

Reduce Costs by Migrating From TCAN10xx-Q1 to TCAN8xx-Q1



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Introduction

In automotive applications, the controller area network (CAN) is a cornerstone of in-vehicle networking, connecting devices like body control modules, automotive gateways, and advanced driver assistance system (ADAS), as shown in [Figure 1](#). These networks carry critical information across the system, even in environments with electrically noisy equipment and long cabling. However, such conditions can increase the risk of bus faults and data distortion, potentially disrupting communication, causing system failures, and increasing downtime.

As a leader in CAN transceiver development for over a decade, Texas Instruments (TI) introduces the TCAN8xx-Q1 family of CAN transceivers. The TCAN8xx-Q1 devices were designed as a cost improvement refresh and currently offer a cost reduction when compared to the TCAN10xx-Q1 devices. The TCAN8xx-Q1 devices are compatible replacements for the pin functions of existing TI CAN transceivers, like TCAN10xx-Q1, and deliver robust performance for the CAN physical layer.

This application brief outlines the key benefits, migration considerations, and design tips for transitioning from an existing TI CAN transceiver to a CAN transceiver from the TCAN8xx-Q1 family.

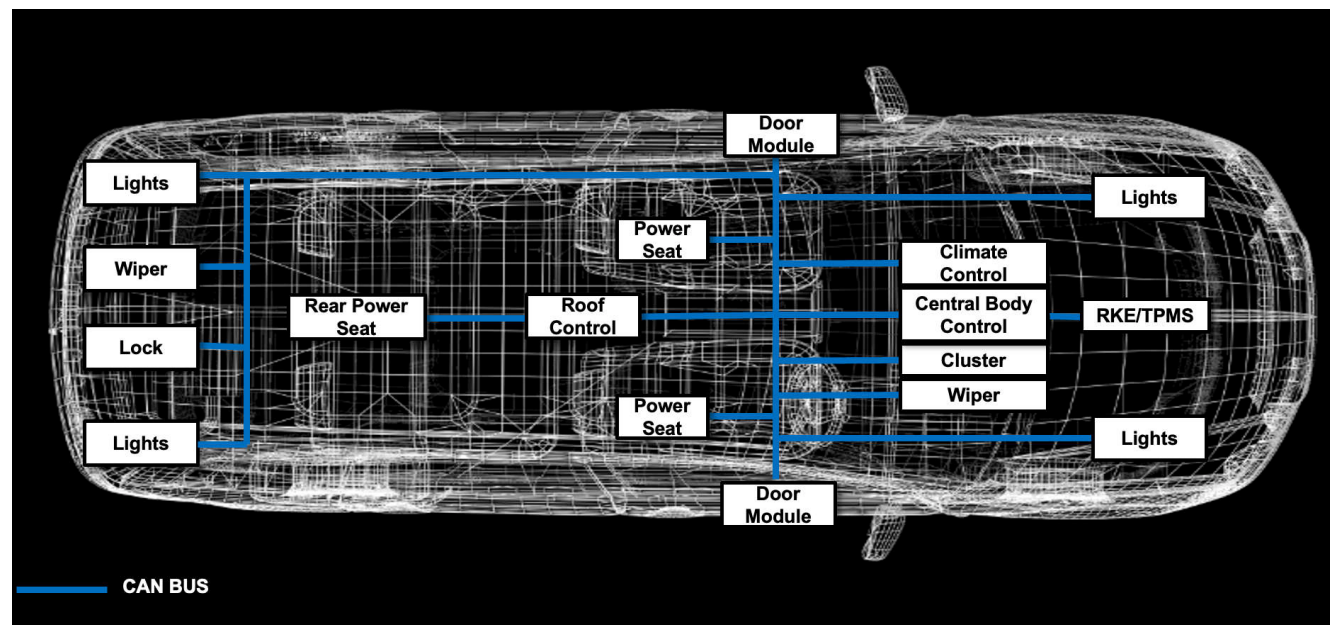


Figure 1. Automotive Body Network Example Architecture

Why Switch to a TCAN8xx-Q1 CAN Transceiver?

The TCAN8xx-Q1 family is a compatible replacement for the pin functions of many cost-sensitive automotive applications, making these devices an attractive option when compared to the TCAN10xx-Q1 family of transceivers. The TCAN8xx-Q1 family maintains full compliance with ISO11898-2:2024, supports up to 5Mbps

for a controller area network with flexible data-rate (CAN FD), and matches the 12V common-mode range. The specification differences between the TCAN8xx-Q1 and TCAN10xx-Q1 family of device can impact performance, therefore, considering these differences is important. [Table 1](#) provides this feature comparison between the device families for customers.

