

## 1 Startup

The startup waveform with input voltage=5V is shown in Figure 1 to Figure 2.

The Load was set to full load.

Channel C1: **input voltage**  
 Channel C2: **output voltage 1.2V@4.9A**  
 Channel C3: **output voltage 1.8V@2.9A**  
 Channel C4: **output voltage 1.0V@2.0A**

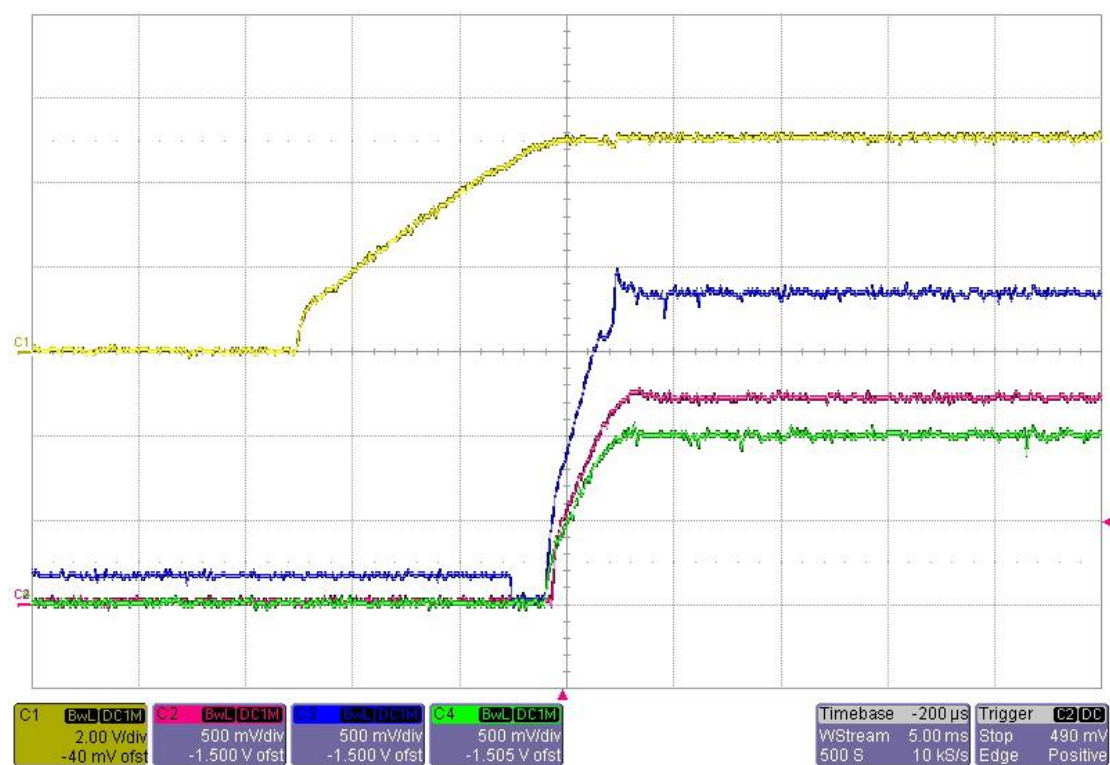
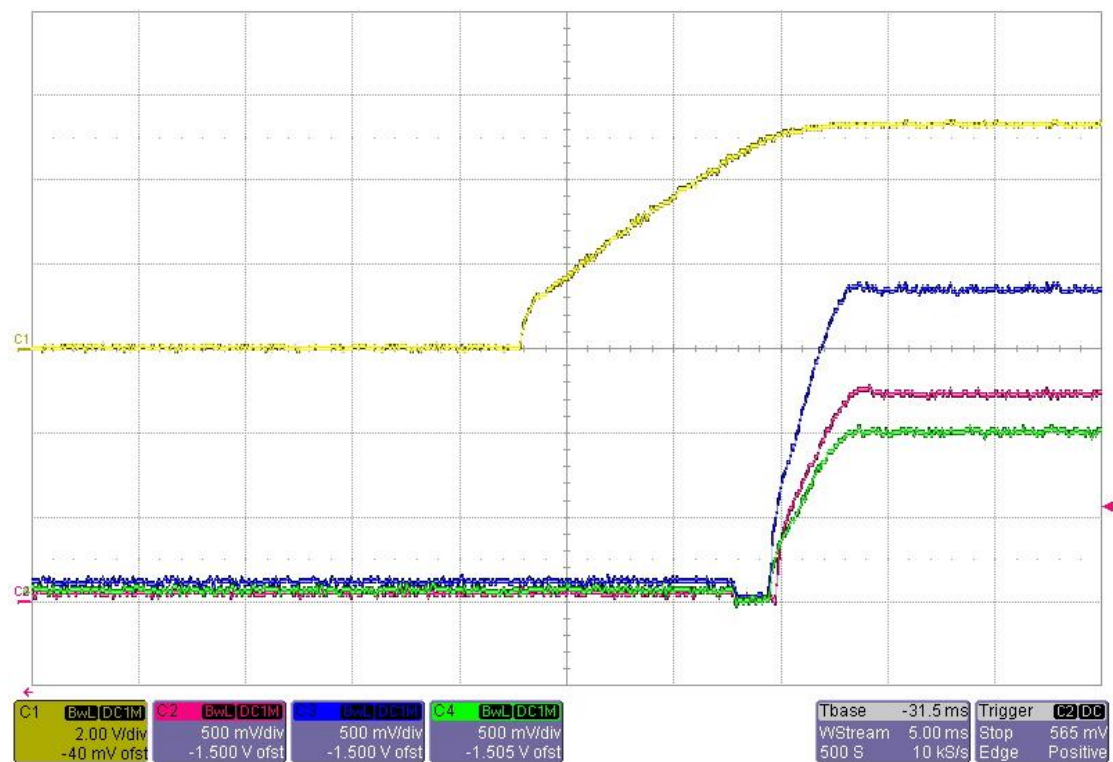


Figure 1

Startup with no load at the outputs.

Channel C1: **input voltage**  
 Channel C2: **output voltage 1.2V@0A**  
 Channel C3: **output voltage 1.8V@0A**  
 Channel C4: **output voltage 1.0V@0A**



**Figure 2**

## 2 Shutdown

The shutdown waveform is shown in Figure 3.

