PMP8965 E2 Test Report

REV A

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PMP8965 12.5W USB Test Results

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1. Photo

The PMP8965 is a 12.5W USB adapter reference design using the UCC28740 quasi-resonant/discontinues flyback controller, with synchronous rectification to improve efficiency using the UCC24610 Green Rectifier Controller. **Note that this reference design is not an orderable device from TI, but shows the performance of a UCC28740/UCC24610 in a constant voltage/ constant current controller in a typical 12.5W USB adapter application.** This reference design converts 100V to 240V RMS input voltage down to 5V DC, with a typical current limit of 2.65A for USB adapter applications. Please note this design used a single sided PCB.

The PMP8965 reference design meets EU Tier 2 no load power (<75mW) requirements; as well as, 10%, and 4 point average efficiency requirements. This design also meets the DOE for low voltage external adaptors no load input power (<100mW) requirements; as well as, 4 point average efficiency requirements.

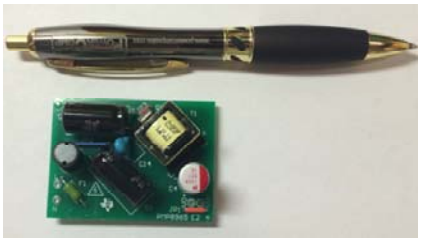


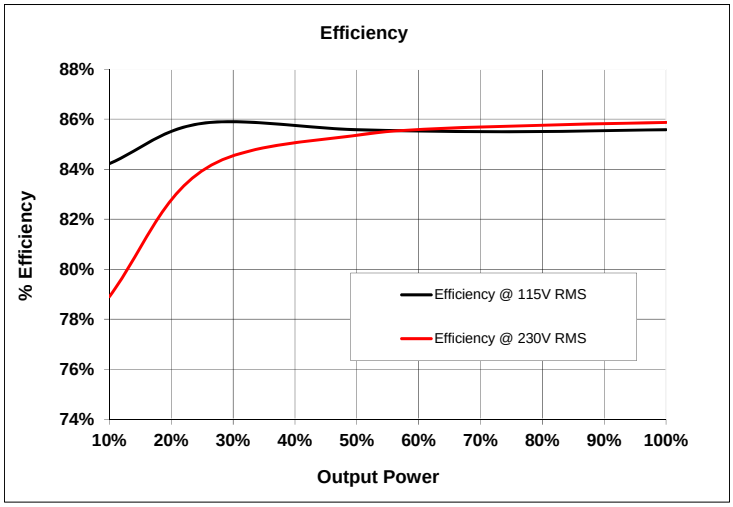
Figure 1, PMP8965 Reference Design, Dimensions 52mmX42mmX17.5mm

2. Electrical Performance Specifications

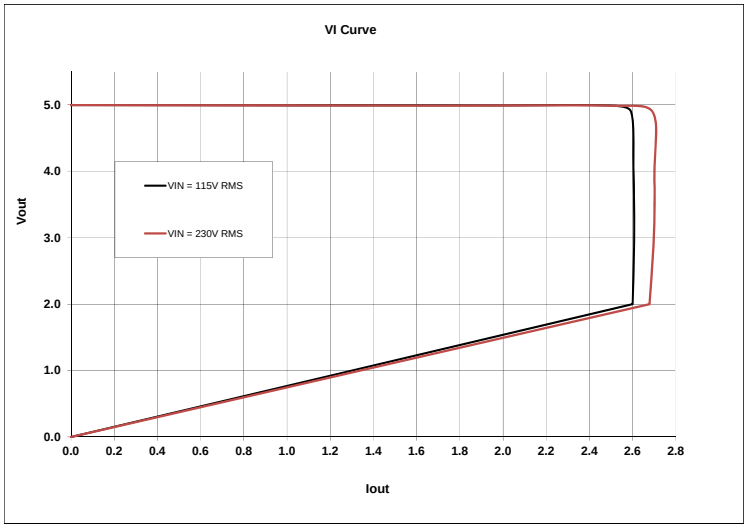
Parameter	Symbol	Notes & Conditions	Min	Nom	Max	Units
INPUT CHARACTERSTICS						
Input Voltage	VIN		100	115/230	240	V
No Load Input Power @ 115/230V RMS		VIN = Nom, IOUT = 0A			50	mW
OUTPUT CHARACTERSTICS						
Output Voltage	VOUT	VIN = Nom, IOUT = NOM	4.75	5	5.25	V
Line Regulation		VIN = Min to Max, IOUT = Nom	-	-	5	%
Load Regulation		VIN = Nom, IOUT = Min to Max	-	-	5	%
Output Voltage Ripple		VIN = Nom, IOUT = Max	-	-	200	mVpp
Output Current	IOUT	VIN = Min to Max		2.5		A
Load Step(Vout = 4.1V to 6V)		0.25 to 2.5A	4.1		6	V
SYSTEMS CHARACTERSTICS						
Operating Temperature Range		VIN = Min to Max, IOUT = Min to Max	25		40	°C