Table 1. Feature Comparison of TCAN8xx-Q1 and TCAN10xx-Q1 Against the ISO11898-2:2024 Standard

Parameter	ISO11898-2:2024	TCAN8xx-Q1	TCAN10xx-Q1	Considerations
Maximum data rate	5Mbps	5Mbps	8Mbps	TCAN8xx-Q1 supports up to 5Mbps CAN FD. Consider the TCAN10xx-Q1 devices for designs >5Mbps.
Bus fault voltage (V_{BUS})	-27V to +40V	$\pm 40V$	$\pm 58V$	TCAN8xx-Q1 is robust for 12V systems. TCAN10xx-Q1 is robust for 24V systems. This robustness is due to the higher bus fault voltage tolerance of TCAN10xx-Q1, which supports 24V system transients. Whereas, TCAN8xx-Q1 suffices for 12V automotive environments.
Common Mode Input	$\pm 12V$	$\pm 12V$	$\pm 12V$	-
Maximum differential voltage range between CANH and CANL (V_{DIFF})	-5V to 10V	$\pm 40V$	$\pm 45V$ (Up to $\pm 70V$ for TCAN104xH-Q1 series)	V_{DIFF} indicates the maximum voltage difference (CANH-CANL) under fault conditions. Maintain proper CAN termination.
ESD (HBM / IEC) kV	-	12 / 8	10 / 8	TCAN8xx-Q1 is more robust for connector ESD robustness.
Pin Compatibility	-	Yes	Yes	Seamless migration. No PCB change is necessary.
Cost	-	Lower	Higher	TCAN8xx-Q1 currently offers a lower BOM cost without sacrificing critical ISO compliance when compared to TCAN10xx-Q1.
Physical-Layer Standard Compliance	Yes	Yes	Yes	-

How to Implement the TCAN8xx-Q1 Family

The TCAN10xx-Q1 family is designed for harsher fault environments or modules exposed to frequent transients or overvoltage risks, such as 24V systems designed with extended voltage protection headroom, industrial CAN, long harnesses, and trucks, for example, use-cases that support up to 8Mbps of high-speed CAN FD.

The TCAN8xx-Q1 family is designed to be a compatible replacement for the pin functions of existing CAN designs which are $\leq 5Mbps$ and cost-sensitive, such as:

- Infotainment
- Lighting
- HVAC
- Door modules, and so forth

The TCAN8xx-Q1 family is most appropriate for 12V automotive electronic control units (ECU) with standard 12V automotive fault expectations. Faults in 12V automotive systems are typically well within the V_{BUS} and V_{DIFF} specifications for the CAN bus pins ($\leq 40V$). This compatibility provides a seamless migration process without requiring significant design changes.

The pinouts between TCAN8xx-Q1 and TCAN10xx-Q1 are the same. [Figure 2](#) and [Figure 3](#) show the pinouts of TCAN8xx-Q1 and TCAN10xx-Q1 for both the 8-pin and 14-pin options.

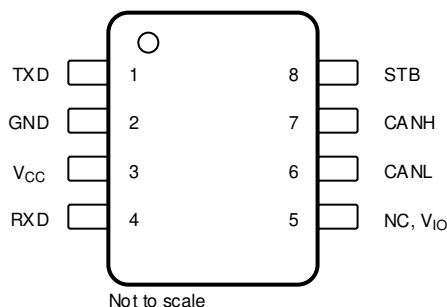


Figure 2. 8-Pin Configuration of TCAN8xx-Q1 and TCAN10xx-Q1 Pinout

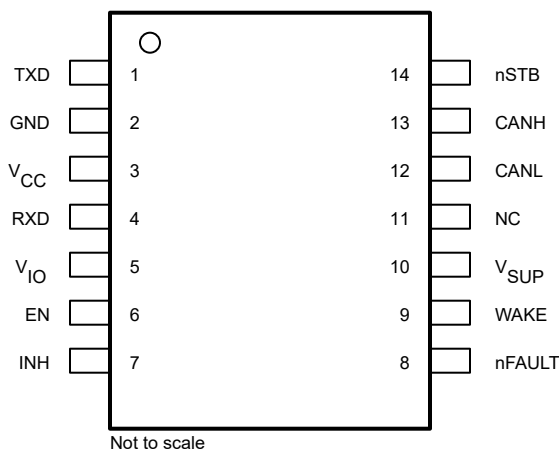


Figure 3. 14-Pin Configuration of TCAN8xx-Q1 and TCAN10xx-Q1 Pinout

Overall, the TCAN8xx-Q1 family of transceivers currently offers a high-performance, cost-reduction option for automotive networks when compared against TCAN10xx-Q1 devices, enabling system designers to transition from existing CAN designs with minimal effort. The TCAN8xx-Q1 family addresses current automotive requirements, with compliance to the latest ISO11898-2:2024 standard, enhanced bus fault protection, and pin-compatible functionality.

To learn more about the TCAN8xx-Q1 CAN family, visit the [TCAN844\(V\)-Q1](#) and [TCAN843\(V\)-Q1](#) product pages to explore the datasheets, evaluation modules, and design resources that can help you accelerate your migration.

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