Product Brief

AS1135

13-30W IEEE 802.3af/at (Draft 2.0) Powered Device with Integrated DC-DC Controller

General Description

The AS1135 is a single-chip, highly integrated CMOS solution for Power over Ethernet (PoE) Powered Devices requiring input power of up to 30Watts. Applications include Voice over IP (VoIP) Phones, Wireless LAN Access Point, Security Cameras, WiMax Terminals, Point of Sales Terminals, RFID Readers, Thin Clients and Notebook computers.

The AS1135 integrates input Surge Protection, a PD controller, and a low-emission DC-DC controller. The AS1135 implements all the physical layer Powered Device (PD) functionality as required by the *IEEE*® 802.3af-2005 and *IEEE*® 802.3at (Draft 2.0) standards. This includes 2-event classification, Type2 PSE detection indicator (ATDET) in addition to PD detection, under-voltage lockout, and hot-swap FET integration.

The AS1135 has been architected and designed to address both EMI emission concerns and surge/over-voltage protection in POE applications. The AS1135 implements many design features that minimizes transmission of system common-mode noise on to the UTP. On-chip integration of surge protection provides faster ressponse to surge events and limits stray surge current from passing through sensitive circuits, such as the Ethernet PHY device. The device is designed to provide a safe low impedance discharge paths directly back to the earth ground, resulting in superior reliability and circuit protection.

By using high-volume standard CMOS technology, Akros enables its customers to implement higher performance PoE devices with low cost and a small footprint.

Features

The AS1135 is fully integrated and architected at a system level to provide the following features:

- Fully supports IEEE® Std. 802.3af-2005 and supports IEEE® Std. 802.3at (Draft 2.0) power requirements
- Supports 2-Event Physical Layer Classification for 802.3at (Draft 2.0) higher power PD applications
- Provides Type 2 PSE detection per 802.3at (Draft 2.0)
- Meets IEC 61000-4-2/3/4/5/6 for EMC Compliance
- Meets IEC 60950 isolation requirements
- Integrated DC-DC controller, provides exceptional EMI performance
- Programmable DC current limit up to 800mA
- Provides seamless support for local power 10~57V
- Low Rds-on hot-swap FET (typical 0.8Ω)
- Over temperature protection
- Industrial temperature range, -40ºC to +85ºC
- 5x5 mm, 20 lead QFN Package, RoHS compliant

Typical Applications

- Pan, Tilt and Zoom (PTZ), Security and Web Cameras
- Voice over IP (VoIP) phones
- Wireless LAN Access Points, WiMax Terminals
- Point of Sale (PoS)Terminals, RFID Terminals
- Thin Clients and Notebook Computers
- Fiber to the Home (FTTH) Terminals

Example Application Diagram

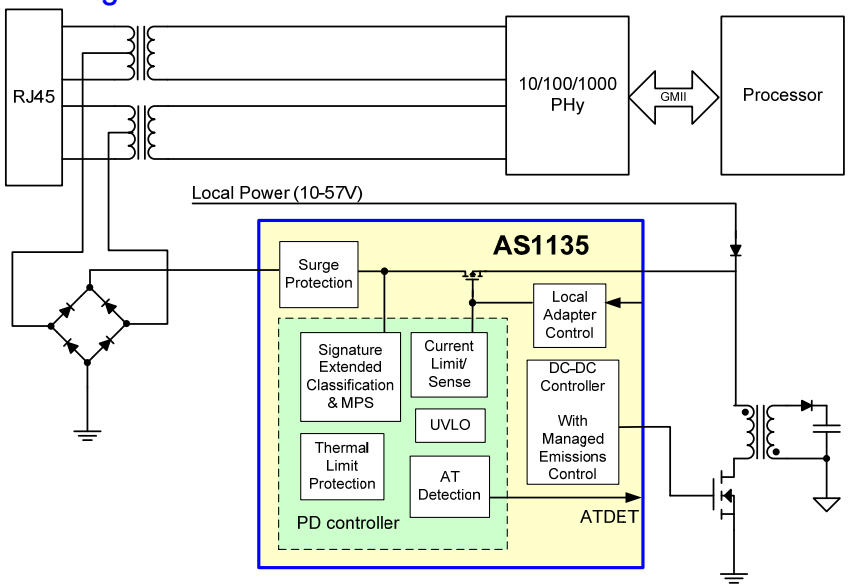


Figure 1: Typical Application Diagram for PoE PD (Flyback converter)

