



**TPS40140 Project**  
**7/14/08**

The following test report is for the TPS40140 Optimus project.

The tests performed were as follows:

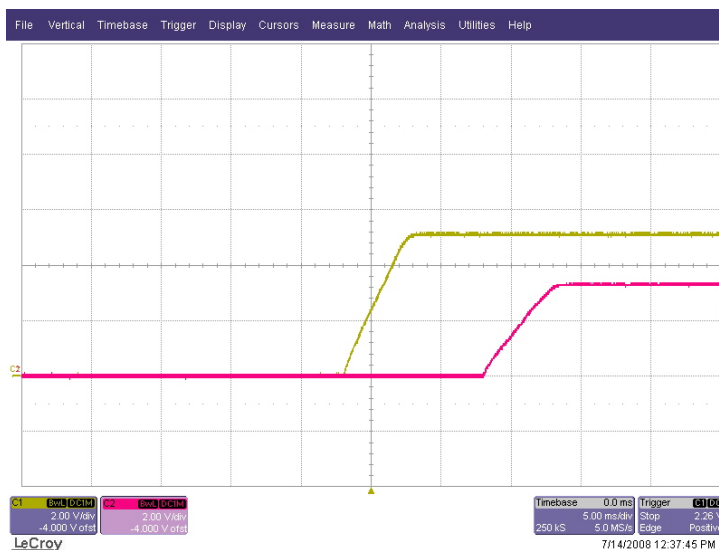
- A. TPS40140 – 5.0V@5A; 3.3V@5A
  - 1. Turn-On (No Load)
  - 2. Turn-Off (1A Load)
  - 3. Output Voltage Ripple (5A Load)
  - 4. Transient Response (0.5A to 4.5A)
  - 5. Efficiency
  - 6. Load Regulation
  - 7. Switch Node (20MHz Bandwidth Limited with full load)
  - 8. Bode Plot (Full Load)
  - 9. Thermal Images (Full Load)

## 1 Startup – (TPS40140 : 5.0V@5A, 3.3V@5A)

The photo below shows the startup waveform. The input voltage is 24V, the outputs are not loaded. The time-base is set to 5ms/Division.

Channel 1 – Yellow : 5.0V Output – (2V/Division)

Channel 2 – Pink : 3.3V Output – (2V/Division)

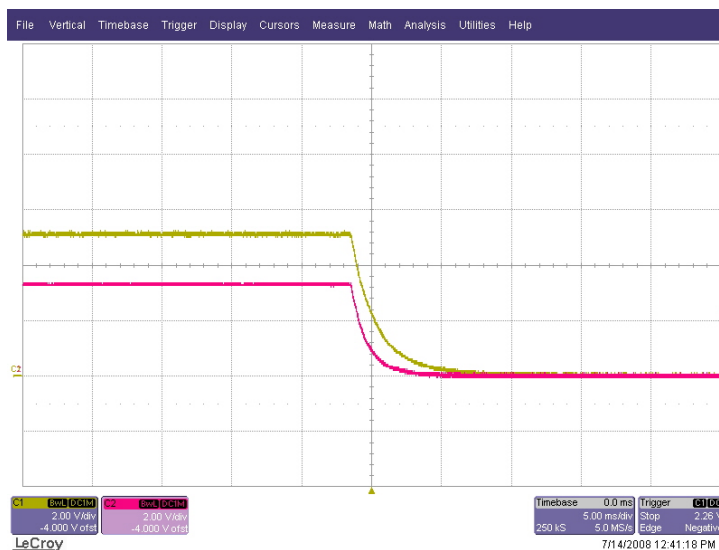


## 2 Shutdown – (TPS40140 : 5.0V@5A, 3.3V@5A)

The photo below shows the shutdown waveform. The input voltage is 24V, the outputs are loaded with 1A. The time-base is set to 5ms/Division.

