



Texas Instruments

PMP4415 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: PMP4415_SCH_RevA

Assembly: PMP4415_PCB_RevA

BOM

1.3 TEST EQUIPMENTS

Multi-meter(voltage): Fluke 287

Multi-meter(current): Fluke 287

DC Source: TDK-Lambda GEN100-33

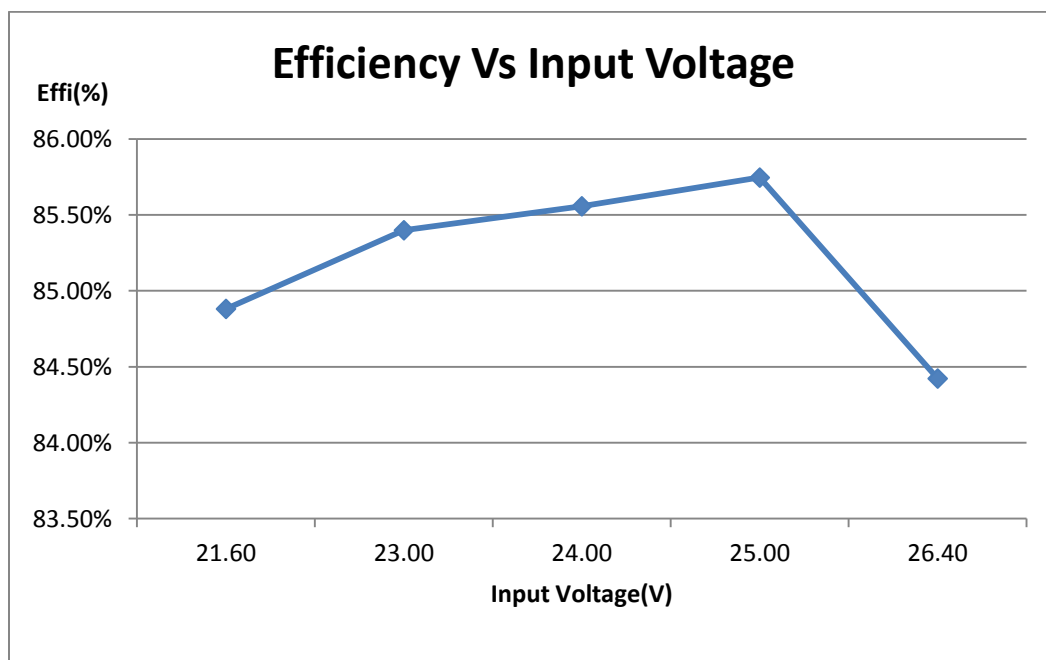
Load: Chroma 63110A module

Oscilloscope: Tek DPO3054

2 INPUT CHARACTERISTICS

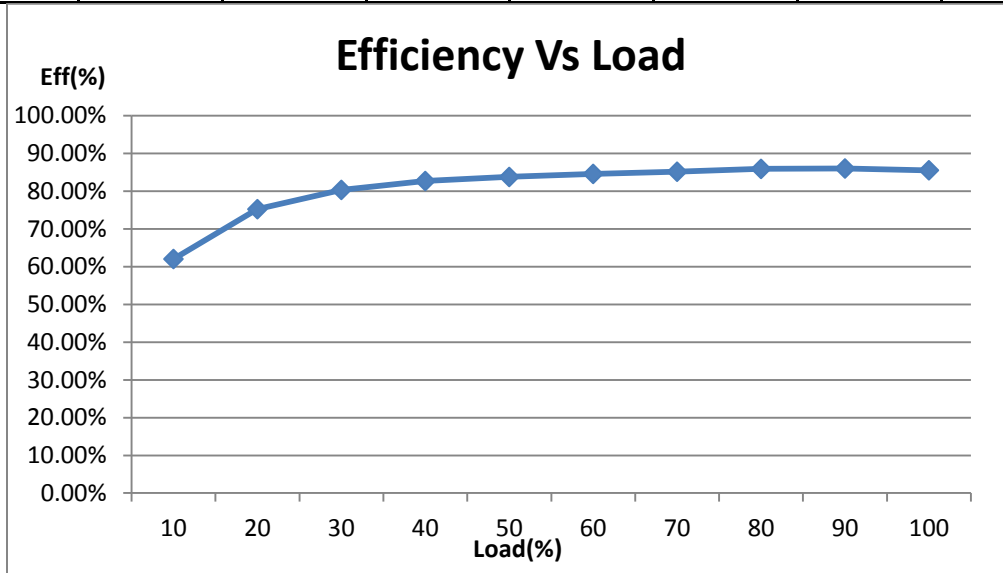
2.1 Full load Efficiency

Vin (V)	Iin(mA)	Vo1(V)	Vo2(V)	Io1(mA)	Io2(mA)	Effi.(%)
21.60	161.39	14.69	-15.11	150.00	50.00	84.88%
23.00	152.76	14.90	-15.31	150.00	50.00	85.40%
24.00	147.05	15.00	-15.39	150.00	50.00	85.56%
25.00	141.65	15.09	-15.46	150.00	50.00	85.75%
26.40	136.69	15.14	-15.51	150.00	50.00	84.42%



2.2 Efficiency versus output current (Io1:100%=150mA; Io2:100%=50mA)

Load(%)	Io1(mA)	Io2(mA)	Vin (V)	Iin(mA)	Vo1(V)	Vo2(V)	Effi.(%)
0	0	0	24.01	7.68	15.70	-15.73	N/A