3. Efficiency

Pout	Vin	Vout	Iout	Pin	Efficiency @ 115V RMS	Vin	Vout	Iout	Pin	Efficiency @ 230V RMS
10%	115	4.996	0.239	1.418	84.2%	230	4.995	0.239	1.513	78.9%
25%	115	4.994	0.633	3.683	85.8%	230	4.994	0.633	3.766	83.9%
50%	115	4.993	1.263	7.369	85.6%	230	4.991	1.262	7.379	85.4%
75%	115	4.991	1.891	11.039	85.5%	230	4.989	1.890	11.000	85.7%
100%	115	4.990	2.496	14.554	85.6%	230	4.987	2.496	14.496	85.9%
				Four Point Average Efficiency	85.6%				Four Point Average Efficiency	85.2%
									EU 10% Load Tier 2 Minimum Efficiency	71.3%
				DOE Minimum 4 Point Average Efficiency	80.2%				EU Tier 2 Minimum 4 Point Average Efficiency	80.6%



4. VI Curves

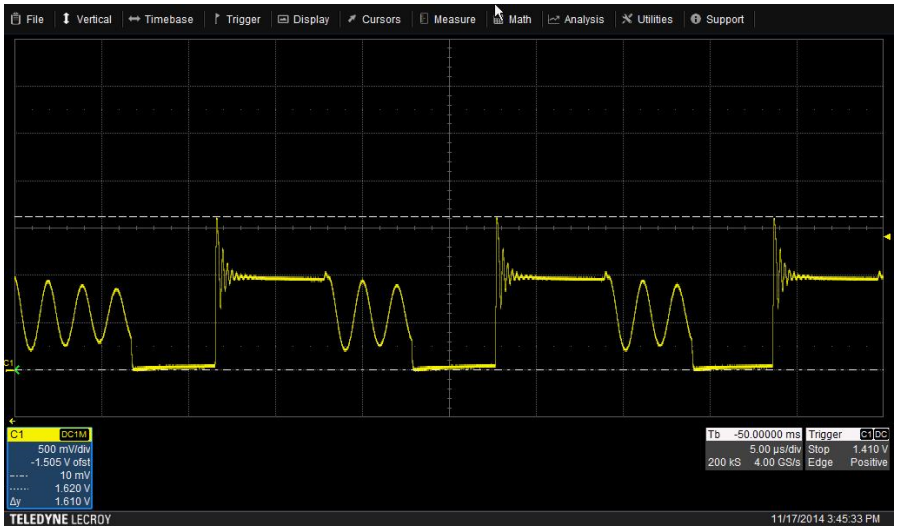


5. No Load Input Power
   a. Meets European Union (EU) Tier 2 < 75mW no Load requirements
   b. Meets Department of Energy (DOE) < 100mW

