

**Test Data
For PMP9409
05/18/2014**



Power Specification

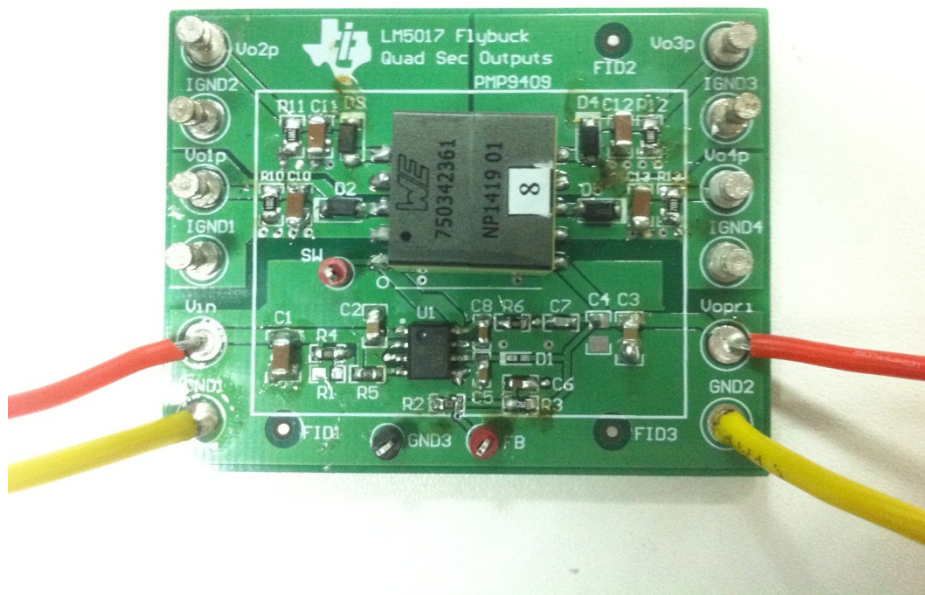
Vin range: 17V – 36V

Nominal Vin = 24V

Quad Isolated Outputs: 5V@30mA x 4channels

Fsw = 250kHz

Board Photo



Size: 56x43mm

Vosec1: 5V output, Vosec2: 5V output, Vosec3: 5V output, Vosec4: 5V output

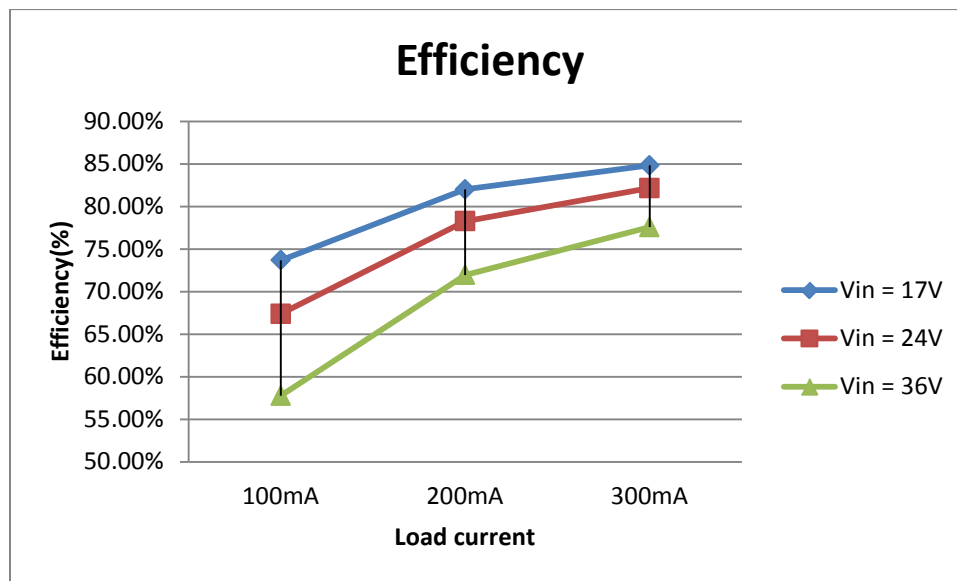
Efficiency

The efficiency is calculated for all outputs; the load current is incremented at 33%, 66% and 100% load.

Vin(V)	Iin(A)	Vosec1(V)	Iosec1(A)	Vosec2(V)	Iosec2(A)	Vosec3(V)	Iosec3(A)	Vosec4(V)	Iosec4(A)	Efficiency
17.059	0.004	5.5375	0	5.1375	0	5.8788	0	5.9288	0	
16.949	0.0165	4.9938	0.0097	4.9988	0.0098	5.0013	0.0116	5	0.0102	73.69%
16.832	0.0298	4.9525	0.0203	4.97	0.0204	4.975	0.0217	4.9713	0.0204	82.00%
16.719	0.0427	4.92	0.0307	4.9538	0.0306	4.9588	0.0311	4.9563	0.0299	84.82%

