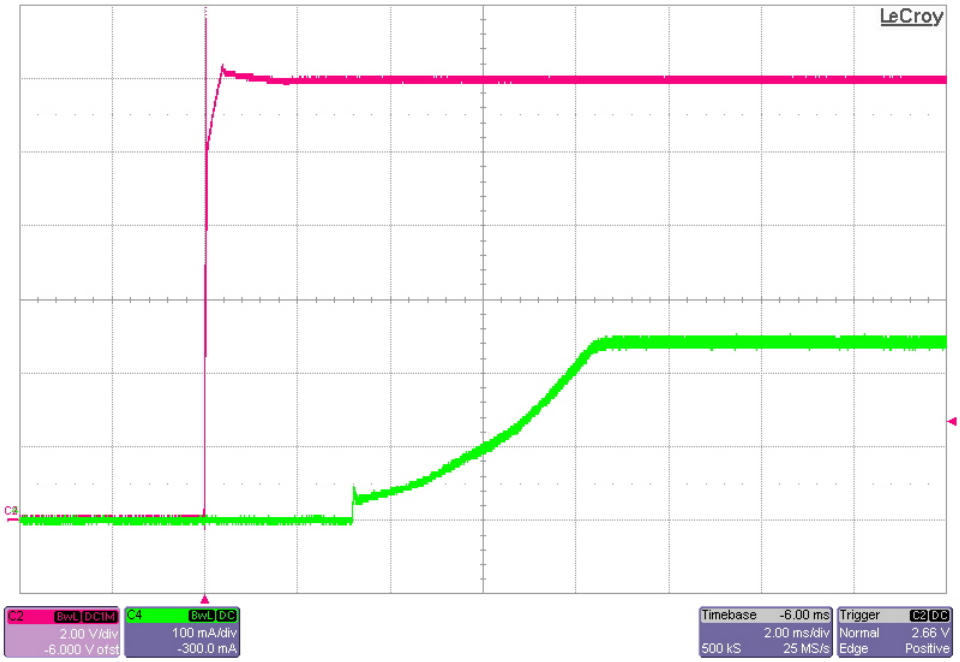
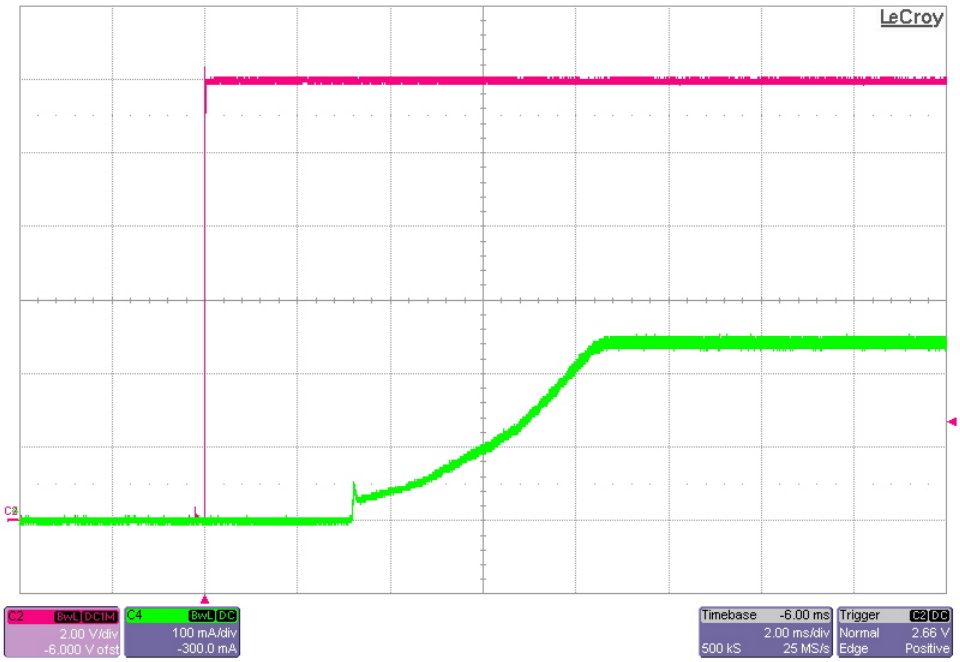
1 Startup

The LED current startup waveform (GREEN) is shown after the input voltage (RED) is applied. The CTRL signal was connected to Vin. Vin = 12V and I_LED = 0.24A. (2V/DIV, 100mA/DIV, 2mS/DIV)

