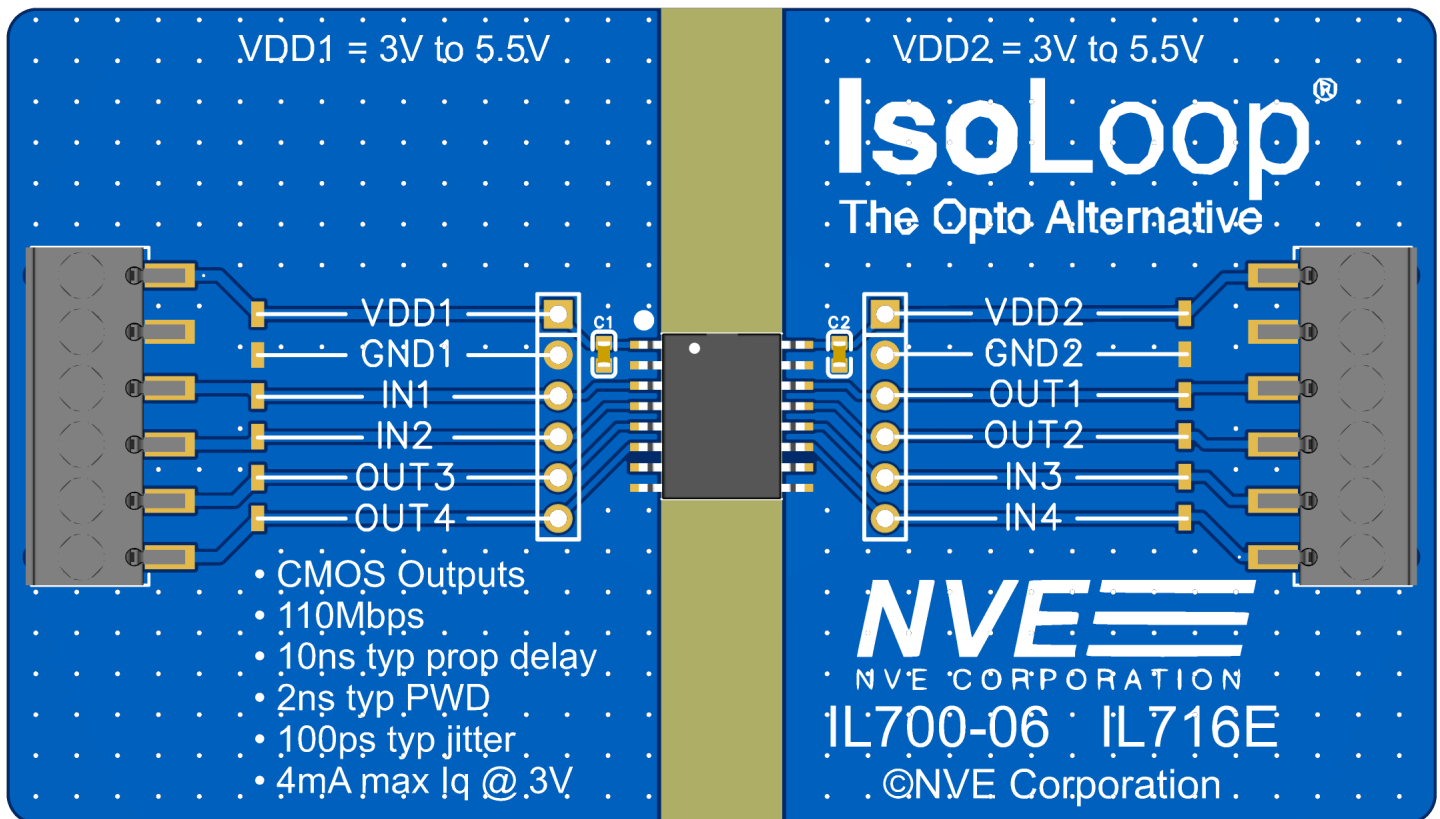


IL700-Series Isolator Evaluation Boards



About These Boards

These 2 x 3.5-inch (50 x 90 mm) boards contain your choice of an IL700/IL200-Series isolator, two bypass capacitors as recommended, as well as screw connections, test pads, and provisions for header pins.

