



# AUTOMOTIVE

# CA-IS37XX-Q1

## Automotive High-speed Digital Isolators

The CA-IS37XX –Q1 devices are high-performance, low-power, multi-channel, unidirectional digital isolators with up to 5kV<sub>RMS</sub> isolation rating and ultra-fast data rate (up to 150Mbps). These devices offer high electro-magnetic immunity and low emissions while isolating different ground domains and block high-voltage/high-current transients from sensitive or human interface circuitry. Each isolation channel has a logic input and output buffer separated by capacitive silicon dioxide (SiO<sub>2</sub>) insulation barrier, the integrated Schmitt trigger on each input provide excellent noise immunity.

All devices of CA-IS374x family feature default outputs. When the input is either not powered or is open-circuit, the default output is low for devices with suffix L and high for devices with suffix H. The CA-IS37XX-Q1 family devices are specified over the -40°C to +125°C operating temperature range and are available in 16-pin SOIC wide body package.

### Key Features

#### Robust Galvanic Isolation of Digital Signals

- ◆ High lifetime: >40 years
- ◆ Up to 5000 VRMS isolation rating
- ◆ ±150 kV/μs typical CMTI
- ◆ Schmitt trigger inputs

#### Interfaces Directly with Most Micros and FPGAs

- ◆ Data rate: DC to 150Mbps
- ◆ Accepts 2.5V to 5.5V supplies
- ◆ Default output High (CA-IS37xxH) and Low (CA-IS37xxL) Options

#### Low Power Consumption

- ◆ 1.5mA per channel at 1Mbps with VDD = 5.0V
- ◆ 6.6mA per channel at 100Mbps with VDD = 5.0V

#### Best in Class Propagation Delay and Skew

- ◆ 12ns typical propagation delay
- ◆ 1ns pulse width distortion
- ◆ 2ns propagation delay skew (chip -to-chip)
- ◆ 5ns minimum pulse width

#### No Start-Up Initialization Required

#### Wide-body SOIC16-WB(W) package

#### Wide Operating Temperature Range: -40°C to 125°C

#### Safety Regulatory Approvals

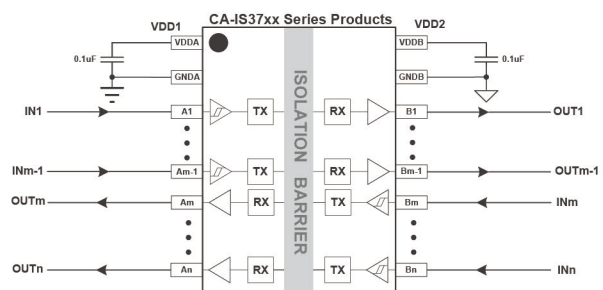
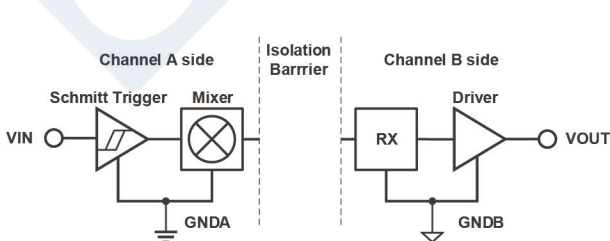
- ◆ VDE 0884-11 reinforced isolation
- ◆ UL certification according to UL1577
- ◆ IEC 62368-1, IEC 61010-1, GB 4943.1-2011 and GB 8898-2011 certifications

#### AEC-Q100 (Grade 1) Certified

### Applications

- Industrial Controls
- Building Automation
- Security and Protection System
- Transportation
- Medical
- Telecom

### Simplified Schematic



# CA-IF1051S/VS-Q1

## 5Mbps, ±58V Fault Protected CAN Transceiver with CAN FD

The CA-IF1051S-Q1/CA-IF1051VS-Q1 are control area network (CAN) transceivers with integrated protection for industrial applications. This family of devices is designed for using in high-speed CAN FD networks up to 5Mbps data rate, features extended ±58V fault protection on the CAN bus for equipment where overvoltage protection is required. These CAN devices also incorporate an input common-mode range (CMR) of ±30V, exceeding the ISO 11898 specification of -2V to +7V, and well suited for applications where ground planes from different systems are shifting relative to each other. For the CA-IF1051VS-Q1 device, interfacing with CAN protocol controllers is simplified by the 2.5V to 5.5V wide logic-supply voltage range ( $V_{IO}$ ).

