

Application Brief

Using Improved TPS544E27 in Existing TPS544C26 Applications



Richard Nowakowski

Introduction

DC/DC converters with integrated MOSFETs supporting Serial Voltage Identification (SVID) are now available and offer a design smaller and easier to design than a multiphase controller-based design when the output current is lower. Both the TPS544E27 and TPS544C26 DC/DC point-of-load converters from Texas Instruments are designed to work with Intel® Xeon® Sapphire Rapids scalable processors to power rails requiring the SVID high-speed interface. The TPS544C26 is typically designed for Intel VR13 SVID-compliant Eagle Stream (EGS) and Birch Stream (BHS) applications, and the TPS544E27 is designed for VR14 SVID-compliant Oak Stream (OKS) applications. Since both DC/DC converters are offered in the exact same package, the newer, backwards-compatible TPS544E27 can be used in existing single phase, lower-current Eagle Stream and Birch Stream server designs, instead of the older TPS544C26 with only a minor circuit modification and no change to the layout. The TPS544E27 provides several advantages to the TPS544C26 shown in [Table 1](#).

Table 1. TPS544C26 and TPS544E27 Comparison

Parameter	TPS544C26	TPS544E27
Input Voltage	4-16V	4-18V
Bias Voltage	5V, for 2.7-16V operation	5V, for 2.7-18V operation
Output Voltage	0.25V-3.04V, programmable	0.25V-5.5V, programmable
Output Current	35A continuous	40A continuous
Switching Frequency	600 – 1200kHz, FCCM and DCM	400 – 2000kHz, FCCM and DCM
MOSFET On-Resistance	4mΩ / 1mΩ	2.5mΩ / 1mΩ
Control Architecture	DCAP+	DCAP+
Telemetry	V _{OUT} , I _{OUT} , Temperature	V _{OUT} , I _{OUT} , Temperature
Analog Current Monitor	No	Yes
Input Power Monitoring	Yes, by VINSEN pins	Yes, by I _{IN} pins
Non-Volatile Memory	Yes	Yes

Table 1. TPS544C26 and TPS544E27 Comparison (continued)

Parameter	TPS544C26	TPS544E27
Interface	I ² C	PMBus® 1.5
SVID Compliance	VR13	VR13, VR14, VR14.Cloud
Security	Accidental changes only	Yes, Level 2
Droop Compensation (Load-Line)	Yes	Yes
RoHS Compliance	Yes, no exemptions	Yes, no exemptions
Package	37 pin 5x6mm QFN (RXX)	37 pin 5x6mm QFN (RXX)

Hardware Modifications

[Figure 1](#) shows the top view of the TPS544C26, and [Figure 2](#) shows the top view of the TPS544E27. The devices are classified as *common footprint*, meaning both devices share the same circuit board land-pattern, simplifying the compatibility. Since both devices employ the same D-CAP+ control architecture, the output filter component values do not need to be modified to support the same transient voltage conditions and output current level.

Contrary to the TPS544C26, pin 29 of the TPS544E27 is a multipurpose pin. During the device initialization, the PMBus® address of the TPS544E27 is set by tying an external resistor between this pin and AGND. After device initialization, pin 29 can be used as an analog current monitor output, senses the current of the low-side MOSFET and is enabled through the EN_AIMON bit. Pin 29 of the TPS544E27 also performs a VOUT reset function that can be enabled through the EN_VORST bit. However, pin 29 of the TPS544C26 simply sets the I²C address of the device. To use the TPS544E27 in a TPS544C26 application, simply select the proper resistor value for the device address.

Pin 28 of the TPS544E27 is also a multipurpose pin and functions as the SMBus alert line, since PMBus is used, a PINALRT# function, and a

catastrophic fault indicator. The functionality of the pin is selected through the SEL_ALERT_FN field in the PMBus (D0h) SYS_CFG_USER1 command. However, pin 28 of the TPS544C26 functions only as a catastrophic fault indicator, which asserts low when any catastrophic fault event (overvoltage, undervoltage, or overtemperature) occurs. During nominal operation, the pin indicator holds high. No pin 28 modifications are required to migrate from TPS544C26 to TPS544E27.

