Data Sheet

Data bus isolators

RS stock number 208-355

The RS Data Bus Isolators are pulse transformers with high input to output isolation. They are designed to give an optimum pulse width capabilitiy at high repetition rates making them ideal for microprocessor bus isolation applications. Four isolators are housed in a single 16 pin dual-in-line package. Isolation of the data, address and control buses of microprocessor based equipment can be achieved easily and effectively, and with the addition of a dc-dc converter whole systems can be isolated one from the other.

The isolators have three important features:

1. They are inherently bi-directional.
2. They can be connected to invert or non-invert as desired.
3. The frequency response is ideal for high speed logic circuitry.

The first of these features is essential for data bus systems since data is inherently bi-directional in nature. The second is convenient when control lines need either invert or non-invert facilities. A good high frequency response is necessary for operation with modern high speed microprocessors.

The power demand of these devices is negligible and more particularly no external current limiting components are needed. Direct connection can be made to logic buffers and/or tri-state gates.

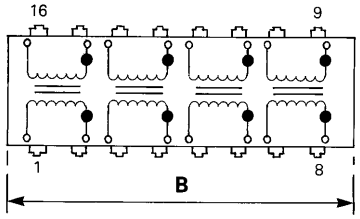
Absolute maximum ratings

Isolation breakdown voltage V_{BR}	500V rms
Insulation resistance at 500V dc R_{INS}	$>10^{10}\Omega$
Propagation delay	<5ns
Maximum pulse width at logic supply voltage	5µs
Maximum repetition rate at pulse width	(See Figure 2)
Storage temperature range	–40°C to +125°C
Operating free air temperature range	0°C to +70°C
Lead temperature (soldering) 1/16 inch from case for 10s	+300°C

Features

- Bi-directional
- Invert or non-invert
- Low power
- Low profile DIL package.

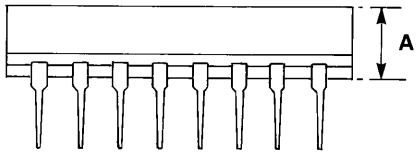
Package details



Standard 0.3in 16 pin dip

MAX. DIMENSIONS: A 6.35mm

B 21.84mm



DIL CASE MATERIAL - DAP

(DIALLYL PHTHALATE)

Electrical specifications over operating temperature range, 5V logic.

Parameter	Conditions	Min.	Typ.	Max.	Units
V_{IH} High level input voltage	Other terminal to GND	2.6			V
V_{IL} Low level input voltage	Other terminal to V_{CC}			0.5	V
V_{OH} High level output voltage	Other terminal to GND	2.4			V
V_{OL} Low level output current	Other terminal to V_{CC}			0.8	V
I_{IL} High level input current	Other terminal to V_{CC}			-15	mA
I_{IH} Low level input current	Other terminal to GND			15	mA

Switching characteristics Ta = 25°C, 5V logic

Parameter	Conditions	Min.	Typ.	Max.	Units
t_{pd} Propagation delay	LSTTL buffer drive			5	ns
t_{LPW} Low level pulse width	Other terminal to V_{CC}			5	µs
t_{HPW} High level pulse width	Other terminal to GND			5	µs