Vin(V)	Iin(mA)	Vosec1(V)	Iosec1(A)	Vosec2(V)	Iosec2(A)	Vosec3(V)	Iosec3(A)	Vosec4(V)	Iosec4(A)	Efficiency
24.06	0.004	5.6125	0	5.2025	0	5.87	0	5.8925	0	
23.982	0.013	5.0688	0.0098	5.0725	0.0098	5.0725	0.0116	5.0713	0.0102	67.39%
23.9	0.0223	5.02	0.0204	5.0363	0.0204	5.0413	0.0218	5.0375	0.0204	78.26%
23.821	0.0313	4.9825	0.0306	5.015	0.0306	5.0225	0.0312	5.0188	0.0299	82.15%

Vin(V)	Iin(mA)	Vosec1(V)	Iosec1(A)	Vosec2(V)	Iosec2(A)	Vosec3(V)	Iosec3(A)	Vosec4(V)	Iosec4(A)	Efficiency
36.063	0.004	5.6088	0	5.275	0	5.995	0	5.9438	0	
36.011	0.0102	5.1375	0.0097	5.1386	0.0096	5.14	0.0116	5.1375	0.0102	57.76%
35.956	0.0164	5.08	0.0204	5.0986	0.0204	5.1038	0.0218	5.0988	0.0204	71.94%
35.904	0.0223	5.04	0.0307	5.0725	0.0306	5.0788	0.0312	5.075	0.0299	77.58%



Cross Line Regulation

Vosec2(V)	Iosec2(mA)	Vosec1(V)	Iosec1(mA)	Vosec3(V)	Iosec3(mA)	Vosec4(V)	Iosec4(mA)	cross line regulation
5.1336	2.4	5.1463	2.4	5.13	3.1	5.1425	1.6	2.67%
5.1225	2.4	5.1388	2.4	5.115	3.1	5.0275	29.8	2.45%
5.1125	2.4	5.1338	2.4	4.985	31.1	5.0238	29.8	2.25%
5.1013	2.4	4.98	30.9	4.9813	31.1	5.02	29.8	2.03%
5.0263	30.8	5.13	2.4	5.115	3.1	5.1325	1.6	0.53%
5.0213	30.8	5.1275	2.4	5.105	3.1	5.0225	29.8	0.43%
5.0188	30.8	5.1238	2.4	4.9825	31.1	5.02	29.8	0.38%
5.015	30.8	4.9775	30.9	4.9775	31.1	5.0175	29.8	0.30%

Note that when all four Vosec outputs are supposed to be no load, I put 2mA dead load onto the Vosec output.

The formula for calculating the numbers in the cross line regulation column is:

$$\text{Cross Line Regulation} = (\text{Vosec2}-5\text{V})/5\text{V} * 100\%$$

Start Up

Test condition: The input voltage was set at 17V, and all four outputs were set at full load.

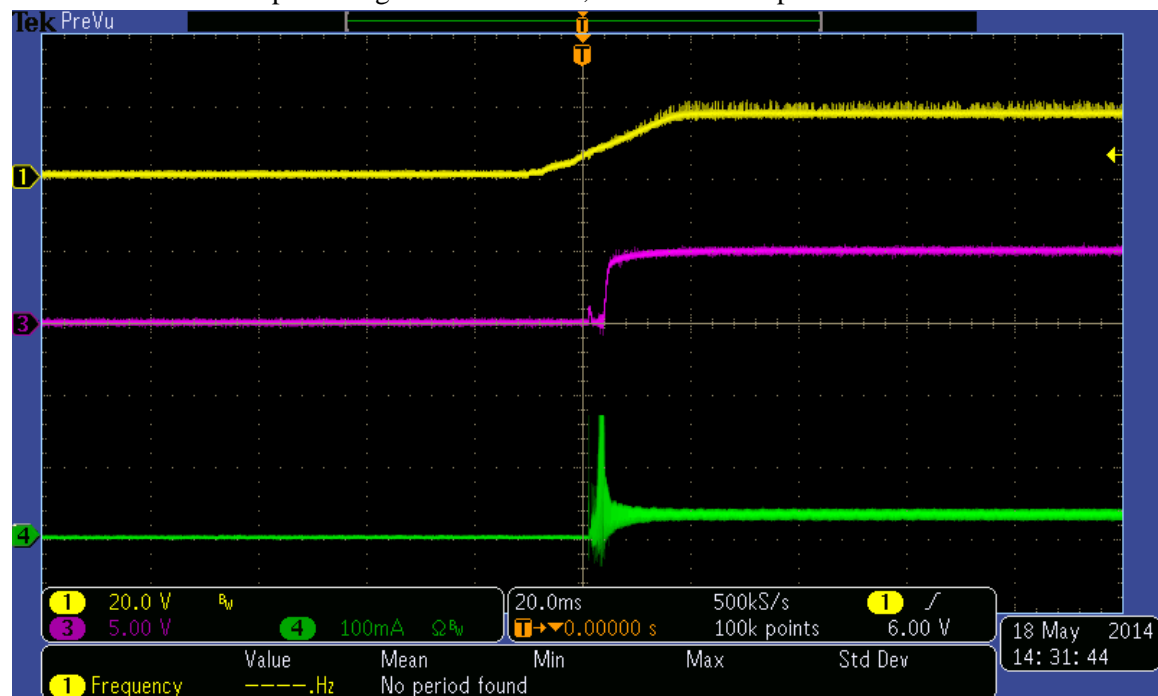


Fig. Vin(yellow), Vosec2(purple) and Iosec2(green)

Test condition: The input voltage was set at 24V, and all four outputs were set at full load.

