Texas Instruments

PMP4475 Test Procedure

China Power Reference Design

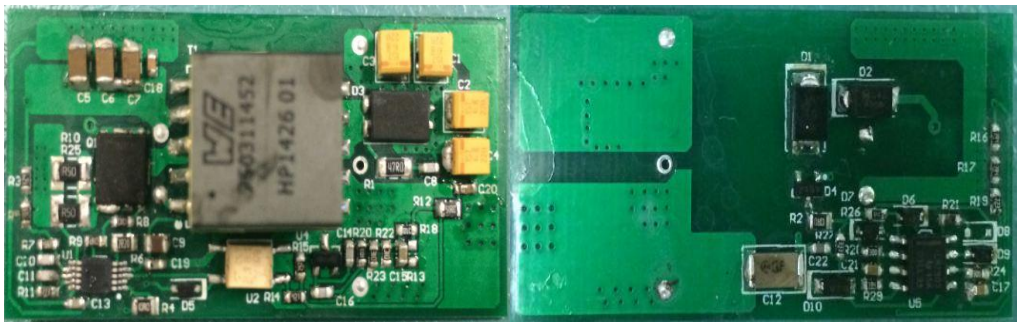
REV A

12/04/2015

1 GENERAL

1.1 PURPOSE

To provide detailed data for evaluating and verifying the PMP4475, this power module uses LM5020 for 5V/2A power supply with size 51mmx26mmx12.5mm.The below photo shows this demo board.



1.2 REFERENCE DOCUMENTATION

Schematic PMP4475_SCH.PDF
Assembly PMP4475_PCB.PDF
BOM
Promotion tools

1.3 TEST EQUIPMENTS

Power-meter: YOKOGAWA WT210
Multi-meter(current): Fluke 8845A
Multi-meter(voltage): Fluke 187
DC Source: Chroma 62102
Electronic load: Chroma 63110A module
Testing demo board

2 INPUT CHARACTERISTICS

2.1 EFFICIENCY DATA

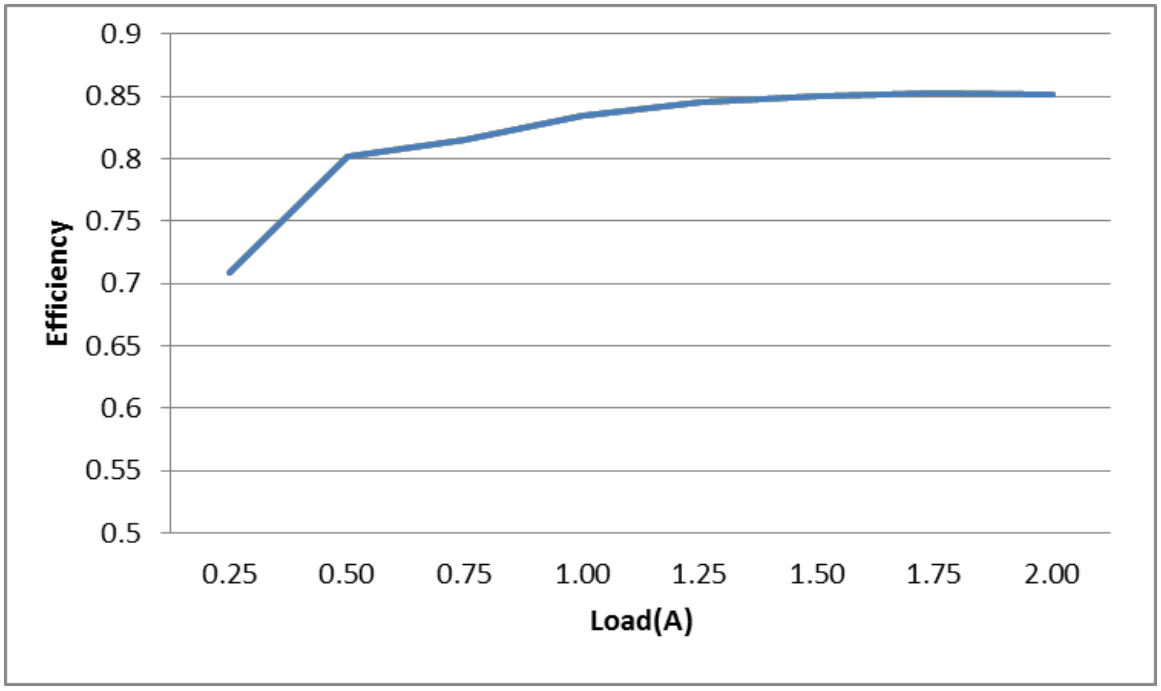
Vin(V)	Iin(A)	Vo(V)	Io(A)	Efficiency(%)
36.117	0.0498	5.0721	0.2513	70.87
36.116	0.0883	5.0694	0.5044	80.18
36.114	0.1307	5.0670	0.7594	81.52
36.114	0.1680	5.0647	1.0003	83.50
36.115	0.2081	5.0621	1.2553	84.55
36.115	0.2487	5.0595	1.5094	85.03
36.114	0.2874	5.0569	1.7503	85.28
36.116	0.3289	5.0536	2.0016	85.16