The input voltage is set at 5V with full load at the outputs

Channel C1: **input voltage**

Channel C2: **output voltage 1.2V@4.9A**

Channel C3: **output voltage 1.8V@2.9A**

Channel C4: **output voltage 1.0V@2.0A**

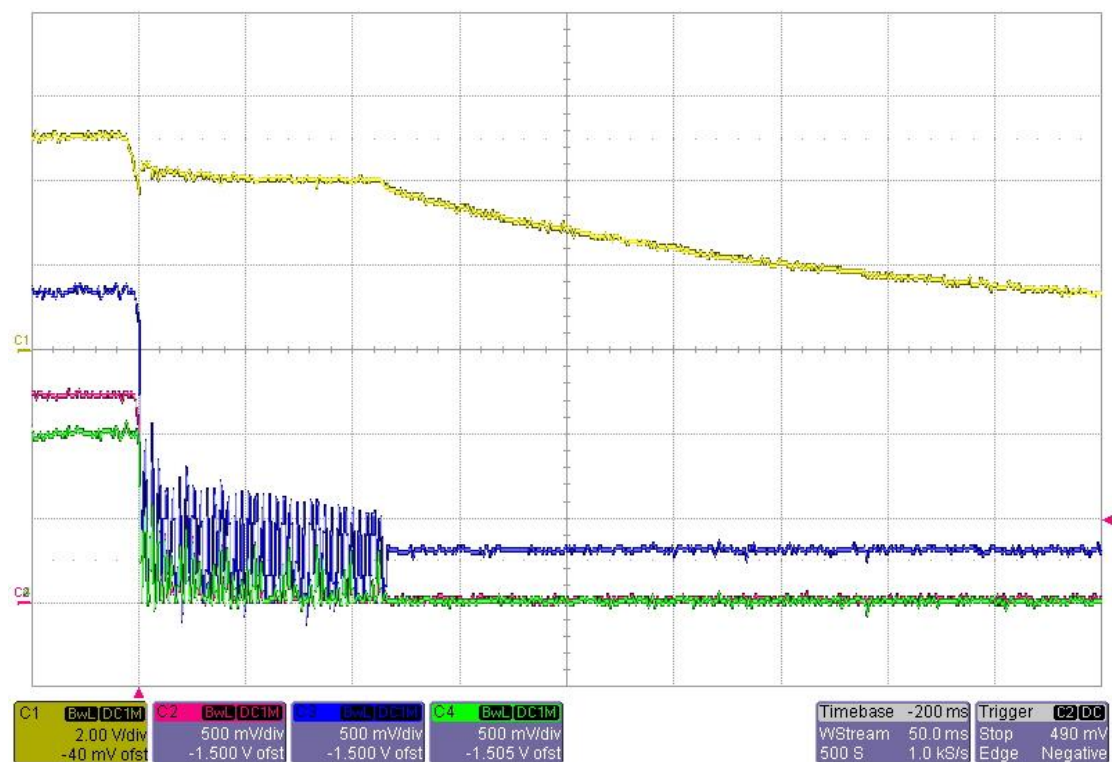
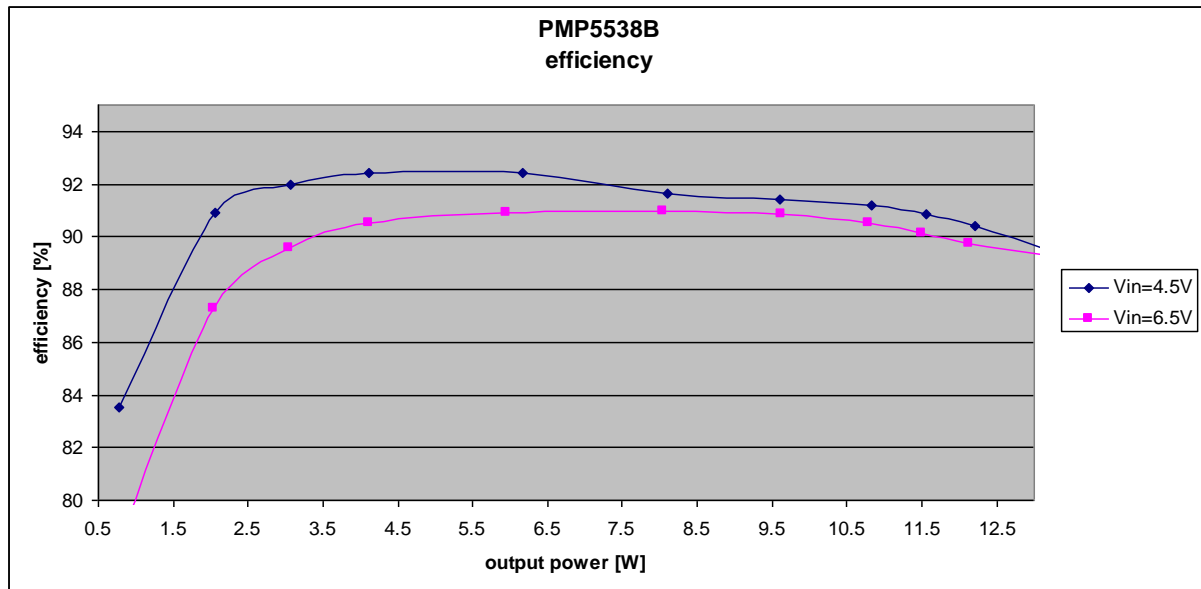


Figure 3

### 3 Efficiency

The efficiency with different input voltages is shown in Figure 4.



**Figure 4**

## 4 Load regulation

The load regulation with different input voltages is shown in Figure 5.