The transmitter include a dominant timeout detection to prevent bus lockup caused by controller error or by a fault on the TXD input. When TXD remains in the dominant state (low) for longer than  $t_{DOM}$ , the driver is switched to the recessive state, releasing the bus. In addition, this family of devices features a silent-mode option to disable the transmitter.

The CA-IF1051S-Q1/CA-IF1051VS-Q1 are in a standard 8-pin SOIC package. Both parts operate over the -55°C to +150°C temperature range.

### Key Features

#### Meets the ISO 11898-2:2016 and ISO 11898-5:2007 Physical Layer Standards

#### 'Turbo' CAN:

- ◆ Support classic CAN and high-speed operation of up to 5Mbps CAN FD (flexible data rate)
- ◆ Short symmetrical propagation delay and fast loop times for enhanced timing margin

#### Ideal Passive Behavior When Unpowered

- ◆ Bus and logic terminals are high impedance (no load)
- ◆ Power up/down with glitch free operation on bus and RXD output

#### Integrated Protection Increases Robustness

- ◆ ±58V fault-tolerant CANH and CANL
- ◆ ±30V extended common-mode input range (CMR)
- ◆ Undervoltage protection on VCC supply terminals
- ◆ Transmitter dominant timeout prevents

lockup, data rates down to 5.5kbps

- ◆ Thermal shutdown

**2.5V to 5.5V Logic-Supply ( $V_{IO}$ ) Range (CA-IF1051VS-Q1 only)**

**-55°C to 150°C Junction Temperatures Range**

**8 pin SOIC Package**

**AEC-Q100 (Grade 1) Certified**

### Applications

Hybrid, electric & conventional powertrain

Industrial automation

Building automation

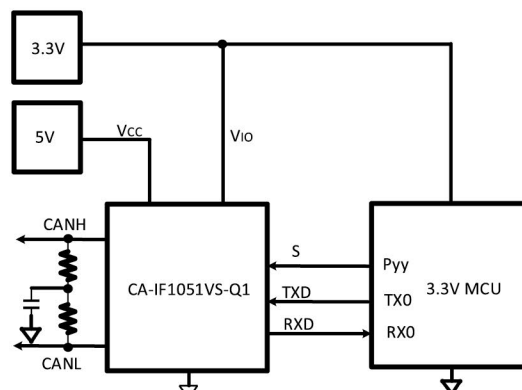
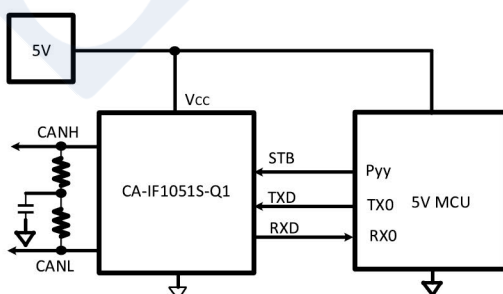
HVAC systems

Distribution automation

Vending machines

Security systems

### Simplified Schematic



# CA-IF1042S-/VS-Q1

## Automotive CAN Transceivers with $\pm 70V$ Fault Protection

The CA-IF1042x-Q1 devices are control area network (CAN) transceivers with integrated protection for industrial and automotive applications. These devices are designed for using in CAN FD networks up to 5 Mbps and feature  $\pm 70V$  extended fault protection on the CAN bus for equipment where overvoltage protection is required. These devices include a dominant timeout to prevent bus lockup caused by controller error or by a fault on the TXD input. The transceivers feature a STB pin for two modes of operation: normal high-speed mode and standby mode for low current consumption. Also, the CA-IF1042Vx family of devices provides low level translation to simplify the interface with low voltage CAN controllers.

The CA-IF1042-Q1 family of devices is available in a standard 8-pin narrow-body SOIC package and 8-pin DFN package, operates over the  $-55^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$  junction temperature range.