Vin(V)	Iin(A)	Vo(V)	Io(A)	Efficiency(%)
48.020	0.0402	5.0727	0.2503	65.78
48.020	0.0690	5.0699	0.5044	77.18
48.019	0.1005	5.0675	0.7575	79.54
48.021	0.1285	5.0654	1.0013	82.19
48.020	0.1583	5.0631	1.2563	83.68
48.020	0.1885	5.0605	1.5075	84.28
48.022	0.2171	5.0580	1.7503	84.92
48.024	0.2515	5.0545	2.0344	85.14

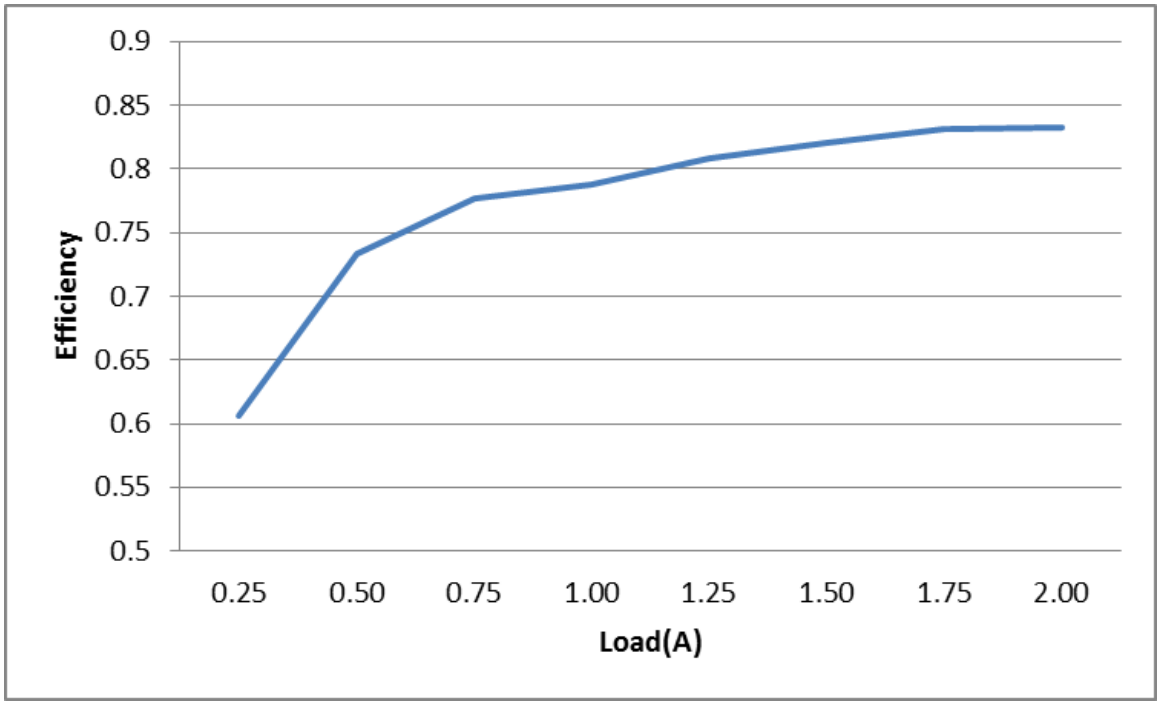
Vin(V)	Iin(A)	Vo(V)	Io(A)	Efficiency(%)
72.014	0.0291	5.0731	0.2503	60.59
72.014	0.0486	5.0713	0.5063	73.36
72.014	0.0688	5.0685	0.7594	77.69
72.014	0.0893	5.0662	1.0003	78.80
72.013	0.1091	5.0636	1.2534	80.78
72.013	0.1291	5.0608	1.5066	82.03
72.013	0.1480	5.0575	1.7503	83.06
72.015	0.1687	5.0542	2.0016	83.27

