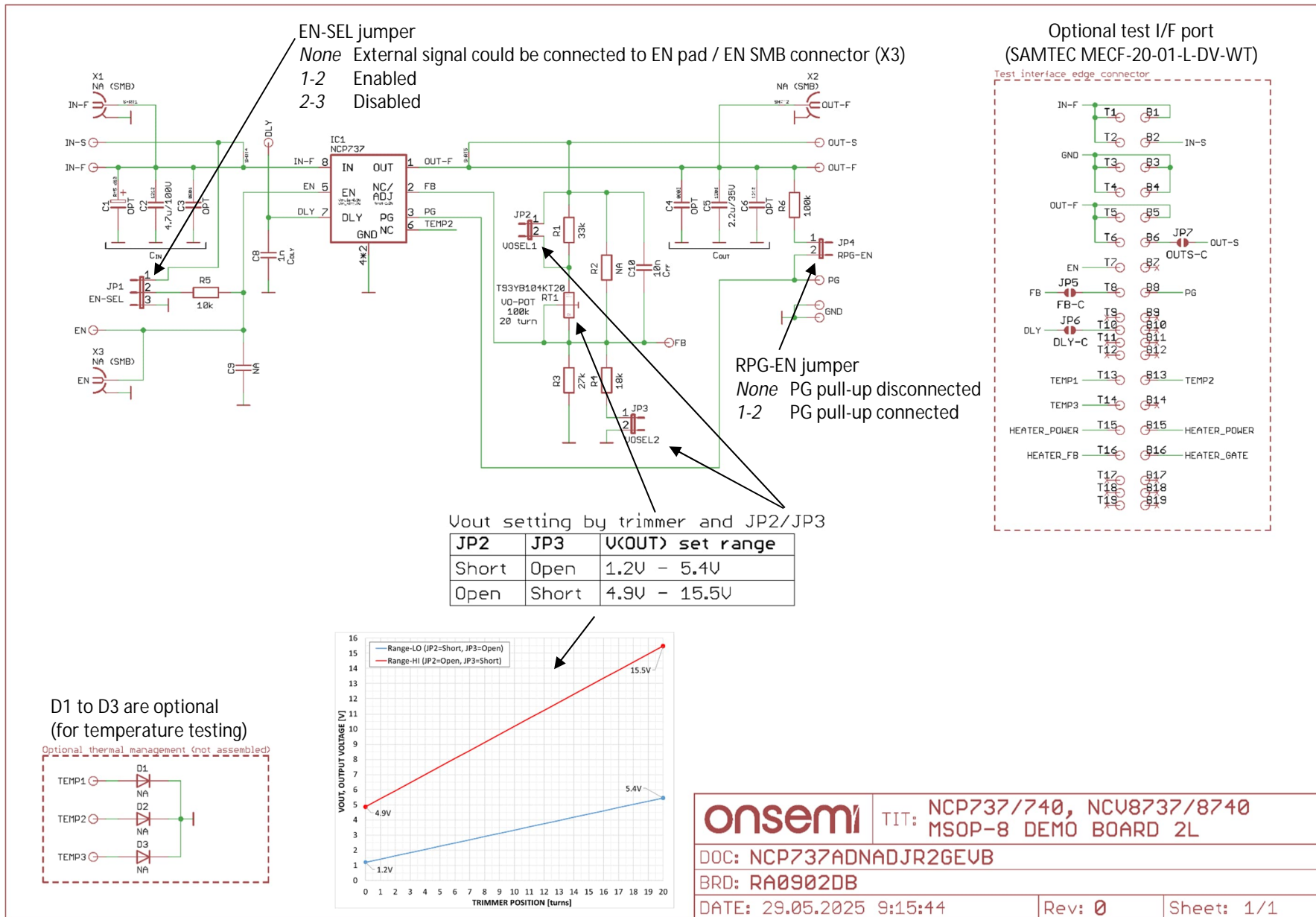


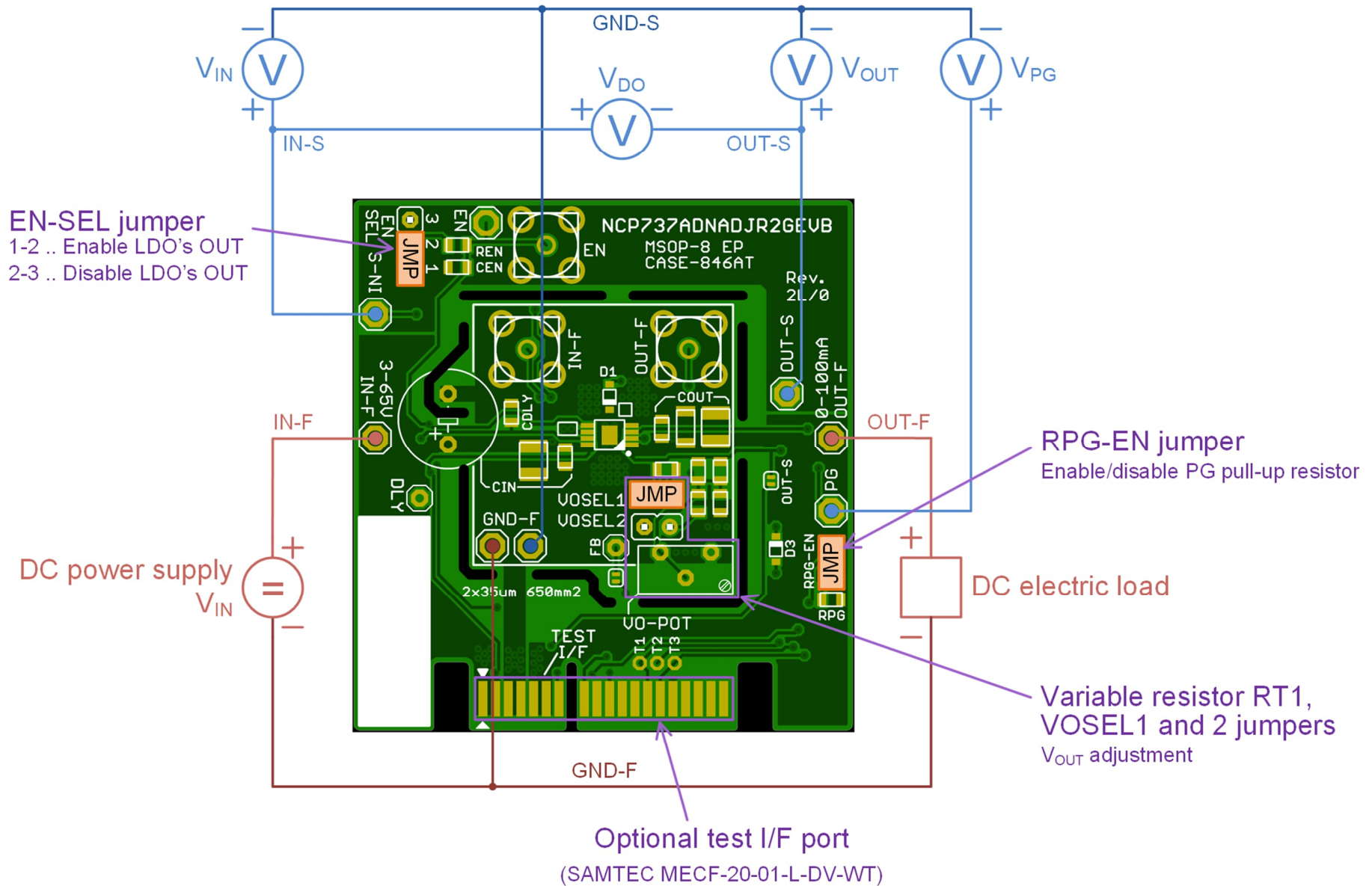
NCP737ADNADJR2GEVB Demo Board 2L v0

Demo Board Testing – Board Schematic

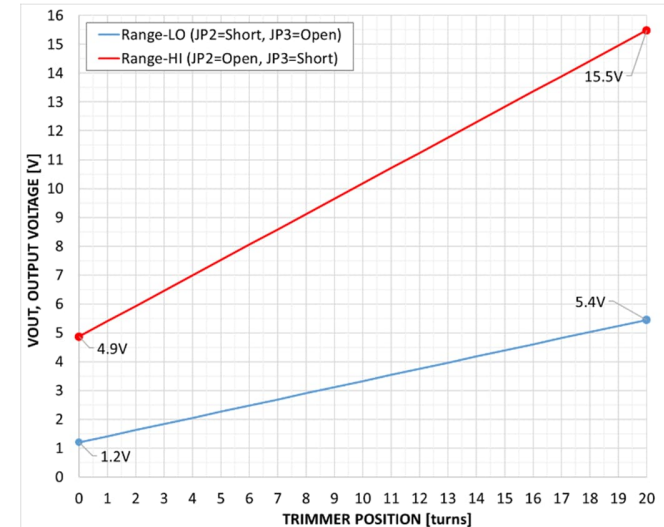


NCP737ADNADJR2GEVB Demo Board 2L v0

Demo Board Testing – Testbench Schematic



- 1) Measurement initialization, disable state and disable current testing
 Connect jumpers: EN-SEL=2-3 (LDO is disabled), VOSEL1=Open, VOSEL2=Short, RPG-EN=Short.
 Connect “V_{IN} power supply” to IN-F and GND points and set voltage to 24V (17 to 65V is possible) / 20mA current limit if possible.
 Check “V_{IN} power supply” output current, should be 0.5uA.
- 2) Quiescent current and enabled state testing
 Set jumper EN-SEL=1-2 (LDO is enabled).
 Check “V_{IN} power supply” output current, should be 5uA.
- 3) V_{OUT} range adjustment testing (variable resistor RT1)
 Connect “DC electric load” to OUT-F and GND points and set it to 1mA.
 Connect voltmeter to OUT-S and GND points.
 - a. Vary the variable resistor RT1 from min. to max. value and watch V_{OUT} voltage, it should be set in range from about 4.9V to 15.5V (as shown on the chart, red line, left-to-right).
 - b. Turn-off the input voltage, swap the jumpers VOSEL1=Short, VOSEL2=Open and turn-on input voltage.
 Vary the variable resistor RT1 from max. to min. value and measure V_{OUT} voltage, it should be set in range from about 5.4V to 1.2V (as shown on the chart, blue line, right-to-left).