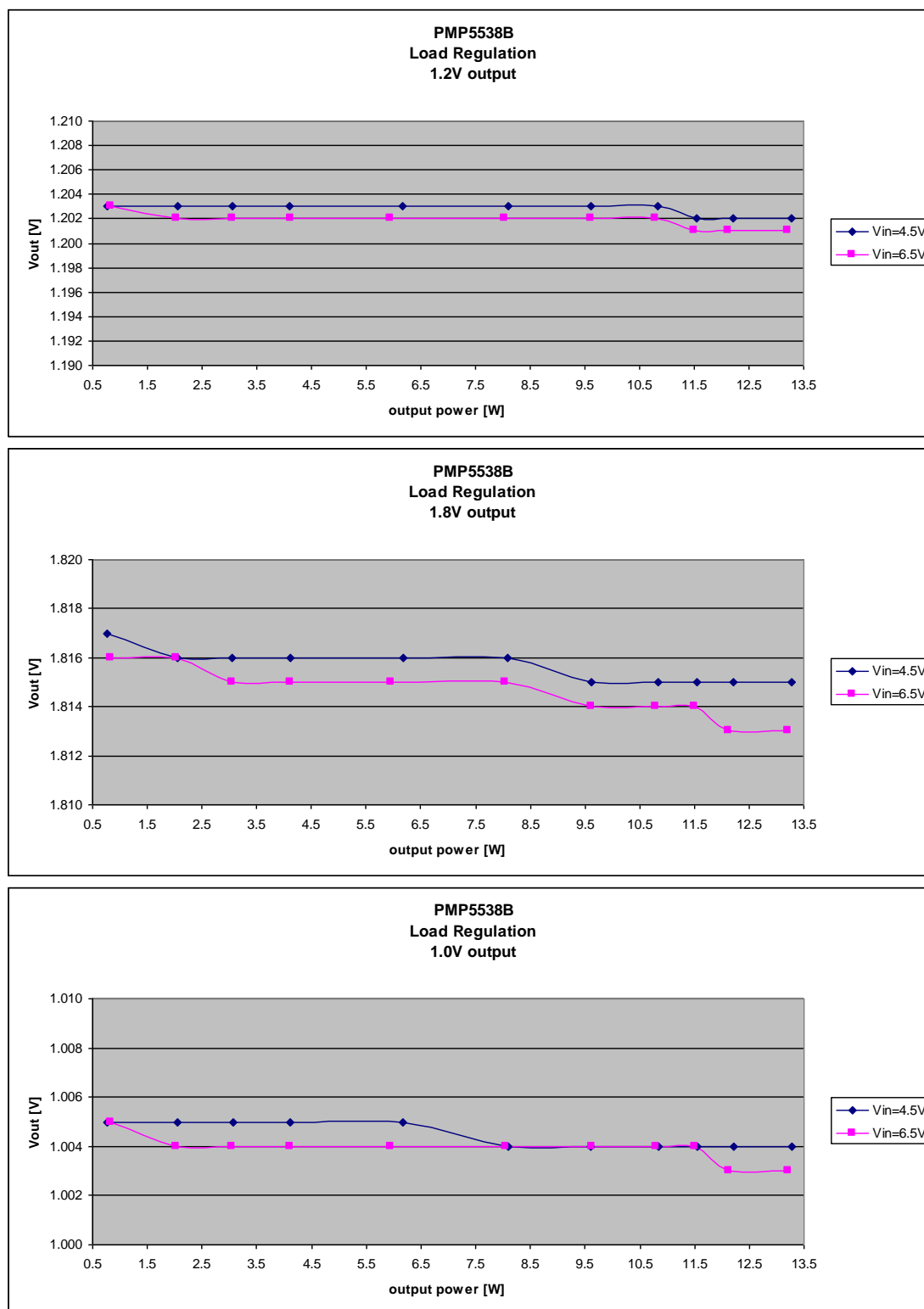


Figure 5

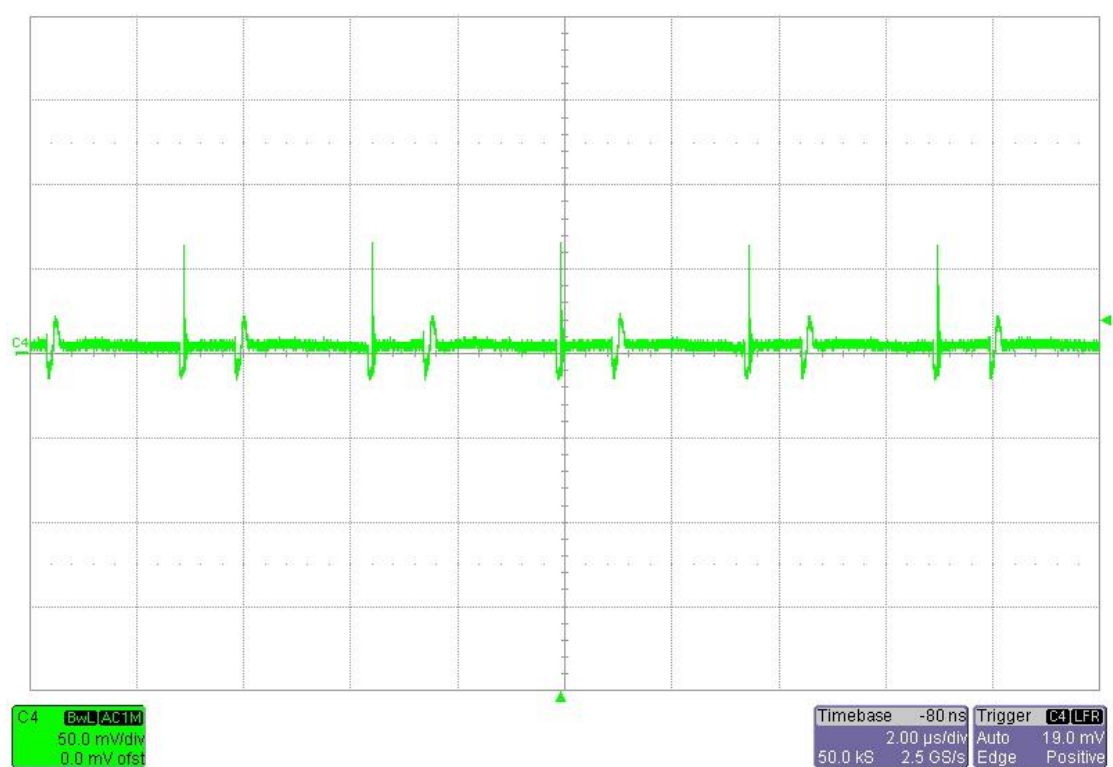
## 5 Output ripple voltage

The output ripple voltage at full load and 5V at the input shown is shown in Figure 6 to Figure 8.