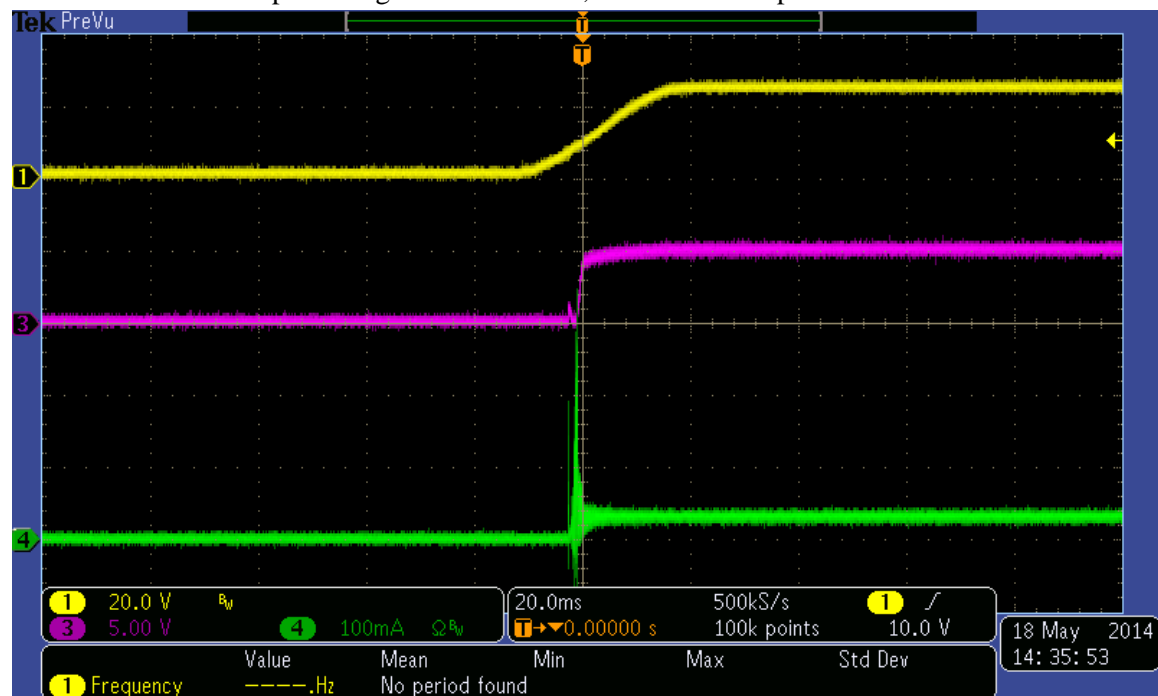


Fig. Vin(yellow), Vosec2(purple) and Iosec2(green)

Test condition: The input voltage was set at 17V, and all four outputs were set at full load.

