Texas Instruments

PMP4413 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: PMP4413_SCH_RevA
Assembly: PMP4413_PCB_RevA
BOM

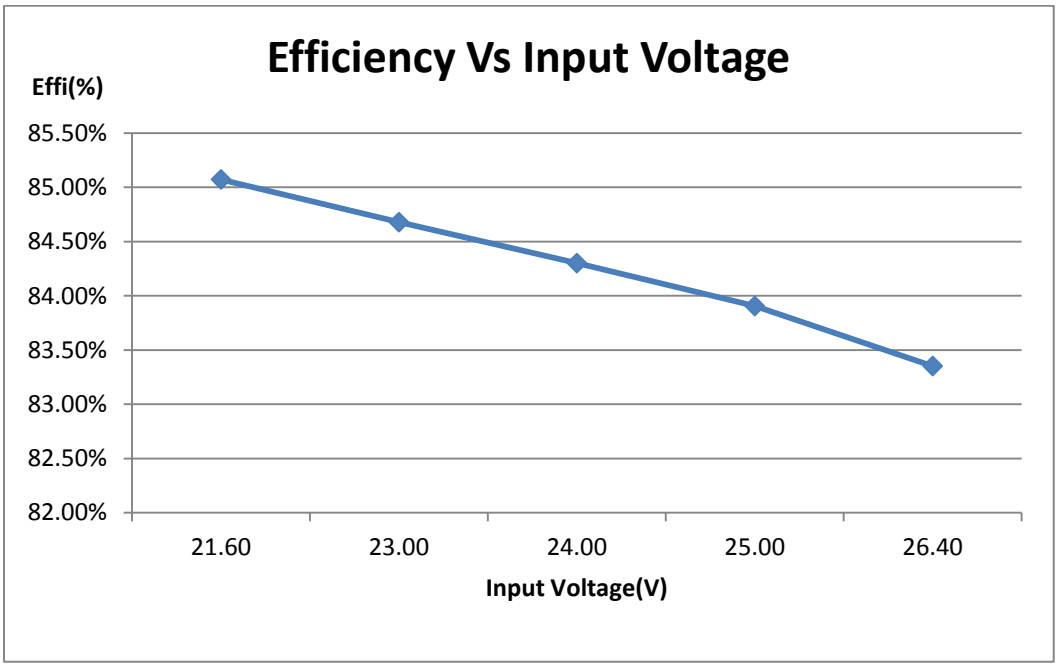
1.3 TEST EQUIPMENTS

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

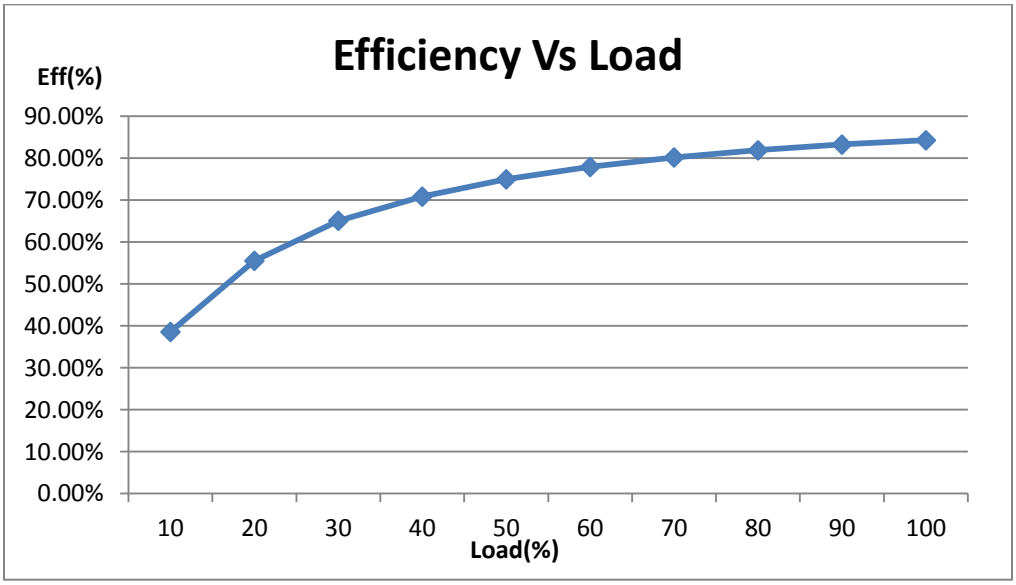
2.1 Full load Efficiency

Vin (V)	Iin(mA)	Vo1(V)	Vo2(V)	Io1(mA)	Io2(mA)	Effi.(%)
21.60	52.78	14.67	-14.72	33.00	33.00	85.07%
23.00	50.12	14.77	-14.81	33.00	33.00	84.68%
24.00	48.41	14.82	-14.86	33.00	33.00	84.30%
25.00	46.85	14.87	-14.91	33.00	33.00	83.91%
26.40	44.84	14.93	-14.97	33.00	33.00	83.35%



