

Design PMP4489 Test Results

1 GENERAL

1.1 PURPOSE

The PMP4489 is designed for evaluating USB PD 36W adapter using the secondary-side regulation UCC28740 and USB C PD recognition protocol TPS25740. The test report presents the standby power, efficiency and related electrical performance.

1.2 REFERENCE DOCUMENTATION

Schematic: PMP4489E1(001)_Sch.PDF
 PCB: GerberNCdrills.zip
 BOM: PMP4489E1(001)_TI-BOM.PDF

1.3 TEST EQUIPMENTS

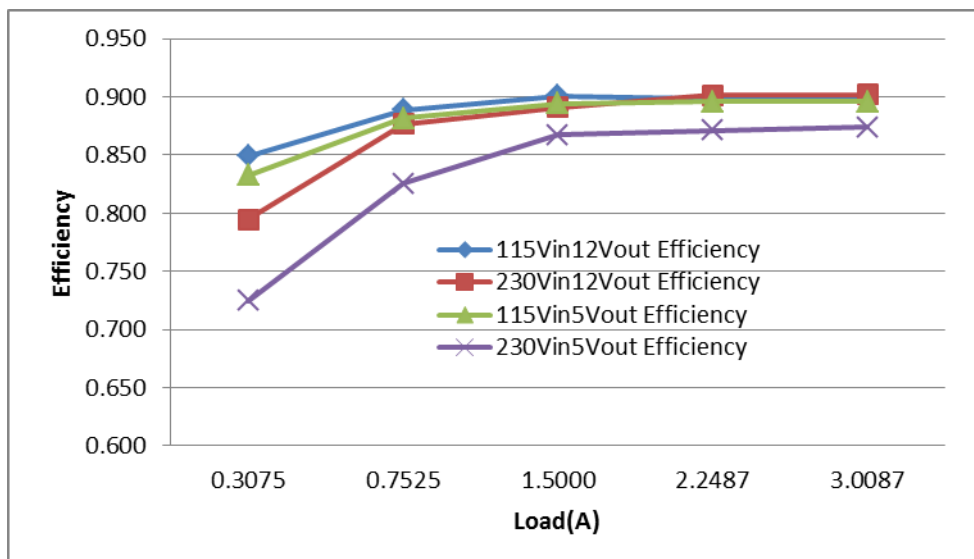
Multi-meter (current): Fluke 287C*2
 Multi-meter (voltage): Agilent 34401A
 AC Source: Chroma 61503
 E-Load: Chroma 63101 module

2 Performance data and waveform

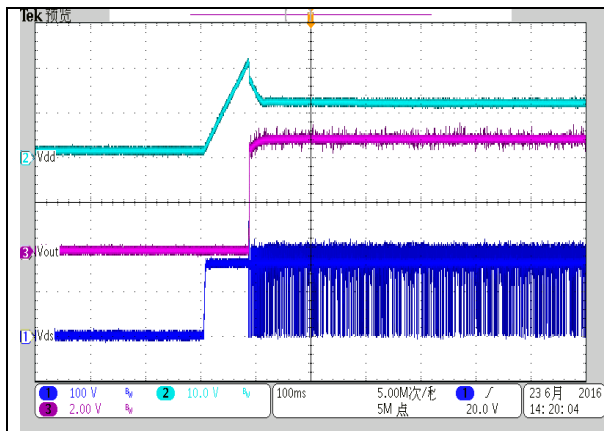
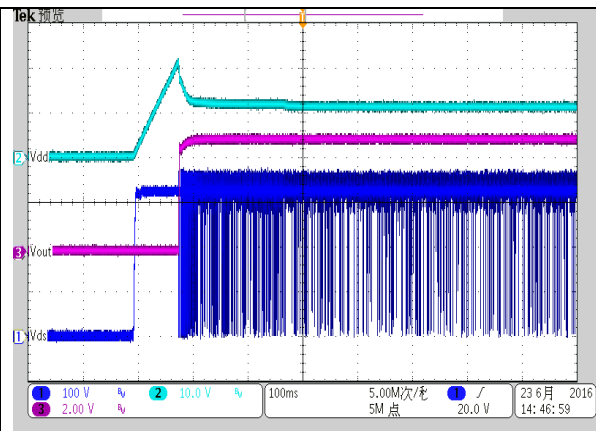
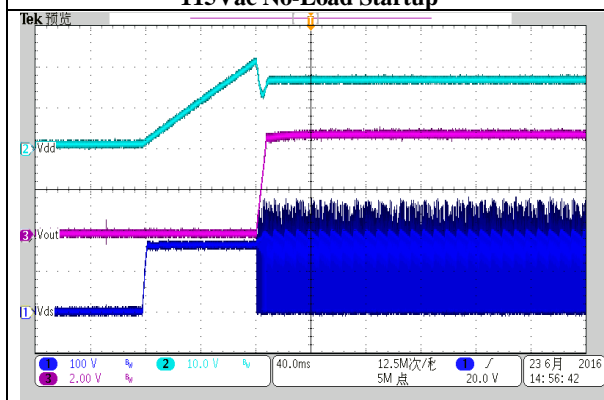
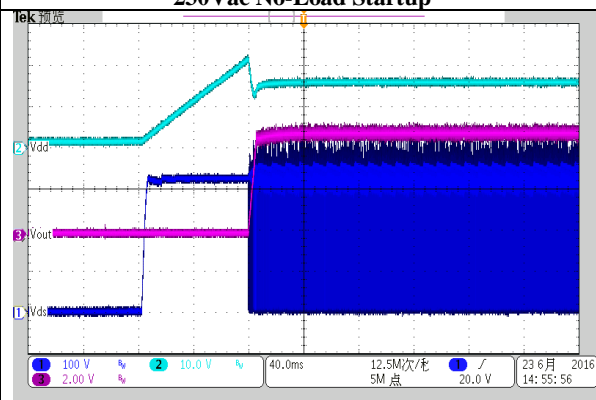
2.1 EFFICIENCY

