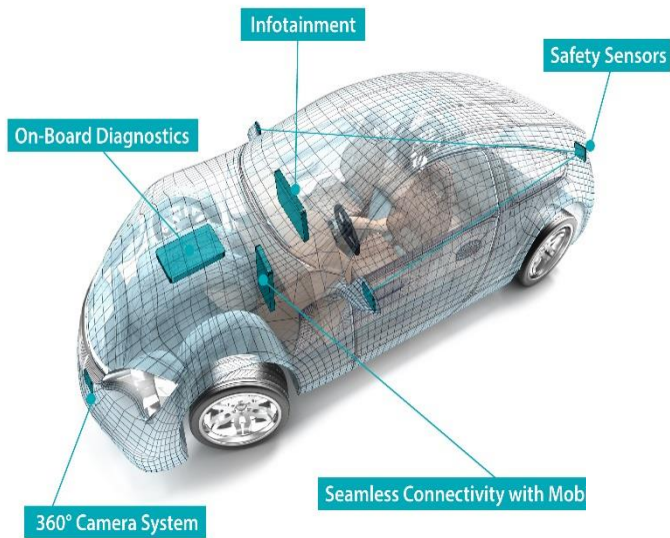


# Automotive Communications

Pulse Electronics offers full Line of AEC-Q200 qualified 100BASE-TX/T1 and 1000BASE-TX/T1 Ethernet Magnetics and Common Mode Chokes for Automotive Communication Applications



Pulse products support multiple technology's used in the Automobile including MOST, CAN Bus, FlexRay, Ethernet Audio Video Bridging (AVB), 100Base-T1, 1000Base-T1, and Power over Data Lines (PoDL). Pulse's parts are designed to operate from -40C up to +125C, have high reliability, high volume manufacturing, long term manufacturing support, and meet AEC-Q200 requirements.



## Applications:

Infotainment, Advanced Driver Assist Systems (ADAS) Body Control, Camera/Radar, Battery Management, Backbone Diagnostics

## Technologies Supported:

MOST, CAN bus, FlexRay, Ethernet AVB, 100Base-T1, 1000Base-T1, PoDL

## Features and Benefits:

- Designed to meet 100BASE-TX/T1 and 1000BASE-TX/T1 IEEE802.3 standards
- Supports all major PHY manufacturers
- Multiple packages and configurations available
- Meets AEC-Q200 requirements
- TS-16949 certification for 100Base-T1, 1000Base-T1, and PoDL parts in-process
- Designed to operate from -40C up to +125C
- PPAP Level 3 Capable

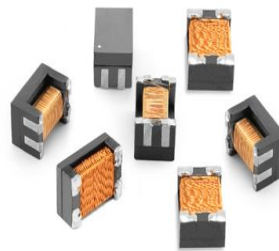
## Featured Products (In production):

- |                         |                         |
|-------------------------|-------------------------|
| • HM0068ANL, HM1188NL   | Fast Ethernet/AVB       |
| • HM1234FNL             | Fast Ethernet Quad Port |
| • HM1225NL              | MOST 50/150             |
| • HM5004EFNL, HM5149NL  | Gigabit - 1000BASE-T    |
| • HM6098FNL (PoE+)      | Gigabit - 1000BASE-T    |
| • TM8116NL              | CAN Bus - CMC           |
| • PE-0805/1206CCMC      | CAN Bus/FlexRay/LVDS    |
| • PE-1812ACC series CMC | CAN Bus/FlexRay         |

## SINGLE TWISTED PAIR TECHNOLOGY (In development)

- AE2002\* 100BASE-T1 CMC
- AE3003 100BT PoDL CMC
- AE5002 1000Base-T1 CMC

\*Qualified, production release Q3 2016



AE-Series CMC



HM-Series Ethernet Transformers

## Competing Technology/Standards in Cars

| Technology                                                        | Speed                       | PHY Cross Ref.                                                                                                                                            | Main Applications                                      | Pulse Parts                                                                                                                |
|-------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| CAN Bus:<br>(Controller Area Network)                             | ~1Mbps                      | N/A                                                                                                                                                       | -Powertrain<br>-Chassis<br>-Body Electronics           | Common Mode Chokes (CMC):<br>-PE-0805CCMC Series<br>-PE-1206CCMC Series<br>-PE-1812ACC Series<br>-TM8116NL                 |
| LIN:<br>(Local Interconnect Network)                              | 20kbps                      | N/A                                                                                                                                                       | -Body Electronics                                      | N/A                                                                                                                        |
| FlexRay:                                                          | 10Mbps                      | N/A                                                                                                                                                       | -Powertrain<br>-Safety                                 | Common Mode Chokes (CMC):<br>-PE-0805CCMC Series<br>-PE-1206CCMC Series<br>-PE-1812ACC Series                              |
| MOST:<br>(Media Oriented Systems Transport)                       | 25Mbps<br>50Mbps<br>150Mbps | Microchip/SMCS<br>-OS81082<br>-OS81092                                                                                                                    | -Cameras<br>-Video                                     | Ethernet Transformers:<br>-HM1225NL                                                                                        |
| LVDS:<br>(Low voltage differential signaling)                     | 3Gbps                       | N/A                                                                                                                                                       | -Camera<br>-Video                                      | Common Mode Chokes (CMC):<br>-PE-0805CCMC Series<br>-PE-1206CCMC Series                                                    |
| Ethernet AVB:<br>(Audio Video Bridging)                           | 100Mbps<br><br>1000Mbps     | Microchip/SMCS<br>-LAN89303, LAN88730<br>Microchip/Micrel<br>-KSZ8041/51xNL,<br>KSZ9031RNXU/V,<br>KSZ8864/73/95xMLLU<br><br>Marvell<br>-88E1119R, 88E1510 | -Audio<br>-Video<br><br>Dashboard Display              | Ethernet Transformers:<br>-HM1188NL<br>-HM0068ANL<br>-HM1234FNL<br>-HM5004EFNL<br>-HM5149NL<br>-HM6098FNL                  |
| Reduced Twisted Pair Ethernet:<br>(100Base-T1, PoDL, 1000Base-T1) | 100Mbps<br><br>1000Mbps     | -Broadcom BCM89810<br>-NXP TJA1100<br><br>-Marvel 88Q2112                                                                                                 | -Camera & ADAS<br>-Sensors<br><br>-All Comms. Networks | CMC and Inductors:<br>-AE2002 – 100Mbps CMC<br>-*AE3003 – PoDL CMC<br>-*AE5002 – 1000Mbps CMC<br>*Parts are in development |


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