2.2 LOAD AND INPUT VOLTAGE VS LOAD CURRENT

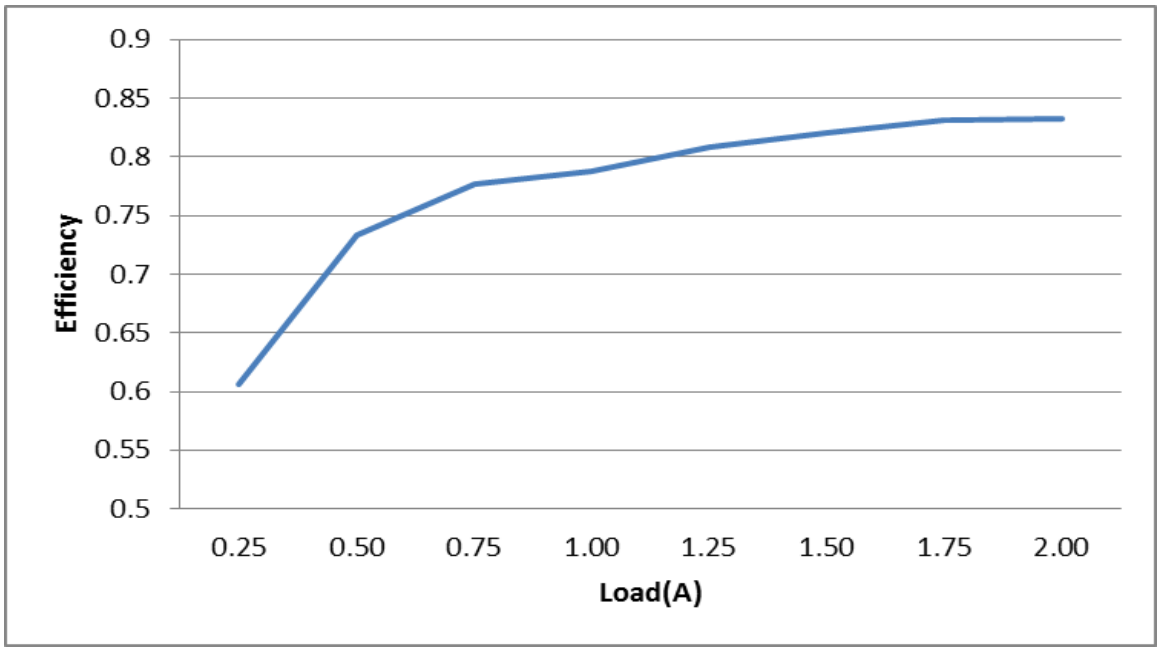
Vin=36V



Vin=48V

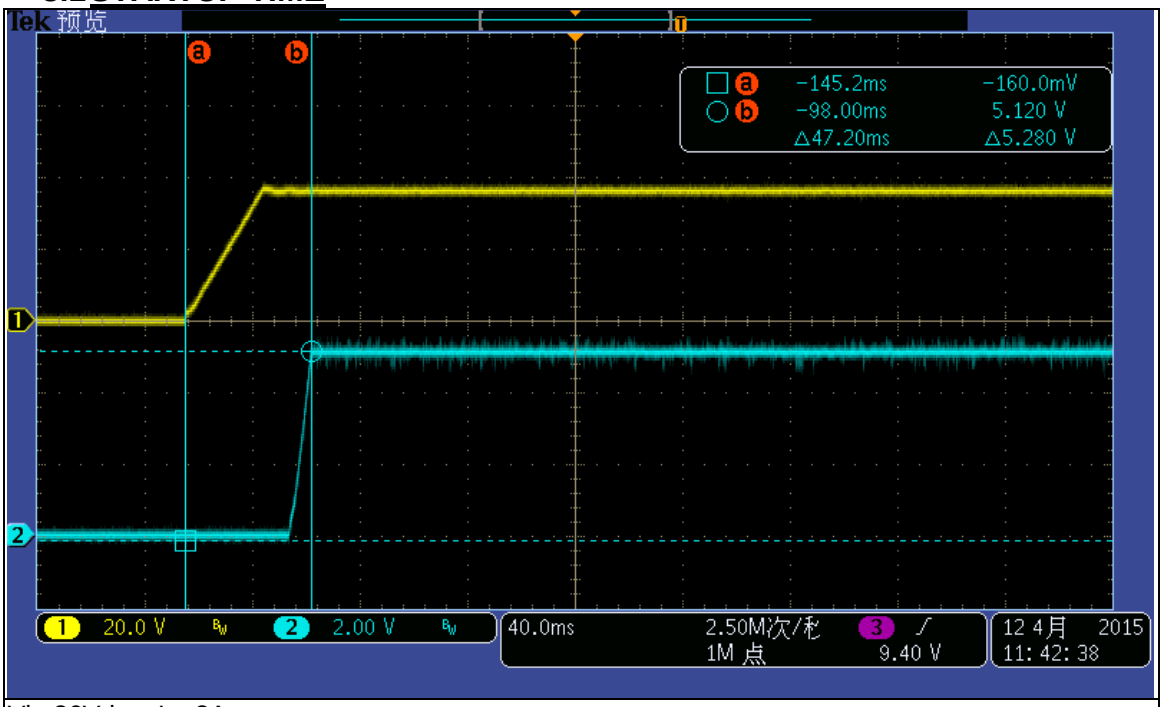


Vin=72V

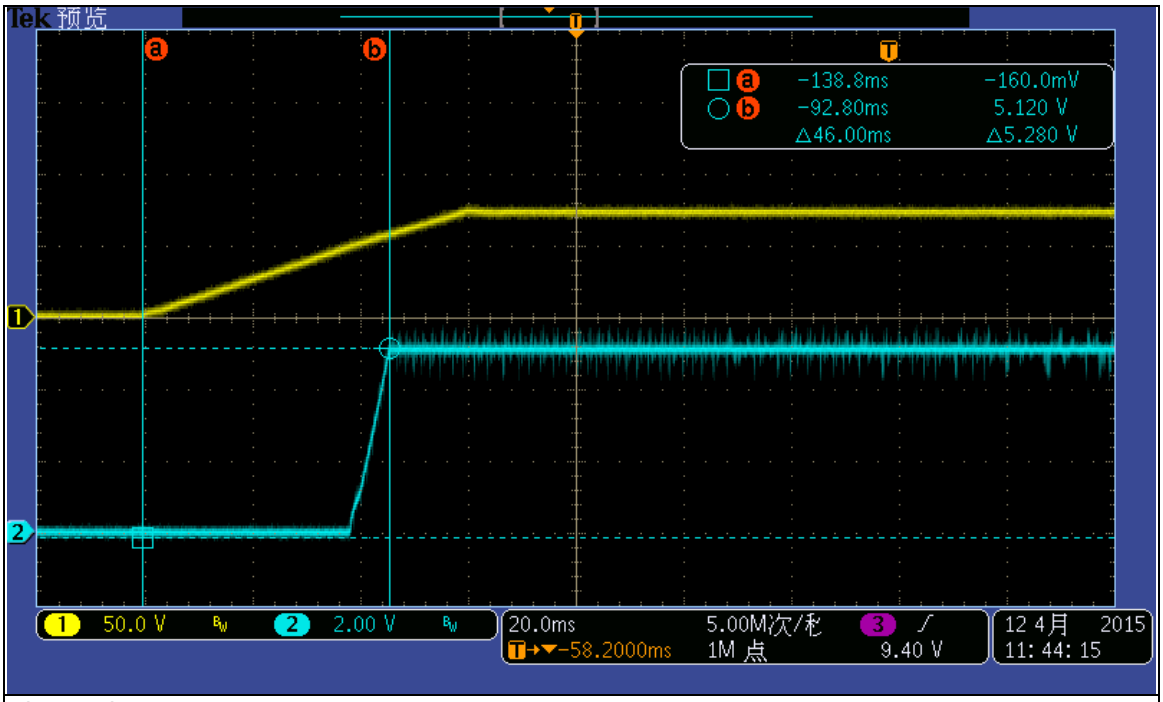


