



Texas Instruments

PMP4414 Test Procedure

China Power Reference Design

REV A

12/2/2014

1 GENERAL

1.1 PURPOSE

To provide detailed data for evaluating and verifying the EVM.

1.2 REFERENCE DOCUMENTATION

Schematic: PMP4414_SCH_RevA

Assembly: PMP4414_PCB_RevA

BOM

1.3 TEST EQUIPMENTS

Multi-meter(voltage): Fluke 287

Multi-meter(current): Fluke 287

DC Source: TDK-Lambda GEN100-33

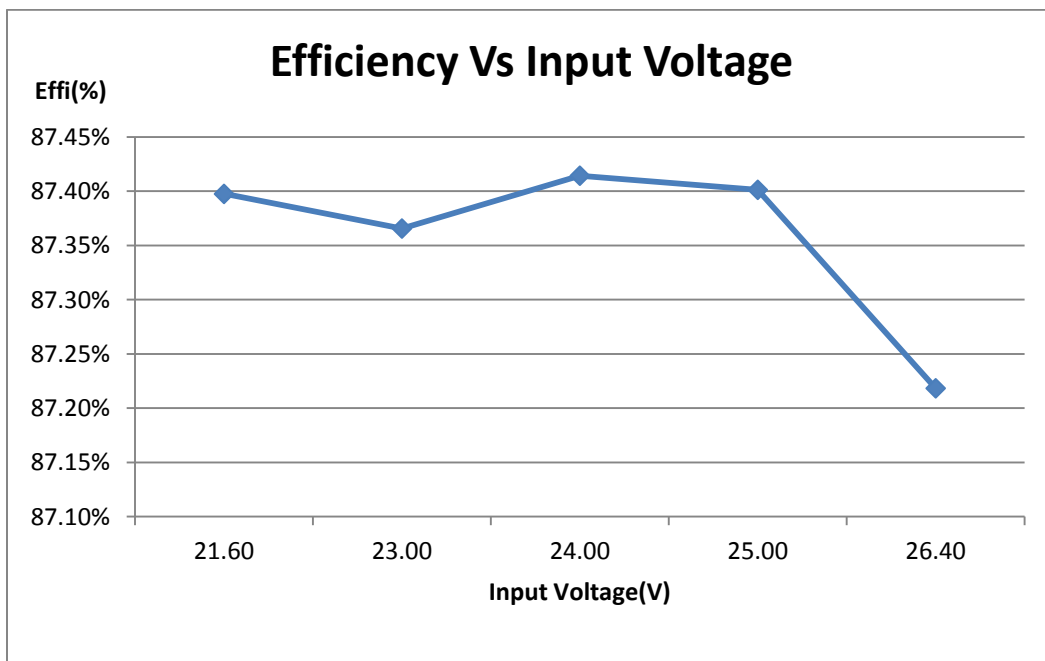
Load: Chroma 63110A module

Oscilloscope: Tek DPO3054

2 INPUT CHARACTERISTICS

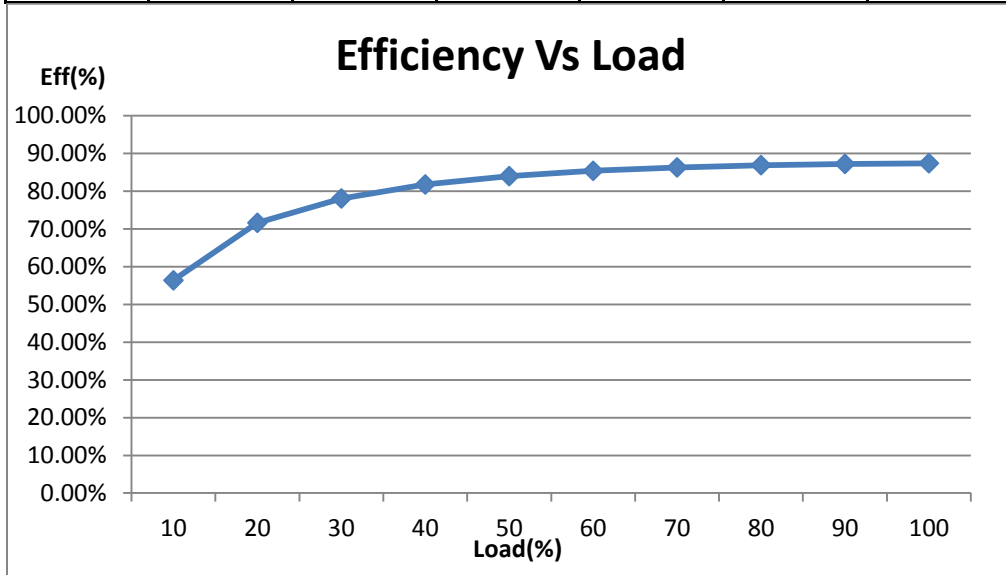
2.1 Full load Efficiency

Vin (V)	Iin(mA)	Vo1(V)	Vo2(V)	Io1(mA)	Io2(mA)	Effi.(%)
21.60	104.50	14.78	-14.92	83.00	50.00	87.40%
23.00	99.35	14.95	-15.11	83.00	50.00	87.37%
24.00	95.91	15.08	-15.21	83.00	50.00	87.41%
25.00	92.62	15.16	-15.31	83.00	50.00	87.40%
26.40	88.47	15.26	-15.41	83.00	50.00	87.22%



2.2 Efficiency versus output current (Io1:100%=83mA; Io2:100%=50mA)

Load(%)	Io1(mA)	Io2(mA)	Vin (V)	Iin(mA)	Vo1(V)	Vo2(V)	Effi.(%)