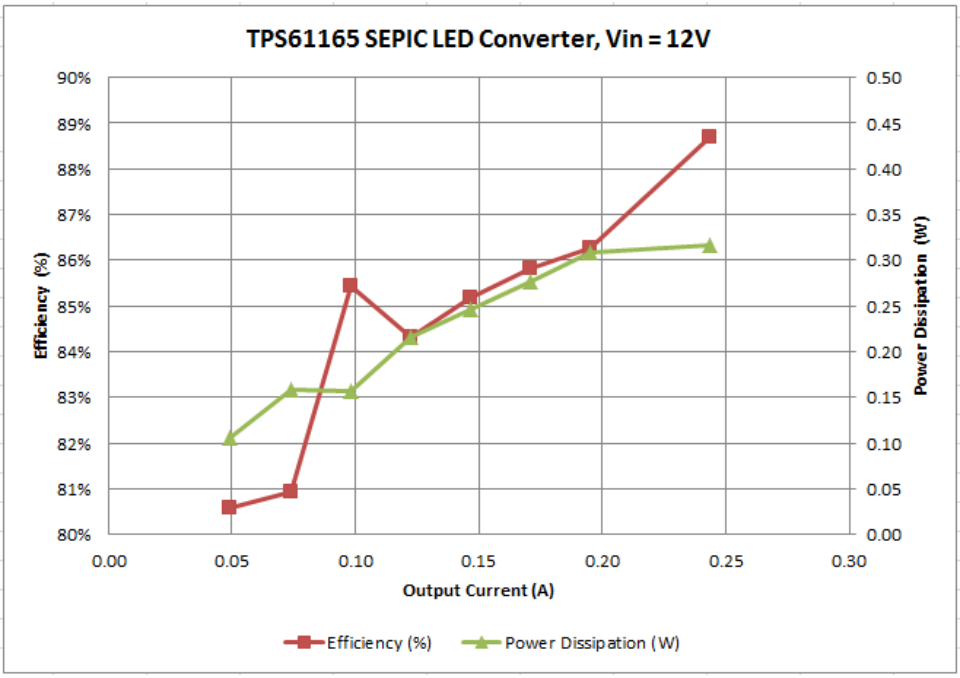


The LED current startup waveform (GREEN) is shown after the CTRL voltage (RED) is applied. The input voltage (Vin = 12V) was applied prior to enabling. I_LED = 0.24A. (2V/DIV, 100mA/DIV, 2mS/DIV)

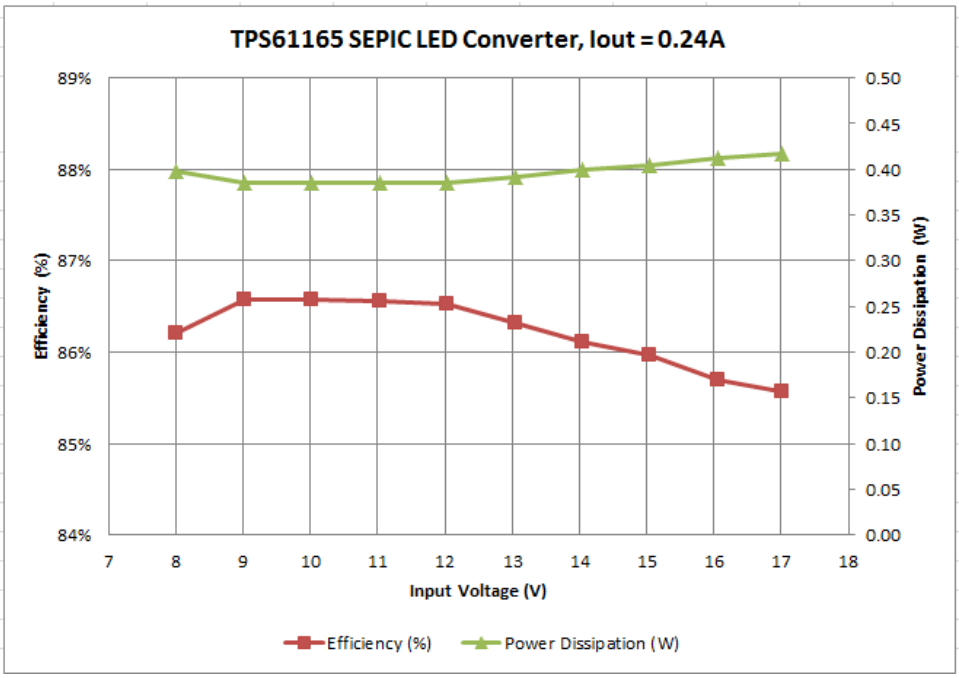


2 Efficiency

The converter's efficiency is shown in the figure below. An external 0-5V, 50KHz PWM input signal was connected to the CTRL input and duty cycle modulated between 20% - 80% to adjust the LED current.