Input Voltage(V)	Pin(W)	Vout(V)	Iout(A)	Pout(W)	Efficiency	Average Efficiency
115	0.02		0			0.892
	1.867	5.0537	0.3075	1.554013	0.832358	
	4.313	5.0534	0.7525	3.802684	0.881679	
	8.48	5.0527	1.5012	7.585113	0.894471	
	12.68	5.0517	2.2487	11.35976	0.89588	
	16.96	5.0507	3.0087	15.19604	0.895993	
Input Voltage(V)	Pin(W)	Vout(V)	Iout(A)	Pout(W)	Efficiency	
230	0.044		0			0.859
	2.144	5.052	0.3075	1.55349	0.724576	
	4.604	5.0515	0.7525	3.801254	0.825642	
	8.74	5.0505	1.5012	7.581811	0.867484	
	13.03	5.0488	2.2487	11.35324	0.871315	
	17.38	5.0469	3.0087	15.18461	0.873683	

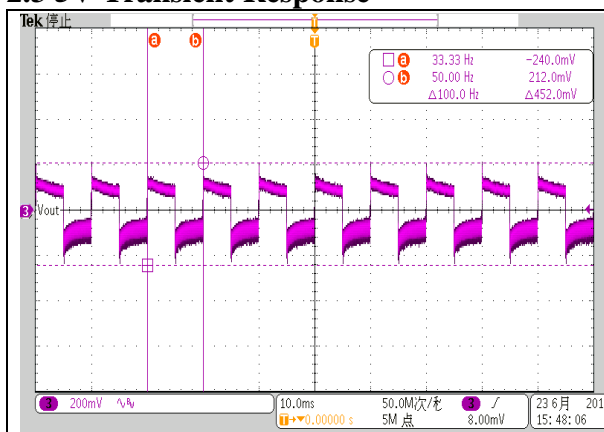
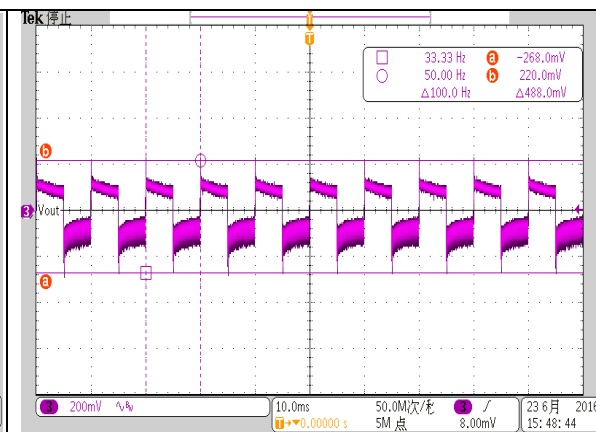
Input Voltage(V)	Pin(W)	Vout(V)	Iout(A)	Pout(W)	Efficiency	Average Efficiency
115	0.08		0.0000			0.897
	4.444	12.271	0.3075	3.77	0.849	
	10.39	12.270	0.7525	9.23	0.889	
	20.43	12.269	1.5000	18.40	0.901	
	30.69	12.266	2.2487	27.58	0.899	
	41.03	12.262	3.0087	36.89	0.899	
Input Voltage(V)	Pin(W)	Vout(V)	Iout(A)	Pout(W)	Efficiency	
230	0.112	12.274	0.0000			0.893
	4.747	12.269	0.3075	3.77	0.795	
	10.53	12.267	0.7525	9.23	0.877	
	20.65	12.263	1.5000	18.39	0.891	
	30.58	12.258	2.2487	27.56	0.901	
	40.87	12.252	3.0087	36.86	0.902	