0	0	0	24.00	6.53	15.59	-15.61	N/A
10	8.3	5	24.01	14.82	15.06	-15.13	56.39%
20	16.6	10	24.01	23.29	15.03	-15.11	71.64%
30	24.9	15	24.01	32.05	15.03	-15.11	78.09%
40	33.2	20	24.01	40.83	15.04	-15.13	81.80%
50	41.5	25	24.00	49.75	15.05	-15.14	84.01%
60	49.8	30	24.01	58.72	15.05	-15.16	85.42%
70	58.1	35	24.01	67.81	15.05	-15.17	86.32%
80	66.4	40	23.99	77.03	15.05	-15.17	86.91%
90	74.7	45	23.99	86.37	15.05	-15.19	87.25%
100	83	50	24.00	95.91	15.08	-15.21	87.41%



3 OUTPUT CHARACTERISTICS

3.1 Line and load Regulation (Io1:100%=83mA; Io2:100%=50mA)

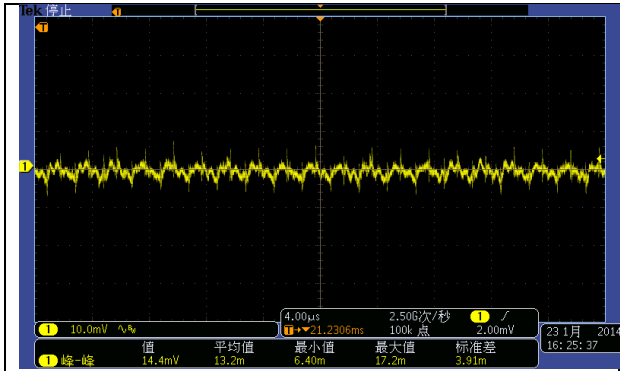
Vin (V)	Io1,Io2=10%		Io1,Io2=30%		Io1,Io2=50%		Io1,Io2=70%		Io1,Io2=100%	
	Vo1 (V)	Vo2 (V)	Vo1 (V)	Vo2 (V)	Vo1 (V)	Vo2 (V)	Vo1 (V)	Vo2 (V)	Vo1 (V)	Vo2 (V)
21.6	14.82	-14.89	14.79	-14.87	14.80	-14.90	14.79	-14.90	14.78	-14.92
24	15.06	-15.13	15.03	-15.11	15.05	-15.14	15.05	-15.17	15.08	-15.21
26.4	15.27	-15.35	15.23	-15.31	15.23	-15.33	15.23	-15.36	15.26	-15.41