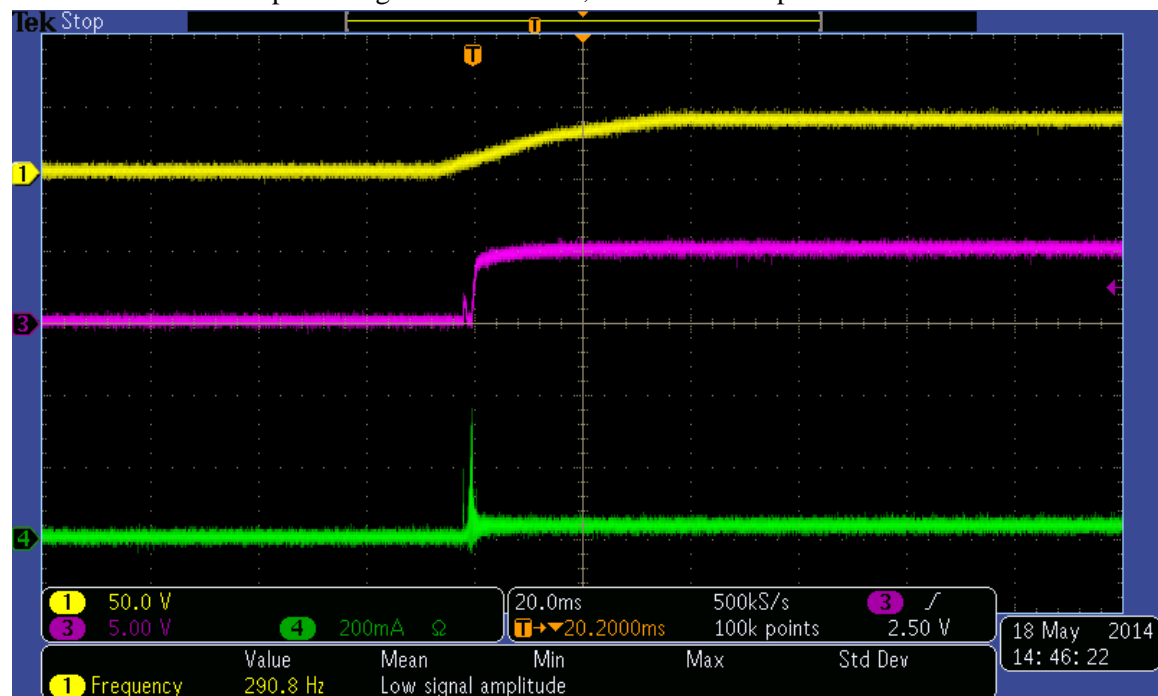


Fig. Vin(yellow), Vosec2(purple) and Iosec2(green)

Note that the load in the previous start up test are using DC load, if changing to resistive