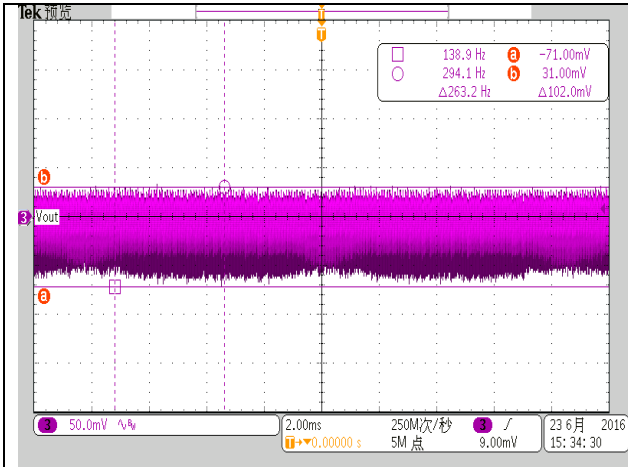
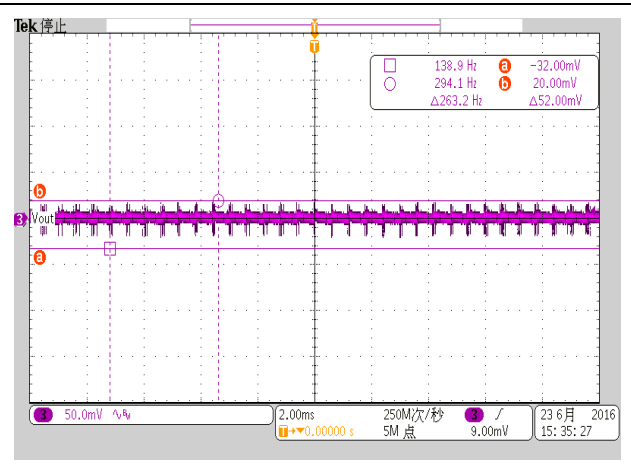
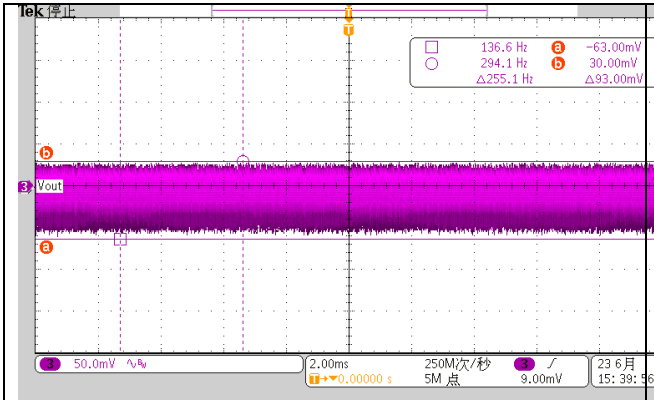
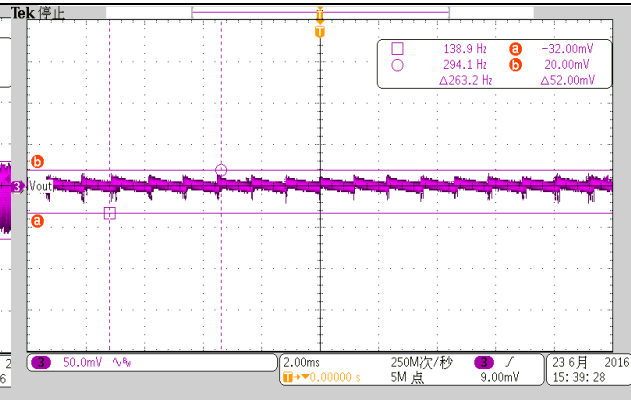
2.2 Start Up