10	15	5	23.99	20.31	15.12	-15.10	62.04%
20	30	10	24.00	33.40	15.05	-15.17	75.25%
30	45	15	24.01	46.96	15.06	-15.22	80.35%
40	60	20	23.99	60.96	15.07	-15.27	82.71%
50	75	25	23.99	75.20	15.05	-15.31	83.78%
60	90	30	24.00	89.41	15.06	-15.33	84.60%
70	105	35	24.01	103.52	15.05	-15.34	85.18%
80	120	40	24.01	117.38	15.06	-15.36	85.92%
90	135	45	23.99	131.98	15.05	-15.38	86.03%
100	150	50	24.00	147.05	15.00	-15.39	85.56%



3 OUTPUT CHARACTERISTICS

3.1 Line and load Regulation (Io1:100%=150mA; Io2:100%=50mA)

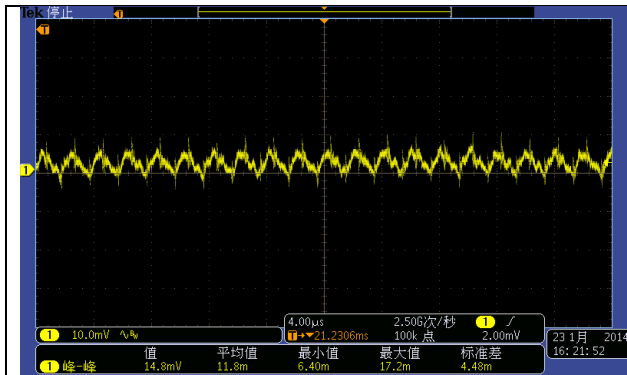
Vin (V)	Io1,Io2=10%		Io1,Io2=30%		Io1,Io2=50%		Io1,Io2=70%		Io1,Io2=100%	
	Vo1 (V)	Vo2 (V)	Vo1 (V)	Vo2 (V)	Vo1 (V)	Vo2 (V)	Vo1 (V)	Vo2 (V)	Vo1 (V)	Vo2 (V)
21.6	14.93	-15.04	14.90	-15.10	14.91	-15.13	14.88	-15.16	14.66	-15.10
24	15.12	-15.10	15.06	-15.22	15.05	-15.31	15.05	-15.34	14.97	-15.37
26.4	15.15	-15.26	15.12	-15.28	15.13	-15.37	15.12	-15.41	15.14	-15.51

