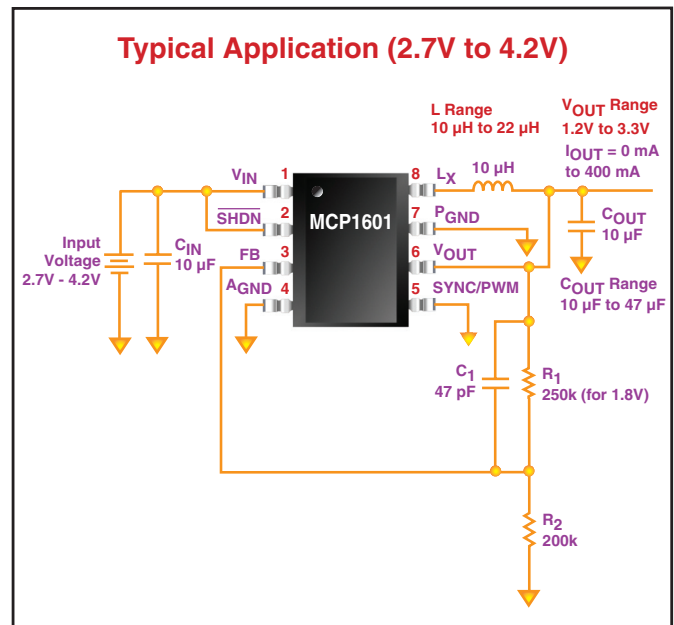


MCP1601, 500 mA Synchronous Buck Regulator

The **MCP1601**, 500 mA synchronous buck regulator, is a fully integrated DC-to-DC switching converter that requires neither an external power transistor nor a power diode for operation within its rated current range. It is designed for down-converting standard battery and bus voltages to the operational voltages required in various systems. It has an adjustable output range of 0.9V to V_{IN} and can be powered with an input voltage range of 2.7V to 5.5V. Given this input range, the MCP1601 is ideal for applications being powered with a single cell Li-Ion, or two or three cell NiMH, NiCd or alkaline batteries, as well as, from standard system bus voltages such as 5.0V, 3.3V or 3.0V. Some typical battery powered applications include: Cell Phones, PDAs, Digital Cameras, and USB powered devices.

At the internally set PWM (Pulse Width Modulation) frequency of 750 kHz, the MCP1601 can exceed 92% efficiency and deliver 500 mA of load current, while using low profile surface mount inductors and ceramic capacitors. Together these features minimize space, cost and wasted power.

The MCP1601 has three operating modes; PWM for normal medium-to-high load conditions, PFM (Pulse Frequency Modulation) for light loads over extended periods of time, and LDO (Low Drop-Out) mode for when the input voltage approaches the output voltage and the PWM duty cycle approaches 100%. In the latter case, the buck switch transistor saturates and supplies the maximum possible voltage to the load. Switching between these modes is automatic and allows the MCP1601 to operate at maximum efficiency over a wide variation of line and load conditions.



Features:

- Three Operating Modes: PWM, PFM and LDO (100% duty cycle) auto Switching between modes
- All Ceramic Capacitor Solution
- Integrated Buck and Synchronous Switches
- Continuous Output Current Capability of 500 mA
- Input Voltage Range of 2.7V to 5.5V
- Low Voltage Output Capability of 0.9V
- Fixed Switching Frequency of 750 kHz
- Capable of PWM external synchronization up to 1.0 MHz
- Over-temperature protection-on-chip
- Integrated Under Voltage Lock-out
- Integrated Soft-start Capability
- Temperature Range of -40°C to +85°C
- Available in a Small 8-pin MSOP Package



Additional Information:

- Microchip's web site: www.microchip.com
- Microchip's *Technical Library CD-ROM*, Order No. DS00161
- *Product Line Card*, Order No. DS00148
- *Analog & Interface Families Data Book 2002*, Order No. DS00207
- *2002 Technical Documentation Analog & Interface Product Families CD-ROM*, Order No. DS51205
- *MCP1601 Data Sheet*, DS21762
- *MCP1601 Evaluation Board User Guide*, DS51315

Development Tools Support:

The MCP1601 Evaluation Board is designed to demonstrate the use of the MCP1601 Synchronous Buck Regulator in a step-down, inductor-based DC-to-DC converter application. The MCP1601 Evaluation Board is constructed using one silk screen layer and two 1 oz. metal wiring layers. The bottom metal wiring layer is a single ground plane which is routed to partition the P_{GND} high current return pin from the small signal A_{GND} return pin on the MCP1601 device.

MCP1601 500 mA Synchronous Buck Regulator

Product	Switching Frequency	V _{CC} Range	PWM, PFM, LDO Operating Modes	SHDN Current (Typical)	Integrated Soft-start	Under Voltage Lock-out	Operating Temperature Range	# of Pins/Package
MCP1601	750 kHz	2.7V to 5.5V	Yes	0.1 μ A	Yes	Yes	-40°C to +85°C	8MS

Package Key: MS = MSOP

Development Tools for Analog and Interface Products from Microchip

MCP1601 Evaluation Board	Demonstrates the Use of the MCP1601 Synchronous Buck Regulator
FilterLab®	Active Filter Software Design Tool
MCP1252/1253 Evaluation Board Kit	Support the MCP1252-33X50, MCP1252-ADJ, MCP1253-33X50 and MCP1253-ADJ Low Noise, Positive-regulated Charge Pump Devices
MCP2120/2150 Developer's Kit	Infrared Products Developer's Kit
MCP2510 CAN Developer's Kit	MCP2510 CAN Evaluation/Development Tool
MCP250XX CAN I/O Expanders Developer's Kit	MCP250XX CAN Evaluation/Development Tool
MXDEV® 1 Analog Evaluation System:	Evaluation Kit for MCP Devices
MCP3001/02 Evaluation Board	Evaluation Kit for 10-bit Analog-to-Digital Converters
MCP3004/08 Evaluation Board	Evaluation Kit for 10-bit Analog-to-Digital Converters
MCP3201/02 Evaluation Daughter Kit	Analog-to-Digital Converter - Four Channel*
MCP3204/08 Evaluation Daughter Kit	Analog-to-Digital Converter - Four Channel*
MCP41XXX/MCP42XXX Evaluation Daughter Kit	Digital Potentiometers Evaluation and Demonstration*
TC642 Demo Board	Fan Control Module for TC64X Devices
TC642 Evaluation Kit	Evaluation Kit for TC64X Fan Controllers
TC650 Demo Board	Demo Board for TC650/TC651 Fan Control ICs
TC652 Demo Board	Demo Board for TC652/TC653 Fan Control ICs
TC74 Demo Board	Demo Board for TC74 Digital Thermal Sensor

***Note:** Requires MXDEV® Analog Evaluation Kit.

Visit our web site at www.microchip.com for additional product information and your local sales office.

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