Eliminate Opto-Isolators and Isolated Power Supply from Power over Ethernet Power Sourcing Equipment

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Power over Ethernet (PoE), is defined by the IEEE 802.3at specification to safely deliver application power over existing Ethernet cabling. Implementation of Power over Ethernet requires careful architecture and component selection to minimize system cost, while maximizing performance and reliability. A successful design must adhere to IEEE isolation requirements, protect the Hot Swap™ FET during short-circuit and overcurrent events, and otherwise comply with the IEEE specification.

The IEEE standard also defines PoE terminology. A device that provides power to the network is known as power sourcing equipment (PSE), while a device that draws power from the network is known as a powered device (PD).

The LTC4290/LTC4271 PSE controller chip-set revolutionizes PSE architecture by deleting the customary digital isolation and removing an entire isolated power supply. Instead, the chipset employs a proprietary isolation protocol using a low cost Ethernet transformer pair, leading to a significant reduction in bill of materials cost.

The LTC4290/LTC4271 fourth generation PSE controller supports fully compliant IEEE 802.3at operation, while minimizing heat dissipation through the use of low $R_{DS(ON)}$ external MOSFETs and 0.25Ω sense resistors.
**Advanced Fourth Generation Features**

Linear’s PoE family incorporates a wealth of PoE experience and expertise backed by well over 100 million shipped ports. This latest PoE generation adds features to a proven, field-tested product line. New features include field-upgradable firmware, future-proofing platforms that incorporate the LTC4290/LTC4271. Also new is optional 1-second current averaging, which simplifies host power management. The highest grade LTC4290A analog controller enables delivered PD power of up to 90W using the new LTPoe++™ physical classification scheme.

As with previous generations, a key benefit of the LTC4290/LTC4271 chipset architecture is the lowest-in-industry power dissipation, making thermal design significantly easier than designing with PSEs that integrate more fragile and higher $R_{DS(ON)}$ MOSFETS. System designers will appreciate the robustness provided by 80V-tolerant port pins. PD discovery is accomplished using a proprietary dual-mode, 4-point detection mechanism that ensures immunity from false PD detection.

Advanced power management includes prioritized fast shutdown, 12-bit per-port voltage and current read back, 8-bit programmable current limits and 7-bit programmable overload current thresholds.

A 1MHz I2C interface allows a host controller to digitally configure the IC or query port readings. “C” libraries are available to reduce engineering costs and improve time to market.

**Conclusion**

The LTC4290/LTC4271 builds on an established, robust lineup of Linear PoE solutions by slashing BOM costs while providing an overall best-in-field solution.