The boards come with a variety of isolator channel configurations, variants, and package types.

IL700/IL200-Series Isolators use patented spintronic Giant Magnetoresistive (GMR) technology. The symmetric magnetic coupling barrier provides a typical propagation delay of only 10 ns and a pulse width distortion as low as 300 ps, the best of any isolator. And their real ceramic/polymer barriers last practically forever.

Available MSOP and QSOP packages are the world's smallest isolators.

IL700/IL200-Series Specification Highlights

- Up to 7 kVrms Isolation (V-Series)
- Up to 125°C (V-Series and T-Series)
- Up to 150 Mbps (S-Series)
- PWD to 300 ps (S-Series)
- 100 ps Typical Pulse Jitter
- 10 ns Typical Propagation Delay
- 4 ns Typical Prop. Delay Skew
- 44000 Year Barrier Life
- Reinforced Isolation (V-Series)
- IEC 60747-17 (VDE 0884-17):2021-10 Certified and UL1577 Approved
- ATEX and IECEx certified for IS-to-IS Intrinsically Safe applications
- MSOP, QSOP, SOIC, and PDIP Packages

Application Information

Why Isolate?

Isolation reduces noise, eliminates ground loops, and improves safety.

Applications

Popular IL700/IL200 applications include multiplexed data transmission, board-to-board communication, serial communications, and logic-level shifting.

Board Layout Speed Limitations

Circuit board traces should be as short as possible for best performance. Since the evaluation board was designed for ease of use and with test points, it may not provide maximum speed.

Electrostatic Discharge Sensitivity

This product has been tested for electrostatic sensitivity to the limits in the datasheet. However, all integrated circuits and boards should be handled with appropriate care to avoid damage. Damage caused by inappropriate handling or storage could range from performance degradation to complete failure.

Electromagnetic Compatibility

NVE isolators have the lowest EMC footprint of any isolation technology. The isolators' Wheatstone bridge configuration and differential magnetic field signaling ensure excellent EMC performance against all relevant standards. Integrated magnetic shielding makes the isolators robust in large external magnetic fields. These isolators are fully compliant with generic EMC standards EN50081, EN50082-1 and the umbrella line-voltage standard for Information Technology Equipment (ITE) EN61000.

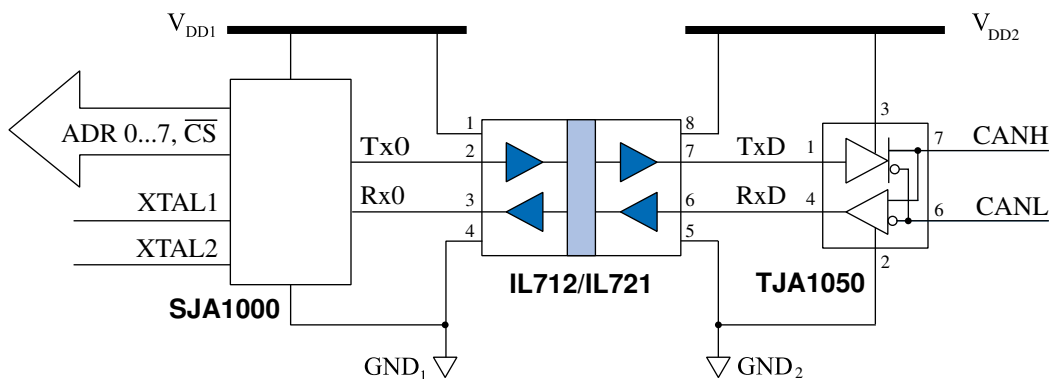
Power Supply Decoupling and Ground Planes

As shown on these boards, both isolator power supplies should be decoupled with 0.1 μF capacitors. Bypass capacitors should be as close as possible to the V_{DD} pins. Ground planes for both GND_1 and GND_2 are recommended for data rates above 10 Mbps. These boards have top and bottom ground planes, with the planes stitched together with vias.