Channel 4: output 1.2V

Input voltage = 5V

Load current = 4.9A

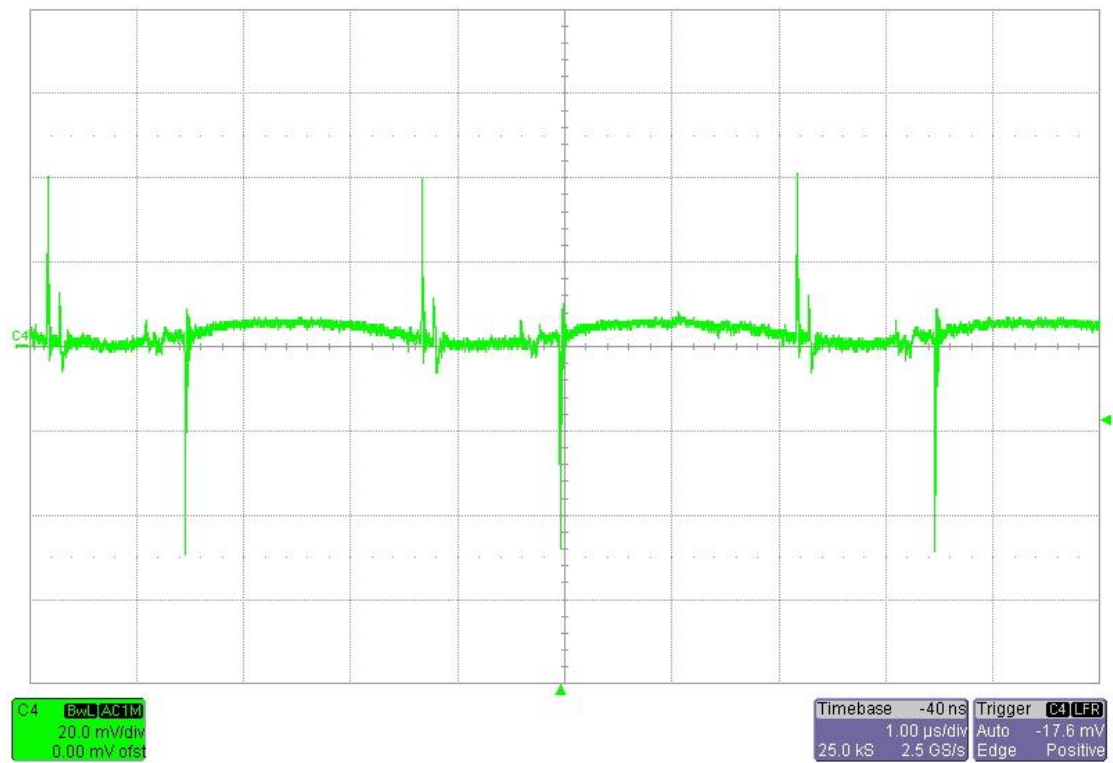


**Figure 6**

Channel 4: output 1.8V

Input voltage = 5V

Load current = 2.9A

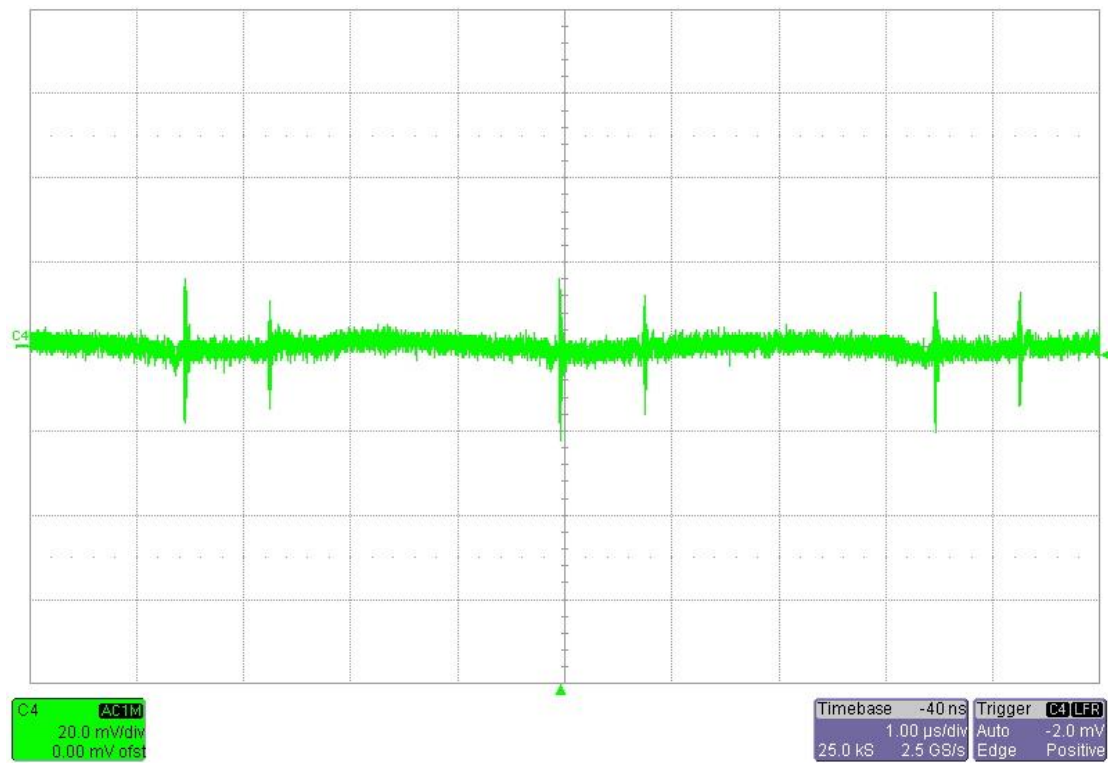


**Figure 7**

Channel 4: output 1.0V

Input voltage = 5V

Load current = 2.0A



**Figure 8**



## 6 Load transients

The response to a load step and a load dump at an input voltage of 5V is shown in Figure 9 to Figure 11.