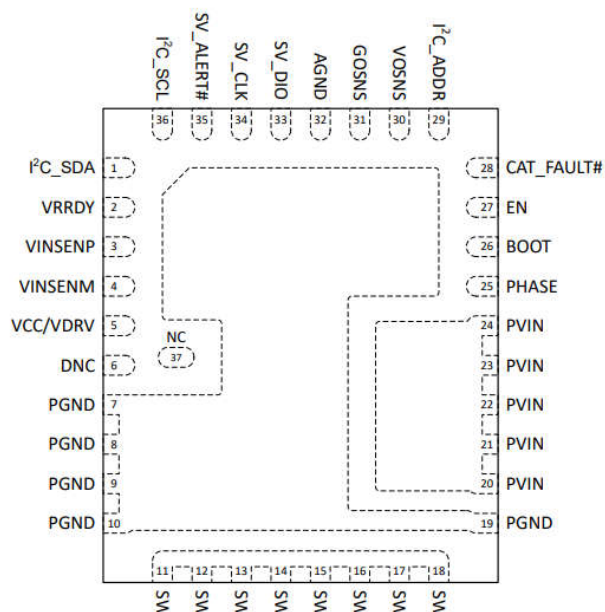


Figure 1. TPS544C26 Top View

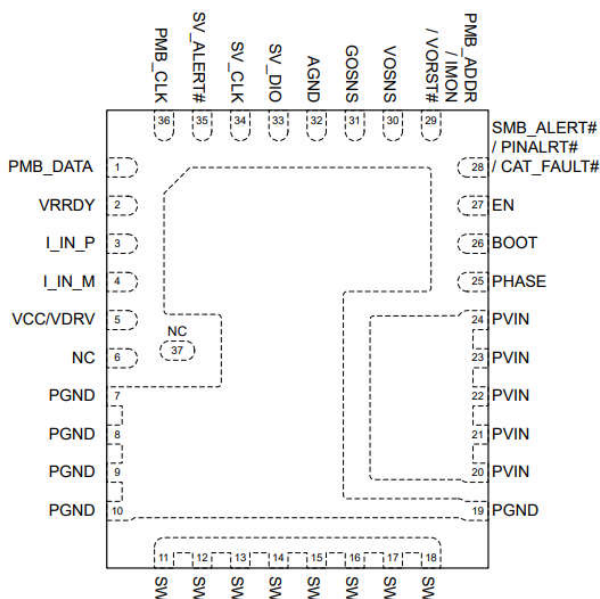


Figure 2. TPS544E27 Top View

Firmware Modifications

Both converters are configured by the serial interface without the provision for pin-strap configuration by external resistors. Since the TPS544C26 uses a custom I²C interface and TPS544E27 uses the industry-standard PMBus interface, a configuration translation is needed. Please contact the TI E2E™ design support forum if any assistance is needed to translate from the TPS544C26 configuration to a TPS544E27 configuration.

Summary

With only a single resistor value modification to pin 29 to the circuit board, the TPS544E27 offers the following advantages when used instead of the TPS544C26 in EGS and BHS applications.

- Logistics improvements by purchasing one IC for EGS, BHS, and OKS applications
- Higher efficiency and better thermal performance
- Industry-standard PMBus interface
- Security features

Trademarks

All trademarks are the property of their respective owners.

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, regulatory 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 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](#), [TI's General Quality Guidelines](#), 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. Unless TI explicitly designates a product as custom or customer-specified, TI products are standard, catalog, general purpose devices.

TI objects to and rejects any additional or different terms you may propose.

Copyright © 2025, Texas Instruments Incorporated

Last updated 10/2025