Signal Status on Start-up and Shut Down

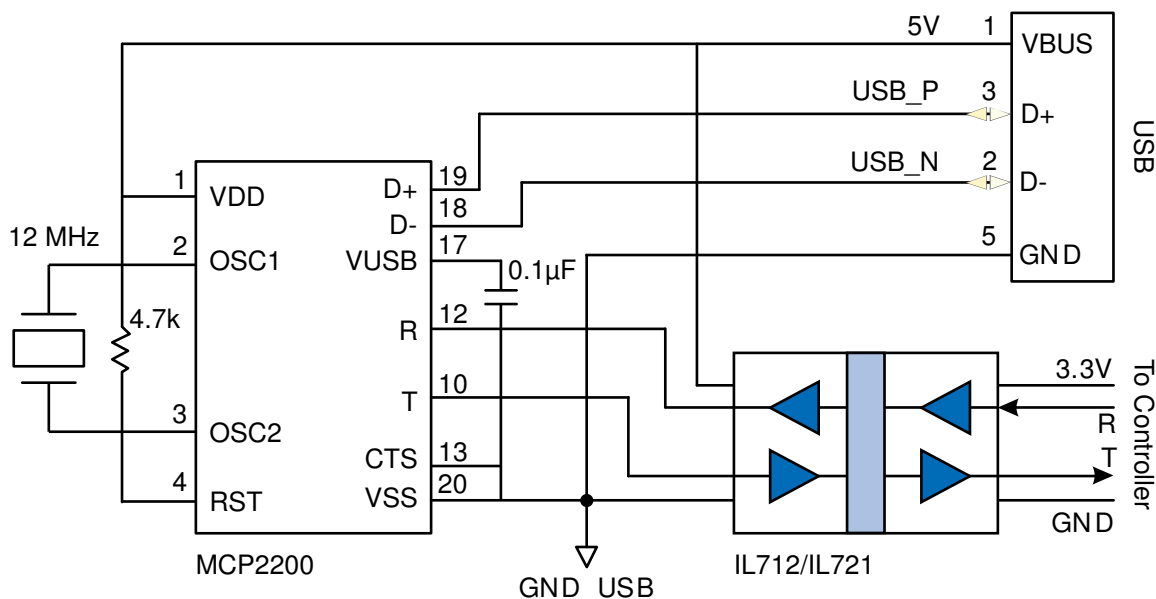
To minimize power dissipation, IL700 input signals are differentiated and then latched on the output side of the isolation barrier to reconstruct the signal. This could result in an ambiguous output state depending on power up, shutdown and power loss sequencing. Therefore, the designer should consider including an initialization signal in the start-up circuit. Initialization consists of toggling the input either high then low, or low then high.