load, the spikes of the current waveform will disappear shown as below (Added on May 24th, 2014).

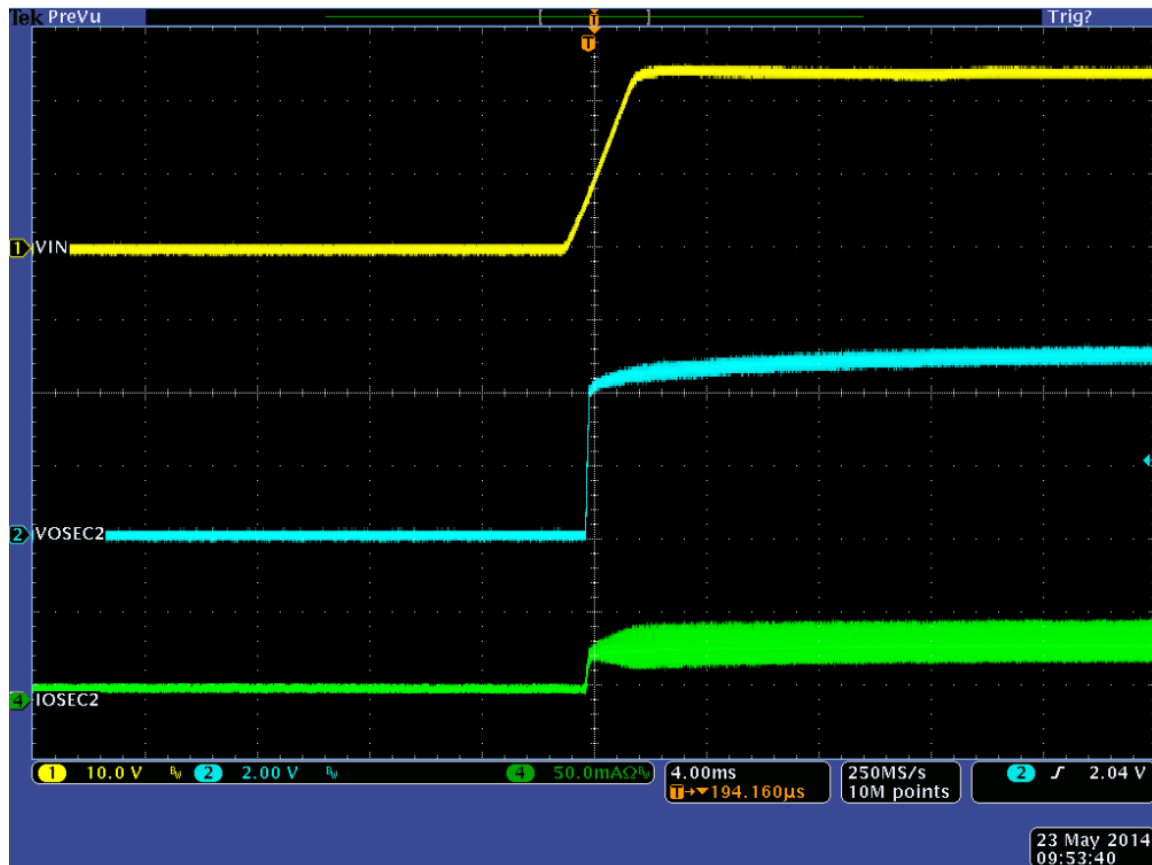
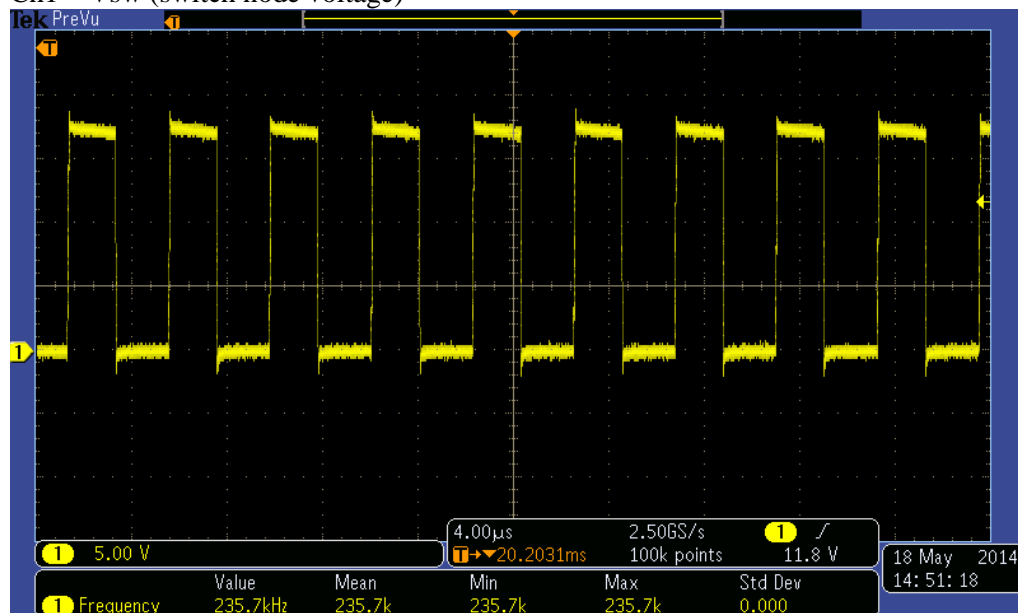