3 OUTPUT CHARACTERISTICS

3.1 STARTUP TIME

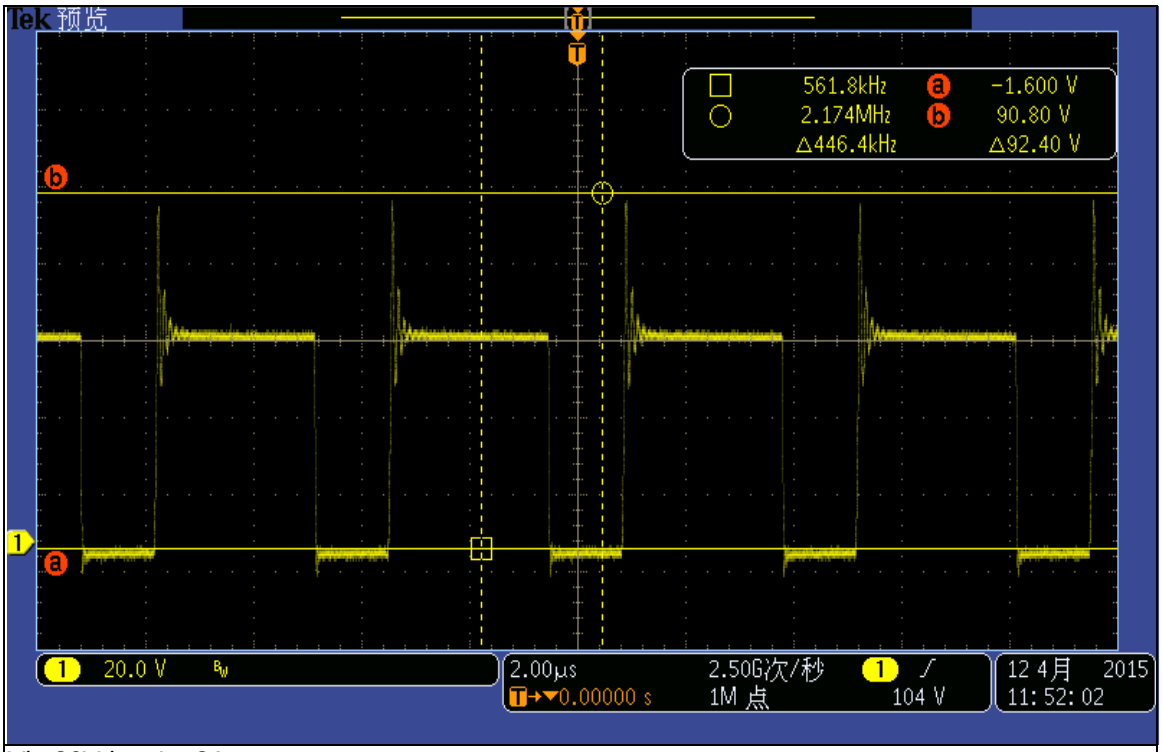


Vin:36Vdc Io: 2A
Ch1: input voltage, 20V/div
Ch2: output voltage, 2V/div