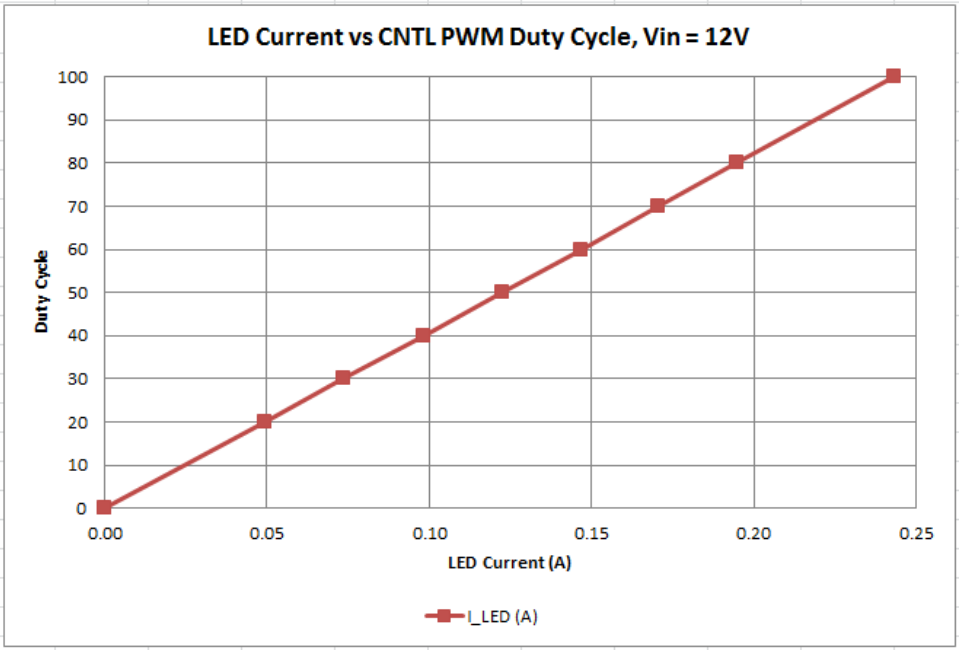


The converter's efficiency is shown in the figure below. The CTRL input was connected to VIN for max LED current.



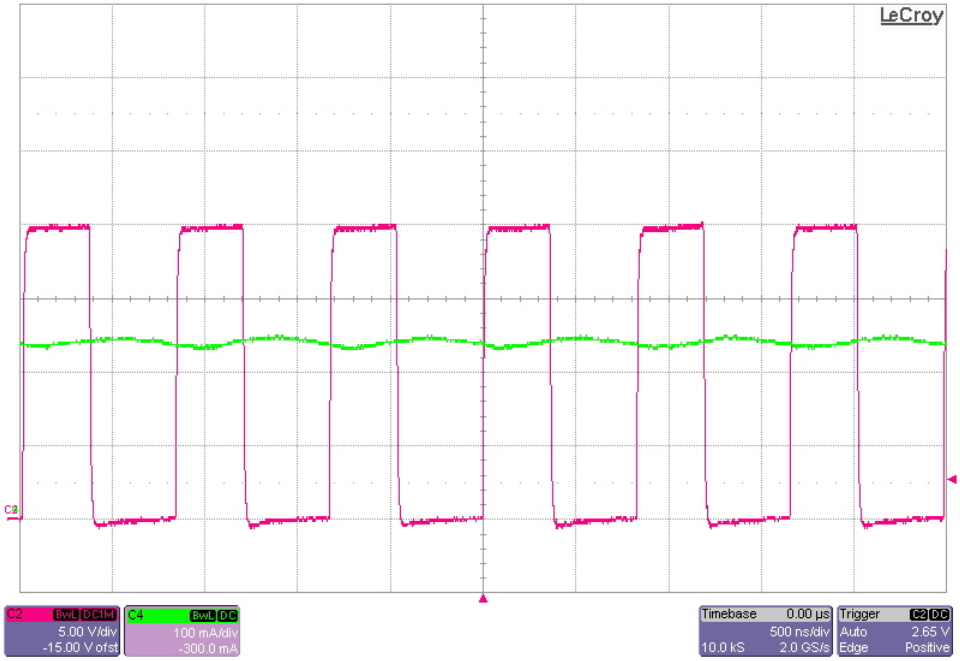
3 LED Current Linearity versus CTRL input signal Duty Cycle

An external 0-5V, 50KHz PWM input was duty cycle modulated between 20% - 80% to adjust the LED current.

