

TEXAS INSTRUMENTS INCORPORATED

PMP20054 Rev A

Power Design Services Test Report

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4/14/2016

PMP20054 Rev A Test Results

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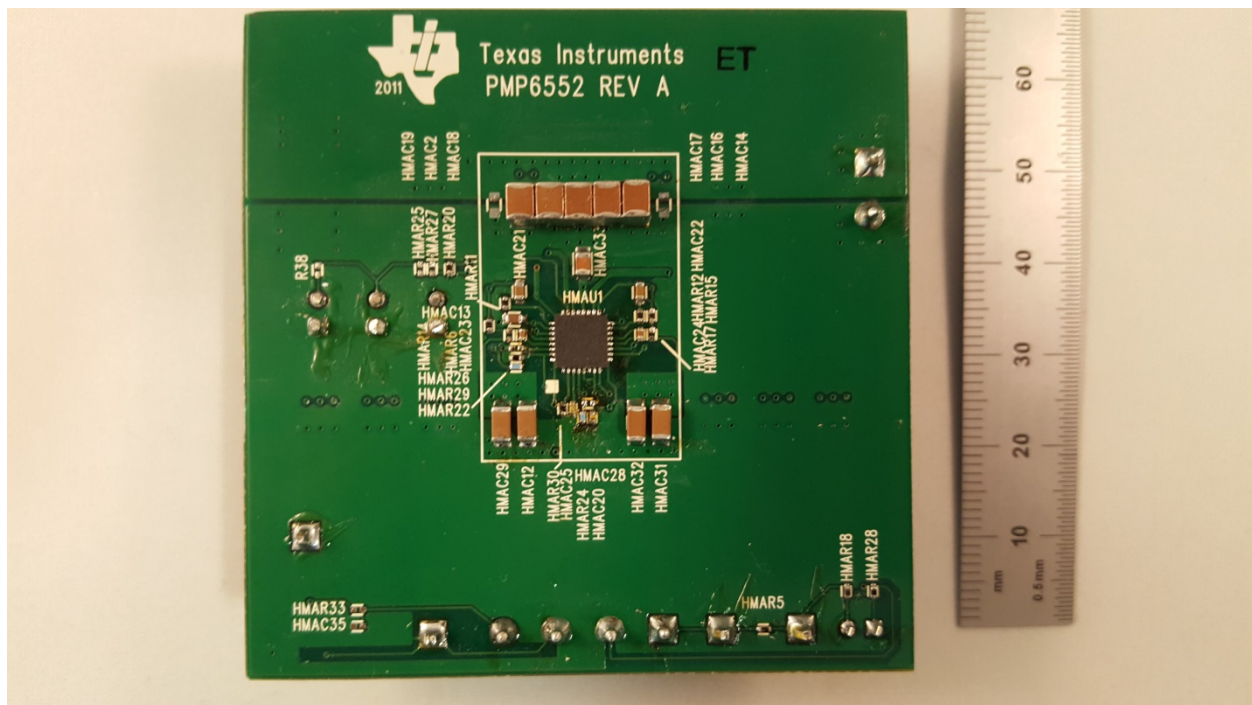
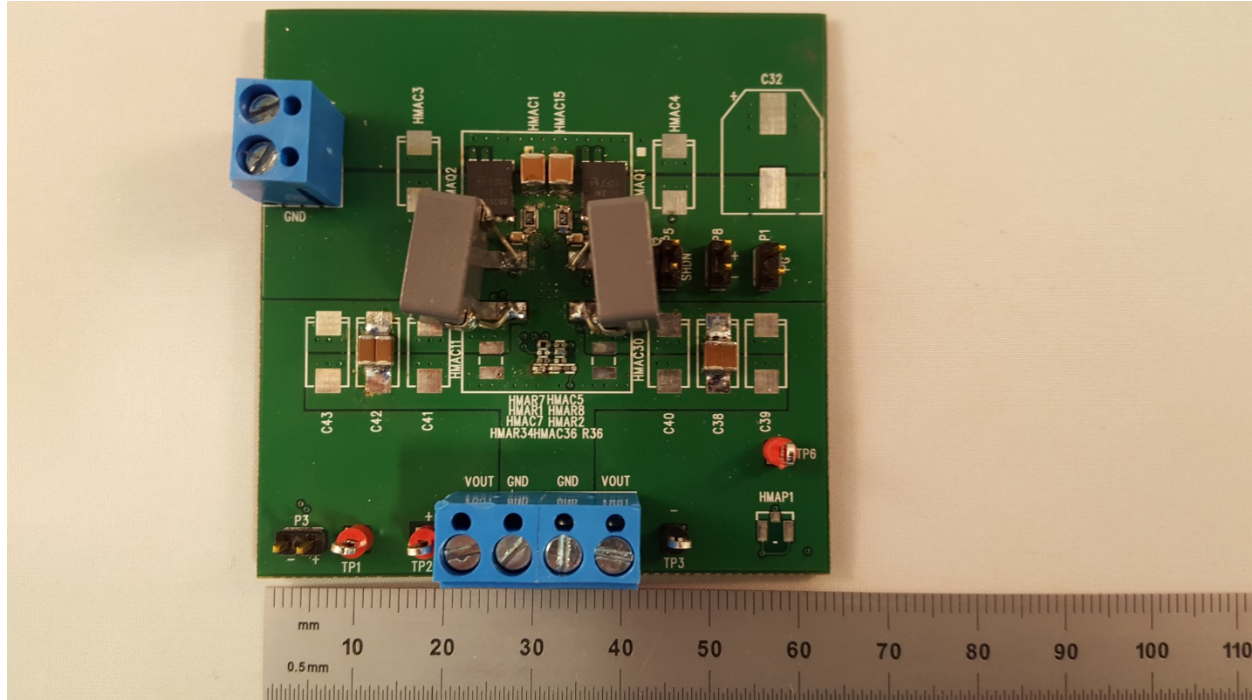
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1. PMP20054 REVA 0.85V/40A – TPS40322-DUAL PHASE

