

# National Semiconductor Introduces First Single-Chip, High-Performance Power over Ethernet Solution

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National Semiconductor Corporation today announced the LM5070, the first single-chip Power Device (PD) solution to feature the high performance and tiny package footprint needed to dramatically simplify the design of a wide variety of systems that use Power over Ethernet (PoE).

- Space-Saving, Highly Integrated PoE Power Device Solution Meets IEEE 802.3af Standard
- Ideal for Internet Telephony, Local Area Networks, Remote Security Cameras, Wireless Access Points, Scan-Card Readers and 48-Volt Telecommunications Power Supply Controls

As the name implies, PoE networks power devices such as IP phones,

security cameras, wireless local area network (WLAN) nodes and even musical instruments through Ethernet networking cables and ports. While competitive solutions use two or three chips, National's LM5070 is the industry's first single-chip PD interface port and pulse-width modulator (PWM) controller that meets the IEEE 802.3af standard. The LM5070 integrates an 80V, 400mA line connection switch and associated PoE interface circuits with a dc-dc controller that steps down the 48V input to power various loads.

“The LM5070 marks National's breakthrough entry into one of the most exciting, fastest-growing global markets available,” said Edward Lam, vice president of National Semiconductor's Power Management group. “This single-chip product combines National's strengths in analog, power management, Ethernet networks, ultra-small packaging and process technologies to create an elegant solution that is clearly superior to anything on the market today.”

### Key Technical Specifications

The LM5070 is built at National's state-of-the-art fabrication facilities in Greenock, Scotland, and Arlington, Texas, using the company's ABCD150-XV1 high-voltage analog Bipolar/CMOS/DMOS process technology. This highly integrated product offers advantages such as an integrated, high-frequency, current-mode dc-dc controller, user-programmable under-voltage threshold and hysteresis, and a highly accurate fault current control loop. It features a maximum operating voltage of 75 volts, user-programmable oscillator frequency up to 1 MHz and over-temperature protection, plus a voltage reference and high-performance error amplifier for non-isolated applications.

## Compelling Features and Benefits

National's LM5070 has a number of unique characteristics that make it easy to design in:

- UVLO Threshold and Hysteresis: Designer can program the under-voltage lockout (UVLO) trip-point and hysteresis completely independently. This allows him or her to control start-up line currents and program the start and stop voltage points as desired for a variety of system applications.
- Inrush Current Programming: Allows designer full control over inrush transient, which is programmed to the current desired via an external resistor on the RCLP pin. Alternatively, if the default inrush limit (375mA) is desired, no external components are required—the designer simply leaves the RCLP pin open.
- Internal Power Sequencing: The designer does not have to control the dc-dc converter system with “power good” signals or any other external communications interface. Communication between the POE PD interface section and the dc-dc converter is completely integrated within the LM5070.
- Controls Isolated or Non-Isolated dc-dc Converters: Integrates the precision voltage reference and error amplifier for dc-dc feedback in non-isolated converters. Provides pull-up for opto-coupler transistor in isolated designs.
- Signature Resistor Disconnect: The 25Kohm signature resistor is disconnected after PD detection to avoid power and efficiency losses.
- Programmable Oscillator Frequency: The oscillator for the switching regulator controller is fully user-programmable, easing power supply control loop design and allowing the user to maximize regulator performance.

### **Power Over Ethernet: A Fast-Growing Global Market**

Power over Ethernet solutions are rapidly growing in popularity. Because PoE devices do not require wall-mounted power supplies, overall systems costs are lower. For Internet Protocol (IP) telephony, uninterruptible power supplies (UPS) guarantee higher reliability and less susceptibility to power surges, theft, interruption or disconnection. In addition, the worldwide usage of the RJ-45 power connector ensures

global compatibility of PoE devices. For wireless access point applications, these systems do not require AC power sources, power lines or outlets. Finally, PoE-enabled devices offer superior management flexibility with remote power up/down capability. According to research firm Venture Development Corp., the global market for PoE-enabling silicon ICs is expected to grow from an estimated 133 million units in 2004 to 496 million units in 2007, a 55 percent compound annual growth rate.

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