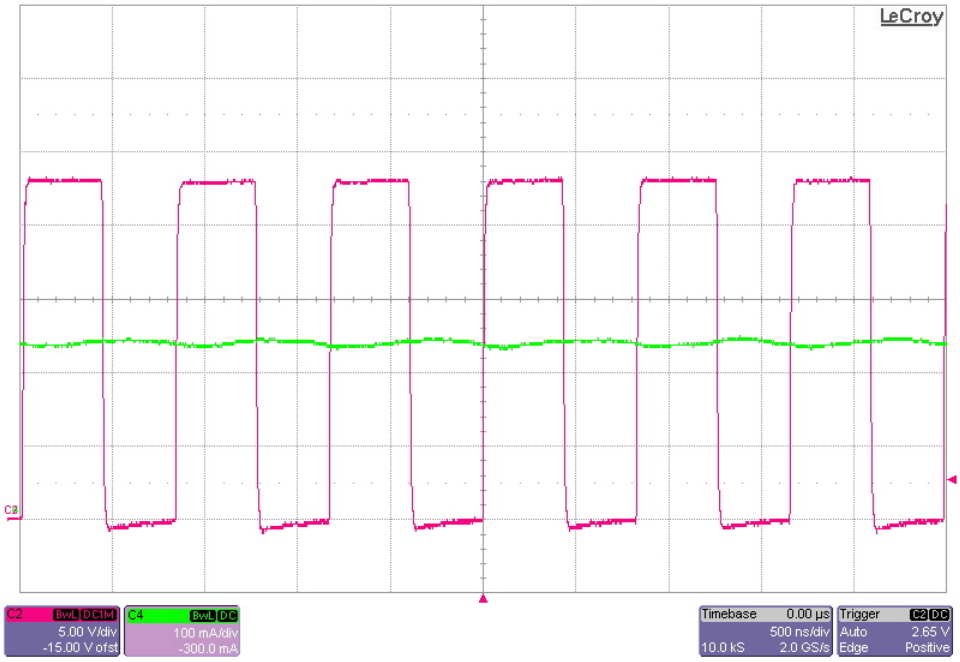


4 Switch Node Waveforms

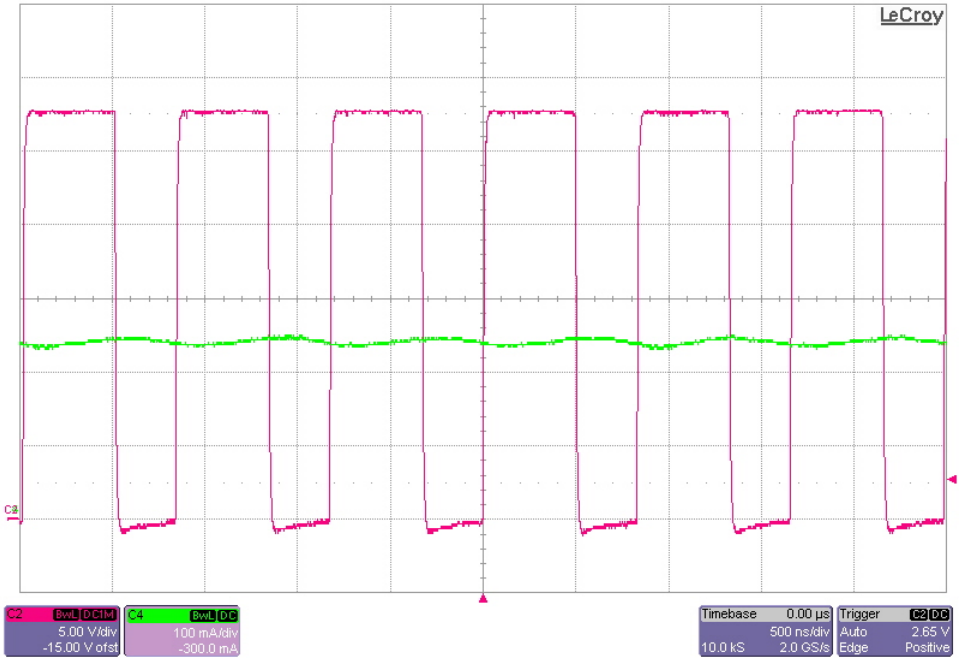
The waveform below shows the switch node voltage at TP1 and the LED current. The input voltage is 8.7V and the LED output is 0.24A. (5V/DIV, 100mA/DIV, 500nS/DIV)



