

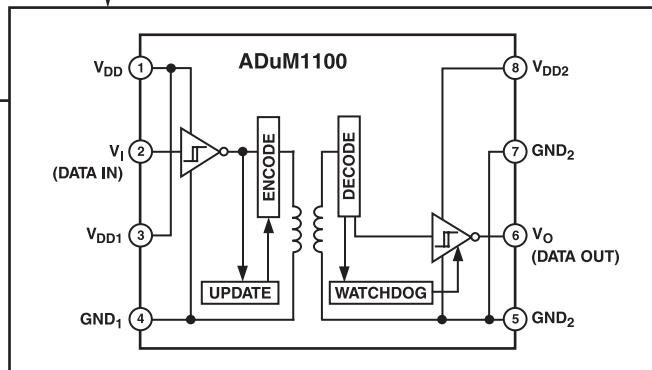
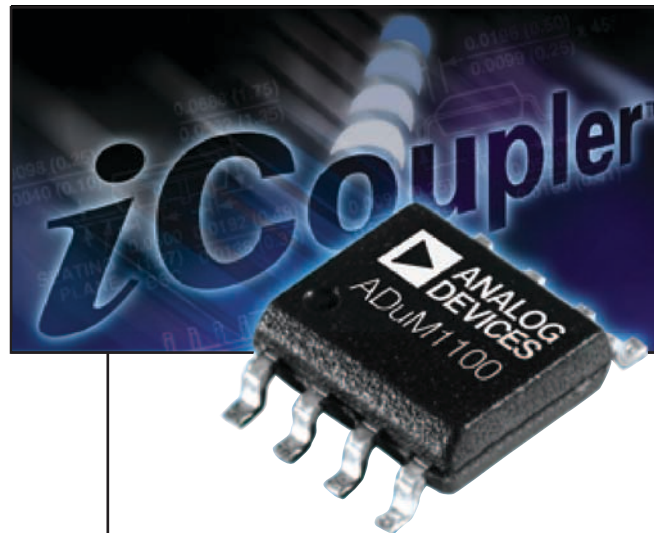
ADuM1100 Digital Isolator

Features

- High data rate:
dc to 100 Mbps (NRZ)
- Compatible with 3.0 V
to 5.5 V operation
(either side)
- Low power operation
(4.5 mA max at 25 Mbps)
- High transient immunity
(25 kV/ μ s min)
- Standard 8-lead
SOIC package
- High temperature
operation (100°C for
AR/BR grades, 125°C
for UR grade)
- UL, CSA, and VDE
regulatory approvals

Applications

- High speed optocoupler
replacement
- High temperature
isolation applications
- Digital fieldbus isolation
- Instrumentation/
data acquisition
- Microprocessor
interface



Innovative Solution Reduces Cost, Improves Performance

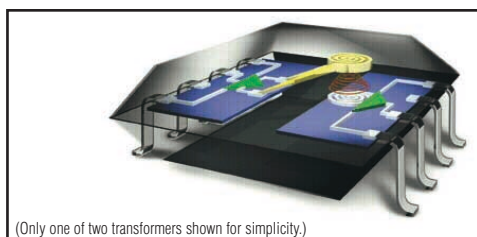
The ADuM1100 is a digital isolator based on Analog Devices' iCoupler® technology. Combining high speed CMOS and monolithic transformer technology, this digital isolator provides outstanding performance characteristics superior to optocoupler devices. Configured as footprint compatible replacements for existing high speed optocouplers, the ADuM1100 operates from 3.0 V to 5.5 V and supports data rates as high as 25 Mbps (AR grade) and 100 Mbps (BR and UR grades), respectively. Furthermore, the ADuM1100UR grade extends the maximum operating temperature from 100°C to 125°C.

The ADuM1100 boasts extremely low propagation delay, pulsewidth distortion, and power consumption. Unlike common transformer implementations, the ADuM1100 provides dc correctness with a patented refresh feature that continuously updates the output signal.

iCoupler Technology

The ADuM1100 consists of two CMOS dice assembled into a common package. Bond wires carry encoded digital input signals from the driver die to a pair of high-Q coils fabricated on top of the receiver die. In addition to these coils, the receiver die contains standard CMOS circuitry, a second pair of coils fabricated within the CMOS metal system, and an insulating barrier between the top and bottom coils. The input logic transitions are inductively coupled from the top to the bottom coils. The receiver electronics connected to the lower coils detect the logic transitions and provide a high fidelity, reconstructed signal at the output. The coils, insulation, and receiver electronics form a single monolithic assembly.

This patented approach to digital isolation offers the beneficial isolation properties of optocouplers, yet provides substantial improvements in terms of data rate, transient immunity, and signal fidelity characteristics. Furthermore, compared to existing high performance optocouplers, this is accomplished with lower power consumption and cost and over a wider range of temperature and supply voltage conditions. By adding a postprocessed superstructure to a standard semiconductor die, iCoupler channels are readily added to a wide variety of semiconductor products.



Optocoupler Performance, Cost, and Operating Condition Difficulties Eliminated

The iCoupler architecture, with its low loss micromachined coil, enables information transfer across an isolation barrier with much higher efficiency than can be achieved with electro-optical devices. This manifests itself in the ADuM1100's superior characteristics, shown below:

Parameter	Analog Devices ADuM1100 iCoupler	Agilent HCPL-0723 Optocoupler	Agilent HCPL-0721 Optocoupler	Agilent HCPL-0710 Optocoupler	Agilent HCPL-0611 Optocoupler	Agilent HCPL-0900/ IL710 GMR Isolators
Max. Data Rate (Mbps, min)	25/100	50	25	12.5	Not Specified	100
Supply Current at 10 Mbps (mA, max)	2	25	19	24	13	7 (typ)
Supply Voltage (V)	3.0–5.5	4.5–5.5	4.5–5.5	4.5–5.5	4.5–5.5	3.0–5.5
Propagation Delay (ns, max)	18	22	40	40	100	15
Pulsewidth Distortion (ns, max)	2	2	6	8	35	3
Propagation Delay Skew (ns, max)	6	16	20	20	40	6
Transient Immunity (kV/μs, min)	25	10	10	10	10	15/20
Input-Output Momentary Withstand Voltage (V_{rms})	2,500	2,500	2,500	2,500	2,500	2,500
DC Correctness	Yes	Yes	Yes	Yes	Yes	No
Temperature Range (°C)	–40 to +100/+125	–40 to +85	–40 to +85	–40 to +100	–40 to +85	–40 to +100

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