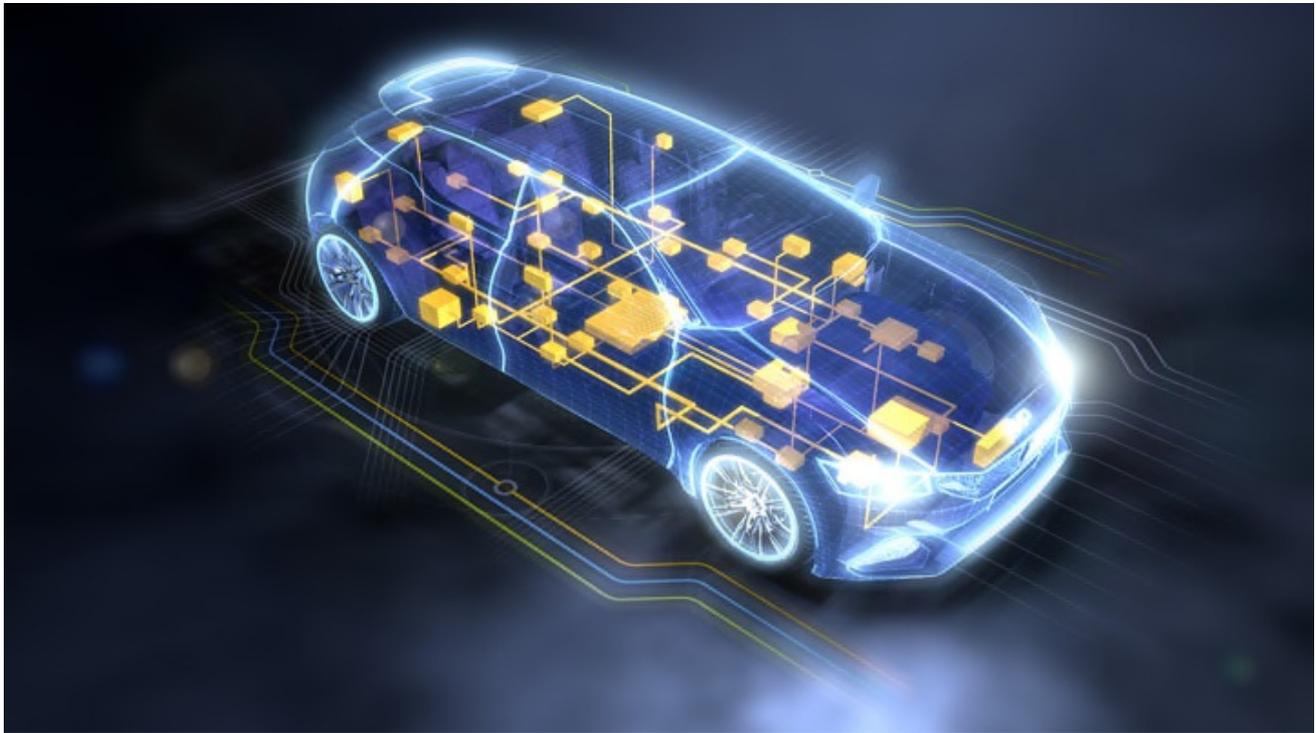


CAN Newsletter Online

CiA 601-4

CAN SIC transceivers for vehicle platform

NXP Semiconductors announced the ramp-up of its TJA146x CAN signal improvement capability (CAN SIC) transceivers into Changan's (China) latest vehicle platform.



(Source: NXP)

NXP's CAN SIC technology enables CAN FD networks to operate in larger, more complex networks and accelerates the achievable data rates by actively improving the CAN signal. This expands the potential and flexibility of CAN FD as a cost-efficient networking technology that can meet the challenges of next-generation vehicles, explained NXP. Changan Automobile is the first NXP automotive customer to incorporate the CAN SIC technology in production.