Fig. Vin(yellow) = 24V, Vosec2(blue) is 5V @Iosec2(green) = 30mA load current with 166ohm resistor

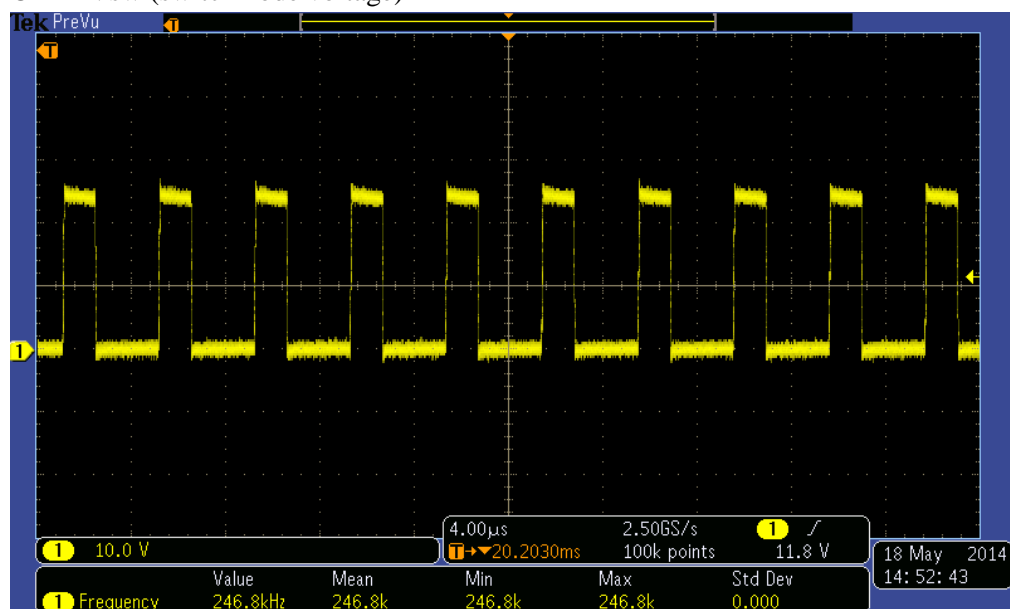
Switching Waveforms

1. Test condition: The input voltage was set at 17V, and all four outputs were set at full load.

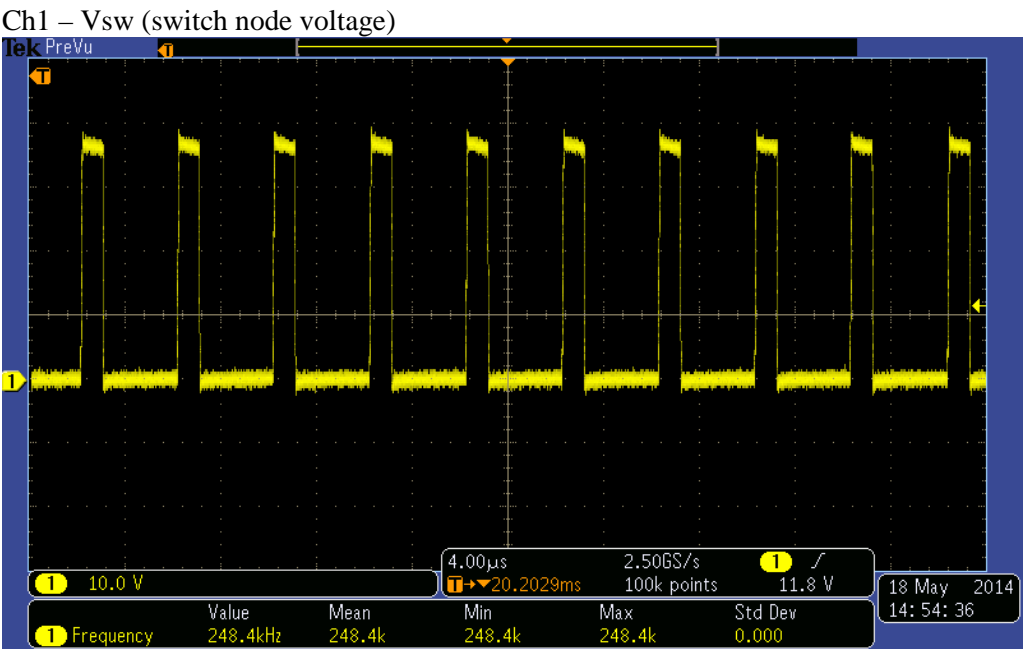
Ch1 – Vsw (switch node voltage)



2. Test condition: The input voltage was set at 24V, and all four outputs were set at no load.
Ch1 – Vsw (switch node voltage)



3. Test condition: The input voltage was set at 36V, and all four outputs were set at full load.



Load Transients

Vosec2 Output Load Step

Test condition: Vin = 17V, Vosec2 load from 0A to 30mA, full load on other Vosec outputs.

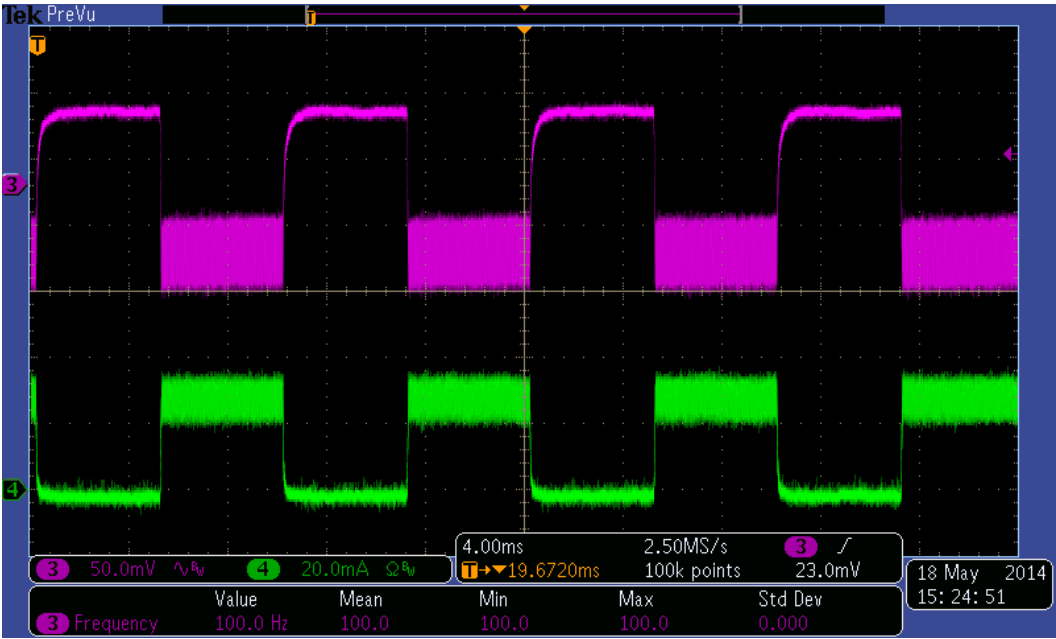


Fig Vosec2(AC)(purple, channel3) and Iosec2(green, channel4)

Test condition: Vin = 24V, Vosec2 load from 0A to 30mA, full load on other Vosec outputs.

