

LMR14206 SIMPLE SWITCHER® 42Vin, 0.6A Step-Down Voltage Regulator in SOT-23

1 Features

- Input Voltage Range of 4.5V to 42V
- Output Voltage Range of 0.765V to 34V
- Output Current up to 0.6A
- 1.25 MHz Switching Frequency
- Low Shutdown I_q , 16 μ A Typical
- Short Circuit Protected
- Internally Compensated
- Soft-Start Function
- Thin 6-Pin SOT Package (2.97 x 1.65 x 1mm)
- Fully Enabled for WEBENCH® Power Designer

2 Performance Benefits

- Tight Accuracy for Powering Digital ICs
- Extremely Easy to Use
- Tiny Overall Solution Reduces System Cost

3 Applications

- Point-of-Load Conversions from 5V, 12V, and 24V Rails
- Space Constrained Applications
- Battery Powered Equipment
- Industrial Distributed Power Applications
- Power Meters
- Portable Hand-Held Instruments

The LMR14206 is a PWM DC/DC buck (step-down) regulator. With a wide input range from 4.5V-42V, they are suitable for a wide range of applications such as power conditioning from unregulated sources. They feature a low $R_{DS(on)}$ (0.9 Ω typical) internal switch for maximum efficiency (85% typical). Operating frequency is fixed at 1.25 MHz allowing the use of small external components while still being able to have low output voltage ripple. Soft-start can be implemented using the shutdown pin with an external RC circuit allowing the user to tailor the soft-start time to a specific application.

The LMR14206 is optimized for up to 600 mA load current with a 0.765V nominal feedback voltage.

Verification Diagram (continued)

PIN DESCRIPTIONS

Pin	Name	Function
1	CB	SW FET gate bias voltage. Connect C _{BOOT} cap between CB and SW.
2	GND	Ground connection.
3	FB	Feedback pin: Set feedback voltage divider ratio with $V_{OUT} = V_{FB} (1+(R1/R2))$. Resistors should be in the 100-10K range to avoid input bias errors.
4	SHDN	Logic level shutdown input. Pull to GND to disable the device and pull high to enable the device. If this function is not used tie to V _{IN} or leave open.
5	V _{IN}	Power input voltage pin: 4.5V to 42V normal operating range.
6	SW	Power FET output: Connect to inductor, diode, and C _{BOOT} cap.

Electrical Learner



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Absolute Maximum Ratings⁽¹⁾⁽²⁾

V_{IN}	-0.3V to +45V
SHDN	-0.3V to ($V_{IN}+0.3V$) <45V
SW Voltage	-0.3V to +45V
CB Voltage above SW Voltage	7V
FB Voltage	-0.3V to +5V
Maximum Junction Temperature	150°C
Power Dissipation ⁽³⁾	Internally Limited
Lead Temperature	300°C
Vapor Phase (60 sec.)	215°C
Infrared (15 sec.)	220°C
ESD Susceptibility Human Body Model ⁽⁴⁾	1.5 kV
For soldering specifications see SNOA549	

- (1) Absolute Maximum Ratings are limits beyond which damage to the device may occur. Operating Ratings are conditions for which the device is intended to be functional, but device parameter specifications may not be ensured. For ensured specifications and test conditions, see the Electrical Characteristics.
- (2) If Military/Aerospace specified devices are required, please contact the Texas Instruments Sales Office/ Distributors for availability and specifications.
- (3) The maximum allowable power dissipation is a function of the maximum junction temperature, $T_J(\text{MAX})$, the junction-to-ambient thermal resistance, θ_{JA} , and the ambient temperature, T_A . The maximum allowable power dissipation at any ambient temperature is calculated using: $P_D(\text{MAX}) = (T_J(\text{MAX}) - T_A)/\theta_{JA}$. Exceeding the maximum allowable power dissipation will cause excessive die temperature, and the regulator will go into thermal shutdown. Internal thermal shutdown circuitry protects the device from permanent damage. Thermal shutdown engages at $T_J=175^\circ\text{C}$ (typ.) and disengages at $T_J=155^\circ\text{C}$ (typ).
- (4) Human Body Model, applicable std. JESD22-A114-C.

Operating Conditions

Operating Junction Temperature Range ⁽¹⁾	-40°C to +125°C
Storage Temperature	-65°C to +150°C
Input Voltage V_{IN}	4.5V to 42V
SW Voltage	Up to 42V

⁽¹⁾ All input and output voltages are with respect to the common-mode voltage. The common-mode voltage is the average of the input and output voltages. The common-mode voltage is the average of the input and output voltages.

⁽²⁾ The maximum allowable power dissipation is a function of the maximum junction temperature, $T_J(\text{MAX})$, the junction-to-ambient thermal resistance, θ_{JA} , and the ambient temperature, T_A .

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PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4)	Samples
LMR14206XMK/NOPB	ACTIVE	SOT-23-THIN	DDC	6	1000	RoHS & Green	SN	Level-1-260C-UNLIM	-40 to 125	SJ2B	Samples
LMR14206XMKE/NOPB	ACTIVE	SOT-23-THIN	DDC	6	250	RoHS & Green	SN	Level-1-260C-UNLIM	-40 to 125	SJ2B	Samples
LMR14206XMXX/NOPB	ACTIVE	SOT-23-THIN	DDC	6	3000	RoHS & Green	SN	Level-1-260C-UNLIM	-40 to 125	SJ2B	Samples

(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.

(4) 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.

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

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