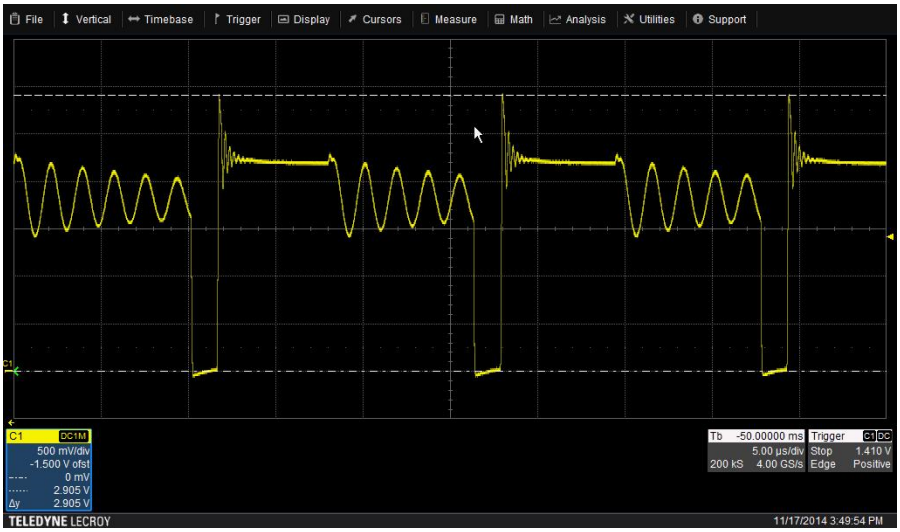
Vin	Pin
90 V RMS	24 mW
115 V RMS	26 mW
230V RMS	33 mW
265V RMS	35 mW