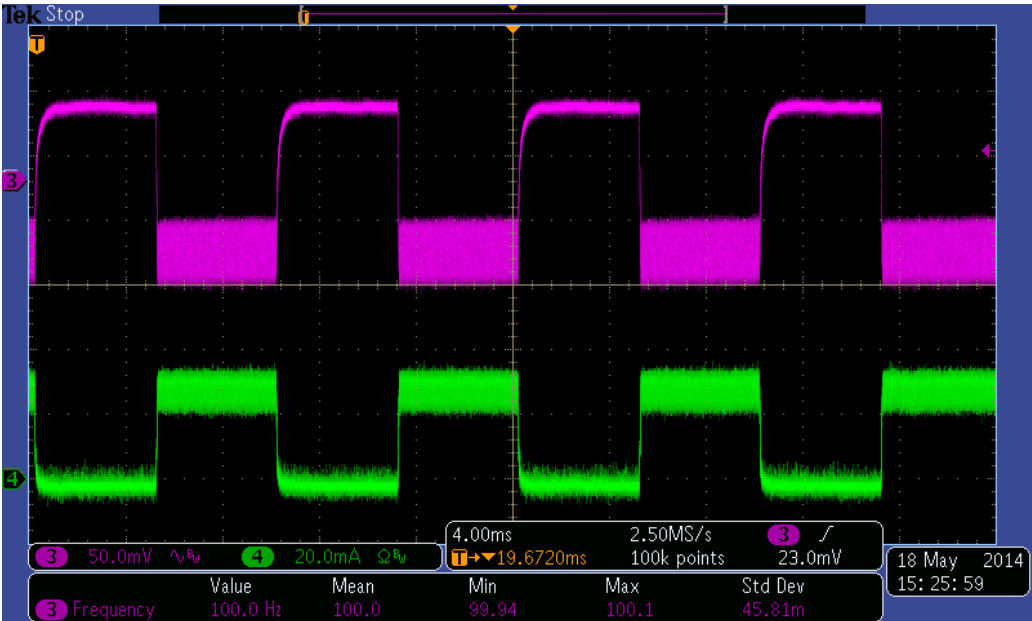


Fig Vosec2(AC)(purple, channel3) and Iosec2(green, channel4)

Test condition: Vin = 36V, Vosec2 load from 0A to 30mA, full load on other Vosec outputs.

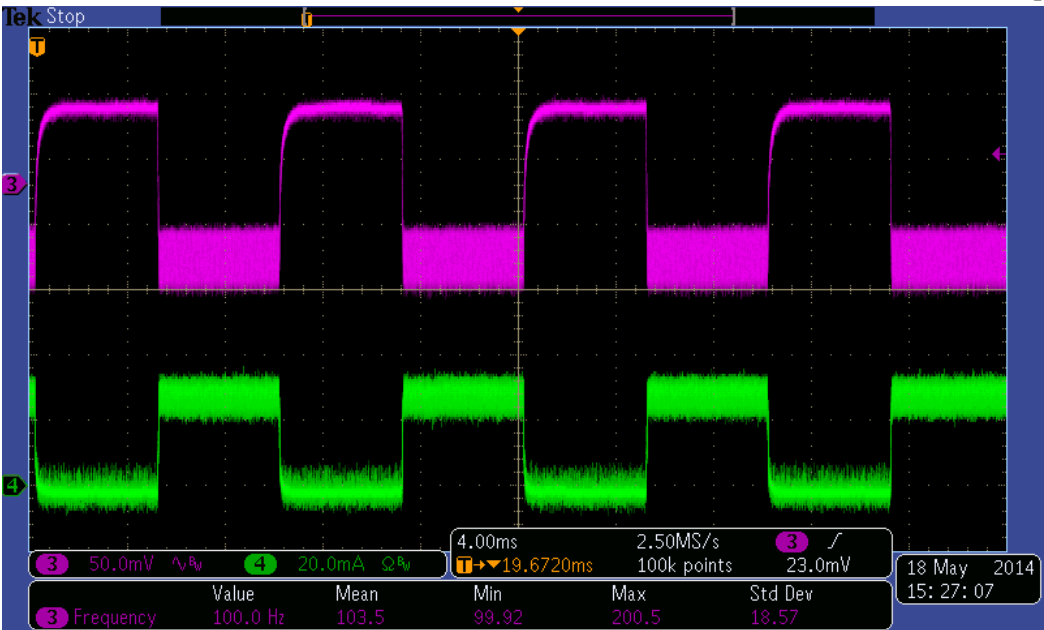


Fig Vosec2(AC)(purple, channel3) and Iosec2(green, channel4)

Output Voltage Ripples

Test condition: The input voltage was set at 17V, and all four outputs were set at full load.

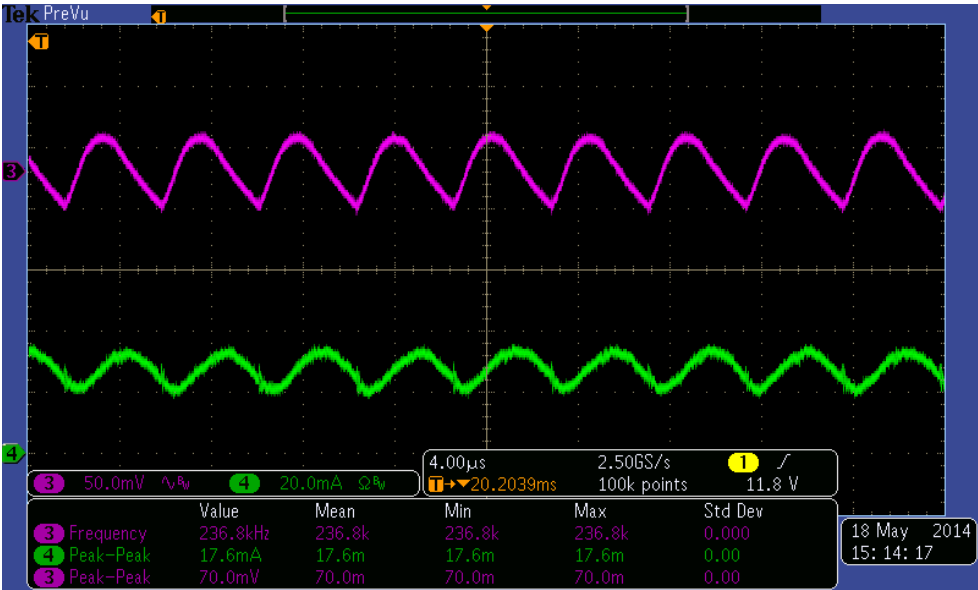


Fig Vosc2(AC)(purple, channel3) and Iosc2(green, channel4)