### Key Features

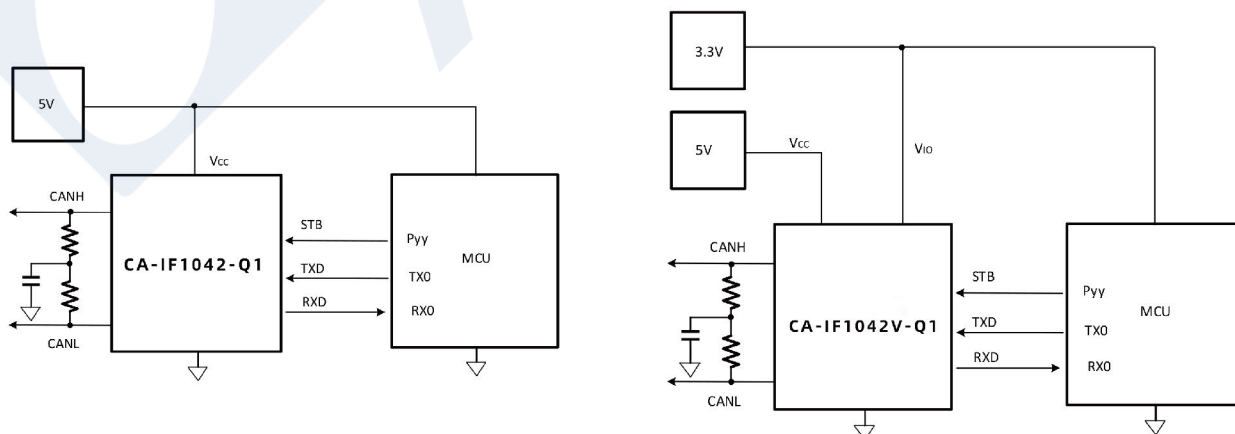
- Meets the ISO 11898-2:2016 and ISO 11898-5:2007 physical layer standards
- Support classic CAN and 5 Mbps CAN FD (flexible data rate)
- Ideal passive behavior when unpowered
- Bus and logic terminals are high impedance (no load)
- ◆ Power up/down with glitch free operation ◆ on bus and RXD output
- Integrated protection increases robustness
  - ◆  $\pm 70V$  fault-tolerant CANH and CANL
  - ◆  $\pm 30V$  extended common-mode input range (CMR)
  - ◆ Undervoltage protection on VCC and VIO supply terminals
  - ◆ Transmitter dominant timeout prevents lockup, data rates down to 4 kbps

- ◆ Thermal shutdown
- Typical loop delay: 160ns
- 3.0V to 5.5V Logic-Supply (VIO) Range (CA-IF-1042Vx-Q1 only)
- $-55^{\circ}\text{C}$  to  $150^{\circ}\text{C}$  Junction Temperatures Range
- Available in SOIC8 and DFN8 packages
- AEC-Q100 qualified for automotive applications

### Applications

- Automotive and transportation
- Industrial automation
- Building automation
- HVAC systems

### Simplified Schematic



# CA-IF1044S/VS-Q1

## Automotive CAN transceiver with standby

The CA-IF1044x-Q1 high-speed control area network (CAN) transceivers meet the ISO 11898-2 physical layer standards. This family of devices is designed for using in automotive CAN FD networks up to 5 Mbps data rate and features  $\pm 58V$  extended fault protection on the CAN bus for equipment where overvoltage protection is required. The transceivers include a dominant timeout detection to prevent bus lockup caused by hung-up microcontroller, and the outputs CANH and CANL are short-circuit current-limited and protected against excessive power dissipation by thermal shutdown circuitry that places the driver outputs in a high-impedance state. Also, the CA-IF1044Vx-Q1 provides low level translation to simplify the interface with low voltage CAN controllers.

The CA-IF1044x-Q1 devices are in a standard 8-pin SOIC package and small-size 8-pin DFN package. This family of devices operates over the  $-40^{\circ}C$  to  $+125^{\circ}C$  temperature range.

### Key Features

#### Meets the ISO 11898-2 physical layer standards

Support classic CAN and 5 Mbps CAN FD (flexible data rate)

#### Integrated protection increases robustness

- ◆  $\pm 58V$  fault-tolerant CANH and CANL
- ◆  $\pm 30V$  extended common-mode input range (CMR)
- ◆ Transmitter dominant timeout prevents lockup
- ◆ Undervoltage protection on VCC and VIO
- ◆ Thermal shutdown

#### Ideal passive behavior when unpowered

- ◆ Bus and logic terminals are high impedance (no load)
- ◆ Power up/down with glitch free operation on bus and RXD output

Low loop delay: 160ns (typical)