NXP continued explaining, Classical CAN networks have been cost-effective, robust, scalable, easy to implement, and able to support complex topologies throughout a vehicle. However, as new functions have entered the vehicle, the need for increased data exchange pushed CAN networking systems beyond their limits. CAN FD, a technology with higher bandwidth capability than Classical CAN, increases bit-rates from 500 kbit/s up to 5 Mbit/s.

Despite the benefits of CAN FD networks, the technology is hindered by so called "signal ringing", that stems from signal reflection. This effectively limits the technology to 2 Mbit/s for many networks, restricting them to highly linear topologies. As a result, wiring harnesses need to avoid long cable branches which results in more convoluted harness routes around the vehicle, adding cost and weight.

NXP's CAN signal improvement technology overcomes this signal integrity issues caused by ringing by actively improving the CAN signal. As a result, OEMs (original equipment manufacturers) can encounter more freedom in the design of their network and on the placement of ECUs (electronic control unit). They can also take advantage of the expected associated benefits such as shorter cables, less weight, fewer connectors, and easier network design, said NXP. The technology also extends the performance of CAN FD to enable data rates in excess of 5 Mbit/s on multi-node networks by using active signal enhancements and stricter timing. With these bandwidth improvements, CAN FD is expected to support a higher range of applications at a relatively low-cost point, the company added.

The TJA146x transceiver series are available as pin-compatible replacements to existing transceivers and comply both with the existing ISO 11891-2:2016 CAN FD transceiver specification, as well as [the CiA 601-4 signal improvement standard](#), making them adopt and backward compatible with regular CAN transceivers. This standard has been published from CAN in Automation (CiA). CiA 601-4 (part 4) specifies the so-called SIC (signal improvement capability) transceivers which suppress the ringing causes by the not optimized network topology. There are two implementations available: one suppresses the ringing when transmitting; the other filters the ringing when receiving. Part 4 is published as a DS and specifies additional requirements for HS-PMA implementations compliant with ISO 11898-1:2015 and ISO 11898-2:2016 for the purpose to reduce differential and common-mode ringing on the CAN_H and CAN_L wires, especially for the transition from dominant to recessive state. The intent of this specification is to enable larger topology flexibility and higher bit-rates for CAN networks. The HS-PMA implementations with additional signal improvement functionalities support communication in the presence of defined unterminated wire stubs without requiring configuration, for example bit-rate settings. Furthermore, this document specifies EMC (electromagnetic compatibility) tests for HS-PMA implementations with additional signal improvement functionalities.

"Since an early stage, Changan and NXP's in-vehicle networking team cooperated on the implementation of CAN SIC in the ADAS

(advanced driving assistance system) system of Changan's latest UNI-K model. The biggest challenge was to solve the interference problem caused by ringing. Repeated simulation, testing, and verification proved that the CAN SIC technology is the most effective way to solve the ringing problem. The TJA146x CAN SIC transceivers allow us to increase the flexibility of the wiring harness layout and paves the way for future upgrade to higher speeds, such as 5 Mbit/s. From the perspective of the entire project, it greatly improved the communications quality and engineering efficiency", said He Wen, Deputy General Manager of Changan Automobile Intelligent Research Institute.

"With our CAN signal improvement technology, carmakers can now create cost-efficient CAN FD networks with the freedom that their vehicle networks demand. We are delighted that Changan has embraced our TJA146x CAN SIC transceiver series for their new UNI-K model, rapidly adopting this technology into production," commented Meindert van den Beld, VP and General Manager of NXP's in-vehicle networking product line.

Changan background

Changan Automobile is a Chinese state-owned automobile manufacturer headquartered in Chongqing, China. Its principal activity is the production of passenger cars, microvans, commercial vans, and light trucks. The company designs, develops, manufactures, and sells passenger cars sold under the Changan brand and commercial vehicles sold under the Chana brand. It operates joint ventures with Ford (Changan Ford), and Mazda (Changan Mazda) which respectively produce Ford and Mazda branded passenger cars for the Chinese market. It also has a joint venture with Jiangling Motor Corporation Group (JMCG) and Aiways, which produces SUVs sold under the Landwind marque.

[CW](#)