Vo1 Line Regulation Ratio: $\pm 1.61\%$; and Load Regulation Ratio: $\pm 0.4\%$;

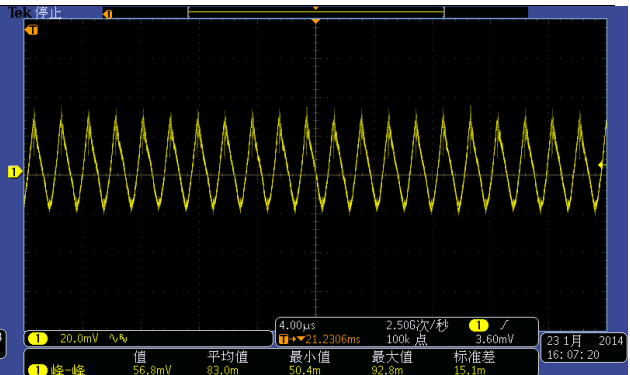
Vo2 Line Regulation Ratio: $\pm 1.34\%$; and Load Regulation Ratio: $\pm 0.95\%$

3.2 Ripple and noise(Io1:100%=150mA; Io2:100%=50mA)

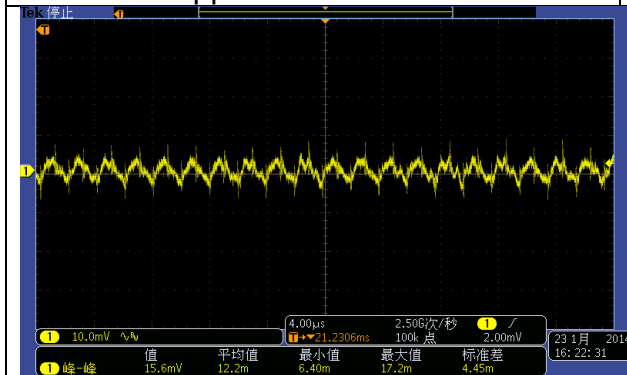
Vin (V)	Io1,Io2=10% Load		Io1,Io2=100% Load	
	Vo1 (mV)	Vo2 (mV)	Vo1 (mV)	Vo2 (mV)
21.6	14.8	7.6	56.8	23.2
24	15.6	6.4	54.4	24
26.4	16	7.2	51.2	21.6