Channel 1 – Yellow : 5.0V Output – (2V/Division)

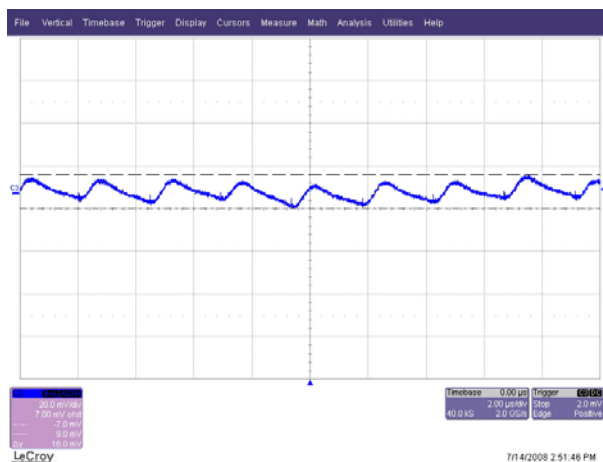
Channel 2 – Pink : 3.3V Output – (2V/Division)



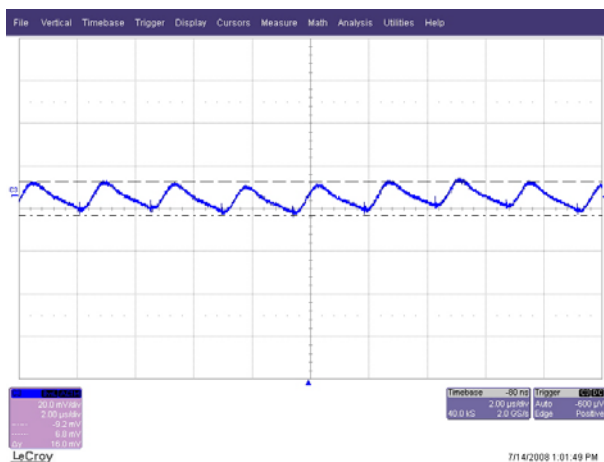
### 3 Output Voltage Ripple – (TPS40140 : 5.0V@5A, 3.3V@5A)

The photos below show the output voltage ripple for each output. Both outputs are fully loaded with 5A each. The input voltage is 24V. The timebase is set to 2ms/Division.

Channel 3 – Output Voltage : (20mV/Division; AC Coupled)



5V@5A



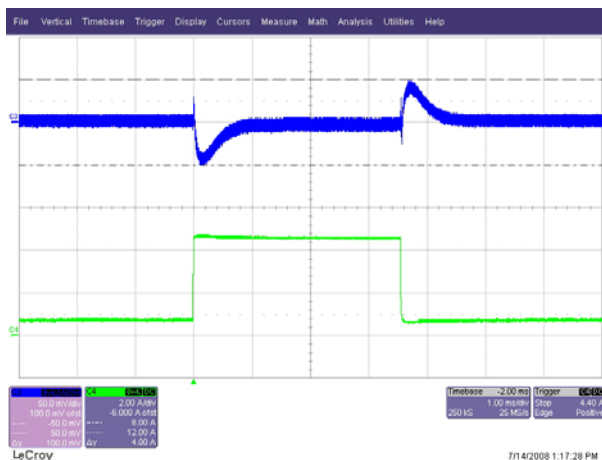
3.3V@5A

### 4 Transient Response – (TPS40140 : 5.0V@5A, 3.3V@5A)

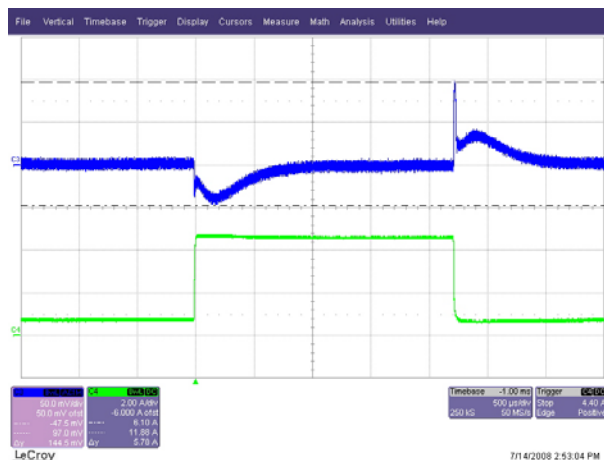
The transient response of the converter is shown in the figure below. The input voltage is 24V. The current is pulsed from 0.5A to 1.2A.