Figure 1 **Supply voltage/Pulse width**

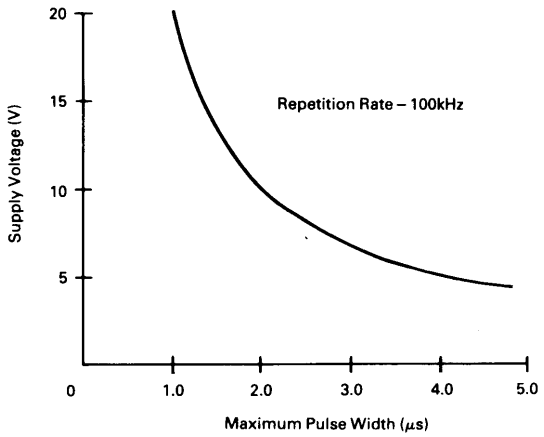
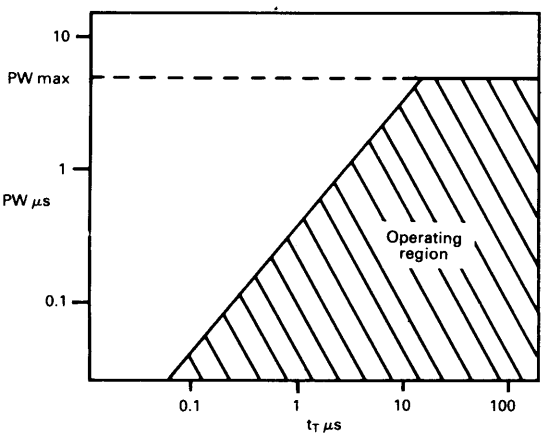


Figure 2 **Repetition rate/Pulse width**



Connection diagrams

Figure 3 **Non-inverted positive going pulses**

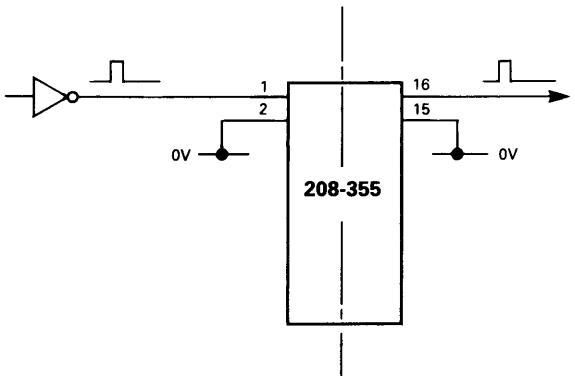


Figure 4 **Non-inverted negative going pulses**

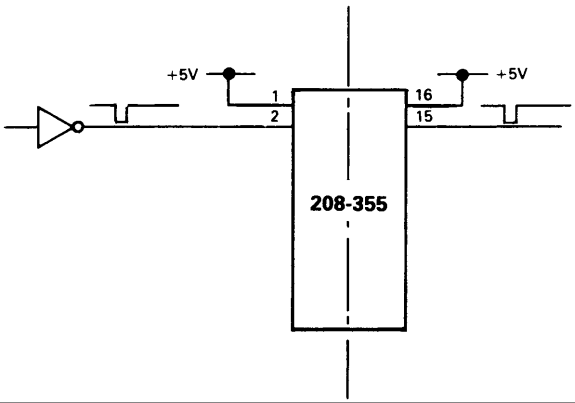


Figure 5 Inverted positive going pulses

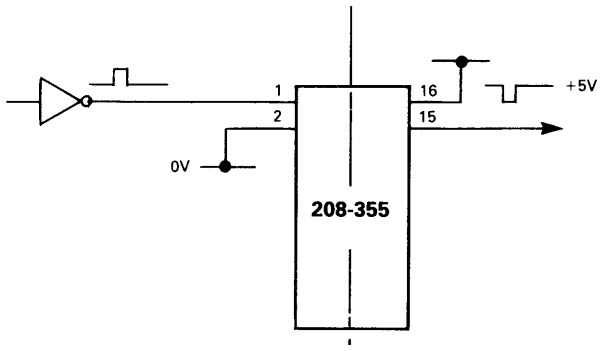
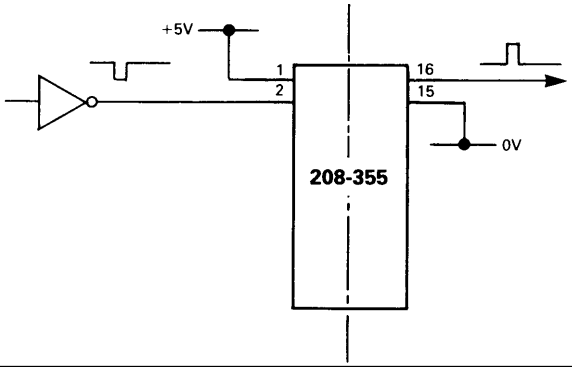