#### Two operation modes

- ◆ Normal high-speed mode
- ◆ Standby mode for low current consumption

3.3V to 5.5V logic-supply range

$-40^{\circ}C$  to  $+125^{\circ}C$  operating temperature

Available in SOIC(8) and DFN(8) packages

AEQ-100 Grade 1 qualified

### Applications

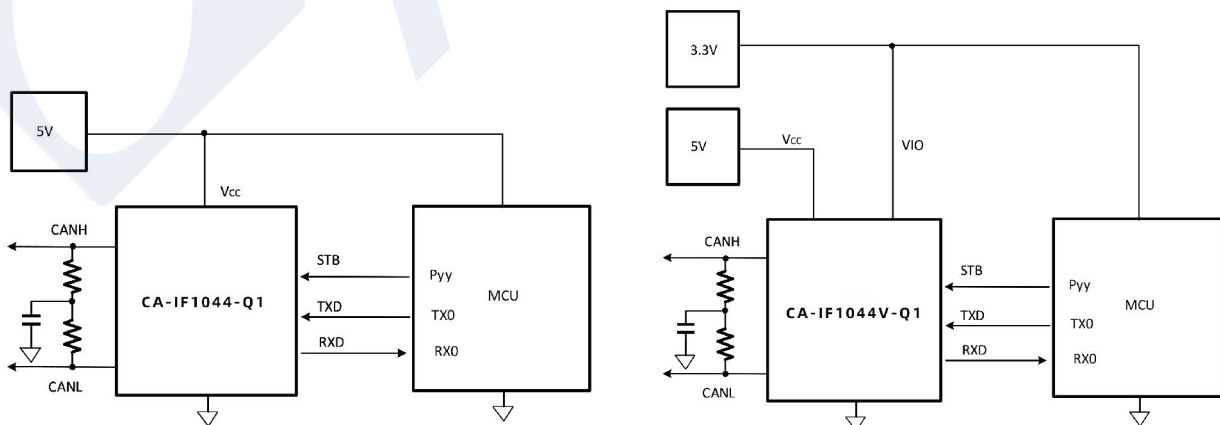
Automotive gateway

Advanced driver assistance system (ADAS)

Body electronics

Infotainment

### Simplified Schematic



# CA-IF1021-Q1

## ±58V Fault Protected LIN Transceiver with Inhibit and Wake-up

The CA-IF1021-Q1 device is Local Interconnect Network (LIN) transceiver with integrated protection for automotive applications. LIN is low-speed universal asynchronous receiver transmitter (UART) communication protocol used to support automotive networking. The CA-IF1021-Q1 transceiver controls the LIN bus state via the TXD input and reports the bus state on its open-drain output RXD. This device features slew-rate control and wave-shaping to reduce electromagnetic emissions (EME).

The CA-IS1021-Q1 is designed to support up to 12V applications with 5.5V to 27V wide input voltage operating range. Also, this device supports low-power sleep mode, as well as wake-up from low-power mode through LIN bus, or the WAKE\_N pin, SLP\_N pin. The CA-IS1021-Q1 allows battery power consumption reduction at system-level by selectively enabling the various power supplies that can be present on a node through the INH pin. The CA-IF1021-Q1 integrates ESD protection and fault protection which help to reduce external components in the applications. In the event of a ground shift or supply voltage disconnection, the device prevents back-feed current through LIN to the supply input.

### Key Features

**AEC Q-100 qualified for automotive applications**  
**Meets LIN2.0, LIN2.1, LIN2.2, LIN2.2A and ISO 17987-4:2016 (12V) physical layer (EPL) standards**  
**Compliant to SAE J2602-1 and SAE J2602-2 LIN physical layer specification**

**Support up to 12V Applications**

**Wide Operating Supply Range:**

- ◆ 5.5V to 27V supply range (V<sub>BAT</sub>)

**LIN Transmit Data Rate is up to 20kbps**

**Operating Mode**

- ◆ Normal operation
- ◆ Low-power standby mode
- ◆ Low-power sleep mode

**Wake-up from Low-power Mode Two operation modes**

- ◆ Remote wake-up event from LIN bus
- ◆ Local wake-up through WAKE\_N pin
- ◆ Wake-up via SLP\_N pin

**3.3V and 5V input logic compatible**

**Integrated Protection Increases Robustness**

- ◆ ±58V fault-tolerant LIN bus
- ◆ 42V load dump protection
- ◆ IEC ESD protection
- ◆ Undervoltage protection on V<sub>BAT</sub>
- ◆ Thermal shutdown

**-40°C to 150°C Junction Temperatures Range 125°C**

**Packages: SOIC8, DFN8**

### Applications

**Body electronics and lighting**

**Infotainment and cluster**

**Hybrid, electric & powertrain systems**

**Personal transport vehicles - Electric bike**

**Industrial transportation**

### Simplified Schematic