Channel 3 – Output Voltage : (50mV/Division; AC Coupled)

Channel 4 – Output Current : (2A/Division; AC Coupled)



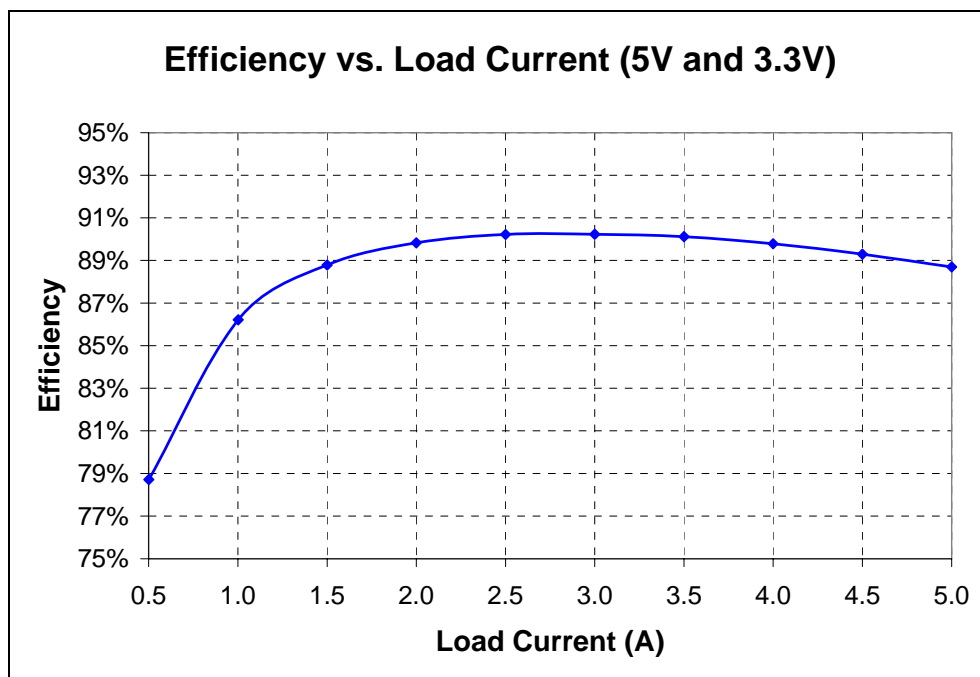
5V Output



3.3V Output

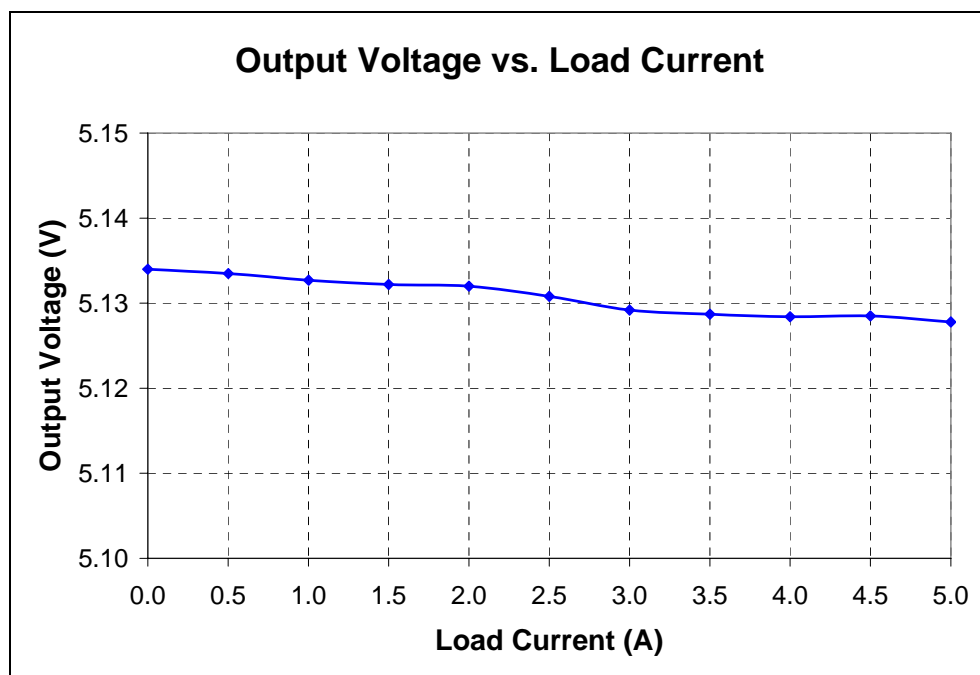
## 5 Efficiency – (TPS40140 : 5.0V@5A, 3.3V@5A)