Channel C3: **load current**, load step 2.45A to 4.9A

Channel C4: **output 1.2V**, AC coupled

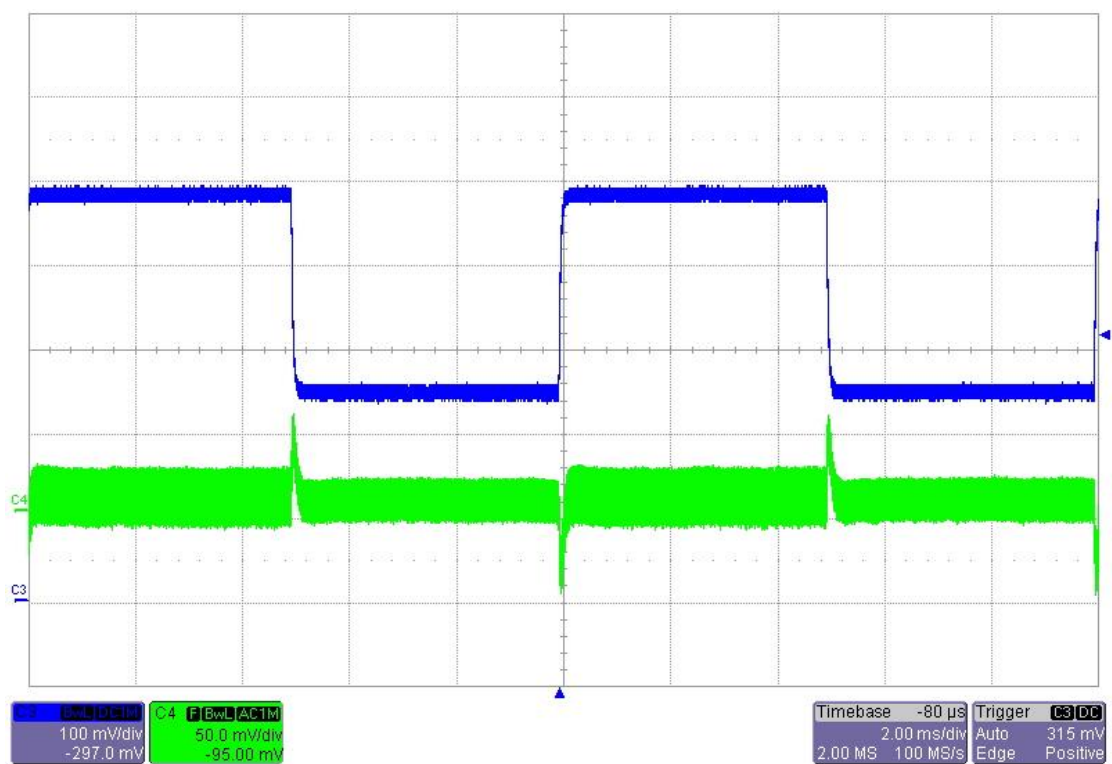
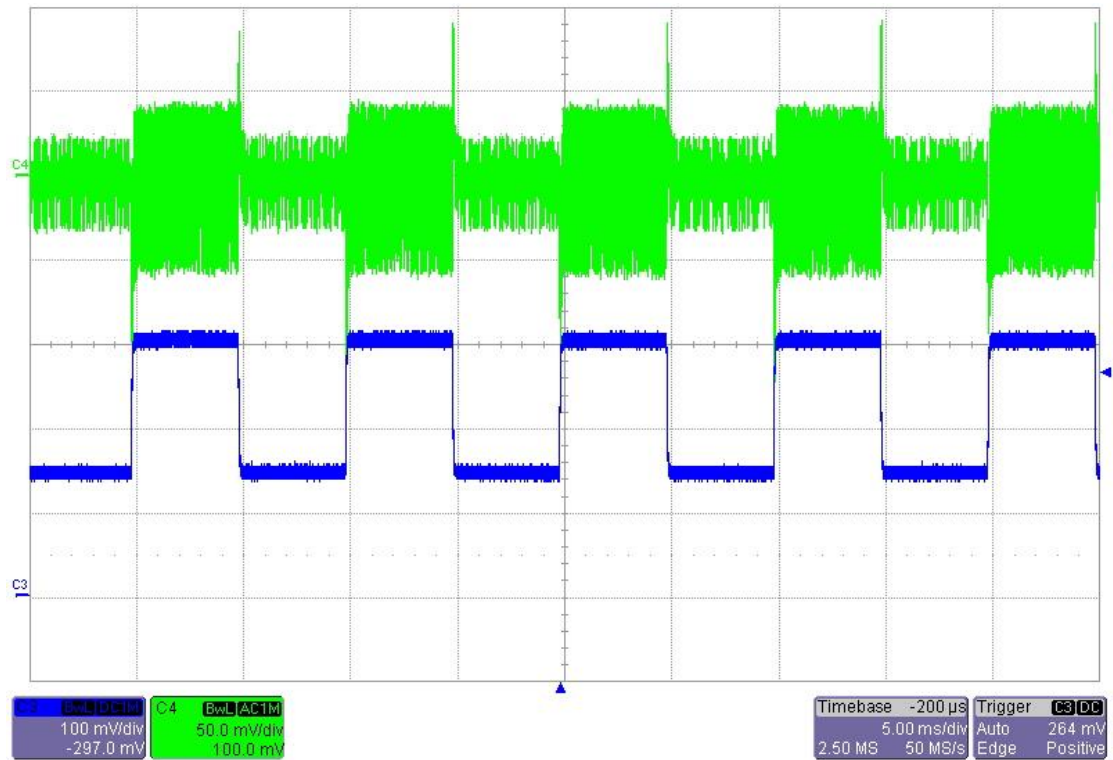