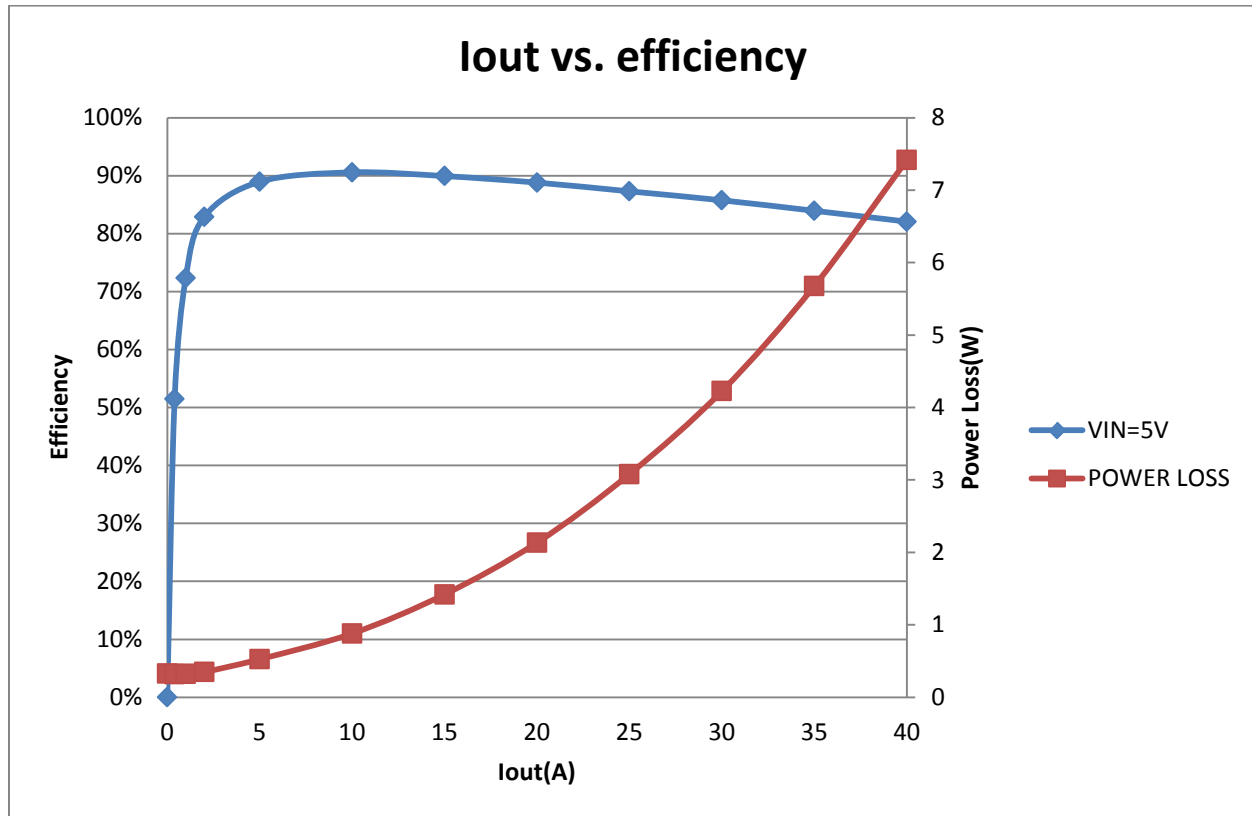
1.1 Board Photos

The top and bottom images of PMP20054 are shown below.