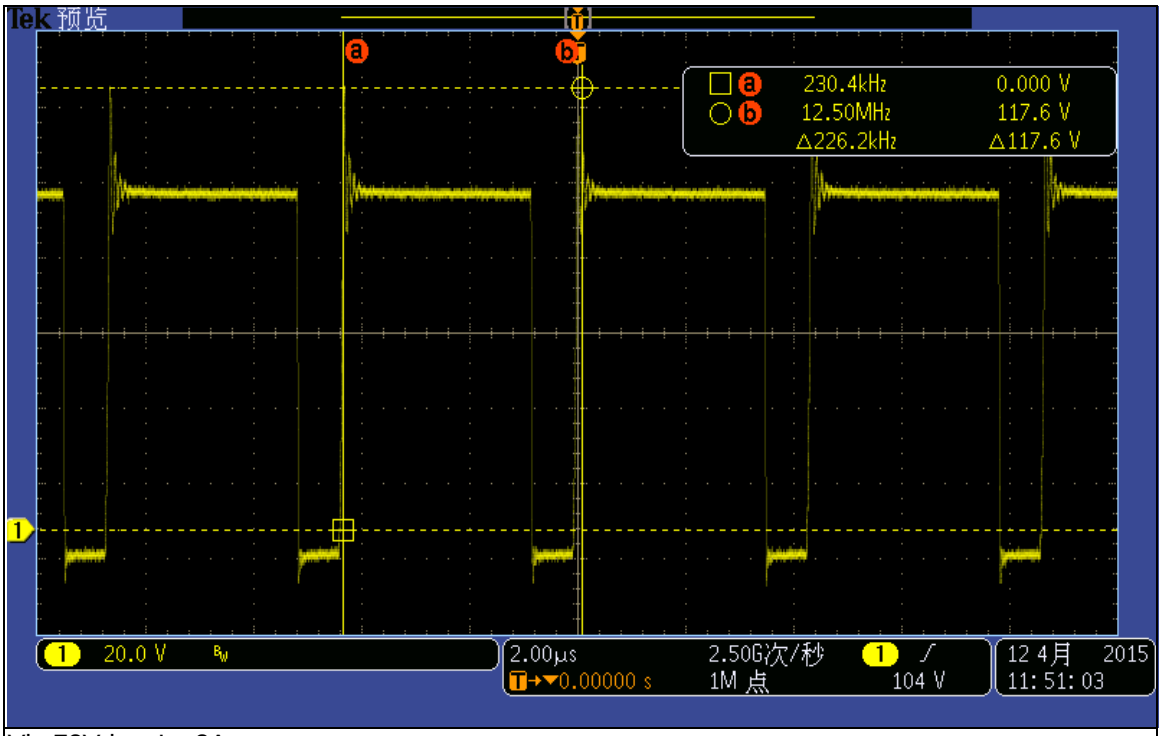


Vin:72Vdc Io: 2A
Ch1: input voltage, 20V/div
Ch2: output voltage, 2V/div

3.2 MOSFET VOLTAGE STRESS



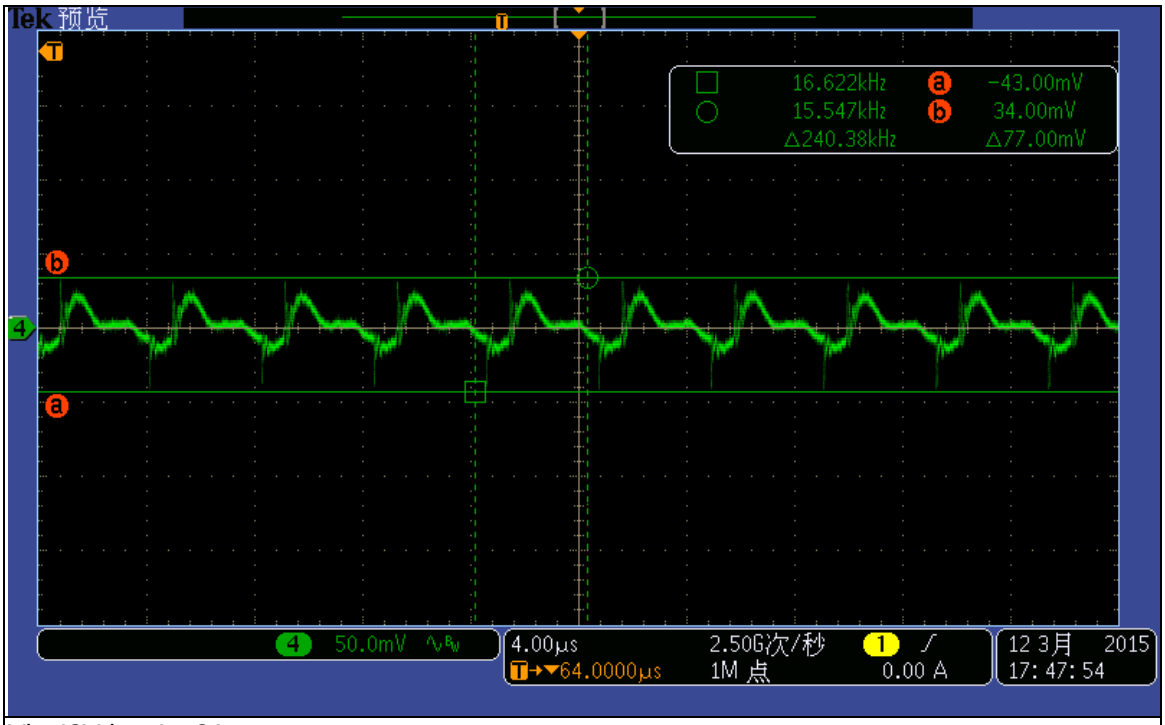
