

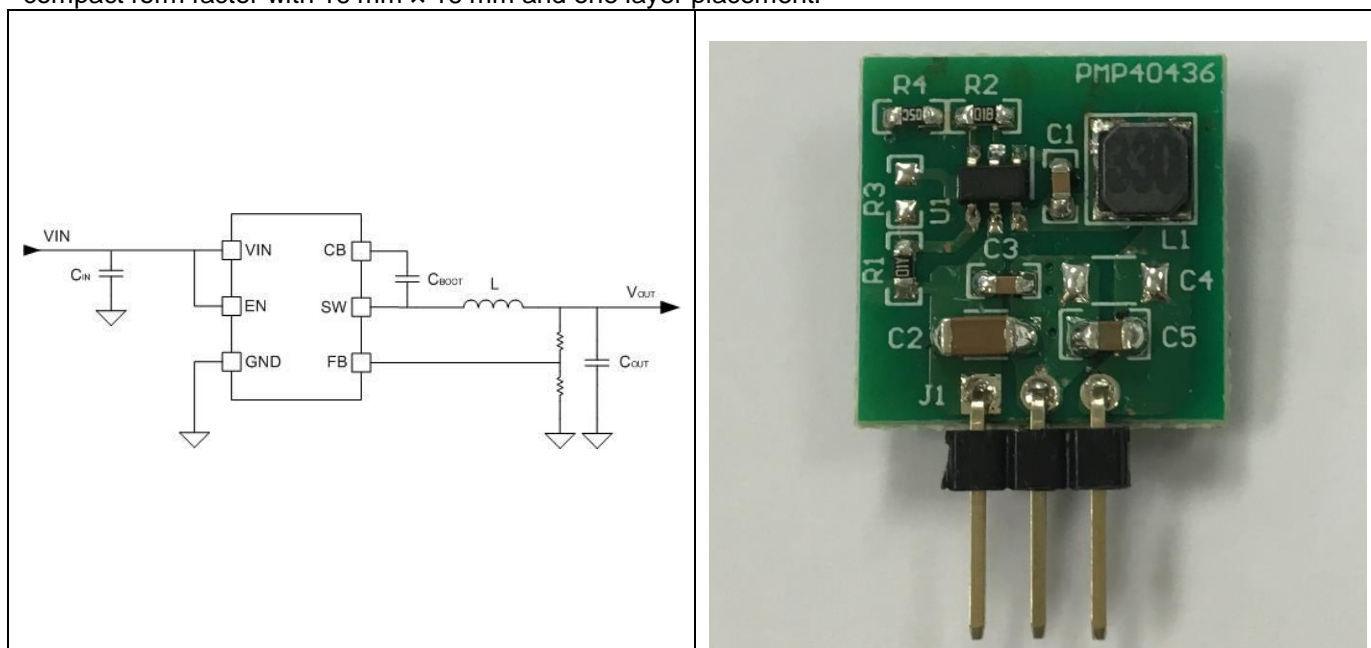
Test Report: PMP40436

13-V to 36-V in, 12-V 125-mA output power module reference design with 0.1% output voltage ripple



Description

This test report provides data gathered from the PMP40436 power module reference design for e-meter applications. The solution implements a synchronous buck converter TPS560430. The efficiency is up to 91.8% at 18-V input and 125-mA output. The output ripple is less than 1% of output voltage. The design is available in a compact form factor with 16 mm x 16 mm and one layer placement.



An IMPORTANT NOTICE at the end of this TI reference design addresses authorized use, intellectual property matters and other important disclaimers and information.

