

5A Step-Down Converter



DESCRIPTION

High efficiency, ultra fast response regulator with digital control for mobile computing and mobile communication markets

LX7165™ is a digitally controlled step-down regulator IC with integrated high side P-Channel MOSFET and low side N-Channel MOSFET, an I²C serial interface port, and fault monitoring functions. The proprietary constant frequency hysteretic control allows for minimal filter components due to its fast transient response. At lower currents, the switching frequency is lowered (PFM mode) to optimize light load efficiency and extend battery life in mobile applications.

The LX7165 will operate from 5V or 3.3V rails. The I²C serial interface allows for on the fly output voltage margining in addition to power monitoring reporting.

Cycle-by-cycle current limiting protects the regulator against over-current conditions. The LX7165 operates in hiccup mode to further enhance the robustness of the converter for heavy over-load or short-circuit faults and it automatically recovers once the fault clears. Thermal protection shuts down the regulator under an over-temperature condition.

KEY FEATURES

BENEFITS

Operational Input Supply Voltage Range: 3V - 5.5V (short durations to 6.5V)

Ideal for 3.3V and 5V applications

Patented Hysteretic Control Technology

Increases speed providing ultra fast transient response

- Eliminates loop error amplifier and compensation network delay
- Minimizes filter components
- Immediate response to load and line variation

Increased Speed and Reduced Device Bias Currents

- Eliminates bias capacitors to support small footprint solutions essential in mobile applications
- Maximizes efficiency with minimal power loss under all current levels and light load conditions
- Increases battery life

Integrated PMOS and NMOS in a Ball Wafer Scale Package

High integration minimizes PCB space and supports low profile package requirement designs

I²C Serial Interface Port

- Simple two wire, bidirectional, serial communication port
- Supports Fast mode (400kHz max) and High speed mode (3.4MHz max)
 - On the fly programming of the output voltage in 3.5mV increments

APPLICATIONS

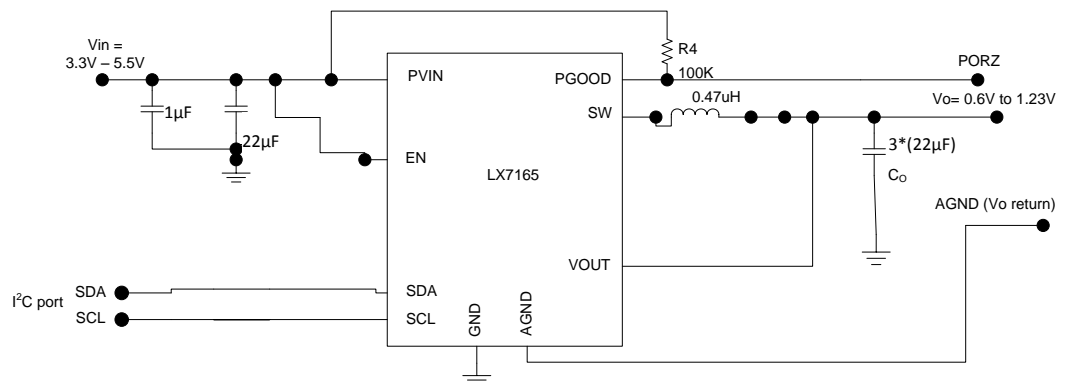
- Mobile Computing, Notebook, Netbook
- Mobile Devices, eBook, Tablets
- Mobile Communication, Smart Phone
- System-On-Chip (SOC) Processor Designs

- High Performance HDD
- Server and Workstations
- Video Cards
- PoE Powered Devices

Additional Features

- PWM Switching at a Constant 1.875MHz
- Programmable Discontinuous Switching Mode (PFM) Improves Light Load Efficiency
- Seven Bit Adjustable Output Voltage via I²C Bus
- Input Under Voltage and Over Voltage Protection
- Dedicated Enable Control
- Power Good Function
- Internal Soft-Start
- Cycle-by-Cycle Over Current Protection
- Hiccup Mode Protects Against Short Circuit Faults
- 20 Ball, 0.4mm Pitch, Wafer Scale Package
- RoHS Compliant for Pb Free

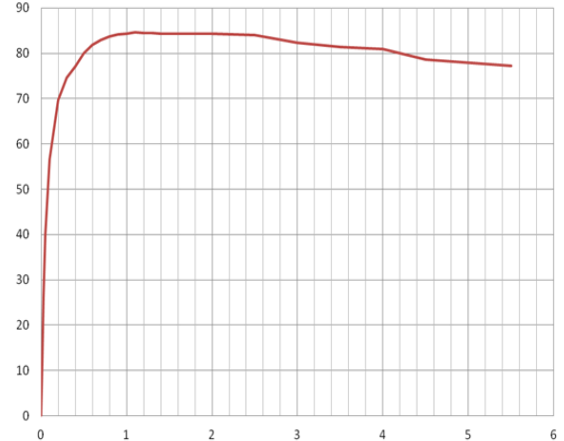
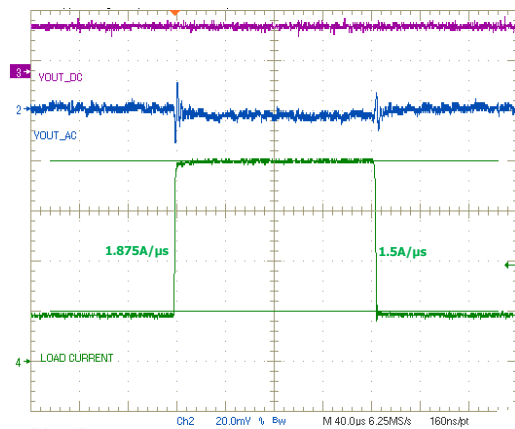
SIMPLIFIED BLOCK DIAGRAM



DYNAMIC LOAD RESPONSE AND EFFICIENCY

Dynamic Transient Response 0.5A to 2.0A (3*22µF, 0.47µH)

LX7167, 1V Efficiency vs. Output Current (A)



ADDITIONAL INFORMATION

The LX7165 complements a complete family of high efficiency regulators for mobile products. See www.microsemi.com for a complete line of solutions.

- LX7167: 2A Step-Down Converter, (8L MLPD, 2 x 2 mm)
- LX7169: 3A Step-Down Converter, (12L MLPD, 3.0 x 3.5 mm)

ORDERING INFORMATION

T _A (°C)	SP WLCSP 20 (0.4mm Pitch)	θ _{JA} = 58 °C/W
	RoHS Compliant / Pb-free	Junction to Ambient Thermal Resistance
-10°C to +85°C	LX7165-xyCSP	Junction Temperature Calculation: T _J =T _A + (P _D x θ _{JA}). The θ _{JA} numbers are guidelines for the thermal performance of the device/pc-board system. The above assumes no ambient airflow. θ _{JA} number above is with 4-layer pc board.
	x is the 2 LSB bits of the Binary I ² C slave address: 0-3, y is the default output voltage, 0=0.6; 1=0.9; 2=1.0; 3=1.1.	
Available in Tape & Reel. Append the letters "TR" to the part number.		

CONTACTS

For more details and sample requests please contact your local Area Sales Manager or Field Application Engineer. More information can be found at www.microsemi.com or at (949) 380-6100.

Microsemi

Analog Mixed Signal Group

One Enterprise, Aliso Viejo, CA. 92656, 949-380-6100, Fax: 949-215-4996