Vin:36Vdc Io: 2A
Ch1: Vds, 20V/div



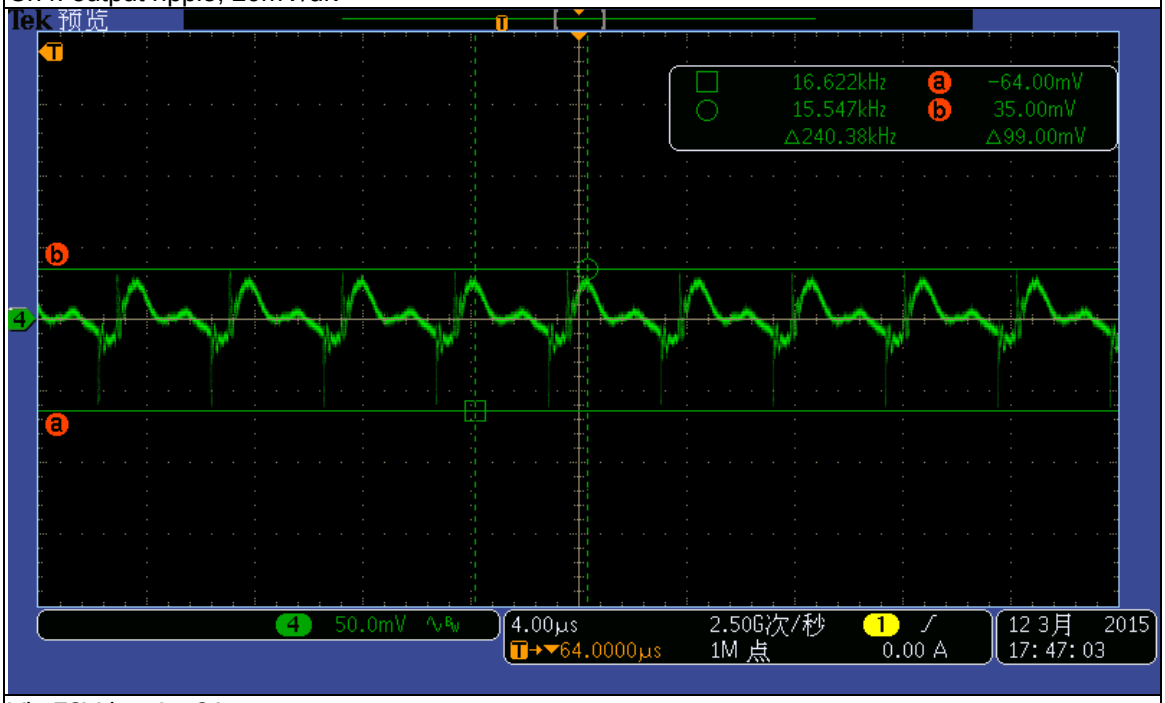
Vin:72Vdc Io: 2A
Ch1: Vds, 20V/div

3.3 RIPPLE VOLTAGE

Vin:36Vdc Io: 2A
Ch4: output ripple, 20mV/div

