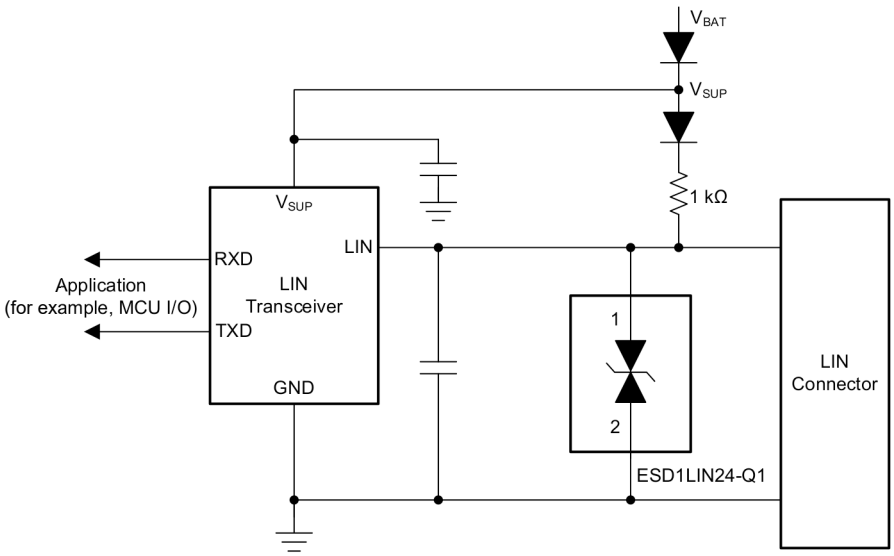
Product Overview

Creating Protection for LIN Expansion Bus

Local Interconnect Network (LIN) was developed to address the need for cost-effective networks to create communication between the devices where speed is not a critical requirement. LIN is a broadcasting, single wire, serial network protocol that supports communications up to 19.2Kbit/s at a bus length of 40 meters. LIN bus is typically a multi-point, low-cost communication line used for expansion within the peripheral devices in conjunction with the CAN bus in an automotive system.

LIN is a serial communication based, leader-follower network where a leader sends a header signal to up to 15 follower nodes which triggers the follower nodes to send a signal back to leader. This is referred to as a LIN cluster. LIN clusters can communicate with each other when connected via a CAN bus.



LIN Application Diagram

The LIN ESD diode is connected between the Ground and LIN bus, which in turn is pulled up to V_{BAT} as the previous image illustrates.

Design Considerations

- 24-V working voltage (V_{RWM}), high enough to account for a *jump start* condition and short-to-battery condition for a 12-V battery system.
- Requires a bidirectional diode to avoid any damage because of miswiring of the battery causing a negative DC voltage on the bus or line faults.
- Line capacitance low enough to provide the signal integrity of the LIN signal.
- Clamping voltage lower than the absolute maximum rating of the LIN pin (±60 V) of the transceiver.
- Low leakage allowing the diodes to conserve power when working below the V_{RWM}

Recommended Parts

CAN Device	Number of Channels	V_{RWM} (V)	IEC61000-4-2 Contact (kV)	Line Capacitance (pF)	Clamping Voltage (V)	Package Size (mm)
ESD1LIN24-Q1	1	24	30	3	37	SOD323 (2.50 x 1.20)
ESD751-Q1	1	24	22	1.6	36.5	SOD523 (1.60 x 0.80)
ESD761-Q1	1	24	15	1.1	36.3	X1SON (1.00 x 0.60)

For more devices, browse through the online parametric tool where you can sort by desired voltage, channel numbers, on-state resistance, and other features.

Target Applications and End Equipment

- Automotive head unit
- Seat comfort module
- Telematics control unit
- Medium and short range radar
- Body control module (BCM) and Zonal module

Learn More

- Texas Instruments, *System-Level ESD Protection Guide Selection Guide*
- Texas Instruments, *Protecting Automotive CAN Bus Systems from ESD Overvoltage Events Application Note*
- Texas Instruments, *ESD fundamentals, part 4: ESD capacitance Technical Article*
- Need additional assistance? Ask our engineer a question on TI E2E™ *ESD and TVS Protection Devices: Key Collateral and FAQs* ESD FAQs/Collateral

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