Test Procedure for the NCL30105GEVB Evaluation Board

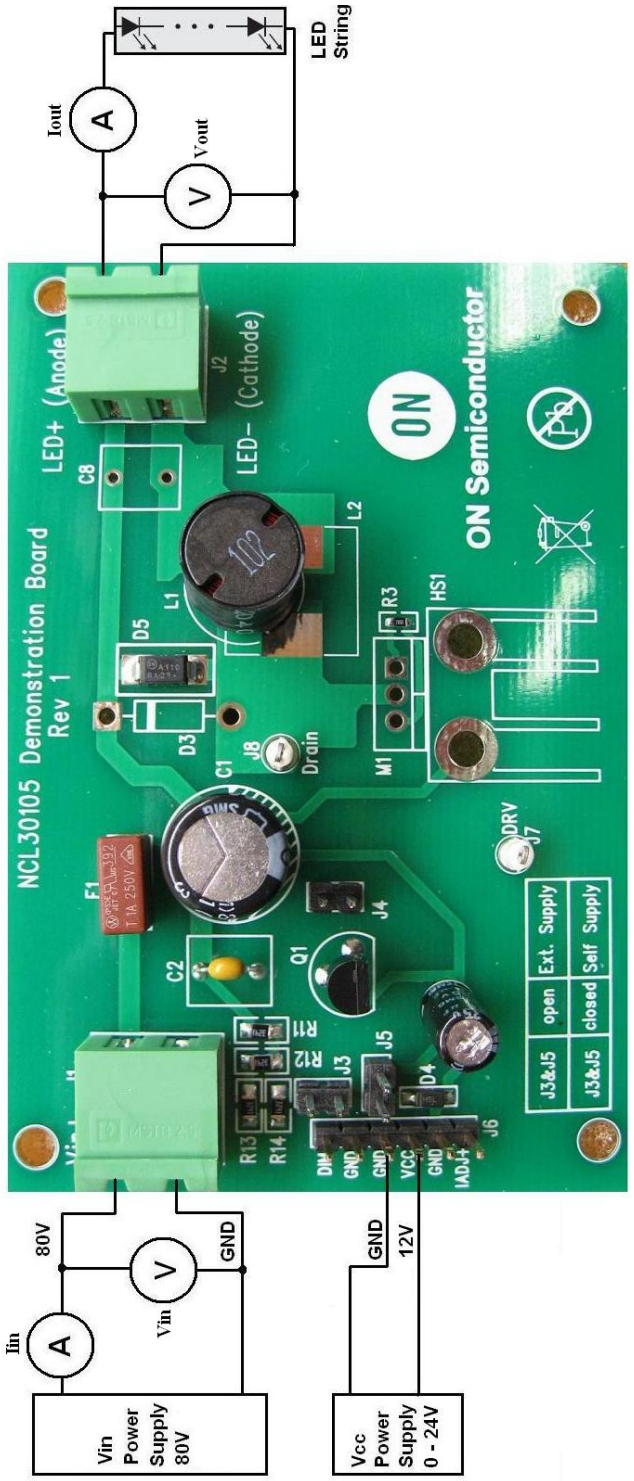

Figure 1 : Test Setup 1

Required Equipment:

- **dc Voltage supply, up to 80V, 1A.**
  Model No: TOPWARD Dual Tracking Power Supply 6603D.
- **dc Voltage supply, up to 24V, 1A.**
  Model No: XANTREX XT30-2.
- **Voltage source meter up to 5V**
  Model No: KEITHLEY 2400 Source Meter
- **Voltage meter**
  Model No: HP 34401A Multimeter
- **Current meter**
  Model No: HP 34401A Multimeter
- **Function Generator**
  Model No: HP 33120A
- **Scope and current probe**
  Scope: Tektronix TDS5034B; Current Probe: Tektronix AM503B
- **18-20 LED string as the load. (could be replaced by zeners and LEDs in series, as long as the load voltage is ~60V with a drive current of 350mA), the LED string could be using LXH8-PW27 in series or other LED products with similar features.**

Efficiency- Setup 1 Test Procedure:

1. **Connect the test setup as shown in** Figure 1**. Verify J3 and J5 jumpers are open as illustrated.**
2. **Slowly ramp the input voltage from 0V up to V_{in} = 80 V. (See Note 1)**
3. **Apply the supply voltage, V_{cc} = 12 V.**
4. **Check that I_{OUT} is 350mA+/-3% nominal and Vout is in the range of 60V nominal.**
5. **Check the efficiency is above 94%, Efficiency = Iout*Vout / (Iin*Vin)**
6. **A typical waveform is shown in** Figure 2**:**

