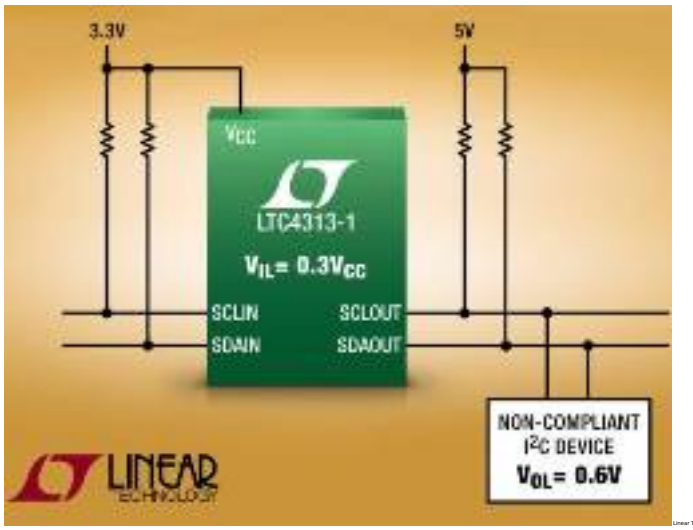
Hot Swap I²C Bus Buffers Provide High Noise Margins, Level Shifting & Stuck Bus Recovery



Linear Technology Corporation introduces the LTC4313 [1] and LTC4315 [2] high noise margin buffers that provide capacitance buffering and bus extension capabilities to I²C/SMBus/PMBus systems. As the number of devices on an I²C bus expands, additive capacitances can critically lengthen rise times. The LTC4313 and LTC4315 alleviate this problem by segmenting the bus and offer the additional advantage of high logic low noise margin, thanks to their guaranteed minimum V_{IL} of 0.3•V_{CC}. This allows the LTC4313 and LTC4315 to operate with noncompliant I²C devices that drive a high logic low output voltage (V_{OL}). This also permits a number of LTC4313s or LTC4315s to be connected in series, and improves the reliability of I²C communications in large noisy systems.

The LTC4313 and LTC4315 are well suited for a variety of computing, networking and data storage systems that use multiple I/O cards with different supply and bus voltage levels. The devices provide automatic level translation from low voltage systems down to 1.4V to higher voltage systems up to 5.5V. The LTC4315 has a second supply pin, allowing use of separate input and output bus pull-up supplies. Rise time accelerators provide pull-up currents during bus rising edges that reduce rise times, ultimately resulting in reduced power consumption, improved logic low noise margins and the ability to design with higher bus capacitances beyond I²C limitations. The LTC4313 provides strong, slew-limited switch (LTC4313-1) or 2mA current source (LTC4313-2) rise time accelerator current, while the LTC4315 provides pin-selectable (strong slew-limited switch, 2mA or off) rise time accelerator current. Safety measures include a stuck bus disconnect and recovery feature to disengage the input from all enabled output channels and to issue clocks to try to get the stuck slave to release the data line, a fault output to signal the host a bus is stuck low (LTC4315 only), and ±4kV HBM ESD protection for increased ruggedness.

Summary of Features: LTC4313/LTC4315

- Bidirectional Buffer Increases Fanout
- High Noise Margin with VIL = 0.3•VCC
- Compatible with Noncompliant I²C Devices That Drive a High VOL
- Fixed (LTC4313-1 and LTC4313-2) or Selectable (LTC4315) Rise Time Accelerator Current
- Level Shift 1.5V, 1.8V, 2.5V, 3.3V & 5V Busses
- Stuck Bus Disconnect & Recovery
- Compatible with I²C Standard Mode, I²C Fast Mode & SMBus Specifications
- ±4kV HBM ESD
- Prevents SDA & SCL Corruption During Live Board Insertion into & Removal from a Live Backplane
- 8-pin 3mm x 3mm DFN & 8-lead MSOP Packages (LTC4313)

12-pin 4mm x 3mm DFN & 12-lead MSOP Packages (LTC4315)

The LTC4313 and LTC4315 are available today in commercial and industrial temperature grades. The LTC4313 is available in an 8-pin 3mm x 3mm DFN or

8-lead MSOP package, and the LTC4315 is available in a 12-pin 4mm x 3mm DFN or 12-lead MSOP package. All packages are RoHS compliant. The devices are priced starting at $2.40 each in 1,000 piece quantities and are available today in production quantities. Please visit www.linear.com/product/LTC4313 [1] and www.linear.com/product/LTC4315 [2] for product selection information.

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http://www.ecnmag.com/product-releases/2011/10/hot-swap-i%C2%B2c-bus-buffers-provide-high-noise-margins-level-shifting-stuck-bus-recovery?qt-video_of_the_day=0

Links:
[1] http://r20.rs6.net/tn.jsp?llr=eutu5r97&et=1108228489544&s=21331&e=0019ymCXplBRRG6c_CfG6dzx0eE4e8E7CT_yzz2guoNmwu960S_3AyoIFk8VTCBxSU_7L9Tfouqs06Wavh5pBUWduSVuxRrp1YfKdsLow7jpQ5cNy6RyKxSi6Z8T-fCO8-EC-TXb_sFjyg=
[2] http://r20.rs6.net/tn.jsp?llr=eutu5r97&et=1108228489544&s=21331&e=0019ymCXplBRRF1AeQXLKwRPrg56uHXka7SGHsMBhGbZnB3amSBKutFNyqpEZGV3Iz_-DVrfcpw1CgqYFuTjGAOKoPbOoes-_r6O6u_fn7MS0cTaKyd5RM-2Lj7ZD8sEC7_kVKXxIPf5DU=