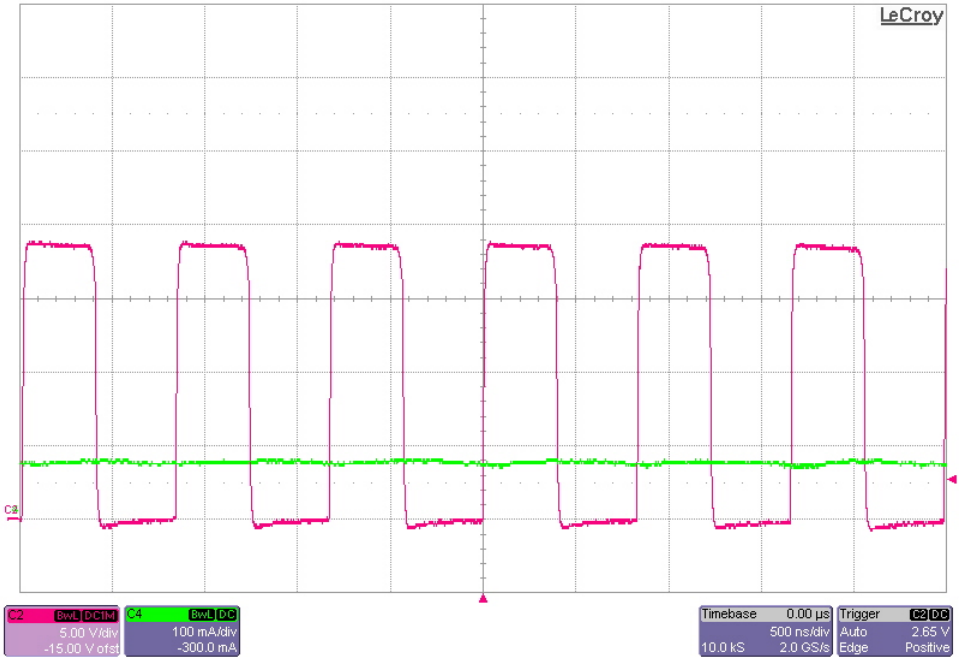
The waveform below shows the switch node voltage at TP1 and the LED current. The input voltage is 12V and the LED output is 0.24A. (5V/DIV, 100mA/DIV, 500nS/DIV)



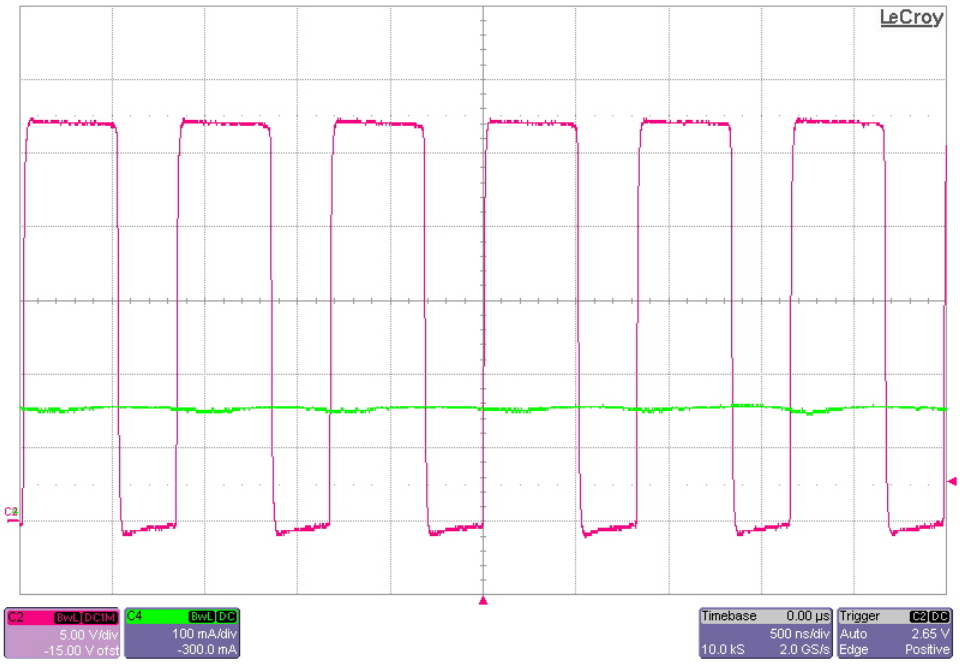
The waveform below shows the switch node voltage at TP1 and the LED current. The input voltage is 16.5V and the LED output is 0.24A. (5V/DIV, 100mA/DIV, 500nS/DIV)



The waveform below shows the switch node voltage at TP1 and the LED current. An external 0-5V, 50KHz PWM input signal was connected to the CTRL input with the duty cycle set to 32% to adjust the LED current to 0.079A. The input voltage was set to 8.7V. The converter is in DCM operation at this LED current and below. (5V/DIV, 100mA/DIV, 500nS/DIV)