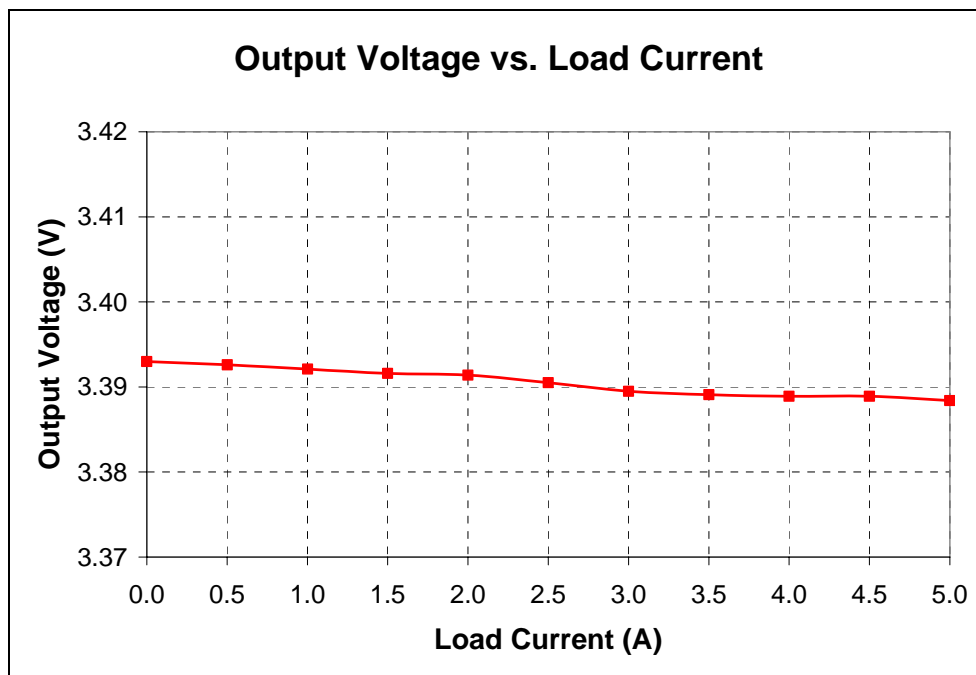
The efficiency of the converters are shown in the picture below.



## 6 Load Regulation – (TPS40140 : 5.0V@5A, 3.3V@5A)

The load regulation for each output is shown in the figures below.





## 7 Switching Waveforms – (TPS40140 : 5.0V@5A, 3.3V@5A)

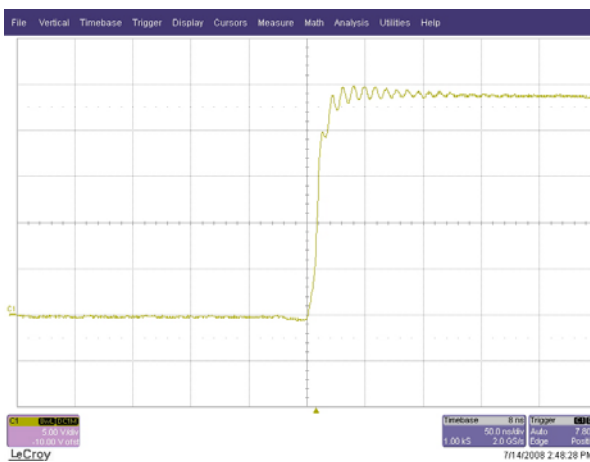
The waveforms below show the switching behavior for each converter. The input is 24V. The outputs are fully loaded.