Vo1 Line Regulation Ratio: $\pm 1.6\%$; and Load Regulation Ratio: $\pm 0.17\%$;

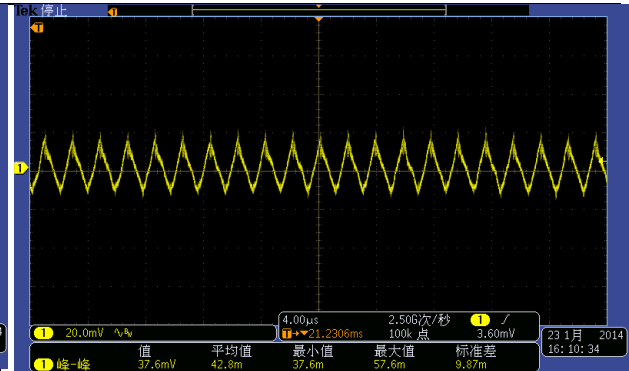
Vo2 Line Regulation Ratio: $\pm 1.62\%$; and Load Regulation Ratio: $\pm 0.33\%$

3.2 Ripple and noise (Io1:100%=83mA; Io2:100%=50mA)

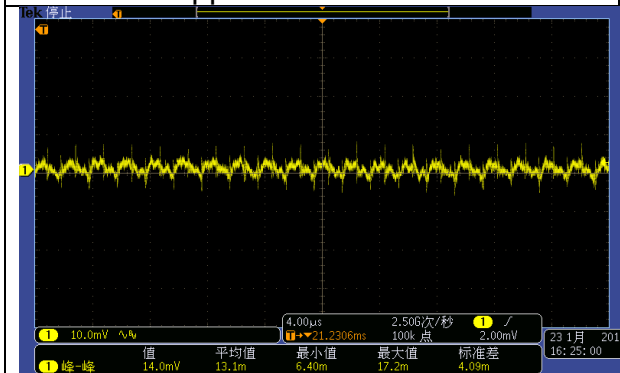
Vin (V)	Io1,Io2=10% Load		Io1,Io2=100% Load	
	Vo1 (mV)	Vo2 (mV)	Vo1 (mV)	Vo2 (mV)
21.6	14.4	8.4	37.6	22.4
24	14.0	8.4	34.4	21.6
26.4	14.4	8.0	32.0	21.6