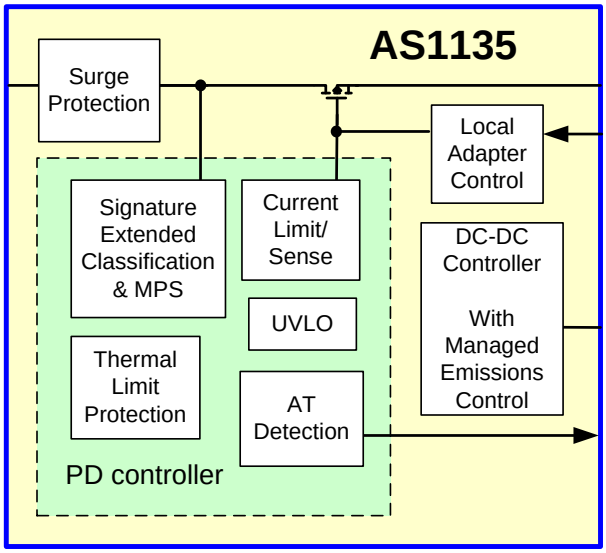


Figure 2: Top-Level Block Diagram of the AS1135

Functional Description

The AS1135 is a fully integrated PD that includes surge protection, PD controller, DC-DC controller, local adapter control and Emission control functions. This includes all the functions and features required to build IEEE 802.3af/at complaint Power over Ethernet (PoE) system. The optimized architecture of the AS1135 reduces external component cost in a small footprint package while providing high performance.

PD Controller

The AS1135 PD controller interface is designed to provide a fully compliant IEEE 802.3at (Draft 2.0) as both Type 1 and Type 2 PD. The PD Controller provides the following major functions:

- Signature detection
- 2-Event Physical Layer Classification
- Type 2 PSE Detection Indicator (ATDET)
- Maitain power signature (MPS)
- Current sense/limit
- Under voltage lockout (UVLO)
- Thermal limit protection

The AS1135 includes new 2-event classification feature based on 802.3at (Draft 2.0) standard to indicate to a Type 2 PSE that the PD is also a Type 2 PD and can accept more than 13W of input power.

The ATDET output indicator stays low if the PD connects to a Type 1 PSE (13W), and goes high if the PD connects to a Type 2 PSE (30W). This can be used by the system micro-controller to self-configure the system based on available power. ATDET stays high under local power since higher power is available through the local adapter.

DC-DC Controller

The integrated DC-DC controller operates from a switched input voltage and includes soft-start and current limiting. After the input power and enable signals are asserted, the DC-DC controller starts up. The controller provides control signals to external MOSFET switche and uses an external sense resistor to sense the transformer primary current.

The DC-DC architecture is a current mode controller which can be configured with external component changes for either flyback, forward or buck topologies. Both non-isolated and isolated switching technologies are supported. The PWM switching signal is controlled for low radiated and conducted emissions.

Local Adapter Control

Even with the convenience of PoE, many systems are designed to work with both the PoE and Local Power supplies to ensure broader deployment. The integrated local adapter controller enables the AS1135 to be used with a wall power adapter in wide range of 10-57V. The local adapter is OR-ed in after the hot-swap FET. The internal detector disabled the hot-swap FET when local power is available. This allows local power to have higher priority than the PoE power irrespective of the relative voltages local or PoE connections. If system design requires higher voltage based priority selection, then local power can also be OR-ed in at the front end diode bridge to take benefit of inrush/current limiting features.

For More Information

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