 Set the output voltage by RT1 to V_{OUT}=3.3V for further testing.
- 4) Line regulation testing
 Measure V_{OUT} voltage, it should be 3.3V as set in 3b).
 Change input voltage to V_{IN} = V_{OUT} + 0.5V = 3.8V and set current limit to 150mA or more (for next test).
 Measure V_{OUT} voltage, it should be 3.3V. The slight difference between the two last V_{OUT} measurements (for 2 different V_{IN}) is called line regulation. Expected 0.01% change.
- 5) Load regulation and PG high state testing
 Change load current to 100mA.
 Measure V_{OUT} voltage again, it should be 3.3V. The slight difference between this and the last measurement at previous point (measurements for 2 different load currents) is called load regulation. Expected 0.1% change.
 Measure V_{PG} voltage, it should be 3.3V (the same as V_{OUT}), high state, indicating V_{OUT} is OK.
- 6) Dropout voltage testing
 Lower input voltage slowly until V_{OUT} voltage drops to level 3.3V – 0.1V = 3.2V. LDO falls out of regulation, into dropout state.
 Measure voltage difference between IN-S and OUT-S, it is the dropout voltage. Expected 400mV difference.
- 7) PG low state testing
 Lower input voltage slowly until V_{OUT} voltage drops below 83% of 3.3V = 2.74V. LDO is still in dropout state and V_{OUT} is lower than Power Good V_{OUT} falling threshold.
