

## Product Brief

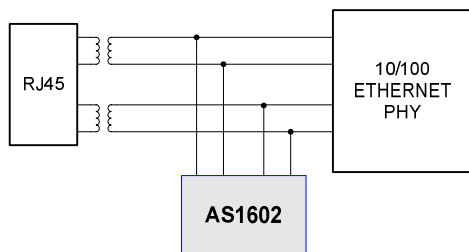
### General Description

The AS1602 is a single-chip, highly integrated CMOS solution for EMI (Electro-Magnetic Interference) & ESD (Electro-Static Discharge) Suppression in Ethernet applications. Electro-Magnetic Compatibility (EMC) is one of the most challenging aspects of system design that very often results in product release delays. The AS1602 is designed to address EMC Compliance (both EMI and ESD) in the early phase of the system design and enables the “Design for EMC” concept.

The AS1602 can be used in any type of 10Base-T/100Base-TX/1000Base-T systems, in both Power-over-Ethernet (POE) and non-POE ports. Applications include; compliance to EMI Emissions (CISPR22 and FCC Part 15, Class B requirements for Radiated and Conducted Emissions), EMI Immunity standards (IEC61000-4-3/6 requirements for Radiated and Conducted Immunity, Level 3 or higher), IEC61000-4-2 Air/Contact Discharge protection ( $\pm 25\text{kV}$  Air Discharge), as well as Cable Discharge Events protection ( $\pm 12\text{kV}$ ). The AS1602 utilizes Akros Silicon's patented “**Active Choke Technology**” that offers superior Common Mode (CM) noise reduction and CM immunity compared to passive filtering techniques in Ethernet applications. At the system level, the AS1602 provides additional CM noise suppression of more than 10dB over the entire Ethernet signal bandwidth.

The AS1602 works with standard Ethernet Physical Layer Transceivers (PHY) and Ethernet transformers. System designers can use the AS1602 to design systems for EMC compliance while maintaining full Ethernet electrical compliance per the IEEE 802.3 specification.

### Example Application Diagrams



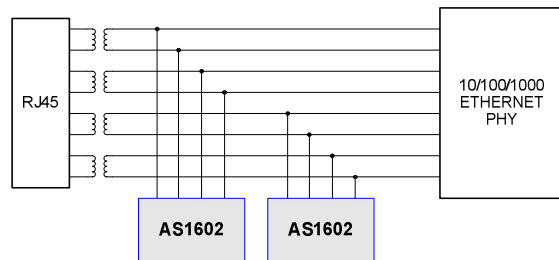
### Features

The AS1602 is fully integrated and architected at a system level to provide the following features:

- Enables system designers to comply with:
  - CISPR22 and FCC Part 15, Class B requirements for Radiated and Conducted Emissions.
  - IEC61000-4-3/6 requirements for Radiated and Conducted Immunity, Level 3 or higher.
  - IEC61000-4-2 ESD (Air Discharge) of  $\pm 25\text{kV}$
- Cable Discharge Event (CDE) of  $\pm 12\text{kV}$ .
- Provides up to 10dB of additional common mode noise suppression over the frequency of 1MHz to 125MHz when used with Ethernet magnetics.
- Robust built-in ESD suppressors protect the Ethernet PHY and improve system ESD performance.
- JESD22-A114, ESD, HBM of  $\pm 8\text{kV}$ .
- Interfaces to standard Ethernet transformers and 10/100/1000Base-T Ethernet PHYs.
- Uses a single standard power rail (3.3V or 2.5V).
- Flow-through routing for ease of board layout.
- Industry Standard 16 pin QSOP RoHS Package
- Industrial temperature range ( $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ ).

### Typical Applications

- Voice over IP (VoIP) phones
- IP Video security cameras
- Wireless access points (WAP)
- Set top boxes
- Networked printers and appliances
- Desktop and laptop computers
- PoE and Non-PoE Ethernet systems



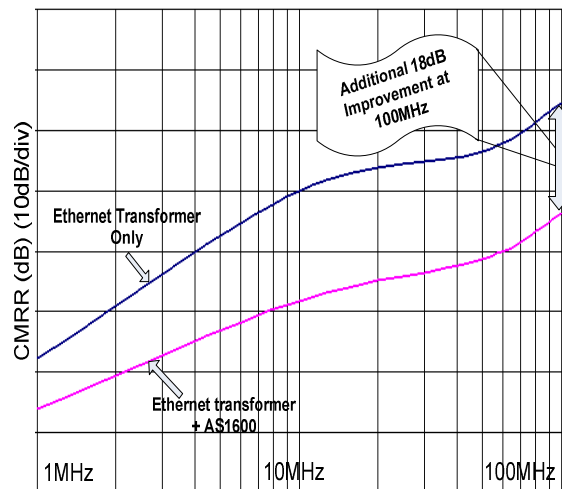
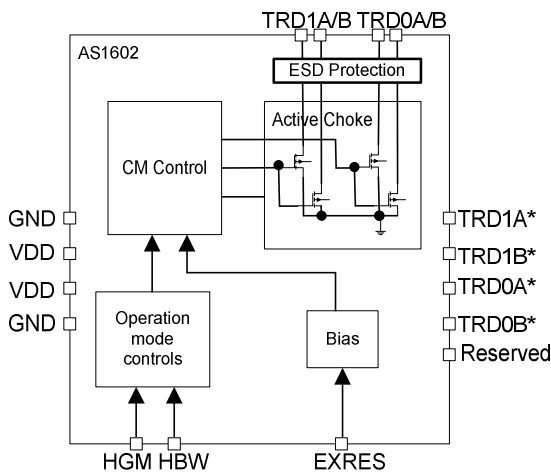
## Functional Description

The AS1602 includes adaptive CM noise suppression circuits and highly robust ESD/ Surge protection circuits. The CM suppression circuit provides very low common mode shunt impedance that absorbs the CM noise in both ingress and egress directions – increasing system's immunity to CM noise coming from the UTP, and reducing emissions to the UTP. The level of CM suppression is hardware programmable and it compensates for many variables that are the source of CM noise in Ethernet systems. Integrity of the Ethernet signal is preserved by maintaining high differential impedance and low differential capacitive loading. For system level ESD protection, the AS1602 includes very fast turn-on, low-inductance protection diodes.

Built using proprietary design techniques, these diodes are capable of shunting both moderate energy/fast transients that create high thermal stress as well as high energy/slow transient events that create tremendous voltage overstress. At the system level, the AS1602 absorbs the overvoltage transients preventing damage to the Ethernet Phy.

Each AS1602 supports two twisted pair interfaces. 10/100Base-T applications require one AS1602 device while 10/100/1000Base-T applications use two AS1602 devices. The AS1602 is available in a small footprint 16-pin QSOP, Reduction of Hazardous Substance (RoHS) compliant package.

## Device Block Diagram



### For More Information

Contact us at [marcom@akrossilicon.com](mailto:marcom@akrossilicon.com), or  
6399 San Ignacio Ave, Suite 250 San Jose, CA  
95119