115Vac No-Load Startup

230Vac No-Load Startup

115Vac Full-Load Startup

230Vac Full-Load Startup

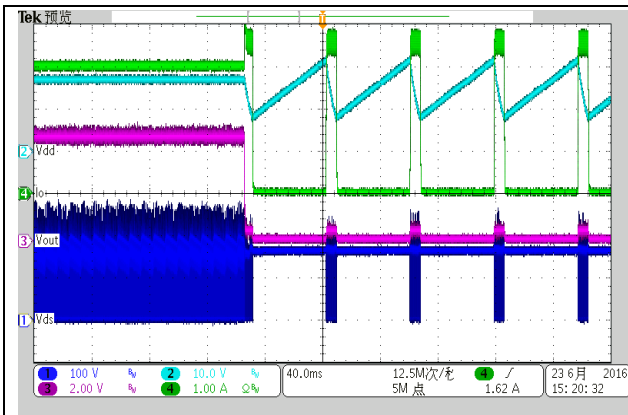
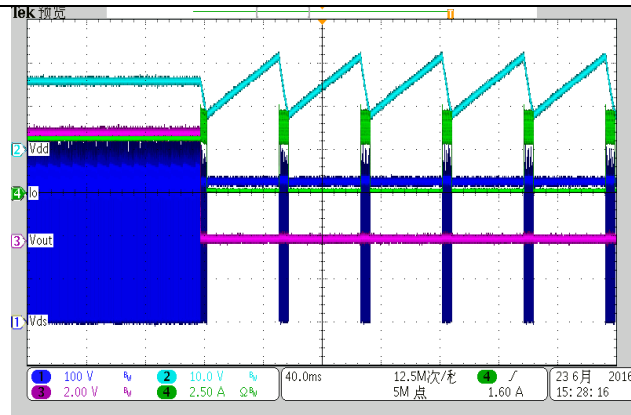
2.3 5V Transient Response