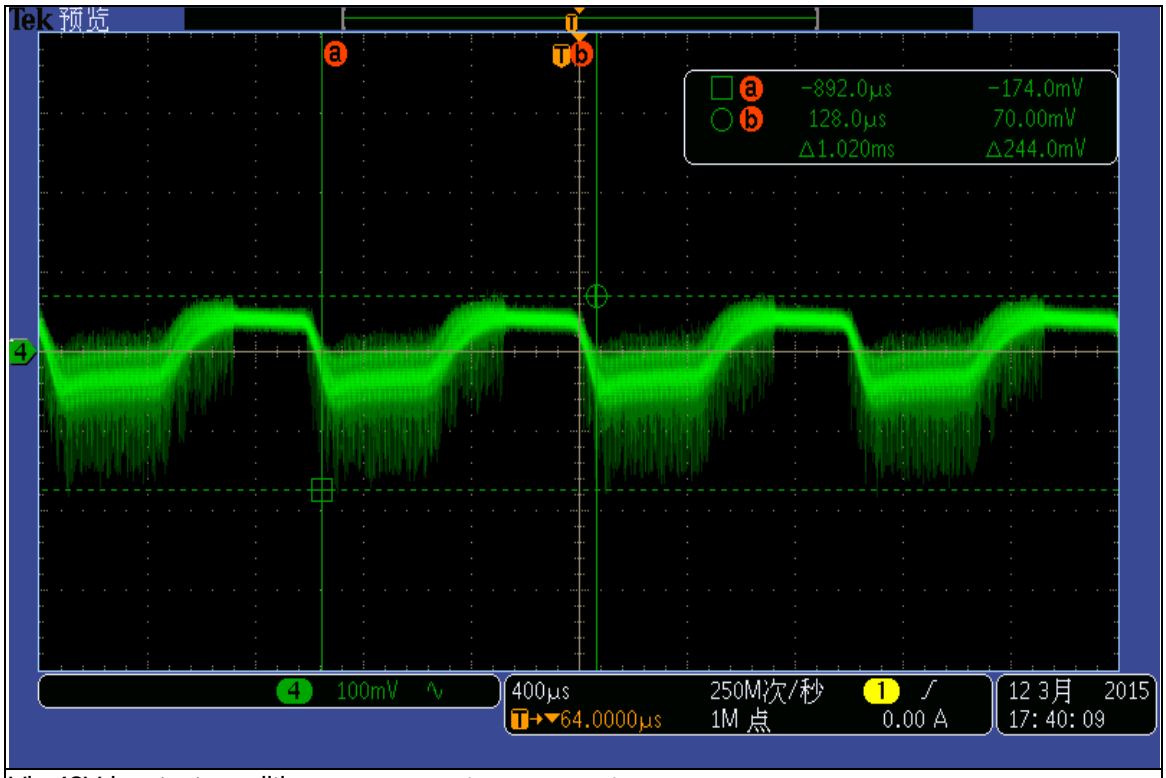


Vin:48Vdc Io: 2A
Ch4: output ripple, 20mV/div



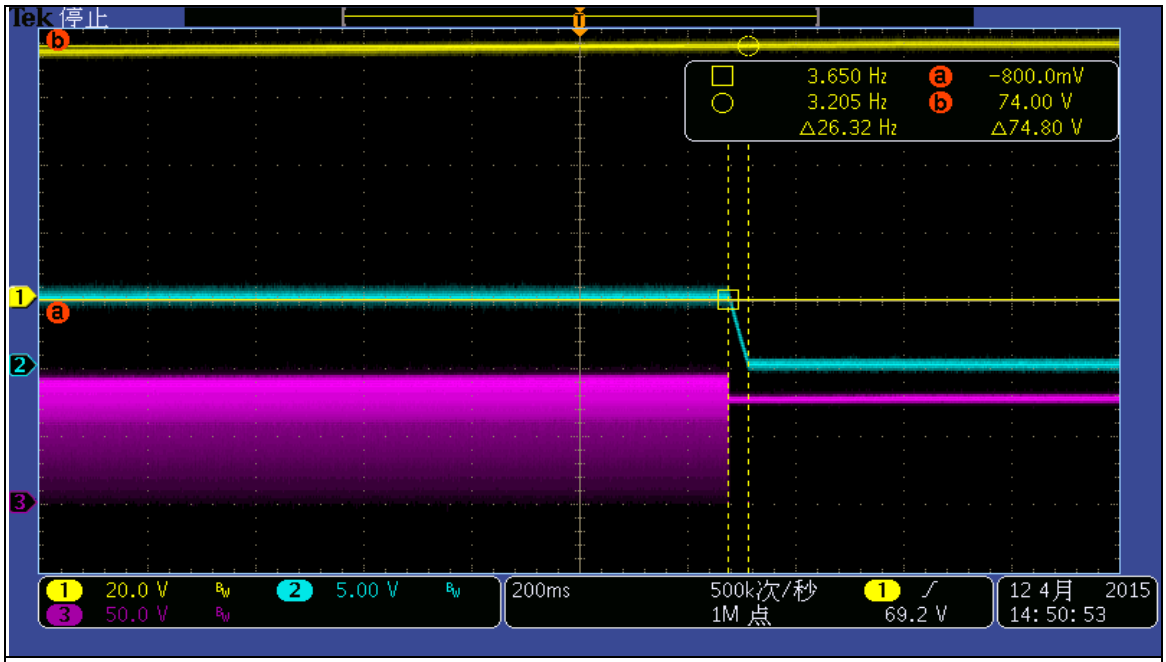
Vin:72Vdc Io: 2A
Ch4: output ripple, 20mV/div

