



## **2.375V to 5.5V Input, 10A $\mu$ Module Regulator Delivers Full Current with 91%-95% Efficiency at up to 85°C Ambient**

MILPITAS, CA – December 15, 2015 – Linear Technology Corporation announces the [LTM4648](#), a 2.375V<sub>IN</sub> to 5.5V<sub>IN</sub>, 10A step-down  $\mu$ Module® (micromodule) regulator in a 9mm x 15mm x 4.92mm BGA package with high operating efficiency and low temperature rise. With an integrated 5V boost converter to drive the gates of its N-channel MOSFETs from low V<sub>IN</sub> supplies, the LTM4648 improves efficiency and simplifies system design by eliminating the need for 5V or 12V power rails and dependency on auxiliary regulators. Applications include point-of-load conversion from a 3.3V main power bus and battery-powered systems in telecom, medical, industrial, avionics and portable test equipment.

At full power (10A, full range of V<sub>OUT</sub> and V<sub>IN</sub>) is delivered when operating from 0°C to 85°C ambient temperature, while the LTM4648 requires no heat sink or airflow nor is its output current derated. Half-power occurs at high ambient temperature of 110°C (T<sub>JMAX</sub>=125°C). The  $\mu$ Module regulator operates at up to 91% efficiency (3.3V<sub>IN</sub> or 5V<sub>IN</sub>, 1.5V<sub>OUT</sub> at 10A). 95% efficiency is achieved when converting 3.3V<sub>IN</sub> to 2.5V<sub>OUT</sub> at 10A.

The LTM4648 regulates output voltages adjustable from 0.6V to 5V. Equipped with a differential remote sense amplifier to compensate for voltage droop due to circuit board trace impedance, the LTM4648 regulates a load voltage with  $\pm 1.5\%$  accuracy over line, load and temperature (–40°C to 125°C).

The LTM4648 provides input and output clocks for multiphase operation among multiple devices to accurately current share for up to 40A load. Multiphase operation reduces input and output ripple as well as the number of input and output capacitors.

The LTM4648 is synchronizable to an external clock ranging in frequency from 400kHz to 750kHz. With options for Burst Mode<sup>®</sup> operation for the highest conversion efficiency at light load and pulse-skipping operation for lower output voltage ripple, gives users the option to personalize a circuit's performance. The LTM4648 permits output voltage tracking for sequencing multiple rails in a system. To protect the load, the LTM4648 features output overvoltage and overcurrent protection.

The LTM4648 E and I grades are guaranteed for internal operation from –40°C to 125°C. Pricing for 1,000-piece quantities starts at \$13.25 each. For more information, visit [www.linear.com/product/LTM4648](http://www.linear.com/product/LTM4648).

**Photo Caption:** Low  $V_{IN}$ , 10A  $\mu$ Module<sup>®</sup> Step-Down Regulator in Small BGA Package


### Summary of Features: LTM4648

- 10A DC Output Current
- Input Voltage Range: 2.375V to 5.5V
- Output Voltage Range: 0.6V Up to 5V
- No Heat Sink or Current Derating Up to 85°C Ambient Temperature
- $\pm 1.5\%$  Maximum Total DC Output Error
- Multiphase Operation with Current Sharing
- Remote Sense Amplifier
- Built-In Temperature Monitor
- Selectable Pulse-Skipping Mode/Burst Mode
- 9mm x 15mm x 4.92mm BGA

The USA list pricing shown is for budgetary use only. International prices may differ due to local duties, taxes, fees and exchange rates.

## About Linear Technology

Linear Technology Corporation, a member of the S&P 500, has been designing, manufacturing and marketing a broad line of high performance analog integrated circuits for major companies worldwide for over three decades. The Company's products provide an essential bridge between our analog world and the digital electronics in communications, networking, industrial, automotive, computer, medical, instrumentation, consumer, and military and aerospace systems. Linear Technology produces power management, data conversion, signal conditioning, RF and interface ICs,  $\mu$ Module<sup>®</sup> subsystems, and wireless sensor network products. For more information, visit [www.linear.com](http://www.linear.com)

 , LT, LTC, LTM, Linear Technology, the Linear logo, Burst Mode and  $\mu$ Module are registered trademarks of Linear Technology Corp. All other trademarks are the property of their respective owners.

### Press Contacts:

#### North America / Worldwide

John Hamburger, Director Marketing  
Communications  
[jhamburger@linear.com](mailto:jhamburger@linear.com)  
Tel: 408-432-1900 ext 2419

Doug Dickinson, Media Relations Manager  
[ddickinson@linear.com](mailto:ddickinson@linear.com)  
Tel: 408-432-1900 ext 2233

#### UK & Nordic

Alan Timmins  
[alan@ezwire.com](mailto:alan@ezwire.com)  
Tel: +44-1-252-629937