1 Test Prerequisites

1.1 Voltage and Current Requirements

Table 1. Voltage and Current Requirements

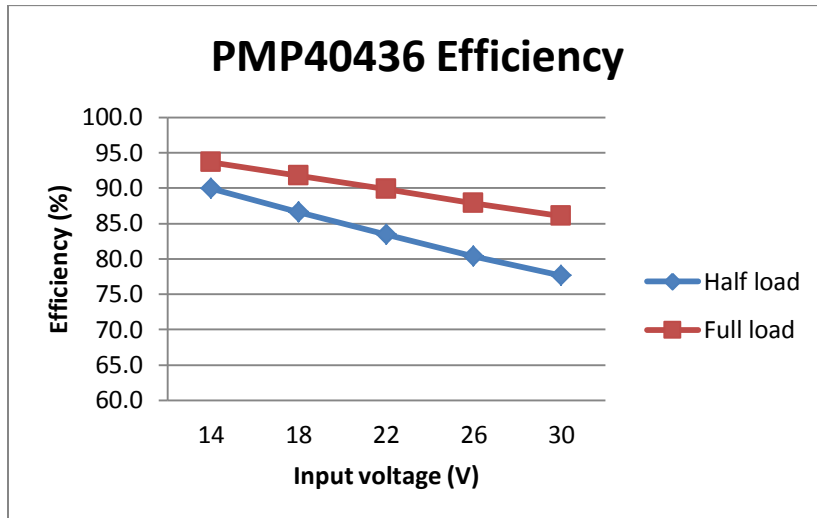
PARAMETER	SPECIFICATIONS
Input	DC Source: 13 V DC to 36 V DC
Output	12 V / 125 mA

1.2 Required Equipment

- Chroma DC power supply 62012P-600-8
- Chroma DC electronic load 63105A
- Tektronix Digital phosphor oscilloscope DPO3054
- Chroma Programmable AC source 61503
- Fluke Thermal imager Ti9

2 Testing and Results

2.1 Efficiency Graphs



2.2 Efficiency Data

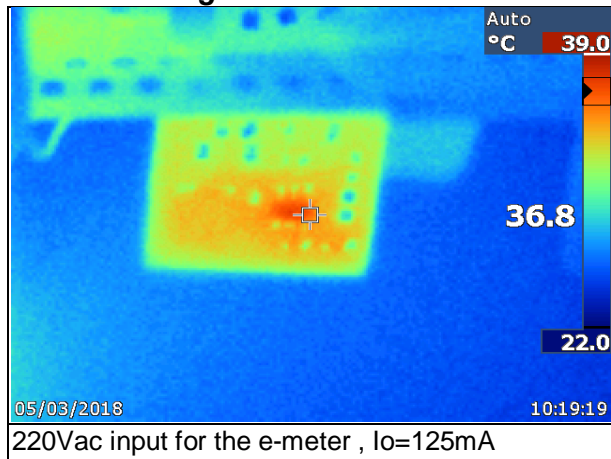
Half Load

Vin (V)	Iin (mA)	Vo (V)	Io (A)	Effi (%)
13.987	59.65	11.969	0.0627	89.9
18.008	48.12	11.967	0.0627	86.6
22.031	40.89	11.967	0.0628	83.4
26.049	35.906	11.968	0.0628	80.4
29.950	32.342	11.968	0.0628	77.6

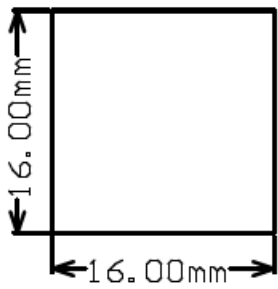
Full load

Vin (V)	Iin (mA)	Vo (V)	Io (A)	Effi (%)
13.975	111.56	11.968	0.122	93.7
18.027	88.26	11.966	0.122	91.8
21.957	74.02	11.966	0.122	89.8
25.987	63.91	11.966	0.122	87.9
29.996	56.54	11.967	0.122	86.1

