12V to 1V 30A Voltage Mode Synchronous Buck Converter with PMBus Control Reference Design

(ACTIVE) PMP20023

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Key Document

- PMP20023 Test Results (PDF 2281 KB)
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PMP20023 12V to 1V 30A Voltage Mode Synchronous Buck Converter with PMBus Control Reference Design Top of Board Image

Fully assembled board (shown above) developed for testing and performance validation only, not available for sale.

Description

Fixed frequency voltage mode control is used for communications and computing applications where a predictable frequency and / or synchronization to an external clock is needed. With control and power in one IC and inductor on top of the IC with its raised leads, a very small size solution is achieved. PMP20023 focuses on ease of electrical testing and ability to make changes "on the fly" thru the PMBus interface. A high speed dynamic load rounds out the rich test interface.

Features

- Fixed frequency voltage mode control allows for user selection of switching frequency and synchronization to an external clock
- Output voltage, current limit and fault thresholds / responses can be adjusted "on the fly" thru the PMBus interface
- Focus of evaluation board is on compactness of design with inductor on top of converter
- Rich test interface includes PMBus socket, Bode plot test points and high speed dynamic test load
- Schematic, BOM, layout and Test Report focusing on control loop & load dynamics for both 600mVout and 1.0Vout

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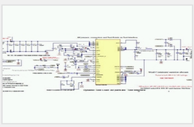
Schematic/Block Diagram

Quickly understand overall system functionality.



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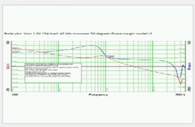
Design Guide

Get results faster with test and simulation data that's been verified.



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Design Files

Download ready-to-use system files to speed your design process. Get Viewer.

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Bill of Materials (BOM)

Find the complete list of components in this reference design.

Download BOM

Parametrics

	PMP20023.1 (Output Voltage 1)
Vin (Min) (V)	10.8
Vin (Max) (V)	13.2
Vout (Nom) (V)	1
Iout (Max) (A)	30
Output Power (W)	30
Isolated/Non-Isolated	Non-Isolated
Input Type	DC
Topology	Buck- Synchronous

TI Devices (1)

Order samples, get tools and find more information on the TI products in this reference design.

Part Number	Name	Product Family	Sample & Buy	Design Kits & Evaluation Modules
TPS544C25	4.5-V to 18-V, 30-A Voltage Mode PMBus™ SWIFT™ Step-Down DC-DC Converter with FSYNC	Step-Down (Buck)	Sample & Buy	View Design Kits & Evaluation Modules

CAD/CAE symbols

Part #	Package | Pins	CAD File [.bxl]	STEP Model [.stp]
TPS544C25	LQFN-CLIP (RVF) | 40	Download	-

Texas Instruments and Accelerated Designs, Inc. have collaborated together to provide TI customers with schematic symbols and PCB layout footprints for TI products.

Step 1: Download and install the free download.

Step 2: Download the Symbol and Footprint from the CAD.bxl file table.

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Technical Documents

User guides (1)

Title	Abstract	Type	Size (KB)	Date	Views	TI Recommends
PMP20023 Test Results		PDF	2281	13 Apr 2016	10	✓

Design files (5)

Title	Abstract	Type	Size (KB)	Date	Views
PMP20023 Gerber (from PMP10364)		ZIP	577	13 Apr 2016	2
PMP20023 PCB (from PMP103648)		PDF	1659	13 Apr 2016	7
PMP20023 Assembly Drawing (from PMP10364)		PDF	120	13 Apr 2016	4
PMP20023 BOM		PDF	106	13 Apr 2016	9
PMP20023 Schematic		PDF	176	13 Apr 2016	15

Related Tools & Software

Reference Designs (2)

Name	Part Number	Tool Type
1V @ 30A Integrated FET with PMBus Reference Design	PMP9008	Reference Designs
High Density 30W DC-DC PMBus Buck Converter with Inductor Mounted Over the Converter to Save Space	PMP10364	TI Designs

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TI E2E™ community

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