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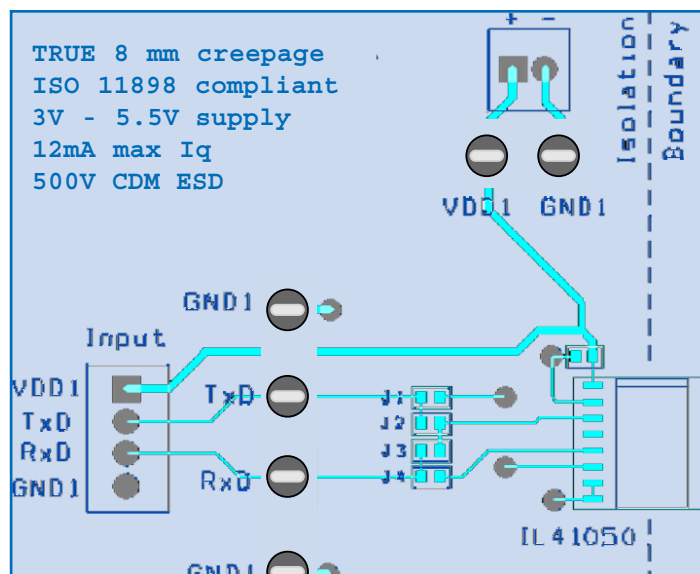
HY-LINE Power Components
Vertriebs GmbH
Inselkammerstr. 10
D-82008 Unterhaching
☎ +49 89/ 614 503-10
power@hy-line.de

HY-LINE AG
Hochstrasse 355
CH-8200 Schaffhausen
☎ +41 52 647 42 00
info@hy-line.ch



IsoLoop[®]

Isolated Wide-Body CAN Transceiver Evaluation Board



- IL41050TA
- IL41050TT

About This Evaluation Board

This Evaluation Board provides a complete isolated CAN node using either the popular IL41050TAE or the low-cost IL41050TTE wide-body isolated CAN transceivers.

IL41050-Series transceivers are galvanically isolated, CAN (Controller Area Network) transceivers designed as the interface between the CAN protocol controller and the bus.

Advanced features facilitate reliable bus operation. Unpowered nodes do not disturb the bus, and a unique non-volatile programmable power-up feature prevents unstable nodes. The IL41050TA also has a hardware-selectable silent mode that disables the transmitter.

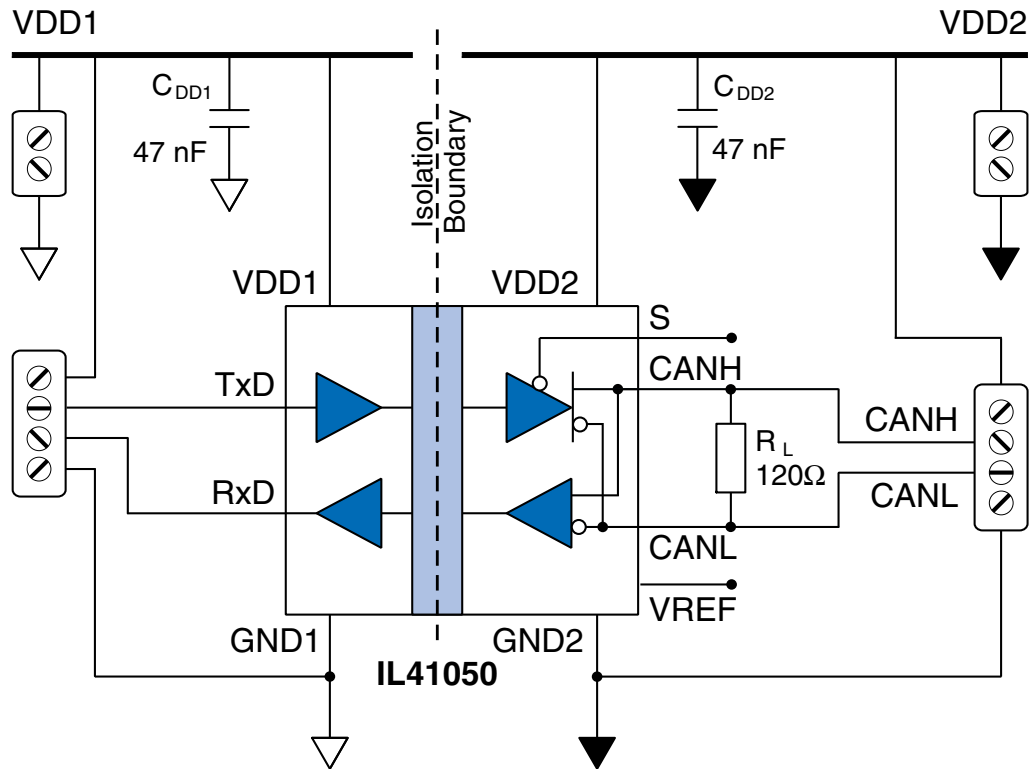
Unlike optocouplers or other isolation technologies, IsoLoop isolators have virtually indefinite barrier life.