Test condition: The input voltage was set at 24V, and all four outputs were set at full load.

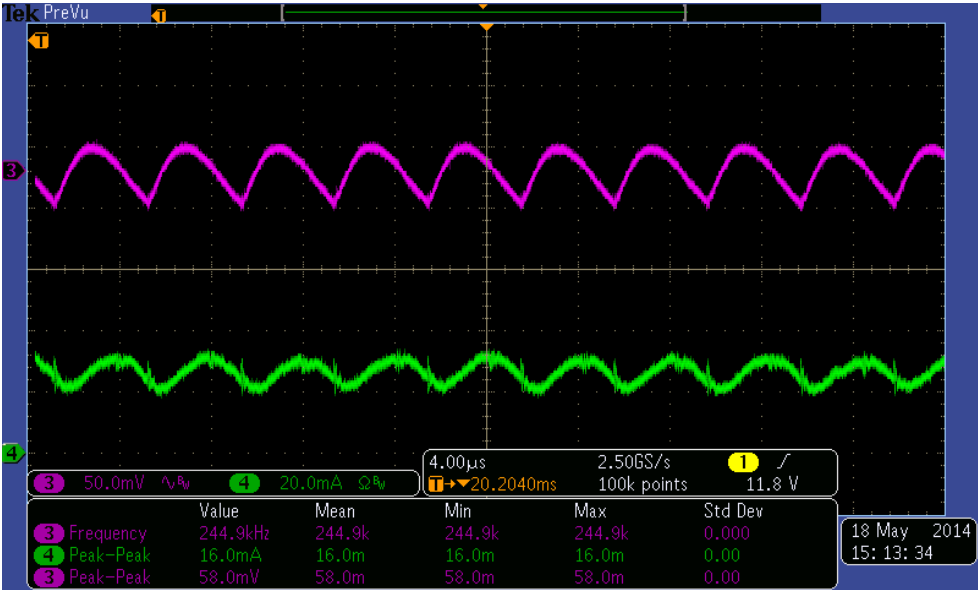


Fig Vosc2(AC)(purple, channel3) and Iosc2(green, channel4)

Test condition: The input voltage was set at 36V, and all four outputs were set at full load.

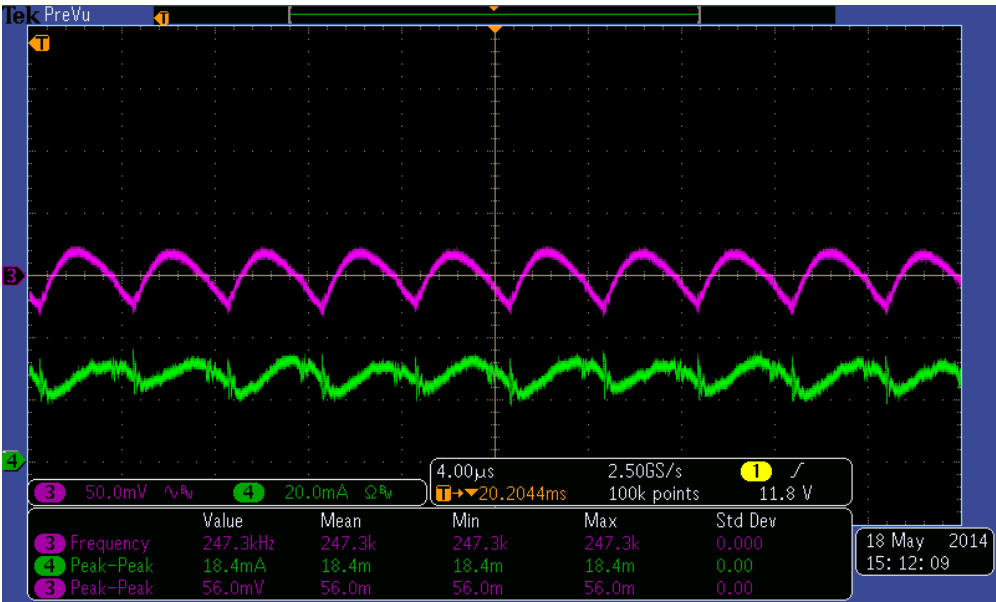


Fig Vosec2(AC)(purple, channel3) and Iosec2(green, channel4)

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