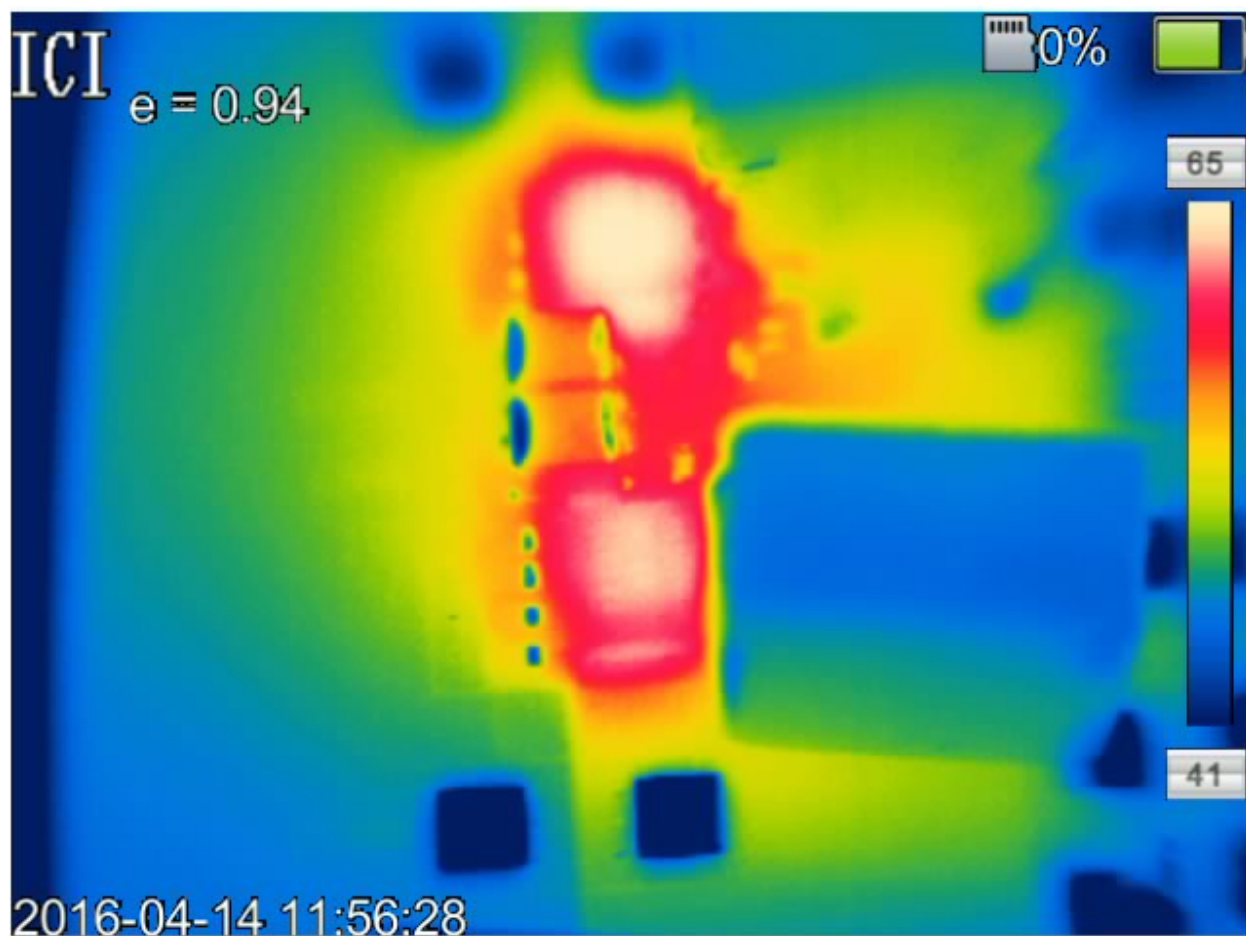
1.2 Efficiency and Power Loss

The efficiency and power loss of the power supply is shown below at 5V_{in} with natural convection.



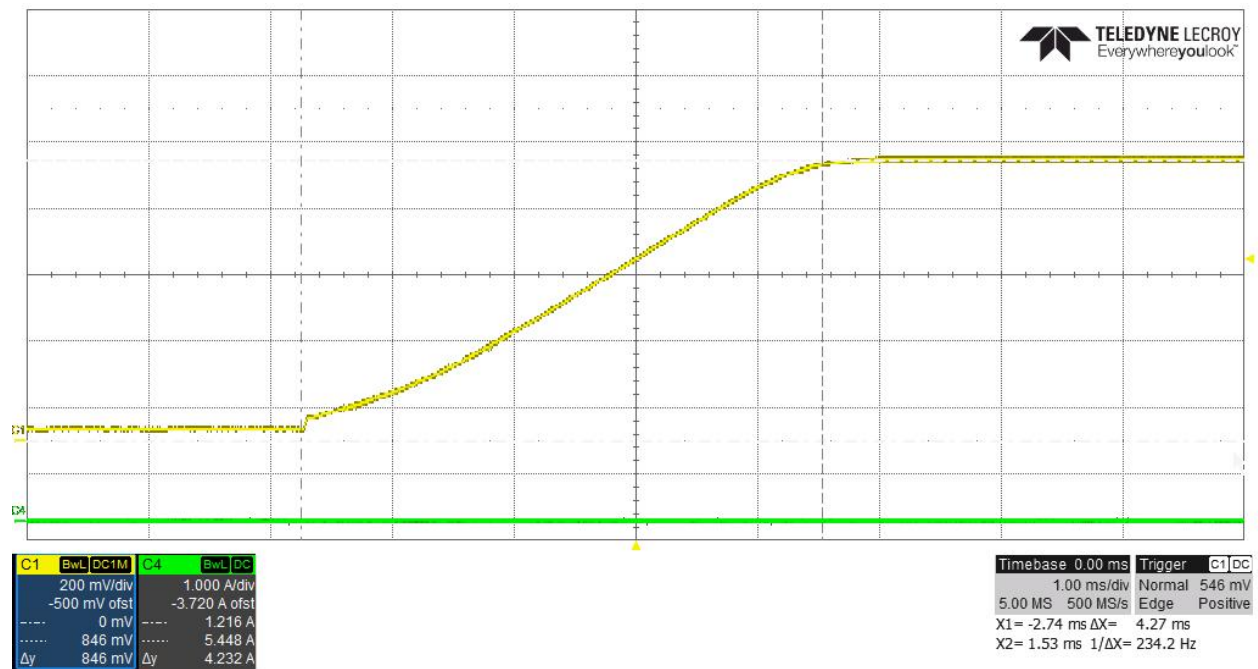
1.3 Thermal

The thermal image of the power supply is shown at room temperature with 5Vin, 40A out, and natural convection. The power supply was held on for 2 min at 40A before the measurement was taken.