6. Q1 Drain Voltage at Full Load (CH1, Differential Probe 1:200)

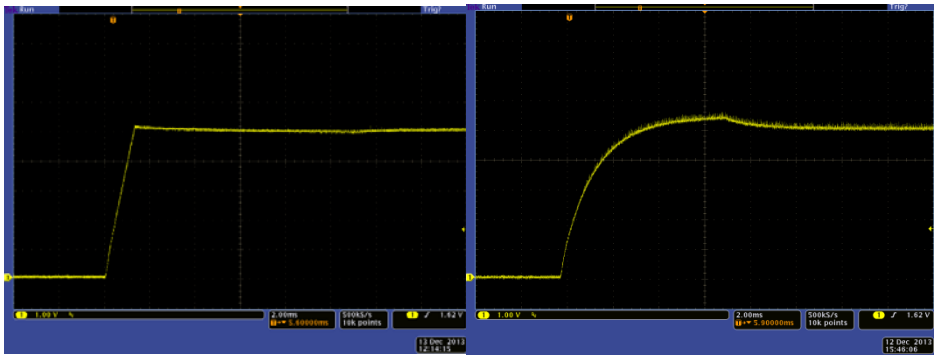
Vin = 90V RMS



Vin= 265V RMS

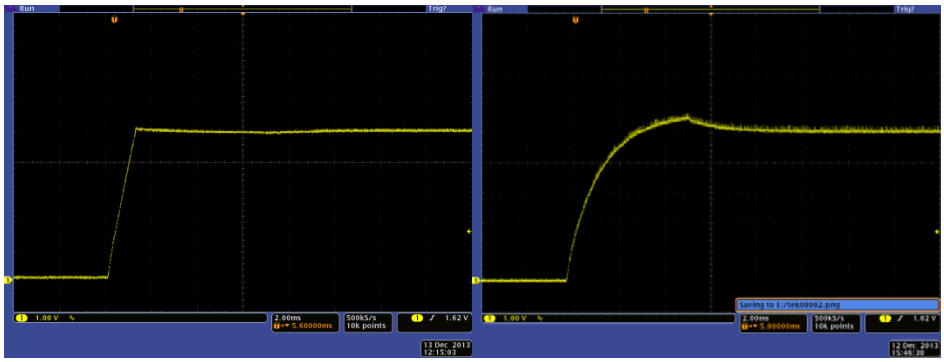


7. Startup 115V RMS



No Load 2 ohm, Full Load

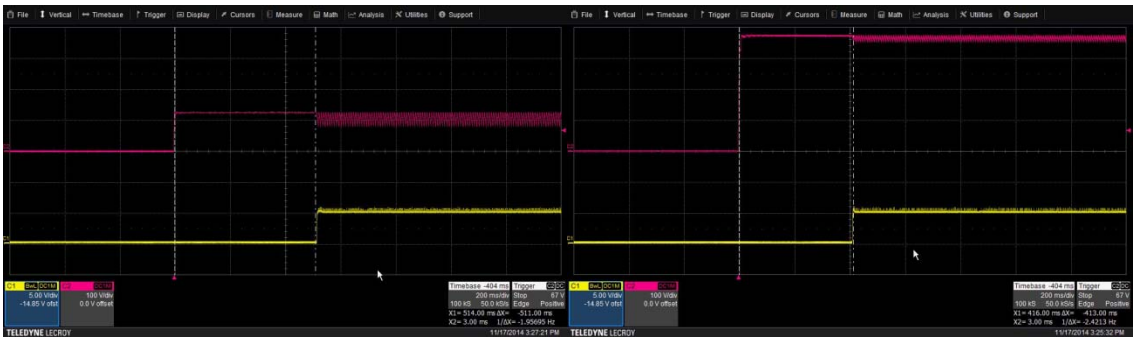
8. Startup 230V RMS



No Load 2 ohm, Full Load

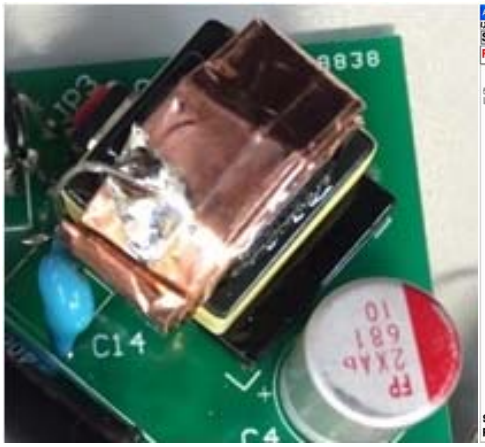
9. Startup in less than 600ms after line voltage is applied
   a. (CH1 =Vout, CH2 = Voltage across C15)

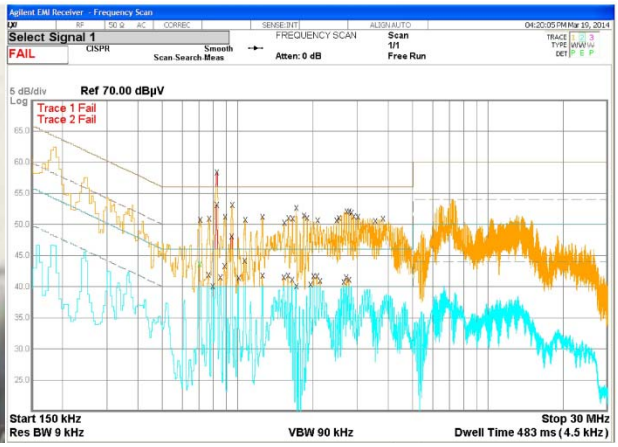
Vin = 90 V RMS Vin = 265V RMS



10. Please note that this reference design does not pass EMI and the design will require more work/adjustments to pass EMI specifications.
    a. EMI data taken with shielded transformer grounded.