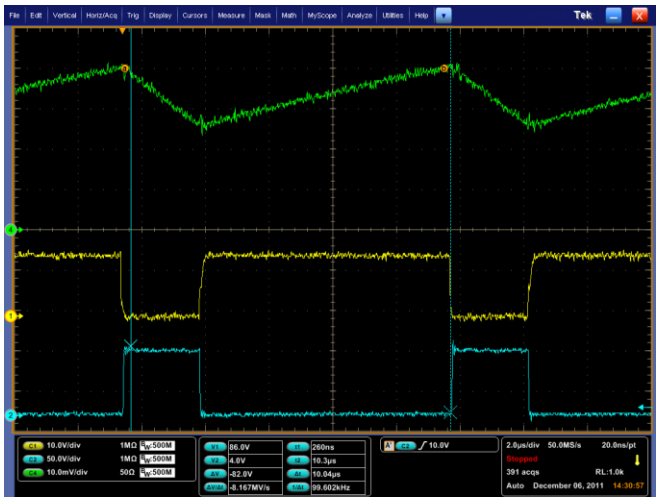

Figure 2 : Test Setup 1 Waveforms

CH1 – yellow – the MOSFET gate drive signal,

CH2 – blue – the MOSFET drain signal,

CH3 – green – the output current (average is about 347mA)

7. **Power down the V_{CC}.**
8. **Slowly ramp down Vin from 80V to 0V.**
9. **End of the efficiency test**

Iadjust Function- Setup 2 Test Procedure:

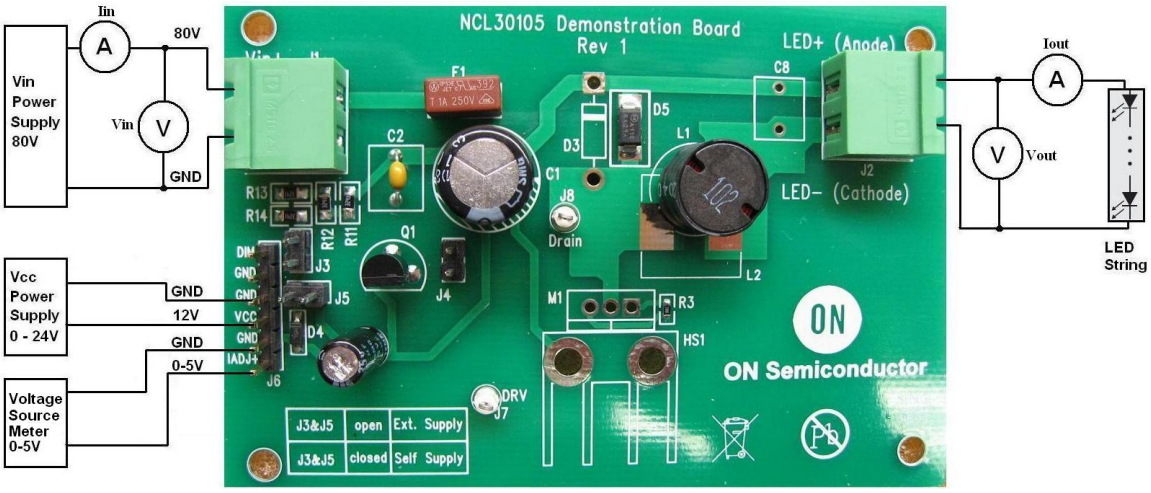

Figure 3 : Test Setup 2

Setup 2 Test Procedure:

1. **Modify the test setup as shown in** Figure 3**. Verify J3 and J5 jumpers are open as illustrated.**
2. **Slowly ramp the input voltage from 0V up to V_{in} = 80 V. (See Note 1)**
3. **Apply the input voltage, V_{cc} = 12 V.**
4. **Apply the input voltage for Iadjust pin, $V_{Iadjust}$ = 5 V.**
5. **Check that I_{OUT} is 350mA and Vout is in the range of 60V nominal with LED load.**
6. **Use the power supply for Iadjust pin to adjust the voltage from 0 V to 5V. Check the output current and voltage reading.**

   Here is the reference on the Iadjust voltage vs. output current.