2.2 Efficiency versus output current(Io1:100% =33mA; Io2:100%=33mA)

Load(%)	Io1(mA)	Io2(mA)	Vin (V)	Iin(mA)	Vo1(V)	Vo2(V)	Effi.(%)
10	3.3	3.3	24.00	10.82	15.17	-15.20	38.59%
20	6.6	6.6	24.01	14.95	15.09	-15.12	55.55%
30	9.9	9.9	24.00	19.08	15.04	-15.07	65.10%
40	13.2	13.2	23.99	23.29	14.98	-15.01	70.85%
50	16.5	16.5	24.01	27.43	14.94	-14.99	74.98%
60	19.8	19.8	24.00	31.64	14.93	-14.96	77.94%
70	23.1	23.1	24.00	35.80	14.90	-14.93	80.20%
80	26.4	26.4	23.99	40.00	14.86	-14.91	81.90%
90	29.7	29.7	24.01	44.18	14.85	-14.89	83.27%
100	33	33	24.00	48.41	14.82	-14.86	84.30%



3 OUTPUT CHARACTERISTICS

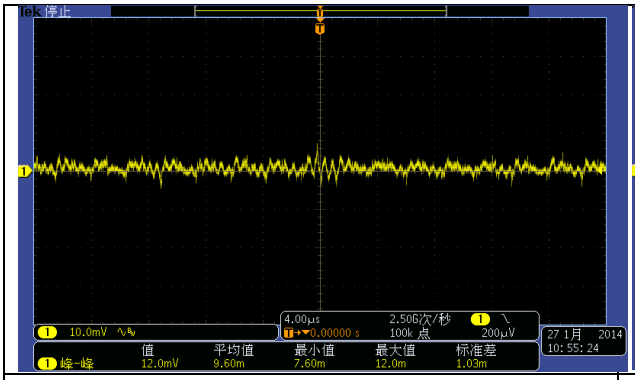
3.1 Line and load Regulation (Io1:100%=33mA; Io2:100%=33mA)

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	15.05	15.08	14.89	14.93	14.83	14.87	14.79	14.82	14.67	14.72
24.0	15.17	15.20	15.04	15.07	14.94	14.99	14.90	14.93	14.82	14.86
26.4	15.28	15.32	15.14	15.17	15.07	15.10	15.01	15.05	14.93	14.97

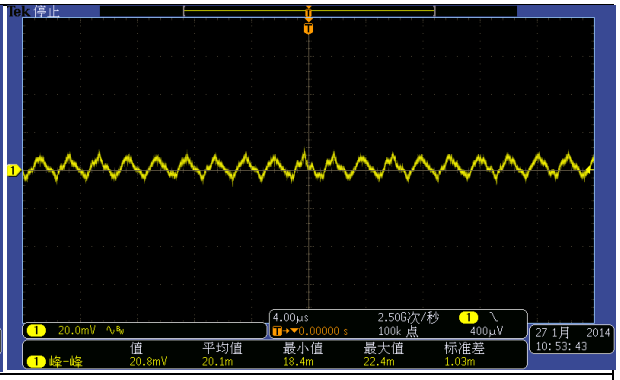
Vo1 Line Regulation Ratio:±0.88%; and Load Regulation Ratio: ±1.17%;
Vo2 Line Regulation Ratio:±0.84%; and Load Regulation Ratio: ±1.13%