Figure 9

Channel C3: **load current**, load step 1.45A to 2.9A

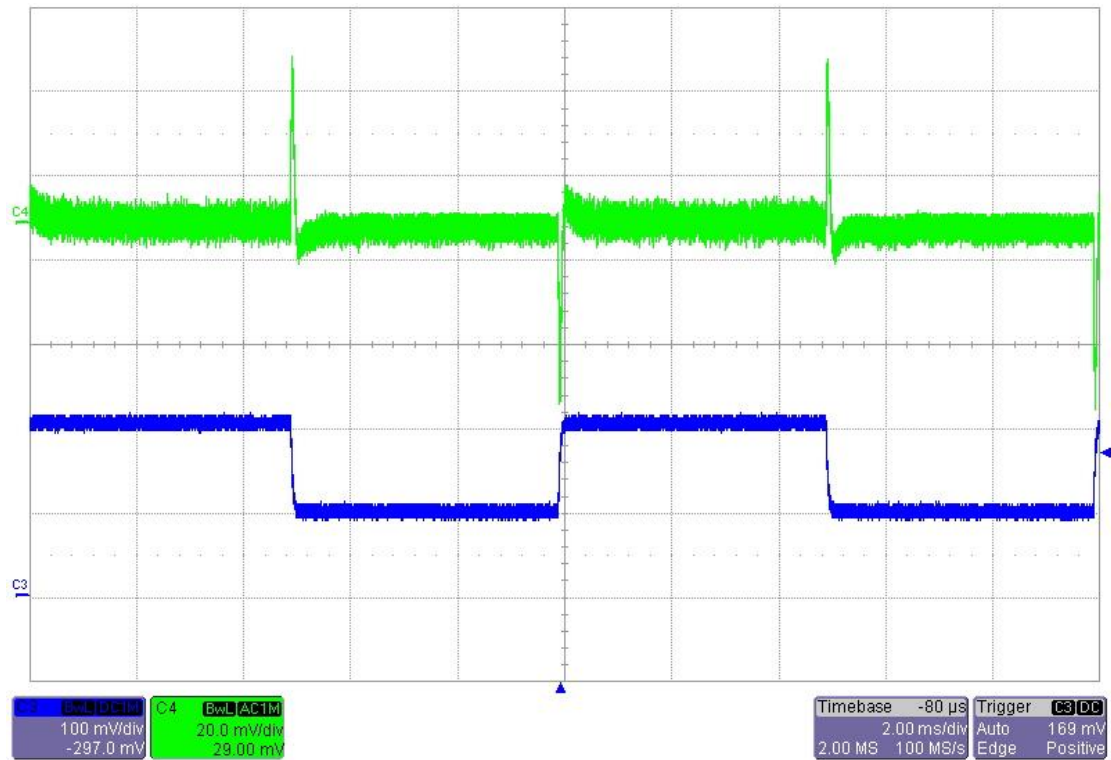
Channel C4: **output 1.8V**, AC coupled



**Figure 10**

Channel C3: **load current**, load step 1.0A to 2.0A

Channel C4: **output 1.0V**, AC coupled

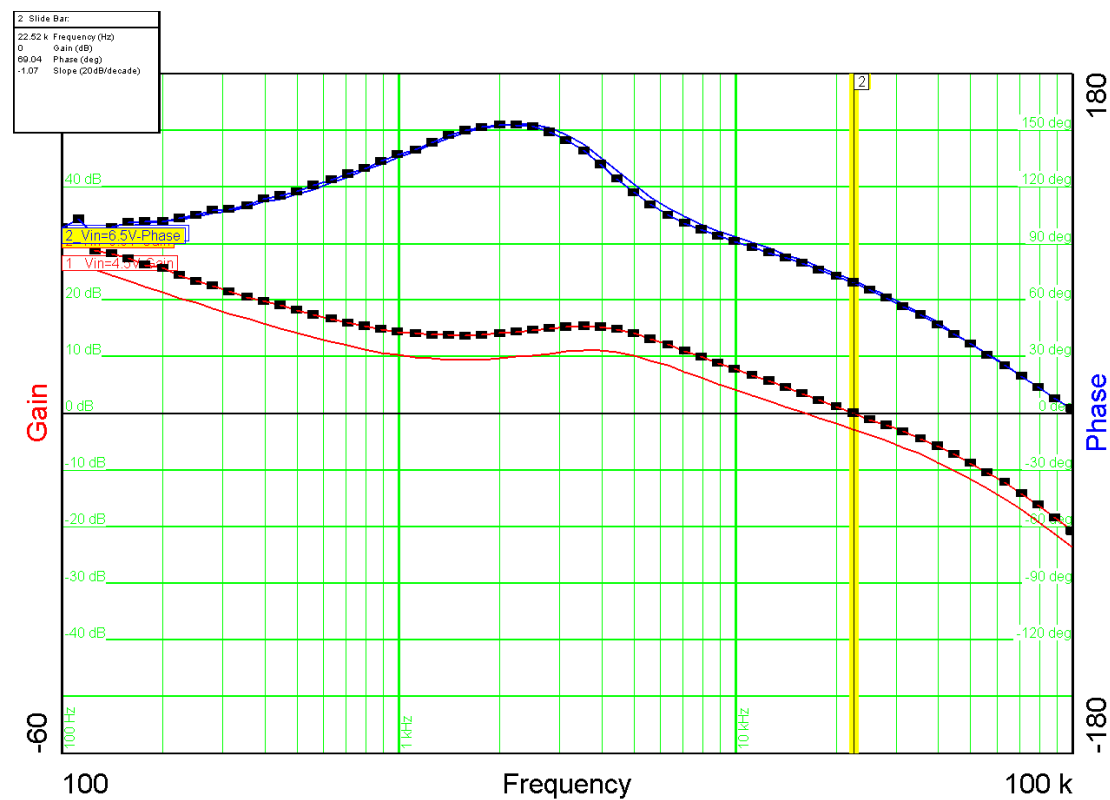


**Figure 11**

## 7 Frequency response

Figure 12 to Figure 14 show the loop response with 4.5V and 6.5V at the input and full load at the output.

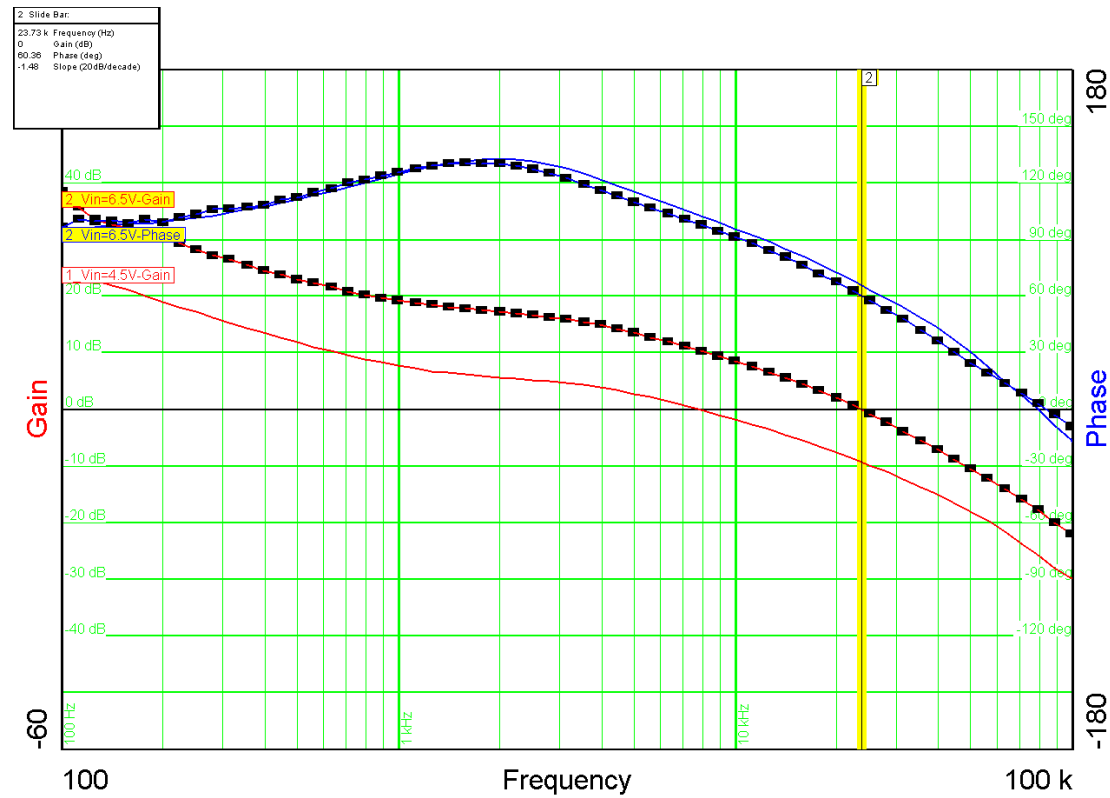
Output 1.2V@4.9A:



**Figure 12**

69.0° phase margin @ crossover frequency 22.5kHz ( $V_{in}=6.5V$ )