Designed for harsh CAN and DeviceNet environments, IL41050 transceivers have transmit data dominant time-out, bus pin transient protection, a rugged Charged Device Model ESD rating, thermal shutdown protection, and short-circuit protection. Unique edge-triggered inputs improve noise performance.

NVE offers four CAN transceiver models:

Model	Max. Operating Temp.	Mbps	Key Features	Package
IL41050TTE	100°C	1	Low Cost	0.3" SOIC-16
IL41050TAE	125°C	1	Silent Mode	0.3" SOIC-16
IL41050TA-3E	125°C	1	Silent Mode; narrow-body package	0.15" SOIC-16
IL41050TA-1E	125°C	1	Silent Mode; ultraminiature QSOP	QSOP-16

Circuit Diagram



Symbol	IL41050 TA pin	IL41050 TT pin	Description
V_{DD1}	1	1	V_{DD1} power supply
GND_1	2,8	2,7,8	V_{DD1} power supply ground return
TxD	3	6	Transmit Data input
NC	4,6,7	4,5	No internal connection
RxD	5	3	Receive Data output
GND_2	9,15	9,10	Bus ground
V_{REF}	10	-	Reference voltage output (nominally 50% of V_{DD2})
CANL	12	12	Low level CANbus line
CANH	13	13	High level CANbus line
S	14	-	Mode select input (open or low for normal; high for silent)
GND_2	15	15	Bus ground
V_{DD2}	16,11	16	Bus power supply input
NC		11,14	No internal connection

Application Information

Evaluation Board Configurations

Jumpers J1, J2, J3, and J4 configure the inputs for either the IL41050TA or IL41050TT pinout. The S and V_{REF} pins are only available on the IL41050TA.

Power Supply Decoupling

Both V_{DD1} and V_{DD2} must be bypassed with 100 nF ceramic capacitors. These supply the dynamic current required for the isolator switching and should be placed as close as possible to V_{DD} and their respective ground return pins.

Input Configurations

The TxD input should not be left open as the state will be indeterminate. If connected to an open-drain or open collector output, a pull-up resistor (typically 16 k Ω) should be connected from the input to V_{DD1} .