Serial Interface Illustrative Applications



Isolating Standard CAN Transceivers

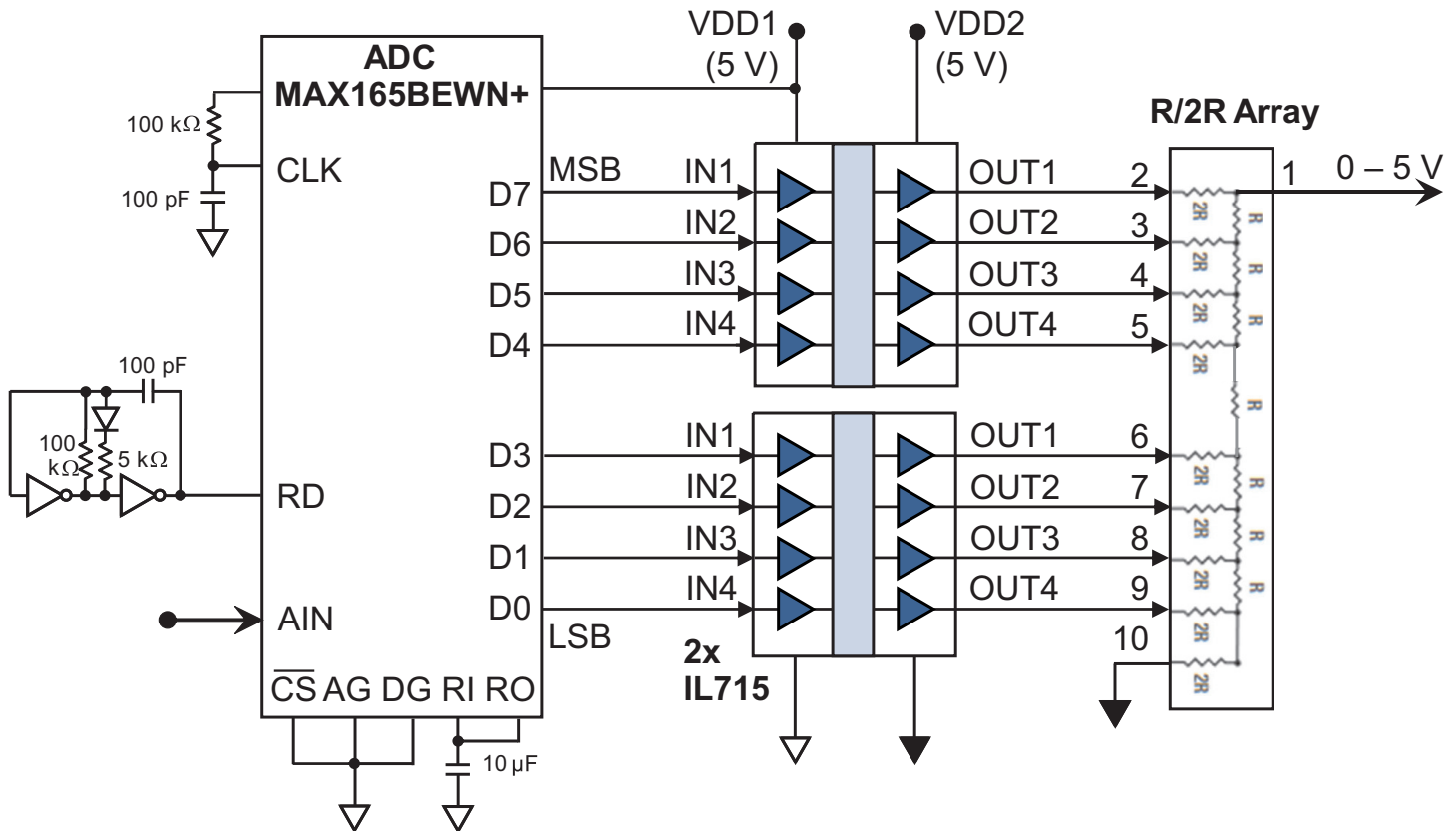
Isolating CANbus allows higher speed and more reliable operation by eliminating ground loops and reducing noise susceptibility. This simple circuit works with any CAN transceiver with a TxD dominant timeout, which includes all of the current-generation transceivers including the ubiquitous Philips/NXP TJA1050. Propagation delay is critical for CANbus, and the IL712 and IL721 bidirectional isolators have best-in-class propagation delay of 10 ns.



Isolated USB UART Using an IL712 or IL721

Isolating the input to a USB controller (rather than the bus lines) requires fewer isolation channels and is therefore usually the simplest solution, as shown above. The Microchip MCP2200 is a USB 2.0 to UART protocol converter.

