CAN SIC transceivers made in China

CAN FD (flexible data rate) networks using CAN SIC (signal improvement capability) transceivers are state-of-the-art. Besides NXP and other Western chipmakers, Chinese semiconductor manufacturers are increasingly offering CAN SIC chips.

(Source: Adobe Stock)

The original idea, suppressing ringing on CAN lines by means of temporarily reducing the impedance of the transceivers, was introduced by Denso (Japan). After some discussions within CiA, this idea was improved and specified in CiA 601-4 (version 2). In the meantime, this approach is internationally standardized in ISO 11898-2:2026.

The first automotive CAN FD users in Europe and U.S.A. applied the legacy CAN FD transceivers enabling 2 Mbit/s in the data phase. CAN SIC transceivers are capable to run up to 8 Mbit/s depending on the physical network design – mainly the chosen topology (e.g., single or double star). The CAN Newsletter has already published several articles about CAN SIC transceivers (see insert). NXP was the first chipmaker, offering CAN SIC transceivers as specified in ISO 11898-2:2026.

The automotive CAN market is migrating from CAN CC (classic), using bit rates of 250 kbit/s or 500 kbit/s, to CAN FD, applying bit rates from 2 Mbit/s to 8 Mbit/s. Some sources estimate the global CAN markets with annual installation figures of 4,5 billion nodes. The annual figure for Chinese markets is 1,5 billion nodes. In order to reduce the dependency on foreign chipmakers, the Chinese government sponsors CAN SIC transceiver developments by Chinese companies.

From the first Chinese CAN SIC transceiver ..

In March 2024, CiA member Novosense introduced the NCA1462-Q1 CAN SIC transceiver, supporting a stand-by mode. It complies with the ISO 11898-2 standard and the predecessor CiA 601-4 specification (withdrawn after the ISO 11898-2 Edition 3 publication in 2025). The transceiver features a normal and a stand-by mode as well as a VIO supply pin. The product has a tight bit-timing symmetry, enabling bit rates of up to 8 Mbit/s and beyond depending on the physical network design. This includes the bus load, the number of nodes, the cable length, and other factors.

The CAN SIC transceiver has a ±12-V input common-mode range, enabling reliable communication between nodes with large ground potential deviations. It has a low-current stand-by mode with a wake-up capability. The transmit data dominant time-out function prevents the CAN FD network from lock-up by the faults on microcontrollers. Moreover, the chip provides a thermal and a short-circuit protection. It is pin-compatible with legacy CAN HS (high-speed) and CAN FD transceivers, such as the NCA1042 by Novosense. The CAN SIC transceiver can be connected to CAN FD controllers supplied with 5 V or 3,3 V.

There are two versions of the NCA1462-Q1 available, only differing in the function of a single pin. Pin 5 is either a VIO supply pin or an NC (not connected) pin. The VIO pin should be connected to the microcontroller's supply voltage. This adjusts signal levels of pins TXD, RXD, and STB (stand-by) to the I/O levels of the microcontroller. The VIO pin also provides the internal supply voltage for the low-power differential receiver of the transceiver. For applications running in low-power mode, this allows the network lines to be monitored for activity, even if there is no supply voltage on VCC pin. For versions without a VIO pin, the VIO input is internally connected to VCC. This sets the signal levels of pins TXD, RXD, and STB to levels compatible with 5-V microcontrollers.

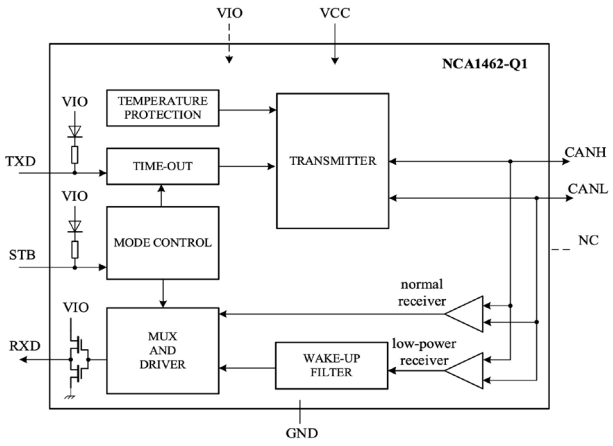

Figure 1: Block diagram of the NCA1462-Q1 CAN SIC transceiver (Source: Novosense)

A "low" level on the STB pin selects the normal mode. In this mode, the transceiver can transmit and receive data via CAN-H and CAN-L. The TXD pin must be "high" at least once in normal mode before the transmission can begin. The differential receiver converts the analog data on the network lines into digital data on the RXD pin. The slopes of the output signals on the network lines are internally controlled and are optimized in a way that guarantees the lowest possible electromagnetic emission. In recessive state, the output voltage on the network pins is VCC/2. After entering the normal mode, it is recommended to pull up the TXD pin to a "high" level for at least 200 ns before communications, for fear of unwanted TXD timeout caused by unstable TXD level during the power-on phase. The stand-alone transceivers are available in SOP8 or DFN8 packages.