Figure 6 Inverted negative going pulses (recommended for LSTTL interfaces)

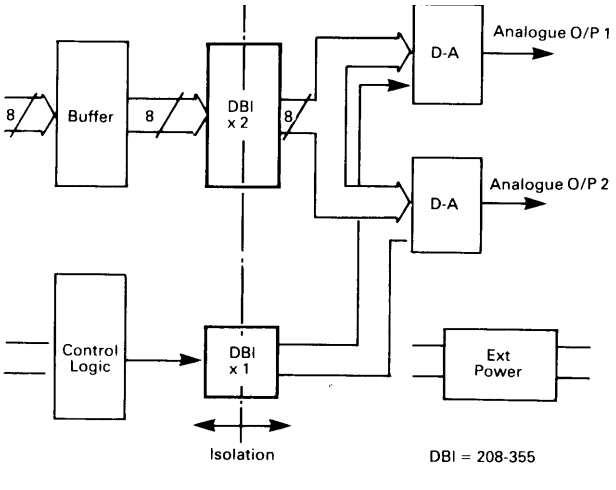


Data bus isolator applications

Isolated digital analogue output

The 8 bit data to be output to the D-A converters is latched into each of the converters via two Data Bus Isolators. The latching signals are also isolated via a Data Bus Isolator. If the isolated output circuitry is provided with an uninterruptible power source then 'level-freeze' can be accomplished should the system supplies fail. Common mode potentials can be present at the analogue outputs without affecting the system performance.

Figure 7 Isolated digital-analogue output

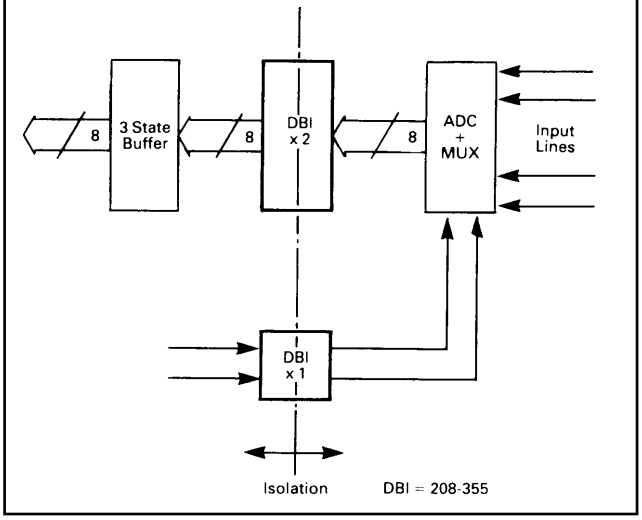


Isolated analogue-digital inputs

The multiplexer, amplifier and A-D converter of a typical data collection system can be isolated most effectively and with a minimal effect upon system accuracy by placing the isolation at the digital interface. The isolation is just before the 3-state buffers which place the converted data on to the system data bus. Control lines are isolated as required and a dc-dc converter supplies power for the isolated circuitry.

The whole 'front end' can now float to any local common mode potential present at the transducer under measurement while allowing an accurate conversion to take place. This approach is simpler and cheaper than the traditional 'flying capacitor' technique.

Figure 8 Isolated analogue-digital inputs



Isolated transceiver bus

Multi-microprocessor systems with different power supplies can suffer from latch-up and catastrophic failure problems at 'power-up' and if the supplies are more than a few hundred millivolts different from each other. Bus isolation is a simple and effective solution to such problems and as they are bi-directional the additional package count is low.

In the illustration two octal transceivers are isolated via a pair of Data Bus Isolators which effectively separates the two systems galvanically. Now either system can sit at any desired local potential and contention between different supplies during 'power-up' is not possible.

Figure 9 **Isolated transceiver bus**