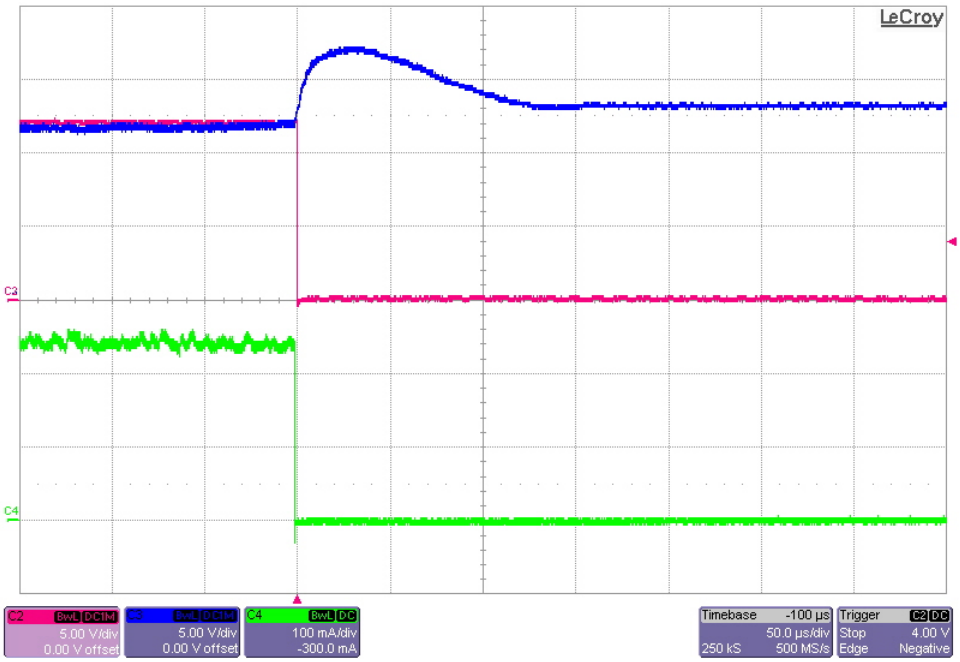


The waveform below shows the switch node voltage at TP1 and the LED current. An external 0-5V, 50KHz PWM input signal was connected to the CTRL input with the duty cycle set to 64% to adjust the LED current to 0.156A. The input voltage was set to 16.5V. The converter is in DCM operation at this LED current and below. (5V/DIV, 100mA/DIV, 500nS/DIV)



5 Open LED Test

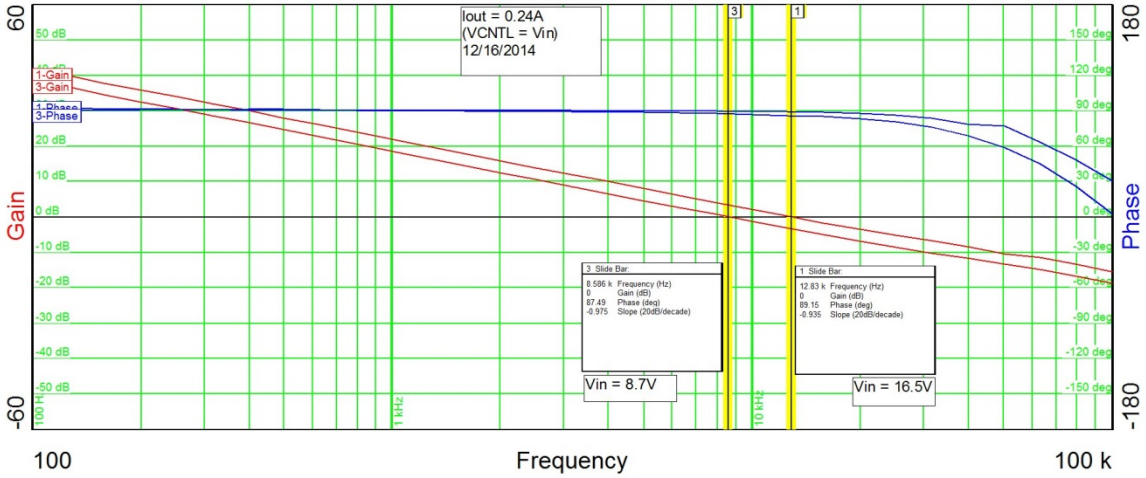
The waveform below shows the LED current (GREEN), Output Voltage (BLUE), and the /OPENLED signal after the LED is removed. The input voltage is 12V and the LED output is 0.24A.
(5V/DIV, 100mA/DIV, 50uS/DIV)



