

Single Twisted Pair Ethernet:

How It's Driving Technology in the Car

by Pulse Networking Team

The automotive industry is changing.

In recent years, the process of building cars has shifted drastically. Today, we're facing a new phenomenon: the connected car and Electric Vehicles.

Consumers have begun to demand internet connectivity everywhere - including their cars. The driving force behind this development is [single twisted pair Ethernet](#). The single twisted pair Ethernet technology is enabling the next generation of connected Cars and EV's.

Experts are estimating that upwards of [400 million automotive Ethernet ports will be on the market by the year 2020](#). In fact, the total number of Ethernet ports is projected to outpace the number of all other ethernet ports combined.

The automotive industry is working to apply this technology in new ways, including automotive connectivity. Vehicles using single twisted pair Ethernet are equipped with a variety of features, and new applications are developing all the time.

What is Driving Ethernet in Automobiles?

Automotive Ethernet is a physical network designed to connect a car's components via a wired network, automotive ethernet adheres to strict electrical, bandwidth, and latency requirements, as well as offering outstanding network management and synchronization. As such, there has been a significant push from the automotive industry to adopt the technology.

In fact, experts predict that, by 2020, [40% of a car's cost will come from electronics](#) (32%, increase from today).

As we see the automotive electronics industry growing and the need for increased bandwidth in the car, we'll start to see new Pulse Electronics Networking components like the AE2002 1000Base-T1 Common Mode (CMC), AE5002 1000Base-T1 CMC and AE3003/AE3005 Power over Data Lines (PoDL) become the norm.

Here are some of the most prominent factors causing Ethernet to become the new standard in the auto industry:

- **Lighter and cheaper:** Using a single twisted pair cabling allows manufacturers to deliver data at a rate of 1000 Mbps, this reduces the overall weight of the car and reduces the cost of the cabling in the car.

- **Faster speeds:** Ethernet connections offer the fastest data speeds possible, allowing information transfer at speeds of one gigabit per second and beyond.
- **Adaptability:** Ethernet technology is adapting in many ways, and is proving more versatile than CAN bus technology.

Automotive Ethernet Products for Fast, Reliable Connections

As cars become more complicated with sensors, controls, and interfaces, the electronics will require higher bandwidth.

Pulse Electronics Networking BU is introducing several new Automotive Ethernet products, AE2002 100Base-T1 (CMC), AE5002 1000Base-T1 CMC, AE3003/AE3005 PoDL CMC to meet the higher bandwidth expectations of motorists.

"Pulse Electronics worked closely with the IEEE committee's and PHY suppliers to develop the 100BASE-T1, 1000BASE-T1, and PoDL standards. Pulse components for single twisted pair Ethernet are built in an IATF16949 certified factory, and PPAP documenting is supported upon request."

Jonas Miller | WW Marketing Manager

All parts meet AEC-Q200 requirements for [automotive applications](#) and are built in an IATF16949 certified factory.

Features and Benefits:

- Single pair Ethernet solution reduces the volume of wiring in an automobile.
- Leverages existing technologies
- AEC-Q200 Qualified
- IATF16949 Factories
- 100BASE-T1 & 1000BASE-T1, and PoDL components that meet IEEE Standards
- IEEE working on Multi-Gig solution >5G

The following Pulse Electronics Automotive Ethernet products are available for designers:

Automotive Ethernet Products

The automotive industry needs products that are flexible and adaptive of IEEE 802.3 Single Twisted Pair Ethernet. This demand for more bandwidth is driven by the needs of the motorist.

Pulse Electronics Automotive Ethernet products are ideal for the following applications:

ADAS

- Camera
- Lane Change
- Park-4-U
- Collision Avoidance
- Body Control
 - *Suspension / Lights / Access*
- Comfort Control
 - *Seats / Mirror / Climate*

COMMS

- Infotainment
 - *Navigation*
 - *Audio / Video*
 - *Phone*
- Dashboard Display
 - *Speed / Rev / Oil / Temp*
 - *Engine Data / Emission*
 - *Tacho / Tracking / Security*
- Diagnostics

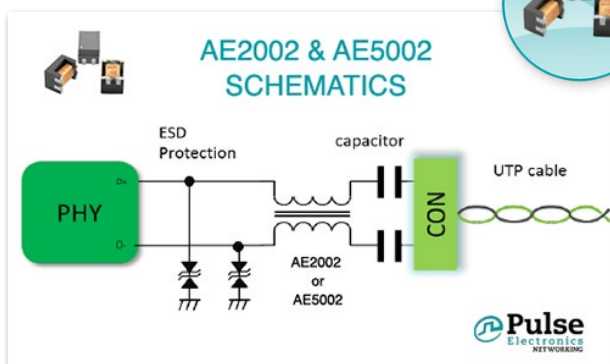
Featured Automotive Ethernet Products

AE2002 100Base-T1 CMC & AE5002 1000Base-T1 CMC

Features & Benefits

- **AE2002 100BASE-T1 CMC, Production Released**
- **AE5002 1000BASE-T1 CMC, Production Release in May 2018**
- **AEC-Q200 Qualified**
- **PPAP Capable**
- **Tested with leading PHY partners**
- **Operating Temperature : -40°C to +125°C**
- **IATF16949 Factories**

Schematics

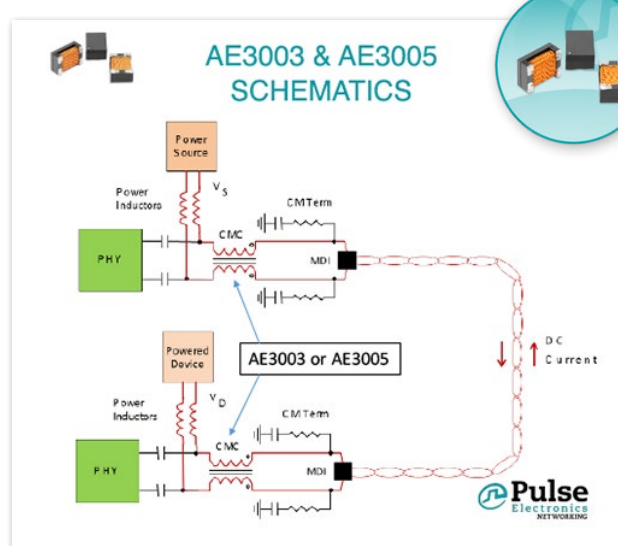


AE3003 300mA and AE3005 350mA (PoDL CMC)

Features & Benefits

- **Current Rating up to 350mA**
- **AEC-Q200 Qualification in process**
- **PPAP Capable**
- **Tested with leading PHY partners**
- **Operating Temperature: -40°C to +125°C**
- **IATF16949 Factories**
- **AE3003/AE3005 Production Release in July 2018**

Schematics



More Info on Our Automotive Ethernet Products

Times are changing, and consumers demand connected cars with network speeds as fast as the cars themselves.

Single twisted pair Ethernet technology is poised to become the new industry standard, replacing current CAN technology. Further safety, infotainment, and communication features will be the primary forces driving the change.

Pulse Electronics will continue driving this technology forward and pushing the industry towards new standards when it comes to creating the perfect modern connected car.

To view, compare and download data sheets for all Ethernet components, [utilize our Product Finder](#) and simply enter the prefix of the part number.

You can also head over to the [AE2002](#) or [AE5002](#) product pages. For AE3003 and AE3005 support, please [click here](#) to contact Pulse Electronics Networking BU. To inquire about lead times, competitive pricing, samples and more, just contact us or use our quote form accessed using the button below.