



“No Opto” Synchronous Forward Controller Generates Secondary Bias for Controlled V_{OUT} Start-Up

MILPITAS, CA – March 17, 2014 – Linear Technology Corporation announces the [LT3752/LT3752-1](#), a high input voltage capable synchronous forward controller with active clamp transformer reset. A controlled V_{OUT} start-up and shut-down is maintained using an integrated housekeeping controller to bias both the primary and secondary IC's. The internal bias generation also reduces the complexity and size of the main power transformer by avoiding the need for extra windings to create bias supplies. The LT3752 operates over 6.5V to 100V input voltage range. For up to 400V inputs and greater, the LT3752-1 allows RC start-up from the input voltage with the maximum voltage limited only by the choice of external components, making it ideal for HV/HEV automotive applications.

An output voltage regulation of $\pm 5\%$ can be attained without the use of an optocoupler. When an optocoupler is used, $\pm 1.5\%$ regulation can be realized. The LT3752/-1 sends a control signal via a pulse transformer to a secondary-side MOSFET driver for the synchronous rectification timing. It can also be used in self-driven applications (when operating over a narrow input voltage range) where the secondary-side MOSFETs are controlled by the power transformer pulses. With the LT3752/-1, secondary side ICs no longer require start-up circuitry to operate when the output voltage is 0V, allowing a controlled V_{OUT} startup.

The LT3752/-1 contains an accurate programmable volt-second clamp. When set above the natural duty cycle of the converter, it provides a duty cycle guardrail to limit primary switch reset voltage and prevent transformer saturation during load transients. The volt-second clamp also limits maximum V_{OUT} if the opto path breaks open or, alternatively, defines V_{OUT} in no-opto applications. For non-isolated high step-down ratios applications, each IC contains a voltage error amplifier allowing a very simple non-isolated fully regulated synchronous forward converter. Additional features include programmable overcurrent protection, adjustable input undervoltage and overvoltage lockout along with built-in thermal shutdown. The LT3752/-1 has a programmable 100kHz to 500kHz operating switching frequency and can also be synchronized

to an external clock allowing the use of a wide range of output inductor values and transformer sizes.

The LT3752/-1 is available in a TSSOP-38 package with several pins removed for high voltage spacing. The LT3752/-1 E- and I-grade versions operate from a -40°C to 125°C junction temperature. The LT3752/-1 H-grade is guaranteed to operate from a -40°C to 150°C operating junction temperature. The LT3752/-1 MP-grade is guaranteed to operate from -55°C to 150°C operating junction temperature. The 1,000-piece price starts at \$3.39 each. For more information, visit www.linear.com/product/LT3752


Photo Caption: Active Clamp Synchronous Forward Controller

Summary of Features: LT3752/-1

- Wide V_{IN} Range:
 - o LT3752: 6.5V to 100V
 - o LT3752-1: Up to 400V+ Limited Only by External Components
- Internal Housekeeping DC/DC Controller
- Active Clamp Transformer Reset
- No Optocoupler Required
- High Efficiency Synchronous Rectification
- Programmable MOSFET Turn-on Delays
- Short Circuit Protection
- Programmable Volt-Second Clamp
- Selectable Fixed Operating Frequency from 100kHz to 500kHz
- Synchronizable to External Clock
- Programmable OVLO & UVLO with Hysteresis
- Extended & Industrial Grades: -40°C to 125°C Operating Junction Temp
- Automotive Temp Grade: -40°C to 150°C Operating Junction Temp
- Military Temp Grade: -55°C to 150°C Operating Junction Temp

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, μ Module[®] subsystems, and wireless sensor network products. For more information, visit www.linear.com

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Press Contacts:

North America / Worldwide

John Hamburger, Director Marketing
Communications
jhamburger@linear.com
Tel: 408-432-1900 ext 2419

Doug Dickinson, Media Relations Manager
ddickinson@linear.com
Tel: 408-432-1900 ext 2233

UK & Nordic

Alan Timmins
alan@ezwire.com
Tel: +44-1-252-629937