Parallel Data Reference Design

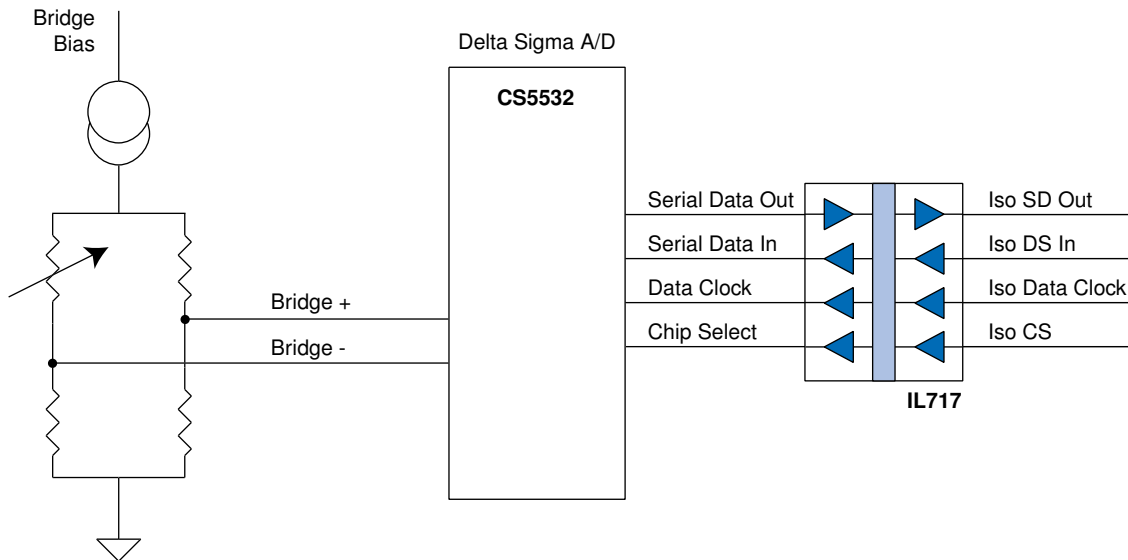


Isolated Parallel A-to-D-to-A Conversion Using IL715s

NVE isolators are ideal for isolating parallel data converters such as ADCs and DACs. This reference design is for high-speed, asynchronous analog-to-analog isolation with just a few chips, no microprocessor, and no software.

An eight-bit A-to-D converter measures the voltage, the data are isolated by a pair of four-channel isolators, then converted back to analog by a D-to-A converter. This circuit uses a simple astable oscillator as a sampling clock, with an ADC sampling rate over 100 kS/s. Since NVE isolators have rail-to-rail outputs, an inexpensive R/2R network as shown above can replace a DAC in many applications.