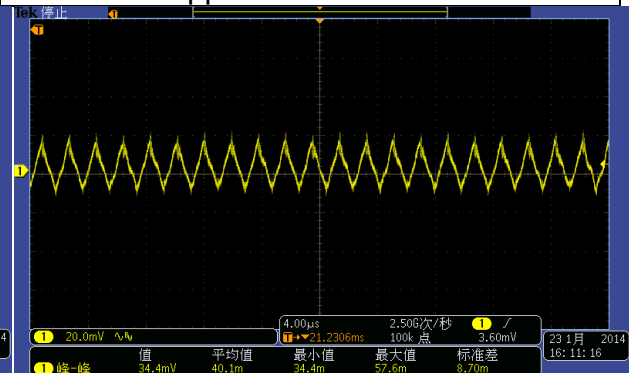
Vin=21.6V Io=10%Load
Ch1: Vo1 Ripple



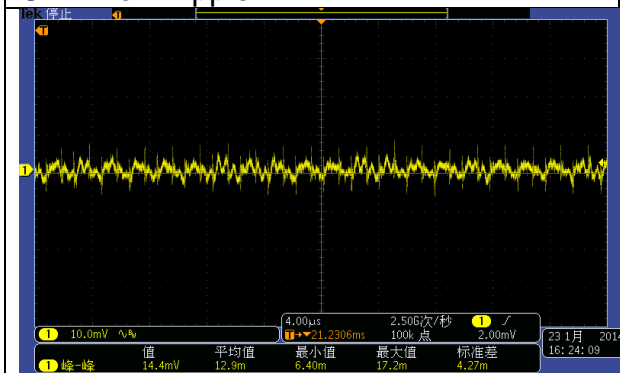
Vin=21.6V Io=100%Load
Ch1: Vo1 Ripple



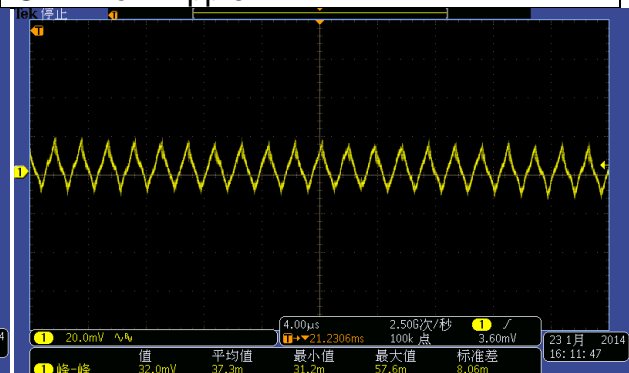
Vin=24V Io=10%Load
Ch1: Vo1 Ripple



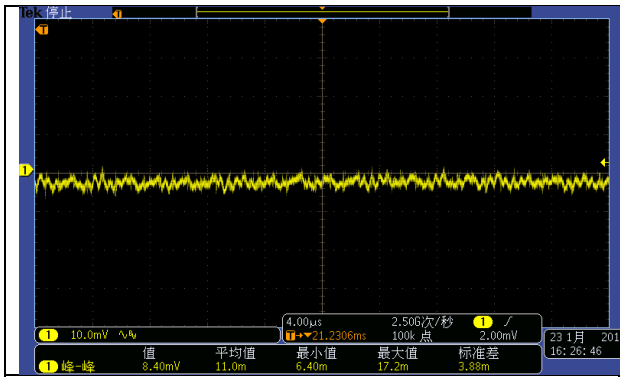
Vin=24V Io=100%Load
Ch1: Vo1 Ripple



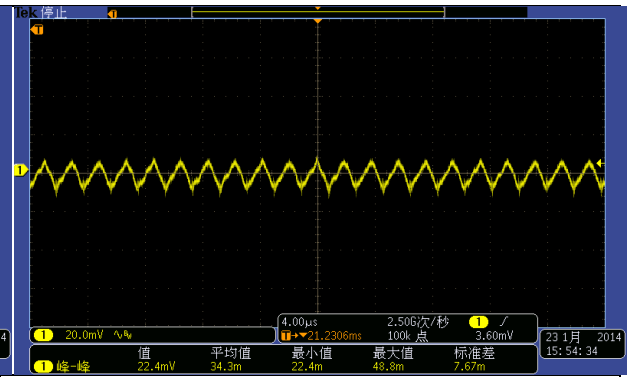
Vin=26.4V Io=10%Load
Ch1: Vo1 Ripple



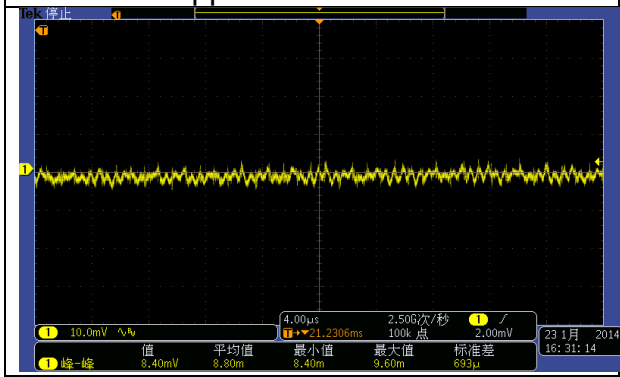
Vin=26.4V Io=100%Load
