CAN *Newsletter Online*

CAN NEWSLETTER MAGAZINE

Interviews with providers: CAN SIC transceivers

CAN SIC (signal improvement capability) transceivers can be used in Classical CAN, CAN FD, and CAN XL networks, reduce signal ringing, improve achievable bit rates, and provide more design flexibility regarding topology. Four semiconductor manufacturers answered questions about their CAN SIC transceivers.

(Source: Adobe Stock)

The complete article is published in the September issue of the CAN Newsletter magazine 2022. This is just an excerpt.

As new functions have entered the modern vehicles, the need for increased data exchange pushed Classical CAN networking systems beyond their limits. CAN FD enables bit rates from 500 kbit/s up to 5 Mbit/s. Despite the benefits, the CAN FD technology is hindered by the signal ringing stemming from the signal reflection. Considering the network topology, this effectively limits the technology to 2 Mbit/s for many networks, restricting them to highly linear topologies. Thus, wiring harnesses need to avoid long cable stubs, which results in more convoluted harness routes around the vehicle, adding cost and weight.

The CAN SIC technology overcomes these signal integrity issues by actively improving the CAN signal and using of stricter timing. As a result, OEMs (original equipment manufacturers) can encounter more freedom in the design of their networks and on the location of ECUs (electronic control unit). Associated benefits include shorter cables, less weight, and fewer connectors. The SIC technology also enables bit rates higher than 5 Mbit/s on multi-node networks. Thus, CAN FD is expected to support a higher range of applications at a relatively low-cost point.

Product	Low-power mode	Vio pin (3,3 V to 5 V)	Package	Automotive grade
TJA1462AT(K)	Stand-by	Yes	SO8 (HVSON8)	Grade 1
TJA1462BT(K)	Stand-by	No	SO8 (HVSON8)	Grade 1
TJA1463AT(K)	Sleep	Yes	SO14 (HVSON14)	Grade 1
TJR1462AT(K)	Stand-by	Yes	SO8 (HVSON8)	Grade 0
TJR1462BT(K)	Stand-by	No	SO8 (HVSON8)	Grade 0
TJR1463AT(K)	Sleep	Yes	SO14 (HVSON14)	Grade 0

Table 1: NXP's CAN SIC transceivers with features (Source: NXP)

The CAN SIC transceivers are specified in the CiA 601-4 document developed by CAN in Automation (CiA) members. There are two implementations available: one suppresses the ringing when transmitting; the other filters the ringing when receiving. CiA 601-4 also specifies additional requirements for HS-PMA (high-speed physical media attachment) implementations compliant with ISO 11898-1:2015 and ISO 11898-2:2016. These aim to reduce differential and common-mode ringing on the CAN_H and CAN_L wires, especially for the transition from the dominant to recessive state. The HS-PMA implementations with additional signal improvement functionalities support communication in the presence of defined unterminated wire stubs without requiring configuration, for example the bit-rate settings. Furthermore, CiA 601-4 specifies the EMC (electromagnetic compatibility) tests for HS-PMA implementations with additional signal improvement functionalities.

Provider interviews

Teun Hulmann (NXP), Johann Pries (Infineon), and Wes Ray (Texas Instruments) answered five questions about the availability and features of their CAN SIC transceivers.

Teun Hulman (NXP) Johan Pries (Infineon) Wes Ray (Texas Instruments)

Q: Has your company CAN SIC (signal improvement capability) transceivers in its portfolio? If yes, how many and how are these named?

Teun Hulman: NXP has released its first CAN SIC transceiver family for mass production in 2020. In the meantime, the TJA146x has

been widely adopted among OEMs and Tier1s and is the first CAN SIC transceiver to be on the road in a vehicle. The family as shown in Table 1 is the first wave of NXP's CAN SIC components, combining a strong signal improvement technology with reliable performance. It consists of two stand-by transceivers and a sleep-mode transceiver, plus variants supporting higher temperature Grade-0 applications. NXP is currently expanding its portfolio, having multiple CAN SIC products with additional features in development.

Johan Pries: These are the TLE9371SJ and TLE9371VSJ transceivers.

Wes Ray: Yes, we have both 8-pin (TCAN1462-Q1) and 14-pin (TCAN1463-Q1) standard CAN SIC transceivers available today via our website. A dual CAN SIC device (TCAN1466-Q1) will sample soon. TI continues to invest in additional CAN SIC products with more news on that subject coming soon. TI also wrote a technical white paper about the [signal improvement capability of CAN FD transceivers](#).

Next question is which maximal bit rate is achievable with the corresponding SIC transceiver? Are there some-features, which are not offered by other providers?

But if you would like to read the [full article](#) with all questions and answers, you can download it free of charge or you [download the entire magazine](#).