3.2 Ripple and noise

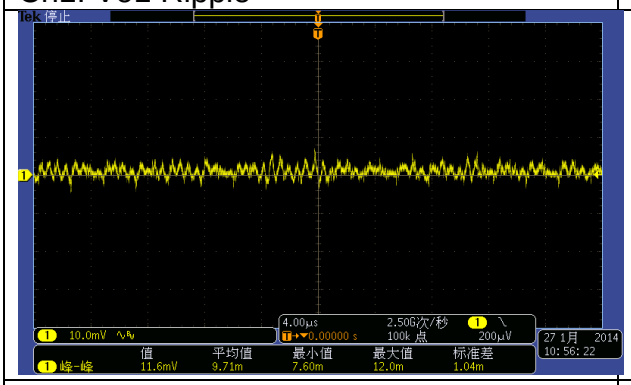
Vin (V)	Io1,Io2=10% Load		Io1,Io2=100% Load	
	Vo1 (mV)	Vo2 (mV)	Vo1 (mV)	Vo2 (mV)
21.6	12.0	8.8	20.8	17.2
24	11.6	9.2	16.4	16.4
26.4	12.0	10.4	20.0	14.4



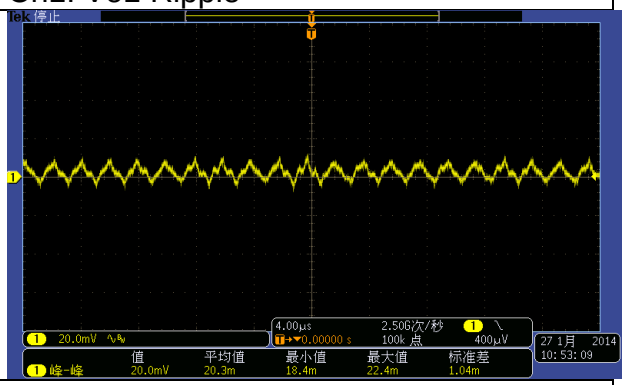
Vin=21.6V Io=10%Load
Ch1: Vo1 Ripple



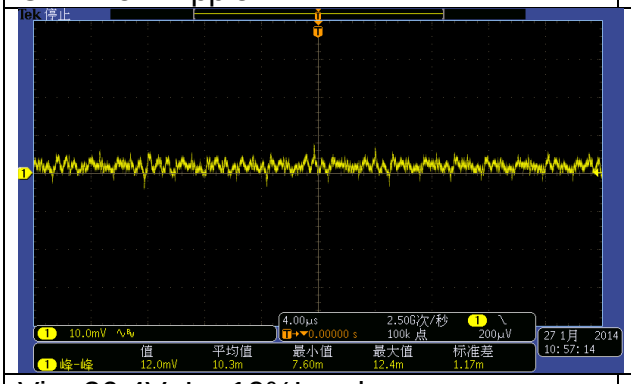
Vin=21.6V Io=100%Load
Ch1: Vo1 Ripple