Iadjust voltage (V)	1.0V	2.0V	3.0V	4.0V	5.0V
LED current (mA)	100-105	229-235	340-355	340-355	340-355

7. **Power down the 5V power supply for Iadjust pin.**
8. **Power down the V_{CC}.**
9. **Slowly ramp down Vin from 80V to oV.**
10. **End of the test**

Dimming function- Setup 3 Test Procedure :

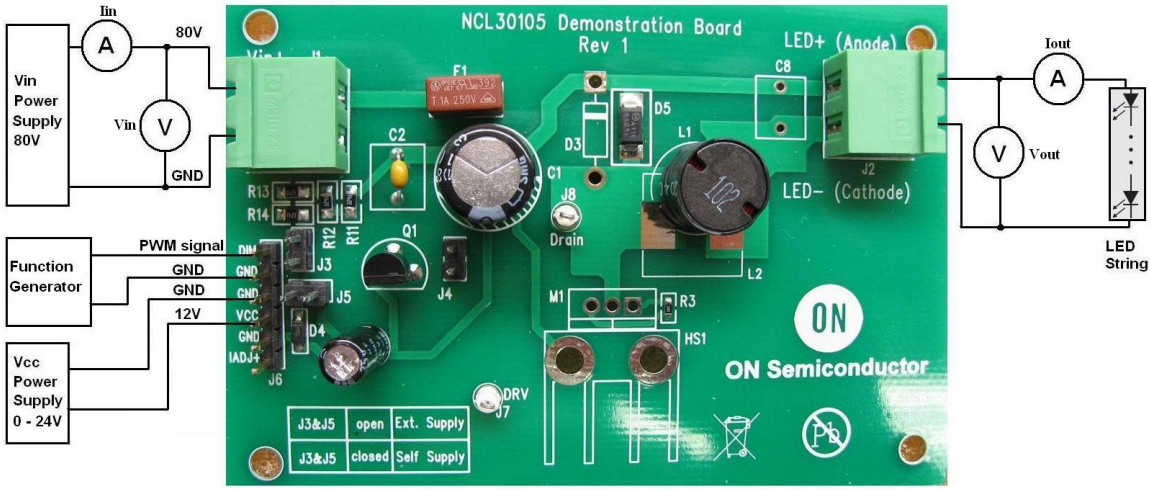

Figure 4 : Test Setup 3

Setup 3 Test Procedure:

1. **Connect the test setup as shown in** Figure 4 **and verify J3 and J5 jumpers are left open as illustrated.**
2. **Slowly ramp the input voltage from 0V up to V_{in} = 80 V. (See Note 1)**
3. **Apply the input voltage, V_{cc} = 12 V.**
4. **Check that I_{OUT} is 350mA and Vout is 60V (nominal) LEDs string.**
5. **Use the function generator to generate a 1 kHz PWM signal with a low level of 0V and high level of 3.3V. Change the duty cycle of this PWM waveform to change the average LED current.**

   The operating waveforms with a duty ratio of 0.5 are shown in Figure 5**.**

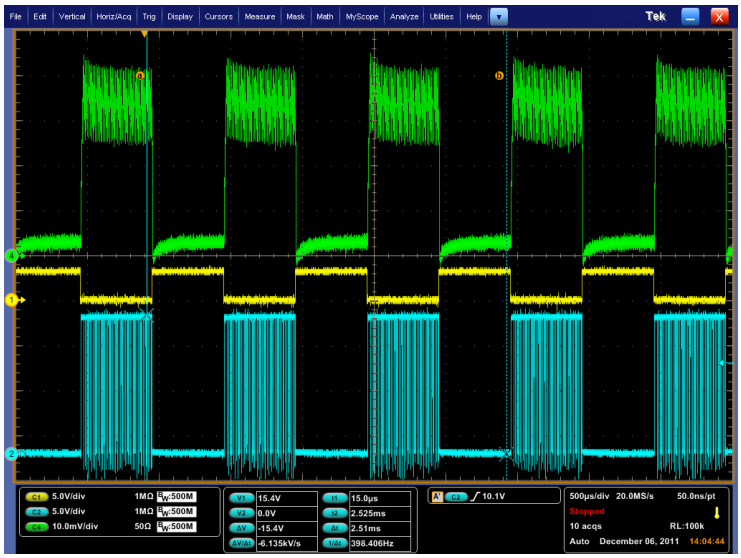

Figure 5 : Test Setup 3 Waveforms

CH1 – yellow – the 1KHz PWM signal,

CH2 – blue – the MOSFET gate drive signal,

CH3 – green – the output current (average is about 171.2mA)

6. **Check the output current changes as the PWM signal duty cycle is changed. Here for reference is the PWM duty cycle vs. output current when J4 is left open.**

Duty cycle	**75%**	**50%**	**25%**	**20%**
LED current (mA)	**62-68**	**170-177**	**255-265**	**270-285**

7. **Power down the function generator.**
8. **Power down the V_{CC}.**
9. **Slowly ramp down Vin from 80V to oV.**
10. **End of the dimming test.**

Note 1:

To ensure the NCL30105 demo board working properly, it needs a sequencing power up. The 80V input rail voltage has to be power on first, and the Vcc rail voltage for the IC controller should be powered on after the 80V input.