

## TPS54531 5-A, 28-V Input, Step-Down SWIFT™ DC-DC Converter With Eco-mode™

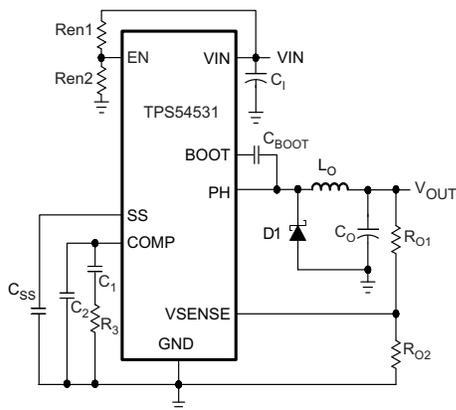
### 1 Features

- 3.5 to 28-V Input Voltage Range
- Adjustable Output Voltage Down to 0.8 V
- Integrated 80-mΩ High-Side MOSFET Supports up to 5-A Continuous Output Current
- High Efficiency at Light Loads with a Pulse Skipping Eco-mode™
- Fixed 570kHz Switching Frequency
- Typical 1μA Shutdown Quiescent Current
- Adjustable Slow Start Limits Inrush Currents
- Programmable UVLO Threshold
- Overvoltage Transient Protection
- Cycle-by-Cycle Current-Limit, Frequency Fold Back, and Thermal Shutdown Protection
- Available in Easy-to-Use Thermally Enhanced 8-Pin SO PowerPAD™ Package

### 2 Applications

- Consumer Applications such as Set-Top Boxes, CPE Equipment, LCD Displays, Peripherals, and Battery Chargers
- Industrial and Car Audio Power Supplies
- 5-V, 12-V and 24-V Distributed Power Systems

### 4 Simplified Schematic



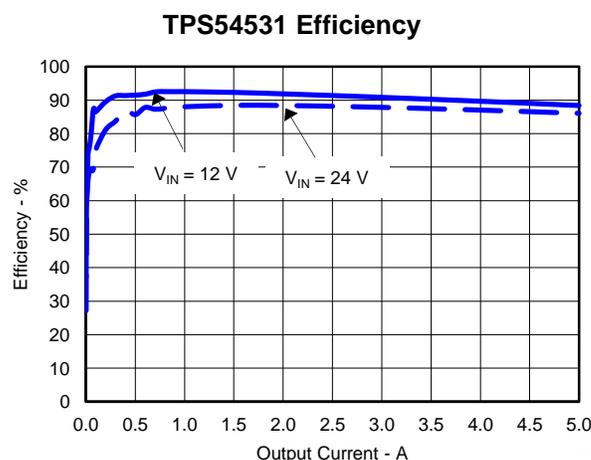
### 3 Description

The TPS54531 device is a 28-V, 5-A non-synchronous buck converter that integrates a low  $R_{DS(on)}$  high-side MOSFET. To increase efficiency at light loads, a pulse skipping Eco-mode feature is automatically activated. Furthermore, the 1-μA shutdown supply current allows the device to be used in battery powered applications. Current mode control with internal slope compensation simplifies the external compensation calculations and reduces component count while allowing the use of ceramic output capacitors. A resistor divider programs the hysteresis of the input under-voltage lockout. An overvoltage transient protection circuit limits voltage overshoots during startup and transient conditions. A cycle-by-cycle current-limit scheme, frequency fold back, and thermal shutdown protect the device and the load in the event of an overload condition. The TPS54531 device is available in 8-pin SO PowerPAD™ package that has been internally optimized to improve thermal performance.

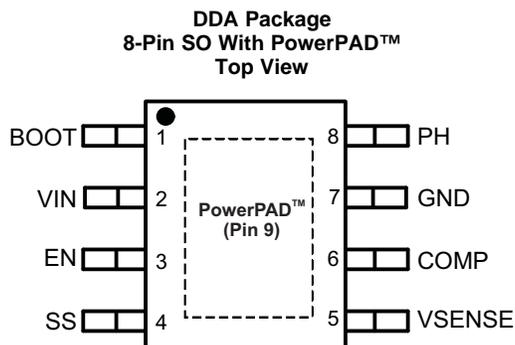
#### Device Information<sup>(1)</sup>

PART NUMBER	PACKAGE	BODY SIZE (NOM)
TPS54531	SO PowerPAD (8)	4.90 mm x 3.90 mm

(1) For all available packages, see the orderable addendum at the end of the datasheet.



## 6 Pin Configuration and Functions



### Pin Functions

PIN		I/O	DESCRIPTION
NO.	NAME		
1	BOOT	O	A 0.1- $\mu$ F bootstrap capacitor is required between the BOOT and PH pins. If the voltage on this capacitor falls below the minimum requirement, the high-side MOSFET is forced to switch off until the capacitor is refreshed.
2	VIN	I	This pin is the 3.5- to 28-V input supply voltage.
3	EN	I	This pin is the enable pin. To disable, pull below 1.25 V. Float this pin to enable. Programming the input undervoltage lockout with two resistors is recommended.
4	SS	I	This pin is slow-start pin. An external capacitor connected to this pin sets the output rise time.
5	VSENSE	I	This pin is the inverting node of the transconductance (gm) error amplifier.
6	COMP	O	This pin is the error-amplifier output and the input to the PWM comparator. Connect frequency compensation components to this pin.
7	GND	—	Ground pin
8	PH	O	The PH pin is the source of the internal high-side power MOSFET.
9	PowerPAD™	—	For proper operation, the GND pin must be connected to the exposed pad.