SPI Illustrative Applications

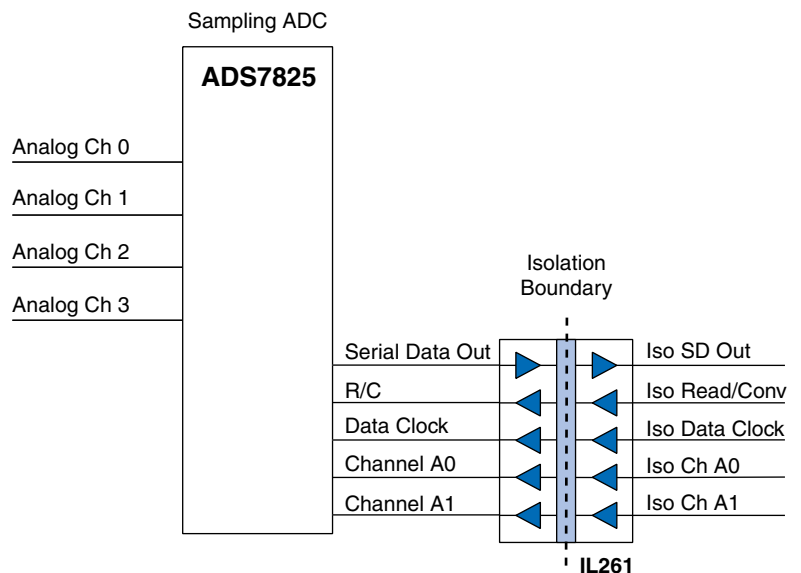


Single-Channel Isolated SPI Delta-Sigma A/D Converter Using IL717

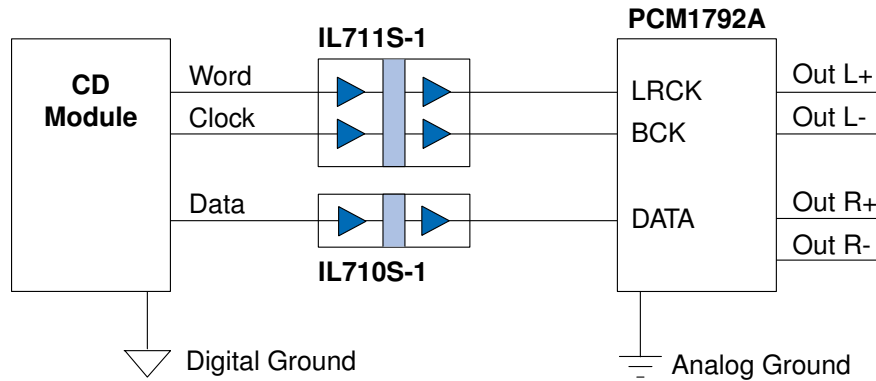
This circuit illustrates a typical single-channel delta-sigma isolated ADC SPI interface. The A/D is located on the bridge with no signal conditioning electronics between the bridge sensor and the ADC. In this case, the IL717 is the best choice for isolation. It isolates the control bus from the microcontroller. The system clock is located on the isolated side of the system.

Multi-Channel Isolated Sampling A/D Converter

The IL261 is ideal for isolating multi-channel sampling ADCs. Isolated channels A0 and A1 control the analog channel being sampled, while the three remaining IL261 I/O lines isolate the SPI interface.

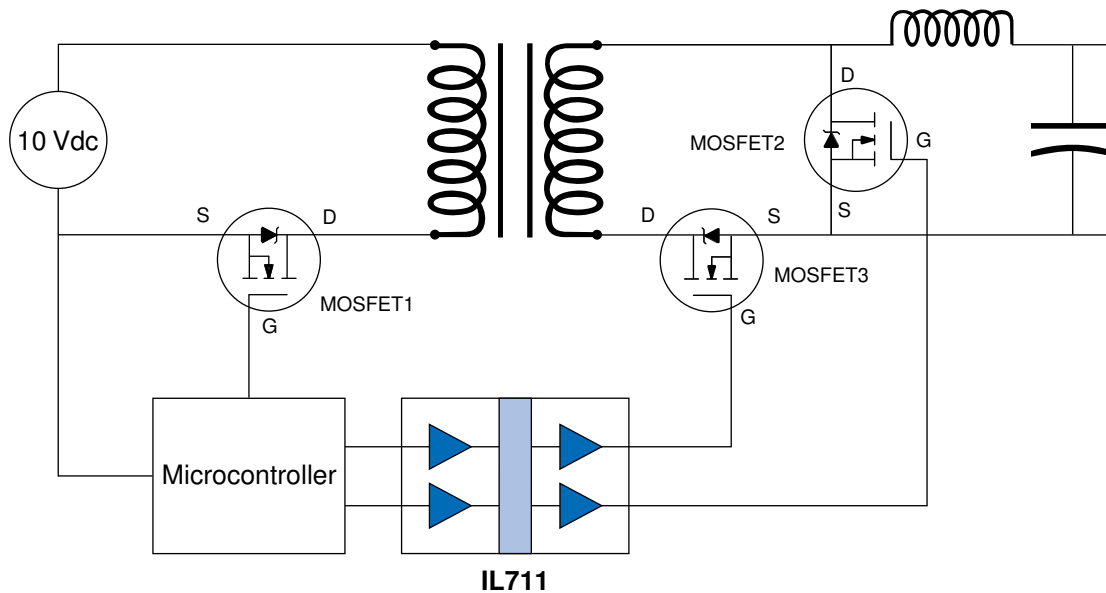


Other Illustrative Applications



Isolated I²S Using IL710/IL711

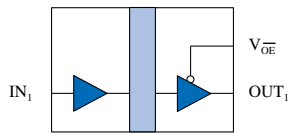
Isolating a CD transport DAC with an isolated Inter-IC Sound (I²S) bus eliminates ground loops. The IL700-Series isolators' precision edge placement (just 100 ps jitter) all but eliminates noise-induced phase error and hum in the analog side of the audio system.



