodes as shown on Figure 1.
7. Connect the DC power source and power meter as shown in Figure 1.
8. Set the DC power source to 48V and turn on power source
9. Using the PD Emulator, set the output to 20 V and verify that the output measures 20 +/- 1 V.
10. Slowly increase the load current to 2.25 A. Verify on Agilent current multimeter that current is 2.25 A +/- 1%.
11. Allow board to run for approximately 30 seconds then use the Input Power Meter to measure input power. Calculate the efficiency and record measurements.
12. Take the efficiency readings at 2.25 A (100% load), 1.69 A (75% load) 1.13 A (50% load), 0.56 A (25% load) and 0.23 A (10% load). Verify that the readings are close to as in Table 2.
13. Set the DC power source to 37V.
14. Repeat steps 8-11.
15. Set the DC power source to 57V.
16. Using the PD Emulator, set the output to 5 V and verify that the output measures 5 +/- 0.5 V
17. Slowly increase the load current to 3 A. Verify on Agilent current multimeter that current is 3 A +/- 1%.
18. Allow board to run for approximately 30 seconds then use the Input Power Meter to measure input power. Calculate the efficiency and record measurements.
19. Take the efficiency readings at 3 A (100% load), 2.25 A (75% load) 1.5 A (50% load), 0.75 A (25% load) and 0.3 A (10% load). Verify that the readings are close to as in Table 3.
20. Set the DC power source to 37V.
21. Repeat steps 8-11.
22. Set the DC power source to 57V.
23. Turn off the DC power source.
24. Disconnect the DC source.
25. Disconnect the electronic load.

26. Disconnect multimeters.
27. Remove the soldered connections from step 1 and clean the points (clean soldering and clean flux).
28. End of test.

Table 2. 20 V Efficiency Measurements

20 Vout	Efficiency @ Load Percentage (%)				
Input Voltage	10%	25%	50%	75%	100%
Efficiency at Vin = 37 Vdc	68.8%	83.9%	91.2%	90.2%	93.1%
Efficiency at Vin = 48 Vdc	74.0%	83.3%	89.6%	92.2%	91.4%
Efficiency at Vin = 57 Vdc	79.2%	87.7%	91.9%	91.2%	92.3%

Table 3. 5 V Efficiency Measurements

5 Vout	Efficiency @ Load Percentage (%)				
Input Voltage	10%	25%	50%	75%	100%
Efficiency at Vin = 37 Vdc	77.1%	81.3%	88.6%	88.9%	89.4%
Efficiency at Vin = 48 Vdc	73.6%	77.1%	84.6%	87.4%	88.2%
Efficiency at Vin = 57 Vdc	71.7%	75.7%	82.4%	86.5%	86.9%