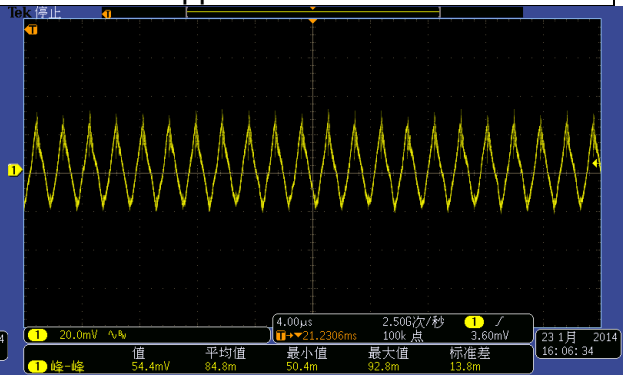
Vin=21.6V Io=10%Load
Ch1: Vo1 Ripple



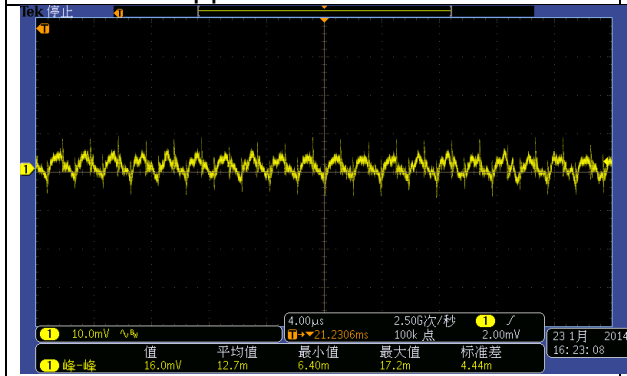
Vin=21.6V Io=100%Load
Ch1: Vo1 Ripple



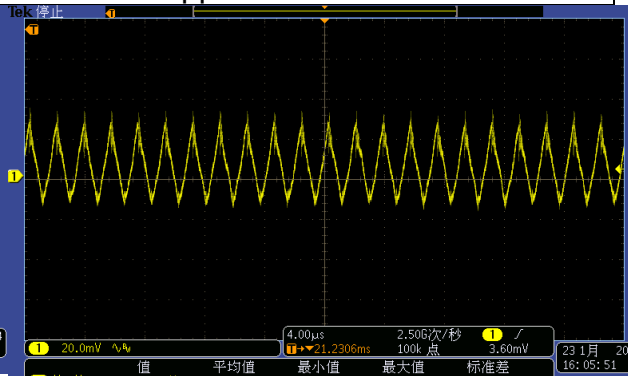
Vin=24V Io=10%Load
Ch1: Vo1 Ripple



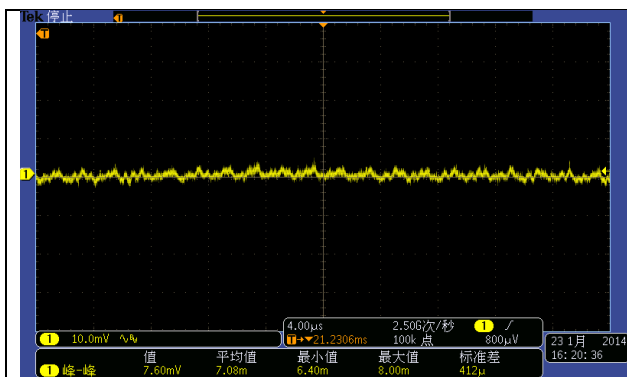
Vin=24V Io=100%Load
Ch1: Vo1 Ripple



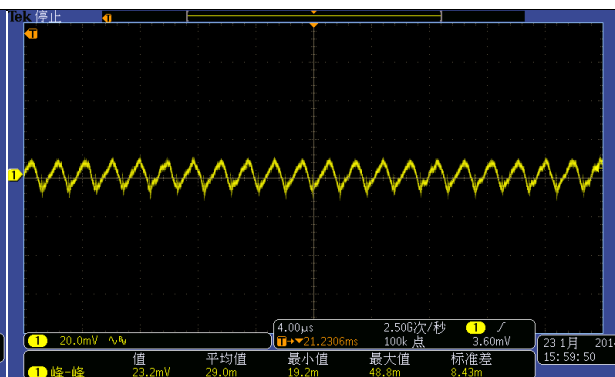