Ch1: Vo1 Ripple



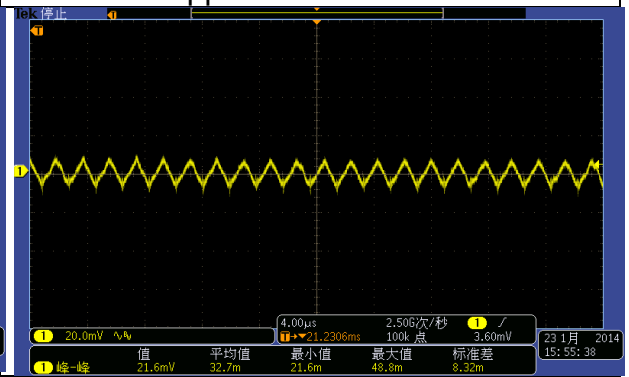
Vin=21.6V Io=10%Load
Ch1: Vo2 Ripple



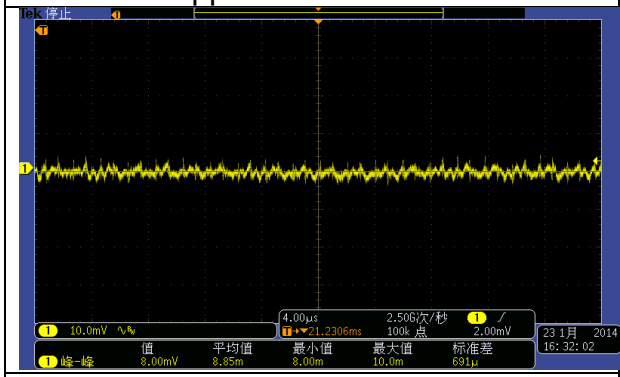
Vin=21.6V Io=100%Load
Ch1: Vo2 Ripple



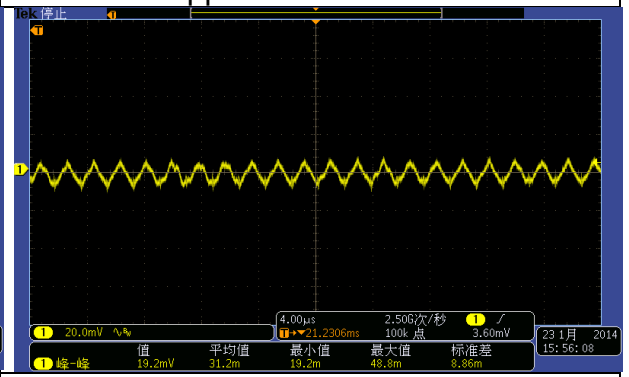
Vin=24V Io=10%Load
Ch1: Vo2 Ripple



Vin=24V Io=100%Load
Ch1: Vo2 Ripple

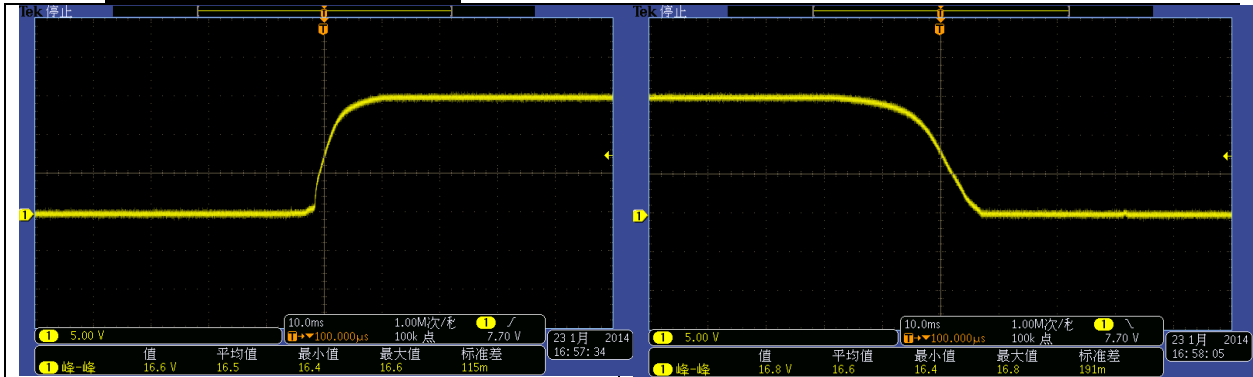


Vin=26.4V Io=10%Load
Ch1: Vo2 Ripple



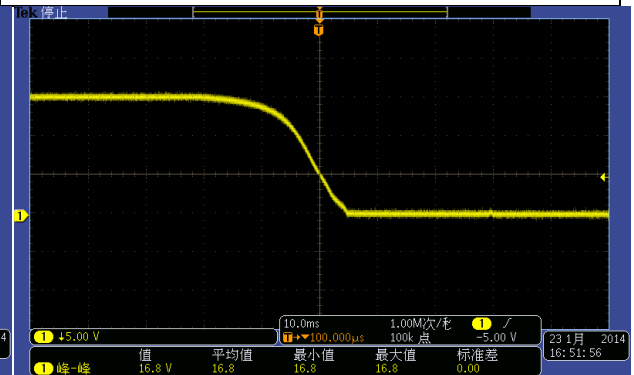
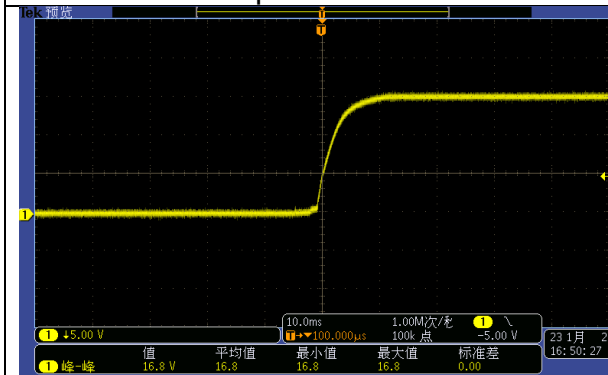