6 Control Loop Gain / Stability

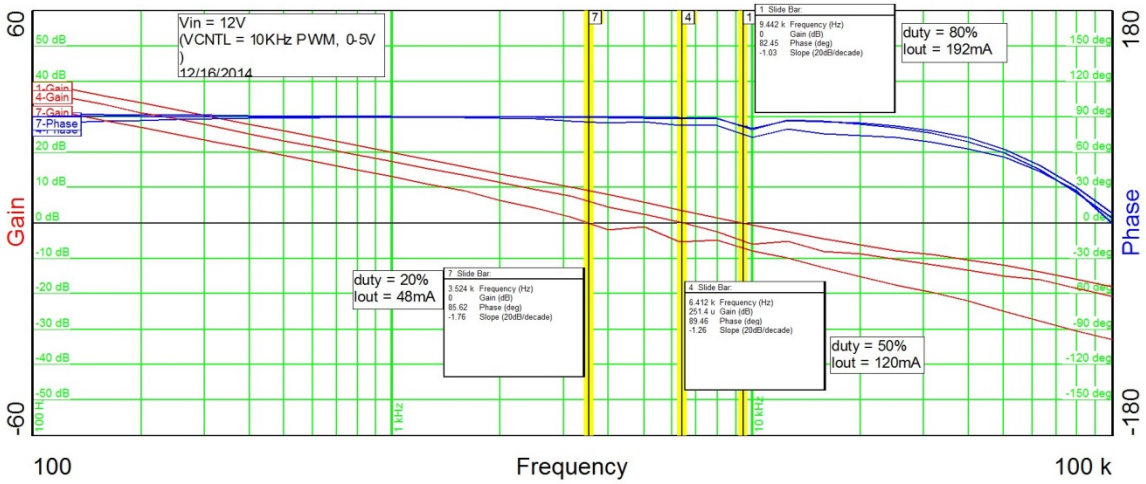
The plot below shows the converter's gain and phase margin when the LED current is 0.24A.

Vin = 8.7V	Band Width = 8.59KHz	Phase Margin = 87 degrees
Vin = 16.5V	Band Width = 12.8KHz	Phase Margin = 89 degrees



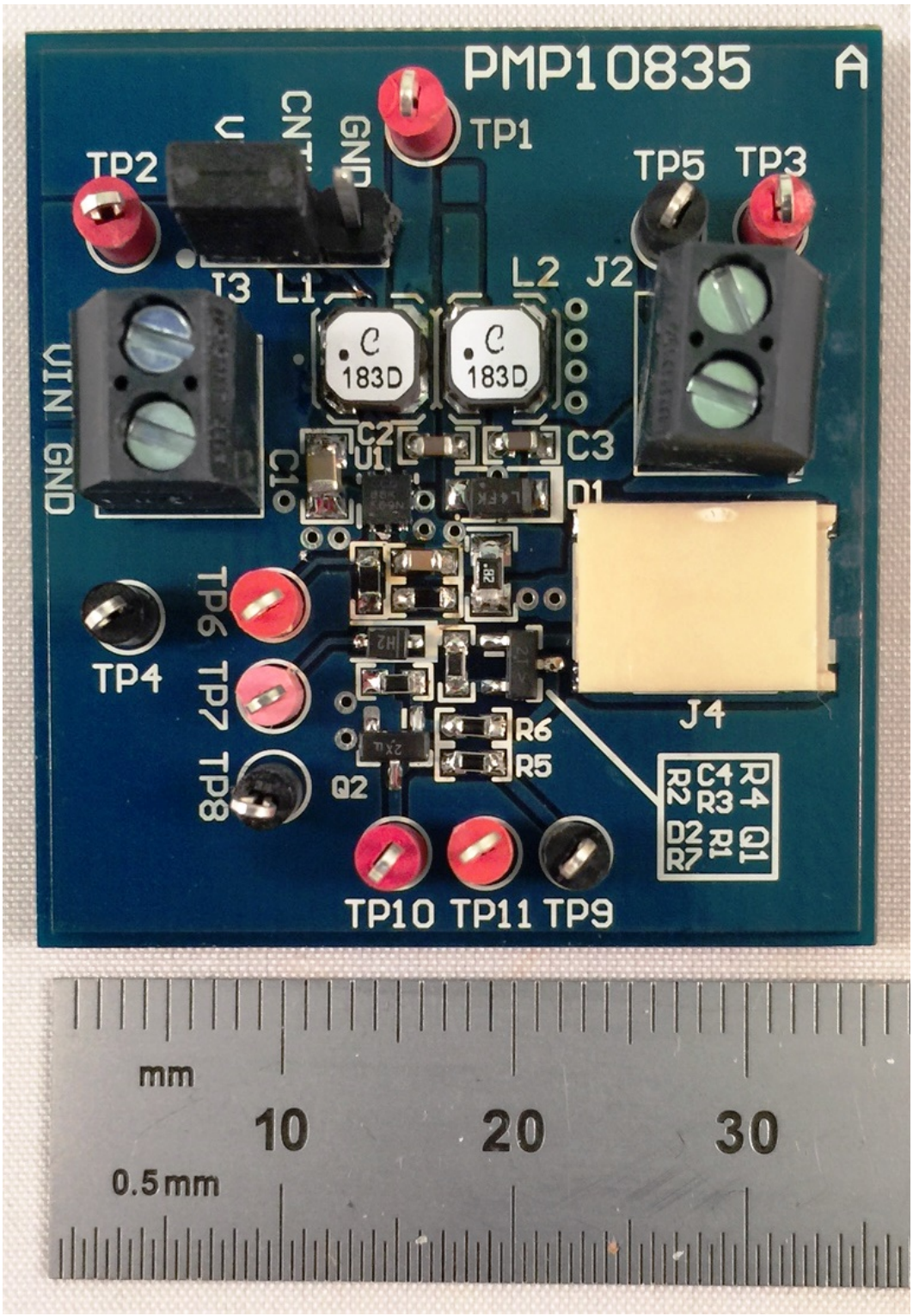
The plot below shows the converter's gain and phase margin for Vin = 12V. An external 0-5V, 50KHz PWM input signal was connected to the CTRL input with the duty cycle adjusted to vary the LED current.