3.4 DYNAMIC RESPONSE

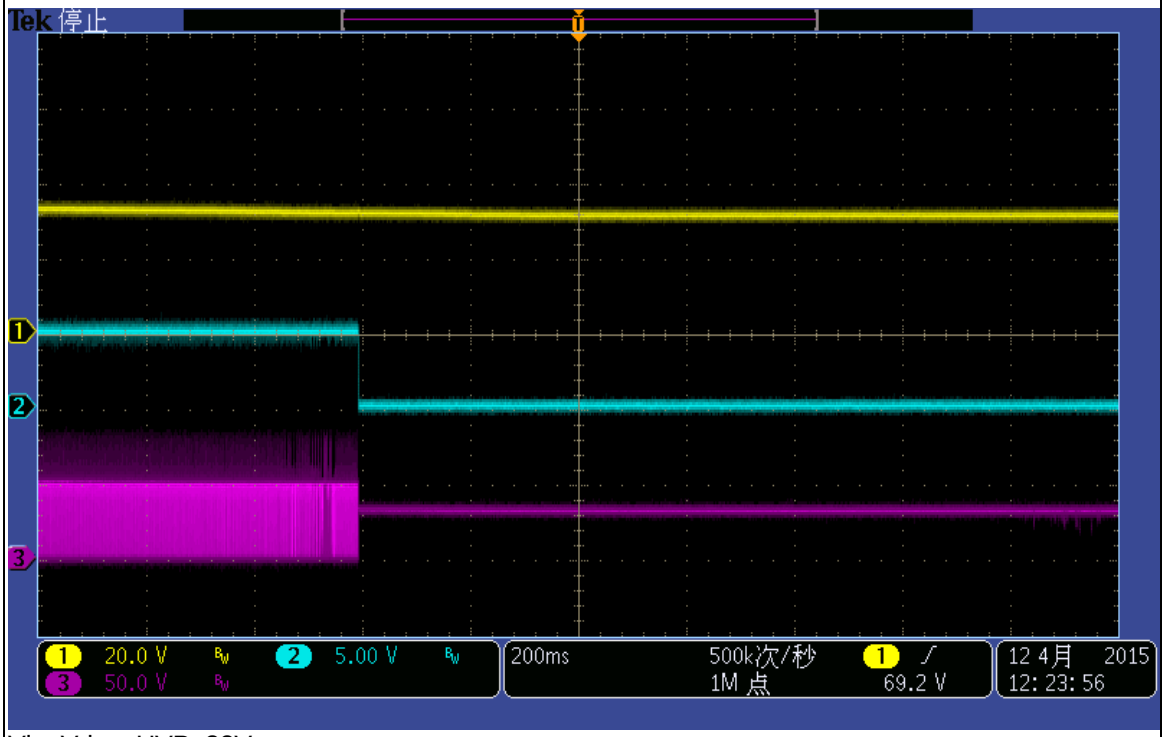


Vin:48Vdc test condition: 0-0.5A, 0.4A/us, 10ms cycle
Ch4: output ripple voltage, 50mV/div

3.5 INPUT VOLTAGE PROTECTION

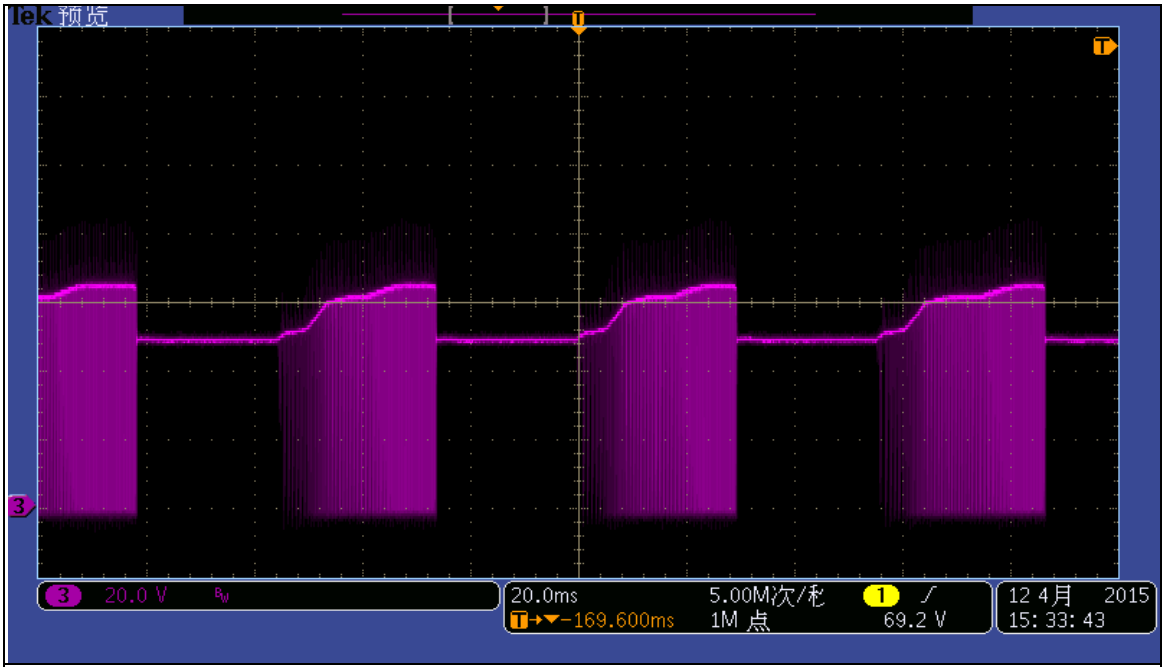


Vin: Vdc OVP: 75V
CH1: input voltage, 20V/div
CH2: output voltage, 5V/div
CH3: Vds voltage of MOSFET, 50V/div



Vin: Vdc UVP: 32V
CH1: input voltage, 20V/div
CH2: output voltage, 5V/div
CH3: Vds voltage of MOSFET, 50V/div

3.6 OUTPUT SHORT CIRCUIT PROTECTION



Vin:48Vdc SCP
CH3: Vds voltage of MOSFET, 50V/div

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
Copyright © 2021, Texas Instruments Incorporated