Vin=26.4V Io=100%Load
Ch1: Vo2 Ripple

3.3 Start up and shut down



Vin=24V Io=100%Load
Ch1: Vo1 Start up

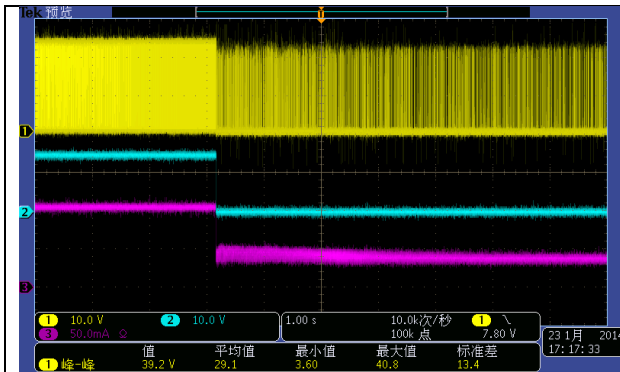
Vin=24V 100%Load
Ch1: Vo1 shut down



Vin=24V Io=100%Load
Ch1: Vo2 Start up

Vin=24V 100%Load
Ch1: Vo2 shut down

3.4 Output short protection (Io1:100%=83mA; Io2:100%=50mA)



Vin=24V Io=100%Load
Vo1 from full load to short
Ch1: SW Pin of U1
Ch2: Vo1
Ch3:Io1

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