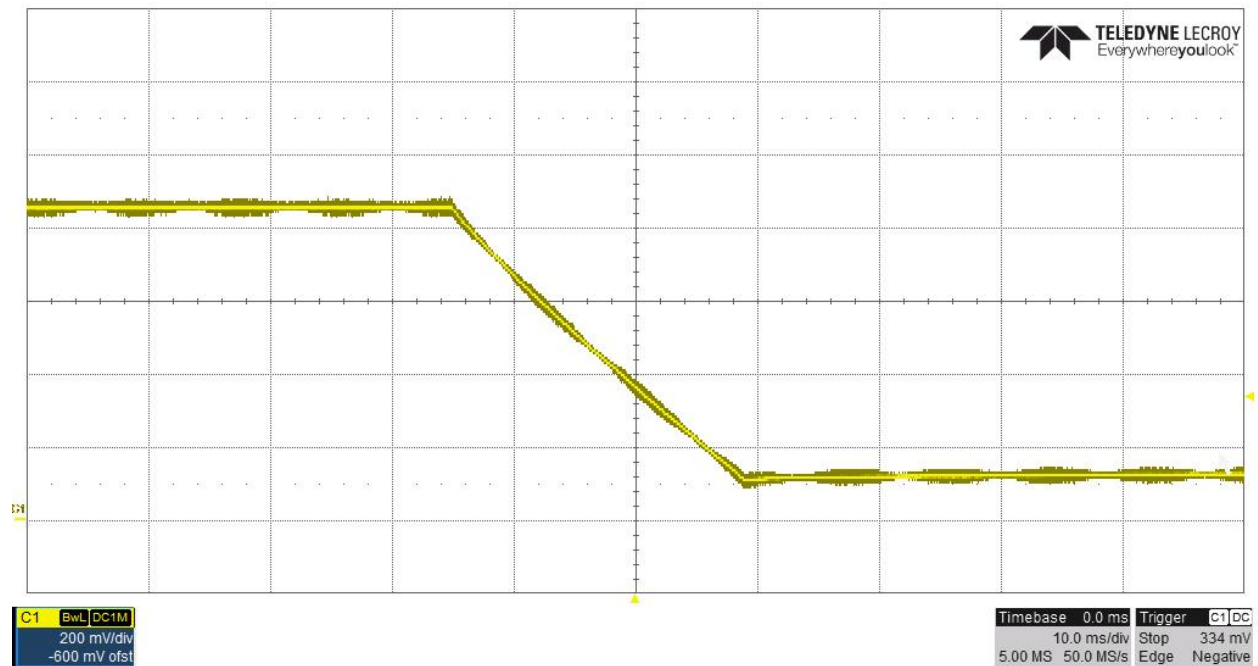
1.4 Startup

The power supply startup at 0A is shown below. The startup time is 4.27ms.



1.5 Shutdown

The shutdown of the power supply with 0A load is shown below.



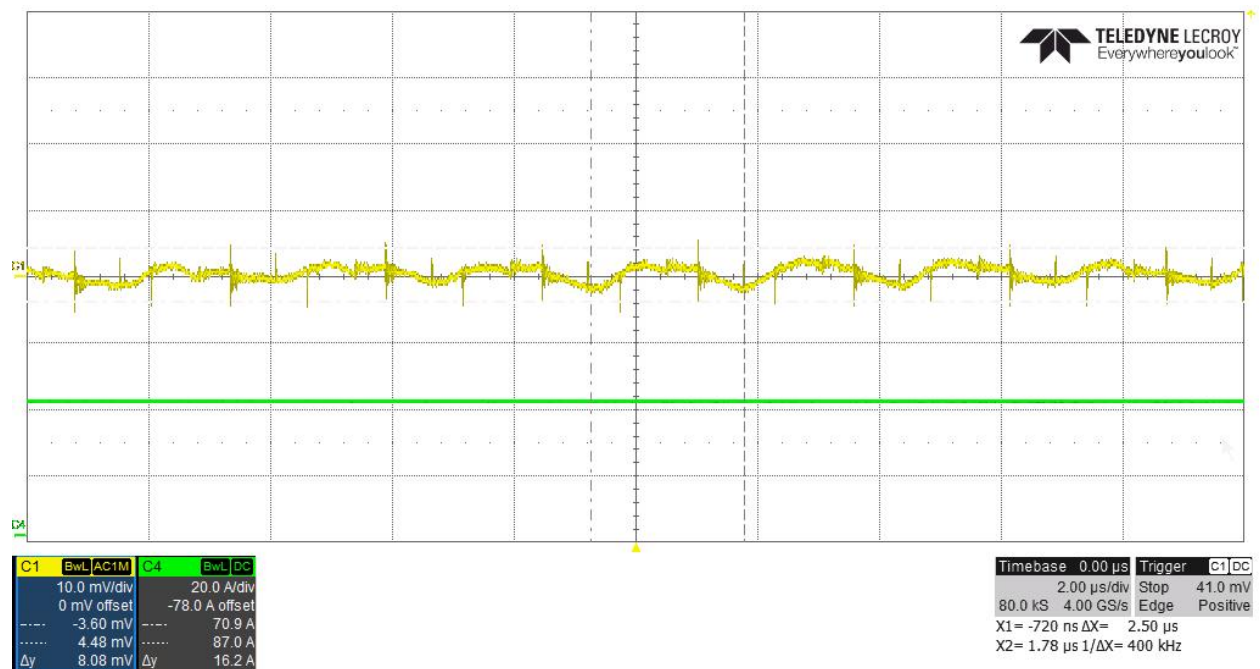
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1.6 Output Ripple