Channel 1 – Yellow : 5.0V Output – (10V/Division)

Channel 2 – Pink : 3.3V Output – (10V/Division)



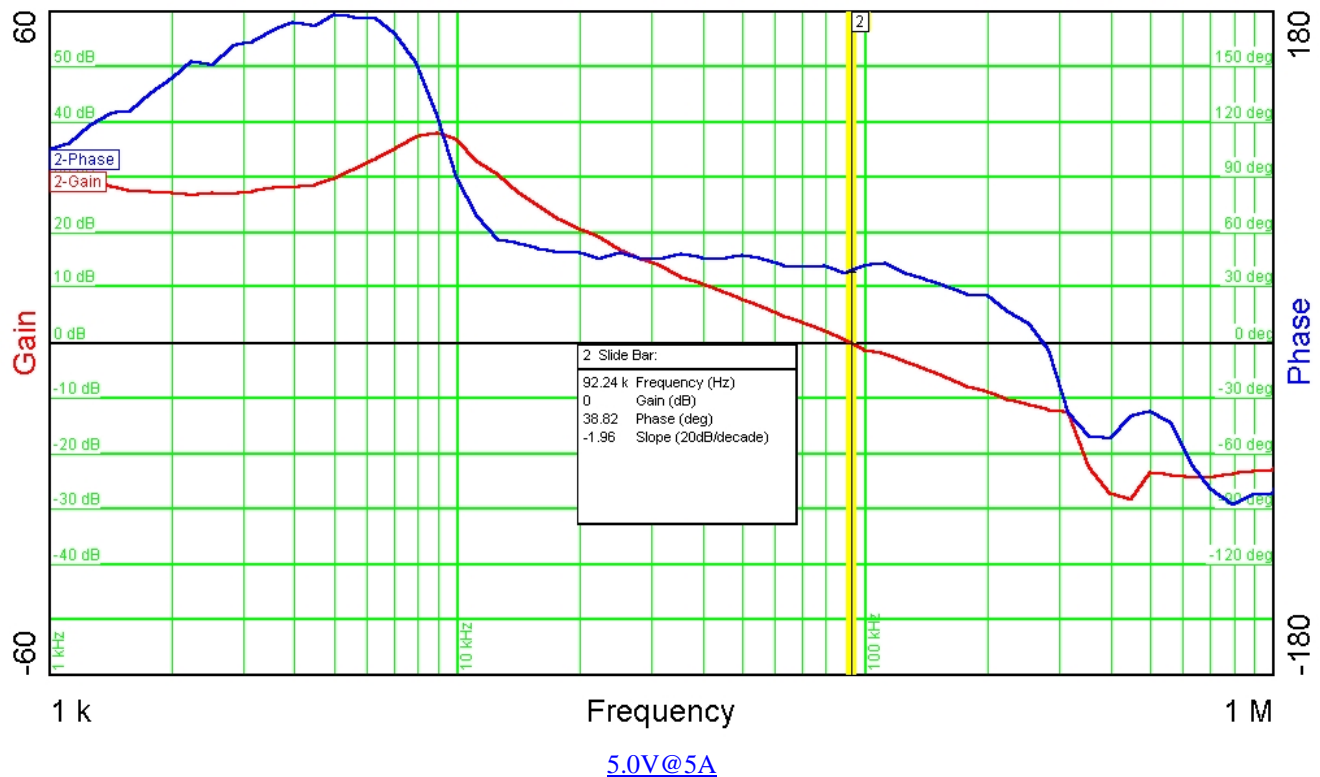
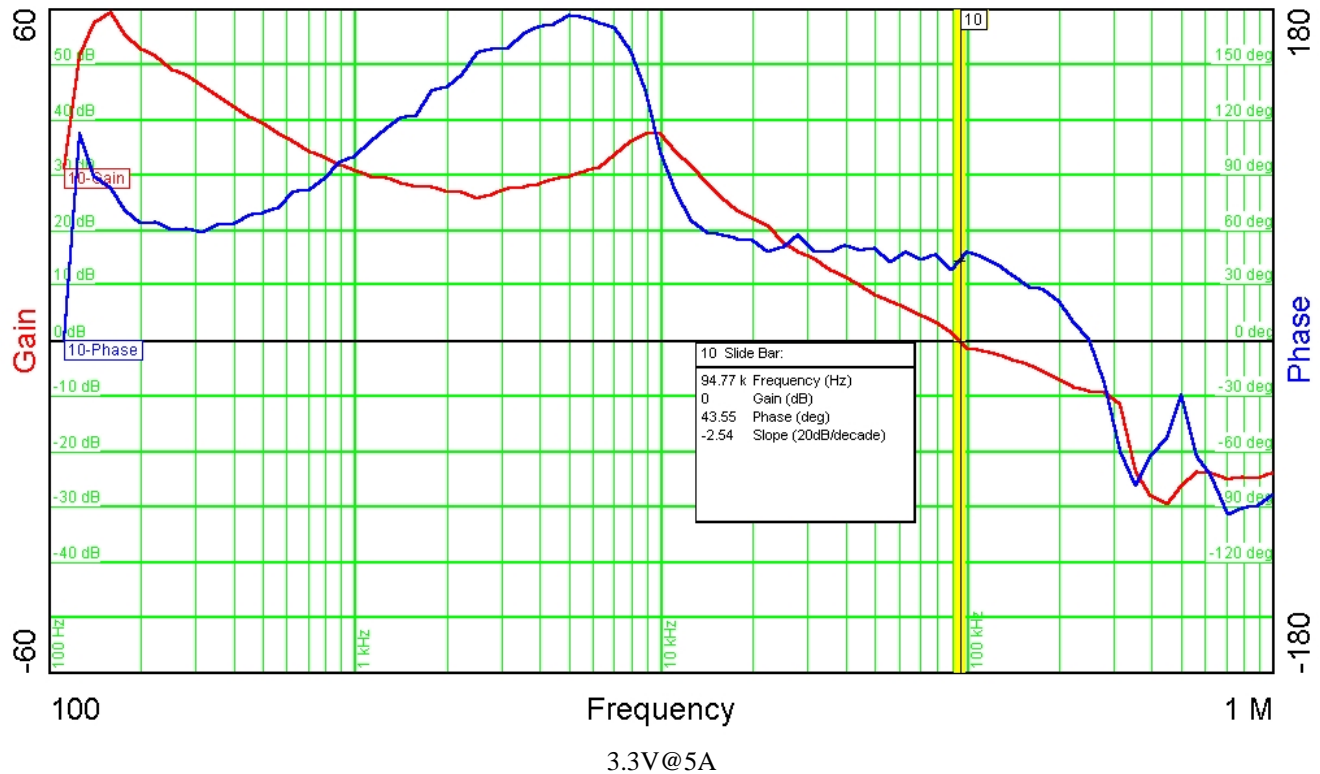
5V and 3.3V Switch Nodes



TPS40140 Channel 2 Switch Node

## 8 Bode Plot – (TPS40140 : 5.0V@5A, 3.3V@5A)

The figures below show the frequency response of the converters. The input voltage is 24V, the outputs are fully loaded.



## 9 Thermal Camera Images

The figures below show the thermal performance of the PMP3866 PCB. The input voltage is 24V, the outputs are fully loaded. The images show the maximum component temperature is on the FETs.





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Interface	<a href="http://interface.ti.com">interface.ti.com</a>	Energy	<a href="http://www.ti.com/energy">www.ti.com/energy</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>	Industrial	<a href="http://www.ti.com/industrial">www.ti.com/industrial</a>
Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>	Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</a>
Microcontrollers	<a href="http://microcontroller.ti.com">microcontroller.ti.com</a>	Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
RFID	<a href="http://www.ti-rfid.com">www.ti-rfid.com</a>	Space, Avionics & Defense	<a href="http://www.ti.com/space-avionics-defense">www.ti.com/space-avionics-defense</a>
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