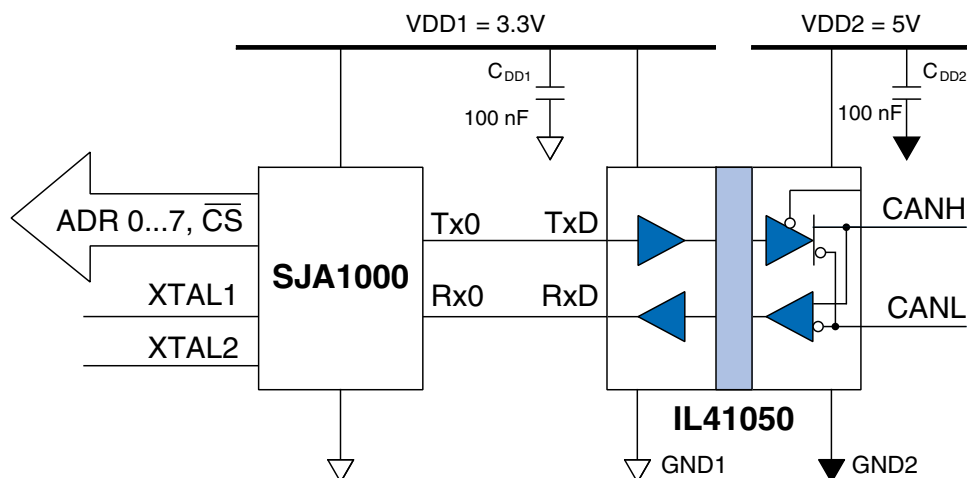
The Mode Select (“S”) input has a 150 k Ω nominal internal pull-down resistor. It can be left open or set low for normal operation.

Bus Termination

Because of their relatively low speed, CAN networks can sometimes be unterminated, but reflections are minimized by terminating both ends of the bus (but not every node). Two 120 Ω termination resistors are generally used to match a 60 Ω cable impedance. This kit comes with a 120 Ω termination resistor. The resistor can be removed for multi-node configurations.

Level Shifting

As shown in the figure below, the IL41050 can provide isolation and level shifting between a 5 volt CAN bus and a 3.3 volt microcontroller such as an SJA1000.



Application Information

IsoRxD Output

The IsoRxD output is an isolated versions of the RxD, which the chip provides for troubleshooting. Normally no connections are made to the pin.

Dominant Mode Time-out and Failsafe Receiver Functions

CAN bus latch up is prevented by an integrated Dominant mode timeout function. If the TxD pin is forced permanently low by hardware or software application failure, the time-out returns the RxD output to the high state no more than 765 μ s after TxD is asserted dominant. The timer is triggered by a negative edge on TxD. If the duration of the low is longer than the internal timer value, the transmitter is disabled, driving the bus to the recessive state. The timer is reset by a positive edge on pin TxD.

If V_{DD2} power is lost, the IL41050 asserts the RxD output high when the supply voltage falls below 3.8 volts. RxD will return to normal operation when V_{DD2} rises above approximately 4.2 volts.

Programmable Power-Up

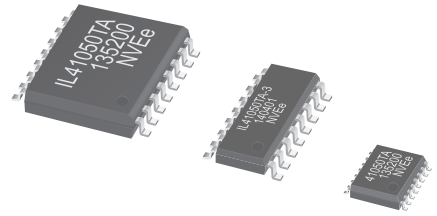
A unique non-volatile programmable power-up feature prevents unstable nodes. A state that needs to be present at node power up can be programmed at the last power down. For example if a CAN node is required to “pulse” dominant at power up, TxD can be sent low by the controller immediately prior to power down. When power is resumed, the node will immediately go dominant allowing self-check code in the microcontroller to verify node operation. If desired, the node can also power up silently by presetting the TxD line high at power down. At the next power on, the IL41050 will remain silent, awaiting a dominant state from the bus.

The microcontroller can check that the CAN node powered down correctly before applying power at the next “power on” request. If the node powered down as intended, RxD will be set high and stored in the IL41050’s non-volatile memory. The level stored in the RxD bit can be read before isolated node power is enabled, avoiding possible CAN bus disruption due to an unstable node.