Vin=26.4V Io=10%Load
Ch1: Vo1 Ripple



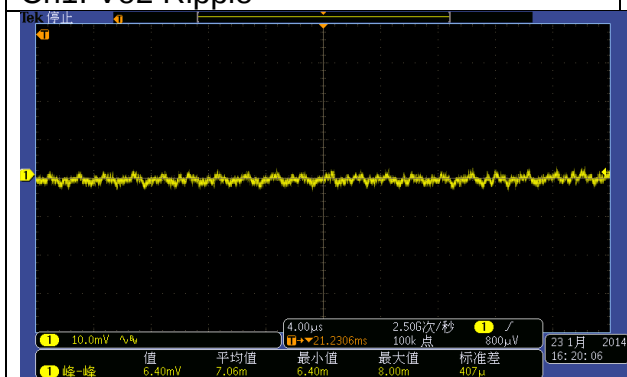
Vin=26.4V Io=100%Load
Ch1: Vo1 Ripple



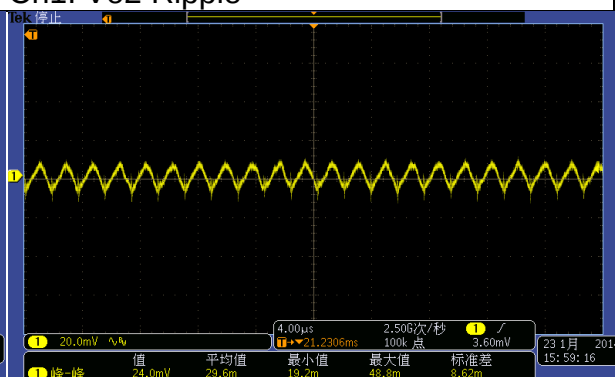
Vin=21.6V Io=10%Load
Ch1: Vo2 Ripple



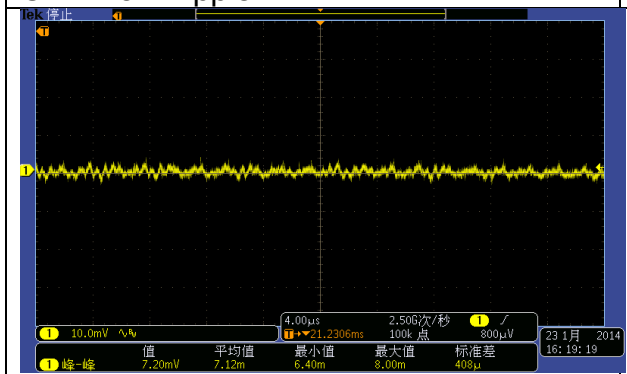
Vin=21.6V Io=100%Load
Ch1: Vo2 Ripple



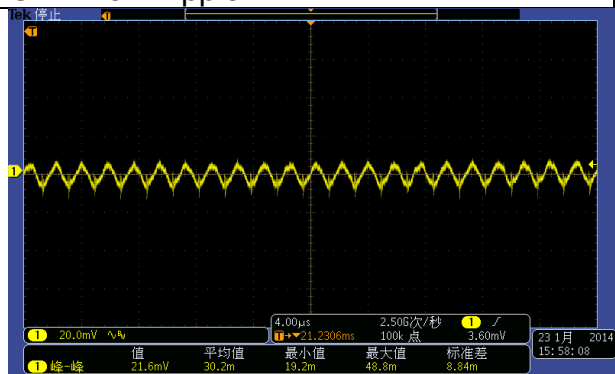
Vin=24V Io=10%Load
Ch1: Vo2 Ripple



