



## **Tiny, Surface Mount, Hermetic Voltage References Offer Outstanding Stability**

MILPITAS, CA – February 12, 2013 – Linear Technology announces the [LS8](#) reference family, a series of hermetic precision voltage references packaged in a 5mm x 5mm surface mount, low stress ceramic package. These precision voltage references offer outstanding long term stability and consistent predictable behavior, over time and operating conditions. For instrumentation that demands the best possible performance over years or decades of operation, the LS8 package offers an alternative to large metal can or ceramic DIP packages.

Mechanical stress on the internal die of a voltage reference frequently causes a shift in its output voltage. The LS8 package achieves superior stability, minimizing die stress in a number of ways. First, the LS8 is a hermetic package, which eliminates humidity effects. This significant and often unrecognized source of error is due to the absorption of water in non-hermetic plastic packaging. Typically, non-hermetic parts can experience 150ppm or more of error with 25% changes in relative humidity. In addition, the LS8 package has minimal direct die contact, reducing die stress from the package. In contrast, plastic molding applies stress directly to a silicon die over time and temperature. Because silicon and plastic have different thermal coefficients of expansion, temperature cycling a plastic part will apply inelastic stress to the die. The result is residual error, even when the part returns to 25°C. Similarly, a large component of long term drift error is due to the plastic package settling over time. All of this is significantly reduced in the LS8 reference family. “The LS8 package is a break-through for voltage references,” says Brendan Whelan, design manager for Linear Technology.

“Minimizing humidity, hysteresis and long term drift will minimize system calibration requirements. This should be welcome news for any precision equipment manufacturer”.

The LS8 reference family is based on four of Linear Technology’s most popular precision voltage references, the LTC6655, LTC6652, LT6654 and LT1236. This includes a 5V buried Zener reference and three low dropout, 2.5V band-gap references. These voltage references cover a wide range of characteristics, including temperature drift from 2ppm/°C to 20ppm/°C, operation from -40°C to 125°C and low frequency noise down to 0.25ppm.

Linear Technology’s LS8 References are now in full production. For more information, visit [www.linear.com/product/LTC6655](http://www.linear.com/product/LTC6655).

**Photo Caption:** LS8 Package Offers Outstanding Improvements in Voltage Reference Performance


### Summary of Features: LS8

- Hermetic Package with No Humidity Effect
- Excellent Thermal Hysteresis Performance
- Excellent Long Term Stability Performance
- Consistent Behavior
- Low Profile, 5mm x 5mm Surface Mount LS8 Package
- LTC6655-2.5: 2.5V Precision Band-Gap Reference
  - A Grade 2ppm/°C
  - B Grade 5ppm/°C
  - Industry Leading Noise Performance of < 625nV<sub>P-P</sub>
  - 5ppm Thermal Hysteresis (0°C to 70°C)
  - 20ppm/√kHr Long Term Stability
- LTC6652-2.5: 2.5V Precision Band-Gap Reference
  - A Grade 5ppm/°C
  - B Grade 10ppm/°C
  - 350uA Supply Current with 2μA Shutdown
  - 8ppm Thermal Hysteresis (0°C to 70°C)
  - 20ppm/√kHr Long Term Stability
- LT6654LS8-2.5: 2.5V Precision Band-Gap Reference
  - A Grade 10ppm/°C
  - B Grade 20ppm/°C
  - Supply Voltage from 100mV Dropout, up to 36V
  - 3ppm Thermal Hysteresis (0°C to 70°C)
  - 15ppm/√kHr Long Term Stability

- LT1236LS8-5: 5V Precision Buried Zener Reference
  - A Grade 5ppm/°C
  - B Grade 10ppm/°C
  - 0.6ppm<sub>p-p</sub> Noise (0.1Hz to 10Hz)
  - 8ppm Thermal Hysteresis (0°C to 70°C)
  - 20ppm/√kHr Long Term Stability

## 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 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)

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