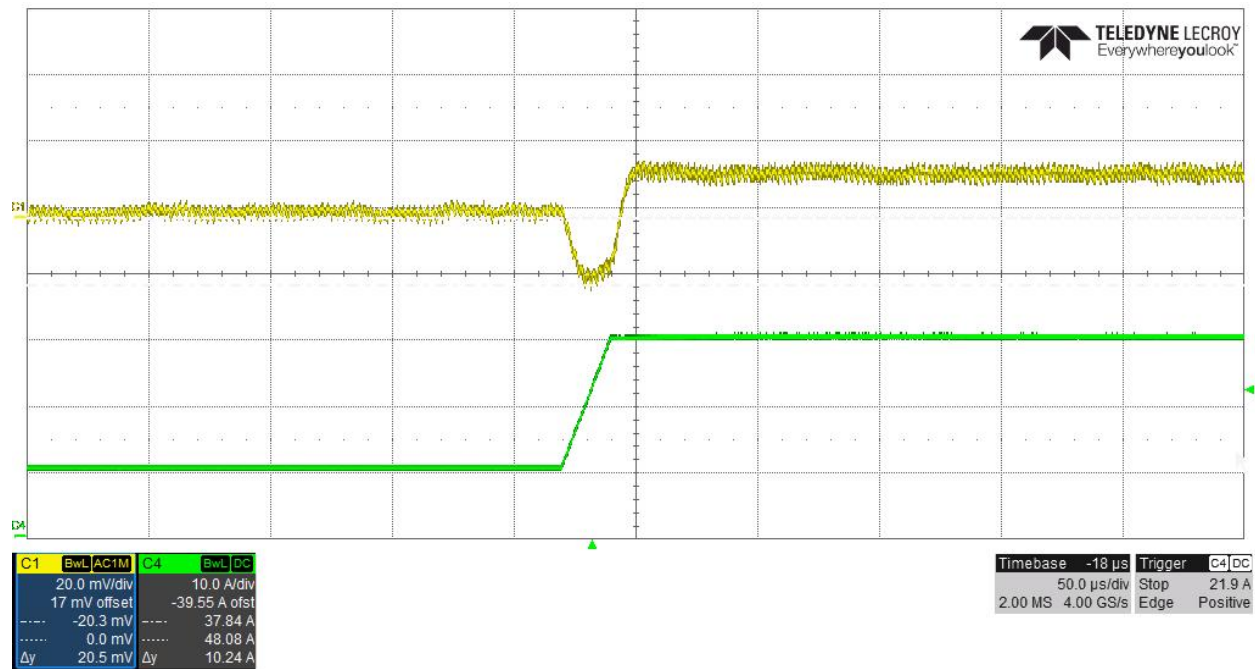
The 0.85V output ripple is shown in Yellow below. The Iout is shown in green at 0A and 40A out. Vripple was ~5.2mVpp with no load and ~8.08mVpp



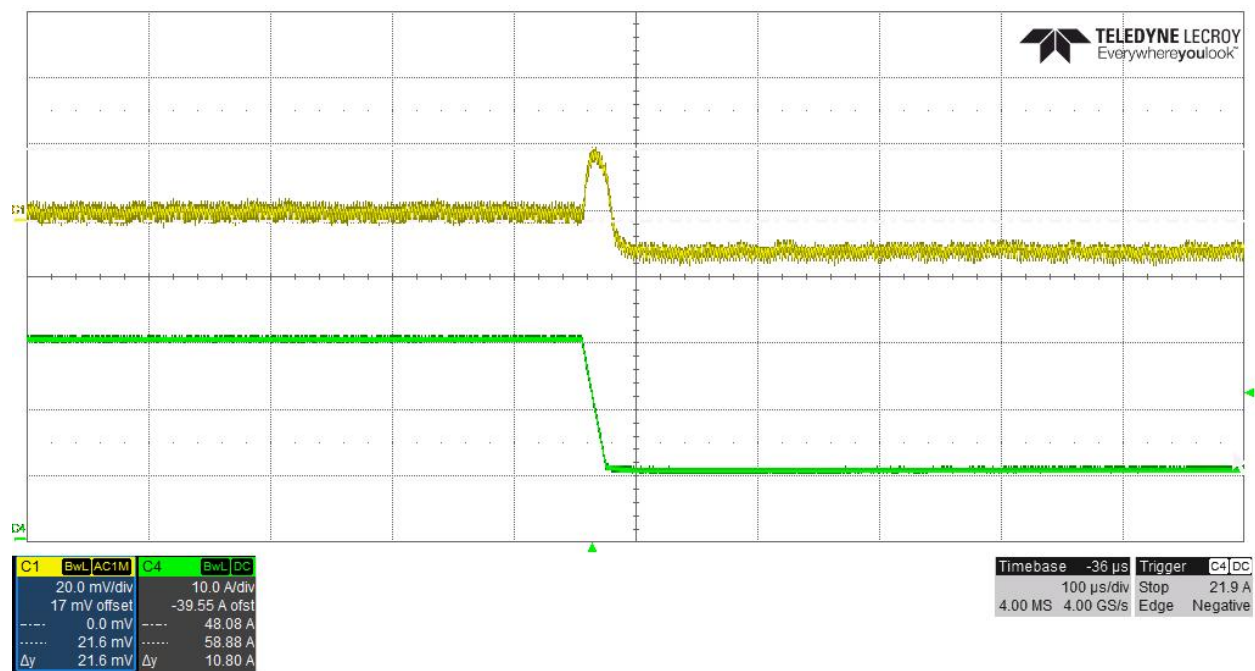
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1.7 Transient response

The transient response is shown in the plots below where the yellow trace is the AC coupled output voltage. Green trace represents the output current. The current step is 10A-30A at 1A/ μ s slew rate.