2.3 Thermal Images



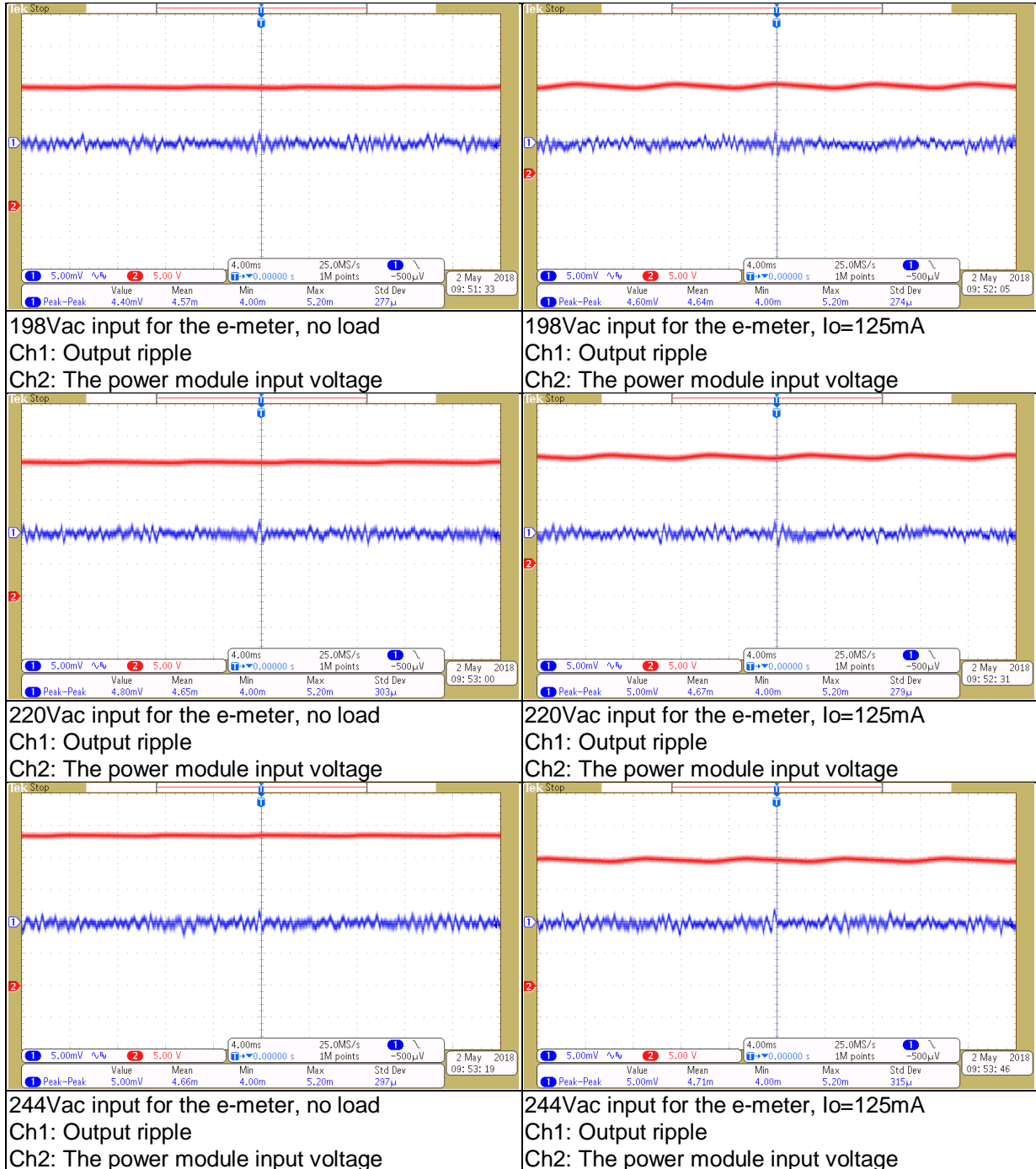
2.4 Dimensions



3 Waveforms

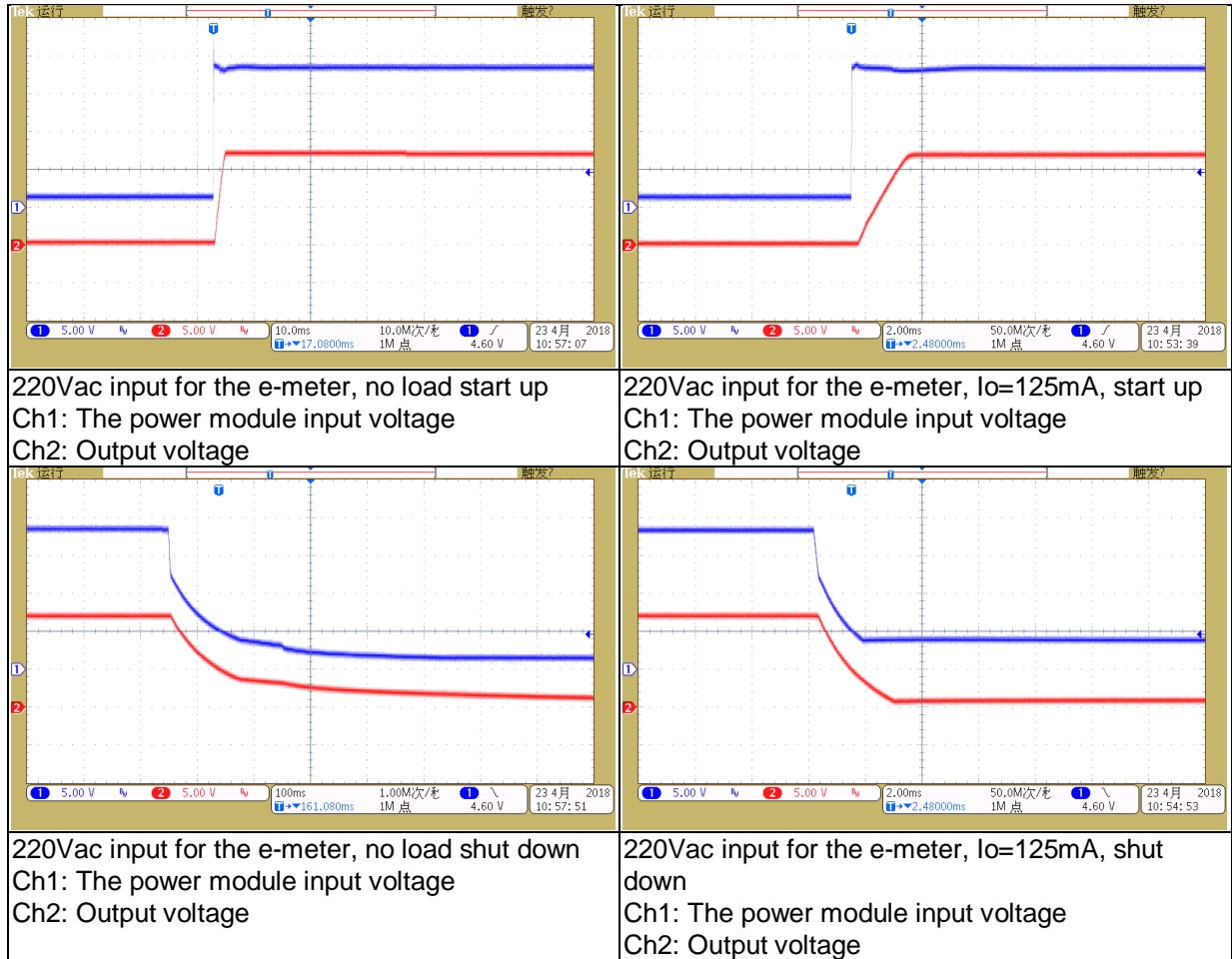
3.1 Output Voltage Ripple

Test on the e-meter



3.2 Start-up and shut-down Sequence

Test on the e-meter



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](https://www.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