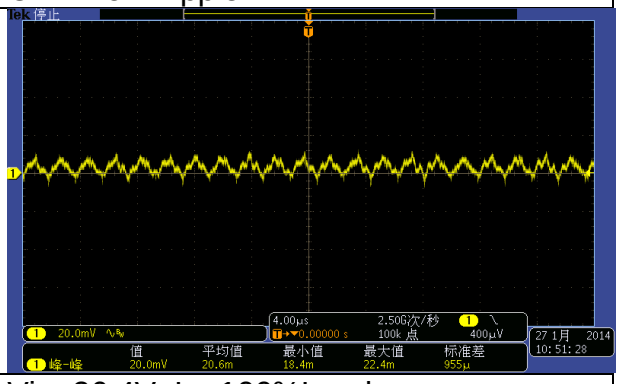
Vin=24V Io=10%Load
Ch1: Vo1 Ripple



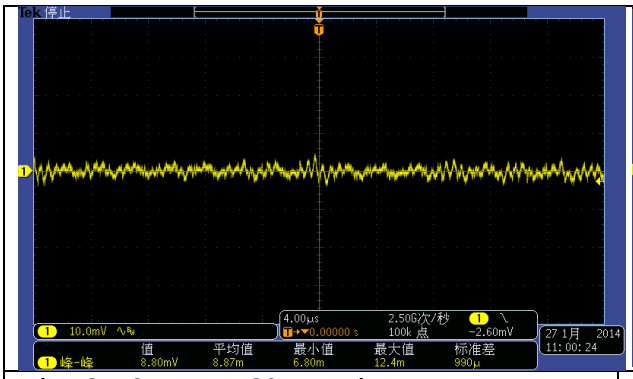
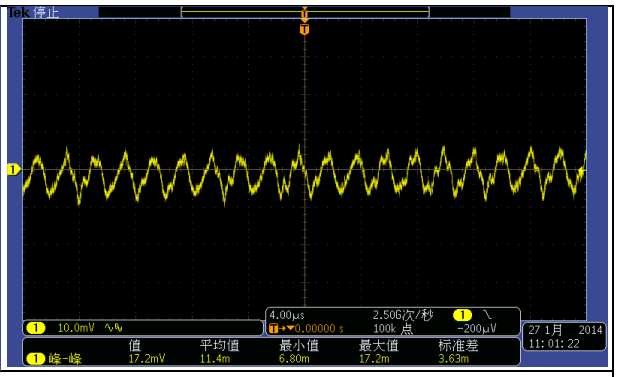
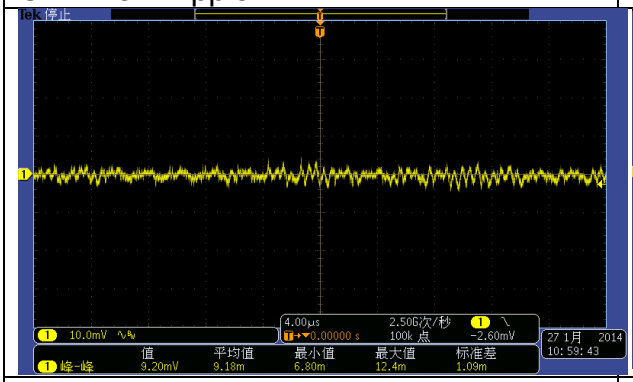
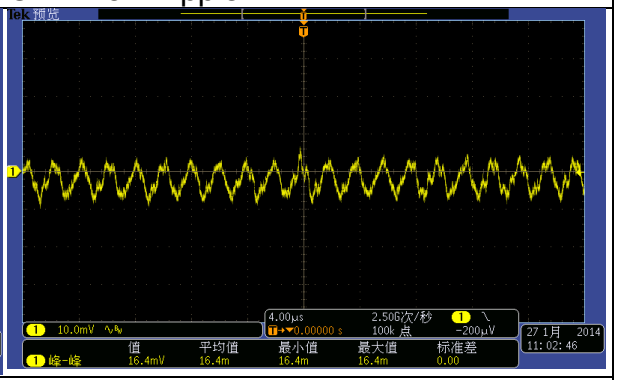
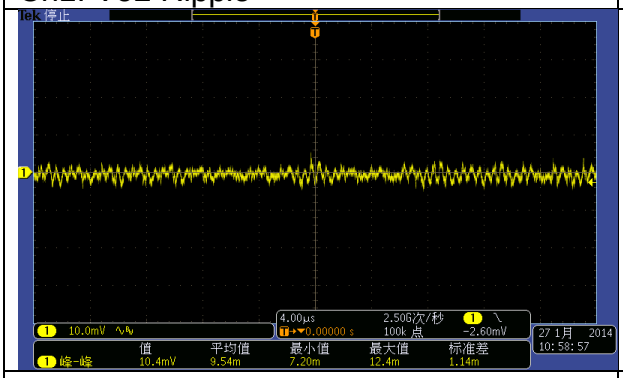
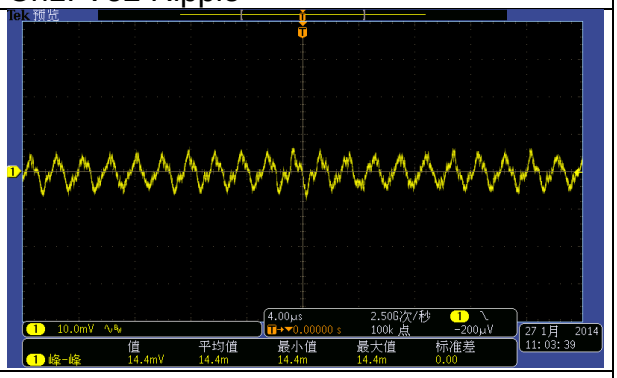
Vin=24V Io=100%Load
Ch1: Vo1 Ripple