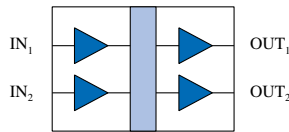
Intelligent DC-DC Converter With Synchronous Rectification

A typical primary-side controller uses an IL711 to drive the synchronous rectification signals from primary side to secondary side. Isolator pulse-width distortion as low as 0.3 ns minimizes MOSFET dead time and maximizes conversion efficiency.

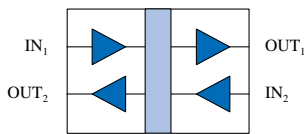
IL700/IL200 Series High-Performance Isolators



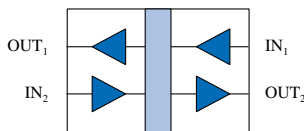
IL710



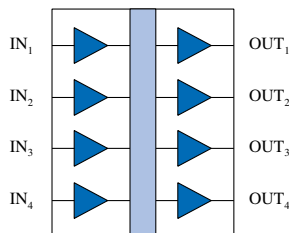
IL711



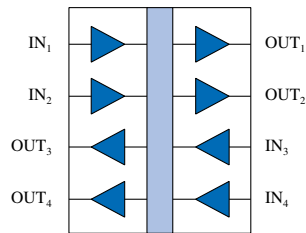
IL712



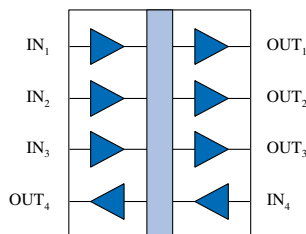
IL721



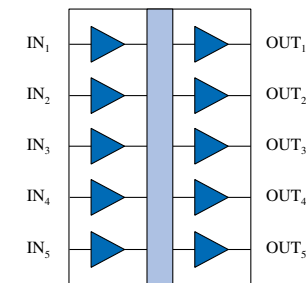
IL715



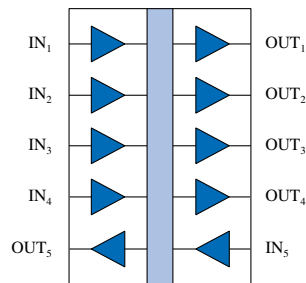
IL716



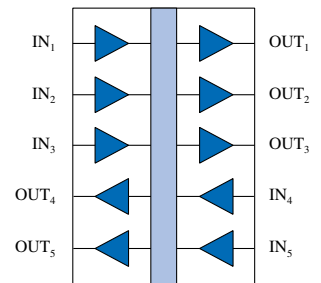
IL717



IL260



IL261



IL262

Premium Versions:

- **-I Series**

World's smallest isolators (MSOP-8 and QSOP-16)

- **S-Series**

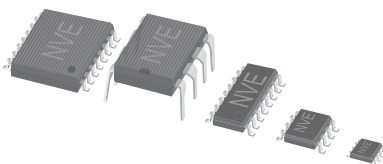
Fastest (150 Mbps) and lowest PWD (300 ps)

- **T-Series**

Highest operating temperature (125°C with no derating)

- **V-Series**

Highest isolation voltage (7 kVrms)



Parameters	Min.	Typ.	Max.	Units
Data Rate (S-Series)	100 (130)	110 (150)		Mbps
PWD (S-Series)		3 (0.3)	3	ns
Propagation Delay		10	15	ns
Propagation Delay Skew		4	6	ns
Pulse Jitter		100		ps
Transient Immunity	20	30		kV/μs
Temperature Range (T-Series)	-40		+100 (+125)	°C
IL200 Series	-40		+85	°C

For a selector guide, see: <https://www.nve.com/IsolatorProducts>

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