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

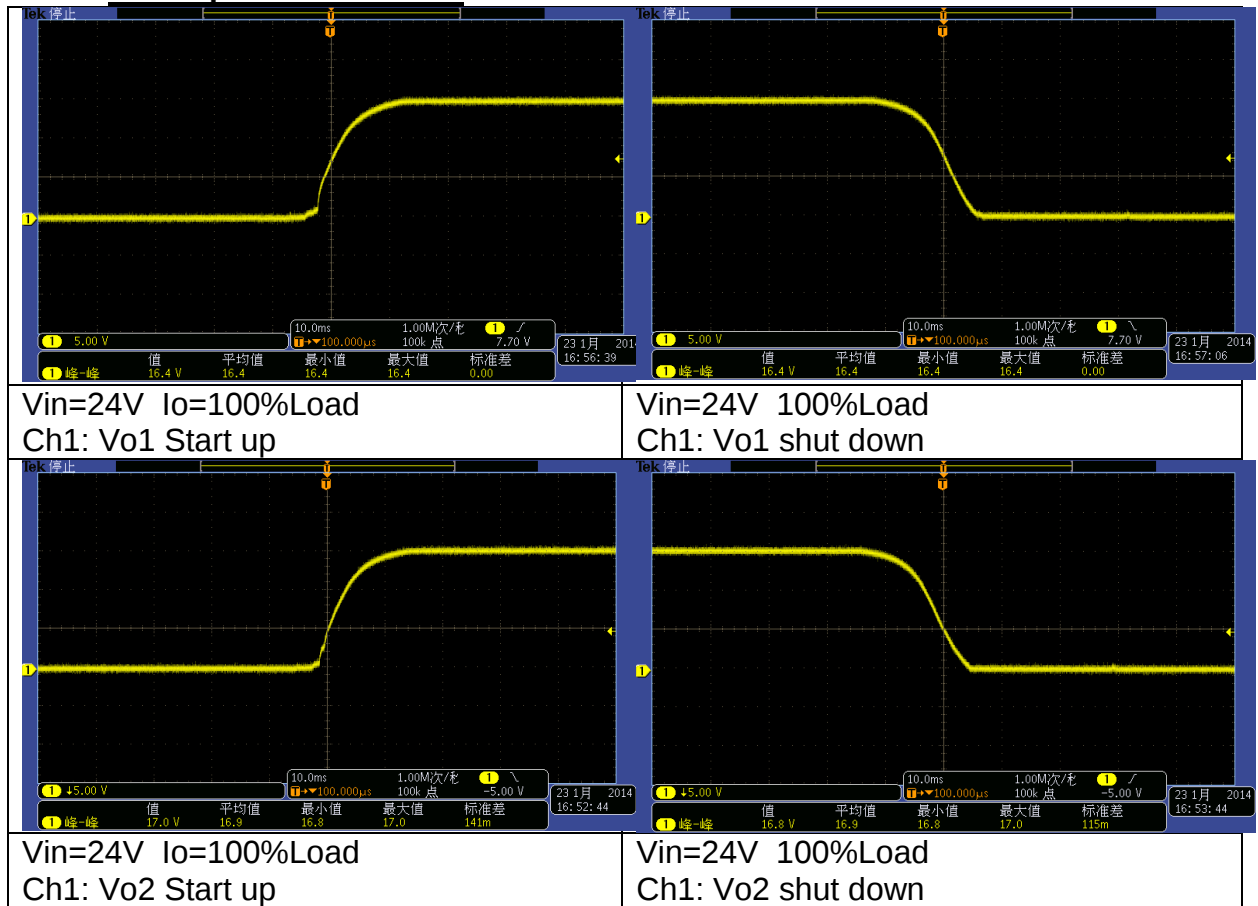


Vin=26.4V Io=10%Load
Ch1: Vo2 Ripple

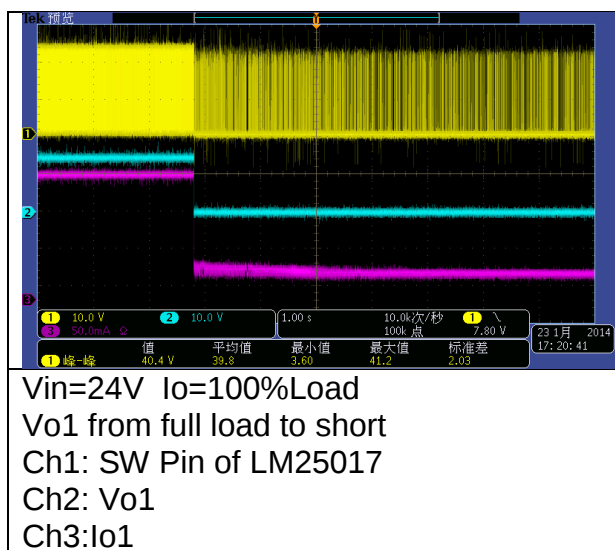


Vin=26.4V Io=100%Load
Ch1: Vo2 Ripple

3.3 Start up and shut down



3.4 Output short protection(Io1:100%=150mA; Io2:100%=50mA)



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