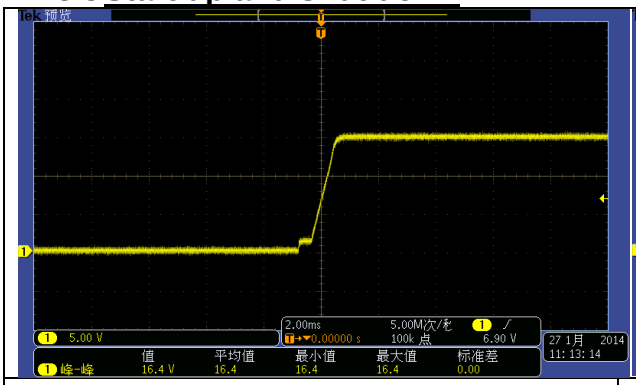
Vin=26.4V Io=10%Load
Ch1: Vo1 Ripple



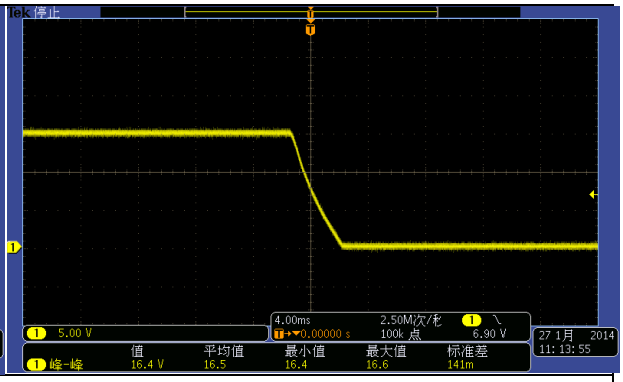
Vin=26.4V Io=100%Load
Ch1: Vo1 Ripple

	
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

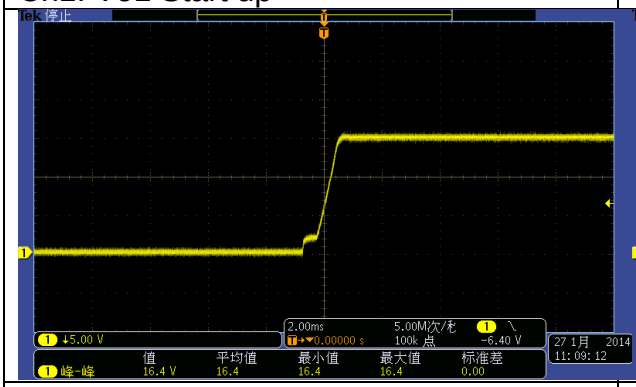
3.3 Start up and shut down



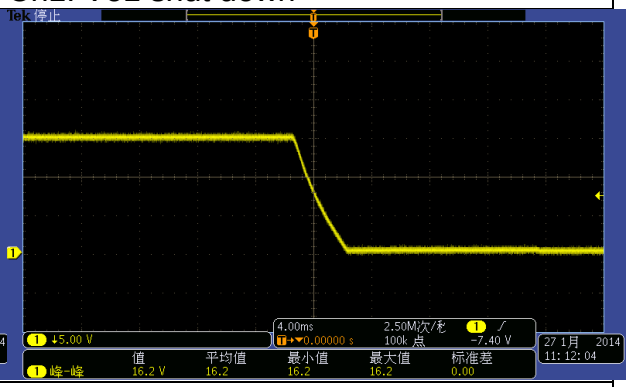
Vin=24V Io=100%Load
Ch1: Vo1 Start up



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

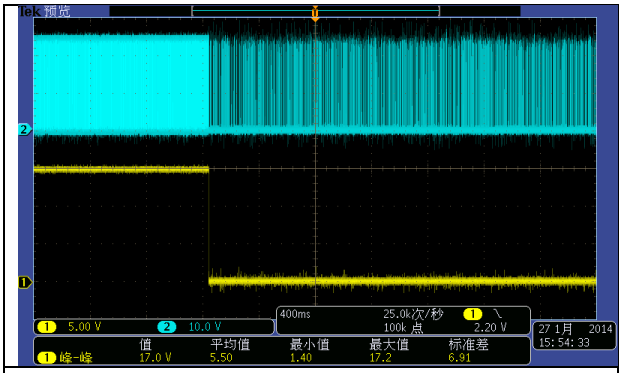


Vin=24V Io=100%Load
Ch1: Vo2 Start up



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

3.4 Output short protection



Vin=24V Io=100%Load
Vo1 from full load to short
Ch1: Vo1
Ch2:SW Pin of LM25018

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI’s products are provided subject to TI’s Terms of Sale (https:www.ti.com/legal/termsofsale.html) or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI’s provision of these resources does not expand or otherwise alter TI’s applicable warranties or warranty disclaimers for TI products.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265