115Vin 5Vout 0%-100%Load; 100Hz Cycle; 1A/us

230Vin 5Vout 0%-100%Load; 100Hz Cycle; 1A/us

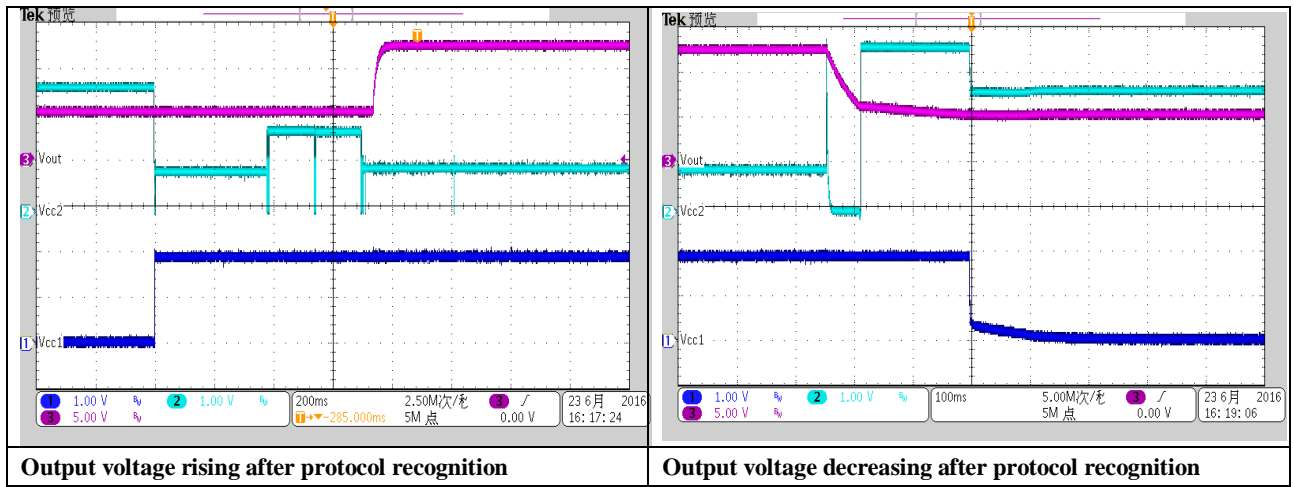
2.4 5V Output Voltage Ripple


230Vac full load

230Vac n load

115Vac full load

115Vac no load

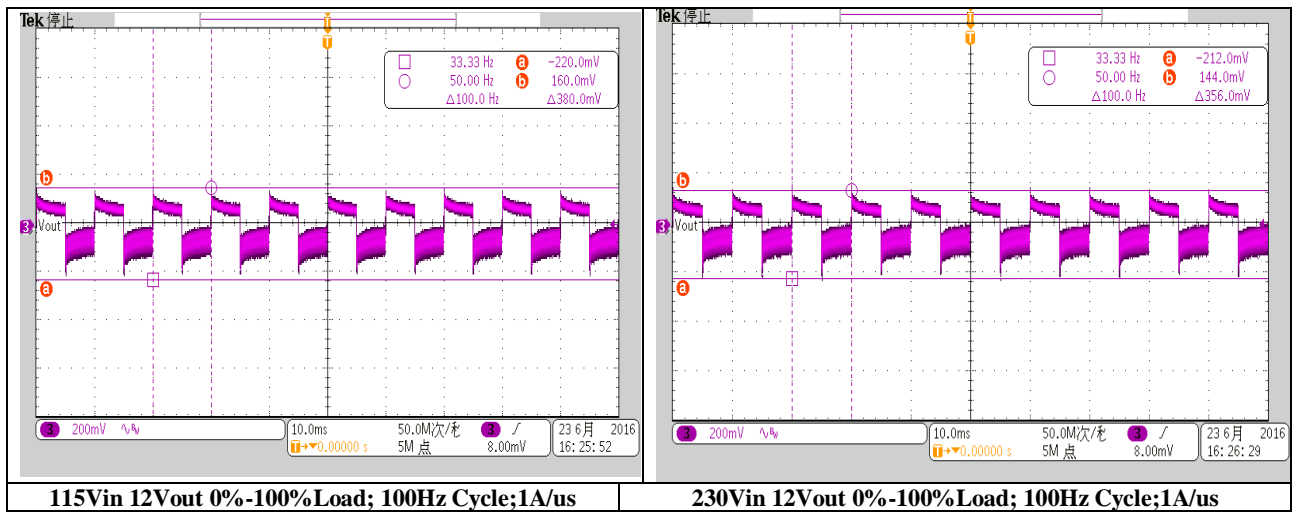
2.5 5V Output Short Circuit Protection


115Vac full load to short circuit

230Vac full load to short circuit

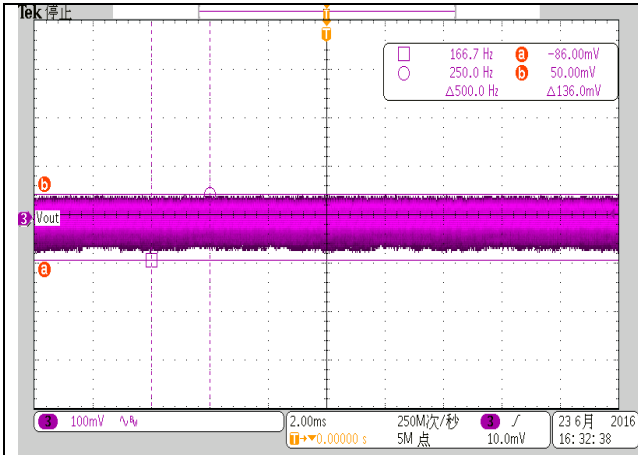
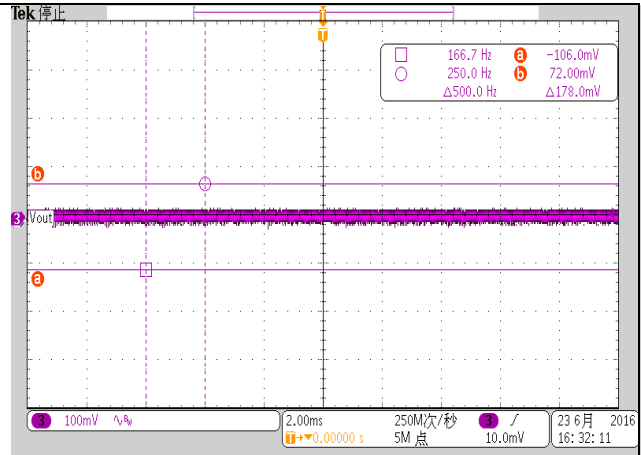
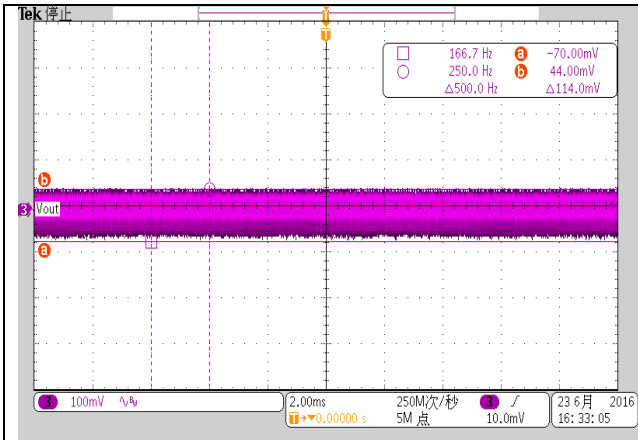
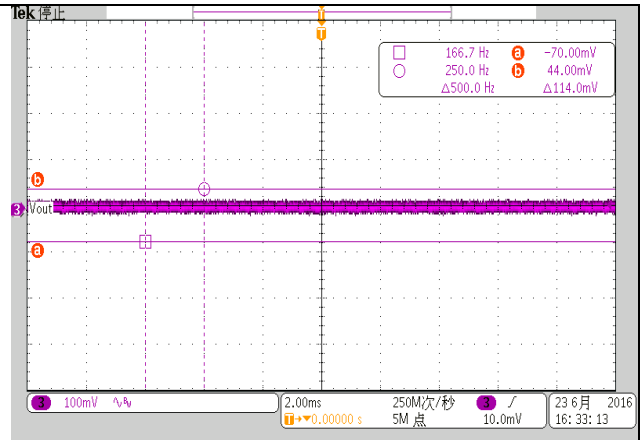
2.6 Protocol Process



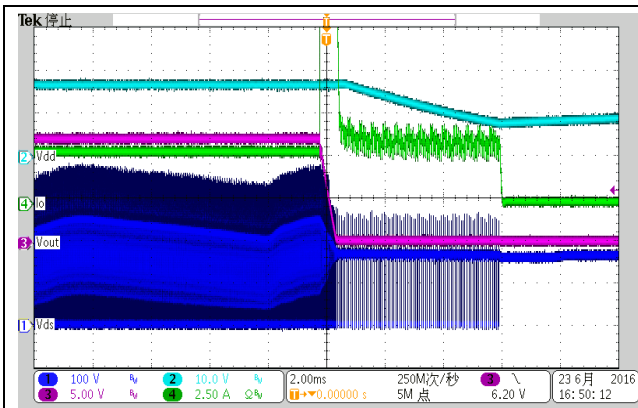