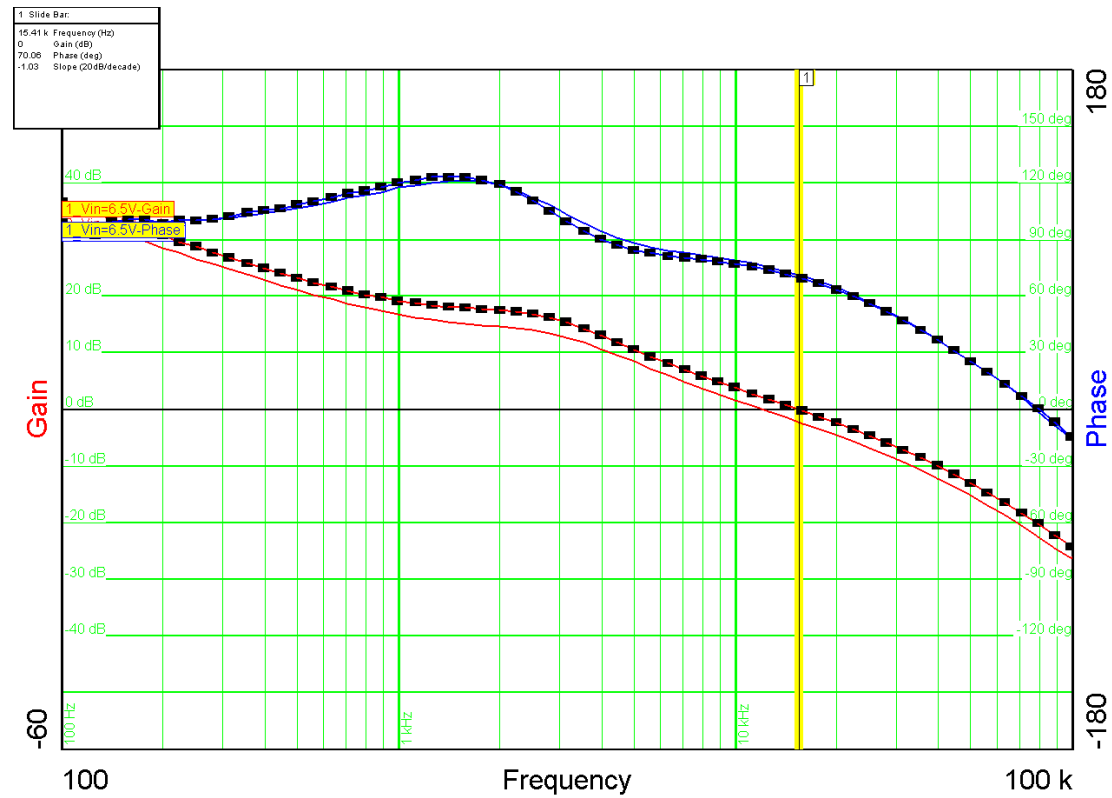
Output 1.8V@2.9A:



**Figure 13**

60.3° phase margin @ crossover frequency 23.7kHz (Vin=6.5V)

Output 1.0V@2.0A:



**Figure 14**

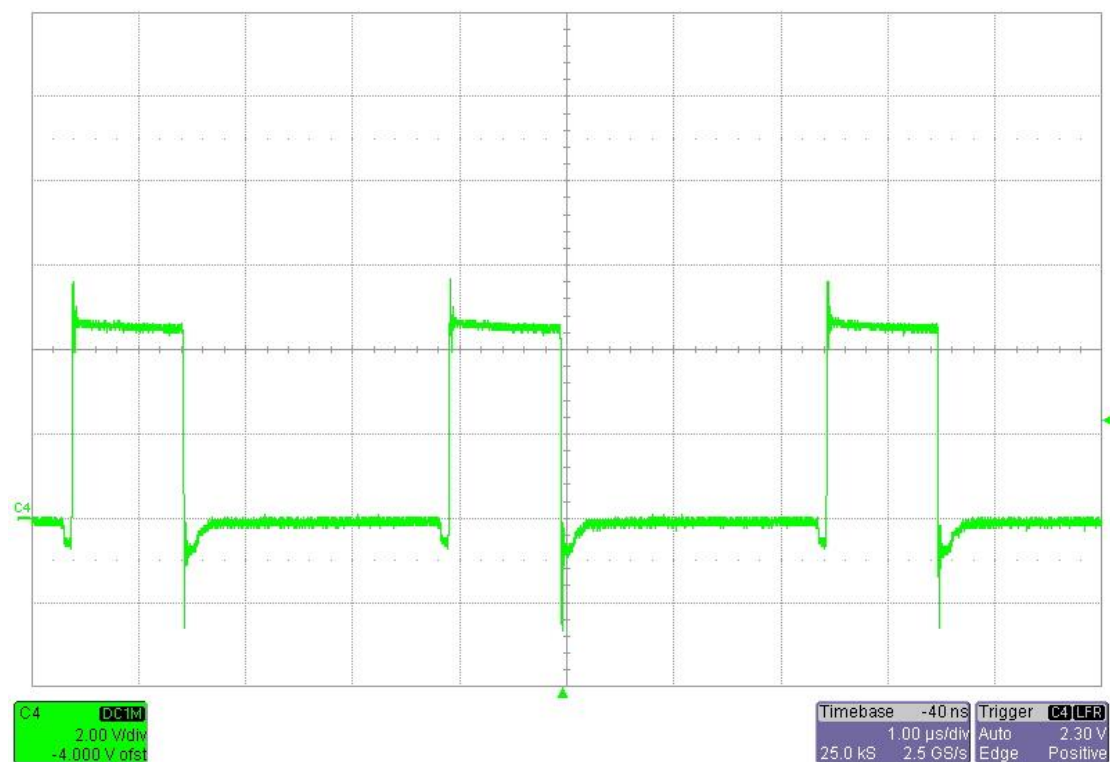
70.0° phase margin @ crossover frequency 15.4kHz (Vin=6.5V)

## 8 Miscellaneous waveforms

The drain-source voltages on the switch node are shown in Figure 15 to Figure 17. The input voltage was set to 5V.