Specification Highlights and Quickstart

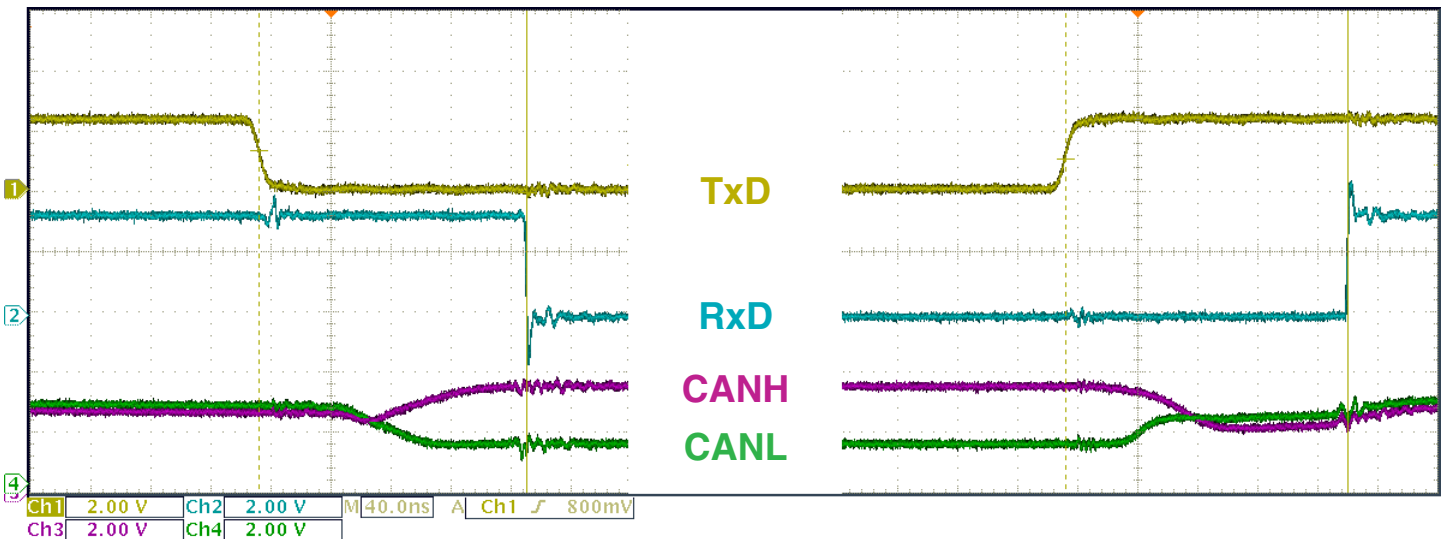
IL41050-Series Specification Highlights:

- Fully compliant with the ISO 11898 CAN standard
- 3.0 V to 5.5 V input power supplies
- 12 mA maximum quiescent recessive supply current
- 70 mA maximum bus-side dynamic supply current
- 2500 V_{RMS} isolation standard; 5000 V_{RMS} for IL41050TTV
- VDE V 0884-10 certified; UL 1577 recognized
- 1 Mbps
- 180 ns typical loop delay
- ±500 V CDM ESD
- 50 kV/μs transient immunity
- Unpowered nodes do not disturb the bus
- Edge triggered, non-volatile input improves noise performance
- Thermal shutdown protection
- Short-circuit protection for ground and bus power
- Silent mode and Vref options (IL41050TA)
- -55°C to +100°C standard operating temperature; 125°C for IL41050TA
- 0.3" True 8™ SOIC16 packages; IL41050TA also available in narrow SOIC16 or QSOP16



