



# LMR14050 SIMPLE SWITCHER® 40 V 5 A, 2.2 MHz Step-Down Converter with 40 $\mu$ A $I_Q$

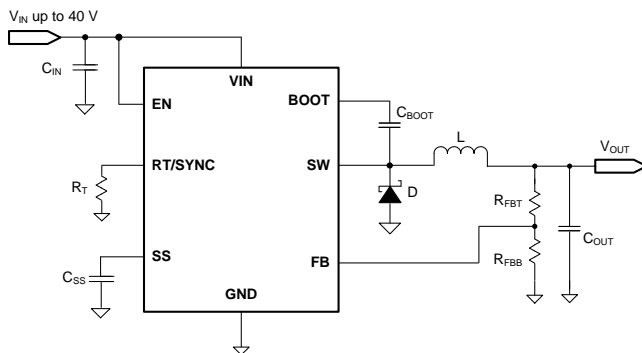
## 1 Features

- 4 V to 40 V Input Range
- 5 A Continuous Output Current
- Ultra-low 40  $\mu$ A Operating Quiescent Current
- 90 m $\Omega$  High-Side MOSFET
- Minimum Switch-On Time: 75 ns
- Current Mode Control
- Adjustable Switching Frequency from 200 kHz to 2.5 MHz
- Frequency Synchronization to External Clock
- Internal Compensation for Ease of Use
- High Duty Cycle Operation Supported
- Precision Enable Input
- 1  $\mu$ A Shutdown Current
- External Soft-start
- Thermal, Overvoltage and Short Protection
- 8-Pin HSOIC with PowerPAD™ Package

## 2 Applications

- Automotive Battery Regulation
- Industrial Power Supplies
- Telecom and Datacom Systems
- Battery Powered System

## 4 Simplified Schematic



## 3 Description

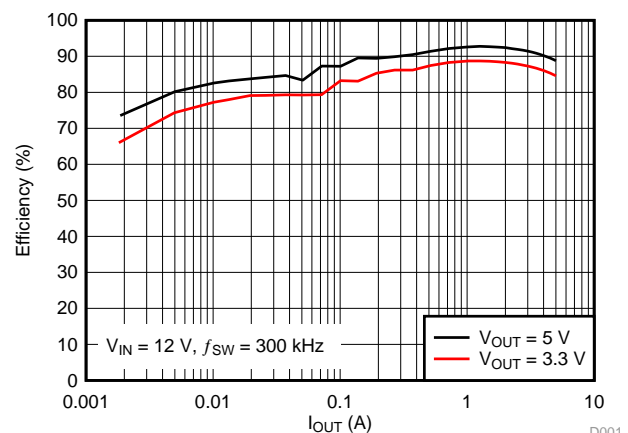
The LMR14050 is a 40 V, 5 A step down regulator with an integrated high-side MOSFET. With a wide input range from 4 V to 40 V, it's suitable for various applications from industrial to automotive for power conditioning from unregulated sources. The regulator's quiescent current is 40  $\mu$ A in Sleep-mode, which is suitable for battery powered systems. An ultra-low 1  $\mu$ A current in shutdown mode can further prolong battery life. A wide adjustable switching frequency range allows either efficiency or external component size to be optimized. Internal loop compensation means that the user is free from the tedious task of loop compensation design. This also minimizes the external components of the device. A precision enable input allows simplification of regulator control and system power sequencing. The device also has built-in protection features such as cycle-by-cycle current limit, thermal sensing and shutdown due to excessive power dissipation, and output overvoltage protection.

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

PART NUMBER	PACKAGE	BODY SIZE (NOM)
LMR14050SDDA	HSOIC-8	4.89 mm x 3.90 mm

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

### Efficiency vs Output Current



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## 5 Revision History

DATE	REVISION	NOTES
February 2015	*	Initial release.

## 6 Device and Documentation Support

### 6.1 Trademarks

PowerPAD is a trademark of Texas Instruments.

### 6.2 Electrostatic Discharge Caution



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

### 6.3 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

## 7 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

## PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
LMR14050SDDA	PREVIEW	SO PowerPAD	DDA	8	75	TBD	Call TI	Call TI	-40 to 125		
LMR14050SDDAR	PREVIEW	SO PowerPAD	DDA	8	2500	TBD	Call TI	Call TI	-40 to 125		

(1) The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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DDA (R-PDSO-G8)

PowerPAD™ PLASTIC SMALL-OUTLINE



- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5-1994.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
  - D. This package is designed to be soldered to a thermal pad on the board. Refer to Technical Brief, PowerPad Thermally Enhanced Package, Texas Instruments Literature No. SLMA002 for information regarding recommended board layout. This document is available at [www.ti.com](http://www.ti.com) <<http://www.ti.com>>.
  - E. See the additional figure in the Product Data Sheet for details regarding the exposed thermal pad features and dimensions.
  - F. This package complies to JEDEC MS-012 variation BA

PowerPAD is a trademark of Texas Instruments.

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Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</a>
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