CAN Newsletter articles on CAN SIC

- ESD Electronics: CAN SIC transceivers improve signal quality (1-2025)
- Infineon: SIC or SIC XL – this is not the question (1-2023)
- Infineon: The new dynamic parameters of CAN SIC (4-2022)
- Interviews with providers: CAN SIC transceivers (3-2022)

.. to a bunch of Chinese CAN SIC products

Also in 2024, Meraki Integrated Circuit launched the MCAN1462-Q1 CAN SIC transceiver. In the meantime, the chipmaker has released additional CAN SIC transceivers (MCAN1463-Q1 and MCAN1465-Q1). They differ in housings and add-on functionality. The company claims to be the first Chinese chipmaker that supports bit rates up to 10 Mbit/s with its CAN SIC transceivers. The implemented wake-up mode includes a local wake-up, an arbitrary frame wake-up, and a local networking function to adapt to different user application scenarios. These transceivers are suitable for 5-V as well as 3,3-V supplied CAN FD nodes.

C&S Group (Germany), an independent test house, has successfully performed conformance and interoperability tests with these CAN SIC transceivers. The tests were based on the ISO 16845-2 test plan standard and additional test cases pre-specified in the CiA association. The ISO 16845-2 edition including dedicated test cases for CAN SIC transceivers is currently in international balloting.

Figure 2: MCAN1463 test report by C&S Group (Source: Meraki)

Another Chinese chipmaker is CiA member 3Peak, who has launched CAN SIC products. The TPT1462xQ and TPT1463Q system basis chips (SBC), implementing a CAN SIC transceiver, have been successfully tested by two independent parties (C&S Group and IHR, Germany) and have passed the Velio (Vehicle LAN Interoperability and Optimization) tests by Toyota (Japan). Besides usual conformance and interoperability issues, the Toyota test covers also SIC activation response, bus-level accuracy, signal-symmetry performance, and data stability. The SBC supports data-phase bit rates up to 10 Mbit/s, depending on the physical network design. The tested transceivers maintain RXD effective bit width and accurate rollover, enabling long-term error-free communication, stated the Chinese chipmaker. Compared with similar products on the market in the same environment, the SBCs offer advantages, effectively ensuring communication stability, said the company.

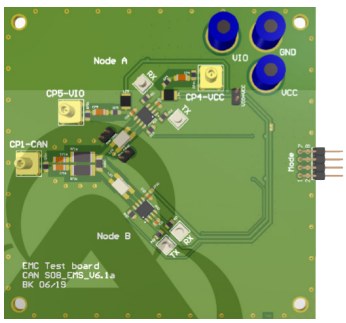

Figure 4: Test board with the AZKN9325P CAN SIC transceiver (Source: Amazing)

Southchip Technology, located in Shanghai, has also developed a CAN SIC transceiver. The SC25042Q chip features a built-in ringing suppression circuitry that automatically adjusts the load impedance. It complies with the ISO 11898-2 standard. At a bit rate of 5 Mbit/s, the signal cycle deviation is measured as 0,5 % (from 200 ns to 199 ns). The chip is suitable for 12-V and 24-V power supplies and can be connected directly to 5-V and 3,3-V microcontrollers with CAN FD ports. There are two 8-pin packaging options: SOP8 and lead-free DFN8.

CiA member Hunan Silicon IoT (SIT) offers two CAN SIC transceivers: SIT1462Q and SIT1463Q. They distinguish in the specified common-mode range (±12 V respectively ±30 V). The SIT1463Q CAN SIC transceiver supports bit rates up to 8 Mbit/s. It features a CAN fault protection from -58 V to +58 V. In addition, the chip provides five modes: normal mode, silent mode, stand-by mode, sleep mode, and off mode. In low-power mode, it supports local wake-up and remote wake-up.

The Taiwanese CiA member Amazing supplies the AZKN9325P CAN SIC transceiver, capable to run up to 8 Mbit/s. The fast signal transitions generate stronger high-frequency harmonics, which can more easily radiate or couple into surrounding circuits through the bus lines. The international standard IEC 62228-3:2019 defines EMC performance requirements for CAN transceivers under minimal-node topology conditions. Like the above-mentioned products, the transceiver by Amazing meets these requirements. The related CAN SIC standards and legacy specifications (ISO 11898-2 respectively CiA 601-4) require to pass additional RF (radio-frequency) immunity tests. The AZKN9325P chip has been certified by third-party laboratories, achieving the required level of performance.

Figure 3: The SIT1463Q transceiver features signal-improvement capability as specified in ISO 11898-2 (Source: SIT)

The Far East competition in the CAN SIC transceiver business is a first step in reducing dependency on Western chip technology. The predicted high volumes of several billion chips make it interesting to invest in such products. Especially, if this is supported by a government.

Besides NXP, the market leader without any doubts, also Aumovio (formerly: Continental) Bosch, Infineon, and Texas Instruments manufacture chips with CAN SIC functionality. Aumovio and Bosch do this mainly for internal use. In general, CAN SIC products are available as stand-alone components or are integrated in an SBC with further circuitry. *hz*