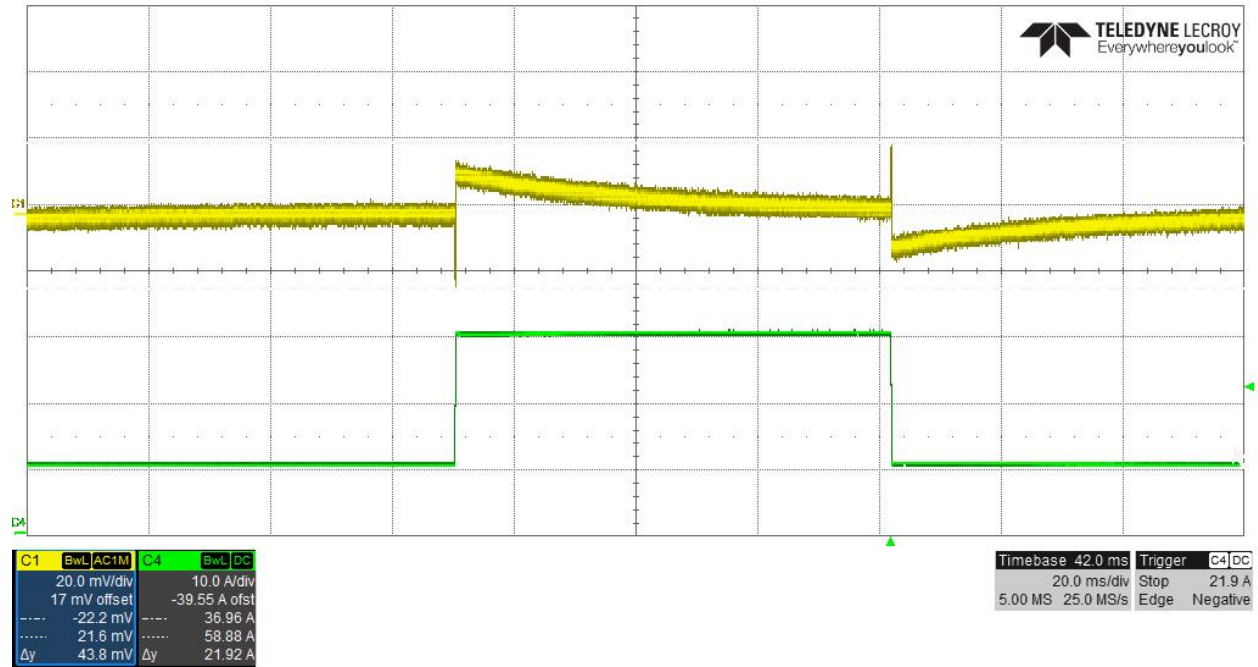
Load step- V_{trans} = 20.5mV



Load dump- V_{trans} = 21.6mV

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Full load Transient- $V_{trans} = 43.8\text{mVpp}$

