# electronics-lab

## 4 Channel SPI Interface Isolator with three Forward and One Reverse Direction Channels

The project described here is a Quad-channel digital isolator with 5000VRMS isolation ratings per UL 1577. The board has three forward and one reverse-direction channel which makes this project ideal for isolated SPI interface between microcontroller and subnode unit. The circuit provides isolation between the main SPI unit (microcontroller) and the SPI slave. It has high electromagnetic immunity, reduces noise, and high voltage traveling to the main unit. All the outputs are normally high, use ENABLE pins to disable the outputs. Connecting Enable 1 and Enable 2 pins to GND respective sides puts all outputs LOW and all outputs are disabled. If the input power or signal is lost then the output goes high. Level translation range: 2.25V to 5.5V

### 4-wire SPI devices have four signals, 3 Forward and One Reverse-Direction

- Clock (SPI CLK, SCLK)
- Chip select (CS)
- main out, subnode in (MOSI)
- main in, subnode out (MISO)

More info about SPI: https://www.analog.com/en/analog-dialogue/articles/introduction-to-spi-interface.html

The ISO7741 device is high-performance, quad-channel digital isolators with 5000 VRMS isolation ratings per UL 1577. This family includes devices with reinforced insulation ratings according to VDE, CSA, TUV and CQC. The ISO7741B device is designed for applications that require basic insulation ratings only. The ISO7741 device provide high electromagnetic immunity and low emissions at low power consumption, while isolating CMOS or LVCMOS digital I/Os. Each isolation channel has a logic input and output buffer separated by a double capacitive silicon dioxide (SiO2) insulation barrier. These devices come with enable pins which can be used to put the respective outputs in high impedance for multi-master driving applications and to reduce power consumption. The ISO7741 device has three forward and one reverse-direction channels.

#### Features

- Wide supply range: 2.25 V to 5.5 V Main SPI Side
- Wide supply range: 2.25 V to 5.5 V Subnode SPI Side
- Level Translation Range: 2.25V to 5.5V
- 2 X Power LED Main SPI side and Subnode Side
- 100 Mbps data rate
- Robust isolation barrier
- 100-year projected lifetime at 1500 VRMS working voltage
- Up to 5000 VRMS isolation rating
- Up to 12.8 kV surge capability
- ±100 kV/µs typical CMTI
- Default output high
- Wide temperature range: -55°C to 125°C
- Low power consumption, typical 1.5 mA per channel at 1 Mbps









- Low propagation delay: 10.7 ns typical (5-V Supplies)
- Robust electromagnetic compatibility (EMC)
- System-level ESD, EFT, and surge immunity
- ±8 kV IEC 61000-4-2 contact discharge protection across isolation barrier
- Low emissions
- PCB dimensions: 40.64 x 27.94mm





















#### PCB DIMENSIONS 40.64MM X 27.94MM

BOM						
NO	QNTY	REF	DESC.	MANUFACTURING	SUPPLIER	SUPPLIER PART NO
1	2	CN1,CN2	7 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5320-ND
2	2	C1,C3	10uF/10V SMD SIZE 1210 OR 1206	YAGEO/MUARATA	DIGIKEY	
3	2	C2,C4	0.1uF/50V SMD SIZE 0805	YAGEO/MUARATA	DIGIKEY	
4	2	D1,D2	LED RED OR GREEN SMD SIZE 0805	LITE ON INC	DIGIKEY	160-1427-1-ND
5	2	R1,R2	1K 5% SMD SIZE 0805	YAGEO/MUARATA	DIGIKEY	
6	1	R3	4K7 5% SMD SIZE 0805	YAGEO/MUARATA	DIGIKEY	
7	1	U1	ISO7741DWR	TI	DIGIKEY	296-47781-1-ND



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