 Measure V_{PG} voltage, it should be almost 0V, low state, indicating V_{OUT} fail.
- 8) Turn-off
 Turn-off V_{IN} voltage and output load.



See notes on the next page.



NCP737ADNADJR2GEVB Demo Board 2L v0

Demo Board Testing – Procedure

Notes:

- The min. and max. output voltage values at each range (blue/red curve) have tolerance $\pm 10\%$ (caused mainly by the tolerance of the variable resistor RT1).
- The V_{IN} could be changed from $V_{OUT} + 0.5V$, but 3V minimally up to 65V and I_{OUT} from 0 up to 100mA, to measure line and load regulations. When setting output currents higher than 15mA, first compute maximum applicable input voltage (to dissipate less than 1W on the LDO) to avoid thermal shutdown cycling, use equation:
$$V_{IN-MAX} = P_{DIS-MAX} / I_{OUT} + V_{OUT} = 1W / I_{OUT} + V_{OUT}$$
- During testing the LDO is self-heated by dissipated power $P_{DIS} = (V_{IN} - V_{OUT}) * I_{OUT}$. Take in mind that measured values, mainly dropout voltage, could be influenced by elevated chip temperature so it can be slightly different to datasheet typical value. Of course, it must be inside of specified min/max values which are defined over the whole temperature range.
- For low input voltages ($V_{IN} < 2.8V$) measurements can't be done because the input voltage would be lower than minimum input voltage $\sim 2.8V$ and LDO will be turned off by internal UVLO function.