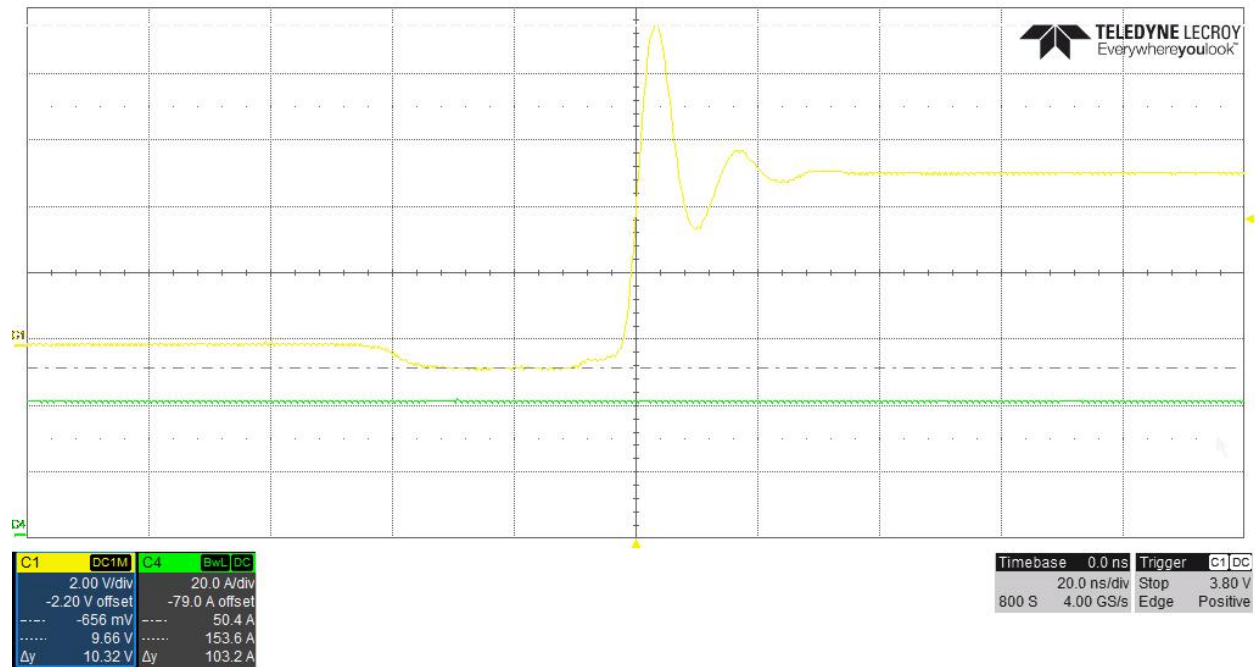
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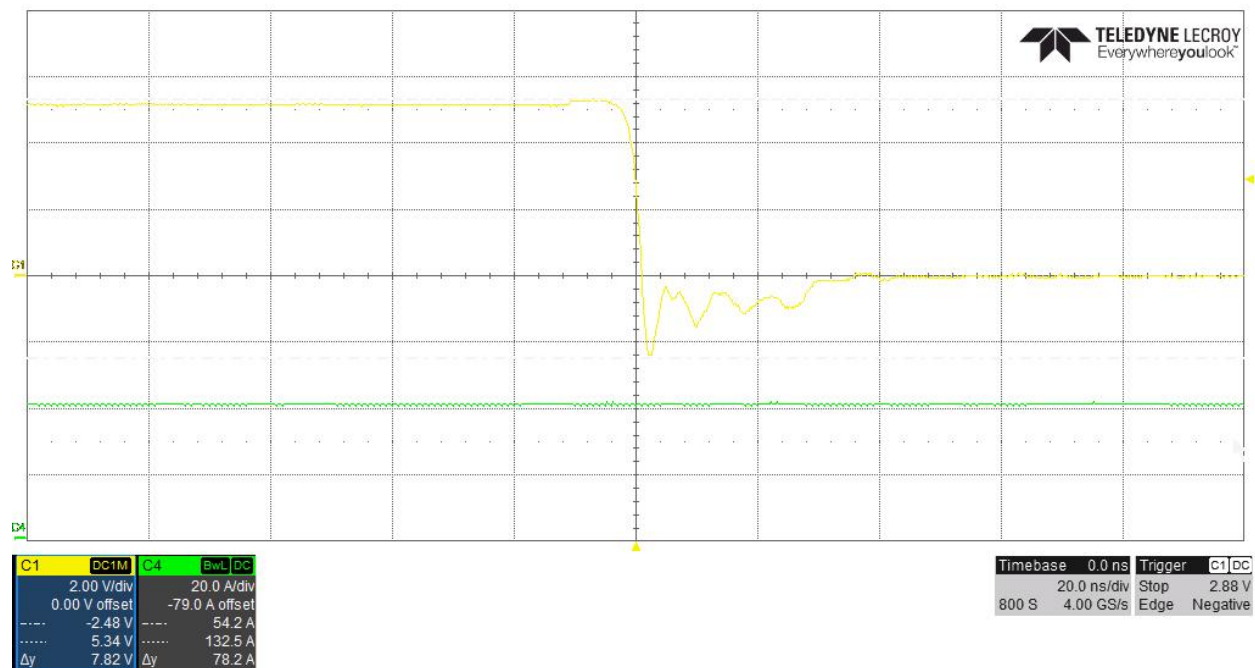


1.8 Switch waveforms

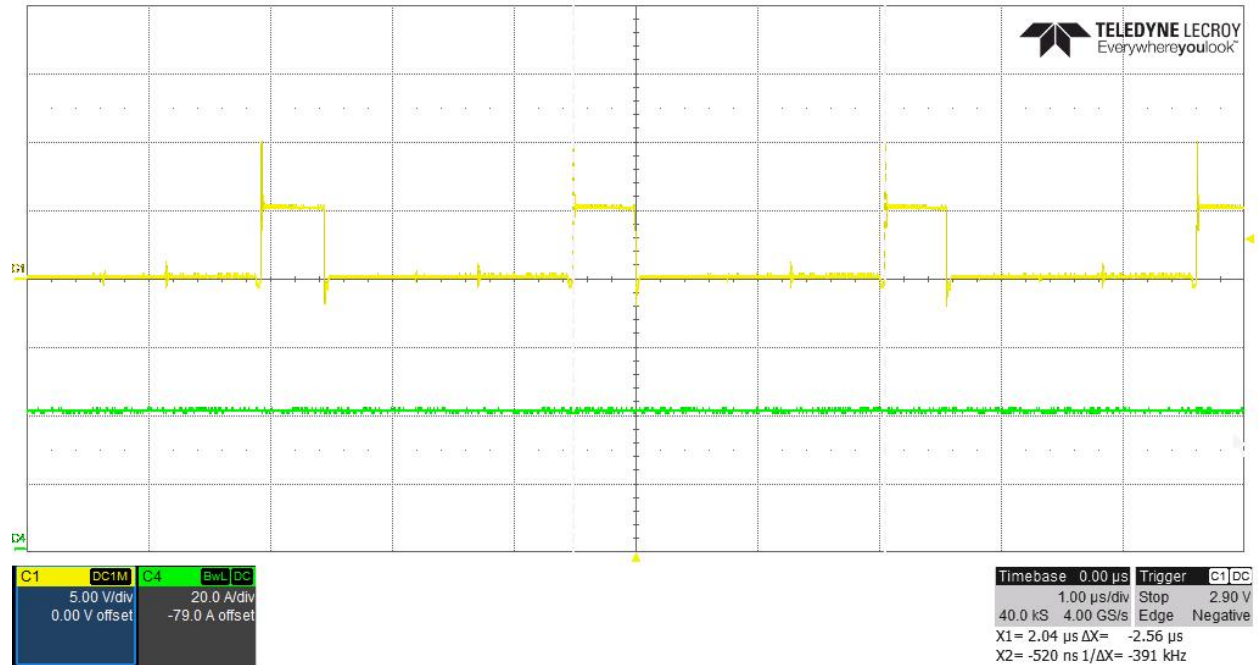
The switch node is shown for one phase below at 40A load with the full bandwidth.