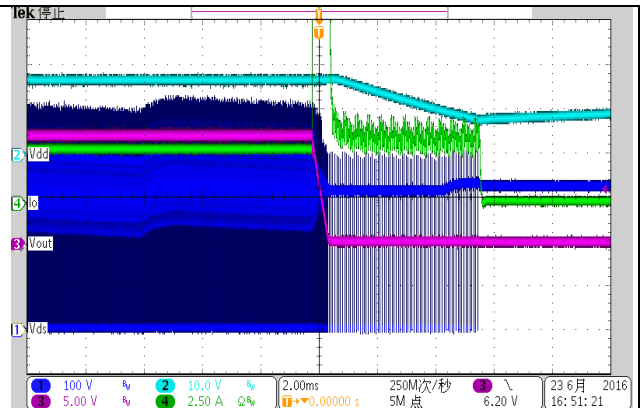
2.7 12V Transient Response



2.8 12V Output Voltage Ripple


230Vac full load

230Vac no load

115Vac full load

115Vac no load

2.9 12V output Short Circuit Protection


115Vac full load to short circuit

230Vac full load to short circuit

IMPORTANT NOTICE FOR TI REFERENCE DESIGNS

Texas Instruments Incorporated ("TI") reference designs are solely intended to assist designers ("Designer(s)") who are developing systems that incorporate TI products. TI has not conducted any testing other than that specifically described in the published documentation for a particular reference design.