Channel C4: switchnode 1.2V output

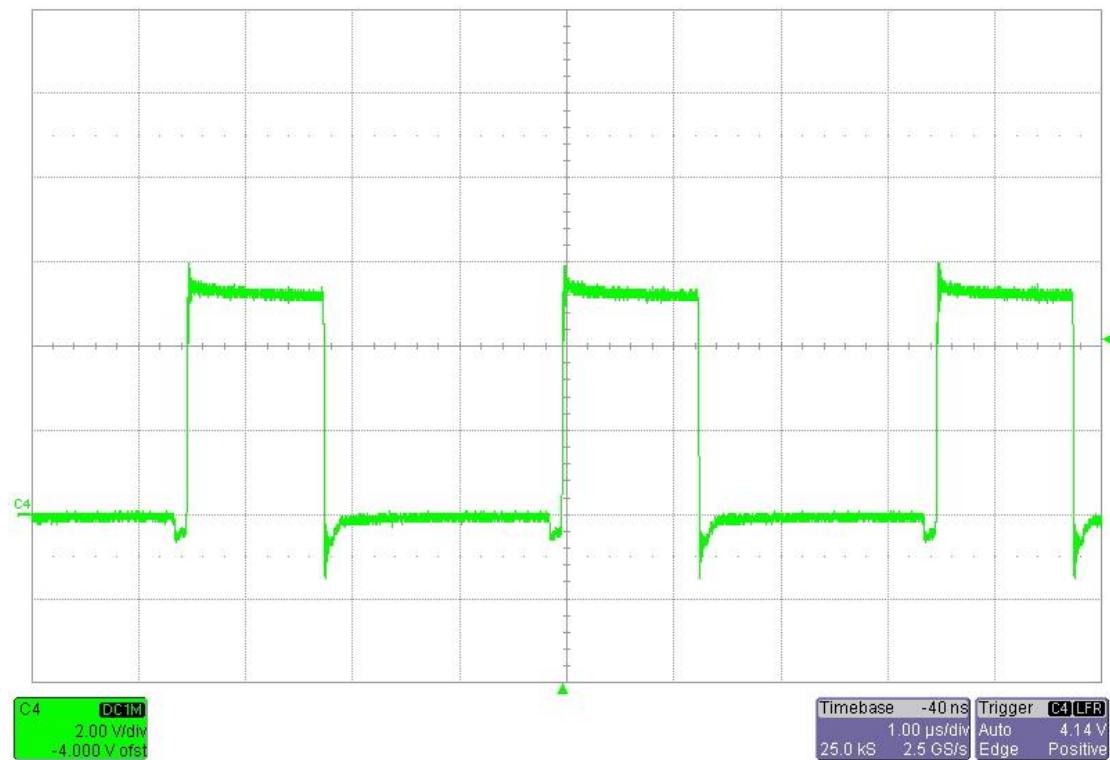
Load current = 4.9A



**Figure 15**

Channel C4: switchnode 1.8V output

Load current = 2.9A

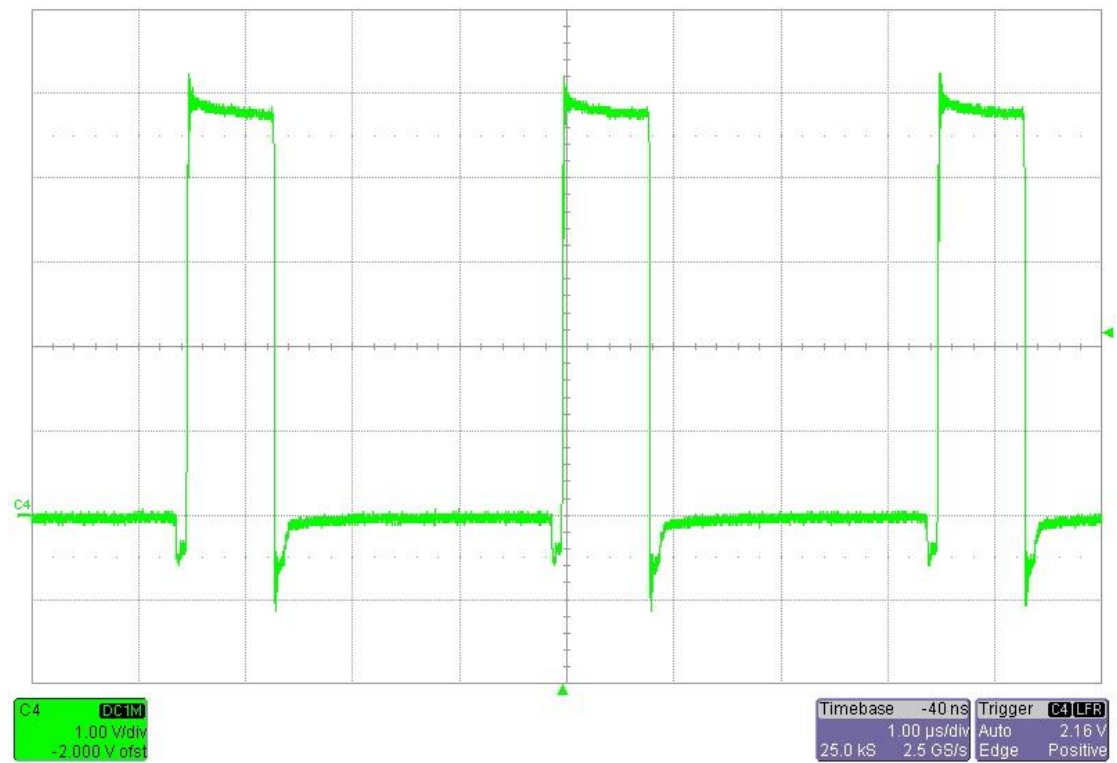


**Figure 16**



Channel C4: switchnode 1.0V output

Load current = 2.0A



**Figure 17**

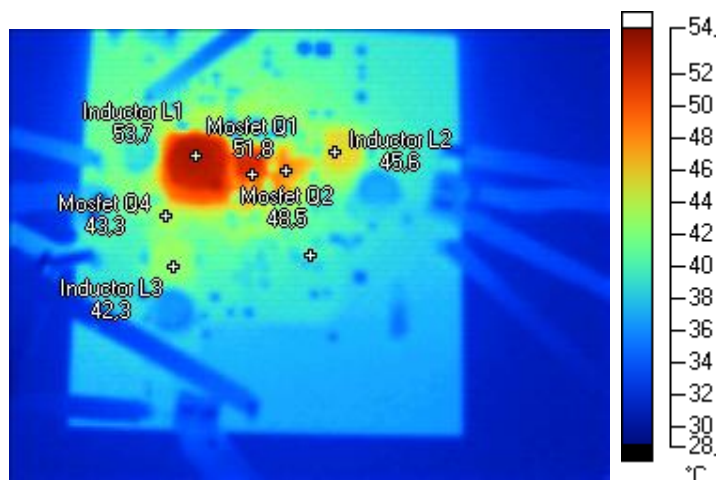
## 9 Thermal Picture

The thermal picture was taken with full load at all outputs.

1.2V@4.9A

1.8V@2.9A

1.0V@2.0A



Inductor L1	53,7 °C
Mosfet Q1	51,8 °C
Mosfet Q2	48,5 °C
Inductor L2	45,6 °C
Mosfet Q4	43,3 °C
Inductor L3	42,3 °C

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