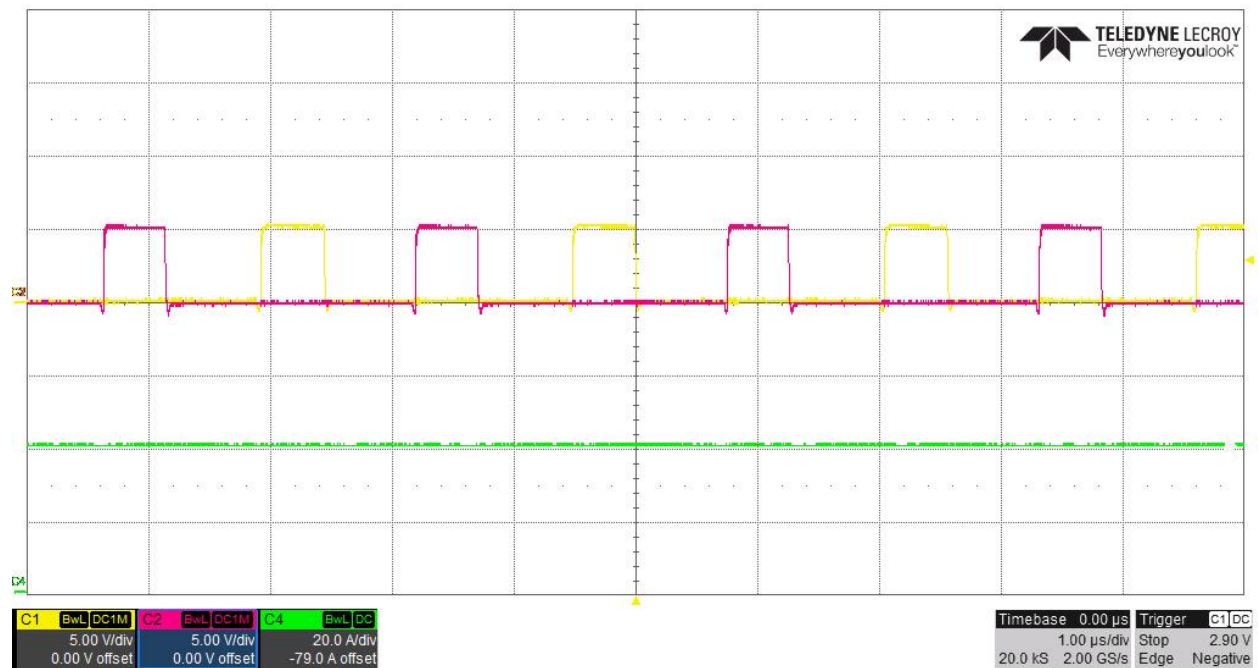
Vsw max = 9.66V @ 40A out



Vsw min = -2.48V @ 40A out



Multiple switching cycles showing fsw = 391Khz

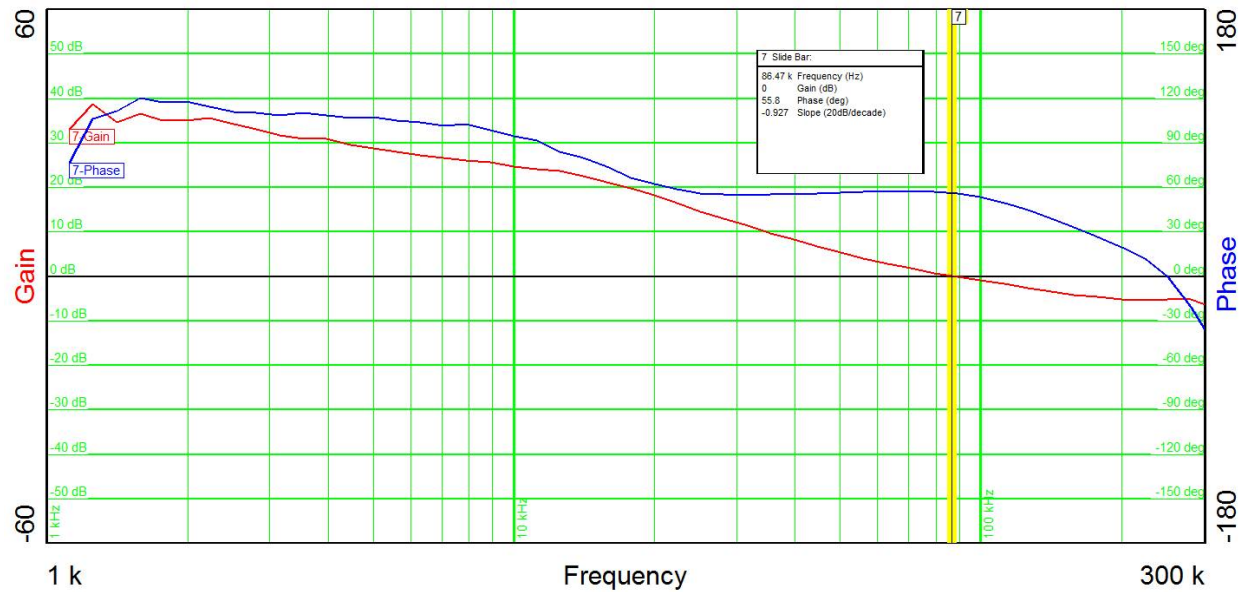


Dual Phase switch node showing 180deg out of phase operation

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1.9 Loop Response

The loop response of the power supply at 5Vin and 40A load current is shown below. The bandwidth is 86.47kHz with ~55° of phase margin.



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