I LED = 0.048A	Band Width = 3.52KHz	Phase Margin = 86 degrees
I LED = 0.120A	Band Width = 6.41KHz	Phase Margin = 89 degrees
I LED = 0.192A	Band Width = 9.44KHz	Phase Margin = 82 degrees



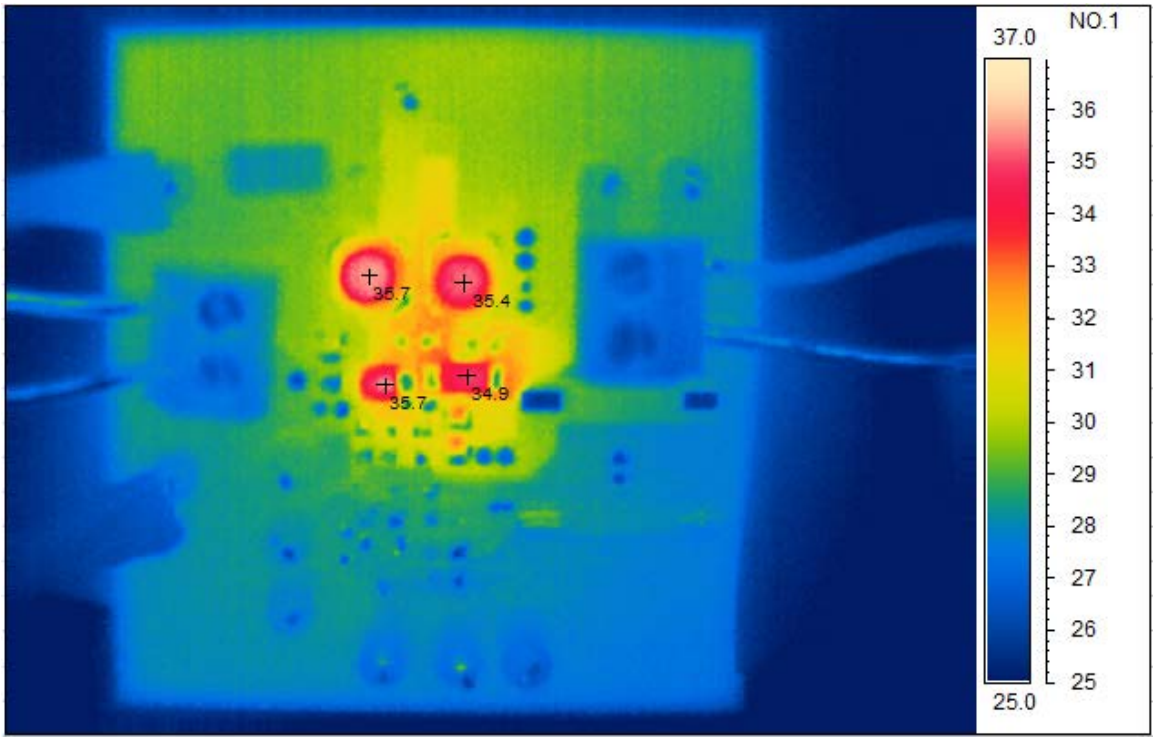
7 Photo

The photo below shows the PMP10835 REVB assy built on the REVA PWB.



8 Thermal Image

The thermal image below shows operation at 12V input and an LED current of 0.24A, with no airflow.



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