TI's provision of reference designs and any other technical, applications or design advice, quality characterization, reliability data or other information or services does not expand or otherwise alter TI's applicable published warranties or warranty disclaimers for TI products, and no additional obligations or liabilities arise from TI providing such reference designs or other items.

TI reserves the right to make corrections, enhancements, improvements and other changes to its reference designs and other items.

Designer understands and agrees that Designer remains responsible for using its independent analysis, evaluation and judgment in designing Designer's systems and products, and has full and exclusive responsibility to assure the safety of its products and compliance of its products (and of all TI products used in or for such Designer's products) with all applicable regulations, laws and other applicable requirements. Designer represents that, with respect to its applications, it has all the necessary expertise to create and implement safeguards that (1) anticipate dangerous consequences of failures, (2) monitor failures and their consequences, and (3) lessen the likelihood of failures that might cause harm and take appropriate actions. Designer agrees that prior to using or distributing any systems that include TI products, Designer will thoroughly test such systems and the functionality of such TI products as used in such systems. Designer may not use any TI products in life-critical medical equipment unless authorized officers of the parties have executed a special contract specifically governing such use. Life-critical medical equipment is medical equipment where failure of such equipment would cause serious bodily injury or death (e.g., life support, pacemakers, defibrillators, heart pumps, neurostimulators, and implantables). Such equipment includes, without limitation, all medical devices identified by the U.S. Food and Drug Administration as Class III devices and equivalent classifications outside the U.S.

Designers are authorized to use, copy and modify any individual TI reference design only in connection with the development of end products that include the TI product(s) identified in that reference design. HOWEVER, NO OTHER LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE TO ANY OTHER TI INTELLECTUAL PROPERTY RIGHT, AND NO LICENSE TO ANY TECHNOLOGY OR INTELLECTUAL PROPERTY RIGHT OF TI OR ANY THIRD PARTY IS GRANTED HEREIN, including but not limited to any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services, or a warranty or endorsement thereof. Use of the reference design or other items described above may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

TI REFERENCE DESIGNS AND OTHER ITEMS DESCRIBED ABOVE ARE PROVIDED "AS IS" AND WITH ALL FAULTS. TI DISCLAIMS ALL OTHER WARRANTIES OR REPRESENTATIONS, EXPRESS OR IMPLIED, REGARDING THE REFERENCE DESIGNS OR USE OF THE REFERENCE DESIGNS, INCLUDING BUT NOT LIMITED TO ACCURACY OR COMPLETENESS, TITLE, ANY EPIDEMIC FAILURE WARRANTY AND ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT OF ANY THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

TI SHALL NOT BE LIABLE FOR AND SHALL NOT DEFEND OR INDEMNIFY DESIGNERS AGAINST ANY CLAIM, INCLUDING BUT NOT LIMITED TO ANY INFRINGEMENT CLAIM THAT RELATES TO OR IS BASED ON ANY COMBINATION OF PRODUCTS AS DESCRIBED IN A TI REFERENCE DESIGN OR OTHERWISE. IN NO EVENT SHALL TI BE LIABLE FOR ANY ACTUAL, DIRECT, SPECIAL, COLLATERAL, INDIRECT, PUNITIVE, INCIDENTAL, CONSEQUENTIAL OR EXEMPLARY DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE REFERENCE DESIGNS OR USE OF THE REFERENCE DESIGNS, AND REGARDLESS OF WHETHER TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

TI's standard terms of sale for semiconductor products (<http://www.ti.com/sc/docs/stdterms.htm>) apply to the sale of packaged integrated circuit products. Additional terms may apply to the use or sale of other types of TI products and services.

Designer will fully indemnify TI and its representatives against any damages, costs, losses, and/or liabilities arising out of Designer's non-compliance with the terms and provisions of this Notice.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2016, Texas Instruments Incorporated