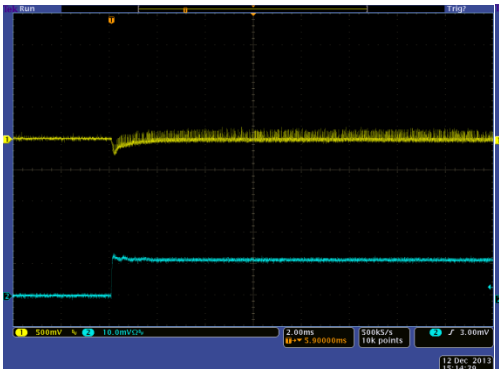
Vin = 230V RMS, Full Load



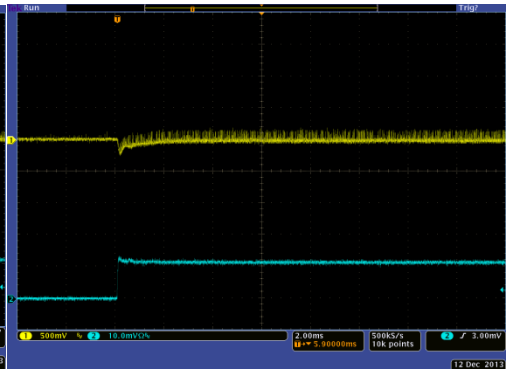


11. Load Transients
    a. CH1 = Vout, With 5V Offset, CH2 = Iout
    b. 0.25 to 2.5A Load Step

Vin = 115V RMS

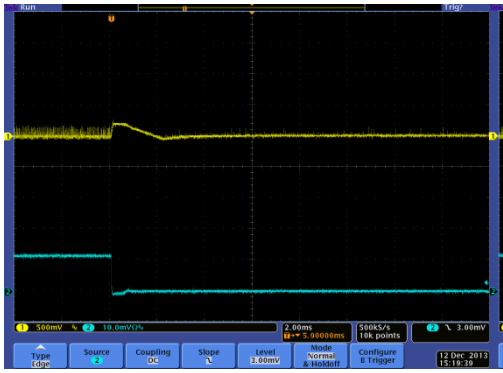


Vin = 230V RMS

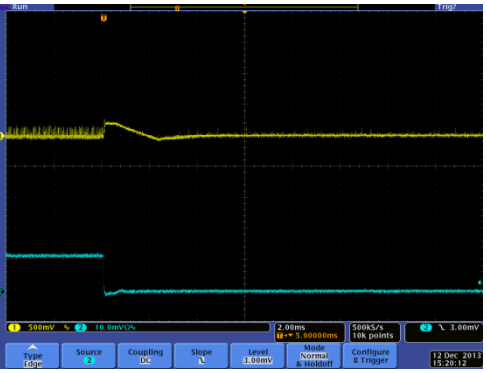


c. 2.5 to 0.25A Load Step

Vin = 115V RMS



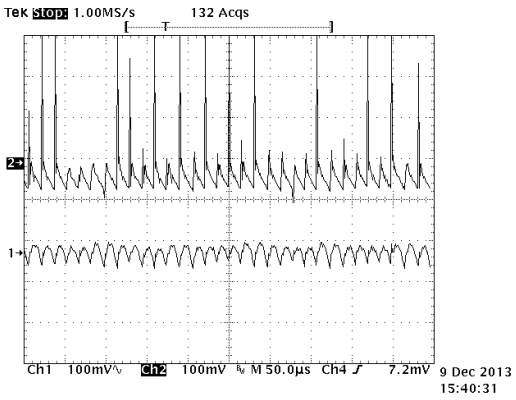
Vin = 230V RMS



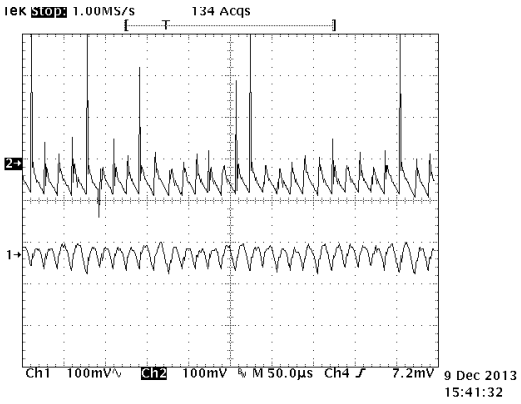
12. Output Ripple Voltage

a. CH1 = Vout, CH2 = Measured at the load after 1M of cable and 1uF of filter capacitance

Vin = 115V RMS, Full Load



Vin = 230V RMS, Full Load



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