

TJA1052i isolated high-speed CAN transceiver



HS-CAN transceiver with integrated galvanic isolation

The TJA1052i is a high-speed controller area network (HS-CAN) transceiver that provides a galvanically isolated interface between an HS-CAN protocol controller and the physical two-wire CAN bus. It is specifically aimed at (hybrid) electric vehicles ((H)EVs), where galvanic isolation is necessary to bridge between the high and low voltage levels.

Key features

- ▶ 5 kV (RMS) rated isolation voltage, compliant with UL1577, IEC61010 and IEC60950
- ▶ Suitable for 12 V and 24 V systems; compatible with 3 V to 5 V microcontrollers
- ▶ Low electromagnetic emission (EME) and high EMI
- ▶ Supports ISO6469 'Electrically propelled road vehicles. Safety specifications.'
- ▶ Bus pins protected against transients in automotive environments
- ▶ Transmit Data (TxD) dominant time-out function
- ▶ Undervoltage detection on supply pins

Key benefits

- ▶ Flawless isolator and transceiver operation
 - increased reliability in application due to fewer components
 - guaranteed performance, e.g. max loop delay < 220 ns
- ▶ Reduced board space due to integration of isolator and transceiver in one SO16WB package

- ▶ Protect electronics from overvoltage, ground offset and reverse current
- ▶ Signal integrity; improved noise immunity

Applications

- ▶ Battery management systems
- ▶ Chargers
- ▶ Inverters
- ▶ DC/DC converters
- ▶ Other ECUs operated from the high voltage domain

As a member of our third generation HS-CAN transceivers, the TJA1052i offers significant advantages over previous generation devices. These include better EMC and ESD performance, together with ideal passive behavior to the CAN bus when the transceiver supply voltage is off.

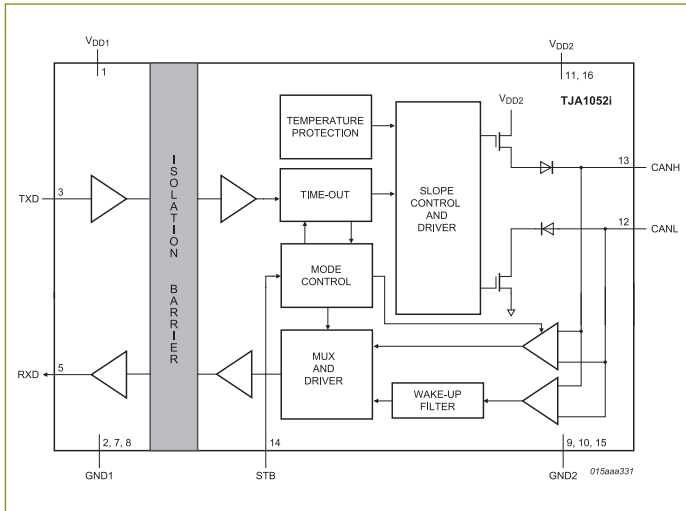


Safety

Designers of networks in hybrid and electric vehicles know that isolation is essential for two main reasons: to protect against electric shocks and to protect electronics from damage. NXP's TJA1052i transceiver combines this protection with outstanding performance especially for high-speed (up to 1 Mbit/s) CAN applications in the automotive industry.

The TJA1052i supplies the differential transmit and receive capability to a CAN protocol controller in a microcontroller. By integrating the galvanic isolation with the transceiver, our solution eliminates the need for standalone isolation and also improves reliability and system performance parameters such as loop delay.

TJA1052i Block Diagram

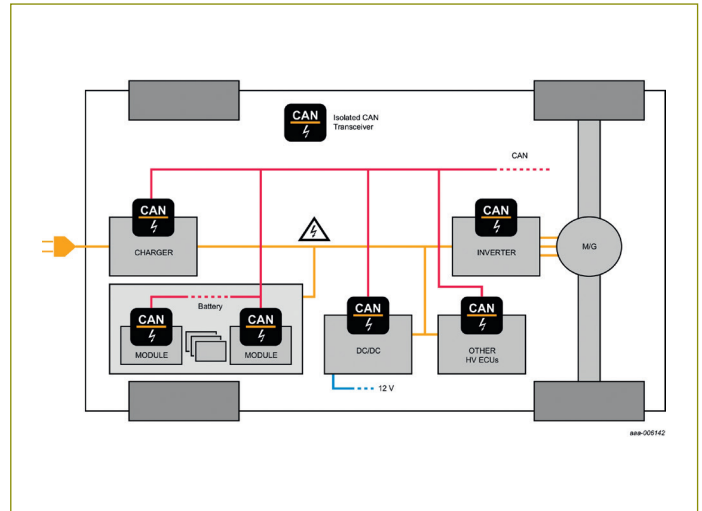


Signal integrity

The isolator uses proprietary capacitive isolation technology to transmit and receive CAN signals. This enables more reliable data communication in extremely noisy environments, such as high-voltage battery management systems or the drive and regeneration systems in EVs and HEVs.

The TJA1052i makes an excellent choice for all types of automotive and industrial CAN networks, especially where isolation is required for safety reasons or to enhance signal integrity in noisy environments.

Example Application Block Diagram



Quick reference data

Symbol	Parameter	Conditions	Min	Max	Unit
V _{DD1}	supply voltage		3.0	5.25	V
V _{DD2}	supply voltage		4.75	5.25	V
V _{ESD}	electrostatic discharge voltage	IEC 61000-4-2 at pins CANH and CANL	-8	+8	kV
V _{CANH/L}	voltage on pin CANH/CANL	no time limit; DC limiting value	-58	+58	V
T _{vj}	virtual junction temperature		-40	+150	°C
T _{amb}	ambient temperature		-40	+125	°C

Ordering Information

Type number	Rated voltage	Working voltage
TJA1052iT/5	5 kV (RMS)	up to 800 V (RMS)*
TJA1052iT/2	2.5 kV (RMS)	up to 450 V (RMS)*
TJA1052iT/1	1 kV (RMS)	up to 300 V (RMS)*

* According IEC60664 Overvoltage Category II. Basic Insulation. See datasheet for full details



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Date of release: February 2013

Document order number: 9397 750 17382

Printed in the Netherlands