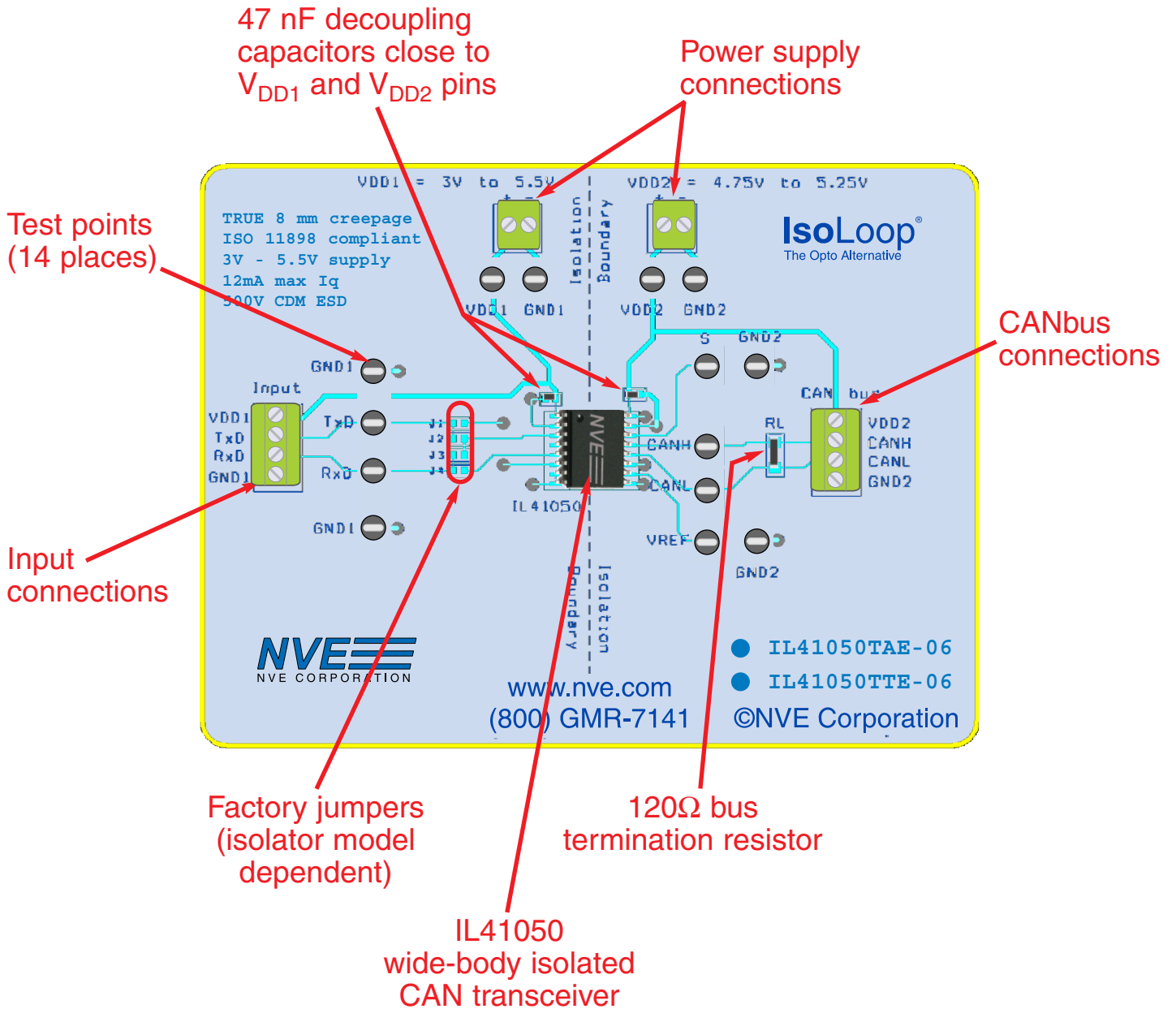
Quick Start:

- Connect V_{DD1} to a 3.3 V power supply and V_{DD2} to 5 V.
- Connect a 500 kHz (1 Mbps) signal generator to the “TxD” input.
- Verify the “RxD” and CAN outputs on an oscilloscope:



Visit www.IsoLoop.com for datasheets.

Evaluation Board Layout



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NVE Corporation
11409 Valley View Road
Eden Prairie, MN 55344-3617

Ihr Vertriebspartner:



HY-LINE Power Components
Vertriebs GmbH
Inselkammerstr. 10
D-82008 Unterhaching
☎ +49 89/ 614 503 -10
power@hy-line.de

HY-LINE AG
Hochstrasse 355
CH-8200 Schaffhausen
☎ +41 52 647 42 00
info@hy-line.ch

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